

YRH Series

User's manual



Trademark Acknowledgments

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StatementError! Bookmark not defined.	
1.	Product Warranty:	Error! Bookmark not defined.
2.	Statement	Error! Bookmark not defined.

Warnings

Read on to learn about using IR camera properly.

Warning:

It is forbidden to disassemble the camera, connect any terminal, install and uninstall the battery, charge the battery, short-circuit, and disassemble the battery and its charger in coal mine environment. Fail to do so may cause terrible disaster and SATIR is not responsible for it. Only the genuine intrinsic safety battery packs and battery charger are allowed to use. This camera is not design for high temperature environment, and the operational temperature range should not exceed -15°C to +50°C (5°F to +122°F).

Avoid damaging eyesight

Warning: Do not trigger the laser pointer in human or animal eyes. Exposure to the laser produced by the laser pointer may damage eyesight.

Do not disassemble

Do not attempt to disassemble or alter any part of the equipment that is not expressly described this guide

Stop operating immediately if it is damaged

Failure to do so may result in fire, electrical shock or explosion in coal mine environment. Immediately turn the IR camera's power off. Do not remove the IR camera battery or in coal mine environment. Return the camera back to SATIR or its distributor and have it check before reusing it.

Stop operating immediately if it emits smoke or

noxious fumes

Failure to do so may result in fire or electrical shock. Immediately turn the IR camera's power off. Do not remove the IR camera battery or in coal mine environment. Return the camera back to SATIR or its distributor and have it check before reusing it.

Stop operating immediately if it is dropped or the casing is damaged

Failure to do so may result in fire or electrical shock. Immediately turn the IR camera's power off. Do not remove the IR camera battery or in coal mine environment. Return the camera back to SATIR or its distributor and have it check before reusing it.

Do not use substances containing alcohol, benzene, thinners or other flammable substances to clean or main the IR camera

The use of these substances may lead to fire.

Remove the power cord on a regular periodic basis and wipe away the dust and dirt that collects on the plug, the exterior of the power outlet and the surrounding area

In dust, humid or greasy environments, the dust that collects around the plug over long periods of time may become saturated with humidity and short-circuit, leading to fire.

Do not handle the power cord if your hands are wet

Handling it with wet hands may lead to electrical shock. When unplugging the cord, ensure that you hold the solid portion of the plug. Pulling on the flexible portion of the cord may damage or expose the wire and insulation, creating the potential for fires and electrical shocks.

Do not cut, alter or place heavy items on the power

adapter cord

Any of these actions may cause an electrical short circuit, which may lead to fire or electrical shock.

Use only the recommended power accessories

Use of power sources not expressly recommended for this IR camera may lead to overheating, distortion of the IR camera, fire, electrical shock or other hazards. Fail to do so may cause terrible disaster and SATIR is not responsible for it.

Do not place the batteries near a heat source or expose them to direct flame or heat

Neither should you immerse them in water. Such exposure may damage the batteries and lead to the leakage of corrosive liquids, fire, electrical shock, explosion or serious injury.

Do not attempt to disassemble, alter or apply heat to the batteries

This is serious risk of injury due to an explosion. Immediately flush with water any area of the body, including the eyes and mouth, or clothing, that comes into contact with the inner contents of a battery. If the eyes or mouth contact these substances, immediately flush with water and seek medical assistance. Fail to do so may cause terrible disaster and SATIR is not responsible for it.

Avoid dropping or subjecting the batteries to severe impacts that could damage the casings

It could lead to leakage and injury.

Do not short-circuit the battery terminals with metallic objects, such as key holders

It could lead to overheating, burns and other injuries.

Before you discard a battery, cover the terminal with tape or other insulators to prevent direct

contact with other objects

Contact with the metallic components of other materials in waste containers may lead to fire or explosions. Discard the batteries in specialized waste facilities if available in your area.

Use only recommended batteries and accessories

Use of batteries not expressly recommended for this equipment may cause explosions or leaks, resulting in fire, injury and damage to the surroundings. Fail to do so may cause terrible disaster and SATIR is not responsible for it.

Do not use the battery charger or compact power adapter if the cable or plug is damaged, or if the plug is not fully inserted into the power outlet

The battery charger varies according to region.

Exercise due caution when screwing on the separately sold tele-lens, close-up lens

If you loosen, fall off and shatter, the glass shards may cause an injury.

If your camera is used for prolong periods, the IR camera body may become warm

Please take care when operating the IR camera for an extended period as your hands may experience a burning sensation.

Prevent Malfunction

Read on to learn about preventing malfunction of IR camera

Avoid damaging the detector of the IR camera

Warning: Do not aim the IR camera directly into the sun or at other intense heat source which could damage the detector of the IR camera.

Avoid Condensation Related Problems

Moving the IR camera rapidly between hot and cold temperatures may cause condensation (water droplets) to form on its external and internal surfaces.

You can avoid this by placing the IR camera in the plastic case (bundle) and letting it adjust to temperature changes slowly before removing it from the case.

If Condensation Forms Inside the IR Camera

Stop using the camera immediately if you detect condensation. Continued use may damage the IR camera. Remove the PC card, and battery or a household power source, from the IR camera and wait until moisture evaporates completely before resuming use.

Extended Storage

When not using the IR camera for extended periods of time, remove the battery from the IR camera or battery charger and store the IR camera in a safe place. Storing the IR camera for extended periods with battery installed will run down the battery.

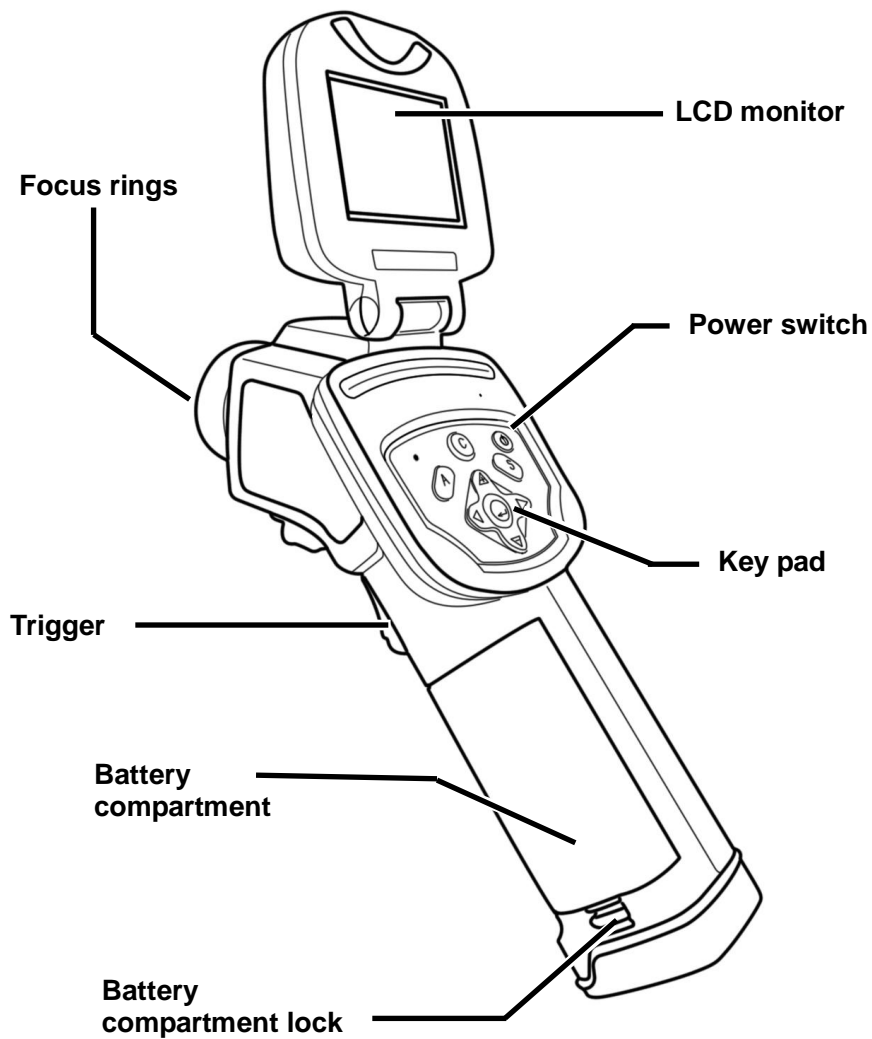
1 Packing

After receipt of YRH, please take out all the components from the packing box, and check according to the list of shipment.

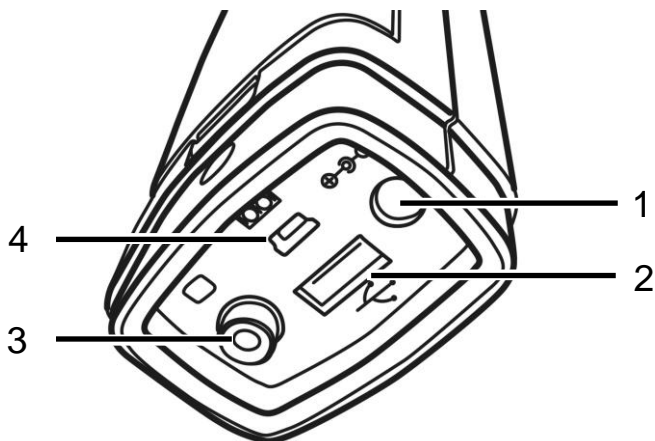
YRH system, packed in the high-strength plastics box, includes:

- ***YRH Camera body ×1***
- ***Rechargeable intrinsic safety battery pack×2***
- ***Intelligent charger×1***
- ***Video signal output cable×1***
- ***Video connector×1***
- ***USB cable ×1***
- ***Infrared lens cap×1***
- ***Lens hood×1***
- ***Operation Manual×1***
- ***Warranty card×1***
- ***Packing list×1***
- ***High quality portable case×1***
- ***Standard software×1***
- ***Portable Leather Strap×1***

2 Component



3 Terminals



1. DC in

External 8V DC input interface

2. USB

Standard USB interface connect to PC

3. Video output

Standard RCA interface

4. Service port

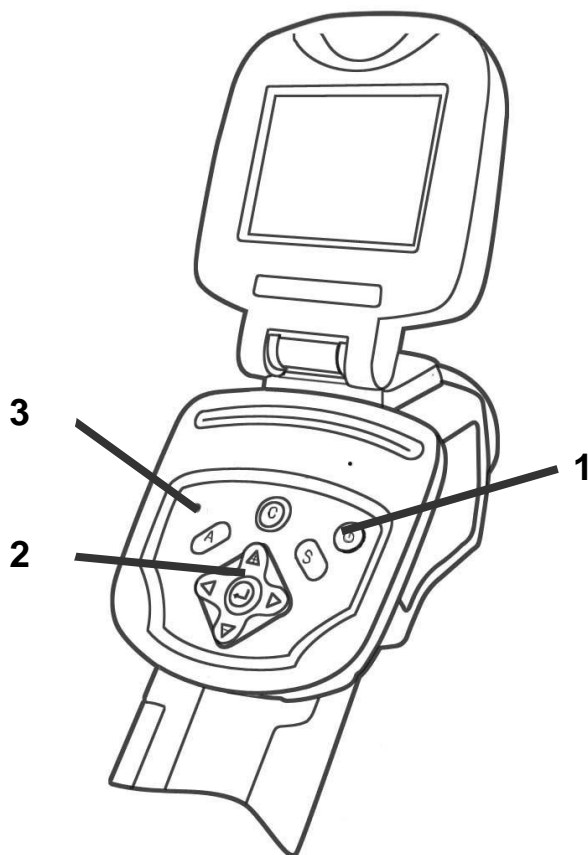
For service only

Warning: Do not attempt to disassemble the camera, connect any terminal, install the battery, charge the battery, short-circuit, disassemble the battery and its charger in coal mine environment. Fail to do so may cause terrible disaster and SATIR is not responsible for it.

The service port is not mini USB cable, which is widely used in digital camera and digital camcorder. Connecting the YRH to the computer's USB terminal with the mini USB cable may damage the camera and avoid your warranty.

4 Operation

4.1 Buttons



Power switch ①

Turn on or turn off the camera.

Key pad ②

Including “Auto Adjust key”, “Cancel Key”, “Freeze/live Key”, “Menu(enter) Key” and 4 direction keys.

A key (Auto adjustment)

In Non-Menu mode, point the IR camera at a target object and press this key, the IR camera will automatically adjust the Level and Span basing on the temperature range of the target. This can be repeated several times to achieve the optimum observation condition. Press this key during analysis; the current analysis status will be suspended. The Direction key is used to adjust the level and span, etc. again.

C key (Cancel adjustment)

In Menu mode, press the key “C” to return to the previous submenu, and continue to press “C” until returning to the Non-Menu mode. This key will not save the prior operations on the sub-menus.

S key (Freeze/Live)







Use it to freeze or live an image. In PC Card Read mode, press this key to return to the Real-time Measurement Status of the IR camera.





With Flash Disk, press this key for a long time (2 to 3 seconds) to save the current image.





**Menu/Enter key**






This key is for pop-up the menu system, enter to the selecting submenu and ensure the function.





In the normal working condition, press this key to pop up a Windows style menu and now the camera is in the menu mode.

In Menu mode, select the options of the Menu by pressing the key “” or “” (up or down). Press the key “” (right), the pull-down menu of the corresponding Menu options will be displayed. Then press the key “” or “” (up or down) to select an option of the pull-down menu. Press the Menu(enter) key to enter the selection. After startup, press the Menu key  to pop up a pull-down menu. Press this key when selecting an option, and a sub-menu will be displayed if there is any, or to enter the selection if there is no sub-menu.

Direction keys “”, “”, “” and “”:

The keys “”, “”, “” and “” are the keys Left, Right, Up and Down in turn. They are used to select the options of the menu, to move the spots, lines and areas in Analysis mode, to select and set the parameters in Parameter Setup mode, to zoom in or out the analyzed area in Area Analysis mode in Non-Menu mode. (Detailed operation instructions referred to Chapter 5).

On Menu mode, press the key “” (right), a pull-down menu will be displayed. Use the keys “” and “” (up and down) to select the options on the menu; and the keys “” and “” (up and down) to set the value of the selected items.

In addition, in Non-Menu mode, besides the key “A”, which can automatically adjust Level and Span, the user may also use the Direction key to manually adjust Level and Span. “” or “” to adjust Span, and “” or “” to adjust Level.

Power LED “③”

4.2 Brief Introduction

Here is for introducing the common use of YRH.

4.2.1 Observation and adjustment

1. Press and hold on the power switch key to turn on the camera
2. Wait till the initialization and data loading completely.
3. Take off the cover of lens and point to the target;
4. Whirl the lens for focusing;
5. Press key “A” to auto-adjustment

Note: the noise from the camera when operating is normal.

4.2.2 Analysis of Temperature Measurement

After startup the camera, press the “menu(enter)” key to pop up the menu;

Press the direction key (“△”、“▽”) to enter the “Analysis”;

Press the direction key (“◀”、“▶”) to select “Spot 1”;


Press the menu(enter) key again;

Move the camera or move the cursor through the direction key to point to the target;


The value displaying on the right-up corner is the target's temperature;

Multi-spot measurement is available when selecting “Spot 2” and “Spot 3”

4.2.3 Store the Infrared image

1. After startup the camera, press the “menu(enter)” key to pop up the menu;
2. Press the direction key (“

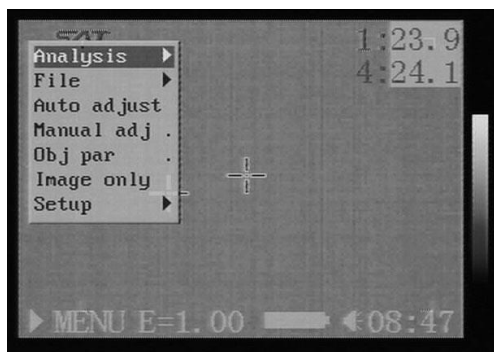
4.2.4 Recall the infrared image

1. After startup the camera, press the “menu(enter)” key to pop up the menu;
2. Press the direction key (“8

4.3 Items and Functions of the Menu

The detail introduction the menu system is as follows:

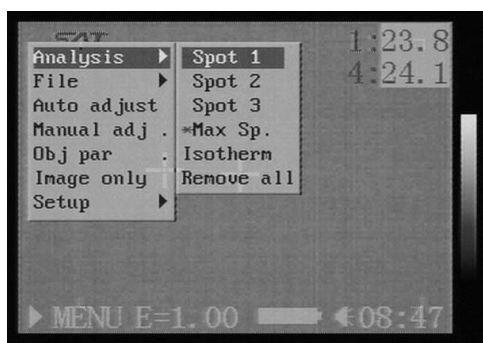
YRH has a powerful analysis processing system, including seven submenus “Analysis”, “File”, “Auto-adjustment”, “Manual adjustment”, “Object parameter”, “Image only” and “Setting”.



Main menu

4.3.1 “Analysis”

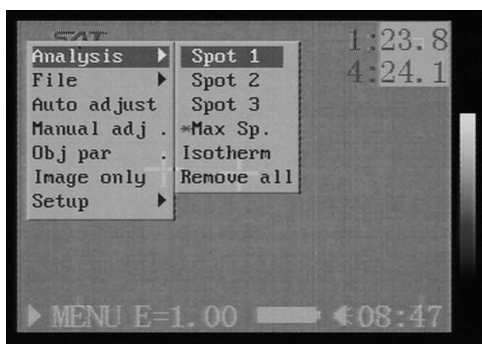
Pop up the menu and select “Analysis”, press the menu(enter)key to pop up the submenu.



Analysis menu

1. Movable spot

Select this and press menu(enter) key that the camera will come into the temperature measurement condition, there will be a cursor comes out at the middle of the screen, move the camera or move the direction key to point the cursor to the target, the target's temperature value will be displaying on the right-up of the screen. The "Spot2" and "Spot 3" is the same as "Spot 1".



Spot 1

2. Max. /Min. temperature

Select this and press menu(enter) key that there will be one spot tracking the highest or lowest temperature in the area. The area size depends on the green box. The user can change the size through the combination key "left-up", "left-down", "right-up" or "right-down", and also the direction can be change through "△", "▽", "◀" or "▶".

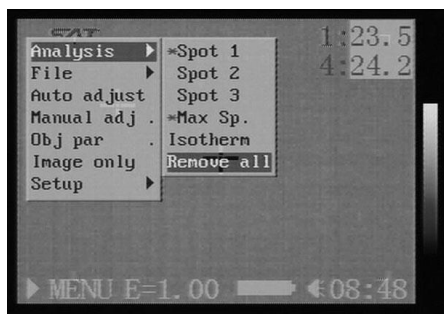
3. Isotherm

Select this and press menu(enter) key that the camera will

do the isotherm analysis of the infrared image. That is to say, if the temperature is in one setting area, it will be displayed in one color. The temperature range and the color can be set in “Setting” menu.

4. Cancel

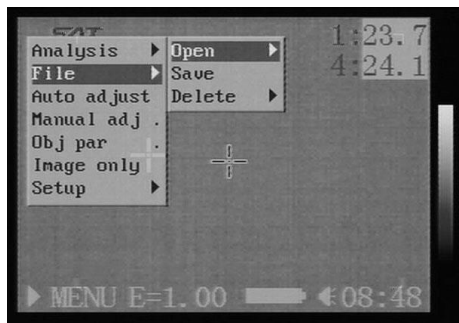
Cancel all the analysis.



4.3.2 “File”

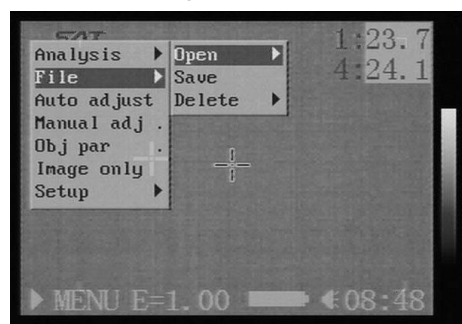
Remove all

Pop up the menu and select “File” press the menu (enter) key to pop up the submenu.



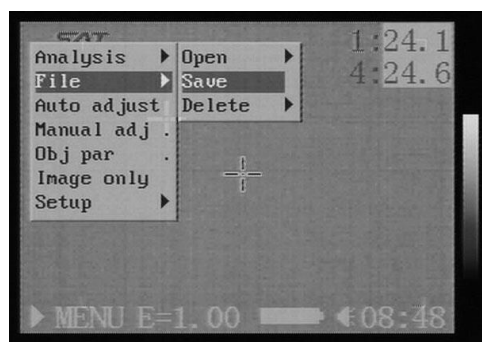
File menu

1. Open: Open the images of the Flash Disk.



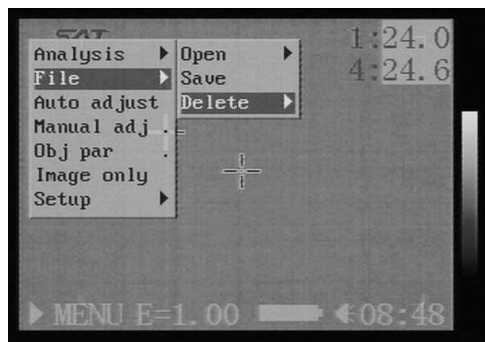
Open

2. Save: Save the image to the Flash Disk.



Save

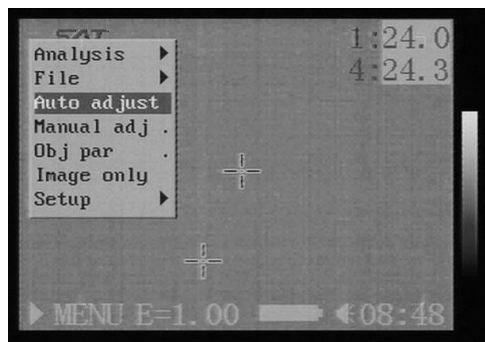
3. Delete: Delete the images of the Flash Disk



Delete

4.3.3 “Auto-adjustment”

Select this and press menu(enter) key that the camera will do the auto-adjustment. The key “A” is the same function as this.



Auto adjust

4.3.4 “Manual adjustment”

Select this and press menu(enter) key that there will be a box comes out as below. Use the direction keys to change the parameters so that the user can manually adjust the image.

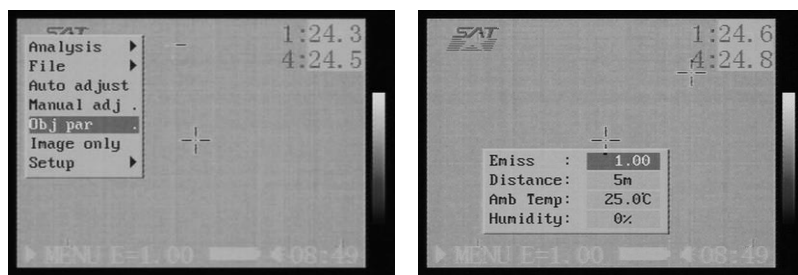


Manual adjust

Note: Temperature range for the YRH is fixed to range 1, the range item is grey and will not be changed.

4.3.5 “Object parameter”

Select this and press menu(enter) key that there will be a box comes out as below. Use the direction keys to change the parameters in order to assure the accuracy of the camera.



Object parameter

1. Emissivity

Different object has different emissivity. Use different emissivity to measure different object.

2. Distance

Different object has different distance to the IR camera. Use different distance to measure different object.

3. Amb Temp

Input ambient temperature.

4. Humidity

Input ambient humidity.

4.3.6 “Image only”

Select this and press menu(enter) key then the screen will display the infrared image only, all the information will be concealed.

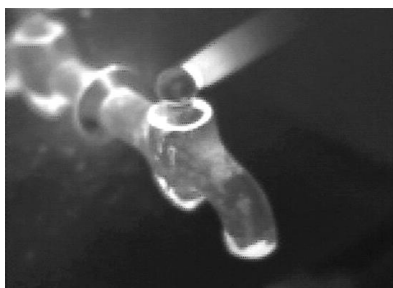
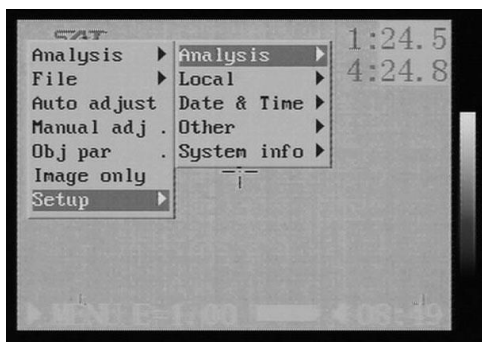


Image only

4.3.7 “Setup”

Select this and press menu(enter) key that it will pop up the

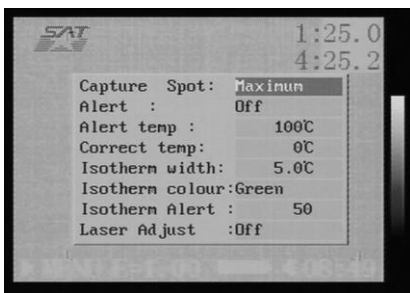
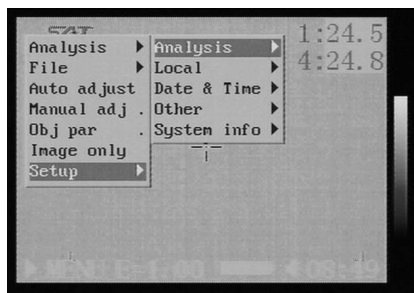
submenu.



Setup menu

1. Analysis setting

Select this and press menu(enter) key that there will be a box comes out in the screen as below, use the direction keys to change the parameters and fulfill the different analysis.



Setup-Analysis

(1).Capture Spot

This is to setting the “highest spot/lowest spot” of the “analysis” menu. If the highest spot was selected, the camera will auto-track the

highest temperature of the area and display the temperature value; if the lowest spot is selected, the camera will auto-tracking the lowest temperature of the area and display the temperature value

(2).Temperature alarm

This is for turning on or turning off the temperature alarm function. When turning on this function, if the temperature of “highest spot” is higher than the preset alarm temperature, the value will display in red and the camera will buzz itself; if the temperature of “lowest spot” is lower than the preset alarm temperature, the value will display in red and the camera will buzz itself

(3).Alarm Temperature

This is to preset the alarm temperature value.

(4).Revised temperature

In some special condition, in order to assure the accuracy of the camera, the temperature can be revised. In the normal condition, it is “0 °C”.

(5).Isotherm width

This is to set the width of the isotherm range. It can be set from 0.1°C to the upper limit. The standard upper limit is 330°C.

(6). Isotherm color

The color of isotherm can be displayed in red or green.

(7).Isotherm alarm

It offers the selection from 1 to 255. 1 is the most sensitive whereas 255 is the least.

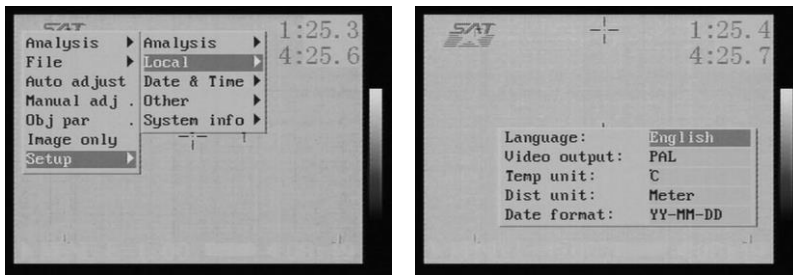
(8).Laser Adjust

It offers the re-selection to define the position of laser point and measure spot. When it's on, user can readjust the laser point direction to correspond with the measuring spot 1. When it's off, the position of

laser point will be recorded.

2. Local Setup

Select this and press the menu (enter) key that there will be a box display in the screen as below. Use the direction key to change the setting.

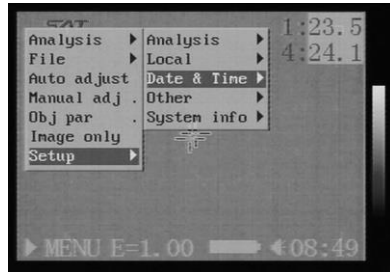
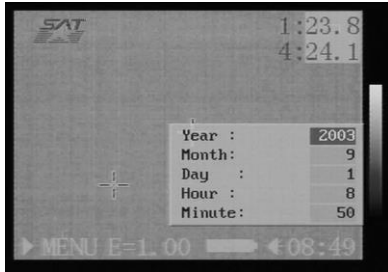


Setup-Local

- (1) Language
Chinese, English, French, German, Italian, Spanish and Portuguese are available.
- (2) Video output
PAL and NTSC video output format are available.
- (3) Temperature unit
Celsius and Fahrenheit are available.
- (4) Distant unit.
“Meter” and “Feet” are available。
- (5) Date format
“DD” means date, “MM” means “month”, “YY” means “year”.

3. Time setting

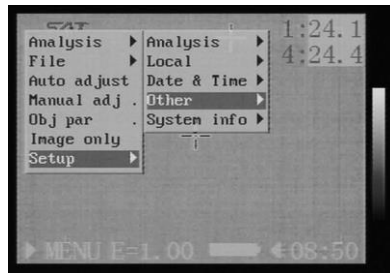
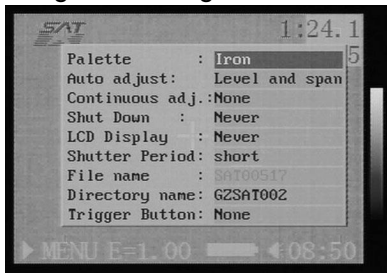
Select this and press the menu(enter) key that there will be a box displaying in the screen as below. Use the direction key to change the setting.



Setup-Date & Time

4. Setup Other

Select this option and press the menu(enter) key, there will be a box displaying in the screen as below. Use the Direction keys to change the settings.



Setup-Other

(1) Palette

It provides a number of artificial color options. YRH

altogether provides 6 artificial color modes, respectively “Iron”, “Iron inverted”, “Rainbow”, “Feather”, “Grey” and “Grey inverted”. The user may select the different artificial colors according to the actual demands or personal preference.

(2) Auto adjust

Use it to define the adjustment way of the key “A”. Three options, “Level and Span”, “Level” and “Span” are available. If “Level and Span” is selected, press the key “A” and the camera will adjust automatically the brightness and contrast of the image to the default optimum image effects. If “Level” is selected, press the key “A”, and the camera will automatically adjust the brightness of the image, while the contrast needs to be adjusted manually. On the contrary, if “Span” is selected, press the key “A” and the camera will automatically adjust the contrast of the image, and the brightness needs to be adjusted manually.

(3) Continuous adjust

This is for setting whether the camera needs to auto-adjust continuously according to the change of the image. There are three options include “continuously adjust”, “middle value of the window” and “off”. If “continuously adjust” is selected, the camera will automatically adjust the brightness and contrast of the image continuously according to the change of the image; If “middle value of the window” is selected, the camera will automatically adjust the brightness of the image continuously according to the image changes. If “off ” is selected, the camera will not automatically adjust the brightness and contract of the image according to the image changes, and

then the image display is adjusted by the key “A” or manually.

(4) Auto shut down the camera

This is to set the camera that whether it needs to auto-shut down when un-using for a long time. There are 4 selections: “never”/“2min.”/“5min.”/“10min.”.

(5) Auto shut down the screen

This is to set the screen that whether it needs to auto-shut down when un-using for a long while. There are 4 selections for saving the power system: “never”/“30 sec.”/“60 sec.”/“2 min.”.

(6) Period of auto- adjustment

This is to set the period of auto-adjustment. It has “standard” and “short period” 2 selections. If the user selects “ standard”, the camera will auto-adjust in every 2 min.; if the user selects “short period”, the camera will auto-adjust in every 1 min.

(7) Initialized file name

It shows the current file name, there is no necessary for the user to change the file name. In NULL status, press ‘C’+‘A’+‘S’ will reset the initialized file name to sat00000.

(8) Directory name

It shows the current Directory name, the user can change the name and the camera will create the new DIR name and use it when save images.

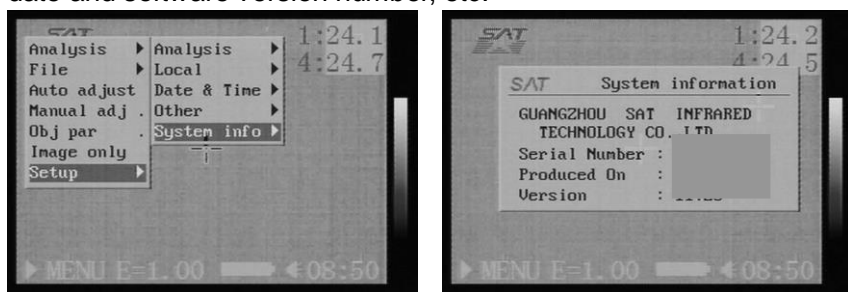
(9)Trigger Button Setting

This is to setting the control switch of YRH.It has “None”、 “Save”、 “Auto-Adjust”、 “Laser” four selections。

- “None”: The control switch will be useless;
- “Save”: Same as button “S”;
- “Auto Adjust”: Same as button “A”;
- “Laser”: The laser function will be available for detect the target location when select this.

5. System Information

Select this option and press the menu(enter) key, the following information will be displayed at the center of the screen, including the model of the equipment, manufacturer, serial number, production date and software version number, etc.



Setup-System info

5 YRH Operation Examples

5.1 Insert Batteries

When the user uses YRH IR camera for the first time, the battery may be in low status. The user can charge the battery with the special charger. (Specific introduction referred to Battery System).

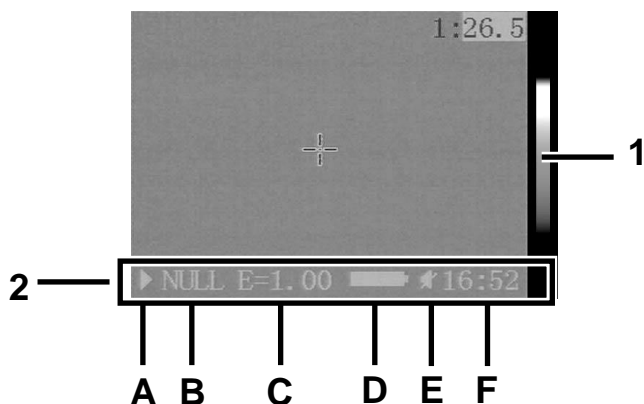
(1) Insert battery: Hold the knob and take off the battery compartment cover, put the battery into the compartment and push it to the bottom, and then close the compartment cover.

(2) Take out the battery: take off the cover and push the battery in a opposite direction.

5.2 Startup

Press the Power switch key and hold it on about 3 seconds to start the IR camera, and the image of SAT logo with color ribbons is displayed in the screen as below. It means the camera is starting up.

After 30 seconds, SAT logo is displayed at the top left corner of the screen, and the temperature and color scale are displayed on the right; a status bar is displayed on the down corner. Now the IR camera has completed the startup.



Info on the screen

1. Color bar

The palette is displayed on the right.

2. Status bar

The status bar is displayed at the bottom of the screen, from left to right: image condition(A), operation condition(B), the emissivity of the target (C), battery charge (D), sound alarm (E) and the current time (F).

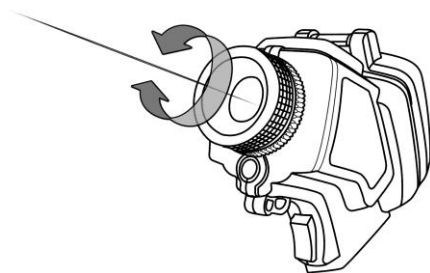
The definition of operation status as below:

Null	No menu or analysis tool is activated
Menu	Currently in menu mode
SP1	Current analysis tool is spot 1
SP2	Current analysis tool is spot 2
SP3	Current analysis tool is spot 3
Cap	Current analysis tool is auto tracking spot
Iso	Current analysis tool is isotherm analysis

5.3 Adjust the camera

5.3.1 Focus

Point the camera to the target and turn the focus ring until you get a sharp image.



Turn the focus ring

5.3.2 Image adjustment

(applicable to “Null” and “Menu” status)

In “Null” or “Menu” status, press the key “A”, and YRH will automatically adjust the obtained image according to the setups under the Setup-Image submenu to achieve the optimum effects.

In other statuses, if it is required to save the current analysis status and adjust, press the key “A”. Now “Null” is displayed on the status bar. Then press the key “A” again or manually adjust the image. If it is required to adjust the image without saving the current analysis status, press the key “C”. Now the current analysis status is cleared and “Null” is displayed on the status bar. Press the key “A” again or manually adjust the image.

5.3.3 Freeze and Live of the image

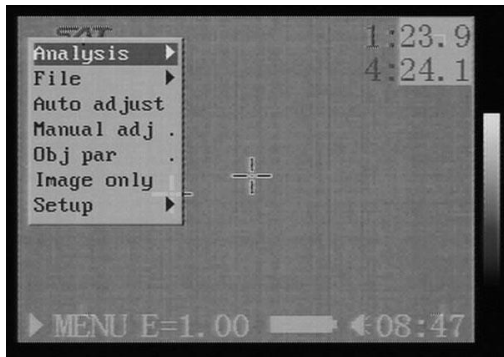
(applicable to any status)

In the live image status, press the key “S”, the image will be frozen. On the contrary, press the key “S” in the Image Freeze status, the image will be lived again. This operation is available in all the status.

5.4 Realization of all functions

5.4.1 Menu calling

(1) In the non-“menu” status, press the menu(enter) key and the menu will be popped up.



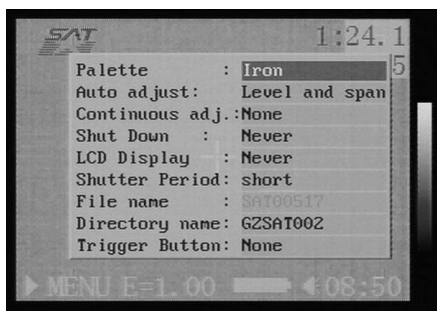
Menu

- (2) Pull down the menu and move up and down as well as left and right with four Direction keys.
- (3) Select one item under the menu, press the “menu(enter)” key to enter this item and press the key “C” to exit the selected mode.
- (4) In Menu mode, press the key “C” to return to the previous menu,

and continuously press “C” until it exits from “Menu” mode.

5.4.2 Temperature measurement

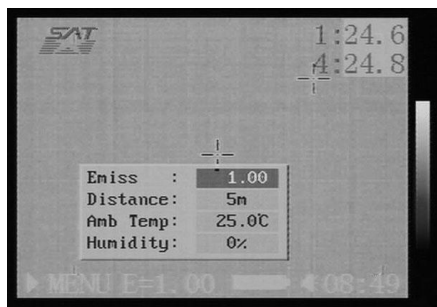
YRH can simultaneously measure four spots' temperature, tracking and displaying the highest/lowest temperature and alarm. The specific operation see follows.



Setup-Analysis

1. Setting the object parameters

Select “Obj Par” under Analysis menu, and make setups according to the specific condition as below

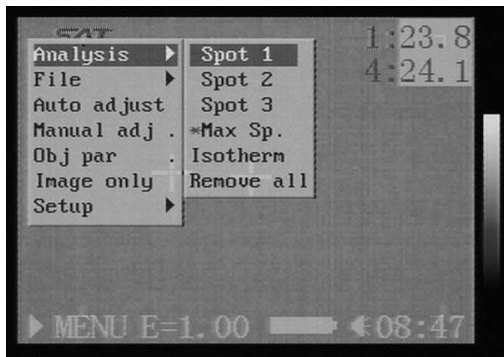


Object parameter

2. Measurement

(1) Spot

Enter “Analysis” menu, select one or any of “Spot 1”, “Spot 2”, “Spot 3” and “highest/lowest spot”. Now one or more cursors will appear on the screen. Meanwhile the specific temperature data appear at the up-right corner of the screen. According to the setups, highest spot will automatically track the highest temperature, and so “SP_1” displays the highest temperature value. If the temperature exceeds preset temperature, the camera will buzz itself. Other spots can be moved with the direction keys to realize the full screen multi-spot temperature measurement.



Analysis tool

(2) Isotherm analysis

a) Analysis Setup

Setup the “Isotherm type”, “Isotherm width” and “Isotherm color” of “Setup-analysis” under Setup menu.

b) Analysis Operations

Select “Isotherm” under Analysis menu, press menu(enter)

key, YRH will display the image within a certain temperature range in one color basing on the isotherm mode set by the user.

(C) Move the Isothermal Area and Change its Size

In Isothermal Analysis mode, press the key “ Δ ” and “ ∇ ” respectively to change the temperature median of the isothermal interval, and press the key “ \blacktriangleleft ” and “ \blacktriangleright ” respectively to change the scope of the isothermal interval.

5.5 Image storage

1. Save an image

After adjusting an image, select “Save” under File menu, and press menu(enter) key. Then YRH will save the current image to the Flash Disk. (Note: this can be performed in both freeze and live status.)

After pressing the key “S” for 2-3 seconds, the image is saved.



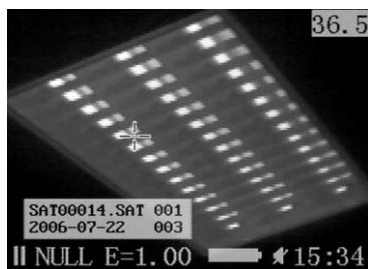
Save an image

The method of YRH image storage is to create a folder in the Flash Disk and save the image to the folder, the directory is named based on the date as below.

The folder will be named from “sat00000” to “sat09999”, number by number. The current folder name is displayed in the menu. For example, if the current name is “sat00081”, then the name of the image you save is “sat00082”.

2. Open Images

Confirm that images have been saved in the Flash Disk. Select “Open” under File menu, and press menu(enter) key. The words “Opening an image” is displayed on the screen along with the image name and the number of images saved in the PC Card as the following figure.



Open an image

Press the Direction key “ \triangle ” or “ ∇ ” to select an image and press menu(enter) key, and the image is opened. Press the Direction key “ \blacktriangleleft ” or “ \blacktriangleright ”, the saved images will be opened in turn.

3. Delete Images

Select “Delete” under “File” menu, and press menu(enter) key. The operations after this are the same as those of “Open”, and then

the current image is deleted.

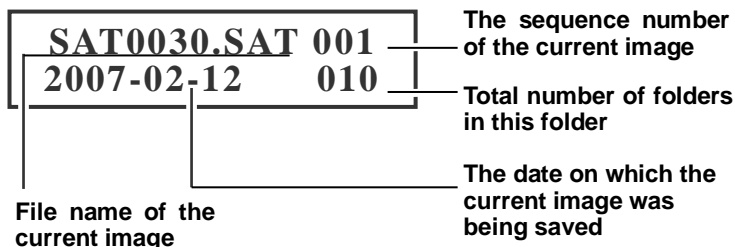


Delete an image

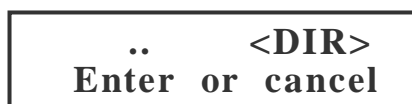


How to select an image

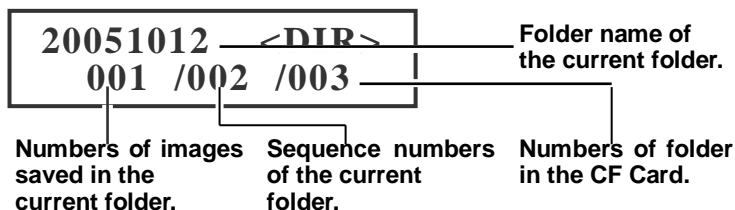
- 1 After you select **[Open]** or **[Delete]** option under **[File]** menu, a message shown as below will appear in the lower left of the screen.



- 2 If the image you wish to open or delete is not in the current folder, press **▲** or **▼** until the following message appear.



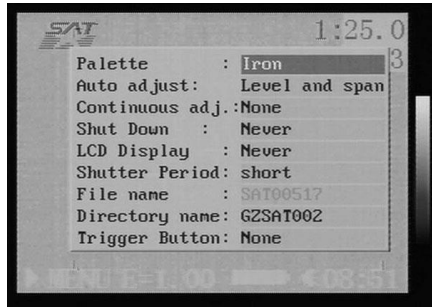
- 3 Press **[Enter]** key to select a dirtory or press **[Cancel]** key to exit. After you press **[Menu/Enter]** key to select a directory, a message appear on the screen.



- 4 Press **▲** or **▼** to select a folder, then repeat step 1 to select an image in the selected folder.

5.6 Changing the palette

Select “Setup-Image” under Setup menu, and press menu (enter) key.



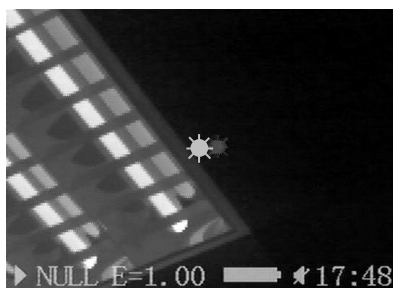
Change the palette

Select “Color Scale” with “ \triangle ” and “ ∇ ”, and then press “ \blacktriangleright ” and “ \blacktriangleleft ” to shift between the images. The images can be previewed during shifting.

5.7 Laser pointer

5.7.1 Trigger the laser pointer

YRH provides the laser pointer function. When observing a target, the user can select “Setup” -> “Other” -> “Laser on” and press and hold the trigger to turn on the laser pointer for locating the target (as the following diagram).

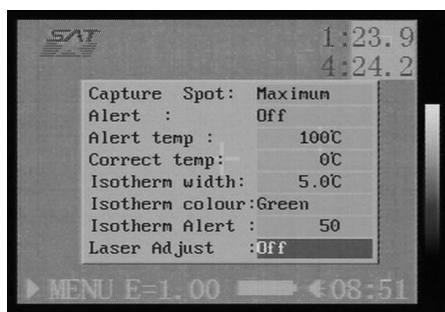


Trigger the laser pointer

Warning: Do not trigger the laser pointer in human or animal eyes. Exposure to the laser produced by the laser pointer may damage eyesight.

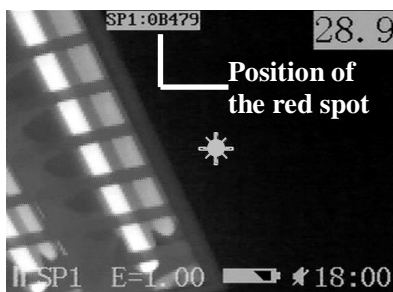
5.7.2 Set the laser point as the measuring instruction

Select "Setup" -> "Analysis Setup" -> "Laser Adjust" -> "On"
Press "Enter". Then select "Analysis" -> "Spot 1", and move the cross onto the spot that the laser pointer instructs (as the following diagram).



Laser adjustment

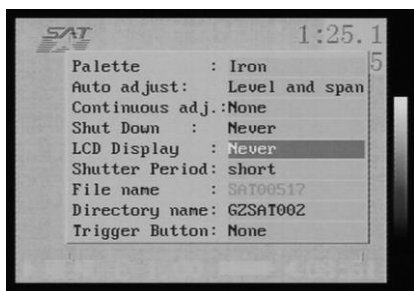
During the setup progress, there are coordinates of Spot 1(as the following diagram) appeared on the up-left corner of the screen.



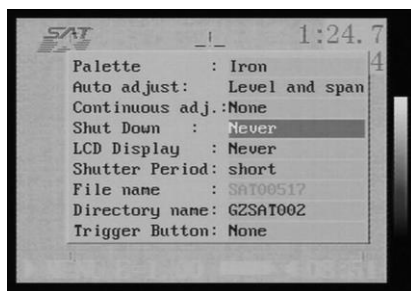
Laser adjustment

5.8 YRH saving power mode

YRH provides a saving power mode. When the camera is being un-used for a while, the user can set the time period, it will auto-turn off the screen for saving the power. It can be recovered by pressing any one key.(This function is like the screen saver of PC).



LCD auto shut down



Camera auto shut down

6 Battery system

YRH battery system is made up of rechargeable lithium battery and a charger.

Warning:

It is forbidden to disassemble the camera, connect any terminal, install the battery, charge the battery, short-circuit, and disassemble the battery and its charger in coal mine environment. Only the genuine battery pack and battery charger are allowed to use. Fail to do so may cause terrible disaster and SATIR is not responsible for it.

6.1 Battery

The battery capacity of YRH is 8.5wh, Inside there is over-current and overheat protection circuit. Each battery cell can be charged for no less than 500 times. Every new battery cell can last for 2 operation hours. When the battery is low, the camera will automatically turn off for protection.

6.2 Charging the battery



Charger



Battery

- Connect the rear power cord of the charger to the electrical outlet. The charger will automatically shift between 100-240V AV voltage. When the power light is on, it indicates the charger is now ready.
- Put the battery into the charger.

6.3 Appendix of the Battery System

- Heat will be produced while charging.
- Over-charging might not damage to a full battery, but it is still

recommended that the charging time shall not exceed 20 hours.

- A new lithium cell will reach the full capacity after 5 charges
- Generally speaking, the battery status is full before shipping.
- It is not required to fully discharge the lithium cells as they do not produce the memory effect as cadmium nickel cells.

6.4 Cautions of Using the Battery

- There will be explosive risk due to improper battery replacing.
- Only the genuine intrinsic safety battery pack and charger manufactured by the manufacturer are allowed to use.
- The used up batteries must be disposed as instructed by the manufacturer.

7 Infrared Camera Maintenance

7.1 Routine Maintenance

7.1.1 Infrared lens

The infrared lens cap shall normally be in place to avoid dust or accidental damage when the camera is not in use. When the optical lens needs to be cleaned, please wipe it with special lens tissue. Do not wipe it with hands, otherwise the imaging quality will not be influenced.

7.1.2 Camera Body

Please pay attention to prevent the camera from falling off during use. Please wash the camera body clean to avoid splash adhesion after using the camera in the field. Then put the camera into the portable case.

7.2 Storage and Transportation

7.2.1 Storage

Keep the camera away from the moisture, dust, unventilated place and high temperature heat source to avoid damage and distortion.

7.2.2 Transportation

Avoid violent impact or vibration during handling and transportation. Otherwise the parts will be possibly damaged.

8 Technical Specification of YRH

Type	YRH600
Thermal	
FOV / min. focus distance	38°x28.5°/ 0.1m
Spatial resolution	4.4mrad
Thermal sensitivity	80mK
Detector type	Focal plane array (FPA) Uncooled microbolometer
Resolution	160x120
Spectral range	8~14um
Focus	Manual
Frame rate	50Hz PAL / 60Hz NTSC
Image presentation	
LCD display	2.5" LCD
Video output	PAL or NTSC composite video
Measurement	
Measurement range	-20 °C to +250 °C, (-4°F to +482°F)
Accuracy	±2°C, ±2%
Spot	3 movable and 1 auto-tracking
Isotherm	Yes
Sound alarm	Yes
Emissivity correction	0.01 to 1.00

Image storage	
Type	Internal memory (128MB)
File format	.SAT format, with 14bit measurement data
Laser pointer	
Type	Class 2, red
Battery	
Type	Explosio-proof, Li-on, rechargeable, field replaceable
Battery operation time	2.5 hours
Battery charger	External 1 bay intelligent charger
Power saving mode	Yes
Environmental Specification	
Operation temperature range	-15°C to +50°C (5°F to +122°F)
Storage temperature range	-40°C to +70°C (-40°F to +122°F)
Humidity	Operating and storage 10% to 95%,non-condensing
Encapsulation	IP 54
Shock	Operation: 25g
Vibration	Operation: 2g

Physical characteristic	
Weight (inc. battery)	700g
Size	211 mm ×80mm ×195mm
Tripod mounting	1/4" 20
Interface	
USB	Download thermal image
Video output	Composite video
DC-in	DC 8-12V, 3A

9 YRH Shortcut key

1. **“A” key:** In any analysis status, “A” key means cancel; in other status, “A” key means auto-adjust.
2. **“S” key:** In any status, “S” key means Live/Freeze function; holding for 2-3 seconds can store the image.
3. **“◀”/“▶” key:** In non menu status, these keys can adjust the level of the image, also means adjusting the brightness of the image.
4. **“Δ”/“▽”Key:** In non menu status, these keys can adjust the span of the image, also means adjusting the contrast of the image.
5. **“C”+“S”:** In non menu status, this combination key means turning on/off the buzzer.
6. **“C”+“+”/“—”:** In non menu status, this combination key means adjusting the brightness of the LCD.
7. **“C”+“L”/“R”:** In non menu status, this combination key means adjusting the contrast of the LCD.
8. **“C”+ menu “enter” key+ “L+”/“R”:** In non menu status, this combination key means adjusting the color level of the LCD
9. Press the key “C” before turn on the camera, the parameter of the system will be initialized into default parameter.^(Note 1)
10. In the “Null” mode, **“C”+“A” +“S”** will return the file name and folder name to 0. ^(Note 2)
11. When YRH is connected to PC successfully, user can copy, delete and format the file of the Flash Disk via PC. ^(Note 3)

Note 1: It can be used when the function is out of gear because of the system parameter.

Note 2: Delete all the file in the camera before initializing the file name.

Note 3: FAT 16 is selected when formatting the file system.

Appendix:

Emissivity of Various Materials

Material	Temperature (°C)	Emissivity
Metal		
Aluminum		
Polished aluminum	100	0.09
Commercial aluminum foil	100	0.09
Electrolytic chrome plate alumina		0.55
Mild alumina	25~600	0.10~0.20
Strong alumina	25~600	0.30~0.40
Brass		
Brass mirror (highly polished)	28	0.03
Brass oxide	200~600	0.61~0.59
Chrome		
Polished chrome	40~1090	0.08~0.36
Copper		
Copper mirror	100	0.05
Strong copper oxide	25	0.078
Cuprous oxide	800~1100	0.66~0.54
Liquid copper	1080~1280	0.16~0.13
Gold		
Gold mirror	230~630	0.02
Iron		

Polished cast iron	200	0.21
Processed cast iron	20	0.44
Polished tempered iron	40~250	0.28
polished steel ingot	770~1040	0.52~0.56
Raw welded steel	945~1100	0.52~0.61
Surface ferric oxide		
Completely rusty surface	20	0.69
Rolled iron plate	22	0.66
Oxidized steel	100	0.74
Cast iron (Oxidizing at 600°C)	198~600	0.64~0.78
Steel (Oxidizing at 600°C)	198~600	0.79
Electrolytic ferric oxide	125~520	0.78~0.82
Ferric oxide	500~1200	0.85~0.89
Iron plate	925~1120	0.87~0.95
Cast iron, heavy ferric oxide	25	0.80
Tempered iron, ferric oxide	40~250	0.95
Melting surface	22	0.94
Melting cast iron	1300~1400	0.29
Melting mild steel	1600~1800	0.28
Liquid steel	1500~1650	0.42~0.53
Pure liquid iron	1515~1680	0.42~0.45
Lead		
Pure lead (Non-oxidization)	125~225	0.06~0.08
Mildly oxidized	25~300	0.20~0.45
Magnesium		

Magnesia	275~825	0.55~0.20
Magnesia	900~1670	0.20
Hg	0~100	0.09~0.12
Nickel		
Electroplate polishing	25	0.05
Electroplate non-polishing	20	0.01
Nickel wire	185~1010	0.09~0.19
Nickel plate (oxidized)	198~600	0.37~0.48
Nickel oxide	650~1255	0.59~0.86
Nickel alloy		
Nickel-chrome (heat-resistance)	50~1000	0.65~0.79
Nickel-chrome alloy	50~1040	0.64~0.76
Nickel-chrome (heat resistance)	50~500	0.95~0.98
Alloy wire (oxidized)		
Nickel-silver alloy	100	0.14
Silver		
Polished silver	100	0.05
Stainless steel		
18-8	25	0.16
304(8Cr,18Ni)	215~490	0.44~0.36
310(25Cr,20Ni)	215~520	0.90~0.97
Tin		
Commercial tin plate	100	0.07
Strong oxidization	0~200	0.60

Zinc		
Oxidizing at 400°C	400	0.01
galvanized shining iron plate	28	0.23
Ash zinc oxide	25	0.28

Non-metal materials	Temperature (°C)	Emissivity approximation
Brick	1100	0.75
Fire brick	1100	0.75
Graphite (lamp black)	96~225	0.95
Porcelain enamel (white)	18	0.90
Asphaltum	0~200	0.85
Glass (surface)	23	0.94
Heat-resistance glass	200~540	0.85~0.95
Calcimine	20	0.90
Oak	20	0.90
Carbon piece		0.85
Isolation piece		0.91~0.94
Sheet metal		0.88~0.90
Glass pipe		0.90
Loop type		0.87
Porcelain enamel products		0.90
Porcelain enamel designs		0.83~0.95
Solid materials		
Capacitor		
Circumrotating type		0.30~0.34
Chemical type		0.25~0.36

Ceramics (plate type)		0.90~0.94
Ceramics (vase type)		0.90
Film		0.90~0.93
Mica		0.94~0.95
Flume mica		0.90~0.93
Glass		0.91~0.92
Semiconductor		
Transistor (plastics sealed)		0.80~0.90
Transistor (metal)		0.30~0.40
Diode		0.89~0.90
Transmitting loop		
Pulse transmission		0.91~0.92
Level chalkiness layer		0.88~0.93
Top loop		0.91~0.92
Electric materials		
Epoxy glass plate		0.86
Epoxy hydroxyl benzene plate		0.80
Gilded sheet copper		0.30
Solder-coated copper		0.35
Tin-coated lead wire		0.28
Brass wires		0.87~0.88
Block talcum terminal		0.87

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