Thermal imager
User manual

Contact :

EASTERN ENERGY CO.,LTD. (HEAD OFFICE)
40/4 Vitoondumri Rd., Banbueng, Banbueng, Chonburi 20170
Tel: 0-3844-6117 Fax: 0-3844-6200 Email: info@ete.co.th

www.ete.co.th

Version EN 1.02 - 25/01/2016

1. Introduction

The Thermal Imager is handheld imaging camera used for predictive maintenance, equipment troubleshooting, and verification. Thermal images are displayed on the LCD and can be saved to internal memories. With Bluetooth instant share function, thermal images can be transferred to smart phone for analyse,share and report quickly.

1.1. Key features

- 80x80 pixel thermal imaging system.
- 6400 points real temperature fast measurements
- Hot,Cold,Center 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

Safety

1.2. safetyinfomation

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.

1.3. Cautions

- Improper use can damage the meter. Please read and understand all of the information provided in this User Guide and other included documentation before use.
- Refer to the CAUTION statement label (shown below) for critical safety information.

EASTERN ENERGY

Contact :

EASTERN ENERGY CO.,LTD. (HEAD OFFICE)
40/4 Vitoondumri Rd., Banbueng, Banbueng, Chonburi 20170
Tel: 0-3844-6117 Fax: 0-3844-6200 Email: info@ete.co.th

www.ete.co.th

2. Quick Start Guide

2.1. 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. Press and hold the Power button for > 2 seconds to power ON. The logo startup 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 color, 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 displayed on the screen.

3.Short trigger to freeze/capture the image. Press"OK" to save image or press "SHARE" to share the image with smart devices. Trigger again to discard the image.

4.Press"LOCK" to Lock current sciene temperature range, Press "LOCK" again to discard.

2.2. Powering and charging the thermal imager

Press and hold the power button for > 2 seconds to switch ON the unit. A start-up screen (a thermal image) will appear. The unit is now ready to use; to switch OFF, press and hold for > 2 seconds. Note that the Auto Power OFF function switches the unit OFF automatically after a programmed period of time.

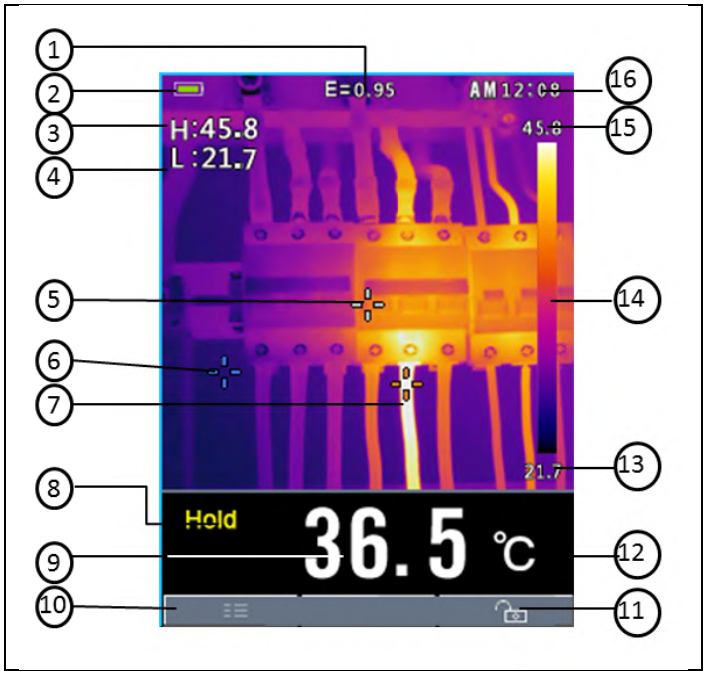
With the power ON, the battery status icon is located at the top left of the display. When battery power is low, connect to an AC source or a computer USB port using the supplied USB cable (USB port is located at top of the unit).

With power 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, it indicate the battery is full.

The unit can also be powered up and in use while charging in which case the battery symbol is animated on the full screen

2.3. The IR Thermal Imaging Display

(1).Current Emiisivity setting
(2). Battery indicator
(3). Hot temperature point reading
(4). Cold temperature point reading
(5). Centre crosshair
(6). Cold temperature crosshair
(7). Hottemperature crosshair
(8)Image freezed 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



2.4. Control Buttons and Trigger

Became familliar with the operation of the control buttons and trigger as described below:

- **POWER/BACK/LOCK BUTTON** Press and hold > 2 seconds to cycle the meter power ON or OFF; Short 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** Short press 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 the Settings Menu and select a menu item setting. ~~When freeze aimage,Press“UP” will share the image to the smart device. Press and hold the DOWN arrow for 4 seconds to access the Image Review mode.~~
- **TRIGGER/LED Flashlight**Short press will take a snapshot of the current image. Short press again to discard image and return to live image mode. Long press will open the LED flashlight,Long press again will close the LED flashlight.

EASTERN ENERGY

Contact :

EASTERN ENERGY CO.,LTD. (HEAD OFFICE)
40/4 Vitoondumri Rd., Banbueng, Banbueng, Chonburi 20170
Tel: 0-3844-6117 Fax: 0-3844-6200 Email: info@ete.co.th

www.ete.co.th

2.5. 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 form 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.

3.0 Discriptions

2.6. Front descriptions

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

2.7. Back descriptions

6.LED Flash Light
7.IR Imaging len
8. Trigger

2.8. Top descriptions

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

2.9. Display Icon and Indicator Description

	Temperature units		Centre crosshair
	Max temperature readings		Hot crosshair
	Minimum temperature readings		Cold crosshair
	Freezing image icon		Unlock icon
	12 time format		Lock icon
	IRON Color palette		Bluetooth icon

 :Battery empty  : Battery Full  : Battery charging

Contact :

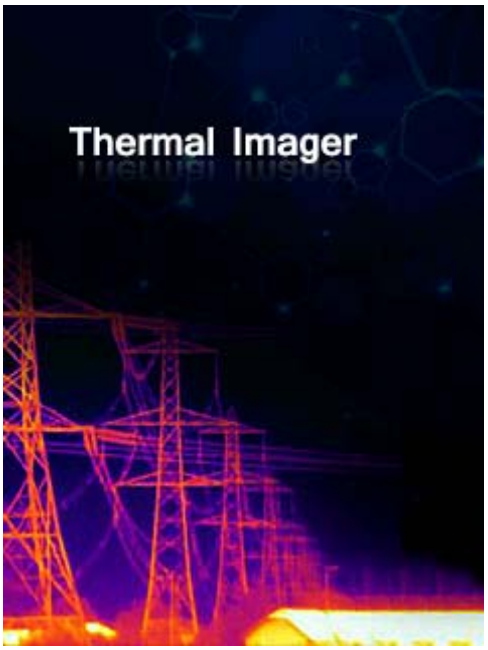
EASTERN ENERGY CO.,LTD. (HEAD OFFICE)
40/4 Vitoondumri Rd., Banbueng, Banbueng, Chonburi 20170
Tel: 0-3844-6117 Fax: 0-3844-6200 Email: info@ete.co.th

www.ete.co.th

3. Opertion

3.1. Switch ON the thermal imager

Press and hold for > 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 startup 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 thethermal imager, for information regarding battery charging.

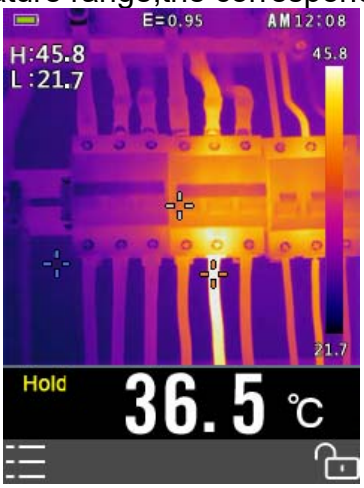


Pic5-1 start logo

3.2. Lock/Unlock scene temperature level-span

The unit is real 80x80 pixels thermal imager, for better get the object temperature problem,It can locks the current scene temperature range, if the temperature higher than lock temperature,the corresponding color is white;if the current scene temperature lower than the lock temperature range,the corresponding color is black.

Pic 5-2 lock mode



pic5-3 unlock mode

1. Point the unit at an object or an area of interest.

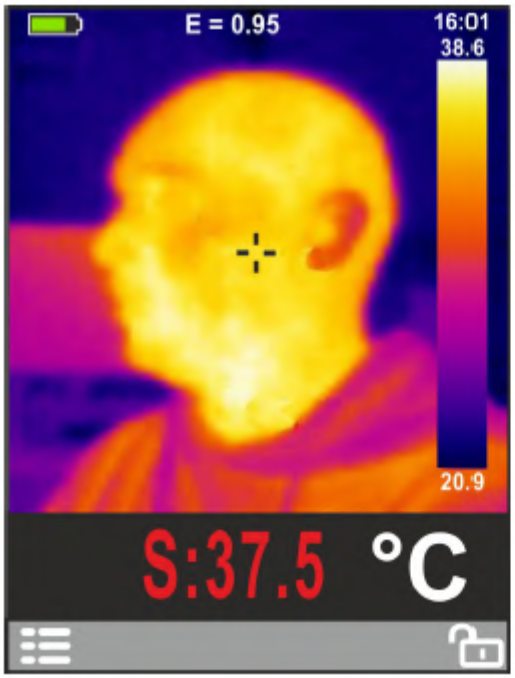
2. Short press the “  ” to lock the scene temperature range; the back color of the temperature readings will turn grey.

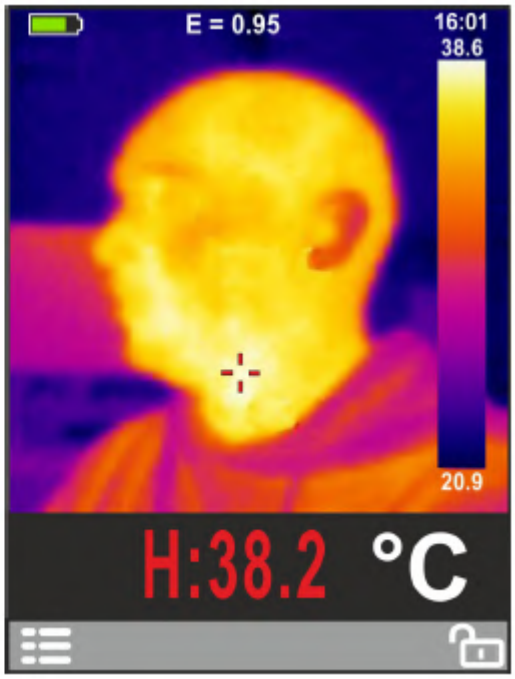
3. Short press the “  ” button again ,it will unlock the scene temperature range.

3.3. Screening mode for surface temperature measurement

The unit canwork in screening mode for surface 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 “Center 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 color in the lower part of the display





3.4. 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 throughBlueTooth.

1. Point the unit at an object or an area of interest.
2. Short press the trigger to capture the image; the image will freeze.
3. If don’t want to save the current image, Short press the trigger again,the image will unfreeze.
4. Press“SAVE” to save the image
5. If the image is stored successfully on the internal memory, the image will unfreeze.
6. To erase/format internal memory please refer to Section 6 Settings Menu.

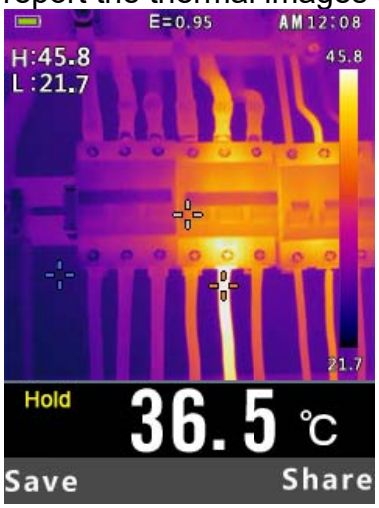
3.5. Share images using BlueTooth

3.5.1. Instant share

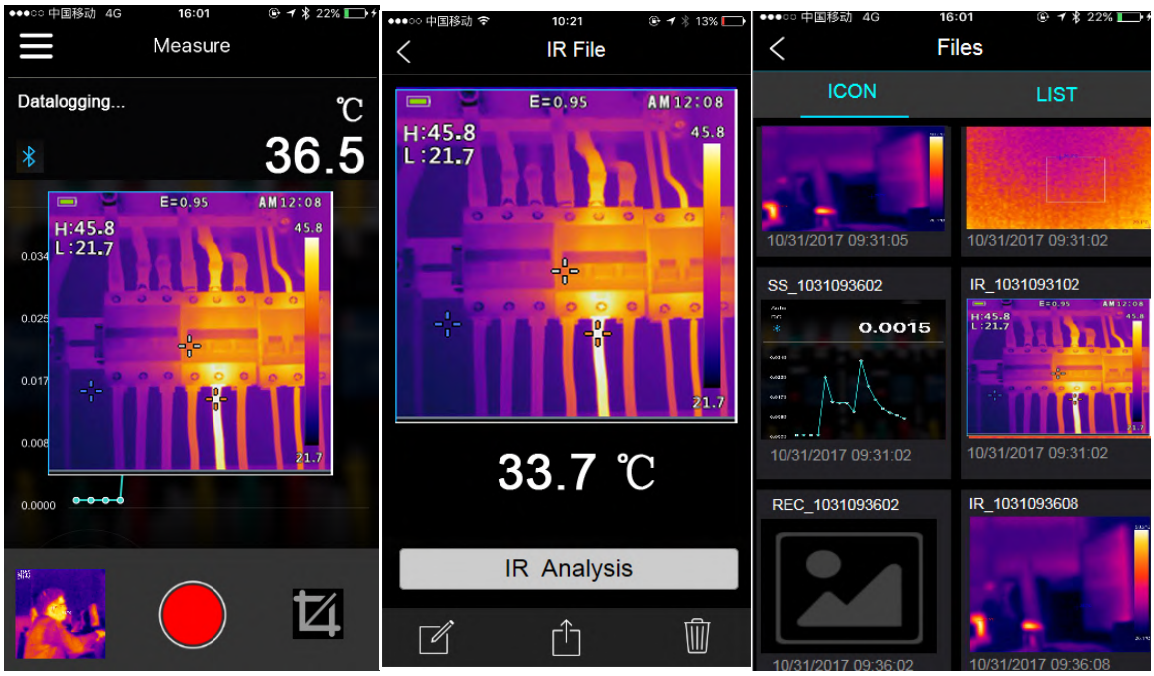
For quick analyse and report the thermal images,Theunit has Bluetooth instant share function, corresponding there are ~~three~~softwares for iOS,Android.

1. Enable the Bluetooth on the thermal imager
2. Run Apps on smart devices, connect unit with smart device or PC(Detailed referece to **Section 6.8 Settings Menu**).
3.Point the unit at an object or an area of interest.
4. Short press the trigger to capture the image; the image will freeze. And the “hold” icon will display.
5. If don’t want the current image, Short press the trigger again,the image will unfreeze.

6. Press“SHARE” to transfer the image
7. If the image is transfered successfully to the smart devices, the image will unfreeze.
8. Save,analyse,share or report the thermal images on smart devices.



Pic5_4Hold the image



Pic5_5Receive,analyse and save the image

3.5.2. Transfer the saved images

1. Enable the Bluetooth on the unit
2. Run Apps on smart devices, connectunit 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.

3.6. 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.

~~4. Connect the DT-870Y through Bluetooth,and transfer the saved image to the PC or smart devices.~~

3.7. Lens and Imager Field of View

This table lists the horizontalFOV, 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

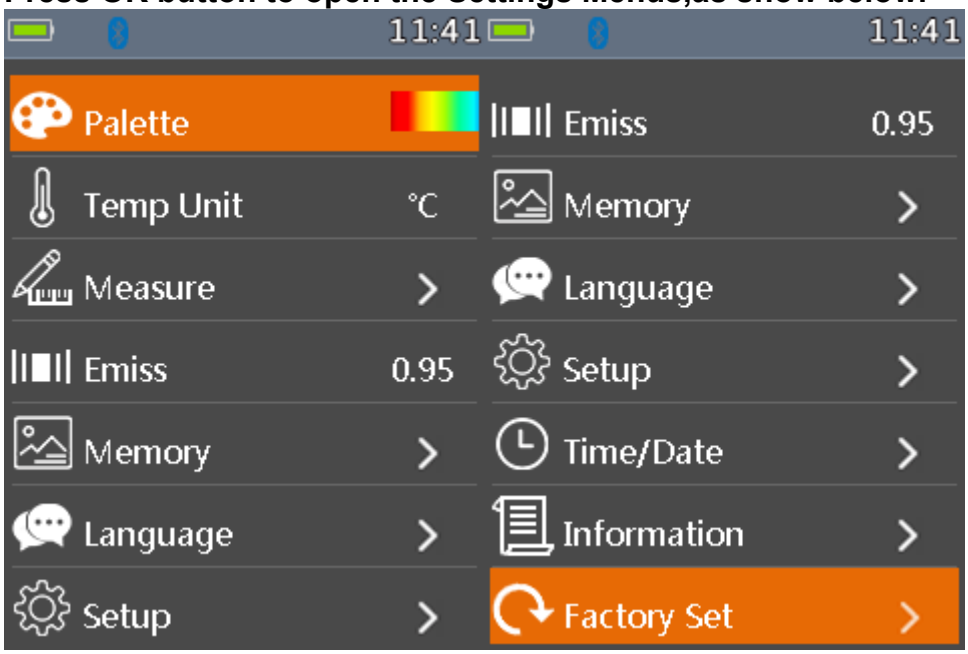
D:S$_{measure}$(= 1/IFOV$_{measure}$) is the spot size needed to provide an accurate temperature measure.

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.

4. SettingsMenus

4.1. 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 enter the submenu or set focus on the current sellecteditem.PressESC button to return to the previous menu.**
- **If want to exit settings menus, can press HOLD button or press ESC button in root menu.**

4.2. Settings details

4.2.1. Palette mode

Thermal imager has five kinds of palette,such as: 
Press OK button to select on of display color palettes.

4.3. Temp Unit

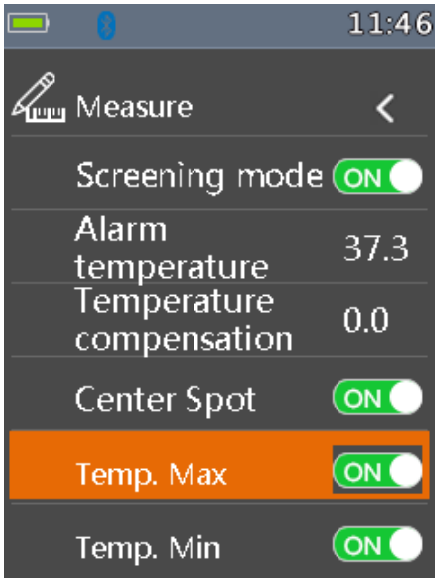
Press OK button to set focus on this option and the color of option value will change to blcak ℃.Infocus state, use the RIGHT / MENU button to toggle℃,℉ and K, use ESC / OK button to exit focus state and the color of option value will change to blcak K.

4.4. Measure

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

- **Screening mode:This option enables thermal imager measure surface temperature.**
- **Alarm temperature:In screening mode, if surface temperature is higher than alarm temperature, then buzzer alarm will be triggered.**

- **Temperature compensation:In screening mode, ther surface temperature will be compensated.**
- **Center Spot:This option enables thermal imager detect thertemperature of center spot.**
- **Temp.Max:This option enables thermal imager automatically detect the highest temperature point.**
- **Temp.Min:This option enables thermal imager automatically detect the lowest temperature point.**

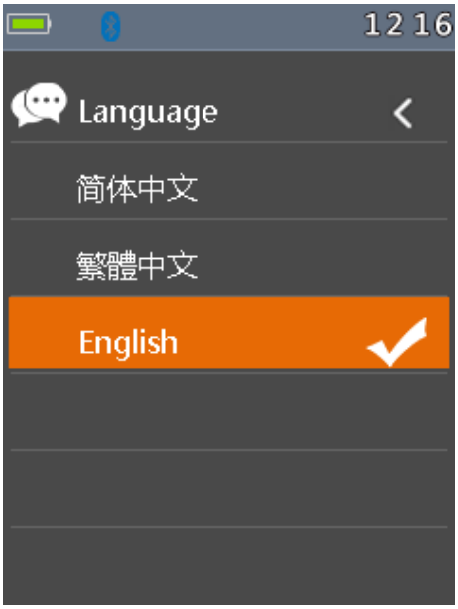


4.5. Emissivity

Press OK button to set focus on this option.In focus state, use UP /DOWN button to increase or decrease emissivity's value,useESC / OK button to exit focus state.The available range is 0.01 to 0.99 in 0.01 steps.

4.6. Language

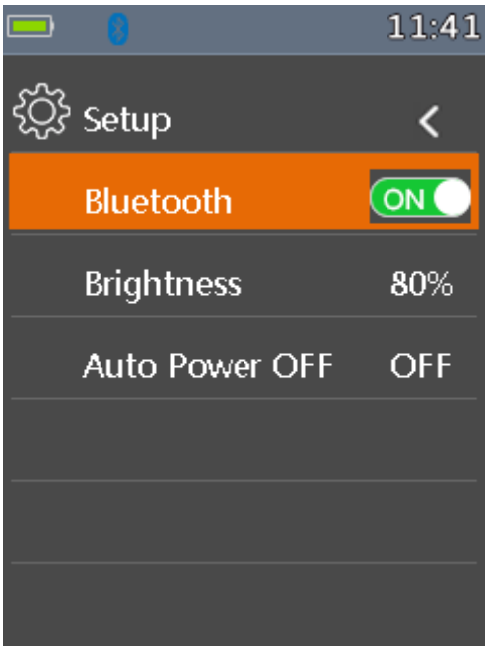
Press OK button toto enter language menu.Threeoptions are available: Simplified Chinese, Traditional Chinese and English.Use UP /DOWN button to select language and use OK button to set selected language to be valid.



4.7. Setup

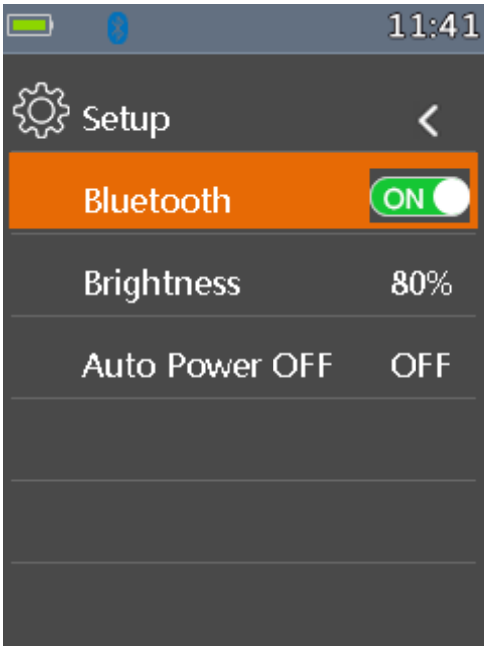
Press OK button to enter setupmenu.Three options are available: Bluetooth, Brightness and Auto Off.

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

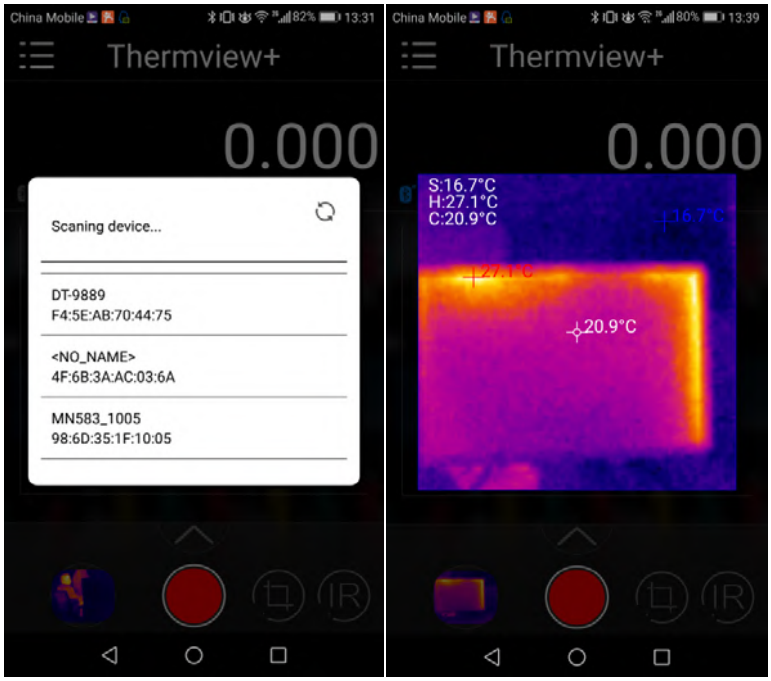


4.8. Bluetooth Connect

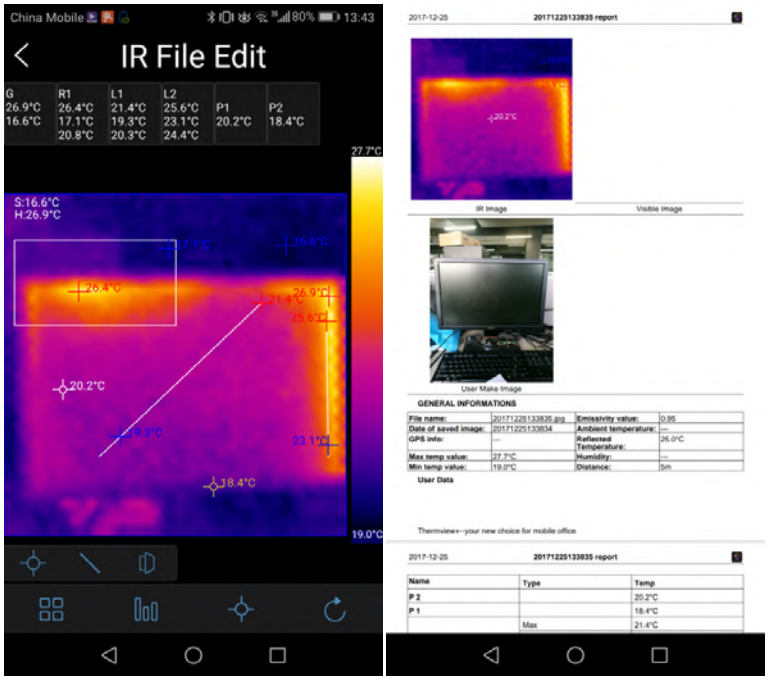
1) Turn on the Bluetooth function on the instrument.



2) Turn on the bluetooth of smartphone，press the icon “Thermoview+” and enter into the home interface, Then press Connect Device icon on the Home interface，bluetooth device name will appear.



3) Touch the device name listed in bluetoothsheet, it will be transmitted to laser distance meter measuring interface after connection.



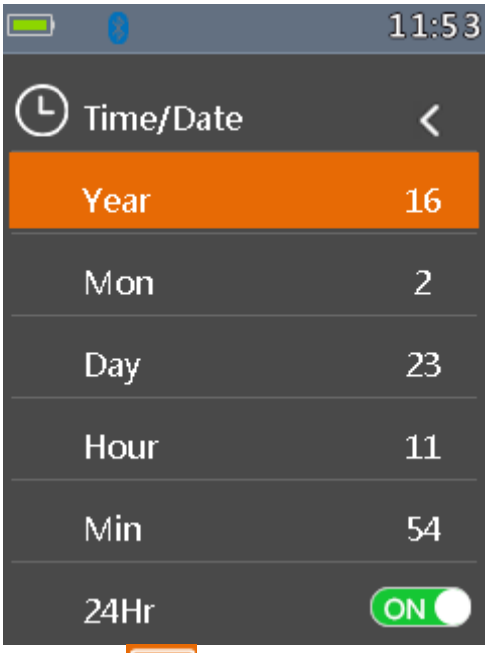
The detail information about Thermview+,please refer to MeterBox Pro APP help file.

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.

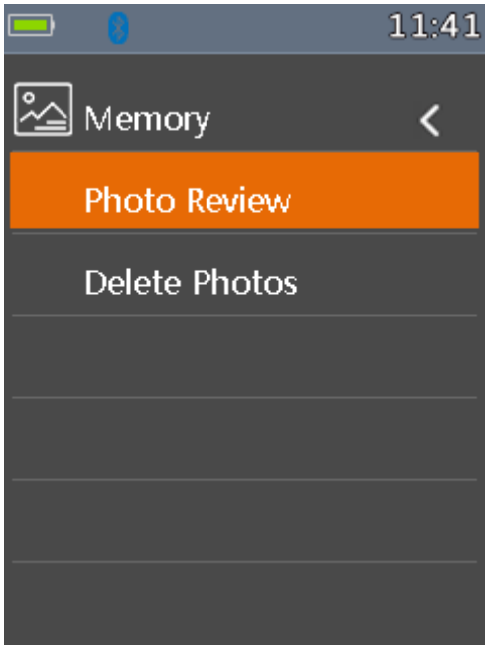
4.9. Time/Date

Press OK button to enter timemenu.In this menu, yeas, month, day, hour, minute and time formate can be set.The changes take effect after exitting settings menus.



4.10. Memory

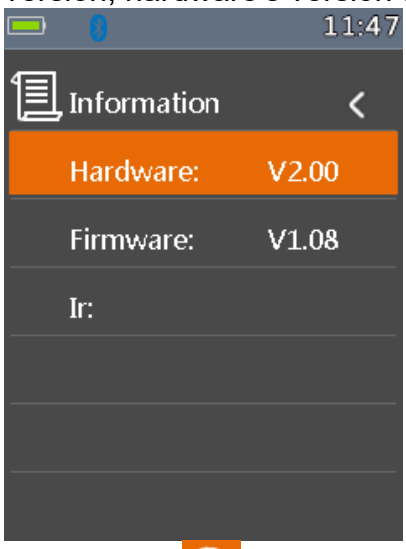
Press OK button to enter memory menu.Twooptions are available: Photo Review and Delete Photo.



- **Photo Review:PressOK button to enter image browser function, and eixt settings menus immediately.**
- **Delete Photo:After Press OK button, dialog box will be displayed as show below.Warnning:Select 'YES', will delete all the photos in 'RECORD' folder of the memory card.**

4.11. Infomation

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

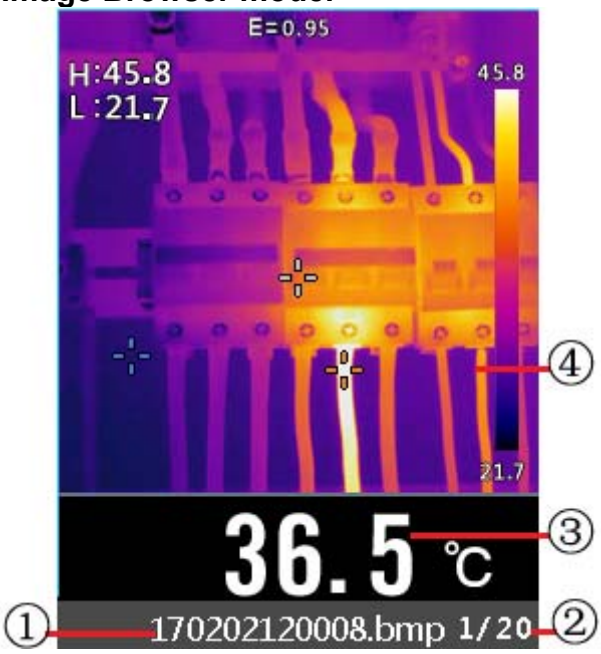


4.12. Factory Set

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

5. Image Browser

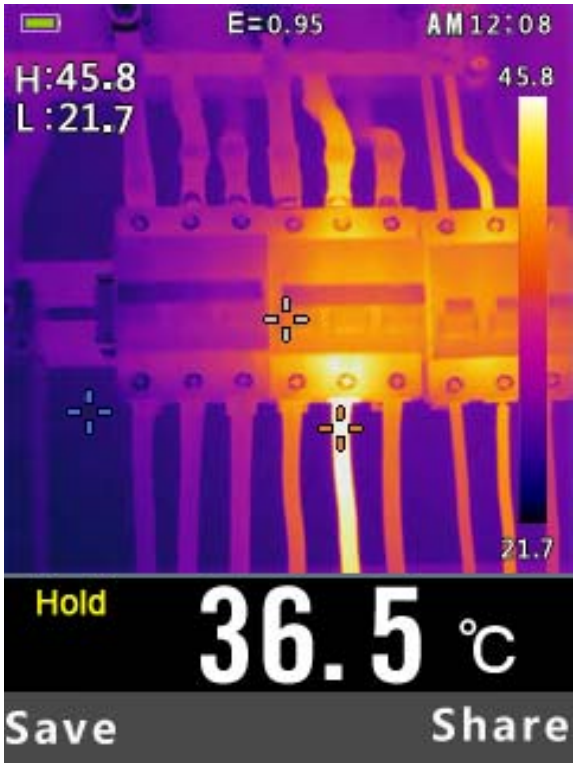
5.1. In Image Browser mode. User can browse the pictures in 'RECORD' folder of the memory card.PressUP / DOWN button to select prev or next picture.Press any other keys to exit Image Browser mode.



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

5.2. 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 memorycompletly, screen will exit hold mode.



6. Technical specifications

6.1. 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) / 100 mK
Image frequency	50Hz
Focus mode	Focus free
Focal length	7.5mm
Focal Plane Array (FPA) / Spectral range	Uncooledmicrobolometer / 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	± 0.5°C (±0.9°F) of reading(The object temperature is between 32°C and42℃.)
Display	2’color TFT LCD screen,
Display resolution	240x320 pixels resolution
Battery	Rechargeable 3.7V (1300mA) lithium ion battery (not user-serviceable)
Battery lift	>6hours,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 temperatureanalyse and emissivity
Operating Temperature	14 to 113oF (-10 to 45oC)
Storage Temperature	-22 to 131oF (-30 to 55oC)
Allowable relative humidity	<80%HR
Storage temperature	-20° ÷ 60°C (-4°F ÷ 140°F)
Storage humidity	<80%HR

Contact :

EASTERN ENERGY CO.,LTD. (HEAD OFFICE)
40/4 Vitoondumri Rd., Banbueng, Banbueng, Chonburi 20170
Tel: 0-3844-6117 Fax: 0-3844-6200 Email: info@ete.co.th

www.ete.co.th