

>>Optical Power and Energy Meters >>Touch Screen Handheld Optical Power and Energy Meter Console

## Touch Screen Handheld Optical Power and Energy Meter Console

- ▶ Brilliant 5.7" Color Touch Screen with VGA Resolution
- ▶ Versatile Functionality with Intuitive Usage
- ▶ Optional Fiber Inspection Camera
- ▶ Over 25 Compatible Sensors

Intuitively Operated via Touch Screen



**PM200**  
Connected to an S130C Sensor with SM1A29 SM1 Thread Adapter



The PM200 Power Meter Connected to the S170C Microscope Slide Sensor

### Related Items

Power and Energy Meters



Self-Contained Sensor and Power Meter



Microscope Slide Power Sensor



CCD Beam Profiler



Overview Specs Display Connectors Sensor Compatibility Sensor Selection Applications Console Selection Software Feedback

### Features of the PM200

- Brilliant 5.7" Color Touch Screen with VGA Resolution and Wide Viewing Angle
- Advanced Spectral Correction Support
- Power and Energy Measurements for CW and Pulsed Sources
- Compact, Rubber-Protected Enclosure: 170 mm x 125 mm x 38 mm (6.70" x 4.9" x 1.5")
- 90° Flip-Screen and Swivel Kick Stand for Landscape and Portrait Viewing
- Console Comes Calibrated with Certificate of Calibration
- Data Storage on USB Stick
- Compatible with All C-Series Sensors (shown below)
- USB 2.0 Remote Operation

Thorlabs' PM200 Touch Screen Power and Energy Meter, the latest addition to our power and energy meter console offerings, is the high-end counterpart to the [PM100D](#) and [PM100A Analog Power Meter Consoles](#). It is equipped with a brilliant 5.7" color touch screen (118 mm x 88 mm) with VGA resolution that offers high contrast, a wide viewing angle, and a 90° flip screen that enables use in either a portrait or landscape orientation. The screen is encased in a compact, removable rubber housing that measures 170 mm x 125 mm x 38 mm.

The PM200 is compatible with all of our power and energy sensors (photodiode, thermal, and pyroelectric sensors) for use from the UV to the Mid-IR. It offers six current ranges for use with [photodiode sensors](#) ([slim photodiode](#), [microscope slide](#), [integrating sphere](#), [fiber](#)) outputting currents from 10 pA to 5 mA and four voltage ranges for use with [thermal sensors](#) with thermopile voltages from 100 nV to 1 V. In both cases, manual and auto ranging are possible. The console has four manual voltage ranges for use with [pyroelectric sensors](#) with voltages from 100 μV to 100 V, and the auto-gain threshold can be adjusted from 0.1% - 99.9%. Customers can use their own custom built sensors and upload a response curve for spectral correction. Finally, a USB 2.0 port offers full remote control. Download an [interactive Sensor Compatibility Guide](#) for a complete overview over all compatible sensors and adapters.

### Unique Features and Flexibility

The PM200 can load the spectral emission curve for a broadband light source and calculate the net adjusted responsivity based on the spectral profile, allowing for more accurate power measurements. Similarly, the transmission curve for a filter can be loaded, and the meter will calculate the adjusted power and display the corrected value.

Other features that were implemented into the PM200 to extend its functionality and applicability include the following:

- Data recording is stored to a large internal memory (128 MB) or a USB drive for stand-alone operation
- Relevant laser beam specifications (e.g., peak power, power density, energy density, etc.) can be determined and sensors can be suggested based on inputted parameters (e.g., diameter, wavelength, power, energy, pulse length)
- Software update using an external USB drive
- Optional temperature and humidity module
- Optional fiber inspection camera with power measurement capability will be available soon

See the Display Screens tab for further information.

[Click Here for an Interactive PM200 Touch Screen Demo](#)

### Connectivity

The sensor's connector enables quick hot swapping of sensor heads and contains all the sensor information, including NIST-traceable responsivity curves, sensor types, and model number. These details can be shown on the sensor information display screen. Diverse I/O ports enable quick integration into non-standard applications like an analog output, auxiliary input/output for external trigger, general-purpose programmable IO-ports, or ADC. For driver software, as well as programming reference guides for LabVIEW™, Visual C++, Visual C#, and Visual Basic, please see the Software tab.

Item #	PM200
Compatible Sensors	Photodiode, Thermal, and Pyroelectric
Optical Power Range <sup>a,b</sup>	100 pW to 200 W
Optical Energy Range <sup>a,b</sup>	3 μJ to 15 J
Available Sensor Wavelength Range <sup>a</sup>	185 nm - 25 μm
Display Refresh Rate	Max 15 Hz
Bandwidth <sup>a</sup>	DC - 100 kHz

a. Sensor Dependent

b. Ranges Selectable in Watts (Photodiode and Thermopile) or Joules (Pyroelectric), depending on the sensor used.



The PM200 Includes a Removable Red Rubber Protective Skin, Power Adapter, Carrying Case, Flash Drive, and Cables



Thorlabs' C-Series Power Meter Sensor Connectors Include the Sensor Calibration Data

## Touch Screen Power Meter Console

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+1 Qty Docs Part Number - Universal

Price Available / Ships

[PM200](#) Touch Screen Power and Energy Meter Console, 5.7" Color LCD

\$1,590.00  3-5 Days

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### Standard Photodiode Power Sensors

For General Purpose Optical Power Measurements  
 Integrated Viewing Target for Easy Sensor Alignment  
 Ø9.5 mm Sensor Aperture  
 Compatible Fiber Adapters: [S120-xx Series](#)  
 Compatible with the [PM200](#), [PM100D](#), [PM100USB](#), [PM100A](#), and [PM320E](#) Consoles  
 Sensor, Protective Cap, IR Target, and Thread Adapter Included



[Click to Enlarge](#)  
 S120C and CP90F Quick-Release Mount

The S12xC Standard Photodiode Power Sensors are ideal for metering low power coherent and incoherent sources from the UV to the NIR. The NIST-Traceable, calibrated sensors feature an integrated viewing target for easy alignment, enhanced shielding against electromagnetic interference, over temperature alert device, and large Ø9.5 mm sensor aperture. The sensors are compatible with [30 mm cage systems](#), [Ø1/2" posts](#), and [SM1 \(1.035"-40\) lens tubes](#), and are ideal for free-space and fiber-coupled sources.

Item #	S120VC	S120C	S121C	S122C
Sensor Image (Click the Image to Enlarge)				
Aperture Size	Ø9.5 mm			
Wavelength Range	200 - 1100 nm	400 - 1100 nm	400 - 1100 nm	700 - 1800 nm
Power Range	50 nW - 50 mW		500 nW - 500 mW	50 nW - 40 mW
Detector Type	Si Photodiode (UV Extended)	Si Photodiode		Ge Photodiode
Linearity	±0.5%			
Resolution <sup>a</sup>	1 nW		10 nW	2 nW
Measurement Uncertainty <sup>b</sup>	±3% (440 - 980 nm) ±5% (280 - 439 nm) ±7% (200 - 279 nm, 981 - 1100 nm)	±3% (440 - 980 nm) ±5% (400 - 439 nm) ±7% (981 - 1100 nm)		±5%
Coating/Diffuser	Reflective ND (OD1.5) <sup>c</sup>	Reflective ND (OD1) <sup>d</sup>	Reflective ND (OD2) <sup>e</sup>	Absorptive ND (Schott NG9)
Head Temperature Measurement	NTC Thermistor 4.7 kΩ			
Housing Dimensions	Ø30.5 mm x 12.7 mm			
Cable Length	1.5 m			
Post Mounting <sup>c,d,e</sup>	Universal 8-32 / M4 Tap, Post Not Included			
Aperture Thread	External SM1 (1.035"-40)			
Fiber Adapters	<a href="#">S120-FC</a> , <a href="#">S120-SMA</a> , <a href="#">S120-ST</a> , <a href="#">S120-LC</a> , <a href="#">S120-SC</a> (Not Included)			

- a. Measured with PM100D console in low bandwidth setting.
- b. Beam diameter > 1 mm.
- c. For the S120VC, these specifications are valid for devices with serial numbers 1203xxx or higher. Older versions had a reflective ND diffuser (OD1). Additionally, they came with an 8-32 tap and M4 adapter. For additional information, please contact [technical support](#).
- d. For the S120C, these specifications are valid for devices with serial numbers 1203xxx or higher. Older versions had an absorptive ND diffuser (Schott NG3). Additionally, they came with an 8-32 tap and M4 adapter. For additional information, please contact [technical support](#).
- e. For the S121C, these specifications are valid for devices with serial numbers 1203xxx or higher. Older versions had an absorptive ND diffuser (Schott NG9). Additionally, they came with an 8-32 tap and M4 adapter. For additional information, please contact [technical support](#).

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Price Available / Ships

[S120VC](#) Standard Photodiode Power Sensor, Si, 200 - 1100 nm, 50 mW

\$407.00  3-5 Days

[S120C](#) Standard Photodiode Power Sensor, Si, 400 - 1100 nm, 50 mW

\$294.00  Today

[S121C](#) Standard Photodiode Power Sensor, Si, 400 - 1100 nm, 500 mW

\$319.00  3-5 Days

[S122C](#) Standard Photodiode Power Sensor, Ge, 700 - 1800 nm, 40 mW

\$587.00  Today

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### Slim Photodiode Power Sensors

For Optical Power Measurements in Confined Spaces  
 Very Slim Design: 5 mm Thin on Sensor Side  
 Ø9.5 mm Sensor Aperture  
 Slideable ND Filter Automatically Changes Sensor Power Range  
 Compatible with the [PM200](#), [PM100D](#), [PM100USB](#), [PM100A](#), and [PM320E](#) Consoles  
 Optional SM1A29 Adapter with UV/IR Target and External SM1 Threading ([More Details](#))

The S13xC Slim Photodiode Power Sensors are designed to take optical source power measurements in locations where space and accessibility are at a premium. The 5 mm thin Slim Photodiode Sensors can fit between closely space optics, cage systems, and other arrangements where standard power meters may not fit. The NIST-Traceable, calibrated sensors also feature a large Ø9.5 mm sensor aperture and slideable neutral density filter for dual power ranges in one compact device.

A separately available SM1A29 adapter can be attached by 2 setscrews to any S130 series power sensor to mount fiber adapters, light shields, filters or any other SM1-threaded (1.035"-40) mechanics or optics.



[Click to Enlarge](#)  
SM1A29: SM1 Thread Adapter Mounted on a S130C Sensor



[Click to Enlarge](#)  
S130C Sensor in a 30 mm Cage

Item #	S130VC	S130C	S132C
Sensor Image (Click the Image to Enlarge)			
Aperture Size		Ø9.5 mm	
Wavelength Range	200 - 1100 nm	400 - 1100 nm	700 - 1800 nm <sup>a</sup>
Power Range (with filter)	500 pW - 0.5 mW <sup>b</sup> (Up to 50 mW) <sup>b</sup>	500 pW - 5 mW (Up to 500 mW)	5 nW - 5 mW (Up to 500 mW)
Detector Type	Si Photodiode (UV Extended)	Si Photodiode	Ge Photodiode
Linearity		±0.5%	
Resolution		100 pW <sup>c</sup>	1 nW <sup>d</sup>
Measurement Uncertainty <sup>e</sup>	±3% (440 - 980 nm) ±5% (280 - 439 nm) ±7% (200 - 279 nm, 981 - 1100 nm)	±3% (440 - 980 nm) ±5% (400 - 439 nm) ±7% (981 - 1100 nm)	±5%
Coating/Diffuser	Reflective ND (OD1.5) <sup>b</sup>	Reflective ND (OD2) <sup>f</sup>	Absorptive ND (Schott NG9/KG3) <sup>a</sup>
Housing Dimensions	150 mm x 19 mm x 10 mm; 5 mm Thickness on Sensor Side		
Cable Length	1.5 m		
Post Mounting	8-32 and M4 Taps		

- a. For the S132C, these specifications are valid for devices with serial numbers 1203xxx or higher. Older versions had a reflective ND diffuser (OD1), which would decrease the wavelength range from 700 nm to 1800 nm to 1200 nm to 1800 nm. For additional information, please contact [technical support](#).
- b. For the S130VC, these specifications are valid for devices with serial numbers 1203xxx or higher. Older versions had an optical power range of 5 nW to 5 mW (50 nW to 50 mW with filter) and a reflective ND diffuser (OD1). For additional information, please contact [technical support](#).
- c. Measured with PM100D console in low bandwidth setting, without filter.
- d. Measured with PM100D console in low bandwidth setting at 1550 nm, without filter.
- e. Beam Diameter > 1 mm.
- f. For the S130C, these specifications are valid for devices with serial numbers 1203xxx or higher. Older versions had an absorptive ND diffuser (Schott NG9). For additional information, please contact [technical support](#).

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+1	Qty	Docs	Part Number - Universal	Price	Available / Ships
	<input type="text"/>		<a href="#">S130VC</a> Slim Photodiode Power Sensor, Si, 200 - 1100 nm, 50 mW	\$592.00	✓ Today
	<input type="text"/>		<a href="#">S130C</a> Slim Photodiode Power Sensor, Si, 400 - 1100 nm, 500 mW	\$489.00	✓ Today
	<input type="text"/>		<a href="#">S132C</a> Slim Photodiode Power Sensor, Ge, 700 - 1800 nm, 500 mW	\$695.00	✓ Today
	<input type="text"/>		<a href="#">SM1A29</a> <b>Customer Inspired!</b> SM1 Thread Adapter for Slim Photodiode Sensors	\$40.20	✓ Today

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### Microscope Photodiode Power Sensor

Wavelength Range: 350 nm to 1100 nm  
 Sensitive to Optical Powers from 10 nW to 150 mW  
 Designed to Measure Light on the Objective Plane of a Microscope  
 Silicon Photodiode with Large 18 mm x 18 mm Active Area  
 Sensor Housing Dimensions: 76.0 mm x 25.2 x 5.0 mm  
 Index Matching Gel Utilized in Design to Prevent Internal Reflections  
 Information Stored in Connector
 

- o Sensor Data
- o NIST- and PTB-Traceable Calibration Data

 Post Mountable via 8-32 (M4) Tap

The S170C Microscope Slide Power Sensor Head is a silicon photodiode sensor designed to measure the power at the sample in microscopy setups. The silicon photodiode can detect wavelengths between 350 nm and 1100 nm at optical powers between 10 nW and 150 mW. The sensor head's 76.0 mm x 25.2 mm footprint matches that of a standard microscope slide and is compatible with most standard upright and inverted microscopes.

The photodiode has an 18 mm x 18 mm active area and is contained in a sealed housing behind a neutral density (ND) filter with OD 1.5. A 20 mm x 20 mm indentation around the surface of the ND filter is sized to accept standard microscope cover slips. An immersion medium (water, glycerol, oil) may be placed in this well directly over the ND filter, or a cover slip may be inserted first to simplify clean up. The gap between the photodiode and the neutral density filter has been filled with an index matching gel in order to prevent internal reflections from causing significant measurement errors when using high NA objectives with oil or water.

Item #	S170C
Sensor Image (Click Image to Enlarge)	
Overall Dimensions	76.0 mm x 25.2 mm x 5.0 mm (2.99" x 0.99" x 0.20")
Active Detector Area	18 mm x 18 mm
Input Aperture	20 mm x 20 mm
Wavelength Range	350 - 1100 nm
Optical Power Working Range	10 nW - 150 mW
Detector Type	Silicon Photodiode
Linearity	±0.5%
Resolution <sup>a</sup>	1 nW

The bottom of the sensor housing features a laser-engraved grid to aid in aligning and focusing the beam. In standard microscopes, the grid can be used for beam alignment before flipping the sensor head to face the objective for power measurements. In inverted microscopes, turn on the transmitted illuminator to align the grid on the detector housing with the beam, thereby centering the sensor in front of the objective. Alternatively, the diffusive surface of the ND filter can be used as a focusing plane.

Sensor specifications and the NIST- and PTB-traceable calibration data are stored in non-volatile memory in the sensor connector and can be read out by the latest generation of Thorlabs power meters. The S170C power sensor is compatible with the [PM100D](#), [PM100A](#), [PM100USB](#), [PM200](#), and [PM320E](#) power meters. We recommend yearly recalibration to ensure accuracy and performance. Calibration may be ordered using the CAL1 recalibration service available below. Please contact [technical support](#) for more information.

The complete set of specifications are presented on the Specs tab above. Thorlabs also offers a Microscope Slide Sensor Head with a [thermal sensor](#); the full presentation can be found [here](#).

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Calibration Uncertainty <sup>b</sup>	±3% (440 - 980 nm) ±5% (350 - 439 nm) ±7% (981 - 1100 nm)
Neutral Density Filter	Reflective (OD 1.5)
Cable Length	1.5 m
Post Mounting	Universal 8-32 / M4 Tap, Post Not Included

a. Measured with PM100D console in low bandwidth setting.  
b. Beam diameter > 1 mm.

<b>+1 Qty</b>	<b>Docs</b>	<b>Part Number - Universal</b>	<b>Price</b>	<b>Available / Ships</b>
		<a href="#">S170C</a> <b>Customer Inspired!</b> Microscope Slide Power Sensor, 350 - 1100 nm, 150 mW	\$1,090.00	✓ Today
<input type="button" value="Add To Cart"/>				

## Integrating Sphere Photodiode Power Sensors

For Measurements Independent of Beam Shape and Entrance Angle  
Integrating Sphere Design Acts as a Diffuser with Minimal Power Loss  
Ø5 mm, Ø7 mm, or Ø12 mm Input Aperture  
Removable [S120-FC](#) Fiber Adapter (FC/PC and FC/APC) Included  
Compatible Fiber Adapters: [S120-xx Series](#) and S140-BFA [Bare Fiber Adapter](#)  
Compatible with the [PM200](#), [PM100D](#), [PM100USB](#), [PM100A](#), and [PM320E](#) Consoles

These Integrating Sphere Photodiode Power Sensors are the ideal choice for power measurements independent of beam uniformity, divergence angle, beam shape, or entrance angle, making them excellent for use with fiber sources and off-axis free space sources.

Our integrating spheres are designed for wavelength ranges from the visible through the NIR. Sensor heads for use between 350 and 2500 nm use a single Ø1" or Ø2" sphere made from Zenith® PTFE and feature a black housing to minimize reflected light around the entrance aperture. These sensors use either a silicon photodiode for detection in the 350 - 1100 nm range or an InGaAs photodiode for detection in the 800 - 1700 nm, 900 - 1650 nm, or 1200 - 2500 nm wavelength range.

The S180C integrating sphere for 2.9 - 5.5 µm uses two connected, gold-plated Ø20 mm spheres, with an entrance port in the first sphere and a port for the MCT (HgCdTe) detector located in the second sphere. Compared to single-sphere designs, the two-sphere configuration improves device sensitivity by minimizing the internal sphere surface area while still effectively shielding the detector from direct illumination. This design reduces the effect of input angle, divergence, and beam shape on the measurement result by effectively shielding the photodiode without the use of a baffle or other shielding mechanism.

The integrating spheres below feature large Ø5 mm, Ø7 mm, or Ø12 mm apertures, externally SM1-threaded (1.035"-40) front connections, enhanced shielding against electromagnetic interference, and an over-temperature alert sensor. Because of the large active detector areas of these sensors, the included S120-FC fiber adapter can be used with FC/PC- or FC/APC-terminated fiber. The externally SM1-threaded adapter can be removed using a size 1 screwdriver to place components closer to the window. NIST-traceable data is stored in the sensor connector.



[Click to Enlarge](#)  
S142C with the S120-FC Fiber Adapter (Included)



[Click to Enlarge](#)  
S142C and S140-BFA Bare Fiber Adapter (Sold Separately)

Item #	S140C	S142C	S144C	S145C	S146C	S148C	S180C
Sensor Image (Click the Image to Enlarge)							
Aperture	Ø5 mm	Ø12 mm	Ø5 mm	Ø12 mm		Ø5 mm	Ø7 mm
Wavelength Range	350 - 1100 nm		800 - 1700 nm		900 - 1650 nm	1200 - 2500 nm	2.9 µm - 5.5 µm
Power Range	1 µW - 500 mW	1 µW - 5 W	1 µW - 500 mW	1 µW - 3 W	10 µW - 20 W	1 µW - 1 W	1 µW - 3 W
Detector Type	Si Photodiode			InGaAs Photodiode			MCT (HgCdTe) Photodiode
Linearity	±0.5%						
Resolution <sup>a</sup>	1 nW			10 nW		1 nW	10 nW
Measurement Uncertainty <sup>b</sup>	±3% (440 - 980 nm) ±5% (350 - 439 nm) ±7% (981 - 1100 nm)		±5%				
Responsivity <sup>c</sup> (Click for Plot)	 <a href="#">Raw Data</a>	 <a href="#">Raw Data</a>	 <a href="#">Raw Data</a>	 <a href="#">Raw Data</a>	 <a href="#">Raw Data</a>	 <a href="#">Raw Data</a>	 <a href="#">Raw Data</a>
Integrating Sphere Material (Size)	Zenith® PTFE (Ø1")	Zenith® PTFE (Ø2")	Zenith® PTFE (Ø1")	Zenith® PTFE (Ø2")		Zenith® PTFE (Ø1")	Gold Plating (Two Ø20 mm Spheres)
Head Temperature Measurement	NTC Thermistor 4.7 kΩ						
Housing Dimensions	Ø45 mm x 30.5 mm	70 mm x 74 mm x 70 mm	Ø45 mm x 30.5 mm	70 mm x 74 mm x 70 mm		Ø45 mm x 30.5 mm	59.0 mm x 50.0 mm x 28.5 mm
Cable Length	1.5 m						
Post Mounting	8-32 and M4 Taps						
Aperture Thread	Included Adapter with SM1 (1.035"-40) External Thread						
Compatible Fiber Adapters	<a href="#">S120-FC (Included)</a> , <a href="#">S120-SMA</a> , <a href="#">S120-ST</a> , <a href="#">S120-SC</a> , <a href="#">S120-LC</a> or <a href="#">S140-BFA</a>						

a. Measured with PM100D console in low bandwidth setting.

b. Beam diameter > 1 mm

c. All sensor responsivities are calibrated to a NIST-traceable source with measurements taken in 5 nm intervals except for the S180C. See the S180C responsivity graph to see the NIST-traceable reference points.

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<b>+1 Qty</b>	<b>Docs</b>	<b>Part Number - Universal</b>	<b>Price</b>	<b>Available / Ships</b>
		<a href="#">S140C</a> Integrating Sphere Photodiode Power Sensor, Si, 350 - 1100 nm, 500 mW	\$675.00	✓ Today



	<input type="text"/>		<b>S142C</b> Integrating Sphere Photodiode Power Sensor, Si, 350 - 1100 nm, 5 W	\$937.00	✓	Today
	<input type="text"/>		<b>S144C</b> Integrating Sphere Photodiode Power Sensor, InGaAs, 800 - 1700 nm, 500 mW	\$793.00	✓	Today
	<input type="text"/>		<b>S145C</b> Integrating Sphere Photodiode Power Sensor, InGaAs, 800 - 1700 nm, 3 W	\$973.00	✓	Today
	<input type="text"/>		<b>S146C</b> Integrating Sphere Photodiode Power Sensor, InGaAs, 900 - 1650 nm, 20 W	\$973.00	✓	Today
	<input type="text"/>		<b>S148C</b> <b>Customer Inspired!</b> Integrating Sphere Photodiode Power Sensor, InGaAs, 1200 - 2500 nm, 1 W	\$814.61	✓	Today
	<input type="text"/>		<b>S180C</b> <b>NEW!</b> Integrating Sphere Photodiode Power Sensor, MCT (HgCdTe), 2.9 - 5.5 μm, 3 W	\$3,533.33	✓	Today

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### Fiber Photodiode Power Sensors

For Fiber-Based Optical Power Measurements  
 Compact Sensor Integrated into the Connector  
 Integrated Design for use in the Field and Lab  
 Includes [PM20-FC Fiber Adapter](#)  
 • S150C and S151C Sensors also Include [PM20-SMA Adapters](#)  
 Compatible with all [PM20-xx Series Fiber Adapters](#)  
 Compatible with the [PM200](#), [PM100D](#), [PM100USB](#), [PM100A](#), and [PM320E](#) Consoles



[Click to Enlarge](#)

PM100D with S150C Sensor and FC Cable

The S15xC Compact Fiber Photodiode Power Sensor is designed to take power measurements from a wide variety of fiber coupled sources. The compact sensor, integrated into the power meter connector, features a unique integrated design housing the photodiode sensor, fiber coupling, and NIST-traceable data. Standard FC (and SMA - S150C and S151C) connectors are easily interchanged with a variety of standard fiber connectors.

Item #	S150C	S151C	S154C	S155C
Sensor Image (Click the Image to Enlarge)				
Included Connectors	FC <sup>d</sup> & SMA		FC <sup>d</sup>	
Wavelength Range	350 - 1100 nm	400 - 1100 nm	800 - 1700 nm	
Power Range	100 pW to 5 mW (-70 dBm to +7 dBm)	1 nW to 20 mW (-60 dBm to +13 dBm)	100 pW to 3 mW (-70 dBm to +5 dBm)	1 nW to 20 mW (-60 dBm to +13 dBm)
Detector Type	Si Photodiode		InGaAs Photodiode	
Linearity	±0.5%			
Resolution <sup>a</sup>	10 pW (-80 dBm)	100 pW (-70 dBm)	10 pW (-80 dBm)	100 pW (-70 dBm)
Measurement Uncertainty <sup>b</sup>	±3% (440 - 980 nm) ±5% (350 - 439 nm) ±7% (981 - 1100 nm)	±3% (440 - 980 nm) ±5% (400 - 439 nm) ±7% (981 - 1100 nm)	±5%	
Coating/Diffuser	N/A	Absorptive ND (Schott NG3)	N/A	
Head Temperature Measurement <sup>c</sup>	NTC Thermistor 3 kΩ			
Aperture Thread	External SM05 (0.535"-40)			
Fiber Adapters	Included: <a href="#">PM20-FC</a> & <a href="#">PM20-SMA</a> ; Optional: <a href="#">PM20-LC</a> , <a href="#">PM20-SC</a> , <a href="#">PM20-ST</a>		Included: <a href="#">PM20-FC</a> ; Optional: <a href="#">PM20-LC</a> , <a href="#">PM20-SC</a> , <a href="#">PM20-ST</a> , <a href="#">PM20-SMA</a>	

a. Measured with PM100D console in low bandwidth setting.  
 b. For a beam diameter > 1 mm incident on the active area of the detector (i.e. at the detector surface after the light has exited the fiber and passed through any internal optics).  
 c. This specification is valid for devices with serial numbers 1203xxx and higher. For older versions, please contact [technical support](#).  
 d. Because of the large active detector area of these sensors, the included PM20-FC fiber adapter can be used with both FC/PC- and FC/APC-connectorized fiber.  
**Based on your currency / country selection, your order will ship from Newton, New Jersey**

+1	Qty	Docs	Part Number - Universal	Price	Available / Ships
	<input type="text"/>		<b>S150C</b> Compact Fiber Photodiode Power Sensor, Si, 350 - 1100 nm, 5 mW	\$294.00	✓ Today
	<input type="text"/>		<b>S151C</b> Compact Fiber Photodiode Power Sensor, Si, 400 - 1100 nm, 20 mW	\$335.00	✓ Today
	<input type="text"/>		<b>S154C</b> Compact Fiber Photodiode Power Sensor, InGaAs, 800 - 1700 nm, 3 mW	\$422.00	✓ Today
	<input type="text"/>		<b>S155C</b> Compact Fiber Photodiode Power Sensor, InGaAs, 800 - 1700 nm, 20 mW	\$484.00	✓ Today

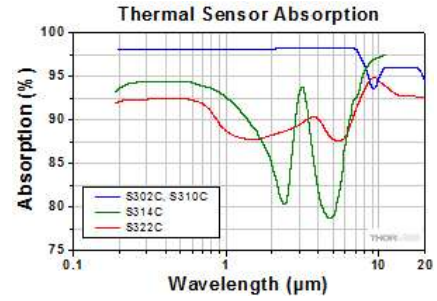
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### Thermal Sensors for General Applications

For General Broadband Optical Power Measurements  
 Available Aperture Sizes Between Ø9.3 mm and Ø25 mm (See Table Below)  
 Broadband Coatings with Flat Response over a Large Wavelength Range  
 Compatible with the [PM200](#), [PM100D](#), [PM100USB](#), [PM100A](#), and [PM320E](#) Consoles

Thorlabs' Standard Thermal Power Sensors are designed for broadband optical power measurements of low (100 μW) to high (200 W) power sources. Each thermal sensor's broadband coating has a flat spectral response over a wide wavelength range, as shown in the plot to the right.

NIST-traceable response curves are stored in the sensor connector. Aperture sizes from Ø9.3 mm to Ø25 mm allow easy alignment and measurement of large-spot-size laser sources. These sensors feature external SM1 (1.035"-40) threading on the front for easy integration into existing cage and lens tube systems in addition to fiber coupling applications.



The S302C and S310C sensors have the same absorption curve as the S305C thermal sensor (sold below). [Click to Enlarge](#)

Item #	S302C	S310C	S314C	S322C
Sensor Image (Click Image to Enlarge)				
Aperture Size	Ø9.3 mm (Ø12 mm with Black SM1-Threaded Shield Removed)	Ø20 mm	Ø25 mm	
Wavelength Range	0.19 - 25 µm	0.19 - 25 µm	0.25 - 11 µm	0.25 - 11 µm
Power Range	100 µW - 2 W	10 mW - 10 W	10 mW - 40 W	100 mW - 200 W
Detector Type	Stabilized Thermal Absorber	Thermal Surface Absorber		
Linearity	±1%			
Resolution <sup>a</sup>	1 µW	200 µW	1 mW	5 mW
Measurement Uncertainty <sup>b</sup>	±3% @ 1064 nm ±5% @ 190 - 2940 nm	±3% @ 1064 nm ±5% @ 190 - 1064 nm	±3% @ 1064 nm ±5% @ 250 - 2940 nm	±3% @ 1064 nm ±5% @ 266 - 1064 nm
Response Time <sup>c</sup>	3 s	<1 s		1 s
Cooling	Convection (Passive)			Active Fan Cooling
Housing Dimensions	Ø40 mm x 50 mm	55 mm x 55 mm x 54 mm	100 mm x 100 mm x 55 mm	100 mm x 100 mm x 87 mm
Cable Length	1.5 m			
Post Mounting	M4, 60 mm Long <a href="#">Ø1/2" Post</a> Included	M6, 75 mm Long <a href="#">Ø1/2" Post</a> Included		
Cage Mounting	N/A	<a href="#">30 mm Cage Systems</a> via Four 4-40 Tapped Holes		
Aperture Thread	Externally SM1 (1.035"-40) Threaded for <a href="#">Ø1" Lens Tubes</a> and <a href="#">Fiber Adapters</a>	SM1-Threaded (1.035"-40) Adapter Plate for <a href="#">Ø1" Lens Tubes</a> and Fiber Adapters		

a. Measurement taken with the PM100D console with the acceleration circuit switched off. Resolution performance will be similar with our other power meter consoles.  
 b. For all of these sensors except the S314C: spectral calibration (the response values for wavelength correction outside of this calibration range) is interpolated from the general absorption curve for the absorber. Other calibration wavelengths are available on request.  
 c. Measured with display (0 - 90%).

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal	Price	Available / Ships
	<input type="text"/>		<a href="#">S302C</a> Thermal Power Sensor, Stabilized, 0.19 - 25 µm, 2 W	\$711.00	✓ Today
	<input type="text"/>		<a href="#">S310C</a> Thermal Power Sensor, Surface Absorber, 0.19 - 25 µm, 10 W	\$711.00	✓ Today
	<input type="text"/>		<a href="#">S314C</a> Thermal Power Sensor, Surface Absorber, 0.25 - 11 µm, 40 W	\$881.00	✓ Today
	<input type="text"/>		<a href="#">S322C</a> Thermal Power Sensor, Surface Absorber, 0.25 - 11 µm, 200 W, Fan Cooled	\$1,300.00	✓ Today

Add To Cart

**Slim Thermal Sensor**

Item #	S305C
Sensor Image (Click Image to Enlarge)	
Aperture Size	Ø10 mm
Wavelength Range	0.19 - 25 µm
Power Range	10 mW - 5 W
Detector Type	Thermal Surface Absorber
Linearity	±1%

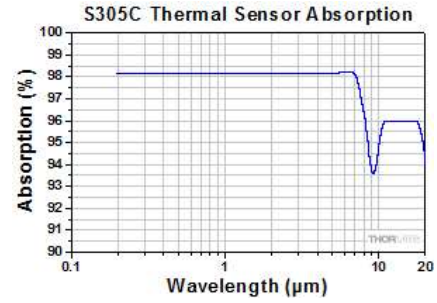
Housing Dimensions: 40.7 mm x 40.7 mm x 18 mm (1.6" x 1.6" x 0.71")  
 For General Broadband Optical Power Measurements  
 Ø10 mm Aperture Size  
 Broadband Coating with Flat Response over a Large Wavelength Range  
 Compatible with the [PM200](#), [PM100D](#), [PM100USB](#), [PM100A](#), and [PM320E](#) Consoles  
 30 mm Cage System and SM1 Lens Tube Compatible

The S305C Slim Thermal Power Sensor is designed for detecting broadband optical powers from 10 mW - 5 W sources. Its slim profile makes it particularly useful in tight spaces. The broadband coating used on this thermal sensor features a flat response over a wide range of wavelengths, as shown in the plot to the right.

NIST-traceable response curves are stored in the sensor connector. The aperture size of Ø10 mm allows easy alignment and measurement of laser sources with large spot sizes. The Slim Thermal Sensor features external SM1 (1.035"-40) threading on the front for integration into existing [Ø1" lens tube systems](#) in addition to fiber coupling applications, and it also offers 4-40 taps at three corners that are compatible with our [30 mm cage systems](#). The sensor housing has virtually the same dimensions as a 30 mm cage plate. For use in particularly tight spaces, the front adapter can be removed to reduce the thickness from 18 mm to 15 mm.

Resolution <sup>a</sup>	100 μW
Measurement Uncertainty <sup>b</sup>	±3% @ 1064 nm; ±5% @ 190 - 2940 nm
Response Time <sup>c</sup>	<1 s
Cooling	Convection (Passive)
Housing Dimensions	40.7 mm x 40.7 mm x 18 mm (1.6" x 1.6" x 0.71")
Cable Length	1.5 m
Post Mounting	Universal 8-32 / M4 Tap, Post Not Included
Cage Mounting	3 x 4-40 Threads for <a href="#">30 mm Cage Compatibility</a>
Aperture Thread	SM1 (1.035"-40) External Thread for <a href="#">Ø1" Lens Tubes</a> and <a href="#">Fiber Adapters</a>

- a. Measurement taken with the PM100D console with the acceleration circuit switched off.
- b. Spectral calibration (the response values for wavelength correction outside of this calibration range) is interpolated from the general absorption curve for the absorber. Other calibration wavelengths are available on request.
- c. Measured with display (0 - 90%).



The S305C sensor has the same absorption curve as the S302C and S310C thermal sensors featured above.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1 Qty Docs Part Number - Universal Price Available / Ships

**S305C** Customer Inspired! Compact Thermal Power Sensor, Surface Absorber, 0.19 - 25 μm, 5 W \$711.00 Today

### High-Sensitivity Thermal Sensor

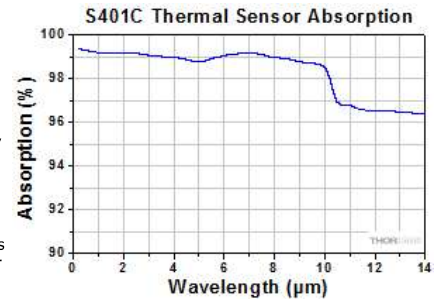
Item #	S401C
Sensor Image (Click Image to Enlarge)	
Aperture Size	Ø10 mm
Wavelength Range	0.19 - 10.6 μm
Power Range	10 μW - 1 W (3 W <sup>2</sup> )
Detector Type	Stabilized Thermal Volume Absorber
Linearity	±0.5%
Resolution	1 μW
Measurement Uncertainty <sup>b</sup>	±3% @ 1064 nm; ±5% @ 190 nm - 10.6 μm
Response Time	<1 s
Cooling	Convection (Passive)
Housing Dimensions	33.0 mm x 43.0 mm x 18.5 mm (1.30" x 1.69" x 0.73")
Cable Length	1.5 m
Post Mounting	Universal 8-32 / M4 Tap, Post Not Included
Cage Mounting	N/A
Aperture Thread	SM1 (1.035"-40) External Thread for <a href="#">Ø1" Lens Tubes</a> and <a href="#">Fiber Adapters</a>

For Broadband Optical Power Measurements Down to 10 μW  
 Housing Dimensions: 33.0 mm x 43.0 mm x 18.5 mm (1.30" x 1.69" x 0.73")  
 Ø10 mm Aperture Size  
 Compatible with the [PM200](#), [PM100D](#), [PM100USB](#), [PM100A](#), and [PM320E](#) Consoles  
 Included Adapter with External SM1 Threading (1.035"-40)  
 29.4 mm (1.16") Long, Removable Light Shield Included (See Photo to the Right)



[Click to Enlarge](#)  
S401C Thermal Sensor with Included Light Shield

The S401C High-Sensitivity Thermal Sensor is designed for detecting broadband optical powers from 10 μW to 1 W sources with a resolution of 1 μW. The broadband coating used on this thermal sensor offers high absorption at wavelengths between 0.19 and 10.6 μm (shown in the plot below and to the right), which makes the sensor ideal for use with aligning and measuring [Mid-IR Quantum Cascade Lasers \(OCLs\)](#).



This sensor uses a thermal volume absorber, as these typically have significantly higher responsivities than thermal surface absorbers for detecting very low power levels and short (ns) pulses. However, this improvement usually comes at the expense of response time. The S401C sensor provides the best of both worlds, as it offers a similar response time to our fastest surface absorber thermal sensors (<1 s) without sacrificing the sensitivity needed for low power measurements.

The sensor aperture size of Ø10 mm allows easy alignment and measurement of laser sources with large spot sizes. The sensor also includes a removable, externally SM1-threaded (1.035"-40) adapter, which is held to the front of the sensor by two Philips-head screws. This adapter allows the sensor to be used with our [Ø1" lens tubes](#), our fiber adapters (sold below), and the included, internally SM05-threaded (0.535"-40) light shield, as shown in the photo above and to the right. For use in particularly tight spaces, the adapter can be removed to reduce the thickness from 18.5 mm to 15 mm. The connector stores NIST-traceable calibration curves for the sensor.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1 Qty Docs Part Number - Universal Price Available / Ships

**S401C** High-Sensitivity Thermal Power Sensor, 0.19 - 10.6 μm, 10 μW - 1 W \$711.00 Today

### Thermal Sensors for Excimer and YAG Lasers

For Optical Power Measurements of Excimer (S350C) and YAG (S370C and S470C) Lasers  
 Ideal for Applications with High Peak Powers  
 High-Sensitivity Version (S470C) Ideal for High-Peak-Power Pulses with Low Average Power  
 Compatible with the [PM200](#), [PM100D](#), [PM100USB](#), [PM100A](#), and [PM320E](#) Consoles

The S350C, S370C, and S470C Thermal Sensors are designed for high-peak-power pulsed laser sources. All of these units are post-mountable for free-space applications and feature NIST-traceable data stored in the sensor connector.

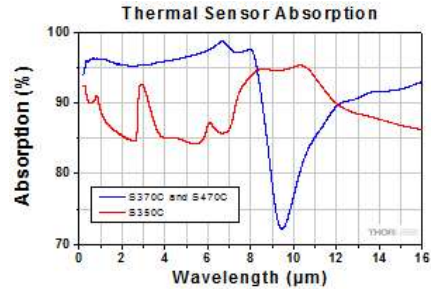
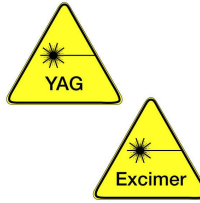
S350C

The S350C sensor features a Ø40 mm aperture and a 40 W max power (CW). It is designed for Excimer lasers and other applications that require measuring high-power, large-spot-size lasers.

**S370C and S470C**

The S370C and S470C are designed for YAG lasers. Both incorporate a Schott glass absorber on top of the thermal absorber; this glass layer allows them to detect pulses with high peak powers. The S370C features a large Ø25 mm aperture ideal for large-spot-size beams, and is compatible with average powers from 10 mW to 10 W (CW).

In comparison, the S470C has a smaller aperture of Ø15 mm and a lower max average power of 5 W. However, the S470C's smaller absorber decreases the response time to <2 s, and it has a thermal detector that can measure average powers down to 100 µW. With a housing size of only 45 mm x 45 mm x 18 mm, this thermal sensor head is also the most compact of our specialized thermal sensor heads for use with high-power lasers.



These absorption curves are shown over a broader wavelength range than the sensors' operating ranges. See the table below for the operating wavelength range of each sensor.

Item #	S350C	S370C	S470C
Sensor Image (Click the Image to Enlarge)			
Aperture Size	Ø40 mm	Ø25 mm	Ø15 mm
Wavelength Range	0.19 - 1.1 µm, 10.6 µm	0.4 - 5.2 µm	0.25 - 10.6 µm
Power Range	10 mW - 40 W (CW)	10 mW - 10 W (CW)	100 µW - 5 W (Pulsed and CW)
Max Power Density	2 kW/cm <sup>2</sup> (Avg.)	35 W/cm <sup>2</sup> (Avg.); 100 GW/cm <sup>2</sup> (Peak)	
Detector Type	Thermal Surface Absorber	Thermal Volume Absorber	
Linearity	±1%		±0.5%
Resolution <sup>a</sup>	1 mW	250 µW	10 µW
Measurement Uncertainty <sup>b</sup>	±3% @ 351 nm; ±5% @ 190 - 1100 nm	±3% @ 1064 nm; ±5% @ 400 - 1064 nm	±3% @ 1064 nm; ±5% @ 250 nm - 10.6 µm
Response Time <sup>c</sup>	1 s	3 s	<2 s
Cooling	Convection (Passive)		
Housing Dimensions	100 mm x 100 mm x 55 mm	75 mm x 75 mm x 51.5 mm	45 mm x 45 mm x 18 mm
Cable Length	1.5 m		
Post Mounting	Ø1/2" Posts via M6 Tap (75 mm Long Post Included)	Ø1/2" Posts via M6 Tap (75 mm Long Post Included)	Ø1/2" Posts via Universal 8-32 & M4 Tap (Post Not Included)
Cage Mounting	N/A	30 mm Cage Systems via Four 4-40 Taps	N/A
Aperture Thread	N/A	External SM1-Threaded (1.035"-40) Adapter Plate for Mounting Ø1" Lens Tubes and Fiber Adapters	External SM1 (1.035"-40) for Mounting Ø1" Lens Tubes and Fiber Adapters

a. Measurement taken with the PM100D console with the acceleration circuit switched, except for the S470C, which was measured with the PM200 console. Resolution performance will be similar with our other power meter consoles.  
 b. Spectral calibration (the response values for wavelength correction outside of this calibration range) is interpolated from the general absorption curve for the absorber. Other calibration wavelengths are available on request.  
 c. Measured with display (0 - 90%).

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1 Qty	Docs	Part Number - Universal	Price	Available / Ships
<input type="text"/>		<b>S350C</b> Thermal Power Sensor, Surface Absorber, 0.19 - 1.1 µm and 10.6 µm, 40 W	\$1,050.00	✓ Today
<input type="text"/>		<b>S370C</b> Thermal Power Sensor, Volume Absorber, 0.4 - 5.2 µm, 10 W	\$1,090.00	✓ Today
<input type="text"/>		<b>S470C</b> High-Sensitivity Thermal Power Sensor, Volume Absorber, 0.25 - 10.6 µm, 0.1 mW - 5 W	\$1,110.00	✓ Today

**Pyroelectric Energy Sensors**

For General Purpose and High Energy Optical Pulse Measurements  
 Black Broadband Coating with Flat Response Over a Wide Wavelength Range  
 Ceramic Coating with High Damage Thresholds for High-Energy-Density Lasers  
 Ø11 mm - Ø45 mm Sensor Area  
 Comes with BNC Connector for Oscilloscope Use and a Sensor Adapter for Use with the [PM200](#), [PM100D](#), [PM100USB](#), and [PM320E](#) Consoles

The ESxxx Standard and High Energy Pyroelectric Sensors are designed to measure pulsed coherent and incoherent sources. Pyroelectric sensors are not suited for CW measurements, as they convert energy from light pulses into voltage pulses. A black broadband or ceramic coating is used for low or high power measurements, respectively. Large sensor areas from Ø11 mm - Ø45 mm allow easy alignment. The energy sensors features BNC connectors for use with an oscilloscope, as well as standard power meter connectors which contain NIST and PTB-traceable calibration data.













[Click to Enlarge](#)  
 ES220C Sensor Mounted in a 30 mm Cage System

Item #	ES111C	ES120C	ES145C	ES220C	ES245C



Sensor Image (Click the Image to Enlarge)					
Aperture Size	Ø11 mm	Ø20 mm	Ø45 mm	Ø20 mm	Ø45 mm
Wavelength Range	0.185 - 25 µm				
Energy Range	10 µJ - 150 mJ	100 µJ - 500 mJ	500 µJ - 2 J	500 µJ - 3 J	1 mJ - 15 J
Detector Type	Pyroelectric Energy Sensor with Black Broadband Coating			Pyroelectric Energy Sensor with Ceramic Coating	
Resolution	100 nJ	1 µJ	1 µJ	25 µJ	50 µJ
Linearity	±1%				
Measurement Uncertainty	±5% @ 0.185 - 25 µm				
Housing Dimensions	Ø36 mm x 16 mm	Ø50 mm x 18 mm	Ø75 mm x 21 mm	Ø50 mm x 18 mm	Ø75 mm x 21 mm
Cable Length	1.5 m				
Post Mounting	8-32 Mounting Thread, 8-32 and M4 Insulating Adapters Included				
Cage Mounting	N/A	Four 4-40 Threadings for 30 mm Cage Systems	N/A	Four 4-40 Threadings for 30 mm Cage Systems	

Based on your currency / country selection, your order will ship from Newton, New Jersey











+1	Qty	Docs	Part Number - Universal	Price	Available / Ships
	<input type="text"/>		<a href="#">ES111C</a> Pyroelectric Energy Sensor, Broadband Coating, 0.185 - 25 µm, 150 mJ	\$1,240.00	✓ Today
	<input type="text"/>		<a href="#">ES120C</a> Pyroelectric Energy Sensor, Broadband Coating, 0.185 - 25 µm, 500 mJ	\$1,290.00	✓ Today
	<input type="text"/>		<a href="#">ES145C</a> Pyroelectric Energy Sensor, Broadband Coating, 0.185 - 25 µm, 2 J	\$1,490.00	✓ Today
	<input type="text"/>		<a href="#">ES220C</a> Pyroelectric Energy Sensor, Ceramic Coating, 0.185 - 25 µm, 3 J	\$1,550.00	✓ Today
	<input type="text"/>		<a href="#">ES245C</a> Pyroelectric Energy Sensor, Ceramic Coating, 0.185 - 25 µm, 15 J	\$1,800.00	✓ Today

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### Recalibration Service for Photodiode Power Sensors

Thorlabs offers Calibration Services for our photodiode optical power sensors. To ensure accurate measurements, we recommend recalibrating the sensors annually. Recalibration of the console is included with the recalibration of a sensor.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal	Price	Available / Ships
	<input type="text"/>		<a href="#">CAL1</a> Recalibration Service for Si Power Meter Sensors Except S130 Series	\$138.00	<a href="#">Lead Time</a>
	<input type="text"/>		<a href="#">CAL2</a> Recalibration Service for Ge & InGaAs Power Meter Sensors Except S132 Series and S148C	\$155.00	<a href="#">Lead Time</a>
	<input type="text"/>		<a href="#">CAL-S130</a> Recalibration Service for Si Power Meter Sensors for S130 Series and PM160	\$160.00	<a href="#">Lead Time</a>
	<input type="text"/>		<a href="#">CAL-S132</a> Recalibration Service for Ge Power Meter Sensors for S132 Series only	\$170.00	<a href="#">Lead Time</a>
	<input type="text"/>		<a href="#">CAL4</a> <b>NEW!</b> Recalibration Service for MCT and Extended InGaAs Mid-IR Power Sensors (S148C and S180C)	\$277.78	<a href="#">Lead Time</a>

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### Additional Optical Power and Energy Meters

- [Photodiode Power Sensors](#)      [Digital Handheld Power & Energy Meter Console](#)      [Compact USB Power Meters](#)      [Power Meter Tutorial](#)
- [Thermal Power Sensors](#)      [Analog Handheld Power Meter Console](#)      [Wireless Power Meter with Sensor](#)
- [Pyroelectric Energy Sensors](#)      [Power and Energy Meter, USB Interface](#)      [Power Meter Bundles](#)
- ▶ [Touch Screen Power and Energy Meter Console](#)      [Dual-Channel Benchtop Power/Energy Meter Console](#)      [Field Power Meter for Terminated Fibers](#)