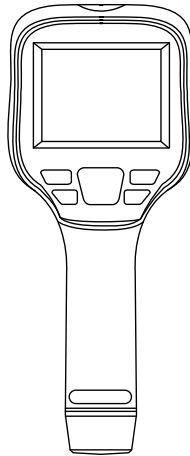**ICI** | **INFRARED CAMERAS** INC

Industry

T-CAM 600 P-SERIES
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.

Revision History

07.2021-001   Document created
12.2021-001   Fixed typographical inaccuracies and updated manual layout

Contents

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

© 2021, 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 T-Cam Series 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, and aerial integrations, 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

- 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.

- 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.

- 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).

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.

4.   Technical Specifications

Pixel Resolution	640 × 512
Accuracy	± 2 °C (± 3.6 °F) or ± 2%
Temperature Range	-20 °C to 550 °C (-4 °F to 1022 °F)
Operation Range	-10 °C to 50 °C (14 °F to 122 °F)
Storage Range	-20 °C to 60 °C (-4 °F to 140 °F)
Detector Array	UFPA (VOx)
Pixel Pitch	12 µm
FOV	48° x 38°
IFOV	1.31 mrad
Focal Length	9.1 mm
Focus	Manual
Spectral Band	8 µm to 14 µm
Thermal Sensitivity (NETD)	< (35 mK) 0.035 °C at 30 °C (86°F)
Frame Rate	30 Hz
Humidity	10% to 95% non-condensing
Pixel Operability	> 99 %
Drop Rating	2 m (6.56′)
Shock/Vibration	25 G/2 G
Dimensions (without lens)	256.4 mm x 105.1 mm x 105.3 mm (L x W x D ± 0.5 mm) (10.09″ x 4.14″ x 4.15″ (L x W x H ± 0.02″))
Power	5 V DC 2 A
Battery	Li-ion, rechargeable/replaceable
Operation Time	4 hours
Charging Time	3 hours
Power Management	Adjustable
Weight (with lens)	670 g (1.48 lbs)
Interface	USB Type-C, MicroSD
Video Format	MP4 (without data)
Image Mode	IR JPG
Image Polarity	10 options
Image Modes	IR, Fusion (ICI Dual Vision), Visible, Picture-in-Picture

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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Data Transmission	USB Type-C, WiFi support
Memory	MicroSD (up to 64 GB)
Screen	3.5" color LCD touch screen, 640 × 480
Emissivity Correction	0.01 to 1.0
Measurement Units	°C, °F, °K
IP Rating	IP54
Brightness	Adjustable
Digital Camera	5 MP
Interval Photography	No
Alarm Snapshot	No
Central /Hot/Cold Spot Measurements	Yes
Point/Line/Area Measurements	Yes
WLAN Support	Yes
Cloud Services	No
Laser	Class II 650 nm, < 1 mW
Language	Multinational
Voice annotation	
Microphone with noise cancellation	
Automatic alarms	
Internal non-uniformity correction (NUC)	
1/4"-20 tripod support	

5.   Structure

5-1   Appearance and Definitions of Housing Interface
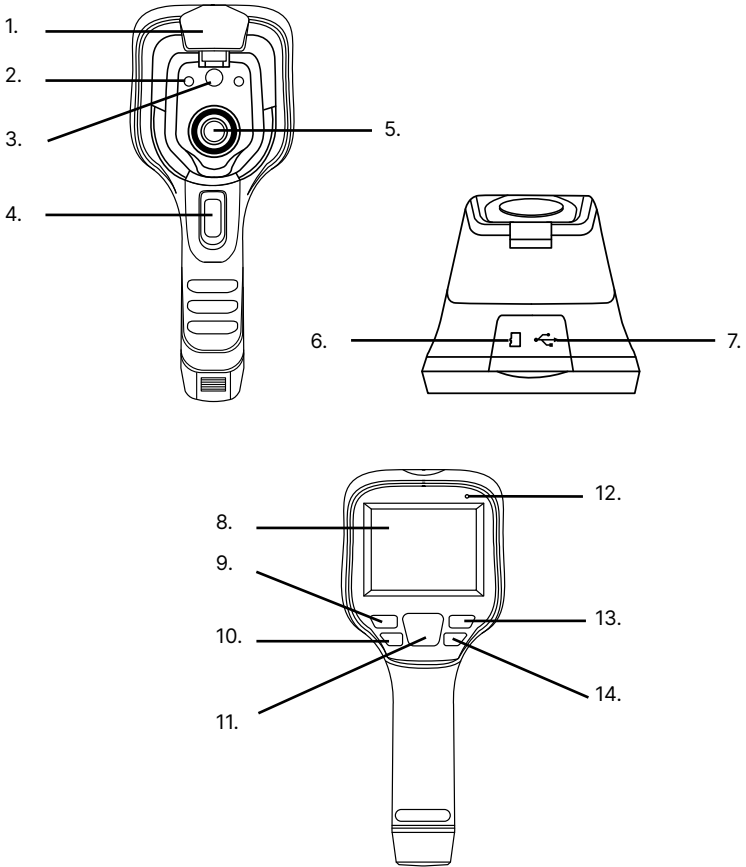
1.	Lens Cover	8.	Touchscreen
2.	Laser	9.	Previous/Back (Cancel)
3.	Digital Camera	10.	OK/Menu
4.	Shutter Trigger	11.	Navigation (up, down, left, right)
5.	Germanium Lens	12.	Microphone
6.	SD Card Slot	13.	Review
7.	USB Slot	14.	Power/Laser

6. Package Includes
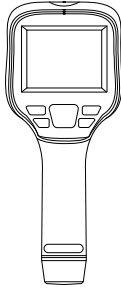
T-Cam device
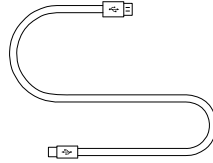
USB to Type-C Cable
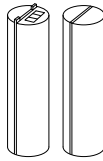
Battery x2
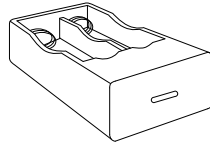
Battery Charger
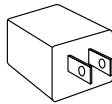
Power Adapter

MicroSD Card

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

7. Quick Start Instructions

7-1 Tripod Setup

A.

Mount the fully charged T-Cam to a tripod using the ¼-20 mount located on the bottom of the device handle.

The T-Cam can be used as a handheld device.
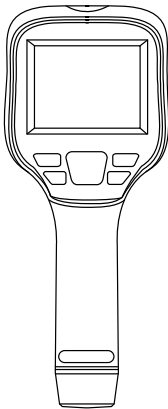
or
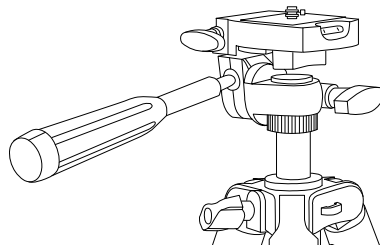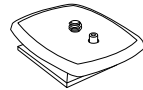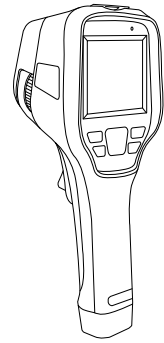
MAKE SURE TRIPODS DO NOT BLOCK THE DIRECT PATH OF PERSON(S) TO BE IMAGED TO ENSURE THE EQUIPMENT WILL NOT BE MOVED OR KNOCKED DOWN. USING A DIVIDING BARRIER WILL HELP KEEP TRIPODS SEPARATE FROM THE PATH.

TURN ON THE CAMERA BY PRESSING AND HOLDING THE POWER BUTTON FOR AT LEAST TWO SECONDS.

B.

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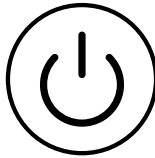
PRESS AND HOLD THE POWER BUTTON FOR MORE THAN 5 SECONDS TO SHUT DOWN THE CAMERA.

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.

7-2   Battery Installation

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

A.

Hold the camera firmly in both hands placing a thumb on the grip lines.
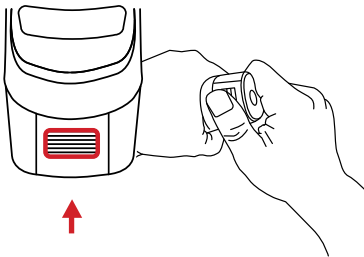
B.

Press the grip lines firmly to create a gap.
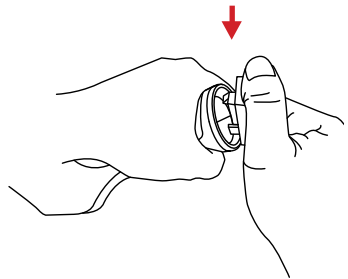
C.

Keep pressing the grip lines and pull battery cover up to remove it.

D.
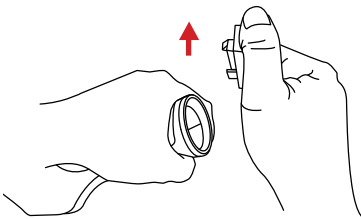
Ensure metal contacts are aligned, then push battery into battery bay.
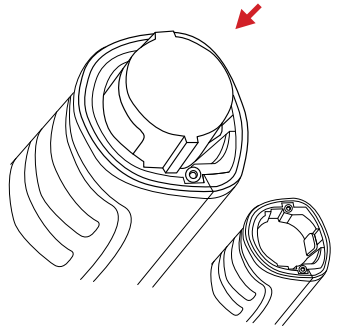
DO NOT FORCE THE BATTERY INTO THE BATTERY BAY. IF USER FEELS SIGNIFICANT RESISTANCE REMOVE THE BATTERY AND ENSURE METAL CONTACTS ARE ALIGNED BEFORE TRYING TO PLACE BATTERY INTO THE BATTERY BAY.

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

E.

To replace a battery held in the battery bay push the battery buckle. Battery will be ejected.
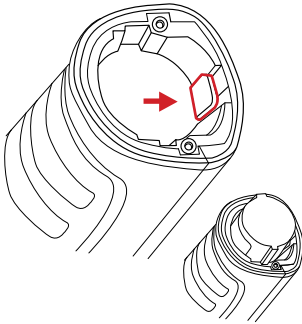
F.

Pressing the grip lines, align battery cover to battery bay and press the cover toward the device.
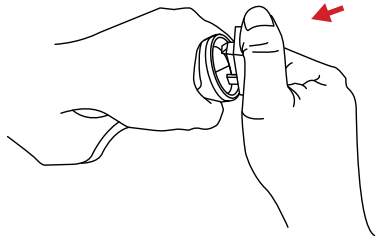
G.

Close gap by releasing the battery cover.
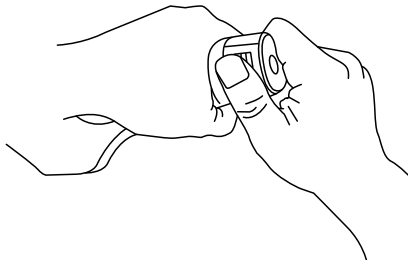
ENSURE BATTERY COVER IS PROPERLY ATTACHED. IMPROPER ATTACHMENT OF BATTERY COVER MAY EXPOSE THE BATTERY AND INTERNAL ELECTRONICS TO ELEMENTAL DAMAGE.

7-3   Memory Card Installation

A.

Insert the Micro-SD Card into the top of the T-Cam device until a clicking sound is heard.
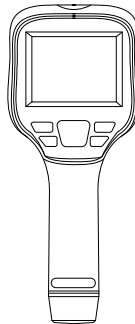
DO NOT FORCE MICRO-SD CARD INTO THE SLOT. THE SIDE OF THE CARD WITH CONTACT PINS MUST BE INSERTED FIRST. IF THERE IS RESISTANCE FLIP THE CARD AROUND AND TRY AGAIN. TO EJECT THE MEMORY CARD PRESS UNTIL A CLICK IS HEARD AND THEN RELEASE. MEMORY CARD WILL BE EJECTED.

7-4   Charging Instructions: Option 1

A.

While a battery is inside the device, plug the USB Type-C end of the USB cable into the top of the T-Cam device.

B.
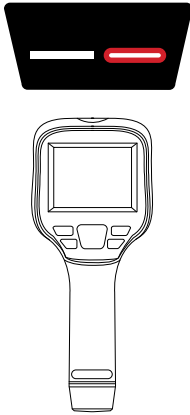
Plug the other end of the USB cable into an available USB port on a computer.
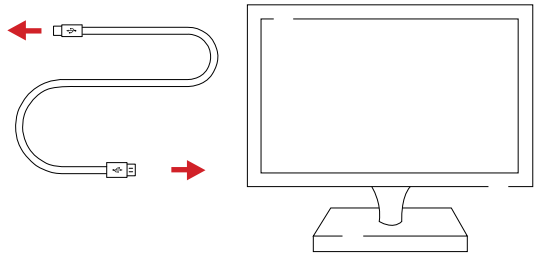
WHEN USING A COMPUTER FOR CHARGING THE COMPUTER SHOULD BE POWERED ON. CHARGE THE BATTERY FOR MINIMUM OF 5 HOURS BEFORE USING FOR THE FIRST TIME.

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.

7-5   Charging Instructions: Option 2

REMOVE THE BATTERIES FROM THE DEVICE TO FOLLOW THIS METHOD OF CHARGING.

A.

Plug the USB Type-C end of the USB cable into the battery charger.

B.
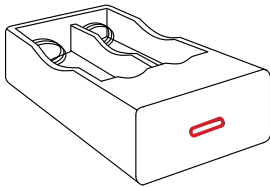
Plug the other end of the USB cable the power adapter.
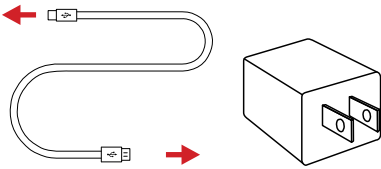
C.

Insert batteries into battery charger.
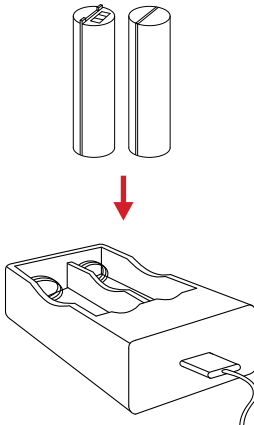
D.

Plug power adapter into a 110/120V electrical outlet.
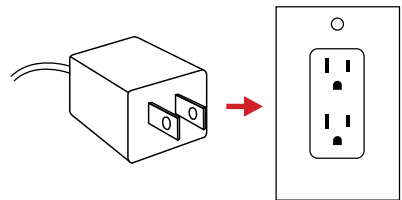
WHEN THE BATTERY IS NOT PLACED IN THE CHARGER THE INDICATOR LIGHT FLASHES. THE LIGHT TURNS RED WHEN THE BATTERY IS PLACED AND CHARGING. WHEN THE BATTERY IS FULLY CHARGED THE LIGHT TURNS GREEN.

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 5 hours. The battery status is shown by the indicator in the upper-right corner of the screen.

8-1-1   Charging via Type-C Cable

1.   Plug the Type-C end of the cable into the T-Cam Device.

2.   Plug the USB end of the Type-C cable into a computer.

3.   Turn computer on to start charging.

8-1-2   Charging via Power Adapter (not included)

1.   Select a charger with 5V 1A or 5V 2A output.

2.   Plug the Type-C cable into the T-Cam Device.

3.   Plug the USB end of the Type-C cable into the power adapter.

4.   Plug the power adapter into a 110v/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.

8-2   Power On/Off the Device

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

Repeat and hold for more than 3 seconds to turn the device off.

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.

8-3   Power On/Off the Laser

To turn the laser on, press the Power button. Repeat to turn the laser off.

8-4 User Interface

The device interface appearance:
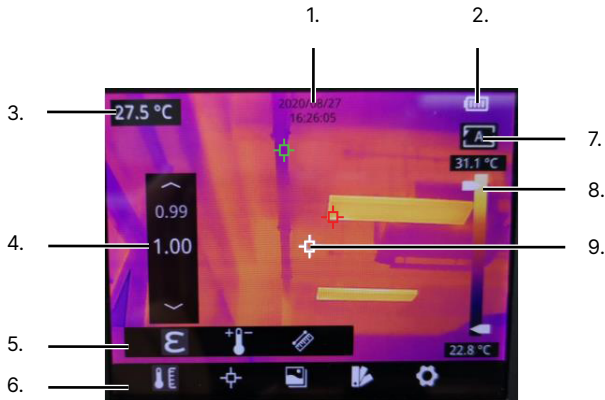
1. Date and Time
2. Battery Life
3. Center Point Temperature
4. Settings
5. Sub-menu

6. Main Menu
7. AGC
8. Level & Span
9. Temperature Measurement Points*

∗ **CENTER POINT, HIGH TEMPERATURE POINT, AND LOW TEMPERATURE POINT ARE ACTIVATED IN THE PRESENTED IMAGE ABOVE.**

8-5 Open the Main Menu

Users can access the Main Menu by pressing the OK button or tapping anywhere on the touchscreen display.

8-6 Close the Main Menu

Close the Main Menu by pressing the Previous button or tapping anywhere on the touchscreen display.

8-7   Capture an Image or Video

Save images and videos as follows:

1.   Find and aim the thermal device at the target.

2.   Adjust the focus ring till the image is clear.

3.   Pull the Shutter Trigger button to take a photo. Press and hold the trigger button to start recording a video; a recording icon will appear in the bottom right corner. Finish recording by releasing the Shutter Trigger button.

4.   Name the image. Using the touchscreen, open the keyboard by tapping the image name. Use the keyboard by tapping the touchscreen to input desired name.

5.   Press the OK button to confirm the name or tap Enter on the touchscreen.

6.   Press the OK button to save the image or video. Press the Previous button to cancel.

Images are captured and stored in the JPG format and videos in the H264 format.

IN AUTO SAVE MODE, PULLING THE SHUTTER TRIGGER SAVES IMAGES/ VIDEOS AUTOMATICALLY. IMAGES/VIDEOS ARE NAMED A DEFAULT FILE NAME. IN THE MANUAL SAVE MODE, THE USER MUST CONFIRM OR CANCEL SAVES MANUALLY. AUTO AND MANUAL MODES CAN BE SWITCHED ON OR OFF IN THE SETTINGS.

8-8   Adding Voice Annotations to an Image or Video

Users can add voiced notes to images and videos using the built-in noise canceling microphone. Add annotations to an image as follows:

1.   Capture an image or video.

2.   Using the touchscreen, tap the microphone icon. A tool tip on-screen will denote recording is happening.

3.   Speak clearly, directly, and loudly into the microphone located at the top right of the touch screen.

4.   Tap the microphone icon again to stop recording.

5.   Name the image. Using the touchscreen, open the keyboard by tapping the image name. Use the keyboard by tapping the touchscreen to input desired name.

6.   Press the OK button to confirm the name or tap Enter on the touchscreen.

7.   Press the OK button to save the image or video. Tap the arrow on the touchscreen to cancel saving.

Audio files are saved separately from images and videos in the AAC format and cannot be played on the T-Cam device. Remove the MicroSD card and insert it into a computer with an application that can play AAC format files to review notes.

8-9   Review Images or Videos

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

1.   Press the Review button to enter the library.

2.   Use the Navigation buttons to select the image or video to review.

3.   Press the OK button to view the image or video in full screen. Use the Navigation buttons to cycle left or right between images and videos.

4.   Press the Previous button twice to exit the menu and return to the imaging interface.

8-10   Playing Videos

Videos can be played at any time as follows:

1.   Press the Review button to enter the library.

2.   Use the Navigation buttons to select the video to play.

3.   Press the OK button to view the video in full screen.

4.   Tap the touchscreen to play the video. Exit play mode by pressing the Previous button.

5.   Press the Previous button twice to exit the menu and return to the imaging interface.

8-11   Delete Images/Videos

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

1.   Press the Review button to enter the library.

2.   Use the Navigation buttons to select the image or video to review.

3.   Press the OK button to view the image in full screen.

4.   Using the touchscreen, tap the Delete icon.

5.   Press the OK button or tap OK on the touchscreen to confirm deletion. Tap Cancel on the touchscreen to cancel deletion.

6.   Press the Previous button twice to exit the menu and return to the imaging interface.

DELETED IMAGES CANNOT BE RECOVERED.

8-12   Rename Images or Videos

When an image or video is captured it will be stored to the MicroSD card with a default file name. Media can be renamed at any time as follows:

1.   Press the Review button to enter the library.

2.   Use the Navigation buttons to select the image or video to review.

3.   Press the OK button to view the image in full screen.

4.   Using the touchscreen, tap the Rename icon.

5.   Using the touchscreen, open the keyboard by tapping the image name. Use the keyboard by tapping the touchscreen to input desired name.

6.   Press the OK button or tap Enter on the touchscreen to confirm rename. Press the previous button to cancel renaming.

7.   Press the Previous button to exit the menu.

8-13   Center Point Temperature Measurement

The center point measurement gives radiometric temperature information contained in the center of the scene. Measurement results will be displayed in the upper left corner of the screen. If disabled, enable center point temperature measurement as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the measurement icon:

3.   Press the OK button to open Sub-menu.

4.   Select Center Point icon:

5.   Press the OK button to enable center point measurement. Menu closes automatically. To disable the center point repeat steps 1 - 5.

8-14   Hot Spot Temperature Tracking

Users can turn on hot spot tracking to identify the highest temperature point in the scene. Measurement results will be displayed in the upper left corner of the screen. Enable hot spot tracking as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the measurement icon:

3.   Press the OK button to open Sub-menu.

4.   Select Hot Spot icon:

5.   Press the OK button to enable hot spot tracking. Menu closes automatically. To disable the hot spot repeat steps 1 - 5.

8-15 Cold Spot Temperature Tracking

Users can turn on cold spot tracking to identify the lowest temperature point in the scene. Measurement results will be displayed in the upper left corner of the screen. Enable cold spot tracking as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the measurement icon:

3. Press the OK button to open Sub-menu.

4. Select Cold Spot icon:

5. Press the OK button to enable cold spot tracking. Menu closes automatically. To disable the cold spot repeat steps 1 - 5.

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.

8-16 Spot Temperature Measurement

Detect temperature information from a user designated spot as follows (limit 10):

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the measurement icon:

3. Press the OK button to open Sub-menu.

4. Select Spot icon:

5. Touch the screen where the spot should be placed. The spot will show on screen and temperature data will be gathered.

8-16-1 Move a Spot Temperature Measurement

Move a temperature spot as follows:

1. Create a spot temperature measurement.

2. Using the touchscreen, tap-and-drag the spot to change its location. Release to set.

8-16-2 Delete a Spot Temperature Measurement

Delete a temperature spot as follows:

1. Using the touchscreen, tap the temperature spot to be deleted.

2. Tap the delete icon at the top left of the screen.

8-17   Line Temperature Measurement

Users can detect the hottest temperature along a set line as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the measurement icon: ⊡

3. Press the OK button to open Sub-menu.

4. Select Line icon: ⊟

5. Press and hold; then, drag on the touchscreen. Release to set the line. Hottest temperature point (marked by a red triangle) will move along the line.

8-17-1   Move a Line Temperature Measurement

Move a temperature line as follows:

1. Create a line temperature measurement.

2. Using the touchscreen, tap-and-drag the line to change its location. Release to set.

8-17-2   Delete a Line Temperature Measurement

Delete a temperature line as follows:

1. Using the touchscreen, tap the temperature spot to be deleted.

2. Tap the delete icon at the top left of the screen.

8-18   Area Temperature Measurement

Drawing a temperature area measurement box will allow users to determine the minimum, maximum, and average temperature in a given space. Information is displayed on screen in screen. Detect temperature information from a user designated area as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the measurement icon: ⊡

3. Press the OK button to open Sub-menu.

4. Select Area icon: ▨

5. Press and hold; then, drag on the touchscreen. Release to select an area. Resize the temperature area by tapping-and-dragging on the corners of the box. Temperature data will be gathered.

8-18-1   Move an Area Temperature Measurement

Move a temperature area as follows:

1.   Create an area temperature measurement.

2.   Using the touchscreen, tap-and-drag the area to change its location. Release to set.

8-18-2   Delete an Area Temperature Measurement

Delete a temperature area as follows:

1.   Using the touchscreen, tap the temperature spot to be deleted.

2.   Tap the delete icon at the top left of the screen.

8-19   Image Modes

There are 5 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
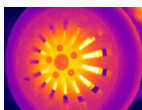
Change the image mode as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Image Mode icon:

3.   Press the OK button to open Sub-menu.

4.   Select the image mode desired.

5.   Press the OK button to enable mode.

6.   Press the Previous button to exit the menu.

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

8-19-1   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.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Setting icon.

3.   Press the OK button to open Sub-menu.

4.   Select Dual-spectrum Registration.

5.   Press the OK button to open Sub-menu.

6.   Select Dual-spectrum Fusion Registration.

7.   Press the OK button. Options and a directional pad appears on screen.

8.   Using the touchscreen, choose either Fine Tuning or Coarse Tuning. Fine Tuning moves the image by small margin and Coarse Tuning moves the image by a larger margin. Choose an option by tapping wither option on screen.

9.   Using the on screen directional pad, adjust the image alignment. Use the directional pad by tapping the arrows on any side of the on screen OK button.

10.   Press the OK button to lock in selection.

11.   Press the Previous button to exit the menu.
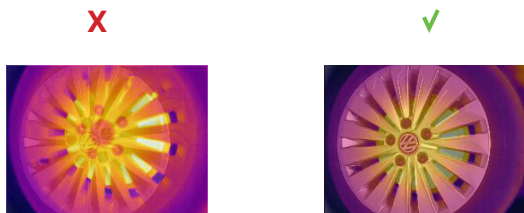
USERS SHOULD STAND AT THE CORRECT DISTANCE FROM THE TARGET WHEN PERFORMING IMAGE ALIGNMENT. THE PROPER DISTANCE IS DETERMINED BY USING THE DISTANCE SETTINGS. MINIMUM DISTANCE IS 1 METER (3' 3.37").

IMAGE MAY REQUIRE REALIGNMENT WHEN CHANGING INSPECTION LOCATIONS.

8-19-2 PIP Location

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

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Setting icon.

3. Press the OK button to open Sub-menu.

4. Select Dual-spectrum Registration.

5. Press the OK button to open Sub-menu.

6. Select PIP adjustment.

7. Press the OK button. Options and a directional pad appears on screen.

8. Using the touchscreen, choose either Fine Tuning or Coarse Tuning. Fine Tuning moves the PIP box by small margin and Coarse Tuning moves the PIP box by a larger margin. Choose an option by tapping wither option on screen.

9. Using the on screen directional pad, adjust the location of the PIP box. Use the directional pad by tapping the arrows on any side of the on screen OK button. Press the OK button to lock in location.

10. Press the Previous button to exit the menu.

Before   After

8-20 Polarity

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

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Palette Setting icon:

3. Press the OK button to open Sub-menu.

4. Select a new palette by using the Navigation buttons.

5. Press the OK button to switch to the new palette. Menu closes automatically.

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

8-21   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 numbers to improve contrast.

8-21-1   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 AGC button twice.

8-21-2   Manual Level & Span Adjustment

The user has control of contrast gain settings and can adjust the Level & Span as follows:

1.   Using the touchscreen, press and hold the Max Slider on the touchscreen; then, drag up or down on the touchscreen. Gain will be adjusted. When the proper contrast is reached release hold.

2.   Using the touchscreen, press and hold the Min Slider on the touchscreen; then, drag up or down on the touchscreen. Gain will be adjusted. When the proper contrast is reached release hold.

USING THE TOUCHSCREEN, RESET THE AUTO GAIN CONTROLS BY TAPPING THE AGC BUTTON TWICE.

8-22 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 temperatures the imager observes.

To more accurately measure materials with a low emissivity, an emissivity correction is necessary. Adjusting the emissivity setting will allow 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 E=x.xx

Users can change the emissivity as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Parameter Settings icon:

3. Press the OK button to open Sub-menu.

4. Select Emissivity.

5. Press the OK button.

6. Adjust number using Navigation buttons.

7. Press the OK button to set Emissivity.

8. Press the Previous button to exit the menu.

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.

8-23 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 T-Cam 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.

8-24   Ambient 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 ambient temperature as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Parameter Settings icon:

3. Press the OK button to open Sub-menu.

4. Select Temperature.

5. Press the OK button.

6. Adjust number using the Navigation buttons.

7. Press the OK button to set ambient temperature.

8. Press the Previous button continuously to exit the menu.

8-25   Temperature Units

By default the imager is set to measure temperatures in Celsius (°C). Change the temperature scale as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon:

3. Press the OK button to open Sub-menu.

4. Select Unit.

5. Press the OK button.

6. Select Temperature Unit.

7. Press the OK button.

8. Select desired temperature unit.

9. Press the OK button.

10. Press the Previous button continuously to exit the menu.

THE AVAILABLE TEMPERATURE SCALES ARE FAHRENHEIT, CELSIUS, AND KELVIN.

8-26 Distance

Adjusting the distance can assist the user obtaining more accurate temperature measurements. Set the distance as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Parameter Settings icon:

3.   Press the OK button to open Sub-menu.

4.   Select Distance.

5.   Press the OK button.

6.   Adjust numbers using the Navigation buttons.

7.   Press the OK button to set new distance.

8.   Press the Previous button continuously to exit the menu.

8-27 Distance Units

By default the imager is set to measure temperatures in Celsius (°C). Fahrenheit and Kelvin scales are also available. Change the temperature scale as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon:

3.   Press the OK button to open Sub-menu.

4.   Select System Settings

5.   Press the OK button.

6.   Select Unit.

7.   Press the OK button.

8.   Select Distance Unit.

9.   Press the OK button.

10.   Select desired distance unit.

11.   Press the OK button.

12.   Press the Previous button continuously to exit the menu.

DISTANCE IS MEASURED IN EITHER METERS OR FEET.

8-28   Alarm Settings

8-28-1   Enable Alarms

By default the imager alarm thresholds are turned off. The user will need to enable the high and low temperature alarms individually. Enable alarms as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select Alarm.

5.   Press the OK button.

6.   Select Alarm Area Setting.

7.   Press the OK button.

8.   Using the touchscreen, toggle the desired threshold to the On position by tapping the switch next to the HI or LO option. The switch will turn red when active. Disable the alarm by tapping the switch again.

9.   Press the OK button.

10. Press the Previous button continuously to exit the menu.

The following symbols appear on screen when a high temperature or a low temperature threshold is detected:
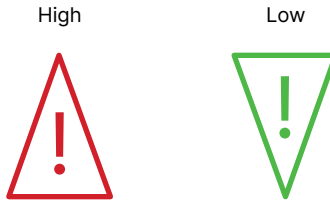
High   Low

BOTH ALARMS CAN BE ENABLED INDIVIDUALLY OR AS A PAIR, BUT THE USER WILL NEED TO ADJUST THE SETTINGS OF THE TEMPERATURE ALARMS INDIVIDUALLY.

8-28-2 Temperature Threshold Adjustment

By default the alarm thresholds are HI: 120 °C (248 °F) and LO 0°C (32 °F). The user will need to change the Hi and LO thresholds individually. Adjust these settings as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon: ⚙

3. Press the OK button to open Sub-menu.

4. Select Alarm.

5. Press the OK button.

6. Select Alarm Area Setting.

7. Press the OK button.

8. Using the touchscreen, toggle the desired threshold to the On position by tapping the switch next to the HI option. The switch will turn red when active. Disable the alarm by tapping the switch again.

9. Using the touchscreen, open the keyboard by tapping the threshold number shown next to the LO switch. Use the keyboard by tapping the touchscreen to input desired threshold number.

10. Press the OK button to confirm the number or tap Enter on the touchscreen.

11. Press the Previous button continuously to exit the menu.

BOTH ALARMS CAN BE ENABLED INDIVIDUALLY OR AS A PAIR, BUT THE USER WILL NEED TO ADJUST THE SETTINGS OF THE TEMPERATURE ALARMS INDIVIDUALLY.

THE USER SHOULD ENSURE THE DEVICE IS IN THE PROPER TEMPERATURE RANGE. IF MORE THAN 15% OF THE TEMPERATURES WITHIN THE FIELD OF VIEW EXCEED 140 °C, THE DEVICE WILL AUTOMATICALLY SWITCH TO THE HIGH TEMPERATURE MEASUREMENT SCALE; IF MORE THAN 95% OF THE TEMPERATURE IN THE FIELD OF VIEW ARE BELOW 120°C, THE DEVICE WILL AUTOMATICALLY SWITCH TO THE STANDARD RANGE SCALE. THE USER MAY NEED TO MANUALLY SELECT THE PROPER TEMPERATURE SCALE.

THE DEVICE WILL PERFORM A NUC CORRECTION EACH TIME A NEW TEMPERATURE SCALE IS SELECTED. THE DEVICE WILL ALSO PERFORM PERIODIC NUC CORRECTIONS TO ADJUST FOR NON-UNIFORMITY OF PIXELS.

SERIES IMAGES ARE SAVED TO THEIR OWN FOLDER ON THE MICROSD CARD AND MUST BE ACCESSED THROUGH A N EXTERNAL COMPUTER.

9-28-3   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 interval and the number of photos to be taken. Turn the option On/Off as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select Alarm.

5.   Press the OK button.

6.   Enable the alarms and set the temperature thresholds before continuing.

7.   Using the touchscreen, toggle the Alarm Auto Photo option to the On position by tapping the switch next to the option. The switch will turn red when active. Disable the alarm by tapping the switch again.

8.   Using the touchscreen, open the keyboard by tapping the number next to the Interval option. Use the keyboard by tapping the touchscreen to input a number, e.g. 10 seconds.

9.   Press the OK button to confirm the number or tap Enter on the touchscreen.

10.   Using the touchscreen, open the keyboard by tapping the number next to the Number (Num) option. Use the keyboard by tapping the touchscreen to input a number, e.g. 100 photos.

11.   Press the OK button to confirm the number or tap Enter on the touchscreen.

12.   Press the Previous button continuously to exit the menu.

THE ABOVE EXAMPLE WILL CAPTURE 1 PHOTO EVERY 10 SECONDS UNTIL A TOTAL OF 100 IMAGES HAVE BEEN CAPTURED.

AFTER TRIGGERING A HIGH OR LOW TEMPERATURE ALARM THRESHOLD, THE DEVICE WILL TAKE A NUMBER OF PICTURES ACCORDING TO THE SET TIME INTERVAL. WHEN THE DEFINED NUMBER OF PICTURES IS REACHED, THE CAMERA WILL STOP TAKING PHOTOS AND THE ALARM SNAPSHOT FUNCTION WILL AUTOMATICALLY BE DISABLED. USERS NEED TO ENABLE THE FEATURE AGAIN IN ORDER TO CAPTURE MORE IMAGES USING THIS METHOD.

SERIES IMAGES ARE SAVED TO THEIR OWN FOLDER ON THE MICROSD CARD AND MUST BE ACCESSED THROUGH A N EXTERNAL COMPUTER.

8-29   Interval Photography

Interval Photography allows for the taking of pictures at regular intervals when the Shutter Trigger is pressed. This feature is independent from Alarm Snapshots as images are not captured when a temperature threshold is exceeded. Users can independently set the time interval and number of pictures to be taken.

Enable Interval Photography as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select Photo Setting

5.   Press the OK button.

6.   Using the touchscreen, toggle the Timer Photo option to the On position by tapping the switch next to the option. The switch will turn red when active. Disable the timer by tapping the switch again.

7.   Using the touchscreen, open the keyboard by tapping the number next to the Interval option. Use the keyboard by tapping the touchscreen to input a number, e.g. 10 seconds.

8.   Press the OK button to confirm the number or tap Enter on the touchscreen.

9.   Using the touchscreen, open the keyboard by tapping the number next to the Number (Num) option. Use the keyboard by tapping the touchscreen to input a number, e.g. 100 photos.

10.   Press the OK button to confirm the number or tap Enter on the touchscreen.

11.   Press the OK button.

12.   Press the Previous button continuously to exit the menu.

THE ABOVE EXAMPLE WILL CAPTURE 1 PHOTO EVERY 10 SECONDS UNTIL A TOTAL OF 100 IMAGES HAVE BEEN CAPTURED.

AFTER CAPTURING A SERIES OF IMAGES, THE DEVICE WILL TAKE A NUMBER OF PICTURES ACCORDING TO THE SET TIME INTERVAL. WHEN THE DEFINED NUMBER OF PICTURES IS REACHED, THE CAMERA WILL STOP TAKING PHOTOS AND THE INTERVAL PHOTOGRAPHY FUNCTION WILL AUTOMATICALLY BE DISABLED. USERS NEED TO ENABLE THE FEATURE AGAIN IN ORDER TO CAPTURE MORE IMAGES USING THIS METHOD.

SERIES IMAGES ARE SAVED TO THEIR OWN FOLDER ON THE MICROSD CARD AND MUST BE ACCESSED THROUGH A N EXTERNAL COMPUTER.

8-30 Auto Save

Images can be saved automatically to the MircoSD card as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon: ⚙

3. Press the OK button to open Sub-menu.

4. Select Photo Setting

5. Press the OK button.

6. Using the touchscreen, toggle the Auto Save option to the On position by tapping the switch next to the option. The switch will turn red when active. Disable Auto Save by tapping the switch again.

7. Press the Previous button continuously to exit the menu.

TURNING OFF AUTO SAVE WILL REQUIRE IMAGES TO BE CONFIRMED BEFORE THEY ARE SAVED TO THE MIRCOSD CARD.

8-31 Transferring Image and Video Files to a Computer

8-31-1 MicroSD Card

The easiest way to move images from the device is to remove the MircoSD card from the device and insert it into a proper computer port or adapter. Follow your company's procedures for moving images and video files between devices.

8-31-2 USB Mode

In USB Mode, the computer can directly access the SD card while it is still in the device through an attached USB cable.

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon: ⚙

3. Press the OK button to open Sub-menu.

4. Select USB Mode

5. Press the OK button.

6. Select USB Disk.

7. Press the OK button. Images should now be viewable on a computer screen.

8. Press the Previous button continuously to exit the menu.

A CAMERA RESTART IS REQUIRED AFTER CHANGING MODES.

8-31-3   Live Streaming to a Computer

Users can synchronize the picture in the camera to the PC software for real-time display and analysis. Stream directly to a computer as follows.

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select USB Mode

5.   Press the OK button.

6.   Select USB Camera.

7.   Press the OK button.

8.   Turn the device Off, then On again. Image feed should now be viewable on the external computer screen.

A CAMERA RESTART IS REQUIRED AFTER CHANGING MODES.

8-32   Temperature Scales

The default temperature scale of the device is -20 °C to 150 °C (-4 °F to 302 °F). A high temperature calibration is also available. Change the temperature scale as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select Temperature Measurement Gear.

5.   Press the OK button.

6.   Select a temperature scale.

7.   Press the OK button.

8.   Press the Previous button continuously to exit the menu.

IF MORE THAN 15% OF THE TEMPERATURES WITHIN THE FIELD OF VIEW EXCEED 140 °C, THE DEVICE WILL AUTOMATICALLY SWITCH TO THE HIGH TEMPERATURE MEASUREMENT SCALE; IF MORE THAN 95% OF THE TEMPERATURE IN THE FIELD OF VIEW ARE BELOW 120°C, THE DEVICE WILL AUTOMATICALLY SWITCH TO THE STANDARD RANGE SCALE.

THE DEVICE WILL PERFORM A NUC CORRECTION EACH TIME A NEW TEMPERATURE SCALE IS SELECTED.

8-33   WLAN Hotspot

Enable the WLAN to transfer images and videos to a mobile device as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select System Settings.

5.   Press the OK button.

6.   Select WLAN Hotspot.

7.   Press OK button.

8.   Using the touchscreen, toggle the WLAN option to the On position by tapping the switch next to the option. The switch will turn red when active. Disable WLAN by tapping the switch again.

9.   Using the touchscreen, open the keyboard by tapping the name next to the Network Name. Use the keyboard by tapping the touchscreen to input the network name.

10.   Press the OK button to confirm the number or tap Enter on the touchscreen.

11.   Using the touchscreen, open the keyboard by tapping the code next to the Password box. Use the keyboard by tapping the touchscreen to input the password.

12.   Press the OK button to confirm the number or tap Enter on the touchscreen.

13.   Press the Previous button continuously to exit the menu.

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

THIS FUNCTION NEEDS TO BE WORKED WITH A DEDICATED APP. AFTER TURNING ON THE WIFI, USERS MAY NEED TO MANUALLY INPUT THE NETWORK PASSWORD. AFTER CONNECTING, USERS CAN TRANSFER SAVED IMAGES/VIDEOS TO A MOBILE DEVICE FOR ANALYSIS AND STORAGE.

USERS MUST BE FIRST BE CONNECTED TO WIFI TO USE THE CLOUD SERVICES.

9-34 Cloud Settings

9-34-1 Cloud Login

Login as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon: ⚙

3. Press the OK button to open Sub-menu.

4. Select Cloud.

5. Press the OK button.

6. Using the touchscreen, open the keyboard by tapping the empty box next to Username. Use the keyboard by tapping the touchscreen to input the username.

7. Press the OK button to confirm the number or tap Enter on the touchscreen.

8. Using the touchscreen, open the keyboard by tapping the empty box next to Password. Use the keyboard by tapping the touchscreen to input the password.

9. Press the OK button to confirm the number or tap Enter on the touchscreen.

10. Using the touchscreen, open the keyboard by tapping the empty box next to Device Name. Use the keyboard by tapping the touchscreen to input the device name.

11. Press the OK button to confirm the number or tap Enter on the touchscreen.

12. Press the Login button.

13. Press the Previous button continuously to exit the menu.

LEAVE THE WIFI DISABLED WHEN NOT USING CLOUD SERVICES AS ENABLING THE WIFI USES MORE POWER AND DEPLETES THE BATTERY AT A FASTER RATE.

THIS FUNCTION NEEDS TO BE WORKED WITH A DEDICATED APP. AFTER TURNING ON THE WIFI, USERS MAY NEED TO MANUALLY INPUT THE NETWORK NAME AND PASSWORD. AFTER CONNECTING, USERS CAN TRANSFER SAVED IMAGES/VIDEOS TO THE CLOUD FOR ANALYSIS AND STORAGE.

USERS MUST BE FIRST BE CONNECTED TO WIFI TO USE THE CLOUD SERVICES.

9-34-2 Register

Register your device for cloud use as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon: ⚙

3. Press the OK button to open Sub-menu.

4. Select Cloud.

5. Press the OK button.

6. Press the Register button.

7. Using the touchscreen, open the keyboard by tapping the empty box next to Username. Use the keyboard by tapping the touchscreen to input the username.

8. Press the OK button to confirm the number or tap Enter on the touchscreen.

9. Using the touchscreen, open the keyboard by tapping the empty box next to Password. Use the keyboard by tapping the touchscreen to input the password.

10. Press the OK button to confirm the number or tap Enter on the touchscreen.

11. Using the touchscreen, open the keyboard by tapping the empty box next to Device Name. Use the keyboard by tapping the touchscreen to input the device name.

12. Press the OK button to confirm the number or tap Enter on the touchscreen.

13. Press the OK button.

14. Press the Previous button continuously to exit the menu.

LEAVE THE WIFI DISABLED WHEN NOT USING CLOUD SERVICES AS ENABLING THE WIFI USES MORE POWER AND DEPLETES THE BATTERY AT A FASTER RATE.

THIS FUNCTION NEEDS TO BE WORKED WITH A DEDICATED APP. AFTER TURNING ON THE WIFI, USERS MAY NEED TO MANUALLY INPUT THE NETWORK NAME AND PASSWORD. AFTER CONNECTING, USERS CAN TRANSFER SAVED IMAGES/VIDEOS TO THE CLOUD FOR ANALYSIS AND STORAGE.

PERFORM A FACTORY RESET TO RESTORE DEFAULT SETTINGS.

8-35 Date and Time Settings

Change the date and time settings as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select Date and Time.

5.   Press the OK button.

6.   Using the touchscreen, adjust the current day and time by tapping the up and down arrows on the screen. Time is in military time.

7.   Press the OK button.

8.   Press the Previous button continuously to exit the menu.

TIME IS IN MILITARY TIME.

8-36 Language Settings

Change the device language as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select Language.

5.   Press the OK button.

6.   Select preferred language.

7.   Press the OK button.

8.   Press the Previous button continuously to exit the menu.

NOT ALL LANGUAGES ARE AVAILABLE.

PERFORM A FACTORY RESET TO RESTORE DEFAULT SETTINGS.

PERFORM A FACTORY RESET TO RESTORE DEFAULT SETTINGS.

8-37   Display Brightness Settings

Users can change the brightness settings as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon:

3. Press the OK button to open Sub-menu.

4. Select Brightness.

5. Press the OK button.

6. Using the touchscreen, select brightness level by tapping the option. Brightness will be adjusted.

7. Press the OK button to confirm selection.

8. Press the Previous button continuously to exit the menu.

8-38   Power Management Settings

To save power users can change the auto shut off settings. The device can be set to turn off after 5 minutes, 10 minutes, or 20 minutes. Auto shut off can also be turned off.

Change power management settings as follows:

1. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon:

3. Press the OK button to open Sub-menu.

4. Select Auto Power-Off.

5. Press the OK button.

6. Select desired time limit. To disable automatic shut off, select the Off option.

7. Press the OK button.

8. Press the Previous button continuously to exit the menu.

PERFORM A FACTORY RESET TO RESTORE DEFAULT SETTINGS.

8-39   Device Information

Access information about the device as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select System Settings.

5.   Press the OK button.

6.   Select Device Info.

7.   Press the OK button. Device information is displayed on screen.

8.   Press the Previous button continuously to exit the menu.

DEVICE INFORMATION CANNOT BE CHANGED.

8-40   Format the SD Card

Users can format the MircoSD card as follows:

1.   Press the Menu button or tap the touchscreen to display the Main Menu.

2.   Select the Settings icon: ⚙

3.   Press the OK button to open Sub-menu.

4.   Select System Settings.

5.   Press the OK button.

6.   Select Format SD Card.

7.   Press the OK button.

8.   Press the OK button again to confirm formatting. SD card will be formated. Press Previous button to cancel formating.

9.   Press the Previous button continuously to exit the menu.

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 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.

8-41 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. Press the Menu button or tap the touchscreen to display the Main Menu.

2. Select the Settings icon: ⚙

3. Press the OK button to open Sub-menu.

4. Select System Settings.

5. Press the OK button.

6. Select Restore Factory Settings.

7. Press the OK button.

8. Press the OK button again to confirm. Device Settings will reset to factory settings. Press Previous button to cancel.

9. Press the Previous button continuously to exit the menu.

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.

9   Cleaning and Maintenance

9-1   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.

9-2   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.

9-3   Device Calibration

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

9-4   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.

10   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.

10-1   Thermal imager does not power on

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

10-2   Thermal imager shuts off unexpectedly

- Replace old battery
- Charge battery

10-3   No thermal image

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

10-4   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

10-5   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 100 °C to 550 °C (212 °F to 1022 °F) range
- Device is at proper height
- Ensure device is in focus
- Adjust emissivity
- Adjust for ambient temperature
- Perform a NUC operation

10-6   Camera out of focus

•   Adjust focus ring

10-7   Memory card error

•   Insert memory card

11   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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