Laser Power and Energy Meters

The broadest selection of laser power and energy meters in the industry.

- **LabMax-TOP**
  Laser Power and Energy Meter (RoHS)
  
  For thermal, pyroelectric, and optical sensors; measures energy up to 10000 pps.

The LabMax display and meter can be positioned at many different angles so customers can place it within the limited bench space typically available in a laser lab and still easily view the display.

LabMax-TOP is directly compatible with most Coherent thermal, pyroelectric and semiconductor sensors and displays beam position for quick and accurate setup. These sensors offer wavelength coverage from 190 nm to 12 µm, measure from nW to kW, nJ to J, and from single shot to 10 kHz.

- **LabMax-TO**
  Laser Power Meter (RoHS)
  
  For thermal and optical sensors; displays beam position.

The LabMax display and meter can be positioned at many different angles so customers can place it within the limited bench space typically available in a laser lab and still easily view the display.

LabMax-TO is directly compatible with most Coherent thermal and semiconductor sensors and displays beam position for quick and accurate setup. These sensors offer wavelength coverage from 190 nm to 12 µm and measure from nW to kW.

- **FieldMaxII-TOP**
  Laser Power and Energy Meter (RoHS)
  
  For thermal, pyroelectric, and optical sensors; measures energy up to 300 pps.

The FieldMaxII-TOP laser power and energy meter functions with a broad range of thermopile, optical and pyroelectric sensors. Together, these sensors enable FieldMaxII-TOP to measure UV, visible, and IR laser output from the nanowatt to the kilowatt range, and to work with CW and pulsed lasers with repetition rates of up to 300 Hz.

The rechargeable battery pack is recharged through an internal charger in the FieldMaxII unit. This internal charger is powered by the FieldMaxII AC adapter. Whenever the AC adapter is in use, the battery pack is being charged.

FieldMaxII incorporates what is known as a "smart charge" circuitry. This circuitry measures the condition of the battery pack and decides if it should be fast charged, top-off charged, or trickle charged. This capability keeps the battery pack from being damaged by overcharging and speeds the process of recharging when the battery is drained.

The meter can also operate with six standard AA batteries.
• **FieldMate**  
Laser Power Meter (RoHS)

This meter provides an economical way to perform laser power measurements and laser tuning.

FieldMate, laser power meter, improves upon a familiar method of peaking laser power - the analog needle. With faster electronics and sophisticated digital processing, the FieldMate's analog needle responds faster and with less overshoot than current meters, enabling rapid, precise laser adjustment.

FieldMate is compatible with all PowerMax thermal sensors and a variety of optical sensors, allowing its use with lasers from the ultraviolet to the infrared, from nW to kW. Built-in wavelength compensation ensures that readings at any wavelength will remain accurate.

This meter provides an economical way to perform laser power measurements and laser tuning.

• **LaserCheck**  
Handheld Power Meter (RoHS)

LaserCheck is an inexpensive, hand-held laser power meter that displays measurements on a built in LCD screen.

LaserCheck™ is a small, lightweight, self-contained power meter that can easily be stored in a pocket or tool kit.

The instrument is micro-processor controlled with wavelength correction, auto-ranging (µW or mW displayed), power overload warning and automatic shutoff. At higher powers the embedded silicon photodiode is protected from saturation with a built-in optical attenuator.

**Sensors - EnergyMax Laser Energy**
Coherent's diverse line of laser energy sensors cover nearly every energy, wavelength, and speed range necessary for most application. Coherent EnergyMax sensors enable laser pulse energy measurement over a broader range of wavelengths, repetition rates, pulse energies and beam diameters than any other product available. With their unique combination of superior performance and user friendly convenience, an EnergyMax sensor is your best choice no matter what your particular laser energy measurement need.

**EnergyMax Performance Advantages**
- Superior damage resistance
- High repetition rate operation
- Large dynamic range gives each sensor broad coverage
- Low noise and excellent linearity for greater accuracy
- Large active area

**EnergyMax Convenience Features**
- High accuracy, spectral compensation characteristics built into each unit
- Onboard sensors provide automatic temperature compensation
- Modular heat sinks to extend measurement range
- Compact size to enable measurements within instruments
- Molded cable with bend and strain relief protects against rough handling
- **Multipurpose EnergyMax Sensors**
  
  High damage threshold, large area, laser energy sensors for a wide variety of uses

  Spectrally flat laser energy sensors for general-purpose use.

Coherent’s Multipurpose EnergyMax sensors are economical, pulse energy detectors intended for use with a wide range of lasers operating in the sub-1kHz repetition rate domain. Multipurpose EnergyMax Series sensors feature extremely broad wavelength coverage (190 nm to 12 µm), and are the first commercially available energy sensors to combine large active area (up to 50 mm diameter), high repetition rate operation and high peak power capability.

**Multipurpose EnergyMax Sensor Benefits**

- Unique MaxBlack coating delivers increased damage threshold, high repetition rate operation and improved mechanical durability
- Operate over the 190 nm to 12 µm range
- Enable pulse energy measurements from 300 nJ to 2 J
- Measure single shot to 1 kHz repetition rate
- Spectral compensation characteristics built into each unit
- Onboard sensors provide automatic temperature compensation

<table>
<thead>
<tr>
<th>Sensor Model</th>
<th>Aperture (mm)</th>
<th>Wavelength (nm)</th>
<th>No Heat sink (W)</th>
<th>Small Heat sink (W)</th>
<th>Medium Heat sink (W)</th>
<th>Large Heat sink (W)</th>
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<tbody>
<tr>
<td>3-10MT-10KHZ</td>
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<td>1064</td>
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<tr>
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<td>20</td>
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<tr>
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<td>NA</td>
<td>49</td>
</tr>
</tbody>
</table>

- **Quantum EnergyMax Sensors**
  
  New Large Aperture Sensors for Very Low Energy Laser Pulses

  - Pulse energy measurement down to 20 pJ and up to 1 µJ (model and wavelength dependent)
  - Average power measurement of pulsed sources from nW to mW level
  - Measures single pulses to 10,000 Hz
  - Accurate spectral compensation
  - 325 nm to 900 nm for Silicon
  - 800 nm to 1700 nm for Germanium
  - Robust and reliable construction
  - Compatible with LabMax™-TOP, 3sigma and EPM1000/2000 meters

  These Quantum EnergyMax™ sensors enable accurate measurement of laser pulse energies down to 20 pJ, as well as the average power of pulsed systems from the nanowatt to milliwatt level, across a broad range of wavelengths. Specifically, the J-10SI-LE and J-10SI-HE are both silicon photodiode based sensors with apertures of 10 mm and a spectral range of 325 nm to 900 nm, which measure down to 20 pJ and 200 pJ respectively, at repetition rates of up to 10 kHz. The J-10GE-LE utilizes a 10 mm aperture germanium photodiode to measure minimum pulse energies of 200 pJ over the 800 nm to 1700 nm spectral range, also at up to 10 kHz. The 10 mm aperture is the largest currently available on the market for detectors of this sensitivity, and can often eliminate the need to utilize an integrating sphere.
Sensors - Laser Power

Standard Laser Power Sensors

Coherent produces nearly 100 different standard laser power sensors. These include semiconductor (optical) photodiodes and thermal (thermopile) detectors. This diversity enables laser power measurement over an extremely broad range of laser output characteristics, and will allow you to select a system that meets your particular requirements in terms of performance, accuracy and cost. Coherent can also engineer custom OEM sensor solutions; please contact us to discuss your volume needs.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Min Power</th>
<th>Max Power</th>
<th>Aperture Diameter</th>
<th>Cooling Method</th>
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</thead>
<tbody>
<tr>
<td>1098328</td>
<td>LM-3 HTD</td>
<td>10 mW</td>
<td>3 W</td>
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<td>10 mW</td>
<td>10 W</td>
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<tr>
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<td>PM10X</td>
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<td>10 W</td>
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<tr>
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<tr>
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<td>300 W</td>
<td>19 mm</td>
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<tr>
<td>1098417</td>
<td>PM300F-50</td>
<td>1 W</td>
<td>300 W</td>
<td>50 mm</td>
<td>Fan</td>
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<tr>
<td>1098414</td>
<td>PM30V1Q</td>
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<tr>
<td>1098505</td>
<td>PM5K-200</td>
<td>100 W</td>
<td>5000 W</td>
<td>200 mm</td>
<td>Water</td>
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<tr>
<td>1098350</td>
<td>PS10</td>
<td>99 µW</td>
<td>1.01 W</td>
<td>10 mm</td>
<td>Air</td>
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<tr>
<td>1098413</td>
<td>PS19</td>
<td>99 µW</td>
<td>1.01 W</td>
<td>19 mm</td>
<td>Air</td>
</tr>
</tbody>
</table>

Sensors - Radiometric

Inexpensive sensors for the measurement of both broadband and laser sources.

- **P4 Series**
  Low-Noise Detector System

  Pyroelectric detectors integrated with current mode amplifier and power supply.

P4 series detectors consist of a 2, 5 or 9 mm diameter pyroelectric detector integrated with a current mode amplifier and power supply. These are all neatly packaged in a 1.90-inch diameter x 5.75-inch long, RFI-immune housing with 50 ohm BNC connector output.

P4-32/-35 series detectors are optimized for wideband detection at frequencies of up to 800 Hz. The P4-42/-45/-49 series feature an ultra-low noise FET input op-amp that provides optimum performance over the 1 Hz to 30 kHz range.
• **P5-01**
  
  Ultra-High-Speed Detector

  Rugged pyroelectric detector element engineered for impedance-matching.

  Last time buys must be complete by the end of the year.
  - 700 MHz frequency response
  - Low noise

  The P5 features a rugged pyroelectric detector element engineered for impedance-matching directly into a 50 ohm coaxial transmission line through a BNC connector. This BNC connector is specially mounted for microphonic suppression and direct oscilloscope attachment.

  Offering 700 MHz uniform frequency response, the P5 is ideal for time-resolved measurements of short, mode-locked laser pulses, x-ray pulses and other high-frequency transient radiation.

### Laser Beam Diagnostics

Laser Beam Profiler, Laser Beam Analyzer, Laser Beam Propagation

Measure beam shape, intensity profile, propagation, wavelength and mode.

- **LaserCam-HR-InGaAs**
  
  High-Resolution SWIR Laser Beam Profiling System

  Measure beam shape, intensity profile, propagation, wavelength and mode.

  - >1000:1 signal to noise – 14-bit digital output
  - 30 µm x 30 µm pixel size
  - Compact 50 x 50 x 68 mm package – fits into small spaces
  - USB 2.0 interface with single USB cable operation
  - 900 nm to 1700 nm spectral range
  - Coherent Adaptive Pixel Technology (CAPT) pixel by pixel offset, linearity and blemish correction
  - CW and Pulsed operation including asynchronous triggering
  - Large area, 320 x 256 matrix, uncooled InGaAs array
  - Adjustable trigger delay

  The new LaserCam™-HR-InGaAs: camera matched with the powerful BeamView™-USB software offers amazing performance from 900 nm to 1700 nm. This 14-bit, large area, uncooled InGaAs camera provides user programmable integration and incredibly fast capture rates with an optical dynamic range of greater than 1000:1.

- **LaserCam-HR-UV**
  
  High-Resolution UV Laser Beam Profiling System

  Measure beam shape, intensity profile, propagation, wavelength and mode.
-Large area, 2/3" 1280 x 1024 matrix, CMOS sensor, with 1.3 millions pixel
-Long-term UV stability
-Compact 68 x 68 x 34 mm package - fits into small spaces
-700:1 signal to noise - 10-bit digital output operation
-20 µm x 20 µm effective pixel resolution
-190 nm to 355 nm spectral range
-USB 2.0 interface means no more framegrabber cards
-Coherent Adaptive Pixel Technology (CAPT) pixel by pixel offset, linearity and blemish correction
-CW and Pulsed operation including asynchronous triggering
-Adjustable trigger delay
-Variable exposure time
-360° Rotational camera mount –convenient and flexible

The new LaserCam™-HR-UV camera provides a compact package at an affordable price for beam diagnostic applications from 190 nm to 355 nm. The large format, 2/3" CMOS camera offers incredible performance, and is robust in the harsh UV wavelength environments that often degrade typical beam diagnostic cameras.

- **LaserCam-HR (RoHS)**
  Including NEW BeamView-USB 4.3.1 software
  
  New LabVIEW Drivers for the LaserCam-HR.

-2/3" CMOS Camera for laser beam profiling
-USB 2.0 Interface
-Compact size
-10-bit digitization
-Measures all spatial beam parameters
-1024 x 1280, 6.8 x 8.5 mm Active Matrix
-6.7 um pixel pitch
-Interfaces to BeamView 4.3 - Included
-RoHS Compliant

The LaserCam-HR, laser beam profiler, combines the speed and ease of use of the USB 2.0 computer interface with the power of BeamView Analyzer PC beam diagnostic software. 1.3 million pixels equal unrivaled performance and measurement accuracy. A single interface cable with both signal and power on the same wire makes camera placement a snap. USB 2.0 connectivity assures compatibility with virtually all, new PC’s.

**Spectral Analysis**

Wavelength meters and laser spectrum analyzers for laser beam analysis.

Traditionally, spectra are analyzed with spectrometers and interferometers. Such standard instruments can also be used to measure and analyze the output beam from a laser.

Two types of instruments are particularly suitable and convenient for laser analysis: wavelength meters and the laser spectrum analyzers.

Wavelength Meters Frequently, a laser beam only has one emission wavelength or a closely grouped set of wavelengths. So to determine the emission spectrum, it's necessary to measure this unique wavelength. The
Coherent WaveMate™ and WaveMaster™ are cost-effective wavelength meters that can measure the wavelength of both pulsed and CW lasers.

Laser Spectrum Analyzers Although lasers usually only have a single-line emission, this line usually has fine structure when analyzed in detail. Frequently, this line structure is due to the transverse and longitudinal modes of the laser and the laser cavity.

Laser spectrum analyzers allow you to analyze modal structure and optimize cavity configurations.

Coherent provides a series of scanning Fabry-Perot-type interferometers with two mirrors mounted in a confocal configuration.

These spectrum analyzers do not measure the absolute wavelength, but display the line structure with very high resolution, typically ~0.000,001 nm to ~0.001 nm (~1 MHz-1 GHz).

Diamond CO2 Lasers

DIAMOND family of sealed CO2 lasers, with power from Watts to Kilowatts for materials ranging from paper to metal.

Coherent offers the broadest portfolio of completely sealed CO2 lasers in the market. Our DIAMOND family of CO2 lasers are available in a wide range of models, with output powers ranging from 20W to 1000W. Their no-maintence design makes them a robust and highly reliable 'laser engine'. And, with market proven Designed in Reliability at its foundation, DIAMOND CO2 lasers offer the best power/performance/size ratio for a sealed CO2 laser. For over 17 years, the DIAMOND family of CO2 lasers have consistently demonstrated higher performance and greater reliability than competitive technologies.

In addition to our standard products, Coherent's strong team develops customized CO2 lasers and solutions for commercial, industrial, and military applications. We have extensive system and subsystem design and development capability which we offer to select customers interested in complete subsystem solutions. These solutions can include lasers, embedded controls, remote telemetry and diagnostics, as well as extensive optical, electronic and mechanical design expertise, enabling our customers faster time to market. Please contact Coherent if you would like to leverage this capability for your competitive advantage.

Diode Lasers
Offering diode lasers in a wide range of wavelengths, power, and package configurations. Enabling optimum solutions for use in materials processing, defense, scientific and medical applications.

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**Ion Lasers**

Innova Ion Lasers - the most respected name in ion laser technology.

Since 1969, we've provided cutting-edge ion laser technology for applications such as holography, printing, digital imaging, non-destructive testing, spectroscopy, optical pumping, confocal microscopy, flow cytometry, compact disc and DVD mastering, photomask direct imaging, printed circuit board direct imaging, and precision optics inspection.

We offer an extremely diverse product line of argon, krypton, and argon/krypton mixed-gas lasers, spanning the widest available wavelength and output power range.

For argon, krypton, and mixed-gas wavelengths, visible and UV, with total multi-line output power greater than 1.5 W, but less than 10W:
- Innova 70 C
- Innova 90 C
- Innova 300 C

For argon and krypton wavelengths, visible and UV, with total multi-line output power greater than 10W:
- Innova Sabre™

**Innova ICE**
Optimal Cooling Option for Small Frame Ion Lasers
**Innova 300C**
The ultimate in small-frame ion laser performance. Extremely stable design.

**Innova 70C**
Available in argon, krypton and mixed-gas; output from the UV to the IR.

**Innova 90C**
Provides high levels of ion laser performance with long-term reliability.

**Innova FRED**
Ion lasers produce CW laser light in the 229 to 264 nm wavelength range.

**Innova Sabre**
The ultimate in high-power ion laser performance, combined with ease-of-use.

**Innova Series V Plasma Tubes**
Our ion plasma tubes have lifetimes 25% longer than the nearest competitor.

## New Lasers

Laser systems, high power diode lasers, high power UV lasers, advanced laser diode modules and more.

### Legend Elite CEP
The new Legend Elite CEP is the first CEP-stabilized amplifier system entirely designed and built by one company. Seeded by the Coherent Micra CEP oscillator, the new Legend Elite CEP delivers a sub-35 fs pulse duration with a repetition rate of 1 kHz for applications such as High Harmonics Generation and Attosecond science.

### Sapphire Green Lasers- 514 nm and 532 nm
Adding to our Sapphire Series of lasers are our new Sapphire 514 and Sapphire 532. The family of Sapphire lasers, based on our unique OPSL technology, are now available in a multitude of wavelengths including 568 nm, 561 nm, 532 nm, 514 nm, 488 nm and 460 nm.

### Increased Range of Wavelengths and Power Levels for the CUBE FP Diode Lasers
With several new wavelengths and power levels added to the CUBE FP diode laser product line, these lasers are now available at the wavelengths 405 nm (50 mW), 445 nm (25 mW), 488 nm (30 mW), 640 nm (30 mW and 75 mW), and 660 nm (75 mW).