



TIS 1900

High Performance Thermal Imaging Camera



Instruction Manual

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1.Introduction

- The Thermal Imager is a handheld imaging camera used for predictive maintenance, equipment troubleshooting and verification.
- Thermal and visual images are displayed on the LCD and can be saved to a Micro SD Memory card, transferring images to a PC is accomplished by removing the SD memory card and connecting it to a PC through the included card reader.
- In addition to the features mentioned above, the Thermal Imager provides video recording with audio and play back.

2.Safety Information

- To prevent eye damage and personal injury, do not look into the laser.
- Do not point laser directly at people or animals or indirectly off reflective surfaces.
- Do not disassemble or modify the Thermal Imager.
- Do not point the Thermal Imager (with or without the lens cover) at intensive energy sources, for example devices that emit laser radiation, or the sun, this can have an adverse effect on the accuracy of the camera, it can also cause damage to the detector in the Thermal Imager.
- Do not use the Thermal Imager in a temperature higher than 50°C (122°F), lower than -20°C (-4°F), high temperatures or low temperatures can cause damage to the Thermal Imager.

Only use the correct equipment to discharge the battery.

- If you do not use the correct equipment, you can decrease the performance or the life cycle of the battery.
- If you do not use the correct equipment, an incorrect flow of current to the battery can occur, this can cause the battery to become hot, or cause an explosion and injury.

Do not disconnect the battery when the thermal imager is working.

- If you pull out the battery when the thermal imager is working, it may cause incorrect readings.
- **Do not disassemble or modify the battery.**
- 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.
- If there is a leak from the battery and the fluid gets into your eyes, do not rub your eyes, flush with water and immediately get medical care.
- Do not puncture the battery with any object.
- Do not put the battery in or near a fire, or in direct sunlight, or other high-temperature locations.
- Do not solder directly onto the battery.

Always charge the battery in the specified temperature range.

- The temperature range through which you can charge the battery is 0 to 50°C (32 to 122°F).
- If you charge the battery at temperatures out of this range, it can cause the battery to become hot or to leak, it can also decrease the performance or the life cycle of the battery.
- Do not get water or salt water on the battery, or permit the battery to get wet.
- 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 and screen.
- Be careful when you clean the infrared lens. Do not clean the infrared lens too vigorously, this can damage the anti-reflective coating.

- Taking the Thermal Imager from from a cold to hot, will cause condensation in the thermal Imager, to protect the Thermal Imager, you should power off the unit, wait until it has become warm enough for the condensation to evaporate.
- If you do not use the Thermal Imager, store it in a cool and dry environment, if you store the unit with the battery, it should be discharged.

3.Packing Lists

Item	Quantity	Description
Thermal Imager	1	
Lens	1	Field of view =21°x15.8°; f=9mm
Li-ion Battery	1	3.7V, 2600mAH
Adaptor	1	Input AC Volts: 100V~240V, 50/60Hz, 0.3A Output DC Volts: 5V, 2400mA
Micro SD	1	8Gbyt
USB Cable	1	
USB OTG Cable	1	
Non-Slip Strap	1	
User Manual	1	
Warranty Card	1	
PC Software Installation CD	1	
Gift Box & Carrying Case	1	

4.Specifications

Imaging and Optical Data	
Field of View (FOV)/Minimum Focus Distance	General: 21°x 15.8°/0.5m (9mm)
	Wide-Angle Type: 17°x12.6°/0.5m (7.5mm)
	Long Focal Length Type: 8°x6°/0.5m (19mm)
Spatial Resolution (IFOV)	General: 1.89mrad (9mm)
	Wide-Angle Type: 2.26mrad (7.5mm)
	Long Focal Length Type: 0.89mrad (19mm)
Thermal Sensitivity/NETD	< 0.1°C at 30°C (86°F)/100mK
Image Frequency	50Hz
Focus Mode	Manual
Zoom	1-32x continuous, Digital zoom
Focal Length	9mm, Optional 7.5mm/19mm
Focal Plane Array (FPA)/Spectral Range	Uncooled microbolometer/8-14μm
IR Resolution	160x120 pixels
Image Presentation	
Display	2.8 in. LCD, 240x320 pixels
Image Modes	IR image, Visual image, Image Fusion
Color Palettes	IRON, Rainbow, Grey, Grey Inverted
Measurement	
Object Temperature Range	-20 to 150°C (4 to 302°F)
	0 to 350°C (32 to 662°F)
	0 to 650°C (32 to 1202°F) High Temperature Model
Accuracy	±2°C (3.6°F) or ±2% of reading (Environment Temperature 10°C to 35°C, Object Temperature >0°C)
Measurement Analysis	
Spot	Center Spot
Automatic Hot/Cold Detection	Auto Hot or Cold markers
Emissivity Correction	Variable from 0.01 to 1.0
Measurement Corrections	Emissivity, Reflected Temperature
Storage of Videos	
Storage Media	8Gbytes Micro SD card
Video Storage Format	Standard MPEG-4 encode, 1280x960 at 30fps, on memory card >60 minutes
Video Storage Mode	IR/Visual images; Simultaneous storage of IR and Visual images

Storage of Images

Image Storage Format	Standard JPEG, including measurement data, on memory card > 6000 pictures
Image Storage Mode	IR/Visual images; Simultaneous storage of IR and Visual images

Set-Up

Laser	<Class2
Set-Up Commands	Local adaptation of units, Language, Date and Time formats, Information of camera
Languages	Multinational

Digital Camera

Built-in Digital Camera	5 Megapixels
Built-in Digital Lens Data	FOV 59°

Data Communication Interfaces

Interfaces	USB-mini, Audio, HDMI
USB	Data transform between camera and PC
	Live video between camera and PC
Video Out	HDMI

Power System

Battery	Li-ion battery, 4 hours operating time
Input Voltage	DC 5V
Charging System	In camera (AC adapter)
Power Management	Automatic shutdown

Environmental Data

Operating Temperature Range	-15 to 50°C (5 to 122°F)
Storage Temperature Range	-40 to 70°C (-40 to 158°F)
Humidity (Operating and Storage)	10% to 90%
Drop Test	2m
Bump	25g (IEC60068-2-29)
Vibration	2g (IEC60068-2-6)

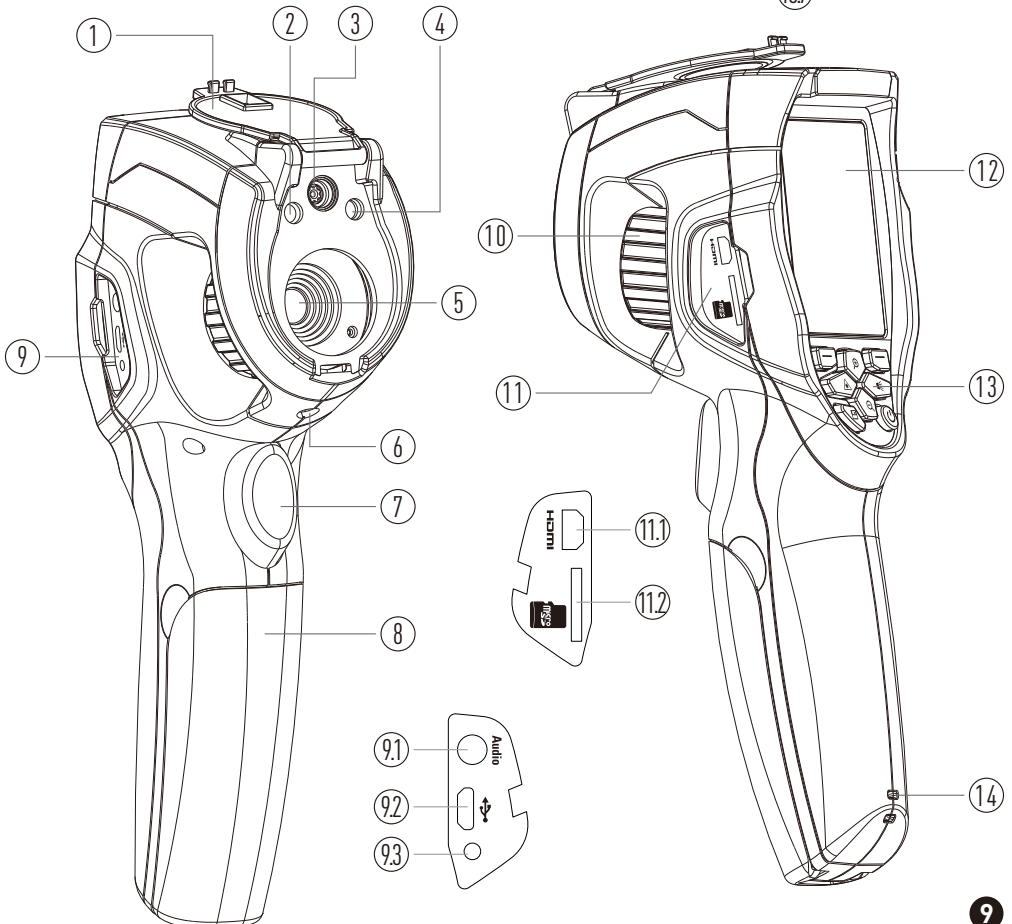
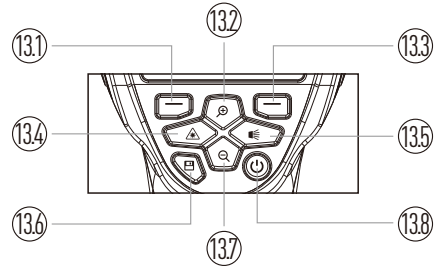
Physical Data

Camera Weight, incl. Battery	<500g
Camera Size (LxWxH)	224x77x96

5. Structure Description

- | | |
|---|---|
| 1-Infrared Camera Lens Cover | 10-Lens Focus Adjuster |
| 2-LED Light | 11-Interface |
| 3-Visual Camera | 11.1-HDMI Output |
| 4-Laser Pointer | 11.2-Micro SD Card |
| 5-Infrared Camera Lens | 12-LCD Display |
| 6-Hole for Tripod Insertion | 13-Buttons |
| 7-Trigger | 13.1-Menu/Select Button |
| 8-Battery Box | 13.2-Up/Zoom Out Button |
| 9-Interface | 13.3-Lock/Close Button |
| 9.1-Audio/Microphone | 13.4-Left /Laser Button |
| 9.2-USB Cable Connection/
Charger Input Terminal | DANGER: Avoid eye or skin
exposure to direct or scattered
radiation. |
| 9.3-Charge Light | |

- | |
|-----------------------------|
| 13.5-Right/Light Button |
| 13.6-Files Browse Button |
| 13.7-Down/Zoom in Button |
| 13.8-Power Button |
| 14-Holes for Non-Slip Strap |








6.Before You Start

7.1.How to Charge the Battery

8.Before you use the Thermal Imager for the first time, charge the battery for a minimum of one and one-half hours.

9.The battery status shows on the four-segment charge indicator.

10.To charge the battery, use follow before:

- 1.Connect the ac power adapter into an ac wall outlet and connect the dc output to the Thermal Imager's ac power socket, the charge light is on.
- 2.The battery indicator becomes “ →  →  → ”, while the battery charges with the ac power adapter.
- 3.Charge until the charge indicator become “”, the charge light is off .
- 4.Disconnect ac power adapter when the battery is full charged.

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

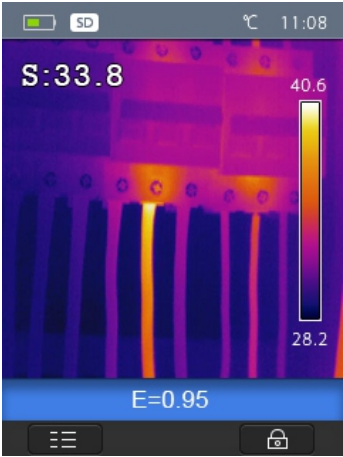
6-2.Power On and Off

- 5.To turn the Thermal Imager on, push the **Power** “” Button.
- 6.When Thermal Imagers power on, push and hold the **Power** “” Button for two seconds, turn the Thermal Imager off.

Note: 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 if the most accurate temperature measurement is very important to your application.

6-3.Desktop

The Desktop is as follow:



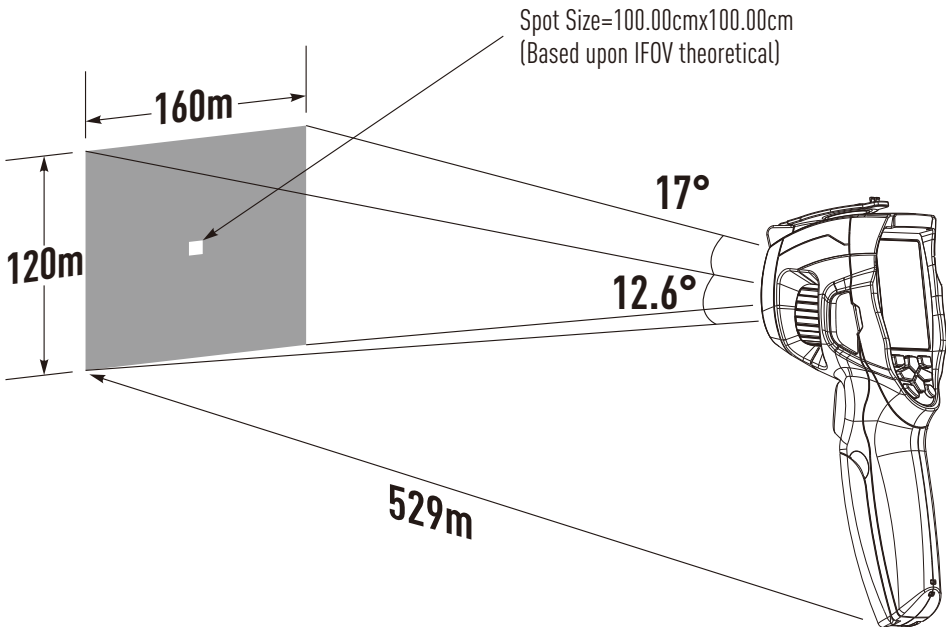
6-4. Lens

- The Thermal Imager has a Lens.
- **FOV** is the largest area that your imager can see at a set distance.
- This table lists the horizontal FOV, vertical FOV and IFOV for lens.

Focal Length	Horizontal FOV	Vertical FOV	IFOV
9mm	17°	12.6°	1.89mrad

- **IFOV** (Instantaneous Field of View) is the smallest detail within the FOV that can be detected or seen at a set distance, the unit is rad, The formula is this: **IFOV=(Pixel Size)/(Lens focal length)**.
- **D:S theoretical** (=1/IFOV theoretical) is the calculated spot size based on the pixel size of the Thermal Imager detector array and lens focal length.

Example: If Thermal Imager uses 9mm lens, because the Pixel Size of detector is 17μm, Horizontal FOV is 17°, Vertical FOV is 12.6°, the IFOV is 17μm/9mm=1.89mrad; D:S theoretical (=1/ IFOV theoretical)=529:1.



- **D:S measure** (=1/IFOV measure) is the spot size needed to provide an accurate temperature measure.
- Typically D:S measure is 2 to 3 times smaller than D:S theoretical, which means the temperature measurement area of the target need to be 2 to 3 times larger than that determined by the calculated theoretical D:S.

Note: IFOV theoretical represents the smallest objects that the thermal imager can detect or see. IFOV measure represents the smallest object form which an accurate temperature can be measured by the thermal imager.

6-5.Focus

- To adjust focus, clockwise or Anti-clockwise rotates the IR Lens.
- When target comes into focus, it shows a sharper image.
- When the target moves out of focus, the thermal image becomes blurry.

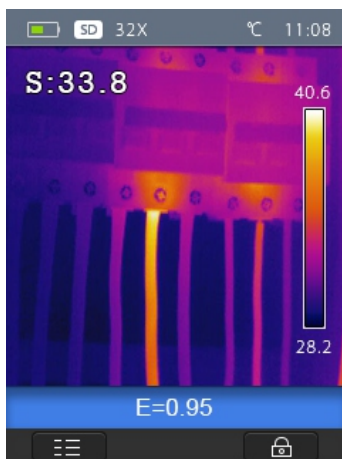
Note: Correct focus is important in all imaging applications. Correct focus makes sure that the infrared energy is correctly directed onto the pixels of the detector. Without the correct focus, the thermal image can be blurry and the radiometric data will be inaccurate. Out-of-focus infrared images are frequently unusable or of little value.

6-6.Shutter



- To get a clear thermal image, the Thermal Imager needs to self calibrate.
- The Thermal Imager has two modes for self correcting, Manual and Auto mode.
- In Manual Mode, hold down the arrow button, the Thermal Imager will self correct.
- In Auto Mode, the Thermal Imager can correct automatically if the image of the camera becomes blurry.

6-7.Zoom



- Thermal Imager offers 1-32x continuous zoom functions.
- In desktop, press the up button, image zoom out 10%, holding down will continue to zoom out.
- In desktop, press the down button, image zoom in 10%, holding down will continue to zoom in.
- When zoom in or zoom out, the zoom factor “1X” displays in the upper status bar.



6-8.LED Light

- In desktop, press the **Right** “” Button and hold about 2 seconds, the LED light is on.
- In desktop, press the **Right** “” Button and hold about 2 seconds again, the LED light is off.

6-9.Laser

- In desktop, press the **Left** “” Button and hold about 2 seconds, the laser is on.
- In desktop, press the **Left** “” Button and hold about 2 seconds again, the laser is off.

6-10.Temperature Measurement

- All objects radiate infrared energy.
- The quantity of energy radiated is base 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 very good at radiating energy and it is easy to get relatively accurate measurements.
- For surfaces that are good at radiating energy (high emissivity), the emissivity factor is ≥ 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.
- To more accurately measure materials with a low emissivity, an emissivity correction is necessary.
- Adjustment to the emissivity setting will usually allow the Thermal Imager to calculate a more accurate estimate of the actual temperature.
- More information please see Emissivity Adjustment to get the most accurate temperature measurements.

6-11.Emissivity Adjustment

- The correct emissivity value is important to make the most accurate temperature measurement.
- Emissivity of a surface can have a large effect on the apparent temperatures that the Thermal Imager observes.
- Understanding the emissivity of the surface, but may not always, allow you to obtain more accurate temperature measurements.

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

- Emissivity is set directly as a value or from a list of emissivity values for some common materials.
- The global emissivity displays in LCD Screen as $E=x.xx$.

6-12.Emissivity Values

Material	Emissivity
Water	0.96
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

Material	Emissivity
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

6-13.Reflected Temperature

- Using the offset factor, the reflection is calculated out due to the low emissivity and the accuracy of the temperature measurement with infrared instruments is improved.
- In most cases, the reflected temperature is identical to the ambient air temperature.
- Only when objects with strong emissions with much higher temperature are in the proximity of the object being measured should be determined and used.
- The reflected temperature has only little effect on objects with high emissivity.
- The reflected temperature can be set individually.
- Follow these steps to get the right value for the reflected temperature.
 - 1.Set the emissivity to 1.0.
 - 2.Adjust the optical lens to near focus.
 - 3.Looking in the opposite direction away from the object, take a measurement and freeze the image.
 - 4.Determine the average value of the image and use that value for your input of reflected temperature.

6-14.Thermal Imager Reporter Software

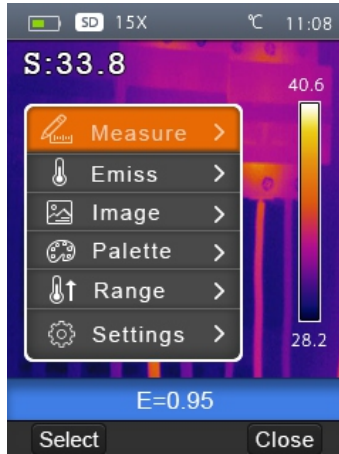
- Thermal Imager Reporter software is supplied with the Thermal Imager.
- This Software is intended for Thermal Imager and contains feature to analyze images, organize data and information, and make professional reports.
- Thermal Imager Reporter software allows audio annotations and commentary to be reviewed on a PC.

7. Menus

The menus, together with buttons, are used for image, measurement, Emiss, Palette, temperature measurement range, taking photo and video, review, and settings.

7-1. Main Menu

Main Menu is the main interface of the Thermal Imager's menus. It contains six items such as Measure, Emiss, Image, Palette, Temperature measurement range, Settings.



- **Measure:** Set for the calculation and display of radiometric temperature measurement data related to the thermal images.
- **Emiss:** Setting the materials type and the emissivity of the measured object, you can also set the environment reflected temperature.
- **Image:** Set image source for the display on the Thermal Imager's LCD, it contains six items such as infrared image, visual image and fusion.
- **Palette:** Set the type of colour bar.
- **Range:** Set the temperature measurement range.
- **Settings:** Set for the user preferences such as language, unit of temperature measurement, date, time, restore factory setting and display product information.

7-2. Image Mode


1. In main menu, press **"Up"** and **"Down"** Button, highlight **"Image"**.
2. Press **"Select"** Button, popup **"Image"** submenu which contains Infrared Image, Visual Image and Fusion.
3. Press **"Up"** and **"Down"** Button, highlight the Image mode which you want to choose.
4. Press **"Select"** to confirm, **"Close"** to exit without change.



5. Thermal Imager has 4 kinds of image modes for display: IR, Visible, IR_Mix_VIS, AUF mode.

- **IR**: Displays only infrared image;
- **Visible**: Displays only visible image;
- **IR_Mix_VIS**: Display fusion image of infrared and visible images.
- **AUF**: Auto Fusion mode, compare the centre area temperature with full screen, the machine will calculate the mix ratio of infrared and visible images automatically.



6. Press “” key to enter lock mode of AUF, the lock mode of AUF is to help users to find the temperature they are interested, users can set the temperature manually and the selected temperature range is coloured with palette, the other temperature will be displayed with visible camera.

7-3. Image Palette

7. The Image Palette lets you change the false-colour presentation of the infrared images on display or captured.

8. A variety of palettes are available for specific applications.

9. The standard palettes offer an equal, linear presentation of colors that allow for best presentation of detail. **Standard Palette**

1. In main menu, press “**Up**” and “**Down**” Button, highlight “**Palette**”.

2. Press “**Select**” Button, popup the Image palette submenu, it shows four kinds of palettes, they are IRON, Rainbow, Grey, GreyInverted.

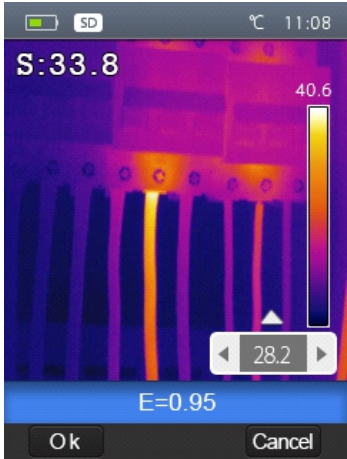
3. Press “**Up**” and “**Down**” button, highlight the palette which you want to choose.

4. Press “**Select**” Button to select palette, press “**Close**” Button to return.



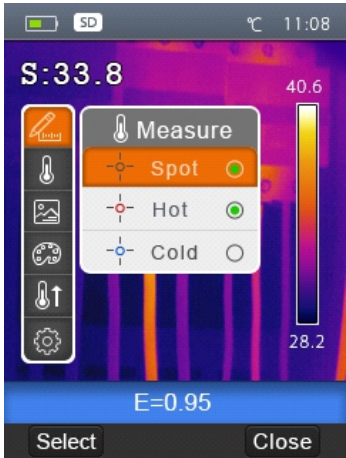
7-4.Image Adjustment

- There are two kinds of mode for image adjustment, Auto and Manual.
- Press right function button to change mode, “ ” means Manual, “ ” means Auto.
- Auto: Level and span are determined by the thermal image of minimum temperature and maximum temperature.
- Manual: Level and span are determined by the manual values, which decide by “Max Temp” and “Min Temp”.
- Hold down right function button to display menu for adjusting “Max Temp” and “Min Temp”.
- Press **Left** Button to decrease value, press **Right** Button to increase value, press **Up** Button or down button to switch “Min Temp” and “Max Temp”, press “Ok” to confirm, press “Cancel” to exit without change.



7-5.Measurement Menu

- In the main menu, highlight “Measure” and press “Select” Button, popup Measure submenu which contains Spot, Hot, Cold.



- Spot: Measures the centre point temperature.
- Hot: Captures the maximum temperature.
- Cold: Captures the minimum temperature.
- Press **"Select"** to select Spot, Hot, Cold to open the corresponding point of the temperature measurement, the icon "●" means to open corresponding point measurement, the "○" icon means to close corresponding point measurement.

7-6.Object Parameter Menu

In the main menu, pressing **"Up"** and **"Down"** Buttons, highlights **"Emiss"**, press **"Select"** Button, object parameter submenu appears.



7-6-1.Emissivity

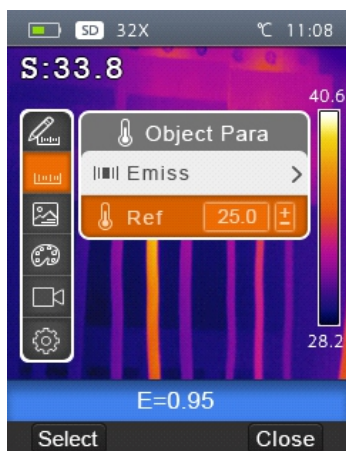
- In Object parameter submenu, pressing **"Up"** and **"Down"** Buttons, highlights **"Emiss"**, press **"Select"** Button, emissivity submenu appears.
- **"Emiss"** sets object emissivity, the value range is 0.01 to 1.00.



7-6-2. Reflective Temperature

- The reflective temperature is important for radiometric temperature measurement, The Thermal Imager has temperature compensation for reflective temperature.
- To get more accurate temperature measurement, accurately set the reflective temperature.
- In most cases, the reflected temperature is identical to the ambient temperature, only when objects with strong emissions with much higher temperature are in the proximity of the object being measured, the reflected temperature must set.

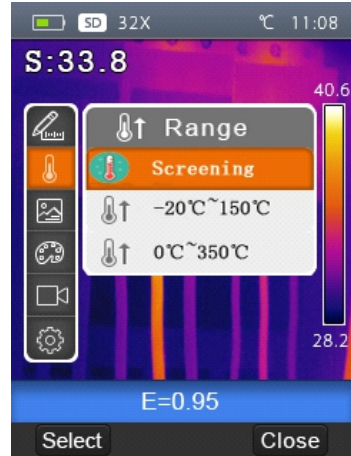
1. In Object parameter submenu, press “Up” and “Down” Button, highlight “Ref”.
2. Press “Select” Button, the reflective temperature will be modified.
3. Press “Up” and “Down” Button to modify the Reflective temperature.
4. Press “Select” to confirm, “Close” to exit without modifying.



7-6-3. Temperature Ranges

- The temperature measurement ranges have “Screening mode”, “-20 to 150°C” and “0 to 350°C”.
- The overlap temperature of the two ranges is more accurate “-20 to 150°C”.

1. In the main menu, press “Up” and “Down” Button, highlight “Range”.
2. Press “Select” Button, temperature ranges submenu appears.
3. Press “Up” and “Down” Button, highlight the Range which you want to select.
4. Press “Select” to confirm, “Close” to exit without change.



7-7. Settings Menu

1. In main menu, press “Up” and “Down” Button, highlight “Settings”.
2. Press “Select” Button, popup Settings submenu, two pages in setting submenu.
3. Press “Left” and “Right” Button, switch the page which you want to choose, press “Up”, “Down” Button, highlight the setting item.
4. Press “Select” Button to entry into setting item, “Close” to exit setting submenu.



7-7-1.Language

1. In settings submenu, press "Up" and "Down" Button, highlight "Language".
2. Press "Select" Button, popup language submenu.
3. Press "Up", "Down", "Left" and "Right" Button, highlight the language which you want to choose.
4. Press "Select" Button to confirm, "Close" to exit without change.



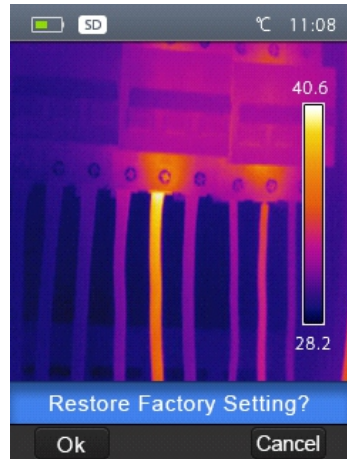
7-7-2.Temperature Unit

1. In Settings submenu, press "Up" and "Down" Button, highlight "Temp. Unit".
 2. Press "Select" Button, popup Temperature Unit submenu.
 3. Press "Up" and "Down" Button, highlight the temperature unit which you want to choose.
 4. Press "Select" to confirm, "Close" to exit without change.
- Temperature Unit have three types to choose: °C, °F and K.
 - Conversion relationship: $^{\circ}\text{F} = 1.8 \times ^{\circ}\text{C} + 32$, $\text{K} = 273.15 + ^{\circ}\text{C}$.



7-7-3.Factory Set

- 1.In Settings submenu, press “Up” and “Down” Button, highlight “Factory Set”.
- 2.Press “Select” Button, popup “Factory Set” submenu.
- 3.Press “OK” to restore factory setting, “Cancel” to exit without change.



- Factory Settings of the Thermal Imager is as follow:

Item	Parameter	Value
Measurement	Center Spot Measurement	Off
	Hot Spot Measurement	Off
	Cold Spot Measurement	Off
Measurement Parameters	Emissivity	0.95
	Reflective temperature	25°C
Image	Mode	Infrared
	Palette	Iron
	Adjustment	Auto
System Setting	Language	English
	HDMI Output	Off
	Laser	Off
	Lamp	Off

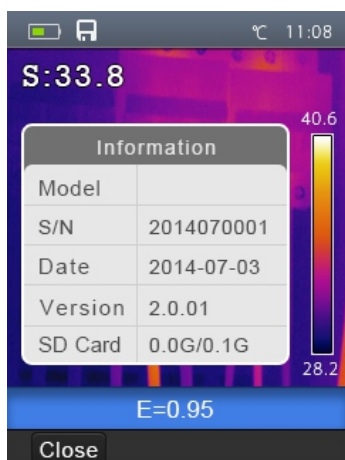
7-7-4.Set Time

- 1.In Settings submenu, press “Up” and “Down” Button, highlight “Set time”.
- 2.Press “Select” Button, popup “Set time” submenu.
- 3.Press “Left” and “Right” Button, highlight the item which you want to choose.
- 4.Press “Up” and “Down” Button, modify the value of the selected item.



7-7-5.Information

- 1.In Settings submenu, press “Up” and “Down” Button, highlight “Information”.
- 2.Press “Select” Button, popup “Information” submenu.
- 3.Press “Close” key return to desktop.



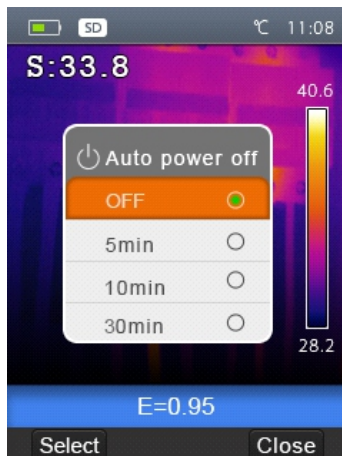
7-7-6.Alignment

- 1.In Settings submenu, press “Up” and “Down” Button, highlight “Alignment”.
- 2.Press “Select” Button, popup “Alignment” submenu.
- 3.Press “Up” and “Down” Button, highlight the item which you want to choose.
- 4.Press “Select” to confirm, “Close” to exit without change.



7-7-7.Power Off

- 1.In Settings submenu, press “Up” and “Down” Button, highlight “Auto power off”.
 - 2.Press “Select” Button, popup “Auto power off” submenu.
 - 3.Press “Up” and “Down” Button, highlight the item which you want to choose.
 - 4.Press “Select” to confirm, “Close” to exit without change.
- The Thermal Imager will shut down after shut down time of inactivity.
 - There are 5 minutes, 10minutes, 30 minutes to select for setting shut down time.
 - “OFF” means to never shut down.



7-7-8.Volume

- 1.In Settings submenu, press "**Up**" and "**Down**" Button, highlight "**Volume**"
- 2.Press "**Select**" Button, popup Volume submenu.
- 3.Press "**Left**" and "**Right**" Button, change the volume level.
- 4.Press "**Select**" to confirm, "**Close**" to exit without change.



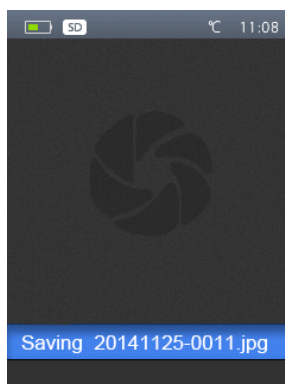
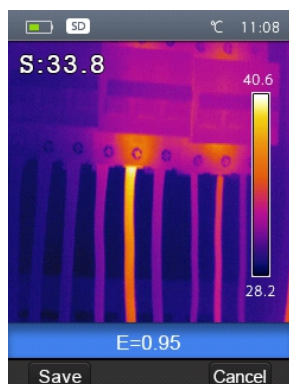
7-8.Camera Menu

- Thermal Imager has photo and video functions, in photo function, the Imager can save thousands of images.
- Every image resolution is 1280x960, format is ".jpg", and stores infrared data and visible data in an image.
- In video function, the Imager has ".mp4" video capture for hours, and save infrared data in .mp4 format.

Note: Images and video files are stored in SD Memory Card. Images can easily be read and second analyzed within Thermal Imager PC software.

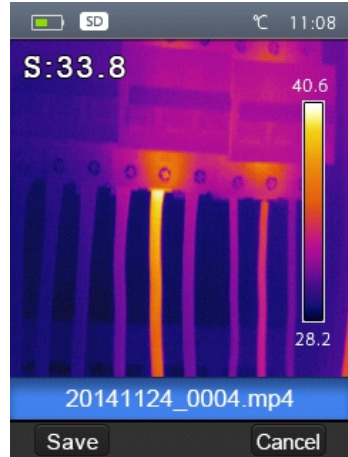
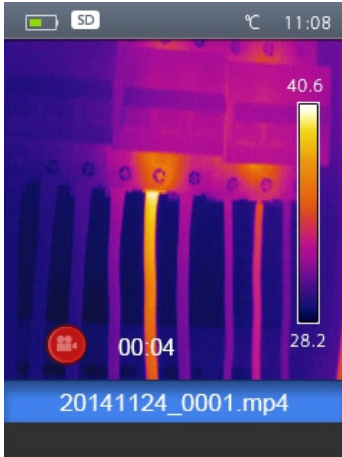
7-8-1.Save Image

- 1.In desktop, press Trigger Button, freeze an image.
- 2.Press "**Save**" key save image, and show the file name saved, press "**Cancel**" return desktop without saving image.



7-8-2.Video Menu

- 1.In desktop, press Trigger button and hold for about 2 seconds, start video capture with voice.
- 2.Insert earphone with microphone, voice can be recorded too.
- 3.To stop video capture, press Trigger button again.
- 4.Press **"Save"** key, the video saved in the video file, press **"Cancel"** key, stop video capture without saving file.



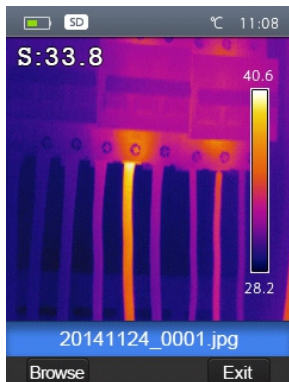
7-8-3.Files Browser

In desktop, press **"Files Browse"** Button, popup files Browser, which displays images and videos saved in SD Memory Card.



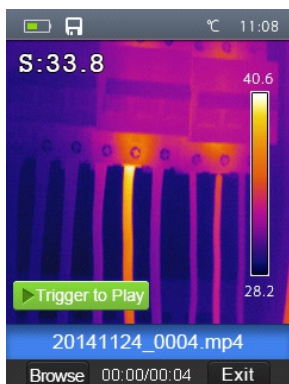
7-8-4.Open an Image

- 1.Press "**Up**", "**Down**", "**Left**" and "**Right**" Button, highlight an image which you want to choose.
- 2.Press "**Open**" key to open an image.
- 3.Press "**Up**" Button to zoom out, "**Down**" Button to zoom in.
- 4.Press "**Left**" Button to open previous image, press "**Right**" Button to open next image.
- 5.To return files browser, press "**Browse**" key.
- 6.To return desktop, press "**Files browse**" Button again or press "**Exit**" key.



7-8-5.Play a Video

- 1.Press "**Up**", "**Down**", "**Left**" and "**Right**" Button, highlight a video which you want to choose.
- 2.Press "**Open**" key entry player interface.
- 3.To hear voice, Insert earphone with microphone.
- 4.To play a video, press "**Trigger**" Button.
- 5.To return files browser, press "**Browse**" key.
- 6.To return desktop, press "**Files browse**" Button again or press "**Exit**" key.



7-8-6.Delete a File or All Files

- 1.Press "**Up**", "**Down**", "**Left**" and "**Right**" Button, highlight an image and a video which you want to choose.
- 2.Press "**Option**" key, popup "**Option**" submenu.
 - 2-1.Press "**Up**" and "**Down**" Button, highlight "**Delete**", press "**OK**" key Delete the selected file.
 - 2-2.Press "**Up**" and "**Down**" Button, highlight "**Delete all**", press "**OK**" key Delete all file.
 - 2-3.Press "**Up**" and "**Down**" Button, highlight "**Exit**", press "**OK**" key return desktop.
 - 2-4.Press "**Close**" return files Browser.



7-8-7.USB Mode

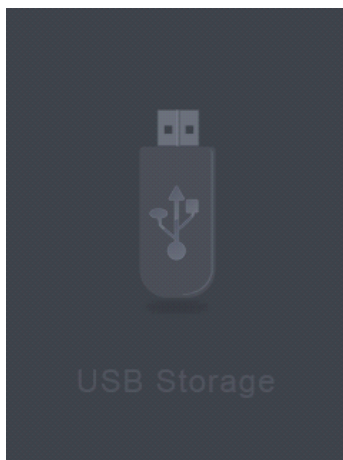
- Connect USB cable to device, popup the menu as follow:



- There are two modes for USB, Storage and PC Camera, press "**Up**" or "**Down**" Button to switch mode.

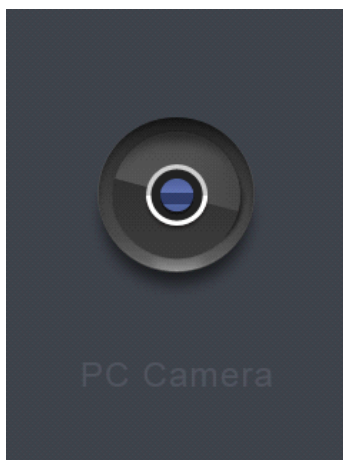
1.Storage

- Browse files stored on the SD card on your computer.
- If select Storage mode, will display a picture as follow:



2.PC Camera

- The device is a USB camera for your computer.
- If select this mode, will display a picture as follow:



7-8-8.HDMI Output

- The video output available in the Thermal Imager enables displaying the thermal image(not includes operator menu) on an external monitor or video recording device capable of managing HDMI systems.
- To connect the Thermal Imager, proceed as follows:
 - 1.Connect the Thermal Imager to the external HDMI monitor or recording device using the HDMI video cable provided.
 - 2.Turn on the external HDMI monitor or device.
 - 3.Power on the Thermal Imager.
 - 4.With the image displayed on the external HDMI monitor or device, the thermal imager's display works simultaneously.
 - 5.Once the operations on the external device are finished, Switch off the extern device and disconnect the HDMI video cable from the thermal imager.

8.Fault Diagnosis and Exclusion

- If you encounter any problems while using the thermal imager, refer to the following table.
- If the problem persists, disconnect the power and contact technical support.

Type of Fault	Cause of the Fault	Solution
Thermal imager cannot start	No battery	Inserting the battery
	No power	Replace the battery or charge it
Thermal imager shut down	No power	Replace the battery or charge it
No Thermal image	The lens cap cover	Opened the lens cap
No Thermal image	The lens cap cover	Opened the lens cap

9.Android/iOS APP Thermview Pro

9-1.Software Install and Uninstall

9-1-1.System Required

Android mobile phone: Android 4.0 above, with USB OTG Support

iOS: iPhone4 above

9-1-2.Thermview Pro App Install

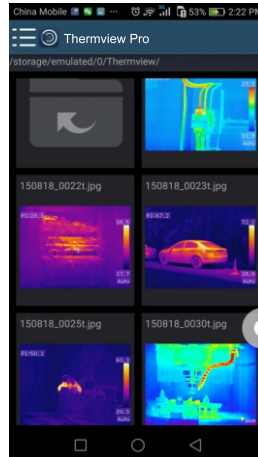
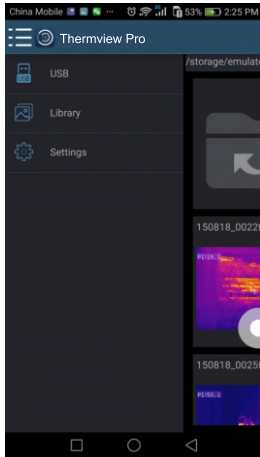
Android: Search “**Thermview Pro**” on Google Play and install it.

iOS: Search “**Thermview Pro**” on Apple Store and install it.

9-2.Thermview Pro Function

9-2-1.Import Pictures

- 1.Enable WiFi function on the thermal device.
- 2.Connect the smart phone to the thermal device through the WiFi.
- 3.Download the IR pictures from the thermal imager directly or get the realtime video stream.
- 4.View and analyse the thermal image.







9-2-2.Analyse

Select a IR Picture and click “” icon to analyse it.



1.Image Mode

Click “” icon to select image mode, there are four mode for you to select.

- (1)  IR Mode: only infrared picture displayed.
- (2)  Visible Mode: only visible picture displayed.
- (3)  IR Fusion Mode: The infrared picture is fusioned with visible picture.
- (4)  Visible Fusion Mode: full screen fusion, the visible picture is fusioned with infrared picture.

2.Colorbar Select




Click “” icon to select colorbar, there are eight colorbar for you choice.



3. Analyse

Click “” icon to analyse the IR pictures, there are three analyse tools.



- (1)  Point Analyse: Add a point to the picture, it will display the temperature of the point.
- (2)  Line Analyse: Add a line to the picture, it will display the highest, lowest and average temperature of the line.
- (3)  Area Analyse: Add a rectangle to the picture, it will display the highest, lowest and average temperature of the rectangle.

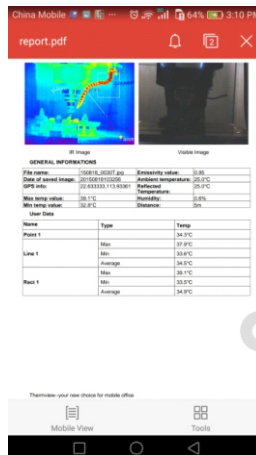
4. Save and Exit

Click “” to save and return to the main page of the APP.

9-2-3. Report and Share

1. Report

Click “” icon to report as a “.pdf” file.



2.Share

Click “” icon to share the Infrared picture with Email, Cloud or Message and so on.



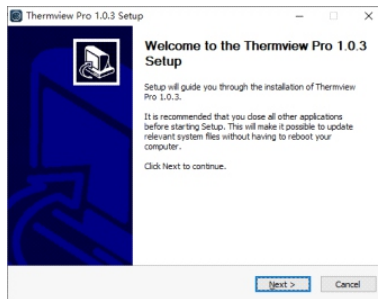
10. PC Software

10-1. System Required

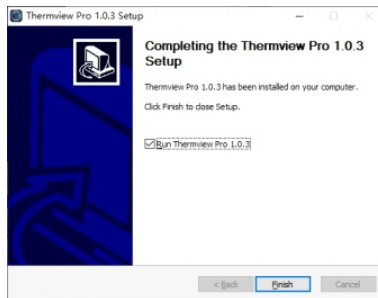
- Window 10 or higher version of Windows system.
- Please make sure you have installed Net Framework 4.6 when you install Thermview Pro software.
- If not, please find and install our Microsoft.NET_Framework_v4.6.exe that provided to you .
- Ppen the net framework 4.6, Follow all tips to install Net Framework 4.6 till it finishes.
- If your system already have installed Net Framework 4.6, then no need to install again.

10-2. Thermview Pro Install

- You can insert your installation CD to install directly if you have one, or you can run "setup.exe" to install it as follow.
- Click "Next" to install, till finish installation.

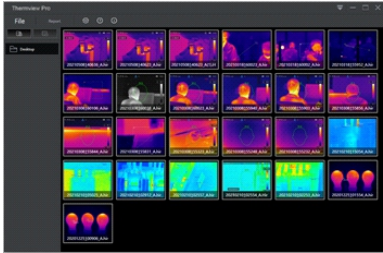


- Installation Successful after click "Finish" like above.



10-3. Running

After ensuring Thermview Pro software has been installed, click shortcuts on the desktop to run the software.



10-4. Uninstall

- Uninstall Thermview Pro in the Installation directory as follow.
- Run “uninst.exe” and then click “YES” to start to uninstall, and finally choose whether to reboot the computer.

