LM02-25/19

Thermal imaging scope

User Manual

Publication Notice

This user manual provides detailed instructions on the use and precautions for thermal imaging scopes. To ensure the safety of operators and the proper maintenance and effective use of the thermal imaging scope, as well as to guarantee its normal lifespan, our company requires users to read and strictly adhere to the following operating guidelines before using the thermal imaging scope.

Until a new user manual is published, this document will serve as the standard for the usage and maintenance of the thermal imaging scope; other materials are for reference only.

If any issues arise during use, please provide timely feedback for further study and revisions.

The content of this User Manual is for customer reference only and does not serve as a standard for product delivery acceptance.

Catalog

1.Product Overview

The LM02-25/19 is an infrared thermal imaging scope that can be mounted on various firearms for observation, ranging, and aiming in nighttime and adverse weather conditions.

Figure 1 LM02-25/19

2. Working Principle

The infrared optical system receives the infrared radiation emitted by the target. Through spectral filtering, the energy distribution of the target's infrared radiation is projected onto the infrared detector array at the focal plane. The detector converts the infrared radiation into electrical signals, which are then amplified by the input circuit with bias and sent to the readout circuit.

The core module digitizes the output signals from the detector and performs corrections on the initial infrared image, including pixel fix, brightness and contrast ratio adjustment, pseudo-color rendering, overlaying interfaces, and reticle display. The processed signals are sent to the OLED display. The operator observes the infrared thermal image of the target through the 14X eyepiece and uses the reticle to aim at the target.

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3.Main Performance and Technical Parameters

Highly sensitive 256x192 resolution 12μm uncooled infrared detector provides clear images at night and in harsh weather conditions;
1024x768 OLED display.
Battery level detection and reverse polarity protection.
Resistant to high-intensity shocks, meeting the requirements for most scenarios.
Waterproof rating: IP67.

3.1Main Technical Parameters

Figure 1 Thermal imaging scope Technical Parameters

Item	LM02-25	LM02-19
Detector	256×192,12μm	256×192,12μm
Objective Lens	25mm	19mm
Recognition Range (Human)	≥600m	≥450m
Detection Range (Human)	≥1300m	≥900m
NETD	≤30mK@F1.0	≤30mK@F1.0
Frame Rate	50Hz	50Hz
Field of View (FOV)	7°×5.3°	9.2°×7°

Item	LM02-25	LM02-19
Exit Pupil	≥5mm	≥5mm
Eye Relief	≥50mm	≥50mm
Diopter Adjustment	-5～+5SD	-5～+5SD
Image Polarity	White Hot, Sky Mode, Black Hot, Red Hot, Fusion	White Hot, Sky Mode, Black Hot, Red Hot, Fusion
System Magnification	3.56X	2.7X
Digital Zoom	1X、2X、4X、8X	1X、2X、4X、8×
Operating Time	≥8 hours (at normal temperature)	≥8 hours (at normal temperature)
Interface	Features Picatinny Rail Interface	Features Picatinny Rail Interface
Battery	18650 lithium-ion battery	18650 lithium-ion battery
Weight	465g	465g
Dimensions	186×84×55mm	186×84×55mm
Waterproof Rating	IP67	IP67
Operating Temperature	-20℃～+50℃	-20℃～+50℃
Storage Temperature	-30℃～+60℃	-30℃～+60℃
Shock Resistance	1200g, 6ms	1200g, 6ms

4. Usage Instructions

4.1 Warnings

1) Do not point the thermal imaging scope directly at the sun, carbon dioxide lasers, welding machines, or other high-intensity radiation sources.
2) The time interval between two power cycles should be more than 20 seconds.
3) The thermal imaging scope combines precision optical instruments with electrostatic-sensitive electronic components. Please do not throw, hit, or shake the scope or its accessories to avoid deformation of structural parts or mounting dimensions.
4) Do not disassemble the thermal imaging scope. If a malfunction occurs, please contact the manufacturer promptly; otherwise, warranty will be void.
5) When the thermal imaging scope is not in use, or during transportation, please remove the battery and place the scope in a protective packaging box.
6) Replace the battery promptly when it is low to avoid damage from over-discharge.
7) Operating the scope outside the specified environmental conditions may cause damage.

4.2 Notes

1) When cleaning non-optical surfaces of the thermal imaging scope, do not use chemical solvents or thinners. Instead, use a clean, soft, dry cloth to wipe the exterior.
2) The infrared lens of the thermal imaging scope has an anti-reflective coating; clean it only when visibly soiled. Frequent cleaning may wear down the lens coating. Avoid touching the lens surface, as acids from fingerprints can damage the coating and lens. (Only use a dedicated lens cloth for cleaning the lens.)
3) After observing or if the scope is powered on but not in use for an extended period, please turn it off promptly to extend its effective usage time.

4.3 Thermal Imaging Scope Component Overview

Eyepiece Adjustment Ring

Battery Compartment

Objective Lens Adjustment Ring

Power Switch

Objective Lens

Control Button

Lens Cap

Data Transfer Interface

Eyecup

Figure 2 Thermal Imaging Scope Component

4.4 Preparation Before Use

4.4.1 Unboxing

Before using the thermal imaging scope for the first time, please ensure to unbox and check that all components are included.

1) Open the packaging box and verify the completeness of the contents according to the thermal imaging scope configuration list (Figure 2).
2) Inspect the thermal imaging scope for any visible damage to the lens, body, eyepiece, buttons, etc.
3) Check the infrared lens for dirt; if there are visible spots, use a lens cloth to clean the infrared lens, ensuring the lens is clean.

4.4.2 Installing the Battery

1) When installing the battery, strictly follow the instructions indicated on the label inside the battery compartment; do not install it in reverse.
2) Use batteries in groups; do not mix different types to avoid damage.
3) Before removing or installing the battery, ensure that the thermal imaging scope is powered off. Opening the battery compartment while the scope is on may cause severe damage.
4) Before the first use of the thermal imaging scope, confirm that the battery is charged.
5)Do not disassemble, drop, or short-circuit the battery to prevent accidents.
During use, charging, or storage, if the battery exhibits overheating, discoloration, deformation, odor, or any other unusual phenomena, stop using it immediately.

5. Packaging Configuration

Figure 2: Thermal Imaging Scope Configuration List

Number	Name	Quantity
①	Thermal Imaging Scope	1
②	18650 lithium-ion battery	1
③	Video Output Cable	1
④	Packaging Box	1
⑤	Lens Cleaning Cloth	1
⑥	User Manual	1
⑦	Packing List	1

6. User Interface Design

6.1 Button Functions

The scope is operated using a power button and navigation buttons. The specific functions of the buttons are as follows:

Figure3: Button Functions

Picture	Name	Function
	Power Button	Hold the power button for 3 seconds to power on/off. Hold the power button for 1-3 seconds will display the sleep icon, entering sleep mode. Wake the device by pressing the power (ON/OFF) button. Press the power button to refresh the device.
	Photo/Video Button	A short press switches Reticle Profiles. Hold for 1.5-3 seconds to take a photo Hold for over 3 seconds to start video recording. In recording mode, hold for over 3 seconds to stop the recording.
	Navigation Up Button	In menu mode : Press to switch menu items upwards. When not in menu mode : Press to change operating mode. Long press to turn on picture-in-picture.
	Menu Button	Press the menu button briefly to access the menu. Use the up and down buttons to navigate through the options. Press the menu button briefly again to enter the sub-menu. Long press to return to the previous menu level in menu mode.
	Navigation Down Button	In menu mode :Press to switch menu items downwards. When not in menu mode, it switches between magnifications of 1x, 2x, 4x, and 8x. Long press to toggle the reticle display on/off.

6.2 Power On/Off

In the powered-off state, hold the power button for 3 seconds to turn on the device.
In the powered-on state, hold the power button for 1-3 seconds until the sleep icon appears on the screen, indicating that the device is in sleep mode. To wake the device from sleep mode, briefly press the power button. Refer to Figure 3.

Figure 3 Power On/Off

6.3 Preparation Before Use

After powering on, the default observation interface will be displayed.
The main interface shows "Electronic Zoom," "Operating Mode," and "Battery Level," while the center displays the reticle. The default content of the main interface is shown in Figure 4.
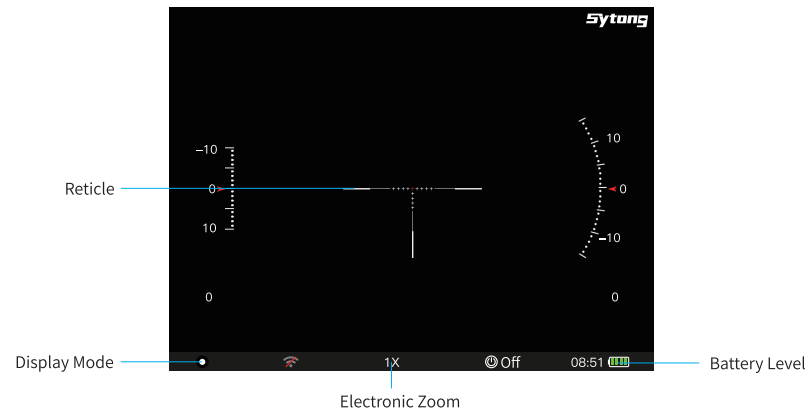

Figure 4 Observation interface

6.4 Main/Sub Menus

Press the Menu button briefly on the main interface to enter the Main Menu. Use the Up and Down navigation buttons to select options. Press the Menu button again to confirm and enter the next sub-menu.
Once in the sub-menu, use the Up and Down navigation buttons to make selections, and press the Menu button to confirm and return to the previous menu, as shown in Figure 5.
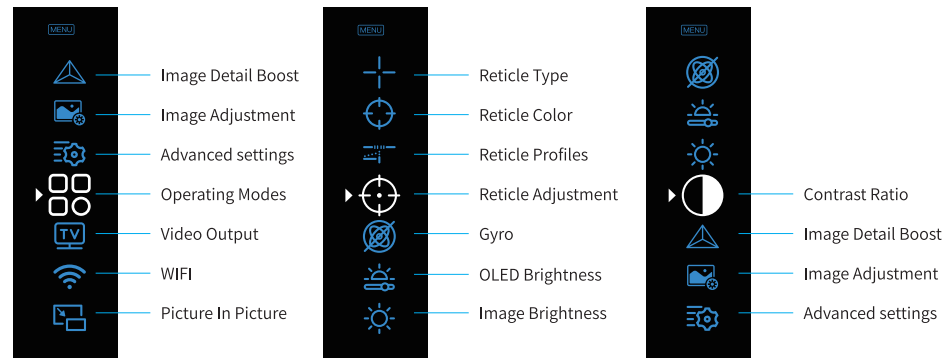

Figure 5 Menu interface

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6.4.1 Operating Modes

There are five operating modes for users to choose from: White Hot, Sky, Black Hot, Red Hot, and Fusion. The default image mode upon startup is 'White Hot,' and the current image mode of the infrared image is displayed at the screen.
In the main menu operation interface, briefly press the navigation up and down buttons to switch between operating modes, and press the menu button briefly to confirm and exit. Refer to Figure 6.
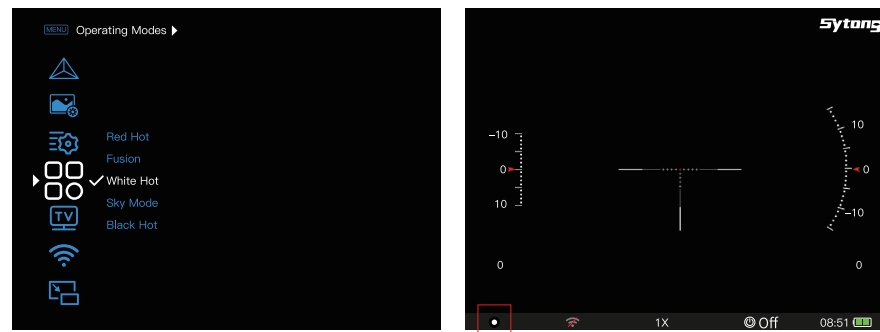

Figure 6 Operating Modes

6.4.2 Video Output

After enabling video output, use the supplied connection cable to externally connect the analog video to a monitor. Plug in the cable and power on; the video output function will activate automatically.

6.4.3 WiFi

1. Enable WiFi in the device menu, then open the WiFi on your phone and the SYTONG testing app. Locate the phone's WiFi MAC address named 'Sytong-LM-XXX' and enter the password '12345678' to connect the device. Refer to Figure 7.
2. After connecting the device to your phone via WiFi, you can observe real-time images captured."
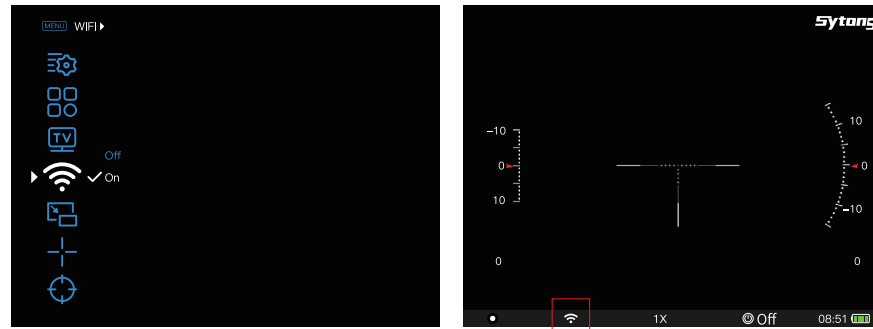

Android/iOS Scan to download

Figure 7 WiFi

6.4.4 Picture In Picture

Press the menu key to enter the subpage, press "up" or "down" to select on or off, and short press the menu key to confirm the selection.

6.4.5 Reticle Types

The scope offers 8 different reticle styles, including an option to turn them off. By default, it displays Number 1 reticle. The 8 reticle styles are shown in Figure 9.
To adjust the reticle style, navigate to the reticle settings interface and press the up or down navigation buttons briefly to switch between the 8 styles. Press the menu button briefly to confirm and return; the reticle will then be displayed in the center of the screen.
After zeroing, users can use the center of the reticle for aiming. Refer to Figure 8.
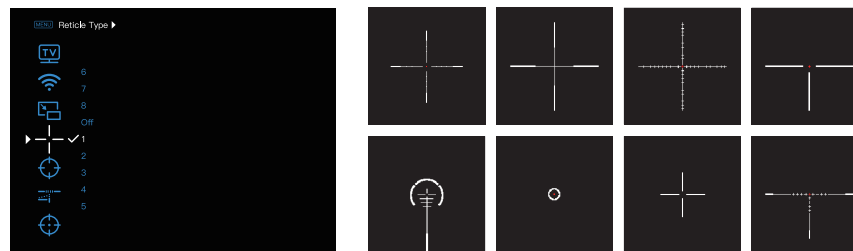

Figure 8 Reticle Types

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6.4.6 Reticle Color

The reticle color options include five choices: "Black, White, Gray, Red, and Green," with the default color set to "Black."
To select the reticle color, briefly press the navigation button to access the "Reticle Color" option. Press the menu button, and a list will appear on the right: "Black - White - Gray - Red - Green." Use the up and down navigation buttons to switch between selections, and press the menu button briefly to confirm and return to the previous menu.
Upon initial startup, the default reticle color is set to white.

6.4.7 Reticle Profiles

Used to save the ballistic zero point parameters set by the user. Press the menu key to enter the sub-page, and press "up" or "down" to select the stored user ballistic zero point setting.
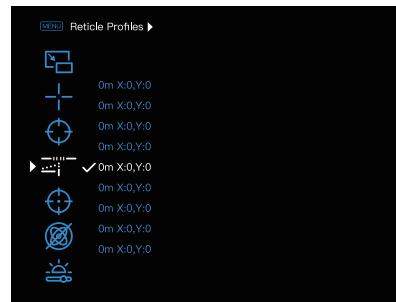

Figure 9 Reticle Profiles

6.4.8 Reticle Adjustment

Press the menu button briefly to freeze the image. Press the photo button briefly to move to the X and Y axis values. Use the up and down buttons to adjust the crosshair position until it aligns with the impact point. Press the photo button briefly to move to other options. Once settings are complete, navigate to the save option and press the menu button briefly to save and exit. Long press the menu button to discard changes. The set distance will be saved in the zero storage menu as the zero point name.
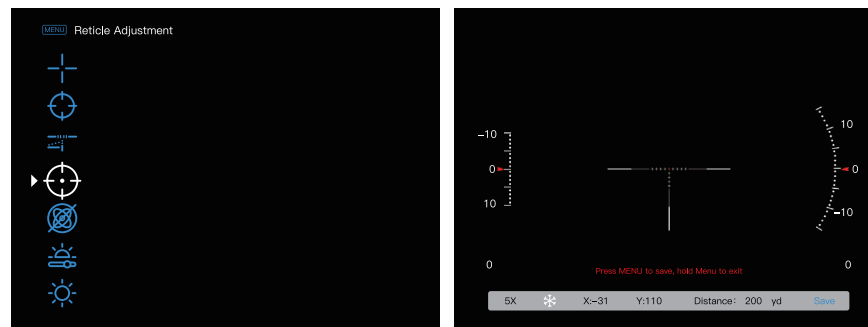

Figure 10 Reticle Adjustment

6.4.9 Gyroscope

Press the menu button to enter the sub-menu. Use the "Up" or "Down" buttons to select either "On" or "Off," and briefly press the menu button to confirm your selection.

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6.4.10 OLED Brightness

Briefly press the up and down navigation buttons to select the "OLED Brightness" option. Then, press the menu button, and a secondary menu will appear on the right. Use the up and down navigation buttons to choose the brightness level; the OLED Brightness increases with higher values, from dim to bright. Confirm and return to the previous menu. Refer to Figure 11.
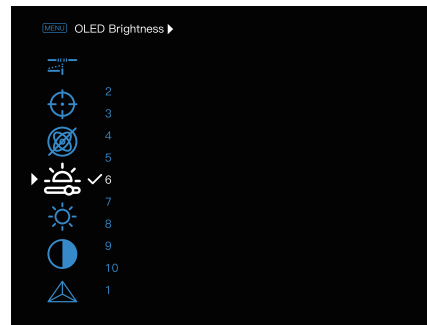

Figure 11 OLED Brightness

6.4.11 Image Brightness

The brightness adjustment allows you to increase or decrease the brightness of the image.
There are 10 brightness levels available, ranging from dim to bright. The default brightness setting upon initial startup is "5."
Users can select an appropriate brightness level based on personal viewing preferences and current environmental conditions.

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Briefly press the up and down navigation buttons to select the "Brightness" option. Then, press the menu button, and a secondary menu will appear on the right. Use the up and down navigation buttons to choose the desired level, and confirm to return to the previous menu. Refer to Figure 12.
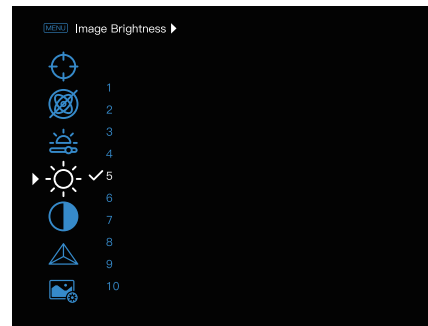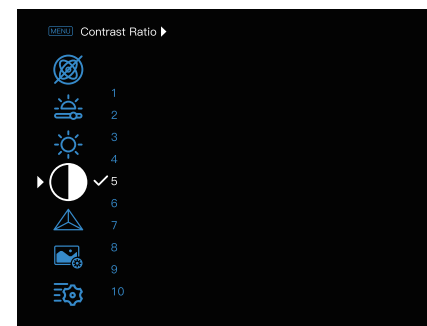

Figure 12 Image Brightness

Figure 13 Contrast Ratio

6.4.12 Contrast Ratio

The contrast Ratio adjustment allows you to increase or decrease the contrast ratio of the image, making the target more distinct. Contrast levels range from 1 to 10, progressing from weak to strong.
The default contrast ratio setting upon initial startup is "5." Users can select an appropriate contrast level based on personal viewing preferences and current environmental conditions.
Briefly press the up and down navigation buttons to select the "Contrast Ratio" option. Then, press the menu button, and a secondary menu will appear on the right. Use the up and down navigation buttons to choose the desired level, and confirm to return to the previous menu. Refer to Figure 13.

6.4.13 Image Detail Boost

Press the menu button to access the "Image Detail Boost" option. The higher the numerical value, the more details are enhanced. Refer to Figure 14.
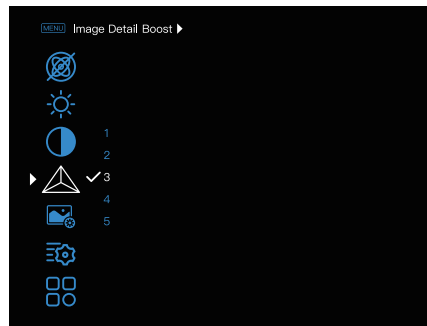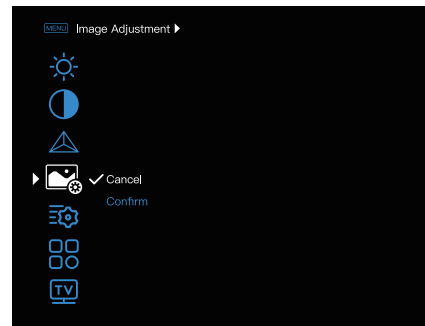

Figure 14 Image Detail Boost   Figure 15 Image Calibration

6.4.14 Image Adjustment

To access the "image adjustment" menu, select 'Confirm' if image adjustment is needed. Cover the lens, then briefly press the menu button to calibrate the background image uniformity. The calibration will be automatically saved and you will exit the menu. Refer to Figure 15.

6.4.15 Advanced Settings

Briefly press the navigation button to select the "Advanced Settings" option. Then, press the menu button to display the advanced settings sub-menu, which includes options such as "Auto Power Off," "Language," "Date/Time," "Pixel Fix" "Format Storage Card," "Default Setting," and "Version." You can set or view information for these options. Long press the menu button to return. Refer to Figure 16.
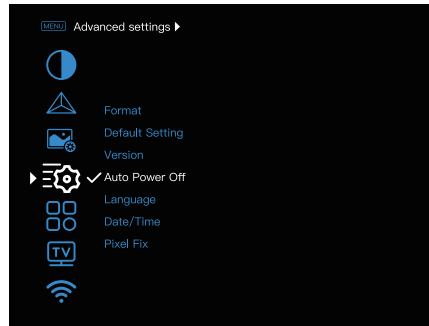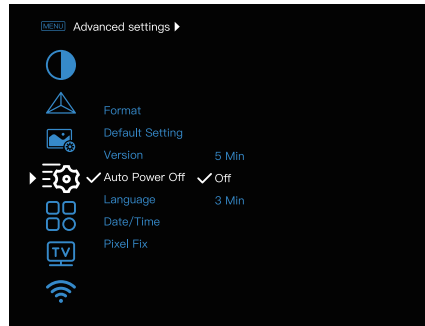

Figure 16 Advanced Settings   Figure 17 Auto Power Off

6.4.15.1 Auto Power Off

After selecting "Default Settings," press the menu button to access the sub-menu. In the sub-menu, choose from "3 minutes," "5 minutes," or "Off." The default setting is "Off." After powering on, you can select automatic Power Off after 3 or 5 minutes. Refer to Figure 17.

6.4.15.2 Language

The thermal scope supports English and other languages, allowing users to set their preferred language. The factory default language is set to English. To adjust the language settings: In the advanced menu, briefly press the up and down navigation buttons to switch to the "Language" option. After selecting "Language," press the navigation button to set the desired language.

Once the operation is complete, press the menu button briefly to save and return to the previous menu. Long press the menu button to exit without saving. Refer to Figure 18.
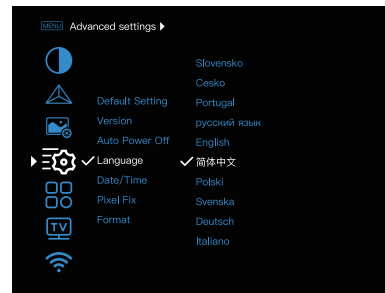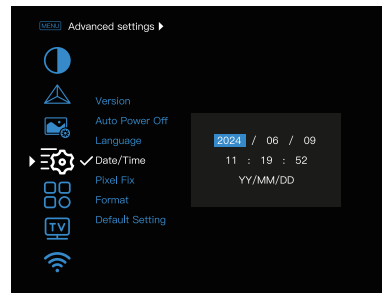

Figure 18 Language

Figure 19 Date/Time

6.4.15.3 Date/Time

Select the "Date/Time" menu and press the menu button briefly to enter the sub-menu. Use the menu button to navigate through the options, and use the up and down buttons to adjust the values. Once adjustments are complete, long press the menu button to save and exit. Refer to Figure 19.

6.4.15.4 Pixel Fix

After turning on the device, navigate to the "Advanced Setting" button to enable the Pixel Fix confirmation. To perform the adjustment, ensure the lens cap is on and follow the on-screen prompts to cure the pixel. Remember to save the changes after the adjustment. Use the navigation buttons to move the cursor up or down, the power button to switch options, and press the Menu button briefly to save. Refer to Figure 20.
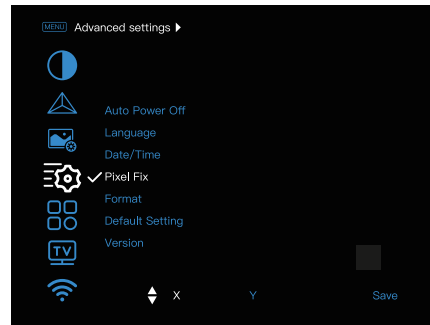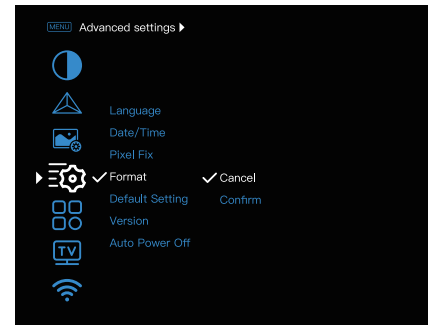

Figure 20 Pixel Fix   Figure 21 Format Storage Card

6.4.15.5 Format Storage Card

Press the Menu key briefly to enter the Advanced Settings sub-menu. Use the up and down navigation buttons to adjust the option to "Format Storage Card." Press the Menu button again to select "Confirm" or "Cancel". Please choose Confirm carefully! Data cannot be recovered once deleted! Refer to Figure 21.

6.4.15.6 Default Setting

In the Advanced Menu, select "Default Setting" to reset the thermal imaging scope to its original configuration.
To restore Default Setting: within the Advanced Menu, use the up and down navigation buttons to select the "Default Setting" option. Once selected, press the Menu button briefly to display the screen shown in Figure 22. Confirming will reset the device to default setting, so please proceed with caution.
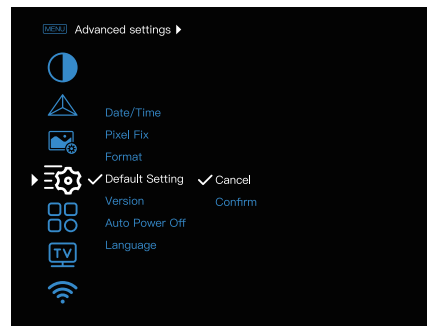

Figure 22 Default Setting

6.4.15.7 Version

Press the navigation buttons briefly to select the "Version Information" option, then press the Menu button to confirm. This will display the software version information of the device.

7. Mount Installation

The thermal imaging scope comes with a detachable connecting mount. Remove the connecting mount and screws from the accessory package, and tighten them diagonally in sequence.
The installation direction for the connecting mount is shown in the figure below:
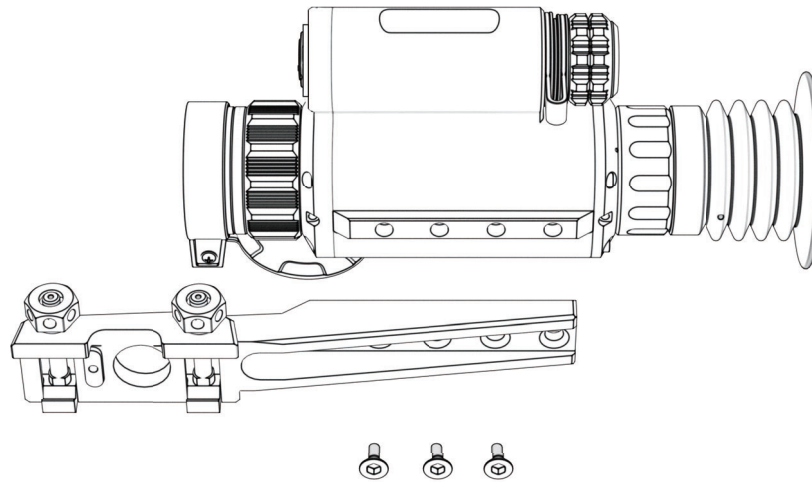
Figure 23 Mount Installation

8. Maintenance and Care

8.1 Daily Maintenance, Care, and Calibration

1)After observing or when the device will not be used for an extended period, turn off the thermal imaging scope to prolong its effective lifespan.

2) The lens is a critical optical component; avoid contact with oils and chemicals to prevent damage. Always cover the lens when not in use.

3) When not using the thermal imaging scope, and during transport, remove the battery and store the device in its packaging.

4)For long-term storage, keep it in a cool, dry environment.

5)Avoid using chemical solvents or thinners to clean the scope's exterior; instead, use a clean, soft, dry cloth.

6)Clean the lens only when visibly dirty. Avoid touching the lens surface, as acids from fingerprints can damage the coating and lens. (Only use a dedicated lens cloth for cleaning the lens.)

7)If the device is not used for an extended period, perform a power-on check and calibration every six months.

FCC Warnning

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

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 communica-
tions. 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 equipment complies with FCC radiation exposure limits set forth for an uncontrolled
environmen.

Sytong