



FiberMASTER™
Fiber Optic Testing Kit
Instruction Manual



#33-931



Introduction

The IDEAL FiberMASTER™ fiber optic testing kit allows the user to measure absolute power and calculate the loss of fiber optic links at several wavelengths. Absolute power measurements are helpful when trouble shooting equipment that may not be operating properly. The dB calibration feature allows the operator to set a reference level to the light source and directly read the loss of fiber optic links without needing to manually calculate the values. The unique form factor allows the light source to be docked neatly within the power meter. This makes the kit compact for easy storage while still allowing full operation of both the source and meter.

Product Features

- 850, 1300/1310, 1490 and 1550 wavelength measurement capability on power meter
- 850/1300/1310/1550nm laser light source (33-931 kit)
- Power measurement in dBm and μ W, loss display in dB
- Power meter auto power off
- Operates on standard AAA batteries, three in each unit
- Includes universal adapter for power meter and ST, SC and FC adapters for light source
- Includes rugged carrying pouch, multimode and single mode SC jumpers and calibration coupler



ADVICE AND PRECAUTIONS

Laser Warning:

- Do not look inside the optical fiber port when the FiberMASTER is operating. The emissions can be dangerous and cause permanent damage to your vision.
- To prevent damage to the lens, do not insert items other than optical connectors into the port of the FiberMASTER.
- Do not look into the fiber if it is connected to an active device. The wavelength of the light transmitted by the equipment is invisible to the human eye and may cause permanent vision damage.
- Always assume that a fiber optic cable is connected to an active device that is emitting dangerous, invisible light.

General Operation

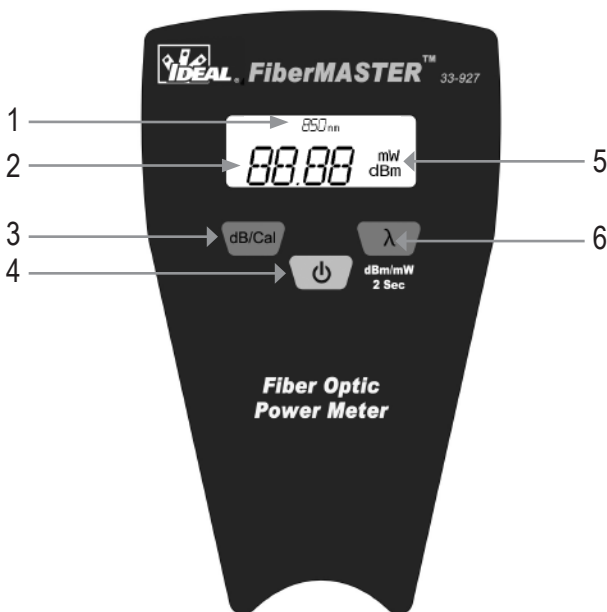
FiberMASTER operates in two basic modes; absolute power measurement and relative power measurement.

Absolute power measurement is the measure of the strength of the light energy coming into the power meter. This mode is indicated by the dBm (decibel milliwatt) or μ W (microwatt) annunciators in the LCD display. This mode is helpful when measuring the output of an optical device to determine if it is operating within its specifications. For example, most fiber optic network devices specify their typical output power in dBm. By connecting the FiberMASTER power meter to the output of a network device the direct power can be instantly measured to isolate a faulty transmitter.

Relative power measurements are used to calculate the difference in power between two measurements. This mode is indicated by the dB annunciator in the LCD panel. This mode is used mostly by installers when measuring fiber optic cabling from end-to-end to determine the link loss of the system. To use this mode, the power meter must first be connected to a stable light source then that power level is stored in the meter's memory. Then future measurements are compared to the stored reference value and the difference is calculated and displayed as dB.

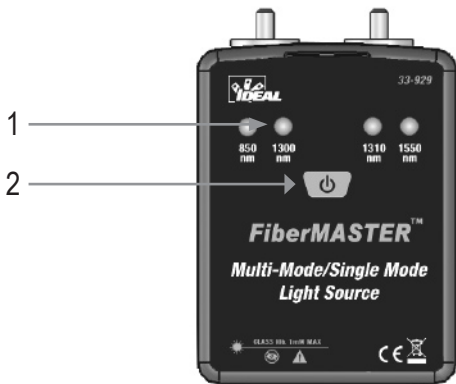
Power Meter Display and Functions

1. Wavelength measurement annunciator.
2. Numeric display for power and loss measurements. Also displays “null” when power is below detection level.
3. Decibel toggle button. Press to change between power measurement mode (dBm) and loss calculation mode (dB). Changing to dB mode automatically stores the current input level as the reference for loss calculations.
4. Power button.
5. Unit of measure annunciator, displays either dBm, dB or μW .
6. Wavelength select and dB/ μW toggle button. Press and release to change wavelength between 850/1300/1310/1490/1550nm. Press and hold for 2 seconds then release to toggle between dBm and μW modes.



Light Source Indicators and Functions

1. Wavelength LEDs. Lights green to indicate active source. Blinks red when battery is low. At 3.6V unit will power off after 10 minutes. At 3.3V unit will power off after 5 seconds.
2. Power button. Press the toggle wavelength, hold to power off.



The power output of the light source will vary slightly during the first five minutes of operation as it warms to operating temperature. To ensure best measurement accuracy, allow the light source to operate for five minutes before calibrating the meter or making measurements.

Basic Operation

Measuring Optical Power

Important: When the power meter is first turned on it self-calibrates to a “no light” condition which is necessary for accurate measurements. THE DUST COVER MUST REMAIN ON THE POWER METER PORT WHEN IT IS FIRST TURNED ON.

1. With the dust cap on the power meter, press the power button. The meter will display ‘null’, indicating that it is ready to measure and is currently receiving no power. Press the wavelength ‘λ’ button to change to the desired wavelength.
2. Remove the dust cap and connect the meter to a cable to begin taking measurements. The default measurement mode is dBm and can be changed to uW by holding the ‘λ’ button for 2 seconds then releasing.



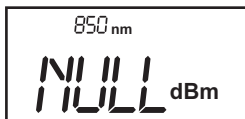
In addition to using a separate light source, the power meter can measure the output from any optical switch, media converter or other device as long as its wavelength is within one of the operating windows of the 33-927 power meter.



Measuring Cabling Loss

Loss measurements are performed to certify a cabling link meets certain criteria for attenuation. Loss (dB) can be manually calculated by subtracting the power (dBm) through the cabling under test from the power (dBm) of the light source when connected directly to the meter. To make this process easier FiberMASTER includes a calibration function that stores the light source power level and compares it to future readings and directly displays loss in dB on the LCD panel.

1. With the dust cap on the power meter, press the power button. The meter will display 'null', indicating that it is ready to measure and is currently receiving no power. Press the wavelength 'λ' button to change to the desired wavelength.
2. Set the light source to the desired wavelength.
3. Remove the dust cap and connect the reference jumpers between the power meter and light source. The meter will display the current power dBm from the light source.
4. Press the 'dB/Cal' button on the power meter to store the current value into memory. The display will now indicate 0.00dB.
5. Remove the coupler from the two reference jumpers, connect to the cabling under test and begin making measurements. The display will indicate the attenuation (dB) compared to the initial calibration power (dBm).



See diagrams on the following page.

Do not disconnect the reference jumper from the light source after calibrating the test set. Doing so will cause inaccuracies and requires recalibration.

Calibration Procedure Diagrams

The following diagrams supplement steps 1–4 on the previous page.



Affix the black dust cap to the input of the power meter. Clear dust caps allow ambient light to pass and cannot be used. Turn on the power meter and wait for 'null' to be displayed on the LCD. The meter is now ready to use.

Connect known good reference jumpers between the light source and power meter. In this example two jumpers are used in conjunction with a coupler. This configuration allows the jumpers to be connected directly to a patch panel when making measurements. A single jumper can also be used as long as it is not disconnected from the light source after the calibration process.

The LCD will display the current power level at the power meter input. Typical values for the 33-929 light sources are -6 to -7dBm. Levels lower than this (ex -15dBm) indicate excessive loss in the reference jumpers. New jumpers should be used.





Press the 'dB/Cal' button to store the reference value. The LCD will display '0.00dB'.

The meter is now measuring loss.

Repeated pressing of the 'dB/Cal' button again will change between the dBm power measurement mode and dB loss measurement mode. Each time the meter

enters the dB mode it stores the current power level as a new reference level. Once the calibration value is set, do not toggle out of the dB mode. Otherwise it will be necessary to perform the calibration step again.

The meter does not store a separate reference value for each wavelength. When changing wavelengths repeat the jumper reference procedure.



Disconnect the two reference jumpers and connect to the cabling under test. The meter will display the total loss of all components between the two reference jumpers.

Reference Information

dB vs. Power Table

dB Loss	% of Power Remaining	% of Power Lost
1	79.00%	21.00%
2	63.00%	37.00%
3	50.00%	50.00%
4	40.00%	60.00%
5	32.00%	68.00%
6	25.00%	75.00%
7	20.00%	80.00%
8	16.00%	84.00%
9	12.00%	88.00%
10	10.00%	90.00%
11	8.00%	92.00%
12	6.30%	93.70%
13	5.00%	95.00%
14	4.00%	96.00%
15	3.20%	96.80%
16	2.50%	97.50%
17	2.00%	98.00%
18	1.60%	98.40%
19	1.30%	98.70%
20	1.00%	99.00%
25	0.30%	99.70%
30	0.10%	99.90%
40	0.01%	99.99%
50	0.001%	99.99%

Maintenance

Clean the case with a damp cloth, do not use detergents. Clean the optical ports with lint free tissues and swabs designed for fiber optic components and use 99% pure isopropyl alcohol and de-ionized water. Do not blow into the optical ports.

Service and replacement parts

This unit has no user serviceable parts. To obtain service call Technical Support at 800-854-2708 or 858-627-0100.

Power Meter Specifications

Wavelength	850, 1300, 1310, 1490, 1550nm
Detector	InGaAs
Measurement Range	-60 to +3dBm
Accuracy	±5%
Display Resolution	.01
Connector	Universal 2.5mm w/ FC adapter
Power Supply	AAA Alkaline Battery x 3
Operating Time	360 hours
Operating Temp	-10 to +60°C
Storage Temp	-25 to +70°C

Light Source Specifications

Wavelength	850/1300/1310/1550nm laser diode
Output Power	-6 to -7 dBm Typical
Stability	.05dB after 15min, 0.1dB over 8 hrs
Connector	2.5mm w/ ST, SC, FC adapters
Power Supply	AAA Alkaline Battery x 3
Operating Time	40 hours
Operating Temp	-10 to +60°C
Storage Temp	-25 to +70°C

Limited Warranty

This instrument is warranted to the original purchaser against defects in material or workmanship for one year from the date of purchase. During this warranty period, IDEAL INDUSTRIES, INC. will, at its option, replace or repair the defective unit, subject to the verification of the defect or malfunction. This warranty does not apply to malfunctions resulting from abuse, neglect, accident, unauthorized repair, alteration or unreasonable use of the instrument.

Any implied warranties arising out of the sale of an IDEAL product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. The manufacturer shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses or economic loss, or for any claim or claims for such damage, expenses or economic loss.

State laws vary, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which may vary from state to state.

Warranty limited solely to repair or replacement; no warranty or merchantability, fitness for a particular purpose or consequential damages.



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