User Guide

FIP-500

Fiber Inspection Scope

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

Patents

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

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Regulatory Information

Canada and USA Electromagnetic Interference Regulatory Statement

Electronic test and measurement equipment is exempt from FCC part 15, subpart B compliance in the United States of America and from ICES-003 compliance in Canada. However, EXFO Inc. makes reasonable efforts to ensure compliance to the applicable standards.

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

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

European Electromagnetic Compatibility Regulatory Statement

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

General Wireless Compliance Related Information

Your unit comes with internal wireless modules for which the information hereafter applies:

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

Canada and USA Wireless Compliance Related Information

Your unit comes with internal wireless modules 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, and at 13.56 MHz for NFC/RFID.

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

- Bluetooth: Between the frequencies 2402 MHz - 2480 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

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This is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries.

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 “FIP-500” 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*.

Note: *Information such as the FCC and IC numbers is available directly from your unit. From the main menu, tap* ***Settings*** *and then* ***Regulatory****. The information is listed on the* ***Regulatory*** *screen.*

1 Introducing the FIP-500 Fiber Inspection Scope

The FIP-500 Fiber Inspection Scope is a portable video microscope used to inspect optical fiber and cable ends. Its built-in 2.4-inch capacitive touchscreen and quick-change SmarTips facilitate the examination of patchcord connectors and also hard-to-reach connectors on the back of patch panels and bulkhead adapters.

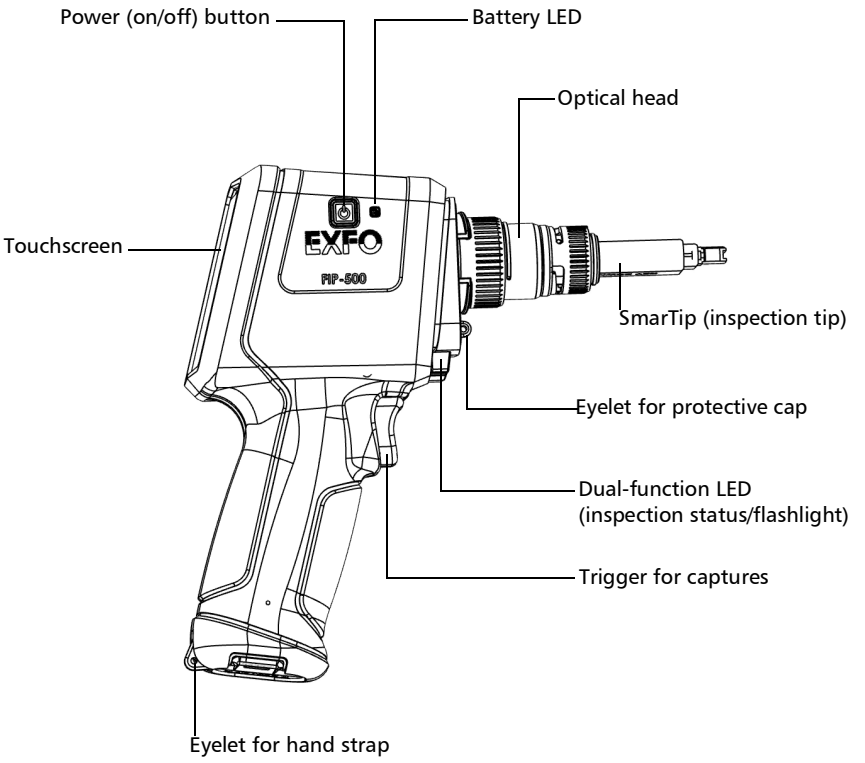
Main Features

- Ergonomic design
- 2.4-inch capacitive touchscreen directly on unit allowing standalone measurements
- Fast auto focus, auto centering, auto acquisition and auto analysis
- Quick change of SmarTips
- Designed to support both single-fiber and multi-fiber connectors
- Visual feedback
- Wi-Fi and Bluetooth® connectivity
- Easy software updates

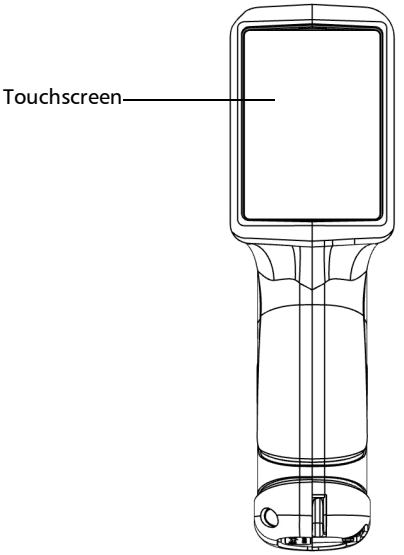
CAUTION

The optical head of your unit contains precision components. To ensure optimum protection when you do not use the unit or during transportation, cover the optical head with the provided protective cap.

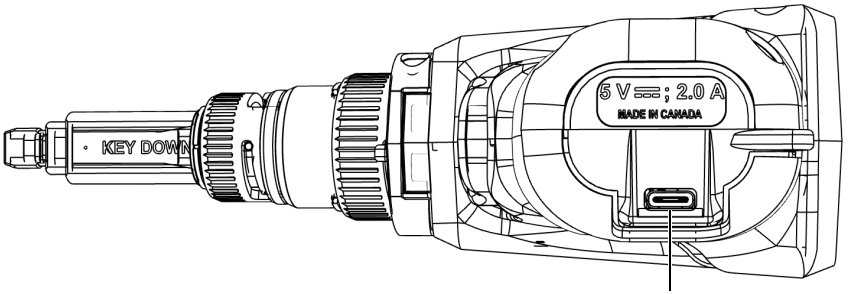
Side view



Back view



Bottom view



USB 2.0 Type-C connector for battery charging
(see *Power Sources* on page 8)

Available Configurations

Several configurations are available for the fully automated and wireless FIP-500 Fiber Inspection Scope:

Configuration	Description
SF	To inspect single-fiber connectors.
MF	To inspect both single- and multi-fiber connectors.

LED Indicators Description

Your unit is equipped with a battery LED and a dual-function LED.

Battery LED

The battery LED, located next to the power button, on the side of your unit, provides you with information about the battery status.

The table below indicates the possible statuses.

Unit	Status	Meaning
Connected to an external power source	Off	The external power source does not provide sufficient power to charge the battery.
	Blue	The battery is fully charged.
	Blue, blinking – slow blinking	The battery is charging.
	Blue, blinking – fast blinking	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 15.
	Red, fast blinking	Charge or temperature error.
	Red, steady for 5 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 5 seconds	The unit is off and the battery level is too low to start the unit.
	White	The unit is starting up.

Dual-Function LED

The dual-function LED is located just above the trigger used for captures, on the front of your unit. It can indicate the status of the inspection or be used as a flashlight to help you see the connectors you have to inspect in darker environments (see *Turning on or Turning off the Flashlight* on page 51).

The table below indicates the possible statuses.

Status	Meaning
Blue	The unit is ready and operational. The flashlight feature is disabled.
Blue, blinking	The capture process is in progress.
Green, steady for 5 seconds	The analysis found no defects or scratches exceeding the pass criteria.
Red, blinking for 5 seconds	➤ The capture process could not be completed successfully. Follow the instructions on the screen. ➤ The auto-focus operation has timed out. ➤ There is a mismatch between the number of fibers found and the selected multi-fiber connector layout.
Red, steady for 5 seconds	The analysis found defects or scratches that do not meet the pass criteria.
White	The unit is ready and operational. The flashlight feature is enabled.

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 gray 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 Fiber Inspection Scope 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) rechargeable battery (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.

The battery recharges automatically when the unit is connected to an external power source.

Note: *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.*

Note: *You can replace the battery yourself (see* Replacing the Battery *on page 84).*

For more information, see *Electrical Safety Information* on page 14.

Technical Specifications

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

Conventions

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

WARNING

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

CAUTION

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

CAUTION

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

IMPORTANT

Refers to information about this product you should not overlook.

2 Safety Information

General Safety Information

WARNING

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

WARNING

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

WARNING

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

WARNING

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

IMPORTANT

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

IMPORTANT

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

IMPORTANT

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

IMPORTANT

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

CAUTION

Do not use the fiber inspection scope outdoors in wet locations.

Other Safety Symbols on Your Unit

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

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

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

CAUTION

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

CAUTION

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

Equipment Ratings	
Temperature	
➤ Operation	➤ unit powered by battery: –10 °C to 40 °C (14 °F to 104 °F) ➤ unit connected to AC power (with USB power adapter): 0 °C to 40 °C (32 °F to 104 °F)[a]
➤ Storage	➤ unit – short-term storage[b]: –40 °C to 70 °C (–40 °F to 158 °F) ➤ unit – long-term storage[c]: 10 °C to 35 °C (50 °F to 95 °F)
Relative humidity[d]	➤ unit: ≤ 93 % non-condensing ➤ USB power adapter: 10 % to 90 % non-condensing
Maximum operation altitude	➤ 3000 m (9843 ft) (unit connected to external power source) ➤ 4000 m (13123 ft) (unit operated from battery)
Pollution degree	➤ 2 (unit connected to external power source) ➤ 3 (unit operated from battery)[e]

Equipment Ratings	
Overvoltage category	➤ unit: I ➤ USB power adapter: II
Measurement category	Not rated for measurement categories II, III, or IV
Input power[f]	➤ unit: 5 V ⎓; 2 A ➤ USB power adapter: 100 - 240 V ∼; 50/60 Hz; 1 A max

a. 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.
b. Short-term storage corresponds to the storage of the unit for a maximum of 48 hours.
c. Long-term storage corresponds to the storage of the unit for more than three months.
d. Measured in 0 °C to 31 °C (32 °F to 87.8 °F) range, decreasing linearly to 50 % at 40 °C (104 °F).
e. Equipment must be normally protected against exposure to direct sunlight, precipitation and full wind pressure.
f. Not exceeding ± 10 % of the nominal voltage.

3 Getting Started with Your Unit

Turning on Your Unit

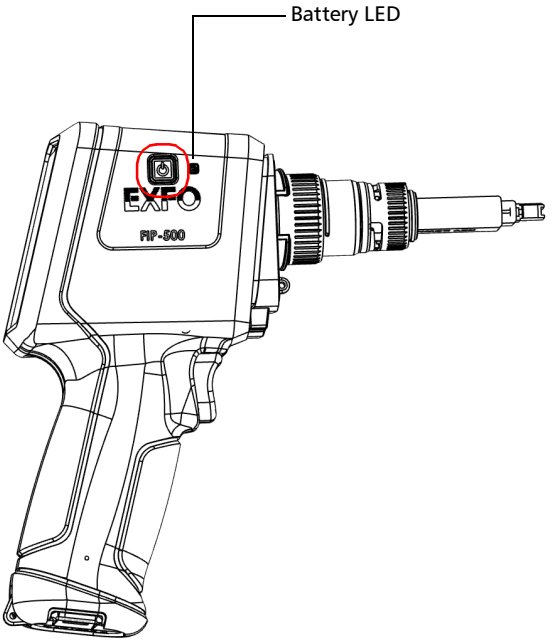
When you turn on the unit for the very first time, you will be prompted to read and accept the EXFO license agreement and set the date and time (see the section about the first startup for more information).

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. The battery LED will light up during the startup process (until the FIP-500 splash screen is displayed).

Side view



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 a long period of time (one day or more), you should perform a shutdown instead 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 the inspection screen.

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 normally do to start your unit. The last capture or modifications made to the settings may be lost, but the rest of the data will still be available.*

To enter the sleep mode:

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

To exit the sleep mode and resume your work:

Press the on/off button or press the trigger.

To turn off the unit completely (shutdown):

Press the on/off button for about three seconds. A shutdown animation will be displayed on the screen.

Configuring Your Unit at First Startup

The first time you turn on the unit, you are prompted to read and accept the EXFO license agreement and configure the date and time.

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

Once the configuration is complete, you are presented with a QR code allowing you to download the user documentation to a smart device.

Note: *Depending on the type of smart device you are using, the appearance of the EXFO Exchange application may vary slightly from the illustrations presented in this documentation. Unless otherwise specified, the information applies both to the Android- and iOS-based smart devices.*

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

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

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 17).
2. Read and accept the EXFO license agreement as follows:
   - **2a.** Use the QR code to download the license agreement to your smart device.
   - **2b.** Select the **I agree with the terms of this license agreement** box, then tap **Next**.
3. If necessary, configure the date and time (tap the line corresponding to the item you want to modify). When it is done, tap **Next**.

4. Read the safety instructions and confirm as follows:

   4a. Use the QR code to download the user documentation to your smart device.

   4b. Select the **I have read the safety instructions** box, then tap **Next**.

5. Tap **Close** when you have finished.

6. EXFO recommends to configure a Wi-Fi network that will allow you to retrieve the software updates. You can proceed as follows:

   6a. Install the EXFO Exchange application on your smart device (see *Installing the EXFO Exchange Application on Your Smart Device* on page 53).

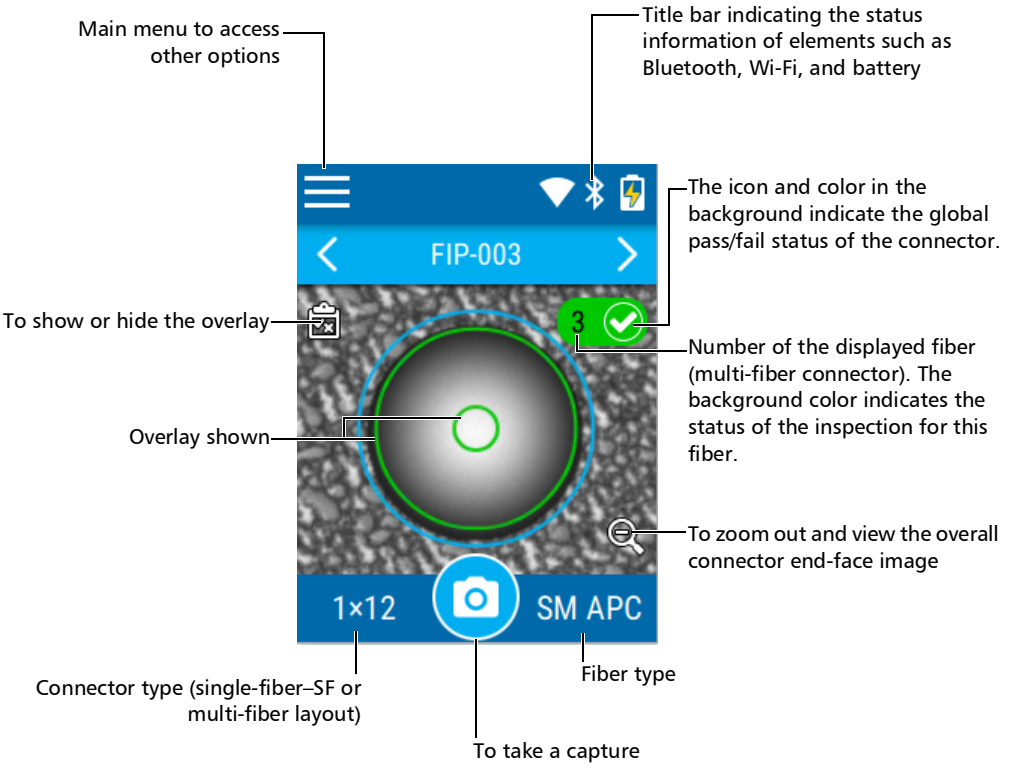
   6b. Establish a Bluetooth connection between the FIP-500 and the smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 54).

   6c. Configure a wireless network (see *Working With a Wireless Network* on page 62).

You are now ready to start working with your FIP-500.

Understanding the Inspection Screen

From the inspection screen, you can take captures of connectors under inspection and view these captures. The inspection screen also shows the title bar, which provides information on many elements such as the Bluetooth connection, Wi-Fi connection and signal strength, as well as battery level.



Note: *You can also show or hide the overlay by tapping anywhere in the non-active area (gray background) of the image or directly on the image of the fiber when you view a specific fiber.*

Changing Your Unit's SmarTip

You can change the SmarTip of your unit to fit the type of connector that you need to inspect. This is particularly useful if you need to inspect APC connectors, followed by UPC connectors, or vice versa.

IMPORTANT

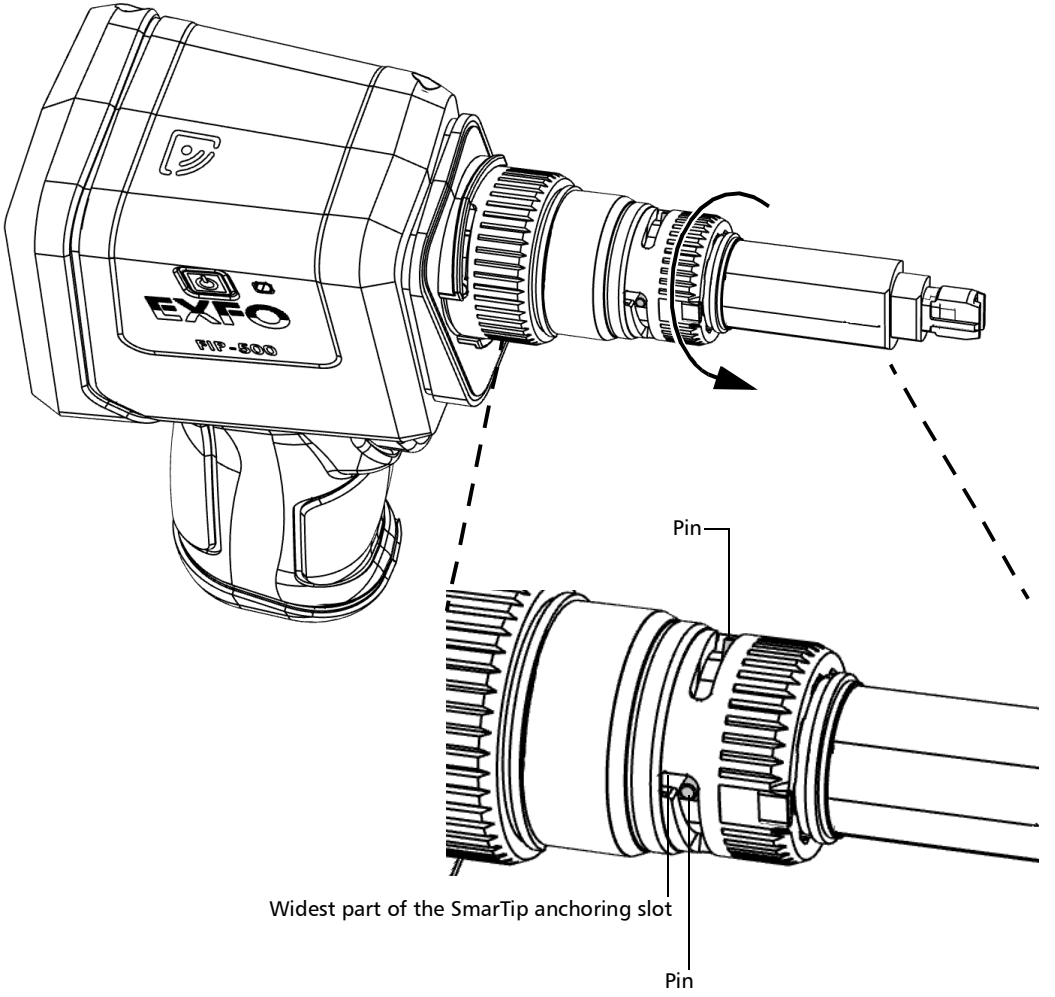
You can only install single-fiber SmarTips on a single-fiber optical head and multi-fiber SmarTips on a multi-fiber optical head.

If you need to inspect both single-fiber and multi-fiber connectors, you may find useful to leave the most frequently used SmarTip attached to its optical head and change the complete SmarTip–optical head assembly instead. For more information, see *Changing Your Unit's Optical Head* on page 26.

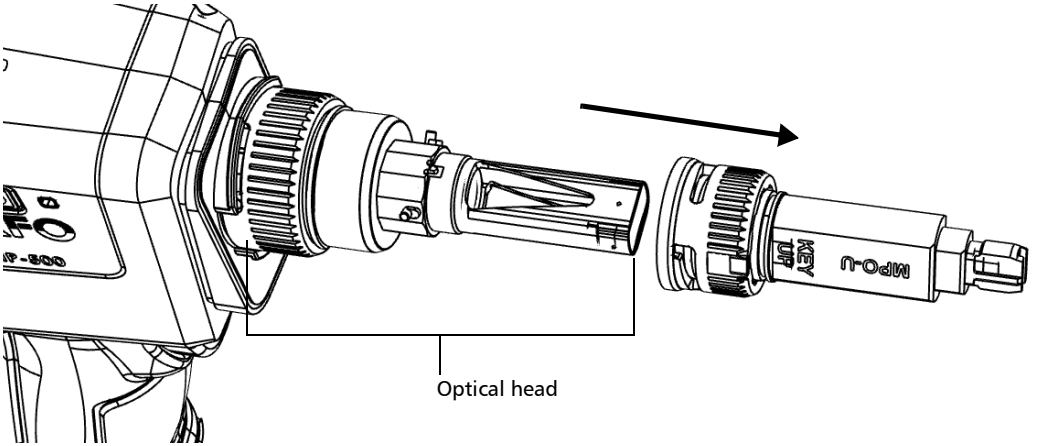
The illustrations shown in the procedure hereafter are for the multi-fiber SmarTips, but the principle remains the same for the single-fiber SmarTips.

To change your unit's SmarTip:

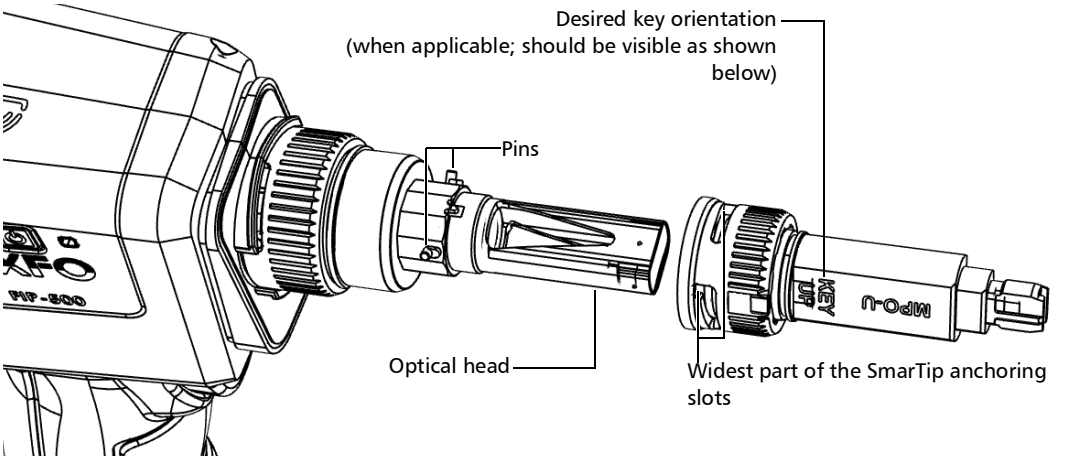
1. If necessary, remove the protective cap from the unit.
2. Turn the SmarTip retaining nut counterclockwise until the pins are aligned with the widest part of the SmarTip anchoring slots.



3. Pull on the SmarTip to remove it.

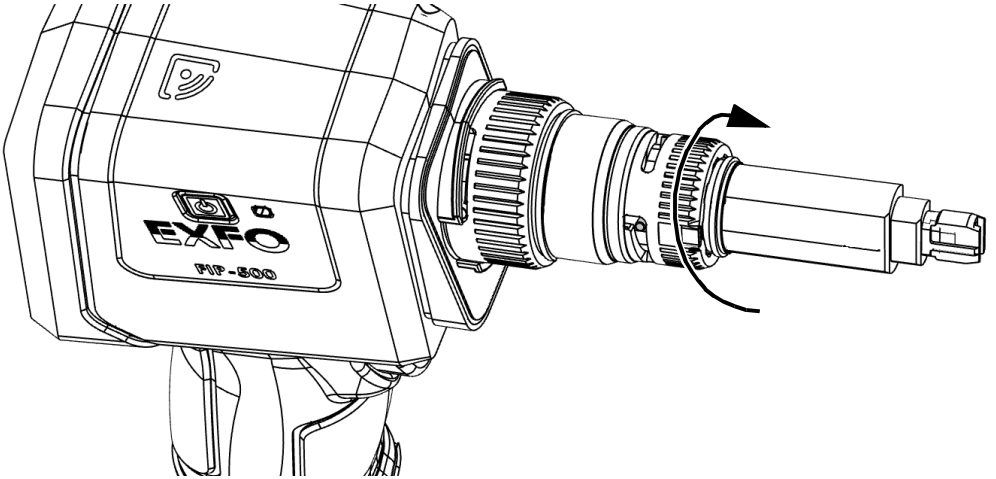


4. Align the new SmarTip with the optical head, ensuring that the orientation of the SmarTip (either key up or key down, when applicable) suits your test setup. In all cases, ensure that the widest part of the anchoring slots is aligned with the pins.



5. Slide the SmarTip toward the unit until it stops.

6. Turn the SmarTip retaining nut clockwise until the pins are aligned with the narrowest part of the anchoring slots to secure the SmarTip in place.



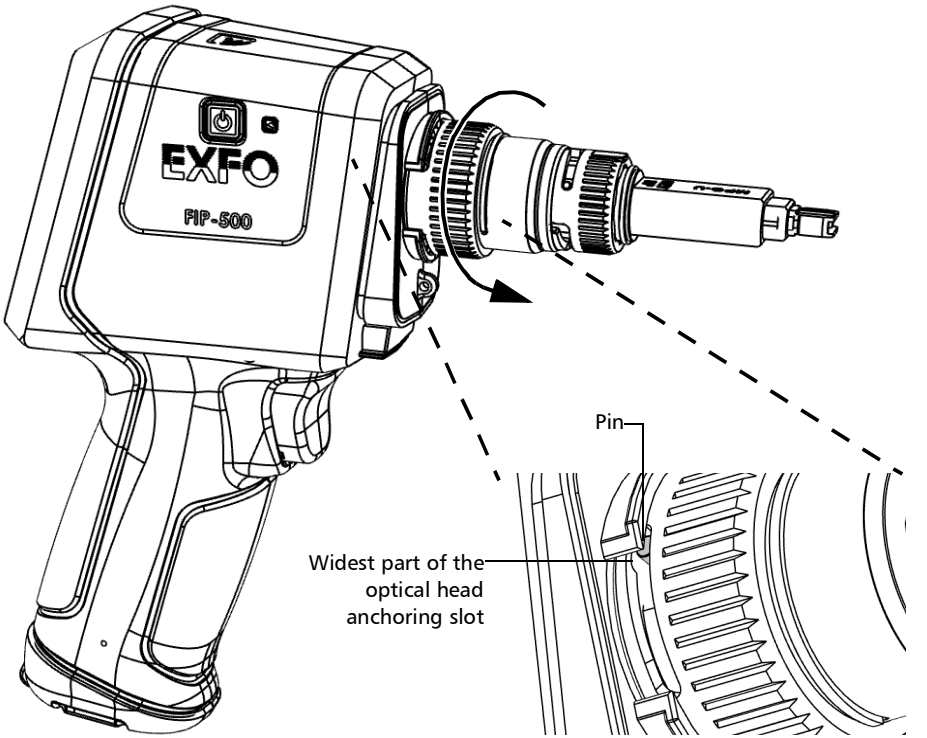
The new SmarTip is now ready to use.

Changing Your Unit's Optical Head

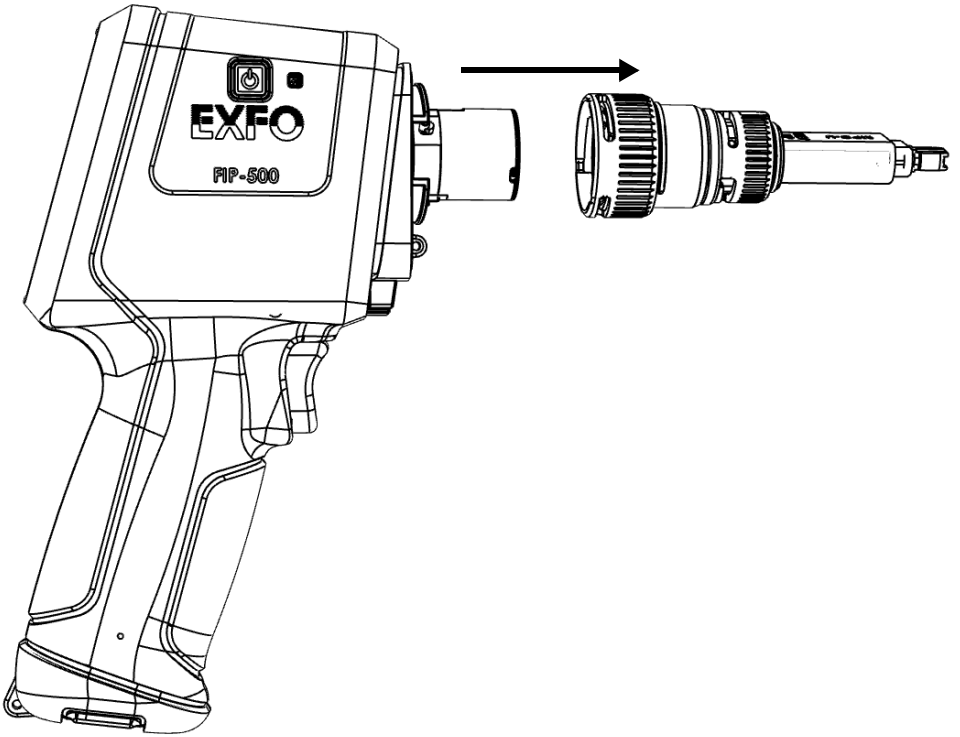
If your unit supports both single-fiber and multi-fiber inspection, you can change the optical head when you need to switch from one type of inspection to the other. There is no need to disassemble the SmarTip from your unit before changing the optical head.

To change the optical head:

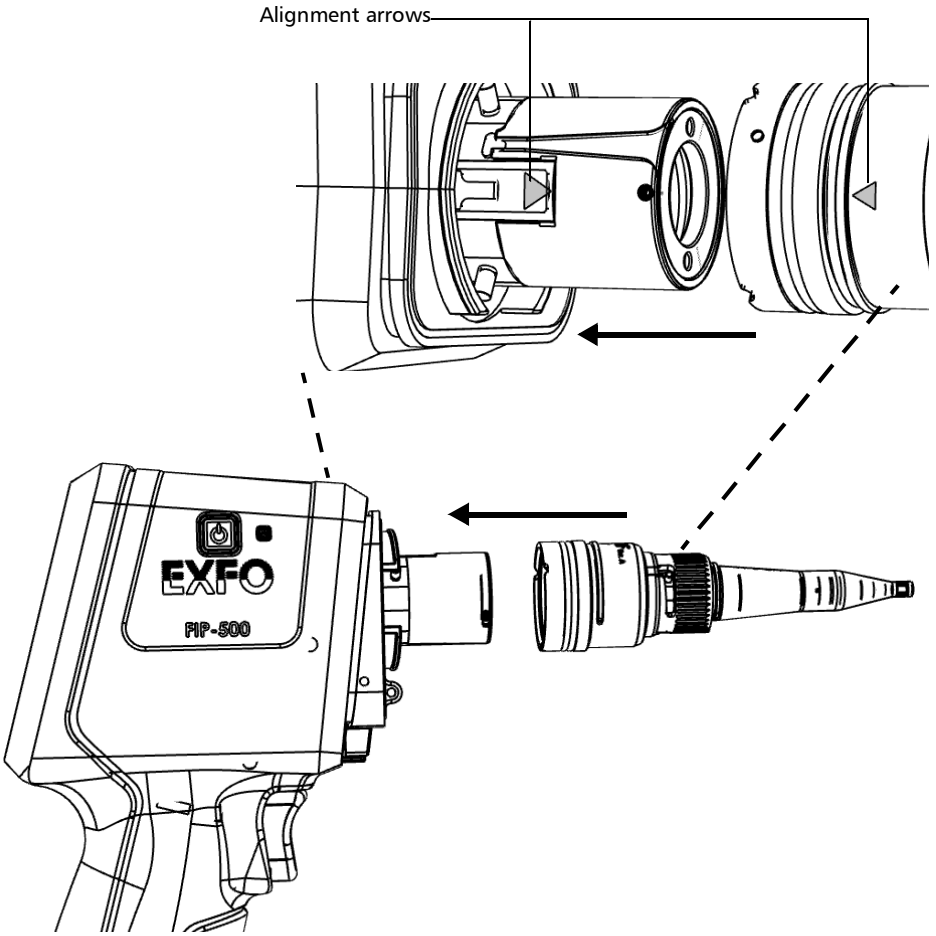
1. Slightly turn the optical head retaining nut counterclockwise to release it from your unit (the pins on the unit will be aligned with the widest part of the anchoring slots on the optical head).



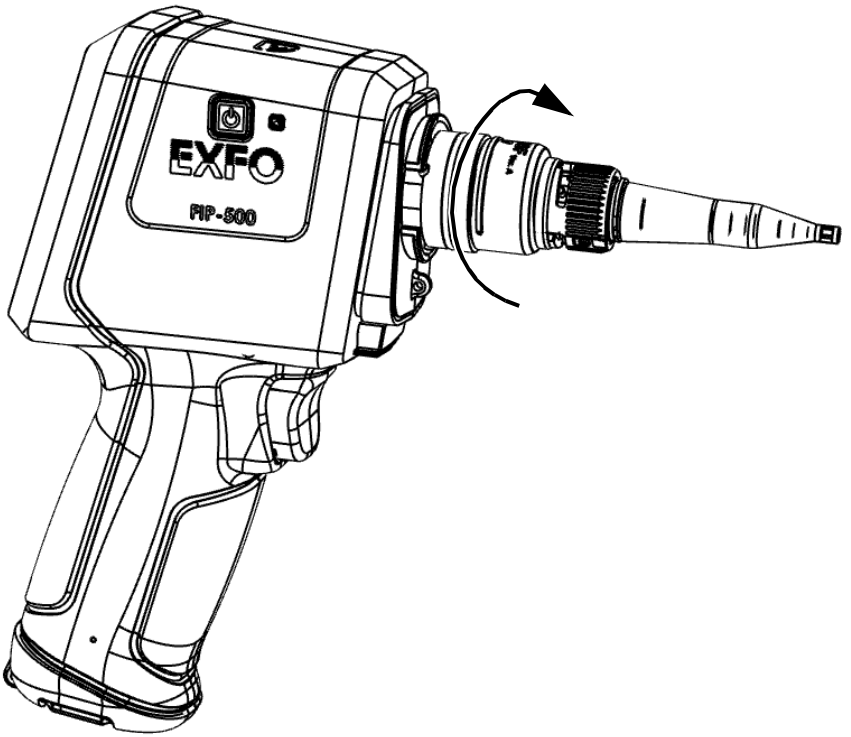
2. Gently pull on the optical head to remove it.



3. Align the arrow on the new optical head with the arrow on your unit and then, gently put the optical head back in place.



4. Slightly turn the optical head retaining nut clockwise to secure it in place (the pins on the unit will be aligned with the narrowest part of the anchoring slots on the optical head).



5. Configure the settings as required according to the type of optical head and SmarTip that you have installed (see *Selecting the Connector and Interface Types* on page 41 and *Selecting the Fiber Type* on page 44).

Your unit is now ready to use.

Cleaning and Connecting Optical Fibers

IMPORTANT

To ensure maximum power and to avoid erroneous readings:

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

To connect the fiber-optic cable to the port:

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

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

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

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

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

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

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

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

Temperature Management

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

In high-temperature conditions, your unit could stop working. If the temperature keeps rising and reaches the limit, your unit will turn off as self-protection.

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

IMPORTANT

For optimum performance of your unit:

- **Ensure that it remains within the recommended operation and storage temperatures (see *Equipment Ratings* on page 15).**
- **Avoid leaving your unit in an overheated vehicle. You may have to let your unit cool down before being able to use it.**
- **If the unit was left in a vehicle during cold weather, you will have to let your unit warm up before using it.**
- **Ensure that your unit is normally protected from direct sunlight (during use and storage).**

4 Setting up Your Unit

Adjusting Display Brightness

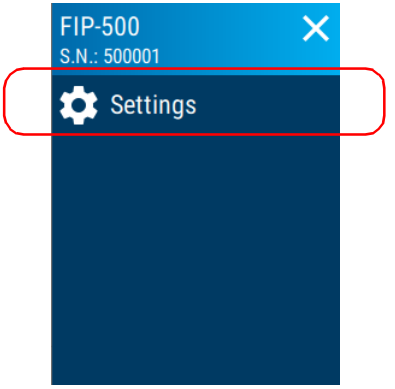
You may want to adjust the display brightness yourself to better fit your work environment or preferences.

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

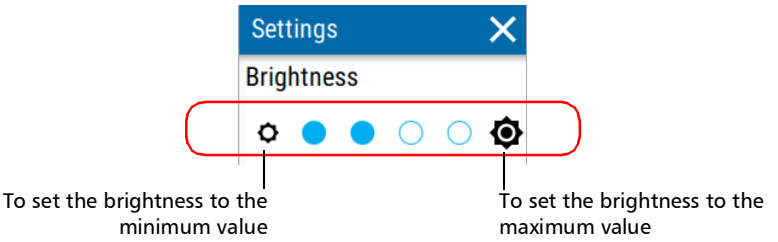
The brightness value is kept in memory even when you turn the unit off.

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.



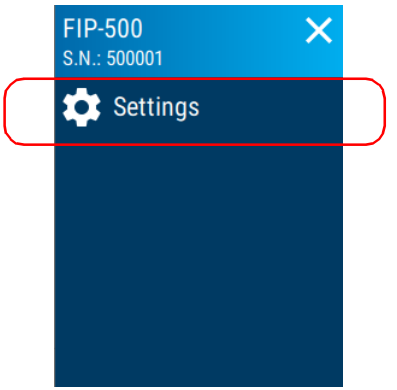
The new brightness value is taken into account immediately.

Adjusting the Date and Time

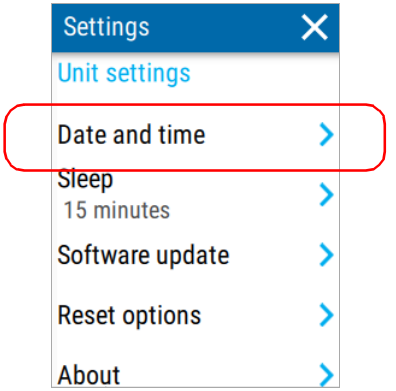
The date and time are expressed in international format. You can adjust them if necessary.

To adjust the date or time manually:

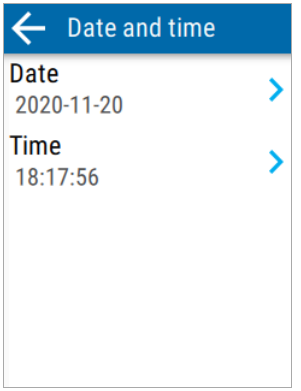
1. From the main menu, tap **Settings**.



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



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



5. Modify the settings according to your needs, and then tap to return to the **Date and time** screen.

The new values are taken into account immediately.

Configuring the 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 18).

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

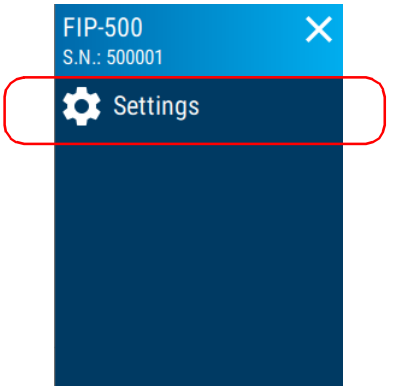
The value that you set is kept in memory even when you turn the unit off.

IMPORTANT

- **If you intend to leave your unit in sleep mode for one day or more, you should turn it off (shutdown) to save battery power.**
- **The unit will not enter sleep mode while you use the unit or perform captures.**

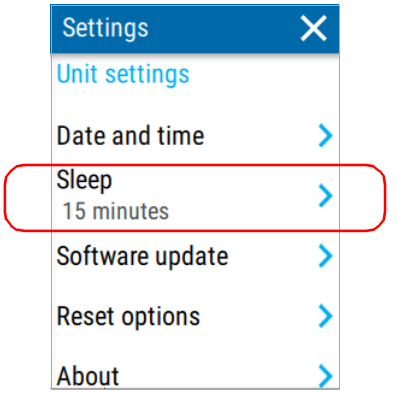
To configure the duration after which the unit enters sleep mode:

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

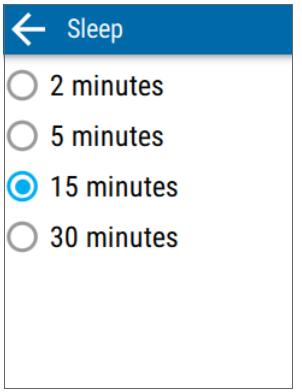


2. Scroll down to the **Unit settings** section.

3. Tap **Sleep**.



4. Select the desired number of minutes, and then tap to return to the Date and time screen.



The new value is taken into account immediately.

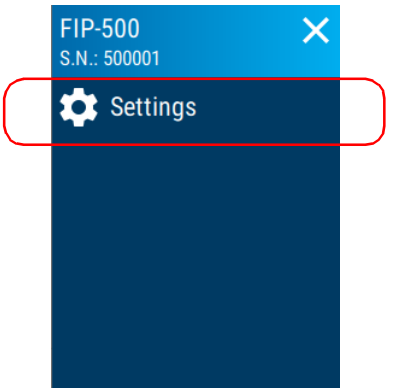
Reverting to Factory Settings

At any time, you can reset all settings that you have customized, such as the delay before the unit switches to sleep mode, to their default values.

This operation does not affect the current date and time and does not delete any stored test data.

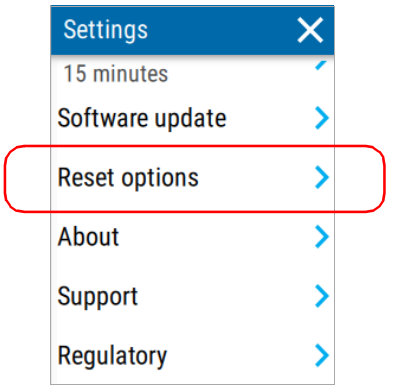
To revert values to factory settings:

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

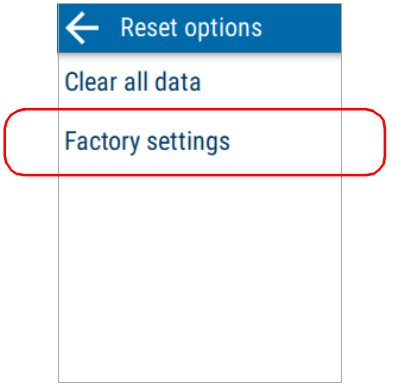


2. Scroll down to the **Unit settings** section.

3. Tap **Reset options**.



4. Tap **Factory settings**.



5. Tap **RESET** to confirm your choice and start the operation.

   When the operation is complete, the unit will restart.

6. Configure the date and time, and accept the license agreement as you did when you first received your unit (see *Configuring Your Unit at First Startup* on page 19).

5 Inspecting Fiber Ends

You can inspect fiber ends and view the result of this inspection directly on the built-in touchscreen of your unit.

WARNING

- **Never look directly into a live fiber. It could cause serious eye damage. Always use your FIP-500 Fiber Inspection Scope.**
- **To protect your eyes, do not stare into the violet light that comes out of your unit.**

Selecting the Connector and Interface Types

Once its initialization is complete, the unit displays the inspection screen from which you can select the connector type (single- or multi-fiber) as well as the interface (connector or fiber stub transceiver) for the next capture.

- Selecting the single-fiber connector type allows you to inspect single or duplex fiber connectors or transceivers such as the LC, FC and SC.
- Selecting the multi-fiber connector type allows you to inspect multi-fiber connectors or fiber stub transceivers such as the MPO, MTP (TM), OptiTip and Q-ODC.
  By default, the 1x12 fiber layout is selected, but you can select another fiber layout that will correspond to the connector you need to inspect. The application displays a graphical representation for each fiber layout available. It also displays the used and unused fibers in the connector.

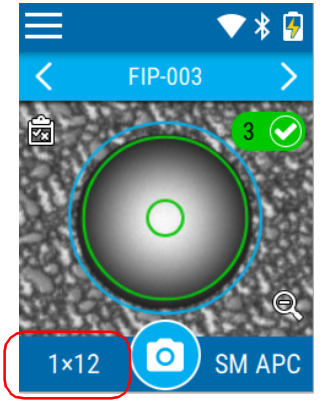
  Depending on the patch panel you are inspecting, the SmarTip can be positioned in two different ways (key up or key down). By default, the key up orientation is selected, but you can change it according to your work environment.

Note: *Only the fibers identified as used will be analyzed.*

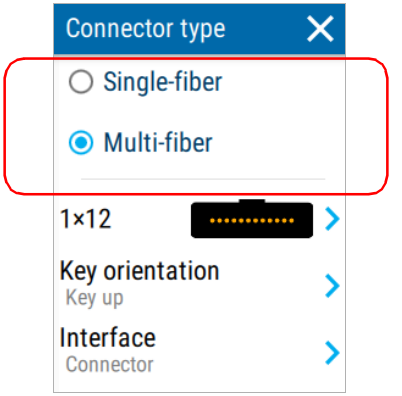
To select the connector and interface types:

1. From the inspection screen, tap **SF** (single-fiber connector type currently selected) or the numbers corresponding to the fiber layout (multi-fiber type selected).

Multi-fiber connector type currently selected

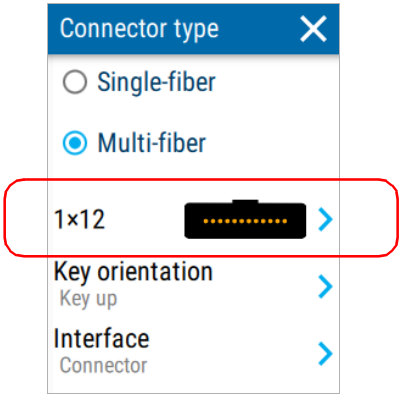


2. In the **Connector type** screen, select the type of connector you want to use.

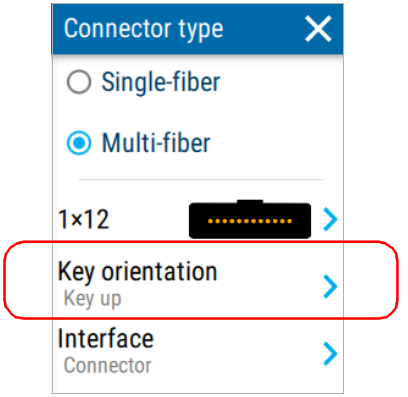


3. If you work with multi-fiber connectors, proceed as follows.

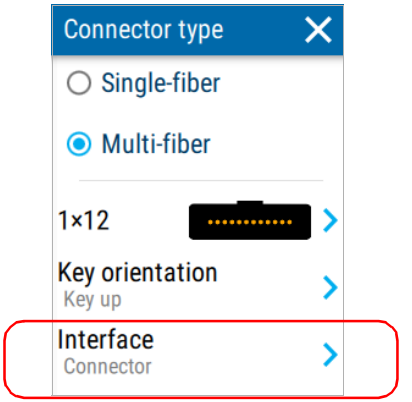
3a. Select the fiber layout corresponding to the connector you want to inspect.



3b. Select the key orientation of the connector that best suits your work environment.



4. Select the type of interface corresponding to the connector you want to inspect.



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

Selecting the Fiber Type

Your unit allows you to inspect singlemode and multimode fiber connectors.

The fiber type that you select for single-fiber connectors is independent of the one that you select for multi-fiber connectors. This means that you can select different fiber types if necessary to better suit your test environment. Both selections are kept in memory even when you turn the unit off.

The possible fiber types for these connectors are listed below.

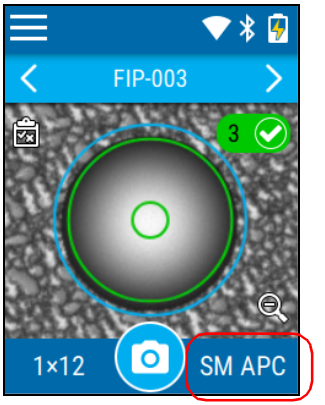
Fiber Type	Features
Singlemode (single-fiber connectors only)	Corresponds to singlemode fiber with a PC or UPC connector. Fiber type selected by default. Fiber jacket is usually yellow and connector is dark blue.

Fiber Type	Features
Singlemode APC	Fiber type selected by default for multi-fiber connectors. Fiber jacket is usually yellow and connector is green.
Multimode OM1	Modal bandwidth: 200-500 MHz·km. Fiber channel designation: M6. Fiber jacket is orange or slate.
Multimode OM2	Modal bandwidth: 500 MHz·km. Fiber channel designation: M5. Fiber jacket is orange.
Multimode OM3	Modal bandwidth: 1500-2000 MHz·km. Laser optimized (VCSEL) at 850 nm. Fiber channel designation: M5E. Fiber jacket is aqua.
Multimode OM4	Modal bandwidth: 3500-4700 MHz·km. Laser optimized (VCSEL) at 850 nm. Fiber channel designation: M5F. Fiber jacket is aqua or violet.
Multimode OM5	Modal bandwidth: 3500-4700 MHz·km. Wideband multimode from 850-953 nm. Fiber jacket is violet or lime green.

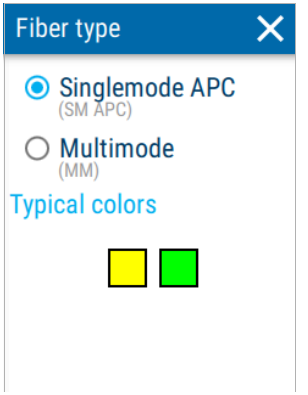
As you select the fiber type for your inspection, your unit displays the typical colors of singlemode and multimode fiber jackets to help you identify it.

To select the fiber type:

1. From the inspection screen, tap the fiber type.



2. In the **Fiber type** screen, select the desired type of fiber. If you are not sure whether your setup uses singlemode or multimode fiber, you can have a look at the color chart displayed on the screen.



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

Inspecting Fiber Ends

Your unit allows you to inspect both single- and multi-fiber connectors. Before beginning to inspect fiber ends, you must first ensure that the appropriate optical head is installed on your unit.

You must ensure that the SmarTip installed on your unit corresponds to the type of connector that you need to inspect. You must also select the proper fiber type (ex.: singlemode APC) in the application.

To inspect fiber ends:

1. If applicable, ensure that the proper optical head is installed on your unit (see *Changing Your Unit's Optical Head* on page 26).
2. Ensure that the proper SmarTip is installed on your unit (see *Changing Your Unit's SmarTip* on page 22).
3. Select the desired connector type, including the fiber layout and key orientation (multi-fiber inspection), as well as the interface. For more information, see *Selecting the Connector and Interface Types* on page 41.
4. Select the desired fiber type. For more information, see *Selecting the Fiber Type* on page 44.
5. Insert the connector that you want to inspect into the tip of your unit.
6. Pull the trigger located on the handle of the unit.

   OR

   Tap .
7. If necessary, clean the connector properly.

The inspection results are displayed on the screen. For more information on navigation through multi-fiber captures, see *Navigating Through Multi-Fiber Captures* on page 48. For more information on the overlay, see *Displaying or Hiding the Overlay* on page 50.

Navigating Through Multi-Fiber Captures

When you inspect multi-fiber connectors, once the analysis is complete, the application displays an overview of the connector (where several fibers are visible at a time). It allows you to have a global view of the inspection results as well as a way to localize large debris that could be located outside the perimeter of the fibers themselves.

From this overview, you can access the detailed capture of any of the inspected fibers that are part of the connector, and vice versa.

From a specific fiber view, you can navigate to the previous or next fiber on the same row. You can also navigate from one row to another when you work with connectors having a multi-row fiber layout.

To scroll through the inspection results:

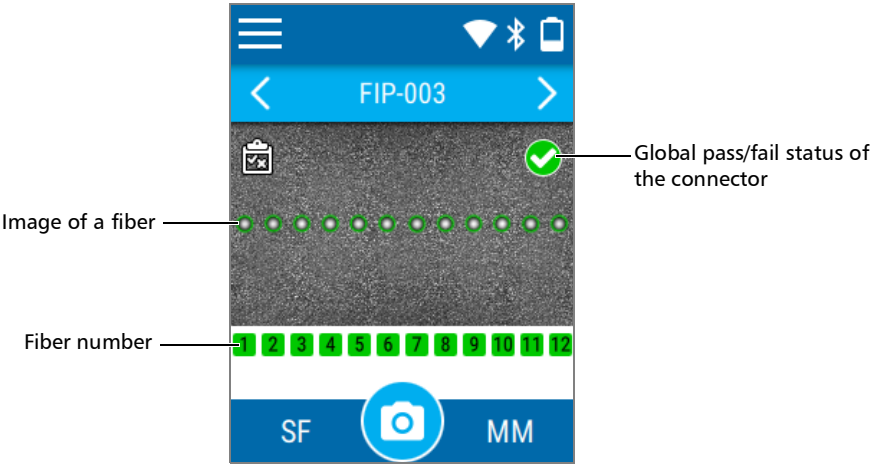
Swipe left or right on the screen.

To switch from one fiber row to the other (multi-row fiber layouts):

Swipe up or down on the screen.

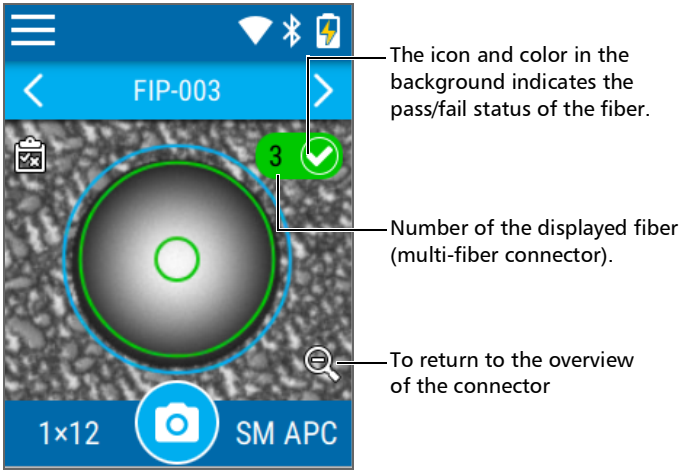
To access the detailed capture of any of the inspected fibers:

From the overview, tap the image of the fiber (small circle) or the desired fiber number.



To return to the overview:

From the detailed capture view, tap the icon.



Displaying or Hiding the Overlay

The overlay is shown by default after an analysis. The application displays a circle around each of the active fibers.

The overlay shows the status of the analysis, the status per zone, the analysis zones and any anomaly (defects and scratches) found on the fiber endface. The different regions on a fiber such as the core, the cladding and the adhesive are represented with circles.

The color of the circles shows the status of the analysis zone:

- green: pass
- red: fail
- blue: no analysis performed

The overlay applied on a specific fiber in a multi-fiber connector is independent from the overlay of the whole connector. You can show or hide the overlay from the connector overview (where several fibers are visible at a time) or from the view showing a specific fiber.

To display or hide the overlay:

Tap the icon.

OR

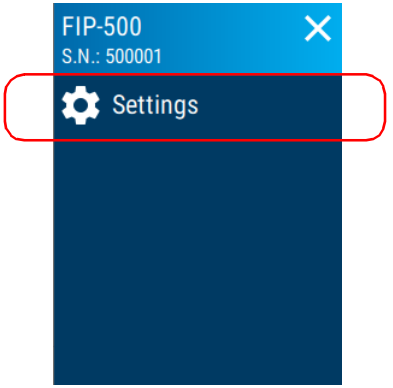
Tap either anywhere in the non-active area (gray background) of the image or directly on the image of the fiber when you view a specific fiber.

Turning on or Turning off the Flashlight

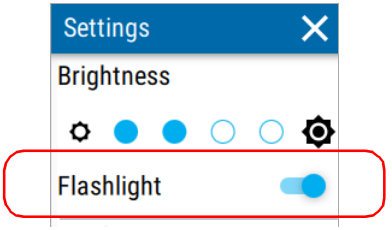
Your unit comes equipped with a dual-function LED that can serve as a flashlight to help you locate the connectors. This is particularly useful when the environment in which you must perform the inspection is dark.

To turn on or turn off the flashlight:

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



2. Turn on or turn off the flashlight with the corresponding toggle.



3. Close the **Settings** page to return to the inspection screen.

6 Working with the EXFO Exchange Application

You can use your FIP-500 in association with a smart device equipped with the EXFO Exchange application allowing you to retrieve the software updates and send captures to EXFO for technical support.

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

Installing the EXFO Exchange Application on Your Smart Device

Before you start working, if you intend to retrieve the software updates for your unit, you will need to install the EXFO Exchange application on your smart device.

To install the EXFO Exchange application:

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

   OR

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

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

When you want to configure Wi-Fi networks to receive updates for your unit, interactions are necessary between the unit and a smart device equipped with the EXFO Exchange 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 59).

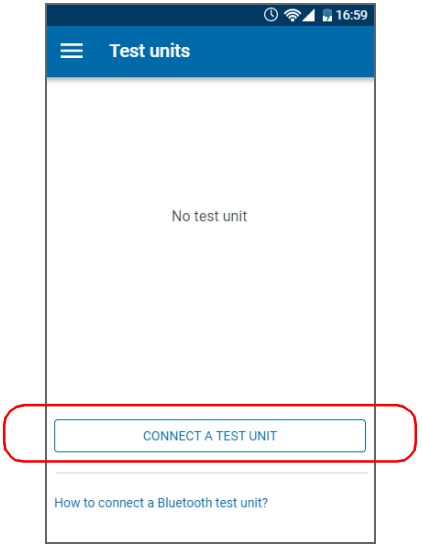
On your FIP-500 unit, the status of the Bluetooth communication is indicated with an icon in the title bar. The table below shows the possibilities.

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.

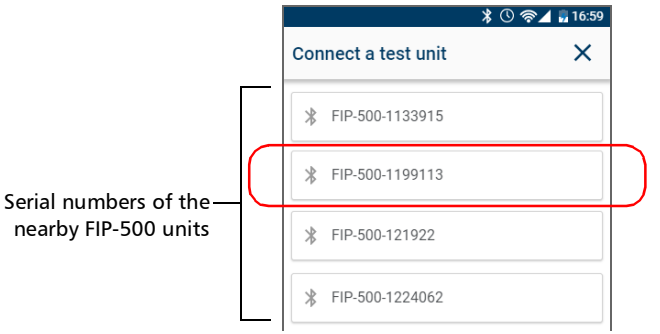
If a connection has been established with a smart device already, but you wish to use your unit with another smart device, you can close the current connection directly from your unit.

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 59).
2. If it is not already done, install the EXFO Exchange application on your smart device (see *Installing the EXFO Exchange Application on Your Smart Device* on page 53).
3. On the smart device, establish the connection as follows.
   - **3a.** Open the EXFO Exchange application.
   - **3b.** From the **Test units** screen, tap the **CONNECT A TEST UNIT** button.



3c. From the list of FIP-500 units, tap the item corresponding to the desired unit.



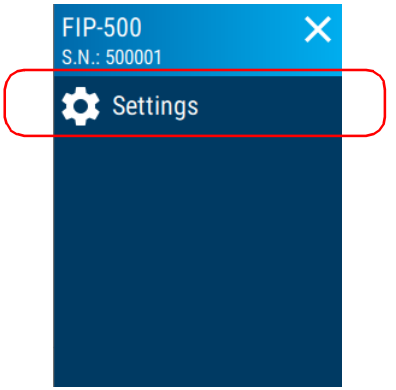
4. On your FIP-500 unit, when you are prompted, tap **ACCEPT** to authorize the pairing with the smart phone

The application establishes the communication automatically. When the connection is successful, the icon remains displayed in the title bar of your FIP-500 unit. The unit (identified with its serial number) is added to the list of test units in EXFO Exchange.

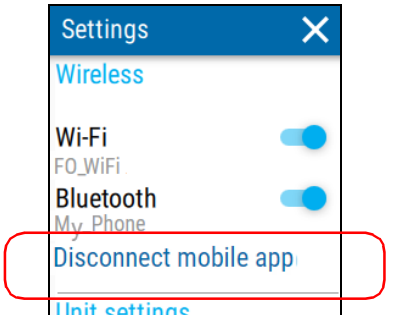
Note: *If the FIP-500 unit that you want to use is already connected to another smart device, you must first close the connection between the FIP-500 unit and the other smart device before being able to see it on the list of the nearby FIP-500 units.*

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**.

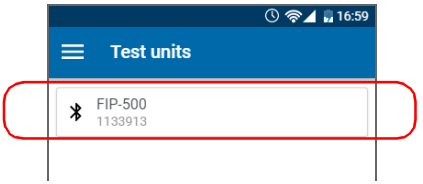


3. When the application prompts you, confirm the disconnection by tapping **YES**.

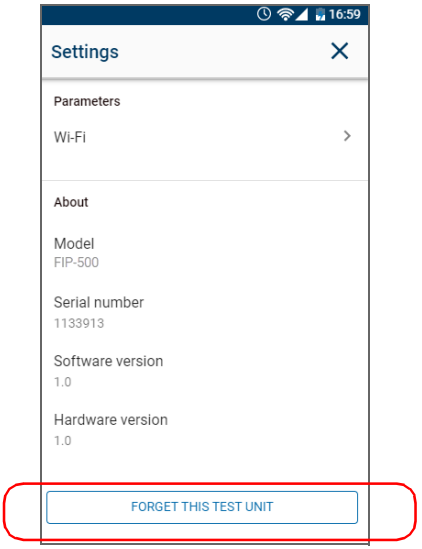
Note: *A new pairing will be required the next time you want to work with the disconnected smart device.*

To close the connection with (release) an FIP-500 from a smart device:

1. From the **Test units** screen, tap the line corresponding to your FIP-500 unit.



2. Tap **FORGET THIS TEST UNIT**.



The smart device is no longer connected to the FIP-500 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 services (to retrieve software updates), are accomplished using a connection to a wireless network.

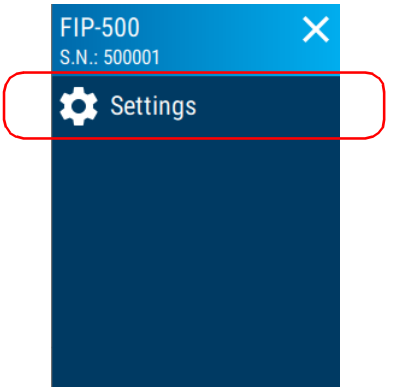
By default, the Bluetooth communication is enabled on your unit, but the Wi-Fi is not.

You can enable or disable the Bluetooth communication from your unit only, and the Wi-Fi communication both from your unit and from the EXFO Exchange application.

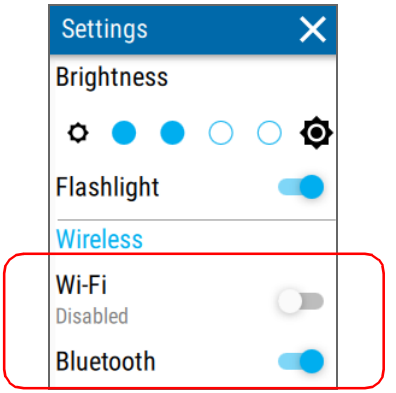
If you do not need to connect to a wireless network for a certain period of time, you may wish to disable the Wi-Fi communication to save battery power.

To enable or disable the wireless communication from your unit:

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



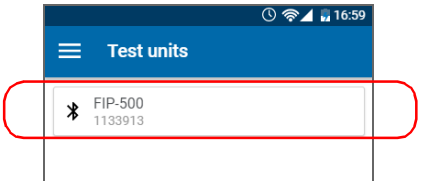
2. From the **Wireless** section, use the **Wi-Fi** or **Bluetooth** toggle to enable or disable the communication as needed.



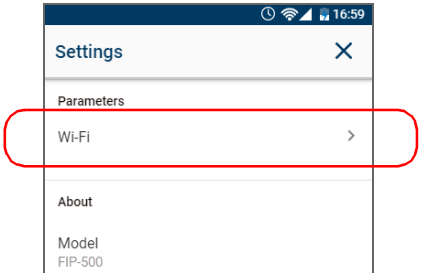
The changes are taken into account immediately.

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

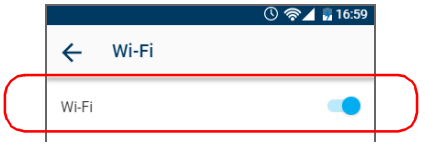
1. Ensure that a Bluetooth connection has already been established between your unit and a smart device (see *Establishing or Closing a Connection With a Smart Device Via the Bluetooth Technology* on page 54).
2. On the smart device, open the EXFO Exchange application.
3. From the **Test units** screen, tap the line corresponding to your FIP-500 unit.



4. Tap **Wi-Fi**.



5. Use the **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* EXFO Exchange *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 on page 66).

By default, the Wi-Fi connection is disabled on the FIP-500 unit. You must enable it before trying to connect to a wireless network (see *Enabling or Disabling the Wireless Communication* on page 59).

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

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 (in the EXFO Exchange application). The table below shows the possibilities.

Icon	Meaning
No Wi-Fi icon visible in the title bar	The Wi-Fi communication is disabled.
	The Wi-Fi 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 gray (list of wireless networks) reflects the strength of the signal.
	Password-protected (secured) networks are identified by a lock in the list of wireless networks (EXFO Exchange).

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 EXFO Exchange 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.

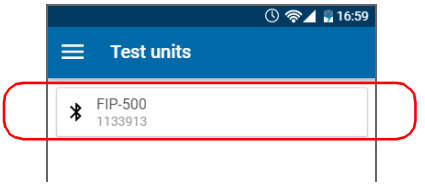
IMPORTANT

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

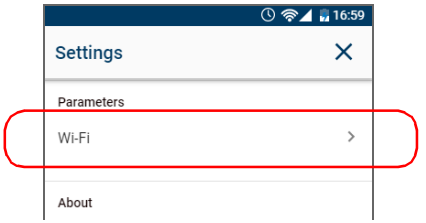
To configure a wireless network:

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 54).
2. If necessary, enable the Wi-Fi communication on your unit (see *Enabling or Disabling the Wireless Communication* on page 59).
3. On the smart device, open the EXFO Exchange application.

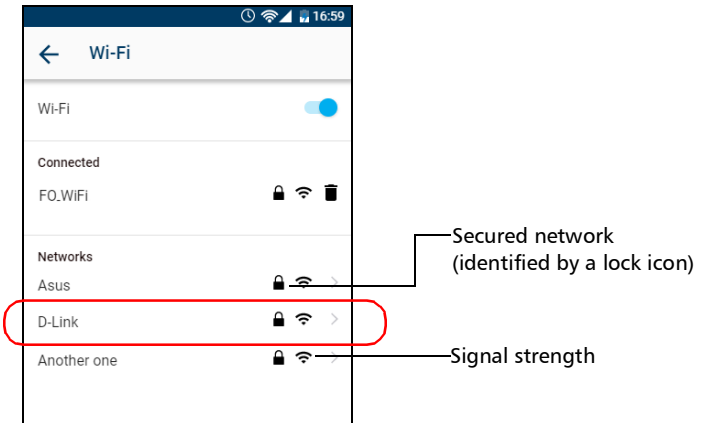
4. From the **Test units** screen, tap the line corresponding to your FIP-500 unit.



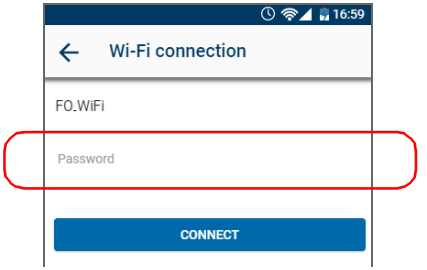
5. Tap **Wi-Fi**.



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



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



8. Tap **CONNECT**.
9. Follow the on-screen instructions.

The application establishes the communication automatically.

Connecting to a Wireless Network From Your Unit

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

7 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 Lenses

Keeping your unit's lenses clean and free of dust will ensure that you get the optimum performance out of your unit. The following recommendations will help you with the cleaning process:

- With a filtered air blower or a soft bristled brush, remove as much dust and dirt as possible.
- Apply a few drops of cleaning solution, which is used to clean camera lenses, on a lens tissue, a cleaning cloth or a lint-free swab. The lens cleaning solution especially manufactured by camera lens manufacturers can be used safely. Reagent grade isopropyl alcohol as well as deionized water can also be used safely.
- Gently remove oil, fingerprints and grime from the lens surface, using a circular motion from the center outwards.

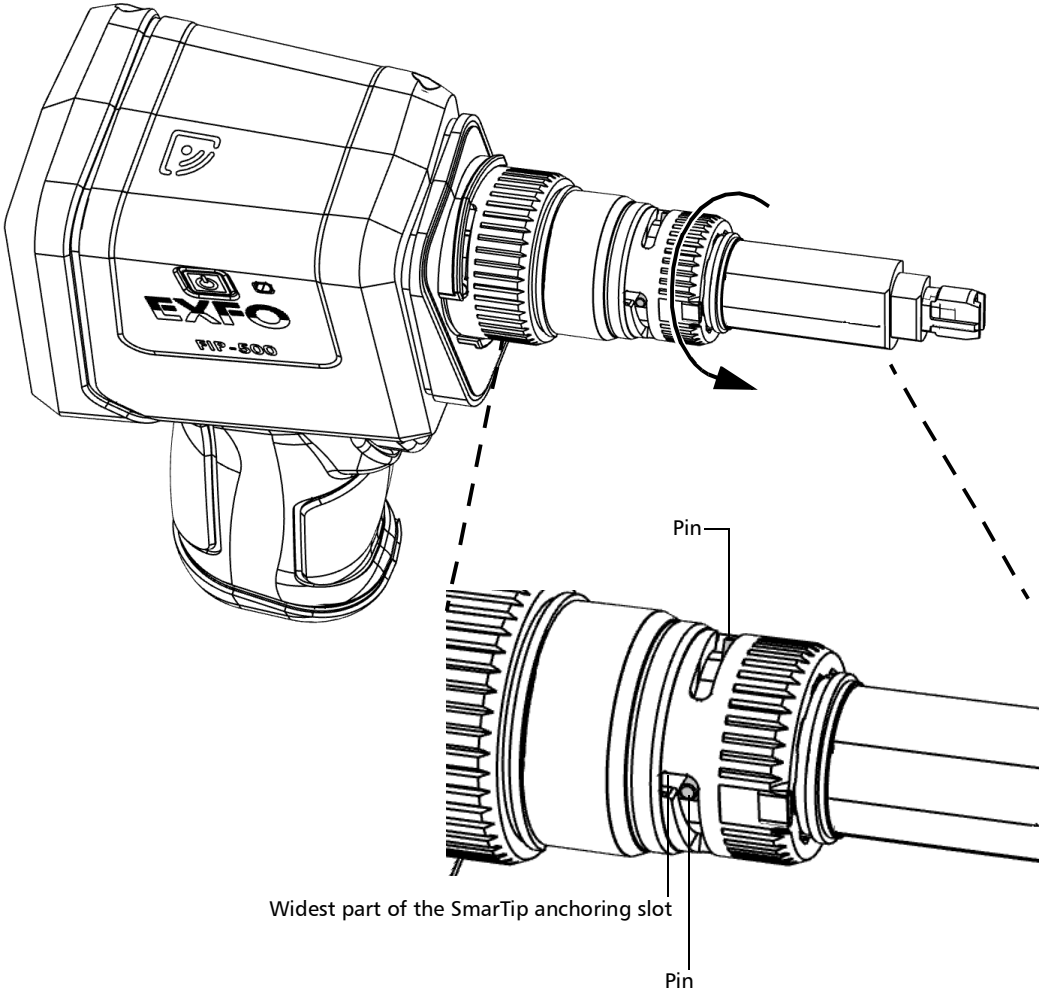
IMPORTANT

EXFO recommends to clean the lenses only when necessary, beginning with the parts that are the most exposed to dust and dirt. For example, the lens that is located at the end of the optical head (just behind the SmarTip) can need cleaning, but not the other lenses.

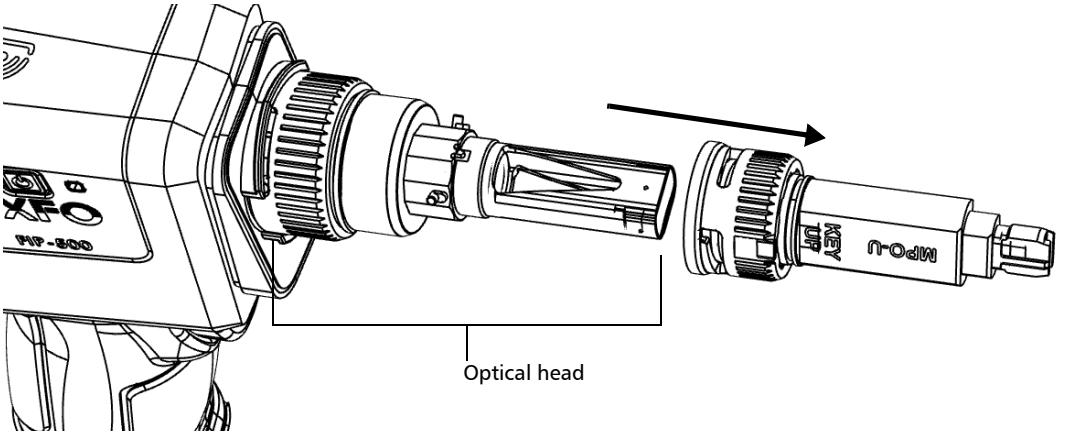
Attempting to clean lenses that do not need cleaning, especially without the right tools or method, can worsen a situation.

To clean lenses:

1. If necessary, turn off your unit and remove the protective cap.
2. Turn the SmarTip retaining nut counterclockwise until the pins are aligned with the widest part of the SmarTip anchoring slots.

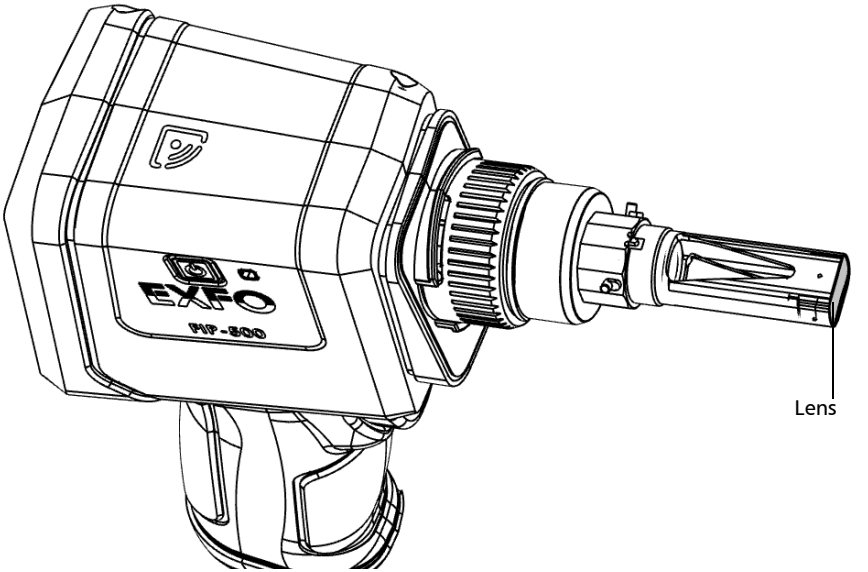


3. Pull on the SmarTip to remove it.

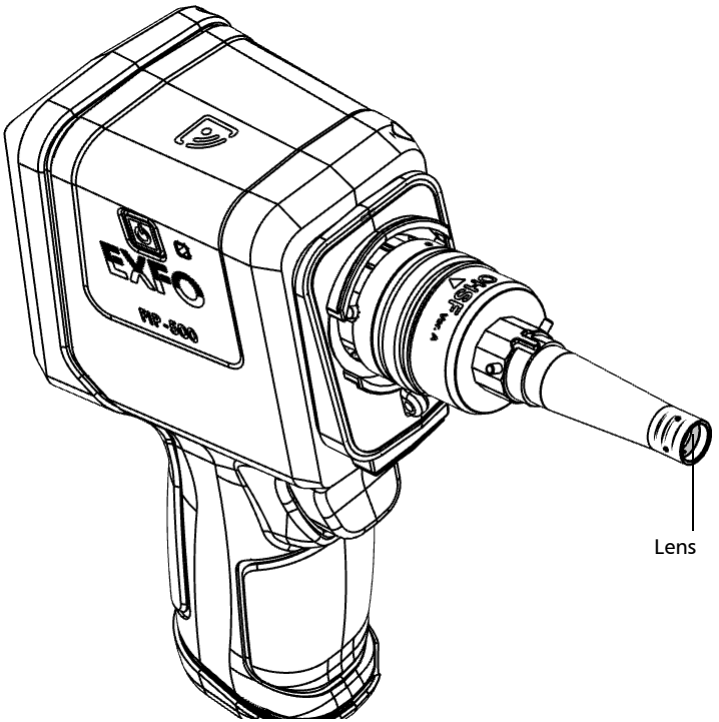


4. Clean the lens that is located at the end of the optical head.

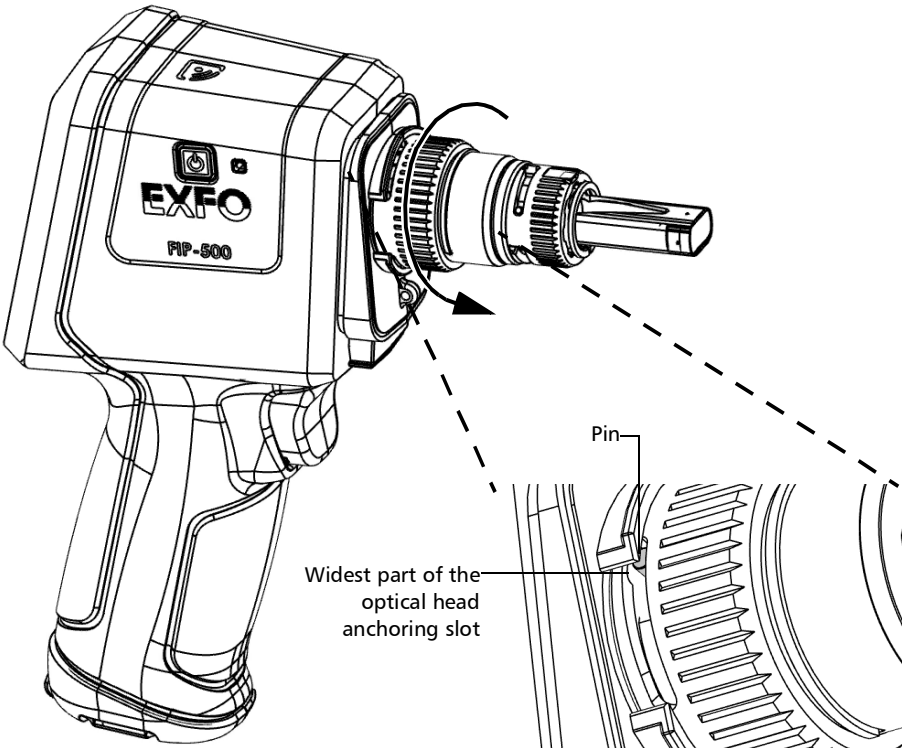
Multi-fiber optical head



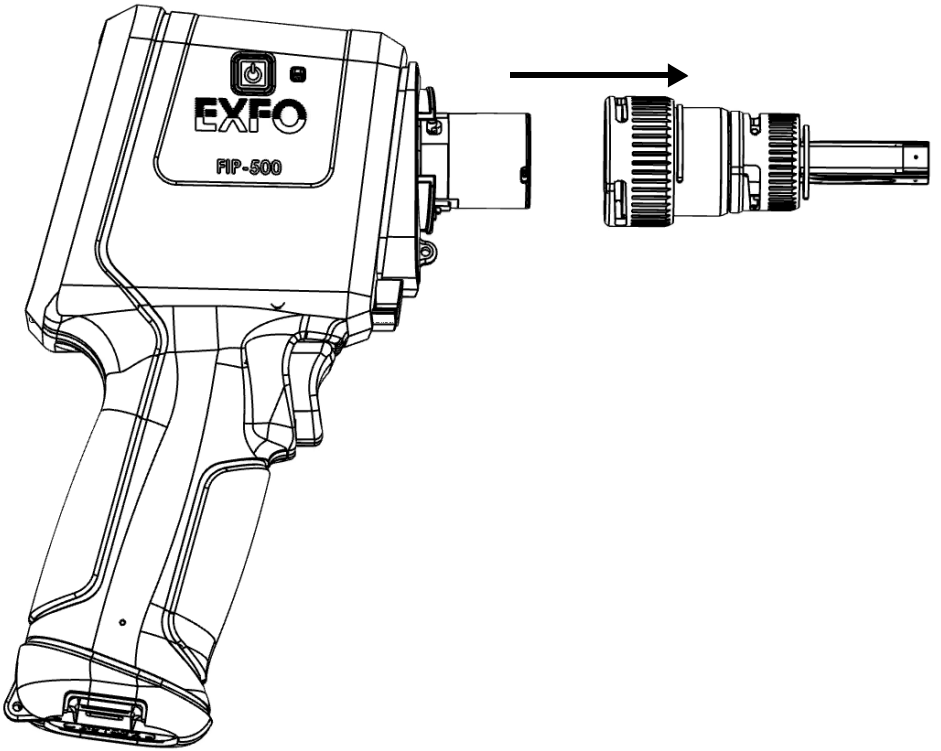
Single-fiber optical head



5. Slightly turn the optical head retaining nut counterclockwise to release it from your unit (the pins on the unit will be aligned with the widest part of the anchoring slots on the optical head).



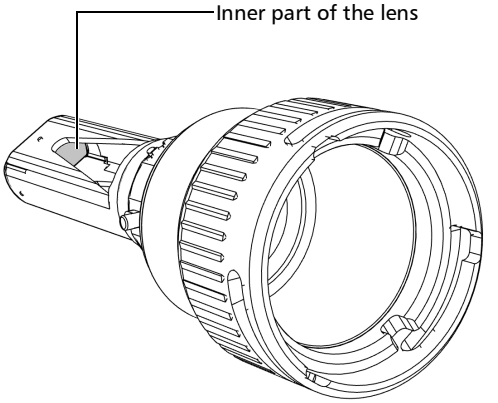
6. Gently pull on the optical head to remove it.



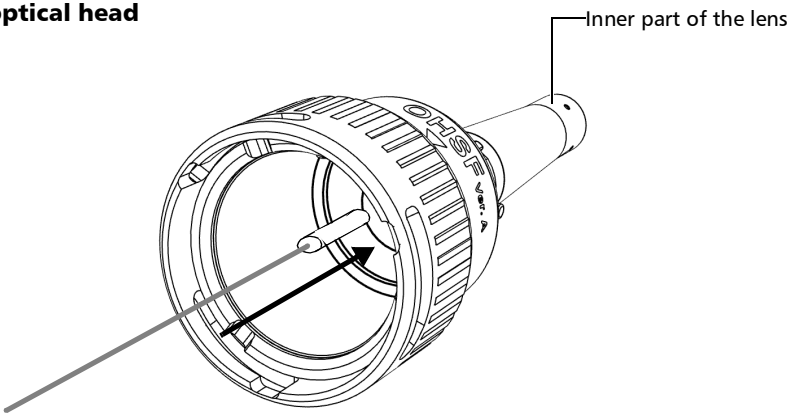
7. Using a lint-free swab, clean the inner part of the lens that is located at the end of the optical head.

Note: *You will need a swab measuring at least 15 cm (6 inches) to clean the inner part of the single-fiber optical head lens.*

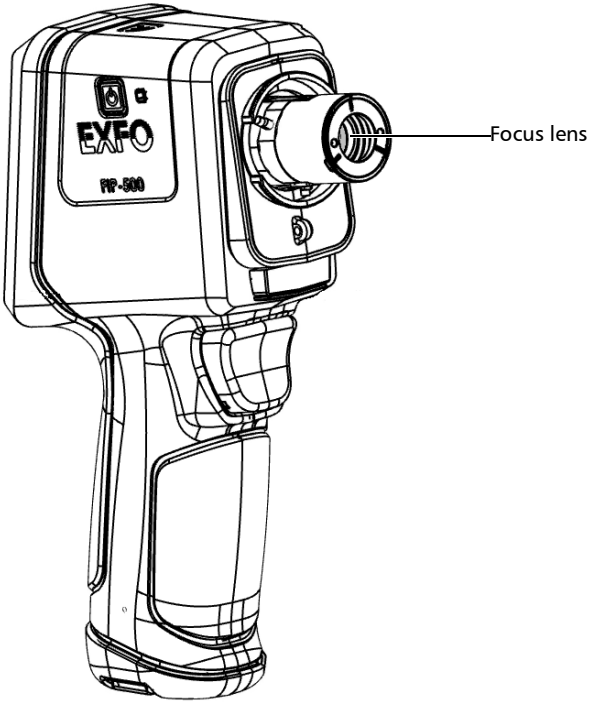
Multi-fiber optical head



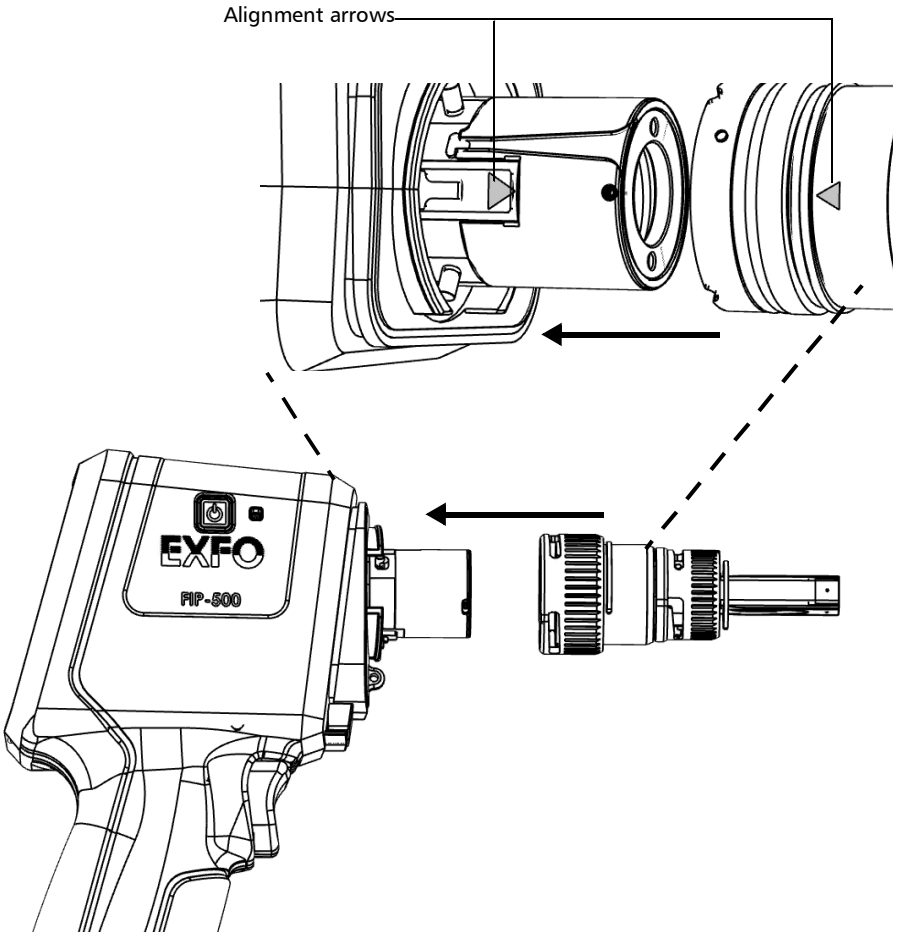
Single-fiber optical head



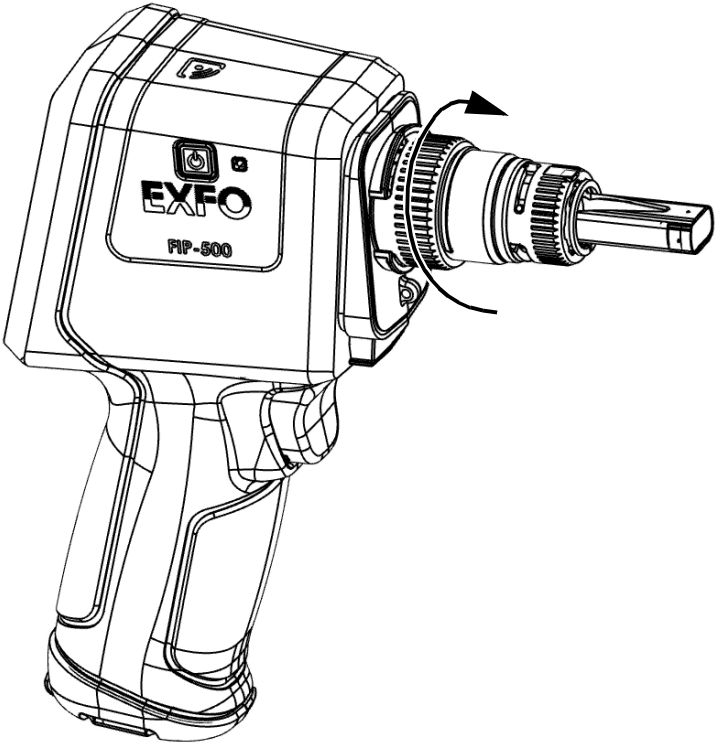
8. Using a lint-free swab, clean the focus lens.



9. Align the arrow on the optical head with the arrow on your unit and then, gently put the optical head back in place.

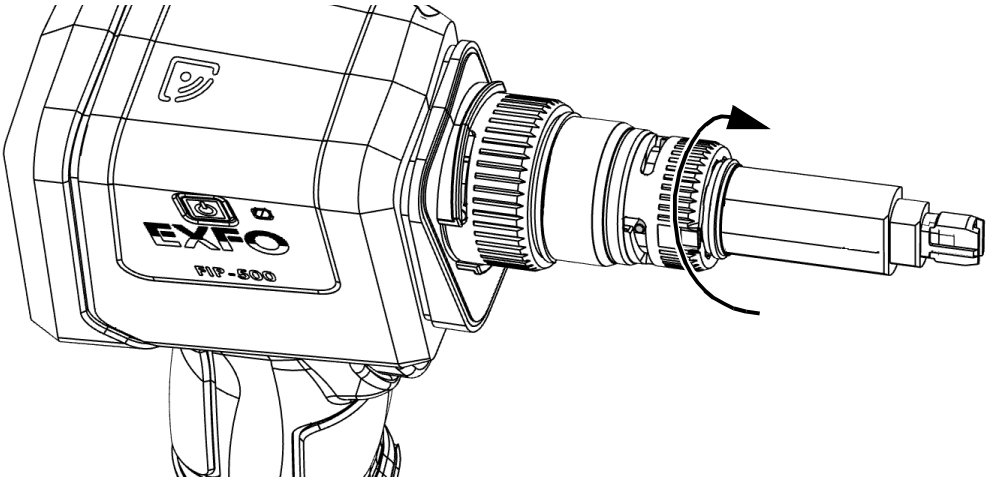


10. Slightly turn the optical head retaining nut clockwise to secure it in place (the pins on the unit will be aligned with the narrowest part of the anchoring slots on the optical head).



11. Put the SmarTip back in place.

12. Turn the SmarTip retaining nut clockwise until the pins are aligned with the narrowest part of the anchoring slots to secure the SmarTip in place.



Your unit is now ready to use.

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.

Battery Maintenance Recommendations

WARNING

Your unit uses the following type of batteries: Lithium-ion (Li-ion).

These are batteries with built-in protection that have been especially designed for EXFO. For this reason, you can only replace them with EXFO-approved batteries of the same type and model.

WARNING

The use of unapproved batteries may result in the batteries expanding or igniting (that is, catching fire).

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.

- At EXFO, we take the safety of our customers very seriously and want to make sure any battery replacement is done properly.

  The batteries of all EXFO-branded products are tested, certified, and in compliance with these international safety standards:

  - United Nations (UN) Transport Regulations UN38.3: Covers battery safety during air transport.
  - UL 61010-1, CAN/CSA C22.2 61010-1 and International Standard IEC/EN 61010-1: Covers the use of batteries for test and measurement equipment.
  - International Standard IEC 62133: Covers secondary cells and batteries containing alkaline or other non-acid electrolytes.
  - In some countries, when required, EXFO-approved batteries have been certified and are marked as per local regulation.

- To get pricing and correct part number for replacement batteries for your products, please contact (via email):
  - For Americas: Isales.us@exfo.com
  - For Europe: Isales.emea@exfo.com
  - For APAC: Isales.apac@exfo.com
  - For China: Isales.China@exfo.com
- You may also obtain replacement batteries for your products by contacting your local distributor:

  https://www.exfo.com/en/how-to-buy/find-distributor
- Your may return your unit for service at your local service center:

  https://www.exfo.com/en/services/field-network-testing/exfo-service-centers/

Recharging the Battery

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

- The charge status is shown in the upper right corner of the title bar. A red icon indicates that the battery level is running low and that you should connect the unit to a power outlet. For more information, see *Battery Status Icon Description* on page 7.
- The unit also indicates the charge status with the LED on its side (see *LED Indicators Description* on page 5).

WARNING

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.

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 40 °C (14 °F and 104 °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.

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. You can purchase new batteries from EXFO.

WARNING

- **Your unit uses a lithium-ion (Li-ion) battery with built-in protection that has been especially designed for EXFO. For this reason, you can only replace it with batteries of the same type and model. The use of other batteries may damage your unit and compromise your safety.**
  You can purchase new batteries from EXFO.
- **Battery replacement should only be done by a qualified technician with the appropriate tools on an electronic bench or similar environment.**

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

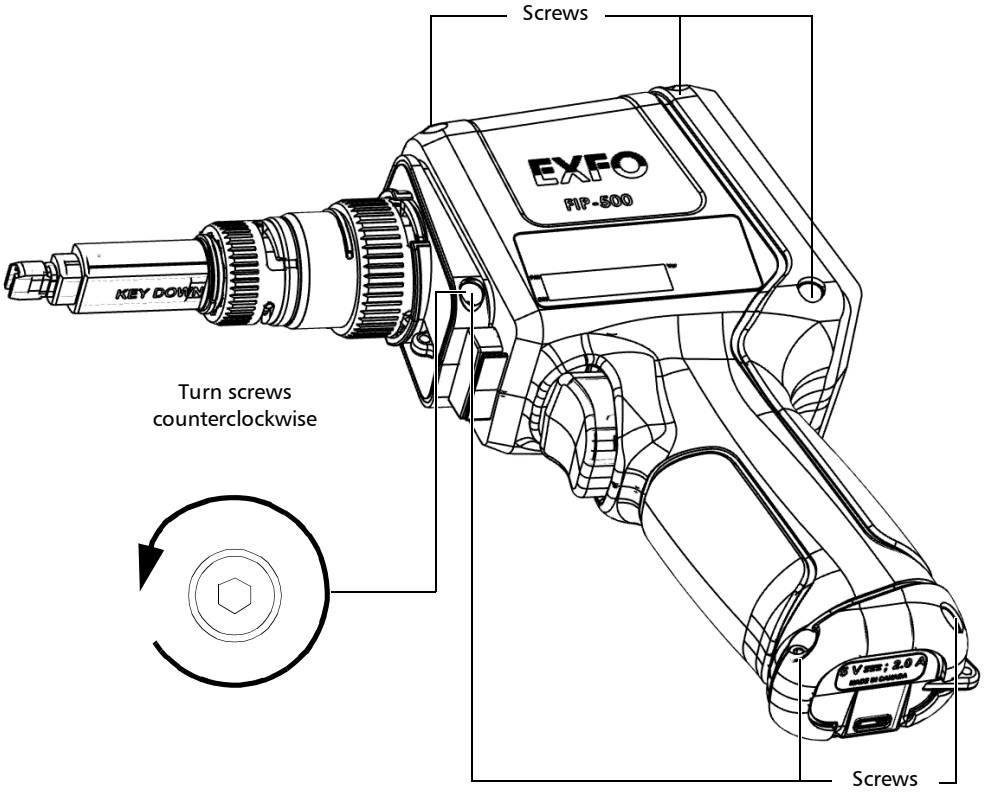
CAUTION

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

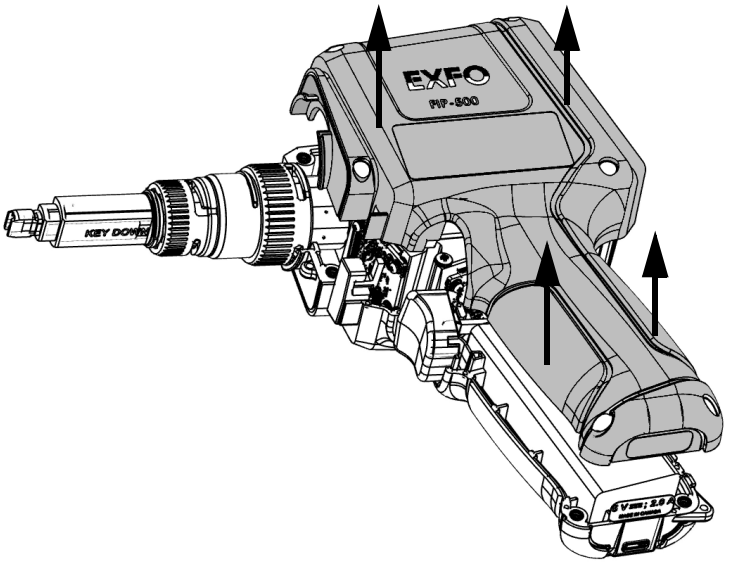
- **Always use an ESD-preventive wrist or ankle strap when replacing the battery. Ensure that the antistatic strap makes good skin contact and that the end of its wire is grounded properly.**
- **Never touch any component inside the unit other than those identified in the procedure hereafter, either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

To replace the battery:

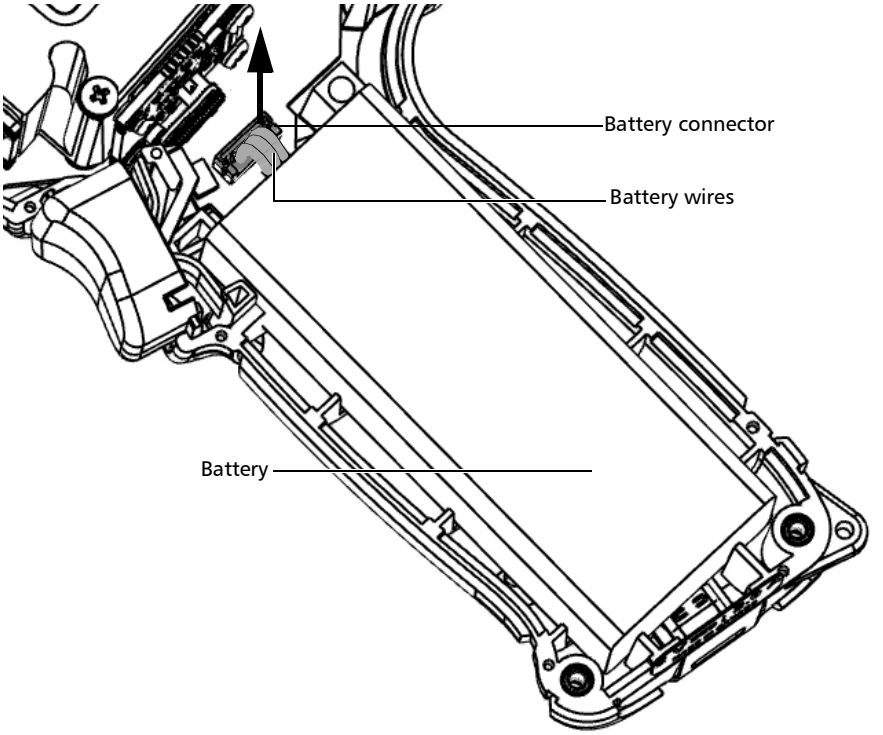
1. Turn off the unit by pressing the on/off button for about three seconds. A shutdown animation will be displayed on the screen.
2. If applicable, disconnect the USB cable.
3. Position the unit so that its side panel with the on/off button rests on a flat surface such as a table.
4. On the case of the unit, using a 2.5 mm hex socket screwdriver, turn the screws (6) counterclockwise until they are loose, and remove them.



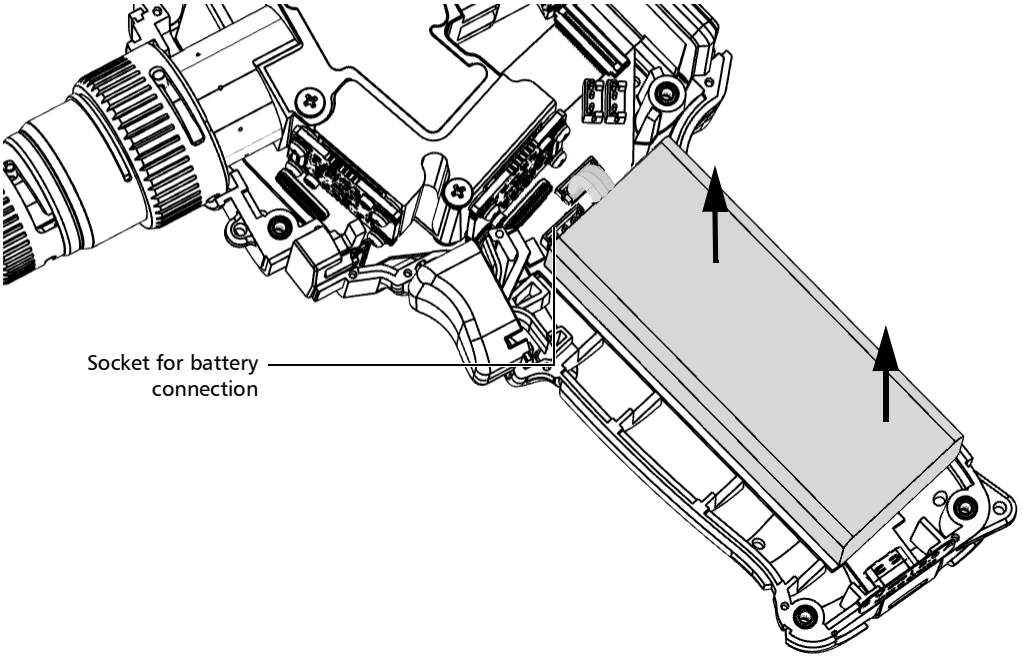
5. Hold the cover by its sides and pull it up to remove it.



6. Gently pull on the battery connector to disconnect it from its socket.

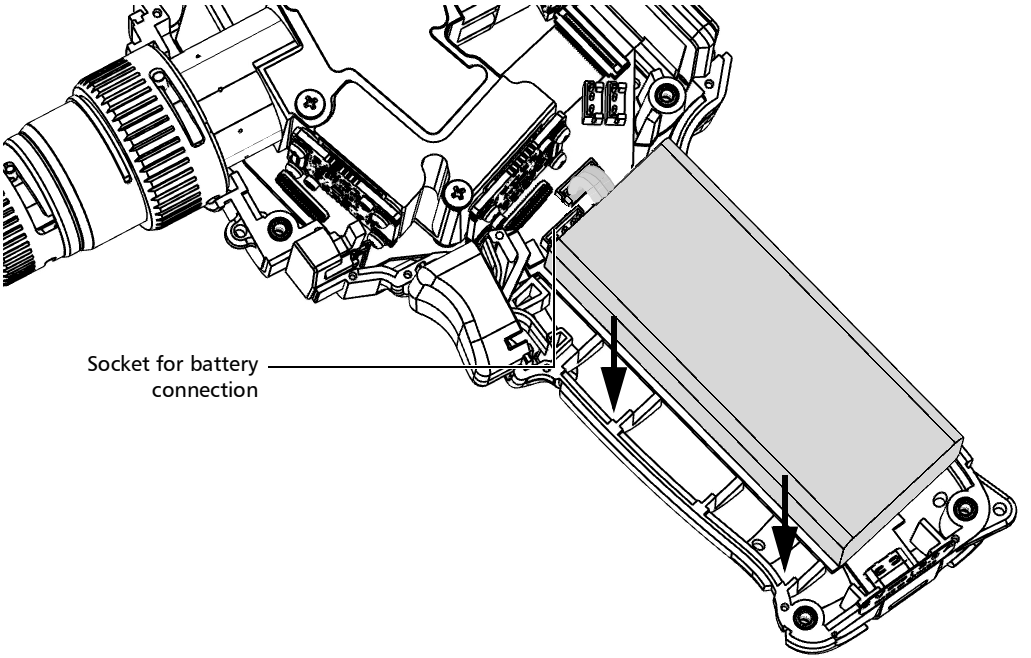


7. Pull the battery up to remove it.



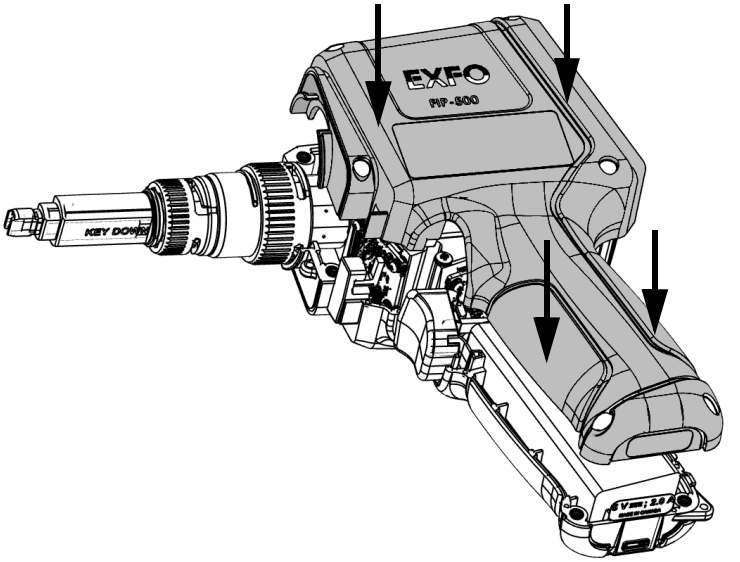
8. Place the new battery so that its wires and connector are located on the same side as the socket in your unit's case. The battery connector should be facing down.

9. Place the new battery in the bottom of the case.



10. Connect the battery connector to the corresponding socket.

11. Carefully place the side panel back on the unit, making sure that it is aligned properly with the other side of the unit and that the trigger has not moved. There should be no gap between both sides of the unit. If necessary, slightly move the side panel until alignment is correct.



12. Using a 2.5 mm hex socket screwdriver, turn the screws (6) clockwise until they are tightened.

This will secure the side panel into place.

IMPORTANT

- **If the battery 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 battery LED indicator and the on-screen battery status icon reflect the actual power level of the new battery.**

Upgrading Software

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

Your unit's application has been preinstalled and configured at the factory. However, you may have to upgrade it 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.*

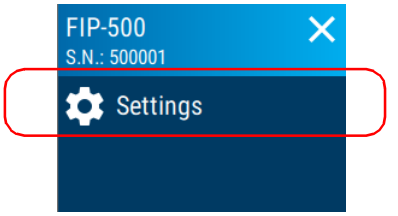
IMPORTANT

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.

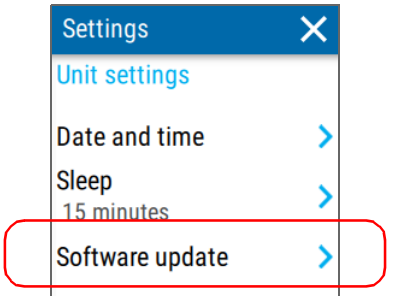
To upgrade software:

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 62).

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



5. Scroll down to the **Unit settings** section.
6. Tap **Software update**.



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.

8 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 battery LED will remain red for about 5 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 84).
	The system has encountered a problem.	Press the on/off button for at least ten seconds to force a hardware reset on the unit.[a]
	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.[a] If the problem persists, try resetting the FIP-500 to its factory settings (see *Reverting to Factory Settings* on page 38).
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.	The USB power adapter is not connected properly.	Make sure that the USB power adapter is connected to the unit and the AC outlet. In this case, the battery LED is off, and there is a battery icon with a flash symbol displayed on the screen. If the USB power adapter is connected properly and the problem persists, it could mean that the USB power adapter is defective. In this case, try replacing the adapter. You can purchase new USB power adapters from EXFO.
	Ambient temperature is too high or too low.	In this case, the battery LED is blue and blinks fast. Make sure that the temperature in the location where you recharge the battery is within the specifications.
I have just replaced the battery and the battery 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 battery 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 displayed.	No network has been configured yet.	You must first configure the desired networks on your smart device, using in the EXFO Exchange application (see *Working With a Wireless Network* on page 62).
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 59). ➤ 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 EXFO Exchange application (see *Working With a Wireless Network* on page 62). ➤ Ensure that the network is working normally and that your unit is within the network's range. ➤ If the problem persists, restart your unit to force a new connection to the network.

Problem	Possible Cause	Solution
My unit cannot connect to a Wi-Fi network even though I have configured all parameters correctly.	Since every network has its own specifications, there may be elements that are not compatible with your unit.	Configure a Wi-Fi hotspot on a smart device or a laptop that you will use to give your unit access a wireless network. When it is done, configure this Wi-Fi hotspot as you would with any Wi-Fi network (see *Configuring a Wireless Network* on page 64).

a. Forcing a hardware reset on the unit will not delete any of the data or settings that were already stored. However, the last capture or modifications made to the settings may be lost.

Restoring Your Unit to Normal Operation

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

CAUTION

- **Once the recovery operation is started, it cannot be cancelled. All data and custom configurations stored on your unit will be permanently lost.**
- **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.**

To restore you unit to normal operation:

1. Ensure that your unit is completely off (not in sleep mode). If necessary, turn off your unit by pressing the on/off button for about three seconds. A shutdown animation will be displayed on the screen.
2. 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.
3. Press and hold the trigger.
4. While you keep the trigger down, press the on/off button until the unit beeps once. Release the on/off button, but not the trigger.
5. Keep the trigger down until the **Recovery** page is displayed, then release the trigger.
6. Read the instructions, and if you choose to perform the recovery operation, tap **FACTORY RESET**.

7. Read the instructions, and then confirm the operation by tapping **FACTORY RESET**. Wait for the operation to complete.

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.

8. A message will inform you when the operation is complete. Tap **RESTART**.
9. Once your unit has restarted, read and accept the EXFO license agreement, set the date and time, and read safety instructions as you did when you first received your unit (see *Configuring Your Unit at First Startup* on page 19).
10. If desired, perform a software upgrade to ensure that your unit is up to date (see Upgrading Software *on page 91*).

You are now ready to work with your unit.

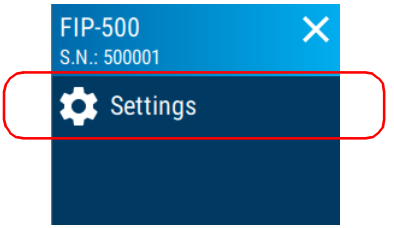
Accessing the Online Documentation

You can access the user guide at all times from your smart device.

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

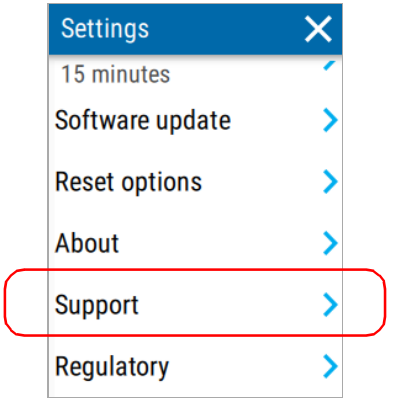
To access the user guide with the QR code:

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

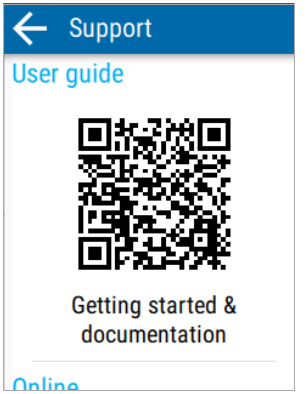


2. Scroll down to the **Unit settings** section.

3. Tap **Support**.



4. Use a smart device to scan the QR code and access the 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).

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

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

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

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

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

Sharing Information With the Technical Support Group

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

To accelerate the process, please have information such as the serial number of your unit as well as the approximative date and time when the captures were taken, close at hand.

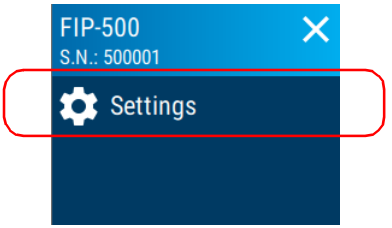
Your unit will need access to a Wi-Fi connection to be able to share captures. If you have not configured any Wi-Fi network yet, see *Working With a Wireless Network* on page 62.

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

Note: *The unit stores the detailed information of the 50 most recent captures.*

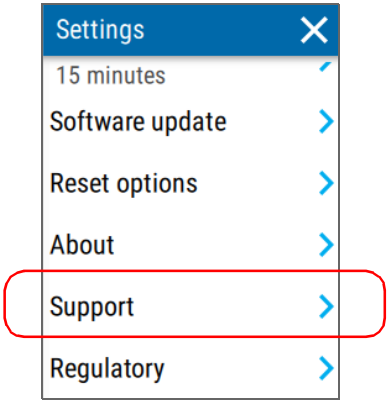
To share information with the technical support group:

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

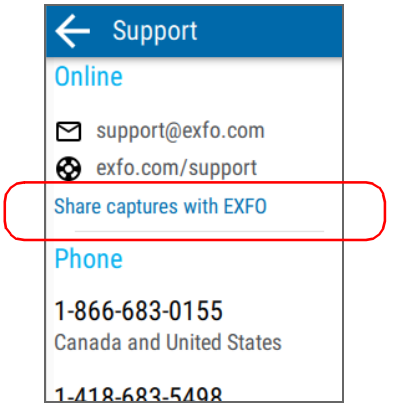


2. Scroll down to the **Unit settings** section.

3. Tap **Support**.



4. Tap **Share captures with EXFO**.



Note: *If the **Share captures with EXFO** link is not available (dimmed), it means that all the captures have been transferred to the support server already.*

5. When the application prompts you, read the information and tap the **SHARE** button to authorize the transfer.

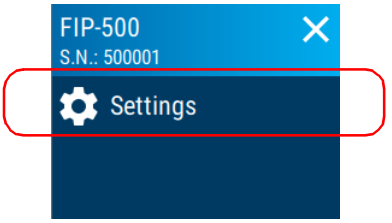
A confirmation message is displayed as soon as the transfer is complete.

Viewing System Information

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

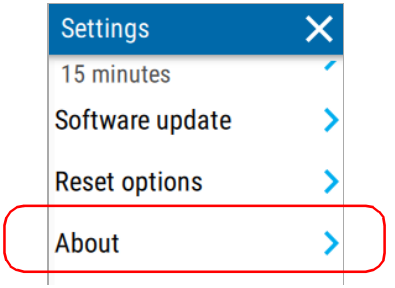
To view the system information:

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

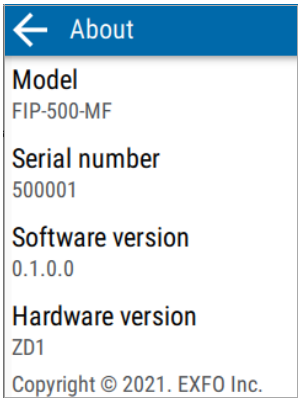


2. Scroll down to the **Unit settings** section.

3. Tap **About**.

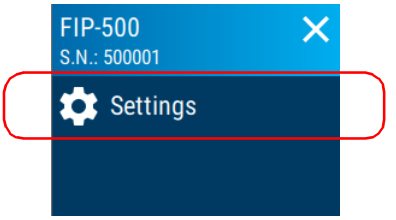


The information you want to view is displayed on the screen.



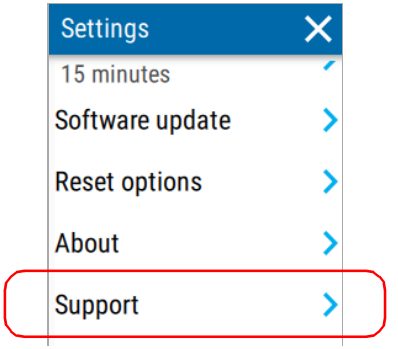
To retrieve the contact information:

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

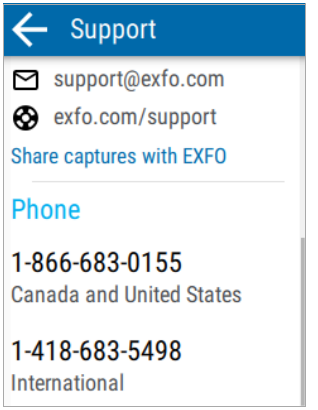


2. Scroll down to the **Unit settings** section.

3. Tap **Support**.



The information you want to view is displayed on the 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.

IMPORTANT

To prevent the unit from turning on unexpectedly, always turn it off (shutdown) before transporting it.

9 Warranty

General Information

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

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

IMPORTANT

The warranty can become null and void if:

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

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

Gray Market and Gray Market Products

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

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

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

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

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

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

Liability

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

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

Exclusions

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

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

IMPORTANT

In the case of products equipped with optical connectors, EXFO will charge a fee for replacing connectors that were damaged due to misuse or bad cleaning.

Certification

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

Service and Repairs

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

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 113). 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 113).

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

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

MARKING REQUIREMENTS
标注要求

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

a. If applicable.
如果适用。

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