



## BENCHTOP BACKREFLECTION METER FOR VISIBLE AND NEAR INFRARED WAVELENGTHS

### Features:

- Unique wavelength offerings for speciality applications
- Broadband SLED for improved stability
- 633 nm - 1625 nm
- Sensitivity to -75 dB
- USB communications port
- Wide range of available wavelengths
- Touch screen display
- Dual wavelength source available
- High resolution
- Optional insertion loss measurement capability
- Built-in memory

### Applications:

- OCT device testing
- Backreflection measurement of passive fiber optic devices
- Insertion loss measurement
- End-to-end loss measurement
- Quality control
- Component or system troubleshooting
- Network installation



Benchtop Backreflection Meter

### Product Description:

The OZ Optics Limited Benchtop BM-1000 and BM-2000 Backreflection Meters measure the total accumulated optical return loss that is reflected back through a pigtailed fiber optics device or fiber under test. The measured reflections are caused by Rayleigh scattering, sudden changes in the refractive index within the device under test (DUT), or from connector ends.

The Benchtop Backreflection Meter is configured with an FC/APC connector on the output port, to minimize unwanted reflections. The meter has either one or two built-in SLEDs, LEDs or laser diodes for return loss measurement at specific wavelengths. An optional detector can be added to the unit for insertion loss measurements. Reference patchcords for calibration are available.

The Benchtop Backreflection Meter is offered with special wavelengths, ranging from 633 nm to 1625 nm, thus providing backreflection measurement capabilities for non-telecom applications as well as telecom. Please refer to the ordering information.

The Benchtop Backreflection Meter has a color touch screen display with a simple graphical user interface. The unit comes with a built-in memory that allows the user to store measured DUT test results.

The Benchtop BM-1000 and BM-2000 Backreflection Meters can be operated remotely via the built-in USB interface. A universal AC/DC power supply is included with all units.

## Ordering Information For Standard Parts:

BC	Part Number	Description
53564	BM-1000-3A-1310-9/125-S	Singlemode Fiber Optic Bench-top Backreflection Meter for 1310 nm. Built-in source with FC/APC connector for measuring up to 70dB ORL.
53565	BM-1000-3A-1550-9/125-S	Singlemode Fiber Optic Bench-top Backreflection Meter for 1550 nm. Built-in source with FC/APC connector for measuring up to 70dB ORL.
53567	BM-2000-3A-1310/1550-9/125-S	Singlemode Fiber Optic Benchtop Backreflection Meter, with dual 1310 and 1550 nm built-in sources.
53568	BM-2000-3A-1310/1550-9/125-S-IL	Singlemode Fiber Optic Benchtop Backreflection Meter, with dual 1310 and 1550 nm built-in sources and insertion loss measurement capability.
52198	BM-1000-3A-1060-6/125-S-IL	Single-mode Fiber Optic Bench-top Backreflection Meter with insertion loss test for 1060 nm. Built-in source with FC/APC connector measuring up to 60dB ORL.
54722	BM-1000-3A-1550-9/125-S-IL	Single-mode Fiber Optic Bench-top Backreflection Meter with insertion loss test for 1550 nm. Built-in source with FC/APC connector measuring up to 60dB ORL.
54876	BM-1000-3A-633-4/125-S-IL	Single-mode Fiber Optic bench-top backreflection meter with insertion loss test for 633 nm. Built-in source with FC/APC connector, measuring up to 50 dB ORL.
10229	SMJ-3A1-1300/1550-9/125-3-1	Reference patchcord, FC/APC to flat-polished ferrule, 9/125 micron singlemode 1300/1550 nm fiber, 3 mm OD PVC jacket, 1 m long.
8131	SMJ-3A3U-1300/1550-9/125-3-2	Adaptor patchcord, FC/APC to FC/UPC, 9/125 micron singlemode 1300/1550 nm fiber, 3 mm OD PVC jacket, 2 m long.
4267	MAND-01	Mandrel for Benchtop Backreflection Meter.

## Standard Product Specifications<sup>1</sup>:

Parameter	Specification					
Central wavelength <sup>2</sup>	633	850	1060	1310	1550	1625
Source type <sup>3</sup>	SLED					
Output power	≥ -3 dBm					
Connector type	8° angled NTT-FC/APC receptacle					
Singlemode fiber sizes	4/125	5/125	6/125	9/125		
Multimode fiber sizes	50/125 62.5/125	50/125 62.5/125	50/125 62.5/125	50/125 62.5/125	50/125 62.5/125	50/125 62.5/125
Reflectance dynamic range for SM <sup>4</sup>	0 to -50 dB		0 to -60 dB	0 to -70 dB	0 to -75 dB	
Reflectance dynamic range for MM <sup>4</sup>	0 to -30 dB					
Reflectance accuracy <sup>5</sup>	± 0.4 dB, up to -50 dB ± 1.0 dB, up to -65 dB ± 2.5 dB, up to -70 dB ± 3.5 dB below -70 dB					
IL detector type <sup>6</sup>	1.5 mm Si			3 mm InGaAs		
IL dynamic range <sup>6</sup>	0 to 55 dB			0 to 60 dB		
IL accuracy <sup>6</sup>	± 0.025 dB			± 0.025 dB		
Long term stability <sup>7</sup>	± 0.05 dB					
Short term stability <sup>8</sup>	± 0.025 dB					
Input voltage	9~12V DC adaptor					
Dimensions (L x W x D)	280 x 300 x 100 mm					
Weight	4 kg					
Operating temperature	-10 to 55°C					
Storage temperature	-30 to 70°C					
Relative humidity	< 85%, RH non-condensing					
Display	Touch Screen					

<sup>1</sup> Reference condition: 23°C ambient temperature after 15 minute warm-up period.

<sup>2</sup> Depends on laser diode manufacturer and operating temperature.

<sup>3</sup> Fabry-Perot lasers may be required if SLED sources are not available for a specific wavelength.

<sup>4</sup> Depending on wavelengths and fiber types.

<sup>5</sup> The reflectance accuracy is warranted when a SLED is used.

<sup>6</sup> IL version only.

<sup>7</sup> 6 hours at constant temperature and after 15 minutes warm-up period, at 1310 nm and 1550 nm.

<sup>8</sup> 15 minutes at constant temperature and after 15 minute warm-up period, at 1310 nm and 1550 nm.

## Ordering Examples For Standard Parts:

A European fiber optic manufacturer must measure the backreflection and the insertion loss of singlemode and polarization-maintaining jumpers, at 1550 nm and at 1310 nm. The manufacturer needs to order the following parts:

Bar Code	Part Number	Description
53568	BM-2000-3A-1310/1550-9/125-S-IL	Singlemode Fiber Optic Benchtop Backreflection Meter, with dual 1310 and 1550 nm built-in sources and insertion loss measurement capability.
10229	SMJ-3A1-1300/1550-9/125-3-1	Reference patchcord, FC/APC to flat-polished ferrule, 9/125 micron singlemode 1300/1550 nm fiber, 3 mm OD PVC jacket, 1 m long.
8131	SMJ-3A3U-1300/1550-9/125-3-2	Hybrid patchcord, FC/APC to FC/UPC, 9/125 micron singlemode 1300/1550 nm fiber, 3 mm OD PVC jacket, 2 m long.

## Ordering Information For Custom Parts:

Although we strongly recommend the purchase of our standard products, OZ Optics also welcomes the opportunity to provide custom-designed products to meet your application requirements. There can be a difference in the pricing for a custom-designed device or part compared to our standard parts list. Please consider the following points when reviewing your quotation:

- Additional time is required to prepare a comprehensive quotation.
- Lead times are usually longer than normal.
- Non-recurring engineering (NRE) charges and lot charges may apply.

These points will be carefully explained in your quotation, so you can make a well-informed decision.

## Questionnaire For Custom Parts:

1. What is your application?
2. What wavelengths do you plan to use?
3. What connector receptacle type do you need?
4. What fiber type are you using?
5. What is the minimum backreflection you want to measure?
6. Do you want to measure insertion losses?
7. Do you want a single wavelength or dual wavelength source?

## Backreflection Meter:

**BM-A-X-W-a/b - F - (-IL)**

**A** = Source type:  
1000: Single wavelength source  
2000: Dual wavelength source

**X** = Connector Code:  
(Angled for low return loss measurement)  
3A= Angled NTT- FC/PC  
SCA= Angled SC

**W** = Wavelength in nm:  
633, 850, 1060, 1310, 1550, and 1625. For dual sources select 1310/1550, 1550/1625, or 1480/1550

**IL** = Add -IL to the end of the part number for insertion loss measurement capability.

**F** = Fiber type  
S: Singlemode  
M: Multimode

**a/b** = Fiber core/cladding sizes, in  $\mu\text{m}$   
4/125 for 633nm  
5/125 for 850nm  
6/125 for 1060nm  
9/125 for 1310, 1550nm, and 1625nm SM fiber.  
50/125 for 850, 1310, or 1550 MM fiber.  
62.5/125 for 850, 1310, or 1550 MM fiber.

### Notes:

1. For the multimode backreflection meter, the minimum measurable backreflection is -30 dB. Multimode backreflection meters are configured with LED sources.
2. For singlemode backreflection meters, the minimum measurable backreflection measurement is -70 dB, with angled FC/APC connectors, at wavelengths of 1310 nm, or higher.
3. Fabry-Perot laser diode may be used under special conditions and in such cases "-LD" will be added to the end of the part number.

## Ordering Example For Custom Parts:

A North American fiber optic manufacturer must measure the backreflection of multimode fiber patchcords at 850 nm. The fiber has 62.5/125  $\mu\text{m}$  core/cladding, and is terminated with an FC/PC connector. The manufacturer needs to order the following parts:

Bar Code	Part Number	Description
NA	BM-1000-3-850-62.5/125-M	Multimode Fiber Optic Benchtop Backreflection Meter, 62.5/125 micron, with a built-in LED at 850 nm, with FC/PC connector.
NA	MMJ-33-IRVIS-62.5/125-3-2	Multimode patchcord, FC/PC to FC/PC, 62.5/125 micron multimode IRVIS fiber, 3 mm OD PVC jacket, 2 m long.

## Frequently Asked Questions (FAQs):

**Q:** What are the reference jumper and mandrel for?

**A:** The reference jumper is terminated on one end with a flat polish ferrule to produce a precise level of reflection (4% from the air/glass interface). This is used to calibrate the optical return loss measurement. The mandrel is used to attenuate the light through the fiber in order to measure and subtract out any background signals from the instrument.

**Q:** To measure return losses you have to attenuate reflections after the device under test using either the mandrel or with index matching gel. This prevents you from measuring simultaneously both IL and ORL.

**Q:** Can I measure the return losses of connectors other than FC type?

**A:** Yes. You just need to use a patchcord with an FC/APC connector on one end and with the same connector type as the new device under test on the other end. The patchcord can then be attached to the test device with a simple sleeve thru connector.

**Q:** I can't get a low enough return loss reading. What's wrong?

**A:** First make sure the receptacle and connectors are clean. Next make sure you attenuate the output light from the test device using the mandrel. If the value is still high, recalibrate the unit (Zeroing and referencing the meter) and if the measurement is still unchanged it may be due to a damaged connector. Remember that the measured return loss includes the connector return loss.

**Q:** How often should I check my meter's calibration?

**A:** When measuring low return losses (>55dB), we advise that you zero the meter before each reading. Otherwise a daily or weekly reference calibration can be performed based on meter usage.