

InfiRay ML-19 Multifunction Thermal Imager User's Manual



Date 01.03.2021

Version V1

Falconclaw OU

<https://www.falconclaw.eu>

CONTENTS

1. Overview	1
2. Tech Specs	2-3
3. System Functions	4
4. Product Components	5
5. Operation Functions	6
5.1 Switching on/off	7
5.2 Electronic Magnification	7
5.3 Context Menu	8
5.4 Advanced Menu	9
6. Preventative Maintenance	14
6.1 Battery Replacement	14
6.2 Product Cleaning and Maintenance	15
7. General Troubleshooting	15
8. Safety Regulation	16

1. Overview

The InfiRay Mini ML19 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 ML19 is compatible with rechargeable 16650 and 16340 batteries and can be powered externally through the USB-C port with a 5V battery pack. The ML19 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

2. Tech Specs

Table 1. Technical Specifications

Model	ML19
Detector Parameter	
Resolution	384×288
Pixel Size	17μm
Spectral Response	8~14μm
NETD	≤60mK@25°C, f/1.0
MRTD	≤500mK@25°C, f/1.0
Frame Rate	50Hz
Optical Parameter	
Objective Lens	19mm
Focus Mode	Manual
Field of View	19°×15°
Detection Range	N/A
Digital Zoom	1.0-4.0×
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 CR123
Max. Battery Life	16340——up to 2 hours 16650——up to 4 hours
Operating Temperature	-10°C~+50°C
Power Consumption	<1700mW
IP Rating	IP67
Weight (without battery)	<225g
Dimension	121mm×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
- 4X 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 ML19 are shown in figure 4-1.

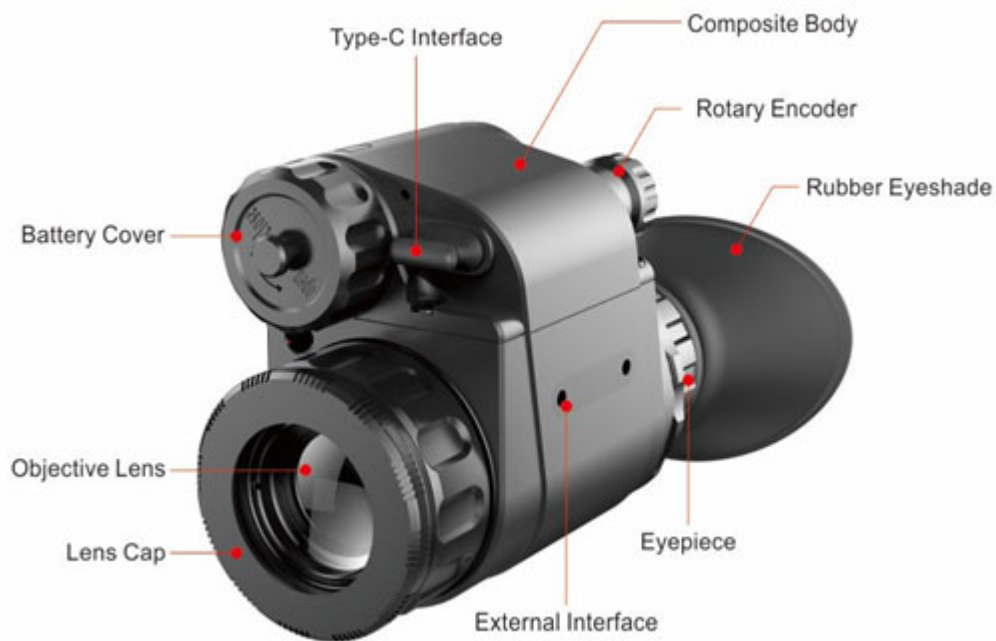


Figure 4-1. ML19 Diagram

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.

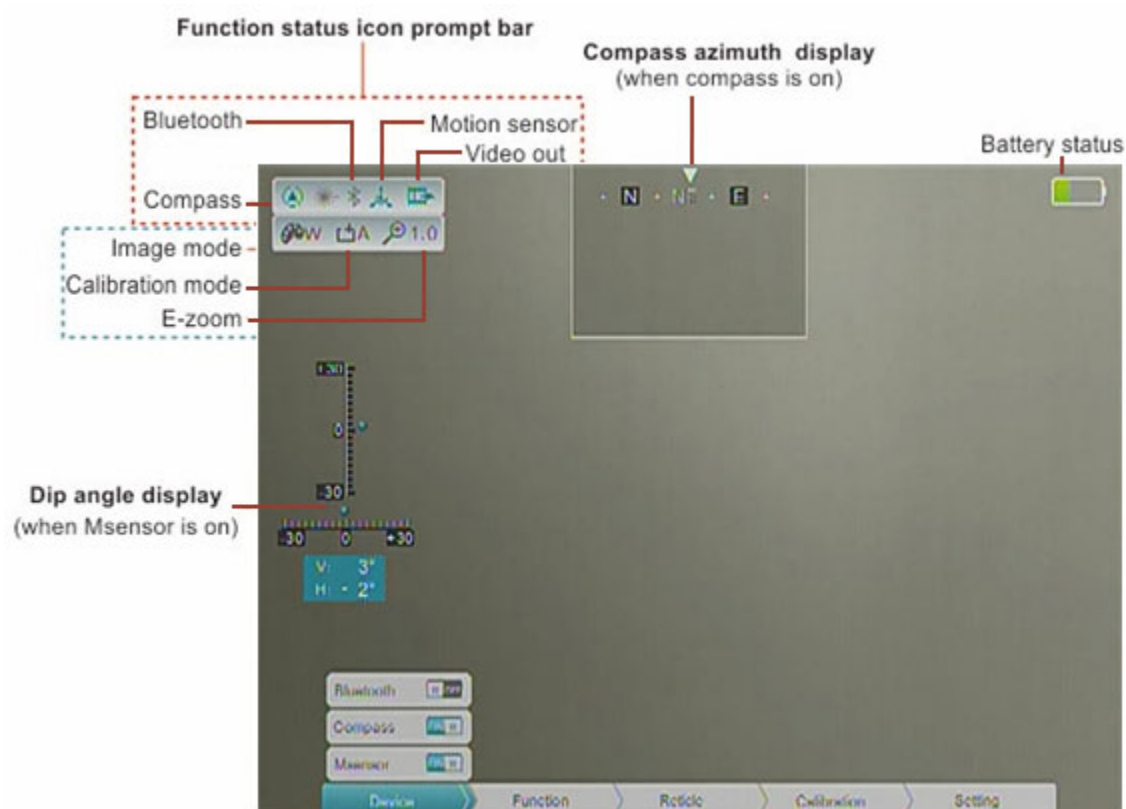


Figure 5-1. Normal display interface

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: ML19 does not have a laser. Only certain models feature a laser, and the ML19 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 ML19 downward will turn the ML19 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 ML19 does not have a laser. Only certain models feature a laser, and the ML19 does not. Even though there is a menu for it, there is no laser.

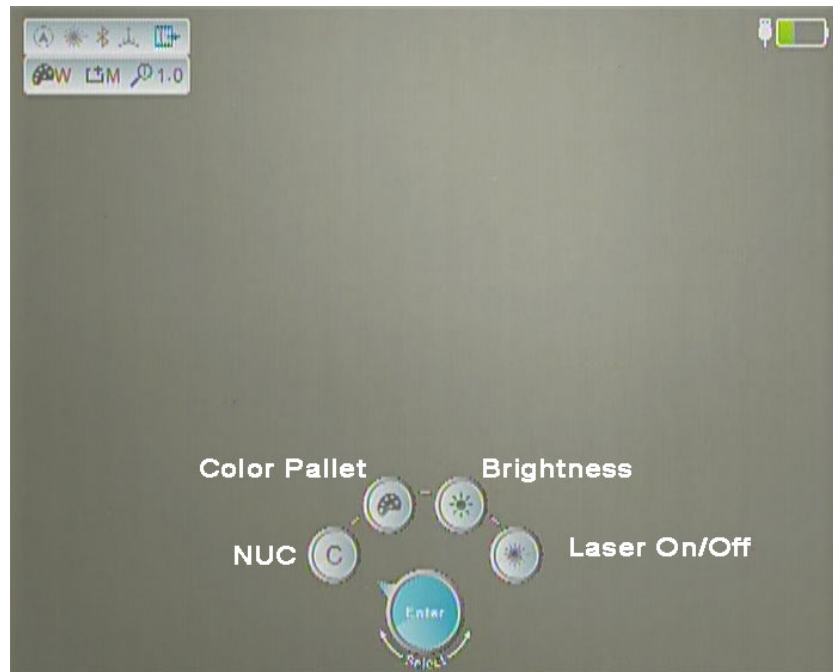


Figure 5-2. Context menu

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 ML19 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 ML19 because there is no reticle and no laser.

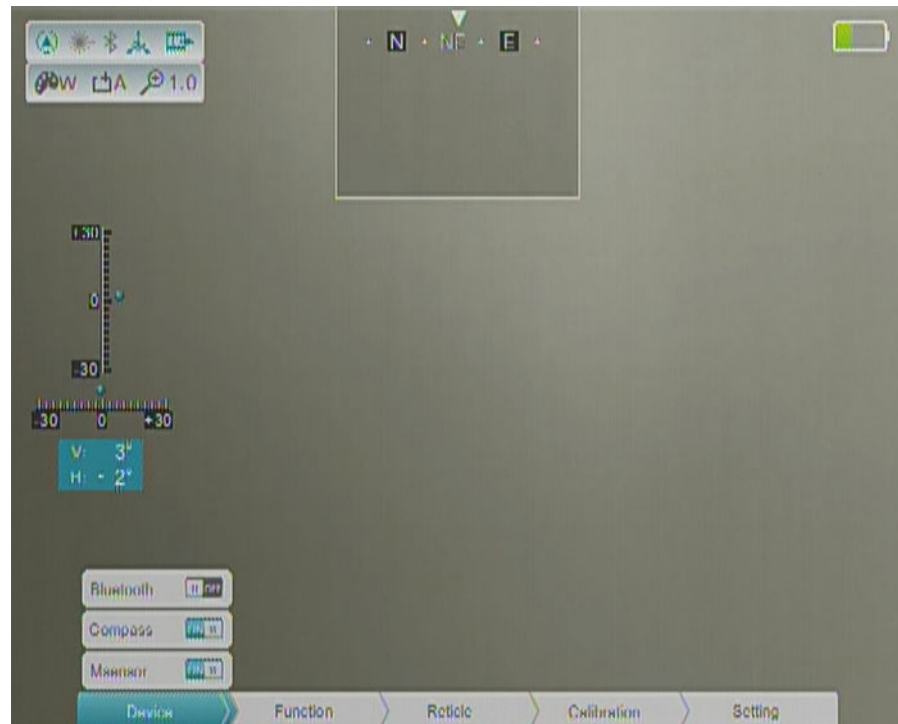


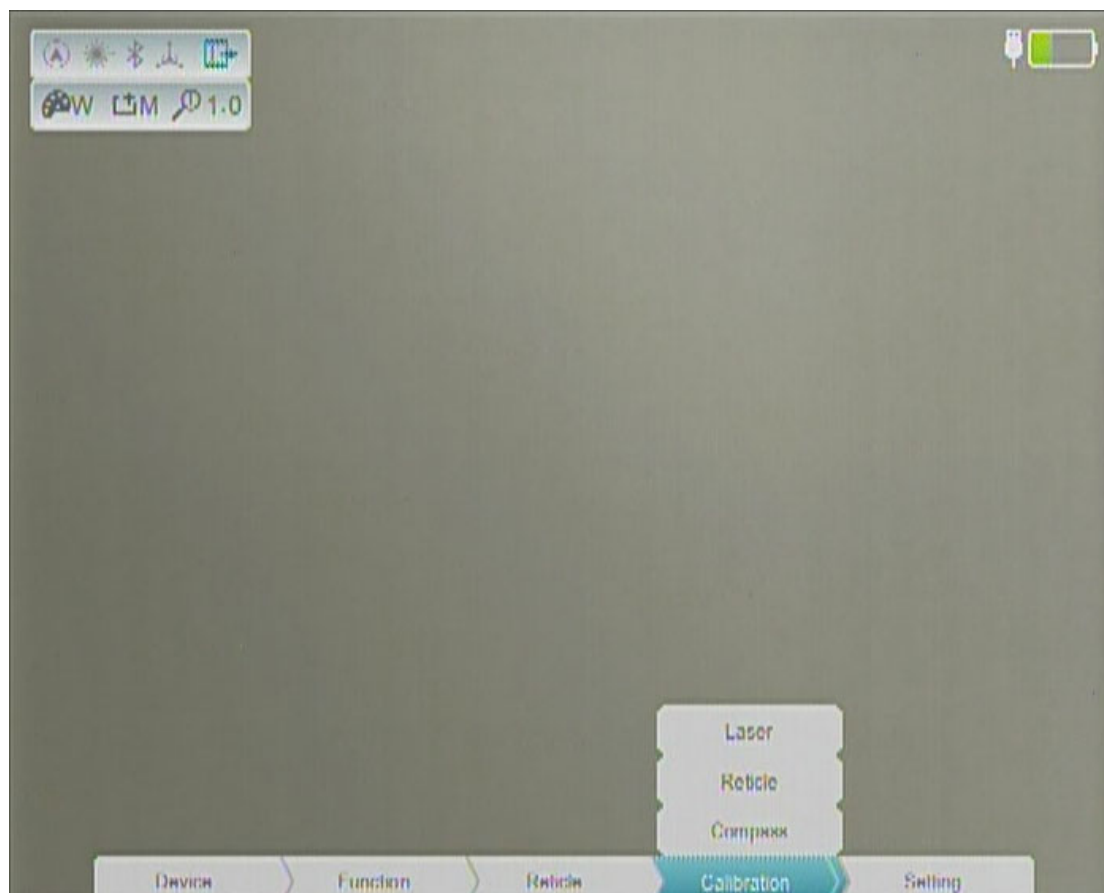
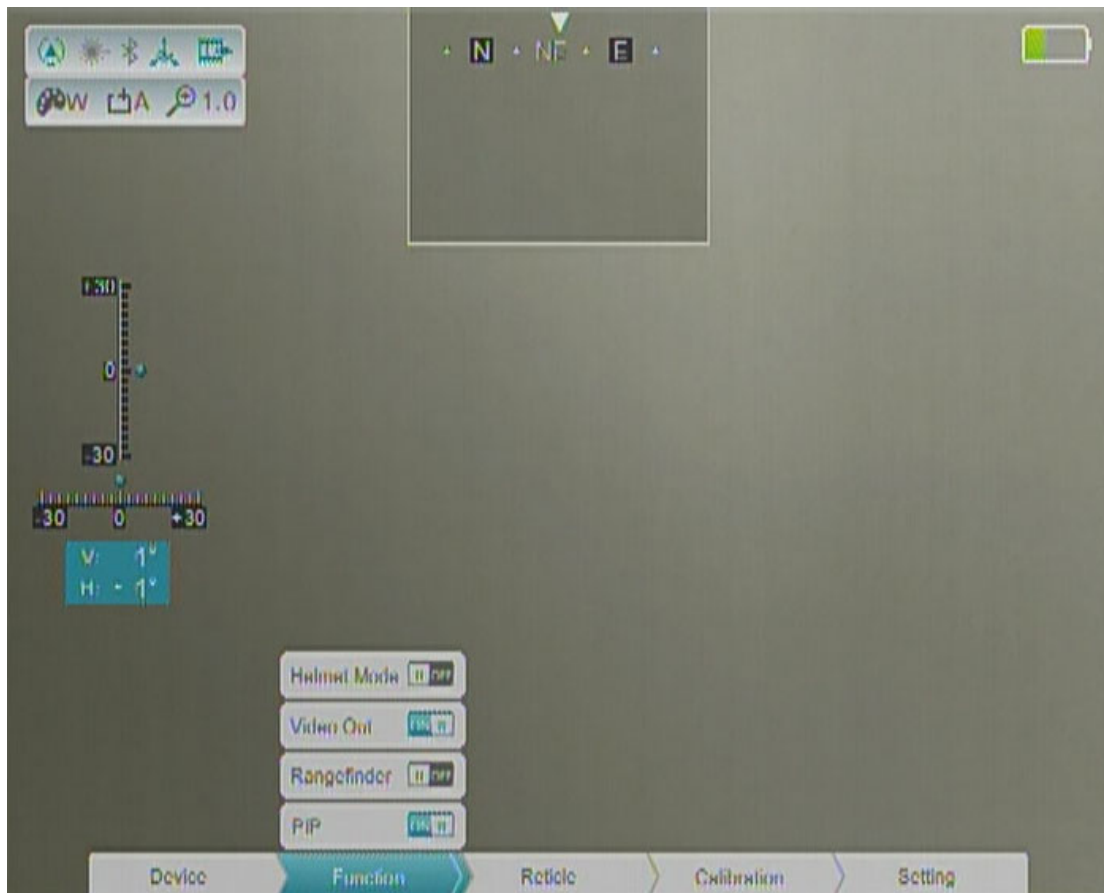
Figure 5-3. Advanced menu

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.



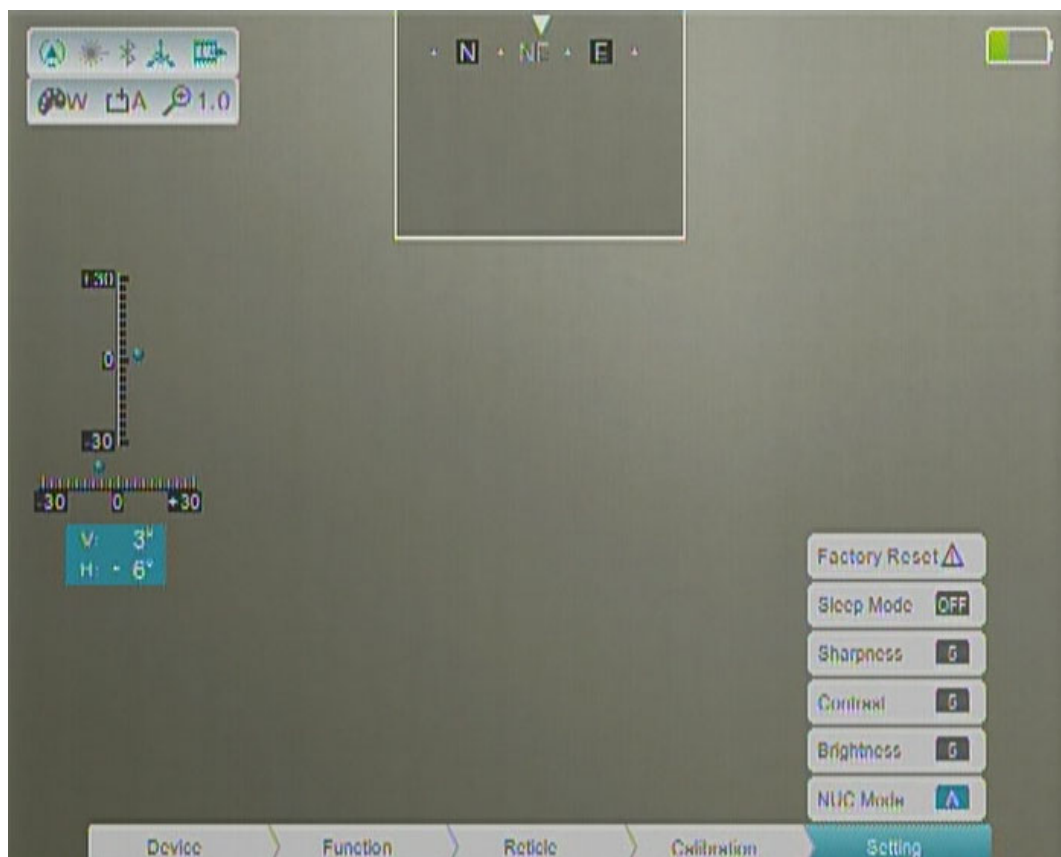
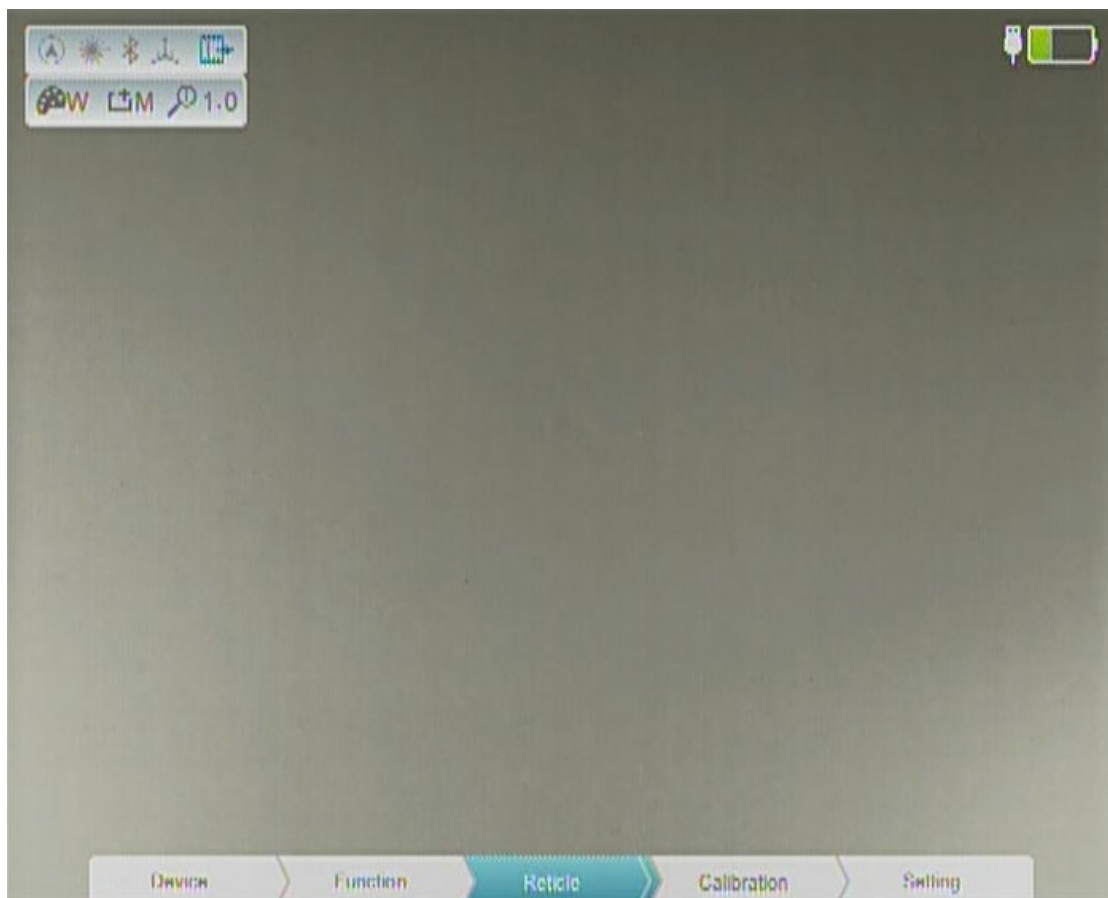


Table 5-1. Details of Xmini advanced menu

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 ML19.		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.




Rangefinder interface





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, Falconclaw 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.

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