MEGANE

1 Engine and peripherals

13B DIESEL INJECTION

17B PETROL INJECTION

17C GAS INJECTION

XM0B - XM0C - XM0F - XM0G - XM0H - XM0J - XM0U

77 11 318 222 **NOVEMBER 2005** **EDITION ANGLAISE**

"The repair procedures given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The procedures may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed."

All rights reserved by RENAULT s.a.s.

Copying or translating, in part or in full, of this document or use of the service part reference numbering system is forbidden without the prior written authority of RENAULT s.a.s.

© Renault s.a.s. 2005

Engine and peripherals

Contents

Page

13B DIESEL INJECTION

Delphi DDCR Injection
Program No.: BE - Vdiag No.: 44 and 48

Introduction	13B-1
Fault finding log	13B-9
System operation	13B-11
Allocation of computer tracks	13B-19
Replacement of components	13B-22
Configuration and programming	13B-24
Fault summary table	13B-25
Interpretation of faults	13B-27
Conformity check	13B-86
Status and parameter summary table	13B-124
Interpretation of statuses	13B-126
Interpretation of parameters	13B-134
Dealing with command modes	13B-136
Tests	13B-138
Customer complaints	13B-151
Fault finding chart	13B-153

Siemens SID 301 Injection
Program No.: B1 - Vdiag No.: 44

Introduction	13B-1
Fault finding log	13B-6
Cleanliness guidelines	13B-8
System operation	13B-10
Allocation of computer tracks	13B-16
Replacement of components	13B-21
Configuration and programming	13B-24
Fault summary table	13B-25
Interpretation of faults	13B-27
Conformity check	13B-78
Status summary table	13B-116
Interpretation of statuses	13B-117
Parameter summary table	13B-134
Interpretation of parameters	13B-136
Dealing with command modes	13B-141
Customer complaints	13B-142
Fault finding chart	13B-145
Tests	13B-167

Page

13B DIESEL INJECTION

Delphi DCM 1-2 Injection
Program No.: 4D - Vdiag No.: 48

Introduction	13B-1
Fault finding log	13B-7
Cleanliness guidelines	13B-9
System operation	13B-11
Allocation of computer tracks	13B-19
Replacement of components	13B-23
Configuration and programming	13B-26
Fault summary table	13B-27
Interpretation of faults	13B-29
Conformity check	13B-91
Status summary table	13B-131
Interpretation of statuses	13B-132
Parameter summary table	13B-140
Interpretation of parameters	13B-142
Command summary table	13B-144
Tests	13B-145
Customer complaints	13B-159
Fault finding chart	13B-161

EDC16 Injection
Program No.: C1 - Vdiag No.: 44 - 48 and 4C

Introduction	13B-1
System operation	13B-8
Allocation of computer tracks	13B-16
Replacement of components	13B-19
Fault summary table	13B-22
Interpretation of faults	13B-25
Conformity check	13B-109
Status summary table	13B-147
Interpretation of statuses	13B-148
Parameter summary table	13B-173
Interpretation of parameters	13B-175
Command summary table	13B-181
Interpretation of commands	13B-182
Customer complaints	13B-195
Fault finding chart	13B-196
Component operation test	13B-203
Glossary	13B-205

Contents

13B DIESEL INJECTION

EDC16 Injection
Program No.: C1 - Vdiag: 50

	Page
Introduction	13B-1
Fault finding log	13B-6
Cleanliness guidelines	13B-8
System operation	13B-10
Allocation of computer tracks	13B-18
Replacement of components	13B-20
Fault summary table	13B-24
Interpretation of faults	13B-28
Conformity check	13B-135
Status summary table	13B-176
Interpretation of statuses	13B-177
Parameter summary table	13B-209
Command summary table	13B-212
Interpretation of commands	13B-213
Customer complaints	13B-227
Fault finding chart	13B-228
Test	13B-243
Glossary	13B-263

17B PETROL INJECTION

Sagem 3000 Injection
Program No.: A7 - Vdiag No.: 44

	Page
Introduction	17B-1
Fault finding log	17B-6
System operation	17B-8
Allocation of computer tracks	17B-13
Replacement of components	17B-16
Configuration and programming	17B-17
Fault summary table	17B-18
Interpretation of faults	17B-22
Conformity check	17B-86
Status summary table	17B-125
Interpretation of statuses	17B-127
Parameter summary table	17B-138
Interpretation of parameters	17B-140
Command summary table	17B-148
Interpretation of commands	17B-149
Help	17B-153
Customer complaints	17B-155
Fault finding chart	17B-156

S3000 injection
Program No.: AD - Vdiag No.: 4C

	Page
Introduction	17B-1
Fault finding log	17B-6
System operation	17B-8
Allocation of computer tracks	17B-22
Replacement of components	17B-27
Configuration and programming	17B-28
Fault summary table	17B-30
Interpretation of faults	17B-34
Conformity check	17B-119
Status summary table	17B-167
Interpretation of statuses	17B-169
Parameter summary table	17B-194
Interpretation of parameters	17B-196
Command summary table	17B-205
Interpretation of commands	17B-206
Customer complaints	17B-210
Fault finding chart	17B-211

Contents

Page

17C GAS INJECTION

Sagem Gas 3000 Injection
Program No.: AB - Vdiag: 08

Introduction	17C-1
System operation	17C-7
Allocation of computer tracks	17C-10
Replacement of components	17C-11
Configuration and programming	17C-12
Fault summary table	17C-13
Interpretation of faults	17C-14
Conformity check	17C-45
Status summary table	17C-66
Interpretation of statuses	17C-67
Parameter summary table	17C-73
Interpretation of parameters	17C-74
Command summary table	17C-78
Customer complaints	17C-86
Fault finding chart	17C-87

ABBREVIATIONS

ABBREVIATIONS	MEANING OF ABBREVIATION
ABS	Anti-lock braking system
ALP	Fault Finding Chart
APC	After ignition
AVC	Before ignition feed
BVA	Automatic gearbox
BVM	Manual gearbox
BVR	Sequential gearbox
CAN	Controller Area Network
AC	Air conditioning
CD	Compact disc
PAS	Power assisted steering (hydraulic)
DAE	Electric power assisted steering
DVD	Digital versatile disc
DTC	Fault finding code
EGR	Exhaust gas recirculation
ESP	Electronic Stability Program
GMV	Fan assembly
CNG	Compressed natural gas
LPG	Liquefied petroleum gas
HLE	High yield strength
MAG	Metal active gas (for welding steel)
MIG	Metal inert gas (for welding aluminium)
MR	Workshop repair manual
TN	Technical Note
OBD	On board diagnostics
SER	Resistance spot welding
SSPP	Tyre pressure monitoring system
THLE	Very high-tensile strength
TM	Labour time
UCH	UCH
UPC	Protection and switching unit
UCT	Roof control unit
UHLE	Ultra high yield strength
VIN	Vehicle identification number

DIESEL INJECTION
Fault finding - Introduction

1. SCOPE OF THIS DOCUMENT

This document presents the fault finding procedure applicable to all computers with the following specifications:

Vehicle(s): **MEGANE II, SCENIC II** for **K9K 722, 728 and 729** engines *Function involved:* **DELPHI K9 DIESEL DIRECT COMMON RAIL INJECTION (DDCR)**	*Computer name:* **DDCR INJECTION** *Program no.:* **BE** *N Vdiag:* **44, 48**

Following the appearance of the Pump repriming function on K9K engines, a new Vdiag has been issued.

When replacing a high pressure pump on vehicles fitted with a computer with Vdiag 44, it is essential to reprogram the injection computer to activate the Pump repriming function.

After reprogamming, Vdiag 44 is replaced by Vdiag 48.

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedures (this manual):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.

Wiring Diagrams:
– Visu-Schéma (CD-ROM), paper.

Type of diagnostic tools

– CLIP

Special tooling required

Special tooling required	
	Multimeter
Elé. 1590	112-track computer bornier
Elé. 1681	Universal bornier
Mot. 1711	Injector flow measuring kit

3. RECAP

Procedure

To run fault finding on the vehicle's computers, switch on the ignition in fault finding mode (**forced + after ignition feed**).

Proceed as follows:
- Put the vehicle card in the card reader.
- Press and hold start button (longer than **5 seconds**) with start-up conditions not fulfilled.
- Then connect the diagnostic tool and perform the desired operations.

Note:
The left-hand and right-hand xenon bulb computers are powered when the dipped headlights are lit. Therefore fault finding can only be carried out on them after the ignition has been switched on in fault finding mode (**forced + after ignition feed**) and the dipped headlights have been switched on.

To **cut off + after ignition**, proceed as follows:
- disconnect the diagnostic tool,
- Press the start button twice briefly (less than **3 seconds**),
- Ensure that the + after ignition feed has been cut off by checking that the computer indicator lights on the instrument panel have gone out.

Faults

Faults are declared as either present or stored (depending on whether they appeared in a certain context and have disappeared since, or whether they remain present but have not been diagnosed within the current context).

The **present** or **stored** status of the faults must be taken into consideration when the diagnostic tool is used after the + after ignition feed has been switched on (without operation of any system components).

For a **present fault,** apply the procedure described in the Interpretation of faults section.

For a **stored fault**, note the faults displayed and apply the instructions in the Notes section.

If the fault is **confirmed** when the Notes are applied, the fault is present. Deal with the fault

If the fault is **not confirmed**, check:
- the electrical lines which correspond to the fault,
- the connectors on these lines (corrosion, bent pins, etc.),
- the resistance of the component detected as faulty,
- the condition of the wires (melted or split insulation, wear).

Or use the fault finding to check the circuit of the faulty component.

Conformity check

The aim of the conformity check is to check statuses and parameters that do not produce a fault display on the diagnostic tool when they are inconsistent. Therefore, this phase is used to:

Run fault finding on faults that do not have a fault display, and which may correspond to a customer complaint.
– Check that the system is operating correctly, and that there is no risk of a fault recurring after repair.
– This section features the fault finding procedures for statuses and parameters, and the conditions for checking them.

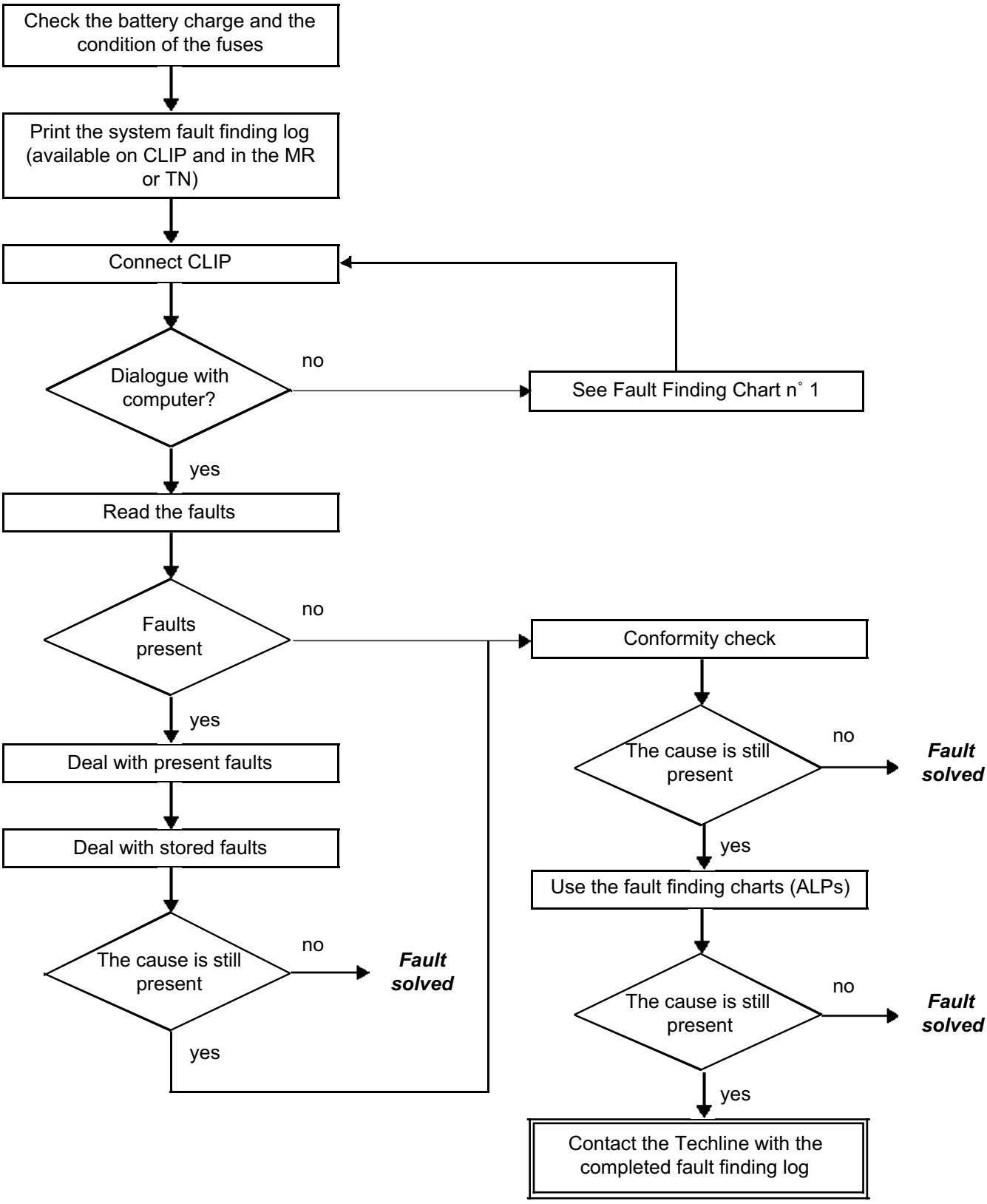
If a status is not operating normally or a parameter is outside permitted tolerance values, you should consult the corresponding fault finding page.

Customer complaints - Fault finding chart

If the diagnostic tool check is correct, but the customer complaint persists, it should be dealt with according to the customer complaint.

A summary of the general procedure to follow is provided on the following page in the form of a flow chart.

4. FAULT FINDING PROCEDURE



4. FAULT FINDING PROCEDURE (continued)

Wiring check

Fault finding problems
Disconnecting the connectors and/or manipulating the wiring harness may temporarily remove the cause of a fault.
Electrical measurements of voltage, resistance and insulation are generally correct, especially if the fault is not present when the analysis is made (stored fault).

Visual inspection
Look for damage under the bonnet and in the passenger compartment.
Carefully check the fuses, insulators and wiring harness routing.
Look for signs of oxidation.

Tactile inspection
While manipulating the wiring harness, use the diagnostic tool to note any change in fault status from stored to present.
Make sure that the connectors are properly locked.
Apply light pressure to the connectors.
Twist the wiring harness.
If there is a change in status, try to locate the source of the fault.

Inspection of each component
Disconnect the connectors and check the appearance of the clips and tabs, as well as the crimping (no crimping on the insulating section).
Make sure that the clips and tabs are properly locked in the sockets.
Make sure that no clips or tabs have been dislodged during connection.
Check the clip contact pressure using an appropriate model of tab.

Resistance check
Check the continuity of entire lines, then section by section.
Look for a short circuit to earth, to **+ 12 V** or to another wire.

If a fault is detected, repair or replace the wiring harness.

5. FAULT FINDING LOG

IMPORTANT!

NOTE
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the procedure, enables you to keep track of the procedure which is carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE COMPULSORY TO COMPLETE A FAULT FINDING LOG
EVERY TIME A FAULT FINDING PROCEDURE IS PERFORMED

You will always be asked for this log:
– when requesting technical assistance from the Techline,
– for approval requests when replacing parts for which approval is obligatory,
– to be enclosed when returning monitored parts on request. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY ADVICE

All work on components requires that the safety rules be respected to prevent damage or injury:
– Make sure that the battery is properly charged to avoid damaging the computers with a low load.
– Use the appropriate tools.

7. CLEANLINESS ADVICE THAT MUST BE OBSERVED WHEN WORKING ON THE HIGH PRESSURE DIRECT INJECTION SYSTEM

Risks relating to contamination:

The high pressure direct injection system is highly sensitive to contamination. The risks associated with contamination are:
– damage to or destruction of the high pressure injection system,
– components jamming,
– a component leaking.

All After-Sales operations must be performed under very clean conditions.
Carrying out an operation under very clean conditions means that no impurities (particles a few microns in size) should get into the system during dismantling.

The cleanliness principle must be applied from the filter to the injectors.

IMPORTANT
BEFORE CARRYING OUT ANY WORK ON THE INJECTION SYSTEM, CHECK WITH THE DIAGNOSTIC TOOL:
– that the rail is depressurised,
– that the fuel temperature is not too high.

What are the causes of contamination?
– metal or plastic swarf,
– paint,
– fibres: from cardboard boxes,
from brushes,
from paper,
from clothing,
from cloths.
– foreign bodies such as hair,
– ambient air,
– etc.

NOTE
It is forbidden to clean the engine using a high pressure cleaner because of the risk of damaging connectors. In addition, moisture may collect in the connectors and create electrical connection faults.

Advice to be followed before any operation

Protect the accessories and timing belts, the electrical accessories (starter, alternator, electric power assisted steering pump) and the coupling face to prevent diesel fuel spilling onto the clutch assembly.

Check that you have plugs for the unions to be opened (set of plugs available from the Parts Department). The plugs are single-use only. After use, they must be discarded (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must be discarded.

Ensure that you have hermetically resealable plastic bags for storing removed parts. There is less risk that the parts will be exposed to impurities if they are stored in this way. These are single-use bags; after use they must be discarded.

Use lint free cleaning cloths (Part no. **77 11 211 707**). Using normal cloth or paper is prohibited. They are not lint-free and could contaminate the fuel circuit. Each cloth should only be used once.

Use fresh cleaning agent for each operation (used cleaning agent is contaminated). Pour it into an uncontaminated container.

For each operation, use a clean brush in good condition (the brush must not shed its bristles).

Use a brush and cleaning agent to clean the unions to be opened.

Blow compressed air over the cleaned parts (tools, workbench, and the parts, unions and injection system sections). Check that no bristles remain.

Wash your hands before and during the operation if necessary.

When wearing leather protective gloves cover them with latex gloves to prevent contamination.

Instructions to be followed during the operation

As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Department. They must not be reused under any circumstances.

Close the hermetically sealed bag, even if it has to be reopened shortly afterwards. Ambient air carries impurities.

All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been plugged.

Using a brush, cleaning agent, air gun, sponge or normal cloth is strictly prohibited once the circuit has been opened. These items are likely to allow impurities to enter the system.

A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

FAULT FINDING LOG

System: Injection

List of monitored parts: ***Computer***

Administrative identification

Date	2 0
Log completed by	
VIN	
Engine	
Diagnostic tool	CLIP
Update version	

Customer complaint

☐	579	Does not start - fault	☐	570	Stalling - cold starting faults	☐	571	Stalling - warm starting faults
☐	586	Injection/preheating warning light on	☐	572	Idling - unstable engine speed	☐	574	Bucking/flat spots
☐	573	Loss of power	☐	520	Abnormal noise, vibrations	☐	576	Smoke - exhaust odours
☐	569	Starting faults						

Other — Your comments:

Conditions under which the customer complaint occurs

☐	001	When cold	☐	005	While driving	☐	008	Under deceleration
☐	002	When hot	☐	006	When changing gear	☐	009	Sudden fault
☐	003	When stationary	☐	007	Under acceleration	☐	010	Gradual deterioration
☐	004	Intermittently						

Other — Your comments:

Documentation used in fault finding

Fault finding procedure used	
Type of diagnostic manual:	Workshop Repair Manual ❑ Technical Note ❑ Assisted fault finding ❑
Fault finding manual no:	
Wiring diagram used	
Wiring Diagram Technical Note No:	
Other documentation	
Title and/or part number:	

RENAULT

FD 01
Fault finding log

FAULT FINDING LOG

System: Injection

Computer identification and parts exchanged for the system

Part 1 part no.	
Part 2 part no.	
Part 3 part no.	
Part 4 part no.	
Part 5 part no.	

To be read with the diagnostic tool (Identification screen):

Computer part no.	
Supplier no.	
Program no.	
Software version	
Calibration no.	
VDIAG	

Faults found with the diagnostic tool

Fault no.	Present	Stored	Fault name	Specification

Conditions under which fault occurs

Status or parameter no.	Parameter name	Value	Unit

System-specific information

Description:

Additional information

What factors led you to replace the computer? What other parts were replaced?	
Other defective functions?	
Your comments:	

RENAULT

FD 01
Fault finding log

System outline

The DDCR injection system used on the K9 engine is an electronically managed high pressure injection system. The fuel is compressed by a high pressure pump then stored in a rail that feeds the injectors. Injection occurs when a current pulse is applied to the injector holders.
The injected flow is proportional to the rail pressure and to the applied pulse length, and the start of injection is phased with the start of the pulse.

The circuit comprises two subsystems, which are distinguished by the fuel pressure level:
- The low pressure system includes the tank, diesel fuel filter, transfer pump and injector holder return pipes.
- The high pressure circuit contains the high pressure pump, the rail, the injector holders and the high pressure tubes.

Finally, there are a certain number of sensors and regulating actuators for controlling and monitoring the entire system.

Functions provided

Function: Fuel supply management (advance, flow and pressure).

Quantity of fuel injected and injection advance setting

The injection checking parameters are the quantities to be injected and their respective advance.
These are calculated by the computer using signals from the following sensors:
Engine speed (Crankshaft + Cam lobe for synchronisation)
Accelerator pedal
Turbocharging pressure and air temperature (Turbocharger pressure)
Coolant temperature
Air temperature
Air load (Flow and Pressure)
Rail pressure
Flowmeter
Turbocharging solenoid valve

The quantities to be injected and their respective advance are converted into:
a reference tooth
the time between this tooth and the start of the pulse
the time the supply to the injector holder is active
An electrical current (pulse) is sent to each injector holder according to previously calculated data. The system makes one or two injections (1 pilot injection, 1 main injection). The main principle is to calculate an overall injected flow which will then be distributed in the main injection flow, and a control injection flow to enable combustion to work properly and to reduce pollutant emissions.
An accelerometer is used to monitor some of the fuel injection deviation. This has several functions:
Protecting the engine by detecting injection leaks (disabled on the basic vehicle).
Checking the pilot quantity by measuring deviation and dispersion.

By changing both the injection duration and advance, the quantity of fuel injected and the mixture's moment of ignition can be readjusted.

Rail pressure check

The quality of combustion is influenced by the size of the atomised droplets in the cylinder.
In the combustion chamber, smaller fuel droplets will have time to burn fully, and will not produce smoke or unburned particles. To meet the pollution requirements, the droplet size, and therefore the size of the injection holes must be reduced.
With smaller holes, less fuel will be able to be introduced at a given pressure, which limits the power. To handle this drawback, the injected fuel flow has to be increased, which means a pressure increase (and more apertures on the injector nozzles). For the DDCR injection system, the pressure reaches **1400 bar** in the rail, and must be constantly regulated. The measuring circuit comprises an active pressure sensor on the rail connected to an analogue port on the computer.
The high pressure pump is supplied at low pressure (**5 bar**) by a built-in transfer pump. It supplies the rail, the pressure of which is controlled by the fuel flow actuator for loading, and for discharging by the injector valves. This compensates for pressure drops. The filling actuator enables the high pressure pump to supply just the exact quantity of diesel fuel required to maintain the rail pressure. This mechanism minimises the heat generated and improves engine output.
In order to discharge the rail using the injector valves, the valves are actuated by short electrical pulses which are:

- short enough not to open the injector (and pass through the return circuit from the injectors),
- long enough to open the valves and discharge the rail.

The fuel surplus is sent back to the fuel filter or the tank, according to its flow. If there is no IMV control, the rail pressure is limited by a discharge valve fitted on the pump.

Idling speed regulation

The computer handles the calculation of idling speed. This has to take account of the instantaneous power level to be supplied, according to the following factors:

- Engine coolant temperature.
- Gear ratio engaged.
- Battery charge.
- Electrical consumers (Heating elements, Air conditioning, Fan assembly, Heated windscreen, etc.) active or inactive,

Individual injector correction (C2I)

The DDCR system injectors must be calibrated with corrective values to adjust their flow precisely. Each injector is calibrated for different pressures on a test bench, and its specifications are shown on a label attached to the body of the injector holders. These individual correction values are then written to the computer EEPROM, which can then actuate the injectors by taking into account their manufacturing dispersion.

Measuring the angular position (Cylinder reference sensor)

The angular position is measured using a magneto-inductive sensor activated by machined teeth on the crankshaft flywheel. This flywheel has 60 teeth separated by six degrees minus 2 missing teeth, that form a notch.
A second sensor (Hall effect) activated by a machined tooth on the high pressure pump drive pulley (synchronised with the camshaft) and which rotates at half the engine speed, supplies an injection cycle running signal. By comparing the signals from these two sensors, the computer's APS module (Angular Position Subsystem) can supply the entire system with the synchronisation factors, which are: the angular position of the flywheel, the engine speed, the number of the active injector and the injection cycle advance. This module also supplies the system with the engine speed signal.

Flow capacity function (VLC)

Because of the combination of several parameters such as the diesel fuel temperature, part wear, clogging of the diesel filter etc., the system limit may be reached during its service life. If this happens, the rail pressure cannot be maintained because the pump lacks the necessary capacity. If the pump lacks the necessary capacity, this programming will therefore reduce the requested flow to a value that will enable the pressure monitoring system to control the pressure again.
The customer may have noticed a loss of vehicle performance when this program is activated (confirmed by **ET563 Flow capacity function**). **This is part of normal operation.**

Function: Air flow management.

EGR valve control

The EGR system (Exhaust gas recirculation) comprises a proportional EGR valve, with a built-in valve position feedback potentiometer. The EGR valve position is controlled by the potentiometer in a closed loop and/or by changes in the estimated air flow.

Calculating the air flow

WITHOUT FLOWMETER (K9K 722)

Certain models are not fitted with air flowmeters. In this case the amount of fresh inlet air must be evaluated, based on the values supplied by the surrounding systems.

The (theoretical) air volume is calculated using a model with various calculation parameters, which are:
- the inlet air temperature measured by a sensor located after the turbocharger and/or after the exchanger (if fitted),
- the turbocharging pressure,
- the atmospheric pressure (external air),
- the EGR valve position,
- the fuel flow,
- the engine speed.

The atmospheric pressure sensor is optional. If fitted, it sends back an atmospheric pressure signal to an analogue port on the micro-controller. If not, atmospheric pressure is found from the turbocharger pressure and the engine field.

WITH FLOWMETER (K9K 728)

The flow of fresh air entering the engine is given by a hot wire ratiometric sensor. This flowmeter is used to manage the amount of exhaust gas to be recirculated to ensure optimum recirculation rates. A fresh air temperature sensor is built into the flowmeter.
Air flow measurement allows closed-loop control via the EGR valve.
Besides electrical faults with the sensor, there is a consistency test between the measured air flow and an estimated air flow without EGR.
This flow evaluates the amount of fresh inlet air, based on the values supplied by the surrounding systems, which are:

- the inlet air temperature measured by a sensor located after the turbocharger and/or after the exchanger (if fitted),
- the turbocharging pressure,
- the engine speed.

Pre-postheating actuation

Pre-postheating actuation consists of controlling the heater plugs and preheating warning light on the instrument panel. The heater plugs are activated by relays, and the power is supplied from the battery. After the ignition is switched on. Preheating is activated for a period of time. The warning light is lit for the activation period which is dependent on the battery voltage, atmospheric pressure and coolant temperature. If the temperature is below a certain threshold, a postheating function can be used to improve the combustion stability, and consequently engine operation (reducing unburnt particles and pollutant emissions).

Turbocharger control solenoid valve actuation

The turbocharger system comprises a solenoid valve that is used to actuate the vanes (or wastegate) to create an overpressure or an underpressure in the inlet circuit.

Functions included

Air conditioning management assistance

For vehicles with air conditioning, the DDCR system can switch off the air conditioning in certain engine operating conditions:

- when requested by the driver,
- when starting the engine,
- if the engine overheats (in order to reduce the power the engine has to supply),
- when the engine speed is kept at a very high level (to protect the compressor),
- during transition phases (e.g. high acceleration demand for overtaking, anti-stalling and pulling away). These conditions are only taken into account if they do not occur repeatedly, so as to prevent system instabilities (erratic deactivation),
- when certain faults appear.

Cold loop air conditioning management

The air conditioning is cold loop managed, shared between several computers. The injection computer is responsible for:

- managing demand for cold air according to the passenger compartment commands and the pressure value,
- determining the power absorbed by the compressor from the pressure,
- determining the fan assembly commands according to vehicle speed and pressure.

The driver requests the air conditioning to be switched on by means of the ventilation selector coupled to a switch. The cold air request is authorised or denied depending on the pressure measured. If this pressure is outside the operating limits, the cold loop program is not activated.

Note:
Requests to operate the fan assembly can be made by the injection computer but these are sent on the CAN. These requests depend on the air conditioning but also on the coolant temperature and vehicle speed.

Thermal regulation of the passenger compartment heating circuit

In a direct injection engine, fuel is injected directly into the combustion chamber. This leads to heat being lost through the upper part of the engine and consequently, the cylinder head cooling circuit is smaller in size.

The effect of this is that the temperature of the coolant which flows through this circuit rises more slowly. This coolant is also used by the passenger compartment heating system. In very cold conditions, it is therefore difficult to achieve a comfortable passenger compartment temperature quickly.

To limit the heating time, air heating resistors, called RCH (passenger compartment heating resistors), are fitted into the passenger compartment heating circuit. The UCH decides whether or not the passenger compartment heating resistors are required; the Protection and Switching Unit physically controls the passenger compartment heating resistors; and the injection computer determines whether to limit the power supplied to the passenger compartment heating resistors depending on alternator load and also whether to prohibit the operation of the passenger compartment heating resistors according to engine speed, load and vehicle speed.

Cruise control/speed limiter management:

When activated, the cruise control function maintains the vehicle at a preselected speed, regardless of the driving conditions encountered. Using the control buttons, the driver can increase or reduce the speed of the vehicle.
The cruise control function can be deactivated either by using the control buttons, or by switching off the cruise control function selection switch or when system events are detected such as depression of the brake or clutch pedals, or when system errors are detected such as an incorrect vehicle speed or a deceleration level which is too great.
The cruise control function can also be temporarily suspended when the driver wants to resume control of the vehicle and exceed the selected cruising speed by depressing the accelerator pedal which then exceeds the selected fuel flow. The cruising speed is resumed when the driver releases the accelerator pedal.
The cruise control function can be reactivated and the last cruising speed can be reselected after deactivating the function for whatever reason until the ignition is switched off (i.e. for as long as computer supply voltage is not switched off). The vehicle will then attempt to return to the cruising speed using a controlled vehicle acceleration rate.

When switched on using the selection switch, the vehicle speed limiter function limits the vehicle speed to a preset value. The driver controls the vehicle in the normal way using the accelerator pedal until the limit speed is reached. If an attempt is made to exceed this speed, the system will ignore the pedal demand and will control the vehicle speed as it does with the cruise control function, provided that the driver continues to press the accelerator pedal.
Like for the cruise control function, the cruising speed can be altered using the control buttons by means of a quick or a sustained press.
For safety reasons, the cruising speed can be exceeded by depressing the accelerator pedal beyond the pedal position limit value; the accelerator pedal regains full control until the vehicle speed falls back below the cruising speed, when the limiter function is reactivated.

The driver has the following controls for the cruise control/speed limiter function:

- accelerator pedal,
- brake pedal,
- clutch pedal,
- function selection switch, used to select cruise control or speed limiter operating mode.

Instrument panel display

The computer manages the data display on the instrument panel relating to engine operation. This concerns five functions: The MIL (Malfunction Indicator Lamp) for the EOBD (European On Board Diagnostic), pre-postheating, coolant temperature and engine faults: Level 1 (non-critical fault) and Level 2 (emergency stop). These five functions are represented by 3 warning lights or messages displayed by the trip computer.

Pre-postheating warning light

This warning light is used both as an in operation indicator light and as a system fault indicator:
- permanently lit during + after ignition feed: indicates preheating of the heater plugs.

After preheating and an automatic timed **3 second** off period, the warning light will come on if a Level 1 fault occurs (leading to reduced operation and reduced safety levels. The user must carry out repairs as soon as possible).

Temperature/emergency stop warning light

This warning light is used both as an in-operation indicator light and as a system fault indicator. It comes on for 3 seconds when switched on (automatic test procedure managed by instrument panel).

Permanently on: this indicates engine overheating or a level 2 fault.
- if the fault reaches a critical level, the injection cuts off automatically after a few seconds.
- in the event of overheating, it is up to the driver whether to stop the vehicle or continue driving.

WARNING LIGHT ACTIVATION PROGRAMMING ON THE INSTRUMENT PANEL

Orange SERVICE warning light (level 1)

This warning light comes on, **accompanied by message Injection Faulty**.

The driver should carry out repairs as soon as possible.

Red STOP warning light (level 2)

This warning light comes on, **accompanied by message Injection Faulty**.

The driver should carry out repairs as soon as possible.

Excess pollution OBD ORANGE warning light:

This warning light is used to alert the driver of any injection faults causing excessive pollution, or if the EOBD system has been deactivated.
The injection computer requests activation of the OBD warning light for a present fault only after three successive driving cycles.
The **3 second** visual inspection when the ignition is switched on (automatic test procedure managed by the instrument panel) is carried out by the injection computer.

Faults that activate the OBD warning light

Associated fault	Title	Specification
DF010	EGR position sensor circuit	**CC.1 - CO.0**
DF016	EGR control circuit	**CC.1**
DF026	Cylinder 1 injector control circuit	**CO - CC**
DF027	Cylinder 2 injector control circuit	**CO - CC**
DF028	Cylinder 3 injector control circuit	**CO - CC**
DF029	Cylinder 4 injector control circuit	**CO - CC**
DF038	Computer	**3.DEF**
DF114	EGR solenoid valve circuit	**4.DEF**

BLACK 32 TRACK CONNECTOR A

Description	Track	Track	Description
Not used	A1	E1	Not used
Cruise control on/off	A2	E2	Not used
CAN L1	A3	E3	Not used
CAN H1	A4	E4	Closed contact Stop signal
Not used	B1	F1	Not used
Not used	B2	F2	Potentiometer supply Gang 2
Not used	B3	F3	Potentiometer signal Gang 2
Diagnostic line K	B4	F4	Potentiometer earth Gang 2
Not used	C1	G1	**+ After ignition** supply
Not used	C2	G2	Potentiometer supply Gang 1
Speed limiter on/off	C3	G3	Not used
Clutch switch signal	C4	G4	Earth
+ After ignition supply	D1	H1	Earth
Cruise control switch signal	D2	H2	Potentiometer signal Gang 1
Cruise control switch earth	D3	H3	Potentiometer earth Signal 1
Not used	D4	H4	Earth

Note:
The supply voltage on track G1 is not measurable when computer connector disconnected.

BROWN 48-TRACK CONNECTOR B

Description	Track	Track	Description
Flowmeter supply (728, 729)	A1	G1	Knock sensor earth (pinking)
Flowmeter signal (728, 729)	A2	G2	Fuel temperature signal
Flowmeter earth (728, 729)	A3	G3	Fuel temperature sensor earth
Cylinder 1 injector + control	A4	G4	Cylinder 4 injector + control
EGR feedback potentiometer supply	B1	H1	Not used
EGR feedback potentiometer signal	B2	H2	Coolant temperature signal
EGR feedback potentiometer earth	B3	H3	Coolant temperature sensor earth
Cylinder 1 injector - control	B4	H4	Cylinder 4 injector - control
Turbocharging pressure sensor supply	C1	J1	Not used
Turbocharging pressure sensor signal	C2	J2	Inlet air temperature signal
Turbocharging pressure sensor earth	C3	J3	Inlet air temperature earth (722)
Cylinder 2 injector + control	C4	J4	Not used
Rail pressure sensor supply	D1	K1	Accelerometer shielding (pinking)
Rail pressure sensor signal	D2	K2	External air temperature signal
Rail pressure sensor earth	D3	K3	External air temperature earth
Cylinder 2 injector - control	D4	K4	Not used
Not used	E1	L1	Not used
Phase sensor signal (cylinder)	E2	L2	Not used
Phase sensor earth (cylinder)	E3	L3	EGR solenoid valve control
Cylinder 3 injector + control	E4	L4	Not used
Knock sensor signal (pinking)	F1	M1	Not used
Engine speed sensor (TDC) + signal	F2	M2	Turbocharging solenoid valve control (728, 729)
Engine speed sensor earth (TDC)	F3	M3	Not used
Cylinder 3 injector - control	F4	M4	Fuel flow actuator control

GREY 32-TRACK CONNECTOR C

Description	Track	Track	Description
Not used	A1	E1	Not used
Water in diesel fuel detector earth	A2	E2	Not used
Not used	A3	E3	Not used
Not used	A4	E4	Not used
Not used	B1	F1	Supply relay control
Not used	B2	F2	Preheating relay control
Water in diesel fuel detector signal	B3	F3	Not used
Not used	B4	F4	Not used
Not used	C1	G1	Not used
Not used	C2	G2	After relay + battery feed 1
Refrigerant pressure sensor signal	C3	G3	Refrigerant pressure sensor earth
Refrigerant pressure sensor supply	C4	G4	Not used
Not used	D1	H1	Not used
Not used	D2	H2	After relay + battery feed 2
Heater plug diag signal	D3	H3	Not used
Not used	D4	H4	Not used

Note:
The supply voltage on tracks G2 and H2 is not measurable when the computer connector is disconnected.

COMPUTER REPLACEMENT OR REPROGRAMMING OPERATIONS

Before programming or reprogramming the computer in After-Sales, **backup the following data to the diagnostic tool:**

- The **C2I parameters (individual injector correction) and the engine adaptive programming** using command **SC003 Backup computer data**.

The system can be programmed and reprogrammed via the diagnostic socket using the RENAULT CLIP diagnostic tool (**Consult Technical Note 3585A and follow the instructions provided by the diagnostic tool**).

NOTE
– Switch on the diagnostic tool (mains or cigarette lighter supply).
– Connect a battery charger.
– Switch off all electrical consumers (lights, interior lights, air conditioning, radio/CD, etc.).
– Wait for the engine to cool (engine coolant temperature below 60 °C and air temperature below 50 °C).

Every time the computer has been reprogrammed or replaced

- **Switch the ignition off and then on again.**
- Use the diagnostic tool command **SC001 Enter saved data** to restore **C2** and the engine adaptives.
- Use command **AC212 New pump chamber filling**.
- Press the Start button (**repriming time until the engine starts may take 20 seconds**).
- After the engine has started, refer to **ET637 New pump chamber filling** and check that it is **Done**. If not, repeat the starting procedure.
- **Stop the engine, switch off the ignition (to initialise the computer) and wait 30 seconds.**
- **Switch on the ignition again and use the diagnostic tool to carry out the following steps:**
- Use command **VP010 Write VIN**.
- After injection system (re)programming, stored faults may appear in other computers. Clear the memories of these computers.
- Carry out a road test followed by another check with the diagnostic tool.

Note:
If commands **SC001** and **SC003** are ignored or do not work, after replacing or (re)programming the computer write the **C2I** codes for each injector manually by reading the **C2I** code on each injector (see **replacing injectors**).
– Use command **AC028 Static test** to autoconfigure the computer (fan assembly, etc.).

NOTE
It is not possible to try an injection computer from the Parts Department because it will no longer be possible to fit it on another vehicle.

REPLACING THE INJECTORS

Note:
The C2I (individual injector correction) is a factory calibration applied to **each injector,** to **adjust the flow** of each of them precisely.
The correction values are written on **a label** affixed to each injector, then entered in the computer which can then actuate each injector by taking account of their **manufacturing variation**.

The system can be set up using the diagnostic socket with the RENAULT CLIP diagnostic tool.
The **C2** parameters must be replaced after replacing an injector/injectors.
To do this, reprogram the **C2I** into the computer using the following commands:

- injector cylinder 1: command **VP001 (flywheel end cylinder)**,
- injector cylinder 2: command **VP002**,
- injector cylinder 3: command **VP003**,
- injector cylinder 5: command **VP004**.

It is also possible to enter the four C2I codes using command **SC002 ENTER INJECTOR CODES**. The technician will use the appropriate command to **enter the new C2I** for the replaced injector and **erase the old C2I**.

- **Only** after having simultaneously replaced of at least 3 injectors should you reset the injector adaptives using the command **RZ004 Pressure regulation for adaptives**.

HIGH PRESSURE PUMP REPLACEMENT

When replacing a high pressure pump on a vehicle fitted with a computer with Vdiag 48, apply the following procedure before starting the engine.

When replacing a high pressure pump on a vehicle fitted with a computer with a Vdiag 44, it is essential to reprogram the injection computer (see Replacement of components).
This reprogramming will install new functions in the computer to enable the injection pump to be reprimed with diesel without damaging it.
After reprogamming, Vdiag 44 is replaced by Vdiag 48.

PROCEDURE

- Switch on the ignition and establish dialogue with the injection computer.
- Use command **AC212 New pump chamber filling**.
- **Press** the START button (**repriming time until the engine starts may take 20 seconds**).
- After the engine has started, refer to **ET637 New pump chamber filling** and check that it is **Done**. If not, repeat the starting procedure.

REPLACING THE EGR VALVE

When replacing an EGR valve, **it is essential to clear the** EGR adaptives using command **RZ002 EGR adaptatives**.

SETTINGS

VP001: Cylinder 1 injector code.
VP002: Cylinder 2 injector code.
VP003: Cylinder 3 injector code.
VP004: Cylinder 4 injector code.
These commands enable you to manually write the calibration code marked on the injector. Use these commands after replacing an injector, replacing or (re)programming the computer when command **SC001** does not work.

VP010: Write VIN.
This command permits manual entry of the vehicle's VIN into the computer. Use these commands each time the computer is replaced or (re)programmed.

SPECIAL COMMANDS

SC001: Write saved data.
Use this command after replacing or (re)programming a computer (if the information was saved using **SC003**).

SC002: Enter injector codes.
This command enables you to manually write the calibration code marked on the injectors. Use this command after replacing the injectors.

SC003: Save computer data.
This command allows you to save the computer data, the C2I (individual injector correction) parameters and the engine programming adaptives. Use this command before replacing or (re)programming a computer.

OTHER COMMANDS

LC005: Gearbox type.
This command enables you to determine the gearbox type configured on the vehicle.

Tool fault	Asso-ciated DTC	Diagnostic tool title
DF001	**0115**	Coolant temperature sensor circuit
DF002	**0070**	Air temperature sensor circuit (728, 729)
DF003	**2226**	Atmospheric pressure sensor circuit
DF005	**0335**	Engine speed sensor circuit
DF007	**0190**	Rail pressure sensor circuit
DF008	**0225**	Pedal potentiometer circuit gang 1
DF009	**2120**	Pedal potentiometer circuit gang 2
DF010	**0409**	EGR position sensor circuit
DF014	**0500**	Vehicle speed signal circuit
DF015	**0685**	Main relay control circuit
DF016	**0403**	EGR control circuit
DF017	**0382**	Preheating unit control circuit
DF024	**0231**	Low pressure actuator control circuit
DF025	**0380**	Preheating unit fault finding connection
DF026	**0201**	Cylinder 1 injector control circuit
DF027	**0202**	Cylinder 2 injector control circuit
DF028	**0203**	Cylinder 3 injector control circuit
DF029	**0204**	Cylinder 4 injector control circuit
DF037	**0513**	Engine immobiliser
DF038	**0606**	Computer
DF039	**0110**	Inlet air temperature sensor circuit
DF047	**0560**	Computer supply voltage
DF049	**0530**	Refrigerant sensor circuit
DF050	**0571**	Brake switch circuit
DF051	**0575**	Cruise control/speed limiter function
DF052	**0200**	Injector control circuit
DF053	**0089**	Rail pressure regulation function
DF054	**0033**	Turbocharging solenoid valve control circuit (728, 729)
DF056	**0100**	Air flow sensor circuit (728, 729)
DF057	**2264**	Water in diesel fuel detector circuit

Tool fault	Asso-ciated DTC	Diagnostic tool title
DF059	**0301**	Misfires in cylinder 1
DF060	**0302**	Misfires in cylinder 2
DF061	**0303**	Misfires in cylinder 3
DF062	**0304**	Misfires in cylinder 4
DF089	**0235**	Inlet manifold pressure sensor circuit
DF098	**0180**	Fuel temperature sensor circuit
DF107	**0604**	Computer memory
DF112	**0340**	Cylinder reference sensor circuit
DF113	**0608**	Sensor supply voltage
DF114	**0400**	EGR solenoid valve circuit
DF116	**C001**	Multiplex network
DF121	**0325**	Accelerometer circuit
DF122	**0609**	Supply voltage pedal potentiometer gang 2
DF130	**0087**	Flow capacity function

DF001 PRESENT	COOLANT TEMPERATURE SENSOR CIRCUIT CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth

NOTES	**Special notes:** If **DF001 present,** fan assembly activated at low speed (**fan assembly 1**). If **fan assembly 1** faulty, **fan assembly 2** activated for vehicles fitted with air conditioning.

Check the connection and condition of the **4-track connector** for the **coolant temperature sensor**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Measure the **resistance** of the **coolant temperature sensor** between **tracks 2 and 3**.
Replace the coolant temperature sensor if the resistance is not **2252 Ω ± 112.16 Ω at 25 °C**.

Check **the insulation, continuity and the absence of interference resistance** on the following connections:

Sensor connector **track 2** → **Track H3** computer connector **B**

Sensor connector **track 3** → **Track H2** computer connector **B**

Sensor connector **track 1** → **Instrument panel**

Sensor connector **track 4** → **Instrument panel**

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF002 PRESENT	AIR TEMPERATURE SENSOR CIRCUIT CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth 1.DEF: Inconsistency

NOTES	None

Check the connection and condition of the **4-track connector** for the **air temperature sensor**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Check for **+ 5 V after ignition feed** between **track 3** and **track 1 earth** on the air temperature sensor connector.
Repair if necessary.

Measure the **resistance** of the **air temperature sensor** between **tracks 2 and 3**.
Replace the air temperature sensor if the resistance is not between:

7419 Ω ± 365 Ω at - 5 °C
5887 Ω ± 282 Ω at 0 °C
4707 Ω ± 220 Ω at 5 °C
3791 Ω ± 173 Ω at 10 °C
3075 Ω ± 137 Ω at 15 °C
2510 Ω ± 113 Ω at 20 °C
2063 Ω ± 87 Ω at 25 °C
1716 Ω ± 71 Ω at 30 °C

Check the **continuity, insulation and the absence of interference resistance on the following connections:**

Sensor connector **track 2** → **Track J2** computer connector **B**
Sensor connector **track 3** → **Track C1** computer connector **B**
Sensor connector **track 4** → **Track C2** computer connector **B**
Sensor connector **track 1** → **Track C3** computer connector **B**

Repair if necessary.

If the fault is still present, replace the air temperature sensor.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF003 PRESENT	ATMOSPHERIC PRESSURE SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V

NOTES	None

Contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF005 PRESENT OR STORED	ENGINE SPEED SENSOR CIRCUIT 1.DEF: Inconsistency 2.DEF: No signal 3.DEF: Too many additional teeth 4.DEF: Teeth missing 5.DEF: Additional teeth 6.DEF: Too many teeth missing

NOTES	**Special notes:** If **1.DEF, 2.DEF, 3.DEF, 6.DEF are present: the engine stops** and **level 1 warning light comes on accompanied by message Injection Faulty**. If **4.DEF, 5.DEF**, 75 % engine performance, no warning light lit. **Conditions for applying fault finding procedures to stored faults:** the fault is **declared present** with the engine under the **starter or idling**.

Check that the flywheel ring gear is not defective (missing teeth).
Check the connection and condition of the **2-track connector** for the **engine speed sensor**. Repair if necessary. Ensure the sensor is correctly fitted on the engine.
Check the condition and connection of the computer's 48-track brown **connector B**. Repair if necessary.
Measure the **resistance** on the **engine speed sensor terminals**. Replace the engine speed sensor if the resistance is not: – for vehicles with 80 hp (K9K 722): 800 Ω ± 80 Ω at 20 ˚C – for vehicles with 100 hp (K9K 728/729): 680 Ω ± 68 Ω at 20 ˚C
Check **the insulation, continuity and the absence of interference resistance** on the following connections: Sensor connector **track A** → **Track F2** computer connector **B** Sensor connector **track B** → **Track F3** computer connector **B** Repair if necessary.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF007 STORED	RAIL PRESSURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to + 12 volts 1.DEF: Inconsistency 2.DEF: Below minimum threshold 3.DEF: Above maximum threshold

NOTES	**Priority when dealing with a number of faults:** in the event of a combination of faults **DF007** and **DF113**, deal with fault **DF113 Sensor supply voltage** first.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present after the engine is started.
	Special notes: If fault **DF007 is present: the engine stops and cannot be restarted** and **level 1 warning light displays the message Injection Faulty**.

Check the connection and condition of the **3-track connector** for the **rail pressure sensor**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Check the **continuity, insulation and the absence of interference resistance on the following connections:**

Sensor connector **track 2** → **Track D3** computer connector **B**

Sensor connector **track 1** → **Track D2** computer connector **B**

Sensor connector **track 3** → **Track D1** computer connector **B**

Repair if necessary.

If the fault is still present, there is a rail pressure sensor fault, replace the rail.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF008 PRESENT	PEDAL POTENTIOMETER CIRCUIT GANG 1 CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V 1.DEF: Inconsistency between pedal gang 1 and gang 2 2.DEF: No signal 3.DEF: Jammed component

NOTES	**Priority when dealing with a number of faults:** If faults **DF008** and **DF113** are present simultaneously, deal with fault **DF113 Sensor feed voltage** first.
	Special notes: if fault **DF008** is present the engine speed is maintained **above 1000 rpm** and the **level 1 warning light comes on accompanied by the Faulty Injection message**. If faults **DF009** and **DF008** are present, the engine speed is fixed at **1300 rpm** and the **level 1 warning light comes on accompanied by the Faulty Injection message**.

1.DEF - 3.DEF	***NOTES***	None

Disconnect computer **connector A** and the **pedal potentiometer connector**.
Check for insulation between **track H2** and **track F3** on computer connector A.
Repair if necessary.
Replace the pedal potentiometer if the fault persists.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF008 **CONTINUED**	

CC.0 ***CC.1*** ***2.DEF***	***NOTES***	None

Check the connection and condition of the **6-track connector** for the **pedal potentiometer**. Repair if necessary.
Check the connection and condition of the computer's 32-track black **connector A**. Repair if necessary.
Measure the **resistance** between **tracks 3 and 5** of the **pedal potentiometer**. Replace the pedal potentiometer if the resistance is not **1.7 kΩ ± 0.9 kΩ**.
Check the **continuity, insulation and the absence of interference resistance on the following connections**: Sensor connector **track 3** → **Track G2** computer connector **A** Sensor connector **track 4** → **Track H2** computer connector **A** Sensor connector **track 5** → **Track H3** computer connector **A** Repair if necessary.
Disconnect computer **connector A** and the **pedal potentiometer connector**. Check the insulation between **track H2** and **track F3** on **computer connector A**. Repair if necessary. Replace the pedal potentiometer if the fault persists.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF009 PRESENT	PEDAL POTENTIOMETER CIRCUIT GANG 2 CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V

NOTES	**Priority when dealing with a number of faults:** If faults **DF009** and **DF122** are present at the same time, deal with fault **DF122 Potentiometer supply voltage gang 2** first.
	Special notes: if fault **DF009** is present the engine speed is maintained **above 1000 rpm** and the **level 1 warning light comes on accompanied by the Faulty Injection message**. If faults **DF009** and **DF008** are present, the engine speed is fixed at **1300 rpm** and the **level 1 warning light comes on accompanied by the Faulty Injection message**.

CO.0	***NOTES***	None

Check the connection and condition of the **6-track connector** for the **pedal potentiometer**. Repair if necessary.
Check the connection and condition of the computer's 32-track black **connector A**. Repair if necessary.
Measure the **resistance** between **tracks 2 and 6** of the **pedal potentiometer.** Replace the pedal potentiometer if the resistance is not **2.85 kΩ ± 2.05 kΩ**.
Disconnect **computer** connector **A** and the **pedal potentiometer** connector. Check **the insulation against earth** on track **F3** of computer **connector A**. Repair if necessary.
Check **the continuity of the connection between**: Sensor connector **track 1** ⟶ **Track F3** computer connector **A** Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF009 **CONTINUED**	

CC.1	***NOTES***	None

Check the connection and condition of the **6-track connector** for the **pedal potentiometer**. Repair if necessary.
Check the connection and condition of the computer's 32-track black **connector A**. Repair if necessary.
Measure the **resistance between tracks 2 and 6 of the pedal potentiometer**. Replace the pedal potentiometer if the resistance is not **2.85 kΩ ± 2.05 kΩ**.
Check the **continuity, insulation and the absence of interference resistance on the following connection**: Sensor connector **track 2** ⟶ **Track F2** computer connector **A** Repair if necessary.
Disconnect computer **connector A** and the **pedal potentiometer connector**. Check the **insulation** against **12 V feed** on tracks **F2 and F3** on computer **connector A**. Repair if necessary.
Check **the continuity** of the following connections: Sensor connector **track 2** ⟶ **Track F2** computer connector **A** Sensor connector **track 6** ⟶ **Track F4** computer connector **A**
Disconnect computer **connector A** and the **pedal potentiometer connector**. Check the insulation between **track F2** and **track F3** on **computer** connector A. Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF010 **STORED**	EGR POSITION SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V 1.DEF: Above maximum threshold 2.DEF: Below minimum threshold

NOTES	**Priority when dealing with a number of faults:** If faults **DF010** and **DF113** are present at the same time deal with fault **DF113 Sensor supply voltage** first.
	Conditions for applying fault finding procedures to stored faults: The fault is **declared present** after the **engine is started**.

Check the connection and condition of the **6-track connector** of the **exhaust gas recirculation solenoid valve**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Measure the **resistance** on the **exhaust gas recirculation solenoid valve** terminals.
Replace the solenoid valve if the resistance is not **4 kΩ ±1.6 kΩ at 20 °C** between **tracks 2 and 4 and 1 kΩ ± 0.5 kΩ at 20 °C** between **tracks 4 and 6**.

Check the **continuity, insulation and the absence of interference resistance on the following connections:**

Sensor connector **track 2** → **Track B1** computer connector **B**

Sensor connector **track 6** → **Track B2** computer connector **B**

Sensor connector **track 4** → **Track B3** computer connector **B**

Repair if necessary.

AFTER REPAIR	If the EGR valve has been replaced, use command **RZ002** to set the EGR valve parameters to 0. Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF014 PRESENT	VEHICLE SPEED SIGNAL CIRCUIT

NOTES	None

For this type of vehicle, the ABS computer or an additional unit (if the vehicle does not have ABS) transmits the vehicle speed on the CAN.
Test the multiplex network to be able to work on the CAN network (fault on the CAN H and CAN L lines between the injection and the ABS). Also check there are no faults in the ABS part or in the system which supplies the vehicle speed.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF015 **PRESENT**	MAIN RELAY CONTROL CIRCUIT 1.DEF: Permanent low level 2.DEF: Permanent high level

NOTES	**Special notes:** The main relay is built into the UPC.

Check the main relay supply fuse in the engine compartment: (**30A** fuse) on the **UPC**.
Replace the fuse if necessary.

Check the condition and connection of the **brown 12-track PEM D connector and black 4-track PPM1 connector** on the **UPC**.
Repair if necessary.

Check the connection and condition of the computer's 32-track grey **connector C**.
Repair if necessary.

Check the **continuity, insulation and the absence of interference resistance on the following connections:**

Computer connector **C track F1**	→	**Track 2 UPC 12-track brown PEM D** connector
Computer connector **C track G1**	→	**Vehicle earth**
Computer connector **C track H2**	→	**Track 1** UPC **4-track black PPM1** connector
Computer connector **C track G2**	→	**Track 1** UPC **4-track black PPM1** connector

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF016 **STORED**	EGR CONTROL CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine idling**.
	Special notes: If fault **DF016** is present, the engine will be unstable and may even stall. Starting difficult or even impossible when cold. **Level 1 warning light comes on, accompanied by the message Injection Faulty**.

Check the connection and condition of the **6-track connector** of the **exhaust gas recirculation solenoid valve**.
Repair if necessary.

Check the connection and condition of the computer's **48**-track brown **connector B**.
Repair if necessary.

Measure the **resistance** on the **exhaust gas recirculation solenoid valve** terminal.
Replace the solenoid valve if the resistance is not **4 kΩ ± 1.6 kΩ at 20 °C** between **tracks 2 and 4** and **1 kΩ ± 0.5 kΩ at 20 °C** between **tracks 4 and 6**.

Check for **12 V after ignition feed** on the connector side on **track 1** of the EGR valve connector.

Check the **insulation, continuity and the absence of interference resistance on the following connections**:

+ after ignition feed PPM1 G **black** UPC connector, **track 3**	→	**Track 1** EGR solenoid valve
Computer connector **B track L3**	→	**Track 5** EGR solenoid valve

Repair if necessary.

AFTER REPAIR	If the EGR valve has been replaced, use command **RZ002** to set the EGR valve parameters to 0. Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF017 **PRESENT**	PREHEATING UNIT CONTROL CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V

NOTES	**Special notes:** If **DF017** is present starting is difficult (or impossible when cold). If **CO.0**: plugs permanently controlled with risk of being damaged and risk of damaging the engine.

Check the connection and condition of the preheating unit **connector**.
Repair if necessary.

Check the connection and condition of the computer's 32-track grey **connector C**.
Repair if necessary.

Check the **insulation, continuity and the absence of interference resistance on the following connections**:

12 V APC	→	**Track 3** preheating unit
Computer connector **C track D3**	→	**Track 9** preheating unit
Computer connector **C track F2**	→	**Track 8** preheating unit

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF024 **PRESENT**	LOW PRESSURE ACTUATOR CONTROL CIRCUIT (IMV) CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V

NOTES	**Special notes:** If fault **DF024** with **CO.0 or CC.1**, level **1 warning light comes on** accompanied by the message **Injection Faulty**. Fuel flow actuator fully opened, engine rattling, and the engine is stopped to prevent it from racing.

Check the connection and condition of the **fuel flow actuator connector**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Measure the resistance between **tracks 1 and 2 of the fuel flow actuator**.
Replace the fuel flow actuator if the resistance is not **5.3 Ω ± 0.5 Ω at 20 °C**.

Check the **insulation, continuity and the absence of interference resistance on the following connections**:

Computer connector **B track M4** ⟶ **Track 1** fuel flow actuator

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF025 **PRESENT**	PREHEATING UNIT FAULT FINDING CONNECTION CO : Open circuit

NOTES	**Special notes:** This fault only directs the fault finding with an open circuit.

Check the connection and condition of the **preheating unit connector**. Repair if necessary.
Check the connection and condition of the **heater plug connectors**. Repair if necessary.
Check the connection and condition of the computer's 32-track grey **connector C**. Repair or replace if necessary.
Measure the resistance of each **heater plug**. The resistance must be **less than 2 Ω**. Replace defective plugs.
Check the **insulation, continuity and the absence of interference resistance on the following connections**: Computer connector **C track F2** ⟶ **Track 8** preheating unit Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 PRESENT OR STORED	CYLINDER 1 INJECTOR CONTROL CIRCUIT CO : Open circuit CC : Short circuit 1.DEF: At minimum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine idling**.
	Special notes: When this fault appears, the idling speed is stuck at **1000 rpm**, there is engine noise, unsteady engine speed, reduced engine performance and the **level 1 warning light comes on accompanied by the message Faulty Injection**.

CO ***CC***	***NOTES***	None

Switch off the ignition and wait **15 seconds**.
Check the connection and condition of the **injector connector**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Use command **AC005 Cylinder 1 injector**.
If 5 actuation cycles of injector 1 cannot be heard working, connect the cylinder 2 injector wire to the cylinder 1 injector and use command **AC006 Cylinder 2 injector**.
Does this injector actuation cycle work?

YES

Injector 1 is not faulty: fault with injector 1 control circuit.

Check the **continuity and absence of interference resistance on the following connections**:

Computer connector **B track A4** → **Track 1,** injector 1

Computer connector **B track B4** → **Track 2,** injector 1

Also check for insulation between these 2 connections.
Repair if necessary.
If the fault is still present, contact Techline.

NO

Injector 1 defective: replace the cylinder 1 injector.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 **CONTINUED**	

1.DEF	***NOTES***	None

Check that the C2I is correctly entered on the computer.
Check the accelerometer shielding on track **K1** of the computer 48-track brown connector **B**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, **be sure to clear** the pressure regulation programming adaptives using command **RZ004 Pressure regulation programming adaptives**.
If the fault is still present, replace the cylinder 1 injector.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF027 PRESENT OR STORED	CYLINDER 2 INJECTOR CONTROL CIRCUIT CO : Open circuit CC : Short circuit 1.DEF: At minimum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine idling**.
	Special notes: When this fault appears, the idling speed is stuck at **1000 rpm**, there is engine noise, unsteady engine speed, reduced engine performance and the **level 1 warning light comes on accompanied by the message Faulty Injection**.

CO ***CC***	***NOTES***	None

Switch off the ignition and wait **15 seconds**.
Check the connection and condition of the **injector connector**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Use command **AC006 Cylinder 2 injector**.
If 5 actuation cycles of injector 2 cannot be heard working, connect the cylinder 3 injector wire to the cylinder 2 injector and use command **AC007 Cylinder 3 injector**.
Does this injector actuation cycle work?

YES

Injector 2 is not faulty: fault with injector 2 control circuit.

Check the **continuity and absence of interference resistance on the following connections**:

Computer connector **B track G4** → **Track 1,** injector 2

Computer connector **B track H4** → **Track 2,** injector 2

Also check for insulation between these 2 connections.
Repair if necessary.
If the fault is still present, contact Techline.

NO

Injector 2 defective: replace the cylinder 2 injector.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF027 **CONTINUED**	

1.DEF	***NOTES***	None

Check that the C2I is correctly entered on the computer.
Check the accelerometer shielding on track **K1** of the computer **48**-track brown connector **B**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, **be sure to clear** the pressure regulation programming adaptives using command **RZ004 Pressure regulation programming adaptives**.
If the fault is still present, replace the cylinder 2 injector.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF028 PRESENT OR STORED	CYLINDER 3 INJECTOR CONTROL CIRCUIT CO : Open circuit CC : Short circuit 1.DEF: At minimum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine idling**.
	Special notes: When this fault appears, the idling speed is stuck at **1000 rpm**, there is engine noise, unsteady engine speed, reduced engine performance and the **level 1 warning light comes on accompanied by the message Faulty Injection**.

CO ***CC***	***NOTES***	None

Switch off the ignition and wait **15 seconds**.
Check the connection and condition of the **injector connector**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Use command **AC007 Cylinder 3 injector**.
If 5 actuation cycles of injector 3 cannot be heard working, connect the cylinder 4 injector wire to the cylinder 3 injector and use command **AC008 Cylinder 4 injector**.
Does this injector actuation cycle work?

YES

Injector 3 is not faulty: fault with injector 3 control circuit.

Check the **continuity and the absence of interference resistance on the following connections**:

Computer connector **B track C4** → **Track 1,** injector 3

Computer connector **B track D4** → **Track 2,** injector 3

Also check for insulation between these 2 connections.
Repair if necessary.
If the fault is still present, contact Techline.

NO

Injector 3 defective: replace the cylinder 3 injector.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF028 **CONTINUED**	

1.DEF	***NOTES***	None

Check that the C2I command in the computer is completed correctly.
Check the accelerometer shielding on track **K1** of the computer 48-track brown connector **B**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, **be sure to clear** the pressure regulation programming adaptives using command **RZ004 Pressure regulation programming adaptives**.
If the fault is still present, replace the cylinder 3 injector.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 STORED	CYLINDER 4 INJECTOR CONTROL CIRCUIT CO : Open circuit CC : Short circuit 1.DEF: At minimum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine idling**.
	Special notes: When this fault appears, the idling speed is stuck at **1000 rpm**, there is engine noise, unsteady engine speed, reduced engine performance and the **level 1 warning light comes on accompanied by the message Faulty Injection**.

CO ***CC***	***NOTES***	None

Switch off the ignition and wait **15 seconds**.
Check the connection and condition of the **injector connector**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Use command **AC008 Cylinder 4 injector**.
If 5 actuation cycles of injector 4 cannot be heard working, connect the cylinder 4 injector wire to the cylinder 3 injector and use command **AC008 Cylinder 4 injector**.
Does this injector actuation cycle work?

NO

Injector 4's wiring is faulty.

Check the **continuity and absence of interference resistance on the following connections**:

Computer connector **B track E4** → **Track 1,** injector 4

Computer connector **B track F4** → **Track 2,** injector 4

Also check for insulation between these 2 connections.
Repair if necessary.
If the fault is still present, contact Techline.

YES

Injector 4 defective: replace the cylinder 4 injector.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 **CONTINUED**	

1.DEF	***NOTES***	None

Check that the C2I command in the computer is completed correctly.
Check the accelerometer shielding on track **K1** of the computer 48-track brown connector **B**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, **be sure to clear** the pressure regulation programming adaptives using command **RZ004 Pressure regulation programming adaptives**.
If the fault is still present, replace the cylinder 4 injector.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF037 PRESENT	ENGINE IMMOBILISER

NOTES	None

Carry out a fault finding procedure on the multiplex network.
Consult the fault finding procedure for the keyless vehicle function.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF038 PRESENT	COMPUTER 1.DEF: Analogue/digital converter 2.DEF: Write EEPROM memory 3.DEF: Read EEPROM memory 4.DEF: Enter injector codes 5.DEF: Memory self-test 6.DEF: Non refreshed watchdog 7.DEF: Interference on the injector control line 8.DEF: Watchdog activation

NOTES	None

7.DEF	***NOTES***	None

Check the connection and condition of the computer's 48-track brown **connector B**. Repair if necessary.

Check the **insulation, continuity and the absence of interference resistance on the following connections**:

Computer connector **B track A4**	→	**Track 1,** injector 1
Computer connector **B track B4**	→	**Track 2,** injector 1
Computer connector **B track G4**	→	**Track 1,** injector 2
Computer connector **B track H4**	→	**Track 2,** injector 2
Computer connector **B track C4**	→	**Track 1,** injector 3
Computer connector **B track D4**	→	**Track 2,** injector 3
Computer connector **B track E4**	→	**Track 1,** injector 4
Computer connector **B track F4**	→	**Track 2,** injector 4

Repair if necessary (See preliminary wiring).

If the fault persists, contact the techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF038 **CONTINUED**	

4.DEF	***NOTES***	None

Check the connection and condition of the computer's 48-track brown **connector B**. Repair if necessary.
Check that the **individual injector correction (C2I)** matches the injector; if not write the C2I (see **Configurations and programming**).
If the **C2I** does match the injectors, contact your Techline.

1.DEF ***5.DEF*** ***6.DEF*** ***8.DEF***	***NOTES***	None

Contact the Techline.

2.DEF ***3.DEF***	***NOTES***	None

Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Switch off the ignition and wait **30 seconds**. Switch on the ignition again and check again using the diagnostic tool. If the fault persists, clear the computer's fault memory for the second time. If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF039 PRESENT	INLET AIR TEMPERATURE SENSOR CIRCUIT CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth

NOTES	**Priority when dealing with a number of faults:** In the event of a combination of faults **DF039** and **DF113**, deal with fault **DF113 Sensor feed voltage** first.

Check the connection and condition of the **4-track connector** for the **air temperature sensor**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Measure the **resistance** between **tracks 1 and 2** on the **air temperature sensor**.
Replace the air temperature sensor if the resistance is not **2051 Ω ± 120 Ω at 25 °C**.

Check the **insulation, continuity and the absence of interference resistance on the following connections**:

Sensor connector **track 1** → **Track C3** computer connector **B**

Sensor connector **track 2** → **Track J2** computer connector **B**

Sensor connector **track 3** → **Track C1** computer connector **B**

Sensor connector **track 4** → **Track C2** computer connector **B**

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF047 **STORED**	COMPUTER SUPPLY VOLTAGE 1.DEF: Above maximum threshold 2.DEF: Below minimum threshold

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine running at over 1000 rpm**.

Measure the **battery voltage** when the ignition is switched on. If the **battery voltage < 10 V** recharge the battery.
Check the condition and connection **of the battery terminals**. Repair if necessary.
Check the vehicle's **charge circuit**. Repair if necessary.
Check the connection and condition of the computer's 32-track black **connector A**. Repair if necessary.
Check the **insulation, continuity and the absence of interference resistance on the following connections**: **+ After ignition feed** → **Track D1** computer connector **A** **Chassis earth** → **Track G4, H4** computer connector **A** Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF049 **STORED**	REFRIGERANT FLUID SENSOR CIRCUIT CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine running and the air conditioning operating**.
	Priority when dealing with a number of faults: If faults **DF049** and **DF113** are present at the same time, deal with fault **DF113 Sensor feed voltage** first.

Check the connection and condition of the **refrigerant pressure sensor** connector.
Repair if necessary.

Check the connection and condition of the computer's 32-track grey **connector C**.
Repair if necessary.

Check **the insulation, continuity and the absence of interference resistance on the following connections**:

Sensor connector **track B** → **Track C4** computer connector **C**

Sensor connector **track C** → **Track C3** computer connector **C**

Sensor connector **track A** → **Track G3** computer connector **C**

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF050 PRESENT OR STORED	BRAKE SWITCH CIRCUIT 1.DEF: No signal 2.DEF: Inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present when the ignition is switched on, when decelerating or when the brake pedal is depressed. Deal with the fault even if it is stored.

Check the connection and condition of the **switch** connector.
Repair if necessary.

Check for the **+ 12 V** feed on the switch supply.
Repair if necessary.

Check the connection and condition of the computer's 32-track black **connector A** and 32-track grey **connector C**.
Repair if necessary.

Check that the **switch is working**.
Repair if necessary.

Check the **insulation, continuity and the absence of interference resistance on the following connections**:

Brake light switch track **1 and 3** → **+ After ignition feed**

Brake light switch track **4** → **Track E4** computer connector **A**

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF051 PRESENT	CRUISE CONTROL/SPEED LIMITER FUNCTION 1.DEF: Inconsistency 2.DEF: On/off switch

NOTES	None

Check the connection and condition of the computer's 32-track black **connector A**. Repair if necessary.
Check the connection and condition of the **connections** for the **cruise control/speed limiter** on/off control switch. Repair if necessary.
Check for **12 V APC** on **track A2** of the **cruise control/speed limiter** function on/off switch. Repair if necessary.
Carry out an **operating check** on the cruise control/speed limiter function on/off switch **(consult the interpretation of ET042 Cruise control/speed limiter**). If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF052 PRESENT	INJECTORS CONTROL CIRCUIT CC.1 : Short circuit to + 12 V CC.0 : Short circuit to earth

NOTES	**Priority when dealing with a number of faults:** In the event of a combination of faults **DF052** and **DF026, DF027, DF028 and DF029** the fault finding procedure remains the same, but it is possible to determine the faulty injector.
	Special notes: The engine stalls when the fault appears. **Level 1 warning light comes on, accompanied by the message Injection Faulty**.

Switch off the ignition, check the condition and connection of the injector **connectors**.
Repair if necessary.

Switch off the ignition, disconnect the injectors (or the injector identified by **DF026, DF027, DF028, DF029**) and switch on the ignition again.
Using the diagnostic tool, check for changes to **DF052**.
Is DF052 present or stored?

DF052 present

The injectors are not faulty.
Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.
Check the **insulation, continuity and the absence of interference resistance on the following connections**:

Injector 1 **track 1** (+)	→	**Track A4,** computer connector **B**
Injector 1 **track 2** (earth)	→	**Track B4,** computer connector **B**
Injector 2 **track 1** (+)	→	**Track G4,** computer connector **B**
Injector 2 **track 2** (earth)	→	**Track H4,** computer connector **B**
Injector 3 **track 1** (+)	→	**Track C4,** computer connector **B**
Injector 3 **track 2** (earth)	→	**Track D4,** computer connector **B**
Injector 4 **track 1** (+)	→	**Track E4,** computer connector **B**
Injector 4 **track 2** (earth)	→	**Track F4,** computer connector **B**

Repair if necessary.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF052 **CONTINUED**	

DF052 **stored**	Injector(s) defective. Replace the injector identified by **DF026** to **DF029** if present. If none of the faults identifying the defective injector circuit is present: – Switch off the ignition. – Reconnect one of the four injectors. – Switch the ignition back on and, if the fault reappears as present, replace the reconnected injector. **Carry out the same procedure for the remaining injectors.**

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF053 STORED	RAIL PRESSURE REGULATION FUNCTION 1.DEF : At minimum limit 2.DEF : At maximum limit 3.DEF: Below minimum threshold 4.DEF: Above maximum threshold 5.DEF: High flow current < maximum 6.DEF: High flow current > maximum 7.DEF: Low flow current < minimum 8.DEF: Low flow current > minimum

NOTES	**Special notes:** If **DF053** the engine may stop, with the **level 1 and 2 warning lights on accompanied by the message Injection Faulty**.
	Priority when dealing with a number of faults: In the event of a combination of faults **DF053** and **DF098** or **DF007,** deal with faults **DF007 or DF098** first.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine running**.

4.DEF ***6.DEF*** ***8.DEF***	***NOTES***	None

Check the connection and condition of the **connector** for the fuel flow actuator (**brown IMV connector on the pump**). Repair if necessary.
Measure the resistance between **tracks 1 and 2 of the fuel flow actuator.** **Replace the fuel flow actuator** if the resistance is not **5.3 Ω ± 0.5 Ω at 20 °C**.
Check the connection and condition of the computer's 48-track brown **connector B**. Repair if necessary.
Check the **insulation, continuity and the absence of interference resistance on the following connection**: Computer connector **B track M4** ⟶ **Track 1** fuel flow actuator Repair if necessary.
Check **for fuel** in the tank. Carry out **Test 1 Low pressure circuit check**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF053 **CONTINUED**	

1.DEF ***2.DEF*** ***3.DEF*** ***5.DEF*** ***7.DEF***	***NOTES***	None

Check **for fuel** in the tank.
Carry out **Test 1 Low pressure circuit check**.
Carry out **Test 7 High pressure system check**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF054 PRESENT	TURBOCHARGING SOLENOID VALVE CONTROL CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: At minimum limit 2.DEF: At maximum limit

NOTES	**Special notes:** If **DF054**, the performance of the vehicle worsens and the **level 1 warning light comes on** accompanied by the message **Injection Faulty**.

Check the condition of the air filter, and replace it if necessary.
Check that the inlet manifold is not obstructed (clogged).
Check that the turbocharger is working properly, and carry out any necessary repairs.

Check the condition and connection of the **2-track connector** for the **turbocharging solenoid valve**.
Repair if necessary.

Check for **+ 12 V feed** on **track 2** of the solenoid valve.
Repair if necessary.

Measure the **resistance** on the **turbocharging solenoid valve** terminals.
Replace the solenoid valve if the resistance is not around **20 Ω ± 2 Ω at 25 °C** between **tracks 1 and 2**.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Check **the continuity and the absence of interference resistance on the following connections**:

Solenoid valve connector **track 2** → **+ After ignition feed**

Solenoid valve connector **track 1** → **Track M2** computer connector **B**

Also check the **insulation** on the connection **between tracks 1 and 2** of the solenoid valve connector.
Repair if necessary.
If the fault persists, replace the turbocharging solenoid valve.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF056 PRESENT OR STORED	AIR FLOW SENSOR CIRCUIT 1.DEF: Permanent low level 2.DEF: Permanent high level 3.DEF: Below minimum threshold 4.DEF: Above maximum threshold 5.DEF: At minimum limit 6.DEF: At maximum limit

NOTES	**Priority when dealing with a number of faults:** – In the event of a combination of faults **DF056** and **DF054**, deal with fault **DF054 Turbocharging solenoid valve control circuit** first. – In the event of a combination of faults **DF056** and **DF113**, deal with fault **DF113 Sensor feed voltage** first.
	Conditions for applying fault finding procedures to stored faults: The fault reappears after the faults have been cleared, followed by a road test.

Check the condition of the air filter, and replace it if necessary. Check that the inlet manifold is not obstructed (clogged). Check that the turbocharger is working properly, and carry out any necessary repairs.
Check the connection and condition of the **6-track connector** for the **air flow sensor**. Repair if necessary.
Check for **+ 5 V APC** on **track 3** of the sensor connector. Repair if necessary.
Check for **+ 12 V** on **track 4** of the sensor connector. Repair if necessary.
Check for earth on connector **track 6**. Repair if necessary.
Check the connection and condition of the computer's 48-track brown **connector B**. Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF056 **CONTINUED**	

Check the **insulation, continuity and the absence of interference resistance on the following connections**:

Sensor connector **track 1**	→	**Track K2** computer connector **B**
Sensor connector **track 2**	→	**Track A3** computer connector **B**
Sensor connector **track 3**	→	**Track A1** computer connector **B**
Sensor connector **track 4**	→	**+ After ignition feed**
Sensor connector **track 5**	→	**Track A2** computer connector **B**
Sensor connector **track 6**	→	**Earth**

Repair if necessary.
Also check the insulation between these connections.
If the fault persists, replace the air flow sensor.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF057 STORED	WATER IN DIESEL FUEL DETECTOR CIRCUIT CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth 1.DEF : Above max threshold (presence of water)

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine running**. **Level 1 warning light comes on with Check Diesel Filter message**.

CO.1 ***CC.0***	***NOTES***	None

Check whether there is any water in the diesel filter, clean and replace the filter if necessary.
Check the condition and connection of the **3-track connector** for the **water detector**. Repair if necessary.
Check the connection and condition of the computer's 32-track grey **connector C**. Repair if necessary.
Check the **insulation, continuity and the absence of interference resistance on the following connections**: Sensor connector **track 3** → **Earth** Sensor connector **track 2** → **Track B3** computer connector **C** Sensor connector **track 1** → **+ After ignition feed** Repair if necessary.

1.DEF	***NOTES***	None

Bleed the diesel filter. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF059 **STORED**	MISFIRING ON CYLINDER 1

NOTES	**Special notes:** If **DF059** engine speed is set to **1000 rpm, engine performance is reduced to 75 %, and the level 1 warning light comes on accompanied by message Injection Faulty**.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine idling**.
	Priority when dealing with a number of faults: In the event of a combination of faults **DF026 (CC or CO)** and **DF059**, deal with **DF026 Cylinder 1 injector control circuit (CC or CO)** first. **Priority when dealing with a number of faults:** In the event of a combination of faults **DF053 (1.DEF, 2.DEF, 7.DEF)** and **DF059**, deal with fault **DF053 Pressure regulation** first.

Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
Check the **inlet manifold** and the **EGR valve** and clean them if necessary.
Replace **the injector**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF060 STORED	MISFIRING ON CYLINDER 2

NOTES	**Special notes:** If **DF060** engine speed is set to **1000 rpm, engine performance is reduced to 75 %, and the level 1 warning light comes on accompanied by message Injection Faulty**.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine idling**.
	Priority when dealing with a number of faults: In the event of a combination of faults **DF027 (CC or CO)** and **DF060**, deal with **DF027 Cylinder 2 injector control circuit (CC or CO)** first. **Priority when dealing with a number of faults:** In the event of a combination of faults **DF053 (1.DEF, 2.DEF, 7.DEF)** and **DF060**, deal with fault **DF053 Pressure regulation** first.

Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
Check the **inlet manifold** and the **EGR valve** and clean them if necessary.
Replace **the injector**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF061 **STORED**	MISFIRING ON CYLINDER 3

NOTES	**Special notes:** If **DF061** engine speed is set to **1000 rpm, engine performance is reduced to 75 %, and the level 1 warning light comes on accompanied by message Injection Faulty**.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine idling**.
	Priority when dealing with a number of faults: In the event of a combination of faults **DF028 (CC or CO)** and **DF061**, deal with fault **DF028 Cylinder 3 injector control circuit (CC or CO)** first. **Priority when dealing with a number of faults:** In the event of a combination of faults **DF053 (1.DEF, 2.DEF, 7.DEF)** and **DF061**, deal with fault **DF053 Pressure regulation** first.

Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
Check the **inlet manifold** and the **EGR valve** and clean them if necessary.
Replace **the injector**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF062 **STORED**	MISFIRING ON CYLINDER 4

NOTES	**Special notes:** If **DF062** engine speed is set to **1000 rpm, engine performance is reduced to 75 %, and the level 1 warning light comes on accompanied by message Injection Faulty**.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine idling**.
	Priority when dealing with a number of faults: In the event of a combination of faults **DF029 (CC or CO)** and **DF062** deal with **DF029 Cylinder 4 injector control circuit (CC or CO)** first. **Priority when dealing with a number of faults:** In the event of a combination of faults **DF053 (1.DEF, 2.DEF, 7.DEF)** and **DF062** deal with fault **DF053 Pressure regulation** first.

Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
Check the **inlet manifold** and the **EGR valve** and clean them if necessary.
Replace **the injector**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF089 PRESENT	MANIFOLD PRESSURE SENSOR CIRCUIT 1.DEF: Permanent low level 2.DEF: Permanent high level 3.DEF: Below minimum threshold 4.DEF: Above maximum threshold 5.DEF: Inconsistency 6.DEF: At maximum limit 7.DEF: At minimum limit

NOTES	**Priority when dealing with a number of faults:** In the event of a combination of faults **DF089** and **DF113**, deal with fault **DF113 Sensor feed voltage** first.
	Special notes: Level **1 warning light comes on along with the message Injection Faulty**.

K9K 722 ENGINE

1.DEF ***2.DEF*** ***3.DEF*** ***4.DEF***	***NOTES***	None

Check the connection and condition of the **4-track connector** for the **inlet pressure sensor**.
Repair if necessary.

Check the connection and condition of the computer's 48 track brown **connector B**.
Repair if necessary.

Check **the insulation, continuity and the absence of interference resistance on the following connections**:

Sensor connector **track 1** → **track C3** computer connector **B**

Sensor connector **track 2** → **track J2** computer connector **B**

Sensor connector **track 3** → **track C1** computer connector **B**

Sensor connector **track 4** → **track C2** computer connector **B**

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF089 **CONTINUED 1**	

5.DEF ***6.DEF*** ***7.DEF***	***NOTES***	None

K9K 722 ENGINE

Visually check the turbocharging circuit **sealing**. Repair if necessary.
Remove the air supply ducts and **check** that they are not blocked. Repair if necessary.
Check the consistency between the **atmospheric pressure** and the **manifold pressure (PR035 = PR032)**. With the engine stopped, the pressure should be approximately the same between the 2 sensors. Replace the manifold pressure sensor if necessary.
Check the **turbocharger**. Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF089 **CONTINUED 2**	

K9K 728 ENGINE

1.DEF ***2.DEF*** ***3.DEF*** ***4.DEF***	***NOTES***	None

Check the connection and condition of the **4-track connector** for the **inlet pressure sensor**.
Repair if necessary.

Check the connection and condition of the computer's 48 track brown **connector B**.
Repair if necessary.

Check **the insulation, continuity and the absence of interference resistance on the following connections**:

Sensor connector **track 1** → **track C3** computer connector **B**

Sensor connector **track 2** → **track J2** computer connector **B**

Sensor connector **track 3** → **track C1** computer connector **B**

Sensor connector **track 4** → **track C2** computer connector **B**

Repair if necessary.

5.DEF	***NOTES***	None

Visually check the turbocharging circuit **sealing**.
Repair if necessary.

Remove the air supply ducts and **check** that they are not blocked.
Repair if necessary.

Check the consistency between the **atmospheric pressure** and the **manifold pressure (PR035 = PR032)**.
With the engine stopped, the pressure should be approximately the same between the 2 sensors.
Replace the manifold pressure sensor if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF089 **CONTINUED 3**	

K9K 728 ENGINE

6.DEF ***7.DEF***	***NOTES***	None

Visually check the turbocharging circuit **sealing**. Repair if necessary.
Remove the air supply ducts and **check** that they are not blocked. Repair if necessary.
With the engine switched off, **check the consistency** between the **atmospheric pressure** and the **manifold pressure (PR035 = PR032)**. With the engine stopped, the pressure should be approximately the same between the 2 sensors. Replace the manifold pressure sensor if necessary.
Check the **turbocharger (wastegate pneumatic actuation circuit)**. Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF098 **PRESENT**	FUEL TEMPERATURE SENSOR CIRCUIT CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth

NOTES	None

Check the connection and condition of the **2-track connector** for the **fuel temperature sensor**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Measure the **resistance** at the **fuel temperature sensor** terminals.
Replace the fuel temperature sensor if the resistance is not approximately **2.2 kΩ at 25 °C**.

Check the **continuity, insulation and the absence of interference resistance on the following connections**:

Sensor connector **track 1** ⟶ **track G2** computer connector **B**

Sensor connector **track 2** ⟶ **track G3** computer connector **B**

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF107 **STORED**	COMPUTER MEMORY

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine running**.
	Special note: If **DF107** engine stopped and starting impossible, the **level 1 warning light comes on along with the message Injection Faulty**.

Enter the individual injector correction (**C2I**) using **the diagnostic tool (command SC002)**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF112 **STORED**	CYLINDER REFERENCE SENSOR CIRCUIT 1.DEF: No signal 2.DEF: Inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is **declared present** with the engine under the **starter or when idling**.

Check the connection and condition of the **3-track connector** for the **cylinder reference sensor**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Check **the insulation, continuity and the absence of interference resistance on the following connections**:

Sensor connector **track 2** → **Track E2** computer connector **B**

Sensor connector **track 1** → **Track E3** computer connector **B**

If necessary replace the sensor.

Check the timing gear setting using the appropriate **Workshop Repair Manual**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF113 PRESENT	SENSOR SUPPLY VOLTAGE 1.DEF : At minimum limit 2.DEF : At maximum limit

NOTES	**Priority when dealing with a number of faults:** In the event of a combination of faults **DF113 and DF007, DF008, DF010, DF039, DF049, DF056, DF089** deal with the fault **DF113 Sensor feed voltage** first.
	Special notes: If **DF113**, the engine stops immediately and it is impossible to restart. **Level 1 warning light comes on, accompanied by the message Injection Faulty**.

Check the condition and connection of the **connectors on all sensors** with a **5 V** feed.
- Refrigerant pressure sensor
- Pressure sensor and inlet manifold temperature sensor
- Rail pressure sensor
- Pedal sensor gang 1
- EGR valve position sensor
- Flowmeter.

Repair if necessary.

Check the condition and connection of computer **connectors A, B and C**.
Repair if necessary.

To locate any internal fault in one of the sensors with a **5 V** supply (short circuit), disconnect each of the sensors on the list above in turn, checking after each disconnection whether the fault changes status from **present** to **stored**.
If the defective sensor is located, check its connections and its conformity. If necessary replace the sensor.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF113 **CONTINUED**	

Connect the bornier in place of the computer and check **the insulation, continuity and the absence of interference resistance on the following connections**:

Computer connector C **track C4**	→	**Track B** Refrigerant pressure sensor
Computer connector B **track C1**	→	**Track 3** inlet pressure-temperature sensor
Computer connector B **track D1**	→	**Track 3** rail pressure sensor
Computer connector A **track G2**	→	**Track 3** pedal sensor gang 1
Computer connector B **track B1**	→	**Track 2** EGR valve position sensor
Computer connector B **track A1**	→	**Track 3** of the flowmeter

Repair if necessary.

If the fault persists, **apply the fault finding procedure** for each sensor **with a 5 V supply**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF114 STORED	EGR SOLENOID VALVE CIRCUIT 1.DEF : At minimum limit 2.DEF : At maximum limit 3.DEF : Inconsistency 4.DEF : Valve jammed 5.DEF : Valve clogged

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present at **idling speed**.
	Special notes: If fault **DF114** is present, the engine speed will be unsteady and may even stall. Cold starting is difficult or impossible and the **level 1 warning light comes on along with the message Injection Faulty**.

Check the connection and condition of the EGR solenoid valve **6-track connector**.
Repair if necessary.

Check the connection and condition of the computer's 48-track brown **connector B**.
Repair if necessary.

Measure the resistance between **tracks 1 and 5 of the EGR solenoid valve**.
Replace the EGR solenoid valve if the resistance is not **8 Ω ± 0.5 Ω at 25 °C**.

Check **the insulation, continuity and the absence of interference resistance on the following connections**:

+ After ignition feed → **track 1** EGR solenoid valve

Computer connector **B track L3** → **track 5** EGR solenoid valve

Repair if necessary.

If 3.DEF, 4.DEF, 5.DEF:
Remove the EGR valve. Check that there are no foreign bodies (scale, etc.) that could jam the valve.
Remove any foreign bodies and clean the EGR valve. Refit the EGR valve.
Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

AFTER REPAIR	If the EGR valve has been replaced, use command **RZ002** to set the EGR valve parameters to 0. Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF116 PRESENT	MULTIPLEX NETWORK 1.DEF: Carry out the multiplex network fault finding procedure

NOTES	None

Carry out the fault finding procedure for the multiplex network.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF121 **STORED**	ACCELEROMETER CIRCUIT

NOTES	**Priorities when dealing with a number of faults:** In the event of a combination of faults **DF121 and DF001, DF098, DF003** deal with faults **DF001 Coolant temperature, DF002 Air temperature, DF098 Fuel temperature, DF003 Atmospheric pressure** first. A fault on these sensors could lead to incorrect fault finding of the accelerometer.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine idling**.

Check the **conformity of the injectors** fitted to the vehicle in relation to the **type of vehicle and engine number** (low-, high- or very high pressure injector).

Check the condition and connection of the **connector** for the **accelerometer**.
Repair if necessary.

Check the connection and condition of the computer brown 48-track **connector B** and the sensor shielding on **track K1**.
Repair if necessary.

Check the **insulation, continuity and the absence of interference resistance on the following connections**:

Sensor connector **track 1** → **Track F1** computer connector **B**

Sensor connector **track 2** → **Track G1** computer connector **B**

Repair if necessary.

Check that the C2I is correctly entered on the computer.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, the engine adaptives **must be cleared** using command **RZ004 Pressure regulation adaptives**.
Carry out a road test followed by another check with the diagnostic tool.
If the fault is still present, replace the accelerometer.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF122 PRESENT	PEDAL POTENTIOMETER GANG 2 SUPPLY VOLTAGE CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth

NOTES	**Special Notes:** If **DF122**, the idling speed is stuck at **1000 rpm**, engine performance is reduced to **75 %** and the **level 1 warning light comes on accompanied by message Injection Faulty**.

CC.0	***NOTES***	None

Check the connection and condition of the **6-track connector** for the **pedal potentiometer**. Repair if necessary.
Check the connection and condition of the computer's 32-track black **connector A**. Repair if necessary.
Measure the **resistance** between **tracks 2 and 6** of the **pedal potentiometer.** Replace the pedal potentiometer if the resistance is not **2.85 kΩ ± 2.05 kΩ**.
Disconnect computer **connector A** and the **pedal potentiometer connector**. Check **the insulation from earth** of the connection on track **F2** on computer **connector A**. Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF122 **CONTINUED**	

CO.1	***NOTES***	None

Check the connection and condition of the **pedal potentiometer connectors**. Repair if necessary.
Check the connection and condition of the computer's 32-track black **connector A**. Repair if necessary.
Measure the **resistance** between **tracks 2 and 6** of the **pedal potentiometer.** Replace the pedal potentiometer if the resistance is not **2.85 kΩ ± 2.05 kΩ**.
Disconnect computer connector A and the pedal potentiometer connector. **– Check for insulation on connector A between track F2 and F4.** – **Check the insulation against + 12 V** feed of the connection on track **F2** for computer **connector A**. Repair if necessary.
Check the **continuity, insulation and the absence of interference resistance on the following connections**: Sensor connector **track 2** → **Track F2** computer connector **A** Sensor connector **track 6** → **Track F4** computer connector **A** Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF130 **STORED**	FLOW CAPACITY FUNCTION

NOTES	**Special notes:** If **DF130**, the engine may stop, with the **level 1 and 2 warning lights on, accompanied by the message Injection Faulty**.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine running**.

Check the connection and condition of the **connector** for the fuel flow actuator (**IMV**), and repair if necessary.
Measure the resistance between **tracks 1 and 2 of the fuel flow actuator**. **Replace the fuel flow actuator** if the resistance is not **5.3 Ω ± 0.5 Ω at 20 °C**.
Check the connection and condition of the computer's 48-track brown **connector B**. Repair if necessary.
Check the **insulation, continuity and the absence of interference resistance on the following connection**: Computer connector **B track M4** ⟶ **track 1** fuel flow actuator Repair if necessary.
Check **for fuel** in the tank. Carry out **Test 1 Low pressure circuit check**. Repair if necessary.
If the fault is still present, carry out **test 7 High pressure system check (see TEST)**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Battery voltage**	**PR074:** Battery voltage.	**12 V < PR074 < 13.5 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**
2	**Engine speed**	**PR055:** Engine speed	**Indicates the engine's speed of rotation in rpm.**	**In the event of a fault, apply the fault finding procedure for DF005 Engine speed sensor circuit.**
3	**Accelerator pedal position**	**PR030:** Accelerator pedal position. **0%**	**Indicates the position of the accelerator pedal as a %. PR030 = 0%**	**In the event of a fault**, apply the **fault finding procedure** for faults **Pedal sensor circuit, track 1 and track 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**.
4	**Coolant temperature**	**PR064:** Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**
5	**External air temperature**	**PR061:** External air temperature	**Indicates the external air temperature in °C. This parameter is controlled by the UCH and transmitted to the injection on the multiplex network.** Default value: 20 °C.	**In the event of a fault, apply the fault finding procedure for this fault described in the UCH document.**
6	**Inlet air temperature (invalid in K9K 728)**	**PR059:** Inlet air temperature Cold = PR061 Warm: 30 °C	**Indicates the inlet air temperature in °C. This signal is provided by the air temperature/pressure sensor.** Default value: 30 °C	**In the event of a fault, refer to the interpretation for parameter PR059 Inlet air temperature.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

MAIN COMPUTER STATUSES AND PARAMETERS (Continued 1)

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
7	**Fuel temperature**	**PR063:** Fuel temperature. Cold = PR064 Warm: 50 °C	**Indicates the fuel temperature in °C. This value is supplied by the fuel temperature sensor.** Default value: 30 °C.	**In the event of a fault, apply the fault finding procedure for fault DF098 Fuel temperature sensor circuit.**
8	**Air circuit pressure**	**PR035:** Atmospheric pressure. **PR032:** Inlet pressure.	**Indicates the atmospheric pressure in mbar. The sensor is built into the computer.** **Indicates the pressure in the inlet circuit in mbar.**	**If not consistent, check that PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
9	**Rail pressure**	**PR038:** Rail pressure. Cold and warm: **- 90 bar < PR038 > 90 bar**.	**Gives the pressure of the diesel in the injection rail in Bar. This pressure is supplied by the sensor on the rail.** Default value: 2000 Bar	**In the event of a fault apply the fault finding procedure for fault DF007 Rail pressure sensor circuit.**
10	**Engine**	**ET038:** Engine. **UNDER + AFTER IGNITION FEED**	**Indicates the current status of the engine.** **– UNDER + AFTER IGNITION FEED** **– UNDER STARTER** **– RUNNING** **– SUPPLY MAINTAINED:** Supply maintained during the power latch phase. **– STALLED:** When the engine has stalled. **– PROTECTED:** When a level 2 fault locking the engine speed to a certain value has appeared.	**NONE**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

MAIN COMPUTER STATUSES AND PARAMETERS (Continued 2)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
11	**Engine immobiliser**	**ET003:**	Engine immobiliser. **INACTIVE**	**Indicates the status of the immobiliser system.** **– INACTIVE:** The injection computer has recognised the immobiliser code transmitted by the UCH. **– ACTIVE:** The injection computer does not recognise the immobiliser code transmitted by the UCH.	**If ACTIVE, follow the associated Help given in the tool.**
12	**Code programmed**	**ET006:**	**Code programmed YES**	**States whether the immobiliser code has been programmed by the computer or not.** **– YES:** Code programmed. **– NO:** Code not programmed into injection computer.	**If NO, contact the techline.**
13	**Vehicle speed**	**PR089:**	Vehicle speed.	**Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer or vehicle speed ECU. This signal is transmitted to the injection via the multiplex network.**	**Test the multiplex network. Refer to ABS or vehicle speed ECU fault finding**
14	**New pump chamber filling**	**ET637:**	New pump chamber filling	**DONE**	**If NOT PERFORMED, see Replacement of components**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: STARTING

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Computer + after ignition**	**ET001:**	Computer + after ignition. **PRESENT**	**Indicates + after ignition feed to computer.** **– Present** **– Absent**	**In the event of a fault, apply the fault finding procedure for DF047 Computer feed voltage or DF015 Main relay control circuit.**
2	**Starting**	**ET076:**	Starting. **AUTHORISED**	**Indicates whether or not starting has been authorised by the injection** **AUTHORISED: the injection has given starting authorisation.** **PROHIBITED: the injection has not given starting authorisation.**	**If PROHIBITED, carry out a full fault finding procedure on the preheating system.**
3	**Engine**	**ET038:**	Engine. **+ AFTER IGNITION FEED ON**	**Indicates the current status of the engine.** **– + AFTER IGNITION FEED ON** **– STARTER ON** **– RUNNING** **– SUPPLY MAINTAINED: Supply maintained during the power latch phase.** **– STALLED: When the engine has stalled.** **– PROTECTED: When a fault locking the engine speed to a certain value has appeared.**	**NONE**
4	**Battery voltage**	**PR074:**	Battery voltage	**12 < PR074 < 13.5 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: PROTECTION

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Engine immobiliser**	**ET003:**	Engine immobiliser **INACTIVE**	**Indicates the status of the immobiliser system. – INACTIVE: The injection computer has recognised the immobiliser code transmitted by the UCH. – ACTIVE: The injection computer does not recognise the immobiliser code transmitted by the UCH.**	**If ACTIVE, follow the associated Help given in the tool.**
2	**Code programmed**	**ET006:**	Code programmed. **YES**	**Indicates whether the immobiliser code has been programmed into the computer. – YES: Code programmed – NO: Code not programmed into injection computer.**	**If NO, contact the techline.**
3	**Battery voltage**	**PR074:**	Battery voltage.	**12 V < PR074 < 13.5 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: COLD LOOP

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Air conditioning present**	**ET079:**	Air conditioning present. **YES**	**States whether the vehicle is fitted with air conditioning or not.** **– YES:** Air conditioning is detected by the injection computer. **– NO:** Air conditioning is not detected by the injection computer.	**If not consistent with the vehicle equipment, carry out the multiplex network test and apply the relevant procedure.**
2	**Compressor activation request**	**ET088:**	Request to engage compressor **INACTIVE**	**The injection requests the UPC (via the multiplex network) to start the compressor.** **– ACTIVE:** The multiplex network must not be faulty on the Automatic Transmission, UPC or UCH systems. The UCH must send a compressor starting request to the injection. The refrigerant pressure sensor must not be faulty. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **– INACTIVE: One of the above conditions has not been met.**	**NONE**
3	**AC authorised**	**ET004:**	Air conditioning authorisation. **NO**	**Non operational information, designed solely for fault finding purposes.** **– YES:** Satisfactory engine operating conditions (coolant temperature, engine load etc.). The vehicle is not in a specific movement phase (hill start or from stop etc.). **– NO:** One of the above conditions has not been met.	**NONE**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: COLD LOOP (Continued 1)

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
4	**Refrigerant pressure**	**PR037:** Refrigerant pressure.	**Indicates the value in bars of the refrigerant fluid pressure in the system.** **2 bar < PR037 < 27 bar** Safe value: 0 bar	**If there is a fault apply the fault finding procedure for DF049 Refrigerant sensor circuit. If the fault persists, replace the refrigerant sensor.**
5	**Engine speed**	**PR055:** Engine speed.	**Indicates the engine's speed of rotation in rpm.**	**In the event of a fault, apply the fault finding procedure for DF005 Engine speed sensor circuit.**
6	**Fast idling speed request**	**ET023:** Fast idling speed request. **ABSENT**	**The UCH requests sends a fast idling speed request to the injection.** **– ABSENT:** The UCH has not made a request. **– PRESENT:** The UCH has made a request.	**If ET023 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct consult the fault finding procedure for UCH.**
7	**Coolant temperature**	**PR064:** Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**
8	**Vehicle speed**	**PR089:** Vehicle speed.	**Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer or vehicle speed ECU. This signal is transmitted to the injection via the multiplex network.**	**Test the multiplex network.** **Refer to ABS or vehicle speed ECU fault finding.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: COLD LOOP (Continued 2)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
9	**Power used by the air conditioning compressor**	**PR125:**	Power absorbed by air conditioning compressor. **0 WATT**	**Indicates the power used by the compressor.**	**NONE**
10	**Fan assembly speed request ***	**ET022:**	Low speed fan assembly request. **INACTIVE**	**The injection requests the UPC to start the fan assemblies.** **– INACTIVE:** Engine speed = 0 rpm. **– ACTIVE:** Engine speed = idle speed, correct refrigerant pressure and vehicle speed = 0 mph or high coolant temperature.	**NONE**
11	**Fan assembly speed request ***	**ET021:**	High speed fan assembly request. **INACTIVE**	**The injection requests the UPC to start the fan assemblies.** **– INACTIVE:** Engine speed = 0 rpm. **– ACTIVE:** Engine speed = idling speed. Refrigerant pressure > 15 bar, vehicle speed = **0 mph (0 mph)** or high coolant temperature.	**NONE**

*** When the air conditioning is requested with the engine idling and vehicle speed = 0 mph, ET022 will always be ACTIVE and ET021 INACTIVE (unless refrigerant pressure > 15 bar, vehicle speed = 0 mph and high coolant temperature). The fan assemblies are disabled under certain coolant temperature conditions when driving.**

When the UPC no longer receives multiplex injection transmissions the fan assemblies operate continuously.

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: HEATING

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**
2	**Set number of RCH**	**ET111:**	Set number of RCH. **YES - NO**	**The RCH are controlled by the UCH. They are high current consumers. Consequently, their use is conditional on the available power all the time (alternator power). The injection checks the mechanical power available according to the engine operating conditions (torque, power etc.) to authorise, limit or stop their use. (These signals are sent via the CAN network to the UCH).** Note: **When the RCHs are actuated, the injection must respond to a fast idling speed request from the UCH**.	**NONE**
3	**RCH cut-off**	**ET112:**	Passenger compartment heating resistor cut-off **YES - NO**		

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: LPG/FUEL CIRCUIT

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Fuel temperature**	**PR063:** Fuel temperature. Cold = PR064 Warm: 50 °C	**Indicates the fuel temperature in °C.** Default value: 30 °C.	**In the event of a fault, apply the fault finding procedure for fault DF098 Fuel temperature sensor circuit.**
2	**Fuel flow**	**PR017:** Fuel flow. **0.0 mg/st**	**Indicates the fuel flow injected in mg/st for each injector. PR017 = 0 mg/st**	**NONE**
3	**Rail pressure**	**PR038:** Rail pressure. Cold and warm: **- 90 bar < PR038 < 90 bar**.	**Indicates the pressure of the diesel fuel in the injection rail in bar. This pressure is supplied by the sensor on the rail.** Default value: **2000 bar**	**In the event of a fault, apply the fault finding procedure for fault DF007 Rail pressure sensor circuit.**
4	**Rail pressure setpoint**	**PR008:** Rail pressure set point. **375 bar**. (Engine starting pressure setpoint). Cold: 500 bar. Warm: 300 bar	**Gives a theoretical pressure value for optimum engine operation. 300 bar < PR008 < 500 bar**	**NONE**
5	**Rail pressure sensor voltage**	**PR080:** Rail pressure sensor voltage. Cold: 0.5 V Cold: 4.5 V	**Shows the voltage delivered by the computer on the rail pressure sensor.** 0.5 V < PR080 < 4.5 V Default value: 4.5 V	**NONE**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: FUEL/LPG CIRCUIT (continued)

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
6	Engine speed	**PR055:** Engine speed	Indicates the engine's speed of rotation in rpm.	In the event of a fault, apply the fault finding procedure for DF005 Engine speed sensor circuit.
7	New pump chamber filling	**ET637:** New pump chamber filling	DONE	If NOT PERFORMED, see Replacement of components

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: PREHEATING/IGNITION

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**
2	**External air temperature**	**PR061:**	External air temperature	**Indicates the external air temperature in °C. This parameter is managed by the UCH and transmitted to the injection on the multiplex network. Default value: 20 °C**	**In the event of a fault, apply the fault finding procedure for this fault described in the UCH document.**
3	**Inlet air temperature (invalid in K9K 728)**	**PR059:**	Inlet air temperature. Cold = PR061 Warm: 30 °C	**Indicates the inlet air temperature in °C. This signal is provided by the air temperature/ pressure sensor.** Default value: **30 °C**.	**In the event of a fault, refer to the interpretation for parameter PR059 Inlet air temperature.**
4	**Battery voltage**	**PR074:**	Battery voltage	**12 < PR074 <13.5 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: AIR CIRC. (TURBOCHARGING/INLET)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Inlet air temperature (invalid in K9K 728)**	**PR059:**	Inlet air temperature Cold = PR061 Warm: 30 °C	**Indicates the inlet air temperature in °C. This signal is provided by the air temperature/ pressure sensor.** Default value: 30 °C.	**In the event of a fault, refer to the interpretation for parameter PR059 Inlet air temperature.**
2	**Air circuit pressure**	**PR035:** **PR032:**	Atmospheric pressure. Inlet pressure.	**Indicates the atmospheric pressure in mbar. The sensor is built into the computer.** **Indicates the pressure in the inlet circuit in mbar.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
3	**Air flow**	**PR132:**	Air flow.	**Air flow estimated by the injection computer.**	**NONE**
4	**Inlet temperature sensor voltage**	**PR081:**	Inlet temperature sensor voltage	**Shows the voltage delivered by the computer to supply the inlet temperature sensor.**	**NONE**
5	**Engine speed**	**PR055:**	Engine speed.	**Indicates the engine's speed of rotation in rpm.**	**In the event of a fault, apply the fault finding procedure for DF005 Engine speed sensor circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: ENGINE COOLING

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:** Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: DRIVER PARAMETERS

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Accelerator pedal position**	**PR030:** Accelerator pedal position. **0 %.**	**Indicates the pedal position percentage between no load and full load position. 0 % < PR030 < 100 %**	**In the event of a fault**, apply the **fault finding procedure** for faults **Pedal sensor circuit, gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**.
2	**Pedal potentiometer gangs voltage**	**PR086:** Pedal potentiometer gang 1 voltage. **16 %** **PR088:** Pedal potentiometer gang 2 voltage. **7 %**	**Indicates the voltage supply percentage for gangs 1 and 2 of the pedal potentiometer. 10 % < PR086 < 20 % 5 % < PR088 < 15 %**	**In the event of a fault**, apply the **fault finding procedure** for faults **Pedal sensor circuit, gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**.

DIESEL INJECTION
Fault finding - Conformity check

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: ANTIPOLLUTION/OBD

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**EGR solenoid valve control**	**ET008:**	EGR solenoid valve control. **INACTIVE**	**Indicates the condition of the EGR valve control.** **– INACTIVE:** The valve is not under the computer's control. **– ACTIVE:** The valve is under the computer's control.	**NONE**
2	**Atmospheric pressure**	**PR035:**	Atmospheric pressure.	**Indicates the atmospheric pressure in mbar. The sensor is built into the computer.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
3	**Air flow**	**PR132:**	Air flow	**Air flow estimated by the injection computer.**	**NONE**
4	**Fuel flow**	**PR017:**	Fuel flow. **0.0 mg/st**	**Indicates the fuel flow out of the high pressure pump in mg/st.**	**NONE**
5	**EGR valve opening setpoint**	**PR005:**	EGR valve opening setpoint. Warm or cold = - 50	**Gives a theoretical EGR valve opening value for optimum engine operation.** PR005 = PR051	**NONE**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: ANTIPOLLUTION/OBD (continued)

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
6	**EGR valve position feedback**	**PR051:** EGR valve position feedback. Warm or cold = - 50	**Indicates the actual value of the EGR valve position.** PR051 = PR005	**NONE**
7	**EGR valve position sensor voltage**	**PR077:** EGR valve position sensor voltage. **1.09 V**	**Indicates the EGR valve voltage according to its position.** – **INACTIVE:** The valve is not under the computer's control. – **ACTIVE:** The valve is under the computer's control. **0.5 V < PR077 < 4.8 V**	**NONE**
8	**Accelerator pedal position**	**PR030:** Accelerator pedal position. **0 %**	**Indicates the pedal position percentage between no load and full load position.** **PR030 = 0%**	**In the event of a fault,** apply the **fault finding procedure** for faults **Pedal sensor circuit, gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**
9	**Coolant temperature**	**PR064:** Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: CRUISE CONTROL/SPEED LIMITER

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Vehicle speed**	**PR089:** Vehicle speed.	**Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer or vehicle speed ECU. This signal is transmitted to the injection via the multiplex network.**	**Test the multiplex network. Refer to ABS or vehicle speed ECU fault finding**
2	**Cruise control/speed limiter**	**ET042:** Cruise control/ speed limiter. **INACTIVE**	**Indicates the status of the controls on the steering wheel and the Cruise control/speed limiter switch.** **– INACTIVE:** When no buttons are pressed. **– STATUS 1:** Cruise control on/off button pressed. **– STATUS 2:** Speed limiter on/off button pressed. **– STATUS 3:** Increase button pressed. **– STATUS 4:** Decrease button pressed. **– STATUS 5:** Suspend button pressed. **– STATUS 6:** Resume button pressed.	**In the event of a fault, refer to the ET042 Cruise control/speed limiter status.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

SUB-FUNCTION: CRUISE CONTROL/SPEED LIMITER (Continued)

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
3	Brake contact	**ET012:** Primary brake contact. **INACTIVE**	**Indicates recognition of brake pedal contacts.** **– INACTIVE:** Brake pedal released. **– ACTIVE:** Brake pedal depressed.	**In the event of a fault, refer to interpretation for status ET012 Primary brake contact.**
		ET013: Secondary brake contact. **INACTIVE**		**If ET013 is inconsistent, test the multiplex network using the diagnostic tool.**
4	Clutch contact	**ET040:** Clutch pedal. **INACTIVE**	**Shows recognition of clutch pedal contacts** **– INACTIVE:** Pedal released. **– ACTIVE:** Pedal depressed.	**In the event of a fault, refer to the interpretation for status ET040 Clutch pedal.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Battery voltage**	**PR074:** Battery voltage.	**13 V < P R074 < 14 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**
2	**Engine speed**	**PR055:** Engine speed Cold: 900 rpm Warm: 805 rpm	**Indicates the engine's speed of rotation in rpm.**	**In the event of a fault, apply the fault finding procedure for DF005 Engine speed sensor circuit.**
3	**Accelerator pedal position**	**PR030:** Accelerator pedal position. **0 %**	**Indicates the position of the accelerator pedal as a %.** **PR030 = 0 %**	**In the event of a fault**, apply the **fault finding procedure** for faults **Pedal sensor circuit, gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**.
4	**Coolant temperature**	**PR064:** Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**
5	**External air temperature**	**PR061:** External air temperature.	**Indicates the external air temperature in °C. This parameter is managed by the UCH and transmitted to the injection on the multiplex network.** Default value: 20 °C.	**In the event of a fault, apply the fault finding procedure for this fault described in the UCH document.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

MAIN COMPUTER STATUSES AND PARAMETERS (Continued 1)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
6	**Inlet air temperature**	**PR059:**	Inlet air temperature Cold = PR061 Warm: 30 °C	**Gives the inlet air temperature in °C. This signal is provided by the air temperature/pressure sensor.** Default value: 20 °C	**In the event of a fault, refer to the interpretation for parameter PR059 Inlet air temperature.**
7	**Fuel temperature**	**PR063:**	Fuel temperature. Cold = PR064 Warm: 50 °C	**Indicates the fuel temperature in °C. This value is supplied by the fuel temperature sensor.** Default value: 30 °C.	**In the event of a fault, apply the fault finding procedure for fault DF098 Fuel temperature sensor circuit.**
8	**Air circuit pressure**	**PR035:**	Atmospheric pressure.	**Indicates the atmospheric pressure in mbar. The sensor is built into the computer.** 600 mbar < Cold < 1050 mbar 600 mbar < Warm < 1050 mbar.	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
		PR032:	Inlet pressure.	**Indicates the pressure in the inlet circuit in mbar.** PR032 = Local atmospheric pressure.	
9	**Rail pressure**	**PR038:**	Rail pressure. Cold: 260 bar. Warm: 230 Bar	**Indicates the pressure of the diesel fuel in the injection rail in bar. This pressure is supplied by the sensor on the rail.** Default value: 2000 Bar.	**In the event of a fault, apply the fault finding procedure for fault DF007 Rail pressure sensor circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

MAIN COMPUTER STATUSES AND PARAMETERS (Continued 2)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
10	**Engine**	**ET038:**	Engine. **RUNNING**	**Indicates the current status of the engine.** **– + AFTER IGNITION FEED ON** **– STARTER ON** **– RUNNING** **– SUPPLY MAINTAINED:** Supply maintained during the power latch phase. **– STALLED:** When the engine has stalled. **– PROTECTED:** When a level 2 fault locking the engine speed to a certain value has appeared.	**NONE**
11	**Engine immobiliser**	**ET003:**	Engine immobiliser. **INACTIVE**	**Gives the status of the engine immobiliser system.** **– INACTIVE:** The injection computer has recognised the immobiliser code transmitted by the UCH. **– ACTIVE:** The injection computer does not recognise the immobiliser code transmitted by the UCH.	**If ACTIVE, follow the associated Help given in the tool.**
12	**Code programmed**	**ET006:**	**Code programmed YES**	**States whether the immobiliser code has been programmed by the computer or not.** **– YES:** Code programmed. **– NO:** Code not programmed into injection computer.	**If NO, contact the techline.**
13	**Vehicle speed**	**PR089:**	Vehicle speed.	**Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer or vehicle speed ECU. This signal is transmitted to the injection via the multiplex network.**	**Test the multiplex network. Refer to ABS or vehicle speed ECU fault finding.**
14	**New pump chamber filling**	**ET637:**	New pump chamber filling	**DONE**	**If NOT PERFORMED, see Replacement of components**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: STARTING

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Computer + after ignition**	**ET001:**	Computer + after ignition. **PRESENT**	**Indicates + after ignition feed to computer. – Present – Absent**	**In the event of a fault, carry out the fault finding procedure for DF047 Computer supply voltage or DF015 Main relay circuit.**
2	**Starting**	**ET076:**	Starting. **AUTHORISED**	**Indicates whether or not starting has been authorised by the injection AUTHORISED: the injection has given starting authorisation. PROHIBITED: the injection has not given starting authorisation.**	**If PROHIBITED, carry out a full fault finding procedure on the preheating system.**
3	**Engine**	**ET038:**	Engine. **RUNNING**	**Indicates the current status of the engine. – + AFTER IGNITION FEED ON – STARTER ON – RUNNING – SUPPLY MAINTAINED: Supply maintained during the power latch phase. – STALLED: When the engine has stalled. – PROTECTED: When a fault locking the engine speed to a certain value has appeared.**	**NONE**
4	**Battery voltage**	**PR074:**	Battery voltage	**13 V < PR074 < 14 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: PROTECTION

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Engine immobiliser**	**ET003:**	Engine immobiliser **INACTIVE**	**Indicates the status of the immobiliser system. – INACTIVE: The injection computer has recognised the immobiliser code transmitted by the UCH. – ACTIVE: The injection computer does not recognise the immobiliser code transmitted by the UCH.**	**If ACTIVE, follow the associated Help given in the tool.**
2	**Code programmed**	**ET006:**	Code programmed. **YES**	**Indicates whether the immobiliser code has been programmed into the computer. – YES: Code programmed – NO: Code not programmed into injection computer.**	**If NO, contact the techline.**
3	**Battery voltage**	**PR074:**	Battery voltage.	**13 V < PR074 < 14 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: COLD LOOP

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Air conditioning present**	**ET079:** Air conditioning present. **YES**	**States whether the vehicle is fitted with air conditioning or not.** **– YES:** Air conditioning is detected by the injection computer. **– NO:** Air conditioning is not detected by the injection computer.	**If not consistent with the vehicle equipment, carry out the multiplex network test and apply the relevant procedure.**
2	**Compressor activation request**	**ET088:** Request to engage compressor **INACTIVE**	**The injection requests the UPC (via the multiplex network) to start the compressor.** **– ACTIVE:** The multiplex network must not be faulty on the Automatic Transmission, UPC or UCH systems. The UCH must send a compressor starting request to the injection. The refrigerant pressure sensor must not be faulty. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **– INACTIVE:** One of the above conditions has not been met or no request has been made by the driver, so **ET004 = NO**.	**NONE**
3	**AC authorised**	**ET004:** Air conditioning authorisation. **NO**	**Non operational information, designed solely for fault finding purposes.** **– YES:** Satisfactory engine operating conditions (coolant temperature, engine load etc.). The vehicle is not in a specific movement phase (hill start or from stop etc.). **– NO:** One of the above conditions has not been met or no request has been made by the driver, so **ET088 = INACTIVE**.	**NONE**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: COLD LOOP (Continued 1)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
4	**Refrigerant pressure**	**PR037:**	Refrigerant pressure.	**Indicates the value in bars of the refrigerant fluid pressure in the system.** **2 bar < PR037 < 27 bar** Safe value: 0 bar	**If there is a fault, apply the fault finding procedure for DF049 Refrigerant sensor circuit. If the fault persists, replace the refrigerant sensor.**
5	**Engine speed**	**PR055:**	Engine speed. Cold: 900 rpm. Warm: 805 rpm.	**Indicates the engine's speed of rotation in rpm.**	**In the event of a fault, apply the fault finding procedure for DF005 Engine speed sensor circuit.**
6	**Fast idling speed request**	**ET023:**	Fast idling speed request. **ABSENT**	**The UCH requests sends a fast idling speed request to the injection.** **– ABSENT:** The UCH has not made a request. **– PRESENT:** The UCH has made a request.	**If status ET023 is inconsistent, test the multiplex network using the diagnostic tool. If the test is in order, consult the fault finding procedure for UCH.**
7	**Coolant temperature**	**PR064:**	Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**
8	**Vehicle speed**	**PR089:**	Vehicle speed.	**Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer or vehicle speed ECU. This signal is transmitted to the injection via the multiplex network.**	**Test the multiplex network.** **Refer to ABS or vehicle speed ECU fault finding.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: COLD LOOP (Continued 2)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
9	**Power used by the air conditioning compressor**	**PR125:**	Power absorbed by air conditioning compressor. **0 WATT**	**Indicates the power used by the compressor.**	**NONE**
10	**Fan assembly speed request ***	**ET022:**	Low speed fan assembly request. **INACTIVE**	**The injection requests the UPC to start the fan assemblies.** **– INACTIVE:** The injection has not made the request because ET088 = INACTIVE and ET004 = NO. **– ACTIVE:** Request made by the injection. ET088 = ACTIVE and ET004 = YES. (Correct refrigerant pressure and vehicle speed = 0 mph (km/h) or high coolant temperature).	**NONE**
		ET021:	High speed fan assembly request. **INACTIVE**	**The injection requests the UPC to start the fan assemblies.** **– INACTIVE:** The injection has not made the request because ET088 = INACTIVE and ET004 = NO. **– ACTIVE:** Request made by the injection. ET088 = ACTIVE and ET004 = YES. (Refrigerant pressure > 15 bar and vehicle speed = 0 mph (km/h) or high engine coolant temperature).	

*** When the air conditioning is requested with the engine idling and vehicle speed = 0 mph, ET022 will always be ACTIVE and ET021 INACTIVE (unless refrigerant pressure > 15 bar, vehicle speed = 0 mph and high coolant temperature). The fan assemblies are disabled under certain coolant temperature conditions when driving.**

When the UPC no longer receives multiplex injection transmissions the fan assemblies are constantly activated.

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: HEATING

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**
2	**Set number of RCH**	**ET111:**	Set number of RCH. **YES - NO**	**The RCH are controlled by the UCH. They are high current consumers. Consequently, their use is conditional on the available power all the time (alternator power). The injection checks the mechanical power available according to the engine operating conditions (torque, power etc.) to authorise, limit or stop their use. (These signals are sent via the CAN network to the UCH).** Note: **When the RCHs are actuated, the injection must respond to a fast idling speed request from the UCH**.	**NONE**
3	**RCH cut-off**	**ET112:**	Passenger compartment heating resistor cut-off **YES - NO**		

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: LPG/FUEL CIRCUIT

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Fuel temperature**	**PR063:** Fuel temperature. Cold = PR064 Warm: 50 °C	**Indicates the fuel temperature in °C.** Default value: 30 °C.	**In the event of a fault, apply the fault finding procedure for fault DF098 Fuel temperature sensor circuit.**
2	**Fuel flow**	**PR017:** Fuel flow. 10 < Cold < 2 mg/st 4 < Warm < 6 mg/st	**Indicates the fuel flow injected in mg/st for each injector.**	**NONE**
3	**Rail pressure**	**PR038:** Rail pressure. Cold: 260 bar Warm: 230 Bar	**Indicates the pressure of the diesel fuel in the injection rail in bar. This pressure is supplied by the sensor on the rail.** Default value: **2000 bar**	**In the event of a fault, apply the fault finding procedure for fault DF007 Rail pressure sensor circuit.**
4	**Rail pressure setpoint**	**PR008:** Rail pressure setpoint. **375 bar** (Engine starting pressure setpoint). Cold: 260 bar. Warm: 230 Bar	**Gives a theoretical pressure value for optimum engine operation.**	**NONE**
5	**Rail pressure sensor voltage**	**PR080:** Rail pressure sensor voltage.	**Shows the voltage delivered by the computer on the rail pressure sensor.** **0.5 V (0 bar) < PR080 < 4.5 V (1600 bar)**	**NONE**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: FUEL/LPG CIRCUIT (continued)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
6	**Engine speed**	**PR055:**	Engine speed. Cold: 900 rpm Warm: 805 rpm	**Indicates the engine's speed of rotation in rpm.**	**In the event of a fault, apply the fault finding procedure for DF005 Engine speed sensor circuit.**
7	**New pump chamber filling**	**ET637:**	New pump chamber filling	**DONE**	**If NOT PERFORMED, see Replacement of components**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: PREHEATING/IGNITION

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**
2	**External air temperature**	**PR061:**	External air temperature.	**Indicates the external air temperature in °C. This parameter is managed by the UCH and transmitted to the injection on the multiplex network.** Default value: 20 °C	**In the event of a fault, apply the fault finding procedure for this fault described in the UCH document.**
3	**Inlet air temperature (invalid in K9K 728)**	**PR059:**	Inlet air temperature Cold = PR061 Warm: 30 °C	**Indicates the inlet air temperature in °C. This signal is provided by the air temperature/ pressure sensor.** Default value: 30 °C.	**In the event of a fault, refer to the interpretation for parameter PR059 Inlet air temperature.**
4	**Battery voltage**	**PR074:**	Battery voltage.	**12 V < PR074 < 14 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: AIR CIRC. (TURBO/INLET)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Inlet air temperature (invalid in K9K 728)**	**PR059:** Inlet air temperature Cold = PR061 Warm: 30 °C	**Indicates the inlet air temperature in °C. This signal is provided by the air temperature/ pressure sensor.** Default value: 30 °C.	**In the event of a fault, refer to the interpretation for parameter PR059 Inlet air temperature.**
2	**Air circuit pressure**	**PR035:** Atmospheric pressure. **PR032:** Inlet pressure.	**Indicates the atmospheric pressure in mbar. The sensor is built into the computer.** **Indicates the pressure in the inlet circuit in mbar.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
3	**Air flow**	**PR132:** Air flow 350 < Cold < 400 mg/st 300 < Warm < 350 mg/st	**Air flow estimated by the injection computer.**	**NONE**
4	**Inlet temperature sensor voltage**	**PR081:** Inlet temperature sensor voltage	**Shows the voltage delivered by the computer to supply the inlet temperature sensor**	**NONE**
5	**Engine speed**	**PR055:** Engine speed. Cold: 900 rpm. Warm: 805 rpm	**Indicates the engine's speed of rotation in rpm.**	**In the event of a fault, apply the fault finding procedure for DF005 Engine speed sensor circuit.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: ENGINE COOLING

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:** Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: DRIVER PARAMETERS

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Accelerator pedal position**	**PR030:** Accelerator pedal position. **0 %**	**Indicates the pedal position percentage between no load and full load position.** **0 % < PR030 < 100 %**	**In the event of a fault**, apply the **fault finding procedure** for faults **Pedal sensor circuit, gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**.
2	**Pedal potentiometer gangs voltage**	**PR086:** Pedal potentiometer gang 1 voltage. **16 %** **PR088:** Pedal potentiometer gang 2 voltage. **7 %**	**Indicates the voltage supply percentage for gangs 1 and 2 of the pedal potentiometer.** **10 % < PR086 < 20 %** **5 % < PR088 < 15 %**	**In the event of a fault**, apply the **fault finding procedure** for faults **Pedal sensor circuit, gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**.

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: ANTIPOLLUTION/OBD

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**EGR solenoid valve control**	**ET008:** EGR solenoid valve control. **INACTIVE**	**Indicates the condition of the EGR valve control.** **– INACTIVE:** The valve is not under the computer's control. **– ACTIVE:** The valve is under the computer's control.	**NONE**
2	**Atmospheric pressure**	**PR035:** Atmospheric pressure.	**Indicates the atmospheric pressure in mbar. The sensor is built into the computer.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
3	**Air flow**	**PR132:** Air flow 350 < Cold < 400 mg/st 300 < Warm < 350 mg/st	**Air flow estimated by the injection computer.**	**NONE**
4	**Fuel flow**	**PR017:** Fuel flow. 10 < Cold < 12 mg/st 4 < Warm < 6 mg/st	**Indicates the fuel flow out of the high pressure pump in mg/st.**	**NONE**
5	**EGR valve opening setpoint**	**PR005:** EGR valve opening setpoint. Warm: 20 %	**Gives a theoretical EGR valve opening value for optimum engine operation.**	**NONE**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: ANTIPOLLUTION/OBD (continued)

Order	Function	Parameter or Status Check or Action		Display and Notes	Fault finding
6	**EGR valve position feedback**	**PR051:**	EGR valve position feedback. Warm approximately 20 %	**Indicates the actual value of the EGR valve position.** Default value: 30 %	**NONE**
7	**EGR valve position sensor voltage**	**PR077:**	EGR valve position sensor voltage.	**Indicates the EGR valve voltage according to its position.** **– INACTIVE:** The valve is not under the computer's control. **– ACTIVE:** The valve is under the computer's control. **0.5 V < PR077 < 4.8 V**	**NONE**
8	**Accelerator pedal position**	**PR030:**	Accelerator pedal position. **0 %.**	**Indicates the pedal position percentage between no load and full load position.** **0 < PR030 < 100 %**	**In the event of a fault,** apply the **fault finding procedure** for faults **Pedal sensor circuit, gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**
9	**Coolant temperature**	**PR064:**	Coolant temperature. Warm: 90 °C	**Indicates the engine coolant temperature in °C.** Default value: 80 °C	**In the event of a fault, refer to the interpretation for parameter PR064 Coolant temperature.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: CRUISE CONTROL/SPEED LIMITER

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
1	**Vehicle speed**	**PR089:** Vehicle speed.	**Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer or vehicle speed ECU. This signal is transmitted to the injection via the multiplex network.**	**Test the multiplex network. Refer to ABS or vehicle speed ECU fault finding**
2	**Cruise control/speed limiter**	**ET042:** Cruise control/ speed limiter. **INACTIVE**	**Indicates the status of the controls on the steering wheel and the Cruise control/speed limiter switch.** **– INACTIVE:** When no buttons are pressed. **– STATUS 1:** Cruise control on/off button pressed. **– STATUS 2:** Speed limiter on/off button pressed. **– STATUS 3:** Increase button pressed. **– STATUS 4:** Decrease button pressed. **– STATUS 5:** Suspend button pressed. **– STATUS 6:** Resume button pressed.	**In the event of a fault, refer to the interpretation for the status ET042 Cruise control/speed limiter.**

NOTES	Only check conformity after a **full check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

SUB-FUNCTION: CRUISE CONTROL/SPEED LIMITER (CONTINUED)

Order	Function	Parameter or Status Check or Action	Display and Notes	Fault finding
3	**Brake contact**	**ET012:** Primary brake contact. **INACTIVE** **ET013:** Secondary brake contact. **INACTIVE**	**Indicates recognition of brake pedal contacts.** **– INACTIVE:** Brake pedal released. **– ACTIVE:** Brake pedal depressed.	**In the event of a fault, refer to interpretation for status ET012 Primary brake contact.** **If ET013 is inconsistent, test the multiplex network using the diagnostic tool.**
4	**Clutch contact**	**ET040:** Clutch pedal. **INACTIVE**	**Shows recognition of clutch pedal contacts** **– INACTIVE:** Pedal released. **– ACTIVE:** Pedal depressed.	**In the event of a fault, refer to the ET040 Clutch pedal status interpretation.**

Tool status	Diagnostic tool title
ET001	+ after ignition computer feed
ET003	Engine immobiliser
ET004	Air conditioning authorisation
ET006	Code programmed
ET008	EGR solenoid valve control
ET012	Primary brake contact
ET013	Secondary brake contact
ET018	Air conditioning request
ET021	High speed fan request
ET022	Low speed fan request
ET023	Fast idle speed request
ET038	Engine
ET040	Clutch pedal
ET042	Cruise control/Speed limiter
ET076	Starting
ET079	Air conditioning present
ET088	Compressor activation request
ET563	Flow capacity function
ET637	New pump chamber filling

Tool parameter	Diagnostic tool title
PR005	EGR valve opening setpoint
PR008	Rail pressure setpoint
PR010	Idle speed regulation setpoint
PR017	Fuel flow
PR025	Air flowmeter supply voltage
PR030	Accelerator pedal position
PR032	Inlet pressure
PR035	Atmospheric pressure
PR037	Refrigerant pressure
PR038	Rail pressure
PR051	EGR valve position feedback
PR055	Engine speed
PR059	Inlet air temperature (invalid in K9K 728)
PR061	External air temperature
PR063	Fuel temperature
PR064	Coolant temperature
PR074	Battery voltage
PR077	EGR valve position sensor voltage
PR080	Rail pressure sensor voltage
PR081	Inlet temperature sensor voltage
PR086	Pedal potentiometer gang 1 voltage
PR088	Pedal potentiometer gang 2 voltage
PR089	Vehicle speed
PR125	Power absorbed by the air conditioning compressor
PR127	Heating resistor maximum authorised power
PR132	Air flow

ET012	PRIMARY BRAKE CONTACT

NOTES	**Special notes:** Only apply the checks if the "**INACTIVE**" and "**ACTIVE**" statuses are not consistent with the pedal position.

INACTIVE STATUS: Brake pedal depressed.

If the brake lights are working:
– Check the continuity of the connection between **track 1** of the brake light switch connector and **track E4** of the 32-track black **connector A** for the **computer**.

If the brake lights are not working:
– Check the condition and fitting of the brake light switch and brake lights fuse.
– Remove the brake light switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch engaged (Brake pedal released)	**3 and 4**	**1 and 2**
Switch released (Brake pedal depressed)	**1 and 2**	**3 and 4**

– Replace the switch if necessary.
– Check for the presence of **+ after ignition feed** on tracks **2 and 4** on the brake light switch connector.

AFTER REPAIR	Carry out a road test, followed by a check with the diagnostic tool.

ET012 **CONTINUED**	

ACTIVE STATUS: brake pedal released.

– Check the condition and fitting of the brake light switch and brake lights fuse.
– Remove the brake light switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch engaged (Brake pedal released)	**3 and 4**	**1 and 2**
Switch released (Brake pedal depressed)	**1 and 2**	**3 and 4**

– Replace the switch if necessary.

– Check for **insulation of the 12 V** feed on the connection between **track 1** of the brake light switch connector and **track E4** of the 32-track black connector **A** for the **computer**.

AFTER REPAIR	Carry out a road test, followed by a check with the diagnostic tool.

ET040	CLUTCH PEDAL

NOTES	**Special notes:** Only apply the checks if the "**INACTIVE**" and "**ACTIVE**" statuses are not consistent with the pedal position.

INACTIVE STATUS: Clutch pedal depressed.

– Check the condition and fitting of the clutch switch.
– Check and ensure the continuity of the connection between **track 1** of the clutch switch connector and **track C4** of the **black 32-track** computer connector.
– Check and ensure the presence of **earth** on **track 2** of the clutch switch connector.

Repair if necessary.
– Remove the clutch switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch engaged (Clutch pedal released)	**1 and 2**	**–**
Switch released (Clutch pedal depressed)	**–**	**1 and 2**

– Replace the switch if necessary.

AFTER REPAIR	Carry out a road test, followed by a check with the diagnostic tool.

ET040 **CONTINUED**	

ACTIVE STATUS: Clutch pedal released.

– Check the condition and fitting of the clutch switch.
– Remove the clutch switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch engaged (Clutch pedal released)	**1 and 2**	**–**
Switch released (Clutch pedal depressed)	**–**	**1 and 2**

– Replace the switch if necessary.

– Check for insulation **to earth** on the connection between **track 1** of the clutch switch connector and **track C4** of the black 32 track computer connector **A**.

AFTER REPAIR	Carry out a road test, followed by a check with the diagnostic tool.

ET042	CRUISE CONTROL/SPEED LIMITER

NOTES	**Special notes:** Only perform the checks if the statuses are not consistent with the position of the buttons.

No STATUS 1, STATUS 2, on/off switch pressed (ET042 INACTIVE).

Check the connections of the cruise control on/off switch and computer **(black 32-track connector A)**. Repair if necessary.

– Check for **+ after ignition** on **tracks A2** on the cruise control/speed limiter switch connector.

– Remove and test the operation of the cruise control/speed limiter switch:

	Continuity between tracks	Insulation between tracks
Switch in rest position	–	**A2 and A3 - A2 and B1**
Switch in cruise control position	**A2 and A3**	**A2 and B1**
Switch in speed limiter position	**A2 and B1**	**A2 and A3**

– Replace the switch if necessary.

– Check for and make sure there is **continuity and no interference resistance** on the connection between **track A3** (cruise control) or **B1** (speed limiter) of the switch connector and **track A2** (cruise control) or **C3** (speed limiter) of the black 32 track computer connector **A**.

AFTER REPAIR	Carry out a road test, followed by a check with the diagnostic tool.

ET042 **CONTINUED 1**	

STATUS 1, STATUS 2, switch in rest position.

Check the connections of the cruise control on/off switch and computer **(black 32-track connector A)**. Repair if necessary.

– Remove and test the operation of the cruise control/speed limiter switch:

	Continuity between tracks	Insulation between tracks
Switch in rest position	–	**A2 and A3 - A2 and B1**
Switch in cruise control position	**A2 and A3**	**A2 and B1**
Switch in speed limiter position	**A2 and B1**	**A2 and A3**

– Replace the switch if necessary.

– Check the **+ 12 V** insulation on the connection between **track A3** (cruise control) or **track B1** (speed limiter) of the cruise control/speed limiter switch connector and **track A2** (cruise control) or **track C3** (speed limiter) of the black 32-track computer **connector A** and repair if necessary.

AFTER REPAIR	Carry out a road test, followed by a check with the diagnostic tool.

ET042 **CONTINUED 2**	

No STATUS 3, STATUS 4, STATUS 5, STATUS 6, button pressed (ET042 INACTIVE).

– Lock the airbag computer and remove the driver's frontal airbag (refer to the Technical Notes on this subject).
– Check the condition and correct connection of the black 3-track connector beneath the driver's frontal airbag. Repair if necessary.
– Disconnect the **3-track** connector and on the buttons side, check the resistance value of the buttons:

Buttons in rest position	**STATUS 3** (+ button pressed)	**STATUS 4** (- button pressed)	**STATUS 5** (0 button pressed)	**STATUS 6** (R button pressed)
R = INFINITE	**R = approximately 300 Ω**	**R = approximately 100 Ω**	**R = approximately 0 Ω**	**R = approximately 900 Ω**

If the values are not in order, replace the controls on the steering wheel.

Reconnect the black **3-track** connector and take the same measurements from the black 32-track computer connector **A** between tracks **D3 and D2**.
– If the values are not in order, **check the connection** between the **engine injection computer** and the **rotary switch under the steering wheel** using the relevant wiring diagram (**line resistance, short circuit, etc.**).
Carry out the necessary repairs.
– If the values are in order, contact the Techline.

AFTER REPAIR	Carry out a road test, followed by a check with the diagnostic tool.

ET042 **CONTINUED 3**	

STATUS 3, STATUS 4, STATUS 5, STATUS 6, button released.

– Lock the airbag computer and remove the driver's frontal airbag (refer to the Technical Notes on this subject).
– Check the condition and correct connection of the black 3-track connector beneath the driver's frontal airbag. Repair if necessary.
– Disconnect the **3-track** connector and on the buttons side, check the resistance value of the buttons:

Buttons in rest position	**STATUS 3** (+ button pressed)	**STATUS 4** (- button pressed)	**STATUS 5** (0 button pressed)	**STATUS 6** (R button pressed)
R = INFINITE	**R = approximately 300 Ω**	**R = approximately 100 Ω**	**R = approximately 0 Ω**	**R = approximately 900 Ω**

If the values are not in order, replace the controls on the steering wheel.

Reconnect the black **3-track** connector and take the same measurements from the black 32-track computer connector **A** between tracks **D3 and D2**.
– f the values are not in order **check** the connection **between** the **engine injection computer** and the **rotary switch** under the steering wheel using the relevant wiring diagram (**line resistance, short circuit, insulation from earth etc.**).
Carry out the necessary repairs.
– If the values are in order, contact the Techline.

AFTER REPAIR	Carry out a road test, followed by a check with the diagnostic tool.

PR059	INLET AIR TEMPERATURE

NOTES	**Special notes:** Only apply the checks if the parameter is **inconsistent**. **PR059 is invalid and freezes at - 50 °C for K9K 728 engine.**

Check the condition of the air temperature/pressure sensor connections.
If necessary replace the sensor.
Measure the **resistance** across **tracks 1 and 2** of the air temperature/pressure sensor:

Theoretical values: 8950 to 9901 Ω at - 10 °C
7054 to 7784 Ω at - 5 °C
5605 to 6169 Ω at 0 °C
3618 to 3964 Ω at 10 °C
2400 to 2620 Ω at 20 °C
1645 to 1787 Ω at 30 °C

Replace the air temperature/pressure sensor, if not in order.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

PR064	COOLANT TEMPERATURE

NOTES	**Special notes:** Only apply the checks if the parameter is inconsistent.

Check the condition of the coolant temperature sensor connections.
If necessary replace the sensor.
Measure the **resistance** between tracks **2** and **3** of the **coolant temperature sensor**.

Theoretical values: 12.46 kΩ ± 1128 Ω at - 10 °C
2252 Ω ± 112.6 Ω at 25 °C
811.4 Ω ± 38.4 Ω at 50 °C
282.6 Ω ± 7.83 Ω at 80 °C

Replace the coolant temperature sensor if it is not in order.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

CLEARING

RZ001: Memory fault.
This command is used for clearing the computer's stored faults.

RZ002: EGR programming adaptives.
This command must only be used when the EGR valve is replaced.

RZ004: Pressure regulation programming adaptives.
This command must be used when replacing all 4 injectors at once It enables you to reset the injector adaptives.

RZ005: Programming.
This command enables you to reinitialise the entire computer configuration according to the vehicle.

ACTUATION

LPG/FUEL CIRCUIT tab

AC010: High pressure pump.
Activating this lets you listen to the operation of the high pressure pump.

AC005 to AC008: Cylinder 1 to 4 injectors.
Activating this lets you listen to the operation of the injector on the cylinder in question.

AC028: Static test.
Activating this runs the fault finding for the EGR and the high pressure pump circuits.

AC029: High pressure circuit sealing test.
Activating this lets you check the high-pressure circuit sealing after a procedure has been carried out.

AC212: New pump chamber filling
This must only be activated after a high pressure pump is replaced (see High pressure pump replacement in Replacement of components). This command is used to activate the pump repriming sequence.

IGNITION/PREHEATING tab

AC001: Preheating unit.
Activating this actuates the preheating unit to test the heater plug supply.

ACTUATION

ANTIPOLLUTION/OBD tab

AC002: EGR Solenoid valve.
Activating this lets you listen to the mechanical operation of the EGR valve.

AC028: Static test.
Activating this runs the fault finding for the EGR and the high pressure pump circuits.

TURBO/INLET AIR CIRCUIT tab

AC004: Turbocharging solenoid valve.
Activating this enables you to listen for the turbocharging solenoid valve operating.

NOTES	**Only consult these tests when dealing with a fault finding chart or when Interpreting faults.**

Some specific checks are grouped together into tests and are performed as required in the various fault finding charts (ALPs) or when interpreting faults.

TEST 1: Low pressure circuit check.

TEST 2: Electrical circuit check.

TEST 3: Injector check.

TEST 4: Parameter check.

TEST 5: Air inlet circuit check.

TEST 6: Computer check.

TEST 7: High pressure system check.

TEST 8: High pressure circuit sealing check.

TEST 9: Injector sealing check.

TEST 10: Injector return flow in starting phase.

TEST 11: Diesel filter check.

TEST 1	Low pressure circuit check

Check the conformity of the low pressure circuit connections.

Are the low pressure circuit connections in order?

NO → **Carry out the necessary repairs.**

YES

↓

Check the condition of the priming bulb, and that it is working properly.

↓

Look for leaks on the unions.

Are there leaks in the hoses and unions?

YES → **Carry out the necessary repairs.**

NO

↓

Check for air bubbles in the diesel fuel.

Are there any air bubbles in the low pressure circuit?

YES → **Bleed the low pressure circuit.**
Place a container under the filter.
- **Disconnect the leak return hose from the filter and cap the filter.**
- **Pump using the priming bulb until there is no more air.**
- **Reconnect the return hose immediately.**

NO

↓

Low pressure circuit in order.

TEST 2	Electrical circuit check

Check the battery charge, and that the alternator is working properly.

Is the charge circuit in order?

NO → **Carry out the necessary repairs.**

YES

Check the fuses.

Are the fuses correct?

NO → **Carry out the necessary repairs.**

YES

Check that the main injection relay is working properly.

Is the main injection relay working properly?

NO → **Carry out the necessary repairs.**

YES

Check the engine earths.

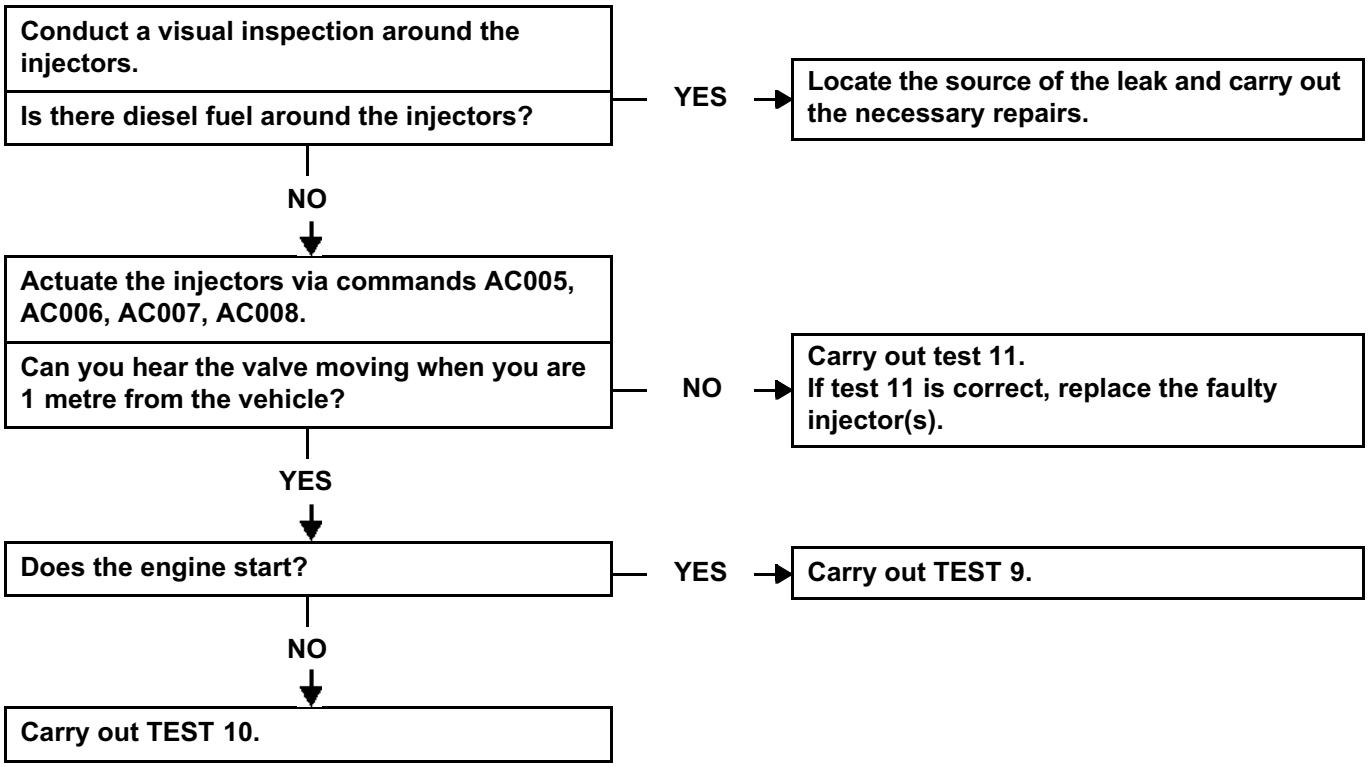
Are the engine earths in order?

NO → **Carry out the necessary repairs.**

YES

The electrical circuit is in order.

TEST 3	Injector check



TEST 4	Parameter check

Using the diagnostic tool, check that the C2I is correctly programmed on the identification screen.

Has C2I been correctly programmed?

NO → **Write the C2I using the diagnostic tool (cylinder 1, flywheel end).**

YES

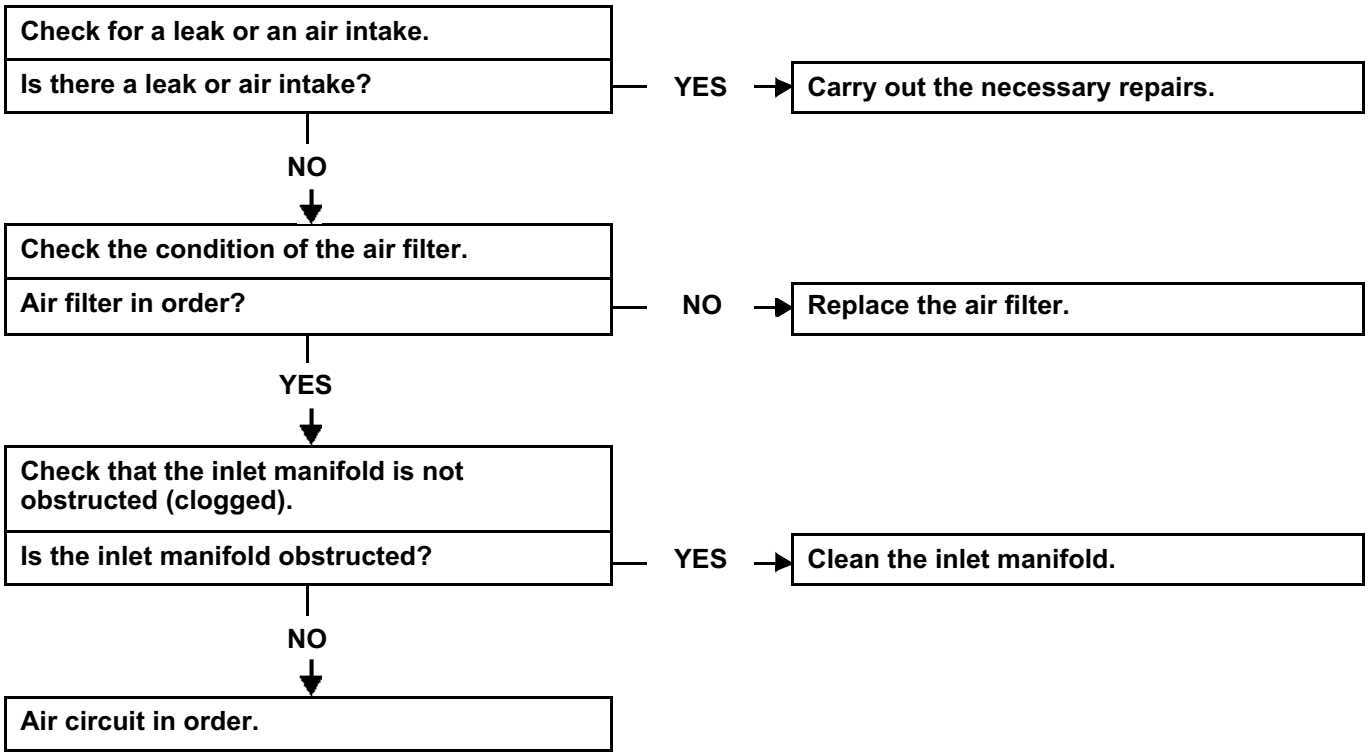
Does the status of the electrical consumers as provided by the diagnostic tool in the various injection sub-functions correspond to the actual status of the electrical consumers?

NO → **Carry out the fault finding procedure and any necessary repairs.**

YES

Check the consistency of the engine parameters.

TEST 5	Inlet circuit check



TEST 6	Computer check

Check the condition of the computer connections. (Bent pins, traces of oxidation, presence of silicon, etc.)

↓

Check that the computer connectors are properly locked.

↓

Computer in order.

TEST 7	High pressure system check

NOTES	**Special notes:** Certain faults make it impossible to carry out this test, deal with them first. **IMPORTANT: It is pointless and dangerous to run the starter motor for more than 5 seconds.**

It is possible to check the high pressure supply pump capacity by carrying out the following procedure:
- **With the ignition off, disconnect** the low pressure actuator from the pump (**brown IMV connector**) and connect a **test IMV** or the **MOT. 1711** adapter.
- Disconnect the 4 injectors electrically.
- Switch on the ignition, connect the diagnostic tool and re-establish dialogue with the injection system.
- Go to screen **Main computer statuses and parameters**.
- Brake and press the START button. **The starter will cut out automatically** after 5 seconds.
- Read the rail pressure maximum value **PR038** during the test on the diagnostic tool.

Is the rail pressure greater than 1050 bar?

NO

Is the rail pressure greater than 900 bar?

NO

Make sure that the ignition circuit is working correctly (minimum engine speed **200 rpm**). Switch off the ignition, and reconnect the 4 injectors and low pressure actuator electrically. Switch the ignition back on, and clear the injection faults using the diagnostic tool.

Carry out TEST 11. → (A)

YES

Repeat the test cold.
Coolant temperature = Ambient air temperature.

Is the rail pressure greater than 1050 bar?

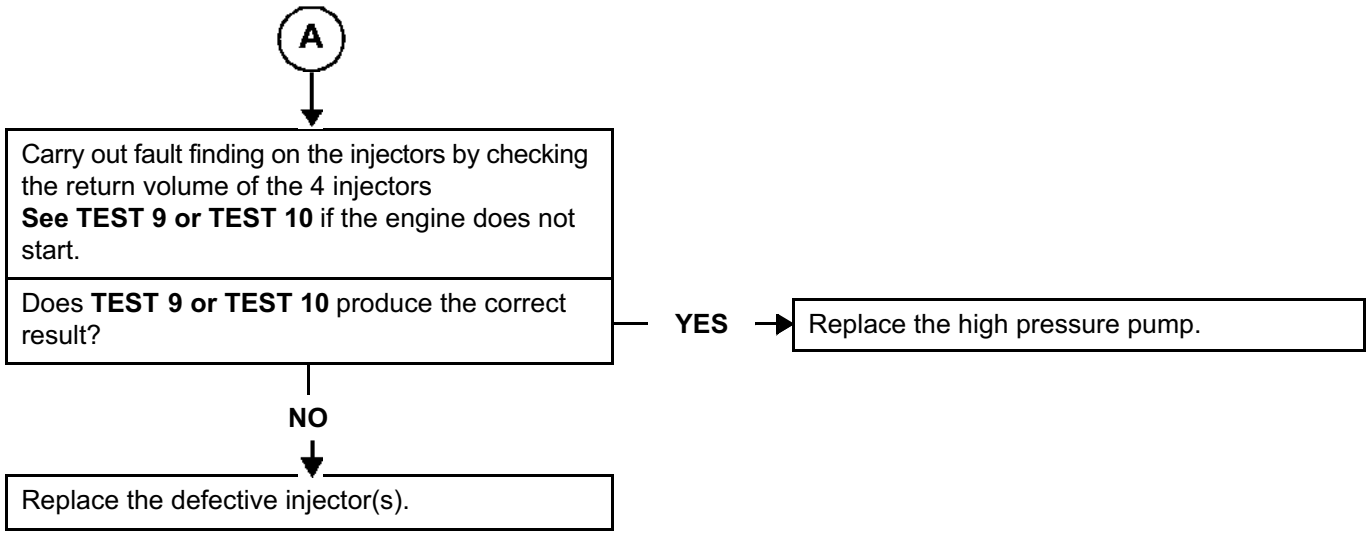
YES → The pump can supply the operating pressure.
Switch off the ignition, and reconnect the 4 injectors and low pressure actuator electrically.
Switch the ignition back on, and clear the injection faults using the diagnostic tool.
Carry out fault finding on the injectors by checking the return volume of the 4 injectors
(See TEST 9 injector sealing check).

NO

YES

The pump can supply the operating pressure.
Switch off the ignition, and reconnect the 4 injectors and low pressure actuator electrically.
Switch the ignition back on, and clear the injection faults using the diagnostic tool.

TEST 7 CONTINUED	



TEST 8	High pressure circuit sealing check

NOTES	**Special notes:** Certain faults make it impossible to carry out this test, deal with them first.

There is a command that carries out a high pressure circuit sealing test when the engine is running.

This command can locate a leak in the high pressure circuit if a union is incorrectly fitted or screwed on. This test does not identify a minor leak due to a union not being tightened to torque.

This command is only possible if the engine temperature is **above 60 °C**.

Watch out for any objects (tools or others) on the engine housing during the 4 accelerations (possible vibrations).

Use command **AC029 High pressure circuit sealing test**; the engine will automatically carry out 1 cycle of 4 accelerations to raise the pressure in the rail and check whether there are leaks in the high pressure circuit.

TEST 9	Injector sealing check

NOTES	**Special notes:** Certain faults make it impossible to carry out this test, deal with them first.

Command AC029 also checks the return volume of each injector to detect a leak inside the injectors.

Be careful with any objects (tools or other) on the engine housing during the 4 cycles of the operation (possible vibrations).

Tooling required

- **MOT. 1711 Injector flow measuring kit.**
  Or: Use 4 pipes with internal diameter **4 mm** and approximately **50 cm** in length, and 4 calibrated measuring cylinders.

Procedure

- Ensure that the engine coolant temperature is **above 60 °C**.
- **Switch off the ignition.**
- Disconnect the return pipes from the 4 injectors.
- Cap the pump venturi tube to prevent the low pressure circuit from depriming.
- Connect the 4 transparent pipes in place of the return pipes.
- Immerse these 4 pipes into 4 graduated measuring cylinders.

Having carried out these preparations, start the engine and let it idle for **2 minutes**.

- **Run** command **AC029 High pressure circuit sealing test**: the engine will automatically perform 1 cycle of 4 accelerations to raise the pressure in the rail and measure the leaks inside the injectors in these conditions.
- **Once the cycle is complete, run command AC029 again** to obtain a correct reading of the return volume of each injector.

At the end of both cycles, the return volume of each injector should be **35 ml maximum**.
If the return volume of one of the injectors is above **35 ml**, replace the faulty injector.

- Disconnect the 4 transparent pipes and reconnect the injector return circuit.

Carry out the following test to confirm the repair:

With the ignition off, disconnect the low pressure actuator from the pump (**brown IMV connector**) and connect a **test IMV** or the **MOT. 1711** adapter.

- Electrically disconnect the 4 injectors.
- Switch on the ignition, connect the diagnostic tool and re-establish dialogue with the injection system.
- Go to screen **Main computer statuses and parameters**.
- Brake and press the START button. **The starter will cut out automatically after 5 seconds.**
- Read the rail pressure maximum value **PR038** during the test on the diagnostic tool.

If the rail pressure PR038 is not above 1050 bar, carry out test 7.

- Switch off the ignition, electrically reconnect the 4 injectors and the low-pressure actuator.
- Switch on the ignition again, and clear the injection faults using the diagnostic tool.

TEST 10	Injector return flow in starting phase

NOTES	**Special notes:** Certain faults make it impossible to carry out this test, deal with them first. **IMPORTANT: It is pointless and dangerous to engage the starter motor for more than 5 seconds.**

In the event the engine does not start, only the static leak can be measured, that is the leak with the injector closed, inactive and under high pressure.
Make sure that the ignition circuit is working correctly (minimum engine speed **200 rpm**).

Tooling required

- **MOT. 1711 Injector flow measuring kit.**
  Or: use four tubes with a **4 mm** internal diameter and approximately **50 cm long and a test adapter (TEST IMV)**.

Procedure

- **Switch off the ignition.**
- Disconnect the return pipes from the 4 injectors.
- Cap the pump venturi tube to prevent the low pressure circuit from depriming.
- Connect the 4 transparent pipes in place of the return pipes (**MOT. 1711**).
- Disconnect the low pressure actuator from the pump (**brown IMV connector**) and connect a **test IMV** or the **MOT. 1711** adapter.
- **Electrically disconnect the 4 injectors.**

If engine coolant temperature > 20°C

- Switch on the ignition, brake and press the START button. **The starter will cut out automatically after 5 seconds.**
- Measure the amount of diesel in each pipe.

Replace the injector(s) whose leak return is greater than 8 cm.

If engine coolant temperature < 20 °C

- Switch on the ignition, brake and press the START button, **Release the brake pedal after 5 seconds** to interrupt the starter.
- Measure the amount of diesel in each pipe.

Replace the injector(s) whose leak return is greater than 10 cm.

Disconnect the 4 transparent pipes, and reconnect the injector return circuit.
Disconnect the test IMV and reconnect the low pressure actuator connector to the pump.

Carry out the following test to confirm the repair:

- **With ignition off, disconnect** the low pressure actuator from the pump (**brown IMV connector**) and connect the test adapter (**test IMV, MOT. 1711**).
- Electrically disconnect the 4 injectors.
- Switch on the ignition, connect the diagnostic tool and re-establish dialogue with the injection system.
- Go to screen **Main computer statuses and parameters**.
- Brake and press the START button. **The starter will cut out automatically** after **5 seconds**.
- Read the rail pressure maximum value **PR038** during the test on the diagnostic tool.

If the rail pressure PR038 is not above 1050 bar, carry out test 7.

- Switch off the ignition, and reconnect the 4 injectors and low pressure actuator electrically.
- Switch the ignition back on, and clear the injection faults using the diagnostic tool.

TEST 11	Diesel filter check

Check the conformity of the diesel filter.

Is the diesel filter in order? — **NO** → **Replace the filter with an original part.**

YES

Switch off the ignition and analyse the diesel fuel in the diesel filter.
- Disconnect the diesel supply and return hoses from the filter.
- Plug the filter inlets and outlets straight away using appropriate plugs.
- Remove the filter from its holder and **shake it well**, keeping the caps in place and empty the contents of the filter into a glass container by lifting up a protective cap and undoing the bleed screw.

Can you see a deposit of black particles at the bottom of the container?

NO

Diesel filter in order.

YES

Pass a magnet beneath the container to collect all the metal particles. Take the magnet away from the container.

Do the particles (only those gathered using the magnet) cover a surface area greater than 1 cm^2? — **NO** → **Diesel filter in order.**

YES

Replace the entire injection system.

DIESEL INJECTION
Fault finding - Customer complaints

NOTES	**Only consult this customer complaint after a complete check using the diagnostic tool.**

- **NO DIALOGUE WITH THE COMPUTER** — **ALP 1**
- **STARTING FAULT**
  - **THE ENGINE WILL NOT START** — **ALP 2**
  - **THE ENGINE STARTS WITH DIFFICULTY, OR STARTS THEN STALLS** — **ALP 3**
  - **STARTING DIFFICULT WITH WARM ENGINE** — **ALP 4**
- **IDLING FAULTS**
  - **ROUGH IDLE (PUMPING)** — **ALP 5**
  - **IDLING SPEED TOO HIGH OR TOO LOW** — **ALP 6**
- **DRIVING BEHAVIOUR**
  - **ERRATIC ACCELERATION/DECELERATION AND ENGINE RACING** — **ALP 7**
  - **ACCELERATION GAP** — **ALP 8**
  - **ENGINE STOPS (STALLS)** — **ALP 9**
  - **ENGINE BUCKING** — **(K9K 722)** — **ALP 10**; **(K9K 728)** — **ALP 19**
  - **LOSS OF POWER** — **(K9K 722)** — **ALP 11**; **(K9K 728)** — **ALP 20**
  - **TOO MUCH POWER** — **ALP 12**

NOTES	**Only consult this customer complaint after a complete check using the diagnostic tool.**

DRIVING BEHAVIOUR (continued)

- **EXCESSIVE CONSUMPTION** — **ALP 13**
- **OVERSPEED WHEN RELEASING ACCELERATOR OR CHANGING GEAR** — **ALP 14**
- **ENGINE DIES ON PULLING AWAY** — **ALP 15**

NOISE, ODOURS OR SMOKE

- **ENGINE RATTLING, NOISY** — **ALP 16**
- **BLUE, WHITE OR BLACK SMOKE** — **ALP 17**
- **SMOKE (BLUE, WHITE, BLACK) WHEN ACCELERATING** — **ALP 18**

ALP 1	No dialogue with the computer

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Try to establish dialogue with a computer on another vehicle to make sure that the diagnostic tool is not faulty. If the tool is not at fault, and dialogue cannot be established with any other computer on the same vehicle, the cause could be a faulty computer interfering on the multiplex network.
Check the battery voltage and carry out the operations necessary to obtain the correct voltage (**9.5 V < Battery voltage < 17.5 V**).

↓

Perform fault finding on the multiplex network using the diagnostic tool.

↓

Check for the presence and the condition of the injection fuses on the UPC, and in the engine fuse box.
Check the connection of the computer connectors and the condition of its connections.
Check the injection computer earths (quality, oxidation, earth bolts secure on the battery terminal).
Check that the supply to the computer is correct:

- **Earth on tracks G4 and H4** of black 32-track **connector A**.
- **+ after ignition feed on track D1** of black 32 track **connector A**.

↓

Check that the power supply to the diagnostic socket is correct:

- **+ before ignition feed on track 16.**
- **+ after ignition feed on track 1.**
- **Earth connection on tracks 4 and 5.**

↓

If dialogue has still not been established after these various checks, contact the Techline.

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 2	The engine will not start

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check the inlet air circuit using TEST 5.

↓

Is the catalytic converter clogged or damaged? — **YES** → **Replace the catalytic converter.**

NO

↓

Check the electrical circuit using TEST 2.

↓

Is the timing set correctly? — **NO** → **Carry out the necessary repairs.**

YES

↓

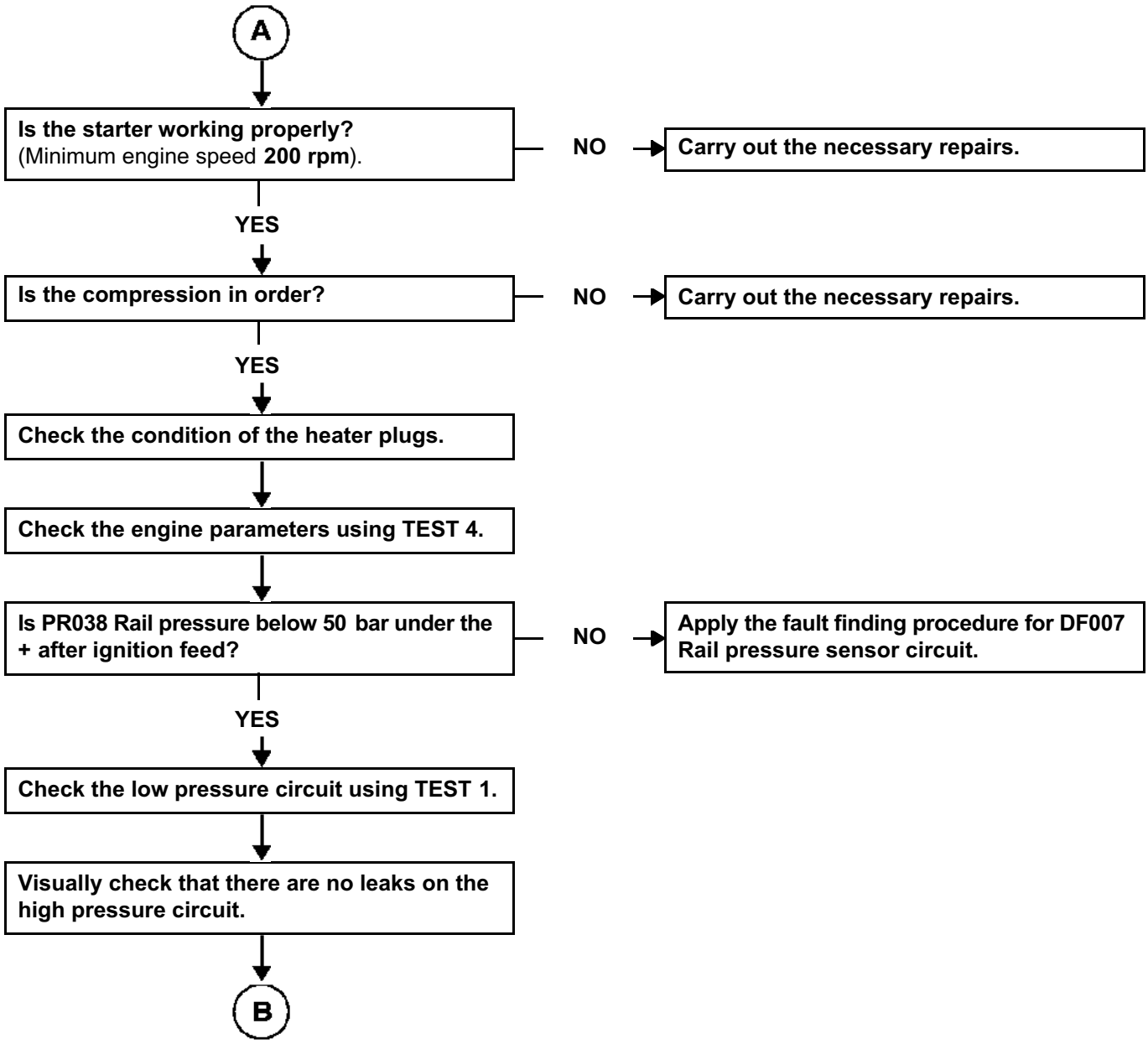
Visually inspect the condition of the engine wiring.

↓

(A)

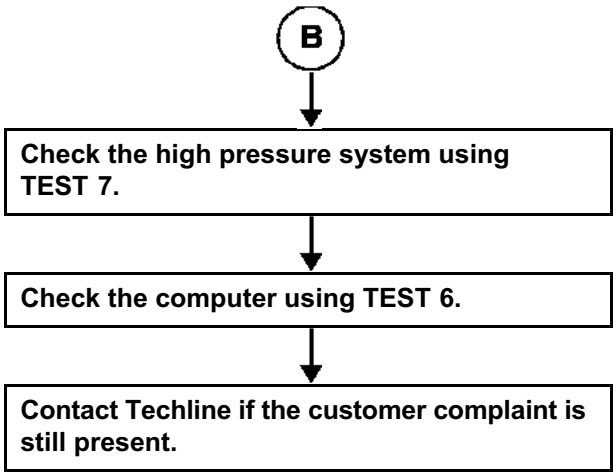
AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 2 CONTINUED 1	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 2 CONTINUED 2	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 3	The engine starts with difficulty, or starts then stalls

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check the inlet air circuit using TEST 5.

↓

Is the catalytic converter clogged or damaged? — **YES** → **Replace the catalytic converter.**

NO

↓

Is the timing set correctly? — **NO** → **Carry out the necessary repairs.**

YES

↓

Is the compression in order? — **NO** → **Carry out the necessary repairs.**

YES

↓

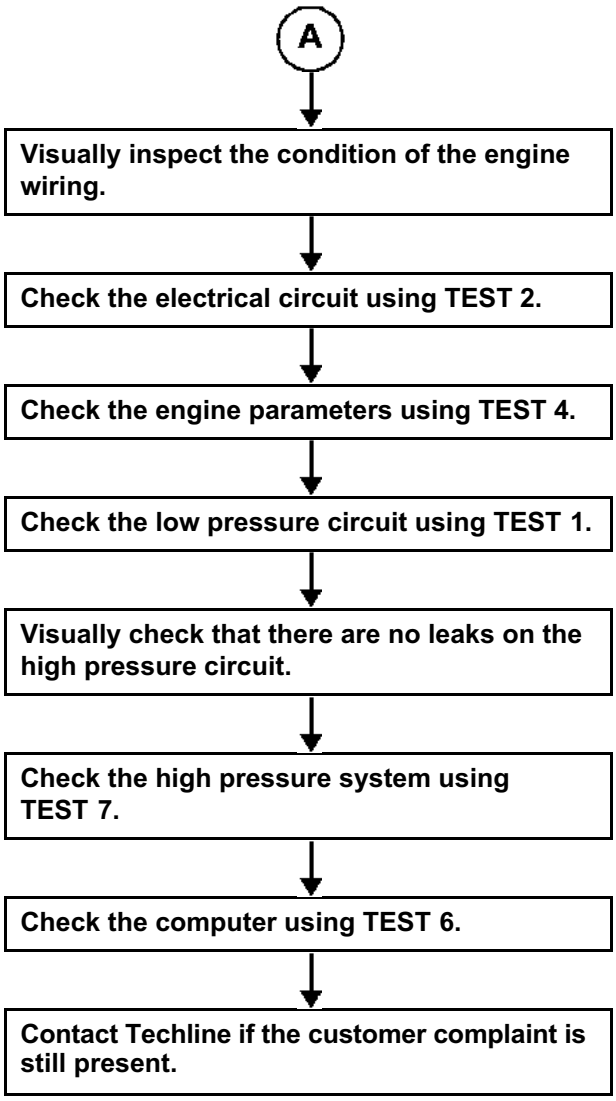
Check the condition of the heater plugs.

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 3 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 4	Starting difficult with warm engine

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the inlet air circuit using TEST 5.

↓

Is the compression in order? — **NO** → **Carry out the necessary repairs**

YES

↓

Is the catalytic converter clogged or damaged? — **YES** → **Replace the catalytic converter.**

NO

↓

Check the engine parameters using TEST 4.

↓

Visually inspect the condition of the engine wiring.

↓

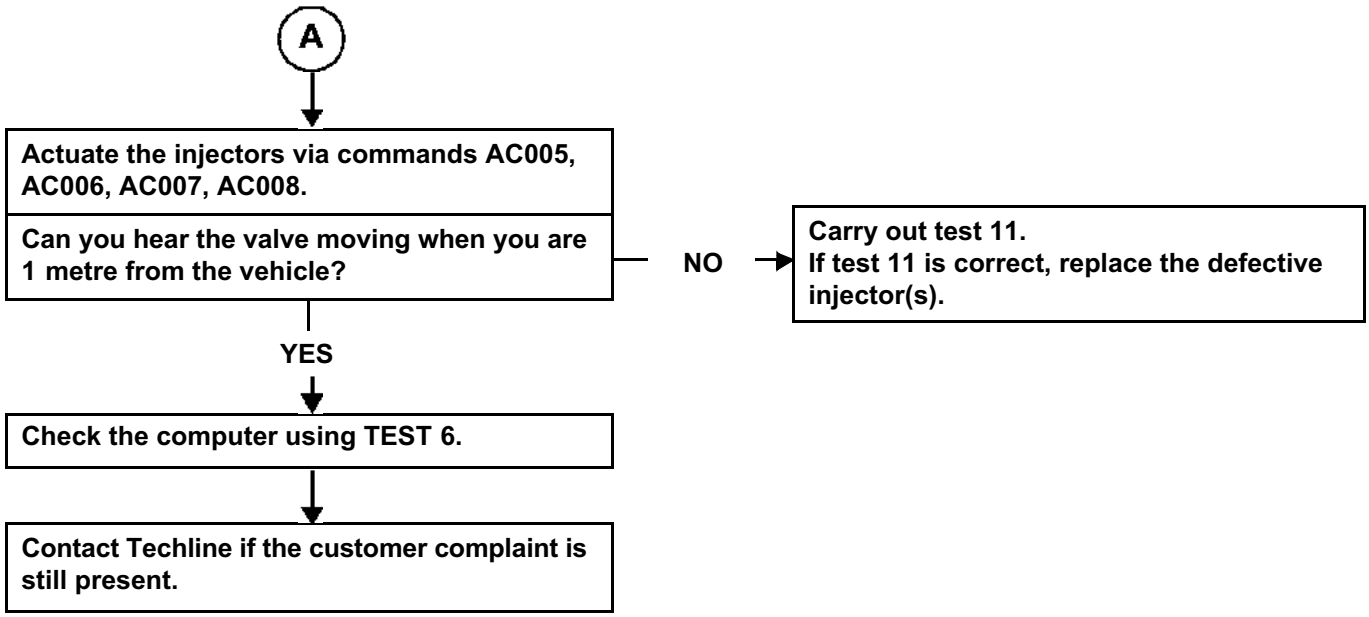
Check the low pressure circuit using TEST 1.

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 4 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 5	Rough idle (pumping)

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the low pressure circuit using TEST 1.

↓

Check the engine parameters using TEST 4.

↓

Visually inspect the condition of the engine wiring.

↓

Visually check that there are no leaks on the high pressure circuit.

↓

Is the compression in order? — **NO** → **Carry out the necessary repairs.**

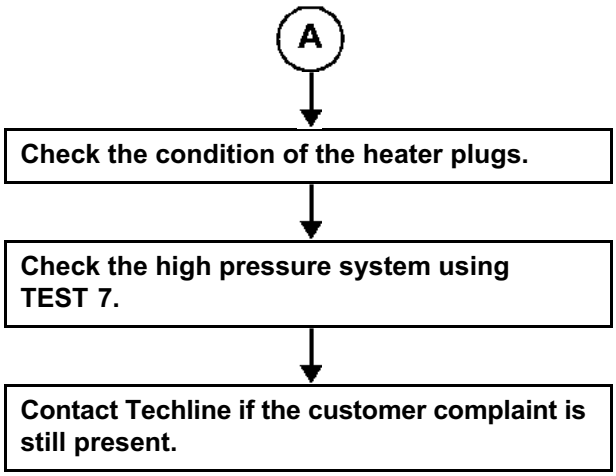
YES

↓

A

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 5 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 6	Idling speed too high or too low

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine parameters using TEST 4.

↓

Check the electrical circuit using TEST 2.

↓

Is the clutch clearance set correctly? — **NO** → **Carry out the necessary repairs.**

YES

↓

Check the computer using TEST 6.

↓

Contact Techline if the customer complaint is still present.

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 7	Erratic acceleration/deceleration and engine racing

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the engine has not sucked up its oil (engine racing).

↓

Check the inlet air circuit using TEST 5.

↓

Check the engine parameters using TEST 4.

↓

Visually inspect the condition of the engine wiring.

↓

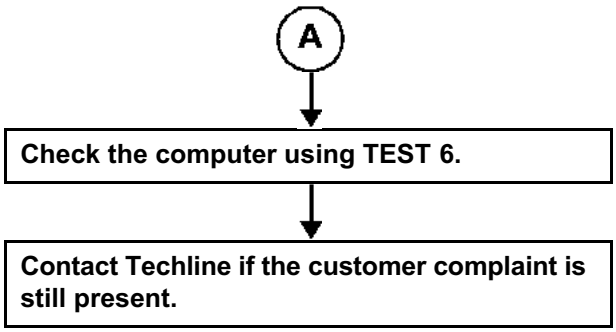
Check the injectors using TEST 3.

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

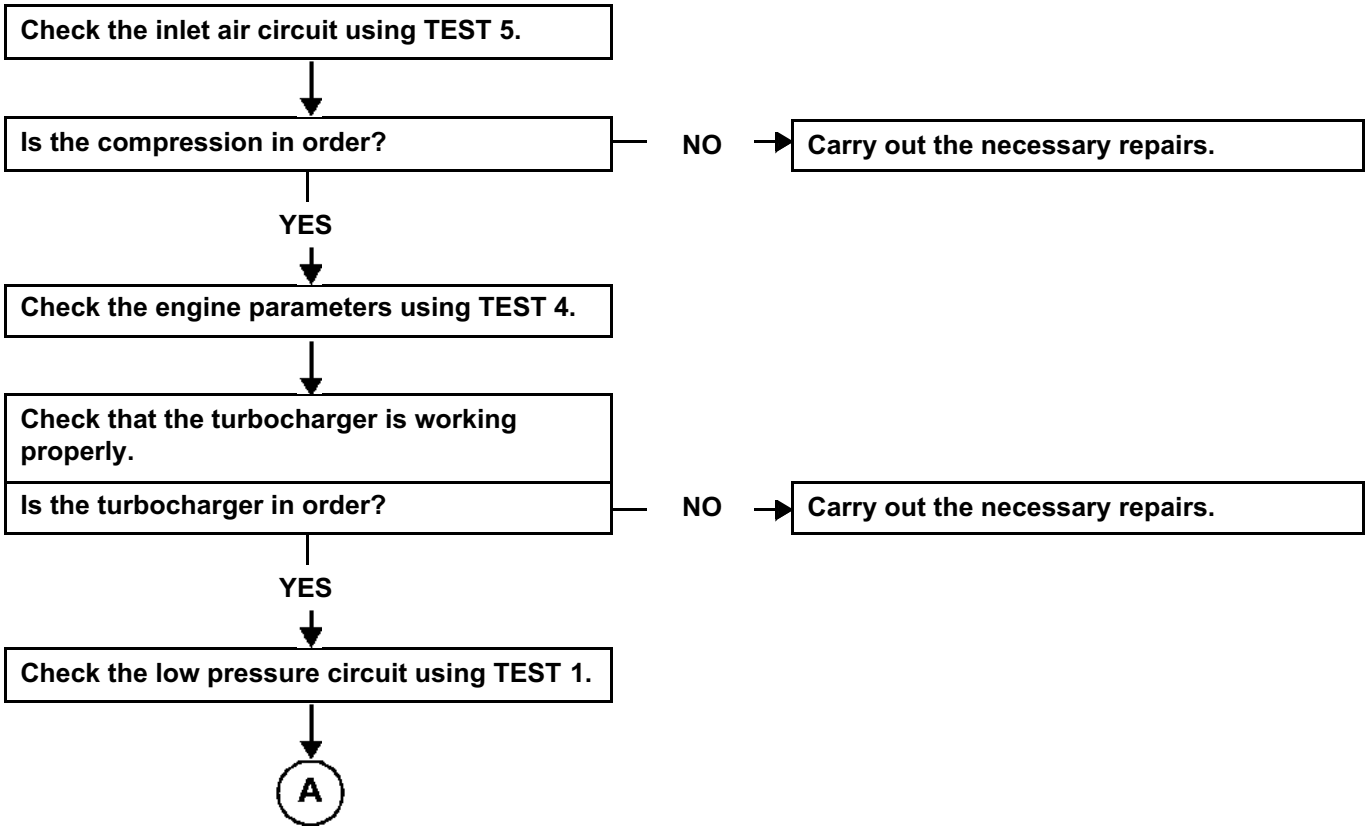
ALP 7 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

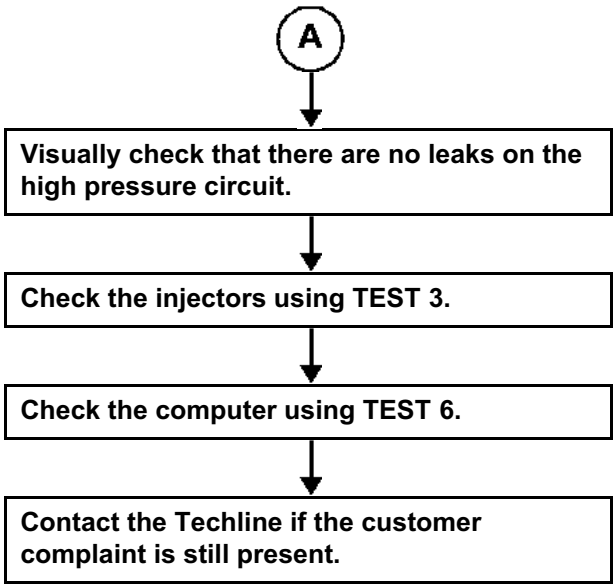
ALP 8	Acceleration gap

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 8 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 9	Engine cut-out (stalling)

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Check the inlet air circuit using TEST 5.

↓

Is the catalytic converter clogged or damaged?

YES → **Replace the catalytic converter.**

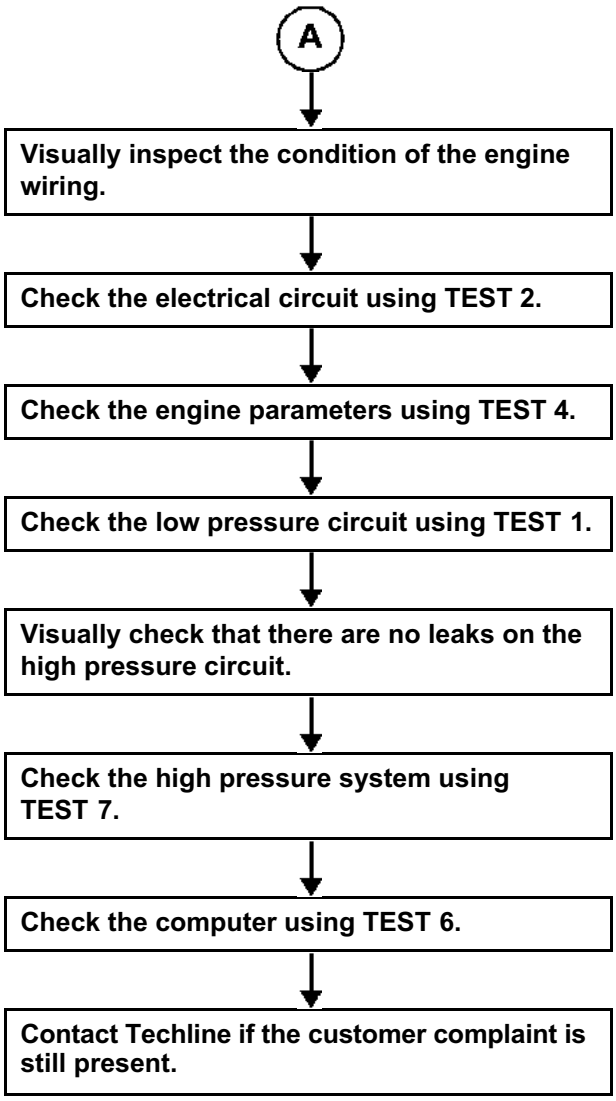
NO

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 9 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 10	Engine bucking

NOTES	**Special notes: This customer complaint only concerns engine K9K 722.** Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Is the compression in order? — **NO** → **Carry out the necessary repairs.**

YES

↓

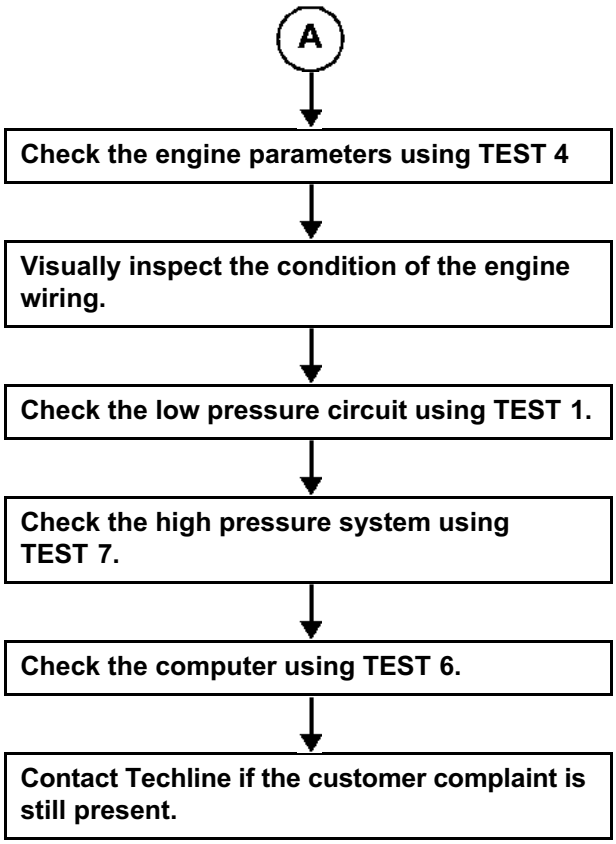
Check the condition of the heater plugs.

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

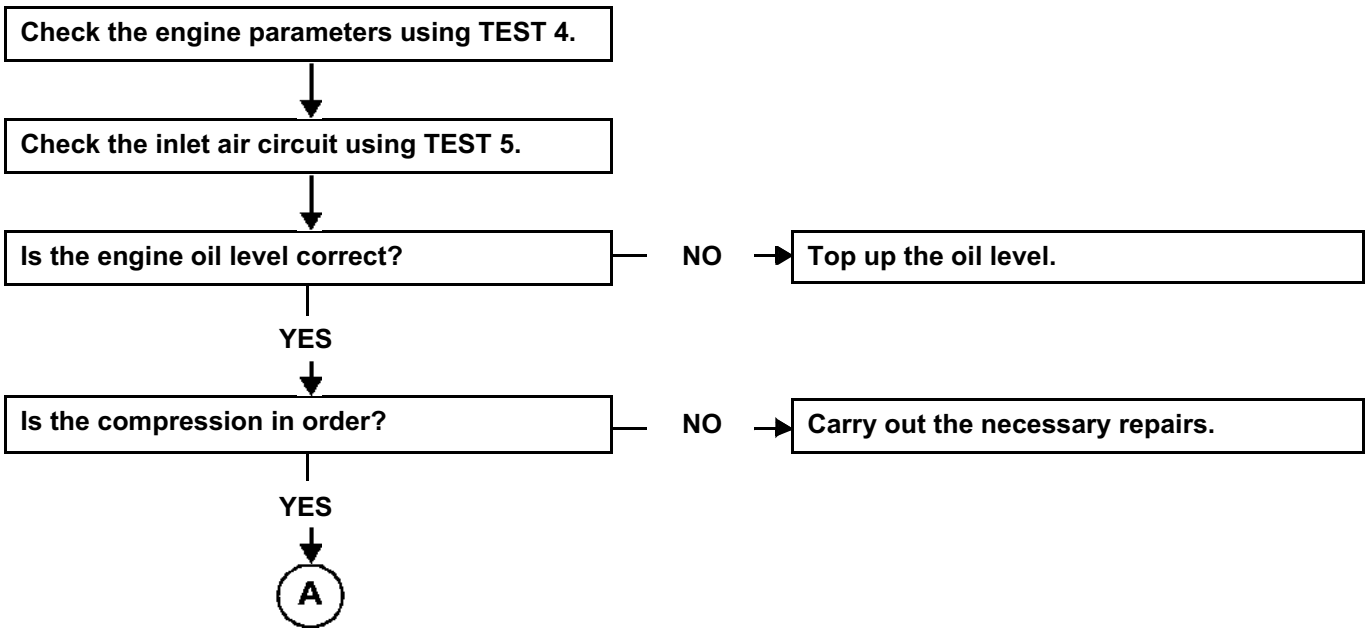
ALP 10 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

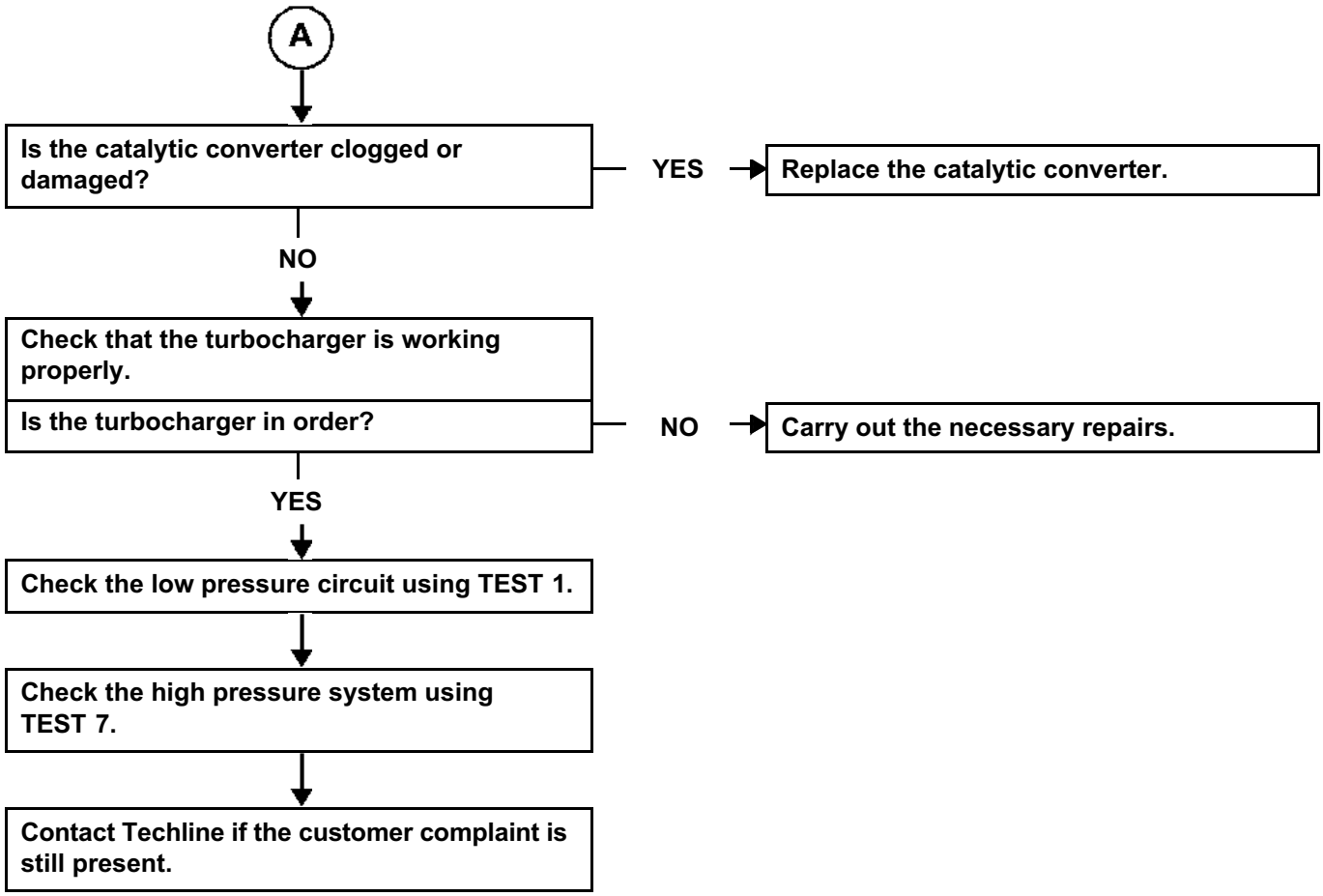
ALP 11	Loss of power

NOTES	**Special notes: This customer complaint only concerns engine K9K 722.** Only consult this customer complaint after a complete check with the diagnostic tool.



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 11 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 12	Too much power

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine parameters using TEST 4.

↓

Check the inlet air circuit using TEST 5.

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Check the injectors using TEST 3.

↓

Check the computer using TEST 6.

↓

Contact Techline if the customer complaint is still present.

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 13	Excessive consumption

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Is the fuel temperature sensor leaking? — **YES** → **Replace the fuel temperature sensor.**

NO

↓

Check the low pressure circuit using TEST 1.

↓

Check the injectors using TEST 3.

↓

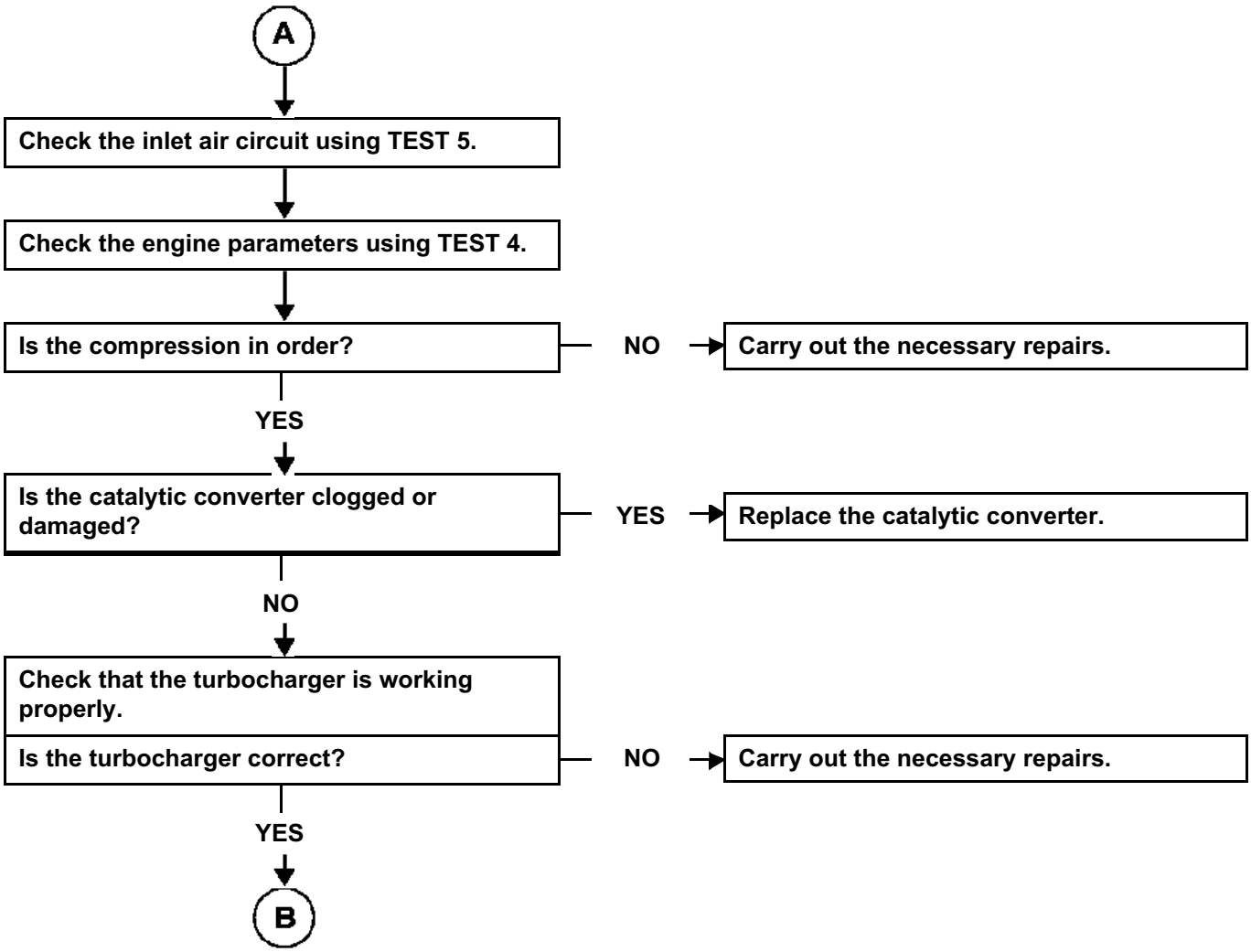
Visually check that there are no leaks on the high pressure circuit.

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 13 CONTINUED 1	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 13 CONTINUED 2	

B

Check the computer using TEST 6.

Contact Techline if the customer complaint is still present.

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 14	Overspeed when releasing accelerator or changing gear

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that there are no obstacles that might impede the accelerator pedal travel (carpet, hard point, etc.).

↓

Check the engine parameters using TEST 4.

↓

Visually inspect the condition of the engine wiring.

↓

Is the clutch clearance set correctly? — **NO** → **Carry out the necessary repairs.**

YES

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Check that the turbocharger is working properly.

Is the turbocharger correct? — **NO** → **Carry out the necessary repairs.**

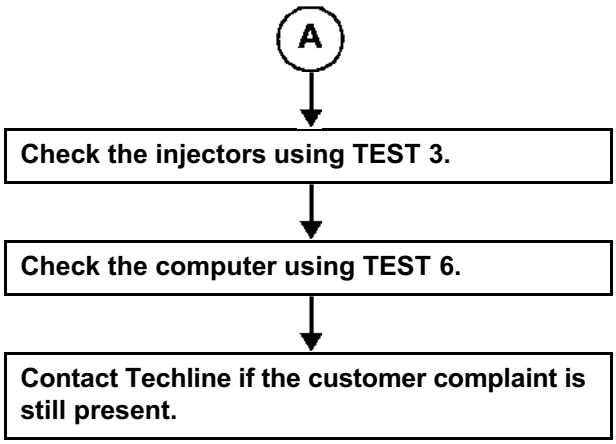
YES

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 14 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 15	Engine dies on pulling away

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Is the clutch clearance set correctly? — NO → **Carry out the necessary repairs.**

YES ↓

Check the engine parameters using TEST 4. ↓

Check the inlet air circuit using TEST 5. ↓

Is the catalytic converter clogged or damaged? — YES → **Replace the catalytic converter.**

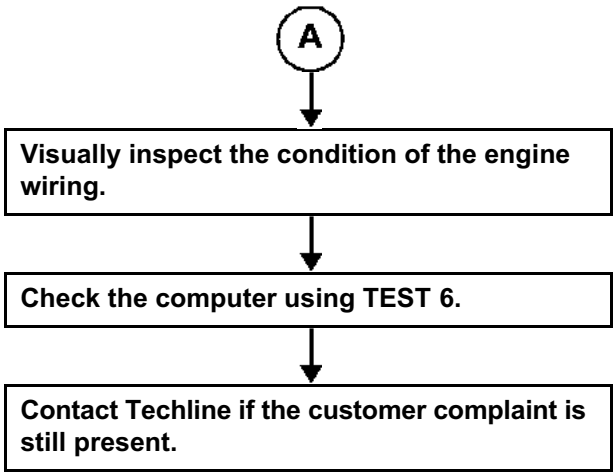
NO ↓

Check the low pressure circuit using TEST 1. ↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 15 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 16	Engine rattling, noisy

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Is the compression in order? — **NO** → **Carry out the necessary repairs.**

YES

↓

Check the condition of the heater plugs.

↓

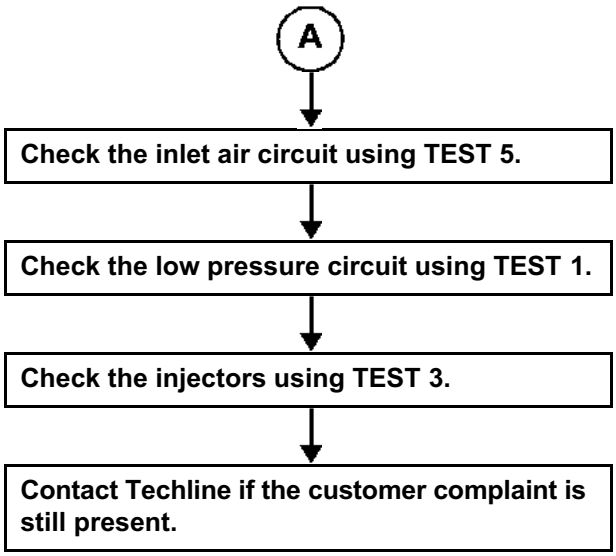
Check the engine parameters using TEST 4.

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 16 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 17	Blue, white or black smoke

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Is the compression in order? — **NO** → **Carry out the necessary repairs.**

YES

↓

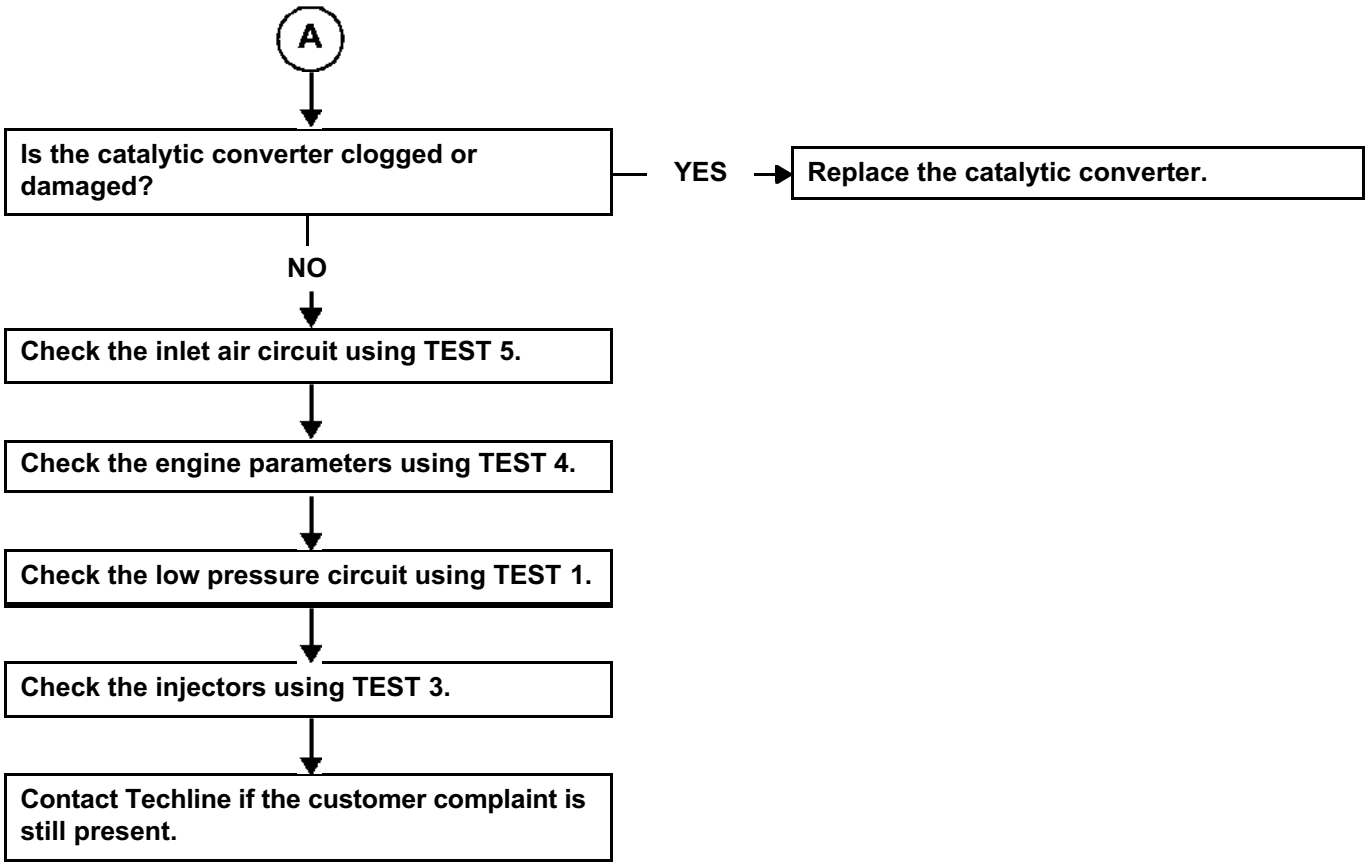
Check the condition of the heater plugs.

↓

(A)

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 17 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 18	Smoke (black, white, blue) when accelerating

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Is the compression in order? — **NO** → **Carry out the necessary repairs.**

YES

↓

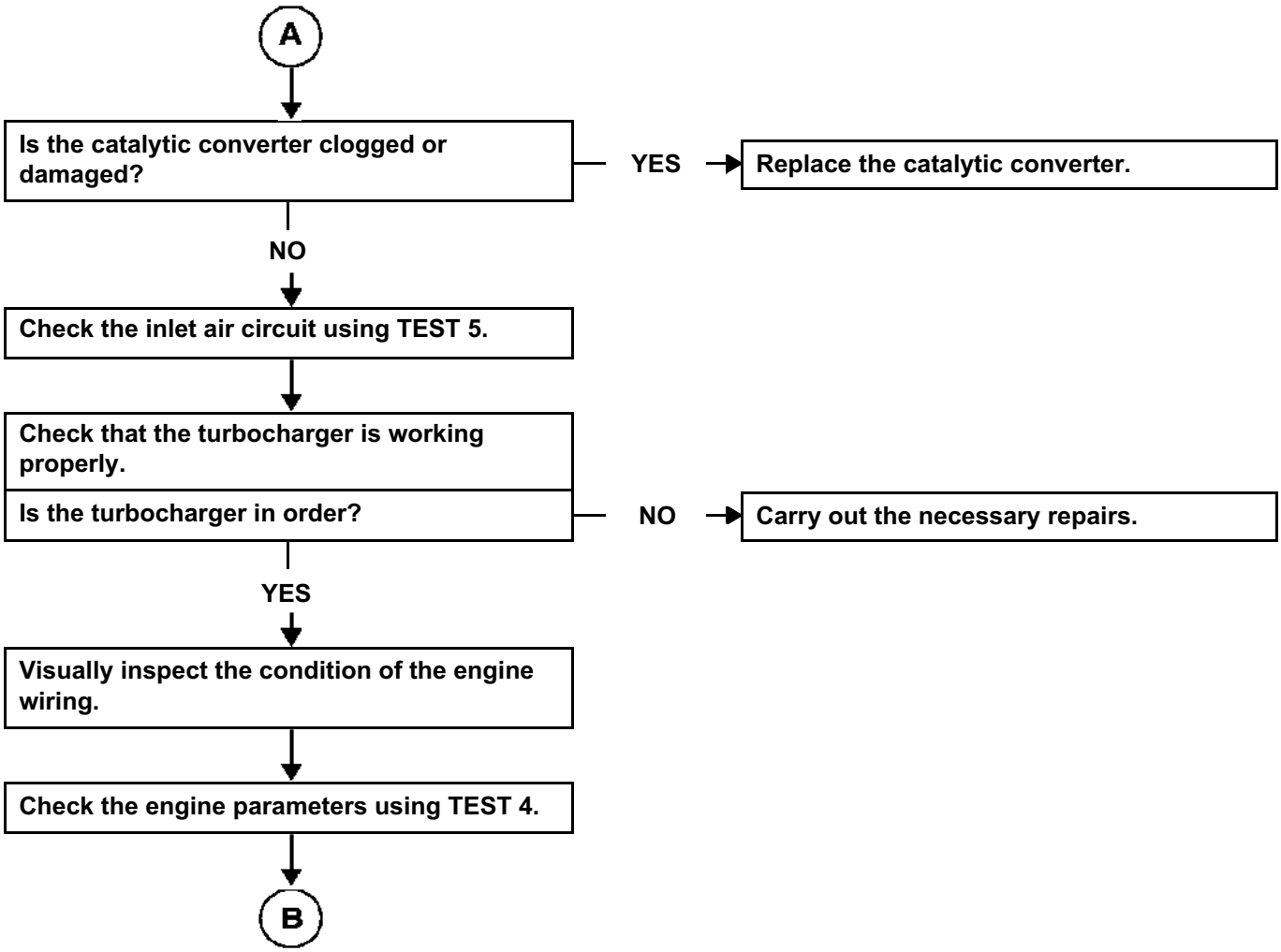
Check the condition of the heater plugs.

↓

(A)

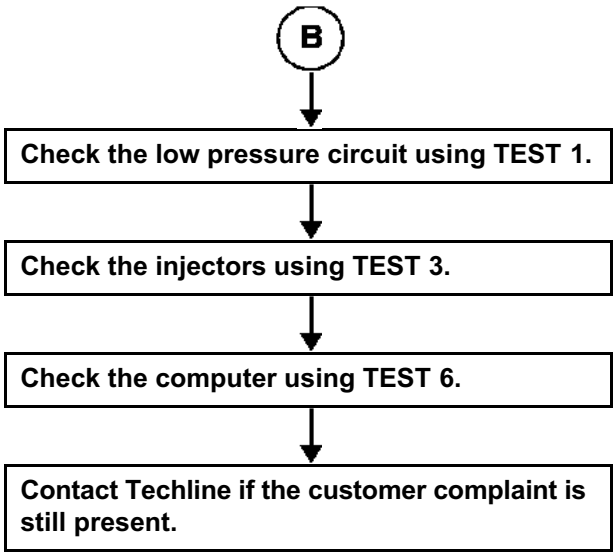
AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 18 CONTINUED 1	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 18 CONTINUED 2	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 19	Engine bucking

NOTES	**Special note: This customer complaint only concerns K9K 728 engines.** Only consult this customer complaint after a complete check with the diagnostic tool. See explanation for flow capacity function in system operation.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the low pressure circuit using TEST 1.

↓

Check the engine parameters using TEST 4.

↓

Is the engine wiring harness cut or pinched? — **YES** → **Carry out the necessary repairs.**

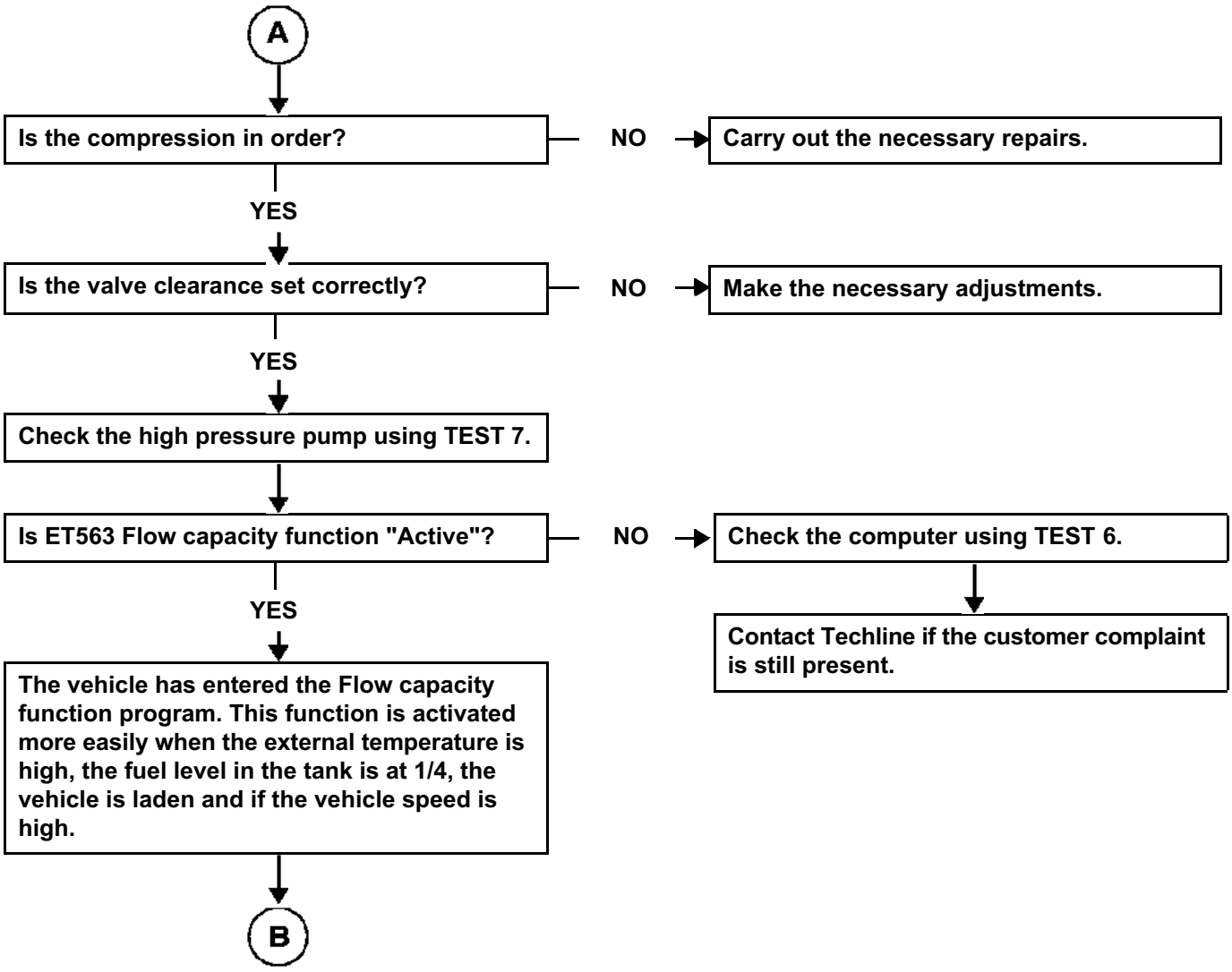
NO

↓

(A)

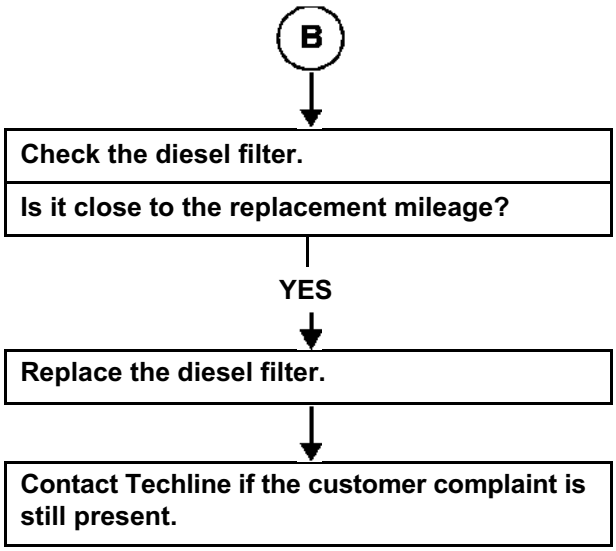
AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 19 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

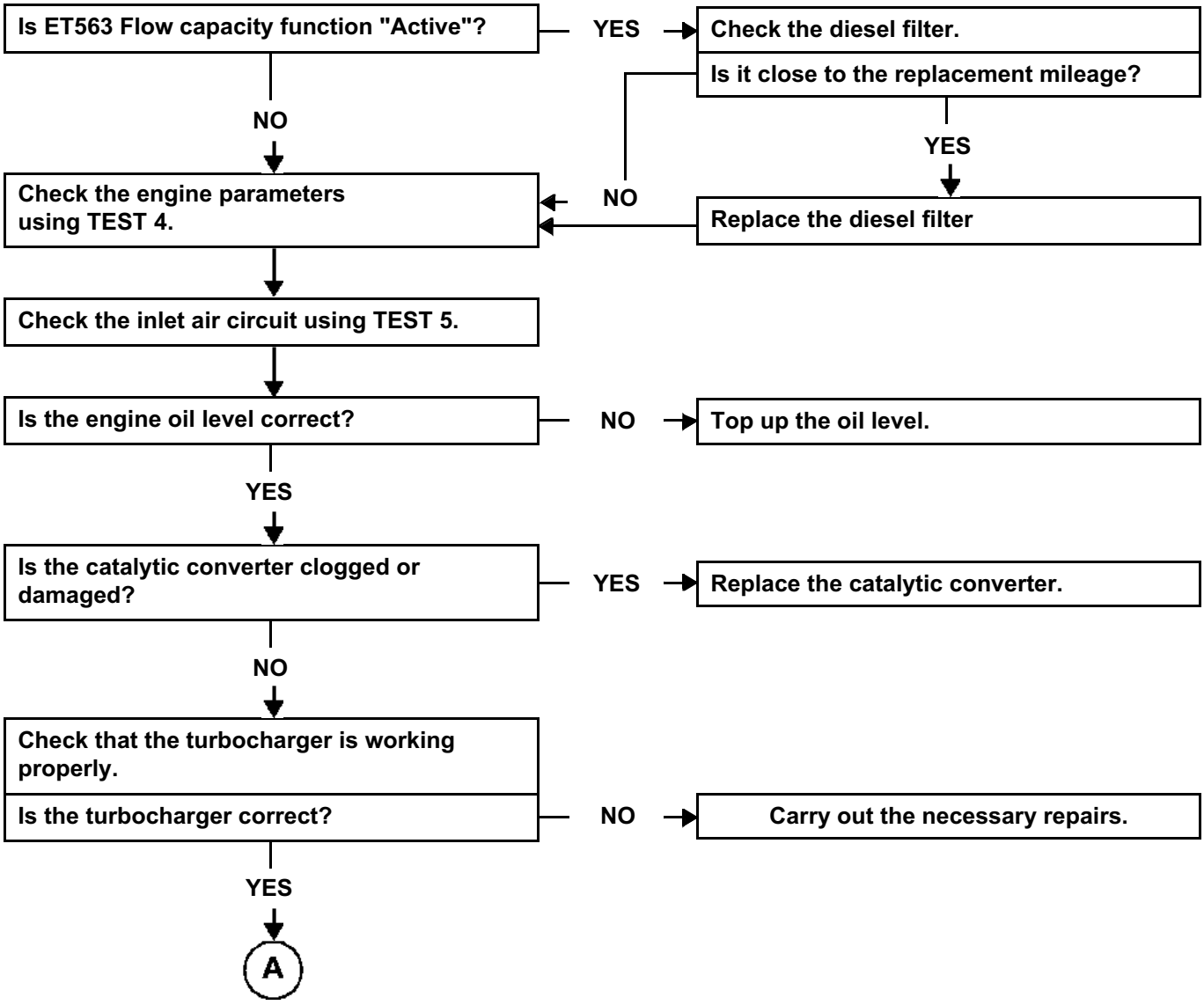
ALP 19 CONTINUED 2	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

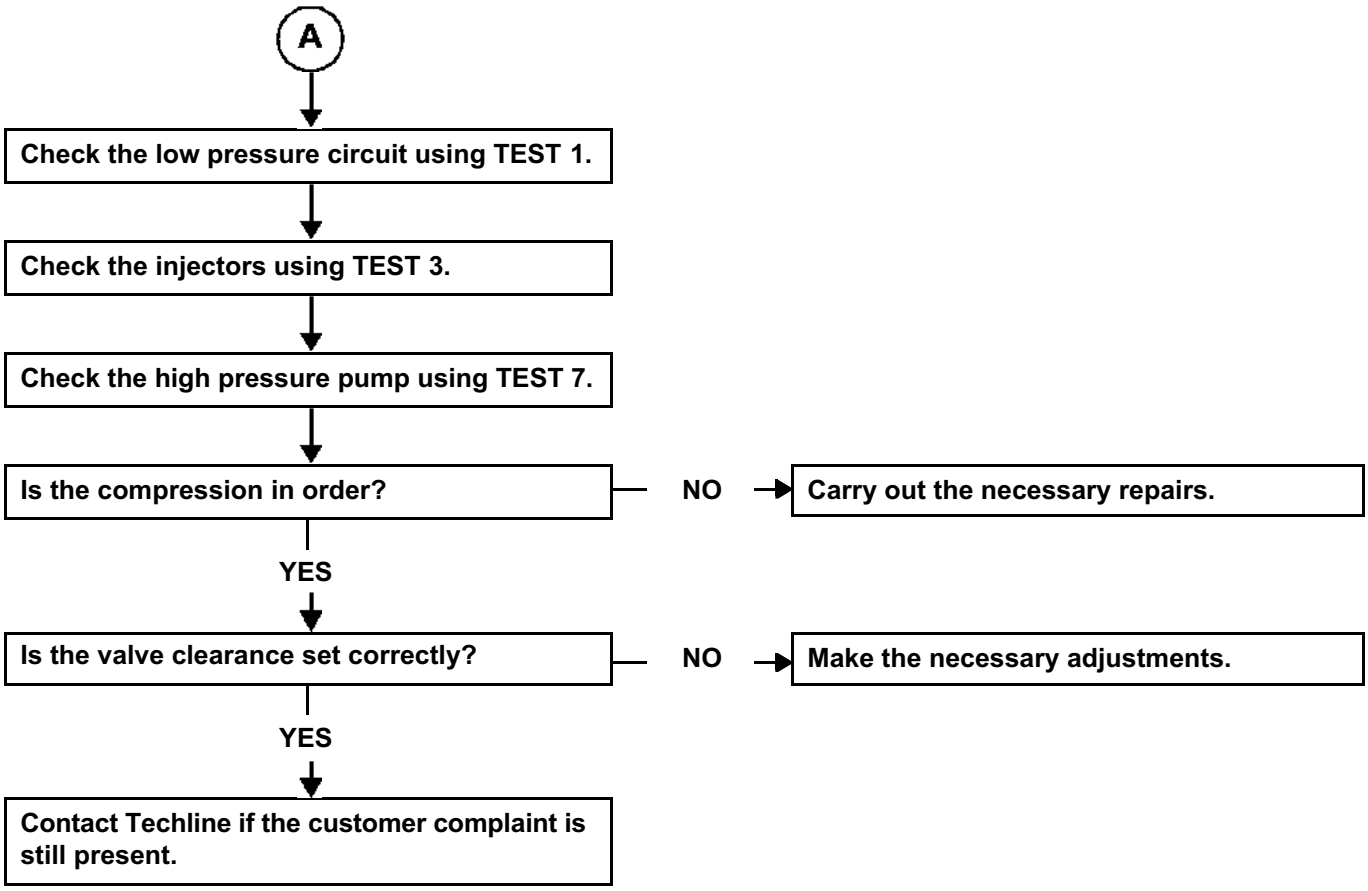
ALP 20	Loss of power

NOTES	**Special note: This customer complaint only concerns K9K 728 engines.** Only consult this customer complaint after a complete check with the diagnostic tool. See explanation for flow capacity function in system operation.



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

ALP 20 CONTINUED	



AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

1. SCOPE OF THIS DOCUMENT

This document presents the fault finding procedure applicable to all computers with the following specifications:

Vehicle(s): **Megane II and Scenic II K9K 732** *Function concerned:* **K9K STEP 2 EURO 4 piezo common rail direct diesel injection system (Siemens SID 301)**	*Computer name:* **SID301 injection system** *Program no.:* **B1** *VDIAG No.:* **44**

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedures (this manual):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.

Wiring Diagrams:
– Visu-Schéma (CD-ROM), paper version.

Type of diagnostic tools

– CLIP

Special tooling required

Special tooling required	
	Multimeter
Elé. 1681	Universal bornier
	Pressure gauge

3. RECAP

Procedure

To run fault finding on the vehicle's computers, switch on the ignition in fault finding mode (forced + after ignition feed).
Proceed as follows:

– with the vehicle card in the reader,
– press and hold Start button (longer than **5 seconds**) with start-up conditions not fulfilled,
– connect the diagnostic tool and perform the required operations.

To **cut off the + after ignition feed**, proceed as follows:

– disconnect the diagnostic tool,
– press the Start button twice briefly (less than **3 seconds**),
– ensure that the + after ignition feed has been cut off by checking that the computer indicator lights on the instrument panel have gone out.

Faults

Faults are declared as either present or stored (depending on whether they appeared in a certain context and have disappeared since, or whether they remain present but have not been diagnosed within the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is used after the + after ignition feed is switched on (without acting on the system components).

For a **present fault**, apply the procedure described in the **Interpretation of faults** section.

For a **stored fault**, note the faults displayed and apply the instructions in the **Notes** section.

If the fault is **confirmed** when the instructions in the Notes section are applied, the fault is present. Deal with the fault

If the fault is **not confirmed**, check:
- the electrical lines which correspond to the fault,
- the connectors for these lines (for oxidation, bent pins, etc),
- the resistance of the component detected as faulty,
- the condition of the wires (melted or split insulation, wear).

Conformity check

The aim of the conformity check is to check data that does not produce a fault on the diagnostic tool because the data is inconsistent. Therefore, this phase is used to:
- carry out fault finding on faults that do not have a fault display, and which may correspond to a customer complaint.
- check that the system is operating correctly and that there is no risk of a fault recurring after repairs.

This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.

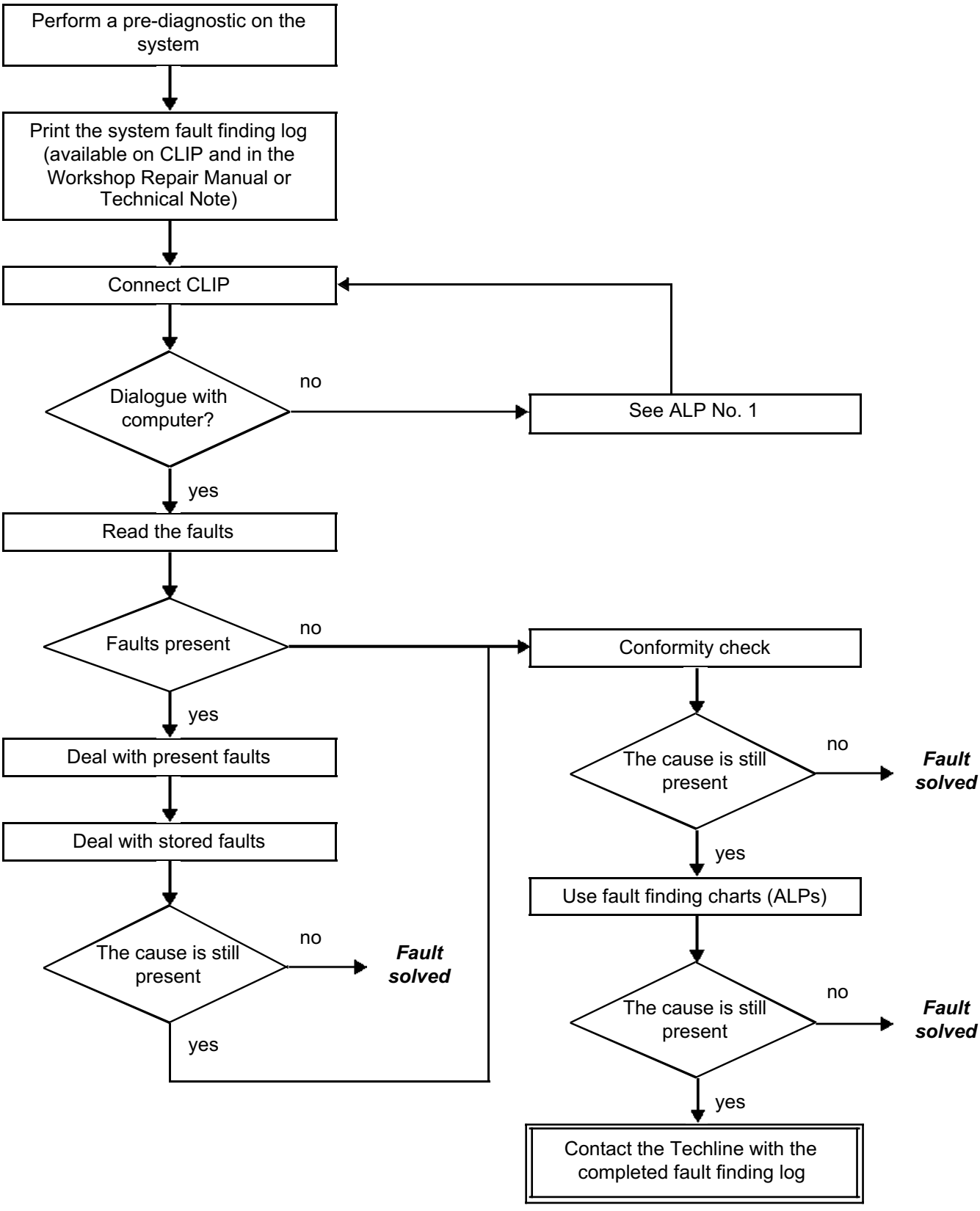
If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

Customer complaints - Fault finding chart

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be processed by **customer complaint**.

A synopsis of the general procedure to follow is provided on the following page in the form of a flow chart

4. FAULT FINDING PROCEDURE



4. FAULT FINDING PROCEDURE (continued)

Wiring check

Fault finding problems
Disconnecting the connectors and/or manipulating the wiring harness may temporarily remove the cause of a fault.
Electrical measurements of voltage, resistance and insulation are generally correct, especially if the fault is not present when the analysis is made (stored fault).

Visual inspection
Look for damage under the bonnet and in the passenger compartment.
Carefully check the fuses, insulators and wiring harness routing.
Look for signs of oxidation.

Tactile inspection
While manipulating the wiring harness, use the diagnostic tool to note any change in fault status from stored to present.
Make sure that the connectors are properly locked.
Apply light pressure to the connectors.
Twist the wiring harness.
If there is a change in status, try to locate the source of the fault.

Inspection of each component
Disconnect the connectors and check the appearance of the clips and tabs, as well as the crimping (no crimping on the insulating section).
Make sure that the clips and tabs are properly locked in the sockets.
Check that no clips or tabs have been dislodged during connection.
Check the clip contact pressure using an appropriate model of tab.

Resistance check
Check the continuity of entire lines, then section by section.
Look for a short circuit to earth, to **+12 V** or to another wire.

If a fault is detected, repair or replace the wiring harness.

5. FAULT FINDING LOG

IMPORTANT!

NOTE
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the procedure, enables you to keep track of the procedure which is carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE MANDATORY TO FILL OUT A FAULT FINDING LOG EACH TIME FAULT FINDING IS CARRIED OUT

You will always be asked for this log:

- when requesting technical assistance from the Techline,
- for approval requests when replacing parts for which approval is obligatory,
- to be enclosed when returning monitored parts on request. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY ADVICE

Safety rules must be observed during any work on a component to prevent any damage or injury:

- make sure that the battery is properly charged to avoid damaging the computers with a low load,
- use the appropriate tools.

FAULT FINDING LOG

System: Injection

List of monitored parts: ***Computer***

Administrative identification

Date	2 0
Log completed by	
VIN	
Engine	
Diagnostic tool	CLIP
Update version	

Customer complaint

☐	579	Does not start - fault	☐	570	Stalling - cold starting faults	☐	571	Stalling - warm starting faults
☐	586	Injection/preheating warning light on	☐	572	Idling - unstable engine speed	☐	574	Bucking/flat spots
☐	573	Loss of power	☐	520	Abnormal noise, vibrations	☐	576	Smoke - exhaust odours
☐	569	Starting faults						

Other — Your comments:

Conditions under which the customer complaint occurs

☐	001	When cold	☐	005	While driving	☐	008	When decelerating
☐	002	When hot	☐	006	When changing gear	☐	009	Sudden fault
☐	003	When stationary	☐	007	When accelerating	☐	010	Gradual deterioration
☐	004	Intermittently						

Other — Your comments:

Documentation used in fault finding

Fault finding procedure used	
Type of diagnostic manual:	Workshop Repair Manual ❑ Technical Note ❑ Assisted fault finding ❑
Fault finding manual no:	
Wiring diagram used	
Wiring Diagram Technical Note No:	
Other documentation	
Title and/or part number:	

RENAULT

FD 01
Fault finding log

FAULT FINDING LOG

System: Injection

Computer identification and parts exchanged for the system

Part 1 part no.	
Part 2 part no.	
Part 3 part no.	
Part 4 part no.	
Part 5 part no.	

To be read with the Diagnostic tool (Identification screen):

Computer part no.	
Supplier no.	
Program no.	
Software version	
Calibration no.	
VDIAG	

Faults found with the diagnostic tool

Fault no.	Present	Stored	Fault name	Specification

Conditions under which fault occurs

Status or parameter no.	Parameter name	Value	Unit

System-specific information

Description:

Additional information

What factors led you to replace the computer? What other parts were replaced?	
Other defective functions?	
Your comments:	

RENAULT

FD 01
Fault finding log

I - RISKS ASSOCIATED WITH CONTAMINATION

The high pressure direct injection system is highly sensitive to contamination. The risks associated with contamination are:
– damage to or destruction of the high pressure injection system,
– components jamming,
– components losing seal integrity.

All After-Sales operations must be performed under very clean conditions. This means that no impurities (particles a few microns in size) should have entered the system during dismantling.

The cleanliness principle must be applied from the filter to the injectors.

What are the sources of contamination?
– metal or plastic chips,
– paint,
– fibres:
    – from cardboard,
    – from brushes,
    – from paper,
    – from clothing,
    – from cloths,
– foreign bodies such as hair,
– ambient air
– etc.

IMPORTANT
Cleaning the engine using a high pressure washer is prohibited because of the risk of damaging connections. In addition, moisture may collect in the connectors and cause electrical connection faults.

II - Notes to be followed before any procedure

IMPORTANT
Before any work is carried out on the high pressure injection system, protect:
– the accessories and timing belts,
– the electrical accessories, (starter, alternator, electric power assisted steering pump),
– the flywheel surface, to prevent any diesel from running onto the clutch friction plate.

Check that you have plugs for the unions to be opened (set of plugs available from the Parts Department). The plugs are single-use only. After use, they must be discarded (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must be discarded.

Check that you have hermetically resealable plastic bags for storing removed parts. Stored parts will therefore be less subject to the risk of impurities. The bags are to be used once only, and discarded after use.

Use lint-free cleaning cloths (cloth part number **77 11 211 707**). Using normal cloth or paper is prohibited. They are not lint-free and could contaminate the fuel circuit. Each cloth should only be used once.

Use fresh cleaning agent for each operation (used cleaning agent is contaminated). Pour it into an uncontaminated container.

For each operation, use a clean brush in good condition (the brush must not shed its bristles).

Use a brush and cleaning agent to clean the unions to be opened.

Blast compressed air over the cleaned parts (tools, workbench, the parts, unions and injection system zones). Check that no bristles remain.

Wash your hands before and during the operation if necessary.

When wearing leather protective gloves cover them with latex gloves to prevent contamination.

III - Instructions to be followed when carrying out any work

As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Department. The plugs must not be reused under any circumstances.

Seal the pouch shut, even if it has to be opened shortly afterwards. Ambient air carries contamination.

All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been plugged.

Using a brush, cleaning agent, air gun, sponge or normal cloth is strictly prohibited once the circuit has been opened. These items could allow contamination to enter the system.

A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

SYSTEM FLOWCHART

The high pressure injection system is designed to deliver a precise quantity of diesel fuel to the engine at a set moment.
The Siemens VDO piezo Common Rail system used on the K9K Step 2 engine is a second generation Common Rail injection system. Fuel pressure in the rail can reach a maximum of **1650 bar**. It uses injectors controlled by piezoelectric actuators. The fuel is pressurised by means of a high pressure pump then sent to a rail which supplies the four injectors.
The circuit comprises two subsystems, which are distinguished by the fuel pressure level:
– the low pressure circuit comprises the tank, the diesel fuel filter, the transfer pump and the injector return lines,
– the high pressure circuit comprises the high pressure (HP) pump, the rail, the injectors and the high pressure (HP) pipes.
Finally, there are a number of control sensors and actuators which enable the entire system to be controlled and monitored.
It is fitted with a **112 tracks** computer manufactured by **SIEMENS, model SID301**.

The system is comprised of:
– a priming bulb,
– a diesel filter,
– a high pressure pump (HPP) with a fuel pressure solenoid valve (PCV), a fuel flow solenoid valve (VCV) and an internal fuel transfer pump (ITP, low pressure pump),
– an injection rail,
– a fuel pressure sensor,
– four piezo injectors,
– a diesel temperature sensor,
– a coolant temperature sensor,
– a cylinder reference sensor,
– an engine speed sensor,
– a turbocharging pressure sensor,
– an exhaust gas recirculation solenoid valve with position sensor,
– an accelerator pedal potentiometer,
– an atmospheric pressure sensor built into the injection computer,
– a flow sensor with integrated air temperature sensor,
– a damper valve.

FUEL SUPPLY

Common Rail pump

The Common Rail pump consists of the following components:
– Internal fuel transfer pump:
  This pump is a vane-type rotary pump. It draws in fuel from the fuel tank through a fuel filter and supplies the high pressure pump with fuel.
– Flow control solenoid valve:
  This solenoid valve regulates the flow of fuel entering the high pressure pump and enables an optimum quantity of fuel to be pressurised according to operating phase; this improves the output of the Common Rail pump and thereby the output of the engine as well.
– High pressure pump:
  This pump is a 3-piston radial pump, it generates the required pressure in the rail.
– Pressure control solenoid valve:
  This solenoid valve regulates the output pressure of the high pressure pump.

Piezo injectors

The piezo injectors enable rapid, precise metering of the quantity of fuel injected, with excellent injection process repetitivity.

The piezo actuator operates like a capacitor. To control the injector, the computer sends, at the correct time, a quantity of energy which is sufficient to enable the actuator to deform and the injector to open.

During the injection period, the piezo actuator stores this energy.

At the end of the injection period, the computer recovers the energy sent at the start of the control operation.

The piezo actuator discharges and returns to its original shape. The injector closes.

To improve output, the energy returned by the piezo actuator is reused, which keeps down the amount of energy that has to be supplied for the next injection process.

The injector voltage is very high (much higher than that of conventional injectors)
This voltage can be as much as **150 V**.

IMPORTANT!

Engine synchronisation

One of the determining factors for fuel injection control is knowing the position of each of the pistons in their respective cylinders at all times.

The angular position is measured by means of a magneto-inductive sensor which is excited by the teeth machined onto the flywheel; this is known as the crankshaft or TDC sensor. The flywheel has 60 teeth, each degrees apart; 2 of these teeth are missing to form a notch.

A second sensor (Hall-effect sensor), stimulated by a tooth machined onto the camshaft, which turns at half the engine speed, provides a signal relating to the progress of the injection cycle. Indeed, when the piston of cylinder 1 is at top dead centre (TDC), either at the end of the compression stroke or at the end of the exhaust stroke, the camshaft sensor enables a distinction to be made between these two states.

By comparing the signals from these two sensors, the computer is able to provide all its systems with synchronisation parameters, namely: the angular position of the flywheel, engine speed, the number of the injector that's active and the progress of the injection cycle.

This module also supplies the system with the rotation speed signal.

The camshaft sensor is only used when starting the engine. As soon as the engine is running by itself (not being cranked by the starter), the signal provided by the TDC sensor is sufficient. If the camshaft sensor should fail while the engine is running, this will not affect the operation of the engine.

Quantity of fuel injected and control of start of injection

The parameters for controlling injection are, for each cylinder, the quantity to be injected and the start of injection.

These are calculated by the injection computer from the following information:
– Engine speed.
– Accelerator pedal position.
– Turbocharging air pressure.
– Coolant temperature.
– Air temperature.
– Fuel temperature.
– Air flow
– Pressure of fuel in the rail.

Station to station flow regulation

The aim of this regulation process is to facilitate smooth engine operation by compensating for the system variations (injectors, compression rate, etc.) which affect the torque generated by each cylinder during combustion.

The regulation process is only active at idle speed, with a warm engine and on condition that the engine speed is sufficiently stable.
An injection timing correction coefficient is assigned to each cylinder; this is "learning" all the time the regulation process is active and remains fixed at the last value that was learned when the regulation is inactive.

At each new cycle, the coefficients are initialised to 1.

AIR SUPPLY

Measurement of the fresh air flow

The flow of fresh air entering the engine is calculated by a flow sensor (ratiometric hot-wire sensor).
An air temperature sensor is integrated into the flow sensor.

The flow sensor facilitates control of the quantity of exhaust gas sent for recirculation, thus ensuring the best possible recirculation rates. Air flow measurement allows closed-loop control via the EGR valve.

EGR valve control

The EGR (exhaust gas recirculation) system consists of a direct current EGR valve fitted with a valve position sensor. The EGR valve is controlled in a closed-loop via the position sensor. Up to a certain rate, exhaust gas recirculation enables nitrogen oxide (NOx) emissions to be reduced significantly.

Turbocharger control

The turbocharger system consists of a solenoid valve connected to the vacuum pump circuit; this enables the vanes to be controlled by means of a diaphragm so as to create either an overpressure or a vacuum in the fresh air inlet circuit.

Air valve control

By default the valve is open when in the rest position and is actuated only when the engine is switched off; this has a damping effect and helps to stop the engine.

IDLE SPEED MANAGEMENT

The injection computer is responsible for regulating the idle speed as a function of the idle speed setpoint which it calculates.

The idle speed setpoint is dependent on:
– the coolant temperature,
– the emission control programs,
– air conditioning requirements,
– the gear engaged,
– the electrical consumers,
– battery voltage.

ENGINE TORQUE MANAGEMENT

The torque structure is the system which translates the driver's request into a torque supplied by the engine. It is required for certain functions such as the electronic stability program (ESP), the automatic gearbox or the sequential gearbox if fitted).
Each inter-system (ESP, automatic gearbox, sequential gearbox) sends the injection computer a torque request via the multiplex network.
The computer arbitrates between the inter-system torque requests and the driver's request (comprised of the accelerator pedal or the cruise control/speed limiter function). The result of the arbitration gives the torque setpoint.

From this torque setpoint, the computer determines the quantity of fuel to be injected (injection duration and number of injection processes) and the amount of air required (turbocharging pressure and EGR rate) so that the engine is able to provide the torque required in the best possible conditions (in terms of smooth running performance, pollutant emissions, etc.).

MANAGEMENT OF PRE/POSTHEATING

Pre-postheating management involves controlling the heater plugs and the heater plugs indicator light in the instrument panel (via the multiplex network). The heater plugs are activated by a relay box and the power is provided by the battery.

After the ignition is switched on. Preheating is activated for a period of time. The indicator light comes on for the activation period which is dependent on the battery voltage, atmospheric pressure and coolant temperature.
When the coolant temperature is below a certain threshold, a postheating function enables combustion stability, and thereby engine operation, to be improved (reduction in unburnt fuel and pollutant emissions).

MANAGEMENT OF ENGINE COOLANT TEMPERATURE

Engine cooling is guaranteed by a 2-speed fan unit (GMV) (slow: GMV1 and fast: GMV2).
The injection computer requests the UPC to activate them via the multiplex network.

To provide cooling:
– Engine running
GMV1 is activated when the coolant temperature exceeds **96°C** and is deactivated when it drops below **94°C**.
GMV2 is activated when the coolant temperature exceeds **104°C** and is deactivated when it drops below **102°C**.

If the engine coolant temperature exceeds the warning threshold of **120°C**, the injection computer requests the instrument panel computer, via the multiplex network, to switch on the coolant temperature warning light. The warning stops if the coolant temperature drops below **117°C**.

If the engine coolant temperature exceeds the threshold of **115°C**, the injection computer requests the UPC computer, via the multiplex network, to switch off the air conditioning compressor so as to reduce the load on the engine and attempt to limit the rise in temperature. The cut-off request is cancelled if the coolant temperature drops below **110°C**.

If a fault in the coolant temperature sensor circuit is detected, the injection computer requests that the coolant temperature warning light is lit and that GMV2 is activated.

In addition to engine management, the injection computer centralises the cooling requirements for the climate control and automatic transmission/sequential gearbox functions (where fitted).

OTHER HOSTED FUNCTIONS

The other functions hosted by the computer are:
– CAN,
– Trip Computer,
– Engine immobiliser,
– Airbags,
– Panic hardware,
– Engine stop management,
– Starter management,
– Heating and ventilation,
– Cruise control/speed limiter.

INTER-SYSTEM EXCHANGES

The inter-system connections concerning the particular requirements of engine management are as follows:
– Request for instrument panel computer to illuminate the OBD warning light to warn of an OBD-related pollution fault.
– Request to light the Level 1 warning light to warn of an operational safety fault with the engine management system which may restrict performance,
– Request to light the Level 2 warning light to warn of an operational safety fault with the engine management system which may result in the engine stopping,
– Request to light the Engine overheating warning light to warn of an engine overheating fault or a fault in the coolant temperature sensor,
– Request to start the Fan units for engine cooling and also for air conditioning purposes,
– Request to shut down the air conditioning compressor for engine programming requirements such as start-up, performance, anti-stalling, overspeed, etc,
– Request to switch off electrical consumers (passenger compartment heating resistor (RCH), heated rear screen, etc.) for engine operation purposes such as: start-up, performance, anti-stalling, overspeed, etc.,
– Formulation of requests to engage electrical consumers and limit power based on rail conditions,
  This last function is made possible with the introduction of alternator control. This enables engine smooth-running performance to be improved in the critical operating phases, mainly at idle speed and when starting up. These requests pass via the multiplex network to the Protection and Switching Unit where they are converted before being sent to the alternator.

Faults that activate the OBD warning light

Tool fault	Associated DTC	Diagnostic tool title
DF026	**0201**	Cylinder 1 injector control circuit
DF027	**0202**	Cylinder 2 injector control circuit
DF028	**0203**	Cylinder 3 injector control circuit
DF029	**0204**	Cylinder 4 injector control circuit
DF038	**0606**	Computer
DF209	**0409**	EGR valve position sensor circuit
DF202	**2413**	EGR valve

PRECAUTIONS/RISKS

The main recommendation regarding the system is:
Never electrically disconnect the injectors with the engine running.
The piezoelectric technology used for the injector system means that the injectors receive a control pulse to open and another control pulse to close. If the injector is disconnected between these 2 pulses while the engine is running, i.e. during the actual injection process, the injector will remain open long enough to create very unfavourable thermodynamic conditions in the cylinder(s) or generate hydraulic pressure which may **result in engine damage**.

The injector voltage is very high (much higher than that of conventional injectors)
This voltage can be as much as **150 V**.

IMPORTANT!

BLACK 32 TRACK CONNECTOR A

Track	Description
A1	Not used
A2	Cruise control On/Off
A3	CAN L1
A4	CAN H1
B1	Not used
B2	Not used
B3	Not used
B4	Not used
C1	Not used
C2	Not used
C3	Speed limiter On/Off
C4	Clutch switch signal
D1	+ After ignition feed
D2	Signal for cruise control/speed limiter button
D3	Earth for cruise control/speed limiter button
D4	Not used
E1	Not used
E2	Not used
E3	Not used
E4	Opening contact Stop signal
F1	Water in fuel sensor logical signal (Not used)
F2	Supply (at +5 V) for pedal potentiometer Gang 2
F3	Signal for pedal potentiometer Gang 2
F4	Earth for pedal potentiometer Gang 2
G1	VBR: Supply after injection supply main relay
G2	Supply for pedal potentiometer Gang 1
G3	Earth
G4	Earth
H1	Earth
H2	Signal for pedal potentiometer Gang 1
H3	Earth for pedal potentiometer Gang 2
H4	Earth

BROWN 48-TRACK CONNECTOR B

Track	Description
A1	EGR valve control (-)
A2	EGR valve control (+)
A3	Air valve earth
A4	Not used
B1	Not used
B2	Not used
B3	Re-reading - air valve position
B4	Not used
C1	(-) TDC sensor signal
C2	Water in fuel sensor analogue signal (Not used)
C3	Signal - EGR valve position sensor
C4	5 V supply - EGR valve position sensor signal
D1	(+) TDC sensor signal
D2	Not used
D3	Earth - EGR position sensor
D4	Not used
E1	Re-reading - preheating unit status
E2	Not used
E3	Refrigerant pressure sensor signal
E4	Refrigerant pressure sensor 5 V supply
F1	Preheating unit control output
F2	Camshaft sensor signal
F3	Refrigerant pressure sensor earth
F4	Not used
G1	Air valve control output
G2	Not used
G3	Not used
G4	+ battery feed
H1	Not used
H2	Not used
H3	Not used
H4	Camshaft sensor earth

48-TRACK BROWN CONNECTOR B (continued)

Track	Description
J1	Not used
J2	Not used
J3	Not used
J4	CAN H2
K1	Injection supply main relay control output
K2	Not used
K3	Not used
K4	CAN L2
L1	Not used
L2	Not used
L3	VBR: Injection supply main after relay feed
L4	VBR: Injection supply main after relay supply
M1	Turbocharging solenoid valve
M2	Not used
M3	Output - control of flow control actuator solenoid valve
M4	Output - pressure regulation actuator solenoid valve control

48-TRACK GREY CONNECTOR C

Track	Description
A1	Not used
A2	Not used
A3	Not used
A4	Not used
B1	Input - turbocharger sensor signal
B2	Turbocharging pressure sensor earth
B3	Not used
B4	Not used
C1	Not used
C2	Air temperature sensor signal input
C3	Coolant temperature sensor signal input
C4	Fuel temperature sensor signal input
D1	Turbocharging pressure sensor 5 V supply
D2	Flow sensor signal input
D3	Not used
D4	Coolant temperature sensor earth
E1	Not used
E2	Not used
E3	Flowmeter earth
E4	Fuel temperature sensor earth
F1	Flow sensor 5 V supply
F2	Not used
F3	Not used
F4	Not used
G1	Not used
G2	Not used
G3	Not used
G4	Not used
H1	5 V supply - rail pressure sensor
H2	Rail pressure sensor signal input
H3	Not used

48-TRACK GREY CONNECTOR C (Continued)

Track	Description
H4	Not used
J1	Not used
J2	Rail pressure sensor earth
J3	Not used
J4	Not used
K1	Not used
K2	Not used
K3	Not used
K4	Not used
L1	Injector 1 control
L2	Injector 2 control
L3	Injector 3 control
L4	Injector 4 control
M1	Injector 1 feed
M2	Injector 2 feed
M3	Injector 3 feed
M4	Injector 4 feed

COMPUTER REPROGRAMMING OPERATIONS

The system can be reprogrammed via the diagnostic socket using the RENAULT CLIP diagnostic tool (see **Technical Note 3585A**)

While the computer is being reprogrammed the fan units are triggered automatically.

NOTE
- **Switch on the diagnostic tool (mains or cigarette lighter supply).**
- **Connect a battery charger.**
- **Shut down all the electrical consumers (lights, interior lights, air conditioning, radio CD, etc.).**
- **Wait for the engine to cool (engine coolant temperature < 60°C and air temperature < 50°C).**

Before reprogramming the computer:
- Backup the computer data to the diagnostic tool (engine adaptives) by running command **SC003 Save computer data**.

After any computer reprogramming operation:
- switch the ignition off and then on again,
- **Use the diagnostic tool to carry out the following steps:**
- run command **RZ019 Programming reinitialisation**,
- run command **SC001 Write saved data** to restore the engine adaptives.
- run command **SC013 Enter VIN**,
- start the engine (warning: the start-up phase may last up to **30 seconds**).
- after injection system reprogramming, stored faults may appear in other computers. Clear the fault memory of these computers.
- carry out a road test followed by another check with the diagnostic tool.

INJECTOR CODE PROGRAMMING IS NOT PERMITTED ON THE SIEMENS SID301 INJECTON SYSTEM.

NOTE
- The injection computer retains the same immobiliser code for life.
- The system has no security code.
- It is forbidden to perform tests with computers borrowed from the Parts Department or from another vehicle which must then be returned.
- These computers are hard-coded.
- If the injection computer appears to be faulty, contact the Techline and refer to the fault finding log.

REPLACING THE EGR (EXHAUST GAS RECIRCULATION) VALVE

After the EGR valve is replace, the computer should store the new valve offset (at **0 miles**), as well as the one measured the last time the ignition was switched off (computer auto feed voltage phase). The computer detects clogging or a blockage in the EGR valve using this data.

When the valve is replaced, clear the stored offsets so that the program uses the offset value of the new valve.

The data associated with this programming is combined under the **EGR Programming** function:

Procedure to follow after replacing the EGR valve:
– select the **CLEAR** menu,
– control the clear command **RZ002 EGR adaptives**,
– switch off the ignition,
– wait **30 seconds** (computer auto-feed phase),
– start the vehicle to enable EGR valve programming,
– Display the **PR400 New EGR valve offset** and **PR129 Last EGR valve offset** parameters,
– if reinitialisation has been carried out correctly then **0.75 V < PR400 = PR129 < 1.5 V**.

COMPUTER REPLACEMENT AND PROGRAMMING OPERATIONS

The system can be programmed via the diagnostic socket using the RENAULT CLIP diagnostic tool (see **Technical Note 3585A**).

While the computer is being (re)programmed the engine fan assemblies are automatically triggered.

NOTE
– Switch on the diagnostic tool (mains or cigarette lighter supply).
– Connect a battery charger.
– Switch off all the electrical consumers (lights, interior lighting, air conditioning, radio CD, etc).
– Wait for the engine to cool (engine coolant temperature < 60°, and air temperature < 50°).

Before reprogramming the computer:
– Backup the computer data to the diagnostic tool (engine adaptives) by running command **SC003 Save computer data**.

Any time the computer has been programmed:
– Switch the ignition off and then on again.
– Use the diagnostic tool to carry out the following steps:
– Use command **RZ019 Programming reinitialisation**.
– Use command **SC001 Write saved data** to restore the engine adaptives.
– Start the engine (warning: the start-up phase may last up to **30 seconds**).
– Stop the engine (to initialise the computer) and wait **30 seconds**.
– Switch on the ignition and use the diagnostic tool to carry out the following steps:
– Run command **SC013 Enter VIN**.
– After injection system reprogramming, stored faults may appear in other computers. Clear the fault memory of these computers.
– Carry out a road test followed by another check with the diagnostic tool.

NOTE
It is not possible to try an injection computer coming from the Parts Department because it will no longer be possible to use it on another vehicle.

REPLACING THE PUMP, INJECTORS, RAIL + RAIL PRESSURE SENSOR OR LOW PRESSURE CIRCUIT COMPONENT (DIESEL FILTER, etc.).

After replacing one of these components, clear **RZ004 Pressure regulation adaptives**.

SPECIAL COMMANDS

SC001: Write saved data.
Use this command after replacing or (re)programming the computer (if the data has been saved using command **SC003**).

SC003: Save computer data.
This command enables the computer operating data, the engine adaptives, to be recorded.
Use this command before replacing or (re)programming a computer.

SC013: VIN code entry
This command permits manual entry of the vehicle's VIN into the computer.
Use this command each time the computer is replaced or (re)programmed.

CONFIGURATION READING

LC009: Air conditioning.
With or without air conditioning.

LC065: Water in diesel fuel detector.
Water present or not in diesel fuel.

Tool fault	Associated DTC	Diagnostic tool title
DF001	**0115**	Coolant temperature sensor circuit
DF003	**2226**	Atmospheric pressure sensor circuit
DF004	**0235**	Turbocharging pressure sensor circuit
DF005	**0335**	Engine speed sensor circuit
DF007	**0190**	Rail pressure sensor circuit
DF008	**0225**	Pedal potentiometer circuit gang 1
DF009	**2120**	Pedal potentiometer circuit gang 2
DF011	**0641**	Sensor supply voltage no. 1
DF012	**0651**	Sensor supply voltage no. 2
DF015	**0685**	Main relay control circuit
DF016	**0487**	EGR control circuit
DF017	**0380**	Preheating unit control circuit
DF025	**0381**	Pre-postheating unit fault finding connection
DF026	**0201**	Cylinder 1 injector control circuit
DF027	**0202**	Cylinder 2 injector control circuit
DF028	**0203**	Cylinder 3 injector control circuit
DF029	**0204**	Cylinder 4 injector control circuit
DF038	**0606**	Computer
DF039	**0110**	Inlet air temperature sensor circuit
DF047	**0560**	Computer supply voltage
DF049	**0530**	Refrigerant sensor circuit
DF051	**0575**	Cruise control/speed limiter function
DF053	**1089**	Rail pressure regulation function
DF054	**0045**	Turbocharging solenoid valve control circuit
DF056	**0100**	Air flow sensor circuit
DF067	**0120**	Damper valve control circuit
DF070	**0830**	Clutch switch circuit
DF091	**0500**	Vehicle speed signal
DF097	**0340**	Camshaft sensor circuit

Tool fault	Associated DTC	Diagnostic tool title
DF098	**0180**	Fuel temperature sensor circuit
DF127	**0571**	Brake switch no. 1 circuit
DF129	**0101**	Requested air flow
DF173	**0812**	Reverse gear signal
DF195	**0016**	Camshaft/engine speed sensor consistency
DF202	**2413**	EGR valve
DF209	**0409**	EGR valve position sensor circuit
DF249	**0200**	Injector control
DF301	**2263**	Air intake circuit
DF532	**2502**	Alternator charge signal
DF582	**0069**	Pressure consistency
DF641	**2101**	Damper valve circuit
DF647	**0488**	EGR valve position regulation
DF770	**0001**	Flow regulator circuit
DF771	**0002**	Flow regulation adaptive
DF773	**0090**	Pressure regulator circuit
DF885	**0087**	Rail pressure
DF886	**2269**	Water in diesel fuel sensor
DF887	**2299**	Accelerator/brake pedal position inconsistency
DF889	**2610**	Engine safety stop

DF001 PRESENT OR STORED	COOLANT TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to +12 V 1.DEF: Micro-breaks 2.DEF: Signal inconsistency

NOTES	**Application conditions for stored faults:** The fault is declared present after the ignition has been switched on for at least **10 seconds**.
	If the fault is present: – the engine overheating warning light is lit on the instrument panel, – the fan units are running, – the air conditioning compressor is switched off, the coolant temperature value switches to safe mode, **10°C < PR064 Coolant Temperature < 90°C**.

Check the connection and condition of the **4-track connector** for the coolant temperature sensor.
Repair if necessary.

Check the connection and condition of computer **connector C**.
Repair if necessary.

Measure the coolant temperature sensor resistance between **tracks 2** and **3**.
Replace the coolant temperature sensor if the resistance is not:
2252 Ω ± 112.16 Ω at 25°C
810 Ω ± 39 Ω at 50°C
283 Ω ± 8 Ω at 80°C

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Sensor connector **track 2** → **Track D4** computer connector **C**

Sensor connector **track 3** → **Track C3** computer connector **C**

Sensor connector **track 1** → **Instrument panel**

Sensor connector **track 4** → **Instrument panel**

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF003 PRESENT OR STORED	ATMOSPHERIC PRESSURE SENSOR CIRCUIT CC.1 : Short circuit to +12 V CO.0 : Open circuit or short circuit to earth 1.DEF: Micro-breaks

NOTES	**Special notes:** The atmospheric pressure sensor is built into the injection computer, and cannot be separated.
	Application conditions for stored faults: The fault is declared present after the ignition has been switched on for at least **10 seconds**.
	If the fault is present: – small amount of smoke may be present, – the atmospheric pressure value changes to safe mode, **PR035 Atmospheric pressure = 900 mbar**.

Disconnect the injection computer and check the condition of its contacts and connector.
Repair if necessary.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF004 PRESENT OR STORED	TURBOCHARGING PRESSURE SENSOR CIRCUIT CC.1 : Short circuit to +12 V CO.0 : Open circuit or short circuit to earth 1.DEF: Micro-breaks 2.DEF: Signal outside lower limit 3.DEF: Signal outside upper limit

NOTES	**If the fault is present:** The **level 1** warning light is lit.

CO.0 ***CC.1*** ***1.DEF***	***NOTES***	**Priority when dealing with a number of faults:** Apply the procedure for dealing with fault **DF012 Sensor voltage supply no. 2** first. **Application conditions for stored faults:** The fault is declared present after the ignition has been switched on. **If the fault is present:** – the EGR function is inhibited. – the turbocharging pressure value is in safe mode, **PR041 = 1000 mbar**, – turbocharging is shut off.

Check the connection and condition of the **3-track connector** of the turbocharging pressure sensor.
Repair if necessary.

Check the connection and condition of computer **connector C**.
Repair if necessary.

With the ignition on, check for **+5 V** on **track 1** and earth on **track 2** of the turbocharging pressure sensor.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Injection computer, connector C **track D1** → **Track 1** turbocharging pressure sensor connector

Injection computer connector C **track B2** → **Track 2** turbocharging pressure sensor connector

Injection computer connector C **track B1** → **Track 3** turbocharging pressure sensor connector

Repair if necessary.

If the fault is still present, replace the turbocharging pressure sensor.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF004 **CONTINUED**	

2.DEF ***3.DEF***	***NOTES***	**Priority when dealing with a number of faults:** First deal with fault **DF2226 Atmospheric pressure sensor circuit**.
		Application conditions for stored faults: The fault is declared present after the ignition has been switched on for **1 second**, with a warm engine when the vehicle is stationary.
		If the fault is present: – the maximum torque supplied by the engine is restricted.

Check the connection and condition of the **3-track connector** of the turbocharging pressure sensor.
Repair if necessary.

Check the connection and condition of computer **connector C**.
Repair if necessary.

With the ignition on, check for **+5 V** on **track 1** and earth on **track 2** of the turbocharging pressure sensor.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector C **track D1** → **track 1** sensor connector

Computer connector C **track B2** → **track 2** sensor connector

Computer connector C **track B1** → **track 3** sensor connector

Repair if necessary.

If correct, replace the turbocharging pressure sensor.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF005 PRESENT OR STORED	ENGINE SPEED SENSOR CIRCUIT 1.DEF: Signal inconsistency 2.DEF: No signal 3.DEF: Signal outside limits 4.DEF: Values outside limits 5.DEF: Configuration/Initialisation

NOTES	**Special notes:** **Level 2** warning light illuminated in instrument panel, engine stalls or cannot be (re-)started. **Conditions for applying fault finding procedures to stored faults:** The fault is **declared present** with the engine when the starter is activated or when idling.

Check the connection and condition of the **2-track connector** for the engine speed sensor. Repair if necessary. Ensure the sensor is correctly fitted on the engine.
Check the connection and condition of computer **connector B**. Repair if necessary.
Measure the resistance on the engine speed sensor terminals. Replace the engine speed sensor if the resistance is not approximately **680** Ω ± **68** Ω.
Check the **insulation, continuity and the absence of interference resistance** on the following connections: Computer connector B **track D1** → **track 1** sensor connector Computer connector B **track C1** → **track 2** sensor connector Repair if necessary.
Check that the flywheel ring gear is not defective (missing teeth).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF007 PRESENT OR STORED	RAIL PRESSURE SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CO.1 : Open circuit or short circuit to +12 V 1.DEF: Faulty sensor 2.DEF: Signal outside upper limit 3.DEF: Micro-breaks

NOTES	**Priorities when dealing with a number of faults:** Apply the procedure for dealing with fault **DF011 Sensor voltage supply no. 1** first.
	If the fault is present: **Level 1 warning light** activated. Restriction of torque setpoint and engine speed loss of performance.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the ignition is switched on or when the engine is running outside idle speed.

Check the connection and condition of the **3 track connector** for the rail pressure sensor.
Repair if necessary.

Check the connection and condition of computer **connector C**.
Repair if necessary.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector C **track J2** → **track 2** sensor connector

Computer connector C **track H2** → **track 1** sensor connector

Computer connector C **track H1** → **track 3** sensor connector

Repair if necessary.

If correct, replace the rail and its sensor and the high pressure pipes.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF008 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 1 CC.1 : Short circuit to +12 V 1.DEF: Signal inconsistency 2.DEF: No signal CO.0 : Open circuit or short circuit to earth

NOTES	**Priorities when dealing with a number of faults:** If fault **DF009 Pedal potentiometer circuit gang 2** is present at the same time, check that the pedal sensor connector is connected correctly. Deal with fault **DF012 Sensor supply voltage no. 2** first, if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a series of full load/no load actions on the accelerator pedal.
	Special notes: Restriction of idle speed setpoint, loss of performance and non-authorised speed regulation. **Level 1** or **2** warning light is lit. Possibility for speed regulation at **1800 rpm** up to **42 mph (70 km/h)** when accelerating **39 mph (65 km/h)** when decelerating, then speed regulated to **48 mph (80 km/h)** beyond that.

Check the connection and condition of the **6-track connector** for the pedal potentiometer.
Repair if necessary.

Check the connection and condition of computer **connector A**.

Measure the resistance on the pedal potentiometer on **gang 1** between **tracks 5** and **3**.
Replace the pedal potentiometer if the resistance is not **1.7 kΩ ± 0.9 kΩ**.

With the ignition on, check for **+5 V** on **track 3** and earth on **track 5** of the pedal potentiometer.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Injection computer, connector A **track H2** → **Track 4** connector on pedal potentiometer

Injection computer connector A **track G2** → **Track 3** pedal potentiometer connector

Injection computer connector A **track H3** → **Track 5** pedal potentiometer connector

Repair if necessary.

If the fault persists, replace the pedal potentiometer.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF009 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 2 CC.1 : Short circuit to +12 V CO.0 : Open circuit or short circuit to earth

NOTES	**Processing priority in the event of a number of faults:** Deal with fault **DF011 Sensor supply voltage no. 1** first if it is present or stored.
	Special notes: Power restriction. Cruise control/speed limiter is not authorised. The **level 1** warning light is lit.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a series of full load-no load accelerator pedal actions have been carried out (engine stopped, ignition on).

Check the connection and condition of the **6-track connector** for the pedal potentiometer.
Repair if necessary.

Check the connection and condition of computer **connector A**.
Repair if necessary.

Measure the **resistance** on the pedal potentiometer on **gang 2** between **tracks 2** and **6**.
Replace the pedal potentiometer if the resistance is not **2.85 kΩ ± 2.05 kΩ**.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **A track F3** ⟶ **track 1** pedal potentiometer connector

Computer connector **A track F2** ⟶ **track 2** pedal potentiometer connector

Computer connector **A track F4** ⟶ **track 6** pedal potentiometer connector

Repair if necessary.

If the fault persists, replace the pedal potentiometer.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF011 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE No. 1 1.DEF: Signal outside lower limit 2.DEF: Signal outside upper limit

NOTES	**Priorities when dealing with a number of faults:** If one or more of the following faults are present at the same time: – **DF009 Pedal potentiometer circuit track 2**, check that the pedal sensor connector is connected correctly. – **DF007 Rail pressure sensor circuit**, check that the rail pressure sensor connector is connected correctly. – **DF049 Refrigerant sensor circuit**, check that the refrigerant sensor connector is connected correctly. – **DF056 Air flow sensor circuit**, check that the air flow sensor connector is connected correctly. – **DF209 EGR valve position sensor circuit**, check that the EGR valve position sensor connector is connected correctly.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the ignition has been switched on.
	Special notes: If the fault is present: – The cruise control/speed limiter function is deactivated. – Power is restricted. – The **level 1** warning light is lit.

The sensors connected to **supply no. 1** are:
– rail pressure sensor,
– gang 2 of the accelerator pedal potentiometer sensor,
– refrigerant pressure sensor,
– air flow sensor,
– EGR valve position sensor.
To locate a sensor and/or connection concerned, disconnect one of these sensors then check if the fault gets stored.
If the fault is still present, start the operation again with each sensor (one by one).
(Wait several seconds between each disconnection to allow the computer time to detect the fault).
If the fault is stored after disconnection, change the faulty sensor or repair its connection.
Clear the faults created by the multiple disconnections.

Check the connection and condition of the connector for the sensors and the injection computer.
Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF011 **CONTINUED**	

If the fault is still present when the sensors have been disconnected:
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Injection computer, connector C **track J2**	→	**Track 2** of the rail pressure sensor
Injection computer connector C **track H1**	→	**Track 3** of the rail pressure sensor
Injection computer connector A **track F2**	→	**Track 2** of the accelerator pedal potentiometer gang 2
Injection computer connector A **track F4**	→	**Track 6** of the accelerator pedal potentiometer gang 2
Injection computer connector B **track B4**	→	**Track B** of the refrigerant fluid pressure sensor
Injection computer connector B **track F3**	→	**Track A** of the refrigerant pressure sensor
Injection computer connector C **track F1**	→	**Track 5** of the air flow sensor
Injection computer connector C **track E3**	→	**Track 2** of the air flow sensor
Injection computer connector B **track C4**	→	**Track 1** of the EGR valve position sensor
Injection computer connector B, **track D3**	→	**Track 3** of the EGR position sensor

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF012 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE No. 2 1.DEF: Signal outside lower limit 2.DEF: Signal outside upper limit

NOTES	**Priorities when dealing with a number of faults:** If one or more of the following faults are present at the same time: – **DF008 Pedal potentiometer circuit gang 1**, check that the pedal sensor connector is connected correctly. – **DF004 Turbocharging pressure sensor circuit**, check that the rail pressure sensor connector is connected correctly.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the ignition has been switched on.
	Special notes: If the fault is present: – Cruise control is deactivated. – Power is restricted. – The **level 1** warning light is lit.

The sensors connected to **supply no. 2** are:
– Accelerator pedal potentiometer sensor, track no. 1.
– Turbocharging pressure sensor.
To locate a sensor and/or connection concerned, disconnect one of these sensors then check if the fault gets stored.
If the fault is still present, start the operation again with each sensor (one by one).
(Wait several seconds between each disconnection to allow the computer time to detect the fault).
If the fault is stored after disconnection, change the faulty sensor or repair its connection.
Clear the faults created by the multiple disconnections.

Check the connection and condition of the **connector for the sensors** and **the injection computer**.
Repair if necessary.

If the fault is still present when the sensors have been disconnected:
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Injection computer, connector C **track D1**	→	**Track 1** of the turbocharging pressure sensor
Injection computer connector C **track B2**	→	**Track 2** of the turbocharging pressure sensor
Injection computer connector A **track G2**	→	**Track 3** of the accelerator pedal potentiometer gang 1
Injection computer connector A **track H3**	→	**Track 5** of the accelerator pedal potentiometer gang 1

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF015 PRESENT OR STORED	MAIN RELAY CONTROL CIRCUIT CO : Open circuit CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Special notes:** The **supply relay for the injection control unit (50A)** is located on a relay board in the engine connection unit under the protection and communication unit. Engine stalls or is impossible to re-start. **If the fault is present:** The **level 2** warning light is lit.

Check the condition of the battery.
Check the condition of the battery terminals making sure they are correctly tightened.
Check the condition of the injection supply relay and its mounting.
Check fuses **F1** and **F2** for the injection system.
Repair if necessary.
Check the connection of injection computer connector B.
Repair if necessary.

With the ignition on, check for **+12 V after ignition feed** on **track 5** and on **track 1** of the main relay support plate.
Check **the continuity, insulation and the absence of interference resistance** on the following connections:

Main relay support plate **track 2** → **track K1** computer connector **B**

Main relay support plate **track 5** → **track L3** computer connector **B**

Main relay support plate **track 5** → **track L4** computer connector **B**

Main relay support plate **track 5** → **track G1** computer connector **A**

Repair if necessary.
If the fault is still present, replace the main relay.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF016 PRESENT OR STORED	EGR VALVE CONTROL CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Values outside the limits CC : Short circuit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the engine idling.
	Special notes: EGR cut-off and incorrect pollution control.

Check the connection and the condition of the **connector for the EGR solenoid valve** and of connector B of the injection computer.
Repair if necessary.

Measure the resistance at the terminals of the exhaust gas recirculation solenoid valve between **tracks 2 and 6**.
Replace the solenoid valve if its resistance is not in the region of **2.3** Ω.

Check **the continuity, insulation and the absence of interference resistance** on the following connections:

EGR valve **track 2** ⟶ **track A2** computer connector **B**

EGR valve **track 6** ⟶ **track A1** computer connector **B**

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF017 PRESENT OR STORED	PREHEATING UNIT CONTROL CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after attempts have been made to start the engine. **Special notes:** If the fault is present, it will be difficult to start the vehicle, or even impossible when cold, or preheating will be continuous and the heater plugs will deteriorate.

Check the connection and the condition of the **connector for the preheating unit and the supply cables for the heater plugs** and **connector B of the injection computer**.
Repair if necessary.

Check the condition of the **F2 (70A)** supply fuse on the power supply fuse board.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

+12 V after ignition feed → **Track 4** preheating unit

Computer connector **B track F1** → **Track 8** preheating unit

Computer connector **B track E1** → **Track 3** preheating unit

Repair if necessary.
If the connections are correct, replace the preheating unit.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF025 PRESENT OR STORED	PREHEATING UNIT DIAGNOSTIC CONNECTION CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to +12 V

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after several attempts have been made to start the engine.
	Special notes: If the fault is present, it will be difficult to start the vehicle, or even impossible when cold, or preheating will be continuous and the heater plugs will deteriorate.

Check the connection and condition of the connector **for the preheating unit and the supply cables for the heater plugs**.
Check the connection and condition of the **connectors for the heater plugs** and **connector B of the injection computer**.
Repair if necessary.

Check the condition of the **F2 (70A)** supply fuse on the power supply fuse board.
Check the **resistance** of the heater plugs.
Replace any heater plugs whose resistance is not **less than 2 Ω at +20°C**.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

+12 V after ignition feed	→	**Track 4** preheating unit
Computer connector **B track F1**	→	**Track 8** preheating unit
Computer connector **B track E1**	→	**Track 3** preheating unit
Heater plug connector **no. 1**	→	**Track 2** preheating unit
Heater plug connector **no. 2**	→	**Track 7** preheating unit
Heater plug connector **no. 3**	→	**Track 1** preheating unit
Heater plug connector **no. 4**	→	**Track 6** preheating unit

Repair if necessary.
If this connection is correct, replace the preheating unit.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 PRESENT OR STORED	CYLINDER 1 INJECTOR CONTROL CIRCUIT CO : Open circuit CC : Short circuit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started. **If the fault is present:** – Engine speed and torque are restricted. – The **level 1** warning light is lit. – Loss of performance, operation on minimum of 2 cylinders.

Check the connection and the condition of the **connector for injector no. 1** and of **computer connector C**.
Repair if necessary.

Disconnect injector no. 1.
Measure the **resistance** of injector No. 1 between **tracks 1** and **2**.
Replace the injector if the resistance at the injector is not between **150 and 250 kΩ at 20°C**.
Otherwise **reconnect injector no. 1**.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **C track L1** ⟶ **Track 1** injector no. 1

Computer connector **C track M1** ⟶ **Track 2** injector no. 1

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF027 PRESENT OR STORED	CYLINDER 2 INJECTOR CONTROL CIRCUIT CO : Open circuit CC : Short circuit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started. **If the fault is present:** – Engine speed and torque are restricted. – The **level 1** warning light is lit. – Loss of performance, operation on minimum of 2 cylinders.

Check the connection and condition of the **connector for injector no. 2** and of **computer connector C**.
Repair if necessary.

Disconnect injector no. 2.
Measure the **resistance** of injector no. 2 between **tracks 1** and **2**.
Replace the injector if the resistance at the injector is not between **150 and 250 kΩ at 20°C**.
Otherwise **reconnect injector no. 2**.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **C track L2** ⟶ **Track 1** injector no. 2

Computer connector **C track M2** ⟶ **Track 2** injector no. 2

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF028 PRESENT OR STORED	CYLINDER 3 INJECTOR CONTROL CIRCUIT CO : Open circuit CC : Short circuit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started. **If the fault is present:** – Engine speed and torque are restricted. – The **level 1** warning light is lit. – Loss of performance, operation on minimum of 2 cylinders.

Check the connection and condition of the **connector for injector no. 3** and **computer connector C**.
Repair if necessary.

Disconnect injector no. 3.
Measure the **resistance** of injector no. 3 between **tracks 1** and **2**.
Replace the injector if the resistance at the injector is not between **150 and 250 kΩ at 20°C**.
Otherwise **reconnect injector no. 3**.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **C track L3** ⟶ **track 1** injector No. 3

Computer, connector **C, track M3** ⟶ **track 2** injector no. 3

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 PRESENT OR STORED	CYLINDER 4 INJECTOR CONTROL CIRCUIT CO : Open circuit CC : Short circuit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started. **If the fault is present:** – Engine speed and torque are restricted. – The **level 1** warning light is lit. – Loss of performance, operation on minimum of 2 cylinders.

Check the connection and the condition of the **connector for injector no. 4** and of **computer connector C**.
Repair if necessary.

Disconnect injector no. 4.
Measure the **resistance** of injector no. 4 across **tracks 1** and **2**.
Replace the injector if the resistance at the injector is not between **150 and 250 kΩ at 20°C**.
Otherwise **reconnect injector no. 4**.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **C track L4** ⟶ **Track 1** injector no. 4

Computer, connector **C, track M4** ⟶ **Track 2** injector no. 4

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF038 PRESENT OR STORED	COMPUTER 1.DEF to 20.DEF : Internal electronic fault

NOTES	**Priorities when dealing with a number of faults:** If there are a number of faults, deal with the other system faults first.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present after an attempted start, or with the engine running.
	If the fault is present: Level 1 or 2 warning light is lit.

Check the connection and condition of the **computer connectors**. Repair if necessary.
If **9.DEF** is present, test the multiplex network (possibility of a fault on the Can H and Can L lines between the injection and the ABS system). Also check that there are no ABS computer faults.
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF039 PRESENT OR STORED	INLET AIR TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to +12 V 1.DEF: Micro-breaks

NOTES	**Special notes:** The inlet air temperature sensor is integrated into the air flowmeter.
	Processing priority in the event of a number of faults: Deal with fault **DF011 Sensor supply voltage no. 1** first if it is present or stored.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present after the ignition has been switched on for at least **10 seconds**.
	If the fault is present: The air temperature has a default value, i.e. **PR059 Inlet air temperature = 40°C**.

Check the connection and condition of the **6-track connector** of the flow sensor.
Repair if necessary.

Check the connection and condition of computer **connector C**.
Repair if necessary.

Measure the air temperature sensor resistance between **tracks 1** and **2** of the air flow sensor.
Replace the air flow sensor if the resistance displayed is not:
3714 Ω ± 161 Ω at 10°C
2448 Ω ± 95 Ω at 20°C
1671 Ω ± 58 Ω at 30°C

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **C track C2** → **Track 1** of the air flow sensor

Computer connector **C track E3** → **Track 2** of the air flow sensor

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF047 PRESENT OR STORED	COMPUTER FEED VOLTAGE 1.DEF: Signal outside lower limit 2.DEF: Signal outside upper limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine running**.

Measure the **battery voltage** when the ignition is switched on.
If the **Battery Voltage < 10 V** recharge the battery.

Check the condition and connection **of the battery terminals**.
Repair if necessary.

Check the vehicle's **charge circuit**.
Repair if necessary.

Check the connection and condition of the **computer connectors**.
Repair if necessary.

Check the condition of the relay support plate and the positioning and condition of the injection supply relay.
Replace the relay if necessary.

With the ignition on, check for **+12 V after ignition feed** on **track 5** and on **track 1** of the main relay support plate.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Main relay support plate **track 5**	→	**Track G1** computer connector **A**
Main relay support plate **track 5**	→	**Track L3** computer connector **A**
Main relay support plate **track 5**	→	**Track L4** computer connector **A**
Chassis earth	→	**Track G4, H1, H4 and G3** connector **A** of the computer

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF049 PRESENT OR STORED	REFRIGERANT FLUID SENSOR CIRCUIT CC.1 : Short circuit to +12 V CO.0 : Open circuit or short circuit to earth

NOTES	**Processing priority in the event of a number of faults:** Deal with fault **DF011** Sensor supply voltage no. 1 first if it is present or stored.
	Conditions for applying fault finding procedures to stored faults: Apply the fault finding procedure below, whether the fault is present or stored.

Check the connection and condition of the **3-track connector** of the refrigerant pressure sensor.
Repair if necessary.

Check the connection and condition of computer **connector C**.
Repair if necessary.

With the ignition on, check for **+5 V** on **track B** and earth on **track A** of the turbocharging pressure sensor.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector B **track F3** → **track A** refrigerant sensor connector

Computer connector B **track B4** → **track B** of the refrigerant sensor connector

Computer connector B **track E3** → **track C** refrigerant sensor connector

Repair if necessary.

If the fault is still present, replace the refrigerant sensor.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF051 PRESENT OR STORED	CRUISE CONTROL/SPEED LIMITER FUNCTION 1.DEF: Values outside limit CC.1 : Short circuit to +12 V 2.DEF: Signal outside upper limit

NOTES	**Special notes:** If the fault is present, the cruise control/speed limiter function will be inhibited.

Check the connection and condition of the connector for the **On/Off switch** for the **cruise control/speed limiter** and of computer connector C. Repair if necessary.
Check for the **+12 V after ignition feed** on **track A2** of the **cruise control/speed limiter** function On/Off switch. Repair if necessary.
Check the **operation** of the cruise control/speed limiter On/Off switch (consult the interpretation of **ET042 Cruise control/Speed limiter**).
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF053 PRESENT OR STORED	RAIL PRESSURE REGULATION FUNCTION 1.DEF: Pressure regulation solenoid valve closed 2.DEF: Pressure regulation solenoid valve open 3.DEF: Flow regulation solenoid valve open 4.DEF: Flow regulation solenoid valve closed 5.DEF: Component fault: flow or pressure solenoid valve 6.DEF: Pressure regulation oscillation 7.DEF: Flow regulation oscillation

NOTES	**Processing priority in the event of a number of faults:** Deal with faults **DF098 Fuel temperature sensor circuit** or **DF007 Rail pressure sensor circuit** if they are present or stored.
	Special notes: Possible engine stop and illumination of **level 1** or **2** warning light or loss of performance with illumination of the **Level 1** warning light.
	Conditions for applying fault finding procedures to stored faults: The fault appears when the engine is running.

Apply **test 1** Low pressure fuel supply system check.
Apply **test 2** Internal fuel transfer pump check (ITP).
Apply **test 3** Fuel pressure solenoid valve check.
Apply **test 4** Check high-pressure pump (HPP) and fuel flow solenoid valve.
Apply **test 5** Rail high pressure regulation circuit check.
Apply **test 6** Major leak in injectors/injectors open.
Apply **test 7** Incorrect injection quantity.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Clear **RZ004 Pressure regulation adaptives**. Carry out a road test followed by another check with the diagnostic tool.

DF054 PRESENT OR STORED	TURBOCHARGING SOLENOID VALVE CONTROL CIRCUIT CC.1 : Short circuit to +12 V CO.0 : Open circuit or short circuit to earth CO : Open circuit

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after: – starting the engine, – a road test, – an actuator control **AC214 Turbocharger control solenoid valve**.
	If the fault is present: Loss of performance with **Level 1 warning light** coming on.

Check the condition and connection of the **2-track connector** for the turbocharging solenoid valve. Repair if necessary.
Check the connection and condition of computer **connector B**. Repair if necessary.
Measure the resistance of the turbocharging solenoid valve between its **tracks 1** and **2**: If the resistance displayed is not **21** Ω ± **2.1** Ω **at 23°C**, replace the turbocharger solenoid valve
With the ignition on, check for **+12 V after ignition feed** on **track 2** of the turbocharging solenoid valve. Check the **insulation, continuity and the absence of interference resistance** on the following connection: Injection computer connector B **track M1** ⟶ **Track 1** of the turbocharger solenoid valve connector Repair if necessary.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF056 PRESENT OR STORED	AIR FLOW SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to +12 V

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the ignition has been switched on. **If the fault is present:** Loss of performance with smoke from the exhaust.

Check the connection and condition of the **6-track connector** of the flow sensor.
Repair if necessary.

Check the connection and condition of **computer connector C**.
Repair if necessary.

With the ignition on, check for the presence of **+12 V** on **track 4, +5 V** on **track 5** and earth on **track 2** of the flow sensor.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Flow sensor connector **track 6** → **Track D2** computer connector C

Flow sensor connector **track 2** → **Track E3** computer connector C

Flow sensor connector **track 5** → **Track F1** computer connector C

Repair if necessary.

With the flow sensor **connected, the vehicle ignition on** and **the engine stopped**:
Check the voltage between **tracks 2** and **6** of the air flow sensor, if the voltage is not between **0.3 V and 0.7 V**, replace the air flow sensor.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF067 PRESENT OR STORED	DAMPER VALVE CONTROL CIRCUIT CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V CO : Open circuit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – starting the engine, – a road test, – an actuator control **AC012 Damper valve**.
	Special notes: The damper function is no longer ensured when the engine is switched off or the flap is closed, then the engine stalls or starting is impossible.

Check the connection and condition of the **6-track connector** of the damper valve.
Repair if necessary.

Check the connection and condition of computer **connector B**.
Repair if necessary.

Ensure presence of **+12 V after ignition** on **track 1** of the damper valve.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **B track B3** → **Track 4** of the damper valve

Computer connector **B track G1** → **Track 5** of the air inlet flap

Computer connector **B track A3** → **Track 2** of the damper valve

Repair if necessary.
If the fault is still present, replace the air inlet flap.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF070 PRESENT OR STORED	CLUTCH SWITCH CIRCUIT 1.DEF: Signal outside upper limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after a series of actions on the clutch pedal during a road test (speed greater than 54 mph (90 km/h)).
	If the fault is present: Engine bucking or high engine speed.

Check the connection and condition of the **connector for the** clutch switch and of **computer connector A**.
Repair if necessary.

With the ignition on, check the clutch switch is supplied with **+12 V after ignition** on **track 2** and the presence of **earth on track 1**.
If correct:
Check the conformity of the clutch switch setting (position, connection).
– display status **ET121 Clutch contact signal**:
– clutch pedal engaged, status **ET121** must be RELEASED,
– when the clutch is disengaged, status **ET121** should be DEPRESSED,
if these checks are not correct, replace the clutch switch.
If the supply to the switch is incorrect:
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **A track C4** ⟶ **Track 2** of the clutch switch

Earth ⟶ **Track 1** of the clutch switch

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF091 PRESENT OR STORED	VEHICLE SPEED SIGNAL 1.DEF: Values outside the limits

NOTES	**Special notes:** None.

For this type of vehicle, the ABS computer or an additional unit (if the vehicle does not have ABS) transmits the vehicle speed on the CAN.
Test the multiplex network to be able to work on the CAN (fault on the CAN H and CAN L lines between the injection and the ABS).
Also check there are no faults in the ABS computer or in the system which supplies the vehicle speed.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF097 PRESENT OR STORED	CAMSHAFT SENSOR CIRCUIT 1.DEF: Signal incoherence 2.DEF: No signal 3.DEF: Values out of range 4.DEF: Configuration/Initialisation

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test. **Special notes:** Longer starting time, requires several attempts to start the vehicle.

Check the camshaft sensor mounting and positioning.
Check the connection and condition of the connector for the camshaft sensor and of **computer connector B**. Repair if necessary.
With the ignition on, check the camshaft sensor is supplied with **+12 V after ignition feed** on **track 3** and the presence of **earth on track 1**. Check the **insulation, continuity and the absence of interference resistance** on the following connections: Sensor connector **track 1** → **Track H4**, computer connector B Sensor connector **track 2** → **Track F2** computer connector B Sensor connector **track 3** → **Track 5** injection supply relay mounting Repair if necessary.
If correct, replace the camshaft sensor.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF098 PRESENT OR STORED	FUEL TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to +12 V 1.DEF: Micro-breaks 2.DEF: Signal inconsistency

NOTES	**Application conditions for stored faults:** The fault is declared present after the ignition has been switched on for at least **10 seconds**.
	If the fault is present: The fuel temperature value is in safe mode, **PR063 Fuel temperature = 60°C**.

Check the connection and condition of the fuel temperature sensor **2-track connector**. Repair if necessary.
Check the connection and condition of computer **connector C**. Repair if necessary.
Measure the **resistance** at the **fuel temperature sensor** terminals. Replace the fuel temperature sensor if the resistance is not approximately: **2051 ± Ω 123 Ω at 25°C** **811 ± Ω 47 Ω at 50°C** **309 ± Ω 17 Ω at 80°C**
Check the **insulation, continuity and the absence of interference resistance** on the following connections: Computer connector **C track C4** → **Track 1** of the fuel temperature sensor. Computer connector **C track E4** → **Track 2** of the fuel temperature sensor. Repair if necessary.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF127 PRESENT OR STORED	BRAKE SWITCH 1 CIRCUIT 1.DEF: Values outside the limits 2.DEF: Signal inconsistency 3.DEF: Signal outside upper limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after a series of actions on the brake pedal.

Check the condition and connection of the brake switch **4-track connector**. Repair if necessary.
Check the connection and condition of computer **connector A**. Repair if necessary.
Check the **insulation, continuity and the absence of interference resistance** on the following connection: Computer connector **A track E4** ⟶ **track 3** brake switch connnector Repair if necessary.
Carry out a multiplex network test.
Run full fault finding on the UCH.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF129 PRESENT OR STORED	REQUESTED AIR FLOW 1.DEF: Signal outside lower limit 2.DEF: Signal outside upper limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** Apply the fault finding procedure as below. **If the fault is present:** EGR function cut off.

Check that the air supply ducts are installed correctly.
Check the condition of the air filter and replace if necessary.
Check the entire air supply circuit, from the filter to the inlet manifold tracts.
Check the connection and condition of the **6-track connector** of the flow sensor. Repair if necessary.
Check the connection and condition of computer **connector C**. Repair if necessary.
With the ignition on, check for **+5 V** on **track 5** and earth on **track 2** of the flow sensor. Check the **insulation, continuity and the absence of interference resistance** on the following connections: Flow sensor connector **track 6** → **Track D2** computer connector C Flow sensor connector **track 2** → **Track E3** computer connector C Flow sensor connector **track 5** → **Track F1** computer connector C Repair if necessary.
With the flow sensor **connected, the vehicle ignition on** and **the engine stopped**: Check the voltage between **tracks 2** and **6** of the air flow sensor, if the voltage is not between **0.3 V and 0.7 V**, replace the air flow sensor.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF173 PRESENT OR STORED	REVERSE GEAR SIGNAL 1.DEF: Values outside the limits

NOTES	**Conditions for applying fault finding procedures to stored faults:** Apply this fault finding procedure.
	Special note: If the fault is present, the reversing lights will not work.

Check the connection and condition of the computer connectors. Repair if necessary.
Carry out a multiplex network test.
Run full fault finding on the UPC.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF195 PRESENT OR STORED	ENGINE SPEED/CAMSHAFT SENSOR CONSISTENCY

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test. **If the fault is present:** Longer starting time, requires several attempts to start the vehicle.

Check the camshaft sensor mounting and positioning.
Check the connection and condition of the connector for the camshaft sensor and of computer connector B. Repair if necessary.
With the ignition on, check the camshaft sensor is supplied with **+12 V after ignition feed** on **track 3** and the presence of **earth on track 1**. Check the **insulation, continuity and the absence of interference resistance** on the following connections: Computer connector B **track H4** → **track 1** sensor connector Computer connector B **track F2** → **track 2** sensor connector Injection supply relay mounting **track 5** → **track 3** sensor connector Repair if necessary.
Check the condition of the target on the camshaft. Repair if necessary.
If correct, replace the camshaft sensor.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF202 PRESENT OR STORED	EGR VALVE 1.DEF: Jammed component

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after starting the engine. **If the fault is present:** – Illumination of **Level 1** fault warning light on the instrument panel. – Engine instability, possibly even stalling. – Difficult to start engine or even impossible when cold. – Loss of performance. – Possible smoke emissions.

Check the connection and condition of the **6-track connector** of the exhaust gas recirculation valve.
Repair if necessary.

Check the connection and condition of computer **connector B**.
Repair if necessary.

With the ignition on, check for **+5 V** on **track 1** and earth on **track 3** of the turbocharging pressure sensor.
Check **the continuity, insulation and the absence of interference resistance** on the following connections:

Computer connector B **track C4** → EGR valve **track 1**

Computer connector B **track C3** → **track 5** EGR valve

Computer connector B **track D3** → **track 3** EGR valve

Repair if necessary.

Check the operation of the EGR valve:
– exit fault finding mode in Clip,
– switch off the vehicle ignition,
– disconnect the EGR valve connector,
– remove the EGR valve.
Check that there are no particles blocking the movement of the piston.
If there are no particles blocking the movement of the piston, use command **RZ002 EGR adaptives** to re-initialise the operating values of the valve.
If the valve is blocked or seized to the extent that it cannot be rectified, replace the EGR valve (see, **replacing components**).

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF209 PRESENT OR STORED	EGR VALVE POSITION SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Priority when dealing with a number of faults:** Apply the procedure for dealing with fault **DF012 Sensor voltage supply no. 2** first.
	Conditions for applying fault finding procedures to stored faults: The fault becomes present after starting the engine.
	If the fault is present: EGR valve cut-off.

Check the connection and condition of the exhaust gas recirculation solenoid valve **6-track connector**.
Repair if necessary.

Check the connection and condition of computer **connector B**.
Repair if necessary.

With the ignition on, check for **+5 V** on **track 1** and earth on **track 3** of the turbocharging pressure sensor.
Check **the continuity, insulation and the absence of interference resistance** on the following connections:

Computer connector B **track C4** → EGR valve **track 1**

Computer connector B **track C3** → **track 5** EGR valve

computer connector B **track D3** → **track 3** EGR valve

Check the operation of the EGR valve:
– exit fault finding mode in Clip,
– switch off the vehicle ignition,
– disconnect the EGR valve connector,
– remove the EGR valve.
Check that there are no particles blocking the movement of the piston.
If there are no particles blocking the movement of the piston, use command **RZ002 EGR adaptives** to re-initialise the operating values of the valve.
If the valve is blocked or seized to the extent that it cannot be rectified, replace the EGR valve (see, **replacing components**).

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF249 PRESENT OR STORED	INJECTOR CONTROL 1.DEF: Voltage outside permitted range of values 2.DEF: Configuration/Initialisation 3.DEF: Inconsistent signal

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after starting the engine. **If the fault is present:** – Illumination of **Level 2** fault warning light on the instrument panel. – Loss of performance, or cannot be started.

Check the connection and condition of the **injector connectors** and **of computer connector C**.
Repair if necessary.

Disconnect the injectors.
Measure the **resistance** of the injectors.
Replace any injector whose resistance is not between **150 and 250 kΩ**.
If OK **re-connect the injectors**.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **C track L1**	→	**track 1** injector No. 1
Computer connector **C track M1**	→	**track 2** injector no. 1
Computer connector **C track L2**	→	**track 1** injector no. 2
Computer connector **C track M2**	→	**track 2** injector no. 2
Computer connector **C track L3**	→	**track 1** injector No. 3
Computer, connector **C, track M3**	→	**track 2** injector no. 3
Computer connector **C track L4**	→	**track 1** injector no. 4
Computer, connector **C, track M4**	→	**track 2** injector no. 4

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF301 PRESENT OR STORED	AIR INLET CIRCUIT 1.DEF: Signal outside lower limit 2.DEF: Signal outside upper limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after starting the engine. **If the fault is present:** – Illumination of **Level 1** fault warning light on the instrument panel. – Loss of performance. – EGR cut off – Turbocharging cut-off.

Check the turbocharger vacuum control circuit (vacuum pump, pipes, diaphragm, etc.).
Check the air supply circuit.
Check the condition of the turbocharger blades and check that the turbocharger has not seized.
Check the condition and connection of the turbocharging solenoid valve **2-track connector**. Repair if necessary.
Check the connection and condition of computer **connector B**. Repair if necessary.
Measure the resistance of the damper valve solenoid valve between **tracks 1** and **2**: The resistance must be between **21 Ω ± 2.1 at 23°C**. Replace the solenoid valve if the resistance is outside the tolerance values.
With the ignition on, check for the presence of **+12 V after ignition feed** on **track 2** of the turbocharging solenoid valve. Ensure the presence of **+ after ignition feed** on **track 2** of the turbocharger control solenoid valve. Check the **insulation, continuity and the absence of interference resistance** on the following connection: Computer connector B **track M1** ⟶ **track 1** of the turbocharger control solenoid valve Repair if necessary.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF532 PRESENT OR STORED	ALTERNATOR CHARGE SIGNAL 1.DEF: Values outside limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after starting the engine.
	Special notes: Rough idle.

Check the connection and condition of the computer connectors. Repair if necessary.
Check the charge circuit.
Carry out a multiplex network test.
Run full fault finding on the UPC.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF582 PRESENT OR STORED	PRESSURE CONSISTENCY 1.DEF: Signal outside lower limit 2.DEF: Signal outside upper limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after starting the engine. **If the fault is present:** – Illumination of **Level 1** fault warning light on the instrument panel. – Loss of performance, torque setpoint restricted.

Check the connection and condition of the **3-track connector** of the turbocharging pressure sensor.
Repair if necessary.

Check the connection and condition of computer **connector C**.
Repair if necessary.

With the ignition on, check for **+5 V** on **track 1** and earth on **track 2** of the turbocharging pressure sensor.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector C **track D1** → **track 1** sensor connector

Computer connector C **track B2** → **track 2** sensor connector

Computer connector C **track B1** → **track 3** sensor connector

Repair if necessary.

If correct, replace the turbocharging pressure sensor.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF641 PRESENT OR STORED	DAMPER VALVE CIRCUIT 1.DEF: No signal 2.DEF: 3.DEF: Values out of range 4.DEF: Inconsistency of signal

NOTES	**Special notes:** If **DF641 2.DEF** is present, apply the fault finding procedure for **DF067 Damper valve control circuit**. Damper valve cut-off.
	Conditions for applying fault finding procedures to stored faults: – the fault becomes present when the engine is started and then stopped. – a road test, – an actuator control **AC012 Damper valve**.

Check the connection and condition of the connector for the damper valve and of computer connector B.
Repair if necessary.

Ensure presence of **+12 V after ignition** on **track 1** of the damper valve.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **B track B3** → **track 4** of the damper valve

Computer connector **B track G1** → **track 5** of the damper valve

Computer connector **B track A3** → **track 2** of the damper valve

Repair if necessary.
If the fault is still present, replace the air inlet flap.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF647 PRESENT OR STORED	EGR VALVE POSITION REGULATION 1.DEF: Signal inconsistency 2.DEF: Signal outside lower limit 3.DEF: Signal outside upper limit 4.DEF: Values outside limits 5.DEF: Defective sensor

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after starting the engine.
	Special notes: – Illumination of **Level 1** fault warning light on the instrument panel. – Engine instability, possibly even stalling. – Difficult to start engine or even impossible when cold. – Loss of performance. – Possible smoke emissions.

Check the connection and condition of the **6-track connector** of the exhaust gas recirculation valve.
Repair if necessary.

Check the connection and condition of computer **connector B**.
Repair if necessary.

With the ignition on, check for **+5 V** on **track 1** and earth on **track 3** of the turbocharging pressure sensor.
Check **the continuity, insulation and the absence of interference resistance** on the following connections:

computer connector B **track C4** → EGR valve **track 1**

computer connector B **track C3** → **track 5** EGR valve

computer connector B **track D3** → **track 3** EGR valve

Repair if necessary.

Check the operation of the EGR valve:
– exit fault finding mode in Clip,
– switch off the vehicle ignition,
– disconnect the EGR valve connector,
– remove the EGR valve.
Check that there are no particles blocking the movement of the piston.
If there are no particles blocking the movement of the piston, use command **RZ002 EGR adaptives** to re-initialise the operating values of the valve.
If the valve is blocked or seized to the extent that it cannot be rectified, replace the EGR valve (see, **replacing components**).

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF770 PRESENT OR STORED	FLOW REGULATOR CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Parameter at maximum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after starting the engine.
	Special notes: Fault warning light (**level 1**) lit on the instrument panel and loss of performance or fault warning light (**level 2**) lit on the instrument panel with loss of performance, engine stalling or not starting.

Check the condition and connection of the **2-track connector** for the fuel flow solenoid valve.
Repair if necessary.

Check the connection and condition of computer **connector B**.
Repair if necessary.

Measure the resistance of the flow solenoid valve between track **M3 computer connector B** and **track 5** of the injection main relay connector.
Replace the pump if the resistance is not between **1.5** Ω and **15** Ω.

With the ignition on, check for the presence of **+12 V after ignition feed** on **track 1** of the fuel flow solenoid valve.
Check **the continuity, insulation and the absence of interference resistance** on the following connections:

Injection computer connector **C track M3** ⟶ **track 2** fuel flow solenoid valve

Grey connector for injection relay **track 5** ⟶ **track 1** of the fuel flow solenoid valve

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF771 PRESENT OR STORED	FLOW REGULATION ACTUATOR ADAPTIVE 1.DEF: Parameter at minimum limit 2.DEF: Parameter at max limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.

Apply **test 1 Low pressure fuel supply system check**.
Apply **test 2 Internal fuel transfer pump check (ITP)**.
Apply **test 3 Fuel pressure solenoid valve check**.
Apply **test 4 Check high-pressure pump (HPP) and fuel flow solenoid valve**.
Apply **test 5 Rail high pressure regulation circuit check**.
Apply **test 6 Major leak in open injectors/injectors**.
Apply **test 7 Incorrect injection quantity**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Clear **RZ004 Pressure regulation adaptives**. Carry out a road test followed by another check with the diagnostic tool.

DF773 PRESENT OR STORED	PRESSURE REGULATOR CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Parameter at maximum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after starting the engine. **Special notes:** – Fault warning light (**level 1**) lit on the instrument panel and loss of performance or fault warning light (**level 2**) lit on the instrument panel with loss of performance, engine stalling or not starting.

Check the condition and connection of the **2-track connector** for the fuel pressure solenoid valve.
Repair if necessary.

Check the connection and condition of computer **connector B**.
Repair if necessary.

Measure the resistance of the pressure solenoid valve between **track M4** computer connector B and **track 5** of the injection main relay connector.
Replace the pump if the resistance is not between **1.5** Ω and **15** Ω.

With the ignition on, check for **+12 V after ignition feed** on **track 1** of the fuel pressure solenoid valve.
Check **the continuity, insulation and the absence of interference resistance** on the following connections:

Connector **C** of injection computer **track M4** → **track 2** fuel pressure solenoid valve

Grey connector for injection relay **track 5** → **track 1** fuel pressure solenoid valve

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF885 PRESENT OR STORED	RAIL PRESSURE 1.DEF: Rail pressure too low on starting

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present during the **first 30 seconds** after the engine starts.
	Special notes: – Illumination of **Level 2** fault warning light on the instrument panel. – Starting and engine operation difficult or impossible.

Apply **test 1 Low pressure fuel supply system check**.
Apply **test 2 Internal fuel transfer pump check (ITP)**.
Apply **test 3 Fuel pressure solenoid valve check**.
Apply **test 4 Check high-pressure pump (HPP) and fuel flow solenoid valve**.
Apply **test 5 Rail high pressure regulation circuit check**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Clear **RZ004 Pressure regulation adaptives**. Carry out a road test followed by another check with the diagnostic tool.

DF886 PRESENT OR STORED	WATER IN DIESEL FUEL SENSOR 1.DEF: Water in diesel fuel sensor

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after a road test above **24 mph (40 km/h)** and the engine speed above **1000 rpm**.

Check whether there is any water in the diesel filter; replace the filter if necessary.
Drain the fuel filter.

Check the connection and condition of the **3-track connector** of the water in diesel fuel detection sensor.
Repair if necessary.

Check the connection and condition of computer **connector C**.
Repair if necessary.

With the ignition on, check for **+12 V after ignition feed** on **track 1** and **earth** on **track 3** of the water in diesel fuel detection sensor.
Check **the continuity, insulation and the absence of interference resistance** on the following connections:

injection computer connector **B track C2** → **track 2** water in diesel fuel detection sensor

injection computer connector **A track F1** → **track 2** water in diesel fuel detection sensor

Repair if necessary.
Replace the water in diesel fuel detection sensor.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF887 PRESENT OR STORED	ACCELERATOR/BRAKE PEDAL POSITION INCONSISTENCY 1.DEF: Inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** Apply this fault finding procedure.
	Special notes: The brake and accelerator pedals were detected as **depressed** simultaneously for **30 seconds**.

Check that the accelerator pedal is not jammed and that nothing is impairing its operation (floor carpet, etc.).

Check the connection and condition of the **6-track connector** for the accelerator pedal potentiometer.
Repair if necessary.

Check the connection and condition of computer **connector A**.
Repair if necessary.

Measure the resistance on the pedal potentiometer on **gang 1** between **tracks 5** and **3**.
Replace the pedal potentiometer if the resistance is not **1.7 kΩ ± 0.9 kΩ**.

Measure the **resistance** on the pedal potentiometer on **gang 2** between **tracks 2** and **6**.
Replace the pedal potentiometer if the resistance is not **2.85 kΩ ± 2.05 kΩ**.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **A track F3** → **track 1** pedal potentiometer connector

Computer connector **A track F2** → **track 2** pedal potentiometer connector

Computer connector **A track F4** → **track 6** pedal potentiometer connector

Computer connector **A track G2** → **track 3** pedal potentiometer connector

Computer, connector **A, track H2** → **track 4** pedal potentiometer connector

Computer, connector **A, track H3** → **track 5** pedal potentiometer connector

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Clear **RZ001 Fault memory**. Carry out a road test followed by another check with the diagnostic tool.

DF889 PRESENT OR STORED	ENGINE SAFETY STOP 1.DEF: Electric 2.DEF: Hydraulic

NOTES	**Priorities when dealing with a number of faults:** If there are a number of faults, deal with the other system faults first.
	Conditions for applying fault finding procedures to stored faults: Apply this fault finding procedure.
	Special notes: The engine only stops after switching the ignition off.

Check the turbocharger.
Check that the engine has not sucked up its oil (engine racing).
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

MAIN SCREEN

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Battery voltage	**PR074:** Battery voltage	**12 V < X < 14.4 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**
2	Engine speed	**PR055:** Engine speed	Indicates the engine's speed of rotation in **rpm**.	In the event of a fault, apply interpretation of **DF005 Engine speed sensor circuit**.
3	Coolant temperature	**PR064:** Coolant temperature	**Close to ambient temperature (cold engine).** Indicates the engine coolant temperature in °C	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
4	Accelerator pedal position	**PR030:** Accelerator pedal position	**0% < x < 100%** near to 0% at no load and near to 100% at full load	In the event of a fault, apply the interpretation of faults **DF008 Pedal sensor circuit gang 1, DF009 Pedal sensor circuit gang 2, DF011 Sensor supply voltage no. 1 and DF012 Sensor supply voltage no. 2**.
5	Inlet air temperature	**PR059:** Inlet air temperature	Indicates the inlet air temperature in **°C**. This signal is provided by the air temperature/ pressure sensor.	In the event of a fault, refer to the interpretation of parameter **PR059 Inlet air temperature**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

MAIN SCREEN (continued 1)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
6	Fuel temperature	**PR063:** Fuel temperature	**Close to ambient temperature (cold engine)** Indicates the fuel temperature in **°C**	In the event of a fault, apply the interpretation of **DF098 Fuel temperature sensor circuit**.
7	Air circuit pressure	**PR035:** Atmospheric pressure	**900 mbar < X < 1100 mbar** Indicates the atmospheric pressure in **mbar**. The sensor is built into the computer.	If not consistent, check that **PR035** = **PR032** = local atmospheric pressure, with the engine stopped and ignition on.
		PR032: Inlet pressure	Indicates the pressure in the inlet circuit in **mbar**.	
8	Rail pressure	**PR038:** Rail pressure	**Approximately 0 bar** **Indicates** the pressure of diesel in the injection rail in **bar**. This pressure is supplied by the sensor on the rail.	In the event of a fault, apply the interpretation of **DF007** Rail pressure sensor circuit **and DF053** Rail pressure regulation function.
9	Engine	**ET038:** Engine	**STOPPED** Gives the current status of the engine. **– STOPPED** **– STARTER ACTIVATED** **– RUNNING**	**NONE**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

MAIN SCREEN (continued 2)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
10	Engine immobiliser	**ET003:**	Engine immobiliser	**INACTIVE** Gives the status of the immobiliser system. **INACTIVE** The injection computer has recognised the immobiliser code transmitted by the UCH. **ACTIVE** The injection computer does not recognise the immobiliser code transmitted by the **UCH**.	If **ACTIVE**, apply the help for **ET003** on the tool.
11	Vehicle speed	**PR089:**	Vehicle speed	**0 mph (km/h)** Gives the vehicle speed in **mph (km/h)**. This parameter is transmitted by the **ABS** computer or vehicle speed **ECU**. This signal is transmitted to the injection on the multiplex network.	Test the multiplex network. Refer to the **ABS** or vehicle speed **ECU** fault finding procedure.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

AIR CIRC SUBFUNCTION (TURBOCHARGING/INLET.)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Air circuit pressure	**PR035:**	Atmospheric pressure	**900 mbar < X < 1100 mbar** Indicates the atmospheric pressure in **mbar**. The sensor is incorporated in the computer.	If not consistent, check **PR035** = **PR032** = **local atmospheric pressure**, with the engine stopped and ignition on.
		PR032:	Inlet pressure	Indicates the pressure in the inlet circuit in **mbar**.	
2	Air circuit sensor voltage	**PR079:**	Atmospheric pressure sensor voltage	**1.6 V < X < 4.9 V**	In the event of a fault, refer to the interpretation of **DF003 Atmospheric pressure sensor circuit**.
		PR078:	Inlet pressure sensor voltage	**0.2 V < X < 4.9 V**	In the event of a fault, refer to the interpretation of **DF004 Turbocharging pressure sensor circuit**.
		PR083:	Air temperature sensor voltage	**0.1 V < X < 4.8 V**	In the event of a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**
3	Air flow	**PR132:** **PR634:**	Air flow Air flow request	**0 mg/st** Estimation of air flow made by the injection computer.	In the event of a fault, refer to the interpretation of parameter **DF056 Air flow sensor circuit**.
		PR073:	Air flow sensor supply voltage	Indicates the **voltage** of the air flow sensor supply	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

AIR CIRC SUBFUNCTION (TURBOCHARGING/INLET.) (continued)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
4	Inlet air temperature	**PR059:** Inlet air temperature	Indicates the inlet air temperature in **°C**. This signal is provided by the air temperature/ pressure sensor)	In the event of a fault, refer to the interpretation of parameter **PR059 Inlet air temperature**.
5	Engine speed	**PR055:** Engine speed	**0 rpm** Indicates the engine's speed of rotation in **rpm**.	In the event of a fault, apply the interpretation of **DF005 Engine speed sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

FUEL CIRCUIT SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Fuel temperature	**PR063:**	Fuel temperature	**Close to ambient temperature (cold engine)** Indicates the fuel temperature in **°C**	In the event of a fault, apply the interpretation of **DF098 Fuel temperature sensor circuit**.
		PR082:	Fuel temperature sensor voltage	**0.1 V < X < 4.9 V**	
2	Coolant temperature	**PR064:**	Coolant temperature	**Close to ambient temperature (cold engine).** Indicates the engine coolant temperature in °C	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
		PR084:	Coolant temperature sensor voltage	**0.13 V < X < 4.90 V**	
3	Engine speed	**PR055:**	Engine speed	**Indicates the engine's speed of rotation in rpm.**	In the event of a fault, apply interpretation of **DF005 Engine speed sensor circuit**.
4	Rail pressure	**PR038:**	Rail pressure	**Indicates the theoretical pressure value for optimum engine operation**	In the event of a fault, refer to the interpretation of fault **DF053 Rail pressure regulation function and DF007 Rail pressure sensor circuit**.
		PR008:	Rail pressure setpoint	**X = 0 bar**	
		PR080:	Rail pressure sensor voltage	**0.4 V < X < 4.7 V**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

FUEL CIRCUIT SUB-FUNCTION (continued 1)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
5	Fuel flow	**ET638:**	Fuel flow regulator	**INACTIVE**	In the event of a fault, refer to the interpretation of fault **DF770** High pressure flow actuator circuit.
		PR739:	Fuel flow solenoid valve current	Close to **0A**	
		PR364:	Cylinder no. 1 fuel flow correction	**X = 0**	**NONE**
		PR405:	Cylinder no. 2 fuel flow correction		
		PR406:	Cylinder no. 3 fuel flow correction		
		PR365:	Cylinder no. 4 fuel flow correction		
6	Fuel pressure	**ET613:**	Fuel pressure regulator	**INACTIVE**	In the event of a fault, refer to the interpretation of fault **ET613**.
7	Inlet air temperature	**PR083:**	Air temperature sensor voltage	**0.1 V < X < 4.8 V**	In the event of a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**.
8	Inlet pressure	**PR078:**	Inlet pressure sensor voltage	**0.2 V < X < 4.9 V**	In the event of a fault, refer to the interpretation of **DF004 Turbocharging pressure sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

FUEL CIRCUIT SUB-FUNCTION (continued 2)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
	Injectors	**PR228:**	Injector control capacitor voltage	**49 V < X < 96 V**	In the event of a fault, refer to the interpretation of faults **DF026, DF027, DF028, DF029 Cylinder 1, 2, 3, 4 injector control circuit**.
		ET228:	Cylinder injector 1 command	**INACTIVE**	
		ET229:	Cylinder injector 2 command		
		ET230:	Cylinder injector 3 command		
		ET231:	Cylinder injector 4 command		

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

DRIVER PARAMETERS SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Power supply	**ET001:**	+ after ignition computer feed	**PRESENT**	**NONE**
2	Brake contact	**ET012:**	Primary brake contact	Indicates recognition of the brake pedal contacts **INACTIVE** brake pedal released **ACTIVE** brake pedal depressed	In the event of a fault, refer to the interpretation of status **ET012**.
		ET013:	Secondary brake contact		In the event of a fault, refer to the interpretation of status **ET013**.
3	Clutch pedal	**ET121:**	Clutch contact signal	Indicates recognition of the clutch pedal contacts **INACTIVE** clutch pedal released **ACTIVE** clutch pedal depressed	In the event of a fault, refer to the interpretation of status **ET121**.
		ET673:	Jammed accelerator pedal detected	**NO**	In the event of a fault, refer to the interpretation of status **ET673**.
4	Warning light lit	**ET028:**	Level 1 fault warning light request	**INACTIVE**	Also check that there are no Injection computer faults.
		ET513:	Mileage counter severity level 1 warning light	**0**	
		ET029:	Level 2 fault warning light request	**INACTIVE**	
		ET514:	Mileage counter severity level 2 warning light	**0**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

DRIVER PARAMETERS SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
5	Accelerator pedal	**PR030:**	Accelerator pedal position	**0% < x < 100%** near to 0% at no load and near to 100% at full load	In the event of a fault, apply the interpretation of faults **DF008 Pedal sensor circuit gang 1, DF009 Pedal sensor circuit gang 2, DF011 Sensor supply voltage no. 1 and DF012 Sensor supply voltage no. 2**.
		PR028:	Pedal position (track 1)	**8% < x < 93%** near to 0% at no load and near to 100% at full load	
		PR086:	Pedal potentiometer voltage gang 1	**0.4 V < X < 4.64 V** near to 0 V at no load and near to 5 V at full load	
		PR029:	Pedal position (track 2)	**5% < x < 75%** near to 0% at no load and near to 100% at full load	
		PR088:	Pedal potentiometer gang 2 voltage	**0.27 V < X < 3.75 V** near to 0 V at no load and near to 5 V at full load	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

PREHEATING/IGNITION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Preheating	**ET160:**	Preheating relay control	**INACTIVE**	**NONE**
2	Coolant temperature	**PR064:**	Coolant temperature	**Close to ambient temperature (cold engine).** Indicates the engine coolant temperature in °C	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
3	Battery voltage	**PR074:**	Battery voltage	**12 V < X < 14.4 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**
4	Inlet air temperature	**PR059:**	Inlet air temperature	Indicates the inlet air temperature in **°C**. This information is provided by the air temperature/pressure sensor.	In the event of a fault, refer to the interpretation of parameter **PR059 Inlet air temperature**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

EMISSION CONTROL/OBD SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Fuel pressure	**ET613:** Fuel pressure regulator	**INACTIVE**	In the event of a fault, refer to the interpretation of status **ET121**.
2	Fuel temperature	**PR063:** Fuel temperature	**Close to ambient temperature (cold engine).** Indicates the fuel temperature in **°C**	In the event of a fault, apply the interpretation of **DF098 Fuel temperature sensor circuit**.
3	Coolant temperature	**PR064:** Coolant temperature	**Close to ambient temperature (cold engine).** Indicates the engine coolant temperature in °C	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
4	Inlet air temperature	**PR059:** Inlet air temperature	Indicates the inlet air temperature in **°C**	In the event of a fault, refer to the interpretation of parameter **PR059 Inlet air temperature**.
5	Atmospheric pressure	**PR035:** Atmospheric pressure	**900 mbar < X < 1100 mbar** Indicates the atmospheric pressure in **mbar**. The sensor is built into the computer.	In the event of a fault, apply the interpretation for **DF003 Atmospheric pressure sensor circuit.**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

EMISSION CONTROL/OBD SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
6	Rail pressure	**PR038:** Rail pressure	**Indicates the theoretical pressure value for optimum engine operation**	In the event of a fault, refer to the interpretation of fault **DF053 Rail pressure regulation function and DF007 Rail pressure sensor circuit**.
		PR008: Rail pressure setpoint	**X = 0 bar**	
7	Air flow	**PR132:** Air flow	**0 mg/st** Air flow estimated by the injection computer.	**NONE**
8	EGR	**PR077:** EGR valve position sensor voltage	**540 Mv < X < 4490 Mv**	In the event of a fault, apply the interpretation of **DF209** EGR valve position sensor circuit.
9	Inlet pressure	**PR032:** Inlet pressure	**900 mbar < X < 1100 mbar** Local atmospheric pressure	**NONE**
10	Accelerator pedal position	**PR030:** Accelerator pedal position	**0% < x < 100%** near to 0% at no load and near to 100% at full load.	In the event of a fault, apply the interpretation of faults **DF008 Pedal sensor circuit gang 1, DF009 Pedal sensor circuit gang 2, DF011 Sensor supply voltage no. 1 and DF012 Sensor supply voltage no. 2**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

ENGINE COOLING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Fan unit	**ET648:**	Fan assembly	**INACTIVE**	**NONE**
		ET022:	Low speed fan assembly request	**-**	
		ET021:	High speed fan assembly request	**-**	
2	Coolant temperature	**PR064:**	Coolant temperature	**Close to ambient temperature (cold engine).** Indicates the engine coolant temperature in °C	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
		PR084:	Coolant temperature sensor voltage	**0.1 V < X < 4.9 V**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

COLD LOOP SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Fan unit	**ET648:**	Fan assembly	**INACTIVE**	**NONE**
		ET022:	Low speed fan assembly request	-	
		ET021:	High speed fan assembly request	-	
2	Compressor activation request	**ET088:**	Compressor activation request	**ACTIVE:** The multiplex network must not be faulty on the Automatic transmission, Protection and Switching Unit or UCH systems. The UCH must send a compressor starting request to the injection. The coolant pressure sensor must not be defective. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **INACTIVE:** **One of the above conditions has not been met.**	**NONE**
3	Fast idling speed	**ET023:**	Fast idle speed request	**INACTIVE**	**NONE**
4	Refrigerant	**PR037:**	Refrigerant pressure	**Indicates the refrigerant pressure in bar.**	In the event of a fault, apply the interpretation of **DF049 Refrigerant sensor circuit**.
		PR076:	Refrigerant sensor voltage	**0.1 V < X < 4.8 V**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

COLD LOOP SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
5	Coolant temperature	**PR064:** Coolant temperature	**Close to ambient temperature (cold engine)** Indicates the engine coolant temperature in **°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
6	Vehicle speed	**PR089:** Vehicle speed	**0 mph (km/h)** Gives the vehicle speed in **mph (km/h)**. This parameter is transmitted by the ABS computer or vehicle speed ECU. This signal is transmitted to the injection system by the multiplex network.	Test the **multiplex network**. **Refer to ABS or vehicle speed ECU fault finding.**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

HEATING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	**Close to ambient temperature (cold engine).** Indicates the engine coolant temperature in **°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
2	Passenger compartment heating resistors (RCH)	**ET111:**	Set number of passenger compartment heating resistors.	**NO**	In the event of a fault, refer to the interpretation for status **ET111**.
		ET112:	Passenger compartment heating resistors cut-off	**NO**	In the event of a fault, refer to the interpretation of status **ET112**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Cruise control/ speed limiter	**ET042:** Cruise control/Speed limiter	**INACTIVE**	In the event of a fault, refer to the interpretation of status **ET042**.
		ET045: CC/SL function selectors on steering wheel	**INACTIVE**	In the event of a fault, refer to the interpretation of status **ET045**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

PROTECTION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Engine immobiliser	**ET003:**	Engine immobiliser	**Indicates the status of the immobiliser system.** **INACTIVE:** The injection computer has recognised the immobiliser code transmitted by the UCH. **ACTIVE:** The injection computer does not recognise the immobiliser code transmitted by the UCH.	**If ACTIVE, apply the "help" for 'ET003 on the tool.**
2	Battery voltage	**PR074:**	Battery voltage	**12 V < X < 14.4 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**
3	Code programmed	**ET006:**	Code programmed	**Indicates whether the immobiliser code has been programmed into the computer.** **YES:** Code programmed **NO:** Code not programmed into injection computer.	If **NO**, carry out a multiplex network test, a fault finding procedure on the injection computer and the UCH.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

MAIN SCREEN

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Battery voltage	**PR074:** Battery voltage	**13 V < X < 16 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**
2	Engine speed	**PR055:** Engine speed	**About 800 rpm** Indicates the engine rotation speed in **rpm**.	In the event of a fault, apply the interpretation of **DF005** Engine speed sensor circuit.
3	Coolant temperature	**PR064:** Coolant temperature	Indicates the temperature of engine coolant in **°C**.	In the event of a fault, refer to the interpretation of parameter **PR064** Coolant temperature.
4	Accelerator pedal position	**PR030:** Accelerator pedal position	**0% < x < 100%** near to 0% at no load and near to 100% at full load.	In the event of a fault, apply the interpretation of faults **DF008 Pedal sensor circuit gang 1, DF009 Pedal sensor circuit gang 2, DF011 Sensor supply voltage no. 1 and DF012 Sensor supply voltage no. 2**.
5	Inlet air temperature	**PR059:** Inlet air temperature	Indicates the inlet air temperature in **°C**. This information is provided by the air temperature/pressure sensor.	In the event of a fault, refer to the interpretation of parameter **PR059 Inlet air temperature**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

MAIN SCREEN (continued 1)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
6	Fuel temperature	**PR063:** Fuel temperature	Indicates the temperature of the fuel in **°C** this value is provided by the fuel temperature sensor.	In the event of a fault, apply the interpretation of **DF098 Fuel temperature sensor circuit**.
7	Air circuit pressure	**PR035:** Atmospheric pressure	**900 mbar < X < 1100 mbar** Indicates the atmospheric pressure in **mbar**. The sensor is built into the computer.	If not consistent, check that **PR035** = **PR032** = local atmospheric pressure, with the engine stopped and ignition on.
		PR032: Inlet pressure	Indicates the pressure in the inlet circuit in **mbar**. **PR032 = local atmospheric pressure**	
8	Rail pressure	**PR038:** Rail pressure	Indicates the pressure in **bar** of the diesel fuel in the injection rail. This pressure is supplied by the sensor on the rail.	In the event of a fault, apply the interpretation of **DF007 Rail pressure sensor circuit and DF053 Rail pressure regulation function**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

MAIN SCREEN (continued 2)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
9	Engine	**ET038:** Engine	**RUNNING** Gives the current status of the engine. **– STOPPED** **– STARTER ACTIVATED** **– RUNNING**	**NONE**
10	Engine immobiliser	**ET003:** Engine immobiliser	**INACTIVE** Gives the status of the immobiliser system. **INACTIVE** The injection computer has recognised the immobiliser code transmitted by the UCH. **ACTIVE** The injection computer does not recognise the immobiliser code transmitted by the UCH.	If **ACTIVE**, apply the help for **ET003** on the tool.
11	Vehicle speed	**PR089:** Vehicle speed	**0 mph (km/h)** Gives the vehicle speed in **mph (km/h)**. This parameter is transmitted by the **ABS** computer or vehicle speed **ECU**. This signal is transmitted to the injection on the multiplex network.	Test the multiplex network. Refer to **ABS** or vehicle speed **ECU** fault finding procedure

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

AIR CIRC SUBFUNCTION (TURBOCHARGING/INLET.)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Air circuit pressure	**PR035:** Atmospheric pressure	**900 mbar < X < 1100 mbar** Indicates the atmospheric pressure in **mbar**. The sensor is built into the computer.	If not consistent, check **PR035 = PR032 = local atmospheric pressure**, with the engine stopped and ignition on.
		PR032: Inlet pressure	Indicates the pressure in the inlet circuit in **mbar**. **PR032 = local atmospheric pressure**	
2	Air circuit sensor voltage	**PR079:** Atmospheric pressure sensor voltage	**1.6 V < X <4.9 V**	In the event of a fault, consult the interpretation of **DF003 Atmospheric pressure sensor circuit**.
		PR078: Inlet pressure sensor voltage	**0.2 V < X <4.9 V**	In the event of a fault, consult the interpretation of **DF004 Turbocharging pressure sensor circuit**.
		PR083: **Air** temperature sensor voltage	**0.1 V < X < 4.8 V**	In the event of a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

AIR CIRC SUBFUNCTION (TURBOCHARGING/INLET.) (continued)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
3	Air flow	**PR132:** Air flow	**300 < X < 350 mg/st** Estimation of air flow made by the injection computer.	In the event of a fault, consult the interpretation of parameter **DF056 Air flow sensor circuit**.
		PR634: Air flow request	The flow must follow the request and must be near to it.	
		PR073: Air flow sensor supply voltage	Indicates the **voltage** of the air flow sensor supply	
4	Inlet air temperature	**PR059:** Inlet air temperature	Indicates the inlet air temperature in **°C**. This signal is provided by the air temperature/ pressure sensor)	In the event of a fault, refer to the interpretation of parameter **PR059 Inlet air temperature**.
5	Engine speed	**PR055:** Engine speed	**About 800 rpm.** Indicates the engine's speed of rotation in **rpm**.	In the event of a fault, apply interpretation of **DF005 Engine speed sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

FUEL CIRCUIT SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Fuel temperature	**PR063:**	Fuel temperature	**Indicates the fuel temperature in °C**	In the event of a fault, apply the interpretation of **DF098 Fuel temperature sensor circuit**.
		PR082:	Fuel temperature sensor voltage	**0.1 V < X < 4.9 V**	
2	Coolant temperature	**PR064:**	Coolant temperature	**Indicates the engine coolant temperature in °C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
		PR084:	Coolant temperature sensor voltage	**0.1 V < X < 4.9 V**	
3	Engine speed	**PR055:**	Engine speed	**About 800 rpm.** Indicates the engine rotation speed in **rpm**.	In the event of a fault, apply interpretation of **DF005 Engine speed sensor circuit**.
4	Rail pressure	**PR038:**	Rail pressure	Gives the theoretical pressure value for optimum engine operation **200 < X = < 250 bar**	In the event of a fault, refer to the interpretation of fault **DF053 Rail pressure regulation function and DF007 Rail pressure sensor circuit**.
		PR008:	Rail pressure setpoint	The pressure must follow the setpoint and must be near to it.	
		PR080:	Rail pressure sensor voltage	**0.4 V < X < 4.7 V**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

FUEL CIRCUIT SUB-FUNCTION (continued 1)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
5	Fuel flow	**ET638:**	Fuel flow regulator	**ACTIVE**	In the event of a fault, refer to the interpretation of fault **DF770 High pressure flow actuator circuit**.
		PR739:	Fuel flow solenoid valve current	**Maximum 2A**	
		PR364:	Cylinder no. 1 fuel flow correction	**X = 1** (tolerance **-0.7 ± 0.9**) (corrective factor without unit)	In the event of a fault, apply **test 6** Major leak in injectors/ injectors open.
		PR405:	Cylinder no. 2 fuel flow correction		
		PR406:	Cylinder no. 3 fuel flow correction		
		PR365:	Cylinder no. 4 fuel flow correction		
6	Fuel pressure	**ET613:**	Fuel pressure regulator	**INACTIVE**	In the event of a fault, consult the interpretation of fault **ET613**.
7	Inlet air temperature	**PR083:**	Air temperature sensor voltage	**0.1 V < X < 4.8 V**	In the event of a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**.
8	Inlet pressure	**PR078:**	Inlet pressure sensor voltage	**0.2 V < X < 4.9 V**	In the event of a fault, consult the interpretation of **DF004 Turbocharging pressure sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

FUEL CIRCUIT SUB-FUNCTION (continued 2)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
9	Injectors	**PR228:** Injector control capacitor voltage	**49 V < X < 96 V**	In the event of a fault, refer to the interpretation of faults **DF026, DF027, DF028, DF029 Cylinder 1, 2, 3, 4 injector control circuit**.
		ET228: Cylinder injector 1 command	**ACTIVE**	
		ET229: Cylinder injector 2 command		
		ET230: Cylinder injector 3 command		
		ET231: Cylinder injector 4 command		

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

DRIVER PARAMETERS SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Power supply	**ET001:**	+ After ignition computer feed	**PRESENT**	**NONE**
2	Brake contact	**ET012:**	Primary brake contact	Indicates recognition of the brake pedal contacts **INACTIVE** brake pedal released **ACTIVE** brake pedal depressed	In the event of a fault, consult the interpretation of status **ET012**.
		ET013:	Secondary brake contact		In the event of a fault, consult the interpretation of status **ET013**.
3	Clutch pedal	**ET121:**	Clutch contact signal	Indicates recognition of the clutch pedal contacts **INACTIVE** clutch pedal released **ACTIVE** clutch pedal depressed	In the event of a fault, consult the interpretation of status **ET121**.
		ET673:	Jammed accelerator pedal detected	**NO**	In the event of a fault, consult the interpretation of status **ET673**.
4	Ignition warning light	**ET028:**	Level 1 fault warning light request	**INACTIVE**	Also check that there are no Injection computer faults.
		ET513:	Mileage counter severity level 1 warning light	**0**	
		ET029:	Level 2 fault warning light request	**INACTIVE**	
		ET514:	Mileage counter severity level 2 warning light	**0**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

DRIVER PARAMETERS SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
5	Accelerator pedal	**PR030:**	Accelerator pedal position	**0% < x < 100%** near to 0% at no load and near to 100% at full load	In the event of a fault, apply the interpretation of faults **DF008 Pedal sensor circuit gang 1, DF009 Pedal sensor circuit gang 2, DF011 Sensor supply voltage no. 1 and DF012 Sensor supply voltage no. 2**.
		PR028:	Pedal position (track 1)	**8% < x < 93%** near to 0% at no load and near to 100% at full load	
		PR086:	Pedal potentiometer gang 1 voltage	**0.4 V < X < 4.64 V** near to 0 V at no load and near to 5 V at full load	
		PR029:	Pedal position (track 2	**5% < x < 75%** near to 0% at no load and near to 100% at full load	
		PR088:	Pedal potentiometer gang 2 voltage	**0.27 V < X < 3.75 V** near to 0 V at no load and near to 5 V at full load	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

PREHEATING/IGNITION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Preheating	**ET160:**	Preheating relay control	**INACTIVE**	**NONE**
2	Coolant temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in **°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
3	Battery voltage	**PR074:**	Battery voltage	**13 V < X < 16 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**
4	Inlet air temperature	**PR059:**	Inlet air temperature	Indicates the inlet air temperature in **°C**. This information is provided by the air temperature/pressure sensor.	In the event of a fault, refer to the interpretation of parameter **PR059 Inlet air temperature**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

ANTIPOLLUTION/OBD SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Fuel pressure	**ET613:** Fuel pressure regulator	**INACTIVE**	**NONE**
2	Fuel temperature	**PR063:** Fuel temperature	Indicates the temperature of the fuel in **°C** this value is provided by the fuel temperature sensor.	In the event of a fault, apply the interpretation of **DF098 Fuel temperature sensor circuit**.
3	Coolant temperature	**PR064:** Coolant temperature	Indicates the engine coolant temperature in **°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
4	Inlet air temperature	**PR059:** Inlet air temperature	Indicates the inlet air temperature in **°C** This information is provided by the air temperature/pressure sensor.	In the event of a fault, refer to the interpretation of parameter **PR059 Inlet air temperature**.
5	Atmospheric pressure	**PR035:** Atmospheric pressure	**900 mbar < X < 1100 mbar** Indicates the atmospheric pressure in **mbar**. The sensor is built into the computer.	In the event of a fault, apply the interpretation for **DF003 Atmospheric pressure sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

EMISSION CONTROL/OBD SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
6	Rail pressure	**PR038:** Rail pressure	**Indicates the theoretical pressure value for optimum engine operation**	In the event of a fault, refer to the interpretation of fault **DF053 Rail pressure regulation function and DF007 Rail pressure sensor circuit**.
		PR008: Rail pressure setpoint	**X = 0 bar**	
7	Air flow	**PR132:** Air flow	**300 < X < 350 mg/st** Estimation of air flow made by the injection computer.	**NONE**
8	EGR	**PR077:** EGR valve position sensor voltage	**540 Mv < X < 4490 Mv**	In the event of a fault, apply the interpretation of **DF209 EGR valve position sensor circuit**.
9	Fuel pressure	**PR032:** Inlet pressure	**-**	**NONE**
10	Accelerator pedal position	**PR030:** Accelerator pedal position	**0% < x < 100%** near to 0% at no load and near to 100% at full load.	In the event of a fault, apply the interpretation of faults **DF008 Pedal sensor circuit gang 1, DF009 Pedal sensor circuit gang 2, DF011 Sensor supply voltage no. 1 and DF012 Sensor supply voltage no. 2**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

ENGINE COOLING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Fan unit	**ET648:**	Fan assembly	**INACTIVE**	**NONE**
		ET022:	Low speed fan assembly request	**-**	
		ET021:	High speed fan assembly request	**-**	
2	Coolant temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in **°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
		PR084:	Coolant temperature sensor voltage	**0.1 V < X < 4.9 V**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

COLD LOOP SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Fan unit	**ET648:**	Fan assembly	**INACTIVE**	**NONE**
		ET022:	Low speed fan assembly request	**-**	
		ET021:	High speed fan assembly request	**-**	
2	Compressor activation request	**ET088:**	Compressor activation request	**ACTIVE:** The multiplex network must not be faulty on the automatic transmission, UPC or UCH systems. The UCH must send a compressor starting request to the injection. The coolant pressure sensor must not be defective. Satisfactory engine operating conditions (coolant temperature, engine load etc.) **INACTIVE:** **One of the above conditions has not been met.**	**NONE**
3	Fast idling speed	**ET023:**	Fast idle speed request	**INACTIVE** or **ACTIVE** (If the air conditioning is running)	**NONE**
4	Refrigerant	**PR037:**	Refrigerant pressure	**Indicates the refrigerant pressure in bar.**	In the event of a fault, apply the interpretation of **DF049 Refrigerant sensor circuit**.
		PR076:	Refrigerant sensor voltage	**0.1 V < X < 4.8 V**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

COLD LOOP SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
5	Coolant temperature	**PR064:** Coolant temperature	Indicates the engine coolant temperature in **°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
6	Vehicle speed	**PR089:** Vehicle speed	**0 mph (km/h)** Gives the vehicle speed in **mph (km/h)**. This parameter is transmitted by the ABS computer or vehicle speed ECU. This signal is transmitted to the injection system by the multiplex network.	**Test the multiplex network. Refer to ABS or vehicle speed ECU fault finding.**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

HEATING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Coolant temperature	**PR064:** Coolant temperature	Indicates the engine coolant temperature in **°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
2	Passenger compartment heating resistors (RCH)	**ET111:** Set number of passenger compartment heating resistors.	**NO**	In the event of a fault, refer to the interpretation for status **ET111**.
		ET112: Passenger compartment heating resistors cut-off	**NO**	In the event of a fault, consult the interpretation of status **ET112**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Cruise control/ speed limiter	**ET042:** Cruise control/Speed limiter	**INACTIVE**	In the event of a fault, refer to the interpretation of status **ET042**.
		ET045: CC/SL selector switch on steering wheel	**INACTIVE**	In the event of a fault, consult the interpretation of status **ET045**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **idling**.

PROTECTION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Engine immobiliser	**ET003:**	Engine immobiliser	**Indicates the status of the immobiliser system.** **INACTIVE:** The injection computer has recognised the immobiliser code transmitted by the UCH. **ACTIVE:** The injection computer does not recognise the immobiliser code transmitted by the UCH.	**If ACTIVE, apply the help for 'ET003 on the tool.**
2	Battery voltage	**PR074:**	Battery voltage	**13 V < X < 16 V**	**In the event of a fault, apply the fault finding procedure for the Charge circuit.**
3	Code programmed	**ET006:**	Code programmed	**Indicates whether the immobiliser code has been programmed into the computer.** **YES:** Code programmed **NO:** Code not programmed into injection computer.	If **NO**, carry out a multiplex network test, a fault finding procedure on the injection computer and the UCH.

Tool parameter	Diagnostic tool name
ET001	+ After ignition computer feed
ET003	Engine immobiliser
ET006	Code programmed
ET012	Primary brake contact
ET013	Secondary brake contact
ET021	High speed fan assembly request
ET022	Low speed fan assembly request
ET023	Fast idle speed request
ET028	Level 1 fault warning light request
ET029	Level 2 fault warning light request
ET033	EGR solenoid valve
ET038	Engine
ET042	Cruise control/speed limiter
ET045	CC/SL selector switch on steering wheel
ET077	Impact detected
ET088	Compressor activation request
ET111	Set number of passenger compartment heating resistors.
ET112	Passenger compartment heating resistors cut-off
ET121	Clutch contact signal
ET148	OBD warning light activation request
ET160	Preheating relay control
ET228	Cylinder injector 1 command
ET229	Cylinder injector 2 command
ET230	Cylinder injector 3 command
ET231	Cylinder injector 4 command
ET238	Synchronisation
ET556	Driver deactivation of the cruise control/speed limiter
ET557	Deactivation by cruise control/speed limiter function
ET613	Fuel pressure regulator
ET638	Fuel flow regulator
ET648	Fan assembly
ET649	Water in diesel fuel detector.
ET673	Jammed accelerator pedal

ET001	COMPUTER + AFTER IGNITION FEED

NOTES	**Special note:** Only apply the checks if the **ABSENT** and **PRESENT** statuses are not consistent with the system operating strategies.

ABSENT	***NOTES***	Ignition on.

Check the condition and conformity of supply fuse **F5D (5A)** of the Protection and Switching Unit.
Repair if necessary.

Check for an earth on the following connections:

Injection computer connector A **Track G4** → **Battery** earth

Injection computer connector A **Track H4** → **Battery** earth

Injection computer connector A **Track H1** → **Battery** earth

Injection computer connector A **Track G3** → **Battery** earth

Repair if necessary.
Check for a **+12 after ignition feed** on track **D1** of injection computer connector A.
If there is no voltage, check the continuity and insulation to **earth** of the following connection:

Injection computer connector A **track D1** → **+ after ignition feed**

Repair if necessary.

PRESENT	***NOTES***	Ignition on.

Check for the absence of **+12 V after ignition feed**, with ignition off, on **track D1** of the injection computer connector A.
Repair if necessary.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET012 **ET013**	PRIMARY BRAKE CONTACT SECONDARY BRAKE CONTACT

NOTES	**Special notes:** Only apply the checks if the **INACTIVE** and **ACTIVE** statuses are not consistent with the pedal position.

INACTIVE STATUS Brake pedal depressed.

If brake lights operate:
– Check the continuity on the connection between **track 3** of the brake light switch connector and **track E4** of **connector A** for the **computer**.
If the brake lights do not operate:
– Check the condition and fitting of the brake light switch and brake lights fuse.
– Remove the brake light switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch depressed (Brake pedal released)	**3 and 4**	**1 and 2**
Switch released (Brake pedal depressed)	**1 and 2**	**3 and 4**

– Replace the switch if necessary.
– Check for **+ after ignition feed** on **tracks 2** and **4** on the brake light switch connector.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET012 **ET013** **CONTINUED**	

ACTIVE STATUS brake pedal released.

– Check the condition and the mounting of the brake light switch, the brake lights fuse and the conformity of the bulbs.
– Remove the brake light switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch depressed (Brake pedal released)	**3 and 4**	**1 and 2**
Switch released (Brake pedal depressed)	**1 and 2**	**3 and 4**

– Replace the switch if necessary.
– Check for insulation from the **+12 V feed** on the connection between **track 3** of the brake light switch connector and **track E4** of **connector A** of the **computer**.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET042	CRUISE CONTROL/SPEED LIMITER

NOTES	**Special notes:** Only apply the checks if the statuses are not consistent with the position of the buttons.

No CRUISE CONTROL, SPEED LIMITER, On/Off button pressed.

Check the connections of the cruise control On/Off switch and computer (**connector A**). Repair if necessary.
Check that the **+ after ignition feed** is on **tracks A2** and **B2** on the cruise control/speed limiter switch connector.
Remove and test the operation of the cruise control/speed limiter switch:

	Continuity between tracks	Insulation between tracks
Button in rest position	**-**	**A2 and A3 - A2 and B1**
Button in cruise control position	**A2 and A3**	**A2 and B1**
Button in speed limiter position	**A2 and B1**	**A2 and A3**

Replace the button if necessary.

Check for **continuity and the absence of interference resistance** on the connection between **track A3** (cruise control) or **B1** (speed limiter) of the button connector and **track A2** (cruise control) or **C3** (speed limiter) of connector **A** of the computer.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET042 **CONTINUED**	

Button in rest position (ET042 ACTIVE).

Check the connections of the cruise control On/Off switch and computer (**connector A**). Repair if necessary. Remove and test the operation of the cruise control/speed limiter switch:

	Continuity between tracks	Insulation between tracks
Button in rest position	**-**	**A2 and A3 - A2 and B1**
Button in cruise control position	**A2 and A3**	**A2 and B1**
Button in speed limiter position	**A2 and B1**	**A2 and A3**

Replace the button if necessary.

Check for **continuity and the absence of interference resistance** on the connection between **track A3** (cruise control) or **B1** (speed limiter) of the button connector and **track A2** (cruise control) or **C3** (speed limiter) of connector **A** of the computer.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET077	IMPACT DETECTED

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	If the vehicle has been involved in an accident, the injection computer receives the impact signal via the multiplex network and may switch off the ignition. Status **ET077** is YES. Switch off the ignition for **10 seconds**, then switch it back on, so the engine can be restarted. Carry out a multiplex network test and deal with any faults.
NO	In normal operating conditions, status **ET077** is NO when the computer has received no impact signal.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET111	SET NUMBER OF PASSENGER COMPARTMENT HEATING RESISTORS

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	The injection computer determines the number of controlled passenger compartment heating resistors as a function of injection requirements (power requirements, torque reduction, etc.). Status **ET111** becomes YES if the number of passenger compartment heating resistors is fixed by the injection computer.
NO	The injection computer determines the number of controlled passenger compartment heating resistors as a function of injection requirements (power requirements, torque reduction, etc.). Status **ET111** becomes NO if the number of passenger compartment heating resistors engaged can be freely controlled by the UCH.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET112	PASSENGER COMPARTMENT HEATING RESISTORS CUT OFF

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	The injection computer cuts off the passenger compartment heating resistors depending on injection requirements (power requirements, torque reduction, etc.). Status **ET112** becomes YES if the number of passenger compartment heating resistors are cut-off by request of the injection computer.
NO	The injection computer cuts off the passenger compartment heating resistors depending on injection requirements (power requirements, torque reduction, etc.). Status **ET112** becomes NO if the passenger compartment heating resistors can be freely controlled by the UCH.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET121	CLUTCH CONTACT SIGNAL

NOTES	**Special notes:** Only apply the checks if the **INACTIVE** and **ACTIVE** statuses are not consistent with the pedal position.

INACTIVE STATUS Clutch pedal depressed.

– Check the condition and fitting of the clutch switch.
– Check for continuity on the connection between **track 2** of the clutch switch connector and **track C4** of connector A of the computer.
– Check and ensure that **earth** is on **track 1** on the clutch switch connector.

Repair if necessary.

– Remove the clutch switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch pressed (Clutch pedal released)	**1 and 2**	**-**
Switch released (Clutch pedal depressed)	**-**	**1 and 2**

– Replace the switch if necessary.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET121 **CONTINUED**	

ACTIVE STATUS Clutch pedal released.

– Check the condition and fitting of the clutch switch.
– Remove the clutch switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch depressed (Brake pedal released)	**1 and 2**	**-**
Switch released (Brake pedal depressed)	**-**	**1 and 2**

– Replace the switch if necessary.

– Check for insulation from **earth** on the connection between **track 1** of the brake light switch connector and **track C4** of **connector A** of the **computer**.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET556	DRIVER DEACTIVATION OF THE CRUISE CONTROL/SPEED LIMITER

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

Notes:
Cruise control remains deactivated as long as the vehicle speed does not exceed **18 mph (30 km/h)**. Status **ET556** details 4 causes for cruise control deactivation.

NOTE
To reinitialise the deactivations stored by the injection computer, use command RZ001 Fault memory.

STATUS 1	Suspend button pressed.
	Status **ET556** becomes **STATUS 1** if: – the driver presses the **0** cruise control button, – the clutch switch is faulty (**no signal on the clutch pedal position is being received by the injection computer**). If status **ET556** is locked at **STATUS 1**, refer to the fault finding procedure for status **ET045** Cruise control/speed limiter function selectors and run fault finding on control button **R/0** of the cruise control.

STATUS 2	Clutch pedal depressed
	The cruise control/speed limiter function is deactivated if the gearbox is no longer linked to the engine (clutch pedal applied or gearbox in neutral). If status **ET556** is locked on **STATUS 2** with the vehicle stationary, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET556 **CONTINUED**	

STATUS 3	Brake pedal applied
	If the driver depresses the brake pedal, the cruise control/speed limiter function status **ET045** becomes **INACTIVE**. Status **ET556** changes to **STATUS3** when driving or during a cruise control function test when stationary. If status **ET556** remains locked at **STATUS 3**, refer to the interpretation of status **ET012 Primary brake switch** and **ET013 Secondary brake switch**.

STATUS 4	Lever in the Neutral position
	Status **ET556** becomes **STATUS 4** if the driver puts the gear lever in the neutral position when driving. This deactivates the cruise control/speed limiter. If status **ET556** remains locked on **STATUS 4** when driving after engaging a gear, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET557	DEACTIVATION BY CRUISE CONTROL/SPEED LIMITER FUNCTION

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

Notes:
Cruise control remains deactivated as long as the vehicle speed does not exceed **18 mph (30 km/h)**. Status **ET557** details 6 causes for cruise control deactivation.

NOTE
To reinitialise the deactivations stored by the injection computer, use command RZ001 Fault memory.

STATUS 1	Automatic transmission in defect mode.
	The cruise control/speed limiter function is deactivated if the gearbox is no longer linked to the engine (clutch pedal applied or gearbox in neutral). If status **ET557** is locked on **STATUS 1** with the vehicle stationary, contact the Techline.

STATUS 2	Traction control request
	If the vehicle being diagnosed is fitted with an traction control system, the cruise control/ speed limiter function is deactivated each time the traction control is selected. Status **ET556** only becomes **STATUS 2** when driving. If this status appears with the ignition on and the vehicle stopped, (see **38C, Anti-lock Braking system**).

STATUS 3	Cruise control or speed limiter fault
	If status **ET557** is **STATUS 3**, refer to the interpretation of status **ET042 Cruise control/ speed limiter** and **ET045 Cruise control/speed limiter function selectors on the steering wheel**, to test the components of the cruise control system and find the faulty one. If status **ET557** is locked on **STATUS 1** contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET557 CONTINUED	

STATUS 4	Problem detected by the injection computer
	Status **ET557** changes to **STATUS 4** if the injection computer detects a fault on the injection system: – **Faults in the camshaft or engine speed sensor.** – **Accelerator pedal faults.** – **Engine speed above 4700 rpm.** – **Engine speed less than 1000 rpm.** Carry out a multiplex network test, then an injection system test, and carry out fault finding on any faults. If the fault is still present, contact the Techline.

STATUS 5	Invalid vehicle speed
	Status **ET557** becomes **STATUS 5** if the vehicle speed received by the computer does not vary. Consult the interpretation for fault **DF091 Vehicle speed signal**, and carry out fault finding on the **ABS** computer. If faults are present (see **38C, Anti-lock braking system**). If the fault is still present, contact the Techline.

STATUS 6	Lack of correlation between the request and the vehicle speed
	Status **ET556** changes to **STATUS 6** if the computer detects a fault between the speed requested by the driver and the vehicle speed. The vehicle signal is getting interference or is wrong. Consult the interpretation for fault **DF091 Vehicle speed signal**. Run fault finding on the **ABS** circuit (see **38C, Anti-lock braking system**). If the fault is still present, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET613	FUEL PRESSURE REGULATOR

NOTES	**None.**

This solenoid valve regulates the output pressure of the high pressure pump.

INACTIVE	– Engine stopped. – Engine running at idle speed.
ACTIVE	Engine running at high load.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET638	FUEL FLOW REGULATOR

NOTES	**None.**

This solenoid valve regulates the flow of fuel entering the high pressure pump and enables an optimum quantity of fuel to be pressurised according to operating phase; this improves the output of the Common Rail pump and thereby the output of the engine as well.

ACTIVE	Engine running at idle speed.
INACTIVE	– Engine stopped. – Engine running at high load.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET673	DETECTION OF ACCELERATOR PEDAL SEIZURE

NOTES	**Special notes:** Apply this procedure if the status is **YES**.

Check that the accelerator pedal is not jammed and that nothing is impairing its operation (floor carpet, etc.).
Check the connection and condition of the **6-track connector** for the accelerator pedal potentiometer. Repair if necessary.
Check the condition and connection of the **4-track connector** of the brake switch Repair if necessary.
Check the connection and condition of computer **connector A**. Repair if necessary.
Measure the resistance on the pedal potentiometer on **gang 1** between **tracks 5** and **3**. Replace the pedal potentiometer if the resistance is not **1.7 kΩ ± 0.9 kΩ**.
Measure the **resistance** on the pedal potentiometer on **gang 2** between **tracks 2** and **6**. Replace the pedal potentiometer if the resistance is not **2.85 kΩ ± 2.05 kΩ**.
Check the brake switch (see **interpretation of statuses ET012 Primary brake switch and ET013 Secondary brake switch**).
Check the **insulation, continuity and the absence of interference resistance** on the following connections: Computer connector **A track F3** → **track 1** pedal potentiometer connector Computer connector **A track F2** → **track 2** pedal potentiometer connector Computer connector **A track F4** → **track 6** pedal potentiometer connector Computer connector **A track G2** → **track 3** pedal potentiometer connector Computer, connector **A, track H2** → **track 4** pedal potentiometer connector Computer, connector **A, track H3** → **track 5** pedal potentiometer connector Computer connector **A track E4** → **track 3** brake switch connnector Repair if necessary.
Carry out a multiplex network test.
Run full fault finding on the UCH.
If the fault is still present, contact the Techline.

AFTER REPAIR	Clear **RZ001 Fault memory**. Carry out a road test, then check with the diagnostic tool.

Tool parameter	Diagnostic tool name
PR005	EGR valve opening setpoint
PR008	Rail pressure setpoint
PR017	Fuel flow
PR028	Pedal position (gang 1)
PR029	Pedal position (gang 2)
PR030	Accelerator pedal position
PR032	Inlet pressure
PR035	Atmospheric pressure
PR037	Refrigerant pressure
PR038	Rail pressure
PR040	Linearised rail pressure
PR041	Turbocharging pressure
PR051	EGR valve position feedback
PR055	Engine speed
PR059	Inlet air temperature
PR063	Fuel temperature
PR064	Coolant temperature
PR073	Air flow sensor supply voltage
PR074	Battery voltage
PR076	Refrigerant sensor voltage
PR077	EGR valve position sensor voltage
PR078	Inlet pressure sensor voltage
PR079	Atmospheric pressure sensor voltage
PR080	Rail pressure sensor voltage
PR082	Fuel temperature sensor voltage
PR083	Air temperature sensor voltage
PR084	Coolant temperature sensor voltage
PR086	Pedal potentiometer gang 1 voltage
PR088	Pedal potentiometer gang 2 voltage
PR089	Vehicle speed

Tool parameter	Diagnostic tool name
PR125	Power absorbed by the air conditioning compressor
PR129	Last EGR valve offset
PR130	Cruise control setpoint
PR132	Air flow
PR228	Injector control capacitor voltage
PR364	Cylinder no. 1 fuel flow correction
PR365	Cylinder no. 4 fuel flow correction
PR400	New EGR valve offset
PR405	Cylinder no. 2 fuel flow correction
PR406	Cylinder no. 3 fuel flow correction
PR513	Mileage counter severity level 1 warning light
PR514	Mileage counter severity level 2 warning light
PR634	Air flow request
PR739	Fuel flow solenoid valve current

PR038	RAIL PRESSURE

NOTES	**There must be no present or stored faults.** Perform this fault finding procedure: – following detection of an inconsistency in the parameter menu, or – following the activation of command **AC003 Fuel pressure solenoid valve** – after a customer complaint (starting faults, poor performance, stalling etc.).

Check the **continuity and for the absence of interference resistance** on the following connections:

Computer **connector C track H1** → **track 3** rail pressure sensor connector

Computer **connector C track H2** → **track 1** rail pressure sensor connector

Computer **connector C track J2** → **track 2** rail pressure sensor connector

If all these connections are correct, check for a fuel pressure sensor power supply:

+5 V → **track 3** of the connector for the rail pressure sensor.

Earth → **track 2** of the connector for the rail pressure sensor.

Check the low and high-pressure diesel circuit sealing (visual checks, odours): on pump body, pressure release valve, pipes, rail and injector unions, injector wells, etc.
If all the above checks are correct:
With the vehicle ignition on, and engine stopped for over **1 minute**:
Display **PR038**, if the value is **lower** than **30 bar**, the sensor is correct.
If not, replace the rail pressure sensor.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

PR041	TURBOCHARGING PRESSURE

NOTES	**Special notes:** Only apply the checks if the parameter is **inconsistent**.

With the vehicle ignition on, engine stopped:
- Remove the turbocharging pressure sensor.
- With the sensor connected to the harness, read the value of **PR041** from the parameter screen:
- If the value is not very close to **PR035 Atmospheric pressure**, maximum pressure difference between **PR035** and **PR041** with the engine switched off = **± 50 mbar**:
  Check **the insulation and absence of interference resistance** on the signal line and the turbocharging pressure sensor power supply lines.
  If the lines are correct, replace the turbocharging pressure sensor.
- Connect **a vacuum pump** or **pressure pump** to the turbocharging pressure sensor.
- Apply a pressure of between **0.1** and **1.3 bar** (maximum pressure to be applied: **1.3 bar**).
- Compare the pressure value displayed in the Parameter screen with that given by the vacuum pump:
  If the difference* = **± 0.1 bar**, replace the turbocharging pressure sensor.
  If there is no discrepancy, the turbocharging pressure sensor is correct.

*Note:
The diagnostic tool displays the **absolute pressure**, the gauge for the vacuum pump displays the ***relative pressure***: the standard deviation between these two measures is equal to atmospheric pressure, that is, **the value of PR035**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

PR059	INLET AIR TEMPERATURE

NOTES	**Special notes:** Only apply the checks if the parameter is **inconsistent**.

Check the condition of the air temperature/pressure sensor connections (flow sensor).
Measure the **resistance** between **tracks 1 and 2** of the air flow sensor.

Theoretical values: **3714 Ω ± 161 Ω** at **10°C**
2448 Ω ± 95 Ω at **20°C**
1671 Ω ± 58 Ω at **30°C**

Replace the air temperature/pressure sensor, if not in order.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

PR064	COOLANT TEMPERATURE

NOTES	**Special notes:** Only apply the checks if the parameter is **inconsistent**.

Check the condition of the coolant temperature sensor connections.
Measure the **resistance** between tracks **3 and 2** of the coolant temperature sensor.

Theoretical values: **2252 Ω ± 112.6 Ω** at **25°C**
810 Ω ± 39 Ω at **50°C**
283 Ω ± 8 Ω at **80°C**

Replace the coolant temperature sensor if it is not in order.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

PR364 **PR405** **PR406** **PR365**	CYLINDER NO. 1 FUEL FLOW CORRECTION CYLINDER NO. 2 FUEL FLOW CORRECTION CYLINDER NO. 3 FUEL FLOW CORRECTION CYLINDER NO. 4 FUEL FLOW CORRECTION

NOTES	**Special notes:** Only apply the checks if the parameter is **inconsistent**.

If the value of these parameters is not equal to **1 (tolerance -0.7/+0.9) when the engine is running**, apply **test 7 Incorrect injection quantity**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

CLEARING

RZ001: Fault memory.
Enables the faults to be erased from the computer memory.

RZ002: EGR programming adaptives
Use this command when replacing the EGR valve.

RZ004: Pressure regulation adaptives.

RZ005: Programming.
This command enables you to re-initialise all the computer data (engine adaptives, EGR, rail, etc.).

RZ019: Reinitialising the programming.

Use the actuator commands to change a stored fault to present, to confirm the fault.

ACTUATION

AC003: Fuel pressure solenoid valve.

AC005 to AC008: Cylinder 1 to 4 injectors.
Activating this lets you listen to the operation of the injector on the cylinder under consideration

AC012: Damper valve
Activating this lets you listen to the operation of the damper valve.

AC029: High pressure circuit sealing test.
Activating this lets you check the high pressure circuit sealing after a procedure has been carried out

AC037: Preheating relay.
Activating this lets you listen to the operation of the preheating relay and enables the warning light in the instrument panel to be illuminated.

AC079: Static actuator test.
This activation is used to activate the injection system actuators (simultaneously activates commands AC003, AC005 to AC008, AC012, AC037, AC213, and AC214).

AC099: Disable electrical consumers.

AC100: Cancel Inhibition of electrical consumers.

AC213: Fuel flow solenoid valve.

AC214: Turbocharger control solenoid valve.
Activating this lets you listen to the operation of the turbocharger control solenoid valve.

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

COMPUTER FAULT

- **NO DIALOGUE WITH THE COMPUTER** — **ALP1**

STARTING FAULT

- **THE ENGINE DOES NOT START OR STARTS WITH DIFFICULTY** — **ALP2**
- **STARTING DIFFICULT WITH COLD ENGINE** — **ALP3**
- **IMPOSSIBLE TO SHUT OFF ENGINE** — **ALP4**

IDLING FAULTS

- **ENGINE IDLE SPEED TOO HIGH** — **ALP5**
- **ENGINE IDLE SPEED TOO LOW OR UNSTABLE** — **ALP6**

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

DRIVING BEHAVIOUR

- ENGINE CUT-OUT (STALLING) — ALP7
- NO OR VERY LITTLE ACCELERATION, INCREASE IN ENGINE SPEED — ALP8
- ENGINE BUCKING — ALP9
- ERRATIC ACCELERATION — ALP10
- NO ENGINE BRAKING — ALP11
- LACK OF POWER — ALP12
- TOO MUCH POWER — ALP13
- OVERSPEED AT IDLE SPEED OR ON RELEASING BRAKE — ALP14
- EXCESSIVE CONSUMPTION — ALP15
- ENGINE KNOCK — ALP16
- ENGINE OVERHEATING — ALP17

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

NOISE, ODOURS OR SMOKE

- **ENGINE SMOKES WHEN STARTED** **ALP18**
- **ENGINE EMITS BLUE SMOKE** **ALP19**
- **ENGINE SMOKES WHEN REVVED** **ALP20**
- **ENGINE EMITS WHITE SMOKE (ESPECIALLY WHEN STARTING)** **ALP21**
- **EMISSION CONTROL NOT SATISFACTORY** **ALP22**

ALP1	No dialogue with the computer

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the diagnostic tool is not causing the fault by trying to establish dialogue with a computer on another vehicle. If the tool is not at fault, and dialogue cannot be established with any other computer on the same vehicle, the cause could be a faulty computer interfering on the multiplex network.
Check the battery voltage and make the necessary adjustments to obtain a correct voltage (**9.5 V < Battery voltage < 17.5 V**).

Carry out a fault finding procedure on the multiplex network using the diagnostic tool.

– Check for the presence and the condition of the injection fuses on the UPC, and in the engine fuse box.
– Check the connection of the computer connectors and the condition of its connections.
– Check the injection computer earths (quality, oxidation, earth bolts secure on the battery terminal).
– Check that the supply to the computer is correct:
  Earth on tracks G4, H1 and H4 of black 32 track **connector A**.
  + after ignition feed on track D1 of black 32 track **connector A**.

Check that the supply to the diagnostic socket is correct:
+ before ignition feed on track 16
+ after ignition feed on track 1
Earth on tracks 4 and 5

If dialogue has still not been established after these various checks, contact the Techline.

ALP2	The engine does not start or starts with difficulty

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the presence and conformity of the fuel.
Check the battery capacity. Check the starter and the starter relay. Check the main relay of the injection computer.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the camshaft and TDC sensors, as well as their wiring.
Check the air inlet system. Check that the damper valve is operating correctly.
Check the low pressure fuel supply system by carrying out tests 1 and 2.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP3	Starting difficult with cold engine

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the grade of the engine oil and that the engine oil level is correct.
Check the battery capacity. Check the starter.
Check the coolant temperature, fuel and air inlet sensors.
Check the preheating system.
Check the low pressure fuel supply system by carrying out tests 1 and 2.
Check the compression.

ALP4	Impossible to stop engine

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.

ALP5	Engine idle speed too high

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check that the accelerator pedal is operating correctly (sensor and wiring).

ALP6	Engine idle speed too low or unstable

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the presence and conformity of the fuel.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check the air conditioning pressure sensor.
Check the exhaust gas recirculation system. Check that the exhaust system is in good condition.
Check the low pressure fuel supply system by carrying out tests 1 and 2.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP7	Engine stop

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the presence and conformity of the fuel.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check the exhaust gas recirculation system. Check that the exhaust system is in good condition.
Carry out a multiplex network test using the CLIP diagnostic tool.
Check the low pressure fuel supply system by carrying out tests 1 and 2.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP8	Acceleration, little or no increase in engine speed

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the presence and conformity of the fuel.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check the turbocharging pressure.
Check that the accelerator pedal is operating correctly (sensor and wiring).
Check the exhaust gas recirculation system. Check that the exhaust system is in good condition.
Check the low pressure fuel supply system by carrying out tests 1 and 2.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP9	Engine bucking

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check that the accelerator pedal is operating correctly (sensor and wiring).
Check the clutch pedal (connector and wiring). Check the vehicle speed signal.
Carry out a multiplex network test using the CLIP diagnostic tool.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check the low pressure fuel supply system by carrying out tests 1 and 2.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP10	Erratic acceleration

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check that the accelerator pedal is operating correctly (sensor and wiring).
Check the clutch pedal (connector and wiring). Check the vehicle speed signal.
Carry out a multiplex network test using the CLIP diagnostic tool.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP11	No engine braking

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check that the accelerator pedal is operating correctly (sensor and wiring).
Check the conformity of the engine speed at idle speed.
Check the injectors by carrying out tests 6 and 7.

ALP12	Lack of power

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the presence and conformity of the fuel. Check that the fuel filter is in good condition and clean.
Check the engine oil grade and level. Check the coolant circuit (coolant level).
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check that the accelerator pedal is operating correctly (sensor and wiring). Check the clutch pedal (connector and wiring). Check the vehicle speed signal. Check the turbocharging pressure.
Carry out a multiplex network test using the CLIP diagnostic tool.
Check the exhaust gas recirculation system. Check that the exhaust system is in good condition.
Check the low pressure fuel supply system by carrying out tests 1 and 2.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP13	Too much power

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the coolant temperature sensor. Check the turbocharging pressure.
Check the clutch pedal (connector and wiring). Check the vehicle speed signal.
Carry out a multiplex network test using the CLIP diagnostic tool.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP14	Overspeed at idle speed or on releasing brake

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine oil grade and level.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Carry out a multiplex network test using the CLIP diagnostic tool.
Check the ABS computer with the CLIP diagnostic tool.

ALP15	Excessive consumption

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check the turbocharging pressure.
Check the coolant temperature sensor.
Check the low pressure fuel supply system by carrying out tests 1 and 2.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP16	Engine knocking

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine oil grade and level.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check that the exhaust system is in good condition.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

ALP17	Engine overheating

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the coolant circuit.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the coolant temperature sensor.
Check the condition and connection of the relay/fuse box.
Check that the fan unit is in good working order:

ALP18	Engine emits smoke when starting

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine oil grade and level.
Check the fuel temperature sensor. Check the coolant temperature sensor.
Check the coolant circuit.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.

ALP19	Engine emits blue smoke

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine oil grade and level.
Check the presence and conformity of the fuel.
Check the coolant temperature sensor.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check the turbocharging pressure. Check the condition of the turbocharger.
Check the exhaust gas recirculation system. Check that the exhaust system is in good condition.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.

ALP20	Engine smokes when revved

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine oil grade and level.
Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the air flow sensor.

ALP21	Engine emits white smoke (especially when starting)

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the conformity of the fuel circuit (air intake).
Check the coolant circuit.
Check the preheating system.
Check the injectors by carrying out tests 6 and 7.

ALP22	Emission control not satisfactory

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the injection computer: that the connections and wiring are in good condition, that earths and feeds are present.
Check the air inlet system. Check that the damper valve is operating correctly. Check the air flow sensor.
Check the turbocharging pressure.
Check the exhaust gas recirculation system.
Check the high pressure fuel supply system by carrying out tests 3, 4 and 5.
Check the injectors by carrying out tests 6 and 7.

NOTES	**Only consult these tests when dealing with a fault finding chart (ALP) or when interpreting faults.**

Some special checks are grouped under the heading Tests and are used as required in different fault finding charts (ALP) or interpretation of faults.

TEST 1: Low pressure fuel supply system check.

TEST 2: Internal fuel transfer pump (ITP) check.

TEST 3: High pressure fuel pressure solenoid valve check.

TEST 4: High pressure pump (HPP) and fuel flow solenoid valve check.

TEST 5: Rail high pressure regulation circuit check.

TEST 6: Major leak in injectors/injectors open.

TEST 7: Incorrect injection quantity.

TEST 1	Low pressure fuel supply system check

NOTES	**Causes:** No fuel can be seen in the transparent supply pipe leading to the pump or large air bubbles can be seen (small air bubbles are permitted). The engine does not start.

Check the conformity and presence of the fuel (petrol instead of diesel, contaminated fuel).

↓

Bleed the fuel supply system with the manual priming pump.

↓

Does the fuel circulate correctly when pumped manually?

YES → Low pressure fuel supply system correct

NO

↓

Check that there are no leaks in the supply and return pipes and check that they are in good condition and installed correctly.

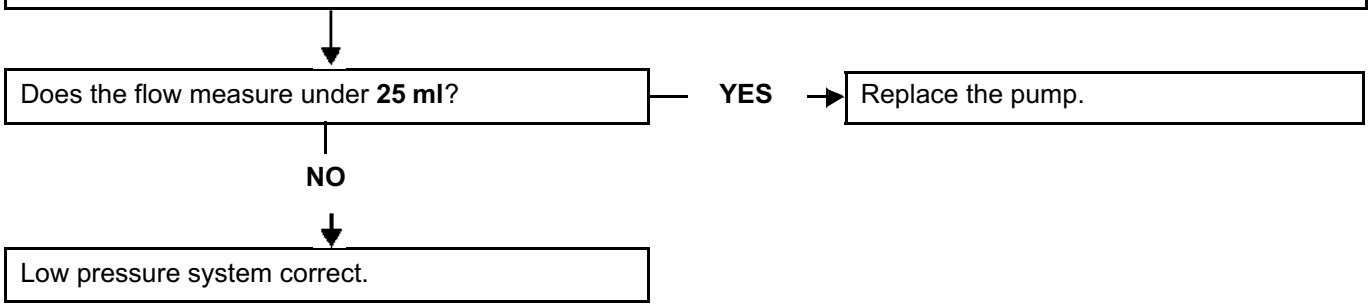
Check the cleanliness of the fuel filter.

Remove the fuel sender and check for leaks.
Check that the fuel sender strainer is not blocked.

TEST 2	Internal fuel transfer pump (ITP) check

NOTES	**Conditions prior to test:** **Test 1 Low pressure fuel supply system check** has been carried out previously and results are satisfactory. **Cause:** Fuel can be seen in the transparent supply pipe leading to the pump. However, fuel does not move during starting.

- Remove the connector of the fuel flow solenoid valve (orange)
- Disconnect the fuel return pipe from the pump and block it so that it is sealed. Connect a pipe to the pump to measure the flow of diesel.
- To authorise a **15 second** starter action and carry out this test it is **essential** to carry out the following procedure:
- Connect a battery charger.
- Run command **SC003 Save computer data**.
- Run command **RZ019 Programming reinitialisation**.
- Perform a starter action for at least **15 seconds** (starting speed **250 rpm**)
- Measure the flow rate of the fuel being collected in a graduated measuring cylinder (**500 ml** minimum). The minimum flow rate must be **25 ml** every **15 sec**.
- Run command **SC001 Write computer data**.



TEST 3	Fuel pressure solenoid valve check

NOTES	**Conditions prior to test:** The entire low pressure system must be in good condition. Check the sealing of the high pressure pipes and unions. **Cause:** Rail pressure approximately **50 bar** during starting.

Measure the resistance of the pressure solenoid valve between **track M4** computer connector B and **track 4** of the injection main relay connector.
Is the resistance between **1.5 Ω** and **15 Ω**?

NO → Replace the pump.

YES

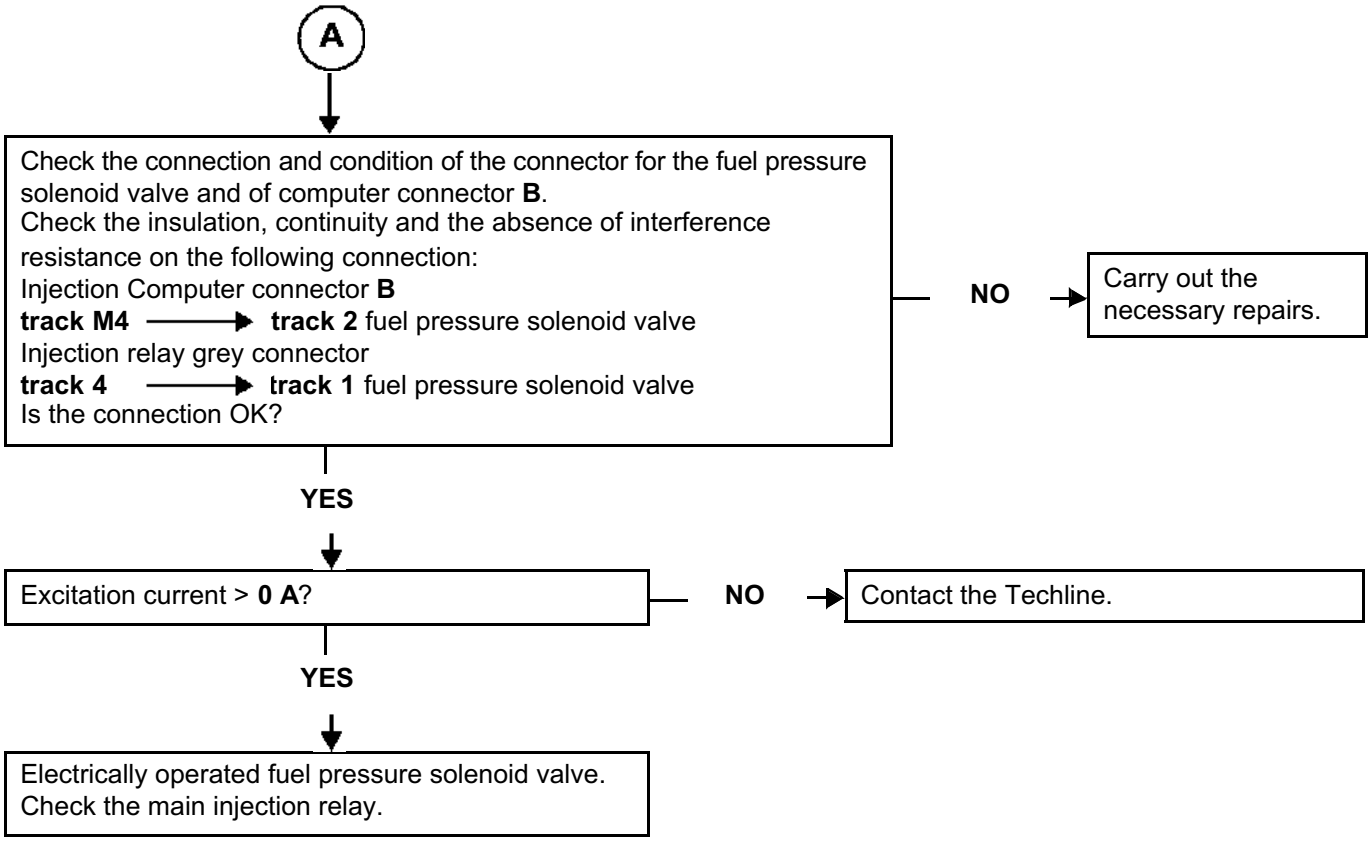
Measure the voltage at the connector of the fuel pressure solenoid valve **track 1** with the ignition on.
Is the voltage the same as the battery voltage?

NO → Check the connection and condition of the connectors for the fuel pressure solenoid valve and the main injection relay.
Grey connector for injection relay
track 5 → **track 1** fuel pressure solenoid valve
Repair if necessary.
Check the main injection relay.

YES

A

TEST 3 CONTINUED	



TEST 4	High pressure pump (HPP) and fuel flow solenoid valve check

NOTES	**Conditions prior to test:** The entire low pressure system must be in good condition. Check the sealing of the high pressure pipes and unions. **Test 3** Fuel pressure solenoid valve check is OK
	Cause: Not enough or no rail pressure during starting. Rail reference pressure during starting, minimum **150 bar**.

Measure the resistance of the flow solenoid valve between **track M3** computer connector B and **track 5** of the injection main relay connector.
Is the resistance between **1.5 Ω** and **15 Ω**?

NO → Replace the pump.

YES

Measure the voltage of the fuel flow solenoid valve connector **track 1** with the ignition on.
Is the voltage the same as the battery voltage?

NO → Check the connection and condition of the connectors for the fuel pressure solenoid valve and the main injection relay.
Grey connector for injection relay **track 5** → **track 1** fuel flow solenoid valve
Repair if necessary.
Check the main injection relay.

YES

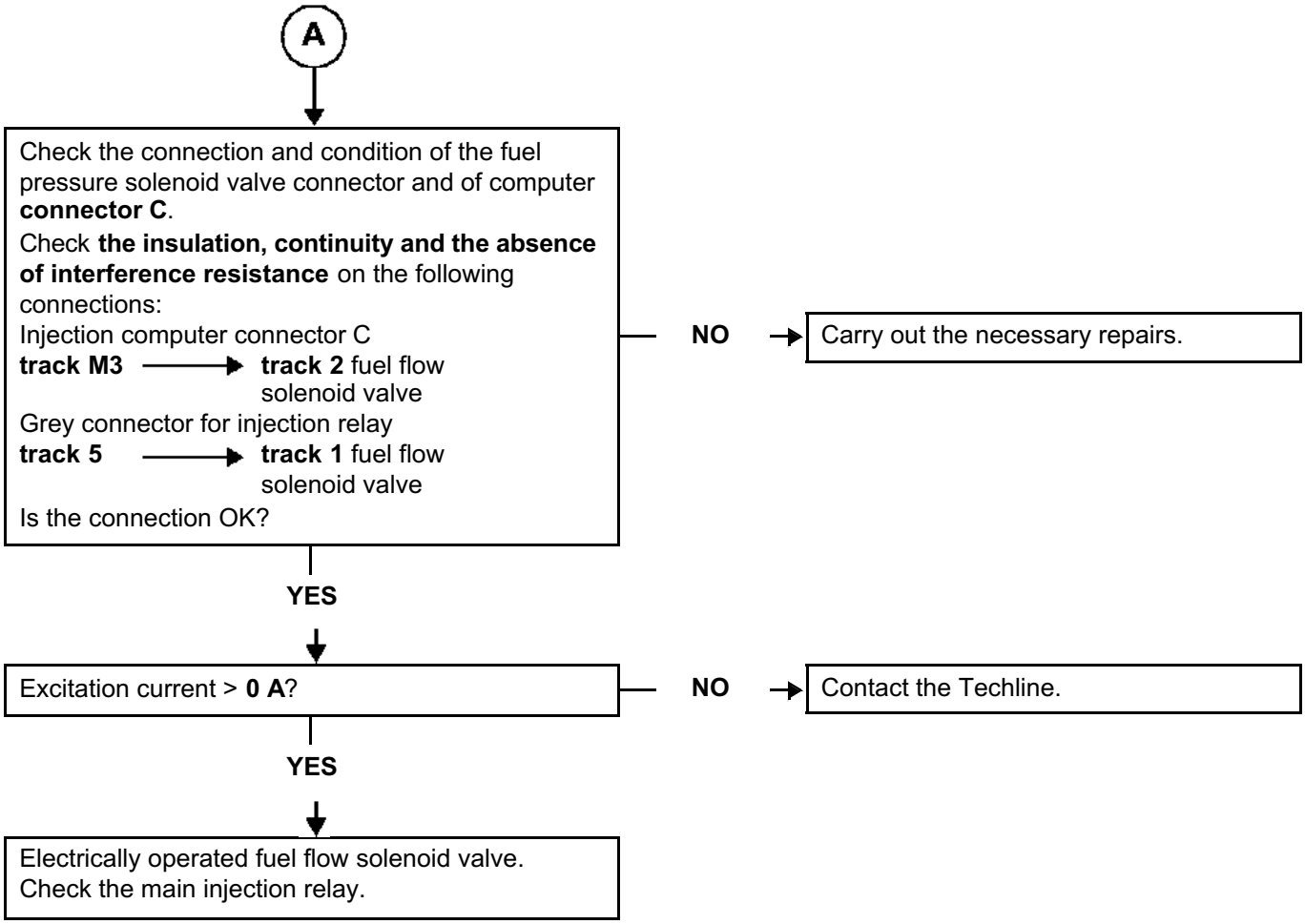
Use parameter **PR379 Fuel flow solenoid valve current** to check the excitation current when the starter is activated.
Is the excitation current between **0.6 A** and **1 A**?

NO → (A)

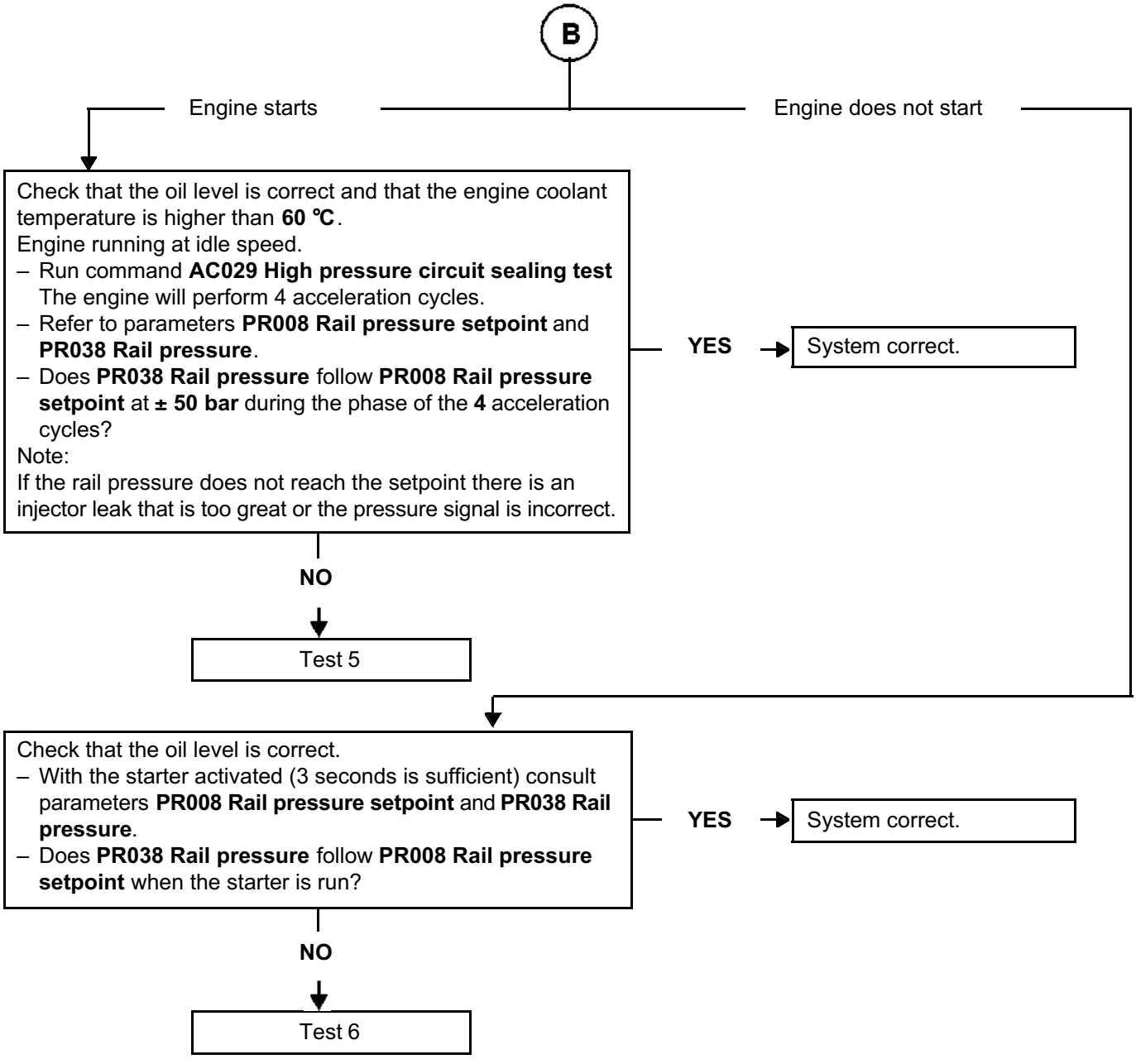
YES

(B)

TEST 4 CONTINUED 1	



TEST 4 CONTINUED 2	



TEST 5	Rail high pressure control circuit check

NOTES	**Conditions prior to test:** Engine coolant temperature between **80°C** and **90°C**. All the electrical consumers are switched off. Air conditioning is switched off. The tank is at least half-full. The pipe connections and unions have been checked. Check the sealing of the high pressure pipes and unions.
	If contaminants (swarf) can be seen in the transparent return pipe, the entire injection system (injectors, pump, rail, high pressure pipes and all return pipes) must be replaced.
	Causes: Rail pressure variations around the setpoint. The rail reference pressure is not reached. Rough idle. Possibly noisy combustion.

Start the engine and let it idle.

↓

Are there large air bubbles in the transparent supply pipe going to the pump?

YES → Check the low pressure system.

NO

↓

Remove the fuel flow solenoid valve connector (orange), does the engine stop?

NO → Replace the pump (the fuel flow solenoid valve remains open mechanically)

YES

↓

Reconnect the fuel flow solenoid valve connector; before re-starting the engine, switch off the ignition and wait **30 seconds**.
Remove the connector for the fuel pressure solenoid valve (white), does the engine stop?

NO → Replace the pump (the fuel pressure solenoid valve remains open mechanically)

YES

↓

(A)

TEST 5 CONTINUED 1	

(A)

Reconnect the fuel pressure solenoid valve connector, restart the engine and let it idle.

Consult the parameters.
PR364 Cylinder no. 1 fuel flow correction.
PR365 Cylinder no. 4 fuel flow correction.
PR405 Cylinder no. 2 fuel flow correction.
PR406 Cylinder no. 3 fuel flow correction.
Are the reference values **1** (tolerance **- 0.7/+ 0.9**)?

NO → Check the injectors by carrying out test 6.

YES

Check that the oil level is correct and that the engine coolant temperature is higher than **60 °C**.
Engine running at idle speed.
– Run command **AC029 High pressure circuit sealing test**
The engine will perform **4** acceleration cycles.
– Refer to parameters **PR008 Rail pressure setpoint** and **PR038 Rail pressure**.
– Does **PR038 Rail pressure** follow **PR008 Rail pressure setpoint** during the phase of the **4** acceleration cycles?

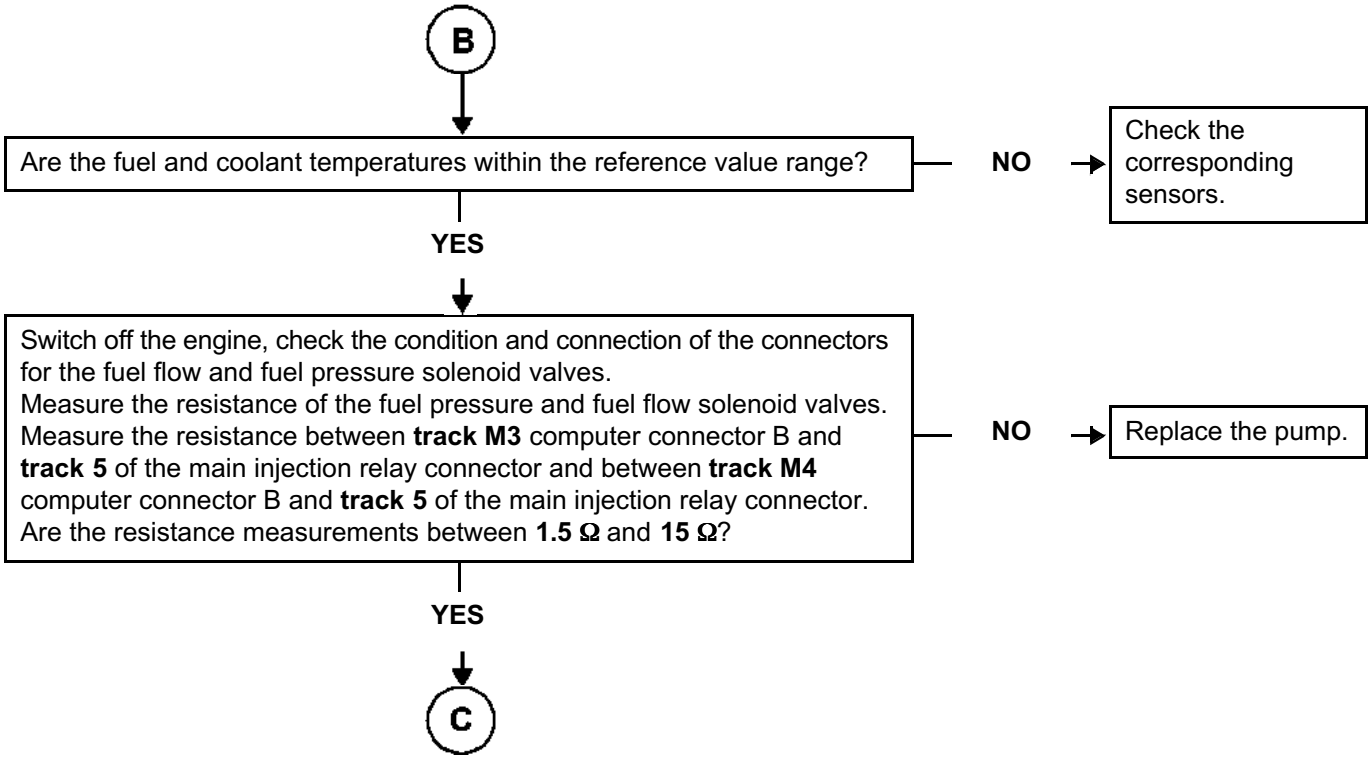
YES → System correct.

NO

Restore parameters **PR063 Fuel temperature** and **PR064 Coolant temperature**.
Fuel temperature reference value when operating at idle speed is between **60°C** and **80°C**.
The coolant temperature reference value is between **80°C** and **90°C**.
Note:
– when the fuel temperature is above **136°C**, the maximum rail pressure is reduced to protect the plastic pipes.
– when the coolant temperature is above **100°C**, the maximum rail pressure is reduced to protect the engine.

(B)

TEST 5 CONTINUED 2	



TEST 5 CONTINUED 3	

C

Ignition on, connector connected to fuel rail pressure sensor.

Measure the feed voltage at the rail pressure sensor between **tracks 3** and **2**.
Supply voltage of approximately **5 V**.

Measure the voltage at the rail pressure sensor between **tracks 1** and **2**.
Voltage of approximately **0.5 V**.

NO → D

IMPORTANT
Do not measure the resistance at the high pressure sensor.
Risk of destruction!
Are the supply voltages and the sensor voltage correct?

YES

Start the engine and let it idle.
An unusual combustion noise may be heard.
Check the rail pressure using parameter **PR038 Rail pressure**.
At idle speed rail pressure between **190** and **210 bar**
2000 rpm rail pressure between **400** and **500 bar**
3000 rpm rail pressure between **500** and **700 bar**
4000 rpm rail pressure between **700** and **900 bar**
Are the rail pressure values correct?

YES → Rail pressure regulation circuit correct.

NO

Replace the rail and the pressure sensor as well as the high pressure pipes.
Do the measurements match the stated values?

NO → Replace the pump.

YES

Rail pressure regulation circuit correct.

Note:
Deviations from the reference values may occur in the rail pressure regulation circuit because of wear, clogging or faulty sensors or actuators.
These deviations can only be compensated for by the pressure regulator within certain limits.
One consequence of this is that the rail pressure may be regulated so that it is too low or too high or it fluctuates.

TEST 5 CONTINUED 4	

D

If the supply voltage is incorrect (**5 V**), check the connection and condition of the connector for the rail pressure sensor and of computer connector **C**.
Check **the insulation, continuity and the absence of interference resistance** on the following connections:

Fuel rail pressure sensor connector **track 3** → Injection computer connector **C track F2**

Fuel rail pressure sensor connector **track 2** → Injection computer connector **C track J2**

Repair if necessary.
If the fault is still present, contact the Techline.

If the sensor voltage is incorrect (**0.5 V**), check the connection and condition of the connector for the fuel rail pressure sensor and of computer connector **C**.
Check **the insulation, continuity and the absence of interference resistance** on the following connections:

Fuel rail pressure sensor connector **track 1** → Injection computer connector **C track H2**

Fuel rail pressure sensor connector **track 2** → Injection computer connector **C track J2**

Repair if necessary.
If the fault is still present, replace the rail and its sensor and the high pressure pipes.

TEST 6	Major leak in injectors/injectors open

NOTES	**Conditions prior to test:** The entire low pressure system must be in good condition. Check the sealing of the high pressure pipes and unions. **Test 3 Fuel pressure solenoid valve check** is OK **Test 4 High pressure pump (HPP) and fuel flow solenoid valve check** is OK **Test 5 Rail high pressure regulation circuit check** is OK.
	Causes: Not enough or no rail pressure during starting. The engine does not start.

Measure the resistance at the injectors.
Resistance between **150** and **250 kΩ**.
Measure at ambient temperature (approx. **20°C**), allow engine to cool down for at least **30 minutes**.
Is the resistance correct?

NO → Replace the corresponding injectors.

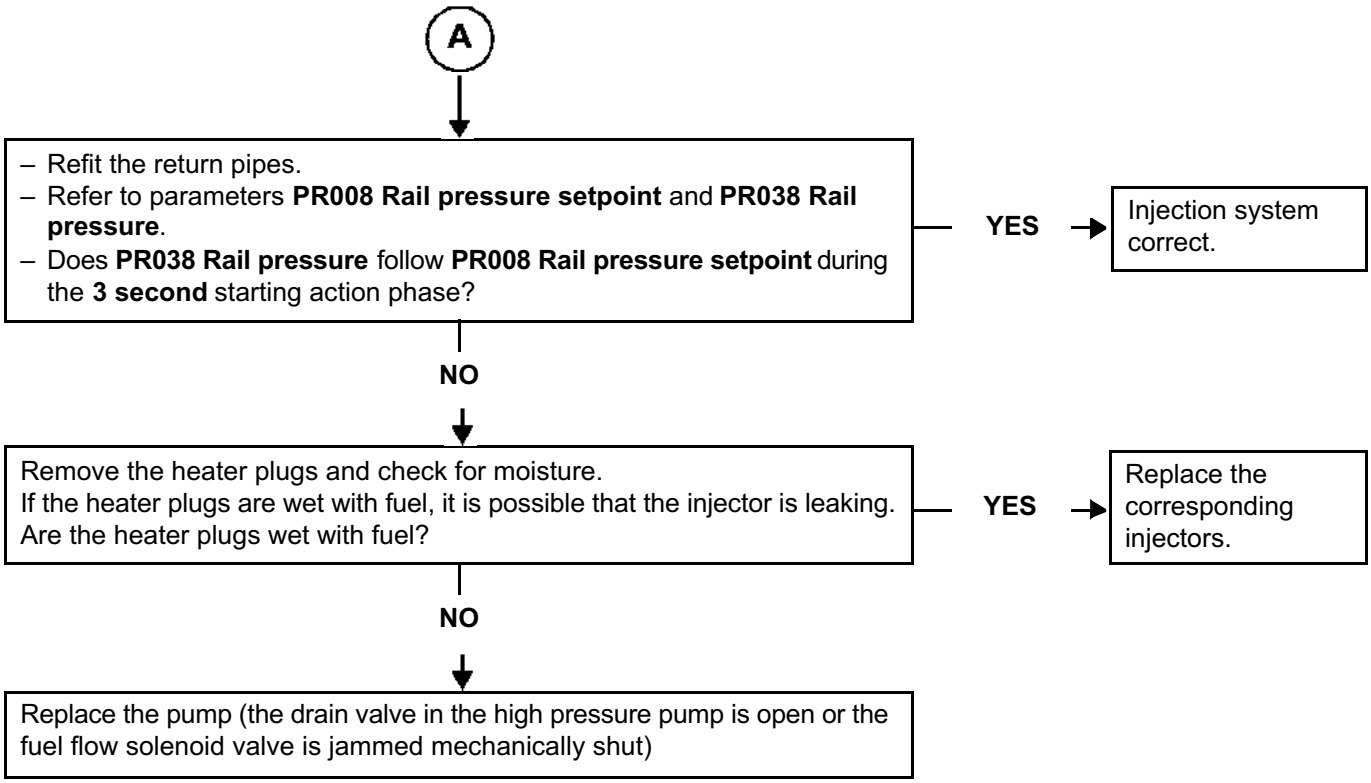
YES

Disconnect the return system connections at the injectors and close off the return pipes so they are leak-tight (pipe and can kit **Mot. 1711** and **Mot. 1771**).
– To authorise a **15 second** starter action and carry out this test it is **essential** to carry out the following procedure:
– Remove the fuel flow solenoid valve connector (orange)
– Run command **SC003 Save computer data**.
– Run command **RZ019 Programming reinitialisation**.
– Perform a starter action for at least **15 seconds** (starting speed **250 rpm**)
– Run command **SC001 Write computer data**.
Is the return volume at the injectors greater than **20 ml** per injector for the starting phase?
Do not repeat this procedure more than **3 times** and wait **30 seconds** between each **15 second** starter activation.
Then wait **30 minutes** before running the starter for **3 cycles** of **15 seconds**.
Follow this instruction so that the starter does not get damaged.

YES → Replace the corresponding injectors.

NO

TEST 6 CONTINUED	



TEST 7	Incorrect injection quantity

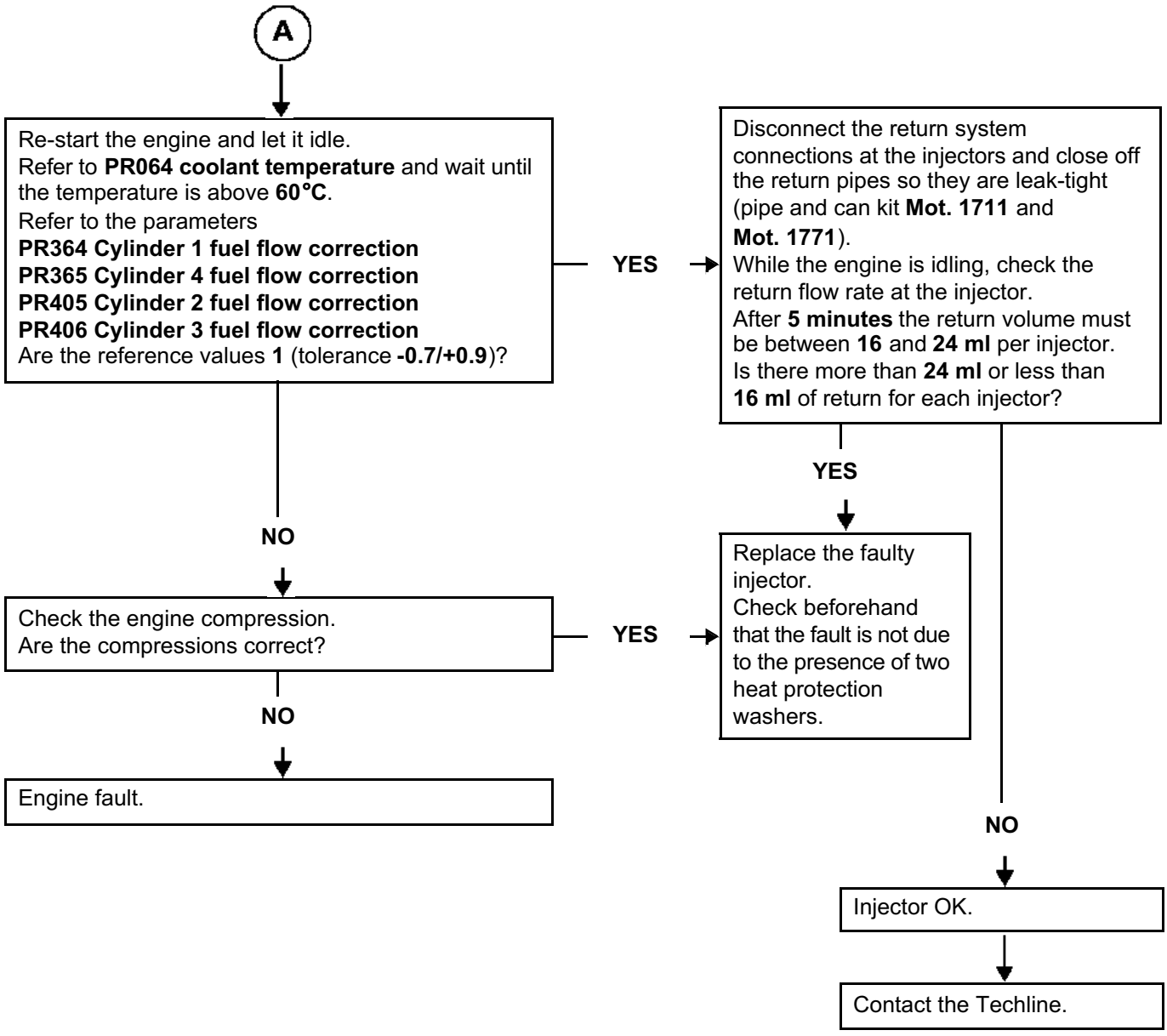
NOTES	**Conditions prior to test:** The entire low pressure system must be in good condition. Check the sealing of the high pressure pipes and unions. **Test 3** Fuel pressure solenoid valve check is OK **Test 4** High-pressure pump (HPP) and fuel flow solenoid valve check is OK. **Test 5** Rail high pressure regulation circuit check is OK. All the electrical consumers are switched off. Air conditioning is switched off.
	Cause: The engine runs poorly at idle speed, possibly emits white smoke.

Ignition off.
Measure the resistance at the injectors.
Setpoint resistance between **150** and **250 kΩ**.
Measure at ambient temperature (approx. **20°C**), allow engine to cool down for at least **30 minutes**.
Are the resistance measurements correct?

NO → Replace the corresponding injectors.

YES

TEST 7 CONTINUED	



DIESEL INJECTION
Fault finding - Introduction

1. SCOPE OF THIS DOCUMENT

This document presents the fault finding procedure applicable to all computers with the following specifications:

Vehicle(s): **MEGANE II/SCENIC II**

K9K 724 engine

Function concerned: **DELPHI MULTIPOINT COMMON RAIL DIESEL DIRECT INJECTION** .

Name of computer: **DCM1.2 injection**

Program No.: **4D**

Vdiag No: **48**

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedures (this manual):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.
Wiring Diagrams:
– Visu-Schéma (CD-ROM), paper version.

Type of diagnostic tools

– CLIP + CAN sensor

Special tooling required

Special tooling required		
		Multimeter
Elé.	**1590**	**112-track computer bornier**
Elé.	**1681**	**Universal bornier**
Mot.	**1711**	**Injector flow measuring kit**

3. RECAP

To run fault finding on the vehicle's computers, switch on the ignition in fault finding mode (forced + after ignition feed).

Proceed as follows:

- with the vehicle card in the card reader,
- press and hold the Start button (longer than 5 seconds) with start-up conditions not met,
- connect the diagnostic tool and perform the required operations.

Note:
The left-hand and right-hand xenon bulb computers are supplied when the dipped headlights are lit.
Therefore fault finding can only be carried out on them after the ignition has been switched on in fault finding mode (forced + after ignition feed) and the dipped headlights have been switched on.

To cut off the + after ignition feed, proceed as follows:

- disconnect the diagnostic tool,
- press the start button twice briefly (less than 3 seconds),
- Ensure that the + after ignition feed has been cut off by checking that the computer indicator lights on the instrument panel have gone out.

Faults

Faults are declared as either present or stored (depending on whether they appeared in a certain context and have disappeared since, or whether they remain present but have not been diagnosed within the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is used after the + after ignition feed is switched on (without acting on the system components).

For a **present fault**, apply the procedure described in the **Interpretation of faults** section.

For a **stored fault**, note the faults displayed and apply the instructions in the **Notes** section.

If the fault is **confirmed** when the instructions in the Notes section are applied, the fault is present. Deal with the fault

If the fault is **not confirmed**, check:
- the electrical lines which correspond to the fault,
- the connectors on these lines (corrosion, bent pins, etc.),
- the resistance of the component detected as faulty,
- the condition of the wires (melted or split insulation, wear).

Conformity check

The aim of the conformity check is to check data that does not produce a fault on the diagnostic tool because the data is inconsistent. Therefore, this phase is used to:
- carry out fault finding on faults that do not have a fault display, and which may correspond to a customer complaint.
- check that the system is operating correctly and that there is no risk of a fault recurring after repairs.

This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.

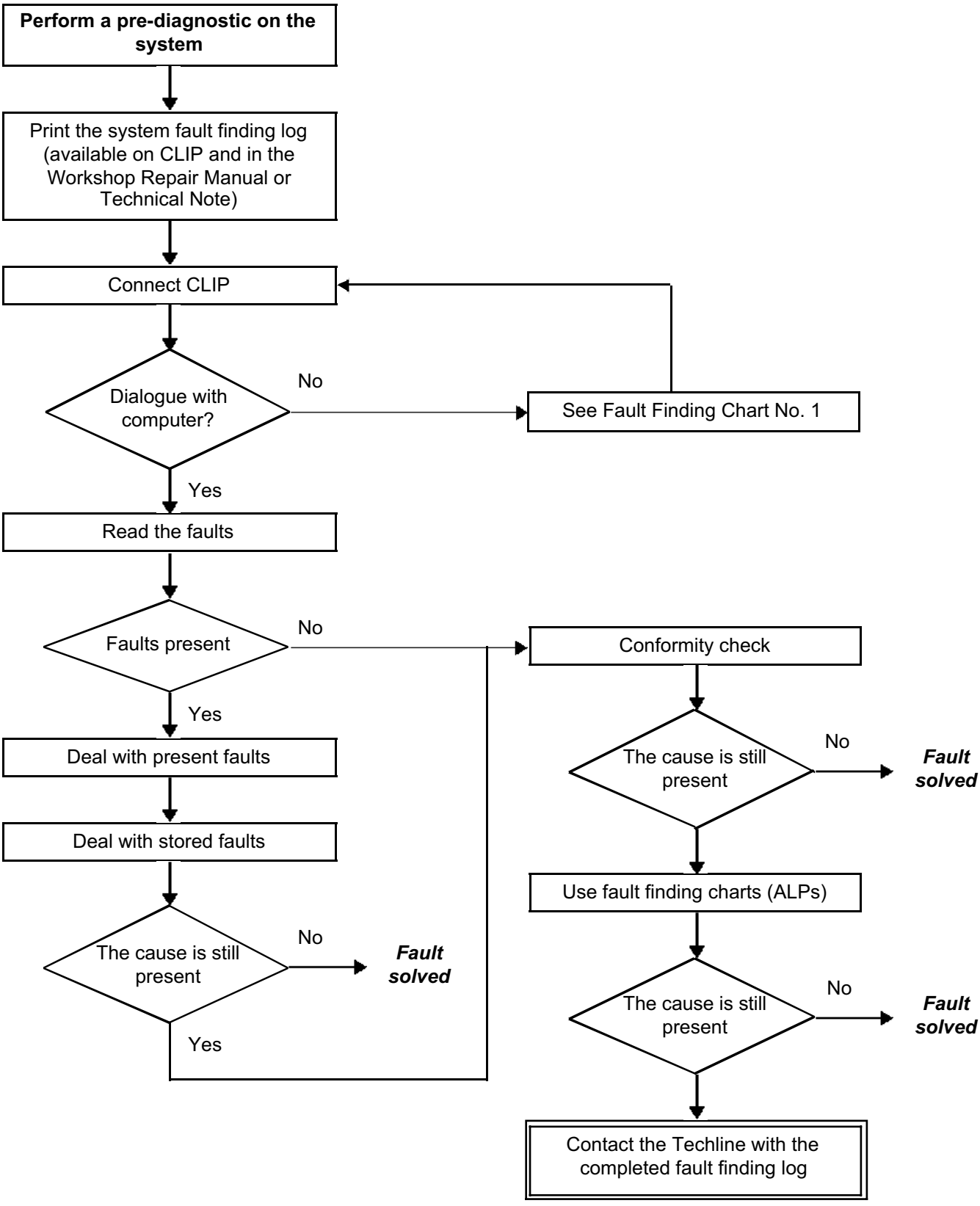
If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

Customer complaints - Fault finding chart

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be processed by **customer complaint**.

A synopsis of the general procedure to follow is provided on the following page in the form of a flow chart.

4. FAULT FINDING PROCEDURE



4. FAULT FINDING PROCEDURE (continued)

Wiring check

Fault finding problems
Disconnecting the connectors and/or manipulating the wiring harness may temporarily remove the cause of a fault.
Electrical measurements of voltage, resistance and insulation are generally correct, especially if the fault is not present when the analysis is made (stored fault).

Visual inspection
Look for damage under the bonnet and in the passenger compartment.
Carefully check the fuses, insulators and wiring harness routing.
Look for signs of oxidation.

Tactile inspection
While manipulating the wiring harness, use the diagnostic tool to note any change in fault status from stored to present.
Make sure that the connectors are properly locked.
Apply light pressure to the connectors.
Twist the wiring harness.
If there is a change in status, try to locate the source of the fault.

Inspection of each component
Disconnect the connectors and check the appearance of the clips and tabs, as well as the crimping (no crimping on the insulating section).
Make sure that the clips and tabs are properly locked in the sockets.
Check that no clips or tabs have been dislodged during connection.
Check the clip contact pressure using an appropriate model of tab.

Resistance check
Check the continuity of entire lines, then section by section.
Look for a short circuit to earth, to **+12 V** or to another wire.

If a fault is detected, repair or replace the wiring harness.

5. FAULT FINDING LOG

IMPORTANT!

IMPORTANT
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the procedure, enables you to keep track of the procedure which is carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE MANDATORY TO FILL OUT A FAULT FINDING LOG EACH TIME FAULT FINDING IS CARRIED OUT.

You will always be asked for this log:
– when requesting technical assistance from the Techline,
– for approval requests when replacing parts for which approval is obligatory,
– and it should be enclosed when returning monitored parts on request. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY ADVICE

Safety rules must be observed during any work on a component to prevent any damage or injury:
– make sure that the battery is properly charged to avoid damaging the computers with a low load,
– use the appropriate tools.

7. CLEANLINESS ADVICE THAT MUST BE OBSERVED WHEN WORKING ON THE HIGH PRESSURE DIRECT INJECTION SYSTEM

The high-pressure direct injection system is highly sensitive to contamination. The risks associated with contamination are:
– damage to or destruction of the high-pressure injection system,
– components jamming,
– components losing seal integrity.

All After-Sales operations must be performed under clean conditions. This means that no impurities (particles a few microns in size) should have entered the system during dismantling.

The cleanliness principle must be applied from the filter to the injectors.

FAULT FINDING LOG

System: Injection

List of monitored parts: ***Computer***

Administrative identification

Date	2 0
Log completed by	
VIN	
Engine	
Diagnostic tool	CLIP
Update version	

Customer complaint

☐	579	Does not start - fault	☐	570	Stalling - cold starting faults	☐	571	Stalling - hot starting faults
☐	586	Injection/preheating warning light on	☐	572	Idling - unstable engine speed	☐	574	Bucking/flat spots
☐	573	Loss of power	☐	520	Abnormal noise, vibrations	☐	576	Smoke - exhaust odours
☐	569	Starting faults						

Other — Your comments:

Conditions under which the customer complaint occurs

☐	001	When cold	☐	005	While driving	☐	008	When decelerating
☐	002	When hot	☐	006	When changing gear	☐	009	Sudden fault
☐	003	When stationary	☐	007	When accelerating	☐	010	Gradual deterioration
☐	004	Intermittently						

Other — Your comments:

Documentation used in fault finding

Fault finding procedure used	
Type of diagnostic manual:	Workshop Repair Manual ❑ Technical Note ❑ Assisted fault finding ❑
Fault finding manual no:	
Wiring diagram used	
Wiring Diagram Technical Note No:	
Other documentation	
Title and/or part number:	

RENAULT

page to print or photocopy - page to print or photocopy - page to print or photocopy

FAULT FINDING LOG

System: Injection

Computer identification and parts exchanged for the system

Part 1 part no.	
Part 2 part no.	
Part 3 part no.	
Part 4 part no.	
Part 5 part no.	

To be read with the diagnostic tool (Identification screen):

Computer part no.	
Supplier no.	
Program no.	
Software version	
Calibration no.	
VDIAG	

Faults found with the diagnostic tool

Fault no.	Present	Stored	Fault name	Specification

Conditions under which fault occurs

Status or parameter no.	Parameter name	Value	Unit

System-specific information

Description:

Additional information

What factors led you to replace the computer? What other parts were replaced?	
Other defective functions?	
Your comments:	

RENAULT

FD 01
Fault finding log

I - RISKS ASSOCIATED WITH CONTAMINATION

IMPORTANT
Before working on the injection circuit, check using the diagnostic tool:
– that the rail is depressurised,
– that the fuel temperature is not too high.

What are the causes of contamination?

– metal or plastic chips,
– paint,
– fibres: from cardboard,
from brushes,
from paper,
from clothing,
from cloths.
– foreign bodies such as hair,
– ambient air
– etc.

IMPORTANT
Cleaning the engine using a high-pressure washer is prohibited because of the risk of damaging connections. In addition, moisture may collect in the connectors and cause electrical connection faults.

II - Instructions to be followed before carrying out any work

IMPORTANT
Before any work is carried out on the high-pressure injection system, protect:
– the accessories and timing belts,
– the electrical accessories, (starter, alternator, electric power assisted steering pump),
– the flywheel surface, to prevent any diesel from running onto the clutch friction plate.

Ensure that you have plugs for the unions to be opened (set of plugs available from the Parts Department). The plugs are single-use only. After use, they must be discarded (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must also be discarded.

Ensure that you have hermetically resealable plastic bags for storing removed parts. Parts stored in this way will be less susceptible to the risk of contamination. The bags are to be used once only, and discarded after use.

Use lint-free cleaning cloths (cloth part number **77 11 211 707**). Using normal cloth or paper is prohibited. They are not lint-free and could contaminate the fuel circuit. Each cloth should only be used once.

Use fresh cleaning agent for each operation (used cleaning agent is contaminated). Pour it into an uncontaminated container.

For each operation, use a clean brush in good condition (the brush must not shed its bristles).

Use a brush and cleaning agent to clean the unions to be opened.

Blast compressed air over the cleaned parts (tools, workbench, the parts, unions and injection system zones). Check that no bristles remain.

Wash your hands before and during the operation if necessary.

When wearing leather protective gloves cover them with latex gloves to prevent contamination.

III - Instructions to be followed when carrying out any work

As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Department. The plugs must not be reused under any circumstances.

Seal the pouch shut, even if it has to be opened shortly afterwards. Ambient air carries contamination.

All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been capped.

Using a brush, cleaning agent, air gun, sponge or normal cloth is strictly prohibited once the circuit has been opened. These items could allow contamination to enter the system.

A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

System outline

The **DCM1.2** injection system used on the **K9** engine is an electronically-managed high-pressure injection system. The fuel is compressed by a high pressure pump then stored in a rail that feeds the injectors. Injection takes place when a current pulse is applied to the injector holders. The amount injected is proportional to the rail pressure and the applied pulse length, and the start of injection is synchronised with the start of the pulse.

The system includes two subsystems, which have different fuel pressure levels:
- the low pressure system includes the tank, diesel fuel filter, transfer pump and injector holder return pipes,
- the high-pressure system includes the high-pressure pump, rail, injector holders and high-pressure pipes.

Finally, there are a certain number of sensors and regulating actuators for controlling and monitoring the entire system.

Functions performed:

Function: Fuel supply management (timing, flow and pressure).

Quantity of fuel injected and injection timing setting

The injection checking parameters are the quantities to be injected and their respective timing.

These are calculated by the computer using signals from the following sensors:
- engine speed (crankshaft + cam lobe for synchronisation),
- accelerator pedal,
- turbocharging pressure sensor,
- air temperature (flow sensor),
- air load (calculated flow rate),
- coolant temperature,
- rail pressure,
- atmospheric pressure.

The quantities to be injected and their respective timing are converted into:
- a reference tooth,
- the time between this tooth and the start of the electrical impulse,
- the time the injector holder is supplied.

An electrical current ("pulse") is sent to each injector holder according to previously calculated data. The system carries out one to four injections (one pilot injection, one pre-injection, one main injection, one post-injection). The general principle is to calculate the total injection flow which is then divided between the injection stages to promote correct combustion and reduce pollutant emissions.

An accelerometer checks some of the fuel injection deviation. This has several functions:
- Protecting the engine by detecting injection leaks (disabled on the basic version).
- Checking the quantity injected by measuring deviations and variations.

By changing both the injection duration and timing, the quantity of fuel injected and the mixture's moment of ignition can be adjusted.

Rail pressure check

The quality of combustion is influenced by the size of the spray droplets in the cylinder.

In the combustion chamber, smaller fuel droplets will have time to burn fully, and will not produce smoke or unburned particles. To meet emission control requirements, the droplet size must be reduced and therefore the injection holes must be smaller.

When these holes are smaller, less fuel will be able to be introduced at a given pressure, which limits the power. To offset this disadvantage, the quantity of fuel injected must be increased, which means increased pressure (and more holes in the injector nozzles). In the Delphi Common Rail injection system, the pressure in the rail can reach **1600 bar** and must be constantly controlled. The measuring circuit comprises an active pressure sensor on the rail connected to an analogue port on the computer.

The High Pressure pump is supplied at low pressure (**5 bar**) by a built-in transfer pump. This pump supplies the rail. The rail filling pressure is controlled by the filling valve (**IMV**) and the discharge pressure is controlled by the injector valves. This compensates for pressure drops. The filling actuator enables the high pressure pump to supply the exact quantity of diesel fuel required to maintain the rail pressure. This mechanism minimises the heat generated and improves engine output.

In order to discharge the rail using the injector valves, the valves are actuated by short electrical pulses which are:
- short enough not to open the injector (fuel passes through the return circuit from the injectors),
- long enough to open the valves and discharge the rail.

The fuel surplus is sent back to the fuel filter or the tank, according to its flow. If there is no IMV control, the rail pressure is limited by a discharge valve fitted on the pump.

Idling speed regulation

The computer handles the calculation of idling speed. This has to take account of the instantaneous power level to be supplied, according to the condition of the following factors:
- engine coolant temperature,
- gear ratio engaged,
- battery charge,
- electrical consumers (Additional heater, Air conditioning, Fan Assembly, heated windscreen, etc.) active or inactive,
- system faults detected.

Individual injector correction (C2I)

The DCM1.2 system injectors must be calibrated with corrective values to adjust their output precisely. Each injector is calibrated for different pressures on a test bench, and its specifications are shown on a label attached to the body of the injector holders. These individual correction values are then entered into the computer memory, which can control the injectors, taking their manufacturing variations into account.

Angular position measurement

Engine speed sensor:
The angular position is measured using a magneto-inductive sensor triggered by machined teeth on the shaft flywheel. This flywheel has sixty teeth, six degrees apart, minus two missing teeth that form a notch.

Cylinder reference sensor:
A second sensor (Hall effect) triggered by a machined tooth on the high-pressure pump drive pulley (synchronised with the camshaft), turning at half the engine speed, supplies information about the progress of the injection cycle.

By comparing the signals from these two sensors, the computer's APS module (Angular Position Subsystem) can supply the entire system with the synchronisation factors, which are: the angular position of the flywheel, the engine speed, the number of the active injector and the injection cycle timing.
This module also supplies the system with the rotation speed signal.

"New pump chamber filling" procedure (pump boosting)

The pump lubrication goes through a booster cycle during which the pump is filled and pressurised before "transferring" the diesel fuel to the rail.
The lubrication goes through a procedure called **new pump chamber filling**, which prevents starting for approximately 10 s, which is the time required for filling the pump and starting. For vehicles with keys, if the key is released before the end of this "first starting" phase there is no need for a power latch phase before a fresh attempt to start the vehicle.
This procedure runs after the first start in the factory, then when a **computer is replaced** if the parameters relating to the rail pressure have not been copied into the new computer, or otherwise, after reprogramming of the injection computer.

Variable Low Capacity (VLC) output function

Because of the combination of several parameters such as the diesel fuel temperature, part wear, clogging of the diesel filter etc., the system limit may be reached during its service life. If this happens, the rail pressure cannot be maintained because the pump lacks the necessary capacity. If the pump lacks the necessary capacity, this programming will therefore reduce the required flow to a value that will enable the pressure monitoring system to control the pressure again.

The customer may have noticed a loss of vehicle performance when this program is activated (confirmed by **ET563 Flow capacity function**). This is normal operation of the injection system.

Function: Air flow management

EGR valve control

The EGR (Exhaust Gas Recirculation) system comprises a **DC proportional EGR valve**, which incorporates a valve position feedback potentiometer. The EGR valve position is controlled by the potentiometer in a closed loop and/or by changes in the estimated air flow.

Calculating the air flow

The flow of fresh air entering the engine is measured by a hot wire ratiometric sensor. This flowmeter is used to manage the amount of exhaust gas to be recirculated to ensure the optimum recirculation rates. A fresh air temperature sensor is incorporated in the flowmeter.
Air flow measurement allows closed-loop control via the EGR valve.

Turbocharger control

The turbocharger system includes a solenoid valve that controls the wastegate to create an overpressure or a vacuum pressure in the inlet circuit.

Function: Hosted functions

Air conditioning management assistance

On models with air conditioning, the DCM1.2 system allows deactivation of the air conditioning under certain operating conditions:

- when requested by the driver,
- during starting,
- if the engine overheats (in order to reduce the power the engine has to supply),
- when the engine speed is kept at a very high level (to protect the compressor),
- during transition phases (e.g. high acceleration demand for overtaking, anti-stalling and moving off). These conditions are only taken into account if they do not occur repeatedly, so as to prevent system instabilities (erratic deactivation),
- when certain faults appear.

Cold loop air conditioning management

The air conditioning is cold loop managed, shared between several computers. The injection computer is responsible for:

- managing demand for cold air according to the passenger compartment controls and the pressure value,
- determining the power absorbed by the compressor from the pressure,
- determining the fan unit commands according to vehicle speed and pressure.

The driver requests the instrument panel to switch on the air conditioning. The signal is sent to the computer via the CAN network. The cold air request is authorised or denied depending on the pressure measured. If this pressure is outside the operating limits, the cold loop programming is not activated.

Note:
Fan unit actuation requests can be sent by the injection computer, but these are sent via the CAN. These requests depend on the air conditioning, but also on the engine coolant temperature and vehicle speed.

Thermal regulation of the passenger compartment heating circuit

In a direct injection engine, fuel is injected directly into the combustion chamber. This leads to heat being lost through the upper part of the engine and consequently, the cylinder head cooling circuit is smaller in size.

The effect of this is that the temperature of the coolant which flows through this circuit rises more slowly. However, this coolant is used by the passenger compartment heating system. In very cold conditions, it is therefore difficult to achieve a comfortable passenger compartment temperature quickly.

To reduce the time taken to produce heat, air heating elements, called passenger compartment heating resistors, are fitted in the passenger compartment heating circuit. The UCH decides whether or not to switch on the passenger compartment heating resistors (RCH) and the UPC physically controls the heating elements. The injection computer determines whether to reduce the power supplied to the RCHs according to alternator load and also whether to inhibit the operation of the RCHs according to engine speed, load and vehicle speed.

Cruise control/speed limiter management

When activated, the cruise control function maintains the vehicle at a preselected speed, regardless of the driving conditions encountered. Using the control buttons, the driver can increase or reduce the speed of the vehicle.

The **cruise control** function can be deactivated either using the control buttons, or by switching off the cruise control function selector switch or when system events are detected such as the brake or clutch pedal being depressed, or when system errors are detected such as an inconsistent vehicle speed or excessive vehicle deceleration.

The **cruise control function** can also be temporarily overridden when the driver wants to resume control of the vehicle and exceed the selected cruising speed by depressing the accelerator pedal, which causes the controlled fuel flow to be exceeded. The cruising speed is resumed when the driver releases the accelerator pedal.

It is possible to reactivate cruise control and to return to the last cruising speed after the function has been deactivated for whatever reason, during the same cycle of use (computer supply voltage not cut off). The vehicle will then attempt to return to the cruising speed using a controlled vehicle acceleration rate.

When selected (using the selection switch) the vehicle **speed limiter function** limits the vehicle speed to a preselected value.

The driver controls the vehicle in the normal way using the accelerator pedal until the setpoint speed is reached. If an attempt is made to exceed this speed, the system will ignore the pedal request and will control the vehicle speed in the same way as the cruise control function, provided that the driver keeps the accelerator pedal depressed.

As with the cruise control function, the limit speed can be altered using the control buttons by pressing briefly or keeping the switch pressed.

For safety reasons, the limit speed can be exceeded by depressing the accelerator pedal beyond the pedal position limit value. The vehicle speed will then be totally controlled as a function of pedal position until the speed falls back below the limit speed when the speed limiter function will once again be reactivated.

The driver has the following controls for the **cruise control/speed limiter** function:

- accelerator pedal,
- brake pedal,
- clutch pedal (not for sequential gearbox),
- function selector switch, used to select **cruise control or speed limiter** operating mode.

Instrument panel display

The **computer** manages the instrument panel display relating to engine operation. This covers five functions: the **OBD** warning light for European On Board Diagnostics (**EOBD**), pre/postheating, coolant temperature and **Level 1** (non critical fault) and **Level 2** (emergency stop) engine faults. These five functions are represented by five warning lights or messages displayed by the trip computer.

Pre/postheating indicator light

This light indicates that preheating is active.

Engine coolant temperature warning light

This indicator light is used as an engine overheating warning light.

– In the event of overheating, it is up to the driver whether to stop the vehicle or continue driving.

OBD warning light

The **OBD** fault warning light is used to warn the driver of the presence of injection faults producing excessive pollution or that the **EOBD** system is deactivated.
The injection computer requests illumination of the **OBD** warning light for a present fault only after three consecutive driving cycles.
The 3 second visual check when the ignition is switched on (automatic test procedure managed by the instrument panel) is carried out by the injection computer.
If a confirmed **OBD** fault causes the **OBD** warning light to come on, there should be no flashing after the warning light illumination test. The instrument panel will also display the message: **Check emission control**.
The gearbox computer, if fitted, may also request the illumination of this warning light.

Note:
This warning light only comes on if the vehicle is **EOBD** approved.

Level 1 warning

If there is a minor fault, the computer may request a level 1 warning to be displayed. Usually, the instrument panel illuminates the SERVICE warning light and displays the message: "Check the Injection". Refer to instrument panel operation.

Note:
The SERVICE warning light will come on if the instrument panel is configured as cruise control/speed limiter present although the function has not yet been detected by the injection computer.

Level 2 warning

If there is a major fault, the computer requests a level 2 warning to be displayed. Usually, the instrument panel illuminates the STOP warning light and displays the message: "Injection defective". Refer to instrument panel operation.

Faults that activate the OBD warning light

Tool fault	Diagnostic tool title	Specification
DF010	EGR position sensor circuit (Minimum and maximum positions)	**1.DEF** **2.DEF**
DF026	Cylinder 1 injector control circuit	**CO - CC**
DF027	Cylinder 2 injector control circuit	**CO - CC**
DF028	Cylinder 3 injector control circuit	**CO - CC**
DF029	Cylinder 4 injector control circuit	**CO - CC**
DF648	Computer	**2.DEF**
DF114	EGR solenoid valve circuit (EGR valve jammed open)	**4.DEF**

Passenger compartment black connector A (CH):

Track	Description
A1	(Option) water in diesel fuel signal
A2	Cruise control On/Off switch
A3	CAN L1
A4	CAN H1
B1	Not used
B2	Not used
B3	Not used
B4	Diagnostic signal K
C1	Not used
C2	Not used
C3	Speed limiter On/Off switch
C4	Clutch switch signal
D1	**+ After ignition** feed
D2	Cruise control programming control
D3	Cruise control earth
D4	Not used
E1	Not used
E2	Not used
E3	Not used
E4	Brake light switch open signal
F1	(Option) water in diesel fuel signal
F2	Pedal potentiometer gang 2 feed
F3	Pedal potentiometer gang 2 signal
F4	Pedal potentiometer gang 2 earth
G1	12 V after relay feed
G2	Potentiometer Gang 1 supply
G3	Not used
G4	Earth
H1	Earth
H2	Pedal potentiometer Gang 1 signal
H3	Pedal potentiometer Gang 1 earth
H4	Earth

Engine brown connector B (CMI):

Track	Description
A1	5 V air flow sensor
A2	Air flow sensor + signal
A3	Air flow sensor earth
A4	+ injector 1 (feed)
B1	+5 V EGR position sensor
B2	EGR position sensor + signal
B3	EGR position sensor earth
B4	Injector 1 control
C1	+5 V turbocharging pressure sensor
C2	Turbocharging pressure sensor + signal
C3	Turbocharging pressure sensor earth
C4	+ injector 3 (feed)
D1	+5 V rail pressure sensor
D2	Rail pressure sensor + signal
D3	Rail pressure sensor earth
D4	Injector 3 control
E1	Not used
E2	Cylinder 1 reference sensor signal
E3	Camshaft sensor earth
E4	+ cylinder 4 injector
F1	Accelerometer sensor earth
F2	Engine speed sensor (TDC) + signal
F3	Engine speed sensor earth
F4	Injector 4 control

Engine brown connector B (CMI) (CONTINUED):

Track	Description
G1	Accelerometer sensor + signal
G2	Fuel temperature sensor signal
G3	Fuel temperature sensor earth
G4	+ cylinder 2 injector
H1	Not used
H2	Coolant temperature sensor + signal
H3	Coolant temperature sensor earth
H4	Injector 2 control
J1	Not used
J2	Not used
J3	Injection air temperature sensor earth
J4	Not used
K1	Accelerometer shielding
K2	Air temperature sensor (flow sensor) + signal
K3	Not used
K4	Not used
L1	Not used
L2	Not used
L3	Not used
L4	Exhaust gas recirculation solenoid valve - control
M1	Not used
M2	Turbocharger solenoid valve - control
M3	Exhaust gas recirculation solenoid valve + control
M4	Fuel pressure regulation solenoid valve - control

Grey external connector C (CME):

Track	Description
A1	Not used
A2	Not used
A3	Not used
A4	Not used
B1	Not used
B2	Not used
B3	Not used
B4	Not used
C1	Not used
C2	Not used
C3	Refrigerant pressure sensor signal
C4	+5 V coolant pressure sensor
D1	Not used
D2	Not used
D3	Preheating unit diagnostic signal
D4	Not used
E1	Not used
E2	(Option) water in diesel fuel sensor earth
E3	Not used
E4	Not used
F1	Main relay - control
F2	Preheating unit - control
F3	Preheating unit - control
F4	Not used
G1	Not used
G2	+12 V feed (UPC after relay)
G3	Refrigerant pressure sensor earth
G4	Earth
H1	Earth
H2	+12 V feed (UPC after relay)
H3	Not used
H4	Engine speed signal

COMPUTER REPLACEMENT, PROGRAMMING AND REPROGRAMMING OPERATIONS

The system can be programmed and reprogrammed via the diagnostic socket using the RENAULT CLIP diagnostic tool (**Consult Technical Note 3585A and follow the instructions provided by the diagnostic tool**).

IMPORTANT
– Switch on the diagnostic tool (mains or cigarette lighter supply).
– Connect a battery charger.
– Switch off all the electrical consumers (lights, interior lighting, air conditioning, radio CD, etc).
– Wait for the engine to cool (engine coolant temperature below 60°C and air temperature below 50°C).

Before After-Sales **computer programming**, **save the computer data with the diagnostic tool by running** command **SC003 Save computer data**. This command saves the following information:
– C2I parameters (individual injector correction) and engine parameters,
– measuring system information,
– injection system reset data.

After reprogramming or replacing the injection computer

– **Switch the ignition off and then on again.**
– Use the diagnostic tool command **SC001 Enter saved data** to restore **C2I** and the adaptives.
– Use command **AC212 New pump chamber filling**.
– **Run the starter motor: Important: starting the engine may take** 20 seconds (time to reprime the pump).
– After the engine has started, refer to **ET637 New pump chamber filling** and check that it is **Done**. If not, repeat the starting procedure.
– Stop the engine (to initialise the computer) and wait 30 seconds.
– Switch on the ignition again and use the diagnostic tool to carry out the following steps:
– Use command **VP010 Write VIN**.
– After injection system reprogramming, stored faults may appear on other computers.
Clear the memory of these computers.

Note:
If commands **SC001** and **SC003**, are ignored or do not work after reprogramming the computer, write the **C2I** for each injector manually by reading the **C2I** on each injector (see replacing injectors).
Use command **AC028 Static test** to autoconfigure the computer (GMV, etc.).

IMPORTANT
It is not possible to try an injection computer from the Parts Department because it will no longer be possible to use it on another vehicle.

REPLACING INJECTORS:

Note:
C2I (individual injector correction) is a calibration carried out in the factory on **each injector** to **adjust the flow** of each injector precisely.
The correction values are written on **a label** affixed to each injector, then entered in the computer which can then actuate each injector by taking account of their **manufacturing variation**.

The system can be set up using the diagnostic socket with the RENAULT CLIP diagnostic tool.

The **C2I** parameters must be replaced after replacing an injector/injectors.

To do this, reprogram the **C2I** into the computer using the following commands:
Cylinder 1 injector: command **VP001 Cylinder 1 injector code (cylinder at flywheel end)**
Cylinder 2 injector: command **VP002 Cylinder 2 injector code**
Cylinder 3 injector: command **VP003 Cylinder 3 injector code**
Cylinder 5 injector: command **VP004 Cylinder 4 injector code**

The four **C2I** can be entered using command **SC002 Injector code entries**.

The technician will use the appropriate command to **enter the new C2I** for the replaced injector and **erase the old C2I**.

Only after simultaneously replacing at least three injectors, reset the injector programming adaptives, using command **RZ004 Pressure regulation programming adaptives**.

HIGH PRESSURE PUMP REPLACEMENT

PROCEDURE

– Switch on the ignition and establish dialogue with the injection computer.
– Use command **AC212 New pump chamber filling**.
– Press the Start button (**repriming time until the engine starts may take 20 seconds**).
– After the engine has started, refer to **ET637 New pump chamber filling** and check that it is **Done**. If not, repeat the starting procedure.

EGR VALVE REPLACEMENT:

If the **EGR valve** is replaced, it is important to program the new valve's offset position. To do this, clear the old offset using the EGR programming deletion procedure and run command **RZ002 EGR valve adaptive**.

IMPORTANT
Do not use this command if the valve is not new.

CONFIGURATION

VP001: Cylinder 1 injector code.

VP002: Cylinder 2 injector code.

VP003: Cylinder 3 injector code.

VP004: Cylinder 4 injector code.
These commands enable you to manually write the calibration code marked on the injector. Use these commands after replacing an injector, replacing or (re)programming the computer when command **SC001** does not work.

VP010: Write VIN.
This command permits manual entry of the vehicle's VIN into the computer.
Use this command each time the computer is replaced or (re)programmed.

VP013: Lock injector control.
This command disables electrical actuation of the injectors, for carrying out the compression test.

SPECIAL COMMANDS

SC001: Write saved data.
Use this command after replacing or (re)programming a computer (if the information was saved using **SC003**).

SC002: Injector code entries.
This command enables you to manually write the calibration code marked on the injectors. Run this command after replacing injectors.

SC003: Save computer data.
This command saves the computer's operating data, **C2I** (individual injector correction) parameters and engine adaptives. Run this command before replacing or (re)programming the computer.

Tool fault	DTC	Diagnostic tool title
DF001	**0115**	Coolant temperature sensor circuit
DF002	**0070**	Air temperature sensor circuit
DF003	**2226**	Atmospheric pressure sensor circuit
DF005	**0335**	Engine speed sensor circuit
DF007	**0190**	Rail pressure sensor circuit
DF008	**0225**	Pedal potentiometer gang 1 circuit
DF009	**2120**	Pedal potentiometer gang 2 circuit
DF010	**0409**	EGR position sensor circuit
DF014	**0500**	Vehicle speed signal circuit
DF015	**0685**	Main relay control circuit
DF016	**0403**	EGR control circuit
DF017	**0382**	Preheating unit control circuit
DF024	**0231**	Low pressure actuator control circuit
DF025	**0380**	Pre-postheating unit fault finding connection
DF026	**0201**	Cylinder 1 injector control circuit
DF027	**0202**	Cylinder 2 injector control circuit
DF028	**0203**	Cylinder 3 injector control circuit
DF029	**0204**	Cylinder 4 injector control circuit
DF037	**0513**	Engine immobiliser
DF038	**0606**	Computer
DF047	**0560**	Computer supply voltage
DF049	**0530**	Refrigerant sensor circuit
DF050	**0571**	Brake switch circuit
DF051	**0575**	Cruise control/speed limiter function
DF052	**0200**	Injector control circuit

Tool fault	DTC	Diagnostic tool title
DF053	**0089**	Rail pressure regulation function
DF056	**0100**	Air flow sensor circuit
DF059	**0263**	Misfires in cylinder 1
DF060	**0266**	Misfires in cylinder 2
DF061	**0269**	Misfires in cylinder 3
DF062	**0272**	Misfires in cylinder 4
DF089	**0235**	Inlet manifold pressure sensor circuit
DF098	**0180**	Fuel temperature sensor circuit
DF099	**C101**	Automatic or sequential gearbox connection via the multiplex network
DF107	**0604**	Computer memory
DF112	**0340**	Cylinder reference sensor circuit
DF113	**0641**	Sensor supply voltage
DF114	**0400**	EGR solenoid valve circuit
DF121	**0325**	Accelerometer circuit
DF122	**0651**	Supply voltage pedal potentiometer gang 2
DF130	**0087**	Flow capacity function
DF195	**0016**	Camshaft/engine speed sensor consistency
DF209	**0487**	EGR valve position sensor circuit
DF221	**0830**	Clutch contact information
DF261	**0045**	Turbocharger actuator circuit
DF427	**2263**	Turbocharger actuator control
DF631	**0703**	Stop light switch signal
DF648	**062F**	Computer
DF859	**0170**	Injector programming cycle not done

DF001 PRESENT OR STORED	COOLANT TEMPERATURE SENSOR CIRCUIT CO.1 : Open circuit or short circuit to +12 V CC.0 : Short circuit to earth

NOTES	**Special notes:** If fault **DF001** is present, the preheating time is more than 10 seconds and the engine fan switches on at low speed (**Fan unit 1**). If there is a fault on **Fan unit 1**, then on vehicles fitted with air conditioning, **Fan unit 2** switches on.

Check the connection and condition of the 4-track connector for the coolant temperature sensor.
Repair if necessary.

Check the condition and connection of injection computer **connector B** (brown 48-track).

Measure the resistance of the coolant temperature sensor between **tracks 2 and 3**.
Replace the coolant temperature sensor if the resistance is not:
75780 Ω ± 7000 Ω at -40°C
12460 Ω ± 1128 Ω at -10°C
at 25°C : **2252 Ω ± 112 Ω**
811 Ω ± 39 Ω at 50°C
283 Ω ± 8 Ω at 80°C
115 Ω ± 3 Ω at 110°C
88 Ω ± 2 Ω at 120°C

Check **the continuity and insulation** of the following connections:

Injection **computer** connector **B, track H3** → **track 2**, coolant temperature sensor connector

Injection **computer**, connector **B, track H2** → **track 3**, coolant temperature sensor connector

Repair if necessary.

If the fault is still present, replace the coolant temperature sensor.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF002 PRESENT OR STORED	AIR TEMPERATURE SENSOR CIRCUIT CO.1 : Open circuit or short circuit to +12 V CC.0 : Short circuit to earth

NOTES	**Special note:** None

The air temperature sensor in the flow sensor has a separate electrical circuit.

Move the wiring between the **computer** and the **air flow sensor**, to see if a change of status occurs (present ⇔ stored).
Look for any damage to the wiring and check the **condition and connection** of the **air flow sensor** and its connections.
Repair if necessary.

Replace the air temperature sensor if resistance is not between:
41255 Ω < Ω < 47492 Ω at -40°C
14260 Ω < Ω < 16022 Ω at -20°C
at 0°C **5497 Ω < Ω < 6050 Ω**
2353 Ω < Ω < 2544 Ω at 20°C
1114 Ω < Ω < 1186 Ω at 40°C
568.9 Ω < Ω < 597.4 Ω at 60°C
310 Ω < Ω < 321.6 Ω at 80°C
180.4 Ω < Ω < 185.1 Ω at 100°C

Check **the continuity and insulation** of the following connections:

Injection computer brown connector B, track K2 → **Track 1 of the flow sensor connector**

Injection computer brown connector B, track A3 → **Track 2 of the flow sensor connector**

Repair if necessary.

If the fault is still present, replace the air flow sensor.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF003 PRESENT OR STORED	ATMOSPHERIC PRESSURE SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Special note:** The atmospheric pressure sensor is incorporated in the computer.

Look for any damage to the wiring and check the condition and connection of the **injection computer** connectors.
Repair if necessary.

Move the wiring between the **injection computer** and the **battery** to see if a change of status occurs (Present ↔ Stored).
Look for any damage to the wiring and check the **connection and condition** of the **battery** and its connections.
Repair if necessary.

Measure the **battery voltage** when the ignition is switched on.
If the **battery voltage** is **less than 11 V**, recharge the battery.

Check the condition and connection of the battery **terminals and posts**.
Repair if necessary.

Check the condition and connection of **connector A** (black, 32 tracks) of the **injection computer**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

Injection computer black connector **A, track D1**	→	**+ after ignition feed**
Injection computer black connector **A, tracks H1, G4, H4**	→	**Chassis earth**
Injection computer black connector **C, track G2**	→	**Track 1, UPC connector**
Injection computer black connector **C, track H2**	→	**Track 2, UPC connector**

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF005 PRESENT OR STORED	ENGINE SPEED SENSOR CIRCUIT 1.DEF: Inconsistency 2.DEF: No signal 3.DEF: Too many additional teeth 4.DEF: Teeth missing 5.DEF: Additional teeth 6.DEF: Too many teeth missing

NOTES	**Special note:** **If 1.DEF, 2.DEF, 3.DEF, 6.DEF are present:** engine stops and level 2 fault warning light illuminates, with the message "Injection defective" displayed on the instrument panel. **If 4.DEF or 5 DEF is present:** engine performance reduced to 75%; no illumination of the warning light.
	Conditions for applying fault finding procedures to stored faults: The fault appears when the starter motor is operating or the engine is running at idle speed.

Check the condition and connection of the (2-track) **engine speed sensor** connector. Repair if necessary.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**.
Measure the **resistance** of the engine speed sensor between **tracks 1** and **2**: Replace the engine speed sensor if the resistance is not: **680 Ω ± 68 Ω (at 20°C)**.
Check **the continuity and insulation** of the following connections: **Injection computer connector B, track F2** → **track 1 engine speed sensor** connector **track A (750 and 752 engines)** **Injection computer connector B, track F3** → **track 2 engine speed sensor** connector **track B (750 and 752 engines)** Repair if necessary.
If the fault is still present, replace the engine speed sensor.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF007 PRESENT OR STORED	RAIL PRESSURE SENSOR CIRCUIT CC.0 : Short circuit to earth C0.1 : Open circuit or short circuit to +12 V 1.DEF: Inconsistency 2.DEF: Below minimum threshold 3.DEF: Above maximum threshold 4.DEF: Value outside permitted tolerance

NOTES	**Priority for dealing with a combination of faults:** If faults **DF007** and **DF113** are combined, deal with fault **DF113 Sensor supply voltage** first.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present after the engine starts.
	Special notes: If fault **DF007** is present: engine stopped and restarting impossible, level 2 fault warning light illuminated and the message "Injection defective" displayed on the instrument panel.

Check the connection and condition of the 3-track **rail pressure sensor** connector.
Repair if necessary.

Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**.

Check for **+5 V** on **track 3** of the **rail pressure sensor**.
Check for **earth** on **track 2** of the **rail pressure sensor**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

Injection computer connector B, track D3 → **track 2 rail pressure sensor** connector

Injection computer connector B, track D2 → **track 1 rail pressure sensor** connector

Injection computer connector B, track D1 → **track 3 rail pressure sensor** connector

Repair if necessary.

If the fault is still present, replace the rail.
Note:
The rail pressure sensor is built into the rail.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF008 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 1 CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Inconsistency between pedal gangs 1 and 2 2.DEF: No signal 3.DEF: Seized component

NOTES	**Priority for dealing with a combination of faults:** If faults **DF008** and **DF113** are combined, deal with fault **DF113 Sensor supply voltage** first.
	Special notes: If fault **DF008** is present: fast idle (1000 rpm) and engine performance reduced to 75%, illumination of the **level 1 fault warning light** with the message **Check the injection** displayed on the instrument panel. If **DF008** and **DF009**: engine speed adjusted to 1800 rpm (fault on gangs 1 and 2), illumination of the **level 1 fault warning light** with the message **Check the injection** displayed on the instrument panel. Note: **Possible risk of the engine speed racing with no load for 1 second.**

1.DEF ***3.DEF***	***NOTES***	**Special notes:** None.

Disconnect the (black) **connector A** of the **injection computer** and the **pedal potentiometer** connector.
Check the **insulation** between track **H2** and track **F3** on **connector A** of the **injection computer**.
Repair if necessary.
If the fault is still present, replace the **accelerator pedal potentiometer**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF008 **CONTINUED**	

CO.0 ***CC.1*** ***2.DEF***	***NOTES***	**Special notes:** None.

Check the connection and condition of the **pedal potentiometer** 6-track connector. Repair if necessary.
Check the condition and connection of **connector A** (black, 32 tracks) of the **injection computer**. Repair if necessary.
Measure the **resistance** between **tracks 3 and 5** of the **pedal potentiometer**. Replace the pedal potentiometer if the resistance is not in the range: **800 Ω < Ω < 2600 Ω**
Check for **+5 V** on **track 3** of the **pedal potentiometer**. Check for **earth** on **track 5** of the **pedal potentiometer**. Repair if necessary.
Check **the continuity and insulation** of the following connections: **Injection computer** connector **A, track G2** → **track 3 pedal potentiometer** connector **Injection computer** connector **A, track H2** → **track 4 pedal potentiometer** connector **Injection computer** connector **A, track H3** → **track 5 pedal potentiometer** connector Repair if necessary.
Disconnect connector **A** of the **injection computer** and the **pedal potentiometer** connector. Check the insulation between **track H2** and **track F3** on **computer connector A**. Repair if necessary.
If the fault is still present, replace the **accelerator pedal potentiometer**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF009 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 2 C0.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Priority for dealing with a combination of faults:** If faults **DF009** and **DF122** are combined, deal with fault **DF122 Pedal potentiometer gang 2 feed voltage** first.
	Special notes: If fault **DF009** is present: fast idle (1000 rpm) and engine performance reduced to 75%, illumination of the **level 1 fault warning light** with the message **Check the injection** displayed on the instrument panel. If faults **DF009** and **DF008** are present: engine speed adjusted to 1800 rpm (fault on gangs 1 and 2), illumination of the **level 1 fault warning light** and the message **Check the injection** displayed on the instrument panel. Note: **Possible risk of the engine speed racing with no load for 1 second.**

CO.0	***NOTES***	**Special notes:** None.

Check the connection and condition of the **pedal potentiometer** 6-track connector. Repair if necessary.
Check the connection and condition of the black 32-track **computer connector A**. Repair if necessary.
Measure the **resistance** between **tracks 2 and 6** of the **pedal potentiometer**. Replace the **pedal potentiometer** if the resistance is not between: **850 Ω < Ω < 4900 Ω**
Check for **+5 V** on **track 2** of the **pedal potentiometer**. Check for **earth** on **track 6** of the **pedal potentiometer**. Repair if necessary.
Disconnect **computer connector A** and the **pedal potentiometer** connector. Check the **earth insulation** on **track F3** of **computer connector A**. Repair if necessary.
Check **the continuity and insulation** of the following connections: **injection computer** connector **A, track F3** ⟶ **track 1 pedal potentiometer connector** gang 2 Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF009 **CONTINUED**	

CC.1	***NOTES***	**Special notes:** None.

Check the connection and condition of the **pedal potentiometer** 6-track connector. Repair if necessary.
Check the connection and condition of the **black** 32-track **computer connector A**. Repair if necessary.
Measure the **resistance** between **tracks 2** and **6** of the **pedal potentiometer**. Replace the **pedal potentiometer** if the resistance is not between: **850 Ω < Ω < 4900 Ω**
Check for **+5 V** on **track 2** of the **pedal potentiometer**. Check for **earth** on **track 6** of the **pedal potentiometer**. Repair if necessary.
Check **the continuity and insulation** of the following connections: **injection computer** connector **A, track F2** → **track 2 pedal** sensor connector, gang 2 **injection computer** connector **A, track F4** → **track 6 pedal** sensor connector, gang 2 **injection computer** connector **A, track F3** → **track 1 pedal** sensor connector, gang 2 Repair if necessary.
Disconnect **computer connector A** and the **pedal potentiometer** connector. Check the insulation between **track F2** and **track F3** on the **computer** connector. Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF010 PRESENT OR STORED	EGR POSITION SENSOR CIRCUIT 1.DEF: Above maximum threshold 2.DEF: Below minimum threshold

NOTES	**Priority when dealing with a number of faults:** If faults **DF010** and **DF113** are combined, deal with fault **DF113 Sensor supply voltage** first.

Check the connection and condition of the **EGR solenoid valve** 6-track connector.
Repair if necessary.

Check the condition and connection of the (brown 48-track) **computer connector B**.
Repair if necessary.

Check for **+5 V** on **track 1** of the **EGR solenoid valve**.
Check for **earth** on **track 3** of the **EGR solenoid valve**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

injection computer connector **B, track B1** → **track 1 EGR** connector

injection computer connector **B, track B2** → **track 5 EGR** connector

injection computer connector **B, track B3** → **track 3 EGR** connector

Repair if necessary.

If the fault is still present, replace the **EGR solenoid valve**.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF014 PRESENT OR STORED	VEHICLE SPEED SIGNAL CIRCUIT

NOTES	**Special note:** None

On this type of vehicle, the **ABS** or the **auxiliary unit** (if the vehicle is not fitted with **ABS**) transmits the vehicle speed information via the multiplex network.
Test the **multiplex network** to be able to work on the **CAN** network (fault on **CAN H** and **CAN L** lines between the **injection** and the **ABS**). Also check there are no faults in the **ABS** computer or in the system that supplies the vehicle speed.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF015 PRESENT OR STORED	MAIN RELAY CONTROL CIRCUIT 1.DEF: Permanent low level 2.DEF: Permanent high level

NOTES	**Conditions for applying fault finding procedures to stored faults:** Apply the fault finding procedure below, whether the fault is present or stored.

Check the condition and connection of the **UPC brown connector** (tracks 1, 2 and 5).
Repair if necessary.

Check the condition and connection of **injection computer** (grey 32-track) connector **C**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

injection computer connector **C, track F1** → **track 5** brown **UPC** connector

injection computer connector **C, track H2** → **track 2** brown **UPC** connector

injection computer connector **C, track G2** → **track 1** brown **UPC** connector

Repair if necessary.

If there is a fault, replace the main relay.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF016 PRESENT OR STORED	EGR VALVE CONTROL CIRCUIT C0 : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: DETECTION OF OVERHEATING

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears when the engine is running at idle speed.
	Special notes: If fault **DF016** is present: **unstable engine speed** and even stalling. **Starting difficult** or even impossible when cold.

Check the connection and condition of the **exhaust gas recirculation solenoid valve** 6-track connector. Repair if necessary.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**. Repair if necessary.
Measure the resistance at the terminals of the **exhaust gas recirculation solenoid valve**. Replace the solenoid valve if the resistance is not between **2 Ω and 2.5 Ω (at 23°C ± 5°C)** between **tracks 2 and 6**.
Check for **13.5 V ± 0.5 V (engine running)/ 12 V ± 0.5 V (ignition on, engine stopped)** on **track 2** of the **EGR solenoid valve** connector.
Check **the continuity and insulation** of the following connections: **injection computer** connector **B, track M3** ⟶ **track 2 EGR** connector **injection computer** connector **B, track L4** ⟶ **track 6 EGR** connector Repair if necessary.
If there is a fault, replace the **EGR solenoid valve**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF017 PRESENT OR STORED	PREHEATING UNIT CONTROL CIRCUIT C0.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Special notes:** If fault **DF017** is present: **starting difficult** (even impossible when cold). If C0.0: heater plugs permanently switched on with risk of engine damage or even breakage.

Check the connection and condition of the **preheating unit** connector.
Repair if necessary.

Check the condition and connection of the **injection computer** (grey 32-track) connector **C**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

permanent +12 V → **Track 3, preheating unit**

injection computer connector **C, track D3** → **Track 9, preheating unit**

injection computer connector **C, track F2** → **Track 8, preheating unit**

Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF024 PRESENT OR STORED	LOW-PRESSURE ACTUATOR CONTROL CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Special notes:** If fault **DF024 is present** with a C0 or a CC.1: illumination of the **level 1 or 2 fault warning light** with the message **Injection defective** displayed on the instrument panel. **The fuel flow actuator is fully open, there is rattling and the engine is stopped to prevent it from racing.**

Check the connection and condition of the **fuel flow actuator** connector. Repair if necessary.
Check for **+12 V after ignition feed** on **track 2** of the **fuel flow actuator** connector.
Check the condition and connection of the **injection computer** (brown 48-track) **connector B**. Repair if necessary.
Measure the **resistance** between **tracks 1** and **2** of the **fuel flow actuator**. Replace the fuel flow actuator if the resistance is not **5.3 Ω ± 0.5 Ω** at **20°C**.
Check the **insulation and continuity** of the following connection: **injection computer** connector **B, track M4** ⟶ **Track 1, flow actuator** Repair if necessary.
If the fault is still present, replace the low pressure actuator.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF025 PRESENT OR STORED	PREHEATER UNIT DIAGNOSTIC CONNECTION

NOTES	**Special notes:** This fault only handles the fault finding with an open circuit.

Check the connection and condition of the **heater plug** connectors. Repair if necessary.
Measure the **resistance** of each **heater plug**. The **resistance** must be less than **2 Ω**. Replace the faulty plugs.
Check the connection and condition of the **preheating unit** connector. Repair if necessary.
Check the condition and connection of **injection computer** (grey 32-track) **connector C**. Repair if necessary.
Check for **+12 V battery feed** on **track 3** of the **preheating unit**. Check for the **preheating unit control** on **track 8**.
Check **the continuity and insulation** of the following connections: **Injection computer** grey connector **C, track D3** ⟶ **Track 9, preheating unit** **Injection computer** grey connector **C, track F2** ⟶ **Track 8, preheating unit** Repair if necessary.
If the fault is still present, replace the preheating unit.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 PRESENT OR STORED	CYLINDER 1 INJECTOR CONTROL CIRCUIT C0 : Open circuit CC : Short circuit 1.DEF: At minimum limit 2.DEF: At maximum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears when the engine is running at idle speed.
	Special notes: When fault **DF026** occurs, the idle speed is locked at 1000 rpm, there is engine noise, the engine speed is unstable, engine performance is reduced to 75%, the level 1 fault warning light illuminates and the message **Check the injector** is displayed until the next time the ignition is switched off.

C0 - CC	***NOTES***	**Special notes:** None.

Switch off the ignition and wait 15 seconds. Check the condition and connection of the **cylinder 1 injector** connector. Repair if necessary.
Check the condition and connection of the (48-track) **connector B** of the **injection computer**. Repair if necessary.
Use command **AC005 Cylinder 1 injector**. If **injector 1** cannot be heard operating five times in a cycle, connect the wire of the **injector of cylinder 2** to the **injector of cylinder 1** and use command **AC006 Cylinder 2 injector**. **Does this injector actuation cycle work?**

YES	Injector 1 is not defective; the fault is in the **injector 1** control circuit.
	Check **the continuity and insulation** of the following connections: **Injection computer** brown connector **B, track A4** → **Track 1 injector 1** **Injection computer** brown connector **B, track B4** → **Track 2 injector 1**
	If the fault is still present, contact the Techline.
NO	Injector 1 faulty, replace the cylinder 1 injector.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 **CONTINUED**	

1.DEF ***2.DEF***	***NOTES***	**Special notes:** None.

Check that the C2I is entered correctly in the **injection computer**.
Check the accelerometer shielding on **track K1** of the (brown 48-track) **connector B** of the **injection computer**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, it is imperative to clear the pressure regulation adaptives using command **RZ004 Pressure regulation adaptives**.
If the fault is still present, replace the cylinder 1 injector.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF027 PRESENT OR STORED	CYLINDER 2 INJECTOR CONTROL CIRCUIT C0 : Open circuit CC : Short circuit 1.DEF: At minimum limit 2.DEF: At maximum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears when the engine is running at idle speed.
	Special notes: When fault **DF027** occurs, the idle speed is locked at 1000 rpm, there is engine noise, the engine speed is unstable, engine performance is reduced to 75%, the level 1 fault warning light illuminates and the message **Check the injector** is displayed until the next time the ignition is switched off.

C0 - CC	***NOTES***	**Special notes:** None.

Switch off the ignition and wait 15 seconds.
Check the connection and condition of the **cylinder 2 injector** connector.
Repair if necessary.

Check the condition and connection of the (48-track) **connector B** of the **injection computer**.
Repair if necessary.

Use command **AC006 Cylinder 2 injector**.
If injector 2 cannot be heard operating five times in a cycle, connect the wire of the **injector of cylinder 3** to the **injector of cylinder 2** and use command **AC007 Cylinder 3 injector**.
Does this injector actuation cycle work?

YES

Injector 2 is not defective; the fault is in the injector 2 control circuit.

Check **the continuity and insulation** of the following connections:

Injection computer connector **B, track G4** → **Track 1 injector 2**

injection computer connector **B, track H4** → **Track 2 injector 2**

If the fault is still present, contact the Techline.

NO

Injector 2 faulty, replace the cylinder 2 injector.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF027 **CONTINUED**	

1.DEF ***2.DEF***	***NOTES***	**Special notes:** None.

Check that the C2I is entered correctly in the **injection computer**.
Check the accelerometer shielding on **track K1** of the (brown 48-track) **connector B** of the **injection computer**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, it is imperative to clear the pressure regulation adaptives using command **RZ004 Pressure regulation adaptives**.
If the fault is still present, replace the cylinder 2 injector.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF028 PRESENT OR STORED	CYLINDER 3 INJECTOR CONTROL CIRCUIT C0 : Open circuit CC : Short circuit 1.DEF: At minimum limit 2.DEF: At maximum limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears when the engine is running at idle speed.
	Special notes: When fault **DF028** occurs, the idle speed is locked at 1000 rpm, there is engine noise, the engine speed is unstable, engine performance is reduced to 75%, the level 1 fault warning light illuminates and the message **Check the injector** is displayed until the next time the ignition is switched off.

C0 - CC	***NOTES***	**Special notes:** None.

Switch off the ignition and wait 15 seconds.
Check the condition and connection of the **cylinder 3 injector** connector.
Repair if necessary.

Check the condition and connection of the **injection computer** (48-track) **connector B**.
Repair if necessary.

Use command **AC007 Cylinder 3 injector**.
If injector 3 cannot be heard operating five times in a cycle, connect the wire of the **cylinder 4 injector** to the cylinder 3 injector and use command **AC008 Cylinder 4 injector**.
Does this injector actuation cycle work?

YES	Injector 3 is not defective; the fault is in the injector 3 control circuit.
	Check **the continuity and insulation** of the following connections: **Injection computer** connector **B, track C4** → **Track 1 injector 3** **Injection computer** connector **B, track D4** → **Track 2 injector 3**
	If the fault is still present, contact the Techline.
NO	Injector 3 faulty, replace the cylinder 3 injector.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF028 **CONTINUED**	

1.DEF ***2.DEF***	***NOTES***	**Special notes:** None.

Check that the C2I is entered correctly in the **injection computer**.
Check the accelerometer shielding on **track K1** of the (brown 48-track) **connector B** of the **injection computer**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, it is imperative to clear the pressure regulation adaptives using command **RZ004 Pressure regulation adaptives**.
If the fault is still present, replace the cylinder 3 injector.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 PRESENT OR STORED	CYLINDER 4 INJECTOR CONTROL CIRCUIT C0 : Open circuit CC : Short circuit 1.DEF: At minimum stop 2.DEF: At maximum stop

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears when the engine is running at idle speed.
	Special notes: When fault **DF029** occurs, the idle speed is locked at 1000 rpm, there is engine noise, the engine speed is unstable, engine performance is reduced to 75%, the **level 1 fault** warning light illuminates and the message Check the injector is displayed until the next time the ignition is switched off.

C0 - CC	***NOTES***	**Special notes:** None.

Switch off the ignition and wait 15 seconds. Check the condition and connection of the **cylinder 4 injector** connector. Repair if necessary.
Check the condition and connection of the **injection computer** (48-track) **connector B**. Repair if necessary.
Use command **AC008 Cylinder 4 injector**. If injector 4 cannot be heard operating five times in a cycle, connect the wire of the **cylinder 3 injector** to the **cylinder 4 injector** and use command **AC007 Cylinder 3 injector**. **Does this injector actuation cycle work?**

YES	Injector 4 is not defective; the fault is in the injector 4 control circuit.
	Check **the continuity and insulation** of the following connections: **Injection computer** connector **B, track E4** ⟶ **Track 1 injector 4** **Injection computer** connector **B, track F4** ⟶ **Track 2 injector 4**
	If the fault is still present, contact the Techline.
NO	Injector 4 faulty, replace the cylinder 4 injector.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 **CONTINUED**	

1.DEF ***2.DEF***	***NOTES***	**Special notes:** None.

Check that the C2I is entered correctly in the **injection computer**.
Check the accelerometer shielding on **track K1** of the (brown 48-track) **connector B** of the **injection computer**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, it is imperative to clear the pressure regulation adaptives using command **RZ004 Pressure regulation adaptives**.
If the fault is still present, replace the cylinder 4 injector.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF037 PRESENT OR STORED	ENGINE IMMOBILISER

NOTES	**Special notes:** None.

Run a multiplex network test (see 88B Multiplexing).
If there is a fault, **see MR 394, Access/Safety, 82A**.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF038 PRESENT OR STORED	COMPUTER 1.DEF : Analogue/digital converter 2.DEF : Injector code entries 3.DEF : Memory self-test 4.DEF : Watchdog not refreshed 5.DEF : Interference on the injector control line 6.DEF : Watchdog Activation

NOTES	**Special notes:** When this fault appears: either: engine speed locked at **1300 rpm** and engine noisy, illumination of the **level 1 fault warning light** with the message **Check the injection** displayed on the instrument panel. or: engine stopped and illumination of the **level 2 fault warning light** with the message **Injection defective** displayed on the instrument panel.

1.DEF ***3.DEF*** ***4.DEF*** ***6.DEF***	***NOTES***	**Special notes:** None.

Contact the Techline.

2.DEF	***NOTES***	**Special notes:** None.

Check that the **individual injector correction (C2I)** matches the injectors; if not, enter the **C2I** (see **Configurations and programming**).
If the **C2I** does correspond to the injectors, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF038 **CONTINUED**	

5.DEF	***NOTES***	**Special notes:** None.

Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

Injection computer connector B, **track A4** → **Track 1** injector 1

Injection computer connector B, **track B4** → **Track 2** injector 1

Injection computer connector B, **track G4** → **Track 1** injector 2

Injection computer connector B, **track H4** → **Track 2** injector 2

Injection computer connector B, **track C4** → **Track 1** injector 3

Injection computer connector B, **track D4** → **Track 2** injector 3

Injection computer connector B, **track E4** → **Track 1** injector 4

Injection computer connector B, **track F4** → **Track 2** injector 4

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF047 PRESENT OR STORED	COMPUTER SUPPLY VOLTAGE 1.DEF: Above maximum threshold 2.DEF: Below minimum threshold

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears when the **engine speed is greater than 1000 rpm**.

Move the wiring between the **injection computer** and the **battery** to see if a change of status occurs (Present ⇔ Stored).
Look for any damage to the wiring and check the **connection and condition** of the **battery** and its connections.
Repair if necessary.

Measure the **battery voltage** when the ignition is switched on.
If the **battery voltage** is **less than 11 V**, recharge the battery.

Check the condition and connection of the battery **terminals and** posts.
Repair if necessary.

Check the vehicle's **charge circuit**.
Repair if necessary.

Check the condition and connection of **connector A** (black, 32 tracks) of the **injection computer**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

Injection computer black connector **A, track D1** → **Track 7, brown UPC connector**

Injection computer black connector **A, tracks H1, G4, H4** → **Chassis earth**

Injection computer black connector **C, track G2** → **Track 1, white UPC connector**

Injection computer black connector **C, track H2** → **Track 2, white UPC connector**

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF049 PRESENT OR STORED	REFRIGERANT FLUID SENSOR CIRCUIT C0.1 : Open circuit or short circuit to +12 V CC.0 : Short circuit to earth

NOTES	**Conditions for applying fault finding procedures to stored faults:** Apply the fault finding procedure below, whether the fault is present or stored.
	Priority when dealing with a number of faults: If faults **DF049** and **DF113** are combined, deal with fault **DF113 Sensor supply voltage** first.

Move the wiring between the **computer** and the **refrigerant pressure sensor** to see if there is a change of status (present ↔ stored).
Look for any damage to the wiring and check the **condition and connection** of the **refrigerant pressure sensor** and its connections.
Repair if necessary.

Check the connection and condition **of the refrigerant pressure sensor** connector.
Repair if necessary.

Check the condition and connection of **injection computer** (grey 32-track) **connector C**.
Repair if necessary.

Check for +5 V on **track B** of the **refrigerant pressure sensor** connector.
Check for **earth** on **track A** of the **refrigerant pressure sensor** connector.

Check **the continuity and insulation** of the following connections:

Injection computer connector **C, track C4** → **track B** of the **refrigerant sensor** connector

Injection computer connector **C, track C3** → **track C** of the **refrigerant sensor** connector

Injection computer connector **C, track G3** → **track A** of the **refrigerant sensor** connector

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF050 PRESENT OR STORED	BRAKE SWITCH CIRCUIT C0.0 : Open circuit or short circuit to earth 1.DEF: Signal absent

NOTES	**Special notes:** The cruise control function is inhibited. The fault is declared present when decelerating, when the brake pedal is depressed.
	Conditions for applying fault finding procedures to stored faults: Apply the fault finding procedure below, whether the fault is present or stored.

Check the connection and condition of the **brake light switch** connector.
Repair if necessary.

Check for **+12 V** feed on **brake light switch track 2**.
Repair if necessary.

Check the condition and connection of **connector A** (black, 32 tracks) of the **injection computer**.
Repair if necessary.

Check the **operation of the brake light switch**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

BFR (Relay/Fuse Box) → **track 2, brake light switch**

UCH → **track 4, brake light switch**

Injection computer connector **A, track E4** → **track 3, brake light switch**

Repair if necessary.

If the fault is still present, replace the brake switch.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF051 PRESENT OR STORED	CRUISE CONTROL/SPEED LIMITER FUNCTION 1.DEF: Inconsistency 2.DEF: On/off switch

NOTES	**Special notes:** The cruise control function is inhibited.

Check the condition and connection of the **injection computer** (black 32-track) **connector A**.
Repair if necessary.

Check the condition and connection of the **cruise control On/Off switch** connections.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

Injection computer connector **A, track A2** → **track 12 black connector, top of detection column control module**

injection computer connector **A, track C3** → **track 6 black connector, top of detection column control module**

Repair if necessary.

Carry out an **operating check** on the cruise control/speed limiter function **on/off switch (consult the interpretation of ET042 Cruise control/speed limiter)**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF052 PRESENT OR STORED	INJECTOR CONTROL CIRCUIT CC.1 : short circuit to +12 volts CC.0 : short circuit to earth

NOTES	**Priority in the event of a number of faults:** If there is a combination of the following faults: – **DF052 Injectors control circuit,** – **DF026 Cylinder 1 injector control circuit,** – **DF027 Cylinder 2 injector control circuit,** – **DF028 Cylinder 3 injector control circuit,** – **DF029 Cylinder 4 injector control circuit,** the fault finding procedure remains the same, but the combination of faults makes it possible to identify the defective injector(s).
	Special notes: When the fault occurs: engine noise, unstable engine speed, reduced engine performance and illumination of the **level 2 fault warning light** with the message **Injection defective** displayed on the instrument panel.

Switch off the ignition and check the condition and connection of the **injector connectors**.
Repair if necessary.

Switch off the ignition, disconnect the injectors (or the injector identified by faults **DF026, DF027, DF028, DF029**) and switch on the ignition again.
Using the diagnostic tool, check for changes to fault **DF052**.
Is DF052 present or stored?

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF052 **CONTINUED**	

DF052
PRESENT

The injectors are not faulty.

Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Injection computer connector **B, track A4**	→	**track 1**, injector 1 (+)
Injection computer connector **B, track B4**	→	**track 2**, injector 1 (control)
injection computer connector **B, track G4**	→	**track 1**, injector 2 (+)
injection computer connector **B, track H4**	→	**track 2**, injector 2 (control)
injection computer connector **B, track C4**	→	**track 1**, injector 3 (+)
injection computer connector **B, track D4**	→	**track 2**, injector 3 (control)
injection computer connector **B, track E4**	→	**track 1**, injector 4 (+)
injection computer connector **B, track F4**	→	**track 2**, injector 4 (control)

Repair if necessary.

If the fault is still present, contact the Techline.

DF052
STORED

Injector(s) faulty.
Replace the injector identified by faults **DF026 Cylinder 1 injector control circuit to DF029 Cylinder 4 injector control circuit** if any are present.
If none of the faults identifying the faulty injector circuit are present:
– switch off the ignition,
– reconnect one of the four injectors,
– switch on the ignition again.
If the fault reappears as present, replace the reconnected injector.
Follow the same procedure for the other injectors.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF053 PRESENT OR STORED	RAIL PRESSURE REGULATION FUNCTION 1.DEF: at minimum limit 2.DEF: at maximum limit 3.DEF: below min threshold 4.DEF: above max threshold 5.DEF: high flow current < minimum 6.DEF: high flow current > maximum 7.DEF: low flow current < minimum 8.DEF: low flow current > maximum

NOTES	**Priority in the event of a number of faults:** If there is a combination of the following faults: – **DF053 Rail pressure regulation function,** – **DF098 Fuel temperature sensor circuit,** – **DF007 Rail pressure sensor circuit,** deal with fault **DF007** or **DF098** first.
	Special note if DF053: possible engine stop and illumination of the **level 2 fault warning light** with the message **Injection defective** displayed on the instrument panel.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine running**.

Check the connection and condition of the **fuel flow actuator** connector. Repair if necessary.
Check for **+12 V** (after relay) on **track 2** of the **fuel flow actuator** connector.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**. Repair if necessary.
Measure the **resistance** between **tracks 1** and **2** of the **fuel flow actuator**. Replace the fuel flow actuator if the resistance is not **5.3 Ω ± 0.5 Ω** at **20 °C**.
Check the **insulation and continuity** of the following connection: **Injection computer** connector **B, track M4** ⟶ **Track 1, flow actuator** Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF056 PRESENT OR STORED	AIR FLOW SENSOR CIRCUIT 1.DEF: Permanent low level 2.DEF: Permanent high level 3.DEF: Below minimum threshold 4.DEF: Above maximum threshold 5.DEF: At minimum limit 6.DEF: At maximum limit

NOTES	**Priority in the event of a number of faults:** If there is a combination of the following faults: – **DF089 Inlet manifold pressure sensor circuit,** – **DF056 Air flow sensor circuit,** deal with fault **DF089** first.
	Special notes: If fault **DF056** is present: air flow regulation stops and the **EGR valve** is closed.

Check that the air filter is not blocked. Check that the air filter is not clogged and that the air inlet system is not blocked between the air filter outlet and the inlet manifold tracts.
Check the condition and connection of the **air flow sensor** connector. Repair if necessary.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**. Repair if necessary.

Check for **+5 V** on **track 5** of the **air flow sensor**.
Check for earth on **track 2** of the **air flow sensor**.
Check **the continuity and insulation** of the following connections: **injection computer** connector **B, track A1** ⟶ **Track 5** of the air flow sensor **injection computer** connector **B, track A3** ⟶ **Track 2** of the air flow sensor **injection computer** connector **B, track A2** ⟶ **Track 6** of the air flow sensor Repair if necessary.
If the fault is still present, replace the air flow sensor.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF059 PRESENT OR STORED	MISFIRING ON CYLINDER 1

NOTES	**Special notes:** If fault **DF059** is present: engine noise, bucking, running on three cylinders, engine speed held at **1000 rpm**, engine performance reduced to **75%**, illumination of the **level 1 fault warning light**.
	Conditions for applying fault finding procedures to stored faults: The fault appears when the **engine is running at idle speed**.
	Priority in the event of a number of faults: – in the event of a combination of faults **DF026 (CC or CO)** and **DF059**, deal with **DF026 Cylinder 1 injector control circuit (CC or CO)** first. – In the event of a combination of **DF053 (1.DEF, 2.DEF, 7.DEF)** and **DF059** deal with **DF053 Pressure regulation** first.

Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
Check the **inlet tracts** and the **EGR valve**, and clean them if necessary.
If the fault is still present, replace the **injector**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF060 PRESENT OR STORED	MISFIRING ON CYLINDER 2

NOTES	**Special notes:** If fault **DF060** is present: engine noise, bucking, running on three cylinders, engine speed held at **1000 rpm**, engine performance reduced to **75%**, illumination of the **level 1 fault warning light**.
	Conditions for applying fault finding procedures to stored faults: The fault appears when the **engine is running at idle speed**.
	Priority in the event of a number of faults: – in the event of a combination of faults **DF027 (CC or CO)** and **DF060**, deal with **DF027 Cylinder 2 injector control circuit (CC or CO)** first. – In the event of a combination of faults **DF053 (1.DEF, 2.DEF, 7.DEF)** and **DF060** deal with **DF053 Pressure regulation** first.

Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
Check the **inlet tracts** and the **EGR valve**, and clean them if necessary.
If the fault is still present, replace the **injector**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF061 PRESENT OR STORED	MISFIRING ON CYLINDER 3

NOTES	**Special notes:** If fault **DF061** is present: engine noise, bucking, running on three cylinders, engine speed held at **1000 rpm**, engine performance reduced to **75%**, illumination of the **level 1 fault warning light**.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine idling**.
	Priority in the event of a number of faults: – In the event of a combination of faults **DF028 (CC or CO)** and **DF061**, deal with **DF028 Cylinder 3 injector control circuit (CC or CO)** first. – In the event of a combination of **DF053 (1.DEF, 2.DEF, 7.DEF)** and **DF061**, deal with **DF053 Pressure regulation** first.

Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
Check the **inlet tracts** and the **EGR valve**, and clean them if necessary.
If the fault is still present, replace the **injector**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF062 PRESENT OR STORED	MISFIRING ON CYLINDER 4

NOTES	**Special notes:** If fault **DF062** is present: engine noise, bucking, running on three cylinders, engine speed held at **1000 rpm**, engine performance reduced to **75%**, illumination of the **level 1 fault warning light**.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine idling**.
	Priority in the event of a number of faults: – In the event of a combination of faults **DF029 (CC or CO)** and **DF062**, deal with **DF029 Cylinder 4 injector control circuit (CC or CO)** first. – In the event of a combination of **DF053 (1.DEF, 2.DEF, 7.DEF)** and **DF062**, deal with **DF053 Pressure regulation** first.

Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
Check the **inlet tracts** and the **EGR valve**, and clean them if necessary.
If the fault is still present, replace the **injector**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF089 PRESENT OR STORED	INLET MANIFOLD PRESSURE SENSOR CIRCUIT 1.DEF: Permanent low level 2.DEF: Permanent high level 3.DEF: Below minimum threshold 4.DEF: Above maximum threshold 5.DEF: Inconsistency 6.DEF: At maximum limit 7.DEF: At minimum limit

NOTES	**Priority when dealing with a number of faults:** If faults **DF089** and **DF113** are combined, deal with fault **DF113 Sensor supply voltage** first.
	Special notes: **Level 1 warning light comes on accompanied by the message "check injection".**

1.DEF ***2.DEF*** ***3.DEF*** ***4.DEF***	***NOTES***	**Special notes:** None.

Check the condition and connection of the **turbocharging pressure sensor** (3-track) connector. Repair if necessary.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**. Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF089 **CONTINUED 1**	

Check for **+5 V** on **track 1** of the **turbocharging pressure sensor**.
Check for **earth** on **track 2** of the **turbocharging pressure sensor**.
Check the **insulation, continuity and the absence of interference resistance** on the following connections: **Injection computer** connector **B, track C1** → **track 1, turbocharging pressure sensor** connector **Injection computer** connector **B, track C2** → **track 3, turbocharging pressure sensor** connector **injection computer** connector **B, track C3** → **track 2, turbocharging pressure sensor** connector Repair if necessary.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF089 **CONTINUED 2**	

5.DEF ***6.DEF*** ***7.DEF***	***NOTES***	**Special notes:** None.

Visually check the **turbocharging circuit sealing**. Repair if necessary.
Remove the air supply ducts and **check** that they are not blocked. Repair if necessary.
Check for consistency between the atmospheric pressure and the turbocharging pressure (**PR035 Atmospheric pressure = PR032 Inlet pressure**). Engine stopped (cold), the pressure read by the two sensors must be nearly the same. If the values are very different, replace the **turbocharging pressure sensor**.
Check the **turbocharger**. Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF098 PRESENT OR STORED	FUEL TEMPERATURE SENSOR CIRCUIT CO.1 : Open circuit or short circuit to +12 volts CC.0 : Short circuit to earth

NOTES	**Special notes:** None.

Check the condition and connection of the **fuel temperature sensor** (2-track) connector
Repair if necessary.

Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**.
Repair if necessary

Measure the **resistance** at the **fuel temperature sensor** terminals.
Replace the **fuel temperature sensor** if the resistance is not approximately **2.2 kΩ** at **25°C**.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

injection computer connector **B, track G2** → **track 1 fuel temperature sensor** connector

injection computer connector **B, track G3** → **track 2, fuel temperature sensor** connector

Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF099 PRESENT OR STORED	AUTOMATIC TRANSMISSION OR SEQUENTIAL GEARBOX CONNECTION VIA THE MULTIPLEX NETWORK 1.DEF: No signal

ENGINE:
K9K Sequential

NOTES	**Special notes:** Gearbox does not change gear in automatic mode. OBD warning light comes on.

Carry out a multiplex network test.

Check the condition and connection of the **sequential gearbox computer** (black 52-track) **connector A**.
Repair if necessary.

Check the condition and connection of the **injection computer** (brown 48-track) **connector C**.
Repair if necessary.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

injection computer connector **C, track A3** → **track 33** sequential gearbox computer connector **A** (black, 52 tracks)

injection computer connector **C, track A4** → **track 45** sequential gearbox computer connector **A** (black, 52 tracks)

Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF107 PRESENT OR STORED	COMPUTER MEMORY

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine running**.
	Special notes: If fault **DF107** is present: engine stopped and restarting impossible, illumination of the **level 2 fault warning light**, and the message **Injection defective** displayed on the instrument panel.

Enter the individual injector corrections (**C2I**) using the **diagnostic tool (command SC002 Injector code entries)**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF112 PRESENT OR STORED	CYLINDER REFERENCE SENSOR CIRCUIT 1.DEF: No signal

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is present when the **starter motor** is operating or the engine is running at **idle speed**.

Check the connection and condition of the **3-track connector** for the **cylinder reference sensor**. Repair if necessary.
Check for **+12 V after ignition feed** on **track 3** of the **cylinder reference sensor connector**. Repair if necessary
Check the condition and connection of the **injection computer** (**brown** 48-track) **connector B**. Repair if necessary.
Check for **earth** on **track 1** of the **cylinder reference sensor**.
Check the **insulation, continuity and the absence of interference resistance** on the following connections: **injection computer** connector **B, track E2** → **track 2, cylinder reference sensor** connector **injection computer** connector **B, track E4** → **track 1, cylinder reference sensor** connector **UPC**, black connector **track 2** → **track 3, cylinder reference sensor** connector Repair if necessary.
Check the timing setting.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF113 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE 1.DEF : At minimum limit 2.DEF : At maximum limit

NOTES	**Priority in the event of a number of faults:** If there is a combination of the following faults: **DF113 Sensor supply voltage,** **DF007 Rail pressure sensor circuit,** **DF008 Pedal potentiometer gang 1 circuit,** **DF009 Pedal potentiometer gang 2 circuit,** **DF010 EGR position sensor circuit,** **DF049 Refrigerant sensor circuit,** **DF056 Air flow sensor circuit,** **DF089 Inlet manifold pressure sensor circuit,** deal with fault **DF113 Sensor supply voltage** first.
	Special notes: If fault **DF113** is present: immediate engine stop, starting impossible. Illumination of the **level 2 fault warning light** with the message **Injection defective** displayed on the instrument panel.

Check the condition and connection of the **connectors on all sensors** with a **5 V** feed.
- **Refrigerant pressure sensor.**
- **Cylinder reference sensor.**
- **Turbocharging pressure sensor.**
- **Rail pressure sensor.**
- **Pedal sensor, gangs 1 and 2.**
- **EGR valve position sensor.**
- **Flow sensor.**

Repair if necessary.

Check the condition and connection of the **injection computer connectors A, B and C**.
Repair if necessary.

To locate a possible fault inside one of the sensors with a **+5 V feed** (short circuit), disconnect each of the sensors on the list above in turn, checking after each disconnection whether the fault status changes from **present** to **stored**.
If the faulty sensor is located, check its connections and that it is in order. If necessary replace the sensor.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF113 **CONTINUED**	

Check for **the insulation, continuity and the absence of interference resistance on the connections**:

- **Injection computer** connector **C, track C4** → **track B of the refrigerant pressure sensor**
- **Injection computer** connector **B, track C1** → **track 1, turbocharging pressure sensor**
- **Injection computer** connector **B, track D1** → **track 3, rail pressure sensor**
- **Injection computer** connector **A, track G2** → **track 3, pedal sensor gang 1**
- **Injection computer** connector **A, track F2** → **track 2, pedal sensor gang 2**
- **Injection computer** connector **B, track B1** → **track 1 of the EGR valve position sensor**
- **Injection computer** connector **B, track A1** → **track 5 flow sensor**

Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF114 PRESENT OR STORED	EGR SOLENOID VALVE CIRCUIT 1.DEF : At minimum limit 2.DEF : At maximum limit 3.DEF : Inconsistency 4.DEF : Valve jammed 5.DEF : Valve clogged

NOTES	**Special note:** If fault **DF114** is present: unstable idle speed and even stalling. Starting difficult or even impossible when cold, smoke emissions and loss of performance possible. Illumination of the **level 2 fault warning light** with the message **Injection defective** displayed on the instrument panel.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine running**.

Check the connection and condition of the **EGR solenoid valve 6-track connector**. Repair if necessary.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**. Repair if necessary.
Check for **+5 V** on **track 1** of the **EGR solenoid valve**. Repair if necessary.
Measure the resistance at the terminals of the **EGR solenoid valve**. Replace the solenoid valve if the resistance between **tracks 2 and 6** is not between **2 Ω and 2.5 Ω at 20°C**.
Check **the continuity and insulation** of the following connections: **injection computer** connector **B, track M3** ⟶ **track 2 EGR** connector **Injection computer** connector **B, track L4** ⟶ **track 6 EGR** connector Repair if necessary.
In addition, if fault 4.DEF or 5.DEF **is present**: Remove the **EGR valve**. Check that there are no foreign bodies (scale, etc.) that could jam the **valve**. Remove any foreign bodies and clean the **EGR valve**. Refit the **EGR valve**. Clear the **computer memory**. Carry out a road test followed by another check with the diagnostic tool.
If the fault is still present, replace the **EGR solenoid valve**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF121 PRESENT OR STORED	ACCELEROMETER CIRCUIT

NOTES	**Priorities when dealing with a number of faults:** If there is a combination of faults: – **DF121 Accelerometer sensor circuit,** – **DF001 Coolant temperature sensor circuit,** – **DF002 Air temperature sensor circuit,** – **DF003 Atmospheric pressure sensor circuit,** – **DF098 Fuel temperature sensor circuit,** give priority to faults **DF001 Coolant temperature sensor circuit, DF002 Air temperature sensor circuit, DF003 Atmospheric pressure sensor circuit, DF098 Fuel temperature sensor circuit**, A fault on these sensors could lead to incorrect fault finding of the accelerometer.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present with the **engine running**.

Check the **conformity of the injectors** fitted to the vehicle in relation to the **type of vehicle and engine number** (low, high or very high pressure injector).
Check the condition and connection of the **accelerometer connector**. Repair if necessary.
Check the condition and connection of **connector B** (brown 48-track) of the **injection computer** and the shielding of the sensor on **track K1**. Repair if necessary.
Check **the continuity and insulation** of the following connections: **Injection computer** connector **B, track F1** → **track 1, accelerometer sensor** connector **injection computer** connector **B, track G1** → **track 2, accelerometer sensor** connector Repair if necessary.
Check that the **C2I** is correctly entered on the computer. Check that the accelerometer is secured on the engine. **After retightening** the accelerometer, **be sure to clear** the engine adaptives using command **RZ004 Pressure regulation adaptives**. Carry out a road test followed by another check with the diagnostic tool. If the fault is still present, replace the accelerometer.
If the fault is still present, replace the **pinking sensor**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF122 PRESENT OR STORED	PEDAL POTENTIOMETER GANG 2 SUPPLY VOLTAGE CO.1 : open circuit or short circuit to +12 V CC.0 : short circuit to earth

NOTES	**Special notes:** If fault **DF122** is present: the idle speed is locked at **1000 rpm**, engine performance is reduced to **75%**, illumination of the **level 1 fault warning light** with the message **Check the injection** displayed on the instrument panel.

CC.0	***NOTES***	**Special notes:** None.

Check the connection and condition of the **6-track connector** for the **pedal potentiometer**. Repair if necessary.
Check the condition and connection of **connector A** (black, 32 tracks) of the **injection computer**. Repair if necessary.
Measure the **resistance of gang 2**, between **tracks 2 and 6** of the **pedal potentiometer**. Replace the **pedal potentiometer** if the resistance is not **2.85 kΩ ± 2.05 kΩ**.
Check for **+5 V** on **track 2** of the **pedal potentiometer**. Check for **earth** on **track 6** of the **pedal potentiometer**. Repair if necessary.
Check the **insulation and continuity** of the following connection: **injection computer** connector **A, track F2** ⟶ **track 2, pedal potentiometer** connector Repair if necessary.
Disconnect **injection computer connector A** and the **pedal potentiometer** connector. Check the **earth insulation** of the connection on track **F2** of **injection computer connector A**. Repair if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF122 **CONTINUED**	

CO.1	***NOTES***	**Special notes:** None.

Check the connection and condition of the **pedal potentiometer connector**. Repair if necessary.
Check the condition and connection of **connector A** (black, 32 tracks) of the **injection computer**. Repair if necessary.
Measure the **resistance** between **tracks 2 and 6** of the **pedal potentiometer**. Replace the pedal potentiometer if the resistance is not **2.85 kΩ ± 2.5 kΩ**.
Check for **+5 V** on **track 2** of the **pedal potentiometer**. Check for **earth** on **track 6** of the **pedal potentiometer**. Repair if necessary.
Disconnect **injection computer connector A** and the **pedal potentiometer** connector. – **Check the insulation** on **connector A** between **tracks F2 and F4**. – **Check the +12 V insulation** of the connection on track **F2** of the **injection computer connector A**. Repair if necessary.
Check **the continuity and insulation** of the following connections: **injection computer** connector **A, track F2** ⟶ **track 2, pedal potentiometer** connector **injection computer** connector **A, track F4** ⟶ **track 6, pedal potentiometer** connector Repair if necessary.
If the fault is still present, replace the **pedal potentiometer**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF130 PRESENT OR STORED	FLOW CAPACITY FUNCTION

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present with the **engine running**.
	Special notes: If fault **DF130** is present: engine may stop, illumination of the **level 2 fault warning light** and the message **Injection defective** displayed on the instrument panel.

Check the condition and the connection of the fuel flow actuator **connector** (**IMV**). Repair if necessary.
Measure the resistance between **tracks 1 and 2 of the fuel flow actuator**. **Replace the fuel flow actuator** if the resistance is not **5.3 Ω ± 0.5 Ω** at **20 °C**.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**. Repair if necessary.
Check the **insulation and continuity** of the following connection: **injection computer** connector **B, track M4** ⟶ **Track 1, fuel flow actuator** Repair if necessary.
Check **for fuel** in the tank. Carry out **Test 1 Low pressure circuit check**. Repair if necessary.
If the fault is still present, carry out **test 7 High pressure system check (see TEST)**.
If the fault is still present, replace the **fuel flow actuator**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF195 PRESENT OR STORED	ENGINE SPEED/CAMSHAFT SENSOR CONSISTENCY

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is present when the **starter motor** is operating or the engine is running at **idle speed**.

Check the connection and condition of the **3-track connector** for the **cylinder reference sensor**.
Repair if necessary.

Check for **+12 V after ignition feed** on **track 3** of the **cylinder reference sensor connector**.
Repair if necessary.

Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**.
Repair if necessary.

Check for **earth** on **track 1** of the **cylinder reference sensor**.

Check the **insulation, continuity and the absence of interference resistance** on the following connections:

computer connector **B, track E2** → **track 2, cylinder reference sensor** connector

computer connector **B, track E3** → **track 1, cylinder reference sensor** connector

UPC black connector **Track 2** → **track 3, cylinder reference sensor** connector

Repair if necessary.

Check the timing setting.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF209 PRESENT OR STORED	EGR VALVE POSITION SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Priority when dealing with a number of faults:** If faults **DF209** and **DF113** are combined, deal with fault **DF113 Sensor supply voltage** first. **Special notes:** None.

Check the connection and condition of the **EGR solenoid valve** 6-track connector. Repair if necessary.
Check the condition and connection of the **injection computer connector B**. Repair if necessary.

Check for **+5 V** on **track 1** of the **EGR solenoid valve**. Check for **earth** on **track 3** of the **EGR solenoid valve**. Repair if necessary.
Check **the continuity and insulation** of the following connections: **Injection computer** connector **B, track B1** → **track 1 EGR** connector **injection computer** connector **B, track B2** → **track 5 EGR** connector **injection computer** connector **B, track B3** → **track 3 EGR** connector Repair if necessary.
If there is a fault, replace the **EGR solenoid valve**.
If there is a fault, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF221 PRESENT OR STORED	CLUTCH CONTACT SIGNAL 1.DEF: Inconsistency

NOTES	**Special notes:** None.

Check the connection and condition of the **clutch pedal switch** connector. Repair if necessary.
Check the **continuity** between **tracks 1** and **2** of the **clutch pedal switch** in the pressed position. If defective, replace the **clutch pedal switch**.
Check for **earth** on **track 2** of the **clutch pedal switch** . Repair if necessary.
Check the condition and connection of **injection computer connector A**. Repair if necessary.
Check the **insulation and continuity** of the following connection: **Injection computer** connector **A, track C4** ⟶ **Track 1 clutch pedal contact** Repair if necessary.
If there is still a fault, replace the **clutch switch**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF261 PRESENT OR STORED	TURBOCHARGER ACTUATOR CIRCUIT C0.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 volts

NOTES	**Special notes:** If fault **DF261** is present: air flow regulation switched off, EGR valve closed, turbocharging regulation switched off. Injection defective message displayed on the instrument panel and reduced performance.

Check that the turbo is operating correctly, check the air inlet system (blocked, etc.), check the turbocharging pressure signal and check the gear number when changing gear.
Check the condition and connection of the **turbocharging solenoid valve** connector. Repair if necessary.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**. Repair if necessary.
Check for the **turbocharging solenoid valve** feed on **track 2** of the connector.
Measure the **resistance** between **tracks 1** and **2** of the **turbocharging solenoid valve**. Replace the **turbocharging solenoid valve** if the resistance is not **20 Ω ± 2 Ω** at **23°C**.
Check **the continuity and insulation** of the following connections: **injection computer** connector **B, track M2** → **Track 1, turbocharging solenoid valve** **UPC** black connector **track 2** → **Track 2, turbocharging solenoid valve** Repair if necessary.
If there is still a fault, replace the turbocharging solenoid valve.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF427 PRESENT OR STORED	TURBO ACTUATOR CONTROL 1.DEF: At minimum limit 2.DEF: At maximum limit

NOTES	**Special notes:** If fault **DF427** is present: air flow regulation switched off, EGR valve closed, turbocharging regulation switched off. Injection defective message displayed on the instrument panel and reduced performance.

Check that the turbo is operating correctly, check the air inlet system (blocked, etc.), check the turbocharging pressure signal and check the gear number when changing gear.
Check the condition and connection of the turbocharging solenoid valve connector. Repair if necessary.
Check for the **turbocharging solenoid valve** feed on **track 2** of the connector.
Check the condition and connection of **connector B** (brown, 48 tracks) of the **injection computer**. Repair if necessary.
Measure the **resistance** between **tracks 1** and **2** of the **turbocharging solenoid valve**. Replace the **turbocharging solenoid valve** if the resistance is not **20 Ω ± 2 Ω** at **23°C**.
Check **the continuity and insulation** of the following connections: **injection computer** connector **B, track M2** → **Track 1, turbocharging solenoid valve** **UPC** black connector **track 2** → **Track 2, turbocharging solenoid valve** Repair if necessary.
If there is still a fault, replace the turbocharging solenoid valve.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF631 PRESENT OR STORED	BRAKE LIGHT SWITCH SIGNAL 1.DEF: No signal 2.DEF: Inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** Apply the fault finding procedure below, whether the fault is present or stored.
	Special notes: The fault is declared present when decelerating, when the brake pedal is depressed. The cruise control function is inhibited.

Check the connection and condition of the **brake light switch** connector.
Repair if necessary.

Check for **+12 V** feed on **brake light switch, track 2**.
Repair if necessary.

Check the condition and connection of **connector A** (black, 32 tracks) of the **injection computer**.
Repair if necessary.

Check the **operation of the brake light switch**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

Injection computer connector **A, track E4** → **Track 3, brake light switch**

UCH → **Track 4, brake light switch**

BFR (Relay/Fuse Box) → **Track 2 brake light switch**

Repair if necessary.

If the fault is still present, replace the **brake light switch**.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF648 PRESENT OR STORED	COMPUTER 1.DEF : Write EEPROM memory 2.DEF : Read EEPROM memory

NOTES	**Special notes:** None.

Carry out a multiplex network test.

Move the wiring between the **injection computer** and the **battery** to see if a change of status occurs (Present ↔ Stored).
Look for any damage to the wiring and check the **connection and condition** of the **battery** and its connections.
Repair if necessary.

Measure the **battery voltage** when the ignition is switched on.
If the **battery voltage** is **less than 11 V**, recharge the battery.

Check the condition and connection of the battery **terminals and** posts.
Repair if necessary.

Check the condition and connection of **connector A** (black, 32 tracks) of the **injection computer**.
Repair if necessary.

Check **the continuity and insulation** of the following connections:

Injection computer black connector **A, track D1**	→	**UPC**
Injection computer black connector **A, tracks H1, G4, H4**	→	**Chassis earth**
Injection computer black connector **C, track G2**	→	**Track 1, UPC connector**
Injection computer black connector **C, track H2**	→	**Track 2, UPC connector**

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF859 PRESENT OR STORED	INJECTOR PROGRAMMING CYCLE NOT DONE

NOTES	**Priority when dealing with a number of faults:** If there is a combination of faults **DF859, DF052, DF026, DF027, DF028, DF029**, deal with them in the following order: **– DF052 Injectors control circuit** **– DF026 Cylinder 1 injector control circuit** **– DF027 Cylinder 2 injector control circuit** **– DF028 Cylinder 3 injector control circuit** **– DF029 Cylinder 4 injector control circuit**

If faults **DF052, DF026, DF027, DF028, DF029** are absent, **carry out the following driving cycle**:

(accelerometer sensor check):
– vehicle stopped,
– engine running at idle speed for 30 s,
– 20°C < water T° < 150°C,
– - 50°C < diesel fuel T° < 150°C.

(injector reset condition): Warm engine (65°C < water T° < 94°C)

In high-pressure areas:
– Vehicle speed > 18 mph (30 km/h),
– Engine speed > 1250 rpm,
– 0°C < air T° < 150°C,
– 10 V < battery V < 16 V,
– -50°C < diesel T° < 150°C,
– fuel flow > 17 mg/st.

(injector reset condition): Warm engine (79°C < water T° < 94°C)

In low-pressure areas:
– vehicle stopped,
– engine speed < 1000 rpm (no electrical consumers),
– 0°C < air T° < 150°C,
– 10 V < battery V < 16 V,
– 10°C < diesel T° < 57°C,
– fuel flow < 10 mg/st.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

DF859 **CONTINUED**	

Check that the C2I is entered correctly in the **injection computer**.
Check the accelerometer shielding on **track K1** of the (brown 48-track) connector **B** of the **injection computer**.
Check that the accelerometer is secured on the engine.
After retightening the accelerometer, it is imperative to clear the pressure regulation adaptives using command **RZ004 Pressure regulation adaptives**.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer fault memory. Carry out a road test followed by another check with the diagnostic tool.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

MAIN COMPUTER STATUSES AND PARAMETERS:

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Battery voltage	**PR074:**	Battery voltage	**12 V < PR074 < 14.4 V**	In the event of a fault: apply the charge circuit fault finding procedure.
2	Engine speed	**PR055:**	Engine speed	**0 rpm** Shows the engine's speed of rotation	If there is a fault, use the interpretation of fault **DF005 Engine speed sensor circuit**.
3	Idle speed regulation	**PR010:**	Idle speed regulation setpoint	Shows the speed of rotation the engine should reach at idle speed: approximately. **825 rpm**	If there is a fault, use the interpretation of faults **DF053 Rail pressure regulation function, DF007 Rail pressure sensor circuit, and DF024 Low pressure actuator control circuit**.
4	Accelerator pedal position	**PR030:**	Accelerator pedal position	**PR030 = 0%** Gives the accelerator pedal position in %.	If there is a fault, use the interpretation of faults **DF008 Pedal potentiometer gang 1 circuit, DF009 Pedal potentiometer gang 2 circuit and DF113 Sensor supply voltage**.
5	Coolant temperature	**PR064:**	Coolant temperature	Warm: **90°C** Indicates the engine coolant temperature in °C Default value: **80°C**	If there is a fault, use the interpretation of parameter **PR064 Coolant temperature**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

MAIN COMPUTER STATUSES AND PARAMETERS (CONTINUED 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
6	Air temperature	**PR730:**	Air flow sensor temperature	Gives the inlet air temperature in °C. This information is supplied by the air temperature sensor incorporated in the air flow sensor.	If there is a fault, use the interpretation of parameter **DF002 Air flow sensor circuit**.
7		**PR059:**	Inlet air temperature	Gives the inlet air temperature in °C. This information is supplied by the temperature sensor (K9K 750, 752).	In the event of a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**
8	Fuel temperature	**PR063:**	Fuel temperature	Cold = **PR064** Warm: **50°C** Gives the fuel temperature in °C. This value is given by "the fuel temperature sensor". Default value: **30°C**	If there is a fault, use the interpretation of fault **DF098 Fuel temperature sensor circuit**.
9	Air circuit pressure	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is built into the computer.	If the values are inconsistent, check with the engine stopped and ignition switched on that parameter **PR035 = PR032 = local atmospheric pressure**.
		PR032:	Inlet pressure	Shows the pressure in the inlet system in mbar	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

MAIN COMPUTER STATUSES AND PARAMETERS (CONTINUED 2)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
10	Rail pressure	**PR038:**	Rail pressure	Cold: **1 bar** Gives the pressure of the diesel in the injection rail in Bar. This pressure is supplied by the sensor on the rail. Default value: **2000 bar**	If there is a fault, use the interpretation of fault **DF007 Rail pressure sensor circuit**.
11	Engine	**ET038:**	Engine	– **NOT RUNNING** – **RUNNING** Gives the current status of the engine.	**NONE**
12	Engine immobiliser	**ET003:**	Engine immobiliser	**INACTIVE** Gives the status of the immobiliser system. **INACTIVE:** The injection computer has recognised the immobiliser code transmitted by the UCH. **ACTIVE:** The injection computer does not recognise the immobiliser code transmitted by the UCH.	If **ACTIVE**, use the help for **ET003** on the tool.
13	Code programmed	**ET006:**	CODE programmed	**YES** **Indicates whether the immobiliser code has been programmed into the computer.** – **YES:** Code programmed – **NO:** Code not programmed into the **injection computer**	If **NO**, contact the Techline.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

MAIN COMPUTER STATUSES AND PARAMETERS (CONTINUED 3)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
14	Vehicle speed	**PR089:**	Vehicle speed	Gives the vehicle speed in mph (km/h). This parameter is sent by the ABS computer or the vehicle speed computer unit. This signal is transmitted to the injection on the multiplex network.	Test the **multiplex network**. Refer to fault finding for the ABS system or the vehicle speed computer.
15	New pump chamber	**ET637:**	New pump chamber filling	**DONE** Indicates that the pump has been filled.	
16	Flow capacity	**ET563:**	Flow capacity function	**INACTIVE** See **System operation, Function: Fuel supply management (timing, flow rate and pressure), flow capacity function (VLC) section**	If there is a fault, use the interpretation of fault **DF130 Flow capacity function**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

START SUB-FUNCTION:

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Engine	**ET038:** Engine	– **NOT RUNNING** – **RUNNING**	**NONE**
2	Starting	**ET076:** Starting	**AUTHORISED** Indicates whether or not starting has been authorised by the injection **AUTHORISED:** injection authorises starting. **PROHIBITED:** injection does not authorise starting.	If **PROHIBITED**, carry out a complete fault finding procedure on the preheating system.
3	Airbag	**ET077:** Impact detected	**NO** **YES** (impact stored by the injection computer)	If **ET077** is **YES**: Switch off the ignition for 10 seconds, then switch it back on, so the engine can be restarted. Then clear any faults.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

PROTECTION SUB-FUNCTION:

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Computer + after ignition feed	**ET001:**	Computer + after ignition feed	**PRESENT** Indicates **+ after ignition** computer feed. **PRESENT/ABSENT**	If there is a fault, use the interpretation of faults **DF047 Computer feed voltage and DF015 Main relay control circuit**.
2	Engine immobiliser	**ET003:**	Engine immobiliser	**INACTIVE** – **INACTIVE:** The injection computer has recognised the immobiliser code transmitted by the **UCH**. – **ACTIVE:** The injection computer does not recognise the immobiliser code transmitted by the **UCH**.	If **ACTIVE**, use the **help** for **ET003** on the tool.
3	Code programmed	**ET006:**	Code programmed	**YES** States whether the immobiliser code has been programmed by the computer or not. **YES:** Code programmed. **NO:** Code not programmed into injection computer.	If **NO**, test the multiplex network.
4	Starting	**ET076:**	Starting	**AUTHORISED** Indicates whether or not starting has been authorised by the injection **AUTHORISED:** injection authorises starting. **PROHIBITED:** injection does not authorise starting.	If **PROHIBITED**, carry out a complete fault finding procedure on the preheating system.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

COLD LOOP SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Climate control present	**ET079:** Climate control present	**YES - NO** States whether the vehicle is fitted with climate control or not. **YES:** Climate control is detected by the injection computer. **NO:** Climate control is not detected by the injection computer.	If not consistent with the vehicle equipment, test the **multiplex network** and follow the relevant procedure.
2	Compressor activation request	**ET088:** Compressor activation request	**INACTIVE** The injection requests the UPC (via the multiplex network) to start the compressor. **ACTIVE:** The multiplex network must not be defective on the Automatic transmission, UPC or UCH systems. The UCH must send a compressor starting request to the injection. The coolant pressure sensor must not be defective. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **INACTIVE:** One of the conditions mentioned above.	**NONE**

NOTES	**Application condition: Engine stopped, ignition on.** Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples.

COLD LOOP SUB-FUNCTION (CONTINUED 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
3	AC authorised	**ET004:**	AC authorised	**NO** **YES:** operating conditions with the engine running are satisfactory (coolant temperature, engine load, etc.). The vehicle is not in a specific movement phase (hill start or from stop etc.). **NO:** One of the above conditions has not been fulfilled.	**NONE**
4	Refrigerant pressure	**PR037:**	Refrigerant pressure	**2 bar < PR037 < 27 bar** Shows the refrigerant fluid pressure value in bar. Default value: **0 bar**	If there is a fault, use the interpretation of **DF049 Refrigerant sensor circuit**.
5	Engine speed	**PR055:**	Engine speed	**0 rpm** Gives the engine's rotational speed in rpm.	If there is a fault, use the interpretation of fault **DF005 Engine speed sensor circuit**.
6	Fast idle speed request	**ET023:**	Fast idle speed request	**ABSENT** The UCH sends a fast idle request to the injection. **ABSENT:** no UCH request. **PRESENT:** UCH request.	If **ET023** is inconsistent, test the **multiplex network** using the diagnostic tool. If the test is in order, consult the fault finding procedure for **UCH**.
7	Coolant temperature	**PR064:**	Coolant temperature ambient temperature	Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.

NOTES	**Application condition: Engine stopped, ignition on.** Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples.

COLD LOOP SUB-FUNCTION (CONTINUED 2)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
8	Vehicle speed	**PR089:**	Vehicle speed	**0 mph** Gives the vehicle speed in mph (km/h). This parameter is sent by the ABS computer or the vehicle speed computer unit. This signal is transmitted to the injection on the multiplex network.	Test the **multiplex network**. Refer to fault finding for the ABS system or the vehicle speed computer.
9	Power absorbed by the air conditioning compressor	**PR125:**	Power absorbed by the air conditioning compressor	**0 W** Indicates the power consumed by the compressor.	**NONE**
10	Fan unit speed request*	**ET022:**	Low speed fan unit request	**INACTIVE** The injection requests the UPC to start the fans. **INACTIVE:** engine speed = **0 rpm** - or activation conditions not met. **ACTIVE:** Engine speed = idling speed, correct refrigerant pressure and vehicle speed = **0 mph** or high coolant temperature.	**NONE**
11		**ET021:**	High speed fan unit request	**INACTIVE** The injection requests the UPC to start the fans. – **INACTIVE:** Because engine speed = **0 rpm**. – **ACTIVE:** Engine speed = idling speed. Refrigerant pressure **> 15 bar**, vehicle speed = **0 mph (km/h)** or high coolant temperature.	

* If climate control is requested with the engine idling and vehicle speed = 0 mph, ET022 will still be "ACTIVE" and ET021 "INACTIVE" (unless refrigerant pressure > 15 bar, vehicle speed = 0 mph and high coolant temperature). The fan units are disabled under certain coolant temperature conditions when driving.
When the UPC is not receiving multiplex signals from the injection, the fans operate permanently.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

HEATING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Warm: **90°C** Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
2	Set number of passenger compartment heating resistors (RCH) Passenger compartment heating resistor cut-off	**ET111:**	**Set number of RCH**	**YES / NO** The passenger compartment heating resistors are controlled by the UCH. They draw large amounts of current. Consequently, their use is conditional on the available power at each moment (alternator power). The injection assesses the available power balance according to the engine's operating conditions (torque, power, etc.) in order to authorise, restrict or stop their use (signals are sent via the CAN network to the UCH). Note: When the passenger compartment heating resistors are activated, the injection must respond to a fast idle request from the UCH.	**NONE**
3	Passenger compartment heating resistor cut-off	**ET112:**	RCH cut-off		

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

FUEL CIRCUIT SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Fuel temperature	**PR063:**	Fuel temperature	Cold = **PR064** Warm: **50°C** Gives the fuel temperature in °C. Default value: **30°C.**	If there is a fault, use the interpretation of fault **DF098 Fuel temperature sensor circuit**.
2	Fuel flow	**PR017:**	Fuel flow	**0.0 mg/st** Shows the fuel injected in mg/st for each injector.	**NONE**
3	Rail pressure	**PR038:**	Rail pressure cold and hot:	Cold: **1 bar** Shows the pressure of the diesel fuel in the injection rail in bar. This pressure is supplied by the sensor on the rail. Default value: **2000 bar**	If there is a fault, use the interpretation of fault **DF007 Rail pressure sensor circuit**.
4	Rail pressure setpoint	**PR008:**	Rail pressure setpoint	**375 bar** (Engine starting pressure setpoint) Cold: **405 bar** Warm: **230 bar** Gives a theoretical pressure value for optimum engine operation.	**NONE**
5	Rail pressure sensor voltage	**PR80:**	Rail pressure sensor voltage	**0.5 V < PR080 < 4.5 V** Shows the voltage supplied by the computer to the rail pressure sensor. Default value: **4.5 V**	**NONE**

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

FUEL CIRCUIT SUB-FUNCTION (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
6	Engine speed	**PR055:**	Engine speed	**0 rpm** Gives the engine's rotational speed in rpm.	If there is a fault, use the interpretation of fault **DF005 Engine speed sensor circuit**.
7	Idle speed regulation	**PR010:**	Idle speed regulation setpoint	Shows the theoretical engine speed required (approximately. 825 rpm).	If there is a fault, use the interpretation of faults **DF007 Rail pressure sensor circuit, DF024 Low-pressure actuator control circuit**.
8	New pump chamber	**ET637:**	New pump chamber filling	**DONE** Indicates that the pump has been filled.	
9	Flow capacity	**ET563:**	Flow capacity function	**INACTIVE** See **System operation, Function: Fuel supply management (timing, flow rate and pressure), flow capacity function (VLC) section**	If there is a fault, use the interpretation of fault **DF130 Flow capacity function**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

PRE-HEATING/IGNITION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Warm: **90°C** Cold ≈ ambient air temperature Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
2	Air temperature	**PR730:**	Air flow sensor temperature	Gives the inlet air temperature in °C. This information is supplied by the air temperature sensor incorporated in the air flow sensor.	If there is a fault, use the interpretation of fault **DF002 Air flow sensor circuit**.
3		**PR059:**	Inlet air temperature	Gives the inlet air temperature in °C. This information is supplied by the temperature sensor (K9K 750, 752).	If there is a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**
4	Battery voltage	**PR074:**	Battery voltage	**12 V < PR074 < 14.4 V**	If there is a fault, apply the fault finding procedure for the **Charge circuit**.
5	Preheating unit	**ET007:**	Preheating unit control	**ACTIVE - INACTIVE** Shows the status of the preheating unit control.	If there is a fault, use the interpretation of faults **DF017 Preheating unit control circuit, and DF025 Preheating unit connection**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

AIR CIRCUIT SUB-FUNCTION (TURBOCHARGING/INLET)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Air temperature	**PR730:**	Air flow sensor temperature	Gives the inlet air temperature in °C. This information is supplied by the air temperature sensor incorporated in the air flow sensor.	If there is a fault, consult the interpretation of parameter **DF002 Air flow sensor circuit**.
2		**PR059:**	Inlet air temperature	Gives the inlet air temperature in °C. This information is supplied by the temperature sensor (K9K 750, 752).	In the event of a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**
3	Air circuit pressure	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer.	If the values are inconsistent, check with the engine stopped and ignition switched on that parameter **PR035 = PR032 = local atmospheric pressure**.
		PR032:	Inlet pressure	Gives the pressure in the inlet circuit (mbar).	
4	Air flow	**PR132:**	Air flow	**mg/st** Air flow estimated by the injection computer.	**NONE**
5	Inlet pressure sensor voltage	**PR078:**	Inlet pressure sensor voltage (turbocharging pressure sensor)	Shows the voltage supplied by the computer to feed the inlet pressure sensor.	**NONE**
6	Engine speed	**PR055:**	Engine speed	**0 rpm** Gives the engine's rotational speed in rpm.	In the event of a fault, refer to the interpretation for fault **DF005 Engine speed sensor circuit**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

ENGINE COOLING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Coolant temperature	**PR064:** Coolant temperature	Hot: ≈ **90°C** Cold ≈ ambient air temperature Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

DRIVER PARAMETERS SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Accelerator pedal position	**PR030:**	Accelerator pedal position	No load: **0%** Shows the pedal position between NO LOAD and FULL LOAD as a percentage. 0% < PR030 < 100%	If there is a fault, use the interpretation of faults **Pedal sensor circuit gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**.
2	Pedal potentiometer gangs voltage	**PR086:**	Pedal potentiometer gang 1 voltage	**15%**	If there is a fault, use the interpretation of faults **DF008 Pedal sensor gang 1 circuit, DF009 Pedal sensor gang 2 circuit and DF113 Sensor supply voltage**.
		PR088:	Pedal potentiometer gang 2 voltage	**7%** Shows the percentage feed voltage on gangs 1 and 2 of the pedal potentiometer. **10% < PR086 < 20%** **5% < PR088 < 15%**	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

EMISSION CONTROL/OBD SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	EGR solenoid valve control	**ET008:**	Solenoid valve control	**INACTIVE** Shows the EGR valve control status. **INACTIVE:** The valve is not controlled by the computer. **ACTIVE:** The valve is controlled by the computer.	**NONE**
2	Atmospheric pressure	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer.	If the values are inconsistent, check with the engine stopped and ignition switched on that parameter **PR035 = PR032 = local atmospheric pressure**.
3	Air flow	**PR132:**	Air flow	Air flow estimated by the injection computer.	**NONE**
4	Fuel flow	**PR017:**	Fuel flow	**0.0 mg/st** Gives the fuel flow at the high-pressure pump outlet in **mg/st**.	**NONE**
5	EGR valve opening setpoint	**PR005:**	EGR valve opening setpoint Cold or	**In %** Gives a theoretical EGR valve opening value for optimum engine operation. **PR005 = PR051**	**NONE**
6	EGR valve position feedback	**PR051:**	EGR valve position feedback	Cold or hot = **0%** Shows the true EGR valve position. PR051 = PR005 Default value 30%.	**NONE**

NOTES	**Application condition: Engine stopped, ignition on.** Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples.

EMISSION CONTROL/OBD SUB-FUNCTION (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
7	EGR valve position sensor voltage	**PR077:** EGR valve position sensor voltage	**0.5 V < PR077 < 4.8 V**	**NONE**
8	Accelerator pedal position	**PR030:** Accelerator pedal position	No load: **0%** Shows the pedal position between NO LOAD and FULL LOAD as a percentage. **PR030 = 0%**	If there is a fault, use the interpretation of faults **Pedal sensor circuit gang 1 and gang 2 (DF008 and DF009) and DF113 Sensor supply voltage**.
9	Coolant temperature	**PR064:** Coolant temperature	Hot ≈ **90°C** Cold ≈ ambient air temperature Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Vehicle speed	**PR089:** Vehicle speed	**0 mph** Gives the vehicle speed in mph. This parameter is sent by the ABS computer or the vehicle speed computer unit. This signal is transmitted to the injection on the multiplex network.	Test the **multiplex network**. See fault finding for the ABS system or the vehicle speed computer.
2	Cruise control/ speed limiter	**ET042:** Cruise control/ speed limiter	– **INACTIVE:** when no buttons are pressed – **STATUS 1:** Cruise control On/Off button pressed – **STATUS 2:** Speed limiter On/Off button pressed – **STATUS 3:** Increase button pressed – **STATUS 4:** Decrease button pressed – **STATUS 5:** Suspend button pressed – **STATUS 6:** Resume button pressed Shows the status of the switches on the steering wheel and the Cruise control/ speed limiter switch.	If there is a fault, refer to the interpretation of **ET042 Cruise control/speed limiter**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition: Engine stopped, ignition on.**

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
3	Brake contact	**ET012:** Primary brake contact **ET013:** Secondary brake contact	**INACTIVE** Indicates recognition of brake pedal contacts. **INACTIVE:** Brake pedal released. **ACTIVE:** Brake pedal depressed.	**If there is a fault, refer to the interpretation of status ET012 Primary brake contact**. If **ET013** is inconsistent, test the **multiplex network** using the diagnostic tool.
4	Clutch contact	**ET040:** Clutch pedal	**RELEASED** Indicates recognition of clutch pedal contacts – **RELEASED:** Pedal released – **DEPRESSED:** Pedal depressed.	If there is a fault, refer to the interpretation of status **ET040 Clutch pedal**.
5	Cruise control/ Speed limiter switch	**ET036:** Speed limiter **ET043:** Cruise control	**INACTIVE** Indicates recognition of the cruise control/speed limiter switch contacts. **INACTIVE:** Switch in rest position. **ACTIVE:** Shows the current status of the Cruise control/ speed limiter switch.	If there is a fault, refer to the interpretation of **ET042 Cruise control/speed limiter**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Battery voltage	**PR074:** Battery voltage	**12 V < PR074 < 14.4 V**	In the event of a fault: apply the charge circuit fault finding procedure.
2	Engine speed	**PR055:** Engine speed	Cold: **900 rpm** Hot: **800 rpm** Gives the engine's rotational speed.	If there is a fault, use the interpretation of fault **DF005 Engine speed sensor circuit**.
3	Idle speed regulation	**PR010:** Idle speed regulation setpoint	approximately **825 rpm** Shows the required speed of rotation of the engine at idle speed.	If there is a fault, use the interpretation of faults **DF053 Rail pressure regulation function, DF007 Rail pressure sensor circuit, and DF024 Low-pressure actuator control circuit**.
4	Accelerator pedal position	**PR030:** Accelerator pedal position	(no load): **PR030 = 0%** Gives the accelerator pedal position in %.	If there is a fault, use the interpretation of faults **DF008 Pedal potentiometer gang 1 circuit, DF009 Pedal potentiometer gang 2 circuit and DF113 Sensor supply voltage**.
5	Coolant temperature	**PR064:** Coolant temperature	Warm: **90°C** Gives the coolant temperature in °C. Default value: **80°C**	If there is a fault, use the interpretation of parameter **PR064 Coolant temperature** .

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

MAIN COMPUTER STATUSES AND PARAMETERS (CONTINUED 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
6	Air temperature	**PR730:**	Air flow sensor temperature	Gives the inlet air temperature in °C. This information is supplied by the air temperature sensor incorporated in the air flow sensor.	If there is a fault, consult the interpretation of parameter **DF002 Air flow sensor circuit**.
7		**PR059:**	Inlet air temperature	Gives the inlet air temperature in °C. This information is supplied by the temperature sensor (K9K 750, 752).	In the event of a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**
8	Fuel temperature	**PR063:**	Fuel temperature	Cold = **PR064** Warm: **50°C** Gives the fuel temperature in °C. This value is given by "the fuel temperature sensor". Default value: **30°C**	If there is a fault, use the interpretation of fault **DF098 Fuel temperature sensor circuit**.
9	Air circuit pressure	**PR035:**	Atmospheric pressure	Cold or hot: **600 mbar < PR035 < 1050 mbar** Indicates the atmospheric pressure in mbar. The sensor is built into the computer.	If the values are inconsistent, check with the engine stopped and ignition switched on that parameter **PR035 = PR032 = local atmospheric pressure**.
		PR032:	Inlet pressure	Shows the pressure in the inlet circuit in mbar.	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

MAIN COMPUTER STATUSES AND PARAMETERS (CONTINUED 2)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
10	Rail pressure	**PR038:** Rail pressure	Cold: **1 bar** Gives the pressure of the diesel in the injection rail in Bar. This pressure is supplied by the sensor on the rail. Default value: **2000 bar**	If there is a fault, use the interpretation of fault **DF007 Rail pressure sensor circuit**.
11	Engine	**ET038:** Engine	– **RUNNING** – **NOT RUNNING** Gives the current status of the engine.	**NONE**
12	Engine immobiliser	**ET003:** Engine immobiliser	**INACTIVE** Gives the status of the immobiliser system. **INACTIVE:** The injection computer has recognised the immobiliser code transmitted by the UCH. **ACTIVE:** The injection computer does not recognise the immobiliser code transmitted by the UCH.	If **ACTIVE**, use the help for **ET003** on the tool.
13	Code programmed	**ET006:** CODE programmed	**YES** **Indicates whether the immobiliser code has been programmed into the computer.** – **YES:** Code programmed. – **NO:** Code not programmed into injection **computer**	If **NO**, contact the Techline.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

MAIN COMPUTER STATUSES AND PARAMETERS (CONTINUED 3)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
14	Vehicle speed	**PR089:**	Vehicle speed	Gives the vehicle speed in **mph (km/h)**. This parameter is sent by the ABS computer or the vehicle speed computer unit. This signal is transmitted to the injection on the multiplex network.	Test the **multiplex network**. Refer to fault finding for the ABS system or the vehicle speed computer.
15	New pump chamber	**ET637:**	New pump chamber filling	**DONE** Indicates that the pump has been filled.	
16	Flow capacity	**ET563:**	Flow capacity function	**INACTIVE** See **System operation, Function: Fuel supply management (timing, flow rate and pressure), flow capacity function (VLC) section**	If there is a fault, use the interpretation of fault **DF130 Flow capacity function**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

START SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Engine	**ET038:** Engine	– **RUNNING** – **NOT RUNNING**	**NONE**
2	Starting	**ET076:** Starting	**AUTHORISED** Indicates whether or not starting has been authorised by the injection **AUTHORISED:** injection authorises starting. **PROHIBITED:** injection does not authorise starting.	If **PROHIBITED**, carry out a complete fault finding procedure on the preheating system.
3	Airbag	**ET077:** Impact detected	**NO** **YES** (impact stored by the injection computer)	If **ET077** is **YES**: Switch off the ignition for 10 seconds, then switch it back on, so the engine can be restarted. Then clear any faults.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

PROTECTION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Computer + after ignition feed	**ET001:**	Computer + after ignition feed	**PRESENT** Indicates **+ after ignition** computer feed. **PRESENT** **ABSENT**	If there is a fault, use the interpretation of faults **DF047 Computer feed voltage and DF015 Main relay control circuit**.
2	Engine immobiliser	**ET003:**	Engine immobiliser	**INACTIVE** **INACTIVE:** The injection computer has recognised the immobiliser code transmitted by the **UCH**. **ACTIVE:** The injection computer does not recognise the immobiliser code transmitted by the **UCH**.	If **ACTIVE**, use the **help** for **ET003** on the tool.
3	Code programmed	**ET006:**	Code programmed	**YES** States whether the immobiliser code has been programmed by the computer or not. **YES:** Code programmed. **NO:** Code not programmed into injection computer.	If **NO**, test the multiplex network.
4	Starting	**ET076:**	Starting	**AUTHORISED** Indicates whether or not starting has been authorised by the injection **AUTHORISED:** injection authorises starting. **PROHIBITED:** injection does not authorise starting.	If **PROHIBITED**, carry out a complete fault finding procedure on the preheating system.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

COLD LOOP SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Climate control present	**ET079:** Climate control present	**YES - NO** States whether the vehicle is fitted with climate control or not. **YES:** Climate control is detected by the injection computer. **NO:** Climate control is not detected by the injection computer.	If not consistent with the vehicle equipment, test the **multiplex network** and follow the relevant procedure.
2	Compressor activation request	**ET088:** Compressor activation request	**INACTIVE** The injection requests the UPC (via the multiplex network) to start the compressor. **ACTIVE:** The multiplex network must not be defective on the Automatic transmission, UPC or UCH systems. The UCH must send a compressor starting request to the injection. The coolant pressure sensor must not be defective. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **INACTIVE:** One of the conditions mentioned above.	**NONE**

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

COLD LOOP SUB-FUNCTION (CONTINUED 1)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
3	AC authorised	**ET004:** AC authorised	**YES - NO** **YES:** operating conditions with the engine running are satisfactory (coolant temperature, engine load, etc.). The vehicle is not in a specific movement phase (hill start or from stop etc.). **NO:** One of the above conditions has not been fulfilled.	**NONE**
4	Refrigerant pressure	**PR037:** Refrigerant pressure	**2 bar < PR037 < 27 bar** Shows the refrigerant fluid pressure value in bar. Default value: **0 bar**	If there is a fault, use the interpretation of **DF049 Refrigerant sensor circuit**.
5	Engine speed	**PR055:** Engine speed	Cold: **900 rpm** Warm: **805 rpm** Indicates the engine's speed of rotation in rpm.	If there is a fault, use the interpretation of fault **DF005 Engine speed sensor circuit**.
6	Fast idle speed request	**ET023:** Fast idle speed request	**PRESENT/ABSENT** The UCH sends a fast idle request to the injection. **ABSENT:** no UCH request. **PRESENT:** UCH request.	If **ET023** is inconsistent, test the **multiplex network** using the diagnostic tool. If the test is in order, consult the fault finding procedure for **UCH**.
7	Coolant temperature	**PR064:** Coolant temperature ambient temperature	Hot: ≈ **90°C** Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

COLD LOOP SUB-FUNCTION (CONTINUED 2)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
8	Vehicle speed	**PR089:**	Vehicle speed	**0 mph** Gives the vehicle speed in **mph (km/h)**. This parameter is sent by the ABS computer or the vehicle speed computer unit. This signal is transmitted to the injection on the multiplex network.	Test the **multiplex network**. Refer to fault finding for the ABS system or the vehicle speed computer.
9	Power absorbed by the air conditioning compressor	**PR125:**	Power absorbed by the air conditioning compressor	**in W** Indicates the power consumed by the compressor.	**NONE**
10	Fan unit speed request*	**ET022:**	Low speed fan unit request	The injection requests the UPC to start the fans. **INACTIVE:** engine speed = **0 rpm** - or activation conditions not met. **ACTIVE:** Because engine speed = idling speed, correct refrigerant pressure and vehicle speed = **0 mph** or high coolant temperature.	**NONE**
11		**ET021:**	High speed fan unit request	The injection requests the UPC to start the fans. **INACTIVE:** Because engine speed = **0 rpm**. **ACTIVE:** Engine speed = idling speed. Refrigerant pressure **> 15 bar**, vehicle speed = **0 mph (km/h)** or high coolant temperature.	

* If climate control is requested with the engine idling and vehicle speed = 0 mph, ET022 will still be "ACTIVE" and ET021 "INACTIVE" (unless refrigerant pressure > 15 bar, vehicle speed = 0 mph and high coolant temperature). The fan units are disabled under certain coolant temperature conditions when driving.
When the UPC is not receiving multiplex signals from the injection, the fans operate permanently.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

HEATING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Warm: **90°C** Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
2	Set number of passenger compartment heating resistors Passenger compartment heating resistor cut-off	**ET111:**	Set number of RCH	**YES / NO** The passenger compartment heating resistors are controlled by the UCH. They draw large amounts of current. Consequently, their use is conditional on the available power at each moment (alternator power). The injection assesses the available power balance according to the engine's operating conditions (torque, power, etc.) in order to authorise, restrict or stop their use (signals are sent via the CAN network to the UCH). Note: When the passenger compartment heating resistors are activated, the injection must respond to a fast idle request from the UCH.	**NONE**
3	Passenger compartment heating resistor cut-off	**ET112:**	RCH cut-off		

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

FUEL CIRCUIT SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Fuel temperature	**PR063:** Fuel temperature	Cold = **PR064** Warm: **50°C** Gives the fuel temperature in °C. Default value: **30°C**	If there is a fault, use the interpretation of fault **DF098 Fuel temperature sensor circuit**.
2	Fuel flow	**PR017:** Fuel flow	Hot: **5 mg/st** Shows the fuel injected in mg/st for each injector.	**NONE**
3	Rail pressure	**PR038:** Rail pressure cold and hot:	Cold: **1 bar** Shows the pressure of the diesel fuel in the injection rail in bar. This pressure is supplied by the sensor on the rail. Default value: **2000 bar**	If there is a fault, use the interpretation of fault **DF007 Rail pressure sensor circuit**.
4	Rail pressure setpoint	**PR008:** Rail pressure setpoint	**375 bar** (Engine starting pressure instruction) Cold: **405 bar** Warm: **230 bar** Gives the theoretical pressure value for optimum engine operation.	**NONE**
5	Rail pressure sensor voltage	**PR80:** Rail pressure sensor voltage	**0.5 V < PR080 < 4.5 V** Shows the voltage supplied by the computer to the rail pressure sensor. Default value: **4.5 V**	**NONE**

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

FUEL CIRCUIT SUB-FUNCTION (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
6	Engine speed	**PR055:**	Engine speed	Cold: **900 rpm** Warm: **805 rpm** Gives the engine's rotational speed in rpm.	If there is a fault, use the interpretation of fault **DF005 Engine speed sensor circuit**.
7	Idle speed regulation	**PR010:**	Idle speed regulation setpoint	Shows the theoretical engine speed required (approximately. 825 rpm).	If there is a fault, use the interpretation of faults **DF007 Rail pressure sensor circuit, DF024 Low-pressure actuator control circuit**.
8	New pump chamber	**ET637:**	New pump chamber filling	**DONE** Indicates that the pump has been filled.	
9	Flow capacity	**ET563:**	Flow capacity function	**INACTIVE** See **System operation, Function: Fuel supply management (timing, flow rate and pressure), flow capacity function (VLC) section**	If there is a fault, use the interpretation of fault **DF130 Flow capacity function**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

PRE-HEATING/IGNITION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Warm: **90°C** Cold ≈ ambient air temperature Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.
2	Air temperature	**PR730:**	Air flow sensor temperature	Gives the inlet air temperature in °C. This information is supplied by the air temperature sensor incorporated in the air flow sensor.	If there is a fault, use the interpretation of fault **DF002 Air flow sensor circuit**.
3		**PR059:**	Inlet air temperature	Gives the inlet air temperature in °C. This information is supplied by the temperature sensor (K9K 750, 752).	If there is a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**
4	Battery voltage	**PR074:**	Battery voltage	**12 V < PR074 < 14.4 V**	If there is a fault, apply the fault finding procedure for the **Charge circuit**.
5	Preheating unit	**ET007:**	Preheating unit control	**ACTIVE - INACTIVE** Shows the status of the preheating unit switch.	If there is a fault, use the interpretation of faults **DF017 Preheating unit control circuit, and DF025 Preheating unit connection**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

AIR CIRCUIT SUB-FUNCTION (TURBOCHARGING/INLET)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Air temperature	**PR730:**	Air flow sensor temperature	Gives the inlet air temperature in °C. This information is supplied by the air temperature sensor incorporated in the air flow sensor.	If there is a fault, consult the interpretation of parameter **DF002 Air flow sensor circuit**.
2		**PR059:**	Inlet air temperature	Gives the inlet air temperature in °C. This information is supplied by the temperature sensor (K9K 750, 752).	In the event of a fault, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**
3	Air circuit pressure	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer.	If the values are inconsistent, check with the engine stopped and ignition switched on that parameter **PR035 = PR032 = local atmospheric pressure**.
		PR032:	Inlet pressure	Gives the pressure in the inlet circuit (mbar).	
4	Air flow	**PR132:**	Air flow	**mg/st** Air flow estimated by the injection computer.	**NONE**
5	Inlet pressure sensor voltage	**PR078:**	Inlet pressure sensor voltage (turbocharging pressure sensor)	Shows the voltage supplied by the computer to feed the inlet pressure sensor.	**NONE**
6	Engine speed	**PR055:**	Engine speed	Cold: **900 rpm** Warm: **805 rpm** Gives the engine's rotational speed in rpm.	In the event of a fault, refer to the interpretation for fault **DF005 Engine speed sensor circuit**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

ENGINE COOLING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Hot: ≈ **90°C** Cold ≈ ambient air temperature Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

DRIVER PARAMETERS SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Accelerator pedal position	**PR030:**	Accelerator pedal position	No load: **0%** Shows the pedal position between NO LOAD and FULL LOAD as a percentage. **0% < PR030 < 100%**	If there is a fault, use the interpretation of faults **Pedal sensor circuit gang 1 and gang 2** (**DF008** and **DF009**) and **DF113 Sensor supply voltage**.
2	Pedal potentiometer gangs voltage	**PR086:**	Pedal potentiometer gang 1 voltage	**15%**	If there is a fault, use the interpretation of faults **DF008 Pedal sensor gang 1 circuit, DF009 Pedal sensor gang 2 circuit and DF113 Sensor supply voltage**.
		PR088:	Pedal potentiometer gang 2 voltage	**7%** Shows the percentage feed voltage on gangs 1 and 2 of the pedal potentiometer. **10% < PR086 < 20%** **5% < PR088 < 15%**	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

EMISSION CONTROL/OBD SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	EGR solenoid valve control	**ET008:**	Solenoid valve control	**ACTIVE - INACTIVE** Shows the EGR valve control status. **INACTIVE:** The valve is not controlled by the computer. **ACTIVE:** The valve is controlled by the computer.	**NONE**
2	Atmospheric pressure	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in **mbar**. The sensor is built into the computer.	If the values are inconsistent, check with the engine stopped and ignition switched on that parameter **PR035 = PR032 = local atmospheric pressure**.
3	Air flow	**PR132:**	Air flow	Hot: **195 mg/st** Air flow estimated by the injection computer.	**NONE**
4	Fuel flow	**PR017:**	Fuel flow	Hot: **5 mg/st** Gives the fuel flow at the high pressure pump outlet in **mg/st**.	**NONE**
5	EGR valve opening setpoint	**PR005:**	EGR valve opening setpoint Cold or	**In %** Gives a theoretical EGR valve opening value for optimum engine operation. **PR005 = PR051**	**NONE**
6	EGR valve position feedback	**PR051:**	EGR valve position feedback	**0%** Shows the true EGR valve position. **PR051 = PR005 Default value 30%.**	**NONE**

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

EMISSION CONTROL/OBD SUB-FUNCTION (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
7	EGR valve position sensor voltage	**PR077:**	EGR valve position sensor voltage	**0.5 V < PR077 < 4.8 V**	**NONE**
8	Accelerator pedal position	**PR030:**	Accelerator pedal position	No load: **0%** Shows the pedal position between NO LOAD and FULL LOAD as a percentage. **PR030 = 0%**	If there is a fault, use the interpretation of faults **Pedal sensor circuit gang 1 and gang 2 (DF008 and DF009) and DF113 Sensor supply voltage**.
9	Coolant temperature	**PR064:**	Coolant temperature	Hot: ≈ **90°C** Cold ≈ ambient air temperature Gives the coolant temperature in °C. Default value: **80°C**	In the event of a fault, refer to the interpretation of parameter **PR064 Coolant temperature**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Vehicle speed	**PR089:** Vehicle speed	**0 mph** Gives the vehicle speed in mph. This parameter is sent by the ABS computer or the vehicle speed computer unit. This signal is transmitted to the injection on the multiplex network.	Test the **multiplex network**. See fault finding for the ABS system or the vehicle speed computer.
2	Cruise control/ speed limiter	**ET042:** Cruise control/ speed limiter	– **INACTIVE:** when no buttons are pressed – **STATUS 1:** Cruise control On/Off button pressed – **STATUS 2:** Speed limiter On/Off button pressed – **STATUS 3:** Increase button pressed – **STATUS 4:** Decrease button pressed – **STATUS 5:** Suspend button pressed – **STATUS 6:** Resume button pressed Shows the status of the switches on the steering wheel and the Cruise control/ speed limiter switch.	If there is a fault, refer to the interpretation of **ET042 Cruise control/speed limiter**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine idling.**

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
3	Brake contact	**ET012:** Primary brake contact **ET013:** Secondary brake contact	**INACTIVE** **INACTIVE** Indicates recognition of brake pedal contacts. **INACTIVE:** Brake pedal released. **ACTIVE:** Brake pedal depressed.	If there is a fault, refer to the interpretation of status **ET012 Primary brake contact**. If **ET013** is inconsistent, test the **multiplex network** using the diagnostic tool.
4	Clutch contact	**ET040:** Clutch pedal	**RELEASED** Indicates recognition of clutch pedal contacts – **RELEASED:** Pedal released – **DEPRESSED:** Pedal depressed.	If there is a fault, refer to the interpretation of status **ET040 Clutch pedal**.
5	Cruise control/ Speed limiter switch	**ET036:** Speed limiter **ET043:** Cruise control	**INACTIVE** Indicates recognition of the cruise control/speed limiter switch contacts. **INACTIVE:** Switch in rest position. **ACTIVE:** Shows the current status of the Cruise control/ speed limiter switch.	If there is a fault, refer to the interpretation of **ET042 Cruise control/speed limiter**.

Tool status	Diagnostic tool title
ET001	Computer + after ignition feed
ET002	Low pressure actuator
ET003	Engine immobiliser
ET004	AC authorised
ET005	Key/Card
ET006	Code programmed
ET007	Preheating unit control
ET008	EGR solenoid valve control
ET012	Primary brake contact
ET013	Secondary brake contact
ET021	High speed fan unit request
ET022	Low speed fan unit request
ET023	Fast idle speed request
ET033	EGR solenoid valve
ET036	Speed limiter
ET038	Engine
ET039	Brake pedal
ET040	Clutch pedal
ET041	Gear ratio
ET042	Cruise control/Speed limiter
ET043	Cruise control
ET044	Main relay
ET076	Starting
ET077	Impact detected
ET079	Climate control present
ET088	Compressor activation request
ET111	Set number of passenger compartment heating resistors.
ET112	Passenger compartment heating resistors cut-off
ET418	Cruise control function
ET419	Speed limiter function
ET563	Flow capacity function
ET637	New pump chamber filling

ET012	PRIMARY BRAKE CONTACT

NOTES	**Special note:** Only apply the checks if the **INACTIVE** and **ACTIVE** statuses are not consistent with the pedal position.

"INACTIVE" STATUS and brake pedal depressed.

If brake lights operate:
– Check the continuity on the connection between **track 3** of the brake light switch connector and **track E4** of the black 32-track **connector A** of the **injection computer**.
If the brake lights do not operate:
– Check the condition and fitting of the **brake light switch** and **brake light fuse 1H (15A)**.
– Remove the **brake light switch** and test its operation:

	Continuity between tracks	Insulation between tracks
Switch pressed (Brake pedal released)	**3 and 4**	**1 and 2**
Switch released (Brake pedal depressed)	**1 and 2**	**3 and 4**

– Replace the switch if necessary.
– Make sure that **+ after ignition feed** is present on tracks **2** and **4** of the **brake light switch** connector.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET012 **CONTINUED**	

"ACTIVE" STATUS and brake pedal released.

– Check the condition and fitting of the **brake light switch** and **brake light fuse 1H (15A)** and the **conformity of the bulbs**.
– Remove the **brake light switch** and test its operation:

	Continuity between tracks	Insulation between tracks
Switch pressed (Brake pedal released)	**3 and 4**	**1 and 2**
Switch released (Brake pedal depressed)	**1 and 2**	**3 and 4**

– Replace the switch if necessary.
– Check the **+ 12 V** insulation of the connection between **track 3** of the **brake switch 1H (15A)** connector and **track E4** of the black 32-track **connector A** of the **injection computer**.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET040	CLUTCH PEDAL

NOTES	**Special note:** Carry out the checks only if the **RELEASED** and **DEPRESSED** statuses are not consistent with the pedal position.

"RELEASED" STATUS and clutch pedal depressed.

– Check the condition and fitting of the **clutch switch**.
– Check the continuity on the connection between **track 2** of the **clutch switch** connector and **track C4** of the black 32-track **connector A** of the **injection computer**.
– Check for **earth** on **track 1** of the **clutch switch** connector.

Repair if necessary.

– Remove the **clutch switch** and test its operation:

	Continuity between tracks	Insulation between tracks
Switch pressed (Clutch pedal released)	**1 and 2**	-
Switch released (Clutch pedal depressed)	-	**1 and 2**

– Replace the switch if necessary.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET040 **CONTINUED**	

"PRESSED" STATUS and clutch pedal depressed.

– Check the condition and fitting of the **clutch switch**.
– Remove the **clutch switch** and test its operation:

	Continuity between tracks	Insulation between tracks
Switch pressed (Clutch pedal released)	**1 and 2**	-
Switch released (Clutch pedal depressed)	-	**1 and 2**

– Replace the switch if necessary.
– Check the **earth** insulation of the connection between **track 1** of the **clutch switch** connector and **track C4** of the black 32-track connector **A** of the **injection computer**.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET042	CRUISE CONTROL/SPEED LIMITER

NOTES	**Special note:** Only apply the checks if the statuses are not consistent with the position of the buttons.

If the On/off switch is pressed and ET042 is "INACTIVE" (STATUS 1 and STATUS 2 absent), carry out the following checks:

Check the connections of the **cruise control On/Off switch** and the **injection computer black 32-track connector A**. Repair if necessary.
– Check for **+ after ignition feed** on **tracks A2** and **B2** of the **cruise control/speed limiter switch** connector.
– Remove and test the operation of the cruise control/speed limiter switch:

	Continuity between tracks	Insulation between tracks
Switch in rest position	-	**A2 and A3 - A2 and B1**
Switch in cruise control position	**A2 and A3**	**A2 and B1**
Switch in speed limiter position	**A2 and B1**	**A2 and A3**

– Replace the switch if necessary.
– Check and make sure there is **continuity and no interference resistance** on the connection between **track A3** (cruise control) or B1 (speed limiter) of the switch connector and **track A2** (cruise control) or C3 (speed limiter) of the black 32 track computer connector A.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET042 **CONTINUED 1**	

STATUS 1, STATUS 2, switch at rest.

Check the connections of the cruise control On/Off switch and the computer **black 32-track connector A**. Repair if necessary.

– Remove and test the operation of the cruise control/speed limiter switch:

	Continuity between tracks	Insulation between tracks
Switch in rest position	-	**A2 and A3 - A2 and B1**
Switch in cruise control position	**A2 and A3**	**A2 and B1**
Switch in speed limiter position	**A2 and B1**	**A2 and A3**

– Replace the switch if necessary.

– Check the **+12 V** insulation on the connection between **track A3** (cruise control) or **track B1** (speed limiter) of the cruise control/speed limiter switch connector and **track A2** (cruise control) or **track C3** (speed limiter) of the black 32-track computer connector A and repair if necessary.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET042 **CONTINUED 2**	

No STATUS 3, STATUS 4, STATUS 5, STATUS 6, button pressed (ET042 "INACTIVE").

– Lock the airbag computer and remove the driver's frontal airbag (see **MR 392, Mechanical, 88C, Airbag and pretensioners, Driver's frontal airbag**).
– Check the condition and correct connection of the black **3 track** connector beneath the driver's frontal airbag. Repair if necessary.
– Disconnect the **3-track** connector and on the buttons side, check the resistance value of the buttons:

Button in rest position	STATUS 3 (+ button pressed)	STATUS 4 (- button pressed)	STATUS 5 (0 button pressed)	STATUS 6 (R button pressed)
R = INFINITE	R = approximately 300 Ω	R = approximately 100 Ω	R = approximately 0 Ω	R = approximately 900 Ω

If the values are not correct, replace the controls on the steering wheel.

Reconnect the black **3-track** connector and take the same measurements from the black 32-track computer connector A between tracks **D3 and D2**.
– If the values are not correct, **test the connection** between the **engine injection computer** and the **rotary switch under the steering wheel** using the relevant wiring diagram (**line resistance, short circuit, etc.**).
Carry out the necessary repairs.
– If the values are in order, contact the Techline.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

ET042 **CONTINUED 3**	

STATUS 3, STATUS 4, STATUS 5, STATUS 6, button released.

– Lock the airbag computer and remove the driver's frontal airbag (see **MR 392, Mechanical, 88C, Airbag and pretensioners, Driver's frontal airbag**).
– Check the condition and correct connection of the black **3 track** connector beneath the driver's frontal airbag. Repair if necessary.
– Disconnect the **3-track** connector and on the buttons side, check the resistance value of the buttons:

Button in rest position	STATUS 3 (+ button pressed)	STATUS 4 (- button pressed)	STATUS 5 (0 button pressed)	STATUS 6 (R button pressed)
R = INFINITE	**R = approximately 300 Ω**	**R = approximately 100 Ω**	**R = approximately 0 Ω**	**R = approximately 900 Ω**

If the values are not correct, replace the controls on the steering wheel.

Reconnect the black **3 track** connector and take the same measurements from the black 32 track computer connector **A** between tracks D3 and D2.
– If the values are not correct, **check** the connection **between** the **engine injection computer** and the **rotary switch** under the steering wheel, using the relevant wiring diagram (**line resistance**, short circuit, insulation from earth, etc.).

Carry out the necessary repairs.
– If the values are in order, contact the Techline.

AFTER REPAIR	Carry out a road test, then check with the diagnostic tool.

Tool parameter	Diagnostic tool title
PR001	Advance
PR005	EGR valve opening setpoint
PR008	Rail pressure setpoint
PR010	Idle speed regulation setpoint
PR017	Fuel flow
PR019	Linearised air flow
PR020	Deceleration
PR021	EGR request
PR026	EGR position offset
PR028	Pedal position (gang 1)
PR029	Pedal position (gang 2)
PR030	Accelerator pedal position
PR032	Inlet pressure
PR033	Requested inlet pressure
PR034	Linearised inlet pressure
PR035	Atmospheric pressure
PR036	Linearised atmospheric pressure
PR037	Refrigerant pressure
PR038	Rail pressure
PR039	Raw rail pressure
PR040	Rail pressure linearised
PR046	EGR solenoid valve OCR
PR051	EGR valve position feedback
PR052	Rail pressure feedback
PR055	Engine speed
PR056	Current engine speed
PR057	Linearised fuel temperature
PR059	Inlet air temperature

Tool parameter	Diagnostic tool title
PR062	Linearised external air temperature
PR063	Fuel temperature
PR064	Coolant temperature
PR065	Linearised coolant temperature
PR067	Injector No. 1 current rise time
PR068	Injector No. 2 current rise time
PR069	Injector No. 3 current rise time
PR070	Injector No. 4 current rise time
PR072	Linearised sensor supply voltage
PR074	Battery voltage
PR075	Raw battery voltage
PR077	EGR valve position sensor voltage
PR078	Inlet pressure sensor voltage
PR080	Rail pressure sensor voltage
PR086	Pedal potentiometer gang 1 voltage
PR087	Raw pedal sensor gang 2 voltage
PR088	Pedal potentiometer gang 2 voltage
PR089	Vehicle speed
PR125	Power absorbed by the air conditioning compressor
PR132	Air flow
PR135	Cruise control/speed limiter buttons voltage
PR136	EGR position
PR147	Pedal potentiometer voltage gang 1
PR148	Pedal potentiometer voltage gang 2
PR400	New EGR valve offset
PR634	Air flow request
PR730	Air flow sensor temperature

PR064	COOLANT TEMPERATURE

NOTES	**Special notes:** Only apply the checks if the parameter is inconsistent.

Check the condition of the coolant temperature sensor connections.
If necessary replace the sensor.
Measure the resistance between **tracks 2** and **3** of the **coolant temperature sensor**.
Theoretical values:

12500 Ω ± 1128 Ω at -10°C
2252 Ω ± 112.6 Ω at 25°C
811.4 Ω ± 38.4 Ω at 50°C
282.6 Ω ± 7.83 Ω at 80°C

Replace the coolant temperature sensor if it is not in order.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test, then check with the diagnostic tool.

PR730	AIR FLOW SENSOR TEMPERATURE

NOTES	**Special notes:** Only apply the checks if the parameter is inconsistent.

Check the condition of the air flow sensor connections.
If necessary replace the sensor.
Measure the **resistance** between **tracks 1 and 2** of the air flow sensor.
Theoretical values:

at -10°C: 8700 to 9700 Ω
at 0°C: 5500 to 6000 Ω
at 10°C: 3500 to 3900 Ω
at 20°C: 2300 to 2550 Ω
at 30°C: 1610 to 1730 Ω

Replace the air temperature/pressure sensor, if not in order.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test, then check with the diagnostic tool.

Tool command	Diagnostic tool title	Comments
RZ001	**Fault memory**	This command is used for clearing the faults stored by the computer.
RZ002	**EGR adaptives**	Use this command when replacing the EGR valve.
RZ004	**Pressure regulation adaptives**	Use this command when replacing all four injectors at once. It enables you to reset the injector adaptives.
RZ005	**Programming**	This command enables you to reinitialise the entire computer configuration according to the vehicle.
AC001	**Preheating unit**	Activating this actuates the preheating unit to test the heater plug supply.
AC002	**EGR solenoid valve**	
AC004	**Turbocharging solenoid valve**	
AC005	**Cylinder 1 injector**	This activation makes it possible to check injector 1 by listening.
AC006	**Cylinder 2 injector**	This activation makes it possible to check injector 2 by listening.
AC007	**Cylinder 3 injector**	This activation makes it possible to check injector 3 by listening.
AC008	**Cylinder 4 injector**	This activation makes it possible to check injector 4 by listening.
AC010	**High pressure pump**	Activating this lets you listen to the operation of the high pressure pump.
AC028	**Static test**	This activation starts the diagnostic check of the EGR and high pressure pump circuits (**Ignition switched on, engine stopped**).
AC029	**High pressure sealing test**	This activation checks the sealing of the high pressure system after a repair (**Engine stopped**).
AC212	**New pump chamber filling**	Activates **New pump chamber filling** next time the vehicle is started.

NOTES	**Only consult these tests when dealing with a fault finding chart (ALP) or when interpreting faults.**

Some specific checks are grouped together into tests and are used as required in various fault finding charts (**ALPs**) or fault interpretations.

TEST 1: Low pressure circuit check

TEST 2: Electrical circuit check

TEST 3: Injector check

TEST 4: Parameter check.

TEST 5: Air inlet circuit check

TEST 6: Computer check

TEST 7: High pressure system check.

TEST 8: High pressure circuit sealing check

TEST 9: Injector sealing check.

TEST 10: Injector return flow in starting phase.

TEST 11: Diesel filter check.

TEST 1	LOW PRESSURE CIRCUIT CHECK

Check the conformity of the low pressure circuit connections

Are the low pressure circuit connections correct?

→ NO → Carry out the necessary repairs.

YES ↓

Check the condition of the priming bulb, and that it is working properly. ↓

Look for leaks at the unions.

Are there leaks from the hoses and unions?

→ NO → Carry out the necessary repairs.

NO ↓

Check for air bubbles in the diesel fuel.

Are air bubbles present in the low pressure circuit?

→ YES → Bleed the low pressure circuit.
Place a container under the filter.
– Disconnect the return hose from the filter and plug the filter.
– Pump using the priming bulb until there is no air left.
– Reconnect the return hose immediately.

NO ↓

Low pressure circuit correct.

TEST 2	ELECTRICAL CIRCUIT CHECK

Check the battery charge and that the alternator is working properly.

Is the charge circuit in good order? — NO → Carry out the necessary repairs.

YES ↓

Check the fuses.

Are the fuses correct? — NO → Carry out the necessary repairs.

YES ↓

Check that the injection locking relay is operating correctly.

Is the injection locking relay operating correctly? — NO → Carry out the necessary repairs.

YES ↓

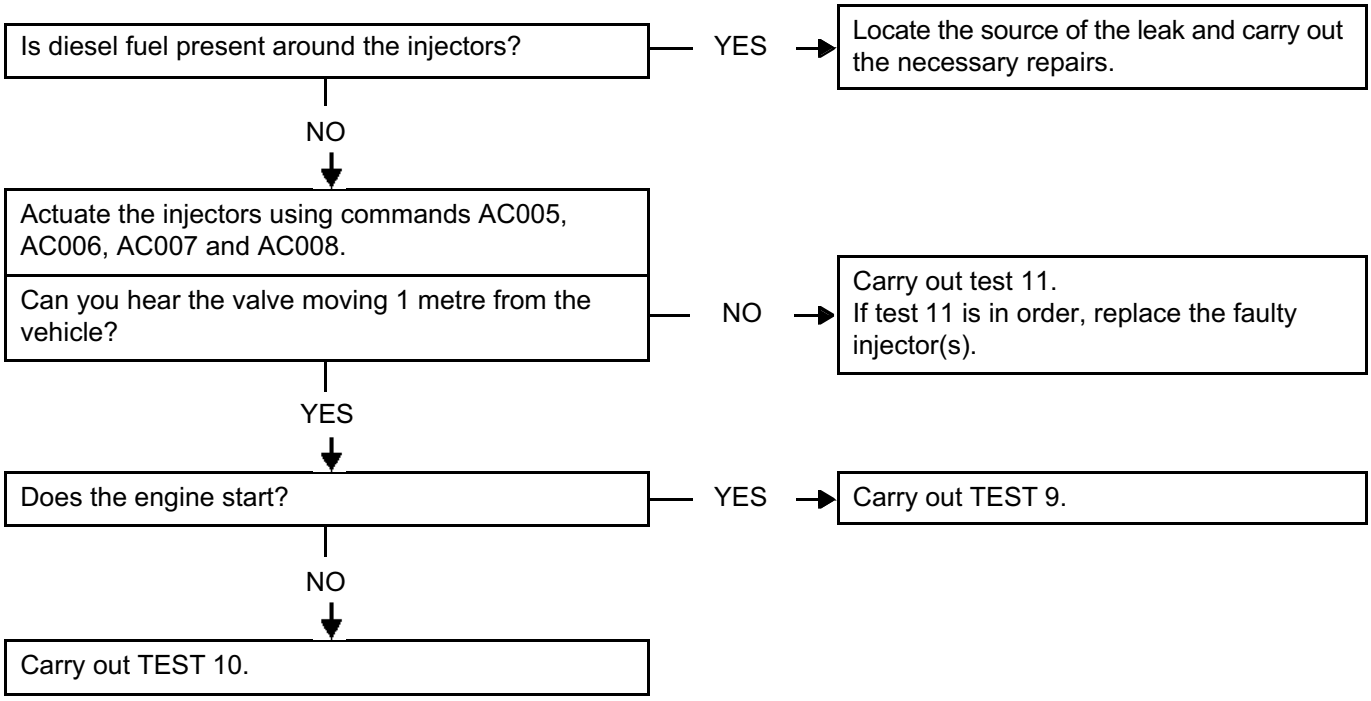
Check the engine earths.

Are the engine earths correct? — NO → Carry out the necessary repairs.

YES ↓

The electrical circuit is in good order.

TEST 3	INJECTOR CHECK



TEST 4	PARAMETER CHECK

Using the identification screen on the diagnostic tool, check that the C2I is correctly entered.

Has the C2I been correctly entered?

NO → Enter the C2I using the diagnostic tool (cylinder 1 flywheel end).

YES

Does the status of the electrical consumers given by the diagnostic tool in the various injection sub-functions correspond to their true status?

NO → Carry out the fault finding procedure and any necessary repairs.

YES

Check the consistency of the engine parameters.

TEST 5	INLET CIRCUIT CHECK

Check for air leaking in or out.

Is air leaking in or out? — YES → Carry out the necessary repairs.

NO ↓

Check the condition of the air filter.

Air filter in order? — NO → Replace the air filter.

YES ↓

Check that the inlet manifold is not obstructed (clogged).

Is the inlet manifold obstructed? — YES → Clean the inlet manifold.

NO ↓

Air circuit in good order.

TEST 6	COMPUTER CHECK

Check the condition of the computer connections (bent pins, signs of corrosion, silicone, etc.).

↓

Check that the computer connectors are properly locked.

↓

Computer correct.

TEST 7	HIGH PRESSURE SYSTEM CHECK

NOTES	**Special note:** Certain faults make it impossible to carry out this test - deal with these first. **IMPORTANT** **It is useless and dangerous to engage the starter for more than 5 seconds.**

It is possible to check the high pressure supply pump capacity by carrying out the following procedure:
- **With the ignition off, disconnect** the low pressure actuator from the pump (**brown IMV connector**) and connect a **test IMV** or the **Mot. 1711** adapter.
- Electrically disconnect the four injectors.
- Switch on the ignition, connect the diagnostic tool and re-establish dialogue with the injection system.
- Go to the **Main computer statuses and parameters** screen.
- Run **the starter for 5 seconds**.
- Read the rail pressure maximum value (**PR038**) during the test on the diagnostic tool.

Is the rail pressure greater than 1050 bar?

NO

Is the rail pressure greater than 900 bar?

NO

Repeat the test cold.
Coolant temperature = Ambient air temperature.

Is the rail pressure greater than 1050 bar?

YES

NO

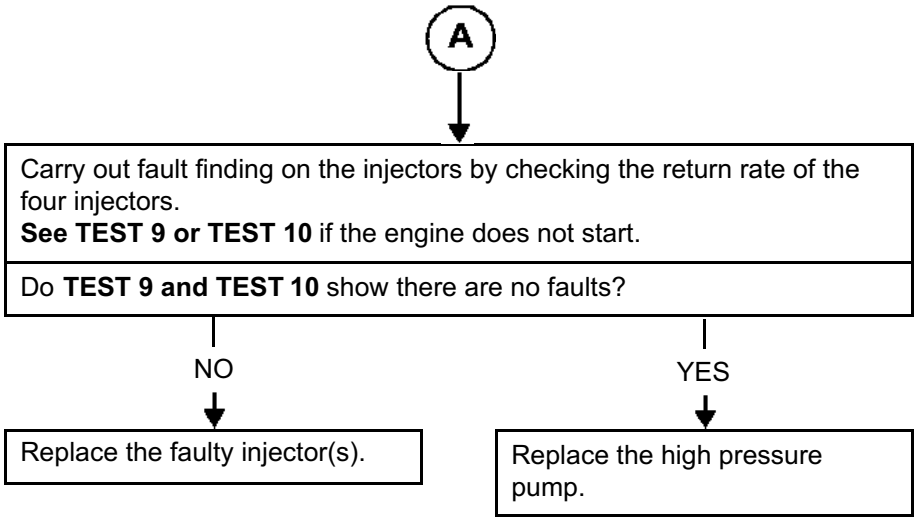
Make sure that the ignition circuit is working correctly (minimum engine speed **200 rpm**). Switch off the ignition, reconnect the electrical connections to the four injectors and the low pressure actuator. Switch the ignition back on, and clear the injection faults using the diagnostic tool.

Carry out TEST 11. → A

YES

The pump can supply the operating pressure.
Switch off the ignition, reconnect the electrical connections to the four injectors and the low pressure actuator. Switch the ignition back on, and clear the injection faults using the diagnostic tool.
Carry out fault finding on the injectors by checking the return rate of the four injectors. (See **TEST 9, injector sealing check**).

TEST 7 CONTINUED	



TEST 8	HIGH-PRESSURE CIRCUIT SEALING TEST

NOTES	**Special note:** Certain faults make it impossible to carry out this test - deal with these first.

There is a command that carries out a high pressure circuit sealing test when the engine is running.

This command can locate a leak in the high pressure circuit if a union is incorrectly fitted or screwed on. This test does not identify a minor leak due to a union not being tightened to torque.

This command is only possible if the engine temperature is **above 60°C**.

Watch out for any objects (tool or others) on the sides of the engine housing during the 4 accelerations (possible vibrations).

Use command **AC029 High-pressure circuit sealing test**; the engine will automatically carry out a cycle of four accelerations to increase the rail pressure and check for leaks in the high pressure circuit.

TEST 9	INJECTOR SEALING CHECK

NOTES	**Special note:** Certain faults make it impossible to carry out this test - deal with these first.

Command AC029 also checks the return volume of each injector to detect a leak inside the injectors.

Beware of any objects (tool or other) on the engine housing during the four cycles of the operation (possible vibrations).

Tooling required

- **Mot. 1711 "Injector flow measuring kit".**
  Or: use four tubes of internal diameter **4 mm** and approximately **50 cm** long, and four graduated measuring cylinders.

Procedure

- Ensure that the engine coolant temperature is **above 60°C**,
- **switch off the ignition;**
- disconnect the return pipes from the four injectors,
- cap the pump venturi tube to prevent the low pressure circuit from depriming,
- connect the four transparent tubes in place of the return pipes,
- put the other ends of the four pipes into four graduated measuring cylinders.

Having carried out these preparations, start the engine and let it idle for **2 minutes**.

– **Run** command **AC029 High pressure circuit sealing check**.
The engine will carry out automatically a cycle of four accelerations to increase the rail pressure and measure internal injector leaks under these conditions.

– **Once the cycle is complete, run command AC029 again** to obtain a correct reading of the return volume of each injector.

At the end of both cycles, the return volume of each injector should be **35 ml maximum**.
If the return volume of one of the injectors is above **35 ml**, replace the faulty injector.

– Disconnect the 4 transparent pipes and reconnect the injector return circuit.

TEST 9 CONTINUED	

Carry out the following test to confirm the repair:

- **With the ignition off, disconnect** the low pressure actuator from the pump (**brown IMV connector**) and connect the test adapter (**test IMV, Mot. 1711**).
- disconnect the 4 electrical connectors,
- switch on the ignition, connect the diagnostic tool and re-establish dialogue with the injection system,
- Go to the **Main computer statuses and parameters** screen.
- run **the starter for 5 seconds**,
- read the rail pressure maximum value (**PR038**) during the test on the diagnostic tool.

If the rail pressure (PR038) is not greater than 1050 bar, carry out test 7.

- **Switch off the ignition, and reconnect the four injectors electrically,**
- disconnect the test filling actuator (test IMV) and reconnect the low pressure actuator connector to the pump,
- switch the ignition back on, and clear the injection faults using the diagnostic tool.

TEST 10	INJECTOR RETURN FLOW IN STARTING PHASE

NOTES	**Special note:** Certain faults make it impossible to carry out this test - deal with these first. **IMPORTANT** **It is useless and dangerous to run the starter for more than 5 seconds.**

If the engine does not start, only the static leakage can be measured, i.e. the leakage with the injector closed, not actuated and under high pressure.

Make sure that the ignition circuit is working correctly (minimum engine speed **200 rpm**).

Tooling required

- **Mot. 1711 "Injector flow measuring kit".**
  Or: use four tubes of internal diameter **4 mm** and approximately **50 cm long and a test adapter (TEST IMV)**.

Procedure

- **Switch off the ignition,**
- disconnect the return pipes from the four injectors,
- cap the pump venturi tube to prevent the low pressure circuit from depriming,
- connect the four transparent pipes in place of the return pipes (**Mot. 1711**),
- disconnect the low pressure actuator from the pump (**brown IMV connector**) and connect a **test IMV** or the **Mot. 1711** adapter.
- **disconnect the four injectors electrically,**
- switch on the ignition and run **the starter for 5 seconds**,
- measure the amount of diesel fuel in each pipe.

Replace the injector(s) whose leak return is greater than 10 cm.

Switch off the ignition, and reconnect the four injectors electrically.
Disconnect the test IMV and reconnect the low pressure actuator connector to the pump.
Disconnect the four transparent tubes and reconnect the injectors return circuit.
Switch the ignition back on, and clear the injection faults using the diagnostic tool.

Carry out the following test to confirm the repair:

- **With the ignition off, disconnect** the low pressure actuator from the pump (**brown IMV connector**) and connect the test adapter (**test IMV, Mot. 1711**).
- disconnect the four injectors electrically,
- switch on the ignition, connect the diagnostic tool and re-establish dialogue with the injection system,
- Go to the **Main computer statuses and parameters** screen.
- engage **the starter for 5 seconds**,
- read the rail pressure maximum value (**PR038**) during the test on the diagnostic tool.

If the rail pressure (PR038) is not greater than 1050 bar, carry out test 7.

- **Switch off the ignition, and reconnect the four injectors electrically,**
- disconnect the test IMV and reconnect the low pressure actuator connector to the pump,
- switch the ignition back on, and clear the injection faults using the diagnostic tool.

TEST 11	DIESEL FILTER CHECK

Check the conformity of the diesel filter.

Is the diesel filter in order?

NO → Replace the filter with an original part.

YES ↓

Switch off the ignition and analyse the diesel fuel in the diesel filter.
– Disconnect the diesel supply and return hoses from the filter.
– Plug the filter inlets and outlets straight away using appropriate plugs.
Remove the filter from its holder and shake it well, keeping the plugs in place, then empty the contents of the filter into a glass container by lifting one protective plug and undoing the bleed screw.

Are black particles present on the bottom of the container?

YES ↓

Pass a magnet beneath the container to collect all the metal particles. Take the magnet away from the container.

Do the particles collected using the magnet cover a surface area greater than 1 cm^2?

YES ↓

Replace the entire injection system.

NO ↓

Diesel filter in good order.

NO ↓

Diesel filter correct.

NOTES	**Special note:** Only consult this customer complaint after a complete check with the diagnostic tool.

NO DIALOGUE WITH THE COMPUTER → **ALP1**

STARTING FAULT

- **THE ENGINE WILL NOT START** — **ALP2**
- **THE ENGINE STARTS WITH DIFFICULTY, OR STARTS THEN STALLS** — **ALP3**
- **STARTING DIFFICULT WITH WARM ENGINE** — **ALP4**

IDLING FAULTS

- **ROUGH IDLE (PUMPING)** — **ALP5**
- **IDLING SPEED TOO HIGH OR TOO LOW** — **ALP6**

DRIVING BEHAVIOUR

- ERRATIC ACCELERATION/DECELERATION AND ENGINE STALLING — ALP7
- ACCELERATION GAP — ALP8
- ENGINE CUT-OUT (STALLING) — ALP9
- ENGINE BUCKING — ALP10
- LOSS OF POWER — ALP11
- TOO MUCH POWER — ALP12
- EXCESSIVE CONSUMPTION — ALP13
- ENGINE RACES ACCELERATOR IS RELEASED OR WHEN CHANGING GEAR — ALP14
- ENGINE DIES ON PULLING AWAY — ALP15

NOISE, ODOURS OR SMOKE

- ENGINE RATTLING, NOISY — ALP16
- BLUE, WHITE OR BLACK SMOKE — ALP17
- SMOKE (BLUE, WHITE, BLACK) WHEN ACCELERATING — ALP18

ALP1	No dialogue with the computer

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the diagnostic tool is not causing the fault by trying to establish dialogue with a computer on another vehicle. If the tool is not at fault, and dialogue cannot be established with any other computer on the same vehicle, the cause could be a faulty computer interfering on the multiplex network. Check the battery voltage and, if necessary, adjust it to the proper voltage (**9.5 V < Battery voltage < 17.5 V**).

Perform fault finding on the multiplex network using the diagnostic tool.

Check for the presence and the condition of the injection fuses on the UPC, and in the engine fuse box.
Check the connection of the computer connectors and the condition of its connections.
Check the injection computer earths (quality, oxidation, earth bolts secure on the battery terminal).
Check that the supply to the computer is correct:
Earth on tracks H1, G4 and H4 of black 32 track connector A.
+ after ignition feed on track D1 of black 32 track connector A.

Ensure that the supply to the diagnostic socket is correct:
+ before ignition feed on track 16.
+ after ignition feed on track 1
Earth connection on tracks 4 and 5.

If dialogue has still not been established after these various checks, contact the Techline.

ALP2	The engine will not start

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check the inlet air circuit using TEST 5.

↓

Is the catalytic converter clogged or damaged? — YES → **Replace the catalytic converter.**

NO

↓

Check the electrical circuit using TEST 2.

↓

Is the timing set correctly? — NO → **Carry out the necessary repairs.**

YES

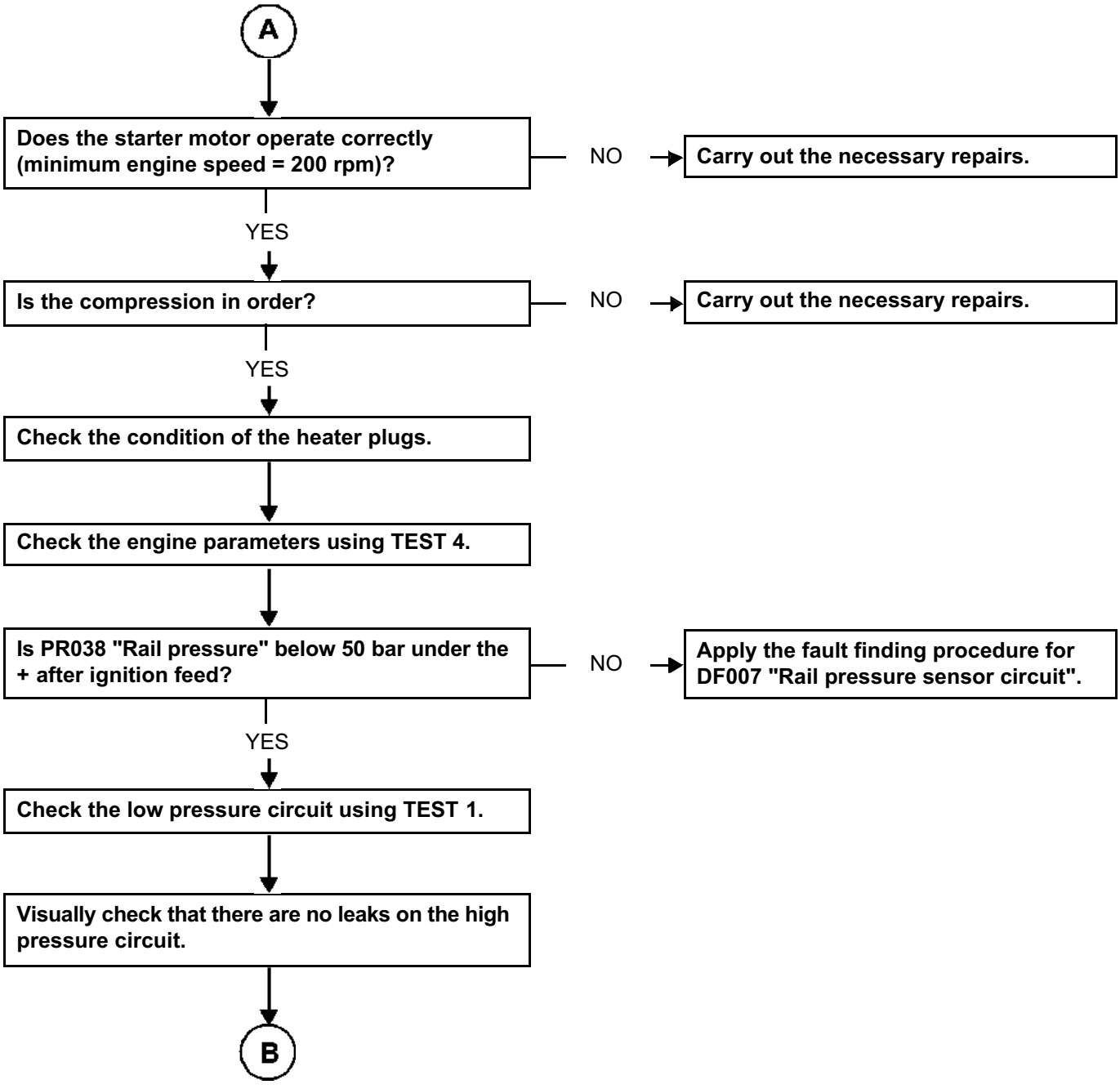
↓

Visually check the condition of the engine wiring harness.

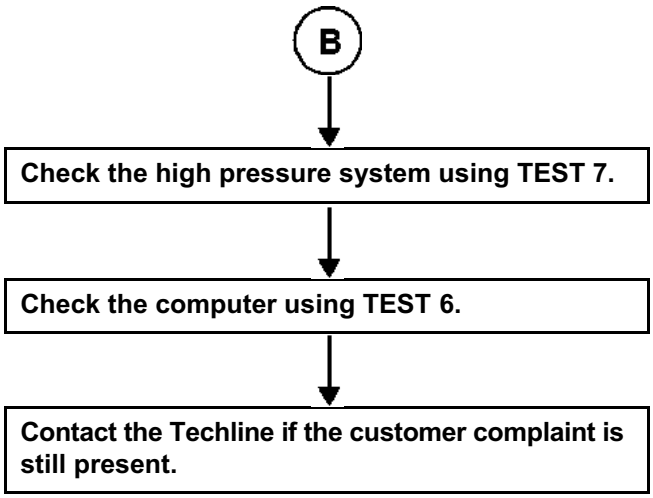
↓

(A)

ALP2 CONTINUED 1	

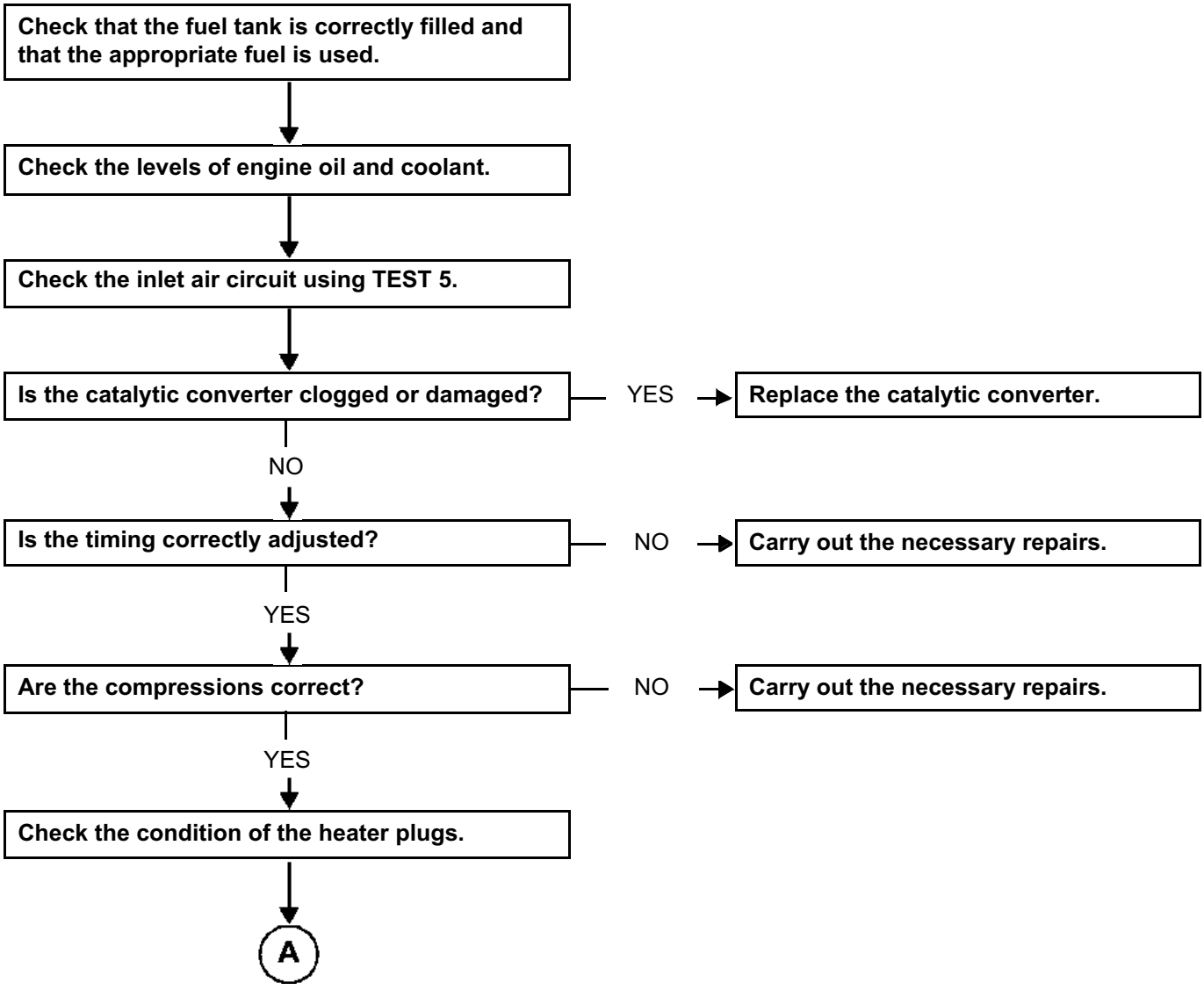


ALP2 **CONTINUED 2**	

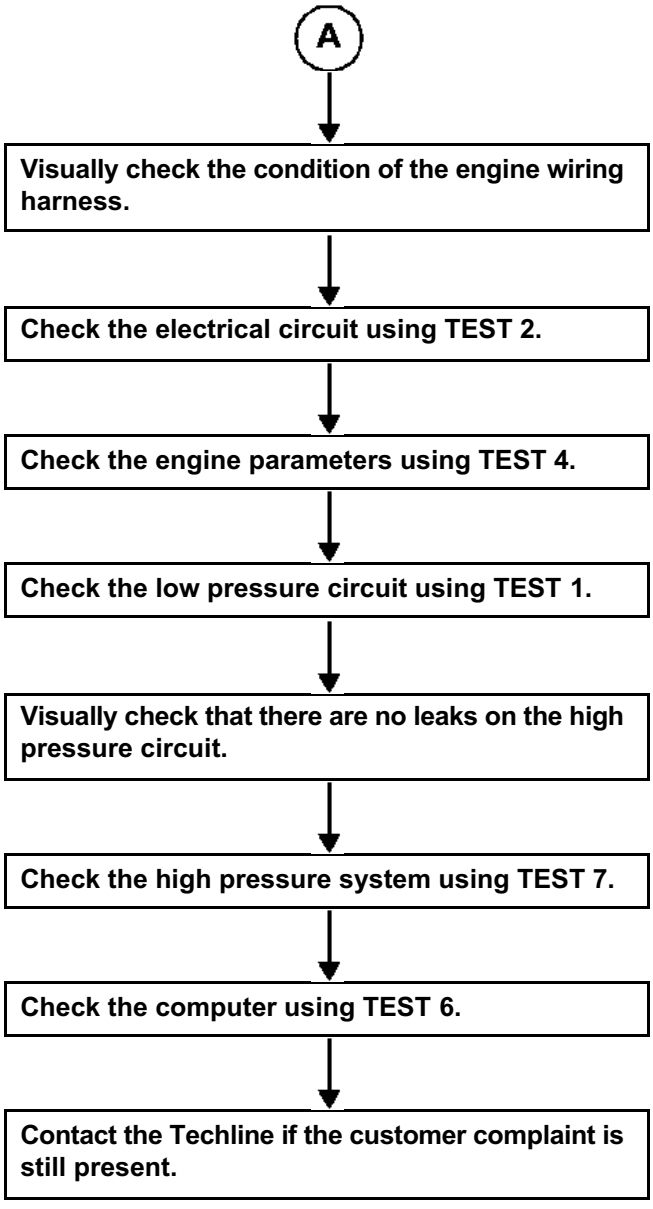


ALP3	The engine starts with difficulty, or starts then stalls

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.



ALP3 **CONTINUED**	



ALP4	Starting difficult with warm engine

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the inlet air circuit using TEST 5.

↓

Are the compressions correct? — NO → **Carry out the necessary repairs.**

YES

↓

Is the catalytic converter clogged or damaged? — YES → **Replace the catalytic converter.**

NO

↓

Check the engine parameters using TEST 4.

↓

Visually check the condition of the engine wiring harness.

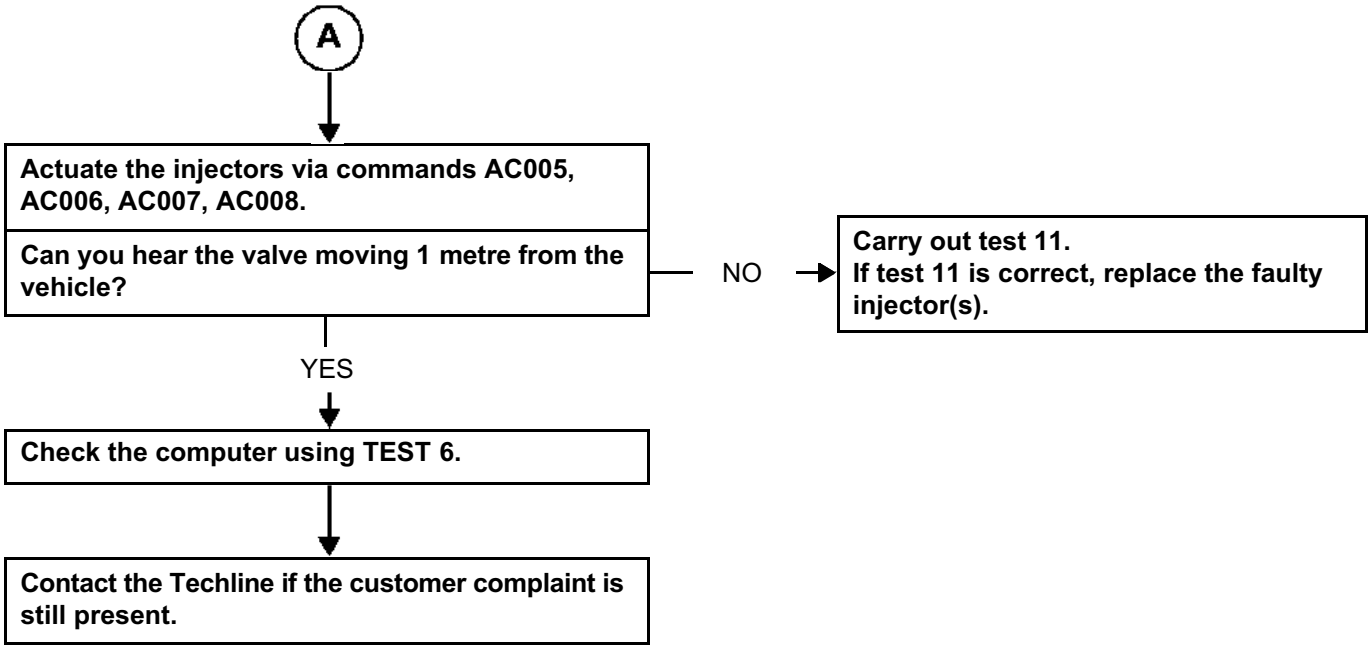
↓

Check the low pressure circuit using TEST 1.

↓

(A)

ALP4 CONTINUED	



ALP5	Rough idle (pumping)

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the low pressure circuit using TEST 1.

↓

Check the engine parameters using TEST 4.

↓

Visually check the condition of the engine wiring harness.

↓

Visually check that there are no leaks on the high pressure circuit.

↓

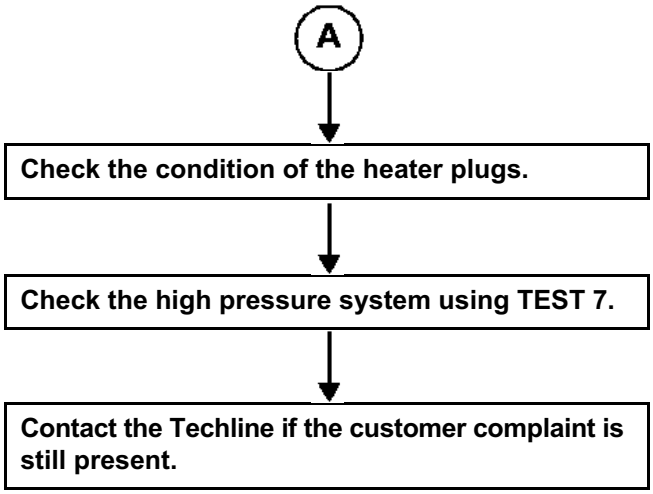
Is the compression in order? — NO → **Carry out the necessary repairs.**

YES

↓

(A)

ALP5 **CONTINUED**	



ALP6	Idling speed too high or too low

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine parameters using TEST 4.

↓

Check the electrical circuit using TEST 2.

↓

Is the clutch clearance set correctly? — NO → **Carry out the necessary repairs.**

YES

↓

Check the computer using TEST 6.

↓

Contact the Techline if the customer complaint is still present.

ALP7	Erratic acceleration/deceleration and engine racing

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the engine has not sucked up its oil (engine racing).

↓

Check the inlet air circuit using TEST 5.

↓

Check the engine parameters using TEST 4.

↓

Visually check the condition of the engine wiring harness.

↓

Check the injectors using TEST 3.

↓

Check the computer using TEST 6.

↓

Contact the Techline if the customer complaint is still present.

ALP8	Acceleration gap

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the inlet air circuit using TEST 5.

↓

Is the compression in order? — NO → **Carry out the necessary repairs.**

YES

↓

Check the engine parameters using TEST 4.

↓

Check that the turbocharger is working properly.

Is the turbocharger in order? — NO → **Carry out the necessary repairs.**

YES

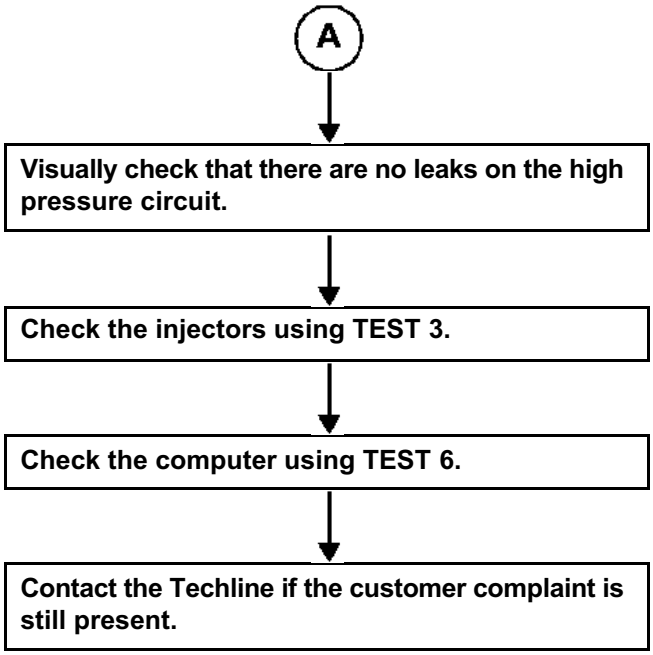
↓

Check the low pressure circuit using TEST 1.

↓

(A)

ALP8 **CONTINUED**	



ALP9	Engine stops (stalls)

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Check the inlet air circuit using TEST 5.

↓

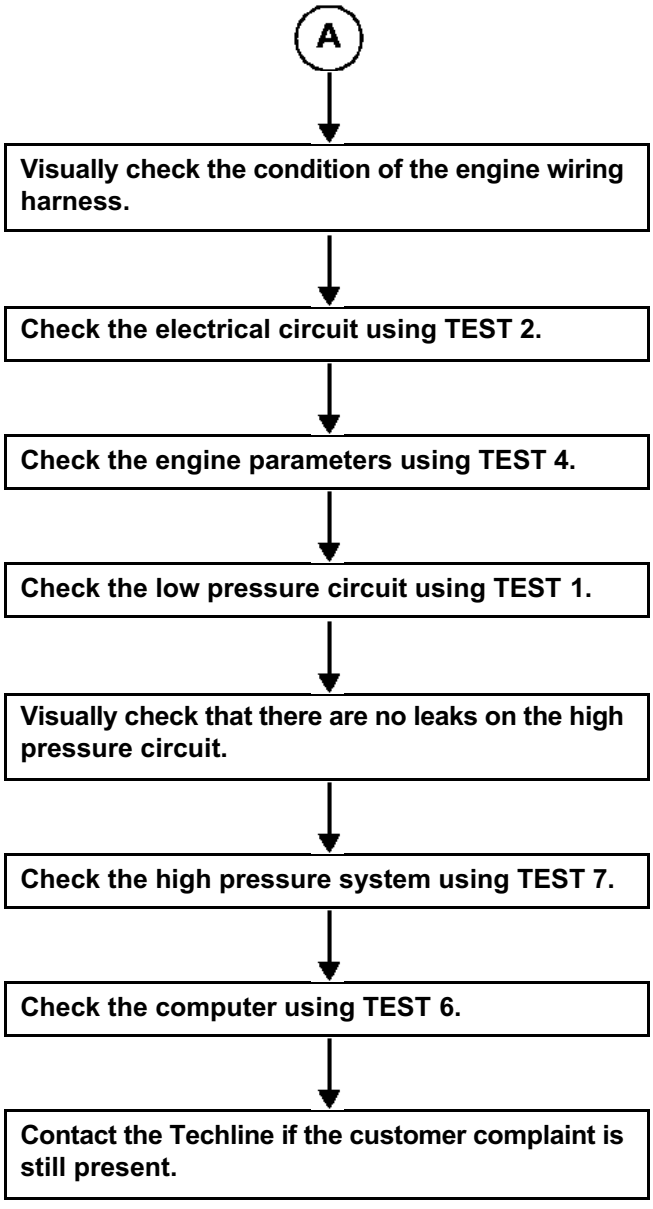
Is the catalytic converter clogged or damaged? — YES → **Replace the catalytic converter.**

NO

↓

(A)

ALP9 **CONTINUED**	



ALP10	Engine bucking

NOTES	**Special note:** Only consult this customer complaint after a complete check with the diagnostic tool. See **System operation, Function: Fuel supply management (timing, flow rate and pressure), flow capacity function (VLC) section.**

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the low pressure circuit using TEST 1.

↓

Check the engine parameters using TEST 4.

↓

Is the engine wiring harness cut or pinched? — YES → **Carry out the necessary repairs.**

NO

↓

Is the compression in order? — NO → **Carry out the necessary repairs.**

YES

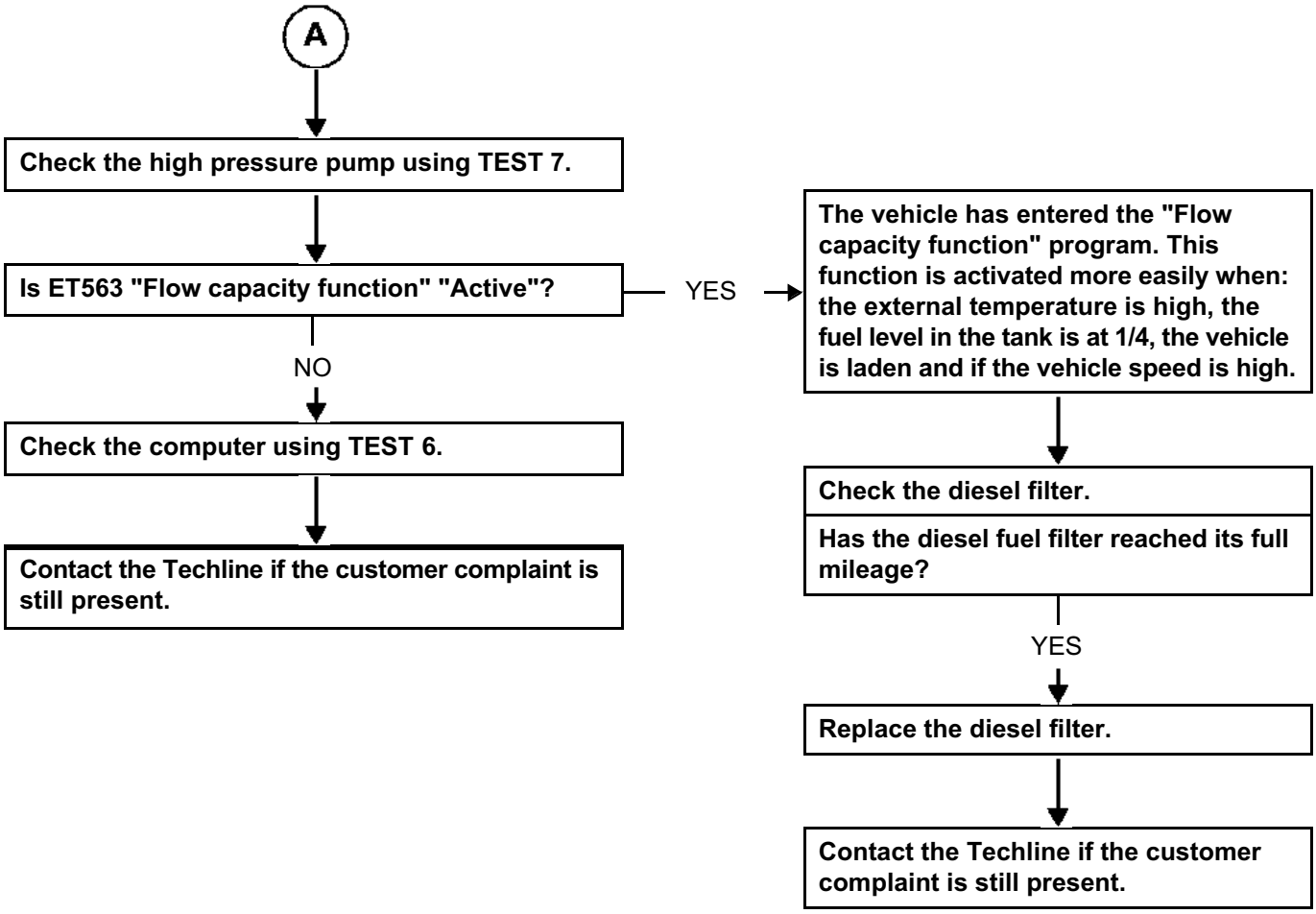
↓

Is the valve clearance set correctly? — NO → **Carry out the necessary repairs.**

↓

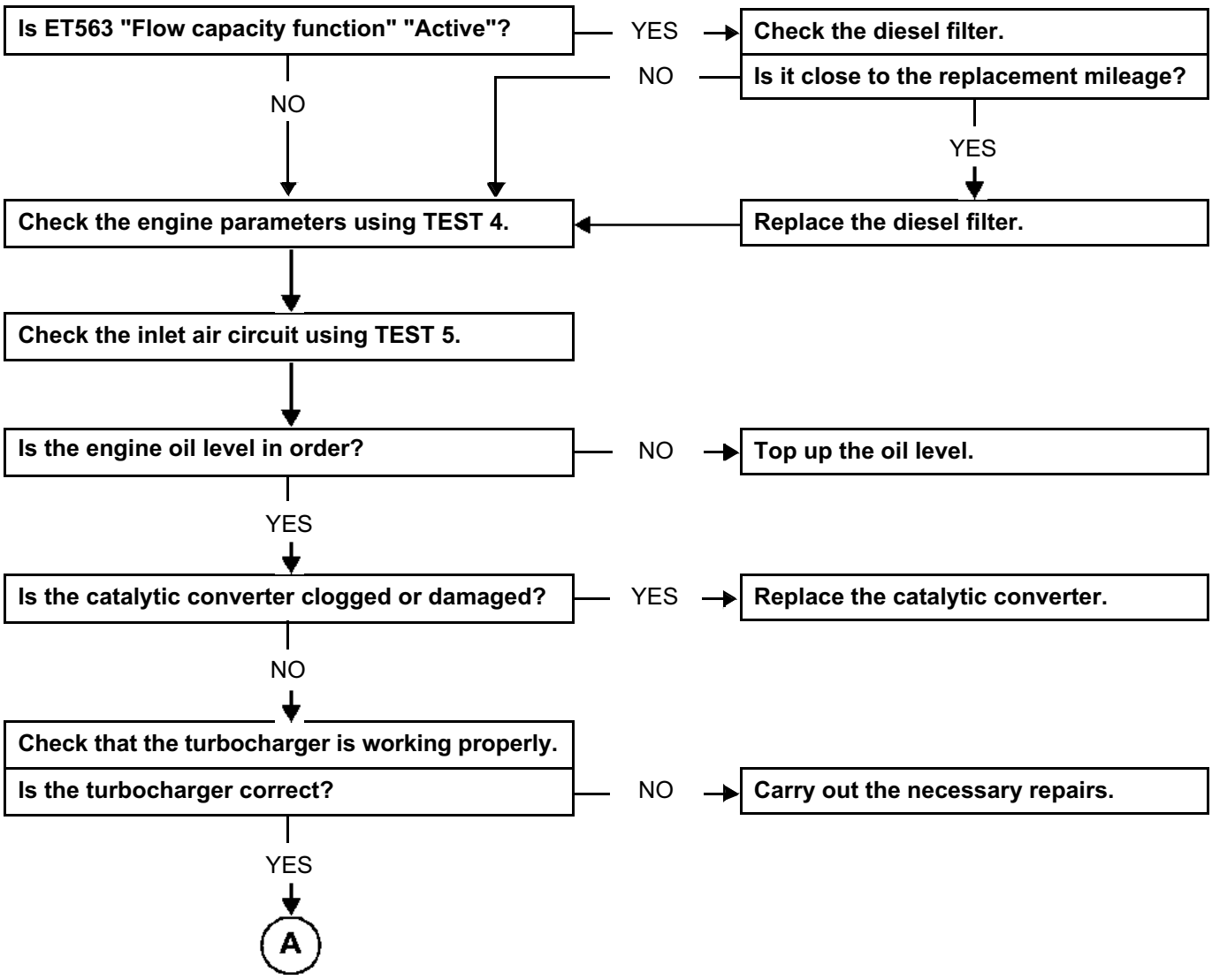
(A)

ALP10 CONTINUED	

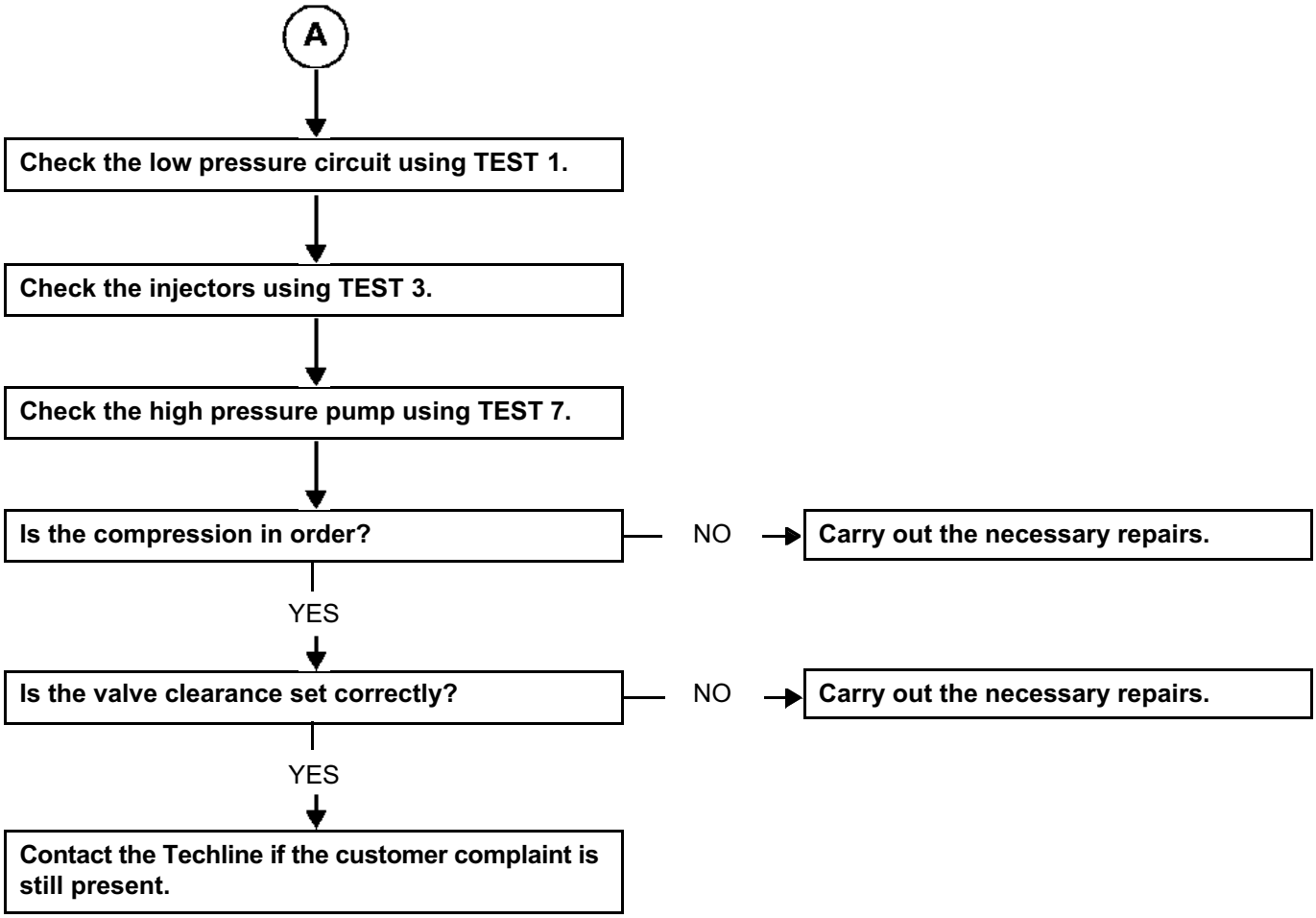


ALP11	Loss of power

NOTES	**Special note:** Only consult this customer complaint after a complete check with the diagnostic tool. See explanation for flow capacity function in system operation.



ALP11 CONTINUED	



ALP12	Too much power

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check the engine parameters using TEST 4.

↓

Check the inlet air circuit using TEST 5.

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Check the injectors using TEST 3.

↓

Check the computer using TEST 6.

↓

Contact the Techline if the customer complaint is still present.

ALP13	Excessive consumption

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Is the fuel temperature sensor leaking? — YES → **Replace the fuel temperature sensor.**

NO

↓

Check the low pressure circuit using TEST 1.

↓

Check the injectors using TEST 3.

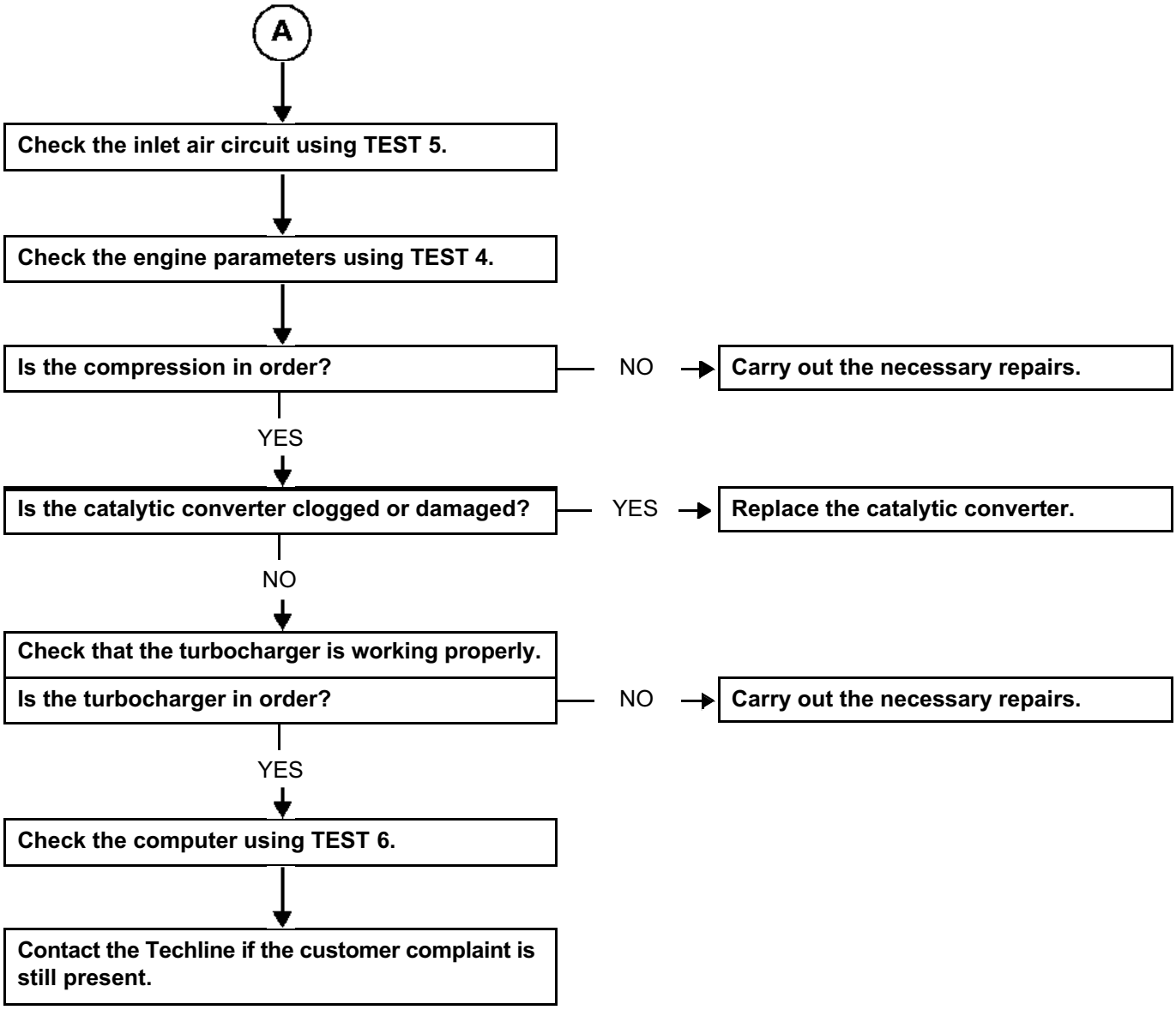
↓

Visually check that there are no leaks on the high pressure circuit.

↓

(A)

ALP13 CONTINUED	



ALP14	Engine races when accelerator is released or when changing gear

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that there are no obstacles that might impede the accelerator pedal travel (carpet, hard point, etc.).

↓

Check the engine parameters using TEST 4.

↓

Visually check the condition of the engine wiring harness.

↓

Is the clutch clearance set correctly? — NO → **Carry out the necessary repairs.**

YES

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Check that the turbocharger is working properly.

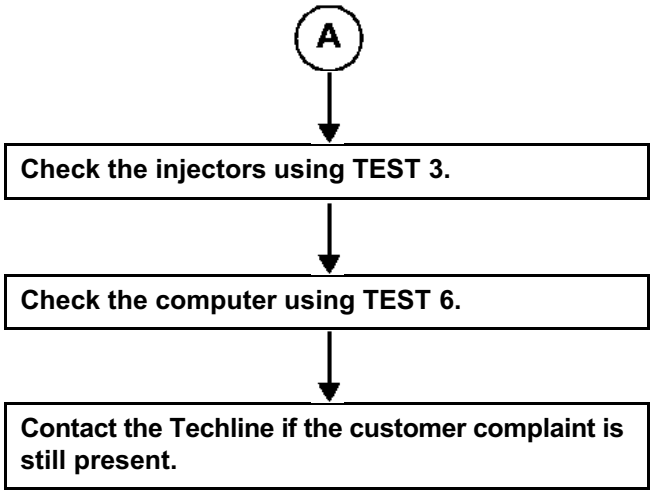
Is the turbocharger in order? — NO → **Carry out the necessary repairs.**

YES

↓

(A)

ALP14 **CONTINUED**	



ALP15	Engine dies when pulling away

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Is the clutch clearance set correctly? — NO → **Carry out the necessary repairs.**

YES

Check the engine parameters using TEST 4.

Check the inlet air circuit using TEST 5.

Is the catalytic converter clogged or damaged? — YES → **Replace the catalytic converter.**

NO

Check the low pressure circuit using TEST 1.

Visually check the condition of the engine wiring harness.

Check the computer using TEST 6.

Contact the Techline if the customer complaint is still present.

ALP16	Engine rattling, noisy

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Is the compression in order? — NO → **Carry out the necessary repairs.**

YES

↓

Check the condition of the heater plugs.

↓

Check the engine parameters using TEST 4.

↓

Check the inlet air circuit using TEST 5.

↓

Check the low pressure circuit using TEST 1.

↓

Check the injectors using TEST 3.

↓

Contact the Techline if the customer complaint is still present.

ALP17	Blue, white or black smoke

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Is the compression in order? — NO → **Carry out the necessary repairs.**

YES

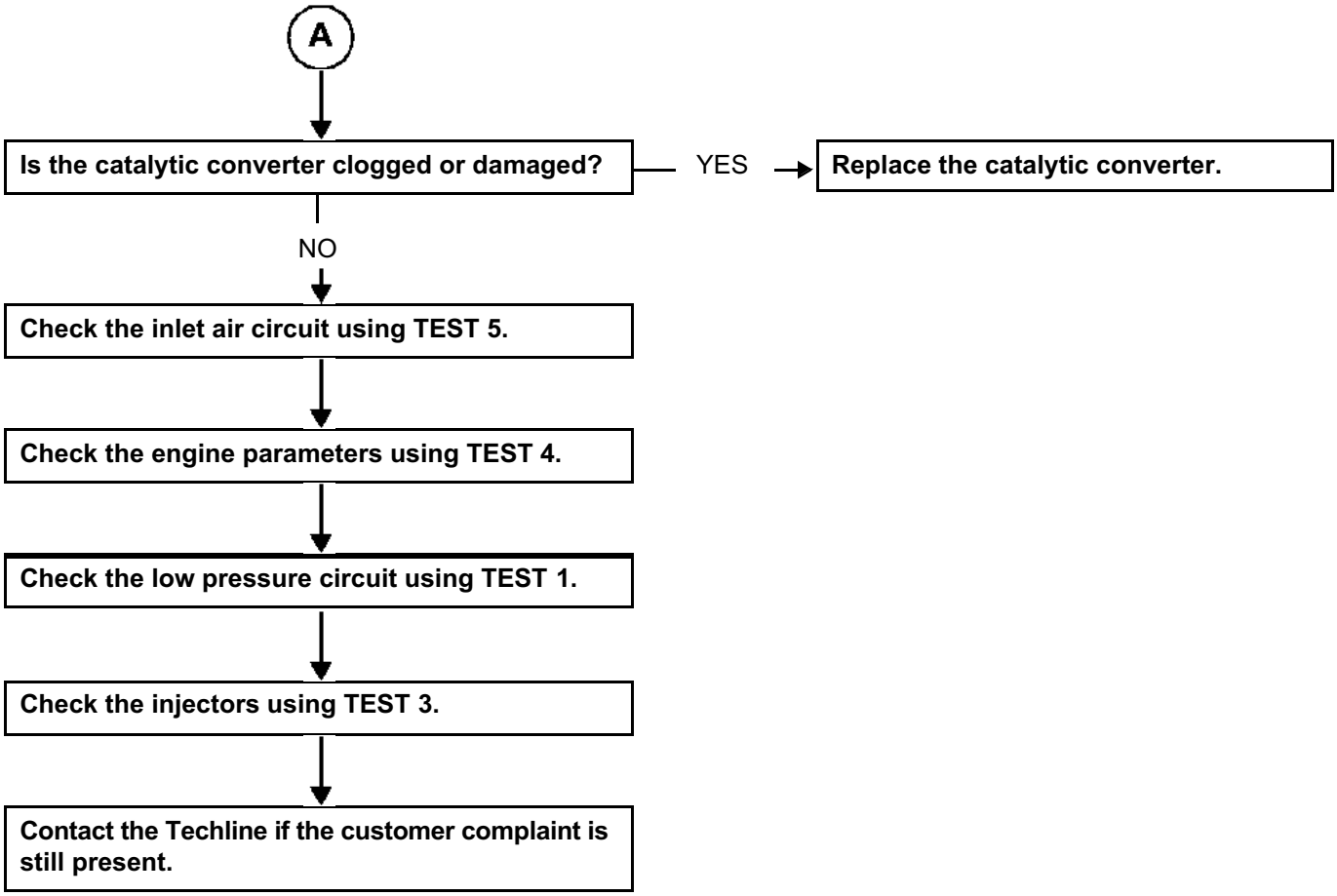
↓

Check the condition of the heater plugs.

↓

(A)

ALP17 CONTINUED	



ALP18	Smoke (black, white, blue) when accelerating

NOTES	Only consult this customer complaint after a complete check with the diagnostic tool.

Check that the fuel tank is correctly filled and that the appropriate fuel is used.

↓

Check the levels of engine oil and coolant.

↓

Check that the engine has not sucked up its oil (engine racing).

↓

Is the compression in order? — NO → **Carry out the necessary repairs.**

YES

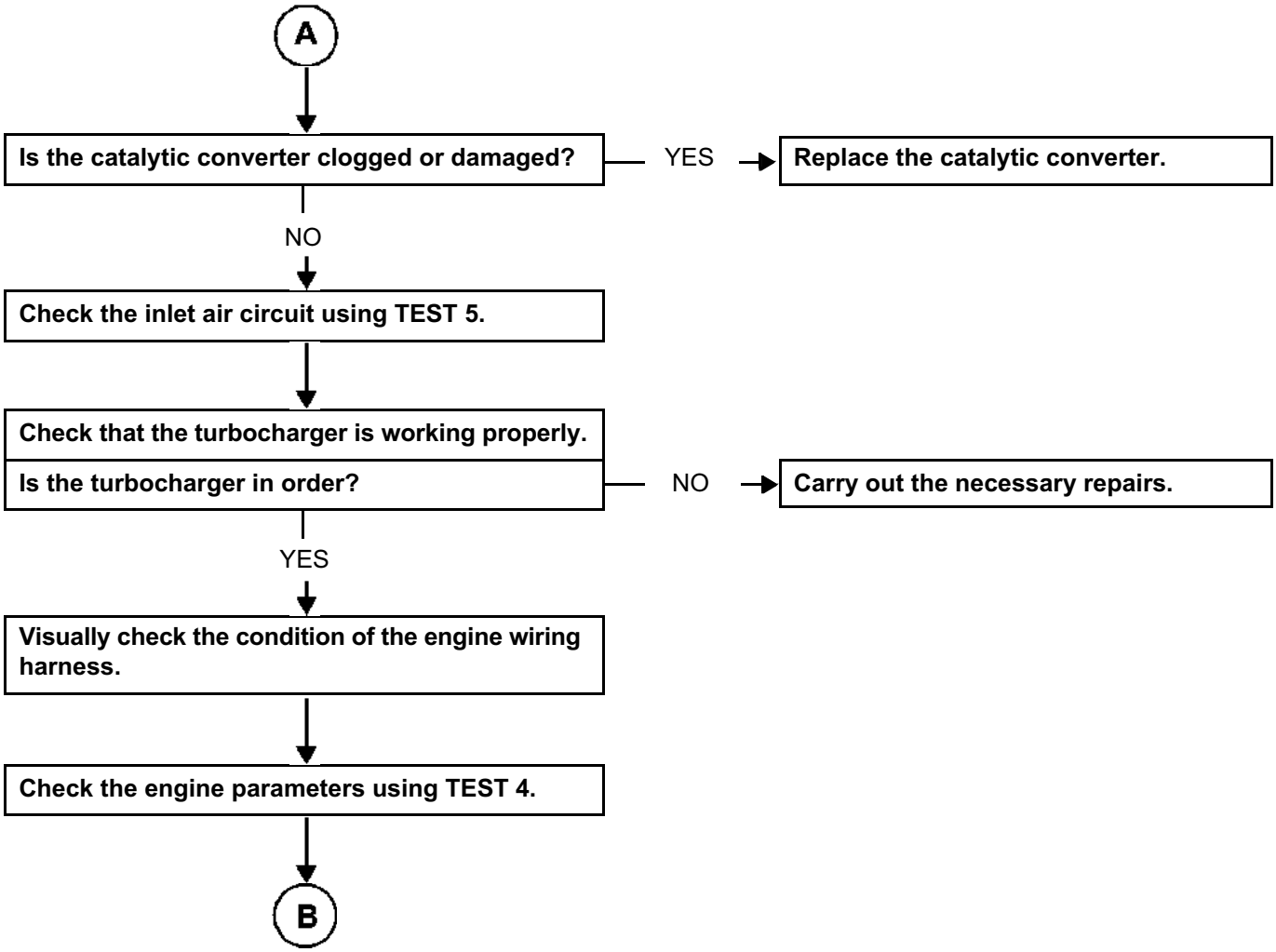
↓

Check the condition of the heater plugs.

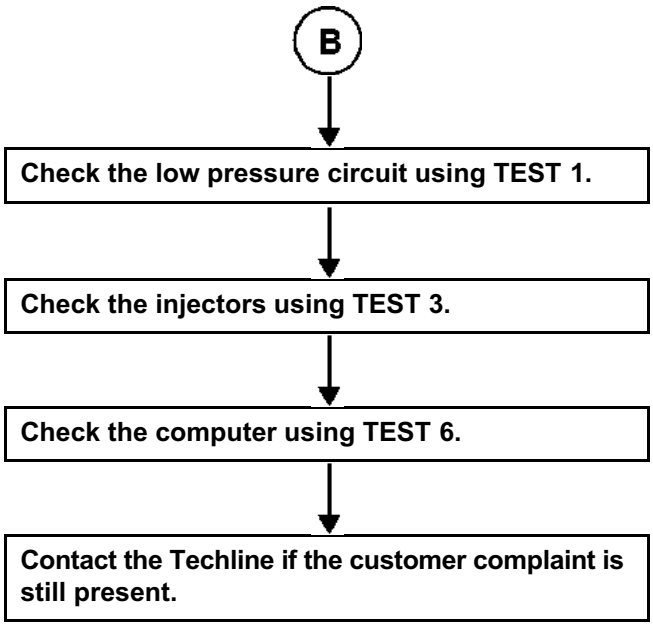
↓

(A)

ALP18 CONTINUED	



ALP18 **CONTINUED**	



DIESEL INJECTION
Fault finding - Introduction

1. SCOPE OF THIS DOCUMENT

This document presents the fault finding procedure applicable to all computers with the following specifications:

Vehicle(s): **Mégane II** *Engine type and suffix:* **F9Q 800, 808, 812** *Function concerned:* **Diesel injection**	*Computer name:* **Diesel injection** *Program no.:* **C1** *VDIAG No.:* **44, 48 and 4C**

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedures (this manual):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.

Wiring diagrams:
– Visu-Schéma (CD-ROM), paper version.

Type of diagnostic tools

– CLIP

Special tooling required

Special tooling required	
	Multimeter
Elé. 1590	Computer connection unit
Elé. 1681	Universal unit

3. RECAP

Procedure

To save energy, the UCH of the vehicle **interrupts the + after ignition feed after 3 minutes**.
To carry out fault finding on the vehicle's computers, switch the ignition to fault finding mode (forced + after ignition).

Proceed as follows:
– vehicle card in reader,
– press and hold Start button (longer than **5 seconds**) with start-up conditions not fulfilled,
– connect the diagnostic tool and perform the required operations.

Note:
The left-hand and right-hand xenon bulb computers are powered when the dipped headlights are lit. Fault finding procedures can only be carried out on them after the ignition has been switched on in fault finding mode (forced + after ignition) and the dipped headlights are lit.

To **cut off + after ignition**, proceed as follows:
– disconnect the diagnostic tool,
– vehicle card in reader,
– press the Start button twice briefly (less than **3 seconds**),
– Check that the + after ignition feed has been cut off by checking that the computer warning lights on the instrument panel have gone out.

Faults

Faults are declared as either present or stored (depending on whether they appeared in a certain context and have disappeared since, or whether they remain present but have not been diagnosed within the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is switched on after the + after ignition feed (without any system components being active).

For a **present fault**, apply the procedure described in the **Interpretation of faults** section.

For a **stored fault**, note the faults displayed and apply the instructions in the **Notes** section.

If the fault is **confirmed** when the instructions in the Notes section are applied, the fault is present. Deal with the fault.

If the fault is **not confirmed**, check:
- the electrical lines which correspond to the fault,
- the connectors for these lines (for oxidation, bent pins, etc.),
- the resistance of the component detected as faulty,
- the condition of the wires (melted or split insulation, wear).

Conformity check

The aim of the conformity check is to check statuses and parameters that do not produce a fault display on the diagnostic tool when they are inconsistent. Therefore, this procedure is used to:
- carry out fault finding on faults that do not have a fault display, and which may correspond to a customer complaint,
- check that the system is operating correctly and that there is no risk of a fault recurring after repairs.

This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.

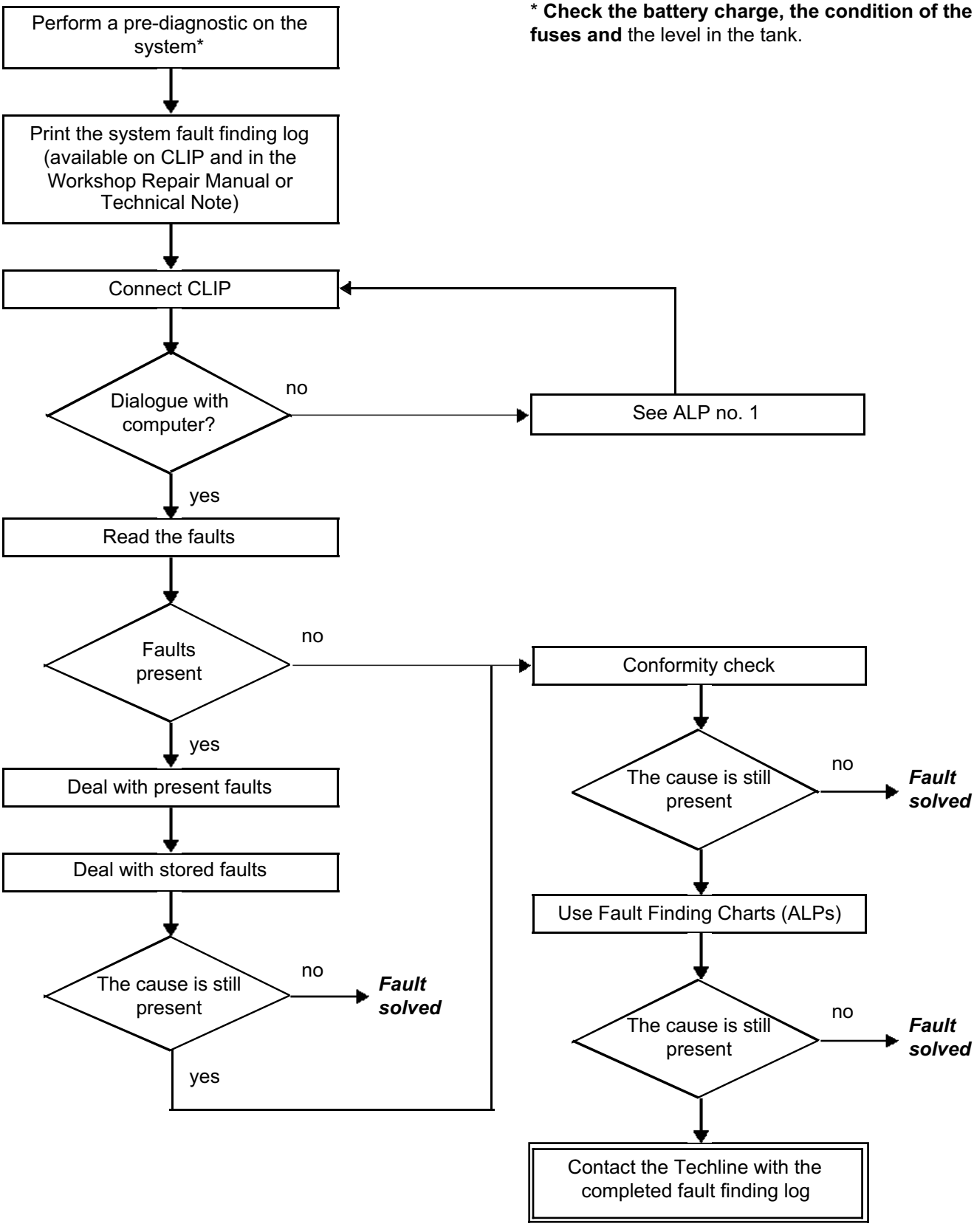
If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

Customer complaints - ALP

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be treated by **customer complaints**.

A summary of the overall procedure to follow is provided on the following page in the form of a flow chart.

4. FAULT FINDING PROCEDURE



* **Check the battery charge, the condition of the fuses and** the level in the tank.

4. FAULT FINDING PROCEDURE (continued)

Wiring check

Fault finding problems
Disconnecting the connectors and/or manipulating the wiring harness may temporarily remove the cause of a fault.
Electrical measurements of the voltage, resistance and insulation are generally correct, especially if the fault is not present when analysing (stored fault).

Visual inspection
Look for damage under the bonnet and in the passenger compartment.
Carefully check the fuses, insulators and wiring harness routing.
Look for signs of oxidation.

Tactile inspection
While manipulating the wiring harness, use the diagnostic tool to note any change in fault status from stored to present.
Make sure that the connectors are properly locked.
Apply light pressure to the connectors.
Twist the wiring harness.
If there is a change in status, try to locate the source of the fault.

Inspection of each component
Disconnect the connectors and check the appearance of the clips and tabs, as well as their crimping (no crimping on the insulating section).
Make sure that the clips and tabs are properly locked in the sockets.
Check that no clips or tabs have been dislodged during connection.
Check the clip contact pressure using an appropriate model of tab.

Resistance check
Check the continuity of entire lines, then section by section.
Look for a short circuit to earth, to **+ 12 V** or to another wire.

If a fault is detected, repair or replace the wiring harness.

5. FAULT FINDING LOG

IMPORTANT!

NOTE
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the procedure, enables you to keep track of the procedure which is carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE MANDATORY TO FILL OUT A FAULT FINDING LOG FOR EACH FAULT FINDING PROCEDURE.

You will always be asked for this log:
– when requesting technical assistance from the Techline,
– for approval requests when replacing parts for which approval is obligatory,
– to be enclosed when returning monitored parts on request. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY ADVICE

Safety rules must be observed whenever work is carried out on a component to prevent physical damage or human injury:
– make sure that the battery is properly charged to avoid damaging the computers with a low load,
– use the appropriate tools.

7. CLEANLINESS GUIDELINES THAT MUST BE OBSERVED WHEN OPERATING ON THE HIGH PRESSURE DIRECT INJECTION SYSTEM

Risks relating to contamination

The system is highly sensitive to contamination. The risks caused by the introduction of contamination are:
– damage or destruction to the high pressure injection system and the engine,
– a component seizing or leaking.

All After-Sales operations must be performed under very clean conditions. Performing an operation in a very clean environment means that no impurities (particles only a few microns in size) will have been able to enter the system during dismantling or into the circuits via the fuel unions.

The cleanliness guidelines must be applied from the filter through to the injectors.

7. CLEANLINESS GUIDELINES THAT MUST BE OBSERVED WHEN WORKING ON THE HIGH PRESSURE DIRECT INJECTION SYSTEM

Risks relating to contamination

The direct injection system is very sensitive to pollution. The risks associated with contamination are:
– damage to or destruction of the high pressure injection system,
– components seizing,
– a component leaking.

All After-Sales operations must be performed under very clean conditions.
This means that no impurities (particles a few microns in size) should enter the system during dismantling.

The cleanliness guideline must be applied from the filter to the injectors.

IMPORTANT

BEFORE CARRYING OUT ANY WORK ON THE INJECTION SYSTEM, CHECK WITH THE DIAGNOSTIC TOOL:

– that the rail is depressurised,
– that the fuel temperature is not too high.

What are the causes of contamination?

– metal or plastic chips,
– paint,
– fibres: from cardboard
from brushes,
from paper,
from clothing,
from cloths.
– foreign bodies such as hair,
– ambient air,
– etc.

NOTE
It is not possible to clean the engine using a high pressure washer because of the risk of damaging connections. In addition, moisture may collect in the connectors and create electrical connection faults.

Instructions to be followed before any work is carried out on the injection system:

Protect the accessories and timing belts, the electrical accessories (starter, alternator, electric power-assisted steering pump) and the mating face to prevent diesel fuel spilling onto the clutch friction plate.

Check that you have plugs for the unions to be opened (set of plugs available from the Parts Department). The plugs are single-use only. After use, they must be discarded (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must be discarded.

Ensure that you have hermetically resealable plastic bags for storing removed parts. There is less risk of parts stored in this way being exposed to contamination. These are single-use bags; after use they must be discarded.

Use lint-free cleaning cloths (Part no. **77 11 211 707**). Using normal cloth or paper is prohibited. They are not lint-free and could contaminate the fuel circuit. Each cloth should only be used once.

Use fresh cleaning agent for each operation (used cleaning agent is contaminated). Pour it into an uncontaminated container.

For each operation, use a clean brush in good condition (the brush must not shed its bristles).

Use a brush and cleaning agent to clean the unions to be opened.

Blast compressed air over the cleaned parts (tools, workbench, and the parts, unions and injection system area). Check that no bristles remain.

Wash your hands before and during the operation if necessary.

When wearing leather protective gloves, cover them with latex gloves to prevent contamination.

Instructions to be followed during the operation

As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Department. They must not be reused under any circumstances.

Close the hermetically sealed bag, even if it has to be reopened shortly afterwards. Ambient air carries impurities.

All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been plugged.

Using a brush, thinner, air gun, rifle-type brush or normal rag is strictly prohibited once the circuit has been opened. These items are likely to allow impurities to enter the system.

If a component is being replaced with a new component, do not remove the packaging until it is ready to be fitted to the vehicle.

The high pressure injection system is designed to deliver a precise quantity of diesel fuel to the engine at a set moment.

It is fitted with a **112-track BOSCH EDC16C3 type** computer.

The system comprises:

- a diesel filter,
- a high pressure pump with an integrated low pressure pump (transfer pump),
- a high pressure regulator mounted on the pump,
- an injection rail,
- a diesel fuel pressure sensor integrated into the rail,
- four solenoid injectors,
- a diesel fuel temperature sensor,
- a coolant temperature sensor,
- an upstream air temperature sensor,
- a cylinder reference sensor,
- an engine speed sensor,
- a turbocharging pressure sensor,
- an accelerator pedal potentiometer,
- an EGR solenoid valve,
- an atmospheric pressure sensor integrated into the injection computer,
- an air flow sensor,
- a turbocharging pressure limitation solenoid valve,
- a damper flap solenoid valve.

The **common rail** direct high pressure injection system works sequentially (based on the petrol engine multipoint injection function).

This injection system reduces operating noise, reduces the volume of pollutant gases and particles and produces high engine torque at low engine speeds thanks to a pre-injection procedure.

The high pressure pump generates the high pressure and transmits it to the injection rail. The actuator located on the pump controls the quantity of diesel fuel supplied, according to the requirement determined by the computer. The rail supplies each injector through a steel pipe.

a) The computer

– Determines the value of injection pressure necessary for the engine to operate correctly and then controls the pressure regulator.
– It checks that the pressure value is correct by analysing the value transmitted by the pressure sensor located on the rail.
– It determines the injection timing required to deliver the right quantity of diesel fuel and the moment when injection should start.
– Controls each injector electrically and individually after determining these two values.

The flow injected into the engine is determined by:
– the duration of injector control,
– the rail pressure (regulated by the computer),
– the injector opening and closing speed,
– the needle stroke (determined by a constant for the type of injector),
– the nominal hydraulic flow of the injector (specific to each injector).

The computer manages:
– idling regulation,
– exhaust gas flow reinjection to the inlet,
– fuel supply check (advance, flow and rail pressure),
– the fan assembly via the Protection and Switching Unit (centralised coolant temperature management function),
– the air conditioning (cold loop function),
– the cruise control/speed limiter function,
– the pre-postheating control.
– the fault warning lights via the multiplex network.

The high pressure pump is supplied at low pressure by an integrated low-pressure pump (transfer pump).
It supplies the rail, the pressure of which is controlled by the fuel flow actuator for charging, and for discharging by the injector valves. This compensates for pressure drops.
The fuel flow actuator enables the high pressure pump to supply the exact quantity of diesel fuel required to maintain the rail pressure. This component minimises the heat generated and improves engine output.
In order to discharge the rail using the injector valves, the valves are controlled by brief electrical pulses which are:
– short enough not to open the injector (passing through the feedback circuit from the injectors),
– long enough to open the valves and discharge the rail.

Multiplex connection between the vehicle's various computers

The Mégane II electronic system is a multiplex network. This enables dialogue between the various vehicle computers. As a result:
– the activation of the fault warning lights on the instrument panel is performed by the multiplex network, with the vehicle speed sensor on the gearbox deactivated,
– the vehicle speed signal is transmitted by the ABS-ESP computer via the multiplex network.

IMPORTANT
The engine must not operate with:
– Diesel fuel containing more than 10 % diester,
– Petrol, even in tiny quantities.

The system can inject diesel fuel into the engine at a pressure of up to **1350 bar**. Before each operation, check that the injection rail is depressurised and that the fuel temperature is not too high.

When working on the high pressure injection system, you must follow the cleanliness guidelines and safety advice specified in this document.

Removal of the internal parts of the pump and injectors is prohibited. Only the fuel flow actuator, the diesel fuel temperature sensor and the air vent unit can be replaced.

For safety reasons, it is strictly prohibited to undo a high pressure pipe union when the engine is running.

It is not possible to remove the pressure sensor from the fuel rail because this may cause circuit contamination faults. If the pressure sensor fails, the pressure sensor, the rail and the five high pressure pipes must be replaced.

It is strictly prohibited to remove any injection pump pulley bearing the number **070 575**. If the pump needs to be replaced, replace the pulley.

Supplying **+ 12 V** directly to any component in the system is prohibited.

Ultrasonic decoking and cleaning are prohibited.

Never start the engine unless the battery is connected correctly.

Disconnect the injection computer when carrying out any welding work on the vehicle.

b) Functions included

Air conditioning management assistance

In the case of vehicles with climate control, the EDC16 system has the option of deactivating the air conditioning via the UCH, under certain conditions of use:
– when requested by the driver,
– when starting the engine,
– if the engine overheats (in order to reduce the power the engine has to supply),
– when the engine speed is kept at a very high level (to protect the compressor),
– during transition phases (e.g. high acceleration demand for overtaking, anti-stalling and moving off). These conditions are only taken into account if they do not occur repeatedly, so as to prevent system instabilities (erratic deactivation),
– when certain faults appear.

Cold loop air conditioning management

The air conditioning is cold loop managed, shared between several computers. The injection computer is responsible for:
– authorising cold requests according to the refrigerant pressure, the engine coolant temperature and the engine speed,
– calculating the power absorbed by the compressor (from the refrigerant pressure),
– requesting operation of the fan assembly, from the UPC, according to the vehicle speed, the refrigerant pressure and the engine coolant temperature.

Passenger Compartment Heating Resistor Management

In order to reduce the time required to heat up the passenger compartment, the vehicle is fitted with **P**assenger **C**ompartment **H**eating resistors (**RCH**). These passenger compartment heating resistors are run and controlled by the UCH.
The injection computer authorises or prohibits the operation of the passenger compartment heating resistors according to the operating phases and engine power needs.

Cruise control/speed limiter management

When activated, **the cruise control function** maintains the vehicle at a preselected speed, regardless of the driving conditions encountered.
If the driver wishes to exceed the cruising speed, they may:

- depress the accelerator pedal and exceed the cruising speed (the vehicle will return to the initial cruising speed once the driver takes their foot off the pedal),
- press the system control buttons.

The cruise control function can be deselected either by:

- the system control buttons,
- deactivating the cruise control switch,
- when system events are detected, such as the brake pedal or clutch being depressed,
- when system errors are detected such as an inconsistent vehicle speed.

The cruise function can also be temporarily disabled when the driver wants to increase speed by depressing the accelerator pedal. The cruising speed is resumed when the driver releases the accelerator pedal.
It is possible to reactivate the vehicle speed control and resume the last cruising speed after deactivation (computer supply not cut off).

The vehicle speed limiter function enables, when it is active (switch turned on), the vehicle speed to be limited to a preselected value. The driver controls the vehicle in the normal way using the accelerator pedal until the limit speed is reached.
If the driver wishes to exceed the cruising speed, they may:

- exceed the accelerator pedal's kickdown point,
- increase the limit speed by pressing or pressing and holding the limit speed switch.

The speed limiter function can be deselected either:

- by using the system control buttons,
- by switching off the speed limiter switch,
- when system events are detected, such as the brake pedal or clutch being depressed,
- when system errors are detected such as an inconsistent vehicle speed.

c) Warning light management

Instrument panel display

The computer manages the data display on the instrument panel relating to engine operation. This involves 5 functions:

- the OBD warning light (European On Board Diagnostic),
- pre/postheating warning light,
- the coolant temperature warning light,
- the fault level 1 warning light (non-critical fault),
- the fault level 2 warning light (stop immediately).

These five functions are represented by 3 warning lights or messages sent by the trip computer.

Pre/postheating indicator light

This warning light is used both as an in operation indicator light and as a system fault indicator:

- continuously lit under + after ignition feed: indicates that the heater plugs are operating,
- continuously lit with **injection faulty**: indicates a level 1 fault (involves injection system operating in defect mode. The user must carry out repairs as soon as possible).

Temperature/emergency stop warning light

This indicator light is used both as an in-operation indicator light and as a system fault warning light. It lights up for **3 seconds** after the ignition is switched on (automatic test procedure managed by the instrument panel).

- continuously lit: indicates engine overheating (the driver remains free to stop the vehicle or not),
- continuously lit, with the **Engine stop** message: indicates a level 2 fault (In this case injection is automatically shut off after a few seconds).

Excess pollution OBD orange warning light

An engine symbol lights up for approximately **3 seconds** when the engine is switched on.
For the Vdiag 44 and 48, it only lights up when the engine is running.
In Vdiag 4C, this warning light comes on if the system has one or more OBD faults.

d) OBD management

The **OBD (On Board Diagnostic)** system enables detection of any faults relating to the vehicle emission control system (OBD EURO IV emission control standards exceeded).

This system should be active for the entire life of the vehicle.

1. Conditions causing an OBD fault

An OBD fault will be detected after **3 operating cycles**, and the following parameters will be saved in the calculator:

- engine load,
- vehicle speed,
- air temperature,
- coolant temperature,
- turbocharging pressure,
- rail pressure,
- air flow,
- vehicle mileage.

It allows the driver to know whether their vehicle has a fault directly linked to the emission control system.

2. System faults indicated by the OBD

Only a few faults are indicated by the OBD system:

- **DF012 Sensor supply voltage no. 2.**
- **DF038 Computer.**
- **DF040 Cylinder 1 injector circuit.**
- **DF041 Cylinder 2 injector circuit.**
- **DF042 Cylinder 3 injector circuit.**
- **DF043 Cylinder 4 injector circuit.**
- **DF209 EGR valve position sensor circuit.**
- **DF272 EGR valve control circuit.**
- **DF621 EGR valve jammed open.**

Some repair operations require programming to ensure that certain engine components function correctly. Follow the programming procedures (described in the component replacement section), if replacing an exhaust gas recirculation valve or an injector.

3. Conditions for clearing an OBD fault

An OBD fault is cleared in several steps.
The fault **present** in the diagnostic tool is not **stored** (following repair) until after 3 trips with the vehicle.
The OBD warning light will only light up after these 3 driving cycles.
The warning light coming on does not always mean that there is a fault on the system.

In order that the OBD fault and the display parameters are cleared from the computer, the system goes through 40 engine heating cycles.

An engine heating cycle is a driving cycle during which:
– the engine coolant temperature reaches at least 71.1 °C,
– the engine coolant temperature varies by 22.2 °C in relation to the engine starting temperature.

If one of these conditions is not fulfilled, the OBD fault will still be present or stored in the injection computer.

1 - Black connector A, 32-track

Track	Description
A1	Not used
A2	Cruise control switch earth
A3	CAN L network signal
A4	CAN H network signal
B1	Not used
B2	Not used
B3	Not used
B4	K line diagnostic socket output
C1	Not used
C2	Not used
C3	Cruise control switch supply
C4	Clutch supply signal output
D1	Protection and Switching Unit supply
D2	Cruise control programming control
D3	Cruise control programming feedback signal
D4	Not used
E1	Not used
E2	Not used
E3	Not used
E4	Brake switch supply signal output
F1	Not used
F2	Accelerator potentiometer load 2 supply
F3	Accelerator potentiometer load 2 signal
F4	Accelerator potentiometer load 2 earth

1 - Black connector A, 32-track (continued)

Track	Description
G1	UPC supply
G2	Accelerator potentiometer load 1 supply
G3	Not used
G4	Battery earth
H1	Battery earth
H2	Accelerator potentiometer load 1 signal
H3	Accelerator potentiometer load 1 earth
H4	Battery earth

2 - Brown connector B, 48-track

Track	Description
A1	Camshaft sensor earth
A2	Not used
A3	Not used
A4	Fuel rail pressure sensor supply
B1	TDC sensor supply signal
B2	Not used
B3	Not used
B4	Air flow sensor supply
C1	TDC sensor earth signal
C2	Not used
C3	Not used
C4	Fuel rail pressure sensor earth
D1	Camshaft sensor signal
D2	Not used
D3	Not used
D4	Turbocharging pressure sensor earth
E1	Injection locking relay coil earth control
E2	Air flow sensor earth signal
E3	Not used
E4	Not used
F1	Refrigerant pressure sensor signal
F2	Coolant temperature sensor supply signal
F3	Refrigerant pressure sensor supply
F4	EGR valve position sensor supply
G1	Air flow sensor supply signal
G2	Air temperature signal
G3	Fuel rail pressure sensor signal
G4	Turbocharging pressure sensor supply

2 - Brown connector B, 48-track (continued)

Track	Description
H1	Injection coolant temperature sensor earth
H2	Fuel temperature signal
H3	Not used
H4	Not used
J1	Not used
J2	Gas recirculation potentiometer signal
J3	Not used
J4	Inlet flap solenoid valve control
K1	Not used
K2	Turbocharging pressure sensor signal
K3	Not used
K4	Not used
L1	Not used
L2	Gas recirculation solenoid valve control
L3	Not used
L4	Flow sensor earth
M1	Not used
M2	UPC supply
M3	Not used
M4	Fuel pressure regulation solenoid valve control

3 - Grey connector C, 32-track

Track	Description
A1	Not used
A2	Water in diesel detection sensor signal
A3	Not used
A4	Preheating relay fault finding signal
B1	Not used
B2	Not used
B3	Not used
B4	Not used
C1	Not used
C2	EGR solenoid valve earth
C3	Refrigerant pressure sensor earth
C4	Not used
D1	Not used
D2	Not used
D3	Not used
D4	Not used
E1	Turbocharging pressure solenoid valve control
E2	Preheating relay control
E3	Not used
E4	Not used
F1	Fuel temperature earth
F2	Not used
F3	Not used
F4	Not used
G1	Injector 4 control
G2	Injector 2 control
G3	Injector 1 earth
G4	Injector 2 earth
H1	Injector 1 control
H2	Injector 3 control
H3	Injector 4 earth
H4	Injector 3 earth

COMPUTER REPLACEMENT OR REPROGRAMMING OPERATIONS

The system can be programmed or reprogrammed via the diagnostic socket using the RENAULT CLIP diagnostic tool (see Technical Note **3585A**).
While the computer is being reprogrammed the engine fan assemblies are automatically triggered.

IMPORTANT
– Switch on the diagnostic tool (mains or cigarette lighter supply).
– Connect a battery charger.
– Switch off all the electrical consumers (lights, interior lights, air conditioning, radio CD, etc.).
– Wait for the engine to cool (engine coolant temperature below 60 °C and air temperature below 50 °C).

Before reprogramming or replacing the computer in After-Sales operations, **backup the following data to the diagnostic tool**:
– The IMA codes (**individual correction of the injector**).
– The engine adaptives (engine speed, and options available on the vehicle).

(this file corresponds to the last backup carried out on the tool)

select **YES**,

When the backup is complete, replace the computer or reprogram, then proceed to the next step,

with command **SC003 Backup computer data**.

IMPORTANT
A computer without the IMA option can be replaced by a computer with this option. The codes have therefore not been backed up during command SC003.
In this case, status ET104 Injector code use becomes YES or FAULTY, fault DF276 Injector code programming is present, and the engine operates in defect mode.
In this case, run command SC002 Enter injector codes, applying the procedure described in the interpretation of this command.

After programming, reprogramming or replacing the computer:
– Switch the ignition off and then on again,
– start and then stop the engine (to initialise the computer) and wait for 30 seconds,
– use the diagnostic tool to carry out the following procedures:

– run command **SC001 Enter saved data**, to re-establish the injector codes and engine adaptives,
– run command **VP010 Write VIN**,
– deal with any faults detected by the diagnostic tool. Clear the computer memory.
– Carry out a road test followed by another check with the diagnostic tool.

Note:
If commands **SC001** and **SC003**, have been forgotten or do not work after replacing or (re)programming the computer, enter the IMA codes for each injector manually by reading the code on each injector (see **Replacement of injectors**).

NOTE
– The injection computer retains the immobiliser code for life,
– the system has no security code,
– it is prohibited to perform tests with computers borrowed from the Parts Department or from another vehicle which must then be returned,
– these computers are hard-coded,
– if the injection computer appears to be faulty, contact the Techline and refer to the fault finding log.

REPLACING THE INJECTORS

Note:
The IMA coding (individual injector correction) is a calibration made in production on **each injector** to **adjust the flow** accurately.
These correction values are etched on the Bakelite body of each injector (6 alphanumerical characters) and then entered into the computer which then controls each injector taking into account their **manufacturing dispersion**.

When one or more injectors are replaced, the IMA parameters of the injector output concerned must be modified.
The system can be configured with the diagnostic socket using the RENAULT CLIP diagnostic tool.

To do this, display the **IMA** code(s) etched on the injector bodies, and enter the codes into the computer using command **SC002 Enter injector codes**, and follow the instructions given by the diagnostic tool.

NOTE
When the command is completed, switch off the ignition and exit fault finding mode.
Wait **30 seconds**.
Return to fault finding mode.
Select the **Identify computer** function from the main screen.
Check that the injector codes entered into the computer correspond to those on the body of the injectors.
If the codes do not match, restart command **SC002 Enter injector codes**.
Then check the system faults, and clear any stored faults.
If the computer does not have any faults, the operation is complete.
If there are faults, deal with the present faults.

REPLACING THE EXHAUST GAS RECIRCULATION VALVE

When replacing the exhaust gas recirculation valve, enter the operational values of the new valve into the computer.

After replacing the exhaust gas recirculation valve, select **Clear** mode on the diagnostic tool.
Run command **RZ002 EGR adaptives**.

When the command is completed, switch off the ignition and exit fault finding mode.
– wait **30 seconds**, and switch on the ignition again,
– clear any faults,
– start the engine,
– let the engine idle for 1 min, accelerate to 2500 rpm for 5 seconds, and return to idle speed,
– repeat this procedure 5 times.
Check the faults.
If the fault does not recur, end the fault finding procedure.
If the fault recurs, restart the procedure after disconnecting and reconnecting the valve.
If the fault is still present, replace the EGR valve.

WARNING LIGHT MANAGEMENT

Management of instrument panel warning lights according to faults displayed.

Tool fault	Asso-ciated DTC	Diagnostic tool title	Level 1 fault warning light (Orange preheating warning light)	Level 2 fault warning light (Red overheating warning light)	No fault warning light lit	OBD warning light lit
DF001	**115**	Coolant temperature sensor circuit	CO.1 / CC.0	...	...	...
DF003	**105**	Atmospheric pressure sensor circuit	1.DEF / 2.DEF / 3.DEF	...	...	...
DF004	**235**	Turbocharging pressure sensor circuit	CO.0/CC.1	...	1.DEF	...
DF005	**335**	Engine speed sensor circuit	...	...	1.DEF / 2.DEF	...
DF007	**190**	Rail pressure sensor circuit		CO.1 / 1.DEF / 2.DEF	CC.0	...
DF008	**225**	Pedal potentiometer gang 1 circuit	CO.0 / CC.1 / 1.DEF / 2.DEF	...	...	...
DF009	**2120**	Pedal potentiometer gang 2 circuit	CO.0 / CC.1 / 1.DEF	...	...	...
DF011	**641**	Sensor supply voltage no. 1	1.DEF / 2.DEF	...	...	...
DF012	**651**	Sensor supply voltage no. 2	1.DEF / 2.DEF	...	...	1.DEF / 2.DEF
DF013	**697**	Sensor supply voltage no. 3	...	1.DEF/2.DEF	...	...
DF015	**685**	Main relay control circuit	...	...	1.DEF / 2.DEF	...
DF017	**380**	Pre-postheating unit control circuit	CC.0	...	CC.1/ CO/ 1.DEF	...
DF025	**670**	Preheating unit fault finding connection		...	X	...
DF037	**C167**	Engine immobiliser		...	X	...
DF038	**606**	Computer	5.DEF / 13.DEF	1.DEF / 2.DEF / 3.DEF / 4.DEF / 6.DEF / 7.DEF / 8.DEF / 9.DEF / 10.DEF / 11.DEF / 12.DEF	...	5.DEF
DF039	**110**	Inlet air temperature sensor circuit	...	...	CC.0 / CO.1 / 1.DEF	...

Tool fault	Asso-ciated DTC	Diagnostic tool title	Level 1 fault warning light (Orange preheating warning light)	Level 2 fault warning light (Red overheating warning light)	No fault warning light lit	OBD warning light lit
DF040	**201**	Cylinder 1 injector circuit	CO	CC.1 / CC / 1.DEF	...	CO
DF041	**202**	Cylinder 2 injector circuit	CO	CC.1 / CC / 1.DEF	...	CO
DF042	**203**	Cylinder 3 injector circuit	CO	CC.1 / CC / 1.DEF	...	CO
DF043	**204**	Cylinder 4 injector circuit	CO	CC.1 / CC / 1.DEF	...	CO
DF046	**560**	Battery voltage	...	...	1.DEF/ 2.DEF	...
DF047	**615**	Computer supply voltage	...	...	X	...
DF049	**530**	Refrigerant sensor circuit	...	...	CC.1 / CO.0	...
DF050	**571**	Brake switch circuit	...	...	1.DEF / 2.DEF	...
DF051	**575**	Cruise control/speed limiter function	...	...	1.DEF / 2.DEF / 3.DEF	...
DF053	**89**	Rail pressure regulation function	3.DEF / 8.DEF	CC.0 / CC.1 / CO / 1.DEF / 2.DEF / 5.DEF / 6.DEF / 7.DEF	4.DEF	...
DF054	**33**	Turbocharging solenoid valve control circuit	CO / CC.0 / CC.1 / 1.DEF	...	...	...
DF055	**243**	Turbocharging pressure regulation circuit	1.DEF / 2.DEF	...	...	...
DF056	**100**	Air flow sensor circuit	3.DEF / 4.DEF	...	CC.0 / CC.1 / 1.DEF / 2.DEF	
DF057	**2264**	Water in diesel fuel detector circuit	...	...	X	...
DF067	**638**	Damper control circuit	...	CC.0	CO/ CC.11.DEF /	...
DF069	**1620**	Impact detected signal			X	
DF070	**830**	Clutch switch circuit	...	...	1.DEF / 2.DEF	...

FAULT WARNING LIGHT MANAGEMENT (continued)

Tool fault	Asso-ciated DTC	Diagnostic tool title	Level 1 fault warning light (Orange preheating warning light)	Level 2 fault warning light (Red overheating warning light)	No fault warning light lit	OBD warning light lit
DF091	**500**	Vehicle speed signal	...	...	1.DEF/ 2.DEF/ 3.DEF/ 4.DEF/ 5.DEF	...
DF097	**340**	Camshaft sensor circuit			1.DEF / 2.DEF	
DF098	**180**	Fuel temperature sensor circuit	...	...	CC.0 / CO.1	
DF114	**400**	EGR solenoid valve circuit	...	...	1.DEF / 2.DEF	
DF118	**409**	EGR solenoid valve servo	...	...	1.DEF / 2.DEF	...
DF119	**365**	Camshaft sensor signal	...	...	1.DEF / 2.DEF	...
DF120	**385**	Engine speed sensor signal		...	1.DEF / 2.DEF	...
DF209	**486**	EGR valve position sensor circuit			1.DEF	CC.1/ CO.0
DF250	**C122**	ESP function	...	...	1.DEF / 2.DEF	...
DF272	**403**	EGR valve control circuit	CC.0		CC.1 / CO/ 1.DEF	CC.0
DF276	**611**	Injector code programming	1.DEF/2.DEF			
DF530	**148A**	EGR programming adaptives			X	
DF619	**487**	EGR valve jammed open	X	...	...	...
DF620	**148B**	EGR valve fouled	X	...	...	...
DF621	**2413**	EGR valve is jammed open (OBD fault)	...	...	...	X
DF622	**2142**	EGR valve jammed open	...	...	X	...

DF001 PRESENT OR STORED	COOLANT TEMPERATURE SENSOR CIRCUIT CC.0 : short circuit to earth CO.1 : open circuit or short circuit to + 12 V

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present with the engine running or following a road test.
	Special notes: If the fault is present: – the coolant temperature: **PR064: Coolant temperature** is stuck at **119 °C**, – the preheating phase is lasts longer than **10 seconds**, – the fan assembly is permanently supplied, The **level 1** warning light is lit. Use bornier **Elé. 1681** for any work on the computer connectors.

CC.0	***NOTES***	None

Check the coolant temperature sensor connections.
Repair if necessary.

Measure the **resistance** of the coolant temperature sensor between **terminals 2 and 3** of the black connector.
Replace the sensor if the resistance is not approximately:
12,460 ± 112 Ω at - 10 °C
2,252 ± 112 Ω at 25 °C
811.4 ± 39 Ω at 50 °C
283 ± 8 Ω at 80 °C
115 ± 3 Ω at 110 °C

Check the injection computer connections.

Check the **continuity and the absence of interference resistance** of the following connections:
Injection computer 48-track brown connector B **track F2** ⟶ **Track 3** coolant temperature sensor
Injection computer 48-track brown connector B **track H1** ⟶ **Track 2** coolant temperature sensor
Repair if necessary.

If the fault is still present, replace the coolant temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF001 **CONTINUED**	

CO.1	***NOTES***	None

Check the coolant temperature sensor connections.
Repair if necessary.

Measure the **resistance** of the coolant temperature sensor between **terminals 2 and 3** of the black connector.
Replace the sensor if the resistance is not approximately: **12,460 ± 112 Ω at -10 °C**
2,252 ± 112 Ω at 25 °C
811.4 ± 39 Ω at 50 °C
283 ± 8 Ω at 80 °C
115 ± 3 Ω at 110 °C

Check the injection computer connections.

Check the **continuity and the absence of interference resistance** of the following connections:
Injection computer 48-track brown connector B **track H1** → **Track 2** coolant temperature sensor
Injection computer 48-track brown connector B **track F2** → **Track 3** coolant temperature sensor
Repair if necessary.

If the fault is still present, replace the coolant temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF003 PRESENT OR STORED	ATMOSPHERIC PRESSURE SENSOR CIRCUIT 1.DEF: signal outside upper limit 2.DEF: signal outside lower limit 3.DEF: inconsistent signal

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after: **– the engine is started,** **– carrying out a road test.**
	Special notes: The atmospheric pressure sensor is integrated into the injection computer, and cannot be separated.
	If the fault is present: – there is light smoke, – the atmospheric pressure value changes to default mode, **PR035 Atmospheric pressure = 750 mbar**, – the **level 1** warning light is lit. Use bornier **Elé. 1681** for any work on the computer connectors.

Disconnect the injection computer and check the condition of the contacts and connector.
Repair if necessary.
Display the value of parameter **PR041 Turbocharging pressure**.
If this value is stuck at **750 mbar**, refer to interpretation of fault **DF004 Turbocharging pressure sensor circuit**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF004 PRESENT OR STORED	TURBOCHARGING PRESSURE SENSOR CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to + 12 V 1.DEF: inconsistent signal

NOTES	**Order of priority in the event of more than one fault:** If there is a combination of faults **DF004 and DF011 Sensor supply voltage no. 1, deal with fault DF011 first**.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present after starting the engine, or during a road test.
	Special notes: Use bornier **Elé. 1681** for all operations on the injection computer connectors. If the fault is present: – the EGR function is inhibited, – the turbocharging pressure sensor is in defect mode, **PR041 = 750 mbar**, – the inlet air temperature is in defect mode, **PR059 = 25 °C**. The **level 1** warning light is lit.

CO.0	***NOTES***	None

Check the turbocharging pressure sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation against earth** of the following connections:

Injection computer brown 48-track connector B **track K2** → **Track 3** turbocharging pressure sensor connector

Injection computer 48-track brown connector B **track G4** → **Track 1** turbocharging pressure sensor connector

Repair if necessary.

If the fault is still present, replace the turbocharging pressure sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF004 **CONTINUED**	

CC.1	***NOTES***	None

Check the turbocharging pressure sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation against + 12 V** of the following connections:

- Injection computer 48-track brown connector B **track D4** → **Track 2** turbocharging pressure sensor connector
- Injection computer 48-track brown connector B **track K2** → **Track 3** turbocharging pressure sensor connector

Repair if necessary.

If the fault is still present, replace the turbocharging pressure sensor.

1.DEF	***NOTES***	None

If it occurs with fault DF003, perform fault finding procedure on parameter **PR041 Turbocharging pressure**.
If the turbocharging pressure sensor is correct, contact the Techline.

Check the turbocharging pressure sensor connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity and the absence of interference resistance** of the following connections:

- Injection computer 48-track brown connector B **track G4** → **Track 1** turbocharging pressure sensor connector
- Injection computer 48-track brown connector B **track D4** → **Track 2** turbocharging pressure sensor connector
- Injection computer 48-track brown connector B **track K2** → **Track 3** turbocharging pressure sensor connector

Repair if necessary.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF005 PRESENT OR STORED	ENGINE SPEED SENSOR CIRCUIT 1.DEF: no signal 2.DEF: inconsistent signal

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present: – when an attempt is made to start the engine, – when the engine is running.
	Special notes: Use bornier **Elé. 1681** for any work on the computer connectors. The engine speed sensor is consistent with the camshaft sensor. If the fault is present, the **level 2** warning light comes on.

Check the engine speed sensor connections.
Repair if necessary.
Check that the sensor is correctly mounted and that the flywheel target is not damaged.
Check that the gap between the engine speed sensor and the engine flywheel is **0.5 to 1.8 mm**.
Check the **resistance** of the engine speed sensor between **terminals A and B** of the black connector.
The **winding resistance** is **800 ± 80** Ω at an engine coolant temperature of **20 °C**.
If the value displayed is incorrect, replace the engine speed sensor.

Check the injection computer connections.
Repair if necessary.

Check the **continuity and the absence of interference resistance** of the following connections:
Injection computer 48-track brown connector B **track B1** → **Track A** engine speed sensor
48-track brown connector B injection computer **track C1** → **Track B** engine speed sensor
Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF007 PRESENT OR STORED	RAIL PRESSURE SENSOR CIRCUIT CC.0 : short circuit to earth CO.1 : open circuit or short circuit to + 12 V 1.DEF: offset at minimum threshold 2.DEF: offset at maximum threshold

NOTES	**Priorities when dealing with a number of faults:** Deal with fault **DF013 Sensor supply voltage no. 3** first, if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after repeated engine starts or with the engine running.
	Special notes: Use bornier **Elé. 1681** for any work on the computer connectors. If the fault is present, the engine stops immediately. The **level 2** fault warning light will be lit.

CC.0	***NOTES***	None

Check the rail pressure sensor connectors.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation** against earth of the following connections:

Injection computer 48-track brown connector B **track G3** → **Track 2** rail pressure sensor

48-track brown connector B injection computer **track A4** → **Track 3** rail pressure sensor

Repair if necessary.

If the fault is still present, replace the rail pressure sensor and tighten to **35 ± 5 Nm**.
Observe the safety instructions in the Introduction.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF007 **CONTINUED**	

CO.1	***NOTES***	None

Check the rail pressure sensor connectors. Check the injection computer connections. Repair if necessary.
Check **the continuity and insulation against + 12 V** of the following connections: Injection computer brown 48-track connector B **track G3** → **Track 2** rail pressure sensor Injection computer brown 48-track connector B **track C4** → **Track 1** rail pressure sensor Repair if necessary.
if the fault is still present, replace the rail pressure sensor and tighten to **35 ± 5 Nm**. **Observe the safety advice given in the Introduction section.**

1.DEF ***2.DEF***	***NOTES***	None

Check the rail pressure sensor connectors. Check the injection computer connections. Repair if necessary.
Check the **continuity and the absence of the interference resistance** of the following connections: Injection computer 48-track brown connector B, **track G3** → **Track 2** rail pressure sensor Injection computer 48-track brown connector B, **track A4** → **Track 3** rail pressure sensor Injection computer 48-track brown connector B, **track C4** → **Track 1** rail pressure sensor Repair if necessary.
With the ignition on and the engine stopped for more than one minute: Display the parameter **PR038 Rail pressure** in the **Fuel circuit, Engine management function** tab. – If the value is below **50 bar**, the sensor is in order. In this case, contact the Techline. – If the pressure is above **50 bar**, replace the rail pressure sensor and tighten to **35 ± 5 Nm**. Observe the safety advice in the **Introduction**.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF008 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 1 CO.0 : open circuit or short circuit to earth CC.1 : short circuit to + 12 V 1.DEF: inconsistent signal 2.DEF: accelerator pedal sensor locked

NOTES	**Priorities when dealing with a number of faults:** Deal with fault **DF011 Sensor supply voltage no. 1** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a series of full load/no load actions on the accelerator pedal.
	Special notes: Turbocharging and cruise control are not authorised. The **level 1** warning light is lit. The engine speed is stuck at **1,400 rpm** if there is fault on gangs 1 and 2 of the pedal potentiometer. Use bornier **Elé. 1681** for any work on the computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in Wiring check in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

CO.0	***NOTES***	**Priorities when dealing with a number of faults:** If fault **DF009 Pedal potentiometer circuit gang 2** is present at the same time, check that the pedal sensor connector is connected correctly.

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation against earth** of the following connections:

- Injection computer black 32-track connector A, **track H2** → **Track 4** pedal potentiometer connector
- Injection computer black 32-track connector A, **track G2** → **Track 3** pedal potentiometer connector

Repair if necessary.

Measure the **resistance** on the pedal potentiometer on **gang 1** between **tracks 5** and **3**.
Replace the pedal potentiometer if the resistance is not approximately: **1.7 kΩ ± 0.9 k**.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF008 **CONTINUED 1**	

CC.1	***NOTES***	None

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation against + 12 volts** of the following connections:

Injection computer black 32-track connector A, **track H2** → **Track 4** pedal potentiometer connector

Injection computer black 32-track connector A, **track H3** → **Track 5** pedal potentiometer connector

Repair if necessary.

Measure the **resistance** on the pedal potentiometer on **gang 1** between **tracks 5** and **3**.
Replace the pedal potentiometer if the resistance is not approximately: **1.7 kΩ ± 0.9 k**.

1.DEF	***NOTES***	None

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity, insulation and the absence of interference resistance** on the following connections:

Injection computer black 32-track connector A, **track H2** → **Track 4** pedal potentiometer connector

Injection computer black 32-track connector A **track G2** → **Track 3** pedal potentiometer connector

Injection computer black 32-track connector A, **track H3** → **Track 5** pedal potentiometer connector

Injection computer 32-track black connector A, **track F3** → **Track 1** pedal potentiometer connector

Injection computer 32-track black connector A, **track F2** → **Track 2** pedal potentiometer connector

Injection computer 32-track black connector A, **track F4** → **Track 6** pedal potentiometer connector

Repair if necessary.

If the fault is still present, replace the pedal potentiometer.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF008 **CONTINUED 2**	

2.DEF	***NOTES***	**Only in Vdiag 4C.**

Check the mechanical condition of the accelerator pedal:
– locked in full load position,
– with the pedal blocked by an external component.

Repair if necessary.

Vary the position of the pedal and refer to the conformity check in order to check the operating values of the accelerator pedal potentiometer.

If the values displayed are inconsistent, replace the accelerator pedal potentiometer.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF009 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 2 CO.0 : open circuit or short circuit to earth CC.1 : short circuit to + 12 V 1.DEF: inconsistent signal

NOTES	**Priorities when dealing with a number of faults:** Deal with fault **DF011 Sensor supply voltage no 1** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a series of full load/no load actions on the accelerator pedal.
	Special notes: Turbocharging and cruise control are not authorised, The **level 1** warning light is lit. The engine speed is stuck at **1,400 rpm** if there is fault on gangs 1 and 2 of the pedal potentiometer. Use bornier **Elé. 1681** for any work on the computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

CO.0	***NOTES***	**Priorities when dealing with a number of faults:** if fault **DF008 Pedal potentiometer circuit gang 1** is present at the same time, check that the pedal is connected correctly.

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity, insulation and the absence of interference resistance** on the following connections:

Injection computer 32-track black connector A **track F3** → **Track 1** pedal potentiometer connector

Injection computer 32-track black connector A **track F2** → **Track 2** pedal potentiometer connector

Repair if necessary.

Measure the pedal sensor **resistance** on **gang 2** between **tracks 2** and **6**.
Replace the pedal potentiometer sensor if the resistance is not approximately **2.85 kΩ ± 2.05**.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF009 **CONTINUED**	

CC.1	***NOTES***	**Priorities when dealing with a number of faults:** Apply the procedure for dealing with fault **DF012 Sensor supply voltage no. 2** first if it is present or stored.

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation against + 12 V** of the following connections:
Injection computer 32-track black connector A **track F3** → **Track 1** pedal potentiometer connector
Injection computer 32-track black connector A **track F4** → **Track 6** pedal potentiometer connector
Repair if necessary.

Measure the **resistance** of the pedal potentiometer on **gang 2** between **tracks 2** and **6**.
Replace the pedal potentiometer sensor if the resistance is not approximately: **2.85 kΩ ± 2.05**.

1.DEF	***NOTES***	None

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity, insulation and the absence of interference resistance** on the following connections:
Injection computer 32-track black connector A **track F3** → **Track 1** pedal potentiometer connector
Injection computer 32-track black connector A **track F2** → **Track 2** pedal potentiometer connector
Injection computer 32-track black connector A **track F4** → **Track 6** pedal potentiometer connector
Injection computer 32-track black connector A **track H2** → **Track 4** pedal potentiometer connector
Injection computer 32-track black connector A **track G2** → **Track 3** pedal potentiometer connector
Injection computer 32-track black connector A **track H3** → **Track 5** pedal potentiometer connector
Repair if necessary.

If the fault persists, replace the pedal potentiometer.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF011 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE No. 1 1.DEF: sensor reference voltage too weak 2.DEF: sensor reference voltage too high

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test or after attempting to start the engine several times.
	Special notes: If the fault is present: – cruise control is deactivated, – engine speed is limited, – the **level 1** warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

The sensors connected to **supply no. 1** are:
– Turbocharging pressure sensor,
– Accelerator pedal potentiometer sensor, gang 1.
To locate a faulty sensor and/or connection, disconnect one of these sensors then check whether the fault becomes stored.
If the fault is still present, start the operation again with the other sensor.
(wait a few seconds between each disconnection to allow the computer to perform the measurement).
If the fault is stored after disconnection, change the faulty sensor or repair the connection.
Clear the faults created by the multiple disconnections.

If the fault is still present when both these sensors have been disconnected:

1. Check **the insulation against earth** of the following connections:

Injection computer brown 48-track connector B **track K2**	→	**Track 3** of the turbocharging pressure sensor
Injection computer brown 48-track connector B **track G4**	→	**Track 1** of the turbocharging pressure sensor
Injection computer black 32-track connector A **track G2**	→	**Track 3** of the accelerator pedal potentiometer gang 1
Injection computer black 32-track connector A **track H2**	→	**Track 4** of the accelerator pedal potentiometer gang 1

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF011 **CONTINUED**	

2. Check **the insulation against + 12 V** for following connections:

Injection computer brown 48-track connector B **track K2**	→	**Track 3** of the turbocharging pressure sensor
Injection computer brown 48-track connector B **track D4**	→	**Track 2** of the turbocharging pressure sensor
Injection computer black 32-track connector A **track H3**	→	**Track 5** of the accelerator pedal potentiometer gang 1
Injection computer black 32-track connector A **track H2**	→	**Track 4** of accelerator pedal potentiometer gang 1

Repair if necessary.

3. Check **the insulation** between the following connections **after disconnecting their sensors**:
- tracks **3** and **5** of the **pedal gang 1 sensor** connector.
- tracks **1** and **2** of the **turbocharging pressure sensor** connector.

If these checks do not produce the correct results, replace the faulty sensor(s).

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF012 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE No. 2 1.DEF: sensor reference voltage too weak 2.DEF: sensor reference voltage too high

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test or after attempting to start the engine several times.
	Special notes: If the fault is present: – the EGR functions and passenger compartment heating resistance functions are inhibited, – engine speed is limited, – the **level 1** warning light is lit. – The OBD warning light will come on after three consecutive cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds). Use bornier **Elé. 1681** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged. Follow the procedure described in Wiring check in the Introduction. This check enables the condition and the conformity of the engine wiring harness to be checked.

The sensors connected to **supply no. 2** are:
– EGR valve position sensor,
– gang 2 of the accelerator pedal potentiometer sensor,
– refrigerant pressure sensor.
To locate a faulty sensor and/or connection, disconnect one of these sensors then check whether the fault becomes stored.
If the fault is still present, repeat the operation with the other sensors.
(Wait a few seconds between each disconnection to allow the ECU to perform the measurement).
If the fault is stored after disconnection, change the faulty sensor or repair the connection.
Clear the faults created by the multiple disconnections.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF012 CONTINUED	

If the fault is still present when the three sensors have been disconnected:

1. Check **the insulation against earth** of the following connections:

Injection computer 48-track brown connector B **track F4**	→	**Track 2** of the EGR valve connector
Injection computer 48-track brown connector B **track J2**	→	**Track 6** of the EGR valve connector
Injection computer black 32-track connector A **track F2**	→	**Track 2** of the accelerator pedal potentiometer gang 2
Injection computer black 32-track connector A **track F3**	→	**Track 1** of the accelerator pedal potentiometer gang 2
Injection computer brown 48-track connector B **track F3**	→	**Track B** of the refrigerant pressure sensor
Injection computer brown connector B **track F1**	→	**Track C** of the refrigerant pressure sensor

Repair if necessary.

2. Check **the insulation against + 12 V** of the following connections:

Injection computer brown connector B **track F4**	→	**Track 2** of the EGR valve connector
Injection computer B brown **track J2**	→	**Track 6** of the EGR valve connector
Injection computer grey connector C **track C2**	→	**Track 4** of the EGR valve connector
Injection computer black connector A **track F2**	→	**Track 2** of the accelerator pedal potentiometer gang 2
Injection computer black connector A **track F3**	→	**Track 1** of the accelerator pedal potentiometer gang 2
Injection computer black connector A **track F4**	→	**Track 6** of the accelerator pedal potentiometer gang 2
Injection computer brown connector B **track F3**	→	**Track B** of the refrigerant pressure sensor
Injection computer brown connector B **track F1**	→	**Track C** of the refrigerant pressure sensor
Injection computer grey connector C **track C3**	→	**Track A** of the refrigerant pressure sensor

Repair if necessary.

3. Check **the insulation** between the following connections **after disconnecting their sensors**:
   - tracks **2** and **6** of **pedal sensor gang 2** connector.
   - tracks **2** and **4** of the **EGR valve position sensor connector**.
   - tracks **A** and **B** of the **refrigerant pressure sensor**.

If these checks do not produce the correct results, replace the faulty sensor(s).

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF013 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE No. 3 1.DEF: sensor reference voltage too weak 2.DEF: sensor reference voltage too high

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test or after attempting to start the engine several times.
	Special notes: If the fault is present: – the EGR function is inhibited. – engine speed is limited, – the **level 2** warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

The sensors connected to **supply no. 3** are:
– Rail pressure sensor,
– Air flow sensor.
To locate a faulty sensor and/or connection, disconnect one of these sensors then check whether the fault becomes stored.
If the fault is still present, start the operation again with the other sensor.
(Wait a few seconds between each disconnection to allow the ECU to perform the measurement).
If the fault is stored after disconnection, change the faulty sensor or repair the connection.
Clear the faults created by the multiple disconnections.

If the fault is still present when both these sensors have been disconnected:
1. Check **the insulation against earth** of the following connections:

Injection computer brown 48-track connector B, **track G3** → **Track 2** of the rail pressure sensor
Injection computer 48-track brown connector B, **track A4** → **Track 3** of the rail pressure sensor
Injection computer 48-track brown connector B, **track G1** → **Track 5** of air flow sensor
Injection computer 48-track brown connector B, **track B4** → **Track 3** of the air flow sensor
Injection computer 48-track brown connector B, **track E2** → **Track 2** of the air flow sensor

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF013 **CONTINUED**	

2. Check **the insulation against + 12 V** of the following connections:

Injection computer brown 48-track connector B, **track G3** → **Track 2** of the rail pressure sensor
Injection computer 48-track brown connector B, **track A4** → **Track 3** of the rail pressure sensor
Injection computer brown 48-track connector B, **track C4** → **Track 1** of the rail pressure sensor
Injection computer 48-track brown connector B, **track G1** → **Track 5** of air flow sensor
Injection computer 48-track brown connector B, **track B4** → **Track 3** of the air flow sensor
Injection computer 48-track brown connector B, **track E2** → **Track 2** of the air flow sensor
Injection computer brown 48-track connector B, **track L4** → **Track 6** of the air flow sensor

Repair if necessary.

3. Check **the insulation** between the following connections **after disconnecting their sensors**:
- tracks **1** and **3** of the **rail pressure sensor**,
- tracks **2** and **3** of the **air flow sensor connector.**

If these checks do not produce the correct results, replace the faulty sensor(s).

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF015 PRESENT OR STORED	MAIN RELAY CONTROL CIRCUIT 1.DEF: relay cut out too soon 2.DEF: relay cut out too late

NOTES	**Conditions for applying fault finding procedures to stored faults:** Only deal with this fault if it is stored.
	Special notes: The main relay is integrated into the UPC. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the Protection and Switching Unit connections.
Check the injection computer connections.
Repair if necessary.
Check the condition of the battery terminals making sure they are correctly tightened.
Repair if necessary.

Check the **continuity and the absence of interference resistance** on the following connection:
Injection computer brown 48-track connector B **track E1** ⟶ **Track D2** brown Protection and Switching Unit connector D
Repair if necessary.

If the fault is still present and remains present, refer to the Protection and Switching Unit Technical Note.

IMPORTANT!

IMPORTANT
If the UPC no longer detects the injection computer frames then fan assembly 1 will be started until the battery has been completely discharged.
In the event that engine cooling fan 1 is not working, engine fan assembly 2 will be supplied.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF017 PRESENT OR STORED	PREHEATER UNIT CONTROL CIRCUIT CC.1 : short circuit to + 12 V CC.0 : open circuit or short circuit to earth CO : open circuit 1.DEF: internal electrical fault

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after actuator command **AC001 Preheating unit**, or after an attempted engine start.
	Special notes: If the fault is present, it is difficult or even impossible to start the vehicle when cold. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

CC.1	***NOTES***	None

Check the preheating unit connections and the heating plug supply cables.
Check the injection computer connections.
Repair if necessary.

Check the condition of the **F2 (70A)** supply fuse on the power supply fuse board.

Check **the continuity and insulation against + 12 V** of the following connections:
Injection computer connector C, grey 32-track **track E2** → **Track 8** preheater unit
Injection computer grey 32-track connector C, **track A4** → **Track 9** preheating unit
Repair if necessary.

If the fault is still present, replace the preheating unit.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF017 **CONTINUED**	

CC.0 ***CO***	***NOTES***	**Special notes:** If the preheating unit has a short circuit to earth there is a risk that the heater plugs will be operated continuously. The heater plugs and the engine may be damaged.

Check the preheating unit connections and the heating plug supply cables.
Check the injection computer connections.
Repair if necessary.

Check the condition of the **F2 (70A)** supply fuse on the power supply fuse board.
Check **the continuity and insulation against earth** of the following connection:
Injection computer grey 32-track connector C, **track A4** ⟶ **Track 9** preheating unit
Repair if necessary.

If the fault is still present, replace the preheating unit.

1.DEF	***NOTES***	None.

Check the preheating unit connections and the heating plug supply cables.
Check the injection computer connections.
Repair if necessary.

Check the condition of the **F2 (70A)** supply fuse on the power supply fuse board.
Check for **continuity and the absence of interference resistance** on the following connection:
Injection computer connector C, grey 32-track **track E2** ⟶ **Track 8** preheater unit
Repair if necessary.

If the fault is still present, **check that the computer output is working correctly**.
With the preheating unit connected:
– connect the negative terminal of the voltmeter to **track 8** of the preheating unit,
– connect the positive terminal of the voltmeter to the **+ 12 V** battery,
– run command **AC001 Pre-postheating unit**.
If the voltmeter does not indicate the battery voltage while the command is running (ten one-second ON/OFF cycles), contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF025 PRESENT OR STORED	PREHEATER UNIT DIAGNOSTIC CONNECTION

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after several attempts to start the engine, or following actuator command **AC001 Preheating unit**.
	Special notes: It is difficult or even impossible to start the engine when cold. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the preheating unit connections.
Check the connections on **all the heater plugs**.
Repair if necessary.

Check **the resistance** of the heater plugs:
Replace any plug whose resistance is not **below 2 Ω at + 20 °C**.

Check **the continuity and the absence of interference resistance** of the following connections:
- Preheating unit **track 1** → **Cylinder 3** heater plug
- Preheating unit **track 2** → **Cylinder 4** heater plug
- Preheating unit **track 6** → **Cylinder 1** heater plug
- Preheating unit **track 7** → **Cylinder 2** heater plug

Check **for + 12 V battery feed** on **track 3** of the preheating relay (via maxi fuse).
Check the engine earthing.

If the fault is still present,
Check the injection computer connections.
Check for **continuity and the absence of interference resistance** on the following connection:
Grey 32-track injector computer connector C, **track A4** → **Track 9** preheating unit connector
If the fault is still present, replace the preheating unit.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF037 PRESENT OR STORED	ENGINE IMMOBILISER

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after a road test or an attempt to start the engine.
	Special notes: It is impossible to start the vehicle. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the UCH connections.
Check the injection computer connections.
Repair if necessary.

Test the multiplex network and carry out a complete fault finding procedure on the UCH.
Refer to the UCH Technical Note if a fault is declared present.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF038 PRESENT OR STORED	COMPUTER CO : open circuit 1.DEF : permanent high signal 2.DEF : permanent low signal 3.DEF : configuration absent or incorrect 4.DEF : analogue/digital converter fault 5.DEF : EEPROM fault 6.DEF : activation in Watchdog 7.DEF : signal outside upper limit 8.DEF : signal outside lower limit 9.DEF : communication disrupted 10.DEF : injector control condenser fault 11.DEF : injector control 12.DEF : Initialisation fault 13.DEF : deceleration fault when decelerating

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after several starting attempts, or with the engine running. **Special notes:** The **level 1** warning light is lit for a fault that does not require you to stop the vehicle. The **level 2** warning light is lit for a fault which requires the engine to be switched off. If 5.DEF is still present, the OBD warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds). Use bornier **Elé. 1681** for all operations on the injection computer connectors.

CO 1.DEF to 9.DEF 11.DEF to 13.DEF	Check the injection computer connections and the **continuity** of all the supplies. Repair if necessary. Clear the faults. Switch off the ignition, **wait 30 seconds** and switch the ignition on again. If the fault is still present, contact the Techline and fill out the **fault finding log** included in this Technical Note.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF038 **CONTINUED**	

10.DEF	***NOTES***	If there are a number of faults, deal with the other system faults first.

Display the stored context for fault **DF038**.
PR142 Computer fault = 10

NO → Contact the Techline

YES → Parameters of main screen **PR071 Computer supply voltage > 10 V**.

NO → – Check the charge circuit and carry out the necessary repairs:
– Check the condition of the battery terminals,
– Carry out fault finding on the alternator.
Recharge or replace the battery.

YES → Stored context of **DF038 PR071 Computer supply voltage > 10 V**.

NO → (same as above)

YES →
– Check the condition of the wiring harness between the computer and the battery, carry out the necessary repairs.
– Start the vehicle.
– Clear the stored faults.
– Check the faults.
– If **DF038** is absent, end of fault finding.
– If **DF038** is present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF039 PRESENT OR STORED	INLET AIR TEMPERATURE SENSOR CIRCUIT CO.1 : open circuit or short circuit to + 12 V CC.0 : short circuit to earth 1.DEF: below minimum threshold

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after an attempted start, or with the engine running following a road test.
	Special notes: If the fault is present: – The air temperature value enters default mode, i.e. **PR059 Inlet air temperature = 20 °C**. – The EGR function is inhibited. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

CO.1	***NOTES***	None

Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity** of the following connection:
6-track air flow meter connector, black **track 4** ⟶ **Track 2** UPC black connector
Repair if necessary.

Check **the continuity and insulation against + 12 V** of the following connections:
Injection computer 48-track brown connector B **track G2** ⟶ **Track 1** air flow sensor connector
Injection computer 48-track brown connector B **track E2** ⟶ **Track 2** air flow sensor connector
Repair if necessary.

Measure the air temperature sensor resistance between **tracks 1** and **2** of the air flow sensor.
Replace the air flow sensor if the resistance displayed is not: **3,714 Ω ± 161 at 10 °C**
2,488 Ω ± 90 at 20 °C
1,671 Ω ± 59 at 30 °C

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF039 **CONTINUED 1**	

CC.0	***NOTES***	None.

Check the air flow sensor connections. Check the injection computer connections. Repair if necessary.
Check **the continuity and insulation** against earth of the following connections: Injection computer 48-track brown connector B, **track G2** → **Track 1** air flow meter 6-track air flow meter connector, black **track 4** → **Track 2** UPC black connector Injection computer 48-track brown connector B, **track B4** → **Track 3** air flow meter Repair if necessary.
Measure the resistance of the air temperature sensor integrated into the flow sensor between **tracks 1** and **2**. Replace the air flow sensor if the resistance displayed is not: **3,714 Ω ± 161 at 10 °C** **2,488 Ω ± 90 at 20 °C** **1,671 Ω ± 59 at 30 °C**

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF039 **CONTINUED 2**	

1.DEF	***NOTES***	None

Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and the absence of interference resistance** of the following connections:
Injection computer 48-track brown connector B **track E2** ⟶ **Track 2** air flow sensor
Injection computer 48-track brown connector B **track G2** ⟶ **Track 1** air flow meter

Repair if necessary.

Measure the resistance of the air temperature sensor integrated into the flow sensor between **tracks 1** and **2**.
Replace the air flow sensor if the resistance displayed is not: **3,714 Ω ± 161 at 10 °C**
2,488 Ω ± 90 at 20 °C
1,671 Ω ± 59 at 30 °C

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF040 PRESENT OR STORED	CYLINDER 1 INJECTOR CIRCUIT CC.1 : short circuit to + 12 V CO : open circuit CC : short circuit 1.DEF: Injector control

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started.
	Special notes: If CC.1, CC, or 1.DEF is present, the **level 2** warning light is lit. If CO is present the **level 1** warning light is lit. If CO is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). If the fault is present, the injection on cylinder 1 is inhibited. Use bornier Elé. 1681 for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This test enables the condition and the conformity of the engine wiring harness to be checked.

CC.1 ***CO*** ***CC*** ***1.DEF***	***NOTES***	**None.**

Check the connections on injector no 1.
Check the injection computer connections.
Repair if necessary.

Disconnect injector no. 1.
Measure the **resistance** of injector No. 1 between **tracks 1** and **2**.
Replace the injector if there is a **short circuit (R = 0 Ω)** or an **open circuit (resistance = infinity)**.
Otherwise, **reconnect injector no. 1**.
Check **the continuity and the absence of interference resistance** of the following connections:

Injection computer 32-track grey connector C **track G3** → **Track 2** injector no. 1
Injection computer 32-track grey connector C **track H1** → **Track 1** injector no. 1

If the fault is still present: run **test 1 INJECTOR TEST**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF041 PRESENT OR STORED	CYLINDER 2 INJECTOR CIRCUIT CC.1 : short circuit to + 12 V CO : open circuit CC : short circuit 1.DEF: Injector control

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started.
	Special notes: If CC.1, CC, or 1.DEF is present, the **level 2** warning light is lit. If CO is present the **level 1** warning light is lit. If CO is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). If the fault is present, the injection on cylinder 1 is inhibited. Use bornier Elé. 1681 for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This test enables the condition and the conformity of the engine wiring harness to be checked.

CC.1 ***CO*** ***CC*** ***1.DEF***	***NOTES***	**None.**

Check the connections on injector no 2.
Check the injection computer connections.
Repair if necessary.

Disconnect injector no. 2.
Measure the **resistance** of injector no. 2 between **tracks 1** and **2**.
Replace the injector if there is a **short circuit (R = 0 Ω)** or an **open circuit (resistance = infinity)**.
Otherwise, **reconnect injector no. 2**.
Check **the continuity and the absence of interference resistance** of the following connections:

Injection computer 32-track grey connector C **track G4** → **Track 2** injector no. 2
Injection computer 32-track grey connector C **track G2** → **Track 1** injector no. 2

If the fault is still present: run **test 1 INJECTOR TEST**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF042 PRESENT OR STORED	CYLINDER 3 INJECTOR CIRCUIT CC.1 : short circuit to + 12 V CO : open circuit CC : short circuit 1.DEF: Injector control

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started.
	Special notes: If CC.1, CC, or 1.DEF is present, the **level 2** warning light is lit. If CO is present the **level 1** warning light is lit. If CO is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). If the fault is present, the injection on cylinder 1 is inhibited. Use bornier Elé. 1681 for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This test enables the condition and the conformity of the engine wiring harness to be checked.

CC.1 ***CO*** ***CC*** ***1.DEF***	***NOTES***	**None.**

Check the connections on injector no 3.
Check the injection computer connections.
Repair if necessary.

Disconnect injector no. 3.
Measure the **resistance** of injector no. 3 between **tracks 1** and **2**.
Replace the injector if there is a **short circuit (R = 0 Ω)** or an **open circuit (resistance = infinity)**.
Otherwise, **reconnect injector no. 3**.
Check **the continuity and the absence of interference resistance** of the following connections:

Injection computer 32-track grey connector C **track H4** → **Track 2** injector no. 3
Injection computer 32-track grey connector C **track H2** → **Track 1** injector no. 3

If the fault is still present: run **test 1 INJECTOR TEST**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF043 PRESENT OR STORED	CYLINDER 4 INJECTOR CIRCUIT CC.1 : short circuit to + 12 V CO : open circuit CC : short circuit 1.DEF: Injector control

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started.
	Special notes: If CC.1, CC, or 1.DEF is present, the **level 2** warning light is lit. If CO is present the **level 1** warning light is lit. If CO is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). If the fault is present, the injection on cylinder 1 is inhibited. Use bornier Elé. 1681 for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This test enables the condition and the conformity of the engine wiring harness to be checked.

CC.1 ***CO*** ***CC*** ***1.DEF***	***NOTES***	**None.**

Check the connections on injector no 4.
Check the injection computer connections.
Repair if necessary.

Disconnect injector no. 4.
Measure the **resistance** of injector no. 4 between **tracks 1** and **2**.
Replace the injector if there is a **short circuit (R = 0 Ω)** or an **open circuit (resistance = infinity)**.
Otherwise, **reconnect injector no. 4**.
Check **the continuity, and the absence of resistance** of the following connections:

Injection computer 32-track grey connector C **track H3** → **Track 2** injector no. 4
Injection computer 32-track grey connector C **track G1** → **Track 1** injector no. 4

If the fault is still present: run **test 1 INJECTOR TEST**.
If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF046 PRESENT OR STORED	BATTERY VOLTAGE 1.DEF: overvoltage 2.DEF: undervoltage

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test or after attempting to start the engine.
	Special notes: Computer operating voltage: **9 V < operating voltage < 16 V**. If the battery voltage is too low this may cause the **level 1** fault warning light to come on. It is then not possible to start the engine. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

1.DEF	***NOTES***	None

Check the charge circuits:
– battery status,
– alternator status (complete fault finding procedure).

Carry out the necessary repairs.

2.DEF	***NOTES***	(Use the **Wiring Diagrams** Technical Note for the vehicle).

With the ignition off, measure the voltage between the battery terminals.
If the voltage is less than **11.5 V**, test the battery.
If the battery is faulty, replace the battery then test the charge circuit.
With the ignition on and the with the starter motor turning, measure the voltage between the battery terminals
If the voltage drops below **9.6 V**, check the tightness and condition of the battery terminals.
Repair if necessary.
If the terminals are in good condition, test the battery.
If they are faulty, replace the battery.
If the starter is cranking the engine correctly, but the fault is still present,
– Check **the continuity and the absence of interference resistance** of the following connections:

+ 12 V timed by UPC → **Track M2** connector **B** of the engine management computer
+ 12 V timed by UPC → **Track G1** connector **A** of the engine management computer
Battery earth → **Tracks G4, H4, H1** of connector **A** of the injection computer

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF047 PRESENT OR STORED	COMPUTER SUPPLY VOLTAGE

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after several starting attempts, or with the engine running. **Special notes:** Computer operating voltage: **9 V < operating voltage < 16 V**. If the battery voltage is too low this may cause the **level 1** fault warning light to come on. It is then not possible to start the engine. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check for **continuity and the absence of interference resistance** on the following connection:
Injection computer black 32-track **connector A**, **track D1** ⟶ **Track 1** UPC **black** connector
Repair if necessary.

Check the condition of the **FD5** fuse on the UPC (poor contact, or oxidation on the relay mounting clips).
Repair if necessary.

If the fault does not recur, start the engine and **wait 1 min**.
Carry out a road test and check the system faults.
If there are no faults, fault finding is complete.

If the fault is still present, **contact the Techline**.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF049 PRESENT OR STORED	REFRIGERANT SENSOR CIRCUIT CC.1 : short circuit to + 12 V CO.0 : open circuit or short circuit to earth

NOTES	**Priorities when dealing with a number of faults:** Apply the procedure for dealing with fault **DF012 Sensor supply voltage no. 2** first if it is present or stored.
	Conditions for applying fault finding procedures to stored faults: The fault is declared present following a road test, or if the air conditioning is switched on. **Special notes:** If the fault is present, air conditioning is not authorised. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

CC.1	***NOTES***	None

Check the refrigerant pressure sensor connectors.
Check the injection computer connections.
Repair if necessary.

Connect an air conditioning filling station (equipped with a high pressure gauge) to the vehicle.
Display parameter **PR037 Refrigerant pressure** and compare the value displayed by the filling station.

If the values match, carry out a fault finding procedure as described in the fault finding note for that vehicle.

If the values do not match, check **the continuity and insulation against + 12 V** of the following connections:

- Injection computer brown 48-track connector **B**, **track F1** → **Track C** refrigerant sensor connector
- Injection computer brown 48-track connector **B**, **track F3** → **Track B** refrigerant sensor connector
- Injection computer grey 32-track connector **C**, **track C3** → **Track A** refrigerant sensor connector

Repair if necessary.

If the fault is still present, replace the refrigerant pressure sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF049 **CONTINUED**	

CO.0	***NOTES***	None

Check the refrigerant pressure sensor connectors.
Check the injection computer connections.
Repair if necessary.

Connect an air conditioning filling station (equipped with a high pressure gauge) to the vehicle.
Display parameter **PR037 Refrigerant pressure** and compare the value displayed by the filling station.

If the values match, carry out a fault finding procedure as described in the fault finding note for that vehicle.

If the values do not match, check **the continuity and insulation against earth** of the following connections:

- Injection computer brown 48-track connector **B**, **track F1** → **Track C** refrigerant sensor connector
- Injection computer brown 48-track connector **B**, **track F3** → **Track B** refrigerant sensor connector
- Injection computer grey 48-track connector **C**, **track C3** → **Track A** refrigerant sensor connector

Repair if necessary.

If the fault is still present, replace the refrigerant pressure sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF050 PRESENT OR STORED	BRAKE SWITCH CIRCUIT 1.DEF: inconsistent signal 2.DEF: no signal

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the brake pedal is depressed, or during a road test.
	Special notes: If the fault is present, cruise control is deactivated. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

1.DEF	***NOTES***	None

Check the brake pedal switch connections.
Check the condition and adjustment of the brake pedal switch.
Repair if necessary.

Check the **continuity and the absence of interference resistance** on the following connection:
Injection computer black 32-track connector **A**, **track E4** ⟶ **Track 3** of the brake switch
Repair if necessary.

Check the conformity of the switch by consulting the interpretation of statuses **ET122 Brake switch no. 1 signal** and **ET123 Brake switch no. 2 signal**.

If the fault is still present, carry out fault finding on the ABS computer.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF050 **CONTINUED**	

2.DEF	***NOTES***	None

Check the brake pedal switch connections.
Check the condition and adjustment of the brake pedal switch.
Repair if necessary.

Check **the conformity of the** brake light switch:
Brake pedal released: continuity between **tracks 3** and **4**
infinite resistance between **tracks 1** and **2**.
Brake pedal depressed: infinite resistance between **tracks 3** and **4**
continuity between **tracks 1** and **2**.
Replace the switch if necessary.

Check the condition of the **1H 15A** fuse on the passenger compartment fuse and relay board.
Replace the fuse if necessary.

Check **the feeds** to the switch:
+ 12 V after ignition → **Track 2** of the brake pedal switch connector
+ 12 V battery → **Track 4** of the brake pedal switch connector (via the UCH)
Replace the switch if necessary.

Check **the continuity and insulation** of the following connection:
Injection computer black 32-track connector **A**, **track E4** → **Track 3** of the brake pedal switch connector

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF051 PRESENT OR STORED	CRUISE CONTROL/SPEED LIMITER 1.DEF: inconsistent signal 2.DEF: inconsistent vehicle speed 3.DEF: controls at the steering wheel

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: The cruise control/speed limiter function is inhibited. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

If fault **DF051** is present, refer to **Cruise control/Speed limiter** section of the conformity check and interpretation of statuses **ET042 Cruise control/Speed limiter, ET415 Cruise control/Speed limiter deactivation and ET413 Cruise control/Speed limiter function**.

Check that by pressing the buttons the statuses change and that, with the ignition switched on, all the values are correct.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF053 PRESENT OR STORED	RAIL PRESSURE REGULATION FUNCTION CC.1 : short circuit to + 12 V CC.0 : short circuit to earth CO : open circuit 1.DEF: internal electrical fault 2.DEF: pressure measured too low 3.DEF: pressure measured too high 4.DEF: insufficient pressure 5.DEF: pressure < minimum 6.DEF: pressure > maximum 7.DEF: significant pump control 8.DEF: significant pump control at idle speed

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test or after attempting to start the engine.
	Special notes: If the fault is present: – It is not possible to start the engine, – the level 2 warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

CC.1	***NOTES***	None

Check the rail pressure regulator connectors.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the rail pressure regulator between **tracks 1** and **2**.
If the resistance is not **3** Ω ± **0.1 at 20** °**C**, replace the rail pressure regulator.
Check **the continuity and insulation against the + 12 V supply** of the following connection:
Injection computer 48-track brown connector **B**, **track M4** ⟶ **Track 2** of the fuel flow regulator

If the fault is still present replace the rail pressure regulator.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF053 **CONTINUED 1**	

CC.0 ***CO***	***NOTES***	None

Check the rail pressure regulator connectors. Check the injection computer connections. Repair if necessary.
Measure the **resistance** of the rail pressure regulator between **tracks 1** and **2**. If the resistance is not **3** Ω ± **0.1 at 20** °**C**, replace the rail pressure regulator. Check **the continuity and insulation against earth** of the following connection: Injection computer brown 48-track connector **B**, **track M4** ⟶ **Track 2** of the rail pressure regulator
With the ignition on, check for **+ 12 V** after relay on **track 1** of the rail pressure regulator. If there is not **+ 12 V** on **track 1**, check **the continuity and the absence of interference resistance** of the following connection: Rail pressure regulator **track 1** ⟶ **PPM1 connector, track 1** of the UPC Repair if necessary.
If the fault is still present, replace the fuel flow regulator.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF053 **CONTINUED 2**	

1.DEF	***NOTES***	None

Measure the **resistance** of the rail pressure regulator between **tracks 1** and **2**.
If the resistance is not **3** Ω ± **0.1 at 20** °**C**, replace the rail pressure regulator.
Check **the continuity and the absence of interference resistance** of the following connections:

Injection computer 48-track brown connector **B**, **track M4** → **Track 2** of the rail pressure regulator

UPC **PPM1** connector, **track 1** → **Track 1** of the rail pressure regulator

Repair if necessary.

***Opening Cyclic Ratio**

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF053 **CONTINUED 3**	

2.DEF to 8.DEF	***NOTES***	None

In the event of rail overpressure:
Check that the injectors are operating correctly (see **Component test, Test 1, Injector Test**).
Check that the rail pressure sensor is operating correctly using command **AC011 Rail pressure regulator**. Display parameter **PR038 Rail pressure**, and refer to the conformity check to check the operating values.
If these checks do not reveal any faults, and if the fault is still present, replace the rail pressure sensor.
In the event of rail underpressure:
Check that the rail pressure sensor is operating correctly using command **AC011 Rail pressure regulator**. Display parameter **PR038 Rail pressure**, and refer to the conformity check to check the operating values.
Check the low pressure diesel circuit priming.
Check the conformity of the diesel filter connections.
Check the condition of the filter (clogging and water saturation).
Check that there are no air bubbles between the filter and the high pressure pump.
Check the low and high pressure diesel fuel circuit sealing (visual inspections, odour, etc.): pump housing, pressure relief valve, pipes, rail and injector unions, injector wells, etc.
Check the conformity of the seal fitting on the pressure regulator.
Check that the injectors are operating correctly (see **Component test, Test 1, Injector Test**).

Carry out the necessary operations.

If the fault is still present replace the rail pressure regulator.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF054 PRESENT OR STORED	TURBOCHARGING SOLENOID VALVE CONTROL CIRCUIT CC.1 : short circuit to + 12 V CC.0 : short circuit to earth CO : open circuit 1.DEF: internal electrical fault

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – starting the engine, – a road test, – an actuator command **AC004 Turbocharging solenoid valve**.
	Special notes: If the fault is present: – turbocharging is no longer authorised, – the EGR function is inhibited, – the level 1 warning light comes on. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

CC.1	***NOTES***	None.

Check the turbocharging solenoid valve connections. Check the injection computer connections. Repair if necessary.
Measure the resistance of the turbocharging solenoid valve between the **tracks 1** and **2**: If the resistance displayed is not **15.4** Ω ± **0.7 at 20** °**C**, replace the turbocharging solenoid valve.
Check **the continuity and insulation against + 12 V** of the following connection: Injection computer grey 32-track connector **C**, **track E1** ⟶ **Track 1** turbocharging solenoid valve Repair if necessary.
If the fault is still present, replace the turbocharging solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF054 **CONTINUED 1**	

CC.0 ***CO***	***NOTES***	None.

Check the turbocharging solenoid valve connections. Check the injection computer connections. Repair if necessary.
Measure the resistance of the turbocharging solenoid valve between the **tracks 1** and **2**: If the resistance displayed is not **15.4** Ω ± **0.7 at 20** °**C**, replace the turbocharging solenoid valve.
Check **the continuity and insulation against earth** of the following connections: Injection computer grey 32-track connector **C**, **track E1** ⟶ **Track 1** turbocharging solenoid valve UPC PPM1 connector **track 1** ⟶ **Track 2** turbocharging solenoid valve Repair if necessary.
If the fault is still present, replace the turbocharging solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF054 **CONTINUED 2**	

1.DEF	***NOTES***	None

Check the turbocharging solenoid valve connections. Check the injection computer connections. Repair if necessary.
Measure the resistance of the turbocharging solenoid valve between the **tracks 1** and **2**: If the resistance displayed is not **15.4** Ω ± **0.7 at 20** °**C**, replace the turbocharging solenoid valve.
Check **the continuity and the absence of interference resistance** of the following connections: Injection computer grey 32-track connector **C**, **track E1** ⟶ **Track 1** turbocharging solenoid valve UPC PPM1 connector **track 1** ⟶ **Track 2** Turbocharging solenoid valve

***Opening cyclic ratio.**

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF055 PRESENT OR STORED	TURBOCHARGING PRESSURE REGULATION CIRCUIT 1.DEF: pressure too low 2.DEF: pressure too high

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – starting the engine, – a road test.
	Special notes: If the fault is present: – turbocharging is no longer authorised, – the EGR function is inhibited, – the **level 1** warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF055 **CONTINUED 1**	

1.DEF	***NOTES***	None.

Check the turbocharging pressure sensor connections.
Check the connections of the turbocharging pressure relief solenoid valve.
Check the injection computer connections.
Repair if necessary.

Check the sealing of the high pressure air circuit:
– disconnected or pierced pipes,
– pressure sensor disconnected or poorly fitted (seal present),
– intercooler pierced (to check the intercooler: with the vehicle stationary, stabilise the engine speed at between 3500 and 4000 rpm and check that there are no leaks).

Check the conformity of the turbocharging pressure signal (refer to the interpretation of parameter **PR041 Turbocharging pressure**).

Check that the turbocharger and the control circuit are working:
– With the engine stopped, make sure that the control rod is in the rest position.
– Start the engine and check that the control rod operates to the upper stop
(when the engine stops, the control rod should return to the rest position).
If the control rod does not move correctly, carry out the following checks:

1) Vacuum pressure command check:
– disconnect the solenoid valve inlet **hose** and connect it to a pressure gauge,
– start the engine and stabilise it at idle speed,
– if the vacuum pressure does not reach **800 mbar ± 100**: check the vacuum circuit from the vacuum pump,
– stop the engine, reconnect the inlet hose and proceed to step 2.

2) Solenoid valve control check:
– Disconnect the solenoid valve outlet **hose**,
– start the engine and stabilise it at idle speed,
– place your hand on the solenoid valve and block the outlet **connection** with your thumb,
– if there is no detectable vibration of the solenoid valve, check that the computer output is operating correctly (see **DF054 Turbocharging solenoid valve control circuit 1.DEF**).

3) Solenoid valve operation check:
– Attach the pressure gauge to the solenoid valve outlet **union**,
– start the engine and stabilise it at idle speed,
– if the vacuum pressure does not reach **800 mbar ± 100**, replace the solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF055 **CONTINUED 2**	

2.DEF	***NOTES***	**Priority when dealing with a number of faults:** Deal with fault **DF004 Turbocharging pressure sensor circuit** first if it is present or stored.

Check the turbocharging pressure sensor connections.
Check the connections of the turbocharging pressure relief solenoid valve.
Check the injection computer connections.
Repair if necessary.

Check the conformity of the turbocharging pressure signal (refer to the interpretation of parameter **PR041 Turbocharging pressure**).

Make sure the turbocharging pressure relief solenoid valve is not jammed open:
– with the engine switched off, disconnect the **inlet and outlet hoses** from the solenoid valve,
– connect a vacuum pump to the inlet **union** and apply a vacuum pressure,
– if the vacuum pressure **is not maintained**: replace the solenoid valve.

Check that the turbocharger control rod has not seized:
– with the engine stopped, make sure the turbocharger control rod is in the rest position,
– apply a vacuum pressure of **800 mbar ± 100**, to the hose connected to the turbocharger control diaphragm,
– if the diaphragm holds the vacuum pressure, check the movement and setting of the turbocharger control rod (see **Workshop Repair Manual 364, 12B, Turbocharging**).

If the control rod is seized, replace the turbocharger.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF056 PRESENT OR STORED	AIR FLOW SENSOR CIRCUIT CC.1 : short circuit to + 12 V CO.0 : open circuit or short circuit to earth 1.DEF: offset at maximum threshold 2.DEF: offset at minimum threshold 3.DEF: parameter at max limit 4.DEF: parameter at min limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: Use bornier **Elé. 1681** for all operations on the injection computer connectors.

CC.1	***NOTES***	None

Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation against + 12 V** of the following connections:

- Injection computer brown 48-track connector **B track E2** → **Track 2** of the airflow sensor
- Injection computer 48-track brown connector **B track L4** → **Track 6** of the airflow sensor
- Injection computer brown 48-track connector **B track G1** → **Track 5** of the airflow sensor
- Injection computer 48-track brown connector **B track B4** → **Track 3** of the airflow sensor
- Injection computer brown 48-track connector **B track G2** → **Track 1** of the air flow sensor

If the fault is still present, replace the air flow sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF056 **CONTINUED 1**	

CO.0	***NOTES***	None.

Check that there is a + 5 V supply on track 3 of the air flow sensor.
Repair if necessary.
Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity and insulation against earth between:**

Injection computer brown 48-track connector **B**, **track E2**	→	**Track 2** of the air flow sensor
Injection computer brown 48-track connector **B**, **track B4**	→	**Track 3** of the air flow sensor
Injection computer brown 48-track connector **B**, **track G1**	→	**Track 5** of the air flow sensor
injection computer brown 48-track connector **B**, **track G2**	→	**Track 1** of the air flow sensor connector
Injection computer, 48-track brown connector **B**, **track L4**	→	**Track 6** of the air flow sensor connector
Black **PPM1** connector of the UPC, **track 2**	→	**Track 4** of the air flow sensor connector

Repair if necessary.

If the fault is still present and remains present, replace the air flow sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF056 **CONTINUED 2**	

1.DEF ***2.DEF***	***NOTES***	None.
3.DEF ***4.DEF***	***NOTES***	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the ignition has been switched off for **15 seconds**.

Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and the absence of interference resistance** of the following connections:

- Injection computer 48-track brown connector **B track B4** → **Track 3** of the airflow sensor
- Injection computer brown 48-track connector **B track G1** → **Track 5** of the airflow sensor
- Injection computer 48-track brown connector **B track L4** → **Track 6** of the airflow sensor
- Injection computer brown 48-track connector **B track E2** → **Track 2** of the airflow sensor
- Injection computer brown 48-track connector **B track G2** → **Track 1** of air flow sensor connector
- Black **PPM1** connector of the UPC, **track 2** → **Track 4** of the air flow sensor connector

Repair if necessary.

Check the entire air inlet circuit:
– air filter unit inlet not blocked and filter not clogged,
– **no** foreign bodies on the air flow sensor grille (**visual inspection only**).

If not, replace the air flow sensor.
– oil vapour recirculation circuit connection conformity,
– **sealing** and **non-blockage** of **high and low pressure** air circuit: Ducts, mounting clips are present and tightened, turbocharging pressure sensor and intercooler are fitted, etc.,
– check that the damper valve is open (valve control **is against the body** of the air vent unit).

With the air flow sensor **connected**, the vehicle **ignition on** and the **engine stopped**:
– check the voltage between **tracks 2** and **5** of the air flow sensor:

If the value is not **0.6 V** ± **0.1**, replace the air flow sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF056 **CONTINUED 3**	

● **Check the EGR valve is not jammed open:**

– remove the EGR valve:
– with the valve removed and connected, run command **AC002 EGR valve**.

Check: the position of the valve,
that it closes when the command is completed.

If these checks show that the valve is jammed or irrevocably seized, replace the EGR valve.

If no faults are revealed, but the fault is still present, replace the air flow sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF057 PRESENT OR STORED	WATER IN DIESEL FUEL DETECTOR CIRCUIT

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine is started or following a road test.

A) Make sure the water detection sensor is properly connected.
- If not, clear the fault,
- carry out a road test (**speed > 12 mph (20 km/h) at an engine speed of > 1,200 rpm**) for more than **30 seconds**,
- if the fault does not recur, end the fault finding procedure,
- if the fault does recur, go to **step B**.

B) If the sensor is properly connected:
- drain the diesel filter unit (see **MR 364, 13A, Fuel supply**),
- clear the fault,
- carry out a road test (**speed > 12 mph (20 km/h) at an engine speed of > 1,200 rpm**) for more than **30 seconds**.

If the fault does not recur, end the fault finding procedure.

C) If the fault recurs:
- Check for **continuity and the absence of interference resistance** on the connection between:
  Injection computer grey 32-track connector C, **track A2** ⟶ **Track 3** of the water detection sensor
- **Check the power supply** to the water detection sensor:
  UPC black PPM1 connector track 2 ⟶ **Track 1** of the water detection sensor
  Earth ⟶ **Track 2** of the water detection sensor
- Carry out the necessary repairs.

If none of these checks reveal any faults:
- Replace the water detection sensor (see **MR 364, 13A, Fuel supply**).
- Clear the fault.
- Carry out a road test (**speed > 12 mph (20 km/h) and engine speed > of 1,200 rpm**) for more than **30 seconds**, to confirm the repair.

Note:
*If the level of water in the fuel filter unit is lower than the two electrodes on the sensor, certain driving conditions (on a bend, leaning) may cause the injection warning light **to light up erratically**.*

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF067 PRESENT OR STORED	DAMPER CONTROL CIRCUIT CC.1 : short circuit to + 12 V CC.0 : short circuit to earth CO : open circuit 1.DEF: internal electrical fault

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after: – starting the engine, – a road test, – an actuator command **C014 Damper valve**.
	Special notes: If the fault is present: – it is difficult or even impossible to start the vehicle. – the level 2 warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

CC.1	***NOTES***	None

Check the connections of the damper valve solenoid valve. Check the injection computer connections. Repair if necessary.
Measure the resistance between **tracks 1** and **2** of the damper flap solenoid valve: The resistance should be between: **43 and 49 Ω at 25 °C**. Replace the solenoid valve if the resistance is outside the tolerance values.
Check **the continuity and insulation against + 12 V** of the following connection: Injection computer brown 48-track connector **B**, **Track J4** ⟶ **Track 1** damper flap solenoid valve Repair if necessary.
If the fault is still present, replace the damper valve solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF067 **CONTINUED 1**	

CO.0 ***CO***	***NOTES***	None.

Check the connections of the damper valve solenoid valve. Repair if necessary.
Measure the resistance between **tracks 1** and **2** of the damper flap solenoid valve: – The resistance should be between: **43 and 49 Ω at 25 °C**. – Replace the solenoid valve if the resistance is outside the tolerance values.
Check **the continuity and insulation** against earth of the following connections: Injection computer brown 48-track connector **B**, **track J4** → **Track 1** damper flap solenoid valve UPC black **PPM1** connector **track 2** → **Track 2** damper valve solenoid valve
Repair if necessary. If the fault is still present, replace the damper valve solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF067 **CONTINUED 2**	

1.DEF	***NOTES***	None.

Check the connections of the damper valve solenoid valve. Check the injection computer connections. Repair if necessary.
Measure the resistance between **tracks 1** and **2** of the damper flap solenoid valve: – The resistance should be between: **43 and 49 Ω at 25 °C**. – Replace the solenoid valve if the resistance is outside the tolerance values.
Check the **continuity, insulation, and the absence of interference resistance** of the following connection: Injection computer brown 48-track connector **B**, **track J4** ⟶ **Track 1** damper flap solenoid valve Repair if necessary. If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF069 PRESENT	IMPACT DETECTED SIGNAL

NOTES	**Fault finding procedure application conditions:** Only apply the procedure if the fault is present and if the vehicle does not start.
	Special notes: The fault appears when the injection computer receives a frontal impact signal from the Airbag computer via the multiplex network. As soon as the injection computer receives this signal, engine operation is inhibited and the level 2 warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

If the vehicle has been involved in an accident:
Carry out any necessary repairs:
– clear the fault,
– switch off the ignition and wait **30 seconds**,
– wait for the engine immobiliser indicator light to flash,
– switch on the ignition,
  If the fault does not recur, end the fault finding procedure.
  If the fault recurs, carry out fault finding on the **AIRBAG** computer.

If the vehicle has not been involved in an accident, carry out fault finding on the **AIRBAG** computer.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF070 PRESENT OR STORED	CLUTCH SWITCH CIRCUIT 1.DEF: no signal 2.DEF: inconsistent signal

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the clutch pedal is depressed, or during a road test.
	Special notes: Use bornier **Elé. 1681** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in the Wiring Check in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

Check the conformity of the clutch switch setting (position, connection).
– Display status **ET233 Clutch pedal**:
– when the clutch pedal is not engaged status **ET233** should be **RELEASED**,
– when the clutch pedal is disengaged status **ET233** should be **DEPRESSED**,
if these checks are not correct, replace the clutch switch.

If these checks are correct:
Check the connections of the clutch pedal switch.
Check the injection computer connections.
Repair if necessary.

Check for **continuity and the absence of interference resistance** on the following connection:
Injection computer, black 32-track connector **A**, **track C4** ⟶ **Track 1** Clutch pedal switch
Repair if necessary.

Check for earth on **track 2** of the clutch pedal switch.
Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF091 PRESENT OR STORED	VEHICLE SPEED SIGNAL 1.DEF: inconsistent signal 2.DEF: no signal 3.DEF: configuration absent or incorrect 4.DEF: signal outside upper limit 5.DEF: CAN connection fault

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present during a road test.
	Special notes: Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the ABS computer connections. Check the injection computer connections. Repair if necessary.
Carry out a fault finding procedure on the multiplex network and ABS. See **88B Multiplexing** and **38C ABS** to deal with any faults. If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF097 PRESENT OR STORED	CAMSHAFT SENSOR CIRCUIT 1.DEF: no signal 2.DEF: inconsistent signal

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault declared present before an attempt is made to start the engine it will not be possible to start the engine. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

1.DEF ***2.DEF***	***NOTES***	**Priority when dealing with a number of faults:** In the event of more than one fault: **– DF056 Air flow sensor circuit,** **– DF057 Water in diesel fuel detector circuit,** **– DF067 Damper control circuit,** Check the conformity of the **+ 12 V** after relay supply line, from **track 2** of the **UPC PPM1 connector**. (Use the **Wiring Diagrams** Technical Note for the vehicle).

Check the camshaft sensor connectors,
Check the injection computer connections.
Check the camshaft sensor fitting and positioning.
Also check the general condition (damaged housing, heating up, etc.).
Carry out the necessary repairs.

Check **the continuity and the absence of interference resistance** of the following connections:
Injection computer brown 48-track connector **B**, **track D1** → **Track 2** Camshaft sensor
Injection computer brown 48-track connector **B**, **track A1** → **Track 1** Camshaft sensor
Repair if necessary.
Check the camshaft sensor resistance between tracks 2 and 3.
If the resistance is not **10,250** Ω ± **500 at 20** °**C**, replace the sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF097 **CONTINUED**	

With the ignition on and the camshaft sensor **connected**:
Use a voltmeter to measure the voltage between **tracks 1** and **3** of the camshaft sensor:
The voltage displayed should be equal to the battery voltage ± **0.08 V**.
if the voltage is outside permitted tolerance values, take the measurement again with the **camshaft sensor disconnected**.
If the voltage is still outside the permitted tolerance values with the sensor disconnected, check **the continuity and the absence of interference resistance** of the following connection:
Camshaft sensor, **track 3** ⟶ **Track 2**, black **PPM1** connector of the UPC
If the voltage displayed is correct with the sensor disconnected, replace the camshaft sensor.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF098 PRESENT OR STORED	FUEL TEMPERATURE SENSOR CIRCUIT CC.0 : short circuit to earth CO.1 : open circuit or short circuit to + 12 V

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test or after attempting to cold start the engine.
	Special notes: – Use bornier **Elé. 1681** for all operations on the injection computer connectors. – The default value given by the diagnostic tool is **100 °C**.

CC.0	***NOTES***	None.

Check the fuel temperature sensor connections. Check the injection computer connections. Repair if necessary.
Measure the fuel temperature sensor **resistance** between **tracks 1** and **2**. Replace the fuel temperature sensor if the resistance is not: **2,050 Ω ± 100 at 25 °C** **810 Ω ± 47 at 50 °C** **309 Ω ± 17 at 80 °C** Check **the continuity and insulation against earth** of the following connections: Injection computer brown 48-track connector **B**, **track H2** ⟶ **Track 1** Fuel temperature sensor Injection computer grey 32-track connector **C**, **track F1** ⟶ **Track 2** Fuel temperature sensor
If the fault is still present, replace the fuel temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF098 **CONTINUED**	

CO.1	***NOTES***	None.

Check the fuel temperature sensor connections.
Check the injection computer connections.
Repair if necessary.

Measure the fuel temperature sensor **resistance** between **tracks 1** and **2**.
Replace the fuel temperature sensor if the resistance is not: **2,050 Ω ± 100 at 25 °C**
810 Ω ± 47 at 50 °C
309 Ω ± 17 at 80 °C
Check **the continuity and insulation against + 12 V** of the following connections:
Injection computer brown 48-track connector **B**, **track H2** ⟶ **Track 1** Fuel temperature sensor
Injection computer grey 32-track connector **C**, **track F1** ⟶ **Track 2** Fuel temperature sensor

If the fault is still present, replace the fuel temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF114 PRESENT OR STORED	EGR SOLENOID VALVE CIRCUIT 1.DEF: insufficient EGR valve flow 2.DEF: excessive EGR valve flow

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after: – starting the engine, – a road test, – an actuator command **AC002 EGR solenoid valve**.
	Special notes: If the fault is present: – the EGR function is inhibited, – the vehicle performance is reduced, – the level 1 warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF114 **CONTINUED**	

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the EGR solenoid valve between **tracks 1** and **5**.
If the is resistance is not **8 Ω ± 0.5 at 20 °C**, replace the exhaust gas recirculation valve.

Check **the continuity and the absence of interference resistance** of the following connections:

UPC **PPM1 connector, track 1** ⟶ **Track 1** EGR solenoid valve
Injection computer brown 48-track connector **B**, **track L2** ⟶ **Track 5** EGR solenoid valve

Check that there are no leaks on the EGR circuit (pipes pierced or damaged) and that the clamps are properly tightened.

Check the EGR valve:
– exit fault finding mode in CLIP,
– switch off the vehicle ignition,
– disconnect the EGR valve connector,
– remove the EGR valve,
– disconnect the connector and EGR valve,
– switch on the ignition and return to fault finding mode on the CLIP tool,
– run command **AC002 EGR solenoid valve with valve removed**.

Check:
– the position of the valve,
– that there is no play between the valve and the control rod, and the general condition (clogging, hard point, etc.),
– the valve closure when the command is completed.

If, during the command:
– no valve movement is evident,
– the valve does not open or close completely,

Check that there are no particles blocking the movement of the piston.

If a particle was blocking the movement of the valve, run command **AC002 EGR solenoid valve, again and check the valve is operating correctly**.

If the valve is operating normally, run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.

If the valve is jammed or irrevocably seized, replace the EGR valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF118 PRESENT OR STORED	EGR SOLENOID VALVE SERVO 1.DEF: insufficient EGR valve flow 2.DEF: excessive EGR valve flow

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after: – starting the engine, – a road test, – an actuator command **AC002 EGR solenoid valve**.
	Special notes: If the fault is present: – the EGR function is inhibited, – the vehicle performance is reduced, – the level 1 warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF118 **CONTINUED**	

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the EGR solenoid valve between **tracks 1** and **5**.
If the resistance displayed is not approximately **8** Ω ± **0.5** Ω**at 20** °**C**, replace the EGR valve.

Check **the continuity and the absence of interference resistance** of the following connections:
UPC **PPM1** connector, **track 1** → **Track 1** EGR valve connector
Injection computer brown 48-track connector **B**, **track L2** → **Track 5** of the EGR valve connector
Check that there are no leaks on the EGR circuit (pipe pierced or damaged) and that the clamps are properly tightened.

Check the operation of the EGR valve:
– exit fault finding mode in CLIP,
– switch off the vehicle ignition,
– disconnect the EGR valve connector,
– remove the EGR valve,
– reconnect the connector and EGR valve,
– switch on the ignition and return to fault finding mode on the CLIP tool,
– run command **AC002 EGR solenoid valve with valve removed**.
– Check:
  – the position of the valve,
  – that there is no play between the valve and the control rod, and the general condition (clogging, hard point, etc.),
  – the valve closure when the command is completed.

If, during the command:
– no valve movement is evident,
– the valve does not open or close completely.
Check that there are no particles blocking the movement of the piston.
If a particle was blocking the movement of the valve, run command **AC002 EGR solenoid valve, again and check the valve is operating correctly**.
If the valve is operating normally, run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.
If the valve is stuck or seized beyond repair, replace the exhaust gas recirculation valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF119 STORED	CAMSHAFT SENSOR SIGNAL 1.DEF: intermittent absence of signal 2.DEF: intermittent inconsistency of signal

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared stored following a road test or after attempting to start the engine several times.
	Special notes: Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the camshaft sensor connections.
Check the injection computer connections.
Check the camshaft sensor fitting and positioning.
Also check the general condition, (damaged housing, heating up, etc.)
Carry out the necessary repairs.
Check the camshaft sensor resistance between tracks 2 and 3.
If the resistance is not **10,250** Ω ± **500 at 20** °**C**, replace the sensor.

Check **the continuity and the absence of interference resistance** of the following connections:
Injection computer brown 48-track connector **B**, **track D1** ⟶ **Track 2** Camshaft sensor.
Injection computer brown 48-track connector **B**, **track A1** ⟶ **Track 1** Camshaft sensor.

With the ignition on and the camshaft sensor **connected**:
Use a voltmeter to measure the voltage between **tracks 1** and **3** of the camshaft sensor:
(This voltage should be equal to the battery voltage ± **0.08 V**)

– If the voltage is outside permitted tolerance values, take the measurement again with the **camshaft sensor disconnected**,
– If the voltage is still outside the permitted tolerance values with the sensor disconnected, check **the continuity and the absence of interference resistance** of the following connection:
Camshaft sensor, **track 3** ⟶ **Track 2**, **PPM1** connector of the UPC
– If the voltage displayed is correct with the sensor disconnected, replace the camshaft sensor.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF120 PRESENT OR STORED	ENGINE SPEED SENSOR SIGNAL 1.DEF: intermittent absence of signal 2.DEF: intermittent inconsistency of signal

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present: – when an attempt is made to start the engine, – when the engine is running. **Special notes:** Use bornier **Elé. 1681** for any work on the computer connectors. The engine speed sensor is consistent with the camshaft sensor. If the fault is present, the **level 2** warning light comes on.

Check the engine speed sensor connections.
Repair if necessary.

Check that the sensor is correctly mounted and that the flywheel target is not damaged.

Check that the gap between the engine speed sensor and the engine flywheel is **0.5 to 1.8 mm**.

Measure the **resistance** of the engine speed sensor between **terminals A and B** of the black connector.
If the **winding resistance** is not **800** ± **80** Ω at an engine temperature of **20** °**C**, replace the engine speed sensor.

Check the injection computer connections.
Repair if necessary.

Check the **continuity and the absence of interference resistance** of the following connections:
Injection computer brown 48-track connector **B**, **track B1** ⟶ **Track A** engine speed sensor
Injection computer brown 48-track connector **B**, **track C1** ⟶ **Track B** engine speed sensor
Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF209 PRESENT OR STORED	EGR VALVE POSITION SENSOR CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to + 12 V 1.DEF: micro-breaks

NOTES	**Priorities when dealing with a number of faults:** Apply the procedure for dealing with fault **DF012 Sensor supply voltage no. 2** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present following a road test or an actuator control **AC002 EGR Solenoid Valve**.
	Special notes: If the fault is present: – there is smoke from the exhaust, – the EGR function is deactivated. If CO.0 and/or CC.1 is still present, the OBD warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds). Use bornier **Elé. 1681** for any work on the computer connectors.

CO.0	***NOTES***	None.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation** against earth of the following connections:
Injection computer 48-track brown connector B, **track J2** → **Track 6** EGR valve
Injection computer brown 48-track connector B, **track F4** → **Track 2** EGR valve
Injection computer grey 32-track connector C, **track C2** → **Track 4** EGR valve
Repair if necessary.

Remove the exhaust gas recirculation valve.
Run command **AC002 EGR solenoid valve**, and check that the valve is moving freely.
If the valve does not move, check that a particle is not blocking the valve.
Try to remove the particle, and run command **AC002 EGR solenoid valve** again.
If the valve is moving freely, refit the exhaust gas recirculation valve.
When the valve has been refitted, run command **RZ002 EGR Adaptives**.
Switch off the ignition and wait **30 seconds**.
Switch the ignition on again and check the system faults.
If there is no longer a fault, fault finding is completed.

If after all the checks the fault is still present, replace the EGR valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF209 **CONTINUED 1**	

CC.1	***NOTES***	None.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation against + 12 V** of the following connections:
Injection computer 48-track brown connector B, **track J2** ⟶ **Track 6** EGR valve
Injection computer grey 32-track connector C, **track C2** ⟶ **Track 4** EGR valve
Repair if necessary.

Remove the EGR valve.
Run command **AC002 EGR solenoid valve**, and check that the valve is moving freely.
If the valve does not move, check that a particle is not blocking the valve.
Try to remove the particle, and run command **AC002 EGR solenoid valve** again.
If the valve moves freely, refit the EGR valve.
When the valve has been refitted, run command **RZ002 EGR Adaptives**.
Switch off the ignition and wait **10 seconds**.
Switch the ignition on again and check the system faults.
If there is no longer a fault, fault finding is completed.

If, after all the checks, the fault is still present, replace the EGR valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF209 **CONTINUED 2**	

1.DEF	***NOTES***	**Only in Vdiag 4C.**

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.
Run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.
(See the **Replacement of components** section).

Check **the continuity and the absence of interference resistance** of the following connections:

Injection computer 48-track brown connector B, **track J2** → **Track 6** EGR valve
Injection computer brown 48-track connector B, **track F4** → **Track 2** EGR valve
Injection computer grey 32-track connector C, **track C2** → **Track 4** EGR valve

Repair if necessary.

If after all the checks the fault is still present, replace the EGR valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF250 PRESENT OR STORED	ELECTRONIC STABILITY PROGRAM FUNCTION 1.DEF: CAN connection fault 2.DEF: inconsistent signal

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present during a road test.
	Special notes: Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the ABS computer connections. Check the injection computer connections. Repair if necessary.
Carry out a fault finding procedure on the multiplex network and ABS. (See 88C, Multiplexing and 38C ABS) to deal with any faults. If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF272 PRESENT OR STORED	EGR VALVE CONTROL CIRCUIT CC.1 : short circuit to + 12 V CC.0 : short circuit to earth CO : open circuit 1.DEF: internal electrical fault

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test or an actuator control **AC002 EGR Solenoid Valve**.
	Special notes: The EGR and turbocharging functions are inhibited. The **level 1** warning light is lit. If CC.0 is still present, the OBD warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds). Use bornier **Elé. 1681** for all operations on the injection computer connectors.

IMPORTANT
If dealing with this fault requires the EGR valve to be replaced, run command RZ002 EGR Adaptives described in Interpretation of commands in this section.

CC.1	***NOTES***	None

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the EGR solenoid valve between **tracks 1** and **5**.
If the resistance is not approximately **8 Ω ± 0.5 at 20 °C**, replace the EGR valve.

Check the **continuity and insulation against + 12 V** of the following connection:
Injection computer brown 48-track connector B **track L2** ⟶ **Track 5** of the EGR valve

Repair if necessary.
If the fault is still present, replace the EGR valve

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF272 **CONTINUED 1**	

CC.0 ***CO***	***NOTES***	**Special notes:** If fault **DF209 EGR valve position sensor circuit CO.0** is present at the same time, check that the EGR valve connector is properly connected.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the EGR solenoid valve between **tracks 1** and **5**.

If the resistance displayed is not **8 Ω ± 0.5 at 20 °C**, replace the EGR valve.

Check **the continuity and insulation against earth** of the following connections:

Injection computer brown 48-track connector B **track L2** → **Track 5** of the EGR valve
UPC black **PPM1** connector **track 1** → **Track 1** of the EGR valve

Check for **+ 12 V** after relay (UPC) on **track 1** of the EGR valve.
If there is not **+ 12 V on track 1**, refer to the UPC fault finding note.
If the fault is still present, replace the EGR valve

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF272 **CONTINUED 2**	

1.DEF	***NOTES***	None.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Check the **resistance** of the EGR solenoid valve between **tracks 1** and **5**.
If the resistance is not **8 Ω ± 0.5 at 20 °C**, replace the EGR valve.

Check for **continuity, insulation and the absence of interference resistance** on the following connections:
Injection computer brown 48-track connector B **track L2** ⟶ **Track 5** of the EGR valve
UPC black PPM1 connector **track 1** ⟶ **Track 1** of the EGR valve

Check for **+ 12 V** after relay (UPC) on **track 1** of the EGR valve.
Repair if necessary.

If the fault persists, **check that the computer output is working correctly**:
- Run actuator command **AC002 EGR solenoid valve**.
- If there is no perceptible movement of the valve, ensure that the computer output is functioning:
  - Leave the EGR valve connected.
  - Connect a "wire clip" to the violet wire between the valve and the injection computer (connection between **track 6 of the valve** and **track J2 of the injection computer connector B**).
  - Connect the positive terminal of the voltmeter to the wire clip.
  - Connect the negative terminal of the voltmeter to the battery earth.
  - Run command **AC002 EGR solenoid valve**.
  - The voltage should vary over **10 cycles** between **1.05 V and 3.5 V**.
  - If the voltage varies between these values, replace the EGR valve.
  - If the voltage does not vary or varies between incorrect values, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF276 PRESENT OR STORED	INJECTOR CODE PROGRAMMING 1.DEF: internal electronic fault during programming 2.DEF: no code stored

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after: – replacing injector(s), – replacing the injection computer.
	Special notes: If the fault is present: – the engine speed is limited, – the level 1 warning light is lit.

1.DEF	***NOTES***	None.

Program the injector codes using command **SC002 Enter injector codes**.
Carry out the procedure described in the **Interpretation of commands** section.
If the fault is still **present**, after the ignition is switched off and dialogue is established, contact the Techline.

2.DEF	***NOTES***	This fault **appears on any blank computer (new or recently reprogrammed).**

IMPORTANT
A computer without the IMA option can be replaced by a computer with this option. The codes have therefore not been saved during command SC003 Computer data backup.
In this case, status ET104 Injector code use changes to YES or FAULTY, fault DF276 will be present, and the engine will operate in defect mode.
– Program the injector codes using:
  command **SC002 Enter injector codes**, (follow the procedure described in the **Interpretation of commands** section).
– after the codes have been entered:
– switch off the ignition,
– wait until power latch closes down and then switch the ignition back on,
– establish dialogue and clear the fault memory,
– end of operation.

If the fault is still present, contact the Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF530 PRESENT OR STORED	EGR ADAPTIVES

IMPORTANT
This fault only appears in Vdiag 48.

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – a road test, – an actuator command **AC002 EGR solenoid valve**.
	Special notes: The EGR and turbocharging functions are inhibited. The **level 1** warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Clear any stored faults.

Run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.

Switch off the ignition and wait for the engine immobiliser warning light to start flashing.

Switch the ignition on again and check the system faults.

If the fault is still present, replace the exhaust gas recirculation valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF619 PRESENT OR STORED	EGR VALVE JAMMED OPEN

IMPORTANT
This fault only appears in Vdiag 48 and 4c.

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – a road test, – an actuator command **AC002 EGR solenoid valve**.
	Special notes: The EGR and turbocharging functions are inhibited. The **level 1** warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Clear any stored faults.

Run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.

Switch off the ignition and wait for the engine immobiliser warning light to start flashing.

Switch the ignition on again and check the system faults.

If the fault is still present:
– remove the EGR valve and reconnect it after removing it,
– check that the movement of the valve is not being blocked by a particle,
– check that the valve is not jammed or stuck in one position,
– run command **AC002 EGR solenoid valve**,
– check the movement of the solenoid valve,
– check that the solenoid valve is completely closed,
– if there is no movement, or if the valve is seized and cannot be repaired, replace the EGR solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF620 PRESENT OR STORED	EGR VALVE FOULED

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – a road test, – an actuator command **AC002 EGR solenoid valve**.
	Special notes: The EGR and turbocharging functions are inhibited. The **level 1** warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Clear any stored faults.

Run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.

Switch off the ignition and wait for the engine immobiliser warning light to start flashing.

Switch the ignition on again and check the system faults.

If the fault is still present:
– remove the EGR valve, and then reconnect it,
– check that the movement of the valve is not being blocked by a particle,
– check that the valve is not jammed or stuck in one position,
– run command **AC002 EGR solenoid valve**,
– check the movement of the solenoid valve,
– check that the solenoid valve is completely closed,
– if there is no movement, or if the valve is seized and cannot be repaired, replace the EGR solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF621 PRESENT OR STORED	EGR VALVE LOCKED OPEN (OBD fault)

IMPORTANT
This fault only appears in Vdiag 48 and 4C.

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – a road test, – an actuator command **AC002 EGR solenoid valve**.
	Special notes: The EGR and turbocharging functions are inhibited. The **level 1** warning light is lit. The **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds). Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Clear any stored faults.

Run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.

Switch off the ignition and wait for the engine immobiliser warning light to start flashing.

Switch the ignition on again and check the system faults.

If the fault is still present:
– remove the EGR valve and reconnect it after removing it,
– check that the movement of the valve is not being blocked by a particle,
– check that the valve is not jammed or stuck in one position,
– run command **AC002 EGR solenoid valve**,
– check the movement of the solenoid valve,
– check that the solenoid valve is completely closed,
– if there is no movement, or if the valve is seized and cannot be repaired, replace the EGR solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

DF622 PRESENT OR STORED	EGR VALVE JAMMED OPEN

IMPORTANT
This fault only appears in Vdiag 4C.

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – a road test, – an actuator command **AC002 EGR solenoid valve**.
	Special notes: The EGR and turbocharging functions are inhibited. The **level 1** warning light is lit. Use bornier **Elé. 1681** for all operations on the injection computer connectors.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Clear any stored faults.

Run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.

Switch off the ignition and wait for the engine immobiliser warning light to start flashing.

Switch the ignition on again and check the system faults.

If the fault is still present:
– remove the EGR valve and reconnect it after removing it,
– check that the movement of the valve is not being blocked by a particle,
– check that the valve is not jammed or stuck in one position,
– run command **AC002 EGR solenoid valve**,
– check the movement of the solenoid valve,
– check that the solenoid valve is completely closed,
– if there is no movement, or if the valve is seized and cannot be repaired, replace the EGR solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test, then check with the diagnostic tool.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Vehicle impact**	**ET077:**	Impact detected	**YES** or **NO**	**In the event of a fault**, refer to the interpretation of fault **DF069 Impact signal detected**.
2	**Supply**	**ET001:**	+ after ignition computer feed	**PRESENT,** ignition on	**If there is a fault** carry out fault finding on the **charge circuit**
		PR071:	Computer supply voltage	**9 V < X < 16 V**	
		PR358:	Sensor reference voltage	**3.47 < X < 3.75 V (Average of the three sensor supply voltages)**	**in the event of a fault**, consult the interpretation of faults **DF011 Sensor supply voltage no. 1, DF012 Sensor supply voltage no. 2, and DF013 Sensor supply voltage no. 3**.
		PR076:	Refrigerant sensor voltage	**0 V < X < 5 V**	**In the event of a fault,** refer to the fault finding procedure for fault **DF049 Refrigerant sensor circuit**.
3	**Engine running**	**PR055:**	Engine speed	Gives the engine speed of rotation in **rpm** **With the ignition on at 0 rpm**	**In the event of a fault**, consult the interpretation of fault **DF005 Engine speed sensor circuit**.
4	**Injection configuration**	**ET104:**	Injector code use	**YES or NO or FAULTY**	This status indicates that the IMA function is activated. **In the event of a fault, refer to the fault finding procedure for fault DF276 Injector code programming.**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

MAIN COMPUTER STATUSES AND PARAMETERS (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
5	**Pressure**	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer. **Default value: 750 mbar**	**In the event of a fault**, refer to the interpretation of fault **DF003 Atmospheric pressure sensor circuit**.
		PR038:	Rail pressure	**0 < X < 2 bar**	**In the event of a fault**, refer to the interpretation of fault **DF007 Rail pressure sensor circuit**.
6	**Temperature**	**PR059:**	Inlet air temperature	Indicates the inlet air temperature **Ignition on** **PR061 = PR059** **Default value: 20 °C**	**In the event of a fault**, refer to the interpretation of parameter **PR059**.
		PR064:	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of **DF001 Coolant temperature sensor circuit**.
7	**Preheating**	**ET007:**	Preheating unit control	**INACTIVE** or **ACTIVE**	**In the event of a fault**, refer to the interpretation of status **ET007**
8	**Torque**	**PR015:**	Engine torque	**X = 0 Nm**	None.
9	**Charge circuit**	**PR016:**	Alternator flow	**X = 0 mA**	**In the event of a fault**, check the charge circuit.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

MAIN COMPUTER STATUSES AND PARAMETERS (continued)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
10	**Speed signal**	**PR089:** Vehicle speed	Indicates the vehicle speed in **mph (km/h)**. This parameter is transmitted by the ABS computer. This signal is transmitted to the injection system by the multiplex network.	**In the event of a fault** test the multiplex network. (see 38C ABS to deal with any faults.)
11	**Reverse gear signal**	**ET035:** Reverse gear signal	**ABSENT** or **PRESENT**	None.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

AIR CIRCULATION (TURBOCHARGING/INLET)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine speed**	**PR055:**	Engine speed	Indicates the engine's speed of rotation in rpm. With ignition on PR55 = 0 rpm.	**In the event of a fault**, refer to the interpretation of fault DF005 Engine speed sensor circuit.
2	**Temperature**	**PR061:**	Exterior air temperature	Gives the exterior air temperature in °C. This parameter is managed by the UCH and transmitted to the injection on the multiplex network. **Default value: 20 °C**	**In the event of a fault**, (see 87B carry out fault finding on the UCH).
		PR059:	Inlet air temperature	**Ignition on** **Default value: 20 °C** **PR061 = PR059**	**In the event of a fault**, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**.
3	**Turbocharging**	**PR041:**	Turbocharging pressure	**PR041 = PR035 = Atmospheric pressure**	**In the event of a fault**, consult the interpretation of fault **DF004 Turbocharging pressure sensor circuit**.
		PR009:	Turbocharging pressure setpoint	**790 < X < 1,010 mbar**	None.
		PR047:	Turbocharging pressure OCR	**X = 5 %**	The opening cyclic ratio should be identical to the correction of the solenoid valve position
		PR011:	Turbocharging solenoid valve position sensor	**X = 5 %**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

AIR CIRCULATION (TURBOCHARGING/INLET) (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	Air circulation	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer. **Default value: 750 mbar**	**In the event of a fault**, refer to the interpretation of fault **DF003 Atmospheric pressure sensor circuit**.
		PR132:	Air flow	**X = 0 kg/h**	**In the event of a fault**, consult the interpretation of parameter **DF056 Air flow sensor circuit**.
		PR050:	Damper flap OCR	**X = 5 %**	**In the event of a fault**, refer to the interpretation of fault **DF067 Damper control circuit**.
5	Sensor supply	**PR081:**	Inlet temperature sensor voltage	**1.90 < X < 2.10 V** **Default value: 5 V**	**In the event of a fault**, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**.
		PR079:	Atmospheric pressure sensor voltage	**3.80 < X < 4 V**	**In the event of a fault**, refer to the interpretation of fault **DF003 Atmospheric pressure sensor circuit**.
		PR073:	Air flow sensor supply voltage	**Ignition on** **U = 0.6 V** **Default value: 0 V**	**In the event of a fault**, refer to the interpretation of fault **DF013 Sensor supply voltage no. 3**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

FUEL CIRCUIT

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine speed**	**PR055:**	Engine speed	Indicates the engine's speed of rotation in **rpm.** **Ignition on** **PR055 = 0 rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
2	**Temperature**	**PR063:**	Fuel temperature	Indicates the fuel temperature **Default value: 100 °C**	**In the event of a fault**, consult the interpretation of **DF098 Fuel temperature sensor circuit**.
3	**Pressure**	**PR008:**	Rail pressure setpoint	Indicates the theoretical pressure value for optimum engine operation **X = 250 bar**	**In the event of a fault**, refer to the interpretation of fault **DF053 Rail pressure regulation function**.
		PR048:	Rail pressure regulation valve OCR	**X = 15 %**	**In the event of a fault**, refer to the interpretation of fault **DF007 Rail pressure sensor circuit**.
		PR038:	Rail pressure	**X = 0 bar** **Default value: 250 bar.**	
		PR213:	Rail pressure loop	**X = PR008 - PR038**	The fuel pressure variation is the difference between the rail pressure and the rail pressure setpoint. **In the event of a fault**, refer to the interpretation of fault **DF007 Rail pressure sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

FUEL CIRCUIT (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	Flow	PR017:	Fuel flow	Ignition on PR017 = 0 bar	NONE
5	Rail current	PR006:	Rail pressure regulator current	X = 395 mA Default value: 1,600 mA or 4 mA	In the event of a fault, refer to the interpretation of fault DF007 Rail pressure sensor circuit.
		PR007:	Rail pressure regulator current setpoint	X = 400 mA Default value: 1600 mA	
6	Sensor voltage	PR082:	Fuel temperature sensor voltage	1.8 < X < 3 V Default value: 5 V	In the event of a fault, consult the interpretation of DF098 Fuel temperature sensor circuit.
		PR080:	Rail pressure sensor voltage	X = 0.5 V Default value: 5 V	In the event of a fault, refer to the interpretation of fault DF013 Sensor supply voltage no. 3.
7	Fuel flow	PR364:	Cylinder no. 1 fuel flow correction	0.0 mg/st	In the event of a fault, refer to test 1 INJECTOR TEST.
		PR405:	Cylinder no. 2 fuel flow correction		
		PR406:	Cylinder no. 3 fuel flow correction		
		PR365:	Cylinder no. 4 fuel flow correction		

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

ANTIPOLLUTION/OBD

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine speed**	**PR055:**	Engine speed	Gives the engine speed of rotation in **rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
2	**Exhaust gas recirculation**	**PR046:**	EGR solenoid valve OCR	**X = 5 %** **5 < X < 95 %**	**In the event of a fault**, refer to the interpretation of faults **DF118 EGR solenoid valve servo and DF114 EGR solenoid valve circuit**.
		PR005:	EGR valve opening setpoint	Gives a theoretical EGR valve opening value for optimum engine operation. **With ignition switched on X = 0 %**	
		PR051:	EGR valve position feedback	**With ignition switched on X = 0 %**	
		PR022:	EGR valve position feedback loop difference	**PR022 = PR051 - PR005**	
		PR128:	First EGR valve offset	**15 % < X < 30 %** (Average value)	
		PR129:	Last EGR valve offset	**15 < X < 40 %** (Average value)	
3	**Air regulation**	**PR171:**	Air flow setpoint for EGR	**Ignition on** **PR004 = PR131 = 0 mg/st**	**None**
		PR131:	EGR air flow variation		
		ET078:	Air regulation	**ACTIVE or INACTIVE**	
4	**Sensor power supply**	**PR077:**	EGR valve position sensor voltage	**1.06 < X < 1.08 V** **Default value: 0 V**	**In the event of a fault**, refer to the interpretation of fault **DF114 EGR solenoid valve circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

COLD LOOP

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Air conditioning detection**	**ET079:**	Air conditioning present	**Indicates the presence of air conditioning on the vehicle.** – **YES:** Air conditioning is detected by the injection computer. – **NO:** Air conditioning is not detected by the injection computer.	**If this is not consistent with the vehicle equipment**, carry out a test with on the multiplex network and apply the relevant procedure.
2	**Engine running**	**PR055:**	Engine speed	Gives the engine speed of rotation in **rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
3	**Driver control**	**ET088:**	Compressor activation request	**Ignition on** **INACTIVE**	**If the air conditioning is authorised, or if the compressor is being controlled, refer to the Air conditioning fault finding note for the vehicle.**
		ET004:	Air conditioning authorisation	**NO**	
4	**Air conditioning system**	**PR053:**	Speed requested by air conditioning	**Ignition on** **PR053 = 0 rpm**	**None**
5	**Pressure**	**PR037:**	Refrigerant pressure	**Ignition on** **PR037 = 0 bar**	**In the event of a fault**, please refer to the interpretation of fault **DF049 Refrigerant sensor circuit**.
6	**Power**	**PR125:**	Power absorbed by the air conditioning compressor	**Ignition on** **PR125 = 0 W**	**None**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

COLD LOOP (continued)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
7	**Engine cooling**	**ET022:** Low-speed fan assembly request **ET021:** High-speed fan assembly request	**With the ignition on, engine < 80° INACTIVE**	**If the engine fan assemblies are supplied with the ignition on**, the injection system may be in defect mode. Carry out a system fault test and refer to the interpretation of any faults.
		ET014: Fan assembly 1 check **ET015:** Fan assembly 2 check	**With the ignition on, engine < 80° STOPPED**	
8	**Coolant temperature**	**PR064:** Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C.**	**In the event of a fault**, refer to the interpretation of **DF001 Coolant temperature sensor circuit**.
9	**Vehicle speed**	**PR089:** Vehicle speed	Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer. This signal is transmitted to the injection system on the multiplex network. With ignition on PR089 = 0 mph (km/h).	In the event of a fault, test the multiplex network. Refer to the ABS fault finding note for the interpretation of possible faults (see 38C, ABS).

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

DRIVER PARAMETERS

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Engine running**	**PR055:** Engine speed	Gives the engine speed of rotation in **rpm** **Ignition on** **PR055 = 0 rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
2	**Accelerator pedal position**	**PR030:** Pedal load*	Indicates the accelerator pedal position **If there is no pressure on the pedal PR030 = 0 %**	**In the event of a fault**, refer to the interpretation of fault **DF008 Pedal potentiometer circuit gang 1 or DF009 Pedal potentiometer circuit gang 2**.
3	**Sensor supply**	**PR147:** Pedal potentiometer gang 1 voltage	**Accelerator pedal released** **0.70 < PR147 < 0.80 V**	**In the event of a fault**, refer to the interpretation of fault **DF011 Sensor supply voltage no. 1** **or** **DF012 Sensor supply voltage no. 2**.
		PR148: Pedal potentiometer gang 2 voltage	**Accelerator pedal released** **0.35 < PR148 < 0.40 V**	

(*) PEDAL VOLTAGES - COLD, IGNITION OFF (Average values given as examples).

Pedal load	0 %	25 %	50 %	100 %	120 %
Gang 1 voltage	0.76 V	1.52 V	2.09 V	3.23 V	3.68 V
Gang 2 voltage	0.37 V	0.74 V	1.02 V	1.56 V	1.79 V

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

HEATING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of fault **DF001 Coolant temperature sensor circuit**.
2	**Resistance Heating Passenger compartment**	**ET111:**	Set number of passenger compartment heating resistors.	Indicates the number of passenger compartment resistors supplied. The passenger compartment resistor function programming is performed through the UCH. Certain operating parameters determine the operation of one or more passenger compartment resistors. The injection computer only receives a signal relating to the number of passenger compartment resistors to control. **Ignition on** **ET111 = NO**	**In the event of a fault**, (see 87B, UCH).
		ET112:	Passenger compartment heating resistor cut-off	Status **ET112** is indicated if the passenger compartment resistors are being controlled. The computer receives the signal to cut-off the resistors through the UCH. **With ignition on** **ET112 = YES**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

CRUISE CONTROL/SPEED LIMITER

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Cruise control/speed limiter**	**PR089:**	Vehicle speed	Indicates the vehicle speed in **mph (km/h)**. This parameter is transmitted by the ABS computer. This signal is transmitted to the injection on the multiplex network. **Ignition on** **PR089 = 0 mph (km/h)**	**In the event of a fault, test the multiplex network.** (See 38C, ABS fault finding) for the interpretation of possible faults.
		PR130:	Cruise control setpoint	Indicates the cruise control limit speed **Ignition on** **X = 0 mph (km/h)**	**In the event of a fault**, refer to the interpretation of statuses **ET413 Cruise control/speed limiter and ET415 Deactivating Cruise control /speed limiter**.
		ET413:	Cruise control/ speed limiter function	INCREASE: Increase button pressed DECREASE: Decrease button pressed SUSPEND: Suspend button pressed RESUME: Resume button pressed	In the event of a fault, refer to the interpretation of statuses ET413 Cruise control/Speed limiter function and ET415 Cruise control/Speed limiter deactivation.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

CRUISE-CONTROL/SPEED LIMITER (continued)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Cruise control/ speed limiter (continued)**	**ET415:** Deactivation of cruise control/ speed limiter Note: the cruise control can only be activated at a speed of **V > 18 mph (30 km/h)**.	**STATUS 1:** Traction control **STATUS 2:** Brake pedal depressed **STATUS 3:** Cruise control or speed limiter fault **STATUS 4:** Engine/ gearbox decoupling **STATUS 5:** Fault detected by the injection computer **STATUS 6:** Vehicle speed invalid **STATUS 7:** Suspend button pressed **STATUS 8:** Gear lever in neutral position **STATUS 9:** Inconsistency between the request and the vehicle speed	The cruise control and speed limiter functions can be deactivated by various events. **In the event of a fault**, refer to the interpretation of statuses **ET042 Cruise control/speed limiter and ET032 Deactivating Cruise control/speed limiter**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

CRUISE-CONTROL/SPEED LIMITER (continued)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
2	**Brake switch**	**ET122:** Brake switch no. 1 signal **ET123:** Brake switch no. 2 signal	**Indicates the position of the brake pedal** **With the ignition on, pedal released:** **ET122 = ET123 = INACTIVE**	**In the event of a fault**, consult the interpretation of statuses **ET122** and **ET123**.
3	**Clutch Switch**	**ET233:** Clutch pedal	**Indicates the position of the clutch pedal** **With the ignition on, pedal released:** **ET233 = released**	**In the event of a fault**, refer to the interpretation of status **ET233**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

ENGINE COOLING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of fault **DF001 Coolant temperature sensor circuit**.
2	**Fan assemblies**	**ET022:**	Low-speed fan assembly request	**With ignition on, engine < 80°** **INACTIVE**	**If the fan assemblies are supplied with the ignition on**, the injection system may be in defect mode. Carry out a system fault test and refer to the interpretation of faults.
		ET021:	High-speed fan assembly request		
		ET014:	Fan assembly 1 check	**With ignition on, engine < 80°** **STOPPED**	
		ET015:	Fan assembly 2 check		
3	**Sensor supply**	**PR084:**	Coolant temperature sensor voltage	**X = 3 V ± 0.5** **Default value: 5 V**	**In the event of a fault**, refer to the interpretation of fault **DF001 Coolant temperature sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

IGNITION/PREHEATING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Supply**	**ET001:**	+ after ignition computer feed	**Ignition on PRESENT**	**If the event of a fault**, carry out fault finding on the **charge circuit**.
2	**Engine speed**	**PR055:**	Engine speed	Indicates the engine's speed of rotation in **rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
3	**Temperature**	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of fault **DF001 Coolant temperature sensor circuit**.
		PR059:	Inlet air temperature	Indicates the inlet air temperature **Default value: 20 °C**	**In the event of a fault**, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**.
4	**Preheating**	**ET007:**	Preheating unit control	Status **ET007** is **ACTIVE** a few seconds after the ignition is switched on, and for postheating	**In the event of a fault**, (**ET007** locked in **ACTIVE** status), refer to the interpretation of fault **DF017 Preheating control circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

STARTING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Supply**	**ET001:**	+ after ignition computer feed	**Ignition on PRESENT**	**If the event of a fault**, carry out fault finding on the **charge circuit**.
		PR071:	Computer supply voltage	**9 V < X < 16 V**	In the event of a fault, carry out fault finding on the charge circuit.
		PR358:	Sensor reference voltage	**3.47 V < X < 3.75 V** (Average of the three sensor supply voltages)	In the event of a fault, refer to the interpretation of faults DF011 Sensor supply voltage no. 1, DF012 Sensor supply voltage no. 2, and DF013 Sensor supply voltage no. 3.
2	**Starting**	**ET076:**	Starting	**AUTHORISED:** The injection gives starting authorisation or **NOT PERMITTED:** The injection system does not authorise starting.	If status **ET076** is **PROHIBITED**, carry out fault finding on the entire multiplex network.
3	**Engine operation**	**ET038:**	Engine	**With the ignition on STOP or STALLED**	**None**
4	**Synchronisation**	**ET238:**	Synchronisation	**DONE**	In the event of a fault, refer to the interpretation of status ET238.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine stopped, ignition on**.

PROTECTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine immobiliser**	**ET341:**	Immobiliser code programmed	**YES** or **NO**	If status **ET341** is stuck at **NO**, (See 87B, UCH).
		ET003:	Engine immobiliser	**ACTIVE** or **INACTIVE**	If status **ET003** is stuck at **ACTIVE**, (See 87B, UCH fault finding).
2	**Vehicle impact**	**ET077:**	Impact detected	**YES** or **NO**	**In the event of a fault**, refer to the interpretation of fault **DF069 Impact signal detected**.
3	**Starting**	**ET076:**	Starting	**AUTHORISED:** The injection allows starting authorisation or **PROHIBITED:** The injection system does not authorise starting.	If status **ET076** is stuck at **PROHIBITED**, (See 87B, UCH fault finding).

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80**°.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Vehicle impact**	**ET077:**	Impact detected	**YES** or **NO**	**In the event of a fault**, refer to the interpretation of fault **DF069 Impact signal detected**.
2	**Supply**	**ET001:**	+ after ignition computer feed	**PRESENT,** ignition on	**If there is a fault** carry out a fault finding test on the **charge circuit**
		PR071:	Computer supply voltage	**9 V < X < 16 V**	
		PR368:	Sensor reference voltage	**3.47 V < X < 3.75 V** **(Average of the three sensor supply voltages)**	**in the event of a fault**, consult the interpretation of faults **DF011 Sensor supply voltage no. 1, DF012 Sensor supply voltage no. 2, and DF013 Sensor supply voltage no. 3**.
		PR076:	Refrigerant sensor voltage	**0 V < X < 5 V**	**In the event of a fault**, refer to the interpretation of fault **DF049 Refrigerant sensor circuit**.
3	**Engine running**	**PR055:**	Engine speed	Gives the engine speed of rotation in **rpm** **PR055 = 800 rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
4	**Injection configuration**	**ET104:**	Injector code use	**YES** or **NO** or **FAULTY**	This status indicates that the IMA function is activated. **In the event of a fault, refer to the interpretation of fault DF276 Injector code programming.**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80**°.

MAIN COMPUTER STATUSES AND PARAMETERS (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
5	**Pressure**	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer. **Default value: 750 mbar**	**In the event of a fault**, refer to the interpretation of fault **DF003 Atmospheric pressure sensor circuit**.
		PR038:	Rail pressure	**250 < P < 300 bar** **Pmax = 1,350 bar**	**In the event of a fault**, refer to the interpretation of fault **DF007 Rail pressure sensor circuit**.
6	**Temperature**	**PR059:**	Inlet air temperature	Indicates the inlet air temperature **Default value: 20 °C**	**In the event of a fault**, refer to the interpretation of parameter **PR059**.
		PR064:	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of fault **DF001 Coolant temperature sensor circuit**.
7	**Preheating**	**ET007:**	Preheating unit control	**INACTIVE** **warm engine**	**In the event of a fault**, refer to the interpretation of status **ET007**
8	**Torque**	**PR015:**	Engine torque	**When starting:** **25 < X < 40 Nm** **At idle speed:** **2 < X < 4 Nm**	None.
9	**Charge circuit**	**PR016:**	Alternator flow	**Warm engine** **10 < X < 20 mA** **With consumers:** **25 < X < 36 mA**	**In the event of a fault**, check the charge circuit.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80**°.

MAIN COMPUTER STATUSES AND PARAMETERS (continued)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
10	**Speed signal**	**PR089:** Vehicle speed	Indicates the vehicle speed in **mph (km/h)**. This parameter is transmitted by the ABS computer. This signal is transmitted to the injection system by the multiplex network.	**In the event of a fault** test the multiplex network. (See 38C ABS to deal with any faults.)
11	**Reverse gear signal**	**ET035:** Reverse gear signal	**ABSENT** or **PRESENT**	None.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80**°.

AIR CIRCULATION (TURBOCHARGING/INLET)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine speed**	**PR055:**	Engine speed	Indicates the engine's speed of rotation in rpm. At idle speed PR055 = 800 rpm.	In the event of a fault, refer to the interpretation of fault DF005 Engine speed sensor circuit.
2	**Temperature**	**PR061:**	Exterior air temperature	Gives the exterior air temperature in °C. This parameter is controlled by the UCH and transmitted to the injection on the multiplex network. **Default value: 20 °C**	**In the event of a fault**, (see 87B, UCH).
		PR059:	Inlet air temperature	Indicates the inlet air temperature **Default value: 20 °C**	**In the event of a fault**, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**.
3	**Turbocharging**	**PR041:**	Turbocharging pressure	**At idle speed PR042 = PR035 = Atmospheric pressure**	**In the event of a fault**, consult the interpretation for fault **DF004 Turbocharging pressure sensor circuit**.
		PR009:	Turbocharging pressure setpoint	**790 < X < 1,010 mbar**	None.
		PR047:	Turbocharging pressure OCR	**Warm engine PR047 = 85 %**	The Opening Cyclic Ratio should be identical to the correction of the solenoid valve position
		PR011:	Turbocharging solenoid valve position sensor	**Warm engine PR011 = 85 %**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80**°.

AIR CIRCULATION (TURBOCHARGING/INLET) (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	Air circulation	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer. **Default value: 750 mbar**	**In the event of a fault**, refer to the interpretation of fault **DF003 Atmospheric pressure sensor circuit**.
		PR132:	Air flow	**At idle speed** **PR132 = 30 kg/h**	**In the event of a fault**, refer to the interpretation of fault **DF056 Air flow sensor circuit**.
		PR050:	Damper flap OCR	**X = 5 %**	**In the event of a fault**, refer to the interpretation of fault **DF067 Damper control circuit**.
5	Sensor supply	**PR081:**	Inlet temperature sensor voltage	**1.9 < PR081 < 2.4 V** **Default value: 5 V**	**In the event of a fault**, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**.
		PR079:	Atmospheric pressure sensor voltage	**3.80 < X < 4 V**	**In the event of a fault**, refer to the interpretation of fault **DF003 Atmospheric pressure sensor circuit**.
		PR073:	Air flow sensor supply voltage	**Engine idling** **1.5 < PR073 < 2.2 V** **Default value: 0 V**	**In the event of a fault**, refer to the interpretation of fault **DF013 Sensor supply voltage no. 3**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80**°.

FUEL CIRCUIT

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine speed**	**PR055:**	Engine speed	Gives the engine speed of rotation in **rpm** **At idle speed** **PR055 = 800 rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
2	**Temperature**	**PR063:**	Fuel temperature	Indicates the fuel temperature **Default value: 100 °C**	**In the event of a fault**, refer to the interpretation of fault **DF098 Fuel temperature sensor circuit**.
3	**Pressure**	**PR008:**	Rail pressure setpoint	Indicates the theoretical pressure value for optimum engine operation **250 < PR008 < 300 bar**	**In the event of a fault**, refer to the interpretation of fault **DF053 Rail pressure regulation circuit**.
		PR048:	Rail pressure regulation valve OCR	**PR048 = 40 %**	**In the event of a fault**, refer to the interpretation of fault **DF007 Rail pressure sensor circuit**.
		PR038:	Rail pressure	**250 < PR038 < 300 bar** **Default value: 250 bar.**	
		PR293:	Rail pressure loop difference	**X = PR008 - PR038**	The fuel pressure variation is the difference between the rail pressure and the rail pressure setpoint. **In the event of a fault**, refer to the interpretation of fault **DF007 Rail pressure sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80**°.

FUEL CIRCUIT (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	Flow	**PR017:**	Fuel flow	**6 < X < 7 mg/st**	**NONE**
5	Rail current	**PR006:**	Rail pressure regulator current	**1320 < X < 1350 mA Default value: 1,600 mA or 4 mA**	**In the event of a fault**, refer to the interpretation of fault **DF007 Rail pressure sensor circuit**.
		PR007:	Rail pressure regulator current setpoint	**1320 < X < 1350 mA Default value: 1,600 mA or 4 mA**	
6	Sensor voltage	**PR082:**	Fuel temperature sensor voltage	**1.5 < X < 2.5 V Default value: 5 V**	**In the event of a fault**, refer to the interpretation of fault **DF098 Fuel temperature sensor circuit**.
		PR080:	Rail pressure sensor voltage	**1.1 < X < 1.2 V Default value: 5 V**	**In the event of a fault**, refer to the interpretation of fault **DF013 Sensor supply voltage no. 3**.
7	Fuel flow correction	**PR364:**	Cylinder no. 1 fuel flow correction	**± 1 mg/st**	**If one of the fuel flow correction parameters is outside the permitted tolerance values, refer to the interpretation of TEST 1 Injector Test.**
		PR405:	Cylinder no. 2 fuel flow correction		
		PR406:	Cylinder no. 3 fuel flow correction		
		PR365:	Cylinder no. 4 fuel flow correction		

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

ANTIPOLLUTION/OBD

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine speed**	**PR055:**	Engine speed	Gives the engine speed of rotation in **rpm** **At idle speed** **X = 800 rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
2	**Exhaust gas recirculation**	**PR046:**	EGR solenoid valve OCR	**At idle speed** **43.5 < X < 44 %**	**In the event of a fault**, refer to the interpretation of faults **DF117 EGR Offset position and DF114 EGR solenoid valve circuit**.
		PR005:	EGR valve opening setpoint	Gives a theoretical EGR valve opening value for optimum engine operation. **At idle speed** **5 < X < 95 %**	
		PR051:	EGR valve position feedback	**5 < X < 95 %**	
		PR022:	EGR valve position feedback loop difference	**PR022 = PR051 - PR005**	
		PR128:	First EGR valve offset	**15 % < X < 30 %** (Average value)	
		PR129:	Last EGR valve offset	**15 % < X < 40 %** (Average value)	
3	**Air regulation**	**PR171:**	Air flow setpoint for EGR	**275 < X < 280 mg/st**	**None**
		PR131:	EGR air flow variation		
		ET078:	Air regulation	**ACTIVE or INACTIVE**	
4	**Sensor power supply**	**PR077:**	EGR valve position sensor voltage	**1.06 < X < 1.08 V** **Default value: 0 V**	**In the event of a fault**, refer to the interpretation of fault **DF114 EGR solenoid valve circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

COLD LOOP

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Air conditioning detection**	**ET079:**	Air conditioning present	**Indicates whether the vehicle is fitted with air conditioning or not.** – **YES:** Air conditioning is detected by the injection computer. – **NO:** Air conditioning is not detected by the injection computer.	**If this is not consistent with the vehicle equipment**, carry out a test with on the multiplex network and apply the relevant procedure.
2	**Engine running**	**PR055:**	Engine speed	Gives the engine speed of rotation in **rpm** **At idle speed** **PR055 = 800 rpm**	**In the event of a fault**, refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
3	**Driver control**	**ET088:**	Compressor activation request	**ACTIVE OR INACTIVE**	**If air conditioning is not authorised, or if the compressor is never activated, (See 62A, Air conditioning).**
		ET004:	Air conditioning authorisation	**YES or NO**	
4	**Air conditioning system**	**PR053:**	Speed requested by air conditioning	**At idle speed** **PR053 = 900 rpm**	**None**
5	**Pressure**	**PR037:**	Refrigerant pressure	**1 < X < 32 bar**	**In the event of a fault**, refer to the interpretation of fault **DF049 Refrigerant sensor**.
6	**Power**	**PR125:**	Power absorbed by the air conditioning compressor	**At idle speed** **PR125 = 300 W**	**None**

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

COLD LOOP (continued)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
7	**Engine cooling**	**ET022:** Low-speed fan assembly request **ET021:** High-speed fan assembly request	**INACTIVE if air conditioning not switched on**	**If the engine fan assemblies are being supplied continuously without the air conditioning being active**, the injection system may be in defect mode. Carry out a system fault test and refer to the interpretation of any faults.
		ET014: Fan assembly 1 check	**RUNNING if air conditioning is active**	
		ET015: Fan assembly 2 check	**RUNNING if operating temperature is reached**	
8	**Coolant temperature**	**PR064:** Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of **DF001 Coolant temperature sensor circuit**.
9	**Vehicle speed**	**PR089:** Vehicle speed	Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer. This signal is transmitted to the injection system on the multiplex network. With ignition on PR089 = 0 mph (km/h)	In the event of a fault, test the multiplex network. Refer to the ABS fault finding notes for the interpretation of possible faults.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

DRIVER PARAMETERS

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Engine running**	**PR055:** Engine speed	Gives the engine speed of rotation in **rpm** **At idle speed PR055 = 800 rpm**	**In the event of a fault**, refer to the interpretation for fault **DF005 Engine speed sensor circuit**.
2	**Accelerator pedal position**	**PR030:** Accelerator pedal position *	Indicates the accelerator pedal position **If no pressure is being applied to the pedal PR030 = 0 %**	**In the event of a fault**, refer to the interpretation of fault **DF008 Pedal potentiometer circuit gang 1 or DF009 Pedal potentiometer circuit gang 2**.
3	**Sensor supply**	**PR147:** Pedal potentiometer gang 1 voltage	**Accelerator pedal released** **0.70 < PR147 < 0.80 V**	**In the event of a fault**, refer to the interpretation of fault **DF011 Sensor supply voltage no.1 or DF012 Sensor supply voltage no.2**.
		PR148: Pedal potentiometer gang 2 voltage	**Accelerator pedal released** **0.35 < PR148 < 0.40 V**	

(*) PEDAL VOLTAGES - COLD, IGNITION OFF (Average values given as examples).

Pedal load	0 %	25 %	50 %	100 %	120 %
Gang 1 voltage	0.76 V	1.52 V	2.09 V	3.23 V	3.68 V
Gang 2 voltage	0.37 V	0.74 V	1.02 V	1.56 V	1.79 V

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

HEATING

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of **DF001 Coolant temperature sensor circuit**.
2	**Resistance Heating Passenger compartment**	**ET111:**	Set number of passenger compartment heating resistors	Indicates the number of passenger compartment resistors supplied. The passenger compartment resistor function programming is performed through the UCH. Certain operating parameters determine the operation of one or more passenger compartment resistors. The injection computer only receives a signal relating to the number of passenger compartment resistors to control. **Warm engine** **ET111 = NO**	**In the event of a fault**, refer to the UCH fault finding note.
		ET112:	Passenger compartment heating resistor cut-off	Status **ET112** is indicated if the passenger compartment resistors are being controlled. The computer receives the signal to cut-off the resistors through the UCH. **Warm engine** **ET112 = YES**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

CRUISE CONTROL/SPEED LIMITER

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Cruise control/ speed limiter**	**PR089:**	Vehicle speed	Indicates the vehicle speed in **mph (km/h)**. This parameter is transmitted by the ABS computer. This signal is transmitted to the injection on the multiplex network. **At idle speed** **PR089 = 0 mph (km/h)**	**In the event of a fault, test the multiplex network.** (See 38C, ABS) for the interpretation of possible faults.
		PR130:	Cruise control setpoint	Indicates the cruise control limit speed **At idle speed** **X = 0 mph (km/h)**	**In the event of a fault**, refer to the interpretation of statuses **ET413 Cruise control/speed limiter and ET415 and Cruise control /speed limiter deactivation**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

CRUISE-CONTROL/SPEED LIMITER (continued)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	**Cruise control/ speed limiter (continued)**	**ET415:** Deactivation of cruise control/speed limiter Note: the cruise control can only be activated at a speed of **V > 18 mph (30 km/h)**.	**STATUS 1:** Traction control **STATUS 2:** Brake pedal depressed **STATUS 3:** Cruise control or speed limiter fault **STATUS 4:** Engine/gearbox decoupling **STATUS 5:** Fault detected by the injection computer **STATUS 6:** Vehicle speed invalid **STATUS 7:** Suspend button pressed **STATUS 8:** Gear lever in neutral position **STATUS 9:** Inconsistency between the request and the vehicle speed	The cruise control and speed limiter functions can be deactivated by various events. **In the event of a fault**, refer to the interpretation of statuses **ET413 Cruise control/speed limiter and ET415 Cruise control/ speed limiter deactivation**.
		ET413: Cruise control/speed limiter function	INCREASE: Increase button pressed DECREASE: Decrease button pressed SUSPEND: Suspend button pressed RESUME: Resume button pressed	In the event of a fault, refer to the interpretation of statuses ET413 Cruise control/Speed limiter function and ET415 Cruise control/Speed limiter deactivation.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

CRUISE-CONTROL/SPEED LIMITER (continued)

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
2	**Brake switch**	**ET122:** Brake switch no. 1 signal **ET123:** Brake switch no. 2 signal	**Indicates the position of the brake pedal** **With the ignition on, pedal released:** **ET122 = ET123 = INACTIVE**	**In the event of a fault**, consult the interpretation of statuses **ET122 and ET123**.
3	**Clutch Switch**	**ET233:** Clutch pedal	**Indicates the position of the clutch pedal** **With the ignition on, pedal released:** **ET233 = released**	**In the event of a fault**, refer to the interpretation of status **ET233**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

ENGINE COOLING

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of fault **DF001 Coolant temperature sensor circuit**.
2	**Fan assemblies**	**ET022:**	Low-speed fan assembly request	**INACTIVE if air conditioning not switched on**	**If the fan assemblies are supplied with the ignition on**, the injection may be in defect mode. Carry out a system fault test and refer to the interpretation of any faults.
		ET021:	High-speed fan assembly request		
		ET014:	Fan assembly 1 check	**RUNNING if air conditioning is active**	
		ET015:	Fan assembly 2 check	**RUNNING if operating temperature is reached**	
3	**Sensor supply**	**PR084:**	Coolant temperature sensor voltage	**Idle speed, engine warm** **PR084 = 0.54 V** **Default value: 5 V**	**In the event of a fault**, refer to the interpretation of fault **DF001 Coolant temperature sensor circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

IGNITION/PREHEATING

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Supply**	**ET001:**	+ after ignition computer supply	**PRESENT**	**If the event of a fault**, carry out fault finding on the **charge circuit**.
2	**Engine speed**	**PR055:**	Engine speed	Indicates the engine's speed in **rpm** **At idle speed** **PR055 = 800 rpm**	**In the event of a fault,** refer to the interpretation of fault **DF005 Engine speed sensor circuit**.
3	**Temperature**	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	**In the event of a fault**, refer to the interpretation of fault **DF001 Coolant temperature sensor circuit**.
		PR059:	Inlet air temperature	Indicates the inlet air temperature **Default value: 20 °C**	**In the event of a fault**, refer to the interpretation of fault **DF039 Inlet air temperature sensor circuit**.
4	**Preheating**	**ET007:**	Preheating unit control	**Idle speed, engine warm** **ET007 = INACTIVE**	**In the event of a fault**, (**ET007** locked in **ACTIVE**), refer to the interpretation of fault **DF017 Preheating unit control circuit**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

STARTING

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Supply**	**ET001:**	+ after ignition computer supply	**PRESENT**	**If the event of a fault**, carry out fault finding on the **charge circuit**.
		PR071:	Computer supply voltage	**9 V < X < 16 V**	In the event of a fault, carry out fault finding on the charge circuit.
		PR358:	Sensor reference voltage	**3.47 < X < 3.75 V** (Average of the three sensor supply voltages)	In the event of a fault, refer to the interpretation of faults DF011 Sensor supply voltage no. 1, DF012 Sensor supply voltage no. 2, and DF013 Sensor supply voltage no. 3.
2	**Starting**	**ET076:**	Starting	**AUTHORISED:** The injection gives starting authorisation or **PROHIBITED:** The injection system does not authorise starting.	If status **ET076** is **PROHIBITED**, carry out fault finding on the entire multiplex network.
3	**Engine operation**	**ET038:**	Engine	**At idle speed** **Running**	**None**
4	**Synchronisation**	**ET238:**	Synchronisation	**DONE**	**In the event of a fault**, refer to the interpretation of status **ET238**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **engine at idle speed, coolant temperature at > 80°**.

PROTECTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Engine immobiliser**	**ET341:**	Code programmed	**YES** or **NO**	If status **ET341** is stuck at **NO**, (See 87B, UCH).
		ET003:	Engine immobiliser	**ACTIVE** or **INACTIVE**	If status **ET003** is stuck at **ACTIVE**, (See 87B, UCH).
2	**Vehicle impact**	**ET077:**	Impact detected	**YES** or **NO**	**In the event of a fault**, refer to the interpretation of fault **DF069 Impact signal detected**.
3	**Starting**	**ET076:**	Starting	**AUTHORISED:** The injection system authorises starting or **PROHIBITED:** The injection system does not authorise starting.	If status **ET076** is **PROHIBITED**, (See 87B, UCH).

Tool Status	Diagnostic tool title
ET001	+ after ignition computer feed
ET003	Engine immobiliser
ET004	Air conditioning authorisation
ET007	Preheating unit control
ET014	Monitor cooling fan 1
ET015	Monitor cooling fan 2
ET021	High-speed fan assembly request
ET022	Low-speed fan assembly request
ET035	Reverse gear signal
ET038	Engine
ET042	Cruise control/speed limiter
ET076	Starting
ET077	Impact detected
ET078	Air regulation
ET079	Air conditioning present
ET088	Compressor activation request
ET104	Injector code use
ET111	Set number of passenger compartment heating resistors.
ET112	Passenger compartment heating resistor cut-off
ET122	Brake switch no. 1 signal
ET123	Brake switch no. 2 signal
ET233	Clutch pedal
ET238	Synchronisation
ET341	Immobiliser code programmed
ET413	Cruise control/speed limiter function
ET415	Deactivation of cruise control/speed limiter

ET001	COMPUTER + AFTER IGNITION FEED

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

ABSENT ignition on

Check the condition and conformity of the **F5D (5A)** supply fuse for the UPC.

Repair if necessary.

Check for the presence of an **earth** on the following connections:

Injection computer black 32-track connector A **track G4** → Battery **earth**

Injection computer black 32-track connector A **track H4** → Battery **earth**

Injection computer black 32-track connector A **track H1** → Battery **earth**

Repair if necessary.

Check for **+ 12 V** on track **D1** of connector A of the injection computer.

If there is no voltage, check the **continuity and insulation against earth** of the following connection:

Injection computer black 32-track connector A, **track D1** → **Track 1** of the UPC black connector

Repair if necessary.

PRESENT ignition on

Check that there is not **+ 12 V** with the ignition switched on track **D1** of connector A of the injection computer.

Repair if necessary.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET003	ENGINE IMMOBILISER

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

ACTIVE

Refer to the UCH fault finding note (See 87B, UCH).

INACTIVE

Refer to the UCH fault finding note (See 87B, UCH).

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET004	AIR CONDITIONING AUTHORISED

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

YES	The air conditioning authorisation only changes to **YES** if: – the air conditioning request has been made by the driver (air conditioning switch in **AC** or **AUTO** position with minimum ventilation), – the engine is not under full load, – the air conditioning system is not faulty.

NO	The status **ET004** remains at **NO** under the following conditions: – Vehicle stopped with the ignition on, – faults present in the air conditioning circuit, – no air conditioning request made by the driver, – engine under full load.
	If status **ET004** remains at **NO** then the air conditioning should be authorised, check: – that the air conditioning compressor is activated correctly, – the air conditioning system supply fuses, – for gas in the air conditioning circuit, – the gas pressure value is consistent at idle speed. If the fault is still present, check the air conditioning computer for faults (See **62A, Air conditioning**).

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET007	PREHEATING UNIT CONTROL

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

YES

When the vehicle is started from cold, the injection computer controls the pre/postheating unit so that the vehicle can be started.

Status **ET007** changes to **YES** a few seconds after the ignition is switched on and during pre/postheating.

If the vehicle does not start and status **ET007** changes to **YES**, check:
- the **F2 (70A)** supply fuse on the preheating unit,
- the resistance of the heater plugs.

Replace any plug with resistance of less than **2 Ω**.

If the vehicle starts and the status **ET007** remains **YES** during the engine functional stage, refer to the interpretation of faults:

DF017 Preheating relay control circuit.

DF025 Preheating unit diagnostic connection.

NO

After the engine is started and preheating, the injection computer should stop the pre/postheating unit operating.

Status **ET007** Should change to **NO**.

In the event that the vehicle does not start and status **ET007** remains at **NO**, check the **continuity and the absence of interference resistance** of the following connections:

Injection computer **track A4, 32-track grey connector C** → **Track 9** preheating unit

Injection computer **track E2, 32-track grey connector C** → **Track 8** preheating unit

Repair if necessary.

If the fault is still present, refer to the interpretation of faults:

DF017 Preheating relay control circuit.

DF025 Preheating unit diagnostic connection.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET014	FAN ASSEMBLY 1 CHECK

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

Note: Status ET022 Low-speed engine fan request and status ET014 Engine fan assembly check 1 change their status at the same time.

RUNNING

The low-speed fan assembly is supplied in three scenarios:
– the engine coolant temperature is above **89 °C**,
– the air conditioning is operational,
– the injection computer has system faults that could lead to the engine overheating.

When the low-speed engine fan is supplied:
– status **ET014** changes to **RUNNING**
– status **ET022 low-speed engine fan request** changes to **ACTIVE**.

In the event that the low-speed engine fan does not work, refer to the UPC fault finding note.

STOPPED

The low-speed engine fan assembly stops when:
– the engine coolant temperature is below **89 °C**,
– no air conditioning request made by the driver.

IMPORTANT!

IMPORTANT
If the UPC does not detect the injection computer frames, the low-speed engine fan assembly is supplied until the battery is completely discharged.
In the event that the low-speed engine fan assembly is faulty, the high-speed engine fan assembly will then be activated.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET015	FAN ASSEMBLY 2 CHECK

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

Note: Status ET015 Engine fan assembly 2 and status ET021 High-speed engine fan request change their status at the same time.

RUNNING

The engine fan assembly can be supplied when:
– the engine coolant temperature is above **99 °C**.
– the injection computer has system faults that could lead to the engine overheating.

When the high-speed fan is supplied:
– status **ET015** changes to **RUNNING**,
– status **ET021 low-speed engine fan request** changes to **ACTIVE**.

In the event that the high-speed engine fan does not work, refer to the UPC fault finding note.

STOPPED

The high-speed engine fan assembly stops when:
– the engine coolant temperature is below **99 °C**.

IMPORTANT!

IMPORTANT
If the UPC does not detect the injection computer frames, the low-speed engine fan is supplied until the battery is completely discharged.
In the event that the low-speed engine is faulty, the high-speed engine fan assembly will then be supplied.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET021	HIGH-SPEED FAN REQUEST

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

Note: Status ET021 High-speed engine fan assembly request and status ET015 High-speed engine fan 2 test change their status at the same time.

ACTIVE

The injection computer requests the activation of the high-speed engine fan assembly when:
– the engine coolant temperature is above **99 °C**.
– the injection computer has system faults that could lead to the engine overheating.

When the high-speed fan is supplied:
– status **ET021 High-speed engine fan request** changes to **ACTIVE**,
– status **ET015** changes to **RUNNING**.

In the event that the high-speed engine fan does not work, refer to the UPC fault finding note.

STOPPED

The high-speed engine fan assembly stops when:
– the engine coolant temperature is below **99 °C**;
– no fault which could engine overheating is present in the injection system.

IMPORTANT!

IMPORTANT
If the UPC does not detect the injection computer frames, the low-speed engine fan is supplied until the battery is completely discharged.
In the event that the low-speed engine is faulty, the high-speed engine fan assembly will then be supplied.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET022	LOW SPEED FAN REQUEST

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

Note: Status ET022 Low-speed engine fan request and status ET014 Engine fan assembly check 1 change their status at the same time.

ACTIVE

The injection computer requests the activation of the low-speed engine fan assembly when:
– the engine coolant temperature is above **89 °C**,
– the injection computer has system faults that could lead to the engine overheating,
– the air conditioning is switched on by the driver.

When the high-speed fan is supplied:
– status **ET022 High-speed engine fan request** changes to **ACTIVE**,
– status **ET014** changes to **RUNNING**.

In the event that the low-speed engine fan does not work, refer to the UPC fault finding note.

STOPPED

The low-speed engine fan assembly stops when:
– the engine coolant temperature is below **89 °C**;
– no fault which could cause engine overheating is present in the injection system,
– the air conditioning is not switched on by the driver.

IMPORTANT!

IMPORTANT
If the UPC does not detect the injection computer frames, the low-speed engine fan is supplied until the battery is completely discharged.
In the event that the low-speed engine is faulty, the high-speed engine fan assembly will then be supplied.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET038	ENGINE
STOPPED	Status **ET038** is stopped if the engine ignition is on but there has been no starter operation.
STALLED	Status **ET038** is stalled when the engine has stalled. The vehicle will still be on + after ignition feed.
RUNNING	Status **ET038** is running if the engine has started.
UNDER STARTER	Status **ET038** is starter if the engine is in starting phase.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET042	CRUISE CONTROL/SPEED LIMITER

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

Cruise control

Status **ET042** changes to **CRUISE CONTROL** when the **cruise control activation** button is pressed. This button is situated on the instrument panel, or on the centre console of the vehicle.

A **green** instrument panel indicator light should light up when status **ET042** is on **CRUISE CONTROL**.

If status **ET042** does not change to **CRUISE CONTROL**, check the condition of the cruise control **STOP/START** button and the condition of the connector.

Repair if necessary.

Check the **continuity and the absence of interference resistance** on the following connection:

Injection computer connector A, black, 32-tracks **track A2** → Cruise control on/off button 6-track connector **track A3**

Repair if necessary.

LIMITER

Status **ET042** changes to **SPEED LIMITER** when the **speed limiter deactivation button** is pressed. This button is situated on the instrument panel, or on the centre console of the vehicle.

A **yellow** instrument panel warning light comes on when status **ET042** is **SPEED LIMITER**.

If status **ET042** does not change to **SPEED LIMITER**, check the condition of the speed limiter **ON/OFF** button and the condition of the connector.

Repair if necessary.

Check the **continuity and the absence of interference resistance** on the following connection:

Injection computer black 32-track connector A, **track C3** → Cruise control on/off button 6-track connector **track B1**

Repair if necessary.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET076	STARTING

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

AUTHORISED	Starting the vehicle is authorised when the UCH authorises starting. Status **ET076** changes to **AUTHORISED** if the vehicle cards are recognised and the engine immobiliser is inactive.
PROHIBITED	If the card is not recognised by the UCH, starting the vehicle is prohibited. Status **ET076** is **PROHIBITED** and the vehicle cannot be started. Run fault finding on the UCH (see 87B, UCH).

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET077	IMPACT DETECTED

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

YES	If the vehicle has been involved in an accident, the injection computer receives the impact signal via the multiplex network and may switch off the ignition. Status **ET077** is at **YES**. Switch off the ignition for ten seconds, then switch it back on to enable the engine to start. Carry out a multiplex network test and deal with any faults.
NO	In normal operating conditions, status **ET077** is **NO** when the computer has received no impact signal.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET088	REQUEST TO ACTIVATE COMPRESSOR

ACTIVE	The air conditioning request has been made by the driver when pressing one of the air conditioning controls (Auto, or AC). Status **ET088 becomes ACTIVE** and the computer authorises or does not authorise air conditioning depending on the operating conditions. If status **ET088** does not become **ACTIVE** after pressing the control button (See 62A, Air conditioning).
INACTIVE	When the driver deactivates the air conditioning, status **ET088** must become **INACTIVE**. If this does not happen, (See 62A, Air conditioning).

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET104	INJECTOR CODE USE

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

YES	Status **ET104** is **YES** if the IMA option (**individual injector correction) is activated in the injection computer**. **All the injectors have IMA codes** etched on the bakelite body, but **not all computers use them**. In the case of a computer configured with the IMA option, the injector codes must be entered into the injection computer in the following scenarios: – when one or more injectors is replaced, – when the injection computer is replaced, – when the injection computer is reprogrammed. **If the injector codes are not programmed after these operations, fault DF276 Injector code programming will be present, and the engine will operate in defect mode.** **Run command SC002 Enter injector codes applying the procedure described in the interpretation of this command.**
NO	Status **ET104** is **NO** if the computer is not configured to interpret the IMA codes (**individual injector correction**). **IMPORTANT** **A computer without the IMA option can be replaced by a computer with this option. In this scenario status ET104 changes to YES after replacing the computer. Fault DF276 Injector code programming will be present and the engine will operate in defect mode.** **In this case, use command SC002 Enter injector codes applying the procedure described in the interpretation of this command.**

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET104 **CONTINUED**	

FAULTY	Status **ET104** is **FAULTY** if the computer does not have IMA codes stored. Fault **DF276 Injector code programming** is present and the engine operates in defect mode. Run command **SC002 Enter injector codes** applying the procedure described in the interpretation of this command. If at the end of the procedure status **ET104** remains **FAULTY**, contact the Techline.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET122 **ET123**	PRIMARY BRAKE SWITCH SECONDARY BRAKE SWITCH

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

Note:
Statuses ET122 and ET123 should change statuses at the same time. In the event of inconsistency, refer to the interpretation of fault DF050 Brake switch circuit.

INACTIVE Brake pedal depressed.

If brake lights operate:
– Check the **continuity and the absence of interference resistance** on the following connection:

Injection computer black 32-track connector A **track E4** ⟶ **Track 3** of the brake pedal switch

Repair if necessary.
If the brake lights do not operate, check:
– the condition and fitting of the brake switch,
– the condition and conformity of the 1H (**15A** fuse),
– the conformity of the values in the following table

	Continuity between tracks	Insulation between tracks
Switch pressed (Brake pedal released)	3 and 4	1 and 2
Switch released (Brake pedal depressed)	1 and 2	3 and 4

Replace the switch if the values obtained are not correct.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET122 **ET123** **CONTINUED**	

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

ACTIVE: brake pedal released.

If the brake lights operate:
– Check the **continuity and the absence of interference resistance** on the following connection:

Injection computer black 32-track connector A **track E4** ⟶ **Track 3** of the brake pedal switch

Repair if necessary.
If the brake lights do not operate:
– Check the condition and fitting of the brake light switch and brake lights fuse.
– Remove the brake light switch and check that it is operating correctly:

	Continuity between tracks	Insulation between tracks
Switch pressed (Brake pedal released)	3 and 4	1 and 2
Switch released (Brake pedal depressed)	1 and 2	3 and 4

Replace the switch if the values obtained are not correct.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET233	CLUTCH PEDAL

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

RELEASE if the clutch pedal is depressed.

– Check the condition and fitting of the clutch pedal switch
– Check for **continuity and the absence of interference resistance** on the following connection:

Injection computer black 32-track connector A **track C4** ⟶ **Track 1** clutch switch connector

– Check for **earth** on **track 2** of the clutch switch connector.
– Repair if necessary.
– Remove the clutch pedal switch and check that it is functioning correctly.

	Continuity between tracks	Insulation between tracks
Switch pressed (Clutch pedal released)	1 and 2	—
Switch released (Clutch pedal depressed)	—	1 and 2

Replace the switch if the values obtained are not correct.

RELEASED clutch pedal depressed.

Check the condition and fitting of the clutch pedal switch
Remove the clutch pedal switch and check that it is functioning correctly.

	Continuity between tracks	Insulation between tracks
Switch pressed (Clutch pedal released)	1 and 2	—
Switch released (Clutch pedal depressed)	—	1 and 2

Replace the switch if the values obtained are not correct.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET238	SYNCHRONISATION

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

IMPORTANT
Synchronisation is carried out during the engine starting phase. This is established between the camshaft position sensor and the TDC sensor.
Once this synchronisation has been carried out, it enables the computer to identify cylinder no.1 and to ascertain the precise position of the cylinder's top dead centre.

INACTIVE	When the engine is switched off but the ignition switched on, cylinder no.1 is no longer indicated. Status **ET238** is **INACTIVE**, no synchronisation between the crankshaft and the camshaft is performed.
DONE	Synchronisation is carried out during the engine starting phase. Cylinder No. 1 is indicated and synchronisation will be performed once the engine is started. Status **ET238** is **COMPLETED**. If after several attempts to start the engine status **ET238** remains **INACTIVE**, refer to the interpretation of the following faults: – **DF005 Engine speed sensor circuit** – **DF097 Camshaft sensor circuit** If the engine still does not start, (see **Customer complaints**, **ALP2 Starting faults**).

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET341	IMMOBILISER CODE PROGRAMMED

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

YES	Status **ET341** becomes **YES** if dialogue is possible between the UCH and the injection computer and the card code is recognised. Engine starting authorisation is only given if the code is recognised by the UCH computer, and status **ET003 Engine immobiliser** is **INACTIVE**.
NO	The code remains **NO** if dialogue between the UCH and the injection computer is not possible. Status **ET003 Engine immobiliser** remains **ACTIVE**. The malfunction may result from poor card programming; in this case (see 87B, UCH and follow the card programming procedure). If the fault is still present, perform a mutliplex network test, and make sure there is dialogue between the UCH, UPC and the injection computer. If dialogue is not established, contact the Techline.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET413	CRUISE CONTROL/SPEED LIMITER FUNCTION

NOTES	Special notes: Only perform these tests if the statuses do not correspond with the system programming functions.

INCREASE

Status **ET413** changes to INCREASE when the **+** button for the cruise control is pressed. This button is situated to the left of the steering wheel.

If status **ET413** does not change to INCREASE, check the condition of the **±** cruise control button and the connector. Repair if necessary.

To be able to remove the driver's airbag and carry out the measures in complete safety (see 88C).
Repair if necessary

Measure **the resistance of the following connection, after pressing the + button**:

Injection computer
black 32-track connector A **track D2** ⟶ **± button Track A2**

If the resistance is not approximately **300 Ω**, check the continuity of the connection when the button is not pressed.
If there is continuity, replace the **±** control button.
If the connection is broken, repair it.

DECREASE

Status **ET413** becomes MINUS when the **-** button for the cruise control is pressed. This button is situated to the left of the steering wheel.

If status **ET413** does not change to DECREASE, check the condition of the **±** cruise control button and the connector. Repair if necessary.

To be able to remove the driver's airbag and carry out the measures in complete safety (see 88C).
Repair if necessary

Measure **the resistance of the following connection after pressing the - button**.

Injection computer
black 32-track connector A **track D2** ⟶ **± button Track A2**

If the resistance is not approximately **100 Ω**, check the continuity of the button, when not pressed.
If there is continuity, replace the **±** control button.
If the connection is broken, repair it.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET413 CONTINUED 1	

SUSPEND	Status **ET413** changes to SUSPEND when the **0** cruise control button is pressed. This button is situated to the right of the steering wheel. If status **ET413** does not change to SUSPEND, check the condition of the **R/0** cruise control button and the connector. Repair if necessary. **To be able to remove the driver's airbag and carry out the measures in complete safety (see 88C).** Repair if necessary Measure the **resistance of the following connection, after pressing the 0 button**:
	Injection computer black 32-track connector A **track D2** ⟶ **Track A2, R/0 button**
	If the resistance is not approximately **0 Ω**, replace the **R/0** control button. If the connection is broken, repair it.

RESUME	Status **ET413** changes to RESUME when the **R** cruise control button is pressed. This button is situated to the right of the steering wheel. If status **ET413** does not change to RESUME, check the condition of the **R/0** cruise control button and the connector. Repair if necessary. **To be able to remove the driver's airbag and carry out the measures in complete safety (see 88C).** Repair if necessary Measure the **resistance of the following connection, after pressing the R button**:
	Injection computer black 32-track connector A **track D2** ⟶ **Track A2, R/0 button**
	If the resistance is not approximately **900 Ω**, check the continuity of the button, when not pressed. If there is continuity, then replace the **R/0** control button. If the connection is broken, repair it.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET415	DEACTIVATING CRUISE CONTROL

NOTES	Only perform the tests if the statuses do not correspond with the system programming functions.

Note:
Cruise control remains deactivated as long as the vehicle speed does not exceed 18 mph (30 km/h).
Status **ET415** details 9 causes for cruise control deactivation.

STATUS 1	**Traction control request**
	If the vehicle being diagnosed is fitted with a traction control system, the cruise control/ speed limiter function will be deactivated each time the traction control is selected. Status **ET415** only becomes **STATUS 1** when driving. If this status appears when the vehicle is stationary with the ignition on, consult the traction control system's associated fault finding note.

STATUS 2	**Brake pedal depressed**
	If the driver depresses the brake pedal, the cruise control will become inactive. Status **ET415** changes to **STATUS 2** when driving or during a cruise control function test when stationary. If status **ET415** remains stuck at **STATUS 2**, refer to the interpretation of status **ET122** and **ET123 Brake switch signal no. 1 and no. 2**.

STATUS 3	**Cruise control or speed limiter fault**
	If status **ET415** is at **STATUS 3**, consult the fault finding procedure for status **ET042 Cruise control/speed limiter**, to test the cruise control system and find the faulty component. Carry out a road test followed by a complete check with the diagnostic tool.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET415 CONTINUED 1	

STATUS 4	Disconnection of the engine/gearbox
	The cruise control function is deactivated if the gearbox is no longer linked to the engine (clutch pedal engaged or gearbox in neutral). If status **ET415** is locked on **STATUS 4** with the vehicle stationary, contact the Techline.

STATUS 5	Fault detected by the injection computer
	Status **ET415** changes to **STATUS 5** if the injection computer detects a fault on the injection system: Carry out a multiplex network test, and then an injection system test, and run fault finding on any faults. If the fault is still present, contact the Techline.

STATUS 6	Invalid vehicle speed
	Status **ET415** becomes **STATUS 6** if the vehicle speed received by the computer is invalid. Refer to the interpretation of fault **DF095 Vehicle speed signal**, and carry out fault finding on the **ABS** computer. (See 38C ABS to deal with any faults.) If the fault is still present, contact the Techline.

STATUS 7	Suspend button pressed
	Status **ET415** becomes **STATUS 7** if: the driver presses the 0 cruise control button, the clutch switch is faulty (**information on the clutch pedal received by the injection computer**). If status **ET415** is stuck at **STATUS 7**, refer to the fault finding procedure for status **ET042 Cruise control/speed limiter** and run fault finding on the R/0 cruise control button.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ET415 CONTINUED 2	

STATUS 8	Gear lever in neutral position
	Status **ET415** becomes **STATUS 8** if the driver puts the gear lever in the neutral position when driving. This deactivates cruise control. If status **ET415** remains locked on **STATUS 8** when driving after engaging a gear, contact the Techline. Carry out a road test followed by a complete check with the diagnostic tool.

STATUS 9	Inconsistency between the request and the vehicle speed
	Status **ET415** becomes **STATUS 9** if the computer detects a fault between the speed requested by the driver and the vehicle speed. The vehicle signal is receiving interference or is incorrect. Consult the interpretation of fault **DF095 Vehicle speed signal**. Run fault finding on the **ABS** circuit, and refer to the vehicle's associated fault finding note. If the fault is still present, contact the Techline.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

Tool parameter	Diagnostic tool title
PR005	EGR valve opening setpoint
PR006	Rail pressure regulator current
PR007	Rail pressure regulator current setpoint
PR008	Rail pressure setpoint
PR009	Turbocharging pressure setpoint
PR011	Turbocharging solenoid valve position correction
PR015	Engine torque
PR016	Alternator flow
PR017	Fuel flow
PR022	EGR valve position feedback loop difference
PR030	Accelerator pedal position
PR035	Atmospheric pressure
PR037	Refrigerant pressure
PR038	Rail pressure
PR041	Turbocharging pressure
PR046	EGR solenoid valve OCR
PR047	Turbocharging pressure OCR
PR048	Rail pressure regulation valve OCR
PR050	OCR damper flap
PR051	EGR valve position feedback
PR053	Speed requested by air conditioning
PR055	Engine speed
PR059	Inlet air temperature

Tool parameter	Diagnostic tool title
PR061	Exterior air temperature
PR063	Fuel temperature
PR064	Coolant temperature
PR071	Computer supply voltage
PR073	Air flow sensor supply voltage
PR076	Refrigerant sensor voltage
PR077	EGR valve position sensor voltage
PR079	Atmospheric pressure sensor voltage
PR080	Rail pressure sensor voltage
PR081	Inlet temperature sensor voltage
PR082	Fuel pressure sensor voltage
PR084	Coolant temperature sensor voltage
PR089	Vehicle speed
PR125	Power absorbed by the air conditioning compressor
PR127	Heating resistor maximum authorised power
PR128	First EGR valve offset
PR129	Last EGR valve offset
PR130	Cruise control setpoint
PR131	EGR air flow variation
PR132	Air flow
PR147	Pedal potentiometer voltage gang 1
PR148	Pedal potentiometer voltage gang 2
PR157	Fuel flow setpoint
PR171	Air flow setpoint for EGR
PR190	Engine idle speed setpoint.
PR213	Rail pressure loop difference
PR358	Sensor reference voltage
PR364	Cylinder no. 1 fuel flow correction
PR365	Cylinder no. 4 fuel flow correction
PR405	Cylinder no. 2 fuel flow correction
PR406	Cylinder no. 3 fuel flow correction

PR035	ATMOSPHERIC PRESSURE

NOTES	**There must be no present or stored faults.** Perform this fault finding procedure after detecting an inconsistency in the **Parameters** menu of the computer or following a customer complaint (lack of power, smoke, etc.).

The atmospheric pressure sensor is incorporated in the computer, so no electrical check can be made.
The sensor default value is **750 mbar**.
If this value or any other inconsistent value appears, then reset the computer.
If the computer is to be reprogrammed (see **Replacement of components**).
If the fault persists and remains present, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

PR037	REFRIGERANT PRESSURE

NOTES	**There must be no present or stored faults.** Perform this fault finding procedure after an inconsistency is displayed in the **Parameters menu or after a customer complaint (no air conditioning, etc.)**.

Step 1
– Start the engine, switch on the air conditioning and increase the engine speed to **1,500 rpm:**
– Display **PR037 Refrigerant pressure** in the **Cold loop** function on the diagnostic tool:
If the pressure is greater than **~ 27 bar**, go to **step 2**.
If the pressure does not rise, or remains below normal:
– Ensure that the air conditioning compressor and the relay are operating correctly.
– Check the conformity of the refrigerant pressure sensor by **comparing*** the value displayed by the tool (**PR192**) with the reading given by the charging station high pressure gauge.

***If the pressure difference* = ± 1.5 bar**, (or **1500 mbar**):

Check the continuity and the absence of interference resistance on the connections between:

Injection computer, **grey 24-track connector C, track C3** → **Track A** of the refrigerant pressure sensor

Injection computer, **brown 48-track connector B, track F1** → **Track C** of the refrigerant pressure sensor

Injection computer, **brown 48-track connector B, track F3** → **Track B** of the refrigerant pressure sensor

If these connections are not faulty, replace the **refrigerant pressure sensor**.
If there is no difference, the refrigerant pressure sensor is correct: go to **step 2**.

Step 2
– Perform fault finding on the **air conditioning**.

*Note:
The diagnostic tool displays the absolute pressure, the charging station high pressure gauge displays the relative pressure.
The normal difference between the two is equal to atmospheric pressure, i.e. **~ 1,000 mbar**.

AFTER REPAIR	Repeat the conformity check from the start.

PR038	RAIL PRESSURE

NOTES	**Perform this fault finding procedure:** – after the interpretation of fault **DF053 Rail pressure regulation function**, – after an inconsistency for **PR038** noted in the Parameters menu, – after the interpretation of the fault finding procedure for **AC011 Rail pressure regulator**, – following a customer complaint (starting faults, poor performance, stalling, etc.).

Check the continuity and the absence of interference resistance on the following connections:

Injection computer, **brown 48-track connector B, track G3** → **Track 2** of the rail pressure sensor connector

Injection computer **brown 48-track connector B, track A4** → **Track 3** of the rail pressure sensor connector

Injection computer, **brown 48-track connector B, track C4** → **Track 1** of the rail pressure sensor connector

If all these connections are correct, check for fuel pressure sensor power supply:

+ 5 V → **Track 3** of the rail pressure sensor connector

Earth → **Track 1** of the rail pressure sensor connector

Repair if necessary.

Check the sealing of the low and high-pressure diesel circuits (visual inspections, odour) pump housing, overpressure valve, pipes, rail and injector unions, injector wells, etc.
If all of the previous checks are correct, switch the ignition on, wait for more than **1 minute** and display **PR038 Rail pressure**.
If the value is **less than 50 bar**, the rail pressure sensor is correct. If it is greater than this value, replace the rail pressure sensor and tighten it to **35 ± 5 Nm**.

AFTER REPAIR	Repeat the conformity check from the start.

PR059	INLET AIR TEMPERATURE

NOTES	**There must be no present or stored faults.** Perform this fault finding procedure after noting an inconsistency in the Parameters menu.

Check the air flow sensor.
Check the injection computer connections.

Repair if necessary.
Check **for + 12 V** on **track 4** of the air flow sensor connector.
Display **PR059 Inlet air temperature** and check that the value displayed is not recovery value **20 °C**.
If this is the case, check the coolant temperature sensor:

Injection computer brown 48-track connector B, **track G2** → **Track 1** of the air flow sensor connector

Injection computer brown 48-track connector B, **track E2** → **Track 2** of the air flow sensor connector

Repair if necessary.

Measure the resistance between tracks 1 and 2 of the air temperature and pressure sensor.
Replace the air temperature and pressure sensor if the resistance is not:

3,714 Ω ± 161 Ω at 10 °C
2,448 Ω ± 96 Ω at 20 °C
1,671 Ω ± 59 Ω at 30 °C

AFTER REPAIR	Repeat the conformity check from the start.

PR063	FUEL TEMPERATURE

NOTES	**There must be no present or stored faults.**
	NOTE **In the event of a relatively low outside temperature, the difference between the fuel temperature and the engine temperature after cold starting may be greater than 30 °C.**

Check in the Fuel circuit tab in **PR063 Fuel temperature** that the value displayed is not the recovery value **100 °C**.
If it is, check the fuel temperature sensor:
Check that the fuel temperature sensor is in good condition:
Repair if necessary.
Check the continuity and the absence of interference resistance on the following lines:

Brown 48-track connector B, **track H2** ⟶ **Track 1** fuel temperature sensor

Grey 32-track connector C, **track F1** ⟶ **Track 2** fuel temperature sensor

If the temperature read is inconsistent, check that the sensor follows the resistance as a function of temperature calibration curve (NTC) correctly.
Replace the fuel pressure and temperature sensor if the resistance is not:

2,051 ± 123 Ω at 25 °C
810 ± 47 Ω at 50 °C
309 ± 17 Ω at 80 °C

Replace the fuel temperature sensor if it is incorrect (an incorrect sensor is often the result of an electric shock).

AFTER REPAIR	Repeat the conformity check from the start.

PR064	COOLANT TEMPERATURE

NOTES	**No fault should be present or stored:** Perform this fault finding procedure after noting an inconsistency in the Parameters menu.

Display the **PR064 Coolant temperature** and check that the value displayed is not recovery value **- 30 °C**.
If this is the case, check the coolant temperature sensor:
Check the condition of the coolant temperature sensor connections.
Repair if necessary.
Check for the absence of interference resistance on the following lines:

Brown 48-track connector B, **track F2** ⟶ **Track 3** coolant temperature sensor

Brown 48-track connector B, **track H1** ⟶ **Track 2** coolant temperature sensor

If the temperature read is inconsistent, check that the sensor follows the resistance as a function of temperature calibration curve (NTC) correctly.
Replace the air temperature and pressure sensor if the resistance is not:

2,252 Ω ± 112 Ω at 25 °C
811 Ω ± 39 Ω at 50 °C
283 Ω ± 8 Ω at 80 °C

Replace the coolant temperature sensor if the values read do not correspond to the ones above.

AFTER REPAIR	Repeat the conformity check from the start.

Tool command	Diagnostic tool title
SC001	Write saved data
SC002	Enter injector codes
SC003	Save computer data
RZ001	Fault memory
RZ002	EGR programming adaptives
RZ005	Programming
AC001	Preheating unit
AC002	EGR solenoid valve
AC004	Turbocharging solenoid valve
AC011	Rail pressure regulator
AC014	Damper flap

AFTER REPAIR	Restart the conformity check from the beginning.

SC001	WRITE SAVED DATA

NOTES	All data must be backed up with command **SC003 Backup computer data** for this command to be run. Writing is carried out after the computer has been reprogrammed or replaced.

Confirming this command writes the data backed up using command **SC003 Backup computer data**.

The data is as follows:
– Vehicle-specific idle speed.
– Options available on the vehicle and managed by the computer (Example: Air conditioning).
– Injector calibration codes (if the vehicle is fitted with IMA).
– Programming of exhaust gas recirculation valve data.

They will configure the computer and will enable it to avoid:
– engine malfunction after reprogramming or replacing the computer,
– faulty interpretation of information provided by the CLIP tool.

AFTER REPAIR	Restart the conformity check from the beginning.

SC002	ENTER INJECTOR CODES

NOTES	This command is carried out after the replacement of the injectors, and only if the vehicle is configured with IMA (**ET104 Injector code use YES**). If this command is not run, the fault **DF276 Injector code programming** will be present.

IMPORTANT
Letters **Q and J**, and figures **0 and 9** are not **used in IMA codification**.
If these characters are used the entry will be **invalid**.
Cylinder **no. 1** is the cylinder located **at the engine flywheel end**.

Procedure to be followed:
– Read the 6-character alphanumeric codes etched on the upper section of the injector bodies.
– Select the cylinder number for the cylinder concerned in the Desired column, then confirm.
– Enter the injector code displayed for the cylinder.
– Enter the new codes for each cylinder, then confirm.
– When the command is completed, the modified codes appear in the Current column.
– Check that the codes correspond to those read earlier.
– If the codes entered appear in neither the Current column nor the Desired column, check the codes read and make sure the data has been entered correctly.
– Exit fault finding mode.
– Switch off the ignition and **wait 30 seconds**.
– Switch the ignition back on and check for faults.
– The **DF276 Injector code programming** should be stored.

If the fault is still present, the command has not been run correctly.
Start the procedure again and follow the instructions.

Switch off the ignition.

If all these checks still do not enable the command to be confirmed, contact the Techline.

AFTER REPAIR	Restart the conformity check from the beginning.

SC003	SAVE COMPUTER DATA

NOTES	The data is saved before computer reprogramming or the computer is replaced.

Selecting this command saves the following vehicle-specific data:
– Vehicle idle speed.
– Injector calibration codes (if the vehicle is fitted with IMA).
– Programming of exhaust gas recirculation valve data.
– Options available on the vehicle and managed by the computer (Example: Air conditioning).

This information will be saved in the CLIP tool.

● **Before replacing or reprogramming the computer:**
– Select **SC003 SAVE COMPUTER DATA**.
– if the following message appears: **backup file exists, do you want to overwrite it?**:

(this file corresponds to the last save carried out on the tool)

Select **YES**.

When the save has been performed, replace the computer or carry out the programming then proceed to the next step.

Once the backup is complete, run the command **SC001 Write backed up data** to reconfigure the computer.

AFTER REPAIR	Restart the conformity check from the beginning.

RZ002	EGR ADAPTIVES

NOTES	This command is only performed after the exhaust gas recirculation valve has been replaced. Deal with all faults which do not involve the exhaust gas recirculation valve before programming the valve.

After replacing the exhaust gas recirculation valve, clear the valve offsets from the memory.
Procedure to be followed after replacing the exhaust gas recirculation valve:
- Switch on the ignition.
- Run command **RZ002**.
- Once the command has terminated, check that the following parameters and statuses correctly indicate the statuses below:
  - **PR128 EGR valve first offset** = 0 %
  - **PR129 EGR valve last offset** = 0 %
  - **PR088 EGR valve position feedback** = 0 %
- When the command has finished, switch off the ignition and exit fault finding mode.
- Wait **30 seconds**, and switch on the ignition again.
- Switch off the ignition again and wait 30 seconds.
- Refer to the following parameters again:
  - PR128 EGR valve first offset: 15 % < X < 30 %
  - PR129 EGR valve last offset: 15 % < X < 40 %
- If the parameters are not correct, refer to the interpretation of DF272 EGR valve control circuit
- Otherwise
- Start the engine.
- Let the engine idle for **1 min**, accelerate to **2,500 rpm** for **5 seconds** and return to idle speed.
- Repeat this procedure 5 times.

Check the faults.
If the fault does not recur, end the fault finding procedure.
If the fault recurs, restart the procedure after disconnecting and reconnecting the valve.
If the fault is still present, replace the EGR valve.

AFTER REPAIR	Restart the conformity check from the beginning.

RZ005	PROGRAMMING

NOTES	This command is only executed after replacing the computer.

Command **RZ005** reconfigures the computer.

If the computer does not have any configuration data, run command **RZ005** to enter the vehicle options:

– air conditioning,
– passenger compartment heating resistors,
– cruise control.

These options are detected by the computer even if command **RZ005** is not used.
The computer is configured as soon as the one of the vehicle's optional system components is operated.

AFTER REPAIR	Restart the conformity check from the beginning.

AC001	PREHEATING UNIT

NOTES	This command is only carried out if fault **DF025 Preheating unit fault finding connection** or **DF081 Preheating relay circuit** is present or stored and if no other fault is present. Refer to the **Wiring diagrams** Technical Note for the vehicle to locate the fuses and relays concerned.

Connect the diagnostic tool and turn on the ignition.

With the preheating unit connected:
– connect the negative terminal of the voltmeter to **track 8** of the preheating unit,
– connect the positive terminal of the voltmeter to the **+ 12 V** battery,
– run command **AC001 Preheating unit**.

if the voltmeter does not indicate the battery voltage while the command is running (ten one-second ON/OFF cycles), contact the Techline:

1. Check the condition of the **F01 (70A)** fuse which supplies the preheating unit. Replace it if necessary.

2. Check **the continuity and the absence of interference resistance** on the following connections:

Injection computer connector C, **track E2** ⟶ **Track 8** of the preheating unit connector
Injection computer connector C, **track A4** ⟶ **Track 9** of the pre-postheating unit connector

Repair if necessary.

3. Check the connections on the preheating unit, heater plugs and injection computer.
Repair if necessary.

4 Measure the resistance of the heater plugs. If the resistance is greater than **2 Ω** replace the faulty plug(s).

5. Check **the continuity and the absence of interference resistance** between:
– preheating unit **track 1** ⟶ Heater plug for **cylinder 3**
– preheating unit **track 2** ⟶ Heater plug for **cylinder 4**
– preheating unit **track 6** ⟶ Heater plug for **cylinder 1**
– preheating unit **track 7** ⟶ Heater plug for **cylinder 2**

6. Then check for **+ 12 V** on **track 3** of the preheating relay connector.

If the fault is still present, replace the preheating unit.

AFTER REPAIR	Restart the conformity check from the beginning.

AC002	EGR SOLENOID VALVE

NOTES	This command enables the exhaust gas recirculation valve function to be checked.

Measure the **resistance** of the exhaust gas recirculation valve between **tracks 1 and 5**.
– If the resistance is not: **8 Ω ± 0.5 at 20 °C**, replace the EGR valve.

Check **the continuity and the absence of interference resistance** of the following connections:

Injection computer brown 48-track connector B **track L2** ⟶ **track 5** of the EGR solenoid valve connector
+ 12 V (UPC) ⟶ **track 1** of the EGR solenoid valve connector

Step 1: Mechanical check of EGR valve:

Remove the exhaust gas recirculation valve.
Run command **AC002 EGR solenoid valve**.
If, during the command:
– no valve movement is evident,
– the valve does not open or close completely,
Check that there are no particles blocking the movement of the piston.
If a particle was blocking the movement of the valve, run command **AC002 EGR solenoid valve again and check the valve is operating correctly**.
If the valve is operating normally, run command **RZ002 EGR Adaptives** to reinitialise the valve operating values.
If the valve is jammed or irrevocably seized, replace the EGR valve.

AFTER REPAIR	Restart the conformity check from the beginning.

AC002 **CONTINUED**	

Step 2: Check the computer output

using a voltmeter:
- Leave the EGR valve connected.
- Connect a "wire clip" to the violet wire between the valve and the injection computer (connection between **track 6 of the valve** and **track J2 of the injection computer connector B**).
- Connect the positive terminal of voltmeter to the wire clip.
- Connect the negative terminal of the voltmeter to the battery earth.
- Run command **AC002 EGR solenoid valve**.
- The voltage should vary over **10 cycles** between **1.05 V and 3.5 V**.
- If the voltage varies between these values, replace the EGR valve.
- If the voltage does not vary or varies between incorrect values, contact the Techline.

AFTER REPAIR	Restart the conformity check from the beginning.

AC004	TURBOCHARGING SOLENOID VALVE

NOTES	This command is run if a fault is detected in the turbocharging circuit.

This command checks that the turbocharger and the control circuit are working properly.

Introduction

1 - Check the sealing of the high-pressure air circuit:
Pipe not joined or pierced, pressure sensor disconnected or poorly fitted (seal present), intercooler pierced.
To test the intercooler: stabilise the engine speed between **3,500** and **4,000 rpm** with the vehicle stopped and check that there are no leaks.

Check the resistance of the turbocharging limitation solenoid valve between **tracks 1 and 2**:
Replace the solenoid valve if the resistance is not: **15.4 Ω ± 0.7 at 20 °C**.

Check the injection computer connections.
Check for **continuity and the absence of interference resistance** on the following connection:
Injection computer grey 32-track connector C, **track E1** ⟶ **Track 1** turbocharging solenoid valve
Repair if necessary.
Check for the presence of **+ 12 V** after relay on **track 2** of the turbocharging solenoid valve.

2 - Turbocharger control circuit check
– With the engine stopped, make sure that the control rod is in the rest position.
– Start the engine and make sure that the control rod operates to the high stop.
(when the engine is switched off, the control rod should return to the idle position)
If the control rod does not move correctly, carry out the following checks:

1) Vacuum pressure command check:
– Disconnect the solenoid valve inlet **hose** and connect it to a pressure gauge.
– Start the engine and run it at a stable idle speed.
– If the vacuum pressure does not reach **800 mbar ± 100**: check the vacuum pressure circuit from the vacuum pump.
– Stop the engine, reconnect the inlet hoses and go to step no. 2.

2) Solenoid valve control check:
– Disconnect the solenoid valve outlet **hose**.
– Start the engine and run it at a stable idle speed.
– Place your hand on the solenoid valve and block the outlet **union** with your thumb.
– If you notice no solenoid valve vibration, check the operation of the computer output (**step 5**).

3) Solenoid valve operation check:
– Connect the pressure gauge to the solenoid valve outlet **union**.
– Start the engine and run it at a stable idle speed.

If the vacuum pressure does not reach **800 mbar ± 100**, replace the solenoid valve.

AFTER REPAIR	Restart the conformity check from the beginning.

AC004 **CONTINUED**	

Turbocharger control circuit check (continued)

4) Turbocharging operation check:
a) Connect vacuum pump to the **hoses** connected to the turbocharger control diaphragm,
– Apply a vacuum pressure of **800 mbar**:
If there is a leak, replace the turbocharger (diaphragm included).
b) Check the movement of the control rod (See **MR 364, 12B, Mechanical, Turbocharging**).
If the control rod is sticking, replace the turbocharger.
c) Engine cold and switched off:
– Remove the turbocharger inlet duct and check that the compressor turns freely on the axis.
d) If the fault is still present:
– Check that the exhaust manifold is not leaking.
– Check that the exhaust is not blocked.
Carry out the necessary repairs.

5) Computer output check (solenoid valve connected):
This operation **can only be carried out if** the checks indicated in **step no. 2** are **not conclusive**.
Using a voltmeter:
– Connect the voltmeter earth to **track 2** of the solenoid valve and the positive cable to **track 1**.
– Clear any solenoid valve fault then run command **AC004**:
➡ The voltmeter should display **ten cycles** of two successive voltages ~ = battery voltage X OCR* current.
either: **~ 2.5 V** (OCR for **20 %**) then **~ 8.7 V** (OCR for **70 %**).
Or using an oscilloscope (range 5 V/division and with time base 1 ms/division):
– Connect the earth of the oscilloscope to the battery earth and the positive test pin to **track 2** of the solenoid valve.
– Clear any solenoid valve faults, then run command **AC004**:
➡ the oscilloscope should display a square wave signal of 12.5 V in amplitude at a frequency of 140 Hz (with an OCR alternating from ~ 20 to ~ 70 %).
– If the measurement is correct, replace the solenoid valve.
– If the measurement does not show any control or continuous voltage, contact the Techline.

* **O**pening **C**yclic **R**atio.

AFTER REPAIR	Restart the conformity check from the beginning.

AC011	RAIL PRESSURE REGULATOR

NOTES	This command enables the operation of the injector high-pressure regulator circuit to be checked.

Step 1

Measure the pressure regulator resistance between **tracks 1** and **2**.
– Replace the regulator if the resistance is not approximately: **3 Ω ± 0.5 at 20 °C**.

Check **the continuity and the absence of interference resistance** of the following connections:
Injection computer brown 48-track connector **B**, track **M4** → **track 2** of the rail pressure regulator connector.
+ 12 V after relay → **track 1** of the rail pressure regulator connector.

If, when running command **AC011**, you can hear a slight whistling noise and the rattling from the regulator, go to **Step 2**. Otherwise, ensure that the computer output is functioning correctly:

● **Using a voltmeter:**
With the solenoid valve connected, connect the voltmeter earth lead to **track 2** of the fuel pressure solenoid valve and the positive cable to **track 1**. Clear any fuel pressure solenoid valve faults, then run command **AC011**:
➡ The voltmeter should display two successive voltages: ~ 2.5 V for an OCR at 20 % then ~ 8.75 V at an OCR at 70 % (ten cycles)

● **Or using an oscilloscope** (range 5 V/division and with time base 1 ms/division):
With the solenoid valve connected, connect the earth of the oscilloscope to the battery earth and the positive test pin to **track 2** of the fuel pressure solenoid valve. Clear any fuel pressure solenoid valve faults then run command **AC011**:
➡ The oscilloscope should display a square-wave signal of 12.5 volts amplitude at a frequency of 185 Hz (with an OCR going successively from 20 to 70 %).

– If the measurement is correct, replace the regulator.

– If the measurement is not correct, contact the Techline.

Step 2, next page

***** **O**pening **C**yclic **R**atio

AFTER REPAIR	Restart the conformity check from the beginning.

AC011 **CONTINUED**	

Step 2

In the event of rail overpressure:

Check the operation of the injectors (see **Components test, Test 1 Injector test**).
Check the operation of the rail pressure sensor: interpretation of fault **DF007 Rail pressure sensor circuit**.

If these checks do not reveal any faults, and if the fault is still present, replace the rail pressure sensor.

In the event of rail underpressure:

Check the operation of the rail pressure sensor: interpretation of fault **DF007 Rail pressure sensor circuit**.
Check the low pressure diesel circuit priming.
Check the conformity of the diesel filter connections.
Check the condition of the filter (clogging and water saturation).
Check there are no air bubbles between the filter and the high pressure pump.
Check the high-pressure diesel circuit sealing, pump, pipes, unions (visual inspections + odours, etc.):
pump housing, pressure release valve, pipes, rail and injectors unions, injector wells, etc.
Check the conformity of the seal fitting on the pressure regulator.
Check the operation of the injectors: see **Component test, Test 1 Injector test**.

Carry out the necessary repairs.

AFTER REPAIR	Carry out a road test followed by a diagnostic tool check. Repeat the conformity check from the start.

AC014	DAMPER FLAP

NOTES	This command enables the damper flap function to be checked.

– Measure the resistance of the inlet flap valve solenoid valve between **tracks 1** and **2**.
Replace the solenoid valve if the resistance is not **46 Ω ± 3 at +25 °C.**
– Check **the continuity and the absence of interference resistance** on the following connections:

Injection computer brown 48-track connector B **track J4** ⟶ **Track 1** of damper flap solenoid valve connector
+ 12 V (UPC) ⟶ **Track 2** damper flap solenoid valve connector

A) Engine running at idle speed:
– Make sure that there is a vacuum pressure of: **~ 900 mb** in the solenoid valve inlet hose.
Make the necessary repairs (vacuum pressure circuit conformity and seal).

B) With the vehicle ignition on, engine stopped:
– Check that the **inlet flap** is **open**.
If not, clean or replace the air vent unit.
– Disconnect the solenoid valve inlet and outlet hoses.
– Connect a vacuum pump to the inlet union and apply a vacuum pressure of **~ 900 mbar**.
If there is a leak, replace the solenoid valve.
– Run command **AC014**.
– If the solenoid valve opens (vacuum pump pressure gauge returns to atmospheric pressure), **go to step C**.
– Otherwise, with the solenoid valve connected, check operation of the computer output with a voltmeter:
Voltmeter earth cable ⟶ **track 1** of the solenoid valve
Voltmeter positive lead ⟶ **track 2** of the solenoid valve
Clear any solenoid valve faults,
Run command **AC014**.
The voltmeter should display ten **ON-OFF** cycles (**8.75 V then 2.5 V).**
If the measurement is correct, replace the solenoid valve.
If the measurement shows is not controlled, contact the Techline.

C) Vehicle with ignition off:
– Connect a vacuum pump to the flap control diaphragm and apply a vacuum pressure of **~ 900 mbar**:
– If the diaphragm **does not maintain the vacuum pressure**, replace the air vent unit (the diaphragm cannot be disconnected).
– If the diaphragm **maintains the vacuum pressure** and **the valve does not operate**, clean or replace the air vent unit.
– If the diaphragm **maintains the vacuum pressure** and **the flap operates** then operate it several times to ensure that there is no blockage.
Check for clogging of the air vent unit and the valve, and clean if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

NO COMMUNICATION WITH THE COMPUTER	→ ALP 1
STARTING DIFFICULT OR IMPOSSIBLE	→ ALP 2
INJECTION NOISE	→ ALP 3
POOR PERFORMANCE	→ ALP 4
IRREGULAR ENGINE OPERATION	→ ALP 5

COMPONENT OPERATION TEST

INJECTOR TEST	→ TEST 1

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ALP 1	No dialogue with the computer

NOTES	**Before dealing with this customer complaint, check that there are no faults, and the conformity (or otherwise) of the parameters and statuses using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

Check the conformity of the vehicle type and the domain selected on the tool.

Check that the tool is not faulty by trying to establish dialogue with a computer on another vehicle.

Disconnect the injection computer, and check the condition of the contacts:

no oxidation, no damage to pins, etc.

Check the condition and conformity of the UPC **F5D 5A** fuse.

Replace it if necessary.

Check the continuity and the absence of interference resistance on the following connections:

Injection computer, 48-track brown connector B, **track M2** → **Track 1** UPC black PPM1 connector

Injection computer black 32-track connector A **track G1** → **Track 4** UPC grey PPH1 connector

Injection computer black 32-track connector A **track G4** → Vehicle **earth**

Injection computer black 32-track connector A **track H4** → Vehicle **earth**

Injection computer black 32-track connector A **track H1** → Vehicle **earth**

Repair if necessary.

Check the supply to the diagnostic socket:

+ Before ignition **on track 16**

+ After ignition **feed on track 1**

Earth on **track 4** and **5**

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ALP 1 **CONTINUED**	

Try to establish dialogue with another computer <u>on the same vehicle</u>.

1) If dialogue is established with **another computer on the same vehicle**:

Contact the Techline.

2) If the dialogue is not established **with any computer on the same vehicle**:

It may be that a faulty computer is causing interference on the multiplex network.

To locate it, carry out a process of elimination, disconnecting in turn all the computers linked to these lines (according to wiring diagram and equipment): Airbag, ABS, UCH, instrument panel.

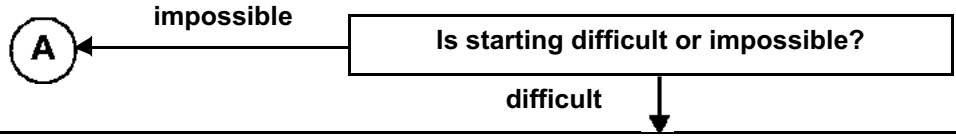
Try to establish dialogue after disconnecting each line:

If after disconnection:
– dialogue is successful: carry out the computer fault finding procedure and reconnect all the disconnected components,
– it is not possible to establish dialogue: contact the Techline.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ALP 2	Starting faults (or starting impossible)

NOTES	**Before dealing with this customer complaint, check that there are no faults, and the conformity (or otherwise) of the parameters and statuses using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**



Check the engine earths.

Make sure that the engine speed reaches **250 rpm** when the starter motor is operated, displayed in the parameter screen.

Ensure that the correct fuel is being used.

Check the conformity of the fuel filter connections.

Ensure that the fuel filter is not saturated with water.

Check there are no air bubbles between the filter and the high pressure pump.

Check the operation of the preheating unit and heater plugs with command **AC001 Preheating unit**.

Check the condition of the air filter (clogging).

Check the high-pressure diesel circuit, pump, pipes, and union seals (inspection + odours).

Check the position of the EGR valve: jamming or mechanical seizure.

Check the consistency of the signal from the engine coolant temperature sensor.

Check that the pressure regulator is operating correctly (see interpretation of command **AC011 Rail pressure regulator**).

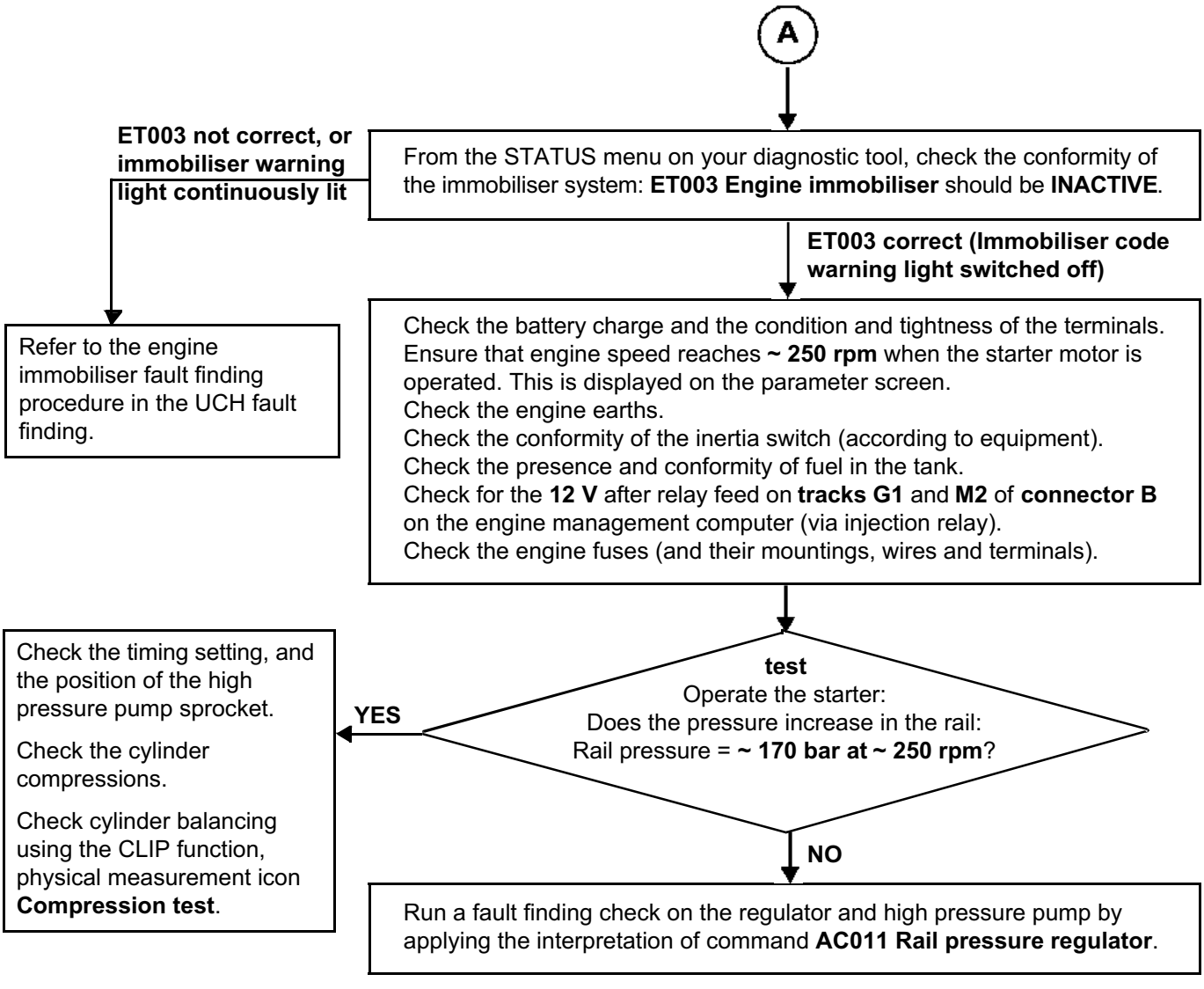
Check the operation of the injectors (too much return leakage, clogging, seizing) referring to **Component test, Test 1 Injector Test**.

Check that the compressions are balanced, in accordance with the current consumption in the starting phase (**Compression test** menu on the CLIP tool).

In the event of imbalance, use a compression gauge to refine the reading (see the procedure in the Workshop Repair Manual). After the operation, clear the faults caused by disconnecting the regulator and the heater plugs.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ALP 2 CONTINUED	



AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ALP 3	Injection noise

NOTES	**Before dealing with this customer complaint, check that there are no faults, and the conformity (or otherwise) of the parameters and statuses using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

If the injection noise occurs after starting from cold:

Check the low pressure diesel circuit priming.
Check the fuel heater supply.
Check the operation of the preheating system.
Check that fuel and engine temperatures are consistent.

If the complaint is still present, check the rail pressure (**Parameter** menu) and apply the interpretation of command **AC011 Rail pressure regulator**.

↓

Does the injection noise occur at idling speed?

Check the condition of the injector connector and pressure regulator terminals.
Check the conformity of the airflow signal (consult parameter **PR018 Air flow measurement**).

Check the condition of the EGR valve (clogging, blocked, seized).
If the complaint is still present, perform the injector fault finding procedure with **Test 1 Injector test**.

Does the injection noise occur at all engine speeds?

Carry out fault finding on the injectors with **Test 1 Injector Test**.
Check the condition of the injector connector and pressure regulator terminals.
Ensure that the correct fuel is being used.
Check the conformity of the air flow signal (consult the interpretation of parameter **PR132 Air flow**).

If the customer complaint is still present, check the rail pressure (**parameter** menu) and apply the interpretation of command: **AC011 Rail pressure regulator**.

↓

If the injection noise occurs at transitional speed:

If the engine races during gear changes, check the conformity of the clutch switch.
When changing gear during a road test, display parameter **PR017 Fuel flow**. if it varies without greatly affecting the rail pressure, perform the fault finding procedure for **AC011 Rail pressure regulator**.
If the fault is still present, carry out a fault finding check on the injectors (see **TEST 1**).

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ALP 4	Poor performance

NOTES	**Before dealing with this customer complaint, check that there are no faults, and the conformity (or otherwise) of the parameters and statuses using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

NOTE
In the event of the engine overheating above **110 °C**, the computer deliberately limits the fuel flow, and supplied the engine fan assembly until the battery is completely discharged.

Is the poor performance accompanied by smoke?

NO

YES

Check:
– Check whether the EGR valve is jammed in the open position.
– That the injectors are properly fitted (**sealing washer fitted and correct**).

Is the engine running on all cylinders?

YES

NO

Check that the injectors are operating correctly. (See **Test 1**)

If the fault is still present

Check the conformity of the accelerator pedal position sensor, the brake pedal sensor, the atmospheric pressure sensor and the EGR valve.
– Check the condition of the air filter.
– Check the consistency of the signal: from the flow sensor or the pressure/air temperature sensor, engine coolant temperature sensor, fuel temperature sensor, engine speed.

Check that there are no foreign bodies on the flow sensor grille (visual inspection only).

Check:
– That the diesel filter is not clogged.
– That there are no leaks in the low pressure and high pressure diesel circuits.
– That the air inlet circuit is complete (sealed and not obstructed).
– That the oil vapour rebreathing system is connected.
– The flow regulator (jammed/seized, consult the interpretation of command **AC011 Rail pressure regulator**).
– The turbocharger control (jammed/seized), check the interpretation of command AC004 Turbocharging solenoid valve,
– Check the engine compression (Cylinder compression balance, with the **Compression test**) function on the CLIP tool.

– Check that the exhaust pipe is not blocked.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

ALP 5	Irregular engine operation

NOTES	**Before dealing with this customer complaint, check that there are no faults, and the conformity (or otherwise) of the parameters and statuses using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

If the engine bucks or races during gear changes, check the conformity of the clutch switch.

If the fault is still present:
- Ensure that the correct fuel is being used.
- Check the low pressure diesel circuit priming.
- Check the conformity of the low pressure circuit connections
- Check the conformity of the diesel filter and that it is not saturated with water (replace the filter if necessary).
- Check that there are no air bubbles between the filter and the high pressure pump.
- Check the conformity of the rail pressure (warm engine):

  ± 25 bar around the rail pressure value at idle speed, (the minimum to maximum variations in the rail pressure at idle speed should not exceed **50 bar**).
  Approximately 1350 bar under load (full load).
  In the event of a fault, apply the interpretation of command **AC011 Rail pressure regulator**.

- Check the conformity of the air flow, apply the interpretation of parameter **PR132 Air flow**.

If the fault is still present:
- Check the operation of the injectors using **Test 1**.
  - Check cylinder balancing using the CLIP function, physical measurement icon **Compression test.**
- Check engine compression where necessary.

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

TEST 1	Injector test

NOTES	**Before dealing with this customer complaint, check that there are no faults, and the conformity (or otherwise) of the parameters and statuses using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

A) Preliminary Checks:

– Check the resistance between tracks **1** and **2** for each injector: **replace the injector if there is a short circuit (R = 0 Ω) or open circuit (resistance = infinity).**
– Check and ensure **the insulation**, **continuity** and **the absence of interference resistance** on the following connections:

Engine management computer, connector **C track G3** → **Track 2** of **injector no. 1** connector,
Engine management computer, connector **C track H1** → **Track 1** of **injector no. 1** connector.
Engine management computer, connector **C track G4** → **Track 2** of **injector no. 2** connector,
Engine management computer, connector **C track G2** → **Track 1** of **injector no. 2** connector,
Engine management computer, connector **C track H4** → **Track 2** of **injector no. 3** connector,
Engine management computer, connector **C track H2** → **Track 1** of **injector no. 3** connector,
Engine management computer, connector **C track H3** → **Track 2** of **injector no. 4** connector,
Engine management computer, connector **C track G1** → **Track 1** of **injector no. 4** connector,

– Carefully check the **clips, cables and tabs** of the connections of each injector.

Check the flow correction on the following page

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

TEST 1 CONTINUED	

B) Flow correction check on each injector
Start the engine, and display the following parameters:
PR364 Cylinder no. 1 fuel flow correction
PR405 Cylinder no. 2 fuel flow correction
PR406 Cylinder no. 3 fuel flow correction
PR365 Cylinder no. 4 fuel flow correction
The normal fuel flow correction for an injector is approximately **± 1 mm^3** (negative or positive according to the injector requirements).

– If at least one of the values is > 5 mm^3 or < - 5 mm^3:
Carry out an engine compression test.
If a cylinder indicates a compression value markedly lower than the others, carry out the necessary engine repairs.
If the 4 cylinders have the same values after the compression measurements, replace the injector with the greatest fuel flow correction.

Once the repairs are completed, start the engine, and check the fuel flow correction values by cylinder.
If the 4 values are correct, fault finding is complete.
If one or more of the values are outside permitted tolerance, refer to the following **customer complaint:**
– Fault Finding Chart 2 Starting difficult or impossible
– Fault Finding Chart 3 Injection noise
– Fault Finding Chart 4 Poor performance
– Fault Finding Chart 5 Irregular engine operation

Note:
Before replacing an injector, check that the sealing washer is in place and in good condition.
After replacing an injector, and **if the IMA is active**, follow the injector code programming procedure.

NOTE
Observe the cleanliness guidelines and safety advice when removing/refitting injectors, (see **Introduction**).

AFTER REPAIR	Carry out a road test followed by another check with the diagnostic tool.

Injection computer	112-track (BOSCH) Connectors: black A 32-track, brown B 48-track, grey C 32-track
Atmospheric pressure sensor	Integrated into the computer (BOSCH)
Injector	R = 0.33 Ω at + 20 °C/2 Ω max (BOSCH) 1,350 bar (1,600 bar max.)
Flow regulator (high pressure pump)	R = 3 Ω at + 20 °C (BOSCH, pump type CP3.2+)
Rail pressure sensor	Start of opening ~ 1,350 bar Pressure limiter on CP3 pump: maximum opening at 1,600 bar (BOSCH, bolted to the rail)
Engine speed sensor	R = 800 ± 80 Ω at + 20 °C (MGI)
Camshaft sensor	Hall effect sensor (ELECTRICFIL) R = 10,250 ± 500 Ω at + 20 °C (measurement between tracks 2 and 3 of the sensor)
Turbocharger control solenoid valve	R = 15.4 ± 0.7 Ω at + 20 °C (PIERBURG)
Electric EGR valve	Track 1: + 12 V solenoid Track 2: + 5 V potentiometer Track 3: Not used Track 4: potentiometer earth Track 5: solenoid earth Track 6: potentiometer signal SOLENOID: R between tracks 1 and 5 = 8 ± 0.5 Ω at + 20 °C POTENTIOMETER: R between the tracks 2 and 4: 4 ± 2 kΩ at + 20 °C (PIERBURG)
Damper solenoid valve	R = 46 ± 3 Ω at + 25 °C (EATON/BITRON)
Air flow sensor	Track 1: air temperature signal Track 2: flow sensor earth Track 3: + 5 V flow sensor Track 4: + 12 V battery feed Track 5: air flow signal Track 6: battery earth (SIEMENS)
Air temperature sensor	R = 3,714 Ω ± 161 at + 10 °C/2,448 Ω ± 96 at + 20 °C/1,671 Ω ± 59 at + 30 °C
Coolant temperature sensor	R = 2,252 Ω ± 112 at 25 °C/811 Ω ± 39 at 50 °C/283 Ω ± 8 at 80 °C
Fuel temperature sensor	R = 2,051 Ω ± 123 at 25 °C/810 Ω ± 47 ± at 50 °C/309 Ω ± 17 at 80 °C
Accelerator pedal sensor	R gang 1 = 1,700 ± 900 Ω R gang 2 = 2,850 ± 2,050 Ω
Heater plug	R = 0.6 Ω at + 20 °C/2 Ω maximum Maximum current drawn: 28 A at 0 seconds/12 A at 10 seconds/9 A after 30 seconds
Presence of water in diesel sensor	According to application (ZERTAN)

(R = Resistance, EGR = Exhaust gas recirculation)

1. SCOPE OF THIS DOCUMENT

This document presents the fault finding procedure applicable to all computers with the following specifications:

Vehicle: **MEGANE II, SCENIC II** *Engine type and suffix:* **F9Q 804** *Function concerned:* **DIESEL INJECTION**	*Computer name:* **BOSCH EDC16 C3** *Program no.:* **C1** *Vdiag no.:***50**

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedures (this manual):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.

Wiring Diagrams:
– Visu-Schéma (CD-ROM), paper version.

Type of diagnostic tools

– CLIP + CAN sensor

Special tooling required

Special tooling required	
Multimeter	
Elé. 1590	**Computer connection terminal**
Elé. 1681	**Universal bornier**

3. RECAP

Procedure

To run fault finding on the vehicle's computers, switch on the ignition in fault finding mode (forced + after ignition feed).

– vehicle card in reader,
– press and hold the Start button (longer than 5 seconds) with start-up conditions not present,
– connect the diagnostic tool and perform the required operations.

To cut off the + after ignition feed, proceed as follows:

– disconnect the diagnostic tool,
– vehicle card in reader,
– press the Start button twice briefly (less than 3 seconds),
– ensure that the + after ignition feed has been cut off by checking that the computer indicator lights on the instrument panel have gone out.

Faults

Faults are declared as either present or stored (depending on whether they appeared in a certain context and have disappeared since, or whether they remain present but have not been diagnosed within the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is switched on after the + after ignition feed is switched on (without any activation of system components).

For a **present fault**, apply the procedure described in the **Interpretation of faults** section.

For a **stored fault**, note the faults displayed and apply the instructions in the **Notes** section.

If the fault is **confirmed** when the instructions in the Notes section are applied, the fault is present. Deal with the fault.

If the fault is **not confirmed**, check:
- the electrical lines which correspond to the fault,
- the connectors for these lines (for oxidation, bent pins, etc.),
- the resistance of the component detected as faulty,
- the condition of the wires (melted or split insulation, wear).

Conformity check

The aim of the conformity check is to check data that does not produce a fault on the diagnostic tool because the data is inconsistent. Therefore, this phase is used to:
- carry out fault finding on faults that do not have a fault display, and which may correspond to a customer complaint,
- check that the system is operating correctly and that there is no risk of a fault recurring after repairs.

This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.

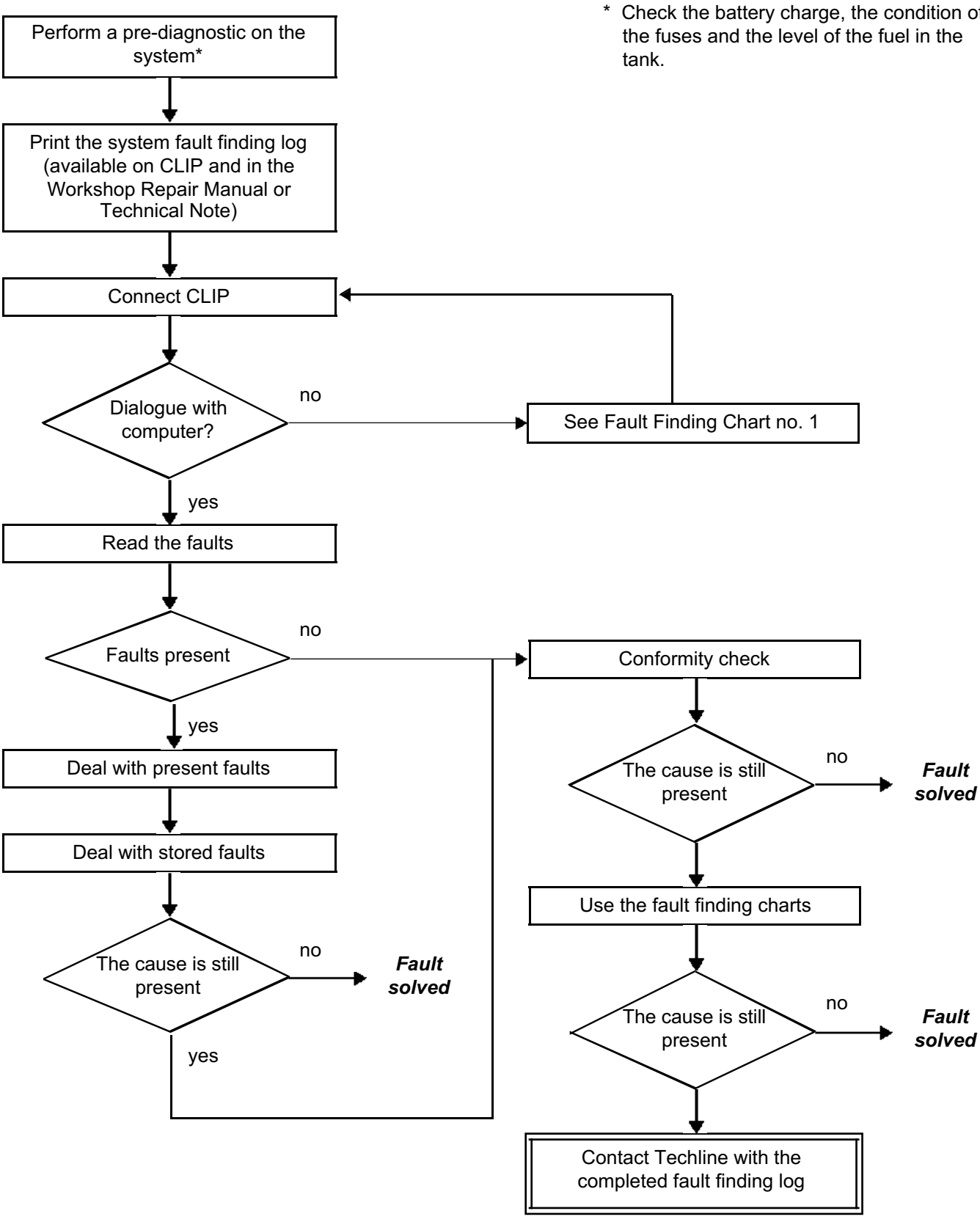
If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

Customer complaints - Fault finding chart

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be processed by **customer complaint**.

A summary of the general procedure to follow is provided on the following page in the form of a flow chart.

4. FAULT FINDING PROCEDURE



4. FAULT FINDING PROCEDURE (continued)

Wiring check

Fault finding problems
Disconnecting the connectors and/or manipulating the wiring harness may temporarily remove the cause of a fault.
Electrical measurements of voltage, resistance and insulation are generally correct, especially if the fault is not present when the analysis is made (stored fault).

Visual inspection
Look for damage under the bonnet and in the passenger compartment.
Carefully check the fuses, insulation and wiring harness routing.
Look for signs of oxidation.

Tactile inspection
While manipulating the wiring harness, use the diagnostic tool to note any change in fault status from "stored" to "present".
Make sure that the connectors are properly locked.
Apply light pressure to the connectors.
Twist the wiring harness.
If there is a change in status, try to locate the source of the fault.

Inspection of each component
Disconnect the connectors and check the appearance of the clips and tabs, as well as the crimping (no crimping on the insulating section).
Make sure that the clips and tabs are properly locked in the sockets.
Check that no clips or tabs have been dislodged during connection.
Check the clip contact pressure using a suitable model of tab.

Resistance check
Check the continuity of entire lines, then section by section.
Look for a short circuit to earth, to **+ 12 V** or to another wire.

If a fault is detected, repair or replace the wiring harness.

5. FAULT FINDING LOG

IMPORTANT!

NOTE
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the procedure, enables you to keep track of the procedure which is carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE MANDATORY TO FILL OUT A FAULT FINDING LOG EACH TIME FAULT FINDING IS CARRIED OUT.

You will always be asked for this log:

- when requesting technical assistance from Techline,
- for approval requests when replacing parts for which approval is obligatory,
- and it should be enclosed when returning monitored parts on request. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY ADVICE

Safety rules must be observed during any work on a component to prevent damage or injury:

- make sure that the battery is properly charged to avoid damaging the computers in the event of a low load,
- use the appropriate tools.

7. CLEANLINESS INSTRUCTIONS WHICH MUST BE FOLLOWED WHEN WORKING ON THE HIGH-PRESSURE DIRECT INJECTION SYSTEM

Risks relating to contamination

The system is highly sensitive to contamination. The risks associated with contamination are:

- damage to or destruction of the high pressure injection system and the engine,
- a component seizing or leaking.

All After-Sales operations must be performed under very hygienic conditions. This means that no impurities (particles a few microns in size) should be allowed to penetrate the system during dismantling or get into the circuits via the fuel unions.

The cleanliness guidelines must be applied from the filter through to the injectors.

FAULT FINDING LOG

System: Power Assisted Steering

List of monitored parts: ***Computer***

Administrative identification

Date	2 0
Log completed by	
VIN	
Engine	
Diagnostic tool	CLIP
Update version	

Customer complaint

	1728	No power assistance		1730	No power assistance variation		1731	Too much power assistance at high speed
	1729	Power assisted steering warning light lit		1732	The recall is not active			

Other — Your comments

Conditions under which the customer complaint occurs

	005	While driving		010	Gradual deterioration		004	Intermittently
	009	Sudden fault						

Other — Your comments

Documentation used in fault finding

Fault finding procedure used			
Type of diagnostic manual:	Workshop Repair Manual ❑	Technical Note ❑	Assisted fault finding ❑
Fault finding manual no.:			
Wiring diagram used			
Wiring Diagram Technical Note no.:			
Other documentation			
Title and/or part number:			

RENAULT

FD 05
Fault finding log

FAULT FINDING LOG

System: Power Assisted Steering

Computer identification and parts exchanged for the system

Part 1 part no.	
Part 2 part no.	
Part 3 part no.	
Part 4 part no.	
Part 5 part no.	

To be read with the diagnostic tool (Identification screen):

Computer part no.	
Supplier no.	
Program no.	
Software version	
Calibration no.	
VDIAG	

Faults found with the diagnostic tool

Fault no.	Present	Stored	Fault name	Specification

Conditions under which fault occurs

Status or parameter no.	Parameter name	Value	Unit

System-specific information

Description:

Additional information

What factors led you to replace the computer? What other parts were replaced?	
Other faulty functions?	
Your comments:	

RENAULT

FD 05
Fault finding log

I - RISKS ASSOCIATED WITH CONTAMINATION

The high pressure direct injection system is highly sensitive to contamination. The risks associated with contamination are:

- damage to or destruction of the high-pressure injection system,
- components jamming,
- a component leaking.

All After-Sales operations must be performed under very hygienic conditions. This means that no impurities (particles a few microns in size) should be allowed to penetrate the system during dismantling or get into the circuits via the fuel unions.

The cleanliness principle must be applied to all components from the filter to the injectors.

What are the sources of contamination?

- metal or plastic chips,
- paint,
- fibres:
  - from cardboard,
  - from brushes,
  - from paper,
  - from clothing,
  - from cloths,
- foreign bodies such as hair,
- ambient air
- etc.

NOTE
Cleaning the engine using a high-pressure washer is prohibited because of the risk of damaging connections. In addition, moisture may collect in the connectors and create electrical connection faults.

II - NOTES TO BE FOLLOWED BEFORE ANY OPERATION

NOTE
Before any work is carried out on the high-pressure injection system, protect:
- the accessories and timing belts,
- the electrical accessories, (starter, alternator, electric power assisted steering pump),
- the flywheel surface, to prevent any diesel from running onto the clutch friction plate.

Ensure that you have plugs for the unions to be opened (set of plugs available from the Parts Department). The plugs are single-use only. After use, they must be discarded (once used they are soiled, cleaning does not make them reusable). Unused caps must be discarded.

Ensure that you have hermetically resealable plastic bags for storing removed parts. Parts stored in this way will be less susceptible to the risk of contamination. The bags are to be used once only, and discarded after use.

Use lint-free cleaning cloths (cloth part number **77 11 211 707**). Using normal cloth or paper is prohibited. They are not lint-free and could contaminate the fuel circuit. Each cloth should only be used once.

Use fresh cleaning agent for each operation (used cleaning agent is contaminated). Pour it into an uncontaminated container.

For each operation, use a clean brush in good condition (the brush must not shed its bristles).

Use a brush and cleaning agent to clean the unions to be opened.

Blast compressed air over the cleaned parts (tools, workbench, the parts, unions and injection system zones). Check that no bristles remain.

Wash your hands before and during the operation if necessary.

When wearing leather protective gloves cover them with latex gloves to prevent contamination.

III - INSTRUCTIONS TO BE FOLLOWED DURING THE OPERATION

As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Department. The plugs must not be reused under any circumstances.

Seal the pouch shut, even if it has to be opened shortly afterwards. Ambient air carries contamination.

All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been capped.

Using a brush, cleaning agent, air gun, sponge or normal cloth is strictly prohibited once the circuit has been opened. These items could allow contamination to enter the system.

If replacing an old component with a new one do not remove it from its packaging until it is ready to be fitted to the vehicle.

System outline

The high-pressure injection system is designed to deliver a precise quantity of diesel fuel to the engine at a set moment.

It is fitted with a **112-track BOSCH EDC16 C3 type computer**.

The system is comprised of:
– a priming bulb on the low pressure circuit,
– a diesel filter,
– a high pressure pump with a built-in low pressure pump (transfer pump),
– a high pressure regulator mounted on the pump,
– an injector rail,
– a diesel fuel pressure sensor built into the rail,
– four solenoid injectors,
– a coolant temperature sensor,
– an upstream air temperature sensor,
– a cylinder reference sensor,
– an engine speed sensor,
– a turbocharging pressure sensor,
– an accelerator pedal potentiometer,
– an EGR solenoid valve,
– an atmospheric pressure sensor built into the injection computer,
– an air flowmeter,
– a turbocharging pressure limitation solenoid valve,
– a motorised damper valve,
– a particle filter,
– a particle filter pressure differential sensor,
– a particle filter upstream temperature sensor,
– a particle filter downstream temperature sensor,
– a turbine upstream temperature sensor.

The "**common rail**" direct high pressure injection system works sequentially (based on the petrol engine multipoint injection).

This injection system reduces operating noise, reduces the volume of pollutant gases and particles and produces high engine torque at low engine speeds thanks to a pre-injection procedure.

The high pressure pump generates the high pressure and transmits it to the injector rail. The actuator located on the pump controls the quantity of diesel fuel supplied, according to the demand determined by the computer. The rail supplies each injector via a steel pipe.

a) The computer:

Determines the value of injection pressure necessary for the engine to operate correctly and then controls the pressure regulator.
Checks that the pressure value is correct by analysing the value transmitted by the pressure sensor located on the rail.
Determines the injection time necessary to supply the correct quantity of diesel and the moment when injection should start, Controls each injector electrically and individually after determining these two values.

The flow injected into the engine is determined by:
– the duration of injector control,
– the rail pressure (regulated by the computer),
– the injector opening and closing speed,
– the needle stroke (determined by a constant for the type of injector),
– the nominal hydraulic flow of the injector (specific to each injector).

The computer manages:
– idling regulation,
– exhaust gas flow reinjection to the inlet (EGR),
– fuel supply monitoring (advance, flow and rail pressure),
– the fan unit control, by the UPC (Centralised Coolant Temperature Management function),
– air conditioning (cold loop function),
– the cruise control/speed limiter function,
– pre/post heating control,
– fault warning lights via the multiplex network,
– the operation of the catalysed particle filter.

The high pressure pump is supplied at low pressure by an integrated low pressure pump (transfer pump).
It supplies the rail, the pressure of which is controlled by the fuel flow actuator (MPROP) for charging, and for discharging by the injector valves. This compensates for pressure drops. The fuel flow actuator enables the high pressure pump to supply the exact quantity of diesel fuel required to maintain the rail pressure. This component minimises the heat generated and improves engine output. In order to discharge the rail using the injector valves, the valves are controlled by short electrical pulses which are:
– short enough not to open the injector (passing through the feedback circuit from the injectors),
– long enough to open the valves and discharge the rail.

b) Multiplex connection between the different vehicle computers.

The electronic system fitted in this vehicle is multiplexed.
This enables dialogue between the various vehicle computers. As a result:
– the activation of the fault warning lights on the instrument panel is performed by the multiplex network, the deactivation of vehicle speed sensor on the gearbox,
– vehicle faults are displayed by the multiplex network,
– the vehicle speed sensor on the gearbox is no longer required.

The vehicle speed signal on the instrument panel is transmitted by the ABS computer via a wire connection, then sent out on the multiplex network by the instrument panel. The vehicle speed signal is used mainly by the injection computer and the airbag computer.

Some vehicles have adopted a sensor for detecting water in the diesel, located in the filter. If there is water in the diesel fuel, the orange "Injection and pre/post heating" warning light will come on.

IMPORTANT
The engine must not operate with:
– Diesel fuel containing more than 10% diester,
– Petrol, even in tiny quantities.

The system injects diesel fuel into the engine at a pressure of up to **1,600 bar**. Before each operation, check that the injector rail is depressurised and that the fuel temperature is not too high.

You must respect the cleanliness guidelines and safety advice specified in this document when completing any work on the high-pressure injection system.
Removing internal parts from the pump and injectors is prohibited. Only the fuel flow actuator, the diesel fuel temperature sensor and the Venturi can be replaced.

For safety reasons, it is strictly forbidden to undo a high pressure pipe union when the engine is running.

It is not possible to remove the pressure sensor from the fuel rail because this may cause circuit contamination faults. If the pressure sensor fails, the pressure sensor, the rail and the five high pressure pipes must be replaced.

It is strictly forbidden to remove any injection pump pulley bearing the number **070 575**. If the pump needs to be replaced, also replace the pulley.

Supplying **+ 12 V** directly to any component in the system is prohibited.

Ultrasonic decoking and cleaning are prohibited.

Never start the engine unless the battery is connected correctly.

Disconnect the injection computer when carrying out any welding work on the vehicle.

c) Hosted functions:

Air conditioning management assistance:

In the case of vehicles with climate control, the EDC16 system has the option of deactivating the climate control through the UCH, under certain conditions of use:
– when requested by the driver,
– during the engine starting phases,
– if the engine overheats (in order to reduce the power the engine has to supply),
– when the engine speed is kept at a very high level (to protect the compressor),
– during transition phases (e.g. high acceleration demand for overtaking, anti-stalling and moving off). These conditions are only taken into account if they do not occur repeatedly, so as to prevent system instabilities (erratic deactivation),
– when certain faults appear.

Cold loop air conditioning management:

The air conditioning is cold loop managed, shared between several computers.

The injection computer is responsible for:
– authorising cold requests according to the refrigerant pressure, the engine coolant temperature and the engine speed,
– calculating the power absorbed by the compressor (from the refrigerant pressure),
– requesting operation of the fan unit, from the UPC, according to the vehicle speed, the refrigerant fluid pressure and the coolant temperature.

The driver requests the air conditioning to be switched on by means of the ventilation selector coupled to a switch. The cold air request is authorised or denied depending on the pressure measured. If this pressure is outside the operating limits, the cold loop programming is not activated.

Management of the damper valve:

The damper valve now carries out two functions:

– Damping: when the engine is switched off; the flap closes in order to block the passage of air towards the cylinders. The aim of this is to stop the engine as quickly as possible and to reduce instabilities when the engine is switched off.

– Valve function: depending on the different functions of the engine, the damper valve closes by a few % in order to create a Venturi effect in the EGR valve flow section.
The aim of this is to accelerate the air flow of EGR gases and to reduce the emission of pollutants.

Passenger Compartment Heating Resistor Management:

In order to reduce the time required to heat up the passenger compartment, the vehicle is fitted with **P**assenger **C**ompartment **H**eating **R**esistors (**RCH**). These resistors are managed by the UCH. The injection computer gives authorisation to the resistors according to the operational phases and the engine output.

Cruise control/speed limiter management:

The vehicle cruise control function, when activated, allows you to keep the vehicle speed at a selected value regardless of the driving conditions encountered.
Using the control buttons, the driver can increase or reduce the speed of the vehicle.

If the driver wishes to exceed the limit speed, he/she may:
– depress the accelerator pedal and exceed the cruising speed (the vehicle will return to the original cruising speed once the driver takes his/her foot off the pedal),
– press the system control buttons.
The cruise control function can be deselected either by:
– the system control buttons,
– switching off the cruise control switch,
– when system events are detected, such as the brake or clutch pedal being depressed,
– when system errors are detected such as an erratic vehicle speed.
The cruise function can also be temporarily inhibited when the driver wants to increase speed by depressing the accelerator pedal. The cruising speed is resumed when the driver releases the accelerator pedal.
The vehicle will then attempt to reach the cruising speed at a controlled acceleration rate.

It is possible to reactivate cruise control and resume the last cruising speed after deactivation (computer supply not switched off).

When activated (using the selection switch) **the vehicle speed limiter function** limits the vehicle speed to a preselected value. The driver controls the vehicle in the normal way using the accelerator pedal until the setpoint speed is reached.

If an attempt is made to exceed this speed, the system ignores the pedal request and controls the vehicle speed in the same way as the cruise control function, provided that the driver keeps the accelerator pedal sufficiently depressed.
As with the cruise control function, the setpoint speed can be modified by pressing or pressing and holding the control buttons.

For safety reasons, the setpoint speed can be exceeded by depressing the accelerator pedal so as to exceed a pedal position limit value. The vehicle speed is then totally controlled as a function of pedal position until the speed falls back below the setpoint speed when the speed limiter function will once again be reactivated.

If the driver wishes to exceed the limit speed, he/she may:
– exceed the accelerator pedal's kickdown point,
– increase the limit speed by the pressing or pressing and holding the limit speed switch.
The speed limiter function can be deselected either by:
– the system control buttons,
– turning off the speed limiter switch,
– when system events are detected, such as the brake or clutch pedal being depressed,
– when system errors are detected such as an erratic vehicle speed.

Exhaust gas recirculation management

The exhaust gas recirculation system comprises a direct current EGR valve controlled by an H bridge in the computer. This system has a built-in valve position feedback potentiometer.
The EGR valve is controlled in a closed loop on the change in the air flow measured by the flow sensor.
The potentiometer is used in the fault finding procedure for the EGR valve position.

Catalysed particle filter management

The particle filter eliminates the emission of carbonated particles emitted by the engine that have not yet been removed from the exhaust fumes.

The particle filter has a microporous structure containing channels in order to force filter the exhaust fumes.

The exhaust system consists of several components:
– an oxidation catalytic converter located after the turbocharger. This catalytic converter allows the HC/CO levels to be attained in line with current standards and to generate an exotherm (rise in exhaust temperature by means of catalysis) required for particle filter regeneration,
– a catalysed particle filter located under the bodywork,
– a pressure differential sensor to inform the computer of the pressures upstream and downstream of the particle filter particle filter upstream and downstream temperature sensor,
– a temperature sensor upstream of the turbine (TAVT).

When driving, the particle filter is loaded with particles (soot). Using a given weight of soot determined via computer mapping, regeneration mode can be triggered when the maximum weight of soot in the particle filter is reached and the engine operating conditions are met (coolant T°, etc.)

Particle filter regeneration consists of burning the particles of soot accumulated in the filter.

The pressure differential sensor measures the particle filter input/output pressure differential. This measurement is used to estimate the weight of soot present in the particle filter via the mappings in the computer:
(soot weight = pressure differential in accordance with exhaust volume flow rate).

If all the criteria are met, the computer enters regeneration mode. The injection programming is then adjusted in order to raise the target exhaust gas temperature between **550 and 650°**.
This temperature allows the particles accumulated in the filter to be partially or completely burnt (regenerated). The efficiency of regeneration depends on the particle filter inlet temperature and the time spent in regeneration mode.

Regeneration may be automatic when driving if the soot weight is under **45 g**.

If the soot content is above **45 g** or it has not been possible to perform regeneration when driving, the user will have to request an **After-Sales regeneration**.

This regeneration is carried out in the workshop. It is imperative that the instructions described in the Interpretation of commands for this Note are followed, to safely carry out the regeneration.

NOTE
The particle filter should be replaced after a period of time which is largely dependent on the quality of the engine oil used - this information is found in the Driver's handbook.
It is essential, after replacing the filter, to reconfigure certain parameters in the computer.

Warning light management:

Instrument panel display

The computer manages the data display on the instrument panel relating to engine operation. This concerns five functions:
– the pre/post heating operating light,
– the coolant temperature warning light,
– the fault level 1 warning light (non-critical fault),
– the fault level 2 warning light (emergency stop),
– EOBD (European On Board Diagnostic) OBD warning light.

These five functions are represented by 3 or 4 warning lights and/or messages transmitted by the trip computer.

Orange pre/post heating/non-critical fault "SERVICE" warning light (level 1)
This warning light is used both as an in operation indicator light and as a system fault indicator:
– Continuously lit with + after ignition feed:
Indicates plug preheating.
– Continuously lit with the "**CHECK INJECTION**" message:
Indicates a **level 1** fault (implies operation in injection system defect mode).
The driver should carry out repairs as soon as possible.

Temperature/red emergency "STOP" (level 2) warning light
This in operation indicator light is used both as an in operation indicator light and as a system fault indicator light.
Lights up for **3 seconds** when the ignition is switched on (automatic test procedure managed by the instrument panel):
– Continuously lit:
Indicates engine overheating (the driver is free choose whether or not to stop the vehicle).
– Continuously lit with the "**FAULTY INJECTION**" message:
Indicates a **level 2** fault (In this case, the injection is automatically cut after a few seconds).
The driver should carry out repairs as soon as possible.

"ORANGE" "OBD" excess pollution warning light
Symbolised by an engine, it lights up for approximately **3 seconds** when the engine is switched on.
This warning light lights up if the system has one or more OBD faults.
This warning light is used to alert the driver of any injection faults causing excessive pollution, or if the EOBD system has been deactivated.
The injection computer requests activation of the OBD warning light for a present fault only after three successive driving cycles.
The **3 second** visual inspection when the ignition is switched on (automatic test procedure managed by the instrument panel) is carried out by the injection computer.

Management of the EOBD:

The **OBD (On Board Diagnostic)** system enables any faults relating to the vehicle emission control system (OBD EURO IV emission control standards being exceeded) to be detected.
This system should be active for the entire life of the vehicle.

1. Conditions causing an OBD fault

An OBD fault will be detected after **3 driving cycles** and the following parameters will be registered in the computer:
– engine load,
– vehicle speed,
– air temperature,
– coolant temperature,
– turbocharging pressure,
– rail pressure,
– air flow,
– distance travelled in miles by the vehicle since activation of the "**OBD**" warning light.
It allows the driver to know whether his vehicle has a fault directly linked to the emission control system.

2. System faults indicated by the OBD

Only a few faults are indicated by the OBD system:
– DF012 "Sensor supply voltage no. 2".
– DF038 "Computer" in 6.DEF "EEPROM fault".
– DF040 "Cylinder 1 injector circuit" in CO "Open circuit".
– DF041 "Cylinder 2 injector circuit" in CO "Open circuit".
– DF042 "Cylinder 3 injector circuit" in CO "Open circuit".
– DF043 "Cylinder 4 injector circuit" in CO "Open circuit".
– DF054 "Turbocharging solenoid valve control circuit" in CC.0 "Short circuit to earth".
– DF209 "EGR valve position sensor circuit".
– DF621 "EGR valve jammed open".

Some repair operations require programming to ensure that certain engine components function correctly. Follow the programming procedures (see "Replacing components"), if replacing the exhaust gas recirculation valve or an injector.

3. Conditions for clearing an OBD fault

An OBD fault is cleared in several steps.
The fault **present** in the diagnostic tool is not **stored** (following repair) until the vehicle is driven 3 times.
The OBD warning light will only light up after these 3 driving cycles.
The warning light coming on does not always mean that there is a fault on the system. In order that the OBD fault and the display parameters are cleared from the computer, the system needs to go through 40 engine heating cycles.
An engine heating cycle is a driving cycle during which:
– the engine coolant temperature reaches at least 71.1 °C,
– the engine coolant temperature varies by 22.2 °C in relation to the engine starting temperature.
If one of these conditions is not fulfilled, the OBD fault will still be present or stored in the injection computer.

1 - 32-track black connector A

Track	Description
A1	Not used
A2	Cruise control on/off control
A3	Passenger compartment CAN L1 network signal
A4	Passenger compartment CAN H1 network signal
B1	Air conditioning inhibition control
B2	Engine speed signal
B3	Not used
B4	K line diagnostic socket output
C1	Not used
C2	Not used
C3	Speed limiter on/off control
C4	Clutch supply signal output
D1	UPC feed (+ after ignition)
D2	Cruise control programming control
D3	Cruise control programming feedback signal
D4	Fuel flow signal
E1	Not used
E2	Air conditioning cycle control
E3	Heated windscreen activation signal
E4	Brake switch supply signal output
F1	Not used
F2	Accelerator potentiometer load 2 supply
F3	Accelerator potentiometer load 2 signal
F4	Accelerator potentiometer load 2 earth
G1	UPC feed (+ BAT 1 after relay)
G2	Accelerator potentiometer load 1 supply
G3	Not used
G4	Battery earth
H1	Battery earth
H2	Accelerator potentiometer load 1 signal
H3	Accelerator potentiometer load 1 earth
H4	Battery earth

2 - 48-track brown connector B

Track	Description
A1	Camshaft sensor earth (cylinder 1 reference) and particle filter upstream temperature sensor
A2	Additional heating fault finding signal
A3	Not used
A4	Fuel rail pressure sensor supply
B1	TDC sensor supply signal (engine speed)
B2	Damper valve fault finding
B3	Not used
B4	Air flow sensor supply
C1	TDC sensor earth signal (engine speed)
C2	EGR valve engine supply signal
C3	Engine CAN H2 network signal (automatic gearbox)
C4	Fuel rail pressure sensor earth
D1	Camshaft sensor signal (cylinder reference 1)
D2	EGR valve engine earth signal
D3	Engine CAN L2 network signal (automatic gearbox)
D4	Turbocharger pressure sensor earth
E1	Main power supply relay control
E2	Air temperature and air flowmeter earth signal
E3	Not used
E4	Not used
F1	Refrigerant pressure sensor signal
F2	Coolant temperature sensor supply signal
F3	Refrigerant pressure sensor supply
F4	EGR valve position potentiometer feed
G1	Air flowmeter supply signal
G2	Air temperature signal
G3	Fuel rail pressure sensor signal
G4	Turbocharging pressure sensor and particle filter pressure differential sensor supply
H1	Coolant temperature sensor earth
H2	Not used
H3	Particle filter upstream temperature sensor signal
H4	Electric coolant pump relay control

2 - 48-track, brown connector B (continued)

Track	Description
J1	Not used
J2	EGR valve position potentiometer signal
J3	Not used
J4	Damper valve solenoid valve control
K1	Not used
K2	Turbocharging pressure sensor signal
K3	Particle filter downstream temperature sensor signal
K4	Auxiliary heating relay coil 1 control
L1	Not used
L2	Not used
L3	Not used
L4	Flowmeter earth
M1	Not used
M2	UPC feed (+ BAT 2 after relay)
M3	Not used
M4	Fuel pressure regulation solenoid valve control (fuel flow actuator)

3 - 32-track, grey connector C

Track	Description
A1	Additional heating relay coil 2 control
A2	Water in diesel detection sensor signal
A3	Not used
A4	Preheating unit diagnostic signal
B1	Not used
B2	Particle filter pressure differential sensor signal
B3	Not used
B4	Not used
C1	Not used
C2	EGR valve position potentiometer earth
C3	Refrigerant pressure sensor earth
C4	Not used
D1	Turbine upstream temperature sensor earth
D2	Not used
D3	Not used
D4	Not used
E1	Turbocharging pressure solenoid valve control
E2	Preheating unit control
E3	Particle filter downstream temperature sensor earth
E4	Turbine upstream temperature sensor supply
F1	Not used
F2	Not used
F3	Particle filter pressure differential sensor earth
F4	Not used
G1	Injector 4 feed
G2	Injector 2 feed
G3	Injector 1 control
G4	Injector 2 control
H1	Injector 1 feed
H2	Injector 3 feed
H3	Injector 4 control
H4	Injector 3 control

COMPUTER REPLACEMENT OR REPROGRAMMING OPERATIONS:

The system can be programmed and reprogrammed via the diagnostic socket using the RENAULT CLIP diagnostic tool (See **Technical Note 3585A**).

While the computer is being (re)programmed the engine fan assemblies are automatically triggered.

NOTE
- **Switch on the diagnostic tool (mains or cigarette lighter supply).**
- **Connect a battery charger.**
- **Switch off all the electrical consumers (lights, interior lighting, air conditioning, audio system, etc.).**
- **Wait for the engine to cool (engine coolant temperature < 60°, and air temperature < 50°).**

- **Before the computer is reprogrammed or replaced in After-Sales, save the following data in the diagnostic tool** using command **SC003** "**Save computer data**":
- the IMA codes (individual injector correction),
- the engine adaptives (engine speed, and options available on the vehicle).

IMPORTANT
A computer without the IMA option can be replaced by a computer with this option. The codes have therefore not been saved during command SC003.
In this event, status ET104 "Using injector codes" becomes "YES", fault DF276 "Injector code programming" is present, and the engine operates in defect mode.
Use command SC002 "Injector code input", applying the procedure described in the interpretation of this command.

After programming, reprogramming or replacing the computer:

- **Switch the ignition off and then on again.**
- **Start and then stop the engine (to initialise the computer) and wait for 40 seconds.**
- **Use the diagnostic tool to carry out the following steps:**
  - use command **SC001** "**Write saved data**" to re-establish the injector codes and engine adaptives,
  - use command **VP010** "**Write VIN**",
  - deal with any faults displayed by the diagnostic tool. Clear the computer memory,
  - carry out a road test followed by another check with the diagnostic tool.

Note:
If commands **SC001** and **SC003** are ignored or do not work, after replacing or (re)programming the computer, write the IMA codes for each injector manually by reading the code on each injector (refer to **Replacing injectors**).

NOTE
- The injection computer retains the same immobiliser code for life.
- The system has no security code.
- It is prohibited to perform tests with computers borrowed from the Parts Department or from another vehicle which must then be returned.
- These computers are hard-coded.
- If the injection computer appears to be faulty, contact Techline and refer to the "fault finding log".

REPLACING THE INJECTORS:

Note:
The "IMA" coding (individual injector correction) is a calibration made in production on **each injector** to **adjust its flow** accurately.
These correction values are etched onto the Bakelite body of each injector (6 alphanumeric characters) and then entered into the computer which then controls each injector taking into account their **manufacturing variance**.

After one or more injectors have been changed, you must record the IMA codes again.
The system must be configured via the diagnostic socket using the RENAULT CLIP diagnostic tool.
To do this, record the "**IMA**" code(s) etched in the injector casings, and enter the codes in the computer using the **SC002** "**Enter injector codes**" command, and follow the instructions given by the diagnostic tool.

IMPORTANT:
The letters **J and Q**, and figures **0 and 9** are not **used in IMA coding**.
If these characters are used the entry will be **invalid**.

Cylinder no. 1 is the cylinder located **at the engine flywheel end**.
Procedure to be followed:
– Read the **6-character** alphanumeric codes etched on the upper section of the injector bodies.
– Use command **SC002**.
– Select the cylinder number for the cylinder concerned in the "**Desired**" column, then confirm.
– Enter the injector code displayed for the cylinder.
– Enter the new codes for each cylinder, then confirm.
– When the command is completed, the modified codes appear in the "**Current**" column.
– Check that the codes correspond to those read earlier.
– If the codes entered appear in neither the "**Current**" column nor the "**Desired**" column, check the codes read and make sure the data has been entered correctly,

The possible confusions are:
digit "1" with the letter "I"
digit "5" with the letter "S"
digit "8" with the letter "B"

– Exit fault finding mode.
– Switch off the ignition and wait **40 seconds**.
– Switch the ignition back on and check for faults.
– **DF276** "**INJECTOR CODE PROGRAMMING**" should be stored.

If fault **DF276** is still present, the command has not been performed correctly.
Start the procedure again and follow the instructions.
If the codes are not always referred to, check to see if power latch* has functioned correctly:
Switch off the ignition and wait **40 seconds**.
If the warning light flashes as soon as the ignition is switched off, the power latch* has not been performed and the command will be ignored.
If all these checks still do not enable the command to be confirmed, contact Techline.

*Computer on standby after switching the ignition off: approximately **40 seconds**.

REPLACING THE EGR VALVE:
After the exhaust gas recirculation valve is replaced, the computer has to store the new valve offset (at 0 miles), and the measured offset from the last time the ignition was switched off (in power latch* phase), this corresponds to the valve closing.
The computer detects clogging or a blockage in the valve using this data.

1. Procedure to follow after replacing the EGR valve:

– switch on the ignition,
– select the "**CLEAR**" menu,
– run the clear command **RZ002** "**EGR adaptives**",
– display the parameters in the "**Emission control/OBD**" sub-function:
PR128 = PR129 = 0 %,
– switch off the ignition and wait **40 seconds**,
– as soon as the ignition is switched on again the EGR valve offset is automatically reinitialised,
– display the parameters for the **EGR circuit**:
10 % < PR128 < 40 %,
– start the vehicle to enable the latest EGR valve offset to be programmed,
– switch off the ignition and wait **40 seconds**,
– display the parameters for the **EGR circuit**:
10 % < PR128 = PR129 = PR051 < 40 %

Clear any faults.

2. Static test:

Exit fault finding mode and switch off the ignition:

– wait **40 seconds**, and switch on the ignition again,
– clear any faults,
– start the engine,
– let the engine idle for **1 min**,
– accelerate very slowly up to **1,500 rpm for 2 mins** until the exhaust gas recirculation function becomes active,
– repeat this procedure 5 times.

Check for faults.
If the fault does not recur, end the fault finding procedure.
If the fault reappears, restart the procedure after disconnecting and reconnecting the EGR valve.
If the fault is still present, replace the EGR valve.

Carry out a vehicle test at low-speed, without accelerating heavily, then normally.
Check for faults using the CLIP diagnostic tool.
If the fault does not recur, end the fault finding procedure.
If the fault reappears, restart the procedure after disconnecting and reconnecting the EGR valve.
If the fault is still present, replace the EGR valve.

*Computer on standby after switching the ignition off: approximately **40 seconds**.

REPLACING THE PARTICLE FILTER:

After replacing the particle filter, reconfigure the computer.
The system must be configured via the diagnostic socket using the RENAULT CLIP tool.

Carry out the following steps:

- switch on the ignition,
- select the "**PARAMETERS**" menu,
- use command **SC030** "**Particle filter adaptive**",
- select "**Particle filter replacement**" as the procedure type and follow the instructions,
- **switch off the ignition and wait 40 seconds**,
- **then switch on the ignition again**,
- deal with any faults detected by the diagnostic tool,
- clear the faults from the computer memory,

Carry out a road test followed by a complete check with the diagnostic tool.

REPLACING THE DAMPER VALVE:

After replacing the damper valve, reconfigure the computer.
The system must be configured via the diagnostic socket using the RENAULT CLIP tool.

Carry out the following steps:

- switch on the ignition,
- select the "**CLEAR**" menu,
- use command **RZ014** "**Damper valve fault adaptives**",
- **switch off the ignition and wait 40 seconds**,
- **then switch on the ignition again**,
- check that **PR420** "**Damper valve error counter**" **= 0**,
- deal with any faults detected by the diagnostic tool,
- clear the faults from the computer memory.

Carry out a road test followed by a full check with the diagnostic tool.

WARNING LIGHT MANAGEMENT:
Management of instrument panel warning lights according to faults displayed.

Tool fault	Description	Asso-ciated DTC	LEVEL 1 FAULT WARNING LIGHT (Orange preheating indicator light)	LEVEL 2 FAULT WARNING LIGHT (Red overheating warning light)	NO FAULT WARNING LIGHT LIT	OBD WARNING LIGHT LIT
DF001	Coolant temperature sensor circuit	115	CO.1/CC.0	...	...	...
DF003	Atmospheric pressure sensor circuit	105	1.DEF/2.DEF/ 3.DEF	...	...	...
DF004	Turbocharging pressure sensor circuit	235	CO.0/CC.1/1.DEF	...	...	....
DF005	Engine speed sensor circuit	335	...	1.DEF/2.DEF	...	...
DF007	Rail pressure sensor circuit	190	...	CO.1/CC.0/1.DEF	...	...
DF008	Pedal potentiometer circuit gang 1	225	CO.0/CC.1 1.DEF	...	2.DEF	...
DF009	Pedal potentiometer circuit gang 2	2120	CO.0/CC.1 1.DEF	...	...	...
DF011	Sensor supply voltage no. 1	641	1.DEF/2.DEF	...	...	...
DF012	Sensor supply voltage no. 2	651	1.DEF/2.DEF	...	...	1.DEF/ 2.DEF
DF013	Sensor supply voltage no. 3	697	...	1.DEF/2.DEF	...	...
DF015	Main relay control circuit	685	1.DEF/2.DEF	...	...	...
DF017	Preheating unit control circuit	380	CC.0/CC.1/CO/ 1.DEF	...	...	...
DF025	Preheating unit fault finding connection	670	X	...	...	...
DF037	Engine immobiliser	C167	...	X	...	...
DF038	Computer	606	6.DEF/8.DEF/ 12.DEF	1.DEF/2.DEF/3.DEF/ 4.DEF/5.DEF/7.DEF/ 10.DEF/11.DEF/ 13.DEF/14.DEF	...	6.DEF

FAULT WARNING LIGHT MANAGEMENT (CONTINUED 1)

Tool fault	Description	Asso-ciated DTC	LEVEL 1 FAULT WARNING LIGHT (Orange preheating indicator light)	LEVEL 2 FAULT WARNING LIGHT (Red overheating warning light)	NO FAULT WARNING LIGHT LIT	OBD WARNING LIGHT LIT
DF039	Inlet air temperature sensor circuit	110	...	CC.0/CO.1	...	...
DF040	Cylinder 1 injector circuit	201	CO	CC.1/CC/1.DEF	...	CO
DF041	Cylinder 2 injector circuit	202	CO	CC.1/CC/1.DEF	...	CO
DF042	Cylinder 3 injector circuit	203	CO	CC.1/CC/1.DEF	...	CO
DF043	Cylinder 4 injector circuit	204	CO	CC.1/CC/1.DEF	...	CO
DF046	Battery voltage	560	...	...	1.DEF/2.DEF	...
DF047	Computer supply voltage	615	...	...	1.DEF	...
DF049	Refrigerant sensor circuit	530	...	...	CC.1/CO.0	...
DF050	Brake switch circuit	571	...	...	1.DEF/2.DEF	...
DF051	Cruise control/speed limiter function	575	...	...	1.DEF/2.DEF/ 3.DEF	...
DF053	Rail pressure regulation function	89	3.DEF	CC.0/CC.1/CO/ 1.DEF/ 2.DEF/ 4.DEF/5.DEF/ 6.DEF/7.DEF	...	...
DF054	Turbocharging solenoid valve control circuit	33	CO/CC.0/CC.1/ 1.DEF	...	...	CC.0
DF055	Turbocharging pressure regulation circuit	243	1.DEF/2.DEF	...	...	...
DF056	Air flow sensor circuit	100	CO.0/CC.1/1.DEF/ 2.DEF	...	...	

FAULT WARNING LIGHT MANAGEMENT (CONTINUED 2)

Tool fault	Description	Asso-ciated DTC	LEVEL 1 FAULT WARNING LIGHT (Orange preheating indicator light)	LEVEL 2 FAULT WARNING LIGHT (Red overheating warning light)	NO FAULT WARNING LIGHT LIT	OBD WARNING LIGHT LIT
DF057	Water in diesel detector circuit	2264	...	...	X	...
DF059	Misfiring on cylinder 1	301	...	...	X	...
DF060	Misfiring on cylinder 2	302	...	...	X	...
DF061	Misfiring on cylinder 3	303	...	...	X	...
DF062	Misfiring on cylinder 4	304	...	...	X	...
DF069	Impact detected signal	1620	...	1.DEF	...	...
DF070	Clutch switch circuit	830	...	...	1.DEF/2.DEF	...
DF086	Coolant pump relay control circuit	2600	CO.0/CC.1	...	...	...
DF091	Vehicle speed signal	500	...	...	1.DEF/2.DEF 3.DEF/4.DEF	...
DF097	Camshaft sensor circuit	340	1.DEF/2.DEF	...	...	...
DF118	EGR solenoid valve servo-control	409	2.DEF	...	1.DEF	...
DF195	Camshaft sensor/ Engine speed consistency	16	1.DEF	...	...	...
DF209	EGR valve position sensor circuit	486	...	...	CO.0/CC.1/ 1.DEF	CO.0/CC.1/ 1.DEF
DF226	Damper valve circuit	638	CO/CC/CC.0/CC.1/ 1.DEF/2.DEF/3.DEF	...	...	...
DF250	ESP function	C122	...	...	1.DEF/2.DEF	...

FAULT WARNING LIGHT MANAGEMENT (CONTINUED 3)

Tool fault	Description	Asso-ciated DTC	LEVEL 1 FAULT WARNING LIGHT (Orange preheating warning light)	LEVEL 2 FAULT WARNING LIGHT (Red overheating warning light)	NO FAULT WARNING LIGHT LIT	OBD WARNING LIGHT LIT
DF272	EGR valve control circuit	403	1.DEF	...	2.DEF	...
DF276	Injector code programming	611	1.DEF/2.DEF	...	...	...
DF297	Particle filter	2002	...	...	1.DEF	...
DF308	Clogged particle filter	1431	X	...	...	...
DF309	Particle filter downstream temperature sensor circuit	544	...	...	CO.1/CC.0	...
DF310	Particle filter upstream temperature sensor circuit	2031	CC.0/CO.1	...	...	...
DF312	Particle filter regeneration not possible	1436	...	...	X	...
DF315	Particle filter pressure differential sensor circuit	470	C0/CO.0/CC.1/1.DEF 2.DEF	...	...	...
DF619	EGR valve jammed open	2142	X	...	...	...
DF620	EGR valve fouled	2141	X	...	...	...
DF621	EGR valve is jammed open (OBD fault)	2413	...	...	X	X
DF652	Turbine upstream temperature sensor circuit	242A	CO/CC.0/CO.1 CC.1/1.DEF	...	...	...
DF717	Particle filter upstream pressure valve	1480	1.DEF	...	...	...
DF778	Turbine upstream temperature regulation	242B	1.DEF/2.DEF	...	...	...
DF890	Speed threshold exceeded during particle filter regeneration	0297	...	...	X	...
DF899	Speed threshold exceeded during particle filer regeneration	3031	...	...	X	...

DF001 PRESENT OR STORED	COOLANT TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to + 12 V

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present: – when an attempt is made to start the engine – with the engine running **Special notes:** If the fault is present: – the coolant temperature: **PR064 "Coolant temperature"** is fixed at **119 °C**, – the preheating phase is lasts longer than **10 seconds**, – the low speed fan unit (**engine fan unit 1**) is continuously supplied, – if **engine fan unit 1** is faulty, then **engine fan unit 2** is activated on vehicles fitted with climate control, – the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the computer connectors.

Check the connections of the **coolant temperature sensor 4-track connector**.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the **coolant temperature sensor** between **tracks 2 and 3** of its black connector.

Replace the sensor if its resistance is not approximately:

75,780 ± 7,000 Ω at - 40 °C
12,460 ± 122 Ω at - 10 °C
2,252 ± 112 Ω at 25°C
811 ± 39 Ω at 50 °C
283 ± 8 Ω at 80 °C
115 ± 3 Ω at 110 °C
87 ± 2 Ω at 120 °C

Check **the insulation, continuity and the absence of interference resistance on the connections**:

Injection computer brown 48-track connector B, **track F2** → **Track 3** coolant temperature sensor

Injection computer brown 48-track connector B, **track H1** → **Track 2** coolant temperature sensor

Repair if necessary.

If the fault is still present, replace the coolant temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF003 PRESENT OR STORED	ATMOSPHERIC PRESSURE SENSOR CIRCUIT 1.DEF: Signal outside upper limit 2.DEF: Signal outside lower limit 3.DEF: Inconsistent signal

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present: – when an attempt is made to start the engine – with the engine running **Special notes:** The atmospheric pressure sensor is built into the injection computer, and cannot be separated. If the fault is present: – there is light smoke at the exhaust, – the atmospheric pressure value changes to safe mode **PR035** "**Atmospheric pressure**" **= 750 mbar**, – the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the computer connectors.

Disconnect the injection computer and check the condition of its contacts and connector.
Repair if necessary.
Display the value of parameter **PR041** "**Turbocharger pressure**".
If this value is stuck at **750 mbar**, refer to interpretation of fault **DF004** "**Turbocharger pressure sensor circuit**".
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF004 PRESENT OR STORED	TURBOCHARGING PRESSURE SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V 1.DEF: Signal inconsistency

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present: – when an attempt is made to start the engine – with the engine running
	Special notes: Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors. If the fault is present: – the EGR function is inhibited, – the turbocharging pressure is in defect mode, i.e.: **PR041** = **750 mbar**, – the **level 1** warning light comes on.
	Order of priority in the event of more than one fault: Deal with fault **DF011 "Sensor supply voltage no. 1"** first if it is present or stored.
	IMPORTANT: This fault can result in a rapid and significant fouling of the particle filter.

CO.0	***NOTES***	None

Check the turbocharging pressure sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation from earth** of the following connections:

Injection computer brown 48-track connector B, **track G4**	→	**Track 3** turbocharging pressure sensor connector
Injection computer brown 48-track connector B, **track K2**	→	**Track 4** turbocharger pressure sensor connector

Repair if necessary.

If the fault is still present, replace the turbocharger pressure sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF004 **CONTINUED 1**	

CC.1	***NOTES***	None

Check the turbocharger pressure sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and insulation to + 12 volts** of the following connections:

Injection computer brown 48-track connector B, **track G4**	→	**Track 3** turbocharger pressure sensor connector
Injection computer brown 48-track connector B, **track D4**	→	**Track 1** turbocharger pressure sensor connector
Injection computer brown 48-track connector B, **track K2**	→	**Track 4** turbocharging pressure sensor connector

Repair if necessary.

If the fault is still present, replace the turbocharger pressure sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF004 CONTINUED 2	

1.DEF	***NOTES***	None

In the event of a number of faults with DF003 "Atmospheric pressure sensor circuit", display parameter **PR041 "Turbocharging pressure"**.
If this value is locked at **750 mbar and PR035 "Atmospheric pressure" is displaying a different value**, replace the turbocharging pressure sensor.

Check the turbocharging pressure sensor connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity and absence of interference resistance** on the following connections:

Injection computer brown 48-track connector B, **track G4**	→	**Track 3** turbocharger pressure sensor connector
Injection computer brown 48-track connector B, **track D4**	→	**Track 1** turbocharger pressure sensor connector
Injection computer brown 48-track connector B, **track K2**	→	**Track 4** turbocharger pressure sensor connector

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF005 PRESENT OR STORED	ENGINE SPEED SENSOR CIRCUIT 1.DEF: Signal absent 2.DEF: Signal inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present: – when an attempt is made to start the engine, – the engine is running.
	Special notes: Use bornier **Elé. 1681 or Elé. 1590** for all operations on the computer connectors. The engine speed sensor is consistent with the camshaft sensor. If the fault is present: – it is impossible to start the engine or the engine stops, – the **level 2** warning light is lit.

Check the engine speed sensor connections.
Repair if necessary.
Check that the sensor is correctly mounted and that the flywheel target is not damaged.
Check that the gap between the "engine speed sensor and the engine flywheel" is **0.5 to 1.8 mm**.
Measure the **resistance** of the engine speed sensor across **terminals A and B** of its black connector.
If the **coil resistance** is not **800 ± 80 Ω** at an engine temperature of **20 °C**, replace the engine speed sensor.

Check the injection computer connections.
Repair if necessary.

Check the **continuity and the absence of interference resistance** for the following connections:

Injection computer brown 48-track connector B, **track B1** → **Track A** engine speed sensor

Injection computer brown 48-track connector B, **track C1** → **Track B** engine speed sensor

Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF007 PRESENT OR STORED	RAIL PRESSURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to + 12 V 1.DEF: Offset at minimum threshold

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after repeated engine starts or with the engine running.
	Special notes: Use bornier **Elé. 1681 or Elé. 1590** for all operations on the computer connectors. If the fault is present: – the engine will stop immediately, – it is impossible to restart, – the **level 2** warning light is lit.
	Priorities when dealing with a number of faults: Deal with fault **DF013** "**Sensor supply voltage no. 3"** first if it is present or stored.

CC.0	***NOTES***	None

Check the rail pressure sensor connectors.
Check the injection computer connections.
Repair if necessary.

Check the **continuity** and **insulation to earth** of the following connections:

Injection computer brown 48-track connector B, **track G3**	→	**Track 2** rail pressure sensor
Injection computer brown 48-track connector B, **track A4**	→	**Track 3** rail pressure sensor

Repair if necessary.

if the fault is still present, replace the rail pressure sensor and tighten to **35 ± 5 Nm**.
Observe the safety advice given in the "Introduction" section.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF007 **CONTINUED 1**	

CO.1	***NOTES***	None

Check the rail pressure sensor connectors. Check the injection computer connections. Repair if necessary.
Check the **continuity** and **insulation to + 12 V** of the following connections: Injection computer brown 48-track connector B, **track G3** → **Track 2** rail pressure sensor Injection computer brown 48-track connector B, **track C4** → **Track 1** rail pressure sensor Injection computer brown 48-track connector B, **track A4** → **Track 3** rail pressure sensor Repair if necessary.
if the fault is still present, replace the rail pressure sensor and tighten to **35 ± 5 Nm**. **Observe the safety advice given in the "Introduction" section.**

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF007 **CONTINUED 2**	

1.DEF	***NOTES***	None

Check the rail pressure sensor connectors.
Check the injection computer connections.
Repair if necessary.

Check the **continuity** and absence of **interference resistance** of the following connections:

Injection computer brown 48-track connector B, **track G3**	→	**Track 2** rail pressure sensor
Injection computer brown 48-track connector B, **track A4**	→	**Track 3** rail pressure sensor
Injection computer brown 48-track connector B, **track C4**	→	**Track 1** rail pressure sensor

Repair if necessary.

With the ignition on and the engine stopped for more than one minute:
Display the parameter **PR038** "**Rail pressure**" in the "**Fuel circuit, Engine control function**" tab,
– If the value is below **50 bar**, the sensor is in order.
In this case, contact Techline.
– If the pressure is above **50 bar**, replace the rail pressure sensor and tighten to **35 ± 5 Nm**.
Observe the safety advice given in the "Introduction" section.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF008 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 1 CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V 1.DEF: Signal inconsistency 2.DEF: Accelerator pedal sensor locked

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after a series of full load/no load actions on the accelerator pedal.
	Special notes: Turbocharging, Passenger Compartment Heating Resistor activation and cruise control/speed limiter are not authorised. If CO.0, CC.1, 1.DEF is present the **level 1** warning light is lit. The engine speed is set at **1,400 rpm** if there is a fault on gang 1 and 2 of the pedal potentiometer and the engine torque is limited. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the computer connectors.
	Priorities when dealing with a number of faults: Deal with fault **DF011** "**Sensor supply voltage no. 1**" first if it is present or stored.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF008 **CONTINUED 1**	

CO.0	***NOTES***	**Priorities when dealing with a number of faults:** If fault **DF009** "**Pedal potentiometer circuit gang 2**" is present at the same time, check that the pedal sensor connector is connected correctly.

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity** and **insulation to earth** of the following connections:

Injection computer 32-track black connector A, **track H2** → **Track 4** pedal potentiometer connector

Injection computer 32-track black connector A, **track G2** → **Track 3** pedal potentiometer connector

Repair if necessary.

Measure the **resistance** on the pedal potentiometer on **gang 1** between **tracks 5** and **3**.
Replace the pedal potentiometer if the resistance is not approximately **1.7 ± 0.9 kΩ**.

CC.1	***NOTES***	None

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity** and **insulation to + 12 V** of the following connections:

Injection computer 32-track black connector A, **track H2** → **Track 4** pedal potentiometer connector

Injection computer 32-track black connector A, **track G2** → **Track 3** pedal potentiometer connector

Injection computer 32-track black connector A, **track H3** → **Track 5** pedal potentiometer connector

Repair if necessary.

Measure the **resistance** on the pedal potentiometer on **gang 1** between **tracks 5** and **3**.
Replace the pedal potentiometer if the resistance is not approximately **1.7 ± 0.9 kΩ**.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF008 CONTINUED 2	

1.DEF	***NOTES***	None

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity** and absence of **interference resistance** of the following connections:

Injection computer black 32-track connector A, **track H2**	→	**Track 4** pedal potentiometer sensor
Injection computer black 32-track connector A, **track G2**	→	**Track 3** pedal potentiometer sensor
Injection computer black 32-track connector A, **track H3**	→	**Track 5** pedal potentiometer sensor
Injection computer black 32-track connector A, **track F3**	→	**Track 1** pedal potentiometer sensor
Injection computer black 32-track connector A, **track F2**	→	**Track 2** pedal potentiometer sensor
Injection computer black 32-track connector A, **track F4**	→	**Track 6** pedal potentiometer sensor

If the fault is still present, replace the pedal potentiometer.

2.DEF	***NOTES***	None

Check the mechanical condition of the accelerator pedal:
– locked in full load position,
– pedal blocked by an external component.
Repair if necessary.
Vary the position of the pedal and refer to the conformity check in order to check the operating values of the accelerator pedal potentiometer.
If the values displayed are inconsistent, replace the accelerator pedal potentiometer.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF009 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 2 CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V 1.DEF: Signal inconsistency

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after a series of full load/no load actions on the accelerator pedal.
	Special notes: Turbocharging, Passenger Compartment Heating Resistor activation and cruise control/speed limiter are not authorised. If the fault is present, the **level 1** warning light comes on. The engine speed is set at **1,400 rpm** if there is a fault on gang 1 and 2 of the pedal potentiometer and the engine torque is limited. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the computer connectors.
	Priorities when dealing with a number of faults: Deal with fault **DF012** "**Sensor supply voltage no. 2**" first, if it is present or stored.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF009 **CONTINUED 1**	

CO.0	***NOTES***	**Priorities when dealing with a number of faults:** If fault **DF008** "**Pedal potentiometer circuit gang 1**" is present at the same time, check that the sensor is connected correctly.

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity** and **insulation to earth** of the following connections:

Injection computer 32-track black connector A, **track F3**	→	**Track 1** pedal potentiometer connector
Injection computer 32-track black connector A, **track F2**	→	**Track 2** pedal potentiometer connector

Repair if necessary.

Measure the **resistance** on the pedal potentiometer on **gang 2** between **tracks 2** and **6**.
Replace the pedal potentiometer if the resistance is not approximately **2.85 ± 2.05 kΩ**.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF009 CONTINUED 2	

CC.1	***NOTES***	**Priorities when dealing with a number of faults:** If fault **DF008** "**Pedal potentiometer circuit gang 1**" is present at the same time, check that the sensor is connected correctly.

Check the pedal potentiometer connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity** and **insulation to + 12 V feed** of the following connections:

Injection computer 32-track black connector A, **track F3**	→	**Track 1** pedal potentiometer connector
Injection computer 32-track black connector A, **track F2**	→	**Track 2** pedal potentiometer connector
Injection computer 32-track black connector A, **track F4**	→	**Track 6** pedal potentiometer connector

Repair if necessary.

Measure the **resistance** on the pedal potentiometer on **gang 2** between **tracks 2** and **6**.
Replace the pedal potentiometer if its resistance is not approximately: **2.85 ± 2.05 kΩ**.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF009 **CONTINUED 3**	

1.DEF	***NOTES***	None

Check the rail pressure sensor connectors.
Check the injection computer connections.
Repair if necessary.

Check the **continuity** and absence of **interference resistance** of the following connections:

Injection computer black 32-track connector A, **track F3**	→	**Track 1** pedal potentiometer sensor
Injection computer black 32-track connector A, **track F2**	→	**Track 2** pedal potentiometer sensor
Injection computer black 32-track connector A, **track F4**	→	**Track 6** pedal potentiometer sensor
Injection computer black 32-track connector A, **track H2**	→	**Track 4** pedal potentiometer sensor
Injection computer black 32-track connector A, **track G2**	→	**Track 3** pedal potentiometer sensor
Injection computer black 32-track connector A, **track H3**	→	**Track 5** pedal potentiometer sensor

Repair if necessary.

If the fault is still present, replace the pedal potentiometer.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF011 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE no. 1 1.DEF: Sensor reference voltage too low 2.DEF: Sensor reference voltage too high

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present following a road test or after attempting to start the engine several times. **Special notes:** If the fault is present: – The cruise control/speed limiter function is deactivated. – Turbocharging is disabled. – Engine speed is restricted. – The **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF011 **CONTINUED 1**	

1.DEF ***2.DEF***	***NOTES***	**Priorities when dealing with a number of faults:** If fault **DF008 "Pedal potentiometer circuit gang 1"** is present at the same time, check that the sensor is connected correctly. In the event of the simultaneous presence of fault **DF004 "Turbocharging pressure sensor circuit"**, check that the turbocharger pressure sensor circuit connector is connected correctly. In the event of the simultaneous presence of fault **DF315 "Particle Filter pressure differential sensor circuit"**, check that the turbocharging pressure sensor circuit connector is correctly connected.

The sensors connected to **supply no. 1** are:
- **Turbocharger pressure sensor.**
- **Particle filter pressure differential sensor.**
- **Accelerator pedal potentiometer sensor, gang no. 1.**

To locate a faulty sensor and/or connection, disconnect one of these sensors then check whether the fault becomes stored.
If the fault is still present, start the operation again with the other sensor.
(Wait a few seconds between each disconnection to allow the computer to make the measurement).
If the fault is stored after disconnection, change the faulty sensor or repair its connection.
Clear the faults created by the multiple disconnections.

If the fault is still present when both these sensors have been disconnected:

1. Check **the insulation to earth** of the following connections:

Injection computer brown 48-track connector B, **track G4**	→	**Track 3** of the turbocharger pressure sensor
Injection computer brown 48-track connector B, **track K2**	→	**Track 4** of the turbocharger pressure sensor
Injection computer brown 48-track connector B, **track G4**	→	**Track 1** of particle filter pressure differential sensor
Injection computer brown 32-track, connector C, **track B2**	→	**Track 3** of particle filter pressure differential sensor
Injection computer black 32-track connector A, **track G2**	→	**Track 3** of the accelerator pedal potentiometer gang 1
Injection computer black 32-track connector A, **track H2**	→	**Track 4** of the accelerator pedal potentiometer gang 1

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF011 **CONTINUED 2**	

2. Check **the insulation to + 12 V** of the following connections:

Injection computer brown 48-track connector B, **track K2**	→	**Track 4** of the turbocharger pressure sensor
Injection computer brown 48-track connector B, **track D4**	→	**Track 1** of the turbocharger pressure sensor
Injection computer brown 48-track connector B, **track G4**	→	**Track 3** of the turbocharger pressure sensor
Injection computer brown 48-track connector B, **track G4**	→	**Track 1** of particle filter pressure differential sensor
Injection computer black 32-track connector C, **track B2**	→	**Track 3** of particle filter pressure differential sensor
Injection computer grey 32-track connector C, **track F3**	→	**Track 2** of particle filter pressure differential sensor
Injection computer black 32-track connector A, **track H3**	→	**Track 5** of the accelerator pedal potentiometer gang 1
Injection computer black 32-track connector B, **track H2**	→	**Track 4** of the accelerator pedal potentiometer gang 1
Injection computer black 32-track connector B, **track G2**	→	**Track 3** of the accelerator pedal potentiometer gang 1

Repair if necessary.

3. Check **the insulation** between the following connections **after disconnecting the sensors** and injection computer:

tracks **3** and **5** of the **pedal sensor gang 1** connector,
tracks **1** and **2** of the **particle filter pressure differential sensor** connector,
tracks **1** and **3** of the **turbocharger pressure sensor** connector.
If these checks do not produce the correct results, replace the faulty sensor(s).
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF012 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE no. 2 1.DEF: Sensor reference voltage too low 2.DEF: Sensor reference voltage too high

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present following a road test or after attempting to start the engine several times. **Special notes:** If the fault is present: – The EGR functions and Passenger Compartment Heating Resistor functions are inhibited. – The cruise control/speed limiter function is deactivated. – Engine speed is limited. – The **level 1** warning light comes on. – The **OBD** warning light will light up after three consecutive cycles (starting + 5 seconds + complete power latch). Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF012 **CONTINUED 1**	

The sensors connected to **supply no. 2** are:
– **EGR valve position sensor.**
– **Sensor for accelerator pedal potentiometer gang 2.**
To locate any faulty sensor and/or connection, disconnect one of the sensors then check whether the fault becomes stored.
If the fault is still present, repeat the operation with the other sensors.
(Wait a few seconds between each disconnection to allow the computer to make the measurement).
If the fault is stored after a disconnection, change the faulty sensor or repair its connection.
Clear the faults created by the multiple disconnections.

If the fault is still present when both these sensors have been disconnected:

1. Check **the insulation to earth** of the following connections:

Injection computer brown 48-track connector B, **track F4**	→	**Track 2** of the EGR valve connector
Injection computer brown 48-track connector B, **track J2**	→	**Track 6** of the EGR valve connector
Injection computer black 32-track connector A, **track F2**	→	**Track 2** of the accelerator pedal potentiometer gang 2
Injection computer black 32-track connector A, **track F3**	→	**Track 1** of the accelerator pedal potentiometer gang 2

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF012 CONTINUED 2	

2. Check **the insulation to + 12 V** of the following connections:

Injection computer brown connector B, **track F4**	→	**Track 2** of the EGR valve connector
Injection computer brown connector B, **track J2**	→	**Track 6** of the EGR valve connector
Injection computer grey connector C, **track C2**	→	**Track 4** of the EGR valve connector
Injection computer black connector A, **track F2**	→	**Track 2** of the accelerator pedal potentiometer gang 2
Injection computer black connector A, **track F3**	→	**Track 1** of the accelerator pedal potentiometer gang 2
Injection computer black connector A, **track F4**	→	**Track 6** of the accelerator pedal potentiometer gang 2

Repair if necessary.

3. Check **the insulation** between the following connections **after disconnecting the sensors and injection computer**:

– tracks **2** and **6** of **pedal sensor gang 2** connector,
– tracks **2** and **4** of the **EGR valve position sensor** connector.

If these checks do not produce the correct results, replace the faulty sensor(s).
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF013 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE no. 3 1.DEF: Sensor reference voltage too low 2.DEF: Sensor reference voltage too high

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present following a road test or after attempting to start the engine several times. **Special notes:** If the fault is present: – the EGR function is inhibited, – the engine stops, – the **level 2** warning light is lit. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF013 CONTINUED 1	

The sensors connected to **supply no. 3** are:
Rail Pressure Sensor,
Air flowmeter.
To locate any faulty sensor and/or connection, disconnect one of the sensors then check whether the fault becomes stored.
If the fault is still present, repeat the operation with the other sensors.
(Wait a few seconds between each disconnection to allow the computer to make the measurement).
If the fault is stored after a disconnection, change the faulty sensor or repair its connection.
Clear the faults created by the multiple disconnections.

If the fault is still present when both these sensors have been disconnected:

1. Check **the insulation to earth** of the following connections:

Injection computer brown 48-track connector B, **track G3**	→	**Track 2** of the rail pressure sensor
Injection computer brown 48-track connector B, **track A4**	→	**Track 3** of the rail pressure sensor
Injection computer brown 48-track connector B, **track G1**	→	**Track 5** of the air flow sensor
Injection computer brown 48-track connector B, **track B4**	→	**Track 3** of the air flow sensor
Injection computer brown 48-track connector B, **track E2**	→	**Track 2** of the air flow sensor

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF013 CONTINUED 2	

2. Check **the insulation to + 12 V** of the following connections:

Injection computer brown connector B, **track G3** → **Track 2** of the rail pressure sensor

Injection computer brown connector B, **track A4** → **Track 3** of the rail pressure sensor

Injection computer brown connector B, **track C4** → **Track 1** of the rail pressure sensor

Injection computer brown connector B, **track G1** → **Track 5** of the air flow sensor

Injection computer brown connector B, **track B4** → **Track 3** of the air flow sensor

Injection computer brown connector B, **track E2** → **Track 2** of the air flow sensor

Injection computer brown connector B, **track L4** → **Track 6** of the air flow sensor

Repair if necessary.

3. Check **the insulation** between the following connections **after disconnecting the sensors and injection computer**:

Tracks **1** and **3** of the **rail pressure sensor** and tracks **2** and **3** of the **air flow sensor** connector,
If these checks do not produce the correct results, replace the faulty sensor(s).
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF015 PRESENT OR STORED	MAIN RELAY CONTROL CIRCUIT 1.DEF: Relay cut-out too soon 2.DEF: Relay cut-out too late

NOTES	**Conditions for applying the fault finding procedure to stored faults:** Only deal with this fault if it is stored.
	Special notes: The "**supply relay for the injection control unit" (50A)** located on a relay plate in the engine connection unit under the Protection and Switching Unit. If the fault is present, the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

Check the UPC connections.
Check the injection computer connections.
Repair if necessary.

Check the condition of the battery terminals making sure they are correctly tightened.
Check the condition of the injection supply relay and its mounting.
Check the **5D (5A) + after ignition feed** injection fuse located on the UPC.
Repair if necessary.

Check the **continuity**, and absence of **interference resistance** of the following connection:

Injection computer brown 48-track connector B, **track E1** → **Track 2 injection supply relay mounting**

Repair if necessary.
If the fault is still present, contact Techline.

IMPORTANT!	**IMPORTANT** **If the UPC no longer detects the injection computer frames then fan unit 1 will be started until the battery has been completely discharged.** **In the event that the engine fan unit 1 is not working engine fan unit 2 will be supplied.**

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF017 PRESENT OR STORED	PREHEATING UNIT CONTROL CIRCUIT CC.1 : Short circuit to + 12 V CC.0 : Open circuit or short circuit to earth CO : Open circuit 1.DEF: Internal electronic fault

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after attempting to start the engine several times or after an actuator command **AC001** "**Preheating unit**".
	Special notes: If the fault is present, it is difficult or even impossible to start the vehicle when cold. If the fault is present, the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

CC.1	***NOTES***	None

Check the preheating unit connections and the heating plug supply cables.
Check the injection computer connections.
Repair if necessary.

Check the condition of the **F2 (70A)** supply fuse on the power supply fuse board.
Check **for continuity and insulation to + 12 V feed** on the following connections:

Injection computer grey 32-track connector C, **track E2**	→	**Track 8** preheating unit
Injection computer grey 32-track connector C, **track A4**	→	**Track 3** preheating unit

Repair if necessary.

If the fault is still present, replace the preheating unit.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF017 CONTINUED	

CC.0 CO	***NOTES***	**Special notes:** If the preheating unit has a short circuit to earth there is a risk that the heater plugs will be operated continuously. The heater plugs and the engine may be damaged.

Check the preheating unit connections and the heater plug supply cables.
Check the injection computer connections.
Repair if necessary.

Check the condition of the **F2 (70A)** supply fuse on the power supply fuse board.
Check the **continuity and insulation to earth** of the following connections:

Injection computer grey 32-track connector C, **track A4** → **Track 3** preheating unit

Injection computer grey 32-track connector C, **track E2** → **Track 8** preheating unit

Repair if necessary.

If the fault is still present, replace the preheating unit.

1.DEF	***NOTES***	None

Check the preheating unit connections and the heater plug supply cables.
Check the injection computer connections.
Repair if necessary.

Check the condition of the **F2 (70A)** supply fuse on the power supply fuse board.
Check the **continuity and insulation to earth** of the following connections:

Injection computer grey 32-track connector C, **track A4** → **Track 3** preheating unit

Injection computer grey 32-track connector C, **track E2** → **Track 8** preheating unit

Repair if necessary.

If the fault is still present, replace the preheating unit.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF025 PRESENT OR STORED	PREHEATING UNIT FAULT FINDING CONNECTION

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after several attempts to start the engine, or following actuator command **AC001** "**Preheating unit**".
	Special notes: It is difficult or even impossible to start the engine when cold. If the fault is present, the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

Check the preheating unit connections.
Check the connections on **all the heater plugs**.
Repair if necessary.

Check fuse **F2 (70A)** located in the power supply fuse board.
Check **the resistance** of the heater plugs:
Replace any plug whose resistance is not below **2 Ω at + 20 °C**.

Check **the continuity and for the absence of interference resistance** on the following connections:

preheating unit **track 1**	→	**cylinder 3** heater plug
preheating unit **track 2**	→	**cylinder 1** heater plug,
preheating unit **track 6**	→	**cylinder 4** heater plug,
preheating unit **track 7**	→	**cylinder 2** heater plug

Check for **presence** of **+ 12 V** on **track 4** of the preheating unit (via fuse **F2, 70A**).

If the fault is still present,
Check the injection computer connections.

Check the **continuity and make sure there is no interference resistance** on the following connections:

Injection computer grey 32-track connector C, **track A4**	→	**track 3** of the preheating unit connector
Injection computer grey 32-track connector C, **track E2**	→	**track 8** of the preheating unit connector

If the fault is still present, replace the preheating unit.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF037 PRESENT OR STORED	ENGINE IMMOBILISER

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after an attempt to start engine.
	Special notes: It is impossible to start the vehicle. If the fault is present, the **level 2** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

Check the UCH connections. Check the injection computer connections. Repair if necessary.
Carry out a multiplex network test and a complete fault finding procedure on the UCH. Refer to the UCH technical note (see **MR 366, 87B**) if the fault is declared present. If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF038 PRESENT OR STORED	COMPUTER 1.DEF : Permanent high signal 2.DEF : Permanent low signal 3.DEF : Configuration absent or incorrect 4.DEF : Analogue/digital converter fault 5.DEF : Dialogue disrupted 6.DEF : EEPROM fault 7.DEF : Watchdog Activation 8.DEF : Signal outside upper limit 10.DEF : Injector control 11.DEF : Injector control condenser fault 12.DEF : Injection fault under deceleration 13.DEF : Initialisation error 14.DEF : Open circuit or internal electronic fault

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after an attempted start, or with the engine running.
	Special notes: If 6.DEF, 8.DEF, 12.DEF is present, the **level 1** warning light is on. If one of the other faults is present, the **level 2** warning light comes on. If 6.DEF is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	Priority when dealing with a number of faults: Deal with fault **DF046 "Battery voltage"** first if it is present or stored.

CO ***1.DEF to*** ***8.DEF*** ***10.DEF*** ***12.DEF*** ***13.DEF***	***NOTES***	Check the injection computer connections and the **continuity** of all its supplies. Repair if necessary. Clear the faults. Switch off the ignition, **wait 10 s** and switch it on again. If the fault is still present, contact Techline and fill out the **fault finding log** included in this Technical Note.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF038 CONTINUED	

11.DEF	***NOTES***	If there are a number of faults, deal with the other system faults first.

Display the stored contexts of fault **DF038**.
PR142 "Computer fault" = 10

NO

Contact Techline.

YES

Parameters of main screen
PR071 "Computer supply voltage" > 10 V

YES

Stored contexts of **DF038**
PR071 "Computer supply voltage" > 10 V

NO

Check the charge circuit and carry out the necessary repairs:
– Check the condition of the battery terminals,
– Carry out fault finding on the alternator.
Recharge or replace the battery.

YES

Check the condition of the wiring harness between the computer and the battery, carry out the necessary repairs.
– Start the vehicle
– Clear the stored faults
– Check the faults
– If **DF038** is stored, end of fault finding
– If **DF038** is present, contact Techline

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF039 PRESENT OR STORED	INLET AIR TEMPERATURE SENSOR CIRCUIT CO.1 : Open circuit or short circuit to + 12 V CC.0 : Short circuit to earth

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after an attempted start, or with the engine running.
	Special notes: If the fault is present: – the air temperature value enters defect mode, i.e. **PR059 "Inlet air temperature" = 20 °C**. – the EGR function is inhibited, – the **level 2** warning light is lit. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

CO.1	***NOTES***	None

Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity** of the following connection:

Injection supply relay mounting **Track 5** → **track 4** air flow sensor connector

Repair if necessary.

Check **the continuity and insulation to + 12 V** on the following connections:

Injection computer brown 48-track connector B, **track G2** → **Track 1** air flow sensor connector

Injection computer brown 48-track connector B, **track E2** → **Track 2** air flow sensor connector

Injection computer brown 48-track connector B, **track B4** → **Track 3** air flow sensor connector

Injection computer brown 48-track connector B, **track L4** → **Track 6** air flow sensor connector

Repair if necessary.

Measure the air temperature sensor resistance between **tracks 1** and **2** of the air flow sensor.
Replace the air flow sensor if the resistance displayed is not:

3,714 ± 161 Ω at 10 °C
2,448 ± 96 Ω at 20 °C
1,671 ± 59 Ω at 30 °C

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF039 CONTINUED	

CC.0	***NOTES***	None

Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity** and **insulation to earth** of the connection between:

Injection computer brown 48-track connector B, **track G2**	→	**Track 1** air flow sensor connector
Injection computer brown 48-track connector B, **track E2**	→	**Track 2** air flow sensor connector
Injection computer brown 48-track connector B, **track B4**	→	**Track 3** air flow sensor connector
Injection supply relay mounting **Track 5**	→	**track 4** air flow sensor connector

Repair if necessary.

Measure the air temperature sensor resistance between **tracks 1** and **2** of the air flow sensor.
Replace the air flow sensor if the resistance is not approximately:

3,714 ± 161 Ω at 10 °C
2,448 ± 96 Ω at 20 °C
1,671 ± 59 Ω at 30 °C

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF040 PRESENT OR STORED	CYLINDER 1 INJECTOR CIRCUIT CC.1 : Short circuit to + 12 V CO : Open circuit CC : Short circuit 1.DEF: Injector control

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started.
	Special notes: If CC.1, CC, or 1.DEF is present, the **level 2** warning light is lit. If CO is present the **level 1** warning light is lit. If CO is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). If the fault is present, the injection on cylinder 1 is disabled. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	NOTE This fault can result in a rapid and significant fouling of the particle filter.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This test enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF040 CONTINUED	

CC.1 CO CC 1.DEF	***NOTES***	None

Check the connections on injector no. 1.
Check the injection computer connections.
Repair if necessary.

Disconnect injector no. 1.
Measure the **resistance** of injector no. 1 between **tracks 1** and **2**.
Replace the injector if there is a **short circuit (R = 0 Ω)** or an **open circuit (resistance = infinity)**.
Otherwise **reconnect injector no. 1**.

Check **the continuity and absence of interference resistance** of the following connections:

Injection computer grey 32-track connector C, **track G3** → **Track 2** injector no. 1

Injection computer grey 32-track connector C, **track H1** → **Track 1** injector no. 1

If the fault is still present: apply **test 8** "**POOR INJECTOR OPERATION**".
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF041 PRESENT OR STORED	CYLINDER 2 INJECTOR CIRCUIT CC.1 : Short circuit to + 12 V CO : Open circuit CC : Short circuit 1.DEF: Injector control

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started.
	Special notes: If CC.1, CC, or 1.DEF is present, the **level 2** warning light is lit. If CO is present the **level 1** warning light is lit. If CO is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). If the fault is present, the injection on cylinder 2 is disabled. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	NOTE This fault can result in a rapid and significant fouling of the particle filter.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This test enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF041 **CONTINUED**	

CC.1 ***CO*** ***CC*** ***1.DEF***	***NOTES***	None

Check the connections on injector no. 2.
Check the injection computer connections.
Repair if necessary.

Disconnect injector no. 2.
Measure the **resistance** of injector no. 2 between **tracks 1** and **2**.
Replace the injector if there is a **short circuit (R = 0 Ω)** or an **open circuit (resistance = infinity)**.
Otherwise **reconnect injector no. 2**.

Check **the continuity and absence of interference resistance** of the following connections:

Injection computer grey 32-track connector C, **track G4**	→	**Track 2** injector no. 2
Injection computer grey 32-track connector C, **track G2**	→	**Track 1** injector no. 2

If the fault is still present: apply **test 8** "**POOR INJECTOR OPERATION**".
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF042 PRESENT OR STORED	CYLINDER 3 INJECTOR CIRCUIT CC.1 : Short circuit to + 12 V CO : Open circuit CC : Short circuit 1.DEF: Injector control

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started.
	Special notes: If CC.1, CC, or 1.DEF is present, the **level 2** warning light is lit. If CO is present the **level 1** warning light is lit. If CO is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). If the fault is present, the injection on cylinder 3 is disabled. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	NOTE This fault can result in a rapid and significant fouling of the particle filter.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This test enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF042 CONTINUED	

CC.1 CO CC 1.DEF	***NOTES***	None

Check the connections on injector no. 3.
Check the injection computer connections.
Repair if necessary.

Disconnect injector no. 3.
Measure the **resistance** of injector no. 3 between **tracks 1** and **2**.
Replace the injector if there is a **short circuit (R = 0 Ω)** or an **open circuit (resistance = infinity)**.
Otherwise **reconnect injector no. 3**.

Check the following connections for **continuity and make sure there is no interference resistance**:

Injection computer grey 32-track connector C, **track H4**	→	**Track 2** injector no. 3
Injection computer grey 32-track connector C, **track H2**	→	**Track 1** injector no. 3

If the fault is still present: apply **test 8** "**POOR INJECTOR OPERATION**".
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF043 PRESENT OR STORED	CYLINDER 4 INJECTOR CIRCUIT CC.1 : Short circuit to + 12 V CO : Open circuit CC : Short circuit 1.DEF: Injector control

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine has been started.
	Special notes: If CC.1, CC, or 1.DEF is present, the **level 2** warning light is lit. If CO is present the **level 1** warning light is lit. If CO is still present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds.). If the fault is present, the injection on cylinder 4 is disabled. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	NOTE This fault can result in a rapid and significant fouling of the particle filter.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This test enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF043 CONTINUED	

CC.1 CO CC 1.DEF	***NOTES***	None

Check the connections on injector no. 4.
Check the injection computer connections.
Repair if necessary.

Disconnect injector no. 4.
Measure the **resistance** of injector no. 4 across **tracks 1** and **2**.
Replace the injector if there is a **short circuit (R = 0 Ω)** or an **open circuit (resistance = infinity)**.
Otherwise **reconnect injector no. 4**.

Check **the continuity and absence of interference resistance** on the following connections:

Injection computer grey 32-track connector C, **track H3**	⟶	**Track 2** injector no. 4
Injection computer grey 32-track connector C, **track G1**	⟶	**Track 1** injector no. 4

If the fault is still present: apply **test 8** "**POOR INJECTOR OPERATION**".
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF046 PRESENT OR STORED	BATTERY VOLTAGE 1.DEF: Overvoltage 2.DEF: Undervoltage

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test or after attempting to start the engine.
	Special notes: Computer operating voltage: **9 V < operating voltage < 16 V**. Battery voltage that is too low can cause the **level 1** fault warning light to come on thereby causing other faults to appear. It is then not possible to start the engine. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

1.DEF	***NOTES***	None

Check the charge circuits:
Condition of the battery.
Condition of the alternator (full fault finding procedure).
Carry out the necessary repairs.

2.DEF	***NOTES***	None

With the ignition off, measure the voltage across the battery terminals.
If the voltage is less than **11.5 V**, test the battery.
If the battery is faulty, replace the battery then test the charge circuit.
With the ignition on and the with the starter motor turning, measure the voltage across the battery terminals
If the voltage drops below **9.6 V**, check the tightness and condition of the battery terminals.
Repair if necessary.
If the terminals are in good condition, test the battery.
If they are faulty, replace the battery.
If the starter is cranking the engine correctly, but the fault is still present,

Check **the continuity and for the absence of interference resistance** of the following connections:

+ 12 V Supply relay **track 5**	→	track **M2** connector **B** of the engine management computer
+ 12 V Supply relay **track 5**	→	track **G1** connector **A** of the engine management computer
Battery earth	→	tracks **G4, H4, H1** injection computer connector **A**

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF047 PRESENT OR STORED	COMPUTER SUPPLY VOLTAGE 1.DEF: Voltage outside permitted range of values

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after several starting attempts, or with the engine running.
	Special notes: Computer operating voltage: **9 V < operating voltage < 16 V**. Battery voltage that is too low can cause the **level 1** fault warning light to come on thereby causing other faults to appear. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

Check **continuity and make sure there is no interference resistance** on the following connection:

Injection computer black 32-track **connector A**, **track D1** → **track 5** supply relay

Repair if necessary.

Check fuse F5D (5A) located on the UPC.
Check the condition of the "**injection control unit supply relay**" (50A) located on a relay plate in the engine interconnection unit below the UPC (no false contact or oxidation on the relay mounting clips).
Repair if necessary.

If the fault does not reappear, start the engine and **wait 1 min**.
Carry out a road test and check the system faults.
If there are no faults, fault finding is complete.
If the fault is still present contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF049 PRESENT OR STORED	REFRIGERANT FLUID SENSOR CIRCUIT CC.1 : Short circuit to + 12 V CO.0 : Open circuit or short circuit to earth

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present following a road test, or if the air conditioning is switched on.
	Special notes: If the fault is present, air conditioning is not authorised. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

CC.1	***NOTES***	None

Check the refrigerant pressure sensor connectors.
Check the injection computer connections.
Repair if necessary.

Check that the configuration reading **LC009** "**Air conditioning**" is "WITH".
If **LC065** is "NONE": use command **RZ005** "**Programming**" to reinitialise the vehicle configurations.
If necessary, operate the air conditioning to reconfigure the computer to "WITH".
Connect an air conditioning filling station (equipped with a high pressure gauge) to the vehicle.
Display parameter **PR037** "**Refrigerant fluid pressure**" and compare the value displayed by the filling station.

If the values match, carry out a fault finding procedure as described in the fault finding note for that vehicle.

If the values do not match, check **the continuity and insulation to + 12 V** of the following connections:

Injection computer brown 48-track connector **B**, **track F1** → **Track C** refrigerant sensor connector

Injection computer brown 48-track connector **B**, **track F3** → **Track B** refrigerant sensor connector

Injection computer grey 32-track connector **C**, **track C3** → **Track A** refrigerant sensor connector

Repair if necessary.

If the fault is still present, replace the refrigerant pressure sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF049 CONTINUED	

CO.0	***NOTES***	None

Check the refrigerant pressure sensor connectors.
Check the injection computer connections.
Repair if necessary.

Check that the configuration reading **LC009** "**Air conditioning**" is "WITH".
If **LC065** is "NONE": use command **RZ005** "**Programming**" to reinitialise the vehicle configurations.
If necessary, operate the air conditioning to reconfigure the computer to "WITH".

Connect an air conditioning filling station (equipped with a high pressure gauge) to the vehicle.
Display parameter **PR037** "**Refrigerant fluid pressure**" and compare the value displayed by the filling station.

If the values match, carry out a fault finding procedure as described in the fault finding note for that vehicle.

If the values do not match, check **the continuity and insulation to earth** of the following connections:

Injection computer brown 48-track connector **B**, **track F1** → **Track C** refrigerant fluid sensor connector

Injection computer brown 48-track connector **B**, **track F3** → **Track B** refrigerant fluid sensor connector

Repair if necessary.

If the fault is still present, replace the refrigerant pressure sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF050 PRESENT OR STORED	BRAKE SWITCH CIRCUIT 1.DEF: Open circuit or short circuit 2.DEF: Signal inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the brake pedal is depressed, or during a road test.
	Special notes: If the fault is present, the cruise control/speed limiter is deactivated. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF050 **CONTINUED 1**	

1.DEF	***NOTES***	None

Check the brake pedal switch connections.
Check the condition and adjustment of the brake pedal switch.
Repair if necessary.

Check **the conformity of the** brake light **switch**:

Brake pedal released: continuity between **tracks 3** and **4**
infinite resistance between **tracks 1** and **2**.

Brake pedal depressed: infinite resistance across **tracks 3** and **4**
continuity between **tracks 1** and **2**.

Replace the switch if necessary.

Check the condition of fuse **H 15A** on the passenger compartment fuse and relay board.
Replace the fuse if necessary.

Check **the feeds** to the switch:

+ 12 V after ignition → **track 2** of the brake pedal switch connector

+ 12 V battery feed → **track 4** of the brake pedal switch connector (via the UCH)

Replace the switch if necessary.

Check **the continuity and insulation** of the following connections:

Injection computer black 32-track connector **A**, **track E4** → **Track 3** brake pedal switch connector

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF050 **CONTINUED 2**	

2.DEF	***NOTES***	None

Check the connections of the brake pedal switch. Check the condition and adjustment of the brake pedal switch. Repair if necessary.
Check the continuity and make sure there is no interference resistance on the following connection: Injection computer **black 32-track connector A, track E4** → **Track 3** of the brake switch Repair if necessary.
Check the conformity of the switch by consulting the interpretation of statuses **ET122** "**Brake switch no. 1 signal**" and **ET123** "**Brake switch no. 2 signal**". If the fault is still present, carry out fault finding on the ABS computer.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF051 PRESENT OR STORED	CRUISE CONTROL/SPEED LIMITER FUNCTION 1.DEF: Signal inconsistency 2.DEF: Inconsistent vehicle speed 3.DEF: Steering wheel controls

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: The cruise control/speed limiter function is inhibited. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

If the fault is declared present, refer to the "**Cruise control/speed limiter**", conformity check section and the interpretation of statuses **ET042** "**Cruise control/speed limiter**", **ET413** "**Cruise control/speed limiter function**" **and ET415** "**Deactivating cruise control**".
Check that by pressing the buttons the statuses change and that with the ignition switched on, all the values are correct.
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF053 PRESENT OR STORED	RAIL PRESSURE REGULATION FUNCTION CC.1 : Short circuit to + 12 V CC.0 : Short circuit to earth CO : Open circuit 1.DEF: Internal electronic fault 2.DEF: Measured pressure too low 3.DEF: Measured pressure too high 4.DEF: Insufficient pressure 5.DEF: Pressure < minimum 6.DEF: Pressure > maximum 7.DEF: Extensive pump command

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – starting the engine, – a road test, – an actuator command **AC011** "**Rail pressure regulator**".
	Special notes: If the fault is present: – it is not possible to start the engine, – engine stops if already started, – if 3.DEF is present, the **level 1** warning light is lit, – if one of the other faults is present, the **level 2** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

CC.1	***NOTES***	None

Check the rail pressure regulator connectors.
Check the injection computer connections.
Check the low pressure circuit and that the correct fuel is being used using **test 2**.
Repair if necessary.

Measure the **resistance** of the rail pressure regulator between **tracks 1 and 2**.
If the resistance is not **3 ± 0.1 Ω at 20 °C**, replace the rail pressure regulator.

Check the **continuity and insulation from the + 12 V feed** of the following connection:

Injection computer brown 48-track connector **B**, **track M4**	→	**Track 2** of the rail pressure regulator (fuel flow actuator)

Check the rail pressure sensor using the interpretation of **DF007** "**Rail pressure sensor circuit**".

If the fault is still present replace the rail pressure regulator.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF053 **CONTINUED 1**	

CC.0 ***CO***	***NOTES***	None

Check the rail pressure regulator connectors.
Check the injection computer connections.
Check the low pressure circuit and that the correct fuel is being used using **test 2**.
Repair if necessary.

Measure the **resistance** of the rail pressure regulator between **tracks 1 and 2**.
If the resistance is not **3 ± 0.1 Ω at 20 °C**, replace the rail pressure regulator.

Check **the continuity and insulation to earth** of the following connection:

Injection computer brown 48-track connector **B**, **track M4**	⟶	**Track 2** of the rail pressure regulator (fuel flow actuator).

With the ignition on, check for **+ 12 V** after relay on **track 1** of the rail pressure regulator.
If there is not **+ 12 V** on **track 1**, check **the continuity and absence of interference resistance** of the following connection:

Rail pressure regulator **track 1**	⟶	Injection supply relay **track 5**

Repair if necessary.

Check the rail pressure sensor using the interpretation of **DF007** "**Rail pressure sensor circuit**".
If the fault is still present replace the rail pressure regulator.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF053 CONTINUED 2	

1.DEF	***NOTES***	None

Check the rail pressure regulator connectors.
Check the injection computer connections.
Check the low pressure circuit and that the correct fuel is being used using **test 2**.
Repair if necessary.

Measure the **resistance** of the pressure regulator between its **tracks 1 and 2**.
If the resistance is not **3 ± 0.1 Ω at 20 °C**, replace the rail pressure regulator.

Check the **continuity and for the absence of interference resistance** on the following connections:

Injection computer brown 48-track connector **B**, **track M4**	→	**Track 2** of the rail pressure regulator (fuel flow actuator).
Injection supply relay **track 5**	→	**Track 1** of the rail pressure regulator (fuel flow actuator).

Repair if necessary.

Check the rail pressure sensor using the interpretation of **DF007 "Rail pressure sensor circuit"**.
Repair if necessary.

If the fault is still present, **check that the computer output stage is working correctly**.

● **Either using an ammeter:**
With the regulator connected, connect the ampermetric clamp to the connection to **track 1** connection, **observing the current direction**.
Clear any rail pressure sensor faults and use command **AC011 "Rail pressure regulator"**.
➡ The ammeter should display ten cycles of two successive strengths: **~ 0.6 A** then **~ 2 A**

● **Or using a voltmeter:**
With the regulator connected, connect the negative terminal of the voltmeter to **track 2** of the rail pressure regulator and the positive terminal to **track 1**. Clear any fuel pressure solenoid valve faults, then run command **AC011 "Rail pressure regulator"**:
➡ The voltmeter should display two successive voltage readings:
~ 3.15 volts for an OCR of 25 % then **~ 9.45 V** for an OCR of 75 % (ten cycles)

● **Or using an oscilloscope** (at 5 V range/division and 1 ms/div time base):
With the regulator connected, connect the negative terminal of the oscilloscope to the battery earth and the positive terminal to **track 2** of the fuel pressure solenoid valve, clear any rail pressure regulator faults, and run command **AC011 "Rail pressure regulator"**:
➡ The oscilloscope should display a square-wave signal of an amplitude of 12.5 V at a frequency of 185 Hz (with an OCR alternating from 25 to 75 %).
➡ If the measurement does not show any control or continuous voltage, contact Techline.

***Opening Cyclic Ratio**

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF053 CONTINUED 3	

2.DEF to 7.DEF	***NOTES***	None

Check the rail pressure regulator connectors.
Check the injection computer connections.
Check the low pressure circuit and that the correct fuel is being used using **test 2**.
Repair if necessary.

Measure the **resistance** of the pressure regulator between its **tracks 1 and 2**.
If the resistance is not **3 ± 0.1 Ω at 20 °C**, replace the rail pressure regulator.

Check the **continuity and absence of interference resistance** on the following connections:

Injection computer brown 48-track connector **B**, **track M4**	→	**Track 2** of the rail pressure regulator
Injection supply relay **track 5**	→	**track 1** of the rail pressure regulator

Repair if necessary.

In the event of rail overpressure:
Check the operation of the injectors: see **13B, "Component testing", test 8 "POOR INJECTOR OPERATION"**.
Check that the rail pressure sensor is operating correctly using command **AC011 "Rail pressure regulator"**.
Display the parameter **PR038 "Rail pressure"**, and refer to the conformity check to check the operating values.
If these checks do not reveal any faults, and if the fault is still present, replace the rail pressure sensor.

In the event of rail underpressure:
Check that the rail pressure sensor is operating correctly using command **AC011 "Rail pressure regulator"**.
Display the parameter **PR038 "Rail pressure"**, and refer to the conformity check to check the operating values.
Check the low pressure diesel circuit priming.
Check the conformity of the diesel filter connections.
Check the condition of the filter (clogging and water saturation).
Check that there are no air bubbles between the filter and the high pressure pump.
Check the low and high pressure diesel fuel circuit sealing (visual checks, odour, etc.): pump housing, pressure relief valve, pipes, rail and injector unions, injector wells, etc.
Check the conformity of the seal fitting on the pressure regulator.
Check the operation of the injectors: see **13B, "Component testing", test 8 "POOR INJECTOR OPERATION"**.
Carry out the necessary operations.

If the fault is still present replace the rail pressure regulator.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF054 PRESENT OR STORED	TURBOCHARGER SOLENOID VALVE CONTROL CIRCUIT CC.1 : Short circuit to + 12 V CC.0 : Short circuit to earth CO : Open circuit 1.DEF: Internal electronic fault

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after: – starting the engine, – a road test, – actuator command **AC004 "Turbocharging solenoid valve"**.
	Special notes: If the fault is present: – turbocharging is no longer authorised, – the EGR function is inhibited, – the vehicle performance is reduced, – the **level 1** warning light is lit, – If CC.0 is present, the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 s.). Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors
	NOTE This fault can result in a rapid and significant fouling of the particle filter.

CC.1	***NOTES***	None

Check the turbocharger solenoid valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the resistance of the turbocharging solenoid valve between its **tracks 1** and **2**:
If the resistance displayed is not **15.4 ± 0.7 Ω at 20 °C**, replace the turbocharger solenoid valve.

Check the **continuity and insulation from the + 12 V feed** of the following connection:

Injection computer grey 32-track connector **C**, **track E1** ⟶ **Track 1** turbocharger solenoid valve

Repair if necessary.

If the fault is still present, replace the turbocharger solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF054 **CONTINUED 1**	

CC.0 ***CO***	***NOTES***	None

Check the turbocharger solenoid valve connections. Check the injection computer connections. Repair if necessary.
Measure the resistance of the turbocharging solenoid valve between its **tracks 1** and **2**: If the resistance displayed is not **15.4 ± 0.7 Ω at 20 °C**, replace the turbocharger solenoid valve.
Check the **continuity and insulation to earth** of the following connections: Injection computer grey 32-track connector **C**, **track E1** → **Track 1** turbocharger solenoid valve UPC PPM1 connector **Track 1** → **Track 2** turbocharger solenoid valve Repair if necessary.
If the fault is still present, replace the turbocharger solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF054 **CONTINUED 2**	

1.DEF	***NOTES***	None

Check the turbocharger solenoid valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the resistance of the turbocharger solenoid valve between its **tracks 1** and **2**:
If the resistance displayed is not **15.4 ± 0.7 Ω at 20 °C**, replace the turbocharging solenoid valve.

Check the **continuity and insulation to earth** of the following connections:

Injection computer grey 32-track connector **C**, **track E1**	⟶	**Track 1** turbocharging solenoid valve
UPC PPM1 connector **Track 1**	⟶	**Track 2** Turbocharger solenoid valve

If the fault is still present, **check that the computer output stage is working correctly**.
With the turbocharger solenoid valve connected:

Or using a voltmeter:
– Connect the negative terminal of the voltmeter to **track 1** of the solenoid valve and the negative terminal to **track 2**,
– Clear any solenoid valve faults and run command **AC004** "**Turbocharger solenoid valve**".

➡ The voltmeter should display **ten cycles** of two successive voltages: **~ 2.5 V** (OCR of **20 %**) then **~ 8.75 V** (OCR* of **70 %**).

Or using an oscilloscope (at 5 V range/division and 1 ms/div time base):
– Connect the negative terminal of the oscilloscope to the battery earth and the positive **track 2** of the solenoid valve.
– Clear any solenoid valve faults and run command **AC004** "**Turbocharger solenoid valve**".

➡ The oscilloscope should display a square wave signal with an amplitude of **12.5 V** (equal to the battery voltage) at a frequency of **140 Hz** (with an OCR increasing successively from **~ 20 to ~ 70 %**).
– If the measurement is correct, replace the solenoid valve.
– If the measurement does not show any control or continuous voltage, contact Techline.

***Opening Cyclic Ratio**

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF055 PRESENT OR STORED	TURBOCHARGER PRESSURE REGULATION CIRCUIT 1.DEF: Pressure too low 2.DEF: Pressure too high

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present: – turbocharging is no longer authorised, – the EGR function is inhibited, – the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors
	NOTE This fault can result in a rapid and significant fouling of the particle filter.

1.DEF	***NOTES***	None

Check the turbocharger pressure sensor connections.
Check the turbocharger pressure relief solenoid valve connections.
Check the injection computer connections.
Repair if necessary.

Check the high pressure air circuit sealing:
– disconnected or pierced pipes,
– pressure sensor disconnected or poorly fitted (seal present),
– intercooler pierced (to check the intercooler: with the vehicle stationary, stabilise the engine speed between **3,500 and 4,000 rpm** and check there are no leaks).

Check the conformity of the turbocharger pressure signal and apply **test 5 and test 6**.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF055 CONTINUED 1	

Check that the turbocharger and its control circuit are working:
– With the engine switched off, make sure the control rod is in the rest position,
– Start the engine and make sure that the control rod operates to the upper stop.
(when the engine stops, the control rod should return to the rest position).
If the control rod does not move correctly, carry out the following checks:
1) Underpressure command check:
– disconnect the solenoid valve inlet **hose** and connect it to a pressure gauge,
– start the engine and stabilise it at idle speed,
– if the underpressure does not reach **800 mbar ± 100**: check the vacuum pressure circuit from the vacuum pump,
– stop the engine, reconnect the inlet hoses and go to step no. 2
2) Solenoid valve control check:
– disconnect the solenoid valve outlet **hose**,
– start the engine and stabilise it at idle speed,
– place your hand on the solenoid valve and block the outlet **connection** with your thumb,
– if there is no detectable vibration of the solenoid valve, check that the computer output is working correctly (see **DF054 "Wastegate valve control circuit" 1.DEF**).
3) Solenoid valve operating check:
– attach the pressure gauge to the solenoid valve outlet **connection**,
– start the engine and stabilise it at idle speed,
– if the underpressure does not reach **800 mbar ± 100**, replace the solenoid valve.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF055 **CONTINUED 2**	

2.DEF	***NOTES***	**Priority when dealing with a number of faults:** Deal with fault **DF004 "Turbocharger pressure sensor circuit"** first if it is present or stored.

Check the turbocharger pressure sensor connections.
Check the turbocharger pressure relief solenoid valve connections.
Check the injection computer connections.
Repair if necessary.

Check the conformity of the turbocharger pressure signal. (Refer to the interpretation of parameter **PR041 "Turbocharging pressure"**).

Make sure the wastegate valve is not blocked open:
– with the engine switched off, disconnect the **inlet and outlet hoses** from the solenoid valve,
– connect a vacuum pump to the inlet **union** and apply an underpressure,
– if the vacuum pressure **is not maintained**: replace the solenoid valve.

Check that the turbocharger control rod has not seized:
– with the engine stopped, make sure the turbocharger control shaft is in the rest position,
– apply an underpressure of **800 mbar ± 100**, to the hose connected to the turbocharger control diaphragm,
– if the diaphragm holds the underpressure, check the movement and setting of the turbocharger control rod (see **MR 364, 12B, Turbocharger**).

If the control rod is seized, replace the turbocharger.
If the fault persists, apply **test 5** and **test 6**.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF056 PRESENT OR STORED	AIR FLOW SENSOR CIRCUIT CC.1 : Short circuit to + 12 V CO.0 : Open circuit or short circuit to earth 1.DEF: Offset at maximum threshold 2.DEF: Offset at minimum threshold

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after a road test.
	Special notes: If the fault is present, the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	Priorities when dealing with a number of faults: As a priority, deal with fault **DF013 "Sensor supply voltage no. 3"** if the fault is present or stored.

CC.1	***NOTES***	None

Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check the continuity and the insulation to **+ 12 V** of the following connections:

Injection computer brown 48-track connector B, **track E2**	→	**Track 2** of the air flow sensor
Injection computer brown 48-track connector B, **track L4**	→	**Track 6** of the air flow sensor
Injection computer brown 48-track connector B, **track G1**	→	**Track 5** of the air flow sensor
Injection computer brown 48-track connector B, **track B4**	→	**Track 3** of the air flow sensor

If the fault is still present, replace the air flow sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF056 **CONTINUED 1**	

CO.0	***NOTES***	None

Check there is a **+ 5 V** supply on track **3** of the air flow sensor.
Repair if necessary.
Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary.

Check the continuity and insulation to **earth** between:

Injection computer brown 48-track connector B, **track E2**	→	**Track 2** of the air flow sensor
Injection computer brown 48-track connector B, **track B4**	→	**Track 3** of the air flow sensor
Injection computer brown 48-track connector B, **track G1**	→	**Track 5** of the air flow sensor
UPC black connector **Track 2**	→	**Track 4** of the air flow sensor

Repair if necessary.

If the fault is still present and remains present, replace the air flow temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF056 CONTINUED 2	

1.DEF	***NOTES***	None

2.DEF	***NOTES***	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the ignition has been switched off for **40 seconds**.

Check the air flow sensor connections.
Check the injection computer connections.
Repair if necessary

Check the following connections for continuity and make sure there is no interference resistance:

Injection computer, brown 48-track connector B, **track B4**	→	**Track 3** of the air flow sensor
Injection computer, brown 48-track connector B, **track G1**	→	**Track 5** of the air flow sensor
Injection computer, 48-track brown connector B, **track L4**	→	**Track 6** of the air flow sensor
Injection computer, brown 48-track connector B, **track E2**	→	**Track 2** of the air flow sensor
UPC black connector **Track 2**	→	**Track 4** of the air flow sensor

Repair if necessary.

If the fault is still present, apply **test 3** "**Checking the turbocharged air inlet circuit**" and **test 4** "**Air flow sensor**",
– check that the damper valve is open (valve control **resting against the** air vent casing)
– with the flow sensor **connected**, the vehicle **ignition on** and **engine stopped**:
– check the voltage between **tracks 2** and **5** of the flow sensor:
If the value is not **0.6 V ± 0.1**, replace the air flow sensor.

● **Check the EGR valve is not jammed open:**
– Deal with any faults.
– Use the conformity check and "**EMISSION CONTROL/OBD**" sub-function.
– Apply **test 7** "**Exhaust gas recirculation valve**".
If these checks show that the valve is jammed or irrevocably seized, replace the EGR valve.
If no faults are revealed, but the fault is still present, replace the air flow sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF057 PRESENT OR STORED	WATER IN DIESEL FUEL DETECTOR CIRCUIT

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.

Check the conformity and quality of the fuel.
Check the sealing of the reservoir and the low pressure circuit by applying **test 2**.

A) Make sure the water detection sensor is properly connected.
– If not, clear the fault,
– Carry out a road test (**speed > 12 mph (20 km/h) and engine speed > 1,200 rpm**) for more than **30 seconds**,
– If the fault does not recur, end the fault finding procedure,
– If the fault does recur, go to **step C**.

B) If the water detection sensor is absent:
– **Insulate the electrical connector not connected to the vehicle** (risk of dampness, oxidation, and erratic appearance of faults).
Check that the configuration reading **LC065** "**Water detected in the diesel**" is "**NONE**".
If **LC065** is "**WITH**": use command **RZ005** "**Programming**" to reinitialise the vehicle configurations.
– Clear the faults,
– Carry out a road test (**speed > 12 mph (20 km/h) and engine speed > 1,200 rpm**) for more than **30 seconds**.
– If the fault does not recur, end the fault finding procedure.

C) If the sensor is properly connected:
– Drain the diesel filter unit (see **MR 364, 13A, Fuel supply**).
– Clear the fault,
– Carry out a road test (**speed > 12 mph (20 km/h) and engine speed > 1,200 rpm**) for more than **30 seconds**.
– **If the fault does not reappear**, end the fault finding procedure.

D) If the fault recurs:
– Check for **continuity and the absence of interference resistance** on the connection between:

Injection computer grey 32-track connector C, **track A2**	→	**Track 3** of the water detection sensor

Check the power supply to the water detection sensor:

+ 12 V after relay	→	**Track 1** water detection sensor
earth	→	**Track 2** water detection sensor

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF057 CONTINUED	

Carry out the necessary repairs.
If all these checks reveal no faults:
– Replace the water detection sensor (see **MR 364, 13A, Fuel supply**).
– Clear the fault,
– Carry out a road test (**speed > 12 mph (20 km/h) and engine speed > 1,200 rpm**) for more than **30 seconds**, to confirm the repair.

Note:
If the level of water in the fuel filter unit is lower than the electrodes on the sensor, certain driving conditions (on a bend, leaning) may cause the injection fault ***warning light to light up erratically****.*

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF059 PRESENT OR STORED	MISFIRING ON CYLINDER 1

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present, engine performance is reduced and engine instabilities may occur.
	Priority when dealing with a number of faults: Firstly, deal with fault **DF040** "**Cylinder 1 injector circuit**" if it is present or stored.

Check that the **injector no. 1 IMA code** is correctly entered and that it corresponds to the code inscribed on the corresponding injector. Enter the code into an injector that has not been programmed or where the code has been entered incorrectly, if necessary. Refer to the interpretation of commands, **SC002** "**Entering injector codes**".
Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
In the event of several combustion misfiring faults being present, check that the right fuel is being used
Visually inspect the injector no. 1 return pipes. Repair if necessary.
If the fault is still present: apply **test 8** "**POOR INJECTOR OPERATION**". If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF060 PRESENT OR STORED	MISFIRING ON CYLINDER 2

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present, engine performance is reduced and engine instabilities may occur.
	Priority when dealing with a number of faults: Deal with fault **DF041** "**Cylinder 2 injector circuit**" first if it is present or stored.

Check that the **injector no. 2 IMA code** is correctly entered and that it corresponds to the code inscribed on the corresponding injector. Enter the code into an injector that has not been programmed or where the code has been entered incorrectly, if necessary. Refer to the interpretation of commands, **SC002** "**Entering injector codes**".
Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
In the event of several combustion misfire faults being present, check that the right fuel is being used
Visually inspect the injector no. 2 return pipes. Repair if necessary.
If the fault is still present: apply **test 8** "**POOR INJECTOR OPERATION**". If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF061 PRESENT OR STORED	MISFIRING ON CYLINDER 3

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present, engine performance is reduced and engine instabilities may occur.
	Priority when dealing with a number of faults: Deal with fault **DF042** "**Cylinder 3 injector circuit**" first if it is present or stored.

Check that the **injector no. 3 IMA code** is correctly entered and that it corresponds to the code inscribed on the corresponding injector. Enter the code into an injector that has not been programmed or where the code has been entered incorrectly, if necessary. Refer to the interpretation of commands, **SC002** "**Entering injector codes**".
Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
In the event of several combustion misfire faults being present, check that the right fuel is being used
Visually inspect the injector no. 3 return pipes. Repair if necessary.
If the fault is still present: apply **test 8** "**POOR INJECTOR OPERATION**". If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF062 PRESENT OR STORED	MISFIRING ON CYLINDER 4

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present, engine performance is reduced and engine instabilities may occur.
	Priority when dealing with a number of faults: Deal with fault **DF043** "**Cylinder 4 injector circuit**" first if it is present or stored.

Check that the **injector no. 4 IMA code** is correctly entered and that it corresponds to the code inscribed on the corresponding injector. Enter the code into an injector that has not been programmed or where the code has been entered incorrectly, if necessary. Refer to the interpretation of commands, **SC002** "**Entering injector codes**".
Check the engine compression. Repair if necessary.
Check the **valve clearance** and adjust if necessary.
In the event of several combustion misfiring faults being present, check that the correct fuel is being used.
Visually inspect the injector no. 4 return pipes. Repair if necessary.
If the fault is still present: apply **test 8** "**POOR INJECTOR OPERATION**". If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF069 PRESENT OR STORED	IMPACT DETECTED SIGNAL 1.DEF: Impact stored by the injection computer

NOTES	**Conditions for applying the fault finding procedure to stored faults:** Only apply the procedure if the fault is present and if the vehicle does not start.
	Special notes: The fault appears when the injection computer receives a frontal impact signal from the "Airbag" computer via the multiplex network. As soon as the injection computer receives this signal: – engine operation is prohibited, – the **level 2** warning light is lit. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

If the vehicle has been involved in an accident:
Carry out any necessary repairs,
– clear the fault,
– switch off the ignition,
– wait for **40 seconds**,
– switch on the ignition,
If the fault does not recur, end the fault finding procedure.
If the fault recurs, carry out fault finding on the "**AIRBAG**" computer.

If the vehicle has not been involved in an accident:
Run fault finding on the "**AIRBAG**" computer

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF070 PRESENT OR STORED	CLUTCH SWITCH CIRCUIT 1.DEF: Signal absent 2.DEF: Signal inconsistency

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the clutch pedal is depressed, or during a road test.
	Special notes: If this fault is present, the cruise control/speed limiter function will be inhibited. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

IMPORTANT
This fault may appear if the wiring harness has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

Check the conformity of the clutch switch setting (position, connection).
– display status **ET233** "**Clutch pedal**":
– when the clutch pedal is not being depressed status **ET233** should be "**RELEASED**"
– when the clutch pedal is being depressed status **ET233** should be "**DEPRESSED**".
If these checks are not correct, replace the clutch switch.

If these checks are correct:
Check the connections of the clutch pedal switch.
Check the injection computer connections.
Repair if necessary.

Check **continuity and make sure there is no interference resistance** on the following connection:

Injection computer, black 32-track connector A, **track C4** → **Track 1** Clutch pedal switch

Repair if necessary.

Check for **the presence of earth** on **track 2** of the clutch pedal switch.
Repair if necessary.
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF086 PRESENT OR STORED	COOLANT PUMP RELAY CONTROL CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the ignition has been switched off and after an interval of **40 seconds**, or after an actuator command **AC195** "**Electric Coolant pump**".
	Special notes: The control relay is located in the engine connection unit. If the fault is present: – the EGR function is inhibited, – the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

CO.0	***NOTES***	None

Test the **electric coolant pump relay (A 20A)** and check it is operating correctly.
Check the injection computer connections.
Repair if necessary.

Check the continuity between the following connections: Track **B1** and **B5** of the coolant pump relay mounting.
If these checks are correct,
Check the **continuity** and **insulation to earth** of the following connections:

Injection computer brown 48-track connector B, **track H4**	→	Track **B2** of the coolant pump relay mounting
Injection supply relay mounting, **Track 5**	→	Track **B1** of the coolant pump relay mounting
Injection supply relay mounting, **Track 5**	→	Track **B5** of the coolant pump relay mounting
Turbocharger bearing coolant pump connector, **Track 1**	→	Track **B3** of the coolant pump relay mounting

Check for the **earth** on **Track 2** of the turbocharger bearing coolant pump connector.
Repair if necessary.
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF086 CONTINUED	

CC.1	***NOTES***	None

Test the **electric coolant pump relay (A 20A)** and check it is operating correctly.
Check the injection computer connections.
Repair if necessary.

Check the continuity between the following connections: Track **B1** and **B5** of the coolant pump relay mounting.
Check the **continuity and insulation from the + 12 V feed** of the following connection:

Injection computer brown 48-track connector B, **track H4**	→	Track **B2** of the coolant pump relay mounting
Turbocharger bearing coolant pump connector, **Track 2**	→	**Earth**

Repair if necessary.
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF091 PRESENT OR STORED	VEHICLE SPEED SIGNAL 1.DEF: Signal inconsistency 2.DEF: Signal outside upper limit 3.DEF: Configuration absent or incorrect 4.DEF: CAN connection fault

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present during a road test.
	Special notes: Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

Check the ABS computer connections.
Check the injection computer connections.
Repair if necessary.
Run fault finding on the multiplex network and the ABS system (**MR 366, 38C Anti-lock braking system**).
Refer to the fault finding notes for the vehicle when dealing with any faults.
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF097 PRESENT OR STORED	CAMSHAFT SENSOR CIRCUIT 1.DEF: No signal 2.DEF: Signal inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test. A drop in engine speed followed by nominal behaviour from the vehicle is possible.
	Special notes: If this fault is present: – it is impossible to start the vehicle, – the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

1.DEF ***2.DEF***	***NOTES***	Check the conformity of the **+ 12 V** after relay supply line, from **track 2** of the **UPC PPM1 connector**. (Use the **"Wiring Diagrams**" Technical Note for the vehicle).

Check the camshaft sensor connections.
Check the injection computer connections.
Check the camshaft sensor mounting and positioning.
Also check its general condition, (damaged housing, heating up, etc.)

Carry out the necessary repairs.

Check **the continuity and absence of interference resistance** of the following connections:

Injection computer brown 48-track connector **B**, **Track D1**	⟶	**Track 2** Camshaft sensor
Injection computer brown 48-track connector **B**, **Track A1**	⟶	**Track 1** Camshaft sensor

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF097 CONTINUED	

With the ignition on and the camshaft sensor **connected**:
Use a voltmeter to measure the voltage across **tracks 1** and **3** of the camshaft sensor:
The voltage displayed should be equal to the battery voltage **± 0.08 V**)
– If the voltage is outside permitted tolerance values, take the measurement again on the connector, with the **camshaft sensor disconnected**.
– If the voltage is still outside permitted tolerance values with the sensor disconnected,
Check **the continuity and the absence of interference resistance** of the following connection:

Camshaft sensor, **track 3** ⟶ **Track 5** injection supply relay mounting

– If the measured voltage is correct with the sensor disconnected.
Measure the camshaft sensor **resistance** between **tracks 2** and **3**.
Replace the sensor if the resistance is not **10,250 ± 500 Ω at 20 °C**
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF118 PRESENT OR STORED	EGR SOLENOID VALVE SERVO-CONTROL 1.DEF: Insufficient EGR valve flow 2.DEF: Excessive EGR valve flow

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – the engine is started. – a road test.
	Special notes: If the fault is present the EGR function is disabled. If 2.DEF is present, – the **level 1** warning light is lit, – there is smoke coming from the exhaust. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	Priority when dealing with a number of faults: Apply the procedure for dealing with fault **DF272 "EGR valve control circuit"** first if it is present or stored.
	NOTE This fault can result in a rapid and significant fouling of the particle filter. If the EGR needs to be replaced to deal with the fault, it must be cleared.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the EGR valve motor between **tracks 1** and **5**.
If the resistance displayed is not approximately **2.96 ± 0.3 Ω at 20 °C**, replace the EGR valve.

Check **the continuity and absence of interference resistance** of the following connections:

Injection computer brown 48-track connector **B**, **track C2** → **Track 1** EGR valve connector

Injection computer brown 48-track connector **B**, **track D2** → **Track 5** EGR valve connector

Check there are no leaks on the EGR circuit: pipe pierced or damaged and that clamps are properly tightened.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF118 CONTINUED	

Check the operation of the EGR valve:
Use the conformity check and "**EMISSION CONTROL/OBD**" sub-function, with the engine running at idle speed.
If the fault if still present, use command **RZ002** "**EGR adaptives**" to reintialise the operating values of the valve and run a programming procedure for the EGR offsets
(see "**Replacing components**" section).
If the valve is jammed or irrevocably seized, replace the EGR valve.

IMPORTANT
A programming procedure is required when the EGR valve is replaced.
The "EGR valve initial offset" and "EGR valve last offset" parameters must be reinitialised.
Refer to the "**Replacing components**" section to carry out this programming.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF195 PRESENT OR STORED	ENGINE SPEED/CAMSHAFT SENSOR CONSISTENCY 1.DEF: Signal inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present after an attempt to start
	Special notes: If the fault is **stored**, clear the fault from the computer memory. Switch off the ignition, start the engine and check that the fault does not reappear. Use bornier **Elé. 1681 or Elé. 1590** for any operation on the injection computer connectors.

Check the **engine speed sensor** and **camshaft sensor** connections.
Check the injection computer connections.
Repair if necessary.

Check **the continuity and the absence of interference resistance** with the connector disconnected from the following connections:

injection computer, **connector B track A1**	→	**track 1** of the camshaft sensor.
injection computer, **connector B track D1**	→	**track 2** of the camshaft sensor
injection computer, **connector B track B1**	→	**track 1** of the engine speed sensor
Injection computer, **connector B track C1**	→	**track 2** of the engine speed sensor

Repair if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF195 CONTINUED	

With the ignition on and the camshaft sensor **connected**:
Use a voltmeter to measure the voltage across **tracks 1** and **3** of the camshaft sensor:
The voltage displayed should be equal to the battery voltage **0.08 V**.
– If the voltage is outside permitted tolerance values, take the measurement again on the connector, with the **camshaft sensor disconnected**,
– If the voltage is still outside permitted tolerance values with the sensor disconnected.
Check the following connection for **continuity and for the absence of interference resistance**:

Camshaft sensor, **track 3** ⟶ **+ after ignition feed after relay**

– If the measured voltage is correct with the sensor disconnected.

Measure the **resistance** of the **camshaft sensor** between **tracks 2** and **3**.
Replace the sensor if the resistance is not **10,250 ± 500 Ω at 20 °C**

Check that the engine speed sensor is correctly mounted and that the flywheel target is not damaged.
Check that the gap between the engine speed sensor and the engine flywheel is **0.5 to 1.8 mm**.

Check the **resistance** of the **engine speed sensor** between **tracks 1** and **2**.
Replace the sensor if its resistance is not **800 ± 80 Ω** at **20 °C**.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF209 PRESENT OR STORED	EGR POSITION SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V 1.DEF: Micro-breaks

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present: – there is smoke coming from the exhaust, – the EGR offset fault finding function is disabled – the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds). Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	Priorities when dealing with a number of faults: Deal with fault **DF012** "**Sensor supply voltage no. 2**" first, if it is present or stored.
	IMPORTANT This fault can result in a rapid and significant fouling of the particle filter. If the EGR needs to be replaced to deal with the fault, it must be cleared.

IMPORTANT
This fault may appear if the wiring has been damaged.
Follow the procedure described in "Check wiring" in the Introduction.
This check enables the condition and the conformity of the engine wiring harness to be checked.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF209 **CONTINUED 1**	

CO.0	***NOTES***	None

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the EGR valve position feedback potentiometer between **tracks 2** and **4**.
If the resistance displayed is not approximately **6.5 ± 0.6 kΩ at 20 °C**, replace the EGR valve.
Check the **continuity** and **insulation to earth** of the following connections:

Injection computer 48-track brown connector B, **track J2**	⟶	**track 6** EGR valve
Injection computer brown 48-track connector B, **track F4**	⟶	**track 2** EGR valve

Repair if necessary.

Check the operation of the EGR valve:
Use the conformity check, sub-function "**EMISSION CONTROL/OBD**" at idle speed with the engine running.

If the fault if still present, use command **RZ002** "**EGR adaptives**" to reintialise the operating values of the valve and launch a programming procedure for the EGR offsets
(see "**Replacing components**" section).
If the valve is jammed or irrevocably seized, replace the EGR valve.

IMPORTANT
A programming procedure is required when the EGR valve is replaced.
The "EGR valve initial offset" and "EGR valve last offset" parameters must be reinitialised.
Refer to the "**Replacing components**" section to carry out this programming.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF209 **CONTINUED 2**	

CC.1 ***1.DEF***	***NOTES***	None

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the EGR valve position feedback potentiometer between **tracks 2** and **4**.
If the resistance displayed is not approximately **6.5 ± 0.6 kΩ at 20 °C**, replace the EGR valve.
Check **for continuity** and **insulation to + 12 V** on the following connections:

Injection computer brown 48-track connector B, **track J2**	→	**Track 6** EGR valve
Injection computer grey 32-track connector C, **track C2**	→	**Track 4** EGR valve
Injection computer brown 48-track connector B, **track F4**	→	**Track 2** EGR valve

Repair if necessary.

Ensure the presence of **+ 5 V** on **track 2** of the EGR valve.

Check the operation of the EGR valve:
Use the conformity check and "**EMISSION CONTROL/OBD**" sub-function, with the engine running at idle speed.

If the fault if still present, use command **RZ002** "**EGR adaptives**" to reintialise the operating values of the valve and launch a programming procedure for the EGR offsets
(see "**Replacing components**" section).
If the valve is jammed or irrevocably seized, replace the EGR valve.

IMPORTANT
A programming procedure is required when the EGR valve is replaced.
The "EGR valve initial offset" and "EGR valve last offset" parameters must be reinitialised.
Refer to the "**Replacing components**" section to carry out this programming.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF226 PRESENT OR STORED	DAMPER VALVE CIRCUIT CC.1 : Short circuit to + 12 V CC.0 : Short circuit to earth CO : Open circuit CC : Short circuit 1.DEF: Internal electronic fault 2.DEF: External fault finding 3.DEF: Values outside tolerances

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault appears after: – the engine is started – a road test – an actuator command **AC012** "**Damper valve**" – switching off the ignition and waiting **40 seconds**.
	Special notes: If the fault is present: – it is difficult or even impossible to start the vehicle, – the engine stops noisily, – the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.
	NOTE This fault can result in a rapid and significant fouling of the particle filter.

CC.1	***NOTES***	After any damper valve procedures, it is necessary to use **RZ014** "**Damper valve fault adaptives**". Then switch off the ignition and wait **40 seconds**.

Check the damper valve connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity and insulation to the + 12 V feed** of the following connection:

Earth	→	**Track 1** of the damper valve
Injection computer brown 48-track connector B, **track J4**	→	**Track 3** of the damper valve
Injection computer brown 48-track connector B, **track B2**	→	**Track 4** of the damper valve

Repair if necessary.

If the fault persists, replace the damper valve.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF226 **CONTINUED 1**	

CO ***CC.0***	***NOTES***	After any damper valve operations, it is necessary to use **RZ014 "Damper valve fault adaptives"**. Then switch off the ignition and wait **40 seconds**.

Check the connections of the damper valve.
Check the injection computer connections.
Repair if necessary.

Check the **continuity** and **insulation to earth** of the following connections:

Injection computer brown 48-track connector B, **track J4**	→	**Track 3** of the damper valve
Injection supply relay mounting, **Track 5**	→	**Track 2** of the damper valve
Injection computer brown 48-track connector B, **track B2**	→	**Track 4** of the damper valve

Repair if necessary.
If the fault persists, replace the damper valve.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF226 **CONTINUED 2**	

CC	***NOTES***	After any damper valve procedures, it is necessary to use **RZ014 "Damper valve fault adaptives"**. Then switch off the ignition and wait **40 seconds**.

Check the damper valve connections.
Check the injection computer connections.
Repair if necessary.

Check the **continuity, absence of interference resistance and insulation** of the following connection:

Earth	→	**Track 1** of the damper valve
Injection supply relay mounting, **Track 5**	→	**Track 2** of the damper valve
Injection computer brown 48-track connector B, **track J4**	→	**Track 3** of the damper valve
Injection computer brown 48-track connector B, **track B2**	→	**Track 4** of the damper valve

Repair if necessary.
If the fault is still present, replace the damper valve.

DF226 **CONTINUED 3**	

1.DEF ***to 3.DEF***	***NOTES***	After any damper valve procedures, it is necessary to use **RZ014** "**Damper valve fault adaptives**". Then switch off the ignition and wait **40 seconds**.

Check the connections of the damper valve.
Check the injection computer connections.
Repair if necessary.

Check the **continuity, absence of interference resistance and insulation** of the following connection:

Earth	→	**Track 1** of the air inlet valve
Injection supply relay mounting, **Track 5**	→	**Track 2** of the damper valve
Injection computer brown 48-track connector B, **track J4**	→	**Track 3** of the damper valve
Injection computer brown 48-track connector B, **track B2**	→	**Track 4** of the damper valve

Repair if necessary.

If the fault is still present, **check that the computer output stage is working correctly**.

Damper valve connected:
– connect the **negative** terminal of the voltmeter to **track 1** of the damper valve,
– connect the **positive** terminal of the voltmeter to **track 2** of the damper valve,
– use command **AC012** "**Damper valve**":

➡ The voltmeter should display **ten cycles** of two successive voltages: **~ 2.5 V** (OCR of **20 %**) then **~ 8.75 V** (OCR of **70 %**).
If the voltmeter does not indicate any control while the command is running (ten 1 second cycles), contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF250 PRESENT OR STORED	ELECTRONIC STABILITY PROGRAM FUNCTION 1.DEF: Signal inconsistency 2.DEF: CAN connection fault

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present during a road test.
	Special notes: Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

Check the ABS computer connections.
Check the injection computer connections.
Repair if necessary.

Run fault finding on the multiplex network, (see **MR 366, 88C**) and the ABS system, (see **MR 366, 38B**).
Refer to the fault finding notes for the vehicle when dealing with any faults.
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF272 PRESENT OR STORED	EGR CONTROL CIRCUIT 1.DEF: Valve stuck open 2.DEF: Valve stuck closed

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after a road test.
	Special notes: The EGR function is deactivated if several faults with **DF226** "**Damper valve circuit**" are present. If **1.DEF** is present, – the **level 1** warning light is lit, – the vehicle performance is reduced, – there is smoke coming from the exhaust. Use bornier **Elé. 1681 or Elé. 1590** for all operations on the injection computer connectors.

1.DEF ***2.DEF***	***NOTES***	None

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Measure the **resistance** of the EGR valve motor between **tracks 1** and **5**.
If the resistance displayed is not approximately **2.96 ± 0.3 Ω at 20 °C**, replace the EGR valve.

Check the following connections for continuity and make sure there is no interference resistance:

Injection computer brown 48-track connector **B**, **track C2** → **Track 1** EGR valve connector

Injection computer brown 48-track connector **B**, **track D2** → **Track 5** EGR valve connector

Check there are no leaks on the EGR circuit: pipe pierced or damaged and that clamps are properly tightened.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF272 CONTINUED	

Check the operation of the EGR valve:
Use the conformity check and "**EMISSION CONTROL/OBD**" sub-function, with the engine running at idle speed.

If the fault is still present, use command **RZ002** "**EGR adaptives**" to reinitialise the operating values of the valve and launch a programming procedure for the EGR offsets (see "**Replacing components**" section).
If the valve is jammed or irrevocably seized, replace the EGR valve.

IMPORTANT
A programming procedure is required when the EGR valve is replaced.
The "EGR valve initial offset" and "EGR valve last offset" parameters must be reinitialised.
Refer to the "**Replacing components**" section to carry out this programming.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF276 PRESENT	INJECTOR CODE PROGRAMMING 1.DEF: Internal electronic fault when writing 2.DEF: No code in memory

NOTES	**Condition for applying fault finding ONLY to a present fault:** The fault appears after: – reprogramming the injection computer, – replacing and programming the injection computer.
	Special notes: If the fault is present: – engine speed is limited, – the **level 1** warning light comes on.

1.DEF	***NOTES***	None

Program the injector codes using command **SC002** "**Enter injector codes**".
Carry out the procedure described in the "**Interpretation of commands**" section.

If the fault is still **present** after switching the ignition off and waiting **40 seconds**, then start a new dialogue.
Follow the interpretation of command **SC002** "**Entering injector codes**".
If the fault is still present, contact Techline.

Otherwise clear the fault memory using **RZ007** "**Fault memory**".

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF276 CONTINUED	

2.DEF	***NOTES***	This fault appears on any blank computer (new or recently reprogrammed)

IMPORTANT
A computer without the IMA option can be replaced by a computer with this option. The codes are not saved during command SC003 "Save computer data".
In this event, status ET104 "Use injector codes" changes to "YES", fault DF276 "Injector(s) code(s) programming" will be present and the engine functions in defect mode.

Program the injector codes using command **SC002** "**Enter injector codes**".
Carry out the procedure described in the "**Interpretation of commands**" section.

If the fault is still **present** after switching the ignition off and waiting **40 seconds**, then start a new dialogue.
Follow the interpretation of command **SC002** "**Entering injector codes**".
If the fault is still present, contact Techline.

Otherwise clear the fault memory using **RZ007** "**Fault memory**".

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF297 PRESENT OR STORED	PARTICLE FILTER 1.DEF: ABSENT

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present: – particle filter regeneration is inhibited, – blue and white fumes and black particles can be seen coming from the exhaust.
	Priorities when dealing with a number of faults: Apply the procedure for dealing with faults **DF315 "Particle filter pressure differential sensor circuit" and DF717 "Particle filter upstream pressure valve"** first if they are present or stored.
	NOTE This fault may lead to, over the long term, premature wear and a greater risk of turbocharger damage.

Check the condition of the pressure differential sensor and the injection computer connectors.
Repair if necessary.

Check the particle filter is present

If it is present,
Visually inspect the particle filter by placing the vehicle on a lift:
– not damaged (no abnormal welds, if necessary compare it with another vehicle fitted with particle filter),
– if After-Sales sleeves are present, as a result of a previous procedure, check that the particle filter's contents have not been emptied when it was removed.

If the particle filter is not in good condition or is absent, replace it.

IMPORTANT
The parameters must be reinitialised after any procedure is carried out on the particle filter.
Use command **SC030 "Particle filter adaptives"**, and **"Replace particle filter"**.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF308 PRESENT OR STORED	CLOGGED PARTICLE FILTER

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present: – particle filter regenerations are inhibited, – the EGR function is inhibited, – the vehicle performance is reduced, – the **level 1** warning light comes on.
	Priorities when dealing with a number of faults: Apply the procedure for dealing with faults **DF315 "Particle filter pressure differential sensor circuit" and DF717 "Particle filter upstream pressure valve"** first if they are present or stored.

The fault appears if the weight of soot contained in the filter is greater than 45 g.

Carry out an After-Sales regeneration.
Follow the command procedure:
VP040 or SC017 "Particle filter regeneration" in the **"Interpretation of commands"** section.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF309 PRESENT OR STORED	PARTICLE FILTER DOWNSTREAM TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to + 12 V

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present: – with the ignition switched on (**CC.0**) or, – following a road test, engine warm (**CO.1**). **NOTE** **The particle filter downstream temperature sensor only measures temperatures above 50 °C.**

Check **the continuity, absence of interference resistance and insulation** to **+ 5 V** and to **+ 12 V** of the following connections:

Injection computer connector **B** brown 48-track, **track K3**	→	**track 2** particle filter downstream temperature sensor connector
Injection computer grey connector **C**, **track E3**	→	**track 1** particle filter downstream temperature sensor connector

Repair if necessary.

Check **the continuity, absence of interference resistance and insulation** to **earth** of the following connection:

Injection computer connector **B** brown 48-track, **track K3**	→	**track 2** particle filter downstream temperature sensor connector

Repair if necessary.

Check for the presence of an **earth** on **track 1** of the particle filter downstream temperature sensor **black** connector.

If the fault is still present, replace the particle filter downstream temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF310 PRESENT OR STORED	PARTICLE FILTER UPSTREAM TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO.1 : Open circuit or short circuit to + 12 V

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present: – with the ignition switched on (**CC.0**) or, – following a road test, engine warm (**CO.1**).
	Special notes: If the fault is present: – particle filter regeneration is inhibited, – the **level 1** warning light comes on.
	NOTE **The upstream particle filter temperature sensor only measures temperatures above 50 °C.**

Check **the continuity, absence of interference resistance and insulation** to **+ 5 V** and to **+ 12 V** of the following connections:

Injection computer, brown 48-track connector **B**, **track H3**	→	**track 2** particle filter upstream temperature sensor connector
Injection computer, brown 48-track connector **B**, **track A1**	→	**track 1** particle filter upstream temperature sensor connector

Repair if necessary.

Check **the continuity, absence of interference resistance and the insulation** to **earth** of the following connection:

Injection computer, brown 48-track connector **B**, **track H3**	→	**track 2** particle filter upstream temperature sensor connector

Repair if necessary.

Check for **an earth** on **track 1** of the particle filter upstream temperature sensor **blue** connector.

If the fault is still present, replace the particle filter upstream temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF312 PRESENT OR STORED	PARTICLE FILTER REGENERATION IMPOSSIBLE

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is still present, the vehicle needs to be driven in order to trigger particle filter regeneration while driving.
	Priorities when dealing with a number of faults: Deal with the following faults first: – **DF308 "Particle filter clogged"** if it is present or stored, – **DF315 "Particle filter pressure differential sensor circuit"** if it is present or stored, – **DF717 "Particle filter pressure upstream valve"** if it is present or stored.

Fault appears following several failed regeneration attempts when driving, or if the weight of soot in the filter is above 35 g.

DO NOT RUN AFTER-SALES REGENERATION with the diagnostic tool.

NOTE
To allow the particle filter to clean itself automatically, drive the vehicle as soon as possible for up to 10 minutes after the "REGENERATE PARTICLE FILTER" message disappears or the specific particle filter warning light on the instrument panel goes out, at an average speed of 48 mph (80 km/h) compatible with:

– the traffic conditions,
– and observing the authorised speed limits.

(See the Driver's handbook for the best conditions)

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF315 PRESENT OR STORED	PARTICLE FILTER PRESSURE DIFFERENTIAL SENSOR CIRCUIT CO : Open circuit CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to + 12 V 1.DEF: Signal inconsistency 2.DEF: Signal outside lower limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present: – the **level 1** warning light is on, – the particle filter fault finding procedure is inhibited, – particle filter regeneration is inhibited.
	Priorities when dealing with a number of faults: Deal with fault **DF011 "Sensor supply voltage no. 1"** first if it is present or stored.

CO ***CC.1***	***NOTES***	None

Check the condition of the connectors on the pressure differential sensor and the injection computer.
Repair if necessary.

Check the **continuity, insulation and absence of interference resistance** of the following connections:

Injection computer connector **C track F3**	→	**track 2** particle filter pressure differential sensor connector
Injection computer connector **C track B2**	→	**track 3** particle filter pressure differential sensor connector
Injection computer connector **B track G4**	→	**track 1** particle filter pressure differential sensor connector

Repair if necessary.

Check for an **earth** on **track 2** of the particle filter pressure differential sensor connector.
Repair if necessary.
If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF315 CONTINUED	

CO.0	***NOTES***	None

Check **the continuity, the absence of interference resistance and the insulation** to **earth** of the following connections:

Injection computer connector **C track B2** → **track 3** particle filter pressure differential sensor connector

Injection computer connector **B track G4** → **track 1** particle filter pressure differential sensor connector

Repair if necessary.
If the fault is still present, contact Techline.

1.DEF ***2.DEF***	***NOTES***	None

Check the condition of the pressure pipes on the pressure differential sensor.
Check that they are sealed and in the correct position.
Replace if necessary.

Check the condition of the connectors on the pressure differential sensor and the injection computer.
Repair if necessary.

Check **the continuity and absence of interference resistance** of the following connections:

Injection computer connector **C track B2** → **track 3** particle filter pressure differential sensor connector

Injection computer connector **B track G4** → **track 1** particle filter pressure differential sensor connector

Repair if necessary.
If the fault is still present, replace the pressure differential sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF619 PRESENT OR STORED	EGR VALVE BLOCKED OPEN

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after a road test.
	Special note: If the fault is present: – the EGR and turbocharger functions are inhibited, – the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for any operation on the injection computer connectors.
	NOTE This fault can result in a rapid and significant fouling of the particle filter. If the EGR needs to be replaced to deal with the fault, it must be cleared.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Check the operation of the EGR valve:
Use the conformity check, "**EMISSION CONTROL/OBD**" sub-function with the engine running at idle speed and apply **test 7** "**Exhaust gas recirculation valve**".

If the fault if still present, use command **RZ002** "**EGR adaptives**" to reintialise the valve operating values and run a programming procedure for the EGR offsets
(see "**Replacing components**" section).
If the valve is jammed or irrevocably seized, replace the EGR valve.

IMPORTANT
A programming procedure is required when the EGR valve is replaced.
The "EGR valve initial offset" and "EGR valve last offset parameters" must be reinitialised.
Refer to the "**Replacing components**" section to carry out this programming.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF620 PRESENT OR STORED	EGR VALVE FOULED

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after a road test.
	Special note: If the fault is present: – the EGR function is inhibited, – particle filter regeneration is inhibited, – turbocharging is inhibited, – the **level 1** warning light comes on. Use bornier **Elé. 1681 or Elé. 1590** for any operation on the injection computer connectors.
	NOTE This fault can result in a rapid and significant fouling of the particle filter. If the EGR needs to be replaced to deal with the fault, it must be cleared.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Check the operation of the EGR valve:
Use the conformity check and "**EMISSION CONTROL/OBD**" sub-function, with the engine running at idle speed.
Apply **test 7** "**Exhaust gas recirculation valve**".

If the fault if still present, use command **RZ002** "**EGR adaptives**" to reintialise the operating values of the valve and launch a programming procedure for the EGR offsets
(see "**Replacing components**" section).
If the valve is jammed or irrevocably seized, replace the EGR valve.

IMPORTANT
A programming procedure is required when the EGR valve is replaced.
The "EGR valve initial offset" and "EGR valve last offset" parameters must be reinitialised.
Refer to the "**Replacing components**" section to carry out this programming.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF621 PRESENT OR STORED	EGR VALVE LOCKED OPEN (OBD FAULT)

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared as present after a road test.
	Special note: If the fault is present: – there is heavy smoke coming from the exhaust, – the **OBD** warning light will come on after three consecutive driving cycles (starting + 5 seconds + switch off the ignition and wait 40 seconds). Use bornier **Elé. 1681 or Elé. 1590** for any operation on the injection computer connectors.
	NOTE This fault can result in a rapid and significant fouling of the particle filter. If the EGR needs to be replaced to deal with the fault, it must be cleared.

Check the EGR valve connections.
Check the injection computer connections.
Repair if necessary.

Check the operation of the EGR valve:
Use the conformity check and "**EMISSION CONTROL/OBD**" sub-function, with the engine running at idle speed.
Apply **test 7** "**Exhaust gas recirculation valve**".

If the fault if still present, use command **RZ002** "**EGR adaptives**" to reintialise the operating values of the valve and launch a programming procedure for the EGR offsets
(see "**Replacing components**" section).
If the valve is jammed or irrevocably seized, replace the EGR valve.

IMPORTANT
A programming procedure is required when the EGR valve is replaced.
The "EGR valve initial offset" and "EGR valve last offset" parameters must be reinitialised.
Refer to the "**Replacing components**" section to carry out this programming.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF652 PRESENT OR STORED	TURBINE UPSTREAM TEMPERATURE SENSOR CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to + 12 V CO.1 : Open circuit or short circuit to + 12 V 1.DEF: Signal outside upper limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present if: – with the ignition on (**CO, CC.0**), – following a road test, engine warm (**CC.1, C0.1,1.DEF**).
	Special notes: If the fault is present: – the EGR function is inhibited, – particle filter regeneration is inhibited, – the vehicle performance is reduced, – the **level 1** warning light comes on.
	NOTE **The turbine upstream temperature sensor only measures temperatures above 200 °C.**

Check **the continuity, absence of interference resistance and insulation** to **+ 5 V** and to **+ 12 V** of the following connections:

Injection computer grey 32-track connector **C**, **track E4** → **track 2** turbine upstream temperature sensor connector

Injection computer grey 32-track connector **C**, **track D1** → **track 1** turbine upstream temperature sensor connector

Repair if necessary.

Check **the continuity, absence of interference resistance and insulation** to **earth** of the following connection:

Injection computer grey 32-track connector **C**, **track E4** → **track 2** turbine upstream temperature sensor connector

Repair if necessary.

Check for an **earth** on **track 1** of the turbine upstream temperature sensor **yellow** connector.

If the fault is still present, replace the turbine upstream temperature sensor.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF717 PRESENT OR STORED	PARTICLE FILTER UPSTREAM PRESSURE VALVE 1.DEF: Signal inconsistency

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault is declared present after the engine is started or following a road test.
	Special notes: If the fault is present: – the **level 1** warning light is lit, – the particle filter fault finding procedure is inhibited, – particle filter regeneration is inhibited.

Check the condition of the following pressure pipes:

Particle filter upstream pressure sensor signal → Pressure differential sensor

Check that the pipe is not crushed, blocked or pierced.
Check the correct position and connection on the pressure differential sensor.
Replace the pressure pipe if necessary.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF778 PRESENT OR STORED	TURBINE UPSTREAM TEMPERATURE CONTROL 1.DEF: Temperature measured too high 2.DEF: Parameter at max limit

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present: – if the engine is started with a speed greater than 1,750 rpm and a fuel flow greater than 30 mg/st, – or following a road test.
	Special notes: If the fault is present: – particle filter regeneration is inhibited, – the vehicle performance is reduced, – the **level 1** warning light comes on.
	NOTE This fault can result in a rapid and significant fouling of the particle filter.

Check **the continuity, absence of interference resistance and insulation** to **+ 5 V** and to **+ 12 V** of the following connection:

Injection computer grey 32-track connector **C**, **track E4** → **track 2** turbine upstream temperature sensor connector

Injection computer grey 32-track connector **C**, **track D1** → **track 1** turbine upstream temperature sensor connector

Repair if necessary.

Check **the continuity, absence of interference resistance and insulation** to **earth** of the following connection:

Injection computer grey 32-track connector **C**, **track E4** → **track 2** turbine upstream temperature sensor connector

Repair if necessary.

Check for an **earth** on **track 1** of the turbine upstream temperature sensor **yellow** connector.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF890 PRESENT OR STORED	SPEED THRESHOLD EXCEEDED DURING PARTICLE FILTER REGENERATION

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present during an After-Sales regeneration with the diagnostic tool and at a non negligible speed.
	Special notes: If the fault is present, the particle filter regeneration in progress fails.

NOTE
The fault is present because the vehicle has been driven while the After-Sales regeneration was in progress.
The vehicle speed should be zero during the regeneration.
Carry out an After Sales regeneration.
Follow the procedure for command **VP040 or SC017** "**Regeneration of the particle filter**" in the "**Interpretation of commands**" section.
DO NOT DRIVE THE VEHICLE.
If the fault is still present, contact Techline.

IMPORTANT
The parameters must be reinitialised after any operation is carried out on the particle filter.
Use command **SC030** "**Particle filter adaptives**", and "**Particle filter regeneration with diagnostic tool**" or "**Particle filter replacement**".

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

DF899 PRESENT OR STORED	TEMPERATURE THRESHOLD EXCEEDED DURING PARTICLE FILTER REGEN.

NOTES	**Conditions for applying fault finding procedures to stored faults:** The fault becomes present during an AFTER-SALES regeneration using the diagnostic tool and when the particle filter upstream temperature is greater than 700 °C.
	Special notes: If the fault is present, the particle filter regeneration in progress is interrupted.

NOTE
The fault is present because the particle filter has reached an abnormally high temperature while AFTER-SALES regeneration is being carried out.
The vehicle particle filter upstream temperature should not exceed 700 °C during the regeneration process.

LET THE VEHICLE COOL DOWN (maximum 30 min)

Carry out a second After-Sales regeneration procedure.
Follow the procedure for command **VP040 or SC017** "**Regeneration of the particle filter**" in the "**Interpretation of commands**" section.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults. Carry out a road test followed by another check with the diagnostic tool.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Vehicle impact	**ET077:**	Impact detected	**NO**	In the event of a fault, refer to the interpretation of fault **DF069 "Impact detected signal"**.
2	Power supply	**ET001:**	computer + after ignition feed	**PRESENT**	In the event of a fault, refer to the interpretation of **DF015 "Main relay control circuit"**.
		PR071:	Computer supply voltage	**9 V < X < 16 V**	In the event of a fault, carry out a fault finding procedure on the charge circuit and refer to the interpretation for **DF047 "Computer supply voltage"**.
		PR358:	Sensor reference voltage	**3.4 V < X < 3.8 V**	Without
3	Speed	**PR190:**	Engine idle speed setpoint	Indicates the engine's rotational speed setpoint in rpm.	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
		PR055:	Engine speed	Indicates the engine's rotational speed in rpm. **With the ignition on, 0 rpm**	
4	Speed signal	**PR089:**	Vehicle speed	Gives the vehicle speed in km/h. This parameter is transmitted by the ABS computer. This signal is transmitted to the injection via the multiplex network.	In the event of a fault, test the multiplex network. **(see 88B, Multiplex)**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

MAIN COMPUTER STATUSESAND PARAMETERS (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
5	Injection configuration	**ET104:**	Injector code use	**YES**	This status indicates that the IMA function is activated. In the event of a fault, consult the interpretation of **DF276 "Injector code programming"**.
6	Pressure	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. **The sensor is built into the computer.** **Default value: 750 mbar.**	In the event of a fault, consult the interpretation of **DF003 "Atmospheric pressure sensor circuit"**.
		PR038:	Rail pressure	**0 < X < 30 bar**	In the event of a fault, consult the interpretation of fault **DF007 "Rail pressure sensor circuit"**.
7	Temperature	**PR059:**	Inlet air temperature	Indicates the inlet air temperature Ignition on PR061 = PR059 **Default value: 20 °C**	In the event of a fault, refer to the interpretation for **DF039 "Inlet air temperature circuit sensor"**.
		PR064:	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
8	Torque	**PR015:**	Engine torque	**N/A**	This parameter is only valid when the engine has been started.
9	Charging circuit	**PR016:**	Alternator flow	**0 mA**	Without

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

AIR CIRCULATION (TURBOCHARGING/INLET)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine speed	**PR055:**	Engine speed	Indicates the engine's rotational speed in rpm. **Ignition on, 0 rpm**	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
2	Temperature	**PR059:**	Inlet air temperature	Indicates the inlet air temperature **Default value: 20 °C**	In the event of a fault, refer to the interpretation of fault **DF039 "Inlet air temperature sensor circuit"**.
		PR061:	External air temperature	Gives the external air temperature in °C. This parameter is controlled by the UCH and transmitted to the injection via the multiplex network. **Default value: 20 °C**	In the event of a fault, see UCH (**see MR 366, 87B**).
3	Turbocharging	**PR009:**	Turbocharging pressure setpoint	**790 < X < 1,190 mbar**	Without
		PR041:	Turbocharging pressure	**PR041 = PR035 ± 10 mbar**	In the event of a fault, consult the interpretation of **DF004 "Turbocharging pressure sensor circuit"**.
		PR047:	Turbocharging pressure OCR	**X < 5 %**	The Opening Cyclic Ratio should be identical to the correction of the solenoid valve position.
		PR011:	Turbocharging solenoid valve position sensor	**X < 5 %**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

AIR CIRCULATION (TURBOCHARGING/INLET) (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	Air circulation	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer. **Default value: 750 mbar.**	In the event of a fault, consult the interpretation of **DF003 "Atmospheric pressure sensor circuit"**.
		PR132:	Air flow	**0 < X < 10 kg/h**	In the event of a fault, consult the interpretation of parameter **DF056 "Air flow sensor circuit"**.
		PR672:	Damper valve position setpoint	**X < 5 %**	In the event of a fault, consult the interpretation for fault **DF226 "Damper valve circuit"**.
		PR417:	Damper valve OCR	**X < 5 %**	
		PR420:	Damper valve error counter	**X = 0**	
5	Sensor feed	**PR081:**	Inlet temperature sensor voltage	**1.90 < X < 3.10 V** **Default value: 5 V**	In the event of a fault, refer to the interpretation of fault **DF039 "Inlet air temperature sensor circuit"**.
		PR079:	Atmospheric pressure sensor voltage	**3.80 < X < 4 V**	In the event of a fault, consult the interpretation of **DF003 "Atmospheric pressure sensor circuit"**.
		PR073:	Air flowmeter supply voltage	**0.5 < X < 1 V** **Default value: 0 V**	In the event of a fault, refer to the interpretation of fault **DF013 "Sensor supply voltage no. 3"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

FUEL CIRCUIT

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine speed	**PR055:**	Engine speed	Indicates the engine's rotational speed in rpm. With the ignition on, 0 rpm.	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
2	Injector codes	**ET104:**	Injector code use	**YES** Indicates whether the injector codes have been programmed	In the event of a fault, consult the interpretation of **DF276 "Injector code programming"**.
3	Pressure	**PR008:**	Rail pressure setpoint	Indicates the theoretical pressure value for optimum engine operation **X = 250 ± 50 bar**	In the event of a fault, refer to the interpretation of fault **DF053 "Rail pressure regulation function" and DF007 "Rail pressure sensor circuit"**.
		PR038:	Rail pressure	**0 < X < 10 bar** **Default value: 250 bar.**	
		PR048:	Rail pressure regulation valve OCR	**X = 15 %**	
		PR213:	Rail pressure loop difference	**X = PR008 - PR038**	The fuel pressure variation is the difference between the rail pressure and the rail pressure setpoint. In the event of a fault, refer to the interpretation of fault **DF007 "Rail pressure sensor circuit"** and **DF053 "Rail pressure regulation function"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

FUEL CIRCUIT (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	Flow	**PR157:**	Fuel flow setpoint	**0 < X < 60 mg/st**	Without
		PR017:	Fuel flow	**PR017 = PR157**	Without
		PR364:	Cylinder no. 1 fuel flow correction	**0.0 mg/st**	In the event of a fault, refer to **test 8 "POOR INJECTOR OPERATION"**.
		PR405:	Cylinder no. 2 fuel flow correction		
		PR406:	Cylinder no. 3 fuel flow correction		
		PR365:	Cylinder no. 4 fuel flow correction		
5	Rail current	**PR007:**	Rail pressure regulator current setpoint	**X = 400 ± 5 mA** **Default value: 1600 mA**	In the event of a fault, refer to the interpretation of fault **DF007 "Rail pressure sensor circuit"** and **DF053 "Rail pressure regulation function"**.
		PR006:	Rail pressure regulator current	**X = PR007 ± 5 mA** **Default value: 1600 mA**	
		PR080:	Rail pressure sensor voltage	**X = 0.5 V** **Default value: 5 V**	In the event of a fault, refer to the interpretation of fault **DF013 "Sensor supply voltage no. 3"**.
6	Sensor voltage	**PR080:**	Rail pressure sensor voltage	**0.5 < X < 1 V** **Default value: 5 V**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

EMISSION CONTROL/OBD

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine speed	**PR055:**	Engine speed	Indicates the engine's rotational speed in rpm.	In the event of a fault, refer to the interpretation for fault **DF005** "**Engine speed sensor circuit**".
2	Exhaust gas recirculation	**ET651:**	EGR programming cut-off	**NONE**	In the event of a fault, refer to the interpretation of **ET651** "**EGR programming cut-off**".
		PR005:	EGR valve opening setpoint	Gives a theoretical EGR valve opening value for optimum engine operation. **- 10 < X < 0 %**	In the event of a fault, refer to fault interpretation **DF272** "**EGR control circuit**".
		PR051:	EGR valve position feedback	**- 10 < X < 0 %**	In the event of a fault, refer to the interpretation of **DF118** "**EGR solenoid valve control**". The EGR valve position feedback loop difference must equal the difference between the EGR valve position and the position feedback.
		PR022:	EGR valve position feedback loop difference	**X = PR005 - PR051**	
		PR128:	Initial EGR valve offset	**10 % < X < 40 %** (average value)	In the event of a fault, run command **RZ002** "**EGR adaptives**".
		PR129:	Last EGR valve offset	**10 % < X < 40 %** (average value)	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

EMISSION CONTROL/OBD (CONTINUED 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
3	Air regulation	**PR171:**	Air flow setpoint for the EGR	**750 ± 200 mg/st**	Without
		PR131:	EGR air flow variation	**X = PR132 - PR171 should be close to 0 with the ignition on**	
		PR132:	Air flow	**0 < X < 10 kg/h**	In the event of a fault, consult the interpretation of parameter **DF056 "Air flow sensor circuit"**.
4	Sensor feed	**PR077:**	EGR valve position sensor voltage	**0.5 < X < 1.5 V default value: 0 V**	In the event of a fault, refer to the interpretation of fault **DF012 "Sensor supply voltage no. 2"**.
		PR668:	Turbine upstream temperature sensor voltage	**X = 5 V**	In the event of a fault consult the interpretation for fault **DF652 "Turbine upstream temperature sensor circuit".**
5	Temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
		PR667:	Turbine upstream air temperature	Gives the turbine upstream air temperature.	In the event of a fault, consult the interpretation for fault **DF778 "Turbine upstream temperature regulation"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

EMISSION CONTROL/OBD (CONTINUED 2)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
6	Particle filter	**PR383:**	Weight of soot in the particle filter	**X < 45 g.** Above 45g: After-Sales regeneration is obligatory and faults occur	If the weight is greater than 45 g, control settings **VP040 or SC017** "**Particle filter regeneration**".
		PR414:	Particle filter pressure differential	**X = 0 ± 1 mbar**	In the event of a fault, refer to the interpretation for **DF315** "**Particle filter pressure differential sensor circuit**" or **DF717** "**Particle filter upstream pressure valve**".
		PR385:	Exhaust pipe flow	**When stopped 0 m^3/h**	Without
		PR382:	Particle filter upstream temperature	**Minimum operating temperature: 50 °C**	In the event of a fault, consult the interpretation of **DF310** "**Particle filter upstream temperature sensor circuit**".
		PR381:	Particle filter downstream temperature	**Minimum operating temperature: 50 °C**	In the event of a fault, consult the interpretation of **DF309** "**Particle filter downstream temperature sensor circuit**".
		PR412:	Miles (km) driven since last regeneration	Miles since last dynamic regeneration (while driving) **minimum 180 miles (300 km) since the last regeneration**	After carrying out any procedures on the particle filter, use **SC030** "**Particle filter adaptive**".
		PR415:	Time since last regeneration	Time counter since last dynamic regeneration (while driving) **minimum 35 minutes between 2 regeneration attempts**	
		PR391:	Miles (km) travelled since particle filter was replaced	Miles (km) counter since the last time the particle filter was replaced	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Execution conditions: **ENGINE STATIONARY, IGNITION ON**.

DRIVER PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine	**PR190:**	Idle speed setpoint	Indicates the engine's rotational speed setpoint in rpm.	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
		PR055:	Engine speed	Indicates the engine's rotational speed in rpm.	
2	Accelerator pedal position *	**PR030:**	Accelerator pedal position	Indicates the accelerator pedal position. **If no pressure is exerted on the pedal PR030 = 0 %**	In the event of a fault, refer to the interpretation of fault **DF008 "Pedal potentiometer circuit gang 1"** or **DF009 "Pedal potentiometer circuit gang 2"**.
3	Sensor feed	**PR147:**	Pedal potentiometer voltage gang 1	Accelerator pedal released **0.70 < X < 0.80 V**	In the event of a fault, refer to the interpretation of fault **DF008 "Pedal potentiometer voltage gang 1"** or **DF009 "Pedal potentiometer voltage gang 2"**.
		PR148:	Pedal potentiometer voltage gang 2	Accelerator pedal released **0.35 < X < 0.40 V**	
4	Brake contact	**ET122:**	Brake contact no. 1 signal	Indicates recognition of the brake pedal contacts as **INACTIVE**	In the event of a fault, consult the interpretation of status **ET122 "Brake contact no. 1 signal"**.
		ET123:	Brake contact no. 2 signal		In the event of a fault, consult the interpretation of status **ET142 "Brake contact no. 2 signal"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

DRIVER PARAMETERS (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
5	Clutch pedal	**ET233:** Clutch pedal	Indicates recognition of clutch pedal contacts. **RELEASED**	In the event of a fault, consult the interpretation of status **ET233 "Clutch pedal"**.

(*) Pedal voltages - cold, ignition on (average values stated for information only).

Pedal load	0 %	25 %	50 %	100 %	120 %
Gang 1 voltage	0.74 V	1.52 V	2.09 V	3.23 V	3.67 V
Gang 2 voltage	0.37 V	0.77 V	1.06 V	1.64 V	1.87 V

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

IGNITION/PREHEATING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Power supply	**ET001:**	computer + after ignition feed	**PRESENT**	In the event of a fault, perform fault finding for **DF047** "**Computer supply voltage**".
2	Engine	**ET038:**	Engine	**STOPPED**	Without
		PR055:	Engine speed	Indicates the engine's rotational speed in rpm.	In the event of a fault, refer to the interpretation for fault **DF005** "**Engine speed sensor circuit**".
3	Temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001** "**Coolant temperature sensor circuit**".
		PR059:	Inlet air temperature	Indicates the inlet air temperature in °C **Default value: 20 °C**	In the event of a fault, refer to the interpretation of fault **DF039** "**Inlet air temperature sensor circuit**".
4	Preheating	**ET007:**	Preheating unit control	**Status ET007 is "ACTIVE" a few seconds after the ignition is switched on and for the post heating**	In the event of a fault, (ET007 locked in "ACTIVE"), refer to the interpretation of fault **DF017** "**Preheating unit control circuit**".
5	Power supply	**PR071:**	Computer supply voltage	**9 V < voltage < 16 V**	In the event of a fault, consult the interpretation of fault **DF047** "**computer supply voltage**".

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

ENGINE COOLING SYSTEM

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
2	Fan unit	**ET021:**	Low speed fan unit request	With the ignition switched on < 80° **INACTIVE**	If the fan assemblies are supplied with the ignition on, the injection may be in defect mode. Carry out a system fault test and refer to the interpretation of faults.
		ET022:	High speed fan unit request		
		ET014:	Engine fan unit 1 check	With the ignition switched on < 80° **STOPPED**	
		ET015:	Engine fan unit 2 check		
3	Sensor feed	**PR084:**	Coolant temperature sensor voltage	**3 < X < 4 V** **Default value: 5 V**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

COLD LOOP

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine	**PR055:**	Engine speed	Indicates the engine's rotational speed in rpm.	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
2	Operation by driver	**ET088:**	Compressor activation request	**INACTIVE**	If the air conditioning is authorised or the compressor being controlled see **62A air conditioning**.
		ET004:	Air conditioning authorisation	**NO**	
3	Air conditioning speed	**PR053:**	Speed requested by air conditioning	**N/A**	This parameter is only valid when the engine has been started
4	Output	**PR125:**	Power absorbed by the air conditioning compressor	**0 W**	Without
5	Engine cooling	**ET022:**	Low speed fan unit request	With the ignition switched on < 80° **INACTIVE**	If the fan assemblies are supplied with ignition on, the injection system may be in defect mode. Carry out a system fault test and refer to the interpretation of any faults occurring.
		ET021:	High speed fan unit request		
		ET014:	Engine fan unit 1 check	With the ignition switched on < 80° **STOPPED**	
		ET015:	Engine fan unit 2 check		

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

COLD LOOP (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
6	Coolant temperature	**PR064:** Coolant temperature	Indicates the engine coolant temperature in °C Default value: 119 °C	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
7	Vehicle speed	**PR089:** Vehicle speed	Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer. This signal is transmitted to the injection via the multiplex network.	In the event of a fault, test the multiplex network. For the interpretation of any faults (see **ABS 38C**).
8	Pressure	**PR037:** Refrigerant pressure	**2 bar < PR037 < 27 bar**	In the event of a fault, refer to the fault finding procedure for fault **DF049 "Refrigerant sensor circuit"**.
9	Voltage	**PR076:** Refrigerant sensor voltage	**0 V < X < 5 V**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

HEATING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
2	Passenger Compartment Heating Resistors (RCH)	**ET111:**	Set number of Passenger Compartment Heating Resistors	Depending on the requirements of the injection system: power requirement, torque reduction, etc., The injection computer sets the number of the RCHs operated (no more, no less).	In the event of a fault, see UCH (**MR 366, section 87B**).
		ET112:	Passenger Compartment Heating Resistor cut-off	Status ET112 indicates whether the injection computer is requesting the RCH to be cut off. **ET112 = YES**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

CRUISE CONTROL/SPEED LIMITER

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Cruise control/speed limiter	**PR089:**	Vehicle speed	Indicates the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer. This signal is transmitted to the injection on the multiplex network.	In the event of a fault, test the multiplex network. For the interpretation of any faults (**see ABS 38C**).
		PR130:	Cruise control setpoint	Indicates the cruise control limit speed	In the event of a fault, refer to the interpretation of statuses **ET042** "**Cruise control/ speed limiter**" **and ET415** "**Deactivating cruise control/ speed limiter**".
		ET042:	Cruise control/ speed limiter	**INACTIVE:** when no button is pressed	In the event of a fault, refer to the interpretation of status **ET042**.
				CRUISE CONTROL: cruise control "ON/OFF" button pressed	The green indicator light on the instrument panel lights up.
				LIMITER: speed limiter "ON/OFF" button pressed	Orange indicator light on the instrument panel lights up.
		ET413:	Cruise control/ speed limiter function	**INACTIVE:** when no button is pressed	In the event of a fault, refer to the interpretation of statuses **ET042** "**Cruise control/ speed limiter**", **ET413** "**Deactivating the cruise control/speed limiter**" and **ET415** "**Deactivating cruise control/speed limiter**".
				PLUS: increase button pressed	
				MINUS: decrease button pressed	
				INHIBIT: "0" button pressed	
				RESUME: "R" button pressed	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

CRUISE CONTROL/SPEED LIMITER (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
2	Cruise control/ speed limiter (continued)	**ET415:**	Deactivation of cruise control/ speed limiter Note: Cruise control can only be activated for a speed V > 18 mph (30 km/h)	**INACTIVE:** when no button is pressed	The cruise control and speed limiter functions can be deactivated by various events. **NOTE** Certain deactivations are stored, to reinitialise this status use **RZ007 "Fault memory"**. In the event of a fault, refer to the interpretation of statuses **ET042 "Cruise control/speed limiter" ET413 "Deactivating the cruise control/speed limiter" and ET415 "Deactivating cruise control/speed limiter"**.
				STATUS 1: traction control request	
				STATUS 2: brake pedal depressed	
				STATUS 3: cruise control or speed limiter fault	
				STATUS 4: engine/ gearbox decoupling	
				STATUS 5: fault detected by the injection computer	
				STATUS 6: invalid vehicle speed	
				STATUS 7: inhibit button pressed	
				STATUS 8: gear lever in neutral	
				STATUS 9: inconsistency between the request and the vehicle speed	
3	Brake switch	**ET122:**	Brake contact no. 1 signal	Brake pedal released **INACTIVE**	In the event of a fault, consult the interpretation of statuses **ET122 and ET123**.
		ET123:	Brake contact no. 2 signal		
4	Clutch switch	**ET233:**	Clutch pedal	Brake pedal released **RELEASED**	In the event of a fault, consult the interpretation of **DF070 "Clutch switch circuit"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

STARTING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Power supply	**ET001:**	computer + after ignition feed	**PRESENT**	If there is a fault carry out a full fault finding test on the charging circuit.
2	Starting	**ET238:**	Synchronisation	**NOT PERFORMED**	In the event of a fault, refer to fault interpretation **DF195 "Camshaft/ engine speed sensor consistency"**.
		ET076:	Starting	**AUTHORISED:** the injection authorises starting	If status **ET076** is "**PROHIBITED**", carry out a complete fault finding procedure on the multiplex network.
3	Engine operation	**ET038:**	Engine	**STOPPED**	Without
4	Power supply	**PR071:**	Computer supply voltage	**9 V < voltage < 16 V**	In the event of a fault, consult the interpretation of fault **DF047 "Computer supply voltage"**.
		PR358:	Sensor reference voltage	**3.4 V < voltage < 3.8 V**	Without

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test conditions: **ENGINE STATIONARY, IGNITION ON**.

PROTECTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine immobiliser	**ET341:**	Immobiliser code programmed	**YES**	If status **ET341** is locked on "**NO**", **see 87B UCH**.
		ET003:	Engine immobiliser	**INACTIVE**	If status **ET003** is locked on "**ACTIVE**", **see 87B UCH**.
2	Vehicle impact	**ET077:**	Impact detected	**NO**	In the event of a fault, refer to the interpretation of fault **DF069 "Impact detected signal"**.
3	Starting	**ET076:**	Starting	**AUTHORISED:** the injection authorises starting	If status **ET076** is "**PROHIBITED**", **see 87B UCH**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Vehicle impact	**ET077:**	Impact detected	**NO**	In the event of a fault, refer to the interpretation of fault **DF069 "Impact detected signal"**.
2	Power supply	**ET001:**	computer + after ignition feed	**PRESENT**	In the event of a fault, refer to the interpretation of **DF015 "Main relay control circuit"**.
		PR071:	Computer supply voltage	**9 V < X < 16 V**	In the event of a fault, carry out a fault finding procedure on the charge circuit and refer to the interpretation for **DF047 "Computer supply voltage"**.
		PR358:	Sensor reference voltage	**3.4 V < X < 3.8 V**	Without
3	Engine running	**PR055:**	Engine speed	Indicates the engine's rotational speed in rpm	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
4	Injection configuration	**ET104:**	Injector code use	**YES**	This status indicates that the IMA function is activated. In the event of a fault, consult the interpretation of **DF276 "Injector code programming"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

MAIN COMPUTER STATUSESAND PARAMETERS (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
5	Pressure	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is built into the computer. **Default value: 750 mbar.**	In the event of a fault, consult the interpretation of **DF003 "Atmospheric pressure sensor circuit"**.
		PR038:	Rail pressure	**250 < X < 350 bar**	In the event of a fault, consult the interpretation of fault **DF007 "Rail pressure sensor circuit"**.
6	Temperature	**PR059:**	Inlet air temperature	Indicates the inlet air temperature PR061 = PR059 **Default value: 20 °C**	In the event of a fault, refer to the interpretation for **DF039 "Inlet air temperature circuit sensor"**.
		PR064:	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
7	Torque	**PR015:**	Engine torque	**20 < X < 40 Nm**	This parameter is only valid when the engine has been started
8	Charging circuit	**PR016:**	Alternator flow	**Warm engine** **1500 < X < 2500 mA** **With electrical consumers:** **2500 < X < 3600 mA**	In the event of a fault, check the charging circuit.
9	Speed signal	**PR089:**	Vehicle speed	Indicates the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer. This signal is transmitted to the injection via the multiplex network.	In the event of a fault, test the multiplex network. See **38C ABS note**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

AIR CIRCULATION (TURBOCHARGING/INLET)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Engine speed	**PR055:** Engine speed	Indicates the engine's rotational speed in rpm.	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
2	Temperature	**PR059:** Inlet air temperature	Indicates the inlet air temperature **Default value: 20 °C**	In the event of a fault, refer to the interpretation of fault **DF039 "Inlet air temperature sensor circuit"**.
		PR061: External air temperature	Gives the external air temperature in °C. This parameter is controlled by the UCH and transmitted to the injection via the multiplex network. **Default value: 20 °C**	In the event of a fault, see UCH (see **MR 366, 87B**).
3	Turbocharging	**PR041:** Turbocharging pressure	**X = PR035 ± 10 mbar**	In the event of a fault, consult the interpretation of **DF004 "Turbocharging pressure sensor circuit"**.
		PR009: Turbocharging pressure setpoint	**790 < X < 1,110 mbar**	Without
		PR047: Turbocharging pressure OCR	**60 < X <90 %**	The opening cyclic ratio should be identical to the correction of the solenoid valve position
		PR011: Turbocharging solenoid valve position sensor	**60 < X <90 %**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

AIR CIRCULATION (TURBOCHARGING/INLET) (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	Air circulation	**PR035:**	Atmospheric pressure	Indicates the atmospheric pressure in mbar. The sensor is integrated into the computer. **Default value: 750 mbar.**	In the event of a fault, consult the interpretation of **DF003 "Atmospheric pressure sensor circuit"**.
		PR132:	Air flow	**25 < X < 50 kg/h**	In the event of a fault, consult the interpretation of parameter **DF056 "Air flow sensor circuit"**.
		PR672:	Damper valve position setpoint	**X < 5 %**	If there is a fault, consult the interpretation for fault **DF226 "Damper valve circuit"**.
		PR417:	Inlet damper valve OCR	**X < 5 %**	
		PR420:	Damper valve error counter	**X = 0**	
5	Sensor feed	**PR081:**	Inlet temperature sensor voltage	**1.90 < X < 2.90 V Default value: 5 V**	In the event of a fault, refer to the interpretation of fault **DF039 "Inlet air temperature sensor circuit"**.
		PR079:	Atmospheric pressure sensor voltage	**3.80 < X < 4 V**	In the event of a fault, consult the interpretation of **DF003 "Atmospheric pressure sensor circuit"**.
		PR073:	Air flowmeter supply voltage	**1.5 < X < 2.5 V Default value: 0 V**	In the event of a fault, refer to the interpretation of fault **DF013 "Sensor supply voltage no. 3"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

FUEL CIRCUIT

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine speed	**PR055:**	Engine speed	Indicates the engine's rotational speed in rpm	In the event of a fault, refer to the interpretation for fault **DF005** "**Engine speed sensor circuit**".
2	Injector codes	**ET104:**	Injector code operation	**YES** Indicates whether the injector codes have been programmed	In the event of a fault, consult the interpretation of **DF276** "**Injector code programming**".
3	Pressure	**PR008:**	Rail pressure setpoint	Indicates the theoretical pressure value for optimum engine operation **X = 270 ± 50 bar**	In the event of a fault, refer to the interpretation of fault ".
		PR038:	Rail pressure	**X = = 315 bar** **Default value: 250 bar**	In the event of a fault, consult the interpretation of fault **DF007** "**Rail pressure sensor circuit**".
		PR048:	Rail pressure regulation valve OCR	**35 < X < 45 %**	
		PR213:	Rail pressure loop difference	**X = PR008 - PR038**	The fuel pressure variation is the difference between the rail pressure and the rail pressure setpoint. In the event of a fault, consult the interpretation of fault **DF007** "**Rail pressure sensor circuit**".

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

FUEL CIRCUIT (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	Flow	**PR017:**	Fuel flow	**X = 0 < X < 60 mg/st**	Without
		PR157:	Fuel flow setpoint	**PR017 = PR157**	Without
		PR364:	Cylinder no. 1 fuel flow correction	± **1 mg/st**	In the event of a fault, refer to the interpretation of **test 8 "POOR INJECTOR OPERATION"**.
		PR405:	Cylinder no. 2 fuel flow correction		
		PR406:	Cylinder no. 3 fuel flow correction		
		PR365:	Cylinder no. 4 fuel flow correction		
5	Rail current	**PR007:**	Rail pressure regulator current setpoint	**X = 1400 ± 50 mA** **Default value: 1600 mA**	In the event of a fault, consult the interpretation of fault **DF007 "Rail pressure sensor circuit"**.
		PR006:	Rail pressure regulator current	**X = PR007 ± 5 mA** **Default value: 1600 mA**	
		PR080:	Rail pressure sensor voltage	**1 < X < 1.5 V** **Default value: 5 V**	In the event of a fault, refer to the interpretation of fault **DF013 "Sensor supply voltage no. 3"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

EMISSION CONTROL/OBD

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine speed	**PR055:**	Engine speed	Indicates the engine's rotational speed in rpm	In the event of a fault, refer to the interpretation for fault **DF005** "**Engine speed sensor circuit**".
2	Exhaust gas recirculation	**ET651:**	EGR programming cut-off	**NONE**	In the event of a fault, refer to the interpretation of **ET651** "**EGR programming cut-off**".
		PR005:	EGR valve opening setpoint	Gives a theoretical EGR valve opening value for optimum engine operation. **10 < X < 40 %**	In the event of a fault, refer to fault interpretation **DF272** "**EGR control circuit**".
		PR051:	EGR valve position feedback	**10< X < 40 %**	In the event of a fault, refer to the interpretation of **DF118** "**EGR solenoid valve control**". The EGR valve position feedback loop difference must equal the difference between the EGR valve position and the position feedback.
		PR022:	EGR valve position feedback loop difference	**X = PR005 - PR051 should be close to 0 at idle speed**	
		PR128:	First EGR valve offset	**10% < X < 40 %** (average value)	In the event of a fault, run command **RZ002** "**EGR adaptives**".
		PR129:	Last EGR valve offset	**10% < X < 40 %** (average value)	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

EMISSION CONTROL/OBD (CONTINUED 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
3	Air regulation	**PR171:**	Air flow setpoint for the EGR	**750 ± 400 mg/st**	Without
		PR132:	Air flow	Approximately **30 kg per hour**	
		PR131:	EGR air flow variation	**X = PR132 - PR171 should be close to 0 at idle speed**	In the event of a fault, consult the interpretation of parameter **DF056** "**Air flow sensor circuit**".
4	Sensor feed	**PR077:**	EGR valve position sensor voltage	**1.5 < X < 2.5 V default value: 0 V**	In the event of a fault, refer to the interpretation of fault **DF012** "**Sensor supply voltage no. 2**".
		PR668:	Turbine upstream temperature sensor voltage	**X = 5 V**	In the event of a fault, consult the interpretation for fault **DF652** "**Turbine upstream temperature sensor circuit**".
5	Temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001** "**Coolant temperature sensor circuit**".
		PR667:	Turbine upstream air temperature	Indicates the turbine upstream air temperature	In the event of a fault, consult the interpretation for fault **DF778** "**Turbocharger upstream temperature regulation**".

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

EMISSION CONTROL/OBD (CONTINUED 2)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
6	Particle filter	**PR383:**	Weight of soot in the particle filter	**X < 45 g** Above 45g: After-Sales regeneration is obligatory and faults may occur	If the weight is greater than 45 g, control settings **VP040 or SC017 "Particle filter regeneration"**.
		PR414:	Particle filter pressure differential	**5 < X < 300 mbar**	In the event of a fault, refer to the interpretation for **DF315 "Particle filter pressure differential sensor circuit"** or **DF717 "Particle filter upstream pressure valve"**.
		PR385:	Exhaust pipe flow	**30 < X < 80 m^3/h**	Without
		PR382:	Particle filter upstream temperature	**150° < X < 200 °C**	In the event of a fault, consult the interpretation of **DF310 "Particle filter upstream temperature sensor circuit"**.
		PR381:	Particle filter downstream temperature	**100° < X < 200 °C**	In the event of a fault, consult the interpretation of **DF309 "Particle filter downstream temperature sensor circuit"**.
		PR412:	Miles (km) driven since last regeneration	Miles since last dynamic regeneration (while driving) **minimum 180 miles (300 km) since the last regeneration**	After all procedures have been carried out on the particle filter, use **SC030 "Particle filter adaptive"**.
		PR415:	Time since last regeneration	Time since last dynamic regeneration (while driving) **minimum 35 minutes between 2 regeneration attempts**	
		PR391:	Miles (km) travelled since particle filter was replaced	Miles (km) since last time particle filter was replaced	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

DRIVER PARAMETERS

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	Engine	**PR055:** Engine speed	Indicates the engine's rotational speed in rpm	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
		PR190: Idle speed setpoint	Indicates the engine's rotational speed setpoint in rpm	
2	Accelerator pedal position *	**PR030:** Accelerator pedal position	Indicates the accelerator pedal position. If no pressure **is being applied to the pedal PR030 = 0 %**	In the event of a fault, refer to the interpretation of fault **DF008 "Pedal potentiometer circuit gang 1"** or **DF009 "Pedal potentiometer circuit gang 2"**.
3	Sensor feed	**PR147:** Pedal potentiometer voltage gang 1	Accelerator pedal released **0.70 < PR147 < 0.80 V**	In the event of a fault, refer to the interpretation of fault **DF008 "Pedal potentiometer voltage gang 1"** or **DF009 "Pedal potentiometer voltage gang 2"**.
		PR148: Pedal potentiometer voltage gang 2	Accelerator pedal released **0.35 < PR088 < 0.40 V**	
4	Brake contact	**ET122:** Brake contact no. 1 signal	Indicates recognition of brake pedal contacts **INACTIVE**	In the event of a fault, consult the interpretation of status **ET122 "Brake contact no. 1 signal"**.
		ET123: Brake contact no. 2 signal		In the event of a fault, consult the interpretation of status **ET142 "Brake contact no. 2 signal"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

DRIVER PARAMETERS (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
5	Clutch pedal	**ET233:** Clutch pedal	Indicates recognition of clutch pedal contacts **RELEASED**	In the event of a fault, consult the interpretation of status **ET233 "Clutch pedal"**.

(*) Pedal voltages - cold, ignition on (average values stated for information only).

Pedal load	0 %	25 %	50 %	100 %	120 %
Gang 1 voltage	0.74 V	1.52 V	2.09 V	3.23 V	3.67 V
Gang 2 voltage	0.37 V	0.77 V	1.06 V	1.64 V	1.87 V

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

IGNITION/PREHEATING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Power supply	**ET001:**	computer + after ignition feed	**PRESENT**	If there is a fault, carry out a fault finding check on the charge circuit.
2	Engine	**ET038:**	Engine	**RUNNING**	Without
		PR055:	Engine speed	Indicates the engine's rotational speed in rpm	In the event of a fault, refer to the interpretation for fault **DF005** "**Engine speed sensor circuit**".
3	Temperature	**PR058:**	Air temperature	Indicates the inlet air temperature in °C **Default value: 20 °C**	In the event of a fault, refer to the interpretation of fault **DF039** "**Inlet air temperature sensor circuit**".
		PR064:	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001** "**Coolant temperature sensor circuit**".
4	Preheating	**ET007:**	Preheating unit control	**Status ET007 is "ACTIVE" a few seconds after the ignition is switched on and during postheating**	In the event of a fault, (ET007 locked in "ACTIVE"), refer to the interpretation of fault **DF017** "**Preheating unit control circuit**".
5	Power supply	**PR071:**	Computer supply voltage	**9 V < voltage < 16 V**	In the event of a fault, consult the interpretation of fault **DF047** "**Computer supply voltage**".

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

ENGINE COOLING SYSTEM

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
2	Fan unit	**ET021:**	Low speed fan unit request	**ACTIVE if air conditioning request**	If the fan assemblies are supplied with the ignition on, the injection may be in defect mode. Carry out a system fault test and refer to the interpretation of faults.
		ET022:	High speed fan unit request	**INACTIVE**	
		ET014:	Engine fan unit 1 check	**RUNNING if air conditioning requested**	
		ET015:	Engine fan unit 2 check	**STOPPED**	
3	Sensor feed	**PR084:**	Coolant temperature sensor voltage	**1 < X < 2 V** **Default value: 5 V**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

COLD LOOP

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine	**PR055:**	Engine speed	Indicates the engine's rotational speed in rpm	In the event of a fault, refer to the interpretation for fault **DF005 "Engine speed sensor circuit"**.
2	Operation by driver	**ET088:**	Compressor activation request	**ACTIVE if air conditioning request**	If the air conditioning is authorised or the compressor is being controlled see **62A air conditioning**.
		ET004:	Air conditioning authorisation	**YES if air conditioning request**	
3	Air conditioning speed	**PR053:**	Engine speed requested by air conditioning	**875 rpm depending on computer programming**	This parameter is only valid when the engine has been started
4	Output	**PR125:**	Power absorbed by the air conditioning compressor	Indicates the power absorbed by the air conditioning compressor	This parameter is only valid when the engine has been started
5	Engine cooling	**ET021:**	Low speed fan unit request	**ACTIVE if air conditioning request**	If the fan assemblies are supplied with the ignition on, the injection system may be in defect mode. Carry out a system fault test and refer to the interpretation of any faults.
		ET022:	High speed fan unit request	**INACTIVE**	
		ET014:	Engine fan unit 1 check	**RUNNING if air conditioning requested**	
		ET015:	Engine fan unit 2 check	**STOPPED**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

COLD LOOP (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
6	Coolant temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
7	Vehicle speed	**PR089:**	Vehicle speed	Indicates the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer. This signal is transmitted to the injection via the multiplex network.	In the event of a fault, test the multiplex network. For the interpretation of any faults (**see ABS 38C**).
8	Refrigerant	**PR037:**	Refrigerant pressure	**1 < X < 27 bar**	In the event of a fault, refer to the fault finding procedure for fault **DF049 "Refrigerant sensor circuit"**.
		PR076:	Refrigerant sensor voltage	**0 V < X < 5 V**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

HEATING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Coolant temperature	**PR064:**	Coolant temperature	Indicates the engine coolant temperature in °C **Default value: 119 °C**	In the event of a fault, refer to the interpretation of **DF001 "Coolant temperature sensor circuit"**.
2	Passenger Compartment Heating Resistors (RCH)	**ET111:**	Set number of Passenger Compartment Heating Resistors	Depending on the requirements of the injection system (power requirement, torque reduction, etc.), the injection computer sets the number of the RCHs operated (no more, no less). **ET111 = NO**	In the event of a fault, see UCH (**MR 366, section 87B**).
		ET112:	Passenger Compartment Heating Resistor cut-off	Status ET112 indicates whether the injection computer is requesting the RCH to be cut off. **ET112 = NO**	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

CRUISE CONTROL/SPEED LIMITER

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Cruise control/ speed limiter	**PR089:**	Vehicle speed	Gives the vehicle speed in mph (km/h). This parameter is transmitted by the ABS computer. This signal is transmitted to the injection via the multiplex network.	In the event of a fault, test the multiplex network. For the interpretation of any faults (**see ABS 38C**).
		PR130:	Cruise control setpoint	Indicates the cruise control cruising speed	In the event of a fault, refer to the interpretation of statuses **ET042 "Cruise control/speed limiter" and ET415 "Deactivating cruise control/speed limiter"**.
		ET042:	Cruise control/ speed limiter	**INACTIVE:** when no button is pressed	In the event of a fault, refer to the interpretation of status **ET042**.
				CRUISE CONTROL: cruise control "ON/OFF" button pressed	The green indicator light on the instrument panel lights up.
				LIMITER: speed limiter "ON/OFF" button pressed	The orange indicator light on the instrument panel lights up.
		ET413:	Cruise control/ speed limiter function	**INACTIVE:** when no button is pressed	In the event of a fault, refer to the interpretation of statuses **ET042 "Cruise control/speed limiter", ET413 "Deactivating the cruise control/speed limiter"** and **ET415 "Deactivating cruise control/speed limiter"**.
				PLUS: increase button pressed	
				MINUS: decrease button pressed	
				INHIBIT: "0" button pressed	
				RESUME: "R" button pressed	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

CRUISE CONTROL/SPEED LIMITER (continued 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
2	Cruise control/ speed limiter (continued)	**ET415:**	Deactivation of cruise control/ speed limiter Note: the cruise control can only be activated at a speed of V > 18 mph (30 km/h)	**INACTIVE:** when no button is pressed	The cruise control and speed limiter functions can be deactivated by various events. **IMPORTANT:** Certain deactivations are stored, to reinitialise this status use **RZ007 "Fault memory"** In the event of a fault, refer to the interpretation of statuses **ET042 "Cruise control/speed limiter"**, **ET413 "Deactivating the cruise control/speed limiter" and ET415 "Deactivating cruise control/speed limiter"**.
				STATUS 1: traction control request	
				STATUS 2: brake pedal depressed	
				STATUS 3: cruise control or speed limiter fault	
				STATUS 4: engine/ gearbox decoupling	
				STATUS 5: fault detected by the injection computer	
				STATUS 6: vehicle speed invalid	
				STATUS 7: inhibit button pressed	
				STATUS 8: gear lever in neutral	
				STATUS 9: inconsistency between the request and the vehicle speed	

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

CRUISE CONTROL/SPEED LIMITER (continued 2)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
3	Brake switch	**ET122:**	Brake contact no. 1 signal	Brake pedal released **INACTIVE**	In the event of a fault, consult the interpretation of statuses **ET122 and ET123**.
		ET123:	Brake contact no. 2 signal		
4	Clutch switch	**ET233:**	Clutch pedal	Brake pedal released **RELEASED**	In the event of a fault, consult the interpretation of **DF070 "Clutch switch circuit"**.

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

STARTING

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Power supply	**ET001:**	computer + after ignition feed	**PRESENT**	If there is a fault carry out a full fault finding procedure on the charging circuit.
2	Starting	**ET238:**	Synchronisation	**PERFORMED**	In the event of a fault, refer to fault interpretation **DF195 "Camshaft/ engine speed sensor consistency"**.
		ET076:	Starting	**AUTHORISED**	If status **ET076 is "PROHIBITED"**, carry out a complete fault finding procedure on the multiplex network.
3	Engine operation	**ET038:**	Engine	**RUNNING**	Without
4	Power supply	**PR071:**	Computer supply voltage	**9 V < voltage < 16 V**	In the event of a fault, consult the interpretation of fault **DF047 "computer supply voltage"**.
		PR358:	Sensor reference voltage	**3.4 V < voltage < 3.8 V**	Without

NOTES	Only check conformity after a complete check using the diagnostic tool. The values shown in this conformity check are given as examples. Test Conditions: **ENGINE AT IDLE SPEED, COOLANT TEMPERATURE > 80 °C**.

PROTECTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine immobiliser	**ET341:**	Immobiliser code programmed	**YES**	If status **ET341** is locked on "**NO", see 87B UCH**.
		ET003:	Engine immobiliser	**INACTIVE**	If status **ET003** is locked on "**ACTIVE**", **see 87B UCH**.
2	Vehicle impact	**ET077:**	Impact detected	**NO**	In the event of a fault, refer to the interpretation of fault **DF069** "**Impact detected signal**".
3	Starting	**ET076:**	Starting	**AUTHORISED: injection authorises starting**	If status **ET076** is "**PROHIBITED**", **see 87B UCH**.

Tool status	Diagnostic tool title
ET001	Computer + after ignition feed
ET003	Engine immobiliser
ET004	Air conditioning authorisation
ET007	Preheating unit control
ET014	Engine fan unit 1 check
ET015	Engine fan unit 2 check
ET021	High speed fan unit request
ET022	Low speed fan unit request
ET038	Engine
ET042	Cruise control/speed limiter
ET076	Starting
ET077	Impact detected
ET079	Climate control present
ET088	Compressor activation request
ET104	Injector code use
ET111	Set number of Passenger Compartment Heating Resistors
ET112	Passenger Compartment Heating Resistor cut-off
ET122	Brake contact no. 1 signal
ET123	Brake contact no. 2 signal
ET233	Clutch pedal
ET238	Synchronisation
ET341	Immobiliser code programmed
ET413	Cruise control/speed limiter function
ET415	Cruise control/speed limiter deactivation
ET651	EGR programming cut-off

ET001	COMPUTER + AFTER IGNITION FEED

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

ABSENT	***NOTES***	Ignition on

Check the condition and conformity of supply fuse **F5D (5A)** of the Protection and Switching Unit.
Repair if necessary.

Check for an earth on the following connections:

Injection computer black, 32-track connector A, **Track G4**	→	Battery **earth**
Injection computer black, 32-track connector A, **Track H4**	→	Battery **earth**
Injection computer black, 32-track connector A, **Track H1**	→	Battery **earth**

Repair if necessary.

Check for **+ 12 V** on track **D1** of connector A of the injection computer.
If there is no voltage, check the continuity and insulation to **earth** of the following connection:

Injection computer black, 32-track connector A, **Track D1**	→	**Track 1** of the UPC black connector

Repair if necessary.

PRESENT	***NOTES***	Ignition on

Check that there is not a **+ 12 V** with ignition switched off on track D1 of connector A of the injection computer.
Repair if necessary.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET003	ENGINE IMMOBILISER

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

ACTIVE	(see **87B, UCH**).
INACTIVE	(see **87B, UCH**).

AFTER REPAIR	Carry out a road test followed by a full check with the diagnostic tool.

ET004	AIR CONDITIONING AUTHORISED

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	The air conditioning authorisation only changes to "**YES**" if: – the air conditioning request has been made by the driver (air conditioning switch in **AC** or **AUTO** position with minimum ventilation), – the engine is not under full load, – the air conditioning system is not faulty.
NO	The status **ET004** remains at "**NO**" under the following conditions: – vehicle stopped with the ignition on, – faults present in the air conditioning circuit, – no air conditioning request made by the driver, – engine under full load. If status **ET004** remains at "**NO**" then the air conditioning should be authorised, check: – that the air conditioning compressor is activated correctly, – the air conditioning system supply fuses, – for freon in the air conditioning circuit, – the freon pressure value is consistent at idle speed. If the fault is still present, check the air conditioning computer for faults (See **MR 366, section 6, Air conditioning**).

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET007	PREHEATING UNIT CONTROL

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES

When the vehicle is started from cold, the injection computer controls the pre-postheating unit so that the vehicle can be started.
Status **ET007** becomes "**YES**" a few seconds after the ignition is switched on and during pre-postheating.
If the vehicle does not start and status **ET007** becomes "**YES**", check:
- the **F2 (70A)** preheating unit supply fuse located on the power supply fuse board in the engine interconnection unit, below the UPC,
- the resistance of the preheater plugs.

Replace any plug whose resistance is not less than **2 Ω**.
If the vehicle starts and the status **ET007** remains "**YES**" during the engine functional stage, refer to the interpretation of faults:
- **DF017 "Preheating relay control circuit",**
- **DF025 "Preheating unit diagnostic connection".**

NO

After the engine is started and the preheating phase, the injection computer should stop the pre-postheating unit operating.
Status **ET007** should become "**NO**".
In the event that the vehicle does not start and status **ET007** remains "**NO**", check the continuity and absence of interference resistance of the following connections:

Injection computer **Track A4** **grey 32-track connector C** → Track **9** preheating unit

Injection computer **Track E2** **grey 32-track connector C** → **Track 8** preheating unit

Repair if necessary.
If the fault is still present, refer to the interpretation of faults:
- **DF017 "Preheating relay control circuit",**
- **DF025 "Preheating unit diagnostic connection".**

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET014	ENGINE FAN UNIT 1 CHECK

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

NOTE:
Status **ET014** "**Engine fan unit 1 test**" and status **ET022** "**Low speed fan unit request**" change their status at the same time.

RUNNING	The low-speed engine fan unit is supplied in three scenarios: – the engine coolant temperature is above **89 °C**, – **the air conditioning is operational,** – the injection computer has system faults that could lead to the engine overheating. When the low-speed engine fan is supplied: – status **ET014** "**Engine fan unit 1 test**" becomes "**RUNNING**", status **ET022** "**Low speed fan unit request**" becomes "**ACTIVE**".
	In the event that the low-speed engine fan does not work, refer to the UPC fault finding note.
STOPPED	The low-speed engine fan unit stops when: – the engine coolant temperature is below **89 °C**, – the air conditioning is not switched on by the driver.

 IMPORTANT!	**IMPORTANT** **If the UPC does not detect the injection computer frames, the low-speed engine fan is supplied until the battery is completely discharged.** **In the event that the low-speed engine fan unit is faulty, the high-speed engine fan unit will then be activated.**

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET015	ENGINE FAN UNIT 2 CHECK

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

NOTE:
Status **ET015** "**Engine fan unit 2 test**" and status **ET021** "**High speed fan unit request**" change their status at the same time.

RUNNING	The engine fan unit can be supplied when: – the engine coolant temperature is above **99 °C**, – the injection computer has system faults that could lead to the engine overheating. When the high-speed fan is supplied: – status **ET015** "**Engine fan unit 2 test**" becomes "**RUNNING**", status **ET021** "**High speed fan unit request**" becomes "**ACTIVE**".
STOPPED	The high-speed engine fan unit stops when: – the engine coolant temperature is below **99 °C**.

 IMPORTANT!	**IMPORTANT** **If the UPC does not detect the injection computer frames, the low-speed engine fan is supplied until the battery is completely discharged.** **In the event that the low-speed engine fan unit is faulty, the high-speed engine fan unit will then be activated.**

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET021	HIGH-SPEED FAN REQUEST

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

NOTE:
Status **ET021** "**High speed fan unit request**" and status **ET015** "**Engine fan unit 2 test**" change their status at the same time.

ACTIVE	The injection computer requests the activation of the high-speed engine fan unit when: – the engine coolant temperature is above **99 °C**, – the injection computer has system faults that could lead to the engine overheating. When the high-speed fan is supplied: – status **ET021** "**High speed fan unit request**" becomes "**ACTIVE**". Status **ET015** "**Engine fan unit 2 test**" becomes "**RUNNING**".
INACTIVE	The high-speed engine fan unit stops when: – the engine coolant temperature is below **99 °C**, – **no fault which could cause engine overheating is present in the injection system.**

 IMPORTANT!	**IMPORTANT** **If the UPC does not detect the injection computer frames, the low-speed engine fan is supplied until the battery is completely discharged.** **In the event that the low-speed engine fan unit is faulty, the high-speed engine fan unit will then be activated.**

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET022	LOW SPEED FAN UNIT CONTROL

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

NOTE:
Status **ET022** "**Low speed fan unit request**" and status **ET014** "**Engine fan unit 1 test**" change their status at the same time.

ACTIVE	The injection computer requests the activation of the low-speed engine fan unit when: – the engine coolant temperature is above **89 °C**, – the injection computer has system faults that could lead to the engine overheating, – the air conditioning is switched on by the driver. When the high-speed fan is supplied: – status **ET022** "**Low speed fan unit request**" becomes "**ACTIVE**", status **ET014** "**Engine fan unit 1 test**" becomes "**RUNNING**".
INACTIVE	The low-speed engine fan unit stops when: – the engine coolant temperature is below **89 °C**, **– no fault which could cause engine overheating is present in the injection system,** **– the air conditioning is not switched on by the driver.**

 IMPORTANT!	**IMPORTANT** **If the UPC does not detect the injection computer frames, the low-speed engine fan is supplied until the battery is completely discharged.** **In the event that the low-speed engine fan unit is faulty, the high-speed engine fan unit will then be activated.**

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET038	ENGINE

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

STOPPED	Status **ET038** is "stopped" if the engine ignition is switched on but there has been no starter operation.
STARTER MOTOR	Status **ET038** is "starter motor" while the engine is in starting phase.
RUNNING	Status **ET038** is "running" when the engine is started.
STALLED	Status **ET038** is "stalled" if the engine has stalled. The vehicle will still be on + after ignition feed.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET042	CRUISE CONTROL/SPEED LIMITER

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

CRUISE CONTROL

Status **ET042** becomes "**CRUISE CONTROL**" when the **cruise control activation** button is pressed. This button is located on the instrument panel, or on the centre console of the vehicle.
A **green** instrument panel indicator light should light up when status **ET042** is on "**CRUISE CONTROL**".
If status **ET042** does not become "CRUISE CONTROL", check the "**ON/OFF**" status of the cruise control and the status of its button connector (see test table if below). Repair if necessary.
Check the injection computer connections.
Check the condition of the **F5F (7.5A)** fuse located on the UPC and replace it if necessary.
Check for the presence of an **+ after ignition feed** on **track A2** of the cruise control on/off switch.
Check **for continuity and make sure there is no interference resistance** on the following connection:

Injection computer black, 32-track connector A, **track A2**	⟶	Cruise control on/off button 6-track connector **track A3**

Repair if necessary.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET042 CONTINUED	

SPEED LIMITER

Status **ET042** becomes "**SPEED LIMITER**" when the **speed limiter activation** button is pressed. This button is located on the instrument panel, or on the centre console of the vehicle.
A **yellow** instrument panel warning light lights when status **ET042** is "**SPEED LIMITER**".
If status **ET042** does not become "**STATUS 2**", check the "**ON/OFF**" status of the speed limiter and the status of its connector (see test table if below). Repair if necessary.
Check the injection computer connections.
Check the condition of the **F5F (7.5A)** fuse located on the UPC and replace it if necessary.
Check for the presence of an **+ after ignition feed** on **track A2** of the speed limiter on/off switch.
Check **for continuity and make sure there is no interference resistance** on the following connection:

Injection computer connector A, black, 32-tracks **track C3**	→	Cruise control on/off button 6-track connector **track B1**

Repair if necessary.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET076	STARTING

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

AUTHORISED	Starting the vehicle is authorised when the UCH authorises starting. Status **ET076** changes to "**AUTHORISED**" if the vehicle cards are recognised and the engine immobiliser is inactive.

PROHIBITED	If the card is not recognised by the UCH, starting the vehicle is not authorised. Status **ET076** is "**PROHIBITED**" and the vehicle cannot be started. Run fault finding on the UCH, and refer to the fault finding note related to the vehicle to deal with any faults (MR 366 section 8, 87B).

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET077	IMPACT DETECTED

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	If the vehicle has had an accident, the injection computer receives the impact signal via the multiplex network and may switch off the ignition. Status **ET077** is "**YES**". Switch off the ignition for ten seconds, then switch it back on to enable the engine to start. Carry out a multiplex network test and deal with any faults.
NO	Under normal operating conditions, status **ET077** is "**NO**" when the computer has received no impact signal.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET088	REQUEST TO START COMPRESSOR

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

ACTIVE	Status **ET078** becomes "**ACTIVE**" if an air conditioning request (pressing "AC" or "AUTO" button with a "coldest setting" request) has been made and if status **ET004** is "YES". The selection is made on the air conditioning control panel, the request for air conditioning is transmitted to the UCH which in turn transmits the request to the injection computer which either authorises or does not authorise the compressor to switch on. If the injection computer authorises the compressor to switch on, its sends the **compressor switch-on request** to the UPC and status ET088 "COMPRESSOR SWITCH-ON REQUEST" becomes "**ACTIVE**" **(Climate control)**. If the vehicle is equipped with **manual air conditioning**, the air conditioning request is transmitted from the air conditioning control panel to the UCH which then accepts or does not accept the air conditioning compressor switch-on depending on the operating status of the passenger compartment fan. When the request has been accepted, the request to switch on the compressor is transmitted to the injection computer which either authorises or does not authorise the compressor to start. If the injection computer authorises the compressor to switch-on, its sends the **compressor switch-on request** to the UPC and status ET088 "COMPRESSOR SWITCH-ON REQUEST" becomes "**ACTIVE**". If the compressor switch-on request has not been carried out and status **ET078 remains** "**ACTIVE**", **refer to** MR 366, section 6, Air conditioning. **Note:** **Switching on the compressor is only authorised when the engine is running. Compressor switch-on is ultimately controlled the UPC.**
INACTIVE	Status **ET078** is "**INACTIVE**" **when no climate control request has been carried out, when the compressor is not authorised to start ET004** is "NO" **or when the driver switches off the climate control.** If the compressor switch-on request has not been carried out and status **ET078 remains** "**INACTIVE**", **refer to** MR 366, section 6, Air conditioning. Note: **Switching on the compressor is only authorised when the engine is running. Compressor switch-on is ultimately controlled the UPC.**

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET104	INJECTOR CODE OPERATION

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	Status **ET104** is "**YES**" if the IMA option (**individual injector correction) is activated in the injection computer**. **All the injectors have IMA codes** inscribed on the bakelite body, but **not all computers use them**. In the case of a computer configured with the IMA option, the injector codes must be entered into the injection computer in the following scenarios: – one or more injectors is replaced, – injection computer replacement, – reprogramming the injection computer. **If the injector codes are not programmed after these operations, fault DF276 "Injector code programming" will be present, and the engine will operate in defect mode.** Then use command SC002 "Enter injector codes" applying the procedure described in the interpretation of this command.
NO	Status **ET104** is "**NO**" if the computer is not configured to interpret the IMA codes (**individual injector correction**). **A computer without the IMA option can be replaced by a computer with this option. In this scenario status ET104 changes to "YES" after replacing the computer.** Fault **DF276 "Injector code programming" will be present and the engine will run in defect mode.** **In this case, use command SC002 "Enter injector codes" applying the procedure described in the interpretation of this command.**
FAULTY	Status **ET104** is "**FAULTY**" if the computer does not have IMA codes in the memory. Fault **DF276** "**Injector code programming**" is present and the engine runs in defect mode. In this case, use command **SC002** "**Enter injector codes**" applying the procedure described in the interpretation of this command. If at the end of the procedure status **ET104** remains "**FAULTY**", contact Techline.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET111	SET NUMBER OF PASSENGER COMPARTMENT HEATING RESISTORS

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	Depending on the requirements of the injection system (power requirement, torque reduction, etc.), the injection computer sets the number of the RCH's switched on (no more, no less). Status **ET111** becomes "**YES**" if the number of passenger compartment heating resistors is set by the injection computer.
NO	Depending on the requirements of the injection system: power requirement, torque reduction, etc., the injection computer sets the number of the RCH's switched on (no more, no less). Status **ET111** becomes "**NO**" if any number of passenger compartment heating resistors can be controlled as required by the UCH.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET112	PASSENGER COMPARTMENT HEATING RESISTOR CUT-OFF

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	The injection computer cuts off the passenger compartment heating resistors according to the injection requirements (power requirements, torque reduction, etc.). Status **ET112** becomes "**YES**" if the passenger compartment heating resistors are cut off at the request of the injection computer.
NO	The injection computer cuts off the passenger compartment heating resistors according to the injection requirements (power requirements, torque reduction, etc.). Status **ET112** becomes "**NO**" if the passenger compartment heating resistors can be controlled as required by the UCH.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET122 **ET123**	BRAKE CONTACT no. 1 SIGNAL BRAKE CONTACT no. 2 SIGNAL

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

Note:
Statuses ET122 and ET123 should change statuses at the same time. In the event of inconsistency, refer to the interpretation of fault DF050 "Brake switch circuit".

INACTIVE and brake pedal depressed

If the brake lights are operating:
- check the continuity and make sure there is no interference resistance on the following connection:

Injection computer **black 32-track connector A, Track E4** → **Track 3** Brake pedal switch

Repair if necessary.

If the brake lights are not operational, check:
- the condition and mounting of the brake switch,
- the condition and conformity of the brake lights fuse **1 H (15A)**, located on the passenger compartment fuse box and relay, in the left-hand lower section of the dashboard,
- the conformity of the values in the following table:

	Continuity between tracks	**Insulation between tracks**
Switch pressed (Brake pedal released)	**3 and 4**	**1 and 2**
Switch released (Brake pedal depressed)	**1 and 2**	**3 and 4**

Replace the switch if the values obtained are not correct.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET122 **ET123** **CONTINUED**	

ACTIVE **and brake pedal released**	If the brake lights are operating: – check the continuity and make sure there is no interference resistance on the following connection: Injection computer **black 32-track connector A, Track E4** → **Track 3** Brake pedal switch Repair if necessary. If the brake lights are not working, check the condition and fitting of the brake light switch as well as the brake lights fuse, remove and test the operation of the brake light switch:

	Continuity between tracks	**Insulation between tracks**
Switch pressed (Brake pedal released)	**3 and 4**	**1 and 2**
Switch released (Brake pedal depressed)	**1 and 2**	**3 and 4**

Replace the switch if the values obtained are not correct.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET233	CLUTCH PEDAL

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

RELEASED and clutch pedal depressed

Check the condition and fitting of the clutch pedal switch.
Check the following connection for continuity and make sure there is no interference resistance:

Injection computer **black, 32-track connector A, Track C4** ⟶ **Track 1** Clutch connector

Check for earth on track 2 of the clutch switch connector.

Repair if necessary.
Remove the clutch pedal switch and check that it is functioning correctly.

	Continuity between tracks	**Insulation between tracks**
Switch engaged (Brake pedal released)	**1 and 2**	
Switch released (Brake pedal depressed)		**1 and 2**

Replace the clutch pedal switch if necessary.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET233 CONTINUED	

DEPRESSED and clutch pedal released

Check the condition and fitting of the clutch pedal switch.
Remove the clutch pedal switch and check that it is functioning correctly.

	Continuity between tracks	Insulation between tracks
Switch engaged (Brake pedal released)	**1 and 2**	
Switch released (Brake pedal depressed)		**1 and 2**

Replace the switch if necessary.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET238	SYNCHRONISATION

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

IMPORTANT
Synchronisation is carried out during the engine starting phase. This is established between the camshaft position sensor and the TDC sensor.
Once this synchronisation has been carried out, it enables the computer to identify cylinder no. 1 and to calculate the precise position of the cylinder's Top Dead Centre.

INACTIVE	When the engine is stopped but the ignition switched on, cylinder no. 1 is no longer indicated. Status **ET238** is "**INACTIVE**", no synchronisation between the crankshaft and the camshaft is performed.
COMPLETED	Synchronisation is carried out during the engine starting phase. Cylinder no. 1 is indicated and synchronisation will be performed once the engine is started. Status **ET238** is "**COMPLETED**". If after several attempts to start the engine status **ET238** remains "**INACTIVE**", refer to the interpretation of the following faults: – **DF005** "**Engine speed sensor circuit**" – **DF097** "**Camshaft sensor circuit**" If the engine still does not start, refer to the information on "**Customer complaints**" in this note, **Fault Finding Chart 2** "**Starting problems**".

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET341	IMMOBILISER CODE PROGRAMMED

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

YES	Status **ET341** becomes "YES" if there is dialogue between the UCH and the injection computer and the card code is recognised. Engine starting authorisation is only given if the code is correctly recognised by the UCH computer, and status **ET003** "**Engine immobiliser**" is "**INACTIVE**".
NO	The code remains "**NO**" if dialogue between the UCH and the injection computer is not possible. Status **ET003** "**Engine immobiliser**" is "**ACTIVE**". The cause of the fault may be incorrect card programming (in this case refer to the fault finding note and follow the UCH card programming procedure). If it is not caused by the card codes, carry out a multiplex network test (if the previous fault finding check was by function), and check that dialogue is established between the UCH, the Protection and Switching unit and the injection computer. If dialogue is not established, please contact Techline.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET413	CRUISE CONTROL/SPEED LIMITER FUNCTION

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

PLUS	Status **ET413** becomes "**PLUS**" when the "**+**" button on the cruise control is pressed. This button is located to the left of the steering wheel. If status **ET413** does not become "**PLUS**", check the condition of the "±" cruise control button and its connector. Repair if necessary. **Refer to the airbag technical note that applies to the vehicle (see MR 366 section 8, 88C) to be able to remove the driver's airbag and carry out the measurements in complete safety.** Repair if necessary.
	Check the continuity and absence of interference resistance of the following connections: Injection computer black 32-track connector A, **track D2** → "±" button **Track 2** Injection computer black 32-track connector A, **track D3** → "±" button **Track 1** If the connection is broken, then repair it.
	Measure **the resistance of the following connection after pressing the "+" button**: If the resistance is not approximately **300 Ω**, check the continuity of the connection when the button is not pressed. If there is continuity, replace the "±" control button.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET413 CONTINUED 1	

MINUS	Status **ET413** becomes "**MINUS**" when the "**-**" button on the cruise control is pressed. This button is located to the left of the steering wheel. If status **ET413** does not become "**MINUS**", check the condition of the "±" cruise control button and its connector. Repair if necessary. **Refer to the airbag technical note that applies to the vehicle (see MR 366 section 8, 88C) to be able to remove the driver's airbag and carry out the measurements in complete safety.** Repair if necessary.
	Check the continuity and absence of interference resistance of the following connections: Injection computer black 32-track connector A, **track D2** → "±" button **Track 2** Injection computer black 32-track connector A, **track D3** → "±" button **Track 1** If the connection is broken, then repair it.
	Measure **the resistance of the following connection after pressing the "-" button**. If the resistance is not approximately **100 Ω**, check the continuity of the connection when the button is not pressed. If there is continuity, replace the "±" control button.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET413 CONTINUED 2	

INHIBIT	Status **ET413** becomes "**INHIBIT**" when the "**0**" button on the cruise control is pressed. This button is located to the right of the steering wheel. If status **ET413** does not change to "**INHIBIT**", check the condition of the "**R/0**" button of the cruise control, and the condition of its connector. Repair if necessary. **Refer to the airbag technical note that applies to the vehicle (see MR 366 section 8, 88C) to be able to remove the driver's airbag and carry out the measurements in complete safety.** Repair if necessary.
	Check the following connections for continuity and make sure there is no interference resistance: Injection computer black 32-track connector A, **track D2** → "**R/0**" button **Track 2** Injection computer black 32-track connector A, **track D3** → "**R/0**" button **Track 1** If the connection is broken, then repair it.
	Measure the **resistance of the following connection, after pressing the "0" button**: If the resistance is not approximately **0 Ω**, check the continuity of the connection when the button is not pressed. If there is continuity, then replace the "**R/0**" control button.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET413 CONTINUED 3	

RESUME	
	Status **ET413** becomes "**RESUME**" when the "**R**" button on the cruise control is pressed. This button is located to the right of the steering wheel. If status **ET413** does not change to "**RESUME**", check the condition of the "**R/0**" button of the cruise control, and the condition of its connector. Repair if necessary. **Refer to the airbag technical note that applies to the vehicle (see MR 366 section 8, 88C) to be able to remove the driver's airbag and carry out the measurements in complete safety**. Repair if necessary.
	Check the following connections for continuity and make sure there is no interference resistance: Injection computer black 32-track connector A, **track D2** → "**R/0**" button **Track 2** Injection computer black 32-track connector A, **track D3** → "**R/0**" button **Track 1** If the connection is broken, repair it.
	Measure the **resistance of the following connection, after pressing the "R" button**: If the resistance is not approximately **900 Ω**, check the continuity of the connection when the button is not pressed. If there is continuity, then replace the "**R/0**" control button.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET415	CRUISE CONTROL/SPEED LIMITER DEACTIVATION

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

NOTE:
Cruise control remains **INACTIVE** as long as the vehicle speed does not exceed **19 mph (30 km/h)**.
Status **ET415** details 9 causes for cruise control deactivation.
IMPORTANT:
To reinitialise the deactivations stored by the injection computer, it is necessary to use command RZ007 "Fault memory".

STATUS 1	**Traction control request**
	If the vehicle undergoing fault finding is fitted with a traction control system, the cruise control/speed limiter function is deactivated each time the traction control is selected. Status **ET415** only becomes "**STATUS1**" when driving. If this status appears with the ignition on when the vehicle is stationary, refer to **MR 366 section 3, 38C anti-lock braking system**.

STATUS 2	**Brake pedal depressed**
	If the driver depresses the brake pedal, the cruise control/speed limiter will become "**INACTIVE**". Status **ET415** changes to "**STATUS2**" when driving or during a cruise control function test when stationary. If status **ET415** remains locked on "**STATUS2**", consult the fault finding procedure for statuses **ET122** and **ET123** "**Brake contact no. 1 and no. 2 signal**".

STATUS 3	**Cruise control or speed limiter fault**
	If status **ET415** is "**STATUS3**", refer to the interpretation for status **ET042** "**Cruise control/speed limiter**" **and ET413** "Cruise control/speed limiter function", to test the components of the cruise control system and find the faulty component. If status **ET415** is locked on "**STATUS3**" contact Techline.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET415 CONTINUED 1	

STATUS 4	**Disconnection of the engine/gearbox**
	The cruise control/speed limiter function is deactivated if the gearbox is no longer linked to the engine (clutch pedal applied or gearbox in neutral). If status **ET415** is stuck at "**STATUS4**" with the vehicle stationary, contact Techline.

STATUS 5	**Fault detected by the injection computer**
	Status **ET415** changes to "**STATUS5**" if the injection computer detects a fault on the injection system: **– Faults in the engine speed sensor or camshaft,** **– Accelerator pedal faults,** **– Engine speed greater than 4,700 rpm,** **– Engine speed less than 1,000 rpm.** Carry out a multiplex network test, and then an injection system test, and carry out fault finding on any faults. If the fault is still present, contact Techline.

STATUS 6	**Invalid vehicle speed**
	Status **ET415** becomes "**STATUS6**" if the vehicle speed received by the computer is invalid. Consult the interpretation for fault **DF091** "**Vehicle speed signal**", and carry out fault finding on the **ABS** computer. If faults are present (see **38C, Anti-lock braking system).** If the fault is still present, contact Techline.

STATUS 7	**Inhibit switch pressed**
	Status **ET415** becomes "**STATUS7**" if: – the driver presses the "**0**" cruise control button – the clutch switch is faulty (**no signal on the clutch pedal position is being received by the injection computer**). If status **ET415** is locked at "**STATUS7**", refer to the fault finding procedure for status **ET042** "**Cruise control/speed limiter**" and run fault finding on the "**R/0**" cruise control button.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET415 CONTINUED 2	

STATUS 8	**Gear lever in neutral position**
	Status **ET415** changes to "**STATUS8**" if the driver puts the gear lever in the neutral position when driving. This deactivates the cruise control/speed limiter. If status **ET415** remains stuck at "**STATUS8**" when driving after engaging a gear, contact Techline.

STATUS 9	**Inconsistency between the request and the vehicle speed**
	Status **ET415** changes to "**STATUS9**" if the computer detects a fault between the speed requested by the driver and the vehicle speed. The vehicle signal is receiving interference or is incorrect. Consult the interpretation for fault **DF091** "**Vehicle speed signal**". Run fault finding on the **ABS** circuit **(see 38C, Anti-lock braking system)**. If the fault is still present, contact Techline.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET651	EGR PROGRAMMING CUT-OFF

NOTES	**Special notes:** Only perform these tests if the status does not correspond with the system programming functions.

NONE	**No EGR cut-off, the EGR valve is working properly in accordance with the computer programs.**
STATUS 1, 5, 6, 7, 9, 10, 12, 13, 15, 19, 23, 24	Switch off the engine and wait **40 seconds**. Switch the ignition on and check for faults. Check the engine battery voltage with the vehicle stationary and the engine running. If no faults are present or stored, restart the vehicle and test at idle speed. **Do not accelerate too much and reach an engine speed that is too high.**
STATUS 3, 14, 16	Accelerate above idling speed for a few seconds.
STATUS 2	Check that the clutch pedal (**ET233** "**Clutch Pedal**") is not depressed, and that the vehicle is completely stopped.
STATUS 4, 17	Test the present and stored faults and repair.
STATUS 8	Reinitialise the EGR offsets with reference to the interpretation of command **RZ002** "**EGR adaptive**".

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

ET651 CONTINUED	

STATUS 11, 22	Allow the engine to heat up until this cut-off disappears.
STATUS 18	Check that the regeneration of the particle filter in progress has completely finished.
STATUS 20	Allow the engine to cool until this cut-off disappears.
STATUS 21	Too low atmospheric pressure, the EGR valve is disabled.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

Tool parameter	Diagnostic tool title
PR005	EGR valve opening setpoint
PR006	Rail pressure regulator current
PR007	Rail pressure regulator current setpoint
PR008	Rail pressure setpoint
PR009	Turbocharging pressure setpoint
PR011	Turbocharging solenoid valve position correction
PR015	Engine torque
PR016	Alternator flow
PR017	Fuel flow
PR022	EGR valve position feedback loop difference
PR030	Accelerator pedal position
PR035	Atmospheric pressure
PR037	Refrigerant pressure
PR038	Rail pressure
PR041	Turbocharging pressure
PR047	Turbocharging pressure OCR
PR048	Rail pressure regulation valve OCR
PR051	EGR valve position feedback
PR053	Speed requested by air conditioning
PR055	Engine speed
PR059	Inlet air temperature
PR061	External air temperature
PR064	Coolant temperature
PR071	Computer supply voltage
PR073	Air flowmeter supply voltage
PR076	Refrigerant sensor voltage
PR077	EGR valve position sensor voltage
PR079	Atmospheric pressure sensor voltage
PR080	Rail pressure sensor voltage

Tool parameter	Diagnostic tool title
PR081	Inlet temperature sensor voltage
PR084	Coolant temperature sensor voltage
PR089	Vehicle speed
PR125	Power absorbed by the air conditioning compressor
PR128	First EGR valve offset
PR129	Last EGR valve offset
PR130	Cruise control setpoint
PR131	EGR air flow variation
PR132	Air flow
PR147	Pedal potentiometer voltage gang 1
PR148	Pedal potentiometer voltage gang 2
PR157	Fuel flow setpoint
PR171	Air flow setpoint for EGR
PR190	Engine idle speed setpoint.
PR213	Rail pressure loop difference
PR220	EGR valve OCR
PR358	Sensor reference voltage
PR364	Cylinder no. 1 fuel correction
PR365	Cylinder no. 4 fuel flow correction
PR381	Particle filter downstream temperature
PR382	Particle filter upstream temperature
PR383	Weight of soot in the particle filter
PR384	Particle filter downstream temperature
PR385	Exhaust pipe flow,
PR391	Miles (km) travelled since particle filter was replaced
PR405	Cylinder no. 2 fuel flow correction
PR406	Cylinder no. 3 fuel flow correction
PR412	Miles (km) driven since last regeneration

Tool parameter	Diagnostic tool title
PR414	Particle filter pressure differential
PR415	Time since last regeneration
PR417	Air inlet valve OCR
PR420	Damper valve error counter
PR667	Turbine upstream air temperature
PR668	Turbine upstream temperature sensor voltage
PR667	Turbocharger upstream air temperature
PR668	Turbine upstream temperature sensor voltage
PR672	Damper valve position setpoint

Tool command	Diagnostic tool title
SC001	Write saved data
SC002	Enter injector codes
SC003	Save computer data
SC017	Particle filter regeneration
SC030	Particle filter adaptive
RZ002	EGR adaptives
RZ005	Programming
RZ007	Fault memory
RZ014	Damper valve fault adaptives
LC009	Climate control
LC065	Water in diesel fuel sensor
VP010	Write VIN
AC001	Preheating unit
AC004	Turbocharging solenoid valve
AC011	Rail pressure regulator
AC012	Damper valve
AC195	Electric coolant pump

SC001	WRITE SAVED DATA

NOTES	All data must be saved with command **SC003** "**SAVE COMPUTER DATA**" for this command to be run. Writing is carried out after the computer has been reprogrammed or replaced.

Validating this command writes the data saved using command **SC003** "**SAVE COMPUTER DATA**".
The data is as follows:
- vehicle idle speed,
- injector calibration codes (if the vehicle is fitted with IMA),
- programming of exhaust gas recirculation valve data,
- options available on the vehicle and managed by the computer (Example: Air conditioning),
- specific data related to the operation of the particle filter.

They will configure the computer and will enable it to avoid:
- engine malfunction after reprogramming or replacing the computer,
- faulty interpretation of information provided by the Clip tool.

SC002	ENTRY OF INJECTOR CODES

NOTES	This command is run after replacing the injectors and only if the vehicle is IMA configured (**ET104** "**INJECTOR CODE OPERATION**" is "**YES**"). If this command is not performed, the **DF276** "**INJECTOR CODE PROGRAMMING**" fault will be present.

IMPORTANT
The letters **J and Q**, and figures **0 and 9** are **not used in IMA coding**.
If these characters are used the entry will be **invalid**.

Cylinder no. 1 is the cylinder located **at the engine flywheel end**.

Procedure to be followed:
- Read the **6-character** alphanumeric codes etched on the upper section of the injector bodies,
- Use command **SC002**,
- Select the cylinder number for the cylinder concerned in the "**Desired**" column, then confirm,
- Enter the injector code displayed for the cylinder,
- Enter the new codes for each cylinder, then confirm,
- When the command is completed, the modified codes appear in the "**Current**" column,
- Check that the codes correspond to those read earlier,
- If the codes entered appear in neither the "**Current**" column nor the "**Desired**" column, check the codes read and make sure the data has been entered correctly,

  The possible confusions are:

  digit "1" with the letter "I"
  digit "8" with the letter "B"
  digit "5" with the letter "S"
- Exit fault finding mode.
- Switch off the ignition and **wait 40 seconds**.
- Switch the ignition back on and check for faults.
- **DF276** "**INJECTOR CODE PROGRAMMING**" should be stored.

If fault **DF276** is still present, the command has not been performed correctly.
Start the procedure again and follow the instructions.
if the codes are still not registered, check to see if power latch* has functioned correctly:
Switch off the ignition and **wait 40 seconds**.
If the warning light flashes as soon as the ignition is switched off, power latch* has not been performed and the command will be ignored.
If all these checks still do not enable the command to be confirmed, contact Techline.

*Computer on standby after switching the ignition off: approximately 40 seconds.

SC003	SAVE COMPUTER DATA

NOTES	The data is saved before computer reprogramming or the computer is replaced.

Selecting this command saves the following vehicle-specific data:
- vehicle idle speed,
- injector calibration codes (if the vehicle is fitted with IMA),
- programming of exhaust gas recirculation valve data,
- options available on the vehicle and managed by the computer (Example: Air conditioning).
- specific data related to the operation of the particle filter.

This information will be saved in the Clip tool.
Once the save is complete, use command **SC001** "**WRITE SAVED DATA**" to reset the computer.

SC017	PARTICLE FILTER REGENERATION

NOTES	Carry out this command only under the following conditions: – **ONLY DF308 "CLOGGED PARTICLE FILTER"** present.

IMPORTANT
- **It is imperative to carry out the next procedure in accordance with the safety and cleanliness guidelines.**
- It is normal not to read the value of the **turbine upstream temperature during an AFTER-SALES regeneration; the operating point** (1,500 rpm no load) **should not be allowed to reach 200 °C**.
- At any moment **the regeneration will cut-out** automatically if **the particle filter upstream temperature exceeds 700 °C** and/or if the **vehicle speed is non negligible**.

To carry out this command, select the command mode in the CLIP tool, and choose command **SC017**.

SAFETY INSTRUCTIONS TO BE FOLLOWED:

The regeneration causes exhaust fumes and high temperatures.
It is recommended that the vehicle is outside during the regeneration process.
If it is not possible to perform regeneration outside, check that the extractor can withstand very high regeneration temperatures (**400 °C at exhaust outlet**).

No objects should be left near the exhaust pipe.
Check the engine oil level before running the command to avoid any engine racing.
The oil level should be between the minimum and maximum levels.

IF NECESSARY:

The regeneration can be stopped (less than 3 seconds) by pressing the engine start button twice briefly.
Switch off the ignition and wait **40 seconds** before switching the ignition back on.
Note: the idle speed will return to **800 rpm** the next time the engine is started.

PROCEDURE TO BE FOLLOWED:

To carry out this command, select the command mode in the CLIP tool, and choose command **SC017**.

During regeneration the engine speed will be locked at **1,500 rpm**, the coolant temperature will reach **80 °C**, then the engine noise will change (delayed injection).
The exhaust fumes rise in temperature and burn the soot retained in the particle filter.
Check **PR382 "Particle filter upstream temperature"**: the temperature should be above **580 °C** during the entire regeneration process.
The **particle filter downstream temperature** starts up after the **particle filter upstream temperature** due to the its volume. Then the combustion of the soot stored in the particle filter causes the **particle filter downstream temperature** to increase, which may reach, depending on the particle filter charge level, more than 700 °C (with the **particle filter upstream temperature** reaching around 600 °C).

SC017 CONTINUED	

The command lasts a minimum of **30 min** (the time required for regeneration will be increased by the time required to heat the coolant to **80 °C**).
There are then two possibilities when regeneration is complete:
1 when the engine speed returns to idle speed the command is complete and the engine speed remains at **1,500 rpm**.
The only way to stop regeneration is to:
– Wait a few minutes to enable the particle filter to cool down and to avoid thermal shock (**3 minutes minimum**), Press (less than 3 seconds) the vehicle start button briefly two times,
– Switch off the ignition and wait **40 seconds** before switching the ignition back on.
Note: the idle speed will return to **800 rpm** the next time the engine is started.

VALIDATING THE REGENERATION PROCEDURE

Check the weight of the soot content in the particle filter. If **PR383 "Weight of soot in particle filter" < 8 g**, the AFTER-SALES regeneration has been successful, if **PR383 "Weight of soot in particle filter" > 8 g**, the AFTER-SALES regeneration has failed, switch off the ignition and wait **40 seconds**, then restart the procedure monitoring the change in the **particle filter downstream temperature (PR381)** during regeneration.

If the AFTER-SALES regeneration fails for the second time,
– replace the catalytic converter if **PR381** is below **450 °C** during regeneration (coolant temperature above **80 °C**).
or
– replace the particle filter if **PR383 "Weight of soot in the particulate filter" > 8 g** after two consecutive regenerations and/or if **PR381 "particle filter downstream temperature" < 580 °C** during the entire regeneration procedure (coolant temperature above **80 °C**), then follow the procedure described in the **"Replacing components"** section
Note: do not drain the oil or top up the oil level in the event of the two consecutive regenerations.

NOTE
– **It is essential to change the engine oil after a regeneration or after two consecutive MAXIMUM regenerations.**
– Use command **SC030 "Particle filter adaptives"**, and **"Particle filter regeneration with diagnostic tool" or "Replacing particle filter"**.

SC030	PARTICLE FILTER ADAPTIVE

NOTES	This command is run after a successful **particle filter regeneration** using the diagnostic tool, or following **replacement of the particle filter**.

IMPORTANT
Only use this command after an operation on the particle filter.

To run this command, select the command mode in the CLIP tool, and choose command **SC030** "**Particle Filter Adaptives**".

PROCEDURE TO BE FOLLOWED:

There are two possible cases:

1 Regeneration of the particle filter using command **SC017** "**Regenerating the particle filter**" has been successful, **PR383** "**Weight of soot in the particle filter**" **< 8 g**,

Use the selection "**Particle filter regeneration with the diag tool**",

Exit fault finding mode.
Switch off the ignition and **wait 40 seconds**.
Switch the ignition back on and check for faults.

2 The particle filter needs to be replaced:
PR383 "**Weight of soot in particle filter**" **> 8 g** after two consecutive regenerations and/or,
PR381 "**Particle filter downstream temperature**" **< 580 °C** during the entire regeneration procedure (coolant temperature above **80 °C**),

Replacing the particle filter,

Use the "**Replacing particle filter**" selection, exit fault finding mode. Switch off the ignition and **wait 40 seconds.** Switch the ignition back on and check the faults.

IMPORTANT
It is essential to change the engine oil after a regeneration or after two consecutive MAXIMUM regenerations.

RZ002	EGR ADAPTIVES

NOTES	This command is run after any procedure is carried out on the valve and/or the exhaust gas recirculation valve is replaced. Deal with all faults which do not involve the exhaust gas recirculation valve before programming the valve.

After any procedures carried out on the valve and/or after replacing the exhaust gas recirculation valve, the valve offsets in the memory must be cleared.

1. Procedure to follow after replacing the EGR valve:
– switch on the ignition.
– select the "**CLEAR**" menu,
– control the clear command **RZ002** "**EGR adaptives**",
– display the parameters in the "**Emission control/OBD**" sub-function:
PR128 = PR129 = 0 %,
– switch off the ignition and wait **40 seconds**,
– as soon as the ignition is switched on again the EGR valve offset is automatically reinitialised,
– display the parameters for the **EGR circuit**:
10 % < PR128 < 40 %
– start the vehicle to enable the latest EGR valve offset to be programmed,
– switch off the ignition and wait **40 seconds**,
– display the parameters for the **EGR circuit**:
10 % < PR128 = PR129 = PR051 < 40 %

Clear any faults.

2. Static test:
Exit fault finding mode and switch off the ignition:
– wait **40 seconds**, and switch on the ignition again,
– clear any faults,
– start the engine,
– let the engine idle for **1 min**,
– accelerate very slowly up to **1,500 rpm for 2 mins** until the exhaust gas recirculation function becomes active,
– repeat this procedure 5 times.

Check for faults,
If the fault does not recur, end the fault finding procedure.
If the fault reappears, restart the procedure after disconnecting and reconnecting the EGR valve.
If the fault is still present, replace the EGR valve.

Carry out a vehicle test at low-speed, without accelerating heavily, then normally.
Check for faults using the CLIP diagnostic tool.
If the fault does not recur, end the fault finding procedure.
If the fault reappears, restart the procedure after disconnecting and reconnecting the EGR valve.
If the fault is still present, replace the EGR valve.

RZ005	PROGRAMMING

NOTES	This command enables you to reinitialise the entire computer configuration according to the vehicle.

Command **RZ005** reconfigures the computer.
If the computer does not have any configuration data, use command **RZ005** to enter the vehicle options:
- air conditioning,
- passenger compartment heating resistors,
- cruise control.

These options are detected by the computer even if command **RZ005** is not used.
The computer is configured as soon as the one of the vehicle's optional system components is operated.

RZ014	DAMPER VALVE FAULT ADAPTIVES

NOTES	This command is run after any procedure on the flap and/or after the air flap being replaced or if fault **DF226** "**DAMPER VALVE CIRCUIT**" is present or stored.

The command **RZ014** allows the damper valve to be recalibrated following a procedure being carried out on it or after it is replaced.
Select the menu commands, then clear.
Run the command **RZ014**.
Once the command has finished,
Check for faults.
If the fault does not reappear after command **AC012** "**DAMPER VALVE**", end of fault finding.
If the fault reappears, restart the procedure after disconnecting and reconnecting the damper valve.
If the fault persists, replace the damper valve.

AC001	PREHEATING UNIT

NOTES	This command is only carried out if the fault **DF025** "**Preheating unit fault finding connection**", or **DF017** "**Preheating unit control circuit**" is present or stored and if no other fault is present. Refer to the "**Wiring diagrams**" TN for the vehicle to locate the fuses and relays concerned.

Connect the diagnostic tool and turn on the ignition.
With the preheating unit connected:
– connect the negative terminal of the voltmeter to **track 8** of the preheating unit,
– connect the positive terminal of the voltmeter to the **+ 12 V** battery,
– run command **AC001** "**Preheating unit**".
If the voltmeter does not indicate the battery voltage while the command is running (ten 1 second ON/OFF cycles):

1. Check the condition of fuse **F01 (70A)** which supplies the preheating unit.
Replace it if necessary.

2. Check **the continuity and that there is no interference resistance** on the following connections:
Injection computer connector C, **track E2** ⟶ **Track 8** of the preheating unit connector.
Injection computer connector C, **track A4** ⟶ **Track 3** of the preheating unit connector
Repair if necessary.

3. Check the connections on the preheating unit, heater plugs and injection computer.
Repair if necessary.

4. Measure the resistance of the preheater plugs. If this resistance is greater than **2 Ω** replace the faulty plug or plugs.

5. Check **the continuity and the absence of interference resistance** between:
preheating unit **track 1** ⟶ **cylinder 3** heater plug
preheating unit **track 2** ⟶ **cylinder 1** heater plug
preheating unit **track 6** ⟶ **cylinder 4** heater plug
preheating unit **track 7** ⟶ **cylinder 2** heater plug

6. Check for **+ 12 V** on **track 4** of the preheating relay connector.
If the fault is still present, replace the preheating unit.

AC004	TURBOCHARGING SOLENOID VALVE

NOTES	This command is used to check the turbocharging circuit.

This command enable confirmation that the turbocharger and its control circuit are working properly.

Introduction

1 - Check the high pressure air circuit sealing:

Pipe not joined or pierced, pressure sensor disconnected or poorly fitted (seal present), exchanger pierced. To test the intercooler: stabilise the engine speed between **3,500** and **4,000 rpm** with the vehicle stopped and check that there are no leaks.

Check the resistance of the turbocharging limitation solenoid valve between **tracks 1 and 2**.

Replace the solenoid valve if its resistance is not: **15.4 Ω ± 0.7 at 20°C**

Check the injection computer connections.

Check **continuity and make sure there is no interference resistance** on the following connection:

Injection computer grey 32-track connector **C**, **track E1** ⟶ **Track 1** turbocharging solenoid valve

Repair if necessary.

Check for the presence of **+ 12 V** after relay **on track 2** of the turbocharging solenoid valve.

2 - Turbocharger control circuit check

- With the engine switched off, make sure the control rod is in the rest position,
- Start the engine and make sure that the control rod operates to the upper stop.
- (when the engine is switched off, the control rod should return to the idle position)
- If the control rod movements do not conform, carry out the following checks:

1) Underpressure command check:
- Disconnect the solenoid valve inlet **hose** and connect it to a pressure gauge,
- Start the engine and stabilise it at idle speed,
- If the underpressure does not reach **800 mbar ± 100**: check the underpressure circuit from the vacuum pump.
- Stop the engine, reconnect the inlet hoses and go to **step no. 2**.

2) Solenoid valve control check:
- Disconnect the solenoid valve outlet **hoses**,
- Start the engine and stabilise it at idle speed,
- Place your hand on the solenoid valve and block the **outlet** union with your thumb,
- If you notice no solenoid valve vibration, check the operation of the computer output (**step 5**)

3) Solenoid valve operating check:
- Attach the pressure gauge to the **outlet** union of the solenoid valve,
- Start the engine and stabilise it at idle speed,

If the underpressure does not reach **800 mbar ± 100**, replace the solenoid valve.

AC004 CONTINUED	

Turbocharger control circuit check (continued)

4) Turbocharger operation check:

a) Attach a vacuum pump to the **hose** connected to the turbocharger control diaphragm,
Apply an underpressure of **800 ± 100 mbar**:
If there is a leak, replace the turbocharger (diaphragm included).

b) Check the movement and adjustment of the control rod (See **MR 364, 12B, turbocharging**).
If the control rod is sticking, replace the turbocharger.

c) Engine cold and stopped:
Remove the turbocharger inlet duct and check that the compressor turns freely on its axis.

d) If the fault is still present:
Check that the exhaust manifold is not leaking.
Check that the exhaust is not blocked.
Carry out the necessary repairs.

5) Computer output stage check: (solenoid valve connected). This operation **can only be carried out if** the checks indicated in **step no. 2** are **not conclusive**.
Or using a voltmeter: Connect the voltmeter earth lead to **track 2** of the solenoid valve and the positive cable to **track 1**.
Clear any solenoid valve fault then run command **AC004**:
➡ The voltmeter should display **ten cycles** of two successive voltages ~ = battery voltage X OCR* current.
either: **~ 2.5 V** (OCR for **20 %**) then **~ 8.7 V** (OCR for **70 %**).
Or with the oscilloscope (at 5 V/division range and time base 1 ms/division): Connect the oscilloscope earth lead to the battery earth and the positive test pin on **track 2** of the solenoid valve,
Clear any faults on the solenoid valve, then run command **AC004**:
➡ the oscilloscope should display a square wave signal of 12.5 V in amplitude at a frequency of 140 Hz (with an OCR alternating from ~ 20 to ~ 70 %).
If the measurement is correct, replace the solenoid valve.
If the measurement does not show any control or continuous voltage, contact Techline.

*Opening Cyclic Ratio

AC011	RAIL PRESSURE REGULATOR

NOTES	This command is used to check: – the operation of the pressure regulator, – and the high pressure injection circuit.

Step 1

Measure the pressure regulator resistance between **tracks 1** and **2**.
– Replace the regulator if its resistance is not approximately: **3 Ω ± 0.5 at 20 °C**.

Check **the continuity and absence of interference resistance** on the following connections:

Injection computer brown 48-track connector **B**, track **M4**	⟶	**track 2** of the rail pressure regulator connector.
+ 12 V after relay	⟶	**track 1** of the rail pressure regulator connector.

If, when running command **AC011**, you can hear a slight whistling noise and a crunching noise from the pressure regulator, go to **step 2**. Otherwise, ensure that the computer output stage is functioning correctly:

● **Or using a voltmeter:**

With the solenoid valve connected, connect the voltmeter earth lead to **track 2** of the fuel pressure solenoid valve and the positive cable to **track 1**. Clear any fuel pressure solenoid valve faults, then run command **AC011**:

➡ The voltmeter should display two successive voltages: **~ 2.5 V** for an OCR of **20 %** then **~ 8.75 V** for an OCR of **70 %** (ten cycles)

● **Or using an oscilloscope** (range 5 V/division and with time base 1 ms/division):

With the solenoid valve connected, connect the oscilloscope earth to the battery earth and the positive contact point on **track 2** of the fuel pressure solenoid valve; clear any fuel pressure solenoid valve faults then run command **AC011**:

➡ The oscilloscope should display a square-wave signal of 12.5 volts amplitude at a frequency of 185 Hz (with an OCR passing successively from 20 to 70 %).

If the measurement is correct, replace the regulator.
If the measurement is not correct, contact Techline.

*Opening Cyclic Ratio

AC011 CONTINUED	

Step 2

In the event of rail overpressure:
Check the injectors are working:
see "**COMPONENT TEST**", **test 10** "**POOR INJECTOR OPERATION**" section.

Check that the rail pressure sensor is operating correctly:
Fault interpretation **DF007** "**RAIL PRESSURE SENSOR CIRCUIT**".
Carry out the necessary repairs.
If these checks do not reveal any faults, and if the fault is still present, replace the rail pressure sensor.

In the event of rail underpressure:
Check that the rail pressure sensor is operating correctly:
Fault interpretation **DF007** "**RAIL PRESSURE SENSOR CIRCUIT**".
Check the low pressure diesel circuit priming.
Check the conformity of the diesel filter connections.
Check the condition of the filter (clogging and water saturation).
Check there are no air bubbles between the filter and the high pressure pump.
Check the low and high pressure diesel circuits sealing (visual checks, odour, etc.): pump casing, overpressure valve, pipes, rail and injector unions, injector wells, etc.).
Check the conformity of the seal fitting on the pressure regulator.
Check the injectors are working:
see section "**COMPONENT TEST**", **test 10** "**POOR INJECTOR OPERATION**".
Carry out the necessary repairs.
If these checks do not reveal any faults, and if the fault is still present, replace the rail pressure sensor.

AC012	DAMPER VALVE

NOTES	This command is used to check the operation of the damper valve

– Measure the **resistance** of the damper valve solenoid valve between **tracks 1 and 2**.
Replace the solenoid valve if its resistance is not approximately **46 ± 3 Ω at + 25 °C**.

– Check the continuity and absence of interference resistance on the connections between:

Injection computer, brown **48-track connector B, track M1**	→	**track 1** of the damper valve solenoid valve connector
+ 12 V after relay	→	**track 2** of the damper valve solenoid valve connector

A) Engine running at idling speed
Make sure that there is a pressure of **~ 900 mbar** on the solenoid valve inlet hose.
Make the necessary repairs (pressure circuit conformity and seal).

B) With the vehicle ignition on, engine stopped
Make sure the **damper valve** is **open**.
If not, clean or replace the air vent unit.
Disconnect the solenoid valve inlet and outlet hoses.
Connect a vacuum pump to the inlet union and apply a pressure of **~ 900 mbar**.
If there is a leak, replace the solenoid valve.
Run command **AC012**.
If the solenoid valve opens (vacuum pump pressure gauge returns to atmospheric pressure), go to **step C**.

Otherwise, with the solenoid valve connected, check operation of the computer output stage with a voltmeter:

Voltmeter earth cable	→	**track 1** of the solenoid valve
Voltmeter positive lead	→	**track 2** of the solenoid valve

Clear any solenoid valve faults.
Run command **AC012**.
The voltmeter should display ten "ON-OFF" cycles (**8.75 V then 2.5 V**).
If the measurement is correct, replace the solenoid valve.
If the measurement shows no control, contact Techline.

C) Vehicle with ignition off
Connect a vacuum pump to the flap control diaphragm and apply a pressure of **~ 900 mbar**:
If the diaphragm **does not maintain the underpressure**, replace the air vent unit (the diaphragm cannot be disconnected).
If the diaphragm **maintains the underpressure** and **the flap does not operate**, clean or replace the air vent unit.
If the diaphragm **maintains the underpressure** and **the flap operates**, then operate it several times to ensure that there is no blockage.
Check for clogging of the air vent unit and its flap, and clean if necessary.

AC195	ELECTRIC COOLANT PUMP

NOTES	This command is used to check the operation of the electric coolant pump

Test the **electric coolant pump relay (A 20A)** and check it is operating correctly.
Check the injection computer connections.
Repair if necessary.

Check the continuity between the following connections: Track **B1** and **B5** of the coolant pump relay mounting.

If these checks are correct,
check **the continuity and absence of interference resistance** of the following connections:

Injection computer brown 48-track connector B, **track H4**	→	Track **B2** of the coolant pump relay mounting
Injection supply relay mounting, **Track 5**	→	Track **B1** of the coolant pump relay mounting
Injection supply relay mounting, **Track 5**	→	Track **B5** of the coolant pump relay mounting
Turbocharger bearing coolant pump connector, **Track 1**	→	Track **B3** of the coolant pump relay mounting
Turbocharger bearing coolant pump connector, **Track 2**	→	**Earth**

Repair if necessary.

If the fault is still present, contact Techline.

NOTES	Before carrying out the procedures associated with customer complaints, check there are no faults and the conformity (or otherwise) of the "**parameters**" and "**statuses**", using the diagnostic tool. If the customer complaint is not eliminated, then proceed according to the corresponding fault finding chart.

NO DIALOGUE WITH ENGINE MANAGEMENT COMPUTER	→ **FAULT FINDING CHART 1**
STARTING FAULT OR STARTING IMPOSSIBLE	→ **FAULT FINDING CHART 2**
INJECTION NOISE	→ **FAULT FINDING CHART 3**
POOR PERFORMANCE	→ **FAULT FINDING CHART 4**
IRREGULAR ENGINE OPERATION	→ **FAULT FINDING CHART 5**
EXTERNAL LEAKS FROM THE FUEL CIRCUIT	→ **FAULT FINDING CHART 6**
ROUGH IDLE	→ **FAULT FINDING CHART 7**
OIL LEAKS FROM THE TURBOCHARGER	→ **FAULT FINDING CHART 8**

FAULT FINDING CHART 1	No dialogue with the engine management computer

Check that the diagnostic tool is not causing the fault by trying to establish dialogue with a computer on another vehicle.

Check the battery voltage and, if necessary, adjust it to the correct voltage (**9.5 V < Battery voltage < 17.5 V**).

If the tool is not at fault, and dialogue cannot be established with any other computer on the same vehicle, the cause could be a faulty computer causing interference on the multiplex network.
Disconnect the engine management computer.
Try to establish dialogue with another computer.
If the fault is still present, reconnect the computer and proceed by elimination by successively disconnecting all the following computers (according to wiring diagram and equipment): Air conditioning, Airbag, ABS and ESP, UCH, instrument panel, central communication unit, proximity sensor.
Try to establish a dialogue between each disconnection:
If, after a disconnection, you manage to establish dialogue, perform the fault finding procedure for the computer concerned.

↓

Perform fault finding on the multiplex network using the diagnostic tool.

↓

Check for the presence and the condition of the injection fuses on the UPC, and/or the engine fuse box.

Check the connection of the computer connectors and the condition of its connections.

Check the injection computer earths (quality, oxidation, earth bolts secure on the battery terminal).

Check that the supply to the computer is correct:
Earth on tracks H1, G4 and H4 of black 32-track **connector A**.
+ after ignition feed on track D1 of black 32-track **connector A**.

↓

Ensure that the supply to the diagnostic socket is correct:
+ before ignition feed on track 16.
+ after ignition feed on track 1.
Earth on tracks 4 and 5.

↓

If dialogue has still not been established after these various checks, contact Techline.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 2	Starting fault (or starting impossible)

NOTES	**Before dealing with this customer complaint, check there are no faults, and conformity (or otherwise) of "parameters" and "statuses", using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks:**

Is it difficult or impossible to start the engine?

impossible → **B** (Go to continued 2)

difficult ↓

SECTION A:

Check the engine earths.

Ensure that engine speed reaches **250 rpm** with the starter motor active, as displayed on the parameter screen (**PR055** "**Engine speed**").

If the engine speed is less than **250 rpm** refer to **Technical Note 6014A**, Checking the charging circuit, Starter motor fault finding, Starter motor (formerly Technical Note 3632A).

If the engine speed shown on CLIP is zero and the engine is running, measure **the resistance** of the engine speed sensor across **tracks 1 and 2 or A and B**:

Replace the sensor if its resistance is not: **800 Ω ± 80 at + 20 °C**

Check **the continuity** of the following connections:

engine management computer, **connector B track D1** → **Track A** of the engine speed sensor

engine management computer, **connector B track C1** → **Track B** of the engine speed sensor

Check that the engine earths are in order (oxidation, tightness, etc.).

Check the mounting, the air gap (if necessary refer to the information in the Workshop Repair Manual for the vehicle) and the condition of the sensor (overheating).

Replace if necessary.

Check the synchronisation of the camshaft sensors and the engine speed sensors with the display of **ET238** "**Synchronisation**".

If synchronisation is not active, refer to the checks described in **DF195** "**Camshaft/engine speed consistency**".

Check the fuel circuit sealing.

If the fault is still present, see **DF053** "**Rail pressure regulation function**" 2.def, stage 4.

After the checks, turn the page.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 2 CONTINUED 1	

Check that the heater plugs are actuated using the **AC001** "**Preheating unit**" command.
Check the sealing and condition of the inlet circuit: apply **test 3**, follow the associated diagnostic procedure.
Check that there are no foreign bodies on the flow sensor grille: apply **test 4**, follow the associated diagnostic procedure.

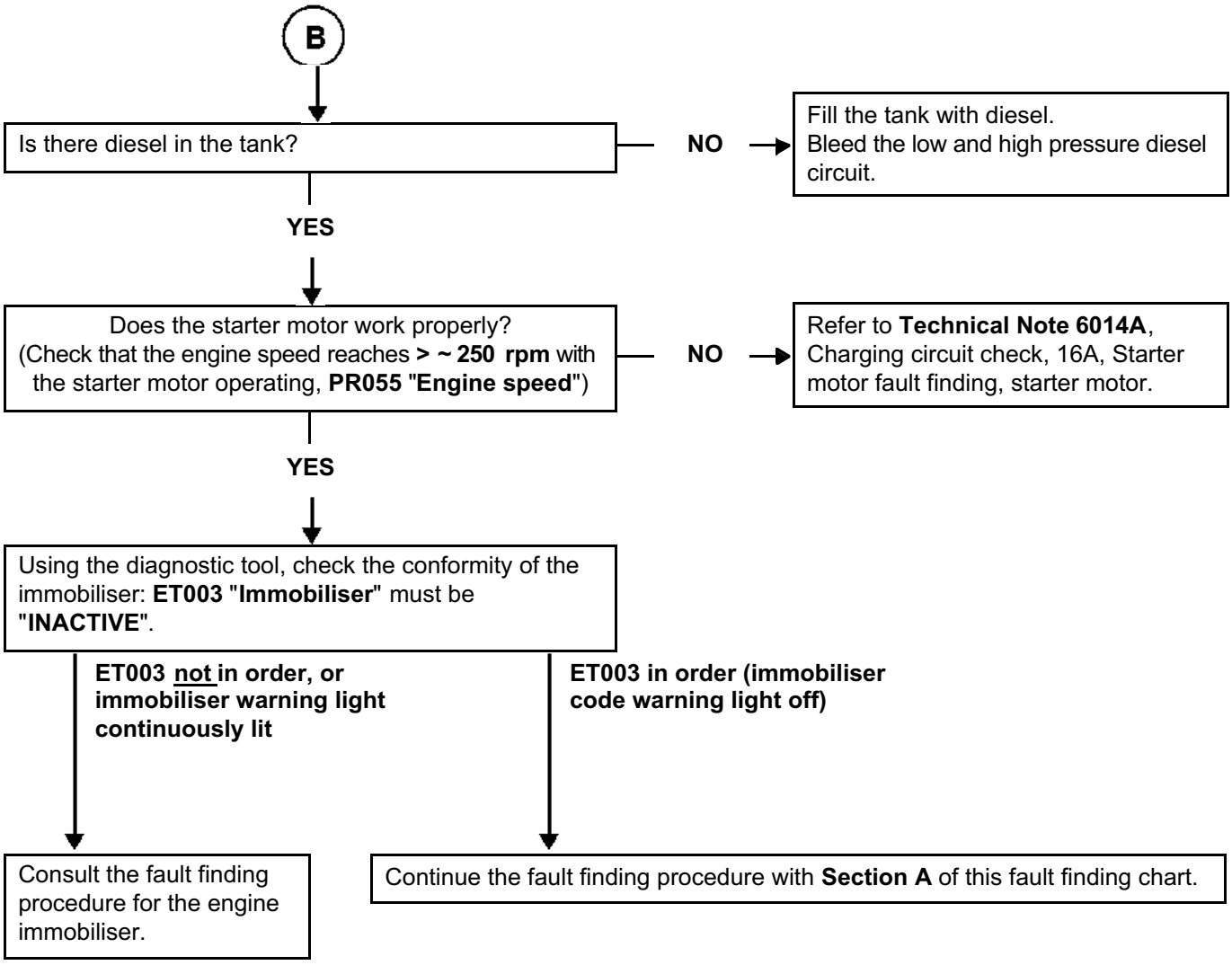
Check the position of the exhaust gas recirculation valve: apply **test 7**.
Check that the exhaust is not blocked: apply **test 1**, follow the associated fault finding procedure.
Check the consistency of the signal from the engine coolant temperature sensor.
Check the pressure regulator is working properly (see command **AC011** "**Rail pressure regulator**").
Check that the injectors are working properly (return leakage too high, clogging, sticking): apply **test 8**.
Check the engine timing (and the position of the high pressure pump sprocket).
Check the balance of the compressions, according to the power consumption during the starting phase ("**Compression test**" menu on the CLIP Technic tool).

> If you do not have the CLIP Technic tool, or in case of imbalance, use a compression gauge to perform the measurement (see procedure in the Workshop Repair Manual). After the operation, clear the faults caused by disconnecting the regulator and the heater plugs.

End of section A

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 2 CONTINUED 2	



AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 3	Injection noise

NOTES	**Before dealing with this customer complaint, check there are no faults, and conformity (or otherwise) of parameters and statuses, using the diagnostic tool. If the customer complaint is not eliminated, perform the following checks.**

If the injection noise occurs after starting from cold:

Check the low pressure diesel circuit priming.
Check the fuel heater supply.
Check the operation of the preheating system.
Check that fuel and engine temperatures are consistent.

Does the injection noise occur at idling speed?

Check the condition of the injector connector and pressure regulator terminals.
Check the conformity of the air flow signal: use the: **PR132 "Air flow"** fault finding or apply **test 3**.

If the fault is still present, perform the injector fault finding procedure: apply **test 10**.

Does the injection noise occur at all engine speeds?

Perform fault finding on the injectors: apply **test 8**.
Check the condition of the injector connector and pressure regulator terminals.
Ensure that the correct fuel is being used:
– Smell and compare the fuel with unpolluted diesel fuel:
To detect petrol, solvent, thinner, sulphuric acid (fuel with a white colour), water or fuel oil.
If the diesel fuel is not correct:
– Replace the diesel.
– Replace the diesel filter.
– Bleed the low and high pressure diesel circuit.

Check the conformity of the air flow signal: use the interpretation for fault finding procedure: **PR132 "Air flow"**.

If the customer complaint is still present:
Activate command **AC011 "Rail pressure regulator"**.
Then apply the conformity check associated with this note, in order to check:
– the conformity of the fuel pressure between **PR008 "Rail pressure setpoint"** and **PR038 "Rail pressure"**,
– the conformity of the pump fuel flow between **PR157 "Fuel flow setpoint"** and **PR017 "Fuel flow"**.

If the fault is still present, contact Techline.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 4	Poor performance

NOTES	**Before dealing with this customer complaint, check there are no faults, and conformity (or otherwise) of "parameters" and "statuses", using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

NOTE
In the case of engine overheating to above **119 °C**, the computer deliberately limits the fuel flow (overheating warning light lights up from **115 °C**).
– Please observe the cleanliness guidelines and safety advice.

Is the poor performance accompanied by smoke?

NO → **A** (next page)

YES ↓

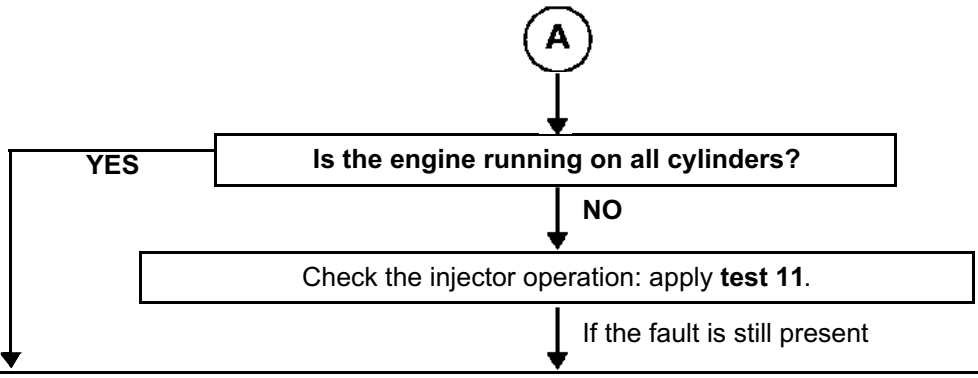
Check:
– That you are using the correct fuel:
Smell and compare the fuel with unpolluted diesel fuel:
To detect petrol, solvent, thinner, sulphuric acid (fuel with a white colour), water or fuel oil.
If the diesel fuel is not correct:
– Replace the diesel fuel.
– Change the diesel filter.
– Bleed the low and high pressure diesel circuit.
– The conformity of the assembly of the injectors (presence and **conformity of the sealing washer**).
Checking procedure:
– Take a straightedge approximately 40 cm long and place it on the 4 injectors. The straightedge should rest on the 4 injectors.
– If 1 injector protrudes, remove the injector and check that the washer is correct.
– If one injector does not touch the straightedge (clearance above 1 mm), remove the injector and check that there is a washer.
– Clean the injector wells and the injector, refit the injector with the correct sealing washer.
– The sealing and condition of the inlet circuit: apply **test 3**.
– The condition of the air flow sensor: apply **test 4**.
– The turbocharger: apply **test 5** for a variable geometry turbocharger, then apply **test 6**.

Check that the turbocharging pressure follows the increase in engine speed and that the loop difference with the turbocharging pressure is low.
Otherwise, replace the turbocharger.

Apply **test 7**, section A.

AFTER REPAIR	Carry out a road test followed by a check with the diagnostic tool.

FAULT FINDING CHART 4 CONTINUED	



Check the conformity of the accelerator pedal position sensor, the brake pedal sensor, the atmospheric pressure sensor, the exhaust gas recirculation valve and the damper valve.

– Check the consistency of the signal: from the air flowmeter, from the engine coolant temperature sensor, from the fuel temperature sensor and of the engine speed.

Check the connections, the continuity and absence of interference resistance of the air flow sensor (apply **DF056** "**Air flow sensor circuit**", 2.def), of the coolant temperature sensor (apply **DF001** "**Coolant temperature circuit**", 1.def), and the engine speed (apply **DF195** "**Camshaft sensor/engine speed consistency**", 2.def).

Check:
– Diesel filter not clogged (for the test, see **DF053** "**Rail pressure regulation function**" 2.def).
– That there are no leaks on the high and low pressure diesel circuits: apply **test 3**.
– That the oil vapour rebreathing system is connected.
– The flow regulator (blocked/seized, apply the interpretation for command: **AC011** "**Rail pressure regulator**").

– Check the engine timing (and the position of the high pressure pump sprocket). (See the procedure in the "**Workshop Repair Manual**" if necessary).
– Check the engine compression (balance of the cylinder compressions with the "Compression test" function on the CLIP Technic tool).
– Measure the engine compressions with the special tool (please refer to the procedure in the "**Workshop Repair Manual**" **if necessary**).

If the fault is still present, contact Techline.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 5	Irregular engine operation

NOTES	**Before dealing with this customer complaint, check there are no faults, and conformity (or otherwise) of "parameters" and "statuses", using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

If the engine races during gear changes, check, if there is a floor carpet, that this is not obstructing the accelerator pedal, brake pedal or clutch pedal, then check the conformity of the clutch switch and the conformity of the accelerator pedal sensor when the pedal is released.
Measure the **resistance** between **tracks A and B** of the engine speed sensor:
Replace the sensor if its resistance is not: **800 Ω ± 80 at + 20 °C**.

Check **the continuity** of the following connections:
- engine management computer, **connector B track B1** → **Track A** of the engine speed sensor
- engine management computer, **connector B track C1** → **Track B** of the engine speed sensor

Check that the engine earth is in order (oxidation, tightness, etc.).
Check the mounting, the air gap (if necessary refer to the information in the Workshop Repair Manual for the vehicle) and the condition of the sensor (overheating).
Replace if necessary.

Low pressure circuit check.
- Check the pressure regulation solenoid valve by applying **section B** of the "**Rough idle**" fault finding chart.
  ~ 1600 bar with full load on the accelerator.
- Apply the same procedure as for checking the air flow, explained in the "Conformity check" section of this note.
- Check the turbocharger: apply **test 5** for a variable geometry turbocharger, then apply **test 6**.
- Apply the same procedure as for checking the hydraulic circuit, which is explained in the "Conformity check" section of this note.

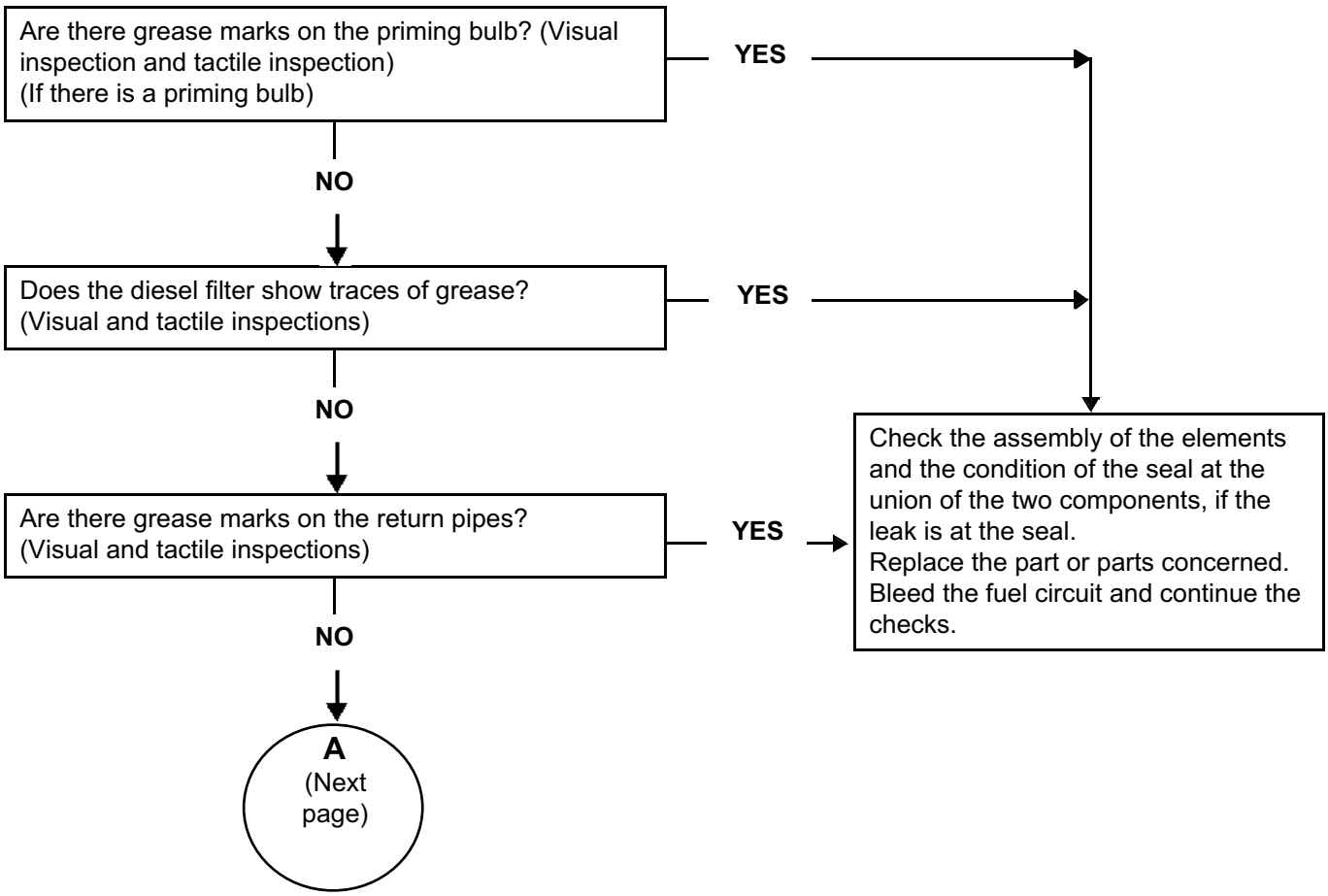
If the fault is still present:
- Check the balance of the cylinders using the CLIP Technic function, "**Compression test**" physical measurements icon.
- Check the engine compressions with the specific tool, if necessary.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 6	Fuel system leaks

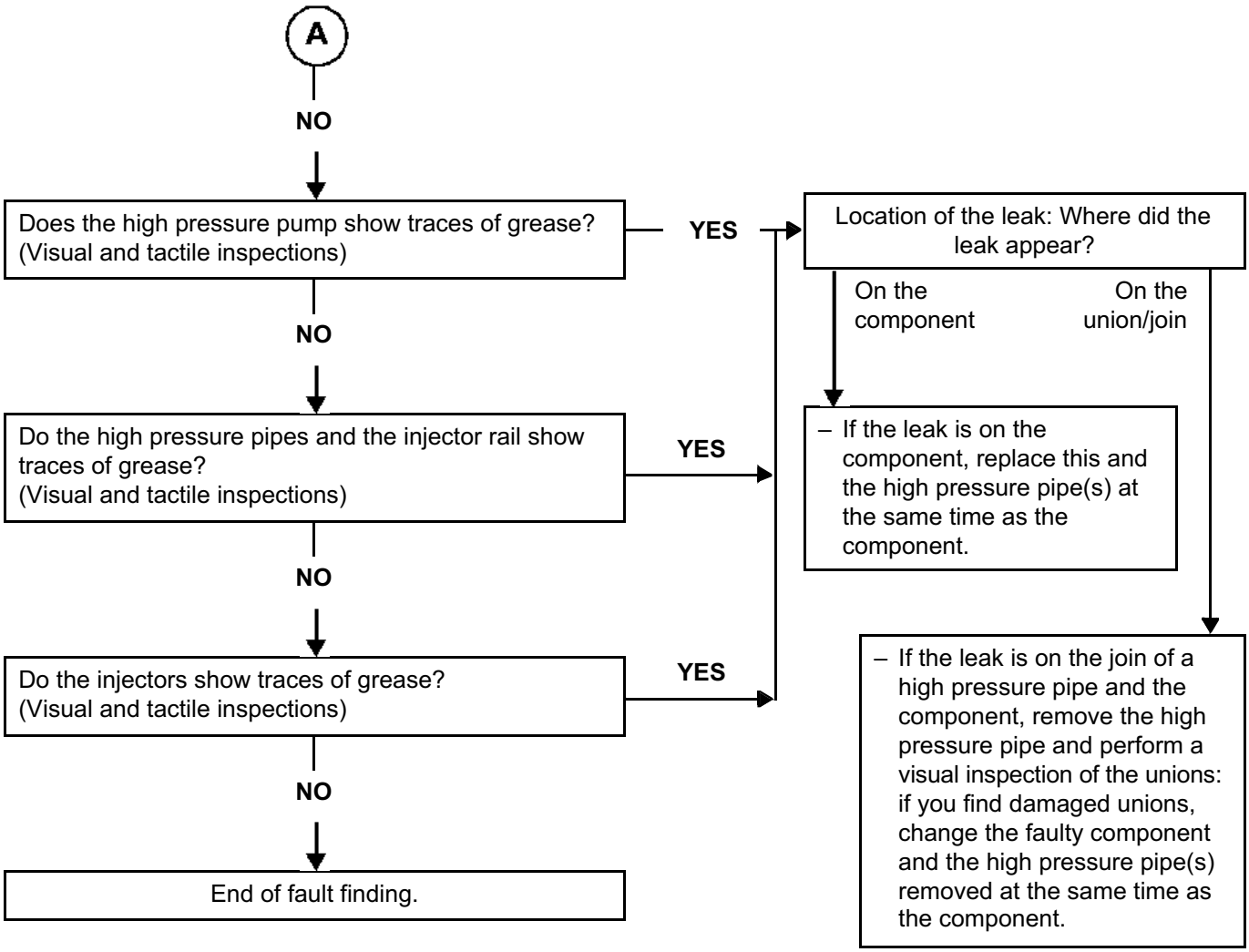
NOTES	**Before dealing with this customer complaint, check there are no faults, and conformity (or otherwise) of "parameters" and "statuses", using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.** **IMPORTANT:** **Please observe the cleanliness guidelines and safety advice.**

Procedure for checking an external leak on the fuel circuit:
Clean away traces of grease with clean thinner and wipe the part or parts concerned with cleaning cloths.
Start the engine and raise the engine coolant temperature until the diesel fuel reaches **80 °C**.
Stop the engine and check for traces of grease on the part or parts concerned.
If there are signs of grease, replace the part or parts concerned.
Bleed the fuel circuit and continue the checks.



AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 6 CONTINUED	



Reminder:
Do not replace the rail, pump or injector unless the union is found to be damaged during the visual inspections.
Bleed the fuel circuit and continue the checks.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 7	Rough idle

NOTES	**Before dealing with this customer complaint, check there are no faults, and conformity (or otherwise) of "parameters" and "statuses", using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

SECTION A

Check the sealing and the condition of the inlet circuit by applying **test 3** and **test 7**.

↓

Check the low pressure circuit → Check the engine parameters:
- Check the calibration updating of the engine management computer (last calibration).
- Check the charging circuit using Technical Note 6014A, Charging circuit check, Alternator fault finding, 16A, Alternator.
- Check that the engine speed signal is correct using an oscilloscope: no interference, broken tooth, etc.

If not correct, check:
* The wiring.
* The position of the flywheel and the condition of the flywheel teeth,
* Check the position and tightness of the engine speed sensor.

- Check the conformity of the "**IMA**" codes (if this function is used).
- Check the correction of the fuel flow from station to station: refer to **test 8**, if necessary.

↓

- Check the injector connections and wiring.
- Check the engine management computer connections and wiring to the injectors.

Repair if necessary.

↓

Check the high pressure circuit (external leaks).
(Refer to the end of the "**Fuel circuit external leaks**" fault finding chart)

↓

- Check the engine timing (and the position of the high pressure pump sprocket).

(See the procedure in the "**Workshop Repair Manual**" **if necessary**)

↓

Check the lower engine:
- Check the compressions using the CLIP Technique diagnostic tool, "Compression test"; or special tool (see "**Workshop Repair Manual**").
- Check the engine stands.

→ **B** (Next page)

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART7 CONTINUED	

SECTION B

Start the engine, engine at idle speed.
– **With the CLIP diagnostic tool:**
Record **PR038 "Rail pressure", PR055 "Engine speed"** and **PR017 "Fuel flow"** for 30 seconds.
If the difference is **< ± 25 bar**, go to the next step.
If the difference is **> ± 25 bar**, contact Techline
Reminder: difference between min. and max. pressure = 50 bar.
If the checks are correct, contact Techline.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 8	Oil leaks from the turbocharger

NOTES	**Before dealing with this customer complaint, check there are no faults, and conformity (or otherwise) of "parameters" and "statuses", using the diagnostic tool.** **If the customer complaint is not eliminated, perform the following checks.**

Clean the oily parts of the turbocharger, when cold, with cleaning cloths (part number: 77 11 211 707).

→ At idle speed, check if the turbocharger is leaking from the turbocharger oil supply inlet or outlet, from the turbine inlet or outlet or from the compressor or the compressor housing rear plate.

If the leak is coming from the turbocharger oil supply inlet or outlet.
Replace the seal of the leaky pipe or channel if necessary.

If the leak is coming from the turbine* or the compressor inlet or outlet*.
Check manually if the axial play is normal or excessive (see the photograph on the next page).
Is the axial play normal?

NO →

Replace the turbocharger and check:
– that the turbocharger oil supply circuit is not blocked.
Perform an oil change and change the oil filter.
Change the air duct.
Empty and clean the intercooler and the air circuit ducts.

IMPORTANT
Risk of destroying the new turbocharger and the engine if the air circuit is not cleaned and the oil and its filter are not replaced.

YES

If the leak is on the rear plate (compressor sump).
Replace the turbocharger.

* Note:
It is normal to find traces of oil at the turbocharger inlet and outlet, as the air passing through the compressor is charged with oil from the engine rebreathing circuit.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

FAULT FINDING CHART 8 CONTINUED	

The operating play of the turbocharger bearings is approximately 25 µm between the turbocharger shaft and the internal mating face of the bearings and 75 µm between the exterior section of the bearings and the bearing housings.

Risks:
In the event of destruction of the turbocharger bearings, the resulting steel and bronze swarf is evacuated through the turbocharger oil to the engine's lower oil sump. The swarf can, consequently, be returned to the oil circuit via the oil pump, then cause widespread contamination to the engine oil circuit. This causes abnormal wear on the crankshaft bearing bushings, the connecting rod bearings and the camshafts, etc.

In the event of the compressor wheel breaking, you may find parts of the blades in the intercooler or in the air circuit ducts. The turbine wheel could easily be found in the catalytic converter.

AFTER REPAIR	Carry out a road test followed by a complete check with the diagnostic tool.

EXHAUST SYSTEM CHECK	→ TEST1
LOW PRESSURE CIRCUIT CHECK	→ TEST2
TURBOCHARGED AIR INLET CIRCUIT CHECK	→ TEST3
AIR FLOWMETER	→ TEST4
COMMAND FOR A VARIABLE GEOMETRY TURBOCHARGER	→ TEST5
ROTATING SECTION OF A TURBOCHARGER	→ TEST6
EXHAUST GAS RECIRCULATION VALVE	→ TEST7
POOR INJECTOR OPERATION	→ TEST8

TEST1	Exhaust system check

Engine stopped: Check that the silencer outlet is not blocked. Repair or replace the silencer, if necessary.

↓

Check the seal of the exhaust manifold on the contact surface between the turbocharger and the exhaust manifold.
Is the seal in order?

NO → Repair or replace the faulty part.

YES

↓

Loosen the pre-catalytic converter on the turbocharger side. Place a wooden block between the two parts.
Start the vehicle and check if the engine runs better.
Is the engine running normally?

NO → The exhaust pipe is not the cause of the fault, repeat the engine fault finding in the Customer complaints - Fault finding chart section.

YES

↓

Retighten the pre-catalytic converter.
Loosen the catalytic converter on the pre-catalytic converter side. Place a wooden block between the two parts.
Start the vehicle and check if the engine runs better.
Is the engine running normally?

NO → Replace the pre-catalytic converter.

YES

↓

(A)

TEST1 CONTINUED	

A

Retighten the catalytic converter.
Loosen or disconnect the intermediate box on the catalytic converter side. Insert a wooden block between the two parts, if necessary.
Start the vehicle and check if the engine runs better.
Is the engine running normally?

NO → Replace the catalytic converter.

YES

Retighten the intermediate box.
Loosen or disconnect the silencer on the intermediate box side. Insert a wooden block between the two parts, if necessary.
Start the vehicle and check if the engine runs better.
Is the engine running normally?

NO → Replace the intermediate box.

YES

Replace the silencer.
END OF TEST1.

TEST2	Low pressure circuit check

Check the fuel filter for:
- Conformity of the fuel filter (correct part number and RENAULT filter),
- Positioning and degree of contamination of the filter cartridge,
- Positioning and condition of the seals.
- **If there is metal swarf in the filter:**
  Replace the fuel filter, bleed the circuit and **continue the fault finding procedure**.

Supplying the injection system with fuel from an auxiliary tank.
This operation aims to detect possible faults in the low pressure supply system of a vehicle by replacing it entirely with an auxiliary tank.
Mode:
- Disconnect the diesel fuel supply pipe at the fuel filter inlet and seal it with a plug.
- Connect a pipe to the fuel filter inlet and insert the other end into a **clean** container of with a capacity of approximately 5 litres.
- Disconnect the diesel fuel return pipe at the pump return and injector leak-off junction and seal it with a plug.
- Fill the container with **clean** diesel fuel.
- Start the engine and let the system bleed itself of air (there must not be any air bubbles in the return pipe).

Is the customer complaint still present?

YES → If the low pressure circuit is in order, reconnect the various pipes making up the low pressure circuit and repeat the fault finding procedure in the fault finding chart or the fault that referred you to this test.

NO

Are the low pressure circuit connections in order and in good condition?

NO → Carry out the necessary repairs.

YES

A
(Next page)

TEST2 CONTINUED	

A

Check the condition of the priming bulb, and that it is working properly.
Perform repairs if necessary and continue the test.

If the fault is still present with a low fuel level, check the consistency of the actual fuel level and that indicated on the instrument panel.
– The transfer pump is supplied via a venturi pipe mounted underneath it.
Check that the opening of the venturi (6 to 8 mm in diameter) is not blocked by dirt contained in the fuel tank.

Check the low pressure diesel fuel circuit priming.

Ensure that the correct fuel is being used:
– Smell and compare the fuel with unpolluted diesel fuel:
To detect petrol, solvent, thinner, sulphuric acid (fuel with a white colour), water or fuel oil.

If the diesel is not correct:
– Replace the diesel fuel,
– Change the diesel filter,
– Bleed the low and high pressure diesel circuits.

Low pressure circuit correct.
END OF TEST2.

TEST3	Checking the turbocharged air inlet circuit

Engine stopped: Check the **sealing** (leak and air inlet) of the low and high pressure air circuits (upstream/downstream of the turbocharger).

→ Look for parts of the system that are abnormally greasy, indicating leakage.
Check:
- The condition and fitting of the ducts (foreign bodies, clogged, disconnected, pinched, broken, holed, cut, tightness of the mounting bolts, etc.),
- The presence, condition and fitting of the seals,
- The presence and tightening of the clamps,
- The assembly of the turbocharging pressure sensor.

Carry out the necessary repairs.

↓

Checking the air filter.

→ Check:
- The air filter unit inlet and outlet are not blocked,
- The condition and the assembly of the air filter unit (disconnected, broken, with holes, etc.),
- The cleanliness, conformity and the non-distortion of the filter element,
- The air flow sensor: apply **test 4**.

Carry out the necessary repairs.

← If the engine is equipped accordingly, check:
- that the damper valve is open (**AC012 "Damper valve"**, step B).
  - the condition of the damper valve:
  - the tightness of the mounting bolts.
  - cracks in the damper valve.

Carry out the necessary repairs.
Replace the flap if necessary.

→ Check that there is no leak on the exhaust manifold, in particular at the exhaust manifold/turbocharger interface.
Check the exhaust system: apply **test 1**.
Carry out the necessary repairs.

↓

Check the condition of the intercooler:
- clogging,
- leaks (vehicle stationary, stabilise the engine speed between 3,500 rpm and 4,000 rpm and check that there are no leaks).

Replace the intercooler if necessary.

END OF TEST3.

TEST4	Air flowmeter

POLLUTION OF THE GRILLES:
Visual inspection: remove the flowmeter. There should be no foreign bodies in the grilles (see illustration on the next page).
Do not clean the grilles using compressed air or any other procedure: this damages the sensors and creates variations to the values displayed on the CLIP tool.
Check the air circuit sealing upstream of the air flowmeter: ducts and air filter unit disconnected or pierced, presence of seals.

Replace the air flowmeter if necessary and clean upstream of this, if necessary.

↓

ELECTRICAL COMPONENT BREAKAGE:
Visual inspection: remove the flow sensor, the components must not be broken (see illustration on next page).

Replace the air flowmeter if necessary.

↓

OXIDATION OF THE ELECTRICAL COMPONENTS:
Visual inspection: remove the air flowmeter, there should not be any greenish deposits on the electrical components.

Replace the air flowmeter if necessary.

↓

CLOGGING OF THE AIR FLOW SENSOR:
Test:
– Check the values for conformity:
  * During the first 5 seconds after starting:
    – Coolant temperature: 80 °C,
    – Engine speed: idle speed (800 ± 50 rpm),
    – Air flow measurement: 47 kg/h ± 10,
    – OCR* EGR valve: between - 10 % and 0 %.

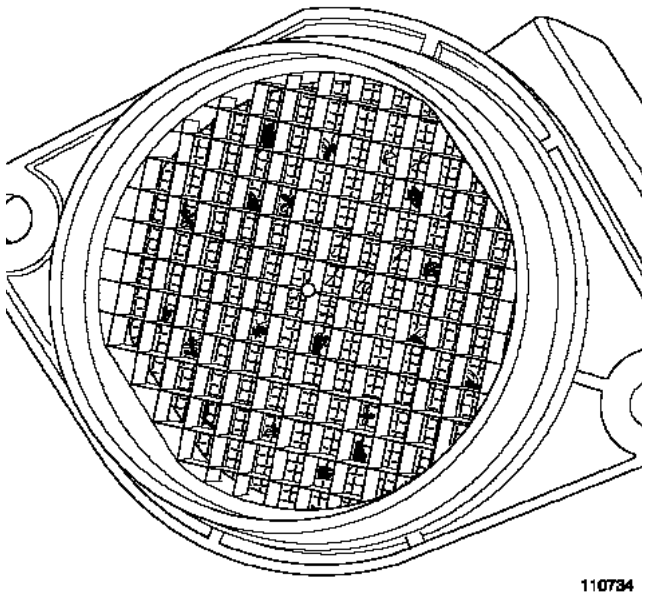
  * After the starting phase:
    – Coolant temperature: 80 °C,
    – Engine speed: idle speed (800 ± 50 rpm),
    – Air flow measurement: 30 kg/h ± 5 %,
    – OCR* EGR valve: between 10 % and 40 %.
– Refer to **DF056 "Air flow sensor circuit"** 2.def, for the air flow sensor checks.

Replace the air flowmeter, if necessary.

* OCR: Opening Cyclic Ratio.

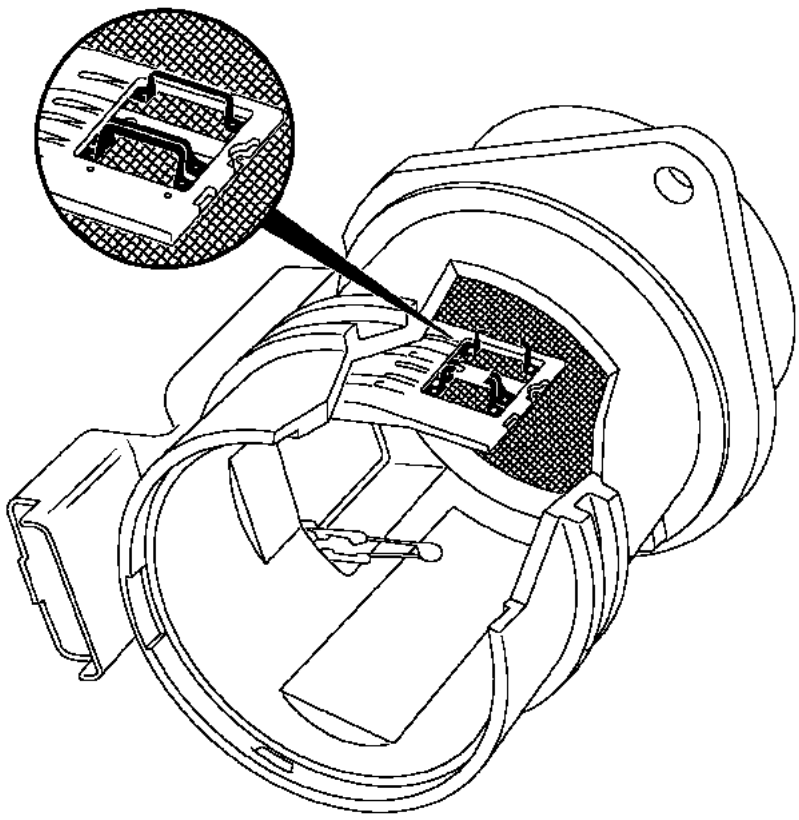
TEST4 CONTINUED	

Contamination of the grille



110734

Damage to the electrical sensors



110736

END OF TEST4.

TEST5	Variable geometry turbocharger control

Engine stopped:
Check manually if the control rod of variable geometry is blocked.
Is the rod blocked?

YES →
- Replace the turbocharger.
- Perform a visual inspection of the condition of the turbine and the compressor (see the illustrations of **test 6**).

If one of the 2 wheels is damaged, you should also replace the duct connected to the damaged wheel.

NO ↓

At idle speed, with turbocharging solenoid valve control: between 70 % and 85 % OCR*, disconnect the electrical connector of the solenoid valve and check at the same time if the rod controlling the variable geometry blades moves.
Does the rod move from end stop to end stop?

YES → The turbocharging control circuit is operating normally.

NO ↓

Check the condition of the turbocharging solenoid valve connectors (corrosion, bent pins, etc.).
Measure the resistance of the turbocharging solenoid valve between its **tracks 1 and 2**.
It should be: **15.4 Ω ± 0.7 at + 20 °C** for a *Pierburg* solenoid valve.
Is the solenoid valve in order?

NO → Replace the turbocharging solenoid valve.

YES → Check the **continuity and insulation to + 12 V** and to earth of the connection between **track E1 of connector C** of the engine management computer and **track 1** of the turbocharger solenoid valve connector.
Check the **continuity and insulation to earth** of the connection between **the UPC PPM1 connector track 1** and **track 2** of the turbocharger solenoid valve connector.
If necessary, carry out repairs.

Reconnect the turbocharging solenoid valve electrical connector.
On the control diaphragm of the variable geometry blades, disconnect the pipe coming from the solenoid valve. Connect a pressure gauge in place of the diaphragm. Engine at idle speed.
Is there underpressure at the pipe outlet?

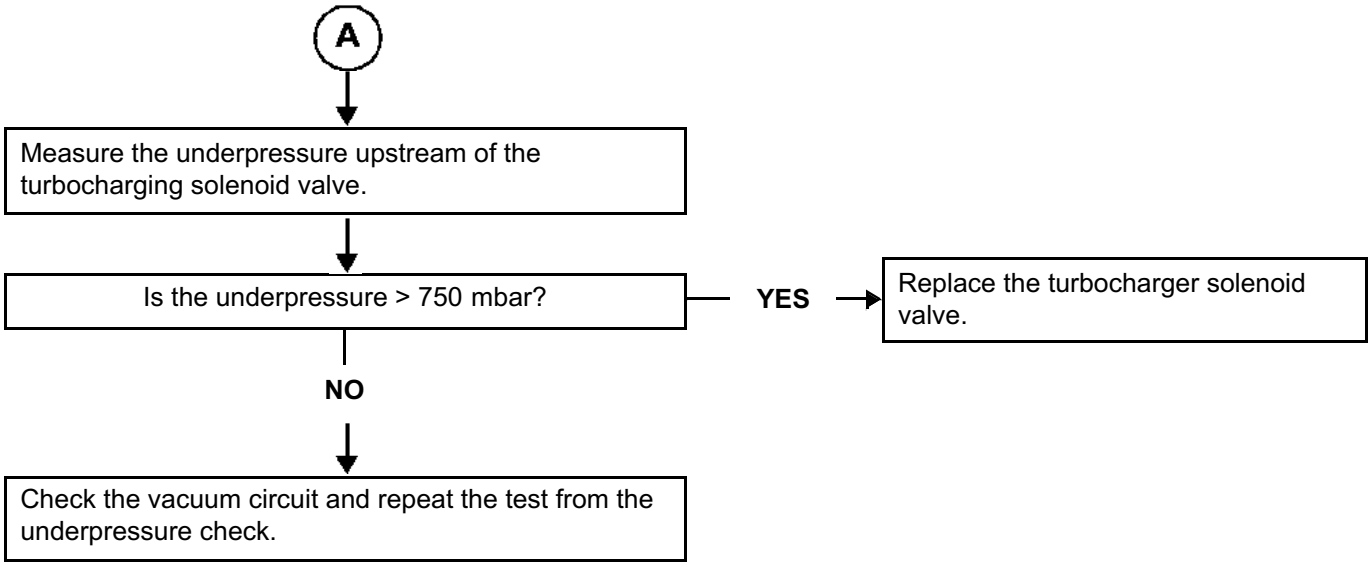
YES → Is the underpressure > 750 mbar?

YES ↓ Replace the turbocharger.

NO → **A** (Next page)

NO ↓ **A** (Next page)

TEST5 CONTINUED	



END OF TEST5.

* OCR: Opening Cyclic Ratio.

TEST6	Rotating section of a turbocharger

With the engine cold and stopped, remove the air inlet duct from the turbocharger, check manually if the turbine and compressor shaft turns.
Does the shaft turn?

NO → Replace the turbocharger.

Seizing of the turbocharger could be caused by poor lubrication of the bearings. Check the lubrication circuit for any blockage and check the engine oil pressure.
Perform an oil change and change the oil filter.

YES

Perform a visual inspection of the condition of the wheels (see the illustrations on the next page).
Are the wheels in good condition?

NO →
- Replace the turbocharger.
- Replace the duct connected to the damaged wheel.

YES

Manually check the axial play of the wheels (see illustration for **test 6** continued 2).
The significant axial play is approximately 2 mm.
Does the turbocharger have too much play in the shaft?

YES → Replace the turbocharger.

If the rotating section is broken:
- change the engine oil and the oil filter,
- clean the intercooler and the air circuit ducts.

NOTE
Risk of damage to the new turbocharger and the engine if the air circuit is not cleaned and the oil and its filter are not replaced.

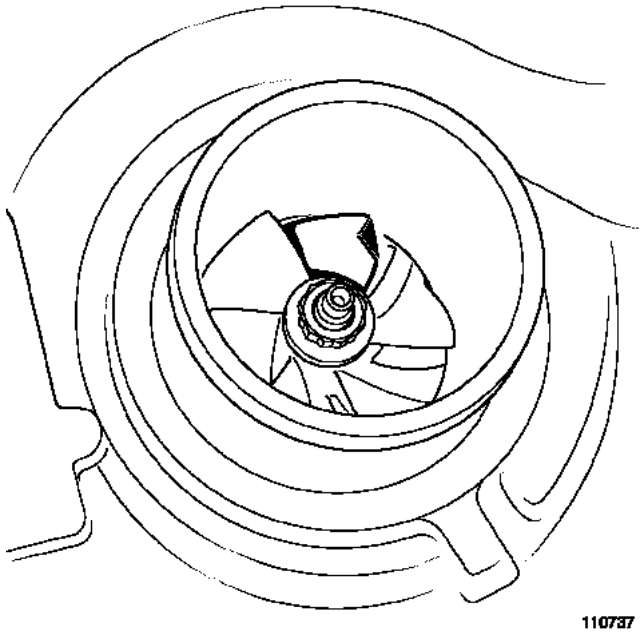
NO

The rotating section is in order.

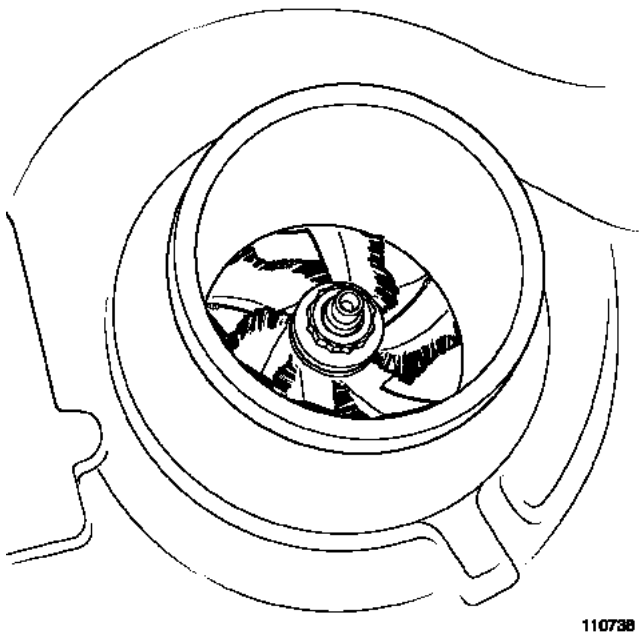
The operating play of the turbocharger bearings is approximately 25 µm between the turbocharger shaft and the internal mating face of the bearings and 75 µm between the exterior section of the bearings and the bearing housings.
Risks:
In the event of destruction of the turbocharger bearings, the resulting steel and bronze swarf is evacuated through the turbocharger oil to the engine's lower oil sump. The swarf can, consequently, be returned to the oil circuit via the oil pump, then cause widespread contamination to the engine oil circuit. This causes abnormal wear on the crankshaft bearing bushings, the connecting rod bearings and the camshafts, etc.
In the event of the compressor wheel breaking, you may find parts of the blades in the intercooler or in the air circuit ducts. The turbine wheel could easily be found in the catalytic converter.

TEST6 CONTINUED 1	

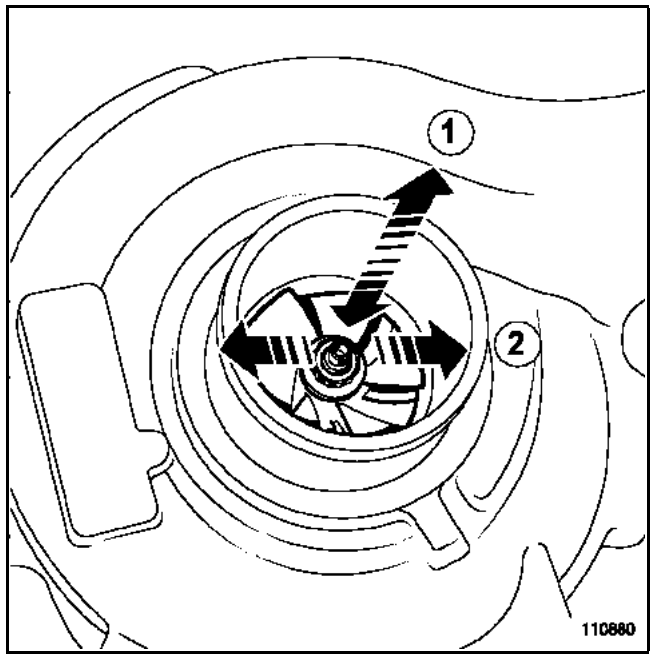
Deformed, twisted blade ("soft" foreign body)



Broken blades ("hard" foreign body)



TEST6 CONTINUED 2	



1 Axial play
2 Radial play

END OF TEST6.

TEST7	Exhaust gas recirculation valve

SECTION A

VALVE POSITION FAULT FINDING:
Or detection of a leak in the exhaust gas recirculation valve

Please observe the cleanliness guidelines and safety advice.

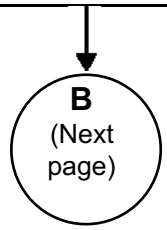
Clear the faults.

Use the **RZ002** "**EGR adaptives**" command to try to reinitialise the of the exhaust gas recirculation valve operating values.

Switch off the ignition and wait **40 seconds**.

Switch the ignition back on and check for faults.

If the fault is still present:
– exit CLIP tool diagnostic mode,
– switch off the ignition,
– disconnect the exhaust gas recirculation valve connector,
– remove the exhaust gas recirculation valve using the special tool (refer to Workshop Repair Manual) and reconnect it after having removed it,
– check that no particles are blocking the displacement of the exhaust gas recirculation valve flap,
– check that the exhaust gas recirculation valve is not stuck or jammed in one position,
– switch on the ignition again and return to fault finding mode using the CLIP tool,
– check the movement of the valve with **PR005** "**EGR valve OCR***" (**0 to 2.5 mm** travel for an opening cyclic ratio of **40 %** and when fully open, **~ 5 mm**, for an Opening Cyclic Ratio of **95 %**),
– check that the exhaust gas recirculation valve flap closes completely,
– If there was no movement, or if the jamming of the exhaust gas recirculation valve cannot be solved, replace the exhaust gas recirculation valve and follow the procedure for replacing the exhaust gas recirculation valve in the "**Replacing components**" section.



TEST7 CONTINUED 1	

SECTION B

EXHAUST GAS RECIRCULATION VALVE POTENTIOMETER FAULT FINDING:
Use the CLIP tool to compare **PR051** "**EGR valve position feedback**" and the setpoint or OCR* voltage and check if there are any drops in feedback (micro-breaks).

↓

EXHAUST GAS RECIRCULATION VALVE SLEEVE FAULT FINDING:
With the engine stopped, and vehicle switched ignition on, read **PR051** "**EGR Valve Position Feedback**"; the value should be around 0 ± 10 %.
Remove the exhaust gas recirculation valve using the special tool (refer to Workshop Repair Manual) and carry out a visual inspection:
the exhaust gas recirculation valve should not contain a cluster of soot between the base and the valve.
Clean the exhaust gas recirculation valve sleeve or replace it if necessary and follow the replacement procedure in the "**Replacing components**" section.

↓

C
(Next page)

* OCR: Opening Cyclic Ratio.

TEST7 CONTINUED 2

SECTION C

– Note **PR128** "**First EGR valve offset**" and **PR129** "**Last EGR valve offset**" in the context of the appearance of the fault (select the fault to display the appearance conditions).
10 % < PR128 < 40 % and 5 % < PR129 < 40 %?

YES

– Display **PR051** "**EGR valve position feedback**".
– Is **PR051 equal to ± 5 % to PR005** "**EGR valve opening setpoint**"**?**

YES

– **Do not replace the EGR valve.**
– Check the air circuit: apply **test 3**.
– Check the air flow sensor: apply **test 4**.
– Follow the recommendations for **confirming the fault finding procedure** described below.

NO

– **Replace the EGR valve** and follow the replacement procedure in the "**Replacing components**" section.
– Follow the recommendations for **confirming the fault finding** described below.

NO

– Run clear command **RZ002** "**EGR adaptives**",
– See the interpretation of this command,
10 % < PR128 < 40 % and 5 % < PR129 < 40 %?

YES

– **Do not replace the exhaust gas recirculation valve.**
– Follow the recommendations for **confirming fault finding** described below.

NO

– Disconnect and reconnect the EGR valve connector after having checked it,
– Run the clear command **RZ002** "**EGR adaptives**"
– See the interpretation of this command,
10 % < PR128 < 40 % and 5 % < PR129 < 40 %?

YES

– **Replace the EGR valve** and follow the replacement procedure in the "**Replacing components**" section.
– Follow the recommendations for **confirming fault finding** described below.

NO

*** Please observe the cleanliness guidelines and safety advice.**

TEST7 CONTINUED 3	

Confirmation of the fault finding:
– Start the vehicle,
– Leave the engine at idling speed for **1 min**,
– Accelerate very slowly up to **1,500 rpm for 2 mins** until the exhaust gas recirculation function becomes active,
– Carry out a vehicle test at low speed, without accelerating heavily, then normally,
– Check for faults using the CLIP diagnostic tool.
If the customer complaint or the faults recur, contact Techline.

END OF TEST7.

TEST8	Injector malfunction

SECTION A:

CHECK THE FUEL REGULATION BALANCE, INJECTOR BY INJECTOR:

– In CLIP, choose the "Fuel circuit" sub-function.
– With the engine at idle speed, coolant temperature **> 80 °C**, display the flow adjustment values, injector by injector i.e. **PR364, PR405, PR406** and **PR365** (FUEL FLOW ADJUSTMENT CYLINDER no. 1, no. 2, no. 3 and no. 4).

The **normal value** for flow correction for an injector is ± **1 mm^3/stroke**.
This tolerance may increase with time, but indicates an injector/cylinder fault if it exceeds ± 5 mm^3/stroke.

1) If at least one of these values is > + 5 mm^3/stroke
– Check the valve clearance.
– Check the condition of the engine with the "**Compression test**" function available on CLIP Technic or measure the cylinder compression using the special tool.
  – If the compression test reveals a cylinder fault, carry out the necessary repairs.
  – If the compression is in order, check the conformity of the assembly of the injector according to the procedure described in the "**Workshop Repair Manual**", then check the fuel regulation again, injector by injector. If the customer complaint is still present, replace the injector*.
– See information in **Section B**, for the confirmation of the fault finding.

2) If at least one of these values is < - 5 mm^3/stroke
– Check the valve clearance.
– Check the level and condition of the engine oil.
– Remove the injector with the largest adjustment.
– If there is pollution via the diesel, check the condition of the cylinder concerned (cylinder, piston, valves).
– Replace the injector.
– See information in **Section B**, for confirmation of the fault finding.

* Note:
Before replacing an injector, check the presence and conformity of its sealing washer (see the checking procedure in the "**Poor performance**" fault finding chart).
After replacing an injector, and if the IMA is in use, follow the procedure for programming the injector codes (refer to the start of the "**Replacing components**" note).

NOTE
When removing or refitting the injectors, follow the cleanliness guidelines and safety advice (in section **13B** of the Workshop Repair Manual).

TEST8 CONTINUED 1	

PART B:

CONFIRMATION OF FAULT FINDING FOR THE CORRECTION OF THE FLOW, INJECTOR BY INJECTOR:

Clear the fault(s) and carry out a test with the **engine at idle speed**, coolant temperature **> 80 °C** and check that no faults appear on the diagnostic tool and the adjustment values do not reach *± 5 mm³/st* to confirm the repair.
– If any other cylinders have injector flow adjustment values > ± 5 mm^3/st, follow the fault finding procedure in **section A of this test**.
– If the repairs carried out have not repaired the engine, contact Techline.

SECTION C:

INJECTOR RETURN FLOW BALANCE CHECK:

– Allow the engine to heat up to a coolant temperature of **> 80 °C**.
– Switch off the ignition.
– Please observe the cleanliness guidelines and safety advice.
– Protect the upper engine edges with rags (mainly around the injectors).
– Disconnect the injector return pipes.
– Start the engine and let it idle.

– With high pressure pump CP3:
  – **Disconnect the fuel pressure regulator**,
  – Start the ignition and perform a starting sequence (press the start button or activate the starter motor for 15 seconds),
  – The flow of fuel on the return is normally very weak. It should not be a jet.

Otherwise, replace the injector.
– Clear the fault caused by the disconnection of the fuel pressure regulator.
– Refit the injector fuel return pipes after checking that the seals and pipes are in good condition.
– If this is not the case, replace the injector fuel return pipes.
– Follow the cleanliness guidelines.
– Confirm the repairs by performing a road test.

SECTION D: "INJECTOR NOZZLE SEALING CHECK" next page.

TEST8 CONTINUED 2	

SECTION D:

INJECTOR NOZZLE SEALING TEST:

– Check the level and condition of the engine oil:
– If there is contamination via the diesel oil, the injector nozzle which is leaking will be greasy.
– Disconnect the preheating relay.

Check that this is not caused by rising engine oil by checking the engine compression values.
Check the condition of the heater plug: this should not be damp. If this is the case, change the faulty injector.
If the compression values are correct, locate the faulty injector by examining the condition of the cylinders and the pistons via the heater plug wells (greasy cylinder, overheating, starting to disintegrate, etc.).
If the cylinder - piston examination is not conclusive, remove the injectors and change the one with the "greasy" nozzle.

* Note:
Before replacing an injector, check the presence and conformity of its sealing washer (see the checking procedure in the "**Poor performance**" fault finding chart).

NOTE
When removing or refitting the injectors, follow the cleanliness guidelines and safety advice (in section **13B** of the Workshop Repair Manual).

END OF TEST8.

Injection computer	112-track (BOSCH) Connectors: black A 32-track, brown B 48-track, grey C 32-track
Atmospheric pressure sensor	Integrated into the computer (BOSCH)
Injector	0.23 Ω at + 20 °C / 2 Ω max (BOSCH) 1,600 bar (1,800 bar max.)
Flow controller (high pressure pump)	R = 3 Ω at + 20 °C (BOSCH, pump type CP3.2+)
Rail pressure sensor	Start of opening ~ 1,600 bar, Pressure limiter on CP3 pump: maximum opening at 1,800 bar (BOSCH, bolted to the rail)
Engine speed sensor	R = 800 ± 80 Ω at + 20 °C (MGI)
Camshaft sensor	Hall effect sensor (ELECTRICFIL) R = 10,250 ± 500 Ω at + 20 °C (measurement between tracks 2 and 3 of the sensor)
Turbocharger control solenoid valve	15.4 ± 0.7 Ω at + 20 °C (PIERBURG)
Electric EGR valve	Track 1: + 12 V electric motor Track 2: + 5 V potentiometer Track 3: Unused Track 4: potentiometer earth Track 5: engine earth Track 6: potentiometer signal DIRECT CURRENT MOTOR: R between tracks 1 and 5 = 2.96 ± 0.3 Ω at + 20 °C POTENTIOMETER: R between its tracks 2 and 4: 6.5 ± 0.6 kΩ at + 20 °C (SIEMENS)
Electric damper valve	CURRENT ENGINE (VDO)
Air flowmeter	Track 1: air temperature signal Track 2: flowmeter earth Track 3: + 5 V flowmeter Track 4: + 12 V battery feed Track 5: air flow signal Track 6: battery earth (SIEMENS)
Air temperature sensor	R = 3,714 Ω ± 161 at + 10 °C / 2448 Ω ± 96 at + 20 °C / 1,671 Ω ± 59 at + 30 °C
Coolant temperature sensor	R = 2,252 ± 112 Ω at 25°C / 811 ± 39 Ω at 50°C / 283 ± 8 Ω at 80°C
Accelerator pedal sensor	R track 1 = 1,700 ± 900 Ω R track 2 = 2,850 ± 2,050 Ω
Heater plug	R = 0.6 Ω at + 20 °C / 2 Ω maximum Maximum current drawn: 28 A at 0 s / 12 A at 10 s / 9 A after 30 seconds

Turbine upstream temperature sensor	2-track yellow connector (NTK) T = 400 °C → R = 1,772 Ω, T = 500 °C → R = 725 kΩ
Particle filter pressure differential sensor	3-track connector = 1: 5 V, 2: Earth, 3: Signal (BOSCH)
Particle filter upstream temperature sensor	2-track blue connector (DENZO) T = 50 °C → R = 106 kΩ, T = 100 °C → R = 33.5 kΩ
Particle filter downstream temperature sensor circuit	2-track black connector (DENZO) T = 50 °C → R = 106 kΩ, T = 100 °C → R = 33.5 kΩ
Presence of water in diesel sensor	According to application (ZERTAN)

(R = Resistance, EGR = Exhaust gas recirculation, FAP = Particle filter)

1. SCOPE OF THIS DOCUMENT

This document presents the fault finding procedure applicable to all computers with the following specifications:

Vehicle(s): **Megane II/Scenic II** *Function concerned:* **Petrol injection**	*Name of computer:* **Sagem S3000** *Program no.:* **A7** *VDIAG no.:* **44**

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedures (this manual):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.

Wiring diagrams:
– Visu-Schéma (CD-ROM), paper version.

Type of diagnostic tools

– CLIP

Special tooling required

Special tooling required	
	Multimeter
Elé. 1481	Bornier
Elé. 1681	Universal bornier

3. RECAP

Procedure

To run fault finding on the vehicle's computers, switch on the ignition in fault finding mode (forced + after ignition feed).

Proceed as follows:
– put the vehicle card in the card reader,
– press and hold Start button (longer than **5 seconds**) with start-up conditions not fulfilled,
– connect the diagnostic tool and perform the desired operations.

Note:
The left-hand and right-hand xenon bulb computers are powered when the dipped beam headlights light up.
Fault finding procedures can only be carried out on them after the ignition has been switched on in fault finding mode (+ after ignition imposed) and the dipped headlights are on.

To **cut off + after ignition feed**, proceed as follows:
– disconnect the diagnostic tool,
– press the Start button twice briefly (less than **3 seconds**),
– check that the + after ignition feed has been cut off by checking that the computer warning lights on the instrument panel have gone out.

Faults

Faults are declared as either present or stored (depending on whether they appeared in a certain context and have disappeared since, or whether they remain present but have not been diagnosed within the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is switched on after the + after ignition feed (without any system components being active).

For a **present fault**, apply the procedure described in the **Interpretation of faults** section.

For a **stored fault**, note the faults displayed and apply the instructions in the **Notes** section.

If the fault is **confirmed** when the instructions in the Notes section are applied, the fault is present. Deal with the fault.

If the fault is **not confirmed**, check:
– the electrical lines which correspond to the fault,
– the connectors for these lines (for oxidation, bent pins, etc.),
– the resistance of the component detected as faulty,
– the condition of the wires (melted or split insulation, wear).

Conformity check

The aim of the conformity check is to check statuses and parameters that do not produce a fault display on the diagnostic tool because they are inconsistent. Therefore, this phase is used to:
– carry out fault finding on faults that do not have a fault display, and which may correspond to a customer complaint,
– check that the system is operating correctly and that there is no risk of a fault recurring after repairs.

This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.

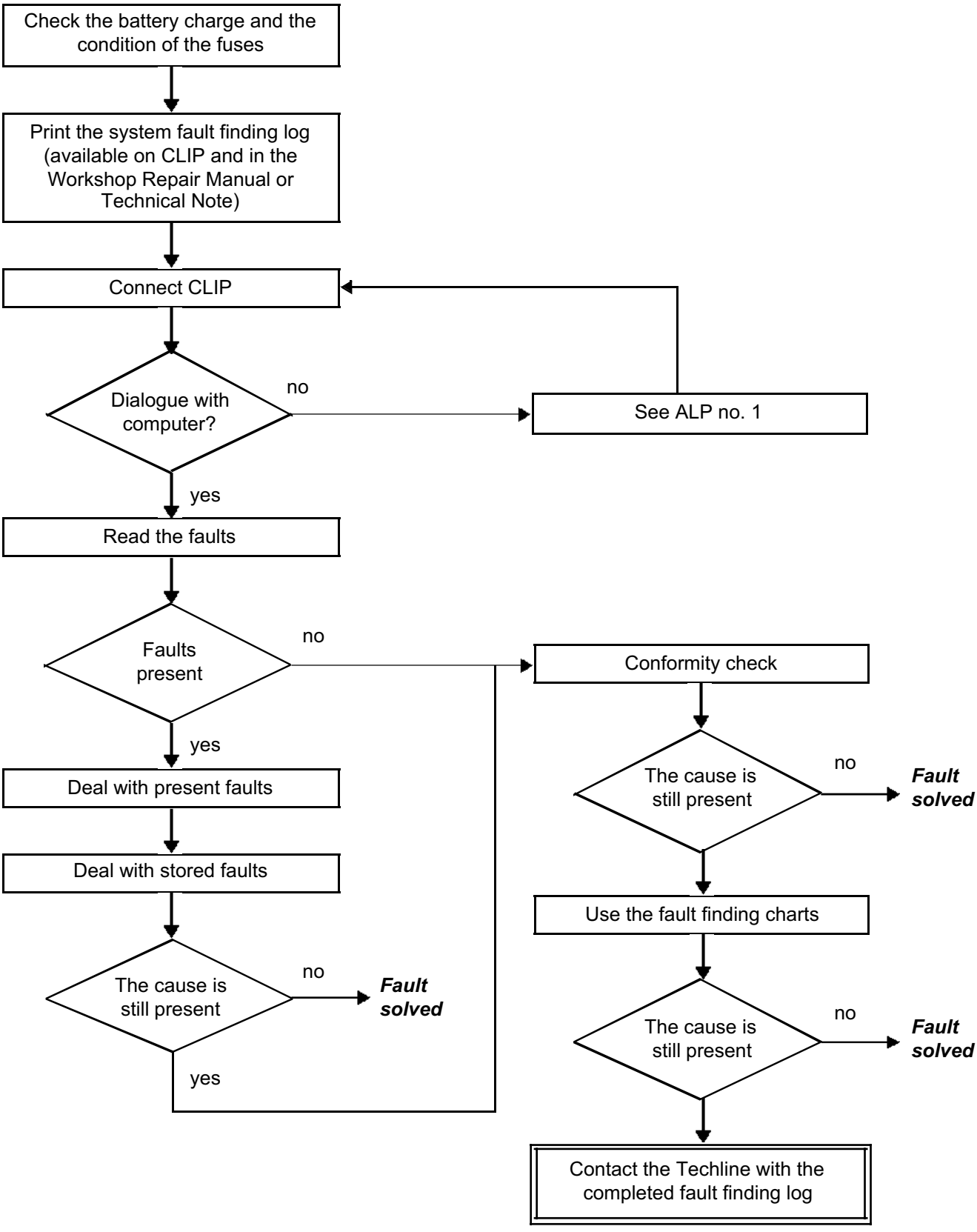
If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

Customer complaints - Fault finding chart

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be treated by **customer complaints**.

A summary of the overall procedure to follow is provided on the following page in the form of a flow chart.

4. FAULT FINDING PROCEDURE



4. FAULT FINDING PROCEDURE (continued)

Wiring check

Fault finding problems
Disconnecting the connectors and/or manipulating the wiring harness may temporarily remove the cause of a fault.
Electrical measurements of the voltage, resistance and insulation are generally correct, especially if the fault is not present when analysing (stored fault).

Visual inspection
Look for damage under the bonnet and in the passenger compartment.
Carefully check the fuses, insulators and wiring harness routing.
Look for signs of oxidation.

Tactile inspection
While manipulating the wiring harness, use the diagnostic tool to note any change in fault status from stored to present.
Make sure that the connectors are properly locked.
Apply light pressure to the connectors.
Twist the wiring harness.
If there is a change in status, try to locate the source of the fault.

Inspection of each component
Disconnect the connectors and check the appearance of the clips and tabs, as well as their crimping (no crimping on the insulating section).
Make sure that the clips and tabs are properly locked in the sockets.
Check that no clips or tabs have been dislodged during connection.
Check the clip contact pressure using an appropriate model of tab.

Resistance check
Check the continuity of entire lines, then section by section.
Look for a short circuit to earth, to **+ 12 V** or to another wire.
If a fault is detected, repair or replace the wiring harness.

5. FAULT FINDING LOG

IMPORTANT!

NOTE
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the procedure, enables you to keep track of the procedure which is carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE MANDATORY TO FILL OUT A FAULT FINDING LOG FOR EACH FAULT FINDING PROCEDURE.

You will always be asked for this log:
– when requesting technical assistance from the Techline,
– for approval requests when replacing parts for which approval is obligatory,
– to be enclosed when returning monitored parts on request. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY ADVICE

Safety rules must be observed during any work on a component to prevent any damage or injury:
– make sure that the battery is properly charged to avoid damaging the computers with a low load,
– use the appropriate tools.

7. FAULT FINDING

Stored faults are managed the same way for all sensors and actuators.
A stored fault is cleared after 128 recurrence-free starts.

FAULT FINDING LOG

System: Injection

List of monitored parts: ***Computer***

Administrative identification

Date	2 0
Log completed by	
VIN	
Engine	
Diagnostic tool	CLIP
Update version	

Customer complaint

	579	Does not start - fault		570	Stalling - cold starting faults		571	Stalling - warm starting faults
	586	Injection/preheating warning light on		572	Idling - unstable engine speed		574	Bucking/flat spots
	573	Loss of power		520	Abnormal noise, vibrations		576	Smoke - exhaust odours
	569	Starting faults						

Other — Your comments:

Conditions under which the customer complaint occurs

	001	When cold		005	While driving		008	When decelerating
	002	When hot		006	When changing gear		009	Sudden fault
	003	When stationary		007	When accelerating		010	Gradual deterioration
	004	Intermittently						

Other — Your comments:

Documentation used in fault finding

Fault finding procedure used	
Type of diagnostic manual:	Workshop Repair Manual ❑ Technical Note ❑ Assisted fault finding ❑
Fault finding manual no.:	
Wiring diagram used	
Wiring Diagram Technical Note no.:	
Other documentation	
Title and/or part number:	

RENAULT

FD 01
Fault finding log

FAULT FINDING LOG

System: Injection

Computer identification and parts exchanged for the system

Part 1 part no.	
Part 2 part no.	
Part 3 part no.	
Part 4 part no.	
Part 5 part no.	

To be read with the diagnostic tool (Identification screen):

Computer part no.	
Supplier no.	
Program no.	
Software version	
Calibration no.	
VDIAG	

Faults found with the diagnostic tool

Fault no.	Present	Stored	Fault name	Specification

Conditions under which fault occurs

Status or parameter no.	Parameter name	Value	Unit

System-specific information

Description:

Additional information

What factors led you to replace the computer?	
What other parts were replaced?	
Other defective functions?	
Your comments:	

RENAULT

FD 01
Fault finding log

1. SYSTEM OPERATION

Composition

The injection system consists of the:
– accelerator potentiometer,
– accelerator pedal switch,
– TDC sensor,
– atmospheric pressure sensor,
– air temperature sensor,
– coolant temperature sensor,
– freon pressure sensor,
– upstream oxygen sensor,
– downstream oxygen sensor,
– cruise control switch,
– steering column switch,
– cruise control on/off switch,
– brake lights switch,
– fuel vapour absorber,
– injection computer,
– motorised throttle valve,
– four injectors,
– four pencil coils,
– + turbocharging pressure sensor,
– coolant pump
– turbocharging solenoid valve.

Computer

SAGEM type S3000 FLASH EEPROM 128-track computer controlling the injection and ignition.

Sequential multipoint injection.

Connections to the other computers:
– Protection and Switching Unit (UPC),
– Passenger Compartment Control Unit (UCH),
– Automatic Transmission Electronic Control Unit (AUTO ECU).

Engine immobiliser

The immobiliser function is managed by the UCH and engine management computers.
Before any driver request (card + button press), the engine management and UCH computers exchange authentication CAN frames to determine whether or not to start the engine.
After more than five consecutive failed authentication attempts, the engine management computer goes into protection (anti-scanning) mode and no longer tries to authenticate the UCH computer. It only leaves this mode when the following sequence of operations is carried out:
– the ignition is left on for at least **60 seconds**,
– ignition is switched off,
– the injection computer self-feed deactivates when it should (the time varies according to engine temperature).
After this, only one authentication attempt is allowed. If it too fails, the sequence of operations described above must be repeated.
If the engine management computer still fails to unlock, contact the Techline.

Impact detected

If an impact has been registered by the injection computer (Impact detected), switch off the ignition for **10 seconds** then switch it back on to start the engine. Then clear any faults.

IMPORTANT
Disconnect the injection computer when carrying out any welding work on the vehicle.

2. OPERATIONAL SAFETY

Warning light illumination

The S3000 injection system manages the illumination of three warning lights and the issuing of warning messages according to the severity of the faults detected, to inform the customer and to direct fault finding.
The injection computer manages the illumination of warning lights and warning messages displayed on the instrument panel. These warning lights illuminate during the starting phase and in the event of an injection fault or engine overheating.
The warning light illumination signals reach the instrument panel via the multiplex network.

Warning light illumination principle

During the starting phase (START button pressed) the **OBD** (On Board Diagnostic) warning light comes on for approximately **3 seconds** then goes out.

If there is an injection fault (**severity 1**), the **INJECTION FAULT** written message lights up followed by the **SERVICE** warning light. It indicates a reduced level of operation and a limited safety level.
The driver should carry out repairs as soon as possible.
Components involved:
– motorised throttle valve,
– accelerator pedal potentiometer,
– inlet manifold pressure sensor,
– computer,
– actuator feed,
– computer feed.

If there is a serious injection fault (**severity 2**), the red engine symbol and the word STOP appear (display with information display only), with the **ENGINE OVERHEATING** written message followed by the **STOP** warning light and a buzzer. If this happens, the vehicle must be stopped immediately.
When a fault causing excessive pollution in the exhaust fumes is detected, the **orange OBD warning light**, an engine symbol, will be lit:
– **flashing** in the event of a fault which might destroy the catalytic converter (destructive misfires). If this happens, the vehicle must be stopped immediately.
– **constantly** in the case of non-compliance with the anti-pollution standards (pollutant misfiring, catalytic converter fault, oxygen sensor faults, inconsistency between the oxygen sensors and canister fault).

Distance travelled with fault

This parameter measures the distance travelled with one of the injection fault warning lights lit: level 1 fault warning light (amber), coolant temperature overheating warning light, or OBD warning light.
The counter can be reset to **0** using the diagnostic tool.

Defect modes

Motorised throttle valve

In defect mode, the motorised throttle valve can have 6 different statuses.

Type 1
The throttle opening is less than the Defect mode position. The throttle is no longer activated and is automatically in Defect mode. The ESP, distance control and cruise control/speed limiter systems are disabled. The automatic transmission is in Defect mode.

Type 2
The throttle opening is no longer controlled. The engine speed is limited by injection cut-off.

Type 3
Defect mode is associated with a pedal reset (constant pedal setting for each gear ratio).

Type 4
The associated defect mode restricts the throttle opening. The maximum throttle valve opening threshold results in a speed of under **54 mph (90 km/h)**.

Type 5
The computer no longer processes torque changes requested by the ESP, distance control, cruise control/ speed limiter and automatic transmission systems.
This defect mode results from a computer malfunction, or a fault with the manifold or turbocharging pressure sensor.
The system then only uses the accelerator pedal signal.
The ESP, distance control and cruise control/speed limiter systems are disabled. The automatic transmission system is in Defect mode.

Type 6
The turbocharging valve no longer works.

Table of defect modes:

	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
DF002 Air temperature sensor circuit						**1.DEF**
DF004 Turbocharging pressure sensor circuit					**1.DEF** **2.DEF**	**1.DEF** **2.DEF**
DF008 Pedal potentiometer circuit gang 1			**CO.0** **CC.1** **1.DEF**	**CO.0** **CC.1** **1.DEF**		**CO.0** **CC.1** **1.DEF**
DF009 Pedal potentiometer circuit gang 2				**CO.0** **CC.1**		**CO.0** **CC.1**
DF011 Sensor supply voltage no. 1	**1.DEF** **2.DEF**	**1.DEF** **2.DEF**				
DF012 Sensor supply voltage no. 2				**1.DEF** **2.DEF**		**1.DEF** **2.DEF**
DF038 Computer	**1.DEF**	**1.DEF**	**1.DEF**	**1.DEF**	**1.DEF**	**1.DEF**
DF046 Battery voltage	**1.DEF**	**1.DEF**				**1.DEF**
DF054 Turbocharging solenoid valve control circuit						**OC** **CC.0** **CC.1**
DF078 Motorised throttle control circuit	**CC.1** **1.DEF**	**CC.1** **1.DEF**				**CC.1** **1.DEF**
DF079 Motorised throttle valve automatic control	**1.DEF** **2.DEF** **3.DEF** **4.DEF** **5.DEF** **6.DEF**	**1.DEF** **2.DEF** **3.DEF** **4.DEF** **5.DEF** **6.DEF**		**4.DEF** **5.DEF**		**1.DEF** **2.DEF** **3.DEF** **4.DEF** **5.DEF** **6.DEF**
DF089 Inlet manifold pressure sensor circuit					**1.DEF** **2.DEF**	**1.DEF** **2.DEF**
DF095 Throttle potentiometer circuit gang 1	**CO.0** **CC.1** **1.DEF**	**CO.0** **CC.1** **1.DEF**				**CO.0** **CC.1** **1.DEF**
DF096 Throttle potentiometer circuit gang 2				**CO.0** **CC.1**		**CO.0** **CC.1**

Connector (A), 32 tracks:

Track	Description
A1	Not used
A2	Cruise control on/off switch
A3	Engine CAN LOW multiplex link
A4	Engine CAN HIGH multiplex link
B1	Not used
B2	Not used
B3	Not used
B4	K-line diagnostic
C1	Not used
C2	Not used
C3	Speed limiter on/off switch
C4	Clutch switch + signal
D1	+ after ignition feed via UPC
D2	Cruise control/speed limiter controls supply
D3	Cruise control programming feedback signal
D4	Not used
E1	Not used
E2	Not used
E3	Not used
E4	Brake pedal switch signal
F1	Not used
F2	Accelerator pedal potentiometer gang 2 + 5 V feed
F3	Accelerator pedal potentiometer signal, track 2
F4	Accelerator pedal potentiometer earth, track 2
G1	Battery + feed via the UPC
G2	Accelerator pedal potentiometer gang 1 + 5 V feed
G3	Not used
G4	Electronic earth
H1	Electronic earth
H2	Accelerator pedal potentiometer signal, gang 1
H3	Accelerator pedal potentiometer earth, gang 1
H4	Electronic earth

Connector (B), 48 tracks

Track	Description
A1	Injector 1 - control
A2	Injector 2 - control
A3	Injector 3 - control
A4	Injector 4 - control
B1	Not used
B2	Pinking sensor screening
B3	Pinking sensor + signal
B4	Pinking sensor - signal
D1	Not used
D2	Not used
D3	Motorised throttle valve potentiometer gang 2 signal
D4	Computer auto supply
E1	- turbocharging pressure sensor
E2	Air temperature sensor signal
E3	Air temperature sensor earth
E4	Engine speed and position sensor signal
F1	Turbocharging pressure sensor signal
F2	Coolant temperature sensor signal
F3	Engine speed and position sensor signal
F4	Coolant temperature sensor earth
G1	+ turbocharging pressure sensor
G2	+ 5 V motorised throttle potentiometer
G3	Motorised throttle valve potentiometer gang 1 signal
G4	Motorised throttle valve potentiometers common earth
H1	Not used
H2	+ 5 V manifold pressure sensor feed
H3	Manifold pressure sensor signal
H4	Manifold pressure sensor earth
I1	Not used
I2	Not used
I3	Not used
I4	Not used
J1	Not used
J2	Air conditioning pressure switch signal
J3	AC pressure switch + 5 V supply
J4	Not used
K1	Not used
K2	Air conditioning pressure switch earth
K3	Engine CAN LOW multiplex link
K4	Engine CAN HIGH multiplex link
L1	Electronic earth
L2	Not used
L3	Not used
L4	- coolant pump
M1	Electronic earth
M2	Battery + feed via the UPC
M3	+ motorised throttle valve motor
M4	- motorised throttle valve motor

Connector (C), 48 tracks

Track	Description
A1	Not used
A2	Downstream oxygen sensor + signal
A3	Not used
A4	Not used
B1	Upstream oxygen sensor + signal
B2	Downstream oxygen sensor - signal
B3	Not used
B4	Not used
C1	Upstream oxygen sensor - signal
C2	Not used
C3	Not used
C4	Not used
D1	Fuel pump control by the UPC
D2	Not used
D3	Not used
D4	Not used
E1	Fuel vapour absorber bleed solenoid valve control
E2	Not used
E3	Not used
E4	Not used
F1	Not used
F2	Not used
F3	Not used
F4	Not used
G1	Not used
G2	Not used
G3	Not used
G4	- turbocharging solenoid valve
H1	Not used
H2	Not used
H3	Not used
H4	Not used
I1	Not used
I2	Not used
I3	Not used
I4	Not used
L1	Electronic earth
L2	Upstream oxygen sensor heating - control
L3	Downstream oxygen sensor heating - control
L4	Not used
M1	Electronic earth
M2	Not used
M3	Ignition coils 2-3 - control
M4	Ignition coils 1-4 - control

1. PROGRAMMING, REPROGRAMMING OR REPLACING THE COMPUTER

The system can be programmed and reprogrammed via the diagnostic socket using the RENAULT CLIP diagnostic tool (**Consult Technical Note 3585A or follow the instructions provided by the diagnostic tool**).

NOTE
- **switch on the diagnostic tool (mains or cigarette lighter supply).**
- **connect a battery charger (during the entire computer (re)programming procedure, the engine fan assemblies are triggered automatically).**
- **observe the engine temperature instructions of the diagnostic tool before (re)programming.**

After programming, reprogramming or replacing the computer:
- **switch off the ignition.**
- **start and then stop the engine (to initialise the computer) and wait for 30 seconds.**
- **switch on the ignition again and use the diagnostic tool to carry out the following steps:**

– use command **VP010 Write VIN**,
– deal with any faults detected by the diagnostic tool. Clear the computer memory,
– program the flywheel sensor target and throttle end stops,
– carry out a road test followed by another check with the diagnostic tool.

NOTE
It is not possible to test an injection computer from the Parts Department because it can no longer be fitted on any other vehicle.

2. REPLACING OR REMOVING THE TDC SENSOR

When the TDC sensor is replaced or removed, the flywheel target has to be programmed.

3. REPLACING THE MOTORISED THROTTLE VALVE

When the throttle valve is replaced, the throttle stops must be programmed.

NOTE
Never drive the vehicle without having programmed the throttle stops.

1. CONFIGURATION

Computer configuration by automatic detection

The computer can automatically configure itself based on the sensors or vehicle options it detects.

2. PROGRAMMING

Programming the flywheel target

Accelerate up to **4000 rpm** in 3rd gear then decelerate to power take-up* speed. Then repeat immediately.
Check the programming with **ET089**.

Programming the throttle end stops

After replacing the computer or motorised throttle valve, after switching on the ignition, wait **30 seconds** for the computer to memorise the MAXIMUM and MINIMUM stops.
Check the programming with **ET051**.

*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque.

Tool faults	Hexadecimal DTC codes	Description	Level 1 fault warning light	No warning light lit	OBD warning light
DF001	0115	Coolant temperature sensor circuit			1.DEF
DF002	0110	Air temperature sensor circuit			1.DEF
DF004	0235	Turbocharging pressure sensor circuit	1.DEF/2.DEF		1.DEF/2.DEF
DF005	0335	Engine speed sensor circuit			1.DEF/2.DEF
DF008	0225	Pedal potentiometer gang 1 circuit	CO.0/CC.1 1.DEF		
DF009	2120	Pedal potentiometer gang 2 circuit	CO.0/CC.1		
DF011	0641	Sensor supply voltage no. 1	1.DEF/2.DEF		
DF012	0651	Sensor supply voltage no. 2	1.DEF/2.DEF		
DF026	0201	Cylinder 1 injector control circuit			CO/CC.0 CC.1
DF027	0202	Cylinder 2 injector control circuit			CO/CC.0 CC.1
DF028	0203	Cylinder 3 injector control circuit			CO/CC.0 CC.1
DF029	0204	Cylinder 4 injector control circuit			CO/CC.0 CC.1
DF037	0633	Engine immobiliser		1.DEF	
DF038	0606	Computer		1.DEF	
DF046	0560	Battery voltage		1.DEF	
DF049	0530	Refrigerant sensor circuit		1.DEF	
DF054	0243	Turbocharging solenoid valve control circuit			CO/CC.0 CC.1

Tool faults	Hexadecimal DTC codes	Description	Level 1 fault warning light	No warning light lit	OBD warning light
DF059	0301	Misfires in cylinder 1			1.DEF/2.DEF
DF060	0302	Misfires in cylinder 2			1.DEF/2.DEF
DF061	0303	Misfires in cylinder 3			1.DEF/2.DEF
DF062	0304	Misfires in cylinder 4			1.DEF/2.DEF
DF065	0300	Combustion misfiring			1.DEF/2.DEF
DF072	0351	Cylinder 1 ignition coil circuit			CO.0/CC.1
DF073	0352	Cylinder 2 ignition coil circuit			CO.0/CC.1
DF074	0353	Cylinder 3 ignition coil circuit			CO.0/CC.1
DF075	0354	Cylinder 4 ignition coil circuit			CO.0/CC.1
DF078	2101	Motorised throttle control circuit	CC.1/1.DEF		
DF079	0638	Motorised throttle valve automatic control		6.DEF	1.DEF/2.DEF 3.DEF/4.DEF 5.DEF
DF080	0010	Camshaft dephaser circuit			
DF081	0443	Canister bleed solenoid valve circuit			CO/CC.0 CC.1
DF082	0135	Upstream oxygen sensor heating circuit			CO.0/CC.1
DF083	0141	Downstream oxygen sensor heating circuit			CO.0/CC.1

Tool faults	Hexadecimal DTC codes	Description	Level 1 fault warning light	No warning light lit	OBD warning light
DF084	0685	Actuator relay control circuit		1.DEF	
DF085	0627	Fuel pump control relay circuit			CO/CC.0 CC.1
DF086	2600	Coolant pump control circuit		CO/CO.0 CC.1	
DF088	0325	Pinking sensor circuit			1.DEF
DF089	0105	Inlet manifold pressure sensor circuit			1.DEF 2.DEF
DF091	0500	Vehicle speed signal			1.DEF
DF092	0130	Upstream oxygen sensor circuit			CO.0 CC.1 1.DEF
DF093	0136	Downstream oxygen sensor circuit			CO.0/CC.1
DF095	0120	Throttle potentiometer circuit gang 1	CO.0/CC.1 1.DEF		
DF096	0220	Throttle potentiometer circuit gang 2	CO.1/CC.0		
DF097	0340	Camshaft sensor circuit			
DF099	C101	Automatic transmission or sequential gearbox connection via the multiplex network		1.DEF	
DF100	C155	Instrument panel multiplex connection		1.DEF	
DF101	C122	Multiplex ESP connection		1.DEF	
DF105	0585	Cruise control/speed limiter on/off circuit		1.DEF	
DF106	0575	Cruise control/speed limiter function selector on steering wheel		1.DEF	

Tool faults	Hexadecimal DTC codes	Description	Level 1 fault warning light	No warning light lit	OBD warning light
DF109	0313	Low fuel level misfiring			1.DEF/2.DEF
DF110	0420	Catalytic converter			1.DEF
DF125	0314	Torque meter programming			1.DEF
DF126	1604	Passenger compartment heating resistor (RCH)		1.DEF	
DF127	0703	Brake switch no. 1 circuit		1.DEF	
DF128	0571	Brake switch no. 2 circuit		1.DEF	
DF398	0170	Fuel circuit operating fault			1.DEF
DF455	0460	Low fuel level signal		1.DEF	
DF608	0830	Clutch pedal switch		1.DEF	
DF612	1605	Oil vapour antifreeze resistor circuit		CO.0	

DF001 PRESENT	COOLANT TEMPERATURE SENSOR CIRCUIT 1.DEF: value outside tolerance range

NOTES	**Priority for dealing with a combination of faults:** Deal with the **DF011 Sensor feed voltage no 1** fault as a priority if it is present or stored.
	Special note: **OBD warning light** lit.

Check the **cleanliness** and **condition** of the coolant temperature sensor and its connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Computer, connector B **track F2** ⟶ **track B2** of the coolant temperature sensor
Computer, connector B **track F4** ⟶ **track B1** of the coolant temperature sensor

Repair if necessary.

Measure the **resistance** of the coolant temperature sensor between **tracks B1** and **B2**.
Replace the coolant temperature sensor if the **resistance** is not:

12.6 kΩ	**± 1.1 kΩ**	**at - 10 °C**
2.2 kΩ	**± 112 Ω**	**at 25 °C**
810 Ω	**± 39 Ω**	**at 50 °C**
282.6 Ω	**± 7.8 Ω**	**at 80 °C**
114.6 Ω	**± 2.6 Ω**	**at 110 °C**
87.7 Ω	**± 1.9 Ω**	**at 120 °C**

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF002 PRESENT	AIR TEMPERATURE SENSOR CIRCUIT 1.DEF: value outside tolerance range

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with fault **DF012 Sensor supply voltage no. 2** first if it is present or stored.
	Special note: – **OBD warning light** illuminated, – throttle valve defect mode **type 6**.

Check the **cleanliness** and **condition** of the air temperature sensor and its connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check the **insulation** and **continuity** on the following connections:
Computer, connector **B, track E3** ⟶ **track 2** of the air temperature sensor
Computer, connector **B, track E2** ⟶ **track 1** of the air temperature sensor
Repair if necessary.

Measure the **resistance** of the air temperature sensor between **tracks 1** and **2**.
Replace the air temperature sensor if the **resistance** is not:

9.6 kΩ	**± 9.6 %**	**at - 10 °C**
2 kΩ	**± 6 %**	**at 25 °C**
810 Ω	**± 5.8 %**	**at 50 °C**
309 Ω	**± 5.5 %**	**at 80 °C**

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF004 PRESENT OR STORED	TURBOCHARGING PRESSURE SENSOR CIRCUIT 1.DEF: voltage outside tolerances 2.DEF: inconsistent data

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with fault **DF012 Sensor supply voltage no. 2** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine has been running or started at an engine speed of over **600 rpm**.
	Special note: – **OBD warning light** illuminated, – throttle valve defect mode **types 5 and 6**.

Check the **cleanliness, condition** and the **assembly** of the turbocharging pressure sensor.
Repair if necessary.

If the fault is still present, adjust the harness so that the fault status changes (present ⇒ stored).
Look for any damage to the wiring harness, and check the **condition and connection** of the injection computer and turbocharging pressure sensor connectors.
Repair if necessary.

If the fault is still present, check for **+ 5 V** on **track G1** and that the **earth** is present on **track E1** of connector **B** of the injection computer.
Contact the Techline if it is not correct.

If the fault is still present, disconnect the battery and the injection computer.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer connector **B, track E1** ⟶ **Track 2** of the pressure sensor
Computer connector **B, track F1** ⟶ **Track 3** of the pressure sensor
Computer connector **B, track G1** ⟶ **Track 1** of the pressure sensor

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm the repair. Deal with any other faults. Clear the stored faults.

DF005 PRESENT OR STORED	ENGINE SPEED SENSOR CIRCUIT 1.DEF: engine flywheel target fault 2.DEF: no speed signal or interference signal

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after the starter motor has been operated for **10 seconds** or at engine speeds over **600 rpm**.
	Special note: – **OBD warning light** illuminated.

1.DEF	***NOTES***	None

Check the **cleanliness, condition** and the **assembly** of the flywheel.
Repair if necessary.

If the flywheel has been replaced or removed, the flywheel target has to be reinitialised, then reprogrammed.

Programming reset:
Run command **RZ005**.

Carrying out the flywheel target programming:
Accelerate up to **4000 rpm** in third gear then decelerate at no load to power take-up speed*.
Then repeat immediately.
In rare cases, fault **DF125 Torquemeter programming** may appear.

(*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque.)

DF005 **CONTINUED**	

2.DEF	***NOTES***	None

Check the **mounting** and **positioning** of the engine speed sensor (see **MR 366, 10A, Engine and peripherals**).
Check the **cleanliness** and **condition** of the engine speed sensor. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the universal bornier, check the **insulation and continuity** on the following connections: Computer **connector B, track E4** ⟶ **Track 2** of the engine speed sensor Computer **connector B, track F3** ⟶ **Track 1** of the engine speed sensor

Measure the **resistance** of the engine speed sensor between **tracks 1 and 2**: Replace the sensor if the **resistance** is not between **200 and 270 Ω at 23 °C**.
If the engine speed sensor has been replaced, the flywheel target has to be reinitialised, then reprogrammed.
Programming reset: Run command **RZ005**. **Carrying out the flywheel target programming:** Accelerate up to **4000 rpm** in third gear then decelerate at no load to power take-up speed*. Then repeat immediately. In rare cases, fault **DF125 Torquemeter programming** may appear. (*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque.)

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the fault memory.

DF008 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 1 CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V** 1.DEF: inconsistency between pedal gangs 1 and 2

NOTES	**Priority for dealing with a combination of faults:** Deal with fault **DF011 Sensor supply voltage no. 1** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the accelerator pedal goes from no load to full load.
	Special note: – **OBD fault warning light** and **severity 1 fault warning light** illuminated. – throttle valve defect mode **types 3, 4 and 6**.

Check that the pedal mechanism has not seized.

Check the **cleanliness** and **condition** of the throttle valve connections.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check the **insulation** and **continuity** on the following connections:
Computer, connector **A, track H3** ⟶ **Track 5** of the pedal potentiometer gang 1
Computer, connector **A, track G2** ⟶ **Track 3** of the pedal potentiometer gang 1
Computer, connector **A, track H2** ⟶ **Track 4** of the pedal potentiometer gang 1
Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF009 PRESENT OR STORED	PEDAL POTENTIOMETER CIRCUIT GANG 2 CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with fault **DF012 Sensor supply voltage no. 2** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the accelerator pedal goes from no load to full load.
	Special note: – **level 1 fault warning light** illuminated, – throttle valve defect mode **types 4 and 6**.

Check that the pedal mechanism has not seized.

Check the **cleanliness** and **condition** of the throttle valve connections.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check for **insulation** and **continuity** on the following connections:
Computer, connector **A, track F4** → **Track 6** of the pedal potentiometer gang 2
Computer, connector **A, track F2** → **Track 2** of the pedal potentiometer gang 2
Computer, connector **A, track F3** → **Track 1** of the pedal potentiometer gang 2
Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF011 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE NO. 1 1.DEF: voltage outside tolerances 2.DEF: internal electronic fault

NOTES	**Priority for dealing with a combination of faults:** Deal with the other faults first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after: – the ignition is switched on, – loss of dialogue between the inter-systems (ESP, CC/SL), – power loss when accelerating.
	Special note: – **level 1 fault warning light** illuminated, – throttle valve defect mode **types 1 and 2**.

Check the **cleanliness** and **condition** of the throttle valve connections.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Sensor feed no. 1 is reserved for the following components:
– motorised throttle valve,
– coolant temperature sensor,
– pedal potentiometer gang 1,
– upstream and downstream oxygen sensors,
– motorised throttle potentiometer gangs 1 and 2.

If, with sensors disconnected the voltage is still less than **3.9 V** or greater than **4.1 V**:
– check the **insulation from earth** of the **+ 5 V** line of each of its sensors.

Using the Universal bornier, check the **insulation** and **continuity** on the following connections:
Computer, connector **B, track G2** ⟶ **Track 2** of the throttle valve
Computer, connector **A, track G2** ⟶ **Track 3** of the pedal potentiometer gang 1
Repair if necessary.

If the fault is still present, there is a computer fault. Contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF012 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE NO. 2 1.DEF: voltage outside tolerances 2.DEF: internal electronic fault

NOTES	**Priority for dealing with a combination of faults:** Deal with the other faults first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after: – the ignition is switched on, – loss of power when accelerating, – loss of inter-systems (ESP, CC/SL).
	Special note: – **level 1 fault warning light** illuminated, – throttle valve defect mode **types 4 and 6**.

Check the **cleanliness** and **condition** of the throttle valve connections.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Sensor feed no. 2 is reserved for the following components:
– air temperature sensor,
– turbocharger pressure sensor,
– pedal potentiometer gang 2,
– coolant pressure sensor,
– inlet manifold pressure sensor.

If, with sensors disconnected the voltage is still less than **3.9 V** or greater than **4.1 V**:
– check the **insulation from earth** of the **+ 5 V** line of each of its sensors.

Using the Universal bornier, check the **insulation** and **continuity** on the following connection:
Computer, connector **A, track F2** ⟶ **Track 2** of the pedal potentiometer gang 2
Repair if necessary.

If the fault is still present, contact Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 PRESENT OR STORED	CYLINDER 1 INJECTOR CONTROL CIRCUIT CO : open circuit CC.0 : short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuators relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the cylinder 1 injector and its connections.
Repair if necessary.

With the ignition on, check for **+ 12 V feed** on **track 1** of the cylinder 1 injector connector.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** from the Protection and switching unit,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:
Protection and Switching Unit **connector PPM1** ⟶ **Track 1** of cylinder 1 injector
Repair if necessary.
Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
If the **+ 12 V feed** is still not present on **track 1** of the cylinder 1 injector connector with the ignition on, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check for **insulation** and **continuity** on the following connection:
Computer, connector **B, track A1** ⟶ **Track 2** of the cylinder 1 injector
Repair if necessary.

Measure the **resistance** between **tracks 1** and **2** of the cylinder 1 injector.
Replace the cylinder 1 injector if the **resistance** is not **12 Ω ± 5 % at 20 °C**.

If the fault is still present, replace the cylinder 1 injector.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF027 PRESENT OR STORED	CYLINDER 2 INJECTOR CONTROL CIRCUIT CO : open circuit CC.0 : short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuator relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the cylinder 2 injector and its connections.
Repair if necessary.

With the ignition on, check for **+ 12 V feed** on **track 1** of the cylinder 2 injector connector.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** from the Protection and switching unit,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:
Protection and Switching Unit **connector PPM1** ⟶ **Track 1** of cylinder 2 injector
Repair if necessary.
Reconnect the Protection and Switching Unit connector and reconnect the battery.
If the **+ 12 V feed** on **track 1** is still not present on the cylinder 2 injector connector with the ignition on, there is a fault with the Protection and Switching Unit.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check for **insulation** and **continuity** on the following connection:
Computer, connector **B, track A2** ⟶ **Track 2** of cylinder 2 injector
Repair if necessary.

Measure the **resistance** between **tracks 1** and **2** of the cylinder 2 injector.
Replace the cylinder 2 injector if the **resistance** is not **12 Ω ± 5 % at 20 °C**.

If the fault is still present, replace the cylinder 2 injector.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF028 PRESENT OR STORED	CYLINDER 3 INJECTOR CONTROL CIRCUIT CO : open circuit CC.0 : short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuator relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the cylinder 3 injector and its connections.
Repair if necessary.

With the ignition on, check for **+ 12 V feed** on **track 1** of the cylinder 3 injector connector.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** from the Protection and switching unit,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:
Protection and Switching Unit **connector PPM1** ⟶ **Track 1** of cylinder 3 injector
Repair if necessary.
Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
If the **+ 12 V feed** is still not present on **track 1** of the cylinder 3 injector connector with the ignition on, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check for **insulation** and **continuity** on the following connection:
Computer, connector **B, track A3** ⟶ **Track 2** of cylinder 3 injector
Repair if necessary.

Measure the **resistance** between **tracks 1** and **2** of the cylinder 3 injector.
Replace the cylinder 3 injector if the **resistance** is not **12 Ω ± 5 % at 20 °C**.

If the fault is still present, replace the cylinder 3 injector.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 PRESENT OR STORED	CYLINDER 4 INJECTOR CONTROL CIRCUIT CO : open circuit CC.0 : short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuator relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the cylinder 4 injector and its connections.
Repair if necessary.

With the ignition on, check for **+ 12 V feed** on **track 1** of the cylinder 4 injector connector.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** from the Protection and switching unit,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check the **continuity** on the following connection:
Protection and Switching Unit **connector PPM1** ⟶ **Track 1** of Cylinder 4 injector
Repair if necessary.
Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
If the **+ 12 V feed** on **track 1** is still not present on the cylinder 4 injector connector with the ignition on, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check the **insulation** and **continuity** on the following connection:
Computer, connector **B, track A3** ⟶ **Track 2** of cylinder 4 injector
Repair if necessary.

Measure the **resistance** between **tracks 1** and **2** of the cylinder 4 injector.
Replace the cylinder 4 injector if the **resistance** is not around **12 Ω ± 5 % at 20 °C**.

If the fault is still present, replace the cylinder 4 injector.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF037 PRESENT OR STORED	ENGINE IMMOBILISER 1.DEF: CAN connection fault

NOTES	**Priority for dealing with a combination of faults:** Deal with the other faults first.

Run a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, run fault finding on the system (see **16A, Starting - Charging**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF038 **PRESENT**	COMPUTER 1.DEF: internal electronic fault

NOTES	**Priority for dealing with a combination of faults:** Deal with the other faults first. **Special note:** – Throttle valve defect mode **types 1 to 6**.

Contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF046 PRESENT OR STORED	BATTERY VOLTAGE 1.DEF: open circuit or short circuit

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with fault **DF084 Actuators relay control circuit** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared as present at an engine speed of more than **2000 rpm**.
	Special note: – Throttle valve defect mode **types 1, 2 and 6**.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the computer connections.
Repair if necessary.

Disconnect the connector marked **PPM1** from the **Protection and Switching Unit**.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check for **continuity** on the following connection:
Computer, connector **B, track M2** ⟶ Protection and Switching Unit **connector PPM1 track 1**
Repair if necessary.

Carry out fault finding on the **Protection and Switching Unit** (the Protection and Switching Unit powers the injection system).

– Clean the battery terminals and all connections to the + and the **Earth**.
– Check the battery voltage.
– Check the charge circuit (see **MR 364 Mechanics, 16A, Starting - Charging**).
Repair or replace the faulty components, if necessary.

AFTER REPAIR	Deal with any faults detected by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF049 PRESENT	REFRIGERANT SENSOR CIRCUIT 1.DEF: voltage outside tolerance range

NOTES	**Priority for dealing with a combination of faults:** Deal with **DF012 Sensor feed voltage no. 2** as a priority if it is present or stored.

Check the **cleanliness** and **condition** of the manifold pressure sensor and its connections.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connections:

- Computer, connector **B, track J2** → **Track B** of the refrigerant sensor
- Computer, connector **B, track J3** → **Track C** of the refrigerant sensor
- Computer, connector **B, track K2** → **Track A** of the refrigerant sensor

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF054 PRESENT OR STORED	TURBOCHARGING SOLENOID VALVE CONTROL CIRCUIT CO : open circuit CC.0 : short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine has been running or started at an engine speed of over **600 rpm**.
	Special note: – **OBD warning light** illuminated. – Throttle valve defect mode **type 6**.

Check the **cleanliness** the **condition** and the **assembly** of the turbocharging pressure sensor.
Repair if necessary.

If the fault is still present, adjust the harness so that the fault status changes (present ⇒ stored).
Look for possible damage to the harness, check the **condition** and **connection** of the injection computer and turbocharging pressure sensor connectors.
Repair if necessary.

If the fault is still present, check for the **+ 12 V** on **track 2** of the turbocharging solenoid valve.
If the **+ 12 V** is not present, check the following connection for **insulation, continuity and the absence of interference resistance**:

Turbocharging solenoid valve **track 2** ⟶ **track 2 of connector PPM1** on the Protection and Switching Unit

Repair if necessary.

If the fault is still present, disconnect the battery and the injection computer.
Check the **insulation, continuity and the absence of interference resistance** on the following connection:

Computer, connector **C, track G4** ⟶ **Track 1** of the turbocharging solenoid valve

Repair if necessary.

If the fault is still present, measure the **resistance** of the turbocharging solenoid valve between **tracks 1 and 2**.
Replace the turbocharging solenoid valve if **resistance** is not: **10 kΩ no load**
5 kΩ full load

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF059 PRESENT OR STORED	MISFIRES IN CYLINDER 1 1.DEF: destructive misfiring 2.DEF: pollutant misfiring

NOTES	**Priority for dealing with a combination of faults:** – ignition: **DF072, DF073, DF074** and **DF075**. – fuel supply system: **DF026, DF027, DF028, DF029** and **DF085**. – engine flywheel signal: **DF005** and **DF125**. Check whether other cylinders have misfiring faults before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done, – engine warm (min. **75 °C**), – idling with all the electrical consumers activated for **15 minutes**.
	Special note: – **OBD warning light** illuminated.

Misfires in cylinder 1 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 1 injector, – check the condition and conformity of the spark plugs, – check the cylinder 1 pencil coil. If everything is in order, check the same components on cylinder 4 (to cover a possible cylinder recognition error).
Misfires in cylinders 1 and 4 (see DF059 Misfires in cylinder 1 and DF062 Misfires in cylinder 4)	The fault is probably due to a component that affects a pair of cylinders: – check the relevant ignition coil circuit (apply the fault finding procedure **DF720 Ignition coil circuit 1** or **DF075 Ignition coil circuit 4**), – check the condition and conformity of the spark plugs.

AFTER REPAIR	Ensure that all the faults have been dealt with. Clear the stored faults. Do not delete the programming. Checking that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault is still present, continue the fault finding procedure. – carry out catalytic converter fault finding through the appropriate After-Sales service.

DF059 **CONTINUED**	

Misfiring on all four cylinders (see DF060, DF061 and DF062)	The fault is probably due to a component affecting all the cylinders: – check that the correct fuel is being used, – check the condition and conformity of the spark plugs.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the sensor/flywheel air gap,
– check the cylinder compressions,
– check the complete fuel supply system (see **Workshop Repair Manual 364 Mechanics, 13A, Fuel supply**),
– check the entire ignition system (see **MR 364, Mechanics, 17A, Ignition**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Ensure that all the faults have been dealt with. Clear the stored faults. Do not delete the programming. Checking that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault is still present, continue the fault finding procedure. – carry out catalytic converter fault finding through the appropriate After-Sales service.

DF060 PRESENT OR STORED	MISFIRES IN CYLINDER 2 1.DEF: destructive misfiring 2.DEF: pollutant misfiring

NOTES	**Priority for dealing with a combination of faults:** – ignition: **DF072, DF073, DF074** and **DF075**. – fuel supply system: **DF026, DF027, DF028, DF029** and **DF085**. – engine flywheel signal: **DF005** and **DF125**. Check whether other cylinders have misfiring faults before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done, – engine warm (min. **75 °C**), – idling with all the electrical consumers activated for **15 minutes**.
	Special note: – **OBD warning light** illuminated.

Misfires in cylinder 2 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 2 injector, – check the condition and conformity of the spark plugs, – check the cylinder 2 pencil coil. If everything is in order, check the same components on cylinder 3 (to cover a possible cylinder recognition error).
Misfire on cylinders 2 and 3 (see DF060 Misfire on cylinder 2 and DF061 Misfire on cylinder 3)	The fault is probably due to a component that affects a pair of cylinders: – check the relevant ignition coil circuit (apply the fault finding procedure **DF073 Ignition coil circuit 2** or **DF074 Ignition coil circuit 3**), – check the condition and conformity of the spark plugs.

AFTER REPAIR	Ensure that all the faults have been dealt with. Clear the stored faults. Do not delete the programming. Checking that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault is still present, continue the fault finding procedure. – carry out catalytic converter fault finding through the appropriate After-Sales service.

DF060 **CONTINUED**	

Misfiring on all four cylinders (see DF060, DF061 and DF062)	The fault is probably due to a component affecting all the cylinders: – check that the correct fuel is being used, – check the condition and conformity of the spark plugs.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the flywheel/sensor air gap,
– check the cylinder compressions,
– check the complete fuel supply system (see **Workshop Repair Manual 364 Mechanics, 13A, Fuel supply**),
– check the entire ignition system (see **MR 364, Mechanics, 17A, Ignition**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Ensure that all the faults have been dealt with. Clear the stored faults. Do not delete the programming. Checking that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault is still present, continue the fault finding procedure. – carry out catalytic converter fault finding through the appropriate After-Sales service.

DF061 PRESENT OR STORED	MISFIRES IN CYLINDER 3 1.DEF: destructive misfiring 2.DEF: pollutant misfiring

NOTES	**Priority for dealing with a combination of faults:** – ignition: **DF072, DF073, DF074** and **DF075**. – fuel supply system: **DF026, DF027, DF028, DF029** and **DF085**. – engine flywheel signal: **DF005** and **DF125**. Check whether other cylinders have misfiring faults before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done, – engine warm (min. **75 °C**), – idling with all the electrical consumers activated for **15 minutes**.
	Special note: – **OBD warning light** illuminated.

Misfires in cylinder 3 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 3 injector, – check the condition and conformity of the spark plugs, – check the cylinder 3 pencil coil. If everything is in order, check the same components on cylinder 2 (to cover a possible cylinder recognition error).
Misfires in cylinders 2 and 3 (see DF060 Misfires in cylinder 2 and DF061 Misfires in cylinder 3)	The fault is probably due to a component that affects a pair of cylinders: – check the relevant ignition coil circuit (apply the fault finding procedure **DF073 Ignition coil circuit 2** or **DF074 Ignition coil circuit 3**), – check the condition and conformity of the spark plugs.

AFTER REPAIR	Ensure that all the faults have been dealt with. Clear the stored faults. Do not delete the programming. Checking that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault is still present, continue the fault finding procedure. – carry out catalytic converter fault finding through the appropriate After-Sales service.

DF061 **CONTINUED**	

Misfiring on all four cylinders (see DF060, DF061 and DF062)	The fault is probably due to a component affecting all the cylinders: – check that the correct fuel is being used, – check the condition and conformity of the spark plugs.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the flywheel/sensor air gap,
– check the cylinder compressions,
– check the complete fuel supply system (see **Workshop Repair Manual 364 Mechanics, 13A, Fuel supply**),
– check the entire ignition system (see **MR 364, Mechanics, 17A, Ignition**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Ensure that all the faults have been dealt with. Clear the stored faults. Do not delete the programming. To check that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault is still present, continue the fault finding procedure. – carry out catalytic converter fault finding through the appropriate After-Sales service.

DF062 PRESENT OR STORED	MISFIRES IN CYLINDER 4 1.DEF: destructive misfiring 2.DEF: pollutant misfiring

NOTES	**Priority for dealing with a combination of faults:** – ignition: **DF072, DF073, DF074** and **DF075**. – fuel supply system: **DF026, DF027, DF028, DF029** and **DF085**. – engine flywheel signal: **DF005** and **DF125**. Check whether other cylinders have misfiring faults before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done, – engine warm (min. **75 °C**), – idling with all the electrical consumers activated for **15 minutes**.
	Special note: – **OBD warning light** illuminated.

Misfires in cylinder 4 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 4 injector, – check the condition and conformity of the spark plugs, – check the pencil coil of cylinder 4. If everything is in order, check the same components on cylinder 1 (to cover a possible cylinder recognition error).
Misfires in cylinders 1 and 4 (see DF059 Misfires in cylinder 1 and DF062 Misfires in cylinder 4)	The fault is probably due to a component that affects a pair of cylinders: – check the relevant ignition coil circuit (apply the fault finding procedure **DF072 Ignition coil circuit 1** or **DF075 Ignition coil circuit 4**), – check the condition and conformity of the spark plugs.

AFTER REPAIR	Ensure that all the faults have been dealt with. Clear the stored faults. Do not delete the programming. Checking that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault is still present, continue the fault finding procedure. – carry out catalytic converter fault finding through the appropriate After-Sales service.

DF062 **CONTINUED**	

Misfiring on all four cylinders (see DF060, DF061 and DF062)	The fault is probably due to a component affecting all the cylinders: – check that the correct fuel is being used, – check the condition and conformity of the spark plugs.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the flywheel/sensor air gap,
– check the cylinder compressions,
– check the complete fuel supply system (see **Workshop Repair Manual 364 Mechanics, 13A, Fuel supply**),
– check the entire ignition system (see **MR 364, Mechanics, 17A, Ignition**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Ensure that all the faults have been dealt with. Clear the stored faults. Do not delete the programming. Checking that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault is still present, continue the fault finding procedure. – carry out catalytic converter fault finding through the appropriate After-Sales service.

DF065 PRESENT OR STORED	MISFIRING 1.DEF: destructive misfiring 2.DEF: pollutant misfiring

NOTES	**Priority for dealing with a combination of faults:** – ignition: **DF072, DF073, DF074** and **DF075**. – fuel supply system: **DF026, DF027, DF028, DF029** and **DF085**. – engine flywheel signal: **DF005** and **DF125**. – cylinder misfiring: **DF059, DF060, DF061** and **DF062**.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done, – engine warm (min. **75 °C**), – idling with all the electrical consumers activated for **15 minutes**.
	Special note: – **OBD warning light** illuminated.

Check the injectors.
Check the condition and conformity of the spark plugs.
Check the ignition pencil coils.
Check that the correct fuel is being used.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the flywheel/sensor air gap,
– check the cylinder compressions,
– check the complete fuel supply system (see **Workshop Repair Manual 364 Mechanics, 13A, Fuel supply**),
– check the entire ignition system (see **MR 364, Mechanics, 17A, Ignition**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF072 PRESENT OR STORED	CYLINDER 1 IGNITION COIL CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Deal with faults **DF046 Battery voltage, DF084 Actuator relay control circuit** or **DF085 Fuel pump relay control circuit** first if they are present or stored. If the **DF075 Cylinder 4 ignition coil circuit** fault is also present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the starter has been in operation for **10 seconds** or after the engine has been running for **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Disconnect the cylinder 1 pencil coil connector.
Check the **cleanliness** and **condition** of the pencil coil and its connections.
check that the correct fuel is being used,

Measure the **primary** and **secondary** resistance of the cylinder 1 pencil coil.
Replace the cylinder 1 pencil coil if the resistances are not:
– for K4 engines:
primary resistance: 540 mΩ ± 27 mΩ
secondary resistance: 10.7 kΩ ± 1.6 kΩ
– for F4 engines:
primary resistance: 520 mΩ ± 50 mΩ
secondary resistance: 6.7 kΩ ± 0.7 kΩ

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:
Computer, connector **C, track M4** ⟶ **Track 2** of Coil 1
Coil 4 **track 2** ⟶ **Track 1** of Coil 1
Repair if necessary.

If the fault is still present, replace the defective pencil coil.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the fault memory.

DF073 PRESENT OR STORED	CYLINDER 2 IGNITION COIL CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Deal with faults **DF046 Battery voltage, DF084 Actuator relay control circuit** or **DF085 Fuel pump relay control circuit** first if they are present or stored. If the fault **DF074 Cylinder ignition coil circuit 3** is also present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the starter has been in operation for **10 seconds** or after the engine has been running for **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Disconnect the cylinder 2 pencil coil connector.
Check the **cleanliness** and **condition** of the pencil coil and its connections. check that the correct fuel is being used,

Measure the **primary and secondary resistance** of the cylinder 2 pencil coil.
Replace the cylinder 2 pencil coil if the resistances are not:
– for K4 engines:
  primary resistance: 540 mΩ ± 27 mΩ
  secondary resistance: 10.7 kΩ ± 1.6 kΩ
– for F4 engines:
  primary resistance: 520 mΩ ± 50 mΩ
  secondary resistance: 6.7 kΩ ± 0.7 kΩ

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:
  Computer, connector **C, track M3** ⟶ **Track 2** of Coil 2
  Coil 3 **track 2** ⟶ **Track 1** of Coil 2
Repair if necessary.

If the fault is still present, replace the faulty pencil coil.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the fault memory.

DF074 PRESENT OR STORED	CYLINDER 3 IGNITION COIL CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Deal with faults **DF046 Battery voltage, DF084 Actuator relay control circuit** or **DF085 Fuel pump relay control circuit** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the starter has been in operation for **10 seconds** or after the engine has been running for **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Disconnect the pencil coil connector on cylinder 3.
Check the **cleanliness** and **condition** of the pencil coil and its connections. Check that the correct fuel is being used.

Measure the **primary and secondary resistance** of the cylinder 3 pencil coil.
Replace the cylinder 3 pencil coil if the resistances are not:
– for K4 engines:
  primary resistance: 540 mΩ ± 27 mΩ
  secondary resistance: 10.7 kΩ ± 1.6 kΩ
– for F4 engines:
  primary resistance: 520 mΩ ± 50 mΩ
  secondary resistance: 6.7 kΩ ± 0.7 kΩ

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:
  Computer, connector **C, track M3** ⟶ **Track 2** of Coil 2
  Coil 3 **track 2** ⟶ **Track 1** of Coil 2
Repair if necessary.

Check for the **+ 12 V feed** on track 1 of the cylinder 3 pencil coil connector with the ignition on.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM2** in the **Protection and Switching Unit**,
– check the **cleanliness and condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:
  Protection and Switching Unit **connector PPM1 track 8** ⟶ **track 1** of the pencil coil for cylinder 3
Repair if necessary.

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
If the **+ 12 V feed** on **track 1** is still not present on the cylinder 3 injector connector with the ignition on, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

If the fault is still present, replace the faulty pencil coil.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the fault memory.

DF075 PRESENT OR STORED	CYLINDER 4 IGNITION COIL CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Deal with faults **DF046 Battery voltage, DF084 Actuator relay control circuit** or **DF085 Fuel pump relay control circuit** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the starter has been in operation for **10 seconds** or after the engine has been running for **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Disconnect the cylinder 4 pencil coil connector.
Check the **cleanliness** and **condition** of the pencil coil and its connections. check that the **correct** fuel is being used,

Measure the **primary and secondary resistance** of the cylinder 4 pencil coil.
Replace the cylinder 4 pencil coil if the resistances are not:
– for K4 engines:
  primary resistance: 540 mΩ ± 27 mΩ
  secondary resistance: 10.7 kΩ ± 1.6 kΩ
– for F4 engines:
  primary resistance: 520 mΩ ± 50 mΩ
  secondary resistance: 6.7 kΩ ± 0.7 kΩ

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:
  Computer, connector **C, track M4** ⟶ **track 2** of Coil 1
  Coil 4 **track 2** ⟶ **track 1** of Coil 1
Repair if necessary.

Check for the **+ 12 V feed** on **track 1** of the cylinder 4 pencil coil connector with the ignition on.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM2** in the **Protection and Switching Unit**,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:
  Protection and Switching Unit **connector PPM1 track 8** ⟶ **track 1** of the pencil coil for cylinder 4
Repair if necessary.

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
If the **+ 12 V feed** on **track 1** is still not present on the cylinder 4 injector connector with the ignition on, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

If the fault is still present, replace the defective pencil coil.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF078 PRESENT OR STORED	MOTORISED THROTTLE CONTROL CIRCUIT CC.1 : short circuit to **+ 12 V** 1.DEF: motorised throttle general control fault

IMPORTANT
Never drive the vehicle without having checked that there are no faults involving the throttle valve.

NOTES	**Priority for dealing with a combination of faults:** If faults **DF095 Throttle potentiometer circuit gang 1** or **DF096 Throttle potentiometer circuit gang 2** are present, deal with these first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after: – a change in engine speed, – the air temperature must be between **5 °C** and **105 °C** inclusive.
	Special note: – **level 1 fault warning light** illuminated. – throttle valve defect mode **types 1, 2 and 6**.

Check the **cleanliness** and **condition** of the throttle valve and its connections.

Manually check that the throttle **rotates properly**.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Computer, connector **B, track M3** ⟶ **Track 4** of the motorised throttle
Computer, connector **B, track M4** ⟶ **Track 3** of the motorised throttle
Computer, connector **B, track G4** ⟶ **Track 1** of the motorised throttle

Repair if necessary.

Measure the **resistance** of the throttle motor between **tracks M3** and **M4** of the computer.
Replace the throttle valve if the **resistance** is not **1.57 Ω at 23 °C**.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF079 PRESENT OR STORED	MOTORISED THROTTLE UNIT AUTOMATIC CONTROL 1.DEF: motorised throttle stop search fault 2.DEF: motorised throttle rest position programming error 3.DEF: motorised throttle automatic control fault 4.DEF: the position memory function does not work 5.DEF: when the throttle bounces off the lower stop, a relatively large permanent discrepancy can be seen between the set position and actual position of the throttle. The bounce detection is based on this error. The oscillation fault, after N oscillations detected, activates the Limp Home defect mode. 6.DEF: when there is a micro-break on gang 1 of the sensor, the voltage delivered is minimal (**0 V**), which broadly corresponds to complete throttle closure. We can then see the gang 1 signal lapse in relation to the gang 2 signal, which remains correct. This lapse speed of one gang in relation to another is used to detect micro-breaks. The micro-break fault does not activate any defect mode or illuminate any warning lights. 7.DEF: non-compliance with emission control standards

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF011 Sensor supply voltage no. 1, DF078 Throttle potentiometer control circuit, DF095 Throttle potentiometer circuit gang 1** and **DF096 Throttle potentiometer circuit gang 2** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after: – A change in engine speed. – The air temperature must be between **5 °C** and **105 °C** inclusive.
	Special note: If **1 DEF, 2.DEF** or **3.DEF**: – **OBD warning light** illuminated, – throttle valve defect mode **types 1, 2 and 6**. If **4.DEF** or **5.DEF**: – **OBD warning light** illuminated, – throttle valve defect mode **types 1, 2, 4 and 6**.

Check the **cleanliness**, **condition** and **mounting** of the throttle valve.
Repair if necessary.

If the fault is still present, manually check that the throttle valve **rotates correctly**.
Repair if necessary.

If the fault is still present, manipulate the harness so that the status changes (present → stored).
Look for possible damage to the harness, check the **condition** and the **connection** of the injection computer and motorised throttle valve connectors.
Repair if necessary.

DF079 **CONTINUED**	

If the fault is still present, disconnect the battery and the injection computer.
Check the **insulation, continuity** and **absence of interference resistance** of the following connections:

- Computer connector **B track M3** → **Track 4** of the motorised throttle valve
- Computer connector **B track M4** → **Track 3** of the motorised throttle valve
- Computer connector **B track G4** → **Track 1** of the motorised throttle valve
- Computer connector **B track G3** → **Track 2** of the motorised throttle valve
- Computer connector **B track G2** → **Track 5** of the motorised throttle valve
- Computer connector **B track D3** → **Track 6** of the motorised throttle valve

Repair if necessary.

If the fault is still present, measure the **resistance** of the throttle motor between **tracks 3** and **4**.
Replace the throttle valve if the **resistance** is not approximately **1.57 Ω at 23 °C**.

If the throttle valve has been replaced, reinitialise RZ005 Programming.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF080 PRESENT OR STORED	CAMSHAFT DEPHASER CIRCUIT CO : open circuit CC.0 : short circuit to earth CC.1 : short circuit to + 12 V 1.DEF: programming deviation 2.DEF: programming inconsistency 3.DEF: camshaft dephaser position fault 4.DEF: dephaser automatic control outside the limits

NOTES	**If faults DF046 or DF084 are present or stored, deal with them first.**
	Conditions for applying the fault finding procedure to stored faults: The fault appears after a change in the engine speed.

Check the **cleanliness and condition** of the camshaft dephaser solenoid valve connections.

Measure the **resistance** of the camshaft dephaser solenoid valve (refer to **364, Mechanical, 17B, Petrol Injection, Camshaft Dephaser: Description**).
If the value is not correct, replace the camshaft dephaser solenoid valve.

With the ignition on, check for the **+ 12 V** on the camshaft dephaser solenoid valve connector (see the connector track number on the relevant wiring diagram).
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** in the **Protection and Switching Unit**,
– check the **cleanliness and condition** of the connections,
– use the Universal bornier to check the **continuity** of the following connection:
Protection and Switching Unit PPM1 connector, track 1 ⟶ Camshaft dephaser solenoid valve

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
With the ignition on, if the **+ 12 V** is still not present on the camshaft dephaser solenoid valve connector, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness and condition** of the connections.
Use the universal bornier to check the **insulation and continuity** of the following connection:
Computer track L3, connector B ⟶ Camshaft dephaser solenoid valve
(see connector track numbers in the corresponding wiring diagram).

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Apply the Stored fault diagnostic application conditions: – Continue to deal with the fault if it is present. – Ignore the fault if it is stored. Deal with any other faults. Clear the stored faults.

DF081 PRESENT OR STORED	CANISTER BLEED SOLENOID VALVE CIRCUIT CO : open circuit CC.0 : short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuator relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the ignition is switched on or command **AC017 Canister bleed solenoid valve** is run.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the fuel vapour absorber bleed solenoid valve connections. Repair if necessary.

Measure the **resistance** between **tracks 1** and **2** of the fuel vapour absorber bleed solenoid valve. Replace the bleed solenoid valve for the fuel vapour absorber if the **resistance** is not **26 Ω ± 4 Ω at 23 °C**.

Check for **+ 12 V feed** on **track 1** of the fuel vapour absorber bleed solenoid valve connector, with the ignition on.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** in the **Protection and Switching Unit**,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:

Protection and Switching Unit **connector PPM1** ⟶ **Track 1** of the fuel vapour absorber bleed solenoid valve

Repair if necessary.

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
If the **+ 12 V feed** is still not present on **track 1** of the fuel vapour absorber bleed solenoid valve connector with the ignition on, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connection:

Computer, connector **C, track E1** ⟶ **track 2** of the fuel vapour absorber bleed solenoid valve

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF082 PRESENT OR STORED	UPSTREAM OXYGEN SENSOR HEATING CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuator relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the upstream oxygen sensor connections.
Repair if necessary.

Check for **+ 12 V feed** on **track A** of the upstream oxygen sensor connector, with the ignition on.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** in the **Protection and Switching Unit**,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:
Protection and Switching Unit **connector PPM1** ⟶ **track A** of the upstream oxygen sensor
Repair if necessary.

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
If the **+ 12 V feed** is still not present on **track A** of the upstream oxygen sensor connector with the ignition on, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connection:
Computer connector **C, track L2** ⟶ **Track B** of the upstream oxygen sensor
Repair if necessary.

Measure the **resistance** of the upstream oxygen sensor heater between **tracks A** and **B**.
Replace the upstream oxygen sensor if the **resistance** is not approximately **9 Ω at 20 °C**.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF083 PRESENT OR STORED	DOWNSTREAM OXYGEN SENSOR HEATING CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuator relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the downstream oxygen sensor connections.
Repair if necessary.

Check for **+ 12 V feed** on **track A** of the downstream oxygen sensor connector with the ignition on.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** in the **Protection and Switching Unit**,
– check **the cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:
Protection and Switching Unit **connector PPM1** ⟶ **track A** of the downstream oxygen sensor
Repair if necessary.

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
If the **+ 12 V feed** is still not present on **track A** of the downstream oxygen sensor connector with the ignition on, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check for **insulation and continuity** on the following connection:
Computer, connector **C, track L3** ⟶ **track B** of the downstream oxygen sensor
Repair if necessary.

Measure the **resistance** of the downstream oxygen sensor heater between **tracks A** and **B**.
Replace the downstream oxygen sensor if the **resistance** is not approximately **9 Ω at 20 °C**.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF084 PRESENT OR STORED	ACTUATOR CONTROL RELAY CIRCUIT 1.DEF: open circuit or short circuit

NOTES	None

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the computer connections.
In the **Protection and Switching Unit**, disconnect connector **PEM** and check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check the **insulation** and **continuity** on the following connection:
Computer, connector **B, track D4** ⟶ **track 2** of the Protection and Switching Unit **PEM connector**
Repair if necessary.

If the fault is still present, there is a fault in the Protection and Switching Unit (the actuator relay is in the Protection and Switching Unit and is not removable).
Contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF085 PRESENT OR STORED	FUEL PUMP CONTROL RELAY CIRCUIT CO : open circuit CC.0 : short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present when command **AC015 Fuel pump relay** is run.
	Special note: – **OBD warning light** illuminated.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the computer connections.
In the **Protection and Switching Unit**, disconnect connector **PEM** and check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the Universal bornier, check the **insulation** and **continuity** on the following connection:
Computer, connector **C, track D1** ⟶ **track 1** on the Protection and Switching Unit, **PEM connector**
Repair if necessary.

If the fault is still present, there is a fault in the Protection and Switching Unit (the fuel pump relay is in the Protection and Switching Unit and is not removable).
Contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF086 PRESENT OR STORED	COOLANT PUMP CONTROL CIRCUIT CO : open circuit CO.0 : short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present when the engine is running.
	NOTE Check that when the coolant pump is active, the coolant circulates in the **reverse direction** to the usual circulation.

Check the **cleanliness**, **condition** and **fitting** of the coolant pump.
Top up the coolant if necessary.

If the fault is still present, manipulate the harness to see if the status changes.
Look for any harness damage, and check the **condition and connection points** of the injection computer and the coolant pump connectors.
Repair if necessary.

If the fault is still present, check for the **+ 12 V** on **track 2** of the coolant pump.
If the **+ 12 V** is not present on **track 2** of the coolant pump, check the following connection for **insulation, continuity and the absence of interference resistance**:

Coolant pump **track 2** ⟶ protection and switching unit **PPM1 connector, track 1**

Repair if necessary.

If the fault is still present, check the **insulation, continuity and the absence of interference resistance** on the following connections:

Computer, connector **C, track L4** ⟶ **track 1** of the coolant pump

Repair if necessary.

If the fault is still present, check that the **resistance** between **tracks 1** and **2** of the coolant pump is **neither zero nor infinite**.
Replace the coolant pump if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF088 PRESENT OR STORED	PINKING SENSOR CIRCUIT 1.DEF: pinking signal fault

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present in a warm engine road test at an engine speed of more than **2500 rpm**. **Special note:** – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the pinking sensor and its connections.
Check the **tightness** of the pinking sensor.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:

- Computer, connector **B, track B3** → **Track 2** of the pinking sensor
- Computer, connector **B, track B4** → **Track 1** of the pinking sensor
- Computer, connector **B, track B2** → **Shielding** of the pinking sensor

Repair if necessary.

Check the **conformity** of the fuel in the tank.
Check the **conformity** of the spark plugs.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF089 PRESENT OR STORED	INLET MANIFOLD PRESSURE SENSOR CIRCUIT 1.DEF: voltage outside tolerance range 2.DEF: inconsistent signal

NOTES	**Priority for dealing with a combination of faults:** Deal with **DF012 Sensor feed voltage no. 2** fault as a priority if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after: – the ignition is switched off and dialogue is lost, – the ignition has been switched on again and dialogue re-established, – a **10 second** delay at idle speed.
	Special note: – **OBD warning light** illuminated. – throttle valve defect mode **types 5** and **6**.

Check the **cleanliness** and **condition** of the manifold pressure sensor and its connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation and continuity** on the following connections:

Computer, connector **B, track H2** ⟶ **Track 1** of the manifold pressure sensor
Computer, connector **B, track H3** ⟶ **Track 3** of the manifold pressure sensor
Computer, connector **B, track H4** ⟶ **Track 2** of the manifold pressure sensor

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF091 PRESENT OR STORED	VEHICLE SPEED SIGNAL 1.DEF: error in speed signal from the ABS

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present when the engine is running.
	Special note: – **OBD warning light** illuminated.

Run a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **ABS - ESP** system (see **38C, Anti-lock braking system**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF092 PRESENT OR STORED	UPSTREAM OXYGEN SENSOR CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V** 1.DEF: component in bad condition

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF011 Sensor supply voltage no. 1, DF046 Battery voltage, DF082 Upstream oxygen sensor heating circuit** or **DF084 Actuator control relay circuit** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present with the engine running after **5 minutes** in richness regulation.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the upstream oxygen sensor connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connections:

Computer, connector **C, track C1** → **Track D** of the upstream oxygen sensor
Computer, connector **C, track B1** → **Track C** of the upstream oxygen sensor

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF093 PRESENT OR STORED	DOWNSTREAM OXYGEN SENSOR CIRCUIT CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V**

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF011 Sensor supply voltage no. 1, DF046 Battery voltage, DF082 Upstream oxygen sensor heating circuit** or **DF084 Actuator control relay circuit** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after: – a road test driving smoothly after the fan assembly has been running, and the **ET056 Double richness loop** is **ACTIVE**. – a smooth driving road test after the fan unit has been in operation, immediately followed by a road test on a slope at no load (injection cut-off in the deceleration phase).
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness** and **condition** of the downstream oxygen sensor connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Computer, connector **C, track B2** → **Track D** of the downstream oxygen sensor
Computer, connector **C, track A2** → **Track C** of the downstream oxygen sensor

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF095 PRESENT OR STORED	THROTTLE POTENTIOMETER CIRCUIT GANG 1 CO.0 : open circuit or short circuit to earth CC.1 : short circuit to **+ 12 V** 1.DEF: inconsistency between throttle gang 1 and gang 2

IMPORTANT
Never drive the vehicle without having checked that there are no faults involving the throttle valve.

NOTES	**Priority for dealing with a combination of faults:** If the fault **DF011 Sensor supply voltage no. 1** is present or stored, handle it first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after a change in the engine speed.
	Special note: – **level 1 fault warning light** illuminated, – throttle valve defect mode **types 1, 2** and **6**.

Check the **cleanliness** of the throttle valve and that the throttle **rotates properly** (no hard point).
Check the **cleanliness** and **condition** of the throttle valve connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connections:

Computer, connector **B, track G4** ⟶ **Track 1** of Throttle potentiometer gang 1
Computer, connector **B, track G3** ⟶ **Track 2** of Throttle potentiometer gang 1
Computer, connector **B, track G2** ⟶ **Track 5** of Throttle potentiometer gang 1

Repair if necessary.

If the throttle valve has been replaced, reinitialise the programming (RZ005).

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF096 PRESENT OR STORED	THROTTLE POTENTIOMETER CIRCUIT GANG 2 CO.1 : open circuit or short circuit to + **12 V** CC.0 : short circuit to earth

IMPORTANT
Never drive the vehicle without having checked that there are no faults involving the throttle valve.

NOTES	**Priority for dealing with a combination of faults:** If the fault **DF011 Sensor supply voltage no. 1** is present or stored, handle it first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after a change in the engine speed.
	Special note: – **level 1 fault warning light** illuminated, – throttle valve defect mode **types 4 and 6**.

Check the **cleanliness** of the throttle valve and the **correct rotation** of the throttle (no hard point).
Check the **cleanliness** and **condition** of the throttle valve connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Use the universal bornier to check the **insulation** and **continuity** of the following connections:

Computer, connector **B, track D3** → **Track 6** of Throttle potentiometer gang 2
Computer, connector **B, track G2** → **Track 5** of Throttle potentiometer gang 2
Computer, connector **B, track G4** → **Track 1** of Throttle potentiometer gang 2

Repair if necessary.

If the throttle valve has been replaced, reinitialise RZ005 Programming.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF097 PRESENT OR STORED	CAMSHAFT SENSOR CIRCUIT 1.DEF: camshaft tooth event 2.DEF: dephasing measurement out of range

NOTES	**If faults DF084 or DF046 are present or stored, deal with them first.**
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a road test.

Check the **cleanliness and condition** of the camshaft sensor connectors.
Check the **cleanliness and condition** of the camshaft sensor.
With the ignition on, check for the presence of **+ 12 V** at the camshaft sensor connector (see the connector track number on the relevant wiring diagram). If **+ 12 V** is not present: – disconnect the battery, – disconnect the connector marked **PPM1** in the Protection and Switching Unit, – check the **cleanliness and condition** of the connections, – use the Universal bornier to check the **continuity** of the following connection: Protection and Switching Unit **track 2 connector PPM1** ⟶ **Camshaft sensor**
Reconnect the **Protection and Switching Unit** connector and reconnect the battery. With the ignition on, if there is still no **+ 12 V** at the camshaft sensor connector, there is a fault in the **Protection and Switching Unit**. Contact the Techline.
Disconnect the battery. Disconnect the computer. Check the **cleanliness and condition** of the connections. Use the universal bornier to check the **insulation and continuity** of the following connections: **Computer track E2, connector C** ⟶ **Camshaft sensor** **Computer track F1, connector C** ⟶ **Camshaft sensor** (see connector track numbers in the corresponding wiring diagram).
If the fault is still present, there is definitely a fault with the camshaft sensor. **Refer to the relevant section in the Workshop Repair Manual.**

AFTER REPAIR	Apply the Stored fault diagnostic application conditions: – Continue to deal with the fault if it is present. – Ignore the fault if it is stored. Deal with any other faults. Clear the stored faults.

DF099 PRESENT OR STORED	AUTOMATIC TRANSMISSION OR SEQUENTIAL GEARBOX CONNECTION VIA THE MULTIPLEX NETWORK 1.DEF: CAN connection fault

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuator relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present when the engine is running.

Run a multiplex network test (see **88B, Multiplexing**).

If the fault is still present, carry out fault finding on the **automatic transmission** system (see **MR 364, Mechanics, 21B, Sequential gearbox**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF100 PRESENT OR STORED	INSTRUMENT PANEL MULTIPLEX CONNECTION 1.DEF: CAN connection fault

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after an attempt is made to start the engine.

Run a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **Instrument panel** system (see **83A, Instrument panel**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF101 PRESENT OR STORED	ELECTRONIC STABILITY PROGRAM MULTIPLEX CONNECTION 1.DEF: CAN connection fault

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after an attempt is made to start the engine.

Run a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **ABS - ESP** system (see **38C, ABS system**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF105 PRESENT OR STORED	CRUISE CONTROL/SPEED LIMITER ON/OFF CIRCUIT 1.DEF: Cruise control/speed limiter on/off button inconsistency

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after a road test using the cruise control then the speed limiter function.

Check the **cleanliness** and **condition** of the cruise control/speed limiter on/off switch and its connections. Repair if necessary
Check for the **+ 12 V feed** on **track A2** of the cruise control or speed limiter selector switch connector with the ignition on. Repair if necessary.
Disconnect the battery. Disconnect the computer. Check the **cleanliness** and **condition** of the connections. Using the universal bornier, check the **insulation and continuity** on the following connections: Computer, connector **A, track A2** → **Track A3** of the cruise control or speed limiter on/off switch Computer, connector **A, track C3** → **Track B1** of the cruise control or speed limiter on/off switch Repair if necessary.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF106 PRESENT OR STORED	CRUISE CONTROL/SPEED LIMITER SELECTOR SWITCH ON STEERING WHEEL 1.DEF: inconsistent data

NOTE
It will be necessary to remove the airbag to remove or check the cruise control/speed limiter control switches (see MR 364, Mechanics, 88C, Airbag and pretensioner).

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after a road test using the cruise control then the speed limiter function.

Check the **cleanliness** and **condition** of the incrementing switches on the steering wheel and their connections.
Repair if necessary.

Check that the **earth** is present on **track 2** of the incrementing switches on the steering wheel.
Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connections:
Computer, connector **A, track D2** → **Track 2** of the steering wheel control switch
Computer, connector **A, track D3** → **Track 1** of the steering wheel control switch
Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF109 PRESENT OR STORED	LOW FUEL LEVEL MISFIRING 1.DEF: destructive misfiring 2.DEF: pollutant misfiring

NOTES	**Priority for dealing with a combination of faults:** – fuel supply system: **DF085, DF026, DF027, DF028** and **DF029**. – misfiring: **DF059, DF060, DF061, DF062, DF065** in **1.DEF** or **2.DEF**.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after starting the engine and under the following conditions: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – idling with all the electrical consumers activated for **15 minutes**.
	Special note: – **OBD warning light** illuminated.

Check that there is fuel in the tank.
Check that the correct fuel is being used.

If there is no present or stored misfire fault, the misfire was caused by the low fuel level.
Erase fault **DF109**.

AFTER REPAIR	Ensure that all the faults have been dealt with. Do not delete the programming. To check that the system has been properly repaired: – there must be no further electrical faults, – programming done, – engine hot (minimum **75 °C**), – running at idle speed with all electrical consumers drawing power for **15 minutes**. If the fault reappears, continue the fault finding procedure.

DF110 PRESENT OR STORED	CATALYTIC CONVERTER 1.DEF: EOBD HC pollutant emissions threshold has been exceeded

NOTES	**Priority for dealing with a combination of faults:** Deal with the other faults first. There must be no other injection system faults, either present or stored. – misfiring: **DF059, DF060, DF061, DF062, DF065** in **1.DEF** or **2.DEF**.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there should be no further electrical faults. – programming should have been carried out. – the engine should be warm (minimum **75 °C**). – idling with all the electrical consumers activated for **15 minutes**.
	Special note: – **OBD warning light** illuminated.

Replace the catalytic converter after dealing with the causes of the misfire.
If there is no present or stored misfire fault, the misfire was caused by the low fuel level. Erase fault **DF109**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF125 PRESENT OR STORED	TORQUE METER PROGRAMMING 1.DEF: programming not carried out

NOTES	**Information:** The torque meter analyses the crankshaft speed.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the starter motor has been operated for **10 seconds** or at engine speeds over **600 rpm**.
	Special note: – **OBD warning light** illuminated.

Reinitialising the programming:
Run command **RZ005**.

Torque meter programming:
Accelerate up to **4000 rpm** in third gear then decelerate at no load to power take-up speed*.
Then repeat immediately.
In rare cases, fault **DF125** may appear.

(*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque)

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF126 PRESENT OR STORED	PASSENGER COMPARTMENT HEATING RESISTOR 1.DEF: No signal or inconsistent signal from the UCH

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after an attempt is made to start the engine.

Run a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **UCH** system (see **87B, UCH**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF127 PRESENT OR STORED	BRAKE SWITCH 1 CIRCUIT 1.DEF: fault on one of the two brake pedal contacts

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present: – engine running, – brake pedal depressed, – cruise control ON.

Check that the pedal assembly is in good condition.
Check the **cleanliness** and **condition** of the dual-contact brake switch and its connections.
Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connection:
Computer, connector **A, track E4** ⟶ **Track 3** of the brake pedal
Repair if necessary.

If the fault is still present, replace the switch.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF128 PRESENT OR STORED	BRAKE SWITCH 2 CIRCUIT 1.DEF: fault on both brake pedal contacts

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with fault **DF127 Gang 1 switch circuit** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present: – engine running, – brake pedal depressed, – cruise control ON with a cruising speed.

Run a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **UCH** system (see **87B, UCH**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF398 PRESENT OR STORED	FUEL CIRCUIT OPERATING FAULT 1.DEF: petrol circuit fault

NOTES	**Priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF081 Canister bleed solenoid valve circuit** and **DF085 Fuel pump relay circuit** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after an attempt is made to start the engine.
	Special note: – **OBD warning light** illuminated.

Check the **cleanliness**, **condition** and **fitting** of the fuel vapour absorber.
Repair if necessary.

If the fault is still present, manipulate the harness so that the fault status changes (present → stored).
Look for any damage to the wiring harness, and check the **condition and connection** of the injection computer and fuel vapour absorber connectors.
Repair if necessary.

If the fault is still present, check for the **+ 12 V** on **track 1** of the fuel vapour absorber.
If the **+ 12 V** is not present, check the following connection for **insulation, continuity and the absence of interference resistance**:

Fuel vapour absorber **track 1** ⟶ **track 2 of the PPM1 connector** on the Protection and Switching Unit

Repair if necessary.

If the fault is still present, disconnect the battery and the injection computer.
Check the **insulation, continuity and the absence of interference resistance** on the following connection:

Computer, connector **C, track E1** ⟶ **track 2** of the fuel vapour absorber

Repair if necessary.

If the fault is still present, measure the **resistance** between **tracks 1** and **2** of the fuel vapour absorber bleed solenoid valve.
Replace the bleed solenoid valve for the fuel vapour absorber if the **resistance** is not **26 Ω ± 4 Ω at 23 °C**.

If the fault is still present, check **the insulation, continuity and the absence of interference resistance** on the following connections:

Computer, connector **C, track D1** ⟶ **track 1 of the PEM connector** of the Protection and Switching Unit

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF455 PRESENT OR STORED	LOW FUEL LEVEL SIGNAL 1.DEF: open circuit or short circuit

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after an attempt is made to start the engine.

Run a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **Instrument panel** system (see **83A, Instrument panel**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF608 PRESENT OR STORED	CLUTCH PEDAL SWITCH 1.DEF: inconsistent signal

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present with the engine running and a road speed of more than **36 mph (60 km/h)**.
	Special note: The acquisition is made if the vehicle is not fitted with an automatic transmission.

Check the **cleanliness, condition and assembly** of the clutch pedal switch and its connections. Repair if necessary.
If the fault is still present, disconnect the switch. Check that when the clutch pedal is depressed, the switch is active, and that when the clutch pedal is released, that the switch is not active and that the recommendations regarding clutch pedal clearance are still valid (see **MR 364, Mechanics, 20A, Clutch**). Replace the switch if necessary.
If the fault is still present, manipulate the harness so that the status changes (present → stored). Look for any damage to the wiring harness, and check the **condition** and **connection** of the injection computer and clutch pedal switch connectors. Repair if necessary.
If the fault is still present, check the **earth** on **track 2** of the switch. If there is no **earth** on **track 2**, check the **insulation, continuity and the absence of interference resistance** on the following connection: Clutch pedal switch **track 2** ⟶ **earth** Repair if necessary.
If the fault is still present, check **the insulation, continuity and the absence of interference resistance** on the following connections: Clutch pedal switch **track 1** ⟶ **Track C4, connector A**, of the computer Repair if necessary.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF612 PRESENT OR STORED	OIL VAPOUR ANTIFREEZE RESISTOR CIRCUIT CO.0 : open circuit or short circuit to earth

NOTES	**Priority for dealing with a combination of faults:** If the faults **DF002 Air temperature sensor circuit, DF004 Turbocharging pressure circuit, DF009 Gang 2 pedal potentiometer circuit** or **DF046 Battery voltage** are present, handle them first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the ignition has been switched on.

Check the **cleanliness** and **condition** of the oil vapour antifreeze resistor relay connections. Clean or replace as necessary.
Measure the **resistance** of the antifreeze resistor relay between **tracks 1** and **2**. Replace the relay if the **resistance** is not: **21 Ω at - 40 °C** **9.5 Ω at 20 °C** **13.4 Ω at 120 °C**
With the ignition on, check for the presence of **+ 12 V** on **track 1** of the antifreeze resistor relay. Repair if necessary.
Disconnect the battery. Disconnect the computer. Check the **cleanliness** and **condition** of the connections. Using the Universal bornier, check the **insulation, continuity and the absence of interference resistance** for the following connection: Computer, connector **B, track L2** ⟶ **track 2** of the oil vapour antifreeze relay Repair if necessary.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Battery voltage**	**PR071:**	Computer supply voltage	**11 V < PR071 < 15 V**	If there is a fault, use interpretation of **PR071 Computer supply voltage**.
2		**ET001:**	Computer + after ignition feed	**Presence of + after ignition feed** **Absent**	
3	**Coolant pump**	**ET543:**	Coolant pump control	**For F4R Turbo engines only** **ACTIVE:** coolant pump running **INACTIVE:** coolant pump idle	In the event of a fault, apply interpretation of **DF086 Coolant pump relay control circuit**.
4	**Vehicle speed**	**PR089:**	Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	In the event of a fault apply the interpretation of **DF091 Vehicle speed signal**.
5	**Clutch switch**	**ET040:**	Clutch pedal	**Shows recognition of clutch pedal switches** **RELEASED:** pedal released **DEPRESSED:** pedal depressed **UNAVAILABLE:** automatic transmission only	If there is a fault, use the interpretation for **ET040 Clutch pedal**.

MAIN COMPUTER STATUSES AND PARAMETERS (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
6	**Brake contact**	**ET039:**	Brake pedal	**Indicates recognition of brake pedal contacts** **RELEASED:** pedal released **DEPRESSED:** pedal depressed	If there is a fault, use the interpretation for **ET039 Brake pedal**.
7	**AT**	**ET063:**	Park/Neutral position	**AT only.** **YES:** automatic transmission is in parking/neutral position **NO:** automatic transmission is not in parking/neutral position	**If ET014 is inconsistent, perform a multiplex network test using the diagnostic tool, then if the test is in order, see the gearbox computer.**
8	**Faults**	**ET064:**	Level 1 injection fault	**YES:** fault present **NO:** fault absent	**NONE**
9		**ET065:**	Level 2 injection fault	**YES:** fault present **NO:** fault absent	**NONE**
10		**PR105:**	OBD fault warning light lit mileage counter	**Shows distance travelled with warning light lit**	
11		**PR106:**	Fault warning light lit mileage counter	**Shows distance travelled with warning light lit**	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Test conditions: Engine stopped, ignition on.**

FUEL CIRCUIT SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Engine speed**	**PR055:** Engine speed	**Gives the engine's rotational speed in rpm.** **0 rpm < PR055 < 500 rpm**	In the event of a fault, apply interpretation of **DF005 Engine speed sensor circuit**.
2	**Motorised throttle**	**PR014:** Idling speed correction	**Shows engine idle speed correction value.** **PR014 = 0 rpm.** **The idle speed regulator performs all of the calculations that allow the idle speed actuator to be controlled physically: the motorised throttle. The functional component of the regulator is adaptive (variation programming and ageing).**	**NONE**
3		**PR054:** Idle speed regulation	**ACTIVE** **INACTIVE**	If **ACTIVE** apply the interpretation for **ET054 Idle speed regulation**.
4		**PR010:** Idle speed regulation setpoint	**The idle speed regulation setpoint depends on the coolant and oil temperature, the position of the gear lever, and which electrical consumers are operating.** **752 rpm < PR010 < 1216 rpm.** **If a manifold pressure sensor fault is present or stored, the idle speed setting is 896 rpm.**	In the event of a fault apply the interpretation for **ET054 Idle speed regulation**.

FUEL CIRCUIT SUB-FUNCTION (continued 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
5	Motorised throttle	PR090:	Idle speed regulation programmed value	- 12 % < PR090 < 12 % PR090, an adaptive built-in action, is a stored parameter designed to program variation and engine ageing for the idle speed regulator. The programming only occurs when the engine is idling and warm, and no electrical consumer (heated windscreen, air conditioning, fan, power steering) is being used. Therefore it adjusts slowly.	NONE
6		PR141:	Integral idle speed regulation correction	0 % The built-in correction is continuously calculated to take into account consumer air demand.	
7	Motorised throttle	PR091:	Theoretical idle speed regulation OCR	0 % < PR091 < 100 % When the conditions for regulation are met, the idle regulator continually repositions the motorised throttle to keep the engine speed at the idle speed setting. The motorised throttle opening ratio required to maintain the engine speed setting is then given by parameter PR091.	

FUEL CIRCUIT SUB-FUNCTION (continued 2)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
8	**Oxygen sensor**	**ET055:**	Upstream sensor richness loop.	**Loop open** **Loop closed**	If **the loop is closed**, apply the interpretation for **ET055 Upstream sensor richness loop**.
9		**PR138:**	Richness correction	**0 %** **In loop phase, the richness correction corrects the injection timing in order to obtain a metering as close as possible to richness 1. The correction value fluctuates around 50, between 0 and 100.**	**NONE**
10		**PR144:**	Self-adapting richness offset	**0 < PR144 < 255** **This parameter is used to detect any tendency of the injection system to increase or decrease the richness.**	
11		**PR143:**	Self-adapting richness gain	**0 < PR143 < 255** **This parameter is used to detect any tendency of the injection system to increase or decrease the richness.**	
12	**Injection**	**PR101:**	Duration of injection	**0 ms**	
13	**Fuel consumption**	**PR103:**	Instantaneous fuel consumption	**0 l/h**	

FUEL CIRCUIT SUB-FUNCTION (continued 3)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
14	**Petrol pump**	**ET047:** Fuel pump control circuit	**ACTIVE** **INACTIVE**	If **ACTIVE**, apply the interpretation for **DF085 Fuel pump relay control circuit**.
15		**AC015:** Fuel pump relay	**The fuel pump should be heard operating**	If there is a fault, use the interpretation for **AC015 Fuel pump relay**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

AIR CIRC. (TURBO/INLET) SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Air circuit pressure**	**PR035:**	Atmospheric pressure	**700 mb < PR035 < 1047 mb**	**If not consistent, check that PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.** In the event of a fault apply the interpretation for **PR032 Inlet pressure**
2		**PR032:**	Inlet pressure	**121.5 mb < PR035 < 2200 mb**	
3	**Turbocharging**	**PR041:**	Turbocharging pressure	**121.5 mb < PR041 < 2200 mb** **Default value: 1016 mb**	In the event of a fault, apply the interpretation of **DF004 Turbocharging pressure sensor circuit**.
4		**PR104:**	Turbocharging solenoid valve OCR setpoint	**Shows the turbocharging solenoid valve opening ratio**	**NONE**
5	**Air temperature**	**PR058:**	Air temperature	**- 40 °C < PR058 < 120 °C**	In the event of a fault, apply interpretation of **DF002 Air temperature sensor circuit**.
6	**Coolant temperature**	**PR064:**	Coolant temperature	**- 40 °C < PR058 < 120 °C**	In the event of a fault, apply interpretation of **DF001 Air temperature sensor circuit**.
7	**Turbocharging**	**AC004:**	Turbocharging solenoid valve	**The turbocharging solenoid valve should be heard operating**	In the event of a fault, apply interpretation of **DF054 Turbocharging solenoid valve control circuit**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

DRIVER PARAMETERS SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Motorised throttle	**ET085:**	Motorised throttle in defect mode	**NO STATUS 0 STATUS 1 STATUS 2 STATUS 3 STATUS 4 STATUS 5**	**NONE**
2		**ET051:**	Throttle stop programming	**DONE**	**Run command RZ005 Programming. If the parameters and statuses are still incorrect, contact Techline.**
3		**PR097:**	Motorised throttle lower stop programmed value	**5.96 % < PR097 < 13.96 %**	
4		**PR113:**	Throttle lower stop after applying Offset	**5.96 % < PR113 < 13.96 %**	
5		**PR096:**	Motorised throttle upper stop programmed value	**PR096 = 87.99 %**	
6		**ET082:**	Motorised throttle position	**OPEN CLOSE NOT DETECTED**	If **NOT DETECTED**, apply interpretation of **ET082 Motorised throttle valve position**.
7		**PR118:**	Motorised throttle position gang 1	**No load = 4 % Full load = 99.02 %**	If there is a fault, use the interpretation for **DF095 Throttle potentiometer circuit gang 1**.
8		**PR119:**	Motorised throttle position gang 2	**No load = 4 % Full load = 100 %**	If there is a fault, use the interpretation for **DF096 Throttle potentiometer circuit gang 2**.
9		**PR116:**	Motorised throttle corrected position setpoint	**No load = 0 % Full load = 60 %**	**NONE**
10		**PR111:**	Motorised throttle position corrected value.	**No load = 0 % Full load = 60 %**	

DRIVER PARAMETERS SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
11	**Accelerator pedal and motorised throttle**	**ET075:**	Pedal released and throttle closed	**DETECTED NOT DETECTED**	If **NOT DETECTED**, interpretation for **PR030 Accelerator pedal position** followed by the interpretation for fault **DF079 Motorised throttle valve servo control**.
12	**Accelerator pedal**	**PR112:**	No load programmed value	**0 % < PR112 < 15 %**	**Run command RZ005 Programming. If the parameters and statuses are still incorrect, contact Techline.**
13		**PR030:**	Accelerator pedal position	**No load = <15 % Full load = 85 %**	If there is a fault, apply interpretation of **DF008** and **DF009 Pedal sensor circuit gang 1 and gang 2** then **DF011** and **DF012 Sensor supply voltage 1 and 2**.
14		**ET081:**	Accelerator pedal position	**No load Full load NOT DETECTED**	In the event of a fault apply the interpretation for **PR030 Accelerator pedal position**.
15	**Motorised throttle**	**AC027:**	Motorised throttle	**The motorised throttle should be heard operating**	In the event of a fault, apply the interpretation for **AC027 Motorised throttle**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

PREHEATING/IGNITION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Engine flywheel target	ET089:	Flywheel target programming	NOT DONE	NONE
2	Engine phasing	ET061:	Cylinder 1 recognition	NOT COMPLETED	
3	Flywheel	ET062:	Flywheel signal	NOT DETECTED	
4	Ignition	PR001:	Advance	0 °V	
5		PR095:	Anti-pinking correction	0 °V	
6	Flywheel	ET581:	Petrol misfiring	NO	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

ANTIPOLLUTION/OBD SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Oxygen sensor	**ET052:**	Upstream O_2 sensor heating	**ACTIVE** **INACTIVE**	If **ACTIVE**, apply the interpretation for **ET052 Upstream O_2 sensor heating**.
2		**ET053:**	Downstream O_2 sensor heating	**ACTIVE** **INACTIVE**	If **ACTIVE**, apply the interpretation for **ET053 Downstream O_2 sensor heating**.
3		**PR098:**	Upstream oxygen sensor voltage	**2.5 V < PR098 < 0 V**	If there is a fault, use interpretation of **PR098 Upstream oxygen sensor voltage**.
4		**PR099:**	Downstream oxygen sensor voltage	**2.5 V PR099 < P < 0 V**	In the event of a fault, apply the interpretation for **PR099 Downstream oxygen sensor voltage**.
5	Canister	**ET050:**	Canister bleed control	**INACTIVE**	**NONE**
6		**PR102:**	Canister bleed solenoid valve OCR	**0 % < PR102 < 99.61 %**	
7	**Flywheel**	**ET581:**	Petrol misfiring	**NO**	
8	**Canister**	**AC017:**	Canister bleed solenoid valve	**The canister bleed solenoid valve should be heard operating**	In the event of a fault, apply interpretation of **AC017 Canister bleed solenoid valve**.

ANTIPOLLUTION/OBD SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
9	Oxygen sensor	**AC018:**	Upstream O_2 sensor heating	**The upstream oxygen sensor should heat up**	In the event of a fault, apply the interpretation for **DF082 Upstream O_2 sensor heating circuit**.
10		**AC019:**	Downstream O_2 sensor heating	**The downstream oxygen sensor should heat up**	In the event of a fault, apply the interpretation for **DF083 Downstream O_2 sensor heating circuit**.
11	**Oil vapour antifreeze resistor**	**ET542:**	Oil vapour antifreeze resistor	**CONNECTED** **NOT CONNECTED**	If there is a fault, apply the interpretation for the fault **DF612 Oil vapour antifreeze resistor circuit**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

COLD LOOP SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Climate control**	**ET079:** Air conditioning present	**Shows whether or not the vehicle is equipped with air conditioning.** **YES:** Air conditioning is detected by the injection computer. **NO:** Air conditioning is not detected by the injection computer.	**If inconsistent with the vehicle equipment, carry out a multiplex network test and apply the relevant procedure.**
2		**ET088:** Compressor activation request	**The injection requests the UPC (via the multiplex network) to start the compressor.** **ACTIVE:** The multiplex network must not be defective on the Automatic transmission, UPC or UCH systems. The UCH must send a compressor starting request to the injection. The refrigerant pressure sensor must not be defective. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **INACTIVE:** One of the above conditions has not been met.	**NONE**
3		**ET004:** Air conditioning authorisation	**Non operational information, intended solely for diagnostic purposes.** **YES:** Satisfactory engine operating conditions (coolant temperature, engine load etc.). The vehicle is not in a specific movement phase (hill start or stop etc.). **NO:** One of the above conditions has not been fulfilled.	

COLD LOOP SUBSYSTEM (continued 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	**Refrigerant pressure**	**PR037:**	Refrigerant pressure	**2 bar < PR037 < 27 bar** **Default value: 0 bar**	If there is a fault, use the interpretation for **PR037 Coolant pressure**.
5	**Engine speed**	**PR055:**	Engine speed	**Shows the speed of rotation in rpm.** **0 rpm < PR055 < 500 rpm**	In the event of a fault, apply interpretation of **DF005 Engine speed sensor circuit**.
6	**Motorised throttle**	**ET023:**	Fast idle speed request	**UCH requests the injection system to increase the idle speed.** **ABSENT:** The UCH did not issue a request **PRESENT:** The UCH has issued a request	**If ET023 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct, check the UCH.**
7	**Coolant temperature**	**PR064:**	Coolant temperature	**- 40 °C < PR064 < 120 °C**	If there is a fault use the interpretation for **DF001 Coolant temperature sensor circuit**.
8	**Vehicle speed**	**PR089:**	Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	If there is a fault use the interpretation for **DF091 Vehicle speed signal**.
9	**Climate control**	**PR125:**	Power absorbed by the air conditioning compressor	**300 W**	**NONE**
10	**Fan assembly**	**ET014:**	Checking fan assembly 1	**RUNNING** **STOPPED**	**If the ET014 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct check the UPC.**
11		**ET015:**	Checking fan assembly 2	**RUNNING** **STOPPED**	**If the ET015 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct check the UPC.**

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

HEATING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature	**- 40 °C < PR064 < 120 °C**	If there is a fault use the interpretation for **DF001 Coolant temperature sensor circuit**.
2	**Passenger compartment heating resistor**	**ET111:**	Number of fixed heating resistors	**This status indicates that the injection computer is preventing any change to the number of passenger compartment heating resistors (RCH) activated (RCH already activated are not shut down, but no more can be added). This limit in the number of RCHs is in response to the vehicle's requirements (power availability, torque requirement, etc.).**	**NONE**
3		**ET112:**	Passenger compartment heating resistor cut-off	**This status indicates that the injection computer is inhibiting all the passenger compartment heating resistors (RCH) in response to the vehicle's requirements (power availability, torque requirement, injection or air conditioning defect mode, etc.).**	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Cruise control/ speed limiter**	**ET045:**	CC/SL selector switch on steering wheel	**STATUS 1:** resume button pressed **STATUS 2:** cancel button pressed **STATUS 3:** decrease button pressed **STATUS 4:** increase button pressed	In the event of a fault, apply the interpretation for **ET045 CC/SL selector switch on steering wheel**.
2		**ET032:**	Cruise control deactivation	**STATUS 1:** Traction control request **STATUS 2:** Brake pedal depressed **STATUS 3:** Cruise control or speed limiter fault **STATUS 4:** Engine/gearbox decoupling **STATUS 5:** Fault detected by injection computer **STATUS 6:** Vehicle speed invalid **STATUS 7:** Cancel button pressed **STATUS 8:** Gear selector lever in neutral **STATUS 9:** Inconsistency between the request and the vehicle speed	**NONE**
3		**ET042:**	Cruise control/ speed limiter	**STATUS 1:** On/Off button pressed **STATUS 2:** On/Off button released	In the event of a fault, apply the interpretation for **ET042 Cruise control/Speed limiter**.
4	**Clutch switch**	**ET040:**	Clutch pedal	**Shows recognition of clutch pedal switches.** **RELEASED:** Pedal released **PRESSED:** Pedal depressed	If there is a fault, use the interpretation for **ET040 Clutch pedal**.
5	**Brake contact**	**ET039:**	Brake pedal	**Indicates recognition of brake pedal contacts.** **RELEASED:** Pedal released **PRESSED:** Pedal depressed	If there is a fault, use the interpretation for **ET039 Brake pedal**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

START SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Starting**	**ET076:**	Starting	**AUTHORISED**	**The authorisation to start is given once the fuel pump is pressurised and if the motorised throttle has completed its stop and limp-home position programming phase.**
2	**Actuator control relay**	**ET048:**	Actuator control relay	**ACTIVE** **INACTIVE**	If **ACTIVE** apply the interpretation of **DF084 Actuator relay control circuit**.
3	**Battery voltage**	**PR071:**	Computer supply voltage	**11 V < PR071 < 15 V**	If there is a fault, use interpretation of **PR071 Computer supply voltage**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

PROTECTION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Code programmed**	**ET006:**	Code programmed	**States whether the immobiliser code has been programmed by the computer or not.** **YES:** Code programmed **NO:** Code not programmed by the injection computer.	**If NO, contact the Techline**
2	**Engine immobiliser**	**ET003:**	Engine immobiliser	**Indicates the status of the immobiliser system.** **INACTIVE:** the injection computer has recognised the immobiliser code transmitted by the UCH. **ACTIVE:** the injection computer does not recognise the immobiliser code transmitted by the UCH.	**If ET003 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct check the UCH.**
3	**Impact detected**	**ET077:**	Impact detected	**YES** **NO**	**If YES, switch off the ignition for 10 seconds, then switch it back on so the engine can be restarted. Then clear any faults.**
4	**Starting**	**ET076:**	Starting	**AUTHORISED**	**The authorisation to start is given once the fuel pump is pressurised and if the motorised throttle has completed its stop and limp-home position programming phase.**

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on**.

TORQUE MANAGEMENT SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Torque	**PR100:**	Torque lapse	**0 Nm**	**If there is a fault, test the multiplex network; if the test is OK, check the automatic transmission.**
2		**PR015:**	Engine torque	**0 Nm**	
3		**PR123:**	Estimated driver demand engine torque	**0 Nm < PR123 < 200 Nm**	
4		**PR122:**	Torque received by automatic transmission converter	**0 Nm**	
5		**PR124:**	Resistant engine torque transmitted via CAN	**0 Nm**	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

MAIN COMPUTER STATUSES AND PARAMETERS:

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Battery voltage**	**PR071:**	Computer supply voltage	**13 V < PR071 < 15 V**	If there is a fault, use interpretation of **PR071 Computer supply voltage**.
2		**ET001:**	Computer + after ignition feed	**+ after ignition feed absent**	
3	**Coolant pump**	**ET543:**	Coolant pump control	**For F4R Turbo engine only.** **ACTIVE:** coolant pump running **INACTIVE:** coolant pump idle	In the event of a fault, apply interpretation of **DF086 Coolant pump relay control circuit**.
4	**Vehicle speed**	**PR089:**	Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	In the event of a fault apply the interpretation of **DF091 Vehicle speed signal**.
5	**Clutch switch**	**ET040:**	Clutch pedal	**Shows recognition of clutch pedal switches** **RELEASED:** Pedal released **DEPRESSED:** Pedal depressed **UNAVAILABLE:** Automatic transmission only	If there is a fault, use the interpretation for **ET040 Clutch pedal**.
6	**Brake contact**	**ET039:**	Brake pedal	**Indicates recognition of brake pedal contacts.** **RELEASED:** Pedal released **PRESSED:** Pedal depressed	If there is a fault, use the interpretation for **ET039 Brake pedal**.

MAIN COMPUTER STATUSES AND PARAMETERS (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
7	**Automatic transmission**	**ET063:**	Park/Neutral position	**AT only.** **YES:** automatic transmission is in parking/neutral position **NO:** automatic transmission is not in parking/neutral position	**If ET063 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct check the automatic transmission.**
8	**Faults**	**ET064:**	Level 1 injection fault	**YES:** fault present **NO:** fault absent	**NONE**
9		**ET065:**	Level 2 injection fault	**YES:** fault present **NO:** fault absent	
10		**PR105:**	OBD fault warning light lit mileage counter	**Shows the distance covered with the warning light lit.**	
11		**PR106:**	Fault warning light lit mileage counter	**Shows the distance covered with the warning light lit.**	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

FUEL CIRCUIT SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine speed**	**PR055:**	Engine speed	**Indicates the engine's speed of rotation in rpm.** **700 rpm < PR055 < 6500 rpm**	In the event of a fault, apply interpretation of **DF005 Engine speed sensor circuit**.
2	**Motorised throttle**	**PR014:**	Idling speed correction	**Shows engine idle speed correction value.** **0 rpm < PR014 < 224 rpm.** **The idle speed regulator performs all of the calculations that allow the idle speed actuator to be controlled physically: the motorised throttle. This regulator has a built-in adaptive component (variation and ageing programming).**	**NONE**
3		**ET054:**	Idle speed regulation	**ACTIVE** **INACTIVE**	If **INACTIVE** apply the interpretation for **ET054 Idling speed regulation**.
4		**PR010:**	Idle speed regulation setpoint	**The idle speed regulation setpoint depends on the coolant and oil temperature, the position of the gear lever, and which electrical consumers are operating.** **752 rpm < PR010 < 1216 rpm.** **If a manifold pressure sensor fault is present or stored, the idle speed setting is 896 rpm**.	If there is a fault, use interpretation of **ET054 Idle speed regulation**.

FUEL CIRCUIT SUB-FUNCTION (continued 1)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
5	Motorised throttle	PR090:	Idle speed regulation programmed value	- 12 % < PR090 < 12 % PR090, an adaptive built-in action, is a stored parameter designed to program variation and engine ageing for the idle speed regulator. The programming only occurs when the engine is idling and warm, and no electrical consumer (heated windscreen, air conditioning, fan, power steering) is being used. Therefore it adjusts slowly.	NONE
6		PR141:	Integral idle speed regulation correction	4.7 % < PR141 < 32 % The built-in correction is continuously calculated to take into account consumer demand for air.	
7	Motorised throttle	PR091:	Theoretical idle speed regulation OCR	5 % < PR091 < 50 % When the conditions for regulation are met, the idle regulator continually repositions the motorised throttle to keep the engine speed at the idle speed setting. The motorised throttle opening ratio required to maintain the engine speed setting is then given by parameter PR091.	

FUEL CIRCUIT SUB-FUNCTION (continued 2)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
8	**Oxygen sensor**	**ET055:**	Upstream sensor richness loop	**Loop open**	In the event of a fault, apply the interpretation for **ET055 Upstream sensor richness loop**.
9		**PR138:**	Richness correction	**0 % < PR138 < 100 %** **In loop phase, the richness correction system corrects the injection timing in order to obtain metering as close as possible to richness 1. The correction value fluctuates around 50.**	**NONE**
10		**PR144:**	Self-adapting richness offset	**0 < PR144 < 255** **This parameter is used to detect any tendency of the injection system to increase or decrease the richness.**	
11		**PR143:**	Self-adapting richness gain	**0 < PR143 < 255** **This parameter is used to detect any tendency of the injection system to increase or decrease the richness.**	
12	**Injection**	**PR101:**	Duration of injection	**0 ms < PR101 < 20000 ms**	
13	**Fuel consumption**	**PR103:**	Instantaneous fuel consumption	**0 l/h < PR103 < 50 l/h**	

FUEL CIRCUIT SUB-FUNCTION (continued 3)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
14	**Petrol pump**	**ET047:**	Fuel pump control circuit	**ACTIVE** **INACTIVE**	If **INACTIVE** interpretation for **DF085 Fuel pump relay control circuit**.
15	**Petrol pump**	**AC015:**	Fuel pump relay	**The fuel pump should be heard operating**	If there is a fault, use the interpretation for **AC015 Fuel pump relay**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

AIR CIRC. (TURBO/INLET) SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Air circuit pressure**	**PR035:**	Atmospheric pressure	**700 mb < PR035 < 1047 mb**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.** In the event of a fault apply the interpretation for **PR032 Inlet pressure**.
2		**PR032:**	Inlet pressure	**114.1 mb < PR035 < 2200 mb**	
3	**Turbocharging**	**PR041:**	Turbocharging pressure	**121.5 mb < PR041 < 2200 mb** **Default value: 1016 mb**	In the event of a fault, apply the interpretation of **DF004 Turbocharging pressure sensor circuit**.
4		**PR104:**	Turbocharging solenoid valve OCR setpoint	**Shows the turbocharging solenoid valve opening ratio.**	**NONE**
5	**Air temperature**	**PR058:**	Air temperature	**- 40 °C < PR058 < 120 °C**	In the event of a fault, apply interpretation of **DF002 Air temperature sensor circuit**.
6	**Coolant temperature**	**PR064:**	Coolant temperature	**75 °C < PR058 < 120 °C**	In the event of a fault, apply interpretation of **DF001 Air temperature sensor circuit**.
7	**Turbocharging**	**AC004:**	Turbocharging solenoid valve	**The turbocharging solenoid valve should be heard operating**	In the event of a fault, apply interpretation of **DF054 Turbocharging solenoid valve control circuit**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

DRIVER PARAMETERS SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Motorised throttle	**ET085:**	Motorised throttle in defect mode	**NO STATUS 0 STATUS 1 STATUS 2 STATUS 3 STATUS 4 STATUS 5**	**NONE**
2		**ET051:**	Throttle stop programming	**DONE**	**Run command RZ005 Programming. If the parameters and statuses are still incorrect, contact Techline.**
3		**PR097:**	Motorised throttle lower stop programmed value	**5.96 % < PR097 < 13.96 %**	
4		**PR113:**	Throttle lower stop after applying offset	**5.96 % < PR113 < 13.96 %**	
5		**PR096:**	Motorised throttle upper stop programmed value	**PR096 = 87.99 %**	
6		**ET082:**	Motorised throttle position	**OPEN CLOSED NOT DETECTED**	If **NOT DETECTED**, apply interpretation of **ET082 Motorised throttle valve position**.
7		**PR118:**	Motorised throttle position gang 1	**No load = 4 % Full load = 99.02 %**	If there is a fault, use the interpretation for **DF095 Throttle potentiometer circuit gang 1**.
8		**PR119:**	Motorised throttle position gang 2	**No load = 4 % Full load = 100 %**	If there is a fault, use the interpretation for **DF096 Throttle potentiometer circuit gang 2**.
9		**PR116:**	Motorised throttle corrected position setpoint	**No load = 0 % Full load = 83 %**	**NONE**
10		**PR111:**	Motorised throttle position corrected value	**No load = 0 % Full load = 83 %**	

DRIVER PARAMETERS SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
11	**Accelerator pedal and motorised throttle**	**ET075:**	Pedal released and throttle closed	**DETECTED** **NOT DETECTED**	If **NOT DETECTED**, apply interpretation of **PR030 Accelerator pedal position**, then interpretation of **ET082 Motorised throttle position**.
12	**Accelerator pedal**	**PR112:**	No load programmed value	**0 % < PR112 < 15 %**	**Run command RZ005 Programming. If the parameters and statuses are still incorrect, contact the Techline.**
13		**PR030:**	Accelerator pedal position	**No load = 0 %** **Full load = 85 %**	In the event of a fault apply the interpretation for **DF008 and DF009, Pedal sensor circuit gang 1 and gang 2** then **DF011 and DF012 Sensor supply voltage no. 1 and no. 2**.
14		**ET081:**	Accelerator pedal position	**No load** **Full load** **NOT DETECTED**	In the event of a fault apply the interpretation for **PR030 Accelerator pedal position**.
15	**Motorised throttle**	**AC027:**	Motorised throttle	**The motorised throttle should be heard operating**	In the event of a fault, apply the interpretation for **AC027 Motorised throttle**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

PREHEATING/IGNITION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Engine flywheel target**	**ET089:**	Flywheel target programming	**DONE**	**NONE**
2	**Engine phasing**	**ET061:**	Cylinder 1 recognition	**DONE**	In the event of a fault, apply interpretation of **ET061 Cylinder 1 recognition**.
3	**Flywheel**	**ET062:**	Flywheel signal	**DETECTED**	In the event of a fault, apply interpretation of **ET062 Flywheel signal**.
4	**Ignition**	**PR001:**	Advance	**0 °V < PR101 < 10 °V**	**NONE**
5		**PR095:**	Anti-pinking correction	**0 °V < PR095 < 8 °V**	
6	**Flywheel**	**ET581:**	Petrol misfiring	**NO**	In the event of a fault, apply interpretation of **DF065 Misfiring**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

ANTIPOLLUTION/OBD SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Oxygen sensor	**ET052:**	Upstream O_2 sensor heating	**ACTIVE** **INACTIVE**	In the event of a fault, apply the interpretation for **ET052 Upstream O_2 sensor heating**.
2		**ET053:**	Downstream O_2 sensor heating	**ACTIVE** **INACTIVE**	In the event of a fault, apply the interpretation for **ET053 Downstream O_2 sensor heating**.
3		**PR098:**	Upstream oxygen sensor voltage	**2.5 V < PR098 < 0 V**	If there is a fault, use interpretation of **PR098 Upstream oxygen sensor voltage**.
4		**PR099:**	Downstream oxygen sensor voltage	**0 V < PR099 < 2.5 V**	If there is a fault, apply interpretation of **PR099 Downstream oxygen sensor voltage**.
5	Canister	**ET050:**	Canister bleed control	**INACTIVE**	**NONE**
6		**PR102:**	Canister bleed solenoid valve OCR	**0 % < PR102 < 99.61 %**	
7	**Flywheel**	**ET581:**	Petrol misfiring	**YES** **NO**	If **YES**, apply the interpretation for fault **DF065 Misfire**.
8	**Canister**	**AC017:**	Canister bleed solenoid valve	**The canister bleed solenoid valve should be heard operating**	In the event of a fault, apply interpretation of **AC017 Canister bleed solenoid valve**.

ANTIPOLLUTION/OBD SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
9	**Oxygen sensor**	**AC018:**	Upstream O_2 sensor heating	**The upstream oxygen sensor should heat up**	In the event of a fault, apply the interpretation for **DF082 Upstream O_2 sensor heating circuit**.
10		**AC019:**	Downstream O_2 sensor heating	**The downstream oxygen sensor should heat up**	In the event of a fault, apply the interpretation for **DF083 Downstream O_2 sensor heating circuit**.
11	**Oil vapour antifreeze resistor**	**ET542:**	Oil vapour antifreeze resistor	**CONNECTED NOT CONNECTED**	If there is a fault, apply the interpretation for the fault **DF612 Oil vapour antifreeze resistor circuit**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

COLD LOOP SUB-FUNCTION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**Climate control**	**ET079:** Air conditioning present	**States whether the vehicle is fitted with air conditioning or not.** **YES:** Air conditioning is detected by the injection computer. **NO:** Air conditioning is not detected by the injection computer.	**If inconsistent with the vehicle equipment, carry out a multiplex network test and apply the relevant procedure.**
2		**ET088:** Compressor activation request	**The injection requests the UPC (via the multiplex network) to start the compressor.** **ACTIVE:** The multiplex network must not be faulty on the Automatic transmission, UPC or UCH systems. The UCH must send a compressor starting request to the injection. The refrigerant pressure sensor must not be faulty. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **INACTIVE:** One of the above conditions has not been met.	**NONE**
3		**ET004:** Air conditioning authorisation	**Non operational information, intended solely for diagnostic purposes.** **YES:** Satisfactory engine operating conditions (coolant temperature, engine load etc.). The vehicle is not in a specific movement phase (hill start or stop etc.). **NO:** One of the above conditions has not been fulfilled.	

COLD LOOP SUB-FUNCTION (continued)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
4	**Refrigerant pressure**	**PR037:**	Refrigerant pressure	**2 bar < PR037 < 27 bar** **Default value: 0 bar**	If there is a fault, use the interpretation for **PR037 Refrigerant pressure**.
5	**Engine speed**	**PR055:**	Engine speed	**Shows the speed of rotation in rpm.** **700 rpm < PR055 < 6500 rpm**	In the event of a fault, apply interpretation of **DF005 Engine speed sensor circuit**.
6	**Motorised throttle**	**ET023:**	Fast idle speed request	**UCH requests the injection system to increase the idle speed.** **ABSENT:** The UCH did not issue a request. **PRESENT:** The UCH has issued a request	**If ET023 is inconsistent, carry out a multiplex network test using the diagnostic tool.** **If the test is correct check the UCH.**
7	**Coolant temperature**	**PR064:**	Coolant temperature	**75 °C < PR064 < 120 °C**	If there is a fault use the interpretation for **DF001 Coolant temperature sensor circuit**.
8	**Vehicle speed**	**PR089:**	Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	In the event of a fault apply the interpretation of **DF091 Vehicle speed signal**.
9	**Climate control**	**PR125:**	Power absorbed by the air conditioning compressor	**300 W < PR125 < 3000 W**	**NONE**
10	**Fan assembly**	**ET014:**	Checking fan assembly 1	**RUNNING** **STOPPED**	**If ET014 or ET015 are inconsistent, perform a multiplex network test using the diagnostic tool, then if the test is in order, see the UPC.**
11		**ET015:**	Checking fan assembly 2	**RUNNING** **STOPPED**	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

HEATING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature	**75°C < PR064 < 120°C**	If there is a fault use the interpretation for **DF001 Coolant temperature sensor circuit**.
2	**RCH**	**ET111:**	Set number of passenger compartment heating resistors	**This status indicates that the injection computer is preventing any change to the number of passenger compartment heating resistors (RCH) activated (RCHs already activated are not shut down, but no more can be added). This limit in the number of RCHs is in response to the vehicle's requirements (power availability, torque requirement, etc.)**	**NONE**
3		**ET112:**	Passenger compartment heating resistor cut-off	**This status indicates that the injection computer is inhibiting all the passenger compartment heating resistors (RCH) in response to the vehicle's requirements (power availability, torque requirement, injection or air conditioning defect mode, etc.)**	

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Cruise control/speed limiter**	**ET045:**	CC/SL selector switch on steering wheel	**STATUS 1:** resume button pressed **STATUS 2:** cancel button pressed **STATUS 3:** decrease button pressed **STATUS 4:** increase button pressed	In the event of a fault, apply the interpretation for **ET045 CC/SL selector switch on steering wheel**.
2		**ET032:**	Cruise control deactivation	**STATUS 1:** Traction control request **STATUS 2:** Brake pedal depressed **STATUS 3:** Cruise control or speed limiter fault **STATUS 4:** Engine/gearbox decoupling **STATUS 5:** Fault detected by injection computer **STATUS 6:** Vehicle speed invalid **STATUS 7:** Cancel button pressed **STATUS 8:** Gear selector lever in neutral **STATUS 9:** Inconsistency between the request and the vehicle speed	**NONE**
3		**ET042:**	Cruise control/ speed limiter	**STATUS 1:** On/Off button pressed **STATUS 2:** On/Off button released	If there is a fault, use the interpretation for **ET042 Cruise control/speed limiter**.

CRUISE CONTROL/SPEED LIMITER SUB-FUNCTION: (continued)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
4	**Clutch switch**	**ET040:** Clutch pedal	**Shows recognition of clutch pedal switches.** – **RELEASED:** Pedal released – **DEPRESSED:** Pedal depressed	If there is a fault, use the interpretation for **ET040 Clutch pedal**.
5	**Brake contact**	**ET039:** Brake pedal	**Indicates recognition of brake pedal contacts.** – **RELEASED:** Pedal released – **DEPRESSED:** Pedal depressed	If there is a fault, use the interpretation for **ET039 Brake pedal**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

STARTING SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Starting**	**ET076:**	Starting	**AUTHORISED**	**The authorisation to start is given once the fuel pump is pressurised and if the motorised throttle has completed its stop and limp-home position programming phase.**
2	**Actuator control relay**	**ET048:**	Actuator control relay	**ACTIVE** **INACTIVE**	If **ACTIVE** apply the interpretation of **DF084 Actuator relay control circuit**.
3	**Battery voltage**	**PR071:**	Computer supply voltage	**13 V < PR071 < 15 V**	If there is a fault, use interpretation of **PR071 Computer supply voltage**.

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

PROTECTION SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Code programmed**	**ET006:**	Code programmed	**Indicates whether immobiliser code programmed into computer.** – **YES:** Code programmed – **NO:** Code not programmed into injection computer.	**If NO, contact the Techline**
2	**Engine immobiliser**	**ET003:**	Engine immobiliser	**Indicates the status of the immobiliser system.** – **INACTIVE:** the injection computer has recognised the immobiliser code transmitted by the UCH. – **ACTIVE:** the injection computer does not recognise the immobiliser code transmitted by the UCH.	**If ET003 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct check the UCH.**
3	**Impact detected**	**ET077:**	Impact detected	**YES** **NO**	**If YES, switch off the ignition for 10 seconds, then switch it back on so the engine can be restarted. Then clear any faults.**
4	**Starting**	**ET076:**	Starting	**AUTHORISED**	**The authorisation to start is given once the fuel pump is pressurised and if the motorised throttle has completed its stop and limp-home position programming phase.**

NOTES	Only check conformity after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idle speed**.

TORQUE MANAGEMENT SUB-FUNCTION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	Torque	**PR100:**	Torque lapse	**0 Nm**	**If there is a fault, test the multiplex network; if the test is OK, check the automatic transmission.**
2		**PR015:**	Engine torque	**- 50 Nm < PR015 < 200 Nm**	
3		**PR123:**	Estimated driver demand engine torque	**0 Nm < PR123 < 200 Nm**	
4		**PR122:**	Torque received by automatic transmission converter	**0 Nm**	
5		**PR124:**	Resistant engine torque transmitted via CAN	**0 Nm**	

Tool Status	Diagnostic tool title
ET001	+ after ignition computer feed
ET003	Engine immobiliser
ET004	Air conditioning authorisation
ET006	Code programmed
ET014	Checking fan assembly 1
ET015	Checking fan assembly 2
ET023	Fast idle speed request
ET032	Cruise control deactivation
ET039	Brake pedal
ET040	Clutch pedal
ET042	Cruise control/speed limiter
ET045	CC/SL selector switch on steering wheel
ET047	Fuel pump control circuit
ET048	Actuator control relay
ET050	Canister bleed control
ET051	Throttle stop programming
ET052	Upstream O_2 sensor heating
ET053	Downstream O_2 sensor heating
ET054	Idle speed regulation
ET055	Upstream sensor richness loop.
ET056	Richness double loop
ET057	Misfires in cylinder 1
ET058	Misfires in cylinder 2
ET059	Misfires in cylinder 3
ET060	Misfires in cylinder 4
ET062	Flywheel signal
ET063	Park/Neutral position

Tool Status	Diagnostic tool title
ET064	Level 1 injection fault
ET065	Level 2 Injection fault
ET074	OBD warning light lit by AT
ET075	Pedal released and throttle closed
ET076	Starting
ET077	Impact detected
ET079	Air conditioning present
ET081	Accelerator pedal position
ET082	Motorised throttle position
ET083	Camshaft dephaser in defect mode
ET084	Camshaft dephaser
ET086	Camshaft dephaser control
ET088	Compressor activation request
ET089	Flywheel target programming
ET111	Set number of passenger compartment heating resistors
ET112	Passenger compartment heating resistor cut-off
ET564	Defect mode type 1
ET565	Defect mode type 2
ET566	Defect mode type 3
ET567	Defect mode type 4
ET568	Defect mode type 5
ET569	Defect mode type 6

ET039	BRAKE PEDAL

NOTES	There must be no present or stored faults.

Check the **condition** of the pedal assembly. Check the **cleanliness** and **condition** of the dual-contact brake switch and its connections. Repair if necessary.
With the ignition switched on, check the presence of **+ 12 V** on **track 1** of the brake light switch. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the Universal bornier, check the **insulation** and **continuity** on the following connection: Injection computer, connector **A, track E4** ⟶ **track 3** of the brake switch Repair if necessary.
If the fault is still present, replace the switch.

AFTER REPAIR	Repeat the conformity check from the start.

ET040	CLUTCH PEDAL

NOTES	There must be no present or stored faults.

Check that the pedal assembly is in good condition. Check the **cleanliness** and **condition** of the clutch pedal switch and its connections. Repair if necessary.
Check for **earth** on **track 2** of the clutch pedal switch connector. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the Universal bornier, check the **insulation** and **continuity** on the following connection: Injection computer, connector **A, track C4** ⟶ **track 1** of the clutch pedal switch Repair if necessary.
If the fault is still present, replace the switch.

AFTER REPAIR	Repeat the conformity check from the start.

ET042	CRUISE CONTROL/SPEED LIMITER

NOTES	There must be no present or stored faults.
	NOTE **It is necessary to remove the airbag to remove or check the cruise control/speed limiter control switches (see MR 364 Mechanics, 88C, Airbag and pretensioners).**

With the ignition on, check for the presence of **+ 12 V** on the cruise control/speed limiter selector switch (see **Technical Note 8227, Wiring diagram, MEGANE II, 1081**).
Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

- Injection computer, connector **A, track A2** → **track A3** of the cruise control or speed limiter on/off switch
- Injection computer, connector **A, track C3** → **track B1** of the cruise control or speed limiter on/off switch

Repair if necessary.

If the fault is still present, replace the switch.

AFTER REPAIR	Repeat the conformity check from the start.

ET045	CRUISE CONTROL/SPEED LIMITER SELECTOR SWITCH ON STEERING WHEEL

NOTES	There must be no present or stored faults.
	NOTE **It is necessary to remove the airbag to remove or check the cruise control/speed limiter control switches (see MR 364 Mechanics, 88C, Airbag and pretensioners).**

Check the **cleanliness** and **condition** of the incrementing switches at the steering wheel and their connections.
Repair if necessary.

Check for the presence of the **earth** on the incrementing switches at the steering wheel (see **Technical Note 8227, Wiring Diagram, MEGANE II, 1081**).
Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Injection computer, connector **A, track D2** ⟶ **track 2** of the steering wheel control switch
Injection computer, connector **A, track D3** ⟶ **track 1** of the steering wheel control switch

Repair if necessary.

If the fault is still present, replace the defective switch.

AFTER REPAIR	Repeat the conformity check from the start.

ET052	UPSTREAM O2 SENSOR HEATING

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the upstream oxygen sensor and its connections.
Repair if necessary.

With the ignition on, check for the presence of **+ 12 V** on **track A** of the upstream oxygen sensor connector.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** from the **Protection and Switching Unit**,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check the **continuity** on the following connection:

Protection and Switching Unit **PPM1 connector, track 2** ⟶ **track A** of the upstream oxygen sensor

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
With the ignition on, if there is still no **+ 12 V** at the upstream oxygen sensor connector, there is a fault in the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check for **insulation** and **continuity** on the following connection:

Injection computer, connector **C, track L2** ⟶ **track B** of the upstream oxygen sensor

Repair if necessary.

Measure the **resistance** of the upstream oxygen sensor heater between **tracks A** and **B**.
Replace the upstream oxygen sensor if the **resistance** is not approximately **9 Ω at 20 °C**.

If the fault is still present, replace the upstream oxygen sensor.

AFTER REPAIR	Repeat the conformity check from the start.

ET053	DOWNSTREAM O2 SENSOR HEATING

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the downstream oxygen sensor and its connections.
Repair if necessary.

Check for the **+ 12 V feed** on **track A**, downstream oxygen sensor connector with the ignition on.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** in the **Protection and Switching Unit**,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:

Protection and Switching Unit **track 2 connector PPM1** ⟶ **track A** of the downstream oxygen sensor

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
With the ignition on, if the **+ 12 V** is still not present on the downstream oxygen sensor connector, there is a fault in the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check for **insulation** and **continuity** on the following connection:

Injection computer, connector **C, track L3** ⟶ **track B** of the downstream oxygen sensor

Repair if necessary.

Measure the **resistance** of the downstream oxygen sensor heater between **tracks A** and **B**.
Replace the downstream oxygen sensor if the **resistance** is not approximately **9 Ω at 20 °C**.

If the fault is still present, replace the downstream oxygen sensor.

AFTER REPAIR	Repeat the conformity check from the start.

ET054	IDLE SPEED REGULATION

NOTES	There must be no present or stored faults.
	Check the parameters PR032, PR058, PR064, PR118, PR119 and PR030. Check that all these parameters are completely correct.

IDLE SPEED TOO LOW

Check:
– the engine oil level (too high → splashing),
– that the exhaust pipe is not blocked (catalytic converter damaged),
– the cleanliness and conformity of the air filter,
– that the air inlet system is not blocked,
– that the throttle valve is not clogged,
– the condition and conformity of the spark plugs,
– the fuel circuit sealing,
– the fuel pressure and flow (see **MR 364 Mechanics, 17B, Petrol injection**),
– the condition and cleanliness of the injectors,
– the engine compression,
– the timing adjustment,
– the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**).
Repair the defective component if necessary.

ET054 **CONTINUED**	

IDLE SPEED TOO HIGH

Check:
– the engine oil level (too high → oil combustion),
– that restrictions are present in the oil vapour rebreathing circuit,
– the sealing between the throttle valve and inlet manifold,
– the manifold pressure sensor sealing,
– the fuel vapour absorber bleed, which must not be jammed open,
– the fuel vapour absorber bleed system sealing,
– the brake servo system sealing,
– the sealing between the inlet manifold and cylinder head,
– the oil vapour recovery circuit sealing between the inlet manifold and cylinder head,
– the fuel pressure and flow (see **MR 364 Mechanics, 17B, Petrol injection**),
– the condition and cleanliness of the injectors,
– the engine compression,
– the timing adjustment,
– the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**).
Repair the defective component if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

ET055	UPSTREAM SENSOR RICHNESS LOOP

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the upstream oxygen sensor connections.
Repair if necessary.

With the ignition on, check for the presence of **+ 12 V** on **track A** of the upstream oxygen sensor connector.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** in the **Protection and Switching Unit**,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:

Protection and Switching Unit **track 2 connector PPM1** ⟶ **track A** of the upstream oxygen sensor

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
With the ignition on, if there is still no **+ 12 V** at the upstream oxygen sensor connector, there is a fault in the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Injection computer, connector **C, track C1** ⟶ **track D** of the upstream oxygen sensor

Injection computer, connector **C, track B1** ⟶ **track C** of the upstream oxygen sensor

Injection computer, connector **C, track L2** ⟶ **track B** of the upstream oxygen sensor

Repair if necessary.

Measure the **resistance** of the upstream oxygen sensor heater between **tracks A** and **B**.
Replace the upstream oxygen sensor if the **resistance** is not approximately **9 Ω at 20 °C**.

Check the **condition** and **secure fitting** of the upstream oxygen sensor.
If the vehicle is driven frequently in town, **carry out the unclogging procedure**.

ET055 **CONTINUED**	

Check:
– the condition of the air filter,
– that the air inlet system is not blocked,
– the condition and conformity of the spark plugs,
– the sealing between the throttle valve and inlet manifold,
– the manifold pressure sensor sealing,
– the fuel vapour absorber bleed, which must not be jammed open,
– the fuel vapour absorber bleed system sealing,
– the brake servo system sealing,
– the turbocharger safety valve circuit sealing,
– the cylinder head oil vapour recovery system sealing,
– the sealing between the inlet manifold and cylinder head,
– the exhaust pipe sealing between the cylinder head and catalytic converter,
– the fuel flow rate and pressure.

If the idle speed is not stable, check:
– the timing adjustment,
– the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**),
– the cylinder compression.

Drive the vehicle to check the repair.
Repair the defective components.

AFTER REPAIR	Repeat the conformity check from the start.

ET062	FLYWHEEL SIGNAL

NOTES	There must be no present or stored faults.
	Information: If the flywheel has been replaced or removed, reinitialise the flywheel target programming.

Check the **mounting** and **positioning** of the TDC sensor (see **MR 364 Mechanics, 10A, Engine and peripherals**).
Repair if necessary.

Check the **cleanliness** and **condition** of the TDC sensor and its connections.
Check the condition of the cable.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:
Injection computer, connector **B, track E4** ⟶ **track 2** of the TDC sensor
Injection computer, connector **B, track F3** ⟶ **track 1** of the TDC sensor
Repair if necessary.

Measure the **resistance** of the TDC sensor between **tracks 1** and **2**.
Replace the sensor if the resistance is not **200 to 270 Ω at 23 °C**.

If the sensor has been replaced, reset the flywheel signal programming.
Flywheel signal programming reinitialisation procedure:
Accelerate up to **4000 rpm** in third gear ratio, then decelerate to power take-up speed*.
Then carry out the procedure twice immediately.
(* This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque.)
If the fault is still present, check the **cleanliness** and **condition** of the flywheel.

AFTER REPAIR	**If the TDC sensor has been replaced, reinitialise the programming (RZ005).** Repeat the conformity check from the start.

Tool parameter	Diagnostic tool title
PR001	Advance
PR010	Idle speed regulation setpoint
PR014	Idle speed correction
PR015	Engine torque
PR018	Estimated air flow
PR028	Pedal position (gang 1)
PR029	Pedal position (gang 2)
PR030	Accelerator pedal position
PR032	Inlet pressure
PR035	Atmospheric pressure
PR037	Refrigerant pressure
PR041	Turbocharging pressure
PR055	Engine speed
PR058	Air temperature
PR064	Coolant temperature
PR071	Battery supply voltage
PR089	Vehicle speed
PR090	Idle speed regulation programmed value
PR091	Theoretical idle speed regulation OCR
PR095	Anti-pinking correction
PR096	Motorised throttle upper stop programmed value
PR097	Motorised throttle lower stop programmed value
PR098	Upstream oxygen sensor voltage
PR099	Downstream oxygen sensor voltage
PR100	Torque lapse
PR101	Duration of injection
PR102	Canister bleed solenoid valve OCR

Tool parameter	Diagnostic tool title
PR103	Instantaneous fuel consumption
PR104	Turbocharging solenoid valve OCR setpoint
PR105	OBD fault warning light lit mileage counter
PR106	Fault warning light lit mileage counter
PR111	Motorised throttle position corrected value
PR112	No load programmed value
PR113	Throttle lower stop after applying Offset
PR116	Motorised throttle corrected position setpoint
PR118	Measured throttle position gang 1
PR119	Measured throttle position gang 2
PR122	Torque received by AT converter
PR123	Estimated driver demand engine torque
PR124	Resistant engine torque transmitted via CAN
PR125	Power absorbed by the air conditioning compressor
PR127	Heating resistor max. authorised power
PR138	Richness correction
PR141	Integral idle speed regulation correction
PR143	Self-adapting richness gain
PR144	Self-adapting richness offset

PR030	ACCELERATOR PEDAL POSITION

NOTES	There must be no present or stored faults.

Check that the pedal mechanism has not seized.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connections:

- Injection computer, connector **A, track H3** → **track 5** of the pedal potentiometer
- Injection computer, connector **A, track G2** → **track 3** of the pedal potentiometer
- Injection computer, connector **A, track H2** → **track 4** of the pedal potentiometer
- Injection computer, connector **A, track F4** → **track 6** of the pedal potentiometer
- Injection computer, connector **A, track F2** → **track 2** of the pedal potentiometer
- Injection computer, connector **A, track F3** → **track 1** of the pedal potentiometer

Repair if necessary.

If the fault is still present, replace the pedal potentiometer.

AFTER REPAIR	Repeat the conformity check from the start.

PR032	INLET PRESSURE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the manifold pressure sensor and its connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check the **insulation** and **continuity** on the following connections:

- Computer, connector **B, track H2** → **track 1** of the manifold pressure sensor
- Computer, connector **B, track H3** → **track 3** of the manifold pressure sensor
- Computer, connector **B, track H4** → **track 2** of the manifold pressure sensor

Repair if necessary.

If the fault is still present, replace the manifold pressure sensor.

If the fault is still present, carry out the following checks:
The inlet line must be perfectly sealed, from the throttle valve to the cylinder head.
Check:
– the condition of the air filter,
– that the air inlet system is not blocked,
– the sealing between the throttle valve and inlet manifold,
– the manifold pressure sensor sealing,
– the fuel vapour absorber bleed, which must not be jammed open,
– the fuel vapour absorber bleed system sealing,
– the brake servo system sealing,
– the turbocharger safety valve circuit sealing,
– the cylinder head oil vapour recovery system sealing,
– the sealing between the inlet manifold and cylinder head,
– the exhaust pipe sealing between the cylinder head and catalytic converter.
Repair if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

PR037	REFRIGERANT PRESSURE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the refrigerant pressure sensor and its connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

- Injection computer, connector **B, track J2** → **track B** of the Refrigerant sensor
- Injection computer, connector **B, track J3** → **track C** of the Refrigerant sensor
- Injection computer, connector **B, track K2** → **track A** of the Refrigerant sensor

Repair if necessary.

If the fault is still present, replace the refrigerant sensor.
If the fault is still present, check the air conditioning circuit (see MR 364, Mechanics, 62A, Air conditioning).

AFTER REPAIR	Repeat the conformity check from the start.

PR074	BATTERY VOLTAGE

NOTES	There must be no present or stored faults. **No electrical consumers.**

Ignition on	**If the voltage is minimum:** Check the battery and the charging circuit (see **MR 364 Mechanics, 16A, Starting - charging**). **If the voltage is maximum:** Check that the charging voltage is correct and that no electrical consumers are on (see **16A, Starting - charging**).
At idle speed	**If the voltage is minimum:** Check the battery and the charging circuit (see **MR 364 Mechanics, 16A, Starting - charging**). **If the voltage is maximum:** Check that the charging voltage is correct and that no electrical consumers are on (see **16A, Starting - charging**).

AFTER REPAIR	Repeat the conformity check from the start.

PR095	ANTI-PINKING CORRECTION

NOTES	There must be no present or stored faults.

The pinking sensor must not supply a zero signal, proving that it is recording the mechanical vibrations of the engine.
Check that there is the **correct** fuel in the fuel tank. Repair if necessary.
Check the **condition** and **conformity** of the spark plugs. Repair if necessary.
Check the **tightness** of the pinking sensor. Repair if necessary.
Check the **cleanliness** and the **condition** of the pinking sensor connections. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the Universal bornier, check the **insulation** and **continuity** on the following connections: Injection computer, connector **B, track B3** → **track 2** of the pinking sensor Injection computer, connector **B, track B4** → **track 2** of the pinking sensor Injection computer, connector **B, track B2** → **Shielding** of the pinking sensor Repair if necessary.
If the fault is still present, replace the pinking sensor.

AFTER REPAIR	Repeat the conformity check from the start.

PR098	UPSTREAM OXYGEN SENSOR VOLTAGE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the upstream oxygen sensor connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:
Injection computer, connector **C, track C1** → **track D** of the upstream oxygen sensor
Injection computer, connector **C, track B1** → **track C** of the upstream oxygen sensor
Repair if necessary.

Check that the upstream oxygen sensor is **secure**.
Repair if necessary.

If the vehicle is driven frequently in town, **carry out the unclogging procedure**.

Check that **there are no leaks** in the exhaust system, from the manifold to the catalytic converter.
Repair if necessary.

If the fault is still present, replace the upstream oxygen sensor.
If the fault has still not been cured, continue with the checks.
Check:
– the condition of the air filter,
– that the air inlet system is not blocked,
– the condition and conformity of the spark plugs,
– that the catalytic converter is not clogged,
– the sealing between the throttle valve and inlet manifold,
– the manifold pressure sensor sealing,
– the fuel vapour absorber bleed, which must not be jammed open,
– the fuel vapour absorber bleed system sealing,
– the brake servo system sealing,
– the cylinder head oil vapour recovery system sealing,
– the sealing between the inlet manifold and cylinder head,
– the exhaust pipe sealing between the cylinder head and catalytic converter,
– the fuel flow rate and pressure.

PR098 **CONTINUED**	

If the idle speed is not stable, check:
– the timing adjustment,
– the hydraulic tappets if there is camshaft noise (see **MR 364 Mechanics, 11A, Top and front of engine**),
– cylinder compression.
Drive the vehicle to check the repair.

AFTER REPAIR	Repeat the conformity check from the start.

PR099	DOWNSTREAM OXYGEN SENSOR VOLTAGE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the downstream oxygen sensor connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:
Injection computer, connector **C, track A2** → **track D** of the downstream oxygen sensor
Injection computer, connector **C, track B2** → **track C** of the downstream oxygen sensor
Repair if necessary.

Check that the downstream oxygen sensor is **secure**.
Repair if necessary.

If the vehicle is driven frequently in town, **carry out the unclogging procedure** (oxygen sensors and catalytic converter clogging).

Check that the exhaust pipe is completely **leak free**.
Repair if necessary.

Replace the downstream oxygen sensor.

If the fault is still present, the catalytic converter is certainly damaged.

If the catalytic converter is defective, determine the cause of the destruction, otherwise the new catalytic converter may be damaged in turn.

Remove the catalytic converter.

Possible reasons for the destruction of a catalytic converter:
- **deformation** (impact),
- **thermal shock** (cold water splashed onto a hot catalytic converter can damage it),
- **defective injector or ignition:** the catalytic converter is damaged by contact with petrol (coil fault, coil control fault, injector jammed open),
- **injector leak**,
- **abnormal oil or coolant consumption** (defective cylinder head gasket),
- **use of a fuel additive** or other equivalent product (obtain information from the customer because this type of product can contaminate the catalytic converter and render it useless sooner or later).

Look up the service history of the vehicle or, if this is not possible, ask the customer if the vehicle has had injection or ignition faults.

If the cause of the catalytic converter damage has been found and the fault has disappeared, replace the catalytic converter.

AFTER REPAIR	Repeat the conformity check from the start.

Tool commands	Diagnostic tool title
SC006	Start OBD test: catalytic converter
SC007	Start OBD test: O_2 sensors
RZ001	Fault memory
RZ005	Programming
AC015	Fuel pump relay
AC017	Canister bleed solenoid valve
AC018	Upstream O_2 sensor heating
AC019	Downstream O_2 sensor heating
AC027	Motorised throttle
VP020	VIN entry

AC015	FUEL PUMP RELAY

NOTES	There must be no present or stored faults.

IF THE RELAY DOES NOT CLICK

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the computer connections.
In the **Protection and Switching Unit** disconnect the **PEM** connector and check the cleanliness and condition of the connections.
Using the Universal bornier, check for **insulation** and **continuity** on the following connection:

Injection computer track **D1 connector C** ⟶ **track 1** on the Protection and Switching Unit, **PEM connector**

Repair if necessary.

If the fault is still present, there is a fault with the **Protection and Switching Unit** (the fuel pump relay is in the Protection and Switching Unit and is not removable).
Contact the Techline.

IF THE PUMP DOES NOT OPERATE

Disconnect the fuel pump.
Check the **cleanliness** and **condition** of the connections.
Check for the **+ 12 V feed** on the fuel pump connector with the ignition on (see **Technical Note 8227 Wiring Diagram, MEGANE II, 456**).
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPH2** in the **Protection and Switching Unit**,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check for **continuity** on the following connection:

Protection and Switching Unit **connector PPH2 track 5** ⟶ Fuel pump connector

Repair if necessary.

AC015 **CONTINUED**	

IF THE PUMP DOES NOT OPERATE	Reconnect the Protection and Switching Unit connector and reconnect the battery. If the **+ 12 V feed** is still not present on the fuel pump relay connector with the ignition on, there is a fault with the **Protection and Switching Unit**. Contact the Techline.
	Check that **the earth** on the fuel pump connector **is present** with the ignition on (see **Technical Note 8227 Wiring Diagram, MEGANE II, 456**). Repair if necessary.
	If the fault is still present, replace the fuel pump.

AFTER REPAIR	Repeat the conformity check from the start.

AC017	CANISTER BLEED SOLENOID VALVE

NOTES	**There must be no present or stored faults.**

Check the **cleanliness** and **condition** of the fuel vapour absorber bleed solenoid valve connections.
Repair if necessary.

Measure the **resistance** between **tracks 1** and **2** of the fuel vapour absorber bleed solenoid valve.
Replace the bleed solenoid valve for the fuel vapour absorber if the **resistance** is not **26 Ω ± 4 Ω at 23 °C**.

Check for **+ 12 V feed** on **track 1** of the fuel vapour absorber bleed solenoid valve with the ignition on.
If **+ 12 V** is not present:
– disconnect the battery,
– disconnect the connector marked **PPM1** in the **Protection and Switching Unit**,
– check the **cleanliness** and **condition** of the connections,
– using the Universal bornier, check the **continuity** on the following connection:
Protection and Switching Unit **PPM1 connector, track 2** ⟶ **track 1** of the fuel vapour absorber bleed solenoid valve
Repair if necessary.

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
With the ignition on, if the **+ 12 V** is still not present on the fuel vapour absorber canister bleed solenoid valve connector, there is a fault with the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the Universal bornier, check for **insulation** and **continuity** on the following connection:
Injection computer, connector **C, track E1** ⟶ **track 2** of the fuel vapour absorber bleed solenoid valve
Repair if necessary.

If the fault is still present, replace the solenoid valve.

AFTER REPAIR	Repeat the conformity check from the start.

AC027	MOTORISED THROTTLE

IMPORTANT
Never drive the vehicle without ensuring that there are no throttle valve faults.

NOTES	There must be no present or stored faults.

Switch on the ignition and activate command **AC027**.
If the motorised throttle does not work, apply the interpretation for **DF079 Motorised throttle valve automatic control**.

AFTER REPAIR	**If the throttle valve has been replaced, reinitialise the programming (RZ005).** Repeat the conformity check from the start.

ELECTRICAL RESISTANCE OF COMPONENTS ON THE F4R ENGINE

Ambient temperature ~ 20 °C

Injectors		**14.5 Ω ± 5 %**
Throttle valve motor		**2.3 Ω ± 10 %**
Fuel vapour absorber solenoid valve		**25 Ω ± 20 %**
Camshaft dephaser solenoid valve		**7.2 Ω ± 10 %**
Rod coils	**Primary:**	**0.5 Ω ± 5 %**
	Secondary:	**10.7 kΩ ± 15 %**
Flywheel signal sensor		**230 Ω ± 20 %**
Upstream oxygen sensor heating		**9 Ω ± 10 %**
Downstream oxygen sensor heating		**9 Ω ± 10 %**

F4R ENGINES

Values for components with variable electrical resistance:

AIR TEMPERATURE SENSOR DAV IATS 04 - PIE 7700101451 B	
Temperature in °C	**Electrical resistance in Ω**
- 40	**49930 ± 15 %**
- 10	**9540 ± 10 %**
25	**2050 ± 6 %**
50	**810 ± 6 %**
80	**309 ± 6 %**
110	**135 ± 6 %**
120	**105 ± 6 %**

COOLANT TEMPERATURE SENSOR SYLEA 402114 02 - PIE 7700113867	
Temperature in °C	**Electrical resistance in Ω**
- 40	**75780 ± 10 %**
- 10	**12460 ± 10 %**
25	**2250 ± 5 %**
50	**810 ± 5 %**
80	**283 ± 5 %**
110	**115 ± 5 %**
120	**88 ± 5 %**

NOTES	**Only consult the customer complaints after performing a complete check with the diagnostic tool.** **IMPORTANT** **Never drive the vehicle without checking that there are no throttle valve faults.**

NO DIALOGUE WITH THE COMPUTER — **ALP 1**

THE ENGINE WILL NOT START — **ALP 2**

IDLING SPEED FAULTS — **ALP 3**

FAULTS WHILE DRIVING — **ALP 4**

AFTER REPAIR	Repeat the conformity check from the start.

ALP 1	No dialogue with the computer

NOTES	None

Test the diagnostic tool on another vehicle in perfect working order.
Check that the sensor's green warning light comes on.
Communication with the second vehicle is impossible, follow the instructions in the **CLIP diagnostic tool check** section.
If you establish dialogue with the second vehicle, follow the instructions in the **Vehicle check** section.

CLIP DIAGNOSTIC TOOL CHECK	Check the **cleanliness** and **condition** of the diagnostic socket contacts which connect to the vehicle. Check the **condition** of the cable from the diagnostic socket to the probe, and the cleanliness and condition of the connections. Check the probe connections. Check the **condition** of the cable from the probe to the CLIP tool, and the cleanliness and condition of the connections. Check the **cleanliness** and **condition** of the CLIP socket. If the fault is still present, contact the Techline.
CLIP VEHICLE CHECK	Check the **electrical voltage** of the battery. Check the **cleanliness** and **condition** of the battery terminals. Check the **condition** and **tightness** of the cable going from the battery + terminal to the Protection and Switching Unit. Check the **condition** of the battery earth cable and ensure that there is **good electrical connection** with the bodywork.
	Check the injection computer earth terminal for **cleanliness** and make sure it is **properly connected** to the bodywork.
	Check the Protection and Switching Unit's main power supply **30A fuse**, plus the **condition** and **cleanliness** of the contacts (see Protection and Switching Unit fault finding).
	Check the injection computer after ignition feed **5A fuse**, plus the **condition** and **cleanliness** of the contacts.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 1 CONTINUED 1	

CLIP VEHICLE CHECK (CONTINUED 1)

Using the Universal bornier, check the following tracks on the **vehicle's diagnostic socket**:

Track 1 + → **After ignition feed**
Track 16 + → **Battery**
Tracks 4 and 5 → **Earth**

Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the computer connections.
Using the universal bornier, check for **continuity** on the **CAN** communication lines:

Injection computer **track A4 connector A** → **track 6** of the vehicle diagnostic socket
Injection computer **track A3 connector A** → **track 14** of the vehicle diagnostic socket

Repair if necessary.

Check the **continuity** of the **K** communication line:

Injection computer **track B4 connector A** → **track 7** of the vehicle diagnostic socket

Repair if necessary.

Disconnect the computer **earth** terminal from the negative battery terminal.
Check the **continuity** and **insulation** of the following tracks:

Injection computer **track L1 connector C** → **Earth terminal**
Injection computer **track M1 connector C** → **Earth terminal**
Injection computer **track M1 connector B** → **Earth terminal**
Injection computer **track L1 connector B** → **Earth terminal**

Repair if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 1 CONTINUED 2	

CLIP VEHICLE CHECK (CONTINUED 2)	
	Disconnect the connector marked **PEM** from the **Protection and Switching Unit**, and check the cleanliness and condition of the connections. Using the Universal bornier, check for **insulation** and **continuity** on the following connection: Computer, connector **B, track D4** ⟶ Protection and Switching Unit **connector PEM track 2** Repair if necessary.
	Disconnect the connector marked **PPM1** from the **Protection and Switching Unit** and check the cleanliness and condition of the connections. Using the universal bornier, check the **continuity** on the following connection: Computer, connector **B, track M2** ⟶ Protection and Switching Unit **connector PPM1 track 1** Repair if necessary.
	Disconnect the connector marked **PEH** from the **Protection and Switching Unit** and check the cleanliness and condition of the connections. Using the universal bornier, check the **continuity** on the following connection: Computer, connector **A, track D1** ⟶ Protection and Switching Unit, **connector PEH, track 1** Repair if necessary.
	If the fault is still present, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 2	The engine will not start

NOTES	**Follow ALP 2 after a complete check with the diagnostic tool.** *(Use the relevant section in the Workshop Repair Manual to carry out certain operations.)*
	IMPORTANT **Never drive the vehicle without checking that there are no throttle valve faults.**

If the starter motor does not operate, there may be a fault with the engine immobiliser. Carry out a fault finding procedure on the UCH.
Check the condition of the battery. Check the cleanliness, condition and tightness of the battery terminals. Check that the battery is correctly earthed to the vehicle bodywork. Check that the + battery leads are correctly connected.
Check that the starter motor is properly connected. Check that the starter works (see **MR 364 Mechanics, 16A, Starting-charging**).
Check the condition and conformity of the spark plugs. Check the mounting, cleanliness and condition of the flywheel signal sensor. Check the flywheel signal sensor air gap. Check the condition of the flywheel.
Check that the air filter is not clogged. Check that the air inlet system is not blocked.
Check that there is fuel in the tank (fuel sender fault). Check that the tank vent is not blocked. Check that the fuel is of the correct type. Check that there are no leaks in the fuel system, from the tank to the injectors. Check that there are no kinked hoses (especially after a removal operation). Check the fuel flow rate and pressure. Check the sealing of the injectors, and that they are working properly.
Check that the exhaust system is not blocked and the catalytic converter not clogged.
Check the timing adjustment.
Check the engine compressions.
Check the hydraulic tappets if there is camshaft noise.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 3	Idle speed faults

NOTES	**Work through ALP 3 after complete checking using the diagnostic tool.** *(Use the relevant section in the Repair Manual to carry out certain operations.)*
	IMPORTANT **Never drive the vehicle without checking that there are no throttle valve faults.**

Check that the oil level is not too high.
Check inlet system sealing, from the throttle to the cylinder head. Check that the fuel vapour absorber bleed is not disconnected or jammed open. Check that there are no leaks in the fuel vapour absorber bleed system. Check that there are no leaks in the braking assistance system. Check that there are no leaks in the oil vapour recovery system (manifold/cylinder head). Check that there are no leaks around the manifold pressure sensor. Check that there are no leaks around the air temperature sensor.
Check that the air filter is not clogged. Check that the air inlet system is not blocked. Check that throttle valve is not clogged.
Check the condition of the pencil coils and the cleanliness of their connections. Check the electrical resistance of the pencil coil secondary circuits. Check the condition and conformity of the spark plugs. Check the mounting, cleanliness and condition of the flywheel signal sensor. Check the flywheel signal sensor air gap. Check the condition and cleanliness of the flywheel.
Check that the tank vent is not blocked. Check that the fuel is of the correct type. Check that there are no leaks in the fuel system, from the tank to the injectors. Check that there are no kinked hoses (especially after a removal operation). Check the fuel flow rate and pressure. Check that the injectors are working properly.
Check that the exhaust system is not blocked and the catalytic converter not clogged.
Check the timing adjustment.
Check the engine compressions.
Check the hydraulic tappets if there is camshaft noise.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 4	Faults occurring while driving

NOTES	**Work through ALP 4 after complete checking using the diagnostic tool.** *(Use the relevant section in the Repair Manual to carry out certain operations.)*
	IMPORTANT **Never drive the vehicle without checking that there are no throttle valve faults.**

Check that the oil level is not too high.
Check the condition of the pencil coils and the cleanliness of their connections. Check the electrical resistance of the pencil coil secondary circuits. Check the condition and conformity of the spark plugs. Check the mounting, cleanliness and condition of the flywheel signal sensor. Check the flywheel signal sensor air gap. Check the condition and cleanliness of the flywheel.
Check that the air filter is not clogged. Check that the air inlet system is not blocked. Check that throttle valve is not clogged. Check inlet system sealing, from the throttle to the cylinder head.
Check that the fuel vapour absorber bleed is not disconnected or jammed open. Check that there are no leaks in the fuel vapour absorber bleed system. Check that there are no leaks in the braking assistance system. Check that there are no leaks in the oil vapour recovery system (manifold/cylinder head). Check that there are no leaks around the manifold pressure sensor. Check that there are no leaks around the air temperature sensor.
Check that the tank vent is not blocked. Check that the fuel is of the correct type. Check that there are no leaks in the fuel system, from the tank to the injectors. Check that there are no kinked hoses (especially after a removal operation). Check the fuel flow rate and pressure. Check that the injectors are working properly.
Check that the exhaust system is not blocked and the catalytic converter not clogged.
Check the timing adjustment.
Check the engine compressions.
Check the hydraulic tappets if there is camshaft noise.

AFTER REPAIR	Repeat the conformity check from the start.

1. SCOPE OF THIS DOCUMENT

This document presents the fault finding procedure applicable to all computers with the following specifications:

Vehicle(s): **MEGANE II phase 2**
SCENIC II phase 2
Engines: **K4J 740 - K4M 766/812/813 - K4M 788 LPG**
F4R 770/771 - F4R-T 776
F4R-T 774 (MEGANE II phase 2 RENAULT SPORT)
Function concerned: **Petrol injection**

Name of computer: **Sagem S3000**
Program no.: **AD**
Vdiag No.: **4C**

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedures (this manual):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.
Wiring Diagrams:
– Visu-Schéma (CD-ROM), paper version.

Type of diagnostic tools

– CLIP + CAN sensor

Special tooling required

Special tooling required	
	Multimeter
Elé. 1481	Bornier
Elé. 1681	Universal bornier

3. RECAP

Procedure

To run fault finding on the vehicle's computers, switch on the ignition in fault finding mode (forced + after ignition feed).

Proceed as follows:
– vehicle card in reader,
– press and hold Start button (longer than **5 seconds**) with start-up conditions not fulfilled,
– connect the diagnostic tool and perform the required operations.

To **cut off + after ignition**, proceed as follows:
– disconnect the diagnostic tool,
– press the Start button twice briefly (less than **3 seconds**),
– Ensure that the + after ignition feed has been cut off by checking that the computer indicator lights on the instrument panel have gone out.

Faults

Faults are displayed as present or stored (they appeared in a certain context and have since disappeared, or they are still present but cannot be diagnosed in the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is used following the + after ignition supply being switched on (without acting on the system components).

For a **present fault**, apply the procedure described in the **Interpretation of faults** section.

For a **stored fault**, note the faults displayed and apply the **notes** section.

If the fault is **confirmed** when the instructions in the Notes section are applied, the fault is present. Deal with the fault

If the fault is **not confirmed**, check:
– the electrical lines which correspond to the fault,
– the connectors for these lines (for oxidation, bent pins, etc.),
– the resistance of the component detected as faulty,
– the condition of the wires (melted or split insulation, wear).

Conformity check

The aim of the conformity check is to check data that does not produce a fault on the diagnostic tool because the data is inconsistent. Therefore, this phase is used to:
– perform fault finding on faults that do not have a fault display, and which may correspond to a customer complaint.
– check that the system is operating correctly and that there is no risk of a fault recurring after repair.

This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.

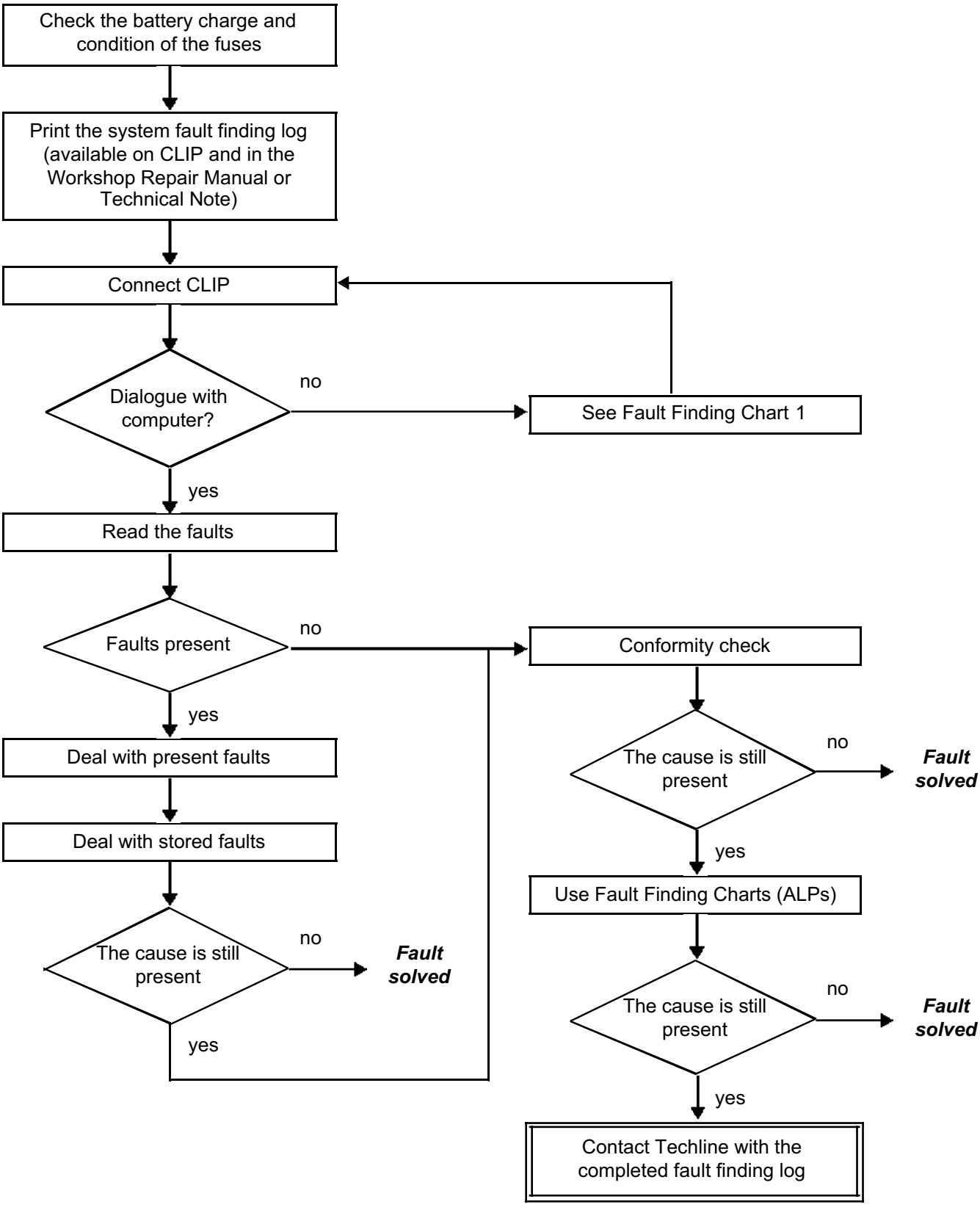
If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

Customer complaints - Fault finding chart

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be processed by **customer complaint**.

A summary of the overall procedure to follow is provided on the following page in the form of a flow chart

4. FAULT FINDING PROCEDURE



4. FAULT FINDING PROCEDURE (continued)

Wiring check:

Fault finding problems:
Disconnecting the connectors and/or manipulating the wiring harness may temporarily remove the cause of a fault.
Electrical measurements of the voltage, resistance and insulation are generally correct, especially if the fault is not present when the analysis is made (stored fault).

Visual inspection:
Look for damage under the bonnet and in the passenger compartment.
Carefully check the fuses, insulation and wiring harness routing.
Look for signs of oxidation.

Tactile inspection:
While manipulating the wiring harness, use the diagnostic tool to note any change in fault status from stored to present.
Check that the connectors are correctly tightened, apply light pressure to the connectors, twist the wiring harness.
If there is a change in status, try to locate the source of the fault.

Inspection of each component:
Disconnect the connectors and check the appearance of the clips and tabs, as well as their crimping (no crimping on the insulating section).
Make sure that the clips and tabs are properly locked in the sockets.
Make sure no clips or tabs have been dislodged during connection.
Check the clip contact pressure using an appropriate model of tab.

Resistance check:
Check the continuity of entire lines, then section by section.
Look for a short circuit to earth, to **+12 V** or to another wire.

If a fault is detected, repair or replace the wiring harness.

5. FAULT FINDING LOG

IMPORTANT!

NOTE
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the fault finding procedure, ensures a record is kept of the procedure carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE MANDATORY TO FILL OUT A FAULT FINDING LOG EACH TIME FAULT FINDING IS CARRIED OUT

You will always be asked for this log:
– when requesting technical assistance from the Techline,
– for approval requests when replacing parts with mandatory agreements, it should be attached to when returning "monitored" parts. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY ADVICE

Safety rules must be observed during any work on a component to prevent any damage or injury:
– make sure that the battery is properly charged to avoid damaging the computers with a low load,
– use the appropriate tools.

7. FAULT FINDING

Stored faults are managed the same way for all sensors and actuators.
A stored fault is cleared after 128 recurrence-free starts.

FAULT FINDING LOG

System: Injection

List of monitored parts: ***Computer***

Administrative identification

Date	2 0
Log completed by	
VIN	
Engine	
Diagnostic tool	CLIP
Update version	

Customer complaint

☐	579	Does not start - fault	☐	570	Stalling - cold starting faults	☐	571	Stalling - warm starting faults
☐	586	Injection/preheating warning light on	☐	572	Idling - unstable engine speed	☐	574	Jerking/flat spots
☐	573	Loss of power	☐	520	Abnormal noise, vibrations	☐	576	Smoke - exhaust odours
☐	569	Starting faults						

Other — Your comments:

Conditions under which the customer complaint occurs

☐	001	When cold	☐	005	While driving	☐	008	When decelerating
☐	002	When hot	☐	006	When changing gear	☐	009	Sudden fault
☐	003	When stationary	☐	007	When accelerating	☐	010	Gradual deterioration
☐	004	Intermittently						

Other — Your comments:

Documentation used in fault finding

Fault finding procedure used	
Type of diagnostic manual:	Workshop Repair Manual ❑ Technical Note ❑ Assisted fault finding ❑
Fault finding manual no:	
Wiring diagram used	
Wiring Diagram Technical Note No:	
Other documentation	
Title and/or part number:	

RENAULT

FD 01
Fault finding log

FAULT FINDING LOG

System: Injection

Computer identification and parts exchanged for the system

Part 1 part no.	
Part 2 part no.	
Part 3 part no.	
Part 4 part no.	
Part 5 part no.	

To be read with the Diagnostic tool (Identification screen):

Computer part no.	
Supplier no.	
Program no.	
Software version	
Calibration no.	
VDIAG	

Faults found with the diagnostic tool

Fault no.	Present	Stored	Fault name	Specification

Conditions under which fault occurs

Status or parameter no.	Parameter name	Value	Unit

System-specific information

Description:

Additional information

What factors led you to replace the computer? What other parts were replaced?	
Other defective functions?	
Your comments:	

RENAULT

FD 01
Fault finding log

1. SYSTEM OPERATION

Composition

The injection system consists of the:
– accelerator potentiometer,
– clutch pedal switch,
– TDC sensor,
– atmospheric pressure sensor,
– air temperature sensor,
– coolant temperature sensor,
– upstream oxygen sensor,
– downstream oxygen sensor,
– cruise control switch,
– steering column switch,
– cruise control on/off switch,
– fuel vapour absorber,
– injection computer,
– motorised throttle valve,
– 4 injectors,
– 4 pencil coils.
– pinking sensor,
– camshaft dephaser solenoid valve (non-LPG K4M only),
– camshaft position sensor (non-LPG K4M only),
– turbocharging pressure sensor (F4R turbo only)
– electric coolant pump (F4R turbo only),
– wastegate solenoid valve (only on F4R Turbo),
– turbocharging solenoid valve (only on F4R-Turbo)

Computer

SAGEM S3000 FLASH EEPROM 128-track computer controlling the injection and ignition.

Sequential multipoint injection.

Connections to the other computers:
– climate control,
– UCH,
– protection and switching unit (UPC)
– Automatic Gearbox Electronic Control Unit (AUTO).
– airbag,
– ABS/ESP,
– instrument panel.

2. Role of components, operating strategy

Engine immobiliser

The Verlog 4 type immobiliser function is managed by the UCH computer and the engine management computer. Before any starting request, the engine management computer is protected.
When a starting request is made, the injection computer and the UCH exchange authentication data via the multiplex network; this determines whether the engine start is authorised.

After more than 5 consecutive failed authentication attempts, the engine management computer goes into protection (anti-scanning) mode and no longer tries to authenticate the UCH computer. It only exits this mode when the following sequence of operations is carried out:
– the ignition is left on for at least **20 seconds**,
– the message is switched off,
– the injection computer self-feed deactivates when it should (the time varies according to engine temperature).

After this, only one authentication attempt is allowed. If this fails again, repeat the sequence of operations described above.
If the engine management computer still fails to unlock, contact the Techline.

Impact detected

If an impact has been stored by the injection computer, switch off the ignition for **10 seconds**, then switch it back on so that the engine can be started. Clear the faults.

IMPORTANT
Disconnect the injection computer when carrying out any welding work on the vehicle.

Torque management

The torque structure is the system for managing engine torque. It is necessary for some functions such as the electronic stability program (ESP) and the automatic gearbox.

Each inter-system (ESP and automatic gearbox) sends a request for torque via the multiplex network to the injection computer. It arbitrates between the inter-system torque requests and the driver's request (pedal or cruise control/ speed limiter). The result of the arbitration gives the torque setpoint. The torque structure uses the torque setpoint to calculate the throttle position setpoint, the advance and, if there is turbocharging, the turbocharger valve setpoint (wastegate) for engines fitted with a turbocharger.

Camshaft dephaser

Its role is to modify the valve timing.
The camshaft dephaser is continuously variable in operation.

In applications without a camshaft sensor, the engine phasing is controlled by software. This is the case on engines that do not have a camshaft dephaser.
This information can be viewed through status **ET084 Camshaft dephaser**.

A first strategy called "Memo phasing" is applied to phase the engine management on starting according to the data recorded when the engine last stalled. Wait for the end of auto-feed (power latch and therefore this data being saved) before disconnecting the computer.
Then, a second program confirms the first decision. It is based on torque analysis.

The injection computer actuates a camshaft dephaser that varies according to the engine:

– **K4M engine**
  Continuous variable inlet camshaft dephaser between **0 and 43°** of the crankshaft, controlled by a solenoid valve supplied by an opening cyclic ratio circuit through the injection computer.

– **F4R and F4R-T engines**
  Inlet camshaft dephaser controlled by a solenoid valve with an all or nothing supply from the injection computer.

Camshaft position sensor (non-LPG K4M only)

The role of the camshaft sensor is:
– to pinpoint the computer cylinders so that the computer correctly synchronises the sequential injection,
– checks the position of the inlet camshaft.

Motorised throttle valve

The throttle valve carries out idling speed regulation and engine air inlet modulation functions. It is composed of an electric motor and two throttle position potentiometers.
When the engine is idling, the throttle position is regulated according to the idling speed setpoint. This setpoint takes into account the major power consumers (air conditioning) and operating conditions (air temperature and coolant temperature).

Fuel supply management

Fuel is supplied by the petrol pump. It is controlled each time the ignition is switched on, for 1 second, to provide a certain pressure level in the circuit, and thereby achieve a correct start, particularly if the vehicle has been unused for a long time.
When the engine is running, the petrol pump relay is always controlled.

Control of the petrol pump relay can be viewed through status **ET047 Petrol pump control circuit**.

The petrol tank is vented by way of a canister filled with activated charcoal that traps the vapour from the petrol tank. This canister is bled via the engine vacuum pipe. It enters the inlet plenum via a hose, which is controlled by a bleed valve. It is controlled by the injection computer via the opening cyclic ratio. For reasons of engine instability or canister bleed solenoid valve operating noise emitted by the vehicle, there are two possible frequencies for controlling the canister bleed solenoid valve:

- a low frequency **8 Hz**,
- a high frequency **20 Hz**.

The frequency of the control opening cyclic ratio depends on the engine speed.
Bleed the canister to drain it as it fills, to limit vapour release into the air if a canister is saturated for example.

Air supply management

The idling speed regulator performs all the calculations required for physical control of the idling speed actuator: the motorised throttle. The functional component of the regulator is adaptive (programming of variation and ageing).

If the idling speed regulation conditions are observed, **ET054 Idle speed regulation** is **ACTIVE**, the idling speed regulator continuously positions the motorised throttle to maintain the engine speed at its idling setpoint. The motorised throttle opening ratio necessary to comply with the speed setpoint is then given by parameter **PR091 Calculated idle speed regulation OCR**.

Note on parameter **PR091**:

This parameter uses only 2 parameters accessible in fault finding frame: **PR444 Idle speed integral correction** and **PR090 Idle speed regulation programming value** which is the integral adaptive action.

- **PR090 Idle speed regulation programming value** is a stored parameter designed to program dispersion and engine ageing for the idle speed regulator. The programming is complete only when the engine is idling and warm, and no electrical consumer (air conditioning, fan assembly, power assisted steering) is on. Therefore it adjusts slowly.
- **PR444 Idling speed regulation integral correction** is constantly calculated to take into account the air required by consumers.

Adaptive idle speed correction:

Under normal warm operating conditions, the idling speed opening cyclic ratio value **PR091 Idling speed regulation theoretical OCR** varies between a high value and a low value to obtain the nominal idling speed.
It is possible that during variations in the operation of the vehicle (running in, engine fouling, etc.), the Opening Cyclic Ratio value could become close to the highest or lowest values.

The adaptive correction **PR090 Idle speed regulation programming value** on the idle speed opening cyclic ratio enables the engine's air requirement to be slowly varied, by bringing the idle speed opening cyclic ratio back to a nominal average value.
This adjustment only takes effect if the coolant temperature is above **75°C, 1 minute** after starting the engine and during the idle speed regulation phase.

Calculation for setting the idling speed:
The idling speed setpoint is given by parameter **PR010 Idle speed regulation valve setpoint**.
The idling speed regulation setpoint depends on the coolant temperature, the depollution programming, the air conditioning requirements, the position of the gearbox selector, any power assisted steering action, the passenger compartment heating resistors, the oil temperature (engine protection) and the electricity balance calculated by the injection software (the engine speed is increased by **160 rpm** maximum if the battery voltage remains below **12.7 V**).

Richness management

For optimal operation of the catalytic converter, the richness must be maintained around 1.

Richness regulation is controlled by the upstream sensor. The sensor gives voltage according to the difference between the partial oxygen pressures contained in the exhaust and a cavity filled with a reference mixture (atmosphere).

As the partial oxygen pressure in the exhaust is representative of the richness, the voltage supplied to the computer represents a Rich - Poor signal.

Adaptive richness correction:
In loop mode, the richness regulation corrects the injection timing so as to obtain a metering as close as possible to richness 1. The richness correction value **PR138 Richness correction value** is around **50%**, with limits of **0** and **100%**.
The richness adaptive corrections **PR143 Self-adapting richness gain** and **PR144 Self-adapting richness offset** are used to offset the injection mapping to centre richness regulation on **50%**.
Adaptive corrections take **50%** as an average value after computer initialisation (clearing the programming) and have the following limit values.

A vehicle is fitted with an upstream sensor if the configuration reading **LC003 Upstream oxygen sensor** is **WITH**.

For the sensor to be operational very rapidly, it is heated. Sensor heating **ET052 Upstream O_2 sensor heating** is only **ACTIVE** when the engine is running. It is inhibited below **84 mph (140 km/h)** or with the engine under load.

The downstream sensor is also used for richness regulation via the double loop program. The way it works is to characterise the condition of the upstream sensor and to compensate for any upstream sensor dynamic richness drift.

The vehicle is fitted with a downstream sensor if the configuration reading **LC004 Downstream oxygen sensor** is **WITH**.

For the double loop **ET056 Double richness loop** to be **ACTIVE**, the vehicle must be driven with the engine warm for approximately **1 minute 30 seconds** in the absence of no load conditions.

The downstream sensor is also heated. The command is not immediate when the engine is started.
ET053 Downstream O_2 sensor heating is **ACTIVE** after a time that depends on the latest coolant temperature with the engine running and in the absence of no load conditions. The heating of the downstream sensor is deactivated under **84 mph (140 km/h)** or when the engine is under load.

There are several commands depending on the sensor type:

- **BOSCH LSH25/NTK 6L (6 Ω)/DELPHI AFS128 (3 wires):** Continuous control,
- **BOSCH LSF 4.7 (known as PLANAR):** Each time the engine is started, control is first executed by means of an OCR (opening cyclic ratio) type signal of **20 Hz** in frequency for approximately **20 seconds** then it becomes continuous,
- **BOSCH NTK 6L (3.3 Ω):** each time the engine is started, the control is continuous first for **15 seconds** then executed by an OCR (Opening Cyclic Ratio) type signal with a **20 Hz** frequency.

Management of turbocharging pressure (F4R Turbo only)

The turbocharging pressure is adjusted via the position of the pressure regulation valve (wastegate).

Principle

This pressure regulation valve, connected via a rod to the wastegate diaphragm, is operated by the injection computer via a solenoid valve. This solenoid valve is normally open and is fitted to the inlet pipe between the air filter and turbocharger inlet.

At rest (open position), this solenoid valve connects the turbocharger outlet (turbocharging pressure) and the pressure regulation valve control diaphragm.
The turbocharging pressure affects the diaphragm directly, the pressure regulation valve (wastegate) opens and the maximum possible pressure is approximately **1,350 mbar - 1,400 mbar**, irrespective of the engine speed (minimum turbocharging for the engine).

When the solenoid valve is controlled, the turbocharging pressure signal (taken at the turbocharger outlet) is diverted to the compressor inlet. As a result, the diaphragm is not subject to turbocharging pressure, the pressure regulation valve (wastegate) closes back to a position imposed by the regulation system.

In addition to turbocharging pressure management, the computer controls the engine for full load constant torque operation.

This means that, irrespective of the engine conditions (air temperature, atmospheric pressure etc.), the maximum torque will always be **275 Nm** and the power **125 kW**. Therefore, for an air temperature of **20°C**, the full load turbocharging pressure will be less than at **50°C**. Except for controlled torque management, the turbocharging pressure can never exceed **1800 mbar**.

Ignition management

The advance is calculated for each cylinder. This may have a negative value, and is limited to between **-23.625°** and **+72°** and includes any corrections due to pinking.

The slow loop anti-pinking correction is the maximum advance value that is deducted from the advance of one of the cylinders. If none of the cylinders is pinking, this correction is zero.

Injectors

The injectors are controlled according to several modes. In particular, the engine is started in semi-full group mode (injectors 1 and 4, then injectors 2 and 3 simultaneously), then it enters sequential mode, to ensure a correct start whether or not it is correctly phased.

In fact in rare cases it is possible for the engine to run incorrectly phased if the Memo phasing program failed during the last engine stop. So, since the system did not enter sequential injection mode and the cylinder 1 detection program did not run, the injections are offset by 2 cylinders: therefore injecting in the order 4-2-1-3 rather than the expected 1-3-4-2.

The injection duration is constantly calculated and may be zero, in the event of cut-off during deceleration or overspeed for example.

3. OBD management

Managed OBD programming is as follows:
- catalytic converter operational fault finding,
- upstream oxygen sensor operational fault finding,
- misfiring fault finding with two levels of detection: pollutant misfiring and catalytic converter breakage misfiring,
- fuel supply system fault finding.

The misfiring and fuel supply system fault finding is performed continuously.

The operational fault finding of the upstream sensor and the catalytic converter can be done only once for every time the vehicle is driven, and can never occur at the same time.

OBD fault manager:

The OBD faults manager does not replace or modify conventional electrical fault management. Perform to comply with OBD standard.

The requirements are:
- storing OBD faults,
- illuminating the OBD warning light for all faults where the OBD emission thresholds are exceeded,
- flashing the OBD warning light for misfire faults damaging the catalytic converter.

Operating principle.

If a fault is detected and confirmed during **3** consecutive journeys then:
- an OBD stored fault is raised,
- the OBD fault warning light receives a request to be lit continuously. This request is only recognised if the fault in question is authorised to activate the OBD warning light.

To deactivate the warning light, no OBD faults should be detected for **3 consecutive** journeys.

The electrical fault finding checks taken into consideration by the OBD faults manager are as follows:

- pressure,
- turbocharging pressure,
- coolant temperature,
- air temperature
- upstream sensor,
- downstream sensor,
- upstream sensor heating,
- downstream sensor heating,
- injector 1,
- injector 2,
- injector 3,
- injector 4,
- ignition coil 1,
- ignition coil 2,
- ignition coil 3,
- ignition coil 4,
- petrol pump,
- wastegate,
- canister bleed,
- air line system,
- turbocharging system
- pinking sensor,
- camshaft dephaser.

Catalytic converter:

Objective

Catalytic converter fault finding should detect a malfunction which would cause hydrocarbon pollutant emissions to exceed the EOBD (European On Board Diagnostic) limit.

Principle

The ability of the catalytic converter to store oxygen indicates the condition of the catalytic converter. As the catalytic converter ages, its ability to store oxygen reduces along with its ability to treat pollutants. The principle lies in using the correlation between the oxygen storage capacity and the HC emissions.
When the conditions for starting fault finding are confirmed, richness excitation peaks are applied, which has the effect of sending bursts of oxygen into the catalytic converter.
If the catalytic converter is in good condition it will absorb the oxygen sent to it and the downstream sensor voltage will remain at its average value.
If it is degraded, it rejects the oxygen that it cannot store and the downstream sensor starts knocking. The more the catalytic converter is degraded, the more the downstream oxygen sensor will oscillate.

Sensors:

Objective

Sensor fault finding should detect a malfunction which would cause pollutant emissions to exceed the EOBD (European On Board Diagnostic) limit.

There are 2 kinds of oxygen sensor damage:

- mechanical damage to the component (breakage, cut in wire) which leads to an electrical fault,
- chemical or thermal damage to the component leading to a slower response time of the sensor and to the increase in the average rocking time.

Description of the strategy

When the conditions for starting fault finding are confirmed, the upstream sensor signal periods are read and the glitches (interference phenomena) removed, then the average taken, and compared with an EOBD (European On Board Diagnostic) limit average period.
The fault finding check may be staggered, i.e. divided over several consecutive engine stability phases, and its duration will vary according to the condition of the sensor.

4. Engine coolant temperature management

Engine cooling is provided by 1 or 2 fan assemblies (depending on the vehicle layout). The injection computer requests their activation by the air conditioning computer via the multiplex network.

To provide cooling:

With the engine running, fan assembly 1 is requested if the coolant temperature exceeds **99°C** and is shut down if the coolant temperature falls below **96°C**. Fan assembly 2 is requested if the coolant temperature exceeds **102°C** and is shut down if the coolant temperature falls below **99°C**.

With the engine stopped, only fan assembly 1 may be activated to provide the anti-percolation function (if the engine is stopped when very hot). The anti-percolation function is active when the ignition is switched off for a determined time. During this period, fan assembly 1 is requested if the coolant temperature exceeds around **100°C** and is shut down if the coolant temperature drops below approximately **95°C**.

If a fault is detected on the coolant temperature sensor circuit, then fan assembly 1 is requested to operate continuously.

If the engine coolant temperature goes beyond the warning threshold of **118°C**, the injection computer directly commands the coolant temperature warning light to come on or requests it from the instrument panel computer via the multiplex network, until the coolant temperature again falls below **115°C**.

In addition to the engine requirements, the injection computer centralises the cooling requirements for the air conditioning and automatic gearbox/sequential gearbox functions.

5. Air conditioning function

The S3000 computer manages a cold loop air conditioning system.
- air conditioning request via multiplex connection,
- acquisition of air conditioning circuit pressure,
- vehicle speed
- air conditioning compressor control,
- fan assembly control request by Protection and Switching Unit.

The injection computer recovers the power absorbed by the air conditioning compressor and the fast idling speed request using the pressure acquired in the air conditioning circuit.
These signals are necessary for adapting the engine management (idle speed regulation, air flow correction, etc.), for several reasons:
- air conditioning compressor efficiency,
- sturdier motor because of torque bucking caused by compressor activation,
- helping the alternator.

Requests for fan assembly 1 and/or fan assembly 2 are recovered based on the climate control circuit pressure and the vehicle speed. In short, the lower the speed and the higher the pressure, the greater the fan assembly requests.

6. Defect modes

Motorised throttle valve
In defect mode, the motorised throttle valve can have 6 different statuses.

Type 1 The throttle opening is less than the Defect mode position. The throttle is no longer activated and is automatically in Defect mode. The ESP, distance control and cruise control/speed limiter systems are disabled. The automatic gearbox is in Defect mode.

Type 2 The throttle opening is no longer controlled. The engine speed is limited by injection cut-off.

Type 3 Defect mode is associated with a pedal reset (constant pedal setting for each gear ratio).

Type 4 The associated defect mode restricts the throttle opening. The maximum throttle valve opening threshold results in a speed of less than 54 mph (90 km/h).

Type 5 The computer no longer processes torque changes requested by the ESP, distance control, cruise control/speed limiter and automatic gearbox systems. This defect mode results from a computer malfunction, or a fault with the manifold or turbocharging pressure sensor. The system then only uses the accelerator pedal signal. The ESP, distance control and cruise control/speed limiter systems are disabled. The automatic gearbox is in Defect mode.

Type 6 The turbocharging valve no longer works.

Any entry into type 1 to 5 defect mode always leads to the application of type 6.

Table of defect modes:

	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
DF004 Turbocharging pressure sensor circuit	-	-	-	2.DEF	1.DEF 2.DEF	1.DEF 2.DEF
DF011 Sensor supply voltage no. 1,	1.DEF	1.DEF	-	1.DEF	-	-
DF012 Sensor supply voltage no. 2	-	-	-	1.DEF	1.DEF	-
DF038 Computer	1.DEF	1.DEF	-	-	1.DEF	-
DF046 Battery voltage	1.DEF	1.DEF	-	-	-	-
DF054 Turbocharging solenoid valve control circuit	-	-	-	-	-	CO/CC.0/ CC.1
DF078 Motorised throttle control circuit	1.DEF	1.DEF	-	-	-	-
DF079 Motorised throttle valve servo control	6.DEF/ CO	6.DEF/ CO	-	2.DEF 3.DEF 4.DEF	-	-
DF089 Manifold pressure sensor circuit	-	-	-	-	1.DEF 2.DEF	-
DF095 Throttle potentiometer circuit gang 1	CO.0/ CC.1	CO.0/ CC.1	-	CO.0/ CC.1	-	-
DF096 Throttle potentiometer circuit gang 2	CO.0/ CC.1	CO.0/ CC.1	-	CO.0/ CC.1	-	-
DF196 Pedal potentiometer circuit gang 1	-	-	1.DEF	CO/CC.0 CC.1/ 1.DEF	-	-
DF198 Pedal potentiometer circuit gang 2	-	-	CO/CC.0/ CC.1	CO/CC.0/ CC.1	-	-
DF650 Accelerator pedal position signal	-	-	1.DEF	1.DEF	-	-

Camshaft dephaser:

The camshaft dephaser **ET083 Camshaft dephaser in defect mode** may assume two different statuses.

- **STATUS 1**
  This defect mode covers all faults that affect the dephaser position measurement. The dephaser is set to the minimum stop and the camshaft angle measurement is forced to 0.
  Tooth signal fault.
  Tooth/camshaft signal consistency fault finding.

- **STATUS 2**
  This defect mode covers all faults affecting the dephaser (pulley and solenoid valve). The dephaser is set to the minimum stop.
  Electrical fault finding on the solenoid valve.
  Dephaser position diagnostic.

7. Operational safety

Warning light illumination

The S3000 injection system manages the illumination of three warning lights and the warning messages displayed according to the severity of the faults detected, with the aim of informing the customer and directing fault finding.
The injection computer manages the illumination of warning lights and warning messages displayed on the instrument panel. These warning lights illuminate during the starting phase and in the event of an injection fault or engine overheating.
The warning light illumination signals reach the instrument panel via the multiplex network.

Warning light illumination principle

During the starting phase (START button pressed) the **OBD** (On Board Diagnostic) warning light comes on for approximately **3 seconds** then goes out.

If there is an injection fault (**level 1**), the message **CHECK INJECTION** lights up followed by the **SERVICE** warning light. It indicates a reduced level of operation and a limited safety level.
The driver should carry out repairs as soon as possible.
Components involved:
– motorised throttle valve,
– accelerator pedal potentiometer,
– inlet manifold pressure sensor,
– computer,
– actuator feed,
– computer feed.

If there is a serious injection fault (**level 2**), the red symbol represented by engine and the word **STOP** (display with information display), appears with the message **ENGINE OVERHEATING** followed by the **STOP** warning light and a buzzer. If this happens, the vehicle must be stopped immediately.
When a fault causing excessive pollution in the exhaust gases is detected, **the orange OBD warning light**, represented by an engine symbol, comes on:
– **flashing** in the event of a fault which might cause damage to the catalytic converter (destructive misfires). If this happens, the vehicle must be stopped immediately.
– **constantly** in the case of non-compliance with the anti-pollution standards (pollutant misfiring, catalytic converter fault, oxygen sensor faults, inconsistency between the oxygen sensors and canister fault).

8. Mileage travelled with fault

These two parameters **PR105 Distance travelled with OBD fault warning light on** and **PR106 Distance travelled with fault warning light on** are used to count the distance travelled with one of the injection fault warning lights lit: **level 1 fault warning light** (amber) as well as the **OBD warning light**.
These counters can be reset to 0 using the diagnostic tool (clear faults command).

9. Inter-system engine functions

The inter-system connections concerning the particular requirements of engine management are as follows:

- **OBD warning light** illumination request by the instrument panel computer to prevent a pollution fault,
- **level 1 warning light** illumination request to warn of an operating safety fault connected to the injection system,
- **level 2 warning light** illumination request to warn of an operating safety fault or provide an engine overheating alert,
- request for fan assembly activation for engine cooling, but also for the air conditioning and automatic gearbox,
- air conditioning compressor shut-down request for engine programming requirements such as pulling away, performance, anti-stalling, overspeed, etc.
- passenger compartment heating resistor shut-down or fixing request for engine programming requirements such as pulling away, performance, anti-stall, overspeed, etc.

Connector (A), 32 tracks:

Track	Description
A1	Not used
A2	Cruise control on/off button logical input
A3	Passenger compartment CAN L1 multiplex connection
A4	Passenger compartment CAN H1 multiplex connection
B1	Not used
B2	Not used
B3	Not used
B4	OBD diagnostic line K
C1	Not used
C2	Not used
C3	Speed limiter on/off button logical input
C4	+ Clutch switch signal
D1	+ after ignition feed via UPC
D2	Cruise control signal analogue input
D3	Cruise control signal earth
D4	Not used
E1	Not used
E2	Not used
E3	Not used
E4	Brake pedal switch signal no. 1 open
F1	Not used
F2	Accelerator pedal potentiometer +5 V supply gang 2
F3	Accelerator pedal potentiometer signal, gang 2
F4	Accelerator pedal potentiometer earth, gang 2
G1	Not used
G2	Accelerator pedal potentiometer +5 V supply gang 1
G3	Not used
G4	Not used
H1	Not used
H2	Accelerator pedal potentiometer signal, gang 1
H3	Accelerator pedal potentiometer earth, gang 1
H4	Not used

Connector (B), 48 tracks:

Track	Description
A1	Injector 1 - control
A2	Injector 2 - control
A3	Injector 3 - control
A4	Injector 4 - control
B1	Not used
B2	Pinking sensor screening earth
B3	Pinking sensor + signal
B4	Pinking sensor - signal
C1	Not used
C2	Not used
C3	Engine speed (LPG) TDC - signal
C4	Not used
D1	Not used
D2	Not used
D3	Motorised throttle valve potentiometer signal gang 2
D4	+ Power latch relay output
E1	Turbocharging pressure sensor earth (F4RT 774 and 776 only)
E2	Air temperature sensor signal
E3	Air temperature sensor earth
E4	Position and engine speed sensor - signal (tooth signal)
F1	Turbocharging pressure sensor + signal (F4RT 774 and 776 only)
F2	Coolant temperature sensor + signal
F3	+ position and engine speed sensor signal (tooth signal)
F4	Coolant temperature sensor earth
G1	+5 V turbocharging pressure sensor (F4RT 774 and 776 only)
G2	+5 V Motorised throttle potentiometer
G3	Motorised throttle valve potentiometer gang 1 signal
G4	Motorised throttle valve potentiometers common earth
H1	Not used
H2	+5 V manifold pressure sensor feed
H3	+ manifold pressure sensor signal
H4	Manifold pressure sensor earth

Connector (B), 48 tracks (continued):

Track	Description
J1	Not used
J2	Refrigerant pressure +5 V feed
J3	Refrigerant pressure + signal
J4	Not used
K1	Not used
K2	Refrigerant pressure sensor earth
K3	Multiplex line L2 engine connection (F4R 771 AUTO, K4M 813 AUTO and K4M 788 LPG only)
K4	Multiplex line H2 engine connection (F4R 771 AUTO, K4M 813 AUTO and K4M 788 LPG only)
L1	Power earth 1
L2	Not used
L3	Inlet camshaft dephaser control (non-LPG K4M only)
L4	Electric coolant pump control (F4RT 774 and 776 only)
M1	Power earth 2
M2	+ Battery supply
M3	+ motorised throttle valve signal
M4	- motorised throttle valve signal

Connector (C), 48 tracks:

Track	Description
A1	Not used
A2	Downstream oxygen sensor + signal
A3	Not used
A4	Not used
B1	Upstream oxygen sensor + signal
B2	Downstream oxygen sensor - signal
B3	Not used
B4	Not used
C1	Upstream oxygen sensor - signal
C2	Not used
C3	Not used
C4	Not used
D1	Petrol pump and ignition coil control
D2	Not used
D3	Not used
D4	Not used
E1	Canister bleed solenoid valve control
E2	Camshaft position sensor earth (non-LPG K4M only)
E3	Not used
E4	Not used
F1	Inlet camshaft input frequency sensor (non-LPG K4M only)
F2	Not used
F3	Not used
F4	Not used
G1	Not used
G2	Not used
G3	Not used
G4	Turbocharging solenoid valve control (F4RT 774, 776 only)
H1	Not used
H2	Not used
H3	Not used
H4	Not used

Connector (C), 48 tracks (continued):

Track	Description
J1	Not used
J2	Coolant thermostat control output
J3	Not used
J4	Not used
K1	Not used
K2	Not used
K3	Not used
K4	Not used
L1	Power 3 earth
L2	Upstream oxygen sensor - control
L3	Downstream oxygen sensor earth - control
L4	Not used
M1	Power earth 4
M2	Not used
M3	Ignition coil control 2 - 3 - control
M4	Ignition coil 1 - 4 - control

1. PROGRAMMING, REPROGRAMMING OR REPLACING THE COMPUTER

The system can be programmed and reprogrammed via the diagnostic socket using the RENAULT CLIP diagnostic tool (**Consult Technical Note 3585A or follow the instructions provided by the diagnostic tool**).

NOTE
- **Switch on the diagnostic tool (mains or cigarette lighter supply).**
- **Connect a battery charger (during the entire computer (re)programming procedure, the engine fan assemblies are triggered automatically).**
- **Observe the engine coolant temperature instructions of the diagnostic tool before (re)programming.**
- **Cut off all the electrical consumers (interior lighting, air conditioning, radio, etc.).**

After programming, reprogramming or replacing the computer:
- **Switch off the ignition.**
- **Start and then stop the engine (to initialise the computer) and wait for 30 seconds.**
- **Turn on the ignition and use the diagnostic tool to carry out the following steps:**

– use command **VP020 Write VIN**.
– deal with any faults displayed by the diagnostic tool. Clear the computer memory.
– program the flywheel sensor target and throttle end stops,
– carry out a road test followed by another check with the diagnostic tool.

NOTE
It is not possible to try an injection computer coming from the Parts Department because it will no longer be possible to use it on another vehicle.

2. REPLACING OR REMOVING THE TDC SENSOR

When replacing or removing the TDC sensor, program the flywheel target (see **17B, Petrol injection, Configuration and programming**).

NOTE
– The injection computer retains the immobiliser code for life.
– the system has no security code,
– It is forbidden to perform tests with computers borrowed from the stores or from another vehicle which must then be returned. These computers are hard-coded.

3. REPLACING THE MOTORISED THROTTLE VALVE

When replacing the throttle valve, the throttle stops are automatically programmed.
– **PR058 Air temperature** is between **0°C** and **105°C**,
– wait for the end of power latch for the programming to be stored in the computer memory.

Check that the programming using status **ET051 Throttle stop programming, is COMPLETE**

NOTE
Never drive the vehicle without having programmed the throttle stops.

1. CONFIGURATION

Computer configuration by automatic detection

LC001	Vehicle speed connection type
	→ Multiplex
	→ Wire
LC003	Upstream oxygen sensor
	→ WITH
	→ WITHOUT
LC004	Downstream oxygen sensor
	→ WITH
	→ WITHOUT
LC005	Gearbox type
	→ Automatic gearbox
	→ Sequential gearbox
	→ Manual gearbox
LC007	Cylinder 1 recognition
	→ WITH
	→ WITHOUT
LC008	Camshaft dephaser
	→ WITH
	→ WITHOUT
LC009	Air conditioning
	→ WITH
	→ WITHOUT
LC010	Electronic stability program
	→ not connected
	→ connected
LC024	OBD warning light management
	→ WITH
	→ WITHOUT
LC096	Closed brake contact
	→ YES
	→ NO

LC158	Air conditioning heating resistor management
	→ WITH → WITHOUT
LC162	Coolant thermostat
	→ WITH → WITHOUT
LC170	Electric coolant pump
	→ WITH → WITHOUT

2. PROGRAMMING

Programming the flywheel target

– Decelerate a first time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **3500** and **3000 rpm**, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.
– Decelerate a second time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **2400** and **2000 rpm for K4 engines** and **between 1800** and **1400 rpm for R4R engines**, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.

Check the programming using **ET089 Flywheel target programming**.

Programming the throttle end stops

When replacing the computer or the motorised throttle valve, with the ignition on, wait **30 seconds** so that the computer may program the MAX and MIN limits, then switch off the ignition and wait **30 seconds** for the end of the Power Latch, so that the computer may **store** the programmed limits.

Check the programming using **ET051 Throttle stop programming**.

*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque

Tool fault	Associated DTC code	Description	Level 2 fault warning light (Red brake warning light)	Level 1 fault warning light (Orange injection warning light)	No warning light lit	OBD warning light
DF001	0115	Coolant temperature sensor circuit				1.DEF 2.DEF 3.DEF
DF002	0110	Air temperature sensor circuit				1.DEF 2.DEF
DF004	0235	Turbocharging pressure sensor circuit			1.DEF 2.DEF 3.DEF	
DF011	0641	Sensor supply voltage no. 1		1.DEF		
DF012	0651	Sensor supply voltage no. 2		1.DEF		
DF026	0201	Cylinder 1 injector control circuit				CO/CC.0 CC.1/1.DEF
DF027	0202	Cylinder 2 injector control circuit				CO/CC.0 CC.1/1.DEF
DF028	0203	Cylinder 3 injector control circuit				CO/CC.0 CC.1/1.DEF
DF029	0204	Cylinder 4 injector control circuit				CO/CC.0 CC.1/1.DEF
DF038	0606	Computer		1.DEF		
DF046	0560	Battery voltage		1.DEF		
DF054	0243	Turbocharging solenoid valve control circuit				CO/CC.0 CC.1
DF059	0301	Misfires in cylinder 1				1.DEF/2.DEF/ 3.DEF
DF060	0302	Misfires in cylinder 2				1.DEF/2.DEF/ 3.DEF
DF061	0303	Misfires in cylinder 3				1.DEF/2.DEF/ 3.DEF
DF062	0304	Misfires in cylinder 4				1.DEF/2.DEF/ 3.DEF
DF078	2101	Motorised throttle control circuit		1.DEF		

Tool fault	Associated DTC code	Description	Level 2 fault warning light (Red brake warning light)	Level 1 fault warning light (Orange injection warning light)	No warning light lit	OBD warning light
DF079	0638	Motorised throttle valve automatic control		2.DEF/ 3.DEF/ 4.DEF/CO/ 6.DEF	1.DEF/5.DEF/ 7.DEF/8.DEF	
DF080	0010	Camshaft dephaser circuit			CO/CC.0/ CC.1/1.DEF/ 2.DEF/3.DEF/ 4.DEF/5.DEF	
DF081	0443	Canister bleed solenoid valve circuit			CC.O/1.DEF	CO/CC.1
DF084	0685	Actuator relay control circuit			CO/CC.0 CC.1	
DF085	0627	Fuel pump relay control circuit			CO/CC.0 CC.1/1.DEF	
DF088	0325	Pinking sensor circuit			1.DEF/2.DEF	
DF089	0105	Inlet manifold pressure sensor circuit		1.DEF 2.DEF 3.DEF		1.DEF 2.DEF 3.DEF
DF091	0500	Vehicle speed signal			1.DEF/2.DEF	
DF092	0130	Upstream oxygen sensor circuit				CO.0 CC.1/1.DEF 2.DEF
DF093	0136	Downstream oxygen sensor circuit				CO.0 CC.1/1.DEF
DF095	0120	Throttle potentiometer circuit gang 1		CO.0/CC.1 1.DEF/2.DEF		
DF096	0220	Throttle potentiometer circuit gang 2		CO.0/CC.1		
DF099	C101	Automatic gearbox or sequential gearbox connection via the multiplex network			1.DEF/2.DEF/ 3.DEF/4.DEF	
DF101	C122	ESP multiplex connection			1.DEF	

Tool fault	Associated DTC code	Description	Level 2 fault warning light (Red brake warning light)	Level 1 fault warning light (Orange injection warning light)	No warning light lit	OBD warning light
DF102	2502	Alternator power signal available			1.DEF	
DF105	0585	Cruise control/speed limiter on/off circuit			1.DEF	
DF106	0575	CC/SL selector switches on steering wheel			1.DEF	
DF109	0313	Low fuel level misfiring				1.DEF/ 2.DEF/ 3.DEF
DF126	1604	Passenger compartment heating resistor (RCH)			1.DEF	
DF138	0830	Clutch pedal switch			1.DEF	
DF154	0335	Flywheel signal sensor circuit			1.DEF/2.DEF/ 3.DEF	
DF196	0225	Pedal sensor circuit gang 1	CO/CC.0 CC.1/1.DEF	CO/CC.0 CC.1/2.DEF		
DF198	2120	Pedal sensor circuit gang 2	CO/ CC.0CC.1	CO/ CC.0CC.1		
DF228	0504	Brake information			1.DEF/2.DEF	
DF232	0530	Refrigerant pressure sensor circuit			1.DEF	
DF319	0340	Camshaft sensor circuit			1.DEF/2.DEF/ 3.DEF/4.DEF	
DF361	0351	Ignition coil control - cylinders 1 - 4		CO.0/CC.1 1.DEF		CO.0/CC.1 1.DEF
DF362	0352	Ignition coil control - cylinders 2 - 3		CO.0/CC.1 1.DEF		CO.0/CC.1 1.DEF
DF377	C115	Petrol ↔ LPG connection			1.DEF/2.DEF	
DF394	0420	Catalytic converter operating fault				1.DEF/ 2.DEF

Tool fault	Associated DTC code	Description	Level 2 fault warning light (Red brake warning light)	Level 1 fault warning light (Orange injection warning light)	No warning light lit	OBD warning light
DF398	0170	Fuel circuit operating fault				CO/1.DEF
DF404	C302	Automatic gearbox or sequential gearbox CAN connection			1.DEF/2.DEF/ 3.DEF	
DF410	C155	Instrument panel connection			1.DEF	
DF436	0300	Detection of engine misfiring				1.DEF/ 2.DEF 3.DEF
DF455	0460	Low fuel level signal			1.DEF/2.DEF	
DF457	0315	Flywheel ring				1.DEF/ 2.DEF
DF570	2600	COOLANT PUMP RELAY				CO/CC.0 CC.1
DF601	0135	Upstream O_2 sensor heating power circuit				CO.0/CC.1 1.DEF
DF602	0141	Downstream O_2 sensor heating power circuit				CO.0/CC.1 1.DEF
DF623	C315	Closing brake signal			1.DEF	
DF624	C111	UPC multiplex connection			1.DEF 2.DEF	
DF635	1301	LPG cylinder 1 combustion misfire				1.DEF 2.DEF
DF636	1302	LPG cylinder 2 combustion misfire				1.DEF 2.DEF
DF637	1303	LPG cylinder 3 combustion misfire				1.DEF 2.DEF
DF638	1304	LPG cylinder 4 combustion misfire				1.DEF 2.DEF
DF639	1300	Combustion misfire in LPG mode				1.DEF 2.DEF 3.DEF
DF650	2299	Accelerator pedal position signal	1.DEF			

DF001 PRESENT	COOLANT TEMPERATURE SENSOR CIRCUIT 1.DEF: Signal incoherence 2.DEF: Abnormal voltage 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Deal with fault **DF011 Sensor supply voltage no. 1** first if it is present or stored. **Special note:** – **OBD warning light** illuminated, – low-speed fan is operating continuously. – refer to parameter **PR064 Coolant temperature**: if **PR064 = 120°C**, short circuit to +12 V, if **PR064 = -40°C**, short circuit to earth.

Check **the cleanliness** and **condition** of the coolant temperature sensor and its connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer connector **B, track F2** → **track B2** of the coolant temperature sensor

Injection computer, connector **B, track F4** → **track B1** of the coolant temperature sensor

Repair if necessary.

Measure the **resistance** of the coolant temperature sensor between **tracks 2 and 3**.
Replace the coolant temperature sensor if the **resistance** is not:

12.6 kΩ ± 1.1 kΩ at -10°C of the coolant temperature
2200 Ω ± 112 Ω at 25°C of the coolant temperature
810 Ω ± 39 Ω at 50°C of the coolant temperature
283 Ω ± 8 Ω at 80°C of the coolant temperature
1156 Ω ± 3 Ω at 110°C of the coolant temperature
88 Ω ± 2 Ω at 120°C of the coolant temperature

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF002 PRESENT	AIR TEMPERATURE SENSOR CIRCUIT 1.DEF: Abnormal voltage 2.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Deal with fault **DF012 Sensor supply voltage no. 2** first, if it is present or stored.
	Special note: – **OBD warning light** comes on. – refer to parameter **PR058 Air temperature**: if **PR058 = 120°C**, short circuit to +12 V, if **PR058 = -40°C**, short circuit to earth.

Check the **cleanliness** and **condition** of the air temperature sensor and its connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **B, track E3** → **track 2** of the air temperature sensor

Injection computer, connector **B, track E2** → **track 1** of the air temperature sensor

Repair if necessary.

Measure the **resistance** of the air temperature sensor between **tracks 1** and **2**.
Replace the air temperature sensor if the **resistance** is not:

9.6 kΩ ± 1 kΩ at -10°C of the air temperature
2000 Ω ± 120 Ω at 25°C of the air temperature
810 Ω ± 47 Ω at 50°C of the air temperature
309 Ω ± 17 Ω at 80°C of the air temperature

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF004 PRESENT OR STORED	TURBOCHARGING PRESSURE SENSOR CIRCUIT 1.DEF: Abnormal voltage 2.DEF: Data inconsistency 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Deal with fault **DF012 Sensor supply voltage no. 2** first, if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine has been running or started at an engine speed above **600 rpm**.
	Special note: – For **F4R Turbo engines** only, – throttle valve defect mode **types 4, 5 and 6**.

Check the **cleanliness**, **condition** and the **assembly** of the turbocharging pressure sensor.
Repair if necessary.

If the fault is still present, manipulate the harness so that the status changes (present ↔ stored).
Look for any damage to the wiring harness, and check **the condition and connection** of the injection computer and turbocharging pressure sensor connectors.
Repair if necessary.

If the fault is still present, check for **+5 V** on **track G1** and that the **earth is present** on **track E1** of connector **B** of the injection computer.
Contact the Techline if it is not correct.

If the fault is still present, disconnect the battery and the injection computer.
Check **the insulation, continuity and the absence of interference resistance** on the following connections:

Injection computer, connector **B, track E1** → **track 2** turbocharger pressure sensor

Injection computer, connector **B, track F1** → **Track 3** of the turbocharger pressure sensor

Injection computer, connector **B, track G1** → **Track 1** of the turbocharger pressure sensor

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF011 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE No. 1 1.DEF: Open circuit or short circuit

NOTES	**Order of priority for dealing with a combination of faults:** Deal with fault **DF084 Actuator relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Special note: – **Level 1 fault warning light** illuminated. – throttle valve defect mode **types 1, 2** or **4**.

Check **the cleanliness** and **condition** of the throttle valve connections.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Sensor feed No. 1 is reserved for the following components:
– inlet manifold pressure sensor
– turbocharger pressure sensor (F4RT 774 and 776 only)
– pedal potentiometer gang 2
– coolant pressure sensor,
– Cruise control/Speed limiter buttons,
– upstream and downstream O_2 sensors.

To locate any internal fault on one of the sensors with a **5 V** supply (short circuit), disconnect each of the sensors on the list above in turn, checking after each disconnection whether the fault changes status from present to stored.
If the faulty sensor is located, check its connections and that it is in order.
Replace the faulty sensor if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF011 **CONTINUED**	

Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **A, track F2**	→	**track 2** of the pedal potentiometer gang 2
Injection computer, connector **C, track A2**	→	**track C** of the downstream oxygen sensor
Injection computer, connector **C, track B1**	→	**track C** of the upstream oxygen sensor
Injection computer, connector **B, track J2**	→	**track B** of the refrigerant pressure sensor
Injection computer, connector **A, track C3**	→	**track B1** of the cruise control or speed limiter on/ off switch
Injection computer, connector **B, track H2**	→	**track C** of the manifold pressure sensor
Injection computer, connector **B, track G1**	→	**track 1** of the turbocharger pressure sensor (F4RT 774 and 776 only)

Repair if necessary.

If the fault is still present: computer fault present, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF012 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE No. 2 1.DEF: Open circuit or short circuit

NOTES	**Special note:** – **Level 1 fault warning light** illuminated. – throttle valve defect mode **types 4 and 5**: vehicle and engine speed restriction, ESP and the Cruise control/Speed limiter are deactivated.

Check **the cleanliness** and **condition** of the throttle valve connections.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Sensor feed No. 2 is reserved for the following components:
– pedal potentiometer gang 1,
– motorised throttle potentiometer gangs 1 and 2.

To locate any internal fault on one of the sensors with a **5 V** supply (short circuit), disconnect each of the sensors on the list above in turn, checking after each disconnection whether the fault changes status from present to stored.
If the faulty sensor is located, check its connections and that it is in order.
Replace the faulty sensor if necessary.

Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **A, track G2** → **track 3** of the pedal potentiometer gang 1

Injection computer, connector **B, track G2** → **track 2** of the motorised throttle valve (K4M 766/812 and 813, F4R 770 and 771)

Injection computer, connector **B, track G2** → **track 5** of the motorised throttle valve (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Repair if necessary.

If the fault is still present **, contact Techline**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 PRESENT OR STORED	CYLINDER 1 INJECTOR CONTROL CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuators relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** comes on.

CO ***CC.1***	***NOTES***	**Special note:** No injection on cylinder 1, severe deterioration in performance.
CC.0		**Special note:** The injector is always open: risk of stalling and damage to the engine on starting, severe deterioration in performance.

Check the **cleanliness** and **condition** of the cylinder 1 injector and its connections.
Repair if necessary.

With the ignition on, check for **+12 V feed** on **track 1** of the cylinder 1 injector connector.
If there is not **+12 V**, check (using the universal bornier) the **continuity** of the following connections:

Injection computer, connector **B, track M2** → **track 1** of the cylinder 1 injector

Protection and Switching Unit, **connector CN, track 6** → **track 1** of the cylinder 1 injector

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 **CONTINUED**	

Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Repair if necessary.
Using the universal bornier, check for **insulation and continuity** on the following connection: Injection computer, connector **B, track A1** ⟶ **track 2** of the cylinder 1 injector Repair if necessary.
Measure the **resistance** between **tracks 1** and **2** of the cylinder 1 injector. Replace the cylinder 1 injector if the **resistance** is not **14.5 Ω ± 0.7 Ω at 20°C (except F4RT 774 RS)** **12 Ω ± 0.6 Ω at 20°C (F4RT 774 RS only)**
If the fault is still present, replace the cylinder 1 injector. **If the fault is still present, deal with the other faults then proceed with the conformity check.**

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF027 PRESENT OR STORED	CYLINDER 2 INJECTOR CONTROL CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF084 Actuators relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** comes on.

CO ***CC.1***	***NOTES***	**Special note:** No injection on cylinder 2, severe deterioration in performance.
CC.0		**Special note:** The injector is always open: risk of stalling and damage to the engine on starting, severe deterioration in performance.

Check the **cleanliness** and **condition** of the cylinder 2 injector and its connections.
Repair if necessary.

With the ignition on, check for **+12 V feed** on **track 1** of the cylinder 2 injector connector.
If there is not **+12 V**, check (using the universal bornier) the **continuity** of the following connections:

Injection computer, connector **B, track M2** → **track 1** of the cylinder 2 injector

Protection and Switching Unit, **connector CN, track 6** → **track 1** of the cylinder 2 injector

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF027 **CONTINUED**	

Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Repair if necessary.
Using the universal bornier, check for **insulation and continuity** on the following connection: Injection computer, connector **B, track A2** ⟶ **track 2** of the cylinder 2 injector Repair if necessary.
Measure the **resistance** between **tracks 1** and **2** of the cylinder 2 injector. Replace the cylinder 2 injector if the **resistance** is not **14.5 Ω ± 0.7 Ω at 20°C (except F4RT 774 RS)** **12 Ω ± 0.6 Ω at 20°C (F4RT 774 RS only)**
If the fault is still present, replace the cylinder 2 injector. **If the fault is still present, deal with the other faults then proceed with the conformity check.**

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF028 PRESENT OR STORED	CYLINDER 3 INJECTOR CONTROL CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority in the event of more than one fault:** Apply the procedure for dealing with faults **DF084 Actuators relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** comes on.

CO ***CC.1***	***NOTES***	**Special note:** No injection on cylinder 3, severe deterioration in performance.
CC.0		**Special note:** The injector is always open: risk of stalling and damage to the engine on starting, severe deterioration in performance.

Check the **cleanliness and condition** of the cylinder 3 injector and its connections.
Repair if necessary.

With the ignition on, check for **+12 V feed** on **track 1** of the cylinder 3 injector connector.
If there is not **+12 V**, check (using the universal bornier) the **continuity** of the following connections:

Injection computer, connector **B, track M2** → **track 1** of cylinder 3 injector

Protection and Switching Unit, **connector CN, track 6** → **track 1** of cylinder 3 injector

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF028 **CONTINUED**	

Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Repair if necessary.
Using the universal bornier, check for **insulation and continuity** on the following connection: Injection computer, connector **B, track A3** ⟶ **track 2** of the cylinder 3 injector Repair if necessary.
Measure the **resistance** between **tracks 1** and **2** of the cylinder 3 injector. Replace the cylinder 3 injector if the **resistance** is not **14.5 Ω ± 0.7 Ω at 20°C (except F4RT 774 RS)** **12 Ω ± 0.6 Ω at 20°C (F4RT 774 RS only)**
If the fault is still present, replace the cylinder 3 injector. **If the fault is still present, deal with the other faults then proceed with the conformity check.**

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 PRESENT OR STORED	CYLINDER 4 INJECTOR CONTROL CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority in the event of more than one fault:** Apply the procedure for dealing with faults **DF084 Actuators relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the engine has been running for a timed period of **10 seconds**.
	Special note: – **OBD warning light** comes on.

CO ***CC.1***	***NOTES***	**Special note:** No injection on cylinder 4, severe deterioration in performance.
CC.0		**Special note:** The injector is always open: risk of stalling and damage to the engine on starting, severe deterioration in performance.

Check the **cleanliness** and **condition** of the cylinder 4 injector and its connections.
Repair if necessary.

With the ignition on, check for **+12 V feed** on **track 1** of the cylinder 4 injector connector.
If there is not **+12 V**, check (using the universal bornier) the **continuity** of the following connections:

Injection computer, connector **B, track M2**
Protection and Switching Unit, **connector CN, track 6**
→ **track 1** of the cylinder 4 injector

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 **CONTINUED**	

Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Repair if necessary.
Using the universal bornier, check for **insulation and continuity** on the following connection: Injection computer, connector **B, track A4** ⟶ **track 2** of the cylinder 3 injector Repair if necessary.
Measure the **resistance** between **tracks 1** and **2** of the cylinder 4 injector. Replace the cylinder 4 injector if the **resistance** is not **14.5 Ω ± 0.7 Ω at 20°C (except F4RT 774 RS)** **12 Ω ± 0.6 Ω at 20°C (F4RT 774 RS only)**
If the fault is still present, replace the cylinder 4 injector. **If the fault is still present, deal with the other faults then proceed with the conformity check.**

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF038 PRESENT	COMPUTER 1.DEF: Internal electronic fault

NOTES	**Priority when dealing with a number of faults:** Deal with the other faults first. **Special note:** – **OBD warning light** illuminated, – throttle valve defect mode **types 1, 2 or 5** present or stored.

Make sure there is a supply to the injection computer:
– disconnect the battery and the injection computer,
– check the cleanliness and condition of the connections,
– reconnect the battery.
Using the universal bornier, check for **+12 V** on the following computer tracks:
– track D1, connector A,
– track M2, connector B.
Repair if necessary.

Make sure there is an earth on the injection computer:
– disconnect the battery and the injection computer,
– check the cleanliness and condition of the connections,
– reconnect the battery.
Using the universal bornier, check for **earths** on the following computer tracks:
– track L1, connector B,
– track M1, connector B,
– track L1, connector C,
– track M1, connector C.
Repair if necessary.

If all the supplies and earths are correct, contact the Techline.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF046 PRESENT	BATTERY VOLTAGE 1.DEF : Abnormal voltage

NOTES	**Priority when dealing with a number of faults:** Apply the procedure for dealing with fault **DF084 Actuator relay control circuit** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears when the engine is running.
	Special note: – **Level 1 fault warning light** illuminated. – throttle valve defect mode **types 1 and 2** in the event of undervoltage: vehicle and engine speed restriction, the ESP and cruise control/speed limiter are deactivated.

Disconnect the battery and the injection computer.
Check **the cleanliness** and **condition** of the computer connections.
Repair if necessary.

Disconnect the **CN and MN connector** of the Protection and Switching Unit.
Check **the cleanliness** and **condition** of its connections.
Using the universal bornier, check for **continuity** on the following connections:

Injection computer, connector **B, track M2**	→	Protection and Switching Unit, **connector CN, track 6**
Injection computer, connector **B, track D4**	→	Protection and Switching Unit, **connector MN, track 5**

Repair if necessary.

– clean the battery terminals and all connections to **+** and the **Earth**,
– check the battery voltage,
– check the charging circuit (see **Technical Note 6014A Checking the charging circuit**).
Repair or replace the faulty components, if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF054 PRESENT OR STORED	TURBOCHARGING SOLENOID VALVE CONTROL CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine has been running or started at an engine speed above **600 rpm**.
	Special note: – **F4R-Turbo** only, – **OBD warning light** illuminated. – Throttle valve defect mode **type 6**.

Check the **cleanliness** the **condition** and the **assembly** of the turbocharging pressure sensor.
Repair if necessary.

If the fault is still present, manipulate the harness so that the status changes (present ↔ stored).
Look for possible damage to the harness, check the **condition and connection** of the injection computer and turbocharging solenoid valve connectors.
Repair if necessary.

If the fault is still present, check (with the ignition on) for **+12 V** on **track 2** of the turbocharging solenoid valve.
If there is not **+12 V**, check the **insulation, continuity and the absence of interference resistance** on the following connections:

Injection computer, connector **B, track M2** → **track 2** of the turbocharging solenoid valve
Main relay →

Repair if necessary.

If the fault is still present, disconnect the battery and the injection computer.
Check the **insulation, continuity and the absence of interference resistance** on the following connections:

Injection computer, connector **C, track G4** → **track 1** of the turbocharging solenoid valve

Repair if necessary.

If the fault is still present, measure the **resistance** of the turbocharging solenoid valve between **tracks 1** and **2**.
Replace the turbocharging solenoid valve if the **resistance** is not **30 Ω ± 2 Ω at 23°C**.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF059 PRESENT OR STORED	CYLINDER 1 MISFIRE 1.DEF: Destructive misfiring 2.DEF: Polluting misfiring 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** – ignition: **DF361 Ignition coil circuit cylinders 1-4** **DF362 Ignition coil circuit cylinders 2-3** – fuel supply circuit: **DF026 Injector control circuit cylinder 1,** **DF027 Injector control circuit cylinder 2,** **DF028 Injector control circuit cylinder 3,** **DF029 Injector control circuit cylinder 4,** **DF085 Fuel pump relay control circuit.** – flywheel signal: **DF154 Flywheel signal sensor circuit** **DF457 Flywheel target** Check whether there are other cylinders with a combustion misfire fault detected by the tool before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done. – warm engine (coolant temperature 75°C minimum), – engine running at idling speed with all electrical consumers on for approximately 15 minutes.
	Special note: – **OBD warning light** comes on.

1.DEF	***NOTES***	**Special note:** – As soon as the fault is detected, the injection is cut off on the faulty cylinder(s) to limit the temperature increase in the catalytic converter, – if a fault is present, the **OBD warning light flashes**.
2.DEF		**Special note:** – the **OBD warning light** remains **continuously lit**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF059 **CONTINUED**	

Misfires in cylinder 1 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 1 pencil coil, – check the condition and conformity of the spark plugs, – check the cylinder 1 injector If everything is in order, check the same components on cylinder 4 (to cover a possible cylinder recognition error).
Misfire on cylinders 1 and 4 (see DF059 Misfire on cylinder 1 and DF062 Misfire on cylinder 4)	The fault is probably due to a component that affects a pair of cylinders: – check the ignition coil circuit concerned (apply the interpretation of fault **DF361 Ignition coil control 1-4**), – check the condition and conformity of the spark plugs.
Combustion misfires on all four cylinders (see DF060, DF061 and DF062)	The fault is probably due to a component affecting all the cylinders: – check that the correct fuel is being used, – check the condition and conformity of the spark plugs.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the sensor/flywheel air gap,
– check the cylinder compressions,
– check the complete fuel system (see **MR 364 or 370 Mechanics, 13A, Fuel supply, Petrol supply system**),
– check the complete ignition system (see **MR 364 or 370 Mechanics, 17A, Ignition, Spark plugs**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF060 PRESENT OR STORED	CYLINDER 2 MISFIRE 1.DEF: destructive misfiring 2.DEF: polluting misfiring 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** – Ignition: **DF361 Ignition coil circuit cylinders 1-4** **DF362 Ignition coil circuit cylinders 2-3** – fuel supply circuit: **DF026 Injector control circuit cylinder 1,** **DF027 Injector control circuit cylinder 2,** **DF028 Injector control circuit cylinder 3,** **DF029 Injector control circuit cylinder 4,** **DF085 Fuel pump relay control circuit.** – flywheel signal: **DF154 Flywheel signal sensor circuit** **DF457 Flywheel target** Check whether there are other cylinders with a combustion misfire fault detected by the tool before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done. – warm engine (coolant temperature 75°C minimum), – engine running at idling speed with all electrical consumers on for approximately 15 minutes.
	Special note: – **OBD warning light** comes on.

1.DEF	***NOTES***	**Special note:** – As soon as the fault is detected, the injection is cut off on the faulty cylinder(s) to limit the temperature increase in the catalytic converter, – if a fault is present, the **OBD warning light flashes**.
2.DEF		**Special note:** – the **OBD warning light** remains **continuously lit**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF060 **CONTINUED**	

Misfires in cylinder 2 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 2 pencil coil, – check the condition and conformity of the spark plugs, – check the cylinder 2 injector. If everything is in order, check the same components on cylinder 3 (to cover a possible cylinder recognition error).
Misfires in cylinders 2 and 3 (see DF060 Misfires in cylinder 2 and DF061 Misfires in cylinder 3)	The fault is probably due to a component that affects a pair of cylinders: – check the ignition coil circuit concerned (apply the interpretation of fault **DF362 Ignition coil control 2-3**), – check the condition and conformity of the spark plugs.
Combustion misfires on all four cylinders (see DF059, DF060, DF061 and DF062)	The fault is probably due to a component affecting all the cylinders: – check that the correct fuel is being used, – check the condition and conformity of the spark plugs.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the sensor/flywheel air gap,
– check the cylinder compressions,
– check the complete fuel system (see **MR 364 or 370 Mechanics, 13A, Fuel supply, Petrol supply system**),
– check the complete ignition system (see **MR 364 or 370 Mechanics, 17A, Ignition, Spark plugs**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF061 PRESENT OR STORED	CYLINDER 3 MISFIRE 1.DEF: Destructive misfiring 2.DEF: Polluting misfiring 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** – Ignition: **DF361 Ignition coil circuit cylinders 1-4** **DF362 Ignition coil circuit cylinders 2-3** – fuel supply circuit: **DF026 Injector control circuit cylinder 1,** **DF027 Injector control circuit cylinder 2,** **DF028 Injector control circuit cylinder 3,** **DF029 Injector control circuit cylinder 4,** **DF085 Fuel pump relay control circuit.** – flywheel signal: **DF154 Flywheel signal sensor circuit** **DF457 Flywheel target** Check whether there are other cylinders with a combustion misfire fault detected by the tool before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done. – warm engine (coolant temperature 75°C minimum), – engine running at idling speed with all electrical consumers on for approximately 15 minutes.
	Special note: – **OBD warning light** comes on.

1.DEF	***NOTES***	**Special note:** – As soon as the fault is detected, the injection is cut off on the faulty cylinder(s) to limit the temperature increase in the catalytic converter, – if a fault is present, the **OBD warning light flashes**.
2.DEF		**Special note:** – the **OBD warning light** remains **continuously lit**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF061 **CONTINUED**	

Misfires in cylinder 3 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 3 pencil coil, – check the condition and conformity of the spark plugs, – check the cylinder 3 injector. If everything is in order, check the same components on cylinder 2 (to cover a possible cylinder recognition error).
Misfires in cylinders 2 and 3 (see DF060 Misfires in cylinder 2 and DF061 Misfires in cylinder 3)	The fault is probably due to a component that affects a pair of cylinders: – check the ignition coil circuit concerned (apply the interpretation of fault **DF362 Ignition coil control 2-3**), – check the condition and conformity of the spark plugs.
Combustion misfires on all four cylinders (see DF059, DF060, DF061 and DF062)	The fault is probably due to a component affecting all the cylinders: – check that the correct fuel is being used, – check the condition and conformity of the spark plugs.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the mounting of the flywheel sensor,
– check the flywheel/sensor air gap,
– check the cylinder compressions,
– check the complete fuel system (see **MR 364 or 370 Mechanics, 13A, Fuel supply, Petrol supply system**),
– check the complete ignition system (see **MR 364 or 370 Mechanics, 17A, Ignition, Spark plugs**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF062 PRESENT OR STORED	CYLINDER 4 MISFIRE 1.DEF: Destructive misfiring 2.DEF: Polluting misfiring 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** – ignition: **DF361 Ignition coil circuit cylinders 1-4** **DF362 Ignition coil circuit cylinders 2-3** – fuel supply circuit: **DF026 Injector control circuit cylinder 1,** **DF027 Injector control circuit cylinder 2,** **DF028 Injector control circuit cylinder 3,** **DF029 Injector control circuit cylinder 4,** **DF085 Fuel pump relay control circuit.** – flywheel signal: **DF154 Flywheel signal sensor circuit** **DF457 Flywheel target** Check whether there are other cylinders with a combustion misfire fault detected by the tool before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming done. – warm engine (coolant temperature 75°C minimum), – engine running at idling speed with all electrical consumers on for approximately 15 minutes.
	Special note: – **OBD warning light** comes on.

1.DEF	***NOTES***	**Special note:** – As soon as the fault is detected, the injection is cut off on the faulty cylinder(s) to limit the temperature increase in the catalytic converter, – if a fault is present, the **OBD warning light flashes**.
2.DEF		**Special note:** – the **OBD warning light** remains **continuously lit**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF062 **CONTINUED**	

Misfires in cylinder 4 only	The fault is probably due to a component that can only affect this cylinder: – check the pencil coil of cylinder 4, – check the condition and conformity of the spark plugs, – check the cylinder 4 injector If everything is in order, check the same components on cylinder 1 (to cover a possible cylinder recognition error).
Misfire on cylinders 1 and 4 (see DF059 Misfire on cylinder 1 and DF062 Misfire on cylinder 4)	The fault is probably due to a component that affects a pair of cylinders: – check the ignition coil circuit concerned (apply the interpretation of fault **DF361 Ignition coil control 1-4**), – check the condition and conformity of the spark plugs.
Combustion misfires on all four cylinders (see DF059, DF060, DF061 and DF062)	The fault is probably due to a component affecting all the cylinders: – check that the correct fuel is being used, – check the condition and conformity of the spark plugs.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the flywheel/sensor air gap,
– check the cylinder compressions,
– check the complete fuel system (see **MR 364 or 370 Mechanics, 13A, Fuel supply, Petrol supply system**),
– check the complete ignition system (see **MR 364 or 370 Mechanics, 17A, Ignition, Spark plugs**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF078 PRESENT OR STORED	MOTORISED THROTTLE CONTROL CIRCUIT 1.DEF: component in bad condition

IMPORTANT
Never drive the vehicle without having checked that there are no faults involving the throttle valve.

NOTES	**Order of priority for dealing with a combination of faults:** If faults **DF095 Throttle potentiometer circuit gang 1** or **DF096 Throttle potentiometer circuit gang 2** are present, deal with these first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared as present if: – the engine speed varies, – command **AC027 Motorised throttle** is activated, – the engine air temperature should be between **5°C** and **105°C**.
	Special note: – **Level 1 fault warning light** illuminated. – throttle valve defect mode **types 1 and 2**: vehicle and engine speed restriction, ESP and the cruise control/speed limiter are deactivated.

Check **the cleanliness and condition** of the throttle valve and its connections.

Manually check that the throttle **rotates properly**.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:

Injection computer, connector **B, track M3** →
- **track 3** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 4** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, connector **B track M4** →
- **track 5** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 3** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF078 **CONTINUED**	

If the fault is still present, measure the **resistance** of the throttle between:
– tracks **3** and **5** for (K4M 766/812 and 813, F4R 770 and 771)
– tracks **3** and **4** for (K4J 740, K4M 788 LPG, F4RT 774 and 776)
Replace the throttle valve if the **resistance** is not:
– **2.2 Ω ± 0.2 Ω at 23°C** for (K4M 766/812 and 813, F4R 770 and 771)
– **1.6 Ω ± 0.2 Ω at 23°C** for (K4J 740, K4M 788 LPG, F4RT 774 and 776)

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF079 PRESENT OR STORED	MOTORISED THROTTLE UNIT AUTOMATIC CONTROL CO : Open circuit 1.DEF: Micro-breaks 2.DEF: Motorised throttle limit search fault 3.DEF: Faulty flap return spring 4.DEF: Safe mode 5.DEF: Motorised throttle valve flap vibrating 6.DEF: Motorised throttle control fault 7.DEF: Inlet supply circuit 8.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If the following faults: **DF011 Sensor supply voltage no. 1,** **DF078 Motorised throttle control circuit,** **DF095 Throttle potentiometer circuit gang 1,** **DF096 Throttle potentiometer circuit gang 2,** are present or stored, deal with these first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared as present if: – the engine speed varies, – the air temperature is between **5°C** and **105°C**.

CO 6.DEF	***NOTES***	**Special note:** – **Level 1 fault warning light** illuminated. – defect mode **type 1 and 2**: vehicle and engine speed restriction, ESP and the cruise control/speed limiter are deactivated.
2.DEF 3.DEF 4.DEF		**Special note:** – **Level 1 fault warning light** illuminated. – throttle valve defect mode **type 4**: speed limiter at 54 mph (90 km/h) and loss of power during acceleration.

Check the **cleanliness, condition** and **mounting** of the throttle valve. Repair if necessary.
If the fault is still present, manually check that the throttle valve **rotates correctly**. Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF079 **CONTINUED 1**	

If the fault is still present, manipulate the harness so that the status changes (present ↔ stored).
Look for possible damage to the harness, check the **condition** and the **connection** of the injection computer and motorised throttle valve connectors.
Repair if necessary.

If the fault is still present, disconnect the battery and the injection computer.
Check the **insulation, continuity** and **absence of interference resistance** of the following connections:

Injection computer, **connector B, track M3** →
- **track 3** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 4** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, connector **B track M4** →
- **track 5** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 3** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, **connector B, track G4** →
- **track 6** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 1** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, **connector B, track G3** →
- **track 1** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 2** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, **connector B, track G2** →
- **track 2** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 5** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, **connector B, Track D3** →
- **track 4** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 6** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

If the fault is still present, measure the **resistance** of the throttle between
– tracks **3** and **5** for (K4M 766/812 and 813, F4R 770 and 771),
– tracks **3** and **4** for (K4J 740, K4M 788 LPG, F4RT 774 and 776).
Replace the throttle valve if the **resistance** is not
– **2.2 Ω ± 0.2 Ω at 23°C** for (K4M 766/812 and 813, F4R 770 and 771),
– **1.6 Ω ± 0.2 Ω at 23°C** for (K4J 740, K4M 788 LPG, F4RT 774 and 776).
If the fault is still present, disconnect the battery and the injection computer.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF079 **CONTINUED 2**	

Check the **insulation, continuity** and **absence of interference resistance** of the following connections:

Injection computer, **connector A, track G2** → **track 3** of the pedal potentiometer

Injection computer, **connector A, track H2** → **track 4** of the pedal potentiometer

Injection computer, **connector A, track H3** → **track 5** of the pedal potentiometer

Injection computer, **connector A, track F2** → **track 2** of the pedal potentiometer

Injection computer, **connector A, track F3** → **track 1** of the pedal potentiometer

Injection computer, **connector A, track F4** → **track 6** of the pedal potentiometer

Repair if necessary.

If the throttle valve has been replaced, reinitialise the programming by running command RZ005: Programming.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF080 PRESENT OR STORED	CAMSHAFT DEPHASER CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Camshaft dephaser position error 2.DEF: Programming deviation 3.DEF: Programming inconsistency 4.DEF: Dephaser operation outside the permitted range of values 5.DEF: Non-compliance with emission control standards

NOTES	**Special note:** **K4M (non-LPG) engines only.**
	Priority when dealing with a number of faults: Apply the procedure for dealing with faults **DF084 Actuators relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a road test.

Check the cleanliness and condition of the camshaft sensor connectors.
Check the cleanliness and condition of the camshaft dephaser.
Repair if necessary.

If the fault is still present, check (with the ignition on) for **+12 V** on **track 1** of the camshaft dephaser.
Check the **insulation, continuity and the absence of interference resistance** between the following connections:

Injection computer, connector **B, track M2** → **track 1** of the camshaft **dephaser**

Protection and Switching Unit, connector **CN, track 6** →

Repair if necessary.

Using the universal bornier, check for **insulation and continuity** on the following connection:

Injection computer, connector **B, track L3** → **track 2** of the camshaft **dephaser**

Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF080 **CONTINUED**	

1.DEF	***NOTES***	**Special note:** If the dephaser remains locked on maximum offset, there is a risk of rough idle, or stalling.

Check the cleanliness and condition of the camshaft sensor connectors.
Check the cleanliness and condition of the camshaft sensor.
Repair if necessary.

Check for the **+12 V feed** on **track 3** of the camshaft sensor connector with the ignition on.
Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the cleanliness and condition of the connections.
Using the universal bornier, check the **insulation and continuity** on the following connections:

Injection computer, connector **C, track E2** → **track 1** of the camshaft sensor

Injection computer, connector **C, track F1** → **track 2** of the camshaft sensor

Injection computer, connector **B, track M2** → **track 3** of the camshaft sensor

Protection and Switching Unit, connector **CN, track 6** → **track 3** of the camshaft sensor

Repair if necessary.

If the fault is still present, there is a fault on the camshaft sensor target (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF081 PRESENT OR STORED	CANISTER BLEED SOLENOID VALVE CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF046 Battery voltage** or **DF084 Actuators relay control circuit** first if they are present or stored.

CO ***CC.1***	***NOTES***	**Special note:** – the valve remains **locked shut**; there is a smell of petrol,' – the **OBD warning light** is lit.
CO.1		**Special note:** The valve remains **locked open**: jerking when driving, risk of stalling and restarting difficulty.

Check that **the** fuse **F8 (10A)** is in good condition and is working correctly.
Repair if necessary.

Check **the cleanliness** and **condition** of the fuel vapour absorber bleed solenoid valve connections.
Repair if necessary.

Measure the **resistance** of the fuel vapour absorber bleed solenoid valve.
Replace the bleed solenoid valve for the fuel vapour absorber if the **resistance** is not **26 Ω ± 4 Ω at 23°C**.

Check for **+12 V feed** on **track 1** of the fuel vapour absorber bleed solenoid valve connector, with the ignition on.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Computer, connector **B, track M2** → **track 1** of the fuel vapour absorber bleed solenoid valve

Protection and Switching Unit, connector **CN, track 6** → **track 1** of the fuel vapour absorber bleed solenoid valve

Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF081 **CONTINUED**	

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connection:

Computer, connector **C, track E1** ⟶ **track 2** of the fuel vapour absorber bleed solenoid valve

Repair if necessary.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF084 PRESENT OR STORED	ACTUATOR CONTROL RELAY CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears when the engine is running. **Special note:** This relay supplies the following actuators: – the injectors – the petrol fuel vapour absorber, – the injection computer supply on **track M2**, – the low-speed and high-speed fan assembly relays. **CO/CC.1:** Actuators no longer supplied: the vehicle stalls and restart impossible. **CC.0:** The actuators are supplied all the time: high electrical consumption when stationary. **Intermittent CO:** Intermittent relay cut-off: jerking while driving.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the injection actuator relay connections.
Check the **cleanliness** and **condition** of the UCH computer and its connections.
Repair if necessary.

Disconnect **connector MN** of the Protection and Switching Unit.
Check **the cleanliness** and **condition** of its connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connection:

Injection computer, connector **B, track D4** ⟶ Protection and Switching Unit, **connector MN, track 5**

Repair if necessary.

If the fault is still present, carry out fault finding on the Protection and Switching Unit system (See **87G, Engine interconnection unit**).

Contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF085 PRESENT OR STORED	FUEL PUMP CONTROL RELAY CIRCUIT CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the ignition is switched on or command **AC079 Actuator static test** is activated.
	Special note: – **OBD warning light** comes on. **CO/CC.1:** The vehicle stalls and restart impossible **CC.0:** Risk of fire in the event of an accident: petrol leak. **Intermittent CO:** Intermittent relay cut-off: risk of draining the battery.

If the relay does not click

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the injection actuator relay connections.
Check **the cleanliness** and **condition** petrol pump relay connector and its connections.
Repair if necessary.

Disconnect **connector MT1** of the Protection and Switching Unit.
Check **the cleanliness** and **condition** of its connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connection:

Computer, connector **C, track D1** ⟶ Protection and Switching Unit, **connector MT1, track 5**

Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF085 **CONTINUED**	

IF THE PUMP DOES NOT OPERATE

Disconnect **connector CN** of the Protection and Switching Unit.
Check **the cleanliness** and **condition** of its connections.
Using command **AC079 Actuator static test**, check for **+12 V** on **track 3** of the fuel pump.
If there is not **+12 V**, check (using the universal bornier) **the insulation** and the **continuity** on the following connection:

Protection and Switching Unit, **connector CN, track 1** → **Track 3 fuel pump**

Repair if necessary.

If the fault is still present, **carry out fault finding on the Protection and Switching Unit system** (see **87G, Engine interconnection unit**).

If the fault is still present, **contact the Techline**.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF088 PRESENT OR STORED	PINKING SENSOR CIRCUIT 1.DEF: Abnormal voltage 2.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present in a warm engine road test at an engine speed greater than **1500 rpm**.
	Special note: The wiring harness connecting the injection computer to the pinking sensor is "shielded", from this a short circuit to **+12 V** is improbable.

Check the **cleanliness and condition** of the pinking sensor and its connections.
Check the pinking sensor **fitting**.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:

Computer, connector **B, track B3** → **track 2** of the pinking sensor

Computer, connector **B, track B4** → **track 1** of the pinking sensor

Computer, connector **B, track B2** → Pinking sensor **screening**

Repair if necessary.

Check **the correct fuel** is in the fuel tank.
Check **the conformity** of the spark plugs.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF089 PRESENT OR STORED	INLET MANIFOLD PRESSURE SENSOR CIRCUIT 1.DEF: Signal incoherence 2.DEF: Abnormal voltage 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If the fault **DF011 Sensor supply voltage no. 1** is present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after: – the ignition is switched off and back on again, then wait **10 seconds** with the engine running at idling speed.
	Special note: – **OBD fault warning light** and **level 1 fault warning light** lit – Defect mode **type 5** the ESP and cruise control/speed limiter are deactivated and the vehicle stalls at idle speed.

Check the **cleanliness and condition** of the manifold pressure sensor and its connections.
Repair if necessary.

If the fault is still present, check for **+5 V** on **track H2** and that the **earth is present** on **track H4** of connector **B** of the injection computer.
Contact the Techline if it is not correct.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:

Injection computer, connector **B, track H2** → **track C** inlet manifold pressure sensor

Injection computer, connector **B, track H3** → **track B** inlet manifold pressure sensor

Injection computer, connector **B, track H4** → **track A** inlet manifold pressure sensor

Repair if necessary.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF091 PRESENT OR STORED	VEHICLE SPEED SIGNAL 1.DEF: Multiplex network 2.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears when the engine is running. **Special note:** – **OBD warning light** comes on.

Carry out a multiplex network test (see **88B, Multiplexing**).
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the battery and the injection computer connections. Repair if necessary.
If the fault is still present, carry out fault finding on the **ABS - ESP** system (see **38C, Anti-lock braking system**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF092 PRESENT OR STORED	UPSTREAM OXYGEN SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Component in bad condition 2.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If the following faults: **DF011 Sensor supply voltage no. 1,** **DF046 Battery voltage,** **DF084 Actuator relay control circuit,** are present or stored, deal with these first.
	Conditions for applying the fault finding procedure to stored faults: If the fault is declared as present after the engine has been running for at least **5 minutes**.
	Special note: – **OBD warning light** comes on.

Check **the cleanliness** and **condition** of the upstream oxygen sensor connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, **connector C, track C1** → **track D** of the upstream oxygen sensor

Injection computer, **connector C, track B1** → **track C** of the upstream oxygen sensor

Repair if necessary.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF093 PRESENT OR STORED	DOWNSTREAM OXYGEN SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If the following faults: **DF011 Sensor supply voltage no. 1,** **DF046 Battery voltage,** **DF601 Upstream oxygen sensor heating power circuit,** **DF084 Actuator relay control circuit,** are present or stored, deal with these first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after: – a road test driving smoothly after the fan assembly has been running, and **ET056 Double richness loop** is **ACTIVE**. – a smooth driving road test after the fan assembly has been in operation, immediately followed by a road test on a slope at no load (injection cut-off in the deceleration phase).
	Special note: – **OBD warning light** comes on.

Check **the cleanliness** and **condition** of the downstream oxygen sensor connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Computer, **connector C, track B2** → **track D** of the downstream oxygen sensor

Computer, **connector C, track A2** → **track C** of the downstream oxygen sensor

Repair if necessary.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF095 PRESENT OR STORED	THROTTLE POTENTIOMETER CIRCUIT GANG 1 CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Component in bad condition 2.DEF: Signal incoherence

IMPORTANT
Never drive the vehicle without having checked that there are no faults involving the throttle valve.

NOTES	**Priority when dealing with a number of faults:** Deal with fault **DF012 Sensor feed voltage No. 2** as a priority if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after a change in the engine speed.
	Special note: – **Level 1 fault warning light** illuminated. – throttle valve defect mode **types 1, 2 and 4**.

Check the **cleanliness** of the throttle valve and the **correct rotation** of the throttle (no resistance point).
Check **the cleanliness** and **condition** of the throttle valve connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Injection computer, **connector B, track G4** →
- **track 6** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 1** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, **connector B, track G3** →
- **track 1** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 2** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, **connector B, track G2** →
- **track 2** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 5** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Repair if necessary.

If the throttle valve has been replaced, reinitialise the programming by running command RZ005 Programming.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF096 PRESENT OR STORED	THROTTLE POTENTIOMETER CIRCUIT GANG 2 CO.1 : Open circuit or short circuit to +12 V CC.0 : Short circuit to earth

IMPORTANT
Never drive the vehicle without having checked that there are no faults involving the throttle valve.

NOTES	**Priority when dealing with a number of faults:** Deal with fault **DF012 Sensor feed voltage No. 2** as a priority if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after a change in the engine speed.
	Special note: – **Level 1 fault warning light** illuminated. – throttle valve defect mode **types 1, 2 and 4**.

Check the **cleanliness** of the throttle valve and the **correct rotation** of the throttle (no resistance point).
Check **the cleanliness** and **condition** of the throttle valve connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Injection computer, **connector B, Track D3** →
- **track 4** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 6** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, **connector B, track G2** →
- **track 2** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 5** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Injection computer, **connector B, track G4** →
- **track 6** of the motorised throttle (K4M 766/812 and 813, F4R 770 and 771)
- **track 1** of the motorised throttle (K4J 740, K4M 788 LPG, F4RT 774 and 776)

Repair if necessary.

If the throttle valve has been replaced, reinitialise the programming by running command RZ005: Programming.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF099 PRESENT OR STORED	AUTOMATIC GEARBOX OR SEQUENTIAL GEARBOX CONNECTION VIA THE MULTIPLEX NETWORK 1.DEF: Signal incoherence 2.DEF: CAN connection fault 3.DEF: Automatic gearbox fault detected 4.DEF: Non-compliance with emission control standards

NOTES	**Priority when dealing with a number of faults:** Apply the procedure for dealing with faults **DF084 Actuators relay control circuit** or **DF046 Battery voltage** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears when the engine is running.

Run a multiplex network test (See **88B, Multiplex**).
If the fault is still present, run fault finding on the **Automatic gearbox** system (see **23A, Automatic gearbox**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF101 PRESENT OR STORED	MULTIPLEX ELECTRONIC STABILITY PROGRAM CONNECTION 1.DEF: CAN connection fault

NOTES	None

Carry out a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **ABS - ESP** system (see **38C, Anti-lock braking system**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF102 PRESENT OR STORED	ALTERNATOR POWER SIGNAL AVAILABLE 1.DEF: Multiplex network

NOTES	**Special note:** – Absent signal or invalid value.

Test the **multiplex network** (see **88B Multiplexing**).

Disconnect **connector CT1** of the Protection and Switching Unit.
Check **the cleanliness** and **condition** of its connections.
If the fault is still present, check the **insulation** and **continuity** of the following connections:

Injection computer, connector **A, track D1**	→	connector **CT1, track 4**, of the Protection and Switching Unit
Protection and Switching Unit connector **MT1 track 8**	→	**track 1** of the Alternator

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF105 PRESENT OR STORED	CRUISE CONTROL/SPEED LIMITER ON/OFF CIRCUIT 1.DEF: Cruise control/Speed limiter ON/OFF button inconsistency

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after a road test using the cruise control then the speed limiter function.

Check the **cleanliness and condition** of the cruise control/speed limiter On/Off switch and its connections.
Repair if necessary.

Check for the **+12 V feed** on **track A2** of the cruise control or speed limiter selector switch connector with the ignition on.
Repair if necessary.

Disconnect the battery. Disconnect the computer. Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:

Injection computer, connector **A, track A2** → **track A3** of the cruise control or speed limiter on/off switch

Injection computer, connector **A, track C3** → **track B1** of the cruise control or speed limiter on/off switch

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF106 PRESENT OR STORED	CRUISE CONTROL/SPEED LIMITER SELECTOR SWITCH ON STEERING WHEEL 1.DEF: No signal

NOTE
To remove or check the cruise control/speed limiter control switches you need to remove the airbag (See **MR 364 or 370 Mechanics, 88C, Airbag and pretensioners**).

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after a road test using the cruise control then the speed limiter function.

Check **the cleanliness and condition** of the incrementing switches at the steering wheel and their connections.
Repair if necessary.

Check that **the earth** is present on **track 2** of the incrementing switches on the steering wheel.
Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:

Injection computer, connector **A, track D2** → **track 2** of the steering wheel control switch

Injection computer, connector **A, track D3** → **track 1** of the steering wheel control switch

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF109 PRESENT OR STORED	LOW FUEL LEVEL MISFIRING 1.DEF: Destructive misfiring 2.DEF: Polluting misfiring 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** – fuel supply circuit: **DF085 Fuel pump relay control circuit,** **DF026 Injector control circuit cylinder 1,** **DF027 Injector control circuit cylinder 2,** **DF028 Injector control circuit cylinder 3** **DF029 Injector control circuit cylinder 4** – misfiring: **DF059 Combustion misfire in cylinder 1,** **DF060 Combustion misfire in cylinder 2,** **DF061 Combustion misfire in cylinder 3,** **DF062 Combustion misfire in cylinder 4.**
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after starting the engine and under the following conditions: – there must be no further electrical faults, – programming done. – warm engine (coolant temperature **75°C** minimum), – engine running with electrical consumers on for **15 minutes**.
	Special note: – **OBD warning light** comes on.

Check the presence and conformity of fuel in the tank.
If there is no present or stored combustion misfire fault, the misfire was caused by the low fuel level. Clear fault **DF109**.

AFTER REPAIR	Ensure that all the faults have been dealt with. Do not delete the programming. To check that the system has been repaired correctly: – there must be no further electrical faults, – programming done, – the engine should be warm (minimum 75°C), – running at idle speed with all electrical consumers drawing power for 15 minutes. If the fault reappears, continue the fault finding procedure.

DF126 PRESENT OR STORED	PASSENGER COMPARTMENT HEATING RESISTOR 1.DEF: Multiplex network

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present when the ignition is switched on.

Test the multiplex network (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the UCH (see **87B, Passenger compartment connection unit**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF138 PRESENT OR STORED	CLUTCH PEDAL CIRCUIT 1.DEF: component in bad condition

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present with the engine running and following a check on the number of times the clutch pedal is depressed in relation to the number of gear changes calculated by the computer.
	Special note: – engine speed surges when changing gear, – the acquisition is made if the vehicle is not fitted with an automatic gearbox, – in the event of a fault, before replacing any component, check using the diagnostic tool that the clutch contact is operational and that the recommended clutch pedal clearance is still valid. – In the event of an **open circuit** or **short circuit** to **+12 V**, the clutch pedal is depressed all the time which makes it impossible to select a cruising speed in cruise control mode. The speed limiter remains operational in defect mode (inaccurate speed restriction), – In the event of a **short circuit** to **earth**, status **ET233 Clutch pedal** is still **RELEASED**.

Check **the cleanliness, condition and assembly** of the clutch pedal switch.
Repair if necessary.

If the fault is still present, disconnect the switch. Check that when the clutch pedal is depressed, the switch is closed, and when the clutch pedal is released, the switch is open.
Replace the switch if necessary.

If the fault is still present, manipulate the harness to see if the status changes.
Look for any damage to the wiring harness, and check the **condition** and **connection** of the injection computer and clutch pedal switch connectors.
Repair if necessary.

If the fault is still present, check the **earth** on **track 2** of the switch.
If the **earth** is not present on **track 2**, check **for insulation, continuity and the absence of interference resistance** on the following connection:

earth ⟶ **track 1** Clutch pedal switch

Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF138 **CONTINUED**	

If the fault is still present, check **for insulation, continuity and the absence of interference resistance** between the following connection:

Injection computer connector **A, track C4** ⟶ **track 2** Clutch pedal switch

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF154 PRESENT OR STORED	FLYWHEEL SIGNAL SENSOR CIRCUIT 1.DEF: Abnormal voltage 2.DEF: Tooth lost 3.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears after the starter motor has been operated for **10 seconds** or at engine speeds above **600 rpm**.
	Special note: – **OBD warning light** illuminated, – In the event of flywheel signal loss, the injection and ignition are cut off: the vehicle stalls and cannot be restarted.

1.DEF	***NOTES***	None

Check the **cleanliness, condition and the assembly** of the flywheel.
Repair if necessary.

If the flywheel has been replaced or removed, the flywheel target has to be reinitialised, then reprogrammed.

Programming reset:
Use command **RZ005: Programming**.
Carrying out the flywheel target programming:
– Decelerate a first time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **3500** and **3000 rpm**, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.
– Decelerate a second time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **2400** and **2000 rpm** for K4 engines and between **1800 and 1400 rpm** for F4R engines, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.
When the work is completed, check that status **ET089 Flywheel target programming** is **COMPLETED**.
(*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque)

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF154 **CONTINUED**	

2.DEF	***NOTES***	None

Check that the engine speed sensor is correctly **fitted** and **positioned** (see **MR 364 or 370 Mechanics, 17B, Petrol injection, engine speed and position sensor**).

Check **the cleanliness and condition** of the engine speed sensor.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check the **insulation and continuity** on the following connections:

Computer, **connector B, track E4** → **track 2 or B** of the engine speed sensor

Computer, **connector B, track F3** → **track 1 or A** of the engine speed sensor

Repair if necessary.

Check the **resistance** of the engine speed sensor between **tracks 1** and **2**:
Replace the engine speed sensor if the **resistance** is not between **235 ± 60 Ω at 20°C**.

If the engine speed sensor has been replaced, the flywheel target has to be reinitialised, then reprogrammed.

Programming reset:
Use command **RZ005: Programming**.
Carrying out the flywheel target programming:
– Decelerate a first time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **3500** and **3000 rpm**, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.
– Decelerate a second time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **2400** and **2000 rpm** for K4 engines and between **1800 and 1400 rpm** for F4R engines, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.
When the work is completed, check that status **ET089 Flywheel target programming** is **COMPLETED**.
(*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque)

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF196 PRESENT OR STORED	PEDAL SENSOR CIRCUIT GANG 1 CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Inconsistency 2.DEF: Component in bad condition

NOTES	**Order of priority for dealing with a combination of faults:** Deal with fault **DF012 Sensor supply voltage no. 2** first, if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault appears after the accelerator pedal goes from no load to full load.
	Special note: – **level 1 fault warning light** illuminated. **CO.0CC.1:** defect mode **type 4**: speed limiter at **54 mph (90 km/h)** and loss of power during acceleration (pedal feels soft). **1.DEF:** defect mode **types 3 and 4**: regulation of pedal's engine or vehicle speed setpoint, speed limiter at **54mph (90 km/h)** and loss of power during acceleration (pedal feels soft).

Check that the pedal mechanism has not seized.

Check **the cleanliness** and **condition** of the throttle valve connections.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **A, track H3** → **track 5** of the pedal potentiometer gang 1

Injection computer, connector **A, track G2** → **track 3** of the pedal potentiometer gang 1

Injection computer, connector **A, track H2** → **track 4** of the pedal potentiometer gang 1

Repair if necessary.

Measure the pedal sensor **resistance** track 1 between **tracks 4** and **2**.
Replace the accelerator potentiometer if the **resistance** is not **1.7 kΩ ± 0.9 kΩ**.
If necessary replace the sensor.

If the fault is still present, **contact the Techline**.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF198 PRESENT OR STORED	PEDAL SENSOR CIRCUIT GANG 2 CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 V

NOTES	**Order of priority for dealing with a combination of faults:** Deal with fault **DF011 Sensor supply voltage no. 1** first if it is present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the accelerator pedal goes from no load to full load
	Special note: – **level 1 or 2 fault warning light** lit, – defect mode **types 3 and 4**: regulation of pedal's engine or vehicle speed setpoint, speed limiter at **54mph (90 km/h)** and loss of power during acceleration (pedal feels soft).

Check that the pedal mechanism has not seized.

Check **the cleanliness** and **condition** of the throttle valve connections.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Repair if necessary.

Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **A, track F4** → **track 6** of the pedal potentiometer gang 2

Injection computer, connector **A, track F2** → **track 2** of the pedal potentiometer gang 2

Injection computer, connector **A, track F3** → **track 1** of the pedal potentiometer gang 2

Repair if necessary.

Measure the pedal sensor **resistance** gang 2 between **tracks 6** and **1**.
Replace the accelerator potentiometer if the **resistance** is not approximately **2.8 kΩ ± 2.05 kΩ**.
If necessary replace the sensor.

If the fault is still present, **contact the Techline**.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF228 PRESENT OR STORED	BRAKE SIGNALS 1.DEF: Component in bad condition 2.DEF: Non-compliance with emission control standards

NOTES	**Special note:** – Cruise control and speed limiter deactivated.

Check:
– the consistency of status **ET039 Brake pedal** becomes **DEPRESSED/RELEASED**,
– **the condition and cleanliness** of the brake lights switch.
Disconnect the battery and the injection computer, check **the condition and cleanliness** of the connections.
Check **the continuity and insulation** of the following connection:

Injection computer, connector **A, track E4** ⟶ **track 3** of the brake light switch

Repair if necessary.

Carry out a multiplex network test (see **88B, Multiplexing**).

If the fault is still present, carry out fault finding on the **ABS - ESP** system (see **38C, Anti-lock braking system**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF232 PRESENT OR STORED	REFRIGERANT PRESSURE SENSOR CIRCUIT 1.DEF: Voltage outside tolerance range

NOTES	**Order of priority for dealing with a combination of faults:** Deal with **DF012 Sensor feed voltage No. 2** as a priority if it is present or stored.

Check **cleanliness** and **condition** of the refrigerant pressure sensor and its connections.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Injection computer, connector **B, track J2** → **track B** of the refrigerant pressure sensor

Injection computer, connector **B, track J3** → **track C** of the refrigerant pressure sensor

Injection computer, connector **B, track K2** → **track A** of the Refrigerant pressure sensor

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF319 PRESENT OU MEMORISE	CAMSHAFT SENSOR CIRCUIT 1.DEF: Camshaft tooth event 2.DEF: Measurement of the offset outside permitted range of values 3.DEF: Tooth lost 4.DEF: Non-compliance with emission control standards

NOTES	**Priority when dealing with a number of faults:** Apply the procedure for dealing with faults **DF046 Battery voltage** or **DF084 Actuators relay control circuit** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a road test.
	Special note: **– K4M only.** – possibility of a slight lowering in performance

Check the **cleanliness and condition** of the camshaft sensor connectors.
Check the **cleanliness and condition** of the camshaft sensor.
Repair if necessary.

If the fault is still present, check (with the ignition on) for **+12 V** on **track 3** of the camshaft sensor.
Check the **insulation, continuity and the absence of interference resistance** between the following connections:

Injection computer, connector **B, track M2** → **track 3** of the camshaft sensor
Protection and Switching Unit, connector **CN, track 6** → **track 3** of the camshaft sensor

Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connections:

Computer, connector **C, track E2** → **track 1** of the camshaft sensor
Computer, connector **C, track F1** → **track 2** of the camshaft sensor

Repair if necessary.

If the fault is still present, there is a fault on the camshaft sensor target (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF361 PRESENT OR STORED	CYLINDER 1 - 4 IGNITION COIL CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Priority when dealing with a number of faults:** Deal with faults **DF046 Battery voltage, DF084 Actuator relay control circuit** or **DF085 Petrol pump relay control circuit** first whether they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present with the engine running for **4 seconds** at **600 rpm** or **0.4 seconds** at **6000 rpm**.
	Special note: – **OBD warning light** illuminated, – **Level 1 fault warning light** illuminated. **CC.0:** The coil is continuously supplied, risk of destruction **CC.1:** The coil is not supplied, injection cut-off on cylinders 1 and 4, destruction of the catalytic converter possible and prevention of On board diagnostics.

Disconnect the cylinder 1 pencil coil connector.
Check the cleanliness and condition of the pencil coil and its connections.
Repair if necessary.

Measure the **primary** and **secondary** resistance of the cylinder 1 pencil coil.
Replace the cylinder 1 coil if the primary resistance is not **540 mΩ ± 30 mΩ** or the secondary resistance is not **10.7 kΩ ± 1.6 kΩ (K4 engines)**.
Replace the cylinder 1 coil if the primary resistance is not **520 mΩ ± 50 mΩ** or the secondary resistance is not **6.7 kΩ ± 0.67 kΩ (F4 engines)**.

Switch off the ignition and disconnect the injection computer.
Check the cleanliness and condition of the connections.
Repair if necessary.

Using the universal bornier, check the **insulation and continuity** on the following connections:

Injection computer, connector **C, track M4** → **track 2** of coil 1

Coil 4 **track 2** → **track 1** of coil 1

If the fault is still present, replace the faulty pencil coil.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF361 **CONTINUED**	

Check for the **+12 V feed** on **track 1** of the cylinder 4 pencil coil connector with the ignition on.
If **+12 V** is not present:
Switch off the ignition,
– disconnect the connector **MN** in the Protection and Switching Unit,
– check the cleanliness and condition of the connections,
– using the universal bornier, check the **continuity** on the following connection:

Protection and Switching Unit **connector MN, track 9** → **track 1** of the pencil coil for cylinder 4

Reconnect the Protection and Switching Unit connector.
With the ignition on, if the **+12 V** is still not present on the cylinder 4 coil connector, there is a fault with the Protection and Switching Unit.
Contact the Techline.

Check the operation of the fuel pump relay using command **AC079 Actuator static test**.
Deal with fault **DF085 Petrol pump relay control circuit** if it is present or stored after the command is activated.

If the fault is still present, replace the faulty pencil coil.
If the fault is still present, deal with the other faults then go to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF362 PRESENT OR STORED	CYLINDER 2 - 3 IGNITION COIL CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Priority when dealing with a number of faults:** Deal with faults **DF046 Battery voltage, DF084 Actuator relay control circuit** or **DF085 Petrol pump relay control circuit** first whether they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present with the engine running for **4 seconds** at **600 rpm** or **0.4 seconds** at **6000 rpm**.
	Special note: – **OBD warning light** illuminated, – **Level 1 fault warning light** illuminated. **CC.0:** The coil is continuously supplied, risk of destruction. **CC.1:** The coil is not supplied, injection cut-off on cylinders 2 and 3, destruction of the catalytic converter possible and prevention of On board diagnostics.

Disconnect the cylinder 2 pencil coil connector.
Check the cleanliness and condition of the pencil coil and its connections.
Repair if necessary.

Measure the **primary** and **secondary** resistance of the cylinder 2 pencil coil.
Replace the cylinder 2 coil if the primary resistance is not **540 mΩ ± 30 mΩ** or the secondary resistance is not **10.7 kΩ ± 1.6 kΩ (K4 engines)**.
Replace the cylinder 2 coil if the primary resistance is not **520 mΩ ± 50 mΩ** or the secondary resistance is not **6.7 kΩ ± 0.67 kΩ (F4 engines)**.

Switch off the ignition and disconnect the injection computer.
Check the cleanliness and condition of the connections.
Repair if necessary.

Using the universal bornier, check the **insulation and continuity** on the following connections:

Computer, connector **C, track M3** → **track 2** of coil 2

Coil 3 **track 2** → **track 1** of coil 2

If the fault is still present, replace the faulty pencil coil.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF362 **CONTINUED**	

Check for the **+12 V feed** on **track 1** of the cylinder 3 pencil coil connector with the ignition on.
If **+12 V** is not present:
Switch off the ignition,
– disconnect the **MN connector** in the Protection and Switching Unit,
– check the cleanliness and condition of the connections,
– using the universal bornier, check for **continuity** on the following connection:

Protection and Switching Unit **connector MN, track 9** → **track 1** of the pencil coil for cylinder 3

Reconnect the Protection and Switching Unit connector.
With the ignition on, if the **+12 V** is still not present on the cylinder 3 coil connector, there is a fault with the Protection and Switching Unit.
Contact the Techline.

Check the operation of the fuel pump relay using command **AC079 Actuator static test**.
Deal with fault **DF085 Petrol pump relay control circuit** if it is present or stored after the command is activated.

If the fault is still present, replace the faulty pencil coil.
If the fault is still present, deal with the other faults then go to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF377 PRESENT OR STORED	PETROL CONNECTION ↔ LPG 1.DEF: CAN connection fault 2.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF046 Battery voltage** is present or stored, deal with this first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears when the engine is running.

Run a multiplex network test (See **88B, Multiplex**).
If the fault is still present, perform fault finding on the **LPG Injection** system (see **17D, LPG Injection**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF394 PRESENT OR STORED	CATALYTIC CONVERTER OPERATING FAULT 1.DEF: component in bad condition 2.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Deal with the other faults first. There must be no other injection system faults, either present or stored. – misfiring: **DF059 Combustion misfire in cylinder 1,** **DF060 Combustion misfire in cylinder 2,** **DF061 Combustion misfire in cylinder 3,** **DF062 Combustion misfire in cylinder 4** (**1.DEF** or **2.DEF**).
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – programming should have been carried out, – warm engine (coolant temperature **75°C** minimum), – engine running at idling speed with all electrical consumers on for approximately **15 minutes**.
	Special note: – **OBD warning light** comes on.

Check **the appearance and condition** of the catalytic converter. Check that there is no air leaking in, heat shock, misfires, consumption of coolant or oil.
If the fault is still present, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF398 PRESENT OR STORED	FUEL CIRCUIT OPERATING FAULT CO : Open circuit 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If faults **DF085 Fuel pump relay control circuit, DF549 Canister bleed circuit** and injector faults **DF026 Injector control circuit cylinder 1,** **DF027 Injector control circuit cylinder 2,** **DF028 Injector control circuit cylinder 3** **DF029 Injector control circuit cylinder 4**, are present or stored, deal with these first.
	Special note: – **OBD warning light** illuminated, – a fuel supply system fault can lead to starting difficulties, and loss of recognition and power.

Check **the cleanliness, condition and fitting** of the petrol vapour absorber.
Check the **connections and operation** of the petrol pump.
Check the **cleanliness, condition and fitting** of the injectors and their sealing.
Repair if necessary.

Check:
– that the fuel is present and correct,
– the tank air vent,
– that there are no leaks on the petrol circuit (from the tank to the injectors),
– that there are no kinked hoses (especially after dismantling),
– the fuel flow rate and pressure.

Repair the faulty component(s) if necessary (see **MR 364 or 370 Mechanics, 13A, Fuel supply**).

If the fault is still present, deal with the other faults then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF404 PRESENT OR STORED	AUTOMATIC GEARBOX OR SEMIAUTOMATIC GEARBOX CAN CONNECTION 1.DEF: Incorrect gear 2.DEF: Incorrect torque signal from automatic gearbox computer 3.DEF: No multiplex frames or invalid values (fault on computer transmitting signal or CAN connection)

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF046 Battery voltage** is present or stored, deal with this first.
	Conditions for applying the fault finding procedure to stored faults: The fault appears when the engine is running.

Run a multiplex network test (See **88B, Multiplex**).
If the fault is still present, run fault finding on the **Automatic gearbox** system (see **23A, Automatic gearbox**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF410 PRESENT OR STORED	INSTRUMENT PANEL CONNECTION 1.DEF: CAN connection fault

NOTES	**Special note:** – Cruise control/Speed limiter deactivated. – **OBD warning light** not illuminated when ignition switched on.

Carry out a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **Instrument panel** system (see **83A, Instrument panel**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF436 PRESENT OR STORED	DETECTION OF ENGINE MISFIRING 1.DEF: Destructive misfiring 2.DEF: Pollutant misfiring 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** – ignition: **DF361 Ignition coil circuit cylinders 1-4,** **DF362 Ignition coil circuit cylinders 2-3.** – fuel supply circuit: **DF026 Injector control circuit cylinder 1,** **DF027 Injector control circuit cylinder 2,** **DF028 Injector control circuit cylinder 3** **DF029 Injector control circuit cylinder 4** **DF085 Fuel pump relay control circuit.** – flywheel signal: **DF154 Flywheel signal sensor circuit,** **DF457 Flywheel target.** – cylinder combustion misfires: **DF059 Combustion misfire in cylinder 1,** **DF060 Combustion misfire in cylinder 2,** **DF061 Combustion misfire in cylinder 3,** **DF062 Combustion misfire in cylinder 4.**
	Conditions for applying the fault finding procedure to stored faults The fault appears in the following conditions: – there must be no further electrical faults, – programming done. – the engine should be warm (minimum 75°C), – engine running at idling speed with all electrical consumers on for approximately 15 minutes.
	Special note: – catalytic converter combustion misfire: **OBD warning light** flashes when the fault is present then lights continuously, – pollutant combustion misfire: **OBD warning light** lit continuously. – engine unstable, loss of power and vibrations.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF436 **CONTINUED**	

Check the injectors.
Check the condition and conformity of the spark plugs.
Check the ignition pencil coils.
check that the correct fuel is being used,

If the fault is still present, carry out the following checks:

- check the flywheel sensor,
- check the condition and cleanliness of the flywheel,
- check the flywheel sensor mounting,
- check the sensor/flywheel air gap,
- check the cylinder compressions,
- check the complete fuel supply system (see **Workshop Repair Manual 364 or 370 Mechanics, 13A, Fuel supply**),
- check the complete ignition system (see **MR 364 or 370 Mechanics, 17A, Ignition**),
- check the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF455 PRESENT OR STORED	LOW FUEL LEVEL SIGNAL 1.DEF: Multiplex network 2.DEF: Non-compliance with emission control standards

NOTES	None

Carry out a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the **Instrument panel** system (see **83A, Instrument panel**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF457 PRESENT OR STORED	FLYWHEEL TARGET 1.DEF: Component in bad condition 2.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault appears when the engine is running. **Special note:** – **OBD warning light** comes on.

Check **the cleanliness** and **condition** of the engine flywheel.
Repair or replace the engine fan if necessary.

If the flywheel has been replaced or removed, the flywheel ring has to be reinitialised, then reprogrammed.

Reinitialise programming:
Use command **RZ005: Programming**.
Carrying out the flywheel target programming:
– Decelerate a first time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **3500** and **3000 rpm**, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.
– Decelerate a second time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **2400** and **2000 rpm** for K4 engines and between **1800 and 1400 rpm** for F4R engines**,** in 3rd gear for a manual gearbox and 2nd for automatic gearbox for at least 5 seconds.
When the work is completed, check that status **ET089 Flywheel target programming** is **COMPLETED**.
(*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque)

If the fault is still present, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF570 PRESENT OR STORED	COOLANT PUMP RELAY CO : Open circuit CO.0 : Short circuit to earth CC.1 : Short circuit to + 12 V

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present when the engine is running or on command **AC195 Electric coolant pump**.

Check the **cleanliness, condition** and **fitting** of the coolant pump. Top up the coolant if necessary.
If the fault is still present, manipulate the harness to see if the status changes. Look for any harness damage, and check **the condition and connection points** of the injection computer and the coolant pump connectors. Repair if necessary.
If the fault is still present, check for **+12 V** on **track 2** of the coolant pump. If **+12 V** is not present on **track 2** of the coolant pump, check the following connection for **insulation, continuity and the absence of interference resistance**: Coolant pump **track 2** ⟶ **track 6, connector CN**, of the Protection and Switching Unit Repair if necessary.
If the fault is still present, check the **insulation, continuity and the absence of interference resistance** on the following connection: Computer, connector **B, track L4** ⟶ **track 1** of the coolant pump Repair if necessary.
If the fault is still present, check that the **resistance** between **tracks 1 and 2** of the coolant pump is **neither zero nor infinite**. Replace the coolant pump if necessary.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF601 PRESENT OR STORED	UPSTREAM O_2 SENSOR HEATING POWER CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF046 Battery voltage or DF084 Actuators relay control circuit** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a delay of **10 seconds** with the engine running or when command **AC018 Upstream O_2 sensor heating** is activated.
	Special note: – **OBD warning light** comes on. **CO/CC.1:** Upstream O_2 heating sensor no longer working. **CO.1:** Upstream O_2 sensor heating on all the time from switching on the ignition: sensor liable to be destroyed.

Check **the cleanliness** and **condition** of the upstream oxygen sensor connections.
Repair if necessary.

Check for **+12 V feed** on **track A** of the upstream oxygen sensor connector, with the ignition on.
Using the universal bornier, check for **insulation** and **continuity** on the following connection:

Computer, connector **B, track M2** ⟶ **track A** of the upstream oxygen sensor

Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connection:

Computer, connector **C, track L2** ⟶ **track B** of the upstream oxygen sensor

Repair if necessary.

Measure the **resistance** of the upstream oxygen sensor heater between **tracks A** and **B**.
Replace the upstream oxygen sensor if the **resistance** is not approximately **9 Ω ± 0.5 Ω at 20°C**.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF602 PRESENT OR STORED	DOWNSTREAM O_2 SENSOR HEATING POWER CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF046 Battery voltage or DF084 Actuators relay control circuit** first if they are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after a delay of **10 seconds** with the engine running or when command **AC019 Downstream O_2 sensor heating** is activated.
	Special note: – **OBD warning light** comes on. **CO/CC.1:** Downstream O_2 heating sensor no longer working. **CO.1:** Downstream O_2 sensor heating on all the time from switching on the ignition: sensor liable to be destroyed.

Check **the cleanliness** and **condition** of the downstream oxygen sensor connections.
Repair if necessary.

Check for **+12 V feed** on **track A** of the downstream oxygen sensor connector with the ignition on.
Using the universal bornier, check for **insulation and continuity** on the following connection:

Computer, connector **B, track M2** ⟶ **track A** of the downstream oxygen sensor

Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation and continuity** on the following connection:

Computer, connector **C, track L3** ⟶ **track B** of the downstream oxygen sensor

Repair if necessary.

Measure **the resistance** of the downstream oxygen sensor heater between **tracks A** and **B**.
Replace the downstream oxygen sensor if the **resistance** is not **9 Ω ± 0.5 Ω at 20°C**.

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF623 PRESENT OR STORED	CLOSING BRAKE SIGNAL 1.DEF: CAN connection fault

NOTES	**Special note:** – Cruise control and speed limiter deactivated.

Check **the condition and cleanliness** of the pedals. Check **the cleanliness and condition** of the dual-contact brake switch and its connections. Repair if necessary.
With the ignition on, check for **+12 V** on **tracks B1 and A1**, of the brake pedal switch connector. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the universal bornier, check for **insulation** and **continuity** on the following connection: Injection computer, **connector A, track E3** ⟶ **Track B3** of the brake pedal Repair if necessary.
Test the **multiplex network** (see **88B Multiplexing**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF624 PRESENT OR STORED	UPC MULTIPLEX CONNECTION 1.DEF: CAN connection fault 2.DEF: Non-compliance with emission control standards

NOTES	None

Test the **multiplex network** (see **88B Multiplexing**).
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Repair if necessary.
Using the universal bornier, check the **insulation and continuity** on the following connections: Computer, connector **A, track A3** → Protection and Switching Unit, **connector CT1, track 7** Computer, connector **A, track A4** → Protection and Switching Unit, **connector CT1, track 9** Repair if necessary.
If the fault is still present, carry out fault finding on the **Protection and Switching Unit** system (See **87G, Engine interconnection unit**).

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF635 PRESENT OR STORED	LPG CYLINDER 1 COMBUSTION MISFIRE 1.DEF: destructive misfiring 2.DEF: polluting misfiring

NOTES	**Order of priority for dealing with a combination of faults:** – LPG fuel system: **see 17C, LPG injection**, – Ignition: **DF361 Ignition coil circuit cylinders 1-4,** **DF362 Ignition coil circuit cylinders 2-3.** – flywheel signal: **DF154 Flywheel signal sensor circuit,** **DF457 Flywheel target.** Check whether there are other cylinders with a LPG combustion misfire fault detected by the tool before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – the programming must have been done, particularly the flywheel target, – the engine should be warm (minimum 75°C), – run the engine at idle speed with all electrical consumers switched on for approximately 15 minutes.
	Special note: – catalytic converter combustion misfire: **OBD warning light** flashes when the fault is present then lights continuously, – pollutant combustion misfire: **OBD warning light** lit continuously. – **engine unstable, loss of power and vibrations**.

Misfires in cylinder 1 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 1 pencil coil, – check the condition and conformity of the spark plugs, – check the cylinder 1 LPG injector If everything is in order, check the same components on cylinder 4 (to cover a possible cylinder recognition error).
Combustion misfires on cylinders 1 and 4	The fault is probably due to a component that affects a pair of cylinders: – check the ignition coil circuit concerned (apply the interpretation of fault **DF361 Ignition coil control 1-4** or **DF362 Ignition coil control 2-3**), – check the condition and conformity of the spark plugs.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF636 PRESENT OR STORED	LPG CYLINDER 2 COMBUSTION MISFIRE 1.DEF: Destructive misfiring 2.DEF: Polluting misfiring

NOTES	**Order of priority for dealing with a combination of faults:** – LPG fuel system: **see 17C, LPG injection**, – Ignition: **DF361 Ignition coil circuit cylinders 1-4,** **DF362 Ignition coil circuit cylinders 2-3.** – flywheel signal: **DF154 Flywheel signal sensor circuit,** **DF457 Flywheel target.** Check whether there are other cylinders with a LPG combustion misfire fault detected by the tool before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – the programming must have been done, particularly the flywheel target, – the engine should be warm (minimum 75°C), – run the engine at idle speed with all electrical consumers switched on for approximately 15 minutes.
	Special note: – catalytic converter combustion misfire: **OBD warning light** flashes when the fault is present then lights continuously, – pollutant combustion misfire: **OBD warning light** lit continuously. – **engine unstable, loss of power and vibrations**.

Misfires in cylinder 2 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 2 pencil coil, – check the condition and conformity of the spark plugs, – check the cylinder 2 LPG injector If everything is in order, check the same components on cylinder 3 (to cover a possible cylinder recognition error).
Combustion misfires in cylinders 2 and 3	The fault is probably due to a component that affects a pair of cylinders: – check the ignition coil circuit concerned (apply the interpretation of fault **DF361 Ignition coil control 1-4** or **DF362 Ignition coil control 2-3**), – check the condition and conformity of the spark plugs.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF637 PRESENT OR STORED	LPG CYLINDER 3 COMBUSTION MISFIRE 1.DEF: Destructive misfiring 2.DEF: Polluting misfiring

NOTES	**Order of priority for dealing with a combination of faults:** – LPG fuel system: **see 17C, LPG injection**, – ignition: **DF361 Ignition coil circuit cylinders 1-4,** **DF362 Ignition coil circuit cylinders 2-3.** – flywheel signal: **DF154 Flywheel signal sensor circuit,** **DF457 Flywheel target.** Check whether there are other cylinders with a LPG combustion misfire fault detected by the tool before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – the programming must have been done, particularly the flywheel target, – the engine should be warm (minimum 75°C), – run the engine at idle speed with all electrical consumers switched on for approximately 15 minutes.
	Special note: – catalytic converter combustion misfire: **OBD warning light** flashes when the fault is present then lights continuously, – pollutant combustion misfire: **OBD warning light** lit continuously. – **engine unstable, loss of power and vibrations**.

Misfires in cylinder 3 only	The fault is probably due to a component that can only affect this cylinder: – check the cylinder 3 pencil coil, – check the condition and conformity of the spark plugs, – check the cylinder 3 LPG injector If everything is in order, check the same components on cylinder 2 (to cover a possible cylinder recognition error).
Combustion misfires in cylinders 2 and 3	The fault is probably due to a component that affects a pair of cylinders: – check the ignition coil circuit concerned (apply the interpretation of fault **DF361 Ignition coil control 1-4** or **DF362 Ignition coil control 2-3**), – check the condition and conformity of the spark plugs.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF638 PRESENT OR STORED	LPG CYLINDER 4 COMBUSTION MISFIRE 1.DEF: Destructive misfiring 2.DEF: Polluting misfiring

NOTES	**Order of priority for dealing with a combination of faults:** – LPG fuel system: **see 17C, LPG injection**, – ignition: **DF361 Ignition coil circuit cylinders 1-4,** **DF362 Ignition coil circuit cylinders 2-3.** – flywheel signal: **DF154 Flywheel signal sensor circuit,** **DF457 Flywheel target.** Check whether there are other cylinders with a LPG combustion misfire fault detected by the tool before starting the following fault finding procedure.
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – the programming must have been done, particularly the flywheel target, – the engine should be warm (minimum 75°C), – run the engine at idle speed with all electrical consumers switched on for approximately 15 minutes.
	Special note: – catalytic converter combustion misfire: **OBD warning light** flashes when the fault is present then lights continuously, – pollutant combustion misfire: **OBD warning light** lit continuously. – **engine unstable, loss of power and vibrations**.

Misfires in cylinder 4 only	The fault is probably due to a component that can only affect this cylinder: – check the pencil coil of cylinder 4, – check the condition and conformity of the spark plugs, – check the cylinder 4 LPG injector If everything is in order, check the same components on cylinder 1 (to cover a possible cylinder recognition error).
Combustion misfires in cylinders 1 and 4	The fault is probably due to a component that affects a pair of cylinders: – check the ignition coil circuit concerned (apply the interpretation of fault **DF361 Ignition coil control 1-4** or **DF362 Ignition coil control 2-3**), – check the condition and conformity of the spark plugs.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF639 PRESENT OR STORED	COMBUSTION MISFIRE IN LPG MODE 1.DEF: Destructive misfiring 2.DEF: Pollutant misfiring 3.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** – LPG fuel system: **see 17C, LPG injection**, – ignition: **DF361 Ignition coil circuit cylinders 1-4,** **DF362 Ignition coil circuit cylinders 2-3.** – flywheel signal: **DF154 Flywheel signal sensor circuit,** **DF457 Flywheel target.** – cylinder combustion misfires: **DF059 Combustion misfire in cylinder 1,** **DF060 Combustion misfire in cylinder 2,** **DF061 Combustion misfire in cylinder 3,** **DF062 Combustion misfire in cylinder 4.**
	Conditions for applying the fault finding procedure to stored faults: The fault appears in the following conditions: – there must be no further electrical faults, – the programming must have been done, particularly the flywheel target, – the engine should be warm (minimum 75°C), – run the engine at idle speed with all electrical consumers switched on for approximately 15 minutes.
	Special note: – catalytic converter combustion misfire: **OBD warning light** flashes when the fault is present then lights continuously, – pollutant combustion misfire: **OBD warning light** lit continuously. – engine unstable, loss of power and vibrations.

Check the LPG injectors.
Check the condition and conformity of the spark plugs.
Check the ignition pencil coils.

If the fault is still present, carry out the following checks:
– check the flywheel sensor,
– check the condition and cleanliness of the flywheel,
– check the flywheel sensor mounting,
– check the sensor/flywheel air gap,
– check the cylinder compressions,
– check the LPG fuel system,
– check the complete ignition system (see **MR 364 or 370 Mechanics, 17A, Ignition**),
– check the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

If the fault is still present, deal with the other faults then proceed with the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

S3000_V4C_DF639

DF650 PRESENT OR STORED	ACCELERATOR PEDAL POSITION SIGNAL 1.DEF: Accelerator pedal sensor locked

NOTES	**Order of priority for dealing with a combination of faults:** Apply the procedure for dealing with faults **DF012 Sensor supply voltage no. 2, DF012 Sensor supply voltage no. 2, DF197 Pedal sensor circuit gang 1, DF198 Pedal sensor circuit gang 2** if these are present or stored.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present when brake and accelerator pedals are depressed simultaneously for **30 seconds**.
	Special note: – **Level 2 fault warning light** illuminated, – defect mode **types 3 and 4**.

1.DEF	***NOTES***	**Special note:** – defect mode **types 2 and 3**: vehicle and engine speed restriction, the ESP and cruise control/speed limiter are deactivated.

Check that the accelerator pedal is not jammed and that nothing is impairing its operation (floor carpet, etc.).
Check the connection and condition of the **6-track connector** for the accelerator pedal potentiometer. Repair if necessary.
Check the connection and condition of computer **connector A**. Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

DF650 **CONTINUED**	

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Computer, connector **A, track G2**	→	**track 3** of the pedal potentiometer gang 1
Computer, connector **A, track H2**	→	**track 4** of the pedal potentiometer gang 1
Computer, connector **A, track H3**	→	**track 5** of the potentiometer gang 1
Computer, connector **A, track F2**	→	**track 2** of the potentiometer, gang 2
Computer, connector **A, track F3**	→	**track 1** of the potentiometer gang 2
Computer, connector **A, track F4**	→	**track 6** of the potentiometer gang 2

Repair if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other faults. Clear the stored faults.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Battery voltage	**ET001:**	computer + after ignition feed	**Present**	In the event of a fault, apply the interpretation for **DF046 Battery voltage**.
2		**PR074:**	Battery voltage	**11 V < PR074 < 15 V**	
3	**Vehicle speed**	**PR089:**	Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.** **PR089 = 0 km/h**	In the event of a fault apply the interpretation for **DF091 Vehicle speed signal**.
4	Faults	**ET064:**	Level 1 injection fault	**YES** **NO**	**NONE**
5		**ET065:**	Level 2 Injection fault	**YES** **NO**	
6		**PR105:**	OBD fault warning light illuminated mileage counter	**Indicates the mileage covered with the OBD warning light lit.**	
7		**PR106:**	Fault warning light illuminated mileage counter	**Shows the distance covered with the warning light on.**	

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: AIR CIRC. (TURBOCHARGING/INLET):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Air circuit pressure**	**PR035:**	Atmospheric pressure	**PR035 = 1000 mb ± 100 mb**	If not consistent, check **PR035 = PR312 = local atmospheric pressure, with the engine stopped and ignition on**.
2		**PR312:**	Inlet manifold pressure	**PR312 = 1000 mb ± 100 mb**	In the event of a fault, apply interpretation of **PR312 Manifold pressure**.
3	**Engine speed**	**PR055:**	Engine speed	**Indicates the engine rotation speed in rpm PR055 = 0 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
4	**Idle speed**	**ET054:**	Idle speed regulation	**INACTIVE**	**None**
5		**PR010:**	Idle speed regulation setting	**700 < X < 750 rpm** **Indicates the speed of rotation setpoint before last engine stop in rpm.**	**None**
6	**Air temperature**	**PR058:**	Air temperature	**-40°C < PR058 < 120°C Default value: -120°C**	In the event of a fault, apply interpretation of **DF002 Air temperature sensor circuit**.
7	**Coolant temperature**	**PR064:**	Coolant temperature	**-40°C < PR064 < 120°C Default value: -39°C**	In the event of a fault, apply interpretation of **DF001 Coolant temperature sensor circuit**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: AIR CIRC.(TURBO/INLET) (continued):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
8	**Air flow**	**PR018:**	Estimated air flow	**Indicates the air flow value estimated by the motorised throttle valve.** **PR018 = 0 kg/h**	If there is a fault, refer to the interpretation of **DF095 Throttle potentiometer circuit gang 1** and **DF096 Throttle potentiometer circuit gang 2**.
9	**Camshaft dephaser (Only on K4M engines)**	**ET083:**	Camshaft dephaser in defect mode	**STATUS 1:** this defect mode covers all faults that affect determining position of the dephaser. The dephaser is controlled at the low stop and the camshaft angle measurement is forced to 0. Tooth signal fault. **STATUS 2:** this defect mode covers all faults that affect the dephaser (pulley and solenoid valve). The dephaser is set to the low stop end. **NO**	For **STATUS 1**, carry out fault finding on the camshaft signal/tooth consistency. For **STATUS 2**, carry out fault finding on the camshaft dephaser position.
10		**PR094:**	Camshaft dephaser OCR setting	Shows required camshaft dephaser value (in %). **PR094 = 0%**	**NONE**
11		**ET086:**	Camshaft dephaser control	**ACTIVE** **INACTIVE**	
12	**Electric coolant pump**	**AC195:**	Electric coolant pump	**The pump should be heard operating**	In the event of a fault, apply interpretation of **DF570 Coolant pump relay**.

OCR: Opening Cyclic Ratio

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION FUEL CIRCUIT

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Engine speed**	**PR055:**	Engine speed	**Indicates the engine rotation speed in rpm PR055 = 0 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
2	**Idle speed**	**PR014:**	Idle speed correction	**Indicates the correction of the engine's speed of rotation in rpm. 0 rpm**	**None**
3		**ET054:**	Idle speed regulation	**INACTIVE**	**None**
		PR010:	Idle speed regulation setting	**700 < X < 750 rpm Indicates the speed of rotation setpoint before last engine stop in rpm.**	**None**

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION FUEL CIRCUIT (continued 1):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
4	**Motorised throttle**	**PR090:**	Idle speed regulation programmed value	**-12% < PR090 < 12% PR090, an adaptive built-in action, is a stored parameter designed to program variation and engine ageing for the idle speed regulator. The programming only occurs when the engine is idling and warm, and no electrical consumer (heated windscreen, air conditioning, fan, power steering) is being used. Therefore it adjusts slowly.**	**NONE**
5	**Motorised throttle**	**PR091:**	Theoretical idle speed regulation OCR	**0% < PR091 < 60% When the conditions for regulation are met, the idle regulator continually repositions the motorised throttle to keep the engine speed at the idle speed setting. The motorised throttle opening ratio required to maintain the engine speed setting is then given by parameter PR091.**	

OCR: Opening Cyclic Ratio

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION FUEL CIRCUIT (continued 2):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
6	Richness	**PR138:**	Richness correction	**In loop mode, the richness correction corrects the injection duration in order to obtain a mixture as close as possible to richness 1. Richness correction value is around 50 with limits of 0 and 100. 0 < PR138 < 100%**	**NONE**
7		**ET300:**	Richness regulation	**INACTIVE**	**NONE**
8		**ET056:**	Richness double loop	**INACTIVE**	In the event of a fault, apply the interpretation for **ET056 Double richness loop**.
9	Oxygen sensor	**PR144:**	Self-adapting richness offset	**0 < PR624 < 255 This parameter serves to determine the trend towards increasing or decreasing richness in the injection system.**	**NONE**
10		**PR143:**	Self-adapting richness gain	**0 < PR625 < 255 This parameter serves to determine the trend towards increasing or decreasing richness in the injection system.**	
11	**Injection**	**PR101:**	Duration of injection	**0 µs**	
12	**Fuel consumption**	**PR103:**	Instantaneous fuel consumption	**PR103 = 0 l/h**	

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: FUEL CIRCUIT (continued 3):

Order	Function	Parameter or Status checked or Action		Display and notes		Fault finding
13	Petrol pump	ET047:	Fuel pump control circuit	ACTIVE for 1 second when the ignition is switched on then INACTIVE		If **ACTIVE**, apply the interpretation of **DF085 Petrol pump relay control circuit (when the + after ignition feed is turned on, the pump control circuit is ACTIVE for 1 second then becomes INACTIVE**.
14	IN LPG ACTIVATED MODE	ET561:	Operating mode	Petrol Ignition on		In the event of a fault, (**see 17C, 3000 LPG injection**).
15		ET067:	LPG ready	With LPG YES	Without LPG NO by default	
16		ET073:	Conditions for switching to LPG mode	With LPG AUTHORISED	Without LPG INHIBITED by default	
17		ET068:	LPG tank empty	With LPG NO	Without LPG NO by default	
18		ET066:	LPG fault	With LPG NO	Without LPG NO by default	
19		ET071:	Transition from petrol mode to LPG mode	With LPG COMPLETE	Without LPG COMPLETE by default	
20		ET072:	Transition from LPG mode to petrol mode	With LPG IN PROGRESS	Without LPG COMPLETE by default	

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: ANTIPOLLUTION/OBD

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Oxygen sensor	**PR098:**	Upstream oxygen sensor voltage	**50 mV < PR098 < 800 mV**	In the event of a fault apply the interpretation for **PR098 Upstream oxygen sensor voltage**.
2		**PR099:**	Downstream oxygen sensor voltage	**50 mV < PR099 < 800 mV**	In the event of a fault, apply the interpretation for **PR099 Downstream oxygen sensor voltage**.
3	Canister	**ET050:**	Canister bleed control	**INACTIVE**	In the event of a fault, apply the interpretation of **DF549 Canister bleed circuit**.
4		**PR102:**	Canister bleed solenoid valve OCR	**0% < PR102 < 100%**	
5	Oxygen sensor	**AC018:**	Upstream O_2 sensor heating	**The upstream oxygen sensor should heat up**	In the event of a fault, apply interpretation of **DF601 Upstream oxygen sensor heating power circuit**.
6		**AC019:**	Downstream O_2 sensor heating	**The downstream oxygen sensor should heat up**	In the event of a fault, apply interpretation of **DF602 Downstream oxygen sensor heating power circuit**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: ANTIPOLLUTION/OBD (cont.):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
7	Oxygen sensor	ET052:	Upstream O_2 sensor heating	INACTIVE	In the event of a fault apply the interpretation of **DF601 Upstream oxygen sensor heating power circuit**.
8		ET053:	Downstream O_2 sensor heating	INACTIVE	In the event of a fault, apply interpretation of **DF602 Downstream oxygen sensor heating power circuit**.
9	Canister	AC017:	Canister bleed solenoid valve	**The canister bleed solenoid valve should be heard running.**	In the event of a fault, apply the interpretation of **DF549 Canister bleed circuit**.
10	Fault finding	ET617:	Upstream oxygen sensor OBD fault finding	INACTIVE	None
11		ET619:	Fuel circuit OBD fault finding	INACTIVE	None
12		ET581:	Petrol combustion misfire fault finding	INACTIVE	None
13	Fault finding	ET340:	Request by automatic gearbox to light up the OBD warning light	INACTIVE	If **ACTIVE**, apply the interpretation of fault **DF099 Automatic gearbox or sequential gearbox connection via the multiplex network**.
14	Richness	ET300:	Richness regulation	ACTIVE INACTIVE	NONE
15		ET056:	Richness double loop	ACTIVE INACTIVE	In the event of a fault, apply the interpretation for **ET056 Double richness loop**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: DRIVER PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Motorised throttle**	**ET051:**	Throttle stop programming	**COMPLETE**	**Run command RZ005: Programming. If the parameters or statuses are still not correct, contact the Techline.**
2		**ET082:**	Motorised throttle position	**PL: no load PF: full load INTERMEDIATE**	
3		**PR116:**	Motorised throttle adjusted reference position	**PR116 ≈ 2%**	
4		**PR111:**	Motorised throttle position corrected value	**No load < 15% Full load > 30%**	
5		**PR097:**	Motorised throttle lower stop programmed value.	**5.96% < PR097 < 13.96%**	
6		**PR096:**	Motorised throttle upper stop programmed value	**80% < PR096 < 100%**	
7		**PR429:**	Measured throttle position	**5% < PR429 < 25%**	
8		**PR118:**	Measured throttle position gang 1	**No load = 4% Full load = 99% Default value: 0%**	If there is a fault, apply the interpretation for **DF095 Throttle potentiometer circuit gang 1**.
9		**PR119:**	Measured throttle position gang 2	**No load = 4% Full load = 100% Default value: 100%**	In the event of a fault, apply the interpretation for **DF096 Throttle potentiometer circuit gang 2**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: DRIVER PARAMETERS (continued 1):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
10	**Accelerator pedal and motorised throttle**	**ET075:**	Pedal released and throttle closed	**YES**	If **NO**, apply the interpretation for **PR030 Accelerator pedal position** followed by the interpretation for fault **DF079 Motorised throttle valve servo control**.
11	**Motorised throttle**	**PR597:**	Motorised throttle in safe mode	**15% < PR597 < 25%**	**Run command RZ005: Programming. If the parameters or statuses are still not correct, contact the Techline.**
12		**PR593:**	Motorised throttle in safe mode gang 1	**PR593 ≈ 1V**	
13		**PR594:**	Motorised throttle in safe mode gang 2	**PR594 ≈ 1V**	
14	**Accelerator pedal**	**ET081:**	Accelerator pedal position	**PL: no load PF: full load INTERMEDIATE**	In the event of a fault apply the interpretation for **PR030 Accelerator pedal position**.
15	**Accelerator pedal**	**PR030:**	Accelerator pedal position	**No load = < 16% Full load ≥ 85%**	In the event of a fault, apply interpretation of **DF196** and **DF198 Pedal sensor circuit gangs 1 and 2**, then **DF011** and **DF012 Sensor supply voltage 1 and 2**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: DRIVER PARAMETERS (continued 2):

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
16	**Accelerator pedal** **(continued)**	**PR568:** Pedal position gang 1	**0.2 V < PR568 < 5 V** **Default value: 5 V**	In the event of a fault, apply the interpretation of fault **DF196 Pedal sensor circuit gang 1**.
17		**PR569:** Pedal position gang 2	**0.2 V < PR569 < 5 V** **Default value: 0 V**	In the event of a fault, apply the interpretation of fault **DF198 Pedal sensor circuit gang 2**.
18		**PR147:** Pedal potentiometer voltage gang 1	**PR147 ≈ 15 V**	In the event of a fault, apply the interpretation of fault **DF196 Pedal sensor circuit gang 1**.
19		**PR148:** Pedal potentiometer voltage gang 2	**PR148 ≈ 7.5 V**	In the event of a fault, apply the interpretation of fault **DF198 Pedal sensor circuit gang 2**.
20		**PR424:** Programming the no-load position value	**PR424 ≈ 15%**	**Run command RZ005: Programming. If the parameters are still not correct, contact the Techline.**

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: DRIVER PARAMETERS (continued 3):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
21	Motorised throttle	**AC027:**	Motorised throttle	**The motorised throttle should be heard operating**	In the event of a fault apply the interpretation of **AC027 Motorised throttle**.
22		**PR539:**	Measured throttle voltage, gang 1	**PR539 ≈ 1 V**	In the event of a fault, apply interpretation of **DF095 Throttle potentiometer circuit gang 1 and DF096 Throttle potentiometer circuit gang 2**.
23		**PR538:**	Measured throttle voltage, gang 2	**PR538 ≈ 0.4 V**	
24		**PR587:**	Motorised throttle lower stop gang 1	**PR587 ≈ 0.5 V**	
25		**PR588:**	Motorised throttle lower stop gang 2	**PR588 ≈ 0.5 V**	
26		**PR589:**	Motorised throttle upper stop gang 1	**PR589 ≈ 4.40 V**	
27		**PR590:**	Motorised throttle upper stop gang 2	**PR590 ≈ 4.40 V**	In the event of a fault, apply interpretation of **DF095 Throttle potentiometer circuit gang 1 and DF096 Throttle potentiometer circuit gang 2**.
28		**PR113:**	Throttle lower stop after applying. offset	**PR113 ≈ 10%**	
29		**ET0564:**	Defect mode type 1	**NO**	**NONE**
30		**ET0565:**	Defect mode type 2	**NO**	
31		**ET0566:**	Defect mode type 3	**NO**	
32		**ET0567:**	Defect mode type 4	**NO**	
33		**ET0568:**	Defect mode type 5	**NO**	
34		**ET0569:**	Defect mode type 6	**NO**	

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: PRE-HEATING/IGNITION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Cylinder recognition**	**ET061:**	Cylinder 1 recognition	**NOT COMPLETE** **COMPLETE**	In the event of a fault, apply the interpretation for status **ET061 Cylinder 1 recognition**.
2	**Engine speed**	**PR055:**	Engine speed	**Indicates the engine rotation speed in rpm** **PR055 = 0 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
3	**Engine flywheel target**	**ET089:**	Flywheel target programming	**NOT COMPLETE** **COMPLETE** **STATUS 1**	**STATUS 1:** Flywheel target fault. **NONE**
4	**Flywheel signal**	**ET062:**	Flywheel signal	**NOT DETECTED**	In the event of a fault, apply the interpretation for status **ET062 Flywheel signal**.
5	**Ignition**	**PR448:**	Ignition advance	**PR448 = 0 °V**	**NONE**
6		**PR095:**	Anti-pinking correction	**PR095 = 0 °V**	
7		**PR126:**	advance after anti-pinking correction	**-23.6 °V < PR126 < 72 °V**	
8		**PR427:**	Average pinking signal	**0**	In the event of a fault, apply the interpretation of **DF088 Pinking sensor circuit**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: IGNITION/PREHEATING (continued 1):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
9		**ET581:**	Petrol combustion misfire fault finding	**INACTIVE**	In the event of a fault, apply interpretation of faults **DF059 Combustion misfire in cylinder 1, DF060 Combustion misfire in cylinder 2, DF061 Combustion misfire in cylinder 3, DF062 Combustion misfire in cylinder 4**.
10	**Misfiring**	**ET057:**	Misfires in cylinder 1	**NO**	
11		**ET058:**	Misfires in cylinder 2	**NO**	
12		**ET059:**	Misfires in cylinder 3	**NO**	
13		**ET060:**	Misfires in cylinder 4	**NO**	
14	**Actuators**	**AC079:**	Actuator static test	**All the actuators must be operated (fuel pump relay, electric coolant pump on F4RT, downstream and upstream sensor heating, motorised throttle)**	In the event of a fault, apply interpretation of **fault associated with the actuators concerned**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: IGNITION/PREHEATING (continued 2):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
15	**Combustion misfires LPG**	**ET582:**	LPG combustion misfire fault finding	**INACTIVE**	In the event of a fault, apply interpretation of faults **DF635 Combustion misfire in LPG cylinder 1, DF636 Combustion misfire in LPG cylinder 2, DF637 Combustion misfire in LPG cylinder 3, DF638 Combustion misfire in LPG cylinder 4**.
16		**ET583:**	LPG cylinder 1 combustion misfire	**NO**	
17		**ET584:**	LPG cylinder 2 combustion misfire	**NO**	
18		**ET585:**	LPG cylinder 3 combustion misfire	**NO**	
19		**ET586:**	LPG cylinder 4 combustion misfire	**NO**	
20	**Actuators**	**AC079:**	Actuator static test	**All the actuators must be operated (fuel pump relay, electric coolant pump on F4RT, downstream and upstream sensor heating, motorised throttle)**	In the event of a fault, apply interpretation of **fault associated with the actuators concerned**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: COLD LOOP

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	Air conditioning	**ET079:** Air conditioning present	**Shows whether or not the vehicle is equipped with air conditioning.** **YES:** Air conditioning is detected by the injection computer. **NO:** Air conditioning is not detected by the injection computer.	**If inconsistent with the vehicle equipment, carry out a multiplex network test and apply the relevant procedure.**
2		**ET088:** Compressor activation request	**The injection requests the UCH (via the multiplex network) to start the compressor.** **ACTIVE:** The multiplex network must not be faulty on the automatic gearbox or UCH systems. The UCH must send a compressor starting request to the injection. The coolant pressure sensor must not be defective. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **INACTIVE:** One of the above conditions has not been fulfilled.	**NONE**
3		**ET004:** Air conditioning authorisation	**YES** **NO**	

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: COLD LOOP (continued 1)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
4	**Idle speed**	**ET023:**	Fast idle speed request	**UCH requests the injection system to increase the idle speed.** **INACTIVE:** The UCH has not formulated a request. **ACTIVE:** The UCH has formulated a request	**If ET023 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct, check the UCH.**
5	**Engine speed**	**PR055:**	Engine speed	**Indicates the rotation speed in rpm** **PR055 = 0 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
6	**Air conditioning**	**PR037:**	Refrigerant pressure	**2 Bar < PR037 < 27 Bar** **Default value: 0 Bar.**	If **1.DEF**, apply interpretation of **PR037 Coolant pressure**.
7		**ET674:**	Refrigerant pressure status	**CORRECT** **TOO LOW**	
8		**PR125:**	Power absorbed by the air conditioning compressor	**PR125 = 300 W**	**NONE**
9	**Coolant temperature**	**PR064:**	Coolant temperature	**-40°C < PR064 < 120°C** **Default value: -39°C**	In the event of a fault, apply interpretation of **DF001 Coolant temperature sensor circuit**.
10	**Vehicle speed**	**PR089:**	Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	In the event of a fault apply the interpretation for **DF091 Vehicle speed signal**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: COLD LOOP (continued 2):

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
11	Fan	**ET022:** Low speed fan request	If the coolant temperature reaches **98°C**, the low-speed fan assembly is activated, and is shut down at **96°C** **ACTIVE** **INACTIVE**	**In the event of a fault, run a multiplex network test using the diagnostic tool then, if the test is in order, consult the Protection and Switching Unit.**
12		**ET021:** High speed fan request	If the coolant temperature reaches **102°C**, the low-speed fan assembly is activated, and is shut down at **99°C** **ACTIVE** **INACTIVE**	

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: HEATING

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature	**-40°C < PR064 < 120°C** **Default value: -39°C**	In the event of a fault, apply interpretation of **DF001 Coolant temperature sensor circuit**.
2	**Passenger compartment heating resistor**	**ET111:**	Set number of passenger compartment heating resistors.	**YES** **NO**	**In the event of a fault, run a multiplex network test using the diagnostic tool; then, if the test is in order consult the Protection and Communication Unit.**
3		**ET112:**	Passenger compartment heating resistor cut-off	**YES** **NO**	

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: CRUISE CONTROL/SPEED LIMITER

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Cruise control/ Speed limiter**	**ET042:**	Cruise control/ Speed limiter	**CRUISE CONTROL SPEED LIMITER**	If there is a fault, apply the interpretation for **ET042 Cruise control/Speed limiter**.
2		**ET413:**	Cruise control/ speed limiter function	**DECREASE** **INCREASE** **SUSPEND** **RESUME**	In the event of a fault, apply the interpretation for **ET413 Cruise control/Speed limiter function**.
3		**ET556:**	Driver deactivation of the cruise control/ speed limiter	**STATUS 1:** Brake pedal depressed **STATUS 2:** Traction control request **STATUS 3:** Press the Suspend button **STATUS 4:** Clutch pedal depressed **STATUS 5:** Gear lever in neutral position **STATUS 6:** Inconsistency between the request and the vehicle speed	**NONE**
3		**ET557:**	Deactivation by cruise control/ speed limiter function	**STATUS 1:** Fault with cruise control or speed limiter **STATUS 2:** Fault detected by the injection computer **STATUS 3:** Vehicle speed invalid **STATUS 4:** Automatic gearbox in defect mode	

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: CRUISE CONTROL/SPEED LIMITER (continued):

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
4	**Vehicle speed**	**PR089:** Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	In the event of a fault apply the interpretation for **DF091 Vehicle speed signal**.
5	**Brake pedal**	**ET039:** Brake pedal	**RELEASED** **DEPRESSED** **Default value: DEPRESSED**	If there is a fault, apply the interpretation for **ET039 Brake pedal**.
6	**Clutch contact**	**ET233:** Clutch pedal	**Shows recognition of clutch pedal contacts** **RELEASED:** Pedal released **DEPRESSED:** Pedal depressed. **If the vehicle has an automatic gearbox, status ET233 should be DEPRESSED.**	In the event of a fault, apply the interpretation for **ET233 Clutch pedal**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: STARTING

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Starting**	**ET076:**	Starting	**AUTHORISED**	**Authorisation to start is given once the petrol pump is pressurised and the motorised throttle has emerged from the stop and limp-home position programming phase.**
2	**Actuator control relay**	**ET048:**	Actuator relay control	**ACTIVE**	If **INACTIVE** apply the interpretation of **DF084 Actuator relay control circuit**.
3	**Battery voltage**	**PR074:**	Battery voltage	**11 V < PR074 < 15 V**	In the event of a fault, apply the interpretation for **DF046 Battery voltage**.
4	**Impact signal**	**ET077:**	Impact detected	**NO**	**In the event of a fault, run a multiplex network test using the diagnostic tool; then, if the test is OK, carry out fault finding on the airbag computer.**

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **off, ignition on**.

SUB-FUNCTION: PROTECTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Code programmed**	**ET006:**	Code programmed	**Indicates whether or not the immobiliser code has been programmed by the computer.** **PROGRAMMED:** Code programmed **NOT PROGRAMMED:** Code not programmed by the injection computer.	**If NOT PROGRAMMED, contact the Techline**
2	**Engine immobiliser**	**ET003:**	Engine immobiliser	**Indicates the status of the immobiliser system.** **INACTIVE**	**If ET003 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct, refer to the UCH fault finding procedure.**
3	**Starting**	**ET076:**	Starting	**AUTHORISED**	**Authorisation to start is given once the petrol pump is pressurised and the motorised throttle has emerged from the stop and limp-home position programming phase.**

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

MAIN COMPUTER STATUSES AND PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Battery voltage	**ET001:**	computer + after ignition feed	**Present**	In the event of a fault, apply the interpretation for **DF046 Battery voltage**.
2		**PR074:**	Battery voltage	**11 V < PR074 < 15 V**	
3	**Vehicle speed**	**PR089:**	Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	In the event of a fault apply the interpretation for **DF091 Vehicle speed signal**.
4	Faults	**ET064:**	Level 1 injection fault	**YES** **NO**	**NONE**
5		**ET065:**	Level 2 Injection fault	**YES** **NO**	
6		**PR105:**	OBD fault warning light illuminated mileage counter	**Indicates the mileage covered with the OBD warning light lit.**	
7		**PR106:**	Fault warning light illuminated mileage counter	**Shows the distance covered with the warning light on.**	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB FUNCTION: AIR CIRC. (TURBOCHARGING/INLET):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Air circuit pressure**	**PR035:**	Atmospheric pressure	**200 mb < PR035 < 1047 mb**	If not consistent, check **PR035 = PR312 = local atmospheric pressure, with the engine stopped and ignition on**. In the event of a fault, apply interpretation of **PR312 Manifold pressure**.
2		**PR312:**	Inlet manifold pressure	**For K4M:** **240 mb < PR312 < 410 mb** **For K4J:** **330 mb < PR312 < 400 mb** **For > F4Rt:** **270 mb < PR312 < 400 mb** **For F4R:** **270 mb < PR312 < 410 mb**	
3	**Engine speed**	**PR055:**	Engine speed	**Indicates the engine rotation speed in rpm** **PR055 = 0 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
4	**Idle speed**	**ET054:**	Idle speed regulation	**INACTIVE**	**None**
5		**PR010:**	Idle speed regulation setting	**700 < X < 750 rpm** **Indicates the speed of rotation setpoint before last engine stop in rpm.**	**None**
6	**Air temperature**	**PR058:**	Air temperature	**-40°C < PR058 < 120°C** **Default value: 120°C**	In the event of a fault, apply interpretation of **DF002 Air temperature sensor circuit**.
7	**Coolant temperature**	**PR064:**	Coolant temperature	**-40°C < PR064 < 120°C** **Default value: 120°C**	In the event of a fault, apply interpretation of **DF001 Coolant temperature sensor circuit**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB FUNCTION: AIR CIRC. (TURBO/INLET) (continued):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
8	**Air flow**	**PR018:**	Estimated air flow	**Indicates the air flow value estimated by the motorised throttle valve.**	If there is a fault, refer to the interpretation of **DF095 Throttle potentiometer circuit gang 1** and **DF096 Throttle potentiometer circuit gang 2**.
9	**Camshaft dephaser (Only on K4M engines)**	**ET083:**	Camshaft dephaser in defect mode	**STATUS 1:** this defect mode covers all faults that affect determining position of the dephaser. The dephaser is controlled at the low stop and the camshaft angle measurement is forced to 0. Tooth signal fault **STATUS 2:** this defect mode covers all faults that affect the dephaser (pulley and solenoid valve). The dephaser is set to the low stop end. **NO**	For **STATUS 1**, carry out fault finding on the camshaft signal/tooth consistency. For **STATUS 2**, carry out fault finding on the camshaft dephaser position.
10		**PR094:**	Camshaft dephaser OCR setting	Shows required camshaft dephaser value (in %).	**NONE**
11		**ET086:**	Camshaft dephaser control	**ACTIVE** **INACTIVE**	
12	**Electric coolant pump**	**AC195:**	Electric coolant pump	**The pump should be heard operating**	In the event of a fault, apply interpretation of **DF570 Coolant pump relay**.

OCR: Opening Cyclic Ratio

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB FUNCTION: FUEL CIRCUIT

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	**Engine speed**	**PR055:** Engine speed	**Indicates the engine's speed of rotation in rpm. 700 rpm < PR055 < 800 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
2		**PR014:** Idle speed correction	**Indicates the correction of the engine's speed of rotation in rpm. 0 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
3	**Idle speed**	**ET054:** Idle speed regulation	**ACTIVE**	**None**
4		**PR010:** Idle speed regulation setting	**700 < X < 750 rpm Indicates the speed of rotation setpoint before last engine stop in rpm.**	**None**

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: FUEL CIRCUIT (continued 1):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
5	Motorised throttle	**PR090:**	Idle speed regulation programmed value	**PR090 ≈ 0%** **PR090, an adaptive built-in action, is a stored parameter designed to program variation and engine ageing for the idle speed regulator. The programming only occurs when the engine is idling and warm, and no electrical consumer (heated windscreen, air conditioning, fan, power steering) is being used. Therefore it adjusts slowly.**	**NONE**
6		**PR091:**	Theoretical idle speed regulation OCR	**5% < PR091 < 50%** **When the conditions for regulation are met, the idle regulator continually repositions the motorised throttle to keep the engine speed at the idle speed setting. The motorised throttle opening ratio required to maintain the engine speed setting is then given by parameter PR091.**	

OCR: Opening Cyclic Ratio

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: FUEL CIRCUIT (continued 2):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
7	**Richness**	**PR138:**	Richness correction	**In loop mode, the richness correction corrects the injection duration in order to obtain a mixture as close as possible to richness 1. Richness correction value is around 50 with limits of 0 and 100. 0 < PR138 < 100%**	**NONE**
8		**ET300:**	Richness regulation	**ACTIVE INACTIVE**	**NONE**
9		**ET056:**	Richness double loop	**ACTIVE**	In the event of a fault apply the interpretation for **ET056 Double richness loop**.
10	**Richness**	**PR144:**	Self-adapting richness offset	**PR624 ≈ 128 This parameter serves to determine the trend towards increasing or decreasing richness in the injection system.**	**NONE**
11		**PR143:**	Self-adapting richness gain	**PR625 ≈ 128 This parameter serves to determine the trend towards increasing or decreasing richness in the injection system.**	
12	**Injection**	**PR101:**	Duration of injection	**At idle speed 2.4 µs < PR101 < 4.3 µs**	
13	**Fuel consumption**	**PR103:**	Instantaneous fuel consumption	**0 l/h < PR103 < 50 l/h**	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: FUEL CIRCUIT (continued 3)

Order	Function	Parameter or Status checked or Action		Display and notes		Fault finding
14	**Petrol pump**	**ET047:**	Fuel pump control circuit	**ACTIVE**		If **INACTIVE**, apply the interpretation for **DF085 Petrol pump relay control circuit**.
15	**IN LPG ACTIVATED MODE**	**ET561:**	Operating mode	**Petrol Then LPG**		In the event of a fault, (**see 17C, 3000 LPG injection**).
16		**ET067:**	LPG ready	**With LPG YES**	**Without LPG NO by default**	
17		**ET073:**	Conditions for switching to LPG mode	**With LPG AUTHORISED**	**Without LPG INHIBITED by default**	
18		**ET068:**	LPG tank empty	**With LPG "NO"**	**Without LPG "NO" by default**	
19		**ET066:**	LPG fault	**With LPG "NO"**	**Without LPG "NO" by default**	
20		**ET071:**	Transition from petrol mode to LPG mode	**With LPG IN PROGRESS then COMPLETE**	**Without LPG COMPLETE by default**	
21		**ET072:**	Transition from LPG mode to petrol mode	**With LPG IN PROGRESS**	**Without LPG COMPLETE by default**	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: ANTIPOLLUTION/OBD

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	Oxygen sensor	**PR098:**	Upstream oxygen sensor voltage	**50 mV < PR098 < 800 mV**	In the event of a fault, apply the interpretation for **PR098 Upstream oxygen sensor voltage**.
2		**PR099:**	Downstream oxygen sensor voltage	**PR099 ≈ 480 mV**	In the event of a fault, apply the interpretation for **PR099 Downstream oxygen sensor voltage**.
3	Canister	**ET050:**	Canister bleed control	**INACTIVE**	In the event of a fault, apply the interpretation of **DF549 Canister bleed circuit**.
4		**PR102:**	Canister bleed solenoid valve OCR	**0% < PR102 < 100%**	
5	Oxygen sensor	**AC018:**	Upstream O_2 sensor heating	**The upstream oxygen sensor should heat up**	In the event of a fault apply the interpretation of **DF601 Upstream oxygen sensor heating power circuit**.
6		**AC019:**	Downstream O_2 sensor heating	**The downstream oxygen sensor should heat up**	In the event of a fault, apply interpretation of **DF602 Downstream oxygen sensor heating power circuit**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: ANTIPOLLUTION/OBD (cont.):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
7	Oxygen sensor (continued)	**ET052:**	**AIR** Upstream O_2 sensor heating	**INACTIVE**	In the event of a fault apply the interpretation of **DF601 Upstream oxygen sensor heating power circuit**.
8		**ET053:**	**AIR** Downstream O_2 sensor heating	**INACTIVE**	In the event of a fault, apply interpretation of **DF602 Downstream oxygen sensor heating power circuit**.
9	**Canister**	**AC017:**	Canister bleed solenoid valve	**The canister bleed solenoid valve should be heard running.**	In the event of a fault, apply the interpretation of **DF549 Canister bleed circuit**.
10	**Fault finding**	**ET617:**	Upstream oxygen sensor OBD fault finding	**INACTIVE**	**None**
11		**ET619:**	Fuel circuit OBD fault finding	**INACTIVE**	**None**
12		**ET581:**	Petrol combustion misfire fault finding	**INACTIVE**	**None**
13	**Fault finding**	**ET340:**	Request by automatic gearbox to light up the OBD warning light	**INACTIVE**	If **ACTIVE**, apply the interpretation of fault **DF099 Automatic gearbox or sequential gearbox connection via the multiplex network**.
14	**Richness**	**ET300:**	Richness regulation	**ACTIVE** **INACTIVE**	**NONE**
15		**ET056:**	Richness double loop	**ACTIVE**	In the event of a fault, apply the interpretation for **ET056 Double richness loop**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: DRIVER PARAMETERS

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Motorised throttle**	**ET051:**	Throttle stop programming	**COMPLETE**	**Run command RZ005: Programming. If the parameters or statuses are still not correct, contact the Techline.**
2		**ET082:**	Motorised throttle position	**PL: no load PF: full load INTERMEDIATE**	
3		**PR116:**	Motorised throttle adjusted reference position	**PR116 ≈ 2%**	
4		**PR111:**	Motorised throttle position corrected value	**No load < 15% Full load > 30%**	
5		**PR097:**	Motorised throttle lower stop programmed value.	**5.96% < PR097 < 13.96%**	
6		**PR096:**	Motorised throttle upper stop programmed value	**80% < PR096 < 100%**	
7		**PR429:**	Measured throttle position	**5% < PR096 < 25%**	
8		**PR118:**	Measured throttle position gang 1	**PR118 ≈ 12%**	If there is a fault, apply the interpretation for **DF095 Throttle potentiometer circuit gang 1**.
9		**PR119:**	Measured throttle position gang 2	**PR119 ≈ 12%**	In the event of a fault, apply the interpretation for **DF096 Throttle potentiometer circuit gang 2**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: DRIVER PARAMETERS (continued 1):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
10	**Accelerator pedal and motorised throttle**	**ET075:**	Pedal released and throttle closed	**YES**	If **NO**, apply the interpretation of **PR030 Accelerator pedal position** followed by the interpretation of fault **ET082 Motorised throttle valve servo control**.
11	**Motorised throttle**	**PR597:**	Motorised throttle in safe mode	**15% < PR597 < 25%**	**Run command RZ005: Programming. If the parameters or statuses are still not correct, contact the Techline.**
12		**PR593:**	Motorised throttle in safe mode gang 1	**PR593 ≈ 1V**	
13		**PR594:**	Motorised throttle in safe mode gang 2	**PR594 ≈ 1V**	
14	**Accelerator pedal**	**ET081:**	Accelerator pedal position	**PL: no load PF: full load NOT DETECTED**	In the event of a fault apply the interpretation for **PR030 Accelerator pedal position**
15		**PR030:**	Accelerator pedal position	**No load = 0% Full load = 100%**	In the event of a fault, apply interpretation of **DF008** and **DF009 Pedal potentiometer circuit track 1 and track 2**, then **DF011 and DF012 Sensor supply voltage 1 and 2**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: DRIVER PARAMETERS (continued 2):

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
16	**Accelerator pedal** **(continued)**	**PR568:** Pedal position gang 1	**0.2 V < PR568 < 5 V** **Default value: 5 V**	In the event of a fault, apply the interpretation of fault **DF196 Pedal sensor circuit gang 1**.
17		**PR569:** Pedal position gang 2	**0.2 V < PR569 < 5 V** **Default value: 0 V**	In the event of a fault, apply the interpretation of fault **DF198 Pedal sensor circuit gang 2**.
18		**PR147:** Pedal potentiometer voltage gang 1	**PR147 ≈ 15V**	In the event of a fault, apply the interpretation of fault **DF196 Pedal sensor circuit gang 1**.
19		**PR148:** Pedal potentiometer voltage gang 2	**PR148 ≈ 7.5 V**	In the event of a fault, apply the interpretation of fault **DF198 Pedal sensor circuit gang 2**.
20		**PR424:** Programming the no-load position value	**PR424 ≈ 15%**	**Run command RZ005: Programming. If the parameters are still not correct, contact the Techline.**

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: DRIVER PARAMETERS (CONTINUED 3):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
21	Motorised throttle	**AC027:**	Motorised throttle	**The motorised throttle should be heard operating**	In the event of a fault apply the interpretation of **AC027 Motorised throttle**.
22		**PR539:**	Measured throttle voltage, gang circuit 1	**PR539 ≈ 2.2 V**	In the event of a fault, apply interpretation of **DF095 Throttle potentiometer circuit gang 1 and DF096 Throttle potentiometer circuit gang 2**.
23		**PR538:**	Measured throttle voltage, gang circuit 2	**PR538 ≈ 2.2 V**	
24		**PR587:**	Motorised throttle lower stop gang 1	**PR587 ≈ 0.5 V**	
25		**PR588:**	Motorised throttle lower stop gang 2	**PR588 ≈ 0.5 V**	
26		**PR589:**	Motorised throttle upper stop gang 1	**PR589 ≈ 4.40 V**	
27		**PR590:**	Motorised throttle upper stop gang 2	**4.40 V**	In the event of a fault, apply interpretation of **DF095 Throttle potentiometer circuit gang 1 and DF096 Throttle potentiometer circuit gang 2**.
28		**PR113:**	Throttle lower stop after applying. offset	**10%**	
29	Motorised throttle	**ET0565:**	Defect mode type 2	**NO**	**NONE**
30		**ET0566:**	Defect mode type 3	**NO**	
31		**ET0567:**	Defect mode type 4	**NO**	
32		**ET0568:**	Defect mode type 5	**NO**	
33		**ET0569:**	Defect mode type 6	**NO**	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: PRE-HEATING/IGNITION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Cylinder recognition**	**ET061:**	Cylinder 1 recognition	**NOT COMPLETE COMPLETE**	In the event of a fault, apply the interpretation for status **ET061 Cylinder 1 recognition**.
2	**Engine speed**	**PR055:**	Engine speed	**Indicates the engine's speed of rotation in rpm. 700 rpm <PR055 < 800 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
3	**Engine flywheel target**	**ET089:**	Flywheel target programming	**NOT COMPLETE COMPLETE STATUS 1**	**STATUS 1:** Flywheel target fault. **NONE**
4	**Flywheel**	**ET062:**	Flywheel signal	**DETECTED**	In the event of a fault, apply the interpretation for status **ET062 Flywheel signal**.
5	**Ignition**	**PR448:**	Ignition advance	**-23.6 °V < PR448 < 72 °V**	**NONE**
6		**PR095:**	Anti-pinking correction	**0 °V < PR095 < 8 °V**	
7		**PR126:**	advance after anti-pinking correction	**-23.6 °V < PR126 < 72 °V**	
8		**PR427:**	Average pinking signal	**10,000 < PR427 < 20,000**	In the event of a fault, apply the interpretation of **DF088 Pinking sensor circuit**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: IGNITION/PREHEATING (continued 1):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
9	Misfiring	**ET581:**	Petrol combustion misfire fault finding	**INACTIVE**	In the event of a fault, apply interpretation of faults **DF059 Combustion misfire in cylinder 1, DF060 Combustion misfire in cylinder 2, DF061 Combustion misfire in cylinder 3, DF062 Combustion misfire in cylinder 4**.
10		**ET057:**	Misfires in cylinder 1	**NO**	
11		**ET058:**	Misfires in cylinder 2	**NO**	
12		**ET059:**	Misfires in cylinder 3	**NO**	
13		**ET060:**	Misfires in cylinder 4	**NO**	
14	**Actuators**	**AC079:**	Actuator static test	**All the actuators must be operated (fuel pump relay, electric coolant pump on F4RT, downstream and upstream sensor heating, motorised throttle)**	In the event of a fault, apply interpretation of **fault associated with the actuators concerned**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: IGNITION/PREHEATING (continued 2):

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
15	**Combustion misfires LPG**	**ET582:**	LPG combustion misfire fault finding	**INACTIVE**	In the event of a fault, apply interpretation of faults **DF635 Combustion misfire in LPG cylinder 1, DF636 Combustion misfire in LPG cylinder 2, DF637 Combustion misfire in LPG cylinder 3, DF638 Combustion misfire in LPG cylinder 4**.
16		**ET583:**	LPG cylinder 1 combustion misfire	**NO**	
17		**ET584:**	LPG cylinder 2 combustion misfire	**NO**	
18		**ET585:**	LPG cylinder 3 combustion misfire	**NO**	
19		**ET586:**	LPG cylinder 4 combustion misfire	**NO**	
20	**Actuators**	**AC079:**	Actuator static test	**All the actuators must be operated (fuel pump relay, electric coolant pump on F4RT, downstream and upstream sensor heating, motorised throttle)**	In the event of a fault, apply interpretation of **fault associated with the actuators concerned**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: COLD LOOP

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	**Air conditioning**	**ET079:** Air conditioning present	**Shows whether or not the vehicle is equipped with air conditioning.** **YES:** Air conditioning is detected by the injection computer. **NO:** Air conditioning is not detected by the injection computer.	**If inconsistent with the vehicle equipment, carry out a multiplex network test and apply the relevant procedure.**
2		**ET088:** Compressor activation request	**The injection requests the UCH (via the multiplex network) to start the compressor.** **ACTIVE:** The multiplex network must not be faulty on the automatic gearbox, fuse and relay box or UCH systems. The UCH must send a compressor starting request to the injection. The coolant pressure sensor must not be defective. Satisfactory engine operating conditions (coolant temperature, engine load etc.). **INACTIVE:** One of the above conditions has not been fulfilled.	**NONE**
3		**ET004:** Air conditioning authorisation	**YES** **NO**	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: COLD LOOP (continued 1)

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
4		**ET023:**	Fast idle speed request	**UCH requests the injection system to increase the idle speed.** **INACTIVE:** The UCH has not formulated a request. **ACTIVE:** The UCH has formulated a request	**If ET023 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct, check the UCH.**
5	**Engine speed**	**PR055:**	Engine speed	**Indicates the engine rotation speed in rpm** **700 rpm < PR055 < 800 rpm**	In the event of a fault, apply the interpretation for **DF154 Flywheel signal sensor circuit**.
6	**Air conditioning**	**PR037:**	Refrigerant pressure	**2 Bar < PR037 < 27 Bar** **Default value: 0 Bar.**	If **1.DEF**, apply interpretation of **PR037 Coolant pressure**.
7		**ET674:**	Refrigerant pressure status	**CORRECT** **TOO LOW**	
8		**PR125:**	Power absorbed by the air conditioning compressor	**0 < PR125 < 300 W**	**NONE**
9	**Coolant temperature**	**PR064:**	Coolant temperature	**-40°C < PR064 < 120°C** **Default value: -39°C**	In the event of a fault, apply interpretation of **DF001 Coolant temperature sensor circuit**.
10	**Vehicle speed**	**PR089:**	Vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	In the event of a fault apply the interpretation for **DF091 Vehicle speed signal**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: COLD LOOP (continued 2):

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
11	Fan	**ET022:** Low speed fan request	If the coolant temperature reaches **98°C**, the low-speed fan assembly is activated, and is shut down at **96°C** **ACTIVE** **INACTIVE**	**In the event of a fault, run a multiplex network test using the diagnostic tool then, if the test is in order, consult the Protection and Switching Unit.**
12		**ET021:** High speed fan request	If the coolant temperature reaches **102°C**, the low-speed fan assembly is activated, and is shut down at **99°C** **ACTIVE** **INACTIVE**	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: HEATING

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Coolant temperature**	**PR064:**	Coolant temperature	**-40°C < PR064 < 120°C** **Default value: -39°C**	In the event of a fault, apply interpretation of **DF001 Coolant temperature sensor circuit**.
2	**Passenger compartment heating resistor**	**ET111:**	Set number of passenger compartment heating resistors.	**YES** **NO**	**In the event of a fault, run a multiplex network test using the diagnostic tool then, if the test is in order, consult the Protection and Switching Unit.**
3		**ET112:**	Passenger compartment heating resistor cut-off	**YES** **NO**	

OCR: Opening Cyclic Ratio

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: CRUISE CONTROL/SPEED LIMITER

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Cruise control/ Speed limiter**	**ET042:**	Cruise control/ Speed limiter	**CRUISE CONTROL SPEED LIMITER**	If there is a fault, apply the interpretation for **ET042 Cruise control/Speed limiter**.
2		**ET413:**	Cruise control/ speed limiter function	**DECREASE** **INCREASE** **SUSPEND** **RESUME**	In the event of a fault, apply the interpretation for **ET413 Cruise control/Speed limiter function**.
3		**ET556:**	Driver deactivation of the cruise control/ speed limiter	**STATUS 1:** Brake pedal depressed **STATUS 2:** Traction control request **STATUS 3:** Press the Suspend button **STATUS 4:** Clutch pedal depressed **STATUS 5:** Gear lever in neutral position **STATUS 6:** Inconsistency between the request and the vehicle speed	**NONE**
4		**ET557:**	Deactivation by cruise control/ speed limiter function	**STATUS 1:** Fault with cruise control or speed limiter **STATUS 2:** Fault detected by the injection computer **STATUS 3:** Vehicle speed invalid **STATUS 4:** Automatic gearbox in defect mode	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: CRUISE CONTROL/SPEED LIMITER (continued):

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
5	**Vehicle speed**	**PR089:** vehicle speed	**Gives the vehicle speed in mph (km/h). This parameter is sent to the injection by the ABS computer via the multiplex network.**	In the event of a fault apply the interpretation for **DF091 Vehicle speed signal**.
6	**Brake pedal**	**ET039:** Brake pedal	**RELEASED** **DEPRESSED** **Default value: DEPRESSED**	If there is a fault, apply the interpretation for **ET039 Brake pedal**.
7	**Clutch contact**	**ET233:** Clutch pedal	**Shows recognition of clutch pedal contacts** **RELEASED:** Pedal released **DEPRESSED:** Pedal depressed. **If the vehicle has an automatic gearbox,** status **ET233 should be DEPRESSED**.	If there is a fault, apply the interpretation for **ET040 Clutch pedal**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: STARTING

Order	Function	Parameter or Status checked or Action	Display and notes	Fault finding
1	**Starting**	**ET076:** Starting	**AUTHORISED**	**Authorisation to start is given once the petrol pump is pressurised and the motorised throttle has emerged from the stop and limp-home position programming phase.**
2	**Actuator control relay**	**ET048:** Actuator control relay	**ACTIVE**	If **INACTIVE** apply the interpretation of **DF084 Actuator relay control circuit**.
3	**Battery voltage**	**PR074:** Battery voltage	**11 V < PR074 < 15 V**	In the event of a fault, apply the interpretation for **DF046 Battery voltage**.
4	**Impact signal**	**ET077:** Impact detected	**NO**	**In the event of a fault, run a multiplex network test using the diagnostic tool; then if the test is OK, carry out fault finding on the airbag computer.**

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application conditions:** Engine **warm, at idling speed**.

SUB-FUNCTION: PROTECTION

Order	Function	Parameter or Status checked or Action		Display and notes	Fault finding
1	**Code programmed**	**ET006:**	Code programmed	**Indicates whether or not the immobiliser code has been programmed by the computer.** **PROGRAMMED:** Code programmed **NOT PROGRAMMED:** Code not programmed by the injection computer.	**If NOT PROGRAMMED, contact the Techline**
2	**Engine immobiliser**	**ET003:**	Engine immobiliser	**Indicates the status of the immobiliser system.** **INACTIVE**	**If ET003 is inconsistent, carry out a multiplex network test using the diagnostic tool. If the test is correct, refer to the UCH fault finding procedure.**
3	**Starting**	**ET076:**	Starting	**AUTHORISED**	**Authorisation to start is given once the petrol pump is pressurised and the motorised throttle has emerged from the stop and limp-home position programming phase.**

Tool status	Diagnostic tool title
ET001	+ After ignition computer feed
ET003	Engine immobiliser
ET004	Air conditioning authorisation
ET006	Code programmed
ET021	High speed fan request
ET022	Low speed fan request
ET023	Fast idle speed request
ET039	Brake pedal
ET042	Cruise control/speed limiter
ET047	Fuel pump control circuit
ET048	Actuator control relay
ET050	Canister bleed control
ET051	Throttle stop programming
ET052	Upstream O_2 sensor heating
ET053	Downstream O_2 sensor heating
ET054	Idle speed regulation
ET056	Richness double loop
ET057	Misfires in cylinder 1
ET058	Misfires in cylinder 2
ET059	Misfires in cylinder 3
ET060	Misfires in cylinder 4
ET061	Cylinder 1 recognition
ET062	Flywheel signal
ET064	Level 1 injection fault
ET065	Level 2 Injection fault
ET066	LPG fault
ET067	LPG ready
ET068	LPG tank empty
ET071	Transition from petrol mode to LPG mode
ET072	Transition from LPG mode to petrol mode
ET073	Conditions for switching to LPG mode
ET075	Pedal released and throttle closed

Tool status	Diagnostic tool title
ET076	Starting
ET077	Impact detected
ET079	Air conditioning present
ET081	Accelerator pedal position
ET082	Motorised throttle position
ET083	Camshaft dephaser in defect mode
ET086	Camshaft dephaser control
ET088	Compressor activation request
ET089	Flywheel target programming
ET111	Set number of passenger compartment heating resistors.
ET112	Passenger compartment heating resistor cut-off
ET233	Clutch pedal
ET300	Richness regulation
ET340	Request by automatic gearbox to light up the OBD warning light
ET413	Cruise control/speed limiter function
ET556	Driver deactivation of the cruise control/speed limiter
ET557	Deactivation by cruise control/speed limiter function
ET561	Operating mode
ET564	Defect mode type 1
ET565	Defect mode type 2
ET566	Defect mode type 3
ET567	Defect mode type 4
ET568	Defect mode type 5
ET569	Defect mode type 6
ET581	Petrol combustion misfiring fault finding
ET582	LPG combustion misfire fault finding
ET583	LPG cylinder 1 combustion misfire
ET584	LPG cylinder 2 combustion misfire
ET585	LPG cylinder 3 combustion misfire
ET586	LPG cylinder 4 combustion misfire
ET617	Upstream oxygen sensor OBD fault finding
ET619	Fuel circuit OBD fault finding
ET674	Refrigerant pressure

ET039	BRAKE PEDAL DEPRESSED RELEASED

NOTES	There must be no present or stored faults.

Check the **condition** of the pedal assembly. Check **the cleanliness** and **condition** of the dual-contact brake switch and its connections. Repair if necessary.
Check for **+12 V feed** on **track 1** of the brake pedal switch connector with the ignition on. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the universal bornier, check for **insulation** and **continuity** on the following connection: Injection computer, **connector A, track E4** ⟶ **track 3** of the brake pedal Repair if necessary.
Carry out a multiplex network test (see **88B, Multiplexing**).
If the fault is still present, carry out fault finding on the UCH (see **87B, Passenger compartment connection unit**).
If the fault is still present, replace the switch.

AFTER REPAIR	Repeat the conformity check from the start.

ET042	CRUISE CONTROL/SPEED LIMITER SPEED LIMITER CRUISE CONTROL

NOTES	There must be no present or stored faults.
	NOTE **To remove or check the Cruise control/speed limiter control switches you need to remove the airbag** (See **88C, Airbag and pretensioners**).

Check for **+12 V feed** on **track A2** of the cruise control or speed limiter selector switch connector with the ignition on.
Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **A, track A2** → **track A3** of the cruise control or speed limiter on/off switch

Injection computer, connector **A, track C3** → **track B1** of the cruise control or speed limiter on/off switch

Repair if necessary.

If the fault is still present, replace the switch.

AFTER REPAIR	Repeat the conformity check from the start.

ET054	IDLE SPEED REGULATION ACTIVE INACTIVE

NOTES	There must be no present or stored faults. **Check parameters: PR030 Accelerator pedal position,** **PR035 Atmospheric pressure,** **PR058 Air temperature,** **PR064 Coolant temperature,** **PR118 Measured throttle position gang 1,** **PR119 Measured throttle position gang 2.** Check that all these parameters are completely correct.

IDLE SPEED TOO HIGH

Check:
- the engine oil level (too high ⇒ oil combustion),
- that the restrictions are present in the oil vapour rebreathing circuit,
- the sealing between the throttle valve and inlet manifold,
- the manifold pressure sensor sealing,
- the fuel vapour absorber bleed, which must not be jammed open,
- the fuel vapour absorber bleed system sealing,
- the brake servo system sealing,
- the sealing between the inlet manifold and cylinder head,
- the oil vapour recovery circuit sealing between the inlet manifold and cylinder head,
- the fuel pressure and flow (see **MR 364 or 370 Mechanics, 17B, Petrol injection**),
- the condition and cleanliness of the injectors,
- the engine compression,
- the timing adjustment,
- check the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**).

Repair the defective component if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

ET056	DOUBLE RICHNESS LOOP ACTIVE INACTIVE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the upstream oxygen sensor connections.
Repair if necessary.

Check for **+12 V feed** on **track A** of the upstream oxygen sensor connector with the ignition on.
If **+12 V** is not present:
– disconnect the battery,
– check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **continuity** on the following connection:

Injection computer, connector **B, track M2** → **track A** of the upstream oxygen sensor

Protection and Communication Unit, **connector CT1, track 4** →

Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **C, track C1** → **track D** of the upstream oxygen sensor

Injection computer, connector **C, track B1** → **track C** of the upstream oxygen sensor

Injection computer, connector **C, track L2** → **track B** of the upstream oxygen sensor

Repair if necessary.

Measure the **resistance** of the upstream oxygen sensor heater between **tracks A** and **B**.
Replace the sensor if the **resistance** is not around **9 Ω at 20°C**.

Check **the condition** and **secure fitting** of the upstream oxygen sensor.
If the vehicle is driven frequently in town, **carry out the unclogging procedure**.

AFTER REPAIR	Repeat the conformity check from the start.

ET056 **CONTINUED 1**	

Check the **cleanliness** and **condition** of the downstream oxygen sensor connections.
Repair if necessary.

Check for **+12 V feed** on track A of the downstream oxygen sensor connector with the ignition on.
If **+12 V** is not present:
– disconnect the battery,
– check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **continuity** on the following connection:

Injection computer, connector **B, track M2** → **track A** of the downstream oxygen sensor

Protection and Communication Unit, **connector CT1, track 4** →

Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **C, track B2** → **track D** of the downstream oxygen sensor

Injection computer, connector **C, track A2** → **track C** of the downstream oxygen sensor

Injection computer, connector **C, track L3** → **track B** of the downstream oxygen sensor

Repair if necessary.

Measure the **resistance** of the downstream oxygen sensor heater between **tracks A** and **B**.
Replace the sensor if the **resistance** is not around **9 Ω at 20°C**.

Check **the condition** and for **secure fitting** of the downstream oxygen sensor.
If the vehicle is normally driven in urban conditions, there is a risk of contamination of the oxygen sensor.

AFTER REPAIR	Repeat the conformity check from the start.

ET056 **CONTINUED 2**	

Check:
– the condition of the air filter,
– that the air inlet system is not blocked,
– the condition and conformity of the spark plugs,
– the sealing between the throttle valve and inlet manifold,
– the manifold pressure sensor sealing,
– the fuel vapour absorber bleed, which must not be jammed open,
– the fuel vapour absorber bleed system sealing,
– the brake servo system sealing,
– the cylinder head oil vapour recovery system sealing,
– the sealing between the inlet manifold and cylinder head,
– the exhaust pipe sealing between the cylinder head and catalytic converter.
– the fuel flow rate and pressure.

If the idle speed is not stable, check:
– the timing adjustment,
– check the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**),
– the cylinder compression.

Drive the vehicle to check the repair.
Repair the defective components.

AFTER REPAIR	Repeat the conformity check from the start.

ET061	CYLINDER 1 RECOGNITION COMPLETE NOT COMPLETE

NOTES	There must be no present or stored faults.

Check **the cleanliness** and **condition** of the camshaft sensor connectors.
Repair if necessary.

Check **the cleanliness** and **condition** of the camshaft sensor.
Repair if necessary.

Check for **+12 V feed** on **track 3** of the camshaft sensor connector with the ignition on.
If **+12 V** is not present:
– Switch off the ignition,
– disconnect the **CN connector** in the Protection and Switching Unit,
– check the **cleanliness** and **condition** of the connections,
– using the universal bornier, check the **continuity** on the following connection:

Injection computer, connector **B, track M2** → **track 3** of the camshaft sensor.

Protection and Communication Unit, **connector CN, track 6**

Reconnect the **Protection and Switching Unit connector**.
If **+12 V feed** is still not present on **track 3** of the camshaft sensor connector with the ignition on, there is a fault with the Protection and Switching Unit.
Contact the Techline.

Switch off the ignition.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connections:

Injection computer, connector **C, track E2** → **track 1** of the camshaft sensor

Injection computer, connector **C, track F1** → **track 2** of the camshaft sensor

Repair if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

ET062	FLYWHEEL SIGNAL DETECTED NOT DETECTED

NOTES	There must be no present or stored faults.
	Information: if the flywheel has been replaced or disassembled, reinitialise the flywheel target programming using command **RZ005 Programming**.

Check **the mounting** and **positioning** of the TDC sensor (see **MR 364 or 370 Mechanical, 11A, top and front of engine**).
Repair if necessary.

Check the **cleanliness** and **condition** of the TDC sensor and its connections.
Check the condition of the cable.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **B, track E4** → **track 2** of the engine speed sensor

Injection computer, connector **B, track F3** → **track 1** of the engine speed sensor

Repair if necessary.

Measure the **resistance** of the TDC sensor between **tracks 1** and **2**.
Replace the TDC sensor if the **resistance** is not **200 to 270 Ω at 23°C**.

If the sensor has been replaced, reset the flywheel signal programming.
Carrying out the flywheel target programming:
- Decelerate a first time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **3500** and **3000 rpm**, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.
- Decelerate a second time with injection cut-off (i.e. feet off the brake, accelerator pedal and clutch pedals) between **2400** and **2000 rpm** for K4 engines and between **1800 and 1400 rpm** for F4R engines, in 3rd gear for a manual gearbox and 2nd for automatic gearbox, for at least 5 seconds.

When the work is completed, check that status **ET089 Flywheel target programming** is **COMPLETE**.
(*This is the moment when, during deceleration with no load, the engine drops to idle speed and recovers torque)

AFTER REPAIR	Repeat the conformity check from the start.

ET067	LPG READY YES NO

NOTE
Before working on an LPG supply circuit component, always refer to the appropriate section of the Workshop Repair Manual (see **17C, LPG Injection, Introduction, Safety advice for all operations**).

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Check:
- the LPG tank solenoid valve (see **DF013 Tank solenoid valve circuit**),
- the general relay (see **DF007 Main relay circuit**),
- the LPG expansion valve solenoid valve (see **DF103 LPG expansion valve solenoid valve**),
- the LPG pressure sensor (see **DF092 Expansion valve downstream pressure sensor circuit**),
- the LPG pressure in the tank (see **DF031 LPG pressure downstream of expansion valve**).

These faults are detected by the LPG injection computer.
Repair or replace the faulty components, if necessary.

Check:
- the LPG filling hoses,
- the supply hoses upstream of the expansion valve,
- the expansion valve,
- the hoses downstream of the expansion valve.

Repair or replace the faulty components, if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET068	LPG TANK EMPTY YES NO

NOTE
Before working on an LPG supply circuit component, always refer to the appropriate section of the Workshop Repair Manual (see **17C, LPG Injection, Introduction, Safety advice for all operations**).

NOTES	There must be no present or stored faults. Ignition on, engine stopped.
	Special Note Check that there is LPG in the tank. Check that there is no fault on the petrol injection computer. Test the LPG injection computer (see **17C, LPG injection**).

Using parameters **PR001 Manifold pressure** and **PR112 LPG pressure downstream of the expansion valve**, check that **PR112 - PR001 = 800 mbar**.
If **PR112 - PR001 < 800 mbar**, check:
- the LPG tank solenoid valve (see **DF013 Tank solenoid valve circuit**),
- the expansion valve,
- the LPG pressure downstream of the expansion valve (see **PR112 LPG pressure downstream of expansion valve**).

This fault is detected by the LPG injection computer.
Repair or replace the faulty components, if necessary.

If the status is still not correct, check:
- that the injectors are functioning correctly, using commands **AC018 Cylinder 4 injector, AC019 Cylinder 3 injector, AC020 Cylinder 2 injector** and **AC021 Cylinder 1 injector**.
- the condition of the hoses between the expansion valve and the injectors.

Repair the faulty components if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET071	TRANSITION FROM PETROL MODE TO LPG MODE IN PROGRESS COMPLETE

NOTE
Before working on an LPG supply circuit component, always refer to the appropriate section of the Workshop Repair Manual (see **17C, LPG Injection, Introduction, Safety advice for all operations**).

NOTES	There must be no present or stored faults. Ignition on, engine stopped.
	Special note: The duration of the transition varies according to the outside temperature.

Check that the LPG tank solenoid valve clicks when LPG mode is entered.
If the LPG tank solenoid valve does not click, **check**:
- the LPG **10A fuse F15**,
- the general relay (see **DF007 Main relay circuit**),
- the LPG tank solenoid valve wiring (see **DF013 Solenoid valve tank circuit**).

These faults are detected by the LPG injection computer.
Repair or replace the faulty components, if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET072	TRANSITION FROM LPG MODE TO PETROL MODE IN PROGRESS COMPLETE

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Check that the fuel pump starts when petrol mode is entered.
Check status **ET025 Fuel pump** changes to **ACTIVE**.
If the fuel pump does not start, **check**:
- the fuel pump cut-off relay (see **DF024 Fuel pump cut-off relay circuit**),
- the petrol computer (see **17B, Petrol injection**).

This fault is detected by the LPG injection computer.
Repair or replace the faulty components, if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET073	BALANCE CONDITIONS IN LPG MODE AUTHORISED INHIBITED

NOTE
Before working on an LPG supply circuit component, always refer to the appropriate section of the Workshop Repair Manual (see **17C, LPG Injection, Introduction, Safety advice for all operations**).

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Variable duration depending on:
– **ET100 LPG system ready,**
– **PR002 Coolant temperature,**
– **PR103 Air temperature,**
– **PR113 LPG temperature.**

Apply the interpretation of faults **DF103 LPG expansion valve solenoid valve** and **DF007 Main relay circuit**.
These faults are detected by the LPG injection computer.

Manipulate the wiring harness between the LPG computer and the petrol computer until a change in status is noted.
Check the **insulation, continuity and the absence of interference resistance** on the connections between:

Petrol computer connector **B, track K3** ⟶ **track A1** of the LPG computer

Petrol computer connector **B, track K4** ⟶ **track A2** of the LPG computer

Repair if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET233	CLUTCH PEDAL

NOTES	There must be no present or stored faults.

Check that the pedal assembly is in good condition. Check **the cleanliness** and **condition** of the clutch pedal switch and its connections. Repair if necessary.
Check for **earth** on **track A1** of the clutch pedal switch. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the universal bornier, check for **insulation** and **continuity** on the following connection: Injection computer, connector **A, track C4** ⟶ **track A2** of the clutch pedal switch Repair if necessary.
If the fault is still present, replace the switch.

AFTER REPAIR	Repeat the conformity check from the start.

ET507	OBD UPSTREAM OXYGEN SENSOR HEATING CIRCUIT

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the upstream oxygen sensor and its connections.
Repair if necessary.

With the ignition on, check for **+12 V** on **track A** of the upstream oxygen sensor connector.
If **+12 V** is not present:
– disconnect the battery,
– disconnect the **CN connector** in the Protection and Switching Unit,
– check the **cleanliness** and **condition** of the connections,
– using the universal bornier, check for **continuity** on the following connection:

Protection and Switching Unit, **connector CN, track 6** ⟶ **track A** of the upstream oxygen sensor

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
With the ignition on, if there is still no **+12 V** at the upstream oxygen sensor connector, there is a fault in the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connection:

Injection computer, connector **C, track L2** ⟶ **track B** of the upstream oxygen sensor

Repair if necessary.

Measure the **resistance** of the upstream oxygen sensor heater between **tracks A** and **B**.
Replace the upstream oxygen sensor if the **resistance** is not approximately **9 Ω at 20°C**.

If the fault is still present, replace the upstream oxygen sensor.

AFTER REPAIR	Repeat the conformity check from the start.

ET509	OBD DOWNSTREAM OXYGEN SENSOR HEATING CIRCUIT

NOTES	There must be no present or stored faults.

Check **the cleanliness** and **condition** of the downstream oxygen sensor and its connections.
Repair if necessary.

With the ignition on, check for **+12 V feed** on **track A** of the downstream oxygen sensor connector.
If **+12 V** is not present:
– disconnect the battery,
– disconnect the **CN connector** in the Protection and Switching Unit,
– check the **cleanliness** and **condition** of the connections,
– using the universal bornier, check the **continuity** on the following connection:

Protection and Switching Unit, **connector CN, track 6** ⟶ **track A** of the downstream oxygen sensor

Reconnect the **Protection and Switching Unit** connector and reconnect the battery.
With the ignition on, if the **+ 12 V** is still not present on the downstream oxygen sensor connector, there is a fault in the **Protection and Switching Unit**.
Contact the Techline.

Disconnect the battery and the injection computer.
Check the **cleanliness and condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connection:

Injection computer, connector **C, track L3** ⟶ **track B** of the downstream oxygen sensor

Repair if necessary.

Measure **the resistance** of the downstream oxygen sensor heater between **tracks A** and **B**.
Replace the downstream oxygen sensor if the **resistance** is not approximately **9 Ω at 20°C**.

If the fault is still present, replace the downstream oxygen sensor.

AFTER REPAIR	Repeat the conformity check from the start.

ET556	DRIVER'S DEACTIVATION OF THE CRUISE CONTROL/SPEED LIMITER

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

Note:
Cruise control remains deactivated as long as the vehicle speed does not exceed **18 mph (30 km/h)**. Status **ET556** details 6 causes for cruise control deactivation.
NOTE
To reinitialise the deactivations stored by the injection computer, use command RZ007 Fault memory.

STATUS 1	Brake pedal applied
	If the driver depresses the brake pedal, the cruise control/speed limiter function status **ET045** becomes **INACTIVE**. Status **ET556** changes to **STATUS 1** when driving or during a cruise control function test when stationary. If status **ET556** remains locked on **STATUS 1**, refer to the interpretation of statuses **ET039 Brake pedal** and **ET683 Brake switch connection**.

STATUS 2	Traction control request
	If the vehicle undergoing fault finding is fitted with a traction control system, the cruise control/speed limiter function is deactivated each time the traction control is selected. Status **ET556** only becomes **STATUS 2** when driving. If this status appears with the ignition on and the vehicle stopped, (see **38C, Anti-lock Braking system**).

STATUS 3	Suspend switch pressed
	Status **ET556** becomes **STATUS 3** if: – the driver presses the **0** cruise control button, – the clutch switch is faulty (**no signal on the clutch pedal position is being received by the injection computer**). If status **ET556** is locked at **STATUS 3**, refer to the interpretation of status **ET413 Cruise control/speed limiter function** and run fault finding on control button **R/0** of the cruise control.

AFTER REPAIR	Repeat the conformity check from the start.

ET556 CONTINUED	

STATUS 4	Clutch pedal depressed
	The cruise control/speed limiter function is deactivated if the gearbox is no longer linked to the engine (clutch pedal applied or gearbox in neutral). If status **ET556** is locked on **STATUS 4** with the vehicle stationary, contact the Techline.

STATUS 5	Gear lever in neutral position
	Status **ET556** changes to **STATUS 5** if the driver puts the gear lever in the neutral position when driving. This deactivates the cruise control/speed limiter. If status **ET556** remains stuck at **STATUS 5** when driving after engaging a gear, contact the Techline.

STATUS 6	Lack of correlation between the request and the vehicle speed
	Status **ET556** changes to **STATUS 6** if the computer detects a fault between the speed requested by the driver and the vehicle speed. The vehicle signal is receiving interference or is incorrect. Consult the interpretation for fault **DF091 Vehicle speed signal**. Run fault finding on the **ABS** circuit (see **38C, Anti-lock braking system**). If the fault is still present, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET557	DEACTIVATION BY CRUISE CONTROL/SPEED LIMITER FUNCTION

NOTES	**Special notes:** Only perform these tests if the statuses do not correspond with the system programming functions.

Note:
Cruise control remains deactivated as long as the vehicle speed does not exceed **18 mph (30 km/h)**. Status **ET557** details 4 causes for cruise control deactivation.
NOTE
To reinitialise the deactivations stored by the injection computer, use command RZ007 Fault memory.

STATUS 1	Cruise control or speed limiter fault
	If status **ET557** is **STATUS 1**, refer to the interpretation of statuses **ET042 Cruise control/speed limiter and ET413 Cruise control/speed limiter function**, to test the components of the cruise control system and find the faulty one. If status **ET557** is locked on **STATUS 1** contact the Techline.

STATUS 2	Fault detected by the injection ECU
	Status **ET557** changes to **STATUS 2** if the injection computer detects a fault on the injection system: **– Faults in the camshaft or engine speed sensor.** **– Accelerator pedal faults.** **– Engine speed above 4,700 rpm.** **– Engine speed less than 1,000 rpm.** Carry out a multiplex network test, then an injection system test, and carry out fault finding on any faults. If the fault is still present, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET557 **CONTINUED**	

STATUS 3	Incorrect vehicle speed
	Status **ET557** becomes **STATUS 3** if the vehicle speed received by the computer does not vary. Consult the interpretation of fault **DF091 Vehicle speed signal**, and run a fault finding procedure on the **ABS** computer. If faults are present (see **38C, Anti-lock braking system**). If the fault is still present, contact the Techline.

STATUS 4	Automatic gearbox in defect mode.
	The cruise control/speed limiter function is deactivated if the gearbox is no longer linked to the engine (clutch pedal applied or gearbox in neutral). If status **ET557** is locked on **STATUS 4** with the vehicle stationary, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

ET564	DEFECT MODE TYPE 1

NOTES	There must be no present or stored faults.

This status covers faults that disable control of the motorised throttle valve.
This defect mode cuts off the throttle control (mechanical Limp Home position).

AFTER REPAIR	Repeat the conformity check from the start.

ET565	DEFECT MODE TYPE 2

NOTES	There must be no present or stored faults.

This status covers faults where the system has lost control of the air flow modulation. The associated defect mode limits the engine speed through injection cut-off.

AFTER REPAIR	Repeat the conformity check from the start.

ET566	DEFECT MODE TYPE 3

NOTES	There must be no present or stored faults.

This status groups the faults for deducing that the system no longer responds to engine or vehicle speed regulation, but still controls the air flow modulation (throttle servo system operational). It uses the pedal mode reconstructed by calibration.

AFTER REPAIR	Repeat the conformity check from the start.

ET567	DEFECT MODE TYPE 4

NOTES	There must be no present or stored faults.

This status covers faults affecting the monitoring system, or for which there is an emergency operating mode viable for the system (scenario of falling back on the second gang of a pedal or throttle potentiometer if there is a fault on the main gang).
Its effect is to restrict the throttle (limited performance).

AFTER REPAIR	Repeat the conformity check from the start.

ET568	DEFECT MODE TYPE 5

NOTES	There must be no present or stored faults.

This status groups faults affecting the control of the throttle by the torque structure. Its effect is to use the pedal feedback mode, instead of the permanent torque structure.

AFTER REPAIR	Repeat the conformity check from the start.

Tool parameter	Diagnostic tool title
PR010	Idle speed regulation setpoint
PR014	Idle speed correction
PR018	Estimated air flow
PR030	Accelerator pedal position
PR035	Atmospheric pressure
PR037	Refrigerant pressure
PR055	Engine speed
PR058	Air temperature
PR064	Coolant temperature
PR074	Battery voltage
PR089	Vehicle speed
PR090	Idle speed regulation programmed value
PR091	Theoretical idle speed OCR
PR094	Camshaft dephaser OCR setpoint
PR095	Anti-pinking correction
PR096	Motorised throttle upper stop programmed value
PR097	Motorised throttle lower stop programmed value
PR098	Upstream oxygen sensor voltage
PR099	Downstream oxygen sensor voltage
PR101	Duration of injection
PR102	Canister bleed solenoid valve OCR
PR103	Instantaneous fuel consumption
PR105	OBD fault warning light illuminated mileage counter
PR106	Fault warning light illuminated mileage counter
PR111	Motorised throttle position corrected value
PR113	Throttle lower stop after applying. offset
PR116	Motorised throttle adjusted reference position

Tool parameter	Diagnostic tool title
PR118	Measured throttle position gang 1
PR119	Measured throttle position gang 2
PR125	Power absorbed by the air conditioning compressor
PR126	Advance after anti-pinking correction
PR138	Richness correction
PR143	Self-adapting richness gain
PR144	Self-adapting richness offset
PR147	Pedal potentiometer voltage gang 1
PR148	Pedal potentiometer voltage gang 2
PR312	Inlet manifold pressure
PR424	Programming the no-load position value
PR427	Average pinking signal
PR429	Measured throttle position
PR448	Ignition advance
PR499	Pedal no load programming
PR538	Measured throttle voltage, gang 2
PR539	Measured throttle voltage, gang 1
PR568	Pedal position gang 1
PR569	Pedal position gang 2
PR587	Motorised throttle lower stop gang 1
PR588	Motorised throttle lower stop gang 2
PR589	Motorised throttle upper stop gang 1
PR590	Motorised throttle upper stop gang 2
PR593	Motorised throttle in safe mode gang 1
PR594	Motorised throttle in safe mode gang 2
PR597	Motorised throttle in safe mode

PR030	ACCELERATOR PEDAL POSITION

NOTES	There must be no present or stored faults.

Check that the pedal mechanism has not seized.
Check the **cleanliness** and **condition** of the pedal potentiometer connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **A, track H3** → **track 5** of the pedal potentiometer

Injection computer, connector **A, track G2** → **track 3** of the pedal potentiometer

Injection computer, connector **A, track H2** → **track 4** of the pedal potentiometer

Injection computer, connector **A, track F4** → **track 6** of the pedal potentiometer

Injection computer, connector **A, track F2** → **track 2** of the pedal potentiometer

Injection computer, connector **A, track F3** → **track 1** of the pedal potentiometer

Repair if necessary.

If the fault is still present, replace the pedal potentiometer.

AFTER REPAIR	Repeat the conformity check from the start.

PR037	REFRIGERANT PRESSURE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the refrigerant pressure sensor and its connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier in place of the computer, check **for insulation** and **continuity** on the following connections:

Computer, connector **B, track J2** → **track B** of the refrigerant pressure sensor

Computer, connector **B, track J3** → **Track C** of the refrigerant sensor

Computer, connector **B, track K2** → **track A** of the refrigerant sensor

Repair if necessary.

If the fault is still present, replace the refrigerant fluid sensor.
If the fault is still present, check the air conditioning circuit (see **MR 366 or 370 Mechanics, 62A, Air conditioning**).

AFTER REPAIR	Repeat the conformity check from the start.

PR074	BATTERY VOLTAGE

NOTES	There must be no present or stored faults. **Without electrical consumers (radio, air conditioning, fan assembly, headlights, etc.).**

Ignition on Then at idle speed	**If the voltage is minimum:** Check the battery and the charging circuit (see **Technical Note 6014A Checking the charging circuit**). **If the voltage is maximum:** Check that the charging voltage is correct with and without electrical consumer (see **Technical Note 6014A Checking the charging circuit**).

AFTER REPAIR	Repeat the conformity check from the start.

PR095	ANTI-PINKING CORRECTION

NOTES	There must be no present or stored faults.

The pinking sensor must not supply a zero signal, proving that it is recording the mechanical vibrations of the engine.
Check that there is the **correct** fuel in the fuel tank. Repair if necessary.
Check the **condition** and **conformity** of the spark plugs. Repair if necessary.
Check the pinking sensor **fitting**. Repair if necessary.
Check the **cleanliness** and **condition** of the pinking sensor connectors. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the universal bornier, check for **insulation** and **continuity** on the following connections: Injection computer, connector **B, track B3** → **track 2** of the pinking sensor Injection computer, connector **B, track B4** → **track 1** of the pinking sensor Injection computer, connector **B, track B2** → **Pinking sensor screening** Repair if necessary.
If the fault is still present, replace the pinking sensor.

AFTER REPAIR	Repeat the conformity check from the start.

PR098	UPSTREAM OXYGEN SENSOR VOLTAGE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the upstream oxygen sensor connections. Repair if necessary.
Disconnect the battery and the injection computer. Check the **cleanliness** and **condition** of the connections. Using the universal bornier, check for **insulation** and **continuity** on the following connections: Injection computer, connector **C, track C1** ⟶ **track D** of the upstream oxygen sensor Injection computer, connector **C, track B1** ⟶ **track C** of the upstream oxygen sensor Repair if necessary.
Check **the fitting** of the upstream oxygen sensor. Repair if necessary.
If the vehicle is driven frequently in town, **carry out the unclogging procedure**.
Check that **there are no leaks** in the exhaust system, from the manifold to the catalytic converter. Repair if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

PR098 **CONTINUED**	

If the fault is still present, replace the upstream oxygen sensor.
If the fault has still not been rectified, continue with the checks.
Check:
– the condition of the air filter,
– that the air inlet system is not blocked,
– the condition and conformity of the spark plugs,
– that the catalytic converter is not clogged,
– the sealing between the throttle valve and inlet manifold,
– the manifold pressure sensor sealing,
– the petrol vapour absorber bleed, which must not be jammed open,'
– the fuel vapour absorber bleed system sealing,
– the brake servo system sealing,
– the cylinder head oil vapour recovery system sealing,
– the sealing between the inlet manifold and cylinder head,
– the exhaust pipe sealing between the cylinder head and catalytic converter.
– the fuel flow rate and pressure.

If the idle speed is not stable, check:
– the timing adjustment,
– the hydraulic tappets if there is camshaft noise (see **MR 364 or 370 Mechanics, 11A, Top and front of engine**),
– the cylinder compression.
Drive the vehicle to check the repair.

AFTER REPAIR	Repeat the conformity check from the start.

PR099	DOWNSTREAM OXYGEN SENSOR VOLTAGE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the downstream oxygen sensor connections. Repair if necessary.
Disconnect the battery and the injection computer. Using the universal bornier, check for **insulation** and **continuity** on the following connections: Injection computer, connector **C, track A2** → **track C** of the downstream oxygen sensor Injection computer, connector **C, track B2** → **track D** of the downstream oxygen sensor Repair if necessary.
Check **the fitting** of the downstream oxygen sensor. Repair if necessary.
If the vehicle is driven frequently in town, **carry out the unclogging procedure** (oxygen sensors and catalytic converter clogging).
Check that the exhaust pipe is completely **leak free**. Repair if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

PR099 **CONTINUED**	

Replace the downstream oxygen sensor.
If the fault is still present, the catalytic converter is certainly damaged.
If the catalytic converter is faulty, determine the cause of the damage, otherwise the new catalytic converter may be damaged in turn.
Remove the catalytic converter.
Various things may destroy a catalytic converter: – **deformation** (impact), – **thermal shock** (cold water splashed onto a hot catalytic converter can damage it), – **defective injector or ignition:** the catalytic converter is damaged by contact with petrol (coil fault, coil control fault, injector jammed open), – **injector leak,** – **abnormal oil or coolant consumption** (defective cylinder head gasket), – **use of a fuel additive** or other equivalent product (obtain information from the customer because this type of product can contaminate the catalytic converter and render it useless sooner or later).
Look up the service history of the vehicle or, if this is not possible, ask the customer if the vehicle has had injection or ignition faults.
If the cause of the catalytic converter destruction has been found and the fault been resolved, replace the catalytic converter.

AFTER REPAIR	Repeat the conformity check from the start.

PR312	MANIFOLD PRESSURE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the manifold pressure sensor and its connections.
Repair if necessary.

Disconnect the battery and the injection computer.
Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check for **insulation** and **continuity** on the following connections:

Injection computer, connector **B, track H2** → **track C** of the manifold pressure sensor

Injection computer, connector **B, track H3** → **track B** of the manifold pressure sensor

Injection computer, connector **B, track H4** → **track A** of the manifold pressure sensor

Repair if necessary.

If the fault is still present, replace the manifold pressure sensor.

If the fault is still present, carry out the following checks:
The inlet line must be perfectly sealed, from the throttle valve to the cylinder head.
Check:
– the condition of the air filter,
– that the air inlet system is not blocked,
– the sealing between the throttle valve and inlet manifold,
– the manifold pressure sensor sealing,
– the fuel vapour absorber bleed, which must not be jammed open,
– the fuel vapour absorber bleed system sealing,
– the brake servo system sealing,
– the cylinder head oil vapour recovery system sealing,
– the sealing between the inlet manifold and cylinder head,
– the exhaust pipe sealing between the cylinder head and catalytic converter.
Repair if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

Tool command	Diagnostic tool title
RZ001	Fault memory
RZ005	Programming
AC017	Canister bleed solenoid valve
AC018	Upstream O_2 sensor heating
AC019	Downstream O_2 sensor heating
AC027	Motorised throttle
AC079	Actuator static test
AC195	Electric coolant pump
VP020	VIN entry

AC017	CANISTER BLEED SOLENOID VALVE

NOTES	There must be no present or stored faults.

Check the **cleanliness** and **condition** of the fuel vapour absorber bleed solenoid valve connections.
Repair if necessary.

Measure the **resistance** of the fuel vapour absorber bleed solenoid valve.
Replace the bleed solenoid valve for the fuel vapour absorber if the **resistance** is not **26 Ω ± 4 Ω at 23°C**.

Check for **+12 V feed** on **track 1** of the fuel vapour absorber bleed solenoid valve with the ignition on.
If **+12 V** is not present:
– Using the universal bornier, check for **continuity** on the following connections:

Fuel computer, connector **B, track M2** → **track 1** of the fuel vapour absorber bleed solenoid valve

Main relay → **track 1** of the petrol vapour absorber bleed solenoid valve

Repair if necessary.

Disconnect the battery.
Disconnect the computer. Check the **cleanliness** and **condition** of the connections.
Using the universal bornier, check the **insulation** and **continuity** on the following connection:

Petrol computer, connector **C, track E1** → **track 2** of the fuel vapour absorber bleed solenoid valve

Repair if necessary.

If the fault is still present, replace the solenoid valve.

AFTER REPAIR	Repeat the conformity check from the start.

AC027	MOTORISED THROTTLE

IMPORTANT
Never drive the vehicle without checking that there are no throttle valve faults.

NOTES	There must be no present or stored faults.

Switch on the ignition and run command **AC027 motorised throttle**.
If the motorised throttle does not work, apply the interpretation for **DF079 Motorised throttle valve automatic control**.

AFTER REPAIR	Repeat the conformity check from the start.

AC079	ACTUATOR STATIC TEST

NOTES	There must be no present or stored faults.

Switch the ignition on and run command **AC079 Actuator static test**.
If the following actuators are not working, apply the interpretation of the associated fault:
– Fuel pump relay, apply the interpretation of **DF085 Fuel pump relay circuit**.
– The motorised throttle, apply the interpretation of **DF079 Motorised throttle valve servo control**.
– The electric coolant pump, apply the interpretation of **DF570 Coolant pump relay**.
– Upstream O_2 sensor heating, apply the interpretation of **DF601 Upstream O_2 heating power circuit**.
– Downstream O_2 sensor heating, apply the interpretation of **DF602 Downstream O_2 sensor heating power circuit**.

AFTER REPAIR	Repeat the conformity check from the start.

AC195	ELECTRIC COOLANT PUMP

NOTES	There must be no present or stored faults.

Switch on the ignition and run command AC027 motorised throttle.
If the coolant pump is not working.
Check the cleanliness, condition and fitting of the coolant pump.
Top up the coolant if necessary.

If the fault is still present, manipulate the harness to see if the status changes.
Look for any harness damage, and check **the condition and connection points** of the injection computer and the coolant pump connectors.
Repair if necessary.

If the fault is still present, check for **+12 V** on **track 2** of the coolant pump.
If **+12 V** is not present on **track 2** of the coolant pump, check the following connection for **insulation, continuity and the absence of interference resistance**:

Coolant pump **track 2** → **track 6, connector CN**, of the Protection and Switching Unit

Repair if necessary.

If the fault is still present, check the **insulation, continuity and the absence of interference resistance** on the following connection:

Computer, connector **B, track L4** → **track 1** of the coolant pump

Repair if necessary.

If the fault is still present, check that the **resistance** between **tracks 1 and 2** of the coolant pump is **neither zero nor infinite**.
Replace the coolant pump if necessary.

If the fault is still present, contact the Techline.

AFTER REPAIR	Repeat the conformity check from the start.

NOTES	**Only consult the customer complaints after performing a complete check with the diagnostic tool.** **IMPORTANT** **Never drive the vehicle without checking that there are no throttle valve faults.**

NO DIALOGUE WITH THE COMPUTER	**ALP 1**
THE ENGINE WILL NOT START	**ALP 2**
IDLING SPEED FAULTS	**ALP 3**
FAULTS WHILE DRIVING	**ALP 4**

ALP 1	No dialogue with the computer

NOTES	None

Test the diagnostic tool on another vehicle in perfect working order.
Check that the sensor's green warning light comes on.
If you cannot establish dialogue with the second vehicle, refer to **CLIP diagnostic tool check**.
If there is no dialogue with the second vehicle, follow the instructions in the **Vehicle check** section.

CLIP DIAGNOSTIC TOOL CHECK	Check the **cleanliness** and **condition** of the diagnostic socket contacts which connect to the vehicle. Check the **condition** of the cable from the diagnostic socket to the probe, and the cleanliness and condition of the connections. Check the sensor connections. Check the **condition** of the cable from the probe to the CLIP tool, and the cleanliness and condition of the connections. Check the **cleanliness** and **condition** of the CLIP socket. If the fault is still present, contact the Techline.
VEHICLE CHECK	Check the **electrical voltage** of the battery. Check the **cleanliness** and **condition** of the battery terminals. Check the **condition** and **tightness** of the cable going from the battery + terminal to the Protection and Switching Unit. Check the **condition** of the battery earth cable and ensure that there is **good electrical connection** with the bodywork.
	Check the injection computer earth terminal for **cleanliness** and make sure it is **properly connected** to the bodywork.
	Check the injection computer after ignition feed **5A fuse F18** in addition to the **condition** and **cleanliness** of the contacts.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 1 CONTINUED 1	

VEHICLE CHECK CONTINUED 1

Using the universal bornier, check the following tracks on the **vehicle's diagnostic socket**:

Track 1 → **+ After ignition**

Track 16 → **+ Battery feed**

Tracks 4 and 5 → **Earth**

Repair if necessary.

Disconnect the battery and the petrol computer.
Check the **cleanliness** and **condition** of the computer connections.
Using the universal bornier, check for **continuity** on the **CAN** communication lines:

Computer, connector **A, track A4** → **track 6** Vehicle diagnostic socket

Computer, connector **A, track A3** → **track 14** Vehicle diagnostic socket

If the fault is still present, check **the condition** of intermediate connector **R262**.
Repair if necessary.

Check the **continuity** of the **K** communication line:

Computer, connector **A, track B4** → **track 7** of the vehicle diagnostic socket

If the fault is still present, check **the condition** of intermediate connector (**R262**).
Repair if necessary.

Disconnect the computer **earth** terminal connection from the negative battery terminal.
Check the **continuity** and **insulation** of the following tracks:

Petrol computer, connector **C, track L1** → **Earth terminal**

Fuel computer, connector **C, track M1** → **Earth terminal**

Petrol computer, connector **B, track M1** → **Earth terminal**

Petrol computer, connector **B, track L1** → **Earth terminal**

Repair if necessary.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 1 CONTINUED 2	

VEHICLE CHECK CONTINUED 2	
	Using the universal bornier, check for **insulation** and **continuity** on the following connection: Computer, connector **B, track D4** ⟶ **track 2** of the main relay Repair if necessary.
	Using the universal bornier, check for **continuity** on the following connection: Computer, connector **B, track M2** ⟶ **track 5** of the main relay Repair if necessary.
	Check the condition and operation of fuse **F6 (10A)**. Using the universal bornier, check for **continuity** on the following connection: Computer, connector **A, track D1** ⟶ **track 8** of the fuse box Fuse box **track 8** ⟶ **track 1** of the petrol pump relay Repair if necessary.
	If the fault is still present, **contact the Techline**.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 2	The engine will not start

NOTES	**Follow ALP 2 after a complete check with the diagnostic tool.**
	IMPORTANT **Never drive the vehicle without checking that there are no throttle valve faults.**

If the starter motor does not engage, there may be an engine immobiliser fault. Carry out fault finding on the UCH (see **87B, Passenger Compartment Connection Unit**).
Check the condition of the battery. Check the cleanliness, condition and tightness of the battery terminals. Check that the battery is correctly earthed to the vehicle bodywork. Check that the + battery leads are correctly connected.
Check that the starter motor is properly connected. Check the starter is working properly (see **Technical Note 6014A Checking the charging circuit**).
Check the condition and conformity of the spark plugs. Check the mounting, cleanliness and condition of the flywheel signal sensor. Check the flywheel signal sensor air gap. Check the condition of the flywheel.
Check that the air filter is not clogged. Check that the air inlet system is not blocked.
Check that there is fuel in the tank (fuel sender fault). Check that the tank vent is not blocked. Check that the fuel is of the correct type. Check that there are no leaks in the fuel system, from the tank to the injectors. Check that there are no kinked hoses (especially after a removal operation). Check the fuel flow rate and pressure. Check the sealing of the injectors, and that they are working properly.
Check that the exhaust system is not blocked and the catalytic converter not clogged.
Check the timing adjustment.
Check the engine compressions.
Check the hydraulic tappets if there is camshaft noise.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 3	Idle speed faults

NOTES	**Fill in ALP 3 after a complete check using the diagnostic tool.**
	IMPORTANT **Never drive the vehicle without checking that there are no throttle valve faults.**

Check that the oil level is not too high.
Check inlet system sealing, from the throttle to the cylinder head. Check that the fuel vapour absorber bleed is not disconnected or jammed open. Check that there are no leaks in the fuel vapour absorber bleed system. Check that there are no leaks in the braking assistance system. Check that there are no leaks in the oil vapour recovery system (manifold/cylinder head). Check that there are no leaks around the manifold pressure sensor. Check that there are no leaks around the air temperature sensor.
Check that the air filter is not clogged. Check that the air inlet system is not blocked. Check that the throttle valve is not clogged.
Check the condition of the pencil coils and the cleanliness of their connections. Check the electrical resistance of the pencil coil secondary circuits. Check the condition and conformity of the spark plugs. Check the mounting, cleanliness and condition of the flywheel signal sensor. Check the flywheel signal sensor air gap. Check the condition and cleanliness of the flywheel.
Check that the tank vent is not blocked. Check that the fuel is of the correct type. Check that there are no leaks in the fuel system, from the tank to the injectors. Check that there are no kinked hoses (especially after a removal operation). Check the fuel flow rate and pressure. Check that the injectors are working properly.
Check that the exhaust system is not blocked and the catalytic converter not clogged.
Check the timing adjustment.
Check the engine compressions.
Check the hydraulic tappets if there is camshaft noise.

AFTER REPAIR	Repeat the conformity check from the start.

ALP 4	Faults occurring while driving

NOTES	**Fill in ALP 4 after a complete check using the diagnostic tool.** *(Use the relevant section in the Repair Manual to carry out certain operations).*
	IMPORTANT **Never drive the vehicle without checking that there are no throttle valve faults.**

Check that the oil level is not too high.
Check the condition of the pencil coils and the cleanliness of their connections. Check the electrical resistance of the pencil coil secondary circuits. Check the condition and conformity of the spark plugs. Check the mounting, cleanliness and condition of the flywheel signal sensor. Check the flywheel signal sensor air gap. Check the condition and cleanliness of the flywheel.
Check that the air filter is not clogged. Check that the air inlet system is not blocked. Check that the throttle valve is not clogged. Check inlet system sealing, from the throttle to the cylinder head.
Check that the fuel vapour absorber bleed is not disconnected or jammed open. Check that there are no leaks in the fuel vapour absorber bleed system. Check that there are no leaks in the braking assistance system. Check that there are no leaks in the oil vapour recovery system (manifold/cylinder head). Check that there are no leaks around the manifold pressure sensor. Check that there are no leaks around the air temperature sensor.
Check that the tank vent is not blocked. Check that the fuel is of the correct type. Check that there are no leaks in the fuel system, from the tank to the injectors. Check that there are no kinked hoses (especially after a removal operation). Check the fuel flow rate and pressure. Check that the injectors are working properly.
Check that the exhaust system is not blocked and the catalytic converter not clogged.
Check the timing adjustment.
Check the engine compressions.
Check the hydraulic tappets if there is camshaft noise.

AFTER REPAIR	Repeat the conformity check from the start.

LPG INJECTION
Fault finding - Introduction

1. SCOPE OF THIS DOCUMENT

This document presents the fault finding procedure applicable to all computers with the following specifications:

Vehicle(s): **MEGANE 2/SCENIC 2 Ph 1 and Ph 2**
Function concerned: **LPG injection**
Engines: **K4M 764/788**

Name of computer: **GAZ 3000**
Program No.: **AB**
Vdiag No: **08**

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedure (this manual):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.
Wiring Diagrams:
– Visu-Schéma (CD-ROM), paper version.

Type of diagnostic tools

– CLIP + CAN sensor

Special tooling required

Special tooling required	
	Multimeter
Elé. 1681	Universal bornier

3. RECAP

Procedure

To run fault finding on the vehicle's computers, switch on the ignition in fault finding mode (forced + after ignition feed).

Proceed as follows:
– Put the vehicle card in the card reader.
– press and hold the Start button (longer than 5 seconds) with start-up conditions not met,
– connect the diagnostic tool and perform the required operations.

Note:
The left-hand and right-hand xenon bulb computers are supplied when the dipped headlights are lit. Fault finding on these is therefore not possible until after the ignition has been switched on in diagnostic mode (forced + after ignition) and the dipped headlights have been lit.

To **cut off + after ignition feed**, proceed as follows:
– disconnect the diagnostic tool,
– press the Start button twice briefly (less than 3 seconds),
– Ensure that the + after ignition feed has been cut off by checking that the computer indicator lights on the instrument panel have gone out.

Faults

Faults are declared either present or stored (depending on whether they appeared in a certain situation and have disappeared since, or whether they remain but have not been diagnosed within the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is used following the + after ignition supply being switched on (without acting on the system components).

For a **present fault**, apply the procedure described in the **Interpretation of faults** section.

For a **stored fault**, note the faults displayed and apply the instructions in the **Notes** section.

If the fault is **confirmed** when the instructions in the Notes section are applied, the fault is present. Deal with the fault

If the fault is **not confirmed**, check:
- the electrical lines which correspond to the fault,
- the connectors on these lines (corrosion, bent pins, etc.),
- the resistance of the component detected as faulty,
- the condition of the wires (melted or split insulation, wear).

Conformity check

The aim of the conformity check is to check data that does not produce a fault on the diagnostic tool because the data is inconsistent. Therefore, this phase is used to:
- carry out fault finding on faults that do not have a fault display, and which may correspond to a customer complaint.
- check that the system is operating correctly and that there is no risk of a fault recurring after repairs.

This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.

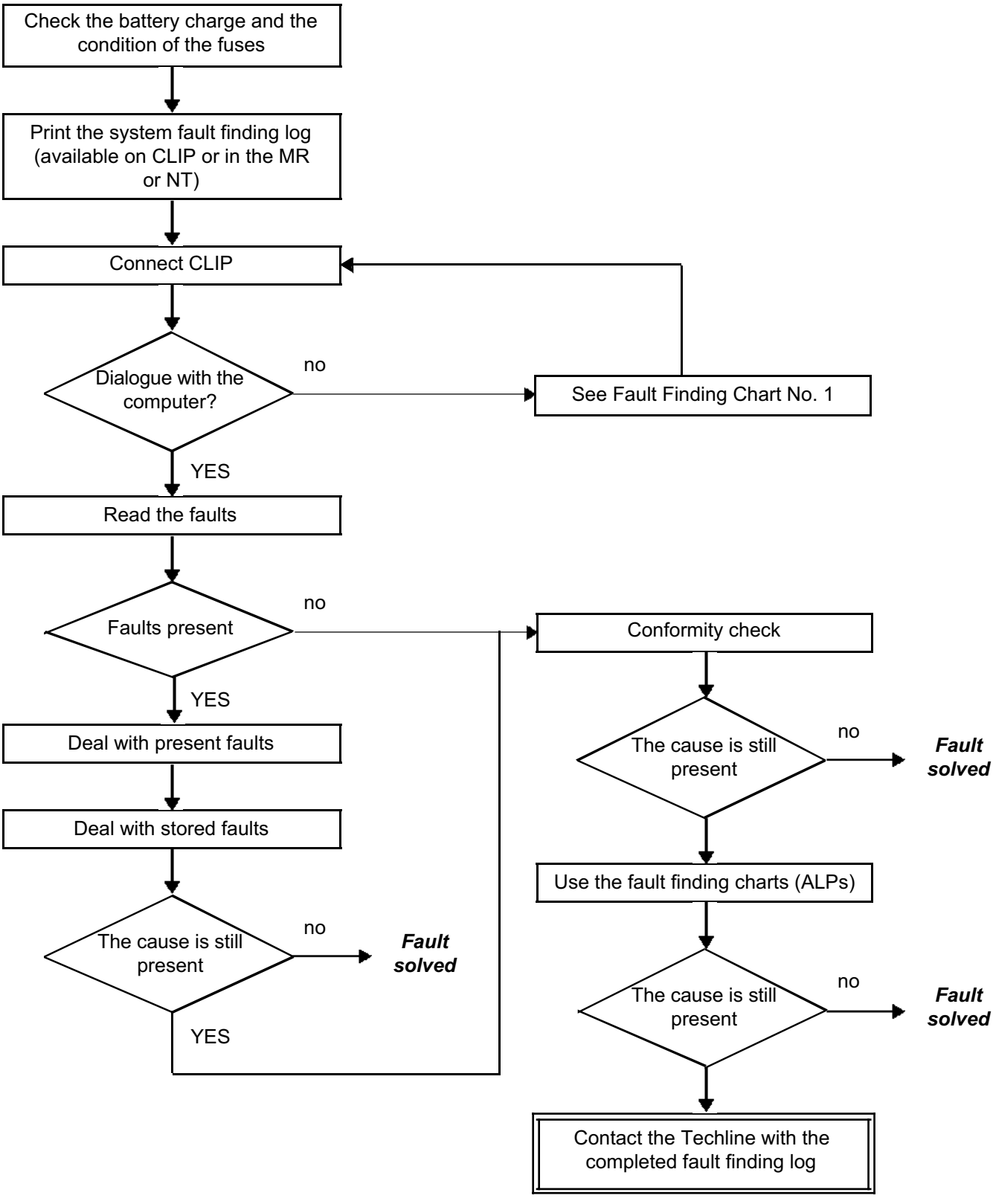
If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

Customer complaints - Fault finding chart

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be processed by **customer complaint**.

A summary of the overall procedure to follow is provided on the following page in the form of a flow chart.

4. FAULT FINDING PROCEDURE



4. FAULT FINDING PROCEDURE (continued)

Wiring check

Fault finding problems
Disconnecting the connectors and/or manipulating the wiring harness may temporarily remove the cause of a fault. Electrical measurements of voltage, resistance and insulation are generally correct, especially if the fault is not present when the analysis is made (stored fault).

Visual inspection
- look for damage under the bonnet and in the passenger compartment,
- carefully check the fuses, insulators and wiring harness routing,
- look for signs of oxidation.

Tactile inspection

While manipulating the wiring harness, use the diagnostic tool to note any change in fault status from stored to present.
- Make sure that the connectors are properly locked.
- Apply light pressure to the connectors.
- Twist the wiring harness.

If there is a change in status, try to locate the source of the fault.

Inspection of each component
- disconnect the connectors and check the appearance of the clips and tabs, as well as their crimping (no crimping on the insulating section),
- make sure that the clips and tabs are properly locked in the sockets. Check that no clips or tabs have been dislodged during connection.
- check the clip contact pressure using an appropriate model of tab.

Resistance check
- check the continuity of entire lines, then section by section,
- look for a short circuit to earth, to **+12 V** or to another wire.

If a fault is detected, apply the associated fault finding procedure and repair or replace the wiring.

5. FAULT FINDING LOG

IMPORTANT!

NOTE
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the fault finding procedure, ensures a record is kept of the procedure carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE MANDATORY TO FILL OUT A FAULT FINDING LOG EACH TIME FAULT FINDING IS CARRIED OUT.

You will always be asked for this log:
– when requesting technical assistance from the Techline,
– for approval requests when replacing parts for which approval is obligatory,
– and it should be enclosed when returning monitored parts on request. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY ADVICE

Safety rules must be observed during any work on a component to prevent any damage or injury:
– make sure that the battery is properly charged to avoid damaging the computers with a low load,
– use the appropriate tools.

Safety instructions that must be followed before any operation is performed on the vehicle
– If a major LPG leak occurs, the vehicle must be isolated, away from buildings and any fire risks,
– the emergency services may be required to intervene if the situation cannot be controlled,
– all work on the LPG circuit must be performed by qualified and authorised personnel,
– do not try to open the tank. Never try to remove the multi-valve located at the end of the tank,
– do not clean the engine compartment using a pressure system with detergents,
– always refer to the RENAULT Workshop Repair Manual before performing any work.

Safety instructions that must be followed when any operation is performed on the vehicle
– all work must be carried out in a well-ventilated space,
– there must not be any naked flames, sparks, lit cigarettes or telephones near the area where work is being carried out,
– the operator must not wear acrylic clothes likely to generate static electricity,
– disconnect the battery and leave the vehicle on the ground,
– if working on the tank, drain it by running the engine in LPG mode,
– once drained and removed, the tank can be sent to GIAT, complete with its mounting,
– if work is to be done in the spray booth, remove the tank (with its mounting),
– the tank must not be subjected to temperatures greater than 50°C.

Safety instructions that must be followed after any operation is performed on the vehicle
– after working on an LPG union, check that it is not leaking after it has been refitted,
– apply soapy water or the product distributed by **SODICAM**, part number **77 11 143 071** (leak detector) to the open union(s),
– fill the fuel tank with a few litres of LPG if it has been bled (the ignition must be switched off first),
– start the engine, put it in LPG mode and check again that there is no leak,
– if a leak is detected, retighten the union concerned. If the leak persists, refit the union,
– fill the fuel tank (80% of total volume). start the engine, put it in LPG mode and check that there is no leak,
– after refitting, check that all the rubber and encased steel LPG pipes are not in contact with any parts that may cause them to wear and create an LPG leak.

ROAD TEST (in Petrol mode, then in LPG mode)
– check that the stabilisation time is normal,
– check that the engine does not stall under sudden braking and that it maintains a stable idling speed until the vehicle comes to a stop,
– put the vehicle in **4th** gear, at a steady speed of **36 mph (60 km/h)**. Check that the vehicle accelerates progressively under full load acceleration.

NOTE
Before performing any work on the vehicle, drain the LPG circuit.
Only personnel who have undergone special LPG training can work with gas unions where gas is circulating and which run from the expansion valve via the fuel tank.
Equally, only these persons are permitted to perform servicing and repair operations on LPG vehicles.
Workshops can only carry out work on the fuel tank if they have a degassing burner. If the tank cannot be degassed, do not touch it and contact the **Comité Français du Butane et du Propane (French Butane and Propane Commission)** by fax on **+ 33 1 41 97 02 89.**

Maintenance operations:
– no adjustment,
– removal of internal components is not permitted,
– if LPG clips are removed, they must be replaced,
– if LPG unions are removed, they must be replaced.

The tank must be bled before removing:
- the fuel tank,
- a component bolted onto the tank, before bleeding the gas contained in the gas circuit.

To remove the following, bleed all gas contained in the gas circuit (except the gas in the tank):
- the filler neck,
- the pipes,
- the filter,
- the expansion valve,
- the solenoid valve.

1. System operation:

Composition

– The LPG injection system consists of the:
  – LPG tank,
  – fuel sender,
  – overpressure unit (thermally triggered),
  – tank automatic solenoid valve,
  – expansion valve,
  – filling spigot or socket,
  – LPG hose,
  – LPG pipes,
  – unions,
  – airtight cover,
  – regulator valve or anti-return valve,
  – excess pressure valve,
  – LPG filter,
  – temperature and pressure sensor,
  – LPG computer,
  – LPG expansion solenoid valve,
  – injectors,
  – LPG or petrol selection switch,
  – fuel sender relay,
  – LPG tank relay,
  – fuel pump cut-off relay.

Operating principle

The engine must be started in Petrol mode.
Petrol mode operates autonomously. Signals are shared between the Petrol computer and the LPG computer via a CAN connection.
The K line common to the two computers allows fault finding to be performed on both the petrol and the LPG systems.
The Petrol computer is also the supervisor of the LPG system and includes, in addition to petrol-specific functions, functions for adapting engine management programming to LPG operation.
Therefore, the Petrol computer includes settings and variables that are specific for LPG operation, e.g. ignition advance adjustment in LPG mode, LPG flow rate setting, richness regulation, engine operating mode, etc.
It manages the choice of program (petrol start-up, etc.) and controls the transition phases for switching from one operating mode to another: Petrol → LPG or LPG → Petrol.

Operating malfunctions

These are characterised by operation in Petrol mode, although the driver has selected LPG mode.
An operational fault must be caused by the LPG system if it cannot be reproduced in Petrol mode.
Forced Petrol mode operation while waiting for LPG conditions to be met.
Forced Petrol mode due to empty tank.
Forced Petrol mode when LPG is faulty.

Expansion valve:

– Purpose:
- reduces pressure of LPG from the tank,
- adjusts injection rail pressure in accordance with manifold pressure.

– Operation:

The LPG expansion valve is an essential component and consists of:
- a stage for lowering the pressure from **25 bar** maximum to a pressure in line with the manifold pressure,

$$P_{outlet} = P_{manifold} + 0.8 \text{ bar}$$

- a pressure regulator, comprised of a system of valves, springs and diaphragms,
- a cut-off solenoid valve,
- a water heating system.

– The expansion solenoid valve

This component controls only supply of gas to the expansion valve. Controlled by the computer, the solenoid valve allows LPG into the two stages of the expansion valve, thus supplying the LPG injectors.

3. Intersystem connections:

Connections to the other computers:
- Petrol injection computer,
- protection and switching unit,
- instrument panel.

Note:
Before carrying out any work on the LPG system, check that the vehicle operates correctly in Petrol mode.

Sender and LPG indicator light programming:

– LPG indicator light:

Operating mode	LPG indicator light status
Petrol	Off
Forced petrol due to LPG condition	Steady green
Forced Petrol mode when LPG is faulty	Steady amber
Forced Petrol mode for empty LPG tank	Flashing green
LPG	Steady green
Petrol to LPG transition	Steady green
LPG to petrol transition	Steady green

– Sender indicator light:

The sender indicator light is controlled as a function of the LPG level from the LPG indicator light status.

32-track connector

Track	Description
A1	CAN L1
A2	CAN H1
A3	LPG pressure sensor supply
A4	LPG sender supply
B1	LPG sender signal
B2	Not used
B3	LPG pressure sensor earth
B4	K line
C1	LPG button input
C2	+ After ignition
C3	Not used
C4	Pressure sensor signal
D1	Not used
D2	Not used
D3	Fuel gauge earth
D4	Not used
E1	Not used
E2	Not used
E3	Not used
E4	Fuel tank solenoid valve relay control
F1	TDC sensor signal
F2	Not used
F3	Fuel pump cut-out relay control
F4	LPG tank solenoid valve relay control
G1	Power earth 1
G2	LPG expansion valve solenoid valve
G3	Injector 1 control
G4	Injector 2 control
H1	Power earth 2
H2	Injector 3 control
H3	Injector 4 control
H4	+ Battery feed

COMPUTER REPLACEMENT OR REPROGRAMMING PROCEDURE

The system can be programmed and reprogrammed via the diagnostic socket using the RENAULT CLIP diagnostic tool (**see Technical Note 3585A or follow the instructions provided by the diagnostic tool**).

NOTE
- **plug in the diagnostic tool (mains or cigarette lighter supply),**
- **connect a battery charger,**
- **shut down all the electrical consumers (lights, interior lights, air conditioning, radio CD, etc.),**
- **wait for the engine to cool (engine coolant temperature below 60°C and air temperature below 50°C).**

After reprogramming or replacing the computer:

- **Switch the ignition off and then on again.**
- **Start and run the engine in LPG mode then stop the engine (to initialise the computer) and wait for 30 seconds.**
- **Turn on the ignition and use the diagnostic tool to carry out the following steps:**
- use command **VP001 Write VIN**,
- after the injection has been reprogrammed, stored faults may appear on other computers. Clear the memories of these computers,
- Carry out a road test followed by another check with the diagnostic tool.

1. CONFIGURATION

CF	**LC010**	LPG downstream temperature sensor	
		⟶ WITH	→ LPG
		⟶ WITHOUT	
CF	**LC011**	LPG downstream pressure sensor	
		⟶ WITHOUT	
		⟶ SAGEM / JCAE	→ LPG
		⟶ KAVLICO	→ CNG

Tool fault	Associated DTC	Description
DF003	2617	Engine speed inconsistency
DF007	1B47	Main relay circuit
DF013	1B40	Tank solenoid valve circuit
DF016	1685	Impact detected
DF017	1094	LPG leak detection downstream of expansion valve
DF018	0512	+ after ignition supply
DF020	1B45	Fuel sender switching relay circuit
DF021	1B46	LPG tank solenoid valve relay circuit
DF022	1B60	COMPUTER
DF024	1B43	Fuel pump cut-off relay circuit
DF026	C073	Multiplex network
DF029	1B20	LPG tank sender signal voltage
DF030	0657	LPG tank sender supply voltage
DF031	1B61	LPG pressure downstream of expansion valve
DF061	C100	Multiplex network
DF074	0336	TDC SIGNAL CIRCUIT
DF080	0560	BATTERY VOLTAGE
DF081	1B32	CYLINDER 2 INJECTOR CIRCUIT
DF087	1B34	CYLINDER 4 INJECTOR CIRCUIT
DF088	1B33	CYLINDER 3 INJECTOR CIRCUIT
DF092	1B05	Expansion valve downstream LPG pressure sensor circuit
DF096	0641	Sensor supply voltage
DF098	1B31	CYLINDER 1 INJECTOR CIRCUIT
DF099	1B49	Instrument panel indicator light circuit
DF103	1B41	LPG expansion solenoid valve circuit

DF003 PRESENT OR STORED	ENGINE SPEED CONSISTENCY 1.DEF: Inconsistency of signal 2.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine has been running for **10 seconds** in LPG mode.
	Appearance conditions: The fault appears when the difference between the hard-wired petrol computer engine speed signal and the multiplex network engine speed is greater than **300 rpm**.

Manipulate the wiring harness between the LPG computer and the petrol computer in order to produce a change in status (present ↔ stored).
Look for any damage to the harness, check the **connection** and **condition** of the LPG computer and its connectors and carry out the same checks on the injection computer.
Repair if necessary.

Check the **insulation and continuity** on the wires of the following multiplex connections:

LPG computer **track A1** ⟶ **track K3, connector B**, petrol computer

LPG computer **track A2** ⟶ **track K4, connector B**, petrol computer

Repair if necessary.

Check the **insulation, continuity and the absence of interference resistance** on the connection between:

LPG computer **track F1** ⟶ **track C3, connector B**, petrol computer.

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF007 PRESENT OR STORED	MAIN RELAY CIRCUIT 1.DEF: Voltage outside permitted range of values 2.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine has been started and switched to LPG mode.

Manipulate the wiring harness between the LPG computer and the main relay in order to produce a change in status. Look for possible damage to the harness, and check the **connections and condition** of the main relay and its connectors (present ⇔ stored).
If necessary, repair or replace the connector.

With the ignition on check for **+12 V** on **tracks 1** and **3** of the main relay.

If **+12 V** is not present:
– disconnect the battery,
– in the Protection and Switching Unit, disconnect the grey connector,
– check the **cleanliness** and **condition** of the connections,
– Use the universal bornier to check the **continuity** of the following connection:

Protection and Switching Unit **Grey connector, track 1** ⟶ **track 3** of the main relay

Repair if necessary.

Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG computer **track F4** ⟶ **track 2** of the main relay

Repair if necessary.

With the ignition on, check for **earth** on **track 2** of the main relay.
If, with the ignition on, the computer does not control the main relay on **track 2** through an earth, contact the Techline.

With the engine running, check that the relay clicks when LPG mode is selected.
Replace the main relay if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF013 PRESENT OR STORED	TANK SOLENOID VALVE CIRCUIT CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Order of priority for dealing with a combination of faults:** If faults **DF021 LPG tank solenoid valve relay circuit** or **DF018 + after ignition feed supply** or **DF016 Impact detected** are present or stored, deal with them first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine is started and switched to LPG mode or when command **AC015 Tank solenoid valve** is executed.

Manipulate the wiring harness between the LPG computer and the LPG tank solenoid valves in order to produce a change in status (present ↔ stored).
Look for any damage to the harness, and check the **connection** and **condition** of the LPG tank solenoid valves and their connectors.
Repair if necessary.

Check the **connection** and **condition** of the LPG tank solenoid valve relay connector and its connections.
Replace the connector if necessary.

– check that the solenoid valve is supplied with **+12 V** by **track E3** of the LPG computer.
– check for **+12 V** on **track D** of the LPG tank solenoid valve.
If necessary, check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG tank solenoid valve **track D** → **track 5** of the LPG tank solenoid valve relay
→ **track E3**, LPG computer

If the fault is still present, check the intermediate connectors (**R2 track 38**), (**R34 track 9**).
Repair if necessary.

Check for **earth** on **track E** of the LPG tank solenoid valve.
Repair if necessary.

With the engine running, check that the LPG tank solenoid valve relay clicks when LPG mode is selected.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF013 **CONTINUED**	

If the fault is still present, check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG computer **track E4** ⟶ **track 2** of the LPG tank solenoid valve relay

Repair if necessary.

With the ignition on, check for **+12 volts** on track **C2** of the LPG computer.
Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG computer **track C2** ⟶ **track 1** of the LPG tank solenoid valve relay

Repair if necessary.

With the ignition on, check that the relay and the fuel pump are supplied with **+12 V**.
Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

Fuel pump relay **track 2** ⟶ **track 3** of the LPG tank solenoid valve relay

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF016 **PRESENT**	IMPACT DETECTED 1.DEF: Impact detected 2.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If faults **DF021 LPG tank solenoid valve relay circuit** or **DF018 + after ignition feed supply** are present or stored, deal with them first.
	Special note: As soon as the LPG computer receives this signal, engine operation is prohibited.

If the vehicle has been involved in an accident:
Carry out any necessary repairs,
- clear the fault,
- switch off the ignition,
- wait for the engine immobiliser indicator light to flash,
- switch on the ignition,

If the fault does not recur, end the fault finding procedure.
If the fault recurs, carry out fault finding on the airbag computer.

If the vehicle has not been involved in an accident:
Check for **+12 V** on **track 3** of the fuel pump cut-off relay and the LPG tank relay.
Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF017 PRESENT OR STORED	LPG LEAK DETECTION DOWNSTREAM OF THE EXPANSION VALVE 1.DEF: Leak detection 2.DEF: Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Fault finding procedure application conditions:** – clear the faults, – start the engine, – select LPG mode, – wait for the engine to operate in LPG mode **ET093 LPG mode** at **YES**. – Turn the engine off, – wait for **5 minutes**, – confirm that the fault is present.
	Special note: To detect the leak, use the product distributed by **SODICAM**, Part number **77 11 143 071** (leak detector).

Start the engine, select LPG mode, wait for the engine to operate in LPG mode **ET093 LPG mode** at **YES** and apply the **leak detector** product to:
- the expansion valve,
- the pipe between the expansion valve and the injector rail,
- the pipes between the injector rail and the injectors,
- the injector bodies.

Repair if necessary.

With the ignition on and the engine off, control the expansion valve solenoid valve using command **AC024 Expansion valve solenoid valve**.
Without disconnecting the pipes, carefully remove:
- the LPG injector rail,
- the LPG injectors.

Apply the leak detector product to the injector seats.
Replace the defective injector(s) (see **MR 364 Mechanics, 17D, LPG Injection, Injectors**).

If the fault is still present, **contact Techline**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF018 PRESENT OR STORED	+ AFTER IGNITION SUPPLY CC.1 : Short circuit to +12 V 1.DEF: Abnormal voltage 2.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If faults **DF021 LPG tank solenoid valve relay circuit** or **DF016 Impact detected** are present or stored, deal with them first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine has been started and switched to LPG mode.

Manipulate the wiring harness between the LPG computer and the after ignition feed supply circuit in order to produce a change in status (present ↔ stored). Look for any damage to the harness, and check the **connection and condition** of the after ignition feed supply circuit and its connectors. If necessary, repair or replace the connector.
With the ignition on, check for **+12 volts** on track **C2** of the LPG computer. Repair if necessary.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF020 **PRESENT** **OR** **STORED**	FUEL SENDER SWITCHING RELAY CIRCUIT CC.1 : Short circuit to +12 V CO.0 : Open circuit or short circuit to earth 2.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine is started and switched to LPG mode or when command **AC005 Fuel sender relay** is executed.

Manipulate the wiring harness between the LPG computer and the fuel sender relay in order to produce a change in status (present ↔ stored).
Look for possible damage to the harness, and check the **connections and condition** of the fuel sender relay and its connectors.
Repair if necessary.

Check **the continuity and insulation** of the following connection:

Fuel sender relay **track 5** ⟶ **track E3**, LPG computer

Replace the fuse if necessary.

With the ignition on, check for **+12 volts** on **track C1** of the LPG computer.
Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG computer **track C1** ⟶ **track 4** of the LPG/petrol selector switch

If the fault is still present, check the intermediate connector (**R34 on track 7**).
Repair if necessary.

Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG computer **track E4** ⟶ **track 2** of the fuel sender relay

Repair if necessary.

In LPG operation, check for **earth** on **track 2** of the fuel sender relay.
If, with the ignition on, the computer does not control the fuel sender relay on **track 2** through an earth, contact the Techline.

If the fault is still present, replace the fuel sender relay.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF021 PRESENT OR STORED	LPG TANK SOLENOID VALVE RELAY CIRCUIT CC.1 : Short circuit to +12 V CO.0 : Open circuit or short circuit to earth 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF024 Fuel pump cut-off relay circuit** is present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine has been started and switched to LPG mode.

Manipulate the wiring harness between the LPG computer and the LPG tank solenoid valve relay in order to produce a change in status (present ↔ stored).
Look for possible damage to the harness, and check the **condition and connection** of the LPG tank solenoid valve relay and its connectors.
If necessary, repair or replace the connector.

With the ignition on, check for **+12 V** on **track 1** of the LPG tank solenoid valve relay and **track C2** of the computer.

If **+12 V** is not present:
– disconnect the battery,
– in the Protection and Switching Unit, disconnect the grey connector,
– check the **cleanliness** and **condition** of the connections,
– Use the universal bornier to check the **continuity** of the following connection:

Protection and Switching Unit **Grey connector, track 7**	⟶	**track 1** of the solenoid valve relay of the LPG tank

Repair if necessary.

Check for **+12 V** on **track 3** of the LPG tank solenoid valve relay.

If **+12 V** is not present, check (using the universal bornier) the **continuity** of the following connections:

Tank solenoid valve relay **track 3**	⟶	**track 5** of the fuel pump relay

Repair if necessary.

Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG computer **track E4**	⟶	**track 2** of the solenoid valve relay of the LPG tank

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF021 **CONTINUED**	

With the ignition on, check for **earth** on **track 2** of the LPG tank solenoid valve relay. If, with the ignition on, the computer does not control the LPG tank solenoid valve relay on **track 2** through an earth, contact the Techline.
With the engine running, check that the relay clicks when LPG mode is selected. **If the fault is still present, replace the LPG tank solenoid valve relay.**
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF022 **PRESENT**	COMPUTER 1.DEF: Internal electronic fault 2.DEF: Non-compliance with emission control standards

NOTES	**Fault finding procedure application conditions:** Only when fault is present.
	Special note: This fault appears when the ignition is switched off (power latch phase: computer data backup phase) or when the engine is stopping.

Clear the faults from memory and then start the engine.
If the fault is still present, **contact Techline**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF024 PRESENT OR STORED	FUEL PUMP CUT-OFF RELAY CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF021 LPG tank solenoid valve relay circuit** is present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine has been running for **10 seconds** in LPG mode.

Manipulate the wiring harness between the LPG computer and the fuel pump cut-off relay in order to produce a change in status (present ↔ stored).
Look for possible damage to the harness, and check the **connections and condition** of the fuel pump cut-off relay and its connectors.

Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

Main relay **track 5** ⟶ **track 1** of the fuel pump cut-off relay

Repair if necessary.

Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG computer **track F3** ⟶ **track 2** of the fuel pump cut-off relay

Repair if necessary.

In LPG operation, using status **ET025 Fuel pump** check that **ET025** is **ACTIVE** on starting, then becomes **INACTIVE** after **1 minute**.
If **ET025** does not become **INACTIVE**, check for **earth** on **track 2** of the fuel pump cut-off relay.
If, with the ignition on, the computer does not control the fuel pump cut-off relay on **track 2** through an earth, contact your Techline.

If the fault is still present, replace the fuel pump cut-off relay.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF026 **PRESENT** **OR** **STORED**	MULTIPLEX NETWORK 1.DEF : No multiplex frames or invalid values (signal-producing computer fault or CAN connection fault). 2.DEF : Non-compliance with emission control standards

NOTES	None

Check the **insulation and continuity** on the wires of the following multiplex connections:

LPG computer **track A1** → **track K3, connector B**, petrol computer

LPG computer **track A2** → **track K4, connector B**, petrol computer

Repair if necessary.

Test the multiplex network (see **88B, Multiplexing**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF029 PRESENT OR STORED	LPG TANK SENDER SIGNAL VOLTAGE CO.0 : Open circuit or short circuit to earth CO.1 : Open circuit or short circuit to +12 V CC.0 : Short circuit to earth 1.DEF: Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine has been started and switched to LPG mode.

Manipulate the wiring harness between the LPG computer and the LPG tank sender in order to produce a change in status (present ↔ stored).
Look for possible damage to the harness, and check the **connections and condition** of the LPG tank sender connector.
Replace the connector if necessary.

Disconnect the connector from the LPG tank sender and measure the **resistance** between **tracks A** and **C**.
Replace the sender if the **resistance** is different to that shown in the table below.

Check for **earth** on **track C** of the LPG tank sender connector.
Repair if necessary.

Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG computer **track B1** ⟶ **track B**, of the LPG tank sender

If the fault is still present, check the intermediate connectors **(R2 track 36), (R34 track 34)**.
Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

Resistance of the tank sender in Ω (± 2 Ω)	Needle position
20	**Full**
290	**Reserve**
320	**Empty**

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF030 PRESENT OR STORED	LPG TANK SENDER SUPPLY VOLTAGE 1.DEF: Voltage outside permitted range of values 2.DEF: Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine has been started and switched to LPG mode.

Manipulate the wiring harness between the LPG computer and the LPG tank sender in order to produce a change in status (present ↔ stored).
Look for possible damage to the harness, and check the **connections and condition** of the LPG tank sender connector.
Replace the connector if necessary.

Check for a supply on **track A4** of the LPG computer and on **track A** of the fuel sender in **LPG mode**.
Check the intermediate connectors **(R2 track 39) and (R34 track A)**.
Contact the Techline if the voltage value is not between:

4.6 < V < 5.2

Check **the insulation** and **continuity** of the following connection:

LPG computer **track D3** ⟶ **track C** of the LPG tank sender

If the fault is still present, check the intermediate connectors (**R2 track 37**), (**R34 track 10**).
Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF031 **PRESENT**	LPG PRESSURE DOWNSTREAM OF EXPANSION VALVE 1.DEF: Inconsistency of signal 2.DEF: Signal outside lower limit 3.DEF: Signal outside upper limit 4.DEF: Non-compliance with emission control standards

NOTES	None

Manipulate the wiring harness between the LPG computer and the LPG tank pressure sensor in order to produce a change in status (present ↔ stored). Look for any damage to the harness, and check the **connection and condition** of the LPG tank pressure sensor downstream of the expansion valve and its connectors. If necessary, repair or replace the connector.
With the engine off, switch on LPG mode and check that the sender is not at minimum. If necessary, put some LPG back into the tank.
Check that the **PR112 LPG pressure downstream of the expansion valve** is not more than **800 mbar** greater than the manifold pressure **PR001 Manifold pressure**. Check the pressure value using parameters **PR001 Manifold pressure, PR003 Pressure difference: LPG/ manifold** and **PR112 LPG pressure downstream of expansion valve** and ensure that **PR003 = PR112 - PR001**.
Check that the LPG supply pipes are not pinched or crushed. Replace the faulty pipes if necessary.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF061 PRESENT OR STORED	MULTIPLEX NETWORK 1.DEF : No multiplex frames or invalid values (signal-producing computer fault or CAN connection fault). 2.DEF : Non-compliance with emission control standards

NOTES	None

Check the **insulation and continuity** on the wires of the following multiplex connections:

LPG computer **track A1** ⟶ **track K3, connector B**, petrol computer

LPG computer **track A2** ⟶ **track K4, connector B**, petrol computer

Repair if necessary.

Test the multiplex network (see **88B, Multiplexing**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF074 PRESENT OR STORED	TDC SIGNAL CIRCUIT 1.DEF: Inconsistency of signal 2.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present following signal incoherence.
	Appearance conditions: The fault appears when the difference between the hard-wired petrol computer engine speed signal and the multiplex network engine speed is greater than **300 rpm**.

Manipulate the wiring harness between the LPG computer and the petrol computer in order to produce a change in status (present ↔ stored).
Look for any damage to the wiring harness, and check **the connection and condition** of the TDC sensor and its connectors.
If necessary, repair or replace the connector.

Check the **insulation, continuity and absence of interference resistance** on the connection between:

LPG computer **track F1** → **track C3, connector B**, of the petrol computer

Check the **insulation and continuity** on the wires of the following multiplex connections:

LPG computer **track A1** → **track K3, connector B**, petrol computer

LPG computer **track A2** → **track K4, connector B**, petrol computer

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF080 **PRESENT**	BATTERY VOLTAGE 1.DEF: Battery voltage too low 2.DEF: Battery voltage too high 3.DEF: Non-compliance with emission control standards

NOTES	**Special note:** The fault is declared present if the voltage value is not between: **6 V < Vbatt < 16 V**

Check **the condition of the battery** and **the charge circuit**. Check the **condition** of the vehicle **earths**.
Check for **+12 V** on **tracks H4** and **C2** of the LPG computer. Repair if necessary.
Check for an **earth** on **tracks G1** and **H1**. Repair if necessary.
If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF081 PRESENT OR STORED	CYLINDER 2 INJECTOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF021 LPG tank solenoid valve relay circuit** is present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine is started and switched to LPG mode or when command **AC020 Cylinder 2 injector** is executed.

Manipulate the wiring harness between the LPG computer and the cylinder 2 injector in order to produce a change in status (present ↔ stored).
Look for any harness damage, and check the **condition and connection points** of Injector no. 2 and its connectors.
If necessary, repair or replace the connector.

Measure the **resistance** of injector 2 between **tracks 1** and **2**.
Replace the injector if its resistance at **approximately 20°C** is not between:

0.7 Ω < R < 1.45 Ω

Check for **insulation against earth, continuity and absence of interference resistance** for the following connections:

General relay **track 5**	→	**track 6 of the black intermediate connector (R37)**
Black intermediate connector (R37) track 6	→	**track 1** of injector 2
LPG computer **track G4**	→	**track 2 of the black intermediate connector (R37)**
Black intermediate connector (R37) track 2	→	**track 2** of injector 2

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF081 **CONTINUED**	

With the ignition on, – check for **+12 V** on **track 1** of injector 2, – check for **earth** on **track 2** of injector 2 when command **AC020 Cylinder 2 injector** is executed. Repair if necessary.
If the fault is still present, **contact Techline**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF087 PRESENT OR STORED	CYLINDER 4 INJECTOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF021 LPG tank solenoid valve relay circuit** is present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine is started and switched to LPG mode or when command **AC018 Cylinder 4 injector** is executed.

Manipulate the wiring harness between the injection computer and the cylinder 4 injector in order to produce a change in status (present ↔ stored).
Look for any harness damage, and check the **condition and connection** of injector no. 4 and its connectors.
If necessary, repair or replace the connector.

Measure the **resistance** between **tracks 1** and **2** of injector 4.
The injector resistance value at **approximately 20°C** must be between:

0.7 Ω < R < 1.45 Ω

Replace the injector if necessary.

Check for **insulation against earth, continuity and absence of interference resistance** for the following connections:

General relay **track 5** → **track 8 of the black intermediate connector (R37)**

Black intermediate connector (R37) track 8 → **track 1** of injector 4

LPG computer **track H3** → **track 4 of the black intermediate connector (R37)**

Black intermediate connector (R37) track 4 → **track 2** of injector 4

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF087 **CONTINUED**	

With the ignition on,
- check for **+12 V** on **track 1** of injector 4,
- check for **earth** on **track 2** of the cylinder 4 injector when command **AC018 Cylinder 4 injector** is executed.

Repair if necessary.

If the fault is still present, **contact Techline**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF088 PRESENT OR STORED	CYLINDER 3 INJECTOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF : Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF021 LPG tank solenoid valve relay circuit** is present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine is started and switched to LPG mode or when command **AC019 Cylinder 3 injector** is executed.

Manipulate the wiring harness between the injection computer and the cylinder 3 injector in order to produce a change in status (present ↔ stored).
Look for any harness damage, and check the **condition and connection** of the injector and its connectors.
If necessary, repair or replace the connector.

Measure the **resistance** between **tracks 1** and **2** of injector 3.
The injector resistance value at **approximately 20°C** must be between:

0.7 Ω < R < 1.45 Ω

Replace the injector if necessary.

Check for **insulation against earth, continuity and absence of interference resistance** for the following connections:

General relay **track 5** → **track 7 of the black intermediate connector (R37)**

Black intermediate connector (R37) track 7 → **track 1** of injector 3

LPG computer **track H2** → **track 3 of the black intermediate connector (R37)**

Black intermediate connector (R37) track 3 → **track 2** of injector 3

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF088 **CONTINUED**	

With the ignition on, – check for **+12 V** on **track 1** of injector 3, – check for **earth** on **track 2** of injector 3 when command **AC019 Cylinder 3 injector** is executed. Repair if necessary.
If the fault is still present, **contact Techline**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF092 PRESENT OR STORED	LPG PRESSURE SENSOR DOWNSTREAM OF EXPANSION VALVE CO.0 : Short circuit to earth CC.1 : Open circuit or short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Fault finding procedure application conditions:** When a fault is stored or present.

Manipulate the wiring harness between the LPG computer and the LPG temperature/ pressure sensor in order to produce a change in status (present ↔ stored).
Look for any damage to the harness, and check the **connection and condition** of the LPG pressure/temperature sensor and its connectors.
If necessary, repair or replace the connector.

Check for **+5 V** on **track 1** of the LPG pressure/temperature sensor in LPG mode.
Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG computer **track A3** ⟶ **track 1** of the LPG pressure/temperature sensor

Repair if necessary.

Check for **earth** on **track 3** of the LPG pressure/temperature sensor in LPG mode.
Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG computer **track B3** ⟶ **track 3** of the LPG pressure/temperature sensor

Repair if necessary.

Check the **insulation, continuity and absence of interference resistance** on the connection between:

LPG computer **track C4** ⟶ **track 2** of the LPG pressure/temperature sensor

Repair if necessary.

Replace the sensor if the **pressure** is not more than **0.8 bar** greater than the manifold pressure **PR001 Manifold pressure**.
Check the manifold pressure sensor sealing.
Check the pressure value using parameters **PR001 Manifold pressure, PR003 Pressure difference: LPG/ manifold** and **PR112 LPG pressure downstream of expansion valve** and ensure that **PR003 = PR112 - PR001**.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF096 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE 1.DEF: Voltage outside permitted range of values 2.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine has been running for **10 seconds** in LPG mode.

Manipulate the wiring harness between the LPG computer and the LPG temperature/ pressure sensor in order to produce a change in status (present ↔ stored).
Look for any damage to the harness, and check the **connection and condition** of the LPG pressure/temperature sensor and its connectors.
If necessary, repair or replace the connector.

Check for **+5 V** on **track A4** and **A3** and for **earth** on **track B3** and **D3** of the LPG computer.
Repair if necessary.
If incorrect, contact the Techline.

Check for a supply on **tracks A3** and **A4** of the LPG computer.
The voltage value must be between:

4.8 < V < 5.2

Check the **insulation** and **continuity** of the following connections:

LPG computer **track A4** → **track B** of the LPG tank sender

LPG computer **track A3** → **track 1** of the LPG pressure sensor

Repair if necessary.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF098 PRESENT OR STORED	CYLINDER 1 INJECTOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF021 LPG tank solenoid valve relay circuit** is present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine is started and switched to LPG mode or when command **AC021 Cylinder 1 injector** is executed.

Manipulate the wiring harness between the injection computer and the cylinder 1 injector in order to produce a change in status (present ↔ stored).
Look for any harness damage, and check the **condition and connection** of the injector and its connectors.
If necessary, repair or replace the connector.

Measure the **resistance** of injector 1 between **tracks 1** and **2**.
The injector resistance value at **approximately 20°C** must be between:

0.77 Ω < R < 1.43 Ω

Replace the injector if necessary.

Check for **insulation against earth, continuity and absence of interference resistance** for the following connections:

General relay **track 5** → **track 5 of the black intermediate connector (R37)**

Black intermediate connector (R37) track 5 → **track 1** of injector 1

LPG computer **track G3** → **track 1 of the black intermediate connector (R37)**

Black intermediate connector (R37) track 1 → **track 2** of injector 1

Repair if necessary.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF098 **CONTINUED**	

With the ignition on,
- check for **+12 V** on **track 1** of injector 1,
- check for **earth** on **track 2** of injector 1 when command **AC021 Cylinder 1 injector** is executed.

Repair if necessary.

If the fault is still present, **contact Techline**.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF099 PRESENT OR STORED	INSTRUMENT PANEL INDICATOR CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTES	**Conditions for applying the fault finding procedure to stored faults:** The fault is declared present after the engine has been started and switched to LPG mode.
	Special note: Status **ET099 LPG system faulty** may help in dealing with this fault.

Check the **insulation and continuity** on the wires of the following multiplex connections:

LPG computer **track A1** → **track 17** of the instrument panel

LPG computer **track A2** → **track 18** of the instrument panel

Repair if necessary.

If the LPG in operation indicator light does not light up normally, carry out fault finding on the instrument panel (see **83A, Instrument panel**).

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

DF103 PRESENT OR STORED	LPG EXPANSION VALVE SOLENOID VALVE CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : Short circuit to +12 V 1.DEF: Non-compliance with emission control standards

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	**Order of priority for dealing with a combination of faults:** If fault **DF021 LPG tank solenoid valve relay circuit** is present or stored, deal with it first.
	Conditions for applying the fault finding procedure to stored faults: The fault is declared present after the engine is started and switched to LPG mode or when command **AC024 LPG expansion solenoid valve** is executed.

Manipulate the wiring harness between the LPG computer and the LPG expansion valve solenoid valve in order to produce a change in status (present ↔ stored).
Look for possible damage to the harness, and check the **condition and connection** of the LPG expansion valve solenoid valve and its connectors.
Repair if necessary.

Measure the **resistance** between **tracks 1** and **2** of the LPG expansion valve solenoid valve.
Replace the solenoid valve if the **resistance** is not **approximately 12.6 Ω ± 1.3 Ω**.

Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG expansion valve solenoid valve **track 1** ⟶ **track 5** of the main relay

Repair if necessary.

Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG expansion valve solenoid valve **track 2** ⟶ **track G2** of the LPG computer

Repair if necessary.

With the engine running, check that the LPG expansion valve solenoid valve clicks when the LPG mode is selected or command **AC024 LPG expansion valve solenoid valve** is executed.

If the fault is still present, deal with the other faults, then proceed to the conformity check.

AFTER REPAIR	Deal with any faults displayed by the diagnostic tool. Clear the computer memory. Carry out a road test followed by another check with the diagnostic tool.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and LPG mode selected.

MAIN SCREEN

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Main relay**	**ET049:**	General relay	**INACTIVE**	In the event of a fault, apply the interpretation of **DF007 Main relay circuit**.
2	**Petrol/LPG mode consistency**	**ET021:**	Mode selected	**LPG**	**NONE**
3		**ET094:**	Petrol mode	**NORMAL**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
4		**ET093:**	LPG mode	**NO**	
5	**Engine speed**	**PR006:**	Engine speed	**PR006 = 0 mph (0 km/h)**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
6		**PR012:**	Engine speed multiplex signal	**PR012 = 0 mph (0 km/h)**	In the event of a fault, apply the interpretation of **DF074 TDC signal circuit**.
7	**LPG switch**	**ET105:**	LPG switch	**DEPRESSED** **RELEASED**	In the event of a fault, apply the interpretation of **DF020 Fuel sender switching relay circuit**.
8	**Sensor voltage**	**PR114:**	Sensor supply voltage	**4.9 V < PR114 < 5 V**	In the event of a fault, apply the interpretation of **DF096 Sensor supply voltage**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and LPG mode selected.

MAIN SCREEN (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
9	**Temperatures**	**PR103:**	Air temperature	**Indicates the temperature – of the coolant in °C. – of the air in °C. – of the LPG in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer. With a cold engine, the three temperatures should be almost identical.**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
10		**PR002:**	Coolant temperature		
11	**LPG temperature**	**PR113:**	LPG temperature		**NONE**

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and LPG mode selected.

SUB-FUNCTION: PETROL → LPG TRANSITION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**LPG / Petrol switch**	**ET094:** Petrol mode	**NORMAL**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
2		**ET084:** Forced petrol mode, empty tank	**NO**	If **YES**, carry out a multiplex network test. If the multiplex network is correct, check that the LPG tank is full. If the tank is full, apply the interpretation of status **ET084 Forced petrol mode, tank empty**.
3		**ET023:** Forced petrol mode when LPG is faulty	**NO**	If **YES**, apply the interpretation of status **ET023 Forced petrol mode, LPG fault**.
4		**ET021:** Mode selected	**LPG**	**NONE**
5		**ET100:** LPG system ready	**NO**	If there is inconsistency, apply the interpretation of status **ET100 LPG system ready**.
6		**ET022:** Waiting for LPG conditions	**NO**	If there is inconsistency, apply the interpretation of status **ET022 Waiting for LPG conditions**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and LPG mode selected.

SUB-FUNCTION: PETROL → LPG TRANSITION (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
7	**LPG / Petrol switch**	**ET096:**	Petrol to LPG transition	**NO**	When the LPG operating mode has been selected, if **ET022 Waiting for LPG conditions** is **NO** and **ET100 LPG system ready** is **YES**, then **ET096 Petrol to LPG transition** should be **YES**. If there is inconsistency, apply the interpretation of status **ET096**.
8		**ET093:**	LPG mode	**NO**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
9	**Petrol injection signals**	**PR006:**	Engine speed	**Indicates the engine's speed of rotation in rpm. PR006 = 0 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
10		**PR002:**	Coolant temperature	**Indicates the temperature – of the coolant in °C. – of the air in °C. – of the LPG in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer. With a cold engine, the three temperatures should be almost identical.**	
11		**PR103:**	Air temperature		
12	**LPG temperature**	**PR113:**	LPG temperature		**NONE**

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and petrol mode selected.

SUB-FUNCTION: LPG → PETROL TRANSITION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**LPG / Petrol switch**	**ET093:** LPG mode	**NO**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
2		**ET021:** Mode selected	**PETROL**	**NONE**
3		**ET095:** LPG to Petrol transition	**NO**	**NONE**
4		**ET094:** Petrol mode	**NORMAL**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
5		**ET084:** Forced petrol mode, empty tank	**NO**	If **YES**, test the multiplex network. If the multiplex network is correct, check that the LPG tank is full. If the tank is full, apply the interpretation of status **ET084 Forced petrol mode, tank empty**.
6		**ET023:** Forced petrol mode when LPG is faulty	**NO**	If **YES**, apply the interpretation of status **ET023 Forced petrol mode, LPG fault**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and petrol mode selected.

SUB-FUNCTION: LPG → PETROL TRANSITION (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
7	Petrol injection signals	**PR006:** Engine speed	**Indicates the engine's speed of rotation in rpm. PR006 = 0 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
8		**PR002:** Coolant temperature	**Indicates the temperature – of the coolant in °C. – of the air in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer. With a cold engine, the two temperatures should be almost identical.**	
9		**PR103:** Air temperature		

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and LPG mode selected.

SUB-FUNCTION: OPERATION IN LPG MODE

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**LPG / Petrol switch**	**ET021:** Mode selected	**LPG**	**NONE**
2		**ET093:** LPG mode	**YES**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
3	**Petrol injection signal**	**PR006:** Engine speed	**Indicates the engine's speed of rotation in rpm.** **PR006 = 0 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
4	**LPG expansion valve solenoid valve**	**ET106:** LPG expansion valve solenoid valve	**CLOSED**	The LPG expansion valve solenoid valve must be **OPEN** in LPG operation with the engine running and **CLOSED** in petrol operation. If there is inconsistency, apply the interpretation of **DF103 LPG expansion valve solenoid valve circuit**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and LPG mode selected.

SUB-FUNCTION: OPERATION IN LPG MODE (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
5	**Manifold pressure**	**PR001:** Inlet manifold vacuum	**Indicates the inlet manifold vacuum pressure in mb. PR001 = atmospheric pressure**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other faults
6	**LPG pressure**	**PR003:** Pressure difference: LPG/ manifold	**Calculation of the difference between LPG pressure and manifold pressure in mb. PR003 ≈ 800 mbar**	Check that: **PR112 - PR001 = PR003**
7		**PR112:** LPG pressure downstream of expansion valve	**Indicates the LPG pressure downstream of the expansion valve in mb. PR112 = PR001 + 800 mbar**	In the event of a fault, apply the interpretation of **DF092 Expansion valve downstream LPG pressure sensor circuit** and **DF017 LPG leak detection downstream of expansion valve**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and LPG mode selected.

SUB-FUNCTION: OPERATION IN LPG MODE (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
8	**LPG flow rate setting**	**PR111:**	LPG flow rate setting	**Indicates the LPG flow rate setting in g/h. PR111 = 0 g/h**	**NONE**
9	**LPG injection timing.**	**PR110:**	LPG injection timing	**Indicates the injection timing in ms. PR110 = 0 ms**	
10	**Tank sender**	**PR013:**	LPG tank sender supply voltage	**4.8 V < PR008 < 5.2 V**	In the event of a fault, apply the interpretation of **DF030 LPG tank sender supply voltage**.
11		**PR009:**	LPG tank sender signal voltage	**Indicates the signal voltage compared to the pressure in the LPG tank.**	In the event of a fault, apply the interpretation of **DF029 LPG tank sender signal voltage**.
12		**PR116:**	Sender resistance	**Tank full: 20 Ω ± 2 Ω Tank in reserve: 290 Ω ± 2 Ω Tank empty: 320 Ω ± 2 Ω**	
13	**LPG temperature**	**PR113:**	LPG temperature	**Gives the LPG temperature in °C. - 40°C < PR113< 120°C**	**NONE**
14	**Petrol pump**	**ET025:**	Fuel pump	**ACTIVE**	**ACTIVE** during operation in petrol mode. If there is inconsistency, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and petrol mode selected.

SUB-FUNCTION: OPERATION IN PETROL MODE

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**LPG / Petrol switch**	**ET021:** Mode selected	**PETROL**	**NONE**
2		**ET094:** Petrol mode	**NORMAL**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
3		**ET084:** Forced petrol mode, empty tank	**NO**	If **YES**, test the multiplex network. If the multiplex network is correct, check that the LPG tank is full. If the tank is full, apply the interpretation of status **ET084 Forced petrol mode, tank empty**.
4		**ET023:** Forced petrol mode when LPG is faulty	**NO**	If **YES**, apply the interpretation of status **ET023 Forced petrol mode, LPG fault**.
5	**Petrol injection signal**	**PR006:** Engine speed	**Indicates the engine's speed of rotation in rpm. PR006 = 0 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
6	**Manifold pressure**	**PR001:** Inlet manifold vacuum	**Indicates the inlet manifold vacuum pressure in mb. PR001 = atmospheric pressure**	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **stopped, ignition on** and petrol mode selected.

SUB-FUNCTION: OPERATION IN PETROL MODE (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
7	**Petrol pump**	**ET025:** Fuel pump	**ACTIVE**	**ACTIVE** during operation in petrol mode. If there is inconsistency, carry out a full fault finding procedure on the petrol injection system. Deal with any other faults
8	**Petrol injection signal**	**PR002:** Coolant temperature	**Indicates the temperature – of the coolant in °C. – of the air in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer. With a cold engine, the two temperatures should be almost identical.**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
9		**PR103:** Air temperature		

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and LPG mode selected.

MAIN SCREEN

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	**Main relay**	**ET049:**	General relay	**ACTIVE**	In the event of a fault, apply the interpretation of **DF007 Main relay circuit**.
2	**Petrol/LPG mode consistency**	**ET021:**	Mode selected	**LPG**	**NONE**
3		**ET094:**	Petrol mode	**NORMAL** **Then NO**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
4		**ET093:**	LPG mode	**NO** **Then YES**	
5	**Engine speed**	**PR006:**	Engine speed	**PR006 = 750 rpm ± 50 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
6		**PR012:**	Engine speed multiplex signal	**PR012 = 0 mph (0 km/h)**	In the event of a fault, apply the interpretation of **DF074 TDC signal circuit**.
7	**LPG switch**	**ET105:**	LPG switch	**DEPRESSED**	In the event of a fault, apply the interpretation of **DF020 Fuel sender switching relay circuit**.
8	**Sensor voltage**	**PR114:**	Sensor supply voltage	**4.9 V < PR114 < 5 V**	In the event of a fault, apply the interpretation of **DF096 Sensor supply voltage**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and LPG mode selected.

MAIN SCREEN (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
9	**Temperatures**	**PR103:**	Air temperature	**Indicates the temperature – of the coolant in °C. – of the air in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer.**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
10		**PR002:**	Coolant temperature		
11	**LPG temperature**	**PR113:**	LPG temperature	**Gives the LPG temperature in °C. - 40°C < PR113 < 120°C**	**NONE**

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and LPG mode selected.

SUB-FUNCTION: PETROL → LPG TRANSITION

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
1	LPG / Petrol switch	**ET094:**	Petrol mode	**NORMAL** **Then NO**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
2		**ET084:**	Forced petrol mode, empty tank	**NO**	If **YES**, check that the LPG tank is full. If the tank is full, apply the interpretation of status **ET084 Forced petrol mode, tank empty**.
3		**ET023:**	Forced petrol mode when LPG is faulty	**NO**	If **YES**, apply the interpretation of status **ET023 Forced petrol mode, LPG fault**.
4		**ET021:**	Mode selected	**LPG**	**NONE**
5		**ET100:**	LPG system ready	**YES**	If **NO**, apply the interpretation of status **ET100 LPG system ready**.
6		**ET022:**	Waiting for LPG conditions	**NO**	If **YES**, apply the interpretation of status **ET022 Waiting for LPG conditions**.
7		**ET096:**	Petrol to LPG transition	**NO** **Then YES**	When the LPG operating mode has been selected, if **ET022 Waiting for LPG conditions** is **NO** and **ET100 LPG system ready** is **YES**, then **ET096 Petrol to LPG transition** should be **YES**. If it is **NO**, apply the interpretation of **ET096**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and LPG mode selected.

SUB-FUNCTION: PETROL → LPG TRANSITION (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
8	**LPG / Petrol switch**	**ET093:** LPG mode	**NO Then YES**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
9	**Petrol injection signals**	**PR006:** Engine speed	**Indicates the engine's speed of rotation in rpm. PR006 = 750 rpm ± 50 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
10		**PR002:** Coolant temperature	**Indicates the engine coolant temperature in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer.**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
11		**PR103:** Air temperature	**Indicates the air temperature in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer.**	
12	**LPG temperature**	**PR113:** LPG temperature	**Gives the LPG temperature in °C. - 40°C < PR113 < 120°C**	**NONE**

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and petrol mode selected.

SUB-FUNCTION: LPG → PETROL TRANSITION

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**LPG / Petrol switch**	**ET093:** LPG mode	**YES** **Then NO**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
2		**ET021:** Mode selected	**PETROL**	**NONE**
3		**ET095:** LPG to Petrol Transition	**YES** **NO**	**NONE**
4		**ET094:** Petrol mode	**NO** **Then NORMAL**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
5		**ET084:** Forced petrol mode, empty tank	**NO**	If **YES**, check that the LPG tank is full. If the tank is full, apply the interpretation of status **ET084 Forced petrol mode, tank empty**.
6		**ET023:** Forced petrol mode when LPG is faulty	**NO**	If **YES**, apply the interpretation of status **ET023 Forced petrol mode, LPG fault**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and petrol mode selected.

SUB-FUNCTION: LPG → PETROL TRANSITION (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
7	**Petrol injection signals**	**PR006:** Engine speed	**Indicates the engine's speed of rotation in rpm. PR006 = 750 rpm ± 50 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
8		**PR002:** Coolant temperature	**Indicates the engine coolant temperature in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer.**	
9		**PR103:** Air temperature	**Indicates the air temperature in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer.**	

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and LPG mode selected.

SUB-FUNCTION: OPERATION IN LPG MODE

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**LPG / Petrol switch**	**ET021:** Mode selected	**LPG**	**NONE**
2		**ET093:** LPG mode	**YES**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
3	**Petrol injection signal**	**PR006:** Engine speed	**Indicates the engine's speed of rotation in rpm. PR006 = 750 rpm ± 50 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
4	**LPG expansion valve solenoid valve**	**ET106:** LPG expansion valve solenoid valve	**OPEN**	The LPG expansion valve solenoid valve must be **OPEN** in LPG operation and **CLOSED** in petrol operation. If there is inconsistency, apply the interpretation of **DF103 LPG expansion valve solenoid valve circuit**.
5	**Manifold pressure**	**PR001:** Inlet manifold vacuum	**Indicates the manifold pressure in mbar.**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
6	**LPG pressure**	**PR003:** Pressure difference: LPG/manifold	**Calculation of the difference between LPG pressure and manifold pressure in mb. PR003 ≈ 800 mb**	Check that **PR112 - PR001 = PR003**
7		**PR112:** LPG pressure downstream of expansion valve	**Indicates the LPG pressure downstream of the expansion valve in mb. PR112 = PR001 + 800 mbar**	In the event of a fault, apply the interpretation of **DF092 Expansion valve downstream LPG pressure sensor circuit** and **DF017 LPG leak detection downstream of expansion valve**.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and LPG mode selected.

SUB-FUNCTION: OPERATION IN LPG MODE (CONTINUED)

Order	Function	Parameter or Status checked or Action		Display and Notes	Fault finding
8	**LPG flow rate setting**	**PR111:**	LPG flow rate setting	**Indicates the LPG flow rate setting in g/h. 0 g/h < PR111 < 600 g/h**	**NONE**
9	**LPG injection timing.**	**PR110:**	LPG injection timing	**Indicates the injection timing in ms. PR110 ≈ 5 ms**	
10	**Tank sender**	**PR013:**	LPG tank sender supply voltage	**4.8 V < PR008 < 5.2 V**	In the event of a fault, apply the interpretation of **DF030 LPG tank sender supply voltage**.
11		**PR007:**	LPG tank sender signal voltage	**Indicates the signal voltage compared to the pressure in the LPG tank.**	In the event of a fault, apply the interpretation of **DF029 LPG tank sender signal voltage**.
12		**PR116:**	Sender resistance	**Tank full: 20 Ω ± 2 Ω Tank in reserve: 290 Ω ± 2 Ω Tank empty: 320 Ω ± 2 Ω**	
13	**LPG temperature**	**PR113:**	LPG Temperature	**Gives the LPG temperature in °C. - 40°C < PR113 < 120°C**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
14	**Petrol pump**	**ET025:**	Fuel pump	**INACTIVE after 1 minute.**	**INACTIVE** during operation in LPG mode. If there is inconsistency, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and petrol mode selected.

SUB-FUNCTION: OPERATION IN PETROL MODE

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
1	**LPG / Petrol switch**	**ET021:** Mode selected	**PETROL**	**NONE**
2		**ET094:** Petrol mode	**NORMAL**	Check the consistency between statuses **ET094 Petrol mode** and **ET093 LPG mode**. If there is inconsistency, contact the Techline.
3		**ET084:** Forced petrol mode, empty tank	**NO**	If **YES**, check that the LPG tank is full. If the tank is full, apply the interpretation of status **ET084 Forced petrol mode, tank empty**.
4		**ET023:** Forced petrol mode when LPG is faulty	**NO**	If **YES**, apply the interpretation of status **ET023 Forced petrol mode, LPG fault**.
5	**Petrol injection signal**	**PR006:** Engine speed	**Indicates the engine's speed of rotation in rpm. PR006 = 750 rpm ± 50 rpm**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
6	**Manifold pressure**	**PR001:** Inlet manifold vacuum	**Indicates the inlet manifold vacuum pressure in mb.**	
7	**Petrol pump**	**ET025:** Fuel pump	**ACTIVE**	**ACTIVE** during operation in petrol mode. If there is inconsistency, carry out a full fault finding procedure on the petrol injection system.

NOTES	Only perform this conformity check after a **thorough check** with the diagnostic tool. The values shown in this conformity check are given as examples. **Application condition:** Engine **running at idle speed at 80°C** and petrol mode selected.

SUB-FUNCTION: OPERATION IN PETROL MODE (CONTINUED)

Order	Function	Parameter or Status checked or Action	Display and Notes	Fault finding
8	**Petrol injection signal**	**PR002:** Coolant temperature	**Indicates the engine coolant temperature in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer.**	In the event of a fault, carry out a full fault finding procedure on the petrol injection system. Deal with any other possible faults.
9		**PR103:** Air temperature	**Indicates the air temperature in °C. Check the consistency of the temperatures by performing fault finding on the petrol computer.**	

Tool status	Diagnostic tool title
ET021	Mode selected
ET022	Waiting for LPG conditions
ET023	Forced petrol mode when LPG is faulty
ET025	Fuel pump
ET049	Main relay
ET084	Forced petrol mode with empty tank
ET093	LPG mode
ET094	Petrol mode
ET095	LPG to Petrol Transition
ET096	Petrol to LPG Transition
ET099	LPG system faulty
ET100	LPG system ready
ET105	LPG switch
ET106	LPG expansion valve solenoid valve

ET022	WAITING FOR LPG CONDITIONS YES NO

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Status **ET022** indicates **YES** for a variable period during which the computer checks that the LPG system is operating correctly.

Variable duration depending on:
– **ET100 LPG system ready,**
– **PR002 Coolant temperature,**
– **PR103 Air temperature,**
– **PR113 LPG temperature.**

Apply the interpretation of faults **DF103 LPG expansion valve solenoid valve circuit** and **DF007 Main relay circuit**.

Manipulate the wiring harness between the LPG computer and the petrol computer until a change in status is noted. Check the **insulation, continuity and absence of interference resistance** on the connections between:

Petrol computer **track 25** → **track A1** of the LPG computer

Petrol computer **track 26** → **track A2** of the LPG computer

Repair if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair.

ET023	FORCED PETROL MODE, FAULTY LPG YES NO

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Status **ET023** indicates **YES** if a fault is detected in LPG mode when LPG mode is selected.

Check the **insulation, continuity and absence of interference resistance** on the connections between:

Petrol computer, **connector B, track K3** → **track A1** of the LPG computer

Petrol computer, **connector B, track K4** → **track A2** of the LPG computer

Repair if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair.

ET084	FORCED PETROL MODE WITH EMPTY TANK YES NO

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	There must be no present or stored faults. Ignition on, engine stopped.
	Special Note Check that there is LPG in the tank. Check that there is no fault on the petrol injection computer. Test the petrol injection computer (see **17B, Petrol injection**).

Status **ET084** indicates **YES** if the LPG tank is empty and LPG mode is selected.

Using parameters **PR001 Manifold pressure** and **PR112 LPG pressure downstream of expansion valve**, check that **PR112 - PR001 = 800 mbar**.
If **PR112 - PR001 < 800 mbar**, check:
- the LPG tank solenoid valve (see **DF013 Tank solenoid valve circuit**),
- the expansion valve,
- the LPG pressure downstream of the expansion valve (see **PR112 LPG pressure downstream of expansion valve**).

Repair or replace the faulty components, if necessary.

If the status is still not correct, check:
- that the injectors are functioning correctly, using commands **AC018 Cylinder 4 injector, AC019 Cylinder 3 injector, AC020 Cylinder 2 injector** and **AC021 Cylinder 1 injector**,
- the condition of the hoses between the expansion valve and the injectors.

Repair the faulty components if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair.

ET095	LPG TO PETROL TRANSITION YES NO

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Status **ET095** indicates **YES** for a variable period during the transition from LPG to petrol mode.
Check that the fuel pump starts when petrol mode is entered. Check that status **ET025 Fuel pump** becomes **ACTIVE**. If the fuel pump does not start, **check**: – the fuel pump cut-off relay (see **DF024 Fuel pump cut-off relay circuit**), – the petrol computer (see **17B, Petrol injection**). Repair or replace the faulty components, if necessary.
If the status is still not correct, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair.

ET096	PETROL TO LPG TRANSITION YES NO

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	There must be no present or stored faults. Ignition on, engine stopped.
	Special note: The duration of the transition varies according to the outside temperature.

Status **ET096** indicates **YES** for a variable period during the transition from Petrol to LPG mode.
Check that the LPG tank solenoid valve clicks when LPG mode is entered. If the LPG tank solenoid valve does not click, **check**: – the LPG fuse **F4 (5A)**, – the general relay (see **DF007 Main relay circuit**), – the LPG tank solenoid valve wiring harness (see **DF013 Tank solenoid valve circuit**). Repair or replace the faulty components, if necessary.
If the status is still not correct, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair.

ET100	LPG SYSTEM READY YES NO

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Status **ET100** indicates **YES** if no LPG fault is present.

Check:
- the LPG tank solenoid valve (see **DF013 Tank solenoid valve circuit**),
- the general relay (see **DF007 Main relay circuit**),
- the LPG expansion valve solenoid valve (see **DF103 LPG expansion valve solenoid valve**),
- the LPG pressure sensor (see **DF092 Expansion valve downstream pressure sensor circuit**),
- the LPG pressure in the tank (see **DF031 LPG pressure downstream of expansion valve**).

Repair or replace the faulty components, if necessary.

Check:
- the LPG filling hoses,
- the supply hoses upstream of the expansion valve,
- the expansion valve,
- the hoses downstream of the expansion valve.

Repair or replace the faulty components, if necessary.

If the status is still not correct, contact the Techline.

AFTER REPAIR	Follow the instructions to confirm repair.

Tool parameter	Diagnostic tool title
PR001	Inlet manifold vacuum
PR002	Coolant temperature
PR003	Pressure difference: LPG/ manifold
PR006	Engine speed
PR007	LPG tank sender signal voltage
PR012	Engine speed multiplex signal
PR013	LPG tank sender supply voltage
PR103	Air temperature
PR110	LPG injection timing
PR111	LPG flow rate setting
PR112	LPG pressure downstream of expansion valve
PR113	LPG temperature
PR114	Sensor supply voltage
PR116	Sender resistance

PR003	PRESSURE DIFFERENCE: LPG/ MANIFOLD

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	There must be no present or stored faults. Engine running in LPG mode.

Check that the **pressure difference** is **800 mbar**. Check the consistency in pressure difference using parameters **PR001 Manifold pressure, PR003 Pressure difference: LPG/manifold** and **PR112 LPG pressure downstream of expansion valve** and ensure that **PR003 = PR112 - PR001**.
If the fault is still present, manipulate the wiring harness between the manifold pressure sensor and the LPG pressure/temperature sensor to produce a status change. Check the **connection and condition** of the manifold pressure sensor and the LPG pressure / temperature sensor, and their connections. If necessary, repair or replace the connector.
If the pressure difference is still inconsistent, apply the interpretation of fault **DF031 LPG pressure downstream of expansion valve**. **If the fault is still present, replace the LPG pressure/temperature sensor** (see **MR 364 Mechanics, 17D, LPG injection**).
If the fault is still present, **check the manifold pressure sensor by testing the petrol computer** (see **17B, Petrol injection, Interpretation of faults**).
If the fault is still present, contact Techline.

AFTER REPAIR	Follow the instructions to confirm repair.

PR007	LPG TANK SENDER SIGNAL VOLTAGE

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Using the voltage value of the LPG tank sender signal **PR007** measure the **resistance**, with a multimeter, between **tracks A** and **C**.
Check the consistency between these values using the table below.

If there is inconsistency, check for **earth** on **track D** or **C** of the LPG tank pressure sensor connector.
Repair if necessary.

Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG computer **track A4** → **track A** of the LPG tank sender

LPG computer **track D3** → **track C** of the LPG tank sender

Repair if necessary.

Pressure sensor voltage in V (± 0.5 V)	Needle position
4	**Full**
1	**Reserve**
0	**Empty**

AFTER REPAIR	Follow the instructions to confirm repair.

PR112	LPG PRESSURE DOWNSTREAM OF EXPANSION VALVE

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Check that the **LPG pressure downstream of the expansion valve** is not more than **800 mbar** greater than the manifold pressure **PR001 Manifold pressure**.
Check the pressure value using parameters **PR001 Manifold pressure, PR003 Pressure difference: LPG/ manifold** and **PR112 LPG pressure downstream of expansion valve** and ensure that **PR003 = PR112 - PR001**.

If the fault is still present, manipulate the wiring harness between the LPG computer and the LPG pressure/ temperature sensor to produce a status change.
Check the **connection and condition** of the LPG pressure/temperature sensor and its connections.
If necessary, repair or replace the connector.

Check for **+5 V** on **track 1** of the LPG pressure/temperature sensor in LPG mode. Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG computer **track A3** ⟶ **track 1** of the LPG pressure/temperature sensor

Repair if necessary.

Check for **earth** on **track 3** of the LPG pressure/temperature sensor in LPG mode.
Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG computer **track B3** ⟶ **track 3** of the LPG pressure/temperature sensor

Repair if necessary.

Check the **insulation, continuity and absence of interference resistance** on the connection between:

LPG computer **track C4** ⟶ **track 2** of the LPG pressure/temperature sensor

Repair if necessary.

If the fault is still present, replace the LPG pressure/temperature sensor.
If the fault is still present, check the expansion valve (see **MR 364 Mechanics, 17D, LPG injection**).

AFTER REPAIR	Follow the instructions to confirm repair.

PR116	SENDER RESISTANCE

NOTES	There must be no present or stored faults. Ignition on, engine stopped.

Using a multimeter, measure the **resistance** between **tracks A** and **C** of the LPG tank sender.

Resistance of the tank sender in Ω (± 2 Ω)	Needle position
20	**Full**
290	**Reserve**
320	**Empty**

Tool command	Diagnostic tool title
RZ001	Memory fault
AC005	Fuel sender relay
AC011	Fuel pump cut-off relay
AC015	Tank solenoid valve
AC018	Cylinder 4 injector
AC019	Cylinder 3 injector
AC020	Cylinder 2 injector
AC021	Cylinder 1 injector
AC022	Actuator sequential control
AC024	LPG expansion valve solenoid valve
VP001	VIN write

AC005	FUEL TANK SENDER RELAY

NOTES	Ignition on and engine stopped.

Switch on the ignition and run command **AC005**.
If the fuel sender relay does not click 10 times, carry out the fault finding procedure below.

Check the **insulation, continuity and the absence of interference resistance** on the connection between:

LPG computer **track E4** ⟶ **Earth**
Fuel sender relay **track B2**

Repair if necessary.

Check the **insulation, continuity and the absence of interference resistance** on the connection between:

Fuel sender relay **track B3** ⟶ **track B5** of the fuel sender relay

Repair if necessary.

If the fault is still present, replace the fuel sender relay (see **MR 364 Mechanics, 17D, LPG injection**).

AFTER REPAIR	Repeat the conformity check from the start.

AC015	TANK SOLENOID VALVE

NOTES	Ignition on and engine stopped.

Switch on the ignition and run command **AC015**. If the tank solenoid valve does not click ten times, carry out the fault finding procedure below.
Look for possible damage to the harness, and check the **condition and connection** of the LPG tank solenoid valve and its connectors. Repair if necessary.
Check **the connection and condition of the** LPG solenoid valve connector and its connections. Replace the connector if necessary.
Check for **+12 V** on **track 1** of the LPG tank relay and **track C2** of the LPG computer. Repair if necessary.
With the ignition on, check for **earth** on **track 2** of the LPG tank solenoid valve relay. If, with the ignition on, the computer does not control the LPG tank solenoid valve relay on **track 2** through an earth, contact the Techline.
– Check that the solenoid valve is supplied with **+12 V** by **track E4** of the LPG computer. If necessary, check the **insulation, continuity and the absence of interference resistance** on the connection between: LPG computer **track E4** ⟶ **track 2** of the LPG tank relay Repair if necessary.
– Check for **+12 V** on **track 5** of the LPG tank relay. If necessary, check the following connections for **insulation against earth, continuity and absence of interference resistance**: LPG computer **track E3** ⟶ **track 5** of the LPG tank relay LPG tank solenoid valve **track D** Repair if necessary.
Check for **earth** on **track E** of the LPG tank solenoid valve. Repair if necessary.
With the engine running, check that the LPG tank solenoid valve clicks when the LPG mode is selected.
If the fault is still present, replace the LPG tank solenoid valve (see **MR 364 Mechanics, 17D, LPG injection**).

AFTER REPAIR	Repeat the conformity check from the start.

AC018	CYLINDER 4 INJECTOR

NOTES	Ignition on and engine stopped.

Switch on the ignition and run command **AC018**.
If the injector does not vibrate 10 times, perform the fault finding procedure for **DF087 Cylinder 4 injector circuit**.

AFTER REPAIR	Repeat the conformity check from the start.

AC019	CYLINDER 3 INJECTOR

NOTES	Ignition on and engine stopped.

Switch on the ignition and run command **AC019**.
If the injector does not vibrate 10 times, perform the fault finding procedure for **DF088 Cylinder 3 injector circuit**.

AFTER REPAIR	Repeat the conformity check from the start.

AC020	CYLINDER 2 INJECTOR

NOTES	Ignition on and engine stopped.

Switch on the ignition and run command **AC020**.
If the injector does not vibrate 10 times, perform the fault finding procedure for **DF081 Cylinder 2 injector circuit**.

AFTER REPAIR	Repeat the conformity check from the start.

AC021	CYLINDER 1 INJECTOR

NOTES	Ignition on and engine stopped.

Switch on the ignition and run command **AC021**.
If the injector does not vibrate 10 times, perform the fault finding procedure for **DF098 Cylinder 1 injector circuit**.

AFTER REPAIR	Repeat the conformity check from the start.

AC024	LPG EXPANSION VALVE SOLENOID VALVE

NOTES	Ignition on and engine stopped.

Switch on the ignition and run command **AC024**.
If the LPG expansion valve solenoid valve does not click 10 times, follow the interpretation of fault **DF103 LPG expansion valve solenoid valve circuit**.

AFTER REPAIR	Repeat the conformity check from the start.

NOTES	Only check the customer complaint after performing a complete check with the diagnostic tool.
	NOTE **For any operation on a component of the LPG supply circuit, consult the safety instructions** (see **17D, LPG injection, Introduction**).

NO DIALOGUE WITH THE COMPUTER — **ALP 1**

LPG GAUGE FAULTS — **ALP 2**

THE ENGINE STALLS WHEN SWITCHED TO LPG MODE — **ALP 3**

IDLING SPEED FAULTS — **ALP 4**

FAULTS WHILE DRIVING — **ALP 5**

LPG LEAK

LPG leak when refilling the tank — **ALP 6**

ALP 1	No dialogue with the computer

NOTES	None

Check for a **+12 V battery feed** on **track H4** and a **+12 V after ignition feed** (using the **forced + after ignition mode** see **Introduction** section) on **track C2** of the LPG computer.
Repair if necessary.

Check **the condition of the battery and the vehicle earths**.
Repair if necessary.

Try the diagnostic tool on another vehicle.

– check the connection between the diagnostic tool and the diagnostic socket (lead in good condition),
– check fuse **F5 (15 A)**.
Repair if necessary.

Check the **insulation, continuity and absence of interference resistance** on the connections between:

LPG computer **track H1** → **Earth**

LPG computer **track G1** → **Earth**

LPG computer **track B4** → **track 7** of the diagnostic socket

Repair if necessary.

Use the diagnostic socket to check the following tracks:

Track 1 → **+ After ignition**

Track 16 → **+ Battery feed**

Tracks 4 and 5 → **Earth**

Repair if necessary.

AFTER REPAIR	Carry out a check using the diagnostic tool.

ALP 2	LPG sender fault

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	Check that there is LPG in the tank.

Disconnect the LPG tank sender connector and check the **voltage** of the sensor signal using parameter **PR007 LPG tank sender signal voltage**.
Replace the sensor if the signal **voltage** is not approximately: **4.8 V** tank full
1 V in reserve
0.2 V tank empty

Check for **earth** on **track C** of the LPG tank connector.
Repair if necessary.

Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

LPG computer **track B1** ⟶ **track B** of the LPG tank sender

If the fault is still present, check the intermediate connectors (**R2 track 36**), (**R34 track 34**).
Repair if necessary.

If the fault is still present, check the LPG tank pressure sensor (see **MR 364 Mechanics, 17D, LPG injection**).

AFTER REPAIR	Carry out a check using the diagnostic tool.

ALP 3	The engine stalls when switched to LPG mode

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	Check that there is LPG in the tank.

Check the condition of the air filter.
Replace the filter if necessary.

Check that the LPG supply pipes are not pinched or crushed.
Replace the faulty pipes if necessary.

Check the expansion valve cooling circuit (see **MR 364 Mechanics, 17D, LPG injection, Expansion valve**).
Repair the circuit if necessary.

Measure the **resistance** between **tracks 1** and **2** of the injectors.
Replace the injectors if their **resistance** at **approximately 20°C** is not between:
0.77 Ω < R < 1.43 Ω

Check the following connections for **insulation against earth, continuity and absence of interference resistance**:

Main relay **track 5** → **track 1** of injector 1
Main relay **track 5** → **track 1** of injector 2
Main relay **track 5** → **track 1** of injector 3
Main relay **track 5** → **track 1** of injector 4

Check the following connections for **insulation against +12 V, continuity and absence of interference resistance**:

LPG computer **track G3** → **track 2** of injector 1
LPG computer **track G4** → **track 2** of injector 2
LPG computer **track H3** → **track 2** of injector 3
LPG computer **track H3** → **track 2** of injector 4

If necessary, repair the defective connections.

AFTER REPAIR	Carry out a check using the diagnostic tool.

ALP 3 **CONTINUED 1**	

Test the operation of the injectors. Run commands **AC018 Cylinder 4 injector, AC019 Cylinder 3 injector, AC020 Cylinder 2 injector** and **AC021 Cylinder 1 injector**.
Run the engine in petrol mode. Disconnect the LPG tank connector and switch to LPG mode. Check for **+12 V** on **track 1** of the LPG tank relay connector. Repair if necessary.
Check for **earth** on **track 2** of the LPG tank relay connector. Repair if necessary.
Measure the **resistance** between **tracks A4** and **A5** of the LPG tank solenoid valve. Replace the solenoid valve if the **resistance** value is not **approximately 12.6 Ω**.

AFTER REPAIR	Carry out a check using the diagnostic tool.

ALP 4	Idle speed faults

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	Check that there is no fault in **petrol mode**. Check that there is LPG in the tank.

Check that hoses are not blocked or pinched (especially after removal operations). Repair the faulty component or components.
Check the condition of the air filter. Replace the air filter if necessary.
Check the expansion valve cooling circuit (see **MR 364 Mechanics, 17D, LPG injection, Expansion valve**). Repair the circuit if necessary.
Check the conformity of the spark plugs. Replace the filter if necessary.
Test the operation of the injectors. Run and interpret commands **AC018 Cylinder 4 injector, AC019 Cylinder 3 injector, AC020 Cylinder 2 injector** and **AC021 Cylinder 1 injector**.

AFTER REPAIR	Carry out a check using the diagnostic tool.

ALP 5	Fault while driving

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	Check that there is no fault in **petrol mode**.

Check that hoses are not blocked or pinched (especially after removal operations). Repair the faulty component or components.
Check the condition of the air filter. Replace the air filter if necessary.
Check the expansion valve cooling circuit (see **MR 364 Mechanics, 17D, LPG injection, Expansion valve**). Repair the circuit if necessary.
Check the conformity of the spark plugs. Replace the filter if necessary.
Test the operation of the injectors. Run and interpret commands **AC018 Cylinder 4 injector, AC019 Cylinder 3 injector, AC020 Cylinder 2 injector** and **AC021 Cylinder 1 injector**.

AFTER REPAIR	Carry out a check using the diagnostic tool.

ALP 6	LPG leak

NOTE
For any operation on a component of the LPG supply circuit, consult the safety instructions (see **17D, LPG injection, Introduction, Safety instructions for all operations**).

NOTES	None

Open the plastic cover on the filler neck.
Check that the filler neck is in good condition.
Change the filler spigot if necessary.
Check that there are no leaks along the pipe that runs from the filler spigot to the LPG tank.
(Fill up with LPG to carry out this operation).
Repair the pipe if necessary.

AFTER REPAIR	Carry out a check using the diagnostic tool.