Test & Inspection

FlexScan® FS300 OTDR

With SmartAuto® and LinkMap®

User's Guide

www.AFLglobal.com or (800) 321-5298, (603) 528-7780

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Safety Information

WARNING! Use of procedures or adjustments other than those specified herein may result in hazardous radiation exposure.

850/1300 nm MM OTDR/OLS port 1310/1550 nm SM OTDR/OLS port	**This is a CLASS I LASER output.**
VFL port	**This is a CLASS IIIa/3R LASER output.** **Avoid exposure to the beam!**

NOTE! FlexScan OTDRs equipped with Bluetooth/WiFi (option W1) contain the following two Bluetooth / WiFi Transmitter Modules:

FCC ID: X3ZBTMOD8 FCC ID: Z64-WL18DBMOD

IC: 8828A-MOD8 IC: 451I-WL18DBMOD

WARNING! Use only the specified AC adapter. Use of another type of AC adapter can damage the instrument and create the danger of fire and electrical shock.

WARNING! To avoid the danger of fire and electrical shock:

- Never use a voltage that is different from that for which the AC adapter is rated.
- Do not plug the unit into a power outlet that is shared by other devices.
- Never modify the power cord or excessively bend, twist, or pull it.
- Do not allow the power cord to become damaged.
- Do not place heavy objects on the power cord or expose it to heat.
- Never touch the AC adapter while your hands are wet.
- Should the power cord become seriously damaged (internal wiring exposed or shorted), contact the manufacturer to request servicing.

Safety Information

- **CAUTION!** Do not run any tests or perform functions that activate a FlexScan laser unless fiber is attached to the corresponding port.
- **CAUTION!** To avoid serious eye injury, never look directly into the optical outputs of fiber optic network equipment, test equipment, patch cords, or test jumpers. Refer to your company's safety procedures when working with optical systems.
- **NOTICE:** Except user replaceable battery, FlexScan OTDR contains no user-serviceable parts, it must be returned to AFL or authorized agents for repair and calibration.
- **IMPORTANT:** Proper care in handling should be taken when using any precision optical test equipment. Scratched or contaminated optical connectors can impact the performance of the instrument. It is important to keep the dust caps in place when the unit is not being used.
- **IMPORTANT:** Always clean OTDR port and any mating connectors using approved cleaning supplies (e.g. One-click cleaner) before mating the connectors.
- **CAUTION!** Power levels in excess of +10 dBm may damage OTDR optics. Do not connect OTDR to network connectors where received power level may exceed +10 dBm. If high power levels are suspected, verify power level by connecting to OPM and measuring received power level.

Apple Inc. Legal Notice

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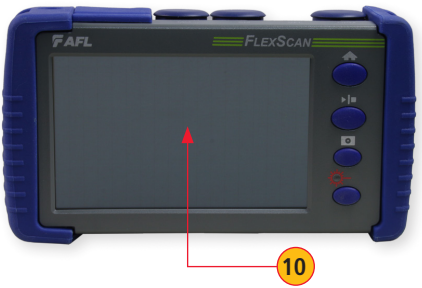
Hardware Overview

Controls, Display, Interfaces

Ref	Feature	Description
1	Power button	Press to power FlexScan OTDR on/off.
2	Power port (5 VDC)	This is interface for the AC power adapter/charger.
3	AC/Charger indicator	Illuminates when AC is connected and indicates battery charging status. • RED light = rechargeable battery is charging. • GREEN light = rechargeable battery is fully charged.
4	USB host port	This USB port may be used to connect USB Flash Drive for data storage, results backup or to update FlexScan software.
5	Micro-USB function port	With the supplied USB cable, this port may be used to connect OTDR to a USB host port on a PC to upload stored results, PDF printouts and captured screen images.

Hardware Overview



Ref	Feature	Description
6	Multimode OTDR/ Source port	**This is a CLASS I LASER output.** Multimode OTDR/Light Source port.
7	Single-mode OTDR/Source port	**This is a CLASS I LASER output.** Single-mode OTDR/Light Source port.
8	VFL port	**This is a CLASS IIIa/3R LASER output. Avoid exposure to the beam!** The VFL (visual fault locator) port is a 635 nm (visible red) laser. Used for short-range fault-location.
9	Power meter port	Optical Power Meter port. Used for power (dBm, W) or loss (dB) measurements.
10	Touchscreen display	5" 800 x 480 Color Backlit LCD and Gesture-Recognition Touchscreen.

Front Panel Buttons and Indicators

Ref	Feature	Description
11	Home button	Press to access the Home screen.
12	Test start/stop button	Press to start a new test; or, if a test is running, stop the current test.
13	VFL button	Use the VFL button to control the VFL laser: Press and hold ~ 1 sec to enable VFL at ~2 Hz flash rate Press and hold ~ 2 sec = CW Press and hold ~ 1 sec to switch off
14	VFL indicator	When the VFL port is active this indicator illuminates as follows: • Flashing RED = VFL flashing at ~2 Hz rate • Solid RED = VFL on CW • OFF = VFL is off

Battery Charging

You may charge the battery while your FlexScan is switched on or off by attaching the supplied AC charger.

- Plug the included AC charger into AC outlet.
- Connect charger plug to the Power port (1).
- AC/Charger indicator (2) will illuminate to indicate charging status as follows:
  RED - Charging battery
  GREEN - Fully charged
  OFF - AC disconnected
- FlexScan charges while operating.
- A fully-charged battery operates for approximately 12 hours of typical use.

Understanding Battery Charge Status

When FlexScan is ON, battery icon shown on the display indicates battery status as follows:

- Battery fully charged
- Battery partially charged
- Battery discharged
- Battery charging

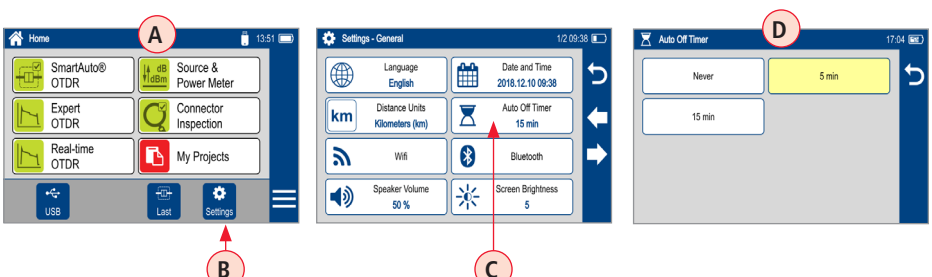
Battery fully charged, Battery partially charged, and Battery discharged symbols will only be shown when unit is operating without being connected to AC.

Configuring FlexScan to Auto-Off

The Auto-Off feature is available for conserving battery power on your FlexScan.

To Configure the Auto-Off Timer:

- Turn your FlexScan On.
- From the displayed Home screen (A), touch Settings menu (B).
- In the Settings menu, locate the Auto Off Timer option (C).
- Touch the Auto Off Timer field to display the settings sub-menu (D).
- Select the desired power save option (Never, 5 min, 15 min).



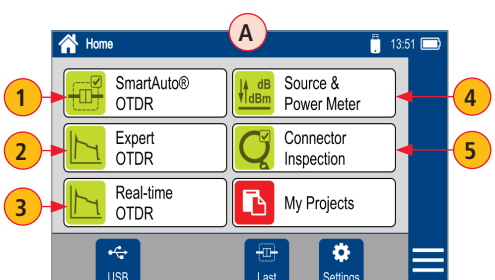
User Interface Overview

Home Screen Features

The Home screen (A) is the FlexScan's Main screen that is displayed at startup. While in any other screen, return to Home by either pressing the Home button or touching and holding (if available) the Back soft key. This screen contains menus of Test and Utility modes that allow users to set test parameters, select user preferences, manage saved test results, configure general settings and perform other non-test functions.

Test Modes and Features Summary

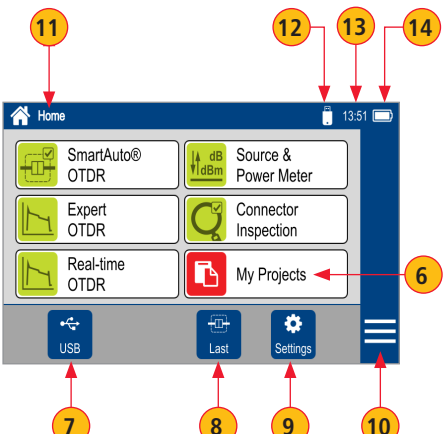
1. **SmartAuto® OTDR (recommended)**: Configure and run SmartAuto OTDR test using multi-pulse acquisition.
2. **Expert OTDR:** Configure and run Expert OTDR test with averaging.
3. **Real Time OTDR:** Configure and initiate OTDR test with real-time updates.
4. **Power Meter & Source (OPM + OLS):** Enable light source and/or measure optical power.
5. **Connector Inspection:** View connector inspection results received via Bluetooth from FOCIS Flex, FOCIS Duel, or FOCIS Lightning probe.



User Interface Overview

Utility Modes and Features Summary

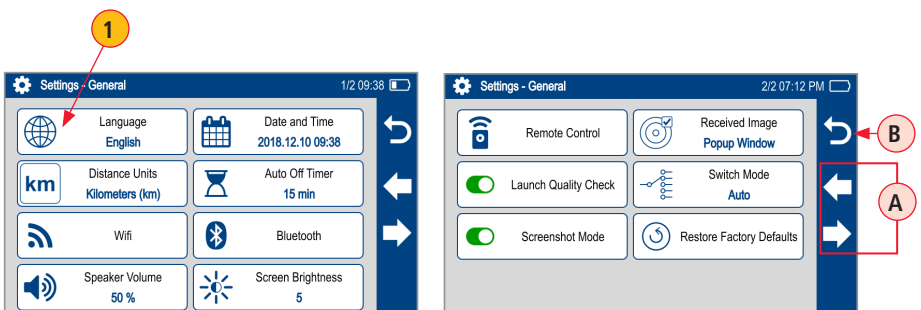
6. **My Projects:** Touch to view test results.
7. **USB:** Touch to enable file transfer. Enabling this mode allows the user to connect to a PC to upload results to the PC or download software updates from the PC.
8. **Last:** Touch to view the most recent test results.
9. **Settings:** Touch to access General Settings menu that contains Unit settings, user preferences, and common OTDR settings.
10. **Menu:** Touch to view Device Information screen.
11. **Screen Title:** Name of the currently displayed screen.
12. **USB:** Indicates external USB memory stick detected.
13. **Time of day.**
14. **Battery Icon:** Indicates battery charge level.



General Settings

While in the General Settings screen:

- Touch the desired setting field (e.g. (1) Language) to display a sub-menu.
- Touch Left / Right Arrows ⬅ ➡ (A) to display additional General Settings screen.
- Touch Back ⮌ (B) to return to the previous menu.



General Settings

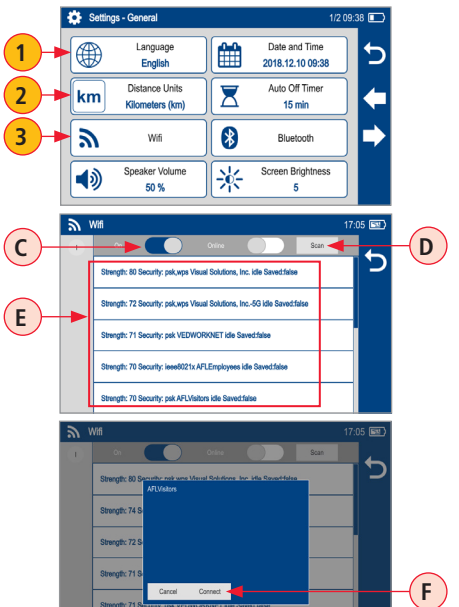
While in the General Settings screen, select and view or edit settings as follows:

1. **Language:** touch to select from available languages (depends on installed language pack).
2. **Distance Units:** select
   - kilometers
   - meters
   - kilofeet
   - feet
   - miles

Note: Link and fiber section Loss/distance will be reported as:

- dB/km (distance units = m or km)
- dB/kft (distance units = ft or kft)
- dB/mi (distance units = mi)

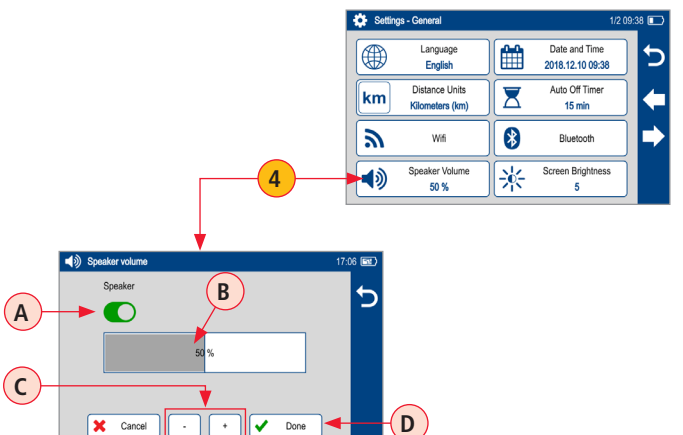
3. **WiFi:** touch to configure WiFi
   - Enable WiFi (C)
   - Scan for networks (D)
   - Select from available networks (E)
   - Connect & enter password if required (F)



General Settings

4 Speaker Volume:

- If disabled, touch the on/off control (A) to turn the Speaker on.
- Touch and/or touch and drag the adjustment slider (B) right/left to increase/decrease the Speaker volume. Or, press controls (C) for precise adjustments of 10% by step.
- Press Done (D) to save changes and return to the General Settings screen.



General Settings

5 Date and Time:

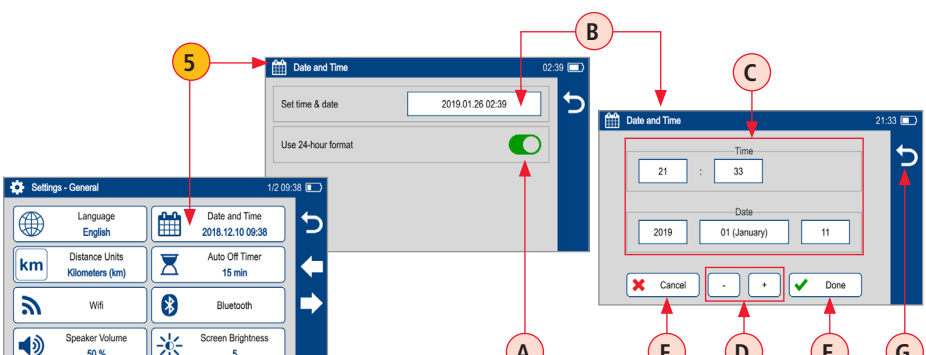
- Enable / Disable 24 hour format (A).
- Touch current Date & Time (B) to edit.

– From the displayed sub-menu, touch the desired Time/Date parameter (C) to enable it: hours, minutes, AM/PM (if 24-hour format disabled), year, month, day.

– Use controls (D) to change (increment or decrement) the selected parameter value.

– Touch Done (E) to save changes and return to the General Settings screen.

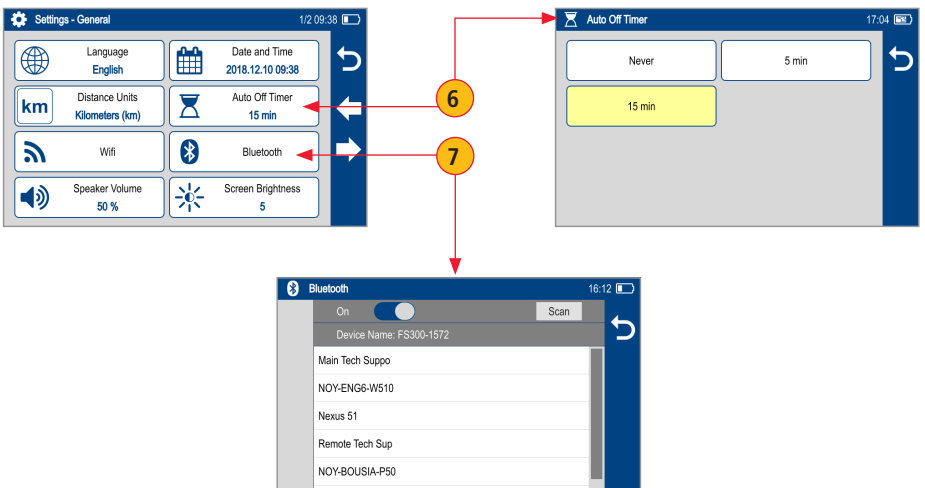
– Touch Cancel (F) or Back ⮌ (G) to return to Settings menu without saving edits.



General Settings

6 **Auto Off Timer:** Touch to display a sub-screen and select Auto Off option: Never, 5 min, 15 min.

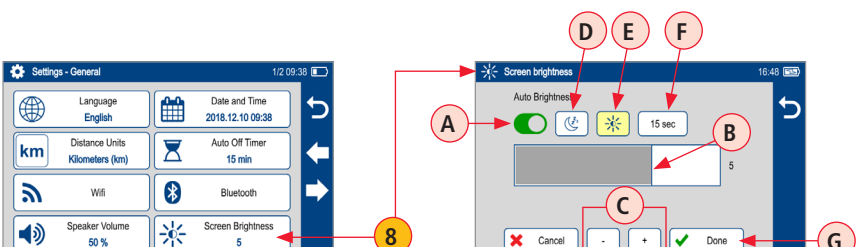
7 **Bluetooth:** Touch to display a sub-screen and enable Bluetooth.



General Settings

8 **Screen Brightness** and Auto-dim:

- Touch the on/off control **A** to enable/disable the Auto Brightness feature.
  - When the Auto Brightness feature is disabled, you may adjust Brightness by touching and/or touching and dragging the adjustment slider **B** right/left to increase/decrease the Brightness value. Or, you may press the [-] and [+] controls **C** for precise adjustments of 10% by step.
  - When the Auto Brightness feature is enabled, you may adjust several parameters:
- Auto-dim **D**: increase/ decrease backlight dim setting
- Brightness **E**: increase/decrease brightness setting
- Timer control **F**: Select and adjust time delay after last touchscreen action before display auto dims (if Auto Brightness enabled)
- Make adjustments using slider **B** or [-] and [+] controls **C**
  - Press Done **G** to save changes and return to the General Settings screen.



General Settings

Touch Left / Right Arrows ⬅ ➡ (A) to display additional General Settings screen.

(9) **Remote Control:** Reserved for future remote control feature.

(10) **Launch Quality Check:** Touch the on/off control to enable/disable check of the OTDR connection quality at start of each OTDR test.

– Poor launch quality is reported when excess loss or excess reflection is detected at the OTDR connection.

(11) **Screenshot Mode:** Touch the on/off control to enable/disable Screenshot Mode.

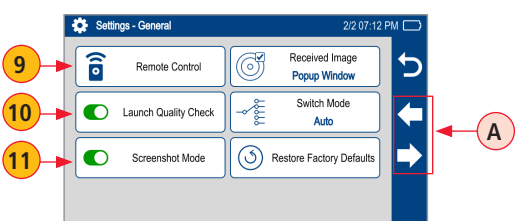
– Screenshot Mode allows the currently displayed screen to be captured and saved to internal memory.

– When Screenshot Mode is enabled, press the Home (🏠) button to capture the currently displayed screen.

– Captured image is saved to \SCREENSHOTS folder in the internal memory.

– Captured Images are sequentially numbered.

– Connect to USB port and enable USB from the Home screen to upload images to a PC.



General Settings

12 **Received Image:** FlexScan® FS300 accepts connector inspections images via Bluetooth® from FOCIS Flex, FOCIS Duel and FOCIS Lightning inspection probes.

– Received images may either be immediately displayed (Popup Window **A** selected) or may be stored in memory for display when Connector Inspection selected from the Home screen (Show in Tray **B** selected)

13 **Switch Mode(future software update):** Touch to configure MPO switch settings.

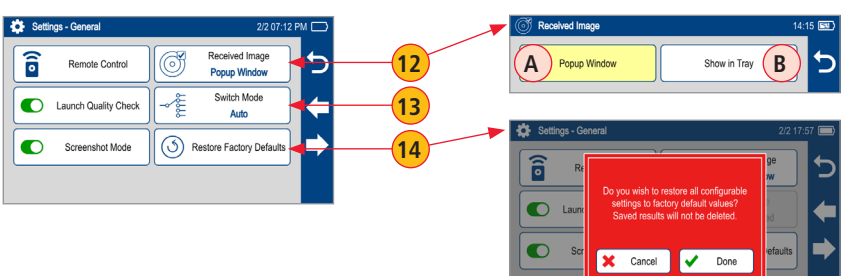
– MPO Switch control is available only when MPO Switch is enabled and connected to FlexScan via USB cable.

– When MPO Switch connected, up to 12 fibers may be tested in a single SmartAuto or Expert mode test.

14 **Restore Factory Defaults:** Touch this option if you need to restore FS300 Test and General Settings to factory default values.

– Touch Done to restore settings without deleting saved results.

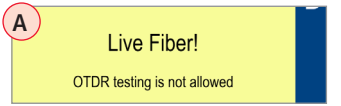
– Touch Cancel to exit without restoring settings to factory default values.



Common Functions in OTDR Test Modes

Live Fiber Detection

To prevent service disruption on live PONs, FlexScan performs a Live Fiber check prior to every OTDR test. If a live fiber is detected, FS300 displays a warning screen (A) and does not allow testing.

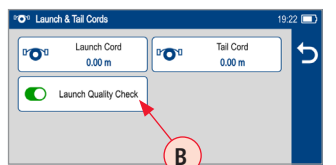


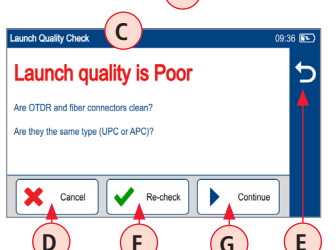
Launch Quality Check

An optional launch quality check enables users to detect dirty, damaged, poorly seated, or mismatched (UPC to APC) connectors.

To perform the launch quality check:

1. With the Launch Quality Check option (B) enabled in the OTDR or General Settings screen, initiate an OTDR test.
2. The FlexScan will assess the loss and reflectance at the OTDR's connection to the launch cord (fiber ring) or fiber under test.
3. If excess loss or reflectance is detected, the OTDR displays the 'Launch Quality is Poor' warning screen (C). From this screen the user may chose to perform one of the following:
   - Cancel a test by touching either Cancel (D) or Back (E).
   - Clean connectors, then repeat the launch quality check by touching Re-check (F).
   - Continue testing without checking and cleaning the connection by pressing Continue (G).





Note: Testing a fiber with poor launch quality may produce poor test results.

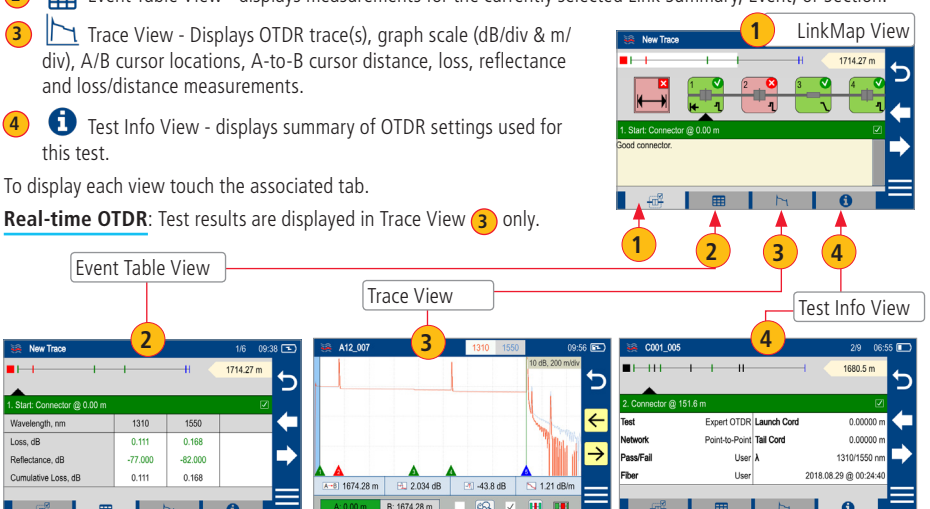
OTDR Test Results Viewers

SmartAuto® OTDR and Expert OTDR. Test results may be displayed in four views as follows:

1. LinkMap View - displays an icon-based representation of the network.
2. Event Table View - displays measurements for the currently selected Link Summary, Event, or Section.
3. Trace View - Displays OTDR trace(s), graph scale (dB/div & m/div), A/B cursor locations, A-to-B cursor distance, loss, reflectance and loss/distance measurements.
4. Test Info View - displays summary of OTDR settings used for this test.

To display each view touch the associated tab.

Real-time OTDR: Test results are displayed in Trace View 3 only.



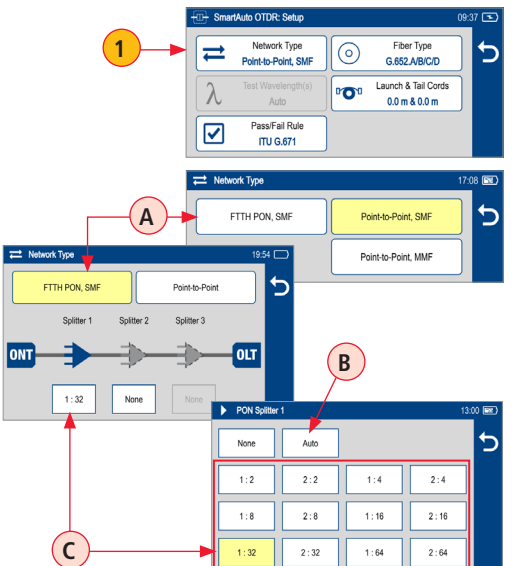
SmartAuto OTDR Setup Summary

Network Type

1 Configure Network Type:

- Select the network type:
  - FTTH PON, Single-mode
  - Point-to-Point, Single-mode
  - Point-to-Point, Multimode
- Configure splitters if the FTTH PON (A) option is selected. You may chose 'Auto -detect' (B) option or select 'Split Ratio' from the available options (C).
  - Auto – Automatically detects splitters and reports split ratio based on loss.

    Note: Excess loss at splitter may result in incorrect split ratio being reported
  - Select split ratio (C) for each expected splitter. Up to 3 splitters may be configured.



SmartAuto OTDR Setup Summary

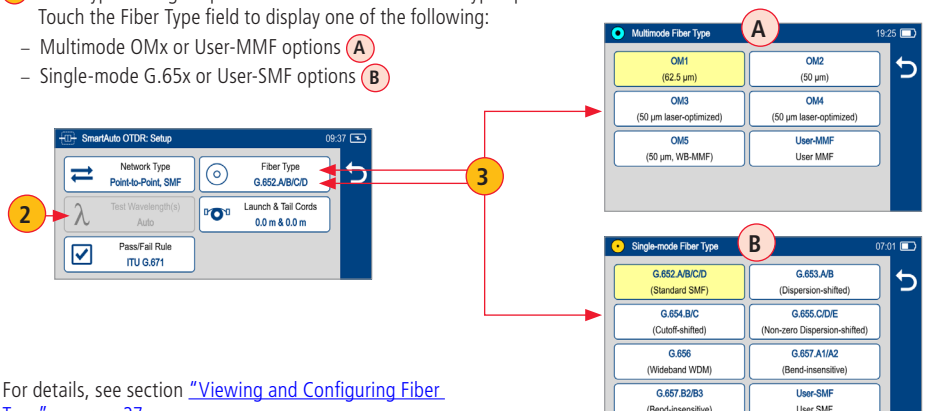
Test Wavelength

2 Test Wavelength(s) option is disabled - SmartAuto always tests both SMF or MMF wavelengths

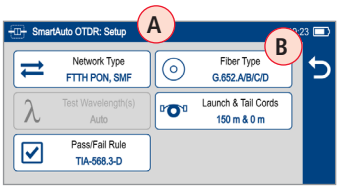
Fiber Type

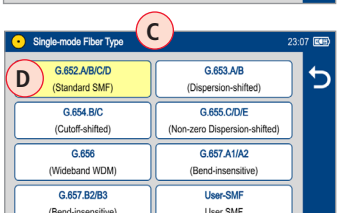
3 Fiber Type settings depends on the selected Network Type option. Touch the Fiber Type field to display one of the following:

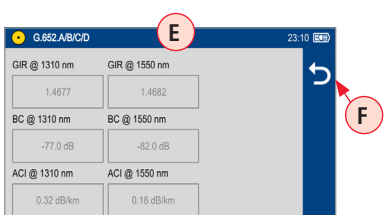
- Multimode OMx or User-MMF options A
- Single-mode G.65x or User-SMF options B



For details, see section "Viewing and Configuring Fiber Type" on page 27.







Viewing and Configuring Fiber Type

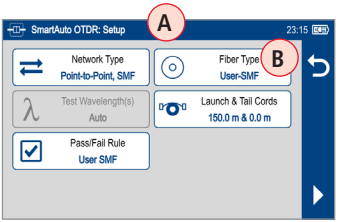
G.65x Fiber Settings may be viewed but NOT changed.

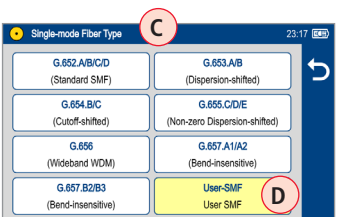
OMx Fiber Settings may be viewed but NOT changed.

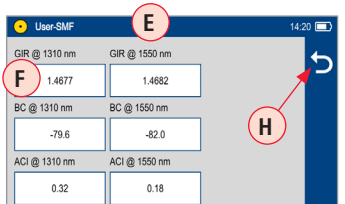
User Settings may be viewed and changed.

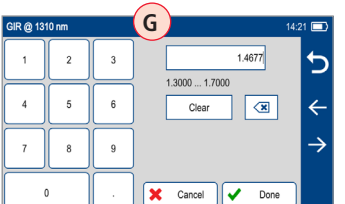
To view G.65x or OMx Fiber Settings

- While in the OTDR Setup screen (A), make sure G.65x/OMx fiber type (B) is displayed in the Fiber Type field.
- If not, touch the Fiber Type field to display the Fiber Type menu (C) and touch the desired G.65x/OMx fiber types (D) to select.
- When back in the OTDR Setup screen, touch and hold the displayed G.65x/OMx fiber type (B) to open and view the default settings (E) as follows:
  - Group Index of Refraction (GIR)
  - Backscatter Coefficient (BC)
  - Fiber Attenuation (ACI; Loss-per-Distance)
- Touch Back ⮌ (F) to return to the OTDR Setup screen.









To view and edit User Fiber Type Settings

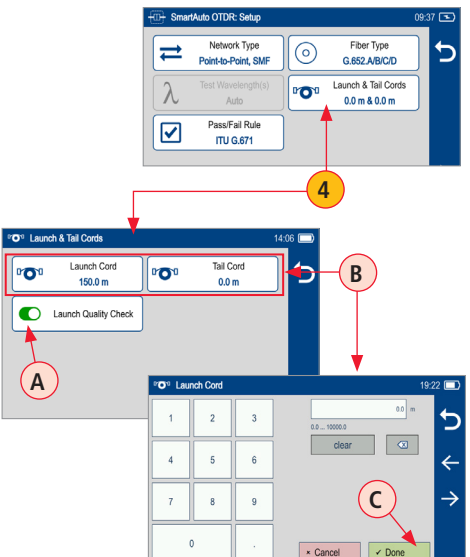
- While in the OTDR Setup screen (A), make sure the User Fiber Type label (B) is displayed in the Fiber Type field.
- If not, touch the Fiber Type field to display the Fiber Type menu (C) and touch the User option (D) to select.
- When back in the OTDR Setup screen, touch and hold the displayed User label (B) to open the User Fiber Type settings screen (E) and configure settings as follows:
  - Group Index of Refraction (GIR)
  - Backscatter Coefficient (BC)
  - Fiber Attenuation (ACI; Loss-per-Distance)
- Touch the desired parameter field (e.g. (F) GIR @1310 nm) to display its Editor screen (G).
- Edit the value using on-screen controls. Touch Done to save changes and return to the User Fiber Type settings screen.
- Touch Back ↩ (H) to return to the OTDR Setup screen.

SmartAuto OTDR Setup Summary

Launch & Tail Cords

4 Touching Launch & Tail Cords option displays the Launch & Tail Cords Setup screen that allows the user to configure the following settings:

- Enable Launch Quality Check (A). When Launch Quality Check is enabled, FlexScan checks loss and reflectance of FlexScan connection to the network enabling the user to detect dirty, damaged, poorly seated, or mismatched (UPC to APC) connectors.
- Configure Launch and Tail Cords lengths, if present.
  - Touch the Launch or Tail Cord field to display the length editor screen (B).
  - Using on-screen controls, enter the desired length.
  - Touch Done (C) to save changes and return to the OTDR Setup screen.



SmartAuto OTDR Setup Summary

Pass/Fail Rule

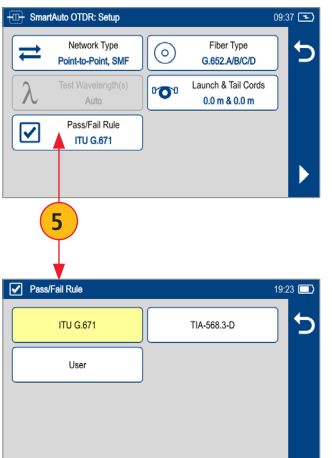
5 Touch Pass/Fail Rule option to select ITU G.671, TIA-568.3-D or User-configured rules:

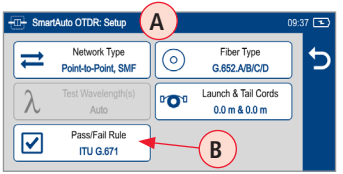
- ITU G.671
- TIA-568.3-D
- User-configured

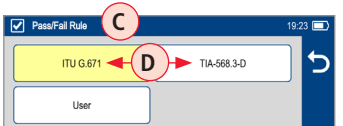
For details, see section "Viewing and Configuring Pass/Fail Rule" on page 31.

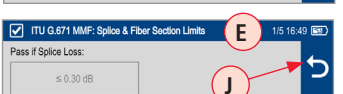
OTDR results are evaluated against selected or configured rules:

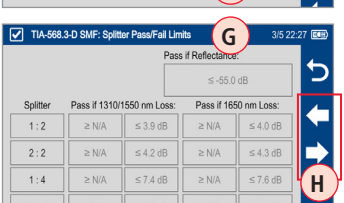
Pass/Fail Limit	ITU-G.671	TIA-568.3-D
Pass if Splice Loss	≤ 0.3 dB	≤ 0.3 dB
Pass if Connector Loss	≤ 0.5 dB	≤ 0.75 dB
Pass if Conn. Reflectance	≤ -35 dB (SM); ≤ -26 dB (MM)	≤ -35 dB (SM); ≤ -26 dB (MM)
Pass if Splitter Loss	Min ≤ Loss ≤ Max (dB) (Split ratio dependent)	Loss ≤ Max (dB) (Split ratio dependent)
Pass if Splitter Reflectance	≤ -55 dB	≤ -55 dB











Viewing and Configuring Pass/Fail Rule

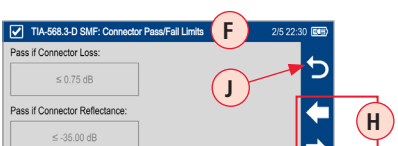
ITU G.671 Pass/Fail Settings may be viewed but NOT changed.

TIA-568.3-D Pass/Fail Settings may be viewed but NOT changed.

User Pass/Fail Settings may be viewed and changed.

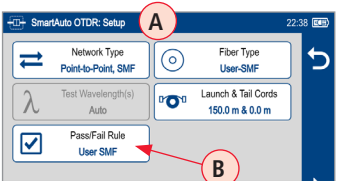
To view ITU G.671 or TIA-568.3-D Pass/Fail Rule Settings:

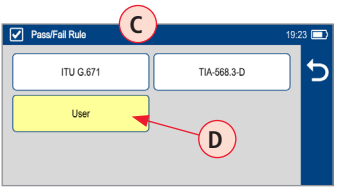
- While in the OTDR Setup screen (A), make sure the ITU G.671/ TIA-568.3-D Rule (B) is displayed in the Pass/Fail Rule field.
- If not, touch the Pass/Fail Rule field to display the Rules menu (C) and touch the ITU G.671/TIA-568.3-D option (D) to select.
- When back in the OTDR Setup screen, touch and hold the displayed Rule (B) to open one of the settings screen:
  - Splice & Fiber Section Limits screen (E)
  - Connector Pass/Fail limit screen (F)
  - One of three Splitter Pass/Fail Limit screens (G)
- Touch ⬅ ➡ keys (H) to cycle through Limits screens. View settings. Touch Back ⮌ (J) to return to the OTDR Setup screen.



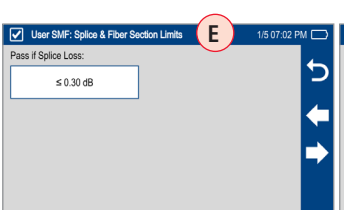
To view and edit User Pass/Fail Rule Settings:

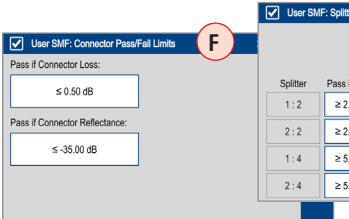
- While in the OTDR Setup screen (A), make sure the User Rule label (B) is displayed in the Pass/Fail Rule field.
- If not, touch the Pass/Fail Rule field to display the Rules menu (C) and touch the User option (D) to select.

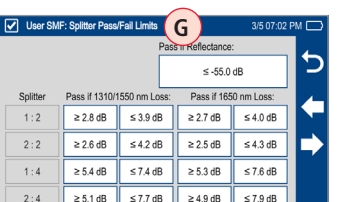




- When back in the OTDR Setup screen, touch and hold the displayed User Rule (B) to open one of the Pass/Fail Limits screens:
  - Splice & Fiber Section Limits (screen 1 of 5) (E)
  - Connector Pass/Fail Limits (screen 2 of 5) (F)
  - Splitter Pass/Fail Limits screen Limits (screen 3, 4, 5 of 5) (G)

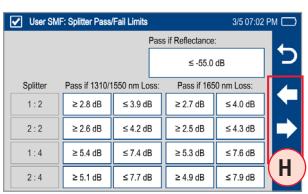


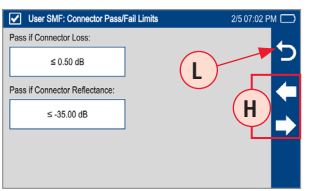


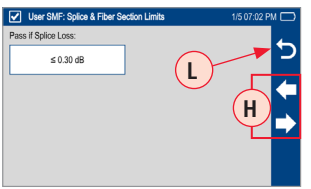


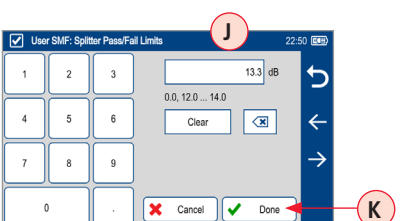
– Touch ⬅ ➡ keys (H) to cycle through screens.
– Touch the desired threshold field to display its Editor screen (J).
– Edit the threshold value using on-screen controls.
– Touch Done (K) to save changes and return to the Thresholds screen.

- Touch ⮌ (L) to return to the OTDR Setup screen.





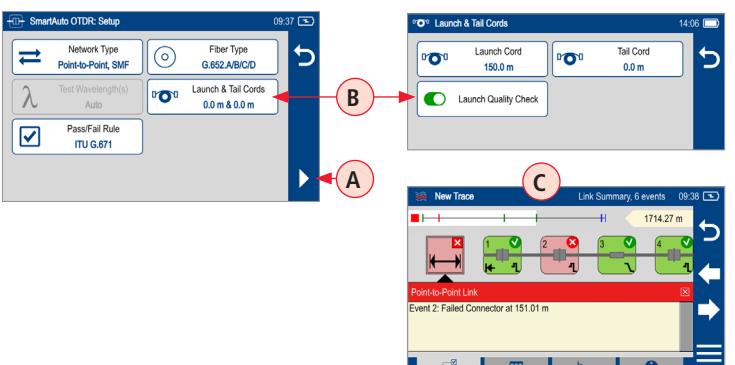




SmartAuto® OTDR

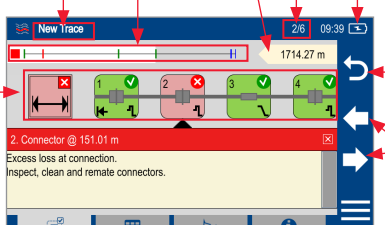
To Start SmartAuto OTDR Test

1 Initiate the SmartAuto test by touching Start ▶ (A) soft key or pressing Start/Stop button.
2 FlexScan begins testing with the Live Fiber check and if a live fiber is NOT detected, proceeds to next step.
3 If the Launch Quality Check is enabled (B), FlexScan checks loss and reflectance of the OTDR connection.
4 If launch quality is 'Good', FlexScan starts testing at both wavelengths using SmartAuto settings.
5 When testing is completed, FlexScan displays the LinkMap® (C) screen, which is a primary display in SmartAuto OTDR mode.



Understanding LinkMap® View Features

LinkMap is an icon-based representation of the analyzed network.



x/y or x1-x2/y, where
x = number of the selected event
x1-x2 = link section between events x1 and x2,
y = total events

Link map thumbnail view with proportionally spaced events

File name: consists of cable name and fiber number, or "New Trace" if file has not been saved

Link Length

Battery icon indicates battery state

LinkMap detail view: shows summary and first 4 events, or up to 5 events. White highlighted area in thumbnail view indicates region of fiber for which events are shown in the detail view.

Back key: touch to return to the previous menu

Touch to move to next or previous event or link section

Menu key: touch to navigate to Save As screen

Link Summary icon: may be green (all events passed) or red (one or more events failed)

A

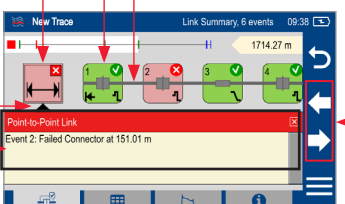
B

Event icon: event icons may be green (pass) or red (fail). Pass/Fail fault is based on event loss and reflectance thresholds configured by the currently selected Pass/Fail Rule.

C

Fiber Section between events

Selection marker ▲ indicates selected Summary, Event or Fiber Section for which additional details are displayed.



Touch to move to next or previous event or fiber section

Details of the currently selected Summary, Event, or Section

Info tab: touch to display summary of OTDR settings used for this test

LinkMap tab: when in any other test results viewer (Event Table, Trace View, Test Info View), touch to return to LinkMap View

Trace tab - touch to display Trace view that depends on active icon:

Icon	Display View
Summary	Trace of entire network
Event	Trace zoomed in at event
Section	N/A

Event Table tab: touch to display measurements for the currently selected Link Summary (A), Event (B), or Section (C)

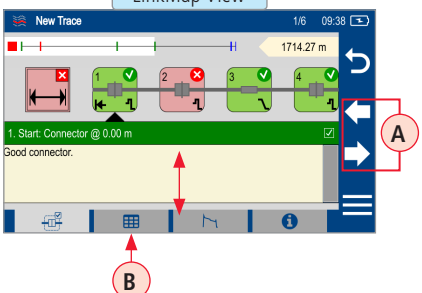
Understanding Event Table View Features

Event Table View may be accessed from either LinkMap® or Test Info View by touching the Event Table tab

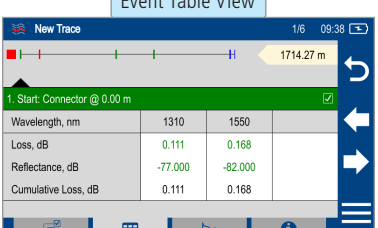
Event Table View displays measurements for the currently selected Link Summary, Event, or Section.

- Touch the desired Event icon (or Section) to learn more details about that Event (or Section)
  - Swipe or touch Left / Right Arrows ⬅ ➡ (A) to move to previous or next fiber Section or Event.
- Touch Event Table tab (B) to view selected Summary, Event, or Section details.

LinkMap View



Event Table View



Understanding Trace View Features

Trace View is accessed from any other results view by touching the Trace tab. Trace View displays OTDR trace(s), graph scale (dB/div & m/div), A/B cursor locations, A-to-B cursor distance, loss, reflectance and loss/distance measurements.

- Touch the desired wavelength make it active.
- White background indicates active wavelength.
- Cursor measurements apply to active wavelength.

Graph scale (dB/div & m/div)

OTDR traces

Launch cable (if present)

Fiber under test

Distance from A to B cursor

Loss between A and B cursor

Maximum Reflectance between A and B cursor

Loss-per-distance between A and B cursors

Touch to return to the previous screen

Touch to switch to the LinkMap view

Touch to toggle between Zoom and A|B Cursor Control modes

Touch to display Menu function (Save As, Print to PDF, etc.)

Trace View – Cursor Control Enabled

A and B cursors. Touch and drag in trace display area to move the active cursor to the desired location

Event Marker:
- Green - Passing event; Red - Failing event, Blue - Not evaluated event.
- Touch Event marker to move active cursor to that event

Cursor Control enabled

Cursor A location (A is active). Yellow highlight indicates the currently active cursor. Cursor A is always located to the left of cursor B.

Jump active cursor to the Next Event

Nudge active cursor Right

Cursor B location (B is inactive cursor). Touch non-highlighted cursor box to make cursor active. Cursor B is always located to the right of cursor A.

Nudge active cursor Left

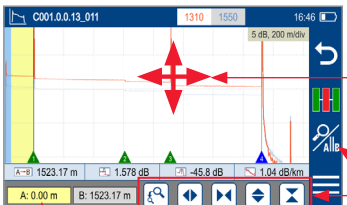
Jump active cursor to the Previous Event

Lock / Unlock A/B cursors (when locked, cursors move together). A|B Cursor locked icon toggles to show expected function when touched (e.g. if A|B currently locked, icons shows unlock A|B)

Trace View – Zoom Control Enabled

Note:

- Zoom In/Out centers trace about a point where the active cursor intersects with the active wavelength trace
- Unzoom / Rezoom icon toggles to show expected function when touched (e.g. if zoomed in, icon shows Unzoom state)



- Pinch in trace area to zoom (horizontally or vertically)
- Swipe in trace area to pan display (horizontally or vertically)

Zoom Control enabled

Touch to zoom out vertically around the currently active cursor.

Touch to zoom in vertically around the currently active cursor.

Touch to zoom out horizontally around the currently active cursor.

Touch to zoom in horizontally around the currently active cursor.

Cursor A location (A is active). Yellow highlight indicates the currently active cursor. Cursor A is always located to the left of cursor B.

Cursor B location (B is inactive cursor). Touch non-highlighted cursor box to make cursor active. Cursor B is always located to the right of cursor A.

Touch to Unzoom (if zoomed in); Touch to Rezoom (If zoomed out).

Expert and Real-time OTDR

Understanding Expert and Real-time OTDR Settings

Parameter	Description
Network Type	Available options to select from: • Point-to-Point, SMF • FTTH PON, SMF • Point-to-Point, MMF
Fiber Type	• G.65x or User-SMF • OMx or User-MMF See section "Viewing and Configuring Fiber Type" on page 27
Test Wavelengths	Test Wavelengths depend on the selected Network Type: • Single-mode Network Type: 1310, 1550, or 1310/1550 nm • Multimode Network Type: 850, 1300 or 850/1300 nm
Trace Length	The Trace Length parameter determines the distance range of the full (unzoomed) trace. It also determines the distance between data points in the trace: the longer the Trace Length, the wider the data point spacing. Range should be at least 20% longer than network length including launch and receive cables. • SMF range: 250 m to 240 km • MMF range: 250 m to 40 km

Expert and Real-time OTDR

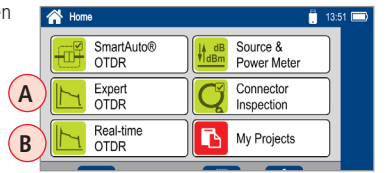
Understanding Expert and Real-time OTDR Settings

Parameter	Description
Pulse Width	• Short pulse widths provide the shortest event and attenuation dead zones. • Longer pulse widths provide smoother trace, but closely-spaced events may overlap and be reported as single event. • Longer pulse widths only available on longer Trace Lengths.
Pass/Fail Rules	Select Pass/fail Rules: ITU G.671, TIA-568.3-D or User. See sections "Pass/Fail Rule" on page 30 and "Viewing and Configuring Pass/Fail Rule" on page 31.
Launch and Tail Cords	• Configure Launch and Tail Cords lengths, if present. • Enable Launch Quality Check to check loss and reflectance of the FlexScan connection to the network. See section "Launch & Tail Cords" on page 29
Expert Mode Only: Averaging Time	The Averaging Time parameter determines the duration of a timed test and the number of trace averages performed. Longer averaging time produces a smoother trace.
Real-time Only: Refresh Rate	Select desired Refresh Rate • Slower refresh rate produces smoother traces

Expert and Real-time OTDR Setup

Expert or Real-time OTDR test mode is accessed from the Home screen by touching the Expert OTDR tab (A) or Real-time OTDR tab (B).
While in the Expert OTDR screen:

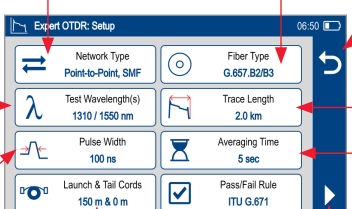
- Touch the desired test setup parameter to display a sub-screen.
- While in a sub-screen, touch the desired field to set the value.
- Touch Start ▶ (C) to initiate test.
- Touching Back ⮌ (D) will return to the Home screen.



Choose Network Type:
- Point-to-Point, SMF or MMF
- FTTH PON, SMF

Choose wavelength(s):
- 1310, 1550, or 1310/1550 nm
- 850, 1300 or 850/1300 nm

Select Pulse Width. This setting depends on the selected Trace Length. For longer test ranges, additional pulse widths are found on 2nd page.



Select Fiber Type:
- OMx or User-MMF;
- G.65x or User-SMF

Select Trace Length in Distance units that are set in the General Settings.

- Expert OTDR: Select Averaging Time. Longer averaging will result in smoother trace.
- Real-time OTDR: Select Refresh Rate: 1, 2, 4 Hz

- Set the Launch & Tail Cord length
- Enable/disable Launch Quality Check

Select ITU G.671, TIA-568.3-D or User

Testing in Expert OTDR Mode

Test Sequence in Expert OTDR Mode

Initiate Expert OTDR test by touching ▶ or pressing the Start/Stop button.

1. FlexScan begins testing with the Live Fiber check and if a live fiber is NOT detected, proceeds to next step. For details, see section "Live Fiber Detection" on page 23.
2. If the Launch Quality check is enabled, FlexScan checks loss and reflectance of the OTDR connection. For details see section "Launch Quality Check" on page 23 .
3. If launch quality is 'good', FlexScan starts testing at the selected wavelength using settings configured in Expert OTDR settings screen.
4. If dual-wavelength test is enabled, FlexScan continues testing at 2nd wavelength.
5. Event analysis is completed when testing at selected wavelength(s) completes.
6. When testing is completed, FlexScan displays test results that may be viewed in one of four views as follows:
   - LinkMap View. For details, see section "Understanding LinkMap® View Features" on page 35.
   - Event Table View. For details, see section "Understanding Event Table View Features" on page 37.
   - Trace View. For details, see section "Understanding Trace View Features" on page 38.
   - Test Info View. This View displays summary of OTDR settings used for this test.

Testing in Real-time OTDR Mode

Test Sequence in Real-time OTDR Mode

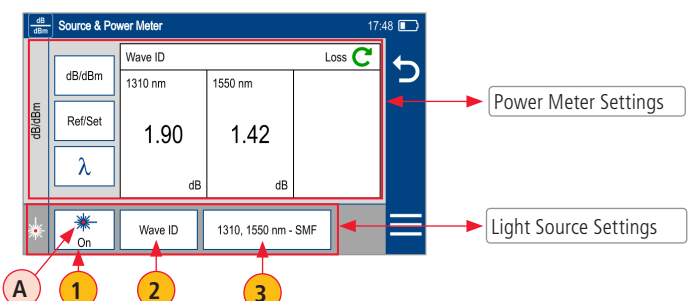
Initiate Real-time OTDR test by touching ▶ or pressing the Start/Stop button.

1. FlexScan begins testing with the Live Fiber check and if a live fiber is NOT detected, proceeds to next step. For details, see section "Live Fiber Detection" on page 23.
2. If the Launch Quality check is enabled, FlexScan checks loss and reflectance of the OTDR connection. For details see section "Launch Quality Check" on page 23 .
3. If launch quality is 'good', FlexScan starts testing at selected wavelength using settings configured in Real-time OTDR settings screen.
4. Trace View is the only screen shown in the Real-time OTDR mode. For details, see section "Understanding Trace View Features" on page 38.

Light Source and Power Meter Operation

Light Source Settings and Features

1. Touch to enable/disable light source. RED Laser (A) indicates that source is ON.
2. Touch to select test mode: Wave ID, CW, Tone (270 Hz, 330 Hz, 1 kHz, 2 kHz).
   - Select Wave ID mode for fastest loss measurements. While in this mode, the FlexScan source transmits wavelength information, enabling a Wave ID power meter to synchronize and measure power at received wavelength(s).
   - Use CW mode to generate continuous wave light at a single wavelength. Use CW mode for loss measurements with non-Wave ID power meter.
   - Generate Tone for fiber identification (270 Hz, 330 Hz, 1 kHz, 2 kHz).
3. Touch to select test wavelength.



Light Source and Power Meter Operation

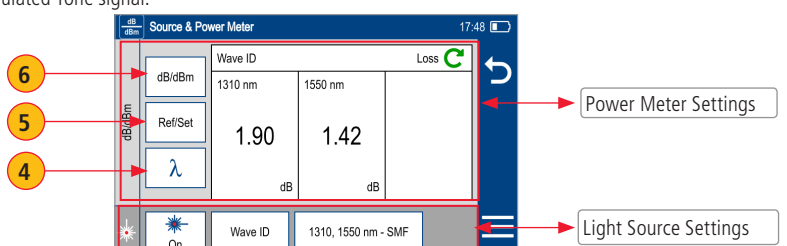
Power Meter Settings and Features

4 If used with non-Wave ID source, touch to select wavelength. If used with Wave ID source, power meter automatically synchronizes to and indicates received wavelength(s).

5 Touch and hold to store new reference(s) at received wavelength(s). Touch and release Ref/Set to view stored reference(s).

6 Touch to toggle between power (dBm or nW) and loss (dB) mode.

Note: Power meter detects and indicates fiber identifying tones when used with a light source capable of generating a modulated Tone signal.



Inspecting Fibers with FOCIS Series Inspection Probe and FlexScan

Optical connectors may be inspected using FOCIS Flex, FOCIS Duel, or FOCIS Lightning auto-focusing connector inspection probe with IEC pass/fail analysis. Captured fiber end-face images and pass/fail results are immediately displayed on the FOCIS probe display and on the paired FlexScan OTDR and may be saved in either FOCI or FlexScan. A micro-USB port on either FOCIS or FlexScan supports fast upload of internally stored results to PC.

Notes:

- For detailed instructions on how to operate FOCIS Flex, FOCIS Duel, or FOCIS Lightning inspection probe, please refer to the FOCIS Flex, FOCIS Duel, or FOCIS Lightning User's Guide (available on www.AFLglobal.com).
- In this User's Guide, FOCIS Flex model is used as example in the following sections, with describe Bluetooth pairing and inspection process.

FOCIS Flex Inspection Probe Overview

Controls

1. Power button.
2. Image Capture button.
3. F1 soft key (typically Back function).
4. F2 soft key (typically Select function).
5. Navigation and Edit functional keys.

FOCIS Flex Inspection Probe Overview

Display (2-inch Color LCD [320 x 240])

6. Screen title.
7. Battery status icon.
8. Image and information display area.
9. F1 and F2 soft key labels area.

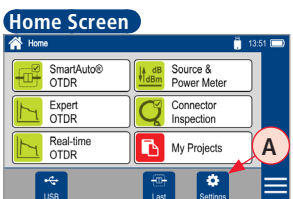
Interfaces

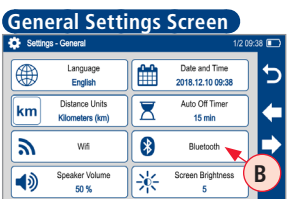
10. Optical inspection port.
11. Adapter tip.
12. Dust cover.
13. Micro-USB port.
14. 5 VDC input jack.
15. Charging indicator.

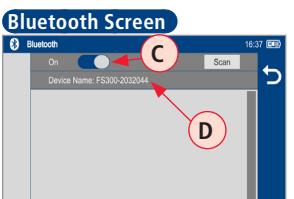
Pairing FlexScan with FOCIS Flex Inspection Probe

To transfer fiber-end images from the FOCIS Flex inspection probe and display inspection results on FlexScan, you must Bluetooth pair your FOCIS Flex probe with FlexScan.

Enable Bluetooth on FlexScan

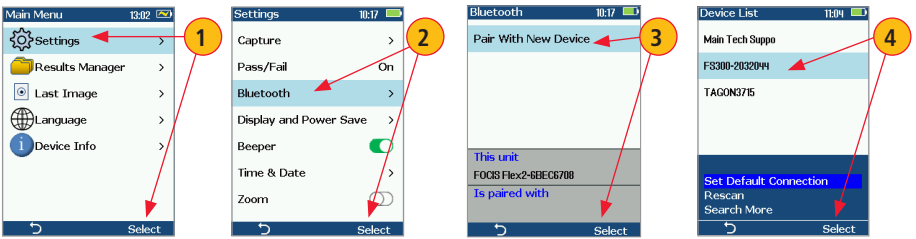




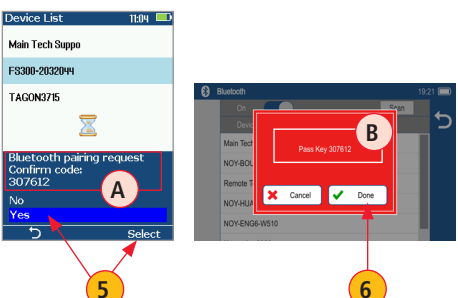


- From the Home screen, touch Settings (A).
- In the General Settings screen, touch Bluetooth (B).
- Touch the Bluetooth On/Off control to enable (C).
- In the device name field (D) you will see Bluetooth ID displayed for the FlexScan device.

Enable Bluetooth on FOCIS Flex



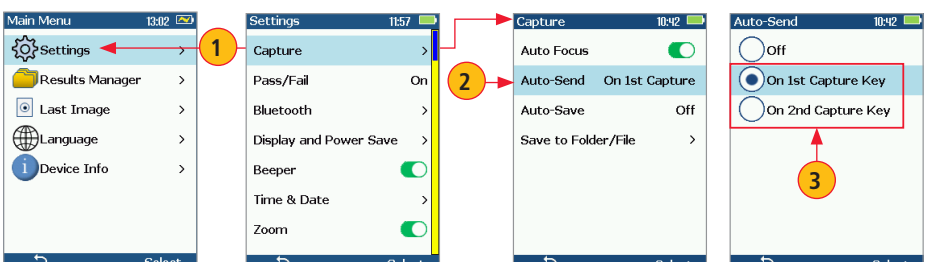
1. From FOCIS probe Main Menu, select Settings, then press Select.
2. From the displayed Settings Menu, select Bluetooth, then press Select.
3. Highlight Pair with New Device, then press Select.
4. When a list of devices is displayed, navigate to and select Bluetooth ID of the FlexScan device, and then press Select to 'Set as Default Device'.
5. Confirm Code displayed on FOCIS Flex (A) by selecting 'Yes'
6. Confirm Code displayed on FlexScan (B) by touching 'Done'.



Configuring Auto-Send

1. From the Main Menu, select Settings > Capture to display the Capture settings screen.
2. Highlight and Select Auto-Send.
3. Use ▼▲ Arrow Keys to enable Auto-Send on 1st Capture key or on 2nd Capture key.

When Auto-Send is enabled, pressing Capture key from Live Image mode will initiate auto-focus (if enabled), capture image, analyze pass/fail (if enabled), then send image and pass/fail results to paired FlexScan OTDR.



Inspecting Optical Connectors

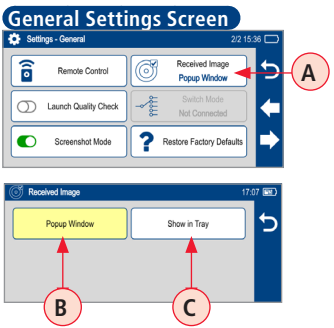
Once FlexScan is paired to FOCIS Flex with Bluetooth enabled on both units, perform the following steps.

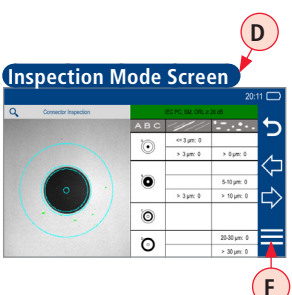
On FOCIS Flex:

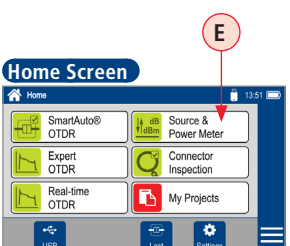
- If testing an optical fiber connector, slide the ferrule of the optical fiber into the adapter tip installed on the FOCIS Flex inspection port. Use caution not to contaminate the end-face of the fiber connector.
- If testing an optical fiber connector mounted in a bulkhead adapter, slide the adapter tip into the bulkhead adapter.
- You will see a Live fiber-end image appears on the FOCIS Flex display.
- Capture the displayed image by pressing the Capture button. (Refer to section "FOCIS Flex Inspection Probe Overview" on page 48).
- Once captured, the fiber end-face image is analyzed by the FOCIS Flex.
- Once analysis is done, inspection results will appear on the FOCIS Flex display.
- Simultaneously, FOCIS Flex will be sending results to the FlexScan paired to it.

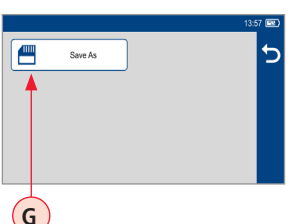
On FlexScan:

- If the Received Image option (A) is set to Popup Window (B) in General Settings, inspection results received from FOCIS Flex will be immediately displayed on FlexScan (D) screen.
- If the Received Image option (A) is set to Show in Tray (C) in General Settings, inspection results will only be displayed when Connector Inspection mode (E) is enabled.
  - Once displayed, Inspection results may ve viewed and saved.
- Inspection results can be stored in FOCIS Flex or FlexScan. To save results in FlexScan, touch Menu (F), then Save As (G).



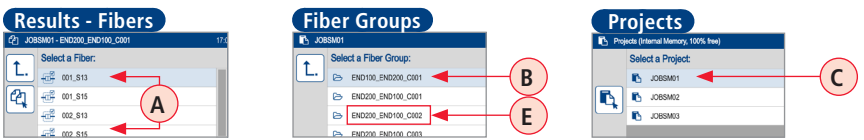


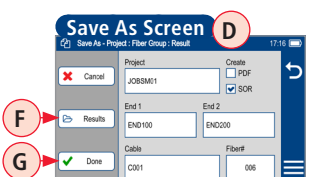




File Manager

Fiber test results (A) may be stored in the FlexScan internal memory or external USB stick.
Saved test results are organized into a Fiber Group sub-folder (B) within a Project folder (C).





The name of a saved result consists of several parameters, which are defined in the Save As screen (D).

End 1_End 2_Cable_Fiber#_Wavelength

Fiber Group Name (E) | Fiber# | S13 for 1310 nm, S15 for 1550 nm, M85 for 850 nm, M13 for 1300 nm

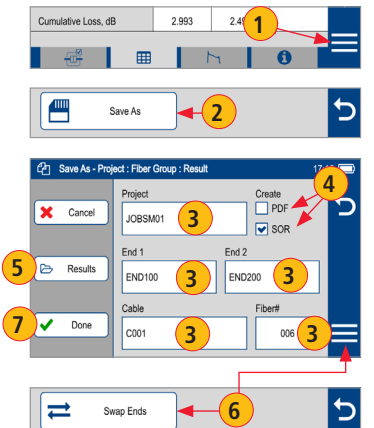
- Touch Results (F) to display File Manager and navigate to the desired Project / Fiber Group folder.
- Project, End 1, End 2, and Cable are user-defined in Text Editor.
- Fiber number auto-increments after each save, but can be modified in Number Editor as needed.
- Touch Done (G) when finished.

For Bi-directional OTDR reports, results must be obtained and stored from each end of the network:

- Use same test settings (range, pulse width, etc.) in both directions; Use same launch and receive cables in both directions; Swap End1, End2 names; Bi-directional averaging and report generation is performed using TRM 3.0.

Saving Results

1. While in the Results view, touch Menu icon ☰.
2. Touch 'Save As'.
3. Edit [Project], [End1], [End2], [Cable] and [Fiber#] names used to identify saved results: touch any field to edit it. Touch Done when finished.
4. Select if results are to be saved in SOR and/or PDF file format.
5. Touch Results to view, navigate and select destination Project/ Fiber Group folder. Touch Back ⮌ to return to Save As screen.
6. If needed for bi-directional testing: Touch Menu ☰; then touch Swap Ends.
7. Touch Done to save test results.



Saving Results for Bi-directional Reporting

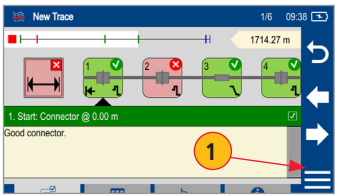
- Results must be obtained and stored from each end of the network. Bi-directional averaging and report generation is performed using TRM 3.0.
- To ensure TRM can associate results from both ends, proper naming of test results is critical:
- Use same Project name and Fiber Group name when testing from each end.
- Fiber Group name created from End1, End2 and Cable names.
- Use same End1 and End2 names.
  - End1 and End2 names must be swapped when testing from End2.
  - Reset fiber number to same starting fiber when testing from End2.

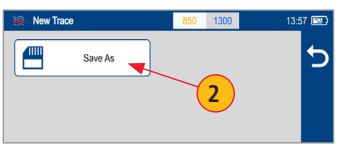
File Manager

Saving to a Newly Created Folder

1. While in the Results view, touch Menu ☰.
2. From the displayed sub-screen, touch Save As to display the Results Manager screen.
3. Define [Project], [End1], [End2], [Cable] and [Fiber#] fields used to name saved results. Touch Done when finished.

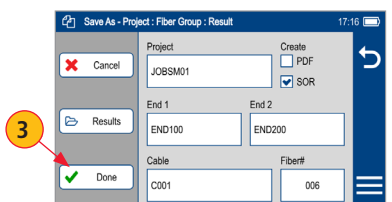
Note: this will make the newly created Job, OTDR End, Cable, or Fiber current.





Saving to the Current Folder

1. While in the Results view, touch the Menu ☰..
2. From the displayed sub-screen, touch Save As to display the Results Manager screen.
3. Review [Project], [End1], [End2], [Cable] and [Fiber#] names used to identify saved results. Touch Done when finished.

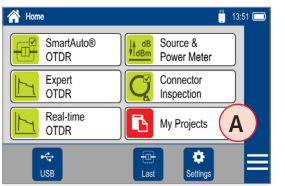


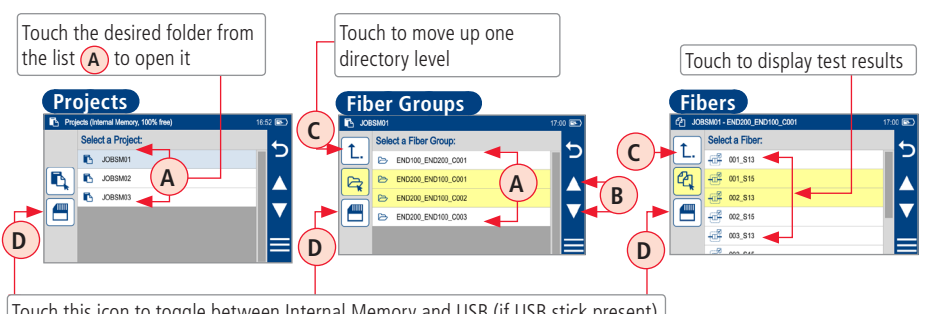
File Manager

Viewing Saved Test Results

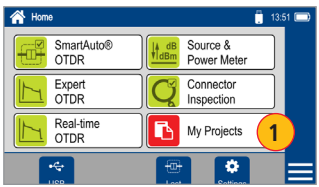
To View Saved Test Results

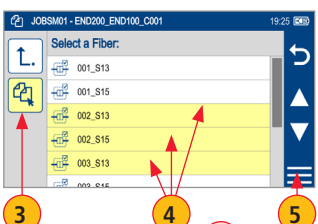
- From the Home screen, touch 'My Projects' (A).
- Navigate through Project/Fiber Group/Fiber screens to locate the desired test record, then touch it to display test results.
  - Touch up/down keys (B) or swipe to scroll up/down through list of files.
  - Touch Folder Up icon (C) to navigate up to Fiber Groups or Projects level.
  - Touch the Memory/USB icon (D) to toggle between USB memory stick and internal memory card (if USB stick present).

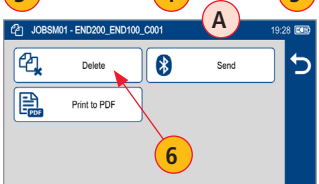


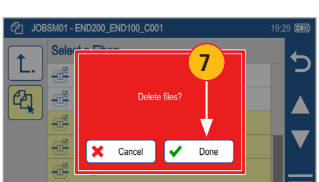


File Manager









Deleting Projects/Jobs/Fibers

1. From the Home screen, touch 'My projects to display the Results Manager, which may be displayed as Projects screen, Jobs screen, or Fibers screen.
2. Navigate through the Projects/Jobs/Fibers screen to locate the desired results.
3. Touch Files icon control to enable 'select' function.
4. Touch as many files as needed to select.
5. Touch the Menu ☰ soft key to display a sub-menu (A).
6. Touch Delete.
7. Then touch Done to confirm deletion.

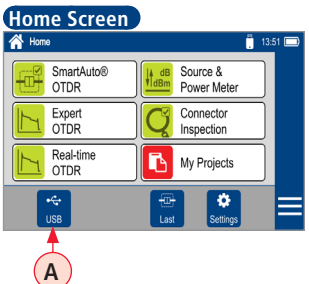
Transferring Results to a PC via USB

To transfer files from your FlexScan to a PC using a USB cable, perform the following:

- Connect your FlexScan to a PC using the supplied micro-USB to USB cable. Make sure the micro-plug is fully seated in your FlexScan.
- Touch the USB (A) soft key on the FlexScan's Home screen.
- On your PC, open My Computer.
  A new removable drive named FS300 X: will appear, where 'X:' is the drive letter assigned to your FlexScan.
- Under FS300 X: you should see two folders: RESULTS and SOFTWARE.
- Copy the RESULTS folder to your PC.
  - Under RESULTS you will see: TRACES.
  - Under TRACES you will see all of the folders containing OTDR traces or OPM results.

Note:

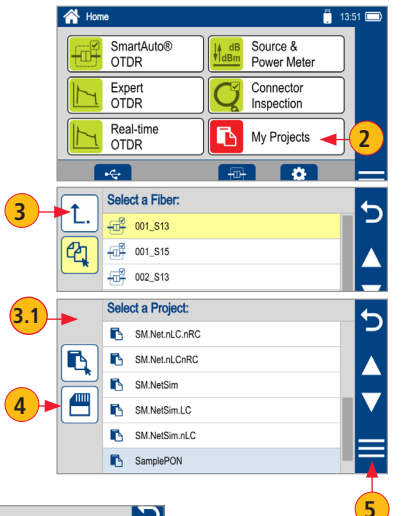
Before removing the USB cable connecting your FlexScan to your PC, or pressing the Cancel soft key on the USB screen, left click the Safely Remove Hardware icon in the Start bar of your PC, then left click the Safely remove USB Mass Storage Device – Drive (X:) message, where 'X' is the drive letter assigned to your FlexScan.



Back Up Saved Results to USB Memory

To back up internally stored results to USB memory stick:

1. Plug external USB memory stick into FlexScan.
2. From the Home screen, touch 'My Projects'.
3. If Folder Up icon is shown, touch it to navigate up to Projects level until icon disappears 3.1.
4. Verify that Internal Memory is currently selected - memory card icon is shown.
   – If USB selected, touch USB memory icon to toggle to internal memory.
5. Touch Menu icon ☰.
6. Touch Backup.
7. Wait until "Writing backup to USB drive…" completes.



Printing Results to PDF

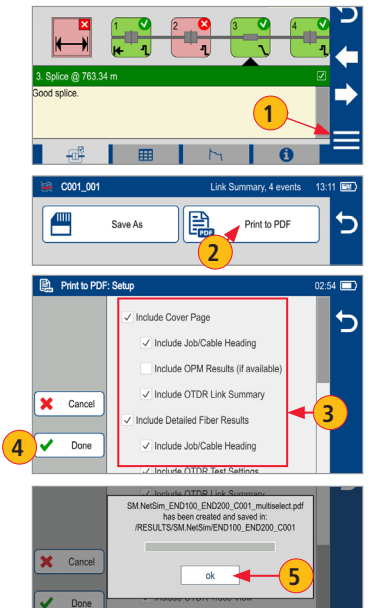
Saved test results may be organized into reports and printed to PDF file format as needed.

1. Navigate to the desired test results and touch Menu (☰) from the results display.
2. Touch Print to PDF from the displayed menu.
3. Select options to include cover page and configure content of printout.
   – Scroll to configure additional options.
4. Touch Done to complete setup and generate PDF report.
   – Generated PDF report will saved to the same RESULTS > TRACES > PROJECT folder as test results.
5. Touch OK when done.

Uploading PDF reports to PC

- Connect FlexScan to PC (via FlexScan's micro-USB function port and USB port on a PC).
- On FlexScan, enable USB mode (on Home screen).
- On PC, navigate to FS300 (X:) > RESULTS > TRACES > "Destination PROJECT folder".
- Upload PDF report from FlexScan to PC.

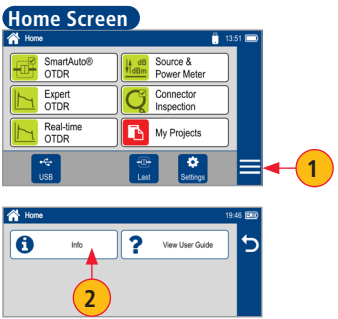
Note: Future software update will allow PDF to be sent to another device via Bluetooth or WiFi (Bluetooth/WiFi option required).

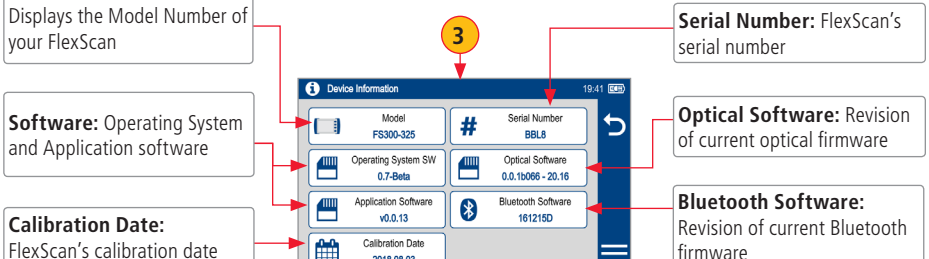


How to View Device Information

FlexScan software revision, serial number, and calibration date can be viewed from the Device Information screen, which is accessed from the Home screen.

1. From the Home screen, touch the Menu ☰ soft key.
2. From the displayed sub-screen, touch Info.
3. View FlexScan Info displayed on the Device Information screen.





General Information

This user's guide provides operating instructions for testing fiber optic networks with your FlexScan OTDR and assumes that you have basic knowledge about testing fiber optic networks. The purpose of this user's guide is to explain how to use and maintain your FlexScan OTDR. Please check our web site at **www.AFLglobal.com**, **Test and Inspection** for updates to this user's guide and additional application information. If you have questions about your FlexScan OTDR and recommended accessories, or if you need technical or sales support, please contact AFL Customer Service.

Contacting Customer Service

You may call AFL Customer Service between 8 AM and 5 PM, United States Eastern Time.

Phone 800-321-5298
603-528-7780
Fax 603-528-2025

Warranty Terms and Conditions

AFL products are warranted against defective material and workmanship for a period of (1) one year from the date of delivery to the end user.

Any product that is found defective within the warranty period will, at the discretion of AFL, be repaired or replaced. Warranty will be voided if the product has been repaired or altered by other than an authorized AFL product repair facility, if the void sticker has been compromised, or which have been subject to misuse, negligence, or accident.

In no case shall AFL liabilities exceed the original purchase price.

Thank you for choosing AFL Test & Inspection!

www.AFLglobal.com or (800) 321-5298, (603) 528-7780