User’s manual
Fusion Vision System

Version Ver.45
SW Ver 0.9.1027.00.ES4.KR.NA
2024-12-16

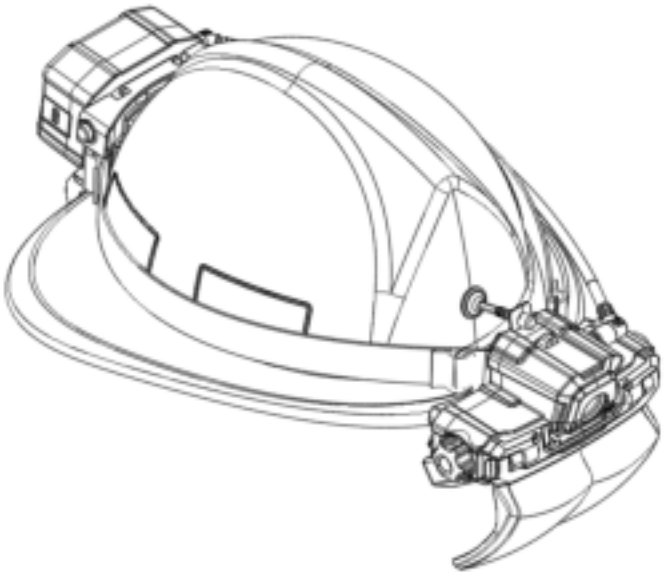


Table of Contents

1. Disclaimers

1.1 Legal Disclaimer

For warranty information, please refer to the document of FVS Thermal Imaging Camera Warranty.

1.2 Usage Statistics

Longan Vision Corp. reserves the right to gather usage statistics to help maintain and improve the quality of our software and services.

1.3 Government Regulations

This product may be subject to U.S. Export Regulations. Send any inquiries to info@longanvision.com.

1.4 Copyright

1.5 Quality Assurance

The products are developed and manufactured under a certified Quality Management System in accordance with ISO 9001:2015 standard.

Longan Vision Corp. is dedicated to a policy of ongoing development and improvement of our products and services. Therefore, we retain the right to implement changes and enhancements to any of our products without prior notice.

1.6 Patent

This product is protected by patent law.

1.7 EULA Terms

IF YOU DO NOT AGREE TO THIS END USER LICENSE AGREEMENT (“EULA”), DO NOT USE THE DEVICE OR COPY THE SOFTWARE. INSTEAD, PROMPTLY CONTACT Longan Vision Corp FOR INSTRUCTIONS ON RETURN OF THE UNUSED DEVICE(S) FOR A REFUND. **ANY USE OF THE SOFTWARE, INCLUDING BUT NOT LIMITED TO USE ON THE DEVICE, WILL CONSTITUTE YOUR AGREEMENT TO THIS EULA (OR RATIFICATION OF ANY PREVIOUS CONSENT).**

2. Safety Information

Caution
Do not direct the infrared camera, whether with the lens cover on or off, towards high-energy sources such as devices emitting laser radiation or the sun. Such exposure could detrimentally impact the precision of the imaging device and may also precipitate damage to its detection component.
Caution
Do not apply solvents or similar liquids to the camera, cables, or other components, as this may damage the equipment and pose a risk of injury.
WARNING
Standard: 47 CFR FCC Part 15 Subpart B(Class B) ANSI C63.4:2014 This device is in conformance with Part 15 of the FCC Rules. Operation of this production is subject to the following two conditions: 1: This device may not cause harmful interference. 2: This device must accept any interference received, including interference that may cause undesired operation.
WARNING
NOTICE Change or modifications made to this equipment not expressly approved by Longan Vision may void the FCC authorization to operate this equipment.
WARNING
Do not disassemble or modify the battery. The battery contains safety and protection mechanisms that, if damaged, could lead to overheating, explosion, or ignition. If battery fluid leaks and comes into contact with your eyes, do not rub them. Rinse thoroughly with water and seek medical attention immediately. Failure to do so could result in eye injury. Do not continue charging the battery if it fails to charge within the specified time. Prolonged charging may cause the battery to overheat, potentially leading to an explosion or ignition, resulting in personal injury.

Do not connect the positive terminal and the negative terminal of the battery to each other with a metal object (such as wire). Damage to the batteries can occur.

Do not solder directly onto the battery, as it can cause damage to the battery.

Always wear eye protection when handling or near exposed batteries.

3. Notices to user

3.1 Calibration

The following items are involved with calibration:

- Spot temperature measurement: The spot surface temperature is measured by the radiometric thermal core that is calibrated for 5 meters distance of spot surface temperature measurement. The objects closer than 5 meters will show higher surface temperature and the objects more than 5 meters away will show lower spot surface temperature.
- The compass will calibrate itself after a short period of time from start-up. Please draw a figure-8 on air until the compass figure shows on the top of the screen.

3.2 Accuracy

For very accurate results,we recommend that you wait 5 minutes after you have started the camera before measuring the temperature.
The spot temperature measurement is set to measure an accurate temperature value at a distance of 5 meters (16.4 feet).

3.3 Disposal of Electronic waste

Electrical and electronic equipment (EEE) contains materials, components and substances that may be hazardous and present a risk to human health and the environment when waste electrical and electronic equipment (WEEE) is not disposed of correctly.
The crossed-out wheeled bin symbol indicates the waste is electrical and electronic and/or equipment should not be discarded together with unseparated household waste and must be collected separately.

For this reason all local authorities have established collection schemes under which residents can dispose of waste electrical and electronic equipment at a recycling center or other collection points, or WEEE will be collected directly from households. More detailed information is available from the technical administration of the relevant local authority.

4. Customer Help

4.1 General

Please find information on www.longanvision.com

4.2 Submitting a question

For customer support, please submit a question ticket through info@longanvision.com

4.3 Software Maintenance and Update

Longan Vision provides software patches and updates for customers. For detailed information, contact info@longanvision.com.

5. Quick Start Guide

5.1 Procedure

Charging the device

Please note there are 2 different ports on the rear module. The charging operation needs to use the ports with a battery icon on the cover, which is on the opposite side of the cable connector from the front module.

- Charging the battery using the FVS GS-552 stand-alone battery charger.
- Charging the battery using a USB-C cable connected to a computer.

Note Charging the device using a USB-C cable connected to a computer takes considerably longer than the FVS GS-552 stand-alone battery charger.

Mount the device on the firefighting helmet

Some models of firefighting helmets need special accessories to mount correctly.

Connect the Front module and Rear module

Important Note Please ensure that the connector is securely plugged into both the rear and front modules. The connector should produce an audible click when seated correctly. **Improper connection may cause the FVS to malfunction.**
The rubber protection may reduce the space for the cable connector to connect on the receptacle. The “click” sound may be lower but please ensure the secure and proper connection for the front and rear module.

Turn on the device

Press **Green Push Button** 🟢 and release quickly. Wait for the system to boot up and see the thermal imaging feed with the user interface.

View the Hands-free Heads-up advanced thermal imaging

Face toward your target of interest and turn the right hand rotary knob to switch mode of processed thermal vision.

Turn off the device

Press and hold the **Green Push Button**🟢 for more than 2 seconds. The battery indicator light will turn off with the front screen.

6. Descriptions

6.1 Device parts

6.1.1 Figure

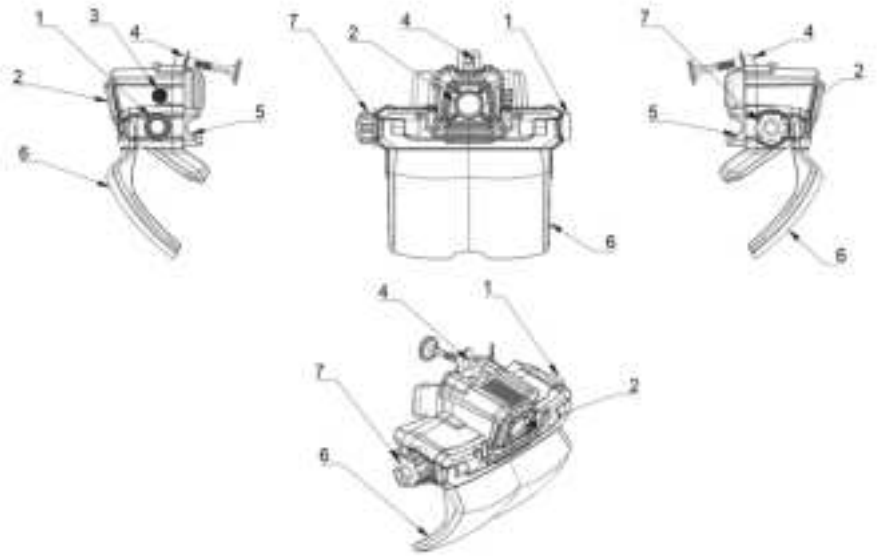


Figure: Front Module Drawing

Note The mounting mechanism may vary depending on the helmet detachability.

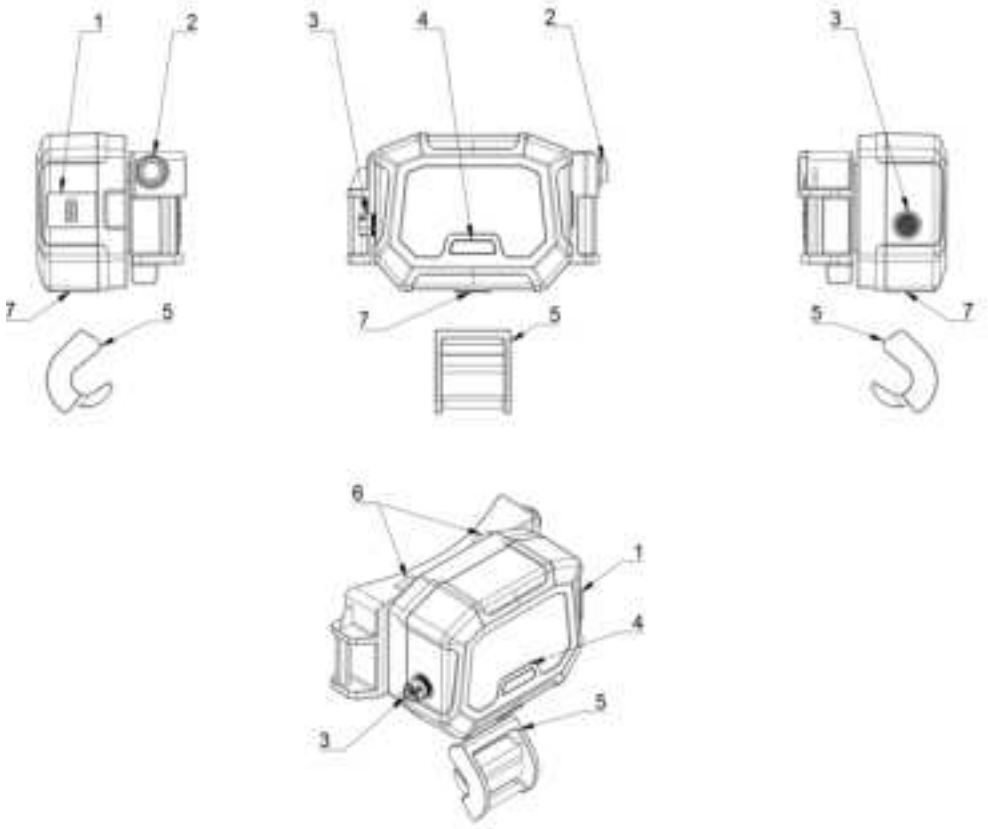


Figure: Rear Module Drawing

6.1.2 Explanation

Note The mounting strap is not included in the previous technical drawing.

Front Module Drawing lists:

1. Power push button.
2. Thermal imager germanium lens.
3. Cable connector port, front.
4. Mounting knob, Rear.
5. Helmet rim pad.
6. Heads-up display.
7. Rotary switch.

Rear Module Drawing lists:

1. Battery charging port.
2. Battery pack release button.
3. Cable connector port, rear.

4. Battery status indicator light.
5. Helmet mount hook.
6. Sliding rail for changing battery.
7. Communication port.

6.2 Rear Module Ports

6.2.1 Figure

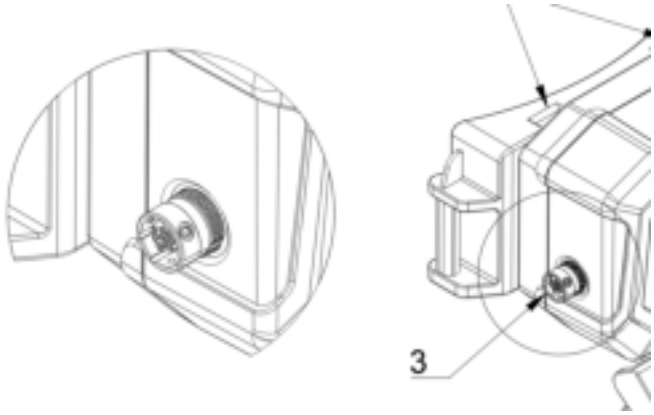


Figure: Cable connector port, rear.

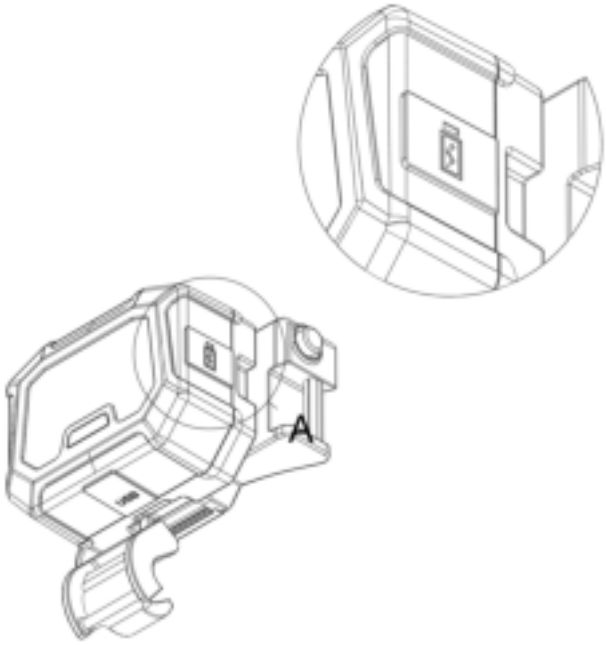


Figure: Battery charging port.

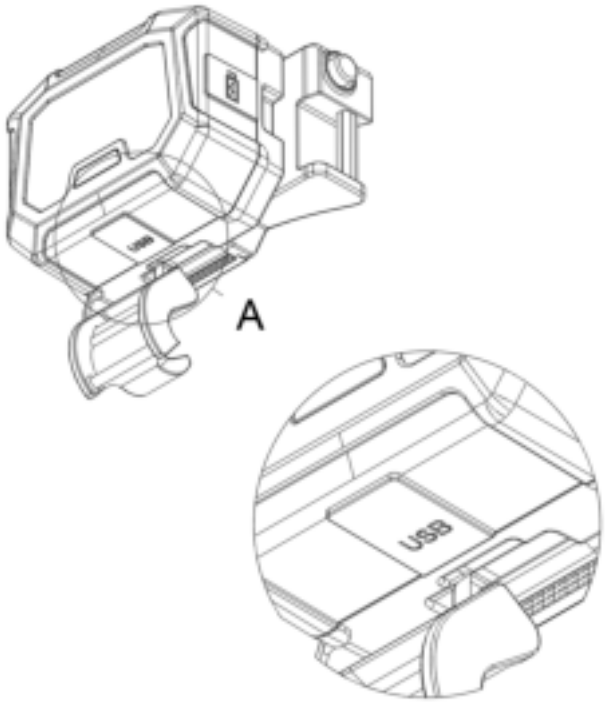


Figure: Communication port.

6.2.2 Explanation

The purpose of the ports are the following:

Cable connector port, rear.

- Connecting front module with provided cable system.

Battery charging port:

- Charging the battery using the FVS GS-552 stand-alone battery charger.
- Charging the battery using a USB-C cable connected to a computer.

Communication port:

- Establish communication with the PC to move recorded video files from the camera to PC for further analysis.

6.3 Screen Elements

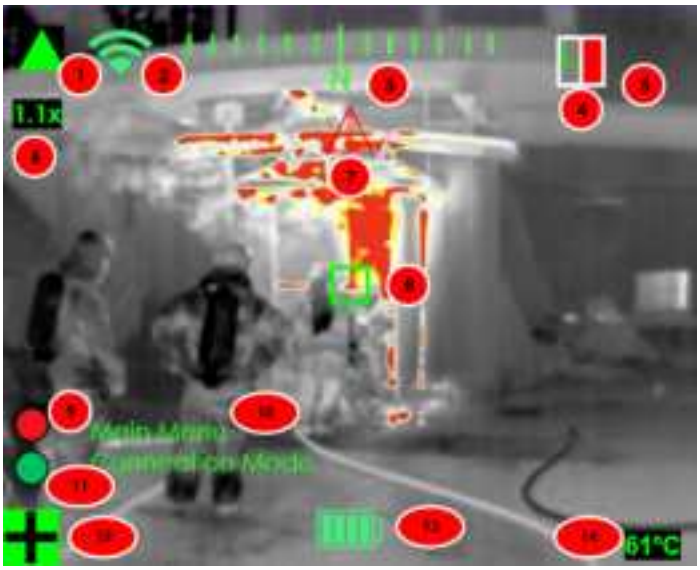


Figure: Main screen example

6.3.1 Explanation

1. Gain indicator
2. Wi-Fi signal strength
3. Digital compass
4. Mode indicator
5. Thermal reference colorbar
6. Zoom indictor
7. Overheat indicator
8. Spot measuring point
9. Recording status indictor
10. Menu
11. Streaming status indicator
12. Ti Basic Mode Plus indicator
13. Battery indicator
14. Spot measurd temperature reading

7. Operations

7.1 Connecting the Rear and Front Modules

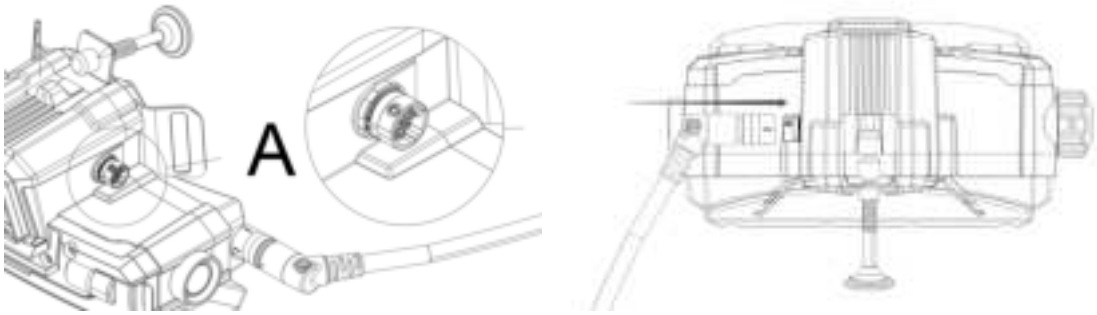


Figure: Cable connector port and cable, front.

Figure: Cable connector port and cable, rear.

Please identify the cable connector direction with the white dot matching the angle for the receptacle on the device.

- For connecting, the connector will have a “click” sound and feel when the lock is in place and means the connection is successful.
- For disconnecting, hold the outer shell at the connector and pull the connector away from the receptacle.

Important Note Please ensure that the connector is securely plugged into both the rear and front modules. The connector should produce an audible click when seated correctly. **Improper connection may cause the FVS to malfunction.**
The rubber protection may reduce the space for the cable connector to connect on the receptacle. The “click” sound may be lower but please ensure the secure and proper connection for the front and rear module.

7.2 Charging the battery

It is recommended to use the provided FVS GS-552 stand-alone battery charger for FVS battery charging.

Follow this procedure:

1. Connect the FVS GS-552 stand-alone battery charger to a wall outlet.
2. Identify the battery port at the opposite side of the cable connector port and open the protective cover on the FVS rear module.
3. Connect the USB-C connector to the port.

🗒️**Charging Note**
Battery pack versions for different configurations will have different capacity and charging time. ● 2C battery pack: the charging time for a fully depleted battery is 2 hours. ● 4C battery pack: the charging time for a fully depleted battery is 4 hours.
Battery Charging status: ● Charging in progress: orange light flashing🟧 ● Charging complete: orange light solid🟠

7.3 Turning the Device On and Off

Turn on the device:

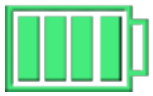
Press **Green Push Button** 🟢 for 1 second and release quickly. Wait for the system to boot up and see the thermal imaging feed with the user interface.

Turn off the device:

Press and hold the **Green Push Button**🟢 for more than 2 seconds. The battery indicator light will turn off with the front screen. You can turn off the device at any time.

Device operation status:

- From the device HUD view:
  Battery indicator icon



Battery at 75% to 100%

Battery at 50% to 75%

Battery at low level, 25% to 50%

Extreme Low Power, needs to turn off now

- From the device external rear view:
  Please observe the LED indicator status on the front of the rear module.

Battery range:	**Lighting Action:**
50% - 100%	Green light solid 🟢
25% - 50%	Orange light solid 🟠
0% - 25%	Red light Flashing 🔴

🗒️**Rear Module LED Logic Note**

The rear module will communicate with the front module all the time to check the system connection integrity. You will observe the following rear module actions:
• Yellow Light Solid: The rear module senses the Green Push Button is pressed and powering up the front module.
  ○ After the front module is booted, the rear will show the current battery range with designated Lighting Action, please refer to section 7.2 Device external rear view.
  ○ If the rear module does not read the front module within 3 minutes, it will turn to Yellow Light Flashing.
• Yellow Light Flashing: The rear module does not read any signal from the front module. There is a problem in the connection between the front module and

	rear module. The rear module will keep Yellow Light Flashing for 8 minutes and it will automatically turn itself off to save power.

7.4 Switching Image Mode

7.4.1 General

The camera can operate in 4 different image modes:
Note Changing the image mode only changes the displayed thermal image, the user interface will remain unchanged.

There are 4 modes available for FVS:

- *Grayscale*: The device displays the temperature difference from high to low in to white to black.

  Note The Grayscale mode(including other mode variants based on the Grayscale) offers three image settings: Auto, High Gain, and Low Gain. These settings are designed to adapt to different working environments, ensuring optimal visibility and clarity.
  - Auto: for most of the cases.
  - High Gain: For uniform temperature environments.
  - Low Gain: For significant temperature differences environments.

Figure: Greyscale example (Auto)

- *Edge Detection*: The device displays the infrared image where the edges of the objects are enhanced.

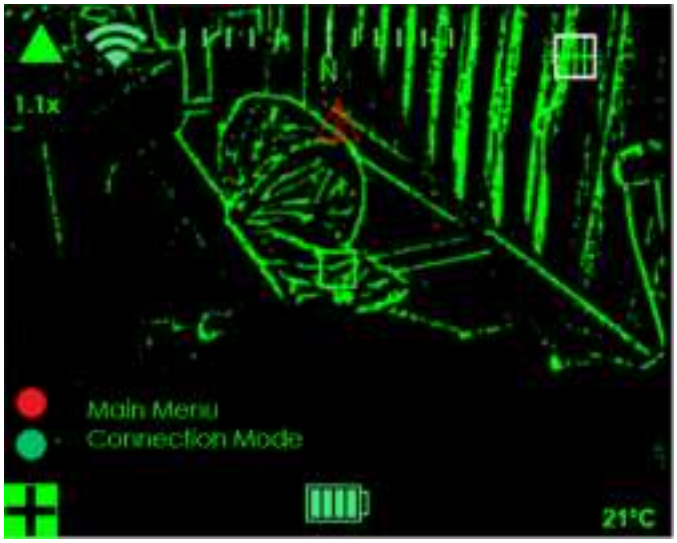


Figure: Edge Detection example

- *Hotspot Detection*: The device displays the high temperature area in the *Grayscale* base.

Figure: Hotspot Detection (High gain) example

- *Fusion*: The device displays the combination of the mode with advanced information filtering.

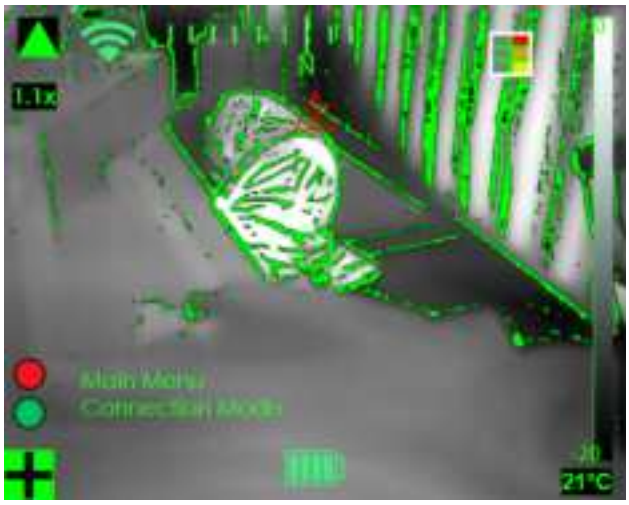


Figure: Fusion example

7.4.2 Procedure

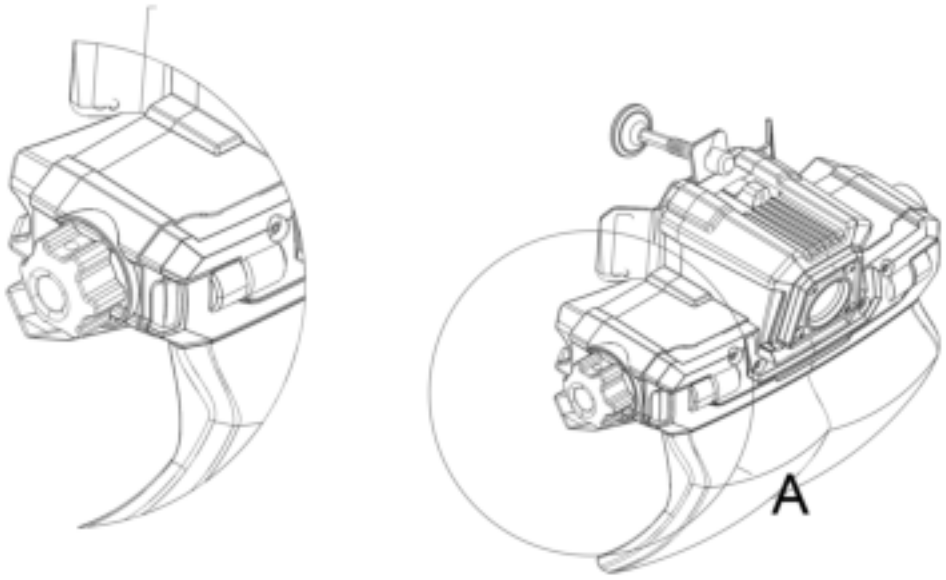


Figure: Front Module

The large knob on the front allows for mode selection by turning the knob in either direction.

Follow this procedure:

1. Ensure the device is not currently in any menu settings.

2. Rotate the rotary knob clockwise (see from right side) to change the mode to next one.
3. Rotate the rotary knob counterclockwise (see from right side) to change the mode to the previous one.

Note The rotary knob is designed to fit operation with heavy duty gloves. Each 2 clicks on the rotary knob results in 1 command in the device.

8. Functions

8.1 Video Recording

Figure: Recording On; Saving record in progress; Unable to record video

- Press the **Rotary Knob once** to start or stop video recording.
- Record video will be available after boot up shortly.
- When the battery level drops to 5% (critical low), active video recording will automatically stop, and the recorded files will be saved. The "Unable to record video" icon will appear in place of the recording icon to indicate that recording has ended.
- Wait until the "Saving record in progress" message disappears before shutting down the system. Shutting down during the saving process will interrupt the saving and lose the recordings.

8.2 Video Streaming

Figure: Stream ON

- Press the **Rotary Knob Twice** to start or stop video recording.
- Please refer to 7.9.1.2 to set up Wi-Fi for internet connection.

- The streaming will turn off if it encounters unexpected situations such as internet connection lost. When the FVS have internet access, you can always stream video again by pressing the **Rotary Knob** again twice.

8.3 Digital Zoom

Figure: Digital Zoom

- Triple-press the **Rotary Knob** to adjust the zoom level.
- Available options: 1.0x (default), 1.1x, 2.0x.

8.4 Main Menu

8.4.1 Main Menu Operation

- Entering/ Leaving menu: Long press the rotary knob to enter/exit.
- Browse the next items: Rotate the knob for two clicks to the next item.
- Select item: Short press the rotary knob once to select an item.
- Return to parent level: Press twice.

8.4.2 Menu Items

- Main Menu
    - Display Adjustments
        - Resize Frame
        - Adjust Distortion
        - Rotation
        - Moving Up & Down
        - Moving Right & Left
    - Connection Mode
        - Debug mode
            - ON
            - OFF
        - Wifi mode
            - ON
            - OFF
    - Temperature Calibration
    - Shutdown

- Enable

8.4.3 Menu Items Details

Display Adjustments

The Display Adjustments are designed for different kinds of User Interface display adjustments. The thresholds are displayed below.

Action	**Range [lowest, highest]**	**step**
Resize Frame	[45, 65]	1
Adjust Distortion	[4.0, 12.0]	0.2
Rotation	[70.0, 110.0]	1
Moving Up & Down	[120.0, 200]	5
Moving Right & Left	[50.0, 210.0]	4

Connection Mode

Debug mode:

Allows connecting the PC to FVS. This is the portal for configuration changes and updates of FVS software.

Wi-Fi mode:

Allows the FVS to connect to enable Wi-fi broadcast.

Temperature Calibration

In case the thermal camera radiometric requires calibration, a black body is required to calibrate the correct temperature reading by manually changing the value.

Shut down

This will shut down the system.

8.5 Local Storage

FVS has an internal storage that stores video recordings.

Accessing Recordings:

1. Use the **FVS-issued USB-C cable** to connect the device to a PC.
2. Ensure the device is powered on and properly booted.

3. Open **File Explorer** on your PC and locate the FVS storage under "My Computer."

Note: If a pop-up asks to scan the drive, it should be ignored.

8.6 FVS Homepage

The FVS Homepage allows users to view device information, change device configurations, and connect the device to Wi-Fi.

8.6.1 Accessing the FVS Homepage

The device is shipped with Debug Mode enabled, broadcasting an AP signal.

1. Enable Wi-Fi on your host PC and place the FVS nearby.
2. Search for the FVS AP signal (e.g., FVS-019) and connect using the password **"nopassword."**
3. Open a web browser and type **http://fvs-homepage-ap.com:5001**.

Figure: FVS Access Point, example unit FVS-019 (sin number)

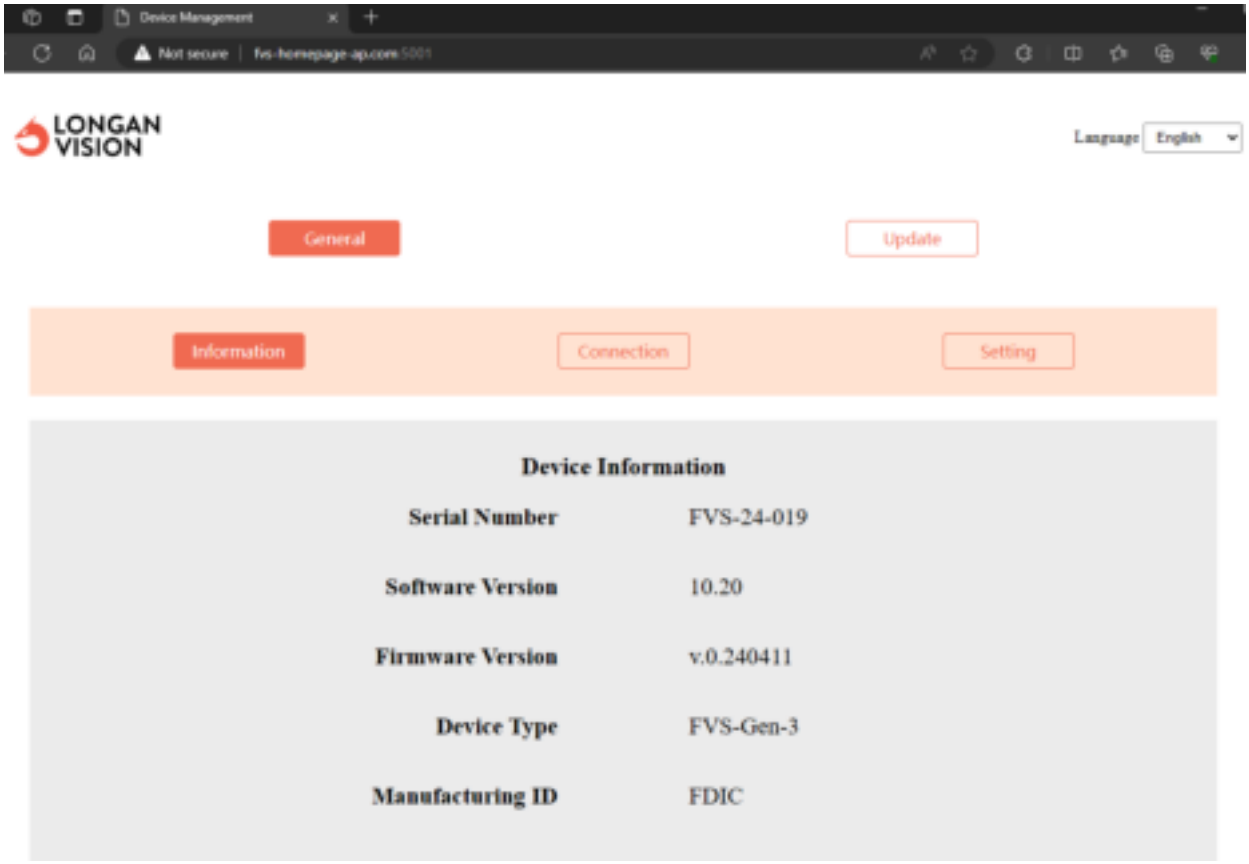


Figure: FVS Homepage example, version: FHP-24.1.0

8.6.2 Homepage Functions

- Information: Displays device details, including serial number, software and firmware versions, device type, and manufacturing ID.
- Network Connection: Users can enter the SSID and Wi-Fi password, then click "Connect to Wi-Fi" to enable Wi-Fi mode. Wi-Fi settings can be updated to connect to a different network as needed.
- Device Settings: Allows users to select temperature units and configure streaming destinations, such as demo.longanvision.com.

8.7 Connect the FVS to Wi-Fi

1. On the FVS Homepage, enter the Wi-Fi SSID and password, then click **"Connect to Wi-Fi."**
2. The device will disconnect from the PC and attempt to connect to the network. A **green still Wi-Fi icon** indicates a successful connection.

If FVS can’t find the Wi-Fi, please check if the Wi-Fi is accessible and verify the SSID/password (note: extra whitespace in the SSID may cause connection failure).
In Wi-Fi mode, you can switch back to Debug Mode in the menu to access the homepage.
After connecting to a given Wi-Fi for the first time, the device will remember it. Next time, this FVS will search for this Wifi connection automatically.

Figure: Example of Connection Tab, version: FHP-24.1.0

8.8 Streaming

The Streaming function is automatically turned on after boot up, if your device has internet access. And, it will turn off when the device loses internet. Then the video will be streamed on the FVS Command Terminal website or other partners' applications. Please refer to the FVS Command Terminal Manual on how to use FVS Command Terminal.

8.7 Compass

The compass function needs calibration for each use. Slowly rotate the device in all directions, including a figure-eight motion. The compass figure at the top of the screen will appear when calibration is successful.

FCC Warnning:

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 againstharmful interference in a residential installation. This equipment generates, uses and can radiateradio frequency energy and, if not installed and used in accordance with the instructions, maycause harmful interference to radio communications. However, there is no guarantee thatinterference will not occur in a particular installation. If this equipment does cause harmfulinterference to radio or television reception, which can be determined by turning the equipmentoff and on, the user is encouraged to try to correct the interference by one or more of thefollowing 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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this 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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 0cm between the radiator and your body.