IR162C Thermal Imager

User Manual

Contents

Chapter 1 Introduction

IR162C is of ultra-compact, lightweight & unparalleled design, low power dissipation, more reliable functionality and robust performance. **IR162C** can penetrate through haze, smoke, rain, snow and total darkness to track and aim target which is difficult to be observed by human eyes in both day and night, and all weather condition. It makes the war field “single-track clarity” for us and meets various demands of high accuracy for night vision, identification, tracking, analysis, and etc, reach the international military standard.

This publication provides the necessary information required to safely operate the **IR162C** Thermal Imager.

It is important to fully check all equipment with which you have been supplied.

The equipment should be used, maintained and serviced by suitably trained personnel, capable of carefully following the procedures and guidelines given in this User Manual.

All User Manuals and leaflets should be read thoroughly before proceeding with operation of the equipment.

It is also advisable that all User Manuals and Instruction Leaflets supplied are kept readily available, for reference when the equipment is in general use.

Chapter 2 Precautions

- Do not direct the **IR162C** Thermal Imager at very high intensity radiation sources such as the sun, carbon dioxide lasers or arc welders etc.
- Do not direct the **IR162C** Thermal Imager at high temperature target when power-on the **IR162C** Thermal Imager.
- When the **IR162C** Thermal Imager is not in use or is to be transported, ensure that the battery is taken out and the unit is stored in the protective carry case.
- The **IR162C** Thermal Imager integrates precision optical equipment and static-sensitive electronics, so please do not casually place, knock, or shock the thermal imager and accessories, and make it far off the static to avoid any damages.
- Never attempt to disassemble or open the imager body, as this action will void the warranty. Contact manufacturer for calibration or repair.

Chapter 3 Maintenance

To ensure that the **IR162C** Thermal Imager is kept in a good working condition and remains fully functional operation, the following guidelines should be respected at all times:

- All User Manuals and leaflets should be read thoroughly before proceeding with operation of the equipment, please contact us if there is any unclear.
- Keep the **IR162C** Thermal Imager steady during operation.
- Do not use the **IR162C** Thermal Imager beyond the specified operation condition scope.
- Do not apply the non-fitted thermal imager adapter.
- Do not frequently power on/off the imager. The time between on and off should be not less than 20 sec.
- Do not pull in/out all the cables when the imager is power-on; and highly recommend to cut off the power of all the connected electric systems when pull in/out the cables.
- If the observation is over or in holding state, please timely cut off the power so as to effectively extend the imager lifetime.
- Pay attention to the protection of the various cables and wires that connected with thermal imager.
- Do not clean with chemical solvent, diluents. The clean, soft and dry flannelette is available.
- As the thermal imager lens had been coated an antireflective film layer and often clean will damage the coating, the optical surfaces of the imager lens should only be cleaned when visibly dirty. Please avoid touching the exposed lens surface, as the acid substance on the print will damage the coatings and lens substrates. Use only a proprietary lens cleaning tissue.

Chapter 4 Technical Specification

Detector	
Detector material:	Uncooled FPA microbolometer
Spectral Range:	8~14μm
Pixels:	384x288
Pitch:	25μmx25μm
Imaging Performance	
Lens:	105mm/F1.2 manual lens
FOV:	Designed value 6.6°×5°
Focus:	105mm
F#:	1.2
Detector MRTD:	0.24mrad
Focus range:	5m ~ ∞
Power System	
Display:	OLED viewfinder
	852×600 pixels
	12.78×9mm^2
	256 level gray
Video Output:	PAL
Frame Frequency:	50Hz
Electronic Zoom:	×2 x4
Adjust:	Auto/Manual brightness/Contrast adjustment
Polarity:	Black/White heat
Power System	
AC/DC adapter::	220VAC/9V±1DC
Rechargeable Li-ion Camcorder battery :	3.6V/6Ah

Power dissipation :	≤4.5W@23℃
Battery Operating Time:	>5hr(for one battery)
Environmental Parameters	
Operating Temperature:	-20℃~+55℃
Storage Temperature:	-40℃~+60℃
Vibration:	20~2000Hz random vibration 1000~2000Hz Power spectral density:0.037g2/Hz X axial vibration: duration 5min
Shock:	Half-sine wave accelerated speed: 30g duration 11ms X axial shock 3times
Interfaces	
Interfaces:	Power/Video/ RS232/ Power-on indicator interface
Physical Characteristics	
Color:	Black
Weight:	(thermal imager + recoilless mount) + battery = 1.23kg + 0.24kg = 1.47kg
Size:	288mmX120mmX120mm

Chapter 5 Buttons and interface of imager

IR162C Thermal Imager: Left side

Thermal imager interface definition:

No.	Definition	Remark
1	+9V	External power +
2	9VGND	External power -
3	Video	Video siganl
4	GND（Video）	Grand (Video)
5	RxD	RS-232 recivied
6	TxD	RS-232 sent
7	Signal+	Power Signal+(Red)
8	Signal-	Power Signal-(Blue)
9	GND	Grand

Button instruction:

Button	Function
M	Menu button
+	Parameter adjusting button “+” (Increase)
-	Parameter adjusting button “-” (Decrease)
C	Calibration with inner shutter
“M” + “C”	Calibration without inner shutter (Hold “M” and press “C” button)
“M” + “+”	Cursor setting menu (Hold “M” and press “+” button for 3 seconds)

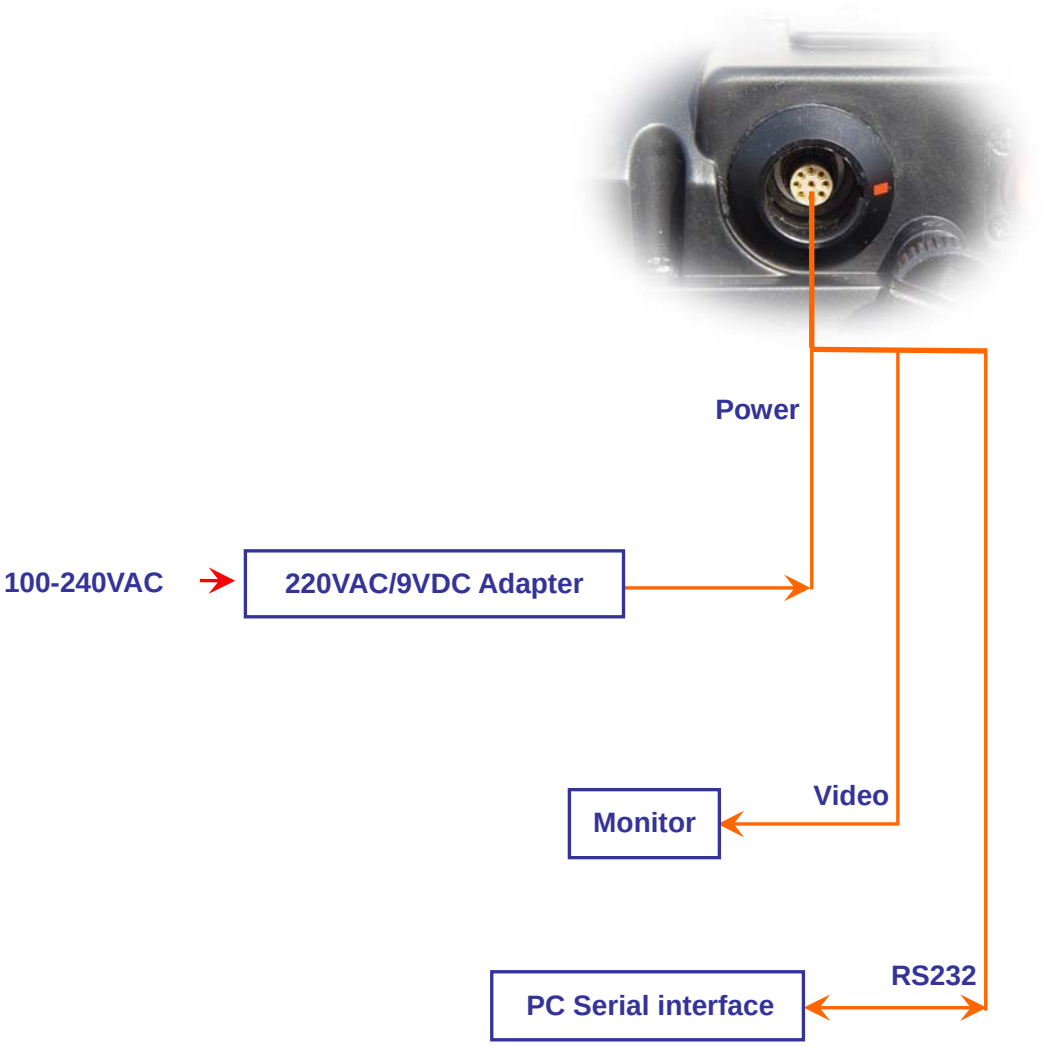
Chapter 6 Quick start guide

6.1 Preparation

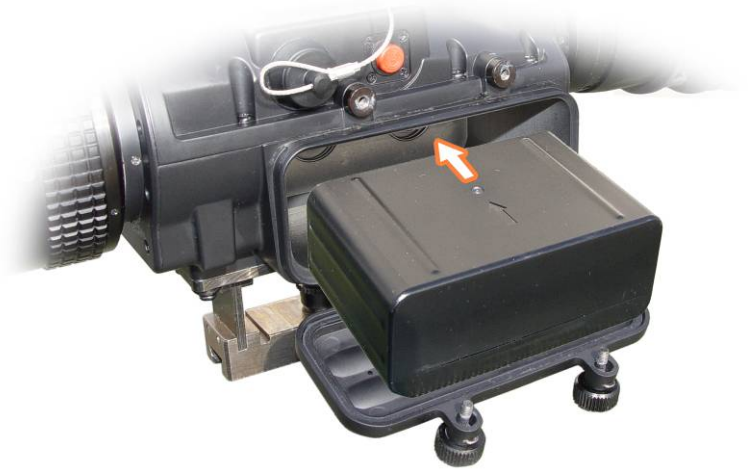
1) The operator could fix the IR162C Thermal Imager to the gun body by the sight mechanism and fix mount at the bottom of the Thermal Imager.

2) There is an integrated interface on the Thermal Imager for power supply, video output, charging RS232 serial, and Power-on indicator interface communication. First insert the enclosed cable connecting LEMO plug to the unique interface on the Thermal Imager. The red mark on the LEMO plug shall match the red mark on the interface; then connect the video port to external display equipment; insert the AC adaptor output plug to the power interface on the filtering case and then connect the plug of the AC adaptor power cable to the socket (100~220v AC).

   User can connect each unit referred to below chart in next page:

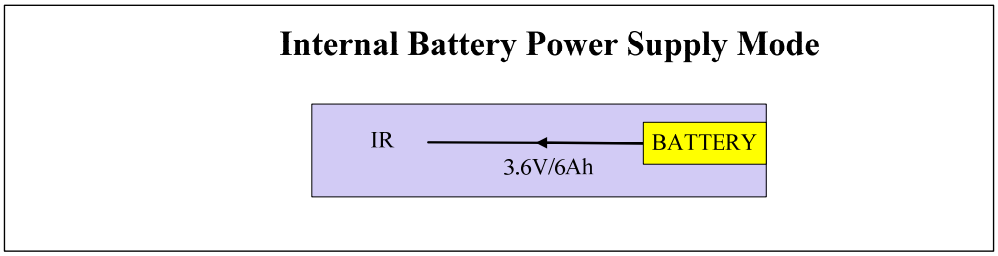

Power
100-240VAC
220VAC/9VDC Adapter
Video
Monitor
RS232
PC Serial interface

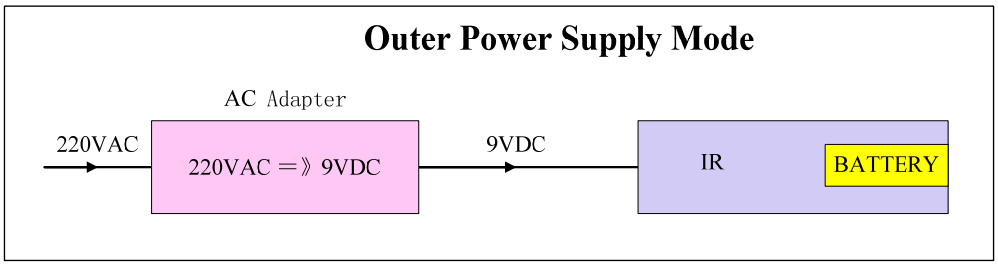
3) If there is no power supply, the Thermal Imager can also be powered by the enclosed 3.6V Li-ion battery. Open the battery case cover and insert the battery with the pole against the reed. Please ensure good contact of the battery electrode and the reed inside the battery case. Close the battery case cover.



The follows are the two power supply methods; user can choose any one of them.

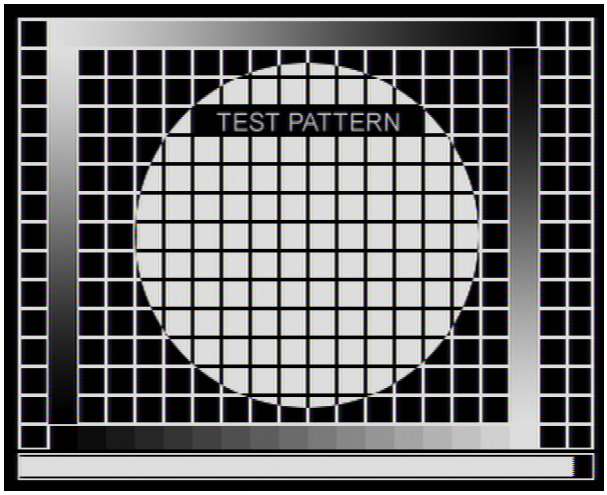
Power Supply Mode





6.2 Quick start guide

1) Start-up image and automatically calibration: Press the power button for 2 seconds to turn on the thermal imager after careful check. A chessboard will appear on the screen and self-diagnose of the system comes after the chessboard. The Thermal Imager will do non-uniformity-calibration automatically.



2) Manual Calibration: If non-uniformity still exists in image long after power-on test, perform non-uniformity calibration manually.

   Two calibration ways:

   a) Calibration with shutter: press calibration button to conduct the calibration on the target with the built-in shutter.

   b) Calibration without shutter: aim the imager at a target of uniform temperature, such as installed lens cap or clear cloudless sky, press and hold “M” button and then press CALIBRATION button “C”. System will use the selected target as the uniform target to perform calibration.

   If there is any non-uniformity exiting in the thermal imager working process, the same method can be also applied.

3) Imaging:
   a) Rotate the viewfinder until the target can be clearly observed.
   b) Aim the Thermal Imager to the target.
   c) The default mode is AUTOMATIC MODE which provides user with a clear image after simply focusing. User can also adjust the brightness and contrast to get a qualified satisfying image.
   d) Adjust the focus manually to get clear image.

4) Function Brief: Detailed button operation instructions such as Brightness and Contrast adjustment, Polarity selection, Non-uniformity calibration, cursor choosing and checking, setting delay time of power saving mode and delay time of auto power off, please refer to OPERATION INSTRUCTIONS in the next section.

5) Power-off: When operation completed, firstly put back the lens cover, then press and hold the power button till the shut-down progress bar on the screen reach its right end.. After that, remove the combo cable from the sight by holding the lock pin on the cable and pulling it out. Do not pull the cable by force, otherwise damage may occur!

Chapter 7 System operation

7.1. Power Instructions icon

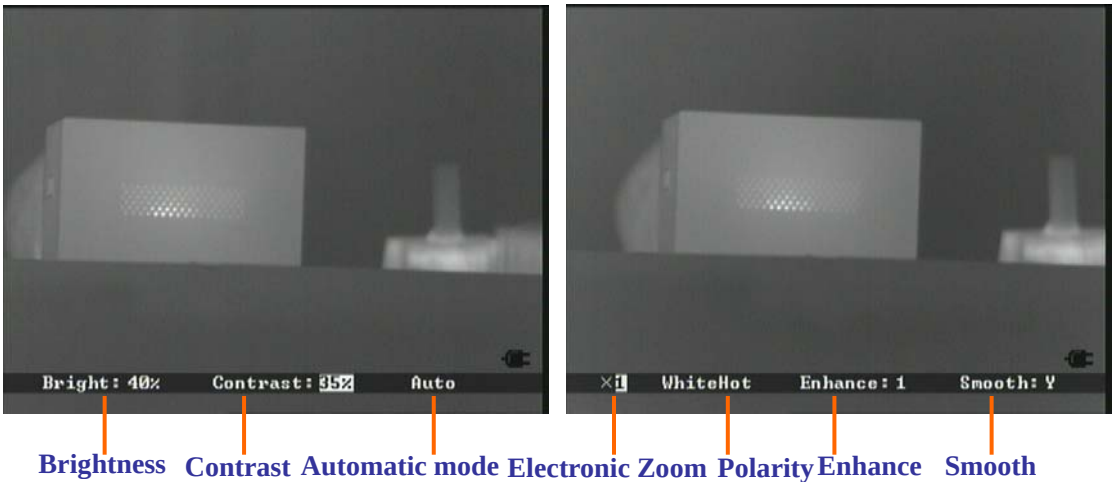
When the thermal imager works with the external power supply, a plug mark will present on the right corner of the screen as the below image shown.

When the thermal imager works with the enclosed Li-ion battery, a battery mark will present in the right corner of the screen as the below image shown.

The system continuously monitors the power supply voltage. If the power is not enough, the power mark will glitter to warn the user; if the user does not take any measures for it, the system will automatically shut down after a certain power decrease.

7.2. Image adjustment

After start-up, press the menu button, and the menu bar will be presented on the screen as the below image shown.



Press “M” button again to select Brightness, Contrast, Automatic Mode, Zoom, and Polarity in turn. The selected menu item will shows in white on gray background. Press “+” or “-” buttons to adjust the parameters of selected item.

7.2.1 Brightness and contrast adjustment

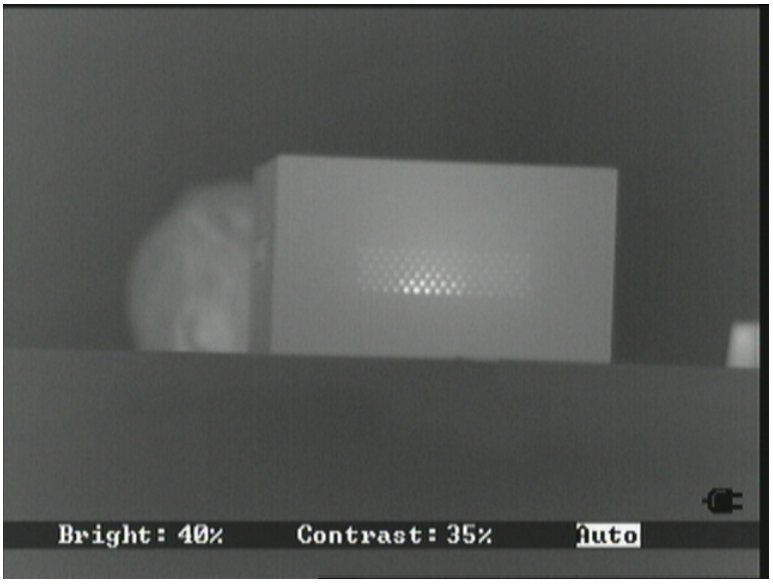
Select menu item “A”, press “+” or “-” buttons to switch between “Auto/SemiAuto”, and correspondingly to select the brightness, contrast Auto/SemiAuto adjustment ways.

Mode	Menu content	Effect
Auto	Brightness, Contrast	Auto offset and gain
Half auto	Brightness, Contrast	Auto offset, manual gain

In the above table, brightness is the expect value of the average of the actual value of the whole or part of the image; contrast is the expect value of the actual contrast of the whole or part of the image; offset and gain are two parameters related to brightness and contrast in the brightness and contrast calculation.

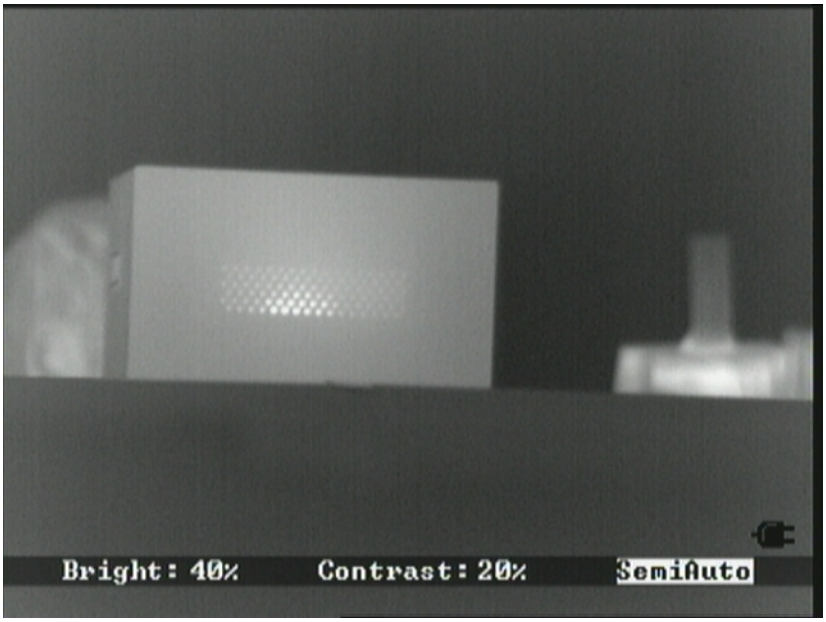
a. Automatic mode

In the automatic mode, user can adjust menu item “B” to get satisfying image brightness, and adjust menu item “C” to get satisfying image contrast. System sets offset and gain in real time as per your input to obtain acceptable image quality. Parameters of menu item “B” and “C” vales are shown in percentage.



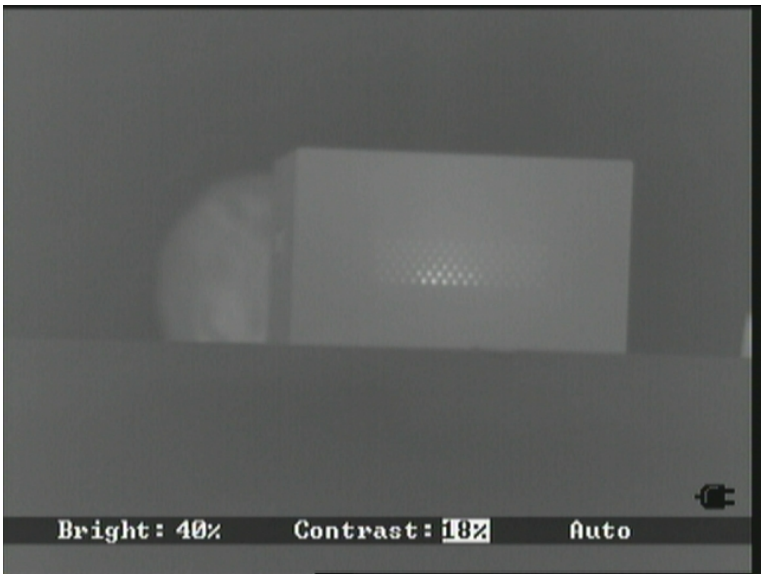
b. Semi-automatic mode

In the semiautomatic condition, user can adjust menu item “B” to get satisfying image Brightness. System automatically sets offset as per your input brightness value. User can adjust gain manually. Parameters of menu item “B” and “C” values are shown in percentage.

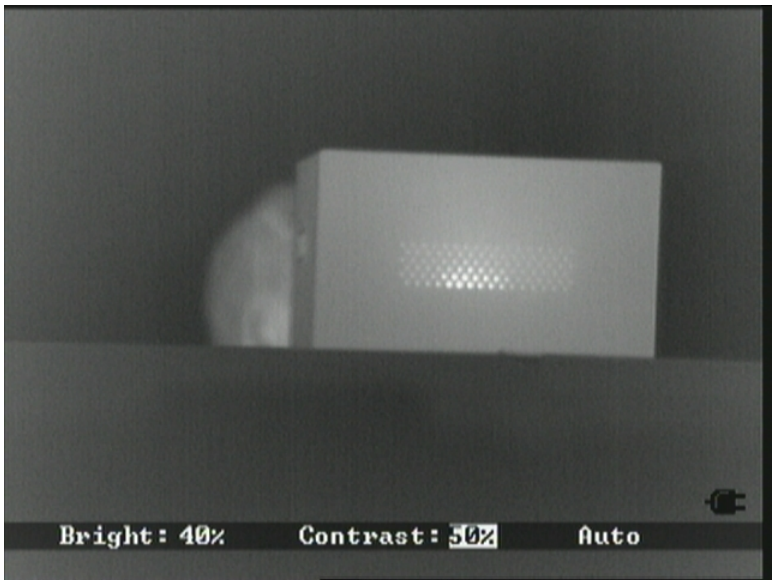


Notice:

If user find the contrast is low when using the imager just like below.

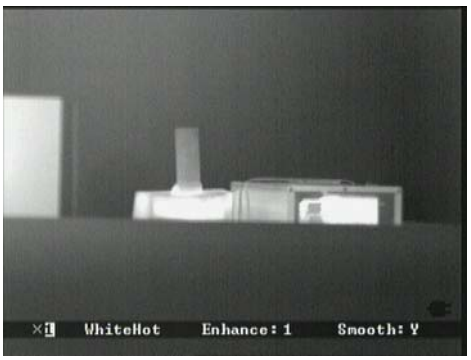


User can adjust contrast according to the circumstance condition in order to make a satisfying image.

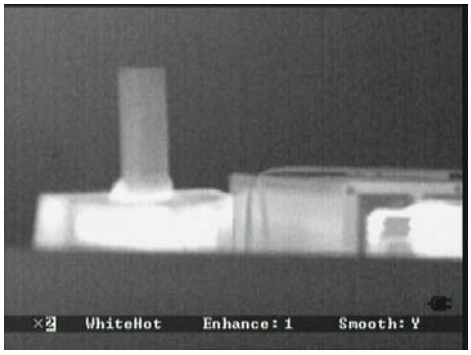


7.2.2 Electronic Zoom

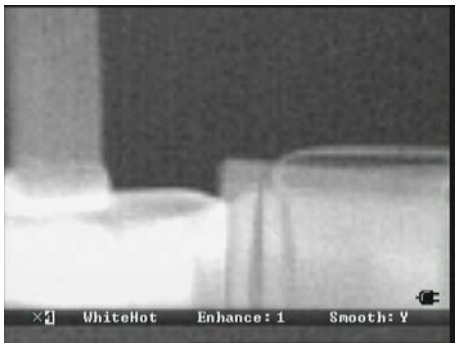
The thermal imager can also conduct electronic zoom function. After selecting the electronic zoom menu, press the “+”.“-” to switch the original image, 2 times and 4 times zooming image.



Original image(×1)



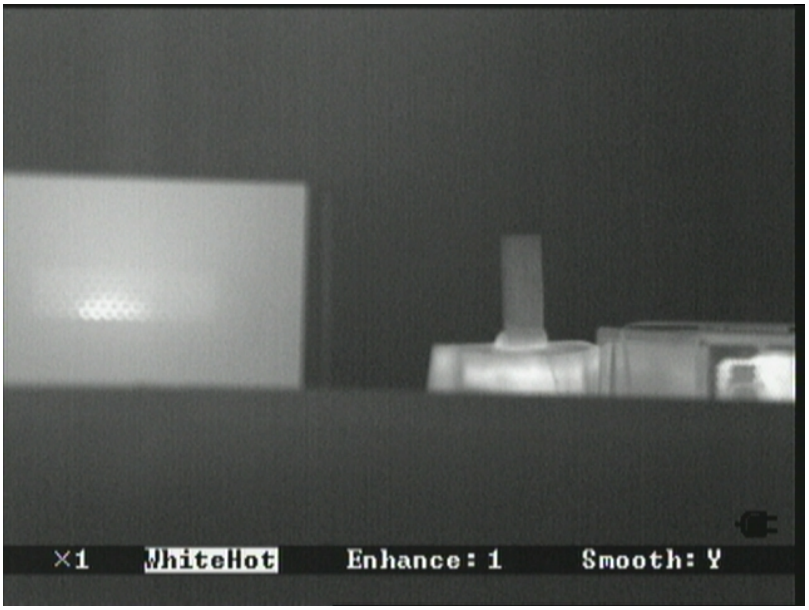
2 times zooming image (×2)



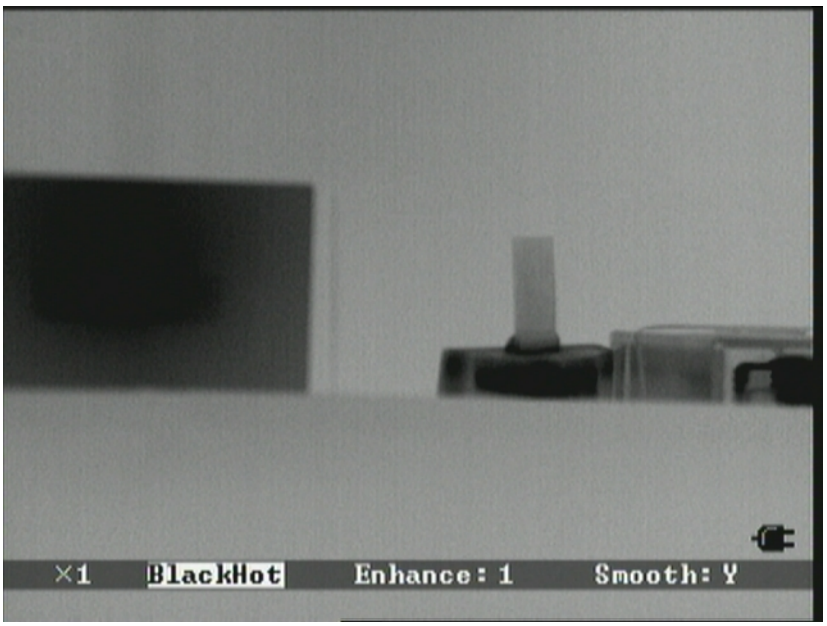
4 times zooming image (×4)

7.2.3 Polarity

IR162C uses different gray level to indicate different temperature. Under positive polarity mode, brighter part represents higher temperature. While under negative polarity mode, brighter part represents lower temperature. Select menu polarity item then press “+” or “-” buttons to switch between 2 polarity modes.



White heat



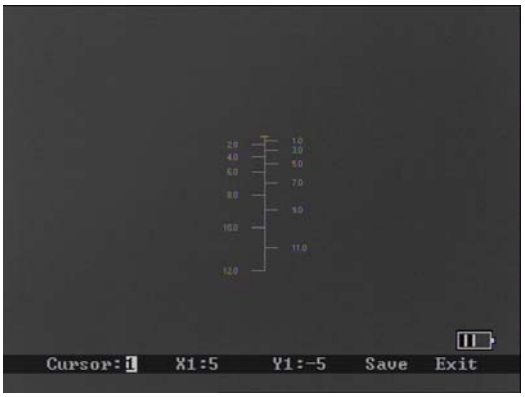
Black heat

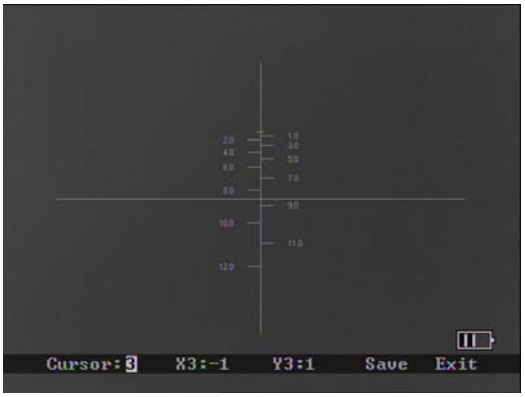
7.3. The cursor display, location and save

User can select the proper cursor that provided by the system and over displayed on the infrared image; user can also calibrate the cursor up and down, left and right.

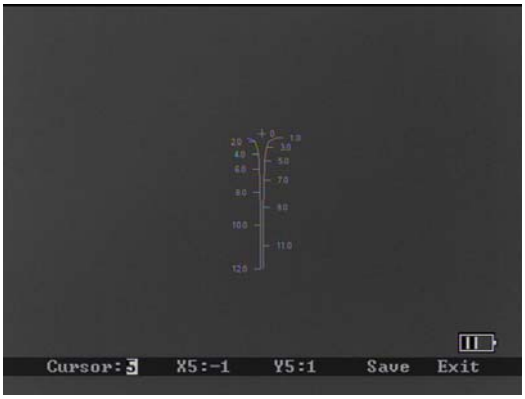
Simultaneously press the Menu button and “+” button for 3 sec until the cursor setting menu displayed on the bottom of screen as below.

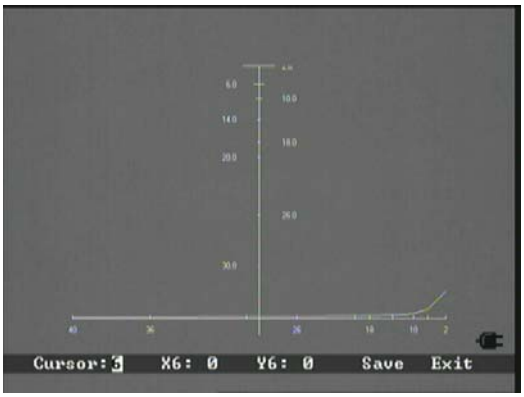
Select the “Cursor” item, then press “+” or “-“button to switch the cursor display mode. When cursor=0, there will be no cursor on the screen; when cursor=1~10, the cursors will display on the screen respectively as below:

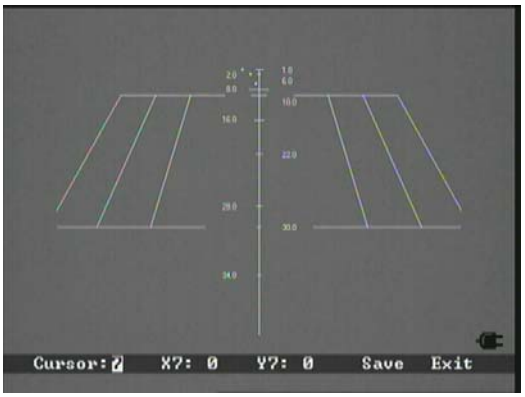


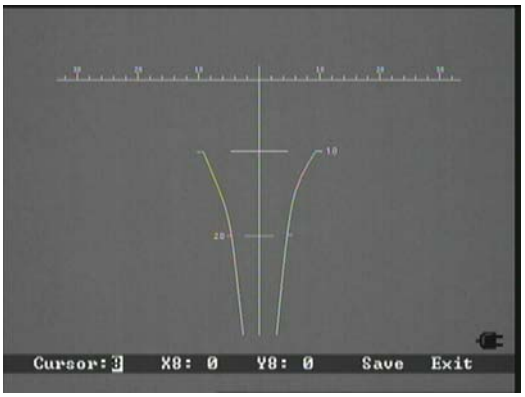

Cursor:3 X3:-1 Y3:1 Save Exit

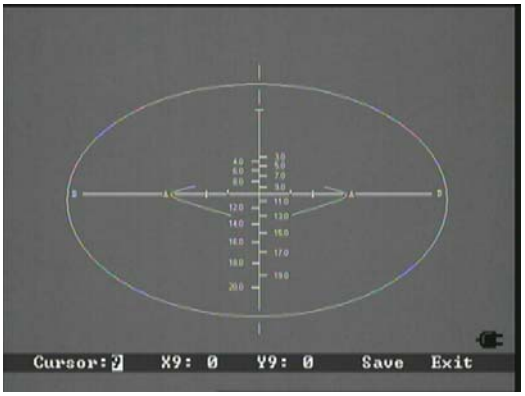

Cursor:4 X4:-1 Y4:1 Save Exit

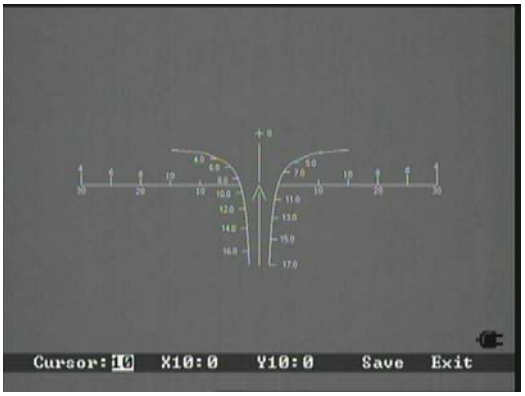

Cursor:5 X5:-1 Y5:1 Save Exit


Cursor:6 X6: 0 Y6: 0 Save Exit


Cursor:7 X7: 0 Y7: 0 Save Exit


Cursor:8 X8: 0 Y8: 0 Save Exit


Cursor:9 X9: 0 Y9: 0 Save Exit


Cursor:10 X10:0 Y10:0 Save Exit

When the cursors respectively display on the screen, select menu item “XN” (N=1~10) then press “+” or “-” to change the value of X axis, and cursor will move horizontally. Select menu item “YN” then press “+” or ”-” to change the value of Y axis, and cursor will move vertically. When there is no cursor on the screen, the cursor adjustment operation is not available. Select “Save” item, then press “+” or ”-” button to save cursor setting (including the cursor mode and cursor location) and save as default value. Following that, the default value will be adopted in next reboot. Select “Exit” item, then press “+” or “-“ button to quit the cursor setting menu.

7.4. Save parameters.

When the system is shut down, the parameters is in automatic mode, and the brightness, contrast, and polarity menu will be automatically save. Additionally these values will be adopted in next reboot.

Chapter 8 Battery status

The **IR162C** runs for over 6 hours by using one 3.6V/6Ah rechargeable Li-ion battery.

Battery charging Method:

a. Charging with AC adapter

1) Aim the Li-ion battery electrode to the charger's electrode, and insert the battery into the charger. The clips of the battery charger shall grip the battery to ensure the good contacting.
2) Insert the 220VAC/9VDC adaptor plug into the AC charge socket.
3) Connect the AC adaptor cable to the 100～240VAC socket to start charging. The indicator on the charger will be red during the charging process;
4) The indicator will be green when charging, and the green indicator will be off after the battery is fully charged; The "Fully charged" means allow you to use longer charging battery than the normal, so you need to charge more than 1 hour (fully charged).
5) The charging process takes around 7 hours.
6) It is normal that the AC adaptor will get heat during the charging process.

Chapter 9 Trouble Shooting

If the **IR162C** meets troubles please check the items listed below first, if the troubles beyond those ones please contact us as soon as possible.

9.1 The Thermal Imager does not turn on

The imager does not turn on if battery contacts are dirty or battery power is low. Remove battery and install a fully charged one correctly or clean battery contacts.

9.2 The image is blurry

Adjust focus till image clear.

9.3 The image is too dark or too bright

a. Perform NUC function manually.

b. Adjust brightness and contrast manually or set to auto brightness/contrast mode.

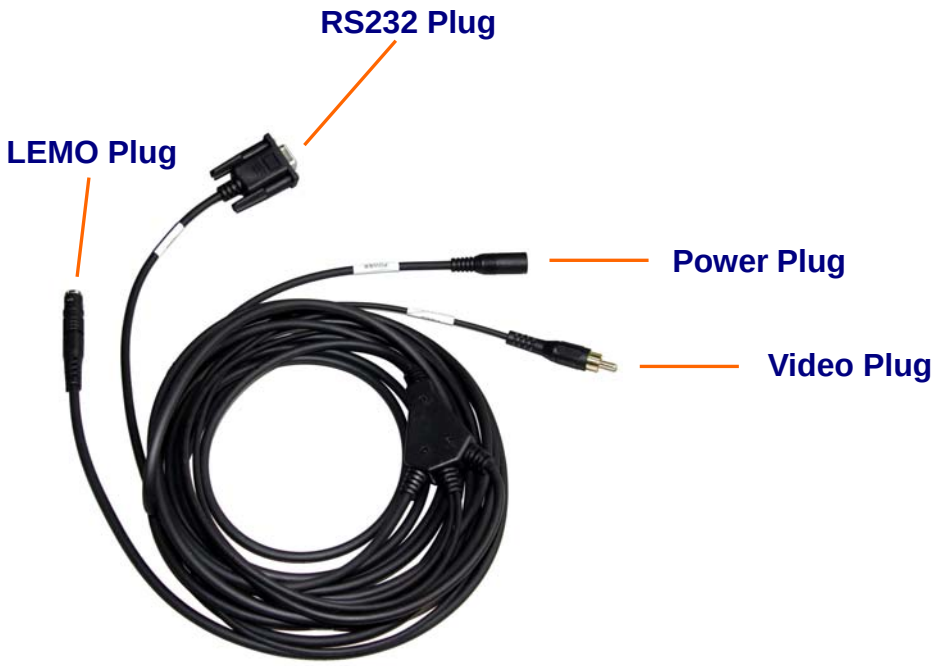
9.4 No image output

Transmission equipment connection problem or video cable contact problems.

Chapter 10 IR162C Standard Packing List

Name	Qty
IR162CThermal Imager	1
Recoilless Mount	1
3.6V/6Ah rechargeable Li-ion battery	2
AC adapter (INPUT:100-240VAC 50/60Hz OUTPUT:9VDC 3.0A)	1
Power/Video/RS232 cable	1
Charger	1
Certificates	1
User manual	1
Equipment case	1

Accessories Pictures



Power/Video/ RS232 Cable

Rechargeable Li-ion battery

Battery Charger

AC Power Adapter