User Guide

OX1

Optical Explorer

www.EXFO.com

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.

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: 4.0.0.1

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Regulatory Information

Canada and 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 and from ICES-003 compliance in Canada. 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.

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.

General Wireless Compliance Related Information

Your unit comes with an internal wireless module (adapter) and two antennas for which the information hereafter applies:

This product does not contain any wireless user-serviceable components. Any unauthorized product changes or modifications will invalidate warranty and all applicable regulatory certifications and approvals.

Canada and USA Wireless Compliance Related Information

Your unit comes with an internal wireless module (adapter) and two antennas for which the information hereafter applies:

- This device complies with Part 15 of the FCC Rules.
- This device complies with Innovation, Sciences and Economic Development Canada license-exempt RSS standards.
- Operation is subject to the following two conditions:
  (1) This device may not cause harmful interference

  and

  (2) this device must accept any interference received, including interference that may cause undesired operation.

Use in Specific Environments:

- The use of wireless products in hazardous locations is limited by the constraints posed by the safety directors of such environments.
- The use of wireless products on airplanes is governed by the Federal Aviation Administration (FAA).
- The use of wireless products in hospitals is restricted to the limits set forth by each hospital.
- Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment.

Radiation Exposure Statement:

- The product complies with the US/Canada portable RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this user documentation.
- Further RF exposure reduction can be achieved if the device can be kept as far as possible from the user's body.

RF Function and Frequency Range:

Your unit is designed to operate in the Bluetooth® and WLAN 2.4 GHz bands.

The information about the Bluetooth® and Wi-Fi frequency bands is as follows:

- Bluetooth®: Channels 1 through 11 - Between the frequencies 2412 MHz - 2462 MHz.
  The output power is 11.7 dBm typical.
- Wi-Fi: Channels 1 through 11 - Between the frequencies 2412 MHz - 2462 MHz.
  The maximum output power is 18.5 dBm.

European Wireless Compliance Related Information

Your unit is designed to operate in the Bluetooth® and WLAN 2.4 GHz bands.

The information about the Bluetooth® and Wi-Fi frequency bands is as follows:

- Bluetooth®: Channels 1 through 13 - Between the frequencies 2412 MHz - 2472 MHz.
  The output power is 11.7 dBm typical.
- Wi-Fi: Channels 1 through 13 - Between the frequencies 2412 MHz - 2472 MHz.
  The maximum output power is 18.5 dBm.

This is a wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France and Italy where restrictive use applies.

In Italy, the end-user should apply for a license at the national spectrum authorities in order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying access to telecommunications and/or network services.

This device may not be used for setting up radio links in France, and in some areas the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 - 2483.5 MHz. For detailed information, the end-user should contact the national spectrum authority in France.

Local Restrictions on 802.11a, 802.11b, 802.11d, 802.11g, 802.11n, and 802.11ac Radio Usage

Due to the fact that the frequencies used by 802.11a, 802.11b, 802.11d, 802.11g, 802.11n, and 802.11ac wireless LAN devices may not yet be harmonized in all countries, 802.11a, 802.11b, 802.11d, 802.11g, 802.11n, and 802.11ac products are designed for use only in specific countries, and are not allowed to be operated in countries other than those of designated use. As a user of these products, you are responsible for ensuring that the products are used only in the countries for which they were intended and for verifying that they are configured with the correct selection of frequency and channel for the country of use.

European Declaration of Conformity

Hereby, EXFO declares that the radio equipment type “OX1” is in compliance with European Directive 2014/53/EU.

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

Japanese Technical Conformity Mark for Radio Law

This equipment contains specified radio equipment that has been certified to the Technical Regulation Conformity Certification for Japan, under the Radio Law.

R **201-135370**

Japan Wireless Compliance Related Information

Your unit is designed to operate in the Bluetooth® and WLAN 2.4 GHz bands.

The information about the Bluetooth® and Wi-Fi frequency bands is as follows:

- Bluetooth®: Channels 1 through 13 - Between the frequencies 2412 MHz - 2472 MHz.
  The output power is 11.7 dBm typical.
- Wi-Fi: Channels 1 through 13 - Between the frequencies 2412 MHz - 2472 MHz.
  The maximum output power is 18.5 dBm.

1 Introducing the OX1 Optical Explorer

The OX1 Optical Explorer is a handheld, ultra-simple, and ultra-fast tool offering multiple test functions to verify any short- to medium-length (up to 40 km) optical links and their components. It is particularly well suited for installation and repair jobs.

It can work in association with a smart device equipped with the EXFO TestFlow mobile application allowing you to document the test results, archive them, and generate reports.

At any time, you can switch from local measurements (that are not part of a TestFlow job) to measurements within a TestFlow job. All the measurements are kept in memory. You can also open, in turn, the power checker and the source page.

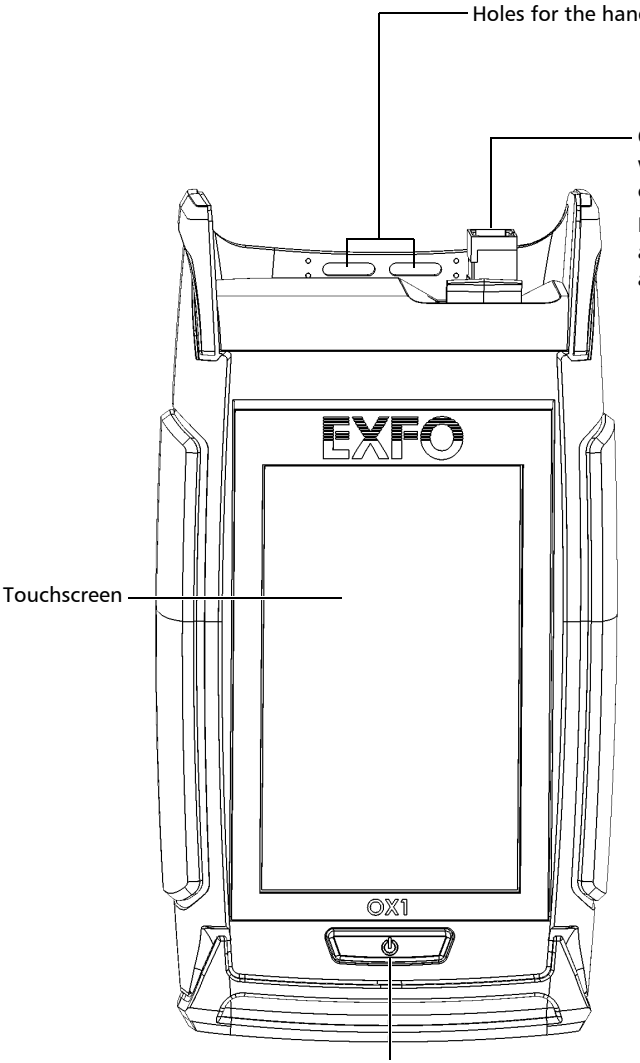
Note: *Depending on the type of smart device you are using, the appearance of the Optical Explorer tool (available from the TestFlow mobile application) may vary slightly from the illustrations presented in this documentation. Unless otherwise specified, the information applies both to the Android- and iOS-based smart devices.*

Note: *Both on your unit and in the TestFlow mobile application, the period is used as the decimal separator in numerical values, when applicable.*

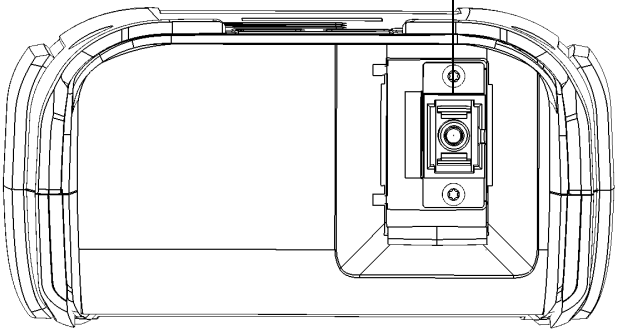
Main Features

- Fiber length, loss and optical return loss (ORL) measured in a single-ended process, in a few seconds
- Easy detection and location of common causes of failure with the Fault Xplorer™ function
- Quality evaluation of the installations with EXFO Advisor™. Measurements are rated using a five-star system.
- PDF report creation
- Job management and cloud storage
- Replaceable Click-Out™ optical connector (Pro units only)

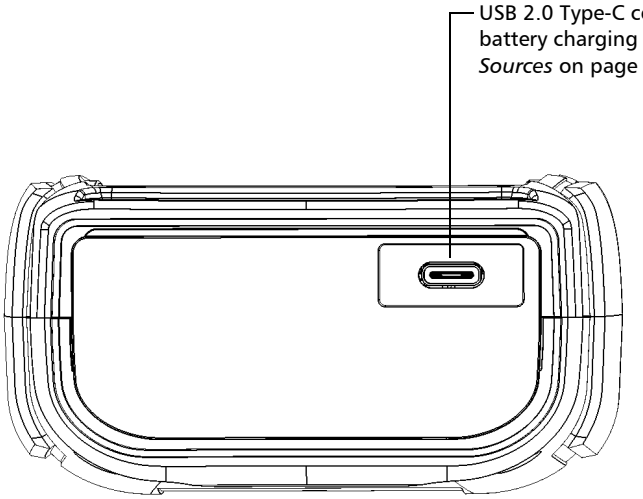
Front panel


Holes for the hand strap
Optical port (Pro unit with Click-Out optical connector shown)
Laser radiation emitted at this port when laser is active.
EXFO
Touchscreen
OX1
Power (on/off) button
(also serves as battery status LED)

Top panel



Bottom panel



Available Options

Several options are available for the Optical Explorer:

Option	Description
M	➤ Optical Explorer designed for the maintenance of live fibers ➤ 1650 nm +10 nm, filtered
PRO-M	➤ Optical Explorer Pro designed for the maintenance of live fibers ➤ 1650 nm +10 nm, filtered ➤ Click-Out optical connector ➤ Link Mapper test function
PRO-M-PPM	➤ Optical Explorer Pro designed for the maintenance of live fibers ➤ 1650 nm +10 nm, filtered ➤ Click-Out optical connector ➤ Link Mapper test function ➤ Broadband and dual-channel PON power checker

Option	Description
I	➤ Optical Explorer designed for installation or repair of dark fibers ➤ 1310/1550 nm ±30 nm
PRO-I	➤ Optical Explorer Pro designed for installation or repair of dark fibers ➤ 1310/1550 nm ±30 nm ➤ Click-Out optical connector ➤ Link Mapper test function
PRO-MI	➤ Optical Explorer Pro designed for both installation or repair of dark fibers, and maintenance of live fibers ➤ 1310/1550 nm ±30 nm ➤ 1650 nm +10 nm, filtered ➤ One output port ➤ Click-Out optical connector ➤ Link Mapper test function

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	Blue	The battery is fully charged.
	Blue, blinking – long pulse[a]	The battery is charging.
	Blue, 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 19.
	Red, fast blinking	Charge or temperature error.
	Red, steady for 10 seconds	The battery level is too low to start the unit.
	White	The unit is starting up.
Not connected to an external power source	Off	The unit is not connected to an external power source.
	Red, steady for 10 seconds	The unit is off and the battery level is too low to start the unit.
	White	The unit is starting up.

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.

Power Sources

The Optical Explorer operates with the following power sources:

➤ Indoor use only: USB power adapter connected to a power outlet (fastest 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. You could also use a certified USB power bank (portable charger) to charge your unit.*

- Indoor and outdoor use:
  - One lithium-ion (Li-ion) or one lithium-polymer (Li-Po) rechargeable battery (main battery that automatically takes over if you disconnect the unit from its external power source).

    Possible to switch from an external power source to battery power or vice versa without affecting operation.
  - Rechargeable battery for real-time clock. This battery can keep the date and time for weeks even if the unit is not connected to AC power and the lithium-ion battery or the lithium-polymer (main battery) is depleted.

Note: *Both the main battery and the clock battery recharge automatically when the unit is connected to an external power source. However, the clock battery will only charge when the unit is on or in sleep mode.*

Note: *You can replace the main battery yourself (see* Replacing the Battery *on page 178), but not the clock battery.*

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 18.

Test Functions and Tools

Your Optical Explorer offers functions and tools to help you with common testing situations such as fiber break location, optical link verification, identification and location of common causes of networks failure.

Each test functions offers an increasing level of detail. See *Testing Fibers* on page 91 for details.

- Flash Advisor™: Offers a quick verification of the continuity and overall quality of simple fiber links. This function, which is selected by default, measures the link length, the insertion loss and the ORL.
- Fault Xplorer: Provides an overall verification of fiber links as well as an automatic identification and investigation of potential causes of failure. This function measures the link length, the insertion loss, the ORL, the loss, the reflectance, and the distance to faults. It also localizes the connectors and identifies the fault types such as splices or macrobends.
- Link Mapper: Provides the mapping of the optical link including fiber sections and all detectable elements over the link. This function measures the link length, the insertion loss, the ORL, the loss, the reflectance, the distance to elements and identifies the element types such as splices, connectors and macrobends.

Note: *Only Pro units offer the Link Mapper function.*

- Power checker: This tool measures the absolute power and the insertion loss. It can also detect the tone coming from the light source. See *Using the Power Checker* on page 103 for details.
- Light source: You can use this tool to perform measurements with a power meter. The modulation can be continuous or set to another value. See *Using the Light Source* on page 115 for details.

Note: *If you choose to work with a modulated signal on the source, ensure that the power meter you are using supports a modulated signal as well.*

Using Your OX1 as a Standalone Unit

You can perform measurements for verification using one of the test functions (Flash Advisor, Fault Xplorer, or Link Mapper), the light source or the power checker. See *Test Functions and Tools* on page 10, and *Testing Fibers* on page 91.

The results are saved on the OX1 under a sequential name which is limited to a maximum of 1000 measurements. Once the numeric part of the measurement names reaches 999, it is reset to 000 automatically. See *Managing Test Results* on page 123.

You can generate single-measurement reports with the measurements stored on your OX1 but you will need a smart device equipped with the TestFlow mobile application. See *Generating Measurement Reports* on page 132.

Using Your OX1 With a Smart Device

You can also use your OX1 in association with a smart device equipped with the EXFO TestFlow mobile application allowing you to document your results, archive them on a cloud server, and generate reports (single or multiple measurements). See *Working With the TestFlow Mobile Application* on page 135.

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.

WARNING

Viewing the laser output with telescopic optical instruments (for example, telescopes and binoculars) may pose an eye hazard and thus the user should not direct the beam into an area where such instruments are likely to be used.

Laser radiation may be encountered at the optical output port.

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

INVISIBLE LASER RADIATION
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
DO NOT EXPOSE USERS OF TELESCOPIC OPTICS
CLASS 1M LASER PRODUCT

RAYONNEMENT LASER INVISIBLE
NE PAS OBSERVER DIRECTEMENT À L'AIDE D'INSTRUMENTS D'OPTIQUE
NE PAS EXPOSER LES UTILISATEURS DE DISPOSITIF OPTIQUE
TÉLESCOPIQUE
APPAREIL À LASER DE CLASSE 1M

Wavelength: / Longueur d'onde : 1250 nm-1600 nm

Pulse width: / Largeur de l'impulsion :  ≤ 20 μs

Max. peak power: / Puissance crête maximum :  ≤ 100 mW

Wavelength: / Longueur d'onde : 1600 nm-1700 nm

Pulse width: / Largeur de l'impulsion :  ≤ 20 μs

Max. peak power: / Puissance crête maximum :  ≤ 150 mW

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[a]	➤ unit powered by battery: –10 °C to 45 °C (14 °F to 113 °F)[b] ➤ unit connected to AC power (with USB power adapter): 0 °C to 40 °C (32 °F to 104 °F)[c]
➤ Storage	➤ unit – short-term storage[d]: –40 °C to 70 °C (–40 °F to 158 °F) ➤ unit – long-term storage[e]: 10 °C to 35 °C (50 °F to 95 °F)
Relative humidity[f]	➤ 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)[g]
Overvoltage category	➤ unit: I ➤ USB power adapter: II
Measurement category	Not rated for measurement categories II, III, or IV
Input power[h]	➤ unit: 5 V ⎓; 2 A ➤ USB power adapter: 100 - 240 V ∼; 50/60 Hz; 1 A max

a. For Fault Xplorer tests performed in normal conditions: minimal brightness and typically a 15-second measurement every 180 seconds.
The operation temperature varies with the test function and intensity of tests:
Fault Xplorer - intensive use (with minimal brightness and typically a 15-second measurement every 60 seconds): –10 °C to 35 °C (14 °F to 95 °F).
b. When the unit is used at an altitude of 5000 m, the maximum operating temperature is 27 °C (80.6 °F).
c. 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.
d. Short-term storage corresponds to the storage of the unit for a maximum of 48 hours.
e. Long-term storage corresponds to the storage of the unit for more than three months.
f. Measured in 0 °C to 31 °C (32 °F to 87.8 °F) range, decreasing linearly to 50 % at 40 °C (104 °F).
g. Equipment must be normally protected against exposure to direct sunlight, precipitation and full wind pressure.
h. Not exceeding ± 10 % of the nominal voltage.

3 Getting Started with Your Unit

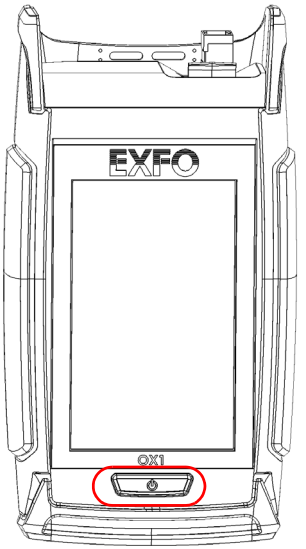
Turning on Your Unit

When you turn on the unit for the very first time, a wizard is displayed, enabling you to set the operation language, read and accept the EXFO license agreement, and set other regional settings (see the section about the first startup for more information).

Note: *The settings you modify at startup can be modified later if necessary.*

To turn on the unit:

Press the on/off button until the unit beeps once. Its LED will light up and remain lit during the whole startup process (until the splash screen is displayed).



Turning off Your Unit

Unless specified otherwise in this documentation, the settings you configure on your unit are kept in memory even when you turn the unit off.

There are several ways to turn off the unit, including the following:

- *Sleep*: keeps the unit's status information in memory (RAM). The next time you turn your unit on, you will quickly return to your work environment (running applications will still be running). If you intend to leave your unit in sleep mode for more than a few hours, you should perform a shutdown instead to save battery power. After four hours in sleep mode, your unit will go into shutdown mode automatically to save battery power.
- *Shutdown*: completely cuts power to the unit; the unit will perform a complete restart routine the next time you use it.You should perform a shutdown if you do not intend to use your unit for several hours.

  After a shutdown, the unit will start in Fiber Xplorer.

Note: *Should the unit ever stop responding, you can force a hardware reset by pressing and holding down the on/off button for at least 10 seconds. To restart your unit, release the on/off button, and then press it again as you would normally do to start your unit.*

To enter the sleep mode:

Press the on/off button. The unit's backlight will turn off and the touchscreen will be deactivated.

To exit the sleep mode and resume your work:

Press the on/off button.

To turn off the unit completely (shutdown):

Press the on/off button for about three seconds. The unit will beep once and its LED will light up briefly.

Configuring Your Unit at First Startup

The first time you turn on the unit, a wizard is displayed, enabling you to set the operation language, read and accept the EXFO license agreement, configure the date and time, and select the desired distance units.

Note: *You can change the regional parameters later if necessary.*

Once the configuration is complete, you are presented with an overview of the main features of your unit. This getting started guide will be available at all times from your unit for future reference (see *Accessing the Online Documentation From the OX1* on page 217).

To configure your unit at first startup:

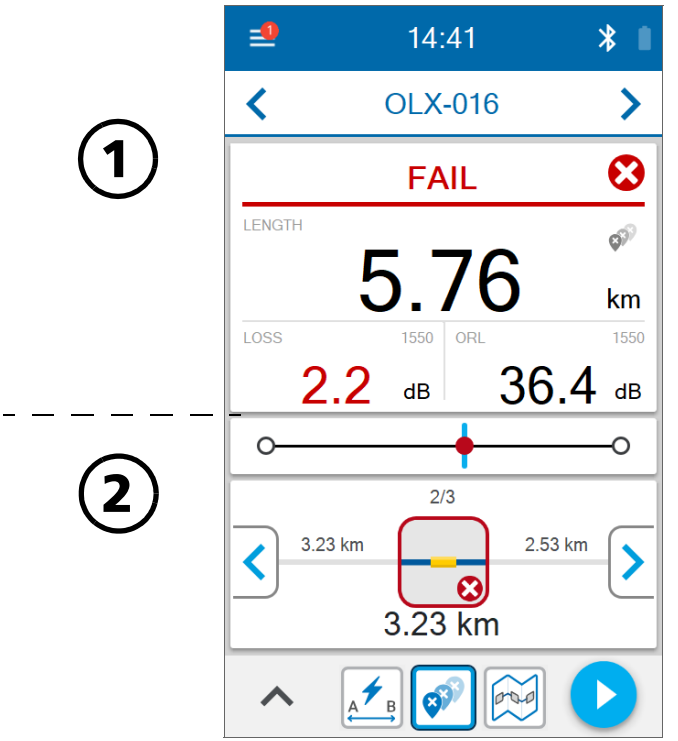
1. If it is not already done, turn on the unit.
2. When the wizard prompts you, select the desired operation language. If you select a language other than English, the unit will restart automatically to apply the change.
3. Read and accept the EXFO license agreement, then tap **NEXT**.
4. Follow the on-screen instructions to configure the other regional parameters and view the getting started guide.
5. If desired, configure a Wi-Fi network allowing you to retrieve the updates and archiving your results on the cloud server, as follows:
   - **5a.** Install the TestFlow mobile application on your smart device (see *Installing the TestFlow Mobile Application on Your Smart Device* on page 136).
   - **5b.** Establish a Bluetooth® connection between the OX1 and the smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 137).
   - **5c.** Configure a wireless network (see *Working With a Wireless Network* on page 145).

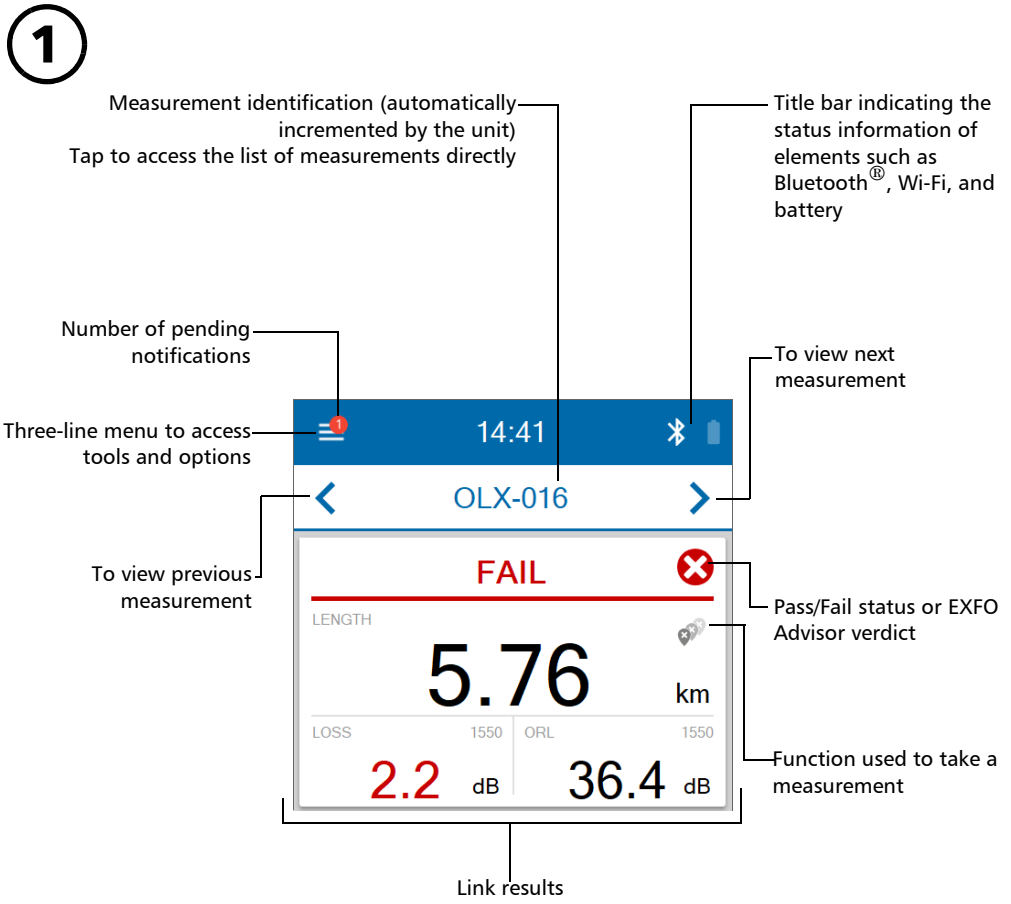
You are now ready to start working with your OX1.

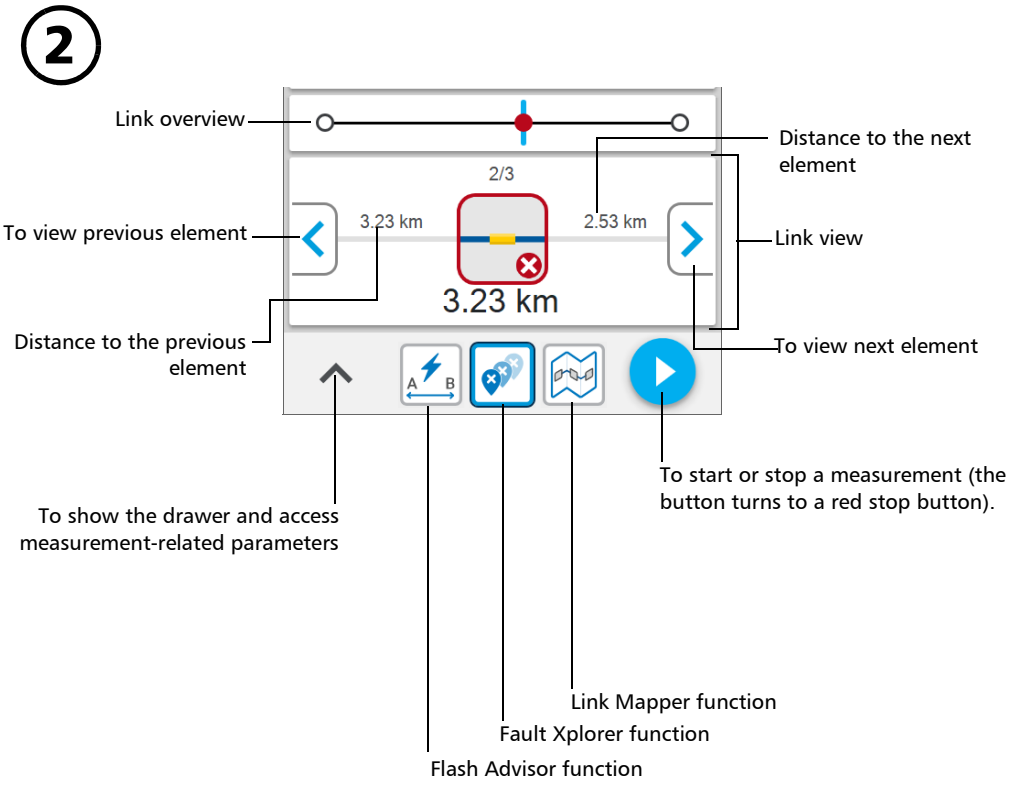
Understanding Fiber Xplorer™

Fiber Xplorer can be seen as the starting point of the application. You can perform measurements in one of the test functions and navigate through the results. It provides information on many elements such as the Bluetooth® connection, Wi-Fi connection and signal strength, as well as battery level.

From Fiber Xplorer, you can also open the three-line menu to access the test tools, parameters, and notifications.




1
Measurement identification (automatically incremented by the unit)
Tap to access the list of measurements directly
Title bar indicating the status information of elements such as Bluetooth®, Wi-Fi, and battery
Number of pending notifications
Three-line menu to access tools and options
To view next measurement
To view previous measurement
14:41
OLX-016
FAIL
Pass/Fail status or EXFO Advisor verdict
LENGTH
5.76
km
LOSS
1550
2.2
dB
ORL
1550
36.4
dB
Function used to take a measurement
Link results


2
Link overview
Distance to the next element
2/3
To view previous element
3.23 km
2.53 km
Link view
3.23 km
Distance to the previous element
To view next element
To start or stop a measurement (the button turns to a red stop button).
To show the drawer and access measurement-related parameters
Link Mapper function
Fault Xplorer function
Flash Advisor function

Viewing Notifications

The OX1 informs you when there are pending notifications on your unit that require your attention. The number of pending notifications is displayed in a red bubble directly on the three-line menu icon  and in the main menu. These notifications are displayed when:

- the optical output diagnosis has failed (see *Verifying the Optical Output of Your Unit* on page 187)
- some tests performed on the OX1 have not been synced with the TestFlow mobile application
- some tests performed on the OX1 have not been synced with the cloud server

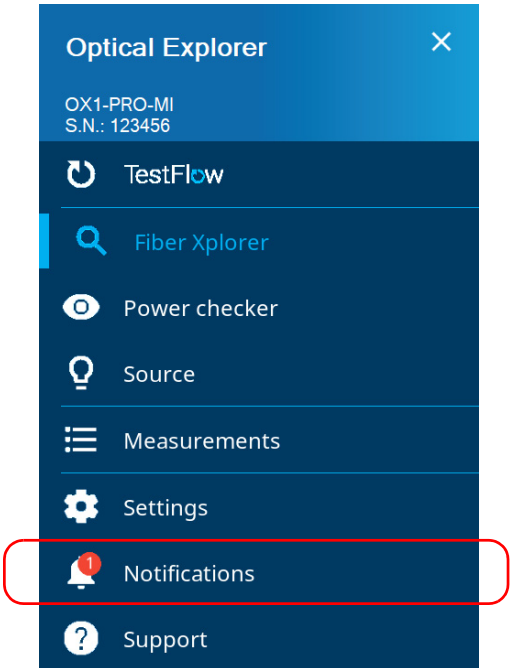
The notification related to the optical output diagnosis can only be erased when the result of the verification is pass.

Note: *The notification of the failed diagnosis is kept in memory even if you revert to factory settings.*

You can delete a notification when it has been read.

To view notifications:

1. From the main menu, tap **Notifications**.



The pending notifications are displayed in a list.

2. You can delete the notification you have read with the X.

3. When the unit prompts you, tap **YES**.

Working With Launch and Receive Test Cords

For easier handling and optimum performance when you work with launch and receive cords, EXFO strongly recommends to use the cords especially designed by EXFO for your OX1 unit. However, you can use your own test cords. By default, the use of launch and receive cords is disabled, but you can enable it and specify the lengths of the cords you intend to use. The length of both cords is set to 20 meters by default, but you can change it. You can also change the meters for feet if you prefer. All your settings are kept in memory even when you turn off the unit.

The launch and receive cords and their connectors should always be in good condition. The connectors should also be clean before using the cords.

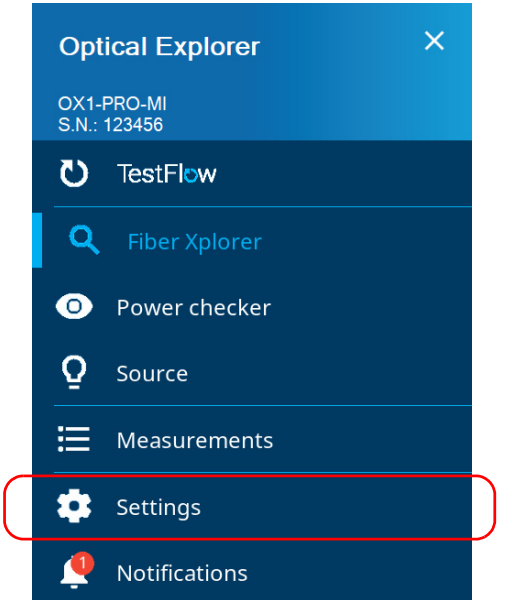
The launch cords used with units having APC-type connectors are 20 meters long. Since these connectors tend to be less reflective even when they are showing signs of wear, 20 meters is usually enough to cover the dead zone located between the OX1 and the actual fiber being measured.

The OX1 units equipped with UPC-type connectors require 60-meter long launch cables. The reflectance between the unit and the actual fiber being measured should be below –35 dB. This value can be significantly affected by connectors that are dirty and showing signs of wear.

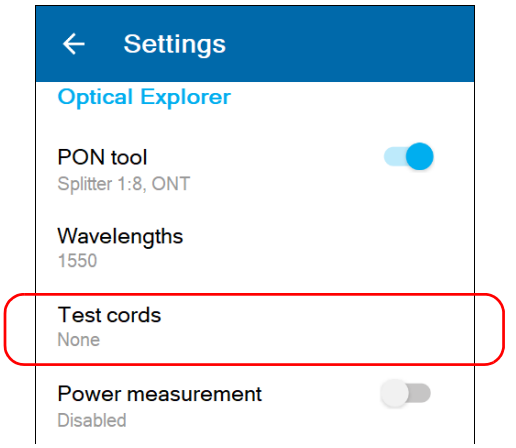
Refer to the technical specifications of your unit to have a complete list of all the launch and receive cords available.

To configure the launch and receive cords lengths from the Settings page:

1. From the main menu, tap **Settings**.

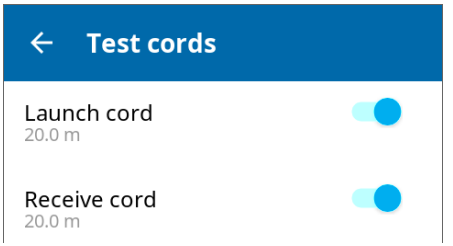


2. From the **Optical Explorer** section, tap **Test cords**.



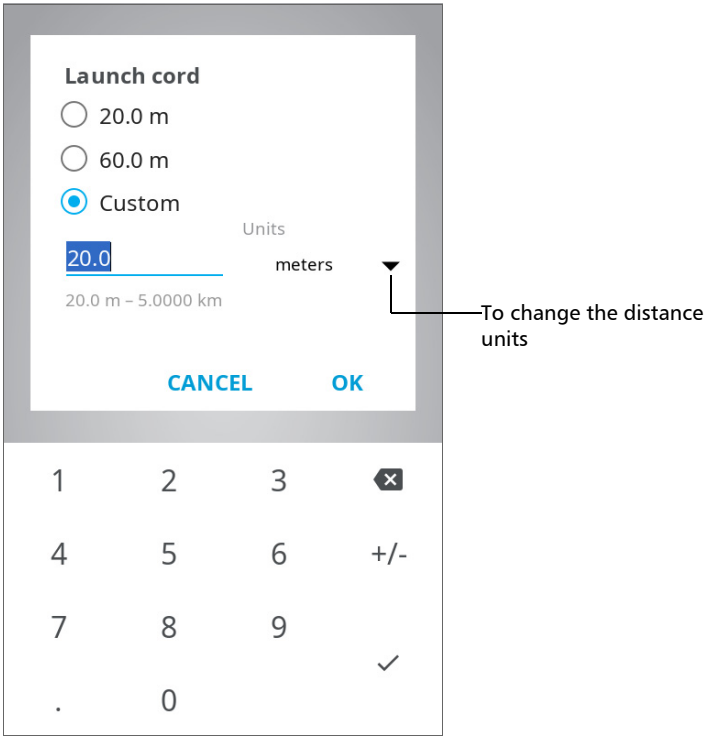
3. To configure the launch and receive cords settings, proceed as follows:

3a. If necessary, activate the feature with the corresponding toggle.



3b. Under the desired test cord, tap the displayed length to edit it.

3c. Select the length of the cable you want to use for your measurement. If you have selected **Custom**, enter the length with the numeric keypad.



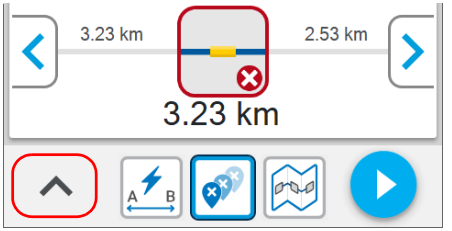
3d. If necessary, change the distance units.

3e. Tap **OK** to confirm.

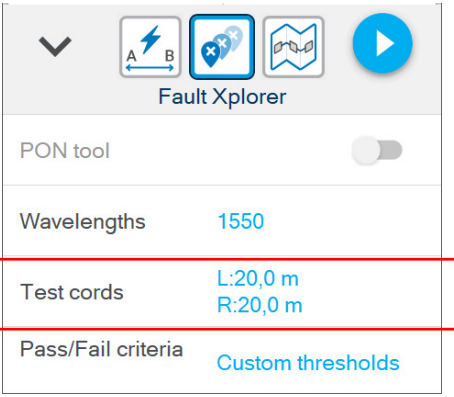
The new selection is taken into account for the next measurement.

To configure the launch and receive cords lengths from Fiber Xplorer:

1. From Fiber Xplorer, tap the arrow to access the drawer.

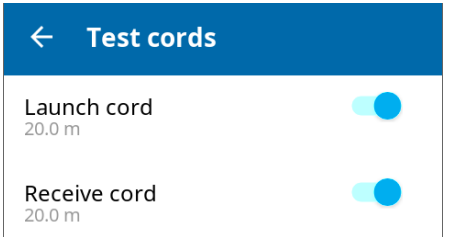


2. Tap **Test cords**.



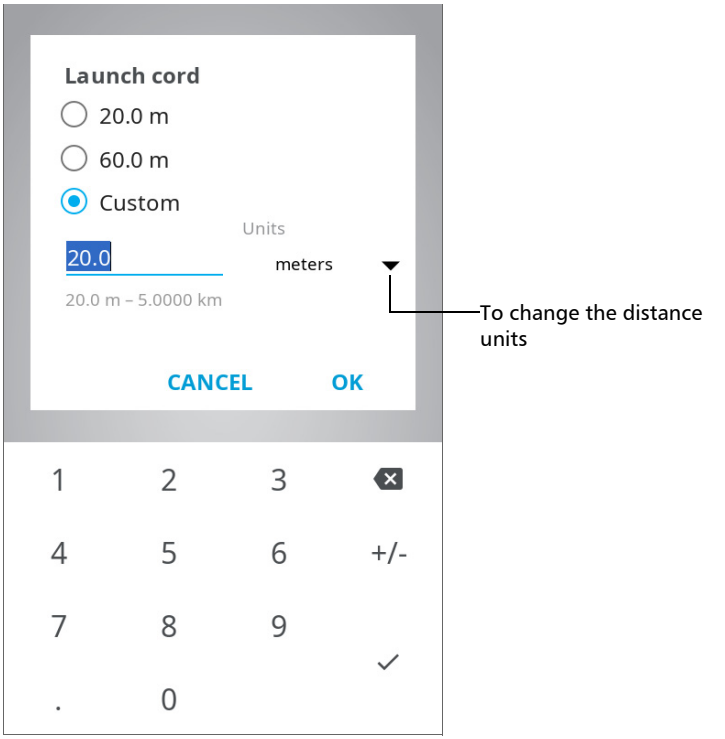
3. To configure the launch and receive cords settings, proceed as follows:

3a. If necessary, activate the feature with the corresponding toggle.



3b. Under the desired test cord, tap the displayed length to edit it.

3c. Select the length of the cable you want to use for your measurement. If you have selected **Custom**, enter the length with the numeric keypad.



3d. If necessary, change the distance units.

3e. Tap **OK** to confirm.

The new selection is taken into account for the next measurement.

Cleaning and Connecting Optical Fibers

IMPORTANT

To ensure maximum power and to avoid erroneous readings:

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

To connect the fiber-optic cable to the port:

1. Inspect the fiber using a fiber inspection scope (or probe). If the fiber is clean, proceed to connecting it to the port. If the fiber is dirty, clean it as explained below.
2. Clean the fiber ends as follows:
   - **2a.** Gently wipe the fiber end with a lint-free swab dipped in optical-grade liquid cleaner.
   - **2b.** Use a dry swab to dry the connector completely.
   - **2c.** Visually inspect the fiber end to ensure its cleanliness.

3. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces.

   If your connector features a key, ensure that it is fully fitted into the port's corresponding notch.

4. Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact.

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

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

EXFO uses good quality connectors in compliance with EIA-455-21A standards.

To keep connectors clean and in good condition, EXFO strongly recommends inspecting them with a fiber inspection scope (or probe) before connecting them. Failure to do so may result in permanent damage to the connectors and degradation in measurements.

Temperature Management

The internal temperature of your unit will vary with the ambient temperature, but also with the type of tests you perform and their intensity.

To regulate its temperature, your unit will determine the most appropriate fan speed, depending on the power requirements.

Your unit has also been designed to adapt its behavior as necessary to regulate its temperature. For this reason, in high-temperature conditions, you could receive warning messages. If the temperature keeps rising and reaches the limit your unit will turn off as self-protection.

For more information on the effects of temperature on battery charging, see *Power Sources* on page 8.

IMPORTANT

For optimum performance of your unit:

- **Ensure that it remains within the recommended operation and storage temperatures (see *Equipment Ratings* on page 19).**
- **Avoid leaving your unit in an overheated vehicle. You may have to let your unit cool down before being able to use it.**
- **Ensure that your unit is normally protected from direct sunlight (during use and storage).**

4 Setting up Your Unit

Adjusting Brightness

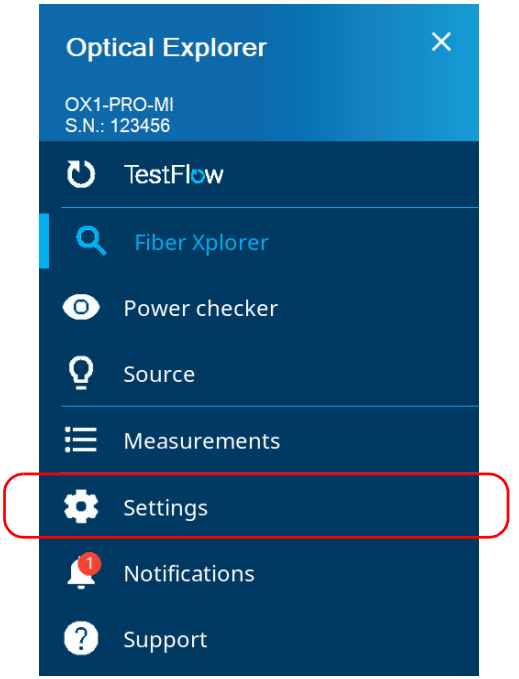
You may want to adjust the display brightness yourself to better fit your work environment or preferences.

You may also want to reduce the display brightness to save battery power (the higher the brightness level, the higher the power consumption).

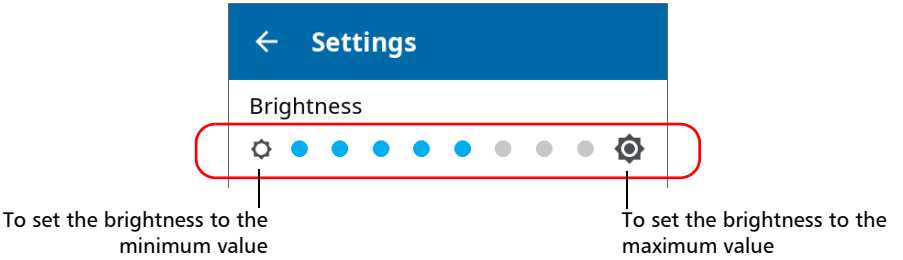
The brightness value is kept in memory even when you turn the unit off.

To adjust the display brightness:

1. From the main menu, tap **Settings**.



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.

Enabling or Disabling Sound Notifications

By default, your unit emits a sound at the end of a measurement and when the power checker detects a tone.

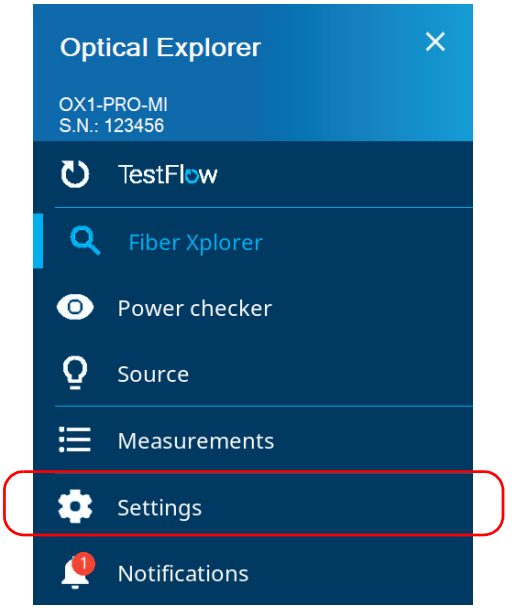
This sound varies with the type of notification, which means that you will hear a different sound in each of these situations:

- At the end of a measurement performed using EXFO Advisor thresholds.
- At the end of a measurement performed using custom thresholds when its status is Pass.
- At the end of a measurement performed using custom thresholds when its status is Fail.
- When the power checker detects a tone from a source.

You can disable the sound notifications if you prefer. Your preference is kept in memory even when you turn the unit off.

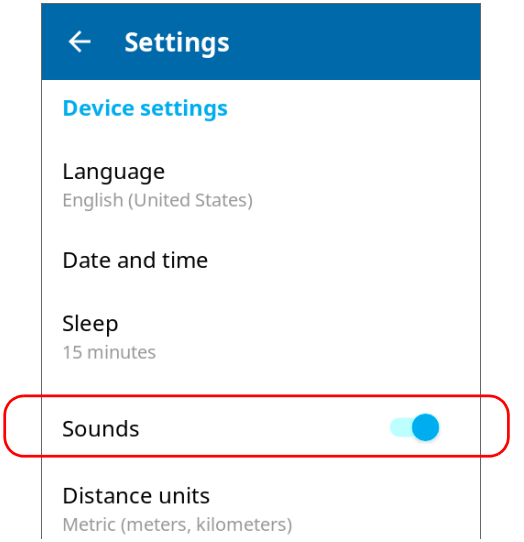
To enable or disable the sound notifications on your unit:

1. From the main menu, tap **Settings**.



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

3. With the **Sounds** toggle, enable or disable the sound notifications.



The new value is taken into account immediately.

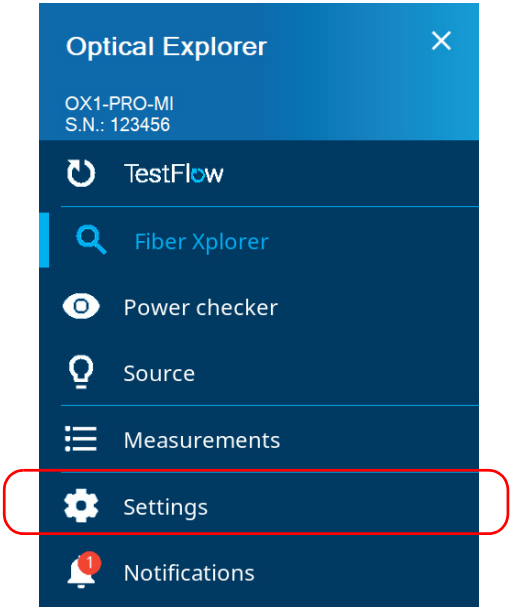
Selecting the Language of Operation

You may display the user interface in one of the available languages. English is the default language.

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

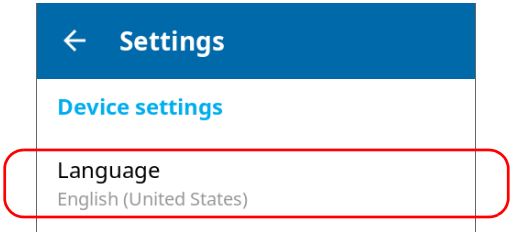
To select a new interface language:

1. From the main menu, tap **Settings**.

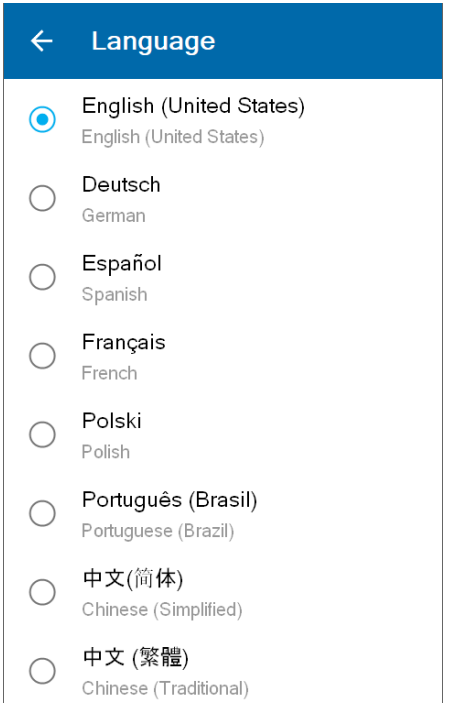


2. Scroll down to the **Device settings** section.

3. Tap **Language**.



4. Select the desired language from the list.



5. Your unit will need to restart to complete the change of language. When the unit prompts you, confirm with **OK**.

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.

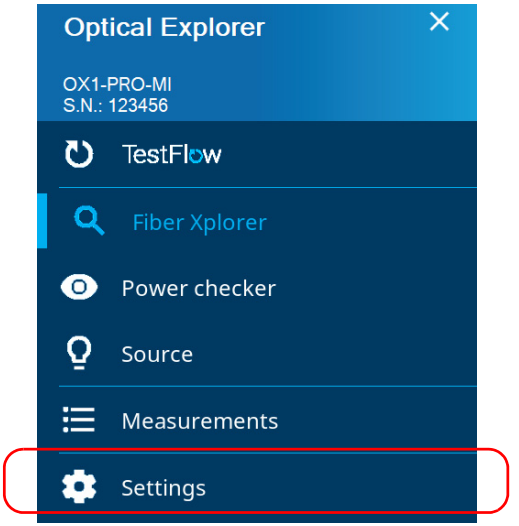
Note: *You cannot modify the format in which the date is displayed.*

You can set the date and time manually or let the unit synchronize them automatically with the TestFlow mobile application (not available when unit is used without a smart device).

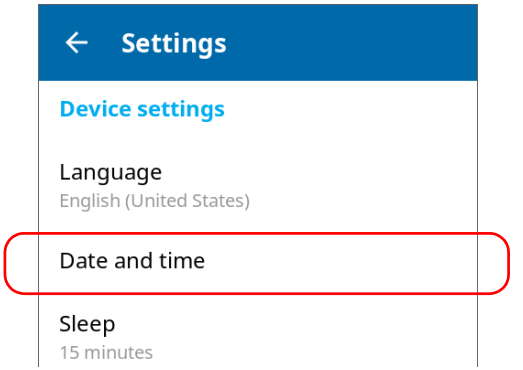
If you use your unit in conjunction with a smart device, each time a connection is established between the two, by default, the date, time and time zone of the unit are synchronized with those of the smart device. You can disable the automatic synchronization if you prefer.

To modify the date format:

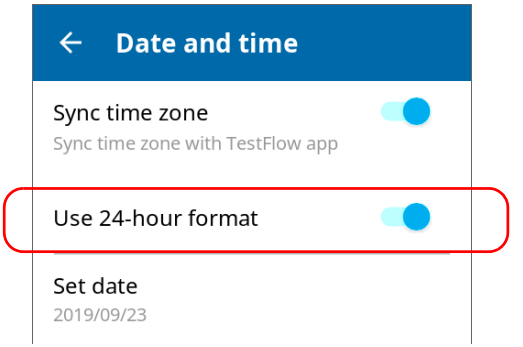
1. From the main menu, tap **Settings**.



2. Scroll down to the **Device settings** section.
3. Tap **Date and time**.



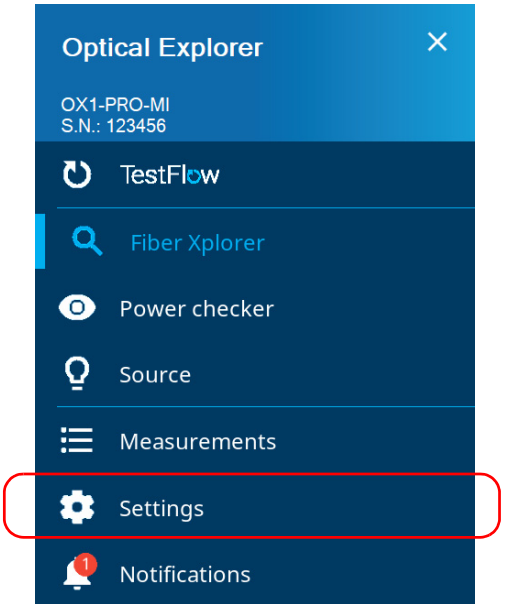
4. With the **Use 24-hour format** toggle, enable or disable the option, depending on your preference. If you prefer to view the time in a 12-hour (AM/PM) format, ensure that the **Use 24-hour format** option is disabled.



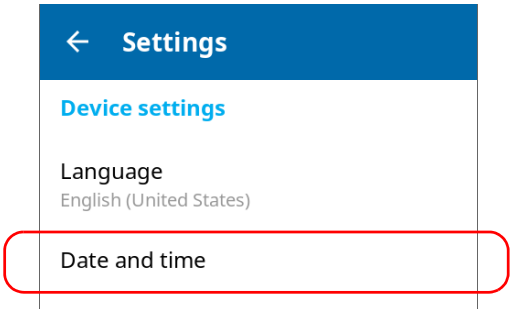
The new time format is taken into account immediately.

To enable or disable the synchronization of date, time and time zone with the TestFlow mobile application:

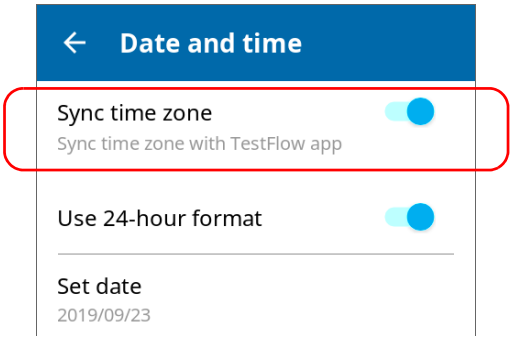
1. From the main menu, tap **Settings**.



2. Scroll down to the **Device settings** section.
3. Tap **Date and time**.

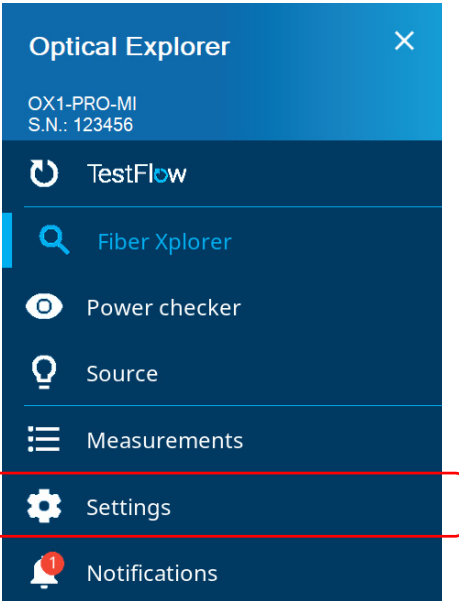


4. With the **Sync time zone** toggle, enable or disable the synchronization of date and time with the TestFlow mobile application.

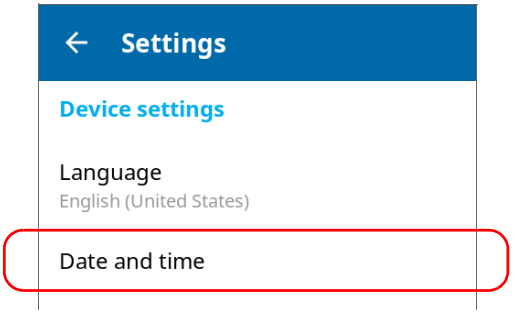


To adjust the date, time or time zone manually:

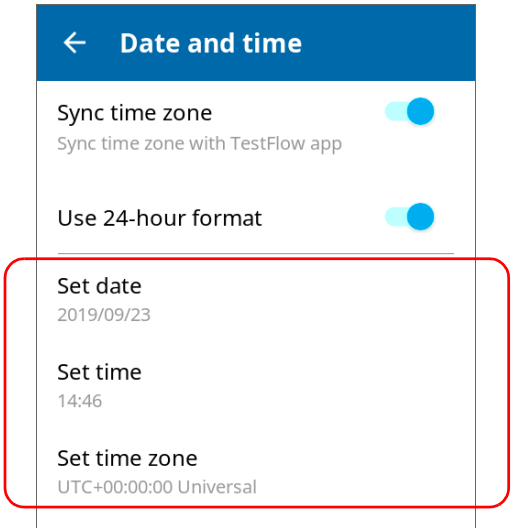
1. From the main menu, tap **Settings**.



2. Scroll down to the **Device settings** section.
3. Tap **Date and time**.



4. Tap the element corresponding to the value that you want to modify.



5. Modify the settings according to your needs, and then tap **OK** to confirm, when applicable.

The new values are taken into account immediately.

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.

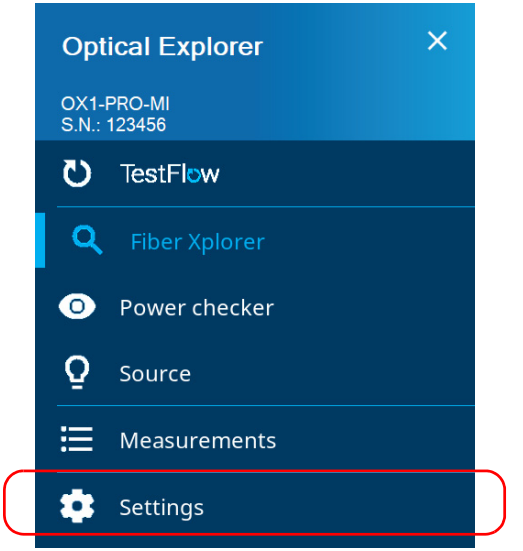
Note: *Values of less than 1 kilometer or 1 kilofeet will be expressed, respectively, in meters or feet for more precision.*

Note: *The measurement units used on your OX1 are independent from those used in the TestFlow jobs. This means that you may have to make changes to ensure consistency in the selected measurement units.*

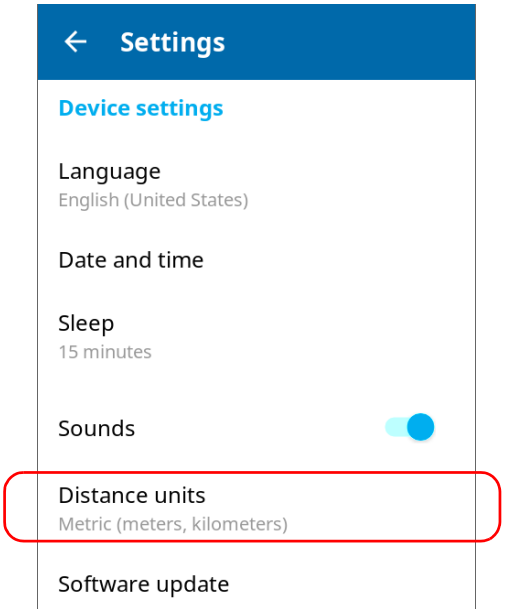
The value that you set is kept in memory even when you turn the unit off.

To select the distance units:

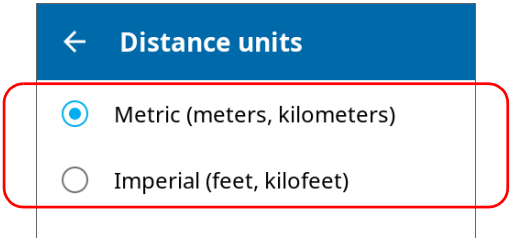
1. From the main menu, tap **Settings**.



2. Scroll down to the **Device settings** section.
3. Tap **Distance units**.



4. Select the desired distance units.



The new value is taken into account immediately.

Configuring Sleep Mode

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 go into sleep mode automatically to save power (see *Turning off Your Unit* on page 22).

Note: *Any data transfer that was underway will continue normally unless the battery level becomes too low. In the event of a low battery, there would be no data loss as no data is erased from your unit until the transfer of all data is complete (to the TestFlow mobile application or to the cloud server).*

By default, the duration after which the unit goes into sleep mode is fifteen minutes, but you can select another value.

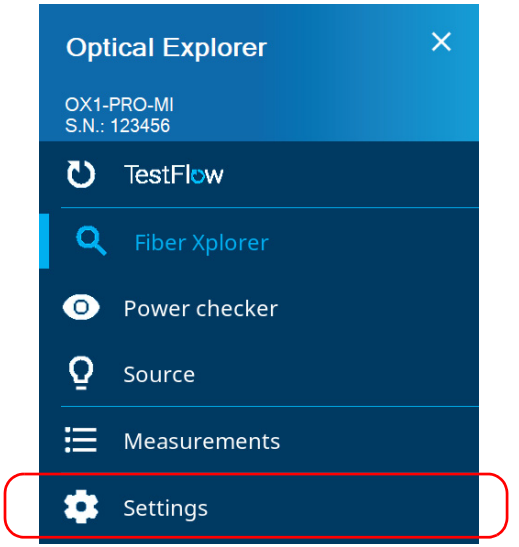
The value that you set is kept in memory even when you turn the unit off.

IMPORTANT

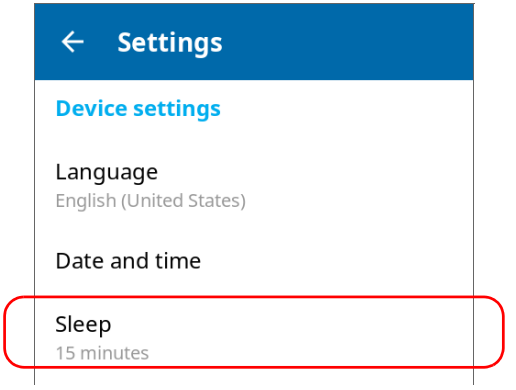
- **If you intend to leave your unit in sleep mode for more than a few hours, you should turn it off (shutdown) to save battery power. After four hours in sleep mode, your unit will go into shutdown mode automatically to save battery power.**
- **The unit will not enter sleep mode while you perform tests or use tools such as the source or the power checker.**
- **To avoid a possible battery drainage, do not forget to stop the source manually if you have deactivated its timer. Also, do not forget to close the power checker page when you have finished your work.**
- **If you have set a timer for the source, the unit will start calculating the idle time after the timer has reached zero. For more information about the source timer, see *Using the Light Source* on page 115.**

To configure the duration after which the unit enters sleep mode:

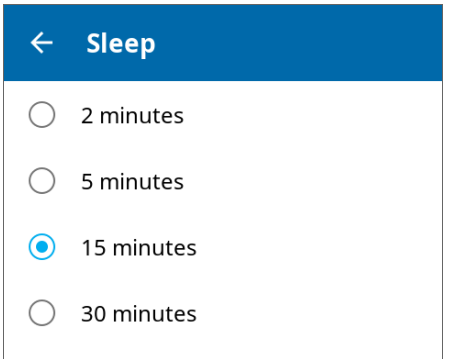
1. From the main menu, tap **Settings**.



2. Scroll down to the **Device settings** section.
3. Tap **Sleep**.



4. Select the desired number of minutes.



The new value is taken into account immediately.

Selecting Test Wavelengths

You can select the wavelengths you want to use for your measurements or let the unit select the most appropriate wavelengths. The manual or automatic selection of the wavelengths is kept in memory when you turn off the device as well as the wavelengths you have chosen. By default, the automatic option is deactivated.

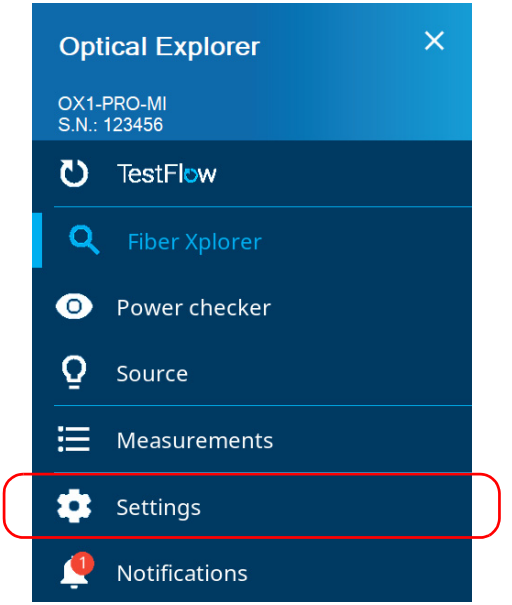
Note: *The automatic wavelength selection is not possible on units with only one wavelength available.*

Note: *When you use the automatic wavelength selection on a unit with both filtered and non-filtered ports, the unit selects the filtered port by default if the OX1 detects a liver fiber.*

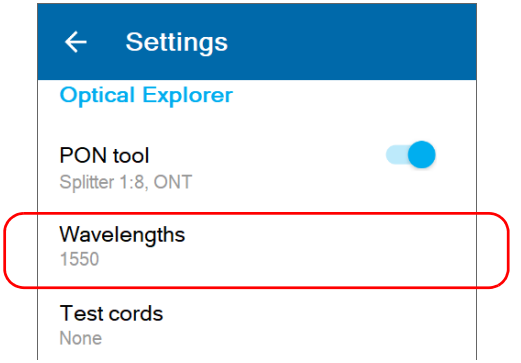
You can make your selection in the Settings page or directly in Fiber Xplorer.

To select test wavelengths from the Settings page:

1. From the main menu, tap **Settings**.



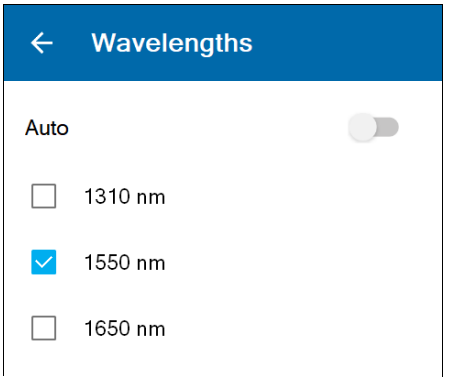
2. Under **Optical Explorer**, tap **Wavelengths**.



3. If you want to let the unit select the most appropriate wavelengths, use the **Auto** toggle to enable the option.

OR

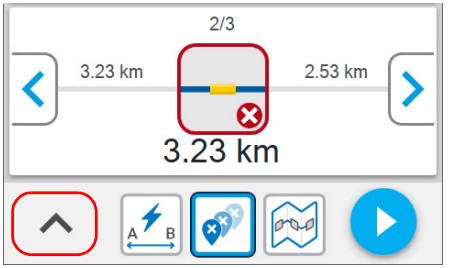
If you prefer to choose the wavelengths yourself, ensure that the **Auto** option is deactivated (use the toggle if necessary), and then select the wavelengths you want to use for your tests.



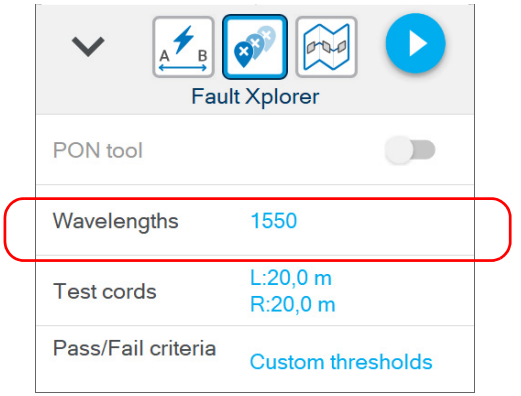
The new selection will be taken into account for the next measurement.

To select test wavelengths from Fiber Xplorer:

1. From Fiber Xplorer, tap the arrow to access the drawer.



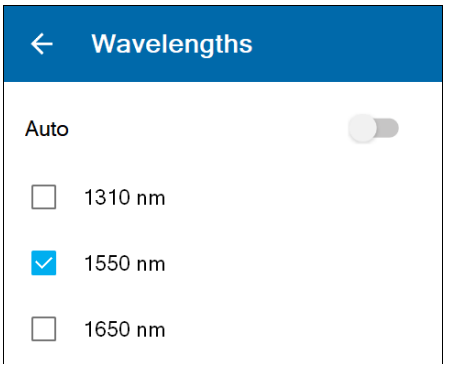
2. Tap **Wavelengths**.



3. If you want to let the application select the most appropriate wavelengths, use the **Auto** toggle to enable the option.

OR

If you prefer to choose the wavelengths yourself, ensure that the **Auto** option is deactivated (use the toggle if necessary), and then select the wavelengths you want to use for your tests.



The new selection will be taken into account for the next measurement.

Enabling or Disabling Power Measurements

You can include the optical power of a link in the measurements that you perform with the OX1.

When you enable this feature (disabled by default), you need to choose a wavelength at which the OX1 will calculate the power of a link.

If you are working with a dual-channel unit, you can either select a single wavelength, a pair of wavelengths, or let the unit automatically interpret the received signal(s) and suggest which PON-type channel(s) could be present on your network. The dual-channel unit supports the following wavelengths related to PON networks:

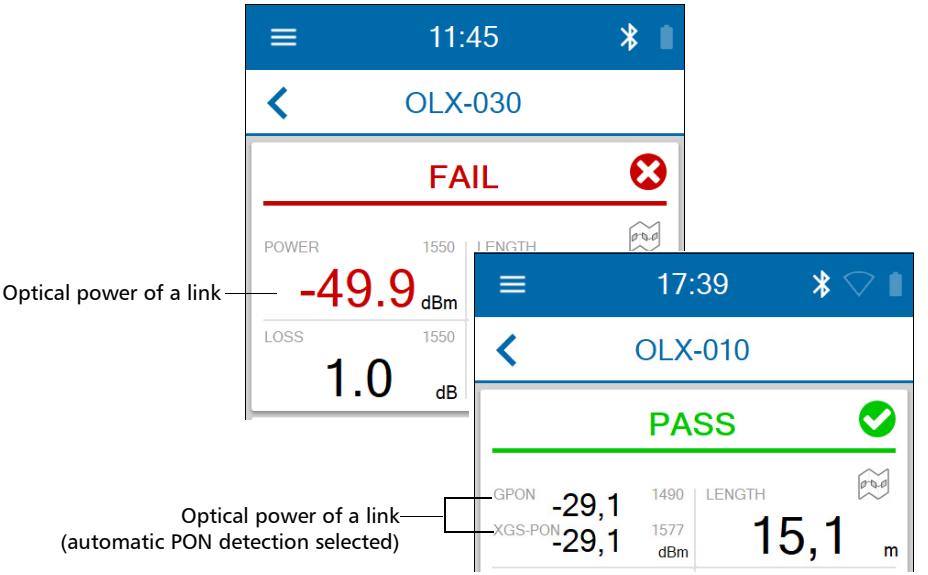
- 1490 nm – GPON
- 1550 nm – RF Video
- 1577 nm – XGS-PON

If you select a pair of wavelengths, the unit will take two downstream measurements simultaneously on your link.

If you select the automatic detection, your unit will take one or two downstream measurements simultaneously on your link, depending on your PON network configuration. In all cases, with the automatic detection, your unit will identify the type of network and the corresponding wavelength at which the power of the link is calculated (ex.: GPON - 1490 nm). By default, the network type is set to GPON if the unit cannot identify your specific network type.

Note: *Should the unit receive atypical signals, the suggested types of channels could differ from your actual network configuration. In this case, you could simply manually select the pair of wavelengths corresponding to your testing needs.*

The value is displayed in the Fiber Xplorer page as soon as you start an acquisition.

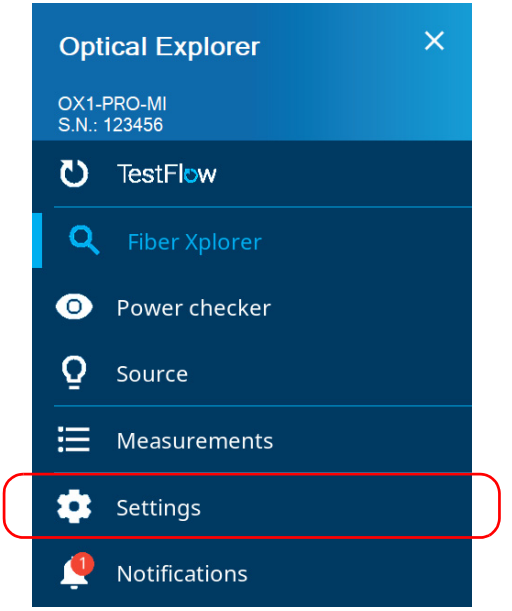


Once the measurement is complete, the power value is also displayed in the Link details page. See *Working With Link Results* on page 96 for details.

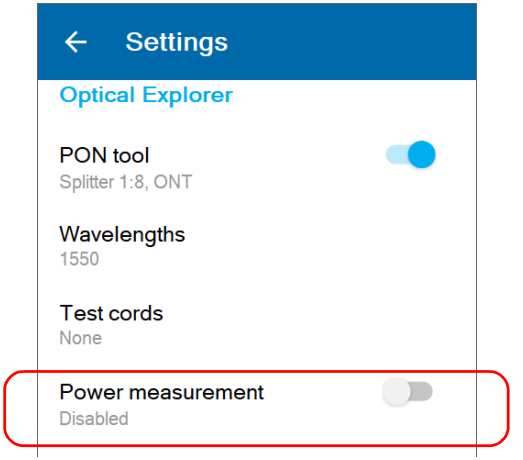
The OX1 includes the pass/fail status of the power measurement in the status of the global acquisition.

To enable or disable power measurements:

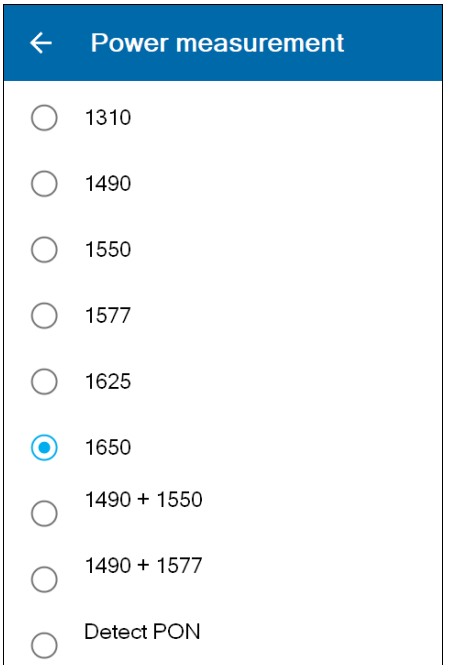
1. From the main menu, tap **Settings**.



2. Under **Optical Explorer**, activate the feature with the toggle button, and then tap **Power measurement** to display the wavelengths available.



3. In the **Power measurement** page, select the desired wavelength. If you are working with a dual-channel unit, you can also select a pair of wavelengths. If you prefer to let the unit interpret the received signals (power) for your network automatically, select **Detect PON**.



Working With Custom Pass/Fail Thresholds or EXFO Advisor

As soon as a measurement is complete, the application displays a status:

- Pass
- Fail
- Unknown
- Quality star rating

The application displays a Pass/Fail status when custom thresholds are applied. It is displayed in the Link Results area and it can be pass, fail, or unknown. See *Working With Link Results* on page 96 for details.

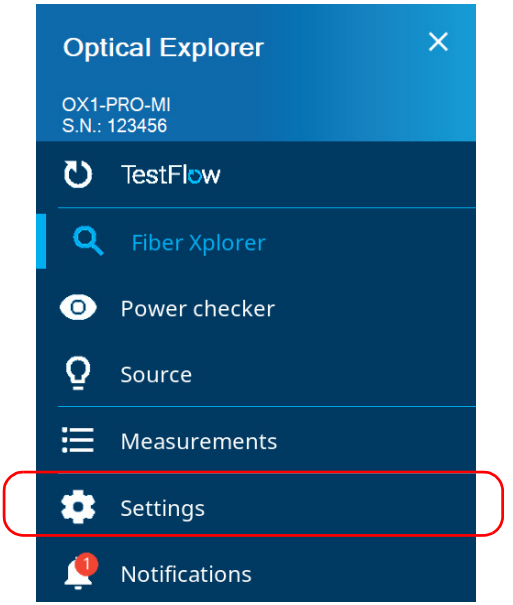
You can also let EXFO Advisor rate the quality of the results. The rating ranges from zero to five stars (half stars are possible).

Note: *EXFO Advisor is always applied when working with Flash Advisor.*

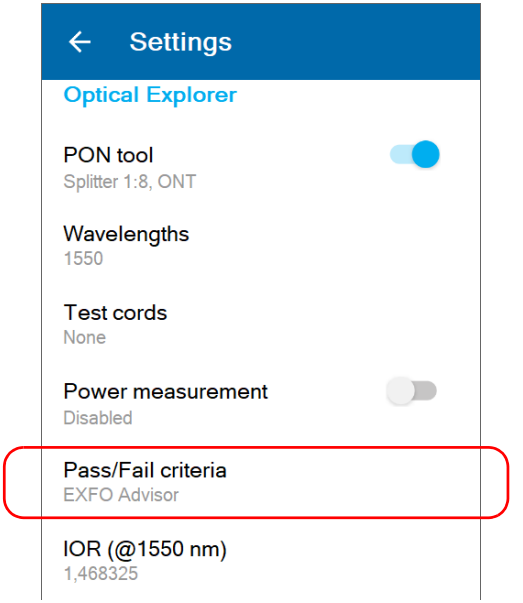
By default, the link thresholds (loss, length, ORL) are disabled. You can enable and customize them when you use Fault Xplorer or Link Mapper. You can also customize thresholds related to the elements (connector loss and reflectance, splice loss). The threshold values, for both the link and elements, are applied automatically to all wavelengths and are kept in memory when you turn off the unit.

To configure custom thresholds or select EXFO Advisor from the Settings page:

1. From the main menu, tap **Settings**.



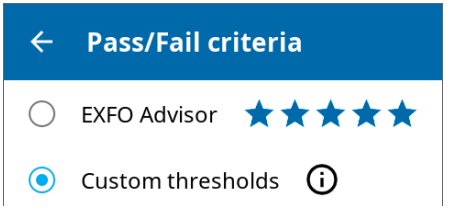
2. Under **Optical Explorer**, tap **Pass/Fail criteria**.



3. If you want to let the application rate the quality of the results, select **EXFO Advisor**.

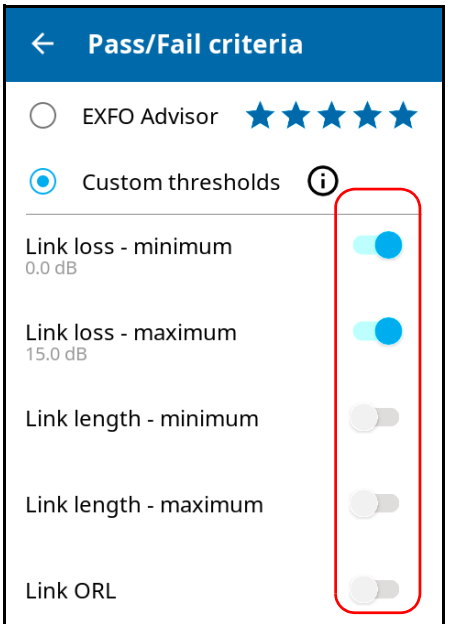
   OR

   If you prefer to customize the values of the thresholds, select **Custom thresholds**.

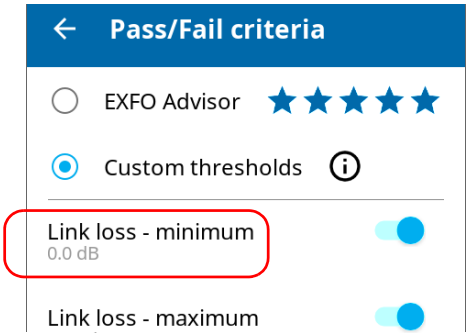


4. To edit the threshold values, proceed as follows:

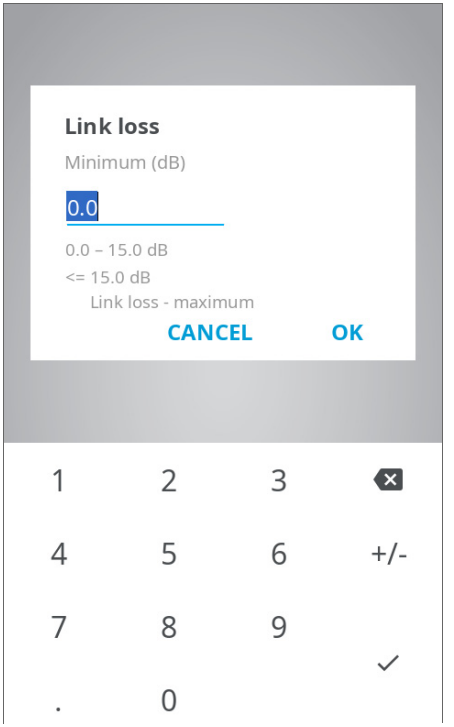
4a. If necessary, activate the threshold with the toggle button.



4b. Tap the threshold you want to modify.



4c. Enter a new value.

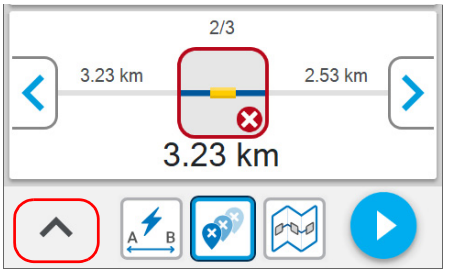


4d. Tap **OK** to return to the **Pass/Fail criteria** page.

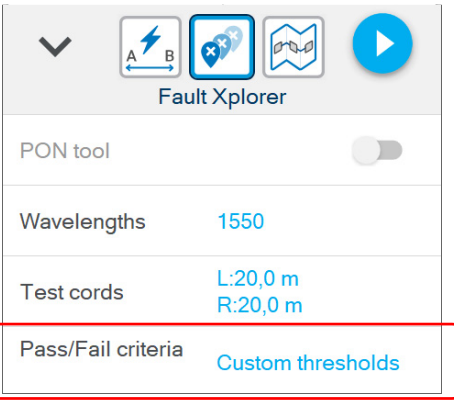
The new thresholds are taken into account for the next measurement.

To configure custom thresholds or EXFO Advisor from Fiber Xplorer:

1. From Fiber Xplorer, tap the arrow to access the drawer.



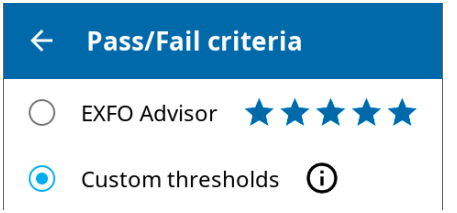
2. Tap **Pass/Fail criteria**.



3. If you want to let the application rate the quality of the results, select **EXFO Advisor**.

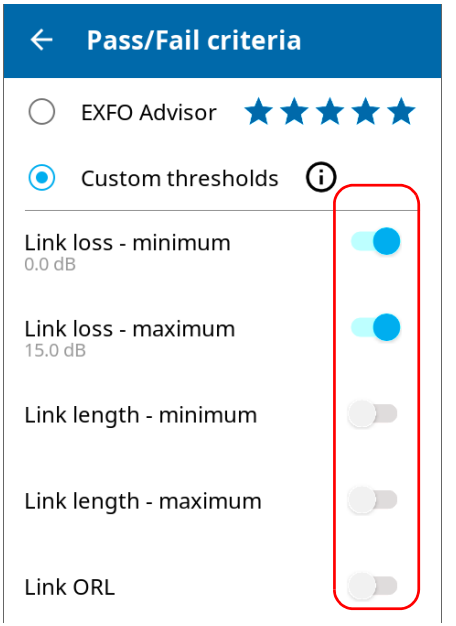
OR

If you prefer to customize the values of the thresholds, select **Custom thresholds**.

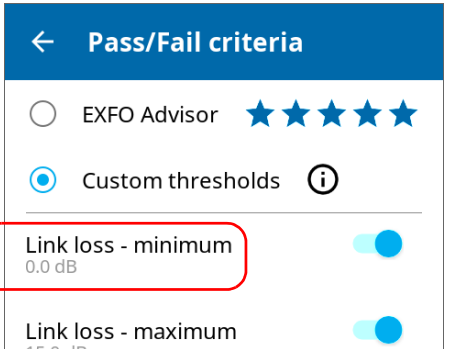


4. To edit the threshold values, proceed as follows:

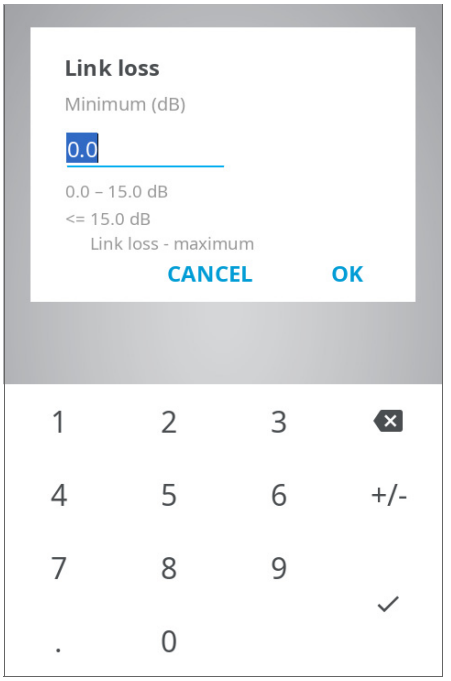
4a. If necessary, activate the threshold with the toggle button.



4b. Tap the threshold you want to modify.



4c. Enter a new value.



4d. Tap **OK** to return to the **Pass/Fail criteria** page.

Working With the PON Tool

The PON tool has been designed and optimized to work with specific use cases related to the FTTx architecture. With this tool, you can perform splitter detection tests (from the ONT to the splitter) and ONT detection tests (from the splitter to the ONT).

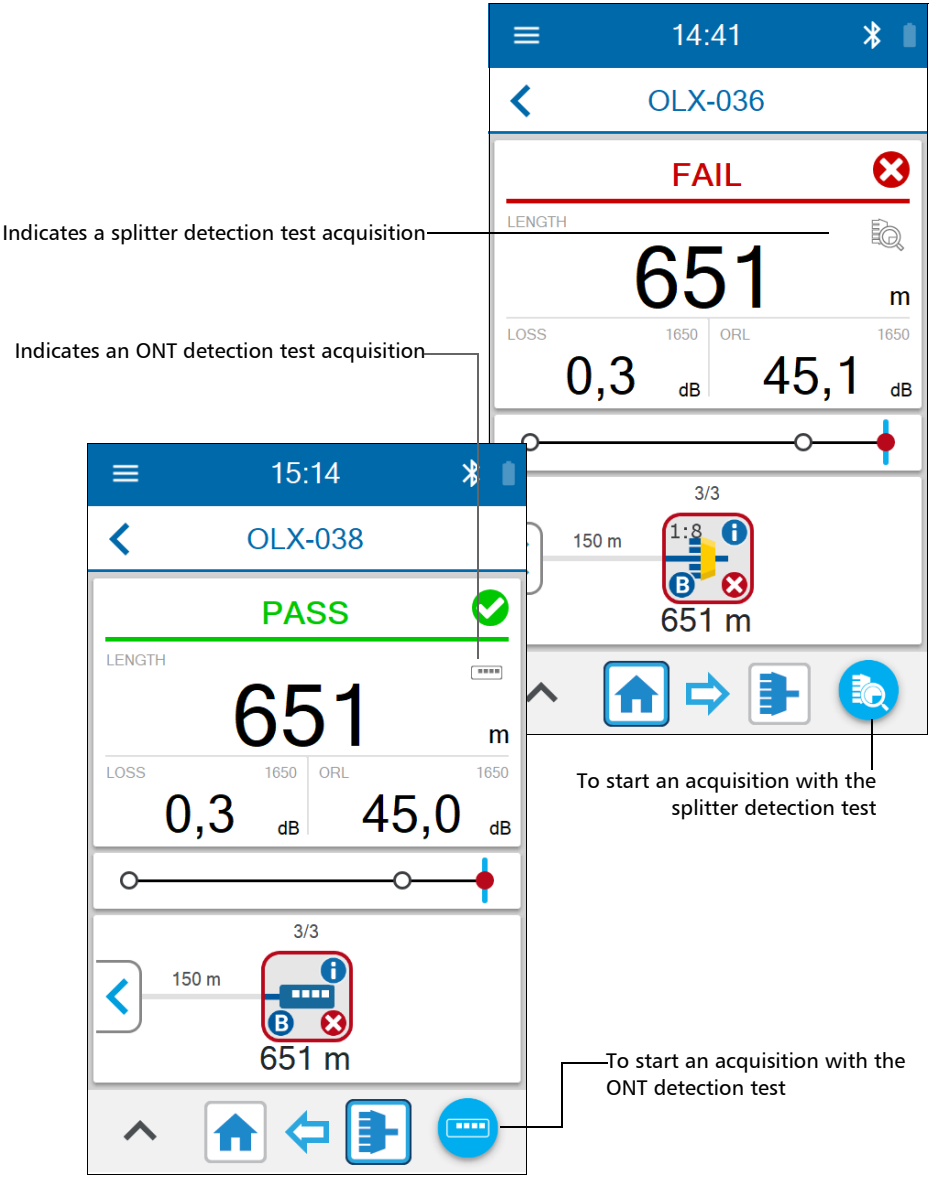
As it is a tool for specific cases, the PON tool is disabled by default. As soon as you enable it, both the splitter and ONT detection tests are enabled. You can disable either the splitter or the ONT detection test if desired. You can also configure your unit to show the PON tool in the drawer if desired.

Note: *You can use the PON tool with PRO models only.*

- The splitter detection test verifies if the subscriber is connected to the splitter by allowing the OX1 to distinguish a splitter from a fiber end or break. When no splitter is detected, the unit displays a splitter element with a fail status. The unit also provides you with a diagnosis giving additional information about the detected problems to assist you in troubleshooting.

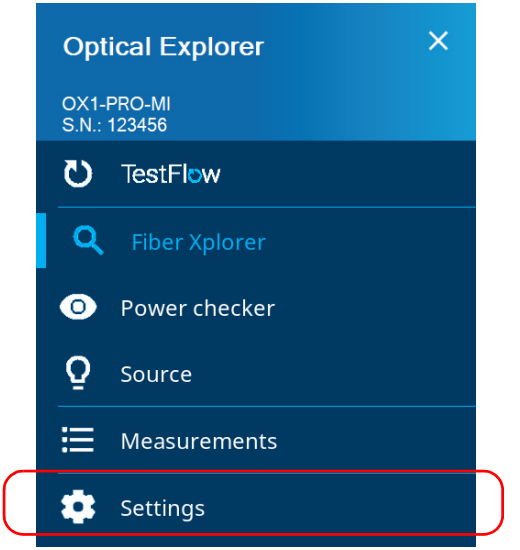
  The splitter detection test requires the selection of the appropriate splitter ratio configuration. In the case of cascaded splitters, you should always select the splitter ratio of the splitter which is closer to the location where you perform an acquisition. If the distance between both levels of splitters does not fit within the minimal length specifications, the splitter detection will fail.

- The ONT detection test helps you identify a bad connection to the ONT or a malfunction of the ONT, from outside the subscriber's premises. When no ONT is detected, the unit displays an ONT element with a fail status. The unit provides you with a diagnosis giving additional information about the detected problems or potential problems to assist you in troubleshooting.

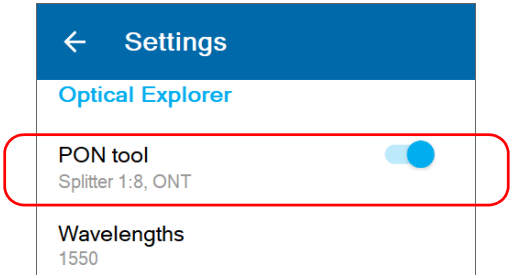

Indicates a splitter detection test acquisition
Indicates an ONT detection test acquisition
14:41
OLX-036
FAIL
LENGTH
651
m
LOSS
1650
0,3
dB
ORL
1650
45,1
dB
3/3
150 m
1:8
651 m
To start an acquisition with the splitter detection test
15:14
OLX-038
PASS
LENGTH
651
m
LOSS
1650
0,3
dB
ORL
1650
45,0
dB
3/3
150 m
651 m
To start an acquisition with the ONT detection test

To configure the PON tool:

1. From the main menu, tap **Settings**.

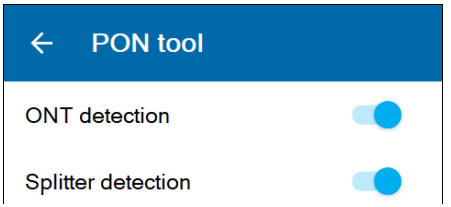


2. Under **Optical Explorer**, activate the feature with the toggle button and tap **PON tool**.

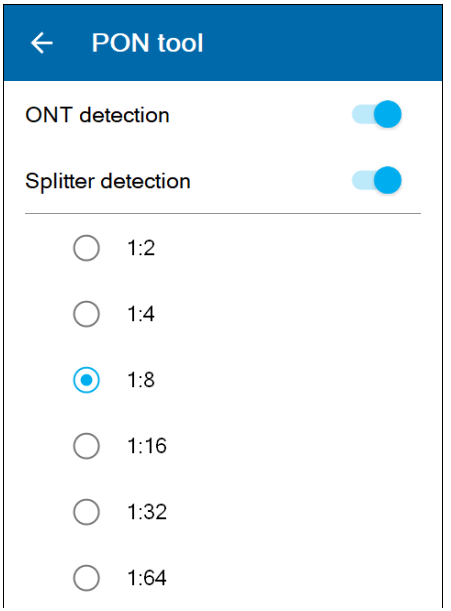


Note: *If you do not see **PON tool** in the settings, it means that your current OX1 unit is not a PRO model.*

3. Ensure that the test selection suits your needs. Use the toggle buttons to enable or disable a test.

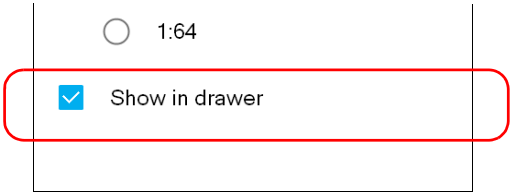


4. If you intend to work with the splitter detection test, select the split ratio you want to use to test the link.



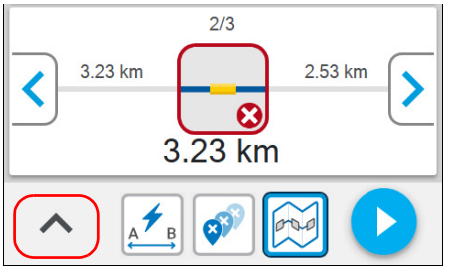
Note: *When working with cascaded splitters, you should always select the splitter ratio of the splitter which is closer to the location where you perform an acquisition. If the distance between both levels of splitters does not fit within the minimal length specifications, the splitter detection will fail.*

5. If you want to be able to access the PON tool settings directly from the drawer, select the **Show in drawer** check box.

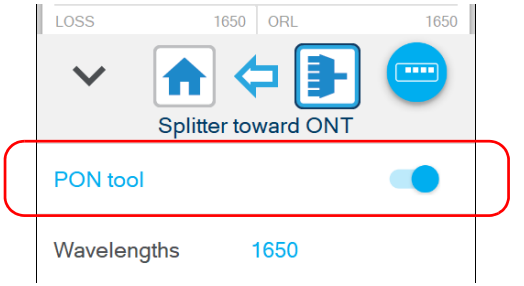


To configure the PON tool from Fiber Xplorer:

1. From Fiber Xplorer, tap the arrow to access the drawer.

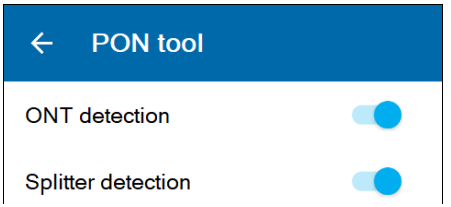


2. If necessary, activate the feature with the toggle button and tap **PON tool**.

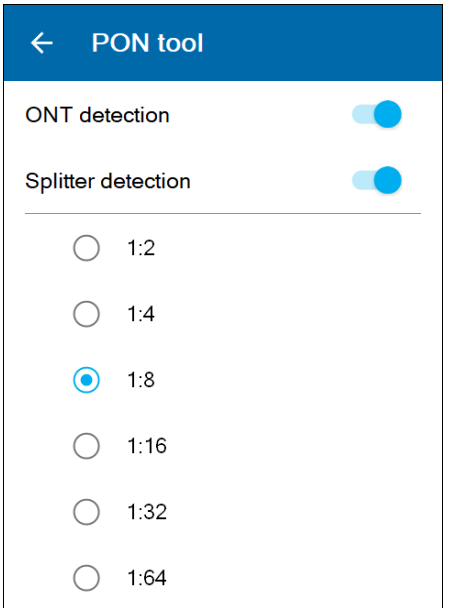


Note: *If you do not see **PON tool** in the drawer, it probably means that its display has not been enabled from the **Settings** menu or that your current OX1 unit is not a PRO model.*

3. Ensure that the test selection suits your needs. Use the toggle buttons to enable or disable a test.



4. If you intend to work with the splitter detection test, select the split ratio you want to use to test the link.



Note: *When working with cascaded splitters, you should always select the splitter ratio of the splitter which is closer to the location where you perform an acquisition. If the distance between both levels of splitters does not fit within the minimal length specifications, the splitter detection will fail.*

Working With a Demarcation Section

Note: *You can only use this feature with the Fault Xplorer and Link Mapper test functions.*

You can define a demarcation section when you need to validate the loss over a portion of the link.

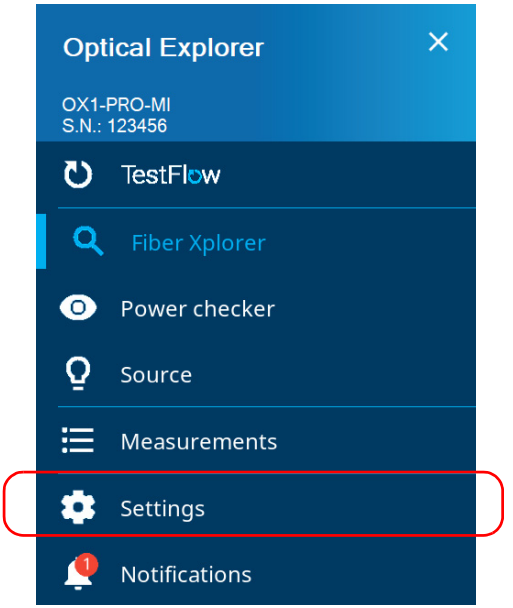
You can configure related parameters such as the length and the loss thresholds.

You can also define the unit's behavior in case it detects the end of the link before the end of the demarcation section. By default, in this situation, the unit identifies the last event as a fiber break (Fail). However, you can modify this setting so that the last event is identified as the actual end of fiber instead (Pass). This could be particularly useful if you know, for example, that your link’s end is located within the demarcation section.

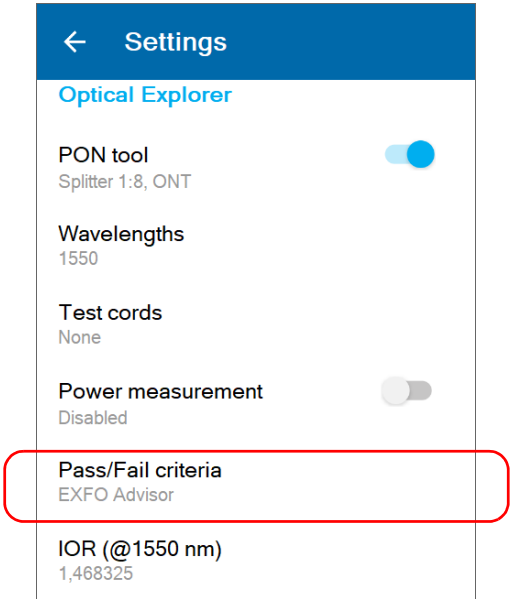
Note: *The start of the demarcation section always corresponds to the testing point.*

To set the demarcation section thresholds from the Settings page:

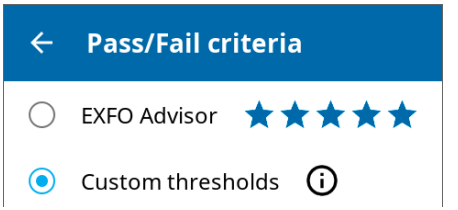
1. From the main menu, tap **Settings**.



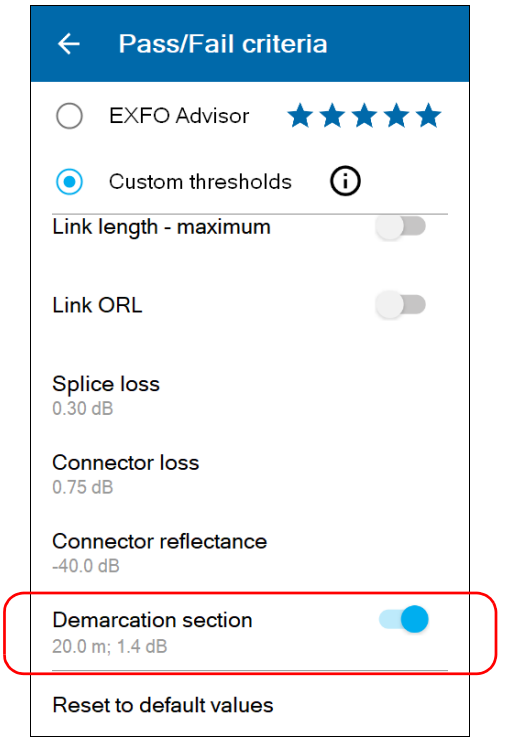
2. Under **Optical Explorer**, tap **Pass/Fail criteria**.



3. Ensure that **Custom thresholds** is selected.

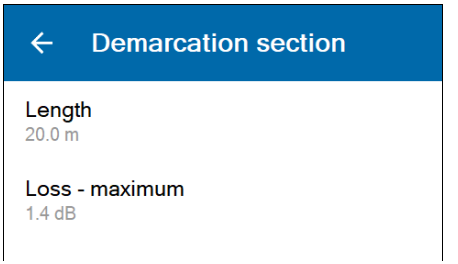


4. If necessary, activate the threshold group with the toggle button and tap **Demarcation section** to modify the parameters.



5. Modify the thresholds as follows:

5a. Tap the threshold that you want to modify.



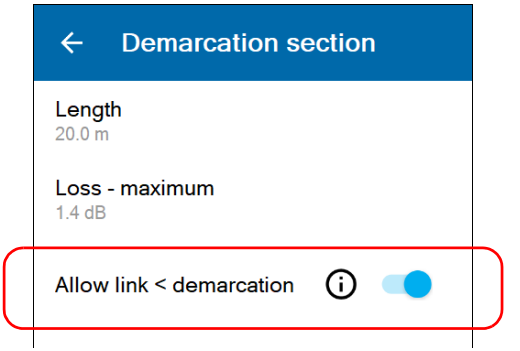
5b. Enter a new value.

5c. Tap **OK** to return to the **Demarcation section** page.

6. Use the **Allow link < demarcation** toggle button to define the behavior of the unit when it detects the end of the link before the end of the demarcation.

➤ To have the last event identified as the actual end of fiber (Pass), enable the feature.

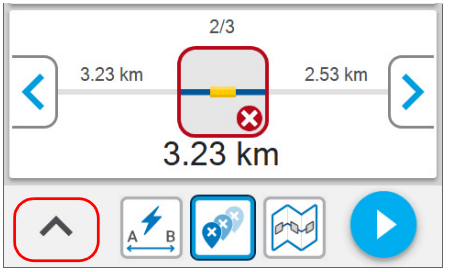
➤ To have the last event identified as a fiber break (Fail), disable the feature.



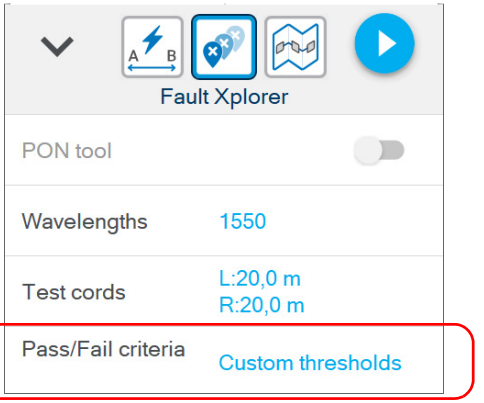
The new settings will be taken into account for the next measurement.

To set the demarcation section thresholds from Fiber Xplorer:

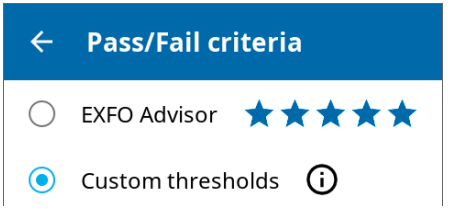
1. From Fiber Xplorer, tap the arrow to access the drawer.



2. Tap **Pass/Fail criteria**.

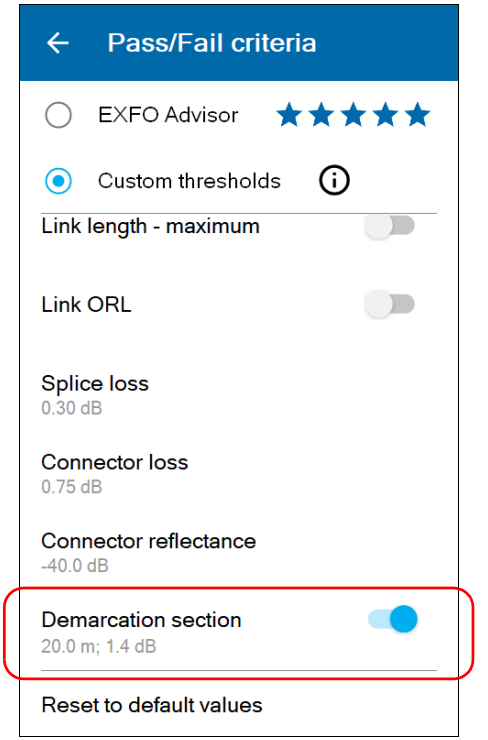


3. Ensure that **Custom thresholds** is selected.

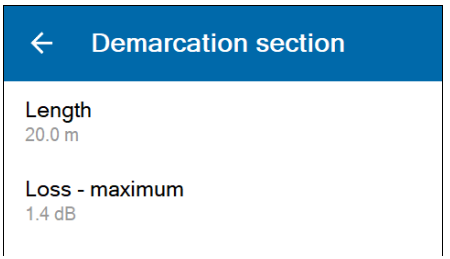


4. To edit the demarcation section, proceed as follows:

4a. If necessary, activate the threshold with the toggle button and tap **Demarcation section** to modify different parameters.



4b. Tap the threshold that you want to modify.



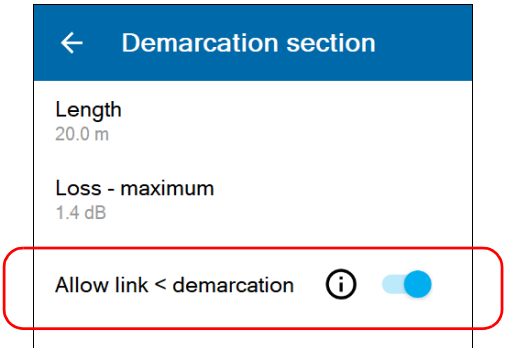
4c. Enter a new value.

4d. Tap **OK** to return to the **Demarcation section** page.

5. Use the **Allow link < demarcation** toggle button to define the behavior of the unit when it detects the end of the link before the end of the demarcation.

➤ To have the last event identified as the actual end of fiber (Pass), enable the feature.

➤ To have the last event identified as a fiber break (Fail), disable the feature.



The new thresholds will be taken into account for the next measurement.

Configuring the IOR Value

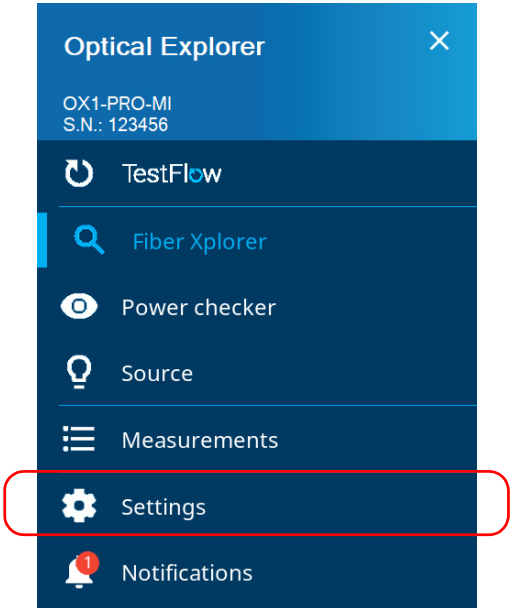
Having the proper index of refraction (IOR) is crucial for all measurements associated with distance (element position, total length, etc.). By doing so, you ensure that the distances are more accurate for your measurements.

You can edit the IOR value associated with the 1550 nm wavelength only. The unit automatically finds the corresponding IOR value for other wavelengths.

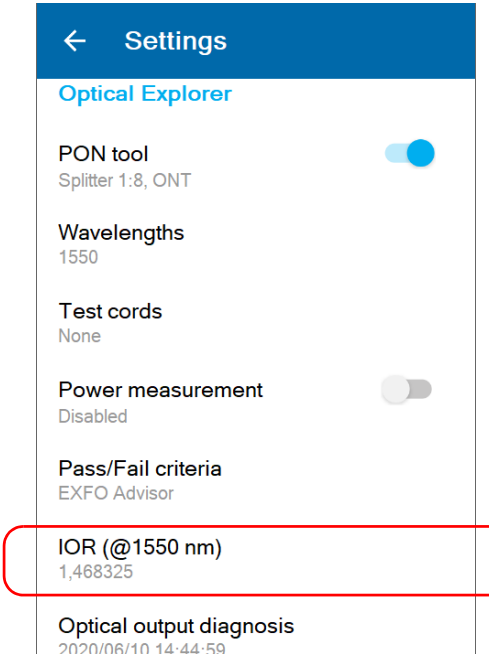
IOR is provided by the cable or fiber manufacturer.

To configure the IOR value:

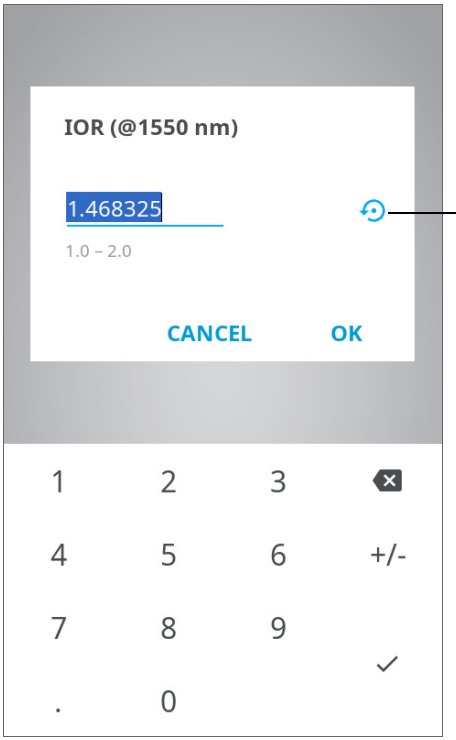
1. From the main menu, tap **Settings**.



2. Under **Optical Explorer**, tap **IOR (@1550 nm)**.



3. Enter the new value.



4. Tap **OK** to confirm the new value and return to the **Settings** page.

The new value will be taken into account for the next measurement.

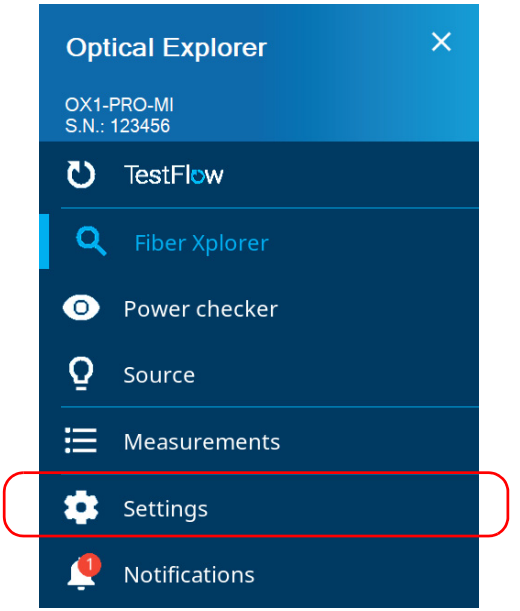
Reverting to Factory Settings

At any time, you can use one of these options, according to your needs:

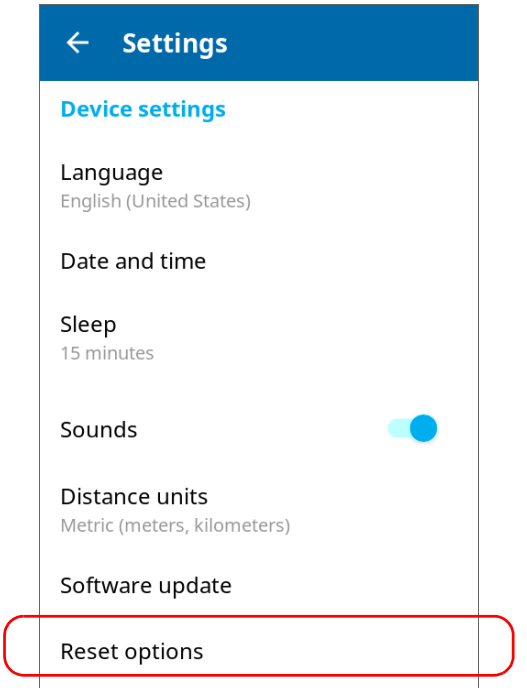
- reset all settings of the unit that you have customized, such as the thresholds, to their default values
- reset the OX1 to factory settings (all customized settings and erase all measurements)
- reset the battery indicator information once you have replaced the battery (see *Replacing the Battery* on page 178 for details)

To revert values to factory settings:

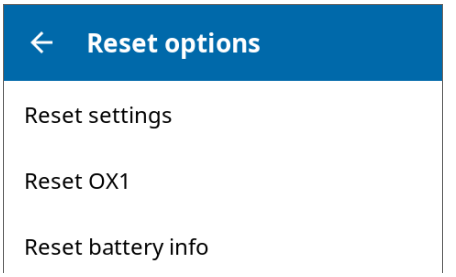
1. From the main menu, tap **Settings**.



2. Scroll down to the **Device settings** section.
3. Tap **Reset options**.



4. Select the desired option.



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

5 Testing Fibers

The OX1 offers different test functions providing you with the level of detail you want to see when testing a fiber link.

Note: *When a measurement is underway, it is automatically stopped as soon as you open the power checker or the light source tool.*

The table below presents each test functions.

Test Functions	Characteristics
Flash Advisor For length, IL, and ORL.	➤ Very fast measurement time. ➤ The link assessment is always performed using the EXFO Advisor settings. The rating displayed suggests that the link may contain faults.
Fault Xplorer For length, IL, ORL, and fault exploration.	➤ Fast measurement time when no problems are found on the fiber link. ➤ Localizes and identifies the fault types on the fiber link.
Link Mapper (Pro units only) For length, IL, ORL, and mapping of all detectable elements.	➤ Since the unit identifies and measures all elements on a link, the duration of the measurement is systematically longer. ➤ Identifies, measures and locates all detectable elements on a link.

Performing Measurements

The OX1 allows you to test fibers with different test functions. You may want to set basic parameters before starting a measurement according to your needs:

- the wavelengths at which you want to perform the measurements (see *Selecting Test Wavelengths* on page 54 for details)
- the thresholds associated with the pass/fail criteria (customized or EXFO Advisor) (see *Working With Custom Pass/Fail Thresholds or EXFO Advisor* on page 64 for details)
- the length of the launch and receive test cords (see *Working With Launch and Receive Test Cords* on page 29 for details)
- the IOR value (see *Configuring the IOR Value* on page 86 for details)
- the possibility to go to the next test with a pass status when working with a TestFlow job (see *Configuring the Unit's Behavior After a Pass Measurement* on page 163 for details)

Note: *At any time, you can switch from local measurements (that are not part of a TestFlow job) to measurements within a TestFlow job. All the measurements are kept in memory. You can also open, in turn, the power checker and the source page.*

Note: *When a measurement is underway, the navigation arrows are disabled and you cannot browse through the measurements you have already performed.*

To perform measurements:

1. If you want to perform a test with a TestFlow job, ensure that you have created a job with your TestFlow account from the TestFlow mobile application or that someone from your organization has created one for you, and transfer it to your OX1. See *Transferring a TestFlow Job to the OX1* on page 159 for details.
2. Clean the connectors properly.
3. Connect the launch cord or the fiber under test to the OX1 port.

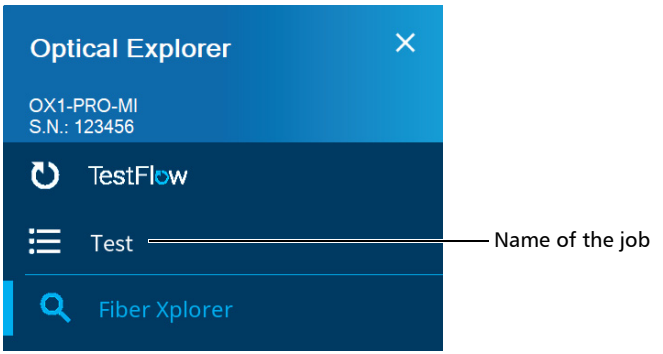
CAUTION

Ensure that the connector of the launch or receive cord always matches the connector of the unit (APC or UPC). Joining mismatched connectors will damage the ferrules.

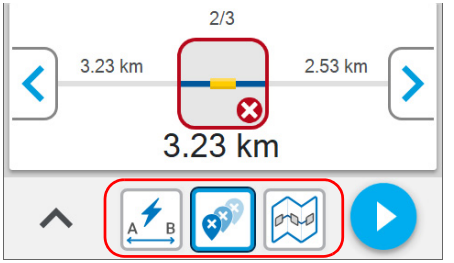
4. On your unit, ensure that the parameters have been set according to your needs.
5. If necessary, from the main menu, tap **Fiber Xplorer**.

   OR

   Under **TestFlow**, tap the name of the job you have transferred to your unit.

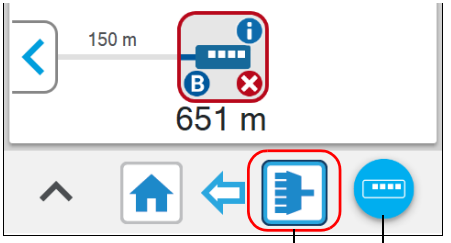


6. If you intend to perform a standard test, select a test function (see *Test Functions and Tools* on page 10 for details).



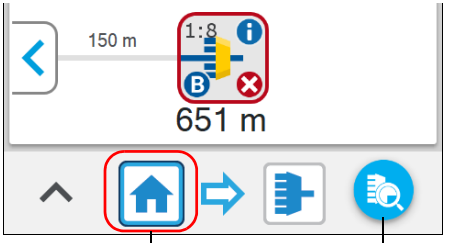
OR

If you intend to perform a test with the PON tool, tap the button corresponding to the test you want to perform (*see* Working With the PON Tool *on page 72* for details).



To test toward the ONT (with or without ONT detection)

To start an acquisition with the ONT detection test



To test toward the splitter (with or without splitter detection)

To start an acquisition with the splitter detection test

7. Tap the  button to start the measurement.

Note: *The start button differs if you are working with a splitter or an ONT detection test.*

Once a measurement is performed, you can view the results in different parts of the screen. See *Working With Link Results* on page 96, *Working With Link Overview* on page 98, and *Working With Link View* on page 99.

The results are stored automatically on the unit. The application will notify you if a synchronization with the TestFlow mobile application is necessary.

Working With Link Results

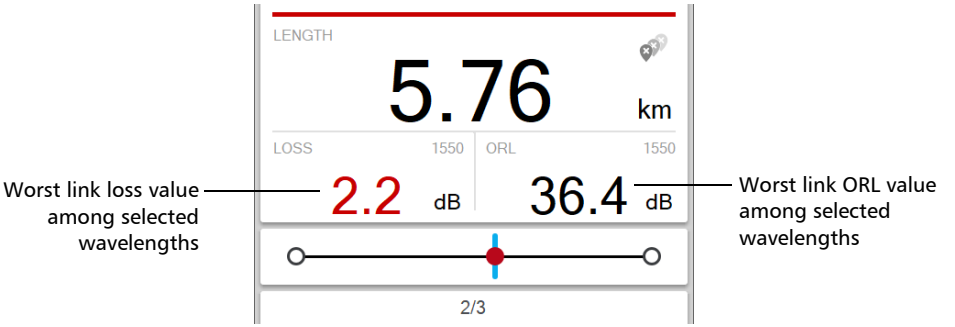
You can view, at a glance, the pass/fail status of the link, the link length, the loss and ORL values for the link. The pass/fail status depends on the status of each value and it will be:

- Pass: when each element on the link has a pass status
- Fail: when at least one of the element on the link has a fail status
- Unknown: when no threshold is configured or a span value (length, loss, ORL) is not available

Note: *If you choose to include the optical power of a link in the measurement, the value will be displayed in the Fiber Xplorer page. This value is taken into account in the status of the global acquisition. See* Enabling or Disabling Power Measurements *on page 59 for details.*

In Fault Xplorer and Link Mapper, the application displays a pass/fail status when custom thresholds are applied.

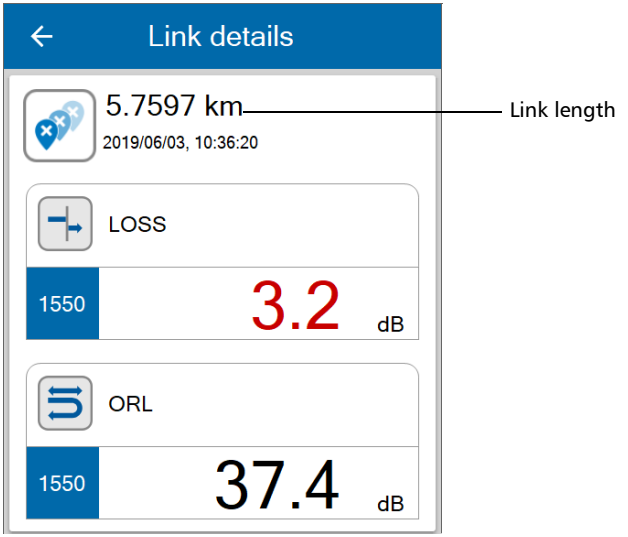
Since you cannot use custom thresholds in Flash Advisor, EXFO Advisor rates the quality of the results according to the parameters used for the measurement. The ratng ranges from zero to five stars (half stars are possible). The same rating is applied to all wavelengths. If you use the EXFO Advisor thresholds in Fault Xplorer and Link Mapper, there will be no pass/fail status displayed either.



By tapping directly on the space dedicated to the link results, you can access specific values by wavelength. The page also displays the length for both the launch and receive test cords.

Note: *If the link ORL value is displayed with a < symbol, the value is exceeding the saturation level of the detector.*

Note: *If the reflectance value is displayed with a > symbol, the value is exceeding the saturation level of the detector.*

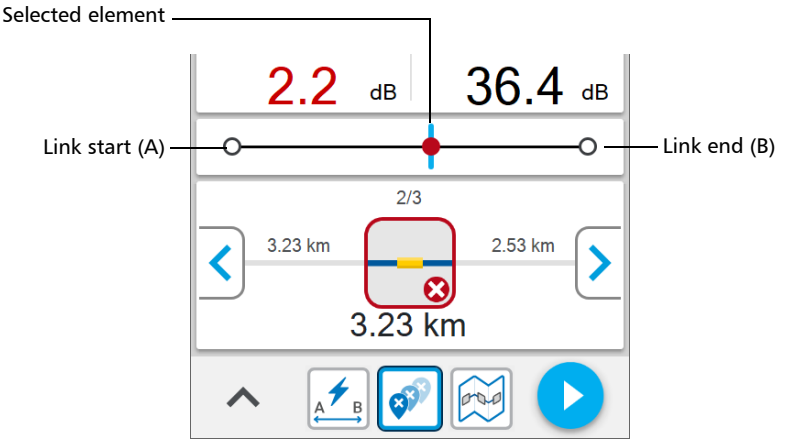


Working With Link Overview

This graphic representation shows the entire link, all of its faults (Fault Xplorer), or all of its detectable elements (Link Mapper), from the link start (A) to the link end (B). The elements are displayed using a proportional distance. During a Fault Xplorer acquisition, the OX1 flags elements that could be potential faults.

When you select an element in the link overview, it is automatically selected in the link view. See *Working With Link View* on page 99 for details.

Note: *The link overview is not available in Flash Advisor.*



Working With Link View

This graphic representation displays, one at a time, all of its faults (Fault Xplorer), or all of its detectable elements (Link Mapper), present on the link from the first connector to the last element detected. You have to use the navigation arrows to see each element.

During a Fault Xplorer acquisition, the elements which are considered as potential faults are tagged with the connector or splice element type icons.

When you select an element in the link view, it is automatically selected in the link overview as long as it is located within the link start and the link end. See *Working With Link Overview* on page 98 for details.

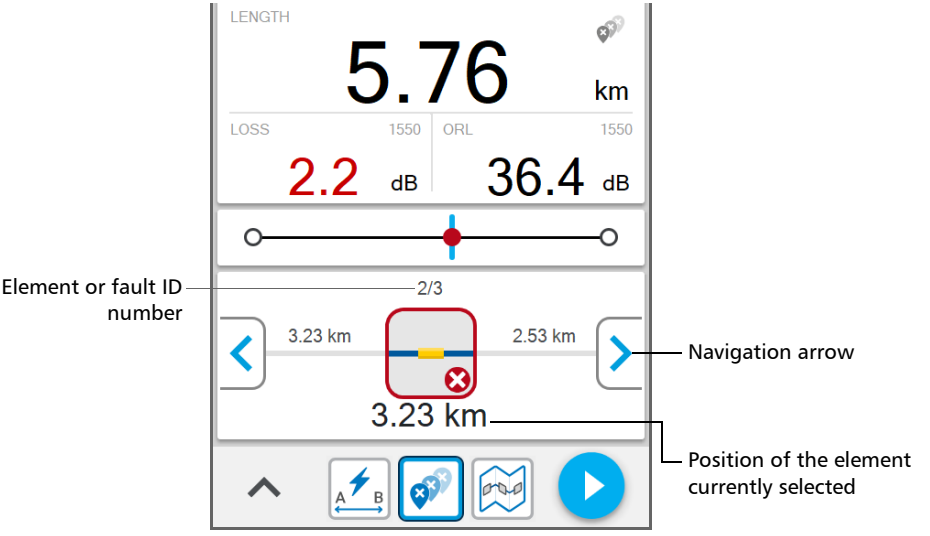
Note: *The link view is not available in Flash Advisor.*

The application assigns a sequential number to each element or fault displayed along the link between the link start (A) and the link end (B). Only one identification number is assigned for a group of elements.

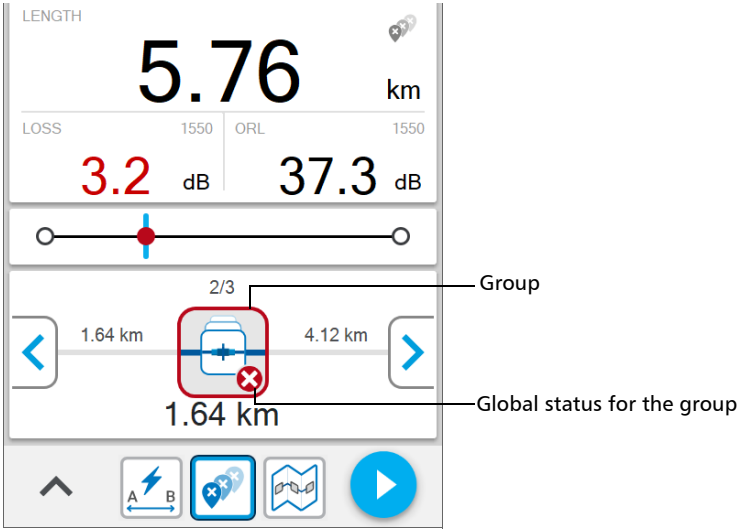
The elements are represented by the following icons:

Element Name	Element Icon	Meaning
Splice		The splice can indicate the junction of two fiber sections, or any non-reflective loss induced by a bend or coupler, for instance.
Connector		The connector is used to join two fibers.
Connector A		Connector A corresponds to the link start.

Element Name	Element Icon	Meaning
Connector B		Connector B corresponds to the link end.
Macrobends		Macrobends can be displayed in the link view when more than one wavelength is present in the measurement.
Out of range		This element is displayed when the application cannot detect the end of fiber because of insufficient dynamic range.
Group		Several link elements or faults are combined when they cannot be independently identified.



The application can detect several link elements or faults that are too close to one another to be independently identified. When this is the case, the application will display the link elements as groups and provide as much information as possible for each individual sub-element. The application will also apply a pass/fail status to each sub-element whenever possible, and a global status for the group.



Performing Tests When Light Is Detected on the Network

When you work with networks on which light is detected, the Optical Explorer units offering the 1650 nm wavelength with a filtered port are more appropriate because they are equipped with a reception filter which rejects incoming light.

In both cases, if the amount of light that hits the OX1 detector is too important, the unit displays a message to notify you.

6 Using the Power Checker

Your unit is equipped with a power checker to measure absolute power (dBm) or insertion loss (dB). It can detect modulated signals (270 Hz, 330 Hz, 1 kHz, and 2 kHz). The OX1 automatically detects the tone coming from the light source. It also indicates when no tone can be detected by displaying CW.

The results are clearly displayed with the global status (pass, fail or unknown) and the unit indicates when the power signal is low.

The power checker can perform measurements as soon as you open the corresponding page and as long as the page remains open.

IMPORTANT

- **When you exit the power checker page, the measurements are automatically stopped. Ensure that the power checker page remains open as long as you need to perform measurements.**
- **Do not forget to close the power checker page when the measurements are complete. Otherwise, the power checker will perform measurements constantly and could drain the battery of the unit.**

Note: *At any time, you can switch from local measurements (that are not part of a TestFlow job) to measurements within a TestFlow job. All the measurements are kept in memory. You can also open, in turn, the power checker and the source page.*

Setting Thresholds

You can define thresholds to specify minimum and maximum power or loss values for each wavelength or you can apply the same thresholds to all wavelengths.

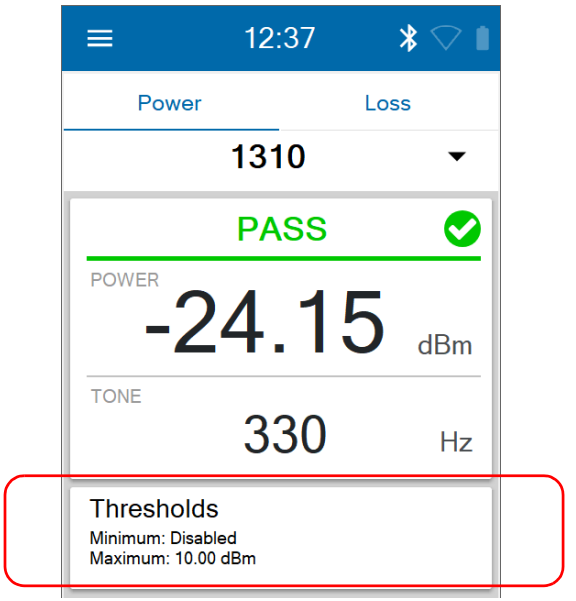
You can also choose not to define any threshold values by disabling this feature. All values can be reverted to factory settings at any time. The values you have entered are kept in memory when you close the page.

The threshold values affect the global status (pass, fail or unknown) of the absolute power and the insertion loss.

You can set the thresholds directly from power checker or in the Settings page.

To set power or loss thresholds directly from the power checker page:

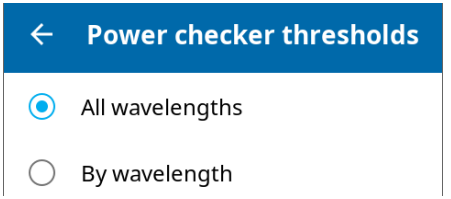
1. Tap **Thresholds**.



2. If you want to use the same threshold values for all wavelengths, select **All wavelengths**.

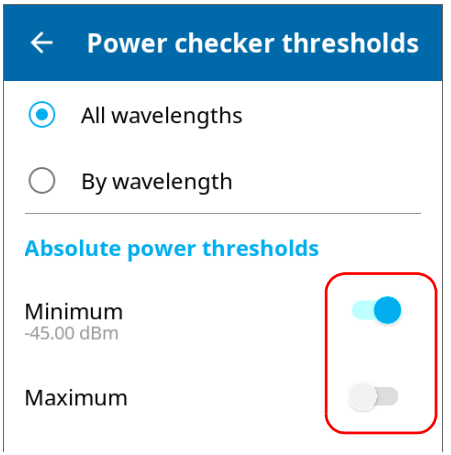
OR

If you prefer to define thresholds per wavelength, select **By wavelength**.

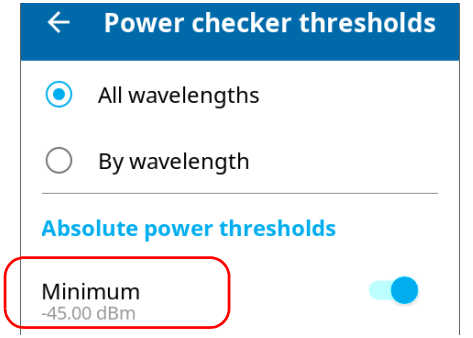


3. To edit the threshold values, proceed as follows:

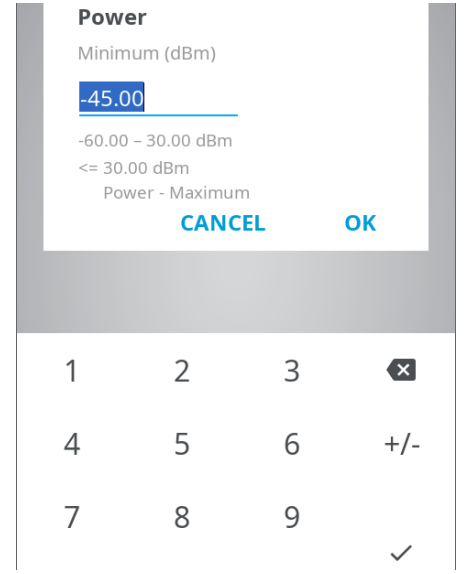
3a. If necessary, activate the threshold with the toggle button.



3b. Tap the displayed numbers.



3c. Enter a new value.

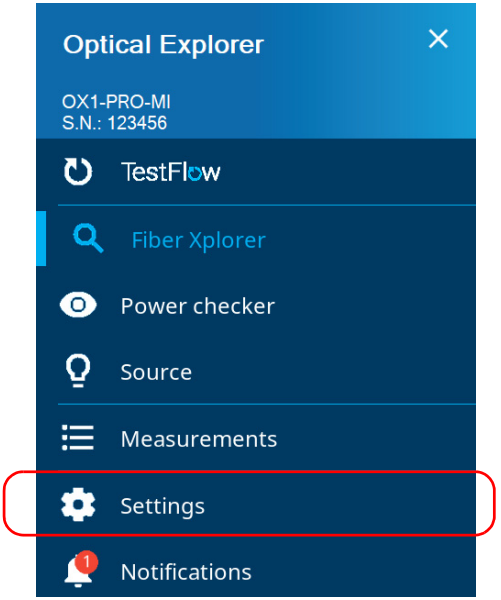


3d. Tap **OK** to return to the **Power checker thresholds** page.

Note: *You can revert to factory settings at any time by tapping* ***Reset to default values****.*

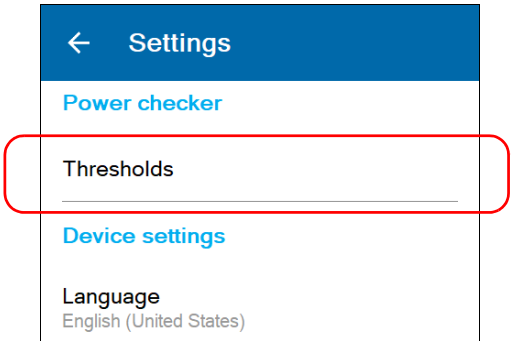
To set power or loss thresholds from the Settings page:

1. From the main menu, tap **Settings**.



2. Scroll down to the **Power checker** section.

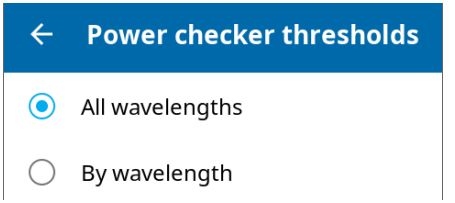
3. Tap **Thresholds**.



4. If you want to use the same threshold values for all wavelengths, select **All wavelengths**.

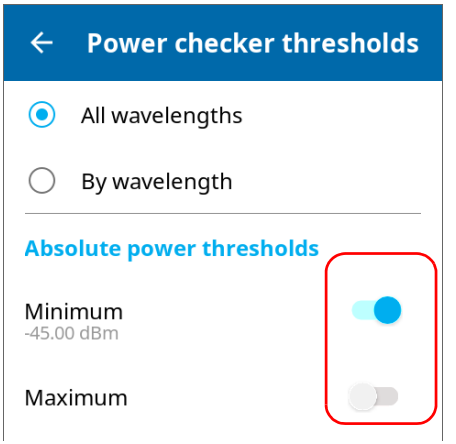
OR

If you prefer to define thresholds per wavelength, select **By wavelength**.

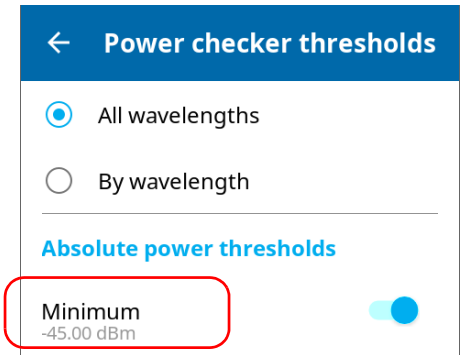


5. To edit the threshold values, proceed as follows:

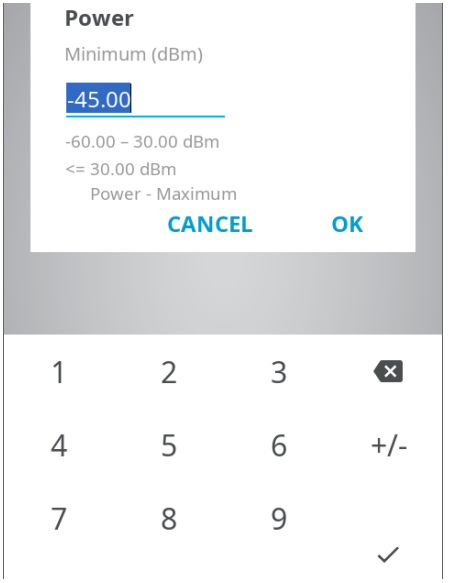
5a. If necessary, activate the threshold with the toggle button.



5b. Tap the displayed numbers.



5c. Enter a new value.



5d. Tap **OK** to return to the **Power checker thresholds** page.

Note: *You can revert to factory settings at any time by tapping* ***Reset to default values****.*

Setting Reference Values on Your Power Checker

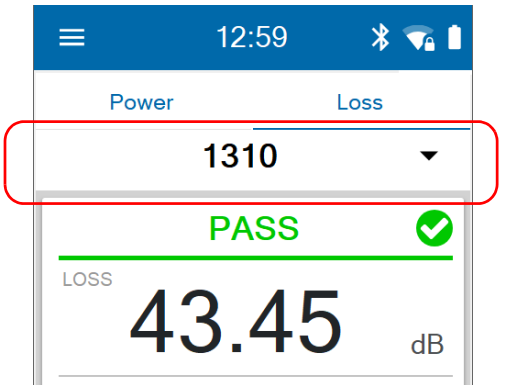
In loss measurement mode, your unit displays on screen the loss created by the fiber under test only, since it subtracts a reference value from the measured power.

You can set a different reference value for each wavelength. The reference value remains available as long as you do not restart the unit. By default, the reference value is set to 0.00 dBm.

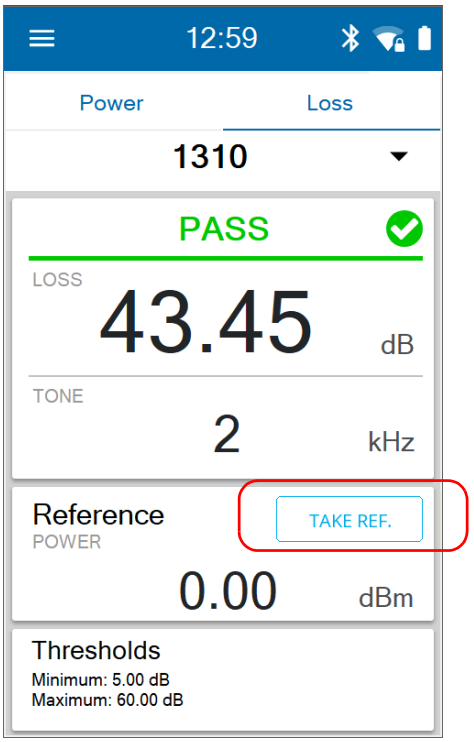
Note: *You can only set reference values in* loss measurement mode*, which is available when a single wavelength is selected. If a pair of wavelengths or the automatic PON detection are selected on a dual-channel unit, you only have access to the power measurement mode (no reference values).*

To set reference values:

1. Inspect your fibers and clean them properly.
2. Using the proper adapter and test jumpers, connect a light source to your unit.
3. From the **Loss** tab, select a wavelength and activate the source at the same wavelength.



4. Tap **TAKE REF.** to save the current power value as the new reference.



Note: *The **TAKE REF.** button is disabled when the power value is unknown or too low and the application displays LOW or "---" on screen.*

Measuring Power or Loss

Measuring absolute power or link loss is done the same way, except for the referencing step.

If you are working with a dual-channel unit, you can either select a single wavelength, a pair of wavelengths, or let the unit automatically interpret the received signal(s) from your PON network, to measure power. The dual-channel unit supports the following wavelengths related to PON networks:

- 1490 nm – GPON
- 1550 nm – RF Video
- 1577 nm – XGS-PON

Note: *The loss measurement is only possible when a single wavelength is selected. If a pair of wavelengths or the automatic PON detection are selected on a dual-channel unit, you can only perform power measurements.*

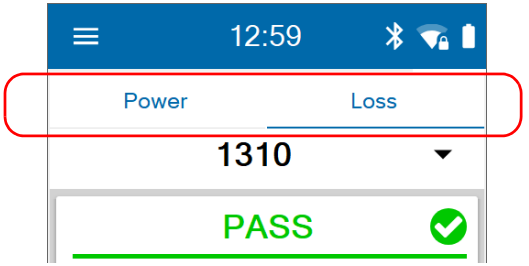
To perform power or loss measurements:

1. Inspect your fibers and clean them properly.
2. For loss measurements, reference your power checker to a light source (see *Setting Reference Values on Your Power Checker* on page 110), then deactivate the light source.
3. If you have used a single reference patchcord, disconnect it *from the power checker port only*, then attach a second reference patchcord to the power checker.

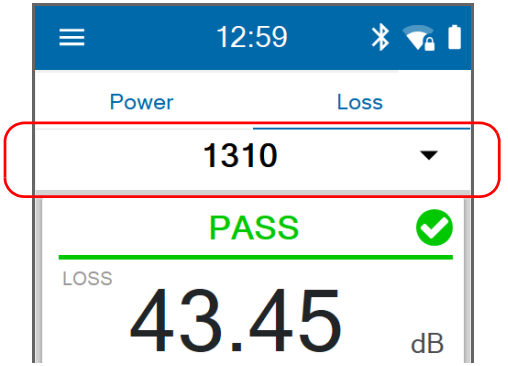
   OR

   If you have used two reference patchcords, disconnect both of them at the bulkhead.

4. Using bulkhead adapters or the system patch panels, connect a fiber under test to reference the patchcord attached to the light source and power checker.
5. Tap the **Power** or **Loss** tab.



6. Select a wavelength and activate the source at the same wavelength.



Note: *If you connect a single-wavelength source to a dual-channel unit and you select a pair of wavelengths, you will see the power value measured at the received wavelength. The unit will display "LOW" for the other channel. If you select the automatic PON detection, you will only see the power value measured at the received wavelength.*

7. Repeat the procedure for other wavelengths if desired.

   The absolute power or link loss value appears on screen.

7 Using the Light Source

You can use the OX1 as a light source to perform measurements with a power meter. By default, the modulation is set to CW (continuous), but you can select another value, depending on the type of tests you want to perform.

- For loss measurement, you should choose a continuous pattern.
- For fiber identification, you should choose any modulation value other than continuous. This will allow the person at the other end of the link to identify the fiber under test, which is particularly useful when working with cables containing many fibers.

When the light source is on (off by default), it emits light constantly until you turn it off, but you can set a timer allowing light emission only for a certain period of time (up to 999 minutes). The first time you work with the source, the timer is disabled. The default value is set to 30 minutes when it is enabled. As soon as the timer reaches zero, the light emission stops automatically. If you enable this feature and decide not to edit the number of minutes during which you want the source to emit light, it will stop after 30 minutes. The application displays clearly the countdown on screen. The state of the timer (on or off) and the value you have entered are kept in memory when you close the page.

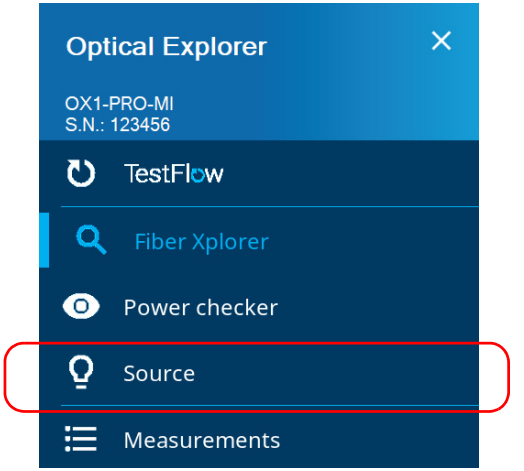
IMPORTANT

- **When you exit the source page, the light source continues to emit light. The light emission stops automatically when you open the power checker or the Fiber Xplorer page.**
- **If you have not set a timer to automatically turn off the source, do not forget to turn it off when the test is complete. Otherwise, the source will emit constantly and could drain the battery of the unit.**

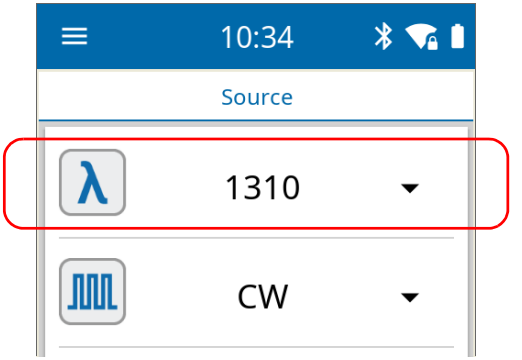
Note: *At any time, you can switch from local measurements (that are not part of a TestFlow job) to measurements within a TestFlow job. All the measurements are kept in memory. You can also open, in turn, the power checker and the source page.*

To use the light source:

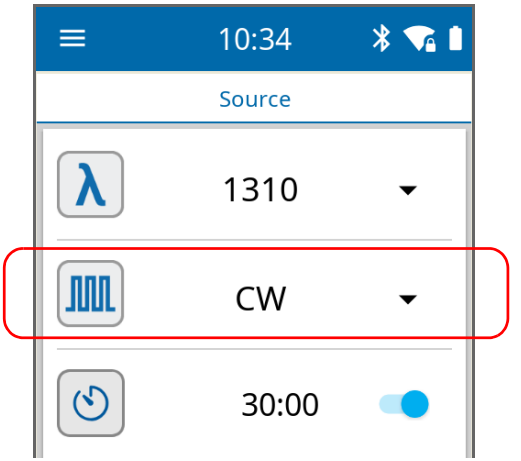
1. From the main menu, tap **Source**.



2. Select a wavelength.



3. Select a modulation.



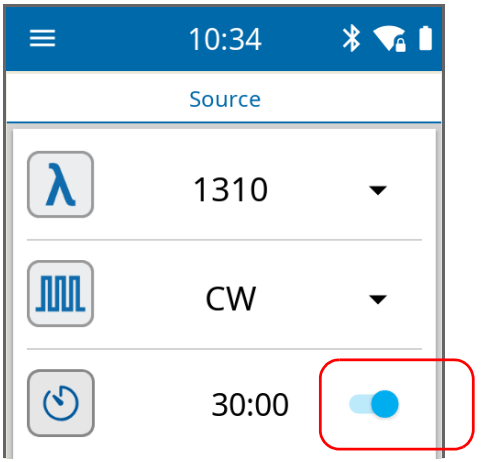
IMPORTANT

The OX1 Optical Explorer can be used in continuous source mode (CW) to perform optical power measurements and it is compatible only with the following: high power Germanium (GeX) versions of the 300 and 600 Series, as well as any unit's built-in GeX power meter.

The EPM-50 power meter and MPC-100 power checker are not compatible for measurements using an OX1 Optical Explorer in continuous setting.

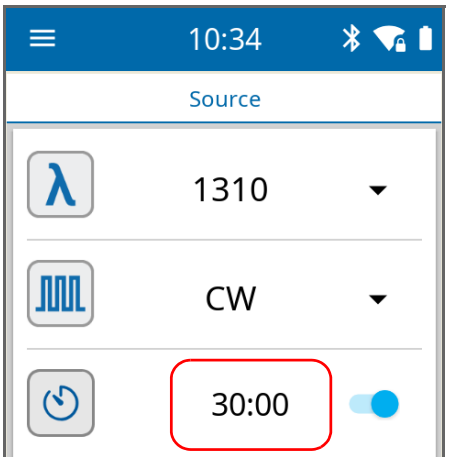
4. To set the timer, proceed as follows:

4a. If necessary, activate the feature with the toggle button.

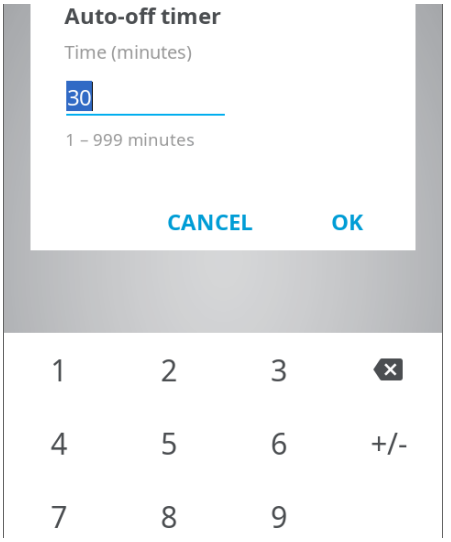


Note: *If you do not want to set the timer, deactivate the feature with the toggle button.*

4b. Tap the displayed numbers.

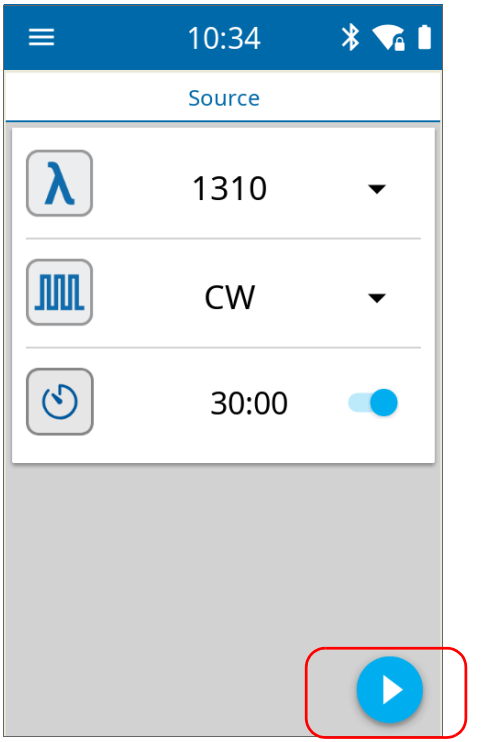


4c. Enter the number of minutes during which you want the source to emit light.

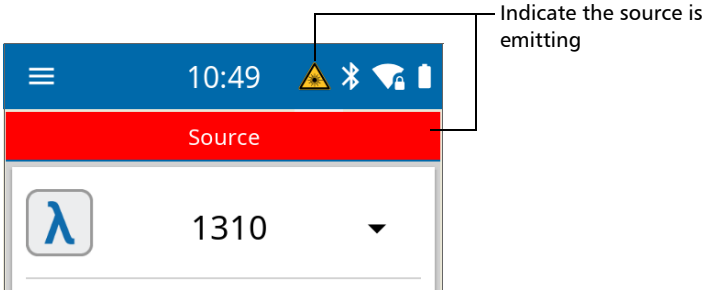


4d. Tap **OK** to return to the **Source** page.

5. Tap  to start the light emission.

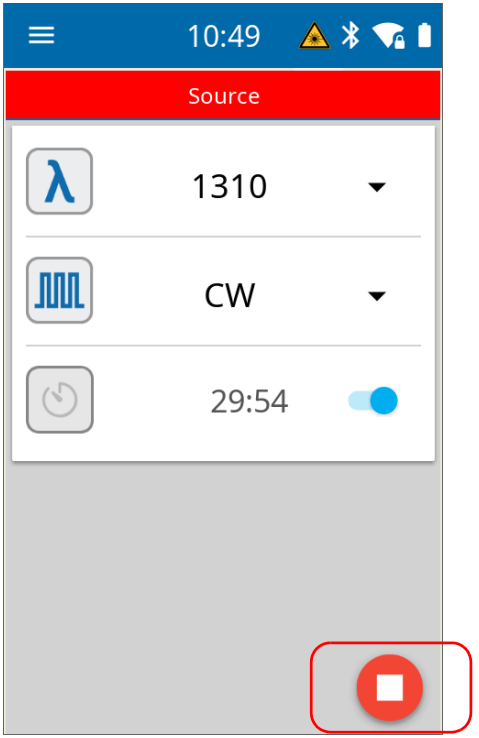


A blinking icon and a red banner clearly indicate when the light source is emitting.



6. To avoid draining the battery of the unit, tap  to stop the light emission as soon as your tests are complete.

Note: *If you have set the timer, the light emission stops when the value you have entered reaches zero.*



8 Managing Test Results

You can view measurements directly from your unit. You can also manually delete measurements that are not part of a TestFlow job by selecting all measurements or some of them only. You cannot delete measurements that are part of a TestFlow job but you can perform a measurement that has already been done again. See *Performing a Measurement Again* on page 165 for details.

If you need to generate measurement reports you can use the TestFlow mobile application. See *Generating Measurement Reports* on page 132, and *Generating Job Measurement Reports* on page 169.

Note: *You cannot transfer measurements from your unit to a computer by connecting them with a USB cable.*

Viewing Measurements

Every time you perform a measurement, the unit saves it under a sequential name generated automatically.

The names are built as followed:

OLX-<Sequential_number>

where

Sequential_number corresponds to a number that increases from 000 to 999.

Once this number reaches 999, it is reset to 000 automatically. Any existing measurement bearing the same name as the new measurement is overwritten.

Note: *The unit will prompt you before resetting the name.*

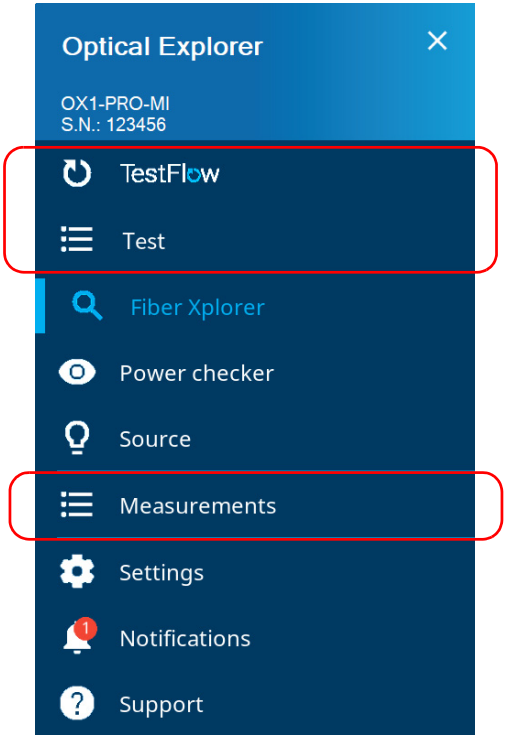
Measurements are visible from their dedicated list (accessible via the main menu) and from Fiber Xplorer.

To view measurements from their dedicated list:

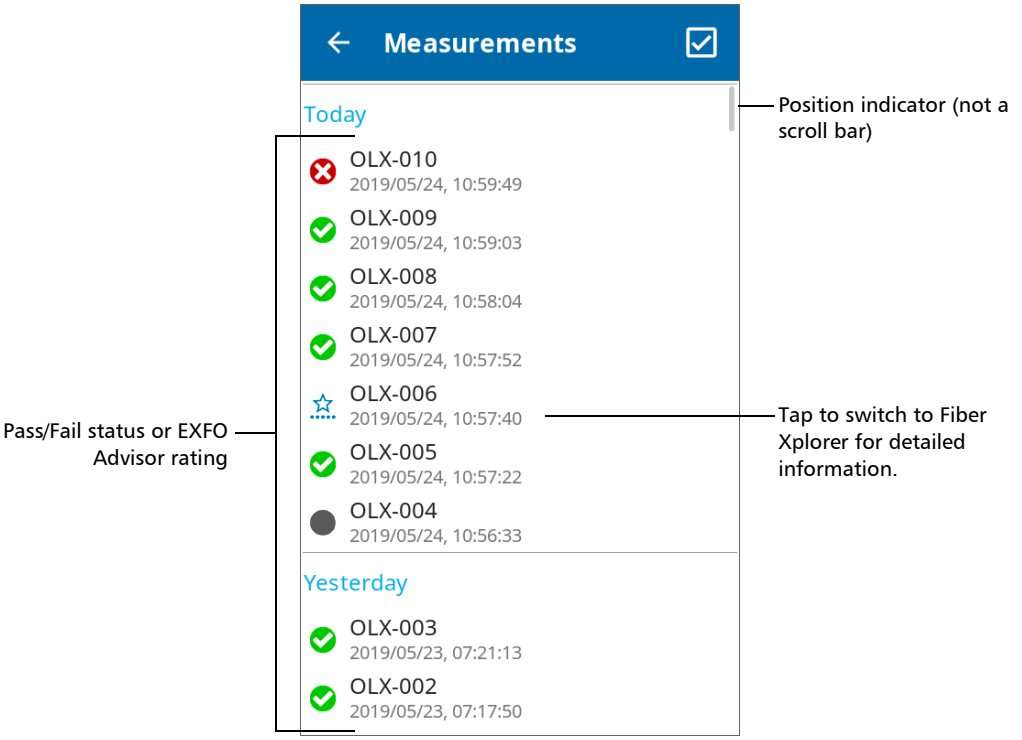
On your unit, from the main menu, tap **Measurements** to view the results that are not part of a TestFlow job.

OR

Tap the name of the job to see the associated results of the tests (unit used in conjunction with a smart device).



The list of measurements is displayed. If you want to view detailed information about a specific measurement, tap the corresponding entry in the list to switch to Fiber Xplorer.

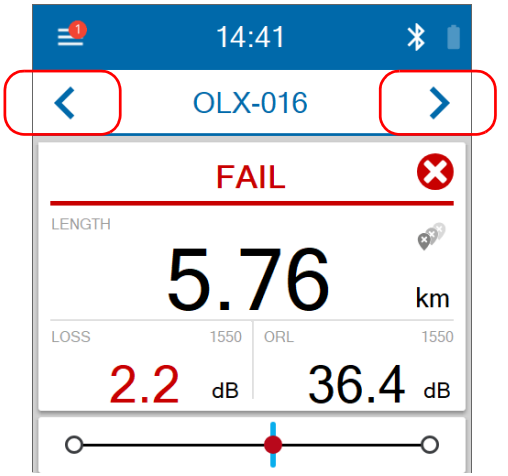


Note: *The measurement appearing at the top of the list corresponds to the last measurement displayed in Fiber Xplorer.*

Note: *When the list of measurements is too long to fit on a single page, a vertical line appears at the right of the screen. This line is an indicator showing the position of the currently visible measurements in the whole list of measurements. You can swipe up or down on the screen to scroll through the list of measurements.*

To view measurements from Fiber Xplorer:

From Fiber Xplorer, use the ‹ and › arrows to view the available measurements, in turn.



For more information, see *Working With Link Results* on page 96, *Working With Link Overview* on page 98, and *Working With Link View* on page 99.

Changing an Element Type

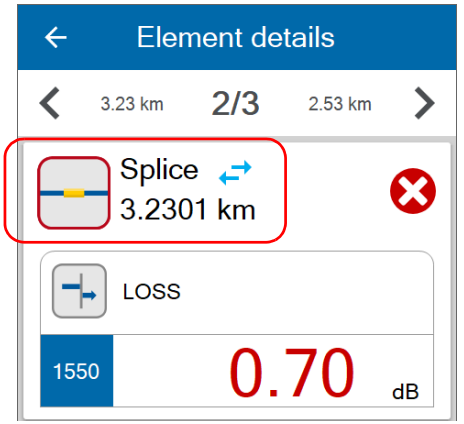
In Fault Xplorer and Link Mapper, you can change the element type identified as “splice” to the element type “connector”. The splice must be between the link start and the link end. A “*” sign is displayed to notify you that the former splice is now considered as a connector. Once the element type has been changed, the unit reanalyzes the measurement automatically by reapplying the thresholds of the connector. Both the pass/fail status of the element as well as the status of the whole link are refreshed.

Note: *You can change back the element type now identified as “connector” to the element type “splice” but the “*” sign will still be displayed.*

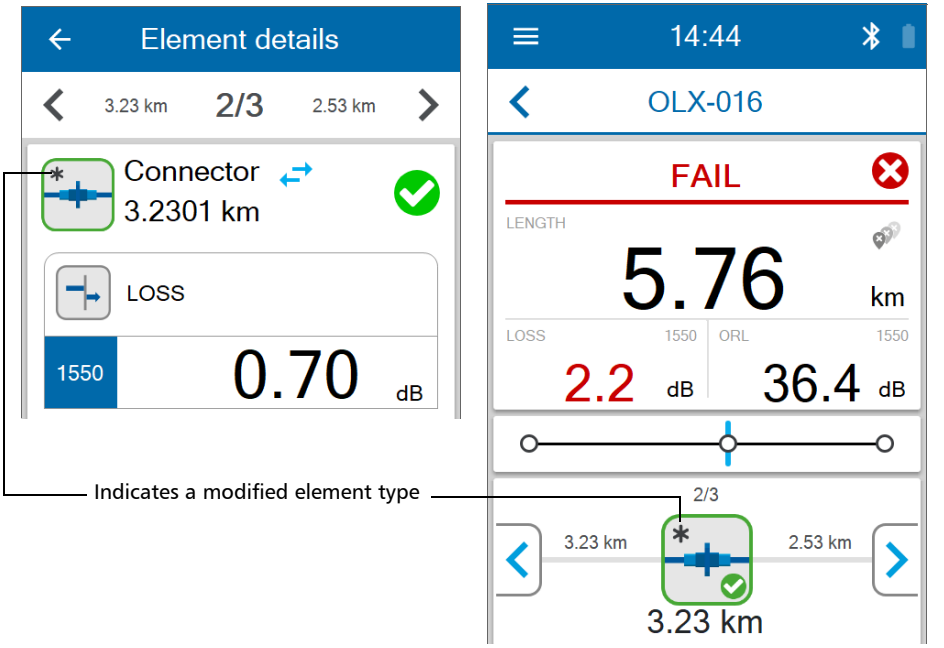
Note: *No confirmation message will be displayed to confirm your change.*

To change an element type:

1. In the link results area, tap the element you want to modify. See *Working With Link Results* on page 96 for details.
2. Use the blue arrows ⇄ to change the element type.



A "*" sign is displayed both in Element details and in Fiber Xplorer to indicate the change of element type.



Deleting Measurements

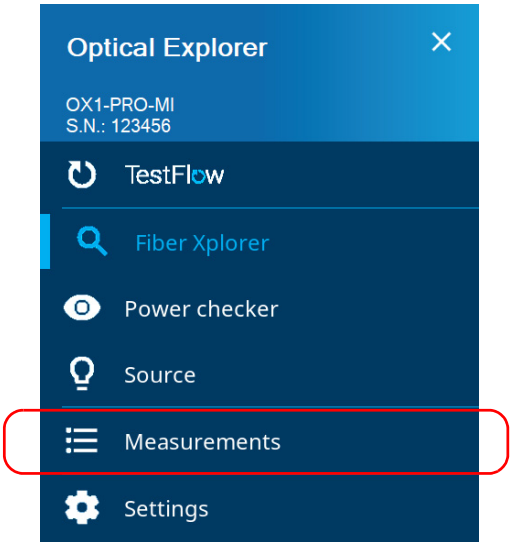
Every time you perform a measurement that is not part of a TestFlow job, the unit stores it under a sequential name generated automatically. The numeric part of the name increases from 000 to 999. Once the numeric part of the name reaches 999, it is reset to 000 automatically. The new results will then overwrite the existing ones bearing the same name.

You can manually delete the measurements that you no longer need.

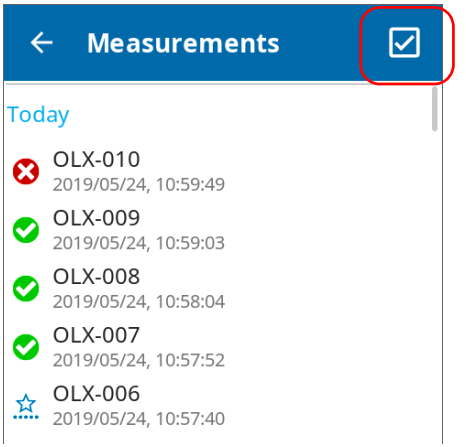
Note: *The unit will always use the next name in sequence to store a measurement. This means that, for example, even if you delete the OX1-003 measurement right after it is complete, the unit will not reuse OX1-003 for the next measurement, but will use OX1-004.*

To delete measurements manually:

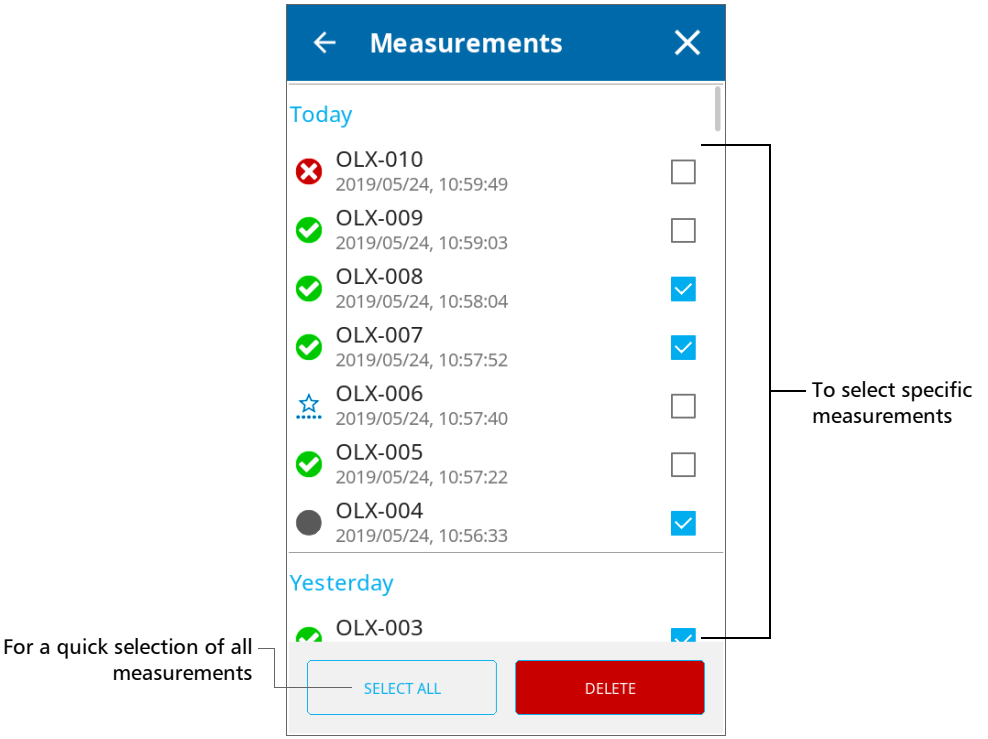
1. From the main menu, tap **Measurements**.



2. Tap  from the upper right corner.



3. Select the item(s) that you want to delete by selecting the corresponding check box. If you prefer to select all items at once, tap the **SELECT ALL** button.



IMPORTANT

Deleted measurements cannot be recovered. The deletion is effective as soon as you tap DELETE (no confirmation message will be displayed).

4. Tap **DELETE**.

The selected measurements are removed from the list.

Generating Measurement Reports

You can generate PDF reports with the TestFlow mobile application.

Once the report has been generated, you can consult it right away with the viewer available on your smart device. Since the PDF is not saved on the smart device, you will need to generate the report again if you close it, unless you transfer it with your smart device.

To generate measurement reports:

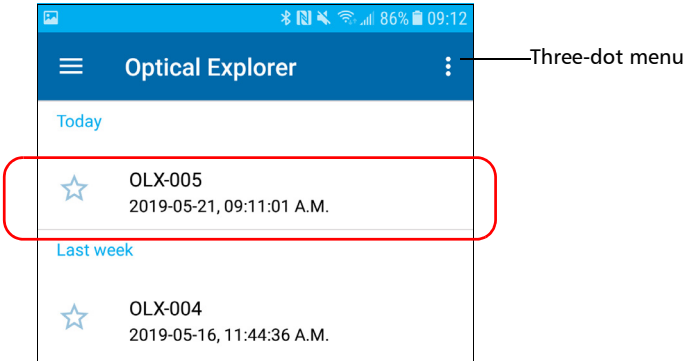
1. Ensure that a Bluetooth®connection has already been established between your unit and a smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 137).

   As soon as a connection is established between the OX1 and a smart device, the list of results in the TestFlow mobile application is refreshed automatically.

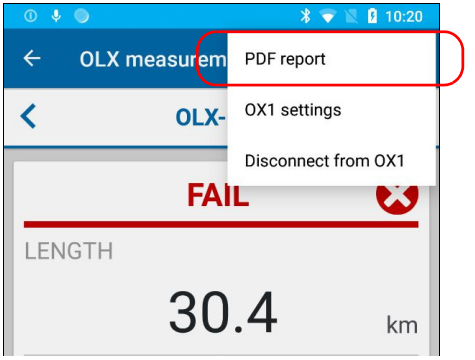
2. On the smart device, if it is not already done, open the TestFlow mobile application and access the Optical Explorer tool.

   If the application prompts you to sign in to a TestFlow account, tap **NOT NOW**, since you do not need to connect to a TestFlow account to generate a measurement report.

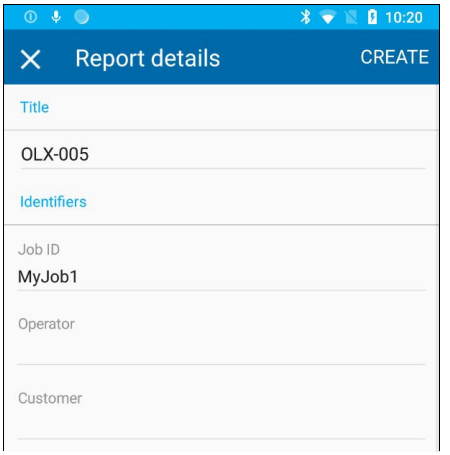
3. From the measurements list, tap the entry corresponding to the measurement for which you want to generate a report.



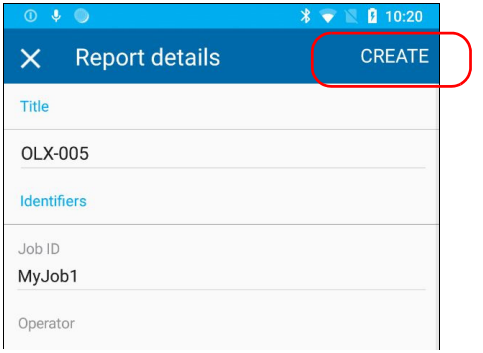
4. From the three-dot menu, select **PDF report**.



5. If desired, modify the report information by tapping the desired field. All the fields are editable, including the report title.



6. When you have finished editing the report information, tap **CREATE** to start the report creation.



Note: *As soon as the report is generated, you can transfer it with the tools available from your smart device as you would do with any other PDF file.*

9 Working With the TestFlow Mobile Application

You can use your OX1 in association with a smart device equipped with the EXFO TestFlow mobile application allowing you to document your results, archive them on a cloud server, and generate reports.

Note: *In addition to all the other features explained throughout this documentation, you also have access to the features presented hereafter if you work with TestFlow jobs.*

Note: *The TestFlow mobile application gives you access to certain features even if you do not log on to your TestFlow account. However, to benefit from all the available features, you will need to log in. The procedures presented throughout this user documentation will indicate if a logon is required.*

At any time, you can switch from local measurements (that are not part of a TestFlow job) to measurements within a TestFlow job. All the measurements are kept in memory. You can also open, in turn, the power checker and the source page.

Note: *Depending on the type of smart device you are using, the appearance of the Optical Explorer tool (available from the TestFlow mobile application) may vary slightly from the illustrations presented in this documentation. Unless otherwise specified, the information applies both to the Android- and iOS-based smart devices.*

Note: *The measurement units used on your OX1 are independent from those used in the TestFlow jobs. This means that you may have to make changes to ensure consistency in the selected measurement units.*

Installing the TestFlow Mobile Application on Your Smart Device

Before you start working, if you intend to generate reports (single or multiple measurements), work with jobs, or retrieve the firmware and software updates for your unit, you will need to install the TestFlow mobile application on your smart device.

To install the TestFlow mobile application:

1. Ensure that you have access to an Internet connection.
2. From your Android-based smart device, open the Google Play Store (usually **Play Store** or **Play** icon).

   OR

   From your iOS-based smart device, open the App Store (usually **App Store** icon).
3. From the Play Store or the App Store, search for *EXFO* or *TestFlow Mobile* to localize the TestFlow mobile application.
4. Start the installation and follow the on-screen instructions.

Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology

When you want to work with TestFlow jobs, perform tasks such as generate reports (single or multiple measurements), or configure Wi-Fi networks to receive updates for your unit, interactions are necessary between the unit and a smart device equipped with the TestFlow mobile application. These interactions are accomplished using the Bluetooth® technology. By default, the Bluetooth® communication is enabled on your unit, but if you have disabled it, you must enable it before trying to connect to a smart device (see *Enabling or Disabling the Wireless Communication* on page 141).

On your OX1 unit, the status of the Bluetooth® communication is indicated with an icon in the title bar. The table below shows the possibilities.

Icon	Meaning
Not visible	The Bluetooth® communication is disabled.
	The Bluetooth® communication is enabled, but no connection has been established yet between the unit and a smart device.
	A connection has been established between the unit and a smart device.

If a connection has been established with a smart device already, but you wish to use your unit with another smart device, you can close the current connection directly from your unit. Similarly, if a connection exists already, but you wish to connect a smart device to another OX1 unit, you can close the connection from the smart device (Optical Explorer tool in the TestFlow mobile application).

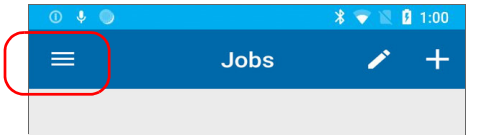
To establish a connection via the Bluetooth® technology:

1. If necessary, enable the Bluetooth® communication on your unit (see *Enabling or Disabling the Wireless Communication* on page 141).
2. If it is not already done, install the TestFlow mobile application on your smart device (see *Installing the TestFlow Mobile Application on Your Smart Device* on page 136).
3. On the smart device, establish the connection as follows.

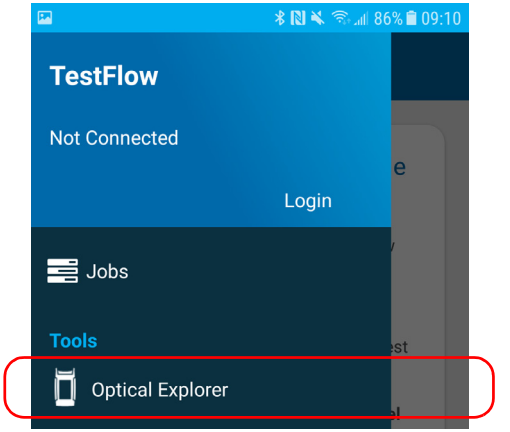
   3a. Open the TestFlow mobile application.

   3b. If the application prompts you to sign in to a TestFlow account, tap **NOT NOW**, since you do not need to connect to a TestFlow account to establish the connection between your unit and a smart device.

   3c. Tap the three-line icon to access the main menu.

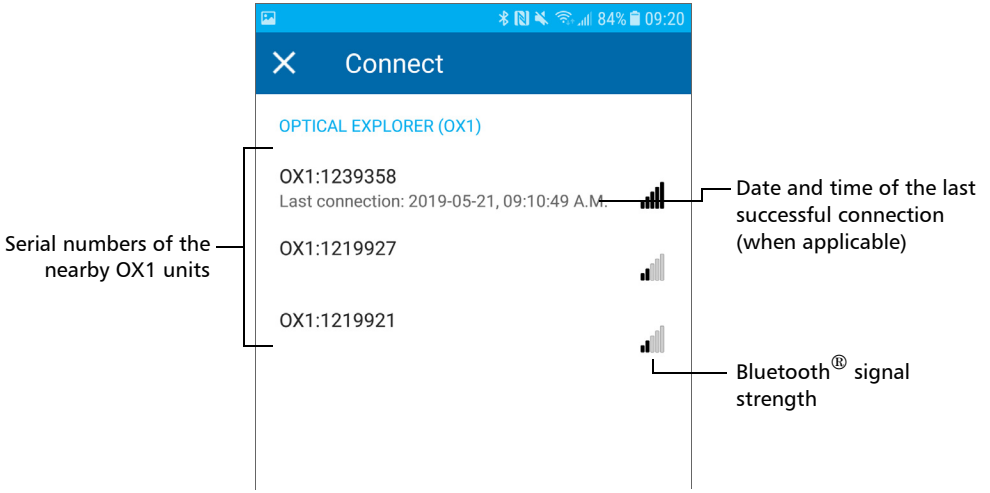


   3d. Under **Tools**, tap **Optical Explorer**.



3e. If the application prompts you to authorize it to access your smart phone's location, tap **ALLOW**. Otherwise, you will not be able to access the list of OX1 units.

3f. From the list of OX1 units, tap the item corresponding to the desired unit.

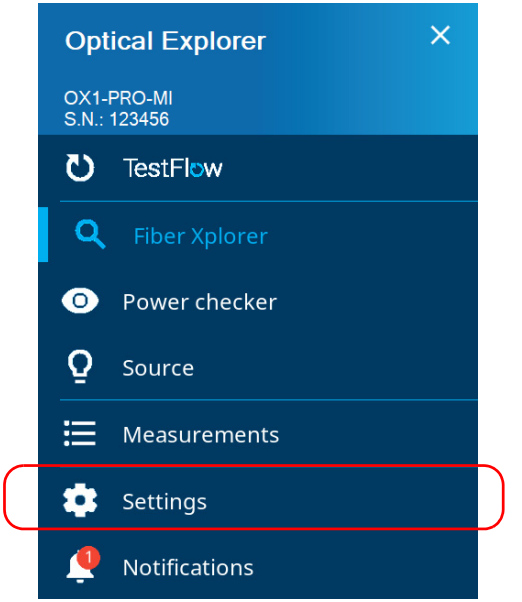


The application establishes the communication automatically. When the connection is successful, the icon appears in the title bar of your OX1 unit.

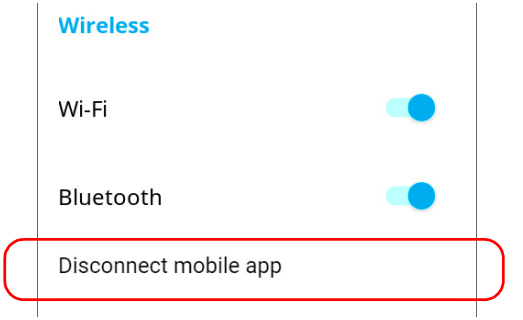
Note: *If the OX1 unit that you want to use is already connected to another smart device, you must first close the connection between the OX1 unit and the other smart device before being able to connect to this specific OX1.*

To close the connection with a smart device from your unit:

1. From the main menu, tap **Settings**.



2. From the **Wireless** section, tap **Disconnect mobile app**.



To close the connection with an OX1 from a smart device:

1. From the measurements list or the measurement details page, open the three-dot menu.
2. Tap **Disconnect from OX1**.

The smart device is no longer connected to the OX1 and you are ready to connect it to another unit.

Enabling or Disabling the Wireless Communication

The interactions between your unit and a smart device are accomplished using the Bluetooth® technology.

The interactions between your unit and the cloud server as well as the EXFO update server (to retrieve firmware and software updates), are accomplished using a connection to a wireless network.

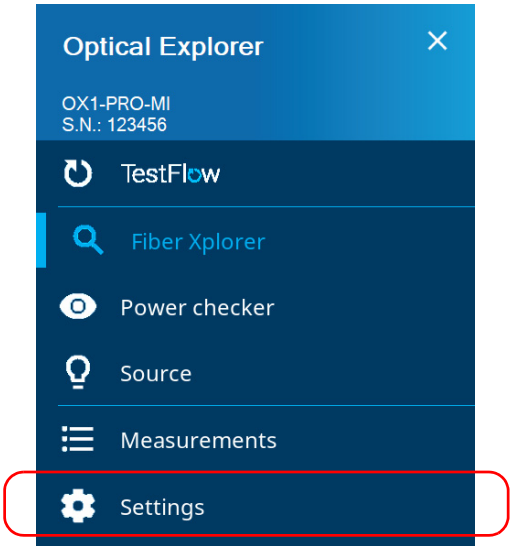
By default, the Bluetooth® communication is enabled on your unit, but the Wi-Fi is not.

You can enable or disable the Bluetooth® communication from your unit only, and the Wi-Fi communication both from your unit and from the smart device (Optical Explorer tool in the TestFlow mobile application).

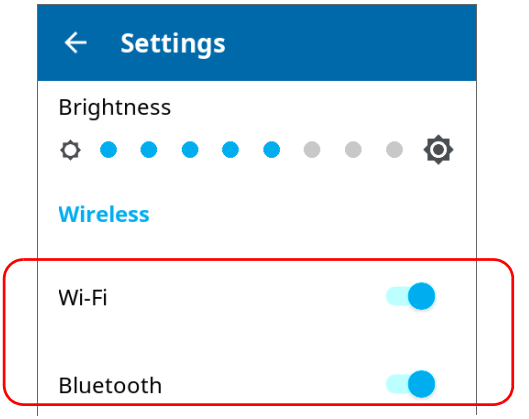
If you do not need to connect to a wireless network for a certain period of time, you may wish to disable the Wi-Fi communication to save battery power.

To enable or disable the wireless communication from your unit:

1. From the main menu, tap **Settings**.



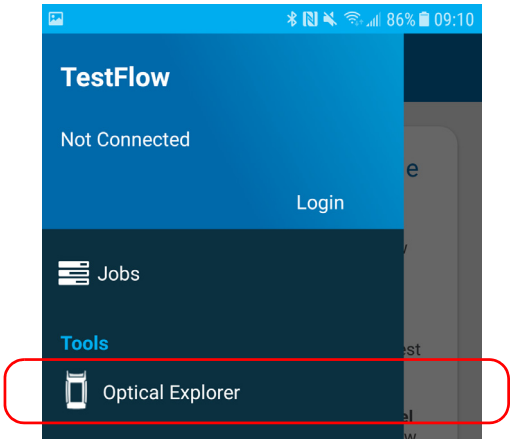
2. Use the **Wi-Fi** or **Bluetooth** toggle to enable or disable the communication as needed.



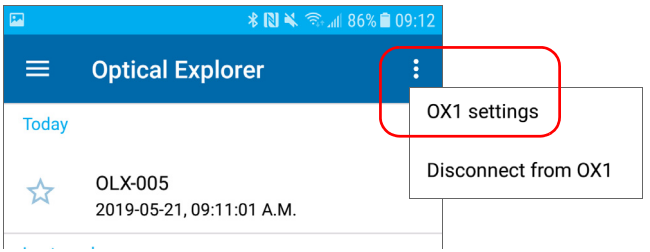
The changes are taken into account immediately.

To enable or disable the Wi-Fi communication from the smart device:

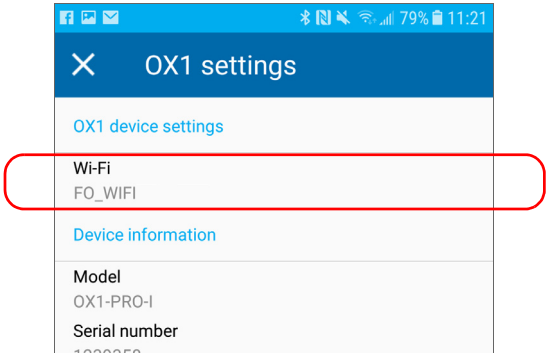
1. On the smart device, open the TestFlow mobile application and access its main menu (menu).
2. Under **Tools**, tap **Optical Explorer**.



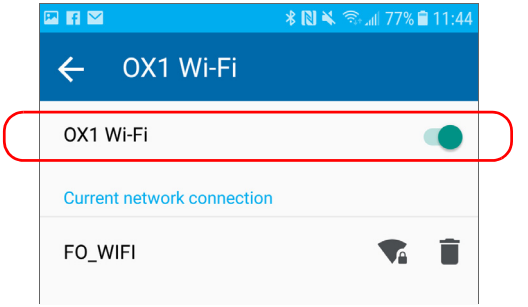
3. From the Optical Explorer tool, open the three-dot menu, and then select **OX1 settings** to access the parameters.



4. Tap the **Wi-Fi** line.



5. Use the **OX1 Wi-Fi** toggle to enable or disable the Wi-Fi communication.



The change is taken into account immediately.

Working With a Wireless Network

By connecting your unit to a wireless network, you can fully synchronize the results and save them to the cloud server once they have been synchronized with the TestFlow mobile application.

Also, by connecting your unit to a wireless network, you can check for updates, download these updates and install them directly on your unit (see *Upgrading Applications and Firmware* on page 199).

By default, the Wi-Fi connection is disabled, both on the OX1 unit and in the Optical Explorer tool of the TestFlow mobile application. You must enable it before trying to connect to a wireless network (see *Enabling or Disabling the Wireless Communication* on page 141).

Before being able to connect your unit to a Wi-Fi network, you must first configure the desired networks directly from your unit or with the TestFlow mobile application.

Once the configuration and first connection are successful, the configured network is automatically added to the list of possible networks on your unit.

The list of configured networks as well as the last network used are kept in memory even when you turn your unit off. This means that the next time you work with your unit, it will automatically connect to the last network used, unless this network is not available or its password has changed in the meantime (reconfiguration necessary). Should a network failure occur while the unit is connected to it, the unit will try to reconnect to this network automatically as soon as it becomes available again.

You can remove configured networks from the list to prevent automatic connections to these networks. If you remove the network currently in use, the unit (or the Optical Explorer tool in the TestFlow mobile application) will try to connect to the next configured network on the list that is available.

Your unit supports IPv4 wireless routers having the following characteristics:

- With dynamic IPv4 address assignment
- Not secured, or secured with WPA/WPA2-Personal standards (WPA-PSK/WPA2-PSK versions)
- Broadcasting their network names (SSID) or not (SSID visible or hidden)
- Configured with a 2.4 GHz Wi-Fi band (b/g/n frequencies).

Note: *Your unit does not support the WEP and WPS standards.*

Note: *Your unit does not support public Wi-Fi hotspots requiring authentication from a Web page.*

Note: *Every work environment has its own specifications. If you need information about the configuration of your router, contact your network administrator.*

Note: *To save battery power, you may wish to disable the wireless communication when you do not use it.*

The information about the Wi-Fi connection is indicated with an icon appearing both in the title bar (on your unit) and next to the name of the wireless networks (on your unit and in the TestFlow mobile application). The table below shows the possibilities.

Icon	Meaning
No Wi-Fi icon visible in the title bar	The Wi-Fi communication is disabled.
Faint Wi-Fi icon visible in the title bar 	The Bluetooth® communication is enabled, but the unit is not connected to any wireless network.
	The portion of the icon that appears in white (title bar) or in dark grey (list of wireless networks) reflects the strength of the signal.
	Password-protected (secured) networks are identified by a lock.

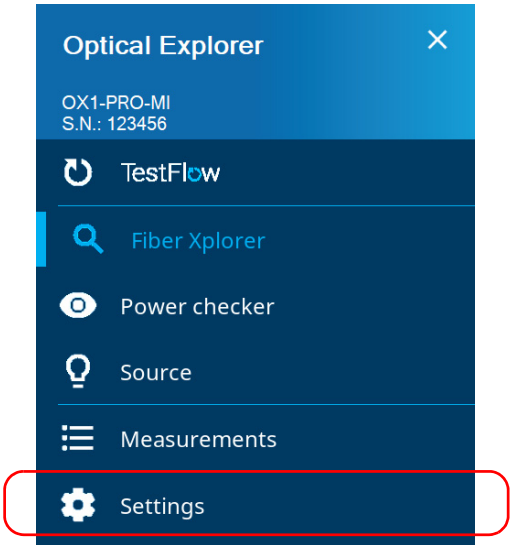
Configuring a Wireless Network

Before being able to connect your unit to a Wi-Fi network, you must first configure the desired networks directly on your unit or with the TestFlow mobile application. Once the configuration and first connection are successful, the configured network is automatically added to the list of possible networks on your unit.

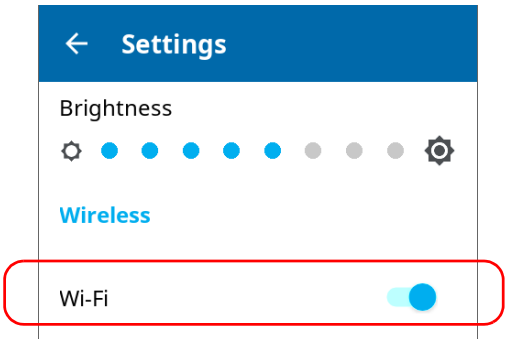
The list of configured networks as well as the last network used are kept in memory for future use even when you turn your unit off.

To configure a wireless network directly from your unit:

1. From the main menu, tap **Settings**.

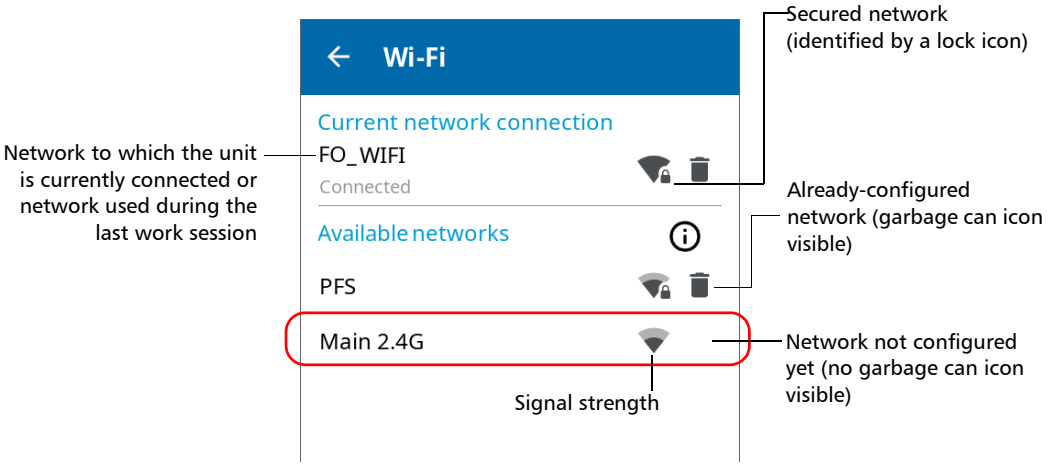


2. If it is not already done, enable the Wi-Fi communication on your unit using the corresponding toggle.

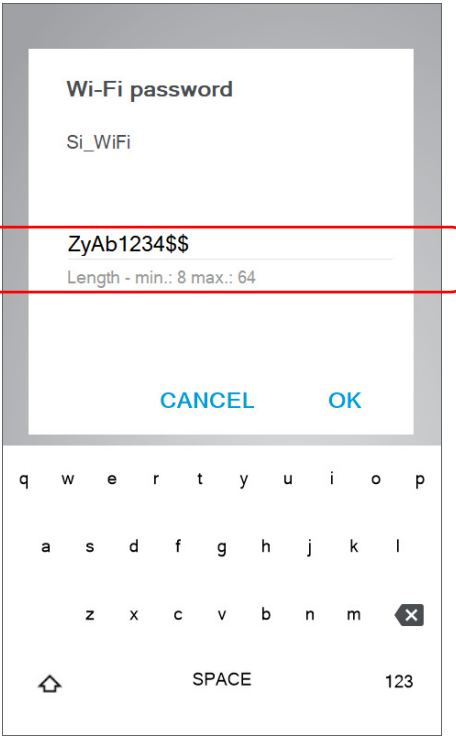


3. Tap **Wi-Fi**.
4. Under **Available networks**, tap the item corresponding to the wireless network that you want to configure.

Note: *No garbage can icon appears next to the networks that have not been configured yet.*



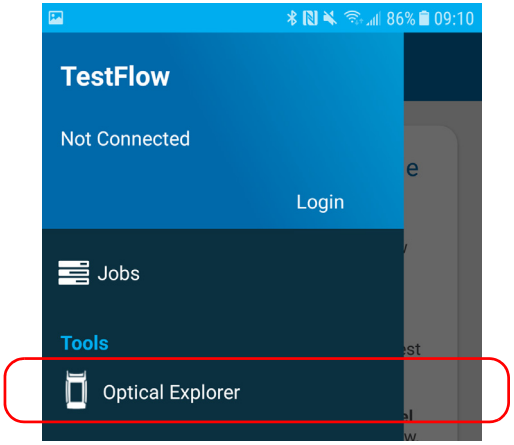
5. If the network is protected by a network security key (password), enter it.



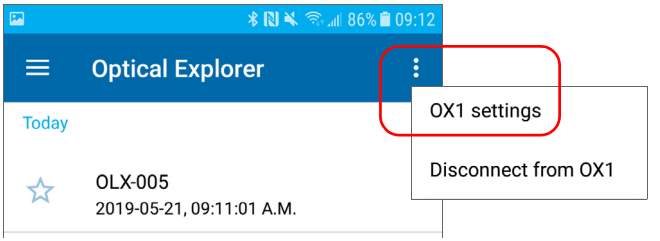
The application establishes the communication automatically.

To configure a wireless network with the TestFlow mobile application:

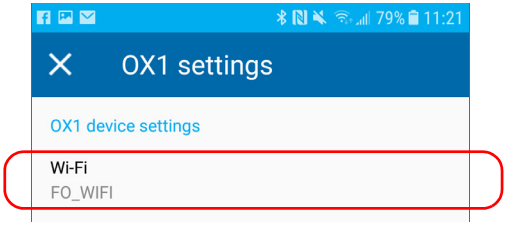
1. Ensure that a Bluetooth®connection has already been established between your unit and a smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 137).
2. If necessary, enable the Wi-Fi communication on your unit (see *Enabling or Disabling the Wireless Communication* on page 141).
3. On the smart device, open the TestFlow mobile application and access its main menu (menu).
4. Under **Tools**, tap **Optical Explorer**.



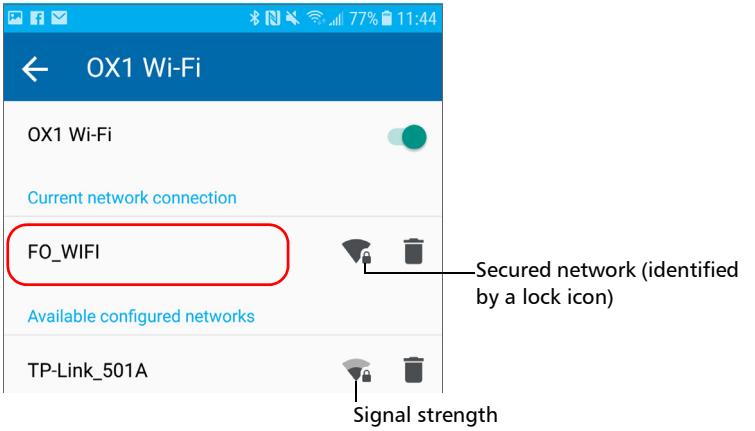
5. From the Optical Explorer tool, open the three-dot menu, and then select **OX1 settings** to access the parameters.



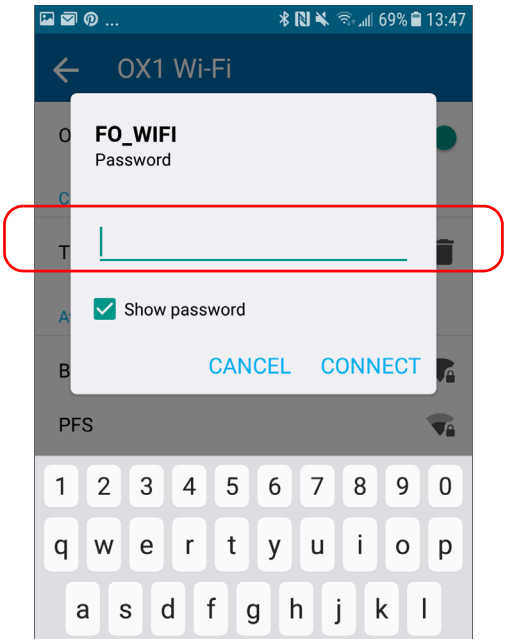
6. Tap the **Wi-Fi** line.



7. Tap the item corresponding to the wireless network that you want to configure.



8. If the network is protected by a network security key (password), enter it.



9. Tap **CONNECT**.

10. Follow the on-screen instructions.

The application establishes the communication automatically.

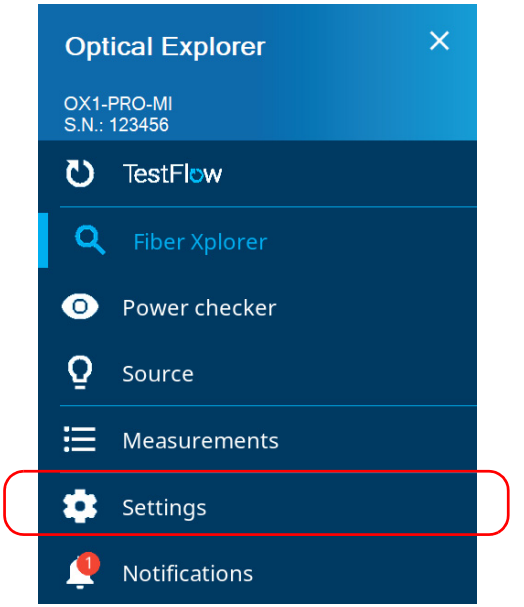
Note: *You may want to ensure that the TestFlow mobile application has been able to establish a first connection with the Wi-Fi network before attempting to connect to this network from your OX1 unit. This is particularly useful in the case of secured networks to ensure that the provided password is good.*

Connecting to a Wireless Network From Your Unit

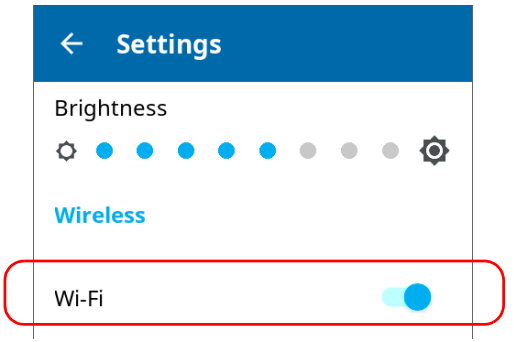
When you start a new work session with your unit, it will automatically connect to the last network used, unless this network is not available or its password has changed in the meantime (reconfiguration necessary). Should a network failure occur while the unit is connected to it, the unit will try to reconnect to this network automatically as soon as it becomes available again.

To connect to a wireless network from your unit:

1. Ensure that a connection has already been established between your unit and a smart device via the Bluetooth® technology (see *Working With a Wireless Network* on page 145).
2. From the main menu, tap **Settings**.

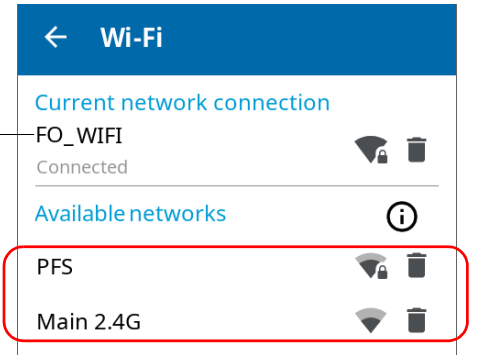


3. If it is not already done, enable the Wi-Fi communication on your unit using the corresponding toggle.



4. Tap **Wi-Fi**.

5. Under **Available networks**, tap the item corresponding to the wireless network to which you want to connect.



Network to which the unit is currently connected or network used during the last work session

The application establishes the communication automatically.

Note: *If you select a network different than the one used during your last work session and the connection to this new network fails, the application will automatically switch to the last network used to try and establish a connection.*

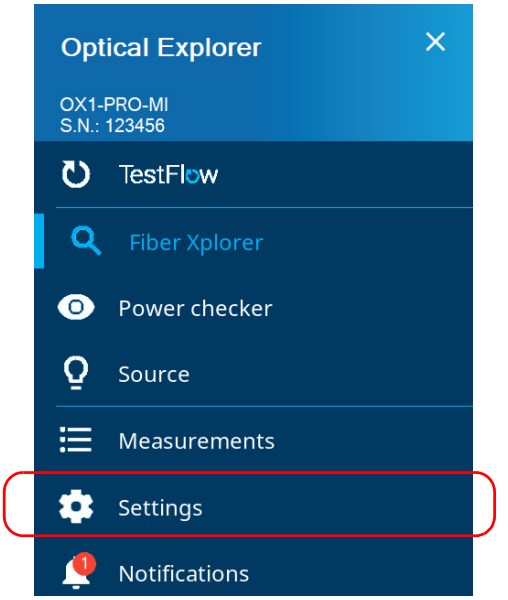
Removing Configured Networks From the List

You can remove configured networks from the list to prevent automatic connections to these networks (forget network feature). If you remove the network currently in use, the unit (or the TestFlow mobile application) will try to connect to the next configured network on the list that is available.

On your unit, removed networks are no longer visible unless you reconfigure these networks (from your unit of the TestFlow mobile application). If these networks are still in range, they will reappear on the list of available networks as if they have never been configured before. This means that for secured networks, their passwords will need to be re-entered if you decide to reconfigure these networks.

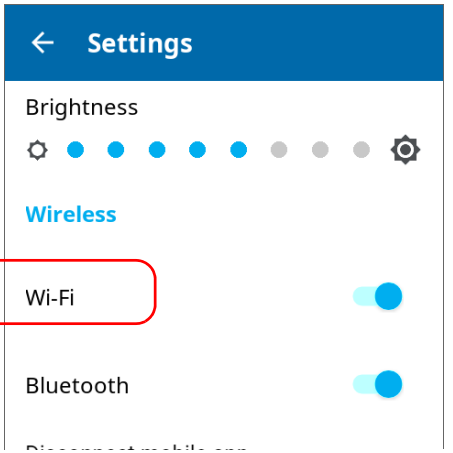
To remove a configured network from the list:

1. From your unit or from the Optical Explorer tool in the TestFlow mobile application, go to the main menu, and then tap **Settings** (from unit) or **OX1 settings** (from TestFlow).

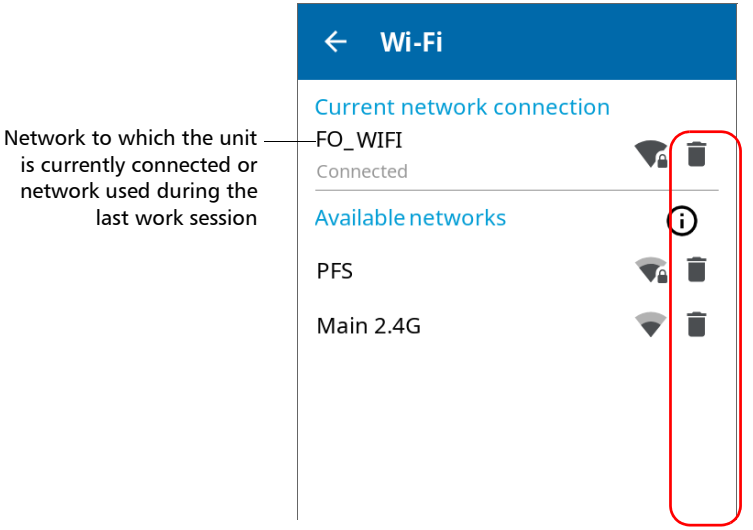


Note: *In the Optical Explorer tool (in TestFlow mobile application), the main menu is accessible by opening the three-dot menu.*

2. Tap **Wi-Fi**.



3. Tap the icon corresponding to the wireless network that you want to remove.



4. When the application prompts you to confirm the removal of the network, confirm by tapping **Forget**.

The network is removed from the list automatically.
If these networks are still in range, they will reappear on the list of available networks.

Transferring a TestFlow Job to the OX1

Once you have created a TestFlow job or someone from your organization has created one and has assigned it to you, you have to synchronize the job with your OX1 to be able to perform the associated tests. The transfer is done via Bluetooth®.

You can retrieve a brand new job from the TestFlow mobile application. You can also resume a job that has already been started by someone else on another unit and transfer it to the OX1 you are using for your tests.

Note: *No results are erased from your OX1 when you switch between jobs.*

As soon as a job is retrieved from the TestFlow mobile application, it is set as the current job even if there was already a job underway. The results of the tests in the job that was already started are kept in memory and you will be able to synchronize them with the TestFlow mobile application later. To do so, you will have to set the job as current again to be able to perform the synchronization process. When the current job changes, the tests that have not been performed yet on the previous job will be available the next time you switch back to this job.

Note: *You can only synchronize one job at a time.*

To transfer a TestFlow job to the OX1:

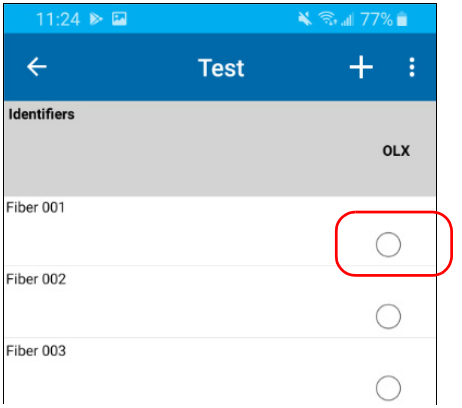
1. Before being able to retrieve a job from TestFlow to transfer it to your OX1, ensure that you meet the following requirements:

   - you have a TestFlow account or you have received an invitation from your organization to active your account
   - you have installed the TestFlow mobile application on your smart device and logged on to your TestFlow account (see *Installing the TestFlow Mobile Application on Your Smart Device* on page 136)
   - you have created a job (directly from the TestFlow mobile application or someone from your organization has created one on the cloud server and has assigned it to you)

Note: *If you have created a job from the cloud server, transfer it to the TestFlow mobile application.*

   - you have configured a Wi-Fi network (see *Working With a Wireless Network* on page 145)
   - you have established a connection, via Bluetooth®, between your smart device and the OX1 (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 137 for details)

2. In the TestFlow mobile application, tap the row corresponding to the job you want to transfer to your OX1.
3. Once you are in a job, tap one of the empty bubble corresponding to a test.

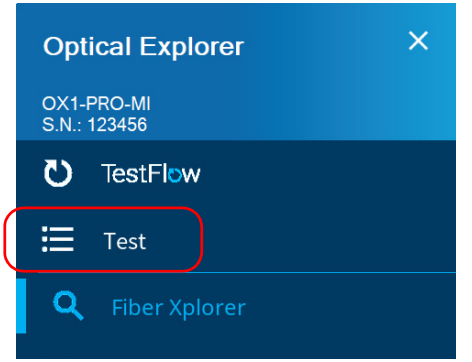


4. When the unit prompts you, tap **Sync**.

Note: *If you are not already connected to an OX1 unit, the application will prompt you to select the unit you want to use.*

Note: *You can also access the job sync feature from the three-dot menu.*

5. In the OX1, from the main menu, tap the name of the job you have just transferred.



6. Tap the test you want to perform.

Note: *From the main menu, you can tap **TestFlow** to go directly to the next test you have to perform.*

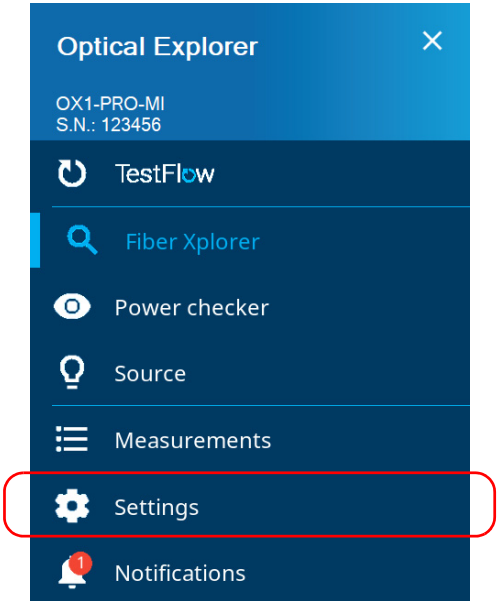
You are now ready to perform the tests in a job (see *Performing Measurements* on page 92 for details).

Configuring the Unit's Behavior After a Pass Measurement

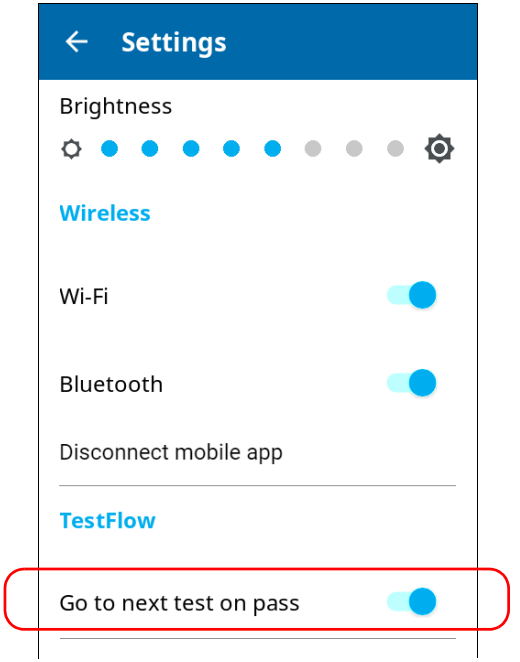
If you are working with a TestFlow job, by default, the application saves measurements with a pass status automatically and goes directly to the next test except when using the EXFO Advisor thresholds. The unit will not go to the next test if the measurement has a fail status, therefore you can perform fail measurements again if desired (see *Performing a Measurement Again* on page 165 for details). Even if the status changes from fail to pass after having performed a measurement again, the unit will not switch to the next test automatically. You will have to use the navigation arrow to go to the next test.

To configure the unit's behavior after a pass measurement:

1. From the main menu, tap **Settings**.



2. Under **TestFlow**, enable or disable the feature with the **Go to next test on pass** toggle.



The change is applied automatically.

Performing a Measurement Again

All measurements are performed the same way either you are using your OX1 with or without a TestFlow job. See *Performing Measurements* on page 92.

However, you can redo a measurement that has already been taken in a job.

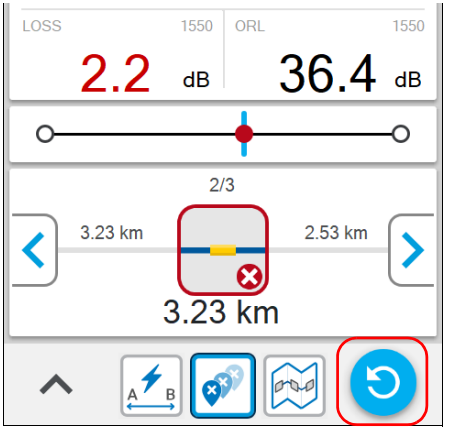
Note: *When a measurement is underway, the navigation arrows are disabled and you cannot browse through the measurements you have already performed.*

IMPORTANT

Once you redo an existing measurement, the previous result is deleted. Only the new result will be available when the measurement is complete.

To perform a measurement again:

1. Select the measurement you want to perform again.
2. Tap the  button to redo the measurement.



3. When the unit prompts you, tap **YES**.

The new result is available as soon as the measurement is complete.

Once a measurement is performed, you can view the results in different parts of the screen. See *Working With Link Results* on page 96, *Working With Link Overview* on page 98, and *Working With Link View* on page 99.

The results are stored automatically on the unit. The application will notify you if a synchronization with the TestFlow mobile application is necessary.

Synchronizing Job Results With the Smart Device and the Cloud Server

The TestFlow mobile application manages the measurements associated with jobs automatically for you.

The synchronization of the results is done in two steps. You can start the synchronization process as soon as a Bluetooth® connection is established between your unit and the smart device. Test results are sent to the mobile application to allow report creation without fulling the smart device's memory. By sending the results to the TestFlow mobile application, you can synchronize the entire job or the tests already done in a job. This way, you can resume a job that has already been started by someone else on another unit and transfer it to the OX1 you are using for your tests. You cannot view the details for the tests already completed and transferred to another unit. Only the final status is available.

The test results will be sent automatically from your unit to the cloud server via a Wi-Fi connection in a subsequent step. The data is erased from the unit as soon as this step is complete.

Note: *To perform a synchronization, the job currently loaded on the OX1 must also be the one selected in the TestFlow mobile application. The tests completed in another job are kept in memory on the OX1 until the results are synced with the TestFlow mobile application.*

When a synchronization is in progress with the smart device or the cloud server, no data is lost if the battery level of the unit is too low or your OX1 is disconnected from the Wi-Fi network. The synchronization process resumes once the OX1 is connected to a power outlet and a Wi-Fi connection is established.

To synchronize job results with the smart device and the cloud server:

1. Ensure that a Bluetooth®connection has already been established between your unit and a smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 137).

   As soon as a connection is established between the OX1 and a smart device, the list of results in the TestFlow mobile application is refreshed automatically.

2. If necessary, enable the Wi-Fi communication on your unit (see *Enabling or Disabling the Wireless Communication* on page 141).
3. On the smart device, open the TestFlow mobile application and access the Optical Explorer tool.
4. Tap the job you want to synchronize with the cloud server.
5. Once you are in a job, tap one of the bubble corresponding to a test.
6. When the unit prompts you, tap **Sync**.

Note: *If you are not already connected to an OX1 unit, the application will prompt you to select the unit you want to use.*

Note: *You can also access the job sync feature from the three-dot menu.*

Deleting Job Measurements

You cannot delete manually the measurements that are part of a job. The application manages automatically the cleanup of the disk space when the disk is almost full. The oldest tests that have not been synced yet with the cloud server are removed first. If there is still not enough storage space, the application deletes the oldest tests that have not been synced yet with the TestFlow mobile application.

Note: *The application cannot delete the job set as current and its associated tests.*

Generating Job Measurement Reports

You can generate PDF reports with the TestFlow mobile application.

Once the report has been generated, you can consult it right away with the viewer available on your smart device. Since the PDF is not saved on the smart device, you will need to generate the report again if you close it, unless you transfer it with your smart device.

It is possible to generate single- or multi-measurement reports with the TestFlow mobile application.

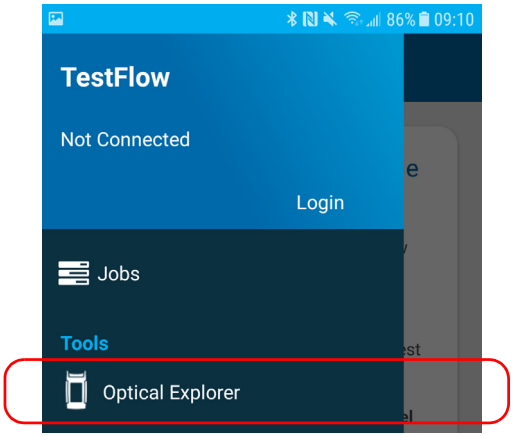
To generate job measurement reports:

1. Ensure that a Bluetooth® connection has already been established between your unit and a smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 137).

   As soon as a connection is established between the OX1 and a smart device, the list of results in the TestFlow mobile application is refreshed automatically.

2. On the smart device, if it is not already done, open the TestFlow mobile application.

3. Under **Tools**, tap **Optical Explorer**.

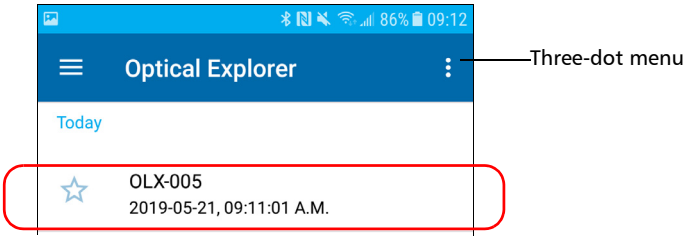


4. Select the job for which you want to generate single- or multi-measurement reports.

5. If you want to generate a single-measurement report, tap the desired measurement.

   OR

   If you want to generate a multi-measurement report, tap the three-dot menu.



6. Select **PDF report**.

Note: *As soon as the report is generated, you can transfer it with the tools available from your smart device as you would do with any other PDF file.*

Accessing the Online Documentation From the Smart Device

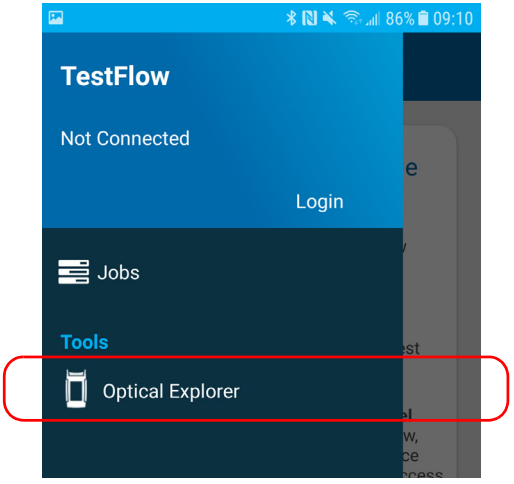
You can access the getting started guide from your unit.

For more detailed information, you can also access the user guide at all times from your smart device:

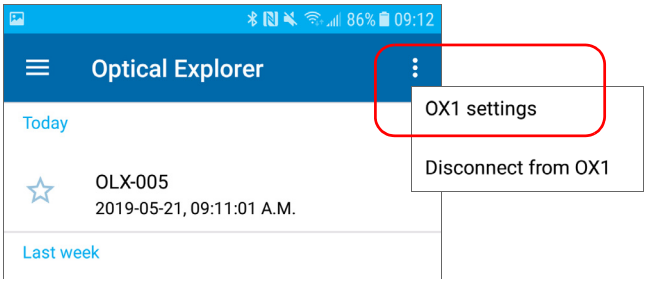
- by scanning the QR code displayed on your unit
- by using the corresponding link in the TestFlow mobile application

To view the user documentation from the TestFlow mobile application:

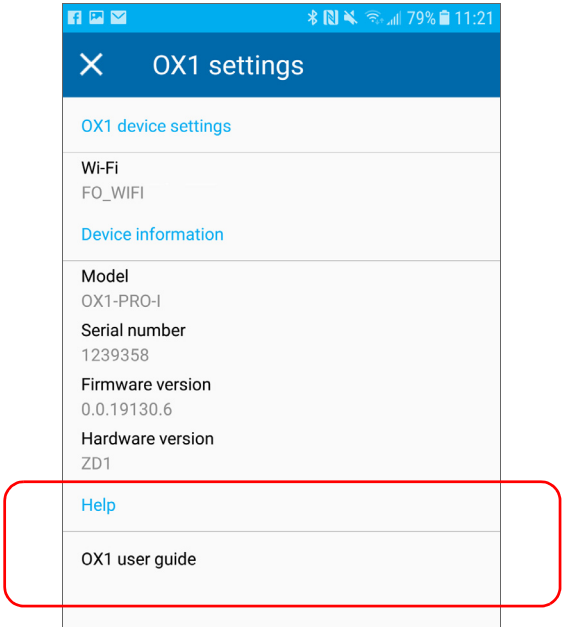
1. If it is not already done, establish a connection between your unit and a smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 137).
2. If it is not already done, on the smart device, open the TestFlow mobile application and access its main menu (menu).
3. Under **Tools**, tap **Optical Explorer**.



4. From the Optical Explorer tool, open the three-dot menu, and then select **OX1 settings** to access the parameters.



5. Under **Help**, tap **OX1 user guide**.



10 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 SC Connectors

Your unit is equipped with an SC connector that can be cleaned using a mechanical cleaner.

WARNING

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

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 smart lithium-ion (Li-ion) or one lithium-polymer (Li-Po) 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 8.
- The unit also indicates the charge status with the LED on its front panel (see *LED Indicator Description* on page 7).

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 (fastest 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. You could also use a certified USB power bank (portable charger) to charge your unit.*

The charge cycle will start and end automatically.

Note: *The clock battery also recharges when the unit is connected to an external power source if the unit is on or in sleep mode.*

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 smart lithium-ion (Li-ion) or lithium-polymer (Li-Po) 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.

Note: *You cannot replace the clock battery yourself.*

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

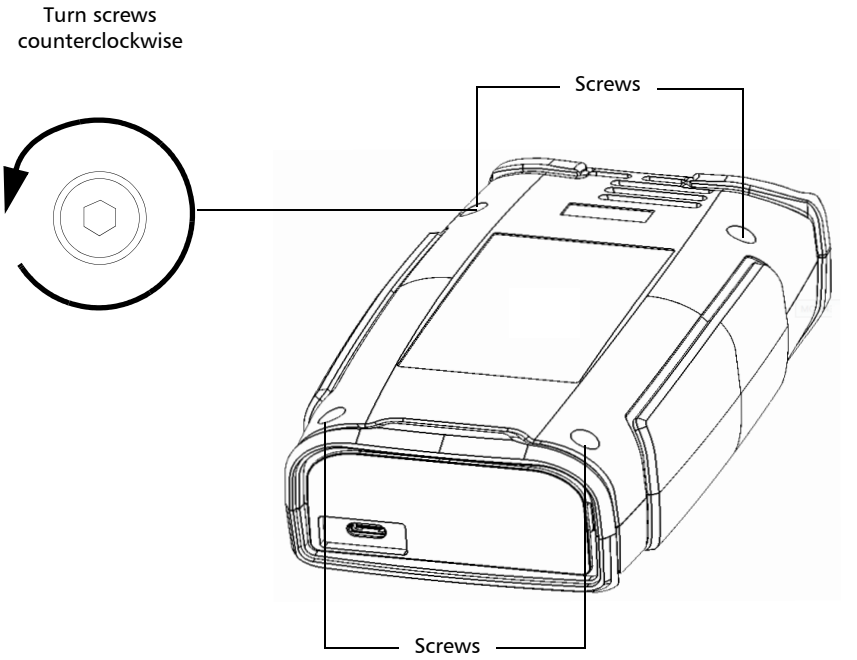
CAUTION

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

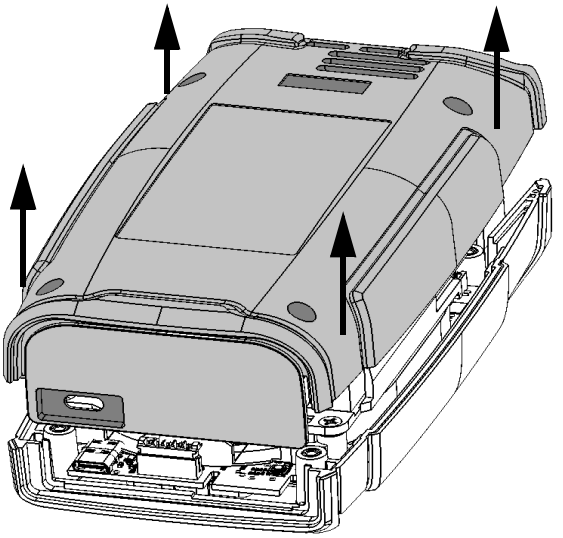
- **Always use an ESD-preventive wrist or ankle strap when replacing the battery. Ensure that the antistatic strap makes good skin contact and that the end of its wire is grounded properly.**
- **Never touch any component inside the unit other than those identified in the procedure hereafter, either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

To replace the battery:

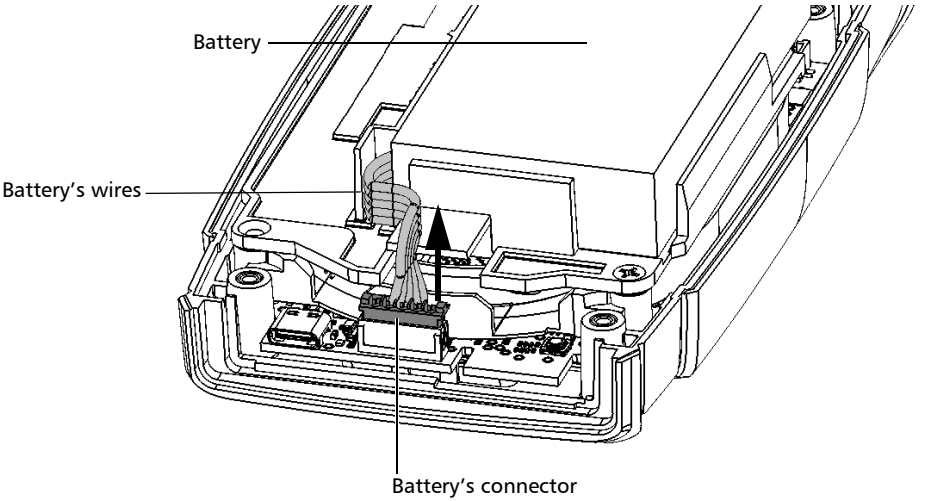
1. Turn off the unit (shutdown) and disconnect the fiber and USB cable (if applicable).
2. Position the unit so that its front panel rests on a flat surface such as a table.
3. On the back of the unit, using a 2.5 mm hex socket screwdriver, turn the screws (4) counterclockwise until they are loose, and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



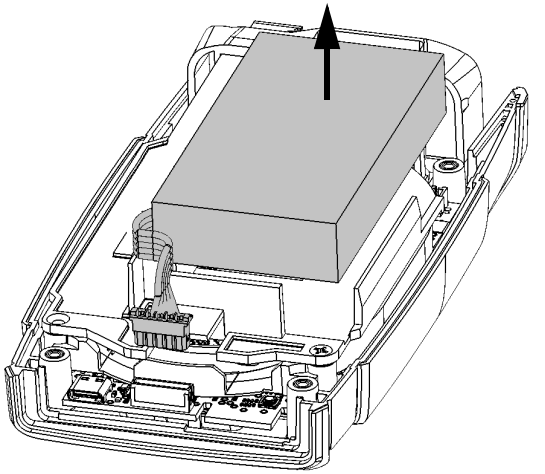
4. Hold the back panel by its sides and pull it up to remove it.



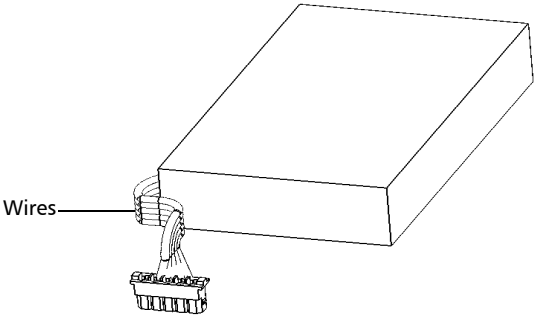
5. Gently pull on the battery's connector to disconnect it from its socket.



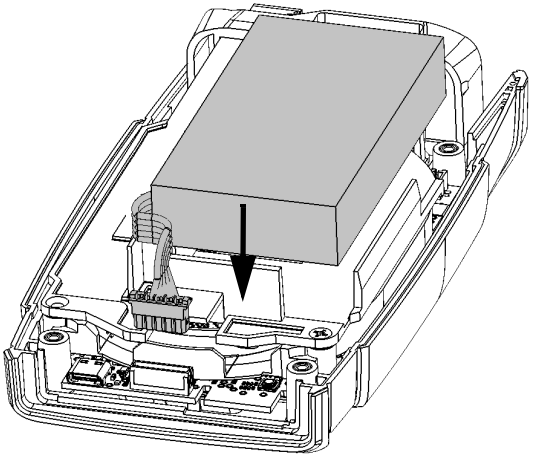
6. Pull the battery up to remove it.



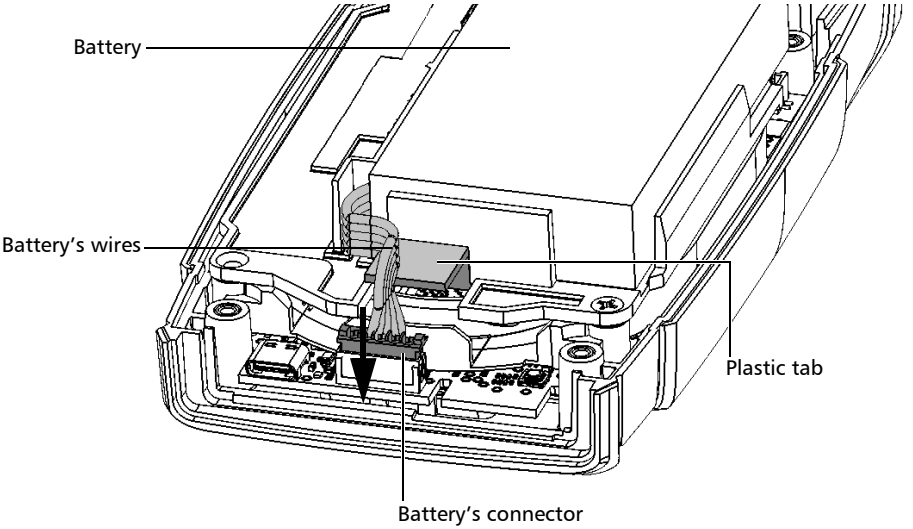
7. Place the new battery so that its wires are located on the left side, toward the front.



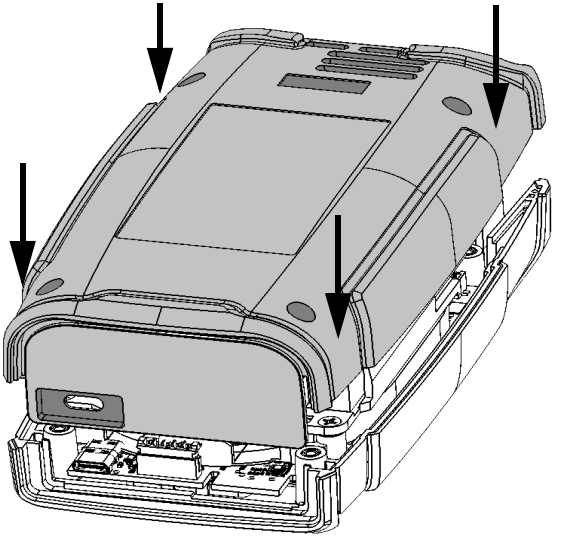
8. Push the new battery toward the bottom of the case until it stops.



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

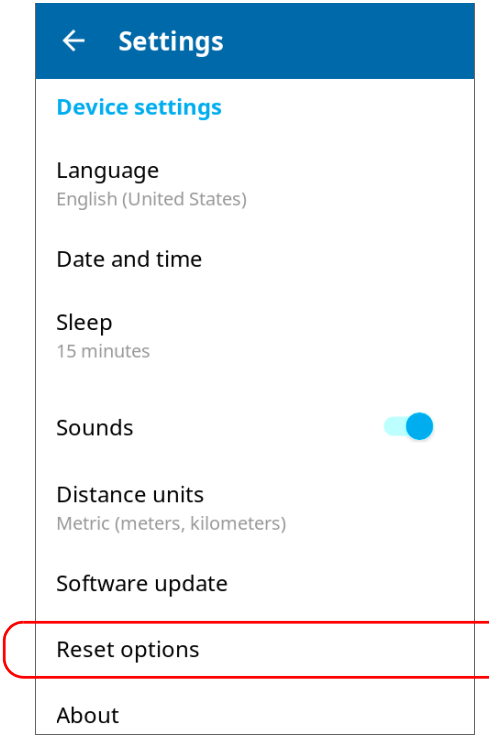
To allow the unit to take into account the new battery, reset the battery information as explained hereafter.

12. Reset the battery information as follows:

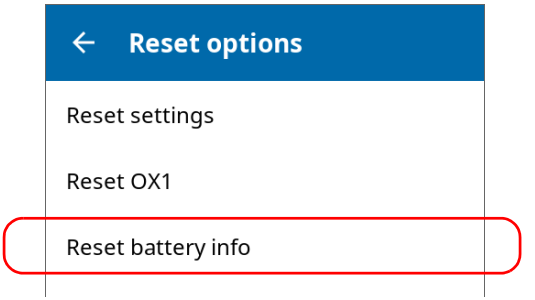
12a. Connect the unit to a power outlet using the USB power adapter.

12b. Turn on your unit.

12c. From the main menu, go to **Settings** > **Reset options**.



12d. Tap **Reset battery info**.



12e. When your unit prompts you, confirm the operation.

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.**

Verifying the Optical Output of Your Unit

Your unit comes with a wizard that verifies the optical output and provides you with information about the condition of the external and the internal optical connectors.

Once its verification is complete, the wizard rates the result from zero to five stars (half-stars are possible). Any verification receiving a three-star rating or less requires your attention. This can help you determine if the optical connectors are still working properly or if a replacement is necessary.

- If you have a Pro unit, it is equipped with a Click-Out optical connector that you can replace should it become damaged with time. You can purchase new Click-Out connectors from EXFO.
- If your unit is not equipped with a Click-Out optical connector and a connector replacement is necessary, you will need to contact EXFO.

CAUTION

To ensure that the internal optical connection remains in the best condition possible, DO NOT REMOVE the Click-Out connector from your unit unless it is absolutely necessary.

IMPORTANT

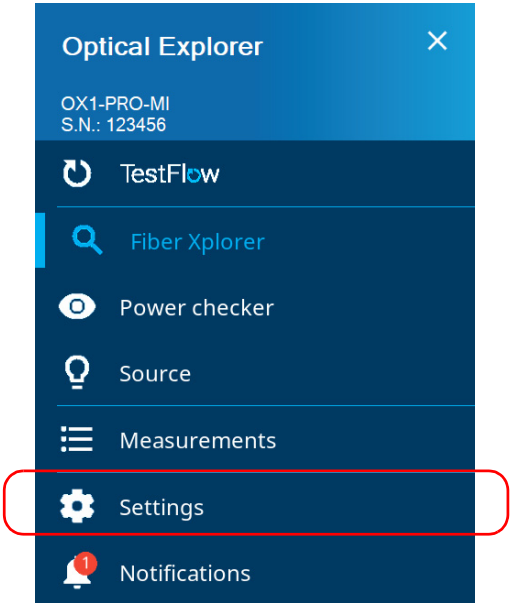
Your unit has been designed not to require frequent calibrations (see *Recalibrating the Unit* on page 197). However, to ensure that the performance of your unit remains optimum, EXFO recommends to perform regular optical output verifications on it.

To verify the optical output of your unit:

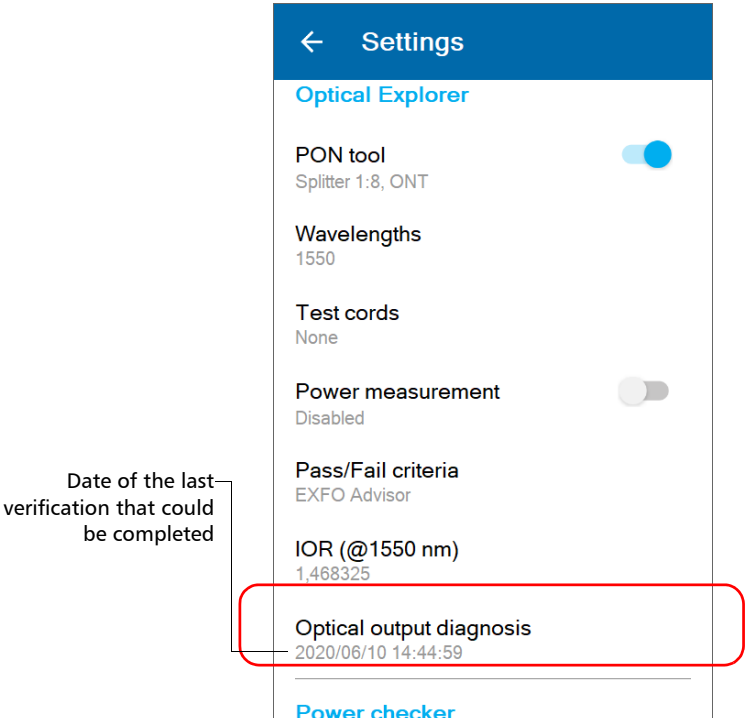
1. Inspect and clean the unit's optical port.
2. If the port is damaged and you have a Pro unit, replace the Click-Out connector (see *Replacing the Click-Out Optical Connector (Pro Units Only)* on page 193). If the port is damaged and your unit is not equipped with a Click-Out connector, contact EXFO (see *Service and Repairs* on page 230*)*.

   OR

   If the port seems fine, continue with the remaining steps of this procedure.
3. Inspect and clean the connector of the launch cord that you will be connecting to the optical port during the verification process.
4. On your unit, from the main menu, tap **Settings**.



5. Scroll down to the **Optical Explorer** section.
6. Tap **Optical output diagnosis**.

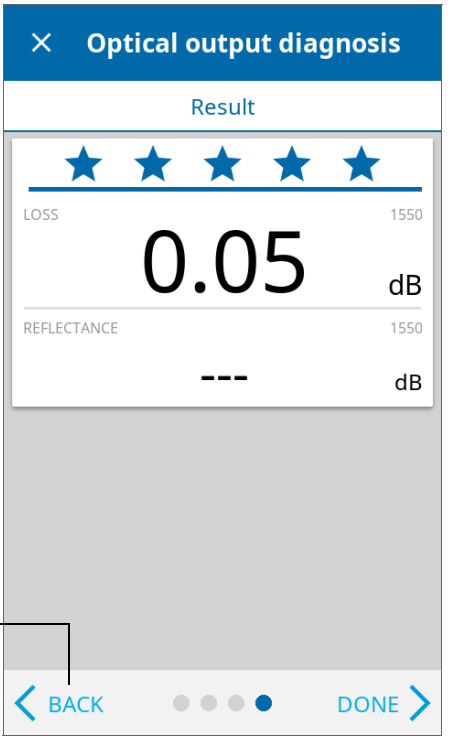


7. Follow the on-screen instructions.

Note: *During the verification process, you will connect one end of the launch cord to the optical port of your unit. The other end of the cord must remain unconnected.*

Once the test is complete, the unit displays the result of the verification as well as recommendations, when applicable. If you have finished your work, tap **DONE**. If you want to perform the verification again, tap **BACK** from the lower left corner of the screen.

Note: *If you have a Pro unit and want to know if the internal connector is damaged or if you could only replace the Click-Out connector,* see Determining the Condition of the Click-Out Optical Connector (Pro Units Only) *on page 191. If your unit is not equipped with a Click-Out connector and the unit needs a connector replacement, you have to contact EXFO (see* Service and Repairs *on page 230).*

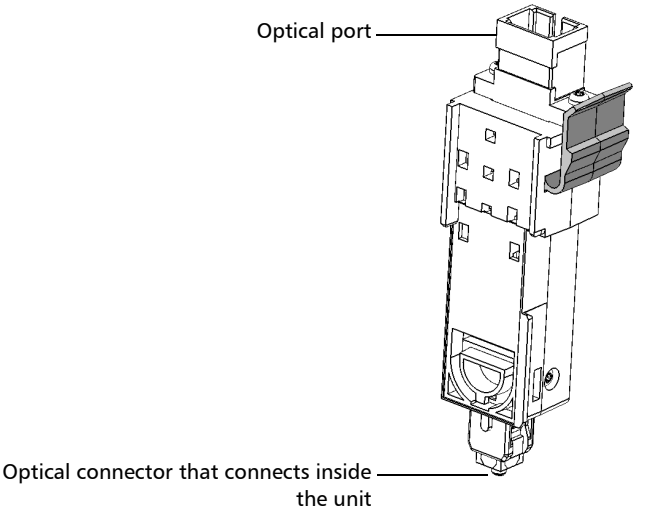


Determining the Condition of the Click-Out Optical Connector (Pro Units Only)

If you have a Pro unit, you can perform a procedure to help you determine if there is a problem with the internal connector or only with the replaceable Click-Out connector.

To determine if the Click-Out connector only needs to be replaced:

1. Remove the Click-Out connector from the unit (see the corresponding procedure in *Replacing the Click-Out Optical Connector (Pro Units Only)* on page 193).
2. Clean and inspect the optical port and the optical connector that connects inside the unit.



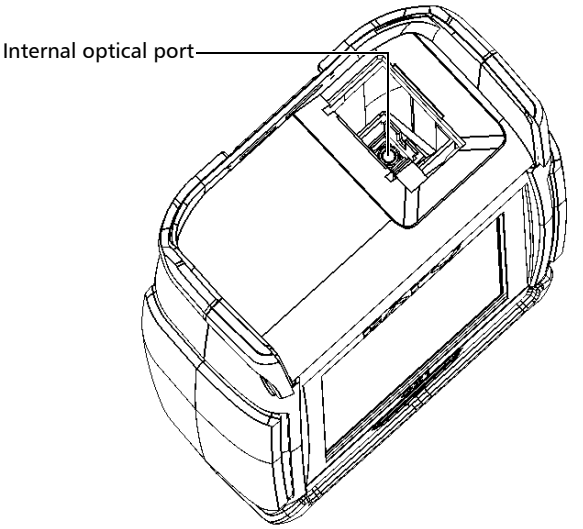
3. If the port or the connector is damaged, replace the Click-Out connector (see *Replacing the Click-Out Optical Connector (Pro Units Only)* on page 193).

OR

If the port and connector seem fine, continue with the remaining steps of this procedure.

4. It is not necessary nor recommended to clean or inspect the internal connector. However, if you still need to clean the internal connector, you can do so from the Click-Out connector bay by using a 2.5 mm pencil cleaner.

Note: *If you do not have a 2.5 mm pencil cleaner, you can use a dry lint-free swab.*



5. Place the Click-Out connector back in the unit (see the corresponding procedure in *Replacing the Click-Out Optical Connector (Pro Units Only)* on page 193).
6. Perform an optical output test again.
7. If the ratng remains low (three stars or less), you could repeat the steps above. If after a couple of tries the rating remains low, it probably means that the internal connector needs to be replaced. In this case, contact EXFO (see *Service and Repairs* on page 230).

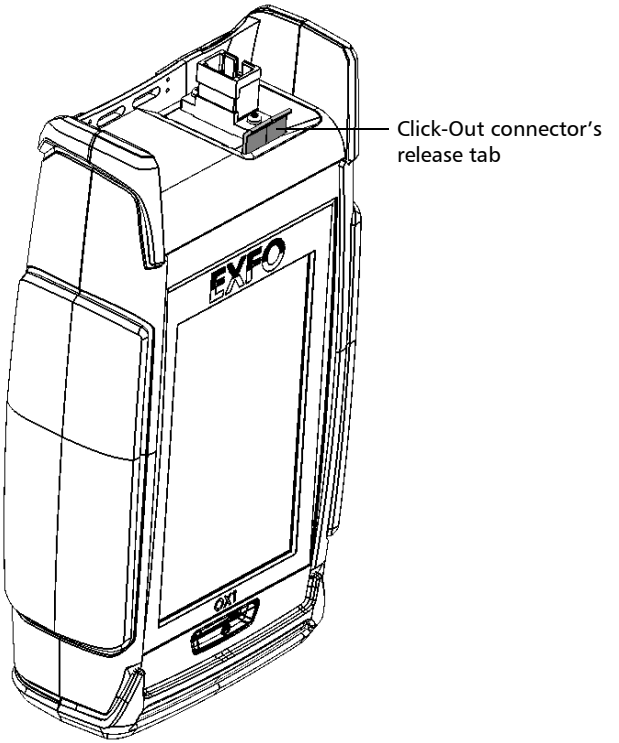
Replacing the Click-Out Optical Connector (Pro Units Only)

All Pro units come with a Click-Out optical connector that you can replace should you need a different connector type (APC or UPC), or should it become damaged with time. You can purchase new Click-Out connectors from EXFO.

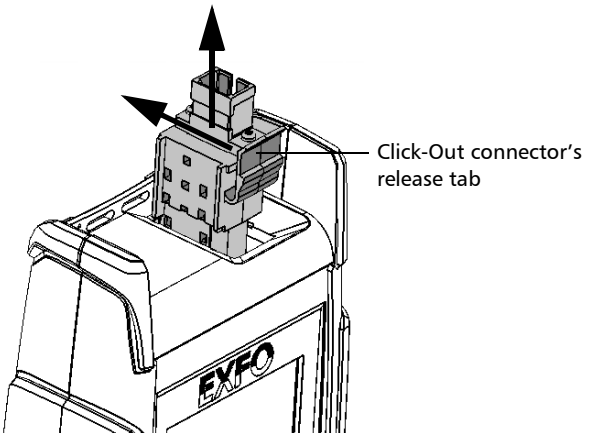
If your unit is not equipped with a Click-Out optical connector and the connector has to be replaced, you need to contact EXFO (see *Service and Repairs* on page 230).

To remove the Click-Out optical connector:

1. Disconnect the fiber and USB cable from the unit, if applicable.
2. Position the unit so that you can see its Click-Out connector and easily access it.

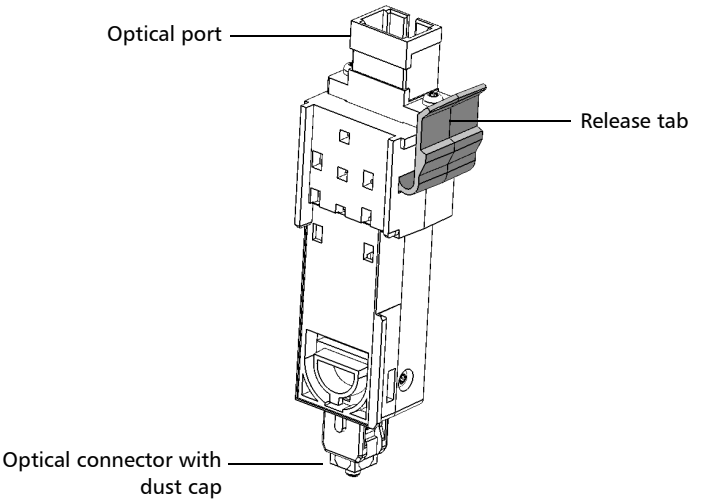


3. While pushing the release tab toward the back of the unit, pull the Click-Out connector out of the unit.

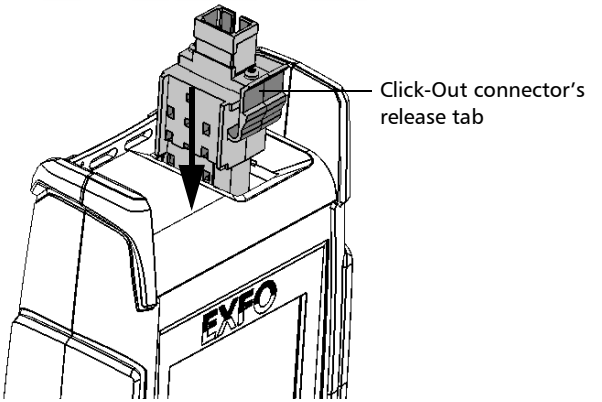


To replace (or reinstall) the Click-Out optical connector:

1. Position the new Click-Out connector vertically so that you can see its release tab and that the optical port is pointing upwards.



2. Remove the dust cap protecting the optical connector (which should be pointing downwards), being careful not to touch the optical connector.
3. Inspect the optical connector (from which you have just removed the dust cap), and clean it if necessary.
4. Slide the Click-Out connector into the unit until it clicks into place.



There should be no gap between the edges of the Click-Out connector and its bay when it is inserted properly.

5. Inspect and clean the optical port if necessary.
6. Turn on the unit.
7. Perform an optical output verification to ensure that the new Click-Out connector is installed properly and that the unit takes into account the right connector type (see *Verifying the Optical Output of Your Unit* on page 187).

Note: *If the optical output verification detects issues, see the step about how to clean the internal connector in* Determining the Condition of the Click-Out Optical Connector (Pro Units Only) *on page 191.*

Your unit is ready to use.

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 OX1 Optical Explorer is: ten 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 (ten 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**).

Upgrading Applications and Firmware

Note: *You need a smart device equipped with the TestFlow mobile application to be able to configure a wireless network, connect your unit to it, and then receive the available updates.*

All the necessary applications have been preinstalled and configured at the factory. However, you may have to upgrade some of them or upgrade the firmware when new versions become available.

Your unit allows you to check for updates, download these updates and install them directly.

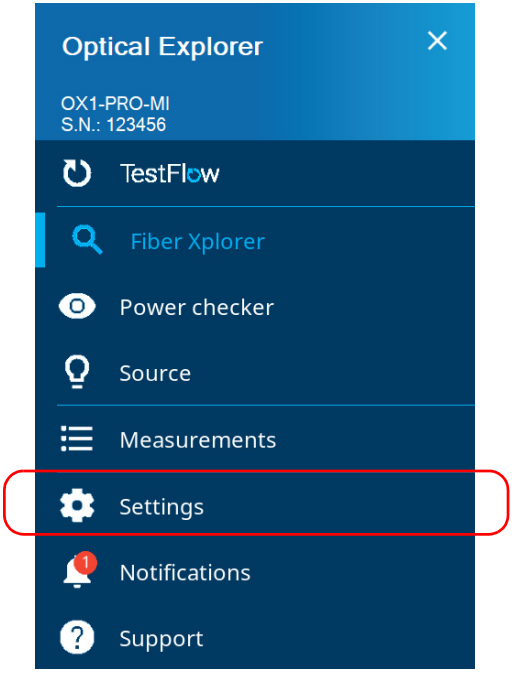
Note: *Your unit must have access to an Internet connection (via Wi-Fi) to be able to download updates and install them.*

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.

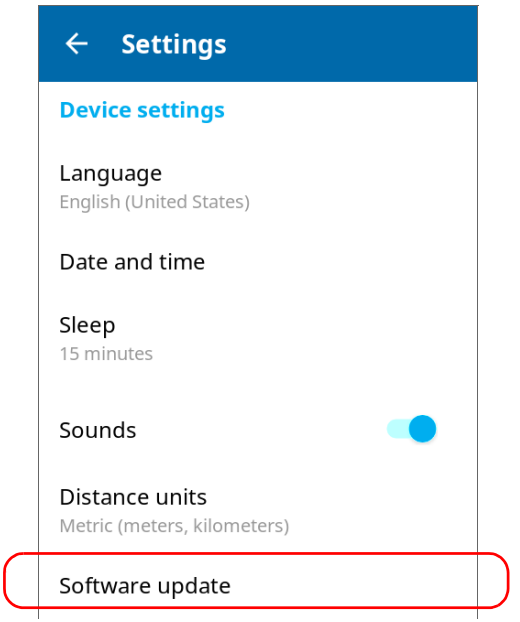
To upgrade applications or firmware:

1. Connect your unit to an external power source with the provided USB power adapter.
2. If it is not already done, turn on your unit.
3. Ensure that your unit has access to the Internet (see *Working With a Wireless Network* on page 145).
4. From the main menu, tap **Settings**.



5. Scroll down to the **Device settings** section.

6. Tap **Software update**. The unit will start to check for updates automatically.



7. Follow the on-screen instructions. If an update is available and you choose to install it, your unit will restart automatically at the end to complete the process.

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.

11 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 178).
	The system has encountered a problem.	Press the on/off button for at least ten seconds to force a hardware reset on the unit. If the problem persists, restore your unit to normal operation (see *Restoring Your Unit to Normal Operation* on page 207).
	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 OX1 to its factory settings (see *Reverting to Factory Settings* on page 89). If the problem still persists, restore your unit to normal operation (see *Restoring Your Unit to Normal Operation* on page 207).
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.

Problem	Possible Cause	Solution
On my unit, no wireless network is listed.	No network has been configured yet.	You must first configure the desired networks on your smart device, using the OX1 tool in the TestFlow mobile application (see *Working With a Wireless Network* on page 145).
My unit does not connect automatically to the wireless network that I have used during my last work session.	There is a connection problem with the network.	➤ Ensure that the Wi-Fi connection is enabled on your unit (see *Enabling or Disabling the Wireless Communication* on page 141). ➤ In the case of a secured network, ensure that the password has not changed since the initial configuration of this network. If the password is no longer valid, you will have to update it using the TestFlow mobile application (see *Working With a Wireless Network* on page 145). ➤ Ensure that the network is working normally.

Problem	Possible Cause	Solution
My unit does not connect to the wireless network that I choose from the list of configured networks.	There is a connection problem with the network.	➤ Ensure that the Wi-Fi connection is enabled on your unit (see *Enabling or Disabling the Wireless Communication* on page 141). ➤ In the case of a secured network, ensure that the right password has been entered and that it has not changed since the initial configuration of this network. You will have to re-enter the password or update it using the OX1 tool in the TestFlow mobile application (see *Working With a Wireless Network* on page 145). ➤ Ensure that the network is working normally.
My unit cannot connect to a Wi-Fi network even though I have configured all parameters correctly.	Since every network has its own specifications, there may be elements that are not compatible with your unit.	Configure a Wi-Fi hotspot on a smart device or a laptop that you will use to give your unit access a wireless network. When it is done, add this Wi-Fi hotspot to the list of configured networks as you would with any Wi-Fi networks (see *Configuring a Wireless Network* on page 148).
I cannot use the TestFlow mobile application anymore.	The SSL certificate is no longer valid.	➤ You need to update the TestFlow mobile application on the smart device and establish a Bluetooth® connection with the OX1. ➤ If this does not work, contact EXFO.

Restoring Your Unit to Normal Operation

If you ever encounter major problems with your unit (for example, the unit does not behave the way it used to), you can revert it to its initial state (as it was at time of purchase).

CAUTION

- **Once the recovery operation is started, it cannot be cancelled. Make sure to transfer any data that you wish to keep prior to starting the recovery operation, as they will be permanently lost.**
- **Follow the procedure below carefully and connect your unit to a power outtlet using the provided USB power adapter when you are instructed to do so.**

CAUTION

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

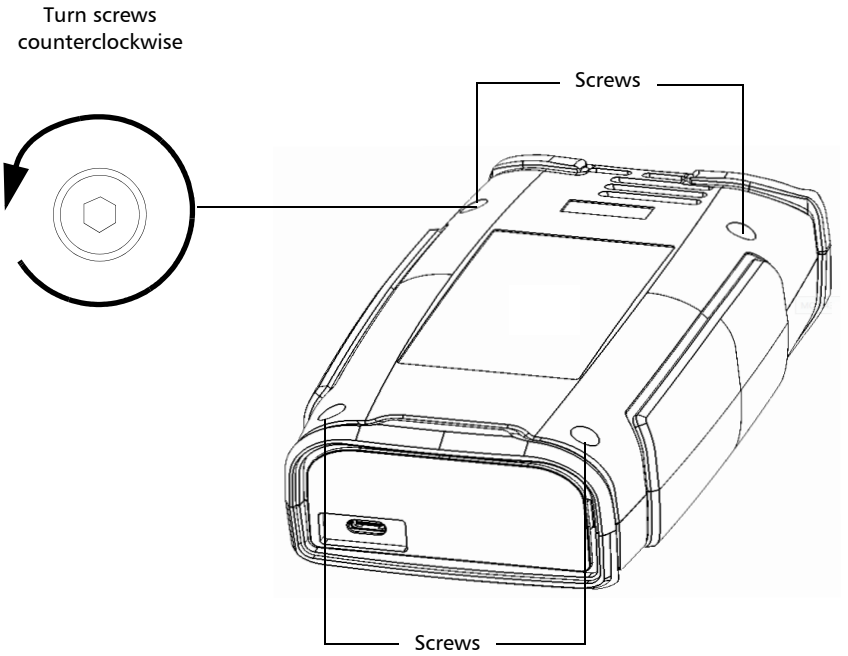
- **Always use an ESD-preventive wrist or ankle strap when opening your unit. Ensure that the antistatic strap makes good skin contact and that the end of its wire is grounded properly.**
- **Never touch any component inside the unit other than those identified in the procedure hereafter, either with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

To restore you unit to normal operation:

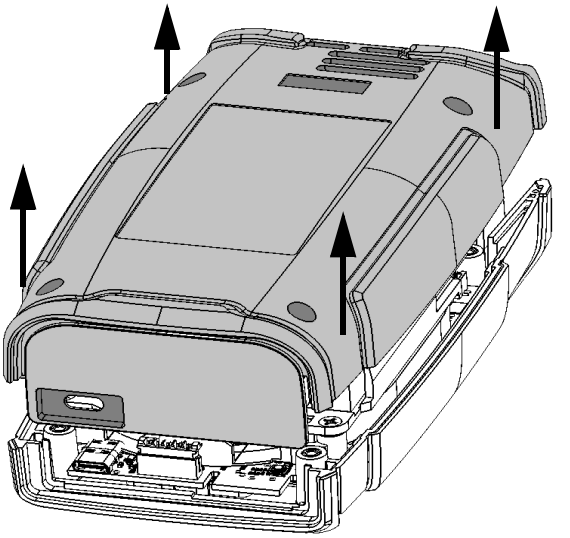
1. If desired, transfer the data that you wish to keep (see *Generating Measurement Reports* on page 132 and *Synchronizing Job Results With the Smart Device and the Cloud Server* on page 167).
2. Ensure that the battery level of your unit will be sufficient to start the unit when instructed to do so (no red battery icon on screen or red, steady LED on the unit's front panel).
3. Turn off your unit (shutdown).
4. If applicable, disconnect the USB cable. This is necessary to be able to open the unit as explained hereafter.
5. Position the unit so that its front panel rests on a flat surface such as a table.

6. On the back of the unit, using a 2.5 mm hex socket screwdriver, turn the screws (4) counterclockwise until they are loose.

Note: *You can remove the screws completely if you want, but you can also leave them in their holes, as long as the back cover can be moved.*

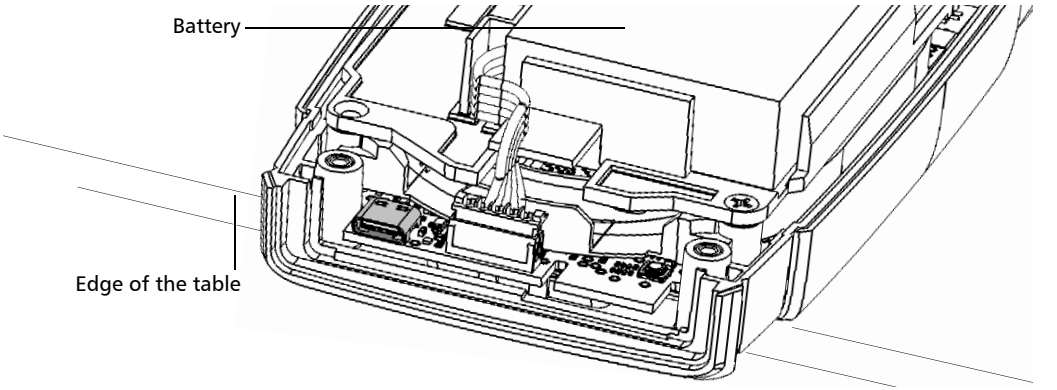


7. Hold the back panel by its sides and pull it up to remove it.



8. Slide your left hand under your unit so that you can have access to the on/off button, being careful not to touch inside your unit.

Note: *You may find helpful to slightly move the unit towards the edge of the table so that its on/off button is more accessible.*

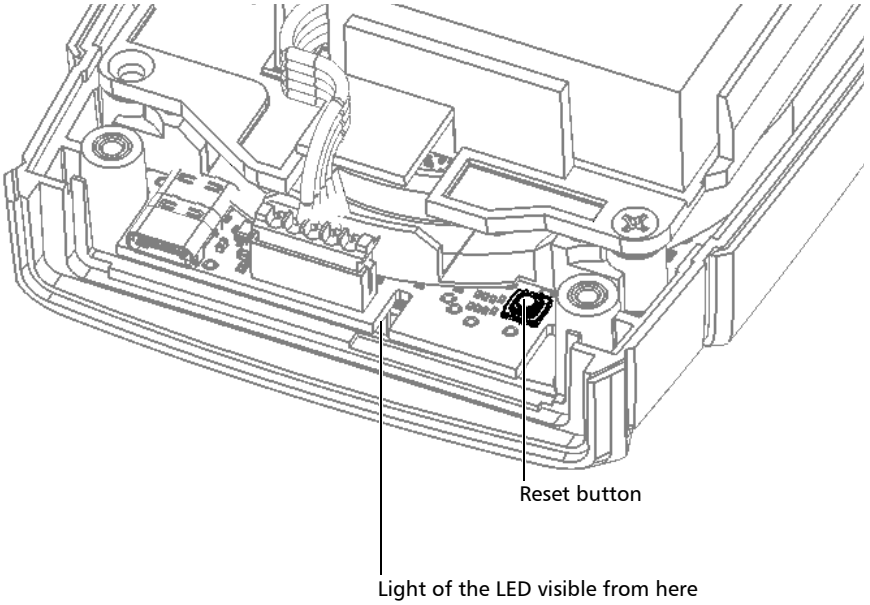


CAUTION

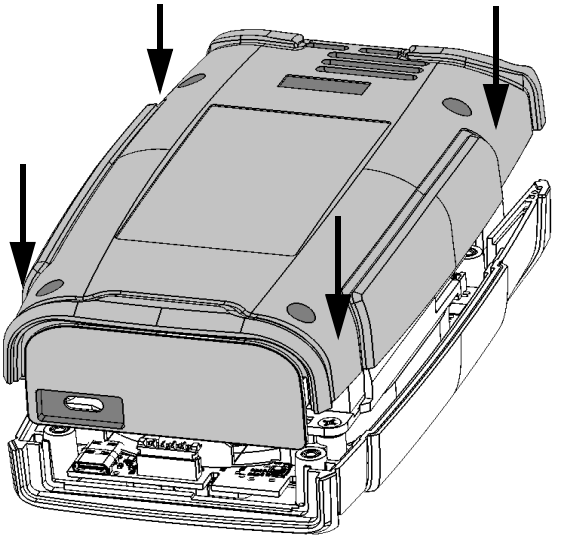
To avoid damaging your unit, do not use metallic objects such as the ball of a pen to push the reset button. Always use your finger or a non-metallic object.

9. While pressing and holding the reset button, push the on/off button. Release the on/off button as soon as the unit beeps once, but continue to hold the reset button as long as the unit's LED is lit or for about 10 seconds.

Note: *The light is visible through the notch in the electronic board.*



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.

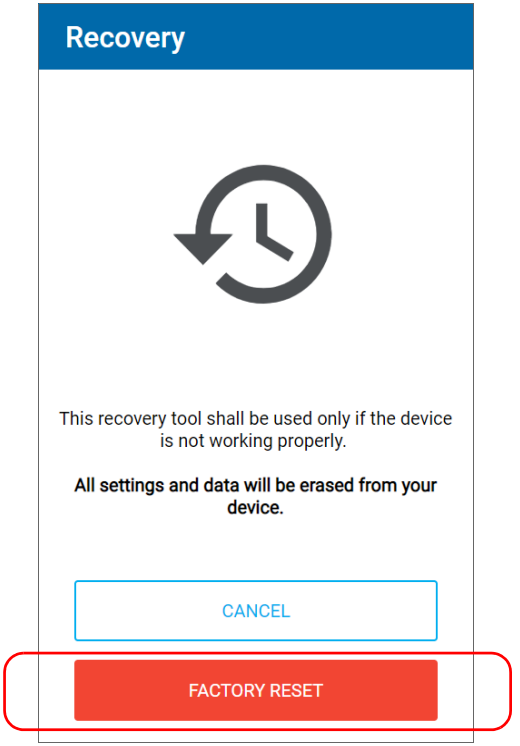
12. Turn your unit over so that you can see its touchscreen.

CAUTION

DO NOT TURN OFF your unit while the recovery operation is underway. Doing so may damage your unit. Damaged units will need to be sent back to EXFO for repair.

13. Connect your unit to a power outlet using the provided USB power adapter. This will ensure that your unit remains powered on during the whole recovery operation.

14. Tap **FACTORY RESET** to launch the recovery operation. If you prefer not to perform the recovery operation for the moment, tap **CANCEL** to simply start the unit without making any changes.



15. Read the warnings, and then tap **FACTORY RESET**. If you prefer not to perform the recovery operation for the moment, tap **CANCEL**.

16. When the operation is complete and the application prompts you, tap **RESTART**.

17. Once your unit has restarted, set the operation language, read and accept the EXFO license agreement, configure the date and time, and select the desired distance units as you did when you first received your unit (see *Configuring Your Unit at First Startup* on page 23).

Testing the Touchscreen

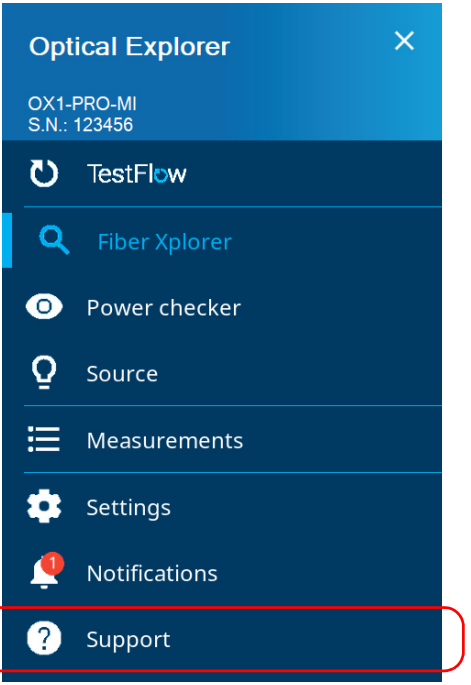
Your unit comes with a tool enabling you to verify that the touchscreen is working as expected.

To help you verify the behavior of the touchscreen, you will see the following:

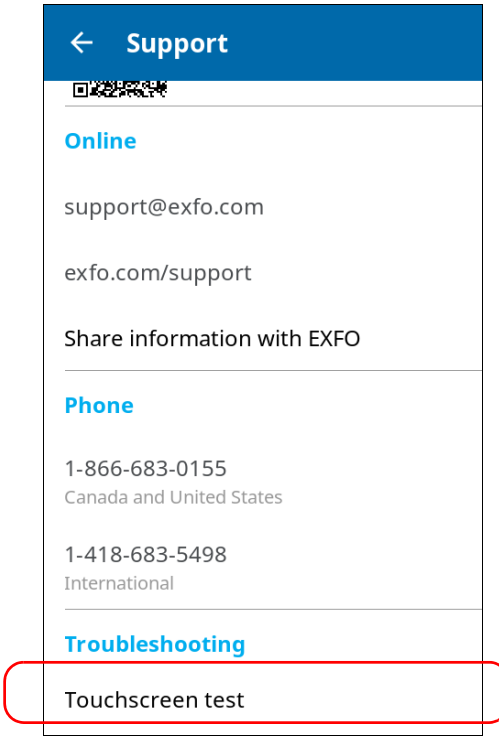
- A red dot displayed for each quick tap on the screen.
- A blue dot displayed for each long tap.
- A blue line appearing as you move the tip of your finger around the screen while applying pressure.

To test the touchscreen:

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



2. Scroll down to the **Troubleshooting** section.
3. Tap **Touchscreen test**.



4. Perform quick taps, long taps or move your finger on the screen to test it.
5. When you have finished your verification, tap **X** to exit the touchscreen tool.

Accessing the Online Documentation From the OX1

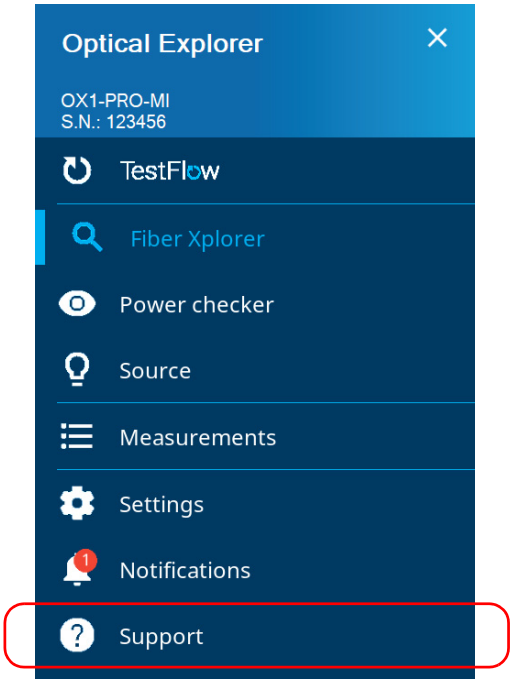
You can access the getting started guide from your unit.

For more detailed information, you can also access the user guide at all times from your smart device:

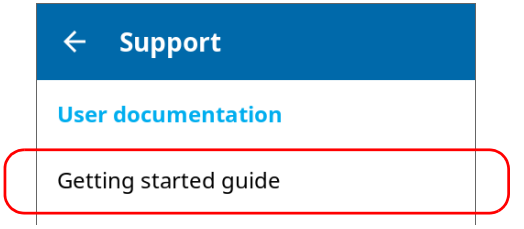
- by scanning the QR code displayed on your unit
- by using the corresponding link in the TestFlow mobile application (see *Accessing the Online Documentation From the Smart Device* on page 171)

To view the getting started guide from your unit:

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



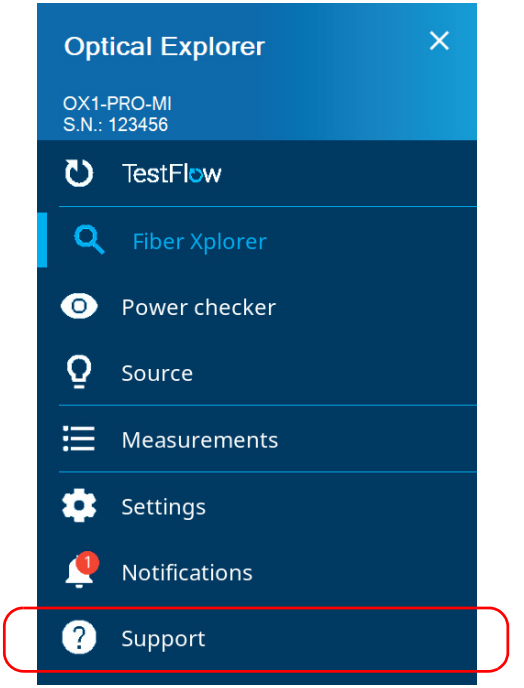
2. Under **User documentation**, tap **Getting started guide**.



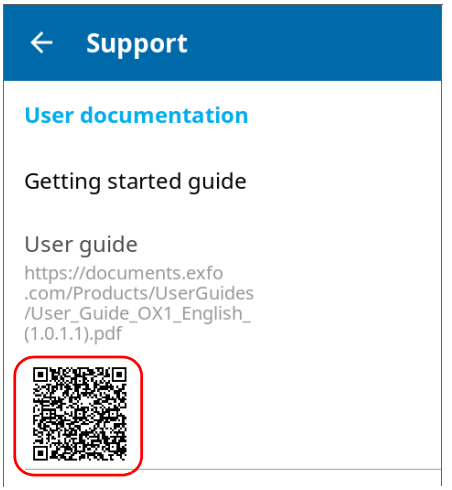
Note: *You can exit the Getting started guide at any time by using the X.*

To access the user guide with the QR code:

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



2. Under **User documentation**, 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.

Sharing Information With the Technical Support Group

After contacting EXFO for support, you may need to share some of the measurements or error reports with the technical support group for further investigation.

Note: *You must contact the technical support group before sharing measurements or error reports. Otherwise, no measurements or error reports will be processed or archived.*

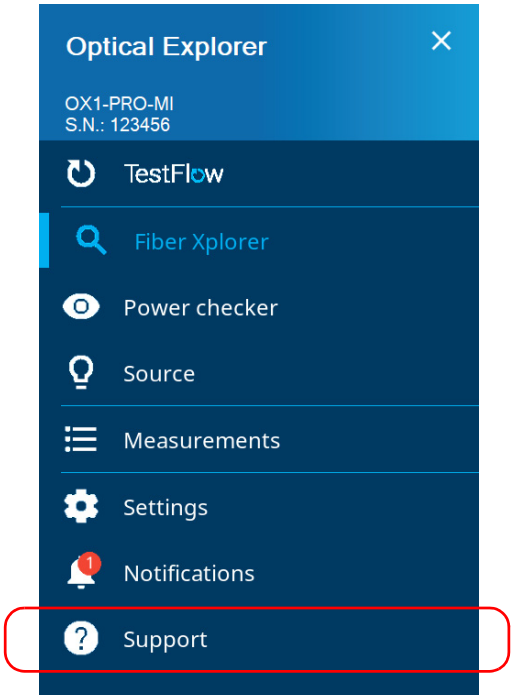
Note: *You must contact the technical support group if you want to share job measurements.*

Your unit will need access to a Wi-Fi connection to be able to share results. If you have not configured any Wi-Fi network yet, see *Working With a Wireless Network* on page 145.

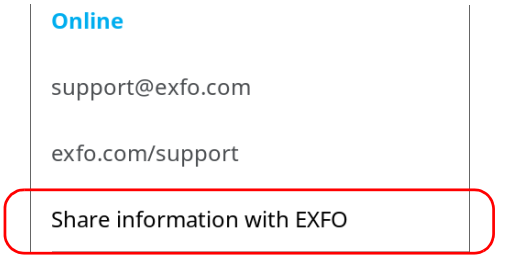
Note: *To be able to send measurements and error reports to the technical support group, you must read and accept the privacy and security policies.*

To share information with the technical support group:

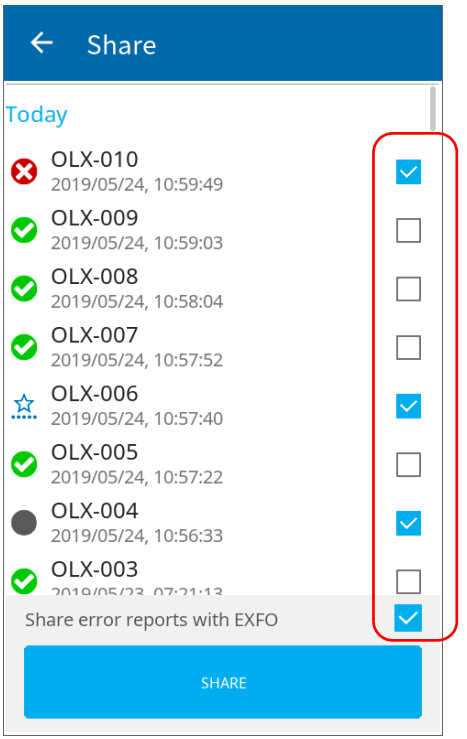
1. From the main menu, tap **Support**.



2. Tap **Share information with EXFO**.



3. Select the check boxes corresponding to the measurement files that you want to share.



4. You can also share error reports with EXFO by selecting the corresponding checkbox.

5. Once your selection is complete, tap **SHARE**.

A confirmation message is displayed as soon as the transfer is complete.

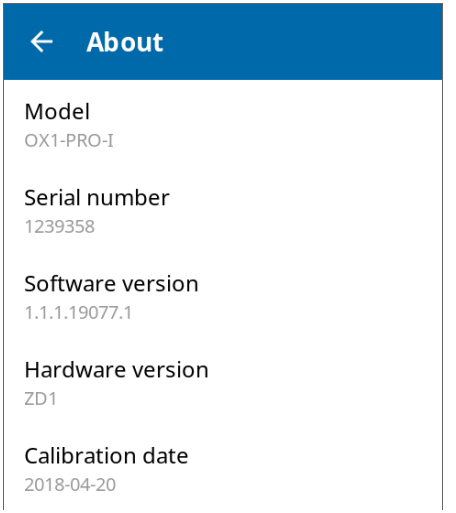
Viewing System Information

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**.

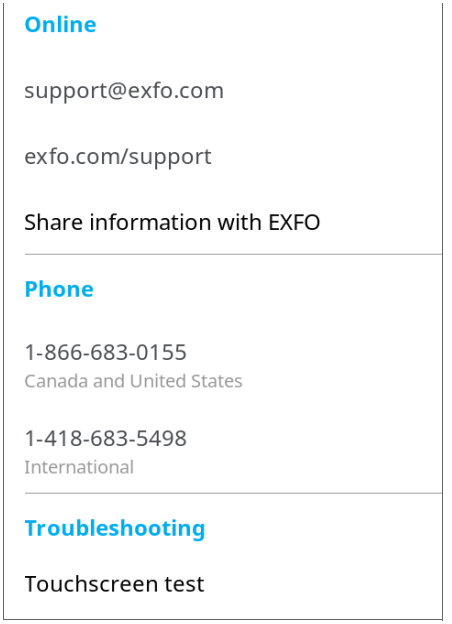
The information you want to view is displayed on screen.



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.

12 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 231). 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 231).

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 Installing the Hand Strap

If desired, you can install the provided hand strap on your unit.

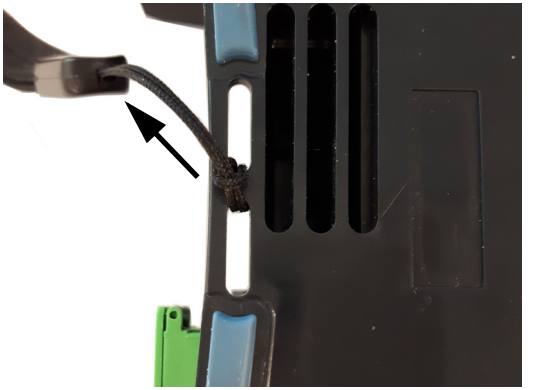
To install the hand strap:

1. Position your unit so that its front panel rests on a flat surface such as a table.
2. Pinch the string loop of the strap between your index finger and your thumb.
3. Slide the string loop down through the first hole of the unit's casing until it stops.

4. While holding the strap with one hand, slide the string loop up through the second hole of the unit's casing. You may need to push the string with your finger.

5. Slide the nylon part of the strap entirely *through* the string loop.

6. Gently pull on the hand strap to secure the knot.



You are now ready to use the hand strap.

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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: 4.0.0.1

www.EXFO.com · info@EXFO.com

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

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