

Power and Energy Meter Quick Reference Guide

Meter Features Summary Table

	FieldMate	FieldMaxII -TOP	FieldMaxII -TO	FieldMaxII -P	LabMax -TOP	LabMax -TO	EPM2000	LaserCheck
POWER & ENERGY Page Reference	15	13	13	13	10	10	16	17
Measurement Modes								
Power & Energy Meters CW Power	•	•	•		•	•	•	•
Avg. Power of Pulsed Lasers	•	•	•		•	•	•	
Long-Pulse Joules		•			•	•	•	
Pulse Energy		•		•	•		•	
Power Sensors Max. Rep. Rate (Hz)		300		300	10,000 ¹		1000	
Display Types								
Energy Sensors Digital Readout	•	•	•	•	•	•	•	•
Analog Needle Tuning	•							
Graphical Tuning		•	•	•	•	•		
Strip Chart/Trending					•	•		
Custom & OEM Measurement Analysis Supported								
Beam Position					•	•		
Statistics		•	•	•	•	•	•	
Display Smoothing		•	•	•	•	•	•	
2-Channel/Ratiometric							•	
CALIBRATION & SERVICE Correction Factors Supported								
Wavelength Correction	•	•	•	•	•	•	•	•
Attenuation Factor		•	•	•	•	•	•	
Laser Cross-Reference Index PC Interfaces								
USB		•	•	•	•	•		
RS-232					•	•	•	
GPIB					• ²		•	
Analog Output	•	•	•	•	•	•	•	
Model Name Index Electrical Power Options								
Battery (rechargeable)		•	•	•	•	•		
Battery (non-rechargeable)	•							•
AC Powered	•	•	•	•	•	•	•	

Meter and Sensor Compatibility Table

Power Sensors	FieldMate	FieldMaxII -TOP	FieldMaxII -TO	FieldMaxII -P	LabMax -TOP	LabMax -TO	EPM2000	LaserCheck
PM Model	•	•	•		•	•	•	
PS Model	•	•	•		•	•	•	
OP-2 Model	•	•	•		•	•		
LM Model and Beamfinder	• ³	• ³	• ³		•	•	• ³	
LM-2 Model	• ³	• ³	• ³		•	•		
Energy Sensors EnergyMax		• ⁴		• ⁴	•		•	

¹ 10,000 Hz sampled; 1000 Hz every pulse.

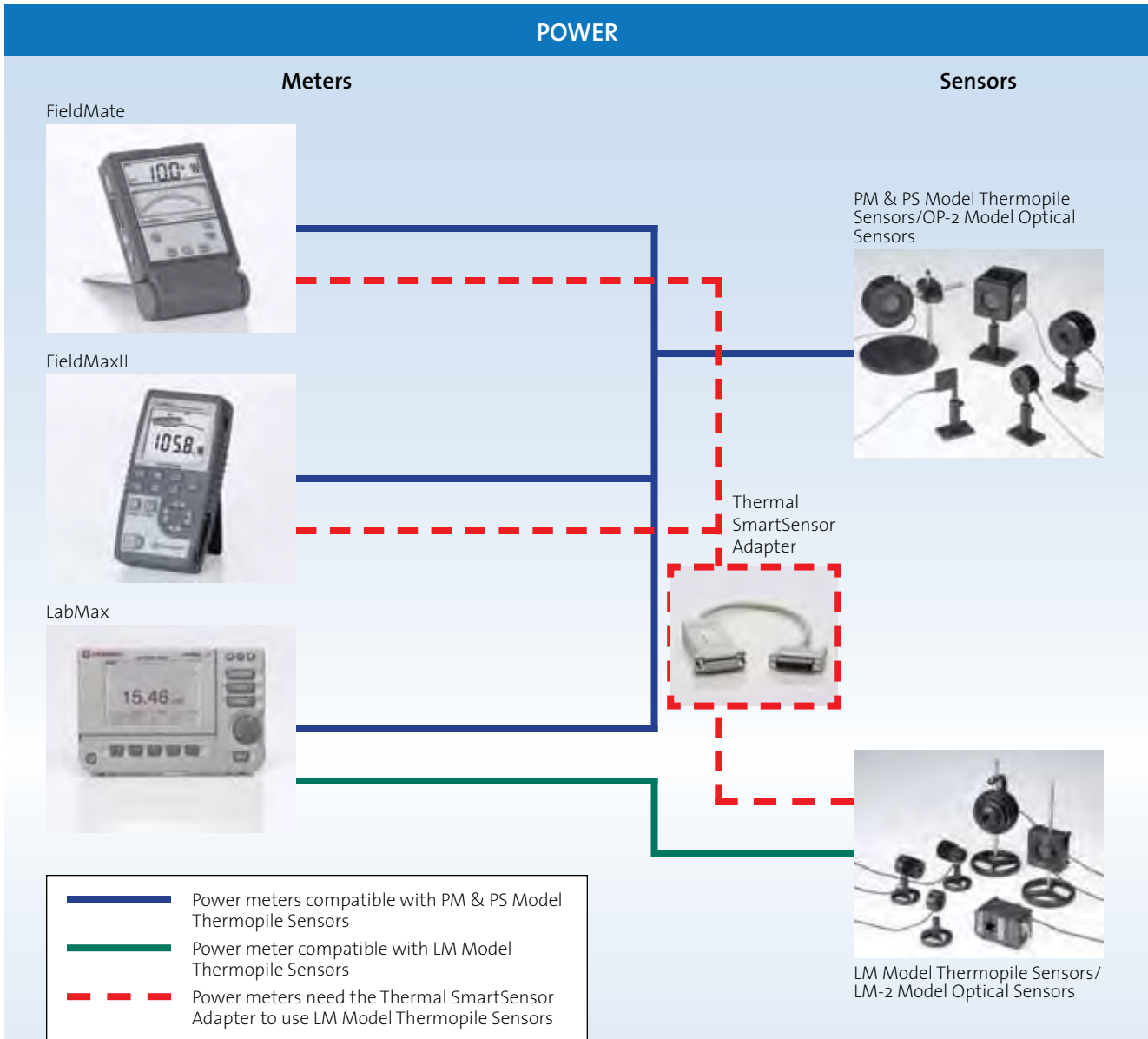
² LabMax-TOP w/GPIB model only.

³ Compatible when used with Thermal SmartSensor Adapter #1056827.

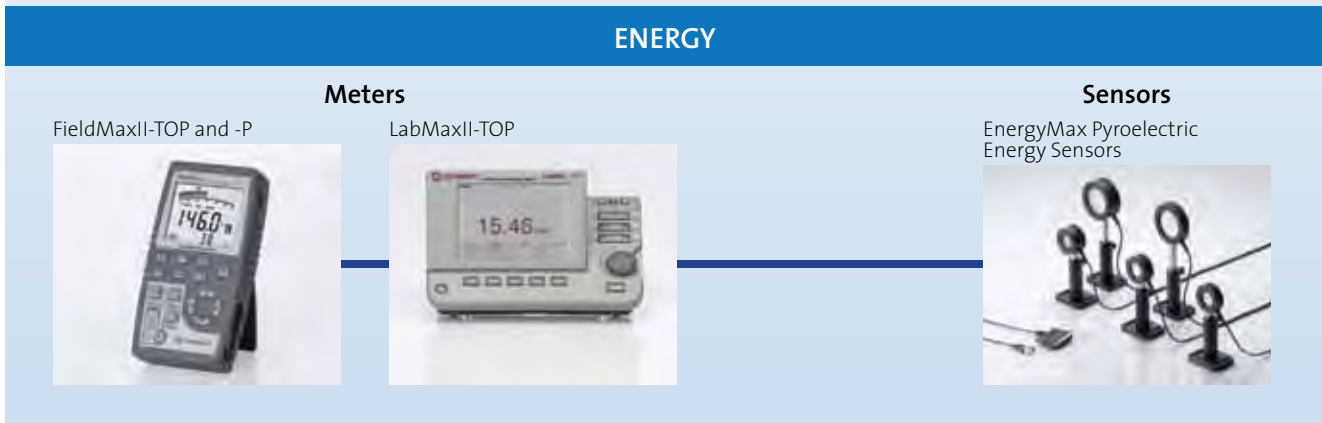
⁴ Our J-50MT-10KHz, J-25MT-10KHz, and J-10MT-10KHz EnergyMax Sensors are not compatible with FieldMaxII-TOP meters. For legacy sensor models not listed, please contact Coherent or your local representative for assistance.

Power and Energy Measurement Overview

Compatibility Chart for Our Most Popular Meters and Sensors



- POWER & ENERGY
- Power & Energy Meters
- Power Sensors
- Energy Sensors
- Custom & OEM
- BEAM DIAGNOSTICS
- CALIBRATION & SERVICE
- Laser Cross-Reference Index
- Model Name Index



LabMax Meters

Laser Power and Energy Meters



LabMax-TOP Power and Energy Meter

Features

- Measure power and energy
- Ergonomic design enhances user experience
- Directly compatible with PM Model and LM Model thermopiles
- Display beam position with LM Model thermopiles
- Log data to internal memory, directly onto USB flash drive, or to PC
- USB, RS-232, and GPIB PC interfaces
- Software:
 - LabMax PC applications software
 - LabVIEW instrument driver and ActiveX control

Models

- LabMax-TOP is compatible with thermopile, optical and pyroelectric (power & energy)
- LabMax-TOP w/GPIB adds IEEE-488 GPIB PC interface (cable included)
- LabMax-TO is compatible with thermopile and optical (power and long-pulse Joules)

LabMax is a versatile meter suitable for anyone who needs to analyze laser output. It analyzes and monitors laser output via onboard data logging. It also supports logging data directly to a USB flash drive, provides enhanced data analysis and statistics, as well as a form factor that allows flexible positioning and viewing angles so it can be used in areas with limited bench space. These meters provide direct compatibility with LM Model and PM Model sensors with no need for adapters.

Sensor Compatibility

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

Beam Positioning

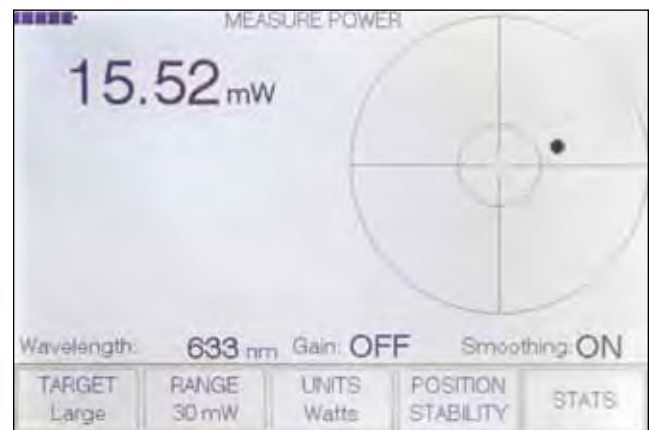
The position of the laser beam on the sensor can be displayed by LabMax when using an LM Model thermopile sensor. This makes it easier to align the laser beam during setup, especially for infrared laser beams. There is also a trending feature to monitor the position of the beam over time, and the position data can be logged to a file. Beam position sensors are on pages 34 to 37.



LM-45 HTD sensor with beam position

Data Logging

Data logging of unlimited size can be performed directly to a USB flash drive, and additionally over 400,000 points can be retained onboard the meter itself in flash memory. The meter has a file management system that allows naming and renaming files, auto increments file names for repetitive logging events, folder creation and renaming, and transferring files and folders from the meter storage to a USB flash drive. Data can also be logged to a file with the LabMax PC applications software.



LabMax beam position display

LabMax Meters

Laser Power and Energy Meters

Ergonomic Design

LabMax features a large, backlit graphical display with an ergonomic interface with easily accessible buttons for all features and modes. The Measure, Tune, and Trend modes are directly accessible via front panel buttons.



Front panel buttons

Flexible Positioning

The LabMax display and meter can be positioned at many different angles within the limited bench space typically available in a laser lab, while still making the display easy to view.



Additional Inputs/Outputs

In addition to PC interfacing, LabMax also includes an analog output with user-selectable voltages of 0 to 1V, 2V, or 4V. Pyroelectric triggering can be achieved with an external trigger input or an internal trigger that is user-adjustable from 2% to 20% percent of full-scale range.

Measurement Analysis

LabMax meters contain several advanced analysis capabilities, including:

Onboard statistics – mean, minimum, maximum, standard deviation, range, three stability parameters, as well as missed pulses. Users can also select which statistical parameters to display, up to six at a time.

Trend charting – trend chart with statistical display and the ability to log data to a file.

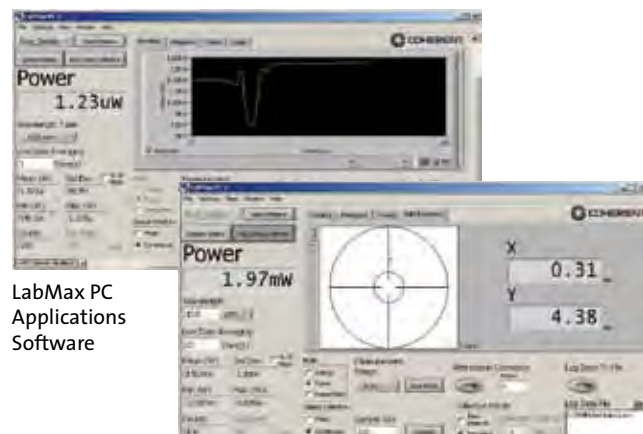
Digital tuning indicators – horizontal bar and trend chart formats with peak indicators.



LabMax Tune Chart

PC Interfacing and Applications Software

Data can also be analyzed directly on a PC through USB, RS-232, or GPIB connections, or by logging data to a USB flash drive attached directly to the meter. Installable applications software and LabVIEW drivers are provided to support PC interfacing.



LabMax PC Applications Software

POWER & ENERGY

Power & Energy Meters

Power Sensors

Energy Sensors

Custom & OEM

BEAM DIAGNOSTICS

CALIBRATION & SERVICE

Laser Cross-Reference Index

Model Name Index

LabMax Meters

Laser Power and Energy Meters

Device Specifications	Model	LabMax-TOP w/GPIB	LabMax-TOP	LabMax-TO
	Measurement Resolution	0.1 % of full-scale		
	Displayable Resolution	3 or 4 digits pyroelectric; 3, 4, or 5 digits thermopile and optical (user-selectable)		3, 4, or 5 digits (user-selectable)
	Measurement Range	Sensor dependent (reference sensor specifications)		
	Accuracy			
	Digital Meter	±1.0% ±2LSD		
	System	Meter accuracy + sensor accuracy		
	Analog Output (%)	±1.0		
	Uncertainty (%)	±1.0		
	Power Sampling Rate (Hz)	10		
	Maximum Repetition Rate (Hz)	10,000 sampling (1000 Hz every pulse)		
	Minimum Positional Resolution (mm)	0.1		
	Display	112 x 78 mm backlight graphic LCD, 480 x 320 pixels. Adjustable contrast and viewing angle		
	Measurement Analysis	Min., max., mean, range, std. dev., dose, stability; trending, tuning, beam position		
	Computer Interface	GPIB, USB and RS-232	USB and RS-232	
	Pulse Triggering	Internal and external (selectable)		–
	Analog Output (VDC)	0 to 1, 2, or 4 VDC (selectable)		
	Analog Output Update Rate	Up to 1000 Hz for pyroelectric; 10 Hz for thermopile and optical		10 Hz
	Temperature			
	Operating Range	5 to 40°C (41 to 104°F)		
	Storage Range	-20 to 70°C (-68 to 158°F)		
	Instrument Power	90 to 260 VAC, 50/60 Hz		
	Instrument Batteries	4400 mAH Rechargeable Li-ion Pack		
	Compliance	CE, RoHS, WEEE		
	Dimensions (H x W x D)	152 x 229 x 53 mm (6.0 x 9.0 x 2.1 in.)		
	Weight	1.25 kg (2.8 lbs.)		
	Front Panel			
	PWR	Turn meter on and off		
	ZERO	Reset ambient offset for thermal and optical sensors		
	MEASURE	Main measure mode including statistics		
	TUNE	View tuning features		
	TREND	Display measured values over a period of time and log data to file		
	SETUP	Setup meter parameters		
	HELP	Onboard context sensitive help - available from any screen		
	BACKLIGHT	Toggle backlight on and off		
	KNOB	Turn knob to change settings; press the knob to save settings		
	Left Side Panel	USB flash drive port USB PC interface port RS-232 PC interface port DB25 sensor port Power jack		
	Rear Panel	Analog output		
		External trigger input		–
		GPIB PC interface port	–	
	Part Number*	1104620	1104622	1104619

* Meter supplied with 4400 mAH Li-ion battery, AC power adapter, power cord, 1.8-meter USB cable, RS-232 adapter, USB flash drive, RCA-to-BNC adapters, user manual, software and driver CD, soft carrying case, and certificate of calibration. LabMax-TOP w/GPIB also includes a GPIB cable.

FieldMaxII Meters

Laser Power and Energy Meters



FieldMaxII-TOP Power and Energy Meter



FieldMaxII-TO Power Meter

Features

- Measure energy of pulsed lasers up to 300 pps
- Large, backlight LCD display
- Compatible with thermopile, optical, and pyroelectric sensors
- Simulated analog-like movement for laser tuning
- USB interface with FieldMaxII PC applications software, LabVIEW instrument driver and ActiveX control
- Area function for density measurements (J/cm^2 or W/cm^2)

Models

- FieldMaxII-TOP is compatible with thermopile, optical and pyroelectric sensors (power & energy)
- FieldMaxII-TO is compatible with thermopile and optical (power only)
- FieldMaxII-P is compatible with pyroelectric (energy only)

FieldMaxII is an affordable, versatile, easy-to-use digital power and energy meter platform designed for a variety of applications ranging from field service to production test applications.

FieldMaxII features a large, easy-to-read backlit LCD and an intuitive user interface offering button-driven control for simple operation. The meter supports onboard analysis of mean, min., max., and standard deviation statistics. It can measure power from nW to kW, and pulse energy from nJ to J at up to 300 pps. In addition, long-pulse Joules energy measurements can be made on the FieldMaxII-TOP model when using thermopiles.

The meter includes a USB PC interface as well as an analog output. The FieldMaxII PC applications software supports trend charting, tuning, statistics, and logging data to a file. A LabVIEW instrument driver with ActiveX control is provided to support custom software developments.

POWER & ENERGY

Power & Energy Meters

Power Sensors

Energy Sensors

Custom & OEM

BEAM DIAGNOSTICS

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Model Name Index

FieldMaxII PC Application



Features

- USB PC Interface
- FieldMaxII PC is completely open-source so that you can use it to help develop your own customized applications
- Multiple meters can be run on a single PC – useful for final test and burn-in applications
- Meters can be operated remotely via host interface and included drivers
- Software features:
 - Measure, Tune, Trend displays
 - Statistics
- LabVIEW instrument driver and ActiveX DLL server included

FieldMaxII Meters

Laser Power and Energy Meters

Device Specifications	Model	FieldMaxII-TOP	FieldMaxII-TO	FieldMaxII-P
Function		Power and energy	Power	Energy
Measurement Resolution			0.1% of full-scale	
Measurement Range		Sensor dependent - reference sensor specifications		
Accuracy				
Digital Meter System			±1.0% ±2LSD	
Analog Output (%)			Meter accuracy + sensor accuracy	
Uncertainty (%)			±1.0	
Power Sampling Rate (Hz)	10		10	–
Maximum Pulse Rep. Rate (Hz)	300		–	300
Display		58 x 73 mm, fixed-segment LCD with backlight		
Digital Tuning Indicator		100 msec time constant		
Statistics		Mean, max., min., standard deviation		
PC Interface		USB 1.1		
Analog Output		0 to 1, 2, or 5 VDC (selectable)		
Internal Trigger	2 to 20% of full-scale, selectable		–	2% to 20% of full-scale, selectable
Temperature				
Operating Range		5 to 40°C (41 to 104°F)		
Storage Range		-20 to 70°C (-68 to 158°F)		
Instrument Power		100 to 240 VAC, 50/60 Hz		
Instrument Batteries		Rechargeable NiMH battery pack		
Compliance		CE, RoHS, WEEE		
Dimensions (H x W x D)		200 x 100 x 40 mm, (7.87 x 3.94 x 1.57 in.)		
Weight		1.0 kg (2.2 lbs.)		
Front Panel				
PWR		Toggle power switch and backlight		
HZ		Display rep. rate	–	Display rep. rate
J/W		Select Joules or Watts mode	–	–
ZERO		Reset ambient offset for thermal and optical sensors		Zero stats
AUTO		Engage auto-ranging with power sensors		–
STAT		Display statistics: mean, max., min., standard deviation		
AVG		Engage display averaging		
λ		Enter wavelength and engage wavelength compensation		
ATTEN		Enter attenuation factor and engage attenuation		
AREA		J/cm ² (fluence) W/cm ² (power density)	W/cm ² (power density)	J/cm ² (fluence)
HOLD		–	Holds displayed values on screen	–
TRIG		Select trigger level with energy sensors	–	Select trigger level with energy sensors
SETUP / LOCAL		Set and enter button/Takes local control of meter back from PC		
ARROW KEYS		Manually control range; Select Stats parameter; Select and change numerical values		
Left Side Panels				
				Power jack
				USB PC interface port
				Analog output
Right Side Panels				
				DB25 sensor port
Part Number*		1098580	1098579	1098581

* Meter supplied with NiMH rechargeable battery pack, power cord, AC adapter, USB cable (1.8m), RCA-to-BNC analog output adapter, user manual, installation CD with FieldMaxII PC and drivers, soft carrying case, and certificate of calibration.

FieldMate

Laser Power Meter



FieldMate Power Meter

Features

- Analog needle for tuning
- Large digital LCD display
- Compatible with thermopile and optical sensors
- Wavelength compensation
- Analog output
- Compact and portable
- AC and battery power
- Auto ranging

FieldMate combines a digital display and analog meter with sophisticated digital processing to enable rapid, sensitive laser adjustment. This meter also offers an economical way of measuring laser power when advanced data analysis is not necessary.

Device Specifications	Model	FieldMate
Power Resolution		0.1% of full-scale for all ranges in the 10s scale 0.3% of full-scale for all ranges in the 3s scale
Measurement Range		Sensor dependent (reference sensor specifications)
Accuracy		
Digital Meter System		±1.0% ±2LSD Meter accuracy + sensor accuracy
Analog Meter (%)		±3.0
Analog Output (%)		±1.0
Uncertainty (%)		±1.0
Power Sampling Rate		20 Hz (thermopile and optical)
Display		26 x 89 mm, custom fixed-segment LCD
Analog Needle		
Scale		0 to 10 (100 divisions), 0 to 3 (60 divisions)
Response		80 ms time constant
Analog Output		
Voltage		0 to 2 VDC
Update Rate		20 times/sec.
Temperature		
Operating Range		5 to 40°C (41 to 104°F)
Storage Range		-20 to 70°C (-68 to 158°F)
Instrument Power		100 to 240 VAC, 50/60 Hz
Instrument Batteries		Two 9V alkaline batteries
Compliance		CE, RoHS, WEEE
Dimensions (H x W x D)		193 x 117 x 46 mm, (7.6 x 4.6 x 1.8 in.)
Weight		0.8 kg (1.8 lbs.)
Front Panel		
PWR		Toggle power
ZERO		Ambient offset
AUTO		Engage auto-ranging
λ		Enter wavelength compensation
ARROW KEYS		Manually control range; select and change numerical values
Left Side Panel		
Power jack		
Analog output		
DB-25 sensor port		
Part Number*		1098297

* Meter supplied with two alkaline 9V batteries, power cord, AC power adapter, RCA-to-BNC analog output adapter, user manual, and certificate of calibration.

POWER & ENERGY

Power & Energy Meters

Power Sensors

Energy Sensors

Custom & OEM

BEAM DIAGNOSTICS

CALIBRATION & SERVICE

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Model Name Index

EPM2000

Dual-Channel Power and Energy Meter



Features

- Measures power and energy
- Repetition rate to 1000 pps
- Dual-channel with ratio measurement
- External trigger input
- RS-232 and GPIB computer interfaces
- Analog output
- LabVIEW driver

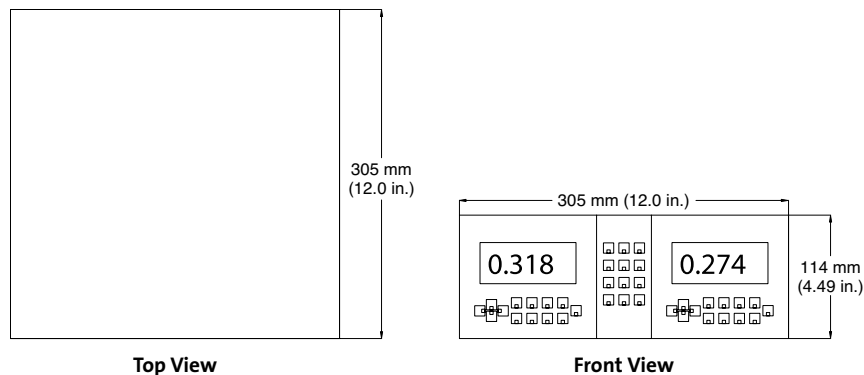
The EPM2000 meter is a versatile, high-performance dual-channel instrument. Each of the EPM2000's channels can be configured as an energy meter or a power meter, regardless of the other channel's setting. Each channel has

an independent trigger circuit, but it can also be slaved to the other channel for applications where timing is critical. EPM2000 meters can also be set into ratio mode with the press of a button.

Device Specifications	Model	EPM2000
Measurement Resolution		0.03% of full-scale
Rep. Rate Resolution		0.1 Hz
Max. Rep. Rate (pulsed energy measurement)		1,000 Hz (every pulse) 500 Hz (every pulse; ratio mode)
Power Sampling Rate	10 Hz	
Accuracy		
Digital Meter System		±1.0% of reading Meter accuracy + sensor accuracy
Analog Output		±1.0%
Display		2 large 4-digit fixed-segment LCDs w/backlight
Statistical Analysis		Min., max., mean, and standard deviation
Computer Interface		RS-232/IEEE-488 (GPIB)
Analog Output		0.00 to 2.00 VDC
Internal Trigger		2 to 20% of full scale, selectable
External Trigger Input		Rising/falling edge trigger via user control
Instrument Power		120 to 220 VAC, 50/60 Hz supply (internal)
Size (H x W x D)		305 x 305 x 114 mm (12.00 x 12.00 x 4.49 in.)
Weight (including batteries)		2.7 kg (5.9 lb.)
Part Number		
EPM2000 ¹		0011-5140
EPM2000e ¹		0011-8231
RM-EPM Rack Mount Hardware (optional)		0011-5600

¹ Supplied with power cord, user manual, and certificate of calibration.

EPM2000



Top View

Front View