



USER MANUAL

Automotive Diagnostic Thermal Camera

Model TG275

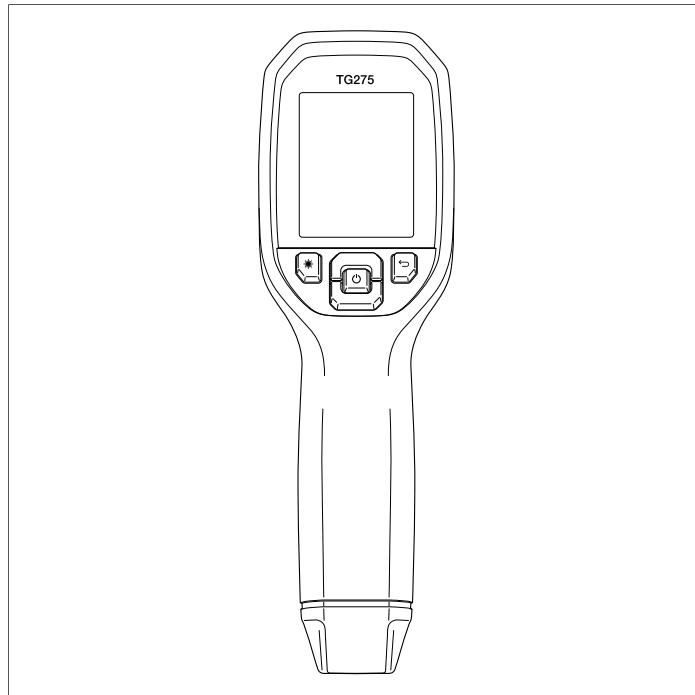


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1 Advisories

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 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: [www.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 Systems representative for more details.

2 Introduction








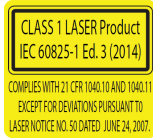
The FLIR TG275 Automotive Diagnostic Thermal Camera combines non-contact temperature measurement and thermal imaging into one troubleshooting tool to help you quickly find the source of heat-related problems and to spot potential faults when performing automotive maintenance and repair. Register the TG275 within 60 days to activate the 2–10 Year Warranty Extension at this link:

Features

- 160 x 120 pixel true thermal imager (Lepton® microbolometer with integrated shutter)
- Visible spectrum digital camera with high resolution (2M pixel) mode
- Adjustable MSX® (Multi-Spectral Dynamic Imaging) adds key details from the visible spectrum to the IR image for improved diagnostics
- Easy-to-read 320 x 240 2.4" TFT color LCD display
- Wide temperature range -13 ~ 1022°F (-25 ~ 550°C)
- High temperature switch for measurements > 752°F (400°C)
- Intuitive programming menu system in over 21 languages
- 3 presets and 1 custom emissivity setting
- LED Flashlight
- Laser pointer and cross-hair display for easy targeting
- 4 GB internal image capture memory
- USB-C connectivity for image transfer and charging
- Bluetooth® remote temperature monitoring and image transmission to mobile devices
- IP54 enclosure protects from dirt, dust, and oil
- Rechargeable battery with adjustable auto power off (APO) timer
- Accessory mounting for tripods and other accessories

3 Safety

3.1 Safety Warnings and Cautions

 WARNING
⚠ This symbol, adjacent to another symbol indicates the user must refer to the manual for further information.
 WARNING
The instrument's IP54 rating is only in affect when the top flap (covering the USB-C jack) is completely sealed. Do not operate the instrument with the flap open, except for charging and PC interface.
 CAUTION
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
 CAUTION
Use extreme caution when the Laser pointer is on.
 CAUTION
Do not point the Laser beam toward anyone's eye or allow the beam to strike the eye from a reflective surface.
 CAUTION
Do not use the Laser near explosive gases or in other potentially explosive areas.
 CAUTION
Refer to the CAUTION statement label (shown below) for critical safety information.


4 Description

4.1 Product Description

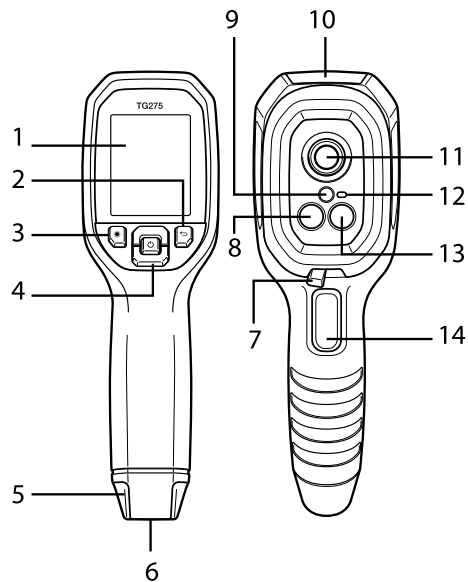







Figure 4.1 Imaging IR Thermometer Description

1. Display area
2. Return button (to back up in the menu system)
3. Laser pointer button
4. Up/Down Navigation buttons & Power (long press)/Menu (short press) button
5. Lanyard post
6. Accessory mount
7. High temperature lever switch
8. 160 x 120 pixel Lepton® IR camera
9. Laser pointer with circular target-spot assist
10. USB-C jack compartment
11. Spot thermal sensor
12. Flashlight (LED)
13. 2M pixel visible spectrum camera
14. Image capture trigger (also used to exit the menu system)

4 Description

4.2 Control Button Descriptions

	Long press to power ON or OFF Short press to access the menu system
	Return button. Back out to previous screen in menus
	Press to scroll upward in the menus
	Press to scroll downward in the menus
	Press to activate the Laser pointer
TRIGGER	Pull trigger to capture camera image Pull trigger to exit the menu system

4.3 Display Description

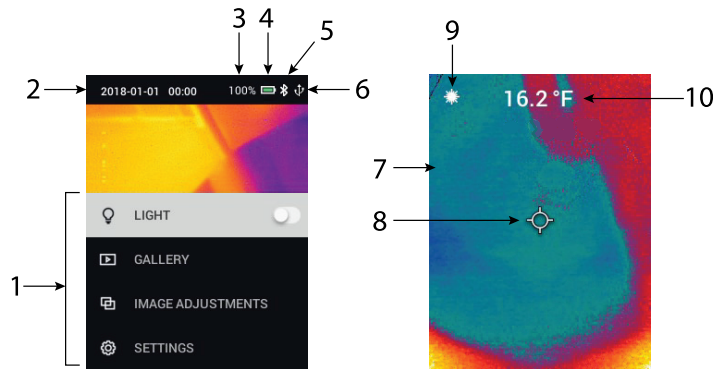


Figure 4.2 TG275 Displays

1. Menu area
2. Date and time
3. Batter status percentage
4. Battery status indicator
5. Bluetooth® active

4 Description

6. USB connection active
7. Camera image area
8. Center spot cross-hairs
9. Laser Pointer active
10. Center spot temperature measurement

5 Operation

5.1 Powering the TG275

The TG275 is powered by a rechargeable lithium battery. Long press the power button (center) to switch the TG275 ON or OFF. If the TG275 does not power ON, charge the battery by connecting to a 5V/1A rated AC wall charger (not supplied) using the supplied USB-C cable. The USB-C jack is located in the compartment at the top of the TG275. Do not use the TG275 while it is charging. When the top flap is closed, the TG275 is rated IP54 for encapsulation. See Section 9.2, *Battery Considerations and Service* for more information.

The TG275 has an Auto Power OFF (APO) utility that switches it OFF automatically if no buttons are pressed for the duration of the selected APO time. Use the menu system (under *Device Settings*) To set the APO timer. See Section 6, *Programming Menu System*, for more information.

5.2 IR Camera and Thermometer



Figure 5.1 Combined Thermal and Visible Image (MSX®)

1. Long press the power button to switch the TG275 ON.
2. If not already selected, choose the Thermal plus Visible Image mode in the menu system (under *Image Adjustments/Image Mode*). You can adjust the MSX® (Multi-Spectral Dynamic Imaging) alignment in the *Image Mode* menu (press MENU at the MSX® image option and use the arrows to make the adjustments; press MENU to confirm). Note that you can also adjust the alignment directly in the normal operating mode using the arrow buttons while viewing a Thermal Plus Visible image.

5 Operation

3. Point the camera toward the test area and scan as desired. View the camera image on the TG275 display.
4. Use the Laser pointer to accurately target a spot. Press the Laser pointer button to switch ON the Laser pointer. The TG275 Laser pointer includes a circular spot indicating the area that is being monitored for temperature, utilizing DOE (Diffractive Optical Elements) technology. See the Laser pointer image example below in **Figure 5.2**. If the Laser beam does not appear when the button is pressed, check the menu system (under *Device Settings*) to ensure that the Laser is enabled.
5. Use the cross-hair icon for reference only when targeting measurement spots, as parallax errors affect targeting accuracy. If the cross-hairs are not shown, check the menu system (under *Measurement*) to ensure that the Center Spot (cross-hairs) function is enabled.
6. The temperature reading on the display represents the measurement of the targeted spot. See **Figure 5.1**.
7. The distance-to-spot ratio is 30:1 and the minimum target distance is 10.2 in. (26 cm).
8. To measure higher than 752°F (400°C) use the High Temperature Switch, see Section 5.3 below.
9. If a measurement is out of range, the display will show 'OL'.
10. To adjust the Emissivity, use the menu system (under *Measurement*).
11. To change the display color palette, use the menu system (under *Image Adjustments/colors*).

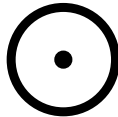


Figure 5.2 Laser pointer with circular border indicating temperature measurement spot

NOTE

The camera's reflected temperature setting is fixed at 77°F (25°C) and may differ from the actual reflected temperature of any given application.

5.3 High Temperature Switch

1. To access the high temperature mode, slide the lever to the right (to expose the red color code).
2. The lever is located directly below the lens area and above the image capture trigger.
3. When engaged, the high end of the temperature range (>752°F [400°C]) is accessible.

5.4 Visible Spectrum Camera



Figure 5.3 Visible Spectrum Digital Camera Image

1. Long press the power button to switch the TG275 ON.
2. Select a Visible Image mode in the menu system (under *Image Adjustments/Image Mode*). Note that the high resolution Visible Image mode does not support object temperature measurements. Use the standard Visible Image mode if measuring object surface temperature is required.
3. Point the camera toward the test area and scan as desired.
4. View the image on the display, see **Figure 5.3**.

5.5 Capture, View, Transfer, Send, and Delete Camera Images

1. To capture a camera image to the TG275 internal memory, pull and release the trigger. Note that an image cannot be saved if a USB cable is connected to the TG275.
2. After a successful image capture, a display confirmation will briefly appear showing the image filename.
3. To view images on the TG275 display, access the *Gallery* mode in the main menu. In the Gallery, scroll through the stored images with the arrows and open an image with the MENU button.
4. To delete images, select the DELETE or DELETE ALL FILES command to erase the selected image or all of the stored images.
5. To transfer images to a PC, connect the TG275 to a PC using the supplied USB-C cable. The USB jack is located at the top of the TG275 under the flap. Once connected to the PC you can use the TG275 as you would any external storage drive. Note: *Device is not 100% compatible with Mac OS, please do not format TG275 internal memory via Mac OS.*
6. To transmit images via Bluetooth®, see Section 7, *Bluetooth® Communication and FLIR Tools™*.

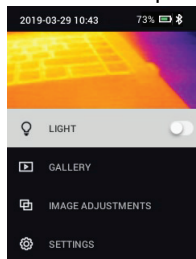
6 Programming Menu System

6.1 Menu System Basics

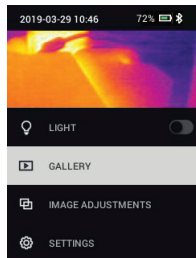
Short press the MENU button to access the menu system. Use the MENU button to switch settings ON or OFF, use the Return button to move to the previous screen, and use the arrows to scroll. In addition, the MENU button is used in some cases to confirm settings. Use the trigger to exit the menu system.

6.2 Main Menu

- **LIGHT:** Short press MENU to switch the Flashlight ON or OFF.



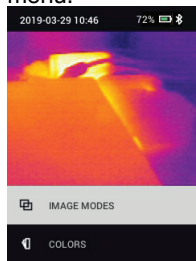
- **GALLERY:** Press MENU to access the stored images. Use the arrow buttons to scroll through the stored images and use the MENU button to open an image. Press MENU at an opened image to see the SEND/CANCEL/DELETE/DELETE ALL FILES menu. Select SEND to transmit the selected image to a paired mobile device (see Section 7, *Bluetooth® Communication and FLIR Tools™*, for more information).



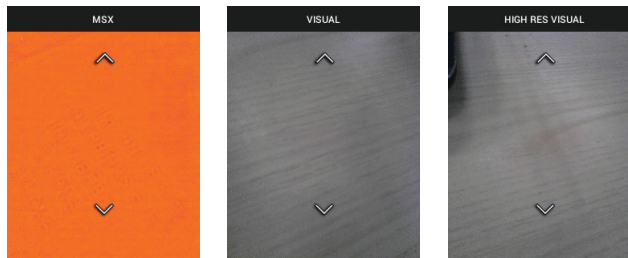
6 Programming Menu System

- **IMAGE ADJUSTMENTS:** Press MENU to access IMAGE MODES (including MSX® alignment) and colors, see below:

1. Image Modes: Press MENU at IMAGE MODES to open the Image Mode menu.

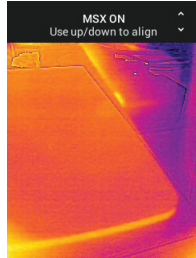


Use the arrow buttons to select an image mode: THERMAL PLUS VISIBLE (MSX®), VISIBLE (QVGA 320 x 120 pixels), or HIGH RESOLUTION VISIBLE (2M; 1600 x 1200 pixels). Note that the High Resolution Visible Image mode does not support object temperature measurements (and the centre spot can not be switched ON/OFF in this mode).



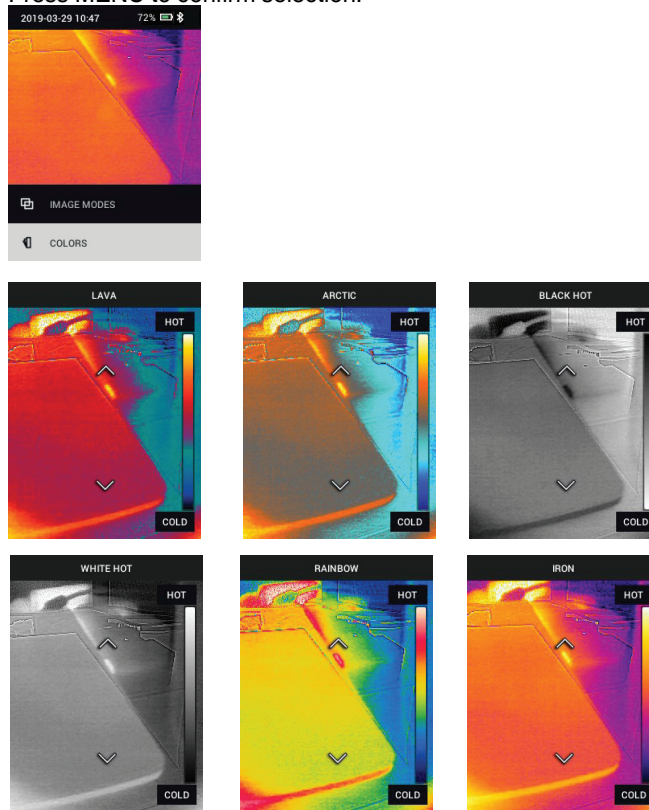
6 Programming Menu System

2. MSX® Alignment: Adjust the alignment (so that the thermal image and the visible image line up accurately) as follows: While viewing the THERMAL PLUS VISIBLE IMAGE screen in the menu, press MENU to access the MSX® adjustment screen and then use the arrow buttons to adjust the alignment. Press MENU to confirm. Note that you can also adjust the alignment directly in the normal operating mode using the arrow buttons while viewing a Thermal Plus Visible image.



6 Programming Menu System

3. Colors: Press MENU at the colors menu and use the arrow buttons to select a color palette: Iron, Rainbow, White hot, Black hot, Arctic, or Lava. Press MENU to confirm selection.



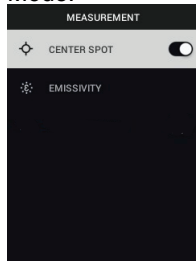
- **SETTINGS:** Press MENU to access the Settings sub-menu (see below):

6 Programming Menu System

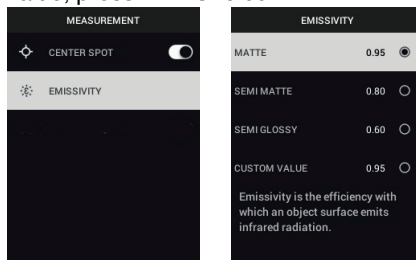
6.3 SETTINGS Sub-Menu

• MEASUREMENT

1. Centre Spot: Press MENU to enable/disable the display cross-hairs. The cross-hairs should be used as a reference only to identify the spot that is being measured for temperature. Use the Laser pointer for more accurate targeting. Note that the high resolution Visible Spectrum Image Mode does not support object temperature measurements and so the centre spot cannot be switched OFF or ON while in the high resolution Image Mode.



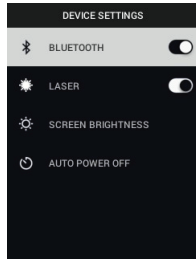
2. Emissivity: Press MENU to open the Emissivity adjustment utility. Use the arrows to scroll through the presets (0.95, 0.80, and 0.60) and use the MENU button to select a preset. Choose the Custom Value utility (last selection on the list) to select a specific emissivity value. At the Custom Value setting, press MENU and then use the arrows to select the emissivity value; press MENU to confirm.



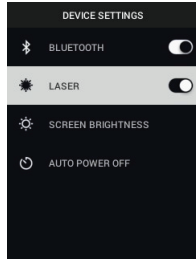
6 Programming Menu System

• DEVICE SETTINGS

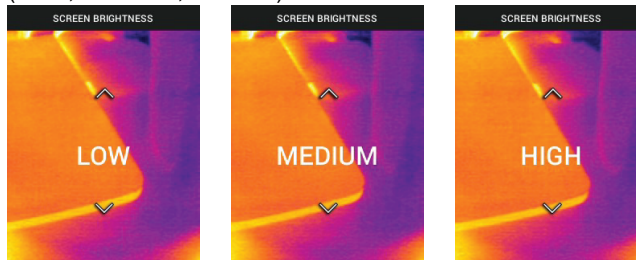
1. Bluetooth®: Press MENU to switch Bluetooth® ON or OFF. See Section 7, *Bluetooth® Communication and FLIR Tools™*, for details.



2. Laser: Press MENU to enable/disable the Laser pointer. When enabled, you can use the Laser pointer button to switch ON the Laser pointer. Use the Laser pointer for accurate targeting of measurement spots.

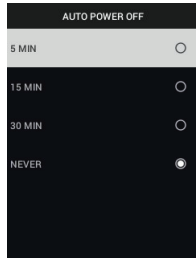


3. Screen brightness: Use the arrows to select the desired display intensity (LOW, MEDIUM, or HIGH).



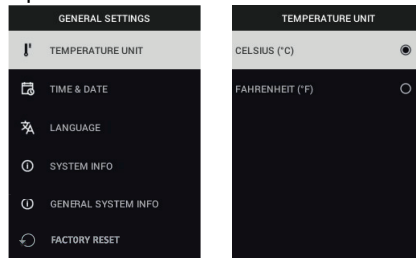
6 Programming Menu System

4. Auto Power OFF (APO): Use the arrows to scroll and MENU to select the desired APO time (5/15/30 minutes). Set to 'Never' to disable APO.

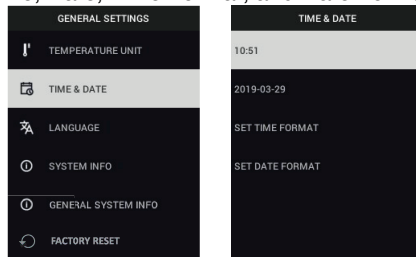


- **GENERAL SETTINGS**

1. Temperature Unit: Use the arrows and the MENU button to select °C or °F.

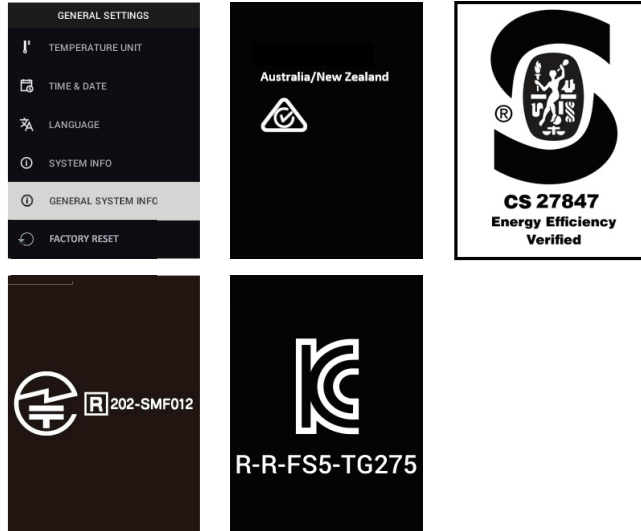


2. Time & Date: Use the arrows to scroll and the MENU button to set the Time, Date, Time Format, and Date Format.

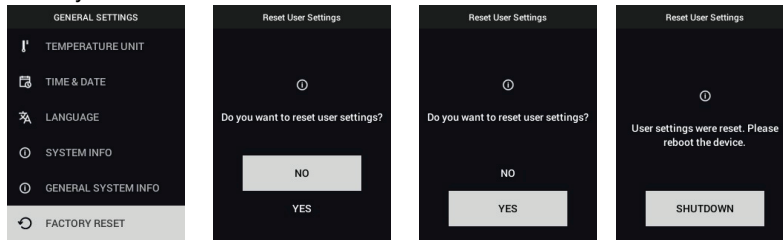


6 Programming Menu System

- **GENERAL SYSTEM INFO:** Press MENU to view compliance information.

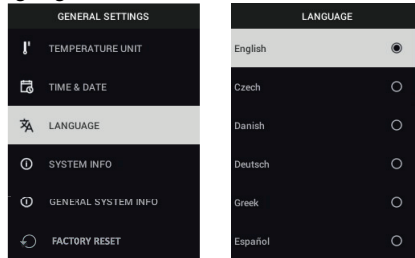


- **FACTORY RESET:** Follow the prompts to reset the User Settings back to Factory Default status.

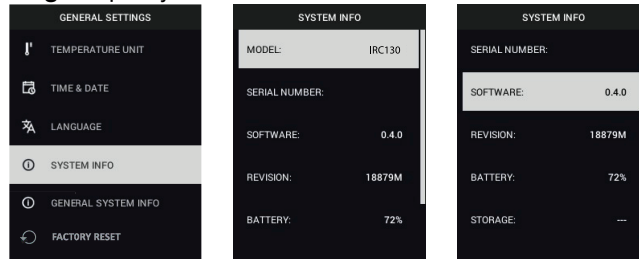


6 Programming Menu System

3. Language: Use the arrows to scroll and the MENU button to select a language.



4. System Info: Scroll to desired topic: **Model Number**, **Serial Number**, **Software Level**, **Revision**, **Battery** status (%), and remaining Internal **Storage Capacity**.



7 Bluetooth® Communication and FLIR Tools™

7.1 Bluetooth® Communication Overview

The TG275, when paired with a mobile device running the FLIR Tools™ App (using the METERLiNK® protocol), continually transmits readings for live display on the mobile device. You can also send images, stored on the TG275, to your mobile device.

7.2 Download the FLIR Tools™ Mobile App

Download the m Apple App store,
or from this link:

7.3 Setting up the FLIR Tools™ Mobile App

1. Switch the TG275 Bluetooth® function ON (*Settings/Device Settings*). See Figure 7.1, below, for illustrations supporting this section.
2. Turn on the mobile device and start the FLIR Tools™ Mobile App.
3. Select INSTRUMENTS from the drop-down menu in the App and search for the TG275 (the TG275 must be ON).
4. Tap in the App to pair with the TG275.

7.4 Transmit Images via Bluetooth®

1. Open the TG275 Image Gallery from the main menu and scroll to an image using the arrow keys. See Figures 7.2 and 7.3, below, for illustrations supporting this section.
2. Press MENU to open a selected image.
3. Press MENU again to call up the SEND/CANCEL/DELETE/DELETE ALL FILES menu.
4. Select the SEND command to transmit the selected image to the paired mobile device.

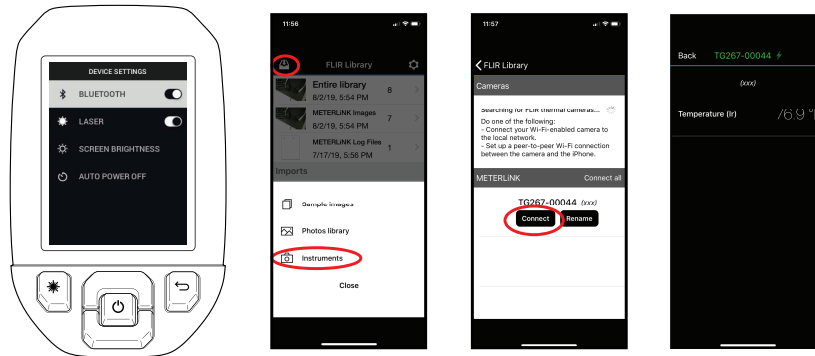


Figure 7.1 Pairing the TG275 with a Mobile Device

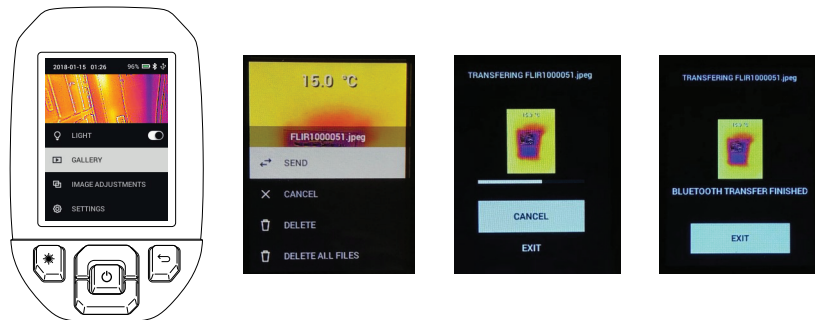


Figure 7.2 Sending Images to a Mobile Device

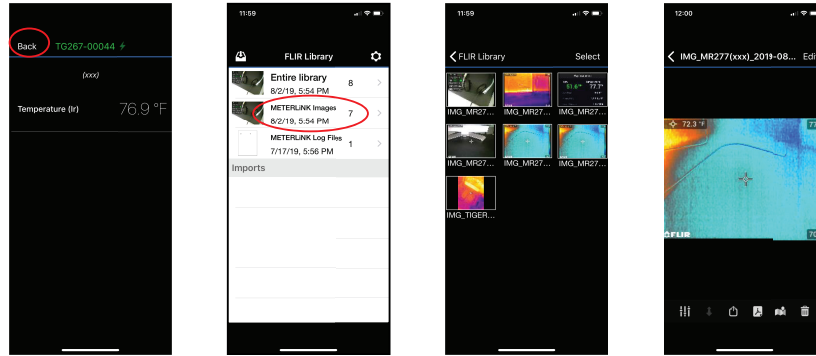


Figure 7.3 Viewing Transferred Images on a Mobile Device

7.5 FCC Compliance

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

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

7 **Bluetooth® Communication and FLIR Tools™**

4. Consult the dealer or an experienced radio/TV technician for help.



WARNING

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

8 Field Firmware Updates

The TG275 includes a USB-C port in the top compartment. The USB port allows the user to update the system firmware by first downloading an update file from the FLIR website and then connecting the TG275 to a PC (using the supplied USB-_____ file to the TG275. Firmware updates are available from

NOTE

The TG275 is not 100% compatible with USB-C to USB-C cables. Use only USB-C to USB-A cables. The supplied cable is USB-C to USB-A.

To update the firmware, you will need:

- Access to the website where the update file is located:
- _____ ated
- The update file. Refer to the steps in the next section:

8.1 System Firmware Update

1. Visit _____ to obtain a firmware update file.
2. Select _____ and then select 'Instrument Firmware' (Test and Measurement) from the drop-down menu.
3. Select TG275 from the second drop-down menu.
4. Select and download the firmware update file to the PC.
5. With the TG275 **ON** connect it to the PC via a USB-C cable (the USB-C port is located in the TG275 top compartment).
6. Copy the firmware update file to the TG275 root directory.
7. Eject the TG275 drive from the PC.
8. Disconnect the USB cable from the PC USB port and from the TG275 USB port.
9. Follow the TG275 display prompts to complete the update.

9 Maintenance

9.1 Cleaning

Wipe the housing with a damp cloth as needed. Do not use abrasives or solvents. Clean the lenses with a high-quality lens cleaner.

9.2 Battery Considerations and Service

The rechargeable lithium battery support for service instructions: e. Please contact FLIR

For best results, charge the battery immediately after seeing a low battery indication using the supplied USB-C cable (with an AC wall charger, not supplied). The wall charger must be rated for at least 5V/1A. If the battery is allowed to fully drain, allow 2~3 hours before the charging display appears after connecting to an AC charger; a full charge (100%) requires 6 hours, a charge to 90% power requires 4 hours. Charging through a PC USB port is not recommended.

If the TG275 is not going to be used for an extended period (> 3 months), it should be charged to at least 70%, stored at room temperature, and recharged every 6 months. Failure to do so may result in a battery that cannot be recharged and that therefore will require service.

9.3 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 Systems representative for additional information.

9.4 Reset the TG275

If the TG275 display freezes or if the TG275 in any way stops operating normally, press and hold the up and down buttons for at least 10 seconds. Release the buttons when the TG275 switches OFF. After the device switches OFF, switch it back ON again to resume use. No data will be lost by resetting the TG275. If problems persist, contact FLIR for support.

10 Specifications

10.1 Imaging and Optical Specifications

IR resolution	160 x 120 pixels
Digital image enhancement	Included
Thermal Sensitivity /NETD	< 70 mK
Field of View (FOV)	57° x 44°
Minimum focus distance	0.89 ft. (0.3 m)
Distance-to-Spot ratio	30:1
Dual range operation	Range 1: < 752°F (400°C) Range 2: > 752°F (400°C) For Range 2, the high temperature lever must be engaged
Focus	Fixed
Image frequency	8.7 Hz

10.2 Detector Specifications

Focal plane array /Spectral response range	Uncooled microbolometer /7.5 ~ 14 μm
Detector pitch	12 μm

10.3 Image Presentation Specifications

Display resolution	320 x 240 pixels
Screen size	2.4 in. (portrait)
Viewing angle	80°
Color depth	24 bit
Aspect ratio	4:3
Display type	TFT technology
Image adjustment	Automatic
Image modes	<ul style="list-style-type: none"> Thermal MSX® (Multi-Spectral Dynamic Imaging) Visible Spectrum (standard and high resolution modes)

10.4 Measurement Specifications

Object temperature range	-13 ~ 1022°F (-25 ~ 550°C)
Accuracy at ambient temperature: 59 ~ 95°F (15 ~ 35°C)	-13°F ~ 32°F (-25°C to 0°C): ± 7.0°F (± 3.0°C)
	32°F ~ 122°F (0°C ~ 50°C): ± 5°F (±2.5°C)
	122°F ~ 212°F (50°C ~ 100°C): ± 3°F (± 1.5°C)
	213°F ~ 932°F (100°C ~ 500°C): ± 2.5%
	932°F ~ 1022°F (500°C ~ 550°C): ± 3.0%
IR Temperature resolution	0.2°F (0.1°C)
Reading repeatability	± 1 % of reading
Response time	150 ms
IR thermometer measurement	Continuous scanning
Minimum measurement distance	0.85 ft. (0.26 m)

10.5 Measurement Analysis Specifications

Spot meter	Center spot (cross-hairs); Programmable ON/OFF
Color display palettes	Iron, Rainbow, White-hot, Black-hot, Arctic, and Lava

10.6 Configuration Specifications

Set-up commands	Local adaptation of units, language, date and time formats
Emissivity adjustment	3 presets plus a custom adjustment utility (0.1 ~ 0.99)
Languages	Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, simplified Chinese, Spanish, Swedish, traditional Chinese, Turkish
Firmware updates	User manageable (instructions included in this user manual)

10 Specifications

10.7 Image Storage Specifications

Storage media	eMMC 4G
Image storage capacity	50k images
Image file format	JPEG with spot temperature metadata tag

10.8 Digital Camera

Resolution	Standard Visible Camera mode: QVGA 320 x 240 pixels High Resolution Visible Camera mode: 2M (1600 x 1200) pixels
Focus	Fixed
Field of View (FOV)	71° x 56° (adapts to IR lens)

10.9 Flashlight Specifications

Flashlight type	Bright LED
LED CCT	6500° K
LED CRI	70
Beam angle	± 20°
Rated power	0.5 W
Light output	100 Lumens

10.10 Laser Pointer Specifications

Laser type	DOE (Diffractive Optical Elements)
Laser function	Indicates the size of the measurement area (circular target)
Laser class	Class I

10.11 Data Communication and Interface Specifications

Interfaces	USB 2.0 and Bluetooth®
USB	USB-C for data transfer and battery charging Not 100% compatible with USB-C to USB-C cables. Use only USB-C to USB-A cables.

10 Specifications

USB standard	USB 2.0 High Speed
Bluetooth®	BLE (Bluetooth® Low Energy)

10.12 Rechargeable Battery Specifications

Battery type	Rechargeable Lithium ion
Battery voltage	3.6 V
Battery operating time	5 hours scanning (medium brightness setting) 4.5 hours with Laser ON (medium brightness setting)
Battery charge life	30 days minimum
Charging system	Battery is charged inside the TG275
Charging time	4 hours to 90% and 6 hours to 100%
Power management	APO adjustable 5/15/30 minutes. Can be disabled.

10.13 Environmental Specifications

Altitude	6562 ft. (2000 m)
Pollution degree	2
Operating temperature	14 ~ 113°F (-10 ~ 45°C)
Storage temperature	-22 ~ 131°F (-30 ~ 55°C)
Humidity (operating and storage)	0 ~ 90% Relative Humidity (RH) 32 ~ 98.6°F (0 ~ 37°C) 0 ~ 65% RH 98.6 ~ 113°F (37 ~ 45°C) 0 ~ 45% RH 113 ~ 131°F (45 ~ 55°C)
EMC	EN 61000-6-3 EN 61000-6-2 FCC 47 CFR Part 15 Class B
Magnetic fields	EN 61000-4-8 Class 3

10 Specifications

Radio spectrum	ETSI EN 300 328 FCC Part 15.249 RSS-247 Issue 2 EN 301 489-1:2011 EN 301 489-17:2009
Encapsulation	IP54 (IEC 60529)
Shock	25 g (IEC 60068-2-27)
Vibration	2 g (IEC 60068-2-6)
Drop	Designed for 6.56 ft. (2 m)
Safety	CE/CB/EN61010/UL
Environmental safety	REACH Regulation EC 1907/2006 RoHS 2 Directive 2011/65/EC WEEE Directive 2012/19/EC JIS C 6802:2011 laser directive IEC 60825-1 class I laser directive FDA laser directive
Humidity requirements	IEC 60068-2-30 for operation and storage

10.14 Physical Specifications

Weight	13.9 oz. (0.39 kg)
Size (L x W x H)	8.3 x 2.5 x 3.2 in. (210 x 64 x 81 mm)
Accessory mount	UNC ¼"-20

10.15 Included Equipment

Standard equipment	TG275, USB-C cable, printed Quick Start, Lanyard, Carry Pouch
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11 2–10 Extended Warranty

To activate the extended 2–10 warranty, please register your product within 60 days of purchase. Otherwise, the standard one-year warranty will be in affect from date of purchase. The 2–10 warranty covers parts and labour for the camera for 2 years and coverage of the detector for 10 years. Register your product at