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Thermal Power Sensor Head, 5 W, Ø10 mm



S405C

Description

The S405C Thermal Power Sensor Head is optimized for 190 nm to 20 µm wavelength and 100 µW to 5 W power optical signals, and it provides 5 µW resolution and a typical response time of 1.1 s. It is well-suited to a variety of free-space and fiber-based applications. The compact housing features an SM05 (0.535"-40) internal thread concentric with the input aperture, and a removable adapter is included 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. Also protect the active detector area from air flow and other thermal disturbances. The S405C is compatible with all currently-available Thorlabs power meter consoles. The EEPROM built into the connector contains sensor identification information and the NIST- and PTB-traceable calibration data, which is used by the consoles.

Specifications

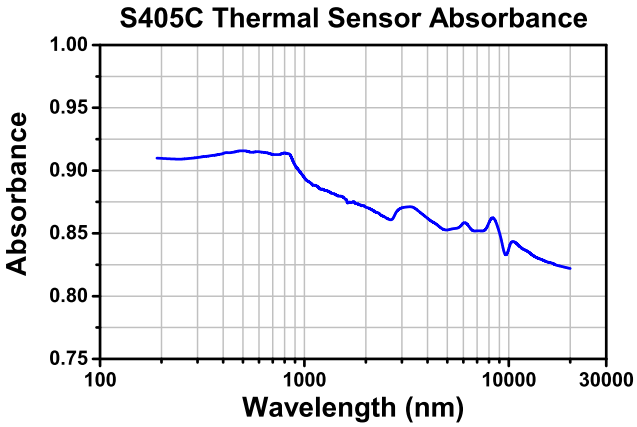
S405C	
Detector Type	Thermal Surface Absorber
Wavelength Range	190 nm - 20 µm
Optical Power Working Range	0.1 mW - 5 W
Max Average Power Density	1.5 kW/cm^2
Max Pulse Energy Density	0.3 J/cm^2 (1 ns Pulse), 5 J/cm^2 (1 ms Pulse)
Resolution[a]	5 µW
Linearity	±0.5%
Measurement Uncertainty[b]	±3% @ 1064 nm ±5% @ 250 nm – 17 µm
Response Time[c]	1.1 s
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
Head Temperature Measurement	Thermistor (NTC)
Thorlabs Console Compatibility (Available Separately)	PM100D, PM100USB, PM100A, PM200, PM400, PM320E

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. Typical Natural Response Time (0 – 95%)

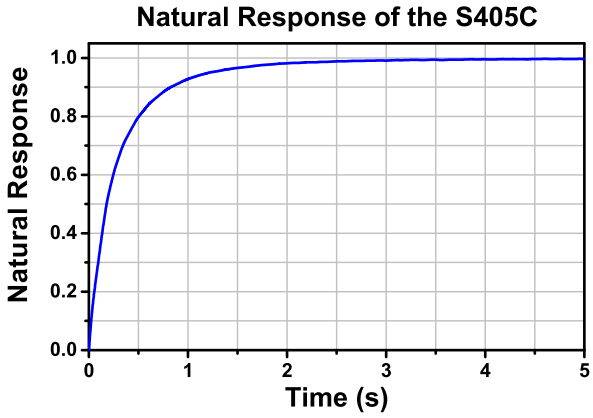
Specifications (Continued)

S405C	
Cable Length	1.5 m
Connector	D-Sub-9 Pin Male
Weight	0.11 kg
Threaded Holes	8-32 (M4), Two Places; 4-40 (Two Places)[a]
Through Holes	Ø6 mm (0.24")[b]
Aperture Threading	SM05 (0.535"-40) Internal
Adapter Threading	SM05 (0.535"-40) External, SM1 (1.035"-40) External

a. Designed to be compatible with Thorlabs' 30 mm cage system components.
b. Designed to accommodate ER series rods.

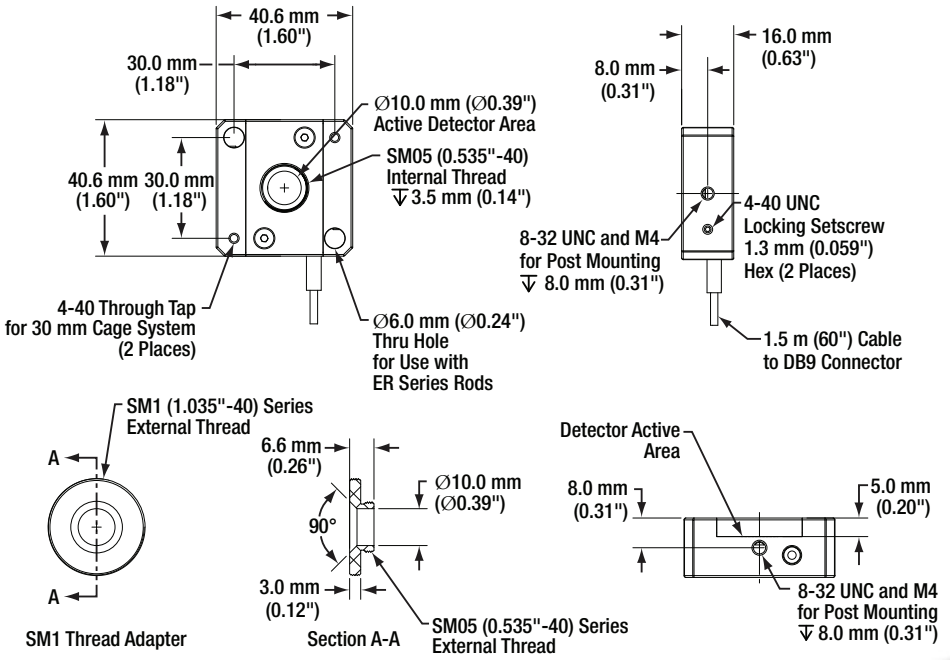


Typical absorbance of the S405C's broadband coating. There is negligible back reflection from the coating.



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

Mechanical Drawing



Cleaning and Maintenance

There are no serviceable parts in the S405C head. The housing may be cleaned by wiping with a soft damp cloth. Do not touch or wipe the absorber surface or use any solvents to clean it! Gently blow off any debris using compressed air. If you suspect a problem with your S405C, please call 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 S405C, Thorlabs recommends a yearly recalibration, starting one year after purchase.

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:

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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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