Perfect Prime

Thermal Imaging Camera

Instruction Manual: IR0002

www.perfectprime.com for product register and warranty

Contents

1. Overview

IR0002 is an uncooled thermal imaging 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 detachable memory card. IR0002 can store up to 25,000 images on the micro SD card. The image can be stored in PC to generate a report and print.

The following are the major features of IR0002:

- 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 IR0002.
- 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 IR0002 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.

IR0002 is the ideal selection for electrician, maintenance personnel, technicians and even the emergency personnel.
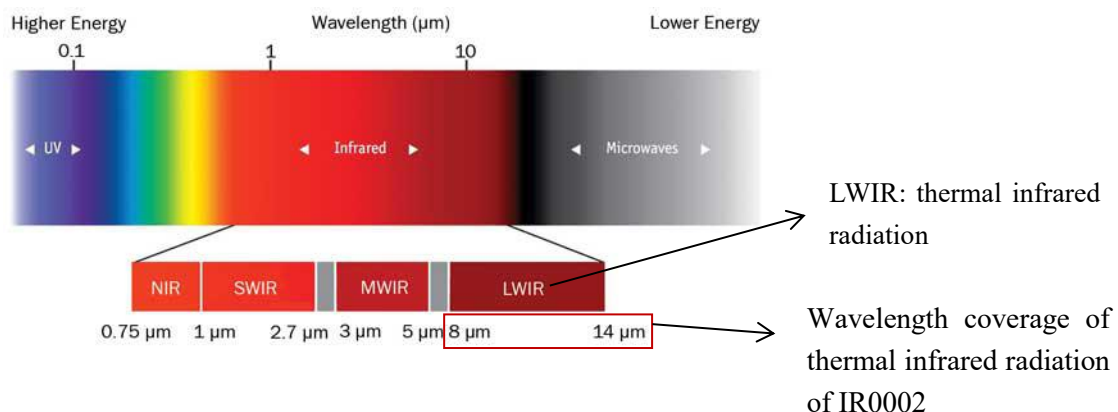
2. Considerations and Safety Maintenance

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-angle high resolution
Infrared image resolution	60*60 (3600 pixels)
Visible image resolution	0.3 mega pixels
Thermal sensitivity	0.15℃
Temperature measurement range	-20~300℃(-4℉~572℉)
Measurement precision	±2% or ±2℃ (±2% or ±4)
Wavelength coverage	8-14um
Field angle/shortest focus length	20*20/0.5m
Emissivity	Adjustable from 0.1 to 1.0
Focus mode	Fixed
Image capturing frequency	6 Hz
Color palette	Rainbow, iron oxide red, rainbow high contrast, gray scale (white glow) and gray scale (black glow)
Vision option	25% step infrared to visional to infrared and visional image
Image storage	Mini SD Card
Image format	bmp
Battery type	1.5V x 4 power supply (For best performance use Alkaline Battery)
Battery service life	6 hours
Auto power-off time	12 minutes
Authentication	CE (EN61326-1:2006)
Warranty period	2 years
Size	212×95×62mm
Weight	320g
Work temperature	-5℃ to ±40℃
Storage temperature	-20℃ to ±50℃
Humidity	10% RH to 80% RH

LWIR: thermal infrared radiation

Wavelength coverage of thermal infrared radiation of IR0002

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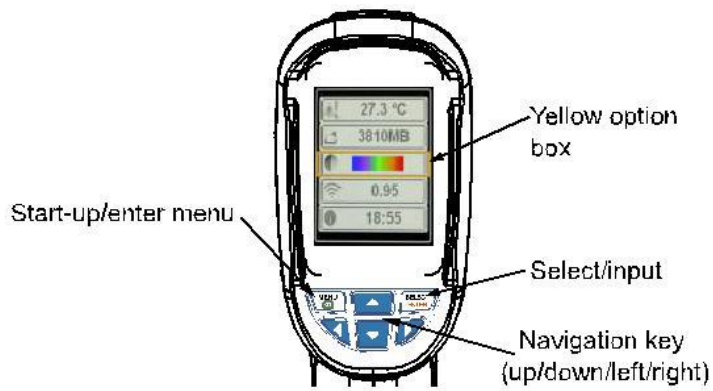
Figure 1- Basic Functions
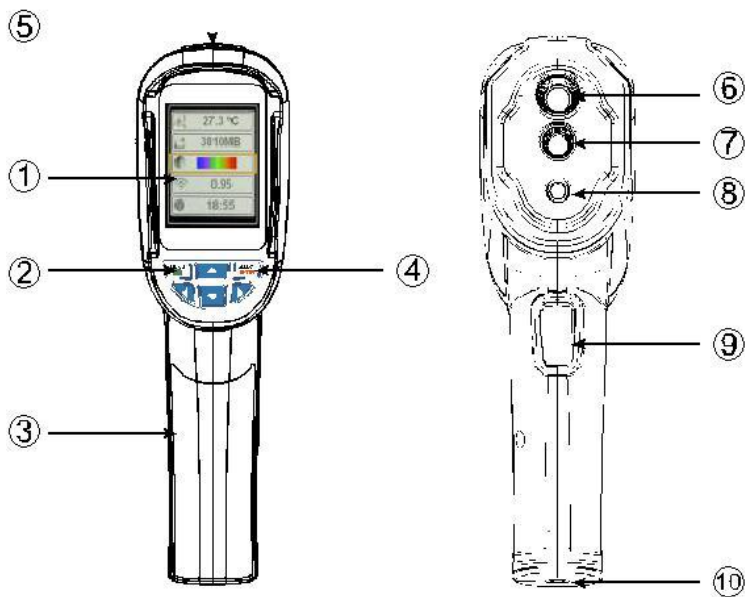
Item	Description	Item	Description
①	TFT HD color screen	⑥	Infrared imagery sensor
②	Power-on/menu key	⑦	Visible light camera
③	Battery cover	⑧	LED lighting lamp
④	Selection/enter key	⑨	Image captures key
⑤	Small SD card	⑩	Installation port of tripod

5. Menu Description

Icon	Description
(clock icon) 12:12	Time setting
(image icon) 5000	Save image
(brightness icon) 50%	Background light setting
(thermometer icon) ℃	Temperature unit setting
(icon) 25℃	Background temperature setting
(card icon) 11088MB	Capacity of memory card
(palette icon) (color bar)	Color palette setting
(signal icon) 0.95	Emissivity setting

6. Basic Operations

6.1. Elimination of noise

1. Start up the instrument.

2. Put the head of sensor close to the worktop.

3. Press "△" key for 5 seconds to eliminate the noise.

6.2. LED light

Press "image capturing" key for 5 seconds to turn on LED light.

6.3. Battery Installation

1. Slide the battery cover open for inserting new batteries into IR0001.

2. Ensure polarity of batteries inserted are correct.

3. Close the battery cover.

6.4. Product Operation

1. Press "Start-up" key for 5 seconds to power up the instrument.

2. Press "menu" for 1 second to enter mode setting of basic functions.

3. The LCD shows 5 function setting options on the screen, press "△"/"▽" to scroll.

4. Select the function for adjustment by the yellow option box

5. Press "select" and select "menu" option and edit the value.

6. Press "△"/"▽" to edit the value.

7. After adjustment, confirm the new value and press "menu" key to exit the edit mode.

7. Time setting

1. Under Time Setting menu, press "◁"/"▷" to select digit for adjustment.

2. Press "△"/"▽" to increase or decrease the time value.

3. After setting, press "menu" to exit.
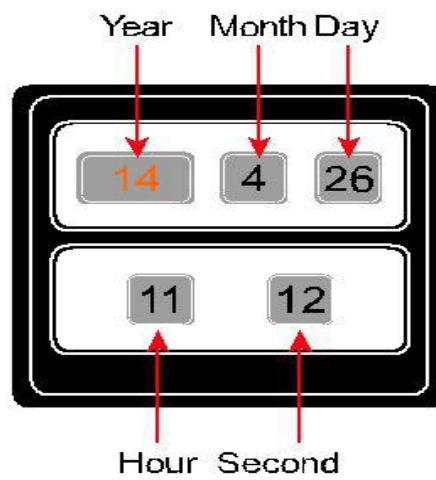
8. Measurement
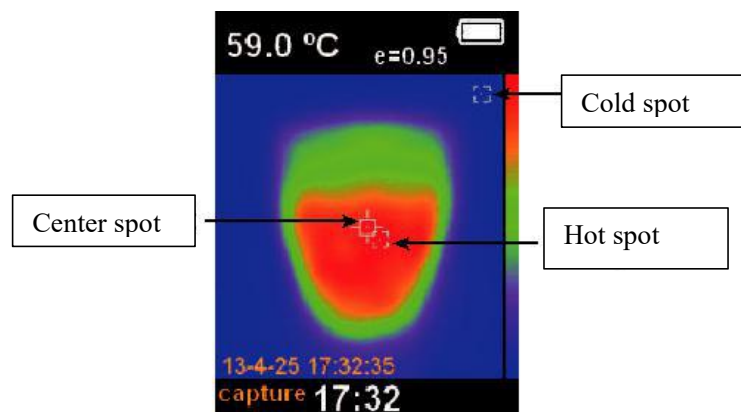
-The measured temperature at the pixel center is displayed at the upper left corner.
-The radiation coefficient is displayed at the upper right corner.

1. Move the product until hot spot or cold spot coincides with the center of pixel.

2. Direct the product to the object to get the optimum measured results. (object temperature is higher or lower than the surroundings temperature.)

9. Color palette

"Color palette" menu can change the representation color of the infrared image displayed on the screen or captured. A number of color palettes are available as below:

1. ***Gray-scale color***: provides balanced linear color, help to reveal full details.

2. ***High-contrast color***: emphasize the displayed color, and the color contrast of high-temperature and low-temperature can therefore be improved.

3. ***Iron red and rainbow color***: provide a mixed high-contrast gray-scale color palette.

High contrast

Iron red

Rainbow
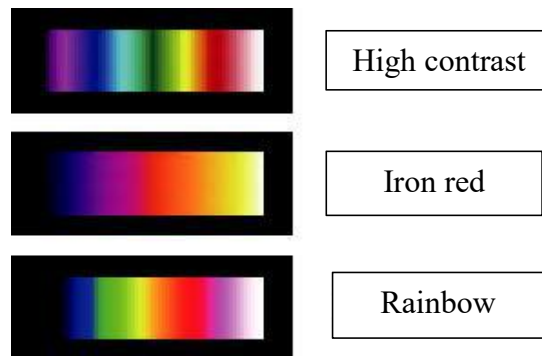
10. Temperature of reflective background

Set the temperature compensation for reflective background in the option of background. The background temperature can be set between 0°C and +36°C.

The surface temperature and measurement accuracy of measured object may be influenced by over-hot or over-cold object (When the radiation coefficient of the surface of the measured object is low, this phenomenon is obvious).

Under many situations, the temperature of reflective background should be adjusted to get the optimum measured result.

11. Marking of spot temperature

Turn on or off the marking of spot temperature:

1. If turning on, the marking of spot temperature indicates that the hot or cold spot on screen needs additional appraisal.

2. If turning off, it indicates that user can focus on the measured pixel per time.

12. Image mixing

IR0002 can capture visible image of infrared image with the temperature distribution of target area clearly displayed on screen, resulting in a easier understanding of infrared image.

To use this function, press "◁"/"▷" to adjust the mixed image from 0% to 100%.
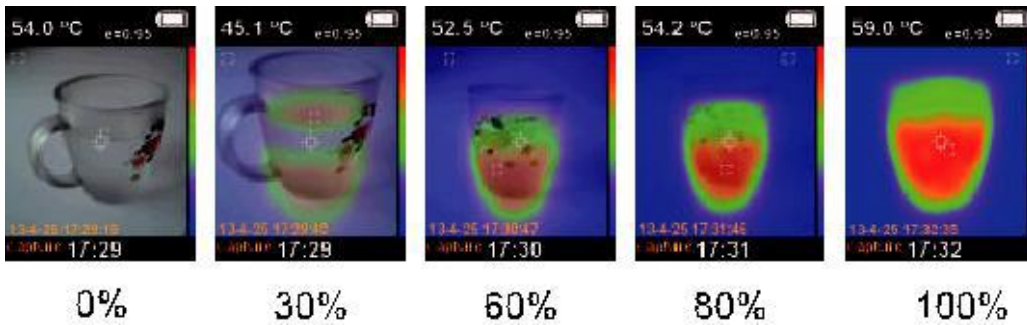
13. Image capturing and checking

13.1. Image capturing

1. Press image capturing button and the symbol of "store photos yes no" will display on screen.

2. Press "MENU" to store image; press "SELECT" to delete the captured image.

   -If "NO SD" displayed at the lower left corner of screen, it indicates SD card is not installed.

   -If "FULL" is displayed at the lower left corner of screen, it indicates that SD card is full.

13.2. Image checking

1. Press "menu" to enter into the mode of menu.

2. Select the image storage module using the arrow keys.

3. Press the "SELECT" button to choose the picture you want to view.

4. Press the arrow keys to view other pictures.

5. Press the "SELECT" button to view pictures.

6. Press the above key on the screen will display "Delete photo yes no":

   -Press "MENU" to delete the picture
   -Press "SELECT" to cancel.

7. Press the "MENU" button to exit Review.

14. 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.

15. 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