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# PON POWER METER

PPM-350B

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*

The PPM-350B is the subject of International Patent Appln. No. WO 2005/036783; EXFO's Universal Interface is protected by US patent 6,612,750.

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# Contents


Certification Information ..... iv

**1 Introducing the PPM-350B PON Power Meter ..... 1**
Main Features ..... 1
Available Models ..... 3
Power Sources ..... 3
Typical Applications ..... 3

**2 Safety Information ..... 4**
Electrical Safety Information ..... 4
Conventions ..... 4

**3 Getting Started with Your PPM-350B PON Power Meter ..... 5**
Turning the Unit On and Off ..... 5
Activating Automatic Shutdown (Auto-Off) ..... 6
Installing the EXFO Universal Interface (EUI) ..... 7
Cleaning and Connecting Optical Fibers ..... 8

**4 Configuring Thresholds and Correction Factors ..... 9**

**5 Testing with Your PPM-350B PON Power Meter ..... 10**
Nulling Electrical Offsets ..... 10
Viewing Correction Factors ..... 11
Selecting a Threshold Set ..... 11
Testing in Pass/Fail Mode or in Normal Mode ..... 13
Measuring Loss Between Two Points ..... 16

**6 Maintenance ..... 18**
Cleaning EUI Connectors ..... 18
Replacing Disposable Alkaline Batteries ..... 20
Recalibrating the Unit ..... 20
Verifying Thresholds ..... 21
Verifying the LEDs and LCD ..... 21
Recycling and Disposal (Applies to European Union Only) ..... 22

**7 Troubleshooting ..... 23**
Solving Common Problems ..... 23
Error Codes and Descriptions ..... 24
Contacting the Technical Support Group ..... 25
Finding Information on the EXFO Web Site ..... 26
Transportation ..... 26

**8 Warranty ..... 27**
General Information ..... 27
Liability ..... 27
Exclusions ..... 28
Certification ..... 28
Service and Repairs ..... 29
EXFO Service Centers Worldwide ..... 30

**A Technical Specifications ..... 31**





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# Certification Information

## F.C.C. Information

Electronic test equipment is exempt from Part 15 compliance (FCC) in the United States. However, compliance verification tests are systematically performed on most EXFO equipment.

## CE Information

Electronic test equipment is subject to the EMC Directive in the European Union. The EN61326 standard prescribes both emission and immunity requirements for laboratory, measurement, and control equipment. This unit has undergone extensive testing according to the European Union Directive and Standards.

EXFO

**DECLARATION OF CONFORMITY**

| | |
|---|---|
| Application of Council Directive(s): | 73/23/EEC - The Low Voltage Directive<br>89/336/EEC - The EMC Directive |
| Manufacturer's Name: | EXFO ELECTRO-OPTICAL ENG. |
| Manufacturer's Address: | 400 Godin Avenue<br>Vanier, Québec<br>Canada G1M 2K2<br>(418) 683-0211 |
| Equipment Type/Environment: | Industrial Scientific Equipment |
| Trade Name/Model No.: | PPM-350B PON Power Meter |

**Standard(s) to which Conformity is Declared:**

| | |
|---|---|
| **EN 61326: 1997/ A2: 2001** | **Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements** |
| **EN 55022: 1998/ A1: 2000** | **Limits and methods of measurement of radio disturbance characteristics of information technology equipment** |

*I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards.*

**Manufacturer**

Signature: 

| | |
|---|---|
| Full Name: | Stephen Bull, E. Eng |
| Position: | Vice-President Research and Development |
| Address: | 400 Godin Avenue Vanier, Quebec, Canada |
| Date: | September 15, 2004 |

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# 1 Introducing the PPM-350B PON Power Meter

The PPM-350B PON Power Meter was designed to suit FTTP testing needs and to be easy to use for people who are not necessarily familiar with fiber optics.

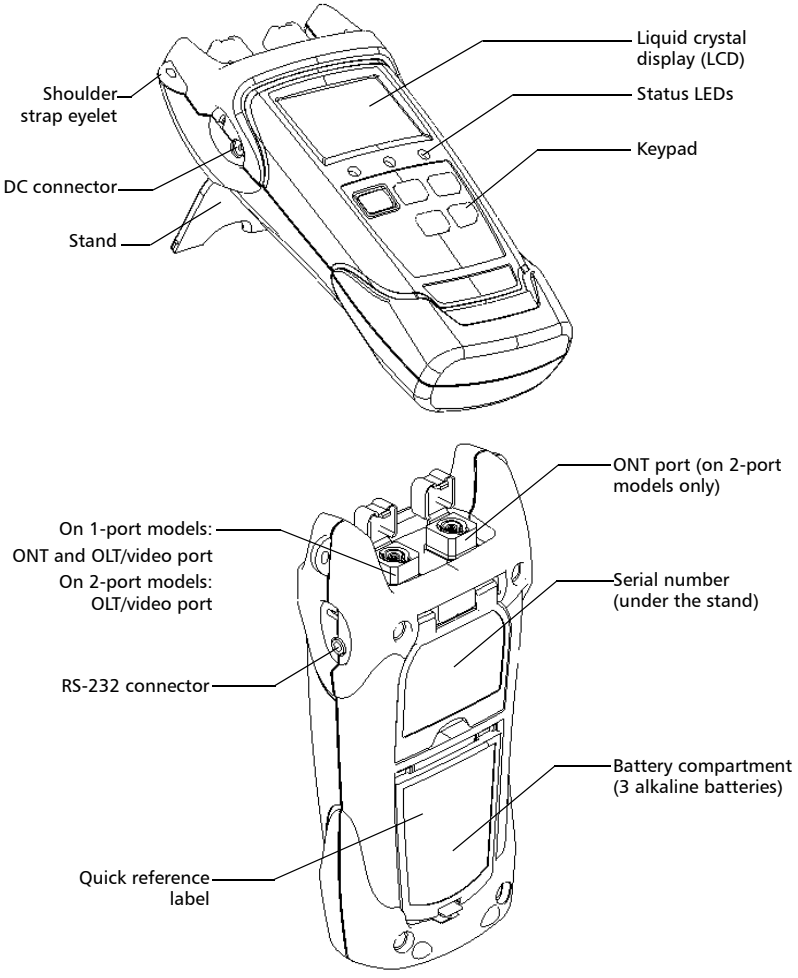
## Main Features

| | Details | 1-port Models | 2-port Models |
|---|---|---|---|
| Supports:<br>➤ 1310 nm (ONT)<br>➤ 1490 nm (OLT)<br>➤ 1550 nm (video) | On 2-port models,<br>➤ Port 1: 1310 nm (ONT)<br>➤ Port 2: 1490 nm (OLT)/ 1550 nm (video) | X | X |
| Pass-through device (spy mode): does not block communication between ONT and OLT | | | X |
| Allows triple-play testing (voice, video and data) | | X | X |
| Measures each signal independently | ➤ Optical network terminal (ONT): 1310 nm<br>➤ Central office (CO): 1490 and 1550 nm | X | X |
| Measures optical power of any type of signal | ➤ Continuous (e.g., TV signal at 1550 nm)<br>➤ Framed (e.g., ATM, Ethernet at 1490 nm or 1310 nm)<br>➤ All baud rates (e.g., 155 Mbps, 1 Gpps; synchronous or asynchronous) | X<br>X<br>X | X<br>X<br>X |
| Measures all signals simultaneously | Only way to measure ONT signal (ONT does not transmit when disconnected) | | X |
| Features visual Pass/Fail indicators | ➤ One indicator (LED) per wavelength<br>➤ All 3 signal status are displayed simultaneously | X | X<br>X |
| Displays all power levels simultaneously | | | X |



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| | Details | 1-port Models | 2-port Models |
|---|---|---|---|
| Contains up to 10 different threshold sets | ➤ You can select any of the predefined threshold sets<br>➤ You can configure thresholds on a computer and transfer them to your PPM-350B PON Power Meter via RS-232 | X | X |
| Automatically shuts down after 10 minutes of idle time (auto-off) | | X | X |




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## Available Models

The PPM-350B PON Power Meter is offered in one- and two-port configurations with normal or extended measurement range. The extended range allows testing at the central office and before the splitter.

Some models support relative-power measurement allowing you to measure loss between two locations.

## Power Sources

The PPM-350B PON Power Meter operates with the following power sources:

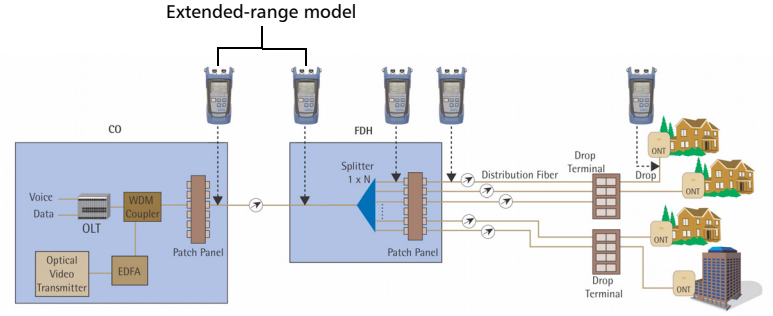
- AC adapter (connected to standard power outlet—indoor use only)
- AA alkaline batteries (automatically take over if you unplug the AC adapter) The icon also indicates the battery charge.

**IMPORTANT**

**If the battery level becomes too low, the unit turns itself off.**

## Typical Applications

You can use your PPM-350B PON Power Meter during service activation (at ONT) or to troubleshoot passive optical networks (at ONT, drop terminal, fiber distribution hub or CO).






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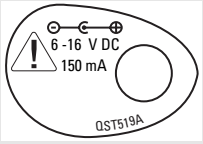
# 2 Safety Information

## Electrical Safety Information



### WARNING

**Use the AC adapter provided with this product *indoors only*.**




## 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.**

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# 3 Getting Started with Your PPM-350B PON Power Meter

## Turning the Unit On and Off

When you turn the PPM-350B PON Power Meter off, it saves the current mode (Pass/Fail or Normal) and threshold set. On models supporting relative-power measurement, unit and reference values are also kept in memory.

**IMPORTANT**

**If you remove batteries (and the AC adapter is unplugged), the unit will turn off *without saving the above values*.**

**If batteries are low (and the AC adapter is unplugged), the unit will save the above values and turn off.**

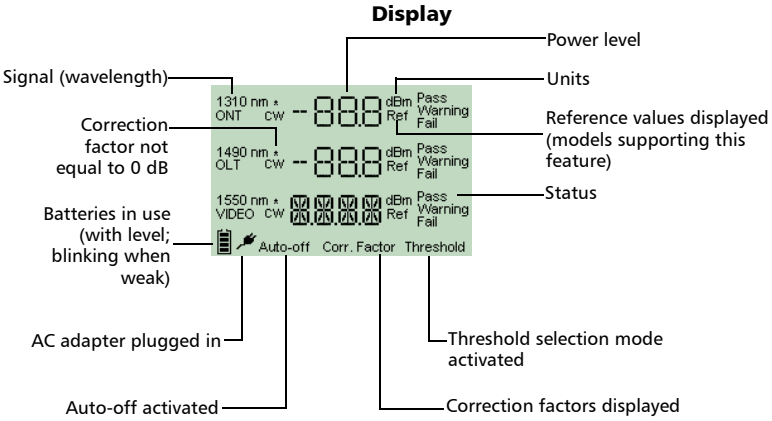
***Note:*** *Offset nulling values are always returned to factory settings.*

***To turn the unit on:***

Press . The unit displays **EXFO** for a few seconds and vertical bars move at the top of the display, indicating the initialization is in progress. You may use your unit immediately under normal conditions. The unit is in Pass/Fail or Normal mode, depending on which mode was used last time.

***To turn the unit off:***

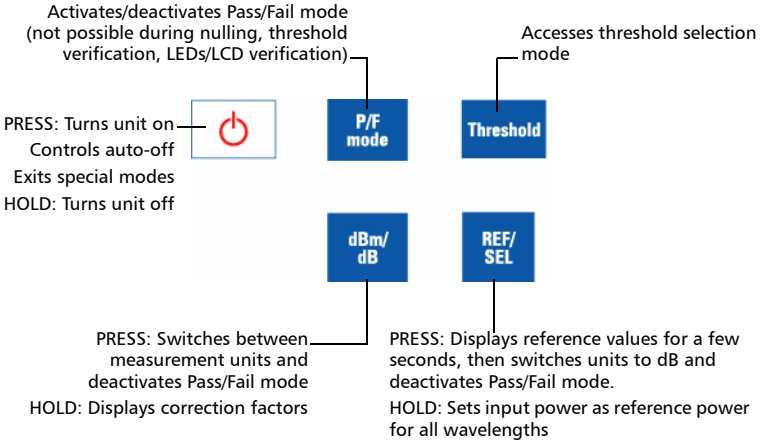
From Pass/Fail or Normal modes (not threshold selection mode or correction factor mode), hold down a few seconds.



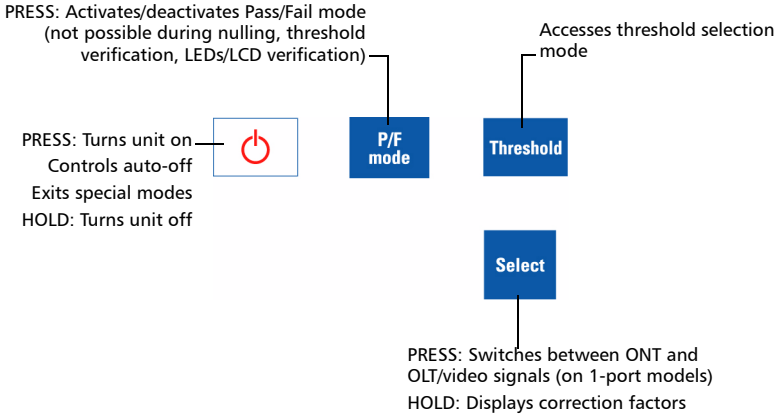



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### Keypad (models that can measure relative power)




### Keypad (other models)

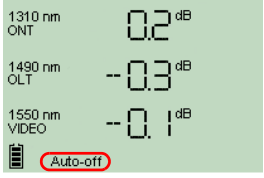



# Activating Automatic Shutdown (Auto-Off)

When auto-off is activated, the unit will turn itself off after 10 minutes of idle time.

Auto-off is activated by default when you turn unit on.

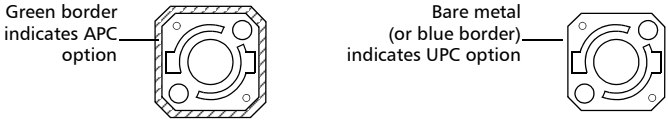
***To deactivate/reactivate auto-off:***
Press ⏻.




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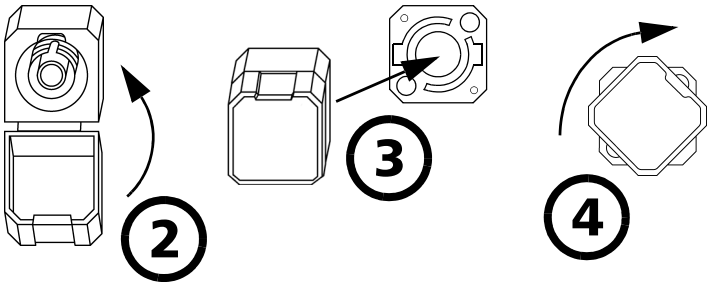
# Installing the EXFO Universal Interface (EUI)

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.



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# 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.*

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# 4 Configuring Thresholds and Correction Factors

Your PPM-350B PON Power Meter offers 3 correction factors (one per wavelength) and up to 10 threshold sets. On a properly calibrated PPM-350B PON Power Meter, correction factors are set to 0 dB.

Correction factors are *added* to the measured values. For this reason, once the correction factors are applied, your PPM-350B PON Power Meter may display “HI” or “LO”, indicating the power levels are no longer within the unit’s power limits.

If you need to define correction factors of more than 1 dB or less than –1 dB to compensate for inaccuracies, it may be a good idea to send your PPM-350B PON Power Meter for recalibration (see *Recalibrating the Unit* on page 20). This will ensure the results remain accurate.

The Handheld Data Transfer (provided on your CD) enables you to create new threshold sets and correction factors or modify values retrieved from your PPM-350B PON Power Meter. For more information, refer to Handheld Data Transfer online help.



**IMPORTANT**

**Both threshold sets *and* correction factors will be transferred to your unit. Previous values will be lost.**



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# 5 Testing with Your PPM-350B PON Power Meter

In this chapter, some instructions are identified as “Models measuring relative power”. A quick way to confirm that your unit can measure relative power is to verify if the keypad has a dBm/dB button.

## Nulling Electrical Offsets

Temperature and humidity variations affect the performance of electronic circuits and optical detectors. Nulling the electrical offsets eliminates these effects. *Your unit has been designed not to require offset nulling under normal operation*, but you should perform it whenever environmental conditions change significantly or when measuring very low power values.

**IMPORTANT**

**If light reaches the detector when nulling offsets, LIGH appears on the display and the nulling is not performed. You will need to press a key to return to the previous display.**

***Note:*** *Factory-defined values will be reinstated when you turn the unit off.*

***To perform an offset nulling:***




- [Models measuring relative power] Hold down dBm/dB and REF/SEL a few seconds.
- [Other models] Hold down Threshold and Select a few seconds.

  The unit displays **NULL** and vertical bars move at the top of the display, indicating the nulling is in progress.

***Note:*** *Keypad is disabled during the operation.*

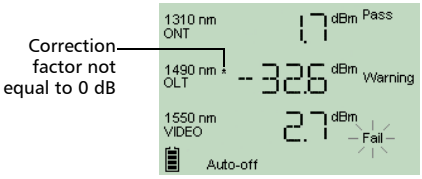
The unit will then return to your previous mode (Pass/Fail or Normal).

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# Viewing Correction Factors

Applying a correction factor to measured power compensates for known power gains or losses, or inaccuracies at specific wavelengths.

By default, correction factors are set to 0 dB, because properly calibrated units do not require any correction factor.

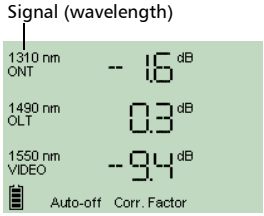



Correction factors are *added* to the values that are read. For this reason, once the correction factors are applied, your PPM-350B PON Power Meter may display “HI” or “LO”, indicating the power levels are no longer within the unit’s power limits.

***Note:*** *The unit takes correction factors into account in both Pass/Fail and Normal modes.*

To modify correction factors, you must use the Handheld Data Transfer (refer to the Handheld Data Transfer online help).

***To view correction factors on your unit:***




1. [Models measuring relative power] Hold down **dBm/dB** for a few seconds.

   [Other models] Hold down **Select** for a few seconds.

   The unit displays correction factors (one per wavelength).

2. Press ⏻ to return to your previous mode (Pass/Fail or Normal).

# Selecting a Threshold Set

You can select which threshold set will be used to determine the Pass/Warning/Fail status. Your unit contains up to 10 threshold sets, but only one set can be selected at a time.

A threshold set comprises three wavelengths (1310, 1490 and 1550 nm), each of them having specific threshold values for pass, warning and fail.

***Note:*** *Thresholds are used in Pass/Fail mode only.*

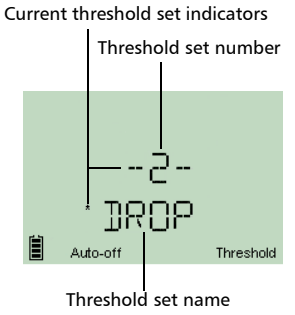
You can view thresholds directly on your unit. To modify threshold values, you must use the Handheld Data Transfer (refer to the Handheld Data Transfer online help).



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***To select a threshold set:***

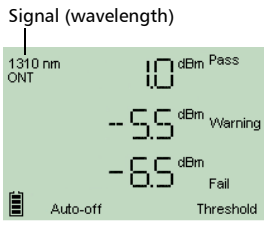
1. Press **Threshold**. The unit enters the threshold selection mode and displays the current threshold set. If the threshold name has more than 4 characters, it will scroll automatically.
2. Press **Threshold** to switch between available threshold sets.



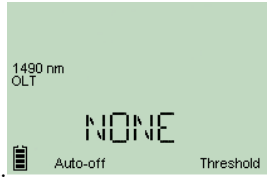

3. If desired, display the Pass/Warning/Fail values of the threshold set as follows:

   ***3a.*** Hold down **Threshold** for a few seconds. The unit displays threshold values of the first wavelength that has not been deactivated.

   ***3b.*** Press **Threshold** to switch to next wavelength.




***Note:*** *If a wavelength has been deactivated via the* Handheld Data Transfer *(*refer to the Handheld Data Transfer online help*), the unit displays no threshold values.*




   ***3c.*** Press ⏻ to return to threshold selection mode.

4. [Models measuring relative power] Press **REF/SEL** to make the displayed threshold set the current one.

   [Other models] Press **Select** to make the displayed threshold set the current one.

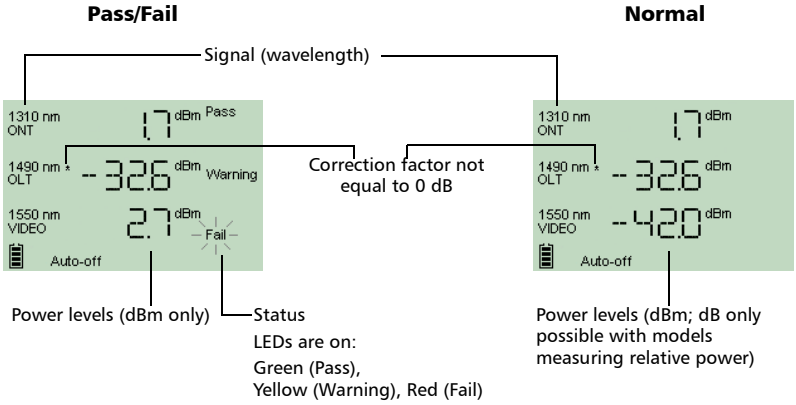
   The unit returns to Pass/Fail mode.

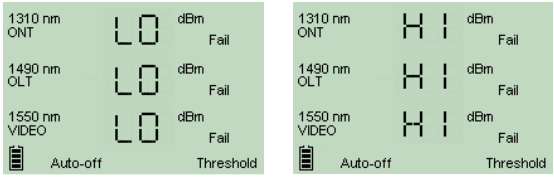
5. Press ⏻ to exit without selecting a new threshold set. The unit returns to your previous mode (Pass/Fail or Normal).

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# Testing in Pass/Fail Mode or in Normal Mode

- Pass/Fail mode: status is indicated directly (screen and LEDs). Status is determined according to the current threshold set (see *Selecting a Threshold Set* on page 11).
- Normal mode: only the power levels are shown and LEDs are off.




When power is outside unit's power limits (see *Technical Specifications* on page 31)

***Note:*** *If the result is greater than the Pass threshold, the word **Fail** and the LED will flash. If the result is lower than the Fail threshold, the unit will only display **Fail** and the LED will not flash.*

***Note:*** *On 1-port units, you will only see values at 1490 nm and 1550 nm.*

At startup, the unit is in the same mode that was used during last test session.

You may activate the Pass/Fail mode at any time (except during nulling, threshold verification, and LEDs and LCD verification).

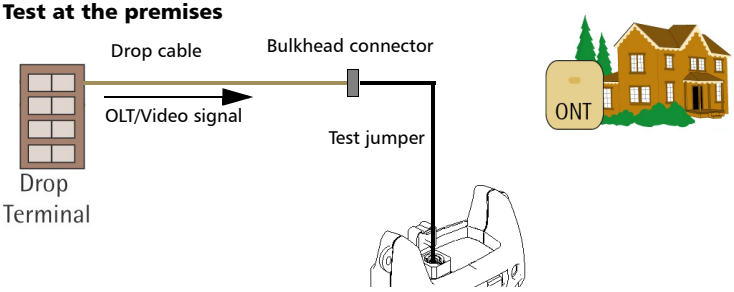


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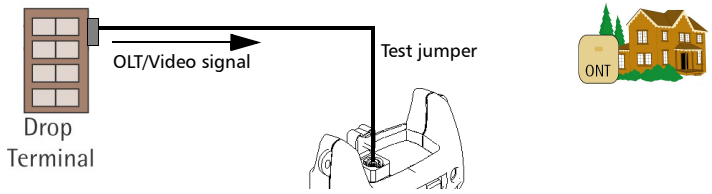
***To test in Pass/Fail or Normal mode with a 1-port model:***

1. Clean your fibers properly as explained in *Cleaning and Connecting Optical Fibers* on page 8.
2. Connect as shown:

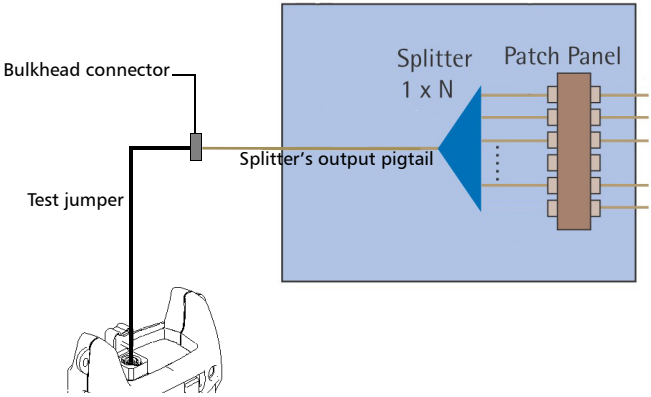
**Test at the premises**




**Test at the drop terminal**




**Test at the fiber distribution hub (FDH)**




3. Turn unit on.
4. Press **Select** to select OLT/video signal.
5. If you want to test in Pass/Fail mode:
   - ➤ Ensure that LEDs are on. If not, press **P/F mode**.
   - ➤ Ensure that the desired threshold set is selected (see *Selecting a Threshold Set* on page 11).

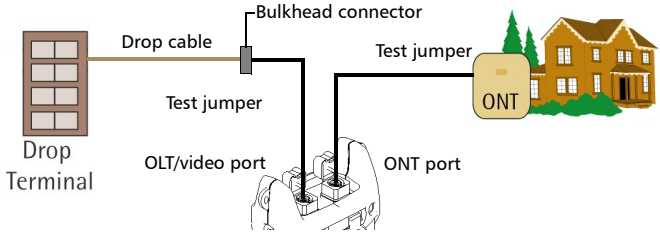
   Results are now available.

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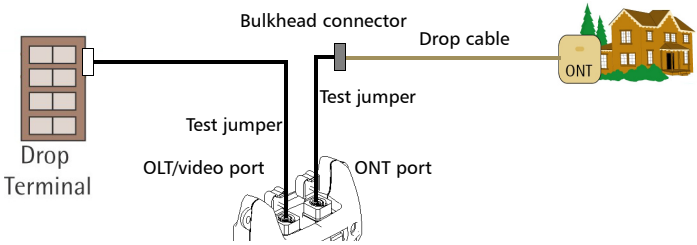
***To test in Pass/Fail or Normal mode with a 2-port model:***

1. Clean your fibers properly as explained in *Cleaning and Connecting Optical Fibers* on page 8.
2. Connect as shown:

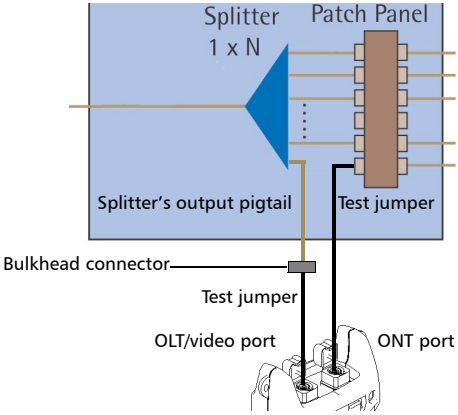
**Test at the premises**




**Test at the drop terminal**




**Test at the fiber distribution hub (FDH)**




3. Turn unit on.
4. If you want to test in Pass/Fail mode:
   - ➤ Ensure that LEDs are on. If not, press **P/F mode**.
   - ➤ Ensure that the desired threshold set is selected (see *Selecting a Threshold Set* on page 11).

   Results are now available.



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# Measuring Loss Between Two Points

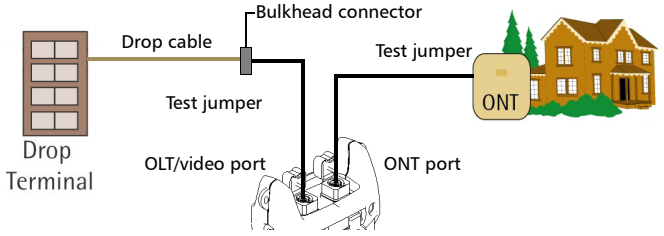
You can measure loss between two locations using a single PPM-350B PON Power Meter.

***Note:*** *This type of test is only possible with models measuring relative power.*

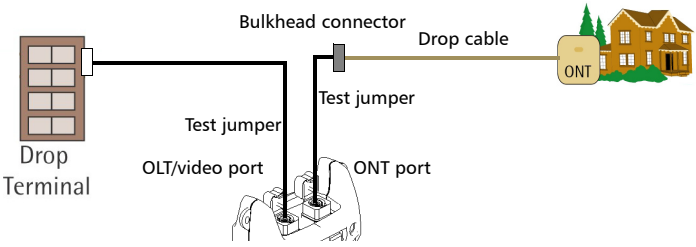
***To measure loss between two points:***

1. Clean your fibers properly as explained in *Cleaning and Connecting Optical Fibers* on page 8.
2. At location A, connect as shown:

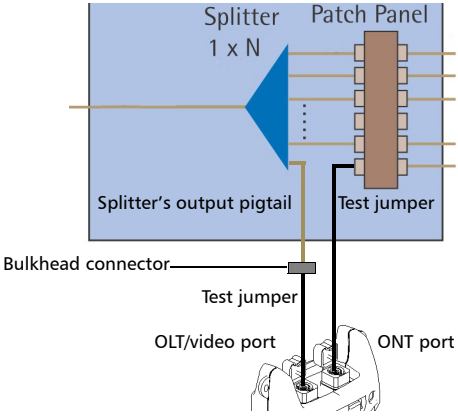
**Test at the premises**




**Test at the drop terminal**

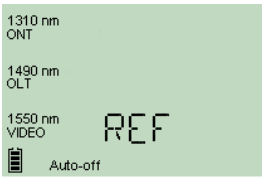



**Test at the fiber distribution hub (FDH)**



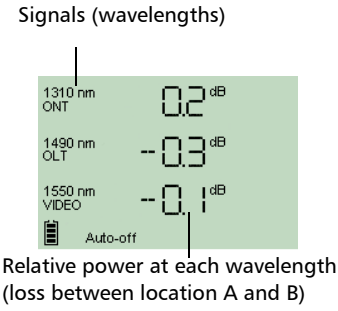

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3. Turn unit on.
4. Hold down REF/SEL for a few seconds to take reference (all 3 wavelengths simultaneously).
5. If desired, press REF/SEL once to view reference values.
6. Press dBm/dB to select dB. You should see 0 dB at each wavelength.




7. When you are done, disconnect and turn unit off.
8. Repeat steps 1 to 3 at location B, using the same PPM-350B PON Power Meter.
9. Press dBm/dB to select dB.

Results are displayed.





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# 6 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 EUI Connectors

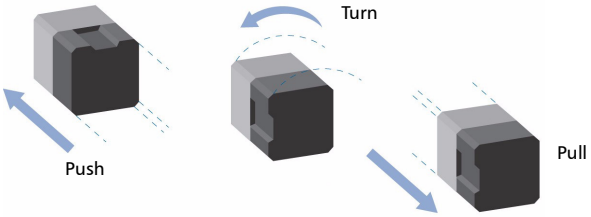
Regular cleaning of EUI connectors will help maintain optimum performance. There is no need to disassemble the unit.

**IMPORTANT**

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

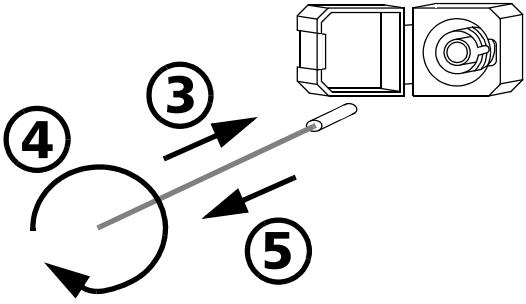
***To clean EUI connectors:***

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).

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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

**Since isopropyl alcohol is not absolutely pure, it 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, dry the surface quickly, and use a bottle that distributes only a drop of alcohol at a time.**

   - **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.

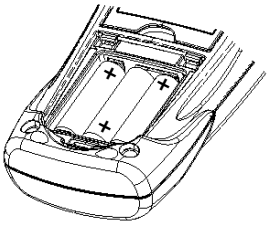


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# Replacing Disposable Alkaline Batteries

Your unit requires three AA alkaline batteries.

***Note:*** *The provided AC adapter is not a charger.*



***To replace disposable alkaline batteries:***

1. Turn off the unit (if the AC adapter is plugged in, you may replace batteries while unit is on).
2. Open the battery compartment door located at the back of the unit.
3. Replace batteries, respecting the polarity as shown.
4. Close the battery compartment door.



**WARNING**

**Do not throw batteries into fire or water and do not short-circuit the batteries' electrical contacts.**

# Recalibrating the Unit

Manufacturing and service center calibrations are based on the ISO/IEC 17025 Standard, which states that calibration documents must not contain a recommended calibration interval, unless this has been previously agreed upon with the customer.

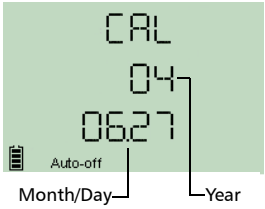
Validity of specifications depends on operating conditions. For example, the calibration validity period can be longer or shorter depending on the intensity of use, environmental conditions and unit maintenance. You should determine the adequate calibration interval for your unit according to your accuracy requirements.

Under normal use, EXFO recommends calibrating your unit every year.

***Note:*** *The FlexCare warranty program includes Calibration/Verification packages (see* Service and Repairs *on page 29).*

***To view the last calibration date:***

1. Hold down **Threshold** and press ⏻ at the same time. The unit displays the main embedded software version.
2. Press **Threshold** to display the calibration date of the unit.
3. Press ⏻ to return to your previous mode (Pass/Fail or Normal).




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# Verifying Thresholds

You can verify the threshold values to ensure that your unit will function normally with any of the available threshold sets.

If a problem is detected, error code 12 will be displayed. If you turn the unit off without correcting the problem, the error code will be displayed once the unit is turned on again. For more information, see *Error Codes and Descriptions* on page 24.

***To verify thresholds:***

Hold down P/F mode and Threshold a few seconds. The unit displays **CHKS** and vertical bars move at the top of the display, indicating the verification is in progress.




***Note:*** *Keypad is disabled during this operation.*

The unit will then return to your previous mode (Pass/Fail or Normal).

# Verifying the LEDs and LCD

You can verify that the LEDs function normally and that the screen can display all the elements properly. The unit must be in Pass/Fail or Normal mode to perform the verification.

***To verify the LEDs and LCD:***

***1.*** Hold down ⏻ and P/F mode a few seconds. The unit displays **TEST** and vertical bars move at the top of the display, indicating the verification is in progress.




The three LEDs will light up briefly in the following order: green, yellow, red. Once LEDs are turned off, all the screen segments will be displayed at the same time, allowing you to verify them.

***Note:*** *Keypad is disabled during the operation.*

***2.*** Press any key to return to your previous mode (Pass/Fail or Normal).



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# 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.

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# 7 Troubleshooting

## Solving Common Problems

| Problem | Possible Cause | Solution |
|---|---|---|
| One of the LEDs remains off.<br>OR<br>One of the LEDs remains green or red even if the status is Warning. | LED is burnt.<br>Verify LEDs (see *Verifying the LEDs and LCD* on page 21). | Contact EXFO. |
| Pressing the P/F mode button does not activate Pass/Fail mode. | ➤ Unit is currently nulling offsets, verifying thresholds or verifying LEDs and LCD. | ➤ Let the unit complete the operation. If the unit was verifying LEDs and LCD, press any key to return to your previous mode (Pass/Fail or Normal). |
| | ➤ The current threshold set contains an unusable (corrupted) value. | ➤ See *Error Codes and Descriptions* on page 24. |
| | ➤ No threshold sets have been defined. | ➤ See *Error Codes and Descriptions* on page 24. |
| The threshold set name is not displayed correctly. | Name contains characters that your unit cannot display. Unsupported characters are replaced with dashes, spaces or "+". | Rename the threshold set using only supported characters:<br>➤ 0 through 9<br>➤ A through Z (both lowercase and uppercase)<br>➤ - (dash) + / . < = > ? [ \ ] _ (underscore) and space<br>For more information on renaming threshold sets, see *Configuring Thresholds and Correction Factors* on page 9. |



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| Problem | Possible Cause | Solution |
|---|---|---|
| [1-port models] In Pass/Fail mode, only the battery charge and the auto-off indicators are displayed. | You selected ONT (1310 nm), but this signal has been deactivated in the current threshold set (see *Selecting a Threshold Set* on page 11). | Reactivate the signal (see *Configuring Thresholds and Correction Factors* on page 9). |
| [1-port models] Impossible to see the current wavelength(s) and the corresponding LED(s) is (are) off. | The signal is deactivated (see *Selecting a Threshold Set* on page 11). | |
| [2-port models] In Pass/Fail mode, Impossible to see all wavelengths and some of the LEDs are off. | At least one signal is deactivated (see *Selecting a Threshold Set* on page 11). | |

# Error Codes and Descriptions

- ER: error code displayed until you press a key.
- WR: warning code displayed for 3 seconds, then unit returns to normal.

| Error Code | Description | Solution |
|---|---|---|
| LIGH | Light detected while nulling offsets. Nulling is not performed. | Correctly place protective cap on ports, then retry. If the problem persists, contact EXFO. |
| ER 12/16 | Threshold values are not usable (corruption problem).<br>Would occur:<br>- during unit initialization<br>- after threshold verification (see *Verifying Thresholds* on page 21)<br>- after threshold set selection | Download new threshold sets to your unit. For more information, see *Configuring Thresholds and Correction Factors* on page 9. |
| ER 13 | EEPROM corrupted (would occur during unit initialization). | Unit must be recalibrated. Contact EXFO. |
| WR 23 | No threshold sets have been defined. Pass/Fail mode cannot be activated. | Download new threshold sets to your unit. For more information, see *Configuring Thresholds and Correction Factors* on page 9. |

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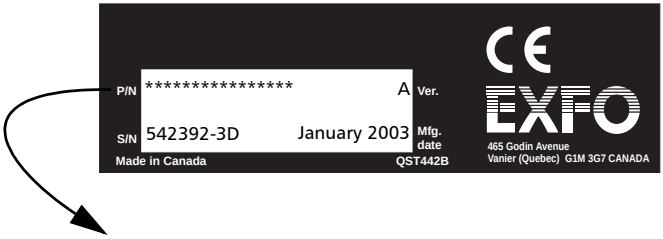
# Contacting the Technical Support Group

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
Quebec (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.




**PPM-35XB-XX**
Model — Connector code

You may also be requested to provide the embedded software's version numbers.

***To display the embedded software version:***

1. Hold down **Threshold** and press ⏻ at the same time. The unit displays the main software version.
2. Press ⏻ to return to your previous mode (Pass/Fail or Normal).






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# Finding Information on the EXFO Web Site

The EXFO Web site provides answers to frequently asked questions (FAQs) regarding the use of your PPM-350B PON Power Meter.

***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.

# 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.

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# 8 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.

## 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.



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## 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.

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# 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 30). 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 30).



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# EXFO Service Centers Worldwide

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

**EXFO Headquarters Service Center**
400 Godin Avenue
Quebec (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

**EXFO Europe Service Center**
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
europe.service@exfo.com

**EXFO China Service Center/**
**Beijing OSIC**
Beijing New Century Hotel
Office Tower, Room 1754-1755
No. 6 Southern Capital Gym Road
Beijing 100044
P. R. CHINA

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

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# 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*.**

| | | PPM-351B | PPM-352B | PPM-352B-EG | PPM-352B-EG-ER | |
|---|---|---|---|---|---|---|
| | | | | | BPON | EPON/GPON |
| Power measurement range – pass zone | 1490 nm | 1 to –33 | 1 to –33 | 1 to –33 | 12 to –40 | |
| for continuous data stream (dBm) | 1550 nm | 15 to –36 | 15 to –36 | 15 to –36 | 25[1] to –40 | |
| Burst mode measurement capability: | | Splitter to ONT | Splitter to ONT | Splitter to ONT | CO to ONT | |
| Burst mode measurement range[2] (dBm) | 1310 nm | 5.5 to –15 | 5.5 to –15 | 5.5 to –24 | 10 to –33 | 10 to –29 |
| ORL[3] (dB) | 1550 nm | 55 | 55 | 55 | 55 | |
| Pass through insertion loss[3] (dB) | | 1.5 | 1.5 | 1.5 | 1.5 | |
| Spectral passband (nm) | 1310 nm | 1260 to 1360 | 1260 to 1360 | 1260 to 1360 | 1260 to 1360 | |
| | 1490 nm | 1480 to 1500 | 1480 to 1500 | 1480 to 1500 | 1480 to 1500 | |
| | 1550 nm | 1539 to 1565 | 1539 to 1565 | 1539 to 1565 | 1539 to 1565 | |
| Power uncertainty at calibrated wavelengths[3,4] (dB) | | 0.5 | 0.5 | 0.5 | 0.5 | |
| Refresh rate of display (Hz) | | 2.5 | 2.5 | 2.5 | 2.5 | |
| Calibrated wavelengths (nm) | | 1310, 1490, 1550 | 1310, 1490, 1550 | 1310, 1490, 1550 | 1310, 1490, 1550 | |
| Threshold sets | | 10 configurable threshold sets with threshold naming | | | | |
| Autonomy[3] (hours) | | > 30 | > 30 | > 30 | > 30 | |
| Number of ports | | 1 | 2 | 2 | 2 | |
| Warranty and recommended calibration interval (year) | | 1 | 1 | 1 | 1 | |

**Notes**

1. At room temperature.
2. Typical.
3. For APC connectors. Typically > 35 dB for UPC connectors.
4. Around –7 dBm, CW.

### GENERAL SPECIFICATIONS

| | | |
|---|---|---|
| Size (H x W x D) | 185 mm x 100 mm x 55 mm | (7 1/4 in x 4 in x 2 1/8 in) |
| Weight | 0.4 kg | (0.9 lb) |
| Temperature | | |
| operating | –10 °C to 50 °C | (14 °F to 122 °F) |
| storage | –40 °C to 70 °C | (–40 °F to 158 °F) |
| Relative humidity | 0 % to 95 % non-condensing | |

### STANDARD ACCESSORIES

User guide, three AA batteries, wrist strap, PC threshold-transfer software, RS-232 cable, alcohol cleaning pads.



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| | | |
|---|---|---|
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| **EXFO AMERICA** | 3701 Plano Parkway, Suite 160 | Plano TX, 75075 USA<br>Tel.: 1 972 907-1505 · |
| **EXFO EUROPE** | Le Dynasteur<br>10/12, rue Andras Beck | 92366 Meudon la Forêt Cedex FRANCE<br>Tel.: +33.1.40.83.85.85 · Fax: +33.1.40.83.04.42 |
| **EXFO ASIA-PACIFIC** | 151 Chin Swee Road<br>#03-29, Manhattan House | SINGAPORE 169876<br>Tel.: +65 6333 8241 · Fax: +65 6333 8242 |
| **TOLL-FREE** | (USA and Canada) | 1 800 663-3936 |


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