

Cable Assembly Test System

IOS-12001B



Mandrel-free reflectance measurements

Accurate, repeatable IL and reflectance measurements

High-Throughput configuration

Remote configuration via LAN

DLL drivers



Fiber-optic T&M,
monitoring, manufacturing
and assembly solutions

EXFO

Integrated Cable Assembly Testing Solutions

Maximize production throughput for insertion loss (IL) and mandrel-free reflection testing for all types of fiber-optic interconnect assemblies with the IQS-12001B Cable Assembly Test System. This fast, accurate system comes with the most complete software package available, making it easy to test simplex, duplex, multifiber, hybrid and fanout fiber assemblies. EXFO's IQS-12001B is a one-box, single-software system that provides truly integrated cable assembly testing.



System Overview

The IQS-12001B features the IQS-3250 Loss Test Module, which is based on advanced time domain technology with a wide-aperture integrating cavity detector. The IQS-3250 delivers accurate, repeatable IL and reflectance measurements. Its internal monitoring channel ensures accurate IL measurements by compensating for any source power variations, a technology that complies with the TIA/EIA-455-34A, Standard FOTP-34A Interconnection Device Insertion Loss Test.

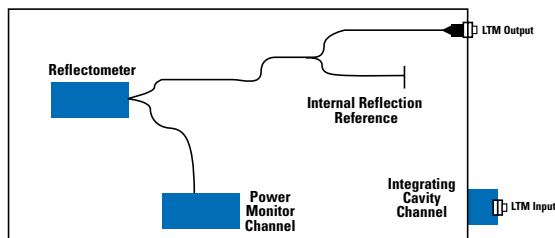


Figure 1: IQS-3250 singlemode block diagram

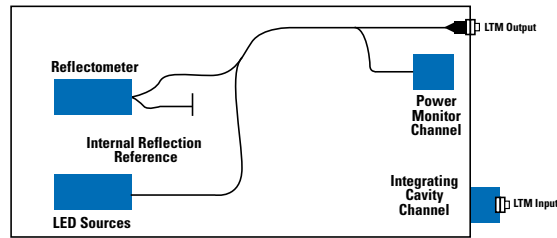


Figure 2: IQS-3250 multimode block diagram

The IQS-3250's internal reflectance reference significantly improves multimode and singlemode reflectance measurement performance and, in singlemode assembly, accounts for the effects of Rayleigh backscattering in each measurement. Combined with EXFO's advanced detection electronics and algorithms, the IQS-3250 provides highly accurate mandrel-free reflectance measurements for even the most difficult-to-test APC connectors.

For multimode applications, the IQS-3250 performs reflectance measurements at 850 nm and 1300 nm using two lasers. IL measurements are obtained through using LED sources at 850 nm and 1300 nm, meeting widely recognized standards—namely TIA/EIA-526-14A (OFSTP-14, *Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant*). With controlled launching conditions, measurement reproducibility increases to ± 0.05 dB.

Key Features

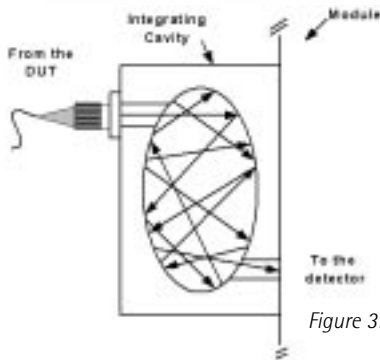
- High-sensitivity reflectance measurements
- Up to 32 measurement channels
- Multimode and singlemode in one system
- Easily upgradable—simply add the appropriate module
- IL measurement practically insensitive to fiber position and alignment

Applications

- Start-up, mid-range and high-volume production
- Singlemode and multimode IL and reflectance measurements
- Simplex, duplex, multifiber, bundle, hybrid and fanout cable assemblies
- FC, SC, ST, LC, MTP, MT, MPO, MT-RJ, MU and other connectors

Integrating Cavity Technology

EXFO has developed an innovative detector assembly for the IQS-12001B. Using wide-aperture integrating cavity packaging, the detector has many properties that make it ideal for interconnect testing. The wide aperture allows it to be used for simplex and multifiber connectors. Because it uses integrating cavity technology, connector alignment is less critical and polarization dependence is negligible. The end result is increased accuracy, repeatability and flexibility.



The integrating cavity technology is similar to what is known in the industry as the integrating sphere technology. Geometry is the major distinction between the latter and EXFO's integrating cavity, which is more ellipsoidal than spherical. The interior of the cavity is coated with a light-reflecting material. The light entering the integrating cavity generates a uniform field of light within the cavity.

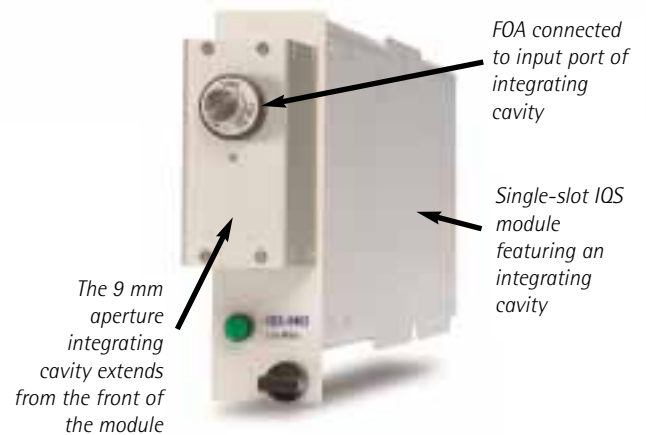
Figure 3: Integrating cavity diagram

Combining an integrating cavity with a detector and the right diameter input port provides a major advantage: power measurements are independent of the fiber's numerical aperture, ferrule polish (PC or APC) and alignment, since the cavity scatters all incident light, with the same average power reaching the detector. Integrating cavity technology is a built-in feature of the two detectors used with the IQS-12001B Cable Assembly Test System, the IQS-3250 Loss Test Module and the IQS-9403 Loss Meter.

The IQS-3250 Loss Test Module



The IQS-9403 Loss Meter



Ideal detector assembly for use with all types of connectors:

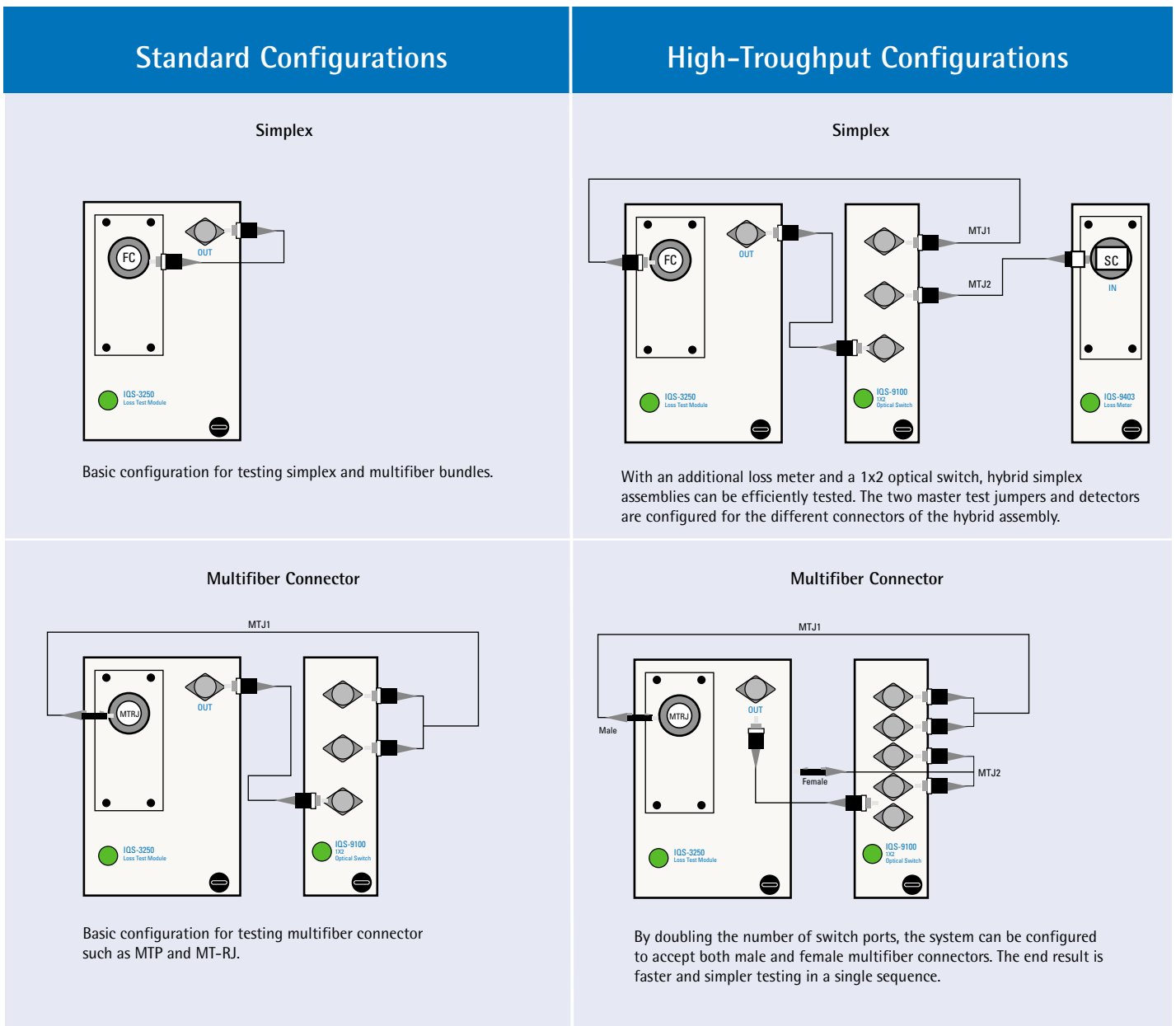
- Surface uniformity
- Wide area
- Excellent linearity
- Repeatable measurements even when changing adapters
- Economical
- Flexible
- Fast response
- Compatible with angled and non-angled polishes
- Low polarization dependence
- Modular

Configure Your System for Optimal Performance

The IQS-12001B Cable Assembly Test System is available in two different configurations: Standard and High-Throughput.

The Standard configuration includes only the minimal hardware necessary to get the job done. It keeps costs in check, while providing fast and accurate measurements in a user-friendly format.

EXFO's High-Throughput (HT) configuration maximizes productivity and reduces testing time. Particularly useful for hybrid assemblies, the HT configuration is designed to minimize handling and manipulation. With more switching ports and an additional loss meter, now you can test hybrid assemblies in one sequence.



Standard and High-Throughput configurations are also available for testing bundle, duplex and multifiber to fanout assemblies.

Comprehensive Software

EXFO used critical input gathered from its interconnect manufacturer customer base to design the IQS-12001B software. The result is a comprehensive, high-performance software package that brings you the following features:

- Configurable operator and supervisor access levels
- Pass, fail and warning thresholds
- Report and label printing
- On-screen instructions
- Training simulator
- Comprehensive SQL results database
- A single software for all multimode and singlemode applications



Thanks to a centralized database, the IQS-12001B can work as a stand-alone station, or it can be connected to a LAN. The LAN connection enables a supervisor to configure connector parameters, cable assemblies, sequences and work orders directly from the office—a convenient feature that saves time and money. A built-in database browser also lets you view, print or export data based on a user-defined filter.

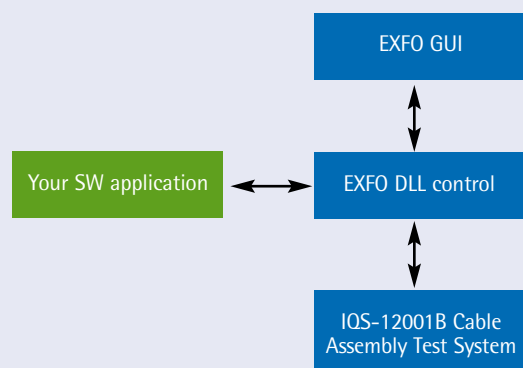


- Flexible easy-to-use query builder
- View, print or export statistics and charts based on displayed data and selected template
- View or print reports and labels based on displayed data and selected template
- Customize templates by using built-in VSReport Designer software

Thanks to a unique software package design, EXFO's IQS-12001B Cable Assembly Test System brings it all: performance, versatility and high throughput—meeting your most exacting needs.

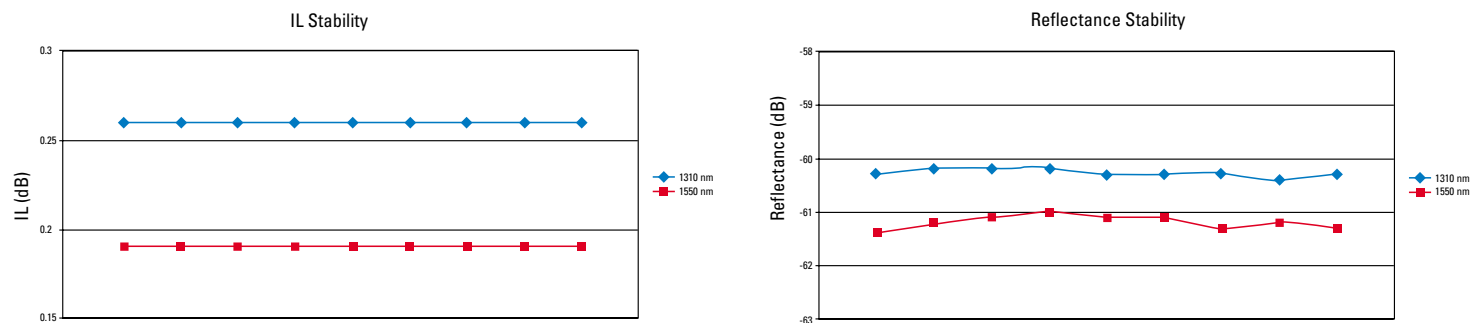
DLL Controls for Customized Applications

The IQS-12001B comes with DLL interfaces that enable you to create your own applications and remotely control your system. These system-level commands ensure smooth, efficient application creation without compromising the system's measurement accuracy and speed.



Repeatable Reflectance and IL Measurements

When testing connectors, achieving repeatable reflectance and IL measurements is a challenge. It requires both reliable test equipment and a solid understanding of the factors that can affect the measurements. EXFO's IQS-12001B Cable Assembly Test System provides the key repeatability you need for characterizing and qualifying connectors and for performing production testing of fiber and cable assemblies. The results below speak for themselves.



The graphs show nine measurements taken on the same device.

The Perfect Accessory for Reflection Measurement Verification

Reflectance measurement verification can be achieved on the production floor with the CKT-30 Singlemode Reflectance Reference module. The calibrated reflectance value of the CKT-30 was designed to fall within the -50 dB to -55 dB range—in the middle of the IQS-3250 operating range and very close to your connector reflectance measurements. Using the IQS-12001B's reflection verification software utility, you can perform step-by-step verification of your system's reflectance calibration. If your IQS-3250 Loss Test Module measurements are within ≤ 0.5 dB of the calibrated values of the CKT-30, you have the assurance that the system is operating within the published specifications. No worry, no downtime!



Wavelength	IL (dB)	RefL (dB)
1310 nm	3.56	-53.93
1550 nm	3.63	-52.53
1625 nm	3.32	-54.29

CKT-30 reflectance values for each wavelength

CKT-30 insertion loss values between its In and Out ports for each wavelength

The CKT-30's reflectance values vary from -55 dB to -50 dB, according to wavelength. The calibration value, along with the standard insertion loss (IL) values (see figure above), is reported in a calibration certificate. The IQS-12001B system takes into account the difference between IL measured during standard CKT-30 calibration and IL measured during IQS-3250 calibration. The CKT-30 has an uncertainty of ± 0.8 dB, including IL uncertainty.

Universal Interface

The IQS-12001B uses the EXFO Universal Interface on the IQS-3250 lost test module, which enables you to avoid high insertion loss, high return loss and measurement instability caused by dirty or contaminated connectors. This patented universal connector gives you access to the ferrule, simplifying connector cleaning and ensuring better results.



Specifications¹

Preliminary Specifications	Singlemode ²	Multimode ³
Testing time ⁴ (s)	< 6	< 6
Cable assembly length (m)	1.8 to 500	1.8 to 500
Insertion loss uncertainty (dB)	$\pm 0.03^5$	$\pm 0.07^6$
Insertion loss stability ⁷ (dB)	< 0.005	< 0.028
Reflectance range (dB)	-30 to -70	-10 to -45
Reflectance uncertainty ⁷ (dB)	± 1 (-30 dB to -60 dB) ± 1.5 (-60 dB to -65 dB) ± 2 (-65 dB to -70 dB)	± 1.1 (-10 dB to -30 dB) ± 1.5 (-30 dB to -40 dB) ± 3.5 (-40 dB to -45 dB)
Reflectance repeatability ^{6,7} (dB)	± 0.2 (-30 dB to -60 dB) ± 0.6 (-60 dB to -65 dB) ± 1.1 (-65 dB to -70 dB)	± 0.3 (-10 dB to -30 dB) ± 0.8 (-30 dB to -40 dB) ± 2.0 (-40 dB to -45 dB)
Wavelength (nm)	1310/1550 1550/1625	850/1300
Output channels	Up to 32 channels	Up to 32 channels
Test method	End-to-end/bidirectional	End-to-end/bidirectional

Notes

- Calculated and measured with the following considerations:
 - Based on recommended procedure for reflectance measurements
 - The FOA-300 series' uncertainty is included in all uncertainty values
 - Although tests are possible with other fiber-optic adapters, these specifications are only valid with the FOA-300 series
 - Cable assemblies < 1.8 m can be tested using a non-reflective termination
- At 1310 nm and 1550 nm. For SMF-28 fiber, specifications were calculated at $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. Switch module connectorized with FC/APC connectors.
- At 850 nm and 1300 nm. For 50/125 and 62.5/125 fibers. Specifications were calculated at $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. Switch module connectorized with FC/PC connectors. Uncertainty due to launching conditions included.
- For IL/reflectance end-to-end measurements, simplex, for two wavelengths, calculations and storage time; does not include referencing and connection time.
- For simplex measurements using FOA-322 adapter. Uncertainty for MTP to MTP, MT-RJ to MT-RJ, MTP to fanout and MT-RJ to fanout is ± 0.06 dB (calculated for a level of confidence of 95 %). These results do not include connector or connector adapter uncertainties or uncertainties due to PDL of the switch.
- For simplex measurement using FOA-322 adapter. Uncertainty for MTP to MTP, MT-RJ to MT-RJ, MTP to fanout and MT-RJ to fanout is ± 0.08 dB (calculated for a level of confidence of 95 %). Does not include uncertainties due to connector, connector adapter or uncertainties due to mode dependence of the switch.
- For a stable connection, over 15 minutes, at constant temperature.

Laser Safety

21 CFR 1040.10 CLASS 1 LASER PRODUCT
IEC 00825-1 and 2001 CLASS 1 LASER PRODUCT

Standard Accessories

Expansion units as required, Instruction Manual, Certificate of Compliance, Custom Report, Label Generator, IQS-12001B software and EUI-89 FC narrow key connector.

Ordering Information

For a complete system:

IQS-12001B-XX-XX-X-XX-XX-XX-XX

Model

- IQS-12001B-05-S1-D = IQS-505P, 850/1300 nm, IL 62.5/125 µm, PC connector
- IQS-12001B-05-S2-D = IQS-505P, 850/1300 nm, IL/RL 62.5/125 µm, PC connector
- IQS-12001B-05-S3-B = IQS-505P, 1310/1550 nm, IL/RL 9/125 µm, APC connector
- IQS-12001B-05-S4-B = IQS-505P, 1550/1625 nm, IL/RL 9/125 µm, APC connector
- IQS-12001B-10-S1-D = IQS-510P, 850/1300 nm, IL 62.5/125 µm, PC connector
- IQS-12001B-10-S2-D = IQS-510P, 850/1300 nm, IL/RL 62.5/125 µm, PC connector
- IQS-12001B-10-S3-B = IQS-510P, 1310/1550 nm, IL/RL 9/125 µm, APC connector
- IQS-12001B-10-S4-B = IQS-510P, 1550/1625 nm, IL/RL 9/125 µm, APC connector

Connector Adapter

- FOA-316 = Ultra-low reflection SMA 906
- FOA-322 = Ultra-low reflection FC
- FOA-328 = Ultra-low reflection DIN47256
- FOA-332 = Ultra-low reflection ST
- FOA-340 = Ultra-low reflection HMS-0, HFS-3
- FOA-354 = Ultra-low reflection SC
- FOA-376 = Ultra-low reflection HMS, HFS-10/AG
- FOA-384 = Ultra-low reflection HMS-10/HP, HFS
- FOA-392 = Ultra-low reflection MTP
- FOA-393 = Ultra-low reflection MT-RJ
- FOA-396 = Ultra-low reflection E-2000
- FOA-398 = Ultra-low reflection LC
- FOA-399 = Ultra-low reflection MU
- FOA-3000 = Adapter for BFA-3000

Example: IQS-12001B-10-S3-B-FOA-322

Reflectance Reference

- 00 = Without reflectance reference
- CKT-30 = With reflectance reference singlemode

Additional Loss Meter

- 00 = Without additional loss meter
- PM01 = With one additional loss meter

Channel Count

- 00 = Without switch
- 1-02 = 1x2 switch
- 1-04 = 1x4 switch
- 1-12 = 1x12 switch
- 1-24 = 1x24 switch
- 1-32 = 1x32 switch
- Singlemode switch with FC/APC connector
- Multimode switch with FC/PC connector
- Other connectors available: contact EXFO for special order

Connector Adapter

- FOA-316 = Ultra-low reflection SMA 906
- FOA-322 = Ultra-low reflection FC
- FOA-328 = Ultra-low reflection DIN47256
- FOA-332 = Ultra-low reflection ST
- FOA-340 = Ultra-low reflection HMS-0, HMS-3
- FOA-354 = Ultra-low reflection SC
- FOA-376 = Ultra-low reflection HMS, HFS-10/AG
- FOA-384 = Ultra-low reflection HMS-10/HP, HFS
- FOA-392 = Ultra-low reflection MTP
- FOA-393 = Ultra-low reflection MT-RJ
- FOA-396 = Ultra-low reflection E-2000
- FOA-398 = Ultra-low reflection LC
- FOA-399 = Ultra-low reflection MU
- FOA-3000 = Adapter for BFA-3000

Example: IQS-3250-12-D-IL-EI-EUI-89-FOA-322

For an IQS-3250: **IQS-3250-XX-XX**

Model

- IQS-3250-12-D-IL = 850/1300 nm IL 62.5/125 µm, PC connector
- IQS-3250-12-D = 850/1300 nm IL/RL 62.5/125 µm, PC connector
- IQS-3250-23-B = 1310/1550 nm IL/RL 9/125 µm, APC connector
- IQS-3250-34-B = 1550/1625 nm IL/RL 9/125 µm, APC connector

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

