# Thermal Imaging Camera

**Instruction Manual**

**IR0004**

# Contents

# 1. Overview

IR0004 is an infrared camera that integrates surface temperature measurement and real-time thermal image. With this product, the potential problems can be identified on the color display screen which is helpful for users to locate the problem, take readings and solve the issue.

The product has a visual camera integrated to increase the differentiation degree. The thermal images and full vision images can be stored in the device and can be transferred to a computer to generate report and printing.

The following are the major features of IR0004:

- High accuracy:    The adjustable radiation coefficient increases the measurement
        accuracy of reflective surfaces.
- Time-saving :    The traditional infrared thermometer needs to measure every
        component one by one, this is not necessary for IR0004.
- Easy to use :    Turn on the device and start measuring temperatures straight
        away.
- User-friendly :    The thermal point and cold point temperature automatically
        marks the area with highest or lowest temperature in real time.
- Adjustable:        Five types of color palettes and emissivity values provided.

The product can be utilized in many fields, for instance:
1. **Detect spills and leaks of chemica**ls which have different thermal signatures
        to the surroundings,
2. **Fire fighting**: Vision can be obscured by smoke and debris in the event of a fire,
        thermal imaging can see through this and locate victims or fire spots.
3. **Locate the source of abnormal leaking of heat** of a house or a machine, find out
        the problem area and fix it.
4. **Enable drug-enforcement** units to locate cannabis plants by detecting abnormal
        amount of heat spot in buildings.
5. **Moisture detection**: Areas with lower temperatures to its uniform surroundings
        can be a source of moisture staining or damage.
6. **Measure body temperatures**: Point the thermal imaging camera at a person to
    find their surface body temperature
7. **Night vision**: Measuring the electromagnetic energies given off when objects
        emit heat, the IR0004 translates those energies into visible light for users to see
        them in the dark.
8. **Building inspection**: Check that heat is retained uniformly in a building.

IR0004 is the ideal selection for electrician, maintenance personnel, technicians and
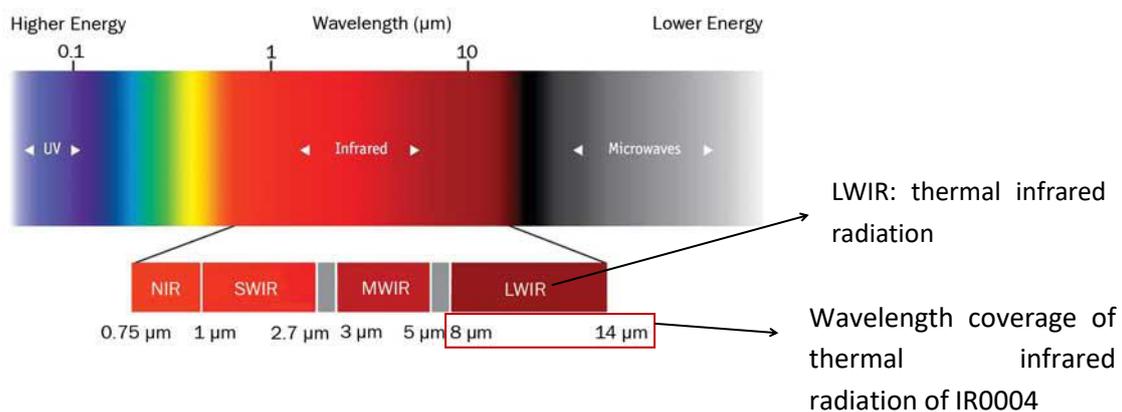
even the emergency personnel.

# 2. Considerations and Safety Maintenance

Please read the instructions carefully so as to ensure accurate measurement results and safety:

✧  Do not use the device in explosive, flammable or corrosive environments.

✧  Since the product is a precision electronic and sensitive optical device. Do not drop it or allow impacts to occur to prevent damage

✧  Do not dismantle the product, doing so can damage it and revoke the warranty.

✧  When the product works, there is a tiny clicking sound every several seconds. This is a normal phenomenon as the lens captures images to produce electronic noises.

✧  Please use a damp cloth or gentle soap to clean the enclosure of the device. Do not use abradant, isopropanol or solvent to clean. Special optical lens cleaner should be used to clean the screen.
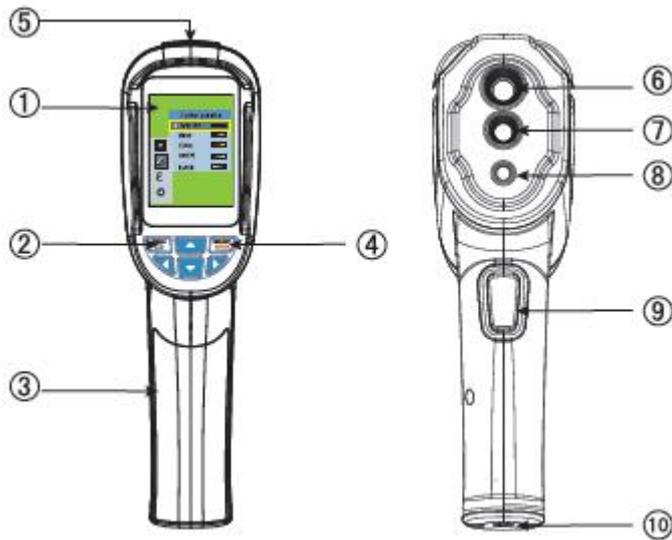
# 3. Performance Index

| | |
|---|---|
| Display screen | 2.4" full-color screen |
| Infrared image resolution | 220×160 |
| Total pixel | 35200 |
| Thermal sensitivity | 0.07℃ |
| Temperature measurement range | -20~300℃(-4℉~572℉) |
| Measurement precision | ±2.5℃ or ±2.5% |
| Wavelength coverage | 8-14um |
| Field angle/shortest focus length | 27°×35°/0.5m |
| Emissivity | Adjustable from 0.1 to 1.0 |
| Focus mode | Fixed |
| Color palette | Rainbow, iron oxide red, cold color, black & white, white & black |
| Image storage | SD Card (4G) |
| Image format | JPG |
| Setting control | Unit adjustment of localization/ language/ date time version/automatic power off |
| Battery type | 1.5V x 4 power supply (For best performance use Alkaline Battery) |
| Battery service life | 2 hours |
| Power-off time | Selectable: 5 minutes/20 minutes/ not power off automatically |
| Vibration resistance | 2G, IEC, 60068-2-6 |
| Anti-dropping | 2M |
| Size | 212×95×62mm |
| Weight | 320g |
| Work temperature | 0℃ to 50℃ |
| Storage temperature | -40℃ to 80℃ |
| Humidity | <85RH |



LWIR: thermal infrared radiation

Wavelength coverage of thermal infrared radiation of IR0004

# 4. Product Description

## 4.1. Instruction to structure



| Item | Description | Item | Description |
|------|-------------|------|-------------|
| ① | TFT HD color screen | ⑥ | Infrared imagery sensor |
| ② | Power-on/menu key | ⑦ | Visible light camera |
| ③ | Battery cover | ⑧ | LED lighting lamp |
| ④ | Selection/enter key | ⑨ | Image captures key |
| ⑤ | Small SD card | ⑩ | Installation port of tripod |

## 4.2. Screen Description

Central point temperature → 39.1°C    e=0.99 ☐

Cold point temperature cursor →

Hot point temperature cursor →

Maximum /minimum value of field temperature → MAX:52.3°C  MIN:16.5°C  16:42

Battery power

Current emissivity

Color code

Temperature cursor at central point

Time
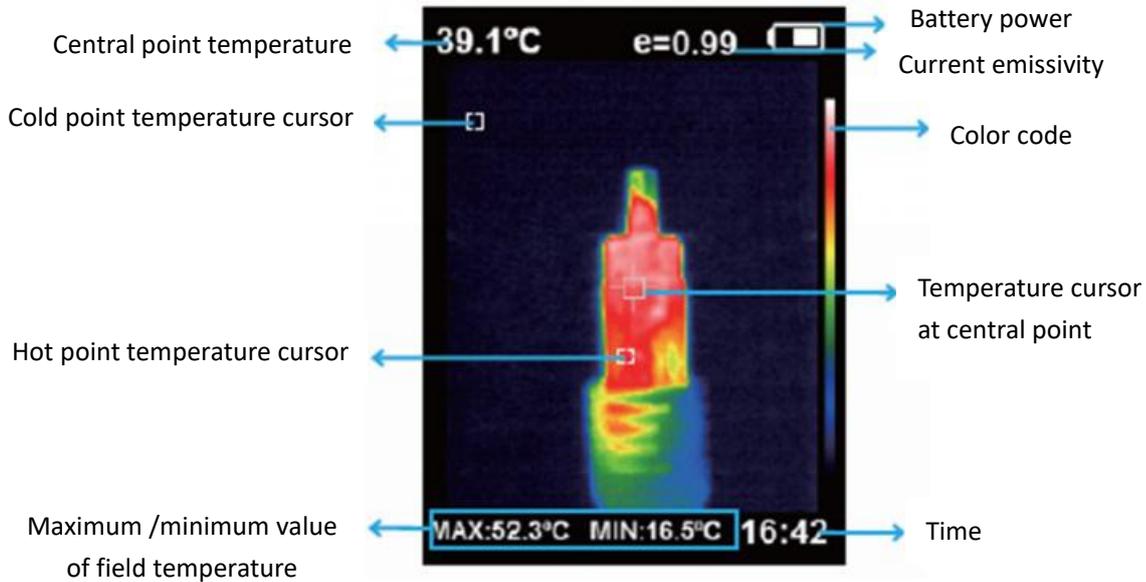
1. Central point temperature cursor

This pointer will always remain at the centre of the screen and allow the user to move the camera to identify the temperature of where they point.
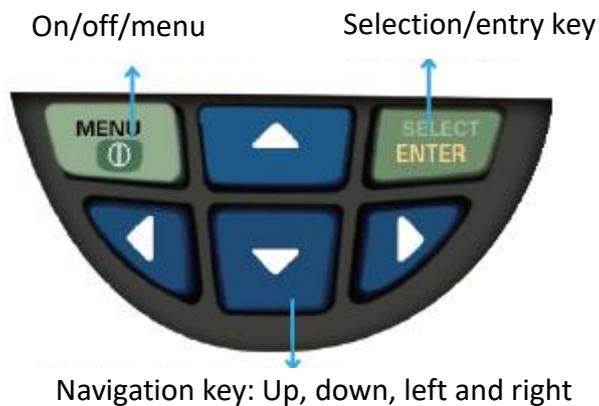
2. Hot point temperature cursor

This pointer will automatically locate and display the highest temperature on the screen.

3. Cold point temperature cursor

This pointer will automatically locate and display the lowest temperature on the screen.

**4.3. Key Description**

On/off/menu          Selection/entry key



Navigation key: Up, down, left and right

# 5. Initial Operation

1.  Install and remove SD card: insert SD card until the sound "click" is heard. To take out SD card, press the card and it will pop out automatically. Then pull out the card.

2.  To power on/off the instrument: hold down " ⏻ " key for several seconds.

3.  Change the view mode: press "◁" and "▷" keys to switch between the mode of infrared thermal imaging and full vision images.

4.  Image capture: the instrument saves the image into SD card automatically when the image capture key is pressed.

5.  Exhibit and hide the bottom bar: press "△" to hide the bottom bar of the screen which shows the maximum /minimum value and time of the field temperature. Press "△" again to display the bottom bar.

# 6. Introduction to "Setting" Sub-menu

## Settings

| | | |
|---|---|---|
| ⏻ Auto shutdown ▶ | No<br>5 mins<br>20 mins | |
| ☀ Display intensity ▶ | Low<br>Medium<br>Hight | |
| 🌐 Language ▶ | English<br>Chinese | |
| °C Unit ▶ | Celsius<br>Fahrenheit | |
| 24h Time format ▶ | 24 hours<br>AM/PM | |
| 🕐 Set time ▶ | Year<br>Month<br>Day<br>Hour<br>Minute<br>Second | 2017<br>12<br>28<br>15<br>15<br>15 |
| ⊕ Spot ▶ | On<br>Off | |

# 7. Color Palette

The menu of color palette can change the false color on the display screen or capture infrared image. There are five types of color palettes provided: rainbow, iron oxide red, cold color, black & white and white & black.

Suitable selection of color palette displays the details of the target objective better:

1. *Rainbow, iron oxide red and cold color*
   -Focus on display of color
   -suitable for high heat contrast
   -improving the color contrast between high and low temperature

2. *Black & white and white & black color*
   -provide even linear color.

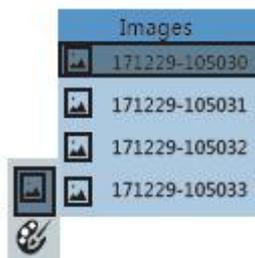The following is the image of the same object with selection of different color palettes:



Rainbow  Iron oxide red  Cold color

Black & white  White & black  Visible light camera
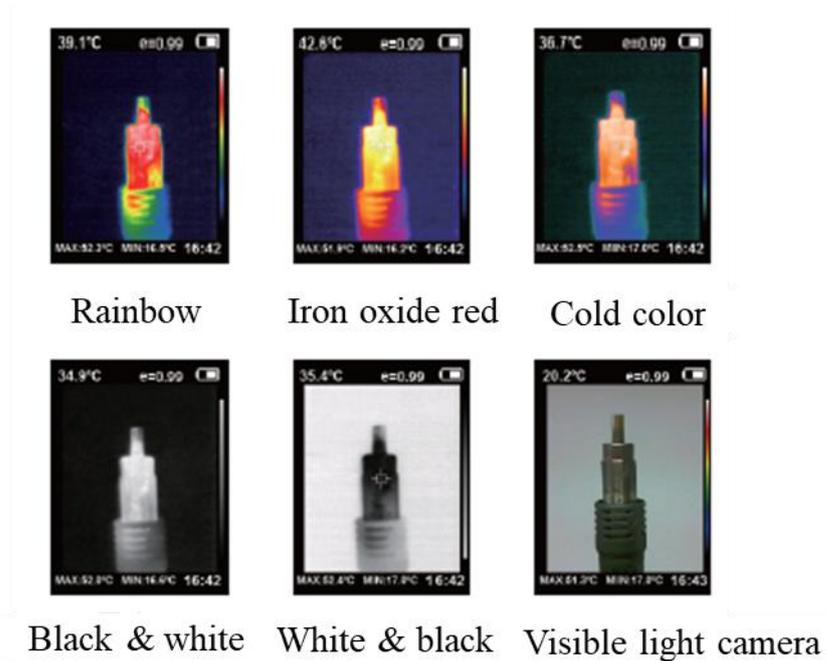
# 8. Application of color palette and image check

## 8.1. Application of color palette



1. Press "SELECT/ENTER " to select;
2. Press "◁" to return.
3. Press "△"/"▽" to adjust the selected items.

## 8.2. Check images



1. Press the "MENU" to select the image menu; press "▷" to enter the image menu or press "MENU" again to exit..

2. Press "△"/"▽" to adjust the selected items.

3. Press "SELECT/ENTER" key to select; press "SELECT/ENTER" key again to return under the interface of image check.

4. Press "◁"/"▷" to check previous/next image under the interface of image check.

5. Image deletion: during image checking, press "△" key and the deletion mode appears. Press "MENU" key to delete images and press "SELECT/ENTER" key to cancel deletion.

# 9. Time Setting



1. Press "△"/"▽" to select year/month/day/hour/minute.

⇩

2. Press "SELECT /ENTER" to enter edit.

⇩

3. Press "△" /"▽" to adjust the selected items.

⇩

4. After editing, press "SELECT /ENTER" again to confirm and return.

⇩

5. Press left key or "MENU" key to return and complete the setting.

# 10. Capture Thermal Points

Capture thermal points are the three different cursors which measure the temperatures ( The central, highest and lowest temperature points).

Find the "Capture thermal points" under the "setting" menu to enable and disable the function.

# 11. Measure Objects

According to the characteristics of the objects and surfaces to be measured, users may select corresponding measurement modes or enter "advanced" option to adjust the value of emissivity (please refer to the table of "emissivity of common materials").

The operating step is as the following:



1. Select the "measure objects"; press "ω" key to enter the sub-menu.
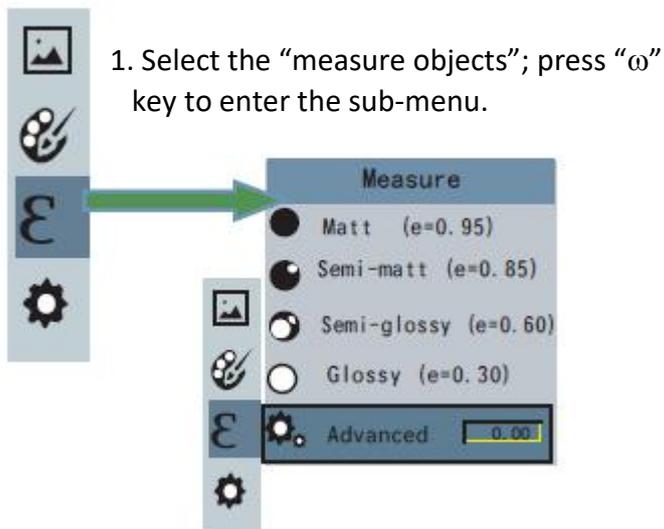
2. When the item is chosen, press "SELECT/ENTER" to enter the setting state.

3. Press "△"/"▽" to adjust the value.

4. After completion, press "SELECT/ENTER" to exit from such setting.

# 12. Emissivity

The emissivity of the surface of a material is its effectiveness in emitting energy as thermal radiation. The emissivity of the product can be adjusted from 0.10 to 1.00 with the default value of 0.95. Many common objects and materials (such as timber, water, skin and textile fabric) can reflect the heat energy effectively, so it is easy to obtain high accuracy.

Choosing the correct setting of the emissivity value of different objects and materials is very important for achieving accurate temperature measurement. The surface emissivity will greatly affect the measured temperature and therefore adjusted the emissivity value to match it is essential.

# 13. The Table of Emissivity Value

The product is provided with four types of object measurement modes:
1. Coarse object (easy to give out energy)(0.95);
2. Semi-matte object (0.80);
3. Semi-shiny object (0.60);
4. Shiny object (0.30);

| Substance | Thermal radiation | Substance | Thermal radiation |
|---|---|---|---|
| Bitumen | 0.90-0.98 | Black cloth | 0.98 |
| Concrete | 0.94 | Human skin | 0.98 |
| Cement | 0.96 | Foam | 0.75-0.80 |
| Sand | 0.90 | Charcoal dust | 0.96 |
| Earth | 0.92-0.96 | Paint | 0.80-0.95 |
| Water | 0.92-0.96 | Matte paint | 0.97 |
| Ice | 0.96-0.98 | Black rubber | 0.94 |
| Snow | 0.83 | Plastic | 0.85-0.95 |
| Glass | 0.90-0.95 | Timber | 0.90 |
| Ceramics | 0.90-0.94 | Paper | 0.70-0.94 |
| Marble | 0.94 | Chromium hemitrioxide | 0.81 |
| Gypsum | 0.80-0.90 | Copper oxide | 0.78 |
| Mortar | 0.89-0.91 | Ferric oxide | 0.78-0.82 |
| Brick | 0.93-0.96 | Textile | 0.90 |