

# Industrial Video Endoscope

## User's Manual



Warning: Please read the instruction manual carefully before using the instrument.



## User Notice

Please read the User Manual carefully before operating this instrument.

### **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 objects that are energized.

### **warn**

1. Unauthorized disassembly or modification of the instrument will void the warranty and repair.
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 headcan of the insertion tube during use. Touching the headcan 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 you feel anything unusual during the angle adjustment operation, stop using the instrument immediately and turn off the power.

## **Precautions**

1. Do not use it beyond the operating temperature range.
2. Do not excessively bend, twist, or fold the insertion tube.
3. Be sure to use the supplied power adapter.
4. When removing the insertion tube from the object under observation, do not remove it forcibly and please 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 state 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 bending section of the probe should be reset, and the tip should not be controlled in one direction for a long time, which 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 bending section to severe impact or sharp bending, as this may cause damage to the optical lens and precision components at the front end of the insertion tube and the bending section.
7. Wipe the camera 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. Do not allow metal objects or foreign matter to enter the main unit through the ports or openings, as this may cause malfunction or electric shock.
10. Do not strongly impact or press the screen, and do not use hard or sharp objects to scratch the screen, otherwise the screen will crack or scratch.
11. Do not cover the main unit with plastic bags or other objects during use. Otherwise it may cause overheating inside the instrument, resulting in damage to the instrument.
12. Do not store the instrument in the following environment, otherwise it may cause damage to the instrument.
  - 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.

### **Handling batteries**

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

### **Danger**

1. Be sure to use batteries and battery chargers designed for this instrument.
2. Never use a battery with the electrodes reversed.
3. Never connect the battery terminals to each other with metal objects, and do not carry or store batteries and metal objects together.

4. Never dispose of batteries in fire or heat them as 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. Never immerse the battery in fresh or salt water, or expose the battery to moisture.
7. Never charge the battery near open flame or in 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. There is a risk of explosion or fire. Do not drop or throw the battery or subject it to strong impact.
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.

## **Warnings**

1. Do not use batteries other than those for this instrument. The battery model is 18650 with protection board, 3.6V lithium battery.
2. Never attempt to recharge a battery other than that specified for this instrument.
3. Do not use batteries that have abnormalities, such as leakage, discoloration, deformation, etc.
4. If the 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. Do not deform the battery case or place foreign objects inside it.
6. 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. The battery will heat up after long-term operation of the instrument. Do not remove the battery immediately after use to avoid burning your hands.
3. Keep batteries out of reach of children.
4. Never leave the battery in a humid, leaking, or extremely hot or cold environment.
5. Never 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 battery is not used for a long time, be sure to remove it from the instrument. Otherwise, battery leakage or heat accumulation may cause fire or personal injury.

## **Prompt**

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 battery performance that is reduced due to low temperatures 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 to 40°C
  - Charging: 0°C to 40°C
  - Storage: -10°C to 40°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. After using the battery for a period of time, because the power of each battery may vary, it is recommended to use a 18650 lithium battery charger to charge the batteries fully.

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## I. Product Overview

The instrument consists of four parts: camera module, insertion tube, host and display screen. 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 reached by the naked eye.

It uses a 5.5 " OLED LCD screen , which is fast and convenient to operate. It uses the company's patented technology to achieve 360° full-range rotation of the probe, realize long-distance image transmission, and can enter deeper pipeline inspections. It uses general-purpose computing graphics processor technology to make the image and video processing algorithm faster, making the image clearer and smoother. It uses up to megapixels high-definition camera modules to make observations more delicate. It also adds high and low brightness functions, color modes, and adjustable screen brightness. The brightness can be adjusted according to on-site needs to ensure the best observation effect.



Figure 1-1 Product Diagram

## II. 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.

## III. Main performance parameters

system	Product size /net weight	172.5* 372.9 * 131.2 mm / 2 kg
	LCD screen	5.5 " OLED LCD screen
	Screen Resolution	1920*1080
	Joystick control	Electric joystick 360° all-round camera guidance /software navigation button
	Probe reset	Automatic reset
	Function	Take photos, record videos, adjust brightness, lock the interface
	Memory	Internal memory: 128G; With 64G SD card (can extend up to 256G).

	Data I/O Ports	SD card, HDMI video signal, Type C, USB, headset and other interfaces
	Battery	Four 18650 lithium batteries (replaceable)
	Standby time	4h
	Dimming	10 levels of brightness adjustment
software	operating system	Intelligent multi-tasking operating system
	user interface	Pop-up driven operation, menu navigation
	File Management	Supports picture/video playback, deletion, and formatting
	Image Control	Zoom, playback
	Digital Zoom	Continuous (2.5 times)
	Image Control	Freeze the picture and flip the image
	picture	JPG/PNG/BMP
	video	AVI/MP4
	language	Simplified Chinese, English, French, Spanish, Russian, Japanese, Korean, Traditional Chinese, German, Portuguese, Polish
	Color settings	Customizable color parameters
	Ruler	Grid Reference
	software upgrade	Upgrade via SD card upgrade package
other	Pixel	160,000-2 million
	Bending Angle	0° -180 °

#### IV. Application

This instrument is widely used in the production and maintenance of modern core industries such as aviation, automobiles, ships, electrical,

chemical, and electric power. 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, and engines. It can take real-time photos and record videos, providing indispensable data collection for analyzing the use status of equipment and ensuring equipment production.

## V. Working environment

Host operating temperature	-20 °C ~ 50 °C
Front end pipe	-20 °C ~ 70 °C
storage temperature	-10 °C ~ 50 °C
Protection level	Probe: IP67

## VI. Compositions and Functions

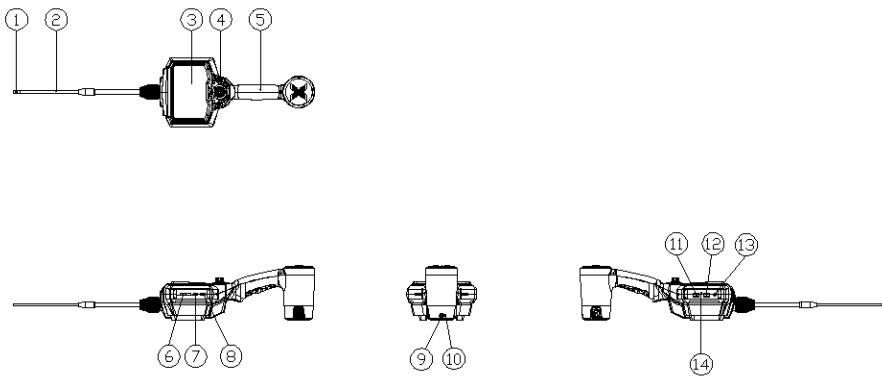


Figure 6-1

No.	Name	No.	Name
①	Camera module	②	Insertion tube
③	LCD screen	④	Joystick
⑤	handle	⑥	SD card interface
⑦	Type-c interface	⑧	Mini HDMI video signal interface
⑨	Type-c charging port	⑩	Charging indicator light
⑪	USB interface	⑫	USB interface
⑬	Headset jack	⑭	Burn reset port

## VII. Preparation before observation

### 7.1 Carrying of boxes

#### ⚠️ Notice

- Before moving the box, check the box's handles, buckles, etc. for any abnormalities. If the buckles are not completely closed, the box lid may accidentally open when you lift the box.
- Do not kick or move the boxes.
- Please use the standard box to prevent the instrument from being damaged.

#### ■ Take the instrument out of the box

#### ⚠️ Warnings

- The box cover must be fully opened before taking out the instrument to prevent accidents caused by closing the box cover.
- Do not operate the host in a box to prevent the lid from closing accidentally and pinching your hands.

#### ⚠️ 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 main unit out of the box, do not use the insertion tube to secure it.
- on the LCD screen of the host , please wipe it clean with a dust-free cloth.

## 7.2 Install the host

When using the host, there are two ways to place it: horizontal placement and tripod placement.

### ⚠️ Notice

- Place the console horizontally to keep it stable.
- Do not place the host in a high place to prevent it from slipping and getting damaged.
- If you need to hang the host during use, please fix the host in a place that can support its weight.
  - 1) There is a 1/4 machine nut hole on the back of the host, place the host horizontally on the tripod.
  - 2) Secure with 1/4 machine screws.

## 7.3 Power supply preparation

### ■ Replace the battery power supply

Follow the steps below (as shown in Figure 7-1):

- ①Press the buttons on both sides of the battery bottom shell and pull out the battery compartment;
- ②Push out the battery cover;
- ③Replace the battery. The battery replacement is complete .

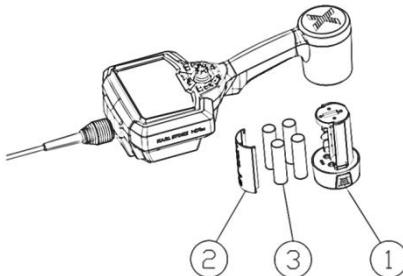


Figure 7-1

#### ⚠️ Notice

- The battery cannot be placed with the positive and negative poles reversed.
- The instrument needs to be equipped with 4 18650 lithium batteries before it can be used.
- The standard 18650 lithium battery has a protection circuit device. If you need to replace the battery, please choose a 18650 lithium battery with a protection circuit .

#### ■ Built-in charging

- 1) Use direct charging or charge separately from the instrument.
- 2) Take out the power adapter and connect it to the battery compartment power Type C port.
- 3) Make sure to place 4 18650 lithium batteries in the battery

compartment.

- 4) Make sure the power cable is connected to the battery compartment power port.
- 5) Plug the power cord into an electrical outlet.
- 6) When the red light is on, it means charging is in progress, and when the green light is on, it means charging is complete ( as shown in Figure 7-2) .

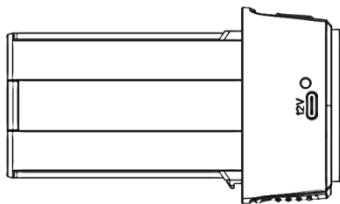


Figure 7-2

### ⚠️ **Warnings**

- Please check whether the power cord is intact before use.
- The adapter output voltage is: 12V, current: 3A;
- 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.

### ■ **External charging**

Place the 18650 lithium battery in the charger according to the positive and negative pole instructions , and plug in the power supply to charge ( as shown in Figure 7-3 ) .

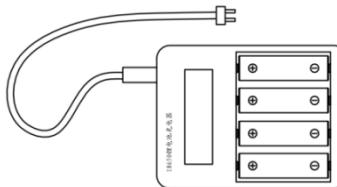


Figure 7-3

**⚠️ Notice**

- Make sure the lithium battery is placed in the charger in the correct direction.
- During the charging process, the four batteries are independent and do not interfere with each other, and have functions such as overload protection, overcurrent protection, and short circuit protection.

## 7.4 Check the insertion tube

### ■ Check the appearance of the insertion tube

- 1) Observe whether the outer material of the entire insertion tube is intact ( as shown in Figure 7-4 ) .
- 2) Check if the outer covering material of the insertion tube (not the angled bend part) is loose.

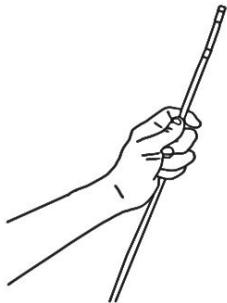


Figure 7-4

**⚠ 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 ( as shown in Figure 7-5 ) .



Figure 7-5

**⚠ Warnings**

- 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.

## **VIII. Basic Operation**

### **8.1 Power on**

Long press the [ Power / Menu button ], the lens light and button light will light up when the machine starts, and a real-time image will be displayed.

### **8.2 Insertion tube**

#### **8.2.1 Check angle bending function**

- 1) Straighten the insertion tube.
- 2) Operate the joystick slowly to ensure that the angled bend moves smoothly.

### ⚠ **Prompt**

The angle bending action corresponds to the angle and direction of the joystick action.

#### **8.2.2 Using the Insertion Tube**

- 1) The insertion tube angle can be bent by joystick control .

- 2) Observing the image, carefully check the insertion tube and slowly insert the object to be observed, bending it at an angle as needed, and applying force carefully and evenly.
- 3) Adjust the LED brightness to achieve the clearest picture.
- 4) When withdrawing the insertion tube, make sure that the front end of the insertion tube is in a straight position (the joystick is in the middle position), and then withdraw it slowly.

#### **⚠️ Prompt**

- 1) You should develop the habit of slowly moving the joystick to operate.
- 2) If the bending control mechanism stops functioning, or if you notice any abnormality during operation of the instrument, stop using it immediately. Release the joystick to the automatic zero (center) position and carefully withdraw the insertion tube from the object under observation.
- 3) If you hear a harsh sound inside the instrument when you move the joystick , please stop using it and use it only after testing to find no abnormalities.
- 4) Repeated bending of the insertion tube will reduce the maximum bending value of the angled bend and keep the insertion tube as straight as possible.
- 5) Before starting the machine, make sure that the insertion tube and lens are in a straightened state. When the insertion tube is in a

curled state, it is strictly forbidden to turn the tube to avoid damaging the traction mechanism.

### ⚠ **Warnings**

- Do not remove the insertion tube while the angle is bent, as this may damage the insertion tube and the observation object.
- After being used in a high temperature environment for a short period of time, the temperature of the tip of the insertion tube becomes high and can only be used after it cools down.

If the insertion tube is abnormal during removal, please gently turn the joystick to remove it. Do not use excessive force to avoid damage.

### 8.3 Button Function Description

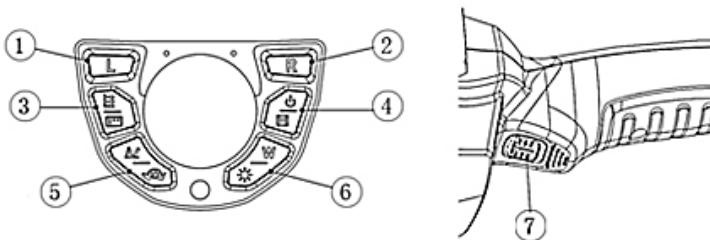


Figure 8-1

The corresponding names and function descriptions of the button numbers in Figure 8-1 are shown in the table below:

No.	Button	Button Name	Button Function Description
①		Function button / return button (L button for short)	1. When in the real-time monitoring interface, long press the button to display/hide the interface buttons ; 2. When in the real-time monitoring

			interface, short press the button when the interface button is displayed to adjust the corresponding icon button. 3. When in non-real-time monitoring interface, the function of this button is "return button".
②		Record button /right selection button/confirm button (R button for short)	1. When in the real-time monitoring interface, long press the button to control the start and end of recording ; 2. When in the real-time monitoring interface, short press the button when the interface button is displayed to move to the right to select the menu button. 3. When in the non-real-time monitoring interface, the function of this button is "Confirmation button".
③		Default folder / image browsing	1. Short press to open the default folder for image browsing, including pictures and videos; 2. Long press to open all folders on the SD card and select different folders to browse images.
④		Power on/off/settings menu button	1. Short press to open the settings menu bar; 2. Long press to turn on or off.
⑤		Joystick setting button	1. Short press the joystick, the camera module can adjust the speed of rotation; 2. Long press the button to switch the joystick modes: normal mode,

			stepping mode and fine adjustment.
⑥		Brightness adjustment /white balance button	<ol style="list-style-type: none"> <li>1. Short press to adjust the brightness of the lens light ;</li> <li>2. Long press to switch between automatic white balance and manual white balance.</li> </ol>
⑦		Switch / photo button	<ol style="list-style-type: none"> <li>1. Short press to take a photo ;</li> <li>2. Long press to switch lenses (only for dual lenses) .</li> <li>3. In file management, short press the button and move the joystick to switch between the selected folder/picture and the create folder column in the upper right corner.</li> </ol>

#### 8.4 Menu Bar

The main menu interface icons and status bar icons (as shown in Figure 8-2 ) .

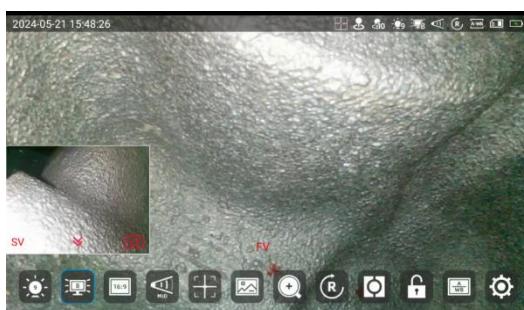


Figure 8- 2

In the system settings, you can set the automatic hiding time of the menu. After the menu bar is hidden (as shown in Figure 8-3 ) , click the screen or long press the [ L ] button to display the full menu (as shown in Figure 8-2 ) . When the menu is displayed, long press the [ L ] button again to hide the menu .

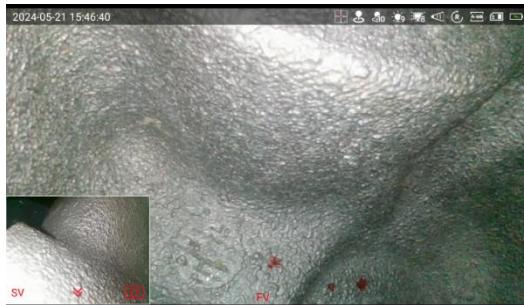


Figure 8- 3

#### 8.4.1 【 Camera brightness adjustment 】

[ Camera Brightness Adjustment ] icon on the screen to automatically adjust the camera brightness. The brightness levels are divided into 0-10 levels, and the default brightness level is 5 .

Button operation: When the bottom menu exists and the camera brightness button is selected , short press the [ L ] button to adjust the camera brightness.

#### 8.4.2 [Screen brightness adjustment]

Touch operation: Click the [Screen Brightness Adjustment] icon on the screen to adjust the screen brightness automatically . The brightness levels are divided into 0~10 levels, and the default brightness level is 5;

Button operation: When the bottom menu exists and the screen

brightness button is selected , adjust the screen brightness by short pressing the [ L ] button .

#### 8.4.3 【Display ratio adjustment】

Touch operation: Click the [Display ratio adjustment] icon on the screen to change the display ratio of the image. The display ratios are divided into 16:9, 4:3, and 1:1;

Button operation: When the bottom menu exists and the display ratio button is selected , adjust the display ratio by short pressing the [ L ] button .

#### 8.4.4 【Color mode adjustment】

Touch operation: Click the [Color Mode Adjustment] icon 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) ;

Button operation: When the bottom menu exists and the color mode button is selected , adjust the color mode by short pressing the [ L ] button .

In custom mode (UD) , long press the color mode icon to enter the color parameter setting interface (as shown in Figure 8-4 ) .

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 8-4 )

#### 8.4.5 【Grid measurement】

Touch operation: 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. The actual distance of a square side corresponding to a 1x grid is 20mm; the actual distance of a square side corresponding to a 2x grid is 10mm; the actual distance of a square side corresponding to a 4x grid is 5mm; users can use the grid to estimate the size of a specific object;

button operation: When the bottom menu exists and the grid measurement button is selected , short press the [ L ] button to adjust the grid multiple .

#### ⚠️ Prompt

Grid measurement is related to the actual shooting distance of the camera. If you need to use this function, you need to correct the camera distance yourself.

#### 8.4.6 Image browsing

Touch operation: Click the [Image Browsing] icon on the screen to enter the image browsing interface (as shown in Figure 8-5 ) . For detailed instructions, see [8.6 Image Browsing](#) .

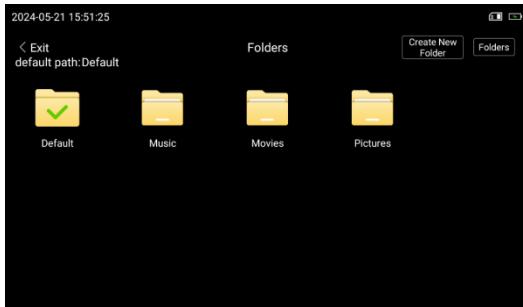


Figure 8- 5

#### 8.4.7 Zoom function

Touch operation: Click the [Zoom Function] icon on the screen to zoom in and out the real-time monitoring interface. The zoom multiples are: 1.15, 1.30, 1.45, 1.60, 1.75, 1.90, 2.05, 2.20, 2.35, and 2.50.

button operation: When the bottom menu exists and the zoom function button is selected , adjust the zoom factor by short pressing the [ L ] button .

#### 8.4.8 Flip adjustment

Touch operation: Click [Flip Adjustment] on the screen and use the selection buttons on both sides of the icon to flip the real-time monitoring interface to the following six modes:

This is the actual screen, default setting;

180° based on the actual image ;

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 picture .

button operation: When the bottom menu exists and the flip button is selected , short press the [ L ] button to flip the screen .

### 8.4.9 Invert Color Function

Touch operation: Click the [Invert Color] icon on the screen to invert the color of the real-time monitoring interface;

Button operation: When the bottom menu exists and the invert button is selected , short press the [ L ] button to invert the color .

### 8.4.10 Freeze function

Touch operation: Click the [Freeze Function] icon on the screen, and use the selection buttons on both sides of the icon to freeze  and unfreeze the real-time monitoring interface ;

button operation: When the bottom menu exists and the Freeze button is selected , short press the [ L ] button to freeze  and  unfreeze.

### 8.4.11 White balance adjustment

Touch operation: Click the [White Balance Adjustment] icon on the screen to adjust the white balance of the real-time monitoring interface. The white balance is divided into two modes: automatic white balance  and manual white balance ;

Button operation: When the bottom menu exists and the white balance button is selected , short press the [ L ] button to adjust the white balance.

### 8.4.12 System Settings

Touch operation: Click the [System Settings] icon on the screen to enter the system settings interface. For detailed instructions, see [8.5 System Settings](#) .

## 8.5 System Settings

in the system setting main interface : button operation and touch operation (as shown in Figure 8-6 ) .

1) button operation:

The joystick can control the up, down, left, and right selections of the main interface of the system settings;

【 L button 】 Short press can be used as return function in the main interface of system settings;

【 R button 】 Short press can be used as confirmation function in the main interface of system settings;

2) Touch operation:

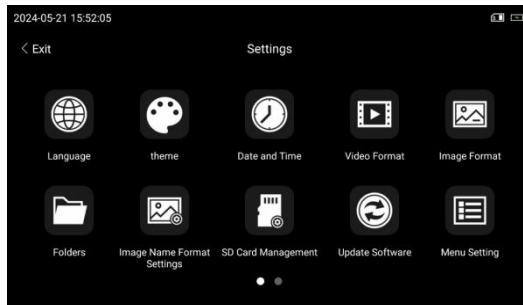


Figure 8- 6

Swipe left on the menu to switch to the second page menu (as shown in Figure 8-7 ) .

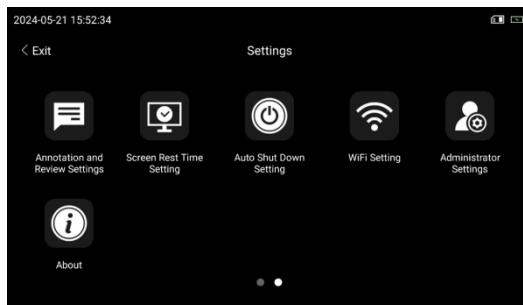


Figure 8- 7

Swipe right to switch to the first page of menu.

### 8.5.1 Language

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

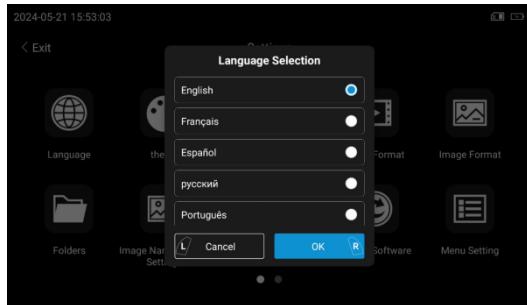


Figure 8- 8

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

### 8.5.2 Time

[ Time ] icon on the main interface of system settings to enter the time settings (as shown in Figure 8-9 ) .

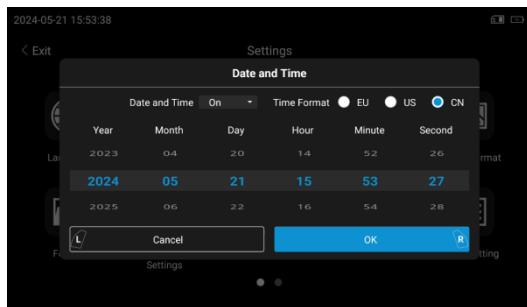


Figure 8- 9

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 [Save] to save the settings, and click [Exit] to complete the time setting.

### 8.5.3 Theme Settings

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

icon to set the theme (as shown in Figure 8-10) .

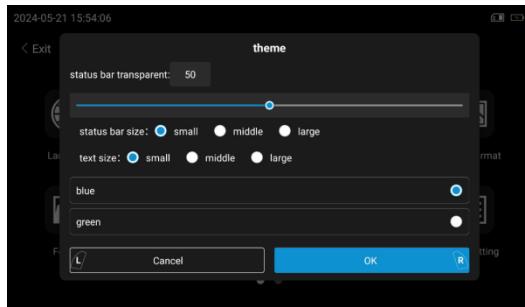


Figure 8- 10

You can slide the progress bar to customize the status bar transparency,

status bar icon size, global text size, and theme style switching.

#### 8.5.4 Menu Settings

In the main interface of system settings, click the [ Menu Settings] icon to set the menu (as shown in Figure 8-11) .

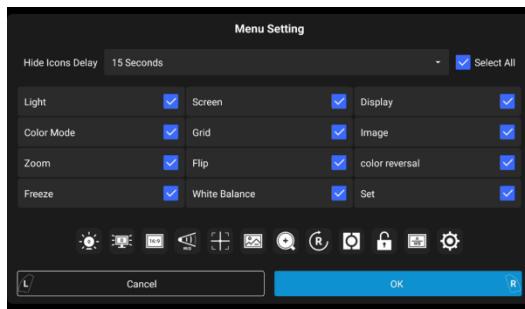


Figure 8- 11

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

### 8.5.5 Video Format

In the main interface of system settings, click the [Video Format] icon to enter the video format settings (as shown in Figure 8-1 2) .

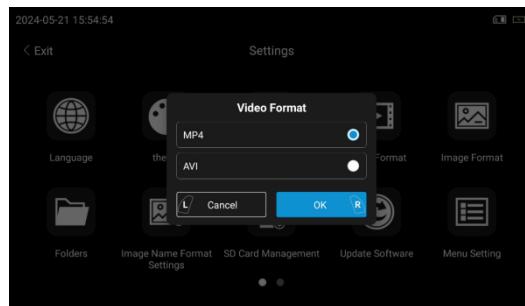


Figure 8- 12

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 8-1 3) .

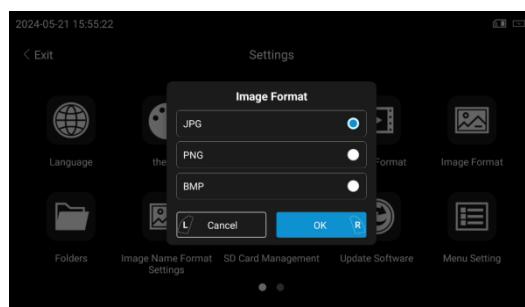


Figure 8-1 3

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

### 8.5.7 Document Management

In the main interface of system settings, click the [File

Management] icon to quickly enter the file browsing interface (as shown in Figure 8-1 4 ).

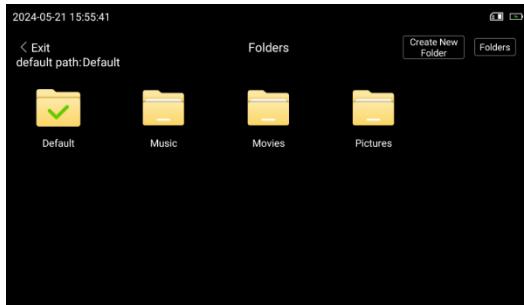


Figure 8- 14

### 8.5.8 SD card format

In the main interface of system settings, click the [SD card format] icon to format the SD card, click [ Confirm ] to format the SD card, and click [ Cancel ] to exit SD card formatting (as shown in Figure 8-1 5 ) .

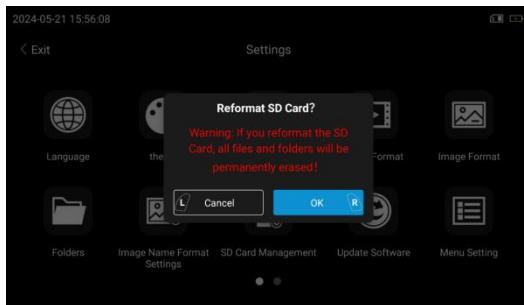


Figure 8-1 5

### 8.5.9 Software Update

Click the [ Software Update ] icon on the main interface of the system settings to update the software. First copy the update file "scope" to the SD card, insert the SD card into the instrument, click [Confirm] to update the software, click [Cancel] to exit, and the

instrument will restart after the software update is completed (as shown in Figure 8-1 6 ) .

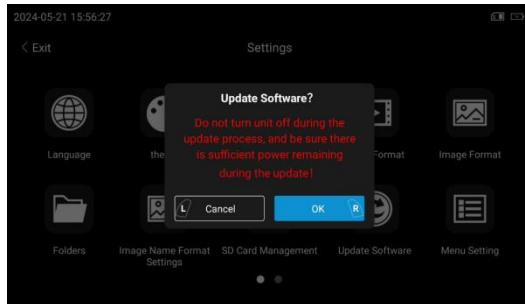


Figure 8-1 6

### ⚠️ Prompt

The instrument software can be updated without power outage, so please make sure to keep the battery fully charged.

After updating the software, you can only click open, not done. Otherwise, the developer mode interface will pop up and you will not be able to shut down the device. You can only shut down the device by unplugging the battery compartment.

### 8.5.10 Annotation Settings

In the main interface of system settings, click the [Annotation Setting] icon to enter the annotation setting interface (as shown in Figure 8-17) .

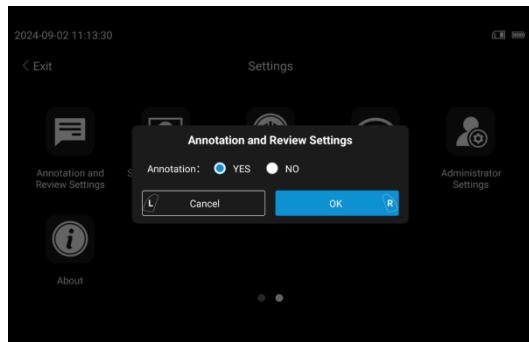


Figure 8-17

If set to “YES”, when back to live image mode, there will be a flag in white on the rightside as a entrance to set annotations (as shown in Figure 8-18).

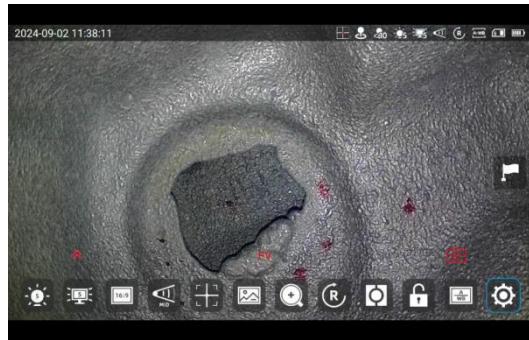


Figure 8-18

If set to “NO”, when back to live image mode, there won’t be any entrance to annotation settings (as shown in Figure 8-19).

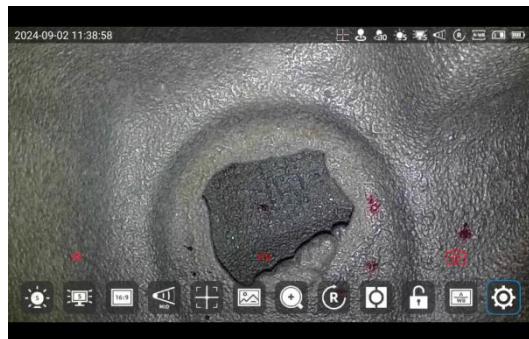


Figure 8-19

When the annotation is “YES”, click the white flag in live image mode, the annotation window will pop up (as shown in Figure 8-20).

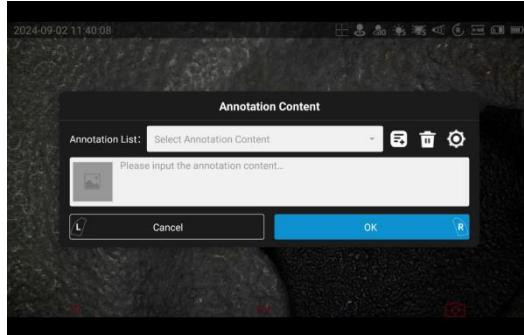


Figure 8-20

In the input box, click the [photo] icon on the left to change the annotation icon, or input the text to revise the current annotated text (as shown in Figure 8-21); click “OK”, it will be back to live image mode and the set annotation text will appear on the live image and will be saved into photos or videos if taken (as shown in Figure 8-22).

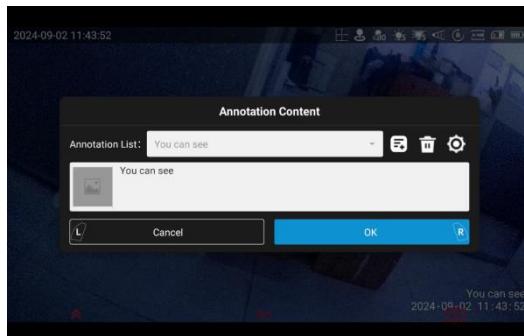


Figure 8-21

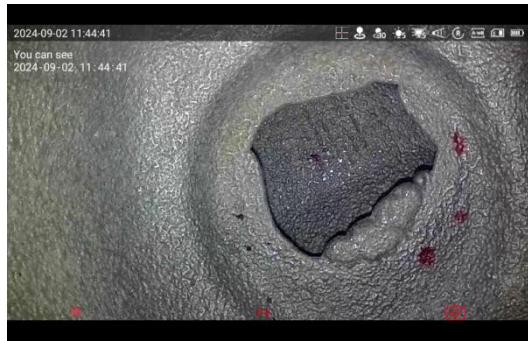


Figure 8-22

On the annotation list window, any one of the history annotations can be selected as the set annoation watermark (as shown in Figure 8-23).

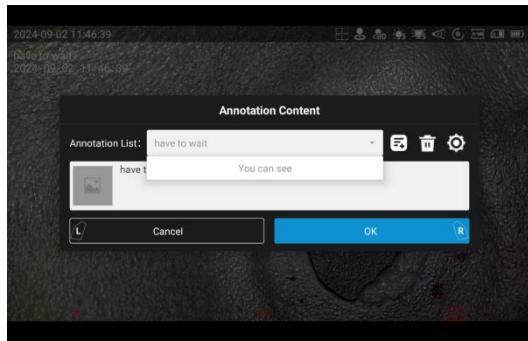


Figure 8-23

1) click the  [Add Annotation] icon, it will enter the annotation addition window(as shown in Figure 8-24); click the  [photo] icon on the left to select annotation photo or input text to add the annoation text (as shown in Figure 8-25); and then click “Save” to save the added annotation.

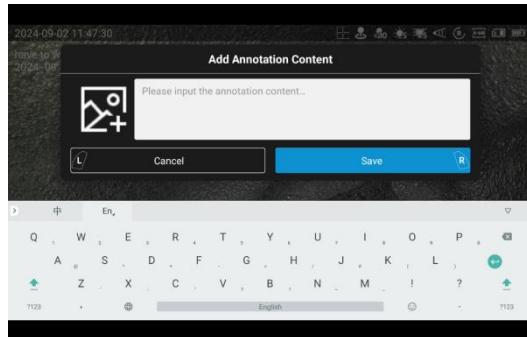


Figure 8-24

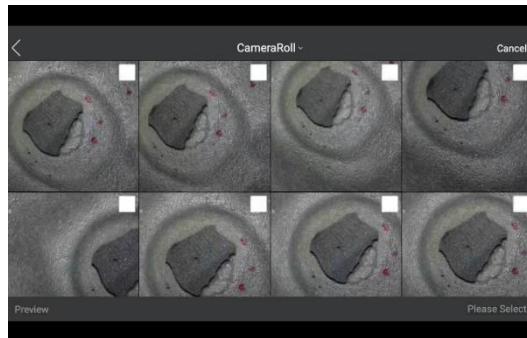


Figure 8-25

2) click the  [Delete] icon to enter the delete window, select the ones needing to delete and click “Delete”(as shown in Figure 8-26);

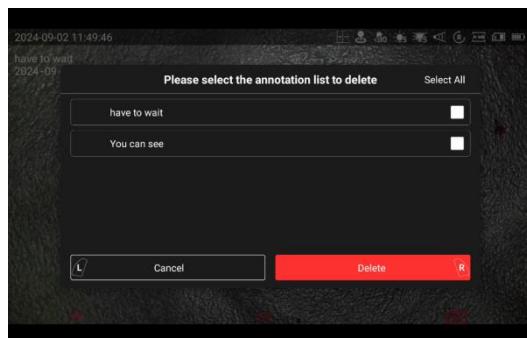


Figure 8-26

3) Click  [Setting] icon to enter the annotation details setting window (as

shown in Figure 8-27), users can not only set to adjust the font size and color, position of text notes, but also adjust the icon size and position, add the current time date watermark. Click Default, font size, color, position, icon size, position will be restored to the original Settings.

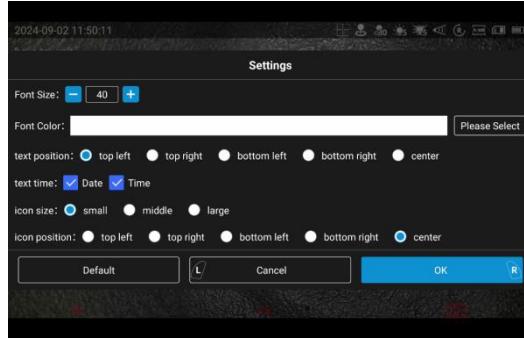


Figure 8-27

### 8.5.11 About

In the main interface of system settings, click the [About] icon to enter system information and view the software version number, SN and system version number (as shown in Figure 8-28) .

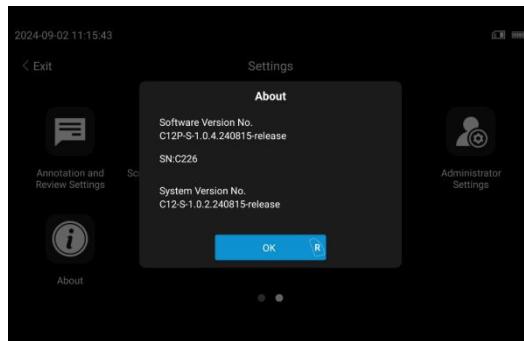


Figure 8-28

### 8.5.12 WIFI SETUP

Click the [WIFI] icon on the main interface of system settings, select “On” for WIFI and confirm (as shown in Figure 8-29).

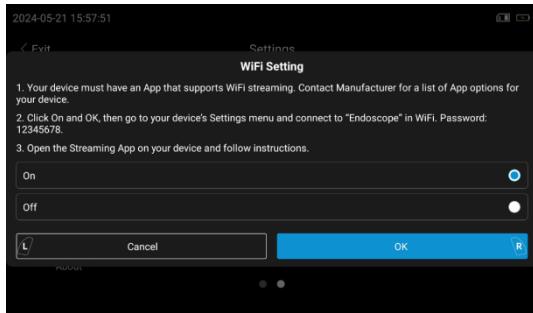


Figure 8-29

After the WIFI function is turned on, the system returns to the monitoring screen . At this time, the endoscope host has turned on the WIFI hotspot and display  s 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 entering 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 8-20).

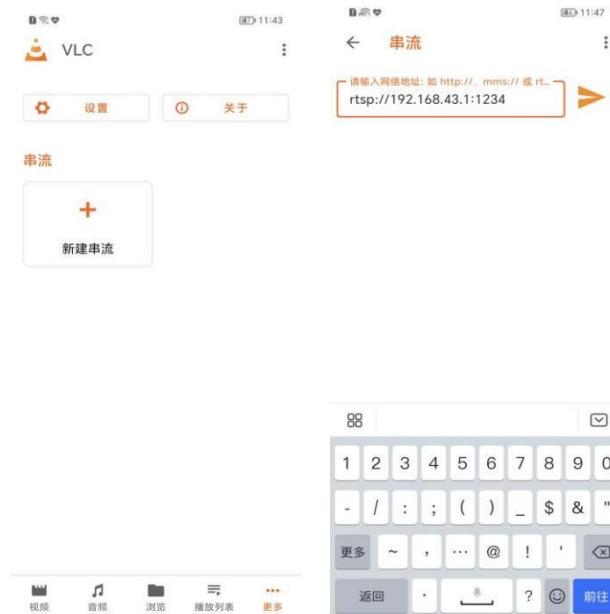


Figure 8-30

iPhone:

1. Download and install the "ScreenSharing" APP from the App Store (as shown in Figure 8-31) :



Figure 8-31

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 8-32).

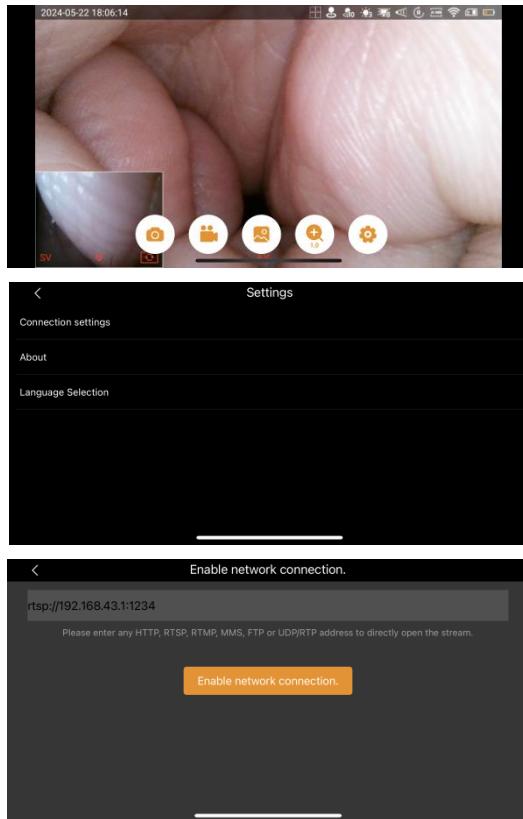


Figure 8-32

### 8.5.13 Screen resting time setting

In the main interface of system settings, click the [ Screen resting time setting] icon to set the automatic screen resting time (as shown in Figure 8-33 ) .

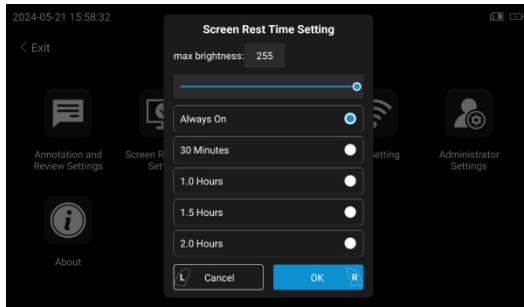


Figure 8- 33

Touch the automatic screen resting time setting to select Never, 30 minutes, 1 hour, 1.5 hours, or 2 hours. After selecting the screen resting time, if there is no operation within the specified time, the screen brightness will automatically change to level 1. If you operate or touch the screen, it will automatically return to the original screen brightness.

Move the progress bar to adjust the maximum brightness of the screen.

### 8.5.1.4 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 8-34 ).

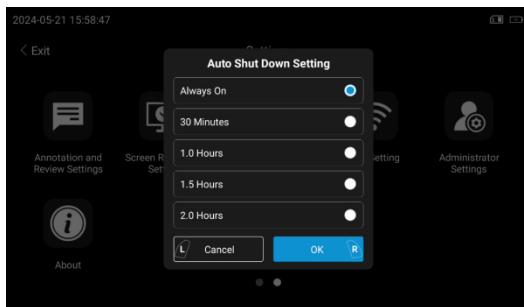


Figure 8- 34

Click on the automatic shutdown setting to select Never, 30 minutes, 1H, 1.5H, 2H. 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.

### 8.5.15 Image naming format settings

In the main interface of system settings, click the [ Image Naming Format Settings] icon to set the image naming format (as shown in Figure 8-35 ).

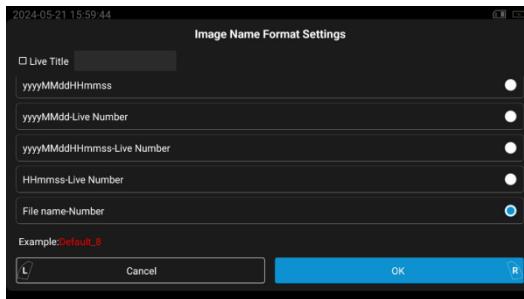


Figure 8- 35

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

### 8.5.15 Administrator settings ( hidden functions )

In the main interface of system settings, click the [ Administrator Settings] icon to enter the password: 123456, click OK, and then select [ Camera Brightness Level Settings ] or [ Camera Angle Settings] (as shown in Figure 8-36 , Figure 8-37 ) .

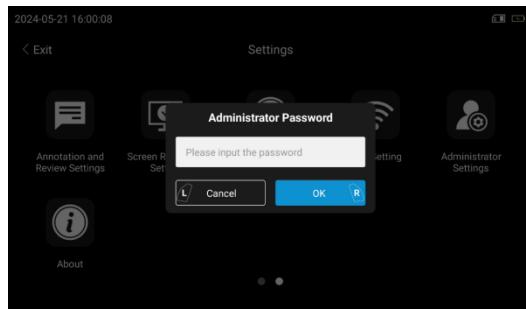


Figure 8- 36



Figure 8- 37

Click [ Camera Brightness Level Settings ] to set the direct side view light brightness level parameters (as shown in Figure 8-38) .

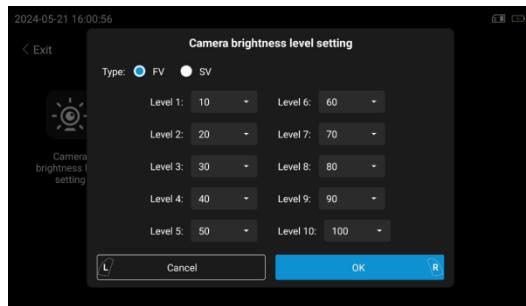


Figure 8- 38

Click [ Camera Angle Settings] to set the maximum bending angle of the camera (as shown in Figure 8-39 ) .

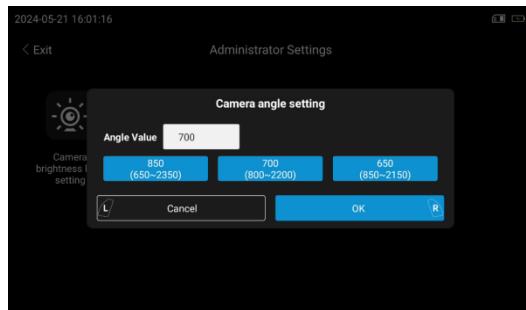


Figure 8- 39

### 8.5.16 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 8-40 ) .



Figure 8- 40

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.

## ⚠️ Prompt

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

### 8.5.17 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 8-41 ).



Figure 8- 41

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 external light source on the main interface.

## ⚠️ Prompt

The light source setting requires corresponding camera support, so please pay attention to the selection.

## 8.6 Image Browsing

Image browsing interface (as shown in Figure 8-42 ).

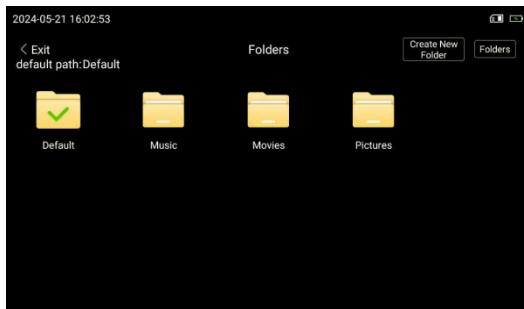


Figure 8- 42

Click [Create Folder] to create a new folder, enter the folder name, and click Save to complete the creation of the new folder (as shown in Figure 8-43) .

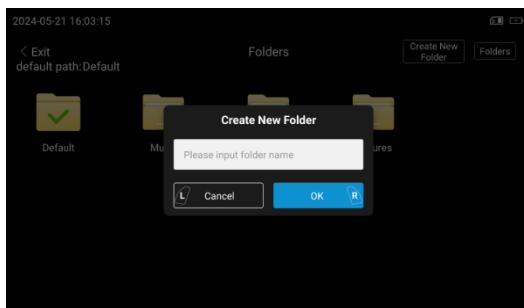


Figure 8- 43

### 8. 6. 1 Folder Management

Click [Folder Management] to enter the management operation mode, and click [Finish] to exit the folder management mode (as shown in Figure 8-44) .

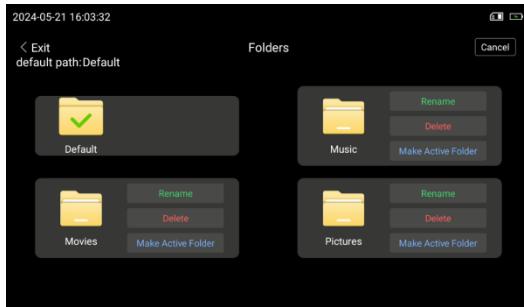


Figure 8- 44

Click [Rename] to rename the folder (as shown in Figure 8-45) .

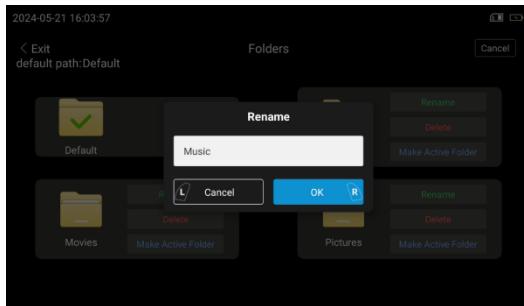


Figure 8- 35

Click [Confirm] to complete the folder renaming.

Click [Delete] to delete the current folder (as shown in Figure 8-

46) .

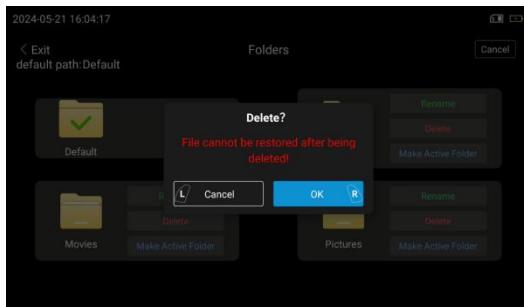


Figure 8- 46

Click [Set default path] to set the current folder as the default folder. After setting it as the default folder, photos and videos taken will be saved in this folder.

## ⚠️ Prompt

- The default folder icon has an arrow and is darker than a normal folder icon.
- The host connects to the computer to read data. After formatting on the computer, all the contents in the folder are deleted.

### 8. 6. 2 Photo and video browsing

When the file is not in folder management mode, click [Folder] to browse the pictures , videos and other folders in the folder (as shown in Figure 8-47 ) .

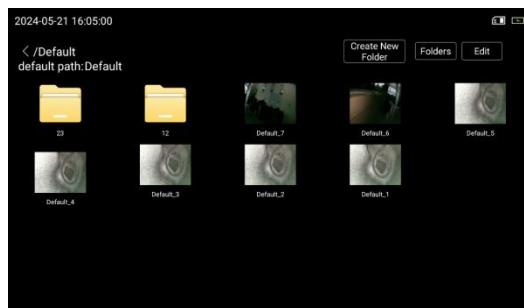


Figure 8- 47

Click [Edit] to enter the multiple selection mode and select multiple pictures , videos or folders for deletion (as shown in Figure 8-48 ) .

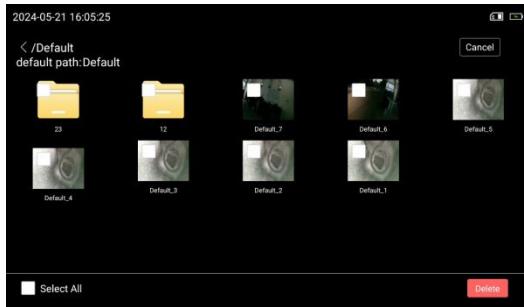


Figure 8- 48

Without entering the multiple selection mode, click on the picture to enter the picture browsing mode (as shown in Figure 8-49 ).

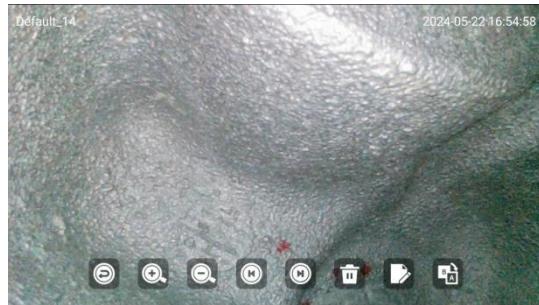


Figure 8- 49

Click the zoom icon to zoom in on the image.

Click the zoom out icon to zoom out and browse the enlarged image;

Click the forward and back icons to browse the previous and next pictures;

Click the delete icon to delete the current picture;

Click the rename icon to rename the current picture;

Click the edit icon to enter the picture editing mode;

Click the curve icon to draw a line on the image (as shown in Figure 8-50 ).



Figure 8- 50

Click the arrow icon to draw an arrow on the image (as shown in Figure 8-51) .



Figure 8- 51

Click the text editing icon to add a text watermark to the image (as shown in Figure 8-52) .

And you can drag the text watermark to the desired position at will.

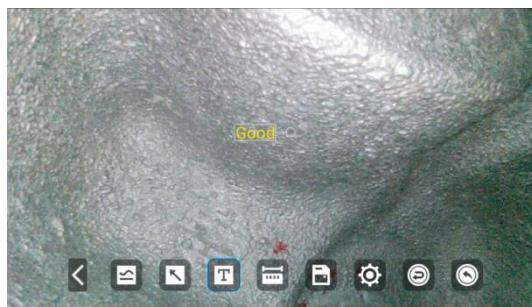


Figure 8- 52

Click the measurement icon to measure the image (as shown in Figure 8-53) .

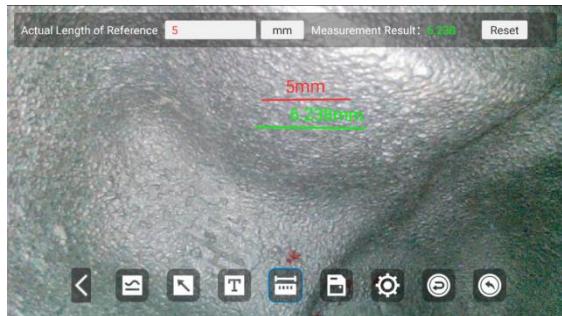


Figure 8- 53

Follow the prompts for each step:

- 1) First, use touch to select the location of the reference object in the image (such as the red line in the middle of Figure 8-53);
- 2) Input reference true value;
- 3) Finally, measure the required position to get the actual value required for measurement (as shown by the green line in the middle of Figure 8-53);
- 4) Click Reset to measure again.

Click the save icon to save the currently edited image.

Click the setting icon to set the line color or font size of each function (as shown in Figure 8-54) .

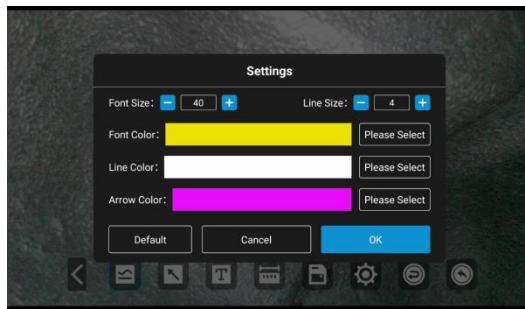


Figure 8- 54

Click the undo icon to undo the last step of the current editing. Select any icon such as line drawing, arrow, or watermark, and click the undo icon to undo the line drawing, arrow, or watermark in sequence. Select the secondary measurement icon and click the undo icon to undo the secondary measurement operation in sequence. The two cannot be undone in a mixed manner ( as shown in Figure 8-55 and Figure 8-56) .

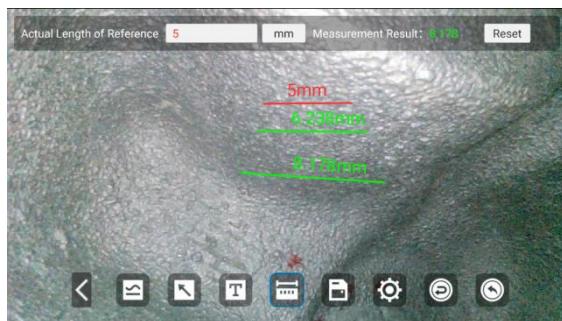


Figure 8- 55

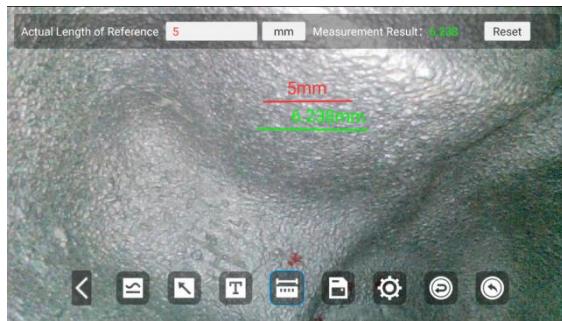


Figure 8- 56

Click the cancel icon to cancel all editing effects.

Click the Exit icon to exit the image editing mode.

Click the thumbnail of a video file to browse the video (as shown in Figure 8-57) .

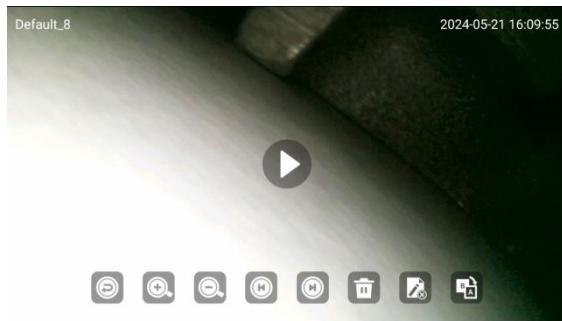


Figure 8- 57

Click the middle play button to start playing the video.

## 8. 7 Recording pause

When recording, click the icon displayed as “” on the lower right side (as shown in Figure 8-58 ) to pause recording. Click the icon displayed as “” on the lower right side to continue recording. When the video is

playing, the image at the time of pause will not be recorded (as shown in Figure 8-59).

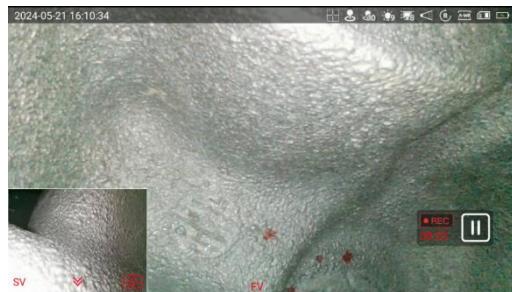


Figure 8-58

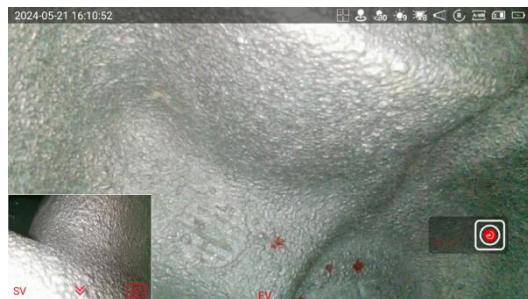


Figure 8-59

## 8. 8 HDMI output

Connecting the HDMI cables to the monitor and host HDMI ports respectively can realize the video output interface and achieve dual-interface display (i.e. host interface and monitor interface).

# IX. Instrument storage and maintenance

## 9.1 Cleaning

### ■ Cleaning the insertion tube

- 1) Use a lint-free cloth to wipe off any foreign matter on the insertion tube.
- 2) If liquid (waste water or oil) touches the insertion tube, wipe it in the following order: ① Wipe with a dust-free cloth or cotton cloth; ② Wipe with a neutral detergent and a dust-free cloth; ③ Wipe with a dust-free cloth dipped in water; ④ Wipe away the water stains with a dust-free cloth.

### ⚠️ Notice

- To extend the life of the insertion tube, clean it with a lint-free cloth .
- Do not rinse the camera directly with tap water, as this may damage the instrument.
- Store the instrument horizontally at room temperature and keep the room clean and dry.
- Do not let it collide with other objects during storage, handle it with care and use it safely.
- When the instrument is not used for a long time, the function should be checked regularly.

### ⚠️ Warnings

- Keep the instrument out of reach of children and use it only after children are familiar with the usage rules.
- It is strictly forbidden to store the instrument in an environment with high temperature, high humidity, strong light, strong shock,

high dust, pollution or corrosion.

### ■ Cleaning the screen

If fingerprints or stains are found on the screen, wipe it clean with a dust-free cloth.

### ■ Clean the main unit and operating handle

If the host is found to be dirty, wipe it clean with a dust-free cloth.

#### ⚠️ Notice

- Do not use tap water to clean the instrument directly to avoid damage to the instrument.

## 9.2 Repacking

#### ⚠️ Notice

- 1) Store the insertion tube and main unit in the correct order. If they are not stored in the correct order, the insertion tube may be damaged.
- 2) When placing the insertion tube into the box, please handle it with care, otherwise the insertion tube may be damaged.
- 3) Store the insertion tube in such a way that it does not get bent.
- 4) Please lock the buckles of the box properly. If not locked properly, the box cover may open during transportation.
- 5) Before putting the main unit back into the box, please lay the box flat and close the cover carefully to avoid pinching your hands or instrument accessories.
- 6) Please use the standard box , otherwise it may cause damage or

malfunction of the host.

### ■ **Fasten the box**

If the box is bumped during the move, the lid of the box may open.

Check that the box is tightly fastened during transportation.

### ⚠ **Notice**

Fasten the two buckles of the box.

## **9.3 Storage precautions**

- 1) Store the instrument under normal room temperature and humidity conditions.
- 2) Please turn off the power of the instrument before packing.
- 3) Place the instrument on a clean, dry, and stable surface.

### ⚠ **Notice**

- 1) Do not store the instrument in locations with high temperature, high humidity, excessive dust or fine particles, direct sunlight, or where radioactive materials are emitted; otherwise, the instrument may be damaged.
- 2) When storing the instrument, please handle it with care and avoid collision with other objects, otherwise it may cause malfunction.

## **X. Troubleshooting**

If the fault cannot be eliminated by following the following methods, do not use the instrument and contact the company:

- ① Check the instrument as described in Chapter 7 for any obvious

faults.

②Abnormalities that cannot be resolved by following "10.1 Troubleshooting Guide".

### 10.1 Troubleshooting Guide

Fault	Possible reason	Suggested Actions
Screen freezes	There may be something wrong with the color settings.	Restart the host
Can't turn on the machine	System busy running	Please wait a moment, if it doesn't work, please re-insert the battery and restart.
Insert SD card, display shows no card inserted	SD card is not properly inserted	Need to reinsert into the card slot
SD card information	When the Type-c cable is connected to the computer to read the SD card, image operations and formatting cannot be performed on the computer side.	Format on the instrument or on a computer using a card reader
	When the computer detects that the SD card is abnormal or partially damaged, a repair prompt will pop up	No need to repair, just click the "X" symbol in the upper right corner to turn it off
Automatic shut-down	If the ambient temperature of the instrument is too high, it will automatically shut	Terminate the test, allow the instrument to cool down, and then restart it.

	down.	
	Low battery will trigger automatic shutdown	Charging the instrument
The image is not clear enough	The front end of the insertion tube or the LCD screen is dirty	Wipe with a clean, dust-free cloth or cotton swab
The operating handle makes a squeaking sound	Steering noise	This is normal
Angle bending operation load is becoming more and more strenuous	The detected object has many turns	Extend the insertion tube as far as possible to reduce the amount of detour

## 10.2 Instrument repair

- 1) Please contact us before returning the instrument for repair. When returning the instrument for repair, a detailed description of the fault and the environment in which the fault occurred must be included.
- 2) According to the warranty agreement, any faults that occur during the warranty period can be repaired free of charge. When returning the instrument for repair, please attach the warranty card.
- 3) This product does not have any parts that can be repaired by the

user. Do not disassemble, modify or repair it. The company does not assume any responsibility for the losses caused to the user. The maintenance service of this product is only provided by the company and authorized dealers.

## **Warnings**

The company does not assume any responsibility for any losses caused by maintenance performed by personnel other than the company .

### **10.3 FCC Caution**

#### **1) Labelling requirements**

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.

#### **2) Information to user**

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

#### **3) Information to the user**

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio

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.

Specific Absorption Rate (SAR) information:

This equipment complies with **FCC** radiation exposure limits set forth for an uncontrolled environment. End user must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

- The portable device is designed to meet the requirements for exposure to radio waves established by the FCC. These requirements set a SAR limit of 1.6 W/kg averaged over one gram of tissue.

## XI. External use standards

Voltage Directive EMC Directive	CE compliant	
EE Directive	WEEE compliant	
RoHS Directive	RoHS compliant	

directive	Comply with the FCC	
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