

# User's Manual

INFRAY OUTDOOR

## MINI MH25 V2

Multi-function Thermal Imager



## **WARNING !**

### **ITAR REQUIREMENTS**

These products may be 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. Learn more at [irayusa.com/ITAR](http://irayusa.com/ITAR).

#### **FCC ID: 2AYGT-24-00**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**CAUTION:** Changes or modifications not expressly approved by IRayUSA could void the user's authority to operate the equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device was tested for typical body-supported operations and use. To comply with RF exposure requirements, a minimum separation distance of 0.5cm must be maintained between the user's body and the handset, including the antenna. Third-party belt-clips, holsters, and similar accessories used by this device should not contain any metallic components. Body accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided. Use only the supplied or an approved antenna.

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## 1. OVERVIEW

The InfiRay Outdoor MINI MH25 V2 is a compact, lightweight thermal imager designed for handheld or helmet-mounted use. Its unique design allows for seamless operation as a handheld monocular, and it can easily transition to a helmet mount for hands-free use. The MH25 V2 is powered by a 50hz 12 μm sensor and features next-generation MATRIX III processing for an unmatched viewing experience. In addition to the features found on the original MH25, the MH25 V2 adds several highly-requested features including an upgraded AMOLED display, an upgraded eyepiece, and onboard video and audio recording.

## 2. FEATURES

- 12 μm high-performance thermal detector
- High image quality
- Aluminum/ABS housing
- Maximum detection range 1375 yards
- Rechargeable battery included
- HD 1280×960 AMOLED display
- High frame frequency: 50hz
- Stepped digital zoom from 1.0× to 4.0×
- Built-in 32 GB storage to support image capture and video recording
- Built-in motion sensor
- Bluetooth remote control
- Built-in Wi-Fi module
- Mobile device App compatible
- Automatic standby
- Multiple color palette options
- Picture in Picture (PIP)
- User-friendly interface

## 3. TECH SPECS

MINI	MH25W
SENSOR	
Resolution	640×512
Pixel Size	12 μm
Frame Rate	50hz
Image Processing	MATRIX III
Core	InfiRay Micro II 640
OPTICS	
Objective Lens	25 mm f/1.0
Magnification	1×
Digital Zoom	4×, Stepped
Field of View	17.5° × 13.1°
Detection Range	1375 Yards
Display Type	AMOLED
Display Resolution	1280×960
Color Palettes	White Hot, Black Hot, Red Hot, Color
Mounting System	MUM Rail
P.I.P.	Yes
Rangefinder	Stadiametric
Eye Relief	20 mm
Diopter Range	-4 to +3
ELECTRONICS	
Onboard Recording	Video and Image
Onboard Storage	32 GB
Data Connector	USB-C, Analog Video Out
Data/Power Connector	USB-C
Power Supply	USB-C External, 16340 Battery (1+ Hour), 16650 Battery (2.5+ Hours)
Start Up Time	<10 Seconds, Instant from Standby
PHYSICAL	
Size	5.03" × 2.75" × 1.77"
Weight	12.1 Oz
ENVIRONMENTAL/WARRANTY	
Warranty	5 Years
Housing Material	Aluminum/ABS
Ingress Protection	IP67
Operation Temperature	14°F~122°F

## 4. ACCESSORIES

The MINI MH25 V2 thermal imager ships with everything you need to get out and hunt.

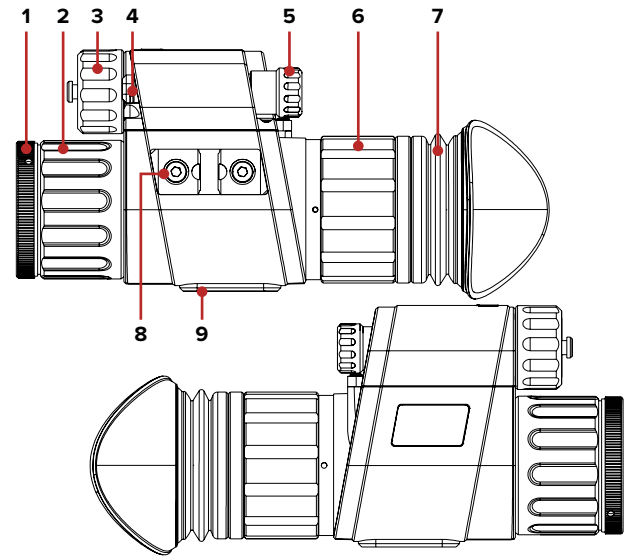
- MINI MH25 V2
- Standard Eyeguard for MINI
- Bluetooth Remote Control
- USB-C to Analog RCA/USB Cable 36"
- 16340 Rechargeable Battery
- Micro-USB Cable
- Adapter for 16650 Battery\*
- USB Power Adapter
- Soft Case and Shoulder Strap
- Lens Cloth
- User Manual

\*16650 battery is optional/not included.



Replacement accessories are available for purchase. Contact 800-769-7125 or [irayusa.com/support](http://irayusa.com/support).

## 5. COMPONENTS AND CONTROLS



- 1 Objective Lens Cap
- 2 Objective Lens Focus Ring
- 3 Battery Cover
- 4 USB-C Port
- 5 Rotary Encoder
- 6 Eyepiece / Diopter Adjustment Ring
- 7 Eyeguard
- 8 MUM Rail Interface
- 9 Dovetail Interface for Optional IRAY-AC49

## 6. QUICK START GUIDE

### Step 1: Prepare to Use the MINI MH25 V2

1. Compare the box contents to the accessories list and examine each for any shipping damage. See **Accessories** on page 4.
2. Check the lens to ensure there are no smudges or dirt present. Clean with the included lens cloth, if necessary.
3. Install the eyeguard (7).
4. Insert the 16340 battery into the battery compartment. See **Installing the Battery** on page 7.
5. Mount the MH25 V2 to a helmet (optional). See **Mounting the MINI MH25 V2 to a Helmet** on page 10.

### Step 2: Turn On the MH25 V2

1. Open the objective lens cap (1).
2. Long press the **Rotary Encoder (5)** for 3 seconds to power on the MH25 V2. The InfiRay Outdoor logo will appear.
3. Rotate the diopter adjustment ring (6) of the eyepiece until the interface icons are clearly visible.

**WARNING:** Do not point the objective lens toward intense energy sources, such as the sun. This may render the electronic components inoperative. The warranty does not cover damage caused by improper operation.

### Step 3: Adjust Image and Device Settings

1. Short press the **Rotary Encoder (5)** to enter the quick menu to adjust the following settings (see **Using the Quick Menu** on page 15):
  - a. Set the color palette to white hot, black hot, red hot, or color.
  - b. Set the display brightness level, from 1–5.
2. Long press the **Rotary Encoder** to enter the main menu to adjust the following settings, as needed:
  - a. Turn on the motion sensor. See **Device Menu > Msensor** on page 28.
  - b. Turn on the PIP window. A 2× zoomed image (2× that of the total zoom shown in the status bar) will appear at the top of the screen. See **Function Menu > PIP** on page 30.
  - c. Set the date and time. See **Calibration Menu > Time** on page 31.
  - d. Set the image sharpness level, from 1–4. See **Setting Menu > Sharpness** on page 33.
  - e. Set the non-uniformity correction (NUC) mode to automatic or manual. See **Setting Menu > NUC Mode** on page 33.
3. From the home screen, rotate the **Rotary Encoder** to zoom in or out, from 1.0 to 4.0×, in increments of 0.1. The real-time amplification number appears in the status bar. See **Digital Zoom** on page 24.

## 7. INSTALLING THE BATTERY

1. Remove the battery cover (3) by turning it counterclockwise.
2. Insert a 16340 battery (or a 16650 battery plus adapter) into the battery compartment following the polarity markings on the outside of the compartment. The positive [+] battery terminal faces in and the negative [-] terminal faces out.
3. Replace the battery cover.

## 8. CHARGING THE BATTERY

The MINI MH25 V2 thermal imager comes with a 16340 rechargeable lithium-ion battery which provides 1+ hours of operation. One 16650 rechargeable li-ion battery (optional/not included) is also compatible with MH25 V2 but requires the use of the included battery adapter.

**WARNING:** The MINI MH25 V2 is ONLY compatible with one 16340 battery or one 16650 battery (with the included adapter). Do NOT use CR123 batteries or two 16340 batteries at the same time as this will damage the thermal imager and void your warranty.

Fully charge the battery before using the MINI MH25 V2 for the first time:

1. Connect the micro-USB cable to the port on the side of the battery.
2. Connect the standard USB end of the cable to:
  - a. The included 5V–2A USB power adapter; **OR**
  - b. Any standard USB 3.0 port on a laptop or computer; **OR**
  - c. An external power supply, such as a USB power bank.

**WARNING:** The MH25 V2 can only be powered by a factory-supplied 16340 battery or a 16650 battery (optional/not included) plus adapter. Using any other battery may cause irreparable damage to the thermal imager or cause a fire. Any damage from using an improper battery will not be covered by warranty.

## 9. REMOVING THE BATTERY

1. Remove the battery cover **(3)** by turning it counterclockwise.
2. Remove the 16340 battery.

## 10. BATTERY SAFETY WARNINGS

### WARNINGS:

- Do not use a power adapter or USB cable that has been modified or damaged.
- Do not expose the battery to high temperatures or flames, and do not immerse in water.
- Do not leave the battery unattended while charging.
- Do not leave the battery charging for long periods after full charge is reached. Charging time should not exceed 24 hours.
- Keep batteries out of the reach of children and pets.
- The battery is equipped with short-circuit protection. However, any situation that may cause short-circuiting should be avoided.
- Do not disassemble, modify, hit, or drop the battery.
- Do not connect the battery to any external device with an electrical current that exceeds permitted levels.
- Do not connect an external device with a current supply that exceeds the 3.0 USB port.

To maintain optimal battery capacity and service life:

- Avoid storing a fully charged or discharged battery for long periods. Partial charging of the battery is necessary if the battery will be stored for an extended period.
- Do not charge an extremely cold battery without bringing it into a warm environment. Let the battery warm up for 45 minutes before charging.
- Charge the battery at a temperature range from 32°F to 113°F; otherwise, the service life of the battery may be reduced.
- The recommended operating temperature range is -4°F to 122°F. Avoid using the battery above the maximum or below the minimum recommended temperature as this may decrease the battery capacity or service life.

## 11. EXTERNAL POWER SUPPLY

The MINI MH25 V2 supports the use of an external power supply, such as a 5V mobile power bank.

1. Connect the external power supply to the USB-C port (4).

### NOTES:

- Always power off the MH25 V2 before disconnecting the external power supply, or data will not be saved.
- Do not connect the MH25 V2 to an external device with a power supply that exceeds the 3.0 USB cable.

## 12. MOUNTING THE MH25 V2 TO A HELMET

The MINI MH25 V2 can be mounted to a helmet using the MUM rail interface or with the optional dovetail shoe (IRAY-AC49).

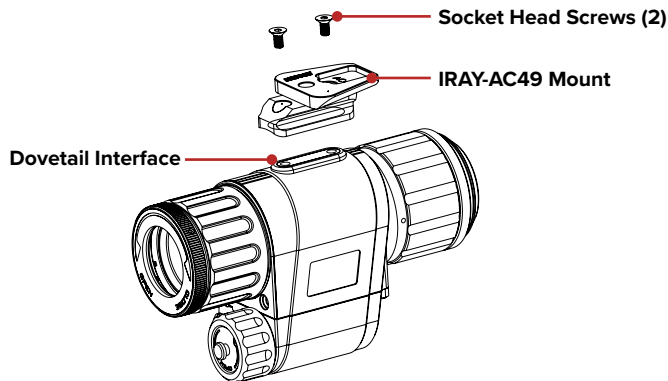
**NOTE:** Torque all hardware to a maximum of 15 inch-pounds (in/lbs) unless noted otherwise. Please note, torque is inch-pounds, NOT foot-pounds. If you do not have a torque wrench, apply until snug. Do not over-tighten. No threadlocker is required for proper use; but if you do decide to use a threadlocker, use only a small amount of low-strength LOCTITE 222.

### MOUNTING WITH THE BUILT-IN MUM RAIL INTERFACE

Mount the MINI MH25 V2 to your helmet with compatible dovetail-style helmet interface and hardware.

### MOUNTING WITH THE OPTIONAL AC49 MINI DOVETAIL SHOE

1. Place the MINI Dovetail Shoe (IRAY-AC49) on the MH25 V2 over the dovetail interface (9) on the bottom of the imager, with the narrow end of the dovetail facing towards the eyepiece as shown on the next page.



2. Insert the two socket head screws included with the dovetail shoe through the screw holes in the shoe.
3. Tighten until snug. Take care not to damage the threads in the body of the MH25 V2.
4. Finish mounting to your helmet with a compatible dovetail-style bridge and mount interface.

## 13. OPERATING INSTRUCTIONS

### WARNING!

Do not point the objective lens towards any intense energy sources, such as laser radiation or the sun. This may render the electronic components inoperative. The warranty does not cover damage caused by improper operation.

### Control Buttons

The MINI MH25 V2 features simple, one-button operation via the Rotary Encoder (5). The MH25 V2 may also be operated via the included Bluetooth remote control. See **Using the Bluetooth Remote** on page 21.

## Power On / Starting

1. Open the objective lens cap **(1)**.
2. Long press the **Rotary Encoder** for 3 seconds to turn on the thermal imager. The InfiRay Outdoor logo will appear.

To determine the current battery charge, check the battery icon in the upper-right corner of the screen. See **Battery Status** on page 15.

## Powering Off / Stopping

To power off the MH25 V2:

1. Point the objective lens down and long press the **Rotary Encoder** for 3 seconds to turn off the thermal imager.

## STANDBY MODE

In the main menu, the MH25 V2 may be set to automatically enter standby mode after 5 minutes of inactivity.

1. In the main menu, turn on standby mode. See **Setting Menu > Standby** on page 34 for instructions.
2. Once set, the MH25 V2 will automatically enter standby mode after 5 minutes of inactivity to conserve battery life.
3. When in standby mode, short press the **Rotary Encoder** to exit and return to the home screen.

### NOTES:

- The MH25 V2 will not enter standby if Wi-Fi, Bluetooth, or video recording is on.
- When standby is off, the thermal imager will operate until the battery runs out.

## Adjusting the Focus

### ADJUSTING THE DIOPTER/EYEPIECE

1. Rotate the eyepiece diopter adjustment ring **(6)** at the rear of the thermal imager right or left until the user interface is clear.
2. Look closely to ensure all screen symbols and the status bar appear sharp and in focus. No additional diopter adjustments are required unless the user wishes to make changes.

### NOTES:

- After the initial adjustment, there is no need to rotate the eyepiece adjustment ring **(6)** for long distances or other conditions.
- If necessary during standard use, the objective lens focus ring **(2)** may be rotated to adjust fine focus on the target object being observed. See **Focusing the Objective Lens** below.

### FOCUSING THE OBJECTIVE LENS

To adjust the focus on the target object:

1. Rotate the objective lens focus ring **(2)** left or right to adjust fine focus on the target object being observed.

**NOTE:** Re-adjusting the focus will be necessary if the distance to the target changes.

# Status Bar Overview

The status bar at the top of the screen shows information on the operating status of the MINI MH25 V2.



- 1 Color Palette:** Shows the color palette icon and selected palette, white hot (W), black hot (B), red hot (R), or color (C). White hot is the default.
- 2 Non-uniformity Correction (NUC) Mode:** Shows the non-uniformity correction (NUC) icon and selected mode, automatic (A) or manual (M). Automatic is selected by default.
- 3 Bluetooth:** When Bluetooth is turned on, the Bluetooth icon will appear in the status bar and flash to indicate that the MH25 V2 is ready to connect to the Bluetooth remote control. When successfully connected, the Bluetooth icon will stop flashing. Bluetooth is off by default.
- 4 Wi-Fi:** Shows the Wi-Fi icon when on. Wi-Fi is off by default.
- 5 Total Magnification:** Shows the real-time magnification, 1.0–4.0×.
- 6 Video Output:** Shows the video output icon when on. Video output is off by default.
- 7 Battery:** Shows the current battery status.

# BATTERY STATUS

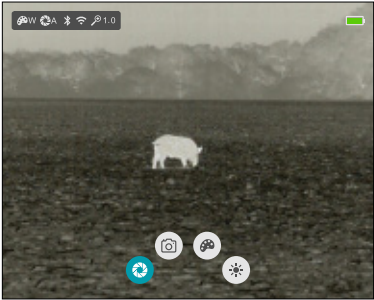
The battery icon color and fill level indicate the current battery status. The battery icon is replaced by the USB icon when an external power supply is connected.




COLOR / ICON	BATTERY STATUS
Green Battery	41% – 100%
Yellow Battery	20% – 40%
Red Battery	<20%; charge the battery right away.
USB	External power supply or computer is connected via the data cable.

# Using the Quick Menu

In the quick menu, perform a non-uniformity correction (NUC), take a photo or video, and set the color palette and display brightness.

- 1. On the home screen, short press the **Rotary Encoder** to enter the quick menu.
- 2. Rotate the **Rotary Encoder** left or right to move through the menu options below. The icon for the selected menu item turns blue.
  - a. **(Perform a NUC):** Short press the **Rotary Encoder** to perform a manual NUC. If the objective lens is pointed down when the Rotary Encoder is pressed, a background NUC will be performed. The device's internal shutter will not close; the user must manually close the objective lens cap.

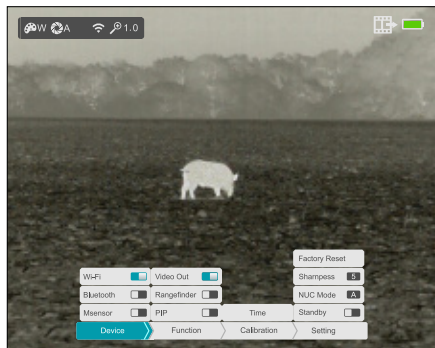


- b.  **(Take a Photo or Start/Stop Video):** Short press the **Rotary Encoder** to take a photo. Long press the **Rotary Encoder** to start a video recording or stop a video recording already in progress.
  - c.  **(Set the Color Palette):** Short press the **Rotary Encoder** to set the color palette to white hot, black hot, red hot, or color. The selected palette will display in the status bar.
  - d.  **(Set the Display Brightness):** Short press the **Rotary Encoder** to set the display brightness level from 1–5.
3. Long press the **Rotary Encoder** to exit the quick menu (except when the camera icon is selected as this will start or stop a video recording instead).

**NOTE:** After 5 seconds of inactivity, the MH25 V2 will automatically save any changes and exit to the home screen.

## Navigating the Main Menu

From the home screen, long press the **Rotary Encoder** to enter the main menu. **NOTE:** If the objective lens is pointing down when the Rotary Encoder is long-pressed, the imager will power off.



In all menu interfaces:

- The cursor position in the main menu and submenus is indicated by a blue back-highlight.
- Short press the **Rotary Encoder** to move right to left through the four main menu selections, Device, Function, Calibration, and Setting.
- Rotate the **Rotary Encoder** to move up or down through the submenu options.
- In a submenu, short press the **Rotary Encoder** to change the parameters for the selected submenu option.
- Long press the **Rotary Encoder** to confirm any changes and exit to the home screen. After 15 seconds of inactivity, the MH25 V2 will automatically save any changes and exit to the home screen.

## 14. NON-UNIFORMITY CORRECTION

A non-uniformity correction (NUC) allows a thermal imager's sensors to correct its pixels and eliminate any image defects caused by pixel drift. A NUC will be performed automatically each time the MINI MH25 V2 is powered on.

The MH25 V2 has two NUC modes, automatic and manual. The selected NUC mode, A or M, appears in the status bar. For instructions on setting the NUC mode in the main menu, see **Setting Menu > NUC Mode** on page 33.

### Automatic Mode


In automatic mode (**A**), the MH25 V2 will perform a NUC automatically according to the internal software algorithm. There is no need to close the objective lens cap (**1**) as the MH25 V2's internal shutter covers the sensor.

**NOTE:** A manual NUC (see next page) may be performed at any time while in Automatic (**A**) mode.

## Manual Mode

In manual mode (M), the user independently determines the need to perform a NUC based on the quality of the observed image. It is not necessary to close the objective lens cap (1) during a manual NUC, as the internal shutter covers the sensor.

To perform a manual NUC while in manual or automatic mode:

1. From the home screen, short press the **Rotary Encoder** to enter the quick menu. The NUC menu  item is selected by default.
2. Short press the **Rotary Encoder** to perform a manual NUC.


## 15. PHOTOGRAPHY AND VIDEO RECORDING

The MINI MH25 V2 is equipped with video recording and image capture. All videos and photos are automatically saved to the 32 GB internal memory storage.


**NOTE:** Photo and video files are named with the time and date; therefore, it is recommended to set the date and time before using the photo and video functions. See **Calibration Menu > Time** on page 31. Alternatively, the date and time may be synchronized in the InfiRay Outdoor App. See **Using the InfiRay Outdoor App** on page 22.

### Photography

To take a photo:



1. From the home screen, short press the **Rotary Encoder** to enter the quick menu.
2. Rotate the **Rotary Encoder** right to select the camera menu item .



3. Short press the **Rotary Encoder** to take a photo.
4. The camera  icon will appear in the upper-right corner of the screen.

### Video Recording

To record video:

1. From the home screen, short press the **Rotary Encoder** to enter the quick menu.
2. Rotate the **Rotary Encoder** right to select the camera menu item .
3. Long press the **Rotary Encoder** to begin recording a video.
4. The video icon  and recording timer, in HH:MM:SS (hour: minute: second) format, appear in the upper-right corner of the screen.
5. While video recording, you may enter the quick menu to take a photo.
6. To stop the video recording, enter the quick menu, select the camera menu item, and long press the **Rotary Encoder**.



### Video and Photography Tips

- You may enter and navigate the menu as normal during video recording. The user interface (the status bar, icons, and menu) is not captured in recorded video or photo files.
- Recorded photos are saved to the internal memory card.
  - Photos are saved in IMG\_HHMMSS\_XXX.jpg format.
  - Videos are saved in VID\_HHMMSS.mp4 format.
  - HHMMSS is hour/minute/second.
  - XXX is a 3-digit counter number.
- The counter used for multimedia file names cannot be reset.

- If a file is deleted from the internal memory, its counter number is not taken by another file.

#### NOTES:

- The maximum duration of a recorded video file is 10 minutes. After this time, video recording will begin a new file automatically.
- The number of recorded files is limited only by the capacity of the internal memory.
- Check the available space on the internal storage card regularly and move video footage and images to other storage media to free up space on the memory card.
- Graphic data (icons and menu) are not displayed in recorded video and photos.

## 16. ACCESSING THE INTERNAL MEMORY

When the MINI MH25 V2 is turned on and connected to a computer via the included data cable, it is recognized by the computer as a flash memory (USB) drive. This allows the user to access the saved multimedia files and copy or delete any desired files.

To access the internal memory:

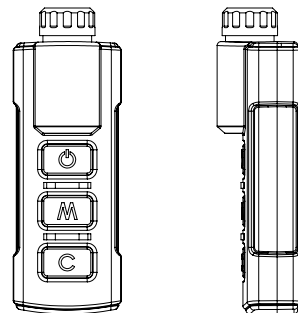
1. Turn on the MH25 V2.
2. Plug the smaller USB-C end of the data cable into the USB-C port (4).
3. Plug the larger USB end of the data cable into your computer.
4. Double-click **My Computer** on your computer desktop.
5. Double-click to open the device named **MH25W**.
6. Double-click to open the device named **Internal Storage** to access the memory.
  - a. Shows the available space (in GB) remaining of the total memory storage.
  - b. Recorded photos and videos are separated by date into folders.

- c. Folders are named by date, in YYYYMMDD (year/month/day) format.

7. Select the desired files or folders to copy or delete.

## 17. USING THE BLUETOOTH REMOTE

The Bluetooth remote control has a rotary encoder and three buttons, Power, M, and C.



### Connecting the Bluetooth Remote to the MH25 V2

1. Turn on Bluetooth in the main menu. See **Device Menu > Bluetooth** for instructions on page 27. The Bluetooth icon will flash in the status bar indicating that it is waiting to connect.
2. Long press the **Power** (⏻) **Button** on the remote control for 15 seconds until the Bluetooth icon in the status bar stops flashing. Once connected, you may release the Power Button.
3. If the Bluetooth connection is lost, the remote control will automatically reconnect within one minute.

**NOTE:** The Bluetooth remote control must be manually connected to the MH25 V2 each time it is used.

### Using the Bluetooth Remote

- Press the **(M)** **Button** to change the color palette.
- Press the **(C)** **Button** to perform a manual non-uniformity correction (NUC).


- The **Rotary Encoder** has the same functionality as the main Rotary Encoder on the imager.

## Disconnecting the Remote Control

1. To disconnect, turn off Bluetooth in the main menu. The Bluetooth remote control will automatically power off within one minute if it cannot find a connection.

## 18. USING THE INFIRAY OUTDOOR APP

The MINI MH25 V2 can be operated using the InfiRay Outdoor App when connected to a smartphone or tablet via Wi-Fi.

1. Download the App for free and install it on your smartphone or tablet:
  - a. Scan one of the QR codes to download the InfiRay Outdoor App from the App Store or Google Play; **OR**
  - b. Download from any app store.
2. Connect the MH25 V2 to Wi-Fi:
  - a. Turn on the Wi-Fi toggle in the main menu. See page 27 for instructions.
  - b. Open the App and press the **ViewFinder**  icon on the home screen.
  - c. Click the **Connect Device Wi-Fi button**.
  - d. On the mobile device, go to **Settings > Wi-Fi**.
  - e. Select the MH25 V2 from the list of Wi-Fi networks. It will appear in the list as "MH25W\_XXXXXX", where XXXXXX is the six-digit device serial number.



- f. Enter the Wi-Fi password and tap the **Join button**. The default password is 12345678.

3. Operate the MH25 V2 via the App:
  - a. Take real-time photos and videos, with or without audio.
  - b. View, share, download, and delete photos and videos taken via the App, which are saved to the mobile device.
  - c. Change the Wi-Fi password and SSID.
  - d. Synchronize the date and time from the mobile device.
  - e. Update the MH25 V2 firmware.

**NOTE:** When a factory reset is performed, the Wi-Fi SSID and password are reset to the defaults, MH25W\_XXXXXX and 12345678. See **Setting Menu > Factory Reset** on page 32.

## 19. VIDEO OUTPUT

The video output function enables connectivity with an external display or recording device via analog video.

To output video:

1. Turn on the video output toggle in the main menu. See **Function Menu > Video Output** on page 29 for detailed instructions.
2. Connect the smaller USB-C end of the data cable to the USB-C port **(4)** on the MH25 V2.
3. Connect the RCA connector to the RCA jack on the external display or recording/display device.

## 20. DIGITAL ZOOM

The MINI MH25 V2 uses stepped zoom and can quickly increase the base magnification from 1.0× to 4.0× by enlarging the image from 1 to 4 times digitally.

To use digital zoom:

1. From the home screen, rotate the **Rotary Encoder** to zoom in and out on the observed object.
  - a. Rotate clockwise to zoom in or counterclockwise to zoom out.
  - b. Each rotation click zooms in / out in increments of 0.1×.
2. The real-time amplification number, 1.0–4.0×, appears in the status bar.

## 21. PICTURE IN PICTURE (PIP)

The Picture in Picture (PIP) function opens a small floating window with a magnified image view at the top of the screen. PIP allows for increased magnification while still being able to see the wide field of view in the main body of the screen.

To open the Picture in Picture window:

1. Turn on the PIP toggle in the main menu. See **Function Menu > PIP** for instructions on page 30.



2. A 2× zoomed image will appear at the top of the screen. Please note that the PIP image is 2× that of the total magnification shown in the status bar.
3. To close the PIP window, return to the menu and turn off the PIP toggle.

**NOTE:** When the image in the main body of the screen is enlarged via digital zoom, the PIP image will enlarge accordingly.

## 22. STADIAMETRIC RANGEFINDER

The MINI MH25 V2 is equipped with a stadiametric rangefinder, which allows the user to calculate the approximate distance to an object if its size is known.

To open the stadiametric rangefinder:

1. Turn on the rangefinder toggle in the main menu. See **Function Menu > Rangefinder** for instructions on page 29.
2. The stadiametric rangefinder interface has the following features:

- 1 Stadia Lines:** The two horizontal lines in the center of the screen can be adjusted to measure the size of the target object.
- 2 Icons and Distances:** Icons and distance values for three pre-configured objects will be displayed on the right side of the screen. The pre-configured objects are Bear: 5.6' tall, Hog: 3.0' tall, and Rabbit: 7.9" tall.



Calculate the approximate distance of the observed object:

1. Rotate the **Rotary Encoder** to expand or contract the space between the horizontal lines until they touch the top and bottom edges of the target object.
  - a. Rotate clockwise to expand the space between the lines.
  - b. Rotate counterclockwise to shrink the space between the lines.
  - c. As you adjust the space between the horizontal lines, the rangefinder distance values on the right side of the screen are automatically recalculated.
2. Long press the **Rotary Encoder** to turn off the stadiametric rangefinder.

## 23. MAIN MENU OPTIONS AND DESCRIPTIONS

Menu and submenu options from left to right are:

- **Main Menu:** Device, Function, Calibration, Setting.
  - **Device Menu:** Wi-Fi, Bluetooth, Msensor.
  - **Function Menu:** Video Output, Rangefinder, PIP.
  - **Calibration Menu:** Time.
  - **Setting Menu:** Factory Reset, Sharpness, NUC Mode, Standby.

Menu option details, descriptions, and navigation instructions are listed in order on the following pages.

### Device Menu


#### Adjust the device settings

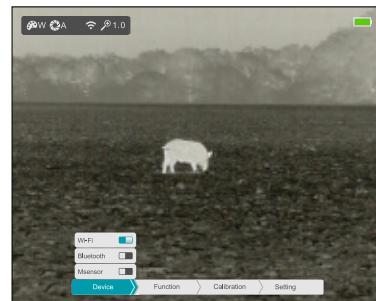
1. Long press the **Rotary Encoder** to enter the main menu. The Device Menu is selected by default.
2. Rotate the **Rotary Encoder** to move through the Device submenu items, Wi-Fi, Bluetooth, and Msensor.

### DEVICE MENU > WI-FI

#### Turn Wi-Fi on / off

Turn on Wi-Fi to manipulate the MH25 V2 via the InfiRay Outdoor App.


1. Rotate the **Rotary Encoder** to select the Wi-Fi submenu item.
2. Short press the **Rotary Encoder** to toggle Wi-Fi on / off. Wi-Fi is off by default.
3. When Wi-Fi is on, the Wi-Fi icon  appears in the status bar.
4. Long press the **Rotary Encoder** to save and return to the home screen.

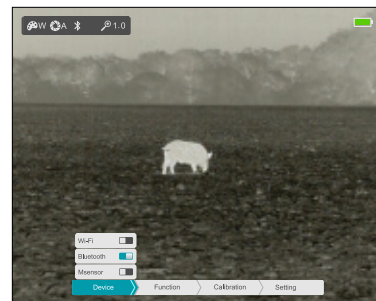


### DEVICE MENU > BLUETOOTH

#### Turn Bluetooth on / off

The Bluetooth function enables connectivity to the included Bluetooth remote control. See page 21 for remote control connection and usage instructions.

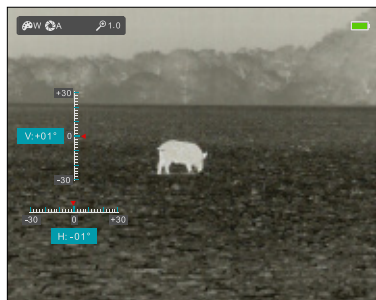
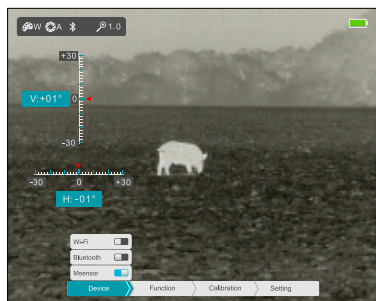
1. Rotate the **Rotary Encoder** to select the Bluetooth submenu item.
2. Short press the **Rotary Encoder** to toggle Bluetooth on / off. Bluetooth is off by default.
3. When Bluetooth is on, the Bluetooth icon  appears in the status bar.
4. Long press the **Rotary Encoder** to save and return to the home screen.



## DEVICE MENU > MSENSOR

### Turn the motion sensor on / off

1. Rotate the **Rotary Encoder** to select the Msensor submenu item.
2. Short press the **Rotary Encoder** to toggle the motion sensor on / off. The motion sensor is off by default.
3. When the motion sensor is on, it appears on the left side of the screen.
4. Long press the **Rotary Encoder** to save and return to the home screen.



## Function Menu


### Adjust the function settings

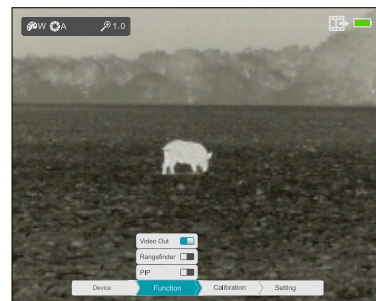
1. Long press the **Rotary Encoder** to enter the main menu.
2. Short press the **Rotary Encoder** to move through the menu options to select the Function Menu.
3. Rotate the **Rotary Encoder** to move through the Function submenu items, Video Output, Rangefinder, and PIP.

## FUNCTION MENU > VIDEO OUTPUT

### Turn video output on / off

The video output function enables connectivity with an external display or recording device via analog video.

1. Rotate the **Rotary Encoder** to select the Video Output submenu item.
2. Short press the **Rotary Encoder** to toggle video output on / off. Video output is off by default.
3. When video output is on, the video output icon  appears in the upper-right corner of the screen.
4. Long press the **Rotary Encoder** to save and return to the home screen.

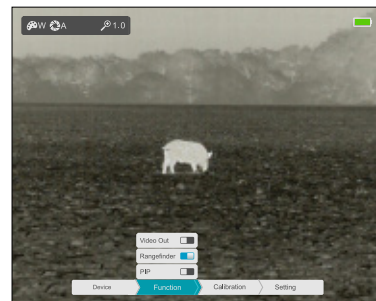


## FUNCTION MENU > RANGEFINDER

### Open the stadiametric rangefinder

See **Stadiametric Rangefinder** on page 25 for instructions for using the stadiametric rangefinder

1. Rotate the **Rotary Encoder** to select the Rangefinder submenu item.
2. Short press the **Rotary Encoder** to turn on the rangefinder toggle. The rangefinder is off by default.



3. The stadiametric rangefinder interface will open and the menu will close automatically.
4. When the rangefinder is open, long press the **Rotary Encoder** to close it and return to the home screen.

## FUNCTION MENU > PIP

### Turn the PIP window on / off

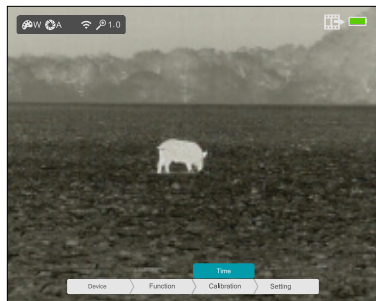
1. Rotate the **Rotary Encoder** to select the PIP submenu item.
2. Short press the **Rotary Encoder** to toggle PIP on / off. The PIP window is off by default.
3. When PIP is turned on, a 2× zoomed image will appear at the top of the screen.
4. Long press the **Rotary Encoder** to save and return to the home screen.



## Calibration Menu

### Adjust the time and date

1. Long press the **Rotary Encoder** to enter the main menu.
2. Short press the **Rotary Encoder** to move through the menu options to select the Calibration Menu.
3. Rotate the **Rotary Encoder** to select the Time submenu item.



## CALIBRATION MENU > TIME

### Set the date and time

1. Short press the **Rotary Encoder** to enter the time/date setting interface.
2. The date and time are displayed in YYYY.MM.DD and HH:MM format. Blue triangle icons appear above and below the year value.
3. Rotate the **Rotary Encoder** to select the value for each digit (year, month, day, hour, second).
4. Short press the **Rotary Encoder** to switch between digits. The two triangle icons move to indicate the selected digit.
5. Long press the **Rotary Encoder** to save the date and time and return to the home screen.



## Setting

### Adjust the general settings

1. Long press the **Rotary Encoder** to enter the main menu.
2. Short press the **Rotary Encoder** to move through the menu options to select the Setting Menu.
3. Rotate the **Rotary Encoder** to move through the Setting submenu items, Factory Reset, Sharpness, NUC Mode, and Standby.

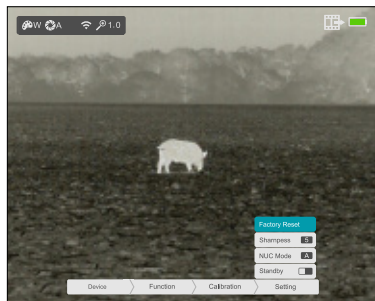
## SETTING MENU > FACTORY RESET

### Restore factory default settings

1. Rotate the **Rotary Encoder** to select the Factory Reset submenu item.
2. A pop-up window shows the message “Restore to Factory Settings” and two options, Yes and No. Yes will restore factory settings and No will cancel the operation. No is selected by default.
3. Short press the **Rotary Encoder** to confirm cancellation of the factory reset and return to the submenu; **OR**
4. Rotate the **Rotary Encoder** to move to **Yes** and short press the **Rotary Encoder** to select **Yes** to confirm the factory reset. Factory settings will be restored instantly.

### NOTES:

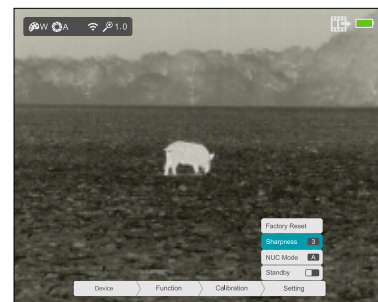
- A factory reset cannot be undone.
- The settings listed below will be reset to the factory defaults:
  - Color Palette: White hot
  - Display Brightness: 3
  - Magnification: 1.0×
  - Wi-Fi: Off
  - Bluetooth: Off
  - Motion Sensor: Off
  - Video Out: Off
  - PIP: Off
  - Image Sharpness: 2
  - NUC Mode: Automatic
  - Standby: Off
  - Wi-Fi SSID: MH25W\_XXXXXX
  - Wi-Fi Password: 12345678



## SETTING MENU > SHARPNESS

### Set image sharpness

1. Rotate the **Rotary Encoder** to select the Sharpness submenu item.
2. Short press the **Rotary Encoder** to toggle through the four sharpness level options, 1–4. Level 2 is selected by default.
3. Long press the **Rotary Encoder** to confirm the selection and return to the home screen.

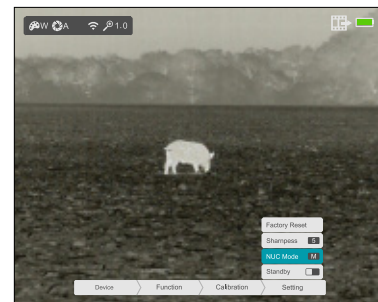


## SETTING MENU > NUC MODE

### Set non-uniformity correction mode

The MINI MH25 V2 has two non-uniformity correction (NUC) modes, Automatic (A) and Manual (M).

1. Rotate the **Rotary Encoder** to select the NUC Mode submenu item.
2. Short press the **Rotary Encoder** to toggle between the two NUC mode options, Automatic (A) or Manual (M). Automatic (A) is selected by default.
3. The selected NUC mode, A or M appears in the status bar.
4. Long press the **Rotary Encoder** to confirm the selection and return to the home screen.



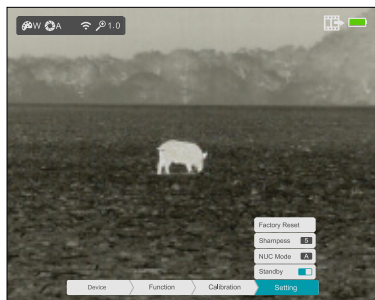
## Turn standby on / off

To conserve battery, the MH25 V2 may be set to automatically enter standby mode after 5 minutes of inactivity.

1. Rotate the **Rotary Encoder** to select the Standby submenu item.
2. Short press the **Rotary Encoder** to toggle standby on / off. Standby is off by default.
3. Long press the **Rotary Encoder** to save and return to the home screen.
4. When standby is turned on, the MH25 V2 will automatically enter standby mode after 5 minutes of inactivity.
5. When in standby mode, short press the **Rotary Encoder** to exit and return to the home screen.

## NOTES:

- The MH25 V2 will not enter standby if Wi-Fi, Bluetooth, or video recording is on.
- When standby is off, the thermal imager will operate until the battery runs out.



# 24. BASIC INSPECTION

It is recommended to carry out a technical inspection before each use. Please check the following:

- The thermal imager appearance: there should be no cracks in the body or visible damage.
- The condition of the objective lens and eyepiece: there should be no cracks, greasy spots, dirt, or other deposits on the lens.
- The rechargeable battery should be fully charged.
- The rotary encoder and Bluetooth remote control should be in working order.

# 25. BASIC MAINTENANCE

Always replace the objective lens cap **(1)** after use to avoid damaging or scratching the lens. Never touch the lens directly; oil from your skin can damage the lens coating and surface.

Basic maintenance should be carried out at least twice a year and includes the following steps:

- Wipe the surface of the external metal and plastic components with a clean, dry cotton cloth. Do not use chemical, corrosive, or abrasive cleaners. Canned air may also be used to clean the external components.
- Clean the electric contacts and battery slots on the thermal imager using a non-greasy organic solvent.
- Check the lens and eyepiece. If necessary, remove any dirt or sand from the optics; a non-contact cleaning method is preferred.
- Cleaning the exterior of the lens should only be done with the included microfiber lens cloth or a similar product. Only clean the lens when it is visibly soiled. Frequent wiping or cleaning can degrade the anti-reflective lens coating.

## 26. WARRANTY

At iRayUSA we're first and foremost hunters and users of our products and we understand that failure isn't an option. We also understand that having to wait extended periods for repair isn't something that a customer should have to put up with when something does go wrong. During your published warranty period, iRayUSA will repair or replace, at its discretion, any optic that becomes defective during normal use. Additionally, if we cannot fix your optic in less than one week, we will offer to replace it with a replacement product in like or better condition. If you would rather wait for your specific optic to be repaired, we can handle that too.

We know you've never seen this from a thermal manufacturer and neither have we; that's why we started iRayUSA.

Our warranty follows the product and is not tied to the original owner. The warranty period is tied to the date of sale to the dealer. This warranty only covers normal use and does not cover cosmetic damage, normal wear, intentional damage, theft, loss, any act of God, or a condition caused by use other than intended. Any product that is modified, opened, or tampered with will void any warranty coverage. Any serial number damage or alteration on the product will be considered a modification. Be sure to register your MINI MH25 V2 thermal imager at [irayusa.com/register](https://irayusa.com/register).

To return a product for repair:

1. Go to [irayusa.com/warranty](https://irayusa.com/warranty) and click the **Request an RMA button** to request an RMA number. Returns will not be accepted without an RMA.
2. The customer is responsible for shipping the product to iRayUSA, per the instructions included with the RMA. iRayUSA will return the product at no cost.

### NOTES:

- The one-week timeline starts from the time of receipt of the product at iRayUSA.
- iRayUSA is not liable for any damages or loss incurred when shipping to iRayUSA.
- This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Please give us a call at **800-769-7125**, visit [irayusa.com/warranty](https://irayusa.com/warranty), or email [info@irayusa.com](mailto:info@irayusa.com) with any questions.

## 27. GENERAL TROUBLESHOOTING

The troubleshooting table on the next page lists issues that may occur when operating the MINI MH25 V2. Carry out the recommended troubleshooting steps in the order shown in the table. Please contact iRayUSA at 800-769-7125 or [irayusa.com/support](https://irayusa.com/support) 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 will void your warranty.

ISSUE	POSSIBLE CAUSES
The MH25 V2 will not turn on.	The battery is very low or has completely discharged.
The MH25 V2 cannot connect to a computer or external power supply.	External power supply has completely discharged.
	Computer is turned off.
	Data cable is damaged.
The MH25 V2 cannot connect to the mobile device (smartphone or tablet).	Wi-Fi is not turned on.
	Wrong Wi-Fi password entered.
	Too many Wi-Fi signals near the MH25 V2.
Wi-Fi signal is lost or interrupted.	Smartphone or tablet is out of range of a strong Wi-Fi signal or there are obstacles between the MH25 V2 and the mobile device.
The image is fuzzy, not clear, not balanced, or has artifacts.	Non-uniformity correction is required.
The image is too dark.	Display brightness level is too low.

TROUBLESHOOTING STEPS
Charge the battery.
Charge the external power supply.
Power on the computer.
Replace the data cable.
Turn on Wi-Fi in the main menu. See <b>Device Menu &gt; Wi-Fi</b> on page 27.
On the mobile device, go to <b>Settings &gt; Wi-Fi</b> and enter the correct password. The default password is 12345678. See <b>Device Menu &gt; Wi-Fi</b> on page 27.
Move the MH25 V2 and mobile device to an area with no or fewer Wi-Fi signals.
<ul style="list-style-type: none"> <li>Try again when the Wi-Fi signal is stable.</li> <li>Move the MH25 V2 closer to the Wi-Fi signal.</li> </ul>
Perform a non-uniformity correction. See <b>Setting Menu &gt; NUC Mode</b> on page 33.
Adjust the display brightness in the quick menu. See <b>Using the Quick Menu</b> on page 15.

The GUI is clear, but the image is fuzzy.	The lens is not focused.
	There is dust on the external optical surface of the lens.
	There is condensation on the interior or exterior optical surfaces of the lens.
The image of the object being observed is missing.	Looking through glass.
The MH25 V2 will not focus.	Image settings are not optimal for the current environmental conditions or the object being observed.
When the MH25 V2 is used in low-temperature conditions, the image quality of the surroundings is worse than in warm-temperature conditions.	Environmental conditions.

<ul style="list-style-type: none"> <li>Adjust the focus on the target by rotating the Objective Focus Ring (2).</li> <li>Adjust the image sharpness in the quick menu. See <b>Setting Menu &gt; Sharpness</b> on page 33.</li> </ul>
<ul style="list-style-type: none"> <li>Wipe the external optical surface with the included microfiber lens cloth.</li> </ul>
<ul style="list-style-type: none"> <li>Wipe the external optical surface with the included microfiber lens cloth.</li> <li>Allow the MH25 V2 to dry by leaving it in a warm, dry environment for at least 4 hours.</li> </ul>
Remove any glass windows from the field of view.
<ul style="list-style-type: none"> <li>Check the external surface of the objective lens and eyepiece and, where necessary, wipe away any dust, condensation, frost, etc.</li> <li>In cold weather, you can use special anti-fogging coatings, such as those made for corrective glasses.</li> <li>Adjust the focus on the target by rotating the Objective Focus Ring (2).</li> <li>Adjust the image sharpness. See <b>Setting Menu &gt; Sharpness</b> on page 33.</li> <li>Adjust the image and device settings. See <b>Quick Start Guide</b> on page 6.</li> </ul>
In warm-temperature conditions, observed objects (the surroundings and background) heat differently due to thermal conductivity, thereby generating a high-temperature contrast. Accordingly, image quality produced by the thermal imager will be high. In low-temperature conditions, the background will cool to roughly the same temperature, and thus the temperature and scene contrast are substantially reduced, resulting in reduced image detail. This is a normal function of a thermal imager and not an indicator of detector performance.



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