USB Power Meter, Thermal Sensor, 5 W, Ø10 mm

PM16-405

Description

The PM16 Series of USB Power Meters integrate USB interfaces with a selection of photodiode and thermal power sensors. Other sensors are available upon request; please contact Tech Support with inquiries. These power meters can be operated using any software and driver package compatible with Thorlabs' power meters. The EEPROM built into the connector contains sensor identification information and the NIST- and PTB-traceable calibration data, which is used by the power meter software.

The PM16-405 includes an S405C sensor head, which is optimized to measure 190 nm to 20 µm wavelength and 100 µW to 5 W power optical signals while providing 5 µW resolution and response times better than 1.1 s. The housing features an SM05 (0.535"-40) internal thread concentric with the input aperture, and included with the PM16-405 is a removable adapter to convert this to SM1 (1.035"-40) external threading. The adapter facilitates integrating the power head with Thorlabs' SM1-threaded accessories, external optics, fiber adapters, light shields, and apertures. There are two 8-32 (M4) threaded mounting holes for post-mounting the sensor head, and other housing features support its integration with Thorlabs' 30 mm case system.

When operating the sensor, allow it to settle to room temperature before performing a zero adjustment. We recommend operating the sensor head post mounted, rather than handheld, as thermal contributions from body heat can negatively impact the accuracy of the measurement. The active detector area should also be protected from air flow and other thermal disturbances.

Software Installation

The software is compatible with Windows XP® as well as later versions of the Windows operating system. The PM16-405 requires a National Instruments VISA installation to allow the correct USB installation as a "Test and Measurement Device (IVI)". It can be downloaded from the National Instruments website (https://www.ni.com/visa/). Please install NI VISA first and then plug the PM16 into a free USB port. After USB installation has finished, the device is ready to operate. Software, drivers, command reference and examples can be downloaded from www.thorlabs.com.

Cleaning and Maintenance

There are no serviceable parts in the PM16-405 head. The housing may be cleaned by wiping with a soft damp cloth. When cleaning the aperture filter, treat it as any other fine optic. Gently blow off any debris using compressed air and wipe gently with an optic tissue wetted with propanol. If you suspect a problem with your PM16-405 please contact Thorlabs and an engineer will be happy to assist you.

As long as the sensor has not been exposed to excessive optical power (please pay attention to the maximum ratings in the technical specifications), the calibration should be very stable over long periods of time (well over a year). To maintain the accuracy and performance of the PM16-405, Thorlabs recommends a yearly recalibration, starting one year after purchase.

Specifications

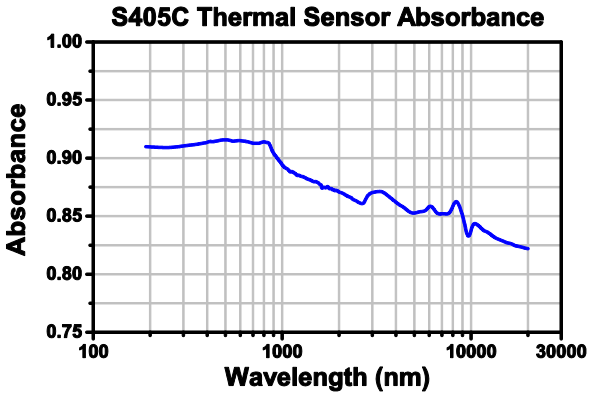
PM16-405 Sensor and Housing Specifications	
Detector Type	Thermal Surface Absorber
Wavelength Range	190 nm - 20 µm
Optical Power Working Range	0.1 mW - 5 W
Max Average Power Density	1.5 kW/cm²
Max Pulse Energy	0.3 J/cm² (1 ns Pulse), 5 J/cm² (1 ms Pulse)
Resolution[a]	5 µW
Linearity	±0.5%
Measurement Uncertainty[b]	±3% @ 1064 nm Calibration with Laser ±5% 250 nm – 17 µm Spectral Absorption Measurement
Response Time[c]	<1.1 s (0 – 95%)
Input Aperture	Ø10 mm
Active Detector Area	10 mm x 10 mm
Active Area Uniformity	±1% (>1 mm Beam Diameter)
Sensor Dimensions	40.6 m x 40.6 mm x 16.0 mm (1.60" x 1.60" x 0.63")
Typical Applications (Laser Types)	Low and Medium Power Lasers (Diode, He-Cd, Ar-Ion, Kr-Ion, Dye, CO_2, Nd:YAG)
Coating / Diffuser	High-Power Broadband
Cooling	Convection
Cable Length	1.5 m
Weight (of the PM16-405)	0.10 kg
Threaded Holes	8-32 (M4), Two Places; 4-40 (Two Places)[a]
Aperture Threading	SM05 (0.535"-40) Internal
Adapter Threading	SM05 (0.535"-40) External, SM1 (1.035"-40) External

a. Measured using the PM400 console with the acceleration circuit switched off. Resolution performance will be similar with Thorlabs' other power meter consoles.
b. Measurement uncertainty during calibration at the specified wavelengths for a beam diameter > 1 mm. The ±3% specification was determined by laser calibration, and the ±5% specification was determined through spectral calibration, in which values were interpolated using the laser calibration data and the absorption curve for the absorber.
c. Natural Response Time

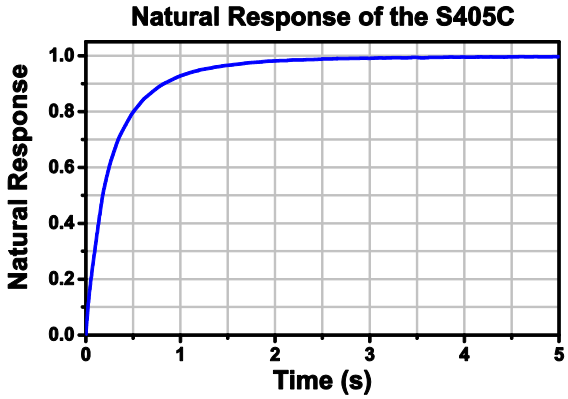
PM16-405 Power Meter Electrical Specifications	
Analog Measurement Ranges[a]	1.6 mV, 25 mV, 400 mV
Measurement Units	W, dBm, V
AD Converter	24 Bit
Analog Amplifier Bandwidth	10 Hz
Update Rate	10/s
Remote Interface	USB 2.0
Power Supply	External: 5 V DC via USB
Connector	USB Type A
Connector Dimensions	65.0 mm x 20.0 mm x 10.0 mm (2.56" x 0.79" x 0.39")

a. The appropriate range is chosen internally by the power meter to achieve the best accuracy; the auto-ranging function can be deactivated.

Specifications (Continued)

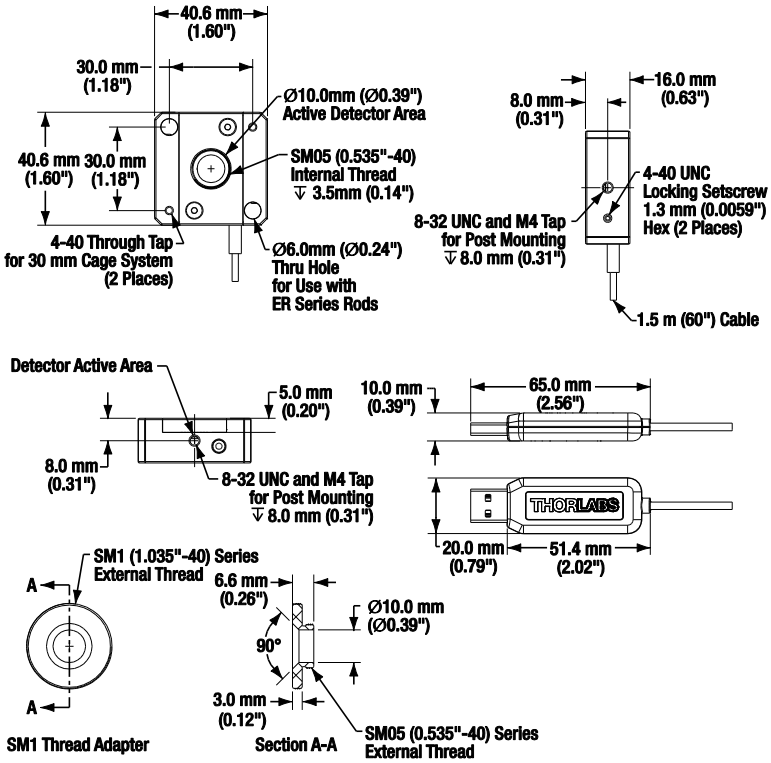


Typical absorbance of the S405C's broadband coating. There is negligible back reflection from the coating.



Typical natural response of the S405C to a 0 to 5 W step change in the incident optical power.

Mechanical Drawings



Precautions and Warranty Information

These products are ESD (electro static discharge) sensitive and as a result are not covered under warranty. Any applied voltage in excess of the maximum specification will cause damage and possible complete failure to the product. The user must use handling procedures that prevent any electrostatic discharges or other voltage surges when handling or using these devices.

The user must avoid any misuse that could cause damage to the detector. Misuse includes, but is not limited to, laser exposure outside Thorlabs' published specifications, high voltage exposure outside Thorlabs' specifications, physical damage due to improper handling and exposure to harsh environments. Harsh environments include, but are not limited to, excessive temperature, vibration, humidity, chemicals or surface contaminants, exposure to flame, aggressive solvents and connection to improper electrical voltage.

Thorlabs, Inc. Life Support and Military Use Application Policy is stated below:

THORLABS' PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS OR IN ANY MILITARY APPLICATION WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF THORLABS, INC. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.

2. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

3. The Thorlabs products described in this document are not intended nor warranted for usage in Military Applications.

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