Instruction Manual

MTiB12

Thermal Imager

Contents

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1. Introduction

The MTiB12 Thermal Imager is a handheld thermal imaging camera used for measuring body temperature, predictive maintenance, equipment troubleshooting, and verification. Thermal images are displayed on the LCD display and can be saved on the internal memory. With Bluetooth and an instant share function, the thermal images can be transferred to one's smart phone to analyse, share and perform quick reporting.

1.1.Key Features

- 80x80 pixel thermal imaging system
- 6400 points real temperature fast measurements
- Screening temperature mode 32 - 42°C
- Measuring Accuracy: ±0.5°C
- Thermal sensitivity : <0.1°C | 300°C / 100mK
- Hot, Cold, Centre three temperature tracking function
- Large, easy-to-read, bright graphical TFT display
- 50Hz fast Thermal image frame rate
- Bluetooth image instant share & save with iOS and Android smart device
- Scene temperature range Lock function.
- With LED flashlight function
- Long running time up to 8 hours with rechargeable battery.
- Smart and compact design
- Rugged industrial design

2. Safety

2.1. Safety Information

This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.

2.2. Cautions

- Improper use can damage the meter. Please read and understand all the information provided in this User Guide and other included documentation before use.

3. Quick Start Guide

3.1. Basic Step

The thermal imager is intuitive and easy to use. Here are the basic steps (covered in more detail later in this Guide):

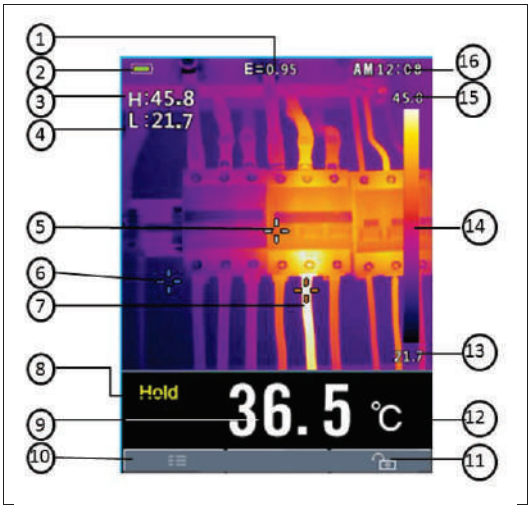
1. Hold the Power button for more than 2 seconds to power ON. The logo start-up screen will appear followed by the thermal image display. If the battery requires recharging, refer to Section 3.2 below.
2. Point the unit toward the area or object of interest and view the thermal image. Relative temperature is represented by colour, hot to cold (light to dark, respectively). The IR Temperature reading represents the temperature of the spot targeted by the Crosshairs, at the same time the hot and cold point temperature will be displayed on the screen.
3. Pull the trigger to freeze/capture the image. Press “OK” to save the image or press “SHARE” to share the image with smart devices. Pull again to discard the image.
4. Press “LOCK” to Lock current science temperature range, Press “LOCK” again to discard.

3.2. Powering and Charging the Thermal Imager

1. Hold the power button for more than 2 seconds to switch ON the unit. A start-up screen (a Thermal Imager) will appear. The unit is now ready to use; to switch OFF, hold the power button for more than 2 seconds. Note that the Auto Power OFF function switches the unit OFF automatically after a programmed period of time.
2. When the power is ON, the battery status icon is located at the top left of the display. When the battery power is low, connect to an AC source or a computer USB port using the supplied USB cable (USB port is located at top of the unit).
3. When the power is OFF, the battery charging Red LED is ON when connected to an AC source or connected to a computer USB port. If the Red LED is off, the battery is full.
4. The unit can also be powered up and in use while charging in which case the battery symbol is animated on the full screen

3.3. The IR Thermal Imaging Display

(1) Current Emissivity setting
(2) Battery indicator
(3) Hot temperature point reading
(4) Cold temperature point reading
(5) Centre crosshair
(6) Cold temperature crosshair
(7) Hot temperature crosshair
(8) Image freeze icon
(9) Centre temperature point reading
(10) “OK” button
(11) “LOCK” button
(12) Current temperature unit
(13) Scene Low Temperature
(14) Palette scale
(15) Scene High Temperature
(16) Time clock



3.4. Control Buttons and Trigger

Become familiar with the operation of the control buttons and trigger as described below:

- **POWER/BACK/LOCK BUTTON:** Hold down button for more than 2 seconds to cycle the meter power ON or OFF and press to exit a menu screen. Also used to lock the current scene temperature range (a soft “” button will appear on the display above the button when this option is available).
- **OK/MENU BUTTON:** Press the button to access the Settings Menu, to confirm an edit, and to save an image when prompted (a soft “SAVE” button will appear on the display above the button when this option is available).
- **UP and DOWN NAVIGATION ARROW BUTTONS:** Scroll through the Settings Menu and select a menu item setting.
- **TRIGGER/LED Flashlight:** Press this button to take a snapshot of the current image. Press again to discard image and return to live image mode. Hold down the button to open the LED flashlight. Hold down the button again to close the LED flashlight.

3.5. Measure, Save, Delete, and Review IR Images

- Point the thermal imager toward the object or area of interest.
- Pull the trigger to capture the image press “SAVE” to save image. Press “SHARE” to share the image.
- To review an image, either access the Settings Menu (**see Section 6**).
- To delete images from the internal memory, access the Settings Menu and delete the stored images as described in **Section 6 Settings Menu.**

Warning: All images are deleted when the internal memory is erased.

4. Descriptions

4.1. Front Descriptions

1. TFT Colour Display
2. MENU-OK button
3. UP-Down arrow buttons
4. Lanyard access
5. POWER-BACK button

Back Descriptions

6. LED Flashlight
7. IR Imaging lens
8. Trigger

Top Descriptions

9. Battery Charging LED indicator
10. USB Battery charging interface

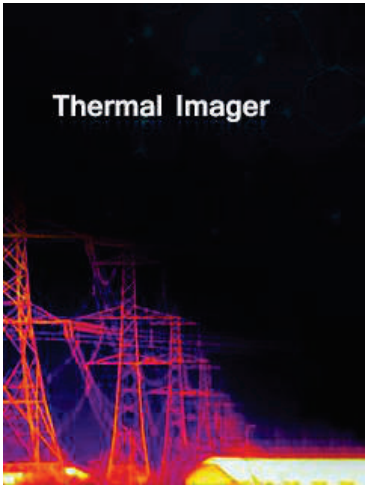
4.2.Display Icon and Indicator Description

°C k °F	Temperature units		Centre crosshair
H:	Max temperature readings		Hot crosshair
C:	Minimum temperature readings		Cold crosshair
Hold	Freezing image icon		Unlock icon
AM	12 time format		Lock icon
	IRON Color palette		Bluetooth icon
:Battery empty : Battery Full : Battery charging			

5. Operation

5.1. Switch ON the Thermal Imager

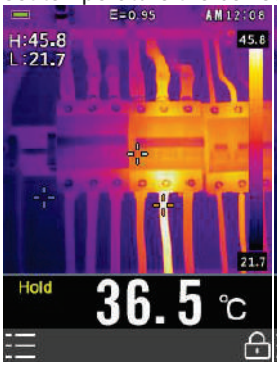
Hold the button down for more than 2 seconds to switch the unit ON. If the unit is sufficiently charged, the meter will display the start-up screen as shown below. The initial displayed image will show until the shutter resets the image. After the start-up period, the unit will show a real time IR thermal image along with an IR Temperature reading. If the meter does not switch ON, please refer to **Section 3.2** Powering and charging the thermal imager for information regarding battery charging.



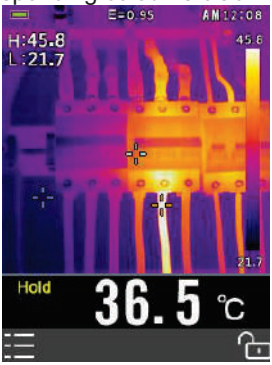
Pic5-1: start logo

5.2. Lock/Unlock SceneTemperature Level-span

The MTiB12 is an 80x80 thermal imager, ideal for measuring object temperature. A temperature range can be set for your current application. If the temperature is higher than your set temperature, the corresponding colour is white. If the temperature is lower than the set temperature the corresponding colour is black.



Pic 5-2: lock mode



pic5-3: unlock mode

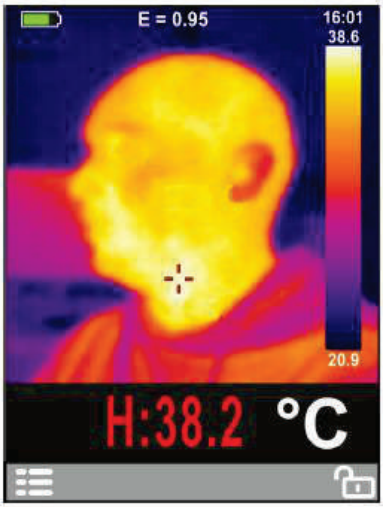
1. Point the unit at an object or an area of interest.
2. Press the “  ” to lock the scene temperature range; the back colour of the temperature readings will turn grey.

3. Press the “  ” button again, it will unlock the set temperature range.

5.3. Screening Mode for Body Temperature Measurement

The unit can work in screening mode for body temperature measurement.

1. Switch “Screening mode” option on in “Measure” menus (see § 6.4).
2. Set the Alarm temperature to appropriate value.
3. Set the Temperature compensation to appropriate value.
4. Switch “Centre Spot” or “Temp Max” on for surface temperature measurement.
5. If surface temperature is higher than the set alarm threshold it will be shown in red in the lower part of the display and the buzzer will sound.



5.4. Capture/Save Images using the Internal Memory

The unit can store 20 images on internal memory. The saved images can be transferred to iOS, android and PC device via the Bluetooth connection.

1. Point the unit at an object or an area of interest.
2. Press the trigger to capture the image, this will freeze the image.
3. If there is no need to save the current image, press the trigger again to unfreeze the image.
4. Press “SAVE” to save the image
5. If the image is stored successfully on the internal memory, the image will automatically unfreeze.
6. To erase/format internal memory please refer to Section 6 Settings Menu.

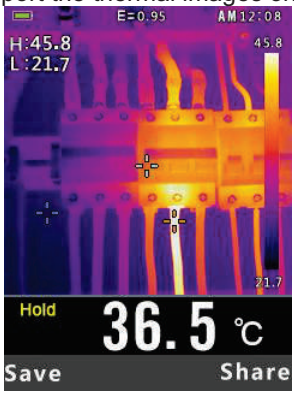
5.5.Share Images using Bluetooth

5.5.1. Instant Share

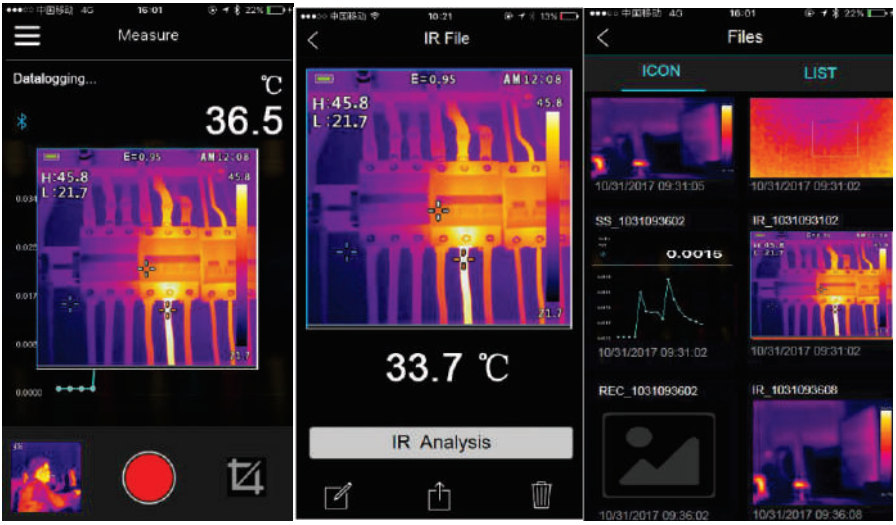
For quick analysing and reporting of the thermal images, the unit has Bluetooth instant share function for iOS, Android and PC devices.

1. Enable the Bluetooth on the thermal imager
2. Run Apps on smart devices, connect unit with smart device or PC (Detailed reference to **Section 6.8 Settings Menu**).
3. Point the unit at an object or an area of interest.
4. Press the trigger to capture the image the image will freeze. And the “hold” icon will be display.

5. If there is no need to keep the current image, press the trigger again to unfreeze the image.
6. Press “SHARE” to transfer the image
7. If the image is transferred successfully to the smart devices, the image will unfreeze.
8. Save, analyse, share or report the thermal images on smart devices.



Pic5_4: Hold the image



Pic5_5: Receive, analyse and save the image

5.5.2. Transfer the Saved Images

1. Enable the Bluetooth on the unit
2. Run Apps on smart devices, connect unit with smart device or PC.
3. To access the Image Review mode, access the Settings Menu (**Section 6-10**) to review and delete images.
4. Press Trigger to share the current picture.
5. Press “SHARE” to transfer the image
6. Save, analyse, share or report the thermal images on smart devices.

5.6. Review / Delete Images

Use the Review Mode to view or delete stored images.

1. To access the Settings Menu (**Section 6-10**) to review and delete images.
2. Press the back button to exit the image review mode
3. To delete all images, please access the Settings Menu as described in Section 6 and reformat the SD card.

5.7. Lens and Imager Field of View

This table lists the horizontal FOV, vertical FOV and IFOV for lens.

Focal Length	Horizontal FOV	Vertical FOV	IFOV
7.5mm	21°	21°	4.53mrad

- **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 34um. Horizontal FOV is 17°, Vertical FOV is 17°, the IFOV is

34um/7.5mm = 4.53mrad;

$D:S_{theoretical}$ (= 1/ $IFOV_{theoretical}$) = 220:1

$D:S_{measure}$ = $D:S_{theoretical}/3$ = 74:1

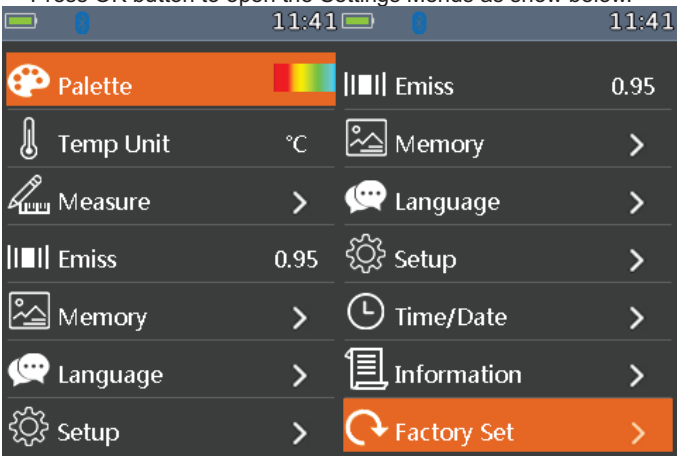
$D:S_{measure}$ (= 1/$IFOV_{measure}$) is the spot size needed to provide an accurate temperature measure.

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.

6. Settings Menus

6.1. Using Settings Menus

- Press OK button to open the Settings Menus as show below.



- Press UP / DOWN button to select menu item or change the value of current focus item.
- Press OK button to change the selection on the current selected item. Press ESC button to return to the previous menu.
- If want to exit settings menus, press the HOLD button or press the ESC button in the main menu.

6.2. Settings Details

6.2.1. Palette Selection

Thermal imager has five palette selections such as:
Press OK button to select on of display colour palettes.

6.3. Temp Unit

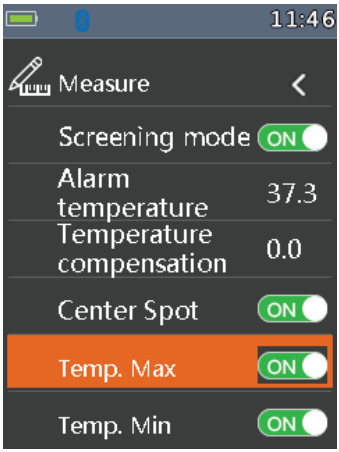
Press OK button to select this option and the colour of option value will change to black ℃. While option is highlighted us the arrow buttons to toggle ℃, ℉ and K, use ESC OK button to exit menu and the colour of option value will change to black K.

6.4. Measure

Press OK button to enter measure menu. Two selections are available: Temp Max and Temp Min. Press OK button to set item on or off.

- Screening mode: This option enables thermal imager to select measure surface temperature.

- Alarm temperature: In screening mode, if surface temperature is higher than alarm temperature, then buzzer alarm will be sounded.
- Temperature compensation: In screening mode, there surface temperature will be compensated.
- Centre Spot: This option enables thermal imager to detect the temperature of centre spot.
- Temp Max: This option enables thermal imager to automatically detect the highest temperature point.
- Temp Min: This option enables thermal imager to automatically detect the lowest temperature point.

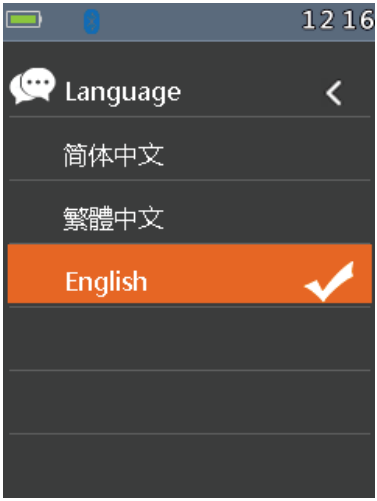


6.5. Emissivity

Press OK button to enter the menu on this option. In selected option, use UP /DOWN button to increase or decrease the emissivity's value, use ESC / OK button to exit menu. The available range is 0.01 to 0.99 in 0.01 steps.

6.6. Language

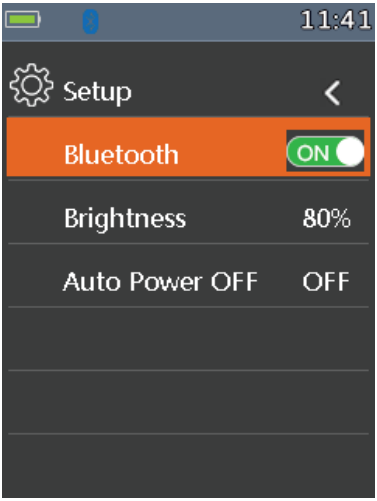
Press OK button to enter language menu. Three options are available: Simplified Chinese, Traditional Chinese and English. Use UP /DOWN button to select language and use OK button to set selected language to be valid.



6.7. Setup

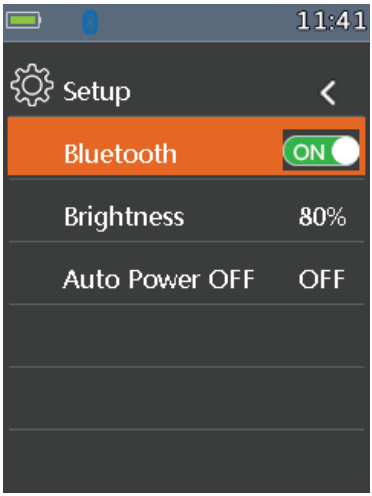
Press OK button to enter set up menu. Three options are available: Bluetooth, Brightness and Auto Off.

- Bluetooth: Use OK button to set Bluetooth power on or off.
- Brightness: Press OK button to select on this option. In this option, use UP /DOWN button to change LCD's brightness, use ESC / OK button to exit menu. The available brightness's range is 100% to 10% in 10% steps.
- Auto Off: Press OK button to select this option. In this option, use UP /DOWN button to choose the time period after which the meter enters the sleep mode.



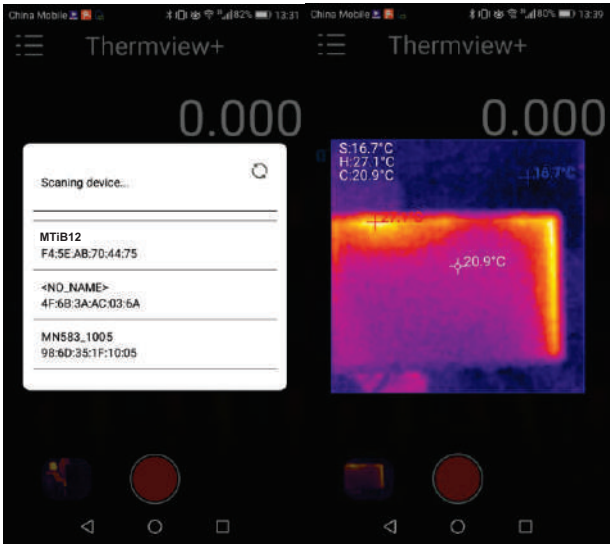
6.8. Bluetooth Connect

1. Turn on the Bluetooth function on the instrument.

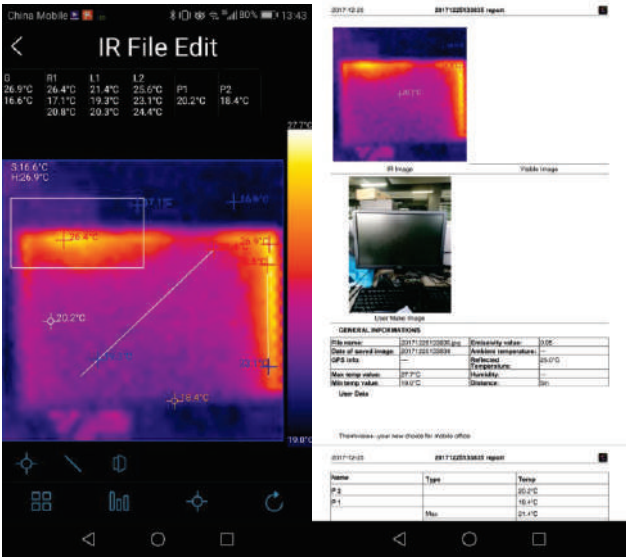


2. Turn on the Bluetooth on smartphone device，press the icon “Thermview+” and enter into the home interface, then press Connect Device icon on the Home interface, Bluetooth device name will appear.

a.



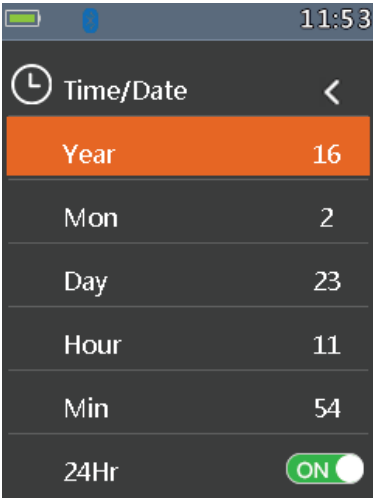
3. Select the device name listed in Bluetooth sheet, it will be connected to the thermview+ App.



- The detail information about Thermview+, please refer to MeterBox Pro APP help file.
- Thermview+ for Android:
  - Please search in Google Play with keyword “Thermview+”, download and run.
- Thermview+ for iOS:
  - Please search in Apple store with keyword “Thermview+”, download and run.

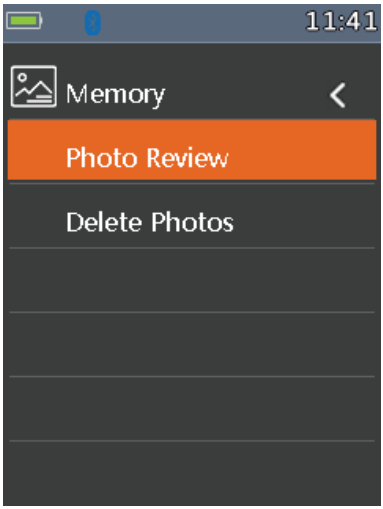
6.9. Time/Date

Press OK button to enter time menu. In this menu, years, month, day, hour, minute and time format can be set. The changes take effect after exiting settings menus.



6.10. Memory

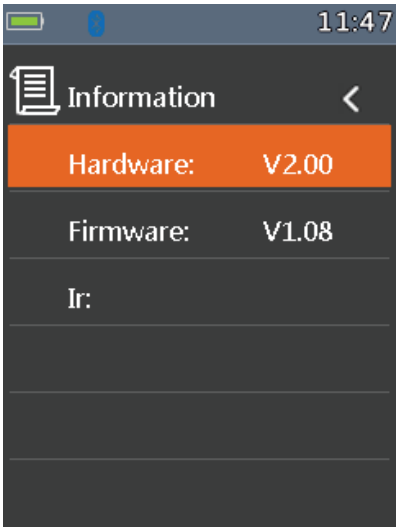
Press OK button to enter memory menu. Two options are available: Photo Review and Delete Photo



- Photo Review: Press OK button to enter image browser function. Use arrows to scroll through saved images and press escape to exit menu.
- Delete Photo: After Press OK button, dialog box will be displayed as show below. Warning: Select 'YES', will delete all the photos in 'RECORD' folder of the memory card.

6.11. Information

- Press OK button to enter system information menu. This menu contains software's version, hardware's version and thermal imager's version.

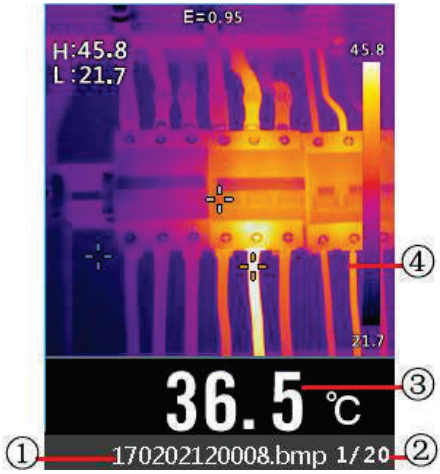


6.12. Factory Set

- When select Factory Set option, after press OK button, the dialog box will be displayed as show below. Select ‘YES' button, system parameter will be reset.

7. Image Browser

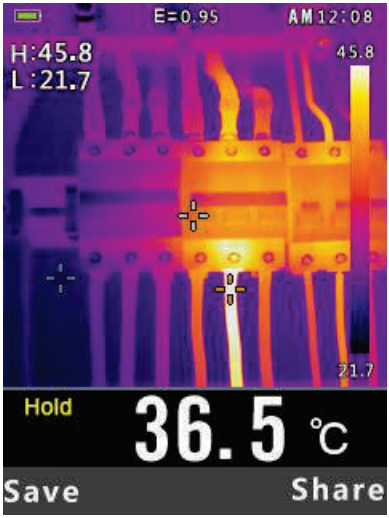
7.1. In Image Browser mode. User can browse the pictures in 'RECORD' folder of the memory card. Press UP / DOWN button to select prev or next picture. Press any other keys to exit Image Browser mode.



1. Current displayed picture's file name.
2. Current picture's index and total number of pictures.
3. Temperature of centre point.
4. Picture display area.

7.2. How to capture screen

When in Thermal imaging mode, use HOLD button to enter hold mode, as show below. Then press OK button to capture screen. After saving to memory completed, is screen will exit hold mode.



8. Technical Specifications

8.1. Technical Characteristics

Field of view (FOV) / Minimum focus distance	21°x 21°/ 0.5m
Spatial resolution (IFOV)	4.53mrad
Thermal sensitivity/NETD	< 0.1°C @ +30°C (+86°F) / 100mK
Image frequency	50Hz
Focus mode	Focus free
Focal length	7.5mm
Focal Plane Array (FPA) / Spectral range	Uncooled microbolometer / 8–14 μm
Object temperature range	–20°C to +380°C (-4°F to +716°F)
Accuracy in Normal mode	±2°C (±3.6°F) or ±2% of reading (Environment temperature 10℃-35℃，object temperature >0℃)
Accuracy in Screening mode Body Temperature	±0.5°C (±0.9°F) of reading (The object temperature is between 32°C and 42℃)
Display	2” colour TFT LCD screen,
Display resolution	240 x 320 pixels resolution
Battery	Rechargeable 3.7V (1300mA) lithium ion battery (not user-serviceable)
Battery life	>6 hours typical
Battery Charger	5V 1A USB charger (not include)
Drop Proof	Designed for up to 2 meters
Connect	Bluetooth BLE4.0, thermal image transfer and data logger.
Save image format	Bitmap (.bmp) with 6400 points temperature analysis and emissivity
Operating Temperature	15 to 30°C (59 to 86°F)
Storage Temperature	-30 to 55°C (-22 to 131°F)
Allowable relative humidity	<80%HR
Storage humidity	<80%HR

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