



3D Measurement Industrial Video Borescope

Operating Instructions



Warning: Please read the Instruction carefully before using the instrument.

User Notice

Thank you for using the endoscope products manufactured by Yateks. (hereinafter referred to as Yateks). We hope that this product will satisfy you for a long time and be helpful to your work.

Please read the Operating Instructions carefully before operating this product. If you have any questions, please consult our technical staff before using it to avoid equipment damage or loss of personnel or property.

If you encounter any problem that you cannot handle during use, please consult our engineers or dealers. We will do our best to provide fast and effective after-sales service and do our best to avoid affecting your work.

Danger

- 1) It is strictly forbidden to use this instrument to detect humans and animals.
- 2) It is strictly forbidden to use or store it in explosive places, strong electromagnetic fields, or places with flammable gases.
- 3) It is strictly forbidden to work on the observed object when it is energized.

Warning

- 1) If the instrument is disassembled or modified without authorization, Yateks will not provide warranty or repair services.
- 2) Do not allow liquids other than water to come into contact with the insertion tube, as this may cause damage to the insertion tube.
- 3) Before packing the instrument into the carrying case, be sure to turn off the power.
- 4) Do not directly touch the lens of the insertion tube during use.

Touching the lens after use in a high-temperature environment may cause burns.

- 5) If smoke or abnormal noise is detected, stop using the instrument immediately and turn off the power.
- 6) Do not look directly at the light emitted from the front end of the insertion tube at a close distance to avoid the strong light affecting your vision.
- 7) If any abnormality occurs during the angle adjustment operation, stop using the instrument immediately and turn off the power.
- 8) The touch screen glass is fragile. Do not press the touch screen with sharp objects! The touch pressure should not exceed 120g!

Precautions

- 1) Do not use beyond the operating temperature range.
- 2) Do not excessively bend, twist, or fold the insertion tube.
- 3) Be sure to use the power adapter provided by Yateks.
- 4) When removing the insertion tube from the object under observation, do not remove it forcibly and pay attention to the following matters:
 - a) When the angle is locked or partially bent, do not withdraw the insertion tube directly from the observation object. Adjust the insertion tube to a straight position before withdrawing it.
 - b) During the withdrawal process, if the insertion tube is stuck, gently move the joystick and withdraw it when the insertion tube is straightened.
- 5) When the instrument is operated, the bend of the front end should be reset, and the camera should not be controlled in one direction for a

long time, as this will put the instrument in a high-load state and affect its service life.

- 6) Please pay attention to the following when operating the front end of the insertion tube:
 - a) Do not subject the tip of the insertion tube to severe impact or strong pulling.
 - b) Do not subject the angled portion to severe impact or sharp bending, as this may cause damage to the lens and precision components at the front end of the tube and the angled portion.
- 7) Wipe the lens clean with alcohol or acetone before use to prevent dirt from hardening, corrosion and deformation.
- 8) If you feel anything unusual while performing angle bending operations, do not apply force, as this may result in damage to the insertion tube or the observation object.
- 9) Never allow metal objects or foreign matter to enter the main unit through the connectors or other openings. This may result in malfunction or electric shock.
- 10) Do not strongly impact, press, or scratch the LCD screen with hard or sharp objects, otherwise the LCD screen may be cracked or scratched.
- 11) Do not cover the main unit with plastic bags or other objects during use, as it may cause overheating inside the instrument and damage it.
- 12) plugging or unplugging the quick connector, please pay attention to align it in the direction of the red dot and do not use force blindly.
- 13) Do not store the instrument in the following environments;

otherwise, the instrument may be damaged.

- a) In an environment with high temperature, high humidity, and a lot of dust or particles.
- b) Places exposed to direct sunlight or radiation.
- c) Places containing halide gases.

How to deal with batteries

Observe the dangers, warnings, and precautions described below when handling batteries.

Danger

- 1) If operating with Li-ion batteries, be sure to use batteries and battery chargers designed for this instrument.
- 2) Never use batteries with the electrodes reversed.
- 3) Never connect the battery electrodes to each other with metal objects, and do not carry or store batteries and metal objects together. The battery may short-circuit and generate heat, catch fire or explode.
- 4) Never throw the battery into fire or heat the battery. Otherwise there is a risk of explosion.
- 5) Do not attempt to open or modify the battery. There is a risk of explosion or fire.
- 6) Do not immerse the battery in liquids such as fresh water or salt water, and do not allow the battery to get wet, as this may damage the battery and the protection circuit, otherwise it may generate heat, smoke, catch fire or explode.
- 7) Do not store or use the battery near open flame or direct sunlight. Otherwise there is a risk of explosion or fire.

- 8) Do not puncture the battery or subject it to strong impact or heavy pressure. Do not drop or throw the battery or subject it to severe impact. Doing so creates the risk of fire or explosion.
- 9) Place the device on a stable surface to remove the battery. If the device is not stable, the battery may fall, causing an explosion and fire.

⚠ warn

- 1) Do not use batteries other than those for this instrument .
- 2) Please use the dedicated charger for this instrument to charge.
- 3) Do not use batteries that have abnormal conditions, such as leakage, discoloration, deformation, or abnormal conditions. Stop using or have them repaired immediately.
- 4) If battery fluid comes into contact with your skin or clothing, wash it off immediately with clean water such as tap water. Otherwise, skin injury may occur. If necessary, seek medical attention immediately.
- 5) Keep away from flammable objects during charging and do not cover the battery charger with flammable objects.

⚠ Precautions

- 1) Do not use or store the battery in a high temperature environment, such as in direct sunlight, in a closed car in the sun, or in front of a heating device.
- 2) long-term operation of the instrument . Do not remove the battery immediately after use to avoid burning your hands.
- 3) Keep batteries out of the reach of children.
- 4) Do not place the battery in a humid, leaking, or extremely high or

low temperature environment.

- 5) Do not touch the battery terminals with wet hands.
- 6) Charge the battery before using it for the first time after purchase or before using it again after a long period of non-use.
- 7) If the instrument is not used for a long time, be sure to remove the batteries from the instrument . Otherwise, battery leakage or heat accumulation may cause fire or personal injury.



hint

- 1) Please use the battery properly, as improper use may cause leakage, excessive heat generation and damage. When replacing the battery, check the insertion direction and insert it correctly.
- 2) The performance of batteries generally decreases as the ambient temperature decreases. Please note that the battery performance that is reduced due to low temperature can be restored when the temperature rises to normal levels.
- 3) When the battery reaches the end of its life, be sure to recycle it according to local regulations.
- 4) Recommended temperature range for Li-ion battery operation.
Discharge (when using the instrument): 0°C ~ 40°C;
Charging: 0°C ~ 40°C;
Storage: -10°C ~ 50°C.
- 5) Using the battery outside the above temperature range may result in reduced performance and life. When storing batteries, always remove them from the instrument .

- 6) Batteries are consumables.
- 7) The product images and displayed contents in the manual are for illustration only. The actual product effects (including but not limited to appearance, color, size) and displayed contents (including but not limited to background, UI, illustrations) may differ. Please refer to the actual product.
- 8) In order to provide as accurate product information, product parameters, and product features as possible, Yateks may adjust and revise the text descriptions, picture effects, and other contents in the manual to match the actual product performance, specifications, parameters, parts, and other information. Due to real-time changes in product batches and production suppliers, if the above modifications and adjustments are necessary, we will not specifically notify you. Please refer to the real-time information on the official website.

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Contents

3D MEASUREMENT	I
INDUSTRIAL VIDEO BORESCOPE	I
1 PRODUCT OVERVIEW	5
2 PARAMETER DEFINITION	6
3 MAIN PERFORMANCE PARAMETERS.....	6
4 PURPOSE AND SCOPE OF APPLICATION.....	9
5 WORK ENVIRONMENT	9
6 NAMES AND FUNCTIONS OF EACH PART OF THE INSTRUMENT.	11
7 PREPARATION AND TESTING BEFORE OBSERVATION	13
7.1 CARRYING OF CASES	13
7.2 INSTALL THE INSTRUMENT	15
7.3 READY TO CHARGE	17
7.4 CHECK THE INSERTION TUBE.....	18
7.5 INSTALL THE OPERATING HANDLE ON THE HOST.....	19
8 BASIC OPERATION	21
8.1 POWER ON	21
8.2 BUTTON AND JOYSTICK FUNCTION DESCRIPTION	21
8.3 MAIN INTERFACE.....	23
8.3.1 Modify the default folder	25
8.3.2 Camera Brightness Adjustment	26
8.3.3 Screen brightness adjustment	27
8.3.4 Zoom function.....	27
8.3.5 Annotation Function	28
8.3.6 Photo /dual camera switch button	30
8.3.7 Video Recording.....	32
8.3.8 Preview	33

8.3.9 Function	34
8.3.10 Measurement	42
8.3.11 System Settings	43
8.3.11 Screen Recording.....	43
8.4 3D MEASUREMENT	44
8.4.1 Point Cloud/3D	46
8.4.2 View Selection	47
8.4.3 Adding Measurements	47
8.4.4 Exporting PLY.....	48
8.4.5 Point to Point	49
8.4.6 Distance from point to line.....	49
8.4.7 Point-to-surface distance (depth).....	50
8.4.8 Line segment measurement	51
8.4.9 Area measurement.....	52
8.4.10 Profile	53
8.4.11 AREA PROFILE--- DEPTH PROFILE	54
8.4.12 AREA COMPENSATION --MISSING CORNER.....	55
8.4.11 Return to the superior menu	57
8.4.12 Reset Measurement	57
8.4.13 Return.....	57
8.4.14 Save	57
8.4.15 Point cloud display.....	57
8.5 SYSTEM SETTINGS	58
8.5.1 Language	60
8.5.2 Theme.....	60
8.5.3 Time.....	61
8.5.4 Audio	62
8.5.5 Video Format	62
8.5.6 Image Format.....	63
8.5.7 File management.....	64
8.5.8 Image name format settings	64

8.5.9 External Storage	65
8.5.10 Software Update	66
8.5.11 Menu Settings.....	67
8.5.12 Button Settings.....	68
8.5.13 Annotation Settings.....	69
8.5.14 Screen off time setting.....	70
8.5.15 Automatic shutdown settings	70
8.5.16 3D Assistive Tools/3D measure effective area	71
8.5.17 Enhanced parallax settings/3D algorithm selection.....	73
8.5.18 Camera temperature setting (optional function).....	73
8.5.19 Light source settings (optional function)	74
8.5.20 WIFI settings.....	75
8.5.21 Administrator Settings	79
8.5.22 About.....	80
8.5.23 Camera angle setting (hidden function)	81
8.5.24 Export crash log (hidden function).....	81
8.5.24 Export crash log (hidden function).....	82
8.6 IMAGE BROWSING	83
8.6.1 Folder Management.....	85
8.6.2 Photo and video browsing	87
8.6.2 Export report	93
8.7 HDMI OUTPUT	95
8.7.1 Touch screen function introduction.....	95
8.7.2 Data Transmission	96
8.7.3 Computer Synchronous Image.....	96
8.8 STEERING LINE OPERATION GUIDE	97
8.8.1 Checking the Angle Bending Function	97
8.8.2 Normal Mode.....	97
8.8.3 Fine-tuning mode.....	97
8.8.4 Step Mode	98
8.8.5 Optical Adapter Installation (Only for Interchangeable Lens Series)	99
8.8.6 Insertion of the insertion tube.....	100

8.8.7 Removing the insertion tube.....	102
9 INSTRUMENT STORAGE AND MAINTENANCE.....	102
9.1 CLEANING	102
9.2 REPACKING	104
9.3 STORAGE PRECAUTIONS	105
10 TROUBLESHOOTING.....	106
10.1 TROUBLESHOOTING GUIDE	106
10.2 INSTRUMENT REPAIR	108
11 INSERTION TUBE RIGID SLEEVE INSTRUCTION MANUAL.....	110
12 EXTERNAL USE STANDARDS	112

1 Product Overview

This instrument is mainly composed of five parts: camera module, insertion tube, host, LCD screen, and operating handle. It is a new type of non-destructive flaw detection instrument that integrates optics, precision machinery, electronic machinery, electronic technology, and microscopic camera technology. It is often used to detect internal surface defects that cannot be touched by the naked eye.



Figure 1-1 -1 Three-dimensional measurement industrial video endoscope

It adopts 7"IPS high-definition LCD touch screen with a resolution of up to 1920*1200 and touch screen function, which is fast and convenient to operate. It adopts the patented technology of Yateks Company, which can realize 360 ° all-round rotation of the probe, realize long-distance image transmission, and can enter deeper pipeline inspection. The powerful graphics processor technology makes the image and video processing algorithm faster, making

the image clearer and smoother. With measurement function, it can generate 3D point cloud map, depth map, profile map, etc. to reproduce the appearance contour of the measured object. The three-dimensional point cloud map can be scaled and rotated, etc., to verify the accuracy of point selection in real time and avoid inaccurate measurement results caused by wrong point selection .

2 Parameter Definition

In order to meet the needs of different environments, users can select insertion tubes according to actual needs. The selection of insertion tubes mainly includes parameters such as tube diameter , length , lens , depth of field, etc. For specific parameters, please contact our sales staff.

3 Main performance parameters

Modules	name	illustrate
system	size	364*198.5*132.5mm
	weight	<2kg (with 2m probe)
	monitor	7-inch IPS, 1920*1200, industrial HD touch LCD screen
	Key Features	Photographing, video recording, Screen recording, light source brightness adjustment, screen brightness adjustment, zooming in and out, screen flipping, inverting, screen freezing, color mode adjustment, display ratio, grid measurement, automatic white balance, image browsing, lock fine-tuning, menu, support

		point-to-point, point-to-line, point-to-surface, profile, etc. measurement
	Joystick control	Electric joystick 360 °all-round camera guidance
	Guidance control	Lockable fine-tuning, stepping, fast and slow speed adjustment, automatic reset
	Memory	Built-in 128G + extended 64G external storage (up to 256G)
	Data I/O Ports	2 USB host "A" ports, Type-C port, headset port
	Video Output	Mini HDMI interface, WIFI interface
	Battery	Removable, independently rechargeable battery pack
	Standby time	≥ 4 hours
	How it works	The host and the operating handle can be separated, and one host can be equipped with multiple sets of handles
software	operating system	Multi-tasking intelligent operating system, menu and button operation
	user interface	Touch screen operation menu
	File Management	Supports picture/video playback, deletion, formatting, and renaming, export report
	Image Control	Zoom, playback
	Negative function	Dynamic Negative
	Digital Zoom	1-2.5 times (zoom ratio can be set according to customer requirements)
	Image Control	Freeze the picture and flip the image
	Video Tags	Video mark location, can quickly locate, can pause the video (continue recording after taking a

		photo)	
	Image Format	JPG, PNG (recording date and time)	
	Video Format	AVI, MP4 (recording date and time)	
	language	Simplified Chinese, English, French, Spanish, Russian, Japanese, Korean, Traditional Chinese, German, Portuguese	
	Color settings	Close, medium, long, custom color modes	
	White Balance	Automatic white balance, manual white balance	
	Measurement	Measurement error	≤5%
		Standard measurement accuracy	±0.05mm
		Repeatability	±0.01mm
	Text Annotation	With the function of adding text annotations, the endoscopy images can be annotated at any time according to the detection situation, which is convenient for later report generation	
	Software Upgrade	via USB flash drive upgrade package	
Lens and insertion tube parameters	Camera pixels	160,000 ~ 2 million	
	Lens outer diameter	0.8mm \1.1mm\1.7mm\ 2.2mm \2.8mm\4mm\6mm\8.4mm	
	Depth of Field	According to the selection	
	Illuminance	According to the selection	
	Insertion tube length	1 ~ 10 meters can be customized	

insertion tube parameters	Insertion tube process	Tungsten Alloy Wire Braided 4 Layer Tube
	Camera Turn	360 °electric rotation
	Maximum bending angle	180 °
	Replaceable pipeline	Pipeline can be replaced within 10S
Operating Environment	Host operating temperature	Temperature -10 ~ 50℃
	Probe operating temperature	Temperature -20 ~ 70℃
	Relative humidity	Up to 90%, non-condensing
	water proof	Probe IP67

4 Purpose and scope of application

This instrument is widely used in aviation, automobile, shipbuilding, electrical, chemical, power and other core industrial production, maintenance and other links. It has the characteristics of direct visualization, and can directly observe whether there are defects or abnormalities on the inner surface of large devices such as pipelines, turbines, cylinders, engines, etc. It can take real-time photos and record videos, providing indispensable data for analyzing the use status of equipment and ensuring equipment production.

5 Work Environment

Host operating temperature	-10 ℃ ~ 50 ℃
----------------------------	--------------

Insertion tube operating temperature	-20°C ~ 60°C
Storage temperature	-10 °C ~ 40 °C
Probe is dust and water resistant	Probe : IP67

6 Names and functions of each part of the instrument

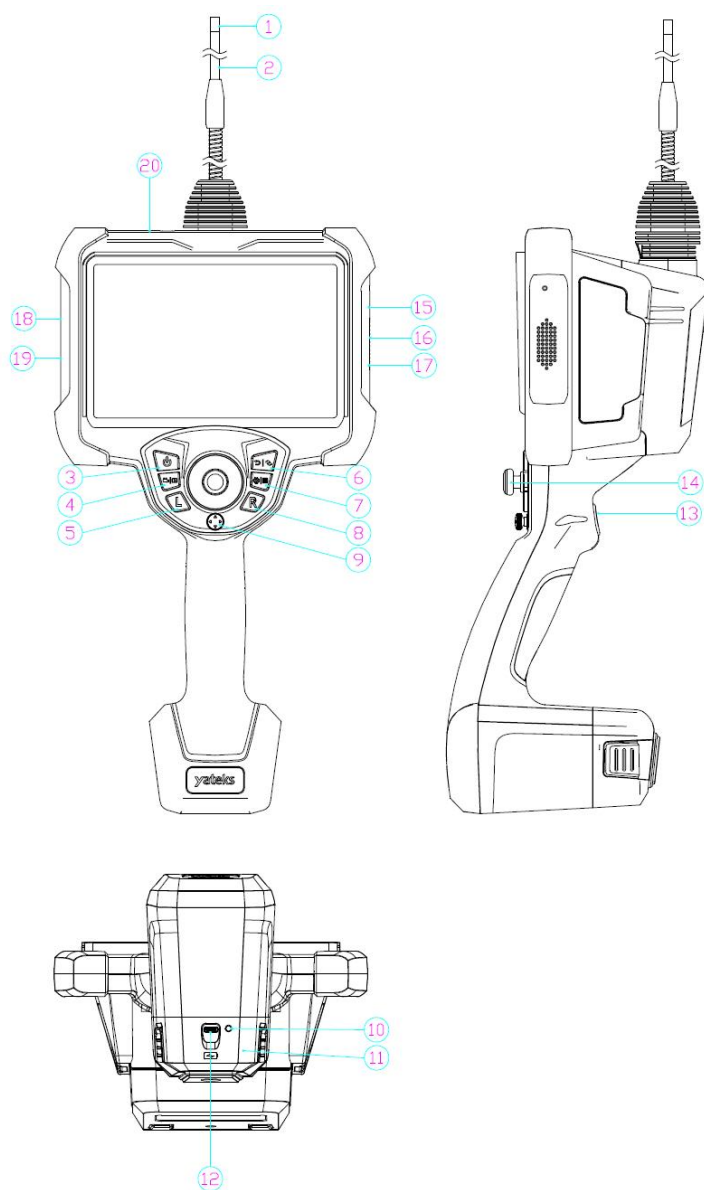


Figure 6-1-1 Host

The names and definitions of each component are as follows:

Serial number	name
①	Camera
②	Insertion tube
③	Host power key
④	Video /Picture Preview Button
⑤	Left custom key
⑥	Guidance speed switch/guidance mode switch/return key
⑦	Settings/Folder Browse Keys
⑧	Right custom key
⑨	Mini joystick
⑩	Battery pack power indicator
⑪	Battery Pack
⑫	Type -C charging port
⑬	Take photo /switch dual camera button
⑭	Articulation direction joystick
⑮	Headset jack
⑯	USB 2.0
⑰	USB 2.0
⑱	Mini HDMI interface
⑲	Type- C data interface
⑳	Type- C data interface

7 Preparation and testing before observation

7.1 Carrying of cases

Notice

- Before moving the box, please check whether there are any abnormalities on the handles, buckles, etc. of the box.

- Please use the standard box to prevent the instrument from being damaged.

■ When using the handle

- 1) Make sure the clasps are firmly closed before lifting the case.
- 2) Rollers can be used to move on flat areas.

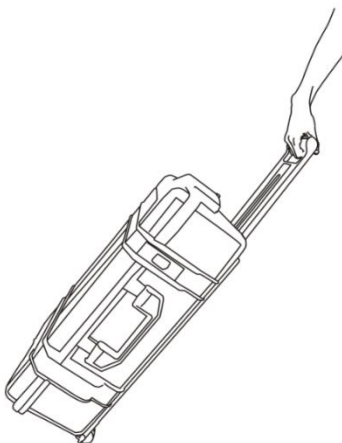


Figure 7 -1 -1 Box handling

Notice

- If the clasp is not fully closed, the lid may accidentally open when lifting the case.

- Do not kick or move the boxes.

■ Take the instrument out of the box

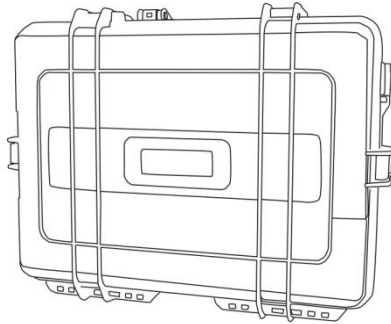


Figure 7-1-2 Taking out the instruments from the box

⚠ **warn**

- The box cover must be fully opened before taking out the instrument to prevent the box cover from closing automatically and causing an accident.

- Do not operate the host in a box to prevent the box cover from closing accidentally and pinching your hands or signal cables.

⚠ **Notice**

- Lay the box horizontally so it remains stable.
- Before opening the case lid, release the clips on the front of the case.
- When removing the insertion tube from the box, be careful to handle it with care. If you use too much force, the insertion tube may be damaged.
- When taking the operating handle or main unit out of the box, do not use the insertion tube or signal cable to secure it.
- Check whether the insertion tube, main unit and operating handle

quick connector are clean. If there is any foreign matter, wipe it clean with a dust-free cloth.

7.2 Install the instrument

When in use, the following instrument disassembly modules are required : battery pack, main unit, and handle pipeline.

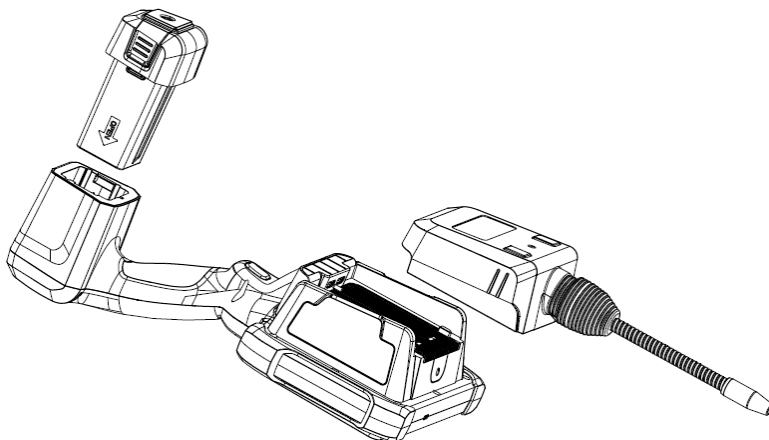


Figure 7-2-1 Removable instrument modules

- 1) As shown in the figure above, first place the host horizontally , align the I-shaped groove of the operating handle with the U-shaped groove of the host, and press the front of the host vertically downward to press the operating handle into the U-shaped groove.
- 2) As shown in the above picture, align the battery pack with the host battery pack position and tighten the clip.

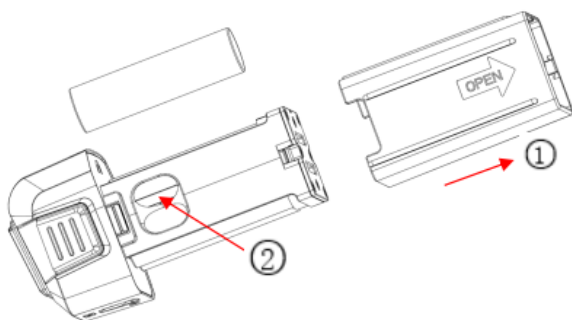


Figure 7-2-2 Removable and install battery pack

- 3) As shown in Figure 7-2-2, remove the battery pack, one hand holds the bottom of the battery pack, another hand pulls out the battery cover as the arrow direction of ①.
- 4) As shown in Figure 7-2-2, when the battery cover is removed, place fingers into the location of ② to push the batteries out from the battery compartment.

⚠ Notice

- Place the console horizontally to keep it stable.
- Do not place the instrument in a high place to prevent it from falling and getting damaged.
- During use , please fix the handle in a place that can support its weight.

7.3 Ready to charge

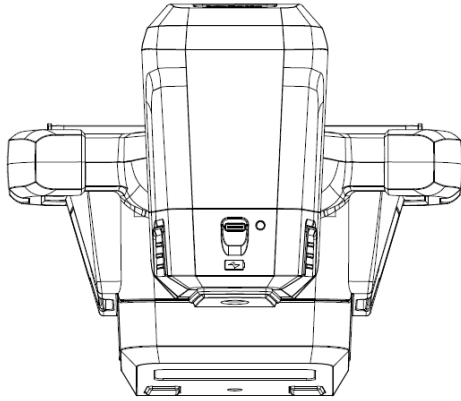


Figure 7 - 3-1 Open the battery

■ Battery Pack Charging

- 1) Take out the power adapter and connect it to the Type- C charging port of the battery pack ;
- 2) Make sure the power cable is connected to the Type- C charging port ;
- 3) Plug the power cord into an electrical outlet ;
- 4) Red light on indicates charging is in progress, and when the green light is on, charging is complete .

⚠ Warn

- Please check whether the power cord is intact before use.
- The input voltage of the power adapter is 100 - 240 V (50/60 Hz) AC. Connecting to an outlet that does not meet the rated voltage may result in fire or electric shock.
- Do not use a non-dedicated power adapter, as it may cause the

instrument to malfunction or be damaged.

- The power adapter is not waterproof and may cause electric shock if it comes into contact with water.

- Charging input voltage: 12V; current: 3A.

7.4 Check the insertion tube

■ Check the appearance of the insertion tube

1) Observe that the outer material of the entire insertion tube and signal cable is intact.

2) Check if the outer covering material of the insertion tube (not the angled bend part) is loose.

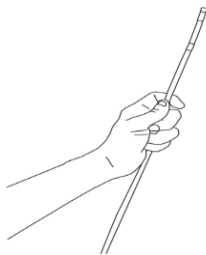


Figure 7 - 4-1 Check the appearance of the insertion tube

⚠ Notice

- If the insertion tube is deformed, it may not be possible to remove it from the observation object.

- If the outer material of the insertion tube is damaged, use caution to avoid injury.

■ Check the front end of the insertion tube

1) Make sure the power is off.

2) Remove the end cap from the front end of the insertion tube.

3) If you find any foreign matter on the lens , please clean it with a dust-free cloth, cotton swab or brush.



Figure 7 - 4-2 Lens Cleaning

⚠ Warn

- Internal heating caused by electrical components can make the tip of the insertion tube hot. Before wiping the lens, turn off the light source and wait until it cools down before touching it.

⚠ Notice

- The lens used is covered with dust or water, the optical adapter or the tip of the insertion tube may be damaged.

- The angle bending part is composed of precision parts. Do not pull the front end of the insertion tube or manually force the front end of the insertion tube to bend, as this may damage the parts of the angle bending part.

7.5 Install the operating handle on the host

The operating handle can be installed on the instrument as needed for easy carrying and observation.

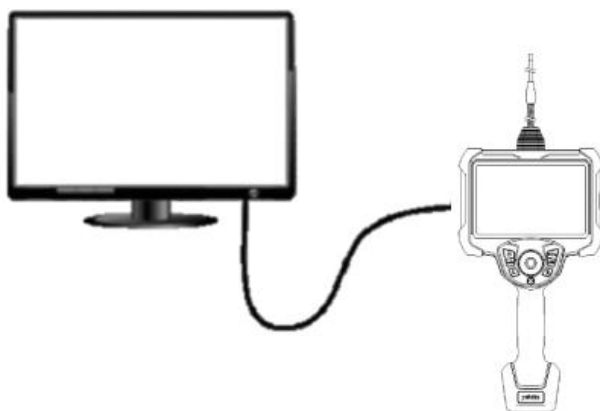


Figure 7-5-1

1) Align the I-shaped groove of the operating handle with the U-shaped groove of the host, and press the front of the host vertically downward to press the operating handle into the U-shaped groove.

2) To remove the operating handle from the instrument, place the instrument vertically, pull the lock outward and hold the front end of the handle with your hand, and lift the operating handle upward.

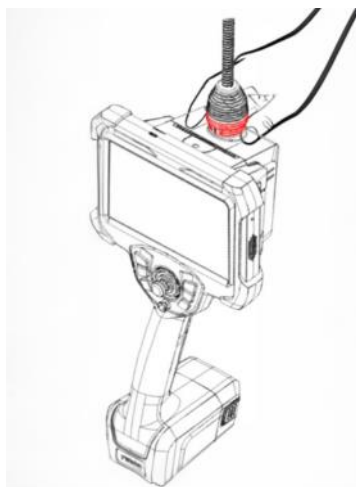


Figure 7-5-2

8 Basic Operation

8.1 Power on

Short press the [Power button] on the upper left corner of the instrument  for 3 seconds. After the button backlight lights up, you can release the power button, the instrument will start, and the real-time image will be displayed .

8.2 Button and joystick function description

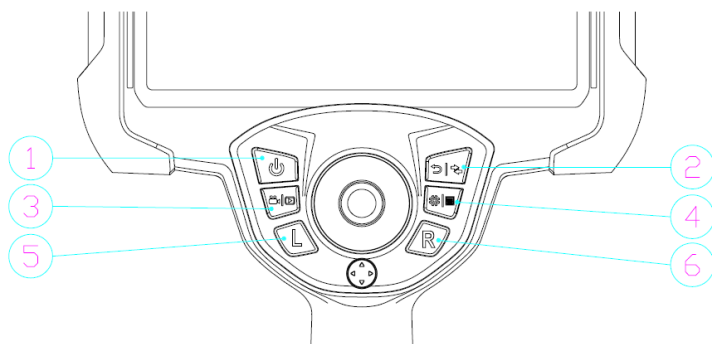


Figure 8-2- 1 Button Diagram

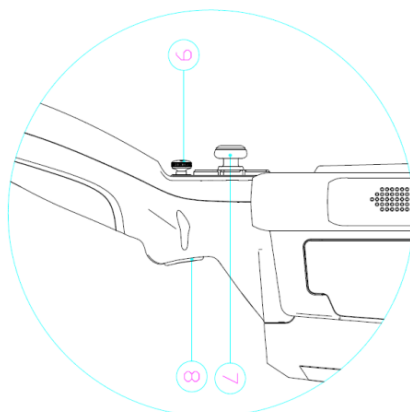


Figure 8-2-2 Button diagram

The names and modes of the buttons in Figures 8-2-1 and 8-2-2 are shown in the table below.

Serial number	name	method	Main Interface	Other interfaces
①	Power on/off	Short press	-	
		Long press	Long press for 3s to turn on/off	
②	Guidance speed switch /guidance mode switch/return	Short press	Switch joystick speed	Return
		Long press	Switch joystick mode	-
③	Video/Picture Preview Button	Short press	Start/Stop Recording	-
		Long press	Jump to the image preview interface	
④	Settings/Folder Browse	Short press	Jump to the settings interface	-
		Long press	Jump to the folder preview interface	
⑤	Customizable buttons on the left	Short press	Customize function in settings	
		Long press		
⑥	Customizable buttons on the	Short press	Customize function in settings	

	right	Long press		
⑦	Joystick	Up, down, left, right	Controlling camera movement	Control cursor movement
		Short press	-	confirm
⑧	Take photo /switch dual camera button	Short press	Take photo	Switch the joystick control area
		Long press	Switch Camera	-
⑨	Mini joystick	Up,down, left, right	-	Control cursor movement (3D interface)
		Short press	-	Confirm the selection of points

8.3 Main Interface

The main interface is divided into four major areas: the top status bar, the bottom menu bar, the left image and video quick preview area, and the right common function area. (As shown in Figure 8-3-1) :



Figure 8-3 -1

The menu settings  in the system settings can be set to automatically hide the bottom menu and all the secondary menu time, after hiding the main interface (Figure 8-3-2), click on the screen to re-display the bottom menu.



Figure 8-3-2

8.3.1 Modify the default folder

Click the default save path of files  `...mulated/0/Default` in the upper left corner of the screen to enter the default folder selection interface (Figure 8-3-3), you can change or create a new  default save path. Long press the folder to select the directory you want to change, and click Confirm to complete the default directory setting.

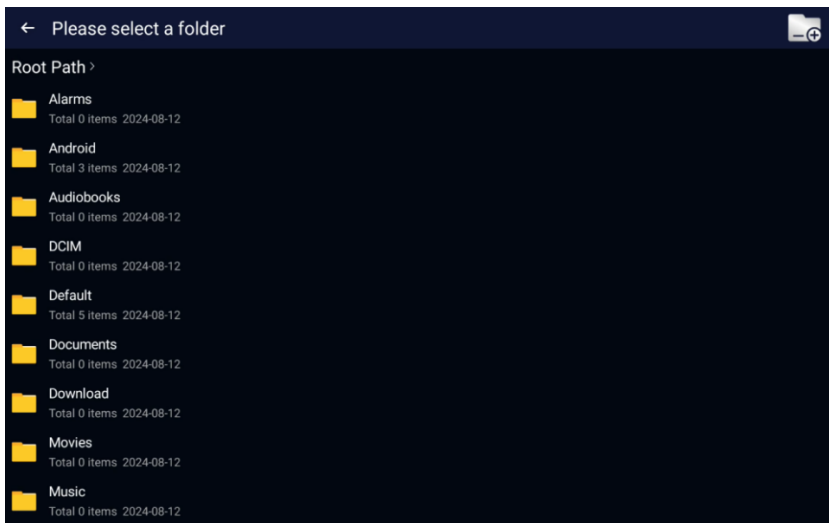


Figure 8-3-3

To create a new folder, click the upper right corner , create the names of each folder, and click OK to complete the creation of the new folder.

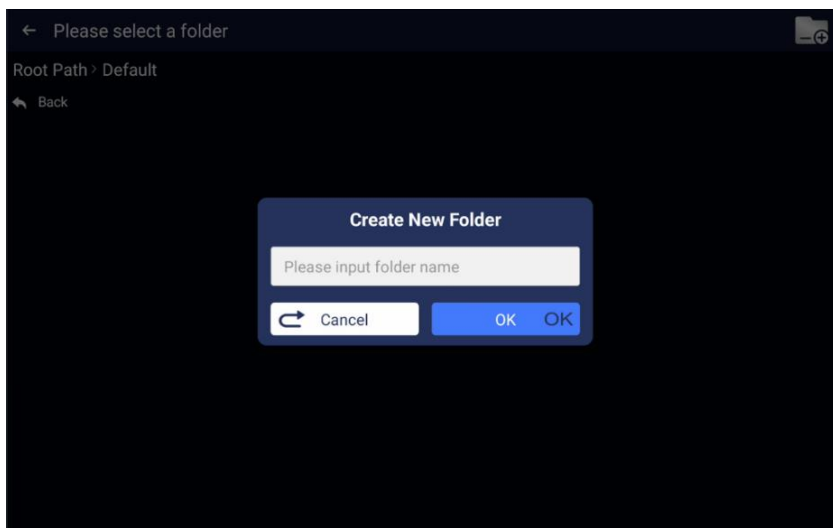


Figure 8-3-4

8.3.2 Camera Brightness Adjustment

Click [Camera Brightness Adjustment] in the upper right corner of the screen and drag to adjust the camera brightness from 0 to 100 levels .



Figure 8-3-5

8.3.3 Screen brightness adjustment

[Screen Brightness Adjustment] icon on the screen (as shown in Figure 8-3-6) to adjust the screen brightness. The brightness levels are divided into 0 to 100.

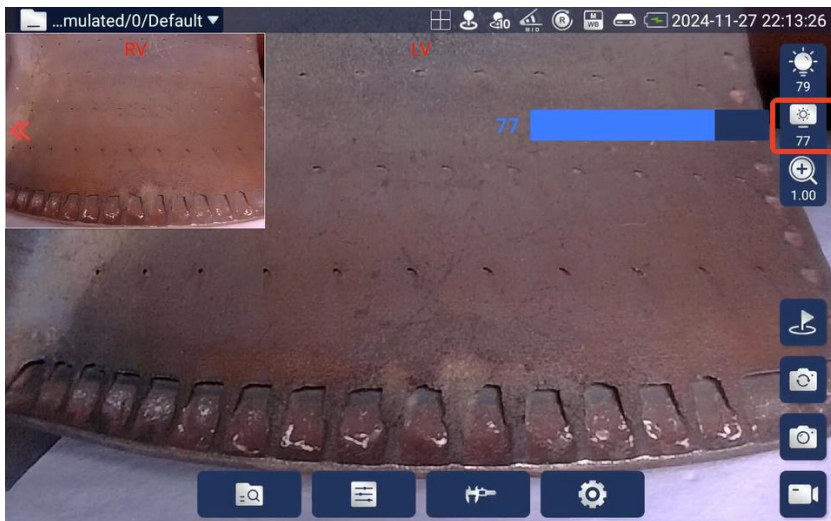


Figure 8-3-6

8.3.4 Zoom function

[Zoom Adjustment] icon on the screen to zoom the real-time preview screen, with a zoom level of 1.00 to 2.50 ; long press the [Zoom Adjustment] icon to customize the maximum zoom level, with a maximum zoom level of 2.50 to 10.00 (as shown in Figure 8-3-7).



Figure 8-3-7

8.3.5 Annotation Function

[Annotation] icon  on the screen to open the notes pop-up window (as shown in Figure 8-3-8). In the notes pop-up window, you can add comments, delete comments, manage comments, add comment icons, add comment text, etc. (as shown in Figure 8-3-9):

Select annotation : Click the drop-down list on the top left to select the annotation you need to add;

Add or modify annotation icon : Click the icon on the bottom left to add or modify the current annotation icon;

Add or edit the current annotation text : Click the input box on the bottom right to add or edit the current annotation text;

Add a annotation : Click the [Add note] icon in the upper right corner to add a note to the note list;

Delete annotation : Click the [Delete Comments] icon in the upper right corner to delete unnecessary comments from the comment list (as shown in Figure 8-3-10);

Annotation settings : Click [Annotation Settings] in the upper right corner to adjust the size/position/color of the annotation

text/icon (as shown in Figure 8-3-11).

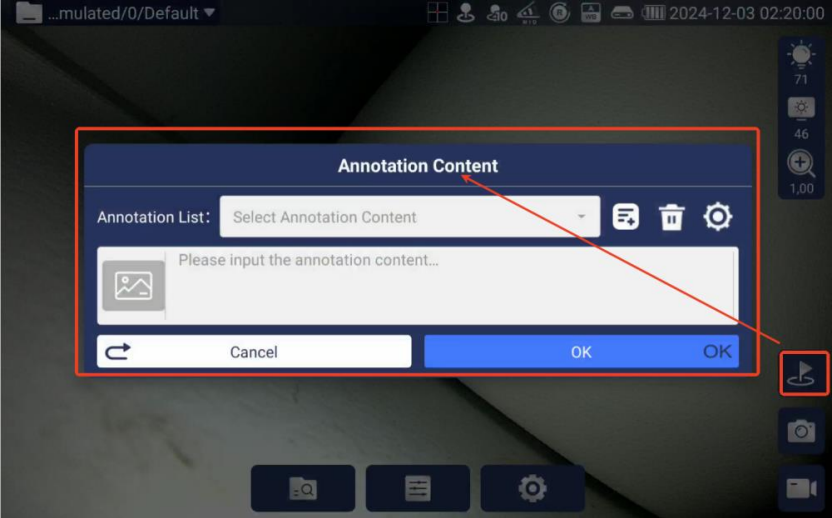


Figure 8-3-8

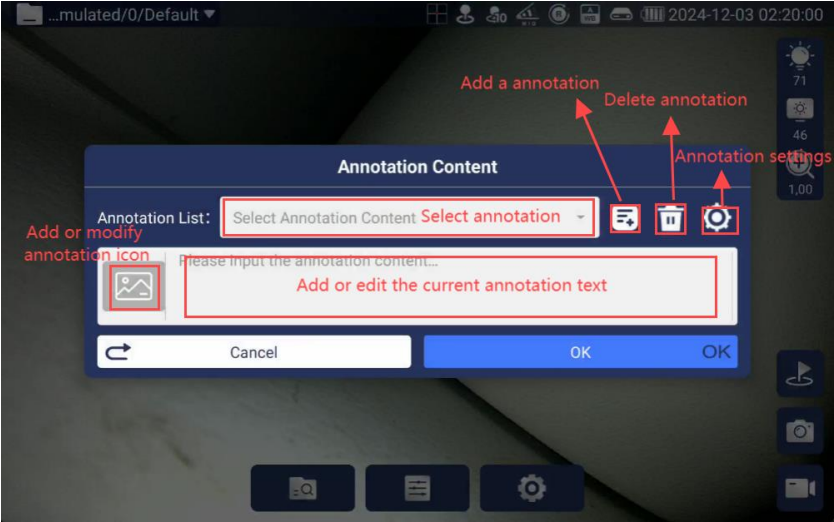


Figure 8-3-9

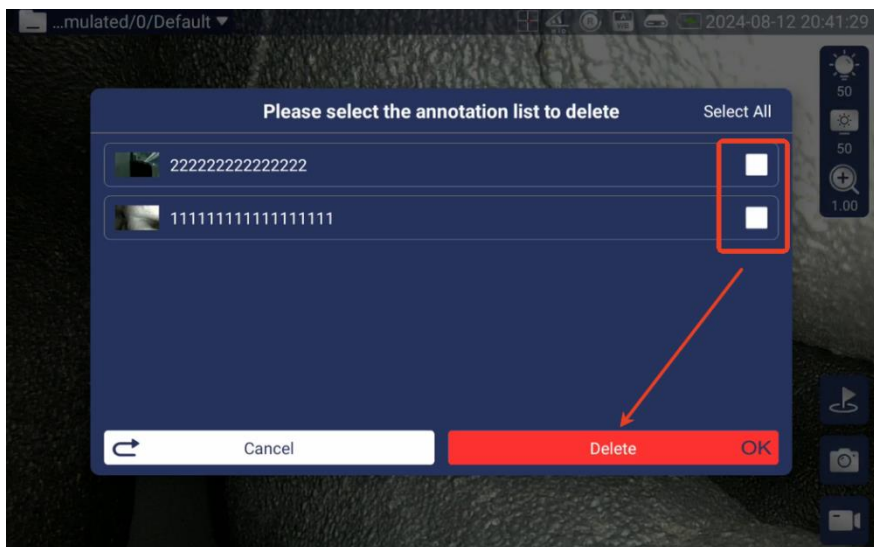


Figure 8-3-10 Comment deletion

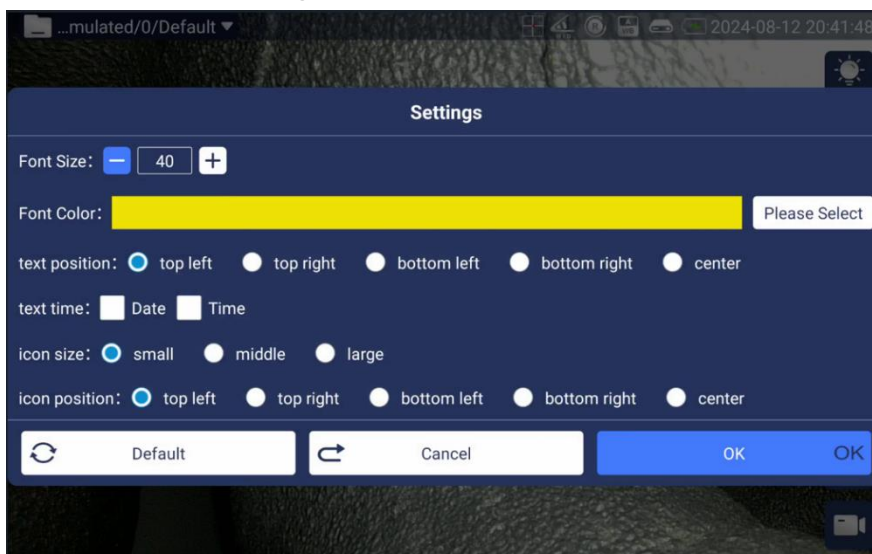


Figure 8-3-11 Annotation settings

8.3.6 Photo /dual camera switch button

Click the dual camera switch button on the right side of the screen to switch the secondary camera in the upper left corner with the main view, making it easier to observe blind area. The current camera number will be displayed

above the image (as shown in Figure 8-3-12) .



Figure 8-3-12

Click the photo icon on the right side of the screen or click the back button to take a photo. After taking the photo, there will be a preview of the current image in the lower left corner. Click the preview to jump directly to the picture details interface (as shown in Figure 8-3-13).



Figure 8-3-13

8.3.7 Video Recording

Click the video icon on the right side of the screen or click the record button to start or stop video recording. During recording, you can click the pause/resume icon to pause/resume video recording (as shown in Figure 8-3-14) . After recording, there will be a preview of the current video in the lower left corner. Click the preview to jump directly to the video details interface (as shown in Figure 8-3-15).

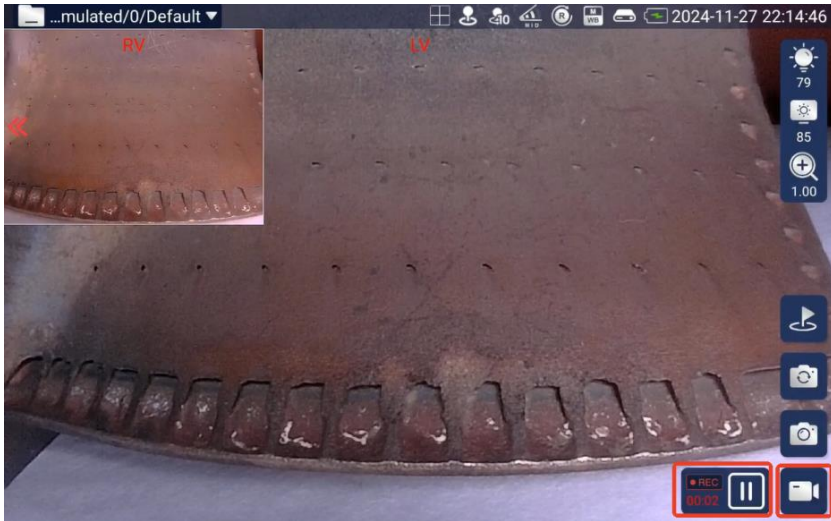


Figure 8-3-14

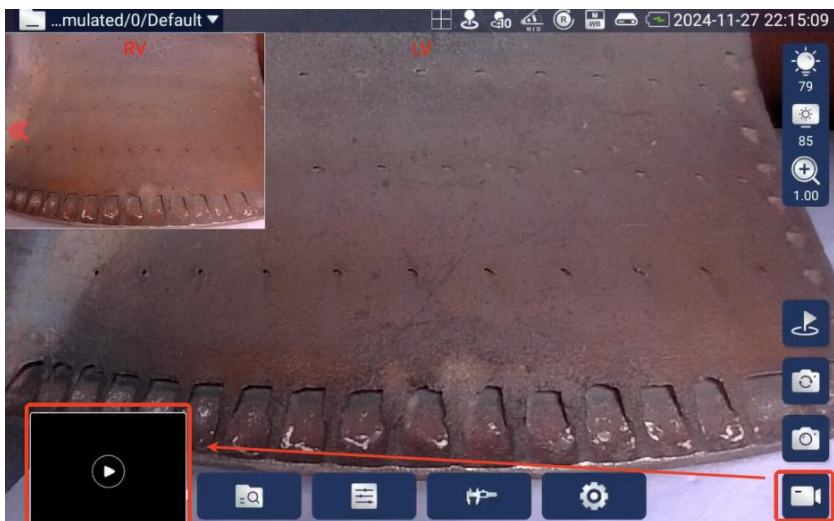


Figure 8-3-15

8.3.8 Preview

Click the [Preview ] button at the bottom of the screen to jump to the preview selection interface. The gallery preview can jump to the default directory where the current pictures and videos are saved. The 3D preview can jump to the default directory where 3D measurements are saved. The file preview can jump to the root directory of the SD card (as shown in Figure 8-3-1

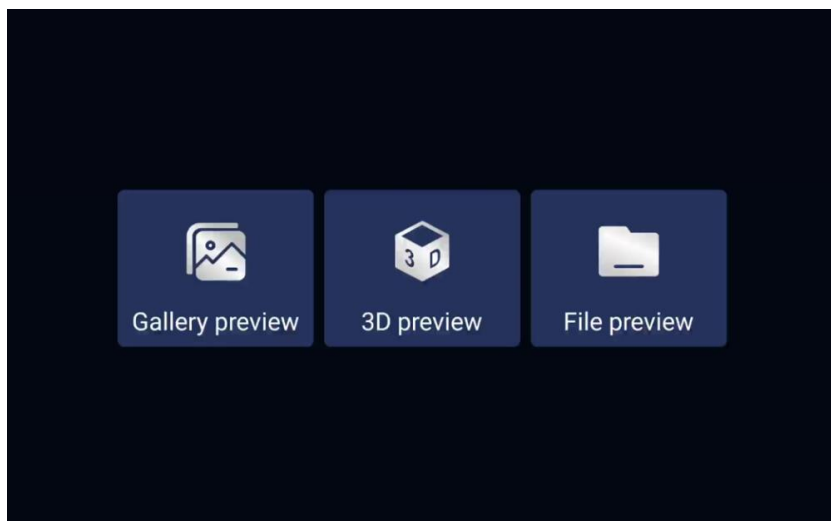


Figure 8-3-16

8.3.9 Function

Click the [Function]  button at the bottom of the screen to expand the function adjustment list. The function list includes the following functions:

Display ratio adjustment: Click the [Display ratio adjustment] icon on the screen to change the display ratio of the image . The display ratio has 3 options: 16:9 , 4:3 and 1:1 (as shown in Figure 8-3-17). The definitions are as follows:

 16: 9 button definition: The ratio of width to height is 16:9, which is a widescreen format. The width of the screen is 1.78 times the height (as shown in Figure 8-3-17).

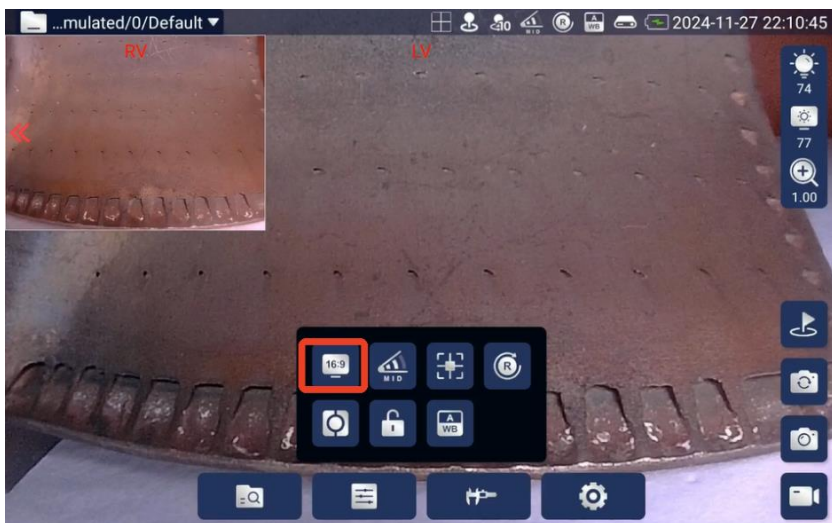


Figure 8-3-17

4:3 4:3 button definition: The ratio of width to height is 4:3, which is a traditional display ratio. The width of the screen is 1.33 times the height (as shown in Figure 8-3-18).



Figure 8-3-18

1:1 1:1 button definition: The ratio of width to height is 1:1, and the

displayed image is a square (as shown in Figure 8-3-19).

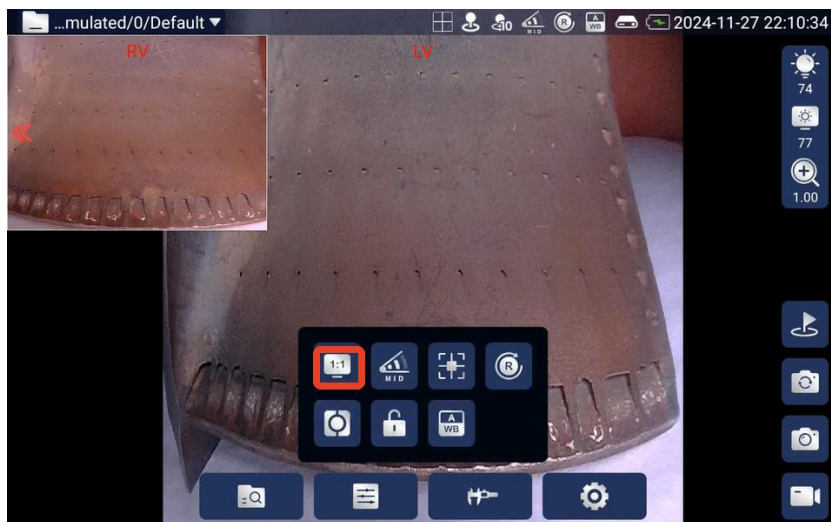


Figure 8-3-19

Color mode adjustment: Click [Color mode adjustment] on the screen, and use the selection buttons on both sides of the icon to change the color mode. The color modes are divided into four types : close mode (CLOSE) , medium mode (MID) , far mode (FAR) , and custom mode (UD) (as shown in Figure 8-3-20) ;



Figure 8-3-20

In the custom mode (UD) , long press the color mode icon to enter the color parameter setting interface , click exposure adjustment to set the exposure time . Select the [Default] button to restore to the factory default settings, and select the [Confirm] button to save the color and return to the main menu (as shown in Figure 8-3-21) .



Figure 8-3-21

Grid measurement: Click the [Grid Measurement] icon on the screen to select grids of different sizes. The grids are divided into three multiples of 1, 2, and 4.

 For a 1x grid, the corresponding side length of a square is 20mm (as shown in Figure 8-3-22) ;

 The grid is doubled, and the corresponding side length of a square is 10mm (as shown in Figure 8-3-23) ;

 It is a 4-fold grid, and the corresponding side length of a square is 5mm (as shown in Figure 8-3-24) ;

The grid allows users to estimate the size of specific objects .

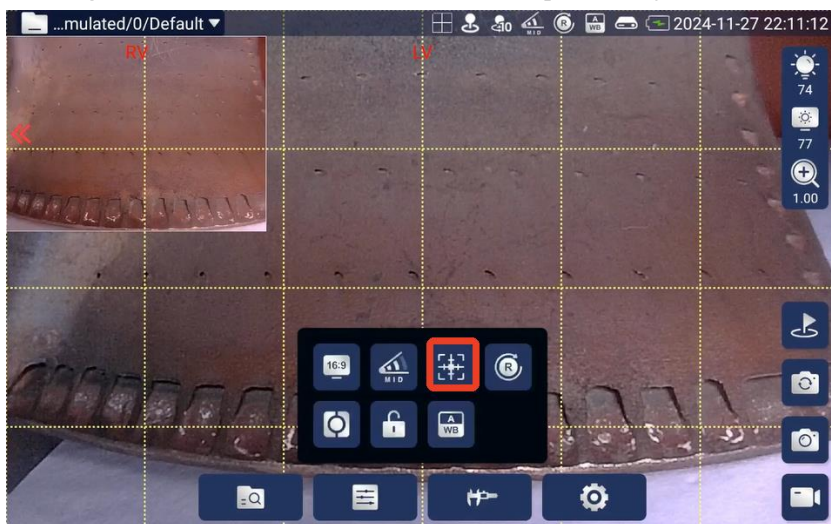


Figure 8-3-22



Figure 8-3-23

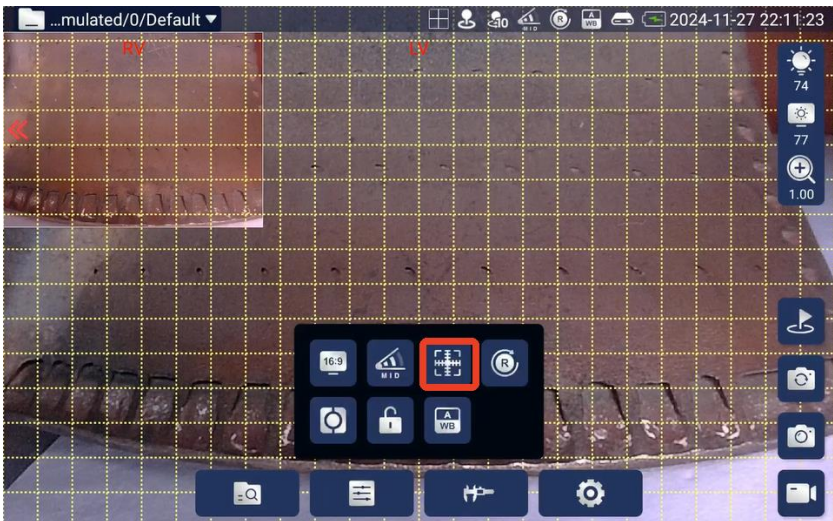


Figure 8-3-24

Flip adjustment: Click [Flip adjustment] on the screen, and use the selection buttons on both sides of the icon to flip the real-time monitoring interface (as shown in Figure 8-3-25). There are six modes:

 This is the actual screen, default setting;

-  180 °based on the actual image ;
-  It is a left-right mirror image based on the actual picture;
-  It is a mirror image up and down based on the actual picture ;
-  90 °based on the actual image ;
-  270 °based on the actual image .

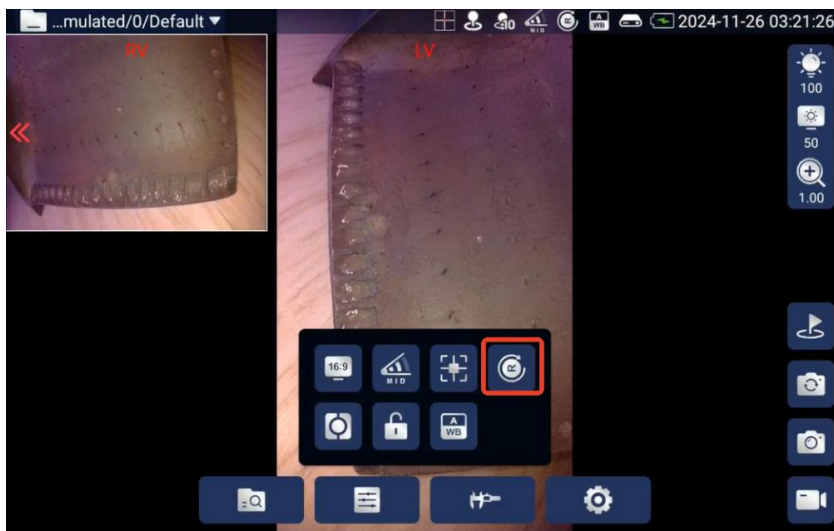


Figure 8-3-25

Invert: Click the [inverse color function]  icon on the screen to invert the real-time monitoring interface (as shown in Figure 8-3-26) ;



Figure 8-3-26

Freeze: Click the [Freeze Function]  icon on the screen (as shown in Figure 8-3-27) to freeze / unfreeze the real-time monitoring interface ;

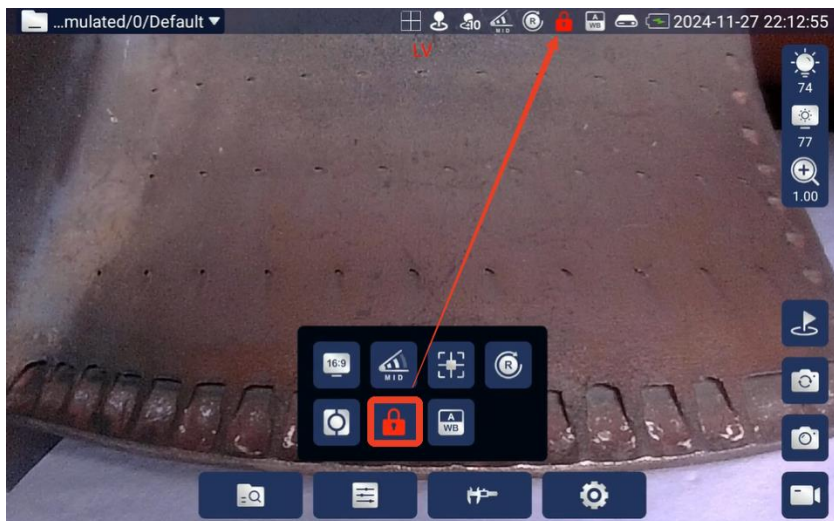


Figure 8-3-27

White balance adjustment: Click the [White balance adjustment] icon on the screen (as shown in Figure 8-3-28) to adjust the white balance of the

real-time monitoring interface. The white balance is divided into two modes: automatic white balance [AWB] and manual white balance [MWB] ;

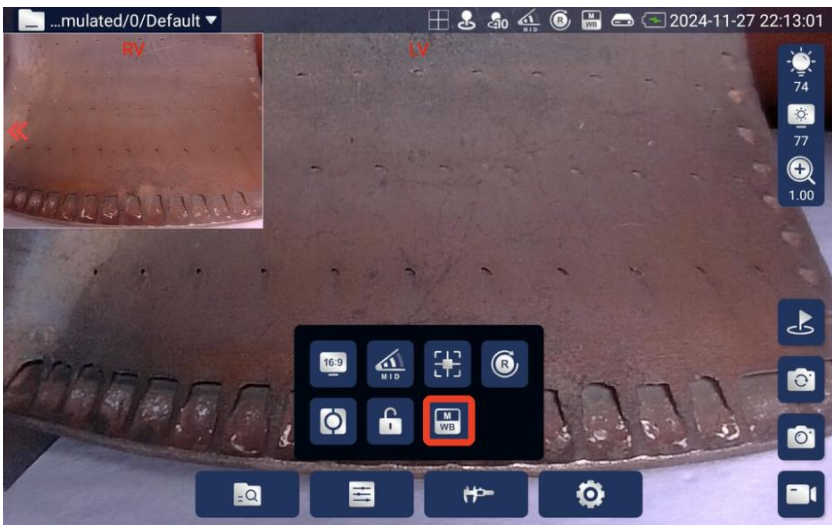


Figure 8-3-28

8.3.10 Measurement

Click the [Measure] button at the bottom of the screen (as shown in Figure 8-3-29) to start taking photos to generate a 3D model and jump to the 3D interface. For detailed instructions, see "8.4 3D Measurement".



Figure 8-3-29

8.3.11 System Settings

Click the [System Settings] icon on the screen (as shown in Figure 8-3-30) to enter the system settings interface. For detailed instructions, see “ 8.5 System Settings ” .

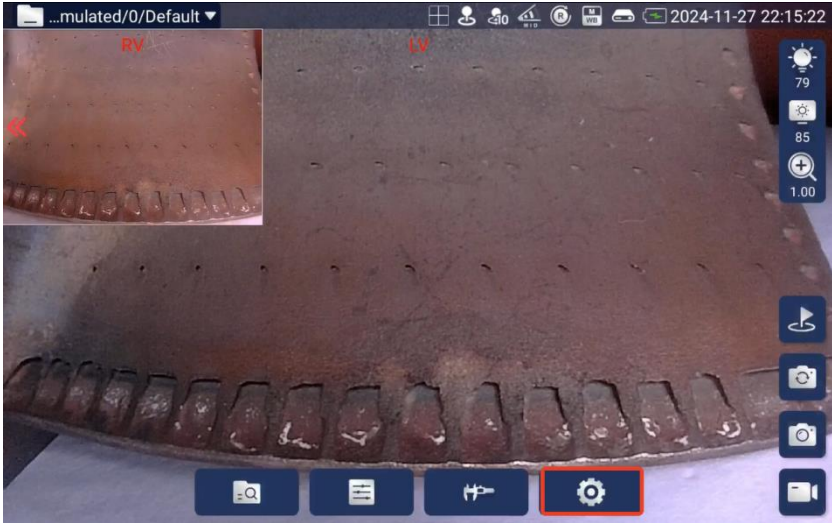


Figure 8-3-30

8.3.12 Screen Recording

Click the [Screen Recording] icon at the bottom left corner of the screen (as in Figure 8-3-31) to enable/disable screen recording. When the screen recording function is on, the status bar will be prompted with a screen recording logo (as in Figure 8-3-32). The screen recording video is saved in the SD card ScreenCapture directory by default, and can be viewed through the file preview.

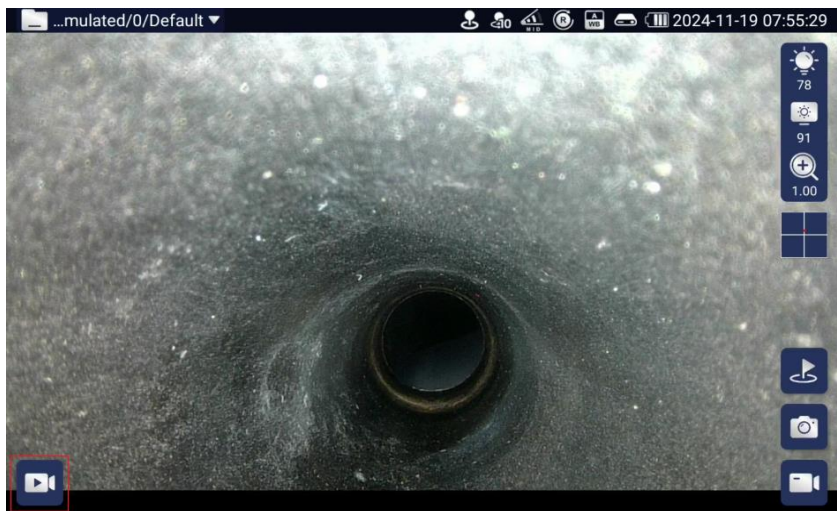


Figure 8-3-31

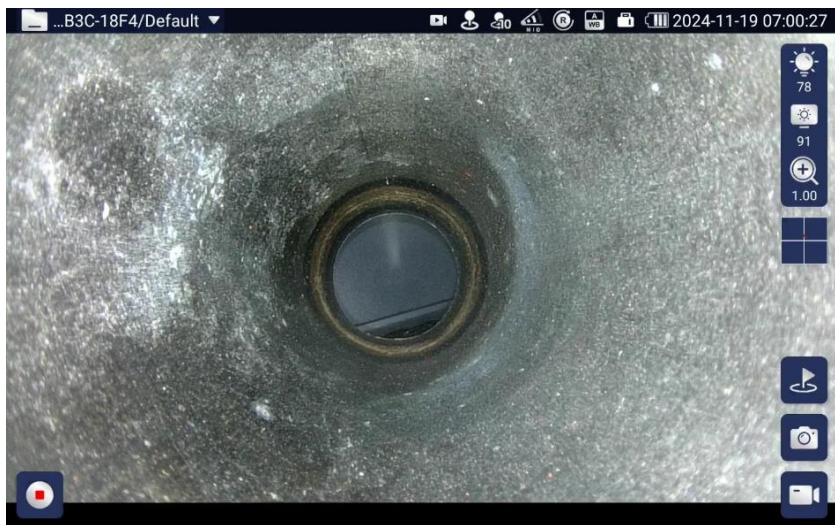


Figure 8-3-32

8.4 3D measurement



Click the 3D measurement icon on the main interface to enter the 3D

measurement interface and perform 3D measurement.

Note: During 3D measurement, the zoom function and flip adjustment should remain in the initial state.

How to enter 3D measurement:

- 1) Aim the camera at the object to be measured and try not to shake the camera too much;
- 2) Click the 3D measurement icon  to enter the 3D measurement interface;
- 3) After clicking the icon, the camera position must be maintained for about 1 second to prevent the image and 3D point cloud generation from failing or having poor results;
- 4) After entering the 3D measurement interface, you need to wait about 5 seconds to generate the measurement image and 3D point cloud map.

The 3D measurement interface is as follows:

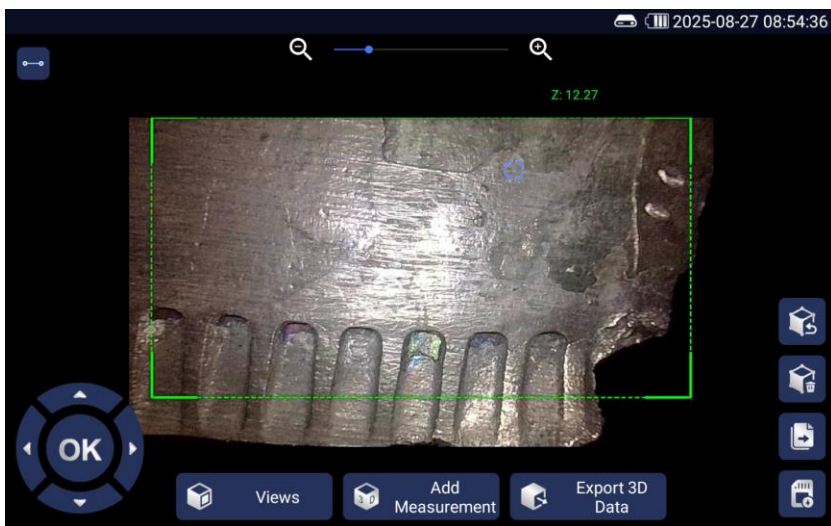


Figure 8-4-1

Before measuring, select the type of measurement method: straight-line distance, point-to-line distance, point-to-surface (depth),

multi-line length, area, section, and click the corresponding icon to make a selection.

Point selection operation method:

Screen touch	Click on the effective position of the measured image on the left, the cursor  will be displayed at the corresponding position, and the coordinate point of the 3D cloud on the right will also be displayed at the corresponding position. You can also select points directly on the 3D cloud map, and adjust the position by moving the virtual joystick up, down, left, and right. Click the " OK " button on the virtual joystick to confirm the point selection. After confirmation, a yellow dot mark will be displayed on the image.
When adjusting the position, the cursor will move with it, and a zoom interface will be displayed in the upper middle . This interface is the zoomed-in area of the image where the cursor is located. This function allows the operator to select the measurement point more accurately. When the point selected is an invalid point, the interface will prompt the operator that the point is an invalid point. When you move the cursor, the depth value (z value) of the measurement point will be displayed in real time. There is a zoom bar on the left image, and it is more convenient to select points when you enlarge the left image. The 3D graph on the right can also be zoomed by clicking on it. Click Screenshot to capture the current interface and save it to the default folder.	

8.4.1 Point Cloud/3D

[ Point Cloud/3D] above the right picture to further calculate and generate a three-dimensional image with better display effect. After successful generation, click again to switch to the initial three-dimensional image effect.

8.4.2 View Selection

Click [View]  and three modes will pop up. The default is the 2D graph on the left (as shown in Figure 8-4-2), and the three-dimensional graph on the right. The other two modes are to display the 2D graph and the 3D graph in full screen respectively, as shown in the figure below:

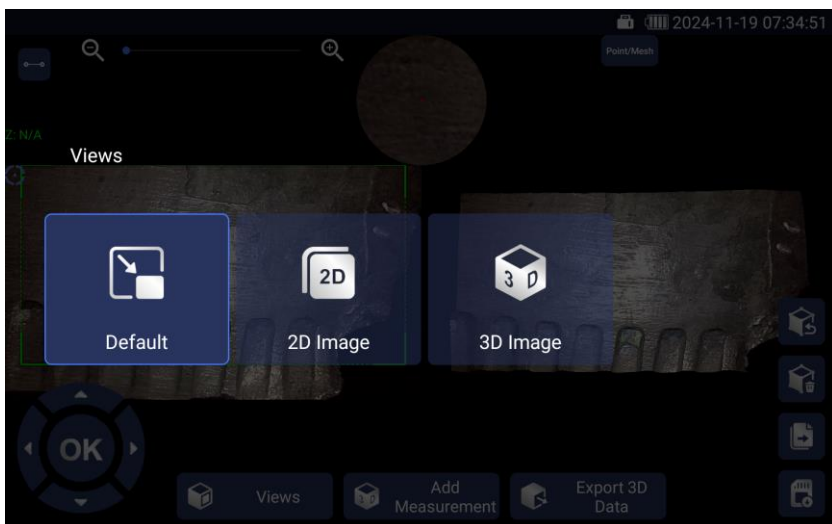


Figure 8-4-2

8.4.3 Adding Measurements

Click [Add Measurement]  and 10 measurement mode options will pop up, as shown below:

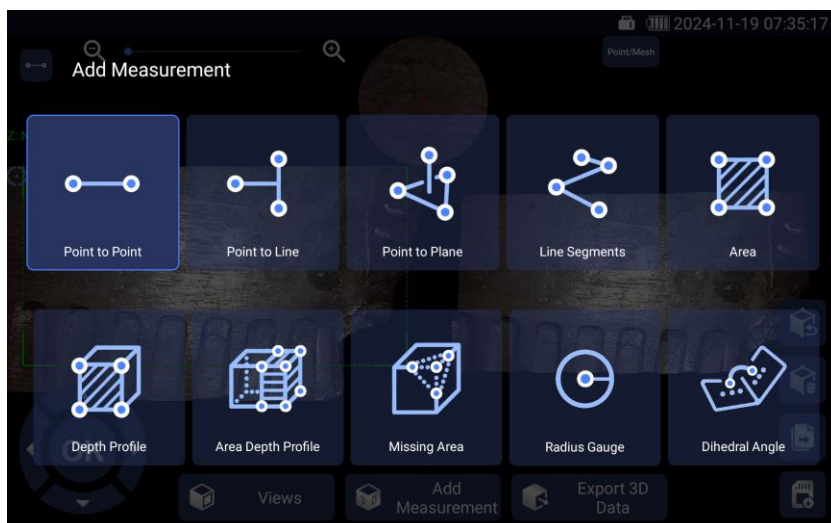


Figure 8-4-3

8.4.4 Exporting PLY

Click [Export PLY]  to export the 3D image file in .ply format to the PLY folder.

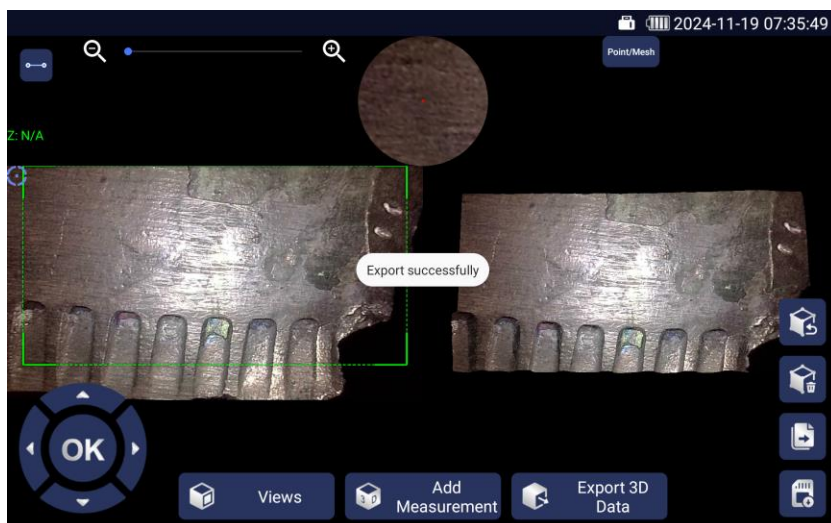


Figure 8-4-4

8.4.5 Point to Point

This mode measures the distance between two specified measuring points. After selecting two measuring points in the image on the left through the point selection operation, the distance between the two points will be automatically generated and displayed on the image.



Figure 8-4-5

8.4.6 Point to line

This mode measures the distance between a point and a line. After selecting three measurement points in the image on the left, the distance between the point and the line will be automatically generated and displayed on the image. The first and second points are two points on the line, and the third point is the measurement point.

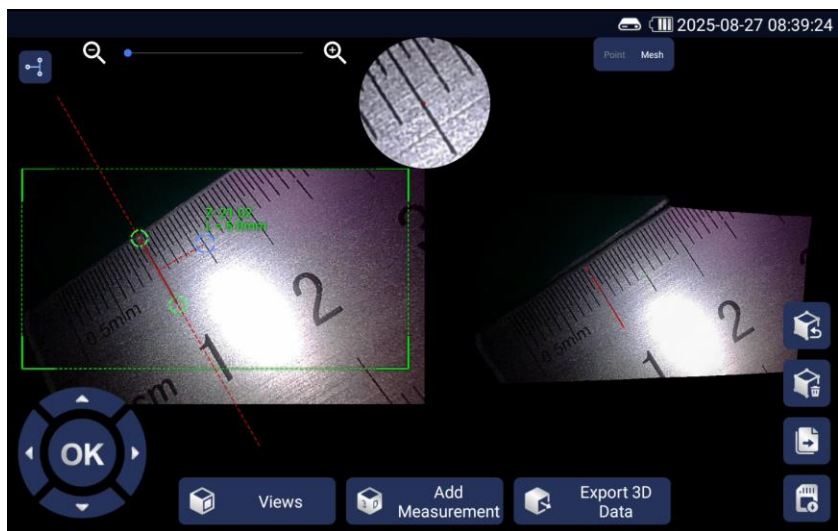


Figure 8-4-6

8.4.7 Point-to-plane distance (depth)



This mode measures the distance between a point and a surface. After selecting 4 measuring points in the image on the left through the point selection operation, the distance between the point and the surface will be automatically generated and displayed on the image. The 4th point is the measuring point, and the 1st , 2nd, and 3rd points are three points on the plane.

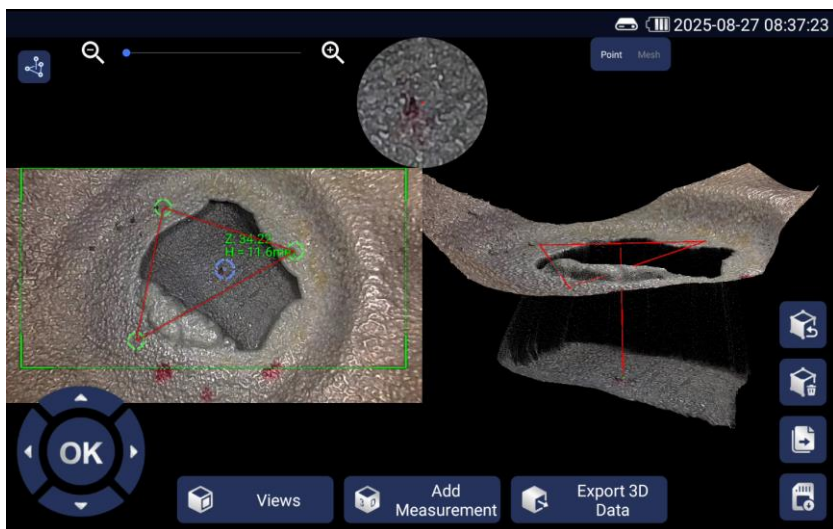


Figure 8-4-7

8.4.8 Line segment measurement



This mode is used to measure the length of line segments composed of multiple points. Select the measuring points in the image on the left by selecting points. When the number of points is greater than 1, the total length of the line segments composed of these points will be automatically updated and displayed on the interface each time a point is selected.

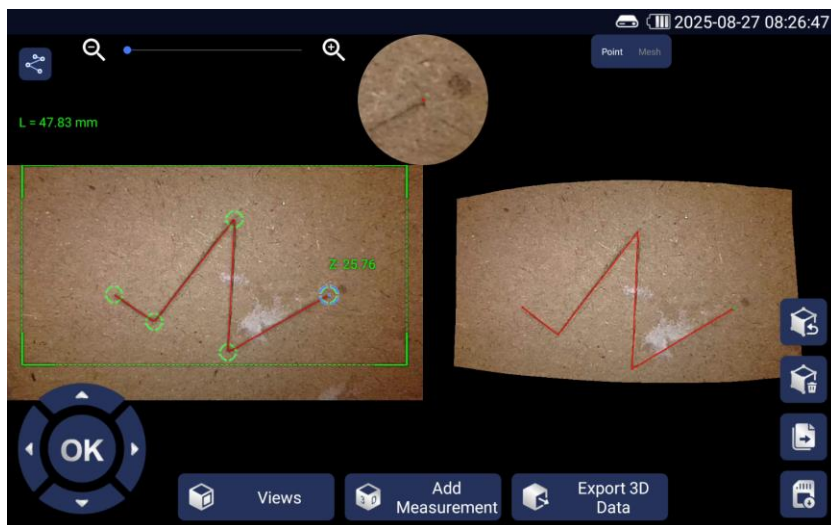


Figure 8-4-8

8.4.9 Area measurement



This mode is used to measure the area of a polygon composed of multiple points. Select the measuring points in the image on the left by selecting points. When the number of points is greater than 2 , the area of the polygon composed of these points will be automatically updated and displayed on the interface each time a point is selected.

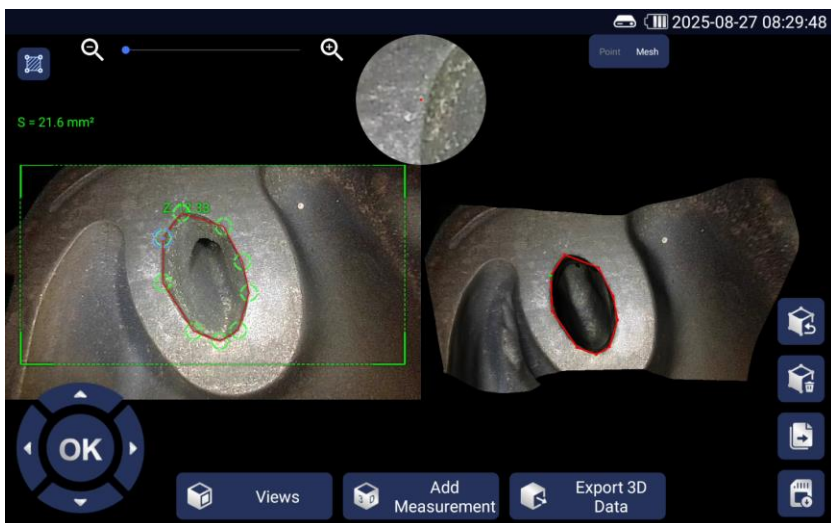


Figure 8-4-9

8.4.10 Profile



This mode is used to obtain a depth trend graph relative to points on a measured object on a cross section. Three measurement points are selected to form a surface through selection operation. The depth of all points on the cover surface that intersect with the measured object is obtained and displayed in the form of a trend graph.

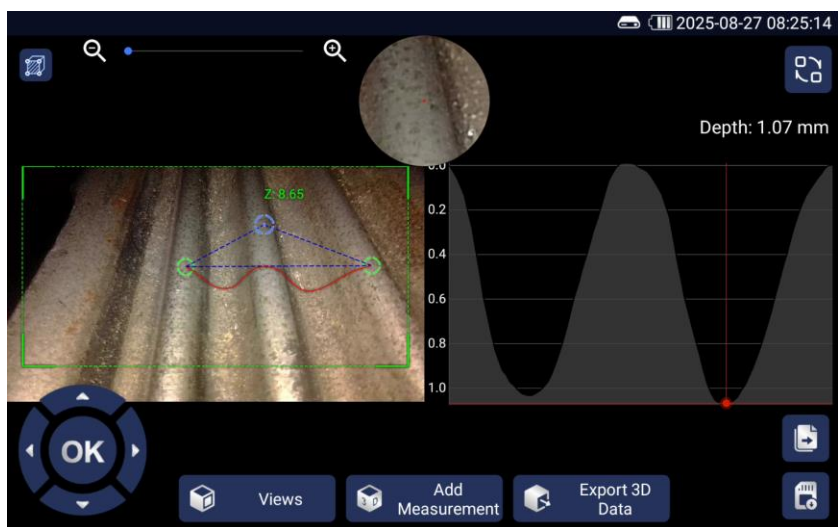


Figure 8-4-10

8.4.11 Area Depth Profile



This mode also generates a depth trend graph relative to points on the measured object along a cross section. Three measurement points are selected to form a surface. Unlike Profile mode, the cross section perpendicular to the line formed by the third point is measured and displayed as a trend graph.

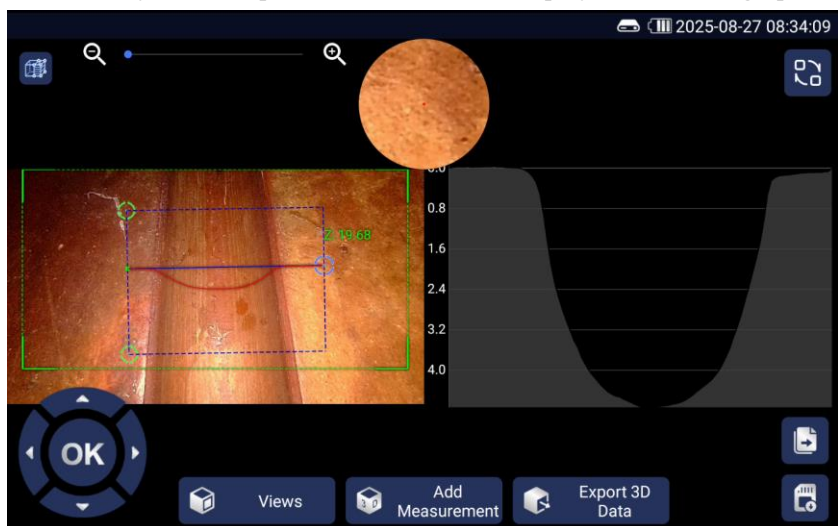


Figure 8-4-11

8.4.12 Missing Area



1. Select three points to define a plane.
2. Select points sequentially along the edge of the notch. Multiple points can be selected.
3. The last point determines the virtual notch tip.
4. Click to complete the point selection, then move the tip until the dashed line aligns with the notch edge.

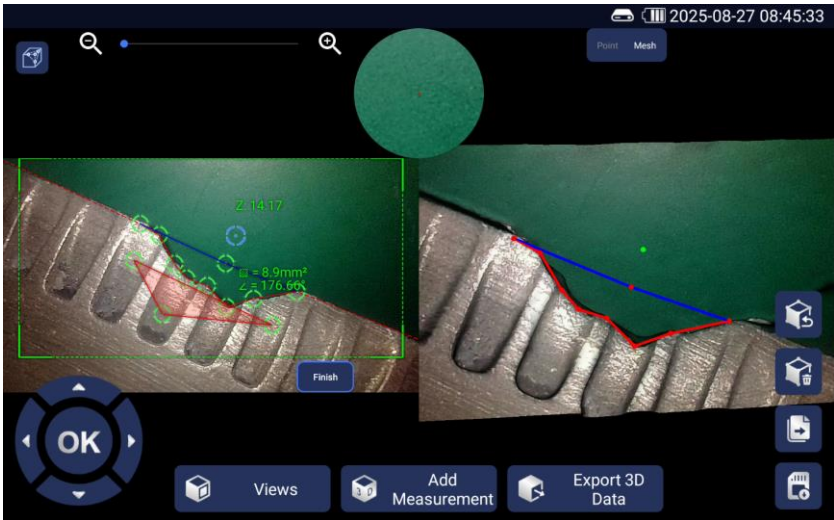


Figure 8-4-12

8.4.13 Radius Gauge



1. Select three points to define a plane.
2. Click Add Circle and enter the radius to create a circle.
3. Generate up to four circles. Click the list on the left to select a circle to move and modify its radius.

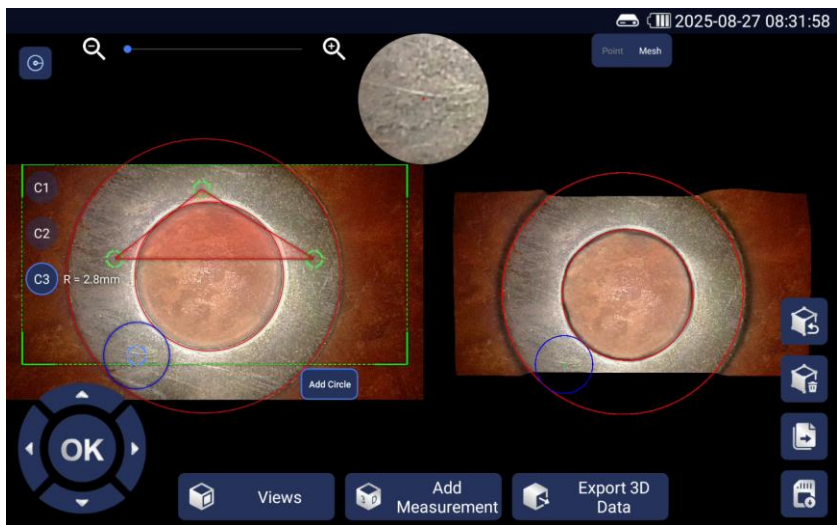


Figure 8-4-13

8.4.14 Dihedral Angle(Surface Angle)

1. Select three points to define a plane (red area)
2. Select three more points to define another plane (blue area)
3. Calculate the angle between two planes

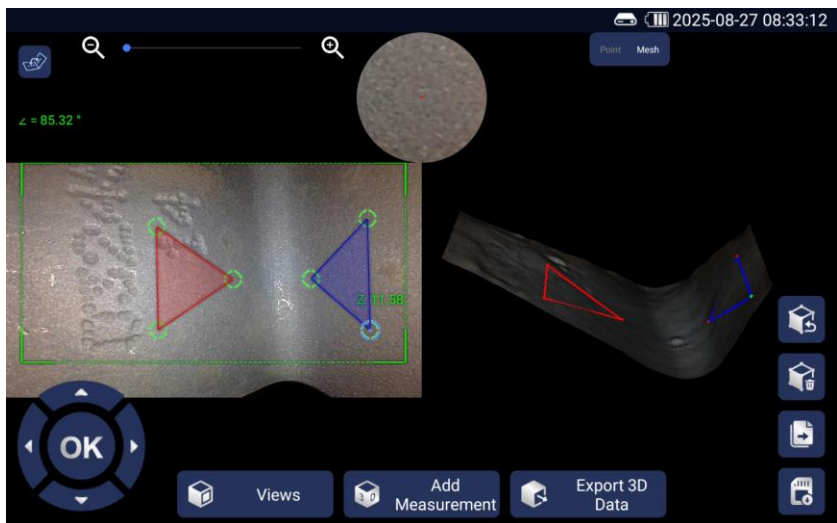


Fig 8-4-14

8.4.15 Return to the superior menu



Click this icon to return to the previous step.

8.4.16 Reset Measurement



Click this icon to clear all measurement points and measurement results on the left image and re-measure, while the measurement method type-remains unchanged.

8.4.17 Return



Click this icon to return to the camera monitoring interface (main interface).

8.4.18 Save



After entering the 3D interface, click to save the current left image, including the selected points and measurement results.

8.4.19 Point cloud display

The display area on the right side of the interface is the point cloud display area. The point cloud is the representation of the 3D spatial points of the object being measured. The specific shape of the object being measured can be seen. The object can be observed by rotating it and can be zoomed in and out.

Another function of the point cloud map is to verify and confirm whether the measurement points selected in the left picture are correct and whether the selected points are on the object being measured, which can better ensure the accuracy of the measurement.

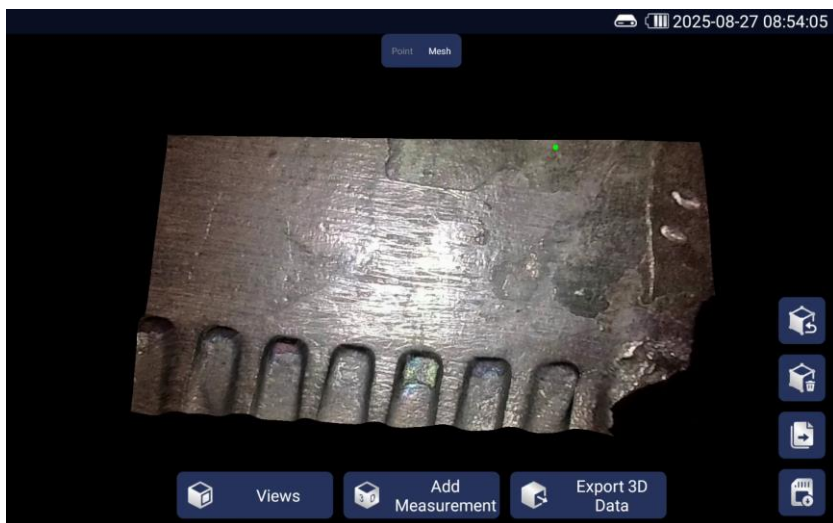


Figure 8-4-11

⚠ If sufficient accuracy is not available

- 1) Move the endoscope as close to the object as possible so that the object fills the frame
- 2) When selecting test points, try to select areas with high point cloud density;
- 3) If the object has similar patterns around the measurement point, is missing surface features, or has blurry or reflective images, change the viewing point and recapture the image;
- 4) If this still doesn't improve the accuracy, take a new picture.

8.5 System Settings

The system interface are shown in the following figure (as shown in Figure 8-5-1, 8-5-2):

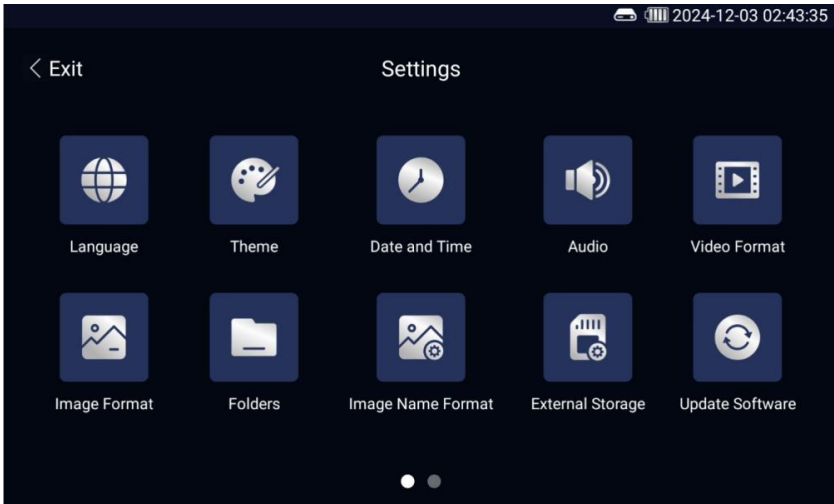


Figure 8-5-1

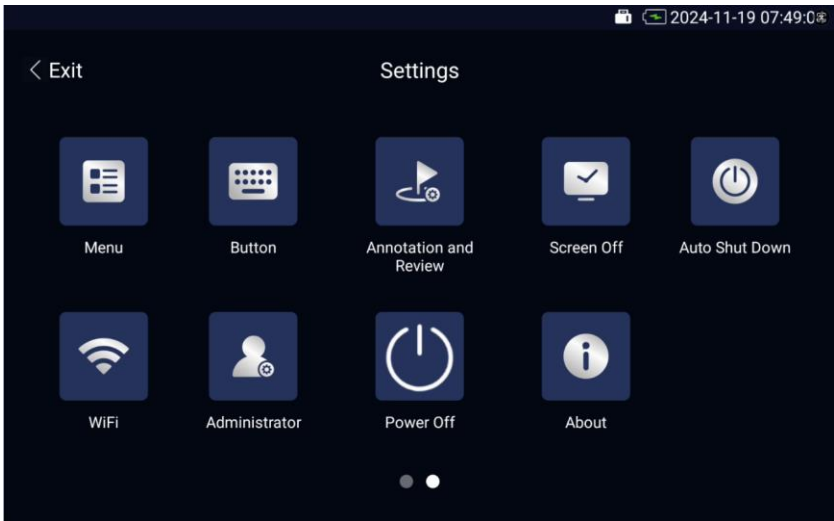


Figure 8-5-2

You can turn the page by swiping left or right ,and clicking the corresponding icon to open the corresponding setting pop-up window; you can also use the joystick to move the cursor and select the corresponding icon to open the corresponding setting pop-up window.

8.5.1 Language

Click the [Language]  icon on the main interface of the system settings to enter the language settings (as shown in Figure 8-5-3) :

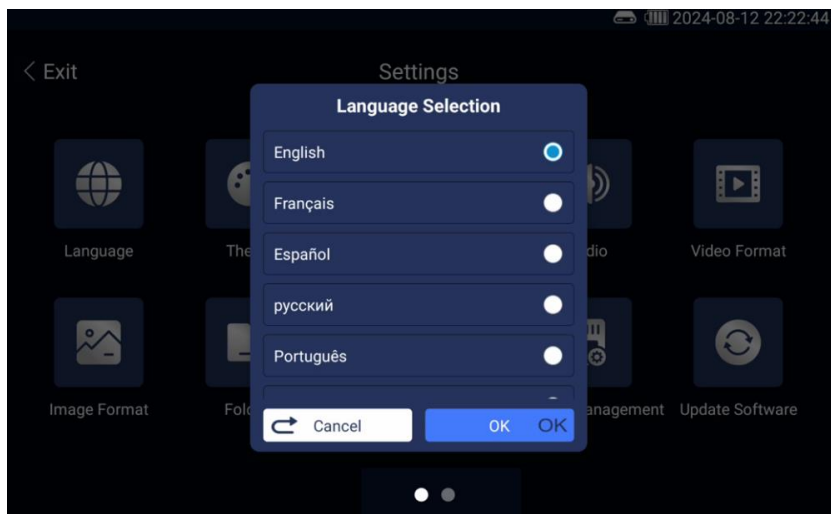


Figure 8-5-3

Ten languages (Chinese, English, French, German, Korean, Portuguese, Russian, Traditional Chinese, Japanese and Spanish) are available. Click the button of the corresponding language to switch. Click the [Cancel] button to exit the language setting interface.

8.5.2 Theme

Click the system setting theme icon to enter the theme setting (as shown in Figure 8-5-4):

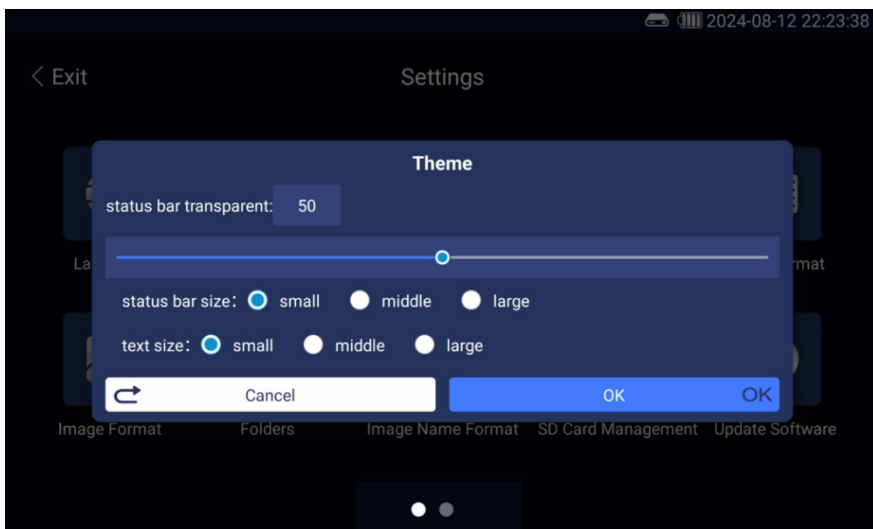


Figure 8-5-4

Theme settings can adjust the transparency of the main interface, the size of the status bar, and the overall text size.

8.5.3 Time

[Time]  icon on the main interface of system settings to enter the time settings (as shown in Figure 8-5-5) :

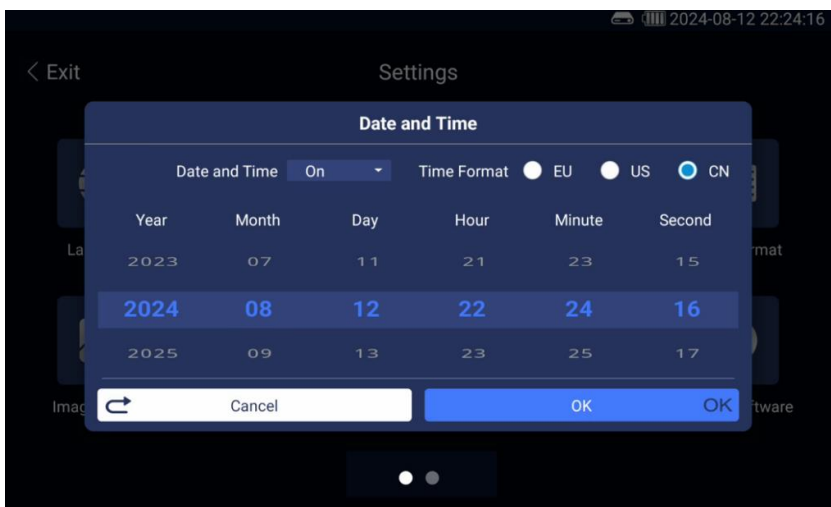


Figure 8-5-5

The time settings are divided into three formats: European (EU), American (US), and Chinese (CH). Select "On" to display the time on the main interface, and select "Off" if not to display the time. Click [OK] to save the settings and exit the time setting. Click [Cancel] to not save the settings and exit the time setting.

8.5.4 Audio

Click the [Audio]  icon on the main interface of the system settings to enter the audio settings (as shown in Figure 8-5-6) :

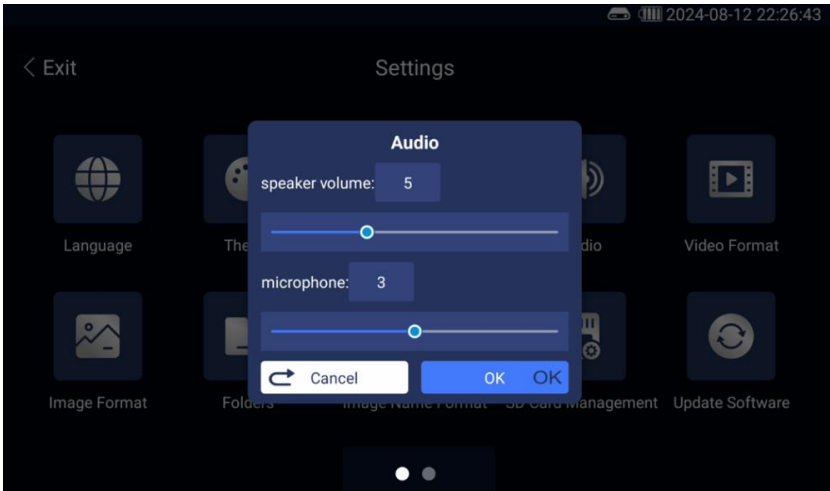


Figure 8-5-6

Audio settings can adjust the volume of the device speaker and microphone.

8.5.5 Video Format

In the main interface of system settings, click the [Video Format]  icon to enter the video format settings (as shown in Figure 8-5-7) :

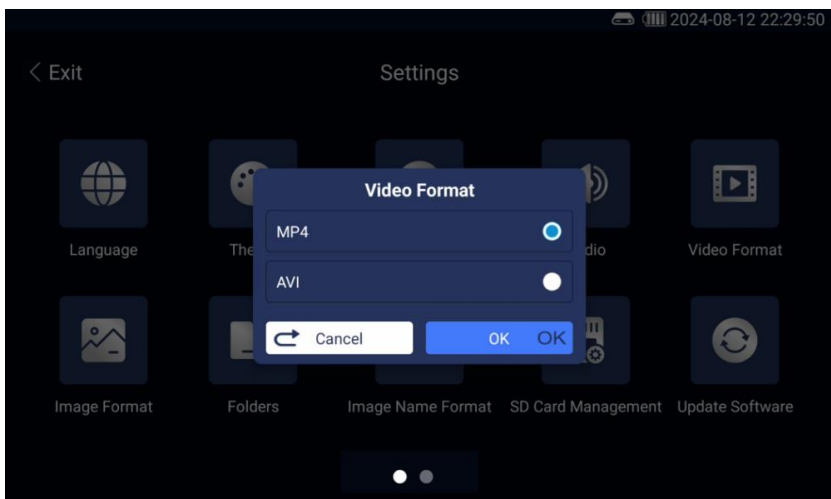


Figure 8-5-7

Video Format: Set the file format for saving the video after recording, which can be divided into AVI and MP4.

8.5.6 Image Format

In the main interface of system settings, click the [Picture Format]  icon to enter the picture format settings (as shown in Figure 8-5-8) :

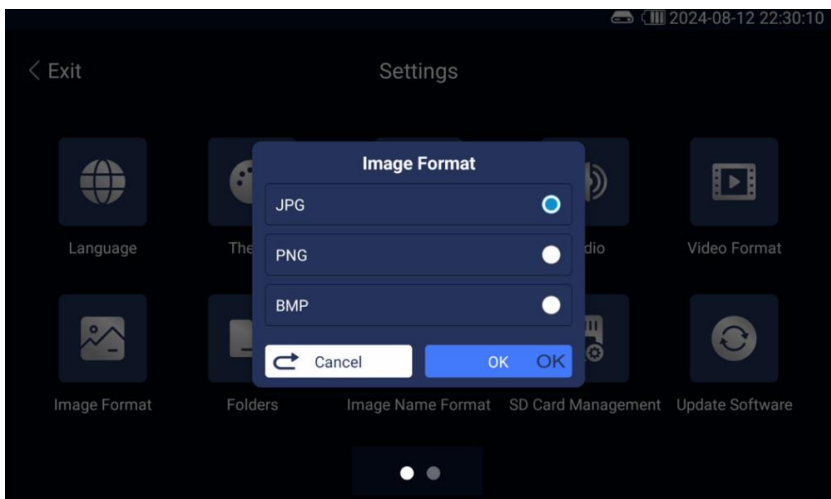


Figure 8-5-8

Picture format: Set the saving format of the picture when taking pictures, which is divided into three types: JPG, PNG , and BMP .

8.5.7 File management

In the main interface of system settings, click the [File Management]  icon to quickly enter the file browsing interface (as shown in Figure 8-5-9) .

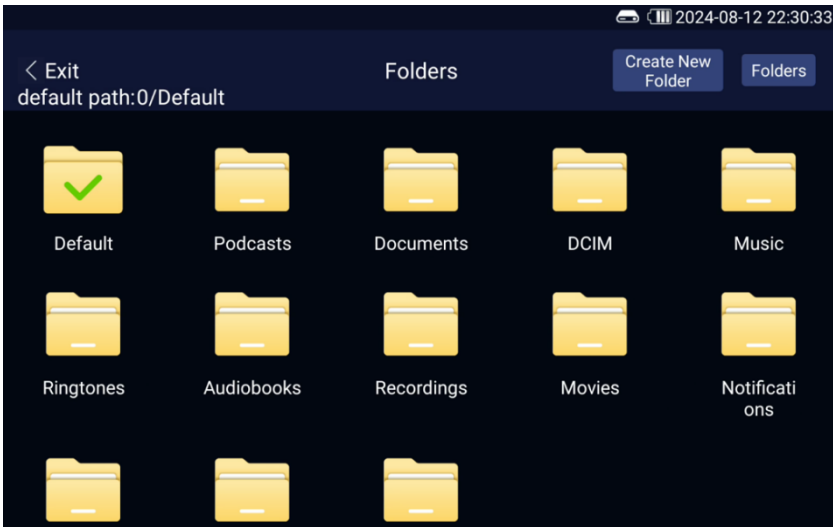


Figure 8-5-9

8.5.8 Image name format settings

In the main interface of system settings, click the [Image Name Format Settings]  icon to set the image naming format (as shown in Figure 8-5-10) .

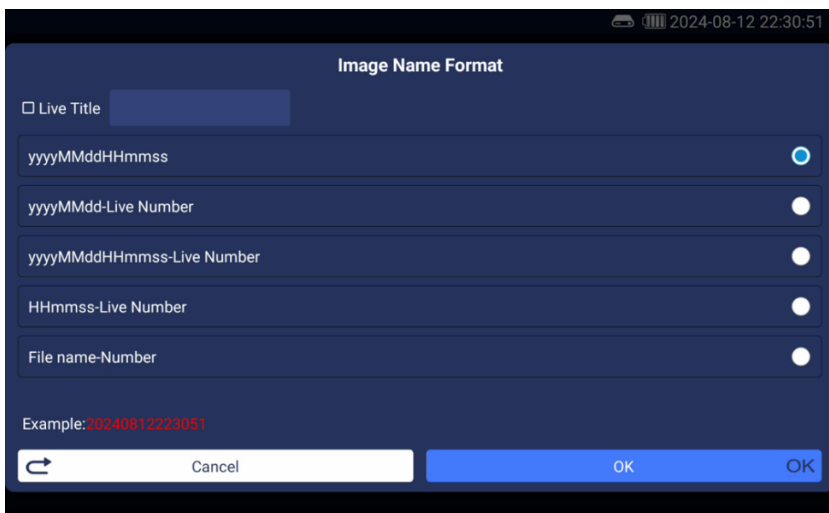


Figure 8-5-10

Select different naming formats, add an relevant title, and click OK. When taking photos or recording videos, the image names will be named in the corresponding naming format .

8.5.9 External Storage

External Storage]  icon on the main interface of system settings to format the external storage , click [OK] to format the external storage , and click [Cancel] to exit the external storage format (as shown in Figure 8-5-11):

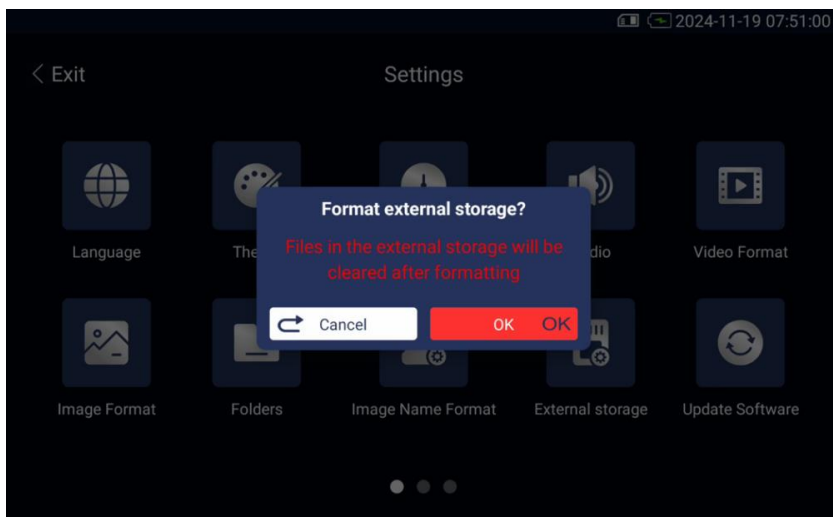


Figure 8-5-11

8.5.10 Software Update

In the main interface of system settings, click the [Software Update]  icon to update the software.

First copy the update file "scope" to the SD card, insert the SD card into the based unit/monitor, click [OK] to update the software, click [Cancel] to exit, and the software will restart after the software update is completed (as shown in Figure 8-5-12) :

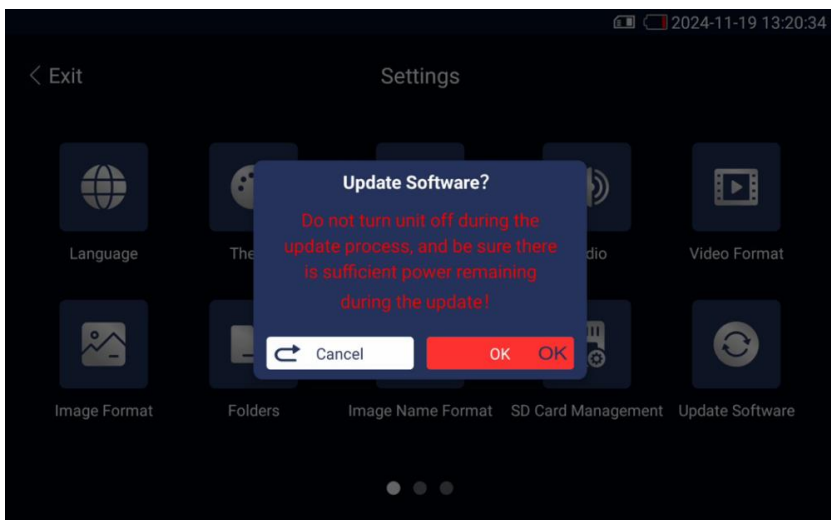


Figure 8-5-12



Kindly reminder

The instrument software can be updated without power failure, so please ensure that the battery power is sufficient -

8.5.11 Menu Settings

In the system settings main interface, click the [Menu Settings]



icon to enter the menu settings interface (as shown in Figure 8-5-13) .

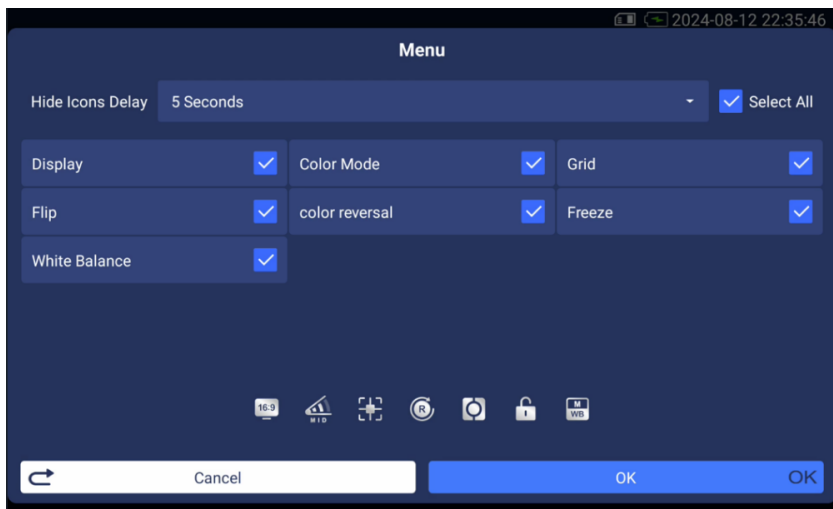


Figure 8-5-13

Selecting different function menus to display them in the monitoring interface. You can drag the icons left and right to place different icons in different positions. Different hide times of the menu can be set, which can be set to 5, 6, 7, 8, 9, 10, 15, 30. After a corresponding period of inactivity, the menu will automatically hide.

8.5.12 Button Settings

System Settings Click the button settings icon to enter the custom button settings (as shown in Figure 8-5-14):

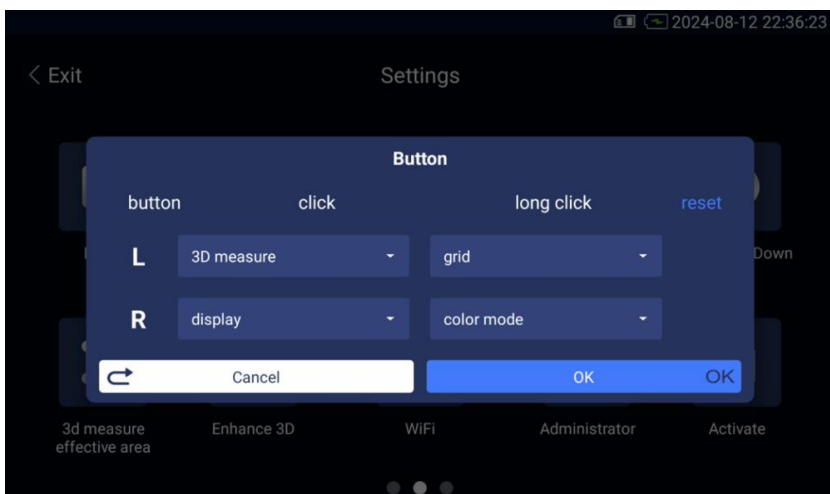


Figure 8-5-14

You can customize the functions of short or long presses on the L and R keys.

8.5.13 Annotation Settings

In the main interface of system settings, click the [Annotation Settings] icon to enter the annotation settings (as shown in Figure 8-5-15) :

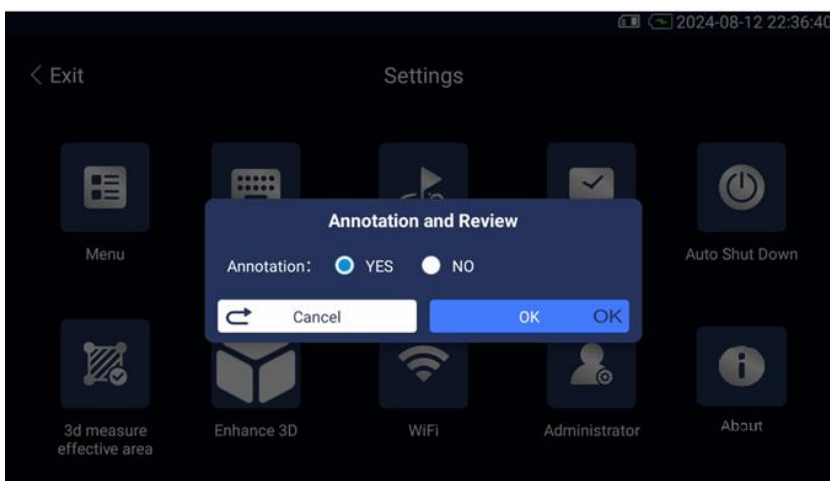


Figure 8-5-15

If set to "YES", the annotation entry icon on the right side of the main

interface will be displayed. If set to "NO", the annotation entry icon on the right side of the main interface will be hidden and the annotation information on the current screen will be cleared.

8.5.14 Screen off time setting

In the main interface of system settings, click the [Screen off time setting] icon to set the automatic screen off time (as shown in Figure 8-5-16).

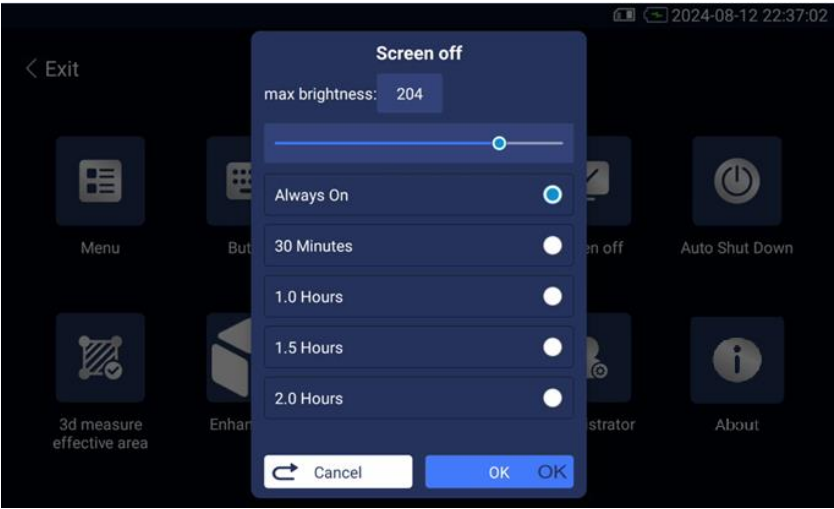


Figure 8-5-16

Click on the automatic screen off time setting to select Never, 30 minutes, 1 hour, 1.5 hours, or 2 hours. After selecting the screen off time, if there is no operation within the specified time, the screen brightness will automatically change to level 1, and the screen brightness will automatically return to the original level if there is any operation or touch. Move the progress bar to adjust the maximum brightness of the screen display.

8.5.15 Automatic shutdown settings

In the main interface of system settings, click the [Auto Shutdown Settings]  icon to set the automatic shutdown time (as shown in Figure

8-5-17).

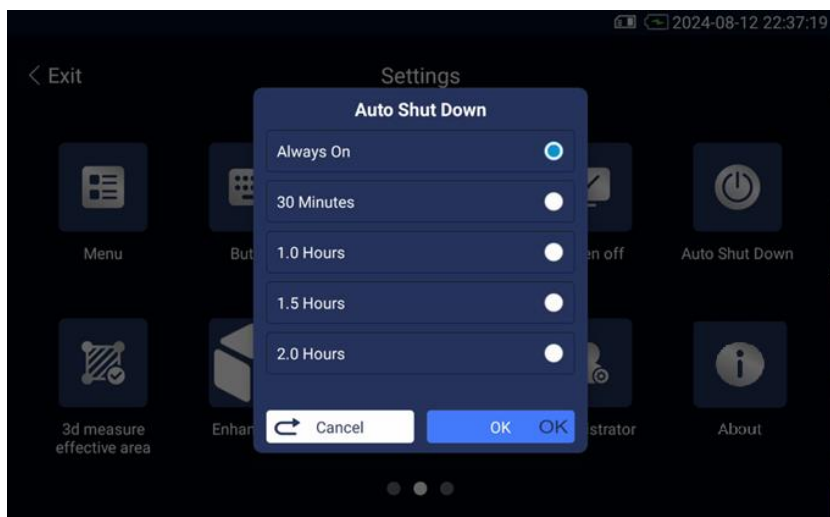


Figure 8-5-17

Click on the automatic shutdown setting to select Never, 330 minutes, 1 hour, 1.5 hours, 2 hours. After selecting the shutdown time, if there is no operation within the specified time, the system will automatically shut down, and the shutdown time will be accumulated again after operation or touch.

8.5.16 3D Assistive Tools/3D measure effective area

Click on the 3D effective area setting on the main interface of system setting  to enter the 3D effective period setting (as shown in Figure 8-5-18):

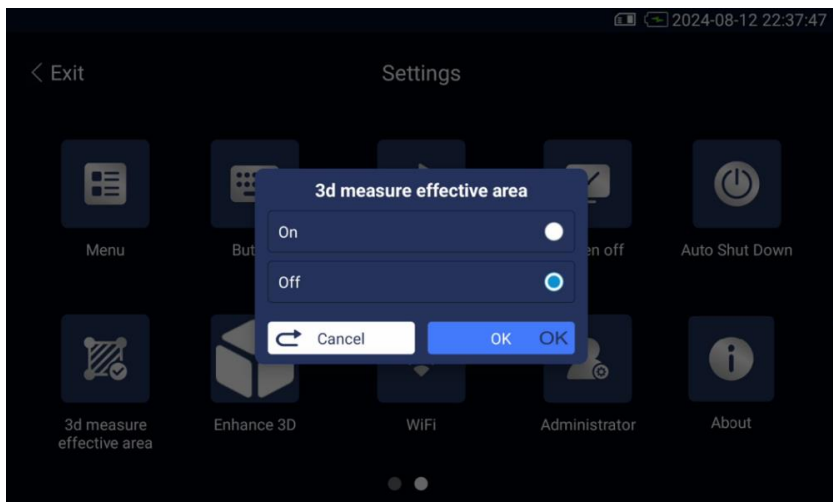


Figure 8-5-18

Click "On" or "Off" to turn on or off the rectangular mark of the 3D measurement effective area.



Figure 8-5-19

8.5.17 Enhanced parallax settings/3D algorithm selection

Click **【Enhance 3D】**  on the main interface of System Settings to enter the 3D algorithm selection pop-up window (as shown in Figure 8-5-20):

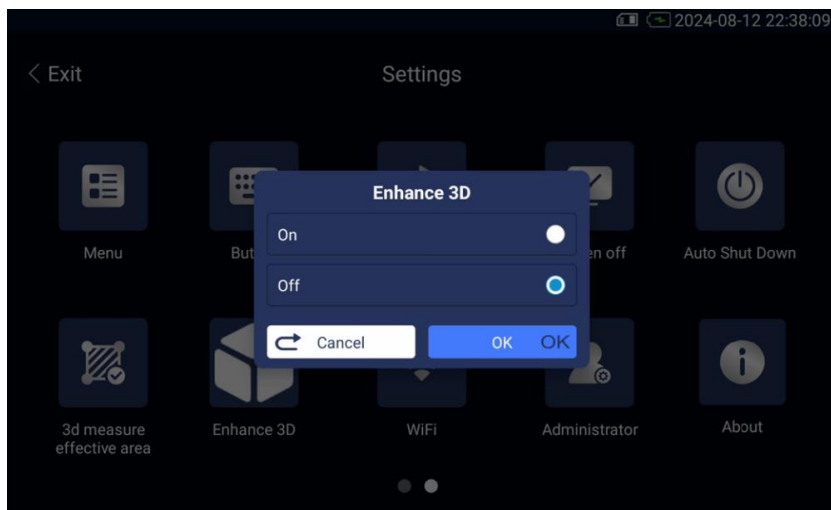


Figure 8-5-20

After turning it on, the generated three-dimensional image can be effectively improved. You can choose between standard algorithm and anti-glare algorithm. The standard algorithm is selected by default.

8.5.18 Camera temperature setting (optional function)

In the main interface of system settings, click the [Camera Temperature Settings]  icon to set the camera temperature (as shown in Figure 8-5-21) :

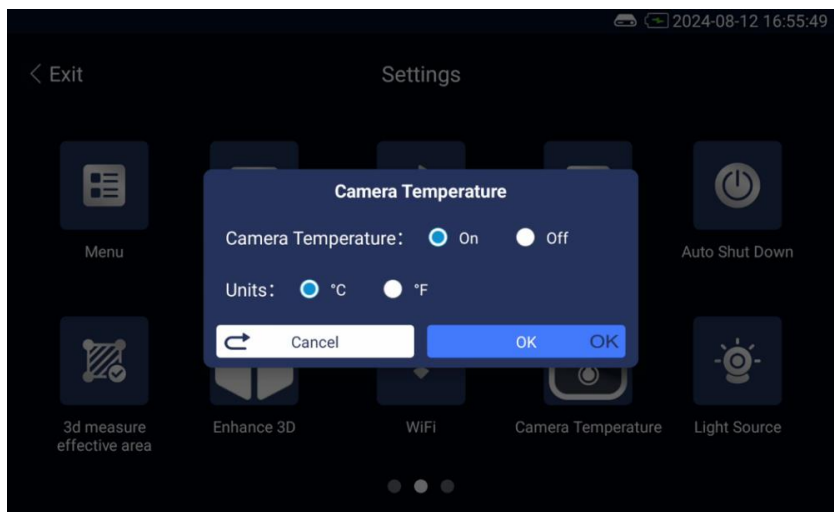


Figure 8-5-21

The camera temperature setting includes whether to display the real-time temperature of the camera and the temperature unit on the main interface. The temperature unit is °C or °F.

⚠ hint

Camera temperature setting requires corresponding camera support, please pay attention to the selection.

8.5.19 Light source settings (optional function)

In the main interface of system settings, click the [Light Source Settings]



icon to set the light source (as shown in Figure 8-5-22) :

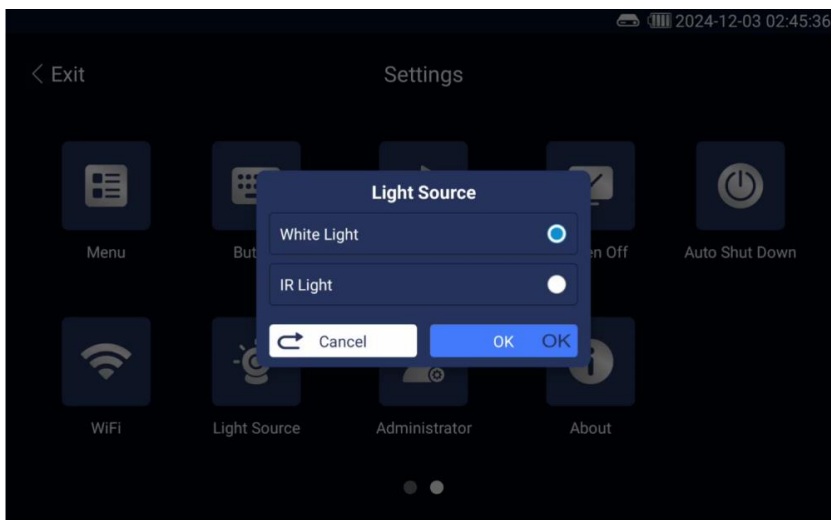


Figure 8-5-22

The current camera light source can be set to white light source or infrared light source. When set to infrared light source, there will be a prompt of infrared light source on the main interface.

⚠ hint

Light source settings require corresponding camera support. Please pay attention to the selection . [Light source settings] require quick clicking [WIFI settings] 10 times to display or hide the function .

8.5.20 WIFI settings

Click the [WIFI]  icon on the main interface of system settings, select “On” for WIFI and confirm (as shown in Figure 8-5-23).

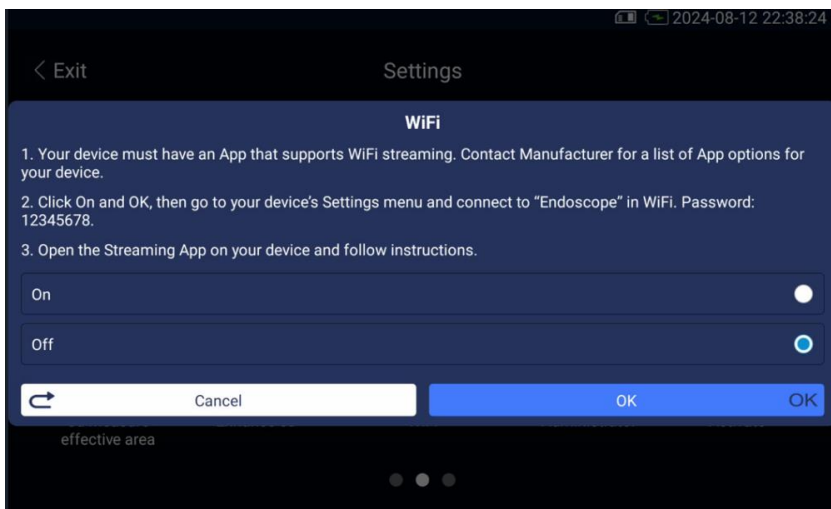


Figure 8-5-23

After the WIFI function is turned on, the screen returns to the monitoring screen . At this time, the endoscope host has turned on the WIFI hotspot and displays  the icon ;

the client (mobile phone or computer) to the endoscope host hotspot via WIFI . The name is: endoscope, password: 12345678. After the connection is successful, open the dedicated APP or video application software to enter the real-time monitoring camera screen.

Note : Some application software requires you to enter the network address provided by the endoscope (rtsp://192.168.43.1:1234) on the APP side . The instrument pushes the video stream to the mobile phone or computer through this network address.

Mobile phone operation steps:

Android Phone:

1. Download and install the "VLC" APP from the App Store
2. After connecting to wifi, enter the "VLC" APP
3. Click “New Stream” and enter the URL: rtsp://192.168.43.1:1234,

click Enter, and wait for connection (as shown in Figure 8-5-24).

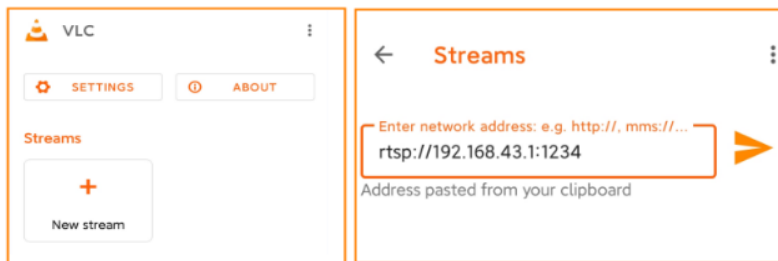


Figure 8-5-24

iPhone:

1. Download and install the "ScreenSharing" APP from the App Store (as shown in Figure 8-5-25) :

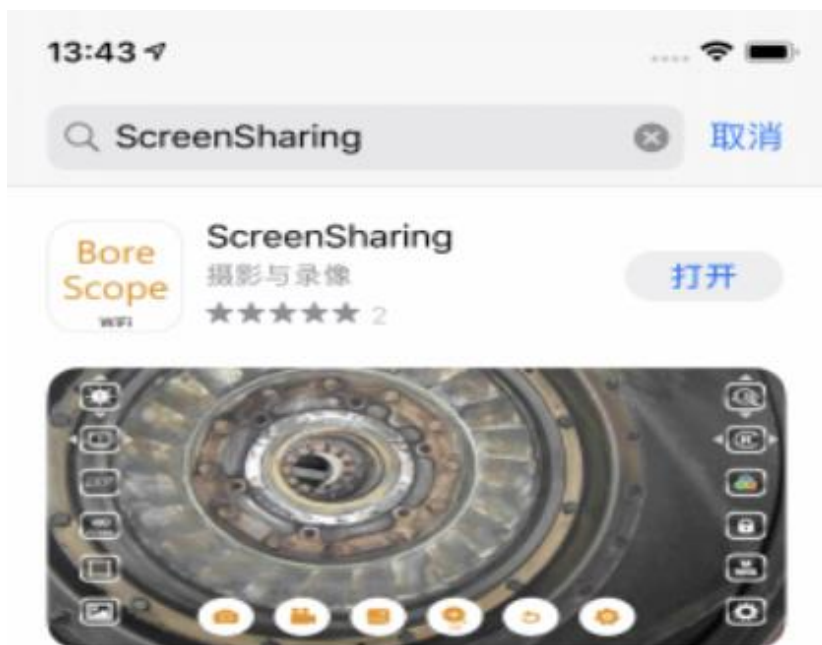
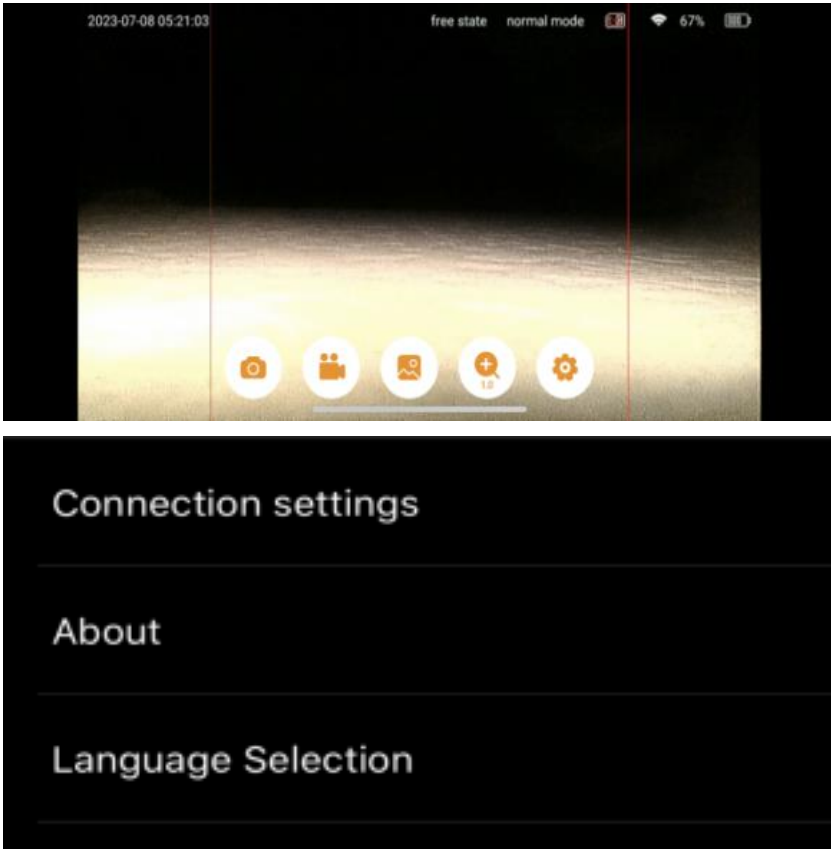


Figure 8-5-25

2. After connecting to wifi , enter the "ScreenSharing" APP
3. Click the "Settings" icon, enter "Connection Settings", enter the URL: rtsp://192.168.43.1:1234, click "Open Network Serial", and wait for connection (as shown in Figure 8-5-26).



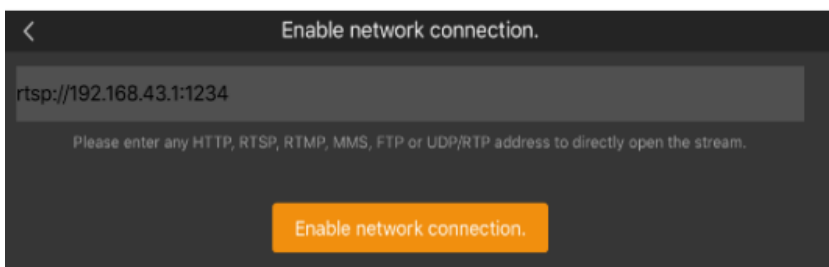


Figure 8-5-26

8.5.21 Administrator Settings

System Settings Click the Administrator Settings icon, and the administrator verification pop-up window will pop up (as shown in Figure 8-5-27). Enter the password: 123456 and jump to the administrator settings interface (as shown in Figure 8-5-28):

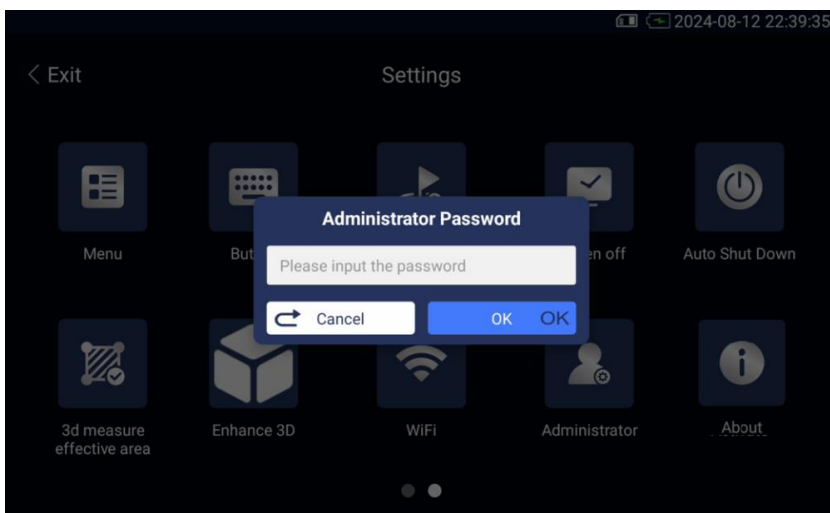


Figure 8-5-27

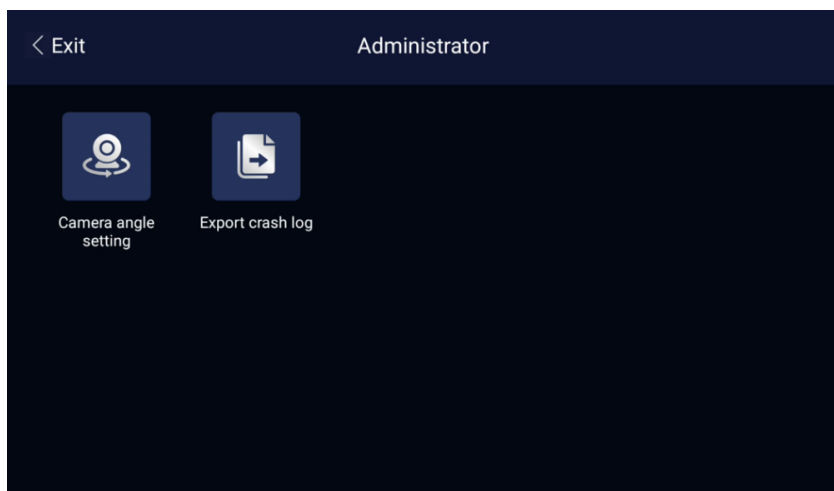


Figure 8-5-28

8.5.22 About

Click the [About] icon on the main interface of system settings to enter system information to view the software version NO. and system version NO. (as shown in Figure 8-5-29):

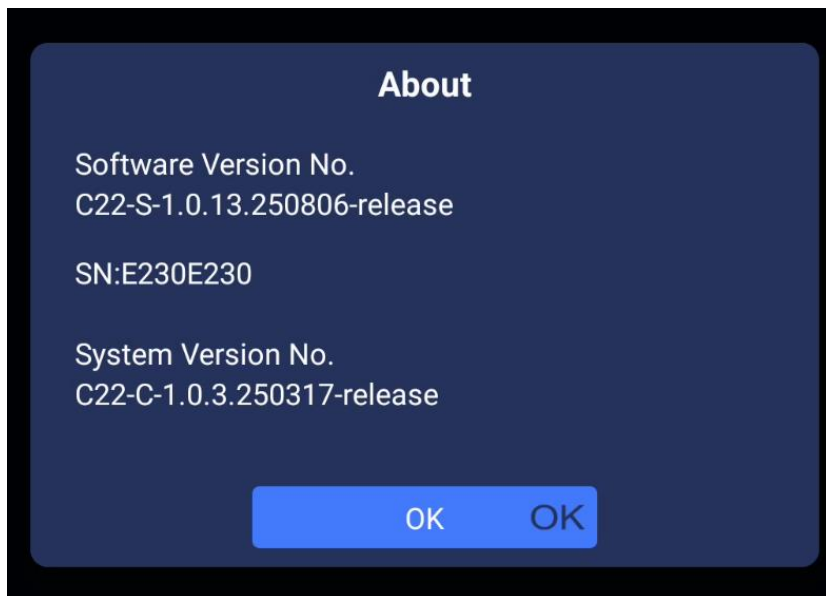


Figure 8-5-29

8.5.23 Camera angle setting (hidden function)

In the main interface of system settings, click the [Camera Angle Settings]  icon to set the camera bending angle value and joystick movement speed (as shown in Figure 8-5-30):

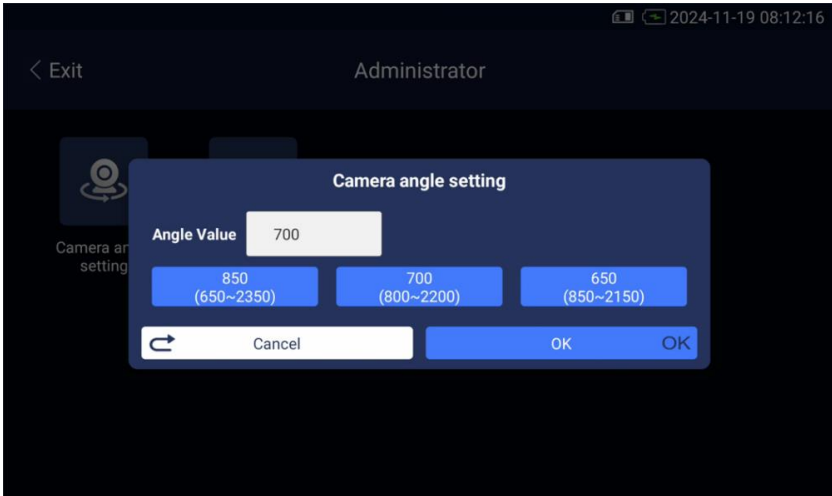


Figure 8-5-30

1) Enter the camera angle setting, you can choose 850 , 700 , 650, 3 angle values, you can also customize the angle value, click confirm to set successfully .

2) The joystick movement speed setting can choose between two movement modes: "Fast" and "Slow". The speed adjustment must be set at the same time as the angle value to be effective.

Note: [Camera Angle Settings] requires contacting our company for settings. [Camera Angle Settings] requires entering the administrator settings interface to display this function .

8.5.24 Export crash log (hidden function)

In the main interface of the administrator settings, click the [Export Crash Log]  icon and click Export (as shown in Figure 8-5-31):

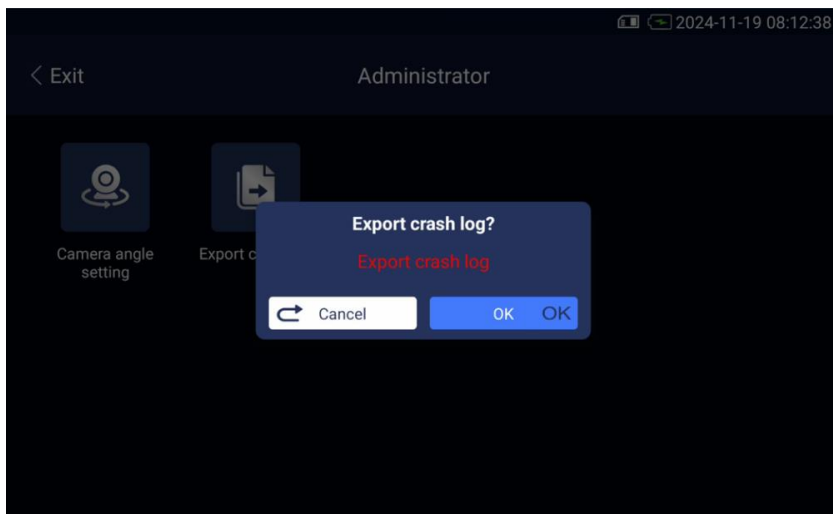


Figure 8-5-31

After the prompt that the operation is successful, insert the USB drive into the computer, search for the "crash" folder in the root directory, and you can view the system crash log.

⚠ hint

[Export crash log] You need to enter the administrator settings interface to display this function .

8.5.25 Export crash log (hidden function)

Click the [Shutdown] icon in the System Settings interface (Figure 8-5-32) to shut down the computer directly by touching the screen.