

InfiRay USA
MH25 Multifunction Thermal Imager
User's Manual



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Version V2.1

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1. Overview

The InfiRay USA Mini MH25 is one of the smallest fully multi-functional 12-micron thermal imagers on the market. It can be used as a handheld monocular or helmet mounted for hands-free use. It's features include picture-in-picture, Bluetooth,* digital magnetic compass, pitch and roll measurement, and analog video output. The MH25 is compatible with rechargeable 16650 and 16340 batteries and can be powered externally through the USB-C port with a 5V battery pack. The MH25 is operated by an intuitive menu system and user-friendly rotary encoder button. This one button operation has positive clicks with each selection and allows for quick and easy operation in dark environments.

*Requires external remote (Sold Separately)



Figure 1-1. Mini multifunction thermal image

NOTE: The MH25 is subject to export and foreign trade control laws of the United States and may not be exported without prior approval of the U.S. Department of State.

2. Tech Specs

Table 1. Technical Specifications

| Model | MH25 |
|---------------------------|--------------------|
| Detector Parameter | |
| Resolution | 640×512 |
| Pixel Size | 12μm |
| Spectral Response | 8~14μm |
| NETD | ≤60mK@25°C, f/1.2 |
| MRTD | ≤600mK@25°C, f/1.2 |
| Frame Rate | 50Hz |
| Optical Parameter | |
| Objective Lens | 25mm |
| Focus Mode | Manual |
| Field of View | 17.5°×14° |
| Detection Range | 1,250 Meters |
| Digital Zoom | 1.0-8.0× |
| Eye Relief | 12mm |
| Exit Pupil | 5mm |
| Diopter Adjustment | -4 - +3 |
| Display | |
| Type | LCOS |

| | |
|--------------------------|--|
| Resolution | 1280×960 |
| Function | |
| Digital Compass | Yes |
| Motion Sensor | Yes |
| Laser Pointer | None |
| Rangefinder | Stadiametric |
| PIP | Yes |
| Palette | White/Black/Red/Pseudo |
| Remote Control | Bluetooth |
| Battery | 16340/16650/ NOTE: The MH25 will not function properly using a CR123A |
| Max. Battery Life | 16340——up to 1.5 hours 16650——up to 3 hours |
| Operating Temperature | -10°C~+50°C |
| Power Consumption | <2000mW |
| IP Rating | IP67 |
| Weight (without battery) | <245g |
| Dimension | 128mm×70mm×45mm |
| Laser | None |
| External Interface | 2 - M3 x 3(Bottom and left side) |

3. System Functions

- Shuttered Calibration and Manual Calibration
- White Hot, Black Hot, Red Hot, Pseudo Color
- 8X digital magnification
- Image brightness adjustment, sharpness adjustment, contrast adjustment
- Motion sensor adjusts the forward image
- Electronic compass
- Pitch and Roll Measurement
- Stadiametric rangefinder
- Picture-in-picture
- Bluetooth remote controller
- Automatic standby
- Power and data interface through USB-C
- Analog video output
- Mini Rail Interface

4. Product Diagram

The main components of the MH25 are shown in figure 4-1.

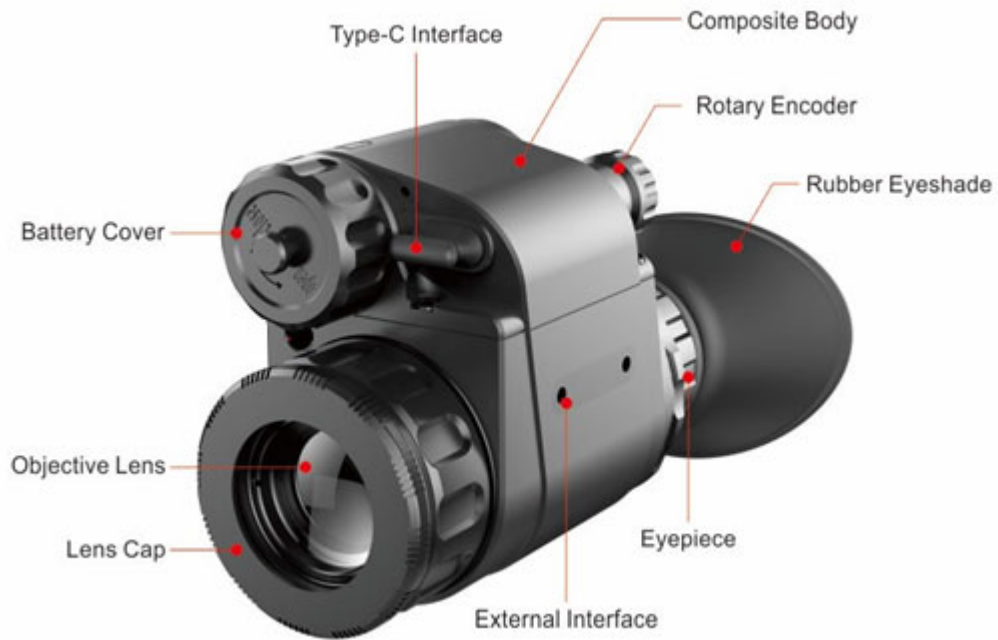


Figure 4-1. MH25 Diagram

5. Operation Functions

The Quick Command Menu, Advanced Menu and other functions can be accessed via the rotary encoder. All menus can be closed by pressing the encoder for 3 seconds.

5.1 Powering On/Off

To power on – hold the encoder button down for 3 seconds.

To power off – point the device down and hold the power button for 3 seconds.

5.2 Digital Magnification

When there is no menu displayed, rotate the encoder to digitally zoom in and out. Digital magnification will increase when the encoder is rotated clockwise, and digital magnification will decrease when rotated counterclockwise.

Rotating the encoder slowly will increase or decrease the digital magnification in increments of 0.1 and rapid rotation will increase or decrease digital magnification by 1.0.

Current magnification is displayed in the upper left icon cluster.

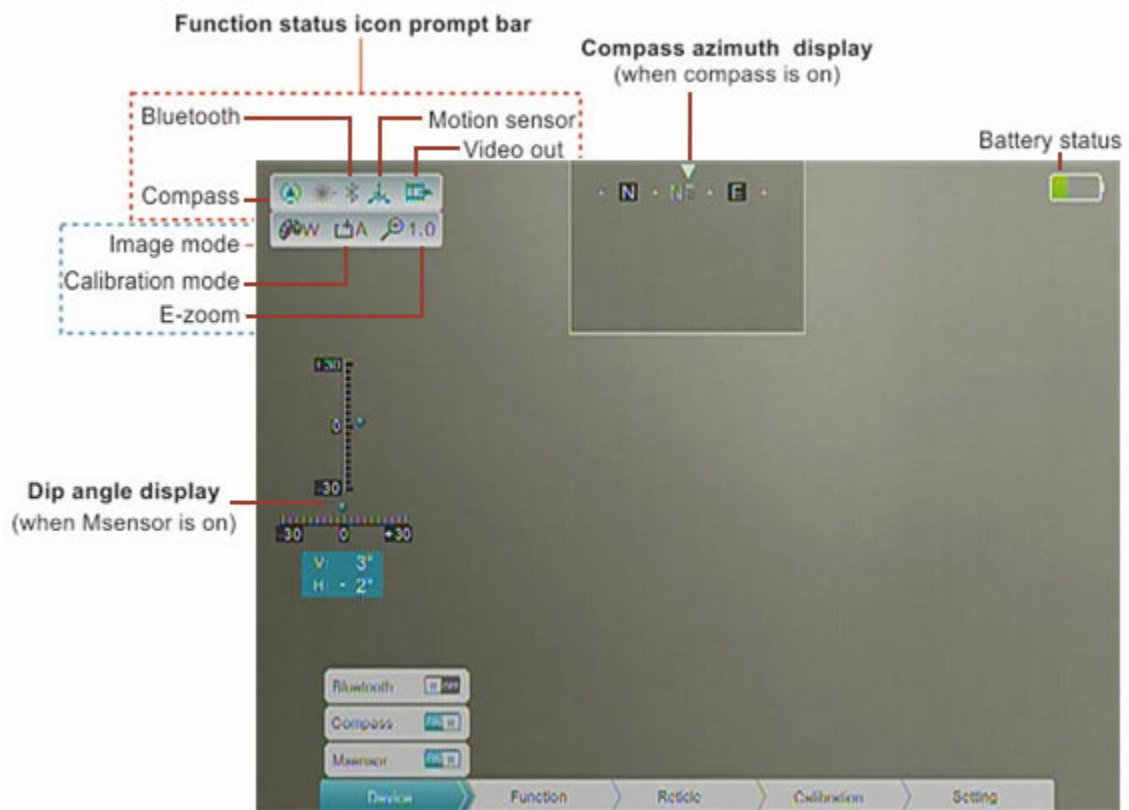


Figure 5-1. Normal display interface

5.3 QCM Quick Command Menu

The quick command menu is activated with a short press of the encoder. The QCM has four functions including NUC (Non-Uniform Calibration), color palette selection, brightness adjustment, and laser activation. NOTE: The InfiRay USA MH25 does not have a laser. Only certain models feature a laser, and the MH25 does not. The laser icon may be present, but there is no laser. Rotating the encoder will toggle functions and a short press will activate the function. If the encoder is not activated within 5 seconds the QCM will disappear automatically. Pressing the encoder for 3 seconds will close the QCM. NOTE: Pressing the encoder for 3 seconds while orienting the MH25 downward will turn the MH25 off.

NUC - Short press while the lens is facing down will perform silent NUC. All other orientations will perform shuttered NUC.

Color Palette - White hot/Black hot/Red Hot/Pseudo color).

Brightness - Screen brightness adjustment.

Laser – None NOTE: The InfiRay USA MH25 does not have a laser. Only certain models feature a laser, and the MH25 does not. Even though there is a menu for it, there is no laser.

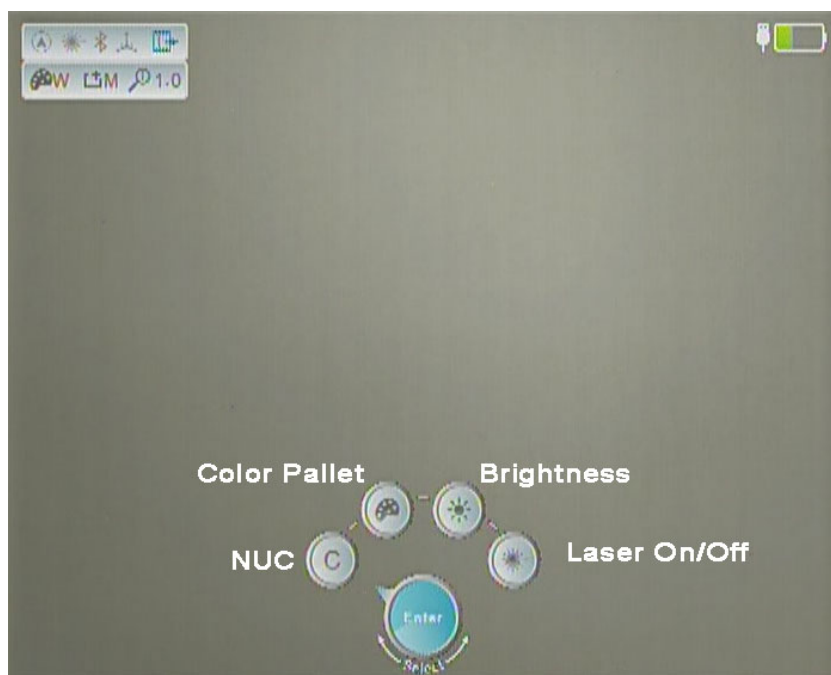


Figure 5-2. Context menu

5.4 Advanced Menu

To activate the advanced menu press and hold the encoder for 3 seconds. Make sure the lens is not pointing down, as a 3 second press pointing down will power the MH25 off.

The advanced menu displays 5 submenus including Device, Function, Reticle, Calibration and Setting. Each submenu contains several options and corresponding options expand (if present) when a submenu is selected, as shown in figure 5-3. Please note, some menus are disabled. The Reticle and Laser functions are non-functioning on the MH25 because there is no reticle and no laser.

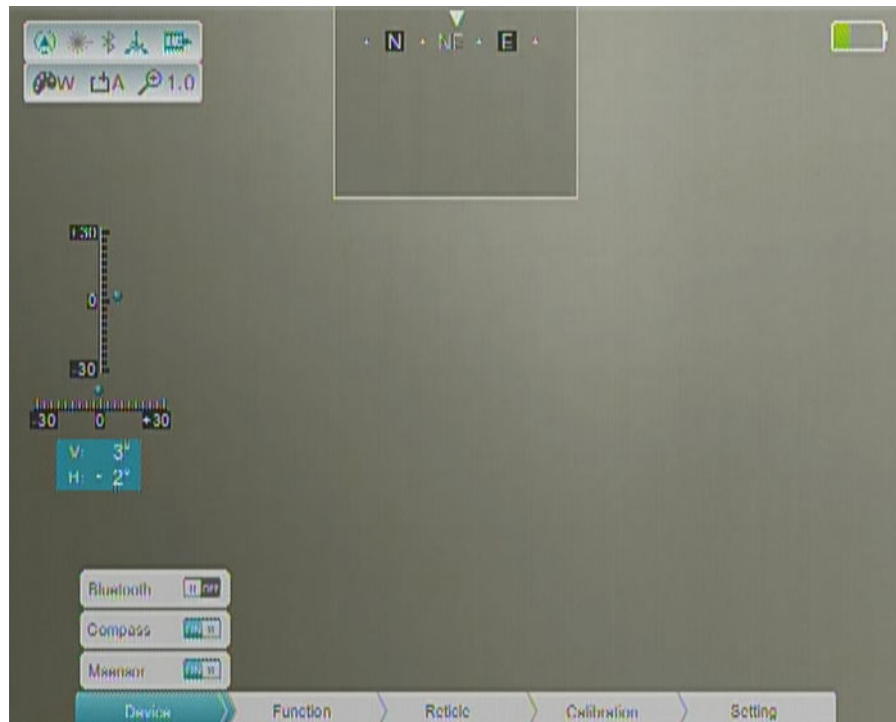


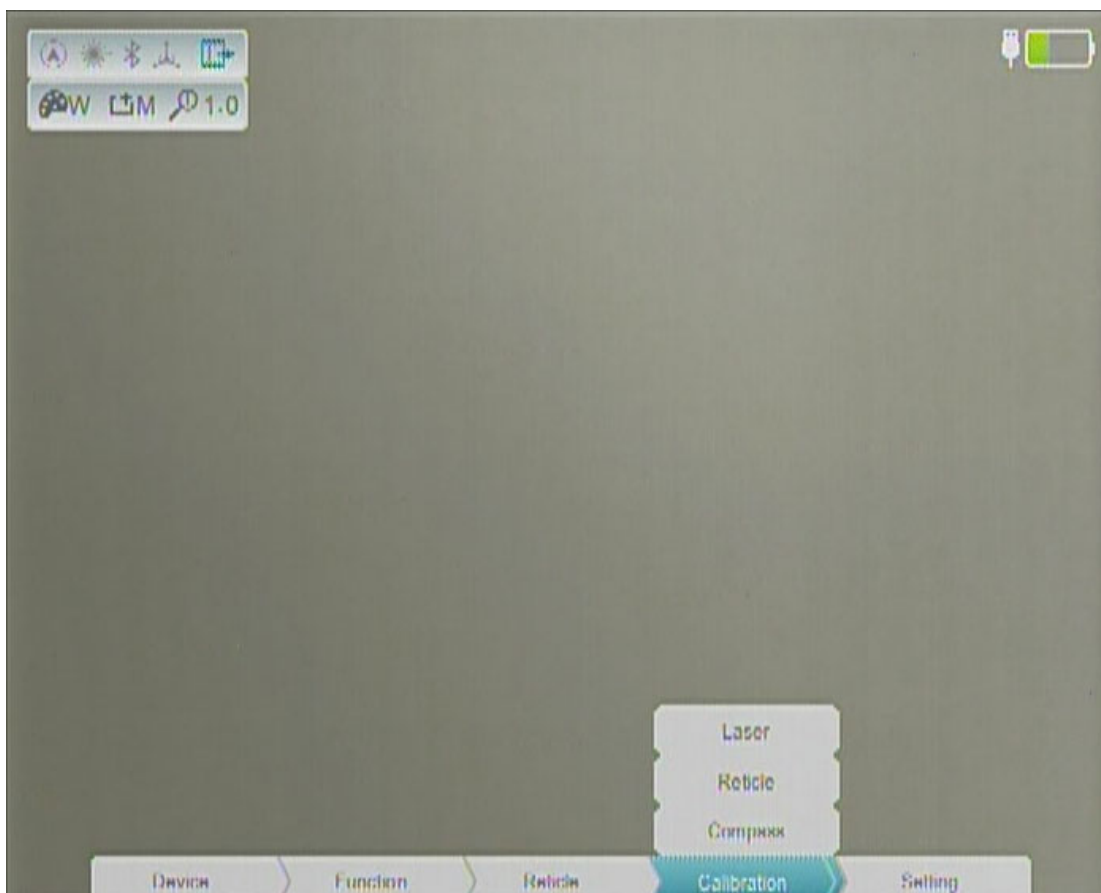
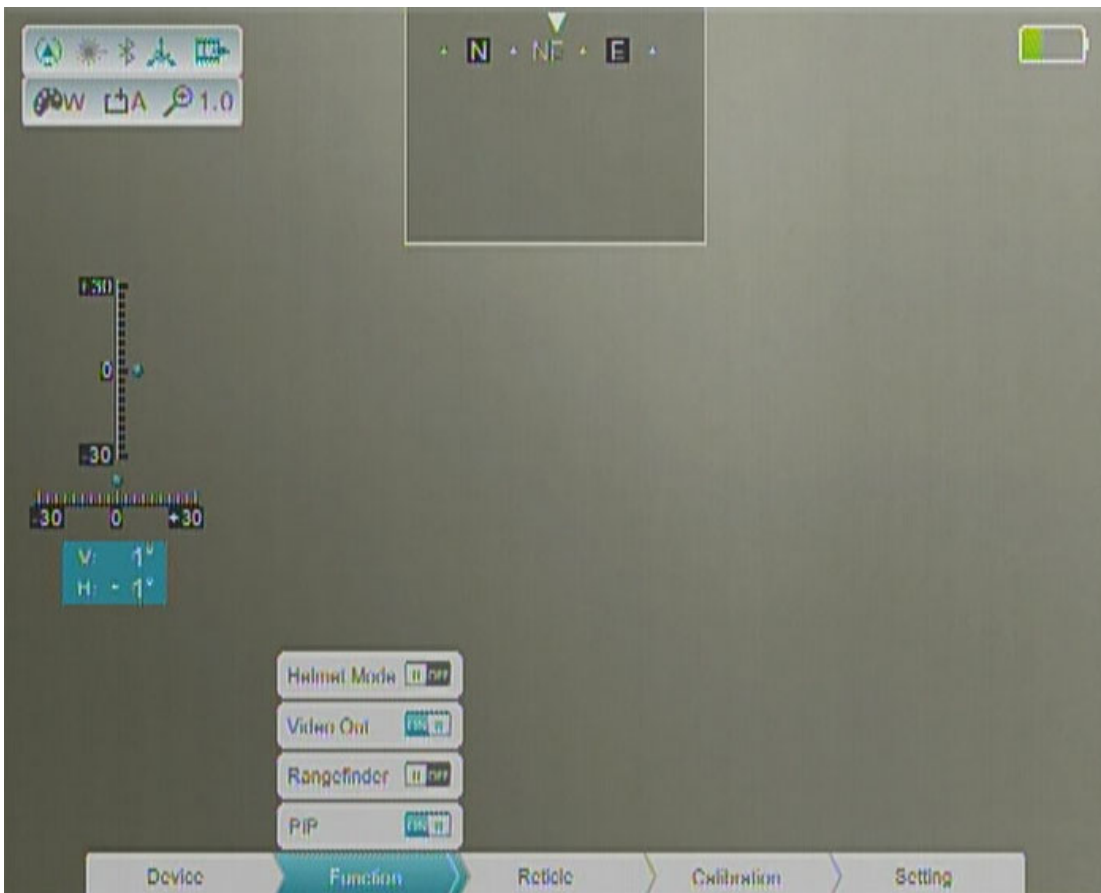
Figure 5-3. Advanced menu

Menu Operation:

Once the advanced menu is displayed, short press the encoder to toggle through the 5 menu selections. Rotate the encoder to toggle through the selections in each submenu.

Short press the encoder to select a particular setting or function in the submenu and rotate the encoder to make changes to that setting or function. Short press the encoder to lock the changes and return to the preceding menu.

Press and hold the encoder for 3 seconds to exit the advanced menu. The advanced menu will exit automatically after 30 seconds of inactivity. The details of the advanced menu are shown in table 5-1 and the relevant operation status is shown in figure 5-4, 5-5, 5-6 and 5-7.



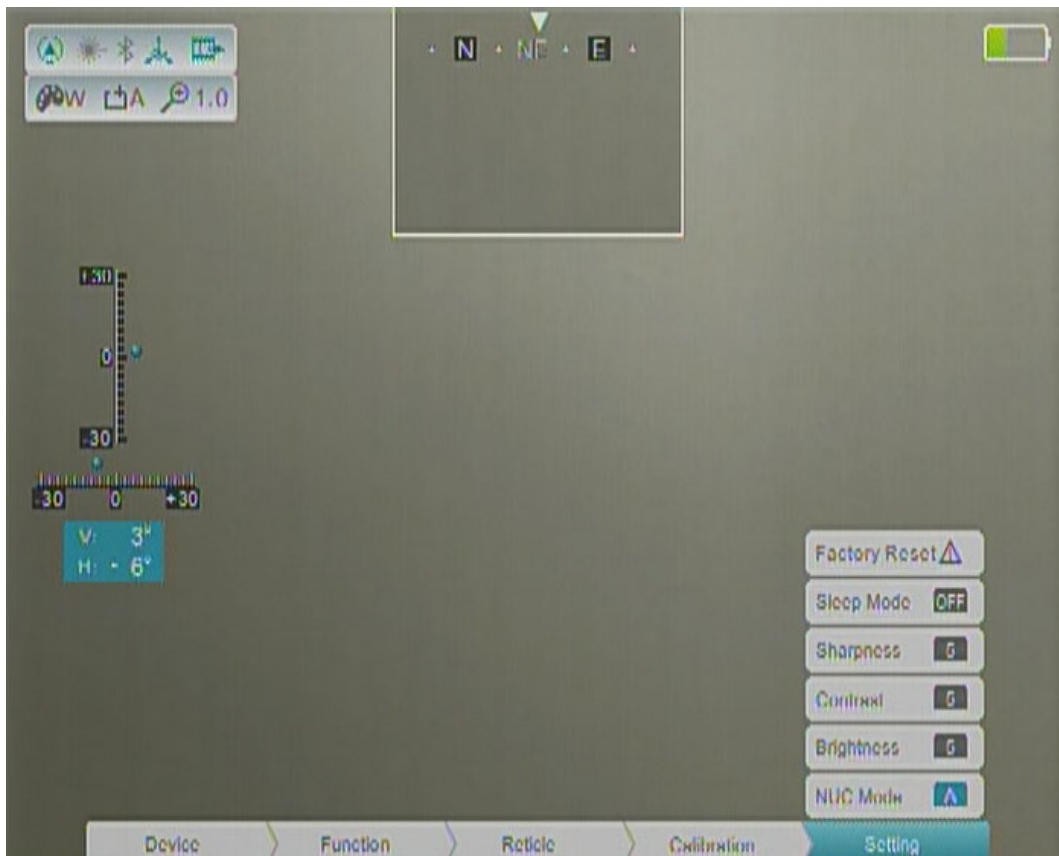
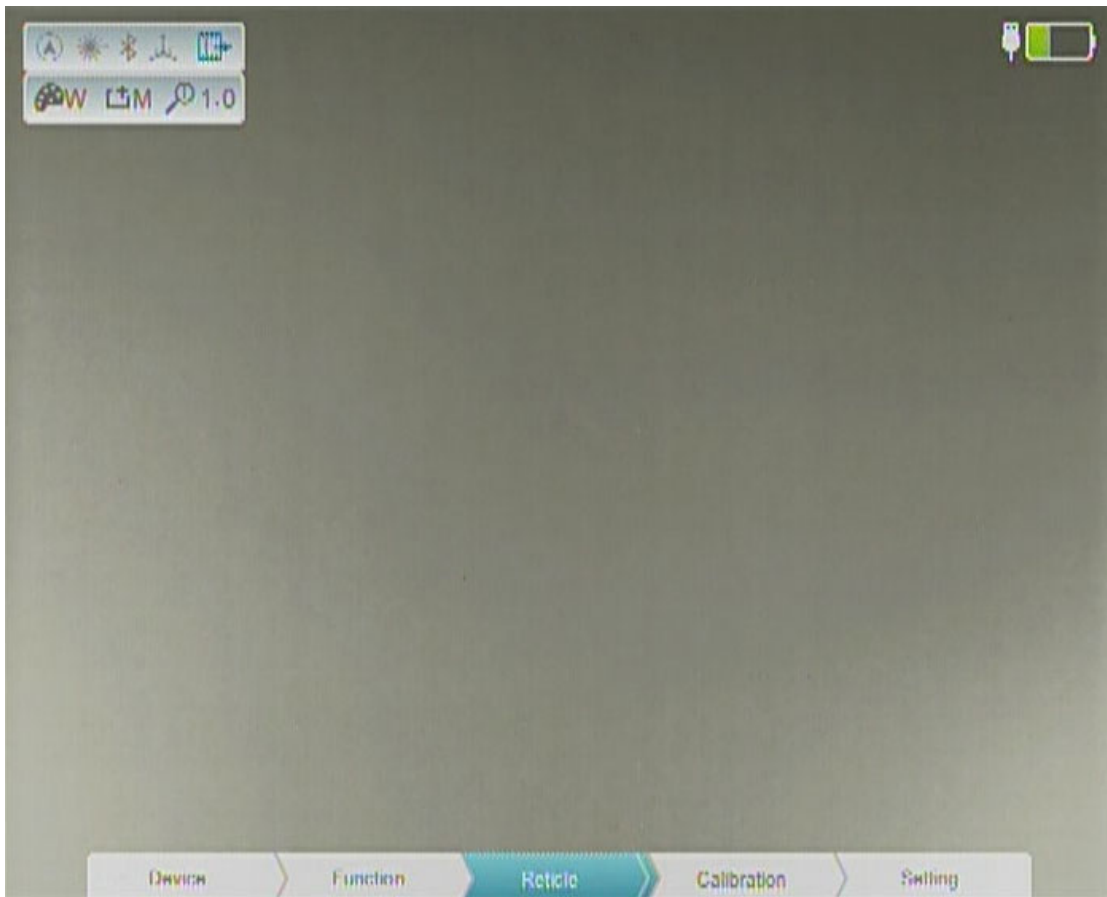


Table 5-1. Details of Xmini advanced menu

| Function items | Option items | Function | Operation | Status |
|----------------|--------------|----------|--|-----------------|
| Device | Bluetooth | ON/OFF | Enables/Disables Bluetooth remote control. **Bluetooth video and data transfer are not supported** | Icon turns blue |

| | | | | |
|-----------------|--------------------|--------|--|--|
| | Compass | ON/OFF | Displays and updates directional heading automatically according to the geomagnetic direction. | The upper left icon turns blue, and the azimuth bar appears above. |
| | Msensor | ON/OFF | Measures the pitch angle and horizon angle of the monocular relative to the ground. | The upper left icon turns blue, and the dip angle scale appears at the left. |
| Function | Helmet Mode | ON/OFF | Decreases the size of the image in the digital display | Image displayed at a reduced size in the center of the digital display |
| | Video Out | ON/OFF | Enables analog video output via USB-C port | The upper left icon turns blue. |
| | Rangefinder | ON/OFF | Align the ranging line to the top (or bottom) of the target and press encoder to record position 1. Then align the ranging line to the bottom (or top) of the target and press to record position 2. | The stadiametric rangefinder interface is shown in figure 5-4. |
| | PIP | ON/OFF | Displays a digitally zoomed (2X) version of the main display. | Image (192x144) shown in the upper middle portion of the main display. |

| | | | | |
|----------------|--------------|-----|-----|-----|
| Reticle | Type | N/A | N/A | N/A |
| | Color | N/A | | N/A |

| | | | | |
|--------------------|---------------------|--|---|-----|
| Calibration | | N/A | N/A | |
| | Pattern | N/A | | N/A |
| | Laser | N/A | N/A | N/A |
| | Reticle | The reticle is disabled on the MH25. | | N/A |
| Compass | Compass calibration | After entering the compass calibration menu item, wave the monocular in a figure 8 motion as indicated by the picture in the display. Figure 9 icon will disappear when calibration is complete. | Compass calibration interface is shown in figure 5-7. | |

| | | | | |
|----------------|----------------------|--|--|---------------------------------|
| Setting | Factory Reset | Restores monocular to original factory settings | After selecting this option, short press the encoder. After pressing the encoder, a dialog box will appear. Select "Yes" to execute or "No" to cancel. | Dialog prompts |
| | Sleep Mode | Turns sleep mode on/off. The standby time can | Short press to select this option, rotate encoder to toggle between options and press encoder to lock the selection. | — |
| | | be set to 5min, 15min, or 30min. | Short press to select setting, rotate encoder to toggle between levels and press encoder to lock the selection. | |
| | Sharpness | Image sharpness adjustment between 1 and 9 level. | | Real-time display |
| | Contrast | Image contrast adjustment between 1 and 9 level. | | Real-time display |
| | Brightness | Image brightness adjustment between 1 and 9 level. | | Real-time display |
| | NUC Mode | Automatic correction (A) and manual correction (M) | Rotate cursor to this option and short press the encoder to switch between A and M. | Displayed in upper left corner. |



Figure 5-4. Rangefinder interface



Figure 5-5. Laser calibration interface



Figure 5-6. Reticle calibration interface



Figure 5-7. Compass calibration interface


6. Preventative Maintenance

6.1 Battery Replacement


- ▶ Power off unit before replacing the batteries;


- ▶ The battery power icon is displayed on the upper right side of the display. There are four levels of power.


- ▶ When the battery icon turns to red, it means that the power is less than 25% and the battery needs to be replaced or connect to external power.;

 To replace the battery, rotate the battery cap counterclockwise, remove old battery and insert new battery button side down. The correct battery orientation is also noted on the outside of the battery compartment.

6.2 Product Cleaning and Maintenance

 Avoid using harsh chemicals or solvents to clean the monocular housing or lenses.

 Rinse the monocular housing with water and wipe clean with a soft cloth.

 For the eyepiece and objective lenses, remove any large particles or loose dirt using compressed air. Fine cleaning should be performed with a lens cloth or lens pen. Clean water, alcohol, or general-purpose window cleaner may be used to remove stubborn stains. Avoid using excessive force as this may result in scratching the lenses.

7. General Troubleshooting






Please contact InfiRay USA or an authorized vendor for assistance before attempting to perform any modifications or repairs beyond the scope of the troubleshooting procedures in this manual. Unauthorized repairs or modifications may void your warranty.

Table 2. General Troubleshooting

| Trouble description | Possible Causes | Trouble shooting |
|---------------------|--------------------------------|--|
| Image is blurry | Objective isn't focused | Rotate the objective lens until the image becomes clear. |
| | Long time no image correction. | Performing image correction. |

| | | |
|-----------------------------------|---------------------------------------|--|
| Display menu and icons are blurry | Diopter setting not adjusted properly | Rotate diopter ring on eyepiece until the display becomes clear. |
| No analog video output | Video output not enabled | Enable video out in Function Menu |
| | The data cable does not match. | Replace data cable. |
| Unit will not power on | Incorrect battery orientation | Check battery orientation and voltage. |
| | Insufficient external supply voltage. | Check the voltage of external power supply. |
| Unit fails to turn off | The lens is not facing down. | Tilt unit downward while pressing the rotary encoder |

8. Safety Regulation

-  Be sure to dispose of batteries properly. Do not short circuit, puncture or disassemble. Inspect all batteries for cracks, leakage, or bulging prior to use.
-  Do not use external power supplies that output over 5V
-  Avoid pointing unit toward intense sources of heat such as the sun, fire, or other hot objects, as prolonged exposure can damage the thermal sensor.
-  Do not store unit with batteries installed.
-  Do not store unit in temperatures exceeding 140°F