



TiS60+

Thermal Imager

Users Manual



November 2019
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Introduction

The Fluke TIS60+ Thermal Imager (the Product or Imager) is a handheld, infrared imaging cameras for use in multiple applications. These applications include equipment troubleshooting, preventive and predictive maintenance, building diagnostics, and research and development.

Productivity Features

- IR-PhotoNotes™
- Fluke Connect™ / WiFi connectivity
- Streaming video

Image Presentation

- Standard Palettes and Ultra Contrast™ Palettes (availability varies by model)

IR-Fusion™ Technology

Automatically aligned (parallax corrected) visual and infrared

- Picture-In-Picture (PIP) infrared
- Full screen infrared
- AutoBlend™ mode
- Full screen visible
- Color alarms (temperature alarms) for user-selectable high temperature and low temperature (availability varies by model)

How to Contact Fluke

To contact Fluke, call one of the following telephone numbers:

- Technical Support USA: 1-800-44-FLUKE (1-800-443-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-3-6714-3114
- Singapore: +65-6799-5566
- China: +86-400-921-0835
- Brazil: +55-11-3530-8901

Anywhere in the world: +1-425-446-5500

Or, visit Fluke's website at www.fluke.com.

To register your product, visit <http://register.fluke.com>.

To view, print, or download the latest manual supplement, visit <http://us.fluke.com/user/support/manuals>.

To download the Fluke Connect™ app, go to iTunes or Google play and download Fluke Connect.

Safety Information

General Safety Information is in the printed Safety Information document that ships with the Product and at www.fluke.com. More specific safety information is listed where applicable.

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Specifications

Complete specifications are at www.fluke.com. See the TiS60+ Product Specifications.

Operation in Extreme Conditions

Storage and/or continual operation of the Imager in extreme ambient temperature conditions can result in temporary interruption of operation. If this occurs, let the Imager stabilize (cool down or warm up) before you resume operation.

⚠ Caution

To prevent permanent damage to the Imager, never point the Imager at the sun, a laser, or other extreme radiation source. Close the dust cover when not in use.

Radio Frequency Data

The Imager ships with the radio disabled. See *Wireless Connectivity* for instructions on how to enable the radio. See *Imager Information* for instructions on how to access digital copies of the radio licenses on the Imager.

For more information, go to www.fluke.com and search for Radio Frequency Data for Class A.

SIMPLIFIED EU DECLARATION OF CONFORMITY

Hereby, Fluke declares that the radio equipment contained in this Product is in compliance with Directive 2014/53/EU. The full text of the EU declaration is available at the following internet address: www.fluke.com/RED

Accessories

Table 1 is a list of the accessories available for the Imager.

Table 1. Accessories

Model	Description	Part Number
FLK-TI-SBP3	Smart Battery Pack	3440365
FLK-TI-SBC3B	Charging Base/Power Supply with Adapters	4354922
TI-CAR-CHARGER	12 V Vehicle Charger Adapter	3039779
FLK-TI-TRIPOD	Tripod Mounting Accessory	4335389
FLK-Bluetooth	Bluetooth Headset	4603258
BOOK-ITP	Introduction to Thermography Principles	3413459

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Before You Start

Carefully unpack the items in the shipment box:

- Two-Bay Battery Charge Base
- Lithium-ion Smart Battery (x2)
- Hard Carrying Case
- Soft Case
- Micro SD Card and Adapter
- AC Power Supply with Mains Adapters
- Mini USB-to-USB Cable
- Quick Reference Guide
- Safety Information

Fluke recommends the removable memory card that is supplied with the Imager or available from Fluke. Fluke does not warrant the use or reliability of aftermarket memory cards of different brands or capacities.

Battery

A Li-ion battery powers the Imager. The Imager includes two batteries for a quick-change during operation.

The battery charges on the 2-bay charging base. The power supply powers the charging base. Country-specific adapters are included.

Before you use the Imager for the first time, charge the battery for a minimum of 2.5 hours. The battery status shows on the five-segment charge indicator.

Caution

To prevent damage to the battery:

- Do not expose battery to heat sources or high-temperature environments such as an unattended vehicle in the sun.
- Do not store the battery on the charger for more than 24 hours as reduced battery life may result.
- Charge the battery for a two-hour minimum at six-month intervals for maximum battery life. Without use, the battery will self-discharge in approximately six months.
- Always operate in the specified temperature range.
- Do not incinerate the Product and/or battery.
- Remove the Imager from the 12 V vehicle charger before you start or jump start the vehicle.

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The battery is tested in accordance with and complies to:

- UN Manual of Tests and Criteria Part III Subsection 38.3 (ST/SG/AC.10/11/Rev.5) – also known as the UN T19.T8 tests
- EN55022 and EN55024
- FCC part 15B
- IEC62133
- ROHS

Note

New batteries are not fully charged. Two to ten charge/discharge cycles are necessary before the battery charges to its maximum capacity.

To charge the battery, use one of the options that follow:

Two-Bay Battery Charger Base

1. Connect the ac power supply to the ac wall outlet and connect the dc output to the charger base.
2. Put one or two smart batteries into bays of charger base.
3. Charge batteries until charge indicators show “full.”
4. Remove smart batteries and disconnect the power supply when batteries are fully charged.

On-Imager AC Power Socket

1. Connect the ac power adapter into an ac wall outlet and connect the dc output to the Imager external power socket.
2. Disconnect ac power adapter when the smart battery is fully charged.

Note

Make sure that the Imager is near room temperature before you connect it to the charger. See the charging temperature specification. Do not charge in hot or cold areas. When you charge the battery in extreme temperatures, battery capacity may be decreased.

 shows in the lower left-hand corner of the display when the Imager is connected to external power.

Note

When the battery is connected to ac power or the unit is in video mode, the Sleep Mode/Auto Off feature is disabled automatically.

Optional 12 V Vehicle Charger

1. Connect the 12 V adapter into the 12 V accessory socket of the vehicle.
2. Connect the output to the external power socket of the Imager.
3. Disconnect the 12 V adapter and Imager when battery is fully charged.

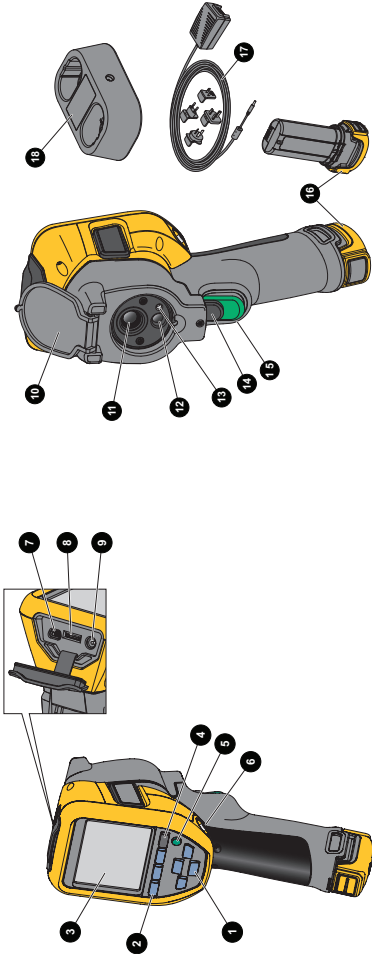
Thermal Imager
Before You Start

Features and Controls

Table 2 is a list of the Imager features and controls.

Table 2. Feature/Control Descriptions

Item		Description	Item	Description
1	Arrow Buttons		10	Retractable Lens Cover
2	Function Buttons (F1, F2, F3)		11	Infrared Camera Lens
3	Display		12	Visual Light Camera Lens
4	Memory View Button		13	Laser Pointer
5	Power On/Off Calibration-On-Demand		14	Secondary Trigger
6	Hand Strap Anchor		15	Primary Trigger
7	USB Cable Connection		16	Lithium-ion Smart Battery
8	Removable Micro SD Memory Card Slot		17	AC Power Supply with Mains Adapters
9	AC Adapter/External Power Socket		18	2-Bay Battery Charge Base



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Power On and Off

To turn on or turn off the Imager, push and hold  for >3 seconds. The Imager has Power Save and Auto Off features. For more information about how to set these features, see *Settings Menu*.

Note

All thermal imagers need sufficient warm-up time for the most accurate temperature measurements and best image quality. This time can often vary by model and by environmental conditions. Although most imagers are fully warmed up in 3-5 minutes, it is always best to wait a minimum of 10 minutes if the most accurate temperature measurement is important to your application. When you move the Imager between environments with large differences in ambient temperature, more adjustment time can be required.

The Imager includes a calibration on-demand feature that causes a calibration event to occur when you press  once briefly during operation. This feature provides the best accuracy and avoids disruption of a timing-sensitive image capture by the next automatic calibration.

Controls for Image Capture

The two-part trigger is located in the standard trigger position for a pistol-grip device. The larger, green trigger is the primary trigger. The smaller, black trigger is the secondary trigger.

In normal operation (video is off), the function of the primary trigger is to capture a thermal image for possible storage to memory by the user. When video is on, the primary trigger is the start/stop for video recording.

The secondary trigger operates the laser on supported models.

Laser Pointer



Warning

To prevent eye damage and personal injury, do not look into the laser. Do not point the laser directly at persons or animals or indirectly off reflective surfaces.

The laser warning symbol () shows in the Header zone of the display when the laser is turned on and you pull the secondary trigger.

The Imager includes a laser pointer. The laser pointer is a sighting aid and is offset from the infrared camera. As a result, it may not always represent the exact center of the infrared or visible image.

The laser dot does not appear on an infrared-only image, but does on visible-only or AutoBlend images. The laser dot cannot be seen in the visible channel of the IR-Fusion image if obscured by the center point marker graphic.

Pull the secondary trigger to turn on laser pointer, release the secondary trigger to turn off the laser pointer.

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Before You Start

Control Buttons

The function and cursor buttons are the primary controls. These buttons move the cursor through the menu structure to set the features.

Controls and Adjustments

- User-selectable temperature scale
- Language/localization selection
- Time and date settings
- Emissivity selection
- Reflected background temperature compensation
- Transmission correction
- User-selectable hot spot and cold spot, and center point on the image
- Expand/contract measurement box with MIN-AVG-MAX
- Color alarms
- User-selectable backlight setting
- Graphic information display (selectable)

In general, push:

F1 to set the change and go back to the live view.

F2 to set the change and go back to the previous menu.

F3 to cancel the change and go back to the live view.

Left Arrow **Right Arrow** to move the cursor and highlight an option.

In live Manual Mode, the arrow buttons are always active to adjust Level and Span.

Memory

Push **Memory** to go directly to the preview images of stored files. See [Memory Menu](#) for more information.

How to Use the Menus

The menus, coupled with the function buttons and arrow buttons, are the access point for:

- Thermal image display
- Camera features
- Measurement
- Advanced functions
- Memory review
- Settings for date, time, language, units, file format
- Information about the Imager

To open the primary menu, push **F2**. The primary menu shows. A secondary menu shows for each option. The text labels on the bottom edge of the screen correspond to the **F1**, **F2**, **F3** buttons. You can use the buttons for these functions:

- Push **F2** to open the primary menu.
- Push **Left Arrow** **Right Arrow** to cycle through the secondary menus. Each secondary menu lists an options menu.
- Push **Left Arrow** **Right Arrow** to cycle through the options.

The primary and secondary menus close 10 seconds after the last push of a function button. The option selection menu stays open until you make the selection, go up a menu level, or cancel the action.

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Image Capture

Point the Imager at the target object. Pull and release the primary trigger. This will capture and freeze the image. To cancel the captured image, pull the primary trigger again or **F3** to return to the Live view.

Depending on the selected file format settings, the Imager shows the captured image and a menu bar. The menu bar lets you save the image, edit some image settings, and add voice annotation or IR-PhotoNotes™ digital photos. To change the file format, see *File Format*.

IR-PhotoNotes™

Use the IR-PhotoNotes™ photo annotation system to capture and add up to three visible (digital) images of various objects.

You can include text or other information that is related to the analysis and reporting of the infrared image. Examples of possible annotations include motor name plates, printed information or warning signs, larger views of the environment or room, and related equipment or objects. Up to three images can be captured with the visible image that is stored in addition to the aligned infrared and visible images used in IR-Fusion™ technology. These visible images are only available in the .is2 file format and are stored in the file so you do not need to collate multiple files at a later time.

To add photos using the IR-PhotoNotes annotation system:

1. With an infrared image in the buffer, push **F2** to open the **EDIT IMAGE** menu.
2. Push **◀** / **▶** to highlight **IR-PhotoNotes**.
3. Push **F1** to enter the Picture mode.
4. Focus the Imager on the object and push the Image Capture button.
5. Push **F2** when done.
6. Push the Image Capture button to capture additional pictures.
7. Push **F1** save the pictures with the image.



Voice Annotation (Recording)

A Bluetooth headset (sold separately) is required and the radio must be enabled for voice (audio) recording. This feature may not be available in all regions.

To record:

1. With an infrared image in the buffer, push **F2** to open the **EDIT IMAGE** menu.
2. Push **◀** / **▶** to highlight **Add Audio**.
3. Push **F1** to record up to 60 seconds of audio. The display updates to show the recorded time.
4. Push **F1** to pause the recorder.
5. Push **F2** when done.
6. Push **F1** to review the audio file or **F2** to save the audio with the image.

Voice annotation is only available in the .is2 file format and is stored in the file so you do not need to collate multiple files at a later time.

Thermal Imager
Micro SD Memory Card

Edit Captured Infrared Image

Before you save a file, use the Imager to edit or modify the image. You can add IR-PhotoNotes and voice annotation, as well as change the palette and IR Fusion mode.

A Bluetooth headset is required and the radio must be enabled for voice (audio) annotation. This feature may not be available in all regions.

To edit:

1. With an image in the buffer, push **F2** to open the EDIT IMAGE menu.
2. Push **▲** / **▼** to highlight **Edit Image**.
3. Push **▶** to open the EDIT IMAGE menu.
4. Push **▲** / **▼** to highlight an option.
5. Push **F1** to save the changes with the file.

Save Captured Infrared Image

To save an image as a data file:

1. Point the Imager to the object of interest or inspection area.
2. Pull the trigger to capture the image. The image is now in the buffer and you can save or edit.
3. Push **F1** to save the image as a file and go back to the live view.

Micro SD Memory Card

To eject a Micro SD memory card, push in on the exposed edge of the card and then release. The card should pop partially out after you release it. Carefully pull the card out of the slot.

To insert the Micro SD memory card, push the card in until it catches.

The Micro SD memory card includes an SD adapter for insertion into a PC or multi-function card reader.

For information about how to save data, see [Save Captured Infrared Image](#). For information about how to view or erase a stored image, see [Delete Image Files](#).

Temperature Measurement

All objects radiate infrared energy. The quantity of energy radiated is based on the actual surface temperature and the surface emissivity of the object. The Imager senses the infrared energy from the surface of the object and uses this data to calculate an estimated temperature value. Many common objects and materials such as painted metal, wood, water, skin, and cloth are very good at radiating energy and it is easy to get relatively accurate measurements. For surfaces that are good at radiating energy (high emissivity), the emissivity factor is $\geq 90\%$ (or 0.90). This simplification does not work well on shiny surfaces or unpainted metals as they have an emissivity of < 0.60 . These materials are not good at radiating energy and are classified as low emissivity. To more accurately measure materials with a low emissivity, an emissivity correction is necessary. Adjustment to the emissivity setting will usually allow the Imager to calculate a more accurate estimate of the actual temperature.

⚠ Warning

To prevent personal injury, see emissivity information for actual temperatures. Reflective objects result in lower than actual temperature measurements. These objects pose a burn hazard.

More information is available on emissivity at <http://www.fluke.com/emissivity> and <http://www.fluke.com/emissivity/explanation>. Fluke recommends the study of this topic to get the most accurate temperature measurements.

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Menus

The menus are the access points for thermal image display, camera features, memory setup, and settings for date, time, language, units, file format, and Imager information.

Measurement Menu

The Measurement Menu has settings for the calculation and display of radiometric temperature measurement data related to the thermal images. These settings include the Temperature Range selection through Level/Span adjustment, Emissivity, Background, Transmission, Spot Temperatures, Center Box, and Markers.

Range

Range (level and span) is set to automatically adjust or is set for manual adjustment. To choose between automatic or manual level and span, do the following:

- 1. Push **F2** .
- 2. Push **▲/▼** to highlight **Measurement**.
- 3. Push **F1** or **▶** to view the menu.
- 4. Push **▲/▼** to highlight **Set Level/Span**.
- 5. Push **F1** or **▶** to view the menu.
- 6. Push **▲/▼** to toggle between the Auto and Manual ranging.
- 7. Push **F1** to set.
- 8. Push:

F1 to set the change and go back to the live view.

F2 or **◀** to set the change and go back to the previous menu.

F3 to cancel the change and go back to the live view.

Fast Auto/Manual Range Toggle

When NOT in a menu mode, push **F1** for 3 seconds to toggle between Auto Range and Manual Range.

Fast Auto Rescale

When in Manual Range and NOT in a menu mode, push **F3** for <1/2 second to automatically rescale the level and span for objects in the thermal field of view. This feature operates the Imager in a semi-automatic mode if manual fine re-adjustment of level and span with the arrow buttons is not necessary. Rescaling can be done as often, or as little, as needed.

Note

The Imager always powers up in the same Range mode, Auto or Manual, as when it was powered down.

Level for Manual Operation Mode

When put into manual ranging, the level setting moves the thermal span up or down within the total temperature range. See Table 3. In the live manual mode, the arrow buttons are always available to adjust the level and span.

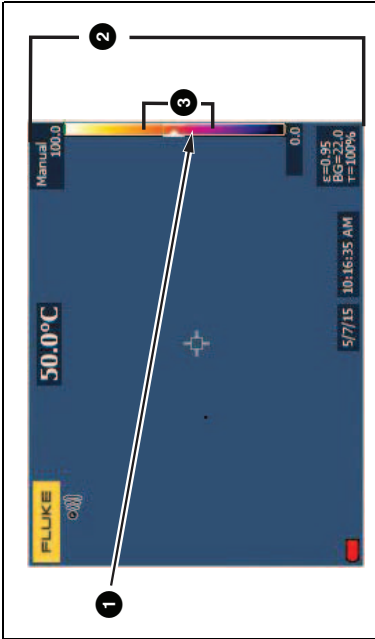
To set the level:

- 1. Push **◀** to move the range to a higher temperature level.
- 2. Push **▶** to move the range to a lower temperature level.

Thermal Imager
Menus

While you adjust the manual level, the scale along the right side of the display shows the thermal span as it moves to different levels within the total range.

Table 3. Level and Span Settings

	
Item	Description
1	Level
2	Total Imager Range
3	Span

Temperature Span for Manual Operation Mode

When in manual mode, the span setting contracts or expands in a selected palette in a temperature range within the total range. See Table 3. In the live manual mode, the arrow buttons are always available to adjust the level and span.

To adjust the temperature span:

1. Push  to increase or widen the temperature span.
2. Push  to decrease or narrow the temperature span.

While you adjust the manual span, the scale along the right side of the display shows the thermal span increasing or decreasing in size.

Emissivity Adjustment

The correct emissivity values are important for the Imager to make the most accurate temperature measurement calculations. Emissivity of a surface can have a large effect on the apparent temperatures that the Imager observes. Understanding the emissivity of the surface being inspected can, but not always, allow you to obtain more accurate temperature measurements.

Note

Surfaces with an emissivity of <0.60 make reliable and consistent determination of actual temperatures problematic. The lower the emissivity, the more potential error is associated with the Imager's temperature measurement calculations. This is also true even when adjustments to the emissivity and reflected background adjustments are performed properly.

Emissivity is set directly as a value, or from a list of emissivity values for some common materials.

Note

If the Display is set to **Display All**, you see the information about current emissivity as $\epsilon = x.xx$.

Adjust by Number

To set the emissivity value:

1. Go to **Measurement > Emissivity > Adjust Number**.
 2. Push   to change the value.
- A custom emissivity value is indicated when any value not in the standard emissivity table is selected.

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Select by Table

To select from a list of common materials:

1. Go to **Measurement > Emissivity > Select Table**.
2. Push   to highlight the material.
3. Push **F1**  to select the material.

If you set a value that is <0.60,  shows on the Imager display with this caution:



Caution:
Emissivity <0.6
(see Manual)

Push **F1**  to clear the message.

Background (Reflected Background Temperature Compensation)

Compensation for reflected background temperature is set in the Background tab. Very hot objects or very cold objects can affect the apparent temperature and measurement accuracy of the target or object of interest, especially when surface emissivity is low. Adjustment of the reflected background temperature can make the temperature measurement better in many situations. For more information, see [Emissivity Adjustment](#).

To adjust the background temperature:

1. Go to **Measurement > Background**.
2. Push   to change the value.
3. Push **F1**  or **F2**  when done.

Note

If the Display is set to **Display All**, you see the information about current reflected background temperature as **BG = xx.x**.

Spot Temperatures

The Spot Temperatures are floating HI and LO temperature indicators that move on the display as the temperature measurements of the image fluctuate.

To turn on/off the hot and cold spot indicators:

1. Go to **Measurement > Spot Temp**.
2. Push   to highlight **ON** or **OFF**.
3. Push **F1**  or **F2**  to set the new value.

User-Definable Spot Markers

Up to three adjustable, fixed-temperature spot markers are available on the display. You can use these markers to highlight a region before you save the image. The marker selection is set as All Off, One Marker, Two Markers, or Three Markers.

To set a Marker:

1. Push **F2** .
2. Push   to highlight **Measurement**.
3. Push **F1**  or  to view the menu.
4. Push   to highlight **Markers**.
5. Push **F1**  or  to view the menu.
6. Push   to highlight the function between **All Off**, **One Marker**, **Two Markers**, and **Three Markers**.
7. Push **F1**  or  to set the marker option and go to the "Move Marker" display. You will see the Move Marker icon and the labels on the function buttons change to **Done**, **Next**, and **Cancel**.

Thermal Imager Menus

To change the Marker position on the display:

1. Push     to move the Marker location on the image.
2. Push **F2**  to highlight the next marker. Do Step 1 again.
3. Do Step 2 for a third marker.
4. Push **F1**  when done.

Center Box

The Center Box feature is an adjustable temperature measurement zone (box) that you can center on the infrared image. This zone (box) expands and contracts to different levels within the infrared image. The zone lets the user see an approximate maximum (MAX), average (AVG), and minimum (MIN) temperature measurement in that area. When in AUTO Level and Span mode, the Imager automatically sets the level and span according to the infrared scene within the parameters of the Center Box.

To enable or disable the Center Box feature:

1. Push **F2** .
2. Push    to highlight **Measurement**.
3. Push **F1**  or  to view the menu.
4. Push   to highlight **Center Box**.
5. Push **F1**  or  to view the menu.
6. Push   to toggle the function ON or OFF.

To set the size of the Center Box when enabled:

1. Push    to highlight **Set Size**.
2. Push **F1**  or  to view the display.
3. Push  to increase the size of the Center Box.

4. Push  to reduce the size of the Center Box.

5. When satisfied with the size of the Center Box, push:

- **F2**  to set the change and go back to the previous menu.
- **F3**  to cancel the change and go back to the live view.

Image Menu

The Image menu has controls for different features used in the presentation of the infrared image on the Imager's LCD and some saved image files.

Note

Data saved as .is2 format can easily be modified within FlukeConnect Desktop software. Still images saved in .bmp or .jpg format, as well as video saved in .avi format will retain image settings at the time of capture and save.

Palettes

The Palette menu lets you change the false-color presentation of the infrared images on the display (availability varies by model). Some palettes are more suitable for specific applications and can be set as required. Two different palette presentation modes are available. The Standard Palettes offer an equal, linear presentation of colors that allow for best presentation of detail. The Ultra Contrast™ Palettes offer a weighted presentation of colors. These palettes work best in situations with high thermal contrast for extra color contrast between the high temperatures and low temperatures.

Available Palettes:

- Grayscale
- Grayscale Inverted
- Blue-Red
- High Contrast
- Hot Metal
- Ironbow
- Amber
- Amber Inverted

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To set a palette:

- 1. Push **F2** .
- 2. Push **▲/▼** to highlight **Image**.
- 3. Push **F1** or **▶** to view the menu.
- 4. Push **▲/▼** to highlight **Palette**.
- 5. Push **F1** or **▶** to view the menu.
- 6. Push **▲/▼** to highlight **Standard** or **Ultra Contrast**.
- 7. Push **▲/▼** to select a palette.
- 8. Push:
 - **F1** to set the change and go back to the live view.
 - **F2** or **◀** to set the change and go back to the previous menu.
 - **F3** to cancel the change and go back to the live view.

IR-Fusion™ Technology

IR-Fusion™ technology makes it easier to understand, analyze, and communicate infrared images through the use of an aligned visible image and infrared image. The Imager automatically captures a visible image with every infrared image to show you precisely where a potential problem might be, and then allows you to more effectively communicate it to others.

Auto Blending Level:

- 5 presets: 0, 25, 50, 75, 100
- Picture-in-Picture (PIP): 25, 50, 75, 100

To set the IR-Fusion mode:

- 1. Push **F2** .
- 2. Push **▲/▼** to highlight **Image**.
- 3. Push **F1** or **▶** to view the menu.

- 4. Push **▲/▼** to highlight **IR-Fusion**.
- 5. Push **F1** or **▶** to view the menu.
- 6. Push **▲/▼** to highlight an option.
- 7. Push:
 - **F1** to set the change and go back to the live view.
 - **F2** or **◀** to set the change and go back to the previous menu.
 - **F3** to cancel the change and go back to the live view.

Color Alarms

The Imager has apparent temperature color alarms.

Available alarm types:

- Hi-Lo Alarm
- Isotherm Alarm

The high-temperature color alarm shows a full visible image and only shows infrared information on objects or areas that are above the set apparent temperature alarm level. The low-temperature (or dew point) color alarm shows a full visible image and only shows infrared information on objects or areas that are below the set apparent temperature (or set dew point) color alarm level. The user must manually determine and set these parameters.

Note

The Imager does not sense ambient or surface dew point level automatically. To use the low-temperature color alarm function as a dew point color alarm, manual determination and input of surface dew point temperature will yield the best results. Depending on the situation, the colors presented may help identify areas of concern with possible dew point condensation.

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To view the Color Alarm menu:

1. Push **F2** .
2. Push **▲/▼** to highlight **Image**.
3. Push **F1** or **▶** to view the menu.
4. Push **▲/▼** to highlight **Color Alarm**.
5. Push **F1** or **▶** to view the menu.

Set High-Temperature Color Alarm

To set a high-temperature color alarm:

1. From the **Color Alarm** menu, push **▲/▼** to highlight the option: **Set High Alarm**.
2. Push **▶** to open the Color Alarm menu.
3. Push **▲/▼** to adjust the temperature setting.

4. Push:

- **F1** to set the change and go back to the live view.
- **F2** or **◀** to set change and go back to the previous menu.
- **F3** to cancel the change and go back to the live view.

Set Low-Temperature/Dew Point Color Alarm

To set a low-temperature/dew point color alarm:

1. From the **Color Alarm** menu, push **▲/▼** to highlight **Set Low Alarm**.
2. Push **▶** to open the Color Alarm menu.
3. Push **▲/▼** to adjust the temperature setting.

4. Push:

- **F1** to set the change and go back to the live view.
- **F2** or **◀** to set the change and go back to the previous menu.
- **F3** to cancel the change and go back to the live view.

Outside/Inside Alarm

If you set values for the high-temperature color alarm and a low-temperature color alarm, the Imager will have the options for inside or outside isotherm color alarms.

To set an outside/inside isotherm color alarm:

1. From the **Color Alarm** menu, push **▲/▼** to highlight **Outside or Inside**.

2. Push:

- **F1** to set the change and go back to the live view.
- **F2** or **◀** to set the change and go back to the previous menu.
- **F3** to cancel the change and go back to the live view.

Display Graphics Presentation

The options for how you view the on-screen graphics are in the Display menu. These options are Display All, Details and Scale, Scale Only, and Image Only.

1. Push **F2** .
2. Push **▲/▼** to highlight **Image**.
3. Push **F1** or **▶** to view the menu.
4. Push **▲/▼** to highlight **Display**.
5. Push **F1** or **▶** to view the menu.
6. Push **▲/▼** to highlight an option.

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7. Push:

- **F1** to set the change and go back to the live view.
- **F2** or **◀** to set the change and go back to the previous menu.
- **F3** to cancel the change and go back to the live view.

Note

Features that have ON/OFF controls must be turned on and turned off with those controls.

Logo

A Fluke logo shows on the display and captured images. You can choose to turn on or turn off the logo:

1. Go to **Image > Logo**.
2. Push **▶/▶** to highlight on or off.
3. Push **F1** to set.

Camera Menu

The Camera menu has controls and options for secondary camera features such as auto focus, backlight level, and laser pointer.

Backlight

The backlight level control is set to low, medium, and high. To set the backlight:

1. Push **F2**.
2. Push **▶/▶** to highlight **Camera**.
3. Push **F1** or **▶** to view the menu.
4. Push **▶/▶** to highlight **Backlight**.
5. Push **F1** or **▶** to view the menu.
6. Push **▶/▶** to highlight an option.
7. Push:
 - **F1** to set the change and go back to the live view.
 - **F2** or **◀** to set the change and go back to the previous menu.
 - **F3** to cancel the change and go back to the live view.

Auto Capture

The Auto Capture feature allows you to set the Imager to capture and save an infrared image, or series of images, automatically. Image capture can be triggered manually or with an “apparent temperature” trigger. The temperature trigger is set to start when a value is above or below a set limit. Regardless of how the capture starts, you can set the interval for when successive images are captured and saved. You also can set the number of images that are captured and saved. The upper limit on how many images is dependent on the amount of storage memory available.

To set and operate the Auto Capture feature:

1. Go to **Camera > Auto Capture**.
2. Push **F1** to start the capture sequence.

Thermal Imager Menus

In the Auto Capture sub-menu, you will see these options:

- **Start Capture:** Executes the Auto Capture settings in camera memory.
- **Interval:** Push  /  to select the number of hours, minutes, or seconds as an interval between images.
- **Image Count:** Push  /  to manually select a number of images. Or, push the **Maximum Memory** button to select the option that will continue capturing and saving images until the chosen storage memory is filled or battery power is depleted.
- **Manual Trigger:** When Manual Trigger is selected, push  to start the automatic capture of a series of images.
- **Temp Trigger:** Select **Temp Trigger** and then select **Set Temp Trigger** to open the adjustment menu.

Note

The minimum interval available can be affected by the file type and visible light camera settings chosen by the user. Some combinations create larger file sizes that take longer to capture and save and create a higher minimum interval compared to others.

Memory Menu

The Memory Menu allows you to review captured images, audio and text annotations, and IR-PhotoNotes™. Files in memory are shown in a large preview format. You can scroll through long lists and open a full-size image.

Change the setting for visible and thermal image and then view all images in the same format.

An icon shows to indicate any additional items saved with the infrared image or IR-Fusion technology image:

-  IR-PhotoNotes photos
-  Voice annotation

Review Image Files

To view stored images on the memory card:

1. Go to .
2. Push  /  to highlight the preview image of the file for review.
3. Push  to review the file.

Edit Image Files

The Fluke Connect™ desktop software allows you to edit .is2 image files that are stored in memory.

Delete Image Files

To erase one image from the memory card:

1. Push .
 2. Push  /  to highlight the preview image of the file to delete.
 3. Push  to open the **Delete** menu.
 4. Highlight **Selected Image** and push .
- The Imager prompts you to continue or cancel.

5. Push  again to delete the file.

To erase all the images from memory:

1. Go to **Memory**.
2. Push .
3. Highlight **All Images** and push . The Imager prompts you to continue or cancel.
4. Push  to delete all files in memory.

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Settings Menu

The Settings menu has adjustments for user preferences such as units of temperature measurement, file format of stored data, "save to" location choice, auto off settings, WiFi and Bluetooth settings, date, time, localization, and language. This menu also has a section that displays information about the Imager such as model number, serial number, and firmware versions. Certificates and licenses are available from this menu.

Units

To change the temperature units:

1. Go to **Settings > Units**.
2. Push  /  to highlight an option.
3. Push **F1**  to set an option.

File Format

Data can be saved to the internal memory or a micro SD memory card in different file formats. Image format selections are .bmp, .jpg, and .is2. These selections remain valid when you turn the Imager off or on.

To change the file format:

1. Go to **Settings > File Format**.
2. Push  /  to highlight an option.
3. Push **F1**  to set the option.

Images saved in the .is2 file format have the consolidation of all data into a single file and are more flexible for analysis and modification in the included Fluke Connect™ desktop software. This file format consolidates the infrared image, radiometric temperature data, visible image, voice annotation, and photos from the IR-PhotoNotes™ photo annotation system into one location.

For situations where a smaller file size with maximum resolution is needed and modification is not, choose the .bmp file format. For the smallest file size where modification is not needed and image quality and resolution are not as important, choose the .jpg file format.

The .bmp and .jpg files can be emailed and then opened on most PC and MAC systems without special software. These formats do not allow full analysis capabilities or modification.

The .is2 file format can be emailed and then opened with Fluke Connect™ desktop software. This format has the maximum versatility. For more information about Fluke Connect™ desktop software, go to www.fluke.com.

Auto Off

The Auto Off timer is user-defined separately for the LCD and power.

Note

Auto Off is automatically disabled when the Imager is connected to ac power.

To set the Auto Off feature:

1. Go to **Settings > Auto Off**.
2. Push  /  to highlight **LCD Time Out** or **Power Off**.
3. Push  /  to set the timer between 1 minute and 120 minutes.
4. Push **F1**  to set.

Localization

The Imager has several settings for localization:

- Date
- Time
- Language
- Decimal Separator

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Date

The date can be displayed in one of two formats: **MM/DD/YY** or **DD/MM/YY**.

To set the date:

1. Go to **Settings > Date**.
2. Push or to highlight the date format.
3. Push **F1** to set a new format.
4. Push or to highlight **Set Date**.
5. Push **F1** to open the Set Date menu.
6. Push or to select highlight day, month, or year.
7. Push or to change the settings.
8. Push **F1** to set the date and exit the menu.

Time

To set the time:

1. Go to **Settings > Time**.
Time displays in two different formats: 24 hour or 12 hour. To set the time format:
 2. Push or to highlight time format.
 3. Push **F1** to select.
 4. Highlight **Set Time**.
 5. Push **F1** to open the Set Time menu.
 6. Push or to highlight hours or minutes.
The 12 hour format has a selection to set the time as AM or PM.
 7. Push or to change the setting.
 8. Push **F1** to set the change.

Language

To change the display to a different language:

1. Go to **Settings > Language**.
2. Push or to highlight the setting.
3. Push **F1** to set a new language.

Wireless Connectivity

The Imager is equipped with wireless connectivity options. Wireless connectivity enhances your ability to work more efficiently and better communicate results. The Imager ships with the radio disabled. For first-time use, you must enable the radio to use wireless connectivity.



Bluetooth®

Bluetooth® technology is available to connect a wireless headset to the Imager. When on, shows on the display (upper left corner).



WiFi™ Hotspot

Note

WiFi is for indoor use only in Kuwait, Chile, and United Arab Emirates.

You can wirelessly send a picture from the Imager to a PC, an iPhone, and an iPad through the WiFi connection. A transferred image is viewed with Fluke Connect™ desktop software.

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WiFi™ Network

Infrastructure WiFi is a wireless local area network (WLAN) that links your Imager to other wireless devices using its radio and providing a connection through an access point to the wider Internet. This gives you the ability to move around within a local coverage area and still be connected to the network.

To turn on the WiFi Network feature:

1. Go to **Settings > Wireless > WiFi > WiFi Network**.
2. Push  /  to highlight **ON**.
3. Push **Select** to scan for available networks within range of the camera.
4. Push  /  to select a network.
5. Push **Fi** to connect/disconnect.
6. Enter a password if you are prompted.

Image Storage

The storage setting allows you to choose to save images to the internal memory or micro SD memory card.

1. Go to **Settings > Image Storage**.
2. Push  or  to change the setting.
3. Push **Fi** to select the new storage setting.

Fluke Connect™

The Imager supports Fluke Connect™ (may not be available in all regions). Fluke Connect™ wirelessly connects your Fluke test tools with an app on your smartphone or tablet. It can show images from your infrared camera on your smartphone or tablet screen, save images to Fluke Cloud™ storage, and share images with your team.

More information about how to enable the Imager radio is in [Wireless Connectivity](#).

Fluke Connect App

The Fluke Connect app works with Apple and Android mobile products. The app is available for download from the Apple App Store and Google play.

Check that the WiFi™ radio on the Imager is ready to operate. See [Enable the Radio](#).

To setup:

1. On the Imager, go to **Settings > Wireless**.
2. Select **WiFi Hotspot**.
3. If the "On" selection is checked, select "Off" before you check the network settings to connect the iOS mobile device to the Imager.
4. Choose the **Settings** menu option and review the SSID and Password values.

For a new Imager, the default value is "Fluke-Camera" for the SSID and the password is disabled.

Note

To enable WiFi Hotspot protection, change the SSID and password values to your organization's preference.

5. Push **F2** (Back) until you reach the Off/On settings menu.
6. Select **On** option and wait a few seconds while the WiFi radio activates.

On the mobile device:

1. Go to **Settings > Wi-Fi**.
The network name for your camera shows in the list (also known as "SSID"). Select this SSID and enter your password when prompted by your mobile device.
2. Open the Fluke Connect app.
3. In the list of Fluke products, connect to **Thermal Imager**.

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4. When the connection is set, the app prompts:
Push Save on the Imager to view the image here
On the Imager:
1. Aim the Imager at something thermally interesting and pull the trigger.
2. Push **F1** (Save).
After a few seconds, the image you captured shows on your mobile device for review.
Go to www.flukeconnect.com for more information about how to use the app.
Fluke Connect Tools
To discover an Imager with Fluke Connect:
1. Turn on the Imager.
2. On the Imager, go to **Menu > Fluke Connect**.
3. Push **/** or **On** to select.
The Imager starts to scan and presents a list with the ID and name of available tools found within the 20 m distance. You can expect several minutes in delay before the scan is complete.
4. Push **▲** / **▼** to select a tool name.
5. Push **F1** (Done) to select the tool.
The labels change to include an Edit function. By default, the Imager shows and saves the data for the selected tools.

Fluke Cloud™ Storage
To upload images to the Fluke Cloud™ storage:
1. Turn on the Imager and connect to a WiFi network (see [WiFi™ Network](#)).
2. When the Imager is connected to a WiFi network, go to **Settings > Wi-Fi > Sign In**.
3. Enter a Fluke Connect user ID with the onscreen keyboard. If you have previously logged in, the history drop down box at the top of the keyboard shows a list of previously used IDs.
4. Enter the password with the onscreen keyboard.
All .is2, .jpg, and .bmp images automatically upload to the Fluke Cloud™ storage when you save the image after capture. Screen icons show you the progress:
 = image upload in progress
 = image upload done
 = error
To turn off the upload feature:
1. Go to **Settings > Wi-Fi > Sign Out**.
2. Or, turn off the WiFi network.
To edit the selection:
1. Push **▲** / **▼** to highlight the tool name.
2. Push **F1** to open the Edit menu. The Edit menu gives you a choice to display the measurement data and/or save it to the SD memory card.
The display updates to show the wireless icon and live measurement for each selected wireless tool.

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Advanced Settings

Filename Prefix

The default filename starts with IR_. You have the option to change this prefix to a different 3-character name with the keyboard.

Reset Filename

You can reset the file number to 00001.

Factory Defaults

Erases all user-set preferences and restores all of the factory default settings.

Imager Information

You can access information about the version, certifications, and licenses for the Imager from the Settings Menu.

This includes:

- Model
- Camera serial number
- Refresh rate
- Engine serial number
- Firmware version
- FPGA #

To show the Imager Info:

1. Go to **Settings > Advanced > Imager Info**.
2. Push **▲ / ▼** to scroll through the menu.
3. Push:
 - **▲ / ▼** to set the change and go back to the live view.
 - **F2** or **◀** to set the change and go back to the previous menu.
 - **F3** to cancel the change and go back to the live view.

To display the electronic certifications:

1. Go to **Settings > Advanced > Imager Info**.
2. Push **▲ / ▼** to highlight **Certificates**.
3. Push **F1** to view the information screen with the Imager certifications.
4. Push **F1** to close the information screen.

To show the license information:

1. Go to **Settings > Advanced > Imager Info**.
2. Push **▲ / ▼** to highlight **Licenses**.
3. Push **F1** to view the information screen with a list of Open Source Software Licenses.
4. Push **▲ / ▼** to scroll to a specific license.
5. Push **F1** to view the information screen with the specific license agreement.
6. Push **F1** to close the information screen.

Adjust Parallax

You can fine-tune the parallax adjustment to precisely align the image.

1. Go to **Settings > Advanced > Adjust Parallax**.
2. Follow the on-screen prompts to adjust.

Thermal Imager
Maintenance

Maintenance

The Imager requires minimal maintenance.

⚠ Warning

To prevent eye damage and personal injury, do not open the Product. The laser beam is dangerous to eyes. Have the Product repaired only through an approved technical site.

How to Clean the Case

Clean the case with a damp cloth and a weak soap solution. Do not use abrasives, isopropyl alcohol, or solvents to clean the case or lens/window.

Lens Care

⚠ Caution

To prevent damage to the infrared lens:

- Carefully clean the infrared lens. The lens has a delicate anti-reflective coating.
- Do not clean too vigorously as this can damage the anti-reflective coating.

For lens care you will need a cleansing liquid such as a commercial lens cleaning liquid with alcohol, ethyl alcohol, or isopropyl alcohol and a lint-free cloth or tissue. A pressurized air can is used to remove loose particulates.

To clean the lens:

1. Blow off particulates from the lens surface with pressurized air can or dry nitrogen-ion gun if available.
2. Soak the lint-free cloth in the alcohol liquid.
3. Squeeze the cloth to remove excess liquid or dab on dry cloth.

4. Wipe the lens surface in one circular motion and discard the cloth.

5. Use a new cloth with liquid if you need to repeat the procedure.

Battery Care

⚠ Warning

To prevent personal injury and for safe operation of the Product:

- Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.
- Do not disassemble or crush battery cells and battery packs.
- Remove batteries to prevent battery leakage and damage to the Product if it is not used for an extended period.
- Connect the battery charger to the mains power outlet before the Product or battery.
- Use only Fluke approved power adapters to charge the battery.
- Keep cells and battery packs clean and dry. Clean dirty connectors with a dry, clean cloth.

⚠ Caution

To prevent damage, do not expose Product to heat sources or high-temperature environments such as an unattended vehicle in the sun.

원문: Fluke FLK-TIS60+ TIS60+ 사용자 설명서 · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

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To get the best performance from the lithium-ion battery:

- Do not store the battery on the charger for more than 24 hours.
- Charge the Imager for a two-hour minimum at three-month intervals for maximum battery life.
- The battery will discharge in about three months if installed in the Imager and powered off. It will discharge in about six months if stored disconnected from the Imager.
- Batteries stored for long periods will need two to ten charging cycles for full capacity.
- Always operate in the specified temperature range.
- Do not store the batteries in extreme cold environments.
- Do not attempt to charge the batteries in extreme cold environments.
- These guidelines apply whether you charge the battery with external power or the charger base.

 Caution

Do not incinerate the Product and/or battery.