

OPTICAL WAVELENGTH METERS

WA-1650/1150/1100 Wavemeter

R&D AND MANUFACTURING



The recognized standard for absolute wavelength measurement

Applications

- Characterize active components
 - Accurate wavelength analysis of transmitters (DFB lasers, tunable lasers and VCSELs)
- Calibrate component test equipment and test stations
 - Accurate wavelength calibration of optical spectrum analyzers (OSAs)
 - Accurate wavelength calibration of discretely tunable and swept wavelength tunable lasers

Features

- Absolute optical wavelength measured to the highest guaranteed accuracy of ± 0.3 pm
- Continuous calibration with built-in wavelength standard
- Accurate absolute wavelength measurement to a 3σ (99.6 %) confidence level
- Operation with CW, modulated and SONET/SDH signals

To meet the growing demand for access to larger volumes of digital information, telecommunications operators increase system capacity using dense wavelength-division multiplexing (DWDM). Both active DWDM components such as transmission lasers, and passive components such as multiplexers, demultiplexers and add/drop filters, thin film filters and fiber gratings, must be accurately characterized with respect to absolute wavelength.

The most precise wavelength characterization of DWDM components

Since first being introduced in 1980, Wavemeter wavelength meters have continually provided the most technically advanced optical wavelength measurement capability available. The WA-1650/1150 and WA-1100 Wavemeter Optical Wavelength Meters provide the highest accuracy wavelength measurement, and are designed specifically for the precise characterization of DWDM components in manufacturing environments.

The Wavemeter Advantage

These systems employ proven scanning Michelson interferometer-based Wavemeter technology to determine the absolute wavelength of a laser under test by comparing its interference fringe pattern with that of a built-in HeNe laser wavelength standard. Unlike other wavelength meters, all factors that can affect wavelength measurement are accounted for in order to achieve the highest absolute wavelength uncertainty of ± 0.3 pm (WA-1650).

When the highest accuracy is not required, a lower cost alternative is available (WA-1150 or WA-1100), providing an absolute wavelength uncertainty of ± 1.5 pm. The absolute wavelength measurement specification has a confidence level of 3σ , which means that 99.6 % of measurements fall within specification. To ensure accuracy of wavelength measurements, all Wavemeter Optical Wavelength Meters are traceable to recognized standards.

Total Optical Power Measured Simultaneously

To provide a more complete analysis of an optical source, these Wavemeter systems simultaneously measure the total power of an optical input signal. The absolute uncertainty of this power measurement is ± 0.5 dB and can be reported in units of dBm or watts.

Measure CW, Modulated and SONET/SDH Optical Signals

The advanced signal processing design of the WA-1650 and WA-1150 systems is capable of operating with CW, modulated and SONET/SDH optical signals. The WA-1100 system uses a different signal processing technique to provide the fastest update rate of 10 Hz for CW signals only.

Special Design for Manufacturing Environment

Several design considerations specific to the needs of DWDM component manufacturers have been incorporated into these optical wavelength meters. With a built-in HeNe laser wavelength standard, each system's accuracy is maintained over long periods of time. A rugged benchtop or rack mounted package minimizes any detrimental effects from a typical manufacturing environment.

SPECIFICATIONS

MODEL	WA-1650	WA-1150	WA-1100
Wavelength			
Range	700 nm to 1650 nm (181 THz to 428 THz)	700 nm to 1650 nm (181 THz to 428 THz)	700 nm to 1650 nm (181 THz to 428 THz)
Uncertainty ^{1,2} (pm)	± 0.3	± 1.5	± 1.5
Display resolution (nm)	0.0001	0.001	0.001
Units	nm (vacuum), GHz	nm (vacuum), GHz	nm (vacuum), GHz
Power			
Uncertainty	± 0.5 dB (at ± 30 nm from 1310 nm and 1550 nm)	± 0.5 dB (at ± 30 nm from 1310 nm and 1550 nm)	± 0.5 dB (at ± 30 nm from 1310 nm and 1550 nm)
Resolution (dB)	± 0.05	± 0.05	± 0.05
Linearity (dB)	± 0.3	± 0.3	± 0.3
Display resolution (dB)	0.01	0.01	0.01
Units	dBm, mW, μW	dBm, mW, μW	dBm, mW, μW
Optical Input Signal			
Sensitivity (1200-1600 nm) ³	-40 dBm (0.1 μW)	-40 dBm (0.1 μW)	-30 dBm (1 μW)
Sensitivity (700-1650 nm)	-30 dBm (1 μW)	-30 dBm (1 μW)	-20 dBm (10 μW)
Maximum input level	+10 dBm (10 mW)	+10 dBm (10 mW)	+10 dBm (10 mW)
Maximum safe level	+18 dBm (63 mW)	+18 dBm (63 mW)	+18 dBm (63 mW)
Measurement Update			
Time (rate)	1 s (1 measurement/s)	1 s (1 measurement/s)	0.1 s (10 measurement/s)
Inputs/Outputs			
Optical input	9/125 μm fiber FC/UPC or FC/APC SC/UPC or SC/APC ST/UPC	9/125 μm fiber FC/UPC or FC/APC SC/UPC or SC/APC ST/UPC	9/125 μm fiber FC/UPC or FC/APC SC/UPC or SC/APC ST/UPC
Instrument interface	GPIO (IEEE-488.2), RS-232, LabVIEW, LabWindows	GPIO (IEEE-488.2), RS-232, LabVIEW, LabWindows	GPIO (IEEE-488.2), RS-232, LabVIEW, LabWindows
Environmental			
Nominal warm-up time	7 minutes	N/A	N/A
Temperature	+15 °C to +30 °C (-10 °C to +70 °C storage)	+15 °C to +30 °C (-10 °C to +70 °C storage)	+15 °C to +30 °C (-10 °C to +70 °C storage)
Pressure (nm Hg)	500 to 900	500 to 900	500 to 900
Relative humidity	≤ 90% R.H. at +40 °C (no condensation)	≤ 90% R.H. at +40 °C (no condensation)	≤ 90% R.H. at +40 °C (no condensation)
Dimensions and Weight			
Dimensions (H x W x D)	3.5 in x 17.0 in x 16.50 in (89 mm x 431.8 mm x 419.1 mm)	3.5 in x 17.0 in x 16.50 in (89 mm x 431.8 mm x 419.1 mm)	3.5 in x 17.0 in x 16.50 in (89 mm x 431.8 mm x 419.1 mm)
Weight	18 lbs (8.18 kg)	17 lbs (7.65 kg)	16.50 lbs (7.50 kg)
Power Requirements			
Voltage and frequency	90 to 260 VAC, 50/60 Hz	90 to 260 VAC, 50/60 Hz	90 to 260 VAC, 50/60 Hz

Notes

1. Absolute wavelength accuracy to 3s (99.6%) confidence level.
2. For linewidths < 10 GHz for WA-1100.
3. Measurement repeatability is reduced when input < -35 dBm.

ORDERING INFORMATION

WA-1100-XX

Connectors

EA-EUI-89 = APC/DIN 47256
EA-EUI-91 = APC/SC
EI-EUI-89 = UPC/DIN 47256
EI-EUI-90 = UPC/ST
EI-EUI-91 = UPC/SC

Example: WA-1100-EI-EUI-89

WA-1150-XX

Connectors

EA-EUI-89 = APC/DIN 47256
EA-EUI-91 = APC/SC
EI-EUI-89 = UPC/DIN 47256
EI-EUI-90 = UPC/ST
EI-EUI-91 = UPC/SC

Example: WA-1150-EI-EUI-89

WA-1650-XX

Connectors

EA-EUI-89 = APC/DIN 47256
EA-EUI-91 = APC/SC
EI-EUI-89 = UPC/DIN 47256
EI-EUI-90 = UPC/ST
EI-EUI-91 = UPC/SC

Example: WA-1650-EI-EUI-89

SAFETY

21 CFR 1040.10 and IEC 60825-1:1993+A2:2001
CLASS 1 LASER PRODUCT

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EXFO is certified ISO 9001 and attests to the quality of these products. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor. For the most recent version of this spec sheet, please go to the EXFO website at <http://www.exfo.com/specs> In case of discrepancy, the Web version takes precedence over any printed literature.