## Product Features

- 2.5% accuracy
- <0.01 dB repeatability
- <0.006 dB polarization dependent response

### Remote Wavelength range of 800 nm to 1650 nm

Remote commands compatible with ILX FPM-8210 and Agilent 8163B

USB and GPIB remote interfaces

User upgradable firmware

LabVIEW® drivers

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### Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>FPM-8715</th>
<th>FPM-87107</th>
<th>FPM-8705</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wavelength Range:</strong></td>
<td>800 to 1650 nm</td>
<td>800 to 1650 nm</td>
<td>800 to 1650 nm</td>
</tr>
<tr>
<td><strong>Power Range:</strong></td>
<td>-70 to +20 dBm</td>
<td>-60 to +30 dBm</td>
<td>-85 to +1.5 dBm</td>
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<tr>
<td><strong>Accuracy</strong></td>
<td>±2.5%</td>
<td>±2.5%</td>
<td>±3.5%</td>
</tr>
<tr>
<td><strong>Polarization Dependent Response</strong></td>
<td>±0.006 dB</td>
<td>±0.006 dB</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Temperature Coefficient</strong></td>
<td>±0.2%/°C</td>
<td>±0.2%/°C</td>
<td>±0.2%/°C</td>
</tr>
<tr>
<td><strong>Linearity</strong></td>
<td>±0.02 dB</td>
<td>±0.02 dB</td>
<td>±0.02 dB</td>
</tr>
<tr>
<td><strong>Optical Measurement:</strong></td>
<td>Integrating sphere with detector</td>
<td>Detector</td>
<td>Detector</td>
</tr>
<tr>
<td><strong>Entrance Aperture:</strong></td>
<td>5 mm</td>
<td>5 mm</td>
<td>3 mm</td>
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<tr>
<td><strong>Numerical Aperture:</strong></td>
<td>&lt;0.4 NA</td>
<td>&lt;0.4 NA</td>
<td>&lt;0.4 NA</td>
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<tr>
<td><strong>Sensor Type:</strong></td>
<td>InGaAs</td>
<td>InGaAs</td>
<td>InGaAs</td>
</tr>
<tr>
<td><strong>Connector Types:</strong></td>
<td>FC, SC, LC, bare fiber, bare female</td>
<td>FC, SC, LC, bare fiber, bare female</td>
<td>FC, SC, LC, bare fiber, bare female</td>
</tr>
<tr>
<td><strong>Output Connector</strong></td>
<td>DB-26 High Density, male</td>
<td>DB-26 High Density, male</td>
<td>DB-26 High Density, male</td>
</tr>
<tr>
<td><strong>GENERAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Size:</strong></td>
<td>86 x 86 x 100 mm (3.4&quot; x 3.4&quot; x 3.9&quot;)</td>
<td>86 x 86 x 100 mm (3.4&quot; x 3.4&quot; x 3.9&quot;)</td>
<td>86 x 86 x 100 mm (3.4&quot; x 3.4&quot; x 3.9&quot;)</td>
</tr>
<tr>
<td><strong>Weight:</strong></td>
<td>0.98 kg; 2.15 lbs</td>
<td>0.98 kg; 2.15 lbs</td>
<td>0.98 kg; 2.15 lbs</td>
</tr>
<tr>
<td><strong>Power:</strong></td>
<td>90 - 126 VAC, 50/60 Hz</td>
<td>207 - 253 VAC, 50/60 Hz</td>
<td>207 - 253 VAC, 50/60 Hz</td>
</tr>
<tr>
<td><strong>GPIB Interface:</strong></td>
<td>207</td>
<td>207</td>
<td>207</td>
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<tr>
<td><strong>USB Interface:</strong></td>
<td>IEEE 488.2</td>
<td>IEEE 488.2</td>
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<tr>
<td><strong>Compliance:</strong></td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
</tr>
</tbody>
</table>

**NOTES**

1. Limit 46 dBm exposure to <1 minute to avoid thermal damage.
2. Reference Conditions: Input power level 10 mW continuous wave (CW), averaging time 1 s, ambient temperature 21°C ±3°C, humidity 15 - 85% non-condensing, spectral width of source < 14 nm FWHM, user setting of wavelength must correspond to actual source center wavelength ± 1 nm. Recommended calibration period 1 year.
3. Accuracy quoted for reference conditions of 21°C ±3°C. Assumes ±2% accuracy at the limits of the operating temperature range 0°C < T < 45°C due to temperature coefficients.
4. Wavelength must not be equal to any water vapor absorption line.
5. Polarization Dependent Response (PDR) is a variation in meter response associated with changes in input polarization state. Measured at constant wavelength (1580 nm) and power (~0.5 dBm).
6. Fiber Input Repeatability measured by the variation in response from removing and replacing a connectorized single mode fiber into the detector head. Does not include bare fiber adapter.
7. Linearity is the variation from an actual measurement to an expected measurement over decades of optical input power. Valid across range limits when measured in auto-range mode.
8. Adapters available for FC, SC, LC, and Bare Fibers.
9. Bare fibers can be supported with ILX Lightwave BF-820 or Agilent 81000BA bare fiber holders. ILX Lightwave BF-820 fiber holders are designed for fiber diameter 125 µm (220 µm and 900 µm buffer).
10. Low power range is measured by dark current in the detectors and is calculated as 3 times the SNR.
11. Measured in slow filter speed mode.

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The FPM-8220 Fiber Optic Power Meter combines accurate, repeatable power measurements with low polarization dependence in a simple easy to use instrument for R&D or manufacturing testing of fiber optic components and systems.

Interchangeable fiber optic power measurement heads deliver repeatable results for measurements up to +30 dBm over a wavelength range of 800 nm to 1650 nm. The FPM-8715 and FPM-87107 fiber optic power measurement heads use integrating sphere technology to virtually eliminate sensitivity to laser polarization state or fiber orientation. The FPM-8705 detector provides easy to use measurements with wide dynamic measurement range from -85 dBm to +1.5 dBm. Connectored, bare fiber, and ferrule only measurements are possible with a variety of adapters. ILX’s patented BF-820 Bare Fiber Holder provides easy fiber positioning for repeatable bare fiber measurements.

Designed for automated systems, the FPM-8220 combines precision measurement with USB 2.0 and GPIB IEEE488.2 computer interfaces. For virtual instrument programming, LabVIEW® instrument drivers are available free of charge and can be downloaded from the Newport website.

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**FPM-8220 Fiber Optic Power Meter**

*For information call 1-800-459-9459*

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Ilx Lightwave 

A Newport Corporation Brand 

31950 Frontage Road, Bozeman, MT  59715   FAX: 406-586-9405

www.newport.com/ilxlightwave
The FPM-8220 Fiber Optic Power meter and FMH-8700 Series Fiber Optic Measurement Heads were designed to provide precise fiber optic measurement in demanding test and measurement applications for fiber optic components. The FPM-8220 Fiber Optic Power Meter incorporates a low noise picocammeter capable of measuring over a wide dynamic range with high stability and repeatability necessary for precise measurement. Designed for production environments, the FPM-8220 Fiber Optic Power Meter incorporates an intuitive front panel and includes GPIB and USB as standard remote interfaces.

By combining the FPM-8220 with one of the FMH-8700 Series Fiber Optic Measurement Heads, the system provides better than ±2.5% accuracy with ±0.01dB repeatability for precise fiber optic component power measurement.

**EASE OF OPERATION**

The front panel features a large 7-segment LED display with integrated dot matrix display. The large 7-segment LED display provides easy viewing of measured power across the lab and displays power in dBm, mW, or reference from a previous setting. The dot matrix display can set wavelength, filter settings, and gain range, or bar graph. The front panel buttons are grouped by function for ease of setup.

**STORE AND RECALL INSTRUMENT SETTINGS**

For multiple test configurations, the FPM-8220 Fiber Optic Power Meter offers a store and recall feature. The store function allows you to save all the front panel settings for any given instrument configuration to a numbered bin. The recall function allows you to retrieve any of the saved configurations at any time through simple front panel button press or remotely through the GPIB and USB interfaces. An additional recall function allows the FPM-8220 to display the current connected measurement head’s information and date of calibration. The store and recall functions save time in instrument re-configuration for different manufacturing runs or R&D experiments.

**OPTICAL MEASUREMENT HEAD TO FIT YOUR APPLICATION**

The FMH-8700 Series Fiber Optic Measurement Heads have the calibration stored in the connector to allow rapid interchanging of measurement heads during different test setups. The measurement heads cover a wavelength range of 800nm to 1650nm with a power range of -85 dBm to +30 dBm.

**COMPATIBLE WITH A VARIETY OF FIBER OPTIC CONNECTORS**

ILX Lightwave adapters accommodate the most common fiber optic connectors. The change from bare to connectorized fiber is simple. The connector adapters locate the fiber ferrule in exactly the same place as the bare fiber end face, giving comparable results.

The patented BF-820 Bare Fiber Holder is designed to hold and position a common telecom fiber. Inside the BF-820, opposing V-guides facilitate correct fiber positioning. Outside, knurled finger grips enable single-handed maneuvering of the fiber holder.

**REMOTE INTERFACE**

Remote instrument operation is available on the FPM-8220 through an IEEE488.2 GPIB interface or USB 2.0 interface. All instrument controls and functions are accessible through the interfaces for easy remote programming and control in automated test systems where repeatable and accurate test sequencing, measurements, and data handling are required. The FPM-8220 can replace the FPM-8210 and Agilent 8163A in automated setups by providing compatible with FPM-8210 and related Agilent 8163A remote commands.

**PUT OUR EXPERTISE TO WORK**

ILX Lightwave is an industry leader in Photonic Test and Measurement. Our products are not only renowned for their reliability, quality, and value; they’re backed by industry-leading after sales support. For more information about the FPM-8220 and our complete family of optical power meters, call us today or visit our website at www.newport.com/ilxlightwave.

**ORDERING INFORMATION**

- FPM-8220-120V Fiber Optic Power Meter, 120V
- FPM-8220-220V Fiber Optic Power Meter, 220V
- FMH-8705 Fiber Optic Measurement Head, 1.5 dBm, InGaAs
- FMH-8715 Fiber Optic Measurement Head, 15 dBm, InGaAs
- BF-820 Bare Fiber Holder (requires CA-120)
- CA-120 Bare Fiber Adapter
- CA-150 SC Adapter
- CA-2201 LC Adapter
- CA-250 Bare Ferrule Adapter
- RM-143 Rack Mount Kit RV-143 Fiber Optic Measurement Head
- RM-144 Single Rack Mount Kit
- RM-145 Dual Rack Mount Kit

The BF-820 Bare Fiber Holder completely encircles the fiber prohibiting ambient light from interfering with power measurements.
PRECISION FIBER OPTIC MEASUREMENT

The FPM-8220 Fiber Optic Power meter and FMH-8700 Series Fiber Optic Measurement Head were designed to provide precise fiber optic measurement in demanding test and measurement applications for fiber optic components. The FPM-8220 Fiber Optic Power Meter incorporates a low noise picometer capable of measuring over a wide dynamic range with high stability and repeatability necessary for precise measurement. Designed for production environments, the FPM-8220 Fiber Optic Power Meter incorporates an intuitive front panel and includes GPIB and USB as standard remote interfaces.

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ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPM-8220-120V</td>
<td>Fiber Optic Power Meter, 120V</td>
</tr>
<tr>
<td>FPM-8220-220V</td>
<td>Fiber Optic Power Meter, 220V</td>
</tr>
<tr>
<td>FMH-8700</td>
<td>Fiber Optic Measurement Head, 1.5 dBm, InGaAs</td>
</tr>
<tr>
<td>FMH-8715</td>
<td>Fiber Optic Measurement Head, 15 dBm, InGaAs</td>
</tr>
<tr>
<td>BF-820</td>
<td>Bare Fiber Holder ( Requires CA-130)</td>
</tr>
<tr>
<td>CA-120</td>
<td>PC Adapter</td>
</tr>
<tr>
<td>CA-150</td>
<td>SC Adapter</td>
</tr>
<tr>
<td>CA-2601</td>
<td>LC Adapter</td>
</tr>
<tr>
<td>CA-260</td>
<td>Bare Ferrule Adapter</td>
</tr>
<tr>
<td>RM-143</td>
<td>Rack Mount Kit</td>
</tr>
<tr>
<td>RM-144</td>
<td>Single Rack Mount Kit</td>
</tr>
<tr>
<td>RM-145</td>
<td>Dual Rack Mount Kit</td>
</tr>
</tbody>
</table>

The BF-820 Bare Fiber Holder completely encircles the fiber, prohibiting ambient light from interfering with power measurements.

The BF-820 Bare Fiber Holder completely encircles the fiber, prohibiting ambient light from interfering with power measurements.
**Product Features**

- +2.5% accuracy
- <±0.01 dB repeatability
- <±0.006 dB polarization dependent response
- Wavelength range of 800 nm to 1650 nm
- Remote commands compatible with ILX FPM-8210 and Agilent 8163B
- USB and GPIB remote interfaces
- User upgradable firmware
- LabVIEW® drivers

The FPM-8220 Fiber Optic Power Meter combines accurate, repeatable power measurements with low polarization dependence in a simple easy-to-use instrument for R&D or manufacturing testing of fiber optic components and systems.

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Designed for automated systems, the FPM-8220 combines precision measurement with USB 2.0 and GPIB IEEE488.2 computer interfaces. For virtual instrument programming, LabVIEW® instrument drivers are available free of charge and can be downloaded from the Newport website.

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**Specifications**

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<tr>
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<th>FMH-87107</th>
<th>FMH-8705</th>
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<tr>
<td><strong>Wavelength Range:</strong></td>
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</tr>
<tr>
<td><strong>Power Range:</strong></td>
<td>-70 to +20 dBm</td>
<td>-60 to +30 dBm</td>
</tr>
<tr>
<td><strong>Damage Threshold:</strong></td>
<td>+40 dBm &lt; 1 mm</td>
<td>+40 dBm &lt; 1 mm</td>
</tr>
<tr>
<td><strong>Accuracy:</strong></td>
<td>±2.5% dB</td>
<td>±2.5% dB</td>
</tr>
<tr>
<td><strong>Polarization Dependent Response:</strong></td>
<td>±0.006 dB</td>
<td>±0.006 dB</td>
</tr>
<tr>
<td><strong>Noise:</strong></td>
<td>±0.01 dB</td>
<td>±0.01 dB</td>
</tr>
<tr>
<td><strong>Temperature Coefficient:</strong></td>
<td>±0.2%/°C</td>
<td>±0.2%/°C</td>
</tr>
<tr>
<td><strong>Linearity:</strong></td>
<td>±0.02 dB</td>
<td>±0.02 dB</td>
</tr>
<tr>
<td><strong>Optical Measurement:</strong></td>
<td>Integrating sphere with detector</td>
<td>Detector</td>
</tr>
<tr>
<td><strong>Entrance Aperture:</strong></td>
<td>5 mm</td>
<td>5 mm</td>
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<tr>
<td><strong>Numerical Aperture:</strong></td>
<td>&lt;0.4 NA</td>
<td>&lt;0.4 NA</td>
</tr>
<tr>
<td><strong>Sensor Type:</strong></td>
<td>InGaAs</td>
<td>InGaAs</td>
</tr>
<tr>
<td><strong>Connector Types:</strong></td>
<td>FC, SC, LC, bare fiber, bare ferrule</td>
<td>—</td>
</tr>
<tr>
<td><strong>Output Connector:</strong></td>
<td>DB-26 High Density, male</td>
<td>—</td>
</tr>
</tbody>
</table>

**FMH-87107**

- **Wavelength Range:** 800 to 1650 nm
- **Power Range:** -60 to +30 dBm
- **Damage Threshold:** +40 dBm < 1 min.
- **Accuracy:** ±100 pW
- **Polarization Dependent Response:** ±0.006 dB
- **Noise:** ±0.01 dB
- **Temperature Coefficient:** ±0.2%/°C
- **Linearity:** ±0.02 dB
- **Optical Measurement:** Integrating sphere with detector
- **Entrance Aperture:** 5 mm
- **Numerical Aperture:** <0.4 NA
- **Sensor Type:** InGaAs
- **Connector Type:** FC, SC, LC, bare fiber, bare ferrule
- **Output Connector:** DB-26 High Density, male

**FMH-8705**

- **Wavelength Range:** 800 to 1650 nm
- **Power Range:** 10 to 70 dBm
- **Damage Threshold:** +10 dBm
- **Accuracy:** ±2.5%
- **Polarization Dependent Response:** ±0.006 dB
- **Noise:** ±0.01 dB
- **Temperature Coefficient:** ±0.2%/°C
- **Linearity:** ±0.02 dB
- **Optical Measurement:** Integrating sphere with detector
- **Entrance Aperture:** 8 mm
- **Numerical Aperture:** <0.4 NA
- **Sensor Type:** InGaAs
- **Connector Type:** FC, SC, LC, bare fiber, bare ferrule
- **Output Connector:** DB-26 High Density, male

**FMH-8715**

- **Wavelength Range:** 800 to 1650 nm
- **Power Range:** 10 to 70 dBm
- **Damage Threshold:** +10 dBm
- **Accuracy:** ±2.5%
- **Polarization Dependent Response:** ±0.006 dB
- **Noise:** ±0.01 dB
- **Temperature Coefficient:** ±0.2%/°C
- **Linearity:** ±0.02 dB
- **Optical Measurement:** Integrating sphere with detector
- **Entrance Aperture:** 8 mm
- **Numerical Aperture:** <0.4 NA
- **Sensor Type:** InGaAs
- **Connector Type:** FC, SC, LC, bare fiber, bare ferrule
- **Output Connector:** DB-26 High Density, male

**Specifications**

- **Input Connector:** DB-26 high density, female
- **Power:** 90 - 126 VAC, 50/60 Hz
- **GPIB Interface:** 207 - 253 VAC, 50/60 Hz
- **USB Interface:** 2.0
- **Compliance:** RoHS, CE
- **Warm-up:** 1 hour to stated specifications
- **Dimensions:** 330mm x 216mm x 90mm
- **Weight:** 3.24 kg; 7.1 lbs.
- **Operating Environment:** 5°C to 45°C
- **Storage Environment:** -25°C to 65°C

**NOTES**

1. Limit 40 dBm exposure to ≤1 minute to avoid thermal damage.
2. Reference Conditions: Input power level 10 µW continuous wave (CW), averaging time 1s, ambient temperature 21°C ±3°C, humidity 10 - 90% non-condensing, spectral width of source ≤ 14 nm FWHM, user setting of wavelength correspond to actual source center wavelength ± 1 nm, recommended calibration period 1 year.
3. Accuracy quoted for reference temperature of 21°C ±3°C. Assumes ±2% accuracy at the limits of the operating temperature range 0°C < T < 40°C due to temperature coefficient.
4. Noise must not be equal to any water vapor absorption line.
5. Gain and zero drift (PDR) is a variation in meter responses associated with changes in input polarization state. Measured at constant wavelength (1580 nm) and power (~0.5 dBm).
6. Fiber Input Repeatability measured by the variation in response from removing and replacing a connectorized single mode fiber into the detector head. Does not include bare fiber adapter.
7. Linearity is the variation from an actual measurement to an expected measurement over decades of optical input power. Valid across range limits when measured in auto-range mode.
8. Adapters available for FC, SC, LC, and Bare Fibers.
9. Bare Fibers can be supported with ILX Lightwave BF-820 or Agilent 81000BA bare fiber holders. ILX Lightwave BF-820 bare fiber holders are designed for fiber diameter 125 ± 20 µm and 900 µm buffer.
10. Low power range is measured by dark current in the detectors and is calculated as 3 times of the SNR.
11. Measured in slow filter speed mode.