

# ASA Beam Profile

Photodiode Power Meter Bundle

**PMB-101**



## About Us

In order to design and manufacture programmable optometrical, optomechanical and optoelectronic devices, the science-based company, ASHA Beam Profile, was established in 2016.

ASHA has been able to design a wide range of devices, relying on indigenous capability and knowledge. Also, since being calibratable is essential for measuring equipment, clients can carry out their periodical calibration.

## Field of activity

The main field of activity of this company is the design and production of laser, optics and photonics equipment and can be categorized in the following topics:

- » Diode laser driver
- » Laser diode stabilizer
- » Laser Parameters measuring equipment such as Power Meter, Beam Profiler, and Ultra-fast Detector
- » Lithographic masks
- » Linear positioner with stepper motor driver
- » Calibration of Power Meters and beam profilers
- » Design and production of software to facilitate the use of electro-optic and optomechanical programmable equipment



## **Main features**

### **Introduction**

Measuring the output of light sources is very important. For example, the optical power of medical lasers is very sensitive and can cause irreparable damage if the function of the device goes out of its proper range. In experimental and research applications, it is always necessary to measure the output of laser sources. In addition to the above, it is crucial to pay special attention to the necessity of calibration of industrial and military laser equipment.

Hence, the semiconductor power meter is designed for high precision laser applications. Productions of this company can well meet the needs of the scientific and industrial community in the field of power metering.

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## Features

- » Direct connection to the multimeter with a special cable (depends on order)
- » Ability to operate in 12 different wavelengths from 350 nm to 1100 nm (depends on order)
- » Adjustable for desired light sources in the specified wavelength range (depends on order)
- » Able to have specific Gain for required scale (depends on order)
- » Measuring the power of coherent optical sources
- » Measuring the power of continuous light sources
- » Possibility to remove background radiation and photodiode dark current (depends on order)
- » Internal rechargeable battery for portable use

## Applications

- » Study incident and reflected beam power and qualify light sources
- » Study the effect of environmental changes on laser sources performance
- » Study the variation of power when passing through (transparent) environments
- » Examining the quality of lenses and optical windows
- » Measure the intensity of reflection/passing beam from different surfaces

**Warning!** With regard to the items listed in the requirements section, to maximize the accuracy of the device, it is strongly recommended to connect the power meter earth to the standard one.



## Technical Features

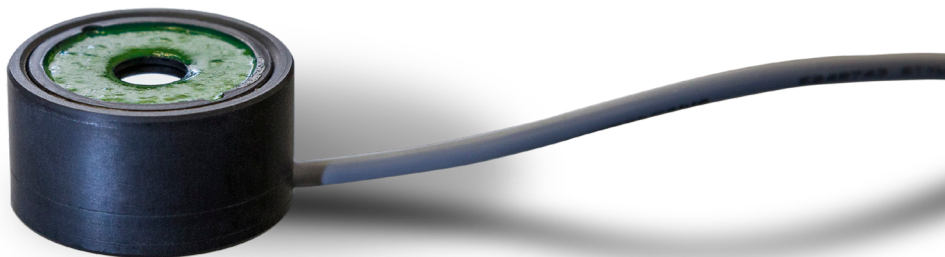
Item	Min	Typ	Max	Unit
Input Voltage	4.75	5	5.25	V
Input Current	60	250	500	mA
Battery	-	<2000	-	mAh
Battery Life	-	20	-	h
Charge Time	-	5	-	h
Wavelength Range	355	-	1064	nm
Optical Power Working Range*	0.01	-	240	mW
Display Power Range	0.1	-	199.9	mW
Measurable Wavelengths**	355, 405, 450, 532, 633, 650, 780, 808, 850, 970, 1064			nm
Measurement Uncertainty	$\pm 5$			%

\* Measuring power in the range of 10 mW to 240 mW is possible If connect 5.5 digit voltmeter with 1 uV accuracy to output.

\*\* Maximum FWHM for console display should be  $\pm 5$  nm and for voltmeter output should be  $\pm 1$  nm.

*Note Console output voltage is equal to one-tenth of optical source power. So 1 V in output is equal to 100 mW power of the optical source.*

More Spec.		Discription
Dimention	Detector	35x35x18.5 mm <sup>3</sup>
	Console	180x165x70 mm <sup>3</sup>
Weight	Detector	< 200 gr
	Console	< 1000 gr
Detector Connection		DB9
Output Connection		BNC
Active Detector Area		10x10 mm <sup>2</sup>
Input Aperture		Ø9 mm
Display		2000 counts - 7segment



*Figure 1. Photodiode Power Meter Sensor with Annular UV Viewing Target*



*Figure 2. Photodiode Power Meter Console - Front View*



*Figure 3. Photodiode Power Meter - Back View*



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## Power Meter Parts

### Available Accessories

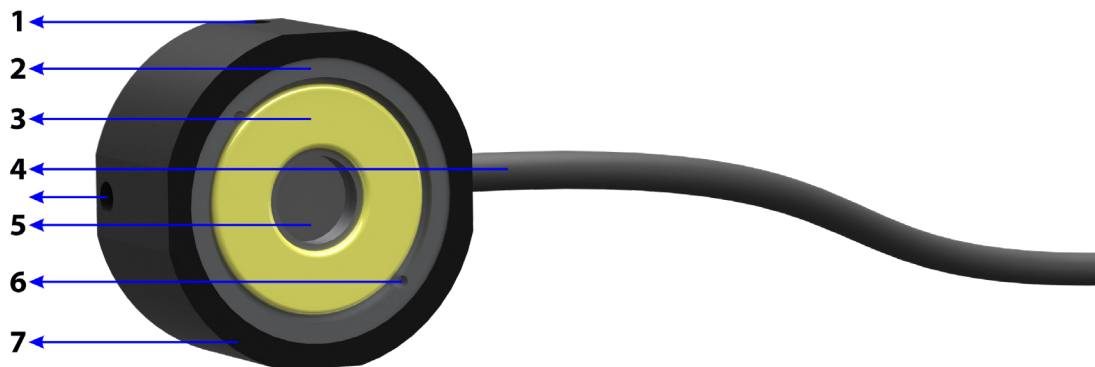
Please make sure that all accessories are available for the box in your first use.

» Photodiode Sensor	x 1
» Dust Cap	x 1
» Photodiode Power Meter Console	x 1
» User Manual*	x 1
» 5V Power Supply	x 1
» Multimeter Connector Cable	x 1
» M4 Screw	x 2

\* Digital version of this user manual is available by scanning the QR-code under the console.

## Detector Parts

1. M4 screw for vertical aligning
2. Sensor Cap(if open, guarantee void)
3. Visible spectrum detector (depends on order)
4. Connector cable
5. M4 screw
6. Input aperture(Optical Filter)
7. Cap furrow
8. Anodised Aluminum body

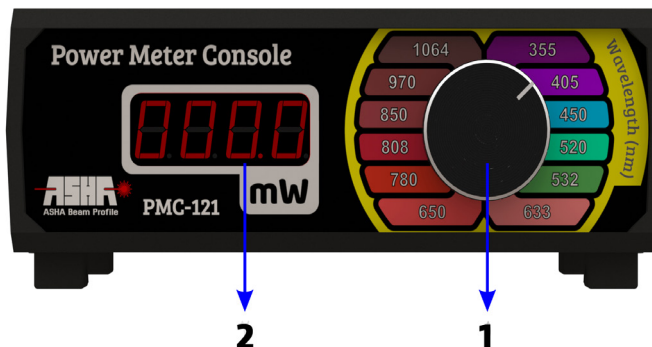


*Figure 4. Semiconductor Power Meter Sensor - Front View*



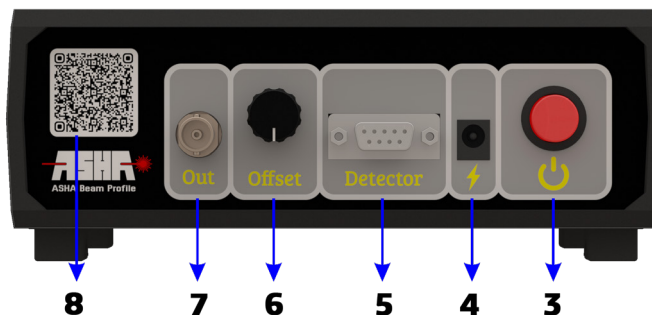
## Console Parts

1. Wavelength selector
2. 4 digits display for reporting power



*Figure 5. Front parts of photodiode power meter console*

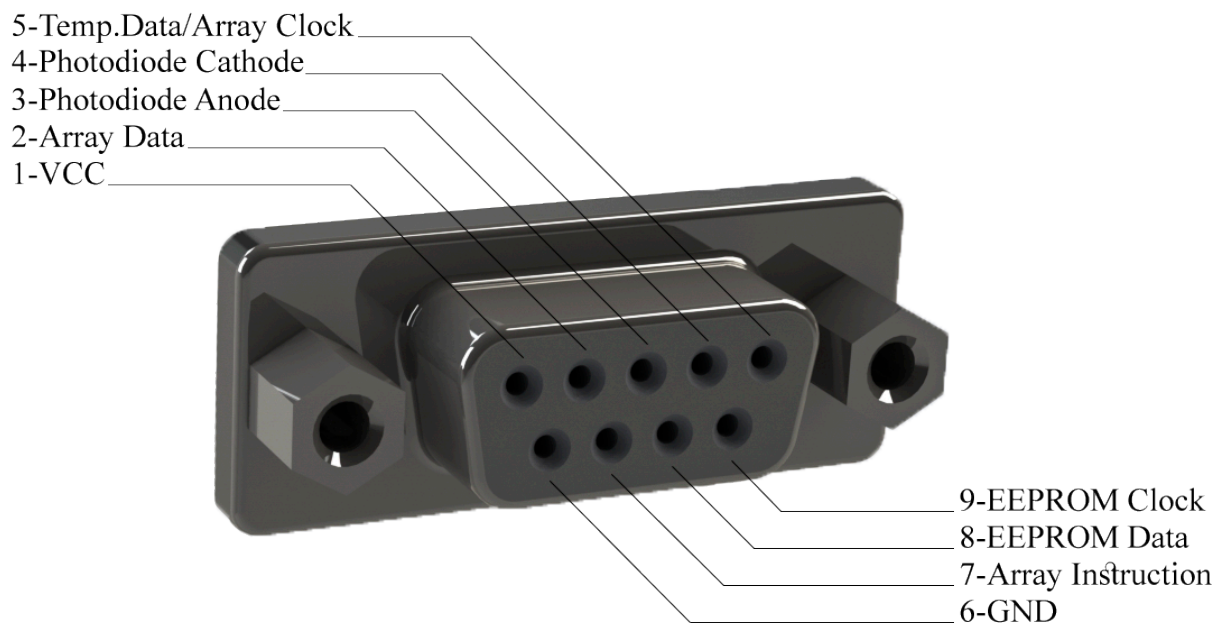
3. ON/OFF Key & Battery status LED
4. Input Power
5. Detector connector
6. Offset null volume (depends on order)
7. Output (BNC)
8. To download datasheet scan this QRcode



*Figure 6. Back parts of photodiode power meter console*



## Pinout



*Figure 7. Photodiode Sensor Pinout*



## Setup

### Safety

It should be noted that all safety tips in this manual are only useful when used in accordance with the conditions and for use under the mentioned situations. All parts should be connected to each other with a suitable and shielded cable. If you need to replace some parts of Asha's company with others, you need to inform ASHA's Technical support. If any changes in the components of the product are applied, it may lose its functionality. Due to the body reflection and optical filter, it is recommended that you turn off the light source or set it in low power mode when using in the desired location. It is also necessary to have an orthogonal beam on the sensor surface. This instrumentational device only will be calibrated when placed in the foam and special box according to the original packaging. It is recommended that you take alternative packaging from ASHA company if necessary.



## Preparation and Measurement

To set up the device, first it is necessary to put the sensor perpendicular to the beam axis with the proper connection at the desired location, and then connect the sensor cable to the device.

The device has a display on its front panel, and it's possible to directly display the result on the screen in addition to measuring through the multimeter. The output of this device, according to the order, is able to be calibrated for required wavelengths, so that the output voltage of the device reports the exact amount of beam power.

If you want to measure power using a voltmeter, using the supplied cable, connect the analog output of the device (BNC port) to the corresponding BNC cable, then connect the black probe to the COM port and the red probe to the voltmeter. Then turn on the device by using the On/Off key. If the device has enough battery, the display on the front panel of the console will turn on. Otherwise, connect the adapter to the input power connector. In this case, the red light turns on on the on/off key, which means that the battery is charging and you can use the console at the same time. When the battery is fully charged, the red light will turn off and you can unplug the adaptor from the console.

This device can measure 12 wavelengths specified in the technical table. To prepare the device to measure the desired wavelength, turn the selector and select the desired wavelength. For the user's convenience, the wavelengths of the device with the corresponding approximate color are indicated symbolically on the front panel. Ob-



viously, the incorrect wavelength selection results in wrong reports. In the end, turn on the beam source or remove the obstacle and measure the beam.

One of the features of this product (according to the order) is the offset setting, which can be used to remove the background radiation and then measure the absolute power of the beam source. To do this, use the offset knob on the back panel of the device and rotate the knob to apply the desired offset according to the application. One of the important applications of this feature is the removal of the background radiation from the end result, which is very useful in environments with unwanted background radiation.



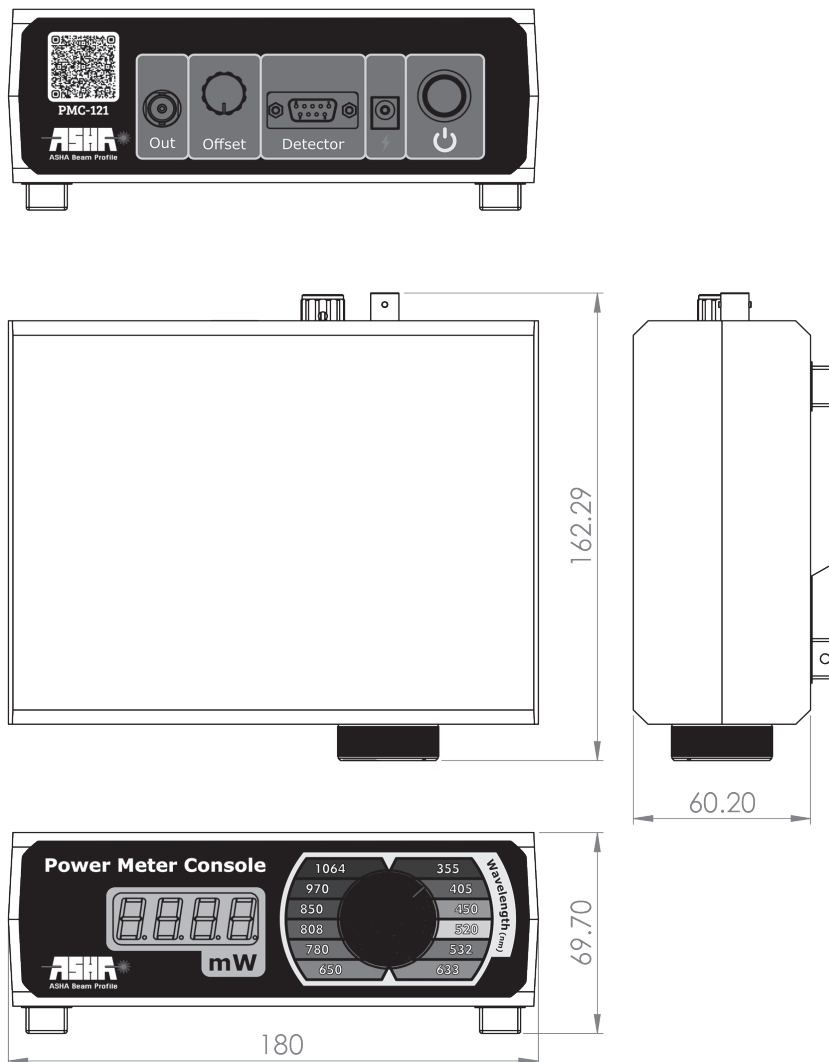
## Requirements

- » High precision analog or digital voltmeter (5.5Digits)
  - » Appropriate Power Supply (Available in Package)
  - » Standard ground connection (Due to the high sensitivity of the sensor, if there is no proper ground connection, the environmental noise will greatly affect the sensor performance.)
- It is necessary to mention that this power meter is very precise and sensitive and due to the precision the device output (listed in the table), in order to use full capabilities of the device, it is recommended to use voltmeters with the accuracy better than  $100\mu\text{V}$ .

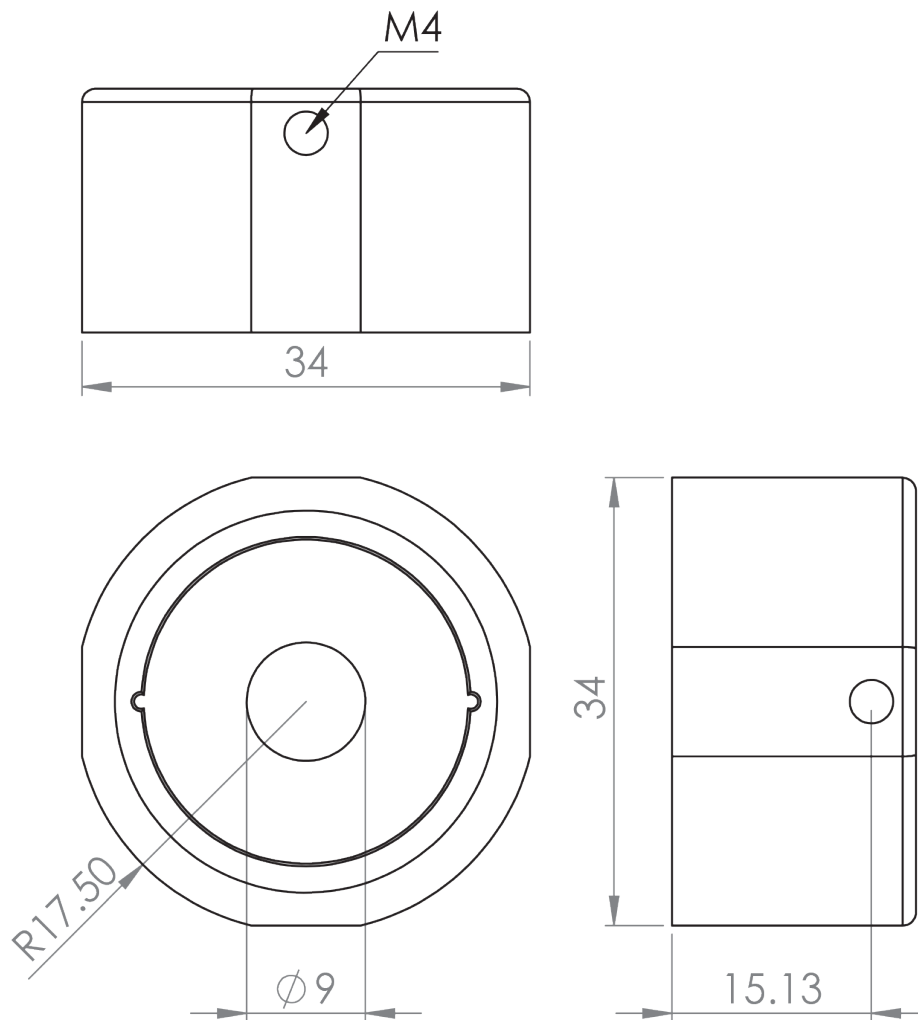




## Drawings



**Figure 8. Photodiode Power Meter Console Dimensions**



*Figure 9. Photodiode Power Meter Detector Dimensions*



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