



**Test & Inspection**

# **FlexScan<sup>®</sup> FS200 OTDR**

**With SmartAuto<sup>®</sup>, FleXpress<sup>™</sup> and LinkMap<sup>®</sup>**

## **User's Guide**

[www.AFLglobal.com](http://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.

|   |   |
|---|---|
| 1550 nm OTDR/OLS port<br>1650 nm OTDR/OLS port<br>1310/1550 nm OTDR/OLS port<br>1310/1550/1650 nm OTDR/OLS port | <b>This is a CLASS I LASER output.</b>                          |
| VFL port  | <b>This is a CLASS II LASER output. Do not stare into beam!</b> |

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

FCC ID: X3ZBTMOD

FCC ID: X3ZBTMOD8

IC: 8828A-MOD7

IC: 8828A-MOD8

**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

## Safety Information

to request servicing.

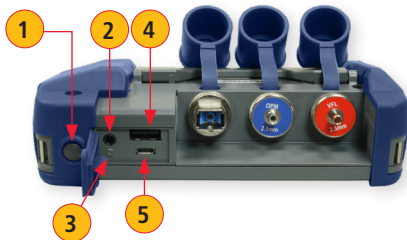
- **CAUTION!** Do not run any tests or perform functions that activate a FlexScan laser unless fiber is attached to the corresponding port.
- **CAUTION!** To avoid serious eye injury, never look directly into the optical outputs of fiber optic network equipment, test equipment, patch cords, or test jumpers. Refer to your company's safety procedures when working with optical systems.
- **NOTICE:** 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 +3 dBm may damage OTDR optics. Do not connect OTDR to network connectors where received power level may exceed +3 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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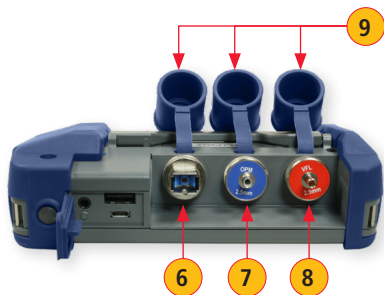
# Hardware Overview

## 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. <ul style="list-style-type: none"><li>• RED light = rechargeable battery is charging.</li><li>• GREEN light = rechargeable battery is fully charged.</li></ul> |
| 4   | USB host port           | This USB port allows connection to a PC for transferring stored test results; also may be used to connect USB Flash Drive for data storage and copying Internal files.   |
| 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.   |

## Hardware Overview



| Ref | Feature                | Description   |
|-----|------------------------|---|
| 6   | OTDR/Light Source port | <b>This is a CLASS I LASER output.</b> 1550 nm only, 1650 nm only, 1310/1550 nm, or 1310/1550/1650 nm single-mode OTDR/Light Source port, depending on model.             |
| 7   | Power meter port       | Optical Power Meter port. Used for power (dBm, W) or loss (dB) measurements.  |
| 8   | VFL port               | <b>This is a CLASS II LASER output. Do not stare into beam!</b> The VFL (visual fault locator) port is a 650 nm (visible red) laser. Used for short-range fault-location. |
| 9   | Dust cap               | Used to protect optical ports from dust/damage. It is important to keep the dust caps in place when the unit is not being used.   |
| 10  | Touchscreen display    | Contains on-screen controls and menus. Used to show setup menus, test results, and saved test data information.   |



## Front Panel Buttons and Indicators

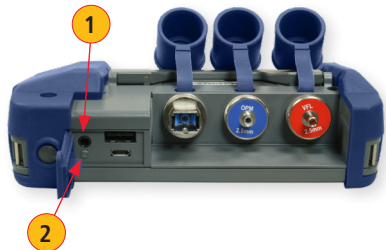


| Ref | Feature                | Description   |
|-----|------------------------|---|
| 11  | Home button            | Press to access the Home screen.  |
| 12  | Test start/stop button | Press to start a new test; or, if a test is running, stop the current test.   |
| 13  | VFL indicator          | When the VFL port is active this indicator illuminates as follows: <ul style="list-style-type: none"> <li>• Flashing RED = VFL is on</li> <li>• Solid RED = CW</li> <li>• OFF = VFL is off</li> </ul> |
| 14  | VFL button             | Use the VFL button to control the VFL laser:<br>Press and hold ~ 1 sec to turn VFL ON<br>Press and hold ~ 2 sec = CW<br>Press and hold ~ 1 sec to switch 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 in front panel display indicates battery status as follows:

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

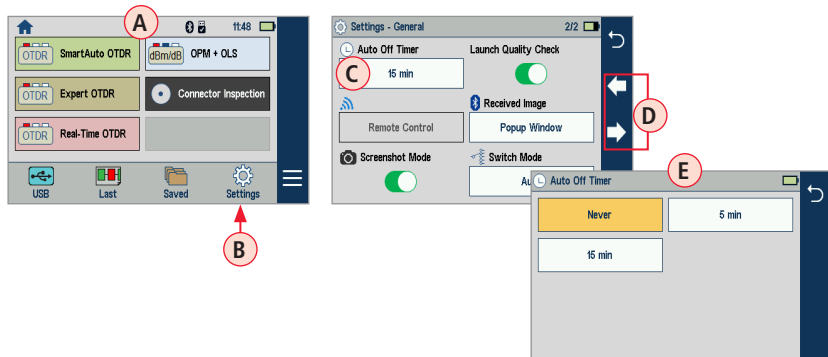
Battery fully charged, Battery partially charged, and Battery discharged symbols will only be shown when unit is operating without being connected to AC.

## 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 **◀▶** **(D)** to navigate to next/previous screen if the Auto Off Timer option is not displayed.
- Touch the Auto Off Timer field to display the settings sub-menu **(E)**.
- Select the desired power save option (5 min, 15 min, Never).



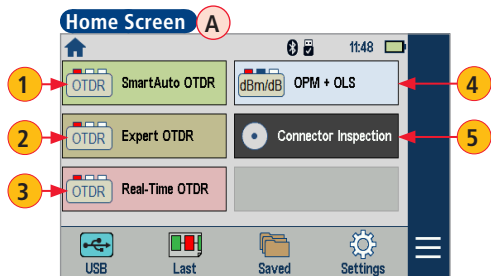
# User Interface Overview

## 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:** 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

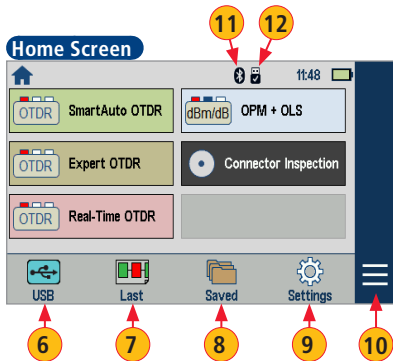


# User Interface Overview

## Utility Modes and Features Summary

FOCIS Flex auto-focus probe.

- 6 **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.
- 7 **Last:** Touch to view the most recent test results.
- 8 **Saved:** Touch to recall and view saved 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 **Bluetooth:** Indicates Bluetooth enabled.
- 12 **USB:** Indicates external USB memory stick detected.




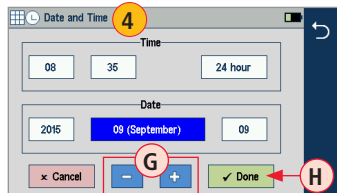
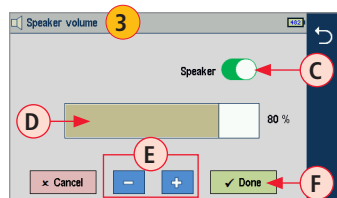
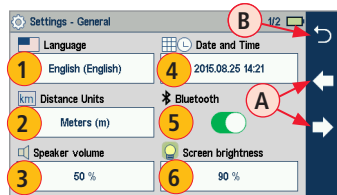
# General Settings

While in the General Settings screen:



- Touch the desired setting field/tab (e.g. 2 Distance Units) to display a sub-menu.
- Touch ← → (A) to display additional General Settings screen.
- Touch ↶ (B) to return to the previous menu.

## Select and view/edit settings as follows














- 1 **Language:** touch to select the desired language.
- 2 **Distance Units:** select kilometers, meters, kilofeet, feet, miles.
- 3 **Speaker Volume:**
  - If disabled, touch the on/off control  to turn the Speaker on (C).
  - Touch and/or touch and drag the adjustment slider (D) right/left to increase/decrease the Speaker volume. Or, press controls (E) for precise adjustments of 10% by step.
  - Press Done (F) to save changes and return to the General Settings screen.
- 4 **Date and Time:**
  - Touch the desired Time/Date Parameter to enable it.
  - Use controls (G) to change the selected parameter value.
  - Press Done (H) to save changes and return to the General Settings screen.
- 5 **Bluetooth:**

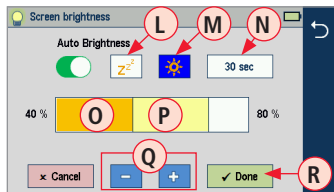
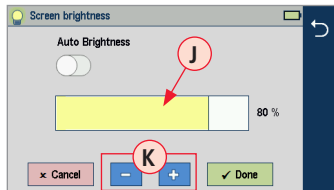
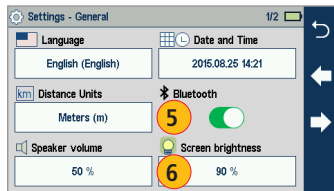


## General Settings


- If disabled, touch the Bluetooth field to display Bluetooth menu.
- Touch the Bluetooth radio button  to enable .
- In the device name field you will see Bluetooth ID displayed for the FlexScan device.

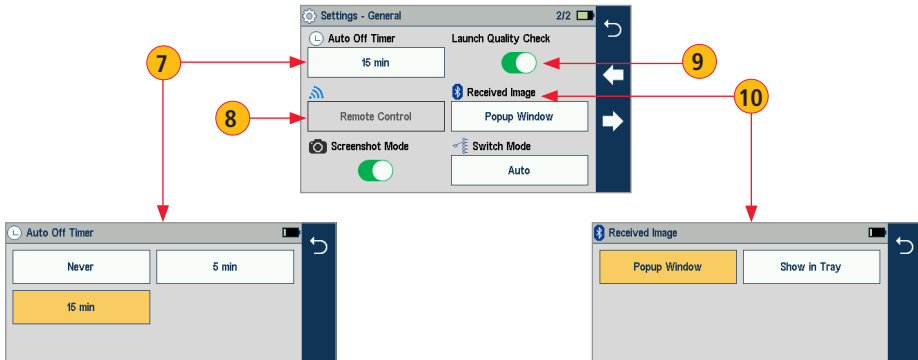
### 6 Screen Brightness and Auto-dim:

- Touch the on/off control / 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  right/left to increase/decrease the Brightness value. Or, you may press the [-] and [+] controls  for precise adjustments of 10% by step.
  - When the Auto Brightness feature is enabled , you may adjust several parameters: Auto-dim , Brightness , and Timer control . Make adjustments using sliders  for dimmer,  for brightness or controls  for all.
- Press Done  to save changes and return to the General Settings screen.



## General Settings

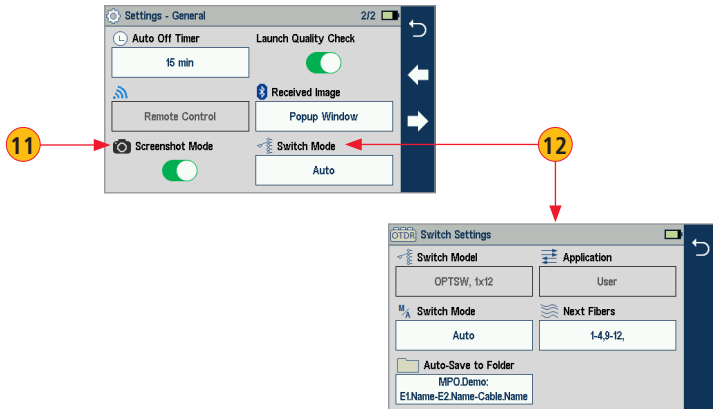
- 7 **Auto Off Timer:** Touch to display a sub-screen and select Auto Off option: 5 min, 15 min, Never.
- 8 **Remote Control:** Reserved for future remote control feature.
- 9 **Launch Quality Check:** Touch the on/off control  to enable/disable check of the OTDR connection quality at start of each OTDR test.
- 10 **Received Image:** Touch to display a sub-screen and select an option for displaying inspection results transferred from the FOCIS Flex probe:
  - Display received FOCIS Flex results in popup window
  - Save received FOCIS Flex results in background and show notification in tray.





## General Settings

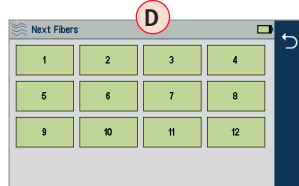
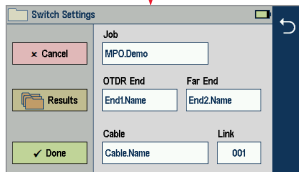
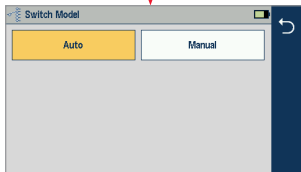
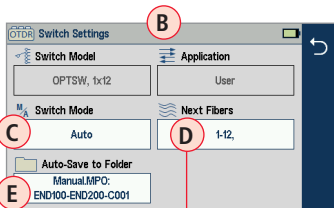
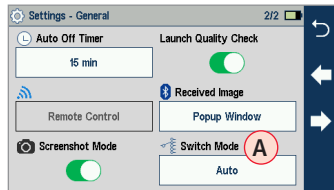
- 11 **Screenshot Mode:** Touch to enable/disable capture.
  - When enabled, press Home (🏠) to capture current screen.
- 12 **Switch Mode:** Touch to configure MPO switch settings.
  - MPO Switch control is available only when MPO Switch is enabled and connected to FlexScan via USB cable.
  - When MPO Switch connected, up to 12 fibers may be tested in a single SmartAuto or Expert mode test.



## General Settings

### To configure automatic MPO Switch control:

- Touch Switch Mode **(A)**.
- A popup error message appears if Switch Mode selected with no MPO switch connected and enabled.
- Switch Settings **(B)** appears if switch connected and enabled.
- Select Auto Switch Mode **(C)**.
- Select Next Fibers **(D)** and configure fibers to be tested.
- Touch Auto-save to Folder **(E)**, then select and configure Job, OTDR End, Far End, Cable folder, and start Link (Fiber#) where multi-fiber test results will be saved.



# SmartAuto® OTDR with FleXpress™ and LinkMap® Display

## Using Touchscreen Controls

### While in the Settings Menu:

If no setting changes required:

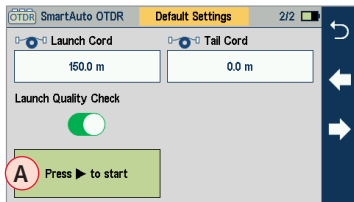
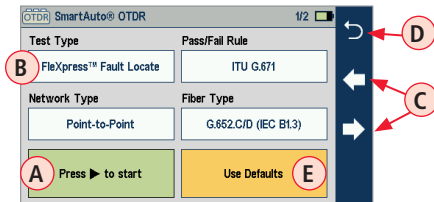
- Touch 'Press ▶ to start' **A** to initiate testing.

Notes:

1. **Characterize mode:** Standard multi-pulse acquisition.
2. **FleXpress mode (FS200-300/304 only):** Fast Test mode for Point-to-Point networks only.

If setting changes required:

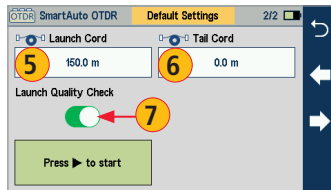
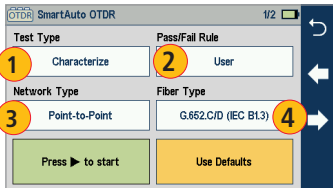
- Touch the desired setting field/tab (e.g. **B** Test Type) to display a sub-menu (where applicable).
- Touch left/right arrows **C** to navigate to next/previous screen (where applicable).
- Touch Back **D** to return to the previous menu.
- Touch Use Defaults **E** (if displayed) to reset settings to the factory defaults as needed.
- When done, touch 'Press ▶ to start' **A** to initiate testing.

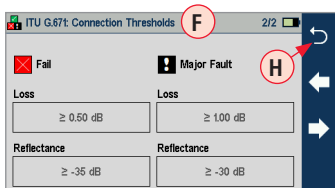
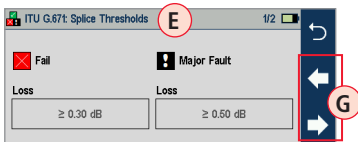
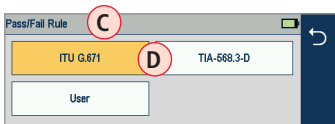
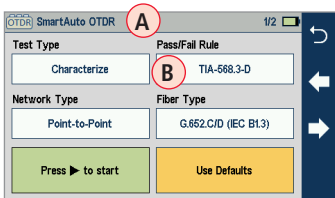


# SmartAuto® OTDR with Flexpress™ and LinkMap® Display

## SmartAuto Settings Summary

- 1 Test Type:**
  - Limited to Characterize in FS200-50B/100 models.
  - Select Characterize or Flexpress Fast Test in FS200-60/300/304 models when Network Type = Point-to-Point.
- 2 Pass/Fail Rule:** Indicates selected LinkMap event pass/fail rules. Touch to select ITU G.671, TIA-568.3-D or User. Touch and hold to view/edit pass/fail event thresholds.
- 3 Network Type:** Limited to Point-to-Point in FS200-50B /100 models. Select Point-to-Point or FTTH PON in FS200-60/-300/-304 models. If PON selected, configure split ratio settings to match expected network splitter configuration.
- 4 Fiber Type:** Touch to select SMF-28e or User fiber type. Touch and hold to view/edit associated Group Index of Refraction (GIR) and Backscatter Coefficient (BC) settings.
- 5 Launch Cord:** Touch to configure length of Launch cable, if present.
- 6 Tail Cord:** Touch to configure length of Receive cable, if present.
- 7 Launch Quality Check:** Enable to check OTDR connection to launch cord or jumper cable at start of test.





## Configuring Pass/Fail Rule

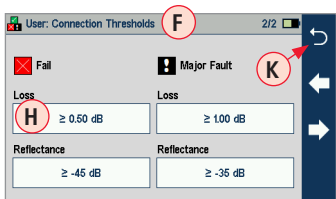
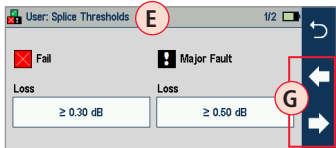
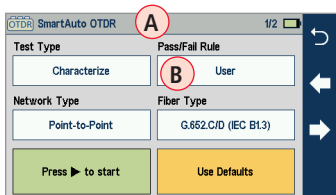
**ITU G.671** Pass/Fail Settings may be viewed but NOT changed.

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

**User** Pass/Fail Settings may be viewed and changed.

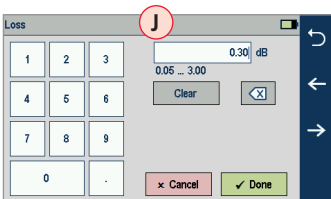
### To view ITU G.671 or TIA-568.3-D Pass/Fail Rule Settings

- While in the SmartAuto Settings screen (A), make sure the ITU G.671 or 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 or TIA-568.3-D option (D) to select.
- When back in the SmartAuto Settings screen, touch and hold the displayed Rule (B) to open one of the settings screen:
  - Either Splice Thresholds (E) or Connection Thresholds (F) screen will be displayed.
  - Touch ← → keys (G) to toggle between screens.
  - View settings.
  - Touch ↶ (H) to return to the SmartAuto Settings screen.

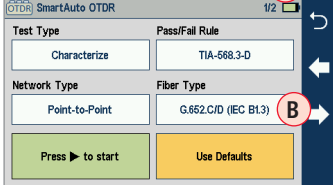


## To view and edit User Pass/Fail Rule Settings

- While in the SmartAuto Settings 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 SmartAuto Settings screen, touch and hold the displayed User Rule **B** to open one of the settings screen:
  - Either Splice Thresholds **E** or Connection Thresholds **F** screen will be displayed.
  - Touch **←** **→** keys **G** to toggle between screens.
  - Touch the desired threshold field (e.g. **H** Fail: Loss) to display its Editor screen **J**.
  - Edit the threshold value using on-screen controls.
  - Touch Done to save changes and return to the Thresholds screen.
- Touch **↶** **K** to return to the SmartAuto Settings screen.



## SmartAuto Settings Screen **A**



OTDR SmartAuto OTDR 1/2

|                  |                               |
|------------------|-------------------------------|
| Test Type        | Pass/Fail Rule                |
| Characterize     | TIA-568.3-D                   |
| Network Type     | Fiber Type                    |
| Point-to-Point   | G.652.C/D (IEC B1.3) <b>B</b> |
| Press ▶ to start | Use Defaults                  |

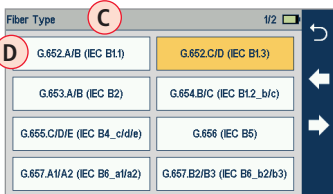
## Configuring Fiber Type

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

User Settings may be viewed and changed.

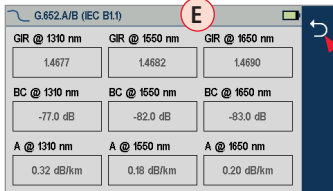
### To view G.65x Fiber Settings

- While in the SmartAuto Settings screen **A**, make sure a G.65x 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 one of the G.65x fiber types **D** to select.
- When back in the SmartAuto Settings screen, touch and hold the displayed G.65x fiber type **B** to open and view the default settings **E** as follows:
  - Group Index of Refraction (GIR)
  - Backscatter Coefficient (BC)
  - Fiber Attenuation (A; Loss-per-Distance)
- Touch Back **F** to return to the SmartAuto Settings screen.



Fiber Type **C** 1/2

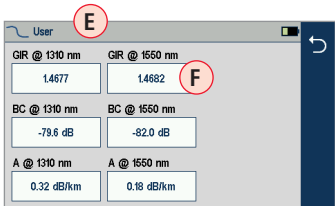
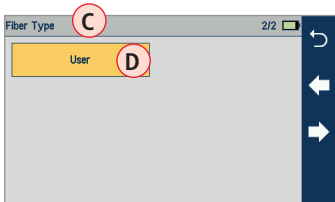
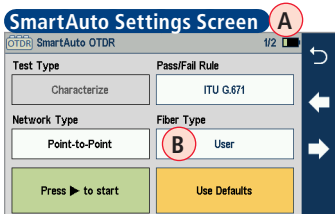
|                               |                            |
|-------------------------------|----------------------------|
| <b>D</b> G.652.A/B (IEC B1.1) | G.652.C/D (IEC B1.3)       |
| G.653.A/B (IEC B2)            | G.654.B/C (IEC B1.2_b/c)   |
| G.655.C/D/E (IEC B4_c/d/e)    | G.656 (IEC B5)             |
| G.657.A1/A2 (IEC B6_a1/a2)    | G.657.B2/B3 (IEC B6_b2/b3) |



G.652.A/B (IEC B1.1) **E**

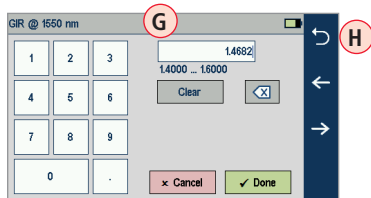
|               |               |               |
|---------------|---------------|---------------|
| GIR @ 1310 nm | GIR @ 1550 nm | GIR @ 1650 nm |
| 1.4677        | 1.4682        | 1.4690        |
| BC @ 1310 nm  | BC @ 1550 nm  | BC @ 1650 nm  |
| -77.0 dB      | -82.0 dB      | -83.0 dB      |
| A @ 1310 nm   | A @ 1550 nm   | A @ 1650 nm   |
| 0.32 dB/km    | 0.18 dB/km    | 0.20 dB/km    |

**F**

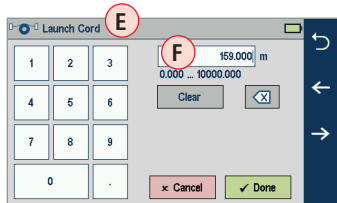
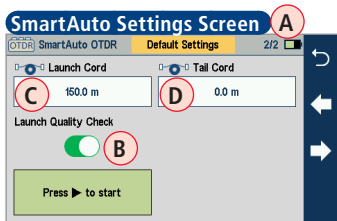


## To view and edit User Fiber Type Settings

- While in the SmartAuto Settings 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 SmartAuto Settings 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 (A; Loss-per-Distance)
- Touch the desired parameter field (e.g. F) GIR @1550) 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 SmartAuto Settings screen.








## Enabling Launch Quality Check

When Launch Quality Check feature is enabled, FlexScan checks loss and reflectance of OTDR connection to network enabling the user to detect dirty, damaged, poorly seated, or mismatched (UPC to APC) connectors.

### To Enable Launch Quality Check

- While in the SmartAuto Settings screen (A), touch the on/off control (B) to enable .

## Launch and Receive Cable Settings

### To Configure Length of Launch and Receive Cables

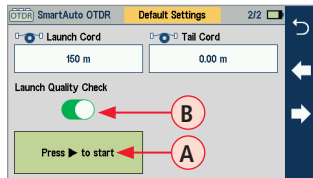
- While in the SmartAuto Settings screen (A), touch the Launch Cord field (C) or Tail (Receive) Cord field (D) to display the length editor screen (E).
- Using on-screen controls, enter the desired length (F).
- Touch Done to save changes and return to the SmartAuto Settings screen.

# Testing in SmartAuto® OTDR

## To Start SmartAuto Test

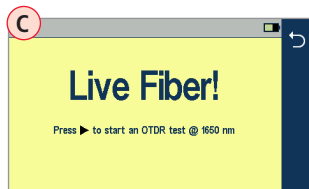
Initiate the SmartAuto test by touching 'Press ► to start' **(A)** soft key or pressing Test start/stop button.

1. FlexScan begins testing with the Live Fiber check and if a live fiber is NOT detected, proceeds to next step.
2. If the Launch Quality check is enabled **(B)**, FlexScan checks loss and reflectance of the OTDR connection.
3. If launch quality is 'Good', FlexScan starts testing at both wavelengths using SmartAuto settings.
4. When testing is completed, FlexScan displays the LinkMap® screen, which is a primary display in SmartAuto OTDR mode.



## 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, FS200-50B/100/300 models display a warning screen and do not allow testing; FS200-60/-304 displays a warning **(C)** and allows the user to complete a test at 1650 nm only.



# Testing in SmartAuto® OTDR

## Launch Quality Check

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

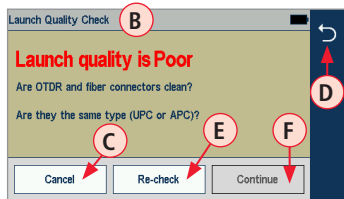
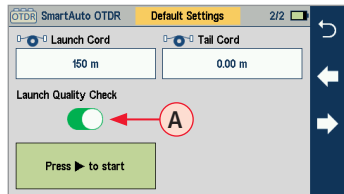
To perform the launch quality check:

1. With the Launch Quality Check option **A** 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 **B**.

From this screen the user may choose to perform one of the following:

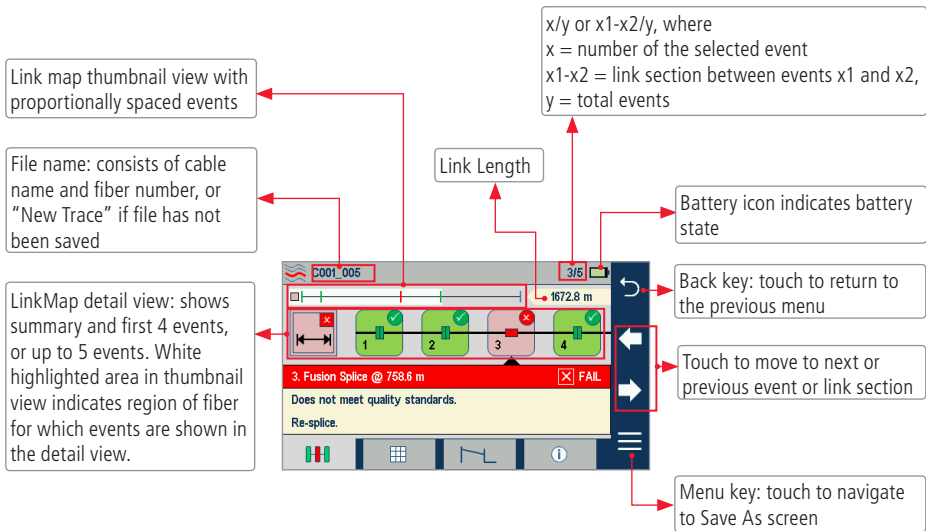
- Cancel a test by touching either Cancel **C** or Back **D**.
- Clean and reconnect connectors and repeat the launch quality check by touching Re-check **E**.
- Continue testing without checking and cleaning the connection by pressing Continue **F**.

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



## Understanding LinkMap Display Features

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



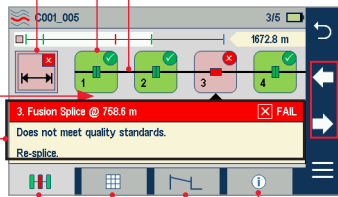
Link Summary icon: may be green (all events passed), red (one or more events failed, but no major fault detected), or black (one or more major faults detected)

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

Selection marker ▲ indicates active icon: Summary, Event, or Section

Link Section between events

Details of the currently selected Summary, Event, or Section



Touch to move to next or previous event or link 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, Info view), touch to return to LinkMap view

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

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

| Icon    | Display View            |
|---------|-------------------------|
| Summary | Trace of entire network |
| Event   | Trace around event      |
| Section | N/A                     |

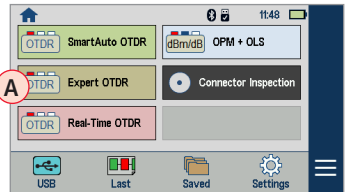
## Understanding Expert/Real-time OTDR Settings

| Parameter                  | Description  |
|----------------------------|--|
| <b>Trace Length</b>        | 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 Trace Length, the wider the data point spacing. We recommend selecting the shortest Trace Length that is longer than the fiber under test. For example, to test a fiber that is 2.5 km long, select the 5 km range.<br>Available Range values: 250 m, 500 m, 1, 2, 5, 10, 15, 20, 40, 80, 160, 240 km. |
| <b>Pulse Width</b>         | The FlexScan can operate using different pulse widths. Short pulse widths provide the shortest event and attenuation dead zones. Long pulse widths provide the range needed to test long fibers. Available Pulse values: 3, 5, 10, 30, 100, 300 ns, 1, 3, 10 $\mu$ s.<br>Note: Longer pulse widths only available on longer Trace Lengths.   |
| <b>Averaging Time</b>      | 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.<br>Available Averaging Time values: 5, 10, 30, 60, 90, 180 sec.  |
| <b>Fiber Type</b>          | Available: User or G.65x. Press and hold the currently selected User or SMF-28E option to view Group Index of Refraction, Backscatter Coefficient, and Attenuation coefficient.<br>User values can be edited.  |
| <b>Wavelength Settings</b> | FS200-50B: 1550 nm only<br>FS200-60: 1650 nm only<br>FS200-100: 1310, 1550, 1310/1550 nm<br>FS200-300: 1310, 1550, 1310/1550 nm<br>FS200-304: 1310, 1550, 1650, 1310/1550, 1310/1650, 1550/1650, 1310/1550/1650 nm   |

## Expert OTDR Settings

The Expert OTDR mode is accessed from the Home screen by touching the Expert OTDR tab **A**. While in the Expert OTDR screen **B**:

- 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 **←** **→** **C** to toggle between Expert settings screens.
- Touch **↶** **D** to return to the Home screen.

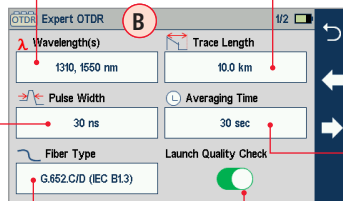


Choose wavelength(s) at which to test

Select Pulse Width: 3, 5, 10, 20, 30, 50, 100, 200 ns. Longer pulse width settings up to 20  $\mu$ s may be selected for longer Trace Length settings.

Select G.65x or User

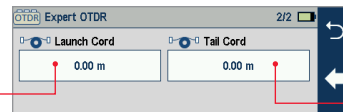
Set the Launch Cord length



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

Select Averaging Time: 5, 10, 30, 60, 90, 180 sec

Touch to enable/disable Launch Quality Check

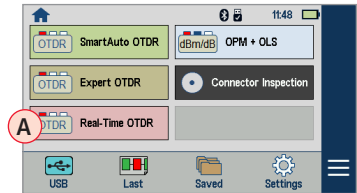


Set the Tail Cord length

# Real-Time OTDR Settings

The Real-Time OTDR mode is accessed from the Home screen by touching the Real-Time OTDR tab **(A)**. While in the Real-Time OTDR screen **(B)**:

- 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 **← →** **(C)** to toggle between Expert settings screens.
- Touch **↶** **(D)** to return to the Home screen.

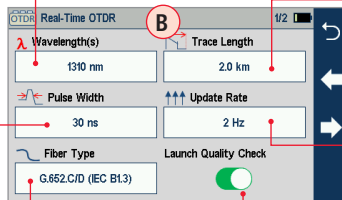


Choose wavelength(s) at which to test

Select Pulse Width: 3, 5, 10, 20, 30, 50, 100, 200 ns. Longer pulse width settings up to 20  $\mu$ s may be selected for longer Trace Length settings.

Select G.65x or User

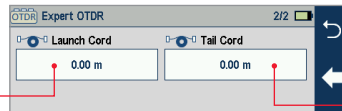
Set the Launch Cord length



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

Select Update Rate: 1, 2, 4 Hz

Touch to enable/disable Launch Quality Check



Set the Tail Cord length



## Testing in Expert and Real-Time OTDR Mode

### To Test in Expert or Real-Time OTDR Mode

Initiate an OTDR test by 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 26.](#)
2. If the Launch Quality check is enabled, FlexScan checks loss and reflectance of the OTDR connection. For details see section ["Enabling Launch Quality Check" on page 25](#) and section ["Enabling Launch Quality Check" on page 25.](#)
3. If launch quality is 'good', FlexScan starts testing using settings configured in Expert OTDR (Real-Time OTDR) settings screen.
4. When testing is completed, FlexScan displays the Trace screen, which is the only view shown in Expert and Real-Time modes. For details, see section ["Understanding Trace Display Features" on page 34.](#)

## Understanding Trace Display Features

A and B cursors

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

Grid units display dB/div on vertical axis and distance/div on horizontal axis

A cursor location (A is inactive cursor). Touch non-highlighted cursor box to make the A cursor active.

B cursor location (B is active).

- Yellow highlight indicates the currently active cursor
- Touch the screen where you want to reposition the currently active cursor

1310 nm trace is red;  
1550 nm trace is blue

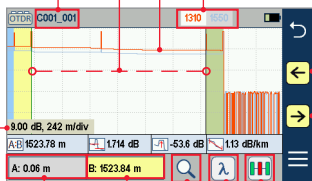
White background indicates the currently selected (active) wavelength. Cursor measurements apply to active wavelength.

Used for cursor position and fine adjustments. Touch or touch and hold arrows to move the active cursor.

Touch to select LinkMap view

Touch to toggle active traces (for multi-wavelength tests)

Touch to enable and display 'zoom control' mode



## Understanding Trace Display Features

The image displays two screenshots of an OTDR (Optical Time Domain Reflectometer) interface, illustrating various trace display features. The top screenshot shows a trace with two cursors (A and B) and several data points. The bottom screenshot shows the same trace with zoom controls and a LinkMap icon highlighted.

**Top Screenshot Callouts:**

- Fiber under test:** Points to the top of the trace area.
- Launch cable (if present):** Points to the initial high-loss region of the trace.
- Distance from A to B cursor:** Points to the 'A-B' label and the distance value '1523.77 m'.
- Loss between A and B cursor:** Points to the '9.00 dB, 242 m/div' label.
- Receive cable (if present):** Points to the final high-loss region of the trace.
- Loss-per-distance between A and B cursors:** Points to the '1.401 dB' label.
- Maximum Reflectance between A and B cursor:** Points to the '-52.7 dB' label.
- Attenuation:** Points to the '0.92 dB/km' label.

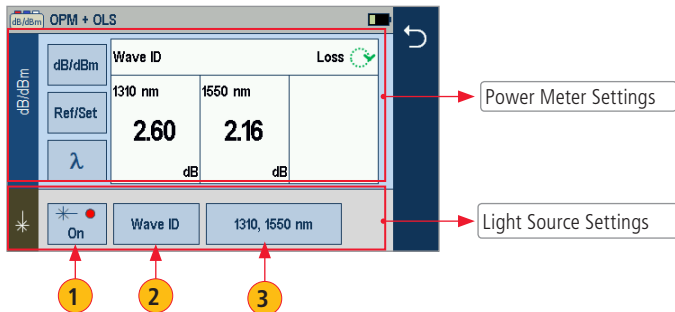
**Bottom Screenshot Callouts:**

- Horizontal zoom:** Points to the left and right arrow icons at the bottom of the screen.
- Vertical zoom:** Points to the up and down arrow icons on the right side of the screen.
- Cursor select key:** Points to the left arrow icon with a small square above it.
- LinkMap icon:** Points to the icon with three vertical bars of increasing height.

# Light Source and Power Meter Operation

## Light Source Settings and Features

- 1 Touch to enable/disable light source. RED dot 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.
  - Generate Tone for fiber identification (270 Hz, 330 Hz, 1 kHz, 2 kHz).
- 3 Touch to select test wavelength: 1310, 1550 or 1650 nm (depending on model).

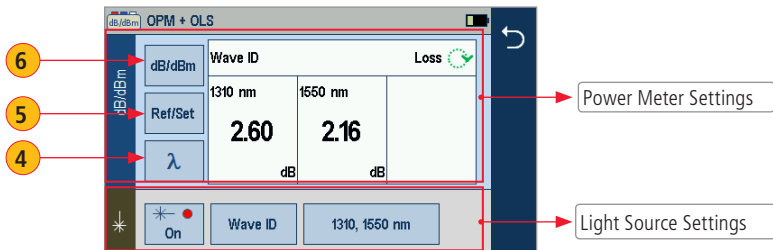


# Light Source and Power Meter Operation

## 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 Hold to store new reference(s) at received wavelength(s). Touch 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 Flex and FlexScan

Optical connectors may be inspected using FOCIS Flex 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 Flex and on the paired FlexScan OTDR and may be saved in either FOCIS Flex or FlexScan. A micro-USB port on either FOCIS Flex or FlexScan supports fast upload of internally stored results to PC.

### FOCIS Flex Inspection Probe Overview

For detailed instructions on how to operate FOCIS Flex inspection probe, please refer to the FOCIS Flex User's Guide (available on [www.AFLglobal.com](http://www.AFLglobal.com)) or the FOCIS Flex Quick Reference Guide provided with your FOCIS Flex inspection probe.

#### Controls

- 1 Power button.
- 2 Power On/Off indicator (GREEN when On).
- 3 Image Capture button.
- 4 F1 soft key (typically Back function).
- 5 F2 soft key (typically Select function).
- 6 Navigation and Edit functional keys.



## FOCIS Flex Inspection Probe Overview

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

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

### Interfaces

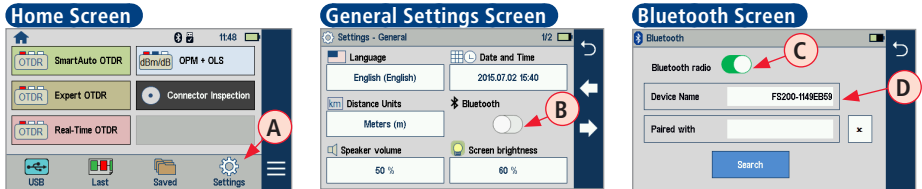
- 11 Optical inspection port.
- 12 Adapter tip.
- 13 Dust cover.
- 14 Micro-USB port.
- 15 6 VDC input jack.
- 16 Charging indicator.



## 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 need to pair your FOCIS Flex probe with FlexScan.

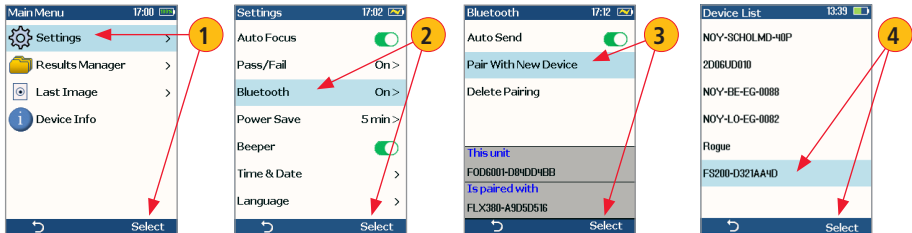
### Enable Bluetooth on FlexScan



- From the Home screen, touch Settings **A**.
- In the General Settings screen: If Bluetooth is disabled  **B**, touch its field to display the Bluetooth screen.
- Touch the Bluetooth radio button  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 Flex 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'.

## Inspecting Optical Connectors

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

### On FOCIS Flex:

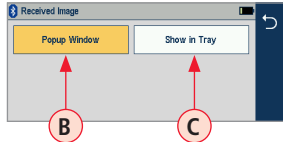
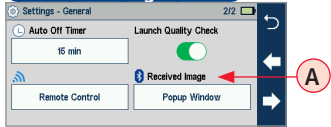
- If testing an optical fiber connector, slide the ferrule of the optical fiber into the adapter tip installed on the FOCIS Flex inspection port. Use caution not to contaminate the end-face of the fiber connector.
- If testing an optical fiber connector mounted in a bulkhead adapter, slide the adapter 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 38](#)).
- Once captured, the fiber end-face image gets 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.

## Inspecting Optical Connectors

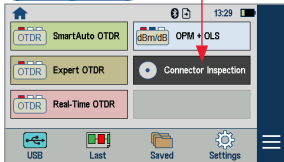
### On FlexScan:

- 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 even if Connector Inspection mode **E** is not enabled.
- 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, view image and results on FlexScan **D**.
- Inspection results can be stored in FOCIS Flex or FlexScan. To save results in FlexScan, select Menu **F**, then Save As **G**.

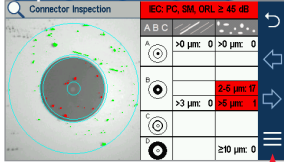
### General Settings Screen



### Home Screen

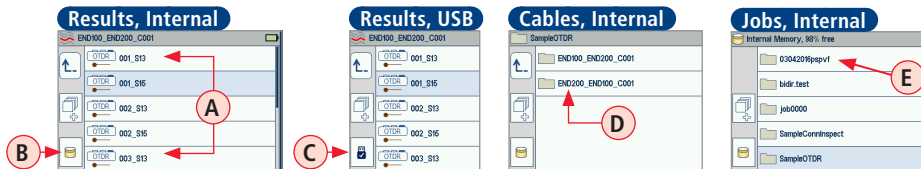


### Inspection Mode Screen



## Saving, Recalling and Uploading Test Results

Test results (A) may be stored in the FlexScan Internal memory (B) or on USB (C). Saved test results are organized into a Cable sub-folder (D) within a Job folder (E).



A name of the saved result consists of several parameters, which are defined in the Save As screen (F).

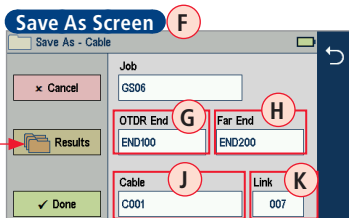
OTDR End (G) \_Far End (H) \_Cable (J) \_Link (K) \_Wavelength

Cable Name (D)

Link Number



S13 for 1310 nm  
S15 for 1550 nm  
S16 for 1650 nm

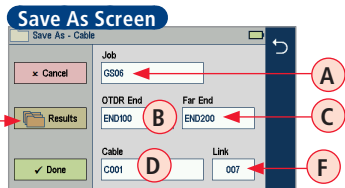
Touch Results to select Internal memory or USB (if present) and navigate to the desired Job and Cable folder



## Saving, Recalling and Uploading Test Results

Touch Results to select Internal memory or USB (if present) and navigate to the desired Job and Cable folder

- Job **(A)**, OTDR End **(B)**, Far End **(C)**, and Cable **(D)** fields are user-defined and may be set and/or edited in the String Editor screen:
  - Touch the desired field to display String Editor **(E)**.
  - Make edits using on-screen controls.
  - Touching Done will save edits and return to the Save As screen.
  - Touching Back  or Cancel will return to the Save As screen with no edits saved.
- Link number **(F)** auto-increments after each save, but can be modified in the Number Editor screen as needed.
  - Touch the Link field **(F)** to display the Number Editor **(G)**.
  - Make edits using on-screen controls.
  - Touching Done will save edits and return to the Save As screen.
  - Touching Back  or Cancel will return to the Save As screen with no edits saved.



**Save As Screen**

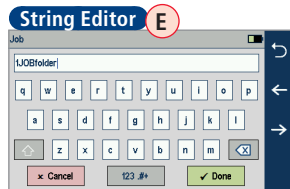
Save As - Cable

Job: GS06 **(A)**

OTDR End: END100 **(B)** Far End: END200 **(C)**

Cable: C001 **(D)** Link: 007 **(F)**

Buttons: x Cancel, Results, Done



**String Editor** **(E)**

Job

[JOBfolder]

Keyboard: q w e r t y u i o p, a s d f g h j k l, z x c v b n m, 123 #+, Done

Buttons: x Cancel, Done



**Number Editor** **(G)**

Link

1 2 3, 4 5 6, 7 8 9, 0 .


Text field: 5 |

1 - 999

Buttons: Clear, Done


Buttons: x Cancel, Done

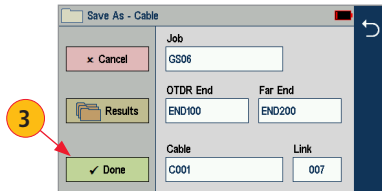
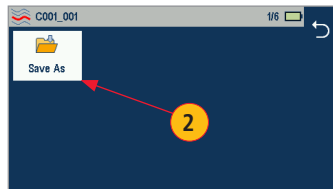
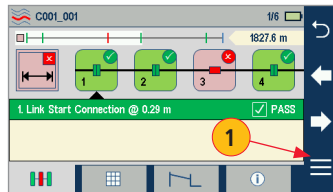
## Saving to a Newly Created Folder

- 1 While in the Results view, touch Menu  soft key.
- 2 From the displayed sub-screen, touch Save As to display the Results Manager screen.
- 3 Define <Job>, <OTDR End>, <Far End>, <Cable>, and <Link> fields used to name saved results. Touch Done when finished.

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

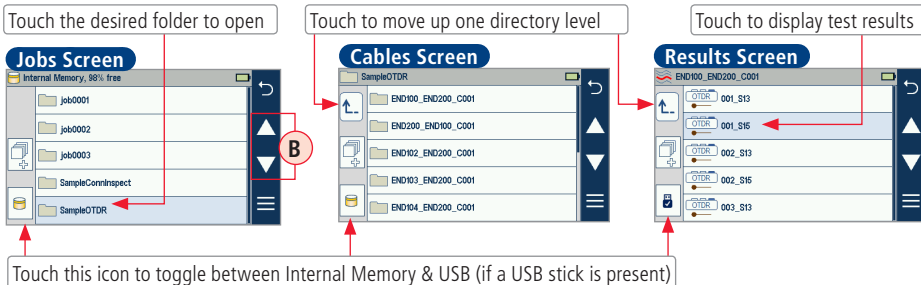
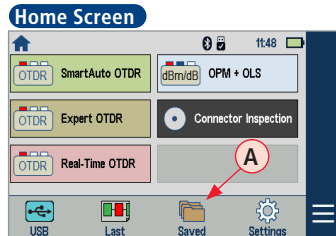
## Saving to the Current Folder

- 1 While in the Results view, touch the Menu  soft key.
- 2 From the displayed sub-screen, touch Save As to display the Results Manager screen.
- 3 Review <Job>, <OTDR End>, <Far End>, <Cable>, and <Link> fields used to name saved results. Touch Done when finished.

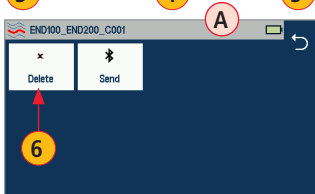
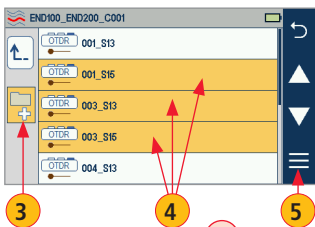
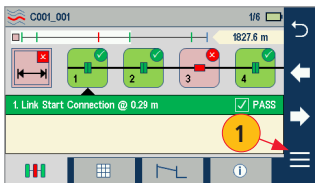




## Viewing Saved Test Results

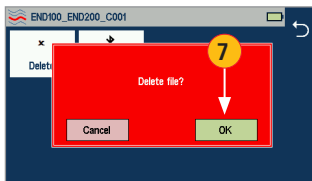
1. From the Home screen, touch the Saved icon **A** to display the Results Manager, which may be displayed as Jobs screen, Cables screen, or Results screen.
2. Navigate through Job/Cable/Results screen to locate the desired test result and touch to display it.
  - In Jobs screen: use Up/Down  $\blacktriangle/\blacktriangledown$  arrow keys **B** to navigate to the desired folder, then touch it to display saved folders.
  - In Cables screen: navigate to the desired folder, then touch it to display saved results.
  - In Results screen: navigate to the desired test record, then touch it to display test results.



## Deleting Jobs/Cables/Files



- 1 From the Home screen, touch the Saved icon to display the Results Manager, which may be displayed as Jobs screen, Cables screen, or Results screen.
- 2 Navigate through the Jobs/Cables/Results screen to locate the desired results.
- 3 Press Add Files 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 .
- 6 Touch Delete.
- 7 Then touch Ok to confirm deletion.





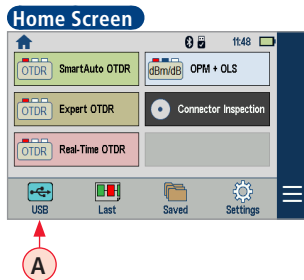
## Transferring Files to a PC via USB

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 FS200 X: will appear, where 'X:' is the drive letter assigned to your FlexScan.
- Under FS200 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:

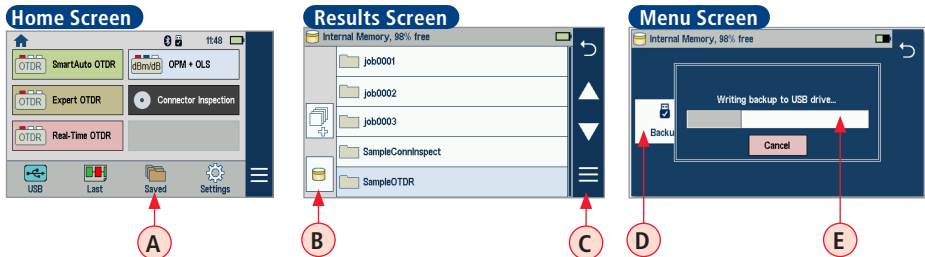
Before removing the USB cable connecting your FlexScan to your PC, or pressing the Cancel soft key on the USB screen, left click the Safely Remove Hardware icon in the Start bar of your PC, then left click the Safely remove USB Mass Storage Device – Drive (X:) message, where 'X' is the drive letter assigned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



## Backing up Results to External USB Memory Stick

To back up internally stored results to USB memory stick:

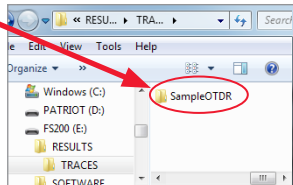
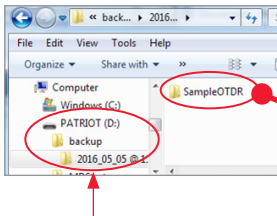
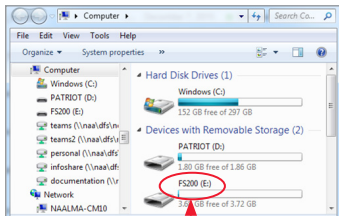
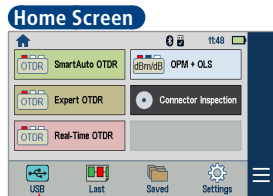
- Turn on the FlexScan OTDR.
- Plug in an external USB memory stick.
- From the Home screen, touch the Saved icon **(A)**.
- When in test results screen, verify that Internal Memory **(B)** option is currently selected.
  - If the USB option is selected, touch the USB memory icon to toggle to the Internal Memory option.
- Touch the Menu icon **(C)**.
- Touch the Backup icon **(D)**.
- Wait until the Backup progress indicated by the “Writing backup to USB drive...” label **(E)** completes.



## Restoring Results from External USB Memory Stick


Use a PC to restore backed up FlexScan results from the USB memory stick:

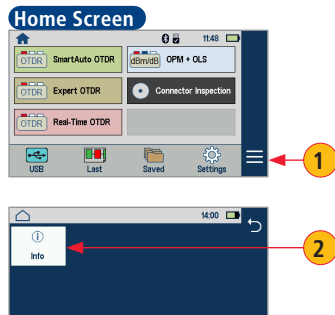
- Turn on the FlexScan OTDR and connect to a PC via USB cable.
- Touch the USB icon **A** on the FlexScan's Home screen.
- Plug the USB memory stick containing test results into a PC.
- Open 'My Computer' and double-click on the FS200 drive **B**.
- Open 2nd instance of 'My Computer' and double-click on the USB drive.
  - Within USB drive, double-click on 'backup' folder, then select date/time-stamped folder **C**.
  - Drag contents of the desired backup folder from the USB to the FS200\Results\Traces folder.
- PC will prompt to confirm overwrite of folders or files having the same names.



## 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 the Info tab.
- 3 View FlexScan Info displayed on the Device Information screen.

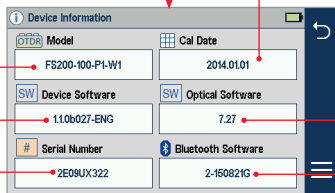


### Model Number:

- FS200-50B: 1550 nm OTDR
- FS200-60: 1650 nm OTDR
- FS200-100: 1310/1550 nm Pt-to-Pt OTDR
- FS200-300: 1310/1550 nm PON & Pt-to-Pt OTDR
- FS200-304: 1310/1550/1650 nm PON & Pt-to-Pt OTDR

**Device Software:** Revision of the current User Interface software

**Serial Number:** FlexScan serial number



**Cal Date:** Date of last calibration

**Optical Software:** Revision of current optical firmware

**Bluetooth Software:** Revision of current Bluetooth firmware

## 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](http://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.

## Repair Services

AFL has an authorized calibration/repair facility for AFL products in the USA, Europe and Asia Pacific. Please contact customer service for a return authorization number prior to sending your AFL test equipment in for repair or calibration.

Fujikura Europe LTD is an Authorized European Repair and Calibration facility for AFL Test and Inspection products and should be contacted directly for service.

Fujikura Asia LTD is an Authorized Asia Pacific Calibration facility for AFL Test and Inspection products and should be contacted directly for product calibrations. Please contact customer service for a return authorization number prior to sending your test equipment in for repair.

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**Test & Inspection**

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