

## POWER METERS

# 1100/1600

### PM-1100 and PM-1600

R&D AND MANUFACTURING



**Pinpoint accuracy, wide dynamic range, high resolution and excellent linearity. The works.**

- Excellent linearity of  $\pm 0.015$  dB
- Choice of one or two detectors
- Easy-to-use menu-driven display
- Wide-area detector for non-connectorized component characterization



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Telecom Test and Measurement

# EXFO

EXPERTISE REACHING OUT

# Accurate, Automated Measurements

The PM-1100 Power Meter and PM-1600 High-Speed Power Meter deliver accurate power measurements over a wide dynamic range along with high resolution and excellent linearity. Choose them for automatically measuring discrete values such as insertion loss or, alternately, for continuous monitoring and data acquisition. These stand-alone power meters provide exceptional performance, flexibility, user-friendliness and extensive integration capabilities.

## Ease of Use, Engineered

EXFO's PM-1100 and PM-1600 were designed with the user in mind. A menu-driven interface guides you through the operation, displaying results clearly. Control your unit remotely with the GPIB and RS-232 interfaces and control codes from any compatible PC or test station.



*Use the BFA-3000 Universal Bare-Fiber Adapter with the PM-1600W High-Speed Power Meter, and ensure repeatable measurements when testing non-connectorized components.*

## Excellent Specifications

The PM-1100 and PM-1600 Power Meters offer  $\pm 0.015$  dB linearity with a  $\pm 5\%$  absolute uncertainty and a 0.001 dB power resolution. Whether you are measuring absolute or relative power levels, count on efficient, highly accurate measurements.

Select the PM-1100 when measuring high power (up to 20 dBm) in the 750 to 1700 nm wavelength range. The sensitivity of this detector is  $-75$  dBm.

## Advanced Detector Option

Select the wide-area detector option (PM-16X3W) for highly repeatable in-process testing—long before they are connectorized—of passive components. This advanced detector option provides a fast stabilization time of 6 ms. Used with EXFO's BFA-3000 Universal Bare-Fiber Adapter, the PM-1600 High-Speed Power Meter (with 3 mm detector) enables efficient, pinpoint measurements in all bands.

## Fast System Monitoring

With its fast stabilization time and high sampling rate, the PM-1600 High-Speed Power Meter is ideal for system monitoring. To start your data acquisition and take full advantage of the high sampling rates, synchronize acquisitions using the two available trigger types.

## Flexibility Through Two Operation Modes

When using the PM-1600 High-Speed Power Meter in automatic gain range mode, power fluctuations of up to 89 dB will stabilize in 12 ms and a continuous rate of up to 256 samples per second can be produced. You can also manually select the gain range for individual channels in burst mode. In this mode of operation, the PM-1600 stabilizes in less than 1 ms, with rates as high as 4096 samples per second.

### Key Applications

The PM-1100 and PM-1600 power meters are ideal for the following applications:

- Periodic monitoring of one or many channels (the PM-1600 is available with two detectors)
- Absolute power measurement (dBm or W)
- Insertion loss measurement (dB or W/W)
- Linearity verification
- Component characterization
- System or subsystem monitoring
- Source stability measurement

Offset values are available for the PM-1100, while calibration factors can be applied to any wavelength on the PM-1600.

#### 1. Clear results

Easy-to-read display, with simultaneous power measurements for dual-detector models (PM-1623 and PM-1623W)

#### 2. Direct access to setup parameters

Perform nulling or adjust setup (power measurement units, reference, wavelength, gain scale, etc.) using the front panel keys

#### 3. Program mode

Programmable acquisitions of up to 1024 samples (PM-1600)

#### 4. Menu-driven interface

Easy control of advanced functions menus

#### 5. Interchangeable fiber-optic adapters (FOA)

Different types of connectors may be used



### SPECIFICATIONS<sup>a</sup>

| MODEL                                       | PM-1102X                               | PM-1613/1623                                    | PM-1613W/1623W                              |
|---|--|---|---|
| Number of detectors                         | 1                                      | 1/2   | 1/2   |
| Detector type                               | GeX                                    | InGaAs  | InGaAs                                      |
| Detector size (mm)                          | 2                                      | 1   | 3   |
| Wavelength range (nm)                       | 750 to 1700                            | 800 to 1700                                     | 800 to 1700                                 |
| Power range (dBm)                           | 20 to -75 <sup>b</sup>                 | 9 to -80 <sup>c</sup>                           | 8 to -70 <sup>c</sup>                       |
| Uncertainty (%)                             | ±5 <sup>d</sup><br>(10 dBm to -35 dBm) | ±5 <sup>e</sup><br>(0 dBm to -55 dBm)           | ±5 <sup>e</sup><br>(0 dBm to -50 dBm)       |
| Linearity <sup>f</sup> (dB)                 | ±0.015<br>(0 dBm to -35 dBm)           | ±0.015<br>(0 dBm to -55 dBm)                    | ±0.015<br>(0 dBm to -50 dBm)                |
| Noise (peak-to-peak) <sup>g</sup> (pW)      | –                                      | 3   | 20  |
| Power resolution <sup>h</sup> (dB)          | 0.001 (20 dBm to -35 dBm)              | 0.001 (9 dBm to -40 dBm)                        | 0.001 (8 dBm to -40 dBm)                    |
| Wavelength resolution (nm)                  | 1                                      | 0.01  | 0.01  |
| Stabilization time (ms)                     |  |   |   |
| automatic range                             |  | 12 (9 dBm to -80 dBm)                           | 6 (8 dBm to -70 dBm)                        |
| automatic range                             |  | 3 (9 dBm to -49 dBm)                            | 3 (8 dBm to -49 dBm)                        |
| fixed range (1 to 4)                        |  | 1   | 1   |
| Sampling rate (sample/s/channel)            |  |   |   |
| fast acquisition mode                       |  | up to 4096                                      | up to 4096                                  |
| continuous measurement mode                 | up to 40                               | up to 256                                       | up to 256                                   |
| Fiber type (µm)                             | 5/125 to 62.5/125                      | 5/125 to 62.5/125                               | 5/125 to 62.5/125                           |
| Analog output                               |  |   |   |
| bandwidth <sup>h</sup> (Hz) (ranges 1 to 6) | N/A                                    | 700 k; 700 k; 30 k; 30 k;<br>150; 150 (typical) | 50 k; 75 k; 5 k; 7 k;<br>1 k; 1 k (typical) |
| output voltage (V)                          |  | between 0 and 2.15 (typical)                    | between 0 and 2.15 (typical)                |
| output impedance (Ω)                        |  | 640 (typical)                                   | 640 (typical)                               |
| External trigger input voltage (V)          | N/A                                    | 0 to 5 (TTL)                                    | 0 to 5 (TTL)                                |

### General Specifications

|                   |                            |                                    |                                    |
|-------------------|----------------------------|------------------------------------|------------------------------------|
| Size (H x W x D)  | 117 mm x 222 mm x 333 mm   |                                    | (4 5/8 in x 8 3/4 in x 13 1/8 in)  |
| Weight            | 2.0 kg (4.5 lb)            | 2.8 kg (6.2 lb)                    | 2.8 kg (6.2 lb)                    |
| Temperature       | operating                  | 0 °C to 40 °C (32 °F to 104 °F)    | 0 °C to 40 °C (32 °F to 104 °F)    |
|                   | storage                    | -40 °C to 70 °C (-40 °F to 158 °F) | -35 °C to 70 °C (-31 °F to 158 °F) |
| Relative humidity | 0 % to 80 % non-condensing |                                    | 0 % to 80 % non-condensing         |

### Notes

- a. At 1310 nm (unless otherwise specified) with an FC/non-angled connector and a warmup time of 20 minutes (30 minutes for PM-16X3W), followed by an offset nulling.
- b. From 0 °C to 30 °C.
- c. From 18 °C to 32 °C.
- d. At 23 °C ± 1 °C with an FOA-322 connector adapter, between 1000 nm and 1650 nm. Add 1 % to uncertainty below 1000 nm and 3 % over 1650 nm.
- e. At 23 °C ± 1 °C with an FOA-322 connector adapter, between 1000 nm and 1640 nm. Add 1 % to uncertainty below 1000 nm and 6 % over 1640 nm.
- f. Averaged measurement at constant temperature in 0 °C to 40 °C range.
- g. Averaging time 0.25 s, observation time 50 s at 23 °C ± 1 °C, from 1200 nm to 1640 nm.
- h. Bandwidth corresponds to each electrical scale from the lowest to the highest gain.

**INSTRUMENTS DRIVERS**

LabVIEW™ drivers and SCPI commands

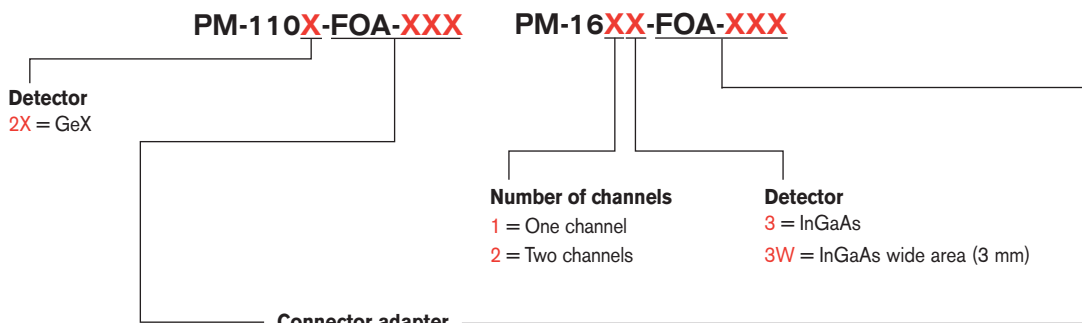
**REMOTE CONTROL**

GPIB (IEEE-488.1, IEEE-488.2) and RS-232.

**STANDARD ACCESSORIES**

User guide, 1 or 2 connector adapters, Certificate of Calibration, Certificate of Compliance and AC power cord

**ORDERING INFORMATION**



**Connector adapter**

- FOA-316 = SMA 906 low reflection
- FOA-322 = FC low reflection: FC, FC (/PC/SPC/UPC/APC, NEC-D3)
- FOA-328 = DIN 47256 (LSA) low reflection: DIN 47256 (/PC/APC)
- FOA-332 = ST low reflection: ST (/PC/SPC/UPC)
- FOA-340 = Diamond HMS-0, HFS-3 (3.5 mm) low reflection
- FOA-354 = SC low reflection: SC (/PC/SPC/UPC/APC)
- FOA-376 = FSMA HMS-10/AG, HFS-10/AG low reflection
- FOA-384 = Diamond HMS-10, HFS-13 low reflection
- FOA-396 = E-2000 low reflection: E-2000 (PC/APC)
- FOA-397 = LX.5
- FOA-398 = LC low reflection
- FOA-399 = MU low reflection
- FOA-3000 = Adapter for BFA-3000 (Universal Bare Fiber Adapter) (with 3 mm detector only)
- FOA-8100 = Utility adapter (with 3 mm detector only)

Examples: PM-1102X-FOA-399  
 PM-1623-FOA-316  
 PM-1623W-FOA-3000 with BFA-3000

**MT-RJ Connector Adapter**

For use with singlemode fiber on PM-16X3W, an FOA-93 connector adapter can be ordered separately (uncertainty is not guaranteed with the FOA-93).

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EXFO is certified ISO 9001 and attests to the quality of these products. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. All of EXFO's manufactured products are compliant with the European Union's WEEE directive. For more information, please visit [www.EXFO.com/recycle](http://www.EXFO.com/recycle). However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. **Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.** For the most recent version of this spec sheet, please go to the EXFO website at <http://www.EXFO.com/specs>. In case of discrepancy, the Web version takes precedence over any printed literature.

