Revision: 04.2023-001

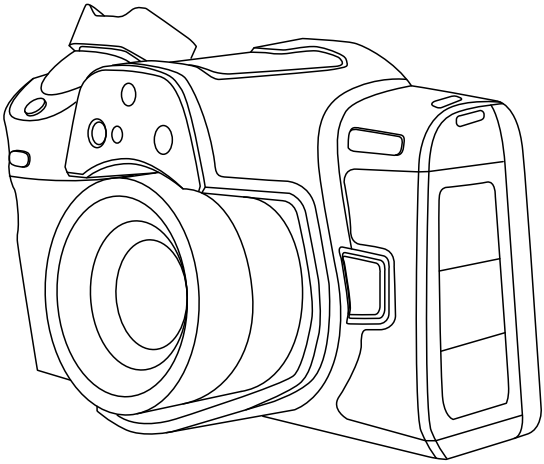
ICI | INFRARED CAMERAS INC

Industry

TITAN HD

USER MANUAL

PLEASE READ THIS MANUAL BEFORE SWITCHING THE UNIT ON.
IMPORTANT SAFETY INFORMATION INSIDE.



ICI cameras fall under US Federal Law and Export Control.

2105 W. Cardinal Dr. Beaumont, TX 77705

For more information, contact us: (409) 861-0788 | sales@infraredcameras.com | www.infraredcameras.com

Revision History

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04.2023-001	FCC statement updated

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1. Disclaimers

1-1 Terms and Conditions

Warranty Terms and Condition of Sale are made available online at:

https://infraredcameras.com/support/terms-and-conditions-of-sale/

1-2 U.S. Government Regulations

This product may be subject to U.S. Export Regulations. Please send any inquiries to support@infraredcameras.com

1-3 Copyright

© 2022, Infrared Cameras, Inc. All rights reserved worldwide. No parts of the software including source code may be reproduced, transmitted, transcribed or translated into any language or computer language in any form or by any means, electronic, magnetic, optical, manual or otherwise, without the prior written permission of Infrared Cameras, Inc.

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1-4 Quality Assurance

Infrared Cameras, Inc. is committed to a policy of continuous development; therefore we reserve the right to make changes and improvements on any of the products without prior notice.

1-5 Customer Help

For customer help, visit:

https://infraredcameras.com/support/

E-mail:

support@infraredcameras.com

2. User Notice

2-1 Calibration

Annual calibration to the thermal camera is recommended. Contact customer service to schedule maintenance.

2-2 Accuracy

For very accurate results, we recommend that you wait a minimum of 5 minutes after you have started the camera before measuring a temperature.

2-3 Cybersecurity

After the products are connected to the Internet, they may face risks including but not limited to network attacks, hacker attacks, virus infections, etc. The company will not be responsible for the abnormal operation of the products and any loss or liability caused therefrom shall be at your own risk.

2-4 Disposal of Electronic Waste

Electrical and electronic equipment (EEE) contains materials, components and substances that may be hazardous and present a risk to human health and the environment when waste electrical and electronic equipment (WEEE) is not handled correctly.

Equipment marked with the below crossed-out wheeled bin is electrical and electronic equipment. The crossed-out wheeled bin symbol indicates that waste electrical and electronic equipment should not be discarded together with unseparated household waste, but must be collected separately.

All local authorities have established collection schemes under which residents can dispose of equipment at a recycling center or other collection points, or WEEE will be collected directly from households. More detailed information is available from the administration of the relevant local authority. Always dispose of waste in accordance with local, state, and federal regulations.

2-5 Intended Use

The Titan HD cameras are used for surface temperature assessment of energy emitted from the first 1/1000th of an inch of a subject.

Environment of use: industrial and petrochemical buildings, electrical plants, security rooms, science labs, animal reserves as well as environmental conservatories, among others.

You agree that this product is for civilian use only, and shall not use applications that may infringe the rights of third parties, medical and safety devices or other applications where product failure may lead to life-threatening or personal injury, as well as weapons of mass destruction, chemical and biological weapons, nuclear explosions, unsafe use of nuclear energy, dangerous or humanitarian purposes. Any loss or liability caused therefrom shall be at the your own risk.

2-6 Manual Update

The user manual will be updated from time to time. To access the latest manuals, translations of manuals, and notifications, go to:

https://infraredcameras.com/product-resources/

The manufacturer reserves the right to alter the specifications of the product without prior notification. The manufacturer allows himself the right to modify without any preliminary opinion the technical specifications of the product.

2-7 Scope of Application

Infrared Cameras, Inc. issues generic manuals that cover several cameras within a model line.

This means that this manual may contain descriptions and explanations that do not apply to your particular camera model. This manual may contain technical inaccuracies or typographical errors.

2-8 Authoritative Versions

The authoritative version of this publication is English. In the event of divergences due to translation errors, the English text has precedence.

Any late changes are first implemented in English. Other languages may or may not be available.

2-9 Training

To read about infrared training, visit:

https://infraredtraininginstitute.com/

3. Safety Information

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

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

  (1) This device may not cause harmful interference, and

  (2) this device must accept any interference received, including interference that may cause undesired operation. Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

  The highest SAR value reported under this standard during product certification for use when properly worn on the body is 1.34W/kg. This device was tested for typical body-worn operations with the back of the handset kept 0cm from the body.

  NOTICE: Changes or modifications made to this equipment not expressly approved by the manufacture may void the FCC authorization to operate this equipment.

CHANGES OR MODIFICATIONS MADE TO THIS EQUIPMENT NOT EXPRESSLY APPROVED BY THE MANUFACTURE MAY VOID THE FCC AUTHORIZATION TO OPERATE THIS EQUIPMENT.

- To prevent eye damage and personal injury, do not look into the laser. Do not point the laser directly at people or animals or indirectly off reflective surfaces.
- Do not disassemble or modify the thermal device.
- Do not point the imager (with or without the lens cover) at intensive energy sources, e.g. devices that emit laser radiation, or the sun. This can affect the accuracy of the camera, and cause damage to the detector.
- Do not use the imager in an ambient temperature outside of the operation range. High/low temperatures can cause damage to the device.
- Always charge the battery in the special temperature range. The temperature range to charge the battery is 0 °C to 40 °C (32 °F to 104 °F). Charging the battery at temperatures outside this range can cause the battery to become hot or to explode. It can also decrease the performance or the life cycle of the battery.

- Do not continue to charge the battery if it does not become charged in the specified charging time. If you continue to charge the battery, it can become hot and cause an explosion or ignition. Injury to persons can occur.
- Do not attach the batteries directly to a car's cigarette lighter socket. Using the incorrect equipment can cause the battery to become hot or cause an explosion.
- Only use the correct equipment to discharge the battery. Using the incorrect equipment can decrease the performance or the life cycle of the battery. Using the incorrect equipment can cause the battery to become hot or cause an explosion.
- Do not connect the positive terminal and the negative terminal of the battery to each other with a metal object (such as wire). Damage to the batteries can occur.
- The battery contains safety and protection devices which, if they become damaged, can cause the battery to become hot, or cause an explosion or an ignition.
- Do not put holes in the battery with objects. Damage to the battery may occur.
- Do not hit the battery with a hammer or apply strong impacts or electric shocks to it. Damage to the battery may occur.
- Do not put the battery in or near a fire, stove or other high-temperature locations. Damage or ignition of the battery may occur.
- Do not put the battery in direct sunlight or other high-temperature locations. Damage or ignition of the battery may occur.
- Do not solder directly onto the battery. Damage to the battery may occur.
- Do not get water or salt water on the battery or device or permit the device or battery to get wet. Damage to the battery may occur.
- Remove any water or moisture on the battery before you install it. Damage to the battery may occur.
- If there is a leak from the battery and the fluid gets into the eyes, do not rub the eyes. Flush well with water and immediately get medical care.
- Always dispose of battery in accordance with local, state and federal regulations.
- Do not use the battery if, when used, charged, or placed in storage, there is an unusual smell from the battery, the battery feels hot, changes color, changes shape, or is in an unusual condition. Speak with a sales office if one or more of these problems occurs.
- Clean the case with a damp cloth and a weak soap solution. Do not use abrasives, isopropyl alcohol, or solvents to clean the case or lens/screen.

THE ENCAPSULATION RATING IS ONLY APPLICABLE WHEN ALL THE OPENINGS ON THE CAMERA ARE SEALED WITH THEIR CORRECT COVERS, HATCHES, OR CAPS. THIS INCLUDES THE COMPARTMENTS FOR DATA STORAGE, BATTERIES, AND CONNECTORS.

- Be careful when cleaning the infrared lens. Do not clean the infrared lens too vigorously. This can damage the anti-reflective coating.
- Avoid condensation. Taking the imager from cold to hot will cause condensation in thermal imager. To protect the imager, power on the device and wait until it becomes warm enough for the condensation to evaporate.
- Keep device out of reach of children.
- After the eyepiece is used for long time, its contrast will be lowered, and the scene will be whitened. You can switch to the LCD display, and switch back to the eyepiece some time later.
- Storage: If you do not use the imager for a long period of time, put the device in a cool and dry environment. Batteries should be stored in an ambient temperature of -20 °C to 20 °C (-4 °F to 67.9 °F). Lithium batteries will discharge time and should be fully charged before storage. It is recommended to fully recharge the batteries every 3 months to prevent damage. Store the device in an ambient temperature of -40 °C to 70 °C (-40 °F to 158 °F).

4. Technical Specifications

Pixel Resolution	1280 × 1024
Accuracy	± 1 °C (± 1.8 °F) or ± 1%
Temperature Range	Standard: -20 °C to 150 °C (-4 °F to 302 °F); Industrial: 150 °C to 800 °C (302 °F to 1472 °F) Optional: 400 °C to 1500 °C (752 °F to 2732 °F)
Operation Range	-20 °C to 50 °C (-4 °F to 131 °F)
Storage Range	-40 °C to 70 °C (-40 °F to 158 °F)
Detector Array	UFPA (VOx)
Pixel Pitch	12 µm
FOV	25° x 20°
IFOV	0.68 mrad
Focal Length	25 mm
Focus	Manual and automatic
Spectral Band	8 µm to 14 µm
Thermal Sensitivity (NETD)	< (20 mK) 0.02 °C at 30 °C (86°F)
Frame Rate	30 Hz
Humidity	10% to 95% non-condensing
Pixel Operability	> 99 %
Shock/Vibration	25 G/2 G
Dimensions (without lens)	140 mm x 210 mm x 115 mm (L x W x H ± 0.5 mm) (5.51” x 8.27” x 4.53” (L x W x H ± 0.02”))
Weight (with lens)	2000 g (4.41 lbs)
Battery	Li-ion, rechargeable/replaceable
Operation Time	3 hours
Charging Time	3 hours
Interface	USB Type-C, HDMI, SD Card
Video Format	IRV or MP4 (without data)
Image Mode	IR JPG (with data) + visible JPG
Image Polarity	20 options
Image Modes	IR, Fusion (ICI Dual Vision), Visible, Picture-in-Picture
Memory	MicroSD (up to 2 TB)
Screen	5.5” color touch screen, 1920 × 1080
Viewfinder	0.39” OLED, 1920 × 1080

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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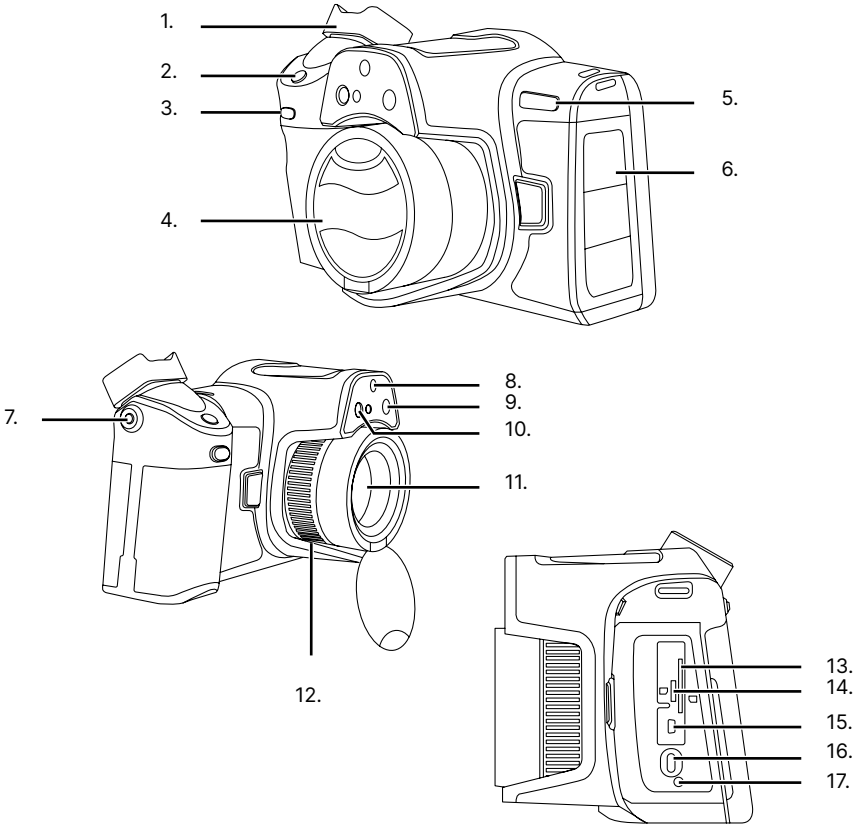
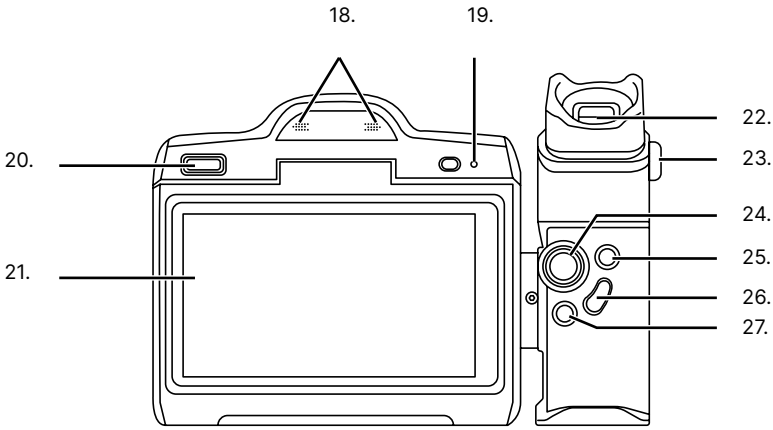
Brightness	Adjustable
Digital Camera	13 MP
Zoom	1x - 10x, continuous
Emissivity Correction	0.01 to 1.0
IP Rating	IP54
Interval Photography	Yes
Alarm Snapshot	Yes
Point/Line/Area Measurements	Yes
WLAN Support	Yes
Bluetooth Support	Yes
Cloud Services	No
Laser	Class II 650 nm, < 1 mW
Language	Multinational
Voice annotation	
Text annotation lists	
Automatic alarms	
Internal non-uniformity correction (NUC)	
1/4”-20 tripod support	

5. Structure

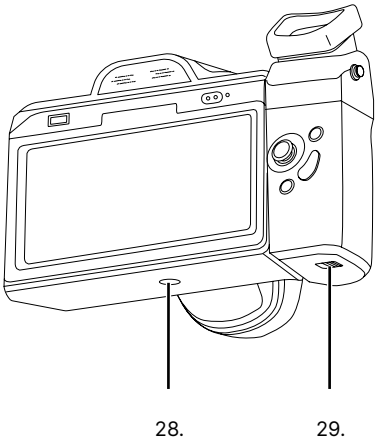
5-1 Appearance and Definitions of Housing Interface



1. Viewfinder
2. Shutter Trigger
3. Auto Focus Button
4. Lens Cover
5. Power/Sleep Mode
6. Interface Slot Cover
7. Diopter Knob
8. Visible Light Camera
9. LED Light
10. Laser
11. Germanium Lens
12. Focus Adjustment Ring
13. SD Card Slot
14. Micro-SD Card Slot
15. Micro-HDMI Output
16. Type-C Slot
17. Charging LED

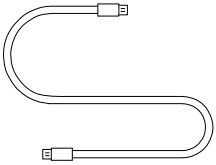


18. Speakers
19. Microphone
20. Touchscreen/Viewfinder Switch
21. Touchscreen
22. Viewfinder
23. Diopter Knob
24. Thumbstick *
25. Review
26. OK/Program Button (AI)
27. Back/Cancel/Close
28. 1/4”-20 Mount
29. Battery Bay

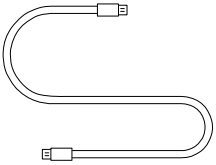


* **THE THUMBSTICK IS A FOUR-WAY DIRECTIONAL JOYSTICK WITH T5 CLICK FEATURE WHICH FUNCTIONS AS AN ENTER KEY. USERS HEAR A CLICK WHEN PRESSING AND DEPRESSING IT.**

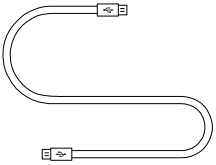
6. Package Includes



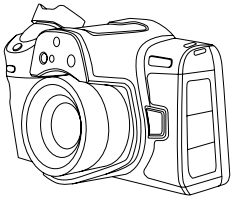
Type-C Cable



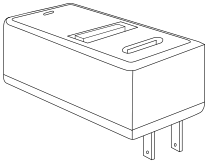
HDMI Cable



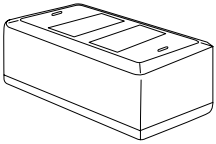
USB Cable



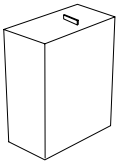
Titan HD Device



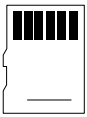
Power Adapter



Charging Base



Battery x2



SD Card

ENSURE ALL SYSTEM EQUIPMENT AND COMPONENT ITEMS ARE PRESENT BEFORE BEGINNING INSTALLATION

7. Quick Start Instructions

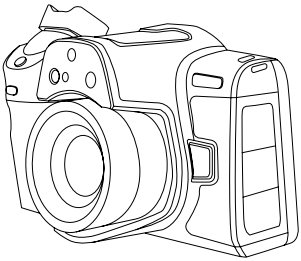
7-1 Tripod Setup

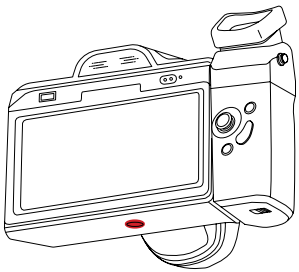
A.

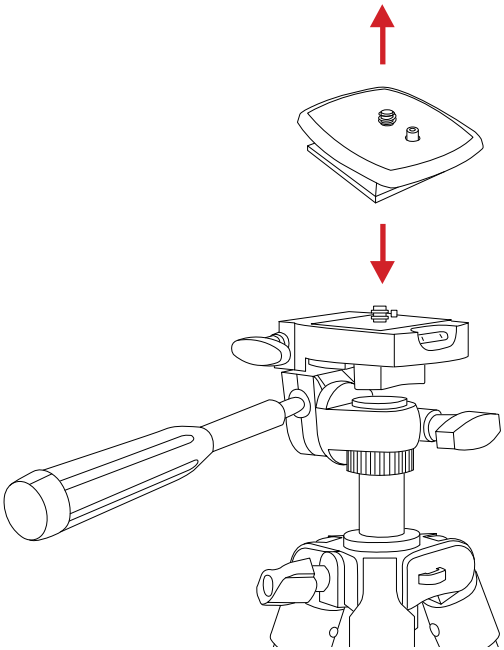
The camera can be used as a handheld device.

or

Mount the fully charged device to a tripod using the ¼"-20 mount located on the body.







MAKE SURE TRIPODS DO NOT BLOCK THE DIRECT PATH OF PERSON(S) TO BE IMAGED TO ENSURE THE EQUIPMENT WILL NOT BE MOVED OR KNOCKED DOWN. USING A DIVIDING BARRIER WILL HELP KEEP TRIPODS SEPARATE FROM THE PATH.

B.

Power on device.

PRESS AND HOLD THE POWER BUTTON FOR MORE THAN 5 SECONDS TO SHUT DOWN THE CAMERA.

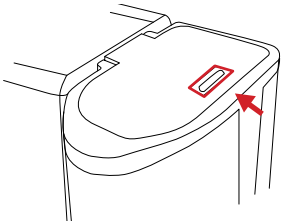
THE THERMAL IMAGER NEEDS SUFFICIENT WARM-UP TIME FOR THE MOST ACCURATE TEMPERATURE MEASUREMENTS AND BEST IMAGE QUALITY. THIS TIME CAN OFTEN VARY BY ENVIRONMENTAL CONDITIONS. IT IS BEST TO WAIT A MINIMUM OF 10 MINUTES FOR THE DEVICE TO COMPLETELY WARM-UP.

MAKE SURE TO HOLD THE CAMERA FIRMLY IN BOTH HANDS WHEN REMOVING OR REPLACING THE BATTERY.

7-2 Battery Installation

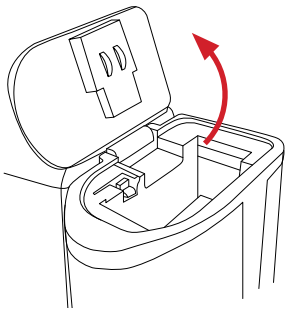
A.

Slide the battery bay cover latch.



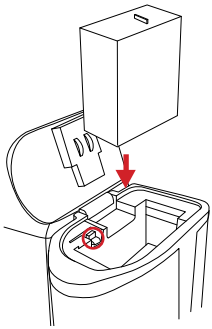
B.

Open the battery bay cover.



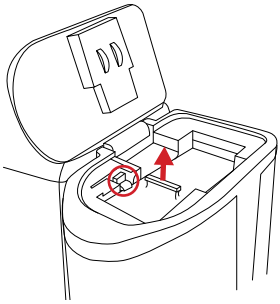
C.

Ensure metal contacts are aligned; then, push the battery into the battery bay until battery is secure under battery buckle.



D.

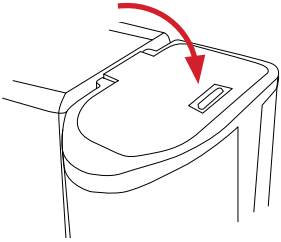
To replace a battery held in the battery bay push and hold the battery buckle; then, pinch the battery handle with the index finger and thumb; pull to remove battery.



DO NOT FORCE THE BATTERY INTO THE BATTERY BAY. IF USER FEELS SIGNIFICANT RESISTANCE REMOVE THE BATTERY AND ENSURE METAL CONTACTS ARE ALIGNED BEFORE TRYING TO PLACE BATTERY INTO THE BATTERY BAY.

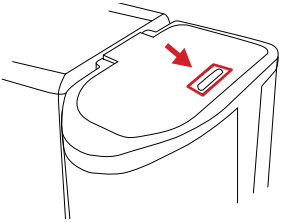
E.

Close the battery bay.



F.

Slide the battery bay latch to secure the battery bay cover.

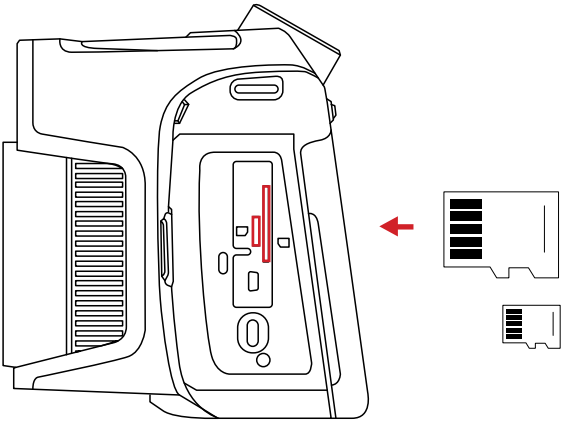


ENSURE BATTERY COVER IS PROPERLY CLOSED. IMPROPER CLOSURE OF BATTERY COVER MAY EXPOSE THE BATTERY AND INTERNAL ELECTRONICS TO ELEMENTAL DAMAGE.

7-3 Memory Card Installation

A.

Align the contact pins of a memory card to the front of the device and insert the card into the proper slot (SD or Micro-SD) on the side of the device until a clicking sound is heard.



B.

To eject the memory card, press down until a click is heard; then, release. The memory card will be ejected from the device.

DO NOT FORCE MICRO-SD CARD INTO THE SLOT. THE SIDE OF THE CARD WITH CONTACT PINS MUST BE INSERTED FIRST. IF THERE IS RESISTANCE FLIP THE CARD AROUND AND TRY AGAIN. TO EJECT THE MEMORY CARD PRESS UNTIL A CLICK IS HEARD AND THEN RELEASE. MEMORY CARD WILL BE EJECTED.

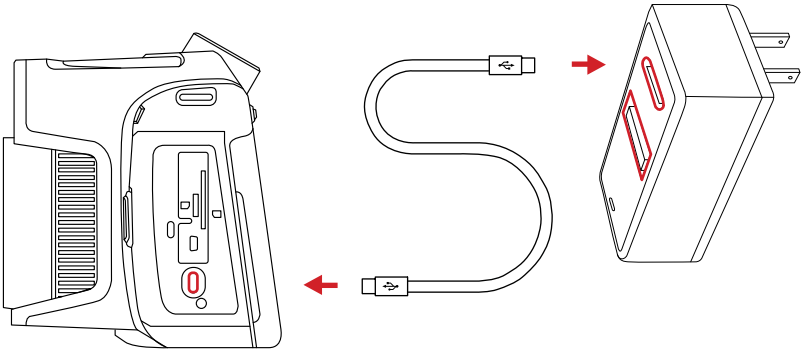
7-4 Charging Instructions: Option 1

A.

While a battery is inside the device, plug the Type-C end of either the Type-C Cable or USB Cable into the Type-C port of the device.

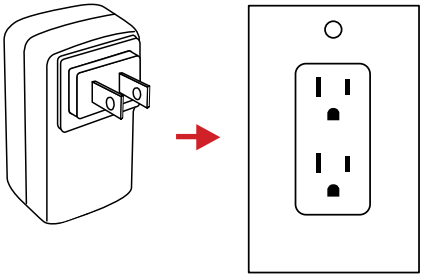
B.

Plug the other end of the cable into the proper slot (Type-C or USB) of the power adapter.



C.

Plug power adapter into a 110/120V electrical outlet.



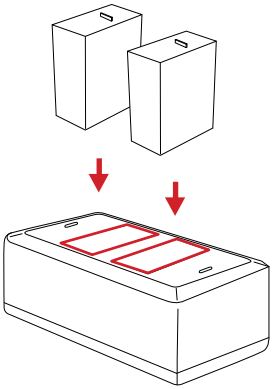
ENSURE THE IMAGER IS NEAR ROOM TEMPERATURE BEFORE CHARGING THE DEVICE. DO NOT CHARGE IN EXTREMELY HOT OR COLD AREAS. THE BATTERY CAPACITY MAY BE DECREASED IF CHARGED IN AN EXTREME TEMPERATURE ENVIRONMENT.

7-5 Charging Instructions: Option 2

REMOVE THE BATTERIES FROM THE DEVICE BEFORE CONTINUING WITH THIS METHOD OF CHARGING.

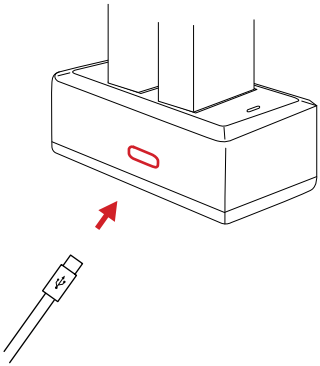
A.

Insert batteries into the battery charging base.



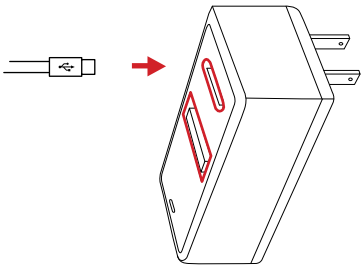
B.

Plug the Type-C end of either the Type-C Cable or USB Cable into the back of the battery charging base.



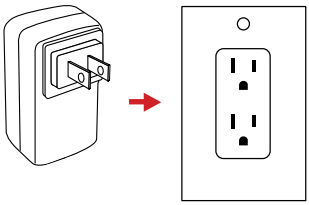
C.

Plug the other end of the cable into the proper slot (Type-C or USB) of the power adapter.



D.

Plug power adapter into a 110/120V electrical outlet.



WHEN THE BATTERY IS NOT PLACED IN THE BATTERY CHARGING BASE THE INDICATOR LIGHT IS BLUE. THE LIGHT FLASHES BLUE WHEN THE BATTERY IS PLACED AND CHARGING. WHEN THE BATTERY IS FULLY CHARGED THE LIGHT IS STEADY BLUE.

CHARGE THE BATTERY FOR A MINIMUM OF 4 HOURS BEFORE USING THE DEVICE.

ICI DOES NOT RECOMMEND CHARGING THE DEVICE WHILE IT IS ON A TRIPOD. LAY DEVICE FACE DOWN ON A FLAT AND STABLE DESK OR TABLE WHILE CHARGING.

ENSURE THE IMAGER IS NEAR ROOM TEMPERATURE BEFORE CHARGING THE DEVICE. DO NOT CHARGE IN EXTREMELY HOT OR COLD AREAS. THE BATTERY CAPACITY MAY BE DECREASED IF CHARGED IN AN EXTREME TEMPERATURE ENVIRONMENT.

IF YOU DO NOT USE THE IMAGER FOR A LONG PERIOD OF TIME, PUT THE DEVICE IN A COOL AND DRY ENVIRONMENT. THE BATTERY WILL DISCHARGE OVER TIME; THEREFORE, THE IMAGER SHOULD BE CHARGED OCCASIONALLY TO PREVENT DAMAGE TO THE BATTERY OR THE DEVICE.

7-6 Lens Cover

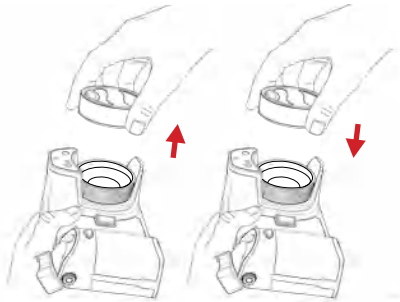
MAKE SURE TO HOLD THE CAMERA FIRMLY IN BOTH HANDS WHEN REMOVING OR REPLACING THE LENS COVER.

A.

Firmly grip around the outer lens ring.

B.

Pull the lens cover from the lens. Replace lens cover by firmly pressing lens cover onto the lens.



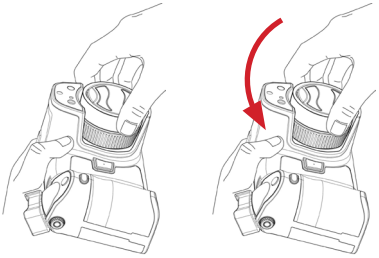
REPLACE THE LENS COVER WHEN THE DEVICE IS NOT IN USE.

7-7 Lens Installation

MAKE SURE TO HOLD THE CAMERA FIRMLY IN BOTH HANDS WHEN CHANGING THE LENS.

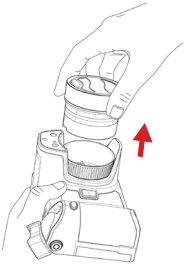
A.

Firmly grip around the outer lens ring and rotate the lens 90° counter-clockwise.



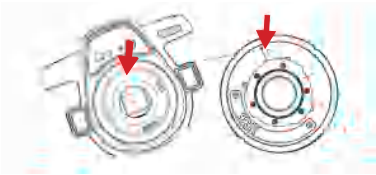
B.

Pull the lens from the lens mount.



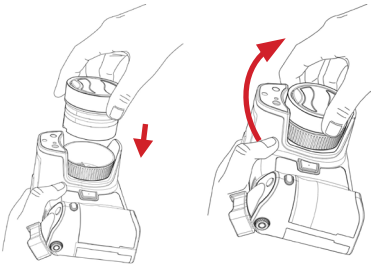
C.

Align the index marks on the new lens and lens mount.



D.

Push the lens into the lens mount; then, rotate the lens 90° clockwise.



DO NOT FORCE LENS INTO THE SLOT AS THREADS MAY STRIP. IF USER FEELS SIGNIFICANT RESISTANCE REMOVE THE LENS AND ENSURE INDEX MARKS AND THREADS ARE PROPERLY ALIGNED; THEN, PUSH THE LENS INTO THE LENS MOUNT AND TRY AGAIN.

PLACE THE LENS IN ITS LENS CONTAINER WHEN NOT IN USE TO AVOID DAMAGE TO THE LENS. AVOID DROPPING OR SMASHING THE LENS TO AVOID LENS DAMAGE.

8. Operation Instructions

8-1 How to Charge the Battery

Before using the imager for the first time, charge the battery for a minimum of 4 hours. The battery status is shown by the indicator in the upper-right corner of the screen. 1 lightning bolt means the device is slow charging while 2 bolts means the device is fast charging.

The power adapter is used both with the charging base and the camera. The white cable is preferred when using the charging base and the black cable is preferred when charging the battery through the camera or via a computer.

8-1-1 Charging though the Device

1. Plug the Type-C end of the black cable into the device.
2. Plug the USB end of the black cable into the power adapter.
3. Plug power adapter into a 110/120V electrical outlet.

8-1-2 Charging via Power Adapter

1. Insert batteries into the battery charging base.
2. Plug the Type-C end of the white cable into the device.
3. Plug the other end of the white cable into the power adapter.
4. Plug power adapter into a 110/120V electrical outlet.

8-1-3 Charging via Computer

1. Plug the Type-C end of the black cable into the device.
2. Plug the USB end of the black cable into USB port on the computer.
3. Power on the computer on to charge.

CHARGING THROUGH A COMPUTER TAKES SIGNIFICANTLY MORE TIME THAN CHARGING WITH THE POWER ADAPTER.

ENSURE THE IMAGER IS NEAR ROOM TEMPERATURE BEFORE CHARGING THE DEVICE. DO NOT CHARGE IN EXTREMELY HOT OR COLD AREAS. THE BATTERY CAPACITY MAY BE DECREASED IF CHARGED IN AN EXTREME TEMPERATURE ENVIRONMENT.

8-2 Power On/Off the Device

To power the camera on, push and hold the Power button for 3 seconds. Please wait patiently as it can take up to a minute for the heads up display to load.

Power off the device as follows:

1. Press and hold the Power button for more than 3 seconds to open the shut down menu.
2. Ensure a restart is necessary as there is not a confirmation prompt; then, tap Power Off on the touchscreen to power the device off. Press the Back button to cancel.

THE THERMAL IMAGER NEEDS SUFFICIENT WARM-UP TIME FOR THE MOST ACCURATE TEMPERATURE MEASUREMENTS AND BEST IMAGE QUALITY. THIS TIME CAN OFTEN VARY BY ENVIRONMENTAL CONDITIONS. IT IS BEST TO WAIT A MINIMUM OF 10 MINUTES FOR THE DEVICE TO COMPLETELY WARM-UP.

8-2-1 Restart the Device

Restart the device as follows:

1. Push and hold the Power button for more than 3 seconds to open the shut down menu.
2. Ensure a restart is necessary as there is not a confirmation prompt; then, tap Restart on the touchscreen to initiate the reboot sequence. Press the Back button to cancel. Please wait patiently as it can take several minutes for the device to power off and restart.

The user can initiate a hard reset by pressing and holding the power button for 15 seconds.

8-2-2 Sleep Mode

While the device is powered on, press the power button to send the device into sleep mode. Press the button again to wake it.

THE DEVICE MAY POWER OFF AFTER AN EXTENDED PERIOD OF NON-USE. POWER ON THE DEVICE BY PRESSING THE POWER BUTTON.

8-3 Power On/Off Laser Ranging

The Laser Range tool sends out a beam of laser light and measures the round trip time to estimate the distance to the target object. Distance is shown in the upper right corner of the Image Display Window.

To power the laser on using the touchscreen, tap the Laser Range button in the bottom right corner of the user interface. Repeat to power the laser off.

DO NOT LOOK INTO THE FLASHLIGHT OR LASER. LOOKING INTO THE FLASHLIGHT OR LASER MAY CAUSE EYE DAMAGE AND PERSONAL INJURY. DO NOT POINT THE FLASHLIGHT OR LASER DIRECTLY AT PEOPLE OR ANIMALS OR INDIRECTLY OFF REFLECTIVE SURFACES.

8-4 Power On/Off Flashlight

Usint the touchscreen, tap the flashlight button to power on the flashlight. Repeat to power the flashlight off.

8-5 Focus

Correct focus is important in all imaging applications. Correct focus makes sure that the infrared energy is correctly directed onto the pixels of the detector. This leads to accurate data collection.

8-5-1 Focus Modes

The device comes with two focus modes: Image Focus and Laser-aided Focus. Image Focus mode must be selected in order to use auto focus. Switch to Laser-aided Focus to use the laser to assist in focusing. Manual and continuous focus options can be controlled in either mode.

Change the focus mode as follows:

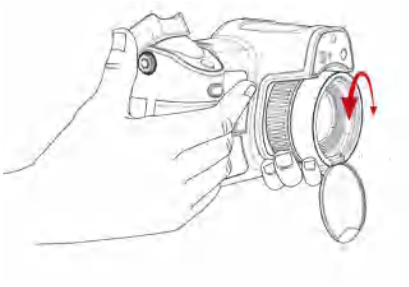
1. Using the touchscreen, tap the gear icon to open the Settings Menu. The Function Settings tab opens by default.
2. Select either Image Focus or Laser-aided Focus. The current option is highlighted green. Changes are saved automatically.
3. Press the Back button continuously to exit the Settings Menu.

THE AUTO FOCUS FEATURE IS DISABLED WHEN LASER-AIDED FOCUS MODE IS ENABLED. WHEN CONTINUOUS AUTO FOCUS IS ENABLED, THE USER CAN MANUALLY ADJUST THE FOCUS BY ROTATING THE FOCUS ADJUSTMENT RING. MANUAL ADJUST CAN BE USED IN EITHER FOCUS MODE.

8-5-2 Manual Focus

Use the Focus Adjustment Ring to manually bring a scene into focus. The target area shows sharp and clear when in focus and becomes blurry when out of focus. Rotate the focus ring clockwise or counter-clockwise to focus a scene.

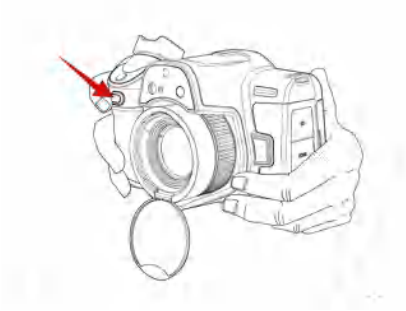
The response of the focus mechanism is progressive, meaning that a faster rotation of the focus ring gives a disproportional higher speed of focus change. This allows for both fine adjustment with a relatively large, but slow rotation and rapid change with a smaller, but faster rotation. Furthermore, for a very slow rotation, the lens moves in very small, discrete steps allowing for controlled focus adjustment. The rotation steps are audible for those with visual impairment.



MANUAL ADJUST CAN BE USED IN EITHER FOCUS MODE.

8-5-3 Auto Focus

To automatically focus a scene push the Auto Focus button. The camera adjusts focus until the main target of the scene is in focus. Auto focus can be refined or canceled by using the Focus Adjustment Ring.



THE AUTO FOCUS FEATURE IS DISABLED WHEN LASER-AIDED FOCUS MODE IS ENABLED.

8-5-4 Continuous Focus

The device can be set up for intelligent, continuous focus which constantly adjusts to keep the subject of a scene in focus. It is suitable for following moving targets such as assembly line parts and equipment or for any application involving subject tracking.

Enable continuous focus by pressing and holding the Auto Focus button for 2 seconds. A brief pop-up shows the feature is enabled. Press and hold the Auto Focus button again to disable the feature.

WHEN CONTINUOUS AUTO FOCUS IS ENABLED, THE USER MAINTAINS THE ABILITY TO MANUALLY ADJUST THE FOCUS BY ROTATING THE FOCUS ADJUSTMENT RING.

USERS CAN ALSO ENABLE/DISABLE CONTINUOUS FOCUS BY VISITING THE FUNCTION SETTINGS TAB OF THE SETTINGS MENU. TAP THE INTELLIGENT FOCUS SWITCH TO ENABLE THE FEATURE. SWITCH TURNS RED WHEN ACTIVE. TAP THE SWITCH AGAIN TO DISABLE THE FEATURE. SWITCH TURNS GRAY WHEN DISABLED.

8-5-5 Laser-aided Focus

The laser can be set up to assist with focusing when the device is set to Laser-aided mode in the user settings. When enabled, the device pulses the laser at the subject and automatically focuses to the point the laser touches. It is suitable for stationary or precise spot measuring.

Press the Auto Focus button once to focus the device. Continuous focus and manual focus can still be used while laser-aided focus is enabled; however, the auto focus feature is disabled.

8-6 Touchscreen/Viewfinder

8-6-1 Touchscreen/Viewfinder Switch

After the device is powered on the LCD touchscreen becomes available by default. Press the Touchscreen/Viewfinder Switch to power off the LCD and enable the viewfinder. Press the button again to power off the viewfinder and enable the LCD. Currently, the touchscreen and viewfinder cannot be enabled at the same time. Future updates may change this feature.

CURRENTLY, THE TOUCHSCREEN AND VIEWFINDER CANNOT BE ENABLED AT THE SAME TIME. FUTURE UPDATES MAY CHANGE THE FEATURE.

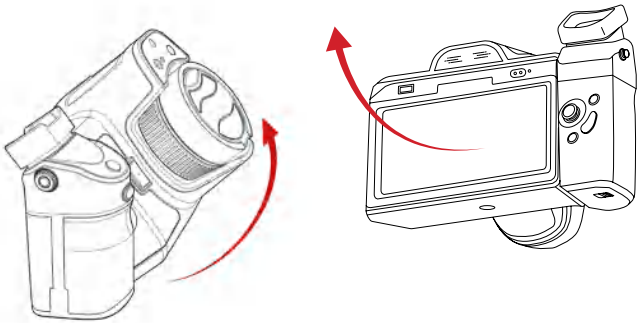
8-6-2 Diopter Adjustment

When using the viewfinder, the user may find it necessary to sharpen the image by adjusting the diopter knob. Look through the viewfinder and focus the image as best as possible; then, rotate the adjustment knob clockwise or counter-clockwise until the scene is clear and sharp.

8-7 Angle Adjustments

Users can adjust the angle of the lens and touchscreen to view targets in hard-to-reach places. To change the lens angle, hold the camera firmly by the viewfinder with one hand and tilt the body of the camera with the other. The body can be rotated 45° forward or backward.

Lift the touchscreen to change its angle up to 45° of tilt. Do not force the screen beyond 45° or try to twist it as this may break the screen.



DO NOT FORCE THE SCREEN BEYOND 45° OF TILT. FORCING THE SCREEN BEYOND THIS POINT MAY CAUSE THE SCREEN TO BREAK. DO NOT HOLD THE DEVICE BY THE SCREEN. DO NOT TWIST THE SCREEN.

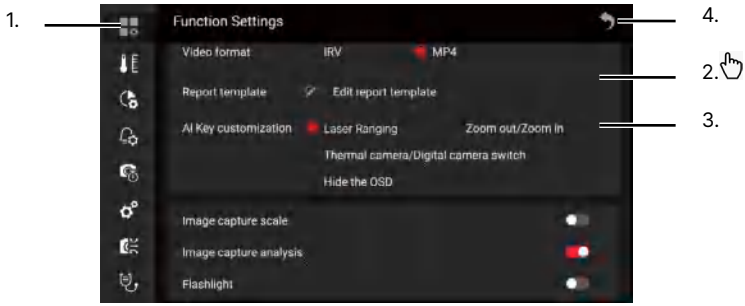
8-8 Programmable Button (AI)

Users can assign different functions to the programmable AI button:

- **Laser Ranging:** sends out a beam of laser light to estimate the distance to the target object. Distance is shown in the upper right corner of the Image Display Window.
    - Press and hold; then, release to enable/disable laser ranging.
- **Zoom out/Zoom In:**
    - Press and hold to zoom in; then, release when preferred zoom factor is reached. Zoom function is continuous and goes to 8X factor.
    - When zoomed to 8X factor, press and hold to zoom out; then, release when preferred zoom factor is reached. The user must be zoomed to 8X in order to zoom out.
- **Thermal Camera/Digital Camera Switch:** switches between thermal and visible feeds.
    - Press and hold to switch between feeds.
- **Hide the OSD:** hides the on screen data and leaves only the Quick Tools and Quick Access menu arrow.
    - Press and hold to enable/disable the OSD.

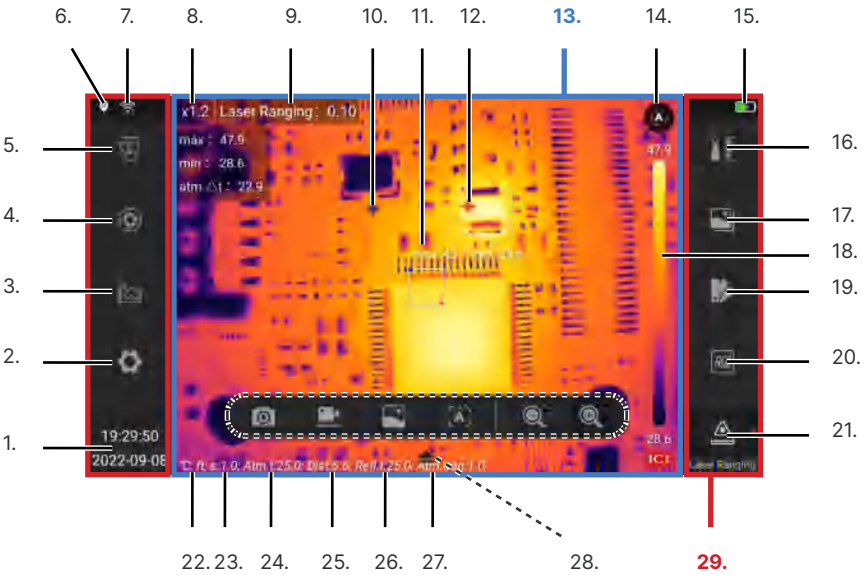
Laser ranging is enabled by default and can be changed as follows:

1. Using the touchscreen, tap the gear icon to open the Settings Menu. The Function Settings tab opens by default.
2. Press-and-hold the on the screen; then, drag up or down on the touchscreen to scroll to the AI Key Customization options.
3. Tap an option: Laser Ranging, Zoom Out/Zoom In, Thermal Camera/Digital Camera Switch, or Hide the OSD. The current option is highlighted red. Changes are saved automatically.
4. Press the Back button continuously to exit the Settings Menu.



8-9 User Interface

The device interface appearance:



1. Date and Time
2. Settings Menu
3. Isotherm
4. Non-uniformity Correction
5. Flashlight
6. GPS
7. Wi-Fi
8. Zoom
9. Laser Range Measurement
10. Cold Spot
11. Region of Interest
12. Hot Spot
13. **Image Display Window**
14. Level & Span Mode
15. Battery
16. Parameter Settings
17. Image Mode
18. Level & Span Bar
19. Image Polarity (Color Palette)
20. Analysis Tools
21. Laser Range
22. Units
23. Emissivity
24. Atmospheric Temperature
25. Distance
26. Reflected Temperature
27. Atmospheric Transmission
28. Quick Menu
29. **Sidebar Tools**

8-9-1 Quick Menu

The Quick Menu has zoom features and the enabled Virtual buttons. Using the touchscreen, access the Quick Menu by tapping the arrow at the mid-bottom of the Image Display Window. Tap again to close.

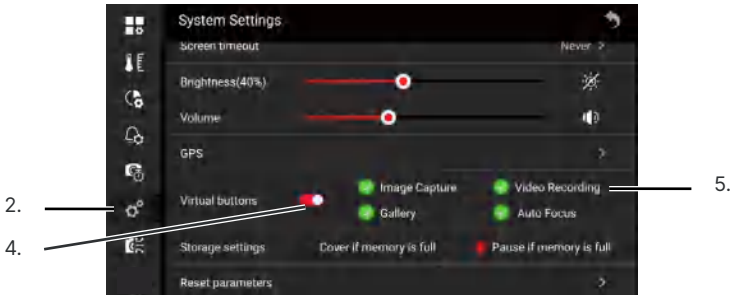
1. Capture Image
2. Record Video
3. Gallery
4. Auto Focus
5. Zoom Out
6. Zoom In

8-9-1-1 Virtual Buttons

Virtual buttons are quick access tools that allow users to alternate ways of capturing images, recording videos, opening the gallery to review media, and automatically adjust focus. Zoom features cannot be disabled.

Enable Virtual buttons as follows:

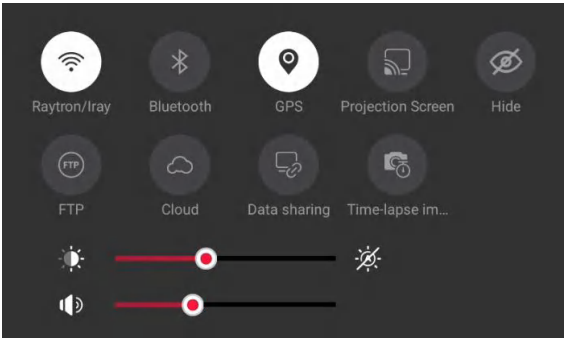
1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Press-and-hold the on the screen; then, drag up or down on the touchscreen to scroll to the Virtual Buttons options.
4. Toggle the feature to the On position by tapping its switch. The switch turns red when active. Disable the feature by tapping the switch again. Switch turns gray when inactive.
5. Tap an option to enable it. A green ✓ appears next to an active feature. Tap the green ✓ again to disable it. Feature is gray when inactive. Active features appear in the Quick Menu. The zoom features cannot be disabled.
6. Press the Back button continuously to exit the Settings Menu.



8-9-2 Connections Menu

The Connections Menu gives the user access to network configuration and sharing tools. Users can also adjust the brightness and volume of the device.

To open the Connections Menu, place a finger at the top of the screen and swipe down. Tap a feature to enable it. Feature is white when enabled. Tap again to disable the feature. Feature is gray when disabled. Press-and-hold to open the settings for the selected feature. Press-and-hold; then, drag on the sliders to adjust brightness and volume settings.



8-9-3 Interface Navigation

There are 2 ways to navigate the menu systems:

1. Use a finger or a stylus pen on the touchscreen, or
2. Use the joystick, Back, and AI buttons.

8-9-4 Open the Settings Menu

Using the touchscreen, tap the Settings Menu icon: ⚙

8-9-5 Close the Settings Menu

Press the Close button to exit the Settings Menu.

8-10 Zoom

The current zoom factor is displayed in the upper left corner of the screen. The device can zoom up to 8X.

Adjust the zoom as follows:

1. Using the touchscreen, access the Quick Menu by tapping the arrow at the mid-bottom of the Image Display Window.
2. Tap to zoom out.
   Tap to zoom in.

   The zoom factor changes by 0.1 each time a button is pressed. Press-and-hold to rapidly change zoom factor.
3. Close the Quick Menu by tapping the arrow at the mid-bottom of the Image Display Window.

8-11 Media Management

8-11-1 Capture an Image

Images can only be stored in the JPG format. The default naming convention for image files is X-Y-IR.jpg or X-Y-DC.jpg, where X is user defined prefix added to the file name, Y is time stamp, and IR/DC denotes infrared or visual. The time stamp is a combination of YYYYMMDDHHMMSS.

Save images as follows:

1. Find and aim the device at the target.
2. Adjust the focus until the scene is clear and sharp.
3. Press the Shutter Trigger button to take a photo. When Image Capture Analysis is enabled, an image preview appears along with a new Quick Menu and Sidebar Tools. These features allow the user to edit file information, add annotations, sketch on the image, perform thermal analysis, and generate reports. Disable Image Capture Analysis to enable auto saving (see **8-11-1-3 Auto Save Images**).
4. Tap the Save icon to save media. Press the Back button to cancel saving.

USER CAN ALSO CAPTURE IMAGES BY ENABLING AND USING THE VIRTUAL BUTTONS OF THE QUICK MENU. SEE SECTION 8-9-1 QUICK MENU AND SECTION 8-9-1-1 VIRTUAL BUTTONS.

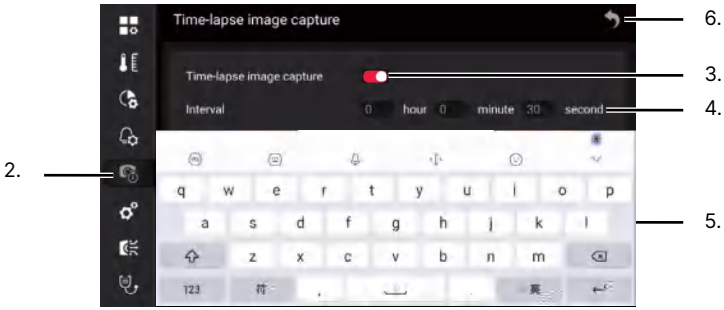
8-11-1-1 Interval Photography

Interval Photography (time-lapse) allows for the auto saving of images at regular intervals when the Shutter Trigger is pressed. Images are taken at a user defined frequency and cannot be programmed to capture images when a temperature threshold is exceeded. This feature is independent from Alarm Snapshots (see Section...).

Interval Photography disables automatically at the end of the capture session and must be enabled again in order to capture another time-lapse interval.

Enable Interval Photography as follows:

1. Using the touchscreen, tap the gear icon to open the Settings Menu.
2. Tap the Time-lapse tab.
3. Toggle the Time-lapse Image Capture to the On position by tapping the switch next to the option. The switch turns red when active. Disable the option by tapping the switch again. Switch turns gray when inactive.
4. Tap the first input box next to Interval. A keyboard appears.
5. Use the keyboard by tapping the touchscreen to input preferred text. The next input box is selected when the user taps the next icon on the keyboard. Fill in all of the input boxes. Press the Back button to close the keyboard.
6. Saving occurs automatically. Press the Back button continuously to exit the Settings Menu.
7. Press the Shutter Trigger button to initiate a time-lapse interval session. End a session early by tapping the power icon: ⏻



INTERVAL PHOTOGRAPHY DISABLES AUTOMATICALLY AT THE END OF THE CAPTURE SESSION AND MUST BE ENABLED AGAIN IN ORDER TO CAPTURE ANOTHER TIME-LAPSE INTERVAL.

DEPENDING ON ALARM SNAPSHOT AND INTERVAL PHOTOGRAPHY SETTINGS THE MEMORY CARD MAY FILL RAPIDLY AND OVERWRITE OLD IMAGES. BE WARY OF DEVICE SETTINGS AND LIMITS OF THE INSERTED MEMORY CARD.

8-11-1-2 Video Snapshot

While recording a video, press the Shutter Trigger button to capture an image.

8-11-1-3 Auto Save Images

Auto saving is disabled by default. Disable Image Capture Analysis to enable auto saving. Image Capture Analysis allows the user to edit file information, add annotations, sketch on an image, perform thermal analysis, and generate reports when an image is captured.

Change the setting as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu. The Function Settings tab opens by default.
2. Press-and-hold the on the screen; then, drag up or down on the touchscreen to scroll to Image Capture Analysis.
3. Toggle the feature Off by tapping the switch; the switch turns gray when disabled. Tap the switch again to enable the feature; the switch turns red when enabled.
4. Press the Back button continuously to exit the Settings Menu.

8-11-2 Record a Video

Save videos as follows:

1. Choose the appropriate file type (see **8-11-2-1 Choose a Video File Type**).
2. Find and aim the device at the target.
3. Adjust the focus until the scene is clear and sharp.
4. Press and hold the Shutter Trigger button for 2 seconds to start recording; a timer appears to the right of the Image Display Window. Press the Shutter Trigger to capture a video snapshot. Press and hold the Shutter Trigger button for 2 seconds to stop recording. MP4s are saved automatically. For IRV files, a new Pop-up Menu and set of Quick Tools appear allowing the user to type or record audio annotations before saving.
5. Tap the Save icon to save IRV files. Press the Back button to cancel saving.

MP4 FILES DO NOT CONTAIN THERMAL DATA AND USERS CANNOT PERFORM THERMAL ANALYSIS ON THEM. RECORD IN THE IRV FORMAT AND USE THE EXTERNAL SOFTWARE TO PERFORM THERMAL ANALYSIS ON VIDEOS.

MP4 FILES SAVE AUTOMATICALLY. IRV FILES DELAY SAVING ALLOWING USERS TO TYPE OR RECORD AUDIO ANNOTATIONS BEFORE SAVING. ANNOTATIONS CANNOT BE ADDED RETROACTIVELY.

8-11-2-1 Choose a Video File Type

By default videos are captured and stored in the MP4 format which can be reviewed on the device. The MP4 does not contain thermal data; as a result, thermal analysis cannot be performed on videos of this file type.

The device also supports the IRV format, a lossless compression file that stores thermal data. Users are able to perform thermal analysis on these files using external software. Videos stored in the IRV format cannot be reviewed on the device.

The default naming convention for video files is X-Y.MP4 or X-Y.IRV, where X is user defined prefix added to the file name and Y is time stamp. The time stamp is a combination of YYYYMMDDHHMMSS.

Choose a file type as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu. The Function Settings tab opens by default.
2. Press-and-hold the on the screen; then, drag up or down on the touchscreen to scroll to the Video Format options.
3. Tap an option: IRV or MP4. The current option is highlighted red. Changes are saved automatically.
4. Press the Back button continuously to exit the Settings Menu.

MP4 FILES DO NOT CONTAIN THERMAL DATA AND USERS CANNOT PERFORM THERMAL ANALYSIS ON THEM. RECORD IN THE IRV FORMAT AND USE THE EXTERNAL SOFTWARE TO PERFORM THERMAL ANALYSIS ON VIDEOS.

8-11-3 Review Media

8-11-3-1 View Images

When media is captured it is stored to the memory card. Media can be viewed at any time as follows:

1. Press the Review button to enter the Gallery.
2. Using the touchscreen, navigate the tabs to select media type. Media files are arranged by date YYYYMMDD.
3. Tap media to view in full screen mode. Press left or right on the thumbstick to cycle through adjacent media.
4. Press the Back button continuously to exit the Gallery.

8-11-3-2 Play Videos

Only MP4s can be played on the device. View IRV files using the external software.

View MP4s as follows:

1. Press the Review button to enter the Gallery.
2. Using the touchscreen, tap the Videos tab. Media files are arranged by date YYYYMMDD.
3. Tap a video to view it in the player. Press left or right on the thumbstick to cycle through adjacent videos.
4. Using the touchscreen, tap the play button to launch the video in full screen mode. The video auto-plays. Use the buttons on screen to play, rewind, and fast forward the video. Press-and-hold; then, drag left or right on the timeline to scroll through the video. Full screen mode closes automatically when video is finished playing; the user can also press the Back button to exit full screen mode.
5. Press the Back button continuously to exit the Gallery.

ONLY MP4 VIDEOS CAN BE PLAYED ON THE DEVICE. PLAY IRV FILES USING THE EXTERNAL SOFTWARE.

8-11-3-3 View Media Information

View detailed information about media as follows:

1. Press the Review button to enter the Gallery.
2. Using the touchscreen, tap a tab to select a media type. Media files are arranged by date YYYYMMDD.
3. Tap media to view in full screen mode. Press left or right on the thumbstick to cycle through adjacent media.
4. Tap the information icon to view media details including file name, size, resolution, and more.
5. Press the Back button continuously to exit the Gallery.

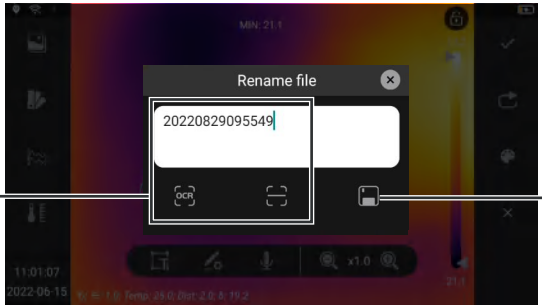
MEDIA INFORMATION CANNOT BE CHANGED.

8-11-4 Rename Media

When media is captured it is stored to the memory card with a default file name. Media can be renamed at any time.

1. Press the Review button to enter the Gallery.
2. Using the touchscreen, tab a tab to select a media type: Images, Videos, or Reports. Media files are arranged by date YYYYMMDD.
3. Tap media file to view in full screen mode.
4. Tap the Rename File icon:
5. Choose an option:
   - Keyboard input:
     - Tap the input field. Keyboard automatically opens.
     - Use the keyboard by tapping the touchscreen to input preferred text.
     - Press the Back button to close the keyboard.
   - Scan text with OCR reader:
     - Tap the OCR icon:
     - Point the device at the target and tap the camera icon. Renaming happens automatically.
   - Scan a QR Code with the reader:
     - Tap the QRC icon:
     - Scan the QR Code. Renaming happens automatically.
6. Tap the Save icon to save. Press the Back button to cancel saving.
7. Press the Back button continuously to exit the Gallery.

5.



6.

8-11-5 Delete Images/Videos

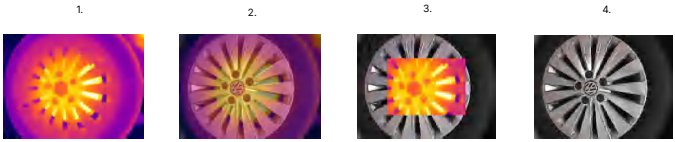
When an image or video is captured it will be stored to the memory card. Media can be deleted at any time as follows:

1. Press the Review button to enter the Gallery.
2. Using the touchscreen, navigate the tabs to select media type.
3. Press-and-hold on media thumbnail for 2 seconds to select it. Selected media has a check mark in the upper right corner; unselected media has an empty circle. Users can select multiple media files individually or press the select all icon:
4. Ensure media is to be erased; then, tap the delete icon. Deleted media cannot be recovered.
5. Tap Confirm to erase media. Tap Cancel prevent deletion.
6. Press the Back button to exit the gallery.

8-12 Image Modes

There are 4 image modes available:

1. Thermal: infrared image
2. Fusion (ICI Dual Vision): infrared and visible image
3. PIP (Picture-in-Picture): thermal image overlay over the visible image
4. Digital: visible image only



Change the image mode as follows:

1. Using the touchscreen, tap the Image Mode icon:
2. Tap the preferred image mode.
3. Press the Back button to exit the menu.

IF THE USER IS RECORDING IN THE IRV FORMAT ONLY THE THERMAL MODE CAN BE SELECTED.

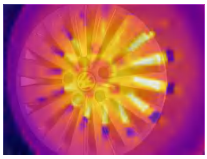
IF THE FUSION AND PIP MODE IS USED MAKE SURE THE IMAGE ALIGNMENT IS SET CORRECTLY.

8-12-1 Image Alignment

When using fusion mode it is important to ensure the image alignment is set correctly to receive the best image. Align the images as follows:

1. After enabling fusion mode, press-and-hold on the touchscreen; then, drag the visible image until it aligns with the thermal image.
2. Press the Back button to exit the menu.

X



✓

USERS SHOULD STAND AT THE CORRECT DISTANCE FROM THE TARGET WHEN PERFORMING IMAGE ALIGNMENT. THE PROPER DISTANCE IS DETERMINED BY USING THE DISTANCE SETTINGS.

IMAGE MAY REQUIRE REALIGNMENT WHEN CHANGING INSPECTION LOCATIONS.

8-12-2 PIP Location

Users can change where the Picture-in-Picture (PIP) box appears on screen as follows:

1. After enabling PIP mode, press-and-hold on the touchscreen; then, drag the box to the new location.
2. Press the Back button to exit the menu.

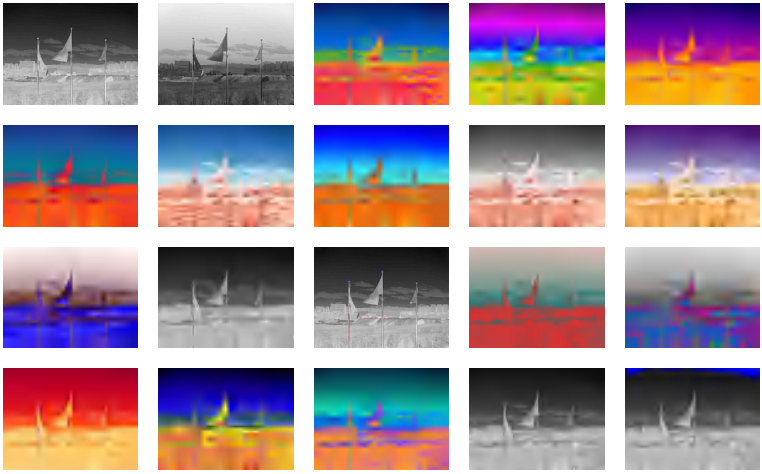
Before

After

8-13 Polarity

Change the polarity (color palette) to enhance temperature differences on the thermal camera as follows:

1. Using the touchscreen, tap the Polarity icon:
2. Tap the preferred color palette: white hot, black hot, rainbow, high contrast rainbow, iron, lava, sky, gray, red gray, hot iron, warm red, fire ice, green red, special, special 2, shade red, medical care, mirage, warm green, or warm blue.
3. Press the Back button to exit the menu.



BE SURE TO TRY ALL OF THE PALETTE OPTIONS TO SEE WHICH ONE WORKS BEST FOR THE CURRENT APPLICATION.

8-14 Non-uniformity Correction (NUC)

Non-uniformity correction (NUC) is used to compensate for the non-uniformity of detector pixels or other optical interference. A common need for NUC correction is to reduce excess noise in an image caused by rapid changes in ambient temperature within an environment.

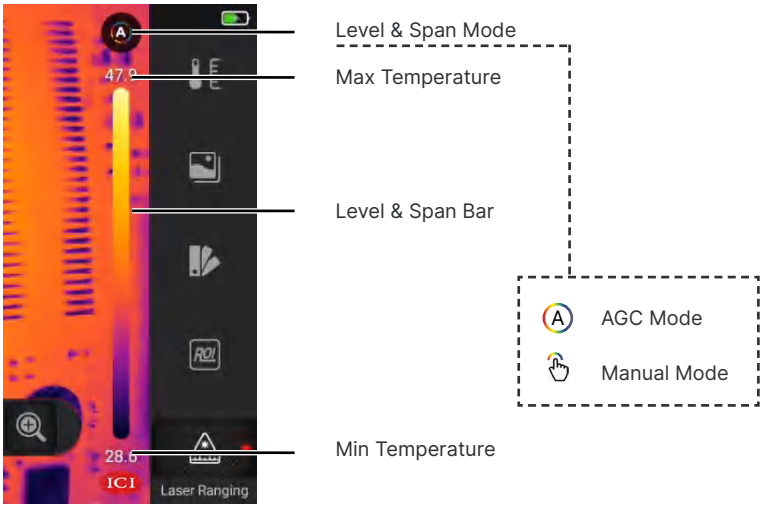
The device features an automatic NUC operation. When performing a correction operation, the user will hear a click from the device and the image will freeze temporarily. The image may clear of some noise grain after the device makes its adjustments.

Perform a manual correction as follows:

1. Using the touchscreen, tap the NUC button.
2. Press and hold the gallery button for more than 2 seconds.

8-15 Auto Gain Control (AGC) and Manual Level & Span Adjustment

To the right of the screen are the AGC and Level & Span controls which plot the surface temperature information detected by the system. The maximum temperature is displayed on the top and the minimum temperature on the bottom.



Preferably, any temperature detected by the thermal device falls between the maximum and minimum temperature detected; if a number falls outside this range the image may “wash out”, i.e. the extraneous energy in the viewing environment may reduce the perceived contrast of the image. Adjust the slider and numbers to improve contrast.

8-15-1 Auto Gain Control (AGC)

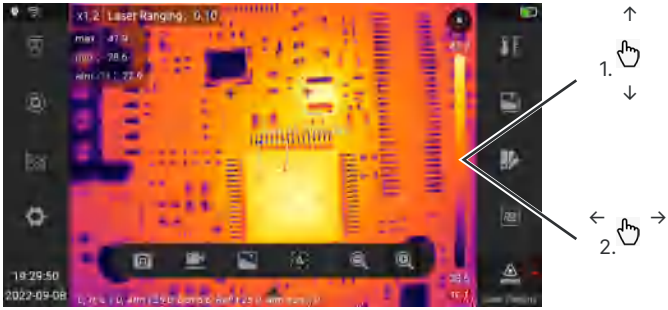
The Auto Gain Control (AGC) function is enabled by default and automatically assists users in fine-tuning image contrast. If the user has manually adjusted the gain controls a reset can be performed by tapping the Level & Span Mode icon.

USING THE TOUCHSCREEN, RESET MANUAL LEVEL & SPAN TO AUTO GAIN CONTROLS BY TAPPING THE LEVEL & SPAN MODE ICON.

8-15-2 Manual Level & Span Adjustment

In manual mode, the user has control of contrast gain settings and can adjust the Level & Span as follows:

1. Level adjustment: press-and-hold on the Level & Span bar; then, slide up to increase the maximum and minimum temperature at the same time or slide down to decrease the maximum and minimum temperature at the same time. Release hold to set temperature values.
    - Individually adjust the minimum and maximum temperatures as follows:
        1. Using the touchscreen, tap either the minimum or maximum temperature. Temperature highlights gray when selected.
        2. Press-and-hold on the Level & Span bar; then, slide up to increase the temperature or slide down to decrease temperature.
        3. Release hold to set temperature value.
2. Span adjustment: press-and-hold on the Level & Span bar; then, slide left to decrease the maximum and increase the minimum temperature or slide to the right to increase the maximum and decrease the minimum temperature. 1° is the minimum span requirement. Release hold to set temperature values.



8-16 Isotherms

An Isotherm is a definable, high-contrast overlay that allows users to locate regions exhibiting similar temperatures, highlight and define hot/cold regions of monochromatic images, or block out areas on non-essential data.

Users can only define 1 isotherm. The isotherm is saved to captured media files.

8-16-1 Enable/Disable an Isotherm

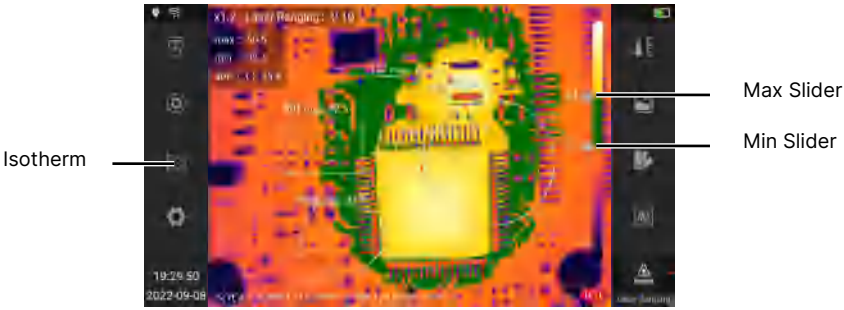
Using the touchscreen, tap the Isotherm icon to enable the feature:

Tap the icon again to disable the feature.

Enabling the isotherm feature disables the users ability to adjust the level & span. Disable the isotherm feature to regain access to the control settings.

8-16-2 Adjust Isotherm Range

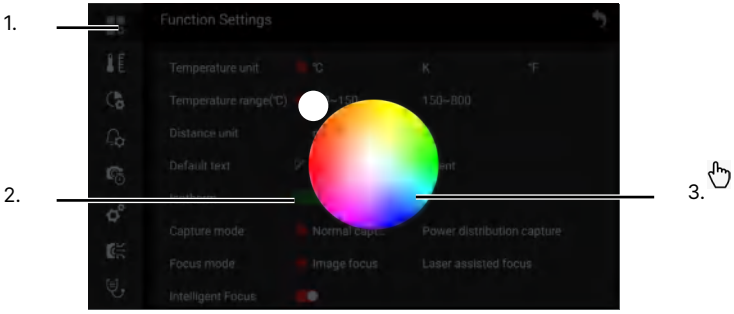
To change the range of the isotherm press-and-hold on an isotherm slider; then, drag the slider up or down to adjust the range. Adjust both sliders to increase or decrease the range to be highlighted.



THE SMALLEST AN ISOTHERM RANGE CAN BE IS 0.8°C (1.4°F). ISOTHERMS CAN COVER THE ENTIRE RANGE OF THE LEVEL & SPAN BAR; THIS VALUE CAN VARY DEPENDING ON SETTINGS AND THE SELECTED TEMPERATURE RANGE.

8-16-3 Change Isotherm Hue

1. Using the touchscreen, tap the gear icon to open the Settings Menu. The Function Settings tab opens by default.
2. Tap the hued rectangle next to Isotherm. A color wheel appears.
3. Press-and hold on the color wheel; then, drag to select a new hue. Selected hue appears in a small circle next to the color wheel. Press the Back button to cancel selection.
4. Press the Back button continuously to exit the Settings Menu.



8-17 Thermal Analysis

8-17-1 Analysis Objects (ROI)

Analysis objects are regions of interest (ROI), such as points, lines, circles, and rectangles, that gives the user temperature information about an enclosed area of the Image Display Window. Collected data assists in decision making and formulating maintenance schedules.

There can only be a maximum of 30 ROI objects, not including the center point or hot/cold trackers. Radiometric temperature information is displayed above the thermal analysis object. Information from the center point ROI is also displayed in the upper right corner.

8-17-1-1 Create an ROI

Users can add an ROI in the form of a point or shape to the live-feed of the Image Display Window, captured images, or add them retroactively to saved images in the gallery.

Create an analysis object as follows:

1. Using the touchscreen, tap the Analysis icon: ROI
2. Tap a measurement icon. Press-and-hold; then, drag up or down on the quick tools to scroll through the available options:

   Spot: adds a temperature spot for collecting data from a single point

   - Tap the screen to create a spot. Temperature data is shown above the analysis object.

   Line: adds a linear object for collecting data along a guideline

   - Press-and-hold; then, drag on the screen create a line. Temperature data is shown above the analysis object.

   Square/Circle: adds a shape object for collecting data in an area

   - Press-and-hold; then, drag on the screen create a shape. Temperature data is shown above the analysis object.

   Polygon: adds a custom object for collecting data in an area

   - Press-and-hold; then, drag on the screen create a shape. Temperature data is shown above the analysis object.
3. Optional: tap the undo icon to undo the creation of an analysis object:
4. Tap X to exit the Analysis Menu.

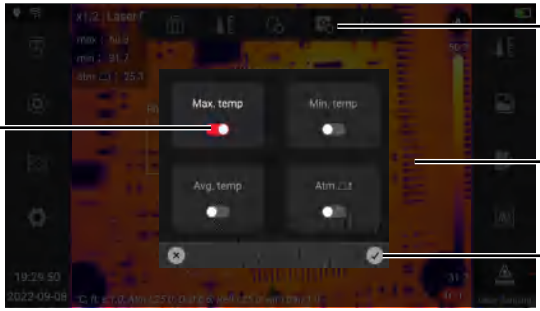
THERE CAN BE A TOTAL OF 30 TEMPERATURE ANALYSIS OBJECTS ON THE IMAGE DISPLAY WINDOW AT ANY GIVEN TIME, NOT INCLUDING THE CENTER POINT OR HOT/COLD TRACKERS.

8-17-1-2 Adjust ROI Thermography Settings

Users can select the thermal data collected by an ROI which includes its ability to detect the maximum, minimum, average temperature, and delta T (change over time) within or along a shape or maximum and delta T from a point.

Adjust analysis objects settings as follows:

1. Tap an existing temperature analysis object to select it. Object is highlighted red when selected and a Pop-up Menu appears.
2. Using the touch screen, tap the Object Analysis Settings icon:
3. Toggle the preferred option to the On position by tapping the switch. The switch turns red when active. Disable the option by tapping the switch again. Switch turns gray when inactive. Spot points cannot have minimum temperature and average temperature readings. Information is displayed on the Image Display Window above the analysis object.
4. Tap ✓ to save changes. Tap X to cancel changes. The window closes.
5. Tap anywhere on the Image Display Window to close the Pop-up Menu.



USERS CAN ALSO CHANGE OBJECT ANALYSIS SETTINGS BY VISITING THE ANALYSIS SETTINGS TAB OF THE SETTINGS MENU. AN ROI WITH AN "R" IS A SQUARE REGION, "C" IS A CIRCLE REGION, "L" IS LINE, "P" IS A POINT, AND "PY" IS A CUSTOM POLYGON.

8-17-1-3 ROI Regional Environmental Parameters

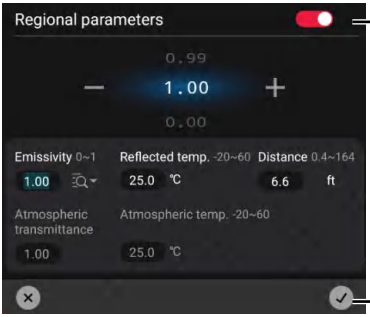
Regional environmental parameters are enabled by default and take into account emissivity, reflected temperature, and distance to assist users in obtaining accurate readings. See Chapter... Radiometry to better understand these settings.

Regional parameters can differ from the global parameters when a target does not have the same conditions as its surrounding. Global parameters are also used to adjust atmospheric transmittance and temperature (see **Section 8-17-2 Global Environmental Settings**).

8-17-1-3-1 Enable/Disable Regional Environmental Parameters

Enable/disable the regional parameters of an ROI as follows:

1. Tap an existing temperature analysis object to select it. A Pop-up Menu appears at the top of the Image Display Window.
2. Using the touch screen, tap the Regional Parameters icon:
3. Toggle the Regional Parameters option to the On position by tapping the switch. The switch turns red when active. Disable the option by tapping the switch again. Switch turns gray when inactive.
4. Tap ✓ to save changes. Tap X to cancel changes. The window closes.
5. Tap anywhere on the Image Display Window to close the Pop-up Menu.



3.

4.

USERS CAN ALSO CHANGE THE REGIONAL PARAMETER SETTINGS BY VISITING THE ENVIRONMENTAL PARAMETERS TAB OF THE SETTINGS MENU. ROI SETTINGS ARE LISTED INDIVIDUALLY UNDER THE FULL FRAME SETTINGS.

REGIONAL PARAMETERS CAN DIFFER FROM THE GLOBAL PARAMETERS WHEN A TARGET DOES NOT HAVE THE SAME CONDITIONS AS THE SURROUNDING ENVIRONMENT (SEE SECTION 8-17-2 GLOBAL ENVIRONMENTAL SETTINGS).

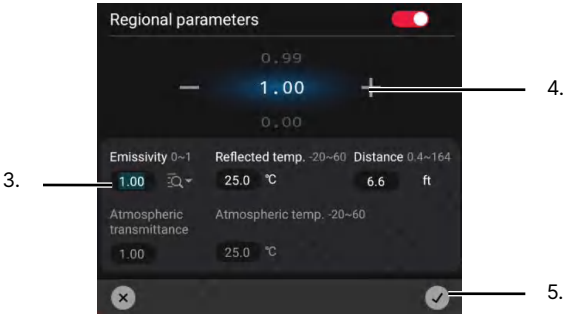
8-17-1-3-2 Adjust Regional Environmental Parameters

Users can change the regional environmental parameters as well as the global parameters for individual thermal analysis objects during or after capture (see Section 8-17-2 Global Environmental Settings).

Adjust the regional parameters of an ROI as follows:

1. Tap an existing temperature analysis object to select it. A Pop-up Menu appears at the top of the Image Display Window.
2. Using the touch screen, tap the Regional Parameters icon:
3. Tap an input field next to an option: Emissivity, Reflected Temperature, Distance, Atmospheric Transmittance, or Atmospheric Temperature.
4. Press-and-hold; then, drag up or down on the rotary dial, or tap - or +, to adjust the setting.
5. Tap ✓ to save changes. Tap X to cancel changes. The window closes.
6. Tap anywhere on the Image Display Window to close the Pop-up Menu.

Parameters can also be changed retroactively within the image gallery.



USERS CAN ALSO CHANGE THE REGIONAL PARAMETER SETTINGS BY VISITING THE ENVIRONMENTAL PARAMETERS TAB OF THE SETTINGS MENU. BE ADVISED, THE FULL FRAME SETTINGS AFFECT THE CENTER POINT TEMPERATURE MEASUREMENTS.

REGIONAL PARAMETERS CAN DIFFER FROM THE GLOBAL PARAMETERS WHEN A TARGET DOES NOT HAVE THE SAME CONDITIONS AS THE SURROUNDING ENVIRONMENT (SEE SECTION 8-17-2 GLOBAL ENVIRONMENTAL SETTINGS).

THERMOGRAPHERS SHOULD ENSURE THEY UNDERSTAND THE PRINCIPLES OF HEAT TRANSFER AND RADIOMETRY BEFORE BEGINNING AN INSPECTION. SEE CHAPTER... RADIOMETRY

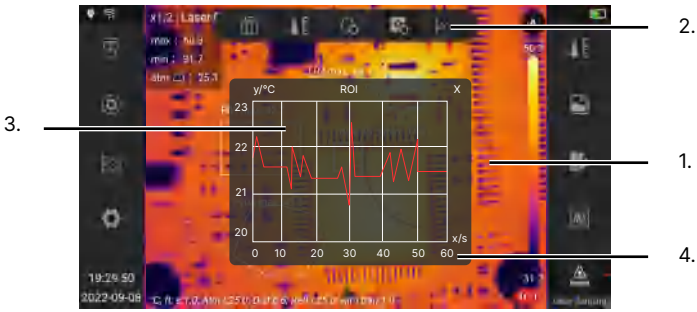
8-17-1-4 ROI Graph

Users can visualize temperature data from an ROI over time using the graphing feature. When enabled the graph plots the change in the maximum temperature of an analysis object. This is useful for tracking the temperatures of a specific target within the Image Display Window.

8-17-1-4-1 Enable the ROI Graph

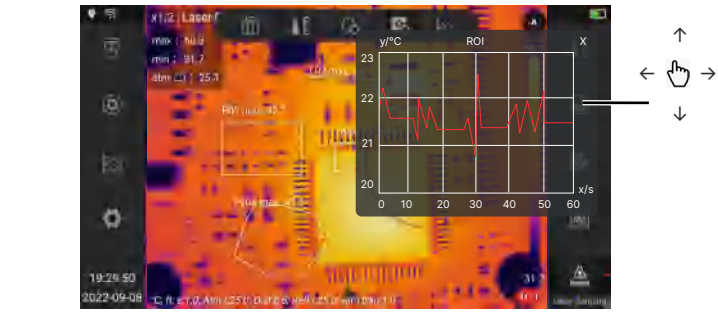
Display a graph on screen as follows:

1. Using the touch screen, tap on an analysis object. Object is highlighted red when selected. A Pop-up Menu appears.
2. Tap the Graph icon. Data is charted on graph.
3. Tap anywhere outside the graph to close the Pop-up Menu. Tap X to close the graph.



8-17-1-4-2 Move the ROI Graph

Press-and-hold on the graph; then, drag to move the graph to a new location.



8-17-1-4-3 Close the ROI Graph

Tap X to close the graph.

8-17-1-5 Move an Analysis Object

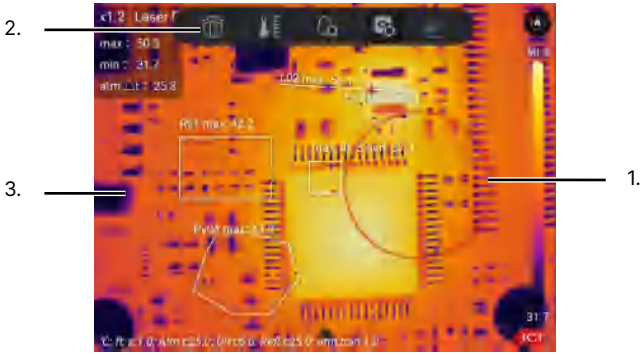
Using the touch screen, press-and-hold an ROI; then, drag to move the object to a new location on the Image Display Window.

ANALYSIS OBJECTS ARE DELETED WITHOUT CONFIRMATION. ENSURE AN OBJECT SHOULD BE REMOVED BEFORE DELETING. DELETED OBJECTS CANNOT BE RECOVERED.

8-17-1-6 Delete an Analysis Object

Delete an ROI as follows:

1. Using the touch screen, tap on an analysis object. Object is highlighted red when selected. A Pop-up Menu appears.
2. Tap the Delete icon. ROI deletes automatically without confirmation.
3. Tap anywhere on the Image Display Window to close the Pop-up Menu.



8-17-1-7 Delete All Analysis Objects

Analysis objects are deleted without confirmation. Ensure an object should be removed before deleting. Deleted objects cannot be recovered.

Delete an analysis object as follows:

1. Using the touchscreen, tap the Analysis icon: ROI
2. Press-and-hold; then, drag up or down on the quick tools to scroll through the available options.
3. Tap the Delete icon.
4. Tap Confirm to confirm deletion of analysis objects. Tap X to cancel deletion.

8-17-1-8 Analysis Object Templates

Users can save and recall a layout of previously used ROI by creating a template.

8-17-1-8-1 Create an Analysis Object Template

Create a analysis object template as follows:

1. Create the preferred analysis object layout.
2. Using the touchscreen, tap the Analysis icon: ROI
3. Press-and-hold; then, drag up or down on the quick tools to scroll through the available options.
4. Tap Export Template icon:
5. Tap the input field. A keyboard appears.
6. Use the keyboard by tapping the touchscreen to input text.
7. Tap ✓ to close the keyboard.
8. Tap Confirm to save changes. Tap Cancel to cancel saving.
9. Tap X to exit the Analysis Menu.

8-17-1-8-2 Import an Analysis Object Template

Import an analysis object template as follows:

1. Using the touchscreen, tap the Analysis icon: ROI
2. Press-and-hold on the quick tools menu; then, drag up or down to scroll through the available options.
3. Tap Preset Import icon:
4. Tap a template to select it; the currently selected template is highlighted with a check mark. Only one template can be selected at a time.
5. Tap ✓ to save changes. Tap X to cancel saving.
6. Tap X exit the Analysis Menu.

IMPORTING A PRESET TEMPLATE CLEARS THE IMAGE DISPLAY WINDOW OF ANY EXISTING ANALYSIS OBJECTS BEFORE IMPORTING THE ANALYSIS OBJECT LAYOUT OF THE TEMPLATE.

8-17-1-8-3 Delete an Analysis Object Template

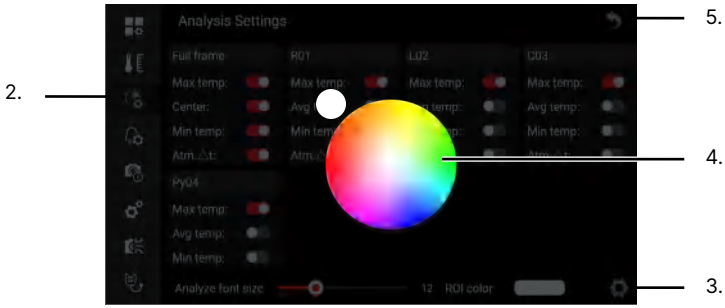
Delete an analysis object template as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Analysis Settings tab.
3. Tap gear icon in the bottom right corner. A list of Analysis Object ROI Templates appears.
4. Tap the Delete icon next to the template to be deleted.
5. Press the Back button continuously to exit the Settings Menu.

8-17-1-9 Change Analysis Object Hue

Improve the contrast of an ROI by changing its color as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Analysis Settings tab.
3. Tap the hued rectangle next to ROI Color. A color wheel appears.
4. Tap a color to select a new hue. Press the Back button to cancel selection.
5. Press the Back button continuously to exit the Settings Menu.



8-17-1-10 Adjust Analysis Object Font Size

Increase or decrease the font size of thermal data shown on screen as follows:

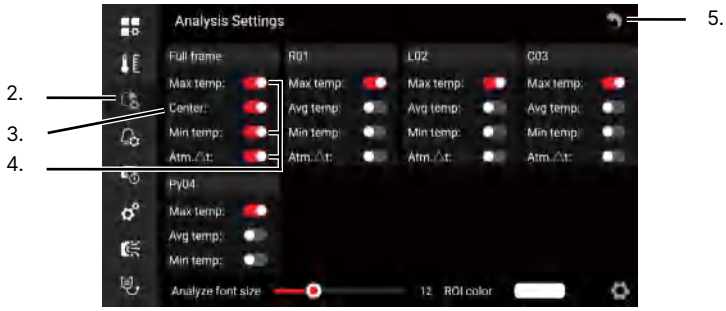
1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Analysis Settings tab.
3. Next to Analyze Font Size, press-and-hold; then, drag the slider to increase or decrease the size of analysis object text.
4. Press the Back button continuously to exit the Settings Menu.

8-17-1-11 Center Point Temperature Measurement

The center point measurement is enabled by default and is locked to the center of the scene. Radiometric temperature information contained in this region is displayed above the region of interest and in the upper left corner of the screen. Users can disable the center point and remove the temperature information from the user interface.

Enable/disable center point temperature measurement as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Analysis Settings tab.
3. Under Full Frame, toggle Center to the On position by tapping the switch next to the option. The switch turns red when active. Disable the option by tapping the switch again. Switch turns gray when inactive.
4. Use the switches to choose whether or not to display the maximum, minimum, and delta T (temperature difference) in the upper left corner of the Image Display Window by enabling/disabling the other switches. The minimum and maximum temperatures are displayed above the region of interest by default and can only be disabled if the center point is disabled.
5. Press the Back button continuously to exit the Settings Menu.



THE CENTER POINT MEASUREMENT IS LOCKED TO THE CENTER OF THE SCREEN AND CANNOT BE MOVED. THE HOT AND COLD POINT TRACKERS WILL MOVE FREELY AROUND THE SCREEN AS TEMPERATURES ARE MEASURED AND CANNOT BE LOCKED INTO A STATIONARY POSITION.

8-17-1-12 Hot/Cold Point Trackers

Hot and cold spot trackers are enabled by default and cannot be disabled. Hot spot tracking identifies the hottest point in the scene whereas cold spot tracking to identify the coldest point in the scene.

8-17-2 Global Environmental Parameters

The device takes into account the environmental parameters for emissivity, reflected temperature, distance, atmospheric transmittance, and atmospheric temperature to assist users in obtaining accurate readings. See Chapter... Radiometry to better understand these settings.

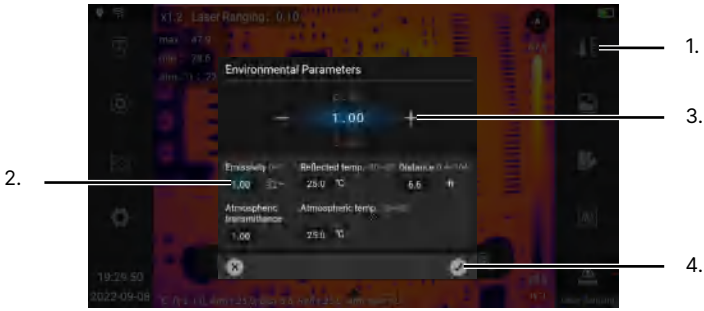
Regional parameters can differ from the global parameters when a target does not have the same conditions as its surroundings. See Section 8-17-1-3-2 **Adjust Regional Environmental Parameters** to adjust regional settings.

8-17-2-1 Adjust Global Parameters

Change global environment parameters as follows:

1. Using the touchscreen, tap the Environmental Parameters icon:
2. Tap an input field next to an option: Emissivity, Reflected Temperature, Distance, Atmospheric Transmittance, or Atmospheric Temperature.
3. Press-and-hold; then, drag up or down on the rotary dial, or tap - or +, to adjust the setting.
4. Tap ✓ to save changes. Tap X to cancel changes. The window closes.

Parameters can also be changed retroactively within the image gallery.



USERS CAN ALSO CHANGE THE GLOBAL PARAMETERS BY VISITING THE ENVIRONMENTAL PARAMETERS TAB OF THE SETTINGS MENU. CHANGE THE FULL FRAME SETTINGS TO ADJUST THE GLOBAL PARAMETERS.

GLOBAL PREFERENCES ARE USEFUL IN CONTROLLED ENVIRONMENTS WHERE ATMOSPHERIC VARIABLES ARE EXPECTED TO REMAIN STABLE. USERS CAN CREATE EXCEPTIONS DURING OR AFTER IMAGES CAPTURE BY ADJUSTING THE REGIONAL PARAMETERS FOR ROI (SEE SECTION 8-17-1-3 ROI REGIONAL ENVIRONMENTAL PARAMETERS).

8-18 Alarm Settings

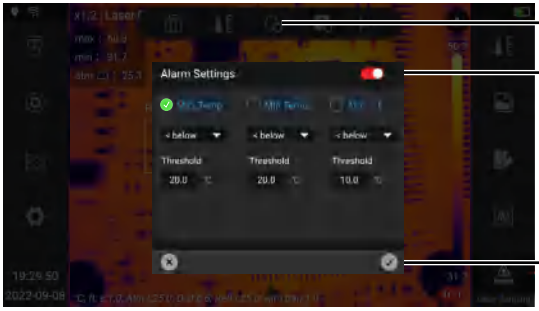
Alarms let users know when a temperature measurement is above, below or beyond a set threshold. Analysis objects with temperature readings that exceed the threshold settings may flash or produce an audible tone depending on user settings. This is useful for detecting abnormal temperatures which may lead to costly repairs or shut downs.

8-18-1 Enable/Disable Alarms

By default the imager alarm thresholds for each analysis object is disabled. The user has the ability to enable each analysis object alarm individually.

Enable alarms as follows:

1. Using the touch screen, tap an existing temperature analysis object to select it. Object is highlighted red when selected and a Pop-up Menu appears.
2. Tap the Alarm Settings icon:
3. Toggle an alarm to the On position by tapping its switch. The switch turns red when active. Disable the alarm by tapping the switch again. Switch turns gray when inactive. Options for analysis object appear: Maximum Temperature, Minimum Temperature, and Delta T.
4. Tap an alarm to enable it. A green ✓ appears next to an active alarm. Tap the green ✓ again to disable the alarm. Alarm is gray when inactive.
5. Tap ✓ to save changes. Tap X to cancel changes. The window closes.



MAXIMUM TEMPERATURE, MINIMUM TEMPERATURE, AND DELTA T ALARMS CAN BE ENABLED INDIVIDUALLY OR AS A GROUP, BUT THE USER WILL NEED TO ADJUST THE SETTINGS OF THE TEMPERATURE ALARMS INDIVIDUALLY.

USERS CAN ALSO CHANGE THE ALARM SETTINGS BY VISITING THE ALARM SETTINGS TAB OF THE SETTINGS MENU.

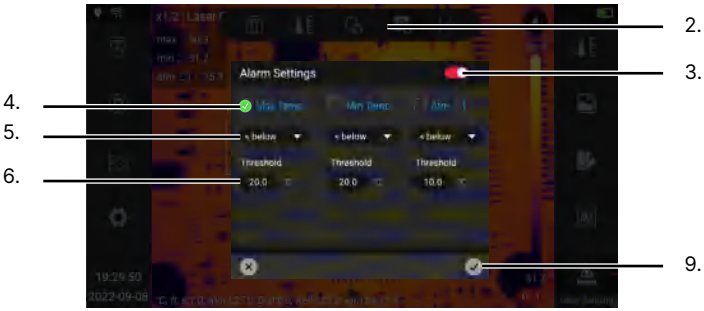
ALARMS CANNOT BE ENABLED FOR THE CENTER POINT.

8-18-2 Adjust Alarm Threshold

By default, the maximum alarm triggers when the temperature detected by an ROI rises above 20°C (68°F). The minimum alarm triggers when the temperature detected by an ROI falls below 20°C (68°F). Delta T triggers an alarm when a temperature difference greater than 10°C (18°F) is detected.

Adjust the alarm settings as follows:

1. Using the touch screen, tap an existing temperature analysis object to select it. Object is highlighted red when selected and a Pop-up Menu appears.
2. Tap the Alarm Settings icon:
3. Toggle an alarm to the On position by tapping its switch. The switch turns red when active. Disable the alarm by tapping the switch again. Switch turns gray when inactive. Options for analysis object appear: Maximum Temperature, Minimum Temperature, and Delta T.
4. Tap an alarm to enable it. A green ✓ appears next to an active alarm. Tap the green ✓ again to disable the alarm. Alarm is gray when inactive.
5. Tap the drop-down options to display trigger options; then, tap an option to select it:
   - > Above: the alarm triggers when the temperature rises over the user designated level
   - < Below: the alarm triggers when the temperature falls below the user designated level
   - <> Beyond: temperatures that fall outside of the user designated range trigger an alarm.
6. Tap an input field under Threshold. Notice that > Above and < Below only have 1 input option each; whereas, <> Beyond has 2 input fields to define low and high thresholds. Keyboard automatically opens.
7. Use the keyboard by tapping the touchscreen to input preferred text.
8. Tap the blue ✓ to close the keyboard.
9. Tap ✓ to save changes. Tap X to cancel changes. The window closes.



USERS CAN ALSO CHANGE THE ALARM SETTINGS BY VISITING THE ALARM SETTINGS TAB OF THE SETTINGS MENU.

8-18-3 Alarm Accessibility

These features help inspectors notice faults faster and assist them in performing high quality inspections.

8-18-3-1 Visual Alarm Settings

An analysis object with an assigned alarm has a gray bell above it. When thresholds are either met or exceeded the bell and its accompanying thermal data text turn red.

By default, analysis objects also have regional flashing which causes the ROI to flash red when thresholds are either met or exceeded. Pause the regional flashing alarm by pressing the bell icon in the bottom left corner of the Image Display Window. Reinstate regional flashing by tapping the bell again.

Enable/disable the feature as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Alarm Settings icon:
3. At the bottom of the screen, tap Regional Flashing to enable the visible alarm. A green ✓ appears next to the feature when active. Tap the green ✓ again to disable the feature. The feature is gray when inactive.
4. Press the Back button continuously to exit the menu.

8-18-3-2 Audible Alarm Settings

An audible alarm can be made to sound when thresholds are either met or exceeded. Pause the audible alarm by tapping on the bell icon in the bottom left corner of the Image Display Window. Reinstate the audio alarm by tapping the bell icon again.

Enable/disable the feature as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Alarm Settings icon:
3. At the bottom of the screen, tap Ring to enable the audible alarm. A green ✓ appears next to the feature when active. Tap the green ✓ again to disable the feature. The feature is gray when inactive.
4. Press the Back button continuously to exit the menu.

PAUSE THE ACCESSIBILITY ALARMS BY PRESSING THE BELL ICON IN THE BOTTOM RIGHT CORNER OF THE IMAGE DISPLAY WINDOW. TAP THE BELL AGAIN TO REINSTATE THE ALARMS.

ACCESSIBILITY ALARMS CANNOT BE PAUSED IF ALARM SNAPSHOT IS ACTIVE. DISABLE ALARM SNAPSHOT TO PAUSE ACCESSIBILITY ALARMS.

8-18-4 Alarm Snapshot

Users can set the device to auto-capture a series of images when the alarm threshold parameters are met. Snapshot timing allows the user to change the capture interval and the number of photos to be taken.

8-18-4-1 Enable/Disable Alarm Snapshot

Enable/disable alarm snapshot as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Alarm Settings icon:
3. At the bottom of the screen, tap Capture to enable alarm snapshots. A green ✓ appears next to the feature when active. Tap the green ✓ again to disable the feature. The feature is gray when inactive.
4. Press the Back button continuously to exit the menu. Changes are saved.

DEPENDING ON ALARM SNAPSHOT AND INTERVAL PHOTOGRAPHY SETTINGS THE MEMORY CARD MAY FILL RAPIDLY AND OVERWRITE OLD IMAGES. BE WARY OF DEVICE SETTINGS AND LIMITS OF THE INSERTED MEMORY CARD.

8-18-4-2 Adjust Alarm Snapshot Settings

Change the alarm snapshot settings as follows:

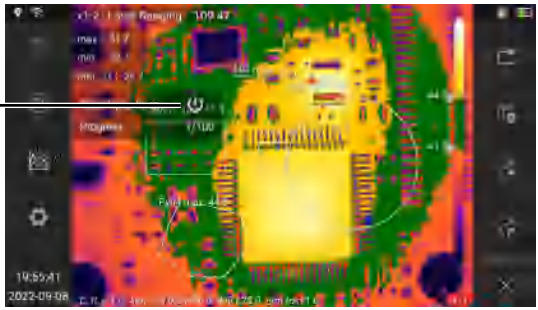
1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Alarm Settings icon:
3. At the bottom of the screen, tap Capture to enable alarm snapshots. A green ✓ appears next to the feature when active. Tap the green ✓ again to disable the feature. The feature is gray when inactive.
4. Tap the drop-down options to display trigger options; then, tap an option to select it: 10 seconds, 15 seconds, 20 seconds, or 30 seconds.
6. Tap an input field next to Quantity. Keyboard automatically opens.
7. Use the keyboard by tapping the touchscreen to input preferred quantity. Limit 1000.
8. Press the Back button to close the keyboard.
9. Press the Back button continuously to exit the menu. Changes are saved.

AFTER TRIGGERING A ALARM SNAPSHOT EVENT, THE DEVICE WILL TAKE A NUMBER OF IMAGES FOR A SET TIME INTERVAL DETERMINED BY THE USER. WHEN THE USER DEFINED NUMBER OF IMAGES IS REACHED, THE CAMERA STOPS TAKING IMAGES AND THE ALARM SNAPSHOT FUNCTION AUTOMATICALLY DISABLES. USERS NEED TO ENABLE THE FEATURE AGAIN IN ORDER TO CAPTURE MORE IMAGES USING THIS METHOD.

8-18-4-3 Cancel an Alarm Snapshot Series

Most device functions and features are disabled while snapshot mode is active. Cancel a series by pressing the power icon in the alarm snapshot pop-up window. To restart a capture series disable an alarm; then, enable the alarm again (see Section 8-18-1 Enable/Disable Alarms).

Cancel alarm snapshot by tapping the power icon.



Because most device functions and features are disabled while snapshot mode is active user should enable isotherms and define parameter settings before initiating an alarm snapshot series.

ALARM SNAPSHOT BLOCKS ACCESS TO MOST FUNCTIONS AND FEATURES OF THE DEVICE. DISABLE AN ALARM SNAPSHOT SERIES BY PRESSING THE POWER ICON IN THE ALARM CAPTURE WINDOW.

8-18-4-4 Alarm Snapshot & Accessibility

A capture series cannot be initiated if the accessibility alarms have been paused. Reinstate the accessibility alarms by pressing the bell icon in the bottom right corner of the Image Display Window. Tap the bell again to pause the accessibility alarms and prevent a capture series.

Paused

Enabled

A CAPTURE SERIES CANNOT BE INITIATED IF THE ACCESSIBILITY ALARMS HAVE BEEN PAUSED. REINSTATE THE ACCESSIBILITY ALARMS BY PRESSING THE BELL ICON IN THE BOTTOM RIGHT CORNER OF THE IMAGE DISPLAY WINDOW. TAP THE BELL AGAIN TO PAUSE THE ACCESSIBILITY ALARMS AND PREVENT A CAPTURE SERIES.

ACCESSIBILITY ALARMS CANNOT BE PAUSED IF ALARM SNAPSHOT IS ACTIVE. DISABLE ALARM SNAPSHOT TO PAUSE ACCESSIBILITY ALARMS.

8-19 Annotations

Users can add text and voice notes to media using the built-in microphone and touchscreen keyboard.

8-19-1 Voice Annotations

Add voice annotations to media as follows:

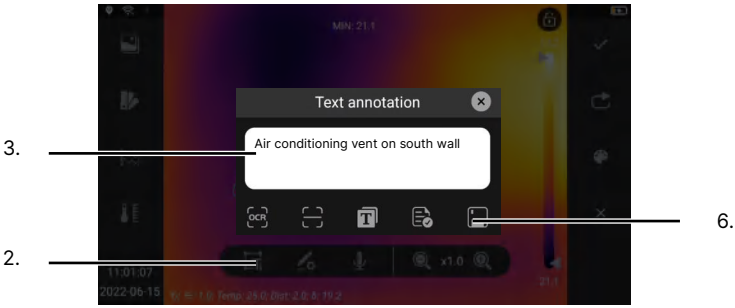
1. Capture an image or IRV video.
2. Using the touchscreen, tap the Microphone icon:
3. Tap the record button to begin recording. Speak clearly, directly, and loudly into the microphone located at the top right of the touchscreen. Tap the pause button to pause recording. Tap the stop button to end recording. Tap the play icon to replay the audio. Tap the delete icon to delete audio.
4. Tap the X to close the recording window.
5. Tap the Save icon to save media. Press the Back button to cancel saving.

8-19-2 Text Annotations

8-19-2-1 Manual Text Annotations

Add text annotations to media as follows:

1. Capture an image or IRV video.
2. Using the touchscreen, tap the Text icon:
3. Tap the input field. Keyboard automatically opens.
4. Use the keyboard by tapping the touchscreen to input preferred text.
5. Press the Back button to close the keyboard.
6. Press the Save icon to save annotation.
7. Tap the Save icon to save media. Press the Back button to cancel saving.



8-19-2-2 ORC Annotations

Scan written text to automatically generate annotations. This option requires a network connection (see Section...).

1. Capture an image or IRV video.
2. Using the touchscreen, tap the Text icon:
3. Tap the OCR icon:
4. Tap the camera icon. Please wait as the process can take several minutes. If the operation fails. Check your network connections.
5. Press the Save icon to save annotation.
6. Tap the Save icon to save media. Press the Back button to cancel saving.

8-19-2-3 QRC Annotations

Scan QR codes to automatically generate annotations as follows:

1. Capture an image or IRV video.
2. Using the touchscreen, tap the Text icon:
3. Tap the QRC icon:
4. Scan the QR code. Text is automatically generated.
5. Press the Save icon to save annotation.
6. Tap the Save icon to save media. Press the Back button to cancel saving.

8-19-3 Preset Annotations (Default Text)

Users can create preset text annotations to increase the speed and efficiency at which inspections are completed and reports are generated.

8-19-3-1 Quick Create Preset Annotations

Quickly create preset annotations as follows:

1. Capture an image or IRV video.
2. Using the touchscreen, tap the Text icon: T
3. Tap the input field. Keyboard automatically opens.
4. Use the keyboard by tapping the touchscreen to input preferred text.
5. Press the Back button to close the keyboard.
6. Tap the Save Preset icon:
7. Tap the Save icon to save the text to the media. Tap the X to close the annotation window without saving text media.
8. Tap the Save icon to save media. Tap Yes to save as a copy and preserve the original text/audio or tap No to overwrite previous text/audio. Press the Back button to cancel saving.
9. Press the Back button continuously to exit the Settings Menu.

8-19-3-2 Create Preset Annotations

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Next to Default Text, tap Default Text Management.
3. Tap + to open preset creation window.
4. Tap the input field. A keyboard appears.
5. Use the keyboard by tapping the touchscreen to input preferred text.
6. Press the Back button to close the keyboard.
7. Tap the Confirm to save changes and close the window. Tap cancel to cancel saving.
8. Press the Back button continuously to exit the Settings Menu.

8-19-3-3 Delete Preset Annotations

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Next to Default Text, tap Default Text Management.
3. Double tap the preferred text to select it. A green ✓ appears next to the selected item. Tap the green ✓ again to deselect the item. Item is gray when deselected. Tap ✓ at the bottom of the screen to select all preset text items.
4. Ensure deleted preferred; then, tap the delete icon. Items are deleted without confirmation.
5. Press the Back button continuously to exit the Settings Menu.

8-19-4 Review Annotations

Users can read and replay annotations for images on the device. Video annotations cannot be reviewed on the device.

Read and Replay image annotations as follows:

1. Press the Review button to enter the Gallery. The Images tab is open by default. Files are arranged by date YYYYMMDD.
2. Using the touchscreen, tap an image to view it in full screen mode. Press left or right on the thumbstick to cycle through adjacent images.
3. Tap the Image Options icon: ◔
4. Select an option:
   - To review text annotations, tap the Text icon: T
   - To review voice annotation, tap the Microphone icon: 🎙
5. Tap the X to close the annotation window.
6. Tap the Save icon to save media. Tap Yes to save as a copy and preserve the original text/audio or tap No to overwrite previous text/audio. Press the Back button to cancel saving.
7. Press the Back button continuously to exit the Gallery.

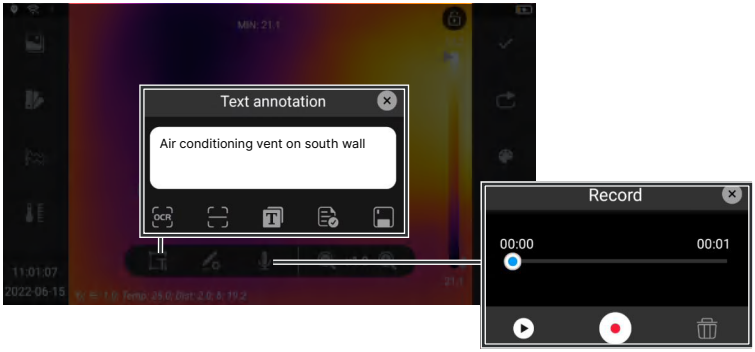
VIDEO ANNOTATIONS CANNOT BE REVIEWED ON THE DEVICE.

8-19-5 Edit Annotations

Users can edit annotations for images on the device. Video annotations cannot be edited on the device.

Edit image annotations as follows:

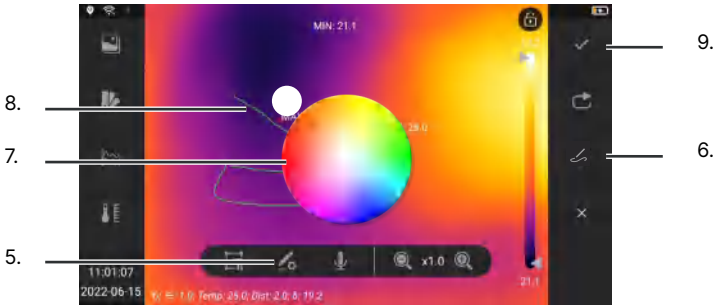
1. Press the Review button to enter the Gallery.
2. The Images tab is open by default. Files are arranged by date YYYYMMDD.
3. Using the touchscreen, tap an image to view it in full screen mode. Press left or right on the thumbstick to cycle through adjacent images.
4. Tap the Image Options icon: ◔
5. Select an option:
   - To edit text annotations, tap the Text icon: T
     - Tap the input field. Keyboard automatically opens.
     - Use the keyboard by tapping the touchscreen to input text.
     - Press the Back button to close the keyboard.
     - Press the Save icon to save annotation.
   - To review voice annotation, tap the Microphone icon: 🎙
     - Tap the record button to begin recording. Speak clearly, directly, and loudly into the microphone located at the top right of the touchscreen. Tap the pause button to pause recording. Tap the stop button to end recording. Tap the play icon to replay the audio. Tap the delete icon to delete audio.
6. Tap the X to close the annotation window.
7. Tap the Save icon to save media. Tap Yes to save as a copy and preserve the original text/audio or tap No to overwrite previous text/audio. Press the Back button to cancel saving.
8. Press the Back button continuously to exit the Gallery



8-19-6 Sketch-on-Image

Users can add sketched notes directly to images as follows:

1. Press the Review button to enter the Gallery.
2. The Images tab is open by default. Files are arranged by date YYYYMMDD.
3. Using the touchscreen, tap an image to view it in full screen mode. Press left or right on the thumbstick to cycle through adjacent images.
4. Tap the Image Options icon:
5. Tap the Sketch Settings icon:
6. Tap the Draw icon to open the color wheel:
7. Press-and hold on the color wheel; then, drag to select a hue. Selected hue appears in a small circle next to the color wheel. Press the X icon to cancel and sketch-on-image.
8. Press-and hold on the Image Display Window; then, drag to draw or write on the image. Tap the undo icon to delete annotations.
9. Tap the Save icon to save changes. Tap the X icon to cancel saving.
10. Tap the Save icon to save media. Press the Back button to cancel saving.
11. Tap Yes to save a copy of the media with an amended title. Type No to overwrite the image.
12. Press the Back button continuously to exit the Gallery



SKETCHES DO NOT GATHER TEMPERATURE DATA.

8-20 Reports

The device has a built-in report generation feature which creates high quality PDF documents. The default naming convention for image files is X-Y.pdf or X-Y-DC.jpg, where X is user defined prefix added to the file nameand Y is time stamp. The time stamp is a combination of YYYYMMDDHHMMSS.

8-20-1 Create a Report

Create a report as follows:

1. Press the Review button to open the image gallery.
2. Using the touchscreen, navigate images tab to select an image. Media files are arranged by date YYYYMMDD. Videos cannot be used for generating reports on the device.
3. Tap an image to view in full screen mode. Press left or right on the thumbstick to cycle through adjacent media.
4. Tap the Image Options icon:
5. Tap the Generate Report icon:
6. Tap the save icon to save the report as a PDF. Press the Back button to cancel saving. The window closes.
7. Press the Back button continuously to exit the Gallery.

There can only be one image per generated report and videos cannot be used for report generation.

8-20-2 Review a Report

Read a report on the device as follows:

1. Press the Review button to open the image gallery.
2. Using the touchscreen, tap Reports. Media files are arranged by date YYYYMMDD.
3. Tap a report to view in full screen mode.
4. Press the Back button continuously to exit the Gallery.

USERS CAN ALSO EJECT THE MEMORY CARD AND INSERT IT INTO A MEMORY CARD READER TO VIEW FILES ON A COMPUTER OR OTHER DEVICE.

8-20-3 Rename a Report

Rename a report on the device as follows:

1. Press the Review button to open the image gallery.
2. Using the touchscreen, tap Reports. Media files are arranged by date YYYYMMDD.
3. Tap a report to view in full screen mode.
4. Tap the Rename File icon:
5. Choose an option:
   - Keyboard input:
     - Tap the input field. Keyboard automatically opens.
     - Use the keyboard by tapping the touchscreen to input preferred text.
     - Press the Back button to close the keyboard.
   - Scan text with OCR reader:
     - Tap the OCR icon:
     - Point the device at the target and tap the camera icon. Renaming happens automatically.
   - Scan a QR Code with the reader:
     - Tap the QRC icon:
     - Scan the QR Code. Renaming happens automatically.
6. Tap the Save icon to save. Press the Back button to cancel saving.
7. Press the Back button continuously to exit the Gallery.

8-20-4 View Report Information

Remove the memory card from the device and insert it into a compatible port on

1. Press the Review button to open the image gallery.
2. Using the touchscreen, tap Reports. Media files are arranged by date YYYYMMDD.
3. Tap a report to view in full screen mode.
4. Tap the Information icon:
5. Press the Back button continuously to exit the Gallery.

8-20-5 Print a Report

Remove the memory card from the device and insert it into a compatible port on a computer. Reports are saved to the memory card at the following path:

...\DCIM\YYYMMDD\pdfs

YYYMMDD is the date the file was saved.

Open the file with an appropriate program and follow the printing instructions from the software/application manufacturer.

8-20-6 Delete a Report

Erase a report on the device as follows:

1. Press the Review button to open the image gallery.
2. Using the touchscreen, tap Reports. Media files are arranged by date YYYYMMDD.
3. Tap a report to view in full screen mode.
4. Press-and-hold the preferred report to select it. A green ✓ appears next to the selected item. Tap the green ✓ again to deselect the item. Item is gray when deselected. Tap ⊘ to the right of the screen to select all reports.
5. Tap the delete icon.
6. Tap Confirm to erase media. Tap Cancel prevent deletion.
7. Press the Back button continuously to exit the Settings Menu.
8. Press the Back button continuously to exit the Gallery.

DELETED FILES CANNOT BE RECOVERED.

USERS CAN ALSO EJECT THE MEMORY CARD AND INSERT IT INTO A MEMORY CARD READER TO MANAGE FILES ON A COMPUTER OR OTHER DEVICE.

8-20-7 PDF Report Templates

The device features a PDF template creator for editing the logo, header, footer, and title of generated reports.

Change the report information as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu. The Function Settings tab opens by default.
2. Press-and-hold the on the screen; then, drag up or down on the touchscreen to scroll to Report Template.
3. Tap Edit Report Template. The contents in red dashed boxes can be edited, including logo, header, footer, and title. The thermal image placeholder is set and cannot be changed.
4. Tap an input field. A keyboard appears.
5. Use the keyboard by tapping the touchscreen to input preferred text.
6. Press the Back button to close the keyboard.
7. Using the touchscreen, tap the Confirm to save changes. Tap Cancel to cancel saving.
8. Tap the logo box to open the Gallery. Navigate the Gallery to find an image.
9. Tap the preferred image. Image opens in preview mode.
10. Tap the check box next to Choose to select the image. A green ✓ appears when selected. Tap the green ✓ again to deselect the item. Item is gray when deselected.
11. Tap Complete to save the new logo. Press the Back button to cancel saving.
12. Tap the Save icon to save. Press the Back button to cancel saving.
13. Press the Back button continuously to exit the Settings Menu.

8-21 Settings

8-21-1 Temperature Units

By default the imager is set to measure temperatures in Celsius (°C). Fahrenheit and Kelvin scales are also available.

Changing the temperature unit automatically adjusts the readout of the temperature scale to the selected unit. The selected temperature unit displays next to the temperature range.

Change the temperature scale as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu. The Function Settings tab opens by default.
2. Next to Temperature Unit, tap an unit to select it: Celsius (°C), Fahrenheit (°F), or Kelvin (°K). Option is highlighted red when selected. Changes are applied automatically
3. Press the Back button to exit the Settings Menu.

CHANGING THE TEMPERATURE UNIT AUTOMATICALLY ADJUSTS THE READOUT OF THE TEMPERATURE SCALE TO THE SELECTED UNIT.

8-21-2 Temperature Range

The default temperature range of the device is -20°C to 150°C (-4°F to 302°F) when using the default temperature unit of Celsius (°C). A high temperature calibration of 150° to 800°C (302°F to 1472°F) is also available.

Change the temperature range as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu. The Function Settings tab opens by default.
2. Next to Temperature Range, tap a range to select it. Option is highlighted red when selected. Changes are applied automatically
3. Press the Back button to exit the Settings Menu.

After a new temperature range is selected the device performs a NUC correction operation to adjust to the new settings. Wait patiently as this process can take up to 1 minute to complete.

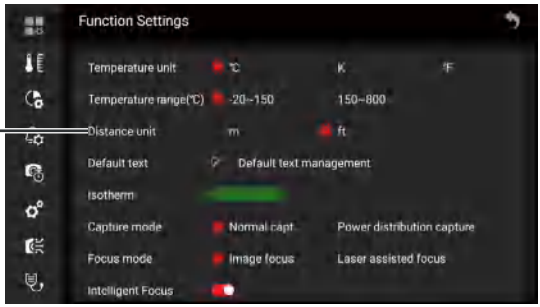
THE DEVICE PERFORMS A NUC CORRECTION OPERATION WHEN A NEW TEMPERATURE RANGE IS SELECTED. WAIT PATIENTLY AS THE CALIBRATION CAN TAKE UP TO 1 MINUTE TO COMPLETE.

8-21-3 Distance Units

By default the imager is set to measure distance in meters (m). Feet (ft) is also available. Change the distance unit as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu. The Function Settings tab opens by default.
2. Next to Distance Unit, tap a unit to select it: meters (m) or feet (ft). Option is highlighted red when selected. Changes are applied automatically
3. Press the Back button to exit the Settings Menu.

2.



8-21-4 Image Grid

Thermographers can enable a Rule of Thirds grid to assist in centering media or aligning subjects consistently throughout the capture process. Commercial photographers can use the grid system to create compelling and well-composed thermal images.

Enable the image grid as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu. The Function Settings tab opens by default.
2. Press-and-hold the on the screen; then, drag up or down on the touchscreen to scroll to Image Grid.
3. Toggle the feature to the On position by tapping its switch. The switch turns red when active. Disable the feature by tapping the switch again. Switch turns gray when inactive. Changes are applied automatically
4. Press the Back button to exit the Settings Menu.

A GRID OVERLAY SHOWS ON THE IMAGE DISPLAY WINDOW WHEN THE IMAGE GRID IS ENABLED. TO REMOVE THE GRID DISABLE THE FEATURE.

8-21-5 WLAN Hotspot

Enable the WLAN allow for automatic date and time settings and other network-based features as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Tap WLAN. Options appear.
4. Toggle the feature to the On position by tapping the switch next to the option. The switch turns red when active. Disable the feature by tapping the switch again. Switch turns gray when inactive.
5. Tap a network to select it. Networks without passwords connect automatically; skip to Step 9. Networks that require a password present a pop-up.
6. Open the keyboard by tapping the network password input box. Use the keyboard by tapping the touchscreen to input the network password. Password must be at least 8 characters long.
7. Press the ✓ button to confirm the password. Press the back button to cancel password input.
8. Tap Confirm to accept password and connect to network. Tap Cancel prevent connection.
9. Press the Back button continuously to exit the Settings Menu.

LEAVE THE WLAN DISABLED WHEN NOT IN USE AS ENABLING THE WLAN USES MORE POWER AND DEPLETES THE BATTERY AT A FASTER RATE.

AFTER TURNING ON THE WIFI, USERS MAY NEED TO MANUALLY INPUT THE NETWORK PASSWORD.

8-21-6 Bluetooth

Coming Soon

LEAVE BLUETOOTH DISABLED WHEN NOT IN USE AS ENABLING THE BLUETOOTH USES MORE POWER AND DEPLETES THE BATTERY AT A FASTER RATE.

8-21-7 Hotspot Sharing

Coming Soon

LEAVE HOTSPOT SHARING DISABLED WHEN NOT IN USE AS ENABLING HOTSPOT SHARING USES MORE POWER AND DEPLETES THE BATTERY AT A FASTER RATE.

8-21-8 Date and Time Settings

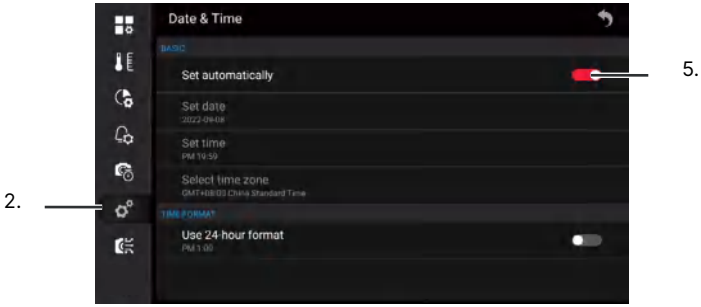
8-21-8-1 Standard Date and Time

8-21-8-1-1 Automatic Date and Time

The device is set to automatically adjust the date and time. In order for the date and time to adjust properly the user must connect the device to a network connection (see Section 8-21-5 WLAN Hotspot).

Disable automatic date and time selection as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Tap Language/Date & Time.
4. Tap Date & Time.
5. Toggle the Set Automatically feature to the OFF position by tapping the switch next to the option. Switch turns gray when inactive. Enable the feature by tapping the switch again. The switch turns red when active.
6. Press the Previous button continuously to exit the menu. Changes are applied automatically



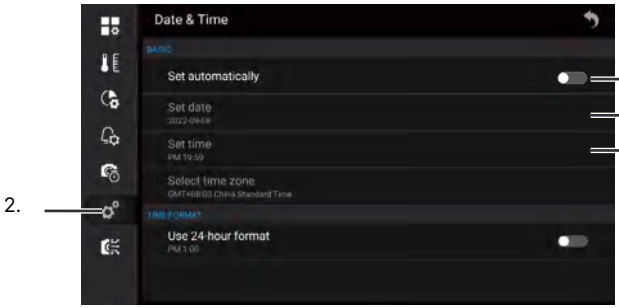
TO PROPERLY ADJUST DATE AND TIME SETTINGS AUTOMATICALLY THE FEATURE REQUIRES THE USE OF A NETWORK CONNECTION. SEE SECTION 8-21-5 WLAN HOTSPOT TO CONNECT TO A NETWORK.

ENABLING WLAN USES MORE POWER AND DEPLETES THE BATTERY AT A FASTER RATE. DISABLE WLAN WHEN NOT IN USE.

8-21-8-1-2 Manually Set Date and Time

Manually set the date and time as follows:

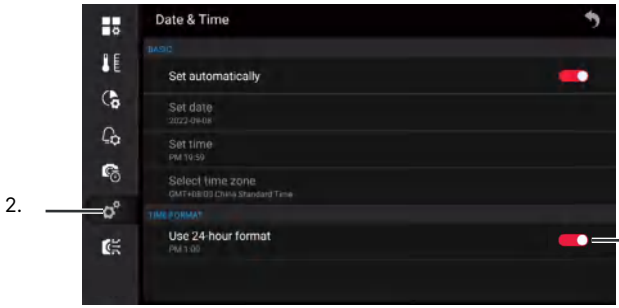
1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Tap Language/Date & Time.
4. Tap Date & Time.
5. Toggle the Set Automatically feature to the OFF position by tapping the switch next to the option. Switch turns gray when inactive. Enable the feature by tapping the switch again. The switch turns red when active.
6. Tap Set Date. A calendar appears.
   - Tap < or > at the top of the calendar to cycle through the months.
   - Tap a date to select a day.
   - Tap the calendar header to open the year options. Press-and-hold; then, drag up or down on the rotary dial to cyclt through the available years. Tap a year to select it. Tap Cancel to cancel changes.
   - Tap Confirm to accept changes. Tap Cancel to cancel saving.
7. Tap Time. A clock appears.
   - Tap a number on the clock face to select an hour.
   - Tap a number on the clock face to select the minutes.
   - Tap AM or PM to select Meridiem.
   - Tap Confirm to accept changes. Tap Cancel to cancel saving.
8. Press the Previous button continuously to exit the menu. Changes are applied automatically



8-21-8-2 Military Time

Switch to the 24-hour military time clock as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Tap Language/Date & Time.
4. Tap Date & Time.
5. Toggle Use 24-hour Format to the ON position by tapping the switch next to the option. The switch turns red when active. Disable the feature by tapping the switch again. Switch turns gray when inactive. Changes are applied automatically
6. Press the Previous button continuously to exit the menu.



8-21-8-3 Time Zones

The time zone is automatically adjusted for the user. Manually set the time zone as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Tap Language/Date & Time.
4. Tap Date & Time.
5. Toggle the Set Automatically feature to the OFF position by tapping the switch next to the option. Switch turns gray when inactive. Enable the feature by tapping the switch again. The switch turns red when active.
6. Tap Select Time Zone.
7. Press-and-hold on the touchscreen; then, drag to scroll through the options.
8. Tap a time zone to select it. Changes are applied automatically
9. Press the Previous button continuously to exit the menu.

8-21-9 Language Settings

Change the device language as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Tap Language/Date & Time.
4. Tap Language.
5. Tap an available Language to select it. Changes are applied automatically
6. Press the Previous button continuously to exit the menu.

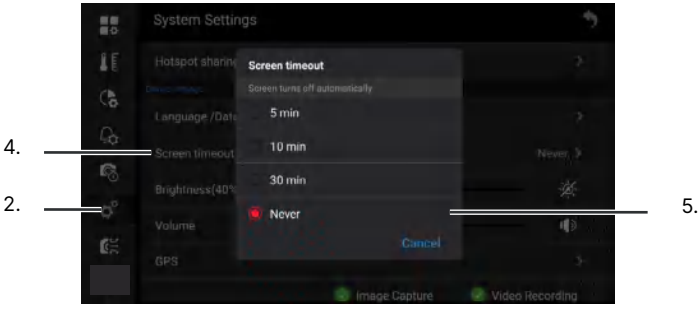
NOT ALL LANGUAGES ARE AVAILABLE.

8-21-10 Power Management Settings

To save power users can change the screen timeout settings. The screen can be set to power off after 5 minutes, 10 minutes, or 30 minutes. Auto shut off can also be disabled.

Change power management settings as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Press-and-hold on the touchscreen; then, drag to scroll through the options.
4. Tap Screen Timeout. A window appears.
5. Tap the preferred time limit. To disable screen timeout select Never. The selected item is highlighted red. Changes are applied automatically and the window closes. Tap Cancel to cancel changes.
6. Press the Previous button continuously to exit the menu.



8-21-11 Display Brightness Settings

Users can change the brightness settings as follows:

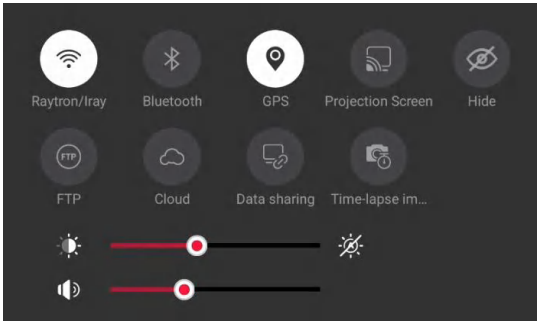
1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Press-and-hold on the touchscreen; then, drag to scroll through the options.
4. Press-and-hold on the slider next to Brightness; then, drag left or right to adjust the screen brightness. Changes are applied automatically.
5. Press the Previous button continuously to exit the menu.

8-21-12 Volume Settings

Users can change the volumes settings as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Press-and-hold on the touchscreen; then, drag to scroll through the options.
4. Press-and-hold on the slider next to Volume; then, drag left or right to adjust the playback volume. Changes are applied automatically.
5. Press the Previous button continuously to exit the menu.

THE USER CAN ALSO ADJUST DEVICE BRIGHTNESS AND VOLUME SETTINGS BY ACCESSING THE CONNECTIONS MENU. TO OPEN THE CONNECTIONS MENU FROM THE MAIN USER INTERFACE, PLACE A FINGER AT THE TOP OF THE SCREEN AND SWIPE DOWN. PRESS-AND-HOLD ON A SLIDER; THEN, DRAG LEFT OR RIGHT TO ADJUST THE SETTINGS. CHANGES ARE APPLIED AUTOMATICALLY



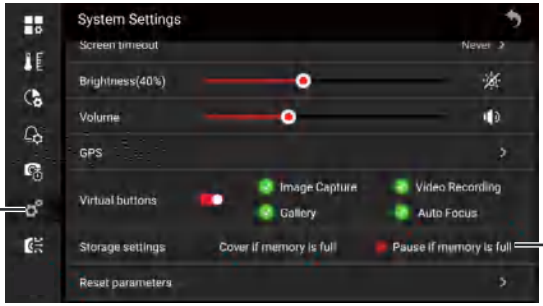
8-21-13 Storage Settings

The user can determine what happens in the event the memory of the device becomes full. Covering the memory replaces the oldest file with a newly captured file. Pausing media capture prevents new media collection until a new memory card is inserted into the device.

Adjust memory settings as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Press-and-hold on the touchscreen; then, drag to scroll through the options.
4. Tap an option next to Storage Settings: Cover if Memory is Full or Pause if Memory is Full. Changes are applied automatically.
5. Press the Previous button continuously to exit the menu.

2.



4.

8-21-14 GPS

GPS is enabled by default. Change GPS settings as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Press-and-hold on the touchscreen; then, drag to scroll through the options.
4. Tap GPS.
5. Toggle the GPS feature to the OFF position by tapping the switch next to the option. Switch turns gray when inactive. Enable the feature by tapping the switch again. The switch turns red when active.
6. Press the Previous button continuously to exit the menu.

8-21-15 Compass

The device features a Digital Magnetic Compass (DMC) support which offers increased accuracy.

8-21-16 Smart Capture

Coming Soon

8-21-17 Lens Type

The camera automatically gathers lens information from an attached lens. Visit the System Settings tab of the Settings Menu to see lens information. The FOV is listed at the top of the screen.

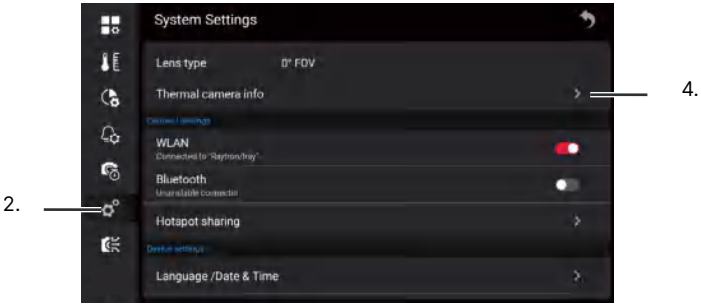
See **Section 7-7 Lens Installation** for instructions on how to switch lenses.

8-21-18 Device Information

Users can view device information including software version, battery status, memory information, and more in the settings of the device.

View device information as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Tap Thermal Camera Info. Information is displayed.
4. Press the Previous button continuously to exit the menu.



8-21-19 Format the Memory Card

Remove the memory card from the device and insert it into an appropriate slot of a computer. Follow the instructions from the computer manufacturer to format the memory card.

FORMATTING THE SD CARD ERASES ALL IMAGES STORED ON THE MEMORY CARD AND CANNOT BE UNDONE.

PERFORMING A FACTORY RESET WILL NOT FORMAT THE MEMORY CARD HOWEVER USERS MAY WISH TO REMOVE THE MEMORY CARD BEFORE ATTEMPTING A FACTORY RESET OF THE DEVICE.

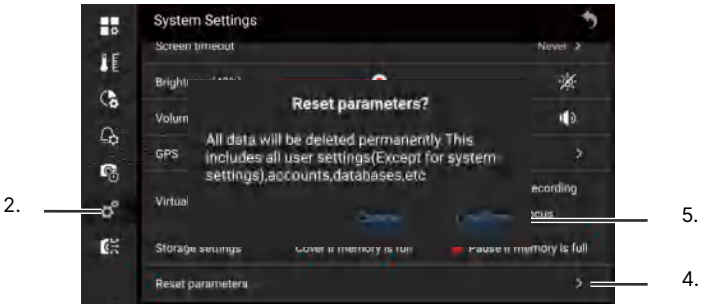
PERFORMING A PARAMETER RESET ERASES CUSTOMIZED USER CONFIGURATIONS STORED ON THE DEVICE BUT DOES NOT RESET THE SYSTEM SETTINGS. TO RESET THE SYSTEM SETTINGS PERFORM A FACTORY RESET. THESE PROCESSES CANNOT BE UNDONE.

8-21-20 Parameters Reset

Deleting the user parameters erases all user settings, accounts, databases, etc., excluding system settings. To reset the system settings perform a factory reset. If measurements are skewed the user should try adjusting the emissivity and ambient temperature before attempting to restore the default parameters.

Restore the default parameters as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Press-and-hold on the touchscreen; then, drag to scroll through the options.
4. Tap Reset Parameters. A pop-up appears.
5. Tap Confirm to reset parameters. Tap Cancel to cancel changes. Parameters are reset and the menu automatically closes. The User may need to adjust the device settings or restart the device to obtain accurate readings.



PERFORMING A PARAMETER RESET WILL NOT FORMAT THE MEMORY CARD HOWEVER USERS MAY WISH TO REMOVE THE MEMORY CARD BEFORE ATTEMPTING A PARAMETER RESET OF THE DEVICE.

THE USER MAY NEED TO ADJUST THE DEVICE SETTINGS OR RESTART THE DEVICE TO OBTAIN ACCURATE READINGS.

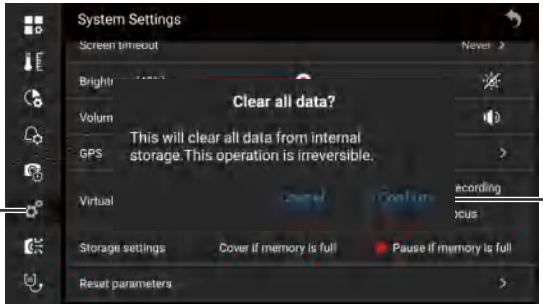
PERFORMING A FACTORY RESET ERASES CUSTOMIZED USER CONFIGURATIONS STORED ON THE DEVICE AND RESTORES THE ORIGINAL DEFAULT SETTINGS PROGRAMMED BY THE MANUFACTURER. THE PROCESS CANNOT BE UNDONE.

8-21-21 Factory Reset the Device

If measurements are skewed the user should try adjusting the emissivity and ambient temperature before attempting to restore factory setting. Restore default settings as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the System Settings icon:
3. Press-and-hold on the touchscreen; then, drag to scroll through the options.
4. Tap Factory Reset. A pop-up appears.
5. Tap Confirm to perform a factory reset. Tap Cancel to cancel changes. The device restarts several times during the reset process. Have patience as this operation can take several minutes. After the final restart use the touchscreen to select a device language and establish date and time settings. The user interface boots after selection is complete.

2.



5.

PERFORMING A FACTORY RESET WILL NOT FORMAT THE MEMORY CARD HOWEVER USERS MAY WISH TO REMOVE THE MEMORY CARD BEFORE ATTEMPTING A FACTORY RESET OF THE DEVICE.

THE USER MAY NEED TO ADJUST THE DEVICE SETTINGS OR RESTART THE DEVICE TO OBTAIN ACCURATE READINGS.

8-21-22 Software Updates

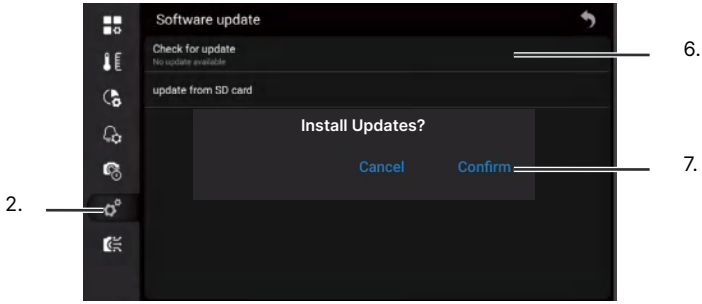
The device may periodically need a software upgrade or patch. Users can update either from a network connection or from the memory card.

8-21-22-1 Update via WLAN

In order to the update the software online the user must connect the device to a network connection (see Section 8-21-5 WLAN Hotspot).

Install an update held online as follows:

1. Connect to a WLAN Hotspot (see Section 8-21-5 WLAN Hotspot).
2. Using the touchscreen, tap the settings icon to open the Settings Menu.
3. Tap the System Settings icon:
4. Press-and-hold on the touchscreen; then, drag to scroll through the options.
5. Tap Software Update.
6. Tap Check for Update. The device automatically searches online for upgrades or patches.
7. Tap Confirm to install updates. Tap Cancel to cancel changes. The device restarts several times during the update process. Have patience as this operation can take several minutes. After the final restart the user may need to select a device language and establish date and time settings. The user interface boots after selection is complete.



8-21-22-2 Update from Memory Card

In order to the update the software from the memory card the user must obtain the most up-to-date file in the form of a download link from customer service.

Install an update from a memory card as follows:

1. Save the customer support file to a memory card compatible with the device; then, insert the memory card into a compatible slot on the device.
2. Using the touchscreen, tap the settings icon to open the Settings Menu.
3. Tap the System Settings icon:
4. Press-and-hold on the touchscreen; then, drag to scroll through the options.
5. Tap Software Update.
6. Tap Update from SD Card. The device automatically searches the inserted memory cards for upgrades or patches.
7. Tap Confirm to install updates. Tap Cancel to cancel changes. The device restarts several times during the update process. Have patience as this operation can take several minutes. After the final restart the user may need to select a device language and establish date and time settings. The user interface boots after selection is complete.

9. Radiometry

9-1 Introduction to Radiometry

The basic reason for employing image processing programs when analyzing IR images is to have a fast and comprehensive means to determine the information content of an image in numerical terms. Radiometry is considered the base from which to conduct this analysis.

Typically, converting the gray scale values to values of temperatures requires either a calibration of individual cameras or field calibration data. The method for calibrating images provided in this program is camera dependent because temperature calibration data is collected through an advanced calibration process at the factory and installed within the software program.

Thermal devices looks for a very specific file in its structure and automatically uses it to perform calculations and produce temperature readings. If the device cannot find the calibration file the user cannot perform temperature analysis. If the file is corrupted temperature readings become skewed. Contact customer service if there is an issue.

IF YOUR PACKAGE INCLUDES ADDITIONAL LENSES A SEPARATE CALIBRATION FILE IS REQUIRED FOR EACH LENS. THESE FILES ARE STORED ON THE DEVICE. CONTACT CUSTOMER SERVICE IS THERE IS AN ISSUE.

9-2 Detail Parameters

Name, Date, and Time information is automatically recorded and stored when media is captured. GPS information is also captured if the feature is enabled.

See Section 8-11-3-3 View Media Information to review media information.

9-3 Radiometry Correction

The accuracy of temperature conversion is also dependent on the physics of the scene. These physical properties include humidity, emissivity and reflection of the target, the transmission in the intervening atmosphere, and the background/foreground temperature within the scene. See Section 8-17-1-3 ROI Regional Environmental Parameters and Section 8-17-2 Global Environmental Parameters to adjust the value setting of an ROI. .

USERS SHOULD ENSURE THE ROI AND GLOBAL ENVIRONMENTAL SETTINGS ARE SET APPROPRIATELY FOR THE SCENE AS THIS CAN IMPACT TEMPERATURE READINGS.

9-3-1 Emissivity

The correct emissivity value is important in order to receive the most accurate temperature measurement. Emissivity of a surface can have a large effect on temperatures the imager observes.

To more accurately measure materials with a low emissivity, an emissivity correction is necessary. Adjusting the emissivity setting allows the imager to calculate a more accurate estimate of the actual temperature.

Emissivity is set directly in the imager. The emissivity displays on the LCD screen as ϵ=x.x

See **Section 8-17-1-3 ROI Regional Environmental Parameters** and **Section 8-17-2 Global Environmental Parameters** to learn how to adjust the emissivity value of an ROI.

The device features a built-in emissivity value table. Select a value as follows:

1. Using the touchscreen, tap the settings icon to open the Settings Menu.
2. Tap the Environmental Parameters icon:
3. Tap the drop-down arrow next to Emissivity of the ROI to be adjusted. A table appears.
4. Press-and-hold on the touchscreen; then, drag to scroll through the options.
5. Tap an option to select it.
6. Press the Previous button continuously to exit the menu.

A chart containing common emissivity values appears on the next page.

All objects radiate infrared energy. The amount of energy radiated varies based on the actual surface temperature and the surface emissivity of the object. The Thermal imager senses the infrared energy from the surface of the object and uses this data to calculate an estimated temperature value.

Many common objects and materials such as painted metal, wood, water, skin, and cloth are particularly good at radiating energy and it is easy to get relatively accurate measurements. For surfaces that are good at radiating energy (high emissivity), the emissivity factor is >=0.90. This simplification does not work on shiny surfaces or unpainted metals as they have an emissivity of <0.6. These materials are not good at radiating energy and are classified as low emissivity.

SURFACES WITH AN EMISSIVITY OF < 0.60 MAKE RELIABLE AND CONSISTENT MEASUREMENTS PROBLEMATIC. THE LOWER THE EMISSIVITY, THE GREATER POTENTIAL FOR ERROR WITHIN THE DEVICE'S CALCULATIONS. ERRORS MAY STILL OCCUR EVEN WHEN ADJUSTMENTS ARE PERFORMED PROPERLY.

A CHART CONTAINING COMMON EMISSIVITY VALUES APPEARS ON THE NEXT PAGE.

The following table gives typical emissivity of important materials:

Material	Emissivity
Water	0.36
Stainless steel	0.14
Aluminum plate	0.09
Asphalt	0.96
Concrete	0.97
Cast iron	0.81
Rubber	0.95
Wood	0.85
Brick	0.75
Tape	0.96
Brass plate	0.06
Human skin	0.98
PVC plastic	0.93
Polycarbonate	0.80
Oxidized copper	0.78
Rust	0.80
Paint	0.90
Soil	0.93

SURFACES WITH AN EMISSIVITY OF < 0.60 MAKE RELIABLE AND CONSISTENT MEASUREMENTS PROBLEMATIC. THE LOWER THE EMISSIVITY, THE GREATER POTENTIAL FOR ERROR WITHIN THE DEVICE'S CALCULATIONS. ERRORS MAY STILL OCCUR EVEN WHEN ADJUSTMENTS ARE PERFORMED PROPERLY.

9-3-2 Distance and Angle of Capture

Although distance usually does not affect the temperatures measured by the software it can be helpful to know the distance to the target location. Generally, the further away the IR sensor is from the target/background area, the less thermal contrast seen in the image.

Angles of reflection can also affect the contrast. This is significant when the IR sensor is operated at low angles over water there may be no perceived thermal difference between the horizon and the water, i.e. the horizon can seem to disappear. Users can change their angle by changing where they stand or by attaching a camera to an unmanned aerial system.

While there is an input box for distance there is not an input for angle. Use the text and voice annotation features of the device to create notes.

See **Section 8-17-1-3 ROI Regional Environmental Parameters** and **Section 8-17-2 Global Environmental Parameters** to learn how to adjust the distance value of an ROI.

9-3-3 Atmospheric Temperature

The imager has temperature compensation to correct environmental sources of energy as this can affect the measurement results. Temperature readings are especially altered when the emissivity of the object is low or the difference between the object temperature and the ambient temperature is large. It is necessary to compensate the results to eliminate the influence of the environmental temperatures.

To get a more accurate temperature measurements set the atmospheric temperature. Generally, atmospheric temperature is equal to ambient temperature.

See **Section 8-17-1-3 ROI Regional Environmental Parameters** and **Section 8-17-2 Global Environmental Parameters** to learn how to adjust the atmospheric temperature value of an ROI.

9-3-4 Reflected Temperature

Users can compensate for sources of energy reflected off objects being measured to eliminate the influence of environmental temperatures. Often, the reflected temperature is equivalent to the ambient temperature.

See **Section 8-17-1-3 ROI Regional Environmental Parameters** and **Section 8-17-2 Global Environmental Parameters** to learn how to adjust the reflected temperature value of an ROI.

9-3-5 Atmospheric Transmittance

Electromagnetic radiation flows through the atmosphere everyday. Most of this energy is absorbed, but some of the radiation makes it though. This is called transmission and refers to the absorption, scattering, and reflection ability of the surrounding atmosphere. Visible light is one of the wavelengths that makes it through generally unabsorbed.

Transmission can cause abnormal readings if not properly accounted.

See **Section 8-17-1-3 ROI Regional Environmental Parameters** and **Section 8-17-2 Global Environmental Parameters** to learn how to adjust the atmospheric transmittance value of an ROI.

9-3-6 Humidity

Humidity remains in the atmosphere even on bright days. Water of all three states can be found naturally in the atmosphere: liquid (rain, fog, and clouds), solid (snowflakes, ice crystals), and gas (water vapor). Water in any state is an obstacle to accurate temperature measurements. When the wave passes through the water particles, a part of its energy is absorbed and a part is scattered. Therefore the electromagnetic wave is attenuated.

Use the text and voice annotation features of the device to create notes.

10. Cleaning and Maintenance

10-1 Cleaning the Germanium Lens

Do not use corrosive chemicals on the optical glass components. The germanium window surface is coated with anti-reflection coating. Dust, grease, and fingerprints will produce harmful substances and lead to a decline in performance, or cause scratches. If dirt is found, please use the following methods:

1. Use a blown balloon or a soft brush to clean the lens surface to avoid dust particles scratching the anti-reflection film on lens surface during the wiping process.
2. Use a soft cotton or microfiber cloth or lens wiping paper and dip in distilled water. Gently wipe the lens surface from the middle to the edge, paying attention to not crack the lens, or use too much liquid. If the lens is still not clean, replace the cloth and repeat the wiping process.

10-2 Disinfecting the Camera Surface

Do not use corrosive cleaning solutions on the optical glass components. It is recommended to disinfect the camera surface regularly with a non-corrosive sanitizing product. Follow the directions provided by the manufacturer of the cleaning solution. Adhere to the sanitation protocols and cleaning schedule set forth by the employer.

10-3 Device Calibration

It is recommended to have the device(s) re-calibrated annually. Contact customer service to schedule maintenance.

10-4 Storage

When the equipment is not in use, the device should be placed in a dust-free and moisture-free environment with a stable temperature and humidity.

DO NOT USE CORROSIVE CLEANING SOLUTIONS ON THE OPTICAL GLASS COMPONENTS. DISINFECT THE CAMERA SURFACE REGULARLY WITH A NON-CORROSIVE SANITIZING PRODUCT.

CALIBRATE YOUR DEVICES ANNUALLY. CONTACT CUSTOMER SERVICE TO SCHEDULE MAINTENANCE.

11. Troubleshooting

If the user encounters any problems while using the imager, refer to the following options. If the problem persists, disconnect the power and contact the customer support department.

11-1 Thermal imager does not power on

- Ensure battery is installed
- Replace old battery
- Charge battery

11-2 Thermal imager shuts off unexpectedly

- Replace old battery
- Charge battery

11-3 No thermal image

- Open the lens cap
- If lens is foggy, use professional equipment to clean the lens

11-4 Unclear or dark visible images

- Turn on lights in imaging area
- Turn on device light
- If lens is foggy, use professional equipment to clean the lens

11-5 Temperature readings are incorrect

- Turn off the device; then, turn it back on
- Ensure the correct temperature range is selected
    - The default temperature range is -20°C to 150°C (-4°F to 302°F)
    - When measuring high temperature objects ensure the temperature range is set to the 150°C to 800°C (302°F to 1472°F) range
- Device is at proper height
- Ensure device is in focus
- Adjust emissivity
- Adjust for ambient temperature
- Perform a NUC operation

11-6 Camera out of focus

- Adjust focus ring

11-7 Memory card error

- Insert memory card

12. About ICI

ICI manufactures complete systems and software. We can provide complete engineering, software, and OEM solutions. Our Fortune 500 clients rely on us for infrared equipment and thermography training (which we offer through the Infrared Training Institute).

In addition to providing custom germanium, silica, and sapphire optics, we also build windows for enclosures, as well as custom pan and tilt units. We can even provide customizable explosion-proof systems.

Our knowledge and experience stems from years of using infrared imaging and temperature measurement instruments to provide solutions to: managers, engineers, scientists, inspectors and operators in space, power companies, medical, pulp and paper, food industry, research and development, and various process industries. You can see our products and services used in industrial, commercial, and government applications worldwide. Additionally, our ICI 7320 was awarded “Product of the Month” by NASA*. Originally named Texas Infrared (still DBA), Infrared Cameras, Inc. has been in business since March, 1995.

Thank you for your dedicated and continued support.

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You may reach a customer care representative by phone or email during regular business hours: Monday – Friday 8:00AM - 5:00PM CST.