User Guide

# OX1

## Optical Xplorer™

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EXFO

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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.

This product does not contain any user-serviceable components. Any product change or modification done by the user that is not expressly approved by the manufacturer will invalidate warranty and all applicable regulatory certifications and approvals and 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.

## 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 2.4 GHz 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 “Wideband Data Transmission” 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 Xplorer

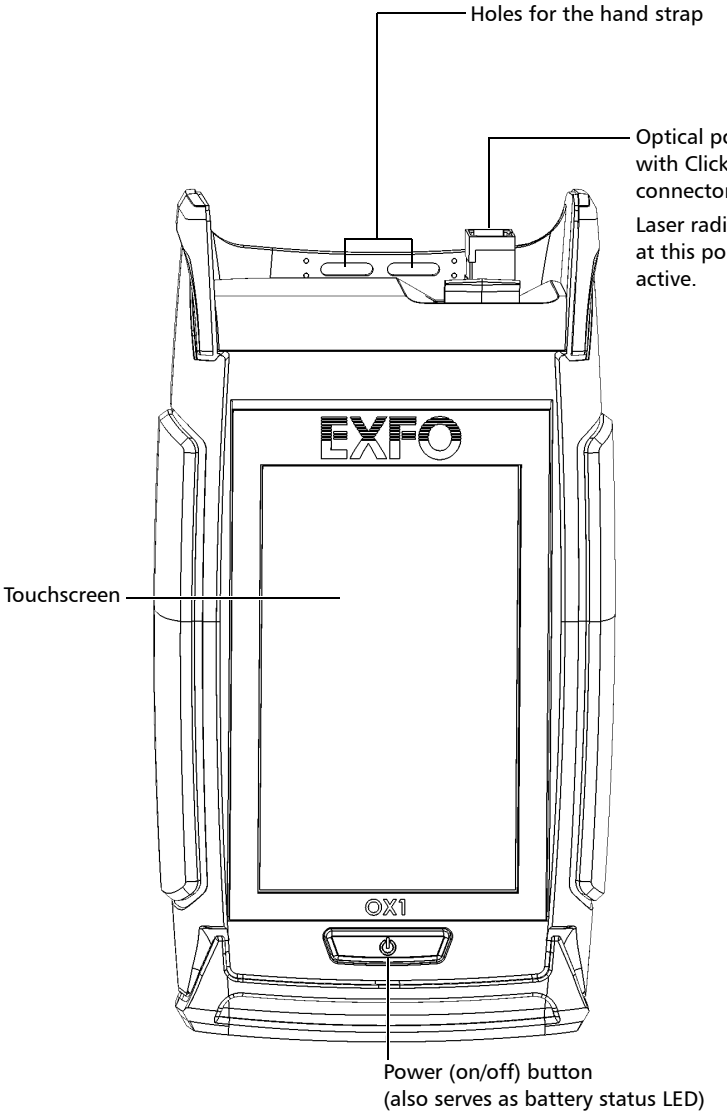
The OX1 Optical Xplorer is a handheld, ultra-simple, and ultra-fast tool offering multiple test functions to verify any short- to medium-length (up to 40 km) optical links and their components. It is particularly well suited for installation and repair jobs.

***Note:*** *On your unit, the period is used as the decimal separator in numerical values, when applicable.*

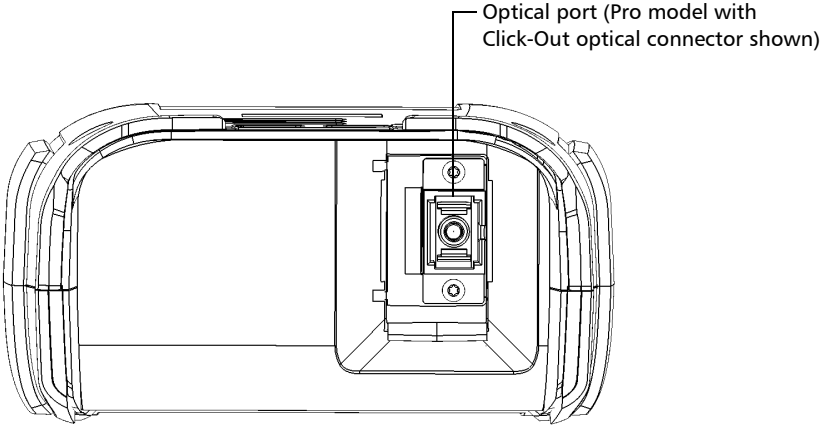
## Main Features

- 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.
- Replaceable Click-Out™ optical connector –Pro models only

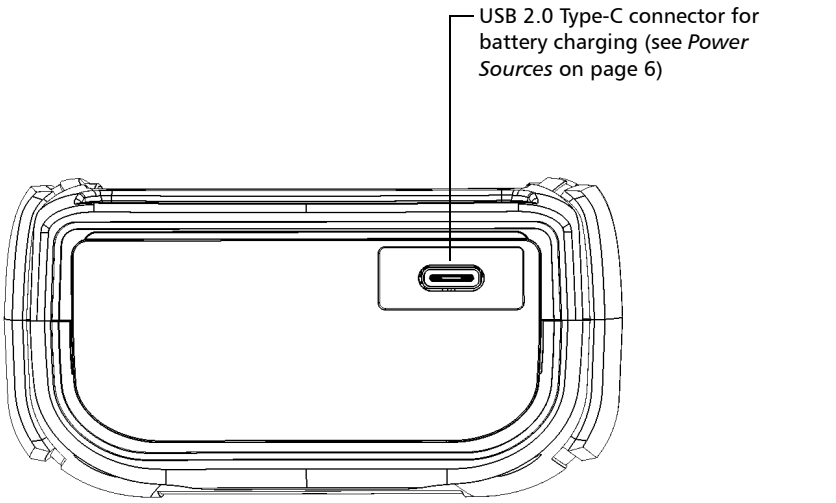
### Front panel


Holes for the hand strap
Optical port (Pro model 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 Models

The Optical Xplorer is offered in several configurations:

| Model | Description |
|---|---|
| OX1-M | ➤ Optical Xplorer designed for the maintenance of live fibers<br>➤ 1650 nm +10 nm, filtered |
| OX1 PRO-M | ➤ Optical Xplorer designed for the maintenance of live fibers<br>➤ 1650 nm +10 nm, filtered<br>➤ Click-Out optical connector<br>➤ Link Mapper test function |
| OX1-I | ➤ Optical Xplorer designed for installation or repair of dark fibers<br>➤ 1310/1550 nm ±30 nm |
| OX1 PRO-I | ➤ Optical Xplorer Pro designed for installation or repair of dark fibers<br>➤ 1310/1550 nm ±30 nm<br>➤ Click-Out optical connector<br>➤ 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 17. |
| | 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 Xplorer 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 118), 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 16.

# Test Functions and Tools

Your Optical Xplorer 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.

- 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:*** *Basic models do not 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 81 for details.
- Light source: You can use this tool to perform tests with a power meter. The modulation can be continuous or set to another value. See *Using the Light Source* on page 95 for details.

# 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

**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) |
| <br>OR<br> | On/off (Power) |
| | Fuse |

# Laser Safety Information

Your instrument is in compliance with standards IEC 60825-1: 2007 and 2014.

## WARNING

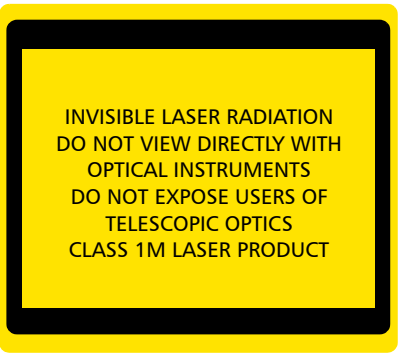
**(IEC 60825-1: 2007) Viewing the laser output with certain optical instruments designed for use at a distance (for example, telescopes and binoculars) may pose an eye hazard.**

## WARNING

**(IEC 60825-1: 2014) 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 labels indicate that the product contains a Class 1M source:



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

Pulse width: / Largeur de l'impulsion : $\leq 20\ \mu s$

Max. peak power: / Puissance crête maximum : $\leq 100$ mW

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

Pulse width: / Largeur de l'impulsion : $\leq 20\ \mu s$

Max. peak power: / Puissance crête maximum : $\leq 150$ mW

Complies with standards 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

# 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 Safety Extra Low Voltage (SELV) 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]<br>➤ 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)<br>➤ unit - long term storage[e]: 10 °C to 35 °C (50 °F to 95 °F) |
| Relative humidity[f] | ➤ unit: ≤ 93 % non-condensing<br>➤ USB power adapter: 10 % to 90 % non-condensing |
| Maximum operation altitude | ➤ 2000 m (6562 ft) (unit connected to external power source)<br>➤ 5000 m (16405 ft) (unit operated from battery) |

| Equipment Ratings | |
|---|---|
| Pollution degree | ➤ 2 (unit connected to external power source)<br>➤ 3 (unit operated from battery)[g] |
| Overvoltage category | ➤ unit: I<br>➤ USB power adapter: II |
| Measurement category | Not rated for measurement categories II, III, or IV |
| Input power[h] | ➤ unit: 5 V ⎓; 2 A<br>➤ 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 mode 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 normal shipping delay of the product.
e. Long term storage corresponds to a 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

## Installing the Hand Strap

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

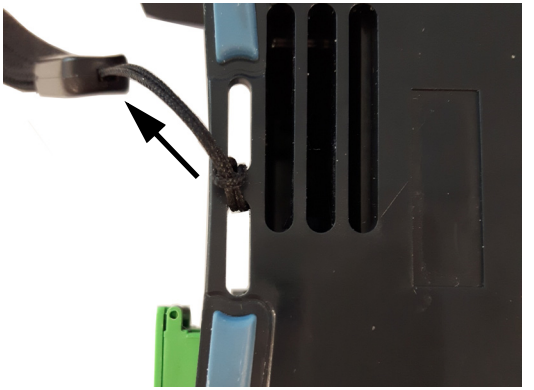
***To install the hand strap:***

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.

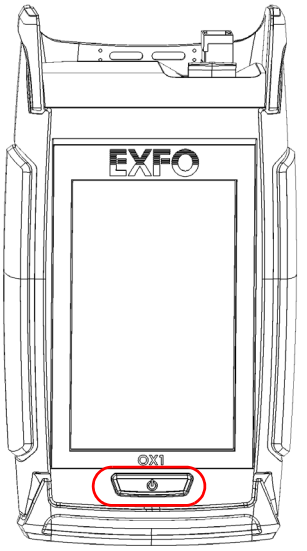
# Turning on Your Unit

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* on page 178).

If you wish to retrieve the firmware and software updates for your unit, you will need to configure a wireless network. To do so, you must install the TestFlow mobile application on a smart device. You will need a Google account (Android-based devices) or an Apple ID (iOS-based devices) to install the TestFlow mobile application to your smart device.

***To configure your unit at first startup:***

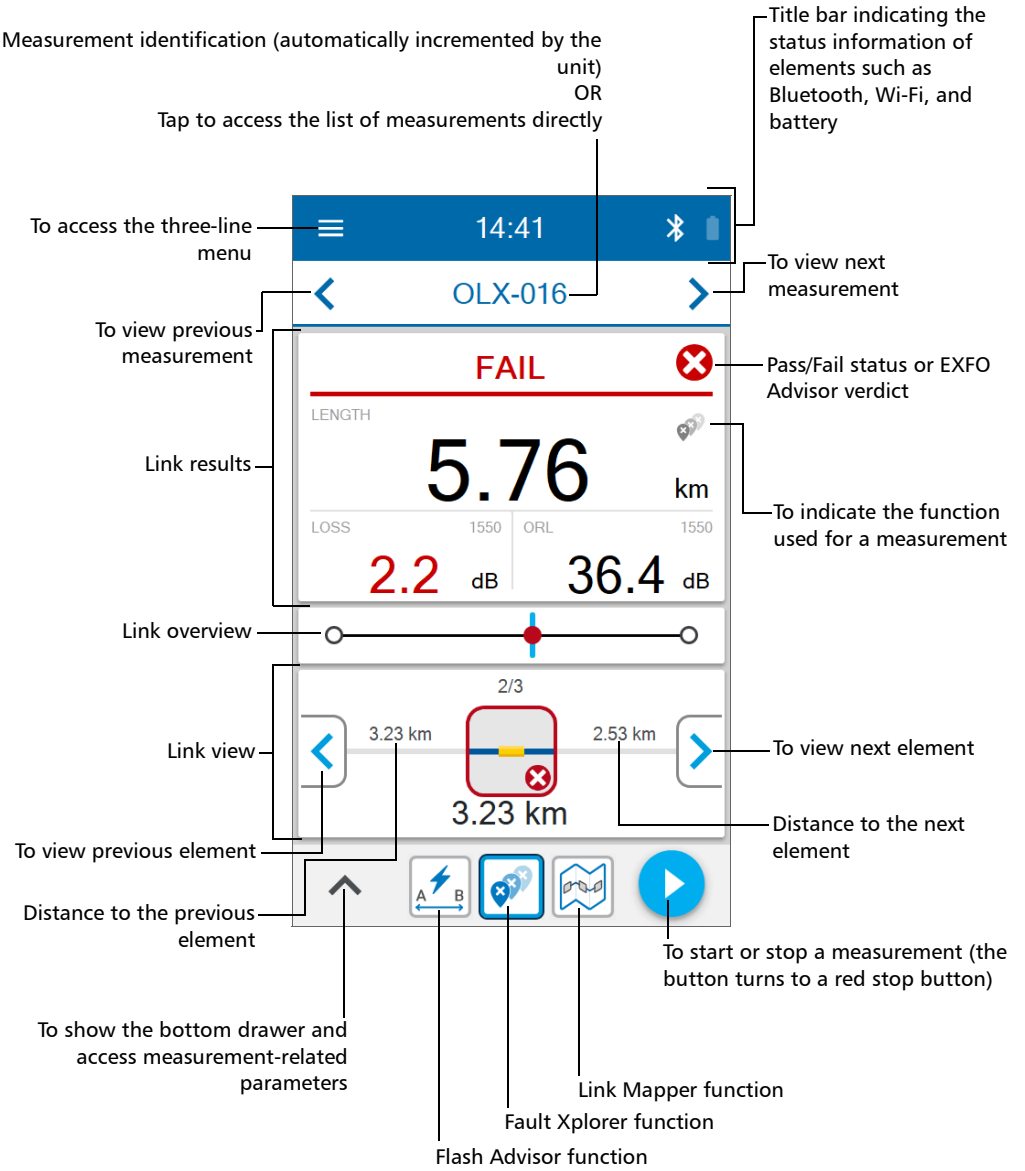
1. If it is not already done, turn on the unit (see *Turning on Your Unit* on page 22).
2. When the wizard prompts you, select the desired operation language. If you select a language other than English, the unit will restart automatically to apply the change.
3. Read and accept the EXFO license agreement, then tap **NEXT**.
4. Follow the on-screen instructions to configure the other regional parameters and view the getting started guide.

You are now ready to start working with your OX1 unit.

# Understanding Fiber Xplorer™

Fiber Xplorer can be seen as the starting point of the application. You can perform tests in one of the test functions and navigate through the results.

From Fiber Xplorer, you can also open the three-line menu to access all the commands required to control the OX1 such as the test tools and parameters.


Measurement identification (automatically incremented by the unit)
OR
Tap to access the list of measurements directly
Title bar indicating the status information of elements such as Bluetooth, Wi-Fi, and battery
To access the three-line menu
14:41
To view next measurement
OLX-016
To view previous measurement
FAIL
Pass/Fail status or EXFO Advisor verdict
LENGTH
Link results
5.76
km
To indicate the function used for a measurement
LOSS
1550
ORL
1550
2.2
dB
36.4
dB
Link overview
2/3
Link view
3.23 km
2.53 km
To view next element
3.23 km
Distance to the next element
To view previous element
Distance to the previous element
A
B
To start or stop a measurement (the button turns to a red stop button)
To show the bottom drawer and access measurement-related parameters
Link Mapper function
Fault Xplorer function
Flash Advisor function

# 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. The 20- and 60-meter cords are mainly used as launch cords, but they can also be used as receive cords for links shorter than one kilometer. For links of more than one kilometer, you should use longer receive cords (a 150-meter SPSB cord, for example). 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.

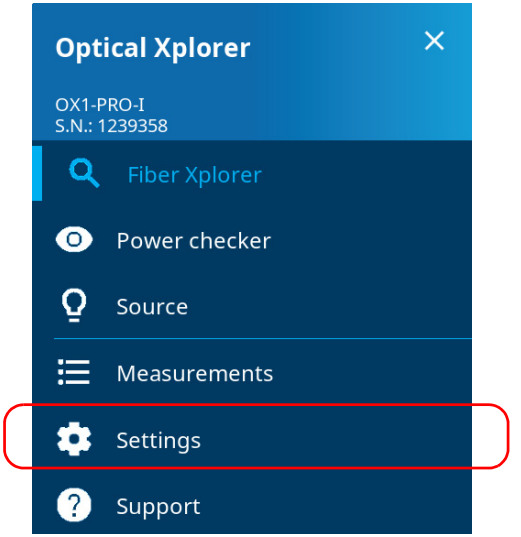
The launch cords used with units having APC-type connectors are 20 meters long. Since these connectors tend to be less reflective even when they are showing signs of wear, 20 meters is usually enough to cover the dead zone located between the Optical Xplorer and the actual fiber being measured.

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.

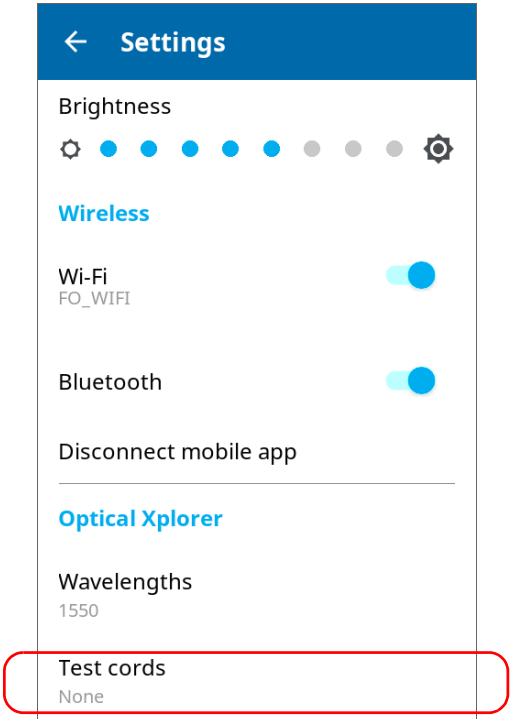
Refer to the technical specifications of your unit to have a complete list of all the launch and receive cords available.

***To configure the launch and receive cords settings from the Settings page:***

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

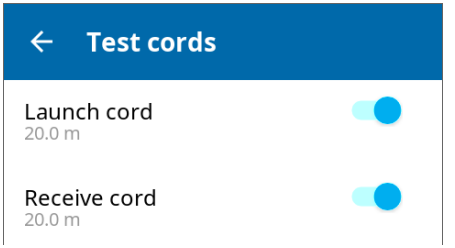


***2.*** From the **Optical Xplorer** section, tap **Test cords**.



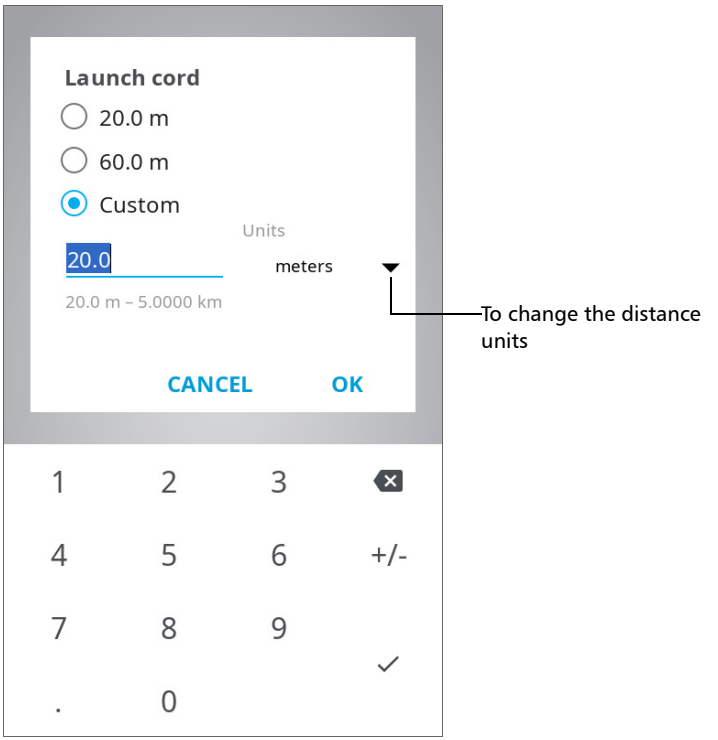

***3.*** To configure the launch and receive cords settings, proceed as follows:

***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 test. If you have selected **Custom**, enter the length with the numeric keypad.



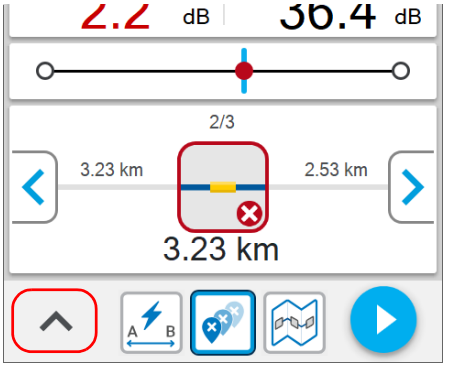

***3d.*** If necessary, change the distance units.

***3e.*** Tap **OK** to return to the **Settings** page.

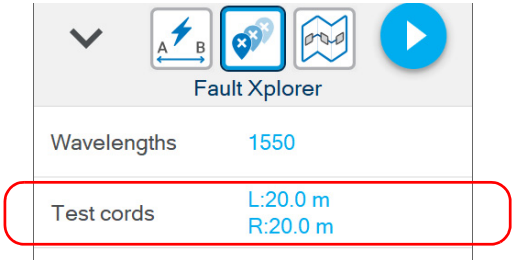
The new selection is taken into account for the next measurement.

***To configure the launch and receive cords settings in Fiber Xplorer:***

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

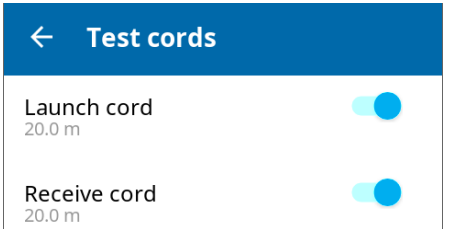



***2.*** Tap **Test cords**.



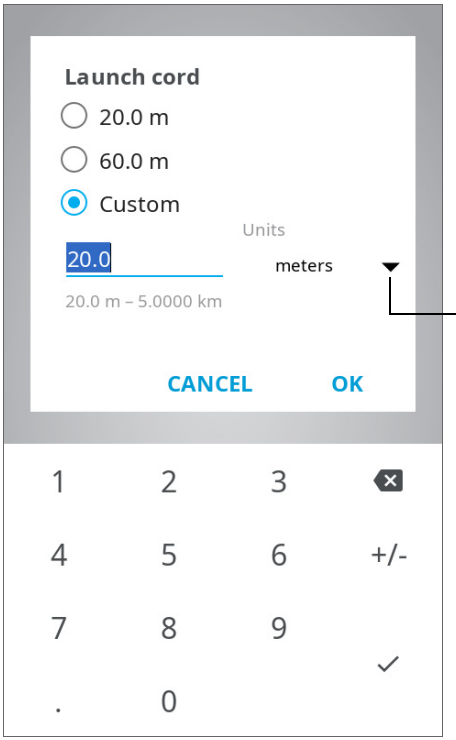

***3.*** To configure the launch and receive cords settings, proceed as follows:

***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 test. If you have selected **Custom**, enter the length with the numeric keypad.




***3d.*** If necessary, change the distance units.

***3e.*** Tap **OK** to return to Fiber Xplorer.

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. 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 probe before connecting them. Failure to do so will 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 6.

## IMPORTANT

**For optimum performance of your unit:**

- **Ensure that it remains within the recommended operation and storage temperatures (see *Equipment Ratings* on page 17).**
- **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

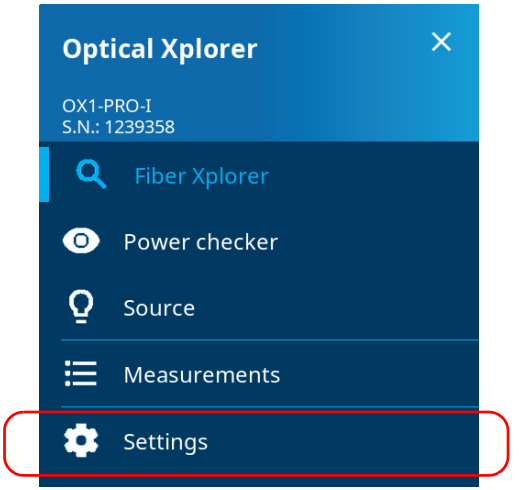
You may want to adjust the display brightness yourself to better fit your work environment or preferences.

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

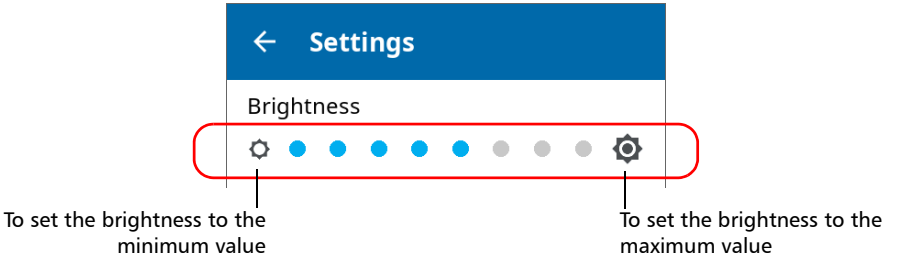
The brightness value is kept in memory even when you turn the unit off.

***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 on Your Unit

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

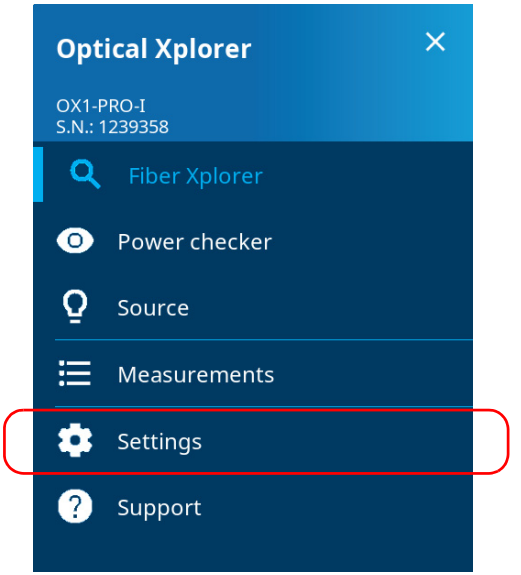
This sound varies with the type of notification, which means that you will hear a different sound in each of these situations:

- 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.

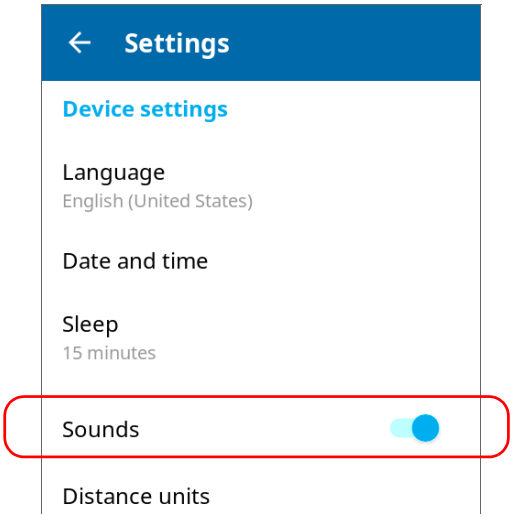
You can disable the sound notifications if you prefer. Your preference is kept in memory even when you turn the unit off.

***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.

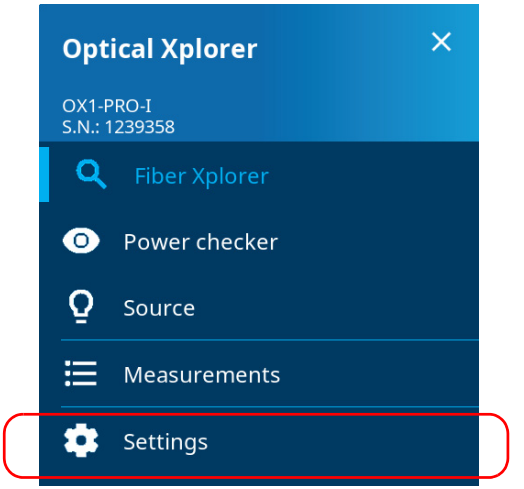
# Selecting the Language of Operation

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

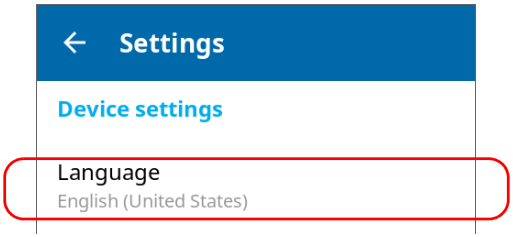
The value is kept in memory even when you turn the unit off.

***To select a new interface language:***

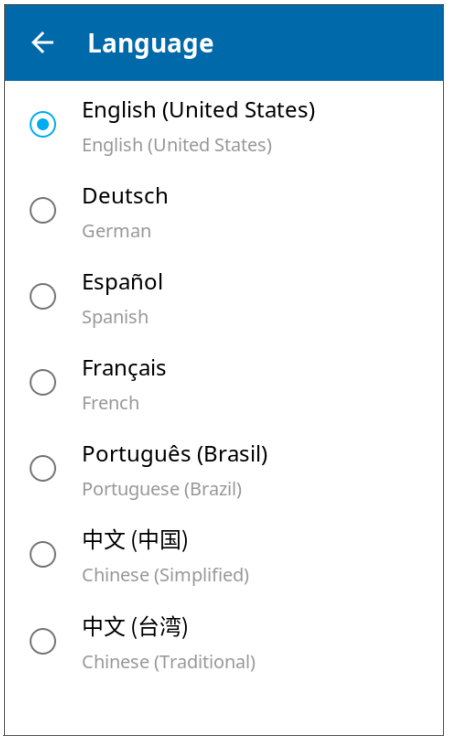
1. From the main menu, tap **Settings**.




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.

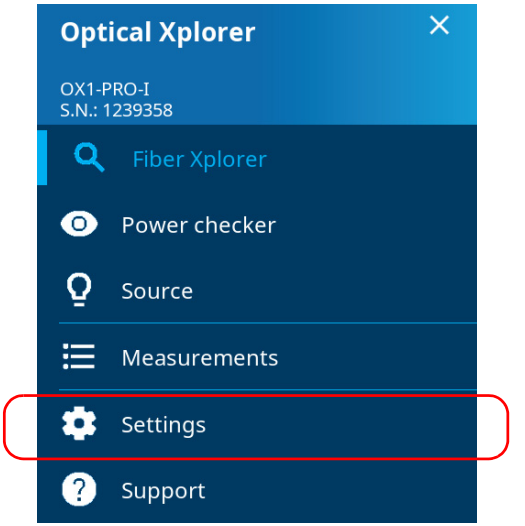
***Note:*** *You cannot modify the format in which the date is displayed.*

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).

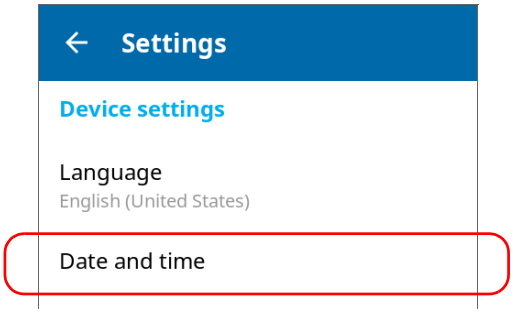
If you use your unit in conjunction with a smart device, each time a connection is established between the two, by default, the date, time and time zone of the unit are synchronized with those of the smart device. You can disable the automatic synchronization if you prefer.

***To modify the date format:***

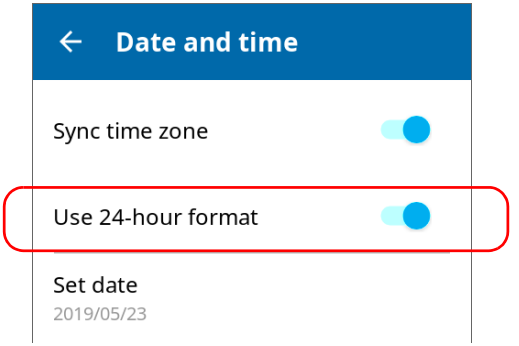
***1.*** From the main menu, tap **Settings**.



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



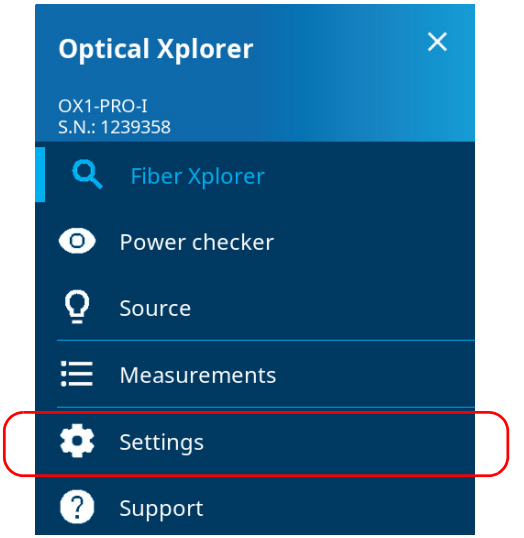

4. With the **Use 24-hour format** toggle, enable or disable the option, depending on your preference. If you prefer to view the time in a 12-hour (AM/PM) format, ensure that the **Use 24-hour format** option is disabled.



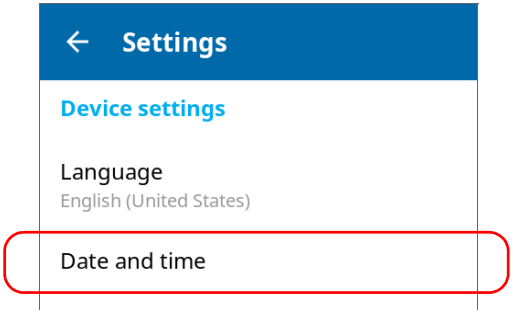

The new time format is taken into account immediately.

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

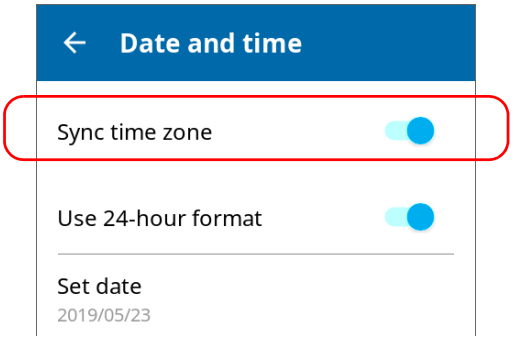
1. From the main menu, tap **Settings**.




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

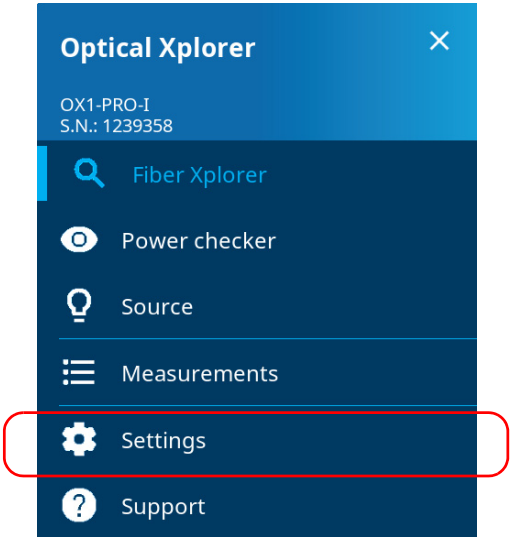


4. With the **Sync time zone** toggle, enable or disable the synchronization of date and time with the TestFlow mobile application.

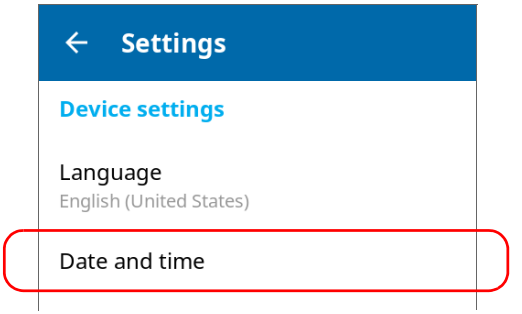



***To adjust the date, time or time zone manually:***

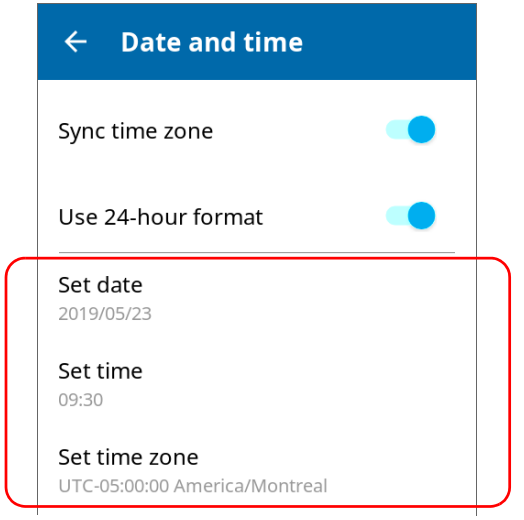
1. From the main menu, tap **Settings**.



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.

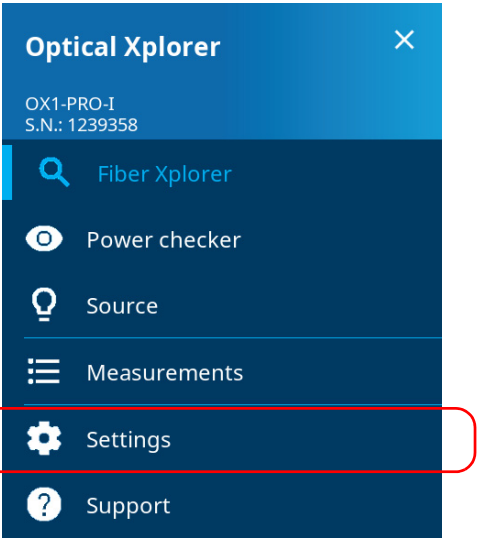
By default, the unit uses metric distance units (meters and kilometers), but you can change for imperial units (feet and kilofeet) if you prefer.

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

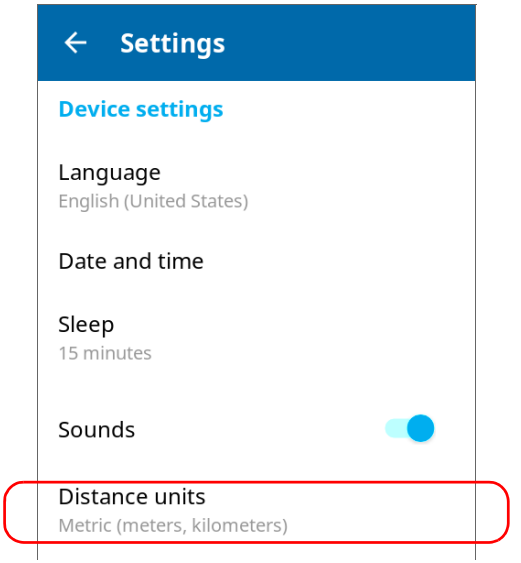
The value that you set is kept in memory even when you turn the unit off.

***To select the distance units:***

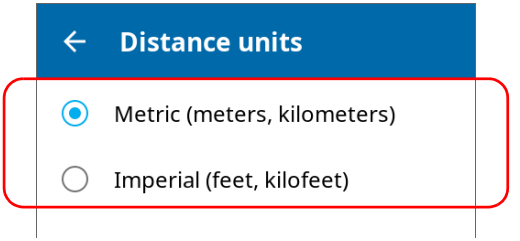
***1.*** From the main menu, tap **Settings**.



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 the Duration After Which the Unit Enters 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 23).

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

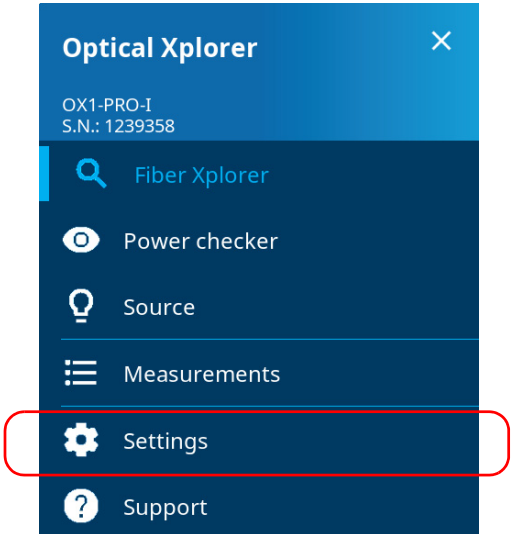
The value that you set is kept in memory even when you turn the unit off.

## IMPORTANT

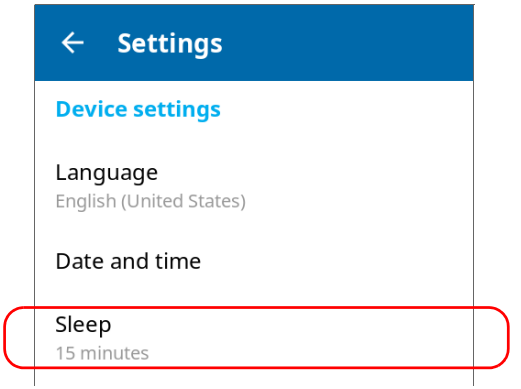
- **If you intend to leave your unit in sleep mode for more than a few hours, you should turn it off (shutdown) to save battery power. After four hours in sleep mode, your unit will go into shutdown mode automatically to save battery power.**
- **The unit will not enter sleep mode while you perform tests 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 95.**

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

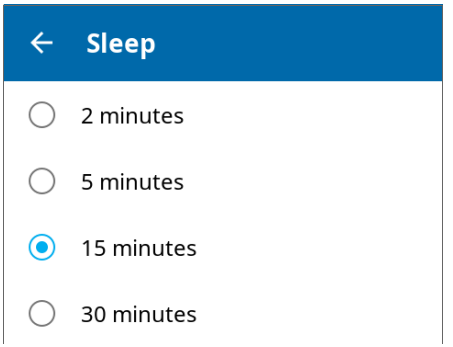
***1.*** From the main menu, tap **Settings**.



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.

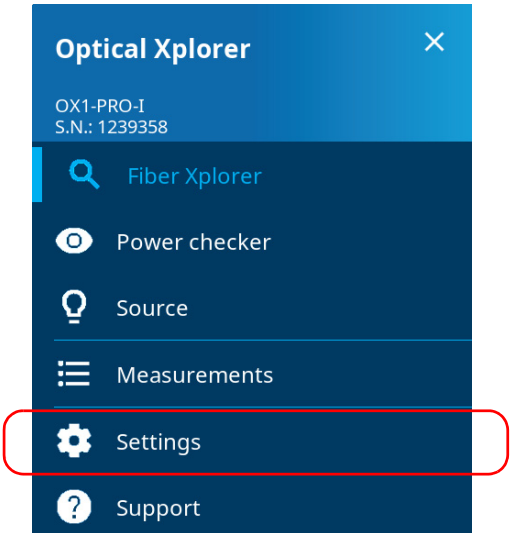
# Selecting Test Wavelengths

You can select the wavelengths you want to use for the link you want to measure. The selection of the wavelengths is kept in memory when you turn off the device.

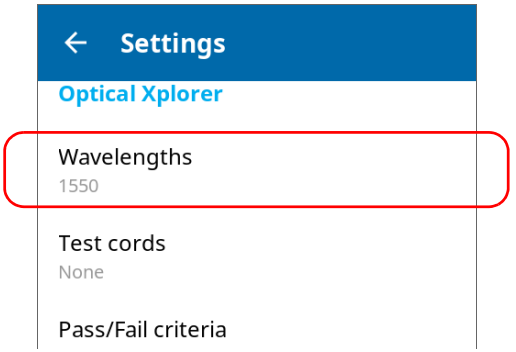
You can make your selection in the settings page or directly in Fiber Xplorer.

***To select test wavelengths from the settings page:***

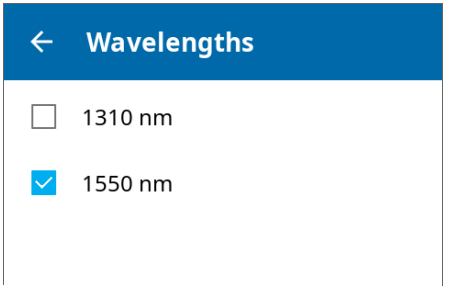
***1.*** From the main menu, tap **Settings**.



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



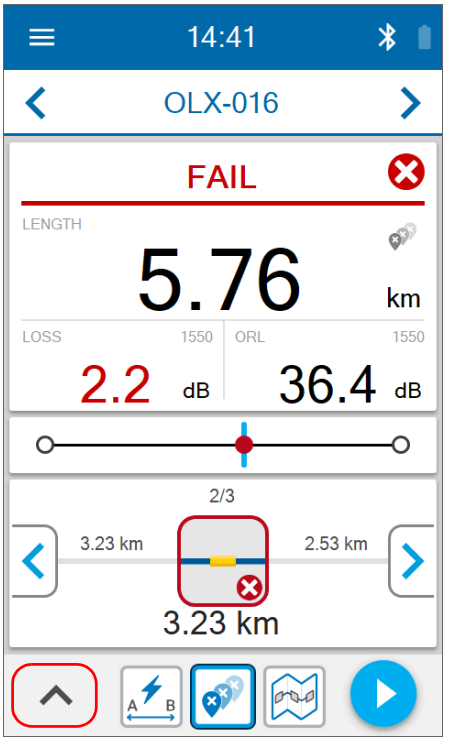

***3.*** Select the wavelengths you want to use for your tests.



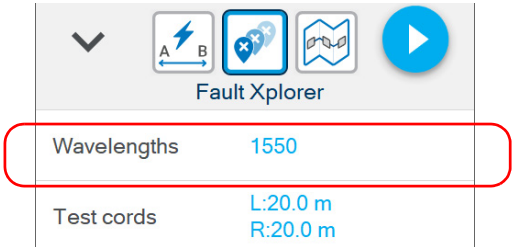

The new selection is taken into account for the next measurement.

***To select test wavelengths in Fiber Xplorer:***

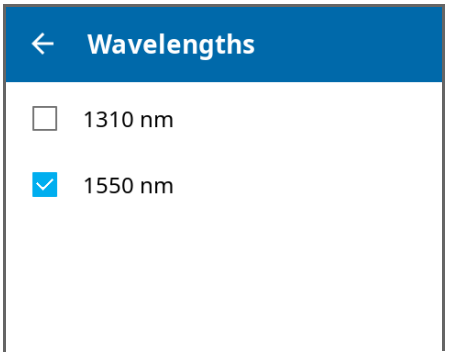
***1.*** From Fiber Xplorer, tap the arrow to access the bottom drawer.



***2.*** Tap **Wavelengths**.




***3.*** Select the wavelengths you want to use for your tests.




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

# 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 75 for details.

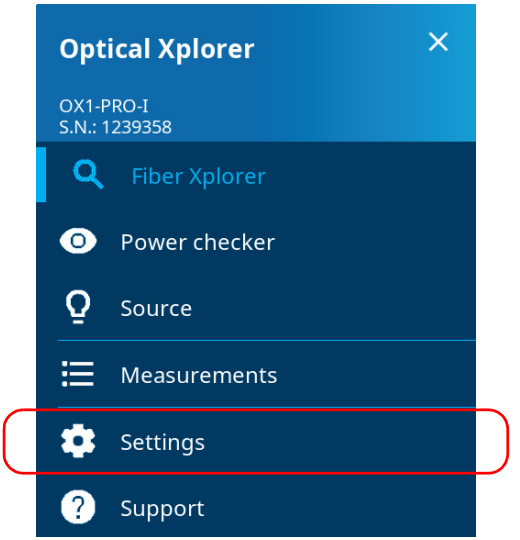
You can also let EXFO Advisor rank the quality of the results. The ranking ranges from zero to five stars (half stars are possible).

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

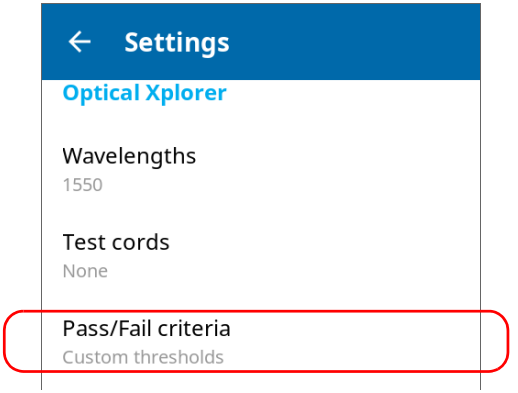
By default, the link thresholds (loss, length, ORL) are disabled. You can enable and customize them when you use Fault Xplorer or Link Mapper. You can also customize thresholds related to the elements (connector loss and reflectance, splice loss). The threshold values, for both the link and elements, 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**.



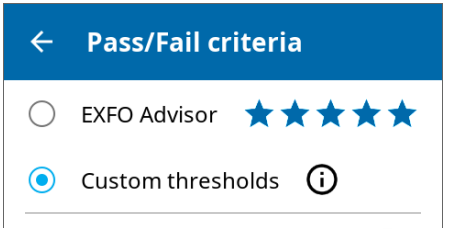

2. Under **Optical Xplorer**, tap **Pass/Fail criteria**.



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

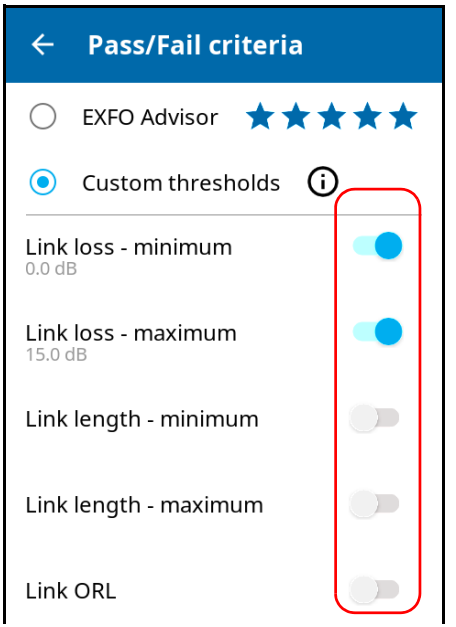
OR

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

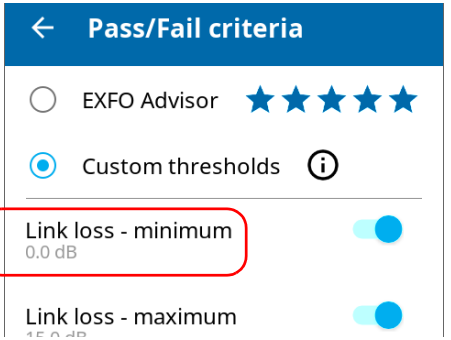



***4.*** To edit the threshold values, proceed as follows:

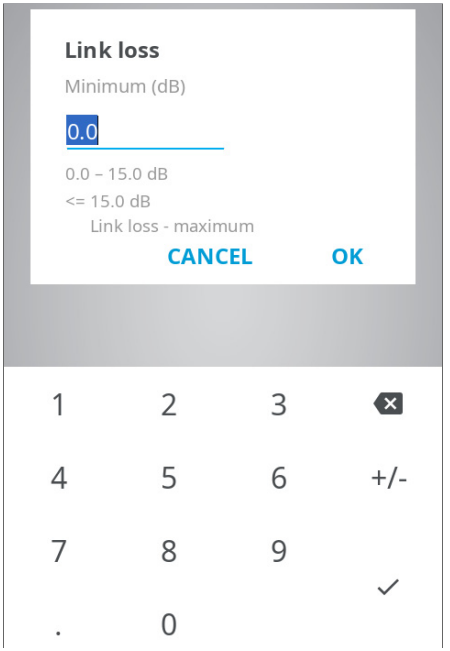
***4a.*** If necessary, activate the threshold with the toggle button.



***4b.*** Tap on the threshold you want to modify.




***4c.*** Enter a new value.

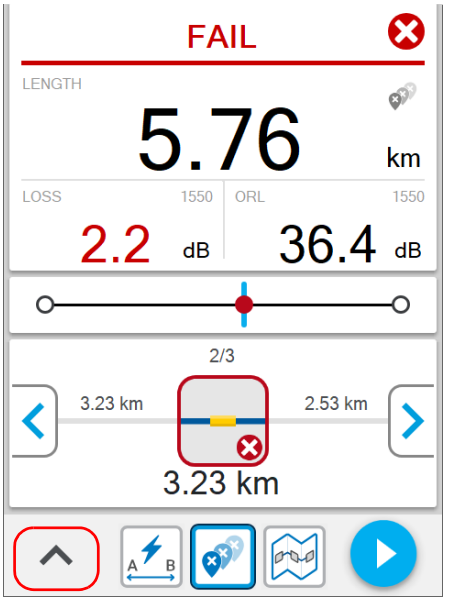



***4d.*** Tap **OK** to return to the **Pass/Fail criteria** page.

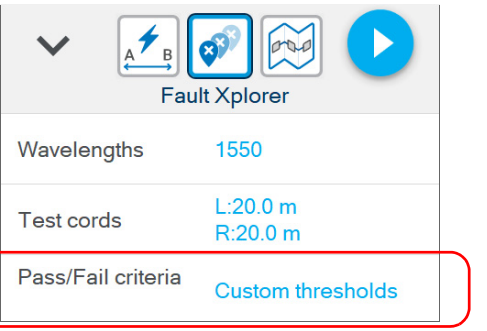
The new thresholds are taken into account for the next measurement.

***To configure custom thresholds or EXFO Advisor from Fiber Xplorer:***

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



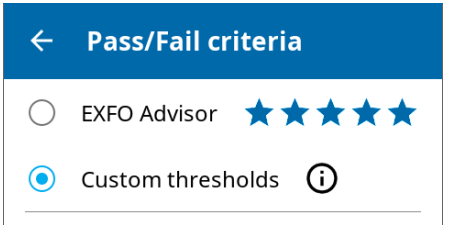

2. Tap **Pass/Fail criteria**.



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

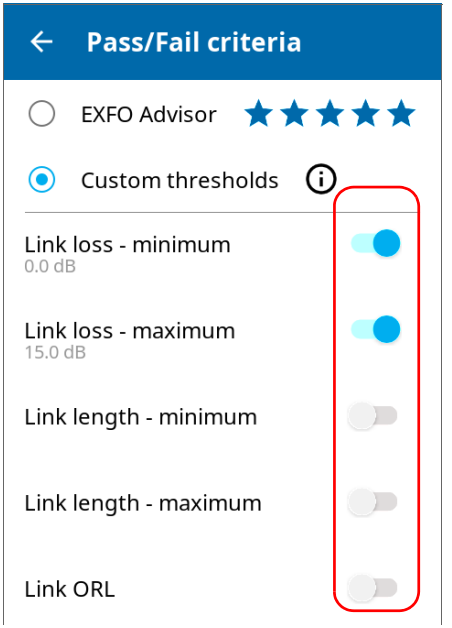
OR

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

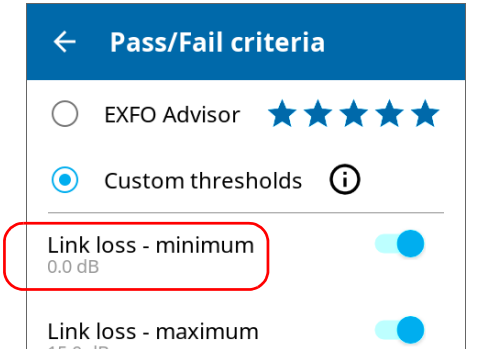



**4.** To edit the threshold values, proceed as follows:

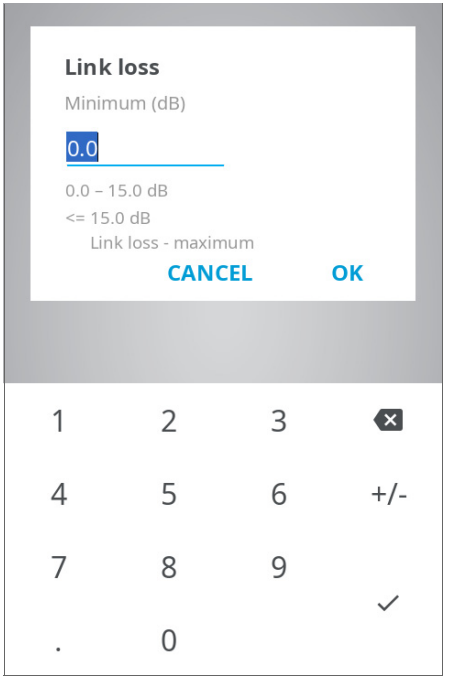
**4a.** If necessary, activate the threshold with the toggle button.



***4b.*** Tap on the threshold you want to modify.




***4c.*** Enter a new value.




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

# Configuring IOR Value

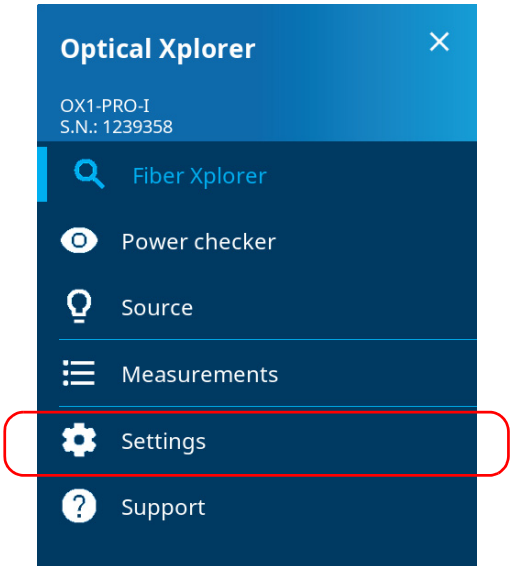
Having the proper IOR is crucial for all measurements associated with distance (element position, total length, etc.). By doing so, you ensure that the distances are more accurate for your measurements.

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

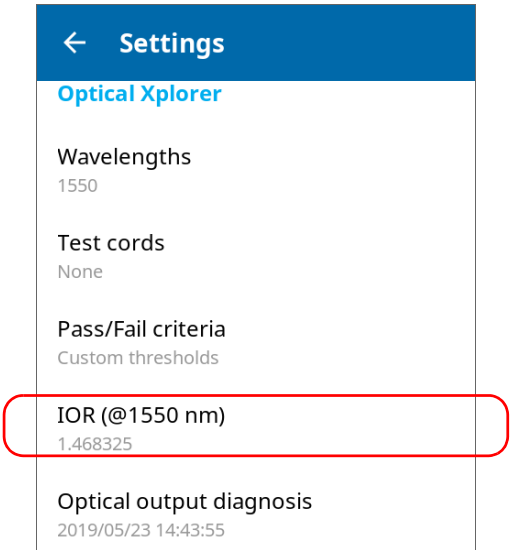
IOR is provided by the cable or fiber manufacturer.

***To configure the IOR value:***

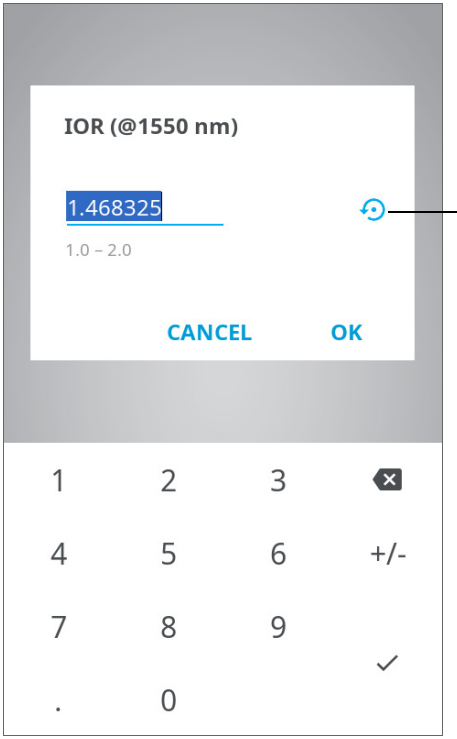
***1.*** From the main menu, tap **Settings**.



2. Under **Optical Xplorer**, 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.

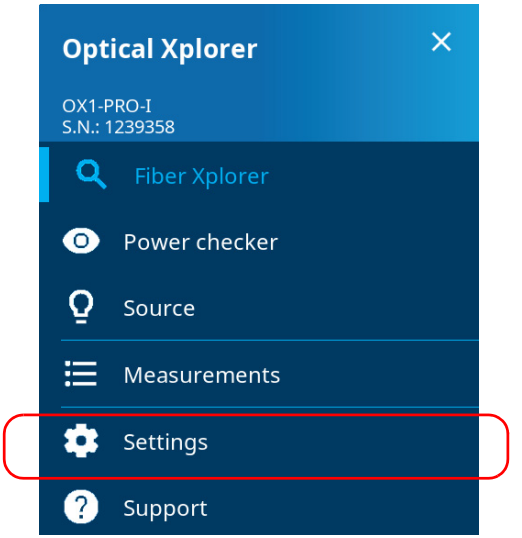
# Reverting to Factory Settings

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

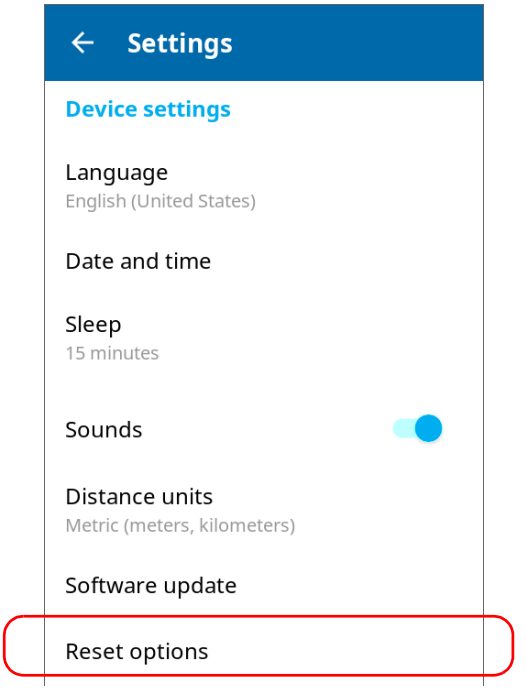
- reset all settings of the unit that you have customized, such as the thresholds, to their default values
- reset the OX1 to factory settings (all customized settings and erase all measurements)
- reset the battery indicator information once you have replaced the battery (see *Replacing the Battery* on page 118 for details)

***To revert values to factory settings:***

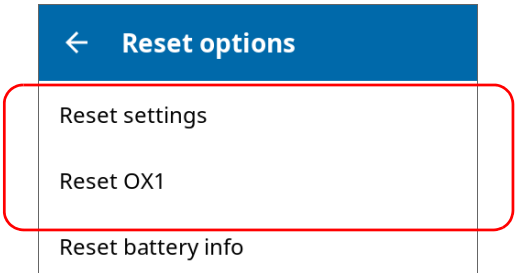
***1.*** From the main menu, tap **Settings**.



***2.*** Under **Device settings**, select **Reset options**.




***3.*** Select the desired option.




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

# 5 Testing Fibers

The Optical Xplorer 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<br>For length, IL, and ORL. | ➤ Very fast measurement time.<br>➤ The link assessment is always performed using the EXFO Advisor settings. The rating displayed suggests that the link may contain faults. |
| Fault Xplorer<br>For length, IL, ORL, and fault exploration. | ➤ Fast measurement time when no problems are found on the fiber link.<br>➤ Localizes and identifies the fault types on the fiber link. |
| Link Mapper (Pro models only)<br>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.<br>➤ Identifies, measures and locates all detectable elements on a link. |

# Performing Measurements

The Optical Xplorer 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 58 for details)
- the length of the launch and receive test cords (see *Working With Launch and Receive Test Cords* on page 28 for details)
- the IOR value (see *Configuring IOR Value* on page 65 for details)

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

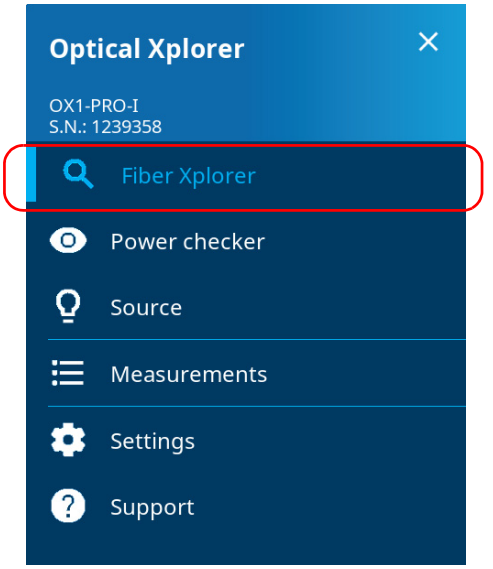
***To perform measurements:***

1. Clean the connectors properly.
2. Connect a fiber to the Optical Xplorer port.

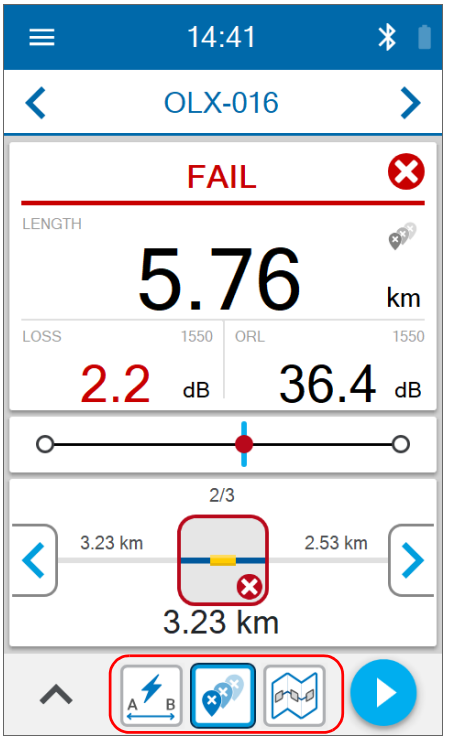
## CAUTION

**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.**

3. On your unit, ensure that the parameters have been set according to your needs.
4. From the main menu, tap **Fiber Xplorer**.



***5.*** Select a test function (see *Test Functions and Tools* on page 8 for details).




***6.*** Tap the button to start the measurement.

Once a test is performed, you can view the results in different parts of the screen.

The results are saved automatically on the unit.

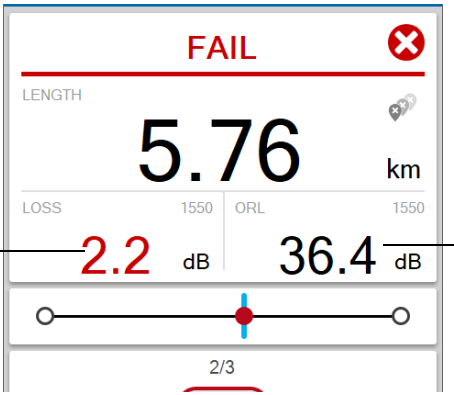
# Working With Link Results

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

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

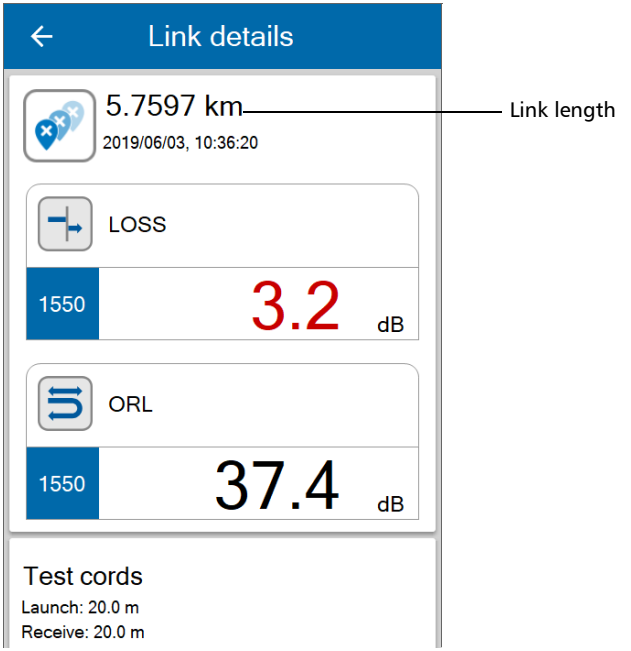
Since you cannot use custom thresholds in Flash Advisor, the EXFO Advisor ranks the quality of the results according to the parameters used for the measurement. The ranking ranges from zero to five stars (half stars are possible). The same ranking is applied to all wavelengths. If you use the EXFO Advisor 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 the loss and ORL values by wavelength. The page displays also 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.*

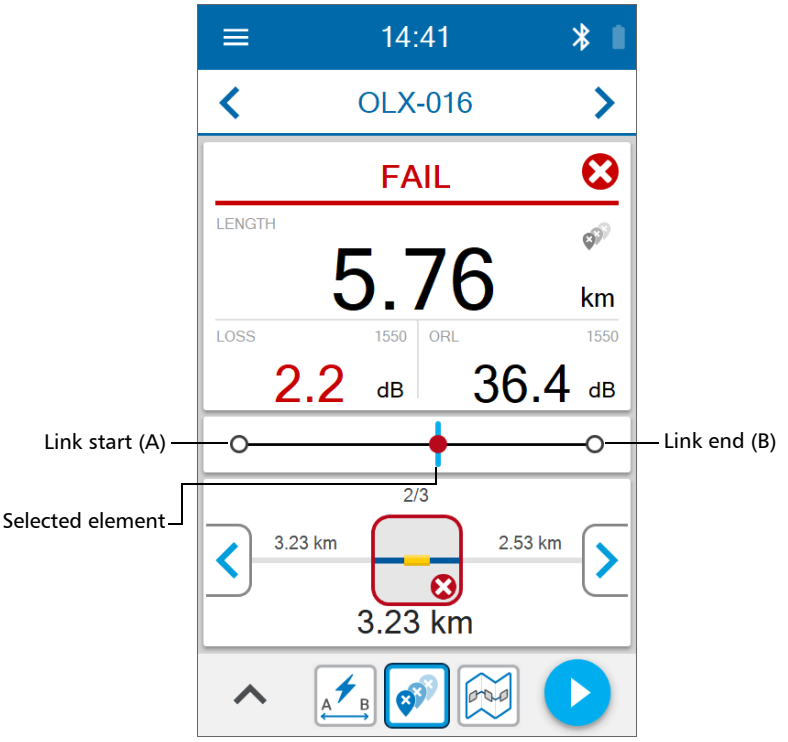


# Working With Link Overview

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.

When you select an element in the link overview, it is automatically selected in the link view. See *Working With Link View* on page 78 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.

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 77 for details.

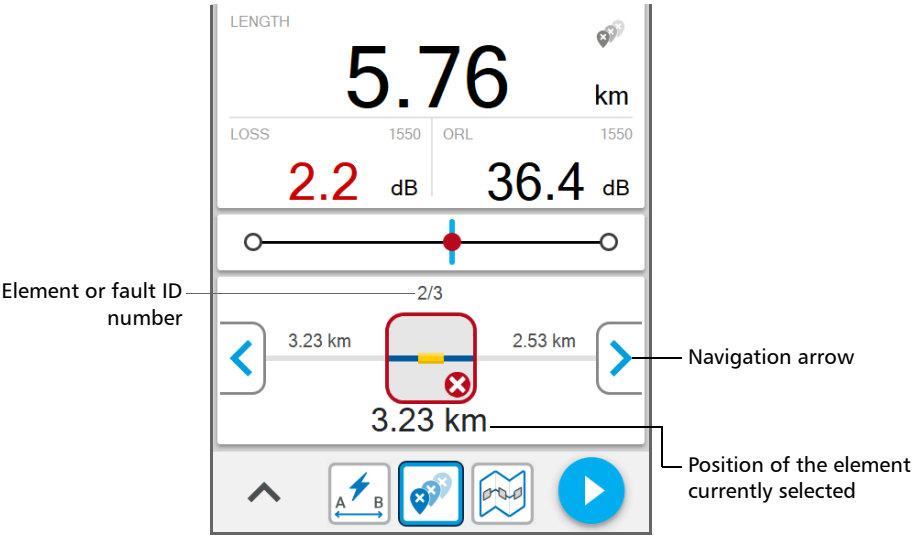
***Note:*** *The link view is not available in Flash Advisor.*

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.

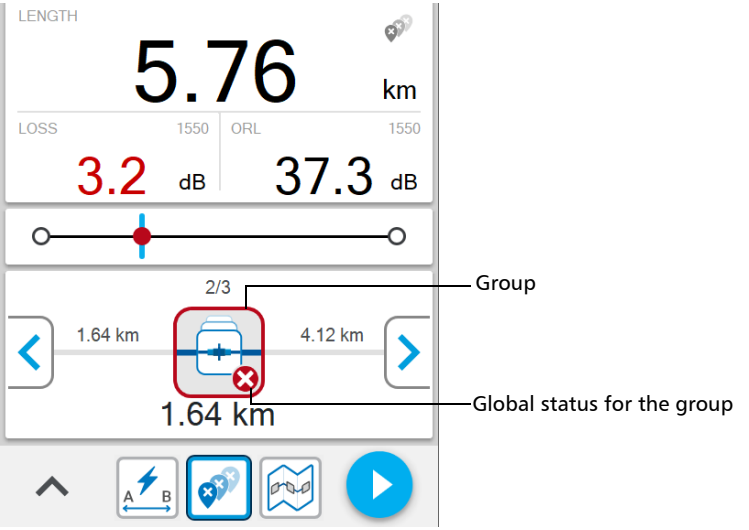
The elements are represented by the following icons:

| 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. |
| Connector B | | Connector B corresponds to the link end. |

| Element Name | Element Icon | Meaning |
|---|---|---|
| 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 Xplorer models 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 Optical Xplorer 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 Optical Xplorer 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.**

# Setting Thresholds

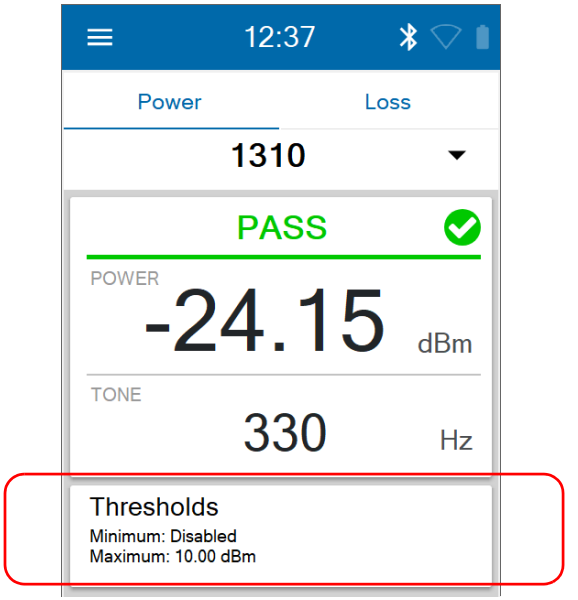
You can define thresholds to specify minimum and maximum power or loss values for each wavelength or you can apply the same thresholds to all wavelengths. You can also choose not to define any threshold values by disabling this feature. All values can be reverted to factory settings at any time. The 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 in the power checker page:***

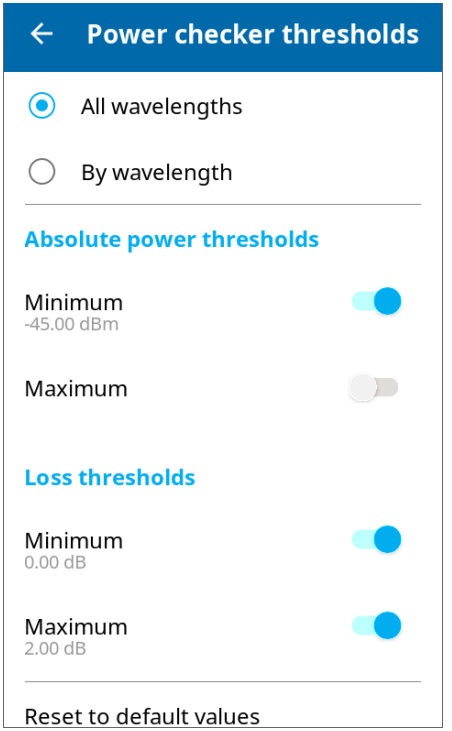
***1.*** Tap **Thresholds**.



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

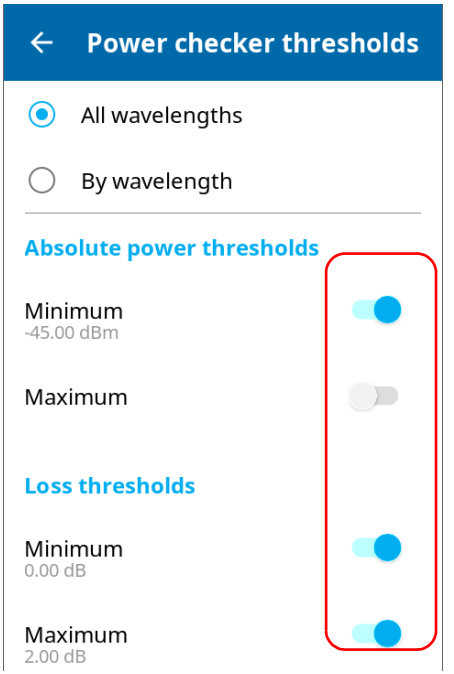
   OR

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

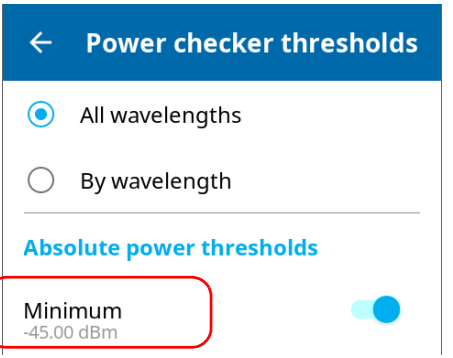


***3.*** To edit the threshold values, proceed as follows:

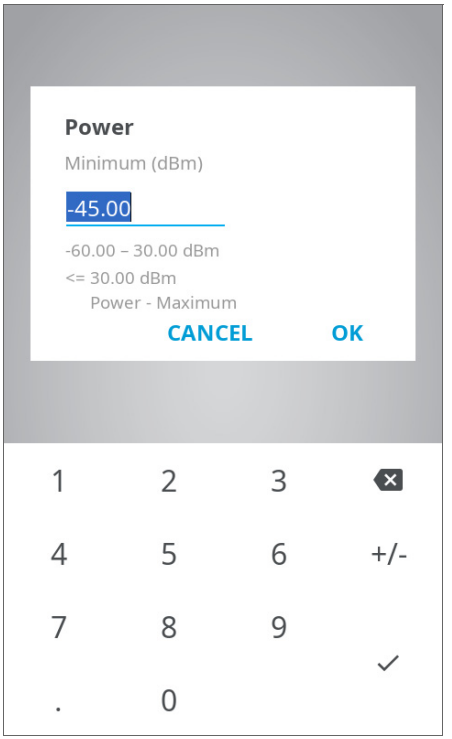
***3a.*** If necessary, activate the threshold with the toggle button.




***3b.*** Tap on the displayed numbers.



***3c.*** Enter a new value.

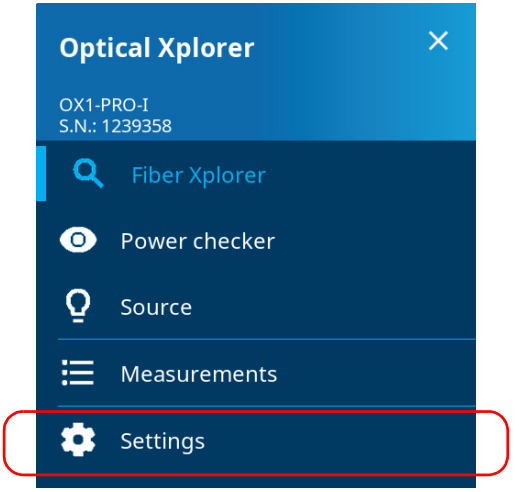



***3d.*** Tap **OK** to return to the **Power checker thresholds** page.

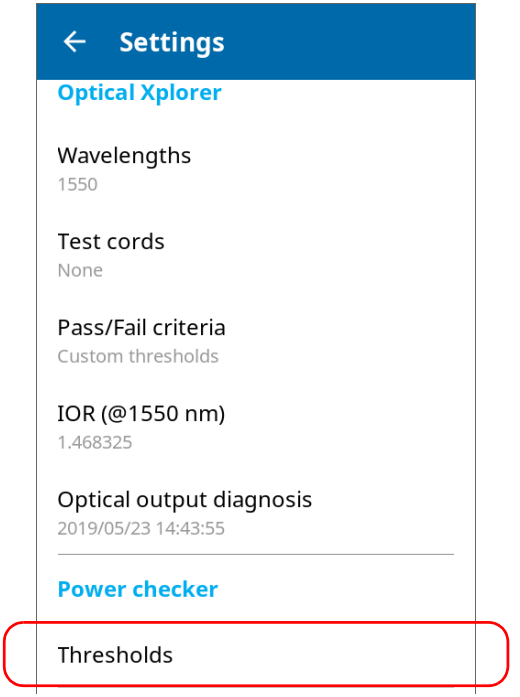
***Note:*** *You can revert to factory settings at any time by tapping* ***Reset to default values****.*

***To set power or loss thresholds from the settings page:***

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



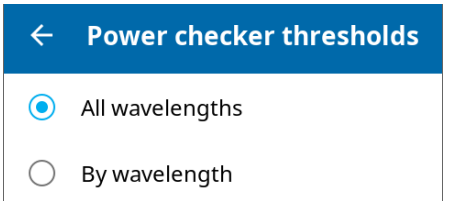
***2.*** Under **Power checker**, tap **Thresholds**.




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

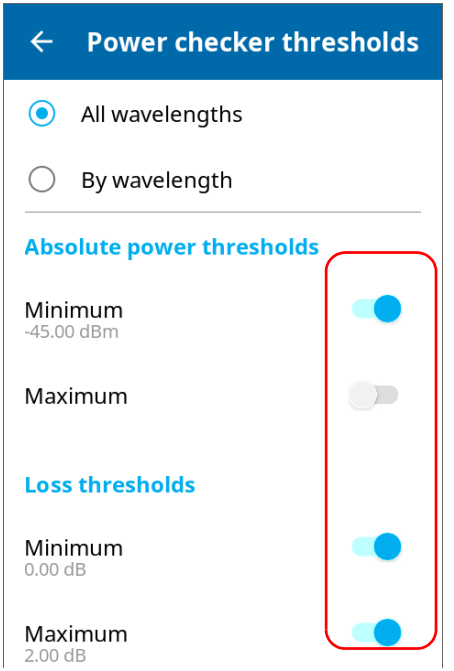
OR

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

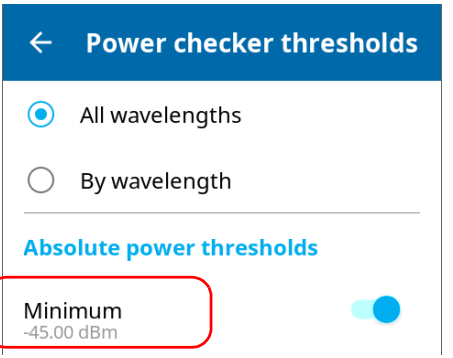


***4.*** To edit the threshold values, proceed as follows:

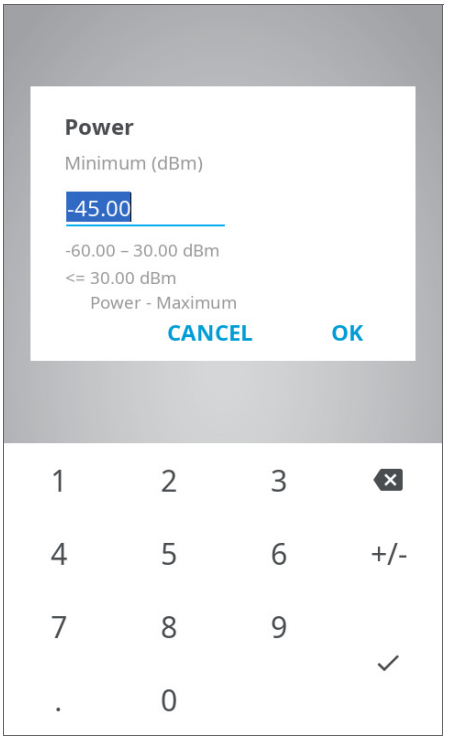
***4a.*** If necessary, activate the threshold with the toggle button.




***4b.*** Tap on the displayed numbers.



***4c.*** Enter a new value.




***4d.*** 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****.*

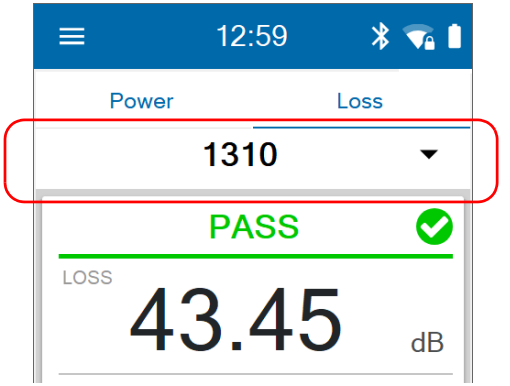
# Setting Reference Values on Your Power Checker

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.

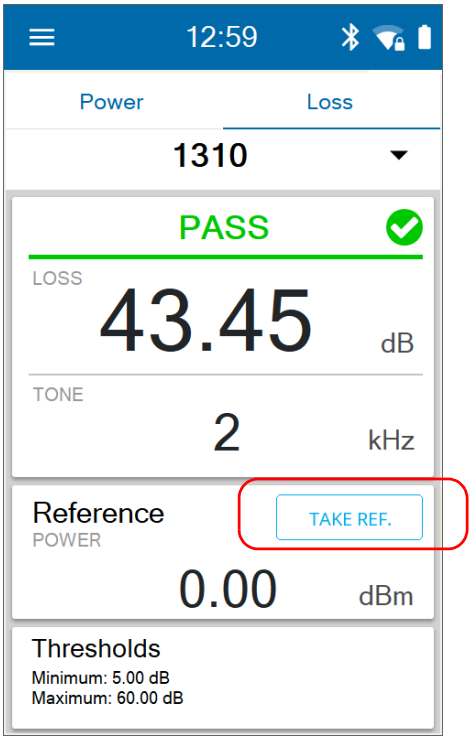
You can set a different reference value for each wavelength. The reference value remains available as long as you do not restart the unit. By default, the reference value is set to 0.00 dBm.

***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

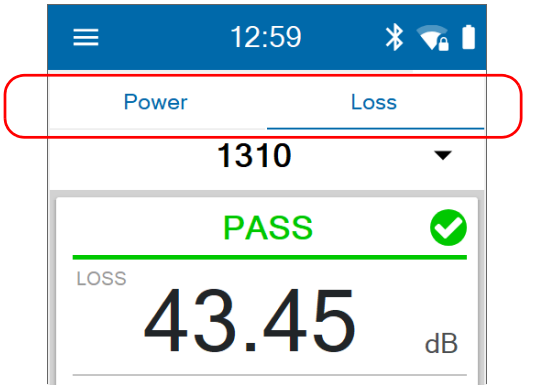
Measuring absolute power or link loss is done the same way, except for the referencing step.

***To perform power or loss measurements:***

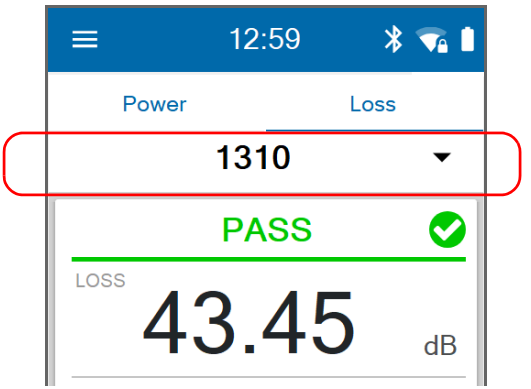
1. Inspect your fibers and clean them properly.
2. For loss measurements, reference your power checker to a light source (see *Setting Reference Values on Your Power Checker* on page 90), then deactivate the light source.
3. If you have used a single reference patchcord, disconnect it *from the power 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.




***7.*** Repeat the procedure for other wavelengths.

The absolute power or link loss value appears on screen.

# 7 Using the Light Source

You can use the Optical Xplorer as a light source to perform tests 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.

By default, the light source is off.

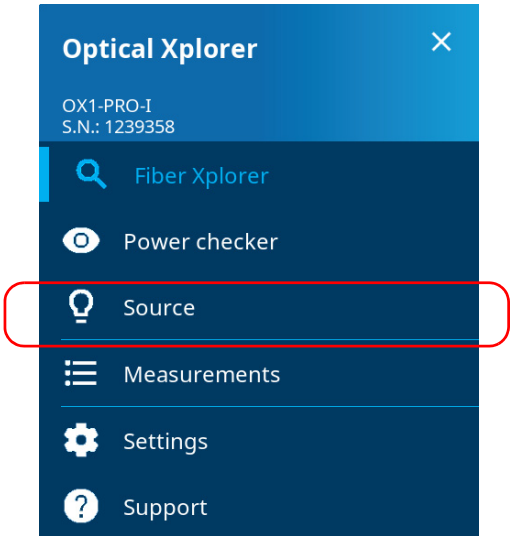
When the light source is on, it emits light constantly until you turn it off, but you can set a timer allowing light emission only for a certain period of time (up to 999 minutes). The first time you work with the source, the timer is disabled. The default value is set to 30 minutes when it is enabled. 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

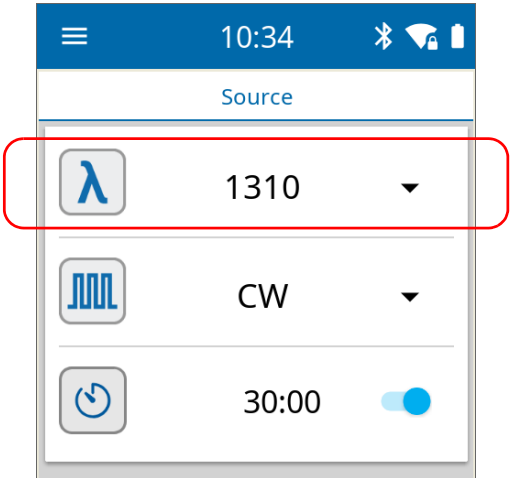
- **When you exit the source page, the light source continues to emit light. The light emission stops automatically when you open the power checker or the Fiber Xplorer page.**
- **If you have not set a timer to automatically turn off the source, do not forget to turn it off when the test is complete.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

***To use the light source:***

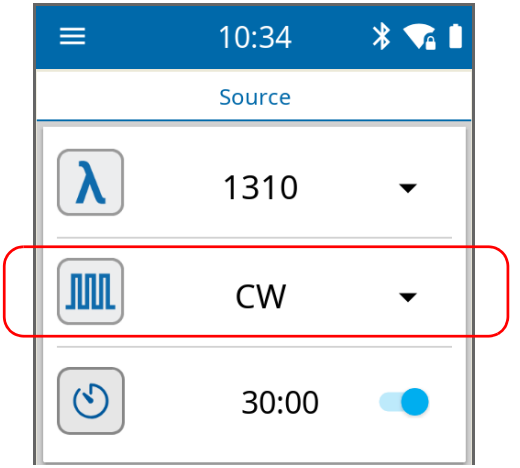
***1.*** From the main menu, tap **Source**.




***2.*** Select a wavelength.

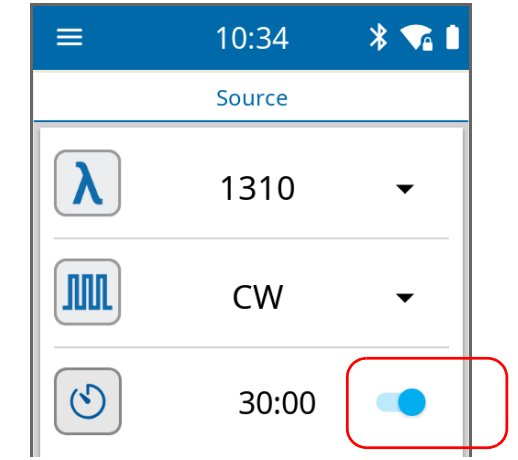


***3.*** Select a modulation.



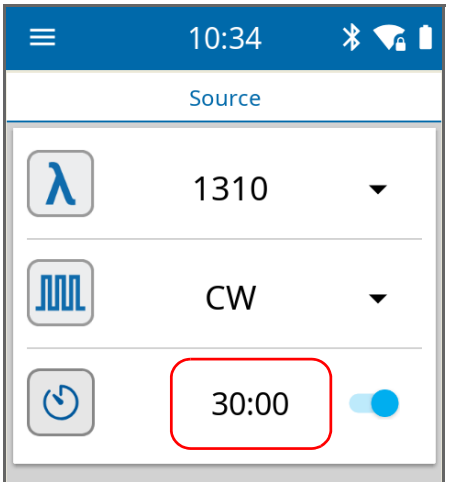

***4.*** To set the timer, proceed as follows:

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

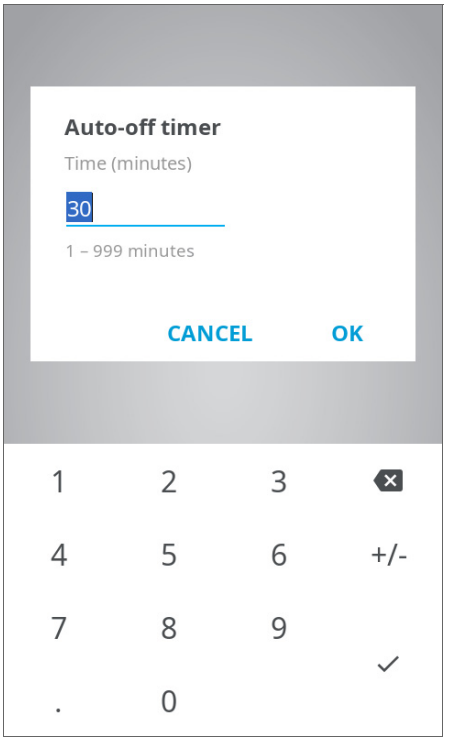



***Note:*** *If you do not want to set the timer, deactivate the feature with the toggle button.*

***4b.*** Tap on the displayed numbers.

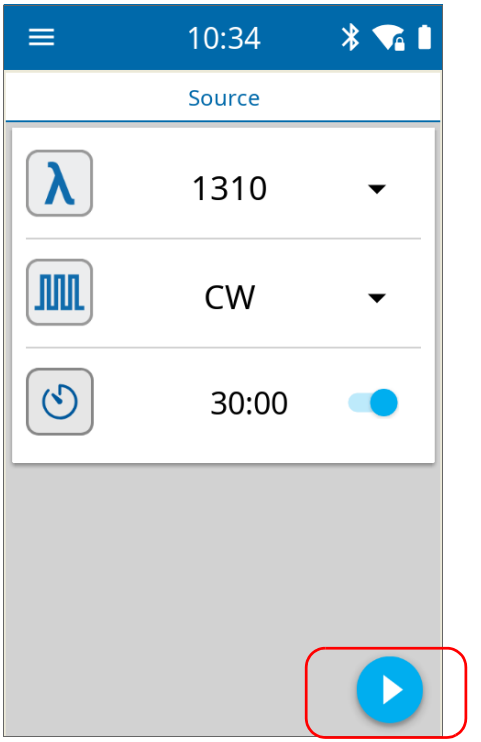


***4c.*** Enter the number of minutes during which you want the source to emit light.

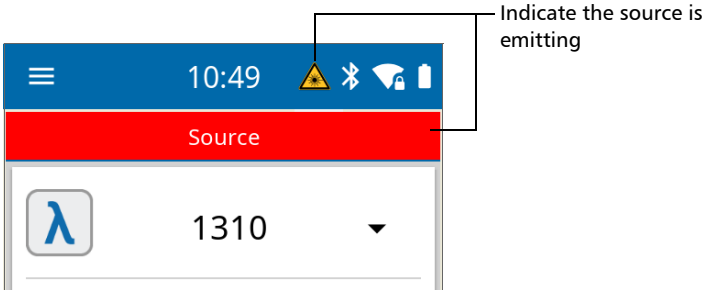



***4d.*** Tap **OK** to return to the **Source** page.

***5.*** Tap to start the light emission.

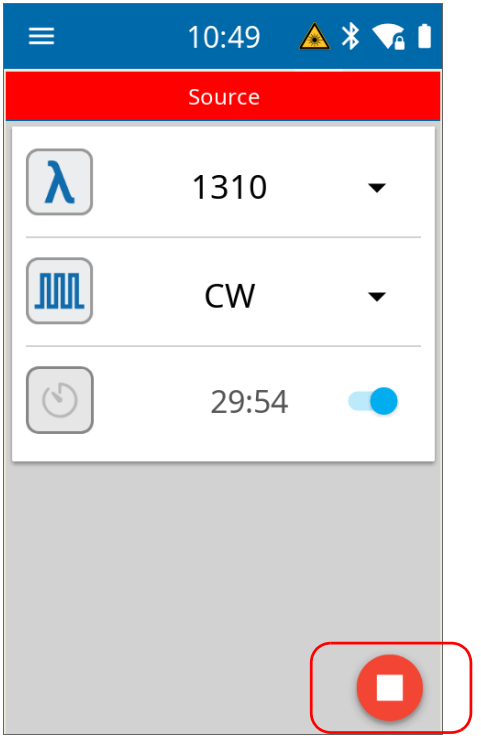



A blinking icon and a red banner clearly indicate when the light source is emitting.



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 delete measurements that you no longer need.

***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.

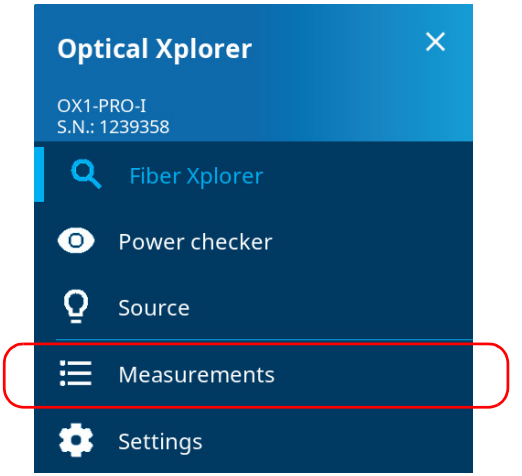
Once this number reaches 999, it is reset to 000 automatically. Any existing measurement bearing the same name as the new measurement is overwritten.

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

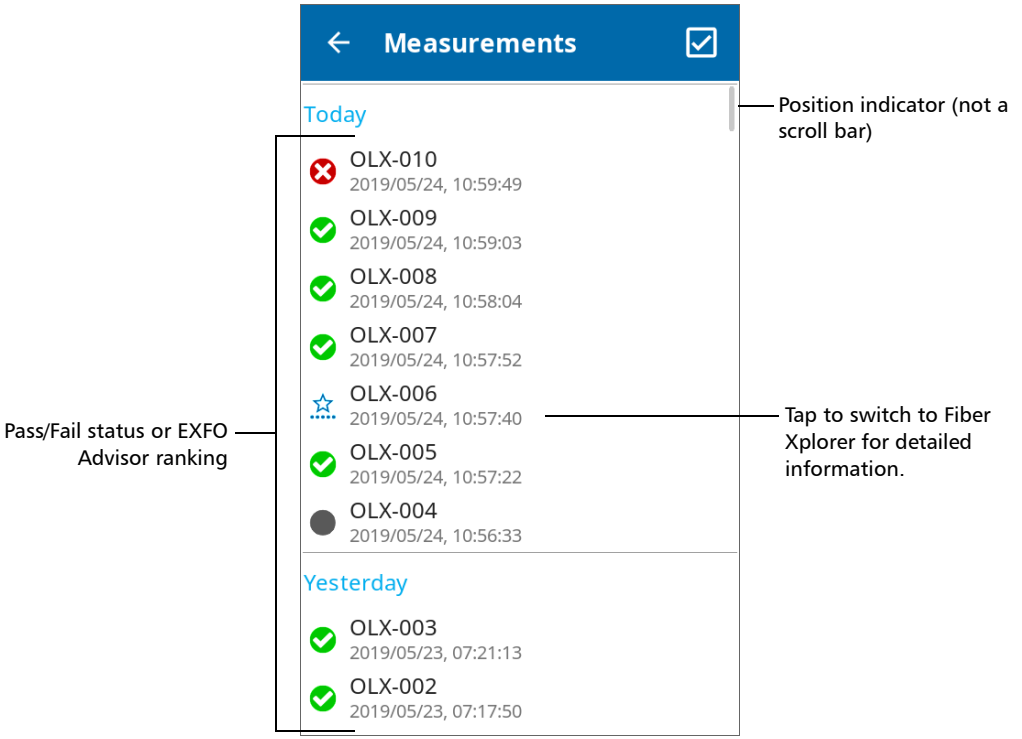
Measurements are visible from their dedicated list (accessible via the main menu) and from Fiber Xplorer.

***To view measurements from their dedicated list:***

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



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.

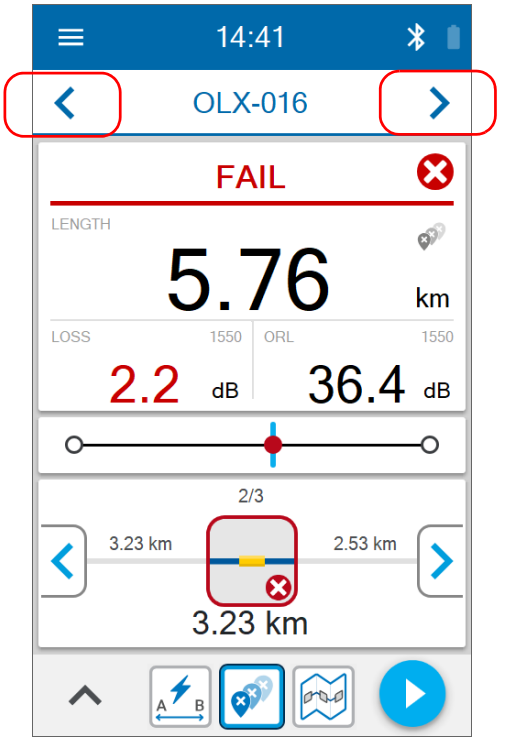



***Note:*** *The measurement appearing at the top of the list corresponds to the last measurement displayed in Fiber Xplorer.*

***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:***

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




For more information, see *Working With Link Results* on page 75, *Working With Link Overview* on page 77, and *Working With Link View* on page 78.

# Changing an Element Type

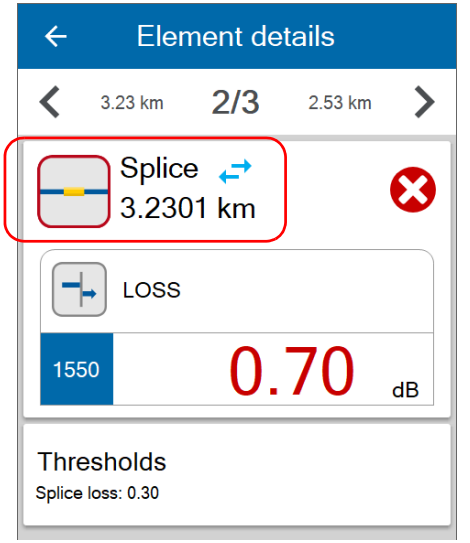
In Fault Xplorer and Link Mapper, you can change the element type identified as “splice” to the element type “connector”. The splice must be between the link start and the link end. A “*” sign is displayed to notify you that the former splice is now considered as a connector. Once the element type has 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.*

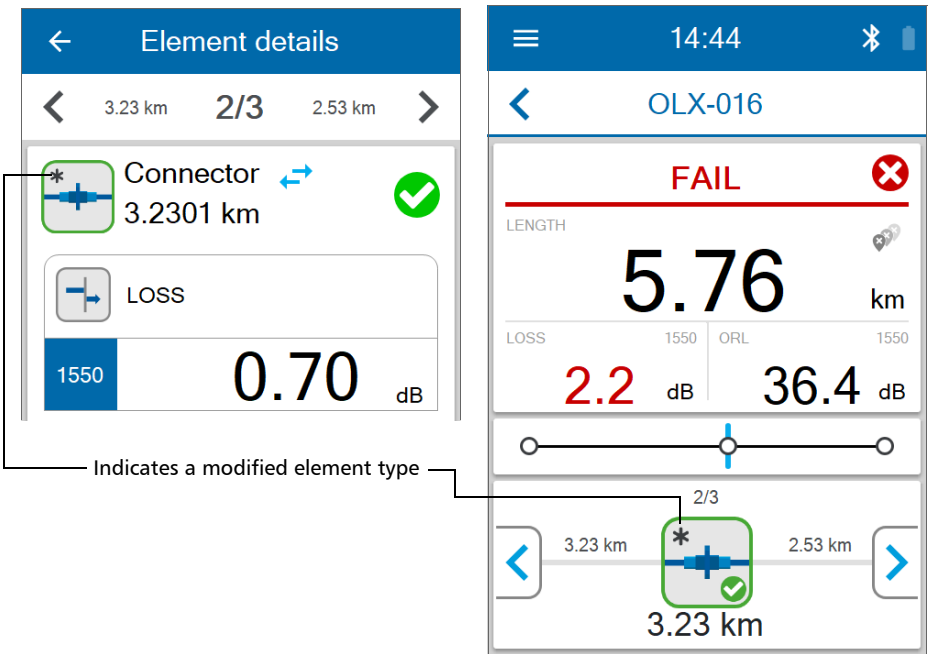
***Note:*** *No confirmation message will be displayed to confirm your change.*

***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 75 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

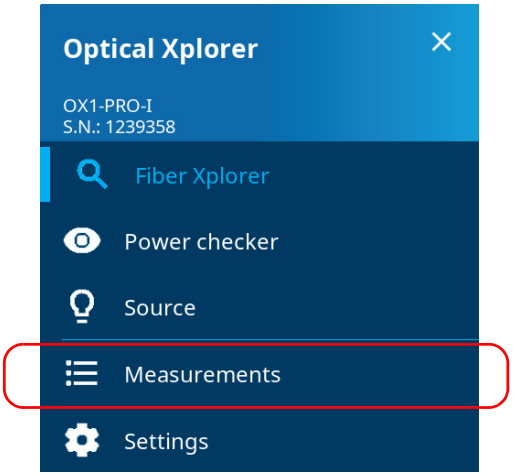
Every time you perform a measurement, the unit saves it under a sequential name generated automatically. The numeric part of the name increases from 000 to 999. Once the numeric part of the name reaches 999, it is reset to 000 automatically. The new results will then overwrite the existing ones bearing the same name.

If you want, you can also manually delete the measurements that you no longer need.

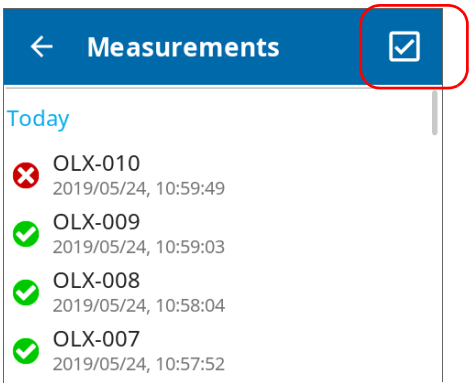
***Note:*** *The unit will always use the next name in sequence to store a measurement. This means that, for example, even if you delete the OX1-003 measurement right after it is complete, the unit will not reuse OX1-003 for the next measurement, but will use OX1-004.*

***To delete measurements manually:***

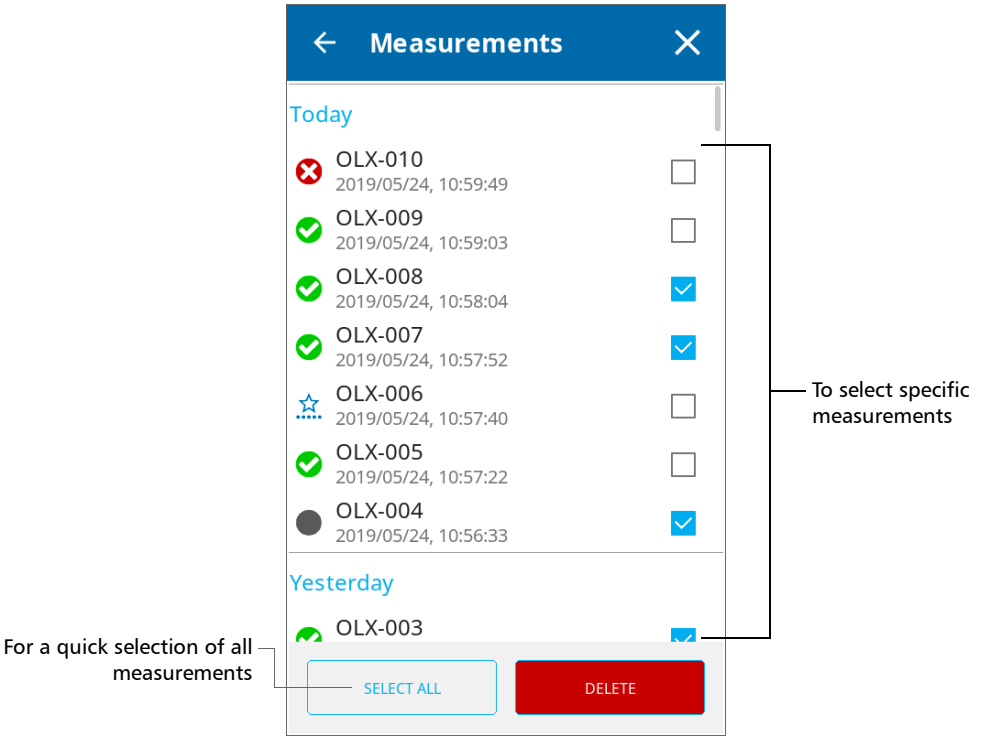
***1.*** From the main menu, tap **Measurements**.




***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.

# 9 Maintenance

To help ensure long, trouble-free operation:

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

## WARNING

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

# Cleaning 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 6.
- The unit also indicates the charge status with the LED on its front panel (see *LED Indicator Description* on page 5).

**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.

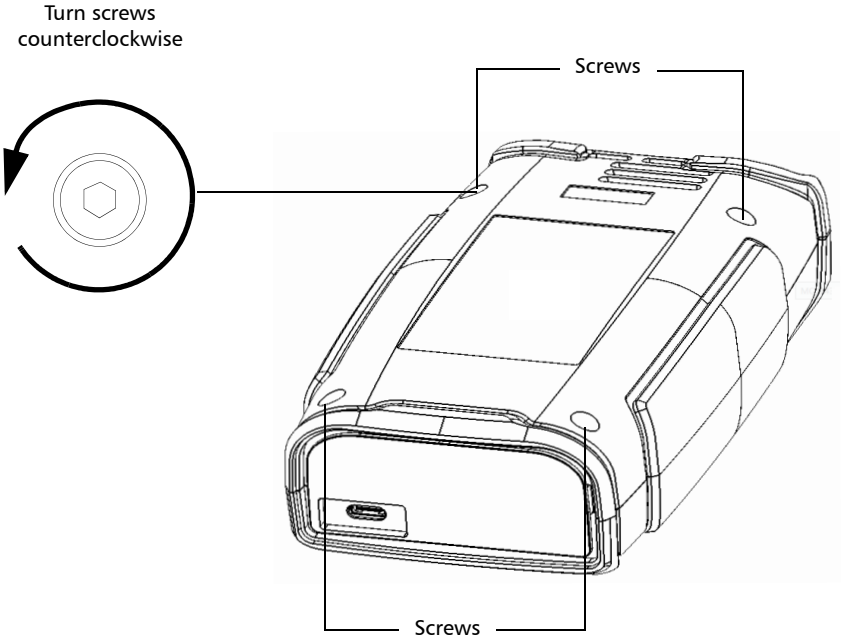
## CAUTION

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

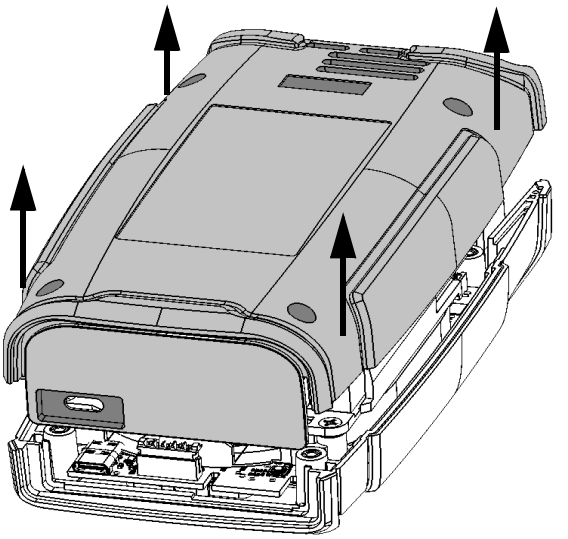
- **Always use an ESD-preventive wrist or ankle strap when replacing the battery. Ensure that the antistatic strap makes good skin contact and that the end of its wire is grounded properly.**
- **Never touch any component inside the unit other than those identified in the procedure hereafter, either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

***To replace the battery:***

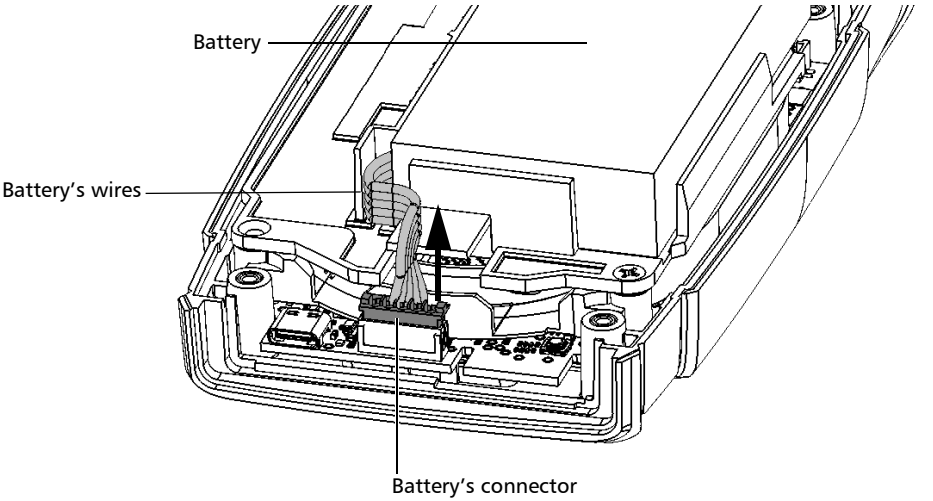
1. Turn off the unit (shutdown) and disconnect the fiber and USB cable (if applicable).
2. Position the unit so that its front panel rests on a flat surface such as a table.
3. On the back of the unit, using a 2.5 mm hex socket screwdriver, turn the screws (4) counterclockwise until they are loose, and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



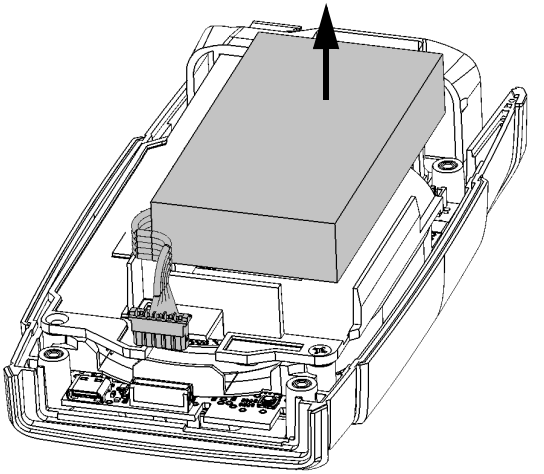
***4.*** Hold the back panel by its sides and pull it up to remove it.



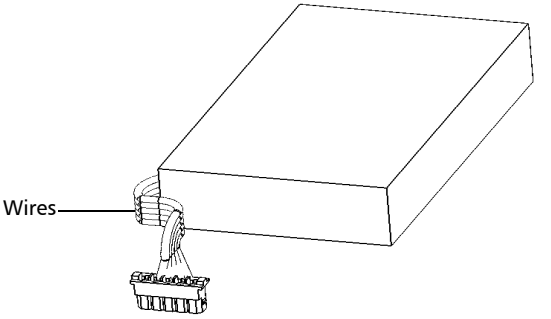
***5.*** Gently pull on the battery's connector to disconnect it from its socket.



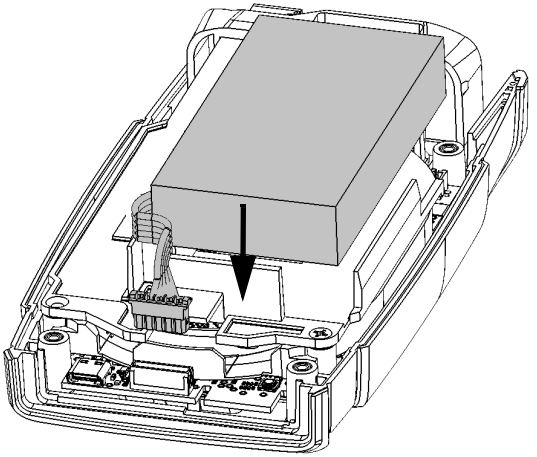
***6.*** Pull the battery up to remove it.



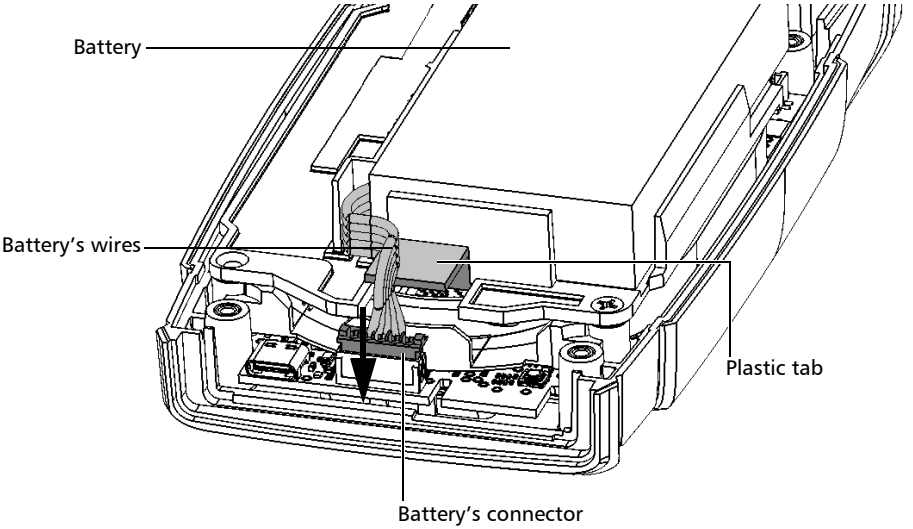
***7.*** Place the new battery so that its wires are located on the left side, toward the front.



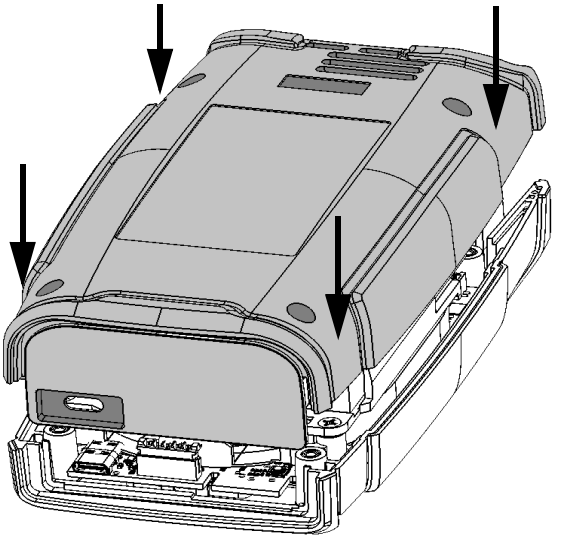
***8.*** Push the new battery toward the bottom of the case until it stops.



***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

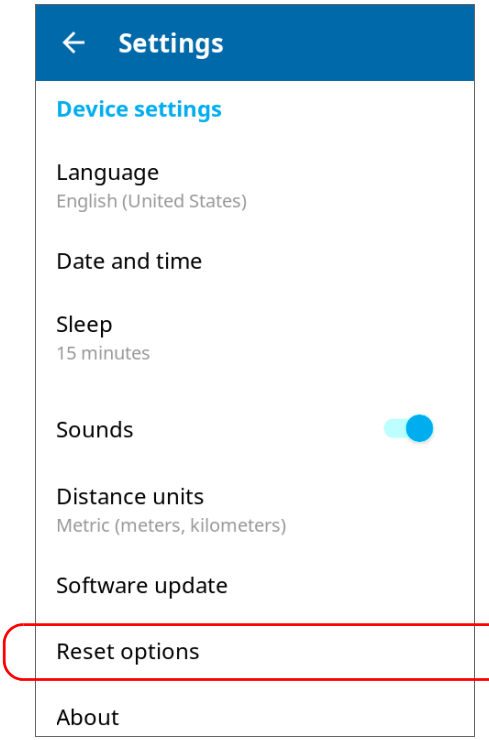
**To allow the unit to take into account the new battery, reset the battery information as explained hereafter.**

***12.*** Reset the battery information as follows:

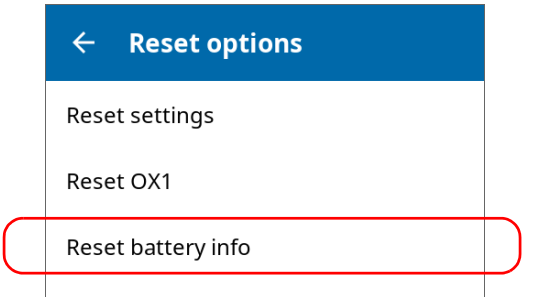
***12a.*** Connect the unit to a power outlet using the USB power adapter.

***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 ranks the result from zero to five stars (half-stars are possible). Any verification receiving a three-star ranking 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 model, 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

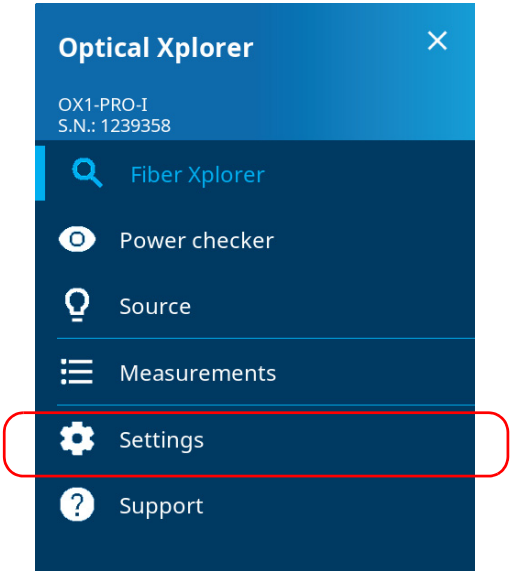
**Your unit has been designed not to require frequent calibrations (see *Recalibrating the Unit* on page 138). However, to ensure that the performance of your unit remains optimum, EXFO recommends to perform regular optical output verifications on it.**

***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 model, replace the Click-Out connector (see *Replacing the Click-Out Optical Connector (Pro Models Only)* on page 133). If the port is damaged and your unit is not equipped with a Click-Out connector, contact EXFO (see *Service and Repairs* on page 191*)*

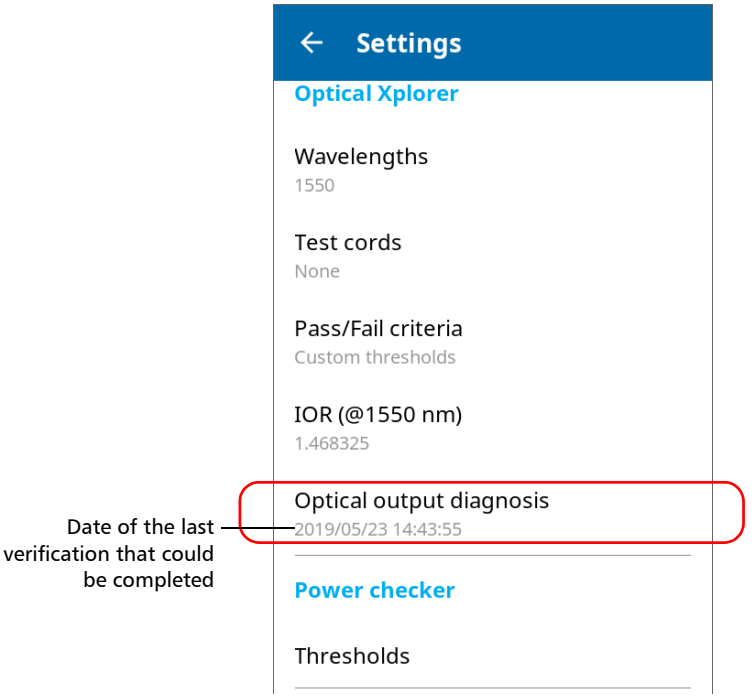
   OR

   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 Xplorer** section.

***6.*** Tap **Optical output diagnosis**.

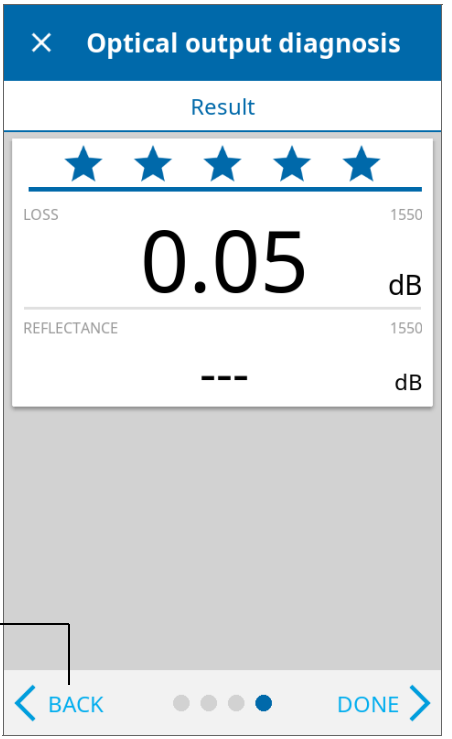



***7.*** Follow the on-screen instructions.

***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 model 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 Models Only) *on page 131*. *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 191).*

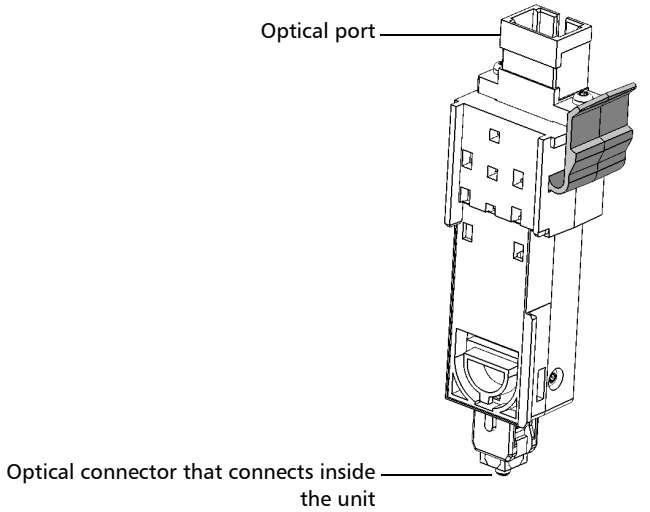


# Determining the Condition of the Click-Out Optical Connector (Pro Models Only)

If you have a Pro model, 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 Models Only)* on page 133).
2. Clean and inspect the optical port and the optical connector that connects inside the unit.



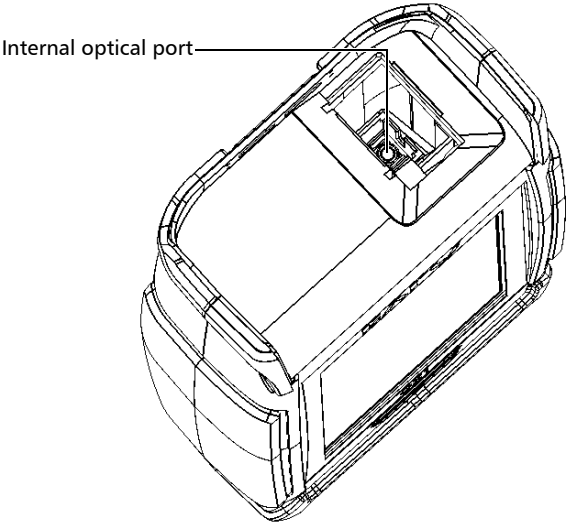
***3.*** If the port or the connector is damaged, replace the Click-Out connector (see *Replacing the Click-Out Optical Connector (Pro Models Only)* on page 133).

OR

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

***4.*** If desired, from the Click-Out connector bay, clean the internal connector 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 Models Only)* on page 133).
6. Perform an optical output test again.
7. If the ranking remains low (three stars or less), you could repeat the steps above. If after a couple of tries the ranking remains low, it probably means that the internal connector needs to be replaced. In this case, contact EXFO (see *Service and Repairs* on page 191).

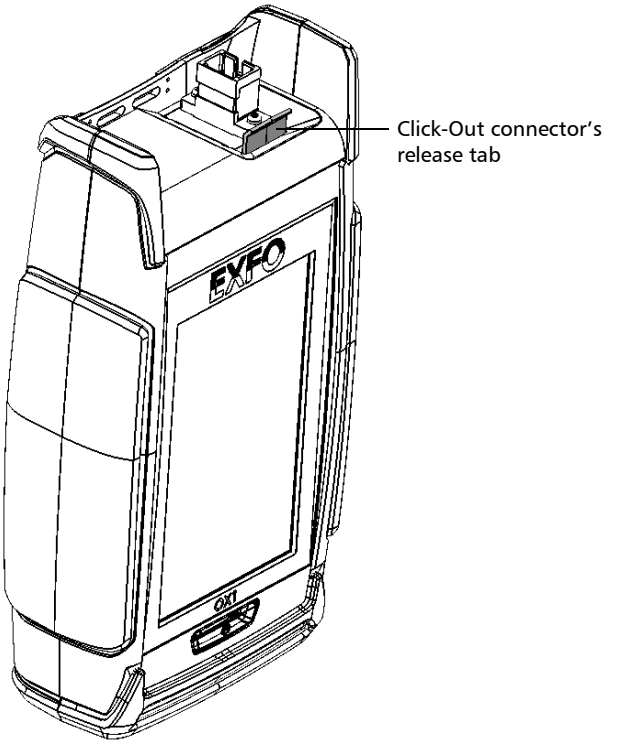
# Replacing the Click-Out Optical Connector (Pro Models Only)

All Pro models 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.

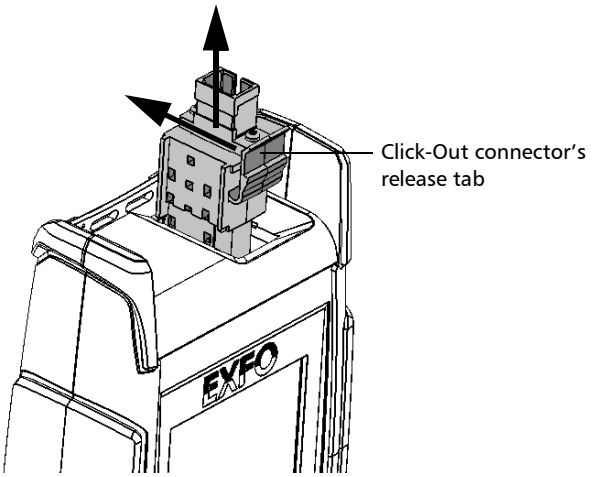
If your unit is not equipped with a Click-Out optical connector and the connector has to be replaced, you need to contact EXFO (see *Service and Repairs* on page 191).

***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.

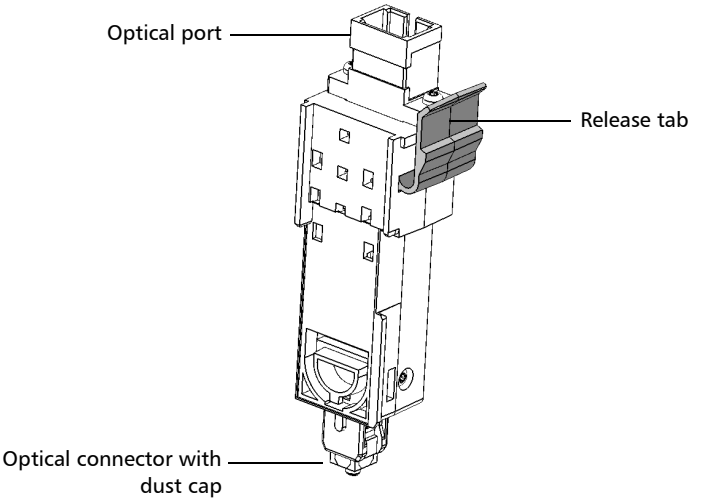


***3.*** While pushing the release tab toward the back of the unit, pull the Click-Out connector out of the unit.



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

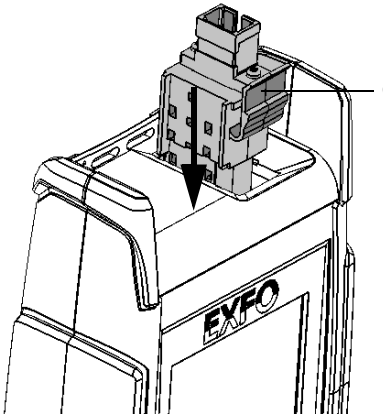
***1.*** Position the new Click-Out connector vertically so that you can see its release tab and that the optical port is pointing upwards.




***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 127).

**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 Models Only) *on page 131.*

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 Xplorer 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**).

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

When you want to 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® Low Energy 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 146).

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

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 Xplorer tool in the TestFlow mobile application).

***Note:*** *Depending on the type of smart device you are using, the appearance of the Optical Xplorer 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.*

***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 146).
2. If it is not already done, install the TestFlow mobile application on your smart device as follows:
   - **2a.** 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).
   - **2b.** From the Play Store or the App Store, search for *EXFO* or *TestFlow Mobile* to localize the TestFlow mobile application.
   - **2c.** Start the installation and follow the on-screen instructions.

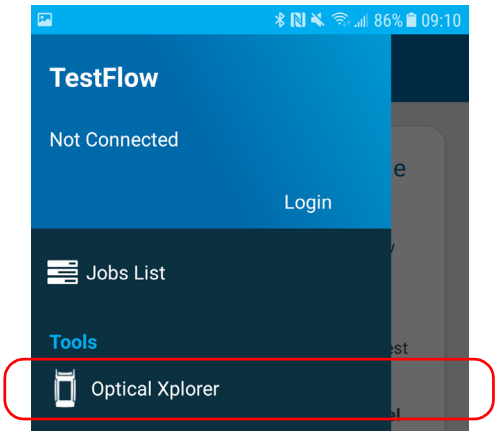
***3.*** On the smart device, establish the connection as follows.

***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.

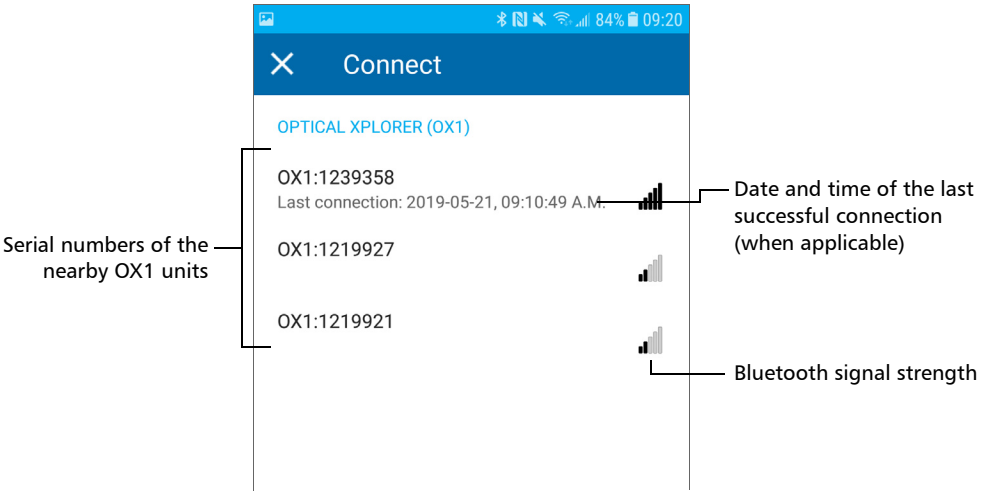
***3c.*** Tap the three-line icon to access the main menu.

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




***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.

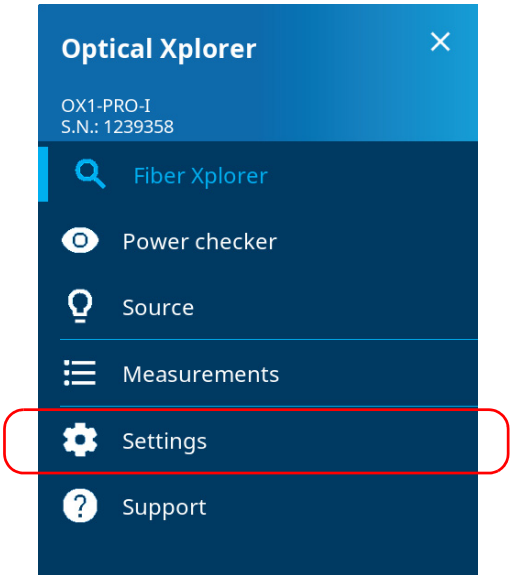



The application establishes the communication automatically. When the connection is successful, the icon appears in the title bar of your OX1 unit.

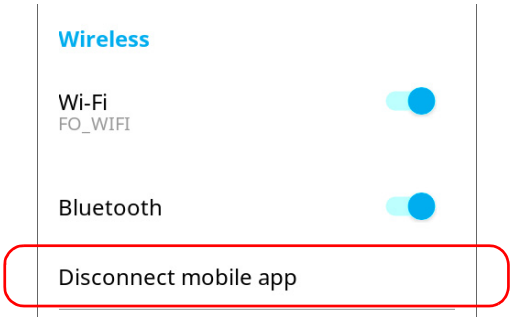
***Note:*** *If the OX1 unit that you want to use is already connected to another smart device, you must first close the connection between the OX1 unit and the other smart device before being able to connect to this specific OX1.*

***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**.




***3.*** When the application prompts you, confirm the disconnection.

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

1. From 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® Low Energy technology.

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

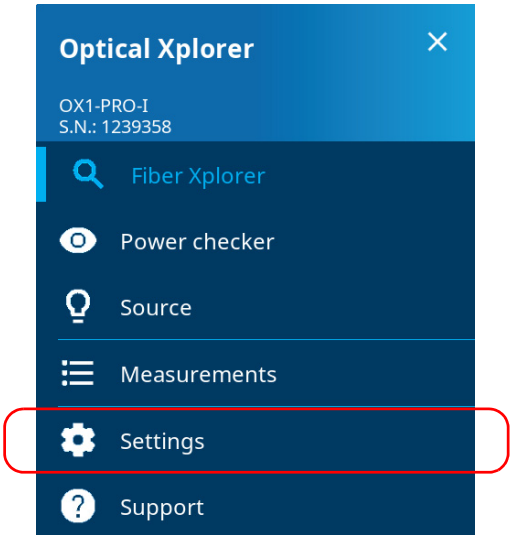
By default, the Bluetooth® communication is enabled on your unit, but the Wi-Fi is not.

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 Xplorer tool in the TestFlow mobile application).

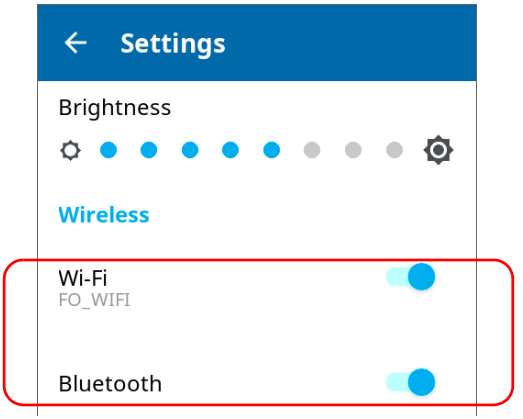
If you do not intend to use your unit in conjunction with a smart device or do not need to connect to a wireless network for a certain period of time, you may wish to disable the wireless communication to save battery power.

***To enable or disable the wireless communication from your unit:***

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



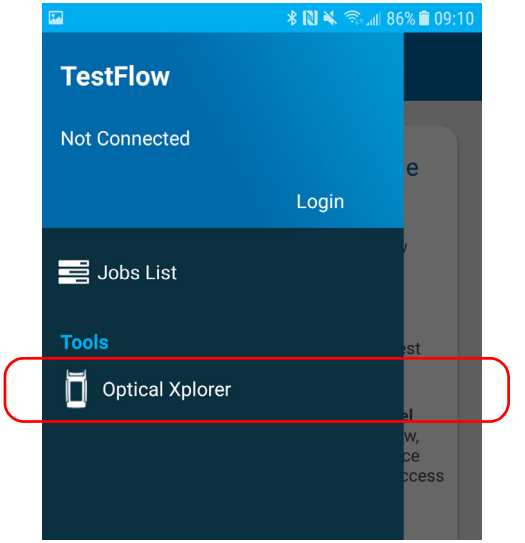

***2.*** Use the **Wi-Fi** or **Bluetooth** toggle to enable or disable the communication as needed.



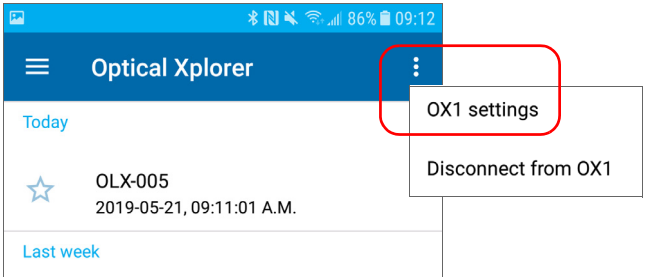

The changes are taken into account immediately.

***To enable or disable the Wi-Fi communication from the smart device (Optical Xplorer tool in TestFlow):***

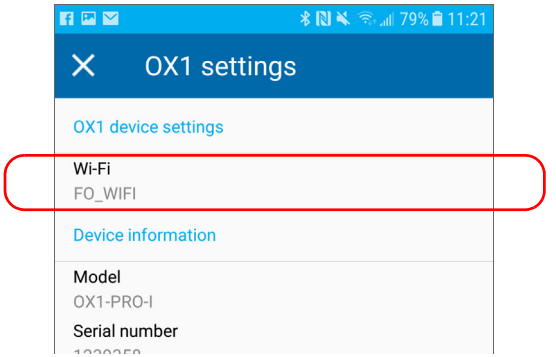
1. On the smart device, open the TestFlow application and access its main menu ( menu).
2. Under **Tools**, tap **Optical Xplorer**.



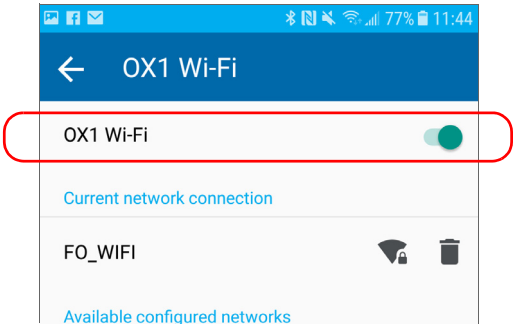

3. From the Optical Xplorer tool, open the three-dot menu, and then select **OX1 settings** to access the parameters.



***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

***Note:*** *You need a smart device equipped with the TestFlow mobile application to configure a wireless network to which your unit will be able to connect later.*

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 163).

By default, the Wi-Fi connection is disabled, both on the OX1 and in the Optical Xplorer 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 146).

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

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

You can remove configured networks from the list to prevent automatic connections to these networks.

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 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.

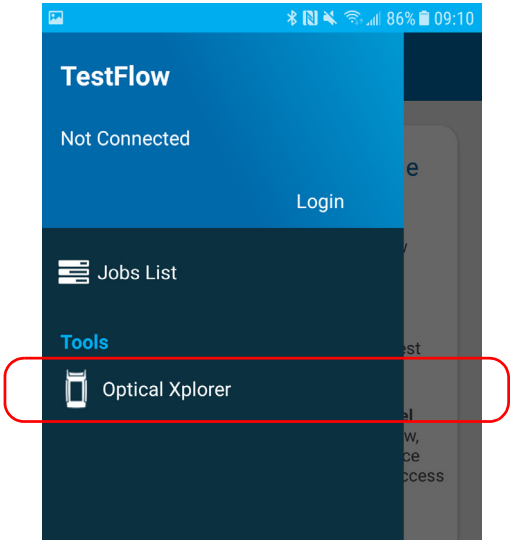
**IMPORTANT**

**You must first establish a Bluetooth connection between your unit and a smart device before attempting to configure a Wi-Fi network.**

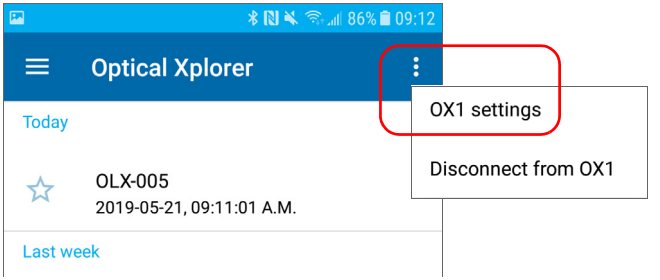
***To configure a wireless network:***

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 140).
2. If necessary, enable the Wi-Fi communication on your unit (see *Enabling or Disabling the Wireless Communication* on page 146).
3. On the smart device, open the TestFlow application and access its main menu ( menu).

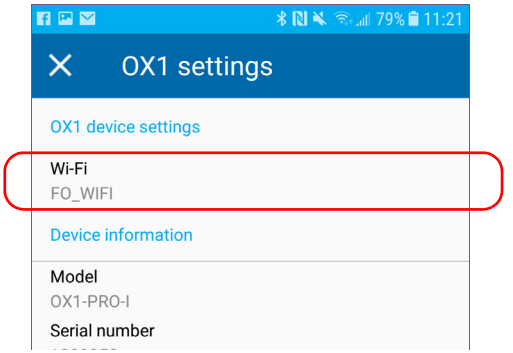
***4.*** Under **Tools**, tap **Optical Xplorer**.



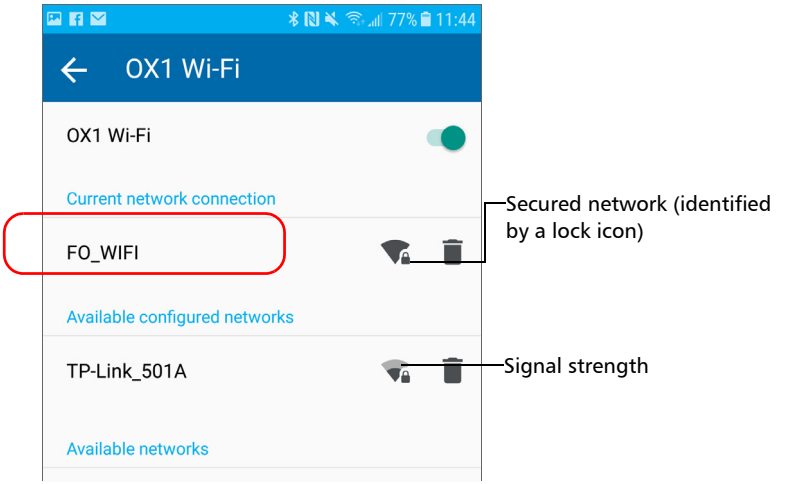

***5.*** From the Optical Xplorer tool, open the three-dot menu, and then select **OX1 settings** to access the parameters.



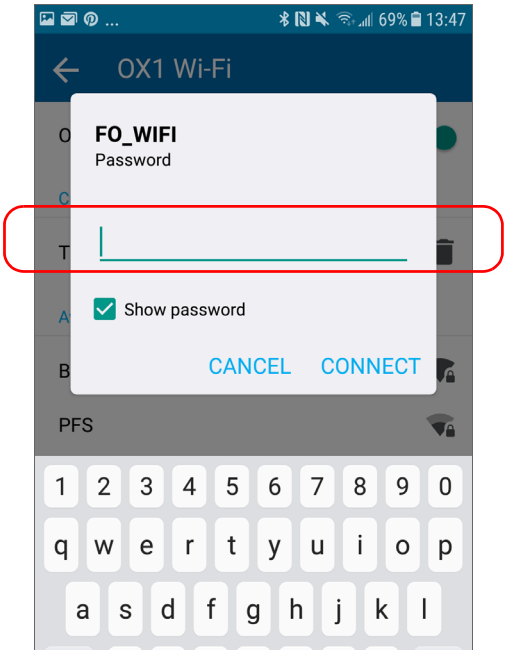
***6.*** Tap the **Wi-Fi** line.




***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.

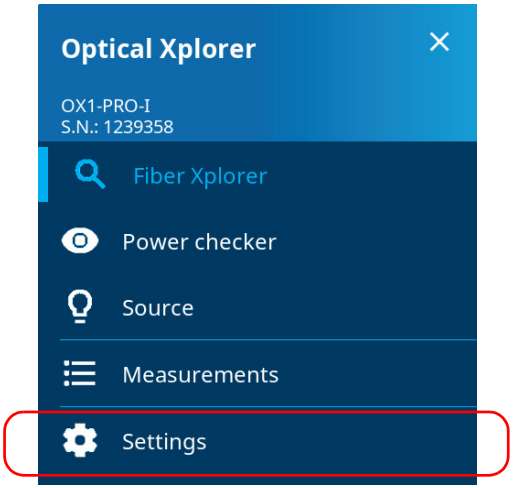
***Note:*** *Ensure that the TestFlow mobile application has been able to establish a first connection with the Wi-Fi network before attempting to connect to this network from your OX1 unit. This is particularly useful in the case of secured networks to ensure that the provided password is good.*

## Connecting to a Wireless Network From Your Unit

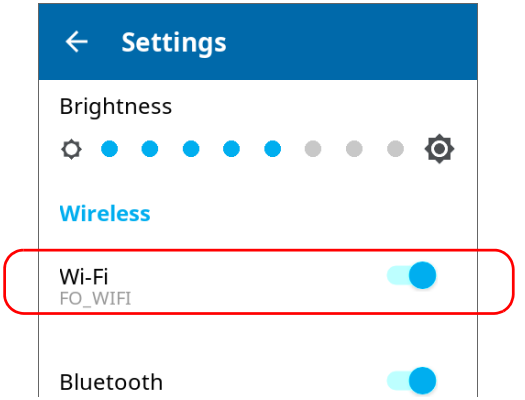
When you start a new work session with you unit, it will automatically connect to the last network used, unless this network is not available or its password has changed in the meantime (reconfiguration necessary). Should a network failure occur while the unit is connected to it, the unit will try to 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 150).
2. From the main menu, tap **Settings**.

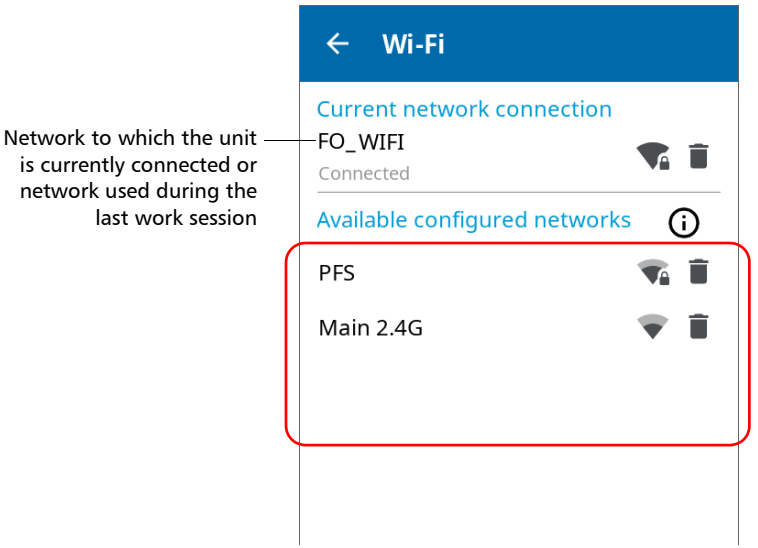


***3.*** If it is not already done, enable the Wi-Fi communication on your unit using the corresponding toggle.




***4.*** Tap **Wi-Fi**.

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




The application establishes the communication automatically.

***Note:*** *If you selected 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.*

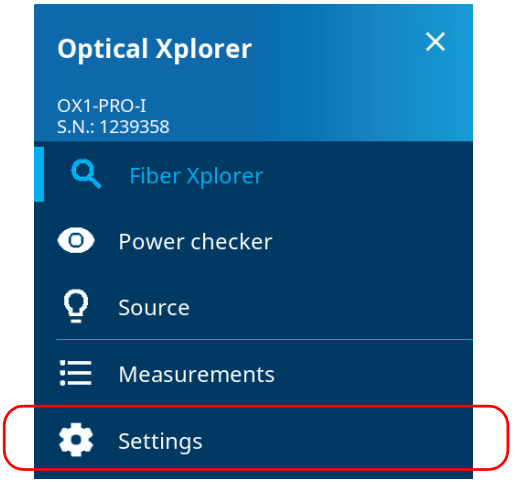
## Removing Configured Networks From the List

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 the TestFlow mobile application. In TestFlow, 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.

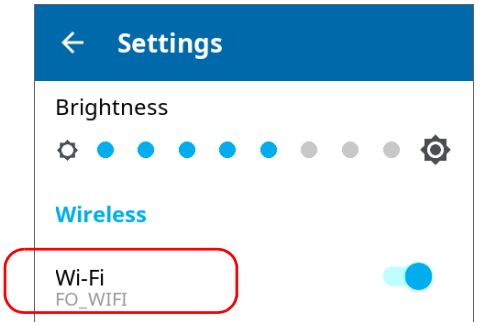
***To remove a configured network form the list:***

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

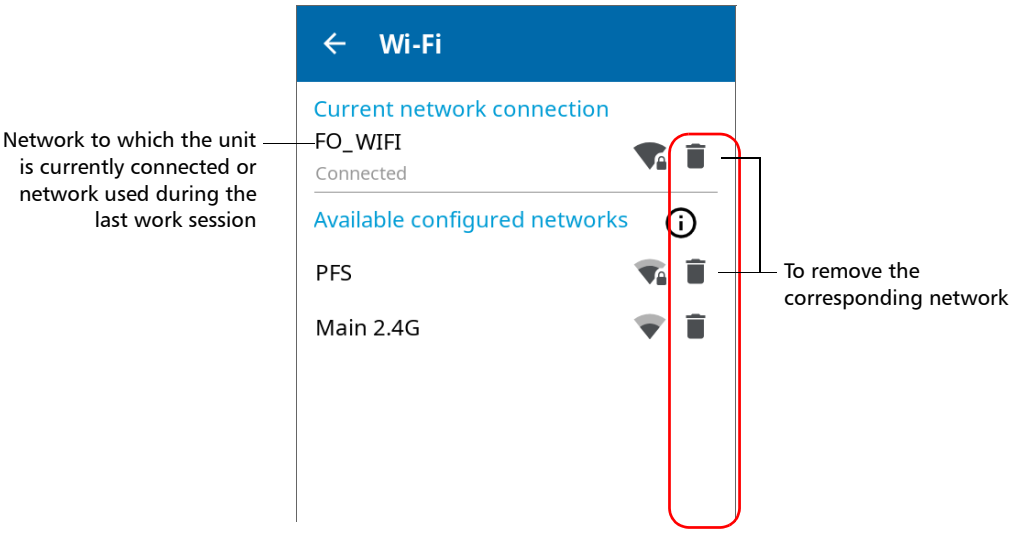



***Note:*** *In the Optical Xplorer tool (in TestFlow mobile application), the main menu is also accessible by opening the three-dot menu.*

***2.*** Tap **Wi-Fi** (from unit) or **OX1 Wi-Fi** (from TestFlow).



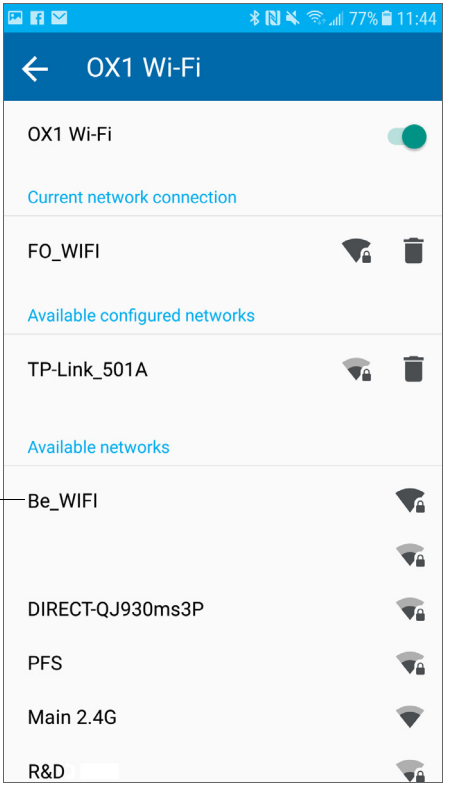

***3.*** Tap the item corresponding to the wireless network that you want to remove.



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.
In the TestFlow mobile application, if these networks are still in range, they will reappear on the list of available networks, at the bottom of the page.

**TestFlow mobile application**




Removed networks that are still in range appear here

# 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.

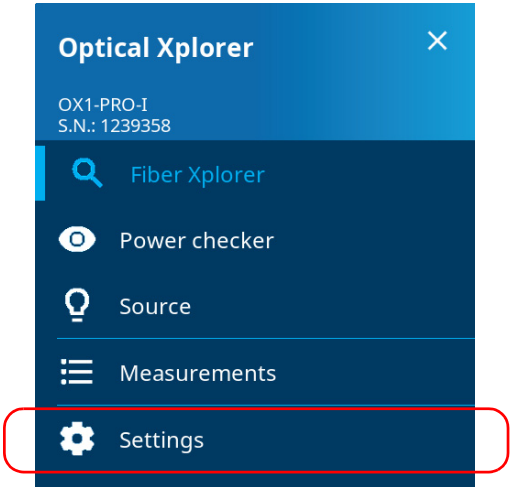
***Note:*** *Your unit must have access to an Internet connection (via Wi-Fi) to be able to download updates and install them.*

**IMPORTANT**

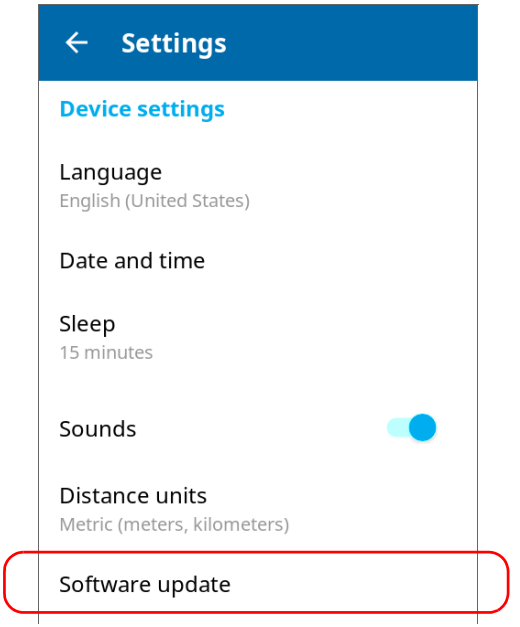
**For a trouble-free upgrade, ensure that you connect your unit to a power outlet and that your unit remains on during all the process.**

***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 150).
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.

# 10 Troubleshooting

## Solving Common Problems

| Problem | Possible Cause | Solution |
|---|---|---|
| My unit does not start. | The battery is completely discharged (if the battery level allows it, the unit's LED will remain red for about 10 seconds when you try to turn on the unit). | Connect the unit to an external power source to recharge the battery. If the battery is no longer charging properly, you may need to replace it with a new one (see *Replacing the Battery* on page 118). |
| | The system has encountered a problem. | Press the on/off button for at least ten seconds to force a hardware reset on the unit.<br>If the problem persists, restore your unit to normal operation (see *Restoring Your Unit to Normal Operation* on page 171). |
| | 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.<br>If the problem persists, try resetting the OX1 to its factory settings (see *Reverting to Factory Settings* on page 68).<br>If the problem still persists, restore your unit to normal operation (see *Restoring Your Unit to Normal Operation* on page 171). |
| 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.<br>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.<br>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.<br>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 150). |
| 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 146).<br>➤ 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 150).<br>➤ 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 146).<br>➤ 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 150).<br>➤ 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.<br>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 153). |
| On the screen of my computer, in Device Manager, “unknown device” is displayed when I connect a USB cable between the unit and the computer. | The USB port is intended for the connection of the provided USB power adapter. For more information, see *Power Sources* on page 6. | ---. |

# 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).

For current updates, use the update tool provided with your unit (see Upgrading Applications and Firmware *on page 163*).

## CAUTION

- **Once the recovery operation is started, it cannot be cancelled.**
- **Follow the procedure below carefully and connect your unit to a power outlet using the provided USB power adapter when you are instructed to do so.**

## CAUTION

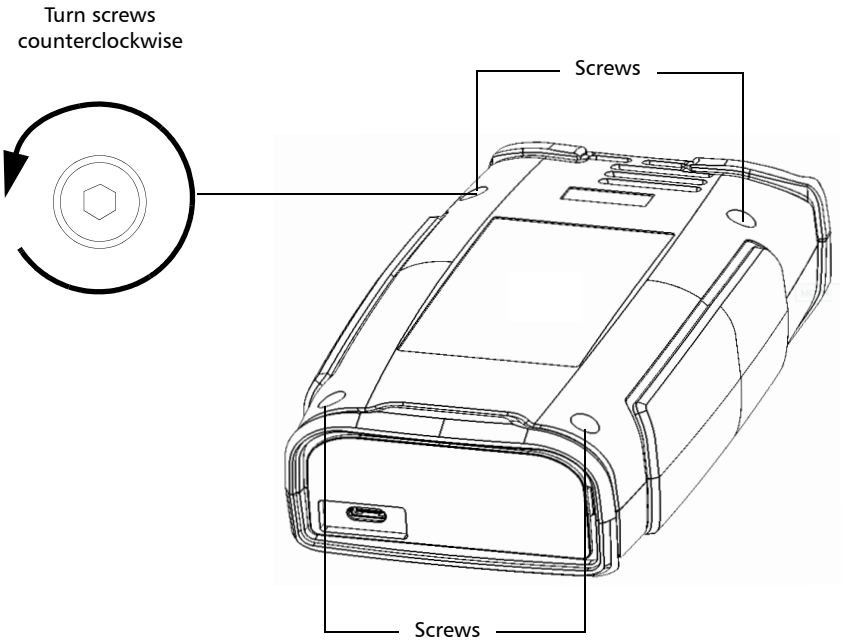
**Electrostatic discharge (ESD) damage can cause complete or intermittent equipment failures.**

- **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.**

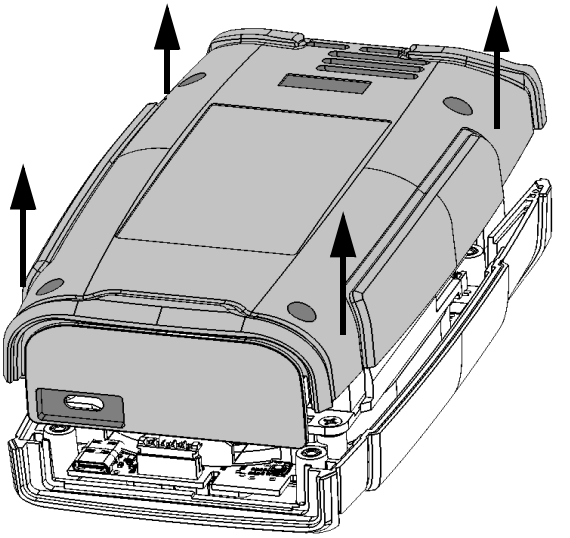
***To restore you unit to normal operation:***

1. 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).
2. Turn off your unit (shutdown).
3. If applicable, disconnect the USB cable. This is necessary to be able to open the unit as explained hereafter.
4. Position the unit so that its front panel rests on a flat surface such as a table.
5. 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.*

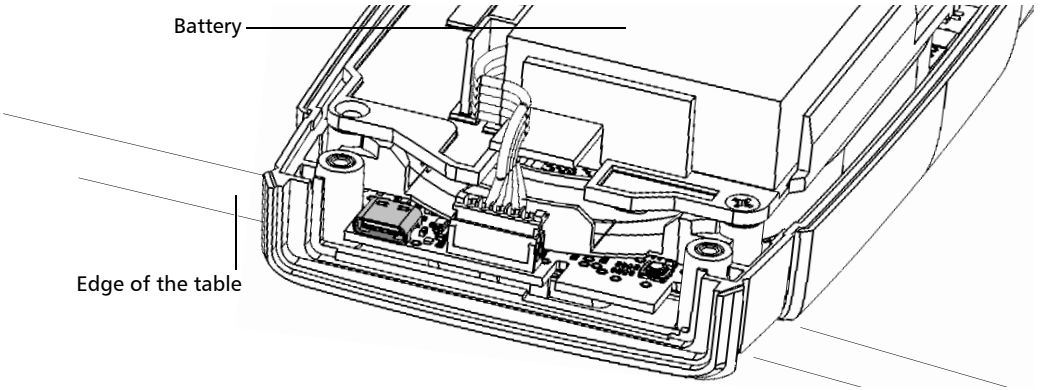

Turn screws
counterclockwise
Screws
Screws

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



***7.*** 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.*

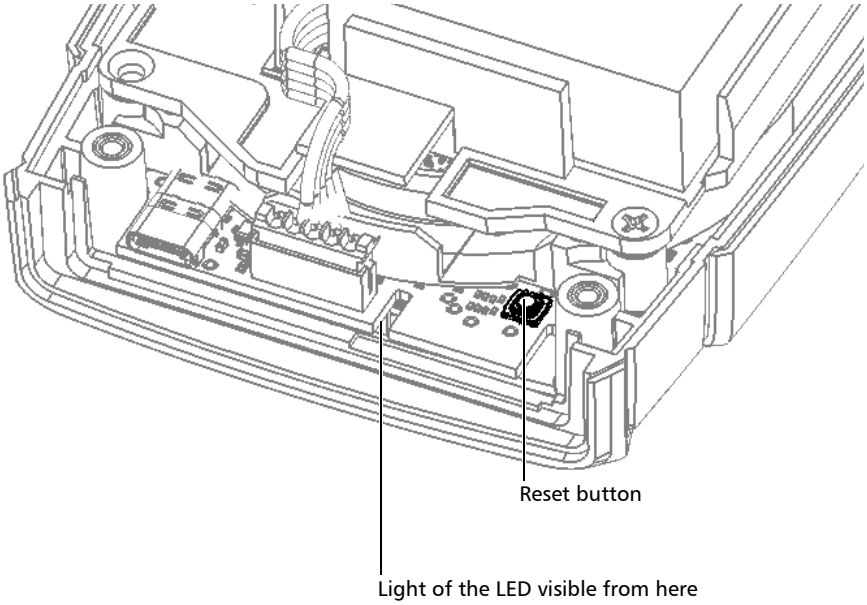


## CAUTION

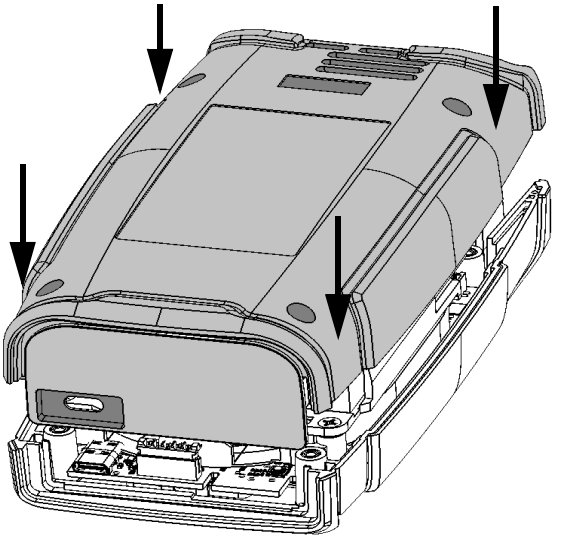
**To avoid damaging your unit, do not use metallic objects such as the ball of a pen to push the reset button. Always use your finger or a non-metallic object.**

***8.*** 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.*



***9.*** 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.



***10.*** 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.

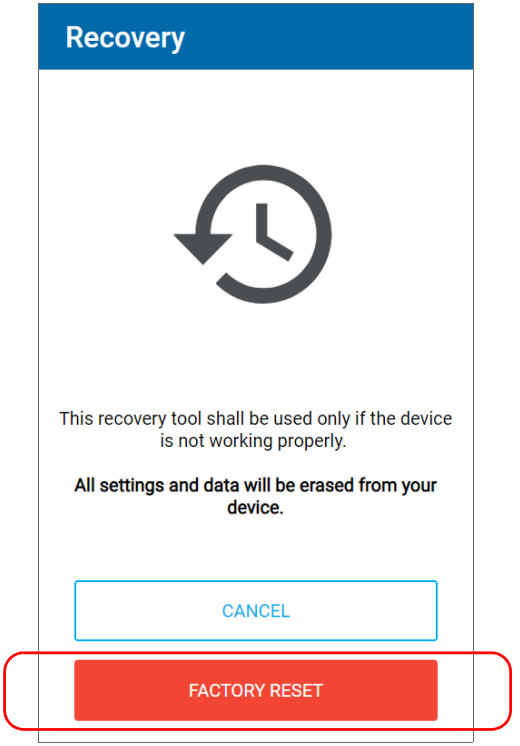
***11.*** Turn your unit over so that you can see its touchscreen.

## 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.**

***12.*** 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.

***13.*** 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.



14. Read the warnings, and then tap **FACTORY RESET**. If you prefer not to perform the recovery operation for the moment, tap **CANCEL**.
15. When the operation is complete and the application prompts you, tap **RESTART**.
16. 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 24).

# Accessing the Online Documentation

You can access the getting started guide from your unit.

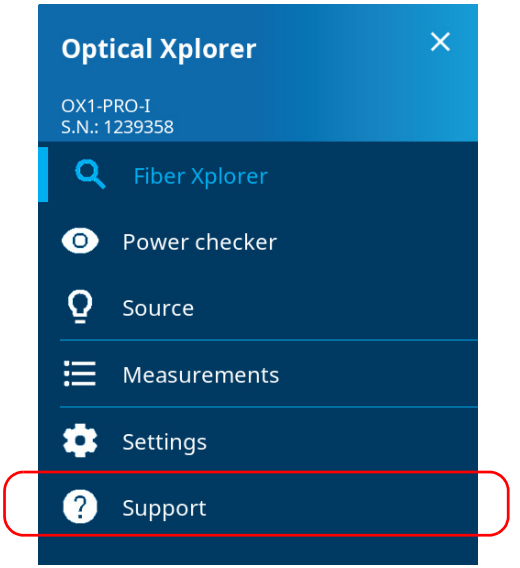
For more detailed information, you can also access the user guide at all times from your smart device:

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

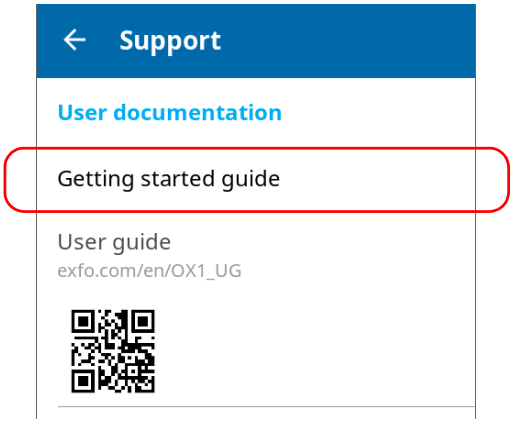
***Note:*** *The user guide is available from the My EXFO section of the EXFO Web site (www.exfo.com) for download in PDF format.*

***To view the getting started guide from your unit:***

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

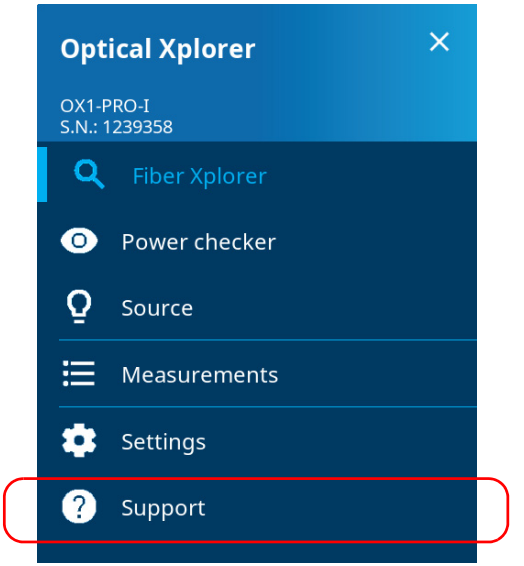



2. Under **User documentation**, tap **Getting started guide**.

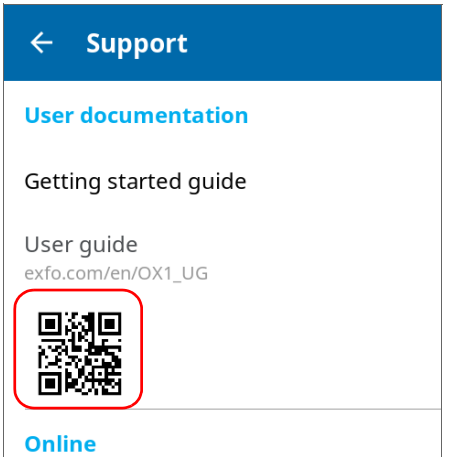


***To access the user guide with the QR code:***

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

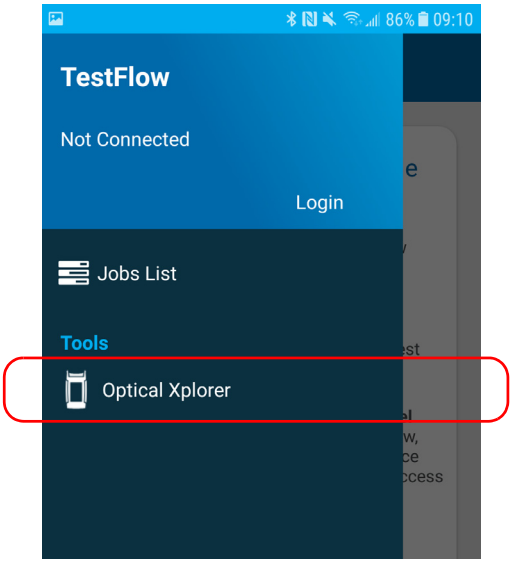



2. Under **User documentation**, scan the QR code with your smart device.

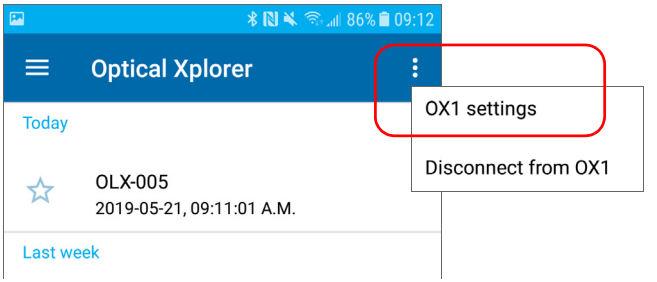


***To view the user documentation from the TestFlow mobile application:***

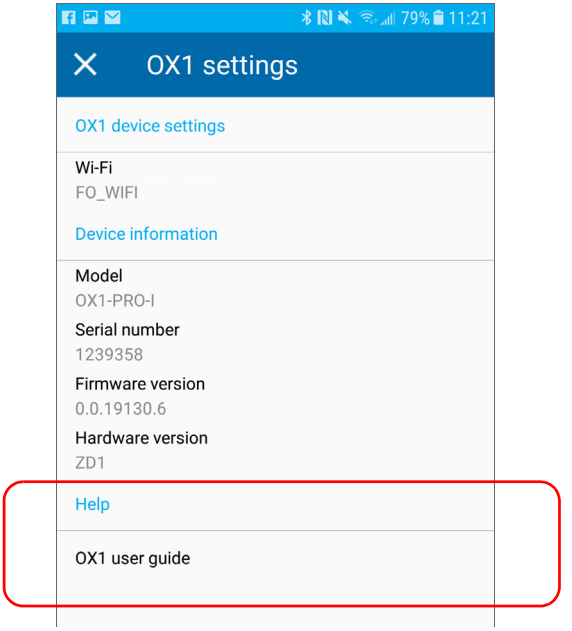
1. If it is not already done, establish a connection between your unit and a smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 140).
2. If it is not already done, on the smart device, open the TestFlow mobile application and access its main menu ( menu).
3. Under **Tools**, tap **Optical Xplorer**.



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




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



# 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).All inquiries regarding service, calibration and technical assistance should be directed to the Customer Service department:

**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.comIf 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 Measurements With the Technical Support Group

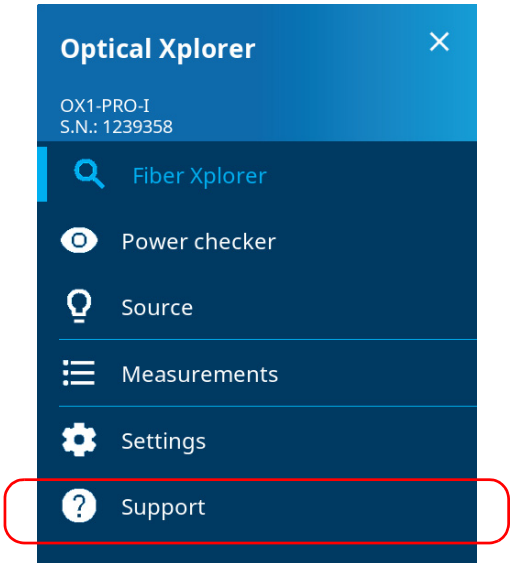
After contacting EXFO for support, you may need to share some of the measurements with the technical support group for further investigation.

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

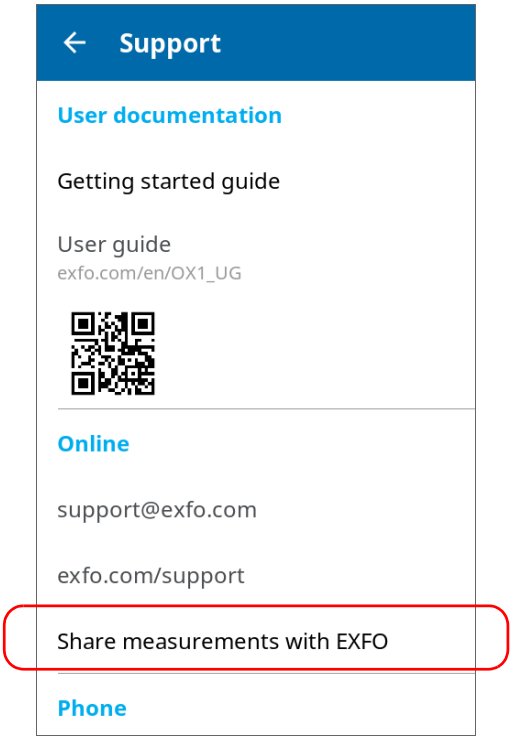
Your unit will need access to a Wi-Fi connection to be able to share results. If you have not configured any Wi-Fi network yet, see *Working With a Wireless Network* on page 150.

***To share measurements with the technical support group:***

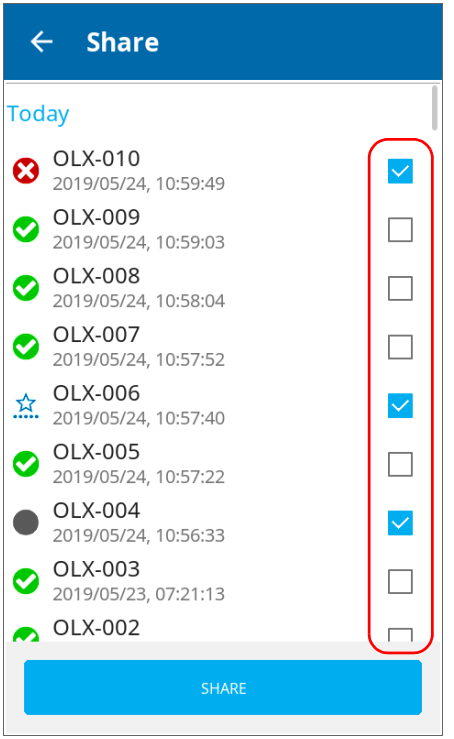
1. From the main menu, tap **Support**.



***2.*** Tap **Share measurements with EXFO**.



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




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

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

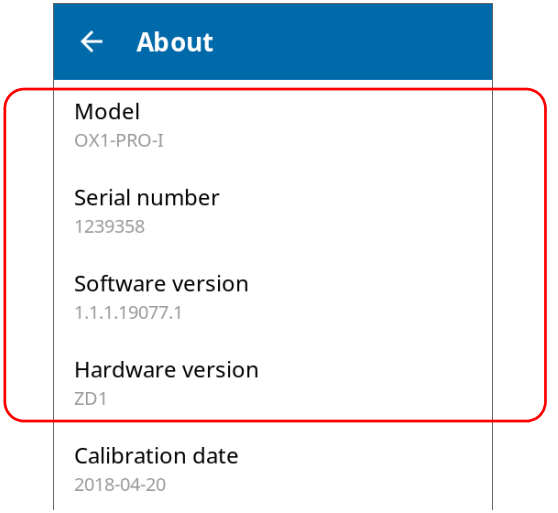
# Viewing System Information

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**.

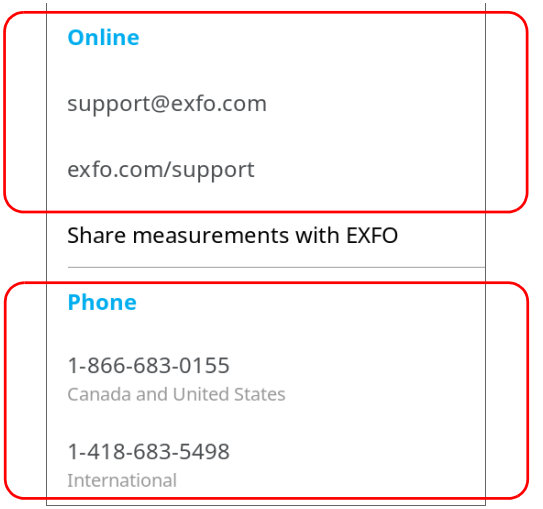
The information you want to view is displayed on screen.



***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.

# 11 Warranty

## General Information

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

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

**IMPORTANT**

**The warranty can become null and void if:**

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

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

## 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 192). 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 192).

# 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.

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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<br>部件名称 | Lead<br>铅<br>（Pb） | Mercury<br>汞<br>（Hg） | Cadmium<br>镉<br>（Cd） | Hexavalent Chromium<br>六价铬<br>（Cr(VI)） | Polybrominated biphenyls<br>多溴联苯<br>（PBB） | Polybrominated diphenyl ethers<br>多溴二苯醚<br>（PBDE） |
|---|---|---|---|---|---|---|
| Enclosure<br>外壳 | O | O | O | O | O | O |
| Electronic and electrical sub-assembly<br>电子和电气组件 | X | O | X | O | X | X |
| Optical sub-assembly[a]<br>光学组件 [a] | X | O | O | O | O | O |
| Mechanical sub-assembly[a]<br>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<br>产品 | Environmental protection use period (years)<br>环境保护使用期限 （年） | Logo<br>标志 |
|---|---|---|
| This EXFO product<br>本 EXFO 产品 | 10 | |
| Battery[a]<br>电池 | 5 | |

a. If applicable.
如果适用。

P/N: 1.0.0.1

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