Contents

Introduction 2

Precautions 3

Technical Specification 4

Accessories Pictures 5

RU60G(H) Components 5

Command Keys 6

Lemo Interface 6

System Operating 6

Menu Bar 7

Trouble Shooting 12

Introduction

The **RU60G(H)** Thermal Camera 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.
Other features are as follows:

- High accuracy for night vision, identification, tracking and etc.
- Accurate performance
- Reach the international military standard
- Ability to be installed on sniper rifles 12.7 mm without the need for additional rail
- Ability to be installed on 12.7, Dragunov, SPG with the basic tracks for 1913 rail

This User Manual provides the necessary information required to safely operate the camera. It is important to fully check all equipment's with which you have been supplied. The camera must be used and maintain by suitably trained personnel. Read the User Manual completely before proceeding with operation of the camera. Never attempt to repair or disassemble the camera body.

Read the User Manual thoroughly before using the RU60G(H) Camera.

Keep the User Manual readily available for reference when the camera is in general use.

Precautions

Important notes that must be met before or while using the camera:

- Do not direct the **RU60G(H)** Thermal Camera at very high intensity radiation sources such as the sun, carbon dioxide lasers or arc welders and etc.
- Do not direct the **RU60G(H)** Thermal Camera at high temperature target when power-on the camera.
- Do not place the **RU60G (H)** Thermal Camera on stone, metal and etc.
- Do not use the **RU60G (H)** Thermal Camera beyond the specific operation condition scope.
- When the **RU60G (H)** Thermal Camera is not in use or is to be transported, ensure that the battery is taken out and the camera is stored in the protective carry case.
- In this camera, focusing is manually (not motorized). Use objective focal length adjust ring (page 12, 14) to adjust the clarity of image. Don't use command keys for focusing.
- The **RU60G(H)** Thermal Camera integrates precision optical equipment and static-sensitive electronics, so please make them far off the knock, shock and static to avoid any damages. Insert the camera in its special carry case.
- Do not open or disassemble the camera, as this action will avoid the guaranty. Contact manufacturer if it is problem with the camera.

Tips for the care and maintenance of the cameras should be considered:

- Read the User Manual completely and carefully. The **RU60G(H)** Thermal Camera must be used by trained personnel, capable of carefully following the procedures and guidelines given in this User Manual.
- Do not apply the non-fitted thermal camera adapter.
- Do not frequently power on/off the camera. The time between on and off should be at least 5 seconds.
- Pull in/out all the cables when the Camera is power off.
- Pay attention to the protection of the various cables and wires that connected with the camera.
- The **RU60G(H)** Thermal Camera lens has been coated with an antireflective film layer and often clean will damage the coating. Therefore clean the optical surfaces only when it is visibly dirty.
- Please avoid touching the exposed lens surface, as the acid substance on the finger will damage the coatings and lens surfaces.
- Use only a propriety lens cleaning tissue. Never use chemical solutions, thinner, ether, acetone, alcohol and etc.
- If for any reason , the lens was oily, use 80% ether and 20% alcohol solution and a soft cloth and gently clean the oily surface.

Important notes that should be considered for the battery used in cameras:

- The **RU60G(H)** Thermal Camera runs for over 5 hours by using 4.2V/1400mAh rechargeable Li-ion battery.
- Use the battery when it has been charged completely before.
- Aim the Li-ion battery electrode to the charger's electrode.
- The charging process takes around 3 hours.
- It is normal that the AC adapter will get heat during the charging process.

Technical Specification

Model	RU60G	RU60H
Detector		
Detector	FPA Uncooled Micro-bolometer	
Spectral Range	8-14 μm	
Pixels	384X288	640X480
Pitch	17 μm	
NETD	≤80mk	≤60mk
Optics		
Focus Type	Manual	
Lens	60mm	
Image Presentation		
Video Output	PAL	
Frame Frequency	50HZ	
Offset & Gain Control	Automatic/ Manual	
Electronic Zoom	2X,4X	
Image Color	White Hot, Black Hot	
Integrated Display	OLED 600×800	
Interfaces		
Video Output/Power	Composite video output/power input	
Power System		
Power Supply	110/220VAC	
Power Dissipation	Less Than 4W	
Battery Type	4.2V, Rechargeable battery Li-ion	
Battery Operating Time	4hours	
Environmental Parameters		
Operating Temperature	-30℃~+60℃	
Storage Temperature	-40℃~+70℃	
Physical Characteristics		
Color	Black、Khaki	
Size	223*75*81mm	
Weight	700g Without Battery	
Rail Gun Mounting	1913Rail	

Accessories Pictures

Power/Video/RS232 Indicator Output Cable

AC Power Adapter

Rechargeable Li-ion Battery

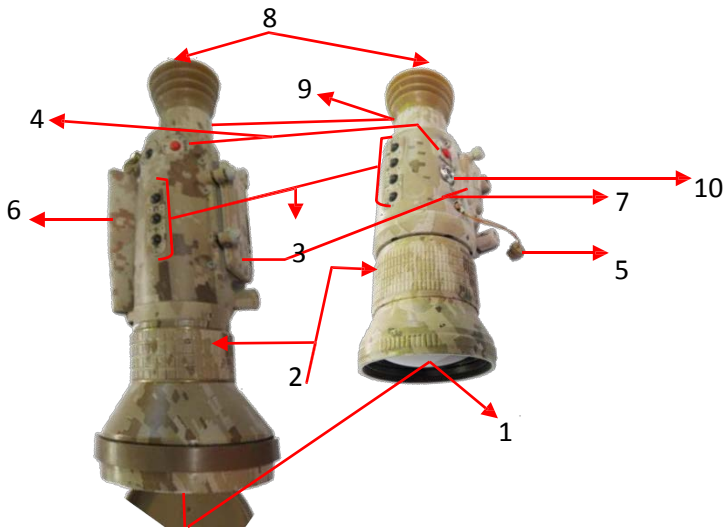
Battery Charger

Safety Bag

User Manual

RU60G(H)

1. Infrared Lens
2. Objective Focal Length Adjust Ring(Focus)
   Adjust the thermal camera to create the best resolution of targets.
3. Command Keys
4. On/Off Key
5. Connector Cover
6. Handle
7. Battery Case
8. Viewfinder
9. Eyepiece Focal Length Adjust Ring(Dioptre)
   Adjust the thermal camera to create a correct vision status for each person eyes.
10. Lemo Interface



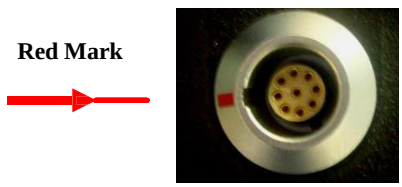
Command Keys

Button	Function
M	Displaying Menu Bar
+	Adjusting parameter with increasing it
-	Adjusti g parameter with decreasing it
R	Desired Reticle
+ & M	Displaying Cursor setting menu
- & M	Displaying Bad Pixel removing menu

Lemo Interface

There is a Lemo interface devised on the **RU60G(H)** Thermal Camera body that has one input and two outputs:

- **Input**
  1. AC Power Adapter
- **Outputs**
  1. Video (external display device)
  2. RS232 Communication Protocol



Insert the enclosed cable connecting Lemo plug to the unique Lemo interface on the **RU60G(H)** Thermal Camera. The red mark on the interface shall match the red mark on the plug.

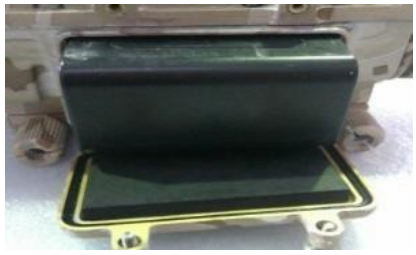
System Operating

The follows are the two power supply method. User can choose any one of them.

1. **AC Power Adapter**

2. **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.



Fix the **RU60G(H)** Thermal Camera to the gun body by the sight mechanism and fix mount at the bottom of the camera. There is an integrated Lemo interface on the camera for power supply, video output and RS232 communication protocol. This is called Indicator Output Cable. Insert the mentioned cable to the Lemo Interface on the camera. Then connect the video port to external display device, AC adapter to the power interface and then connect the plug of the AC adapter to the 220V AC socket. If it is necessary, connect the RS232 port to PC.

Press and keep the On/Off key for 3 ~ 5 seconds to turn on the **RU60G(H)**

Then adjust the clarity of infrared image by rotating objective focal length adjust ring (focus) and eyepiece focal length adjust ring (diopter).

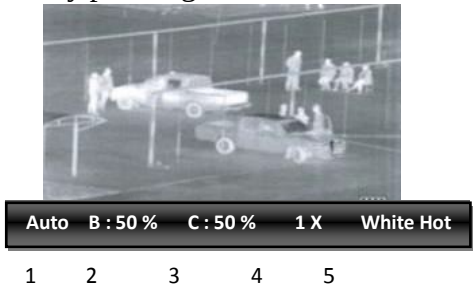
When operation completed, firstly put back the lens cover. Then press and keep the On/Off key till the shut-down progress bar on the display reaches its right end. After that, remove the Lemo plug from the sight by holding the lock pin on the Lemo plug and putting it out. Do not pull the Lemo plug by force, otherwise damage may occur.

When the **RU60G(H)** Thermal Camera works with the adapter, a plug mark will present on the right corner of the display as the below picture shown. A battery mark will present on the right corner of the display when the camera works with Li-ion battery.

If the voltage of battery isn't enough, the battery 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 voltage decrease.

Menu Bar

After start-up, press the menu button (M button).the menu bar will be presented on the display as the below picture shows. There are some parameters on menu bar that you can select them by pressing the menu button. The selected parameter will be shown in white on gray background. Adjust each parameter value by pressing +and -buttons.



Menu Bar Parameter

1. **Auto / Semi Auto Mode**
2. **Brightness**
3. **Contrast**
4. **Electronic Zoom**
5. **Polarity (White hot / Black Hot)**

Auto/Semi Auto Mode

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

Mode	Menu Content	Effect
Auto	Brightness, Contrast	Auto Offset and Gain
Semi Auto	Brightness, Contrast	Auto Offset, Manual Gain

In the Auto mode, user can adjust parameter (B) to get satisfying image brightness and adjust parameter (C) to get satisfying image contrast. System sets offset and gain in real time as per your input to obtain acceptable image quality.

In the Semi Auto mode, user can adjust parameter (B) to get satisfying image brightness. System automatically sets offset as per your input brightness value. User can adjust gain manually.

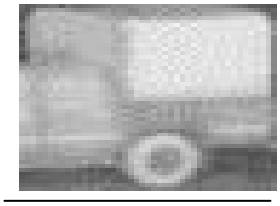
Auto Mode : C : 21%

Auto Mode : C : 38%

Semi /Auto Mode

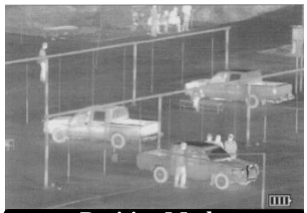
Electronic Zoom

The **RU60G(H)** Thermal Camera can also conduct electronic zoom function. After selecting the electronic zoom parameter, press + or - buttons to switch the original image and 2 times zooming image.



Polarity

The **RU60G(H)** Thermal Camera 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 parameter and press + or - buttons to switch between 2 polarity modes.

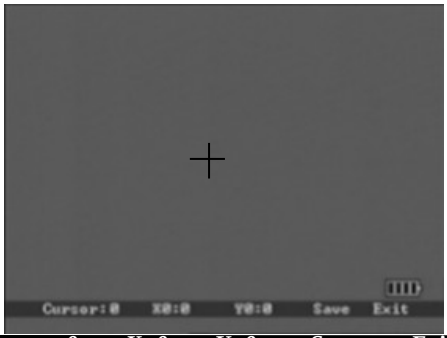


Positive Mode

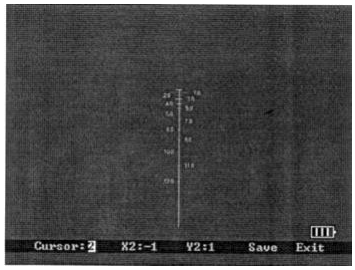
Negative Mode

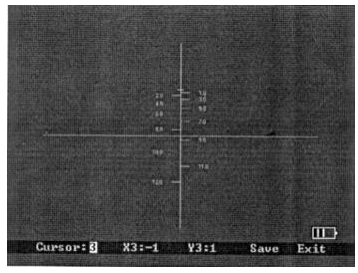
Cursor Setting Menu

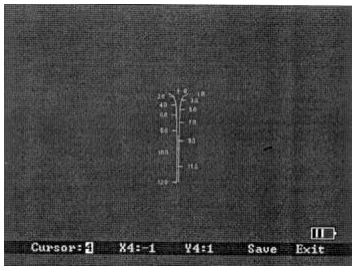
User can select the cursor that provided by the system and over displayed on the infrared image. User can also calibrate the cursor up and down, left and right. Press simultaneously M & + buttons for 3 seconds until the cursor setting menu appears on the bottom of display as below:

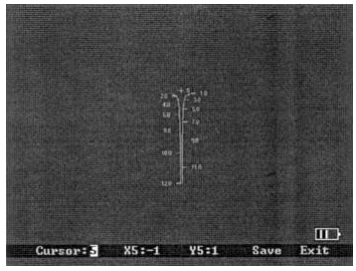


Select the Cursor parameter then press + or - to switch the cursor display mode. When cursor=0, there will be no cursor on the display. When cursor =1~10, the cursors will display on the display .There are some pictures of different cursors as below:





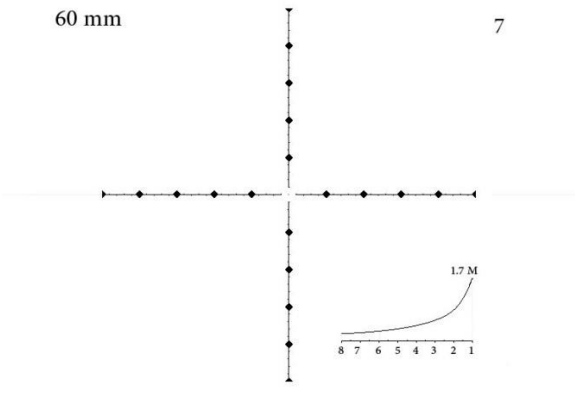




When the cursor is displayed, select parameter XN (N=1~10) then press + or - to change the value of X axis. And cursor will move horizontally. Select parameter YN (N=1~10) then press + or - to change the value of Y axis. And cursor will move vertically. Select" Save "parameter, then press + buttons to save cursor setting. Select" Exit "parameter, then press + buttons to quit the cursor setting menu.

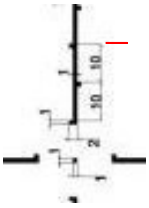
One of these reticles that is programmed in **RU60G(H)** and showed in below is used in ranging, alignment and proper shooting.

* In **RU60G(H)** the eighth reticle is for RPG



Reticle guide

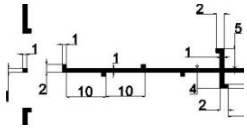
The reticle's given size is based on mili-radian and to use it you need bullet ballistic table that is used in specific weapon (at the end of user manual guide) or by zeroing the bullet drop must be clear in different distances. According picture below distance between the two lines is 10 m Radian as each unit is equivalents to 10 cm fall off (drop) per each 100 meter or one meter fall off in each 1000 meter.、



So if in ballistic table you expect the 20cm drop in 2000m, angle (mi-radian) could be calculated by following formula

For example if we expect 20cm drop in 200 m for bullet, from above equation

It means that one must point one mm lower the target. Since line space is equal to 10 mrad so there are some signs for target less than 10mrad.



For ranging by this reticle a mature man in 100m distance and 1.7 heights is equivalent to 17mrad.

Troubleshooting

If the **RU60G(H)** Thermal Camera meets troubles, please first check the items listed below. If the troubles beyond those ones, please contact us as soon as possible.

- **Bad Pixel on the infrared image**

To remove bad pixel, press the M & - buttons for 3 seconds until a menu appears on the bottom of display as below:

1. Place exactly the cursor on bad pixel in <, > part with moving the cursor in X and Y axis respectively .Use + and - buttons.
2. Press M and select (Add) parameter. Then press + button to remove bad pixel.
3. Press M and select (Save BP) parameter. Then press + button to save removing the bad pixel.
4. Press M and select (Exit)parameter. Then press +button to exit the bad pixel removing menu.

- **The camera doesn't turn on**
  1. Remove the battery and install a fully charged battery.
  2. Clean battery contacts.
- **The image is blurry**
  Press C button and adjust focus till image clear.
- **The image is too bright or too dark**
  1. Perform NUC function manually(press C button)
  2. Adjust brightness and contrast manually or set to auto brightness/contrast mode.

Guaranty	
Model	
Serial No.	
Guaranty Start date	
Guaranty End date	
Verification Signature	

Cancellation items of warranty

- Physical injury or any visible burns
- Change or compromise the device's serial number or the hologram
- Use non-standard
- Manipulation by unacceptable person

Comments:

Repairs	
Model	
Serial No.	
Referral Date	

Repairs	
Model	
Serial No.	
Referral Date	
Fault description :	

Unit Name	
Transferee Name	
Deliverer Name	
Delivered Date	
Returned Date	

Unit Name	
Transferee Name	
Deliverer Name	
Delivered Date	
Returned Date	

Unit Name	
Transferee Name	
Deliverer Name	
Delivered Date	
Returned Date	