Passive Component Environmental Test System



Temperature- and humidity-based environmental testing for

- Insertion loss
- Loss drift over time
- Optical return loss
- Polarization-dependent loss







Fiber-optic test, measurement and monitoring instruments

Integrated Solutions For Environmental Testing

Perform environmental tests based on temperature and humidity changes such as extended thermal age, extended humidity and thermal cycle as well as temperature humidity cycle with the IQ-12003 Passive Component Environmental Test System. This automated test system monitors IL, ORL and PDL performance during passive component environmental stress tests.

The IQ-12003 Passive Component Environmental Test System monitors temperature and humidity with standard probes. Six thermocouples and one hygrometer send environmental data to the test application, which compiles these results along with performance data about the device under test (DUT). The result: valuable correlation between environmental stress conditions and the behavior of the DUT.



Key Features

- Accurate, repeatable results
- Complete environmental characterization
- Comprehensive data management
- Supervisor and operator access levels

Scalable and future-proof

The IQ-12003 Passive Component Environmental Test System is based on EXFO's flexible IQ-200 Optical Test System platform and powerful Visual IQ software. Assembling different configurations for the IQ-12003 is easy with EXFO's wide variety of test modules. Start with a basic system and expand to a more sophisticated setup without having to modify or upgrade the software.

Customize Your System

The IQ-200 Optical Test System is EXFO's flexible, system-based approach to optical test and measurement. It combines PC benefits with seamless module interaction to make complex, integrated systems work like a single instrument.

Platforms

Control Unit–Oversee the measurement process, data interpretation and data storage IBM PC. LAN connectivity is standard.

IQ-206 Expansion Unit–House the test instruments you need in the IQ-206 Expansion Unit. Up to four expansion units may be connected to the IBM PC.



Modules



IQ-2400 WDM Laser Source Execute all the defined tests with the IQ-2400 WDM Laser Source. Measure insertion loss and return loss by modulating and depolarizing the output signal. Measure PDL by modifying the polarization state with the IQ-5100 Polarization Controller.



IQ-9700 Depolarizer Condition the IQ-2400 or IQ-2100-ORL laser signal with the IQ-9700 Depolarizer while performing IL and ORL measurements.



IQ-5100 Polarization Controller Scan the entire Poincaré sphere and produce all states of polarization to determine PDL with the IQ-5100 Polarization Controller. PDL is determined from the minimum and maximum loss levels via the measurement performed during the scan.



IQ-9402 Loss Reference Module

Perform numerous functions with the IQ-9402 Loss Reference Module. Measure transmitted power, provide a continuous dynamic power reference, ensure measurement accuracy and perform ORL and PDL measurements.



IQ-9100 Optical Switch

Use the IQ-9100 Optical Switch to direct a signal through the system's optical conditioning to the IQ-9402 Loss Reference Module. Then, direct the signal through each of the device channels as defined during the test setup phase.



Internal System Bus

The automated test system's components communicate through the internal system bus, a faster and more efficient method than GPIB, DAQ and other data-transfer interfaces.

Visual IO Software Benefits

Visual IQ software controls all instrument functions from start to finish. Ensure repeatable results with this comprehensive, systematic test procedure software. Features include automatic Pass/Fail flags, a device database and flexible test configurations that simplifies passive component qualification. Protective barriers ensure test results are saved; in case of power failure or accidental shutdown, simply restart the test where you left off. Even the most complex and time-consuming environmental test is quickly configured and set in motion. Retrieve, analyze, monitor and print data at anytime during the test.

Select

Configure

Configure a component database, including all the different devices to undergo environmental qualification, from your desktop workstation by completing two easy screens:

1. DUT

- physical description of the DUT
- part number
- required Pass/Fail limits for each parameter to be tested

2. Setups

- number of devices
- test duration
- delay between cycles
- parameters to be measured
- measurement direction (end-to-end or bidirectional)
- A customer database is also available









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Simply select the test to be performed. Connect the devices according to the previously established instructions. Start the test.

Test

Automatically perform tests for the defined duration with the IQ-12003. Results are updated after each acquisition cycle and the Pass/Fail indicator provides instant DUT performance status.

Obtain additional details for better interpretation of the graphical test results with the Graphic Settings tool. Drift, ORL and PDL values, along with their correlated temperature and humidity values, are presented as a function of time. View variable scales and markers on the graphical display; customize the display for a channel, a group of channels or with respect to wavelength.



Manage Data

Use the Microsoft database (MDB), an Access[™]-compatible automated application, to store results in a separate database for each system. Store databases on each test station or connect to a LAN for storage on any network drive. Test data can also be exported to delimited .TXT format, which is compatible with several storage and analysis programs.

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System Overview

Prior to entering the DUT environment, the signal passes through a number of different stages. EXFO has obtained high system stability by channeling the signal through optical conditioning, then a first detection stage. Three measurement configurations address all environmental testing requirements. Whether you require a drift-only setup or a PDL setup, EXFO delivers the high-quality measurements you've come to expect.



IL, drift and ORL measurement setup



IL, drift, ORL and PDL measurement setup



IL and drift measurement setup

Measurements

Measurement	Details
IL	Insertion loss is calculated at the central wavelength. Using the cutback method, splice and connector loss may be accurately
	calculated at the end of the test.
Drift	Insertion loss variation for each channel is measured as a function of time and correlated to temperature and humidity variations.
ORL	ORL measurements for each channel need no device manipulations. An initial calibration stage is necessary to obtain accurate results.
PDL	PDL measurements are performed at the selected wavelength using the polarization scanning method. Device manipulations are not
	required for the measurement.
Temperature	Temperature measurements are made through the provided thermocouples. Up to six temperature channels can be monitored at the
	same time. Thermocouple uncertainty is \pm 0.7 °C over the –100 °C to +100 °C temperature range.
Humidity	The state-of-the-art hygrometer offers a reading uncertainty of ± 3 % over the 0 % to 100 % relative humidity range and the
	-40 °C to 125 °C temperature range.

Specifications

System

System	
Testing time	~3 seconds for IL measurements, including channel selection, calculations and storage time.
Loss measurement uncertainty ^{1, 2, 3, 4}	± 0.1 dB (0 to 45 dB loss)
Loss measurement stability $(2\sigma)^{1,2}$	± 0.05 dB over 100 hours
ORL range ^{4, 5}	> 55 dB
ORL measurement uncertainty ^{1, 2, 3, 4}	± 1 dB from 15 to 55 dB
ORL measurement stability $(2\sigma)^{1, 2, 4}$	± 0.05 dB over 100 hours from 15 to 50 dB
PDL measurement uncertainty ^{3, 4, 6}	± 0.2 dB
PDL measurement stability $(2\sigma)^{4, 6}$	± 0.03 dB over 100 hours
Wavelength⁵	850 nm, 1300 nm, 1310 nm, 1550 nm
Detectors dynamic range	> 85 dB
Temperature uncertainty	± 0.7 °C
Humidity uncertainty	± 3 %

General Specifications

Dimensions (HxWxD)	188 cm x 61 cm x 81 cm	(71 in x 24 in x 32 in)
Weight	136 kg	(300 lb)
Environmental conditions	Working temperature range: 15 °C to 27 °C	
	Relative humidity: 0 to 80 % non-condensing, at wor	rking temperature
	Storage temperature: -20 °C to 60 °C	

Options

Low ORL option for switches
Environmental chamber integration
Wavelengths in the 1510 nm to 1612 nm range
Multitasking capability, sharing hardware with up to
three environmental chambers
External source (XS) working in the 1270 nm to 1350 nm and
1529 nm to 1565 nm ranges

Notes

1. Does not include connector or connector-adapter uncertainties.

2. Obtained with a depolarized IQ-2400 source and EXFO switches.

3. Reported with a 95 % confidence level.

4. For 0 dBm input power.

5. Splice and connector ORL must be better than 55 dB.

6. At 1550 nm using EXFO switches, for a 10 W loss (< 5 dB) component and PDL < 1 dB.

Ordering Information

For the system:

IQ-12003-01-Y-ZZ for IL only

Y is the fiber type $B = 9 \mu m$ (SM) $C = 50 \,\mu m$ (MM) $D = 62.5 \,\mu m \,(MM)$

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ZZ is the wavelength 01 = 850 nm (MM)02 = 1300 nm (MM)12 = 850/1300 nm (MM) 03 = 1310 nm (SM) 04 = 1550 nm (SM) 34 = 1310/1550 nm (SM) XS = External source

For the switch:

Specify the number of channels

12, 24, 32, 48, 64, 100, 120, 140, 180 the fiber type 9 μm, 50 μm or 62.5 μm

the connector type

Bulkhead FC/APC^{1, 4} Bulkhead FC/UPC^{1, 5} Pigtail 5 m with FC/APC connectors^{2, 4} Pigtail 5 m with FC/UPC connectors^{3, 5} Pigtail 5 m without connectors6

Standard Accessories

IQ-12003-02-YY-ZZ for IL/ORL with or without PDL

- YY is P0 = Without PDL P1 = With PDL
- ZZ is the wavelength 03 = 1310 nm (SM) 04 = 1550 nm (SM)
- 34 = 1310/1550 nm (SM)
- XS = External source

Notes

- 1. Includes one test jumper per channel.
- 2. Includes one connector per APC channel.
- 3. Includes one connector per UPC channel.
- 4. For APC: PDL test is possible but specifications are not guaranteed.
- 5. For UPC: ORL test is not possible.
- 6. For IQ-12003-01, IL system only.

Safety Laser Safety Interface (LSI4) Mainframe unit with keyboard, mouse, network card, OS Expansion units as required IQ-12003 software TempBook/66 with 6 thermocouples and 1 hygrometer PMAX: im) [-14 dBm nm) [-19 dBm (1530 to 1560 nm) (1529 to 1565 nm) Temperature-controlled rackmount Connector cleaning kit: including Video Fiber Inspection Probe, FOMS Fiber-Optic Microscope, Reel CLEANER and carrying case 21 CFR 1040.10 Class IIIb Laser Product 2 days on-site installation and training, all expenses included IEC 60825-1 : Ed. 1.1 1998 Class 3A Laser Product Instruction manual Interconnecting patchcords Acceptance test plan Certificate of Compliance **CORPORATE HEADQUARTERS** 465 Godin Avenue Vanier (Quebec) G1M 3G7 CANADA Tel.: 1 418 683-0211 . Fax: 1 418 683-2170 EXFO AMERICA 1201 Richardson Drive, Suite 260 Richardson TX 75080 USA Tel.: 1 800 663-3936 . Fax: 1 972 907-2297 EXFO EUROPE Le Dynasteur, 10/12 rue Andras Beck 92366 Meudon la Forêt Cedex FRANCE Tel.: +33.1.40.83.85.85 . Fax: +33.1.40.83.04.42 **EXFO ASIA-PACIFIC** 151 Chin Swee Road, #03-29 Manhattan House SINGAPORE 169876 Tel.: +65 333 8241 . Fax: +65 333 8242 TOLL-FREE (USA and Canada) Tel.: 1 800 663-3936 www.exfo.com • info@exfo.com

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 Web site at http://www.exfo.com/support/techdocs.asp In case of discrepancy, the Web version takes precedence over any printed literature.





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