Compact USB Power Meter with Germanium Photodiode Detector

PM16-122

Description

The PM16 remotely controlled power meters have USB interfaces and are offered with a selection of photodiode and thermal power sensors. Other sensors are available upon request; please contact Tech Support with inquiries. Each sensor is connected to the USB interface by a standard 1.5 m connection cable and can be operated using any of the software and driver packages that are compatible with Thorlabs' other power meters. The PM16-122 power sensor head is designed for general purpose optical power measurements. The head is optimized for small thickness to fit in tight spaces. The high sensitivity photodiode with large active area in combination with a reflective, diffused ND filter enables power measurements up to 40 mW in free-space and fiber-based applications. A removeable annular VIS/IR viewing target serves as an aid for centering a beam on the active area of the photodiode. The target absorbs light from 400 to 640 nm and 800 to 1700 nm.

The front face of the PM16-122 housing is SM1 (1.035"-40) threaded for compatibility with with Thorlabs' Ø1" lens tubes and other accessories,, providing a convenient way to mount external optics, fiber adapters, light filters, and apertures. A combined 8-32- and M4-threaded mounting hole on the side of the housing accepts both metric and imperial posts.

The meter holds the sensor's individual NIST- and PTB- traceable spectral calibration data in a non-volatile memory.

Software Installation

System Requirements: Windows XP and Later

The PM16 requires a National Instruments VISA installation, that can be downloaded from the National Instruments website (https://www.ni.com/visa/), to allow the correct USB installation as an "Test and Measurement Device (IVI)". Please install NI VISA first and then plug the PM16 into a free USB port. Wait until USB installation has finished, after which 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 *PM16-122* 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 *PM16-122* 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 keep the accuracy and performance of the *PM16-122*, Thorlabs recommends a yearly recalibration, starting one year after purchase.

Specifications

PM16-122 Specifications	
Sensor Properties	
Detector Type	Germanium Photodiode
Wavelength Range	700 - 1800 nm
Optical Power Working Range	50 nW – 40 mW
Max Average Power Density	10 W/cm²
Linearity	± 0.5%
Active Area Uniformity[a]	± 1%
Resolution	<2 nW
Calibration Uncertainty[a]	±5%
Typical Application	Low Power Lasers
Laser Types	Diode, Diode Arrays, He-Ne, Dye, Ion Lasers (Ar+, Kr+)
Filter / Diffuser	Absorptive ND (Schott NG9)
Response Time	<1 µs
Sensor Head Dimensions	Ø30.5 mm x 12.7 mm
Active Detector Area	9.7 mm x 9.7 mm
Input Aperture	Ø9.5 mm
Post	8-32 & M4 Combined Thread
Aperture Thread	External SM1 (1.035"-40)
Fiber Adapters (Optional)	FC, SC, LC, SMA, ST (Not Included)
Cable Length	1.5 m
Electronics Properties	
Analog Measurement Ranges[b]	500 nA, 50 µA, 5 mA
Measurement Units	W, dBm, A
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
Electronics Dimensions	65 mm x 20 mm x 10 mm
Total Weight	0.07 kg

a. Beam diameter > 1 mm

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

Precautions, Warranty and Conformity Information

These products are ESD (electro static discharge) sensitive and as a result are not covered under warranty. In order to ensure the proper functioning of a photodiode care must be given to maintain the highest standards of compliance to the maximum electrical specifications when handling such devices. The photodiodes are particularly sensitive to any value that exceeds the absolute maximum ratings of the product. 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 electro static discharges or other voltage surges when handling or using these devices.

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.

Category	Standards or description	
EC Declaration of Conformity - EMC	Meets intent of Directive 2004/108/EC[1] for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:	
	EN 61326-1:2006	EMC requirements for Class A electrical equipment for measurement, control and laboratory use, including Class A Radiated and Conducted Emissions [2,3,4]) and Immunity. [2,3,4])
	IEC 61000-4-2	Electrostatic Discharge Immunity (Performance Criterion B)
	IEC 61000-4-3	Radiated RF Electromagnetic Field Immunity (Performance Criterion A)
	IEC 61000-4-4	Electrical Fast Transient / Burst Immunity (Performance Criterion B)
	IEC 61000-4-6	Conducted RF Immunity (Performance Criterion A)
FCC EMC Compliance	Emissions comply with the Class A Limits of FCC Code of Federal Regulations 47, Part 15, Subpart B [2,3,4].	
EC Declaration of Conformity - Low Voltage	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Communities: Low Voltage Directive 2006/95/EC [5]	
	EN 61010-1:2010	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use - Part 1: General Requirements
U.S. Nationally Recognized Testing Laboratory Listing	UL 61010-1 2nd ed.	
Canadian Certification	CAN/CSA C22.2 No. 61010-1 3nd ed.	
Additional Compliance	IEC 61010-1:2010	
Equipment Type	Test and Measuring	
Safety Class	Class I equipment (as defined in IEC 60950-1:2001)	

[1] Replaces 89/336/EEC.

[2] Compliance demonstrated using high-quality shielded interface cables shorter than or equal to 3 meters.

[3] Emissions, which exceed the levels required by these standards, may occur when this equipment is connected to a test object.

[4] Minimum Immunity Test requirement

[5] Replaces 73/23/EEC, amended by 93/68/EEC