Keysight U5850 Series True*IR* Thermal Imager

KEYSIGHT TECHNOLOGIES

User's Guide

Notices

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Safety Information

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Safety Symbols

The following symbols on the instrument and in the documentation indicate precautions which must be taken to maintain safe operation of the instrument.

	Caution, risk of danger (refer to this manual for specific Warning or Caution information)
	Laser radiation

Safety Considerations

Read the information below before using this instrument.

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards for design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements.

WARNING

- Do not use the U5850 Series if it is damaged. Before you use the U5850 Series, inspect the casing. Look for cracks or missing plastic. Do not operate the U5850 Series around explosive gas, vapor, or dust.
- Always use the U5850 Series with the cables provided.
- Observe all markings on the U5850 Series before establishing any connection.
- Turn off the U5850 Series before removing the battery cover.
- When servicing the U5850 Series, use only the specified replacement parts.
- Do not operate the U5850 Series with the battery cover or portions of the cover removed or loosened.
- Use only the designated AC/DC power adapter or charger provided by the manufacturer to avoid any unexpected hazards.
- Use only the battery pack supplied with the U5850 Series. Do not disassemble/modify the battery pack or leave it under direct heat/ sunlight.
- Keep the battery pack away from water, fire, or heat.
- Avoid any contact with battery leakage to prevent personal injuries. If there is leakage or strange smell, remove the battery pack immediately from the U5850 Series or the external battery charger.

WARNING

- Do not connect the positive terminal and the negative terminal of the battery pack (metallic part) to each other with any metal objects, such as wires.
- Do not continue to charge the battery pack if it does not become charged within the specified charging time.
- Do not apply impact to or insert foreign objects into the battery pack.
- Do not use the camera on a tripod in an area with large vibration or shock.
- Do not use the U5850 Series under water or with conductive gloves or cloths worn or in a strong electromagnetic field.
- Do not stare into the torch light.

CAUTION

- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- The U5850 Series uses a highly-sensitive infrared detector. Ensure to comply with the requirements in "Environmental Conditions" on page 8 when using the U5850 Series.
- Do not apply excessive stress to the LCD screen, the focus adjustment ring, or the camera lens to avoid damages.
- Avoid direct rays or shock to the visible or infrared camera lens of the U5850 Series.
- Do not perform image acquisition directly at the sun or objects with extremely high temperature over a long period of time to avoid damage to the infrared detector.

CAUTION

- The following condition may be observed when the U5850 Series acquires or saves a visible image. This condition is not a device failure.
  - The color of the visible image changes periodically or may be different from the real target object when the image is replayed in the freeze mode.

  To avoid this condition, perform image acquisitions by changing the camera angle. In this case, it is recommended to acquire visible images by observing the image on the screen.
- The following condition may be observed in outdoor data acquisitions. This condition is not a device failure.
  - If the contrast is great (e.g., due to backlight), the object may appear darker on the camera display as compared to the brightness of the background.

  To avoid this condition, control the frame so that it covers only the target object.
- If bright sunlight enters the visible camera, the entire picture may become reddish. To avoid this, shield the camera from bright sunlight.
- When the U5850 Series is moved from objects with large temperature differences, “ghost” image may be present on the display. This condition is not a device failure. It may take several minutes to dissipate the “ghost” image. You can automatically dissipate the “ghost” image by switching to the freeze mode and back to the run mode (refer to “Image Playback” on page 56).
- **Do not input laser beam (CO_2 laser, etc.) to avoid damage to the infrared detector.**
- If the U5850 Series is used in a manner not specified by the manufacturer, the U5850 Series protection may be impaired.
- Always use a dry cloth to clean the U5850 Series. Do not use ethyl alcohol or any other volatile liquid to clean the U5850 Series.

WARNING

Laser pointer precautions:

- This laser pointer is a Class 2 laser product.
- Laser beam contact with the eyes may cause visual impairment.
- Do not point the laser beam towards people.
- Do not stare into the laser beam.
- The U5850 Series is intended for professional use and is not suitable for general use.

Environmental Conditions

The U5850 Series True*IR* Thermal Imager is designed for indoor use and in an area with low condensation. The table below shows the general environmental requirements for this instrument.

Environmental condition	Requirement
Temperature	Operating condition – –15 °C to 50 °C Storage condition – –40 °C to 70 °C
Humidity	Operating condition – 50% RH to 95% RH at 40 °C Storage condition – 95% RH at 40 °C
Altitude	Up to 2000 m
Pollution degree	2

Regulatory Information

The U5850 Series True*IR* Thermal Imager complies with the following safety and Electromagnetic Compatibility (EMC) compliances:

Safety compliance

- Laser safety: IEC 60825-1 (Laser Class 2)
- IEC 61010-1

EMC compliance

- IEC 61326-1
- CISPR11, Group 1 Class A
- Canada: ICES/NMB-001: Issue 4, June 2006
- Australia/New Zealand: AS/NZS CISPR 11

Regulatory Markings

CAN ICES NMB-001(A) ISM GRP 1-A	CAN ICES/NMB-001(A) indicates that this ISM device complies with the Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.		The RCM mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australia EMC Framework regulations under the terms of the Radio Communication Act of 1992.
 MSIP-REM- ATi-THERMAL	This symbol is a South Korean Class A EMC Declaration. This is a Class A instrument suitable for professional use and in electromagnetic environment outside of the home.		This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.
	This symbol indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.		

Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.

Product category:

With reference to the equipment types in the WEEE directive Annex 1, this instrument is classified as a “Monitoring and Control Instrument” product.

The affixed product label is as shown below.

Do not dispose in domestic household waste.

To return this unwanted instrument, contact your nearest Keysight Service Center, or visit http://about.keysight.com/en/companyinfo/environment/takeback.shtml for more information.

Sales and Technical Support

To contact Keysight for sales and technical support, refer to the support links on the following Keysight websites:

- www.keysight.com/find/trueIRimager
  (product-specific information and support, software and documentation updates)
- www.keysight.com/find/assist
  (worldwide contact information for repair and service)

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1 Introduction

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This chapter guides you to set up the U5850 Series True*IR* Thermal Imager for the first time. A summary of all the U5850 Series True*IR* Thermal Imager features is also given.

About This Manual

The descriptions and instructions in this manual apply to the Keysight U5855A, U5856A, and U5857A True*IR* Thermal Imager (hereafter referred to as the U5850 Series or the instrument).

The model U5857A appears in all illustrations.

Documentation map

The following manuals and software are available for your instrument. For the latest version, visit our website at: www.keysight.com/find/trueIRimager

Check the manual revision on the first page of each manual.

- **User's Guide**
  This manual.
- **Quick Start Guide**
  Printed copy, included with shipment.
- **Service Guide**
  Free download at the Keysight website.
- **Keysight True*IR* Analysis and Reporting Tool software**
  Free download at the Keysight website: www.keysight.com/find/trueIR_ART

Safety notes

Safety notes are used throughout this manual (refer to the Safety Symbols section for format examples). Familiarize yourself with each of the notes and its meaning before operating your instrument.

More pertinent safety notes for using this instrument are located under the Safety Considerations section.

Do not proceed beyond a safety notice until the indicated conditions are fully understood and met.

Preparing the U5850 Series

Check the shipment

When you receive your instrument, check the shipment according to the following procedure.

1. Inspect the shipping container for damage. Signs of damage may include a dented or torn shipping container or cushioning material that indicates signs of unusual stress or compacting. Save the packaging material in case the instrument needs to be returned.
2. Carefully remove the contents from the shipping container, and verify that the standard items are included in the shipment according to the standard shipped items list shown in "Standard shipped items" on page 22.
3. For any enquiries, refer to the Keysight contact numbers on the back of this manual.

If any item is found missing or damaged, contact your nearest Keysight Sales Office.

Keep the original packaging in case the U5850 Series has to be returned to Keysight in the future. If you return the U5850 Series for service, attach a tag identifying the owner and model number. Include also a brief description of the problem.

Standard shipped items

Keysight U5850 Series True*IR* Thermal Imager

Hard carrying case

Power adapter

Power cord

Li-Ion rechargeable battery

SD memory card

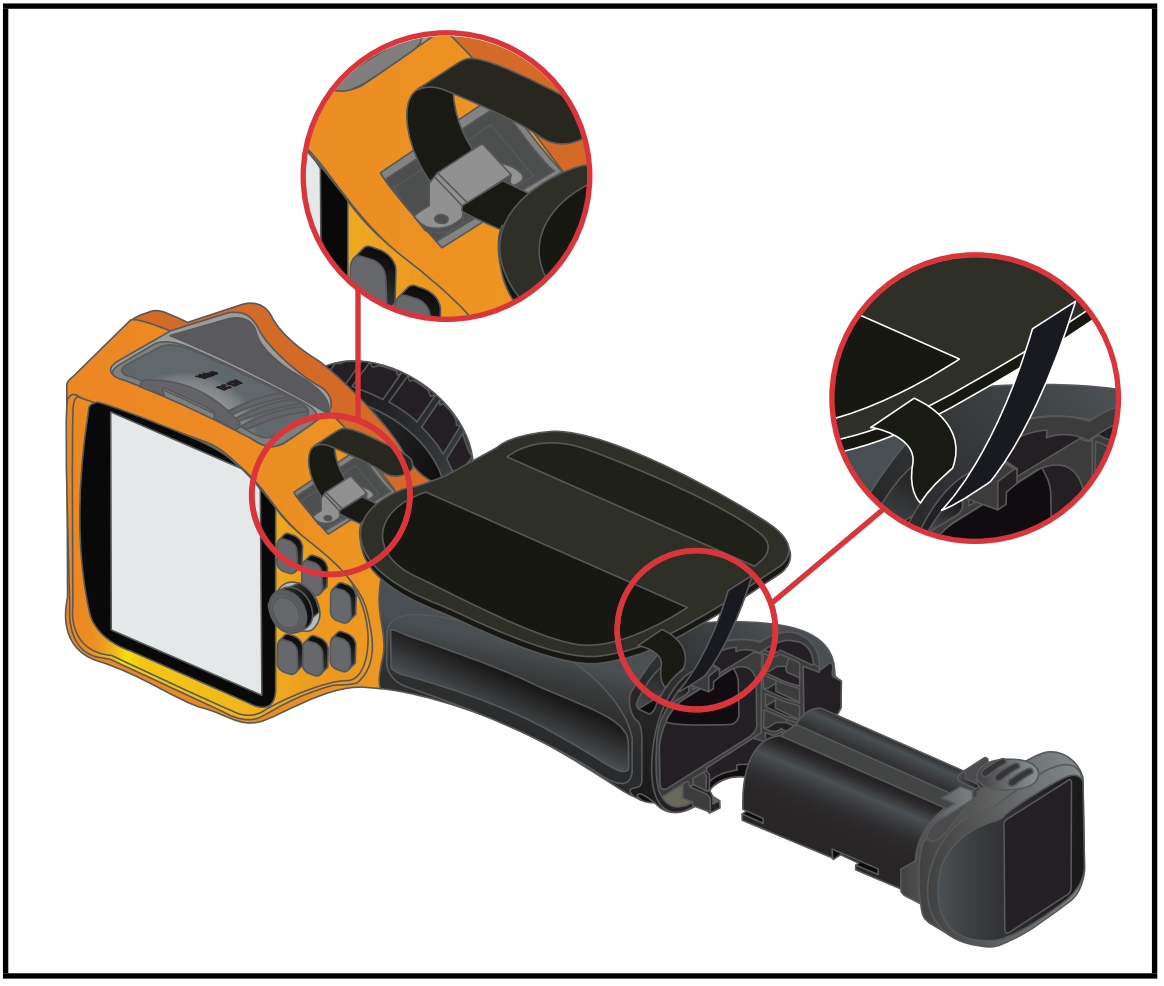
USB Standard-A to Mini Type-B interface cable, 2 m

Video RCA to RCA interface cable, 2 m

Keysight U5850 Series Quick Start Guide

Certificate of Calibration

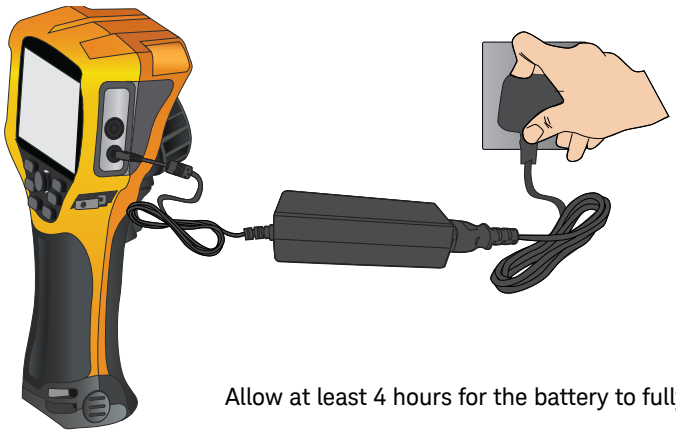
Install the hand strap



Install and charge the battery

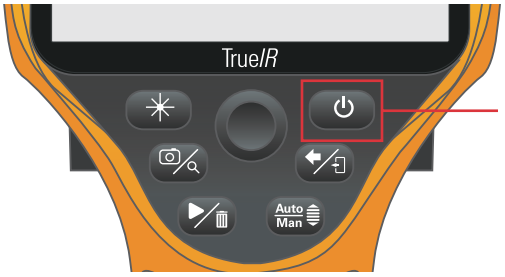
NOTE It is recommended to store the battery in a cool, dry place at normal room temperature. Remove the battery from the device if the device is stored for extended periods.

2



Allow at least 4 hours for the battery to fully charge.

2a



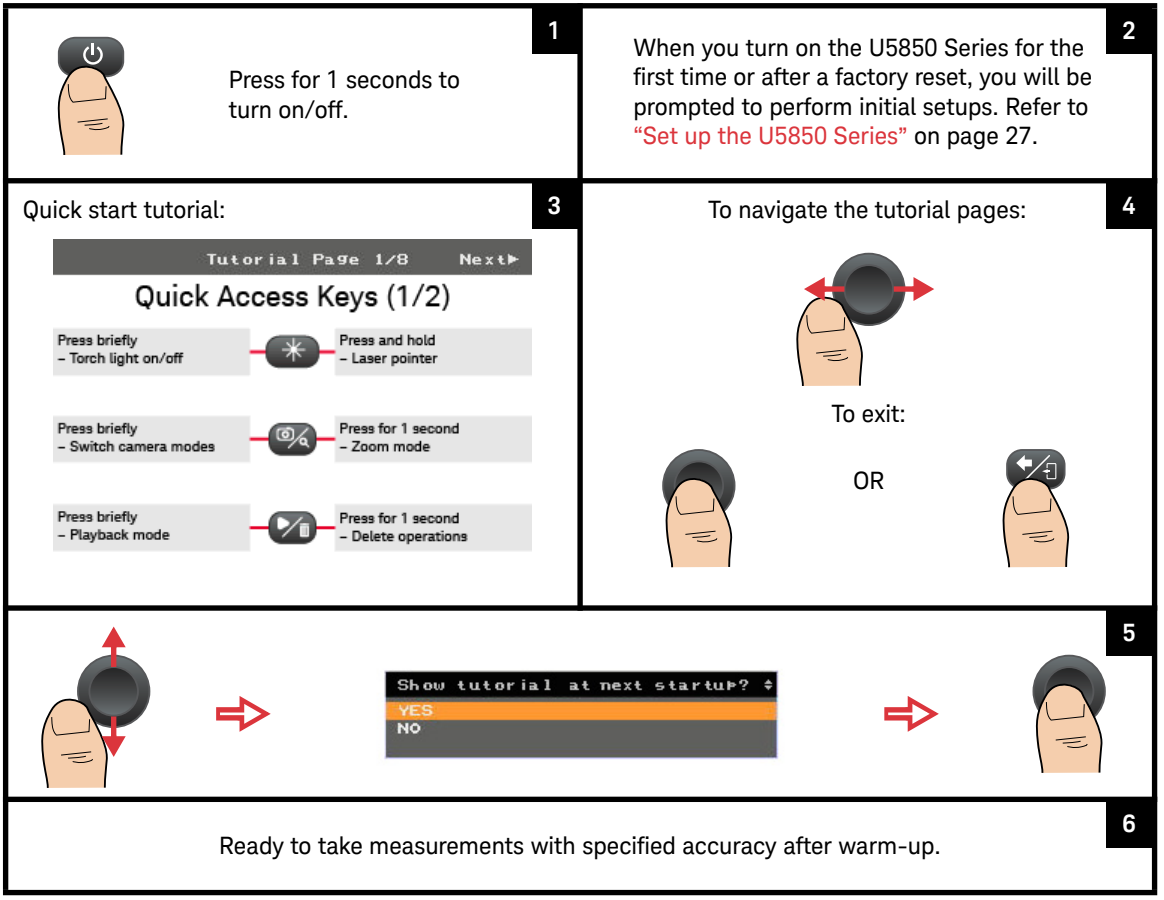
Indicates charging status

NOTE Refer to “LED status indication” on page 34 and “Battery status indication” on page 37 for more details.

Insert the SD memory card

Turn on the U5850 Series

CAUTION DO NOT REMOVE the battery or the SD memory card before power is turned off and the LED light goes off entirely. Otherwise it may damage the U5850 Series or destroy files saved in the SD memory card.



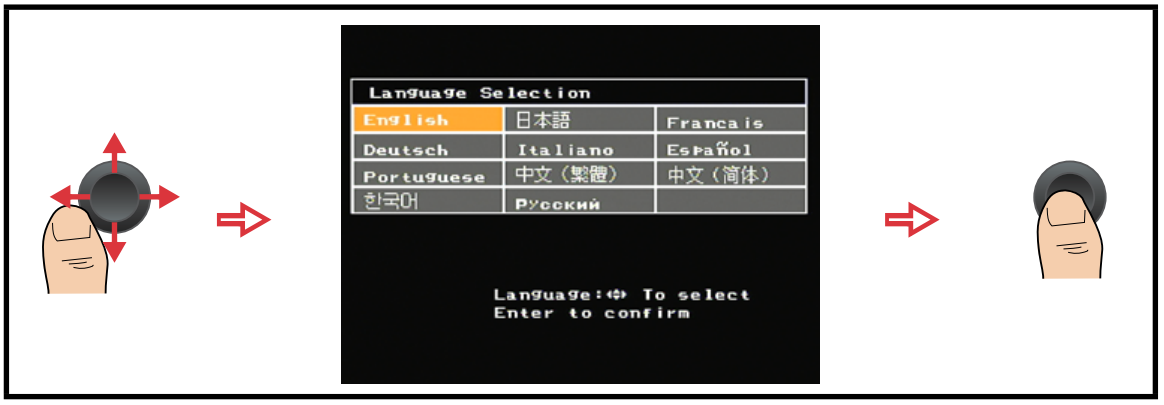
NOTE

- If Auto Off is enabled, the U5850 Series will automatically turns off if idle for 20 minutes (default). Pressing the power key will turn it back on.
- If Auto Sleep is enabled, the U5850 Series will automatically goes to sleep if idle for 10 minutes (default). Pressing any key will turn it back on.
- Refer to "Set the USB mode" on page 115 for more details.

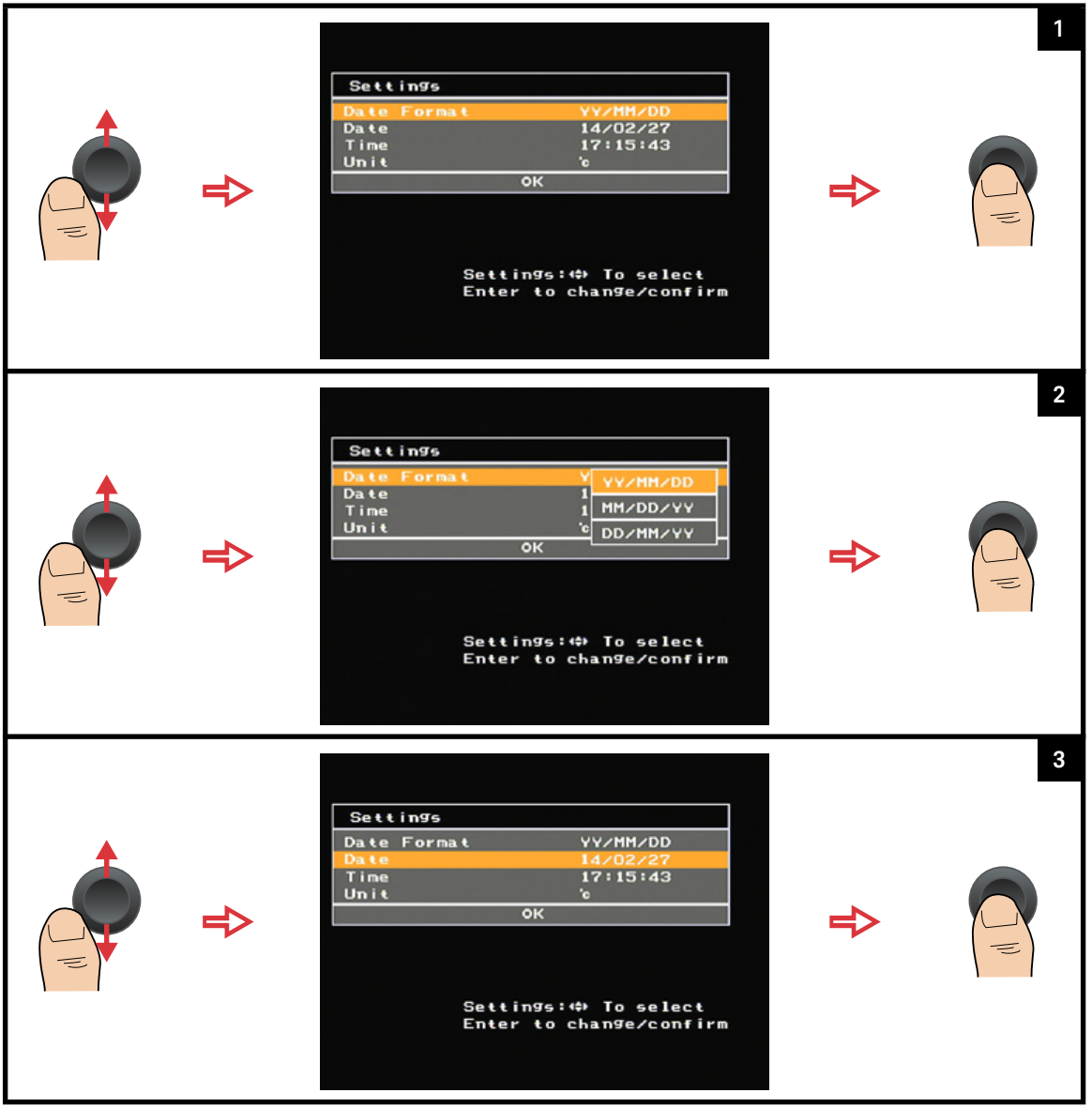
Set up the U5850 Series

NOTE This is only applicable when you turn on the U5850 Series for the first time, or after restoring the factory settings.

Set the language

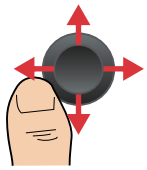


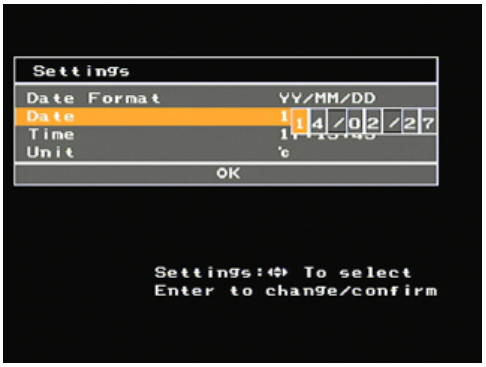
Set the date, time, and temperature unit

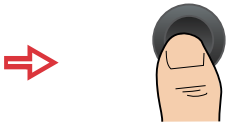


4

– Year: **00** to **99** (00: year 2000) – Month: **01** to **12** – Date: **01** to **31**



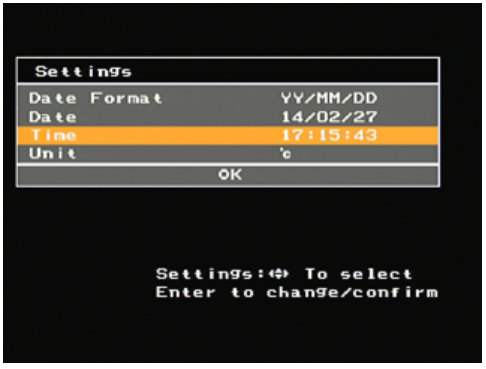


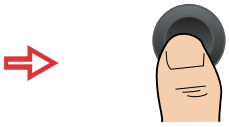


Push left/right to move the indicator.

Push up/down to increase/decrease the digits.

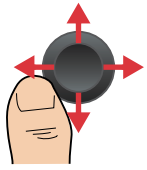
5

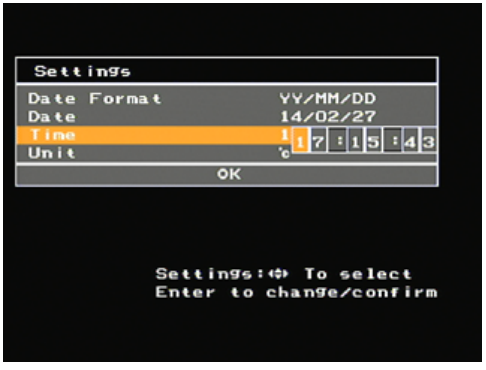


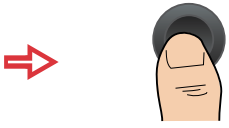


6

– Hour: **00** to **23** – Minute: **00** to **59** – Second: **00** to **59**

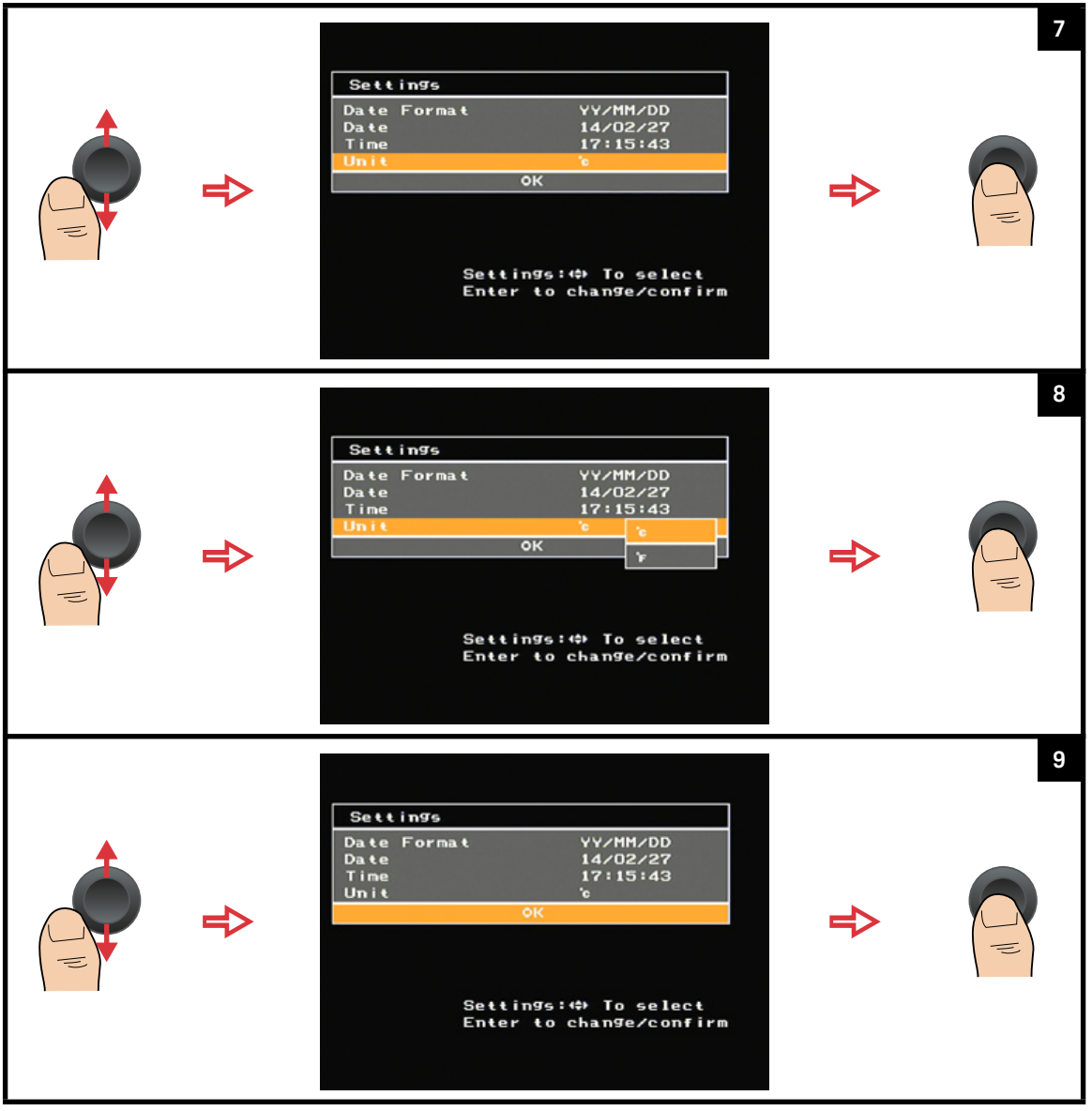






Push left/right to move the indicator.

Push up/down to increase/decrease the digits.


7
Settings
Date Format YY/MM/DD
Date 14/02/27
Time 17:15:43
Unit °c
OK
Settings:↔ To select
Enter to change/confirm
8
Settings
Date Format YY/MM/DD
Date 14/02/27
Time 17:15:43
Unit °c
OK
°c
°F
Settings:↔ To select
Enter to change/confirm
9
Settings
Date Format YY/MM/DD
Date 14/02/27
Time 17:15:43
Unit °c
OK
Settings:↔ To select
Enter to change/confirm

The U5850 Series in Brief

Figure 1-1 The front and side panels at a glance

[1] Press briefly to toggle between the image freeze (capture) or run operation. Press for 1 second to perform a quick-save.

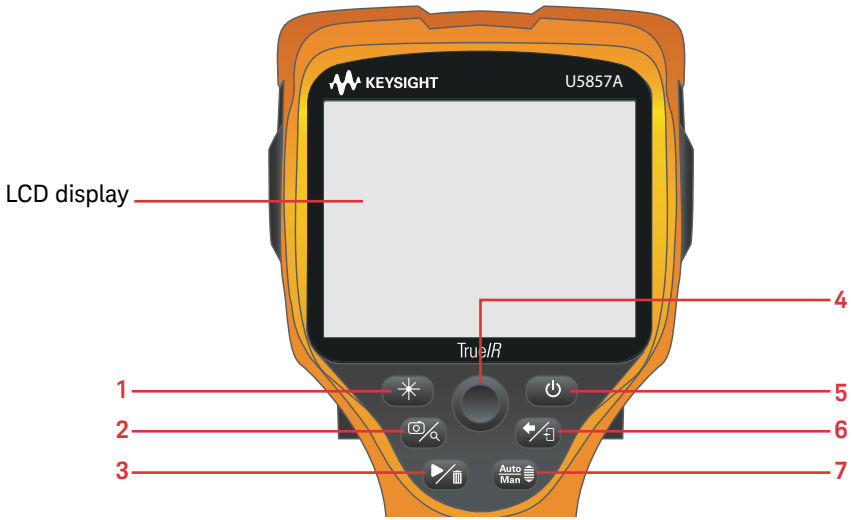
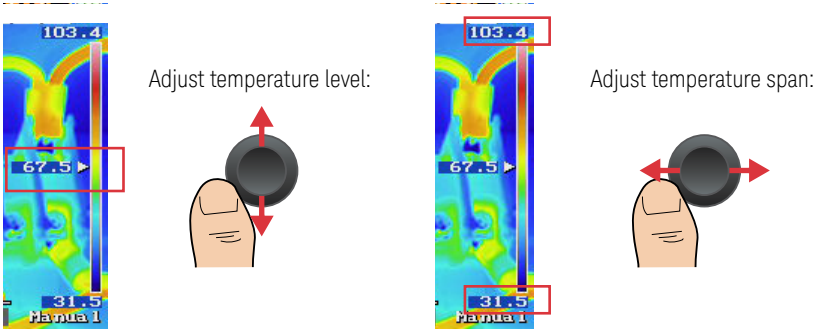


Figure 1-2 The rear panel at a glance

Table 1-1 Rear panel descriptions

	Legend	Description
1	Light/Laser control key[a]	– Press briefly to toggle the torch light on or off. – Press and hold to turn on the laser pointer, and release to turn it off.
2	Camera/Zoom key	– Press briefly to select the camera mode (refer to "Camera mode switching flow" on page 35 for more details). – Press for 1 second to access the zoom mode.
3	Play/Delete key	– Press briefly to play back saved images. – Press for 1 second for delete operations.
4	Navigation/Enter key	– Press the center of the key briefly to use as an Enter key or to access the Main Menu. – Push the sides of the key for up/down/left/right navigation. The left/right sides can be pushed to open or close sub-menus.
5	Power on/off key (with LED status indicator)	Press for 1 seconds to turn the U5850 Series on or off.
6	Back/Exit key	– Press briefly to return to the previous menu. – Press for 1 second to exit any menu.

Table 1-1 Rear panel descriptions (continued)

Legend	Description
7 Auto/Manual scale key	Press briefly to switch from auto to manual scaling. – In the manual scaling mode, press briefly to perform auto scaling once. – Manual scaling allows you to set the temperature level or the temperature span (upper/lower temperature limits) of the temperature scale.  Press for 1 second to switch from manual to auto scaling.

[a] Torch light and laser pointer are not functional when the U5850 Series is in the power-saving mode.

LED status indication

Table 1-2 LED status indication (power adapter connected)

Unit turned on/off	LED	Status
Off	Red (flashing)	Charging
	Off	Full charge
	Red	Charge error
On	Green	Charging
		Full charge
	Red	Charge error
	Red (flashing)	Laser on
	Green (flashing)	Power saving (Auto-Sleep) mode

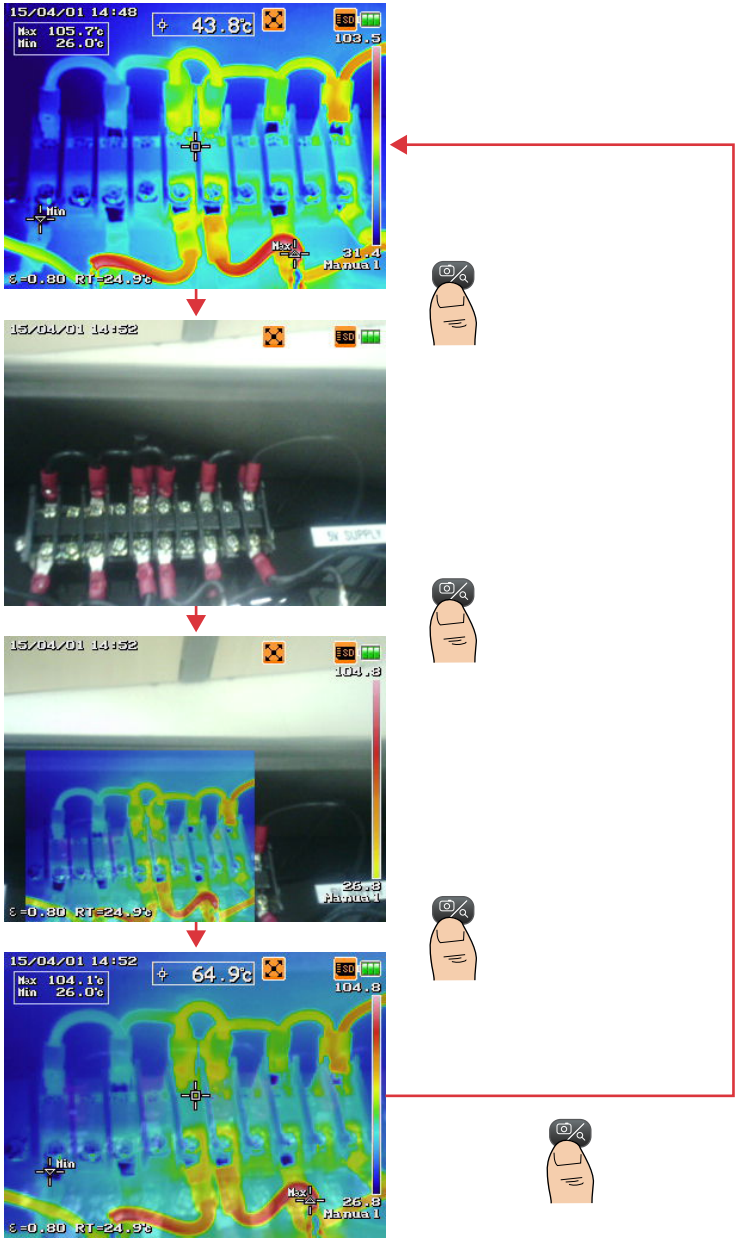
Camera mode switching flow

IR image
(with Fine Resolution enabled)

Visible image

Picture-in-picture
(fusion) image

Blend (fusion) image



Display screen

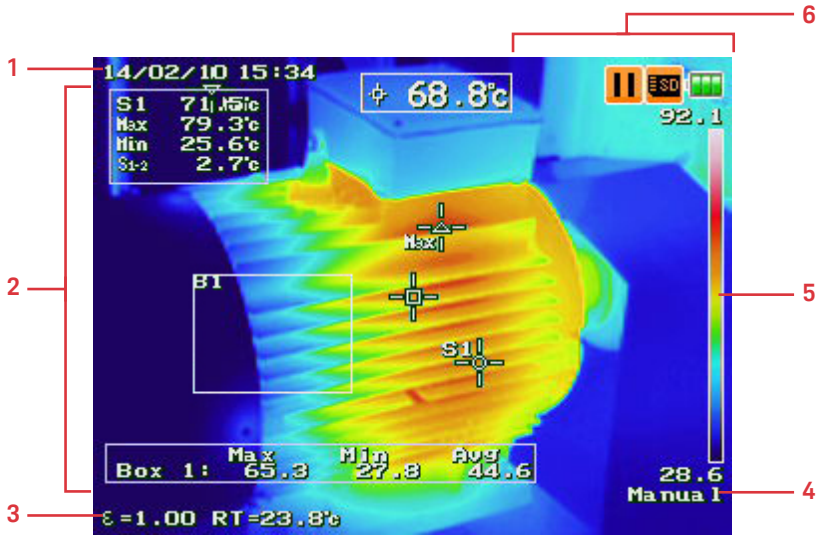


Figure 1-3 The display at a glance

Table 1-3 Display descriptions

	Description
1	Date/time
2	Measurement results and tools
3	Info bar (selectable up to four items to display)
4	Auto/manual scaling

Table 1-3 Display descriptions (continued)

	Description
5	Temperature scale/color bar with upper and lower temperature limits
6	Icons as status indicators: Freeze mode Laser on SD memory card inserted Edit mode Battery status Fine Resolution Mode Image logging operation USB connectivity for mass storage USB connectivity for data streaming

Battery status indication

Table 1-4 Battery status indication[a]

(~2.5 to 4 hours remaining)	1 to 2.5 hours remaining	15 to 60 minutes remaining	Empty (flashing)
Charging	Fully charged (with adapter connected)	No battery (with adapter connected)	Charge error (flashing) (with adapter connected)

[a] Typical operating time of a new battery.

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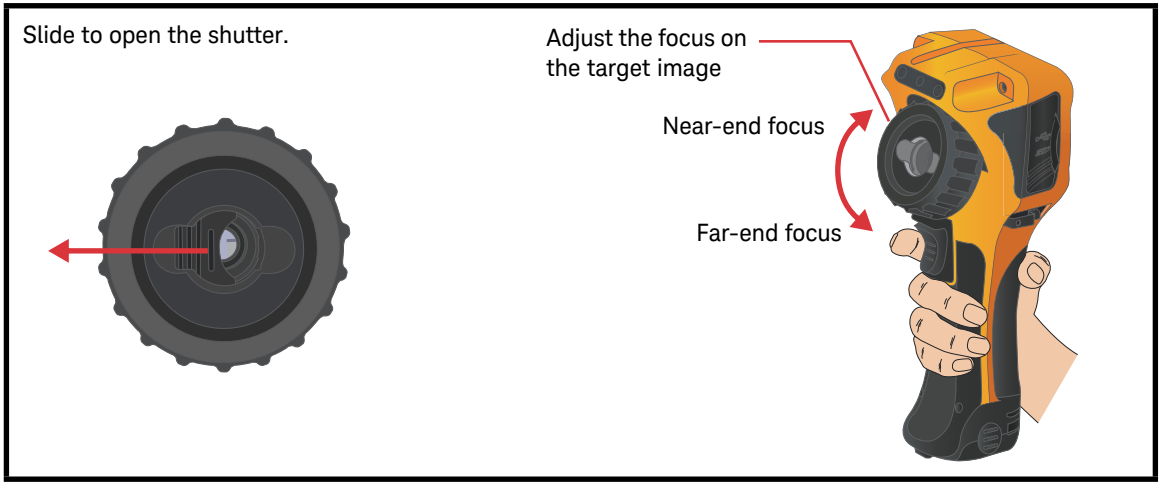
2 Image Capture, Processing, and Measurement Functions

Camera Controls 40
Image Saving 44
Image Playback 56
Measurement Controls 63
Imaging Controls 75
Digital Zoom 83
Parameter Controls 85

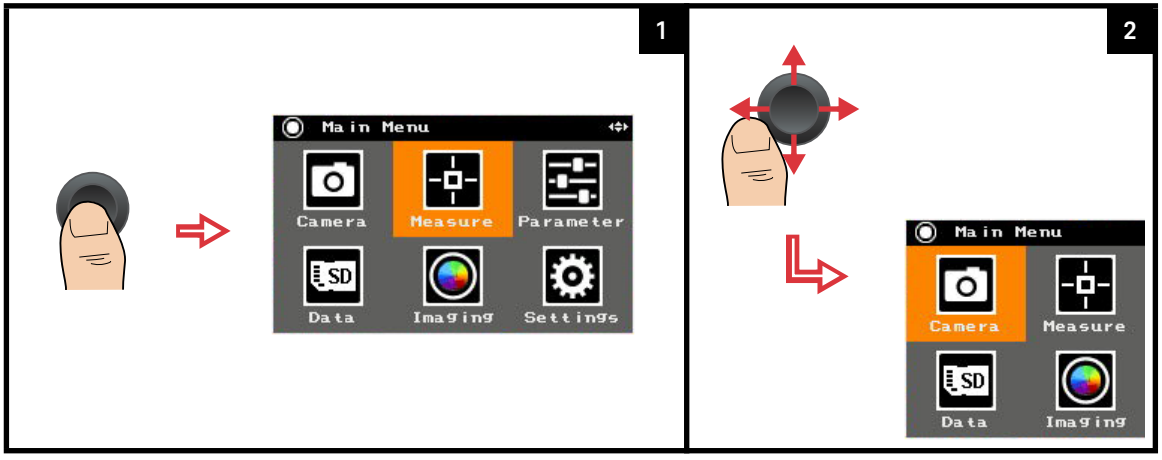
This chapter guides you on how to operate the main functions of the U5850 Series True*IR* Thermal Imager.

Camera Controls

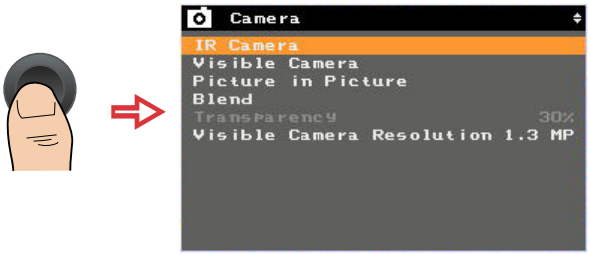
Capture images



Select a camera mode



3



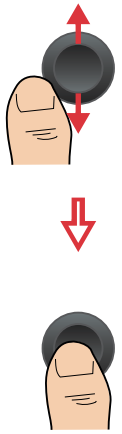
The U5850 Series provides two fusion camera modes:

- Picture in Picture
- Blend

These modes enable you to identify abnormalities easily with a fusion of both IR and visible images.

4

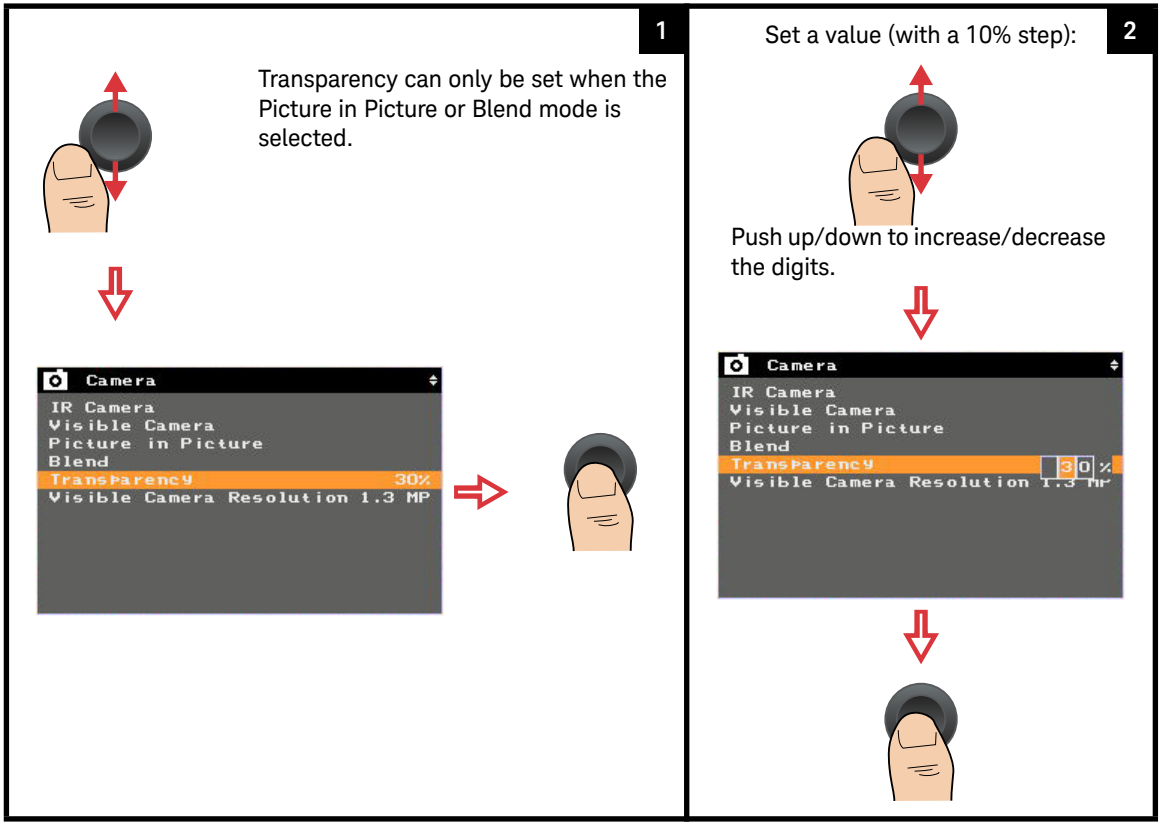
Select a camera mode:



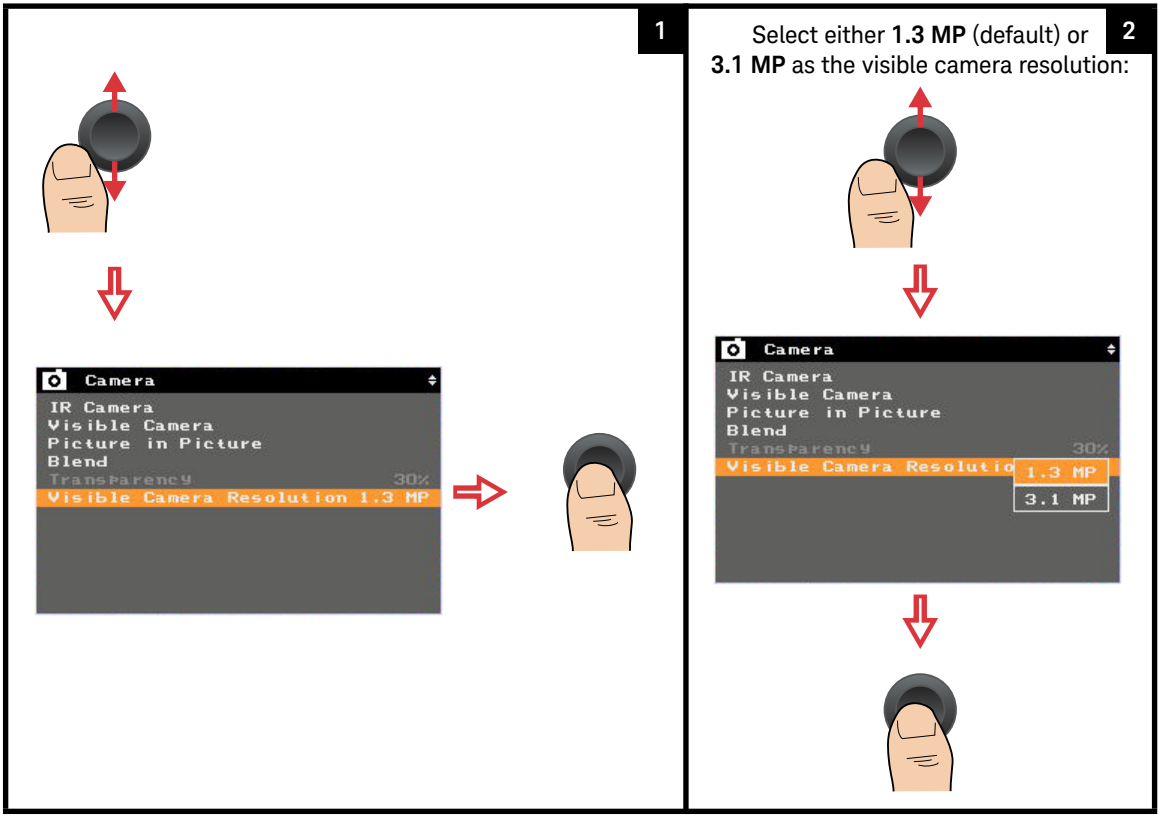
Fine resolution (FR)

Fine resolution thermal imaging produces high quality in-camera IR images by capturing images with 4× more effective IR resolution and approximately 1.5× finer Instantaneous Field of View (IFOV) using multi-frames capturing and sophisticated image processing techniques.

Set the transparency of fusion images



Set the visible camera resolution



NOTE For better clarity and higher resolution, select **3.1 MP** as the visible camera resolution.

Image Saving

NOTE

- Allow a short warm up before performing image acquisition for accurate measurement.
- It is recommended to power on the U5850 Series before connecting the USB cable to the PC.

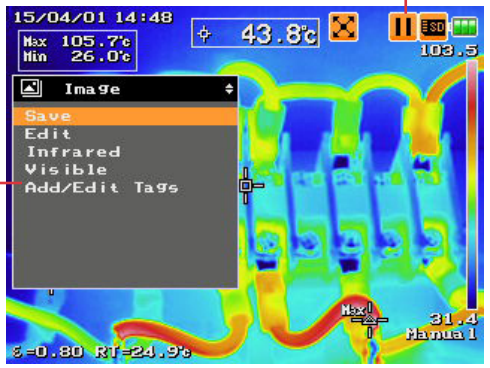
After capturing the images, you can save them into the SD memory card inserted in the U5850 Series. You can also add tags and edit the images.

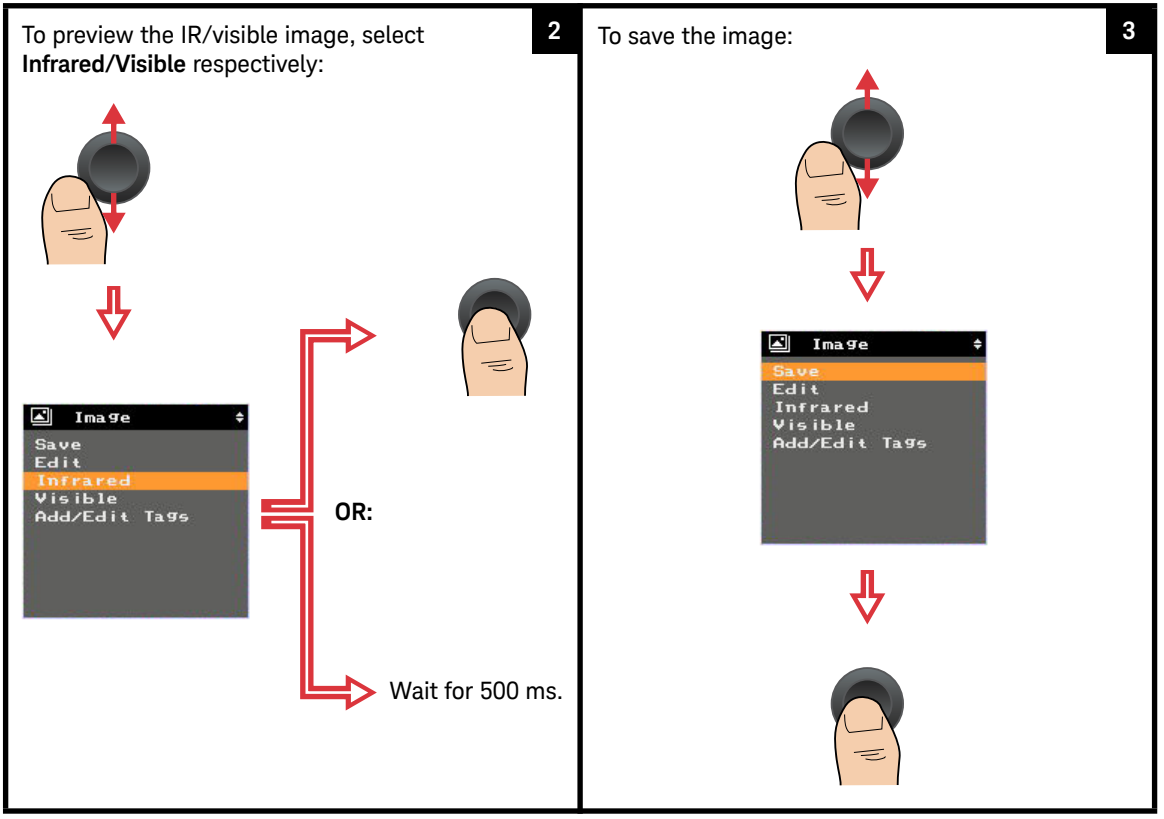
Preview and save an image

1

The Image menu is displayed:

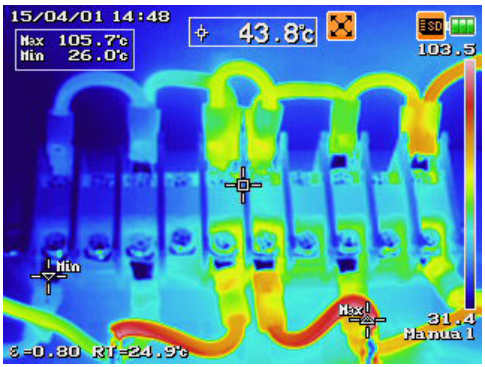
*(You need to set to the **Preview/Save** mode for the Trigger key press in order to display the Image menu. Refer to "Configure the main key press functions" on page 114.)*




2
To preview the IR/visible image, select **Infrared/Visible** respectively:
Image
Save
Edit
Infrared
Visible
Add/Edit Tags
OR:
Wait for 500 ms.
3
To save the image:
Image
Save
Edit
Infrared
Visible
Add/Edit Tags

4

Once the image has been saved, it will return to the run mode.



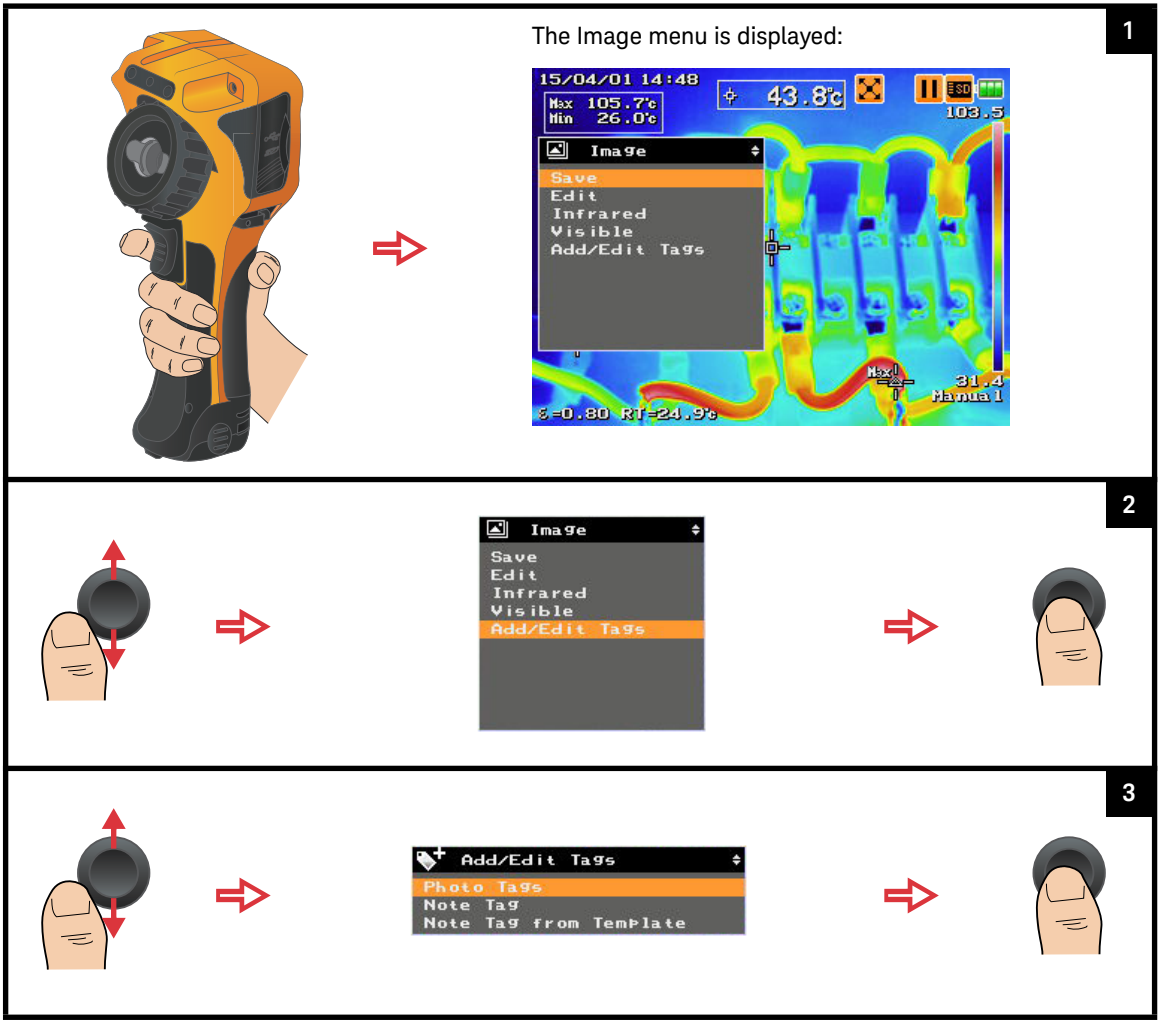
- If the auto save visible image setting is enabled, both the IR and visible images will be saved.
- If the auto save visible image setting is disabled, only the IR image will be saved.

Refer to "Turn on/off visible image auto-save" on page 111 for more details.

Add tags

You can include photo tags (up to three visible images) and note tag that correspond to your IR image analysis.

Add photo tags



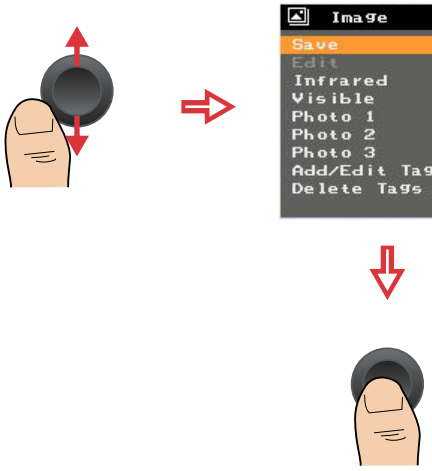
4 Visible image is displayed:

5 To capture the photo tag:

Repeat the same to add more photo tags (up to three).

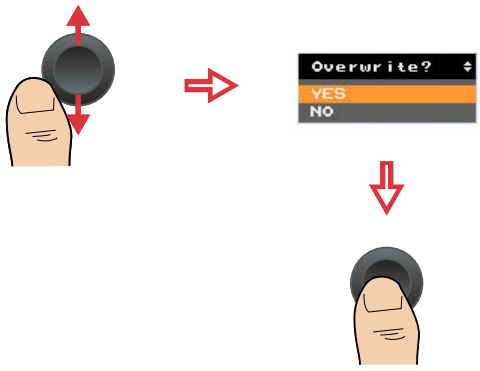
6 Photo tag indicators will be added:

7 Save the photo tags with the IR and visible images, and return to the run mode:



8 If there is already an existing photo tag and you want to add a new tag, a message prompts you to overwrite the existing tag:

9 Select **YES** to proceed with adding tags or **NO** to return to the previous screen:



Add a note tag

1 Repeat steps 1 to 2 from "Add photo tags" on page 47.

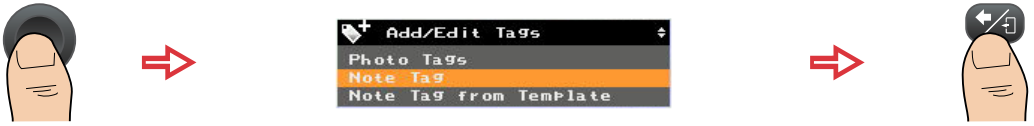
2

Move the character cursor — Confirm the cursor position — Select and enter the character

If there is no character input, a blank character is inserted.

3

Press for 1 second.

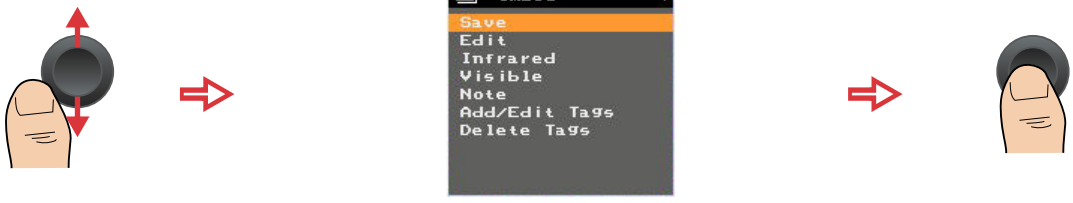


4

Note tag indicator will be added:

5

Save the note tag with the IR and visible images, and return to the run mode:



6

To preview the note tag:

Add a note tag from a template file

You can download the note tag template file from the Keysight website to the SD memory card.

To ensure proper use of this template file, use the following guidelines:

- File name and extension: NOTE_TMP.TXT
- File format: Text file/Notepad
- File location: Root of the SD memory card
- Character code: ASCII (20h to 7Fh)
- Maximum line: 50 lines
- Maximum characters per line: 64 characters

Follow steps 1 to 2 from "Add photo tags" on page 47. 1

The note tag template file that you downloaded will be displayed. Select a template and follow the same procedure from "Add a note tag" on page 49. 2

Edit tags

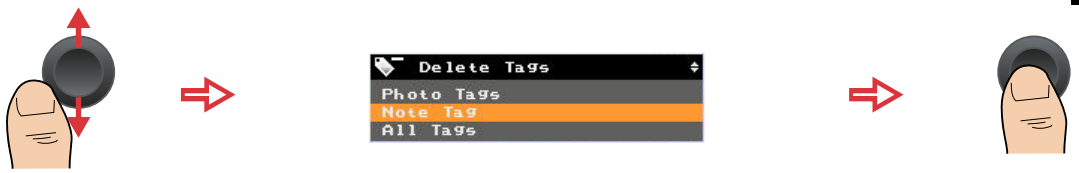
1

Follow the same procedure as adding tags. Existing tags will be overwritten by the edited tags. 2

Delete tags

1

2



3

Select **YES** to delete all photo tags, note tag, or all photo and note tags.
Select **NO** to return to the previous screen.

When a tag is deleted, the respective tag indicator will be removed from the Image menu.

Save an image directly

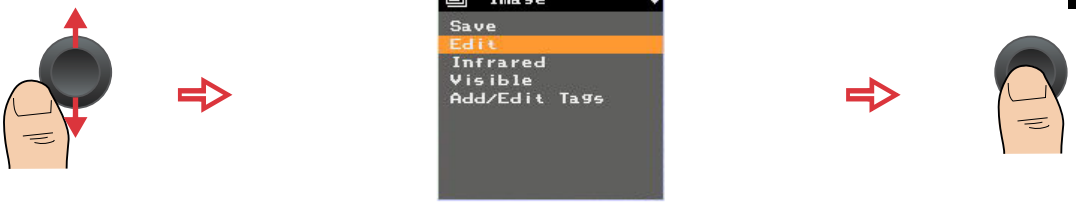
Press for 1 second to save.

Edit an image

1

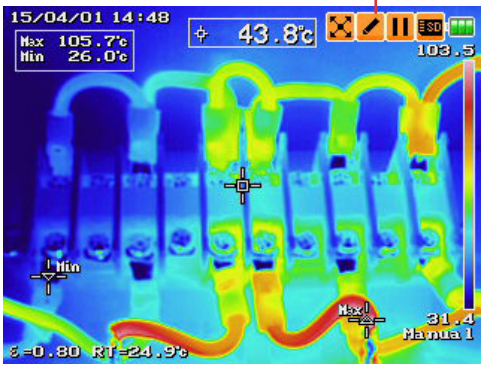
The Image menu is displayed:

2



3

Edit mode indicator



You can then proceed to edit the image or access the Main Menu for more operations.

4

To exit the Edit mode:

OR

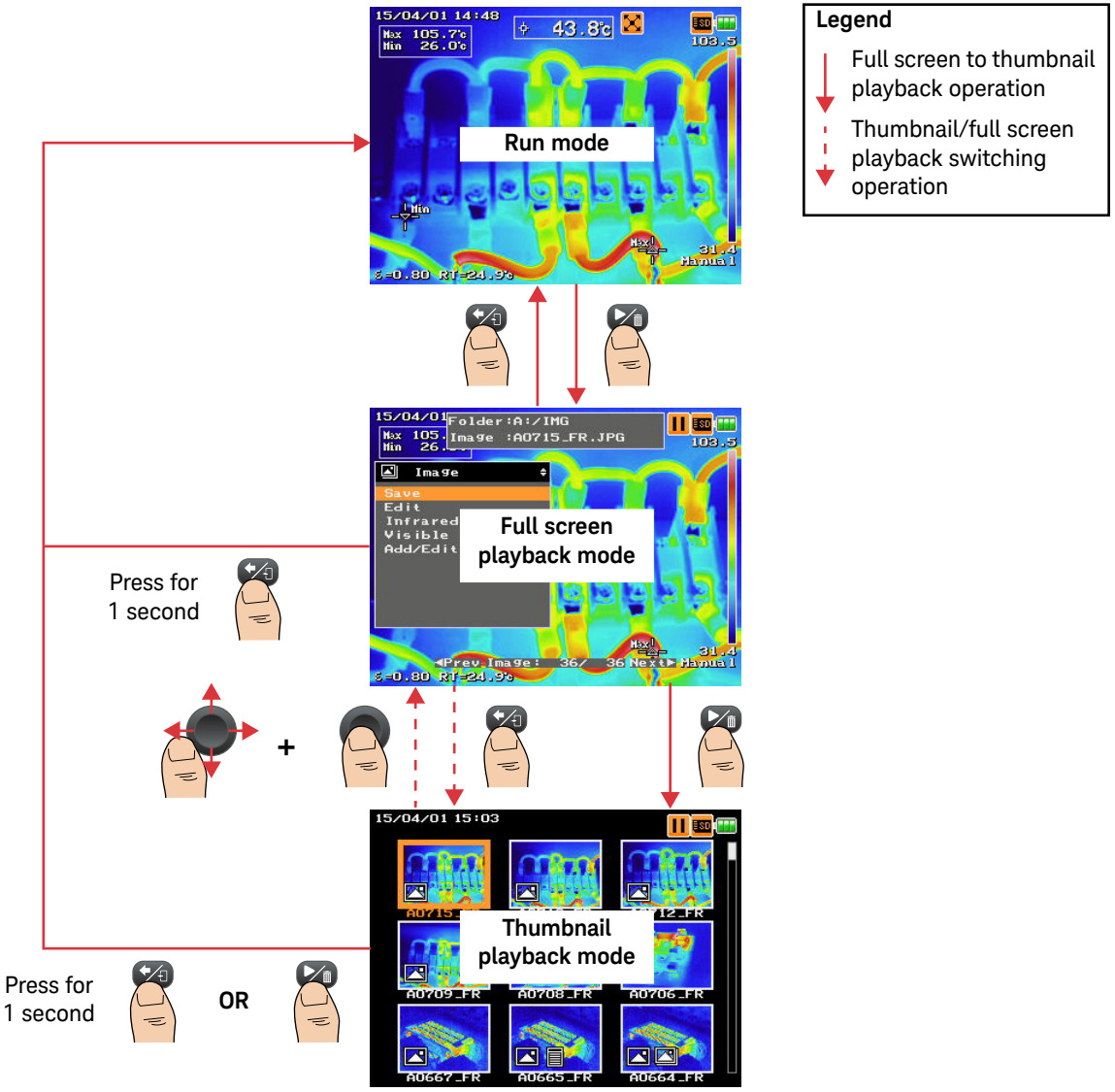
5

- Select **Save and exit** to overwrite the existing image and save your new edits, and then exit the Edit mode.
- Select **Exit without saving** to exit the Edit mode without saving your edits.
- Select **CANCEL** to return to the current operation.

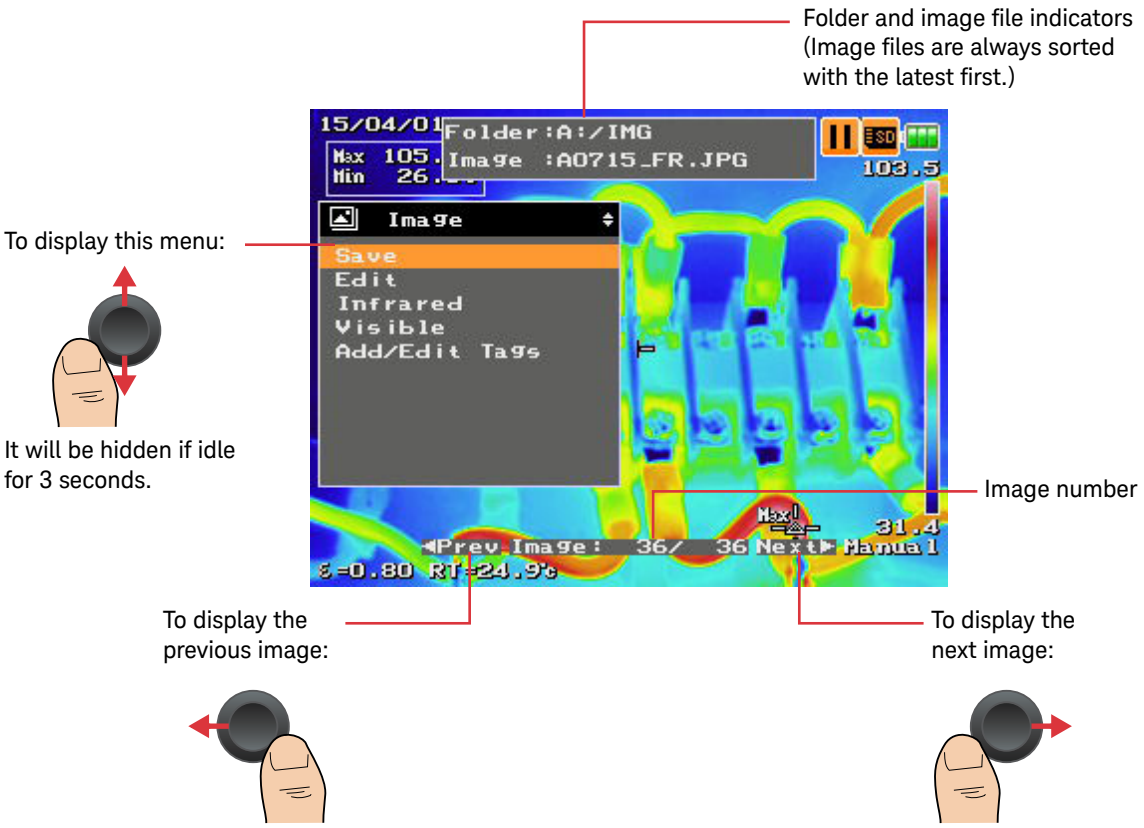
Image Playback

This feature allows you to play back saved images.

Full screen/Thumbnail playback mode operation

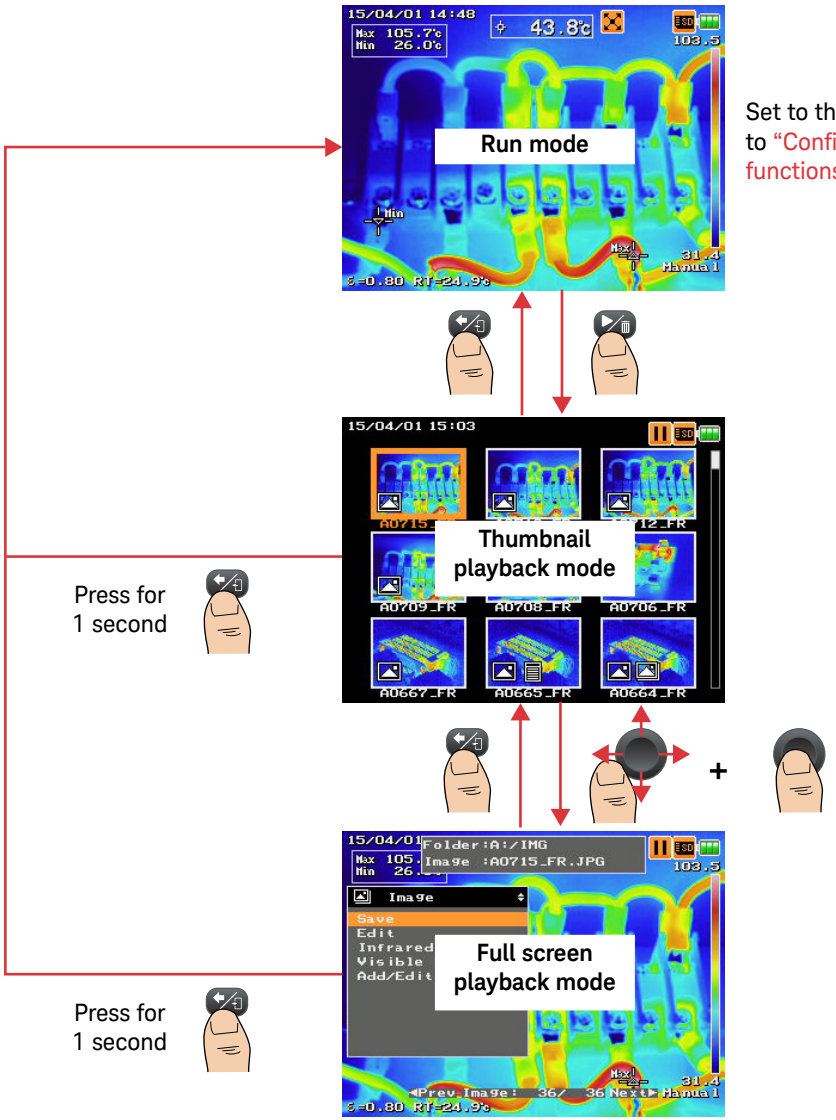


Full screen playback mode overview

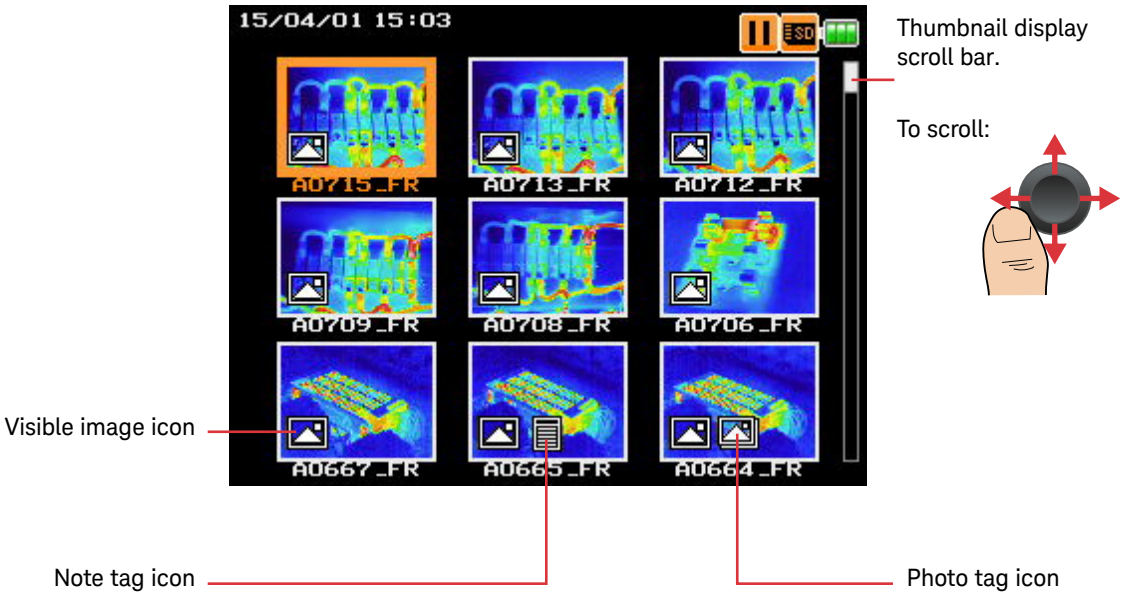


NOTE In the playback mode, you can perform the same Image menu operations as described in the previous sections of this chapter.

Thumbnail playback mode operation



Thumbnail playback mode overview

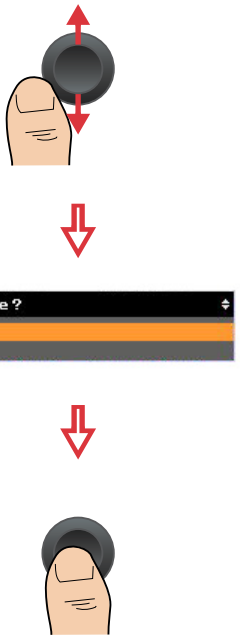


Delete an image (full screen playback mode)

3

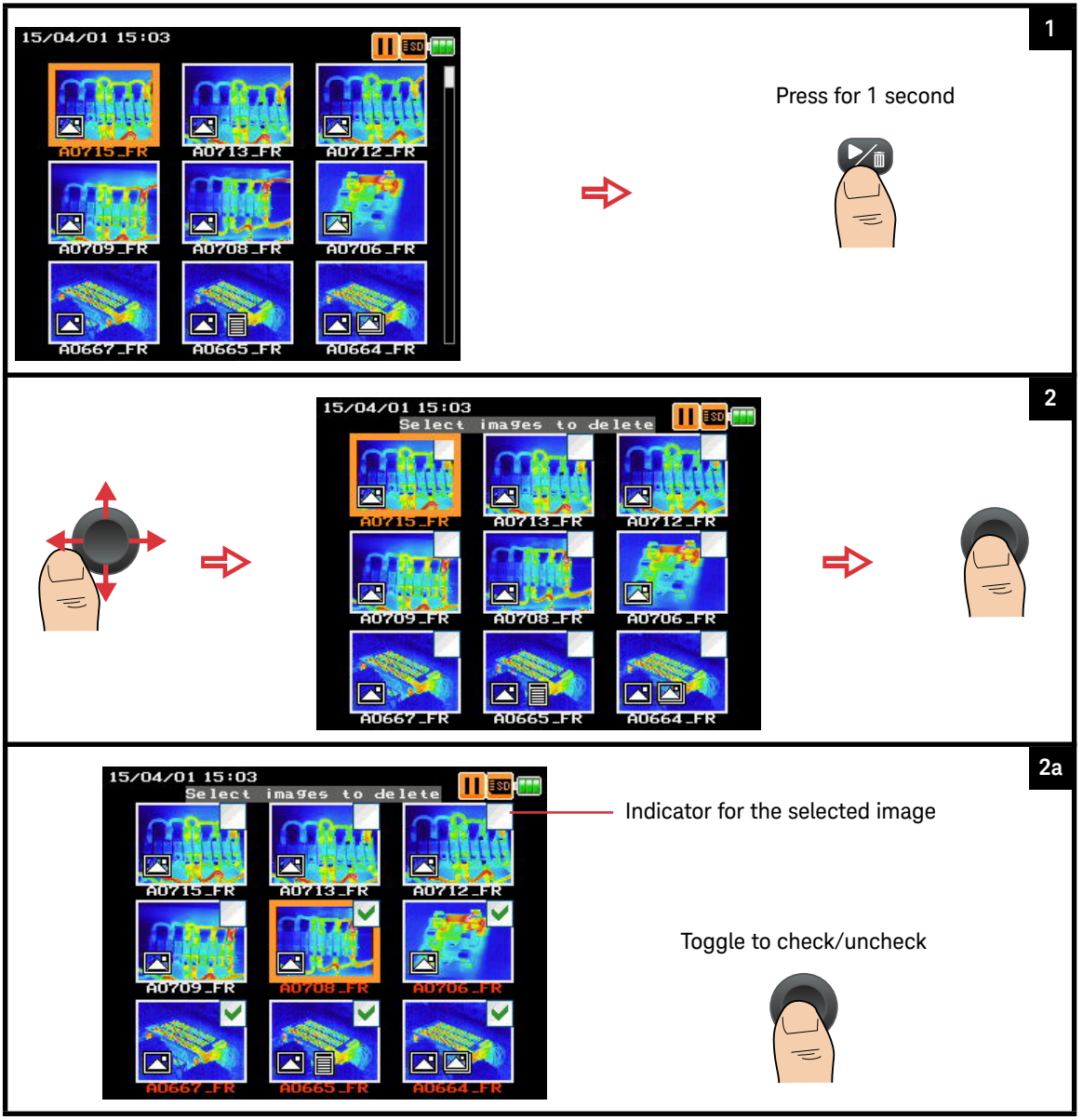
Press for 1 second

4

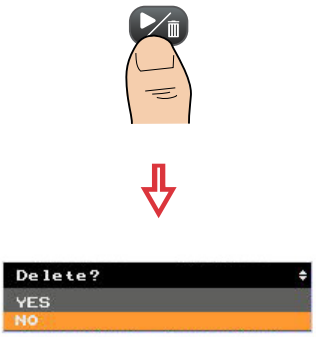


If an IR image is deleted, its related visible image, photo tag, and note tag are also deleted.

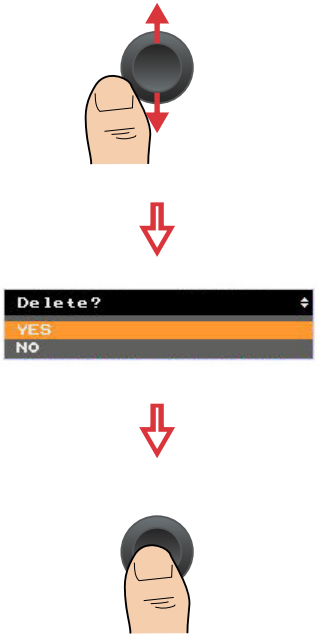
Delete multiple images (thumbnail playback mode)



3



4



Every deleted image will be updated with another thumbnail image.

If an IR image is deleted, its related visible image, photo tag, and note tag are also deleted.

Measurement Controls

The U5850 Series True*IR* Thermal Imager measurement controls enable you to identify hot/cold spots and to perform thermal analysis on the move, directly on the camera.

Set the temperature range

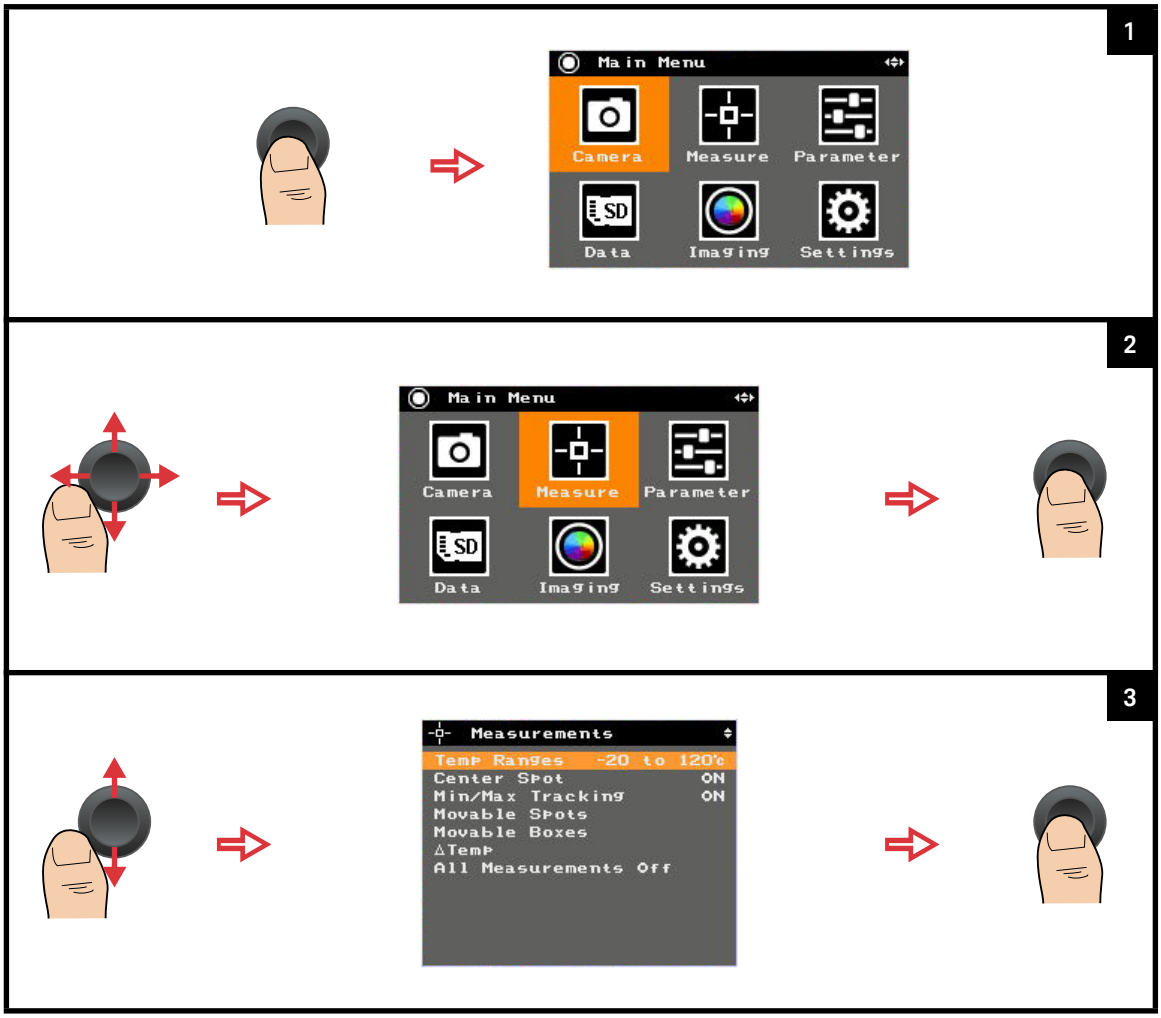
You can set auto range or manual range for temperature measurement.

- Range 1: –20 to 120 °C (U5855A/U5856A/U5857A)
- Range 2: 0 to 350 °C (U5855A/U5857A), 0 to 650 °C (U5856A)
- Range 3: 0 to 1200 °C (U5857A)

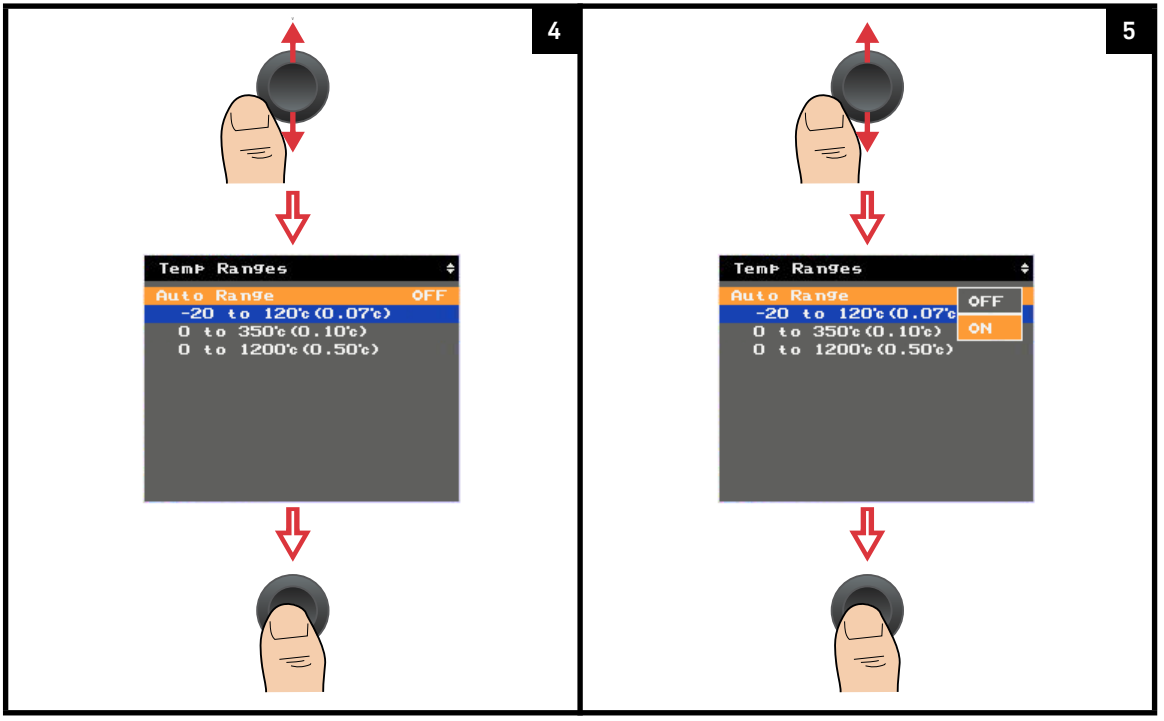
If the maximum temperature (within 80% of the image center area) meets the following conditions, auto ranging will occur:

- > 120 °C:
  Automatically switches from range 1 to range 2.
- > 350 °C (for U5857A):
  Automatically switches from range 2 to range 3.
- < 108 °C:
  Automatically switches from range 2 to range 1.
- < 315 °C (for U5857A):
  Automatically switches from range 3 to range 2.

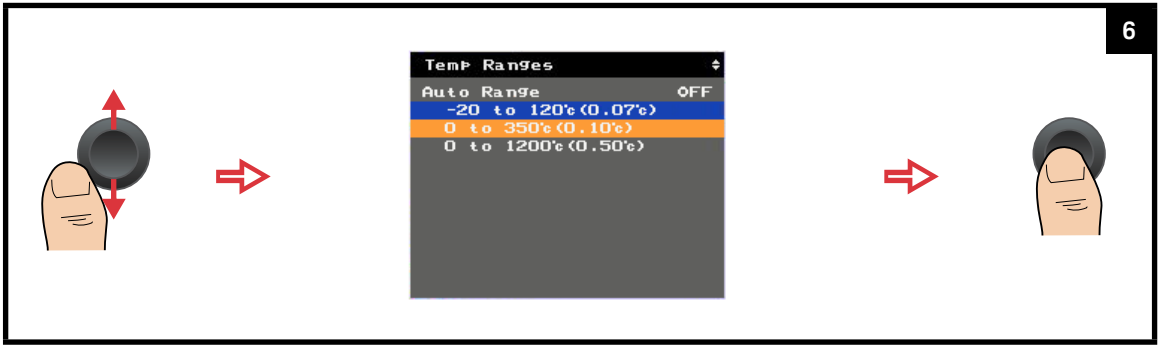
Auto ranging for these conditions only applies in the auto scaling mode.


1
Main Menu
Camera
Measure
Parameter
SD
Data
Imaging
Settings
2
Main Menu
Camera
Measure
Parameter
SD
Data
Imaging
Settings
3
Measurements
Temp Ranges -20 to 120°c
Center Spot ON
Min/Max Tracking ON
Movable Spots
Movable Boxes
ΔTemp
All Measurements Off

Enable/disable auto range



Select a manual range (auto range disabled)

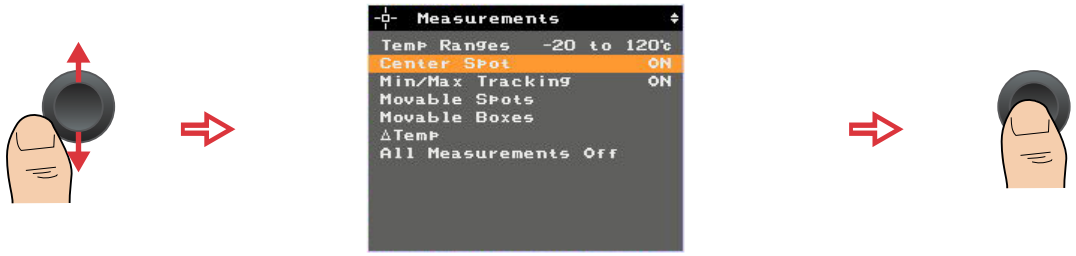


Set the center spot

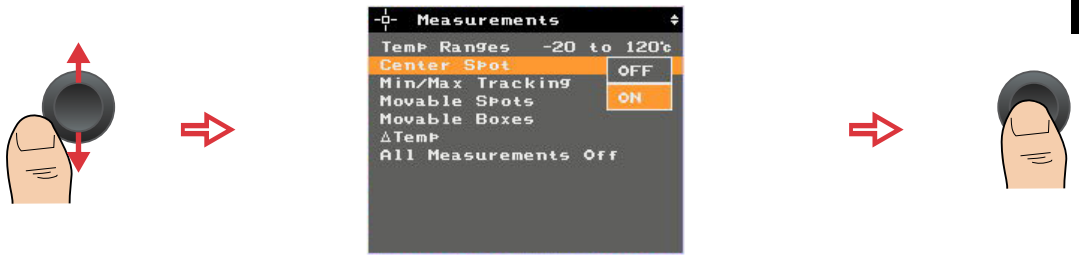
You can enable or disable the center spot cursor which measures the temperature at the center of the IR image.

Follow steps 1 to 2 from "Set the temperature range" on page 63.

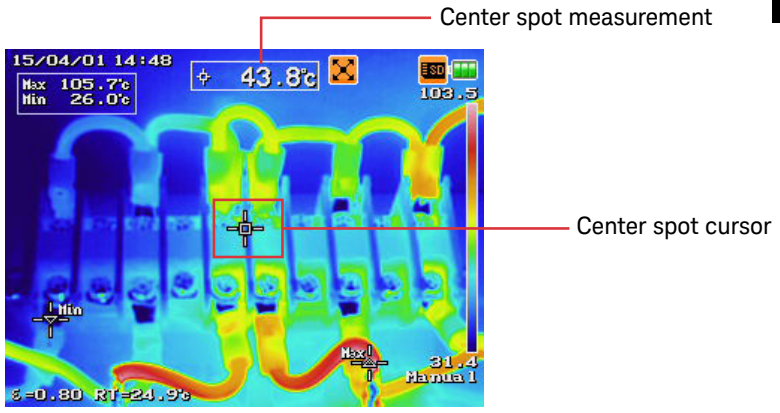
1



2



3

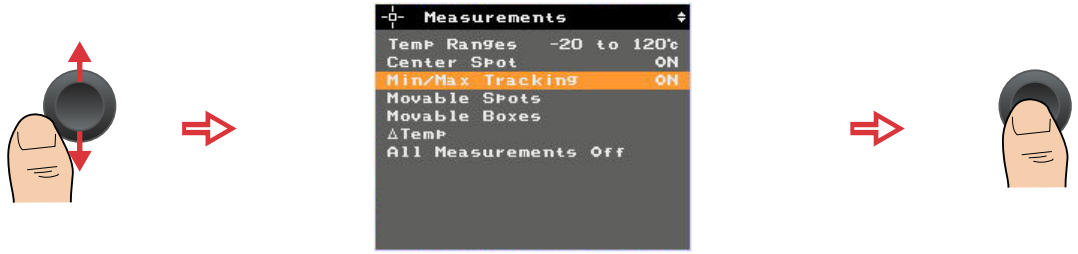


Set the max/min tracking

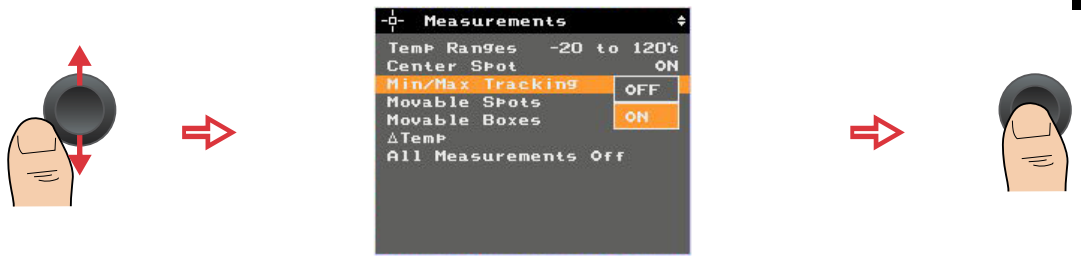
This function tracks the maximum and minimum temperature within the full IR image.

Follow steps 1 to 2 from "Set the temperature range" on page 63.

1



2



3

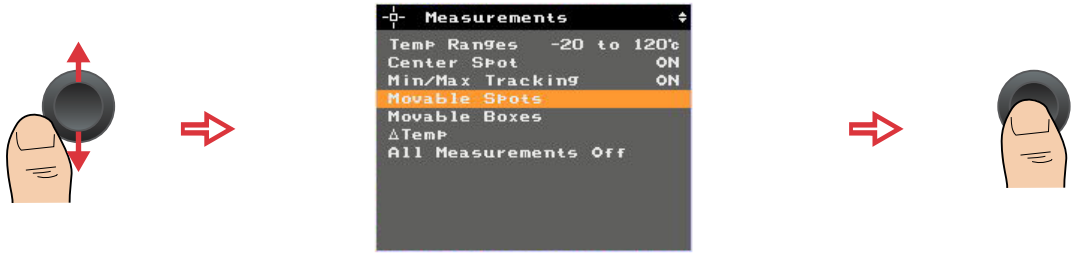
Set the moveable spots and boxes

You can enable measurement spots and boxes to browse and detect the hot/cold areas of the IR image. You can allocate boxes at specific areas of the IR image to perform max, min, and average temperature measurements within the areas. The box size can be adjusted.

Set a measurement spot

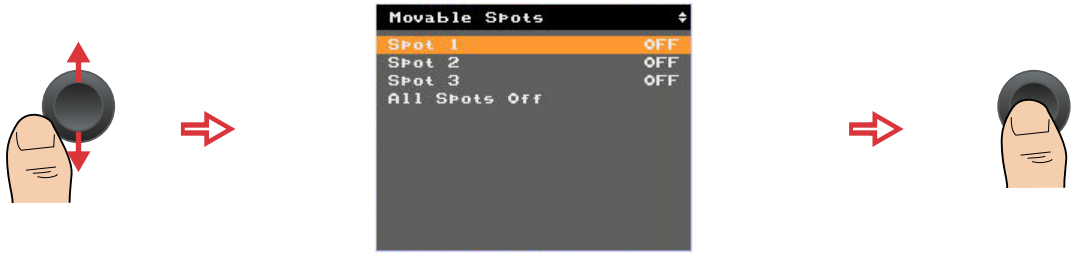
Follow steps 1 to 2 from "Set the temperature range" on page 63.

1



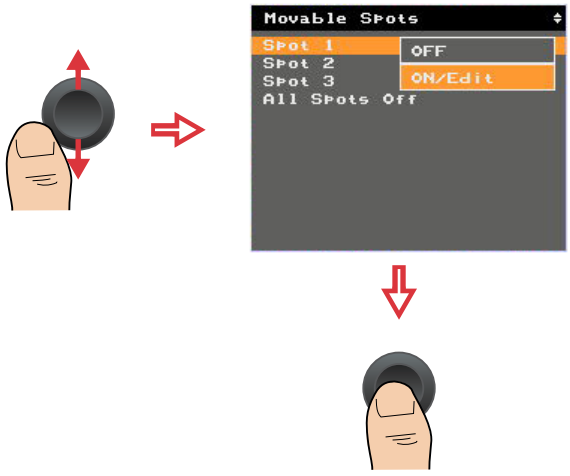
Select any spot or disable all existing spots:

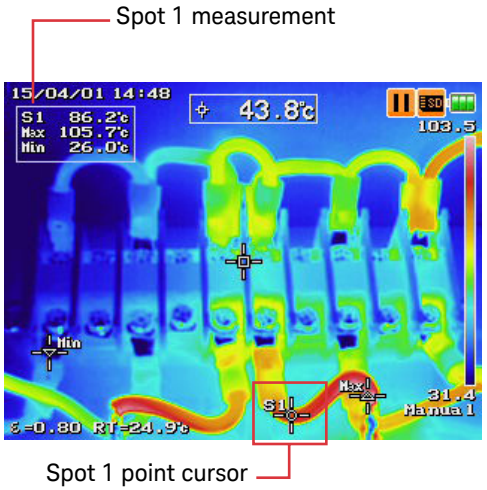
2



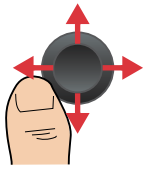
For example, to enable or move spot 1:

3





To move spot 1:



To confirm spot 1 location:

4

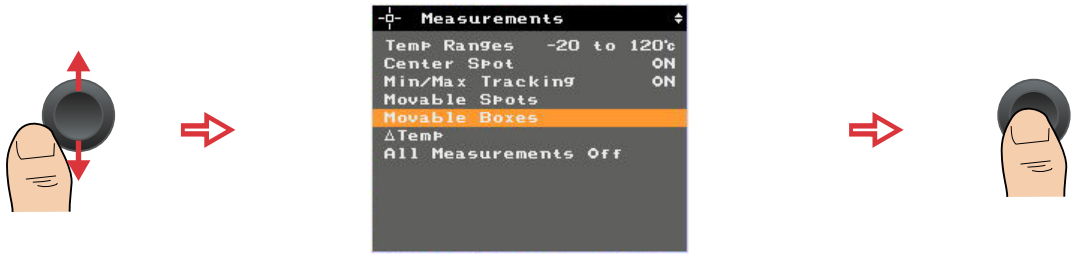
To exit spot 1 moving mode:

4a

Set a measurement box

1

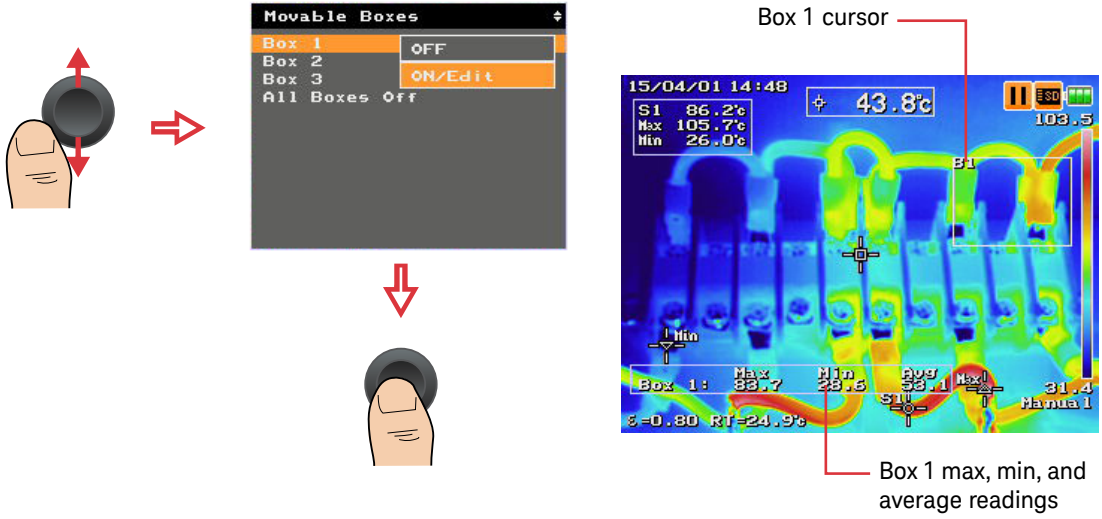
Follow steps 1 to 2 from “Set the temperature range” on page 63.



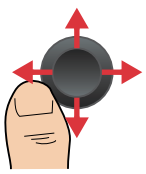
2

Select any box or disable all existing boxes:

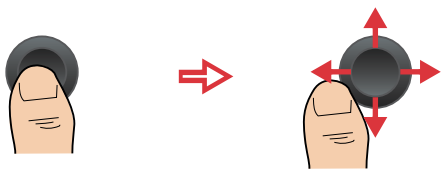
For example, to enable or move/adjust box 1: **3**



To move box 1: **4**



To adjust the size of box 1: **5**



To confirm box 1: **6**

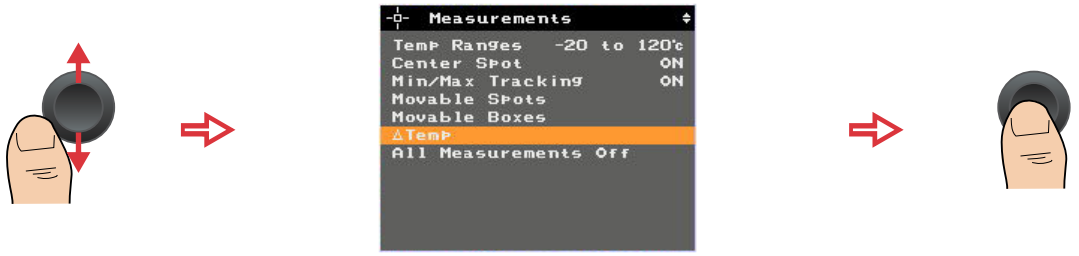
To exit box 1 moving mode or size adjustment: **6a**

Set the delta temperature

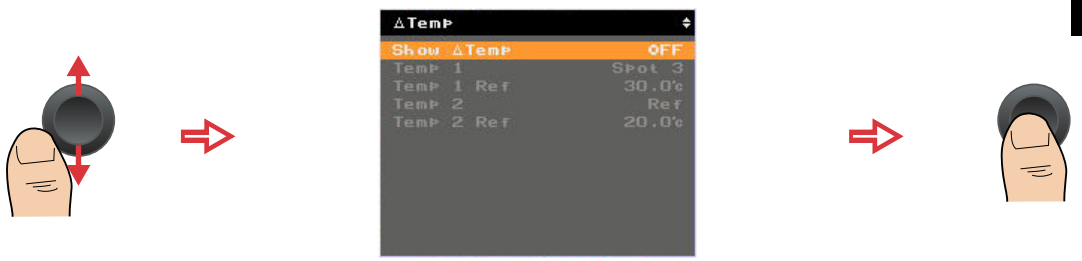
You can measure the difference between two temperature readings – you can select from the spot readings or specify your own reference value.

Follow steps 1 to 2 from "Set the temperature range" on page 63.

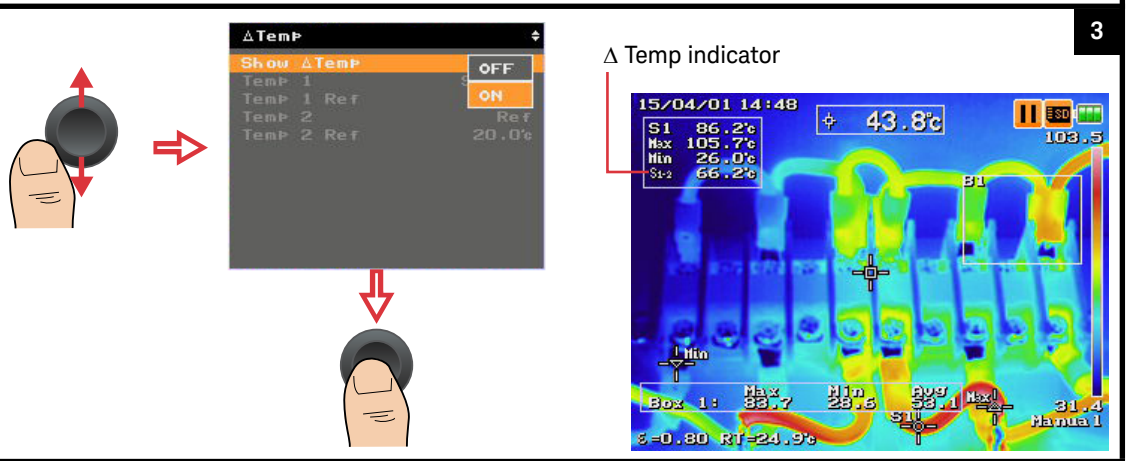
1



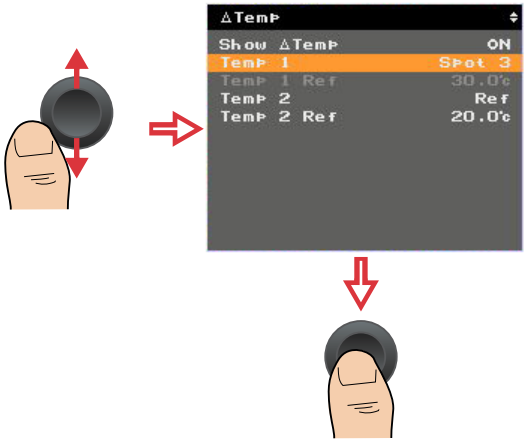
2



3

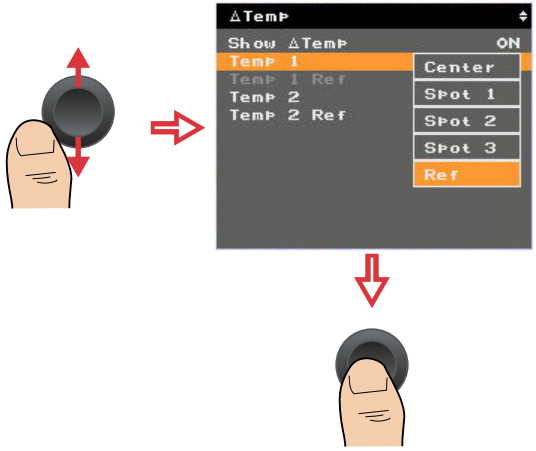


4



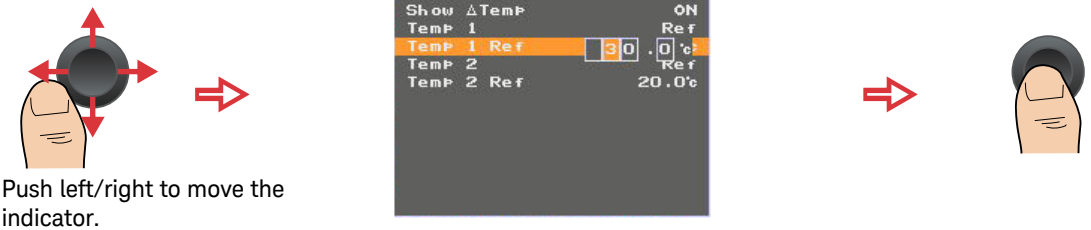
5

Select the center spot, spot 1, 2, or 3, or a reference value for Temp 1:



6

If you want to enter a reference value:



Push left/right to move the indicator.

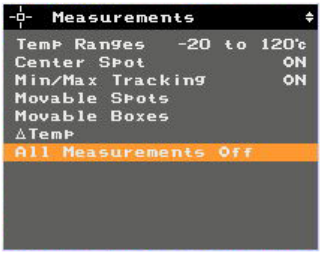
Push up/down to increase/ decrease the digits.

7

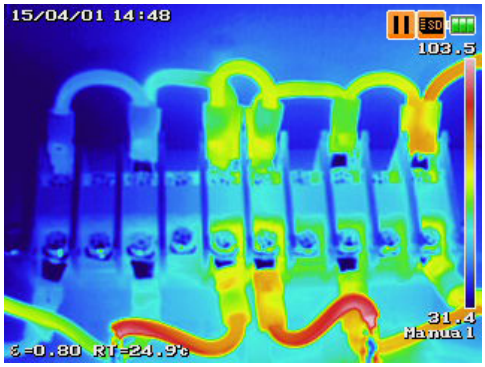
Repeat the same procedure for **Temp 2**.

Turn off all measurements

Follow steps 1 to 2 from "Set the temperature range" on page 63.



All measurement indicators are removed:

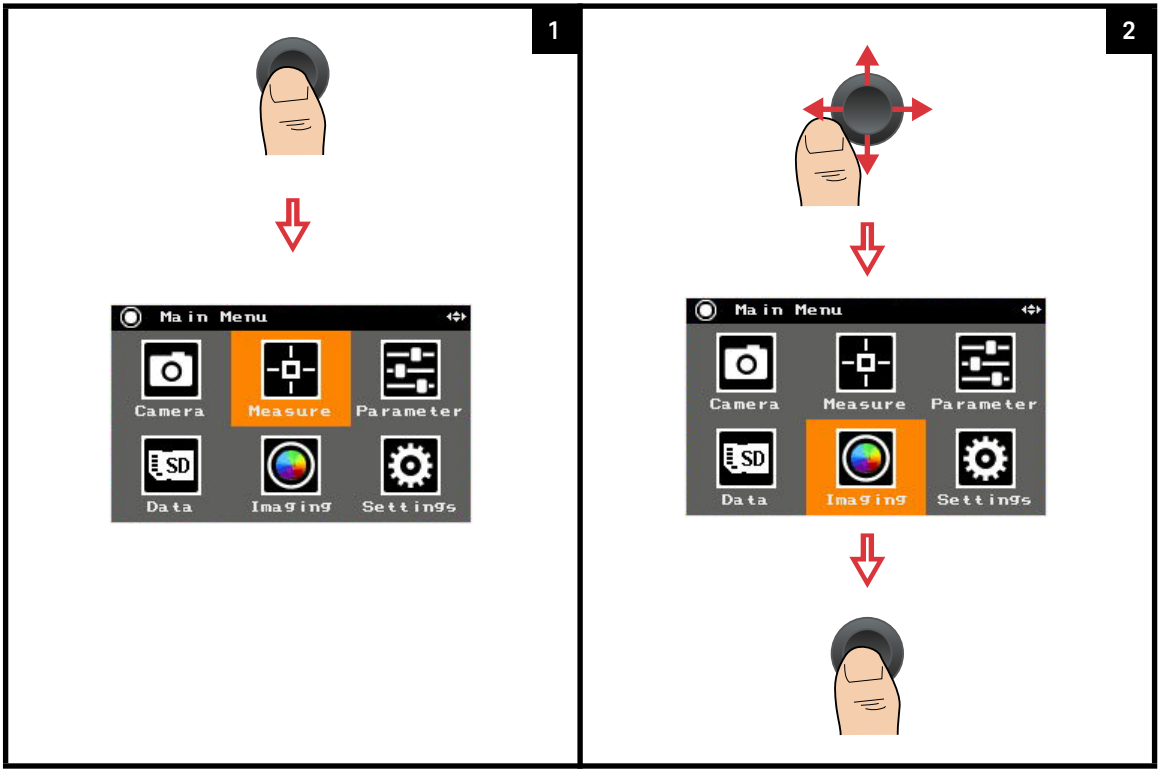


Imaging Controls

The imaging feature allows you to perform a more comprehensive thermal analysis by configuring the IR image display for different environments.

Set the color palette

You can apply a specific color palette for your IR image to improve contrast and clarity when identifying hot/cold areas.



3

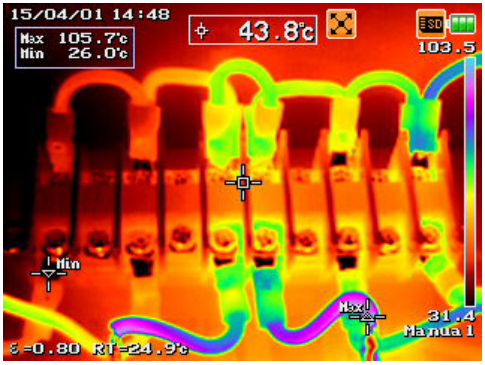
4

Select a color palette:

Lava, Olive, and Medical are only available for U5856A and U5857A.

5

For example, the Medical color palette is applied:



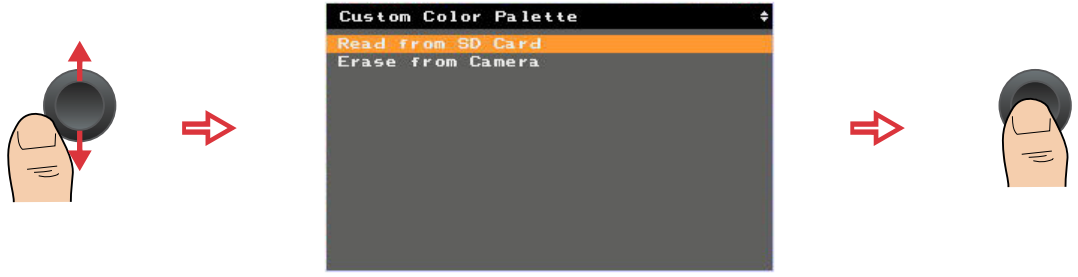
Load a custom color palette

You can create custom color palette from the Keysight True*IR* Analysis and Reporting Tool. Visit www.keysight.com/find/trueIR_ART to download the software for free.

1

2

- Select **Read from SD Card** to select a custom color palette from the SD memory card to be loaded into the U5850 Series.
- Select **Erase from Camera** to remove the custom color palette from the U5850 Series.

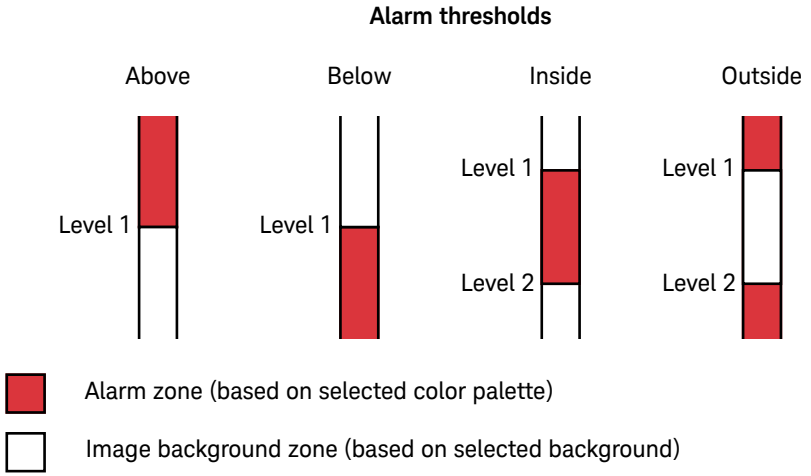


NOTE

- The custom color palettes must be saved into the root directory of the SD memory card.
- The maximum characters for the custom color palette file name is 8 characters.
- The U5850 Series allows up to 30 custom color palettes (sorted by time) to be displayed from the SD memory card.

Set the color alarm

The color alarm allows you to set an alarm threshold which only displays IR components on image zones above, below, inside, or outside the alarm threshold.

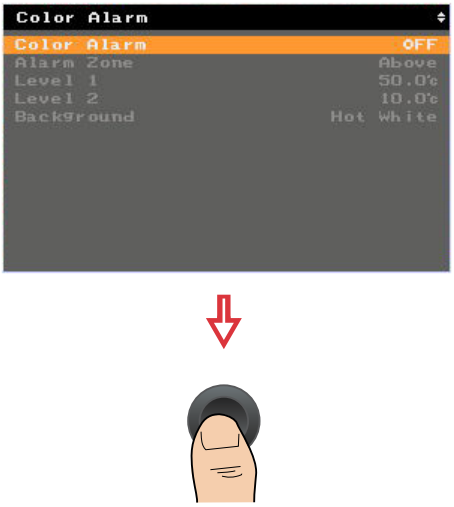


Turn on/off the color alarm

Follow steps 1 to 2 from "Set the temperature range" on page 63.

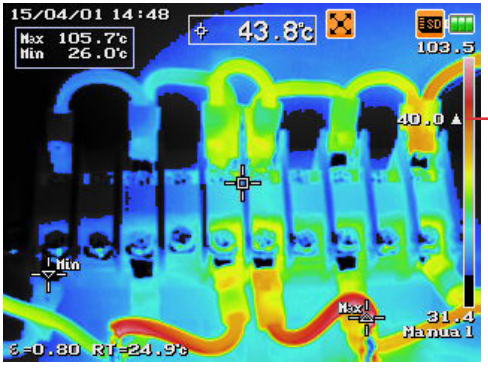
1

2



3

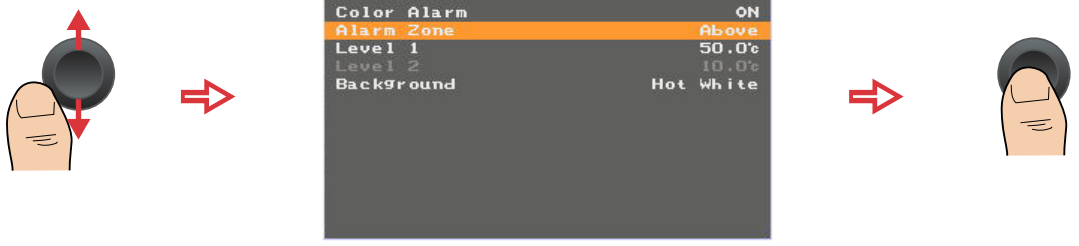
3a



Color alarm indicator when enabled

Set the alarm threshold

1

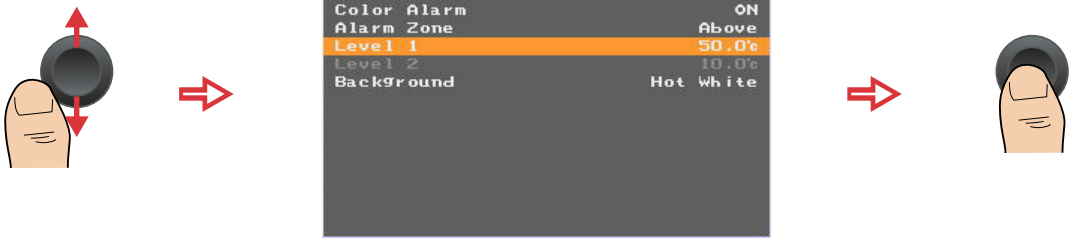


2

Select the threshold type:

Set the alarm threshold level

1



2

Push left/right to move the indicator.

Push up/down to increase/ decrease the digits.

If you have selected the **Inside** or **Outside** threshold, repeat the same procedure to enter the value for **Level 2**.

Set the image background

1

2

Select the background type:

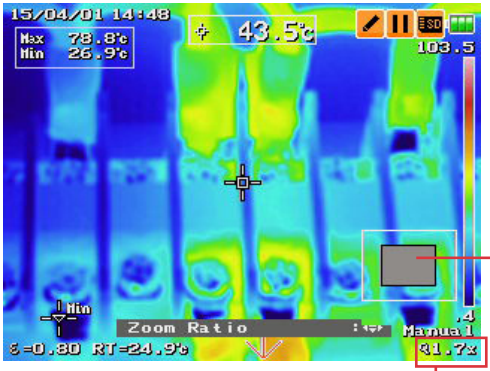
Digital Zoom

You can zoom in to expand the view of certain areas of the image at a 1× to 4× ratio.

Set the zoom ratio

Press for 1 second. 1

2



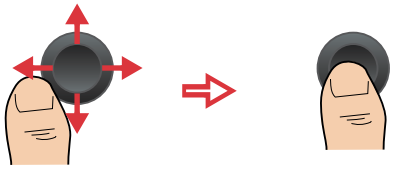
Zoom area

Zoom ratio value

In run mode, the zoom area is always at the center of the image.

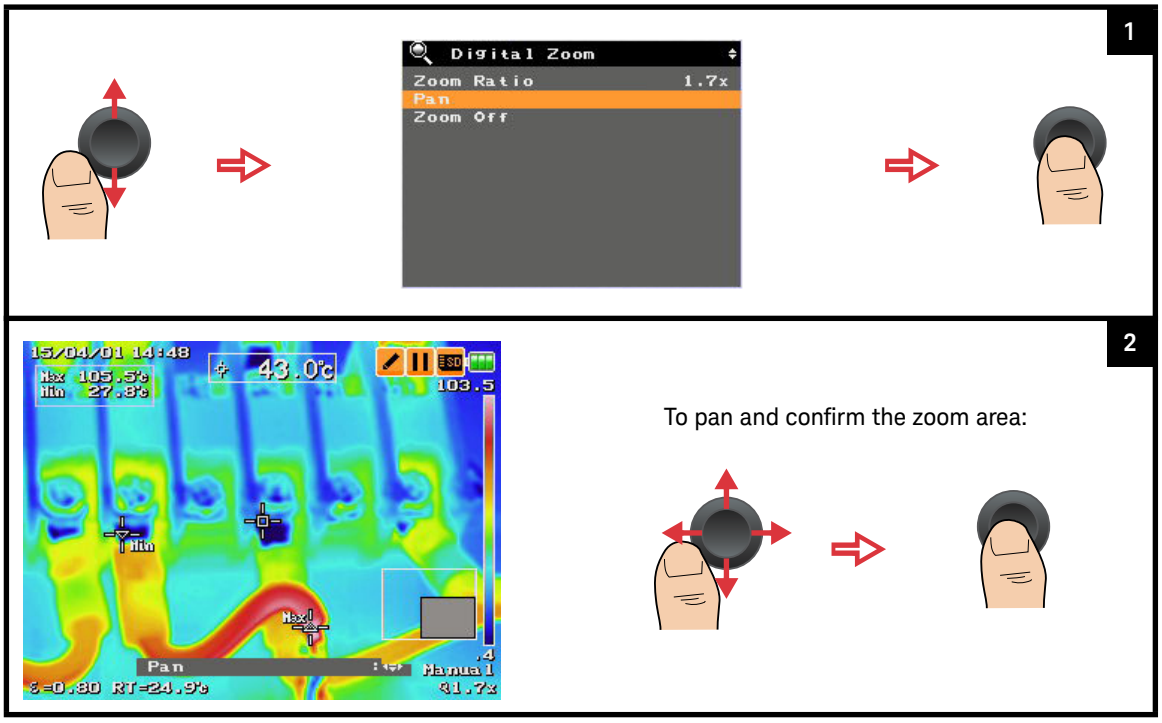
3

To change and confirm the zoom ratio:



To exit:

Pan (move) the zoom area

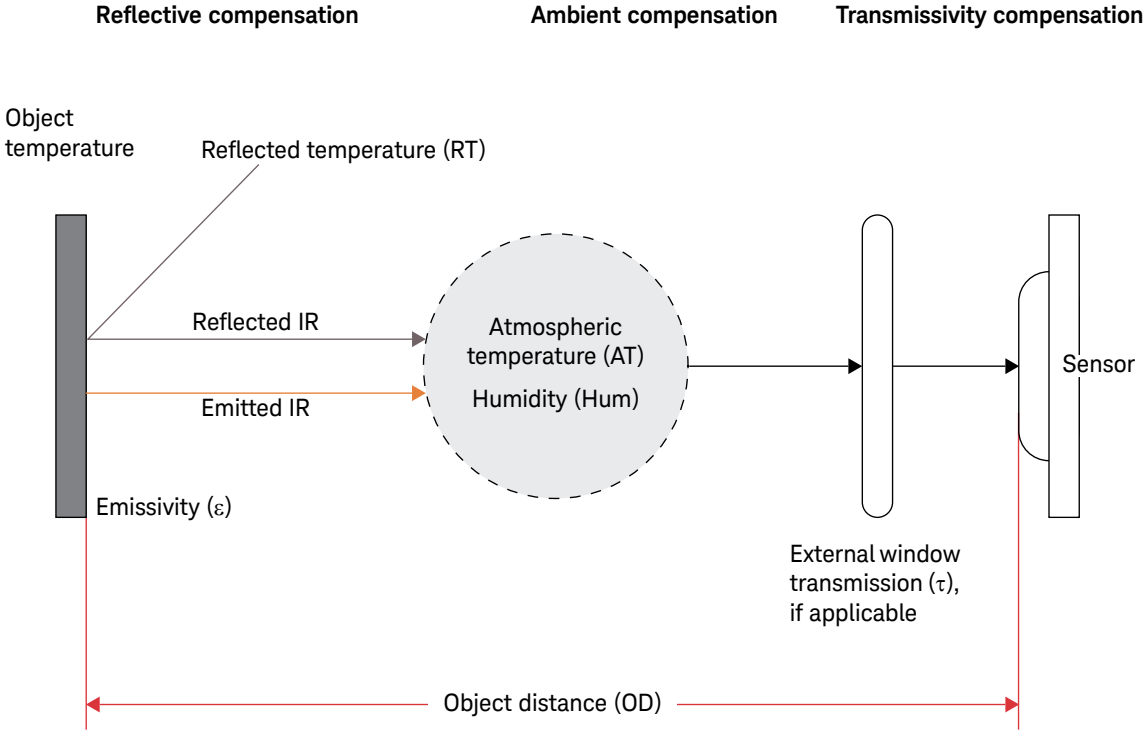


Disable zoom

Parameter Controls

These controls enable you to improve the accuracy of your temperature measurements by making corrections or compensations to the emissivity, reflected temperature, object distance, ambient temperature, humidity, and transmissivity.

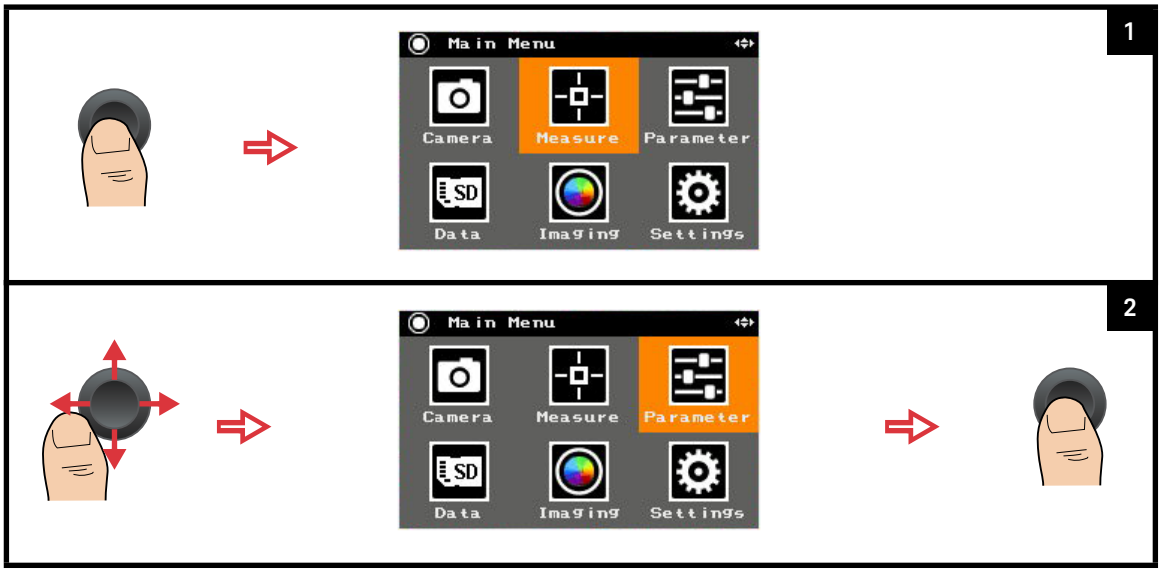
Below illustrates a model of the IR emission energy received by the U5850 Series.



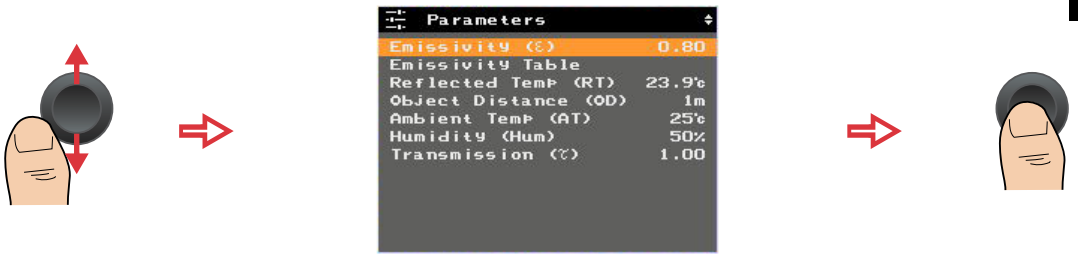
Set the emissivity (ε)

Emissivity is the ratio of energy radiated from an object and energy radiated from blackbody. The emissivity varies with the surface condition of the object. The emissivity value is expressed between 0.10 to 1.00.

Enter an emissivity value



3

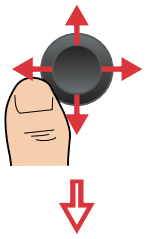


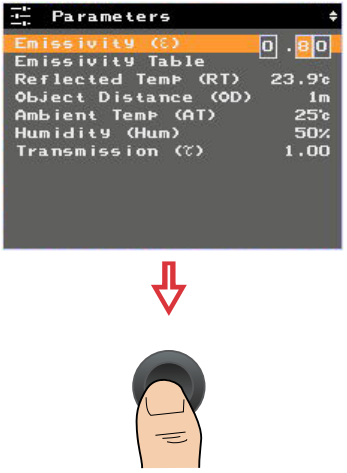
4

Enter a value from **0.10** to **1.00**:

Push left/right to move the indicator.

Push up/down to increase/decrease the digits.





5

Emissivity parameter indicator

To display the parameter indicator, refer to "Configure the display items" on page 112.

Select a common emissivity value

Table 2-1 Emissivity table

Common item	Emissivity value	Common item	Emissivity value
Iron (polished)	0.10	Paint (typical)	0.94
Iron (oxidized)	0.70	Brick	0.93
Aluminum (oxidized)	0.15	Paper	0.90
Stainless steel (polished)	0.20	Clay	0.92
Stainless steel (oxidized)	0.80	Graphite (carbon)	0.95
Copper (oxidized)	0.40	Glass	0.90
Nickel (oxidized)	0.37	Rubber	0.90
Brass (oxidized)	0.64	Concrete	0.92
Snow	0.85	Skin	0.98
Cloth	0.90	Water	0.96

Set the reflected temperature (RT)

RT can be corrected to obtain a more accurate temperature measurement especially for low-emissivity objects.

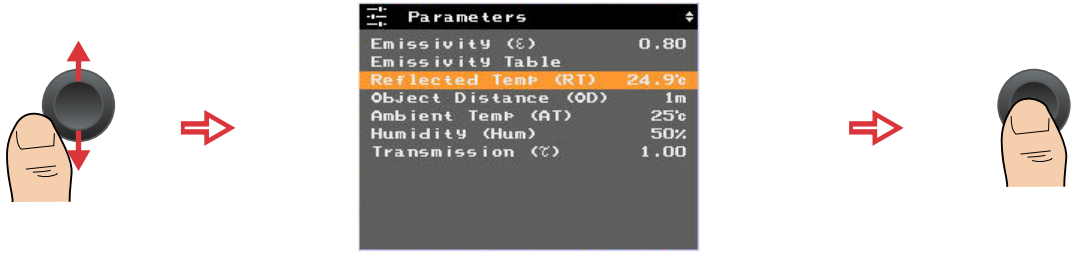
You can manually enter an RT value or run the RT calibration (RT Cal) for reflection source correction. When the source of reflection exists around an object and the temperature of the source of reflection is known, you can enter the RT value manually. If the temperature of the source of reflection is not known, perform RT Cal to obtain the RT value automatically.

NOTE RT Cal cannot be executed during freeze mode and image logging.

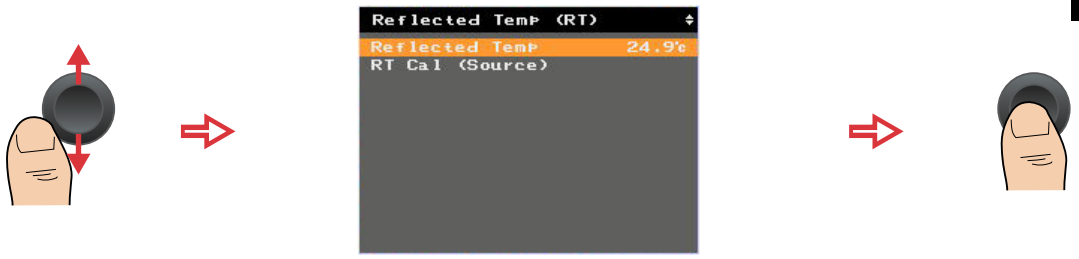
Enter an RT value

Follow steps 1 to 2 from "Enter an emissivity value" on page 86.

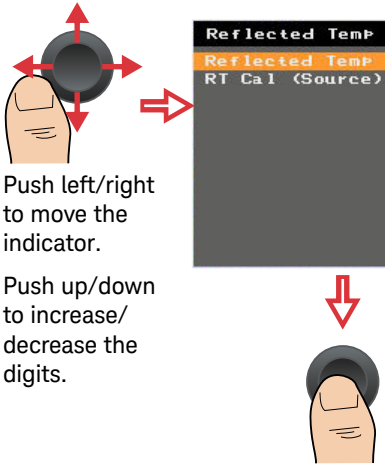
1



2



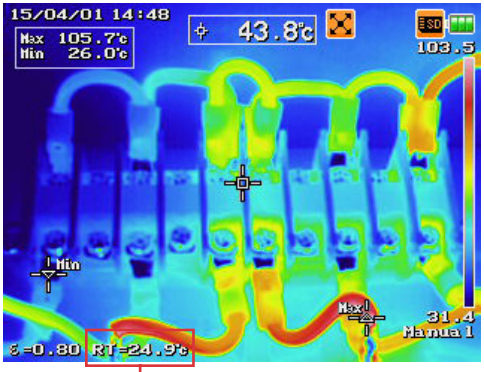
3



Push left/right to move the indicator.

Push up/down to increase/ decrease the digits.

4

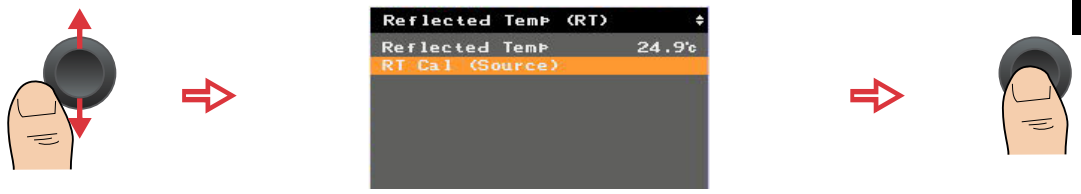


RT parameter indicator

To display the parameter indicator, refer to "Configure the display items" on page 112.

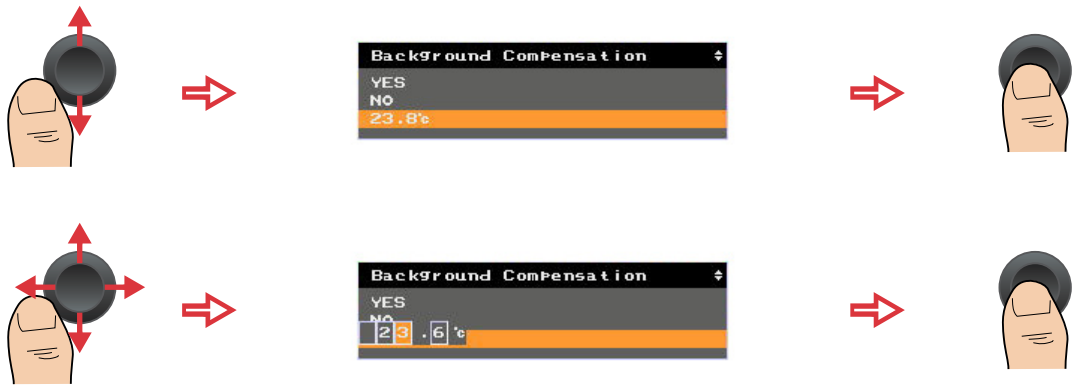
Run RT Cal for reflection source correction

1



2

If you know the temperature of the reflection source, you may enter the value. If not, point the U5850 Series at the reflection source and select **YES** to run the calibration to obtain the temperature.



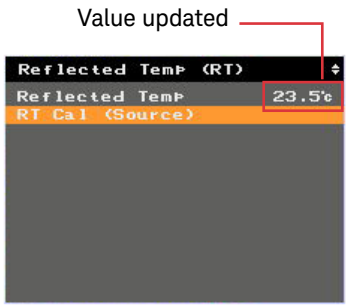
Push left/right to move the indicator.

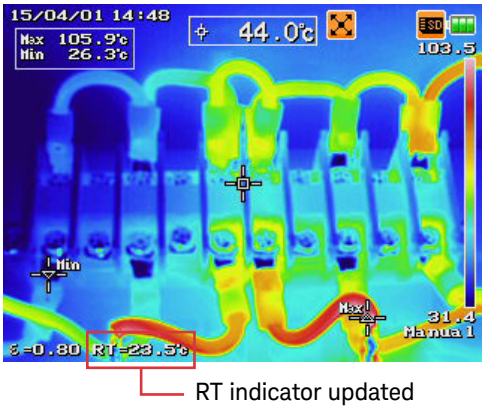
Push up/down to increase/decrease the digits.

OR

3

When completed, it will return to the Reflected Temp (RT) menu.





Set the object distance (OD), ambient temperature (AT), and humidity (Hum)

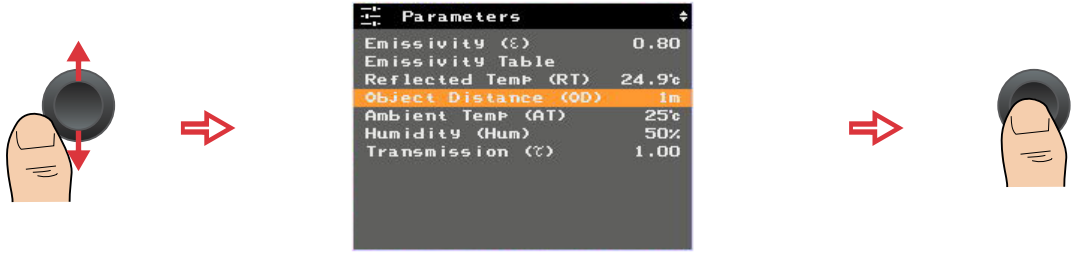
You can perform compensation for ambient parameters (OD, AT, Hum) to correct atmospheric errors in your temperature measurements.

NOTE Ambient parameter settings are not supported in the freeze, playback, and image logging modes.

1

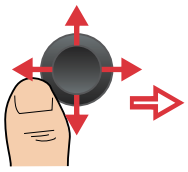
Follow steps 1 to 2 from "Enter an emissivity value" on page 86.

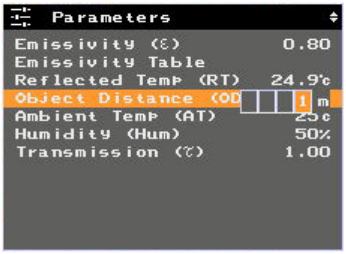
Select **Object Distance (OD)/Ambient Temp (AT)/Humidity (Hum)**:



2

- OD: **1 to 1000 m**
- AT: **–15 to 50 °C**
- Hum: **0 to 100%**

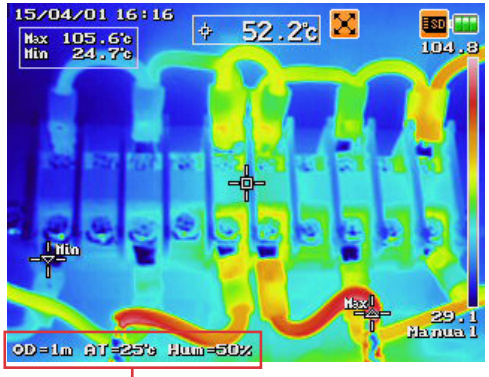




Push left/right to move the indicator.

Push up/down to increase/decrease the digits.

3



Ambient parameter indicators

To display the parameter indicator, refer to "Configure the display items" on page 112.

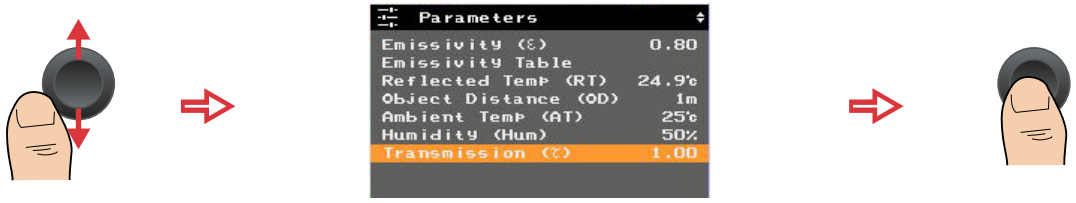
Set the transmissivity (τ)

Some IR energy may be lost when transmitted through an external window; this transmissivity error must be corrected to improve the accuracy of your temperature measurements.

NOTE Transmissivity setting is not supported in the freeze, playback, and image logging modes.

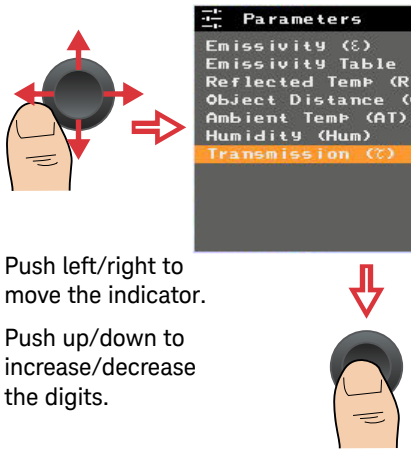
Follow steps 1 to 2 from "Enter an emissivity value" on page 86.

1



Enter a value from **0.10** to **1.00**:

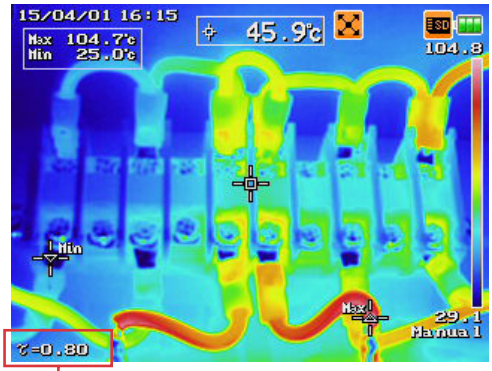
2



Push left/right to move the indicator.

Push up/down to increase/decrease the digits.

3



Transmissivity parameter indicator

To display the parameter indicator, refer to "Configure the display items" on page 112.

3 Data Management and System-Related Functions

Data Management Controls 96
System-Related Settings 107

This chapter guides you on how to configure data and system settings for the U5850 Series True*IR* Thermal Imager.

Data Management Controls

These controls allow you to log images, check the memory status, manage your image folders, and format the SD memory card.

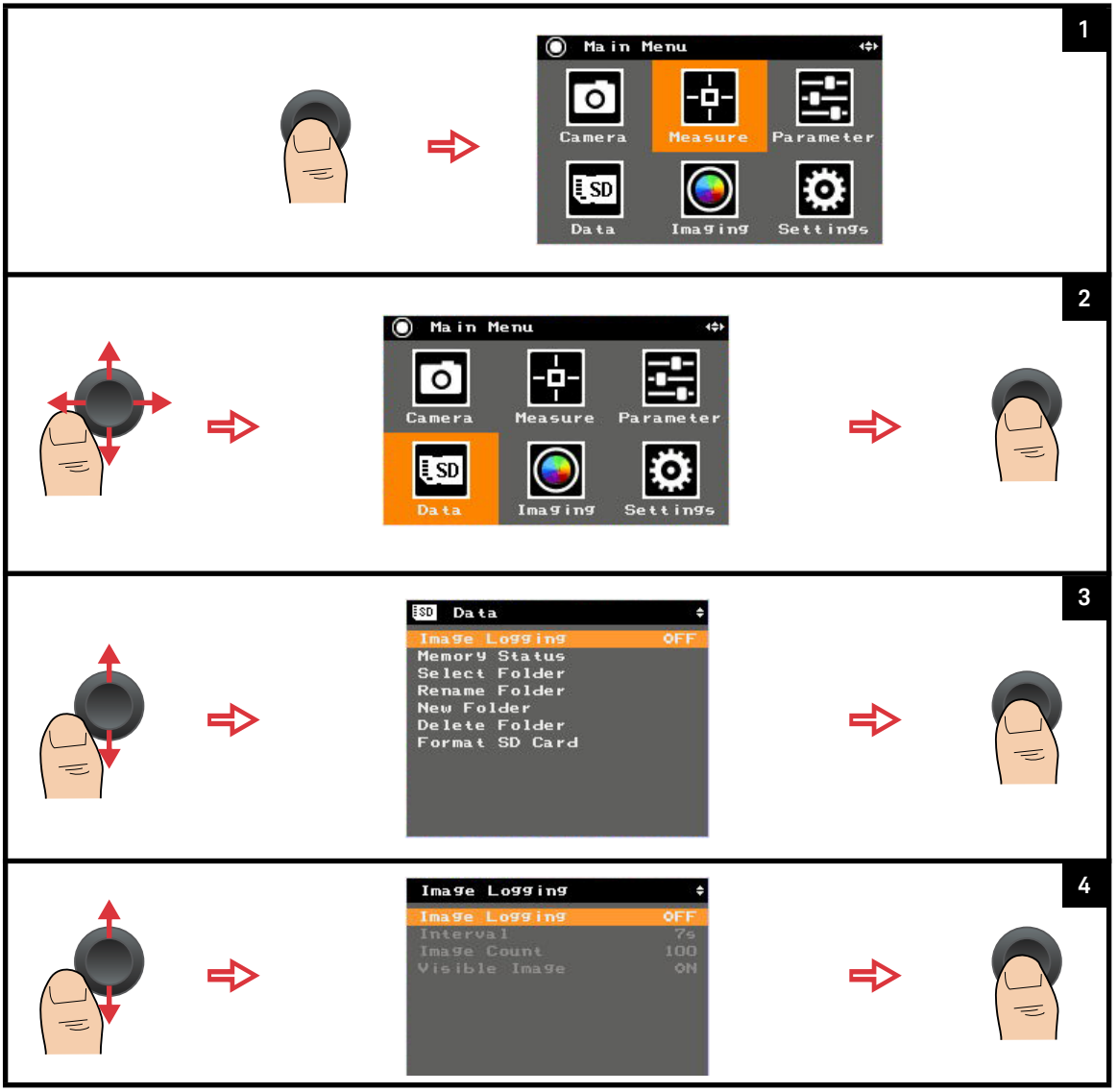
Perform image logging

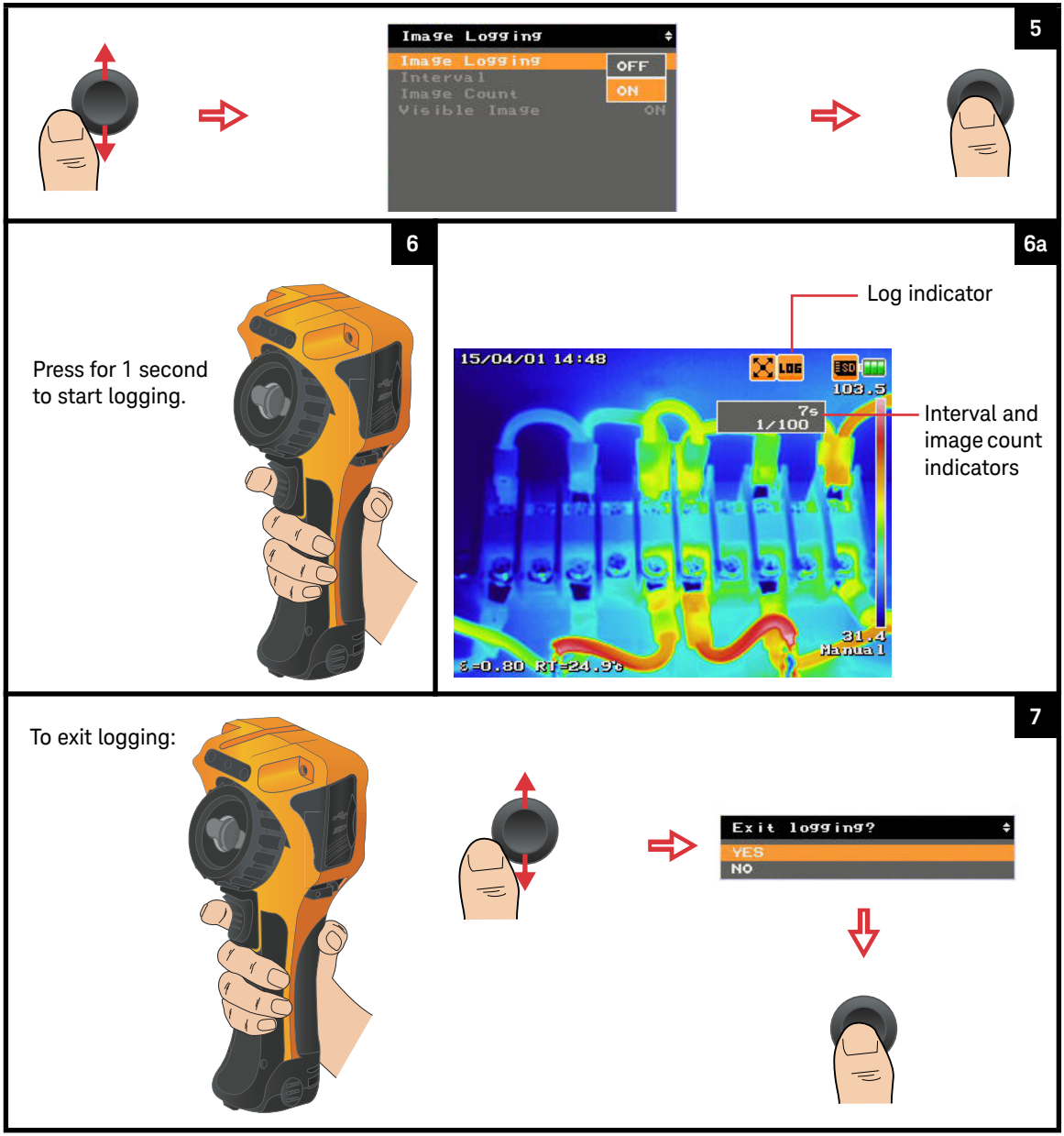
You can log IR, visible, or fusion images at defined intervals. During logging, folders are automatically created in the SD memory card to store the images. The folder created at the first logging interval will be named LOG_0001, then LOG_0002 at the next interval, and will increase subsequently.

NOTE All functions are not accessible during image logging.

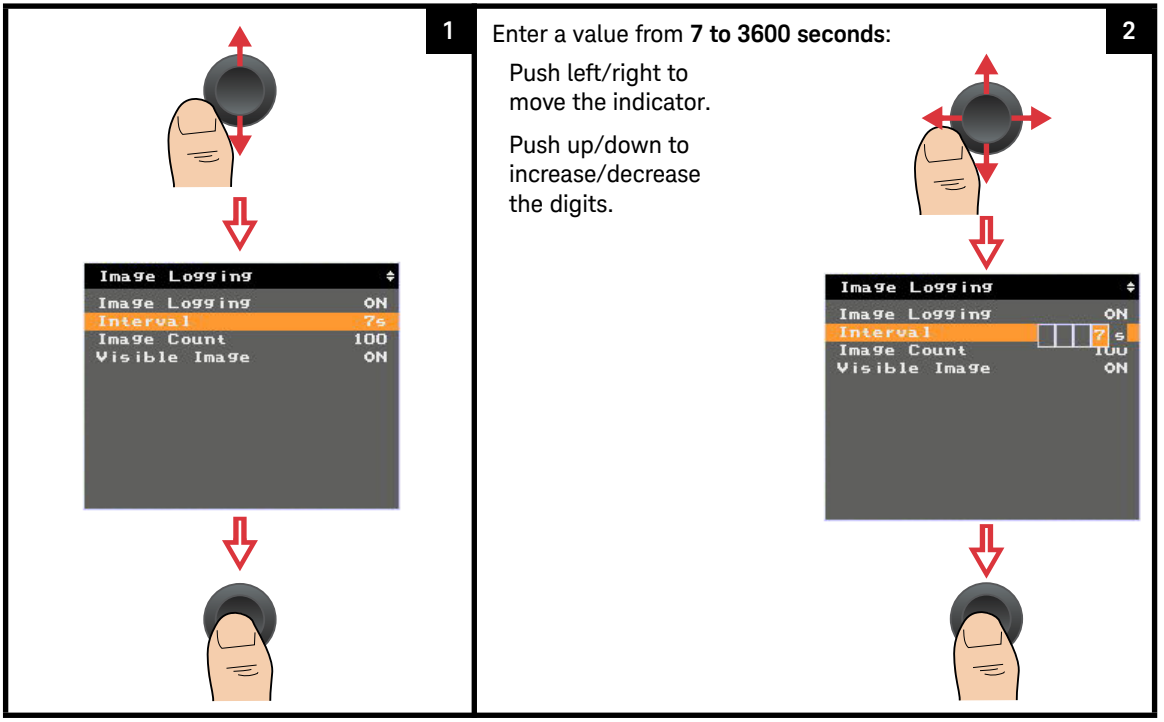
CAUTION Do not perform image logging on objects with extremely high temperature over a long period of time to avoid damage to the infrared detector.

Enable/Disable image logging

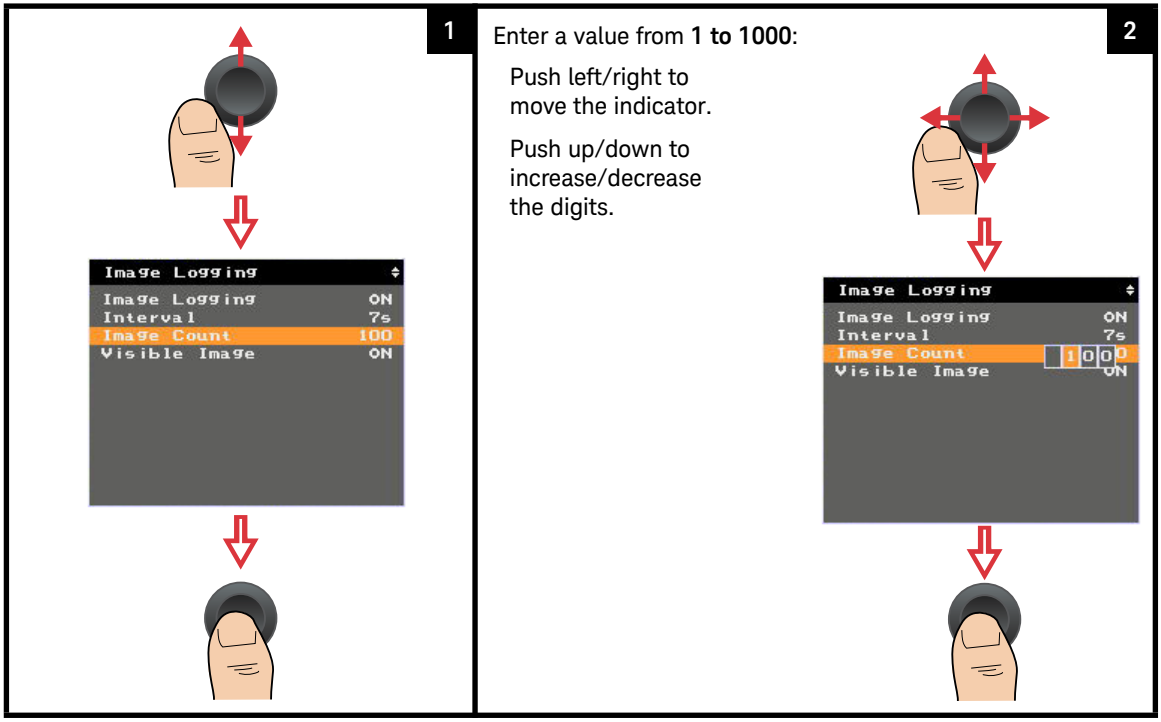



5
Image Logging
Image Logging
Interval
Image Count
Visible Image
OFF
ON
ON
6
Press for 1 second
to start logging.
6a
Log indicator
15/04/01 14:48
LOG
SD
103.5
7s
1/100
Interval and
image count
indicators
31.4
Manual
ε=0.80 RT=24.9°C
7
To exit logging:
Exit logging?
YES
NO

Set the logging interval



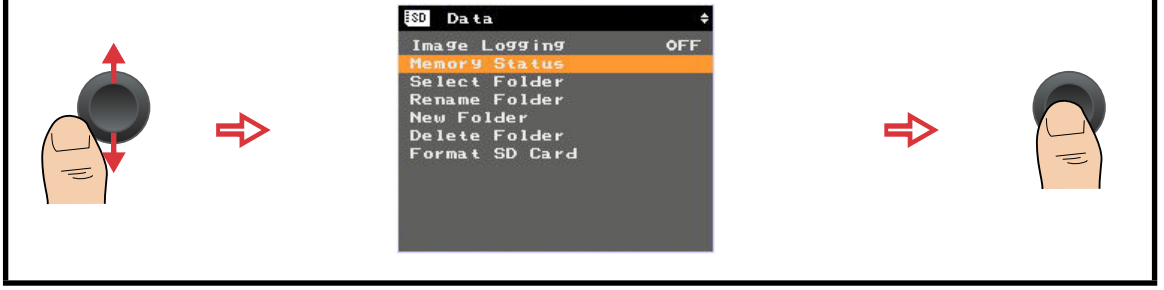
Set the image count



Enable/Disable logging of visible images

View the memory status of the SD memory card

Follow steps 1 to 2 from “Enable/Disable image logging” on page 97.



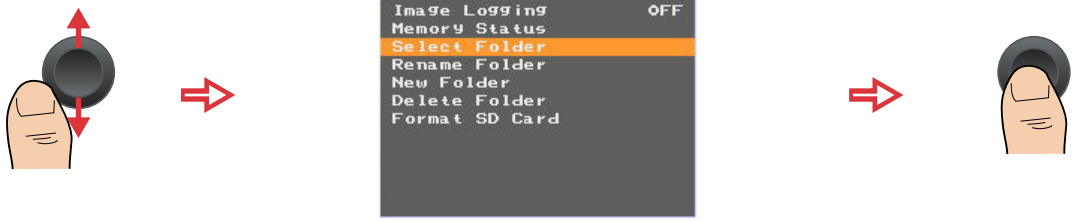
Manage image folders

You can create a new image folder or select, rename, or delete an existing folder for your image saving purposes.

Select a folder

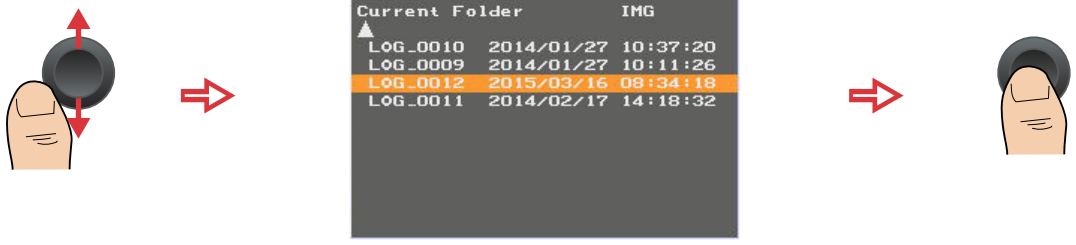
Follow steps 1 to 2 from "Enable/Disable image logging" on page 97.

1

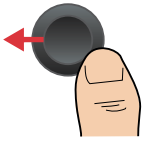


Select an existing folder to use:

2

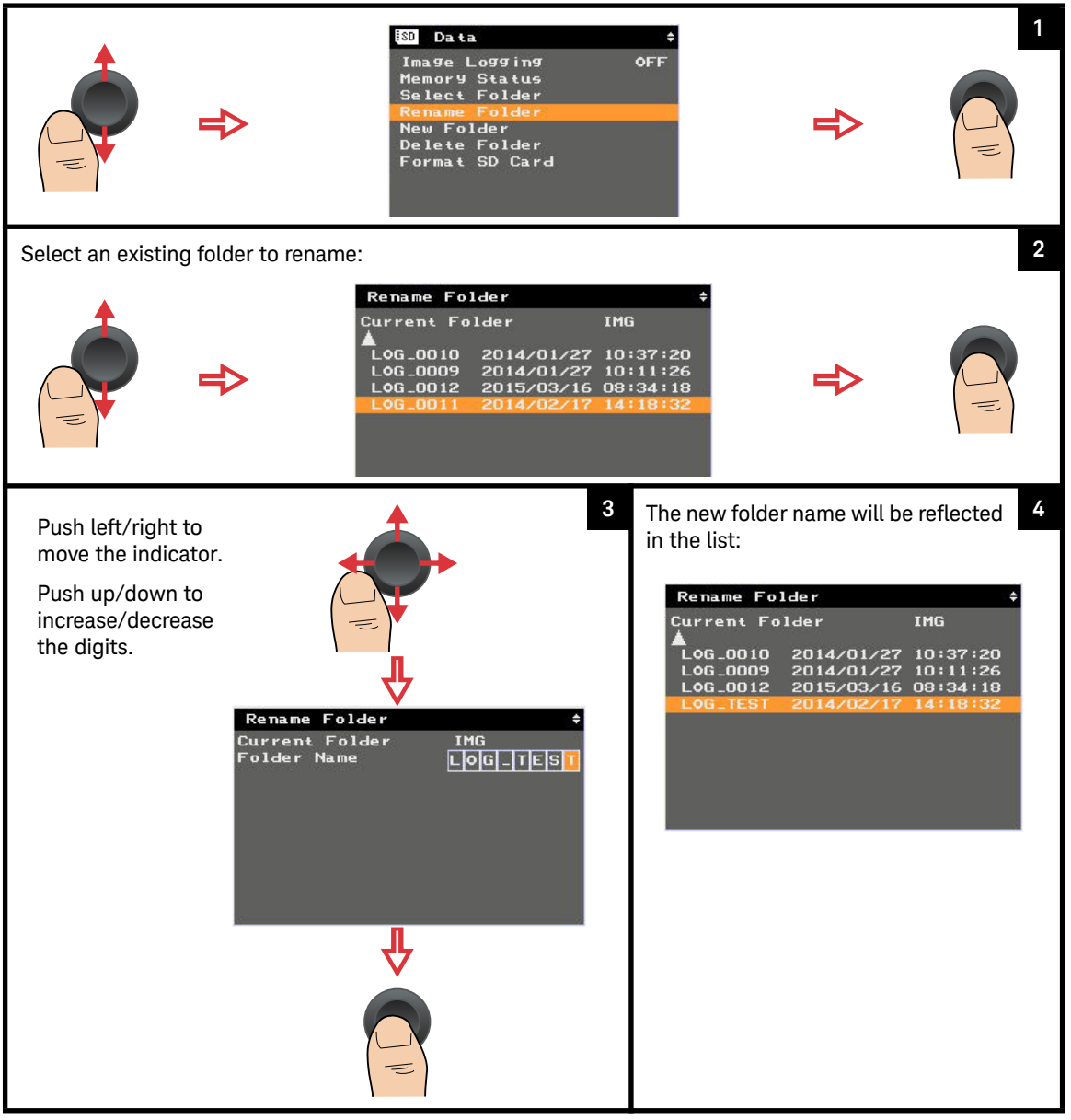


To return to the previous folder list display:



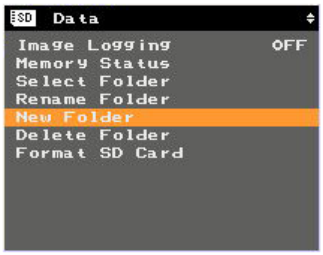
To return to the Data menu:

Rename a folder

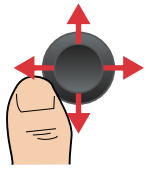


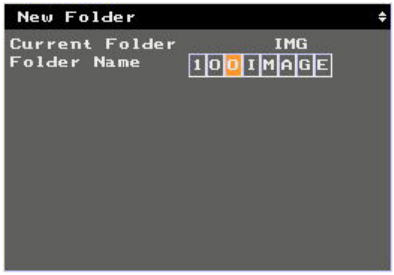
Create a new folder

1



2





Push left/right to move the indicator.

Push up/down to increase/decrease the digits.

This will lead you to add another new folder.

To exit,

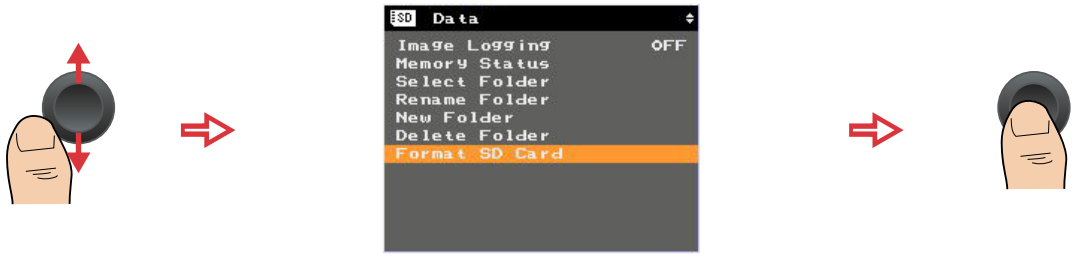
You can view the new folders under the Select Folder menu.

Delete a folder

Format the SD memory card

Follow steps 1 to 2 from "Enable/Disable image logging" on page 97.

1



Select **YES** to proceed and return to the Data menu once completed.

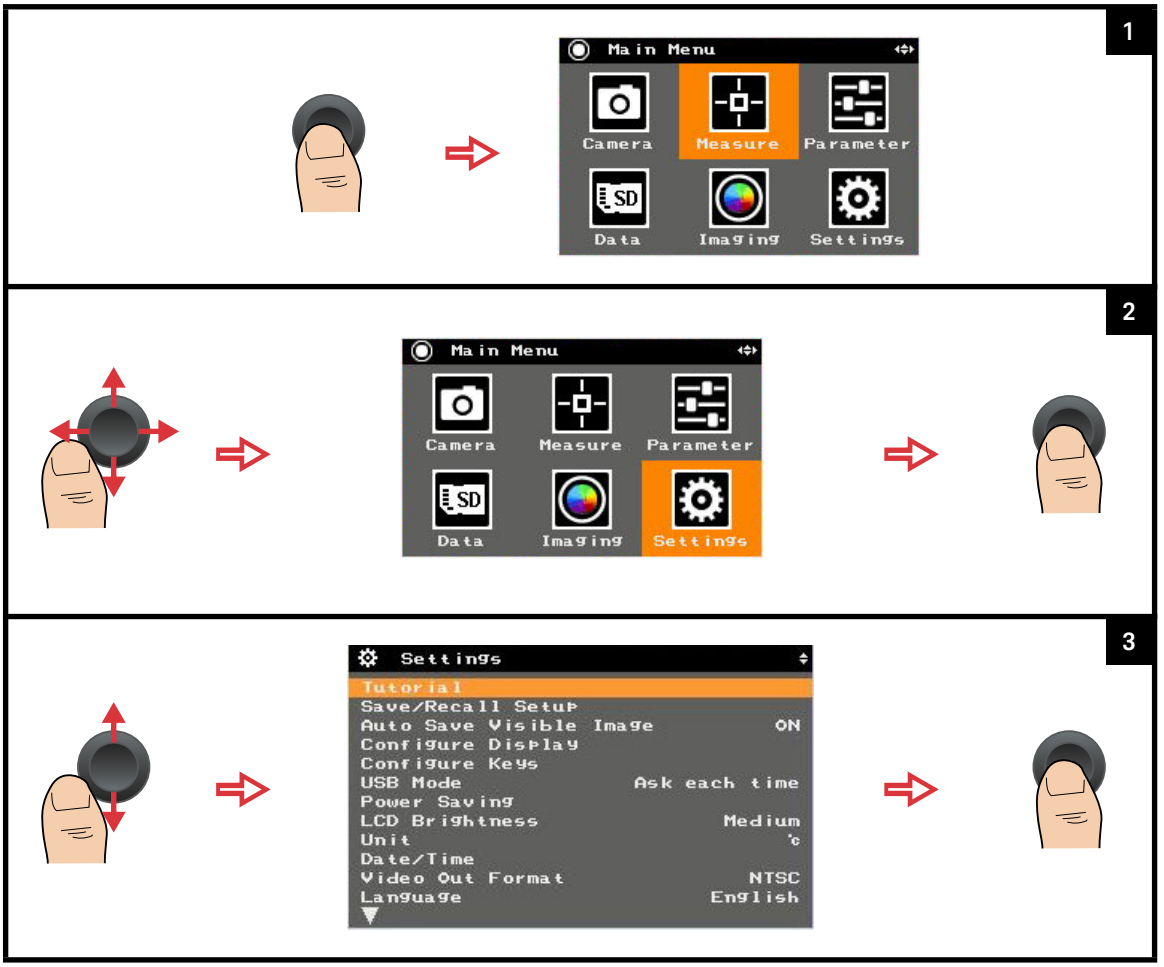
2

System-Related Settings

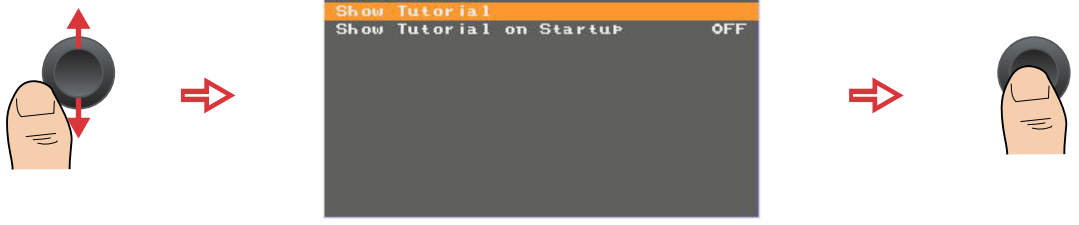
These settings allow you to make general system configurations for the U5850 Series.

Configure the Quick Start Tutorial

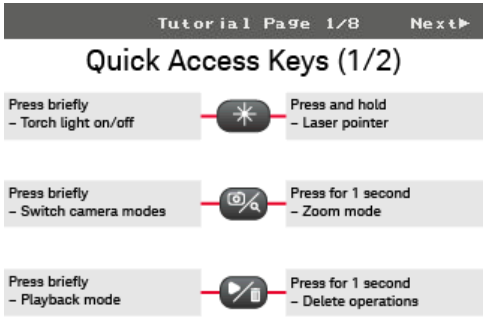
Display the tutorial



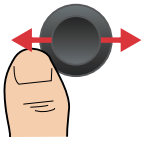
4



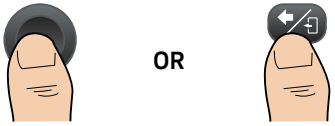
5



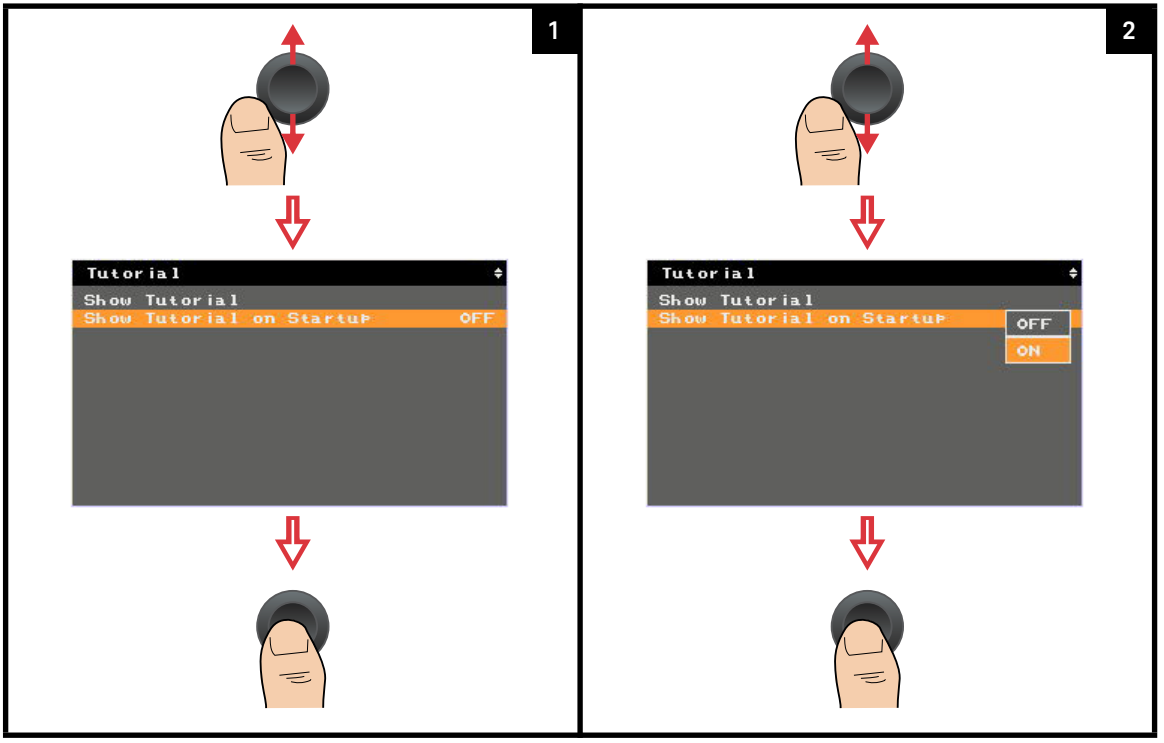
To navigate the tutorial pages:



To exit:



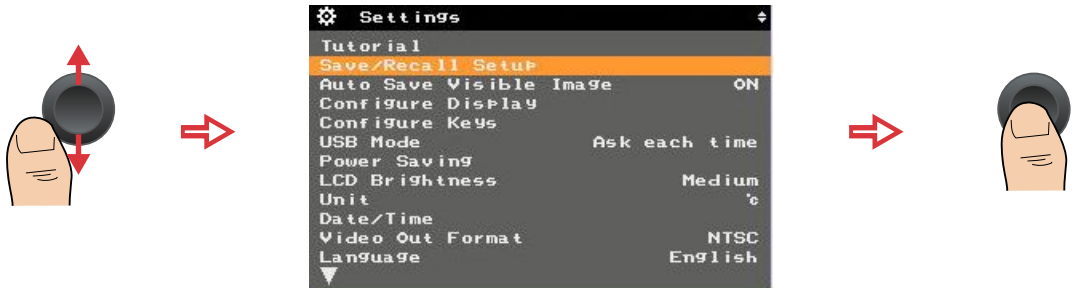
Enable/Disable the tutorial at power-on



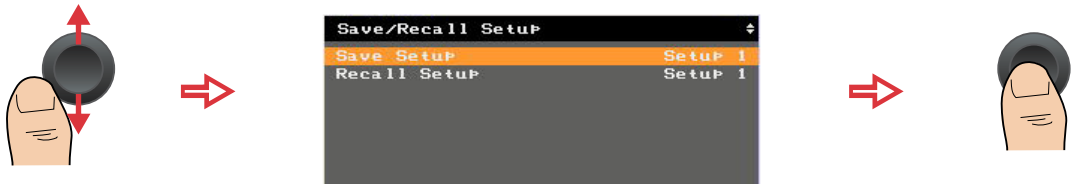
Save/recall instrument setups

You can save up to three instrument setups at a time into the SD memory card, and recall a setup to use. If there is an existing saved setup and you perform a save for the current setup, the existing setup will be overwritten.

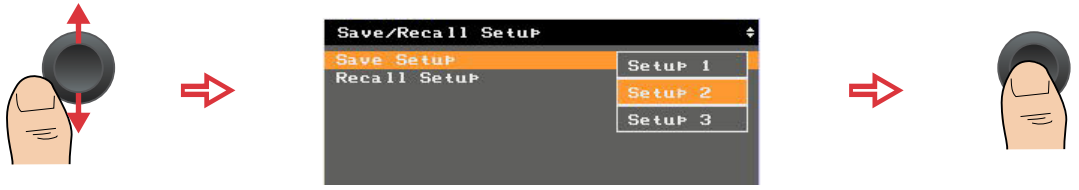
Follow steps 1 to 2 from "Display the tutorial" on page 107. **1**



Select **Save Setup** or **Recall Setup**: **2**



Select a setup storage to save/recall: **3**



Turn on/off visible image auto-save

If you enable auto-save for visible images, both the IR and visible images will be saved. If disable, only the IR image will be saved.

NOTE This is only applicable for the IR camera mode. Visible images will always be auto saved in the Visible Camera, Picture in Picture, and Blend modes.

Follow steps 1 to 2 from "Display the tutorial" on page 107.

1

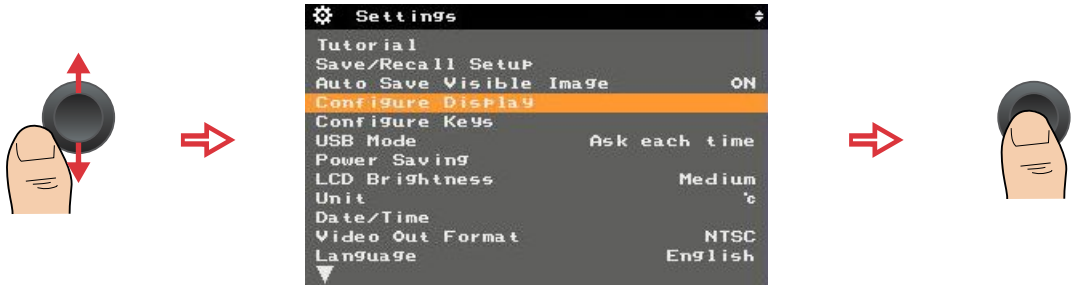
2

Configure the display items

You can set the items that you want to display on the screen.

1

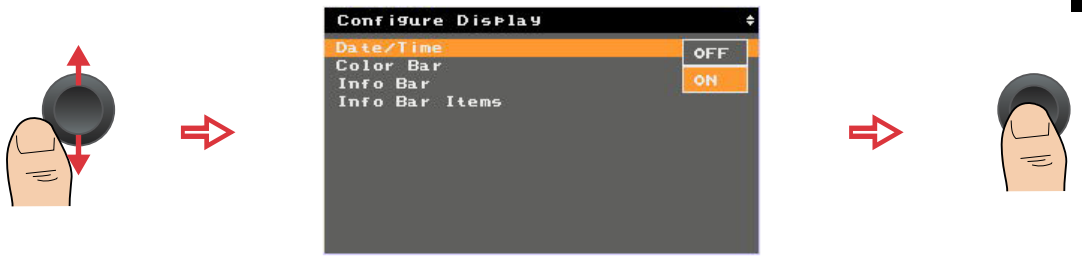
Follow steps 1 to 2 from "Display the tutorial" on page 107.



2

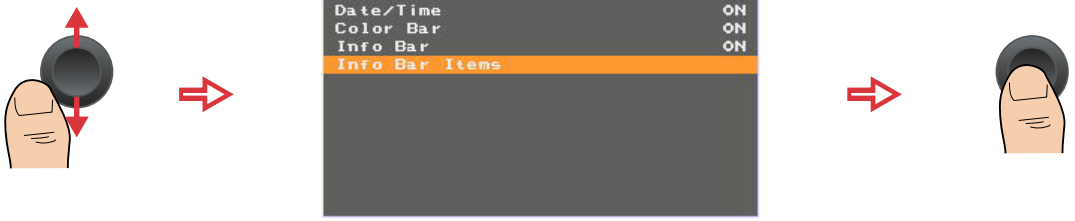
Select **Date/Time**, **Color Bar**, or **Info Bar**:

3



To select the info bar items to display:

4



Select the items (only the first four items selected will be displayed):

5

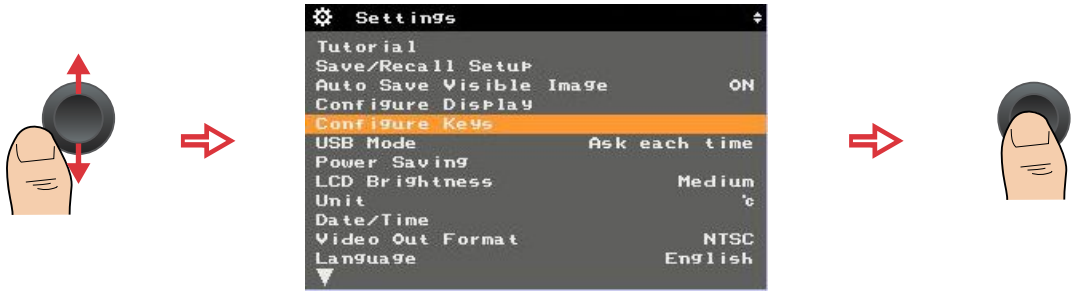
Toggle to check/uncheck

To confirm and exit:

Configure the main key press functions

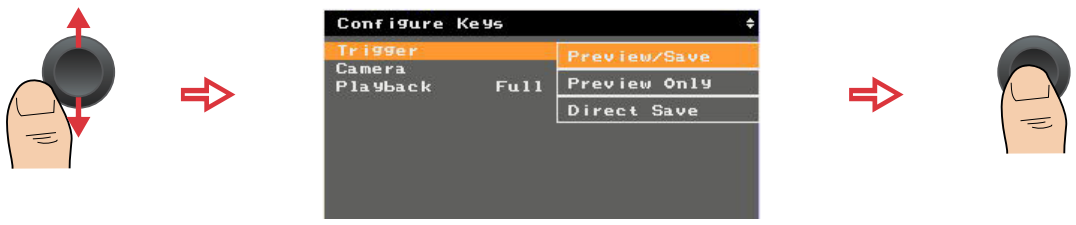
You can set the default functions for the Camera Trigger, Camera/Zoom, and Play/Delete key presses.

Follow steps 1 to 2 from "Display the tutorial" on page 107. **1**



Select **Trigger/Camera/Playback**: **2**

For example, if you select **Trigger**, you can set to preview and save the image, preview the image only, or save an image directly when you press the key: **3**



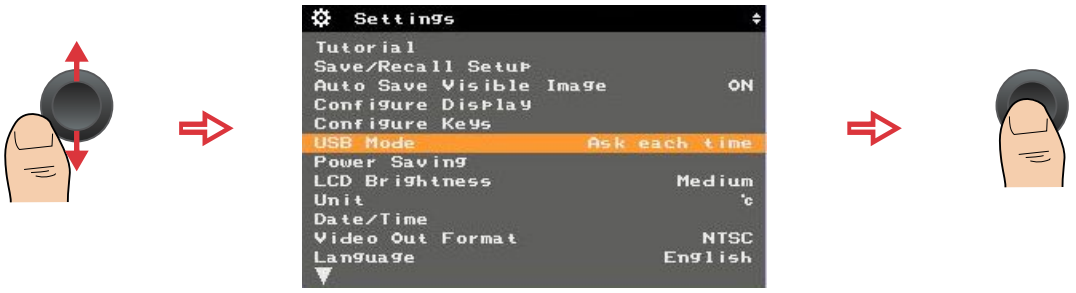
Set the USB mode

You can set the USB mode to allow mass storage or data streaming when you connect the U5850 Series to the PC using the USB cable. The default selection is Ask each time. If Ask each time is selected, you will be prompted to select between mass storage or data streaming upon the start-up of the U5850 Series. This prompt occurs when you connect the U5850 Series to the PC using the USB cable.

NOTE Do not press any keys on the U5850 Series True*IR* Thermal Imager when you are connecting its USB cable to the PC and launching the Keysight True*IR* Analysis and Reporting Tool software.

Follow steps 1 to 2 from "Display the tutorial" on page 107.

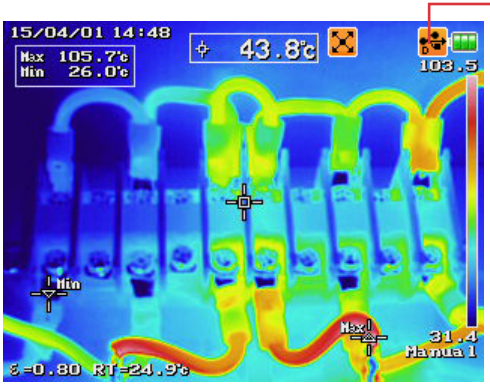
1



2

Data streaming mode

Data streaming mode allows you to stream, capture, and record live IR images using the Keysight True*IR* Analysis and Reporting Tool software from your PC.



Set the power saving mode

You can enable/disable auto sleep or auto power-off, and change the timer period of these functions.

NOTE

- It is recommended to remove the battery from the U5850 Series when not in use.
- Auto sleep and auto power-off functions are disabled during image logging.

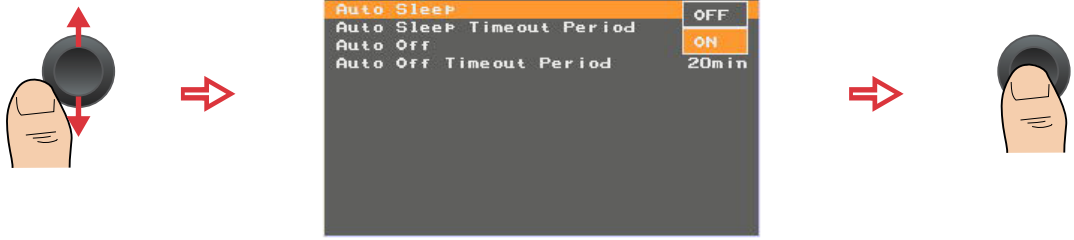
Follow steps 1 to 2 from "Display the tutorial" on page 107.

1

Select **Auto Sleep** or **Auto Off**:

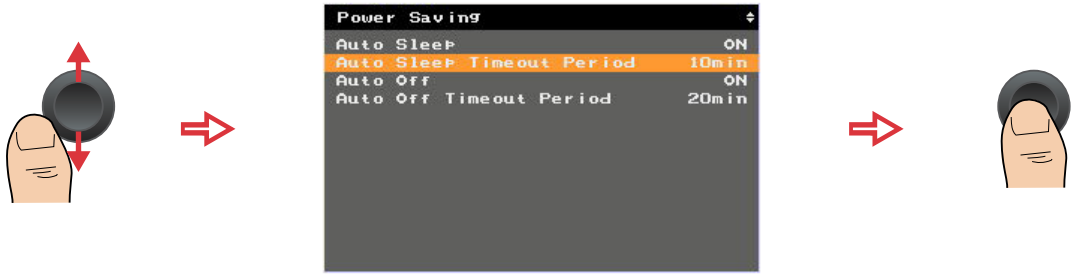
2

3



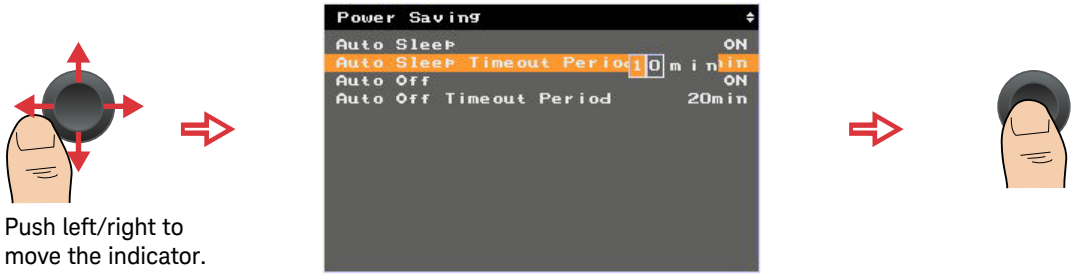
4

To set the auto sleep or auto power-off timer, select **Auto Sleep Timeout Period** or **Auto Off Timeout Period**:



5

- Auto Sleep: 1 to 15 mins (10 mins by default)
- Auto Off: 5 to 60 mins (20 mins by default)

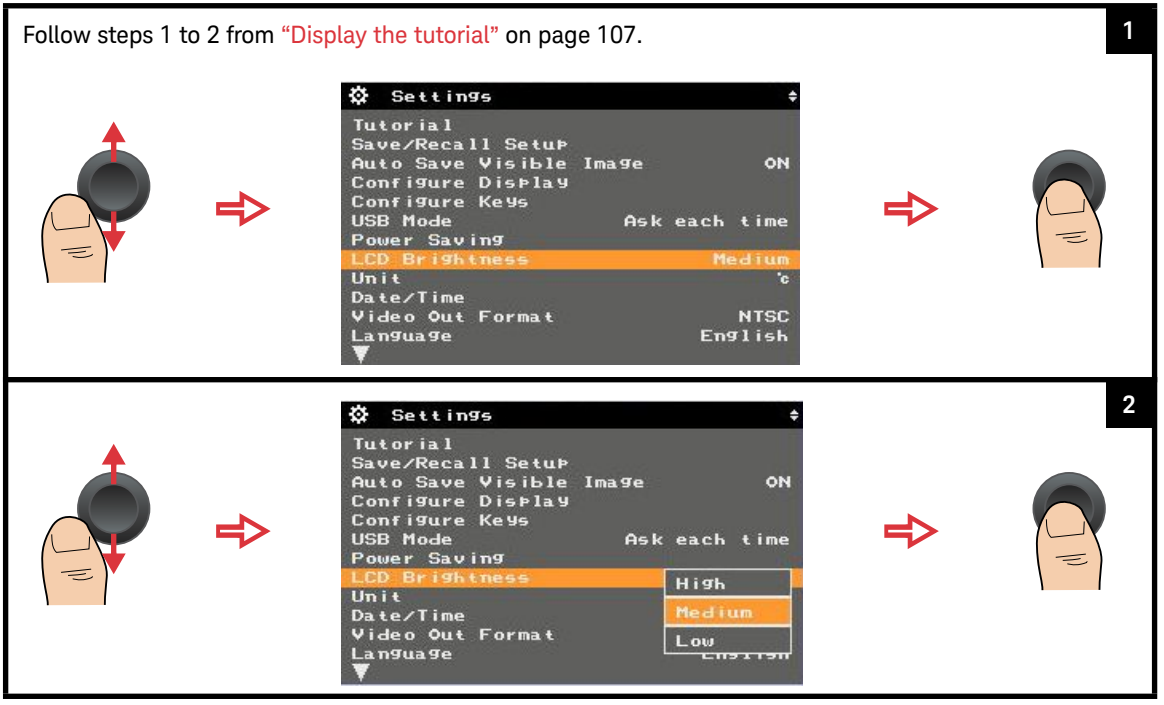


Push left/right to move the indicator.

Push up/down to increase/decrease the digits.

Set the LCD brightness

If viewing the display becomes difficult in certain conditions, you can adjust the LCD brightness to high, medium, or low.



Set the temperature unit (°C or °F)

Refer to "Set up the U5850 Series" on page 27.

Set the date and time

Refer to "Set up the U5850 Series" on page 27.

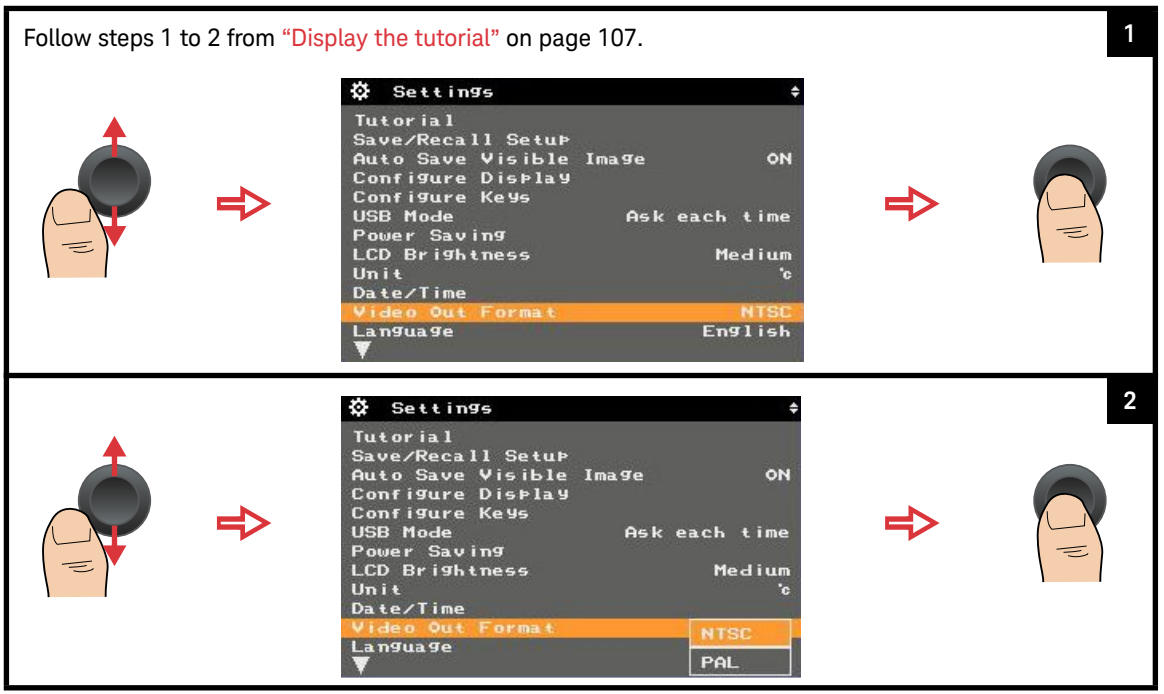
Set the video out format

You can set the video out format to NTSC or PAL when you connect the U5850 Series to an external monitor.

NOTE

- The PAL and NTSC formats are full resolution screen videos. Hence, if a TV/ projector/monitor screen is truncated, switch its OVERSCAN function to OFF.
- Video out is disabled in the power-saving mode.

Follow steps 1 to 2 from "Display the tutorial" on page 107.



Set the language

Refer to "Set up the U5850 Series" on page 27.

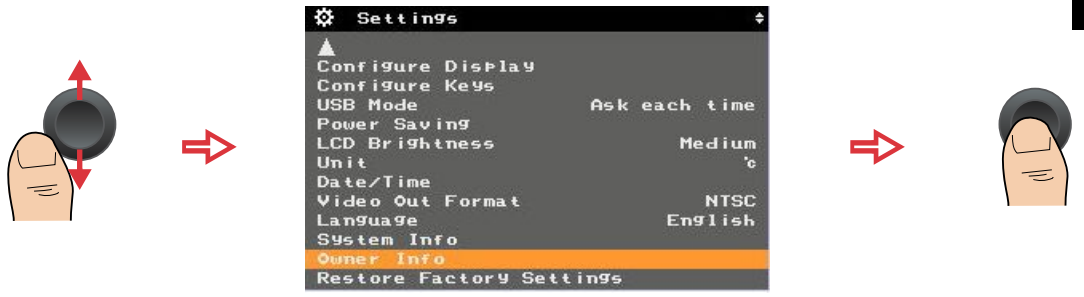
Display the system and owner information

Display the system information

Follow steps 1 to 2 from "Display the tutorial" on page 107.

Display the owner information

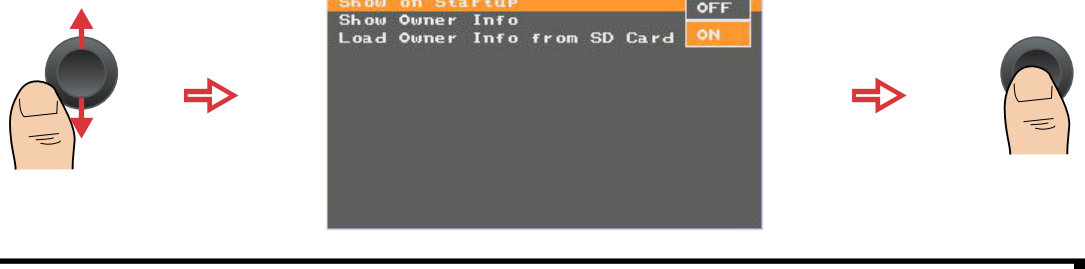
1



2

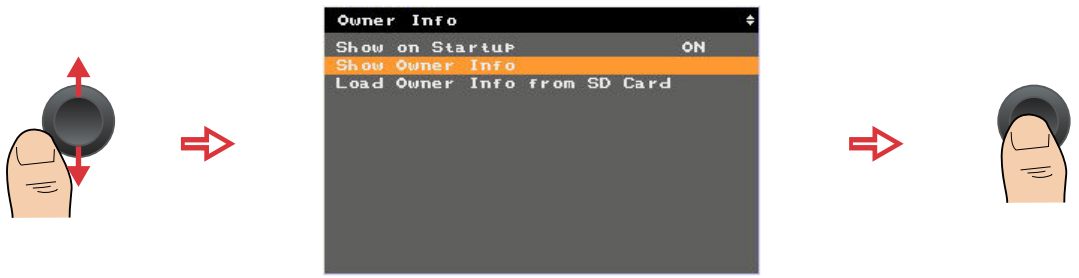
To display the information at power-on:

3



4

To view the owner information:



Add the owner information from a template file

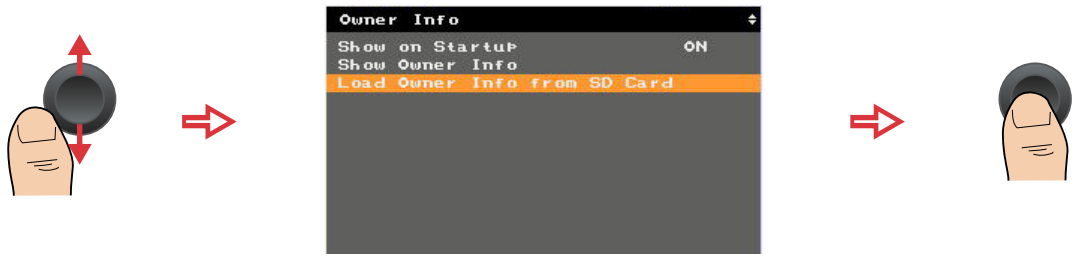
You can download the owner information template file from the Keysight website to the SD memory card.

To ensure proper use of this template file, use the following guidelines:

- File name and extension: OWNERINF.TXT
- File format: Text file/Notepad
- File location: Root of the SD memory card
- Character code: ASCII (20h to 7Fh)
- Maximum line: 8 lines
- Maximum characters per line: 18 characters

When you load the owner information from the template file, the contents of the file are read and registered with the U5850 Series memory.

To view the owner information: 1



Select **YES** to load the info file and return to the Owner Info menu: 2

If the info file does not exist on the SD memory card, an error message is

Reset the U5850 Series to factory default settings

Follow steps 1 to 2 from "Display the tutorial" on page 107.

1

2

4 Characteristics and Specifications

For the characteristics and specifications of the U5850 Series True*IR* Thermal Imager, refer to the data sheet at http://literature.cdn.keysight.com/litweb/pdf/5991-4297EN.pdf.

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This information is subject to change without notice. Always refer to the Keysight website for the latest revision.

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