ATS Series Infrared Imaging Observation Scope

User Manual(V1.0)

CONTENTS

1. Product Overview 1
2. Performance Parameters 2
3. Product Features 3
4. Product Components 4
5. Operation Functions 5
6. Battery 5
7. External Power Supply 7
8. Power On & Image Settings 7
9. Calibration 7
10. Digital Zoom 8
11. Photography and Video Recording 8
12. Status Bar 10
13. Quick Menu Functions 11
14. Main Menu 12
15. Main Menu Options and Instructions 12
16. Picture-in-Picture Function 17
17. Wireless Network Function 17
18. Technical Inspection 17
19. Maintenance 18
20. Troubleshooting 18

1.Product Overview

The ATS Series Thermal Imaging Search Scope is specially designed for use at night or in harsh weather (such as rain, snow, fog, or smoke) to observe targets obscured by obstacles (e.g., branches, tall grass, shrubs). Unlike night vision devices, this series requires no external light source and is not affected by strong light. It can be equipped with a high-precision laser rangefinder, measuring distances up to 1000 meters. This series is widely used in night search, observation, terrain navigation, rescue operations, etc.



Figure 1-1 ATS Thermal Imaging Search Scope

2.Performance Parameters

Table 1 ATS Series Thermal Imaging Search Scope Performance Parameters

Item	Specifications	Model: BH-ATS01-650-LRF
Optical Parameters	Resolution	640x512
	Pixel Pitch	12μm
	Frame Rate	50Hz
	NETD	≤30mk
	Objective Lens	50mm/F0.9
	Field of View	8.7°×7.0°
	Recognition Distance (12 pixels)	590m (human)
	Detection Distance (2 pixels)	3500m (vehicle)
	Digital Magnification	1x, 2x, 4x
	Ranging Performance	Range 1000m, Accuracy ±1m
Focusing Mode	Manual Focusing	
Display Features	Screen Type	AMOLED, 0.39 inches
	Display Resolution	1024x768
	Eye Relief / Exit Pupil	15mm / 6mm
	Image Adjustment	Contrast / Brightness Adjustment
	Image Modes	White Hot / Black Hot / Red Hot / Fusion / Golden Hot / Green Hot / Highlight
Interfaces	External Power	USB Type-C, 5V/2A
	WIFI	2.4GHz
	Video Output	Micro HDMI
Battery Life	≥8h (25), 1x21700 (5000mAh) Rechargeable Battery	
Storage	Built-in 32GB EMMC	
Physical	Weight (without battery)	≤700g
	Dimensions	198×66.5×66.5 (mm)
Environmental	Operating Temperature	-20℃~+50℃
	Protection Grade	IP67

Notes:
1. Actual runtime depends on WIFI usage intensity, video recording, and laser rangefinder operation.
2. Measuring range depends on target characteristics and environmental conditions.

3. Product Features

- 640-core high-resolution thermal detector
- High-definition image quality
- Anodized housing
- Maximum detection range up to 3500 meters
- Equipped with laser rangefinder
- Quick-change rechargeable battery pack
- HD AMOLED display (1024×768)
- High frame rate: 50Hz
- Digital zoom: ×1/×2/×4

• Built-in 32GB storage, supports photo and video recording
• Built-in WIFI module
• Built-in digital compass and motion sensor
• Ultra-clear mode
• Supports PIP and pixel calibration

4. Product Components

Main components of the ATS device are shown in Figure 4-1:

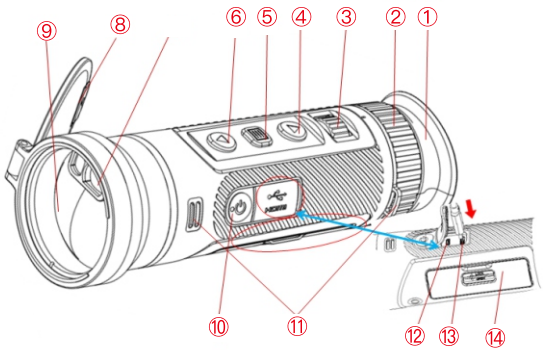


Figure 4-1 Main Components of ATS Device

① Eyepiece	② Eyepiece Diopter Ring	③ Objective Focus Roller	④ Down Button
⑤ Menu Button	⑥ Up Button	⑦ Laser Ranging Module	⑧ Objective Lens Cap
⑨ Objective Lens	⑩ Power Button	⑪ Strap Buckle	⑫ HDMI Port
⑬ TYPE-C Port	⑭ Battery Compartment		

5. Operation Functions

Button functions are listed in Table 2:

No.	Button	Function
1	Power Button	Long press: 3s to power on; 3s to power off (on state). Short press: standby on/off.
2	Up Button	Short press: take photo; Long press: start/stop video; Double click: enable/disable laser ranging.
3	Down Button	Short press: digital zoom; Long press: shutter calibration; Double click: enable/disable PIP.
4	Menu Button	Home screen: short press to switch image mode; long press to enter menu. Menu mode: short press to confirm & return; long press to cancel & return.

6. Battery

The ATS Series uses rechargeable lithium-ion batteries. Fully charge the battery before first use.

6.1 Battery Charging

1. Insert the battery into the charger, aligning positive poles.
2. Connect the Type-C plug to the charger port.
3. Connect the other end to a power adapter.
4. Plug the adapter into a 220V socket.
5. The LED indicator lights up after installation.

• Red: charging
• Green: fully charged
• Unplug and remove the battery when fully charged.

6.2 Battery Installation

1. Pull out the battery ring and rotate 90° clockwise.
2. Insert the battery, aligning pins with grooves.
3. Push the battery cover into place after full insertion.
4. Slide the lock to the "lock" position until red marks show.

6.3 Safety Precautions

1. Use only the supplied charger; incompatible chargers may cause fire or damage.
2. Partially charge batteries for long-term storage; do not store fully charged or fully discharged.
3. Do not charge batteries immediately after moving from cold to warm environments; wait 30–40 minutes.
4. Do not leave charging batteries unattended.
5. Do not use damaged or modified chargers.
6. Charge only between 0℃and +45℃to preserve battery life.
7. Disconnect within 24 hours after full charge.
8. Do not expose to high temperatures or open flames.
9. Do not submerge in water.
10. Do not connect to devices exceeding current limits.
11. Avoid short circuits.
12. Do not disassemble or deform batteries.
13. Do not drop or impact batteries.
14. Capacity reduction in low temperatures is normal, not a defect.
15. Avoid use above rated temperatures to prevent lifespan reduction.
16. Keep out of reach of children.

7. External Power Supply

The ATS Series supports external 5V/2A power (e.g., power bank).
1.Connect external power to the USB Type-C port.
2.The device switches to external power and slowly charges the battery.
3.The screen shows a battery icon with charging percentage.
4.Without a battery, the icon changes to USB.
5.The device automatically switches to battery power when external power is removed, without shutting down.

8. Power On & Image Settings

1.Remove the lens cap.
2.Long press the Power button to turn on.
3.Rotate the eyepiece diopter ring until text is clear; no further adjustment needed.
4. Rotate the focus roller for target distance.
5.Calibration: long press Up on the home screen for shutter calibration.
6.Adjust image mode, brightness, contrast, zoom in the menu.
7.Power off: long press Power for 3–4 seconds until the screen turns off.
8.Standby: short press Power to enter/exit standby.

9. Calibration

Calibration balances detector temperature and removes artifacts (stripes, ghosting). Three modes: Auto (A), Manual (M), Background (B). Select in the main menu:
• A (Auto): Automatic calibration by software; no lens cap needed.
• M (Manual): Long press Up to trigger; no lens cap needed.

• B (Background): Close the lens cap, then long press Up (shutter sound).

10. Digital Zoom

On the home screen, press the corresponding button to cycle zoom levels: 1x, 2x, 4x. The status bar shows the current zoom.

11. Photography and Video Recording

The device saves photos and videos to built-in 32GB storage. Set date/time before use for correct file naming.

Photo:

• Short press the photo button on the home screen; the screen freezes 0.5s, and a camera icon appears.

Video:

• Long press the photo button to start recording; a recording icon appears.
• Short press during recording to take a photo.
• Long press again to stop and save.
• Videos auto-split every 5 minutes.
• Files are named: IMG_HHMMSS.jpg / VID_HHMMSS.mp4.
• Menus can be accessed during recording.
• Connect to a computer via Type-C to access the DCIM folder for file management.

Note:

▶You can access and browse the menu during video recording;

▶Recorded images and videos will be saved in IMG_HHMMSS.jpg format on the device's internal storage card, while videos will be saved in VID_HHMMSS.mp4 format;

▶The maximum duration of a recorded video file is 5 minutes. After this time, the video will be automatically saved to a new file;

▶The number of recorded files is limited by the device's internal storage capacity. Note: Regularly check the available space on the internal storage card and transfer video clips to other storage media to free up memory space on the storage card;

▶When there are no files in memory: Graphical data (status bar, icons, and menus) in recorded videos and photo files will not be displayed.

Memory Access:

When the device is powered on and connected to a computer, the computer will recognize it as a flash memory card, using it to access the device's memory and copy images and videos.

1. Turn on the device and connect it to your computer using a Type-C data cable;
2. Double-click "My Computer" on the desktop—double-click to open the device named "MODEL"—double-click again to open the device named "DCIM" to access the internal memory;
3. There will be several folders in the storage, named according to time;
4. Photos and videos recorded on the same day will be saved in the corresponding folders; Select the files or folders you want to copy or delete.

12. Status Bar



The top status bar shows (left to right):

1. Photo / video status
2. Current image mode
3. Digital zoom
4. Display brightness
5. Laser ranging indicator (when enabled)
6. WIFI status
7. Battery status (green >40%, yellow 20–40%, red <20%)
8. Attitude & compass
9. Date & time

13. Quick Menu Functions

Basic settings (including image mode, display brightness, image clarity and focus distance) can be changed in the quick menu.

1. Long press the Menu button on the home screen to enter the function menu.
2. Use Up/Down buttons to switch function items; selected items are highlighted in the background.
3. Image mode: short press Menu to switch modes (White Hot, Black Hot, Red Hot, pseudo-color, Highlight).
4. Long press Menu to save changes and exit, or wait 2–3 seconds to auto-return to home screen.
5. On the main screen, long press to enter/exit the recording function;

▶On the main interface, "Up Button" will perform the laser rangefinder function and a rangefinder icon will appear in the upper right corner, and the distance of the measured object will be displayed in the center;

▶On the main interface, click "Up Button" to perform the photo function, and a camera icon will appear in the upper left corner;

▶On the main screen, long press "Down Button" to perform shutter correction;

▶On the main interface, double-click "Up Button" to turn on/off the picture-in-picture function switch;

▶On the main interface, click "Down Button" to perform electronic zoom, and the electronic zoom number in the upper right corner of the page (3) will change.

14. Main Menu

1. Long press Menu on home screen to enter main menu.
2. Use Up/Down to navigate menu options.
3. Menu navigation is cyclic.
4. Short press Menu to adjust parameters or enter submenus.
5. In all menu interfaces: short press Menu to save and return; long press Menu to cancel and return.
6. Cursor position is saved per session; after restart, cursor is on saved item.

15. Main Menu Options and Instructions

After power-on, long press “Menu Button” to display the settings menu.

- “Up Button”: move cursor up
- “Down Button”: move cursor down
- “Menu Button”:Press to return to the previous menu;
- “Menu Button”short press to confirm
- “Menu Button”Menu long press to exit

15.1 Settings

Once the device is turned on, long press "Menu Button" to display the operation settings menu.

15.1.1 Brightness Adjustment

1. Press “Down Button”to move cursor to Brightness icon.
2. Press “Menu Button” to enter adjustment page.
3. Use Up/Down to select brightness level.
4. Press Menu to save and exit.

15.1.2 Contrast Adjustment

1. Press Down to move cursor to Contrast icon.
2. Press Menu to enter adjustment page.
3. Use Up/Down to select contrast level.
4. Press Menu to save and exit.

15.1.3 Image Enhancement

1. Press Down to move cursor to Image Enhancement icon.
2. Press Menu to enter settings.
3. Use Up/Down to turn the image enhancement mode on or off.
4. Press Menu to save and exit.

15.1.4 Image Noise Reduction

1. Press Down to move cursor to Noise Reduction icon.
2. Press Menu to enter settings.
3. Use Up/Down to select one of five noise reduction levels.
4. Press Menu to save and exit.

15.2 Advanced Menu

1. Press Down to move cursor to Advanced Settings icon.
2. Press Menu to enter.
3. Long press Menu to exit and return to the previous menu.

15.2.1 Multimedia

1. Press Down to Multimedia icon.
2. Press Menu to enter (stores photos/videos).
3. Use Up/Down to browse; press "Menu Button" button to enter the multimedia folder, and then press "Menu Button" button to play the captured photos or videos;
4. Press Menu to play
5. Long press Menu to exit and back to the previous menu.

15.2.2 Color Palette

1. Press Down to Color Palette icon.
2. Press Menu to enter.
3. Use Up/Down to select: White Hot, Black Hot, Red Hot, Fusion, Golden Hot, Green Hot.
4. Press Menu to save and exit.

15.2.3 Highlight Mode

1. Press Down to Highlight Mode icon.
2. Press Menu to enter.
3. Use Up/Down to select one of five modes.
4. Press Menu to save and exit.

15.2.4 Laser Ranging

1. Press Down to Laser icon.
2. Press Menu to enter settings.
3. Use Up/Down to select ranging method.
4. Press Menu to save and exit.

15.2.5 Image Calibration

1. Press Down to Calibration icon.
2. Press Menu to enter.
3. Use Up/Down to select Auto or Manual.
4. Press Menu to save and exit.

15.2.6 Screen Brightness Adjustment

1. Press Down to Screen Brightness icon.
2. Press Menu to enter.
3. Use Up/Down to select one of five levels.
4. Press Menu to save and exit.

15.2.7 Picture-in-Picture

1. Press Down to PIP icon.
2. Press Menu to enter.
3. Use Up/Down to select On/Off.
4. Press Menu to save and exit.

15.2.8 Red Hot Tracking

1. Press Down to Tracking icon.
2. Press Menu to enter.
3. Use Up/Down to select On/Off.
4. Press Menu to save and exit.

15.3 Advanced Settings

1. Press Down to Advanced Settings icon.
2. Press Menu to enter.

3. Long press Menu to back to previous manu.

15.3.1 Wireless Network

1. Press Down to WIFI icon.
2. Press Menu to enter.
3. Use Up/Down to select On/Off.
4. Press Menu to save and exit.

15.3.2 HDMI Menu

1. Press Down to HDMI icon.
2. Press Menu to enter.
3. Use Up/Down to select On/Off.
4. Press Menu to save and exit.

15.3.3 Display Icons

1. Press Down to Display Icons icon.
2. Press Menu to enter.
3. Use Up/Down to select On/Off.
4. Press Menu to save and exit.

15.3.4 Image Formation

1. Press Down to Image Formation icon.
2. Press Menu to enter.
3. Use Up/Down to select On/Off.
4. Press Menu to save and exit.

15.3.5 Theme Menu

1. Press Down to Theme Menu icon.
2. Press Menu to enter.
3. Use Up/Down to select On/Off.
4. Press Menu to save and exit.

15.3.6 Screen Adaptation

1. Press Down to Screen Adaptation icon.
2. Press Menu to enter.
3. Use Up/Down to select On/Off.
4. Press Menu to save and exit.

15.3.7 Time Setting

1. Press Down to Time icon.
2. Press Menu to enter.

3. Set year, month, day, hour, minute with Up/Down; press Menu to confirm.
4. Select Save to confirm or Cancel to discard.

15.3.8 Compass Calibration

1. Press Down to Compass Calibration icon.
2. Press Menu to enter.
3. Select YES and rotate the device smoothly horizontally to calibrate.
Note: When calibrating due to changes in the progress bar, please rotate the device horizontally smoothly and avoid shaking.
4. Select Cancel to abort.

15.3.9 Defective Pixel Correction

1. Press Down to Defective Pixel Correction icon.
2. Press Menu to enter.
3.Press the "Menu Button" key to enter, click the "Up Button" key to move the aperture to the left; click the "" key to move the aperture to the right; click the "Up Button" key to exit.
4. Use Up/Down to adjust X/Y coordinates.
5. Select Save to apply or Reset to undo.

15.3.10 Formatting

1. Press Down to Format icon.
2. Press Menu to enter.
3. Select YES to erase all data; select Cancel to exit.
Note: All photos, videos, and records will be deleted.
4. Press Down to move the cursor to the "Cancel" option, and then press Manu will exit.

15.3.11 Factory Mode

1. Press Down to Factory Mode icon.
2. Press Menu to enter.
3. Select YES to restore factory defaults; Cancel to exit.

15.3.12 System Information

1. Press Down to System Information icon.
2. Press Menu to view.
3. Long press Menu to exit.

16. Picture-in-Picture Function

PIP (Picture-in-Picture) shows both magnified sub-image and main image simultaneously.
• Long press Down on home screen to toggle PIP.
•When you zoom in on the main image by briefly pressing the "Down Button" button, the PIP image will zoom in by 2 times.
For example, when the magnification of the main image is 1x, 2x, and 4x, the corresponding magnification of the PIP image is 1x, 2x, and 4x, respectively.

17. Wireless Network Function

ATS Series has built-in WIFI for wireless connection with mobile devices.
• Long press Menu to enter main menu.
• Can select the Wi-Fi options menu by rotating this "Power Button" and "Menu Button" button;
• Short press Menu to enable/disable WIFI.
• External device recognizes scope by serial number.
• Connect to WIFI and enter default password: abc.1234.
• Control the device via app after connection.

18. Technical Inspection

Inspect before each use:
1. Scope body: no cracks or damage.
2. Lenses: clean, no cracks, dust, or stains.
3. Battery: fully charged.
4. Buttons: all functional.

19. Maintenance

Perform maintenance at least twice per year:
1. Wipe external metal and plastic parts with soft cloth; use silicone grease for cleaning.
2. Clean electrical contacts and battery compartment with oil-free solvent.
3. Inspect optical surfaces; remove dirt/sand with non-contact method if needed.
4. Clean optics with dedicated lens cleaner.

20. Troubleshooting

Follow the sequence below to troubleshoot. Return for service if unresolved.

Symptom	Cause	Solution
Device cannot power on	Battery completely depleted	Charge the battery
Cannot use external power	USB cable damaged / power disconnected	Replace cable; check power source
Image blurry, uneven, with lines	Calibration needed	Perform image calibration
Image too dark	Brightness too low	Adjust screen brightness
UI clear but image blurry	Out of focus / lens dirty	Adjust focus/Wipe the external optical surfaces with a soft cotton cloth. Allow the device to dry in a warm environment for 4 hours.
Target image missing	View through glass	Remove glass from field of view
Device cannot focus	Incorrect settings	Adjust the device according to the instructions in the "Power-on and Image Settings" section; Inspect the outer surfaces of the eyepiece and eyepiece tube, and remove dust, condensation, frost, etc., if necessary; In cold weather, you can use a special anti-fog coating (such as the same coating used on corrective glasses).
Cannot connect to smartphone	Wrong WIFI password/Too many Wi-Fi signals around the device	Enter correct password: abc.1234/Move the device to an area where the wireless network signal is weak or nonexistent.
Wireless network signal loss or absence interruption	The smartphone is located in an area without strong Wi-Fi signal coverage or there are obstacles between the device and the smartphone.	The smartphone is located in an area without strong Wi-Fi signal coverage or there are obstacles between the device and the smartphone.

Poor image quality or shorter range	Bad weather (rain, snow, fog)
Worse image in low temperature	Under normal temperature conditions, the observed object (surrounding environment and background) will experience different temperature rises due to differences in thermal conductivity, resulting in significant temperature differences. Therefore, thermal imagers produce images of higher quality. Under low temperature conditions, the observed object (background) typically cools to roughly the same temperature, thus significantly reducing temperature differences and consequently lowering image quality (magnification); this is a notable characteristic of thermal imagers.

Note:
1.Content and version are subject to change without prior notice.
2.Revisions and updates to the content of this manual may be made without prior notice.