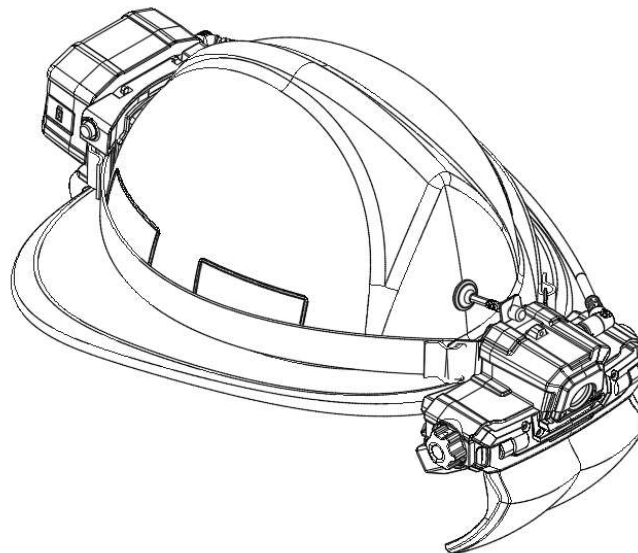


# **User's manual Fusion Vision System**

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# 1. Disclaimers

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## 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](mailto:info@longanvision.com).

## 1.4 Copyright

© 2024, Longan Vision, Corp. All rights reserved worldwide. No parts of the software including source code may be reproduced, transmitted, transcribed or translated into any language or computer language in any form or by any means, electronic, magnetic, optical, manual or otherwise, without the prior written permission from Longan Vision Corp.

## 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

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<b>WARNING</b>
Always wear eye protection when handling or near exposed batteries.
<b>Caution</b>
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.

## 3. Notice to user

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### 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 CALIB\_STAT register indicates fully calibrated.

### 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

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### 4.1 General

Please find information on [www.longanvision.com](http://www.longanvision.com)

### 4.2 Submitting a question

For customer support, please submit a question ticket through [info@longanvision.com](mailto:info@longanvision.com)

### 4.3 Download

The customer help site can download the following:

- Configuration tool software for FVS on PC.
- Technical datasheets.
- Firmware update.



## 5. Quick Start Guide

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### 5.1 Procedure

1. 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.

2. Mount the device on the firefighting helmet.

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


3. 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.

4. 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.

5. 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.Description

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### 6.1 Device parts

#### 6.1.1 Figure

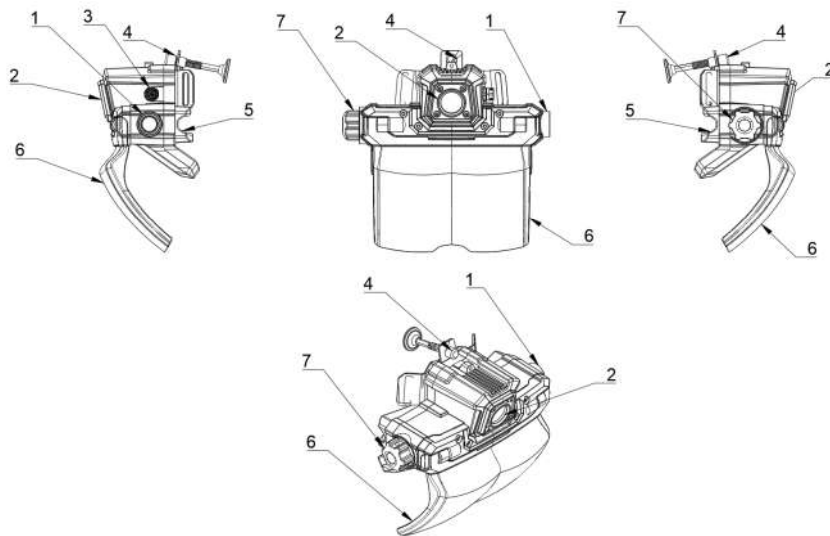


Figure: Front Module Drawing

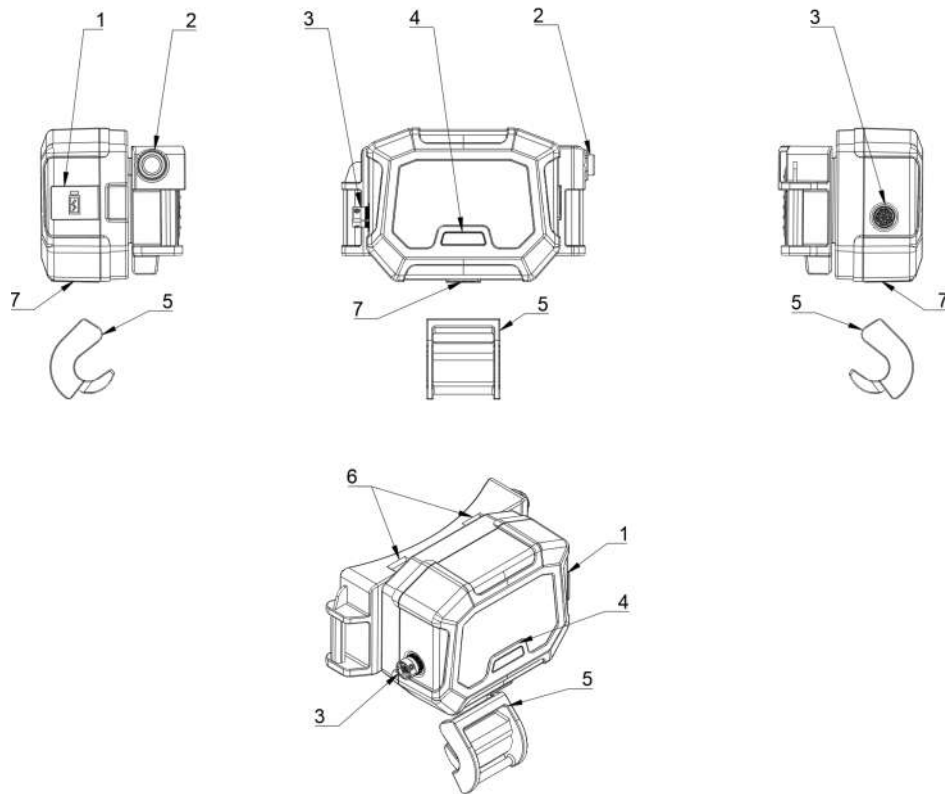


Figure: Rear Module Drawing

### 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.

#### 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 Connectors

### 6.2.1 Figure

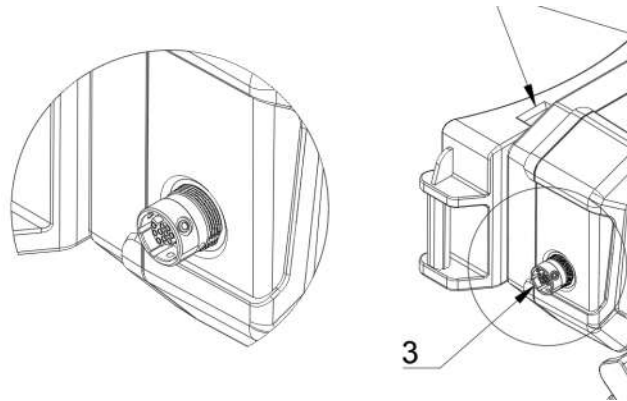


Figure: Cable connector port, rear.

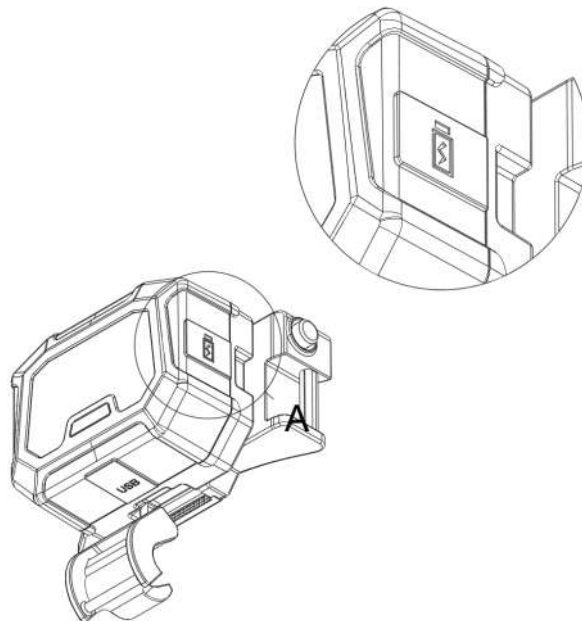


Figure: Battery charging port.

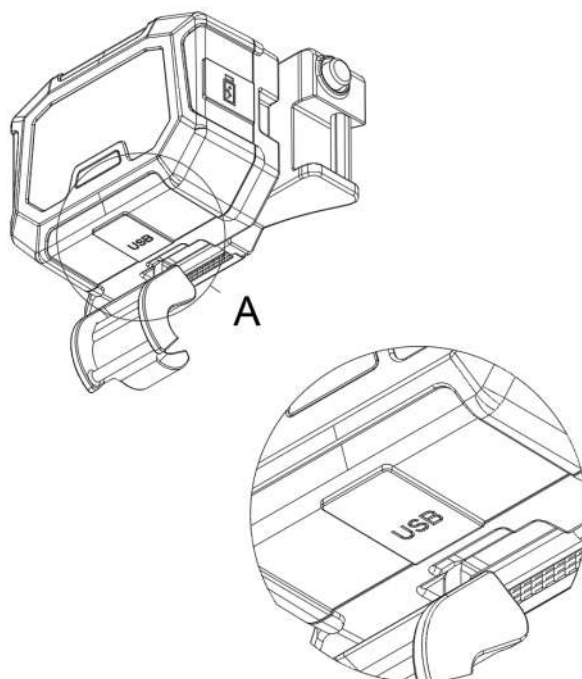


Figure: Communication port.

### 6.2.2 Explanation

The purpose of the USB-C connector 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 connect with the internet.
- Establish communication with the PC to update firmware.
- Establish communication with the PC to move recorded video files from the camera to PC for further analysis.

## 6.3 Screen Elements

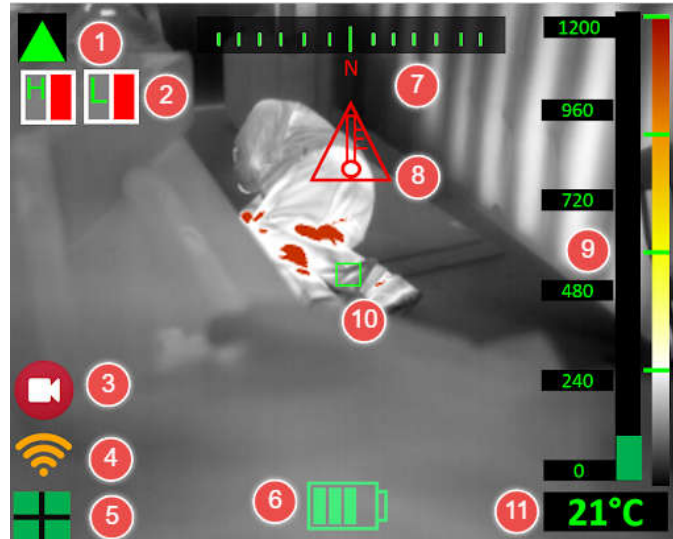


Figure: Main screen example

### 6.3.1 Explanation

1. Gain indicator
2. Thermal mode indicator
3. Recording icon
4. Wifi signal di
5. Ti Basic Mode Plus indicator
6. Battery indicator
7. Digital compass
8. Overheat indicator
9. Thermal reference colorbar
10. Spot measuring point
11. Spot measurd temperature reading

### 6.3.2 Streaming Symbol & Notes



Icon: Stream OFF



Icon: Stream ON

Please refer to 7.6.2 to set up Wi-Fi for internet connection with the user software application first.

If the streaming turns off, you can always stream video again by pressing the **Rotary Knob** again once.

**Note** The streaming will turn off if it encounters unexpected situations such as internet connection lost.

## 7.Operation

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### 7.1 Connecting the rear module and front module

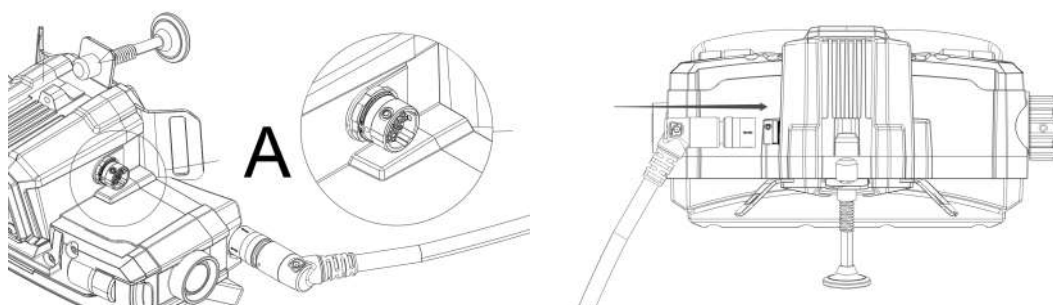


Figure: Cable connector port and cable, front.

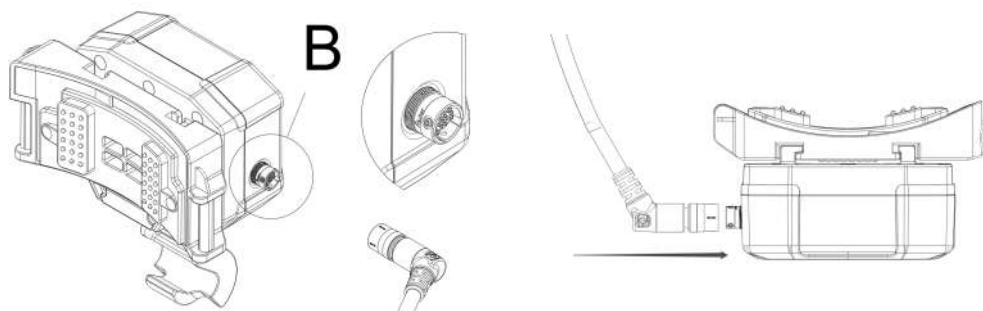


Figure: Cable connector port and cable, rear.

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.

**Note** 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

### 7.1.1 Charging the battery using the FVS GS-552 stand-alone battery charger

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 

## 7.2 Turning on and turning off the device

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.

## 7.3 Interpupillary Distance Fitting

Please adjust the interpupillary distance fitting(IPD) for your individual best fit to see the Augmented Reality image properly for optical quality and comfort.

**Note** Misaligned IPD and improperly adjusted IPD are common causes of blurry images, dizziness, and eye strain.

## 7.4 Changing image mode

### 7.3.1 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.



Figure: Grey Scale example

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

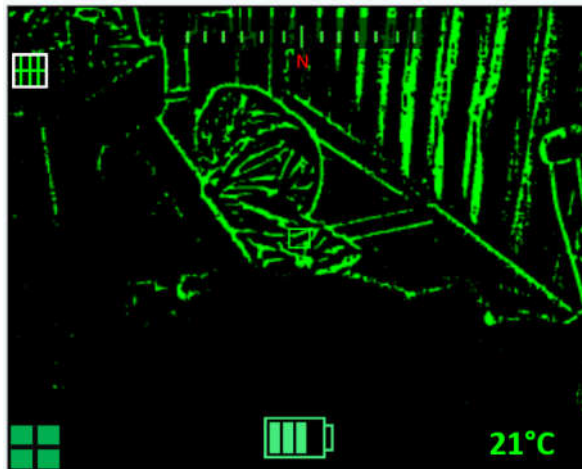


Figure: Edge Detection example

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

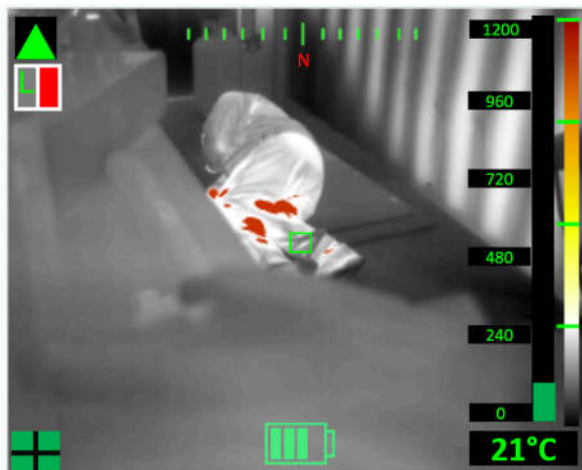


Figure: Hotspot Detection example

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

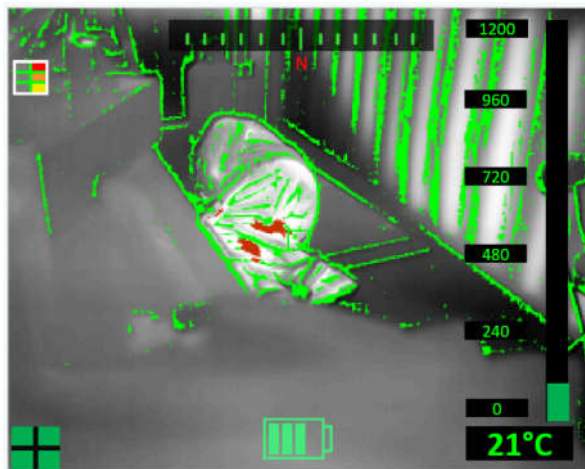


Figure: Fusion example

### 7.3.2 Procedure

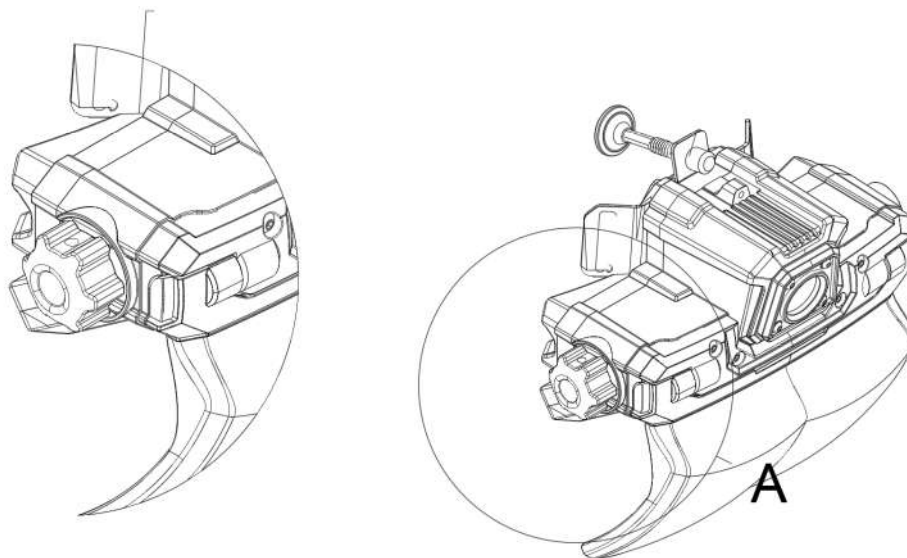


Figure: Front Module

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.

## 7.4 Quick Access Functions

### 7.4.1 Video Recording

Triple press the **Rotary Knob** to start or stop video recording.

In the regular view when operating with FVS, the recording icon will not display. When the recording is active, the recording icon will appear on the user interface as shown in the *Figure: Main screen example* under section 6.3 *Screen Element*.

When the battery level reaches the 5% (critical low), the active video recording will be automatically turned off and save the recorded files. The “Unable to record video” icon will replace the recording icon to indicate the recording is ended.



Figure: Unable to record video

The video recording function will be unavailable if the battery level is under 5% (critical low) to prevent data loss. The “Unable to record video” icon will appear for 2 seconds to indicate the video recording function is unavailable.

### 7.4.2 Digital Zoom

Double press the **Rotary Knob** for digital zoom. Will have 1.0x (100%, default), 0.9x (90%), 0.5x (50%)

### 7.4.3 Quick left and right (IPD) adjustment

Hold pressing **Rotary Knob** and rotate for quick left & right adjustment.

## 7.5 Main Screen

Everytime the FVS starts, it will boot to this screen with the following User Interface(UI) layout and images in Grayscale.

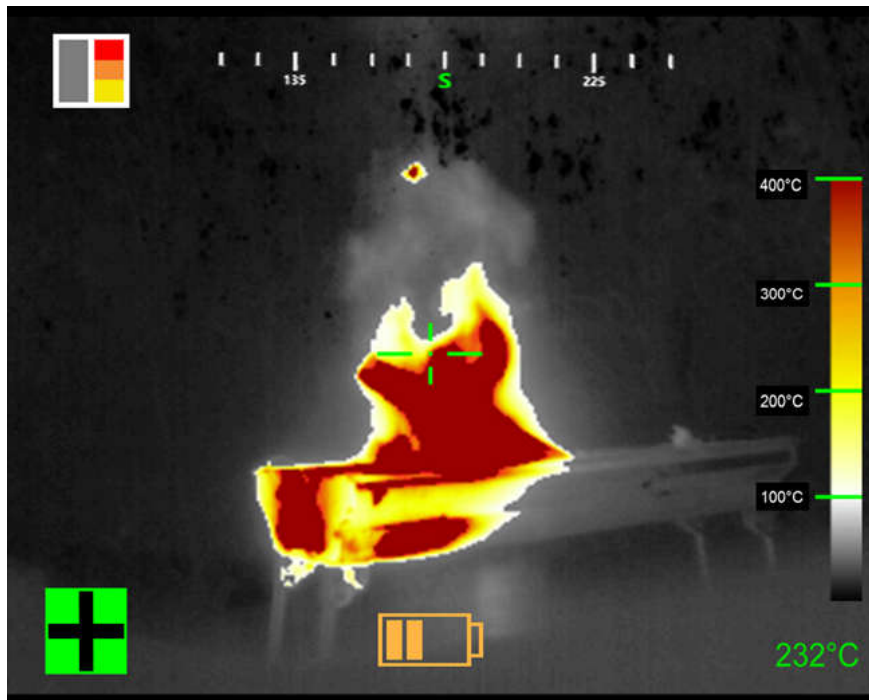


Figure: Main Screen, example of a live fire

**Note** This exact screen image is an example. Your User Interface(UI) may be different due to the regional setting.

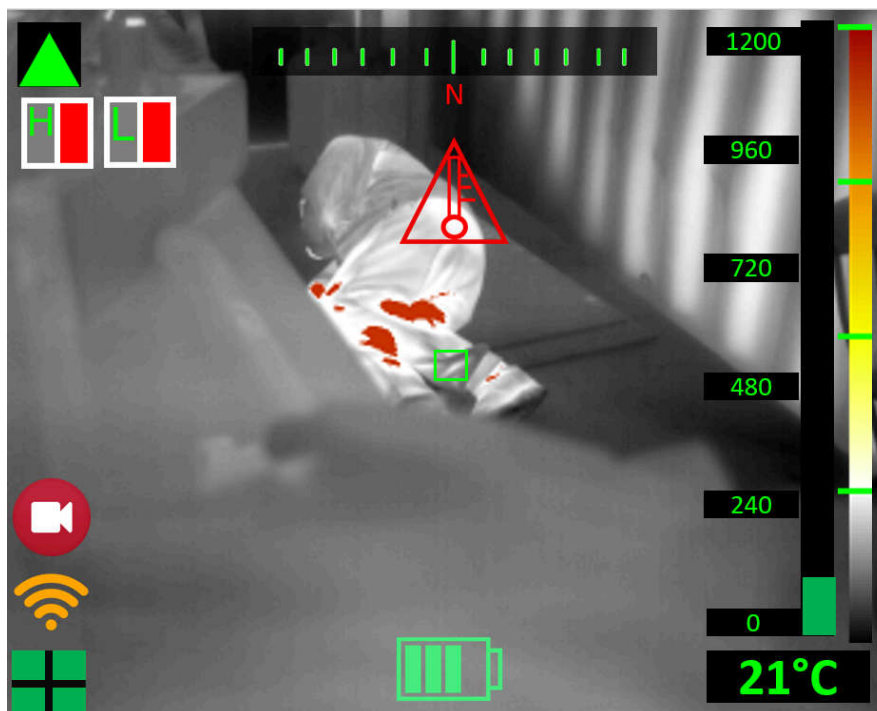


Figure: Main Screen, example of a person laying on ground

## 7.6 Menu Options

Menu Option Operation guide:

- Entering/ Leaving menu
  - Long press the rotary knob to enter/exit
- When in menu, rotate the knob to browse different items
- Select item:
  - Short press the rotary knob once to select item
- Return to parent level.
  - Press twice.

The menu has 2 submenus.

- Display Adjustments.
- System Settings.

The display adjustments are designed for different kinds of User Interface display adjustments.

- Interpupillary distance (IPD) distance.
- Distortion.
- Resizing the frame.
- Rotation of the frame.





Use system settings to configure settings related to the device.

- Display Celsius or Fahrenheit in the radiometry reading.

## 7.7 PC Connection, Internet Connection, file transfer and software update

### 7.7.1 Connect the FVS to a Personal Computer FVS

To connect the device with PC, please use the FVS standard issued USB-C cable.

1. Establish the connection:
  - a. Boot FVS to the system with camera feed.
  - b. Connect FVS to PC via USB Type-C data cable.
  - c. Please review the File Explorer within the "My Computer" interface to identify the Mass Storage Device, referred to as the FVS storage.

### 7.7.2 Connect the device to Wireless service

Please download the Configuration Tool Graphical User Interface Software from the website.

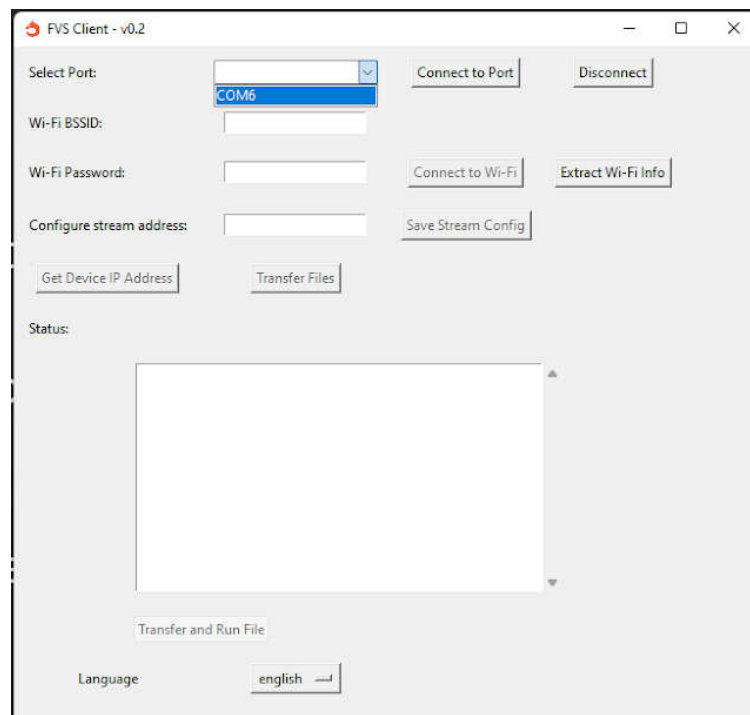


Figure: Graphical User Interface



**Note** If the FVS' Wi-Fi has been configured with the Wi-Fi before, you don't need to do this step.

Connect FVS to PC with following order:

- a. Boot FVS to the system with camera feed.
- b. Connect FVS to PC via USB Type-C data cable.
- c. Short press the **Green Push Button**, for 4 times fast, to allow the device entering DEBUG MODE.
- d. Click on the "Select Port", to find the FVS device.
- e. Select the device from the dropdown menu.
- f. Click on the "Connect to Port" button to establish the connection.
- g. A message will be shown on the Status Box.

**Note** Upon entering DEBUG MODE on the FVS, the Mass Storage Device will disconnect from the PC. To access the FVS storage, it is necessary to restart the FVS and proceed with the steps outlined in section 7.7.1.

1. Connect device to the same Wi-Fi as the PC:
  - a. Extract the Wi-Fi info of your PC with clicking on the "Extract Wi-Fi Info" button, the GUI will extract the Wi-Fi information and display it on the Status Box.
  - b. Fill in the internet password.
  - c. Click on "Connect to Wi-Fi".
  - d. The IP address will be displayed on the Status Box. If not, please press on "get Device IP address", to confirm the Wi-Fi connection information.
  - e. Once the IP address is known as shown in the picture, the device is connected to Wi-Fi. If failed to get the IP address, please redo this procedure 2.a.

### 7.7.3 File Transfer

To connect the device with PC, please use the FVS standard issued USB-C cable. After the connection is established, there will be a pop-up port connection notification appearing on your PC.

**Note** Please do not scan the drive, this pop-up is expected.

The FVS data can be accessed on the PC as though it is a USB storage device.



#### 7.7.4 Software Update

To take advantage of our latest FVS firmware, it is important that you keep your camera updated.

To connect the device with PC, please use the FVS standard issued USB-C cable and follow the 7.6.1

When the FVS is connected to a Windows PC with USB-Type C Cable, drop the latest software named as “main640” and other attached files together to the root folder of the FVS USB Mass Storage file directory folder through your PC.

**Note** Reboot the FVS to finish the software update.

FCC Warning:

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.

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.