

Key Features

- Power levels from pW to 2W
- Wavelengths from 190 nm to 1800 nm
- Proprietary detector optics
- Patented, matched OD3 attenuator
- NIST/NPL-traceable calibration included
- EMI/RFI shielded
- Free-space and fiber optic versions available

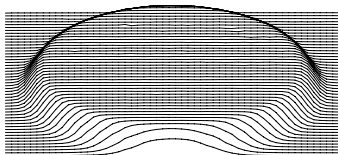


Figure 1—Newport detector response uniformity with coherent light.

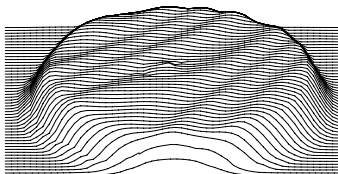


Figure 2—Typical detector response uniformity with coherent light.

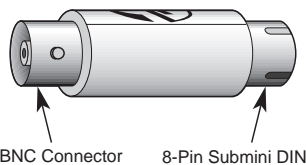


Figure 3—“/CM” Calibration Module, Patent Pending

818 Series

Low-Power Detectors

Newport uses the highest quality semiconductor detector materials available in our **818 Series Low-Power Detectors**. In addition, each detector arrives with a complete full-spectrum calibration report detailing detector responsivity in 10 nm increments.

Proprietary detector optics are designed to address the problems associated with measuring coherent light (see Fig. 1 and 2). In ordinary detectors, coherent light causes reading errors across the detector surface and measurements are more sensitive to thermal drift. This results in an additional, unreported 5% to 8% calibration uncertainty when making laser power measurements. Newport's detector design eliminates these problems for stable, uniform detector response.

Newport's advanced in-house calibration facility performs the tightest calibrations in the business, further improving the absolute accuracy of our detectors. For more information,

refer to Detector Calibration Services on page 3-35.

Exclusive OD3 attenuator technology extends the calibrated optical dynamic range of our Cylindrical and Hand-Held Wand Detectors by three decades, as shown in Fig. 4. Our patented attenuator design provides low reflection, high damage threshold and spectral flatness, without the damage susceptibility problems of thin-film attenuators or the spectral variance of simple volume-absorbing attenuators.

Calibration modules are required when using Cylindrical and Hand-Held Wand Detectors with Newport's Model 840-C, 1830-C, 1835-C, 2832-C, 2835-C or 4832-C optical meters. The module, shown in Fig. 3, is matched to an individual detector and provides the meter with detector calibration and operating information. The calibration module option is indicated by the /CM suffix in the detector model number.

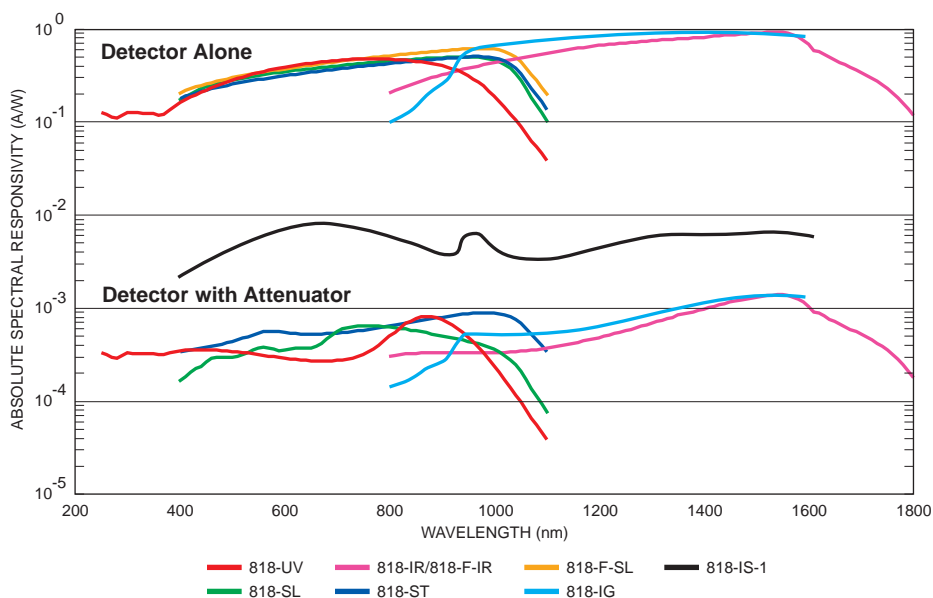
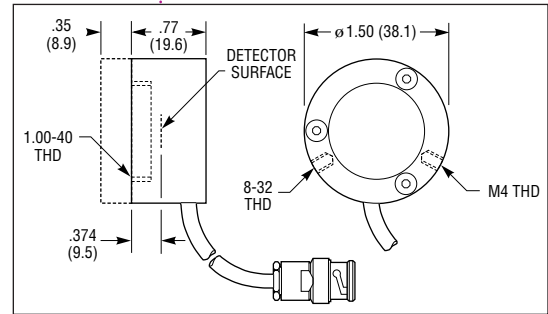


Figure 4—Low-Power Detector Responsivity Curves.

818 Series Cylindrical Detectors



The 818 Series Cylindrical Detectors (818-UV, 818-SL, 818-IR, 818-IG) are offered for broad wavelength ranges covering UV, visible, near-IR, and IR regions. They use the finest large-area planar-diffused PIN silicon, indium gallium arsenide, germanium PIN or inverted-channel silicon detectors. Each is optimized for zero-bias operation to provide

the low noise, high stability and uniformity demanded by critical radiometric measurements. Compact packaging, international mounting holes and BNC-terminated cabling make incorporation into experimental, production and field applications straightforward. See page 3-24 for Specifications and Ordering Information.

818-SL and 818-IG detectors can be mounted to our 819 Series Integrating Spheres and calibrated as a system. See page 3-30 for more information.

Cylindrical Detector Accessories

Fiber optic adaptors for the 818 Series Cylindrical Detectors allow the user to perform optical power

measurements when working with bare and connector terminated optical fibers.

The FP3-FH1 Bare Fiber Holder is a cleverly designed clamp that is used to hold 250 μm bare fibers without damaging the fiber. It in turn plugs into the 818-FA2 Bare Fiber

Holder Mount, which allows one to attach the assembly to the front end of Newport's Cylindrical Detector housing.

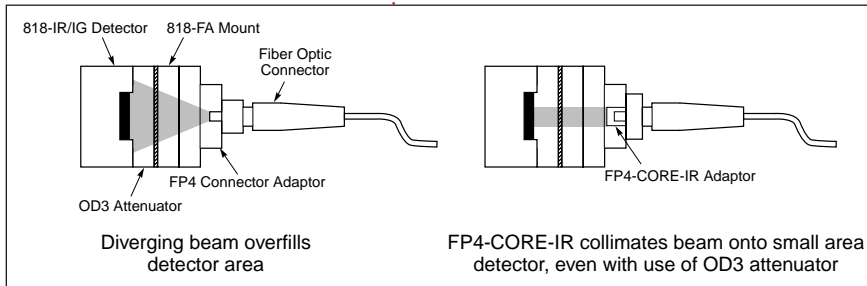
FP3/FP4 Series Connector Adaptors accommodate optical fibers terminated in the most popular fiber optic connector styles: SMA, ST, FC and SC. The redesigned adaptors have more space around the threaded input and can be attached to the 818-FA Fiber Adaptor Mount with two screws, allowing for easier insertion and

unplugging of fiber optic connectors. When working with our small area detectors (818-IR/818-IG), we recommend using an FP4-CORE-IR, described next. FP4-CORE-VIS/NIR Adaptor Cores do not contain collimating optics, and are suitable only for use with our large area detectors.





► **FP4-CORE-IR Series Adaptor Cores** allow you to make accurate measurements from connectorized fibers regardless of input conditions by preventing detector overflow effects. The FP4-CORE-IR collimates the light emerging from the fiber tip to prevent detector overflow when using small area detectors (818-IR, 818-IG), even when the attenuator is used. Insertion

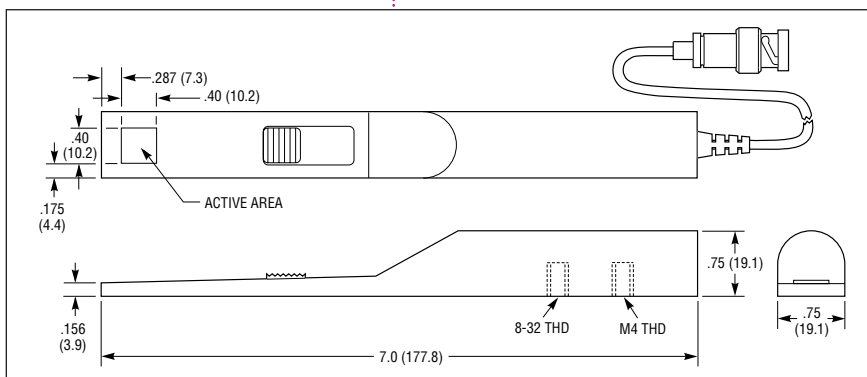


loss and backreflection from the fiber tip may be reduced by applying a small amount of index matching gel to the air gap between the fiber tip and the fused silica input surface. The coating is optimized for 900–1600 nm.

Models **FP4-CORE-NIR** and **FP4-CORE-VIS** do not have the collimating optics, and are intended only for use with our large area detectors (818-UV, 818-SL). They do have the fused silica window, and can be used with index matching gel to obtain low backreflection and low insertion loss connections. The modularity of the FP4 series allows quick interchangeability of the cores into the various FP4 series connector adaptors. The FP4 cores cannot be used with the FP3-SMA connector adaptor.

See page 3-24 for Ordering Information on Newport's Cylindrical Detector Accessories.

818-ST Hand-Held Wand Detector



The **818-ST** Hand-Held Wand puts all the performance of the 818-SL detector into a narrow-profile, hand-held wand. It even provides a built-in OD3 attenuator at the flick of a button. BNC termination provides compatibility with Newport optical meters. The wand is compatible with both English and metric post mounts. See page 3-24 for Specifications and Ordering Information.

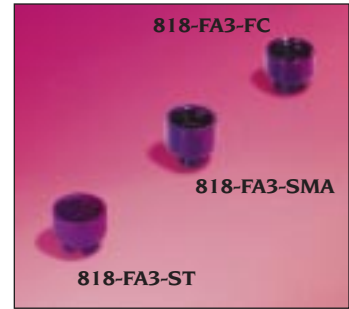
818-F Series Fiber Optic Detector Modules



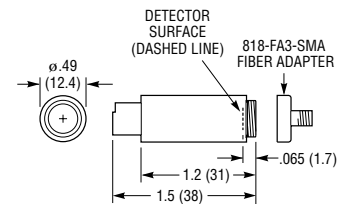
818-F Series Fiber Optic Detector Modules are optimized for measurements on connectorized fiber optics. These compact detector modules allow the connection of an optical fiber directly to the meter, configuring it as a dedicated fiber optic power meter. These detector modules are only compatible with Newport meters that support the /CM detector option. They are not BNC-terminated.

See page 3-24 for Specifications

Connector adaptors for the 818-F Series Detector Modules are available for five popular fiber optic connectors. An SMA adaptor comes with each Fiber Optic Module.

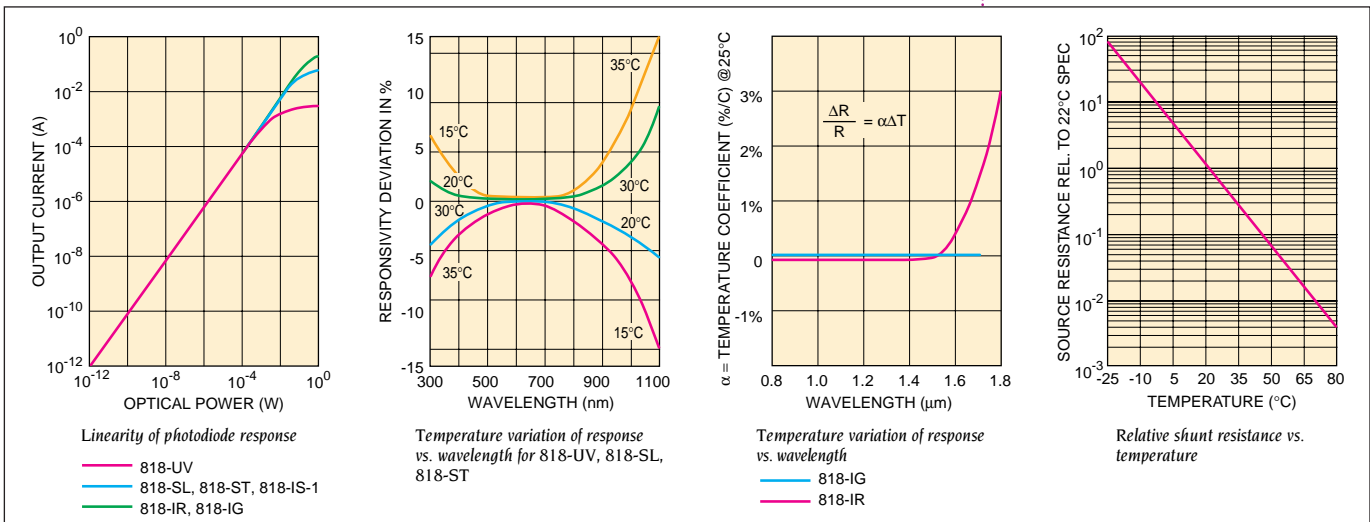


Dimensions



Ordering Information

Model	Description	Price
818-F-SL	Detector Module 400–1100 nm	
818-F-IR	Detector Module 780–1800 nm	
818-FA3-SMA	SMA Adaptor	
818-FA3-FC	FC Adaptor	
818-FA3-ST	ST Adaptor	



818 Series Detector Specifications and Ordering Information

Model w/ Calib. Module	818-UV 818-UV/CM	818-SL 818-SL/CM	818-F-SL —	818-ST 818-ST/CM	818-IR / 818-F-IR 818-IR/CM	818-IG 818-IG/CM
Spectral Range [μm]	0.19–1.1	0.4–1.1	0.4–1.1	0.4–1.1	0.78–1.8	0.8–1.65
Max. Avg. Power ⁽¹⁾						
w/ Attenuator [W/cm ²]	0.2	2	—	2	2	2
w/o Attenuator [mW/cm ²]	0.2	2	2	2	3	3
Max. Pulse Energy ⁽²⁾						
w/ Attenuator [μJ/cm ²]	0.10	1	—	0.03	0.35	0.35
w/o Attenuator [nJ/cm ²]	0.1	1	0.03	0.03	Not Avail. ⁽³⁾	0.35
Accuracy [%]	±7@ 0.19	±2@ 0.4–1.1	±2@ 0.4–1.1	±2@ 0.4–1.1	±3@ 0.78–1.7	±2@ 0.8–1.65
at constant temperature	±2@ 0.20–1.1				±5@ 1.71–1.8	±7 w/Atten.
					±7 w/Atten. ⁽⁵⁾	
Uniformity ⁽⁴⁾ [%]	±2	±2	±2	±2	±2	±2
Linearity [%]	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5
Saturation Current [mA/cm ²]	0.1	4.6	2	8	400	250
Responsivity [A/W]	≥0.09	≥0.1	≥0.1	≥0.1	≥0.2	≥0.1
[nm]	250–1000	400–1000	400–1100	400–1100	850–1700	800–1600
Peak Responsivity [A/W]	>0.4	>0.5	>0.4	>0.5	>0.8	>0.9
[nm]	@ 850 ± 100	@ 920	@ 960	@ 960	@ 1550	@ 1550
Risetime [μs]	≤2	≤2	≤1	≤3	≤2	≤2
Shunt Resistance [MΩ]	≥2 (typ)	≥2 (typ)	≥200 (typ)	≥50 (typ)	≥35kΩ (typ)	≥20
Die Capacitance	8800 pF	12,000 pF	160 pF	1100 pF	14 nF	1500 pF (max)
Max. Reverse Bias [V]	100	10	5	5	0.25	2
NEP [W/√Hz]	8.9 × 10 ⁻¹³	5.5 × 10 ⁻¹³	1.1 × 10 ⁻¹⁴	1.5 × 10 ⁻¹⁴	0.7 × 10 ⁻¹²	3.0 × 10 ⁻¹⁴
Material	Silicon	Silicon	Silicon	Silicon	Germanium	Indium Gallium Arsenide
Active Area [cm ²]	1	1	0.071	1	0.071	0.071
Active Diameter [cm]	1.13	1.13	0.3	1 × 1	0.3	0.3
Dimensions	Cylinder	Cylinder	Fiber Module	Wand	Cylinder ⁽⁵⁾ Fiber Module ⁽³⁾	Cylinder
OD3 Attenuator	Detachable	Detachable	—	Built-In	Detachable ⁽⁵⁾ Not Avail. ⁽³⁾	Detachable
Price w/Calibration Module			—			

Notes 1) Applies to entire spectral response
 2) 15 ns pulse width
 3) Applies to 818-F-IR

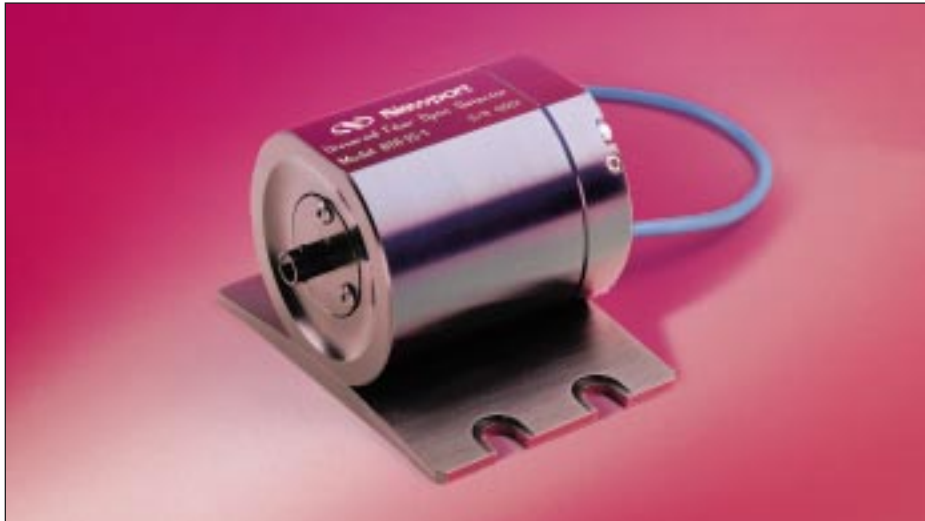
4) When measured with 1.0 mm diameter beam centered within 80% of active area
 5) Applies to 818-IR & 818-IR/CM

Cylindrical Detector Accessories Ordering Information

Model	Description	Price
818-FA2	Bare Fiber Holder Mount	
FP3-FH1	Bare Fiber Holder	
818-FA	Fiber Adaptor Mount	
FP3-SMA	Connector Adaptor	
FP4-ST	ST Connector Adaptor	

Model	Description	Price
FP4-FC	FC Connector Adaptor	
FP4-SC	SC Connector Adaptor	
FP4-CORE-VIS	Adaptor Core (430–700 nm)	
FP4-CORE-NIR	Adaptor Core (650–1000 nm)	
FP4-CORE-IR	Lensed Adaptor Core (1000–1550 nm)	

Universal Fiber Optic Detector



The Model 818-IS-1 Universal Fiber Optic Detector uses a symmetrical integrating sphere design to ensure accurate calibration, regardless of the fiber type measured. The detector uses a novel dual detector design, with special optics that improve temperature sensitivity markedly from ordinary detectors.

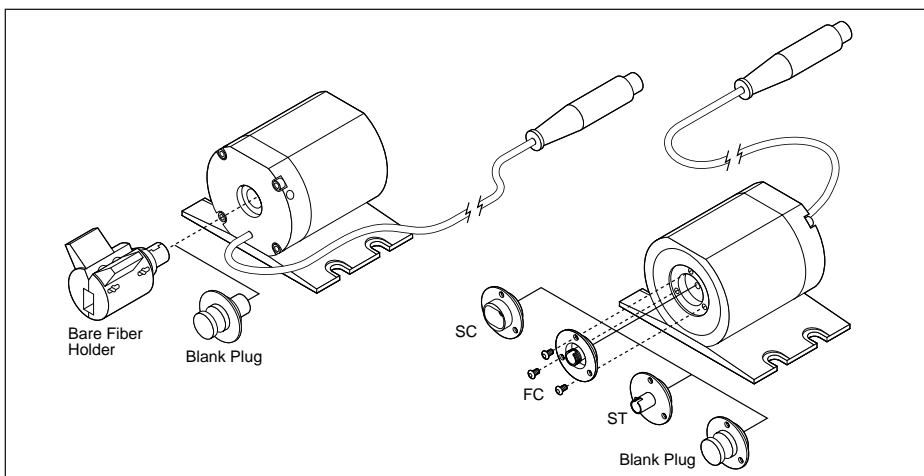
Each detector is fully calibrated to NIST traceable standards over the wavelength range of 400 to 1650 nm. The calibration data is encoded in a calibration module integral to the electrical connector, which makes

the 818-IS-1 compatible with all of Newport's power meters that use calibration modules.

Maximum versatility is provided by the detector's dual port design. A variety of adaptors for connector terminated fibers are provided, and plug into the detector's front port. The rear port is designed to measure light from straight and angle cleaved bare fibers, using Newport's FP3-FH1 bare fiber holder. A complete kit of adaptors is included with each detector, together with a rugged carrying case.

Key Features

- Integrating sphere design enables accurate and polarization independent measurements from all fiber optic sources
- Continuous measurements over the entire 400 to 1650 nm wavelength range
- Optical power input up to 200 mW
- Accepts bare fiber and FC, ST and SC terminated fiber inputs



818-IS-1 Accuracy

The specified accuracy of the 818-IS-1 equals two times the root-sum-of-square of NIST's Combined Standard Uncertainty and Newport's Calibration Process Standard Deviation. This method results in a 95% confidence level for the accuracy specified. For more information on Newport's calibration process, see page 3-35.



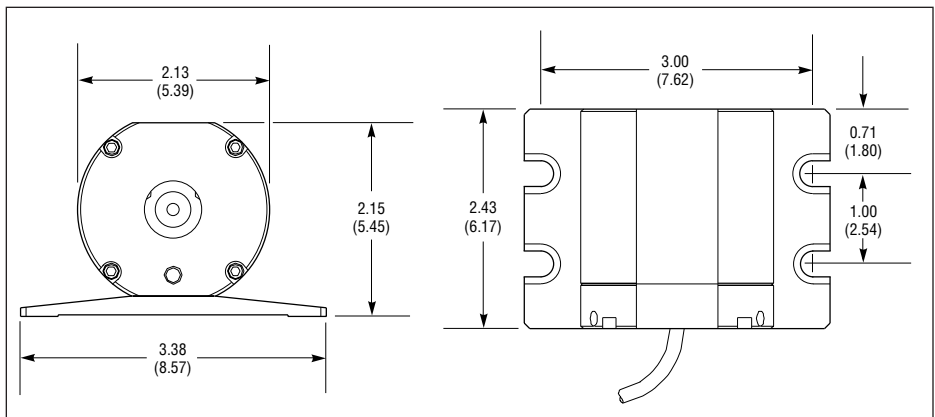
A bare fiber holder and various fiber optic connector adaptors are provided with the 818-IS-1 detector.

Specifications

Spectral range [nm]	400–1650
Saturation Power [mW]	>200
Saturation Energy [μJ]	>1 (10–15 ns pulse)
Max. Ave. Power [W]	0.25 (Bare fiber), 1 (Connectorized) ⁽¹⁾
Max. Pulse Energy [μJ]	100
Accuracy [%]	± 2.5
Responsivity [A/W]	>0.0025 (400–600 nm) >0.0075 (610–1650 nm)
Risetime [μs]	≤ 2
Shunt Resistance [MΩ]	≥ 20
Die Capacitance [pF]	800 max.
NEP [pW/√Hz] @ 5 Hz and 0.01 A/W	3
Material	InGaAs/Si

1) Bare fiber specification is de-rated because bare fiber end is closer to sphere's first surface.

Dimensions



Ordering Information

Model	Description	Price
818-IS-1	Universal Fiber Optic Detector	

For calibrated integrated sphere based detectors for free-space light input, please see page 3-27.