Thermal Imaging Camera

Instruction Manual: IR0018

www.perfectprime.com

Contents

1. Overview

IR0018 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 IR0018:

- 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 IR0018.
- 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 IR0018 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.

IR0018 is the ideal selection for electrician, maintenance personnel, technicians and even the emergency personnel.

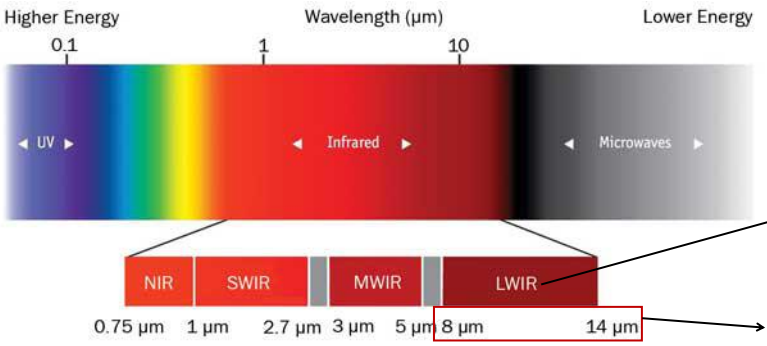
2. Considerations and Safety Maintenance

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	3.2” full angle TFT display screen
Infrared image resolution	220 ×160
visible image resolution	0.3 million pixel
Field angle/shortest focus length	27° × 35° /0.5m
Thermal sensitivity	0.07° C
Temperature measurement range	-20~300° C (-4° F~572° F)
Test and measurement precision	±2.5° C or ±2.5%
Emissivity	Adjustable from 0.1 to 10.0
Image capture frequency	9 Hz
Wavelength coverage	8-14um
Focus mode	Fixed
Color palette	Rainbow, iron oxide red, cold color, black & white, white & black
View option	Full infrared and full vision Visible image with 25% step length
Storage medium	Built-in 4 GB
Image format	JPG
Power supply	Built-in chargeable 18650 lithium batteries
USB	Micro USB 2.0
Automatic power-off time	Selectable: 5 minutes/20 minutes/ not power off automatically
Product size (length × width × height)	90 mm×105 mm×223 mm
Product Weight	389g
Work temperature	0° C- 50° C
Storage temperature	-40° C- +80° C
Relative humidity	< 85％RH



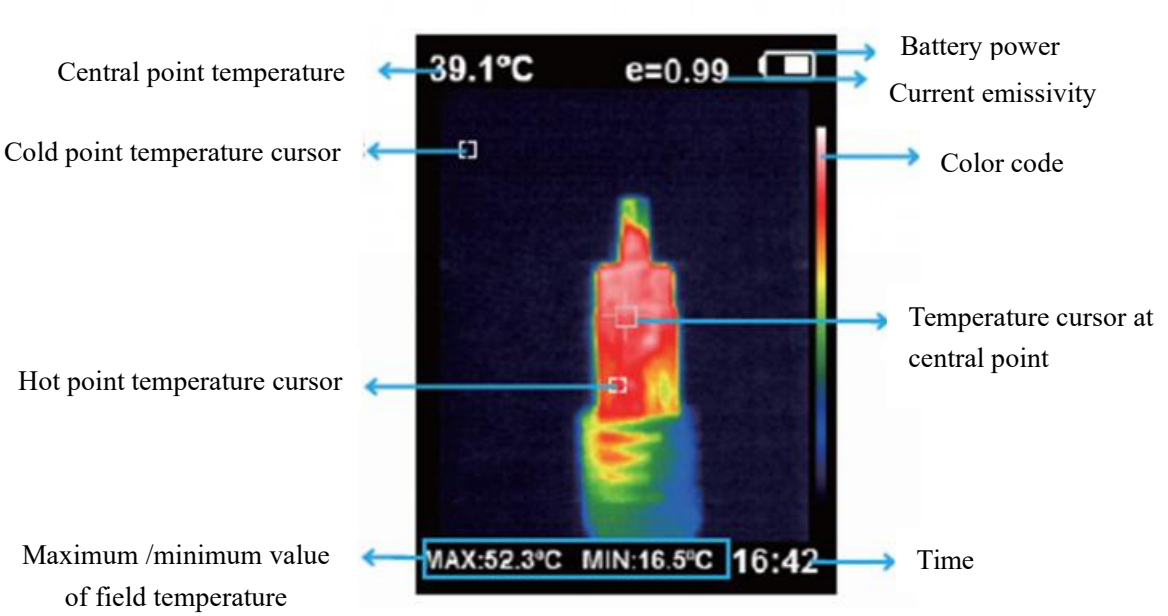
LWIR: thermal infrared radiation

Wavelength coverage of thermal infrared radiation of IR0018

4. Product Features

4.1. Physical features

4.2. Screen features



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.

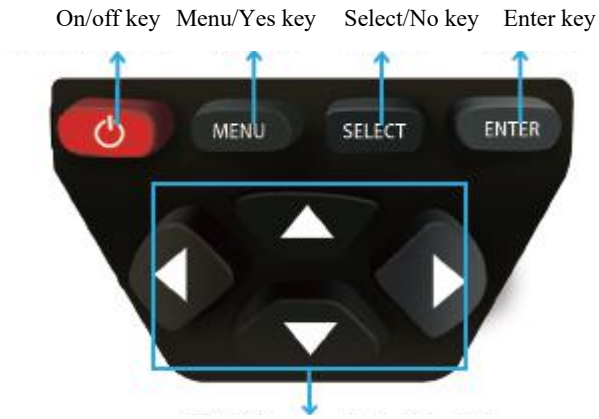
2. Hot point temperature cursor

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. Button features



Navigation key: Up, down, left and right

5. Initial Operation

1. Charging: When the battery power empty or low, please charge it through the micro USB interface.

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

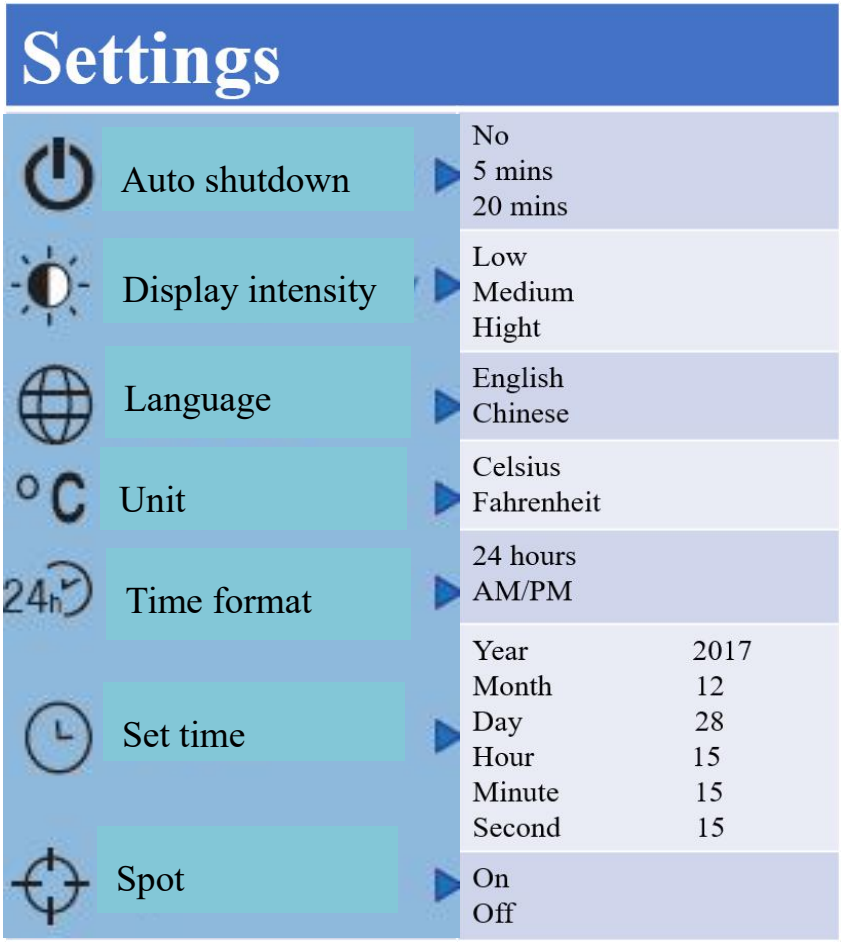
3. Change the view mode: press "◁" and "▷" keys to switch between the mode of infrared thermal imaging and full vision images.

4. Image capture: the instrument saves the image when the image capture trigger is pressed.

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

6. Image export: use the Micro USB cable to connect the IR0018 to a computer to transfer the files.

6. Introduction to “Setting” Sub-menu



7. Color Palette

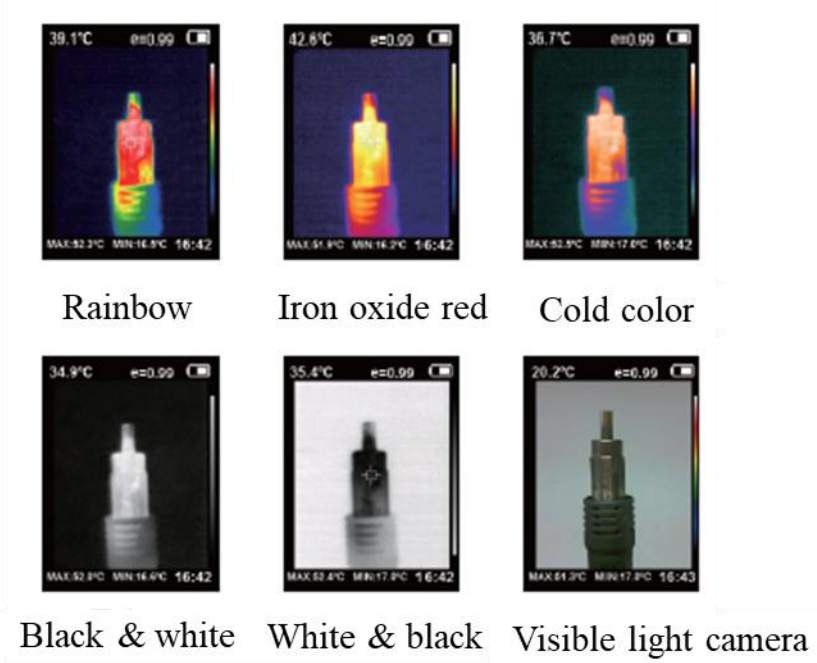
The menu of color palette can change the false color on the display screen or capture infrared image. There are five types of color palettes provided: rainbow, iron oxide red, cold color, black & white and white & black.

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

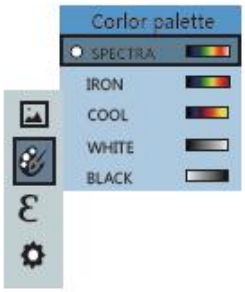
2. ***Black & white and white & black color***
   -provide even linear color.

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



8. Application of Color Palette and Image Check

8.1. Application of color palette



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

8.2. Check images

1. Press the menu key to select the image menu; press “▷” to enter the image menu.

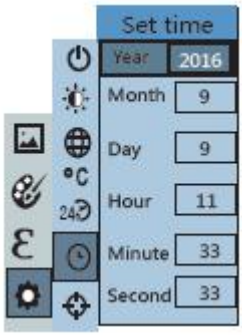
2. Press “△”/“▽” to select items.

3. Press “SELECT” key to select; press “Enter” key to return to previous menu.

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

5. Image deletion: when an image is selected, press “△” key and the deletion mode appears. Press “MENU” key to delete images or press “SELECT” key to cancel deletion.

9. Time Setting



1. Press “△”/“▽” to select year/month/day/hour/minute.
2. Press “SELECT” to enter edit
3. Press “△” /“▽” to adjust the selected items.
4. After editing, press “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).

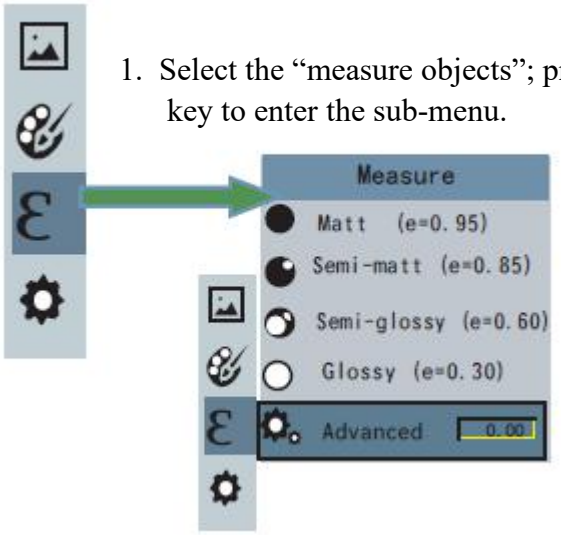
Find the “Capture thermal points” under the “setting” menu to enable and disable the function.

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”).

To do this:

1. Select the “measure objects”; press “ω” key to enter the sub-menu.



2. When the item is highlighted, press “SELECT” to enter the setting state.

3. Press “△”/“▽” to adjust the value.

4. After completion, press “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) will reflect heat energy, so it is easy to obtain high accuracy as a result.

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 adjusting the emissivity value to match it is essential.

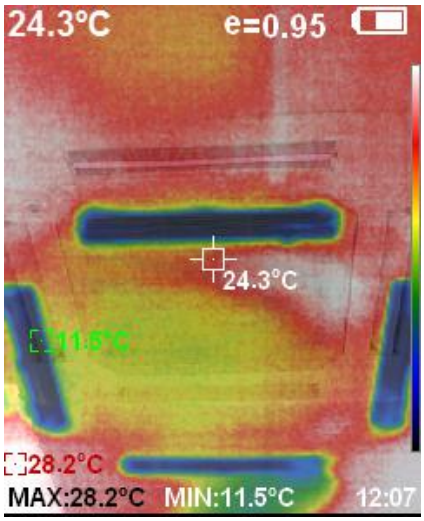
13. The Table of Emissivity Value

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

14. Image Registration

The location of the visible light camera is above the infrared imaging sensor which is at the centre of the camera. Together they produce an image overlay (in between visible light mode and infrared mode) which would show the visible light image over the infrared image just like the left image below.



The Image Registration feature helps to adjust the positions of the visible light image and infrared image to make sure they align.

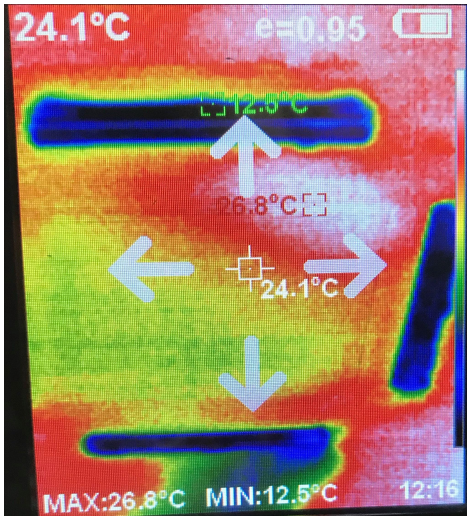


Image registration adjustment mode

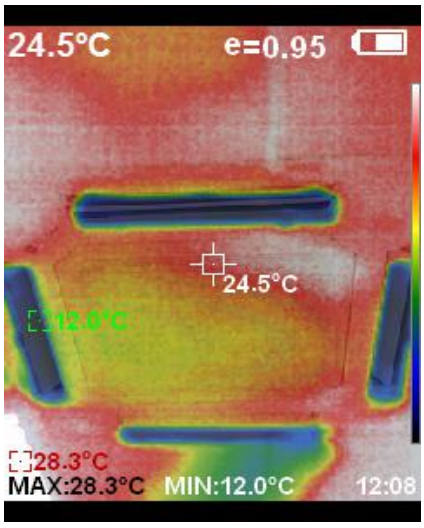


Image registration after adjustment

To access this feature, press the menu button, then select Image Registration (see right image above). Use the arrow keys to adjust the position of the images until they align.