

PTi120

Pocket Thermal Imager

Users Manual



April 2019, Rev. 1, 5/21

© 2019-2021 Fluke Corporation. All rights reserved. Specifications are subject to change without notice.

All product names are trademarks of their respective companies.

LIMITED WARRANTY AND LIMITATION OF LIABILITY

Each Fluke product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is two years and begins on the date of shipment. Parts, product repairs, and services are warranted for 90 days. This warranty extends only to the original buyer or end-user customer of a Fluke authorized reseller, and does not apply to fuses, disposable batteries, or to any product which, in Fluke's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation or handling. Fluke warrants that software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on non-defective media. Fluke does not warrant that software will be error free or operate without interruption.

Fluke authorized resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Fluke. Warranty support is available only if product is purchased through a Fluke authorized sales outlet or Buyer has paid the applicable international price. Fluke reserves the right to invoice Buyer for importation costs of repair/replacement parts when product purchased in one country is submitted for repair in another country.

Fluke's warranty obligation is limited, at Fluke's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to a Fluke authorized service center within the warranty period.

To obtain warranty service, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that service center, with a description of the difficulty, postage and insurance prepaid (FOB Destination). Fluke assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation prepaid (FOB Destination). If Fluke determines that failure was caused by neglect, misuse, contamination, alteration, accident, or abnormal condition of operation or handling, including overvoltage failures caused by use outside the product's specified rating, or normal wear and tear of mechanical components, Fluke will provide an estimate of repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer transportation prepaid and the Buyer will be billed for the repair and return transportation charges (FOB Shipping Point).

THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. FLUKE SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE OR THEORY.

Since some countries or states do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any provision of this Warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision.

Fluke Corporation	Fluke Europe B.V.
P.O. Box 9090	P.O. Box 1186
Everett, WA 98206-9090	5602 BD Eindhoven
U.S.A.	The Netherlands

11/99

Table of Contents

Title	Page
Introduction	1
Contact Fluke	1
Safety Information	1
Product Familiarization	2
Controls and Connections	2
Touch Screen (Display)	3
Basic Operation	4
Turn On and Off the Product	4
Capture Image	4
Save Images to PC	4
Menu Controls	5
Main Menu	6
Image Menu	7
Level/Span	8
Palette Menu	9
Display Menu	9
Settings Menu	10
Device Settings Menu	10
IR Settings Menu	11
Emissivity Adjustment	12
Transmissivity	12
Memory Menu (Memory Gallery)	13
View Image	13
Notes	13
Notes with Single Image	13
Add a Note to Multiple Images	14
Delete Images	14
Delete an Image	14
Delete Multiple Images	14
Delete All Images	14
Asset ID	15
Asset Identification (Asset ID)	15
Assign Asset ID Tag with a QR Code or Barcode	15
Assign Asset ID Tag Manually	15
Exit an Asset ID Tag	16
Assign a Different Asset ID Tag	16
Fluke Connect Desktop Software	16
Download Fluke Connect Software	16

- Update Firmware..... 17
- Maintenance..... 17
 - Clean the Case 17
 - Lens Care..... 17
 - Battery Care 18
 - Charge Batteries 18
- Radio Frequency Data 18
- Specifications 18

Introduction

The Fluke PTi120 (the Product or Imager) is a handheld, infrared imaging camera for use in many applications. These applications include equipment troubleshooting, preventive and predictive maintenance, building diagnostics, and research and development.

The Product shows thermal images on a high-visibility, industrial-quality LCD touch screen. The Product saves images to internal memory which can be transferred to a PC through a direct USB connection to the PC or by wireless transfer to a PC or mobile device.

The Product includes Fluke Connect™ desktop software. Fluke Connect is a high-performance, professional software suite for quality analysis and reporting.

Product Familiarization

Table 1 lists the features of the Product.

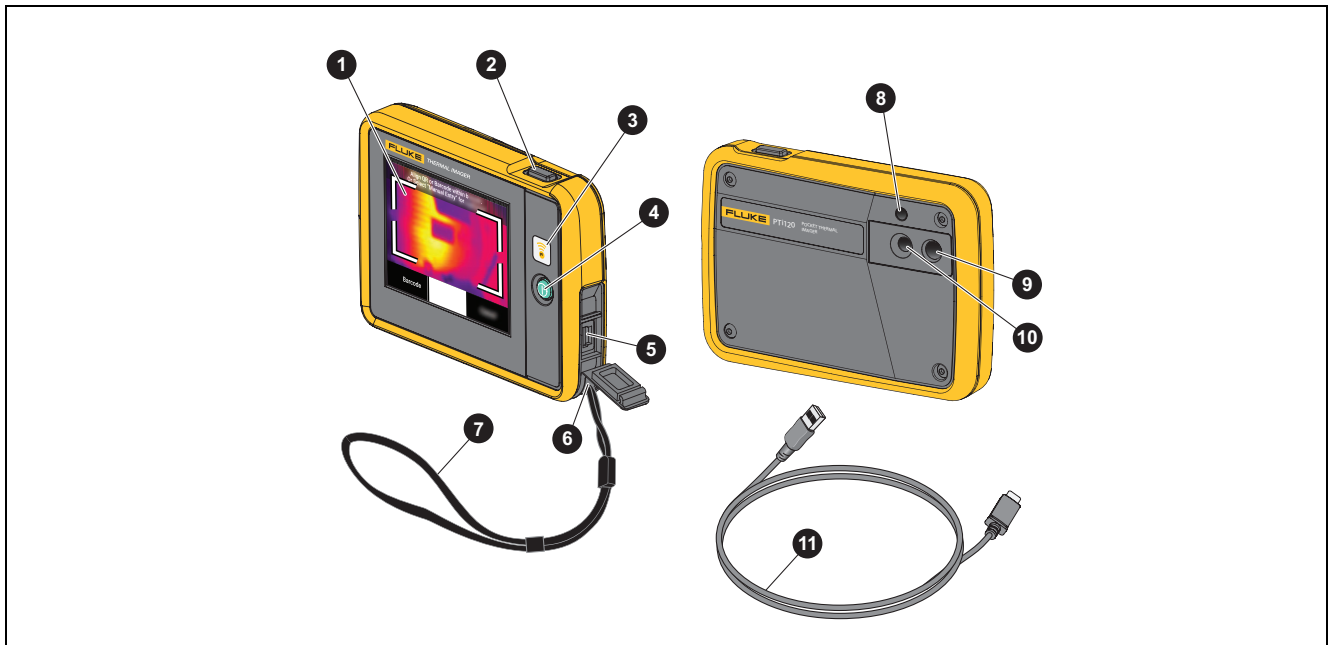
Table 1. Features

IR-Fusion™ Technology	Image annotations
Visible	Asset Identification
Fullscreen IR Autoblend™	Fluke Connect desktop software

Controls and Connections

Table 2 shows the controls and connections of the Product.

Table 2. Controls and Connections



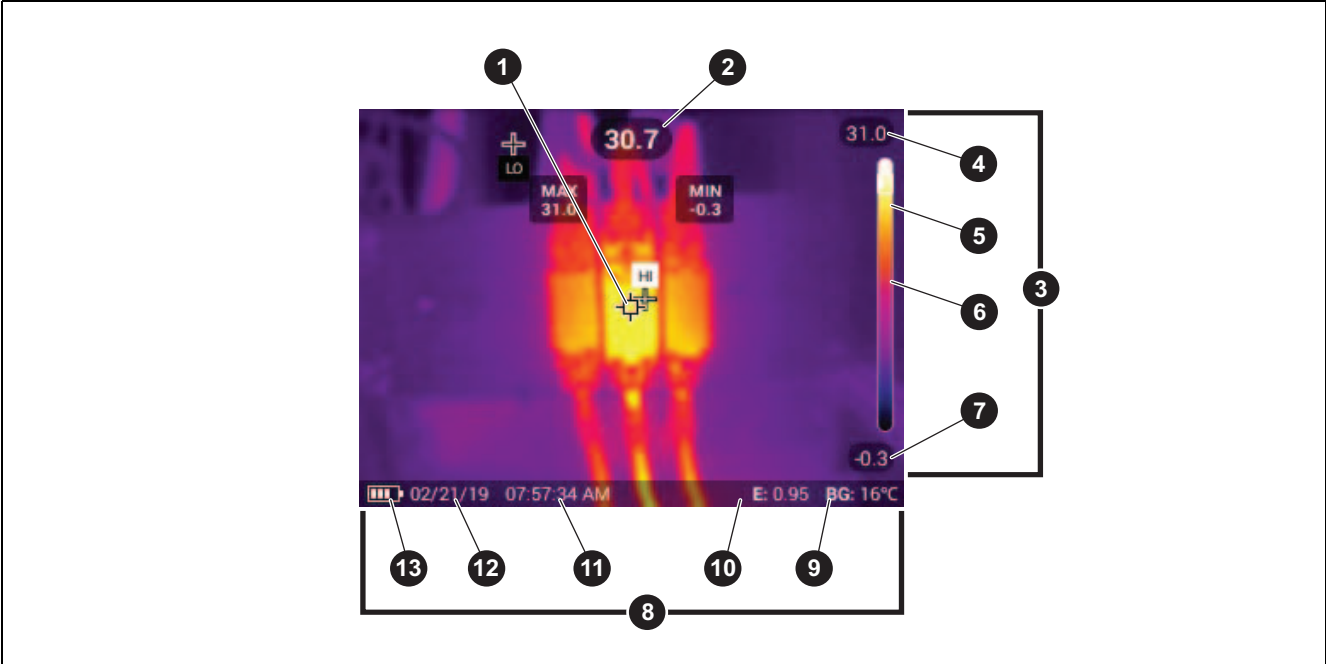
Item	Description	Item	Description
1	LCD touch screen (display)	7	Hand strap
2	Image capture button	8	LED torch/flashlight
3	Fluke Connect indicator	9	Infrared camera lens
4	Power button	10	Visual light camera lens
5	USB port	11	USB cable
6	Connector cover		

Touch Screen (Display)

The touch screen is the user interface of the Product. The touch screen has a backlight for work in dimly lit spaces.

Table 3 shows the default information on the screen of the Product.

Table 3. Display





Item	Description	Item	Description
1	Center point marker	8	Status bar
2	Center point temperature	9	Background temperature
3	Scale	10	Emissivity value
4	Temperature range upper value	11	Time
5	Range bar The range of colors in the palette mapped to a certain range of temperatures	12	Date
6	Center point color in relation to the palette	13	Battery status
7	Temperature range lower value		

Basic Operation

Turn On and Off the Product

Before you use the Product for the first time, charge the battery for a minimum of 1.5 hours. See [Charge Batteries](#).

To turn on or turn off the Product, push and hold  for 2 seconds. To keep the Product on and turn the display off, push  for <2 seconds.

Note

There is no visible way to tell if only the display is off or if the Product is off. To maximize the life of the battery, use the LCD Time Out and Power Off features. See Table 9 for more information about how to set these features.

Note

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

Capture Image

To capture an image:

1. In the Device Settings menu, set the **Distance** to the target.
2. Focus on a target.
3. Push and release the **Image Capture** button or double tap on the display to capture and freeze the image.

The image is in the memory buffer for you to save or to add an asset ID tag or note to the image. To add an asset ID tag to the image, see [Asset Identification \(Asset ID\)](#). To add a note to an image, see [Notes](#).

Note

Asset ID tags and notes can be saved with images captured in .is2 file format only. To select .is2 file format, see [Device Settings Menu](#).

Save Images to PC

To save images to a PC with the USB cord:

1. Turn on the Product.
2. Connect one end of the USB cord into the USB port on the Product and the other end into a USB port on a PC.

The PC recognizes the Product as an external memory storage device.

3. On the PC:
 - a. Save the images to a directory.
 - b. Eject the Product from the PC.
4. Remove the USB cable from the PC and the Product.














Menu Controls

To use the menus to change and view settings:

1. Tap the display to open the main menu.
2. Tap an icon on the main menu to open a submenu. See Table 5.
The background of the selected icon changes to yellow.
3. Tap a menu control to set and change options. See Table 4.
4. To close a submenu and return to live camera mode, tap the submenu icon again.

Table 4 lists the menu controls.

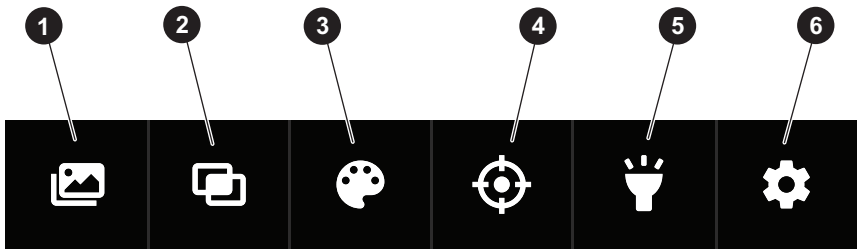
Table 4. Menu Controls

Item	Control	Function
Slider bar		Adjusts a value. Touch and slide the bar to the left to decrease the value or to the right to increase the value.
Toggle switch		Turns on or off a feature. Feature on.
Radio button		Selects one item from a list. Option selected.
More menu options button		Opens a menu to show other menu options.
Option menu button		Opens an option menu to adjust a setting.
Numerical value adjuster buttons		Decreases a numerical value.
		Increases a numerical value.
Back arrow		Returns to the previous menu.
Exit button		Closes menu and returns to camera mode. Or, Exits out of an Asset ID. See Asset ID .
Delete button		Delete an image. See Delete Images .
Note button		View, add, or edit a note. See Notes .
Add a note button		With at least one note attached to an image, add another note to the image. See Notes .
Asset ID button		Add or remove an asset ID tag. See Asset ID .

Main Menu

Table 5 lists the secondary menus available in the Main Menu.

Table 5. Main Menu










Item	Secondary Menu	Option	Function
1	 Memory	<options>	Select to review, edit, and delete captured images. See Memory Menu (Memory Gallery) .
2	 Image	IR-Fusion	Set the IR-Fusion level. See Image Menu .
3	 Palette	<options>	Set the palette to use on the image. See Palette Menu .
4	 Display	<options>	Set the features to show on the display. See Display Menu .
5	 Light	Torch	Use the toggle switch to turn on or off the torch (flashlight).
		Backlight	Use the slider bar to set the brightness level of the display.
6	 Settings	<options>	Set user preferences and view information about the Product. See Settings Menu .

Image Menu

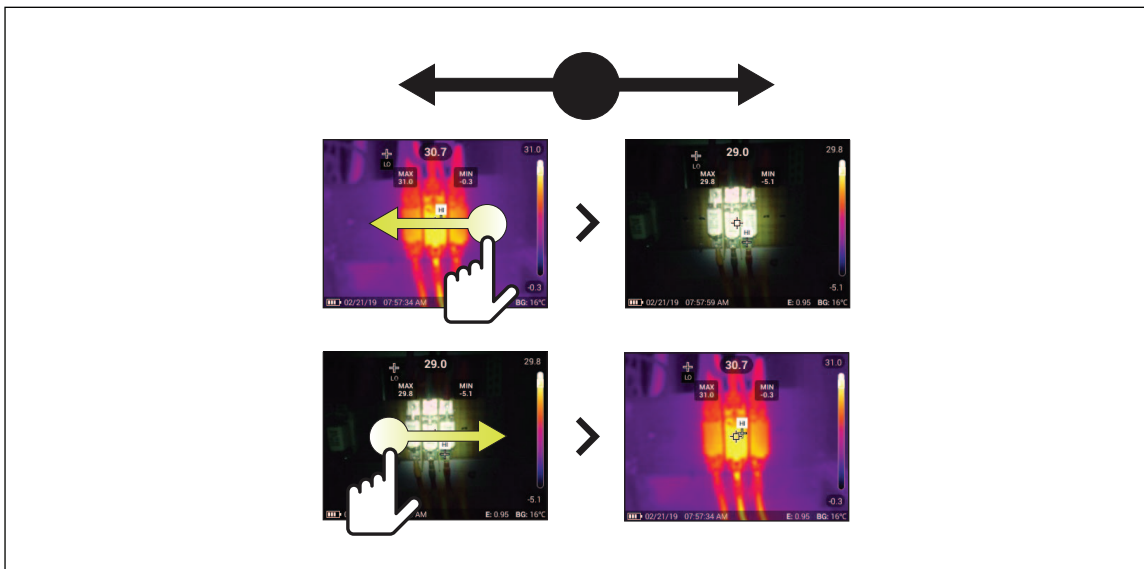
The IR-Fusion slider bar sets the Product to take images from full visible light mode to full IR-Fusion mode. Use a blend between visible light mode and IR-Fusion to view an object with some temperature overlays.

To adjust the IR-Fusion level:

1. Tap .
2. Use the slider bar to set the IR-Fusion level.

Alternatively, you can adjust the IR-Fusion level in camera mode. Touch the display and slide left to right to increase the level of IR-Fusion. Slide from right to left to decrease the IR-Fusion level. See Figure 1.

Figure 1. IR-Fusion Level



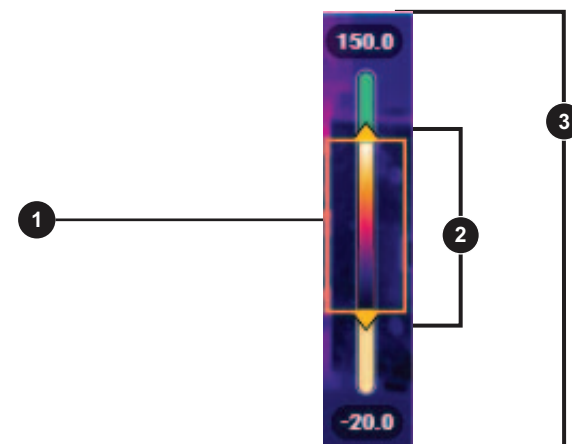
Level/Span

Level and Span are values within the total range of temperature. Level is the temperature level to view within the total range of temperatures. Span is the span of temperatures to view within the total range of temperatures.

With Level/Span set to **Auto**, the Imager sets Level/Span based on the total temperature range.


With Level/Span set to **Manual**, you can move the thermal span up or down within the total temperature range. Table 6 shows Level and Span in Manual edit mode.

Table 6. Level and Span Settings



Item	Description
1	Level
2	Span
3	Scale

To access manual Level/Span mode:

- From the menu: Select  > **IR Settings**> **Level/Span** > **Manual**> **Edit Level / Span**.
- From the screen: tap **Auto** or tap the scale.

To adjust Level/Span mode:

1. Move the top and bottom of the span box to adjust the range.
2. Slide the box to adjust the level.

To automatically rescale: In Manual mode tap **Manual**. The camera will automatically adjust the scale and return to **Manual** mode.

Palette Menu

The standard palettes offer an equal, linear presentation of colors that allow for best presentation of detail. The palettes are Grayscale, Ironbow, High Contrast, Amber, Hot Iron, and Blue-Red.

To change the palette of an image:

1. Tap .
2. Tap on a palette thumbnail.

A check mark shows on the selected palette. The color and temperature range bar on the display changes according to the selected palette. See Figure 2.

Figure 2. Palette and Range Bar Selection



Display Menu

Use the Display menu to set which features to show on the display. To show the Fluke logo on the display, see [Device Settings Menu](#). Table 7 lists the options in the Display menu.




Table 7. Display

Option	Description
Spot Temp (Min/Max)	Turn on or off the maximum and minimum temperature indicators on the display. The Spot Temperatures are floating HI and LO temperature indicators that move on the display as the temperature measurements of the image fluctuate.
Center Point	Turn on or off the Center point marker and Center point temperature.
Scale	Turn on or off the Scale.
Status Bar	Turn on or off the Status bar

Settings Menu

Table 8 lists the options in the Settings menu.

Table 8. Settings Menu

Option Menu	Description
 Scan Asset ID Scan QR Code or Barcode	Assign images to an asset. Scan a QR code or barcode attached to an asset or manually enter an asset identification. See Asset Identification (Asset ID) .
 IR Settings	Set the infrared settings. See IR Settings Menu .
 Device Settings	Set user preferences and view information about the Product. See Device Settings Menu .

Device Settings Menu

Table 9 lists the options in the Device Settings menu.

Table 9. Device Settings Menu

Option Menu	Option	Description
File Format	IS2	Saves images as an .is2 file. Choose the .is2 file format when image modification and maximum resolution is needed. The .is2 file format consolidates the infrared image, radiometric temperature data, visible image, notes, and tags into a single file. To customize or separate the visible and infrared images, use Fluke Connect desktop software. Use to assign an asset ID tag or to flag an asset image.
	JPEG	Saves images as a .jpg file. Choose the .jpg file format for images with the smallest file size, where modification is not needed, and image quality and resolution are not as important.
Units	<options>	Sets the temperature units. This option is not available in all countries.
Distance	<options>	Sets the distance to the target.
	Units	Sets the units to use to measure distance. This option is not available in all countries.
Change Filename	Filename Prefix	Changes the default filename that starts with IR_ to a different 3-character prefix.
	Reset Filename Numbers	Resets the file number to 00001.
Auto Off	LCD Time Out	Sets the time before the display automatically turns off.
	Power Off	Sets the time before the Product automatically turns off.
Date	<options>	Sets the date format and the date.
Time	<options>	Sets the time format and the time.
Fluke Logo	NA	Shows or hides the Fluke logo on the display.

Table 9. Device Settings Menu (cont.)

Option Menu	Option	Description
Language	<options>	Sets the language to use on the display.
Decimal Separator	<options>	Sets the decimal separator to comma or decimal point.
Reset to Factory Defaults	NA	Erases user-set preferences and restores the factory default settings.
Certificates	NA	Shows information about the wireless certificates of the Product.
Licenses	NA	Shows information about the Open Source Software Licenses used to develop the Product.
Version	NA	Shows information about the version of the Product.

IR Settings Menu

Table 10 lists the options available in the IR Settings menu.

Table 10. IR Settings Menu

Option	Description
Level / Span	Select the level and span mode: Auto - Automatically adjusts Level/Span. Manual - Manually adjust Level/Span with slider. Select Edit Level / Span .
Emissivity	Select an emissivity value from a list of common materials. Use the scroll bar to see all of the options. See Emissivity Adjustment .
Background	Changes the background temperature to compensate for reflected background temperature. Very hot objects or very cold objects can affect the apparent temperature and measurement accuracy of the target, especially when surface emissivity is low. Adjust the reflected background temperature to improve the accuracy of the measurement.
Transmissivity	Changes the values used to calculate the temperature based on the transmission percentage of the infrared-transparent window (IR window). See Transmissivity .

Emissivity Adjustment

All objects radiate infrared energy. The actual surface temperature and emissivity of the target affects the quantity of energy radiated. The Imager senses the infrared energy from the surface of the target and uses the data to calculate an estimated temperature value. Many common materials such as wood, water, skin, cloth, and painted surfaces, including metal, radiate energy well and have a high emissivity factor of $\geq 90\%$ (or 0.90). The Imager measures temperatures accurately on targets with a high emissivity.

Shiny surfaces or unpainted metals do not radiate energy well and have a low emissivity factor of < 0.60 . For the Imager to calculate a more accurate estimate of the actual temperature of targets with a low emissivity, adjust the emissivity setting.

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.

Set emissivity as a direct value or from a list of emissivity values for some common materials. If the emissivity value is < 0.60 , a caution shows on the display.

Note

Surfaces with an emissivity of < 0.60 make it difficult to determine reliable and consistent actual temperatures. The lower the emissivity is the greater the potential of error is when the Imager calculates the temperature measurement because more of the energy reaching the camera is specified as background temperature. This is also true even when adjustments to the emissivity and reflected background adjustments are performed properly.

Transmissivity

When you do infrared inspections through IR windows, not all of the infrared energy emitted from the target is transmitted through the optical material in the window. If you know the transmission percentage of the window, adjust the transmission percentage in the Imager or in Fluke Connect desktop software to improve the accuracy of the measurement.

When you do not do infrared inspections through an IR window, set Transmissivity to 100 % to disable the correction percentage.


Memory Menu (Memory Gallery)

Note

When the memory is 90 % full, a yellow message bar shows at the top of the display. When the memory is full, the message bar changes to red. To capture more images when the internal memory is full, save the images to an external memory device and delete the images from the Product.

Images are saved to the internal memory storage. Use the Memory menu to view, edit, or delete images. Images are organized by the date they were captured with the newest images at the top.


When additional information has been saved with an .is2 file, an icon shows with the preview file. The icons are:

 Asset ID

 Note

View Image

To open an image in fullscreen mode:

1. Tap .
2. If needed, touch the display and slide up or down to view all the images.
3. Tap on a thumbnail or preview image to view the image fullscreen.




A toolbar briefly opens on the top of the display. Tap on the image to open or close the toolbar.

Notes

Notes are stored with the image so you do not need to collate multiple files later. To add, edit, and delete notes, use the keyboard that opens on the display.



Notes with Single Image

To add, edit, or delete a note:

1. Open an image in fullscreen mode.
2. Tap . If needed, tap  first.
If no notes are saved with the image, a keyboard opens on the display.
3. Use the keyboard to enter a message.
4. Tap **Save**.
If a note is saved with the image, a list of notes opens on the display.
5. To add another note to the image, tap , use the keyboard to add the new note, and tap **Save**.
6. To edit a note, tap on a note, use the keyboard to edit it, and tap **Save**. If needed, scroll down to see all the notes.
7. To delete a note, tap on a note, tap **Delete**, and tap **Delete** again.

Add a Note to Multiple Images

To add a note to multiple images at the same time:



1. Select  >  > **Add a Note to Multiple Images**.
The display returns to the memory gallery.
2. Tap an image to select it. Tap an image again to clear the selection.
The border and filename text color change to yellow.
3. Repeat for each additional image.
4. Tap **Add Note**.
A keyboard opens on the display.
5. Use the keyboard to enter a message.
6. Tap **Save**.

Delete Images

To delete images, do the corresponding procedure below for the desired action.



Delete an Image

To delete only one image:

1. Open an image in fullscreen mode.
2. Tap . If needed, tap  first.
3. Tap **Delete**.

Delete Multiple Images

To delete multiple images at the same time:

1. Select  >  > **Delete Multiple Images**.
The display returns to the memory gallery.
2. Tap an image to select it. Tap an image again to clear the selection.
The border and filename text color change to yellow.
3. Repeat for each additional image.
4. Tap **Delete Images**.
5. Tap **Delete**.

Delete All Images


To delete all of the images at the same time:

1. Select  >  > **Delete All Images**.
2. Tap **Delete**.


Asset ID

Use the memory gallery toolbar to add or remove an asset ID from an image that is saved in memory. See [Asset Identification \(Asset ID\)](#).

To add an asset ID to an image:


1. Open an image in fullscreen mode.
2. Tap .
3. Assign an asset ID. See [Asset Identification \(Asset ID\)](#).

To remove an asset ID from an image:

1. Open an image in fullscreen mode.
2. Tap the asset ID that looks like  on the display.
3. Tap **Remove**.


The display returns to the image in fullscreen mode, and the asset ID does not show on the display.

Asset Identification (Asset ID)

Use Asset ID to save and organize images by asset like a motor or electrical panel. Use a barcode, QR code, or other unique identification as a tag to attach to images. When in camera mode, the asset ID shows on the display and looks like . Asset IDs need to be unique to each asset.

Assign Asset ID Tag with a QR Code or Barcode

To save images to an asset with a QR code or barcode:


1. Select  > **Scan Asset ID**.
2. Focus a QR code or barcode in the white box on the display.
3. When the Product detects a barcode has been scanned, tap **Use Barcode** or **Use QR Code**. If the Product cannot detect a barcode or QR code, manually enter a unique asset ID. See [Assign Asset ID Tag Manually](#).

The display returns to camera mode, and the barcode or QR code number shows on the display.

4. Capture an image.

Assign Asset ID Tag Manually



To manually enter a unique asset ID:

1. Select  > **Scan Asset ID**.
2. Tap **Manual Entry**.
A keyboard opens on the display.
3. Enter a unique asset identification.
4. Tap **Save**.

The display returns to camera mode, and the asset ID shows on the display.



Exit an Asset ID Tag

To exit out of an asset ID and save images without an asset ID:

1. Tap the asset ID that looks like  on the display.
2. Tap  **Exit Asset ID xxxxx** (where xxxxx is the name of the asset ID).
The display returns to camera mode, and the asset ID does not show on the display.

Assign a Different Asset ID Tag

To exit out of an asset ID and save images with a different asset ID:

1. Tap the asset ID that looks like  on the display.
2. Tap  **Scan New Asset ID**.
3. Assign a new asset ID. See [Asset Identification \(Asset ID\)](#).

Fluke Connect Desktop Software

Fluke Connect desktop software for a PC is available to use with the Product and contains features to analyze images, organize data and information, and make professional reports.

Use Fluke Connect software to:

- Review notes, asset IDs, and flags.
- Export IR and visible images.
- Edit .is2 image files.
- Update the firmware with new features.

Download Fluke Connect Software

1. On the website, follow the instructions to download the software to the PC.
2. On the PC, follow the instructions to install Fluke Connect software. (Administrator privileges are required for the installation.)
3. Restart the PC when installation is complete.

Update Firmware

1. On the PC, open Fluke Connect software.
2. Connect one end of the USB cable into your PC and the other end of the USB cable into the Product.

Windows automatically installs the device driver for use with the Product. Fluke Connect software recognizes the connection with the Product.

3. On the PC:
 - a. Select **Yes** if prompted to download a firmware update file onto the PC.
 - b. Select the Product from the list on the left.
 - c. Select **Yes** if prompted to download a firmware update to the Product.
4. On the Product, tap **Ok**.

To complete the firmware update, the Product turns off.

5. To use the new firmware, turn on the Product.

Maintenance

The Product requires minimum maintenance.

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.

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 the lens too vigorously because this can damage the anti-reflective coating.**

To clean the lens:

1. Use a pressurized can of air or a dry nitrogen-ion gun, if available, to blow off the particulates from the lens surface.
2. Soak a lint-free cloth in a commercial lens cleaning liquid that contains alcohol, ethyl alcohol, or isopropyl alcohol.
3. Squeeze the cloth to remove excess liquid.
4. Wipe the lens surface in one circular motion and discard the cloth.
5. If needed, repeat with a new lint-free cloth.

Battery Care

Caution

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

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

- Do not charge the Product for more than 24 hours as reduced battery life may result.
- Charge the Product for at least 1.5 hours every six-months for maximum battery life. Without use, the battery will self-discharge in approximately six months.

Charge Batteries

Caution

To prevent damage to the Product:

- **Always operate in the specified temperature range.**
- **Do not attempt to charge the batteries in extreme cold environments.**
- **Do not use a USB charger that supplies >5 V ($\pm 5\%$).**


Caution

Do not incinerate the Product.

Note

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

Before you use the Product for the first time, charge the battery for at least 1.5 hours. The battery status shows on the five-segment charge indicator.

1. Connect one end of the USB cord into the USB port on the Product and the other end into a USB port on a PC.
2. Charge until the charge indicator, , on the display does not flash.
3. Disconnect the USB cable when the battery is fully charged.

Radio Frequency Data

See Table 9 for instructions on how to access digital copies of the Certificate IDs on the Product.