SATIR

SATIR UTR

User's manual

Trademark Acknowledgments

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Content

1. Overview

1.1   Device Brief Introduction

SATIR UTR handheld thermal camera is equipped with advanced UFPA (uncooled focal plane array) infrared detector and used for observation of mid and short-range target, like people, vehicle, ship, etc.

SATIR UTR handheld thermal camera is designed in all-metal case, compact structure, comfortable holding, easy operation and high adaptability to environment that it can work stably and reliably in variety harsh conditions.

1.2   Packing list

After receiving the product, user can remove the external carrying packing (normally corrugated case) and check the cargo quantity and exterior in accordance with corresponding packing list or inventory of supply contract.

When there are no particular requirements, SATIR UTR handheld thermal camera and its small accessories will be place in hard dedicated engineering plastics carrying case for delivery, normally including:
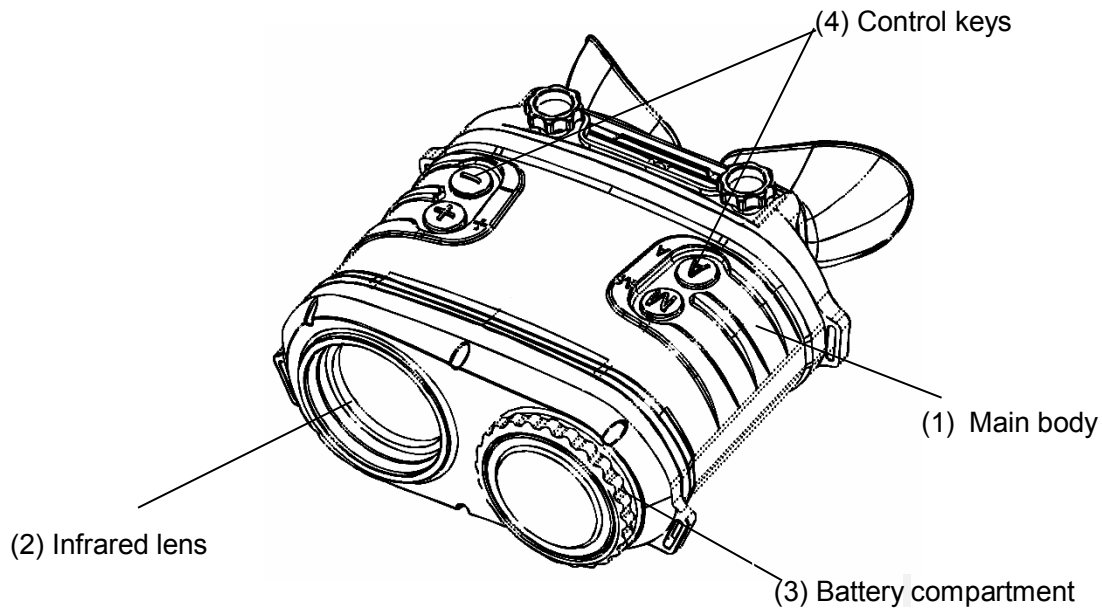
- Thermal imager (including binocular)   1X
- Rechargeable Li-ion battery   1X
- Intelligent charger (including power   2X
  cord)
- Shoulder girdle   1X
- Video output cable   1X
- Video output connector   1X
- USB cable   1X
- Binocular extension cord   1X
- User manual   2X
- Operation demonstration CD   1X
- Inspection Report   1X
- Certification of product   1X
- Packing list   1X
- Plastic carrying case   1X
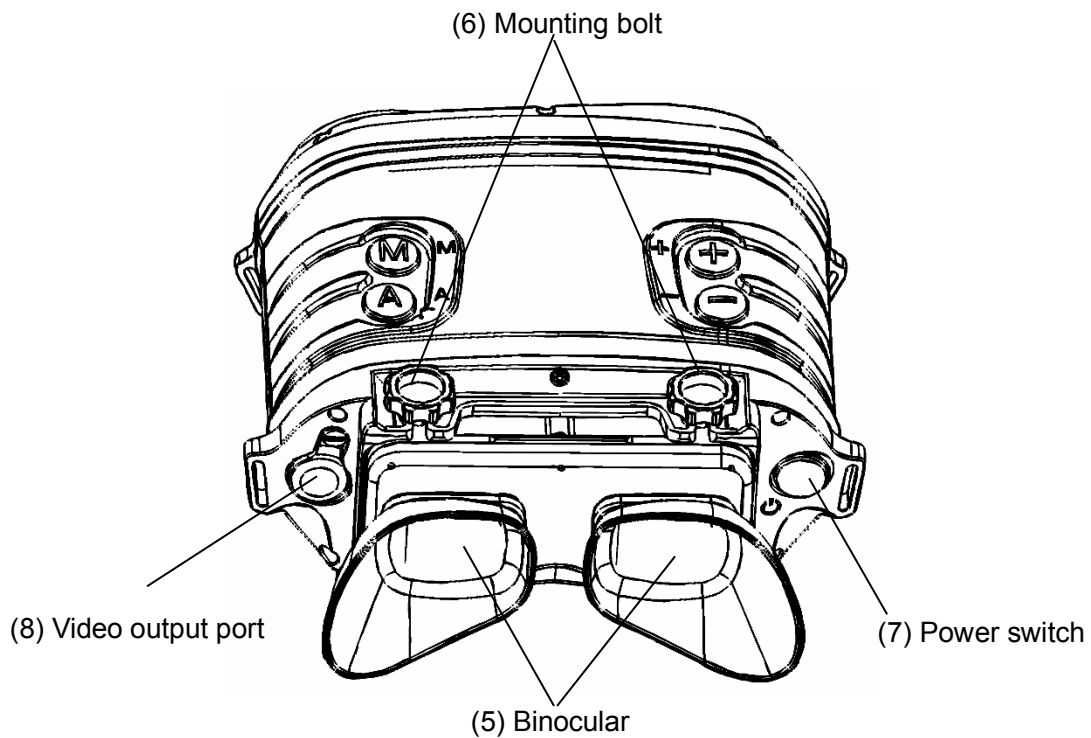
2. Main technical parameters

A. Constitute: Thermal camera and binocular module, thermal camera is including thermal detector, lens, circuit board and keys.

B. Control mode: Control keys.

C. Video output: High resolution OLED display, binocular observation.

D. Power supply: 7.2V Li-ion battery，power dissipation is less than 5W.

E. Battery working hours：No less than 3 hours (use new fully charged battery).

F. Size and weight: 175mm×196mm×85mm (L×W×H)，no more than 1.5kg (including battery）.

G. Field of view：11°×8.2°.

H. Detector：384X288 long ware UFPA (uncooled focal plane array) infrared detector.

I. Focus mode and range: Electronic focus, 10m～∞.

J. Boot time：No more than 20 seconds.

K. Mean time between failures (MTBF): more than 3000 hours.

L. Mean time to repair (MTTR)：no more than 12 hours.

M. Reconnaissance and identification capability (meteorological condition: visibility 7.5km, air temperature 20℃, relative humidity 60%, temperature difference of target and background 3～5℃, 50% probability):
Aim at target of skiff (5 meters length、2.5 meters high，side): Detector distance is no shorter than 1000 meters.

3. Operation and use

3.1 Brief introduction of device component

1) **Main body**: Used to convert the infrared radiation to image and implement other functionality.

2) **Infrared lens**: Infrared lens converge the infrared radiation of target and background on the detector.

3) **Battery compartment**: The cover of battery compartment has threads and seal ring, it is easy to open and water proof.

4) **Control keys**: Used to control functions of the device.

(6) Mounting bolt

(8) Video output port

(7) Power switch

(5) Binocular

5) Binocular: Design in binocular, clear and bright, detachable and separated from main body to realize observation.

6) Mounting bolt: Used to fix the binocular, unscrew to demount the binocular.

7) Power switch: Used to turn power on or off.

8) Video output port: Used to output the video of the device to the video equipment, like television, monitor, etc.

3.2 Basic operation

3.2.1 Preparation

● Take the device out of the carrying case and confirm that the power has been turn off.

● Unscrewed counterclockwise the cover of the battery compartment.

● Install the battery into the battery compartment and lock the battery steady with the nearby clamping-lock.

● Close and screw clockwise to tighten the battery compartment cover.

3.2.2 Turn on the device

● Press the power switch and keep holding for 3 seconds to start the device and the OLED displayer will light.

● The device will start up completely in 20 seconds.

● Open the lens cover, aim the device at the area or the object you want to observe, go on observation and operation.
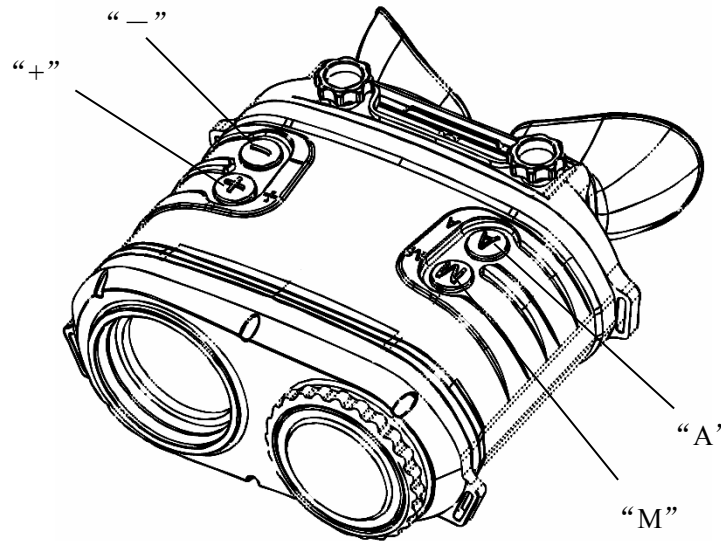
3.2.3 Turn off the device

● Close the lens cover, press and keep holding the power switch for more than 3 seconds to turn off the device.

● Unscrew the batter compartment cover.

● Push aside the clamping-lock, and take out the battery.

● Close and screw the cover of the battery compartment, place the device and accessories into the carrying after the battery has been fully charged.

3.3 Function and operation

The operations of the device are very easy and you can control all functions of the device via the keys of the main body or binocular. All functions of the device are accomplished by the keys.

There are 4 keys on the shell and the distribution is presented in following picture.
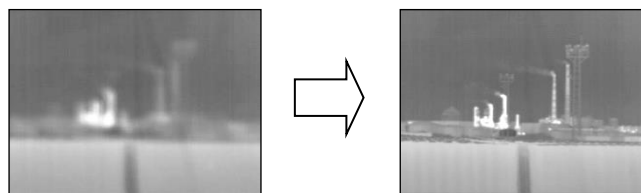
"—"

"+"

"A"

"M"

Distribution of key on main body

Function of each key is as follows.

Key	Function
+	Focus on the target far in the distance or switch to next items of the menu.
—	Focus on the target near in the distance or switch to last items of the menu.
A	Internal/external reference or quit the menu.
M	Enter the menu and switch to next menu.

The device mainly contains the following functions.

（1） Focusing

When you need to observe target in difference distance, you can do the operation of focusing. If you want to observe the target far in the distance, you can press the "+" key to adjust the focusing. If you want to observe the target near in the distance, you can press the "-" key to adjust the focusing. If it is difficult to judge the place of the target, you can press the "+" key and the "-" key at the same time to focus on the target automatically.
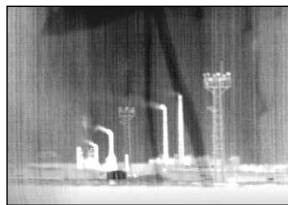
Comparing the images of focusing before and after
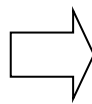
（2） Internal/external reference

Internal or external reference can improve image quality and reduce the pattern noise and image quality degrading which due to the environment change. The device will execute the internal reference several times when booting. You can execute the reference manually if you found the degradation of image quality. Press the "A" key to execute the internal reference and it is normal that the image will pause briefly during the internal reference process. Press and keep holding the "A" key, the device will execute the external reference automatically and the screen will show words "External B.REF". Close the lens cover before the external reference and it is no need to execute the internal reference after the external reference.

If you observe from indoor to outdoor and there is a large difference in temperature of indoor and outdoor and the effect of external reference is not ideal, you can use the background with uniform temperature distribution and be full of the screen to replace the lens cover to executed the external reference, like the cloudless sky, wide area wall, ground, etc. Internal and external reference is an important method of image quality adjustment that is necessary to do repeatedly.

The effect after the internal or external reference calibration is shown like the following pictures.
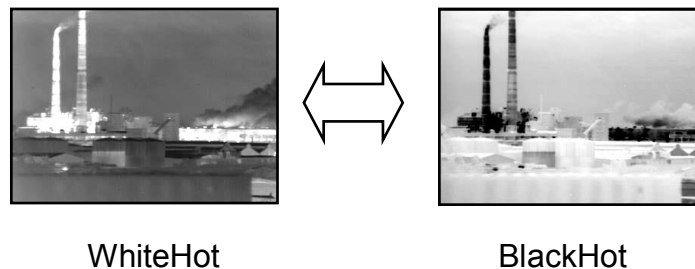

Before calibration   After calibration

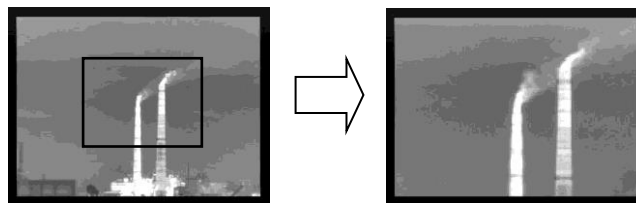Comparison of Internal/external reference calibration before and after

（3） Image polar setting

Thermal image has "BlackHot" and "WhiteHot" display modes. In "WhiteHot" mode, the higher the temperature of the target, the more white the target displays on the screen and the lower the temperature of the target, the more black the target displays on the screen. The "BlackHot" mode is on the contrary. You can use different mode according to personal habit. Press the "M" key to enter the menu and press the "M" key continuously to switch to "IMA_POLAR", then press the "+" or "-" key can switch between the two modes.

WhiteHot   BlackHot

（4） Digital zoom

In some case, the target is too small or in far distance, it is still difficult to observe the details of the target even the target is in focus. In order to identify the target, you can magnify the image to 2 times or 4 times with digital zoom function. Press the "M" key to enter the menu and press the "M" key continuously to switch to "ZOOM_IN", and then press the "+" key to zoom in the image or press the "-" key to zoom out the image to original size.

The image before and after digital zoom

（5） Level/Gain（contrast）adjustment

Press the "M" key to enter the menu and press the "M" key continuously to switch to "LEVEL" or "GAIN", and then press the "+" key to increase the level or gain of the image, press the "-" key to decrease the level or gain of the image.

Press the "M" key to enter the menu and press the "M" key continuously to switch to "AUTO_GAIN", and then press the "-" key to set it to "OFF".

（6） Txt polar setting

The txt display on the screen can switch between "Black" and "White" as required.

Press the "M" key to enter the menu and press the "M" key continuously to switch to "TXT_POLAR", and then press the "+" key or "-" key to switch the txt polar between "Black" and "White".

（7） DDE adjustment

Press the "M" key to enter the menu and press the "M" key continuously to switch to "DDE" digital detail enhance, and then press the "+" key to increase or press the "-" key to decrease the DDE strength.

（8） Automatic internal reference

Press the "M" key to enter the menu and press the "M" key continuously to switch to "AutIntREF", press the "+" key to turn "ON" the automatic internal reference or press the "-" key to turn "OFF" the automatic internal reference.

（9） Display brightness adjustment

Press the "M" key to enter the menu and press the "M" key continuously to switch to "OLED BRT", and then press the "+" key to increase or press the "-" key to decrease the OLED display brightness.

（10） Image filter

Press the "M" key to enter the menu and press the "M" key continuously to switch to "FILTER", and then press the "+" key to increase or press the "-" key to decrease the filter strength.

（11） Mode setting

Press the "M" key to enter the menu and press the "M" key continuously to

switch to "MODE", and then press the "+" key to switch to "Manu" mode or press the "-" key to switch to "AUTO" mode.

（12） MP4 function

Press the "A" key and "-" key at the same time to switch to "MP4 MODE" and again to quit "MP4 MODE", and then you can press the "+" or "-" key to switch between "PREVIEW", "PLAYBACK" and "SETTING" mode in MP4 mode. In different mode, the function of each key is shown like the following form.

Mode	"A" key	"M" key	"+" or "－" key
PREVIEW	Press to take an image. Long press to record or quit recording.	Press to execute internal reference. Long press to pop up the menu.	Focusing.
PLAYBACK	Play/pause the image or video playing.	Long press to return to "PREVIEW" mode and pop up the menu.	Switch to the last or next file.
SETTING	Confirm to enter the setting menu.	Long press to return to "PREVIEW" mode and pop up the menu.	Switch to the last or next item of the menu.

（13） Display/hide the system time

This function is only accessed in MP4 mode. Press the "A" key and "-" key at the same time to switch to "MP4 MODE". Long press the "M" key to enter the menu and press the "M" key continuously to switch to "SYS TIME", and then press the "+" key to display the system time or press the "-" key to hide the system time.

（14） System setting

This function is only accessed in MP4 mode. Press the "A" key and "-" key at the same time to switch to "MP4 MODE". Long press the "M" key to pop up

the menu and press the "M" key continuously to select "MP4 MODE". Then press the "+" key or "-" key to select "SETTING" mode and press the "A" key to enter "SETUP" menu.

Setting items	Operation
CYCLIC RECORD	Press the "+" or "-" key to select "**CYCLIC RECORD**" and then press the "A" key to confirm. Press the "+" or "-" key to select "OFF", "5 Minutes", "10 Minutes" or "15 Minutes", and then press the "A" key to save the setting and return to "SETUP" menu.
DATE/TIME	Press the "+" or "-" key to select "**DATE/TIME**" and then press the "A" key to confirm. Press the "+" or "-" key to modify selecting items and then press the "A" key continuously to save and switch to other items and return to "SETUP" menu.
FORMAT	Press the "+" or "-" key to select "**FORMAT**" and then press the "A" key to confirm. Press the "+" or "-" key to select "CANCE" or "OK" and then press the "A" key save the setting and return to "SETUP" menu. All data will be deleted after formatting.
LANGUAGE	Press the "+" or "-" key to select "**LANGUAGE**" and then

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	press the "A" key to confirm. Press the "+" or "-" key to select language as required and then press the "A" key to save the setting and return to "SETUP" menu.
DEFAULT SETTING	Press the "+" or "-" key to select "**DEFAULT SETTING**" and then press the "A" key to confirm. Press "+" or "-" key to select "CANCE" or "OK" and then press the "A" key save the setting and return to "SETUP" menu. All setting will be return to default settings.
VERSION	Press the "+" or "-" key to select "**VERSION**" and then press the "A" key to check version information. Press the "A" key again to return to "SETUP" menu.

3.4 Video output

Use the accessary video output cable (section 4.2.2) can output the device's video to the display device.

Video output port is on the left of the binocular and covered by rubber waterproof cover. Open the waterproof cover and insert the 10-pin connectors of the video cable into the video output port of the device with right direction. Another connector of the video out cable connect to video output device. You can use the video output accessory connector as required.

3.5 Binocular operation

The binocular can be separated from the device and connect to main body via the cable to display the image and control the device.

3.5.1 Separation and combination of binocular and main body

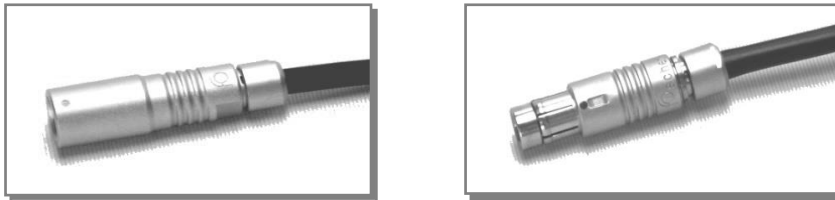#### A. Separation of binocular and main body

Unscrew the fixed screw of binocular, and then pull out the binocular from main body. Fix the screw after separation to avoid missing.

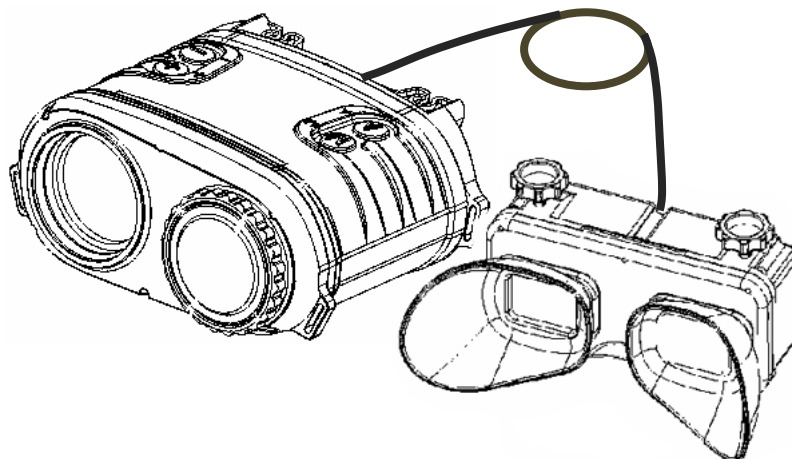### B. Combination of binocular and main body

Unscrew the screw and put the binocular into the original place of the main body, then slightly push the binocular into the main body completely. Screw the fixed screw and make sure the connection is steady.

3.5.2 Extension cord connection

After separation, the main body can connect to binocular by the accessory extension cord (section 4.2.2).The two terminals of the extension cord are different and do not mistaken when connecting.
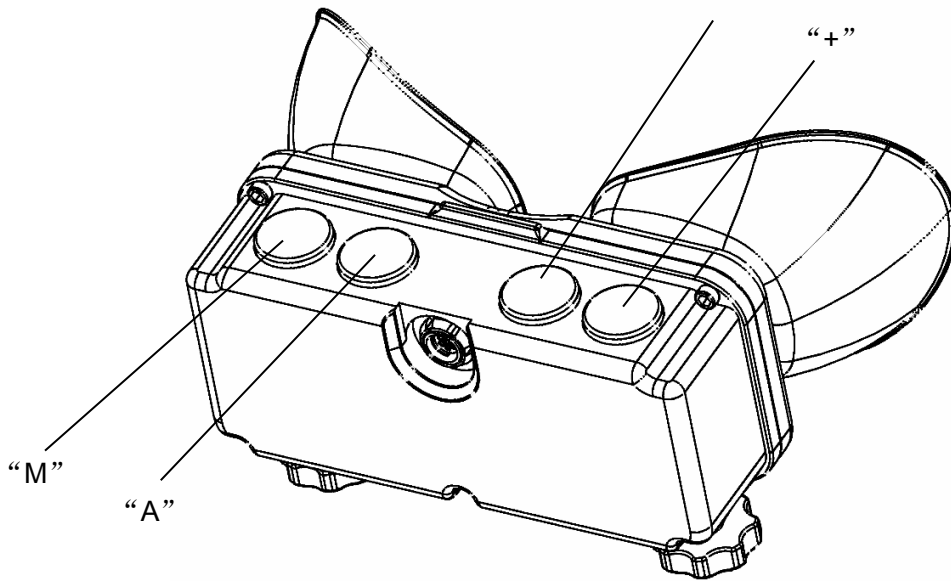
Extension cord (the left shown terminal connect to main body and the right terminal connect to binocular)

Connect the main body and binocular via the extension cord

3.5.3 Remove control

"-"

"+"

"M"

"A"

Separated binocular

The keys on the binocular are defined as above shown picture and the functions of the keys are the same as the key on main body.

3.6 Screen information

There will display some information when the operating the device and the information distribution is shown like the following picture.

（1）

（2）

(1) For the menu operation, the content of menu and operations will display on the top right corner of the screen.

(2) For the other operation, the relevant explanations will display on the bottom left corner of the screen.
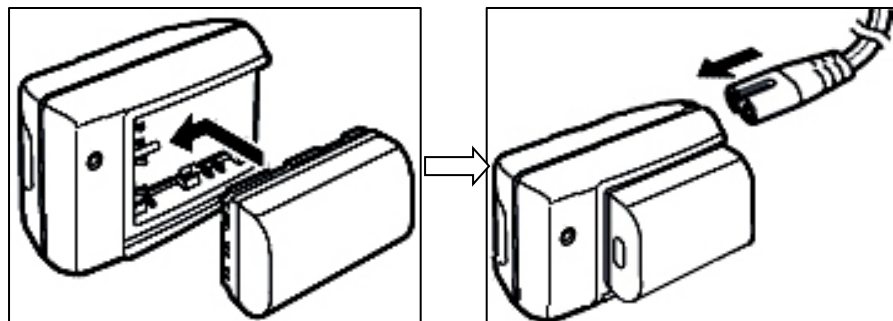
4. Accessory

4.1   Battery system

Every HE606 handheld thermal camera is equip with two rechargeable Li-ion batteries and an intelligent charger (including the power cable).

4.1.1 Battery

The batteries are high-performance rechargeable Li-ion batteries, built in overcurrent and overheating protection, up to 500 cycles of charge and discharge. Every battery can provide more than 3 hours usage times and the device will power off automatically when in low battery voltage.

4.1.2 Recharger

(1) Plug the recharger into the AC supply circuit outlet, it will adapt automatically to the voltage from 100V to 240V, and the power indicator will light in green.

(2) Put the battery into the slot of the recharger completely, (notice the direction, like the shown picture), the power indicator of recharger will light in red and means starting charging. It requires about 3 hours to fully charge the battery and the power indicator of recharger will light in green after fully charging.

Charging sketch

4.2 Other accessories

4.2.1 Video output cable and connector

4.2.2 Binocular extension cord

4.2.3 Lens cleaning tools

5. Trouble shooting

When something is wrong with the device, user should contact the technologists immediately and provide relative information including device module, serial number, production date, software version, the description of troubles, etc. And it will help the technologists provide the user the high efficiency and high quality service. It is advised the user do not try to disassemble the device for maintenance or detection.

There are common troubles that can identify or exclude by the user.

Phenomenon	Check item	Result	Suggestion
Camera shutdown automatically.	1. Whether the battery voltage is in the standard range?	Yes	Handled by Technologists.
		No	Charge the battery or replace the battery with a new one.
	2. Whether the battery is overheating?	Yes	Waiting for the battery to cool or replace the battery with a new one.
		No	Handled by Technologists.
Camera cannot start.	1. Whether the battery voltage is in the standard range?	Yes	Handled by Technologists.
		No	Charge the battery or replace the battery with a new one.
	2. Whether the battery is overheating?	Yes	Waiting for the battery to cool or replace the battery with a new one.
		No	Handled by Technologists.
Boot without image or blurred.	1. Whether the lens cover is opened?	Yes	Check the next project.
		No	Open the lens cover.
	2. Whether is focused?	Yes	Handled by Technologists.
		No	Adjust the focus for imaging.

6. Attention and maintenance

6.1 Attention

The infrared detector is working by accepting infrared radiation so that the superheated objects such as sun, laser welding torch, nozzle of jet engine will damage the detector by forming high temperature area on the surface of the detector and even the image is hard to observe when suffer certain damage. User should avoid the objects that will damage the infrared detector when observing, otherwise it will damage and affect the performance of the camera.

6.2 Daily maintenance

6.2.1 Infrared optical lens

The camera lens should be covered by the lens cover when not in use to avoid dust or accidental damage. Please use the special cleaning tools and do not clean by hands or the others to avoid lens scratches and affecting the image quality.

6.2.2 The host

Prevent the camera falling from heights or colliding with hard objects when in use. Gently wipe the camera body with a soft cloth or brush if stained by some liquid and dust, then put into the carrying case after drying.

6.2.3 Connecting cable

All the connection cables are design in special ports so it should avoid colliding and squeezing when in use and storage. Avoid plugging and pulling the connection cable rudely, otherwise the port will be out of shape and damaged. And the cables should be organized into rings without over bending to avoid the outer rubber aging or rupture.

The connection cable should be cleaned after using.

6.3 Storage and transportation

6.3.1 Storage

The camera and its accessories should be placed in the carrying case and stored in drying and well ventilated storage environment. Also stay out of the sun and the hot reservoir.

When stored over 3 months, take out the camera for booting and checking.

6.3.2 Transportation

Prevent the product from dramatic shock and vibration when moving or transporting, otherwise the internal components will be damaged.

7. Contact information

> **Manufacturer Information**
>
> *SATIR Europe (Ireland) Co. Ltd*
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