User Guide

PXM/LXM

MPO Optical Loss Test Set (OLTS)

www.EXFO.com

Copyright © 2019–2023 EXFO Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form, be it electronically, mechanically, or by any other means such as photocopying, recording or otherwise, without the prior written permission of EXFO Inc. (EXFO).

Information provided by EXFO is believed to be accurate and reliable. However, no responsibility is assumed by EXFO for its use nor for any infringements of patents or other rights of third parties that may result from its use. No license is granted by implication or otherwise under any patent rights of EXFO.

EXFO's Commerce And Government Entities (CAGE) code under the North Atlantic Treaty Organization (NATO) is 0L8C3.

The information contained in this publication is subject to change without notice.

Trademarks

EXFO's trademarks have been identified as such. However, the presence or absence of such identification does not affect the legal status of any trademark.

Where applicable, the Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by EXFO Inc. is under license. Where applicable, the MTP® mark is a registered trademark of US Conec Ltd. Other third party trademarks and trade names are those of their respective owners.

Units of Measurement

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

Patents

The exhaustive list of patents is available at EXFO.com/patent.

Version number: 2.0.0.1

Contents

Regulatory Information vi

1 Introducing the PXM and LXM MPO Loss Test Set Solution 1

Benefits of Both PXM and LXM 2
Main Features 3
Hardware Features 5
LED Indicator Description 8
Battery Status Icon Description 9
Power Sources 10
Technical Specifications 11
Conventions 11

2 Safety Information 13

General Safety Information 13
Other Safety Symbols on Your Unit 15
Laser Safety Information 16
Electrical Safety Information 17

3 Setting Up and Using Your Units 21

Common Settings 22
PXM Unit Settings 32

4 Working with Jobs 37

Selecting a Job 37
Creating a Job 39
Job Details and Results Browser 44
Deleting a Job 45

5 Managing Tests and Results 47

Auto Navigation 47
Test Results 51

6 LXM Light Source Operation 55

Introducing the LXM Source 55
Wavelength Selection 56
Source Tones Selection 56
VFL Operation 57
FasTesT Operation and Wavelength Selection 58
Factory Power Output 59

7 PXM OPM (Optical Power Meter) Operation 61
Introducing the PXM MPO Power Meter 61
Live Power Reading 62
Analyzing Results 65
Wavelengths Selection and Thresholds Access 65
Thresholds and MPO Layout Selection 66

8 PXM/LXM FasTesT™ Operation 71
Running FasTest 72
Taking References 74
MPO Loss Measurement 77
Link Length Measurement 81
Analyzing Results 84
Thresholds 89
Test Limits 92
Network Application Summary 99

9 Maintenance 101
Cleaning MPO Connectors 102
Inspecting MPO Connectors 103
Cleaning the Touchscreen 103
Recharging the Battery 104
Replacing the Battery 107
Recalibrating the Unit 115
Recycling and Disposal 116

10 Troubleshooting 117
Solving Common Problems 117
Accessing User Documentation 119
Contacting the Technical Support Group 120
Viewing System Information 121
Transportation 122

11 Warranty 123
General Information 123
Gray Market and Gray Market Products 124
Liability 125
Exclusions 125
Certification 125
Service and Repairs 126
EXFO Service Centers Worldwide 127

A MPO Types and Test Cords 129
Polarities 129
EXFO Test Cords 130
MPO Adapters 130

B MPO-12 Test Methods 131
One-cord test method 131
Two-cord test method 134
Three-cord test method 136
Adapter-cord test method 140
Equipment-cord test method 142

C MPO-24 Adapter-cord Testing Method 145
Two-pass FasTesT testing sequence 145
Pinned/Pinned FUT 147
Pinned/Unpinned FUT 150
Unpinned/Unpinned FUT 153

D Bidirectional Testing Method 157
Two-pass FasTesT Testing Sequence 157
MPO-12 Pinned/Pinned FUT 158
MPO-12 Pinned/Unpinned FUT 160
MPO-12 Unpinned/Unpinned FUT 163

Index 165

Regulatory Information

USA Electromagnetic Interference Regulatory Statement

Electronic test and measurement equipment is exempt from FCC part 15, subpart B compliance in the United States of America. However, EXFO Inc. makes reasonable efforts to ensure compliance to the applicable standards.

The limits set by these standards are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user documentation, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Canada Electromagnetic Interference Regulatory Statement

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference.

Cet équipement génère, utilise et peut émettre de l'énergie radio-fréquence et, s'il n'est pas installé et utilisé conformément à la documentation de l'utilisateur, il peut occasionner une interférence néfaste aux communications radio. L'utilisation de cet équipement dans une zone résidentielle est susceptible d'occasionner une interférence néfaste.

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Attention : Cet appareil n'est pas destiné à être utilisé dans des environnements résidentiels et peut ne pas assurer la protection adéquate à la réception radioélectrique dans ce type d'environnements.

This is a class A, group 1 product.

Ceci est un produit de classe A, groupe 1.

- Class A equipment: Equipment that is, by virtue of its characteristics, highly unlikely to be used in a residential environment, including a home business shall be classified as class A and shall comply with the class A limits specified in the applicable ICES standard. Characteristics considered in this assessment include price, marketing and advertising methodology, the degree to which the functional design inhibits applications suitable to residential environments, or any combination of features that would effectively preclude the use of such equipment in a residential environment.

  Classe A : Matériel qui, en raison de ses caractéristiques, ne sera fort probablement pas utilisé dans un milieu domiciliaire ni par des entreprises établies à domicile. Parmi les caractéristiques considérées dans cette évaluation, il y a le prix, les méthodes de commercialisation et de publicité, la mesure dans laquelle les fonctions de l'appareil font qu'il ne se prête pas à des applications convenant au milieu domiciliaire ou toute combinaison de ces caractéristiques qui aurait pour conséquence d'en prévenir effectivement l'utilisation à domicile. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

- Class B equipment: Equipment that cannot be classified as Class A shall comply with the Class B limits specified in the applicable ICES standard.

Classe B : Matériel qui ne peut pas être inclus dans la classe A. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

- Group 1 equipment: group 1 contains all equipment which is not classified as group 2 equipment, and includes equipment such as laboratory and scientific equipment, industrial process, measurement and control equipment.

  Group 2 equipment: group 2 contains all ISM RF equipment in which radio-frequency energy in the frequency range 9 kHz to 400 GHz is intentionally generated and used or only used locally, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material for inspection/analysis purposes, or for transfer of electromagnetic energy.

  Appareils du groupe 1 : le groupe 1 réunit tous les appareils compris dans le domaine d'application de la présente Norme, qui ne sont pas classés comme étant des appareils du groupe 2. Le groupe 1 inclut les appareils scientifiques et de laboratoire, les processus industriels, appareils de mesure ou de contrôle.

  Appareils du groupe 2 : le groupe 2 réunit tous les appareils ISM à fréquences radioélectriques dans lesquels de l'énergie à fréquences radioélectriques dans la plage de fréquences comprises entre 9 kHz et 400 GHz est produite et utilisée volontairement ou uniquement utilisée localement sous forme de rayonnement électromagnétique, de couplage inductif et/ou capacitif, pour le traitement de la matière, à des fins d'examen ou d'analyse ou pour le transfert d'énergie électromagnétique.

Supplier's Declaration of Conformity (SDoC)

The SDoC for your product is as follows:

CAN ICES-001 (A) / NMB-001 (A)

European Electromagnetic Compatibility Regulatory Statement

Warning: This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures. Your product is suitable for use in industrial electromagnetic environments.

European Declaration of Conformity

The full text of the EU declaration of conformity is available at the following Internet address: *www.exfo.com/en/resources/legal-documentation*.

1 Introducing the PXM and LXM MPO Loss Test Set Solution

The PXM Power Meter and LXM MPO Light Source test sets are an MPO 12 native power meter and source that are fast, rugged, and simple to use. They are a fully featured Tier-1 certification solution.

Designed to be efficient when qualifying a large volume of MPO (multi-fiber push-on) links, the PXM and LXM combo tests 12 fibers at 2 wavelengths in 1 second, which is the fastest in the industry.

Benefits of Both PXM and LXM

- Comprehensive pass/fail results are combined on one page:
  - Global pass/fail status and pass/fail per fiber
  - Insertion loss per wavelength
  - Polarity type (A, B, C, or U) with graphical representation
  - Pass/fail on the polarity type vs expected
  - Full details available on FasTesT™ and fiber results pages
  - Link length measurement
- Data center certification
- Visual indicator on screen and sound notification for continuity with LXM and PXM

Main Features

PXM

- Dual wavelength testing of the MPO link on FasTesT mode: link loss, polarity, length
- Optical Power Meter mode
- SM (singlemode) (1310/1550 nm) and MM (multimode) (850/1300 nm) wavelengths
- APC (SM) and UPC (MM) MPO 12 compatible
- Custom Job creation
- Extract test results via USB to PC
- Pass/Fail thresholds
- Sound notification on continuity

LXM

- Dual wavelength testing FasTesT mode: loss, polarity, link length
- CW mode with selectable wavelengths
- APC SM (singlemode) or UPC MM (multimode) connector (source model dependent)
- In-line VLF tool for tracing and fast link identification

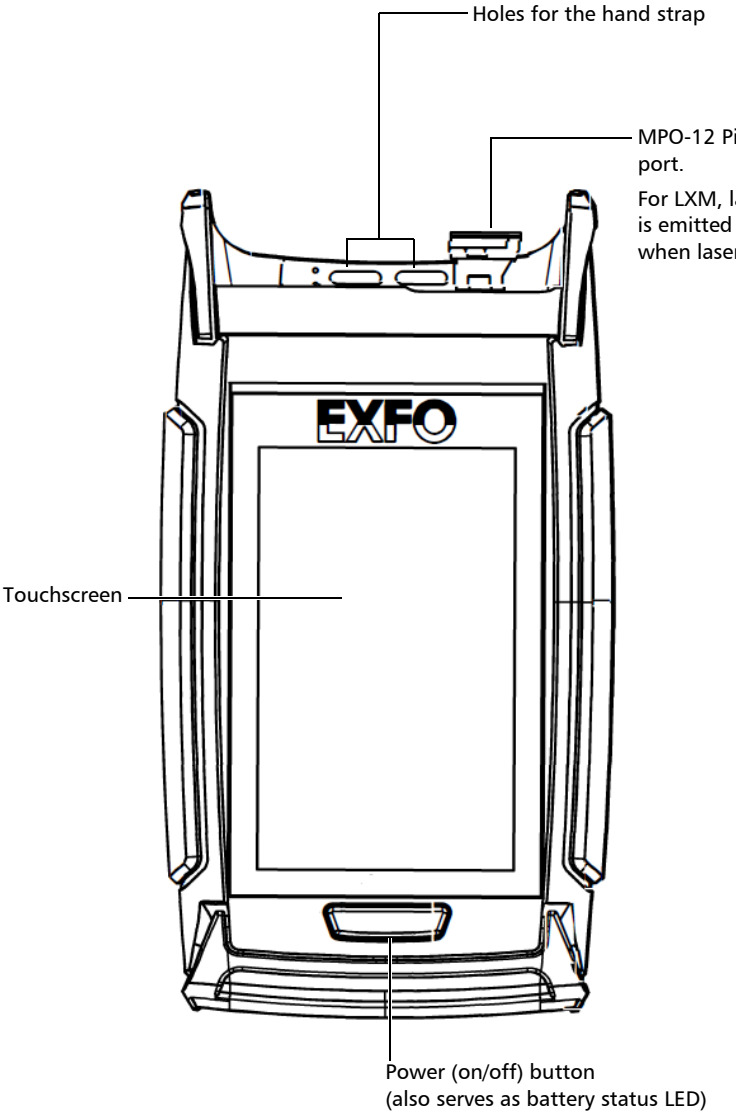
Hardware Features

- 4-inch pixel color display and capacitive touch screen
- Internal buzzer
- USB port
- Pinned MPO devices: LXM and PXM are pinned interfaces. See *EXFO Test Cords* on page 130 and *MPO-12 Test Methods* on page 131 for more information.
- Evolutive with easy software update

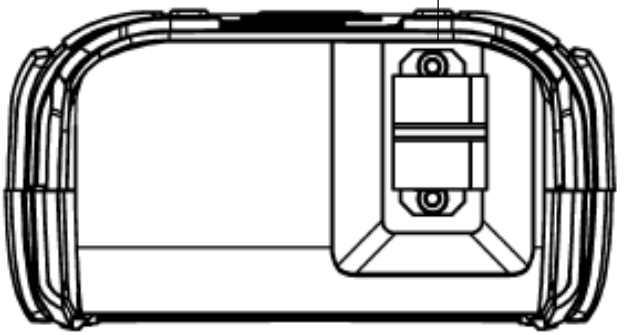
Available Options

- PXM: MPO Optical Power Meter Singlemode 1310/1550 nm and Multimode 850/1300 nm
- LXM:
  - SM1 MPO Singlemode 1310/1550 nm sources
  - MM1 MPO Multimode 850/1300 nm sources

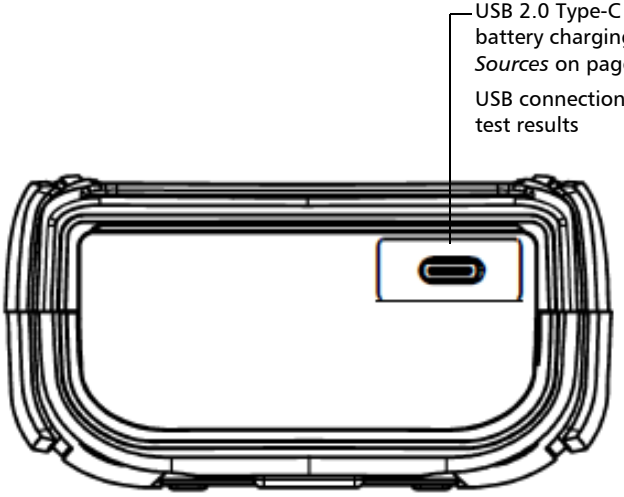
Front panel


Holes for the hand strap
MPO-12 Pinned optical port.
For LXM, laser radiation is emitted at this port when laser is active.
EXFO
Touchscreen
Power (on/off) button
(also serves as battery status LED)

Top panel



Bottom panel



LED Indicator Description

The power button, located on the front panel of your unit, also serves as a LED indicator providing you with information about the battery status.

Unit	Status	Meaning
Connected to an external power source	On	The battery is fully charged.
	Blinking – long pulse[a]	The battery is charging.
	Blinking – short pulse[b]	The battery charge has been interrupted, possibly because the unit may not be within the recommended charging temperatures. For more information, see *Equipment Ratings* on page 18.
	Fast blinking	Charge or temperature error.
		The battery level is too low to start the unit.
Not connected to an external power source	Off	The unit is not connected to an external power source.
	Fast blinking	The unit is off and the battery level is too low to start the unit.

a. LED lit during 50 % of duty cycle.
b. LED lit during 10 % of duty cycle.

Battery Status Icon Description

The battery status icon is shown in the upper right corner of the title bar. It complements the information provided by the unit's LED.

Icon	Meaning
	The portion of the icon that appears in white in the title bar (in black here) reflects the current battery level.
	A red icon indicates that the battery level is running low and that you should connect the unit to a power outlet.
	A flash symbol indicates that the unit is connected to an external power source.
	There is a charge or temperature error.
	No battery information is available.

Power Sources

The MPO Optical Loss Test Set (OLTS) operates with the following power sources:

- For indoor charge only: the USB power delivery adapter connected to a power outlet (fastest way to charge the battery).
- The standard USB ports of a computer can power your unit and charge its battery, but it can be slower to charge than if you are using the USB power adapter.

Note: *Depending on the power supply capacity of your computer, the battery may not charge properly due to insufficient current supplied from the computer's USB port. In this case, use the USB power delivery AC adapter for charging.*

- If you have a vehicle equipped with dedicated USB charging ports, you could connect your unit to one of these ports to charge the battery.

Note: *Actual results will vary with each vehicle.*

It is possible to switch from an external power source to battery power or vice versa without affecting operation.

Note: *You can replace the main battery yourself (see* Replacing the Battery *on page 107).*

Note: *When the ambient temperature is below 0 °C (32 °F) or when it reaches or exceeds about 40 °C (104°F), the main battery can either charge more slowly than usual, or not charge at all, depending on the internal temperature of your unit.*

For more information, see *Electrical Safety Information* on page 17.

Technical Specifications

To obtain this product's technical specifications, visit the EXFO Web site at *www.exfo.com*.

Conventions

Before using the product described in this guide, 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.

2 Safety Information

General Safety Information

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

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

WARNING

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

WARNING

Use only accessories designed for your unit and approved by EXFO. For a complete list of accessories available for your unit, refer to its technical specifications or contact EXFO.

IMPORTANT

Refer to the documentation provided by the manufacturers of any accessories used with your EXFO product. It may contain environmental and/or operating conditions limiting their use.

IMPORTANT

When you see the following symbol on your unit **, make sure that you refer to the instructions provided in your user documentation. Ensure that you understand and meet the required conditions before using your product.**

IMPORTANT

When you see the following symbol on your unit **, it indicates that the unit is equipped with a laser source, or that it can be used with instruments equipped with a laser source. These instruments include, but are not limited to, modules and external optical units.**

IMPORTANT

Other safety instructions relevant for your product are located throughout this documentation, depending on the action to perform. Make sure to read them carefully when they apply to your situation.

Other Safety Symbols on Your Unit

One or more of the following symbols may also appear on your unit.

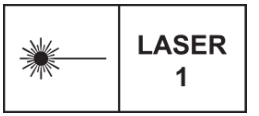
Symbol	Meaning
	Direct current
	Alternating current
	The unit is equipped with an earth (ground) terminal.
	The unit is equipped with a protective conductor terminal.
	The unit is equipped with a frame or chassis terminal.
	On (Power)
	Off (Power)
 OR 	On/off (Power)
	Fuse

Laser Safety Information

Your instrument is in compliance with standard IEC 60825-1: 2014.

Laser radiation may be encountered at the optical output port.

The following label indicates that a product contains a Class 1 source:



Complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2019.

LXM Power Values

- LXM-SM1 MPO Singlemode 1310 / 1550 nm sources: -13/-13 dBm
- LXM-MM1 MPO Multimode 850/1300 nm sources: -33/-33 dBm

Electrical Safety Information

WARNING

If you need to ensure that the unit is completely turned off, disconnect the power cable and remove the battery. For more information on how to remove the battery, see the section about replacing the battery in this user documentation.

WARNING

- **Use the external power supply (USB power adapter) indoors only.**
- **Never connect the unit to the AC mains (with the USB power adapter) when it is used outdoors.**
- **To avoid electrical shock, do not operate the unit if any part of the outer surface (covers, panels, etc.) is damaged.**
- **Only authorized personnel should carry out adjustments, maintenance or repair of opened units under voltage. A person qualified in first aid must also be present. Do not replace any components while the USB cable and battery are connected.**
- **Unless otherwise specified, all interfaces are intended for connection to ES1 circuits only.**
- **Use only the listed and certified USB power adapter provided by EXFO with your unit. It provides reinforced insulation between primary and secondary, and is suitably rated for the country where the unit is sold.**
- **Capacitors inside the unit may be charged even if the unit has been disconnected from its electrical supply.**

CAUTION

- **Position the unit so that the air can circulate freely around it.**
- **When you use the unit outdoors, ensure that it is protected from liquids, dust, direct sunlight, precipitation, and full wind pressure.**

CAUTION

The use of voltages higher than those indicated on the label affixed to your unit may damage the unit.

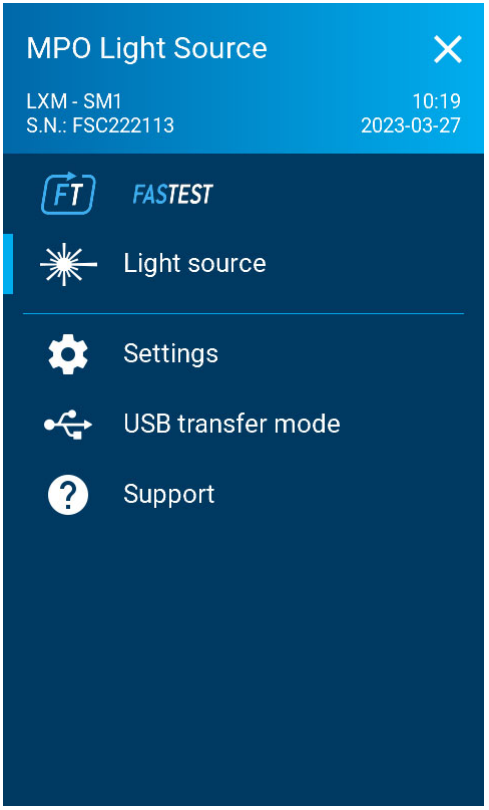
Equipment Ratings	
Temperature	
➤ Operation	➤ unit powered by battery: –10 °C to 45 °C (14 °F to 113 °F)[a] ➤ unit connected to AC power (with USB power adapter): 0 °C to 40 °C (32 °F to 104 °F)[b]
➤ Storage	➤ unit – short-term storage[c]: –40 °C to 70 °C (–40 °F to 158 °F) ➤ unit – long-term storage[d]: 10 °C to 35 °C (50 °F to 95 °F)
Relative humidity[e]	➤ unit: ≤ 93 % non-condensing ➤ USB power adapter: 10 % to 90 % non-condensing
Maximum operation altitude	➤ 2000 m (6562 ft) (unit connected to external power source) ➤ 5000 m (16405 ft) (unit operated from battery)

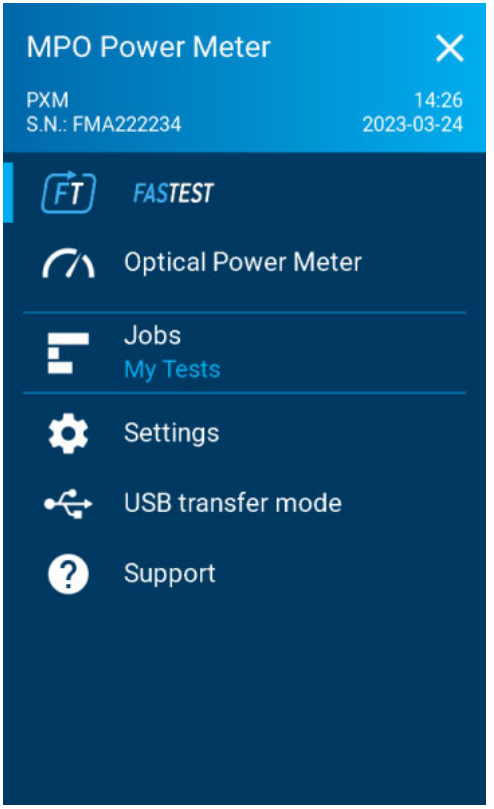
Equipment Ratings	
Pollution degree	➤ 2 (unit connected to external power source) ➤ 3 (unit operated from battery)[f]
Overvoltage category	➤ unit: I ➤ USB power adapter: II
Measurement category	Not rated for measurement categories II, III, or IV
Input power[g]	➤ unit: 5 V ⎓; 2 A ➤ USB power adapter: 100 - 240 V ∼; 50/60 Hz; 1 A max

a. When the unit is used at an altitude of 5000 m, the maximum operating temperature is 27 °C (80.6 °F).
b. When the ambient temperature is below 0 °C (32 °F) or when it reaches or exceeds about 40 °C (104°F), the main battery can either charge more slowly than usual, or not charge at all, depending on the internal temperature of your unit.
c. Short-term storage corresponds to the storage of the unit for a maximum of 48 hours.
d. Long-term storage corresponds to the storage of the unit for more than three months.
e. Measured in 0 °C to 31 °C (32 °F to 87.8 °F) range, decreasing linearly to 50 % at 40 °C (104 °F).
f. Equipment must be normally protected against exposure to direct sunlight, precipitation and full wind pressure.
g. Not exceeding ± 10 % of the nominal voltage.

3 Setting Up and Using Your Units

This chapter covers common LXM and PXM specific settings.





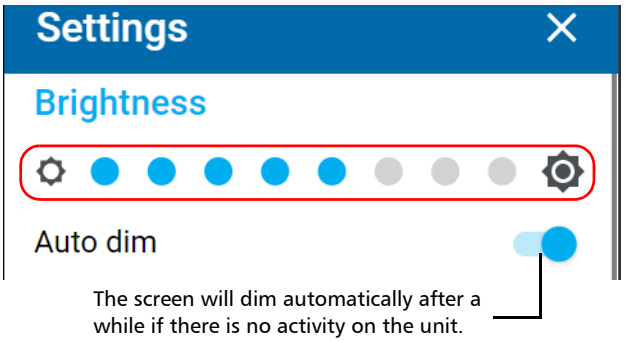
Common Settings

Adjusting Brightness

You can adjust the display brightness to better fit your work environment or preferences. Also reducing the brightness saves battery power (the higher the brightness level, the higher the power consumption). The brightness value is kept in memory even when you turn the unit off.

To adjust the display brightness:

1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .
2. Under **Brightness**, tap the dots until the screen appearance is to your liking. You can also tap the desired brightness icon to quickly set the brightness to the minimum or the maximum value.



The new brightness value is taken into account immediately.

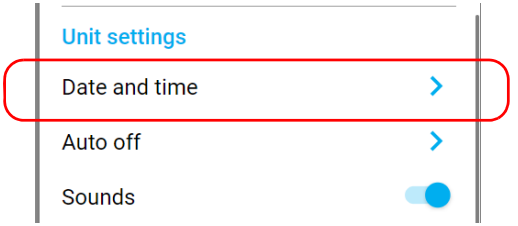
Adjusting the Date, Time, and Time Zone

The time is displayed in the title bar. When saving results, the unit also saves the corresponding date and time. By default, the time is expressed in a 24-hour format, but you can select a 12-hour format (AM/PM) if you prefer.

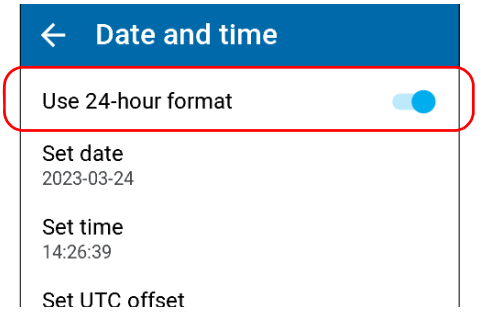
Note: *You cannot modify the format in which the date is displayed.*

To modify the date format:

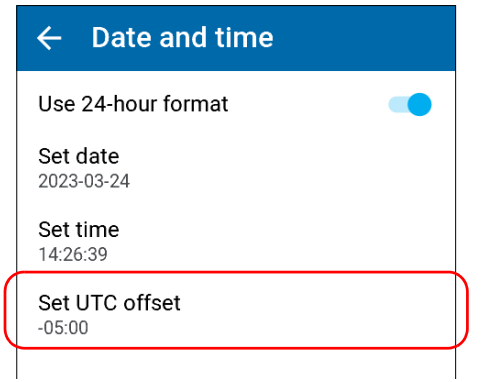
1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .
2. Scroll down to the **Unit settings** section.
3. Tap **Date and time**.



4. With the **Use 24-hour format** toggle, enable or disable the option, depending on your preference. If you prefer to view the time in a 12-hour (AM/PM) format, ensure that the **Use 24-hour format** option is disabled.



5. Tap the other elements corresponding to the values that you want to modify. **UTC offset** is the difference in hours and minutes between a particular time zone and UTC (Coordinated Universal Time), the time at zero degrees longitude. For example, New York is UTC-05:00, which means it is five hours behind London, which is UTC±00:00.



6. Modify the settings and tap **OK** to confirm.

The new values are taken into account immediately.

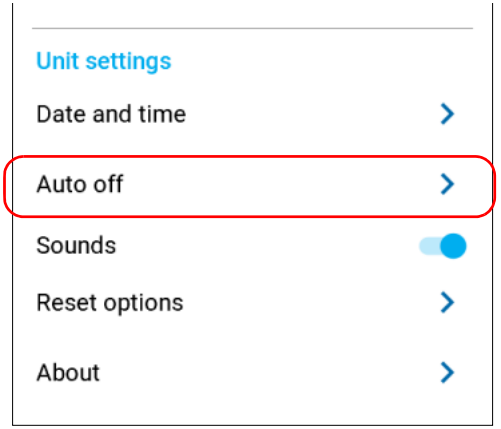
Configuring the Auto-Off Value

To help you get the optimum performance out of your unit, it comes with a predefined set of parameters to manage power. When you do not use your unit for a while, it will shut down automatically to save power.

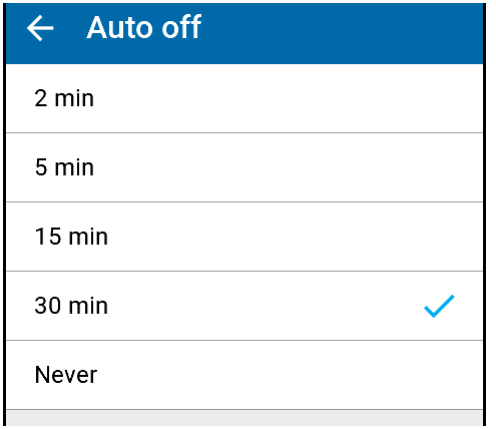
By default, the duration after which the unit shuts down is two minutes, but you can select another value. The value that you set is kept in memory even when you turn the unit off.

To configure the auto-off value:

1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .
2. Under **Unit settings**, tap **Auto off**.



3. Select the desired number of minutes.



The new value is taken into account immediately.

Sounds

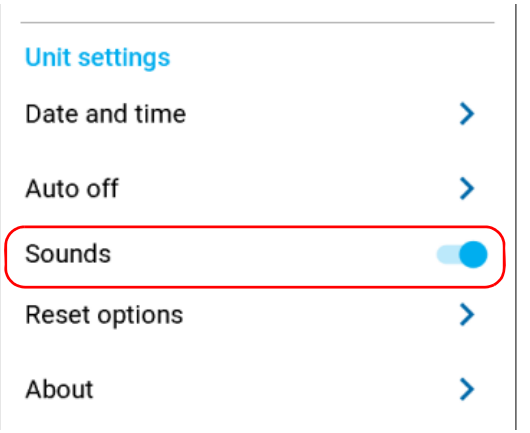
By default, your unit emits a sound when certain events occur. You can choose to disable some of them if you prefer. This preference will be kept in memory even when you turn the unit off.

The table below shows which notifications can be disabled.

Notifications that can be disabled	Notifications that cannot be disabled
➤ Tone detection ➤ FasTesT™ signal is detected and lost ➤ Sounds emitted at the end of the acquisition and stored (Completed/Pass/Fail) ➤ When the acquisition fail to be fully performed. ➤ When the acquisition result is undetermined because of a missing value ➤ When polarity and loss cannot be determined	➤ Unit is turned On/Off ➤ External power supply connected or disconnected. ➤ High power detected

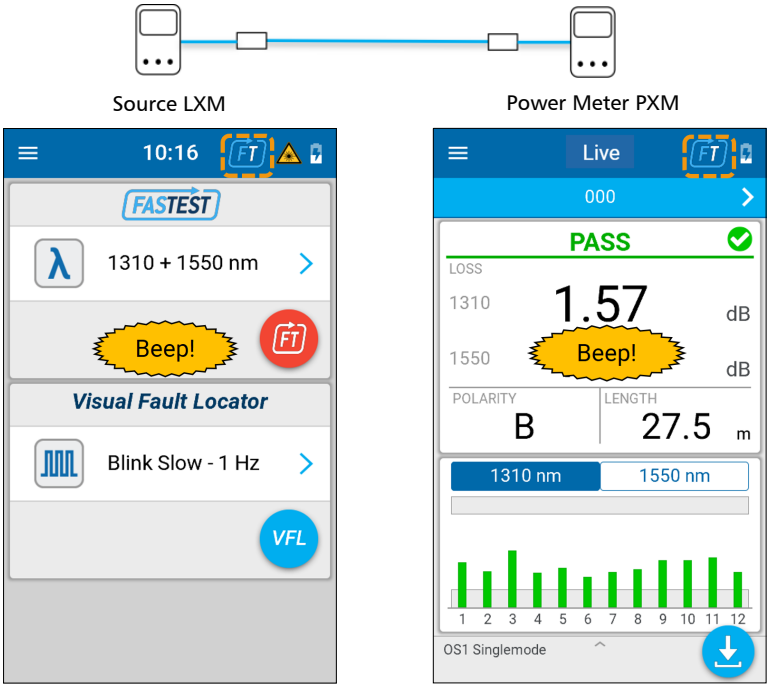
To enable or disable the sound notifications on your unit:

1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .
2. Under **Unit settings**, toggle **Sounds** to enable/disable the sound notifications.



The new value is taken into account immediately.

Sound Notification on Continuity



This feature allows you to automatically detect if the source LXM and power meter PXM are connected on the same cable. Turn *On* FasTesT on the LXM, then when the PXM is detected on the same fiber, a sound notification is emitted on both units.

Software Update

The application on your unit has been pre-installed and configured at the factory. However, you may have to upgrade it when new versions become available.

IMPORTANT

For a trouble-free upgrade, ensure that you connect your unit to a power outlet and that your unit remains on during all the process.

To get started:

1. Download the latest software version from the EXFO apps web site at https://www.exfo.com/en/exfo-apps/ and have it on the computer you plan to use for the update prior to upgrading your unit.
2. On the EXFO apps web site, select the test unit that you want to update, then download the update package on your computer.

Note: *There is a distinctive software package for the LXM and PXM devices.*

To upgrade the test unit software:

1. On the computer, extract the software update folder by executing the compressed update package or by extracting it with an unzip tool.
2. Connect the test unit via USB to a PC, then activate the USB transfer mode.
3. Using the file explorer, browse to your test unit internal storage and place the Software Update folder in it.
4. Once the software update folder is copied, tap **Disconnect** or disconnect the USB cable from the computer.
   The test unit will restart automatically, beginning the update process.

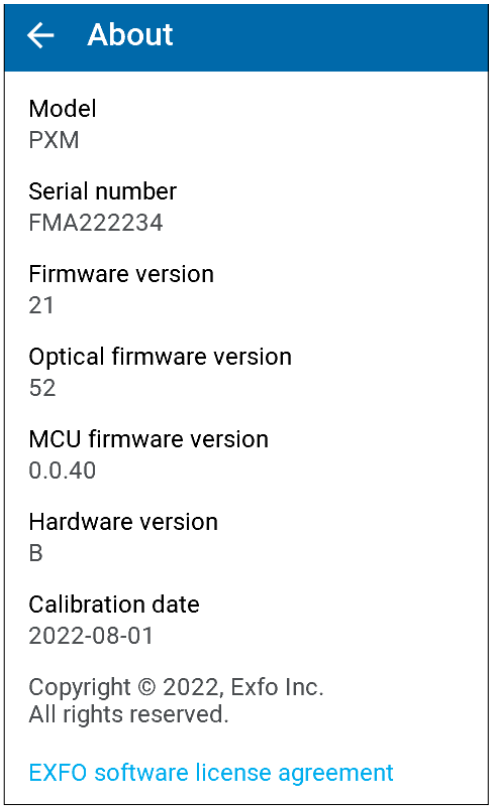
Note: *The update can take a few minutes to complete. After the update process, the update file is automatically deleted from the test unit internal storage.*

About

You can easily access important information such as the model of your unit, the serial number, the software and hardware versions, as well as the latest hardware calibration, directly from your unit.

To view the system information:

1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .
2. Under **Unit settings**, tap **About**.



The information you want to view is displayed on screen.

PXM Unit Settings

Auto Navigation

This setting is described in the *Managing Tests and Results* chapter. For information, see *Auto Navigation* on page 47.

Selecting the Distance Units

You can select the measurement units that your unit will use to display distance and length values.

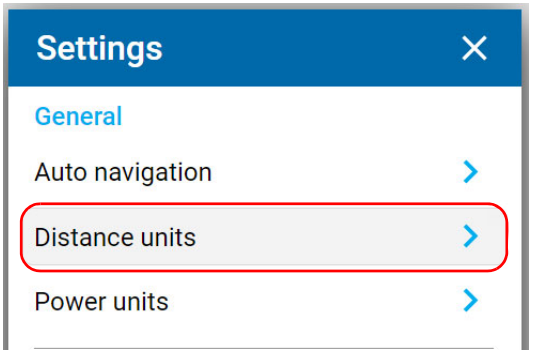
By default, the unit uses metric distance units (meters and kilometers), but you can change for imperial units (feet and kilofeet) if you prefer.

Note: *Values of less than 1 kilometer or 1 kilofeet will be expressed, respectively, in meters or feet for more precision.*

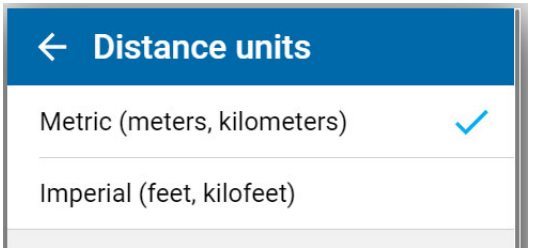
The value that you set is kept in memory even when you turn the unit off.

To select the distance units:

1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .
2. Under **General**, tap **Distance units**.



3. Select the desired distance units.



The new value is taken into account immediately.

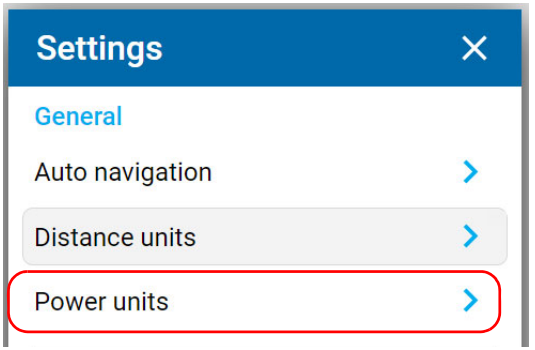
Power Units

You can work with your unit using either dBm or Watts.

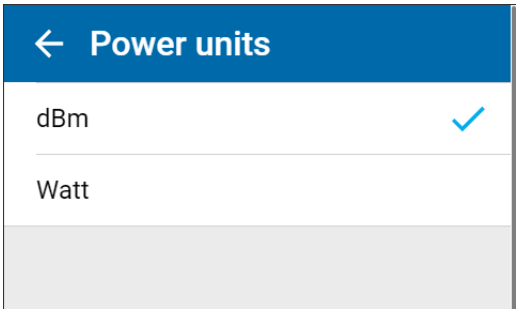
To change the power units:

1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .

2. Under **General**, tap **Power units**.



3. Select the desired units, **dBm** or **Watt**.



The changes are effective immediately.

Reverting to Factory Settings

There are 2 options:

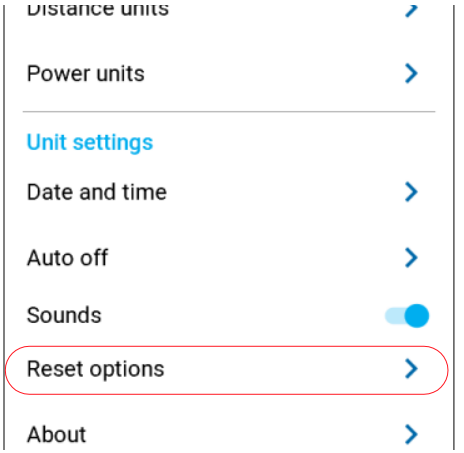
- Clear all data: All jobs and measurements will be deleted. Your application settings will be kept.
- Reset all settings: All application settings will be restored to default values. Your stored jobs and measurements will be kept.

To revert values to factory settings:

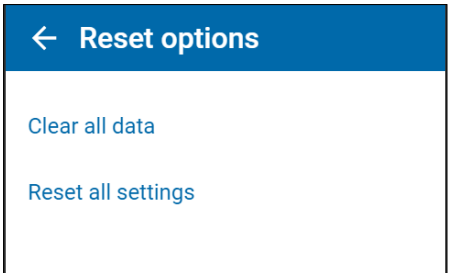
1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .

2. Scroll down to the **Unit settings** section.

3. Tap **Reset options**.



4. Select the desired option.

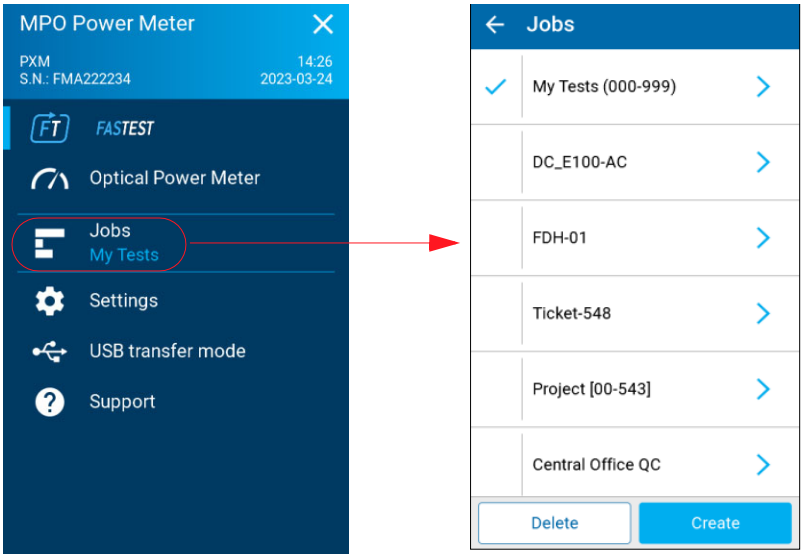


5. Tap **OK** to confirm your choice.

4 Working with Jobs

Selecting a Job

The test unit allows you to select a Job as the current one from all those available on the unit. You can select another Job at any time even if the current one is not completed.

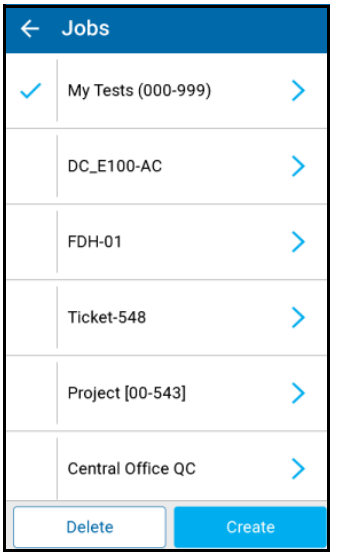


The Job list is sorted by the creation date and time except for **My Tests** which is displayed first. The Job list displays some basic information related to each Job state; for example, creation time stamp (date/time): 2021-03-29 14:24:12.

My Tests

The test unit provides a built-in default Job named My Tests which includes a predefined identification sequence of 1000 test points: OPM-000 to OPM-999. The Job My Tests is always available on the test unit and cannot be deleted.

You can delete all test results from the result browser.



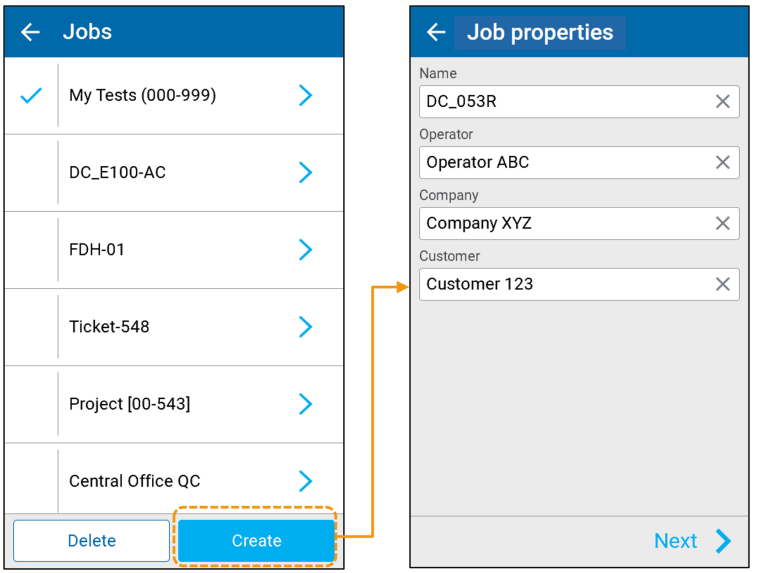
Creating a Job

To create a new job:

1. Tap **Create** to add a new job.
2. In the **Job properties** screen, enter a **Name** for the new job, or use the suggested default name which will consist of the prefix **PXM** followed by the current date. The number after the decimal point will increase by one every time a new job is created on the same date using the default job name.

Note: *Leaving the Job **Name** field blank will result in the default name. This can be useful if you do not have a predefined job name and you want to quickly create a new job.*

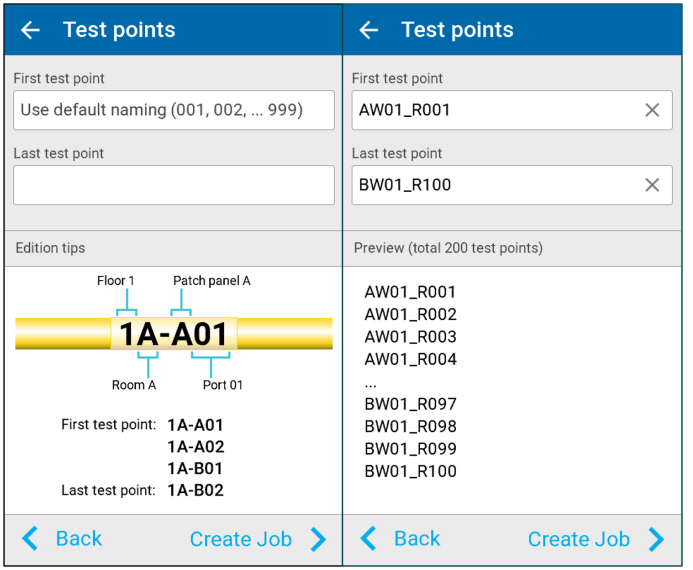
3. Optionally, enter an **Operator**, **Company**, and **Customer** name. Tap **X** to clear the values.



The **Job Properties** are included in the measurement data for each stored result in the current job.

4. When completed, tap **Next** to display the **Test points** screen.

5. In the **Test points** screen, enter values for the **First** and **Last test point**. Tap **X** to clear the values. For more information on generating valid test point identifiers, see *Generating Valid Test Point Identifiers* on page 42.



The **Test points** screen provides default values and **Edition tips** for the identifiers.

Note: *Leaving both the first and last test point fields blank will result in the default naming basic sequence; for example: OPM-000 to OPM-999 test points. The text* ***Use default naming (001, 002, 003 ... 999)*** *will be displayed for the first test point. This can be useful if you don't have a predefined naming sequence and you want to quickly create a new job. If you wish to keep the default values your unit provides for the identifiers, your unit generates a list of 1000 test points with OPM-000 as the first test point and OPM-999 as the last.*

6. When completed, tap **Create Job**.

Generating Valid Test Point Identifiers

All test points must be part of a job. For more information on creating a local job, see *Creating a Job* on page 39. You can create a list of test point identifiers by providing the first and last test points. Your unit then automatically and sequentially generates all test point identifiers between the values you provide for the first and last test points.

For your unit to create a valid list of sequential test point identifiers, you must provide a first and last test point according to the rules listed in the table below.

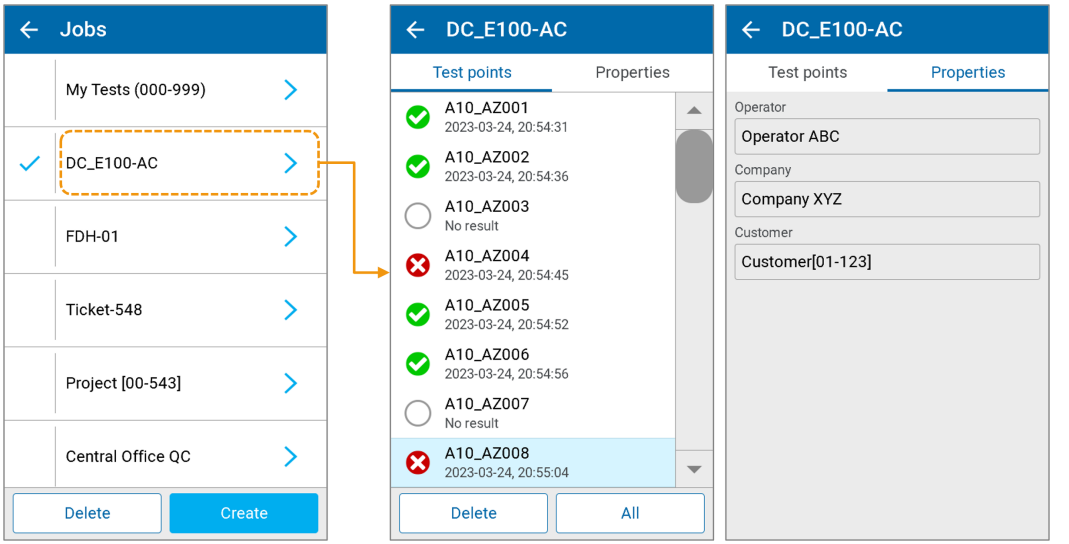
Note: *If you leave the first and last test point fields blank, your unit will create and display the default auto-naming of test points OPM-000 to OPM-999.*

Rule	Correct	Incorrect
The total number of test points must be less than or equal to 1000.	➤ First test point: OPM-000 ➤ Last test point: OPM-999	➤ First test point: OPM-0000 ➤ Last test point: OPM-1200
The first and last test points must have the same number of characters	➤ First test point: OPM-000 ➤ Last test point: OPM-999	➤ First test point: OPM-000 ➤ Last test point: OM-999
The first and last test points must consist of letters, numbers, or the following special characters: **@ + - & ^ % $ # ! _ ( ) ' ; ~ ` = { } [ ] ,** (comma) **.** (dot)	➤ First test point: OPM&000 ➤ Last test point: OPM&999	➤ First test point: OPM% ➤ Last test point: OPM%

Rule	Correct	Incorrect
For the first and last test points, the letters at each position must be the same or follow alphabetical order (test points are case-sensitive).	➤ First test point: AAA-000 ➤ Last test point: AAB-010	➤ First test point: AAB-000 ➤ Last test point: AAA-010
Special characters must match between the first and last test points.	➤ First test point: O@X&000 ➤ Last test point: O@X&999	➤ First test point: O@X&000 ➤ Last test point: O#X!999
For the first and last test points, character types (letters, numbers, special characters) must match at each position. Letters are case-sensitive.	➤ First test point: A&A-000 ➤ Last test point: A&B-010	➤ First test point: A&A-00A ➤ Last test point: &AB-010
Numbers in the last test point must be equal to or greater than the numbers in the first test point.	➤ First test point: OPM-000 ➤ Last test point: OPM-119	➤ First test point: OPM-119 ➤ Last test point: OPM-000
First and last test points are limited to 25 characters.	➤ First test point: Rack01_Port01 ➤ Last test point: Rack02_Port24	➤ First test point: BuildA_RoomWS-Rack01_Port01 ➤ Last test point: BuildA_RoomWS-Rack02_Port24

Job Details and Results Browser

The Job details page allows you to consult the **Test points** browser tab and **Properties** tab. Job properties are read-only and can only be edited while creating a job.



Tapping a test point in the browser list makes it the new active test point and leads to the measurement page (FasTesT or OPM, depending on the mode currently selected). The corresponding test point will automatically be selected in the measurement page.

Tapping a test point in the browser of a non-active Job makes it the new active Job and leads to the measurement page (FasTesT or OPM, depending on the mode currently selected). The corresponding test point will automatically be selected in the measurement page. See *Test Points Browser* on page 51.

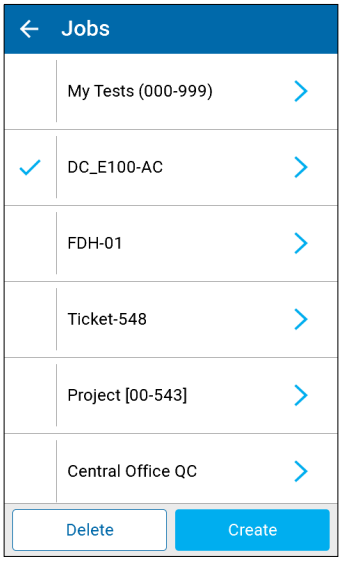
Deleting a Job

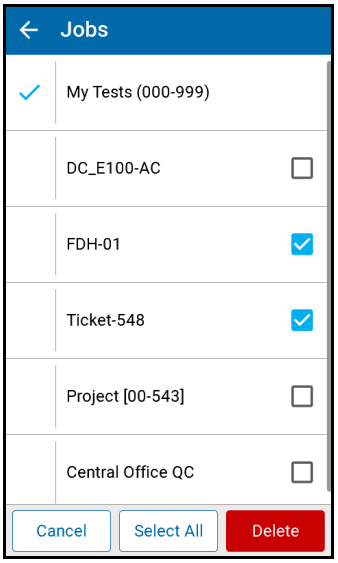
The test unit allows you to delete one or more Jobs and its tests results in a single operation. There is no possibility to delete a job without deleting its test results. However, you can delete only test results from the result browser.

Note: ***My Tests*** *Job is excluded as it cannot be deleted.*

To delete a local job:

1. From the **Jobs** page, tap **Delete** to enable the list of jobs for deletion.
2. Select the job(s) you want to delete by tapping the corresponding check box. To select all jobs at once, tap **Select All**.





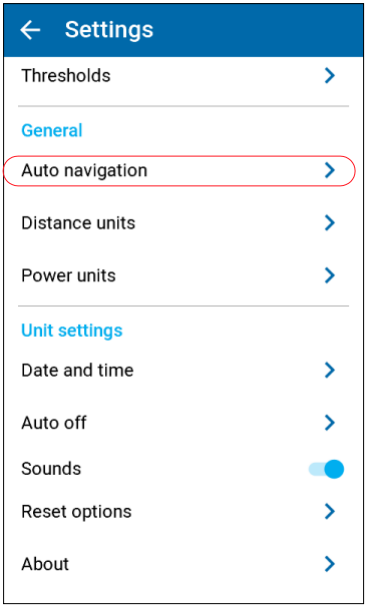
3. Tap **Delete** to remove the selected job(s) or **Cancel** to abort the operation.

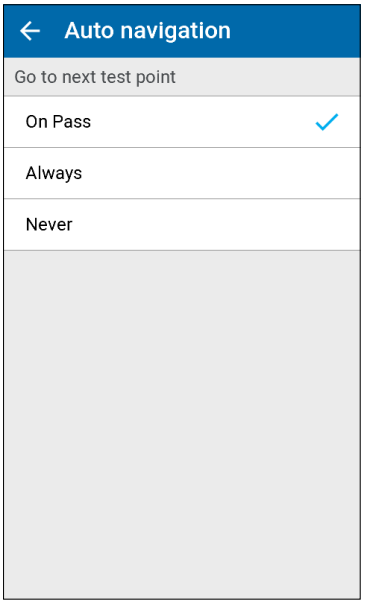
5 Managing Tests and Results

Auto Navigation

To set auto navigation:

1. From the PXM main menu, select **Settings**.
2. Scroll to **General** and tap **Auto navigation**.





3. Select one of the following to **Go to the next test point**:

➤ **On Pass** - (default) automatically selects the next test point not yet acquired in the Job sequence after a save, if the test Pass/Fail verdict is **Pass**. If the Pass/Fail verdict is **Fail** or **Unknown** after a save, the same test point remains selected and the current Fail or Unknown test point results are displayed.

➤ **Always** - automatically selects the next test point not yet acquired in the sequence after a save.

- **Never** - the test unit always remain on the current test point after a save.You need to manually select the next test to be performed by using the next/previous arrow to navigate into the Job test sequence.

Auto Navigation Behaviour

When the auto navigation option is set to go to the next test **On Pass** and the test Pass/Fail verdict is **Pass**, the application automatically selects the next test point not yet acquired. Otherwise the current test result is still displayed.

Note: *Next test point not yet acquired in the sequence means that the test can be a previous test in the job sequence, if all next tests in the job sequence are already completed.*

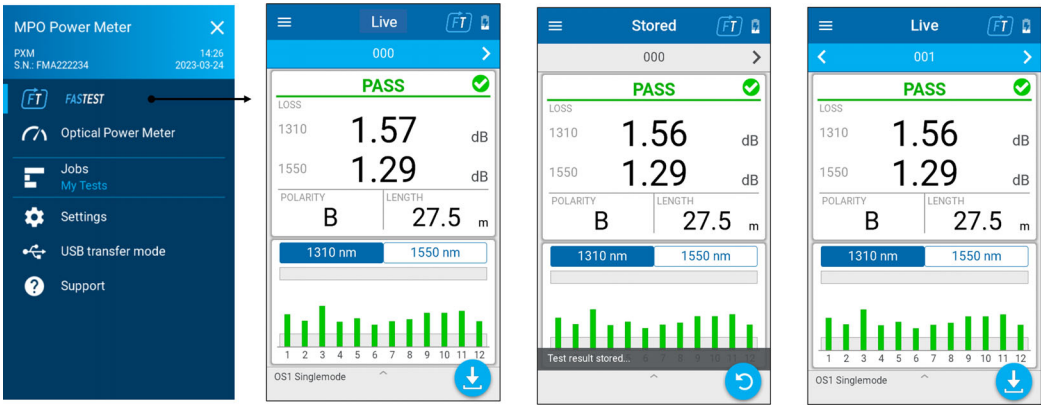
For example:

- Test point 1: Done
- Test point 2: To do
- Test point 3: Done
- Test point 4: To do
- Test point 5: Done

Case #1: If the current test is 2, the next test selected after Pass verdict will be test point 4.

Case #2: If the current test is 4, the next test selected after Pass verdict will be test point 2.

To run FasTesT with Auto Navigation On Pass:



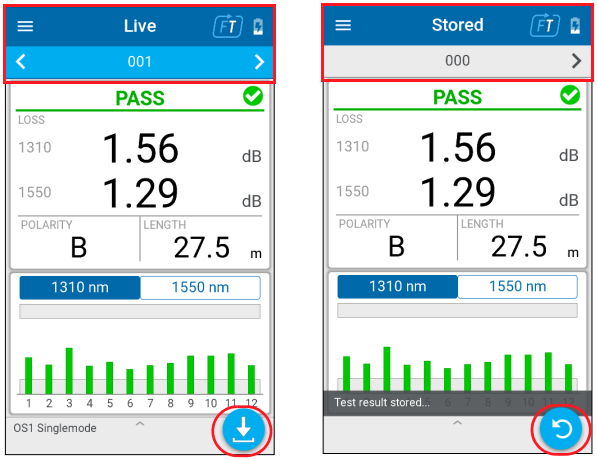
Tap to store results

Test executed, 4 s to test again. Then go to next measurement.

Ready for next measurement.

To distinguish a test not done with the Live reading vs a test done with a Stored test result:

When the test point has no test result or after tapping test again, the application title bar is **Live** and the navigation bar is blue.



Tap to store results

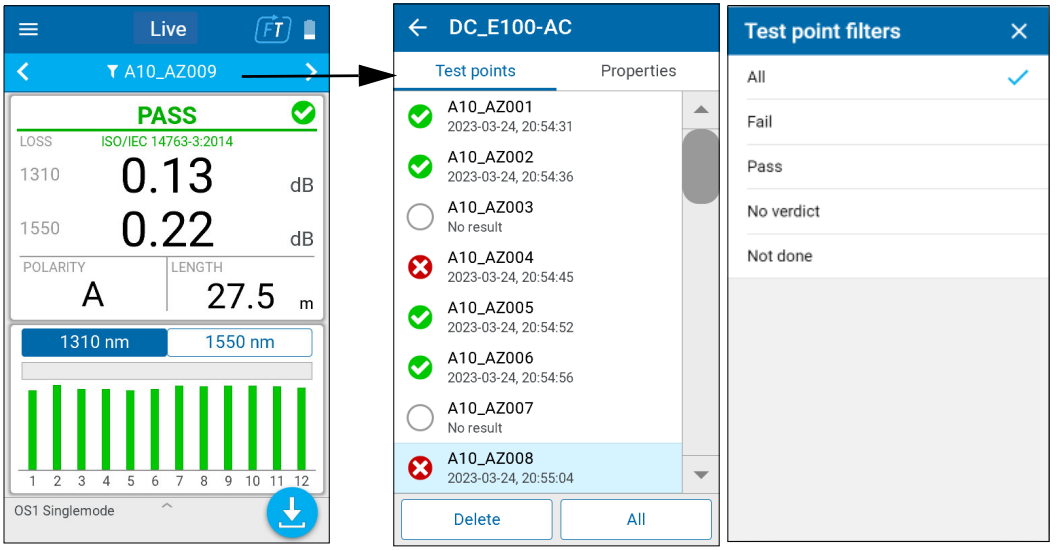
Test executed, 4 s to test again. Then go to next measurement.

When the test point has a result, the application title bar is **Stored** and the navigation bar is gray.

Filtering Test Points

To set Test point filters:

1. Tap on the navigation bar to open the browser page.
2. Tap on the bottom right-hand filter button to open the **Test point filters** page.
3. Select a filter.

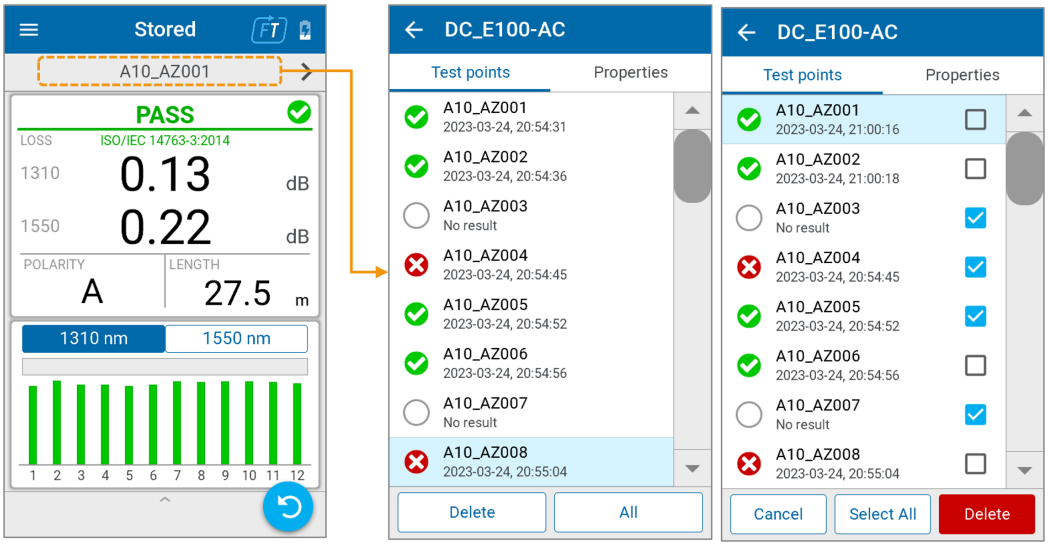


The selected filter is also identified/confirmed on the filter button.

Test Results

Test Points Browser

Test results are displayed in a browser, with test date/time and P/F verdict.



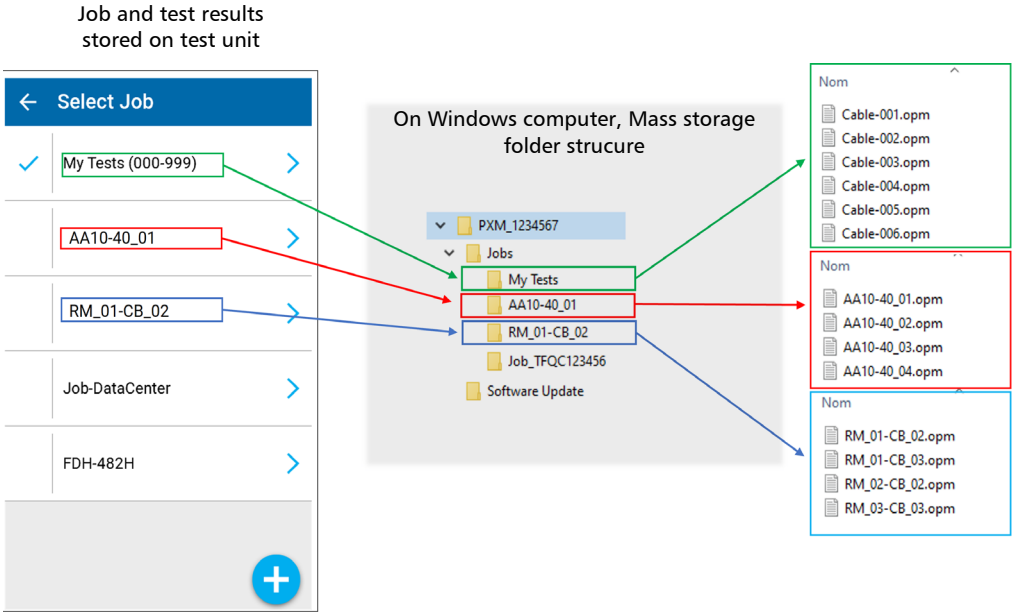
The test results management allows you to **Delete** all or a single result.

Extracting Results by USB

USB data transfer is useful for reporting, post processing, and archiving purposes. When the test unit is connected to a PC, you can browse, list, and download all test results stored in the unit, to the PC. The transfer functionality does not require installing any specific USB driver or application. User experience is similar to a USB stick (mass storage device). From the Windows file explorer browse on the test unit, select test results, and copy/past to a folder on the PC.

PXM test results can be opened in FastReporter 3 allowing you to generate reports and perform post-processing tasks.

Extract USB to a computer



PXM_1234567 (Mass Storage Drive)

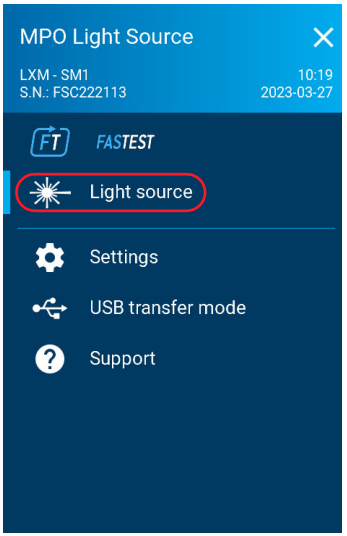
- **Jobs** (folder)
  - **Sub folders for each Job**, named with the Job name.

    - **Job test result files**, named with the test point name.
- **Software Update** (folder) for firmware update file

6 LXM Light Source Operation

Introducing the LXM Source

The LXM Source is an MPO (multi-fiber push-on) native source designed to test MPO links with speed and efficiency. It has a VFL (visual fault locator) discorporated in the same source connector, to visually find where the source is connected, thus easing the test operation.



FasTesT™ vs CW Light Source

The LXM Source has 2 modes of operation:

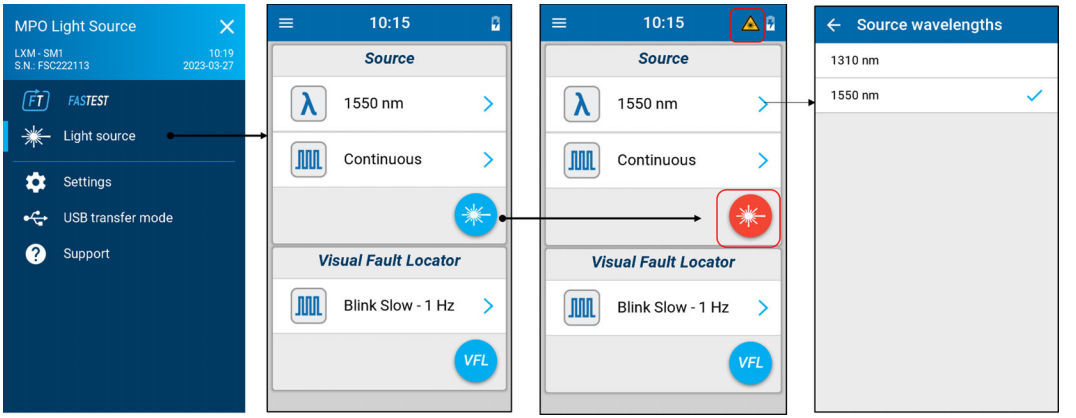
- Source mode which is classical CW (continuous wavelength) mode.
- FasTesT mode which is designed for automated loss test and polarity of many wavelenghs, in a fast and efficient way.

The FasTesT mode is covered in detail in the *PXM/LXM FasTesT™ Operation* chapter.

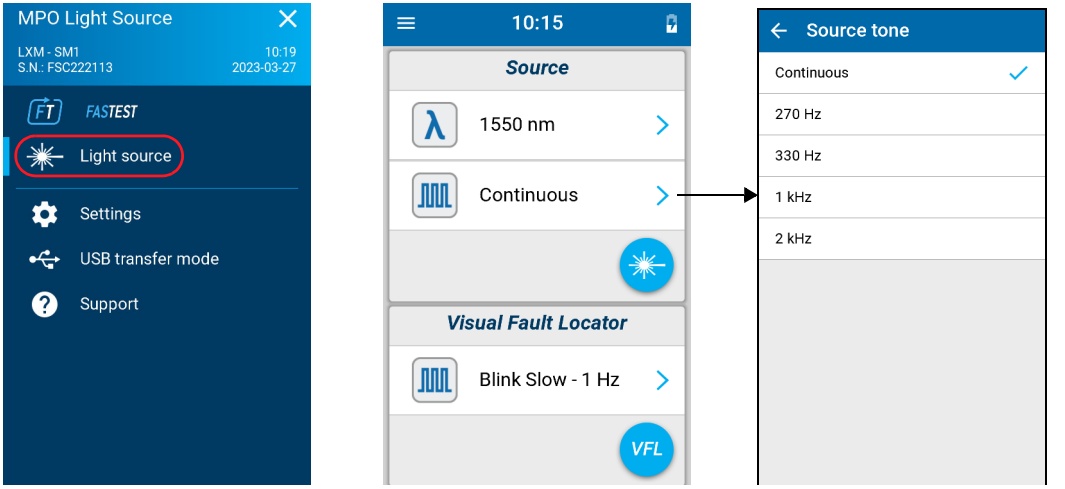
Settings and support are covered in the *Setting Up and Using Your Units* and *Maintenance* chapters.

Wavelength Selection

Turn on the **Source**.

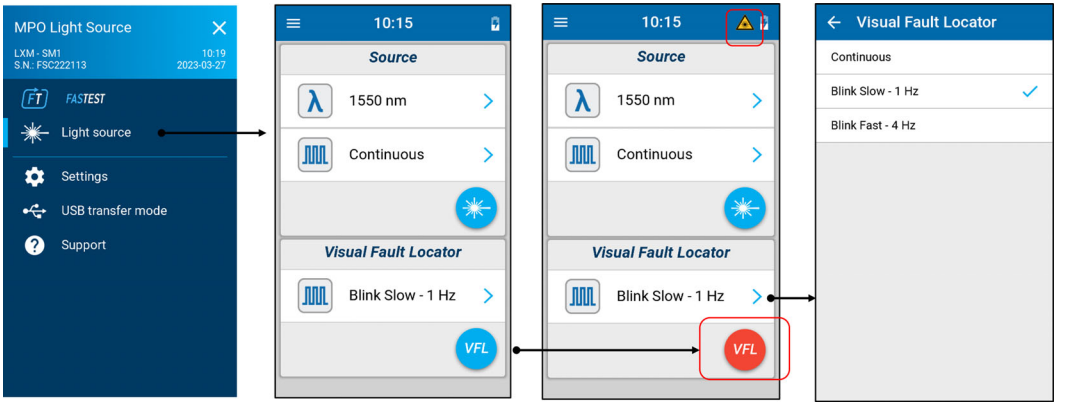


Source Tones Selection



VFL Operation

Turn on the VFL.

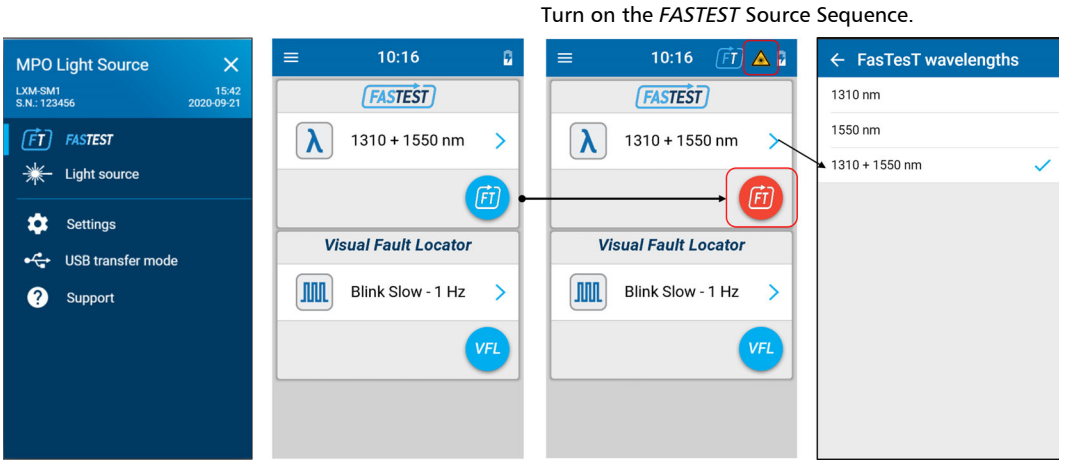


The visible light VFL is emitted at 650 nm as follows:

- LXM-SM1 on 5 fibers (2, 5, 8, 10, 12)
- LXM-MM1 on 4 fibers (6, 8, 10, 12)

FasTesT Operation and Wavelength Selection

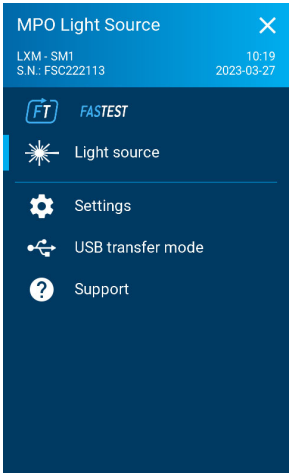
When the LXM emits a FasTesT signal and there is a PXM connected on the same cable, both test units will automatically detect the continuity.

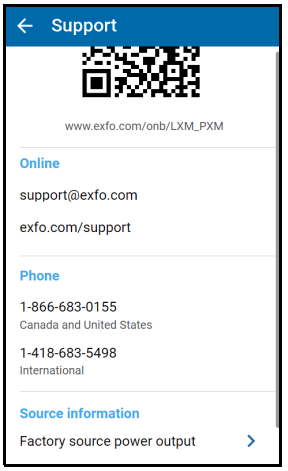


Factory Power Output

To view the Factory source power output:

1. From the Main Menu, tap **Support**.



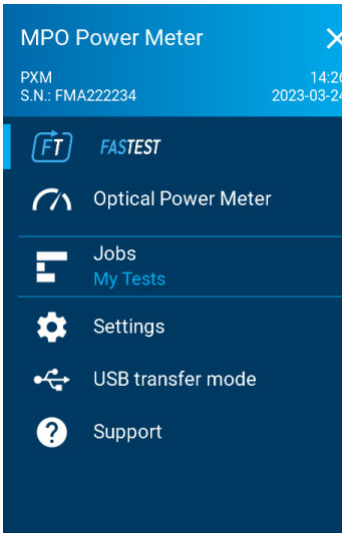


2. Under **Source information**, tap **Factory source power output** to open the **Factory power output** page.

7 PXM OPM (Optical Power Meter) Operation

Introducing the PXM MPO Power Meter

The PXM Power Meter is an MPO (multi-fiber push-on) native power meter designed to test MPO links with speed and efficiency.



FasTesT™ vs OPM

The PXM has 2 modes of operation:

- Optical Power Meter (OPM) to measure any live signal power level emitted on fibers.

Note: *For best results, both test units must be in the same mode: OPM or FasTesT.*

- FasTesT to measure the link loss, length, and polarity for all wavelength(s) included by the incoming signal emitted by an LXM source.

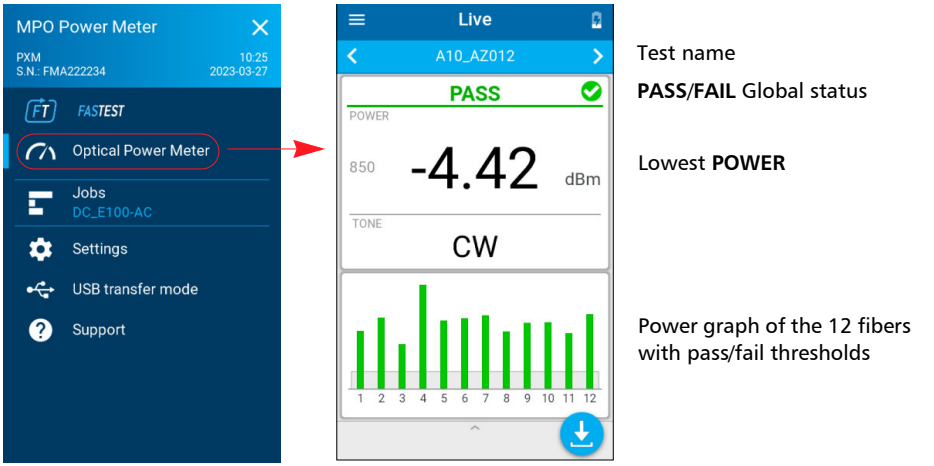
Note: *To operate in FasTest mode, the source and the power meter must be in FasTesT mode. If the source is in OPM mode, the measurement will not work.*

The FasTesT mode is covered in detail in the *PXM/LXM FasTesT™ Operation* chapter.

Settings and support are covered in the *Setting Up and Using Your Units* and *Maintenance* chapters.

Live Power Reading

The **LIVE** indicator is present for live signal acquiring. While the live reading is displayed, you can store the test result by tapping on the store button.



Some of the entries are listed as follows:

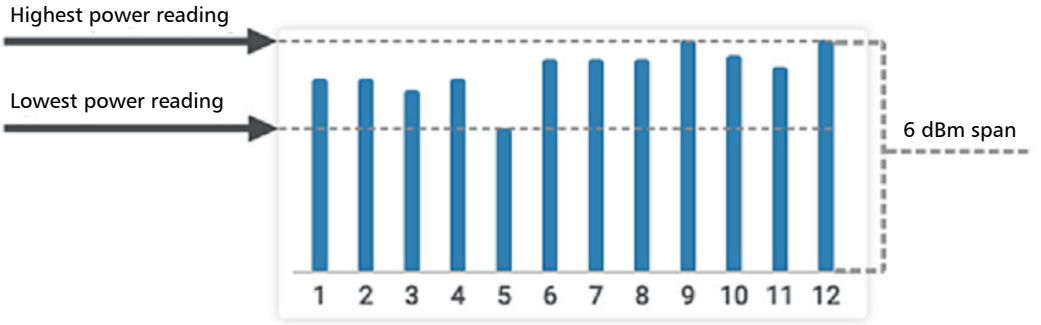
- Test point name
- **Power** is stored for all 12 fibers.

Note: *The highest power value is displayed when the maximum threshold is fail and there is no minimum threshold fail. Otherwise, the lowest power value is displayed.*

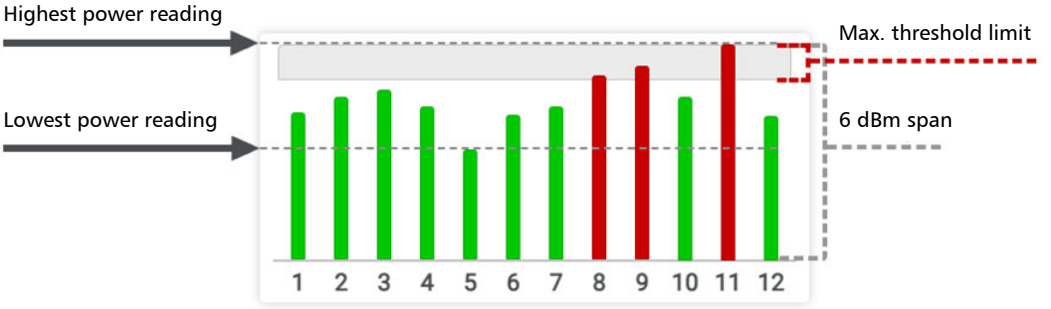
- The detected **Tone** or modulation is saved in the measurement data.

Understanding the (OPM) Power Graph Bar

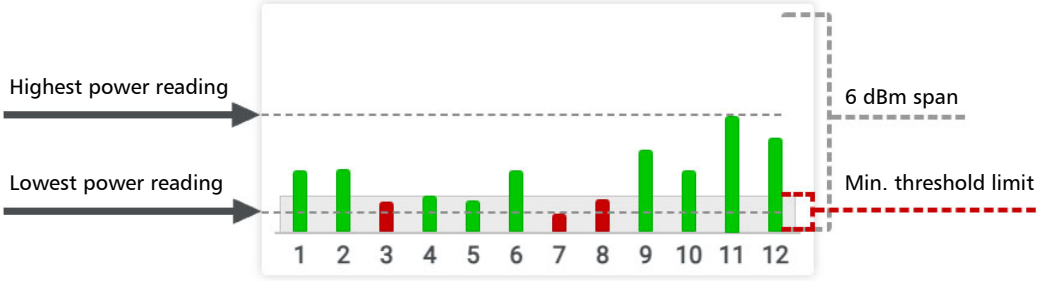
- When *no power threshold* is applied:
  - The graph span is fixed to a 6 dBm range.
  - The fiber with the highest power reading corresponds to the upper range of the graph.



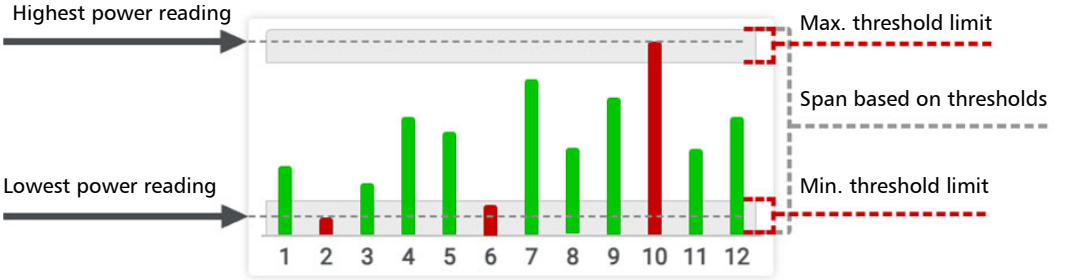
- When *maximum power threshold* is applied:
  - The graph span is fixed to a 6 dBm range.
  - The maximum power threshold corresponds to the upper range of the graph.
  - The gray box indicates the maximum power threshold limit.



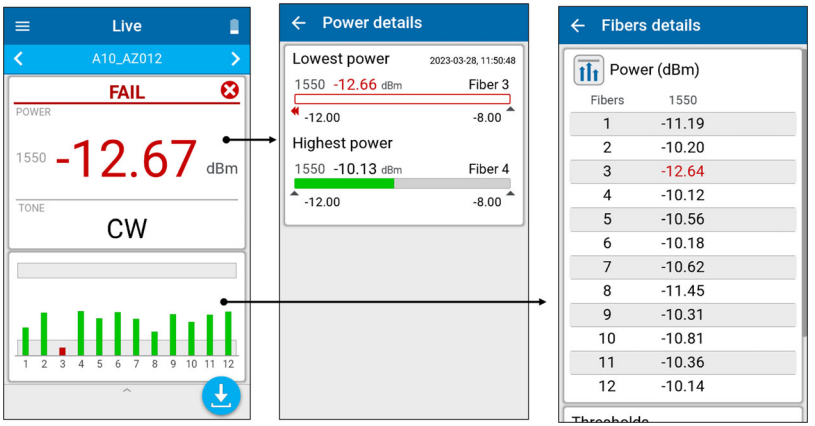
- When *minimum power threshold* is applied:
  - The graph span is fixed to a 6 dBm range.
  - The minimum power threshold corresponds to the lower range of the graph.
  - The gray box indicates the minimum power threshold limit.



- When *minimum and maximum power thresholds* are applied:
  - The graph span is determined to display the range between both thresholds applied.
  - The upper gray box indicates the maximum power threshold limit.
  - The lower gray box indicates the minimum power threshold limit.



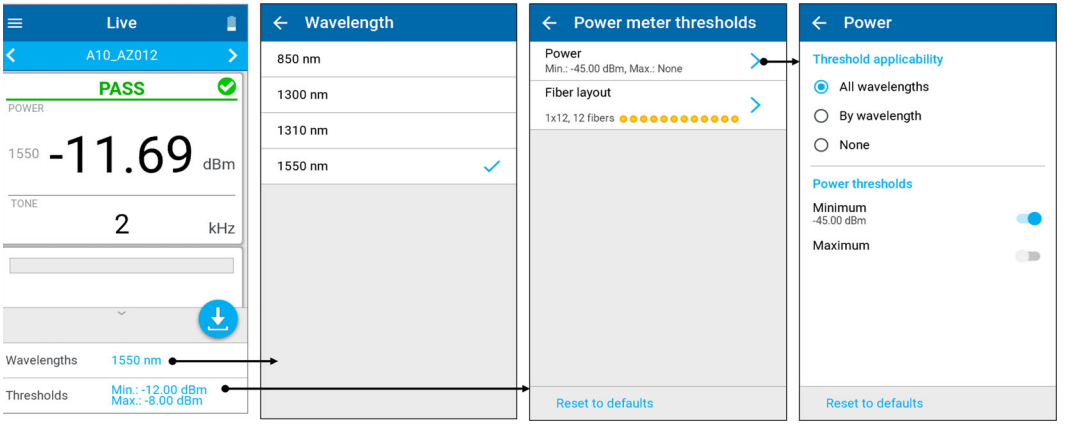
Analyzing Results



Lowest and highest power with pass/fail thresholds

Provides results table for each of the 12 fibers

Wavelengths Selection and Thresholds Access



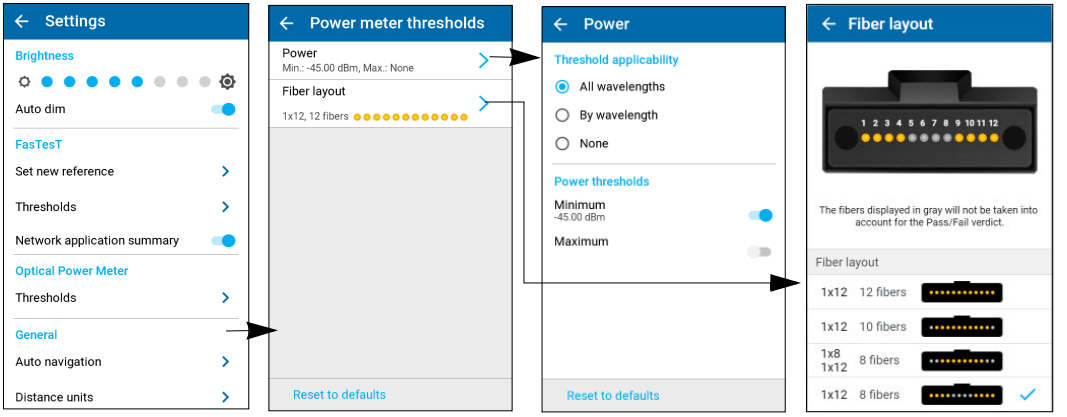
From bottom drawer...

Wavelength selection

Power thresholds settings

Thresholds and MPO Layout Selection

Threshold power values and layout are available from the bottom drawer or **Settings** menu.



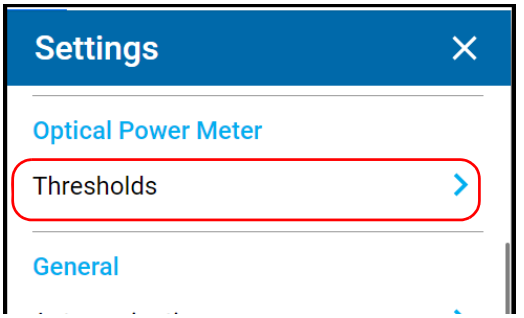
The power meter always measures all fibers no matter what layout is selected. However, as noted above, the fibers in gray will not be tested.

Thresholds

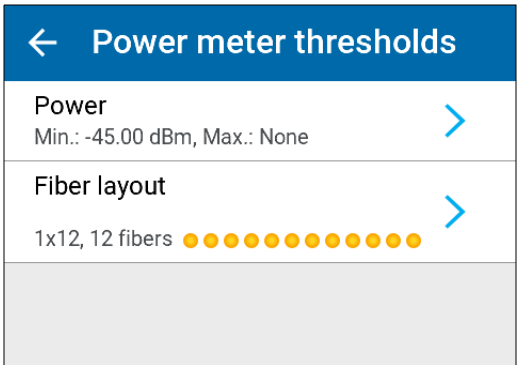
You can set Pass/Fail thresholds for the **Optical Power Meter**. As soon as a measurement is complete, the application displays a pass or fail status when thresholds are applied.

To configure thresholds:

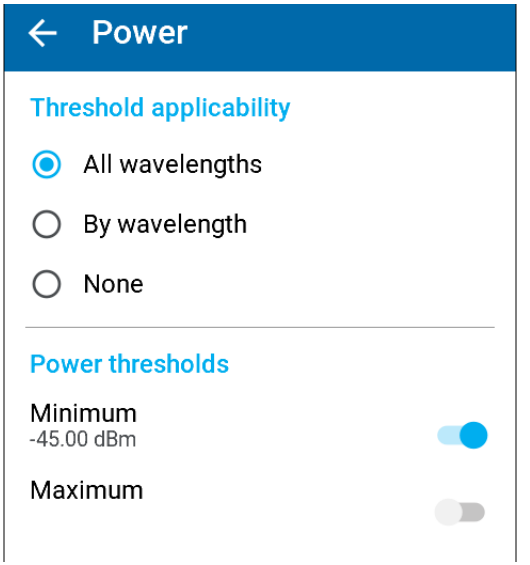
1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .
2. Under **Optical Power Meter**, tap **Thresholds**.



3. Select a threshold to set.



4. Select whether the threshold values will be applied for all wavelengths, if each wavelength will have specific thresholds, or if no thresholds will be used for the measurements.

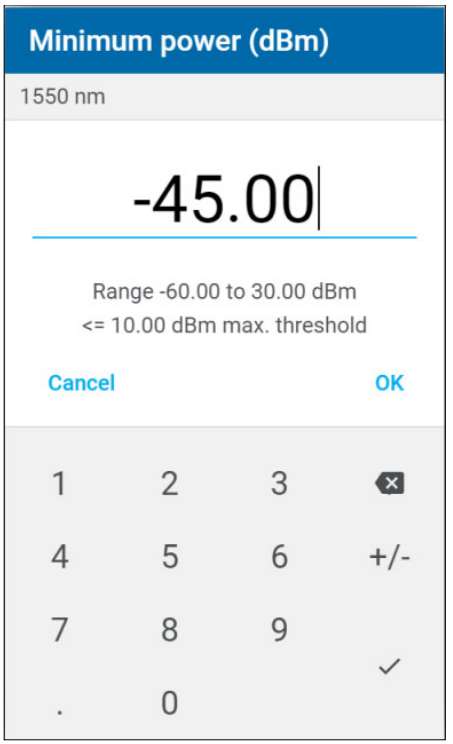


5. Depending on the option you have selected, select the corresponding menu.

Note: *If you select **By wavelength,** select the desired wavelength.*

6. You can enable or disable the **Power thresholds** using the corresponding **Minimum**/**Maximum** (dBm) sliders. Threshold values are as follows (nm):
   - 850
   - 1300
   - 1310
   - 1550

7. If you want to change the value, tap on the threshold you want to modify and enter a new value.



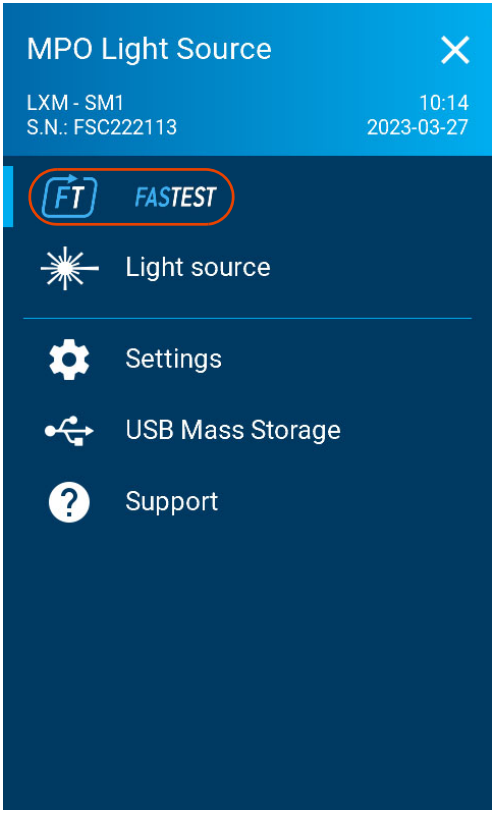
8. Tap **OK** to confirm the value or **Cancel** to abort the page. The new thresholds are taken into account for the next measurement.

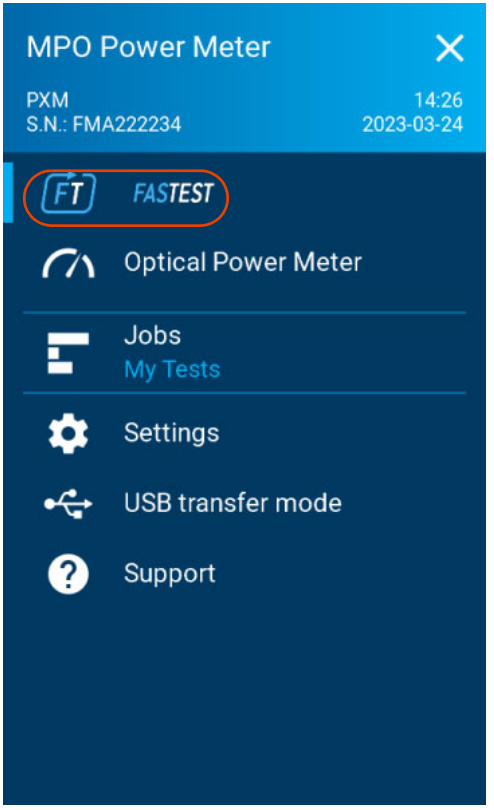
8 PXM/LXM FasTesT™ Operation

The FasTesT mode is designed for automated loss test, polarity, and link length measurement in a fast and efficient way. This chapter covers the following:

- Referencing
- FasTesT Operation

Settings and support are covered in the *Setting Up and Using Your Units* and *Maintenance* chapters.

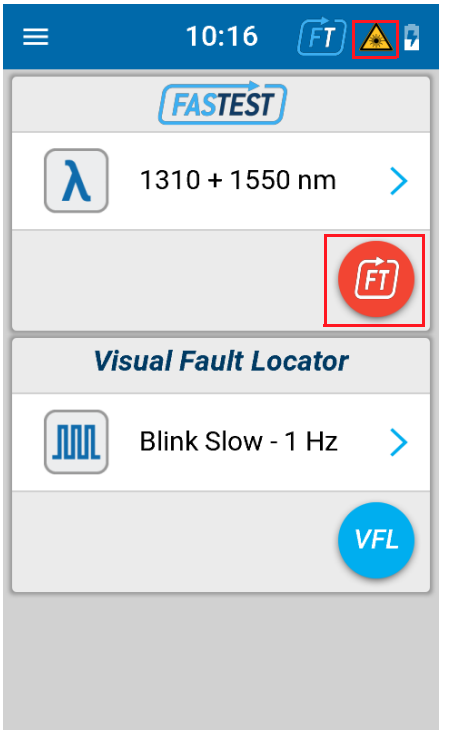




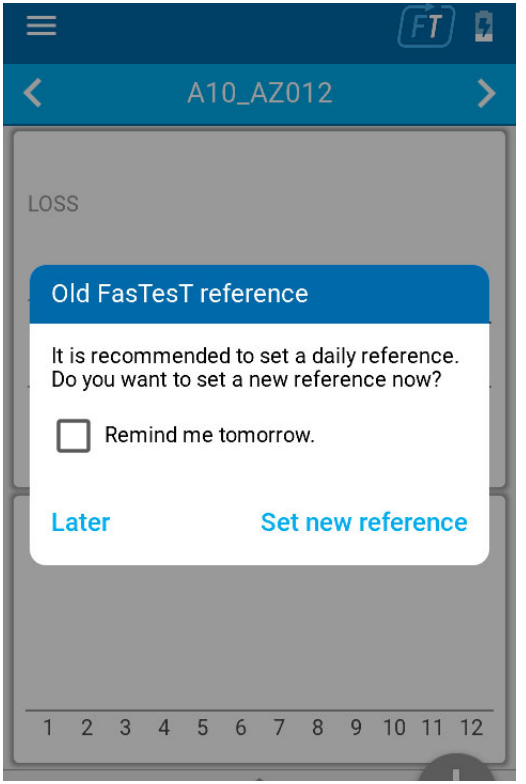
Running FasTest

To run FasTesT:

1. Connect the LXM to PXM and ensure the test units are in FasTesT mode.
2. Turn on the source in FasTesT mode.



3. Ensure the reference is done and up to date. See next section.

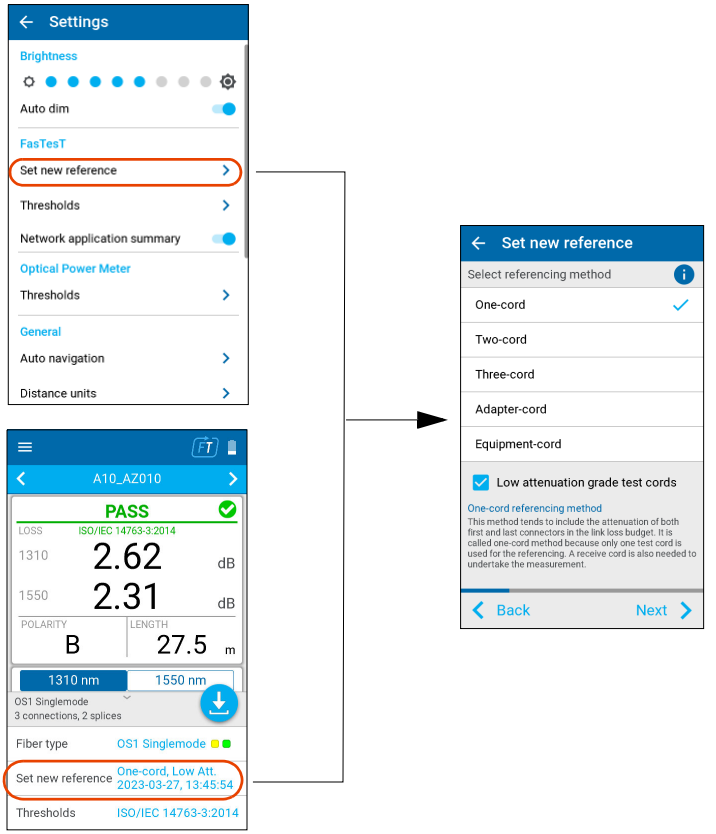


Taking References

Reference Method Selection

To set a new reference:

Tap **Set new reference** from either the **Settings** menu or from the bottom tray of a **Live** measurement page.



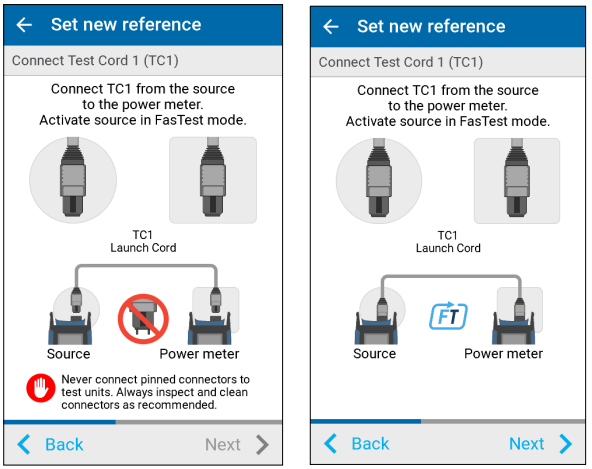
Reference Requirements

- All test cords must be type A (Straight) polarity.
- All 12 fibers must be referenced.

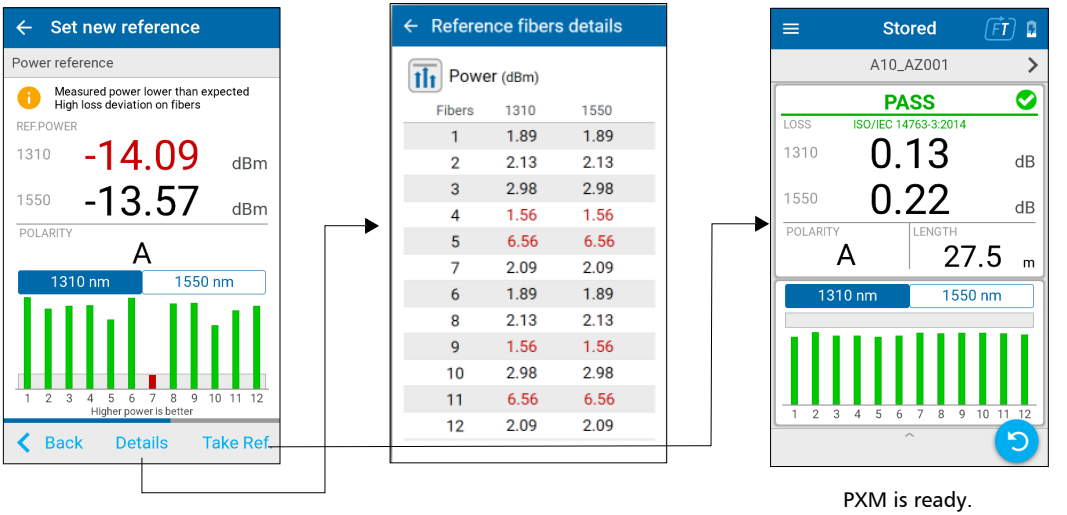
Recommendation

Test cord lengths must be 2 to 10 meters and the same length.

Connecting LXM and PXM

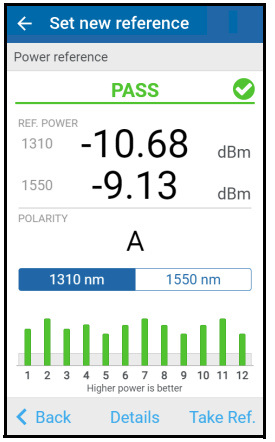


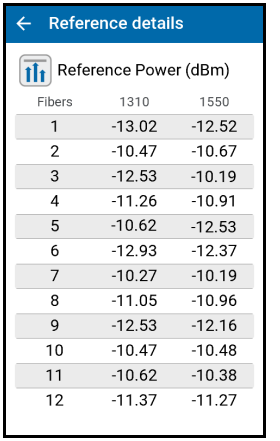
Power Reference



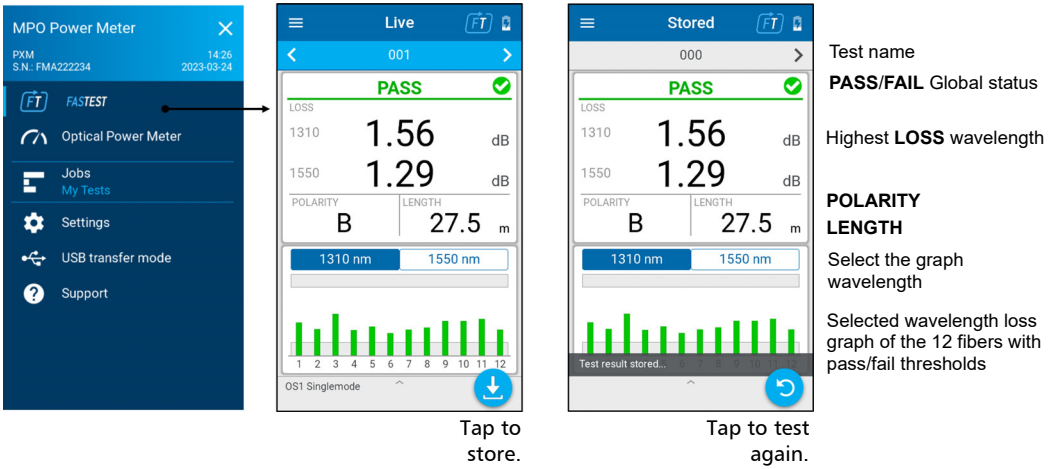
PXM is ready.

Note: *When the reference is not correct, a message* ⓘ *explaining the reason is displayed, as shown in the first screen above.*





MPO Loss Measurement



Some of the entries are listed as follows:

- Test point name
- **Loss** is stored for all 12 fibers.

Note: *The lowest loss value is displayed when the minimum threshold is fail and there is no maximum threshold fail. Otherwise, the highest loss value is displayed.*

Note: *A negative loss measurement occurs when the measured power level is more than the reference power level.*

Negative loss can be caused by the following:

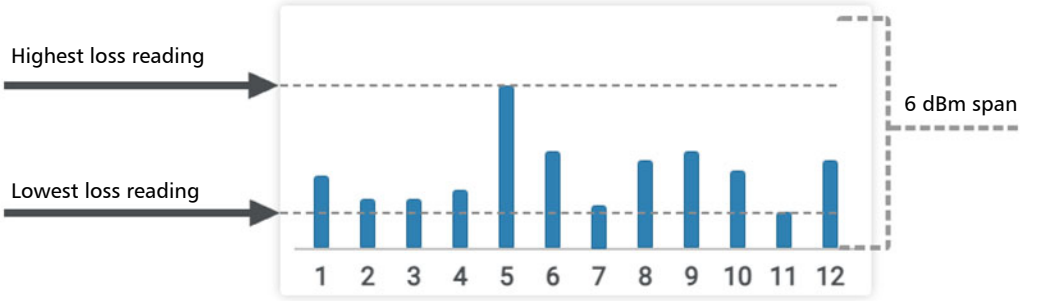
- The test method used may not be suitable for measuring loss on a short link; the one-cord or adapter-cord method is recommended.
- Damaged or dirty test cords.
- Poor quality of referencing test cords.

- Test cords have been disconnected since the last referencing.
- The referencing method or test cord connections are incorrect.

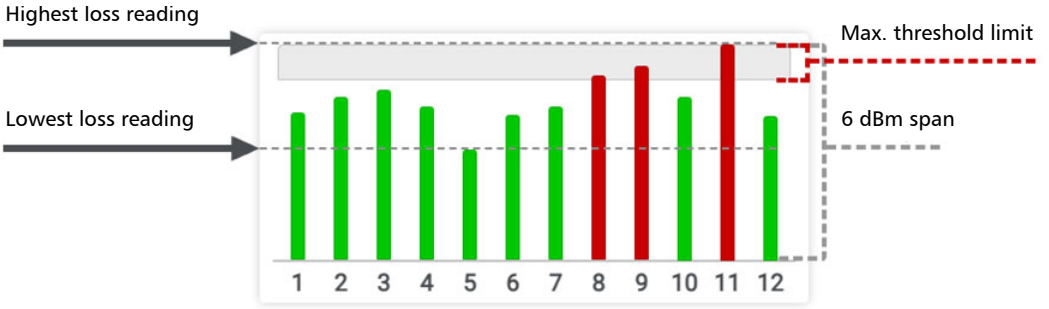
In these instances, it is strongly recommended to set a new reference.

Understanding the FasTesT Loss Graph Bar

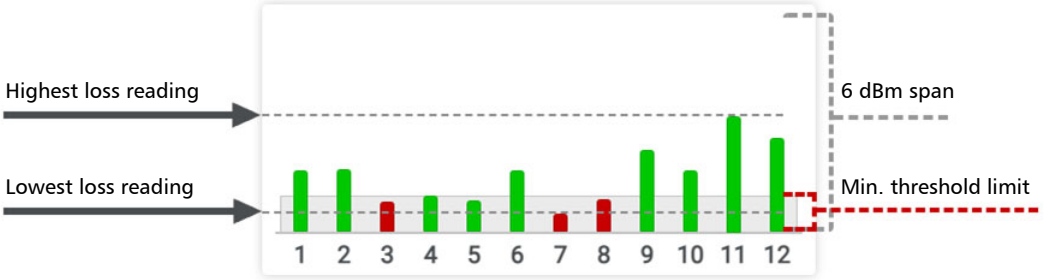
- When *no loss threshold* is applied:
  - The graph span is fixed to a 6 dB range.
  - The fiber with the lowest loss reading will correspond to the minimum graph span.



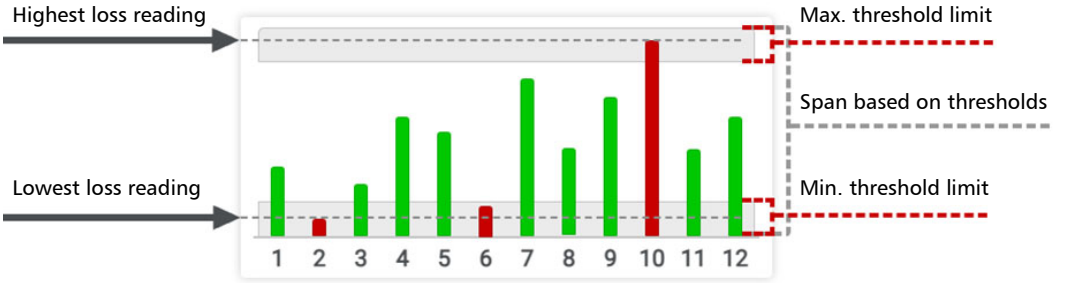
- When *maximum loss threshold* is applied:
  - The graph span is fixed to a 6 dB range.
  - The maximum loss threshold corresponds to the upper range of the graph.
  - The gray box indicates the maximum loss threshold limit.



- When *minimum loss threshold* is applied:
  - The graph span is fixed to a 6 dB range.
  - The minimum loss threshold corresponds to the lower range of the graph.
  - The gray box indicates the minimum loss threshold limit.



- When *minimum and maximum loss thresholds* are applied:
  - The graph span is determined to display the range between both thresholds applied.
  - The upper gray box indicates the maximum loss threshold limit.
  - The lower gray box indicates the minimum loss threshold limit.



Link Length Measurement

Each time a FasTesT measurement is conducted, the test units automatically measure the link length for polarity type A, B, C, and U.

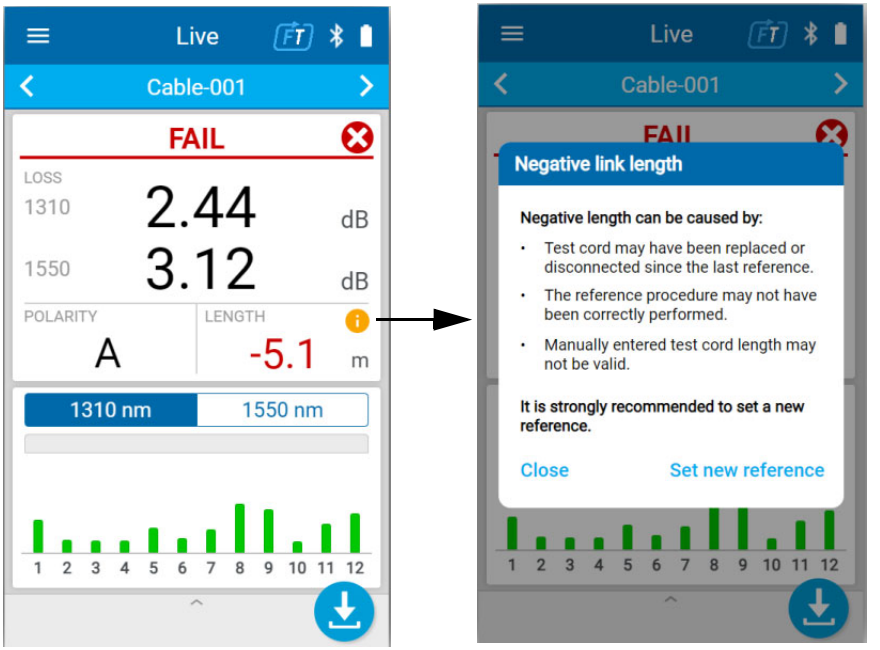
Note: *When testing with one or more multimode wavelengths, the link length is not available with Universal System type U polarity.*

Link length values are displayed according to the selected distance unit, and a single link length is reported.

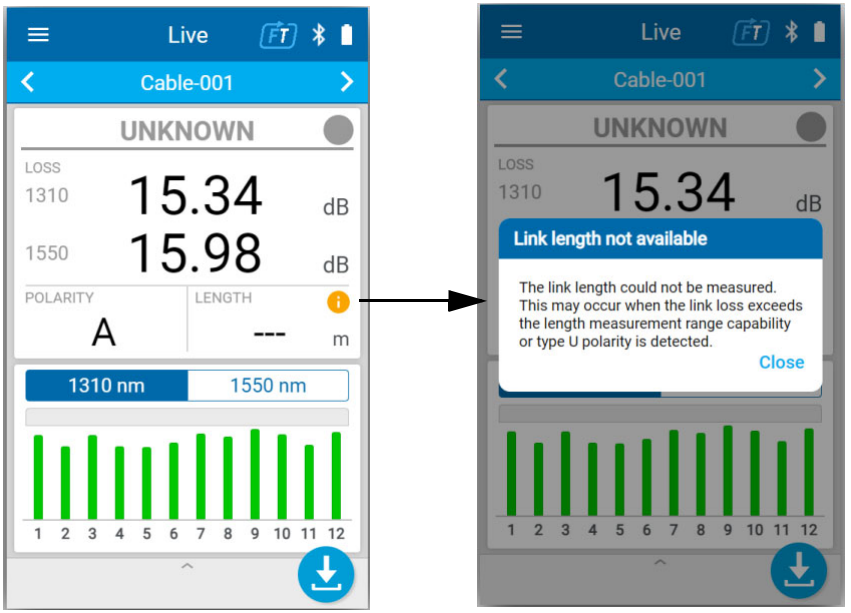
Note: *All fibers in an MPO cable are presumed to be the same length.*

The link length measurement excludes all test cord lengths currently referenced since the referencing assistant measures and calculates test cord lengths.

Negative Link Length

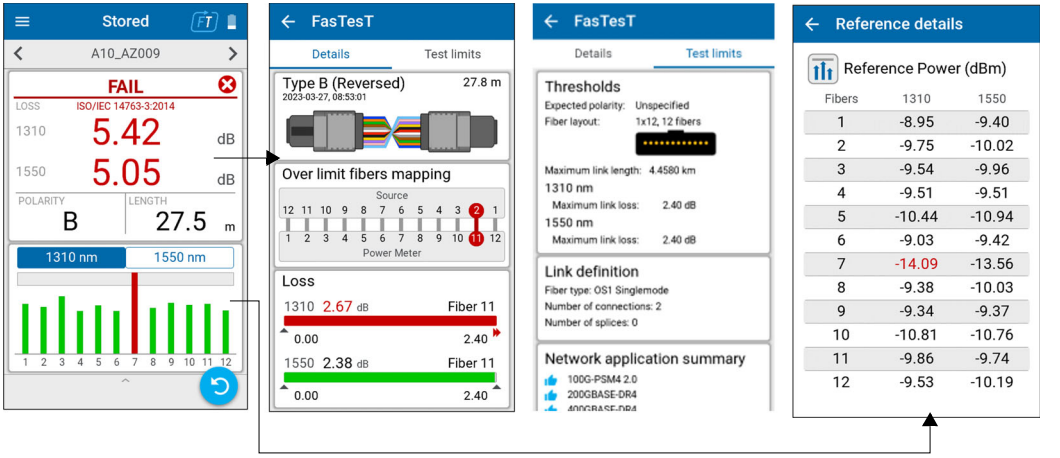


Unavailable Link Length



Analyzing Results

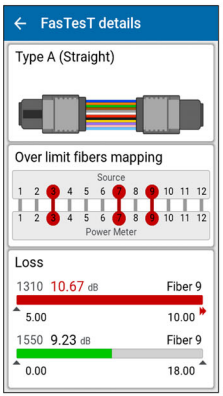
Tap on the global result tile to see FasTesT polarity graphic representation and fiber mapping **Details** and **Test limits**, as well the corresponding Pass/Fail verdict for each fiber.



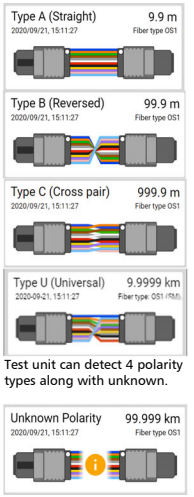
The margin meters are displayed for each wavelength reading loss according to the threshold applied. When no threshold value is defined, then the loss Pass/Fail verdict is unknown.

Polarity, Fiber Mapping, and Loss

FasTesT Details Panel

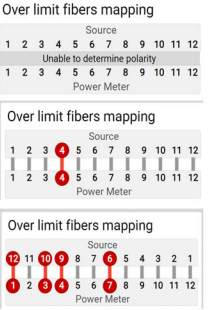


Polarity Types

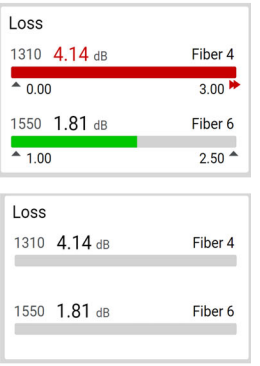


Test unit can detect 4 polarity types along with unknown.

Fibers in Fault at LXM and PXM Connectors



Loss Values and Threshold Detailed Analysis



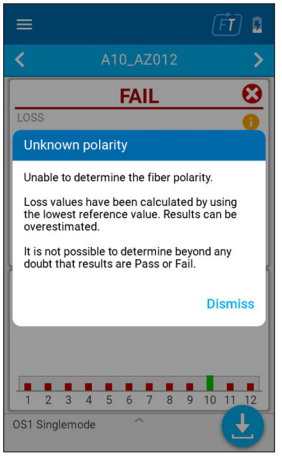
The margin page displays the lowest loss value when the minimum threshold is fail and there is no maximum threshold fail. Otherwise, the highest loss value is displayed.

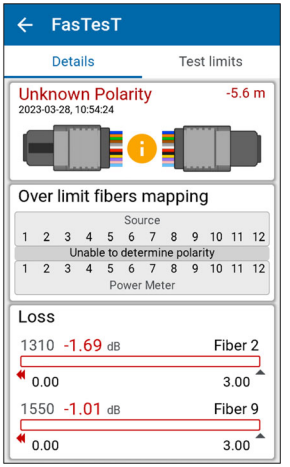
Unknown Polarity Message

The test unit can detect only one of the following polarities:

- Type A (Straight)
- Type B (Reversed)
- Type C (Cross pair)
- Type U (Universal System)

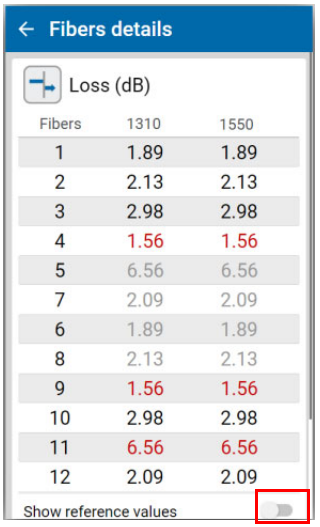
All other fiber arrangements may not be identified, therefore the test unit cannot determine the Pass/Fail verdict.

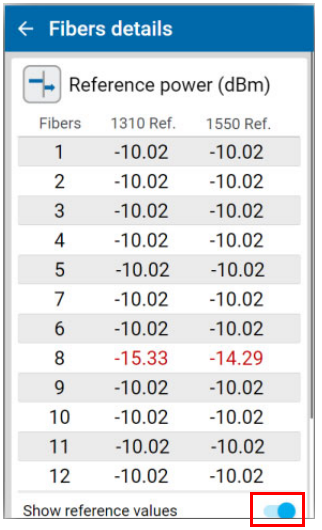




Fiber Details and Reference Values

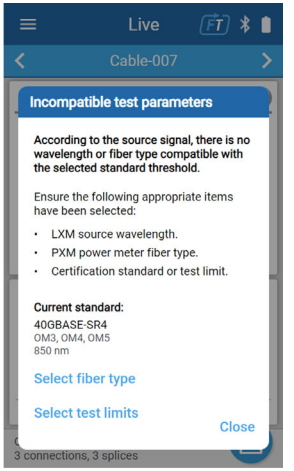
Allows for consulting the reference. See *Taking References* on page 74.





Incompatible Test Parameters

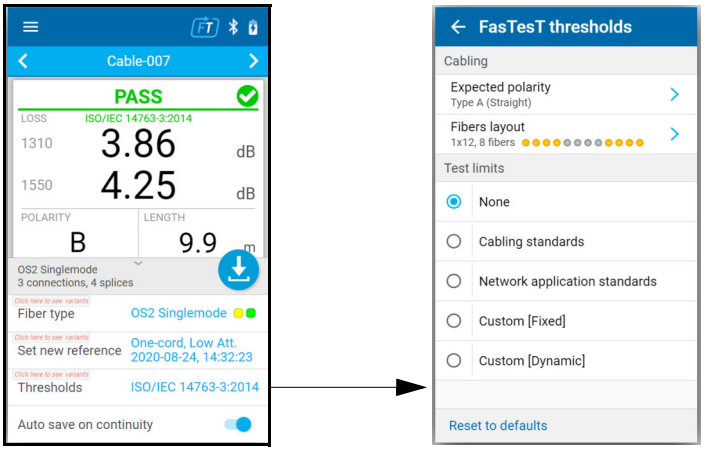
The test unit displays an icon with **Incompatible test parameters** diagnostics, along with **UNKNOWN** global Pass/Fail verdict when the current fiber type and/or the source signal do not include any wavelength to provide a loss Pass/Fail verdict.



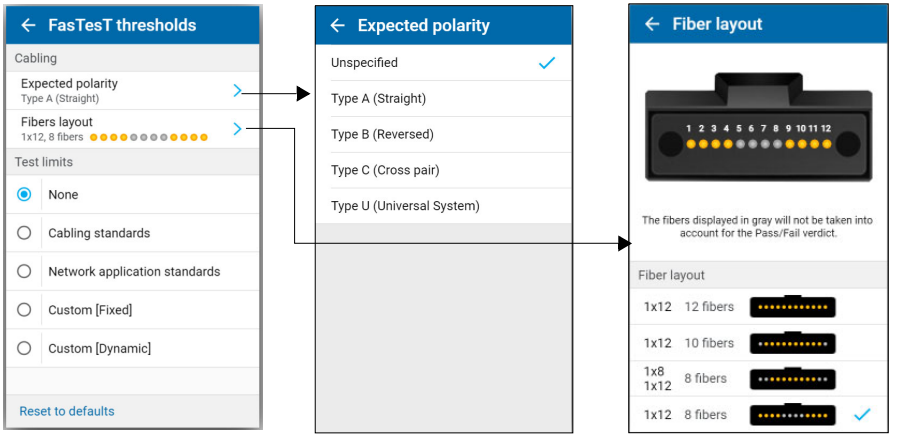
Thresholds

FasTesT threshold values and layout are available from the bottom drawer or **Settings** menu.

Thresholds Specification



Configuration

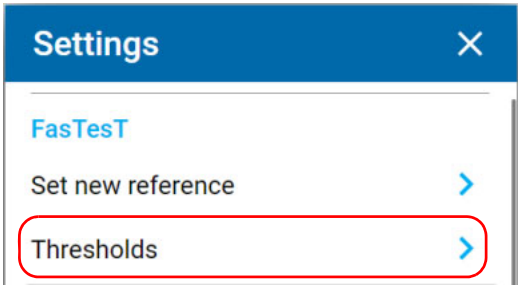


When the **Expected polarity** is **Unspecified**, the polarity detected during the FasTesT acquisition is not tested.

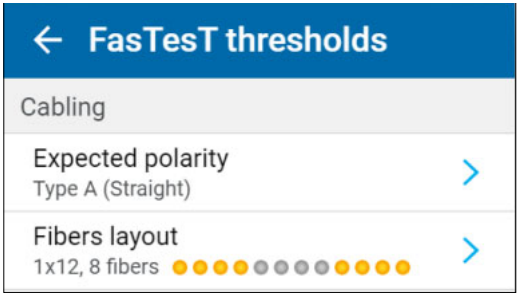
You can set Pass/Fail thresholds for FasTest. As soon as a measurement is complete, the application displays a pass or fail status when thresholds are applied.

To configure the polarity thresholds:

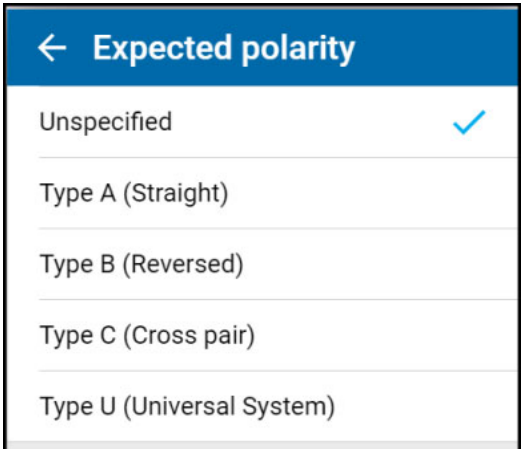
1. From the main menu, tap **Settings** or tap the icon to access the menu, then select .
2. Under either **FasTest**, tap **Thresholds**.



3. Select a threshold to set.



4. Set the **Expected polarity** (only FasTest).

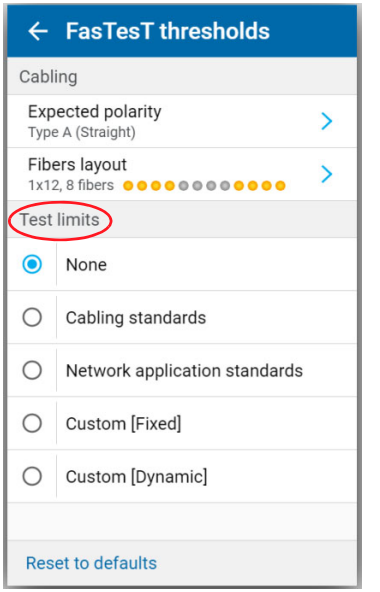


To see a depiction of the polarity types, go to *Polarity, Fiber Mapping, and Loss* on page 85.

Test Limits

The **FasTesT thresholds** page provide the means to select *one* of the following test limits:

- None
- Cabling standards
- Network application standards
- Custom [Fixed]
- Custom [Dynamic]



By selecting a single test limit, you can determine your thresholds to apply to your next measurements. Only 1 type of test limit can be selected.

When **None** is selected, the link loss and length are not tested.

Cabling Certification Standards

The cabling standards page provides the means to edit the number of connections and splices. These values are used for the link loss budget calculation.

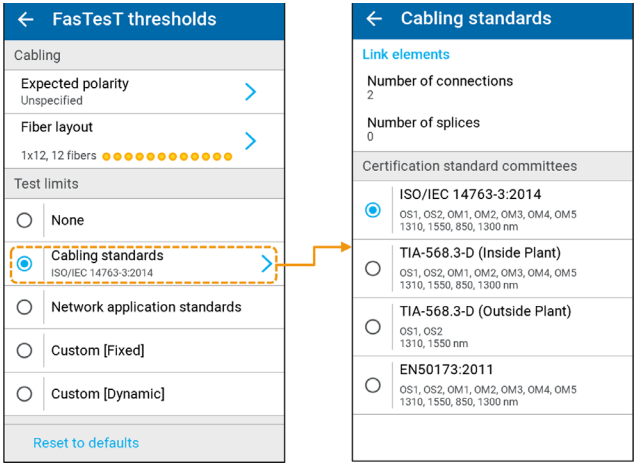
Note: *Only one cabling standard can be selected at a time.*

For each cabling standard, the test unit comes with pre-programmed threshold values defined by the industry standards. Internal thresholds for cabling standards are defined by fiber type. It is therefore important to select the appropriate fiber type before testing.

Test cord grades such as *Low attenuation grade* or *Standard grade* are also considered for the cabling link loss budget. You can select the grade when referencing.

For each cabling standard, the corresponding basic information like supported fiber types and wavelengths are displayed under each standard name.

Note: *Threshold values are defined in each standard.*



Dynamic loss budget is calculated according to the selected certification standard, and Pass/Fail status and global P/F verdict is displayed .

Test parameters used to calculate a cabling loss budget are as follows:

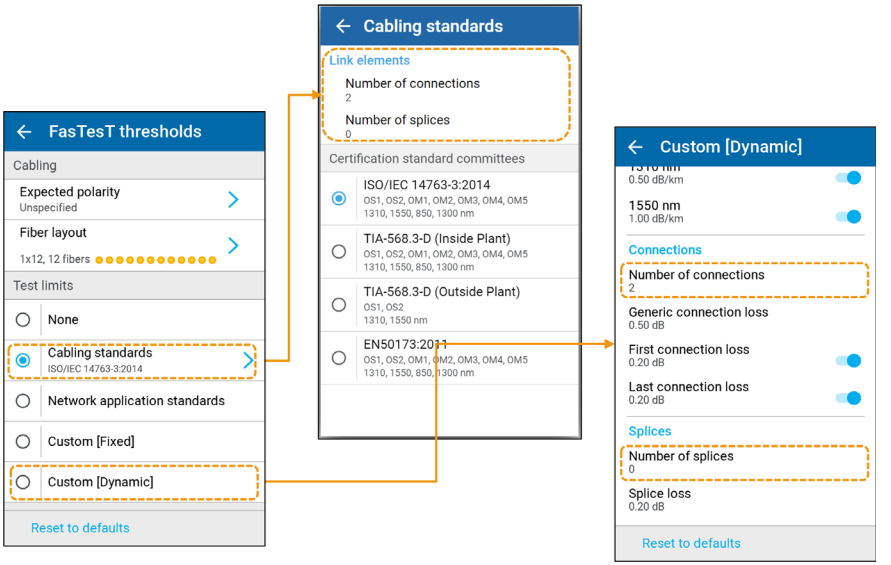
- Fiber Type (OS1, OS2, OM1…OM5)
- Number of splices
- Number of connections
- Link length.

Defining Connections and Splices

For custom and certification cabling, you can calculate the budget loss by defining the number of connectors and splices.

To edit the number of connections and splices:

1. From the Main Menu/**Settings**/**FasTest** tap **Thresholds**.
2. Under **Test limits**, tap **Cabling standards** to select one from the list of **Certification standard committees**.
3. Select **Custom [Dynamic]** to edit the number of **Connectors** and **Splices**.



Network Application Certification Standards

Network application certification standards include internal thresholds to calculate fixed limits such as:

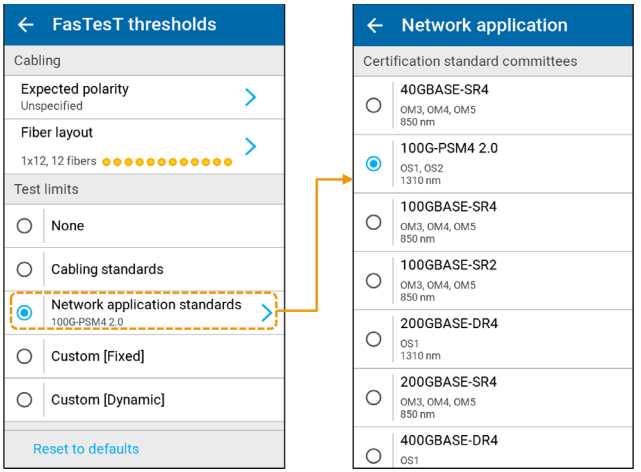
- Maximum loss (dB)
- Maximum link length (m)

For each network application standard, the test unit comes with pre-programmed threshold values defined by the industry standards.

Note: *Network application certification standards do not include thresholds to calculate a dynamic loss budget.*

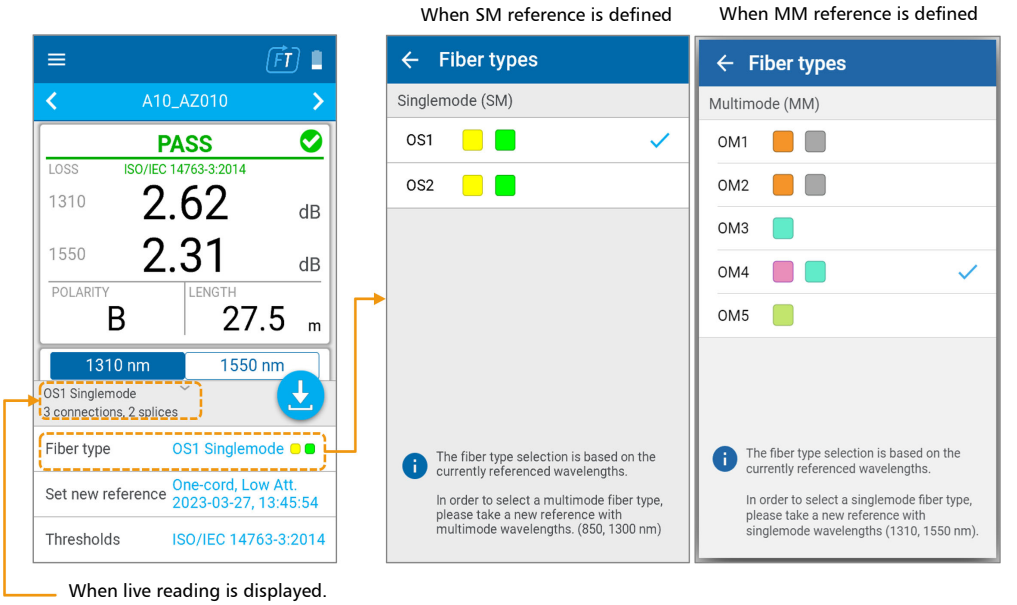
For each network application standard, the corresponding basic information like fiber types and wavelengths supported are displayed under each standard name.

Note: *Only one network application standard can be selected at a time.*



Fiber Type Selection

The aforementioned cabling and network application standards require the selection of a fiber type based on the wavelengths currently referenced.

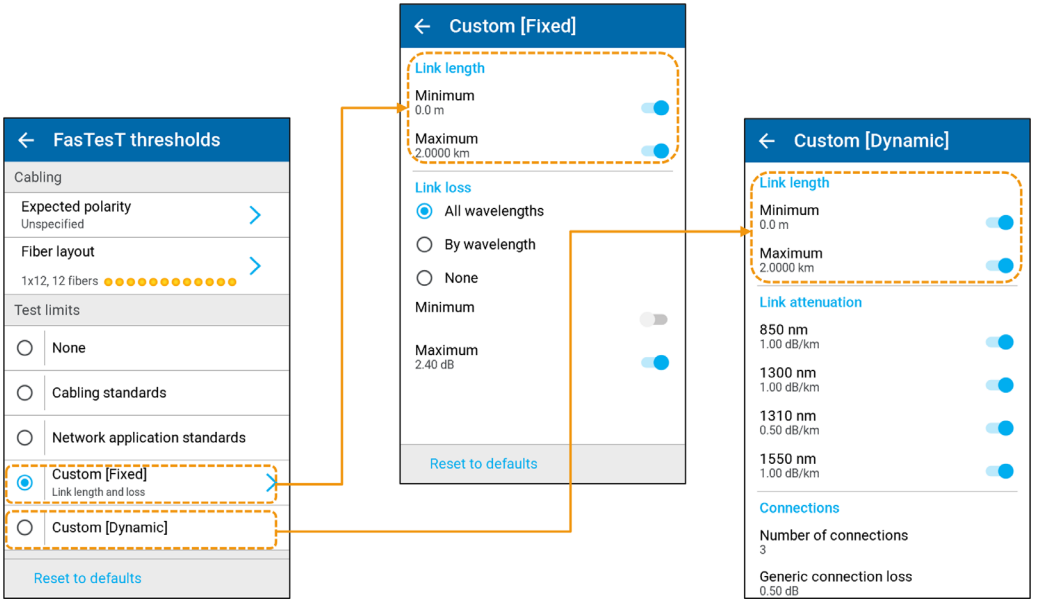


- When one or two **Singlemode (SM)** wavelengths are referenced, **Fiber types** OS1 and OS2 are available.
- When one or two **Multimode (MM)** wavelengths are referenced, **Fiber types** OM1, OM2, OM3, OM4, and OM5 are available.
- When no reference is defined, a message is displayed explaining that the fiber type selection is based on the currently referenced wavelengths. A shortcut **Set new reference** is provided.

Link Length Thresholds

From the Main Menu/**Settings**/**FasTest**/**Thresholds** under **Test limits**, the following 2 options for **Minimum**/**Maximum** link lengths (m, km, ft, kft) are available:

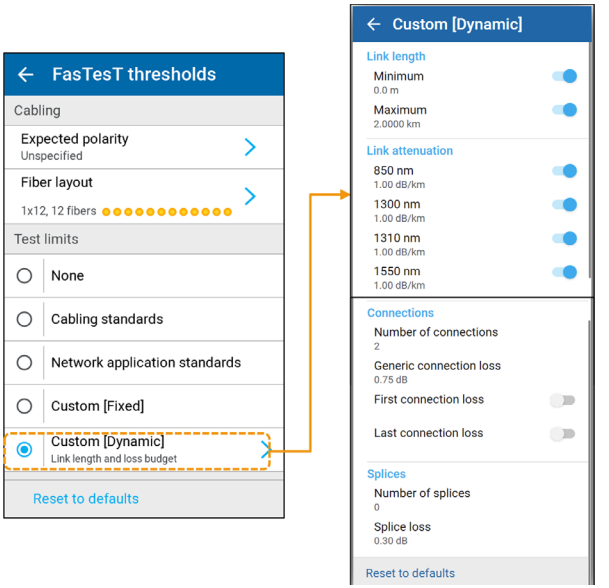
- **Custom [Fixed]** (default) allows you to view/edit the link length threshold values in a context of fixed link loss test limits.
- **Custom [Dynamic]** allows you to view/edit the link length threshold values in a context of dynamic test limits with a link loss budget.



Custom Dynamic Loss Budget

The following custom Pass/Fail thresholds are available to calculate the **Custom [Dynamic]** loss budget:

- Link attenuation (dB/km)
- Splice loss (dB)
- Generic connection loss (dB)
- First and last connection loss (dB)



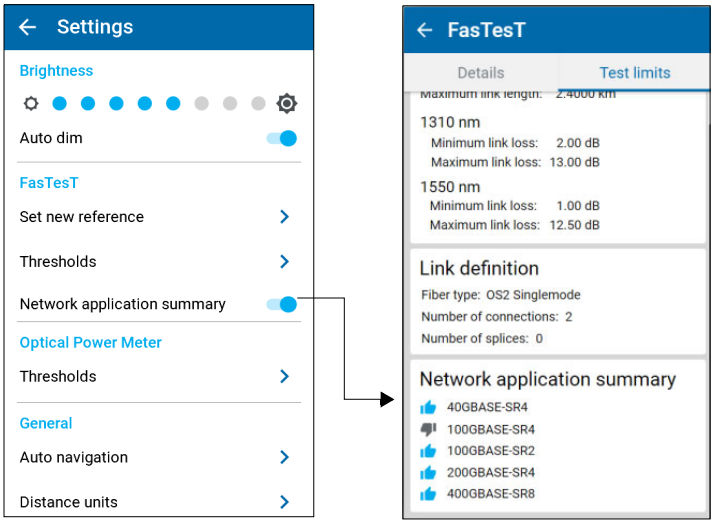
The following test parameters are used to calculate a custom loss budget:

- Measured link length
- Number of connections/splices

Note: *Custom dynamic loss budget can be applied only to a loss measurement.*

Network Application Summary

The **Network application summary** list is based on test parameters such as the fiber type and wavelength(s) used to perform the measurement. A specific verdict is displayed for each supported network application standard with a thumbs up and thumbs down icon. The summary list informs about the capacity of the tested link without affecting the global Pass/Fail verdict.



9 Maintenance

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- 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, disconnect from any external power source, remove the batteries and let the unit dry completely.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

Cleaning MPO Connectors

Your unit is equipped with MPO connectors that can be cleaned using a mechanical cleaner.

Note: *EXFO strongly recommends that both test unit and test cord connectors be cleaned.*

WARNING

Verifying the surface of a connector with a fiber-optic microscope WHILE THE UNIT IS ACTIVE WILL result in permanent eye damage.

To clean a connector using a mechanical cleaner:

1. Insert the cleaning tip into the optical adapter and push the outer shell into the cleaner.

Note: *The cleaner makes a clicking sound to indicate that the cleaning is done.*

2. Verify the connector surface with a fiber inspection probe (for example, EXFO's FIP).

Inspecting MPO Connectors

The EXFO FIP-500 fiber inspection scope facilitates the examination of the MPO connectors. See the FIP-500 User Guide for more information.

Use the following FIP-500 tips as follows:

- For Singlemode LXM (LXM-SM1) connector inspection:

  STIP-MPO-A = MPO/APC SmarTip

  or

  STIP-MPO-A-KL = Keyless MPO/APC SmarTip (used straight/keyup)

- For Multimode LXM (LXM-MM1) connector inspection:

  STIP-MPO-U = MPO/UPC SmarTip

- For PXM connector inspection:

  STIP-MPO-A-KL = Keyless MPO/APC SmarTip
  (used inverted/keydown)

Cleaning the Touchscreen

Clean the touchscreen with a soft, non-abrasive cloth, such as one used for cleaning reading glasses, dampened with water.

CAUTION

Using anything else than water can damage the special coating of the touchscreen.

Recharging the Battery

Your unit uses one lithium-ion (Li-ion) battery.

- The charge status is shown in the upper right corner of the title bar. A red icon indicates that the battery level is running low and that you should connect the unit to a power outlet. For more information, see *Battery Status Icon Description* on page 9.
- The unit also indicates the charge status with the LED on its front panel (see *LED Indicator Description* on page 8).

CAUTION

Only charge the battery with the USB power adapter provided by EXFO with your unit.

IMPORTANT

- **The battery is not charged at the factory. You must fully charge it before using the unit for the first time. The battery is fully charged after a few hours or when the battery LED indicator is steady blue.**
- **The time required to charge the battery depends on various factors such as the type of tests currently performed and the ambient temperature.**
- **To ensure that the battery functions properly, keep it in temperatures between –10 °C and 45 °C (14 °F and 113 °F). Store it between 10 °C to 35 °C (50 °F to 95 °F).**
  When the ambient temperature is below 0 °C (32 °F) or when it reaches or exceeds about 40 °C (104°F), the battery can either charge more slowly than usual, or not charge at all, depending on the internal temperature of your unit.
- **Do not leave a battery discharged for several days.**
- **After 300 cycles (approximately 18 months of use), you may want to replace the battery with a new one to maintain optimal operation conditions. Otherwise, the operating time might be reduced.**

IMPORTANT

- **If you need to store the unit (or a battery) for an extended period of time, ensure that the battery is charged at around 50 % of its capacity, and then turn the unit off (shutdown).**
- **Place the unit (or the battery) in a cool dry place, and ensure that the battery is charged at around 50 % of its capacity. Every three months during the storage period, verify the battery level. Recharge the battery when necessary, so that its charge level remains around 50 % of the total capacity. This will ensure that you get the optimum performance out of the battery.**

To recharge the battery:

Connect the unit to a power outlet using the USB power adapter (way to charge the battery).

Note: *The standard USB ports of a computer cannot power your unit or charge its battery while the unit is on. If you connect your unit to such a USB port with the USB cable, the unit will still consume battery power. If the unit is off when you connect it to the USB port of a computer, its battery could charge, but slowly.*

Note: *If you have a vehicle equipped with dedicated USB charging ports, you could connect your unit to one of these ports to charge the battery. The actual results will vary with each vehicle.*

The charge cycle will start and end automatically.

Replacing the Battery

Your unit can be powered either by battery or from an appropriate power outlet when used with the provided USB power adapter.

WARNING

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

WARNING

Do not throw batteries into fire or water and do not short-circuit their electrical contacts. Do not disassemble.

IMPORTANT

Recycle or dispose of used batteries properly, in accordance with local regulations. Do not dispose of them in ordinary garbage receptacles. For more information, see the section about recycling and disposal in this user documentation.

WARNING

Your unit uses a lithium-ion (Li-ion) battery with built-in protection that has been especially designed for EXFO. For this reason, you can only replace it with batteries of the same type and model. You can purchase new batteries from EXFO.

For more information on the available power sources for your unit, as well as their characteristics, refer to the *Technical Specifications* of your product.

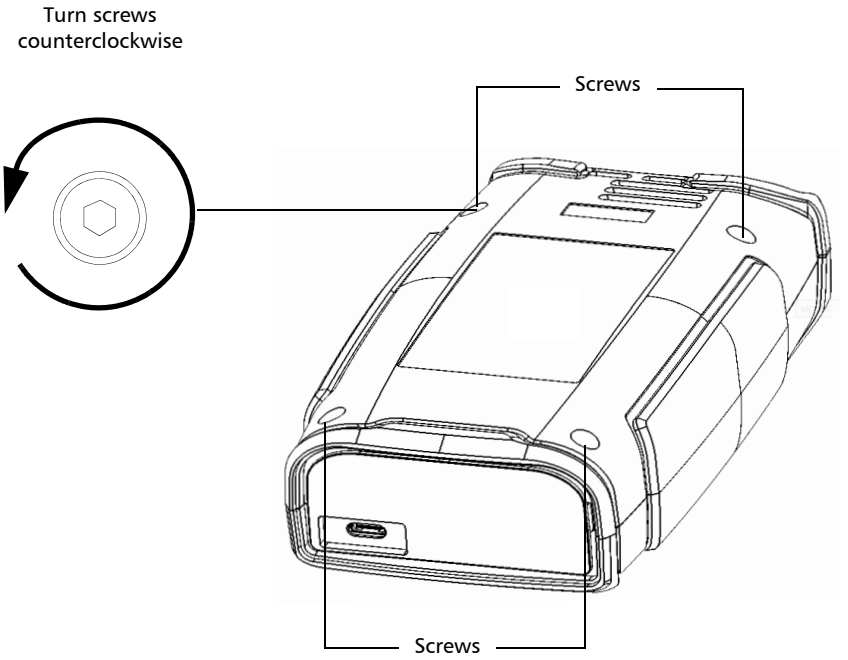
CAUTION

Electrostatic discharge (ESD) damage can cause complete or intermittent equipment failures.

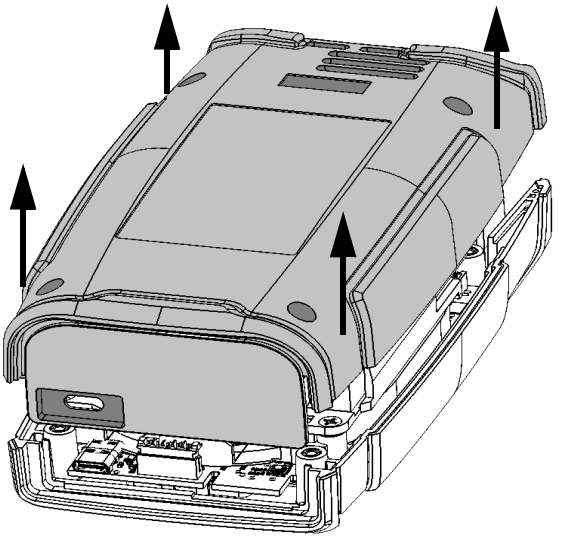
- **Always use an ESD-preventive wrist or ankle strap when replacing the battery. Ensure that the antistatic strap makes good skin contact and that the end of its wire is grounded properly.**
- **Never touch any component inside the unit other than those identified in the procedure hereafter, either with tools or your fingers.**

To replace the battery:

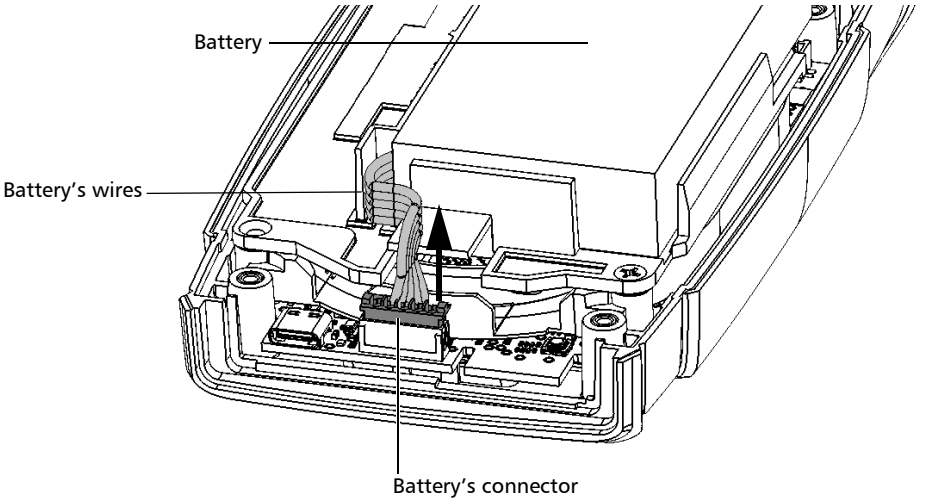
1. Turn off the unit (shutdown) and disconnect the fiber and USB cable (if applicable).
2. Position the unit so that its front panel rests on a flat surface such as a table.
3. On the back of the unit, using a 2.5 mm hex socket screwdriver, turn the screws (4) counterclockwise until they are loose, and remove them.



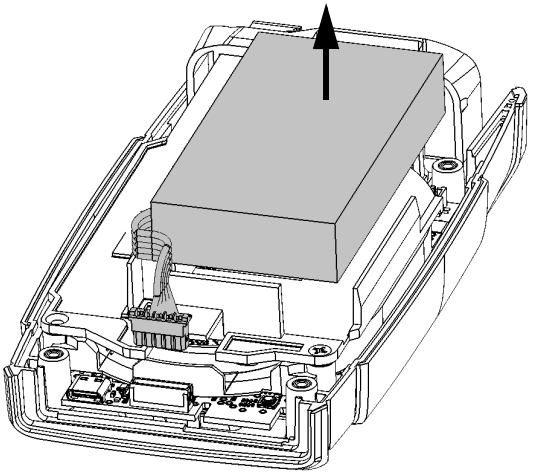
4. Hold the back panel by its sides and pull it up to remove it.



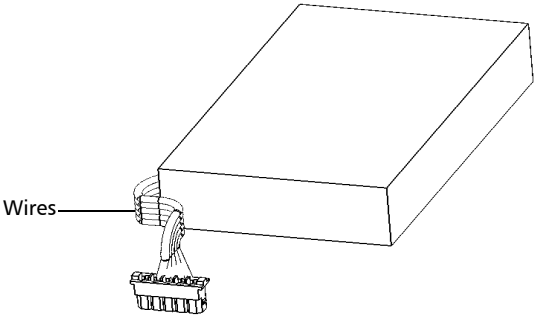
5. Gently pull on the battery's connector to disconnect it from its socket.



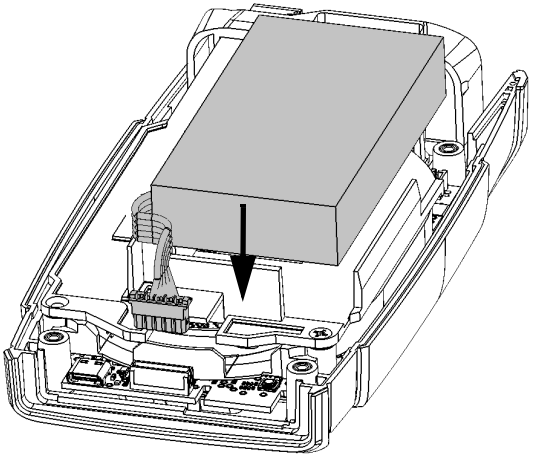
6. Pull the battery up to remove it.



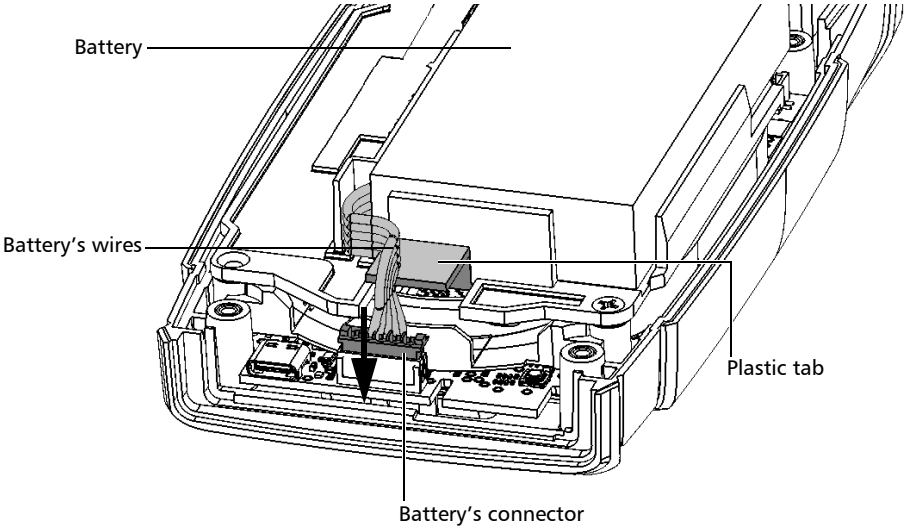
7. Place the new battery so that its wires are located on the left side, toward the front.



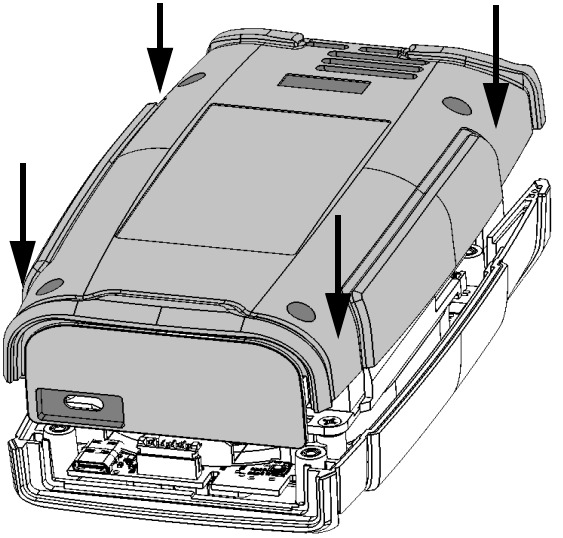
8. Push the new battery toward the bottom of the case until it stops.



9. Ensure that the battery's wires are *above* the plastic tab (not under), and then connect the battery's connector to the corresponding socket.



10. Place the back panel on the unit, making sure that it is aligned properly with the front of the unit. The sides of the back panel should be flush with those of the front. There should be no gap between the back panel and the front of the unit. If necessary, slightly move the back panel until alignment is correct.



11. Using a 2.5 mm hex socket screwdriver, turn the screws (4) clockwise until they are tightened.

This will secure the back panel into place.

IMPORTANT

To allow the unit to take into account the new battery, reset the battery information as explained hereafter.

IMPORTANT

- **If the unit's LED turns to red when you turn on the unit, simply connect the unit to a power outlet and let the new battery charge for a few minutes.**
- **It could take a few charge/discharge cycles before the unit's LED indicator and the on-screen battery status icon reflect the actual power level of the new battery.**

Recalibrating the Unit

EXFO manufacturing and service center calibrations are based on the ISO/IEC 17025 standard (*General Requirements for the Competence of Testing and Calibration Laboratories*). This standard states that calibration documents must not contain a calibration interval and that the user is responsible for determining the re-calibration date according to the actual use of the instrument.

The 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, as well as the specific requirements for your application. All of these elements must be taken into consideration when determining the appropriate calibration interval of this particular EXFO unit.

Under normal use, the recommended interval for your MPO Optical Loss Test Set (OLTS) is: three years.

For newly delivered units, EXFO has determined that the storage of this product for up to six months between calibration and shipment does not affect its performance.

To help you with calibration follow-up, EXFO provides a special calibration label that complies with the ISO/IEC 17025 standard and indicates the unit calibration date and provides space to indicate the due date. Unless you have already established a specific calibration interval based on your own empirical data and requirements, EXFO would recommend that the next calibration date be established according to the following equation:

Next calibration date = Shipping date+ Recommended calibration period (three years)

To ensure that your unit conforms to the published specifications, calibration may be carried out at an EXFO service center or, depending on the product, at one of EXFO's certified service centers. Calibrations at EXFO are performed using standards traceable to national metrology institutes.

The original calibration date is available on the calibration certificate that came with your unit. Since this date is printed on a sticker, if desired, you could affix it to your unit for easier reference. The most recent calibration date is also available from your unit (Main menu > **Settings** > **About** > **Calibration date**).

Recycling and Disposal

This symbol on the product means that you should 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.

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

10 Troubleshooting

Solving Common Problems

Problem	Possible Cause	Solution
My unit does not start.	The battery is completely discharged (if the battery level allows it, the unit's LED will remain red for about 10 seconds when you try to turn on the unit).	Connect the unit to an external power source to recharge the battery. If the battery is no longer charging properly, you may need to replace it with a new one (see *Replacing the Battery* on page 107).
	The system has encountered a problem.	Press the on/off button for at least ten seconds to force a hardware reset on the unit.
	Some files essential to the normal operation of the unit have been corrupted.	Press the on/off button for at least ten seconds to force a hardware reset on the unit. If the problem persists, try resetting the PXM/LXM to its factory settings (see *Reverting to Factory Settings* on page 63).
My unit is not responding.	The system has encountered a problem.	Press the on/off button for at least ten seconds to force a hardware reset on the unit.

Problem	Possible Cause	Solution
The battery is not recharging.	Ambient temperature is too high or too low.	In this case, the unit's LED is blue and blinks slowly. Make sure that the temperature in the location where you recharge the battery is within the specifications.
	The USB power adapter is not connected properly.	Make sure that the USB power adapter is connected to the unit and the AC outlet. In this case, the unit's LED is not blinking at all, but there is a battery icon with a flash symbol displayed on screen. If the USB power adapter is connected properly and the problem persists, it could mean that the USB power adapter is defective. In this case, try replacing the adapter. You can purchase new USB power adapters from EXFO.
I have just replaced the battery and the unit's LED turns to red when I turn on the unit.	The unit may take a little time to detect the level of a new battery.	Connect the unit to a power outlet with the provided USB power adapter and let the battery charge for a few minutes. After a short while, the unit should turn on. However, it could take a few charge/discharge cycles before the unit's LED indicator and the on-screen battery status icon reflect the actual power level of the new battery.

Accessing User Documentation

You can access the user guide at all times using your smart device by scanning the QR code displayed on your unit.

To access the user guide with the QR code:

1. From the main menu, tap **Support** to open the page.
2. Scan the QR code with your smart device.

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, 8:00 a.m. to 7:00 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

For detailed information about technical support, and for a list of other worldwide locations, visit the EXFO Web site at www.exfo.com.

If you have comments or suggestions about this user documentation, you can send them to customer.feedback.manual@exfo.com.

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

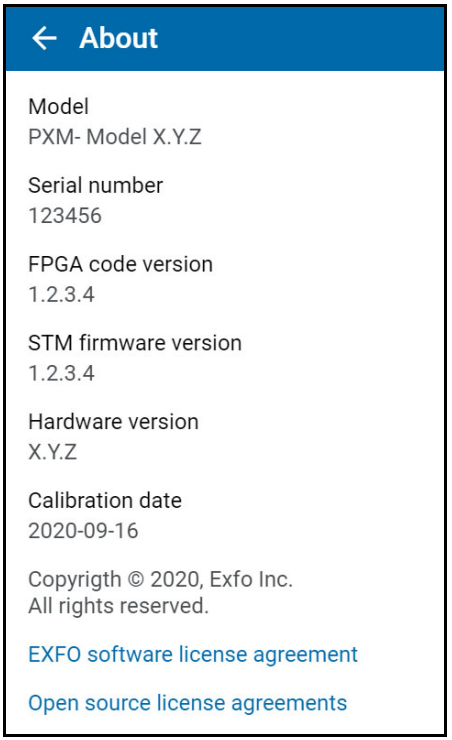
Viewing System Information

You can easily access important information such as the model of your unit, the serial number, the software and hardware versions, as well as the latest hardware calibration, directly from your unit. You can also find the contact information if you ever need to reach EXFO.

To view the system information:

From the main menu, tap **Settings**, and then **About**.

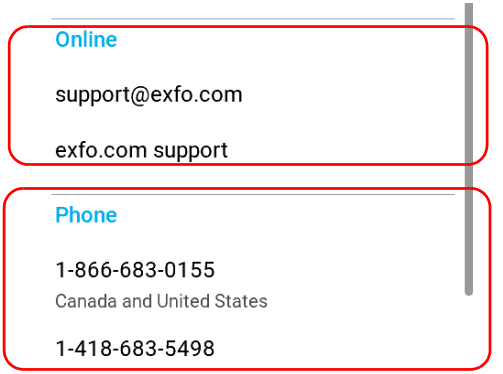
The information you want to view is displayed on screen.



To retrieve the contact information:

From the main menu, tap **Support**.

The information you want to view is displayed on screen.



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 shocks and vibrations.

11 Warranty

General Information

EXFO 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.

Gray Market and Gray Market Products

Gray market is a market where products are traded through distribution channels that are legal but remain unofficial, unauthorized, or unintended by the original manufacturer. Intermediaries using such channels to distribute products are considered to be part of the gray market (hereafter unauthorized intermediary).

EXFO considers that a product originates from the gray market (hereafter gray market product) in the following situations:

- A product is sold by an unauthorized intermediary.
- A product is designed and destined for a particular market and sold on a second market.
- A product is resold, despite being reported lost or stolen.

When products are purchased on the gray market, rather than through an authorized EXFO distribution channel, EXFO is unable to guarantee the source and quality of those products nor the local safety regulations and certifications (CE, UL, etc.).

EXFO will not honor warranty, install, maintain, repair, calibrate, provide technical support nor make any support contracts available for gray market products.

For complete information, refer to EXFO's policy regarding gray market products at www.exfo.com/en/how-to-buy/sales-terms-conditions/gray-market/

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 the control of EXFO.

IMPORTANT

In the case of products equipped with optical connectors, EXFO will charge a fee for replacing 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 127). 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 127).

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
support@exfo.com

EXFO Europe Service Center
Winchester House, School Lane
Chandlers Ford, Hampshire S053 4DG
ENGLAND

Tel.: +44 2380 246800
Fax: +44 2380 246801
support.europe@exfo.com

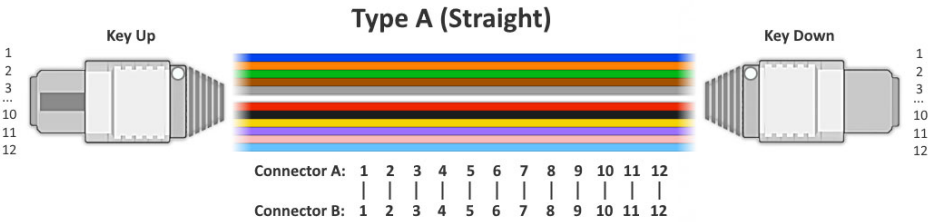
EXFO Telecom Equipment (Shenzhen) Ltd.
3rd Floor, Building C,
FuNing Hi-Tech Industrial Park, No. 71-3,
Xintian Avenue,
Fuhai, Bao'An District,
Shenzhen, China, 518103

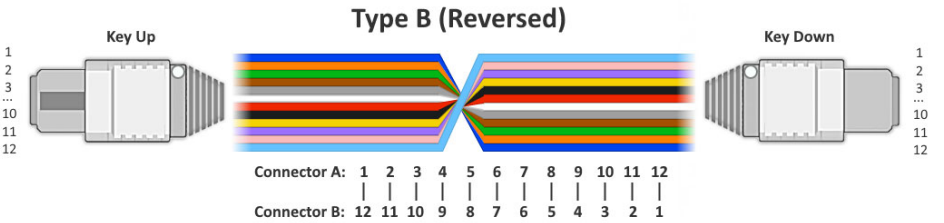
Tel: +86 (755) 2955 3100
Fax: +86 (755) 2955 3101
support.asia@exfo.com

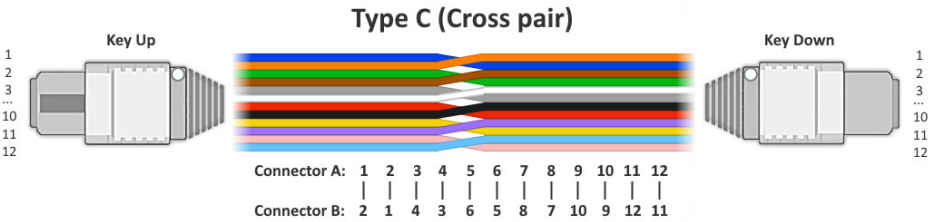
To view EXFO's network of partner-operated Certified Service Centers nearest you, please consult EXFO's corporate website for the complete list of service partners:
http://www.exfo.com/support/services/instrument-services/exfo-service-centers.

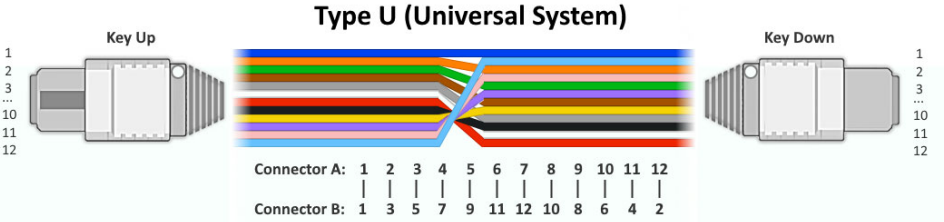
A MPO Types and Test Cords

Polarities









EXFO Test Cords

- Polarity A
- Reference grade type
- 3 m/0.5 m length (test cord/adapter cord)
- Offered in Unpinned/Unpinned and Pinned/Unpinned

Singlemode Test Cords

- 9 mm (OM4)
- MPO APC Type

Multimode Test Cords

- 50 mm (OM4)
- MPO UPC Type
- 0.5 m adapter cord without Mandrel

MPO Adapters

In all configurations, MPO adapters are Key up/Key down. Pinned/Pinned test cords are not offered since the product is pinned.

Adapter cords are as follows:

- Unpinned/Pinned
- Unpinned/Unpinned
- Pinned/Pinned (for 3-cord method)

B MPO-12 Test Methods

One-cord test method

The one-cord is the recommended test method. This method tends to include the attenuation of both first and last connectors in the link loss budget. It is called one-cord method because only one test cord is used for the referencing. A receive cord is also needed to undertake the measurement.

This is the most commonly used method in the industry, as it will yield the most accurate testing results since there is only one connection during the referencing step (uncertainty coming from the connection mating is minimal). The one-cord method allows for testing of the fiber optic link from end-to-end including losses from all connections. Since connectors are the major contributor to the overall loss, and not the fiber itself, including connector losses becomes very important as the link gets shorter.

Fiber under test compatibility:

Pinned/Pinned

Pinned/Unpinned

Unpinned/Unpinned

By using gender-changing test cords, it is possible to use one-cord method with unpinned/unpinned FUT (Fiber Under Test). Otherwise the adapter cord method is recommended for this FUT type.

Note: *All test cords are type A (Straight) polarity. The mating adapter type key Up/key Down must be the same for all connections.*

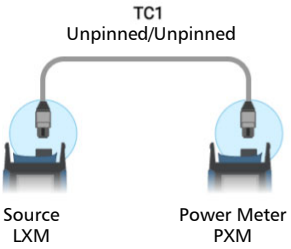
Pinned/Pinned FUT

Test cords required:

- TC1 Launch Cord - Unpinned/Unpinned
- TC2 Receive Cord - Unpinned/Unpinned

1 Reference

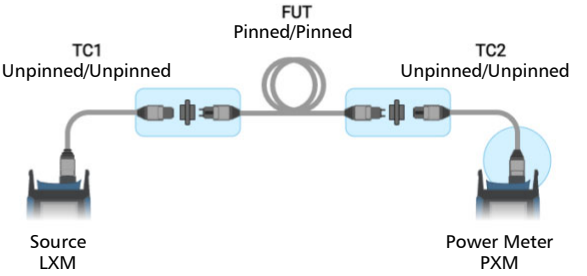
Connect TC1 from the source to the power meter.
Activate source in FasTesT mode.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from the power meter.
Connect TC2 to the power meter.
Insert FUT between TC1 and TC2.



TC1 must remain connected to the source port, otherwise a new reference will be required.

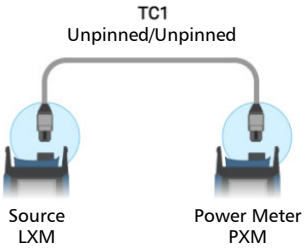
Pinned/Unpinned FUT

Test cords required:

- TC1 Launch Cord - Unpinned/Unpinned
- TC2 Receive Cord - Pinned/Unpinned

1 Reference

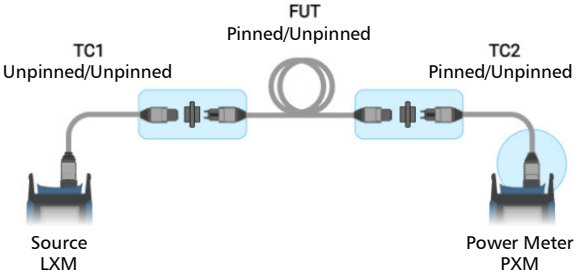
Connect TC1 from the source to the power meter.
Activate source in FasTesT mode.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from the power meter.
Connect TC2 to the power meter.
Insert FUT between TC1 and TC2.



TC1 must remain connected to the source port, otherwise a new reference will be required.

When TC1 and TC2 ends are different (Unpinned and Pinned), they can be connected together for a verification step. EXFO recommends this step to improve the measurement accuracy by validation the connectors quality.

Two-cord test method

This method tends to include only the attenuation of the first or last connector in the link loss budget. It is called two-cord method because launch and receive test cords are used for the referencing.

This method will yield less accurate test results than the recommended one-cord reference method, since it includes a connection mating in the reference.

Fiber under test compatibility:

- ✗ Pinned/Pinned
- ✓ Pinned/Unpinned
- ✗ Unpinned/Unpinned

Note: *All test cords are type A (Straight) polarity. The mating adapter type key Up/key Down must be the same for all connections.*

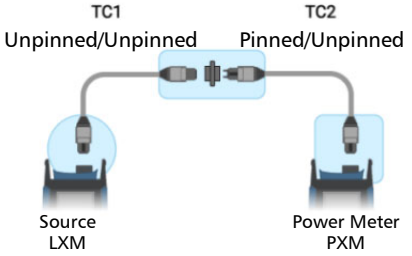
Pinned/Unpinned FUT

Test cords required:

- ➤ TC1 Launch Cord - Unpinned/Unpinned
- ➤ TC2 Receive Cord - Pinned/Unpinned

1 Reference

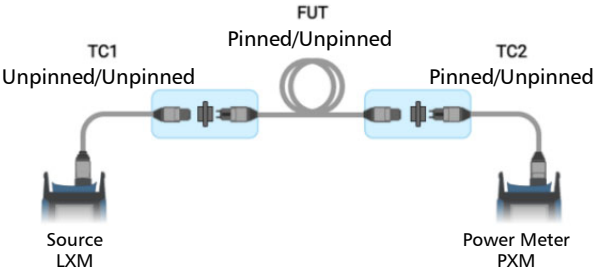
Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from TC2.
Insert FUT between TC1 and TC2.



TC1 must remain connected to the source port, otherwise a new reference will be required.

The attenuation of both test cords and the connection losses are included in the reference.

Impact of including connector mating in the reference:

1. May yield optimistic loss values if the loss exhibited by the TC1 and TC2 connection is relatively high.
2. May yield negative loss readings if connection was dirty (higher loss) during the referencing and cleaned afterwards.
3. There is no guarantee that the connection included in the reference will exhibit a similar loss when connected to the link under test.

Three-cord test method

This method tends to exclude the attenuation of both first and last connectors from the link loss budget. Three test cords are used: launch, substitution, and receive. The loss of connections between test cords is critical for the uncertainty of the measurement.

Fiber under test compatibility:

- Pinned/Pinned
- Pinned/Unpinned
- Unpinned/Unpinned

Note: *All test cords are type A (Straight) polarity. The mating adapter type key Up/key Down must be the same for all connections.*

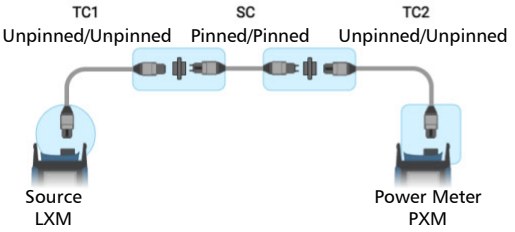
Pinned/Pinned FUT

Test cords required:

- TC1 Launch Cord - Unpinned/Unpinned
- TC2 Receive Cord - Unpinned/Unpinned
- SC Substitution Cord - Pinned/Pinned

1 Reference

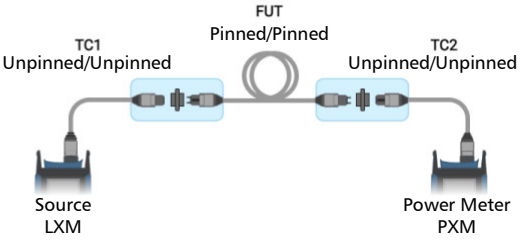
Connect TC1 to the source and TC2 to the power meter. Insert SC between test cords, then activate the source in FasTesT mode.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Replace the SC with the FUT.



TC1 must remain connected to the source and TC2 connected to the power meter, otherwise a new reference will be required.

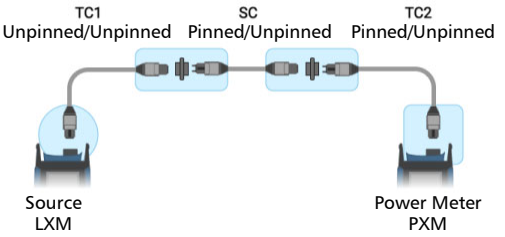
Pinned/Unpinned FUT

Test cords required:

- TC1 Launch Cord - Unpinned/Unpinned
- TC2 Receive Cord - Pinned/Unpinned
- SC Substitution Cord - Pinned/Unpinned

1 Reference

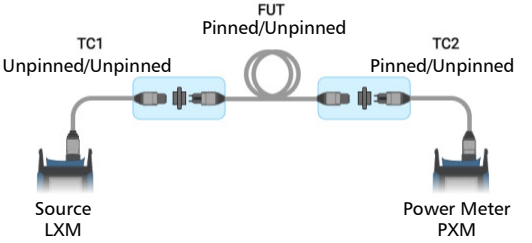
Connect TC1 to the source and TC2 to the power meter. Insert SC between test cords, then activate the source in FasTesT mode.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Replace the SC with the FUT.



TC1 must remain connected to the source and TC2 connected to the power meter, otherwise a new reference will be required.

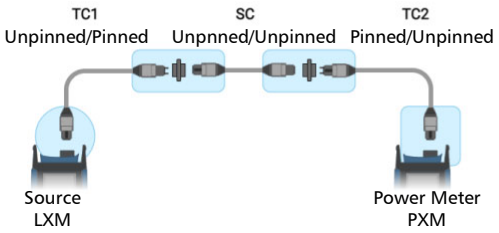
Unpinned/Unpinned FUT

Test cords required:

- TC1 Launch Cord - Unpinned/Pinned
- TC2 Receive Cord - Pinned/Unpinned
- SC Substitution Cord - Unpinned/Unpinned

1 Reference

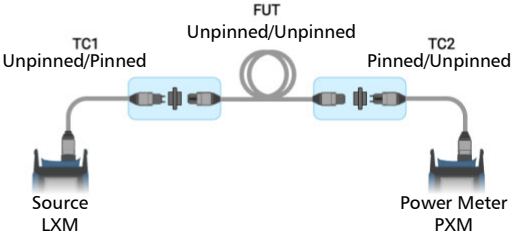
Connect TC1 to the source and TC2 to the power meter. Insert SC between test cords, then activate the source in FasTesT mode.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Replace the SC with the FUT.



TC1 must remain connected to the source and TC2 connected to the power meter, otherwise a new reference will be required.

Adapter-cord test method

When the MPO test cable connector gender is not compatible with the test unit's connector gender, a one-cord reference method cannot be applied. This is because the reference test cord cannot be connected to the test unit. In this case, an alternative adapter-cord method is recommended.

The adapter-cord method tends to include the attenuation of both first and last connectors in the link loss budget. It is called adapter-cord because after the referencing step, an adapter cord is added during the FUT measurement.

Fiber under test compatibility:

Pinned/Pinned

Pinned/Unpinned

Unpinned/Unpinned

Although pinned/pinned and pinned/unpinned are compatible with the adapter-cord, the one-cord method is recommended for these FUT types.

Note: *All test cords are type A (Straight) polarity. The mating adapter type key Up/key Down must be the same for all connections.*

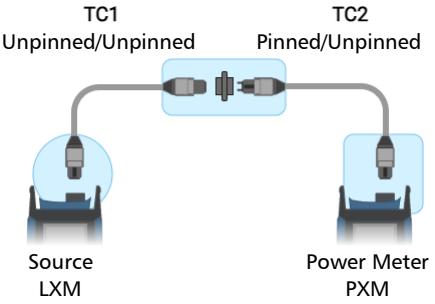
Unpinned/Unpinned FUT

Test cords required:

- TC1 Launch Cord - Unpinned/Unpinned
- TC2 Receive Cord - Pinned/Unpinned
- AC Adapter Cord - Pinned/Pinned

1 Reference

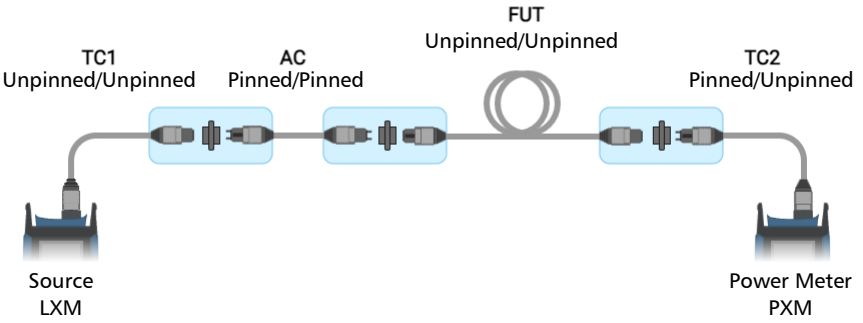
Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from TC2.
Connect AC to TC1 end.
Insert FUT between AC and TC2.



TC1 and TC2 must remain connected to source and power meter, otherwise a new reference will be required.

Equipment-cord test method

This method tends to include in the link loss budget, the attenuation of the fiber under test, the attenuation of equipment cord connections to the fiber under test, and the fiber attenuation of one equipment cord. The attenuation of the first equipment cord EC1 is not included. Equipment cord method is adapted for the link with a presence of permanent patch cords on both ends of the FUT.

According to standard, the equipment cord method is only suitable if both equipment cords are present during testing. They should remain in place and apply to the cabling that is pinned to pinned; and have equipment cords terminated with MPO plugs on both ends, unpinned to unpinned. The attenuation of the optical fiber in the equipment cords is negligible if the equipment cords are short.

Fiber under test compatibility:

- ✗ Unpinned/Unpinned
- ✓ Pinned/Pinned
- ✗ Pinned/Unpinned

Note: *All test cords are type A (Straight) polarity. The mating adapter type key Up/key Down must be the same for all connections.*

Pinned/Pinned FUT

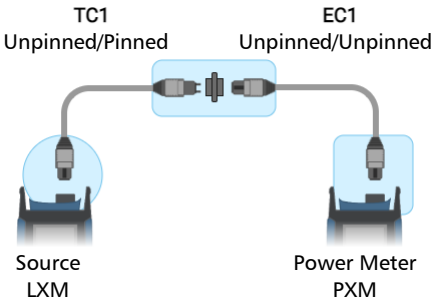
Test cords required:

- TC1 Launch Cord - Unpinned/Pinned
- EC1 Equipment Cord 1 - Unpinned/Unpinned

➤ EC2 Equipment Cord 2 - Unpinned/Unpinned

1 **Reference**

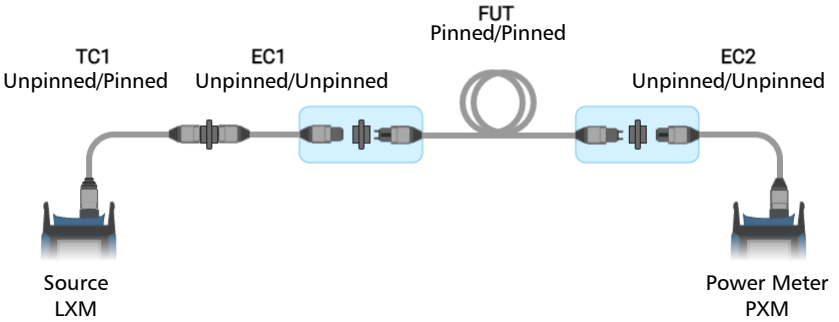
Connect TC1 to the source and EC1 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 **Test method**

Disconnect EC1 from the power meter.
Connect EC2 to the power meter.
Insert FUT between EC1 and EC2.



TC1 must remain connected to the source port and EC1 connected to TC1, otherwise a new reference will be required.

C MPO-24 Adapter-cord Testing Method

When testing MPO-24 cable, the adapter-cord method is advised. The recommended one-cord method is not possible because test cords cannot be connected directly to the test unit.

The adapter-cord method tends to include the attenuation of both first and last connectors in the link loss budget. It is called adapter-cord because after the initial reference is made, an adapter cord is added during the cabling measurement.

Two-pass FasTesT testing sequence

In order to avoid a new referencing for each MPO-24 under test, it is strongly recommended to make a two-pass test sequence. To perform MPO-24 tests, two Y cables (two MPO-12 to one MPO-24) should be used in order to separate two-pass test sequences and take a measurement without disconnecting the referencing test cords. This is due to the fact that after referencing, TC1 and TC2 must remain connected to the source and power meter, otherwise a new reference will be required.

One pair of LXM and PXM is used in this two-pass FasTesT sequence.

First pass:

- The sequences begin with a reference of the first group of 12 fibers.
- Then the first 12 fibers of all FUT (Fiber Under Test) are tested.

Second pass:

- The sequences begin with a reference of the second group of 12 fibers.
- Then the second 12 fibers of all FUT are tested.

Results management occurs via naming in the PXMs and later in the FastReporter PC application. See *Creating a Job* on page 39.

Best practice: Create two Jobs to properly distinguish the first and second pass when testing MPO-24 cables. The incremental value should match the number of cables.

Fiber under test compatibility:

- Pinned/Pinned
- Pinned/Unpinned
- Unpinned/Unpinned

Note: *The adapter-cord method is recommended for all fiber under test genders.*

Note: *All test cords are type A (Straight) polarity. The mating adapter type key Up/key Down must be the same for all connections.*

When mating two MPO-24 connectors with the key Up/key Down adapter, the first and second fiber rows become inverted. For this reason, the Y cable branch is inverted on the power meter side. This particular case is unique to the MPO-24 cable since the connector layout is composed of two rows.

Pinned/Pinned FUT

Test cords required:

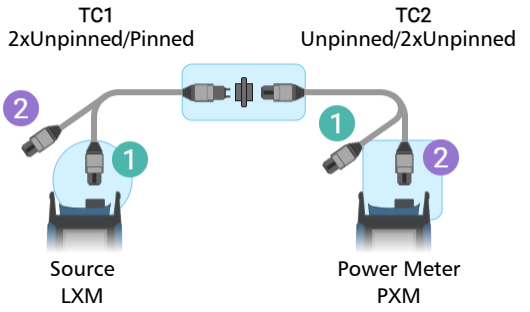
- TC1 Launch Cord
  2x MPO-12 Unpinned/MPO-24 Pinned (*Y test cord*)
- TC2 Receive Cord
  MPO-24 Unpinned/2x MPO-12 Unpinned (*Y test cord*)
- AC Adapter Cord
  Unpinned/Unpinned (*MPO-24 test cord*)

First Pass: First group of 12 fibers

1 Reference

Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.

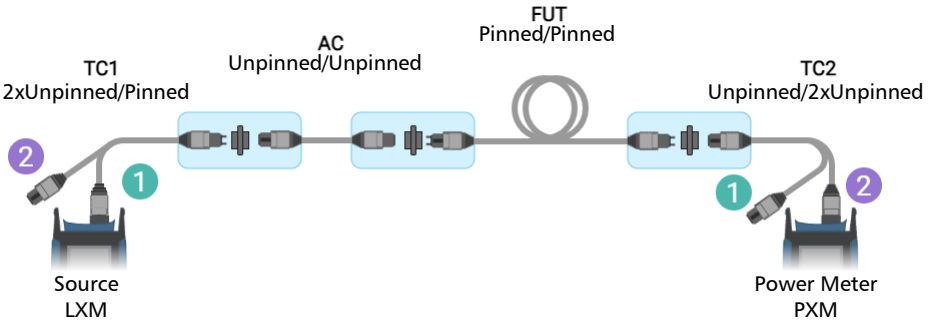
Caution: For the TC1 Y test cord, connect branch 1 to the source. For TC2 Y test cord, connect branch 2 to the power meter.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from TC2.
Connect AC to TC1 end.
Insert FUT between AC and TC2.



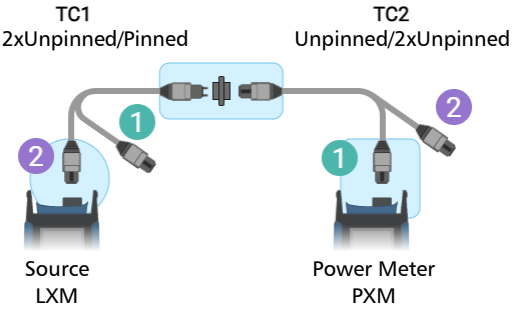
TC1 and TC2 must remain connected to source and power meter, otherwise a new reference will be required.

Second Pass: Second group of 12 fibers

1 Reference

Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.

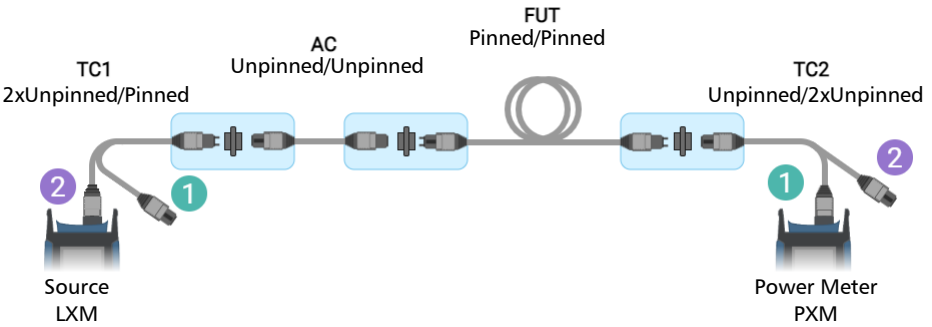
Caution: For the TC1 Y test cord, connect branch 2 to the source. For TC2 Y test cord, connect branch 1 to the power meter.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from TC2.
Connect AC to TC1 end.
Insert FUT between AC and TC2.



TC1 and TC2 must remain connected to source and power meter, otherwise a new reference will be required.

Pinned/Unpinned FUT

Test cords required:

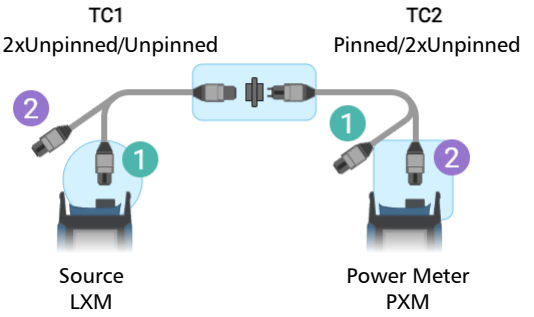
- TC1 Launch Cord
  2x MPO-12 Unpinned/MPO-24 Unpinned (*Y test cord*)
- TC2 Receive Cord
  MPO-24 Pinned/2x MPO-12 Unpinned (*Y test cord*)
- AC Adapter Cord
  Pinned/Unpinned (*MPO-24 test cord*)

First Pass: First group of 12 fibers

1 Reference

Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.

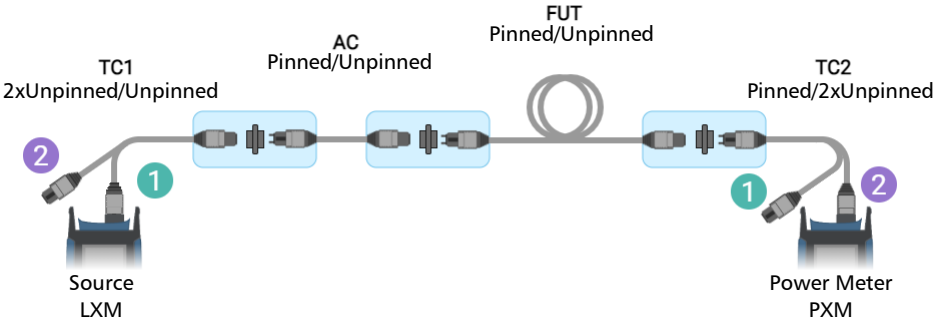
Caution: For the TC1 Y test cord, connect branch 1 to the source. For TC2 Y test cord, connect branch 2 to the power meter.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from TC2.
Connect AC to TC1 end.
Insert FUT between AC and TC2.



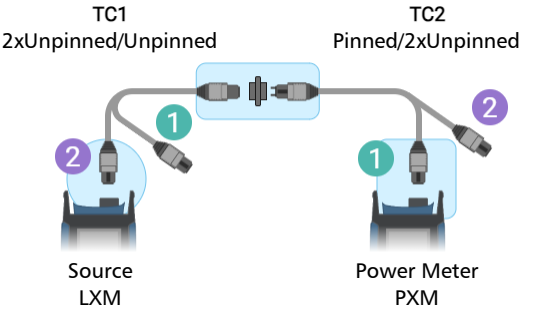
TC1 and TC2 must remain connected to source and power meter, otherwise a new reference will be required.

Second Pass: Second group of 12 fibers

1 Reference

Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.

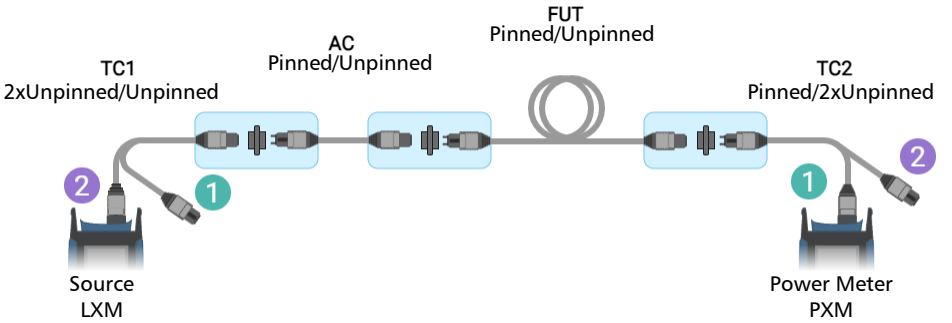
Caution: For the TC1 Y test cord, connect branch 2 to the source. For TC2 Y test cord, connect branch 1 to the power meter.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from TC2.
Connect AC to TC1 end.
Insert FUT between AC and TC2.



TC1 and TC2 must remain connected to source and power meter, otherwise a new reference will be required.

Unpinned/Unpinned FUT

Test cords required:

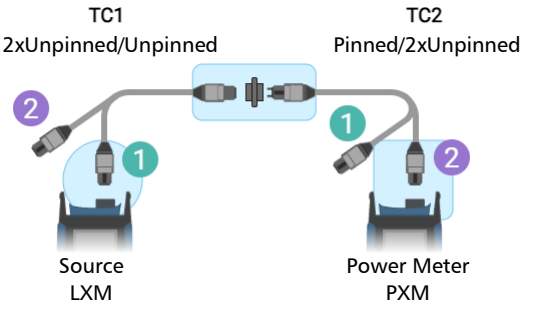
- TC1 Launch Cord
  2x MPO-12 Unpinned/MPO-24 Unpinned (*Y test cord*)
- TC2 Receive Cord
  MPO-24 Pinned/2x MPO-12 Unpinned (*Y test cord*)
- AC Adapter Cord
  Pinned/Pinned (*MPO-24 test cord*)

First Pass: First group of 12 fibers

1 Reference

Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.

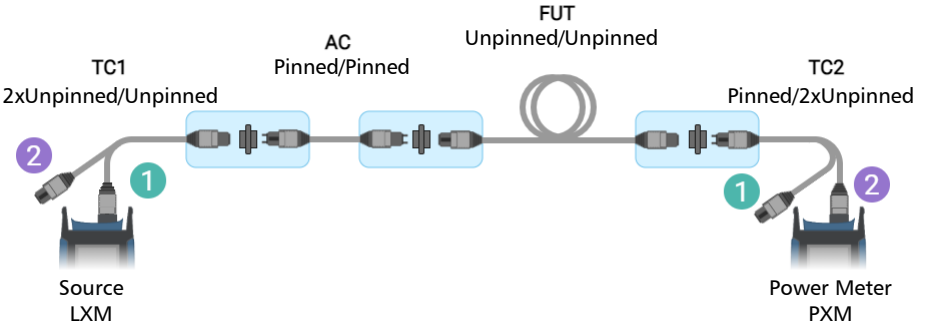
Caution: For the TC1 Y test cord, connect branch 1 to the source. For TC2 Y test cord, connect branch 2 to the power meter.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from TC2.
Connect AC to TC1 end.
Insert FUT between AC and TC2.



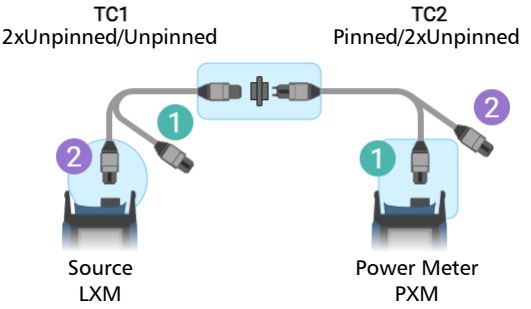
TC1 and TC2 must remain connected to source and power meter, otherwise a new reference will be required.

Second Pass: Second group of 12 fibers

1 Reference

Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT mode.

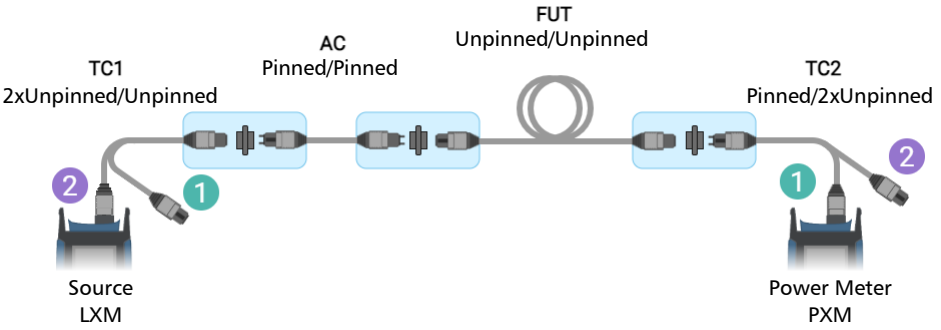
Caution: For the TC1 Y test cord, connect branch 2 to the source. For TC2 Y test cord, connect branch 1 to the power meter.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method

Disconnect TC1 from TC2.
Connect AC to TC1 end.
Insert FUT between AC and TC2.



TC1 and TC2 must remain connected to source and power meter, otherwise a new reference will be required.

D Bidirectional Testing Method

Two-pass FasTesT Testing Sequence

The same testing and referencing methods as the one-cord, two-cord, or adapter-cord method must be used while testing in both directions.

One pair of LXM and PXM is used in this two-pass FasTesT sequence.

First pass:

- The sequences begin with a reference.
- Then the first direction of all FUT (Fiber Under Test) are tested.

Second pass:

- If a test cord has been disconnected or changed, a new reference should be taken. Otherwise, no reference is required to test the second direction.
- The second direction of all FUT is tested.

Results management occurs via naming in the PXMs and later in the FastReporter PC application. See *Creating a Job* on page 39.

Best practice: Create two Jobs to properly distinguish the first and second direction when testing bidirectional MPO-12 cables. The incremental value should match the number of cables.

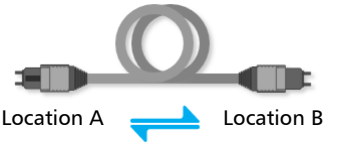
Bidirectional Fiber under test compatibility:

- Pinned/Pinned (One-cord method is recommended)
- Pinned/Unpinned (Two-cord method is recommended)
- Unpinned/Unpinned (Adapter-cord method is recommended)

Note: *All test cords are type A (Straight) polarity. The mating adapter type key Up/key Down must be the same for all connections.*

MPO-12 Pinned/Pinned FUT

One-cord Method

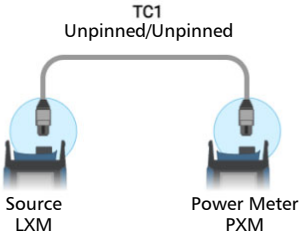


Test cords required:

- TC1 Launch Cord - Unpinned/Unpinned
- TC2 Receive Cord - Unpinned/Unpinned

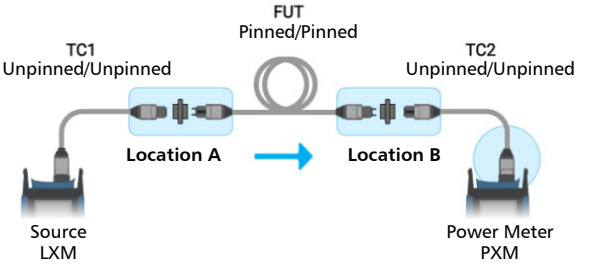
1 **Reference, same for both directions**

Connect TC1 from the source to the power meter.
Activate source in FasTesT mode.



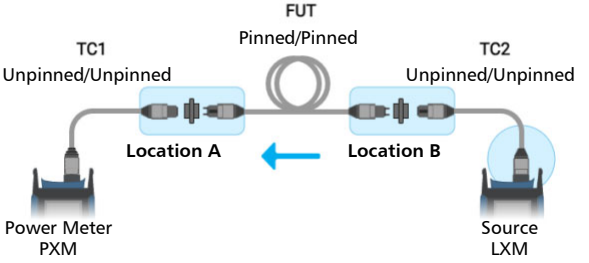
2 **First Direction: Test method for A to B**

Disconnect TC1 from the power meter.
Connect TC2 to the power meter.
Insert FUT between TC1 and TC2.



3 **Second Direction: Test method for B to A**

Insert FUT between TC1 and TC2.



Caution for direction B to A, the position of the LXM and PXM are reversed in this diagram.

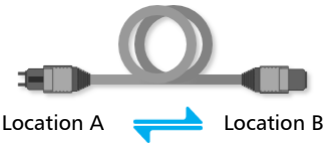
Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

TC1 must remain connected to the source port, otherwise a new reference will be required.

No need for a new reference for the second direction since the same launch TC1 and receive TC2 cables can be used for both directions.

MPO-12 Pinned/Unpinned FUT

Two-cord Method



Test cords required direction A to B:

- TC1 Launch Cord - Unpinned/Unpinned
- TC2 Receive Cord - Pinned/Unpinned

Test cords required direction B to A:

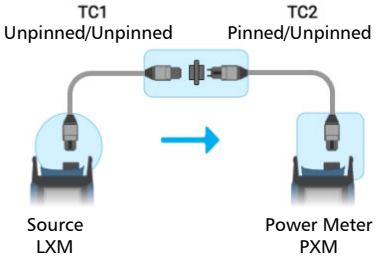
- TC1 Launch Cord - Pinned/Unpinned
- TC2 Receive Cord - Unpinned/Unpinned

Note: *The same test cords TC1 and TC2 are interchanged when referencing in the second direction.*

First Direction

1 Reference for direction A to B

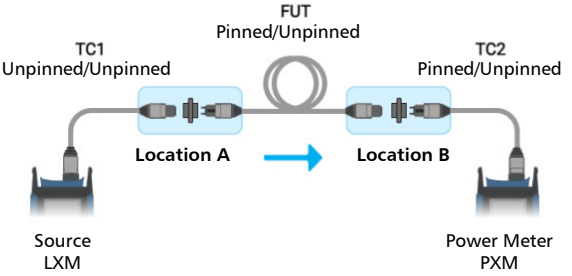
Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method for direction A to B

Disconnect TC1 from TC2.
Insert FUT between TC1 and TC2.

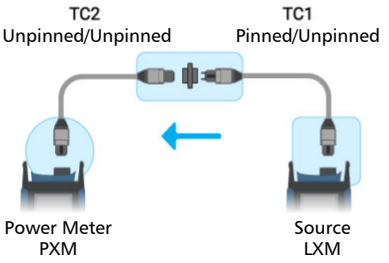


TC1 must remain connected to the source and TC2 connected to the power meter, otherwise a new reference will be required.

Second Direction

1 Reference for direction B to A

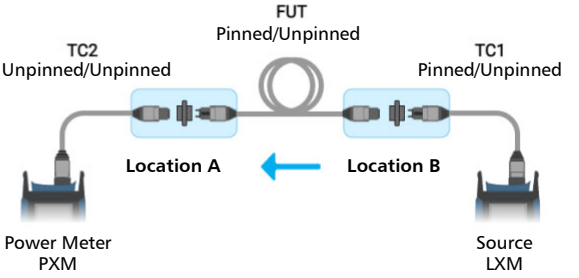
Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTesT.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

2 Test method for direction B to A

Disconnect TC1 from TC2.
Insert FUT between TC1 and TC2.

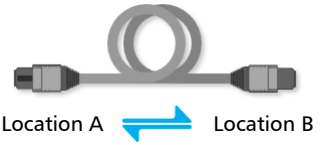


TC1 must remain connected to the source and TC2 connected to the power meter, otherwise a new reference will be required.

Caution for direction B to A, the position of the LXM and PXM are reversed in this diagram.

MPO-12 Unpinned/Unpinned FUT

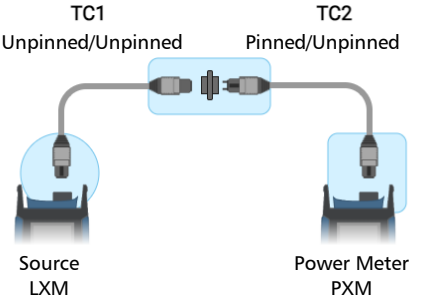
Adapter-cord Method



Test cords required:

- TC1 Launch Cord - Unpinned/Unpinned
- TC2 Receive Cord - Pinned/Unpinned
- AC Adapter Cord - Pinned/Pinned

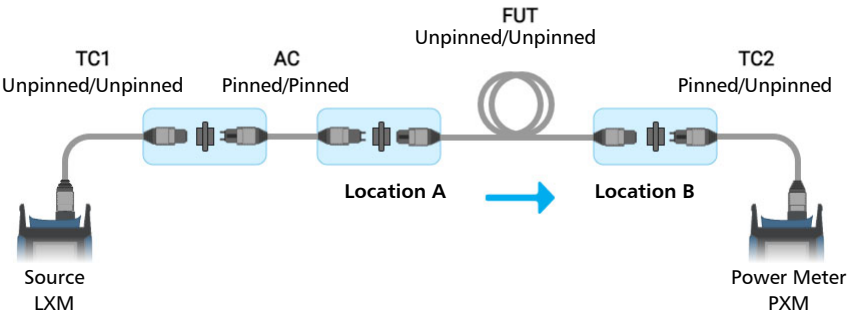
1 **Reference, same for both directions**
Connect TC1 to the source and TC2 to the power meter. Connect test cords to each other, then activate the source in FasTest.



Never connect pinned connectors to test units. Always inspect and clean connectors as recommended.

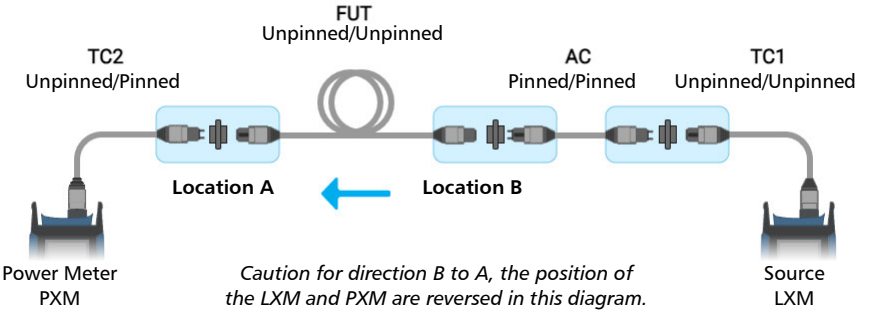
First Direction: Test method for direction A to B

2 Disconnect TC1 from TC2.
Connect AC to TC1 end.
Insert FUT between AC and TC2.



Second Direction: Test method for direction B to A

3 Insert FUT between AC and TC2.



Caution for direction B to A, the position of the LXM and PXM are reversed in this diagram.

TC1 and TC2 must remain connected to the source and power meter, otherwise a new reference will be required. No need for a new reference for the second direction since the same launch TC1 and receive TC2 cables can be used for both directions.

Index

A

about 31
AC requirements 18, 19
adapter 17
adjusting
  brightness 22
  date, time and time zone 23
after-sales service 120
anchors for hand strap 6
auto navigation 32, 47, 48

B

backlight, setting 22
battery
  level 104, 114, 118
  maintenance recommendations 104
  recharging 7, 10, 104, 106
  replacing or removing 107, 109
  resetting information 34
  status icons 9, 104, 114, 118
  status LED 6, 8, 104, 114, 118
  type allowed 107
beep, enabling or disabling 28
blinking LED 8
blue LED 8
brightness
  adjusting 22
  icon 22
browser
  results 44
  test points 44, 51
button, on/off 6, 8, 106, 109

C

cabling
  connections and splices 94
  standards 92
capacitors 17
caution
  of personal hazard 11
  of product hazard 11
changing
  battery 107, 109
  date and time 23
  time zone 23
charge
  icon 104, 114
  status of the battery 104, 114, 118
charger 17
charging battery 7
cleaning
  front panel 101
  SC connectors 102
  touchscreen 103
colors, LEDs 8
configuring
  brightness 22
  date and time 23
  delay before auto off 25
  polarity 90
  sound notifications 28
  thresholds 89
  time zone 23
connector
  cleaner 102
conventions, safety 11
current, electrical 19
custom
  dynamic 94, 97, 98
  fixed 97
customer service 126

D

date and time, adjusting 23
default values 34

disabling sounds 28
distance units 32

E

enabling sounds 28
equipment returns 126
external power supply 17

F

factory power output 59
factory settings 34
FasTest vs light source 55
FasTest vs OPM 61
fiber details 87
fiber mapping 85
fiber types 96
front panel, cleaning 101

G

graph bar
  loss 78
  power 63

H

hand strap
  anchoring 6
hardware features
  available options 5
hour, setting 23

I

icon
  battery status 9, 104, 114, 118
  brightness 22
identification label 120
incompatible test parameters 88
indoor use 17
input current 19
inserting battery 107, 109
internal
  temperature 10

J

jobs
  create 39
  delete 44, 45
  details 44
  select 37

L

label, identification 120
LED
  battery status 6, 104, 114, 118
  icon 9
  indicators 8
Li-ion battery 104, 107
link length
  negative 82
  thresholds 97
  unavailable 83
loss 85
loss budget 98

M

main features
  LXM 4
  PXM 3
maintenance
  battery 104
  front panel 101
  general information 101
  screen 103
maximum
  input current 19
mechanical connector cleaning 102
muting unit 28
my tests 38

N

network application
standards ... 95
summary ... 99

O

off LED ... 8
on/off button ... 6, 8, 106, 109

P

polarity ... 85, 86, 90, 91
port
USB ... 7
power
adapter ... 10, 106
button ... 6, 8, 106, 109
management ... 25
see also battery
see also USB power adapter
sources ... 19
supply ... 17
units ... 33
product
identification label ... 120
specifications ... 11
properties ... 44

R

recharging the battery ... 10, 104, 106
red LED ... 8, 118
reference
connecting ... 75
power ... 76
requirements ... 75
selection ... 74
values ... 87
regulatory information ... vi, ix
removing
battery ... 107, 109
repairing unit ... 17
replacing
battery ... 34, 107, 109
return merchandise authorization (RMA) ... 126

S

safety
caution ... 11
conventions ... 11
warning ... 11
SC connectors, cleaning ... 102
selecting
time zone ... 23
service and repairs ... 126
service centers ... 127
setting
brightness ... 22
date and time ... 23
reset ... 34
sound notifications ... 28
shipping to EXFO ... 126
software update ... 30
sound notification
continuity ... 29
sound notifications ... 27, 28
specifications, product ... 11
standards
cabling ... 92
network application ... 95
storage requirements ... 101
symbols, safety ... 11

T

technical specifications ... 11
technical support ... 120
temperature for storage ... 101
test cords
multimode ... 130
singlemode ... 130
test point filters ... 50
test points
browser ... 44, 51

filters 50
generating identifiers 42
live 49
stored 49
thresholds
FasTest 89
OPM 67
time zone, selecting 23
touchscreen
cleaning 103
location 6
transportation requirements 101, 122
turning off
sounds 28
turning on
sounds 28

U

unit
repairing 17
ventilation 18
USB
extract to computer 53
extracting results 52
port 7
power adapter 10, 106
UTC offset 24

V

ventilation 18

W

warranty
certification 125
exclusions 125
general 123
liability 125
null and void 123
wavelength 68

CHINESE REGULATION ON RESTRICTION OF HAZARDOUS SUBSTANCES (RoHS)
中国关于危害物质限制的规定

NAMES AND CONTENTS OF THE TOXIC OR HAZARDOUS SUBSTANCES OR ELEMENTS CONTAINED IN THIS EXFO PRODUCT
包含在本 EXFO 产品中的有毒有害物质或元素的名称及含量

Part Name 部件名称	Lead 铅 （Pb）	Mercury 汞 （Hg）	Cadmium 镉 （Cd）	Hexavalent Chromium 六价铬 （Cr(VI)）	Polybrominated biphenyls 多溴联苯 （PBB）	Polybrominated diphenyl ethers 多溴二苯醚 （PBDE）
Enclosure 外壳	O	O	O	O	O	O
Electronic and electrical sub-assembly 电子和电气组件	X	O	X	O	X	X
Optical sub-assembly[a] 光学组件 [a]	X	O	O	O	O	O
Mechanical sub-assembly[a] 机械组件 [a]	O	O	O	O	O	O

Note:
注：
This table is prepared in accordance with the provisions of SJ/T 11364.
本表依据 SJ/T 11364 的规定编制。
O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。
X: indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572. Due to the limitations in current technologies, parts with the “X” mark cannot eliminate hazardous substances.
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。
标记“X”的部件，皆因全球技术发展水平限制而无法实现有害物质的替代。
a. If applicable.
如果适用。

MARKING REQUIREMENTS
标注要求

Product 产品	Environmental protection use period (years) 环境保护使用期限 （年）	Logo 标志
This EXFO product 本 EXFO 产品	10	
Battery[a] 电池	5	

a. If applicable.
如果适用。

P/N: 2.0.0.1

www.EXFO.com · info@EXFO.com

CORPORATE HEADQUARTERS 400 Godin Avenue Quebec (Quebec) G1M 2K2 CANADA
Tel.: 1 418 683-0211 · Fax: 1 418 683-2170

TOLL-FREE (USA and Canada) 1 800 663-3936

© 2023 EXFO Inc. All rights reserved.
Printed in Canada (2023-07)