OptoTest

Your Partner in Fiber Optic Test Solutions

OP740

High Speed Multichannel OPM

Instruction Manual

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MnOP740-RevA

OP740
online resources

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Overview

The OP740 offers a state-of-the art solution for high speed optical power measurement applications where multiple channels are needed. Unlike many other systems, this instrument is comprised of individual power meters allowing for simultaneous data acquisition over all channels with unparalleled speed.

The OP740 is available with 4 to 24 channels and can be configured for a variety of detector and connector interfaces. With the rack mount option, multiple units can be combined for even higher channel counts.

Available detector options:

IN1	1mm InGaAs detector with 5/8” Adapter
IN3	3mm InGaAs detector with 5/8” Adapter
IN5	5mm InGaAs detector with 5/8” Adapter
IN10	10mm InGaAs detector with 5/8” Adapter
HP	2mm High Power InGaAs detector with 5/8” Adapter
SI3	3mm Silicon detector with 5/8” Adapter
R	Electrical port for Remote Head Detector

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 or 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 OP740 Multichannel Optical Power Meter
2. 9V Power Supply and Power Cord
3. USB A-B cable and USB-C
4. Certificate of Calibration and, if requested, the Metrology Report
5. Instruction Manual(s) and Quick Start Guide
6. USB drive with applicable software and documentation (if ordered)
7. Rackmount Kit (optional)

Definition of Specifications

Dynamic Range

The dynamic range, or measurement range, of the optical power meter 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). The dynamic range is measured by comparing the absolute measured power against a reference power. When the difference between the two exceeds 1dB either end of the dynamic range has been reached.

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 or better) should be measured.

Calibration Wavelength

The calibration wavelengths are the nominal wavelengths of the instrument's calibration points. The exact wavelength of each particular calibration is stated in the Certificate of Calibration.

Calibration Traceability

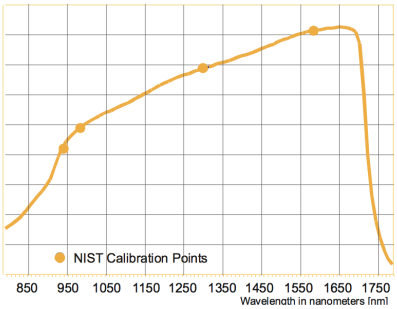
The detector's absolute calibration data is directly traceable to N.I.S.T. at the specified calibration wavelength and the specified power level, typically -10dBm.

Definition of Specifications

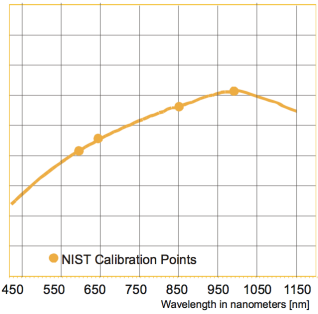
Spectral Responsivity

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. (Contact OptoTest for the detailed chain of uncertainties)

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 areal 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, may not under fill a small area detector hence the absolute power reading will be less than actual.

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.

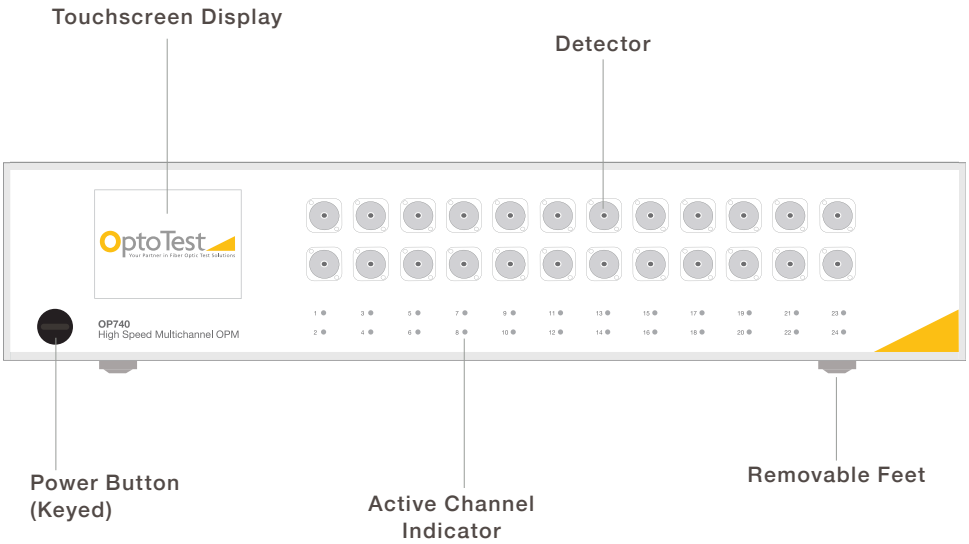
Instrument, Environmental

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.

Nomenclature



How to Navigate the User Interface

The OP740 is equipped with a full color touchscreen display, eliminating the need for physical buttons and allowing for increased functionality through the front panel.

Home Screen

At startup, the unit loads the Home screen. From here the user can select the single channel screen, multichannel screen, or settings screen.

Single	Single Channel Screen
Multi	Multichannel Screen
⚙	Settings Screen

Front Panel Operation

Single Channel Screen

From the single channel screen, accessible from the Home Screen and the Multichannel Screen, the user can view real-time optical power measurement and adjust parameters for a single channel. This screen features a variety of indicators and controls for all the functions of a state-of-the-art optical power meter such as multiple wavelength calibrations, relative/absolute mode (dB/dBm), and referencing.

Across the top of the screen are indicators for the measurement speed, current channel, and relative/absolute mode as well as a button to toggle through the available wavelengths.

Auto Range and Range Hold

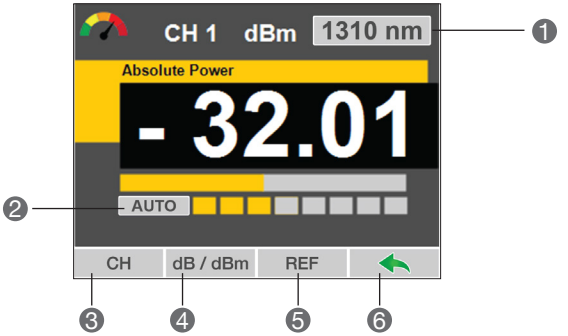
The indicators below the power reading show the measured power in terms of the current gain stage of the detector and whether the unit is measuring on the high or low end of that gain stage. By default, the unit operates in “Auto Range” mode meaning that it will find the gain stage in which it it can most accurately measure the optical power. The unit also has the option to operate in “Range Hold” mode meaning it will remain in the same gain stage regardless of the measured power. This mode is set using the Auto/Hold button next to the indicators.

Note: In “Range Hold” one should not be operating at the high or low end of the range. This will increase the error of the measurement.

Across the bottom of the screen are controls for selecting the current channel, taking a reference, toggling between relative and absolute mode, and returning to the previous screen.

Front Panel Operation

Single Channel Screen



1310 nm* ❶	Toggle through available wavelengths. Typically, for power meters with InGaAs this is 850nm, 980nm, 1300nm, 1310nm, 1480nm, 1550nm, and 1625nm; for Silicon Power Meters the wavelengths are 650nm, 850nm, and 980nm
AUTO* ❷	Select Auto Range or Range Hold
CH ❸	Set displayed channel; Value Entry Screen
dB / dBm ❹	Toggle between relative and absolute power view
REF ❺	Take reference: store the current absolute power reading as the reference and switch to relative power view if not already there
❻	Return to previous screen

**global settings*

Front Panel Operation

Multichannel Screen

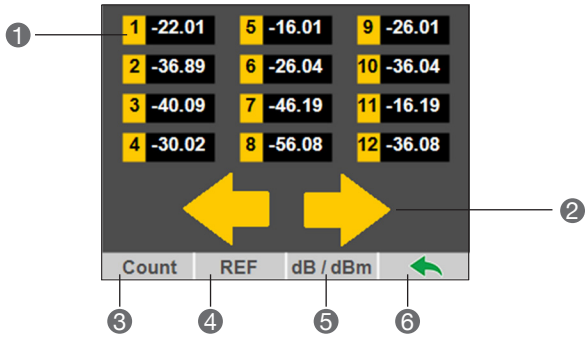
From the multichannel screen, the user can view real-time optical power measurement in relative and absolute mode for any 8, 18, 12, or 24 channels simultaneously.

Channel Remapping

With exception of the 24-channel variation, the channels in multichannel view can be remapped to any position of the user's choosing. This is done by selecting the channel currently in the desired position, which brings up the Single Channel Screen for that channel. From there, assign the new channel using the Value Entry Screen by selecting CH (see Single Channel Screen)

12-channel Alternate View

In the 12-channel variation, the user can choose which set of 12 channels to view using the yellow arrows that appear on screen.



1 ** ❶	Single Channel Screen for selected channel
***❷	Toggle between both 12 channel views
Count ❸	Toggle between 8,18,12, and 24 channel views
REF * ❹	Take reference: store the current absolute power reading as the reference and switch to relative power view if not already there
dB / dBm ❺	Toggle between relative and absolute power view
❻	Return to previous screen

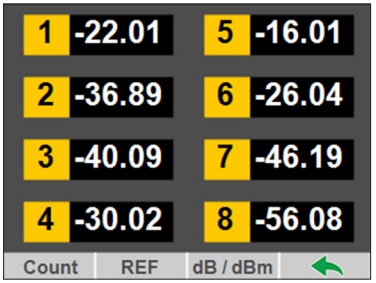
**global settings*

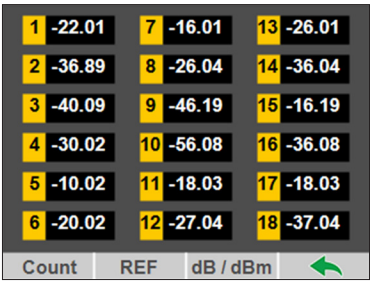
***not available in 24 channel view*

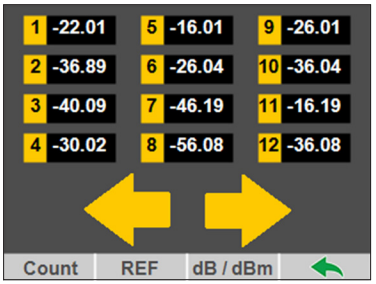
****12 channel view only*

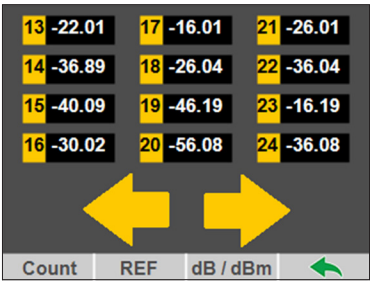
Front Panel Operation

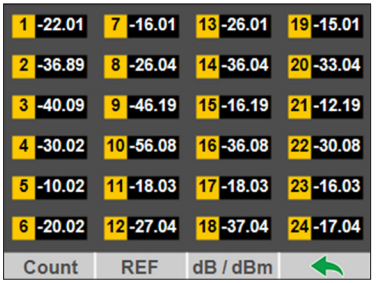
Multichannel Screens











Front Panel Operation

Settings Screen

From the settings screen, the user can adjust multiple unit parameters such as decimation rate, data filtering, and pass/fail thresholds.

Decimation

When viewing power readings through the front panel, the values shown are the average of a number of readings set by the decimation rate. By selecting x32, x64, x128, x256, x512, or x1024, the user selects how many samples to average in the calculation of the results being displayed. As such, increasing the decimation rate slows down the sampling rate in exchange for cleaner results.

Sinc5 and Wide Band Filtering

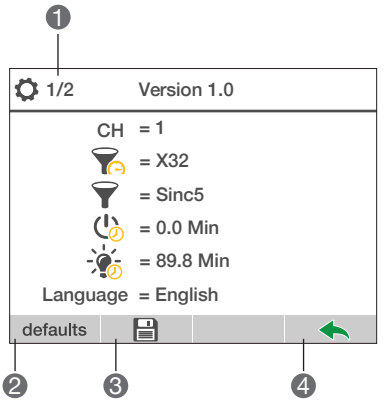
The Sinc5 filter is a low-pass filter that removes all frequencies above a certain cutoff while allowing acceptable frequencies to pass unaffected. By contrast, the Wide Band filter is a band-pass filter with both upper and lower frequency cutoffs that together create a, in this case wide, passband.

Pass/Fail Thresholds

The front panel displays pass/fail status of channels by way of color change, with green values for passing channels and red for failures. To determine if a channel passes or fails, the value is compared to high and low limits set by the user in the settings screen. These limits create a range that the value must fall within to pass. Pass/fail status indication can be turned on/off using the limit parameter in the settings screen.

Front Panel Operation

Settings Screen

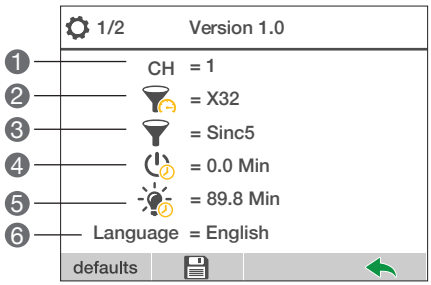


1/2 ❶	Current page
defaults ❷	Restore default settings
❸	Save current settings
❹	Return to previous screen without saving

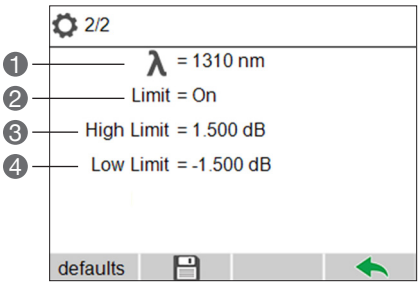
Front Panel Operation

Settings Screen

Page 1



Page 2



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CH ❶	Set the default channel for Single Channel Screen; Value Entry Screen
* ❷	Set the decimation rate: x32, x64, x128, x256, x512, x1024
* ❸	Select filtering: Sinc5 or Wide Band
❹	Set a time limit after which the unit restarts; Value Entry Screen
❺	Set a time limit after which the front panel dims; Value Entry Screen
Language ❻	Select language for the front panel. Options: English, Spanish, French, German, Italian, Polish

**global settings*

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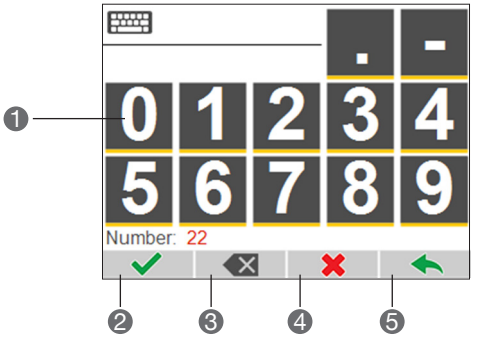
λ * ❶	Toggle through available wavelengths. Typically, for power meters with InGaAs this is 850nm, 980nm, 1300nm, 1310nm, 1480nm, 1550nm, and 1625nm; for Silicon Power Meters the wavelengths are 650nm, 850nm, and 980nm
Limit * ❷	Select whether or not to impose pass/fail criteria on the measurements; green/red pass/fail indication only applied if on
High Limit * ❸	Set high threshold; Value Entry Screen
Low Limit * ❹	Set low threshold; Value Entry Screen

**global settings*

Front Panel Operation

Value Entry Screen

From this screen the user can enter values for different parameters throughout the front panel.



1 2 ❶	Enterable values
✓ ❷	Confirm entry and return to previous screen
⌫ ❸	Backspace
✖ ❹	Clear entry
↩ ❺	Return to previous screen without confirming entry

Warranty Information

See our Terms and Conditions at www.optotest.com for warranty information.

NOTE: Do not send instruments for any reason without contacting OptoTest headquarters first. To request an RMA contact OptoTest at +1.805.987.1700 or customerservice@optotest.com.

Notes

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

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