

PULSE SUPPRESSOR BOX

FTB-PSB and Stand-Alone PSB

NETWORK TESTING

USER GUIDE



www.exfo.com

Telecommunications Test and Measurement

EXFO

EXPERTISE REACHING OUT

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Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

Patents

EXFO's Universal Interface is protected by US patent 6,612,750.

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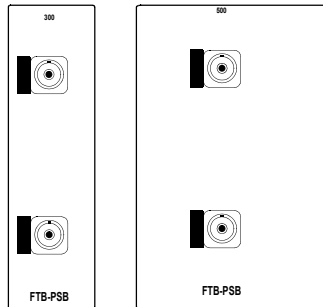
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1 Introducing the Pulse Suppressor Box

Main Features

With a Pulse Suppressor Box, the Optical Time Domain Reflectometer (OTDR) can measure the loss of the first connectorized port of an optical fiber network patch panel. It also makes it possible to work around the effects of a dead zone.

The Pulse Suppressor Box is a connectorized fiber spool. It is available as a stand-alone unit housed in a rugged resin case or as a module used in the FTB-400 Universal Test System.



FTB-PSB



Stand-alone PSB

The stand-alone unit and the module main features include:

- singlemode or multimode fiber types
- three different fiber lengths: 500 m and 1500 m fiber on singlemode fiber and 300 m on multimode fiber

The stand-alone unit also offers:

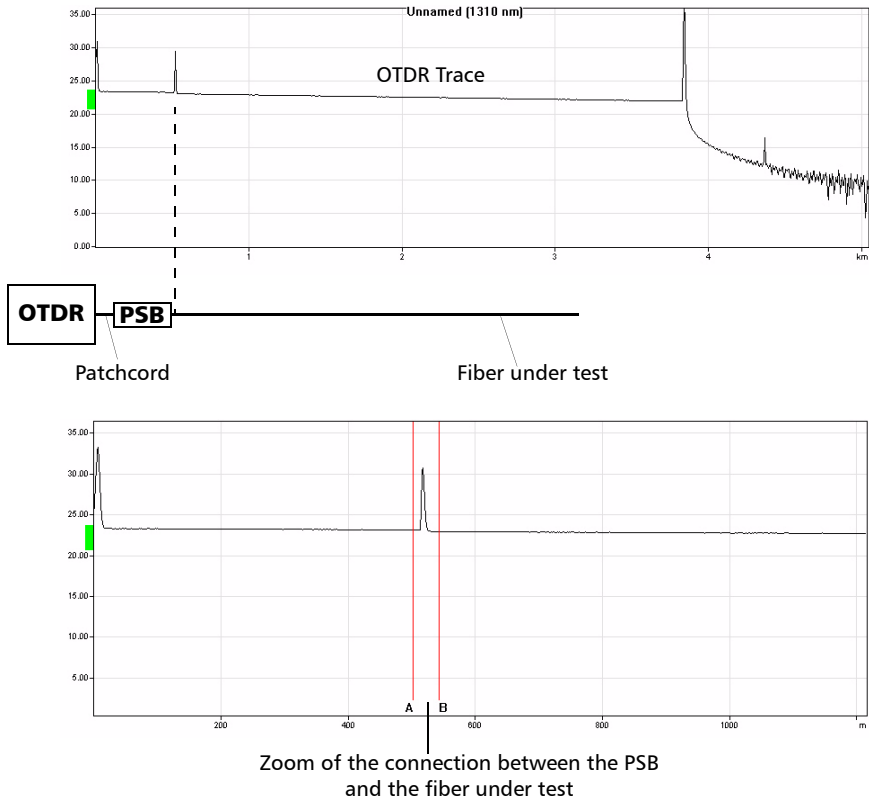
- wide variety of available connectors
- rugged and compact case

Introducing the Pulse Suppressor Box

Pulse Suppressor Box Theory

Pulse Suppressor Box Theory

Because it is impossible to measure loss within a dead zone, loss due to connectors close to the OTDR launch point cannot be determined under ordinary circumstances. However, you can work around this problem by connecting the Pulse Suppressor Box between the OTDR and the fiber under test. The length of fiber in the Pulse Suppressor Box distances the dead zone from connectors, making it possible to measure the crucial loss values. The pictures below show a fiber under test to which a Pulse Suppressor Box has been added; the loss is clearly visible.



2 **Safety Information**

Conventions

Before using the product described in this manual, you should understand the following conventions:



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in *death or serious injury*. Do not proceed unless you understand and meet the required conditions.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *minor or moderate injury*. Do not proceed unless you understand and meet the required conditions.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *component damage*. Do not proceed unless you understand and meet the required conditions.



IMPORTANT

Refers to information about this product you should not overlook.

Safety Information

Laser Safety Information

Laser Safety Information

Although the Pulse Suppressor Box does not incorporate any laser source, laser radiation may still emanate from the optical ports when a laser source is connected. Avoid long-term exposure to laser radiation.



WARNING

Do not install or terminate fibers while a light source is active. Never look directly into a live fiber and ensure that your eyes are protected at all times.



WARNING

Use of controls, adjustments and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure.

3 **Operating Your Pulse Suppressor Box**

The following chapter shows you how to prepare the Pulse Suppressor Box, as well as connections, for connector loss measurement.

Inserting and Removing Test Modules




CAUTION

Never insert or remove a module while the FTB-400 Universal Test System is powered on. This will result in immediate and irreparable damage to both the module and unit.



WARNING

When the laser safety light () is flashing on the FTB-400, at least one of your modules is emitting an optical signal. Please check all modules, as it might not be the one you are currently using.

To insert a module into the FTB-400 Universal Test System:

1. Exit ToolBox and power off your unit.
2. Position the FTB-400 so that its right panel is facing you.

Operating Your Pulse Suppressor Box

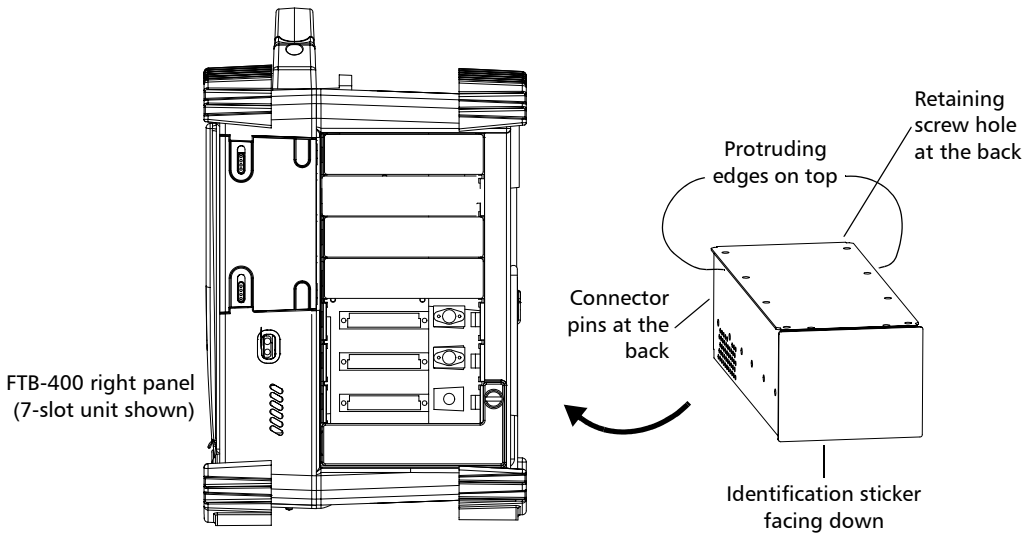
Inserting and Removing Test Modules

3. Take the module and place it so that the connector pins are at the back, as explained and shown below. Identification sticker must be facing down and connector pins at the left of the retaining screw hole.



CAUTION

Inserting a module upside down could result in permanent damage to the module, as the connector pins might be bent.



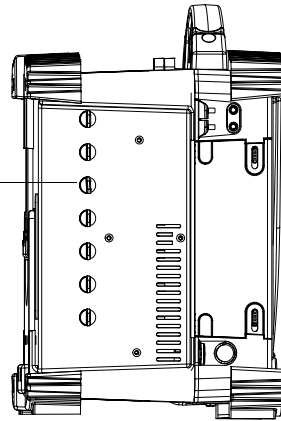
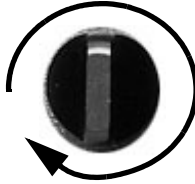
4. Insert the protruding edges of the module into the grooves of the unit's module slot.
5. Push the module all the way to the back of the slot, until the retaining screw makes contact with the unit casing.
6. Place the FTB-400 so that its left panel is facing you.

Operating Your Pulse Suppressor Box

Inserting and Removing Test Modules

7. While applying slight pressure to the module, turn the retaining screw clockwise until it is tightened. This will secure the module into its “seated” position.

Turn retaining screw knob(s)
clockwise



FTB-400 left panel
(7-slot unit shown)

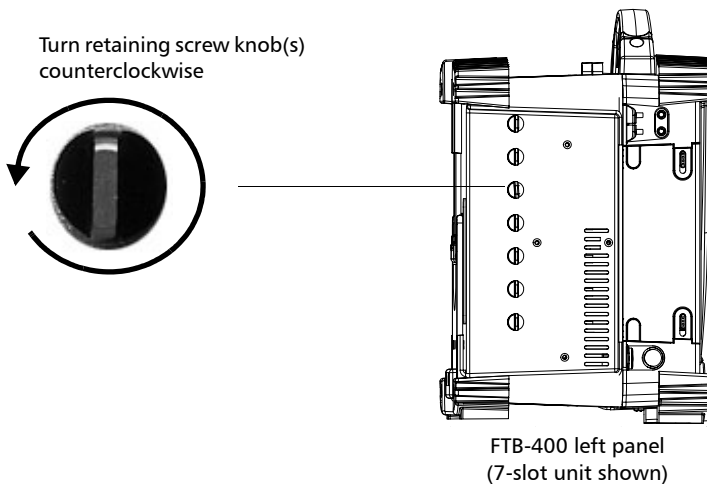
When you turn on the FTB-400, the startup sequence will automatically detect the module.

Operating Your Pulse Suppressor Box

Inserting and Removing Test Modules

To remove a module from the FTB-400 Universal Test System:

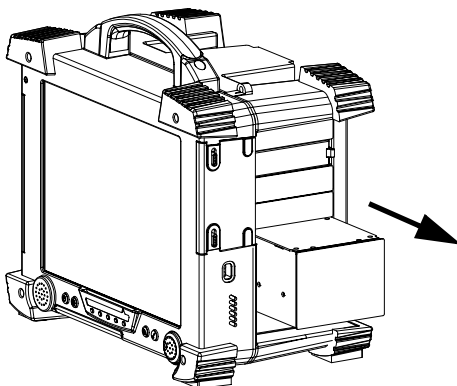
1. Position the FTB-400 so that the left panel is facing you.
2. Turn the retaining screw counterclockwise until it stops. The module will be slowly released from the slot.



3. Place the FTB-400 so that the right panel is facing you.
4. Hold the module by its sides or by the handle (*NOT by the connector*) and pull it out.

Operating Your Pulse Suppressor Box

Inserting and Removing Test Modules



CAUTION

Pulling out a module by a connector could seriously damage both the module and connector. Always pull out a module by its casing.

5. Cover empty slots with the supplied protective covers.



CAUTION

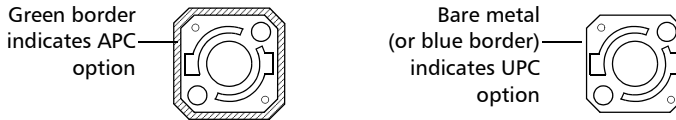
Failure to reinstall protective covers over empty slots will result in ventilation problems.

Operating Your Pulse Suppressor Box

Installing the EXFO Universal Interface (EUI)

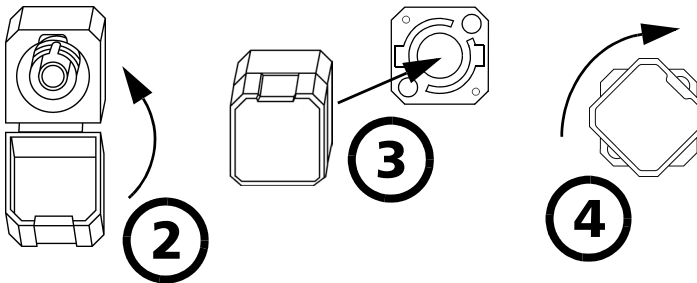
Installing the EXFO Universal Interface (EUI)

The EUI fixed baseplate is available for connectors with angled (APC) or non-angled (UPC) polishing. A green border around the baseplate indicates that it is for APC-type connectors, as shown below:



To install an EUI connector adapter onto the EUI baseplate:

1. Hold the EUI connector adapter so the dust cap opens downwards.



2. Close the dust cap in order to hold the connector adapter more firmly.
3. Insert the connector adapter into the baseplate.
4. While pushing firmly, turn the connector adapter clockwise on the baseplate to lock it in place.

Cleaning and Connecting Optical Fibers



IMPORTANT

To ensure maximum power and to avoid erroneous readings:

- Always clean fiber ends as explained below before inserting them into the port. EXFO is not responsible for damage or errors caused by bad fiber cleaning or handling.
- Ensure that your patchcord has appropriate connectors. Joining mismatched connectors will damage the ferrules.

To connect the fiber-optic cable to the port:

1. Clean the fiber ends as follows:
 - 1a. Gently wipe the fiber end with a lint-free swab dipped in isopropyl alcohol.
 - 1b. Use compressed air to dry completely.
 - 1c. Visually inspect the fiber end to ensure its cleanliness.
2. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces. If your connector features a key, ensure that it is fully fitted into the port's corresponding notch.
3. Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact.

If your connector features a screwsleeve, tighten the connector enough to firmly maintain the fiber in place. Do not overtighten, as this will damage the fiber and the port.

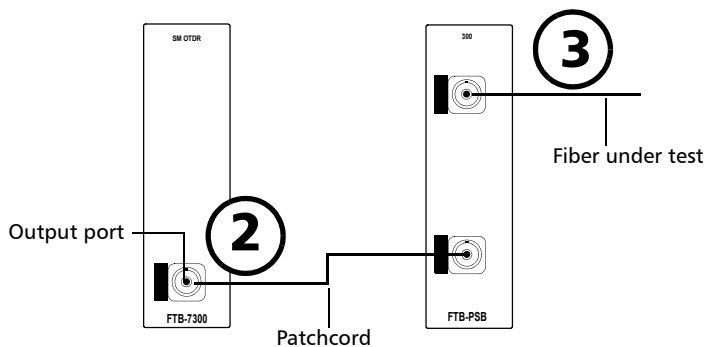
Note: *If your fiber-optic cable is not properly aligned and/or connected, you will notice heavy loss and reflection.*

Preparing Connections for Connector Loss Measurement

The Pulse Suppressor Box adds an extra fiber length to the OTDR, which can prevent you from viewing the entire trace once your acquisition is done. The OTDR compensates for this extra fiber length to make sure you see the entire trace. For more information, refer to the user guide that came with your OTDR.

To operate the FTB-PSB module:

1. Insert the module into the FTB-400 Universal Test System as explained in *Inserting and Removing Test Modules* on page 5.
2. Using a patchcord, connect the output port of the OTDR to one of the FTB-PSB ports.



3. Connect the fiber under test to the other FTB-PSB port. You are now ready to measure the loss of the first connector in an optical network.
4. Before starting the OTDR tests:
 - Select the operation mode and test wavelength.
 - Set up the OTDR acquisition parameters. For more information, refer to the user guide that came with your OTDR.

To operate the stand-alone unit:

- 1.** Slide the first connector ferrule into the OTDR module connector port.
- 2.** Slide the second connector ferrule into the connectorized port of the optical fiber network patch panel to be tested.
- 3.** To prevent the lid from falling and damaging the patchcords:
 - 3a.** Unscrew the black bolt located on the outside of the resin case.
 - 3b.** Unscrew one of the bolts located inside the case (located in the corners).
 - 3c.** Replace this bolt with the black bolt you removed from the resin case. The bolt support will prevent the lid from closing completely and damaging your material.
- 4.** Before starting the OTDR tests:
 - Select the operation mode and test wavelength.
 - Set up the OTDR acquisition parameters. For more information, refer to the user guide that came with your OTDR.

4 **Maintenance**

To help ensure long, trouble-free operation:

- Always clean fiber-optic connectors before using them.
- Keep the unit free of dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately and let the unit dry completely.



WARNING

Use of controls, adjustments and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure.

Cleaning Fixed Connectors

Regular cleaning of connectors will help maintain optimum performance. *Do not try to disassemble the unit. Doing so would break the connector.*

To clean fixed connectors:

1. Fold a lint-free wiping cloth in four to form a square.
2. Moisten the center of the lint-free wiping cloth with *only one drop* of isopropyl alcohol.



IMPORTANT

Alcohol may leave traces if used abundantly. Avoid contact between the tip of the bottle and the wiping cloth, and do not use bottles that distribute too much alcohol at a time.

3. Gently wipe the connector threads three times with the folded and moistened section of the wiping cloth.



IMPORTANT

Isopropyl alcohol takes approximately ten seconds to evaporate. Since isopropyl alcohol is not absolutely pure, evaporation will leave microscopic residue. Make sure you dry the surfaces before evaporation occurs.

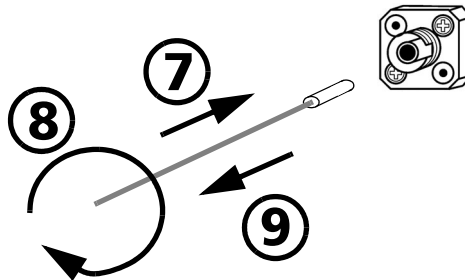
4. With a dry lint-free wiping cloth, gently wipe the same surfaces three times with a rotating movement.
5. Throw out the wiping cloths after one use.
6. Moisten a cleaning tip (2.5 mm tip) provided by EXFO with *only one drop* of isopropyl alcohol.



IMPORTANT

Alcohol may leave traces if used abundantly. Avoid contact between the tip of the bottle and the cleaning tip, and do not use bottles that distribute too much alcohol at a time.

7. Slowly insert the cleaning tip into the connector until it reaches the ferrule inside (a slow clockwise rotating movement may help).



8. Gently turn the cleaning tip one full turn.
9. Continue to turn as you withdraw the cleaning tip.
10. Repeat steps 7 to 9, but this time with a dry cleaning tip (2.5 mm tip provided by EXFO).

Note: *Make sure you don't touch the soft end of the cleaning tip and verify the cleanliness of the cotton tip.*

11. Throw out the cleaning tips after one use.

Cleaning EUI Connectors

Regular cleaning of EUI connectors will help maintain optimum performance. There is no need to disassemble the unit.

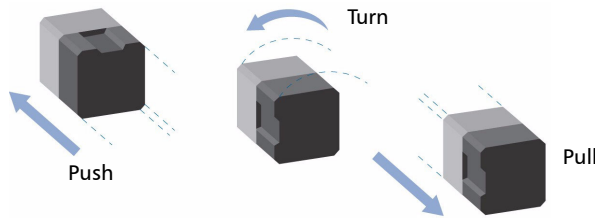


IMPORTANT

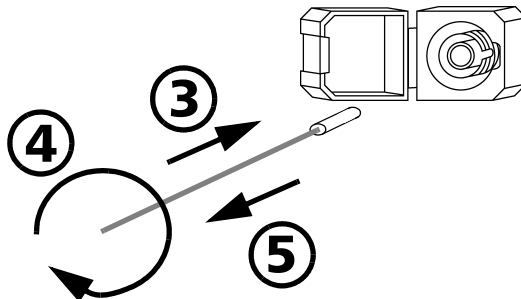
If any damage occurs to internal connectors, the module casing will have to be opened and a new calibration will be required.

To clean EUI connectors:

1. Remove the EUI from the instrument to expose the connector baseplate and ferrule.



2. Moisten a 2.5 mm cleaning tip provided by EXFO with *one drop* of isopropyl alcohol (alcohol may leave traces if used abundantly).
3. Slowly insert the cleaning tip into the EUI adapter until it comes out on the other side (a slow clockwise rotating movement may help).



4. Gently turn the cleaning tip one full turn, then continue to turn as you withdraw it.
5. Repeat steps 3 to 4 with a dry cleaning tip.

Note: *Make sure you don't touch the soft end of the cleaning tip.*

6. Clean the ferrule in the connector port as follows:
 - 6a. Deposit *one drop* of isopropyl alcohol on a lint-free wiping cloth.



IMPORTANT

Isopropyl alcohol may leave residues if used abundantly or left to evaporate (about 10 seconds).

Avoid contact between the tip of the bottle and the wiping cloth, and dry the surface quickly.

- 6b. Gently wipe the connector and ferrule.
- 6c. With a dry lint-free wiping cloth, gently wipe the same surfaces to ensure that the connector and ferrule are perfectly dry.
- 6d. Verify connector surface with a portable fiber-optic microscope (e.g., EXFO's FOMS) or fiber inspection probe (e.g., EXFO's FIP).



WARNING

Verifying the surface of the connector WHILE THE UNIT IS ACTIVE WILL result in permanent eye damage.

7. Put the EUI back onto the instrument (push and turn clockwise).
8. Throw out cleaning tips and wiping cloths after one use.

Cleaning Detector Ports

Regular cleaning of detectors will help maintain measurement accuracy.



IMPORTANT

Always cover detectors with protective caps when unit is not in use.

To clean detector ports:

1. Remove the protective cap and adapter (FOA) from the detector.
2. If the detector is dusty, blow dry with compressed air.
3. Being careful not to touch the soft end of the swab, moisten a supplied cleaning tip with *only one drop* of isopropyl alcohol.



IMPORTANT

Alcohol may leave traces if used abundantly. Do not use bottles that distribute too much alcohol at a time.

4. While applying light pressure (to avoid breaking the detector window), gently rotate the cleaning tip on the detector window.
5. Repeat step 4 with a dry cleaning tip or blow dry with compressed air.
6. Discard the cleaning tips after one use.

Recycling and Disposal (Applies to European Union Only)



Recycle or dispose of your product (including electric and electronic accessories) properly, in accordance with local regulations. Do not dispose of it in ordinary garbage receptacles.



This equipment was sold after August 13, 2005 (as identified by the black rectangle).

- Unless otherwise noted in a separate agreement between EXFO and a customer, distributor or commercial partner, EXFO will cover costs related to the collection, treatment, recovery and disposal of end-of-lifecycle waste generated by electronic equipment introduced after August 13, 2005 to an European Union member state with legislation regarding Directive 2002/96/EC.
- Except for reasons of safety or environmental benefit, equipment manufactured by EXFO, under its brand name, is generally designed to facilitate dismantling and reclamation.

For complete recycling/disposal procedures and contact information, visit the EXFO Web site at www.exfo.com/recycle.

5 **Troubleshooting**

Finding Information on the EXFO Web Site

The EXFO Web site provides answers to frequently asked questions (FAQs) regarding the use of your Pulse Suppressor Box.

To access FAQs:

1. Type <http://www.exfo.com> in your Internet browser.
2. Click on the **Support** tab.
3. Click on **FAQs** and follow the on-screen instructions. You will be given a list of questions pertaining to your subject.

The EXFO Web site also provides the product's most recent technical specifications.

Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 7:30 a.m. to 8:00 p.m. (Eastern Time in North America).

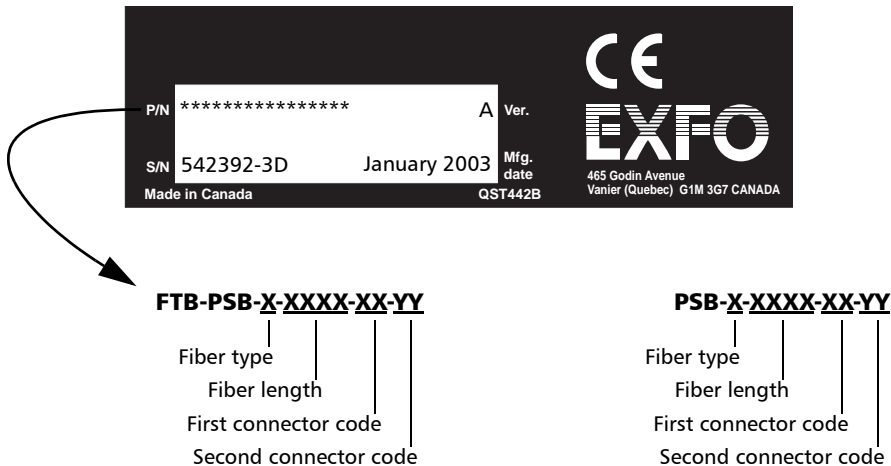
Technical Support Group
400 Godin Avenue
Vanier (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

To accelerate the process, please have information such as the name and the serial number (see the product identification label—an example is shown below), as well as a description of your problem, close at hand.

Troubleshooting

Transportation



Transportation

Maintain a temperature range within specifications when transporting the unit. Transportation damage can occur from improper handling. The following steps are recommended to minimize the possibility of damage:

- Pack the unit in its original packing material when shipping.
- Avoid high humidity or large temperature fluctuations.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shock and vibration.

6 **Warranty**

General Information

EXFO Electro-Optical Engineering Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of one year from the date of original shipment. EXFO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, EXFO will, at its discretion, repair, replace, or issue credit for any defective product, as well as verify and adjust the product free of charge should the equipment need to be repaired or if the original calibration is erroneous. If the equipment is sent back for verification of calibration during the warranty period and found to meet all published specifications, EXFO will charge standard calibration fees.



IMPORTANT

The warranty can become null and void if:

- unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.
- warranty sticker has been removed.
- case screws, other than those specified in this guide, have been removed.
- case has been opened, other than as explained in this guide.
- unit serial number has been altered, erased, or removed.
- unit has been misused, neglected, or damaged by accident.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL EXFO BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Warranty

Liability

Liability

EXFO shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

EXFO shall not be liable for damages resulting from improper usage or unauthorized modification of the product, its accompanying accessories and software.

Exclusions

EXFO reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with EXFO products are not covered by this warranty.

This warranty excludes failure resulting from: improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond EXFO's control.



IMPORTANT

EXFO will charge a fee for replacing optical connectors that were damaged due to misuse or bad cleaning.

Certification

EXFO certifies that this equipment met its published specifications at the time of shipment from the factory.

Service and Repairs

EXFO commits to providing product service and repair for five years following the date of purchase.

To send any equipment for service or repair:

- 1.** Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 28). Support personnel will determine if the equipment requires service, repair, or calibration.
- 2.** If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
- 3.** If possible, back up your data before sending the unit for repair.
- 4.** Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
- 5.** Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

Note: *A test setup fee will apply to any returned unit that, after test, is found to meet the applicable specifications.*

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, you will be invoiced for the cost appearing on this report. EXFO will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 28).

Warranty

EXFO Service Centers Worldwide

EXFO Service Centers Worldwide

If your product requires servicing, contact your nearest authorized service center.

EXFO Headquarters Service Center

400 Godin Avenue
Vanier (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
quebec.service@exfo.com

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Tel.: +86 (10) 6849 2738
Fax: +86 (10) 6849 2662
beijing.service@exfo.com

A **Technical Specifications**



IMPORTANT

The following technical specifications can change without notice. The information presented in this section is provided as a reference only. To obtain this product's most recent technical specifications, visit the EXFO Web site at www.exfo.com.

Description	Typical specifications For singlemode fiber only	
Connector insertion loss (dB)	< 0.5 (maximum initial)	
Connector reflectance (dB)	UPC: < -50 APC: < -60	
Fiber type	Wavelength	Typical attenuation range
Multimode fiber 50/125 μ m	850 nm	2.4 to 3.0 dB/km
	1300 nm	0.6 to 1.2 dB/km
Multimode fiber 62.5/125 μ m	850 nm	3.0 to 3.2 dB/km
	1300 nm	0.7 to 0.9 dB/km
Singlemode fiber 9/125 μ m	1310 nm	\leq 0.35 dB/km
	1550 nm	\leq 0.25 dB/km

GENERAL SPECIFICATIONS

Size (H x W x D)	Single slot	9.6 cm x 2.5 cm x 26 cm	(3 ³ / ₄ in x 1 in x 10 ¹ / ₄ in)
	Double slot	9.6 cm x 5.1 cm x 26 cm	(3 ³ / ₄ in x 2 in x 10 ¹ / ₄ in)
Weight	Single slot	325 g	(0.72 lb)
	Double slot	495 g	(1.09 lb)

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