THORLABS

Optical Power Meter Interfaces

PM102, PM102A, PM102U
Operation Manual



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We aim to develop and produce the best solutions for your applications in the field of optical measurement techniques. To help us to live up to your expectations and constantly improve our products, we need your ideas and suggestions. We and our international partners are looking forward to hearing from you.

Thorlabs GmbH

Warning

Sections marked by this symbol explain dangers that might result in personal injury or death. Always read the associated information carefully before performing the indicated procedure.

Attention

Paragraphs preceded by this symbol explain hazards that could damage the instrument and the connected equipment or may cause loss of data.

Note

This manual also contains "NOTES" and "HINTS" written in this form.

Please read this advice carefully!

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1 General Information

The PM102x Optical Power Meter Interfaces measure the optical power of laser light or other monochromatic or near monochromatic light, detected by a connected sensor. The PM102x power meter interfaces are compatible with all Thorlabs “C-Series” Thermal Power Sensors, Thermal Position Sensors (S44xC Series) and respective custom sensors.

To flexibly integrate the PM102x into a setup, the PM102x models offer different electronic interfaces for instrument control and output:

- PM102: USB port and DA-15 connector
- PM102A: USB port (Input and Output) and SMA analog interface (Output only)
- PM102U: USB port only

The USB port features a fixture for secure connection of the cable to the housing.

For the PM102U and PM102A power meters, instrument control and power supply are facilitated via the USB port. The PM102 can alternatively use the DA-15 interface for instrument control and to connect a power supply. Further, the PM102 can even be controlled via an external micro-controller, supplied by the customer. For more information on the special features of the PM102x models, please see the table PM102x Model Comparison below.

For instrument control and data analysis through a connected PC, tablet or laptop, Thorlabs offers the Optical Power Monitor (OPM) software, available for download. When connected to a PM102x, thermal sensors can be calibrated using the OPM software. Alternatively, the user can write custom made software. For information on driver and SCPI commands, please refer to the manual WriteYourOwnApplication (WYOA) for the PM102x.

These features allow for maximum flexibility to integrate the instrument in test and measurement systems and a wide range of industrial and scientific applications in Manufacturing, Quality Control, Quality Assurance, and R&D for stationary and field use.

Attention

Please find all safety information and warnings concerning this product in the chapter Safety in the Appendix.

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1.1 PM102x Model Comparison

	PM102	PM102A	PM102U
USB Connector and Operation	√	√	√
SMA Output Connectors		√	
DA-15 Universal Connector	√		
RS232 Operation	√		
Analog Output Operation	√	√	
Autonomous Operation to Analog Output	√	√	
Sensitivity Configurable Analog Output	√	√	
UART Operation	√		
2 Auxiliary I/O ports	√		
NTC Input	√		
Power Supply +5V to +36V	√		

Table 1

1.2 Ordering Codes and Accessories

PM102	Power Meter Interface with DA-15 Connector; USB, RS232, or UART Operation. Digital or Analog Signal Output; Two Auxiliary I/O Ports; NTC Input; USB Interface for Control and Power Supply.
PM102A	Power Meter Interface with SMA Connectors for Analog Output; USB Interface for Control and Power Supply.
PM102U	Power Meter Interface with USB Connector and USB Operation for Control, Read Out, and Power Supply.

Included Accessories:

The PM102x Power Meters include certain cables. Further cables are recommended in Optional Accessories.

PM102:	DA-15 Connector and Connector Housing USB Cable, Type A to Mini B, with locking screw, 1.5m
PM102A:	USB Cable, Type A to Mini B, with locking screw, 1.5m
PM102U:	USB Cable, Type A to Mini B, with locking screw, 1.5m

Optional Accessories:

To run the PM102x power meter, additional cables or mounting devices may be required.

Cables

- PM102: Cable to attach to the provided DA-15 connector housing.
- PM102A: SMA cable: Please provide a cable with a SMA connector to operate the PM102A. Thorlabs offers a variety of SMA connector cables.

Mounting

- Horizontal Mounting Clamp (ECM225) to mount the PM102x onto a post.
- Vertical Mounting Clamp (ECM100) to mount the narrow side of the PM102x onto a post.
- Double Sided Horizontal Mounting Clamp (EPS225) to securely mount two devices on top of each other.

Please visit our homepage http://www.thorlabs.com for various accessories like power and thermal sensors, fiber adapters, posts and post-holders.

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1.3 Requirements

Hardware Requirements

PM102: Please provide an appropriate cable to be attached to the DA-15 connector.

PM102A: Please provide appropriate cables to connect to the SMA ports.

Software Requirements

All models of the PM102x can be run with the Thorlabs' OPM software. Please see the requirements for the OPM on the website.

Sensor Requirements

Thorlabs C-Series Sensors

The PM102x supports all Thorlabs C-Series thermal power and position sensors. The C-Series can be easily identified by the red connector-housing of the DE-9 connector, compared to older versions of Thorlabs power sensors.

Please refer to the chapter Connecting a Power Sensor on how to use older Thorlabs sensors or custom sensors.

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2 Getting Started

Please inspect the shipping container for damage. Please do not cut through the cardboard. You might need the box for storage or for returns.

If the shipping container seems to be damaged, inspect the contents for completeness and test the PM102x mechanically and electrically. Keep the container for storage or in order to return the product in case of future problems.

Verify that you have received the following items within the package:

2.1 Parts List

1. PM102x Optical Power Meter Interface
2. USB Cable, Type A to Mini B, with Locking Screw, 1.5 m
3. PM102: DA-15 Connector and Connector Housing
4. Quick Reference
5. Certificate of Calibration

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3 Operating Instructions

3.1 How To

This chapter describes how to install the PM102x for standard measurements.

3.1.1 PM102x Setup

- Download and install the Optical Power Monitor software on the device that will be used to control the power meter interface (PC, laptop or tablet).

  Note

  Install the software prior to connecting the power meter interface to the PC (see Software).
- Connect the PM102x to a PC or other power source via the USB port.
  - The PM102 accepts external power supplies with 5 V to 36 V via the DA-15 interface. When connecting the USB port while using an external power supply via the DA-15 port, connecting the USB port will automatically switch to the 5 V power supply via USB.
  - The status LED for the power supply is yellow in USB mode and green when connected to an external power supply via the DA-15 connector.
- Connect the PM102x to a readout instrument (PC) using the USB cable or a matching cable for the respective output port (SMA or DA-15). For PM102A and PM102, please provide cables.
- Connect a suitable sensor to the PM102x.

  The sensor status LED indicates, when a sensor has been detected (green) or when no sensor or no recognizable sensor is connected (red).

  The Power Meter is now ready for operation and is recognized by the OPM software.

Note

For detailed instructions on controlling the PM102x through the OPM software, please download the OPM manual.

3.1.2 Connecting a Power Sensor

The PM102x supports all Thorlabs C-Series thermal power and position sensors, that can be identified by the red connector-housing of the DE-9 connector, compared to older versions of Thorlabs power sensors. Sensor type and calibration data are saved in the non-volatile memory of the DE-9 connector. Upon connection, this information is automatically sent to the PM102x and to the control device and software. The software will automatically recognize the sensor.

To plug-in or remove a sensor, slightly press on the two bolts in the connector housing, that fix it by tension.

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DE-9 connector

Sensors can be hot-swapped to the power meter interface. After recognizing a new valid sensor, the type and calibration data will be downloaded to the power meter interface in approximately 2 seconds and the unit is ready to operate with the new sensor.

Note

Older Thorlabs Sensors without a DE-9 connector

The PM102x will **NOT** automatically recognize sensors lacking a DE-9 connector, as for the case of the 'A' and 'B' series. Please contact Thorlabs for an upgrade of old sensors with DE-9 connectors.

Note

Custom Sensors

To use sensors without a DE-9 connector, manufactured by Thorlabs or else, the user may provide an appropriate adapter. To build the adapter, refer to the Pin-out of the DE-9 connector shown in the Appendix. The adapter will per default automatically be recognized by the application Optical Power Monitor as "Photodiode adapter". The sensor type can then be adjusted in the software.

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3.2 Power Meter Interface Features

PM102x optical power meters offer full functionality to process signals from compatible thermal power or position sensors to be displayed and analyzed on a connected PC.

PM102x general features

- All PM102x models have a non-volatile memory which prevents power meter settings from being lost upon shutting down or rebooting.
- A fast readout rate of 1 kilo-sample per second permits online signal monitoring.
- Finely graduated thermal power ranges permit optimal resolution for thermal power measurements.
- A Reset Button allows quick rebooting of the micro controller.
- The PM102x is powered either via the USB interface or via the DA-15 interface. A status LED indicates appropriate connection to a power supply.
- All PM102x models support the thermal position sensors S440C and S442C.

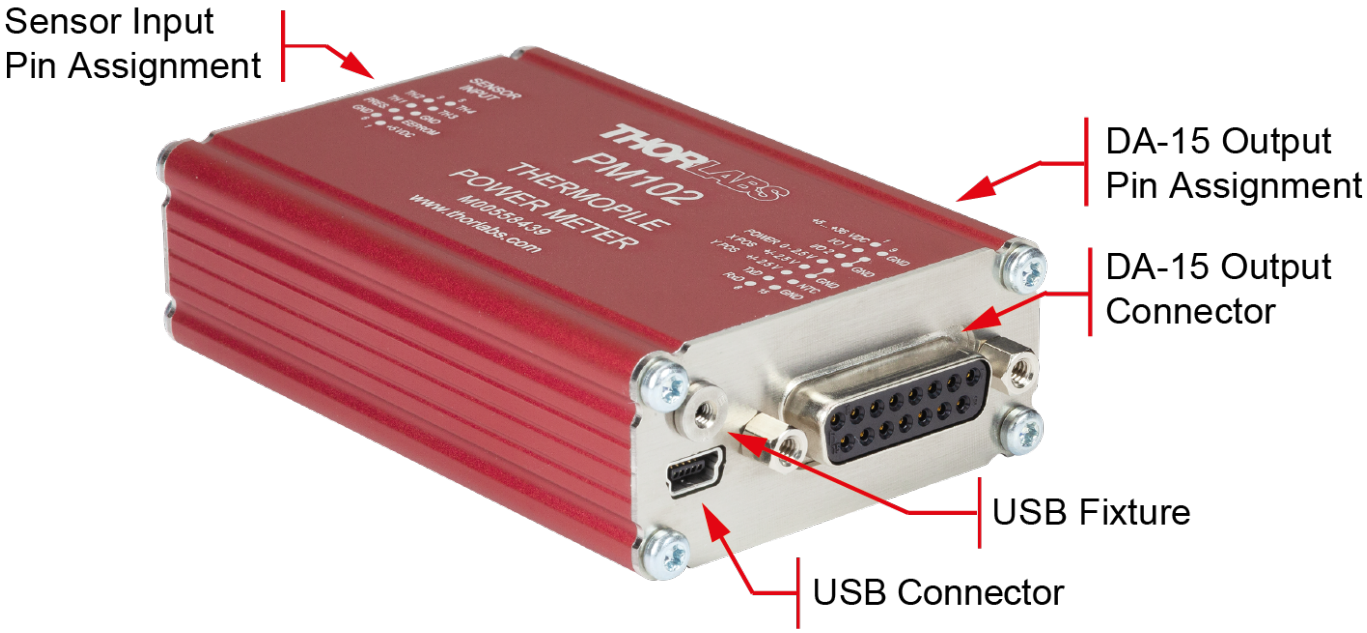
Beyond the above functions, the group of PM102x models offer individual electrical interfaces for integration into different systems in industrial and scientific applications. The different electrical interfaces come with further functions, described in the following chapters.

3.2.1 PM102x Sensor Connector

All models of the PM102x have the same connector shown here to the left side. The Pin assignment is engraved on the front of the PM102x.



3.2.2 PM102



PM102 Special Features

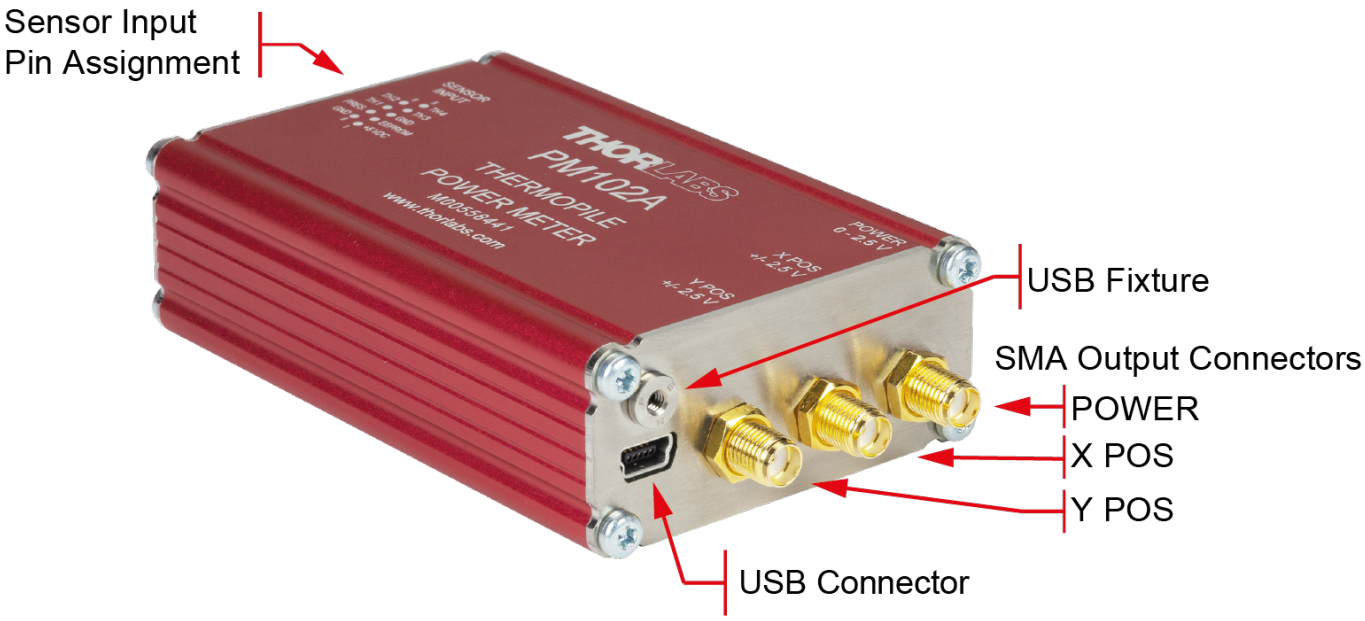
The PM102 features a number of additional options, due to the DA-15 output connector.

The PM102 is per default configured to RS232 configuration (+/- 5 V voltage level). This can be changed to a UART configuration (0/5 V voltage level) so that the PM102 can be accessed by external micro-controllers for instrument control and data export. The PM102 can also be adjusted to accommodate micro-controllers using 3.3 V.

1. DA-15 Interface
2. Two Auxiliary I/O ports
3. NTC input
4. Three Analog Output Ports
5. Autonomous Operation to Analog Output
6. Optional Use of 5 V - 36 V Power Supply
7. RS232 Operation
8. Adjustable Baud Rate via USB or Serial Communication (SCPI commands); The default BAUD Rate is 115200 Bit/s.
9. UART Operation (i.e. for Control via an External Micro-Controller)
10. Instrument Control using SCPI commands (Serial Communication)
11. Power Meter Control and Output via USB

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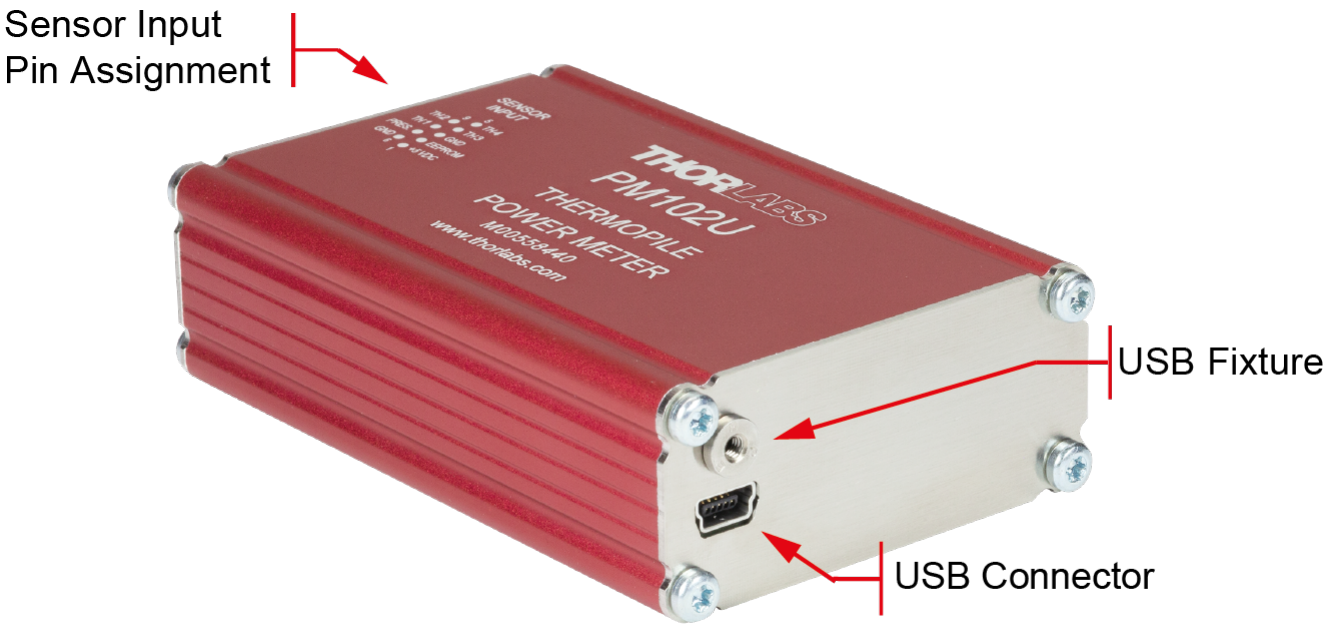
3.2.3 PM102A



PM102A Special Features

1. Autonomous Operation to analog output
2. Three Analog Output Ports: POWER for the sensor signal, X POS and Y POS for the position of the signal in X and Y on thermal position sensors.
3. Configurable Analog Output
4. Power Meter Control and Output via USB

3.2.4 PM102U



PM102U Special Features

- Power Meter Control and Output via USB

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3.2.5 USB Operation

All PM102x models can be run via the USB port. The USB interface on all PM102x models also serves to connect the power meter to a power supply and to update firmware of the PM102x. The PM102U uses the USB interface as the only port for control and output.

Note

In case a USB communication is established in addition to the DA-15 connection, PM102 switches to USB-Mode and the DA-15 serial interface becomes inactive. Only after actively closing the USB connection, the serial communication is reestablished.

When switching the PM102 from USB to RS232 operation or UART operation, the PM102 uses the DA-15 interface for control and output.

3.2.6 RS232 Operation

The PM102 can be operated with serial communication via RS232.

Please use a RS232 standard protocol for RS232 communications. For questions, please contact our engineers at Thorlabs.

Please set up the port as follows:

Parameter	Setting
Baud Rate	115.200 Bit/s (default) Supported range of Baud Rate: 9.600 and 230400 Bit/s
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None
Termination Character	LF (x0A; \n). The termination character needs to be enabled.

Note

PM102:

To operate the PM102 via RS232, RxD, TxD, and GND need to be wired from the DA-15 connector to a 9 Pin female connector to perform the connections.

PM102 DA-15 Pin	Female DE-9 Pin (PC)
Pin7: TxD	Pin2: RxD
Pin8: RxD	Pin3: TxD
Pin15: GND	Pin5: GND

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3.2.7 UART Operation

The PM102 is delivered in RS232 operation but can be switched to UART operation.

UART dependent PM102 functions:

The PM102 may need to be switched from RS232 to UART operation when using an external micro controller for PM102 control. In RS232 operation the PM102 uses voltage levels of +/-5 V, while in UART mode the voltage level is shifted to 0/5 V. The PM102 can also be adjusted to accommodate micro-controllers using 3.3 V. When switched to 3.3 V, UART operation is tolerant for 5 V input signal.

For instructions on how to change the voltage level for UART operation, please refer to the document Write-Your-Own-Applications (WYOA) for PM102x.

For UART operation, please use standard protocols for UART communication and the SCPI commands listed in WYOA for PM102x.

3.2.8 Reset Button

This button reboots the internal micro controller of the PM102x. To press the button, please use a small device that will not break inside the instrument. All settings are saved due to the internal non-volatile memory.

3.2.9 Baud Rate

For PM102, the Baud rate can be adjusted from 9600 to 230400 Bit/s. This can be done either via the USB interface or via the serial interface using SCPI commands or driver functions. Please see the document Write-Your-Own-Applications (WYOA) for PM102x. The default baud Rate is 115200.

Note

After adjusting the Baud Rate via RS232 or UART, close the RS232 or UART connection and reconnect with the desired Baud Rate in order for the Baud Rate to communicate it via RS232/UART. This is not required for operation via USB.

3.2.10 Non-Volatile Memory

All PM102x models have an internal non-volatile memory for all settings (i.e. wavelength setting, ranging, analog output configuration). The PM102x will start in the same configuration as prior to shut-down.

3.2.11 Auxiliary I/O Ports

PM102 with its DA-15 connector gives access to two configurable general purpose input/output (I/O) Pins (DA-15 Pins 2 and 3). Please see the Pin assignment in the appendix. These auxiliary I/O ports use 3 V logic for output and are tolerant for 5 V input signal.

The I/O port can be controlled or monitored via the instrument driver or through SCPI commands in custom made software.

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3.2.12 Analog Output

PM102A

The PM102A has three analog output ports with SMA output connectors: POWER, X POS, and Y POS.

The analog output POWER, delivers a range independent voltage which is DAC controlled. The output voltage is proportional to a configured value in V/W. This constant can be adjusted via the OPM software or the SCPI/driver commands for custom made software. The constant can be set in the OPM software under the Settings tab: POWER AO Responsivity. The analog signal is generated with a 16-bit DAC with an update rate of 1 kHz. The analog output voltage can range from -0 V to +2.5 V.

The output signal is wavelength corrected and corrected regarding the sensor calibration data.

The ports X POS and Y POS deliver a signal that is proportional to the position of the light signal on the sensor. X POS delivers the x-axis signal and Y POS the y-axis signal. The analog output voltage can range from -2.5 V to +2.5 V. The ports X POS and Y POS are soley used for the positional information from thermal position sensors.

PM102

The PM102 has three analog outputs, POWER, X POS, and Y POS. The Analog Output ports provide the amplified thermal sensor voltage.

POWER: The port POWER (DA-15 Pin 4) delivers a range independent voltage which is **DAC controlled**. The output voltage is proportional to a configured value in V/W. This constant can be adjusted via the OPM software or the SCPI/driver commands for custom made software. The constant can be set in the Thorlabs software OPM under the Settings tab: POWER AO Responsivity. The signal of the port POWER is generated with a 16-bit DAC with an update rate of 1 kHz. The analog output voltage can range from -0 V to +2.5 V.

X POS and Y POS deliver a range independent voltage which is **DAC controlled**. The signal is proportional to the position of the light signal on the sensor. X POS delivers the x-axis signal and Y POS the y-axis signal. The analog output voltage can range from -2.5 V to +2.5 V.

The ports X POS and Y POS are soley used for the positional information from thermal position sensors.

3.2.13 Autonomous Operation to Analog Output

Power meters PM102 and PM102A can be run autonomously by only connecting a power supply and using analog output. In that case, no control device is required. Either one of the three analog ports needs to be connected for autonomous operation. By choosing the respective port, the user selects the output of the signal (POWER) or the X or Y positions (X-POS, Y-POS).

3.2.14 NTC Input

To monitor the temperature in a test environment, the PM102 has an NTC Input (DA-15 Pin 14) which allows connection of an NTC thermistor. To connect the ground of the TSP-TH, please use one of the GND connectors DA-15 Pin 10 through Pin13. The measurement range is 0.1 – 100 kΩ. The set range R0 and the bandwidth B for the NTC thermistor can be adjusted in the OPM software or through SCPI commands. The default settings are 10 kΩ and 3988 K to directly access the TSP-TH temperature probe. The measurement range with the PM102 is then -10 °C to 80 °C with the TSP-TH.

3.2.15 Power Supply

All PM102x models use the USB port for power supply. Please provide an appropriate connection to a PC or power bank.

Note

When operating the PM102 via the RS232 interface or completely autonomously via the analog output POWER, the unit can either be powered with 5 V via the USB connector or with any supply in the range from +5 V to +36 V via the DA-15 connector (Pin 1 and Pin 9 (GND)). As an external power supply, we recommend the DS5 5 VDC regulated power supply.

3.3 Software

The PM102x is operated remotely from a PC, laptop or tablet.

Thorlabs Optical Power Monitor (OPM) Software

The Thorlabs OPM software provides a Graphical User Interface to view, log, and analyze measurement data. Download the OPM software package from the Thorlabs website, via this link, through the software tab on the product website, or through searching for the product name within the Thorlabs software website.

All information on software installation, device control and data management software can be found in the software manual directly downloaded here.

Note

Do not connect the PM102x prior to software installation!

Attention

Exit all running applications on your PC as the installer may require a reboot of your PC during installation!

Custom Made Software

The PM102x can also be run using custom made software. For this, please refer to the document Write-Your-Own-Application (WYOA) for PM102x.

3.3.1 Software Requirements

All models of the PM102x can be run with the Thorlabs' OPM software.

Please find the requirements for the PC intended to be used for operation of the PM102x on the OPM website.

3.3.2 PM102x Specific Software Functions

When using a PM102 power meter interface, the latest version of the OPM software shows several power meter specific functions. To see details, please also visit the OPM manual.

3.3.2.1 PM102 Specific Software Functions

1. When a PM102x power meter is connected, the OPM software recognizes NTCs in the devices section. The OPM now allows users to adjust settings, view measurement results and to integrate the NTC measurements results in long-time monitoring experiments. For more information, please see the OPM manual.

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2. When a PM102 is connected, it is possible to configure the analog ports POWER, X POS , and Y POS. There are two configuration options for these three ports: One for the port POWER and one for the two ports X POS and Y POS to configure the position in X and Y.

3.3.2.2 PM102A Specific Software Functions

When a PM102A is connected, it is possible to configure the analog ports POWER, X POS , and Y POS. There are two configuration options for these three ports: One for the port POWER and one for the two ports X POS and Y POS to configure the position in X and Y.

3.3.3 Sensor Calibration

All models of the PM102x can be used to calibrate signal detected by Thorlabs photodiodes to a known reference.

For this, the Sensor Calibration Tool within the software Optical Power Monitor is used. All the user needs to provide is a signal from a reference sensor. The signal from the sensor to be calibrated is then adjusted and the calibration along with the serial number of the calibrated sensor and the reference are saved in the power meter EEPROM and are retrieved by the software. Please see the manual of the OPM for more information.

3.3.4 Firmware update

To update the firmware of the PM102x, please download the latest firmware through the OPM website and use the Firmware Update Tool in the software Optical Power Monitor (OPM). For more information, please see the manual of the OPM.

3.4 Maintenance and Service

Protect the PM102x from adverse weather conditions. The PM102x is not water resistant.

Attention

To avoid damage to the instrument, do not expose it to spray, liquids or solvents!

The unit does not need a regular maintenance by the user. It does not contain any modules and/or components that could be repaired by the user himself. If a malfunction occurs, please contact Thorlabs for return instructions.

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4 Appendix

4.1 Technical Data

All technical data are valid at 23 ± 5°C and 45 ± 15% rel. humidity (non condensing)

	PM102	PM102A	PM102U
Interfaces			
Input/Output Interface	Mini USB, DA-15	Mini USB, Analog SMA	Mini USB
Operation Protocol	USB, RS232, UART Autonomous Operation	USB, Analog, Autonomous Operation	USB
Voltage Input (Thermopile Sensors)			
Connector	DE-9 (left housing side)		
Units	W, dBm, W/cm², V		
Measurement Range [1)]	9 Ranges; 2, 4, 10, 20, 40, 100, 200, 400, 1000 mV Ranges Selectable in W, Sensor Dependent		
Display Resolution	1 µV / Responsivity Value (V/W)		
Measurement Uncertainty	±0.5% Full Scale (10 mV - 1 V) ±1% Full Scale (2 mV, 4 mV)		
Analog Bandwidth	DC - 10 Hz, Dependent on Sensor and Settings		
Time Constant Correction Range	1 s - 30 s		
Wavelength Correction	Sensor Dependent; nm, (V/W)		
Beam Area Setting	Diameter 1/e² or Rectangular x,y		
Sensor Temperature Measurement			
Supported Temperature Sensor	Thermistor		
Temperature Measurement Range	-10° C to 120° C		
Sensor Power Supply			
Connector	DE-9 Pin 1		
Voltage	5V		
Maximum Current	100 mA		
Remote Interfaces			
Remote Interface Type 1	USB 2.0		
Connector	Mini-B USB		
Measurement Speed	Up to 1 kS/s		
Remote Interface Type 2	RS232		
Connector	DA-15 Pin 7/8	NA	NA
Baud Rate	9600 - 230400 Bit/s Default: 115200 Bit/s	NA	NA
Settings	N1S	NA	NA
Measurement Speed	Up to 200/s	NA	NA
Analog Output, Configurable			
Number of Analog Outputs	3	3	NA
Connector	DA-15 Pin 4, 5, 6	SMA	NA
Signal	Power (configurable in V/W), X-Position & Y-Position (configurable in V/µm)	Power (configurable in V/W), X-Position & Y-Position (configurable in V/µm)	NA

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	PM102	PM102A	PM102U
Voltage Range	Power: 0 to 2.5 V; Positions: -2.5 V to +2.5 V	Power: 0 to 2.5 V; Positions: -2.5 V to +2.5 V	NA
Accuracy	±1%	±1%	NA
Bandwidth	1 kHz	1 kHz	NA
Auxiliary Temperature Measurement			
Connector	DA-15 Pin 14	NA	NA
Supported Temperature Sensor	Thermistor NTC 0.1 - 100 kΩ, B-Value: 1000 - 9999 K	NA	NA
Temperature Measurement Range	-40 °C to +200 °C (NTC dependent)	NA	NA
Digital Control Pins I/O			
Connector	DA-15 Pins 2/3	NA	NA
Function	2 x GPIO	NA	NA
Power Management			
DC Input 1 / Connector	+5 VDC to +36 VDC / DA-15 Pins1/9	NA	NA
DC Input 2 / Connector	5 V / USB 2.0		
Power Consumption	1 W		
Display			
Display Type	None; External PC - Windows Application or Driver Set		
Display Screens	Windows Application Software Provided		
GUI Refresh Rate	1000 Hz (Dependent on PC and Settings)		
General			
Detector Compatibility	Thermal Sensors S400C & S300C Series Thermal Position Sensors (Max 1 V) Thermopiles (Max 1 V)		
Operating Temperature	0 °C to +40 °C		
Storage Temperature	-40 to 70 °C		
Dimensions (L x W x H)	3.80" x 2.25" x 1.00" (96.5 x 57.2 x 25.4 mm^3)	3.94" x 2.25" x 1.00" (100.0 x 57.2 x 25.4 mm^3)	3.68" x 2.25" x 1.00" (93.6 x 57.2 x 25.4 mm^3)
Weight	0.16 kg (0.35 lb)		

[1] The PM102x features an amplifier after each Thermal Sensor Input port TH1, TH2, TH3, and TH4 (Pins 4, 5, 8, and 9). They vary the measurement range. All 4 amplifiers are always on the same range.

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4.2 Pin Assignment Output Connector

PM102: PM102 has a universal DA-15 connector. The Pins are assigned as follows:

Pin	Function	Description
1	+5...36VDC	Pin for Alternative Power Supply with 5 VDC to 36 VDC
2	I/O 1	General Digital Input / Output port; 3 V logic (Output), 5 V tolerant for Input
3	I/O 2	General Digital Input / Output port; 3 V logic (Output), 5 V tolerant for Input
4	POWER	Software Configurable Analog Output; 0 V to 2.5 V
5	X POS	Software Configurable Analog Output for X-Position; -2.5 V to 2.5 V
6	Y POS	Software Configurable Analog Output for Y-Position; -2.5 V to 2.5 V
7	TxD	RS232; Connect to PC terminal RxD (PC DE-9 Pin2)
8	RxD	RS232; Connect to PC terminal TxD (PC DE-9 Pin3)
9	GND	Power Supply Ground
10	GND	Ground
11	GND	Ground
12	GND	Ground
13	GND	Ground
14	NTC	NTC Thermistor Input; Measurement Range 0.1 kΩ to 100 kΩ
15	GND	RS232 Signal Ground; Connect to PC Terminal Ground (PC DE-9 Pin5)

4.3 Pin Assignment of the Sensor Connector

The sensor connector allows the access of all Thorlabs “C-type" thermal power sensors. The power meter interface uses the sensor calibration data, stored in the sensor connector, to calculate the corresponding actual power levels.

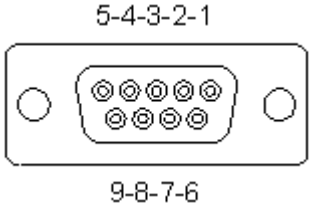
Additionally, the PM102x is capable to support custom made detectors. Please read the following instruction prior to connecting a self made sensor.

Note:

The PM102 features an amplifier after each Thermal Sensor Input port TH1, TH2, TH3, and TH4 (Pins 4, 5, 8, and 9). All 4 amplifiers are always on the same range.

Warning

Pin 2 is uniquely used for the EEPROM Digital I/O (memory in Thorlabs sensor heads) and MUST NOT be used. Connecting this Pin may cause malfunction of the PM102x.



Pin-out of the DE-9 female connector (female)

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Pin	Function	Description
1	+5 VDC	Power Supply +5 V; Max Current 100 mA from this Pin
2	EEPROM	Sensor Memory for the Calibration Data
3	GND	Analog Ground for Thermal Sensor , NTC
4	TH3	Thermal Sensor Input Quadrant 3
5	TH4	Thermal Sensor Input Quadrant 4
6	DGND	Digital Ground for EEPROM and 5V Output
7	PRESENT	Sensor Recognition. Connect via a 1kΩ – 10kΩ Resistor to Pin 3 (AGND) to Enable a Custom Sensor
8	TH1	Thermal Sensor Input Quadrant 1
9	TH2	Thermal Sensor Input Quadrant 2

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4.4 Safety

Attention

The safety of any system incorporating the equipment is the responsibility of the assembler of the system.

All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly as it was designed for.

The PM102x must not be operated in explosion endangered environments!

Only with written consent from Thorlabs may changes to single components be made or components not supplied by Thorlabs be used.

All modules including control inputs / outputs and the sensor must be connected with duly shielded connection cables.

Attention

The following statement applies to the products covered in this manual, unless otherwise specified herein. The statement for other products will appear in the accompanying documentation.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing Equipment Standard ICES-003 for digital apparatus. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/T.V. technician for help.

Thorlabs GmbH is not responsible for any radio television interference caused by modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Thorlabs GmbH. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.
The use of shielded I/O cables is required when connecting this equipment to any and all optional peripheral or host devices. Failure to do so may violate FCC and ICES rules.

Attention

Mobile telephones, cellular phones or other radio transmitters are not to be used within the range of three meters of this unit since the electromagnetic field intensity may then exceed the maximum allowed disturbance values according to IEC 61326-1.

This product has been tested and found to comply with the limits according to IEC 61326-1 for using connection cables shorter than 3 meters (9.8 feet).

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4.5 Certifications and Compliances

EU Declaration of Conformity

in accordance with EN ISO 17050-1:2010

We: Thorlabs GmbH

Of: Münchner Weg 1, 85232 Bergkirchen, Deutschland

in accordance with the following Directive(s):

2014/30/EU	Electromagnetic Compatibility (EMC) Directive
2011/65/EU	Restriction of Use of Certain Hazardous Substances (RoHS)

hereby declare that:

Model: ***PM102x***

Equipment: ***Power Meter for Thermal Power and Position Sensors***

is in conformity with the applicable requirements of the following documents:

EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013

and which, issued under the sole responsibility of Thorlabs, is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:

does not contain substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.

Signed:  *On:* 05 November 2019

Name: Bruno Gross

Position: General Manager

EDC - PM102x -2019-11-05

CE

4.6 Return of Devices

This precision device is only serviceable if returned and properly packed into the complete original packaging including the complete shipment plus the cardboard insert that holds the enclosed devices. If necessary, ask for replacement packaging. Refer servicing to qualified personnel.

4.7 Manufacturers Address

Manufacturer Address Europe
Thorlabs GmbH
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D-85232 Bergkirchen
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Fax: +49-8131-5956-99
www.thorlabs.de
Email: europe@thorlabs.com

EU-Importer Address
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Fax: +49-8131-5956-99
www.thorlabs.de
Email: europe@thorlabs.com

4.8 Warranty

Thorlabs warrants material and production of the PM102x for a period of 24 months starting with the date of shipment in accordance with and subject to the terms and conditions set forth in Thorlabs' General Terms and Conditions of Sale which can be found at:

General Terms and Conditions:

https://www.thorlabs.com/Images/PDF/LG-PO-001_Thorlabs_terms_and_%20agreements.pdf

and

https://www.thorlabs.com/images/PDF/Terms%20and%20Conditions%20of%20Sales_Thorlabs-GmbH_English.pdf

4.9 Copyright and Exclusion of Liability

Thorlabs has taken every possible care in preparing this document. We however assume no liability for the content, completeness or quality of the information contained therein. The content of this document is regularly updated and adapted to reflect the current status of the product.

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Please refer to the general terms and conditions linked under Warranty.

4.10 Thorlabs Worldwide Contacts and WEEE Policy

For technical support or sales inquiries, please visit us at
https://www.thorlabs.com/locations.cfm for our most up-to-date contact information.



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Thorlabs 'End of Life' Policy (WEEE)

Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return “end of life” Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges. Eligible units are marked with the crossed out “wheelie bin” logo (see right), were sold to and are currently owned by a company or institute within the EC, and are not dissembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. “End of life” units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site. It is the users responsibility to delete all private data stored on the device prior to disposal.



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