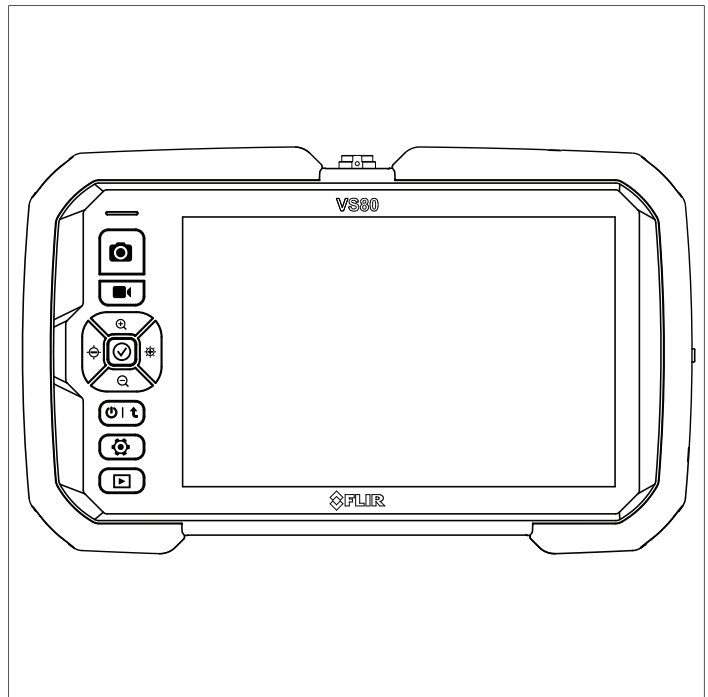




User Manual

VS80 Kit

High Performance Videoscope with Camera Probe





User Manual

VS80 Kit

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1 Advisories

1.1 Copyright

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1.2 Quality Assurance

The Quality Management System under which these products are developed and manufactured has been certified in accordance with the ISO 9001 standard. FLIR Systems, Inc. is committed to a policy of continuous development; therefore, we reserve the right to make changes and improvements on any of the products without prior notice.

1.3 Documentation


To access the latest manuals and notifications, go to the Download tab at: <https://support.flir.com>. It only takes a few minutes to register online. In the download area you will also find the latest releases of manuals for our other products, as well as manuals for our historical and obsolete products.

1.4 Disposal of Electronic Waste




As with most electronic products, this equipment must be disposed of in an environmentally friendly way, and in accordance with existing regulations for electronic waste. Please contact your FLIR representative for more details.


2 Safety


 CAUTION
Please read all user instructions and safety guidelines before proceeding.


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

The battery is not user-serviceable. **DO NOT** open the unit to replace the battery or to perform maintenance. Contact FLIR if the unit needs servicing or a battery replacement.

 WARNING
Risk of explosion if the battery is replaced using an incompatible battery type.

 WARNING
Failure to use the device without observing the information provided next to the WARNING symbol may cause serious injury or loss of life.

 CAUTION
Failure to use the device without observing the information provided next to the CAUTION label may cause damage to the product.

 WARNING
HAZARDOUS ENVIRONMENTS DO NOT use this system in explosive environments including gasoline and alcohol storage tanks.
FLAMMABLE GASES DO NOT use this device near flammable gases.
FOR INDUSTRIAL USE ONLY
AVOID EYE INJURY DO NOT look into the LED worklight or direct the worklight toward the eyes.

**CAUTION****INCOMPATIBLE SUBSTANCES MAY DAMAGE THE PROBE**


See the probe user manual for a list of specified liquids into which the probe can be inserted.

3 Introduction

3.1 Overview

Thank you for selecting the VS80 High Performance Videoscope kit. The VS80 kit is a rugged, waterproof video inspection system that includes the VS80 Videoscope, a detachable camera probe, and accessories.

The VS80 works with a variety of camera probes as listed in Section 3.3 and 3.4 below. VS80 probes are especially designed to perform well in difficult to reach locations and areas unsafe to approach. The probes provide sharp video and still images and can be safely submerged in fluids, as specified in the separate instructions provided with each probe.

	CAUTION
<p>Before putting the VS80 into operation there are two steps that must be performed immediately after connecting the probe to the main unit:</p> <ol style="list-style-type: none">1. Update the VS80 firmware, as explained in Section 14.2. For visual probes only: Select the probe that you intend to use from the Probe Selection Settings menu list, as explained in Section 8. This does not apply when connecting an IR probe. <p>Failure to perform these steps will cause the VS80 to incorrectly identify the connected probe.</p>	

The VS80 is battery operated and its internal lithium battery can be charged by connecting the VS80 to an AC source using the supplied USB AC adaptor/charger (see Section 10).

Still images and videos are stored on the supplied micro SD card, inserted in the VS80 right side compartment. Stored media can be downloaded to a PC using the USB-C port (see Sections 9 and 13).

3.2 Product Features


- Large display monitor shows camera images, touch-screen icons, settings menu, and other information.
- Sun visor protects monitor and allows viewing in brightly lit areas.
- Image/video recording with micro SD card storage.
- PC interface for downloading images/video and updating firmware.
- Micro HDMI port for viewing images on an external monitor.
- Split screen shows forward/side view images simultaneously when using a dual camera or a mirror accessory.
- Split-screen also compares live images with stored images.
- Wi-Fi connectivity for use with a smart device.
- FLIR Tools™ compatible for connecting with other FLIR cameras.
- Microphone/headset input for voice-over recording on videos.
- Internal rechargeable lithium battery runs 8 hours from a full charge.

3.3 Kit Descriptions

KIT Order Numbers	KIT Descriptions
VS80-KIT-1	General Purpose Videoscope Kit with 5.5 mm × 1 m long probe
VS80-KIT-2	Videoscope Kit with 2-Way Articulation 4.5 mm × 1 m long probe
VS80-KIT-3	Videoscope Kit with Dual HD Camera 4.9 mm × 1 m long probe
VS80-KIT-4	Videoscope Kit with 4-Way Articulation 6.0 mm × 2 m long probe
VS80-KIT-5	Videoscope Kit with Plumbing Spool and 10 mm × 25 m long probe
VS80-KIT-6	Videoscope Kit with HD 5.5 mm × 1 m long probe
VS80-IR21	Videoscope Kit with IR Thermal 19 mm × 1 m long probe

3.4 Ordering Videoscope and Probes Separately

Order Numbers	Descriptions
VS80	VS80 Videoscope Screen only (No Camera Probes)
VS80CIR-21	VS80 160 × 120 IR Thermal Camera Probe 19 mm × 1 m (3.3 ft) long
VS80C55-1RM	VS80 Camera Probe 5.5 mm × 1 m (3.3 ft) long
VS80A2-45-1RM	VS80 2-way Articulating Camera Probe 4.5 mm × 1 m (3.3 ft) long
VS80A4-60-2RM	VS80 4-way Articulating Camera Probe 6.0 mm × 2 m (6.6 ft) long
VS80C10-25RM	VS80 Plumbing Spool and Camera Probe 10 mm × 25 m (82 ft) long
VS80CHD-55-1RM	VS80 HD Camera Probe 5.5 mm × 1 m (3.3 ft) long
VS80C2-49-1RM	VS80 Dual HD Camera Probe 4.9 mm × 1 m (3.3 ft) long

	CAUTION
<p>The probe in use must be selected from the list of probes in the Probe Selection settings menu. If this is not done, the VS80 will not operate correctly with your probe.</p> <p>Always switch OFF the VS80 when swapping probes.</p>	

3.5 Supplied Equipment (all kits)

- VS80 High Performance Videoscope
- Camera probe
- Sun visor (removable and retractable)
- USB C to USB A charging and PC interface cable
- Power adaptor with AC plugs (for US, UK, EU, AUS)
- Micro HDMI audio-visual cable
- Audio headset
- Hand and neck straps
- Micro SD card (32 G)
- Printed Quick Start booklet
- Heavy duty carrying/shipping case

3.6 Supplied Equipment (select probes)

- Side-view and dual view mirror accessories for VS80C55-1RM and VS80A4-60-2RM probes.
- Side-view mirror and centring tools for pipe inspection kit, VS80C10-25RM.

4 Product Description

4.1 Front View

Note that not all display icons can be represented in Figure 4.1 at one time because of differences in operational modes; display icons not shown here are explained in their relevant sections.

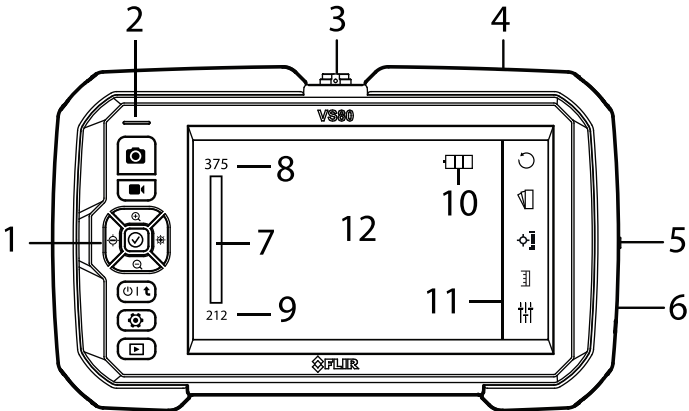


Figure 4.1 Front View of Monitor

1. Control buttons. See Section 6.
2. Status LED: Blue when power is on (charger not connected); green when charging with power off; cyan (light blue) when charging with power on; no light when fully charged (with charger attached).
3. Probe connection.
4. Charging/PC interface USB-C port.
5. Compartment for reset button, micro SD card slot, micro HDMI port.
6. Audio headset/microphone connector (for recording audio over videos).
7. Temperature scale bar graph (IR camera).
8. Upper temperature range limit (IR camera).
9. Lower temperature range limit (IR camera).
10. Battery status icon.
11. Touch screen icons.
12. Camera images and menu screens.

4.2 Top View

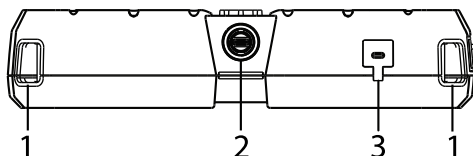


Figure 4.2 Top View of Monitor

1. Neck and hand strap fasteners. One on each corner of the unit.
2. Probe connector. Line up the white dots on the probe connector and the display unit connector when attaching the probe.
3. USB-C port for PC interface and battery charging.

4.3 Right Side View

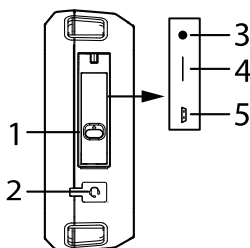


Figure 4.3 Right Side View of Monitor

1. Compartment latch. Push latch upward to access the compartment (the compartment contains items 3, 4, and 5, listed below).
2. Audio connector (3.5 mm) for voice-over video recording using the supplied earpiece microphone.
3. Reset button. Press the recessed button for 2 seconds to reset the unit in the event of a system crash.
4. Micro SD card slot. Do not remove or replace the SD card while the VS80 is powered. Do not use cards that have been formatted by another camera or system.
5. Micro HDMI port for connecting an external monitor. Note that Wi-Fi is not operable when an external monitor is connected.

4.4 Back of Unit

The tilt stand, tripod mount, and informational labels are located on the back of the VS80 (not pictured).

5 Quick Start (en)



CAUTION

Before putting the VS80 into operation there are two steps that must be performed immediately after connecting the probe to the main unit:

1. Update the VS80 firmware, as explained in Section 14.
2. For visual probes only: Select the probe that you intend to use from the Settings menu list, as explained in Section 8. This does not apply when connecting an IR probe.

Failure to perform these steps will cause the VS80 to misidentify the connected probe.

1. If the battery status icon is showing a low charge, or if the unit will not power up, connect the VS80 to an AC power source using the supplied AC adaptor/charger, the charger connects to the USB port located on the top of the display unit (see Section 10 for details).
2. Ensure that a micro SD card is inserted in the slot located in the right side compartment.
3. Carefully connect the camera probe as detailed below:

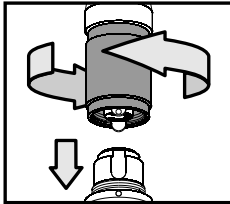
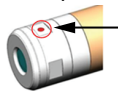


Figure 5.1 Connecting the probe to the monitor unit

- Align the white dot on the probe connector with the dot on the display connector.
 - Carefully plug the probe into the display unit.
 - Tighten the connecting collar to secure the probe connection.
 - As mentioned, select the probe from the Settings menu list. See Section 8.
4. Remove the protective lens cap from the camera probe.
 5. Long press the power button, the FLIR logo will appear.
 6. The camera image will then appear with touch-screen icons, battery status icon, date/time, and color bar graph (IR camera).

7. To orient the camera, the IR probe includes a dot on the head to indicate the top of the image, as shown.



8. The front panel status LED (located above the control buttons) is blue when power is on (charger not connected); green when charging with power off; cyan (light blue) when charging with power on; no light when fully charged (with charger attached).
9. Long press the power button to switch off the VS80 after use.

6 Control Buttons

6.1 Control Buttons Overview

The physical control buttons are used in conjunction with the touch-screen icons to set up and operate the VS80. Similar to the touch-screen icons, several control buttons have extended capabilities that adapt to each probe's features.

6.2 Button Descriptions

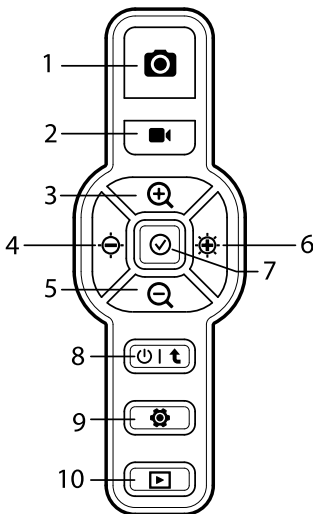


Figure 6.1 Control Buttons

1. **Image Capture button.** Short press to capture an image. Images are stored on the supplied micro SD card.
2. **Video Record button.** Short press to start or stop recording. Videos are stored on the supplied micro SD card. See Sections 9 and 13 for details on viewing and downloading media. See the Specifications (Section 16) for media formats and SD card information.
3. **Zoom In / Menu + (plus) button.** In normal operation for visual cameras only, short press the button to zoom in on the camera image. A slider graphic appears on the right side of the image showing 1x, 1.5x, 2x, and 3x zoom levels. When programming, this button can be used to increase a setting value or to move up a list.

4. **Brightness decrease and left arrow button.** Short press this button to decrease worklight brightness. A slider graphic appears on the left side of the image showing the brightness level. In some menus, this button can be used as a left arrow button.
5. **Zoom Out / Menu — (minus) button.** In normal operation for visual cameras only, short press the button to zoom out on the camera image. A slider graphic appears on the right side of the image showing 1x, 1.5x, 2x, and 3x zoom levels. When programming, this button can be used to decrease a setting value or to move down a list.
6. **Brightness increase and right arrow button.** Short press this button to increase worklight brightness. A slider graphic appears on the left side of the image showing the brightness level. In some menus, this button can be used as a right arrow button.
7. **Full-screen view button.** Short press to extend the image viewing area, short press to return to the default view. When Wi-Fi is active, this button is used to disconnect Wi-Fi.
8. **Power / Return button.** Long press to switch the VS80 on/off. Short press to return from a menu screen.
9. **Settings menu button.** Short press to open or exit the Settings menu. See Section 8 for details on settings menu options and navigation.
10. **Image and Video Gallery.** Short press to open the media gallery. Thumbnails of stored media will appear. See Sections 9 and 13 for complete information.

7 Touch Screen Icons

7.1 Touch-Screen Overview

The touch-screen icons are used in conjunction with the physical control buttons to configure and operate the VS80. See Section 6 for details on the control buttons.

Touch-screen icons appear along the left and right side of the VS80 display for visual cameras, and only along the right side for IR cameras. An icon can be tapped to activate/deactivate a function or to open a submenu for further configuration.

7.2 Visual Camera Touch-Screen Icons

A visual camera display example, with touch-screen icons, is provided below. The table below the camera image explains each touch-screen icon in detail. Tap an icon to enable/disable it or to open its submenu.

Note that camera probes are typically supplied with their own user manual, see the probe manual for additional information.

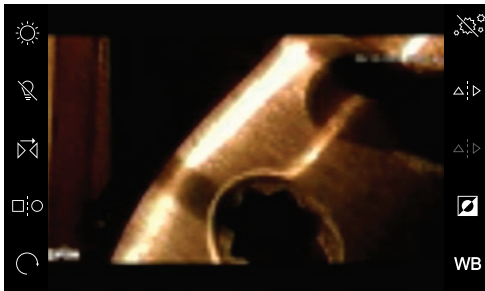




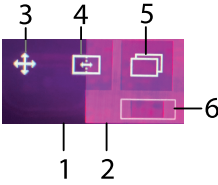







Figure 7.1 Digital Camera touch-screen icons shown on left and right side borders

ICON	DESCRIPTION
	Tap to switch the exposure compensation filter on or off. The filter gives detail and brightens dark areas in an image.
	Tap to switch the LED worklight on or off.
	Tap to show/hide a mirror image of the camera view.

	<p>Tap to begin comparing stored images with the live camera feed on a split-screen. When you tap the icon, the image gallery opens. Select an image from the gallery to compare with the live image. The screen will split, showing the stored image and the live image side by side.</p> <p>Additional touch-screen icons are active in this mode, see figure below.</p>  <ol style="list-style-type: none"> 1. Live image (default position: left) 2. Stored image (default position: right) 3. Tap the icon and drag the stored image as desired, tap icon when done 4. Swap left and right images 5. Return to Gallery to select a different image 6. Selected area of image (see step 3 above)
	<p>Tap to rotate image clockwise (90°, 180°, and 270°).</p>
	<p>Tap to switch the dust elimination filter on or off (for use with dual camera models and mirror accessories).</p>
	<p>For dual camera models and for single camera models using mirror accessories, tap this icon to show a split screen with the forward facing (F) and side facing (S) views shown on a split screen.</p>
	<p>Same as icon directly above but, when tapped, the worklight toggles direction from side to forward or from forward to side.</p>
	<p>Tap to show the camera image in a 'negative' contrast format. Tap again to return to normal operation.</p>
<p>WB</p>	<p>Tap to open the white balance menu described below:</p> <ul style="list-style-type: none"> • Default: Reset to the factory default. • Calibration: Point to a white surface, tap the box in the centre of the screen or press the check mark ✓ button, and then confirm. • Custom: Set the White Balance manually using the RGB sliders.

7.3 IR Camera Touch-Screen Icons

An IR camera display example, with touch-screen icons, is provided below. The table below the camera image explains each touch-screen icon in detail. Tap an icon to open its submenu.

Note that camera probes are typically supplied with their own user manual, see the probe manual for additional information.

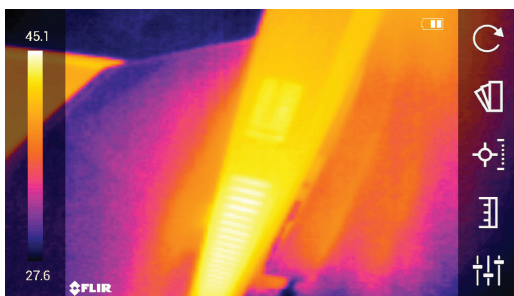




















Figure 7.2 IR Camera touch-screen icons shown on right edge of display

ICON	DESCRIPTION
	<p>Tap to open the rotate/flip image menu. Select a view from the list below.</p> <p>1 2</p> <p> </p> <p>3 4 5 6</p> <p>   </p> <ol style="list-style-type: none"> 1. Tap to rotate image per items 3, 4, 5, and 6. 2. Tap to view mirror image. 3. 90° clockwise rotation. 4. 180° clockwise rotation. 5. 270° clockwise rotation. 6. Normal view.

	<p>Tap to open the color palette menu. Select from the options below.</p> <p>1 2 3 4 5</p>  <ol style="list-style-type: none"> 1. Iron color palette. 2. Rainbow color palette. 3. Gray-scale palette. 4. Below alarm. Areas in the image that are below the temperature set point are highlighted in blue (see Section 11). 5. Above alarm. Areas in the image that are above the temperature set point are highlighted in red (see Section 11).
	<p>Measurement type:</p> <p> CENTRE SPOT: Temperature of spot (identified by the displayed cross-hairs) is measured and shown on the upper left hand side of display.</p> <p> COLD SPOT: The coldest temperature spot is targeted in the boxed region of the image. The spot temperature is shown on the upper left side of the display. Tap and drag the box to move it, use the up/down/right/left navigation buttons (the four buttons that surround the centre check mark ✓ button) to re-size it, or pinch/stretch the box with two fingers to narrow or widen it.</p> <p> HOT SPOT: The hottest temperature spot is targeted in the boxed region of the image. The spot temperature is shown on the upper left side of the display. Tap and drag the box to move it, use the up/down/right/left navigation buttons (the four buttons that surround the centre check mark ✓ button), or pinch/stretch the box with two fingers to narrow or widen it.</p> <p> NO MEASUREMENTS: Temperature is not measured.</p>


	<p>Tap to open the Auto/Manual Temperature Scale menu.</p> <p>A Auto Scale. The VS80 automatically selects the low to high temperature scale (range) based on the camera image. Use Auto in normal operation.</p> <p>M Manual scale. Use manual scaling to limit the temperature scale close to the targeted spot temperature. You can manually adjust the temperature range by first tapping the temperature readout at the top or bottom of the bar graph, to enable editing, and then using the plus  and minus  buttons to adjust the value.</p>
	<p>Tap to open the Measurement Parameters settings menu. Use the touch-screen up/down arrows to set Emissivity and/or Reflected Temperature.</p> <p>Tap the desired temperature unit of measure °C or °F.</p> <p>See Section 8.2.10 for additional details.</p> <p>Note on Emissivity: For most applications, the default emissivity setting of 0.95 is a good place to start. For shiny, reflective surfaces, an emissivity adjustment is likely needed. To learn more about emissivity, and how to adjust it, follow the link below.</p> <p>Note on Reflected Temperature: Set the Reflected Temperature to the ambient temperature in the test area, to start. If surrounding objects are interfering with your measurements, an adjustment to the Reflected Temperature setting may be needed. Refer to the link below for more information.</p> <p>Emissivity and Reflected Temperature Information</p>

8 Settings Menu

8.1 Settings Menu Overview



Figure 8.1 Settings Menu example. Menu items vary depending on attached camera probe.

The Settings menu allows you to quickly and easily customize the VS80. Press the Settings button  to open/close the menu. The menu has two pages, tap the up/down arrow touch-screen icons to scroll. Tap a menu item to open it or to toggle its setting ON/OFF.

The menu is different for IR and visual cameras. See the table below. Detailed descriptions are provided, below, in Section 8.2.

MENU ITEMS	VISUAL CAMERA	IR CAMERA
PROBE SELECTION	√	×
LANGUAGE	√	√
Wi-Fi	√	√
DISPLAY GRID	√	×
TIMESTAMP	√	√
EXTERNAL MICROPHONE	√	√
USB CARD READER	√	√
SD CARD	√	√
IMAGE	√	×
MEASUREMENT PARAMETERS	×	√
APO	√	√
DATE / TIME	√	√
RECORDING QUALITY	√	×
INFO	√	√

ASPECT RATIO	x	√
REGULATORY	√	√

8.2 Menu Item Descriptions

Each menu item is detailed below.

8.2.1 Probe Selection (visual cameras only)

Tap to open the Probe Selection menu.

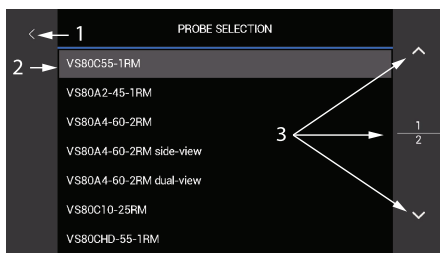


Figure 8.2 Probe Selection Settings Menu

Tap the probe model number (2) that matches the probe you are using. This will ensure optimal probe compatibility with the VS80. The touch-screen icons and control buttons will adapt to each selection. Tap the up/down arrow icons (3) to scroll pages. Tap the left arrow (1) to return to the main menu.

8.2.2 Language

Tap to open the Language menu.

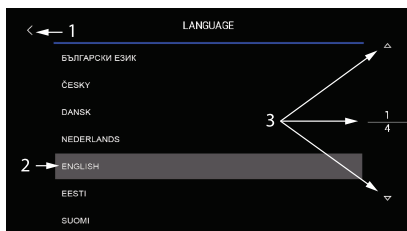


Figure 8.3 Language Settings Menu

Tap the desired language (2). Tap the up/down arrow icons (3) to scroll pages. Tap the left arrow (1) to return to the main menu.

8.2.3 Wi-Fi Menu

The Wi-Fi utility allows you to connect the VS80 with a smart device, see Section 12 for complete information. The items listed below provide a basic overview of the Wi-Fi menu options:

- Set Wi-Fi ON/OFF.
- View the **SSID** (Service Set Identifier) number. The SSID is the identifier for all of the networks currently within range.
- Create a password (up to 16 characters) using the touch-screen keyboard. Tap the **SETTINGS** box to open the password menu.

8.2.4 Display Grid (visual cameras only)

Tap ON or OFF to enable or disable the Display Grid. Each block in the grid represents one square 0.2 in (0.5 cm) area. Tap the unit of measure on the screen to toggle imperial and metric units.

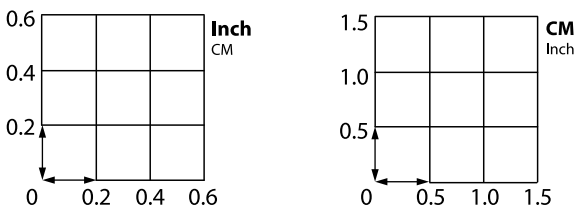


Figure 8.4 Display Grid. Image on left shows Imperial units selected; Image on right shows Metric units selected.

The grid is superimposed over the camera image to give dimensional context to the area under inspection.


8.2.5 Timestamp

Tap ON or OFF to enable or disable the timestamp option. When enabled, time and date are saved with each image and video.

8.2.6 External Microphone

Tap ON or OFF to enable or disable the external microphone function. Attach the supplied microphone earpiece to the 3.5 mm connector on the meter's right side. Use the VOLUME slider to set the microphone input volume from 1 to 10, or press DEFAULT to set the volume to 5. Audio narrative can then be recorded with each video.

8.2.7 USB Card Reader

There are no programmable settings to adjust in this menu. The menu text turns from grey to white, and the USB icon  appears, when the VS80 is connected to a PC. While connected, you can move images and video from the SD card to a PC and update the VS80 firmware. See Section 13, for PC interface information, and Section 14, for firmware updating.

8.2.8 SD Card

Tap SD CARD to open the menu.

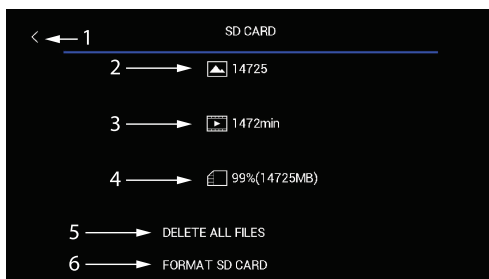


Figure 8.5 SD Card Settings Menu

The available memory for images only (2), video only (3), and total memory (4) is displayed. You can delete all files by tapping DELETE ALL FILES (5) or you can format a new SD card by tapping FORMAT SD CARD (6). Tap the left arrow (1) to return to the main menu.

Do not use SD cards that were formatted on another device, as the filing systems may differ. Always format SD cards with the VS80 before use (the supplied card is formatted at the factory).

For additional SD card information, see the Specifications (Section 16).

8.2.9 Image (visual cameras only)

Tap to open the Image Brightness, Contrast, and Sharpness control menu.

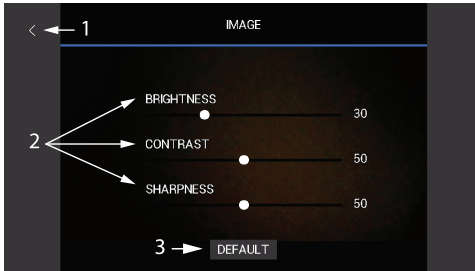


Figure 8.6 Image Settings Menu

Tap and drag the sliders (2) as desired. Tap DEFAULT (3) to reset the image settings. Tap the left arrow (1) to return to the main menu.

8.2.10 Measurement Parameters (IR camera only)

Tap to open the Measurement Parameters menu.

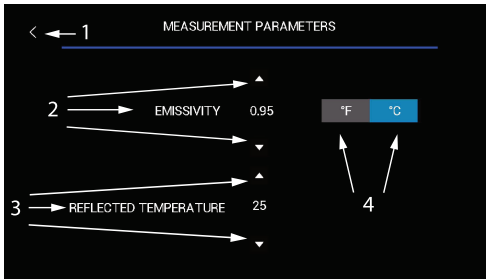


Figure 8.7 Measurement Parameters Settings Menu

Program the Emissivity (2) and Reflected Temperature (3) values using the up/down touch-screen icons. Select the unit of measure by tapping °C or °F (4). Tap the left arrow (1) to return to the main menu.

Note on Emissivity: For most applications, the default emissivity setting of 0.95 is a good place to start. For shiny, reflective surfaces, an emissivity adjustment is likely needed. To learn more about emissivity, and how to adjust it, follow the link below.

Note on Reflected Temperature: Set the Reflected Temperature to the ambient temperature in the test area, to start. If surrounding objects are interfering with your measurements, an adjustment to the Reflected Temperature setting may be needed. Refer to the link below for more information.

[Emissivity and Reflected Temperature Information](#)

8.2.11 Auto Power Off (APO)

Tap to open the APO menu.

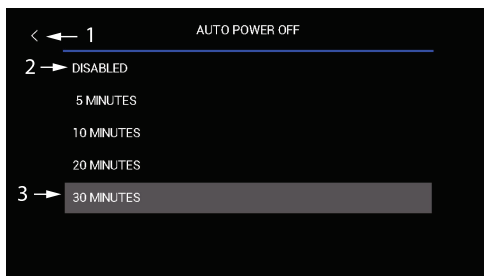


Figure 8.8 APO Settings Menu

To set APO, tap 5, 10, 20, 30 minutes (3) or Disable (2). Tap the left arrow (1) to return to the main menu.

8.2.12 Date / Time

Tap to open the Date/Time menu.

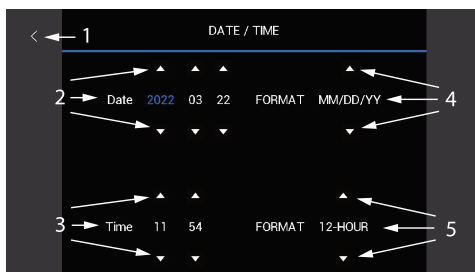


Figure 8.9 Date/Time Settings Menu

Use the touch-screen arrows to set the date (2) and the time (3). Tap the up/down arrows (4) to select the display format for month (MM), day (DD), and

year (YY): MM/DD/YY, DD/MM/YY, or YY/MM/DD. Tap the up/down arrows (5) to select the 12 or 24 hour clock. Tap the left arrow (1) to return to the main menu.

8.2.13 Recording Quality (visual cameras only)

This setting applies to video recording only. Tap to open the Recording Quality menu.

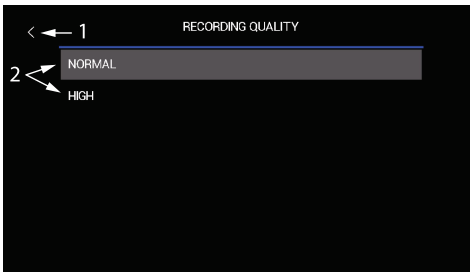


Figure 8.10 Recording Quality Settings Menu

Tap Normal or High Quality (2). In Normal mode, video is recorded at a rate of 1 M bits/s (megabits per second), in High Quality mode the bit rate is 2 M bits/s. Tap the left arrow (1) to return to the main menu. The higher quality mode will result in file sizes proportionately larger than those of normal quality.

8.2.14 Information (Info)

Tap to open the Information menu.

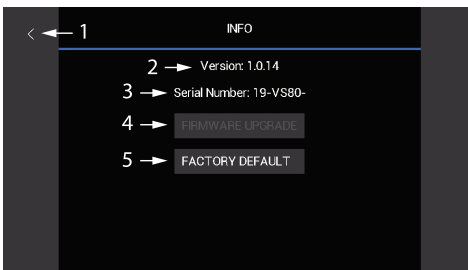


Figure 8.11 Information Settings Menu

View the firmware version (2) and serial number (3). Tap FIRMWARE UPGRADE (4) to upgrade the VS80 firmware. Tap FACTORY DEFAULT (5) to

reset all user programmable settings. See Section 14 for details on firmware upgrading. Tap the left arrow (1) to return to the main menu.

8.2.15 Aspect Ratio (IR camera only)

Tap to select a 4:3 or 16:9 aspect ratio. This setting does not affect the recorded images and video, only the display is affected. Selecting 16:9 will expand the thermal image to fit the width of the screen. Selecting 4:3 will present the thermal image in the centre of the screen.

8.2.16 Regulatory



Tap this item to view safety verifications and regulatory compliance certifications.



Figure 8.12 Regulatory information

9 Image and Video Recording

9.1 Image and Video Basics




The VS80 allows you to capture still images (.jpg) and video (.mov). Press the image capture button  to save still images and press the video record button  to start/stop video recording.

With a connected microphone, you can record narration audio with videos. See the Specifications (Section 16) for image and video file resolution information.

Media are stored on the supplied micro SD card (inserted in the right-side compartment). For information regarding the number of images and length of video that can fit on a variety of SD card sizes, see the Specifications (Section 16).

Images and video can be downloaded to a PC using the USB connector at the top of the VS80, see Sections 9.6 and 13.

9.2 Media Gallery

Once images and video are recorded you can view them directly in the VS80 media gallery by pressing the Gallery button . In the gallery, tap the Image icon  or the Video icon  to select a media type to browse. Tap a thumbnail to open the image or video. Refer to the call-out below for more details.

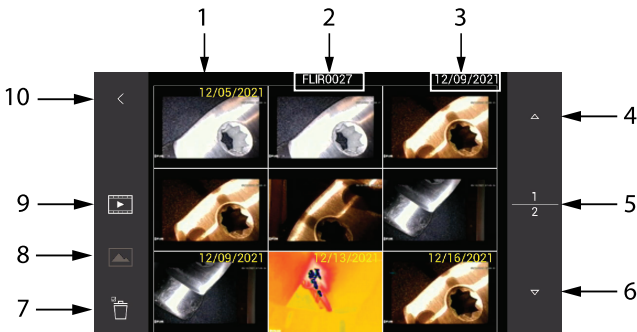


Figure 9.1 Media Gallery

1. If the timestamp option is enabled in the Settings menu, media will include the date and time.
2. Selected thumbnail's filename.

3. Selected thumbnail's timestamp.
4. Up arrow. Scroll gallery pages.
5. Down arrow. Scroll gallery pages.
6. Selected page (top number) and total number of pages (bottom number).
7. Delete the selected image or video.
8. Tap to show only image thumbnails.
9. Tap to show only video thumbnails.
10. Tap arrow to return to exit the gallery.

9.3 Opened Images

When you tap an image thumbnail, the image will open on the VS80 display. While the image is opened, you can type text onto the image, delete the image, and perform other actions as described in the call-out below.

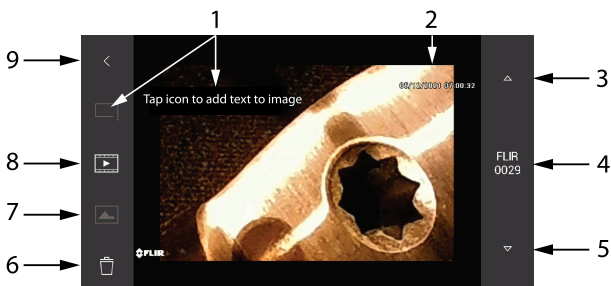






Figure 9.2 Opened Image in Media Gallery

1. Tap the comments icon  and type a comment using the touch-screen keyboard that appears; tap DONE on the keyboard when finished. Delete comments by tapping the eraser icon  or open the keyboard again to amend comments, by pressing the keyboard icon . When satisfied with your comment, tap the disc icon  to save the comments with the image.
2. Image timestamp.
3. Up arrow to scroll to next image.
4. Image filename.
5. Down arrow to scroll to prior image.
6. Tap trash icon to delete image.
7. Tap to view image thumbnails.
8. Tap to view video thumbnails.
9. Return to the main thumbnail gallery.

9.4 Opened Videos

When you tap a video thumbnail, the video will open on the VS80 display. While the image is opened, press the play icon (▶) to start the video and press the pause (⏸) icon to pause/stop the video. You can perform other actions as described in the call-out below.

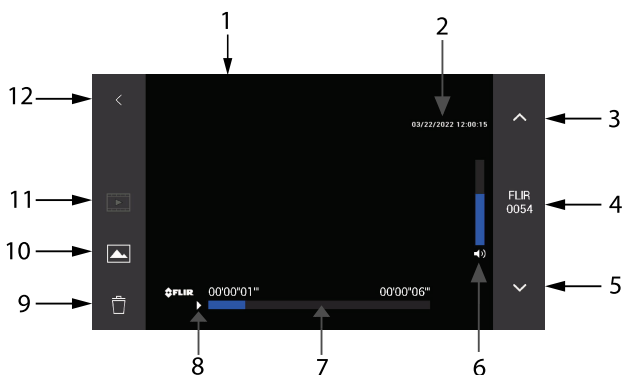




Figure 9.3 Opened Video in Media Gallery

1. Video playback.
2. Video timestamp.
3. Up arrow to scroll to next video.
4. Video filename.
5. Down arrow to scroll to prior video.
6. Playback volume control. Use the +/- buttons (located above/below the  button).
7. Video time-line.
8. Play/Pause icons appear here.
9. Tap the trash icon to delete the video.
10. Tap to view image thumbnails.
11. Tap to view video thumbnails.
12. Return to main thumbnail gallery.

9.5 Recording Audio over Video

Voice-over recordings can be combined with videos by plugging the supplied microphone earpiece into the 3.5 mm connector on the right side of the VS80 (below the side compartment).

Activate the microphone function in the Settings menu. Press  to access the menu, scroll to the External Microphone setting, and tap ON. Set the microphone volume level (1 to 10) using the on-screen slider or tap DEFAULT to set the microphone volume to 5. Now, each time you record video, you can add a narrative audio track that can be heard upon playback.

9.6 Downloading Media to a PC

The VS80 is equipped with a PC interface. Connect the supplied USB cable to the VS80 USB port, located under the flap at the top of the unit, and to a PC USB port.

The VS80 will be recognized by the PC as a new external storage drive.

Simply drag files out of, and into (in the case of firmware upgrades), the VS80 drive. Media files are located in the MEDIA folder, the firmware file must be kept in the root directory, not in a folder. See Sections 13 and 14 for additional information regarding the PC interface and firmware updates.

10 Rechargeable Battery

10.1 Battery Overview

The VS80 is supplied with an internal, rechargeable lithium battery. The battery icon on the upper right hand corner of the display provides battery status (see Section 10.2). The battery cannot be replaced or serviced in the field, please contact FLIR support for assistance. The VS80 can operate for 8 hours from a full charge (at room temperature).

10.2 Battery Status Icon

The battery status icon is shown on the upper right hand corner of the VS80 display.

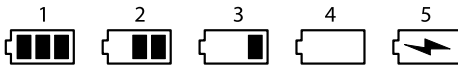


Figure 10.1 Battery status icon stages

In the figure above, the battery is fully charged in image no. 1. In images 2 and 3 the battery energy is decreasing until it is depleted in image no. 4. Image no. 5 shows the icon's appearance when the VS80 is actively charging. Just before the battery expires, the display will show a large battery icon in the centre of the screen. The unit must be charged at this point.

10.3 Recharging the Battery




A USB-C cable is supplied and is used to connect the VS80 (top USB port) to the supplied AC adaptor/charger. Connect the adaptor to an AC power source to charge. The AC charger is rated for 100 to 240 V AC (50/60 Hz) and international power adaptors are supplied (for US, UK, EU, AUS). The VS80 will also charge while connected to a PC, but the charge time increases. The time required to fully charge the battery, from a low battery condition, is typically 3.5 hours using the AC adaptor.

11 Temperature Alarm (IR Camera)

11.1 Alarms Overview

For the IR camera, the VS80 offers a high (above) and a low (below) alarm function; only one can be selected at a time.

11.2 Configuring the Alarms

1. Tap the color palette touch-screen icon .
2. Tap the Above alarm icon  or the Below alarm icon .
3. The temperature set point will appear at the centre left area of the monitor (as shown in Figure 11.1 as 77.1°).
4. Tap and drag the color palette bar graph up or down to change the set point. The bar graph is located on the left side of the display, as shown in Figure 11.1, below).

11.3 Alarm Trigger Indication

In the Above alarm mode, a red color is applied to all parts of the image that represent a temperature above the alarm set point. Some further adjustment to the set point may be necessary to achieve the proper contrast. Tap and drag on the color bar graph to change the set point.



Figure 11.1 Above Alarm display

In Below alarm mode, a blue color is applied to all parts of the image that represent a temperature below the alarm set point. Some further adjustment to the set point may be necessary to achieve the proper contrast. Tap and drag on the color bar graph to change the set point.

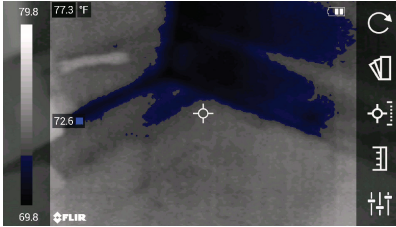


Figure 11.2 Below Alarm display

12 Wi-Fi Connectivity

12.1 Wi-Fi Overview

You can join the VS80 Wi-Fi network with your smart device by first switching the Wi-Fi function ON in the VS80 Settings menu and then selecting the VS80 network from your smart device.

For security, when you join the VS80 Wi-Fi network on your smart device you automatically disconnect from your commercial or residential network. You can also set up a password, as explained in the next section, to restrict access to the VS80 network.

12.2 Connecting a Smart Device to the VS80


1. Open the VS80 settings menu by pressing the Settings button .
2. Tap **Wi-Fi** to open the sub-menu.
3. To set a password, tap **SETTINGS**, type a password, and tap **DONE**. To continue without password protection skip this step.






Figure 12.1 Touch-screen keyboard

4. Tap the 'ON/OFF' touch-screen icon to switch on the Wi-Fi network. The Wi-Fi connection screen will appear, showing the 60 second timer, SSID, and password (see Figure 12.2).



Figure 12.2 Wi-Fi Connecting Screen

5. To abort the connection process, press the check button  or tap the icon on the upper right hand corner of the display (item 2 in Figure 12.2).

6. Tap the VS80 from the list of available networks on your smart device before the 60 second timer counts down. See Figure 12.3 below for example smart device screens.
7. When successfully connected, the Wi-Fi icon  will appear at the top right of the VS80 display.
8. To disconnect Wi-Fi at any time, select 'OFF' from the Wi-Fi Setting menu or press the  button.

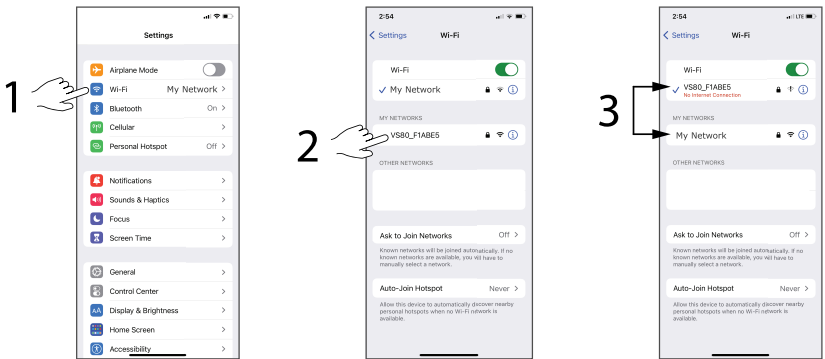


Figure 12.3 Smart device setup example. Step 1, tap the Wi-Fi setting on your smart device. Step 2, tap the VS80 from the list of available networks. Step 3, note that the VS80 is now the connected network and your personal network ('My Network', in this example) is now in the available network list, but it is no longer connected. To return to your network, simply tap your network name from the available networks (the VS80 will disconnect).

12.3 Using the FLIR Tools™ App

With FLIR Tools, you can view live VS80 camera images and video on your smart device. You can also download previously recorded images and video from the VS80 to the smart device. You cannot, however, *capture* a new image or record a new video from the smart device, those actions can only be performed using the control buttons on the VS80.

Follow these steps to set up FLIR Tools for the VS80 on your smart device:

1. Download and install FLIR Tools on the smart device.
2. Connect the smart device to the VS80 network via Wi-Fi, per the directions in Sections 12.1 and 12.2, above.
3. Open FLIR Tools on the smart device.
4. Select the VS80 Wi-Fi network, from the list of available networks, on the smart device.

13 PC Interface

13.1 PC Interface Overview

The VS80 PC interface utility allows you to download images and video to your PC, see Section 9.

The PC interface also allows you to upgrade the VS80 firmware, see Section 14.

When connected to a PC, the VS80 also charges its battery. For quicker charging, connect the VS80 to an AC power source using the supplied AC adaptor and USB cable, see Section 10.

13.2 Connecting the VS80 to a PC

The VS80 is supplied with a USB-C to USB-A cable, connect the USB-C end of the cable to the USB port at the top of the VS80 (to the right of the probe connection) and the other end to the PC USB-A port. Depending on the type of USB port on your PC, you may need to use a USB adaptor to connect correctly.

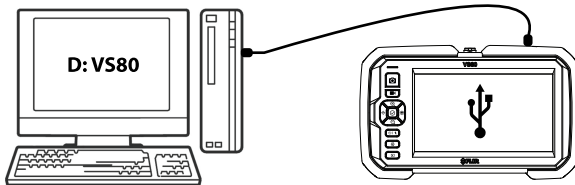


Figure 13.1 Connect the VS80 to a PC using the supplied USB-C (VS80 port) to USB-A (PC port) cable.

13.3 Accessing the VS80 Directory on the PC

When successfully connected, the PC will show a newly connected VS80 drive. Open the drive to see its root directory which contains the firmware file and a set of folders. The Media folder is where images and videos, captured by the VS80, are stored. There may be other folders present that are for system use only.

You can then move images and video from the Media folder onto your PC hard drive.

The VS80 root directory is where you place firmware update files. See Section 14 for firmware upgrade details.

14 Firmware Updates

To update the VS80 firmware, carefully follow the steps in the following sections. The FLIR website is updated periodically to make improvements and so the screen examples, below, may not match the current format or configuration exactly. If you need assistance please contact FLIR support.

14.1 Obtaining the Firmware Update File

1. Go to the support site: <https://support.flir.com>
2. Click on the **DOWNLOADS** menu heading, as shown.

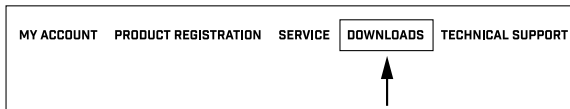


Figure 14.1 Click 'DOWNLOADS'.

3. Click **Software and Firmware** as shown.

Software and Firmware [login needed]

Figure 14.2 Click the 'Software and Firmware' item from the options list.

4. Type your **Email Address** to log in or to create an account, as shown. Click **Continue**.

Sign in

Or create a new account by entering your email address below

EMAIL ADDRESS

CONTINUE

- For Figure 15.3, below, 1. Type **VS80** in the search field; 2. Select **FLIR / Extech Meters Software** from the pull-down menu; 3. Select **FLIR Software** from the pull-down menu; 4. Click **SEARCH**; 5. Click the update file to download it to your PC.

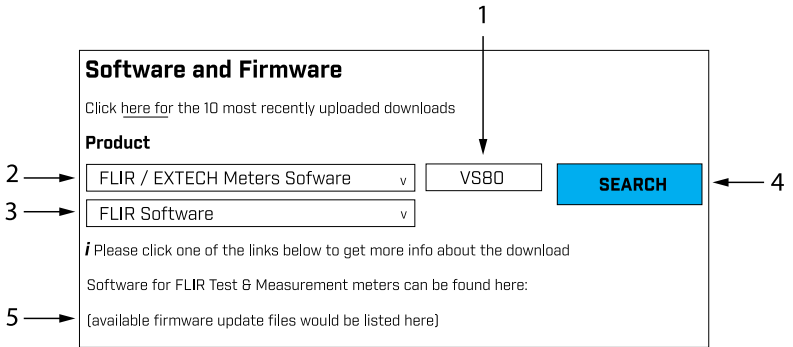


Figure 14.3 Follow the steps to complete the download process.

14.2 Moving the Upgrade File to the VS80

- As explained in Section 13, *PC Interface*, connect the VS80 to the PC using the supplied USB cable.
- When the VS80 is physically connected to the PC, the PC should recognize the VS80 as an external storage drive. For Windows, the VS80 drive will be given a drive letter in File Explorer (**E:**, for example). For Mac, the VS80 drive icon will appear on the desktop.
- Drag the downloaded firmware file from your PC to the root (top level) directory of the VS80 as shown in the Windows example below in Figure 15.4.

NOTE

Drag only the update file (FLIRVS80.BRN, for example) into the VS80 root directory. Do not drag other files or folders that may accompany the update file (readme.txt, for example).

Rename the existing firmware file to FLIRVS80-old.BRN, before loading the new update file. This will allow you to revert to the earlier firmware version if necessary.

- Safely eject the VS80 from the PC (for Windows, right-click the drive letter in File Explorer and select Eject; For Mac, drag the drive icon into the Trash).
- Physically disconnect the VS80 from the PC.

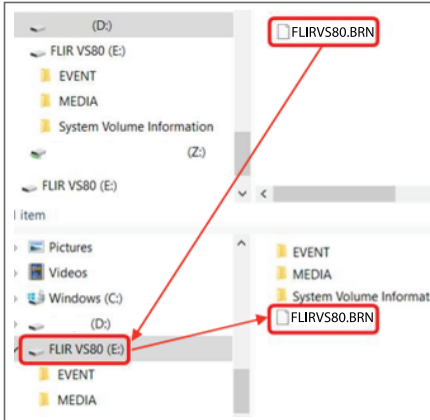



Figure 14.4 Windows PC example: Moving the update file to the VS80 root directory.

14.3 Executing the Firmware Update

1. With the VS80 disconnected from the PC, press the VS80 Settings button  to open the Settings menu.
2. Navigate to the INFO menu, tap INFO to open it, and then tap FIRMWARE UPGRADE; confirm the action when prompted.
3. Depending on the specific firmware, the VS80 may automatically cycle power and restart with the new firmware active, or you may have to manually restart the VS80 after it switches off.
4. After restarting, verify that the new firmware version number is displayed in the INFO settings menu.
5. If you have questions, or run into problems upgrading, please contact FLIR (see Section 17, *Customer Support*).

15 FCC and IC Notices

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

FCC and IC Identification Numbers

FCC identification number: 2AXRO-VS80

IC identification number: 5306A-VS80

Federal Communications Commission Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

RF Exposure Warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm (7.9 in) from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Canada, avis d'Industry Canada (IC)

Cet appareil est conforme avec Industrie Canada exemptes de licence RSS standard(s).

Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (antennas are greater than 20 cm (7.9 in) from a person's body).

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industrie Canada (IC). Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a également été évalué et démontré conforme aux limites d'exposition aux RF d'IC dans des conditions d'exposition à des appareils mobiles (antennes sont supérieures à 20 cm à partir du corps d'une personne).

16 Specifications

Monitor	7 in (17.8 cm) diagonal color touch-screen (1024 * 600)
Stored images file format	<p>HD and other visual camera probes: .jpg (1280 * 720)</p> <p>Thermal camera probe: .jpg (640 * 480)</p> <p>Comments can be added directly onto images in the Media Gallery</p>
Stored video file format	<p>HD and other visual camera probes: .mov (1280 * 720)</p> <p>Thermal camera probe: .mov (640 * 480)</p> <p>Selectable video recording quality (Settings menu)</p> <p>Audio can be recorded over video using supplied headset microphone</p>
Media storage capacity	<p>32 G micro SD card (supplied); 64 G maximum size.</p> <p>SD card capacity examples:</p> <p>4 GB: total images 31,130; video length: 135 minutes</p> <p>8 GB: total images 62,259; video length: 270 minutes</p> <p>16 GB: total images 124,518; video length: 539 minutes</p> <p>32 GB: total images 249,037; video length: 1079 minutes</p> <p>Larger SD card sizes will accommodate proportionately longer video lengths and image totals.</p> <p>Note that the video lengths listed above apply to the Normal recording mode (Settings menu); Selecting the High Quality recording mode will shorten the available lengths.</p>
Connectivity	<p>USB 2.0 for PC interface and battery charging</p> <p>FLIR Tools™ compatible</p> <p>Wi-Fi connection to smart devices (802.11 b/g/n) with a 10 m distance limit</p> <p>Micro HDMI connection for displaying camera images on an external monitor (NTSC / PAL compatibility)</p> <p>3.5 mm audio headset connection</p>
IR Probe Measurement Range	14°F to 752°F (-10°C to 400°C); 'OL' is displayed when IR temperature measurement is out of range
Visual Probe Depth of Field	10 mm to infinity

Operating temperature	14 to 140°F (-10 to 60°C) on battery power 32 to 104°F (0 to 40°C) when connected to charger
Storage temperature	-4 to 140°F (-20 to 60°C)
Relative humidity	10 to 95%, non-condensing
Altitude	6562 ft (2000 m)
Dimensions (VS80 Videoscope)	9.8 x 6.0 x 2.0 in (248 x 150 x 51 mm)
Weight (VS80 Videoscope)	2.86 lbs (1.3 kg)
Power supply	Rechargeable lithium ion battery (9800 mAh) 3.5 hours charging and 8 hours operation at 79°F (26°C) AC adaptor/charger (supplied) for US, UK, EU, and AUS plugs. Output is rated 100 to 240 VAC ±10%, 50/60 Hz. Input is rated 5.0 V DC, 3.0 A
Dust and water protection	IP 54 rated for display unit console
Drop-proof	6.6 ft (2 m)
Approved liquids for camera probe immersion	See separate instructions provided with probe or contact FLIR support
Safety Compliance	IEC / EN 61010 or 62368; IEC 62471
Hazardous substance compliance	WEEE 2012/19/EU RoHs 2011/65/EU REACH Regulation EC 1907/2006 CA 65
EMC compliance	EN 61000-6-2:2005 (Immunity) EN 61000-6-3:2011 (Emission) FCC Title 47 part 15, sub-part B EN 301489-1/17
RF compliance	EN 300328 EN 62479 (MPE) IC and FCC Part 15 C (15.247)

17 CUSTOMER SUPPORT

The FLIR support site, address below, is your resource for obtaining firmware upgrade files, latest versions of user manuals, customer service, and other product and accessory information.

Have the probe(s) and main unit serial numbers handy when contacting our support staff. Serial numbers are printed on white labels attached to each probe. The VS80 serial number is found on the back of the product and in the Settings menu.

<https://support.flir.com>

18 Warranty

18.1 Three-Year Limited Warranty

This product is protected by FLIR's 3-Year Limited Warranty. Visit www.flir.com/testwarranty to read the 3-Year Limited Warranty document.



Website

<http://www.flir.com>

Customer support

<http://support.flir.com>

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