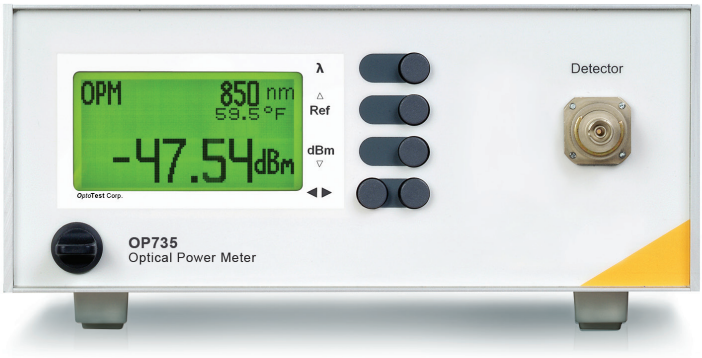
OptoTest

Test Solutions for Fiber Optics



OP735

Benchtop Optical Power Meter

Instruction Manual

Contacting OptoTest Corporation

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MnOP735-RevC

OP735
online resources

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Overview

The OP735 can be configured up to 4 channels with a mix of InGaAs, Silicon, and High Power Detectors. This unit is ideal as a compact stand-alone power meter or used in conjunction with a stabilized light source to measure insertion loss.

Designed for a high speed data acquisition on fiber optic components, the OP735 provides absolute or relative measurements with high resolution and linearity. The OP735 is available starting at one channel up to four channels and can be configured for a variety of detector and connector interfaces.

Available detector options:

IN1	1mm InGaAs detector with Universal Adapter
IN3	3mm InGaAs detector with Universal Adapter
IN5	5mm InGaAs detector with Universal Adapter
IN10	10mm InGaAs detector with Universal Adapter
SI3	3mm Silicon detector with Universal Adapter
R	Electrical port for Remote Head Detector
S	Digital port for Integrating Sphere

Initial Preparation

Unpacking and Inspection

The unit was carefully inspected, mechanically, electrically and optically before shipment. When received, the shipping carton should contain the items listed in Standard Contents. Account for and inspect each item. In the event of a damaged instrument, write or call OptoTest Corp, California.

Note: Be aware that accessories such as detector adapters, remote head detectors, and high performance reference cables will be located inside a small box labeled "Accessories Inside". If this box is not included with the original shipment, contact OptoTest of their nearest distributor.

Please retain the shipping container in case re-shipment is required for any reason.

Damaged In Shipment

All instruments are shipped F.O.B. Camarillo when ordered from OptoTest.
If you receive a damaged instrument you should:

1. Report the damage to your shipper immediately.
2. Inform OptoTest Corporation.
3. Save all shipping cartons.

Failure to follow this procedure may affect your claim for compensation.

Standard Contents

1. Model OP735 Multichannel Optical Power Meter
2. Power Cord (U.S. Shipments only)
3. USB A-B cable
4. Certificate of Calibration and if requested the Metrology Report
5. Instruction Manual(s)
6. CD with applicable software and documentation (if ordered)
7. Rack mount kit (optional)

Definition of Specifications

Dynamic Range

The dynamic range spans from the maximal power level the instrument can measure without major saturation to the detector to the minimal power level where the thermal noise of the detector becomes greater than the current produced by the incident light. For accurate power measurements it is NOT recommended to measure power levels at either end of the dynamic range. (see Linearity)

Linearity

Photodetectors are, by nature, very linear over a wide range of optical input powers, but the power meter electronics can affect the overall system linearity. The power meter linearity is characterized and specified to know the measurement accuracy and linearity over the full dynamic range. For accurate insertion loss measurements only power levels that fall within the range with the best linearity (+/-0.05dB) should be measured.

Calibration Wavelength

The calibration wavelengths are the nominal wavelengths of the instrument is calibration points. The exact wavelength of each particular calibration is stated in the certificate of calibration.

Calibration Traceability

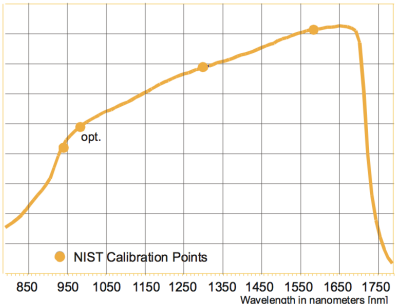
The detector's absolute calibration data is directly traceable to N.I.S.T. at the specified calibration wavelength and the specified power level, typically -10dBm.

Definition of Specifications

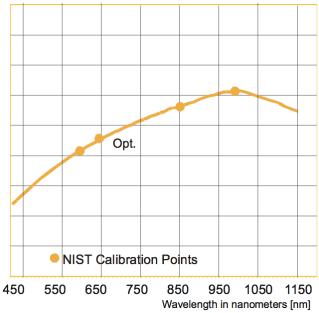
Spectral Responsivity

Depending on the detector type, InGaAs (Indium Gallium Arsenide) or Silicon the spectral responsivity, the efficiency of the detector to convert optical power into electrical current changes with wavelength.

Responsivity of InGaAs Detectors



Responsivity of Silicon Detectors



Note that other detector types are available such as IN5 (5mm InGaAs) IN10 (10mm InGaAs) as well as WSR (wide spectral range) and might exhibit a different spectral responsivity.

Absolute Accuracy

The absolute accuracy specification includes the total measurement uncertainties involved in the calibration process including the transfer of the absolute power standard from N.I.S.T.

Optical Power Meter, Channel Performance

For multichannel instruments, the power meter circuit converts and digitizes the optical power level with the given sampling interval. Changes in light levels such as modulation will be averaged within that sampling interval.

Instrument, Warm up Time

Optical power meters, in general, do not need any warm-up time unless the instrument has to acclimate to a changing environment. In order to calibrate the instrument or to perform stable measurements, the instrument should be acclimated for 15 minutes for each 5ºC of temperature differential. For example if the instrument was stored at 18ºC and brought into an environment of 28ºC the instrument should be allowed to warm up for 30 minutes.

Definition of Specifications

Recommended Recalibration Period

This is the recommended time period for re-calibration in order to maintain accuracy specifications. The recommendation is made based upon statistics on detector aging; however it is up to the metrology policies and procedures within each company to define the calibration cycles on optical power meters.

Optical Power Meter, Fiber Compatibility

The amount of aerial coverage of the detector, or the portion of the light emitted from the fiber being measured, depends on the mechanical features of the optical interface, the active area of the detector and the numerical aperture (NA) of the fiber. A fiber with a large NA, for example 100/140 multimode fiber, might not under fill a small area detector hence the absolute power reading will be less than actual.

Return Loss Range

The lower end of the return loss (low return loss = high reflection) defines the level where the instrument is saturated by large reflections. The higher end of the return loss (high return loss = very weak reflections) is given by capability of the instrument to amplify and resolve reflection out of the noise floor.

Return Loss Accuracy

The Return Loss Accuracy is measured using an optical variable attenuator connected to a >98% reflector. The insertion loss of the attenuator is initially quantified against a reference optical power meter. The actual attenuation is then used to calculate the generated reflection, where the resulting reflection = 2x (variable attenuation + insertion loss of attenuator) + reflector coefficient. Accuracy of return loss measurements can also be affected by the reference cable and any excessive losses at the front panel interface.

Definition of Specifications

Reference Cable

The reference cable is the cable with which the DUTs will be measured against. Typically reference cables are required to be of a defined quality with a specified connector/endface polish.

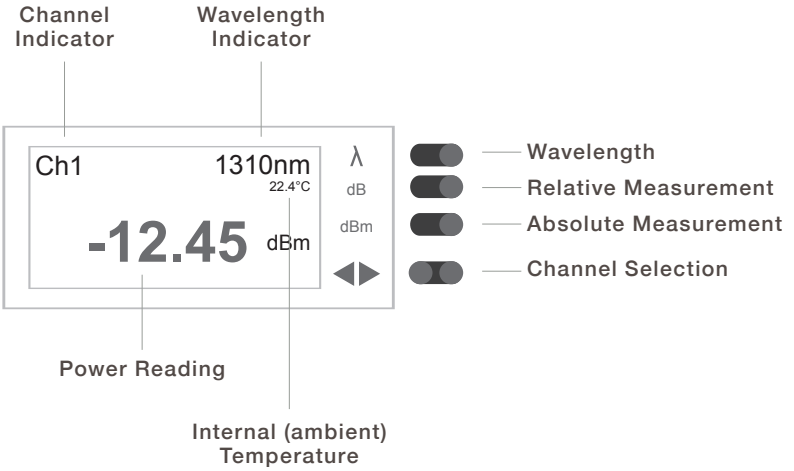
Instrument, Environmental

Operating Temperature: This is the temperature range in which the instrument will conform to the specifications after the specified warm up time.

Storage Temperature: This is the temperature range at which the instrument can be stored with the power off without any damage or any loss of specification to the instrument. It is required that the instrument be brought back to within the operating temperature range before it is turned on.

Humidity: The relative non-condensing humidity levels allowed in the operating temperature range.

Front Panel Operation



Wavelength

The wavelength button toggles through the available calibration wavelength. Typically for power meters with InGaAs this is 850nm, 980nm, 1300nm, 1310nm, 1480nm, 1550nm, and 1625nm.

Relative Measurement

The dB button switches the power meter into relative measurement mode. At the same time it stores the current absolute power reading as the reference. The reference power is displayed above the relative power reading (see illustration of Display). If the instrument is already in relative measurement mode pressing the dB button stores the current power level as the new reference.

For each wavelength and for each channel a reference reading can be stored.

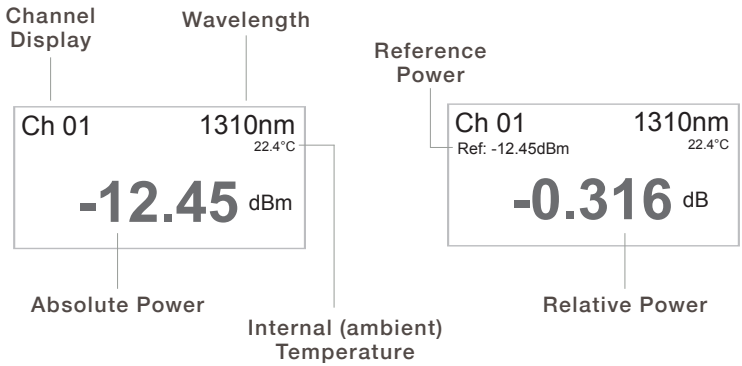
Absolute Measurement

The dBm button switches the power meter into absolute measurement mode.

Channel Selection

By pressing the right button the instrument display switches to the next channel, it will stop at the last channel. Similarly the left button switches the instrument to the previous channel. Each channel retains the calibration wavelength, absolute or relative measurement mode and the corresponding reference power levels.

Display Operation



Channel Display
Shows the current selected channel.

Wavelength
Displays the currently selected calibration wavelength.

Absolute Power
The absolute power is displayed in dBm.

Relative Power
The relative power is displayed in dB. It is the difference between the reference power and the measured absolute power.

Internal Temperature
The internal, ambient temperature is displayed in either ºF (Fahrenheit) or ºC (Celsius), that selection is performed with a USB command.

USB
When communicating with the instrument via USB, the unit will display the OptoTest logo.

Smart Remote Head Option

The OP735 when manufactured has the option of having a digital OPM port. This port interfaces with a smart remote head and/or a smart integrating sphere. When no remote head is connected the unit will function normally as described in this manual.

For the remote head to be properly loaded by the system, the remote head should be connected while the unit is powered down. Connect the remote head to the mainframe and power up the system. Linearity and absolute calibration are established by the remote head, not the mainframe.

USB Control of the OP735

The OP735 can be controlled via the USB bus. Upon request, OptoTest can supply the appropriate DLLs along with sample programs to facilitate the software creation process. For these DLLs please contact sales@optotest.com.

Warranty Information

OptoTest Corp. warrants this product to be free from defects in material and workmanship for a period of one year from date of shipment. During the warranty period we will, at our option, either repair or replace any product that proves to be defective. To exercise this warranty contact OptoTest Corp. headquarters. You will be given prompt assistance and return instructions. Repairs will be made and the instrument returned, transportation prepaid. Repaired products are warranted for the balance of the original warranty period, or at least 90 days.

NOTE: Do not send instruments for any reason without contacting OptoTest headquarters first.

For Application Notes, more detailed Testing Instructions, and the most up-to-date OptoTest News go to ***www.optobuzz.com***

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1.805.987.1700