ENDOSCOPE IMAGING PROCESSOR

AQ-300/ AQ-300E/
AQ-300N/ AQ-300S

INSTRUCTIONS FOR USE

Shanghai AOHUA Photoelectricity
Endoscope Co., LTD.

CE 0344

Important information — Please Read Before Use

- Before use, thoroughly review this manual.
- Please keep all instruction manuals in a safe, accessible place.
- Contact for any questions or comments about this instruction manual.

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Important Information — Please Read Before Use

Intended use

AQ-300 endoscope imaging processor is intended to be used with video endoscope and light source manufactured by Aohua in endoscopy, endoscopic diagnosis and endoscopic treatment. Do not use this instrument for any purpose other than its intended use.

Instruction manual

This instruction manual should be kept in an accessible place. Before use, thoroughly review this manual which contains the most appropriate instructions regarding to the maintenance and operation of this endoscope imaging processor. Although the endoscope imaging processor itself is fine and precise, the malfunction rate could be significantly reduced by following the essentials in this manual during operation and maintenance, resulting in extended lifetime of the endoscope imaging processor.

Any questions about the information provided in this instruction manual or about the endoscope imaging processor operation and safety regards, contact with Aohua.

User qualifications

This instrument should be used by persons trained in the use of this instrument.

If there is an official standard on user qualifications to perform endoscopy and endoscopic treatment that is defined by the medical administration or other official institutions, such as academic society on endoscopy and endoscopy physicians, follow that standard. If there is no official qualification standard, the operator of this instrument must be a physician approved by the medical safety manager of the healthcare facility or person in charge of the department (department of internal medicine, etc.).

The physician should be qualified to operate and safety perform the planned endoscopy and endoscopic treatment following guidelines set by the academic societies on endoscopy, etc., and considering the difficulty of endoscopy and endoscopic treatment. This manual does not explain or discuss endoscopic procedures.

Ancillary equipment

The safety of the endoscope imaging processor does not only rely on the endoscope imaging processor itself, but also relies on its ancillary equipment. To guarantee the compatibility, only the ancillary equipment manufactured by Aohua or confirmed by Aohua is recommended to use. Aohua prepared the standard accessory and spares list. Please carefully check the items in the package according to the list provided in Section 1.1, "Checking the package contents list" after purchase. If any item is missing or damaged, contact Aohua or distributor immediately. Prior to the

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first time use of a new endoscope imaging processor, carefully clean and disinfect the endoscope imaging processor and accessories.

The endoscope imaging processor and other components should be stored according to the following Section 4.7.2, "Storage and disposal".

Instrument compatibility

Before use, please refer to "Ancillary Equipment" to confirm that this instrument is compatible with the ancillary equipment being used. Using incompatible equipment can result in patient or operator injury and/or equipment damage.

Spare equipment

Be sure to prepare another light source to avoid interruptions during examination due to equipment failure or malfunction.

Repair and modification

This instrument does not contain any user-serviceable parts. Do not disassemble, modify or attempt to repair it; patient or operator injury and/or equipment damage and/or the failure to obtain the expected functionality may result. Some problems that appear to be malfunctions may be correctable by referring to Chapter 5, "Troubleshooting". This instrument should be repaired by Aohua authorized personnel only.

Signal words

The following signal words are used throughout this manual:

⚠ **DANGER**	: It indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	: It indicates a potentially hazardous situation, if not be avoided, could result in death or serious injury.
⚠ CAUTION	: It indicates a potentially hazardous situation, if not be avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or potential equipment damage.
NOTE	: It indicates additional helpful information.

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Warnings and cautions

Follow the warnings and cautions below when handling this instrument. Information below is to be supplemented in each chapter.

⚠ **DANGER**

- Never apply this Imaging processor connected with the endoscope to the heart or any area near the heart.

- Never apply an endotherapy accessory or another endoscope applied to or near the heart to come in contact with the endoscope connected to this imaging processor.

- Strictly observe the following precautions. Failure to do so may put the patient and the medical personnel in danger.

   o When the instrument is used to examine a patient, do not allow metal parts of the endoscope or its accessories to touch metal parts of other system components.

   o Keep fluids away from all electrical equipment. If fluids are spill on or into the unit, stop operation immediately and contact Aohua.

   o Avoid preparing, inspecting or using the instrument with wet hands.

- Never install and operate the endoscope imaging processor in location where:

   o The concentration of oxygen is high.

   o Oxidizing agent (such as nitrous oxide ($N2O$)) or flammable anesthetics are present in the atmosphere.

   o Flammable liquids are nearby.

⚠ **WARNING**

- This device must be operated by a medical practitioner capable of safely performing endoscopy after operation technique training. Do not use this instrument for any purpose other than its intended use.

- This product may interfere with other medical electronic equipment used in combination with it. Before use, please confirm the compatibility of the device with all equipment to be used.

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 WARNING

- Do not use the instrument in any place where it exposed to strong electromagnetic radiation. Otherwise, this may impair the performance of the instrument.

- Always set the brightness to the minimum required level, as strong light like xenon light may cause patient burns.

- Avoid observing in proximity to the mucosa for an extended period. It may cause patient burns.

- The APPLIED PARTS of HF surgical equipment must be TYPE BF APPLIED PARTS or TYPE CF APPLIED PARTS.

- Be sure to use the ancillary equipment manufactured by Aohua or confirmed by Aohua is recommended to use. Using incompatible equipment can result in patient or operator injury and/or equipment damage.

 CAUTION

- This instrument shall be used with auxiliary equipment or accessories complied with relevant EMC standards for safety reason. Otherwise, performance of the imaging processor may be affected.

- Portable or mobile phones may cause radio interference to this instrument. Relocating the imaging processor or provide shield to the location if the radio interference occurs.

- Do not connect or disconnect the endoscope connector while this instrument is turned ON. This action may destroy the instrument.

- When the instrument is used with other non-medical auxiliary equipment, such as video recorder and printer, the isolated transformer or insulating socket must be used to ensure the safety.

- Do not use a sharp or hand object to tap the icons on the touch panel. This may damage the icons.

- Avoid applying excessive force to the connectors, as this may damage the instrument.

- Do not place any device on the endoscope imaging processor as this may cause damage to the device.

- Do not block or block the endoscope imaging processor vents (located on the side and bottom of the image processor). Clogged vents can overheat the machine and damage

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⚠ CAUTION

> the equipment.
>
> ● Ensure reliable grounding. Power requirements: The user needs to input 100 - 240V, 50/60 Hz, if the voltage is unstable, the customer must configure automatic regulation and regulation power supply (more than 1000W, cannot use household type voltage regulator; If you have any questions, you can call the company or special maintenance station). The user must provide a power supply with a reliable, safe grounding. Electrical products with large power consumption cannot use the same regulated power supply at the same time. If the power grid in the user area loses power frequently, it is recommended to use uninterruptible power supply (UPS) to ensure the normal operation of the system. Connect the power cable of the endoscope image processor to the UPS power input port.

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Labels and symbols

	Type BF equipment
	Protective earth(ground)
	Equipotential
	Power ON/OFF
	Fuse
	The positive electrode of the battery (CR2025 3V) is placed upward
	Stand-by switch
支架最大负荷1.0kg Bracket maximum load of 1.0kg	Warning: Bracket maximum load of 1.0kg
EC REP	European Community authorized representative
REF	Catalogue number
	Refer to instruction manual
	Date of manufacture
	Manufacturer
	Keep dry
	Use-by date
	Protect from sunlight

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SN	Serial number
	Fragile, handle with care
	Stack up
	Temperature limit
MD	Medical device
UDI	Unique device identifier
$C\epsilon$ 0344	CE marking. With this marking, the manufacturer declares the conformity of the product with the applicable REGULATION (EU) 2017/745 on medical devices. A code number after the CE mark indicates the responsible notified body.
	In accordance with European Directive 2012/19/EU on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately.

01 Checking the Package Contents

1.1 Checking the package contents list

> ⚠️ **CAUTION**
>
> - Check all items in the package against the components listed below. If any component is missing or damaged, do not use the item; please contact Aohua immediately. Accessories below in the list are only for the reference. Please refer to the packing list/shipping list included in each shipment.
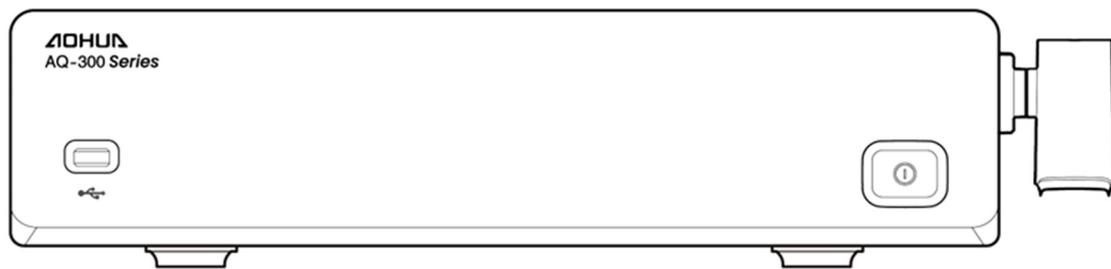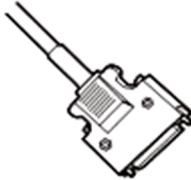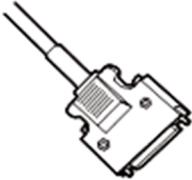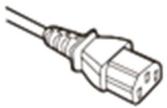

Figure 1: AQ-300 series Endoscope Imaging Processor

Touch panel	LS link cable	ENDO link cable
Power cord	Fuse	DVI cable
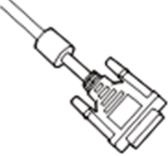
01 Checking the Package Contents
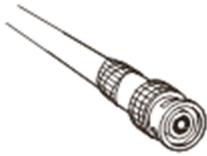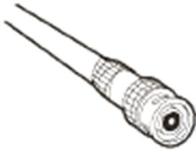
CVBS video cable	S-video cable	SDI cable
White balance cap	User manual	USB flash disk
Keyboard	Tablet stand	Tablet base
Hexagon wrench set	Foot Switch assembly (Optional)	
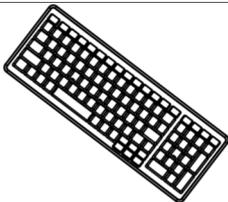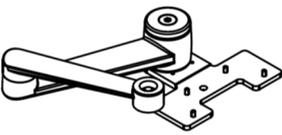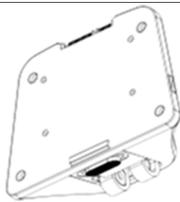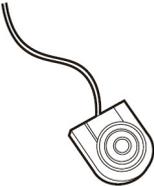
02 Nomenclature and Functions

2.1 Nomenclature and functions

2.1.1 Front panel
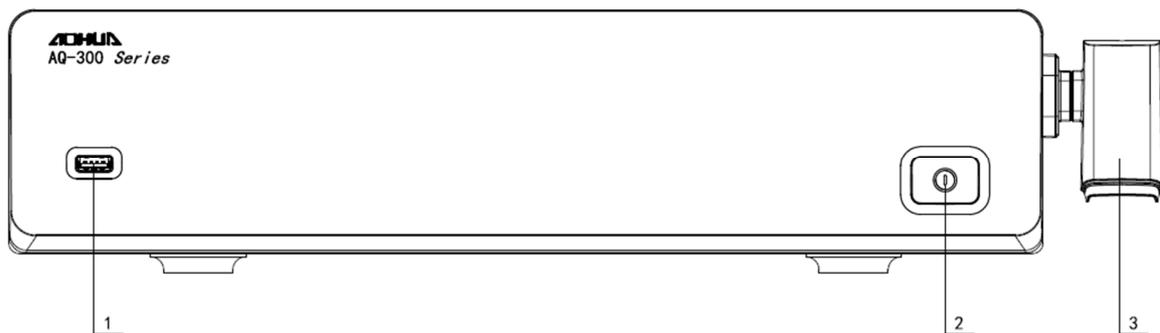
Figure 2.1.1 Front panel

Nomenclature	Description
1. USB Port	Insert portable memory into this port.
2. Power Switch	Press to turn the endoscope imaging processor ON or OFF.
3. White Balance Cap	Insert the distal end of the endoscope to perform white balance adjustment

Nomenclature and Functions

2.1.2 Rear panel
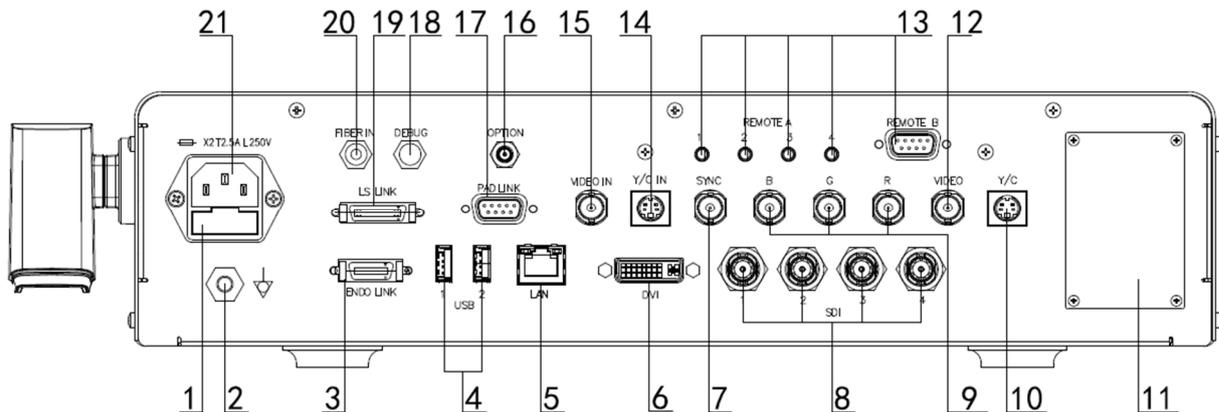
Figure 2.1.2 Rear panel

Nomenclature	Description
1. Fuse Socket	This socket is used to install fuse to protect the imaging processor when the current is too large.
2. Equipotential Terminal	This terminal is connected to a potential equalization terminal of the other equipment connected to the imaging processor. The electrical potential of the equipment is equalized.
3. ENDO LINK Terminal	Establishes data communication between the endoscope and the imaging processor.
4. USB Port	Insert portable memory into this port.
5. LAN Terminal	Connects with local area net.
6. DVI Video Output Terminal	Connects equipment compatible with the DVI (Digital Visual Interface). Outputs DVI video.
7. SYNC Video Output Terminal	Outputs the separate SYNC signal.
8. SDI Video Output Terminal	Connects equipment compatible with the SDI (Serial Digital Interface). Outputs SDI video.

Nomenclature	Description
9. G, B, R Video Output Termina	Outputs the RGB component video signal.
10. Y/C Video Output Terminal	Outputs the Y/C video signal.
11. Nameplate	Provides necessary relevant information of the imaging processor on the nameplate.
12. VIDEO Output Terminal	Outputs the PIP video signal.
13. REMOTE Terminal	Connects the printer, etc. REMOTE B Terminal is for the connection of foot switch.
14. Y/C IN video terminal	Inputs the PIP video signal.
15. VIDEO IN terminal	Inputs the PIP video signal.
16. Option Terminal	Debugs the device.
17. VIDEO IN terminal	Inputs the PIP video signal.
18. Touch panel Link Terminal	Connects with the touch panel.
19. LS LINK Terminal	Connects with the light source and establishes data communication between the light source and the imaging processor.
20. Fiber IN Terminal	Connects with the light source and establishes data communication between light source and imaging processor.
21. Power Inlet	Connects the power cord with the imaging processor through this socket to provide mains power supply.

NOTE

- Connecting a computer to the LAN terminal to read relevant operation status information for repairing.
- The potential equalization wire is designed to connect the potential equalization terminals of different devices. The product is directly connected to the potential equalization bus of a building to reduce the ground potential difference between different medical devices, so as to reduce the risk of electric shock to the human body due to the unexpected current generated by the ground potential difference. If you need to interconnect different devices to form the ME system, refer to the IEC 60601-1 standard for ME system requirements.
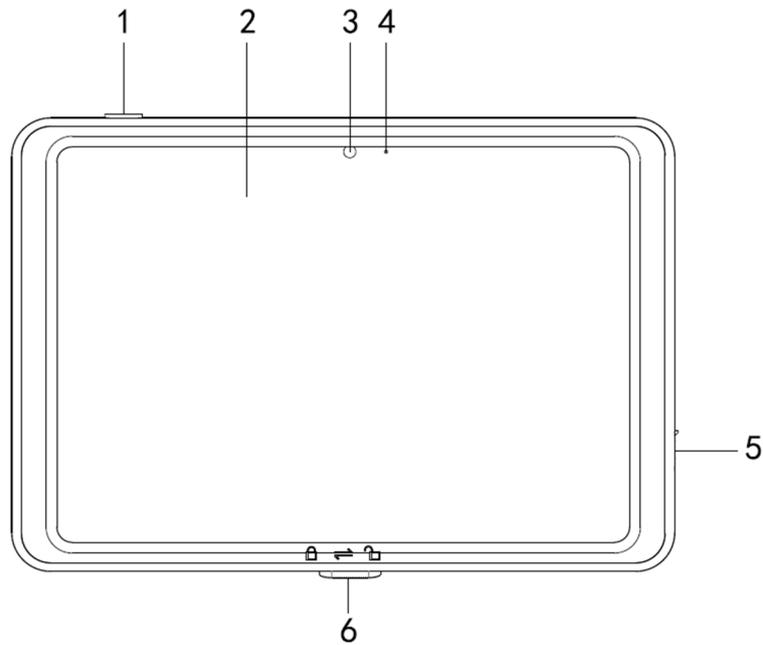
2.1.3　Touch panel

Figure 2.1.3.1 Front panel of touch panel
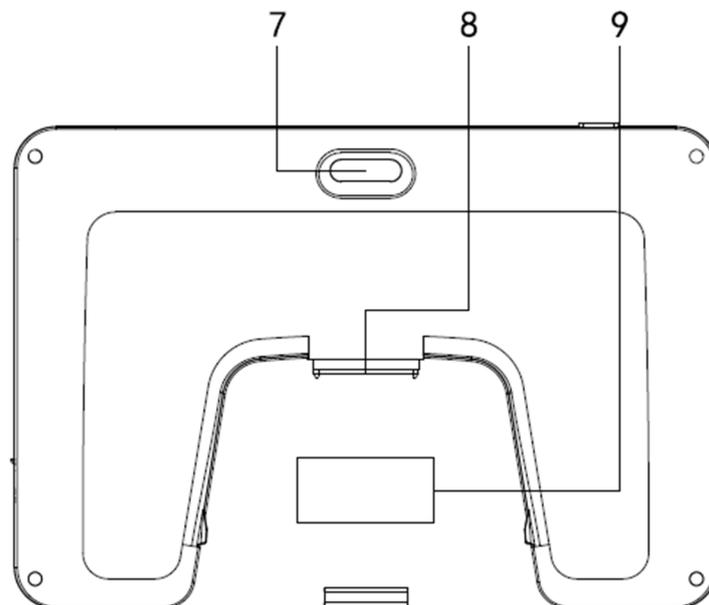
Figure 2.1.3.2 Rear panel of touch panel

Nomenclature	Description
1. Power switch	Press to turn the touch panel ON or OFF
2. Display screen	Display the operation interface and can be operated by touch
3. Front-facing camera	Capture images for face recognition
4. Microphone	Collect sound for voice control
5. Stylus bracket interface	Use to install the stylus holder
6. Support connection switch	Lock/Unlock the touch panel and bracket
7. Rear camera and supplement light	/
8. Base plate connection port	The port is communication and charging connection between touch panel and base
9. Touch panel nameplate	Provide the model of touch panel and production information on the nameplate

2.1.4　Schematic diagram of the touch panel

The schematic diagram of the touch panel is shown in figure 4.4.2.1(Login interface)，figure 4.4.2.2(Main interface), figure 4.4.2.3(Patient information interface)，figure 4.4.2.4(User information interface)，figure 4.4.2.5 and figure 4.4.2.6(Maintenance interface). Tap the icon to perform touch panel operation.

(Figure 4.4.2.1: Login interface)

(Figure 4.4.2.2: Main interface)

(Figure 4.4.2.3: Patient information interface)

(Figure 4.4.2.4: User information interface)

(Figure 4.4.2.5: Maintenance interface)
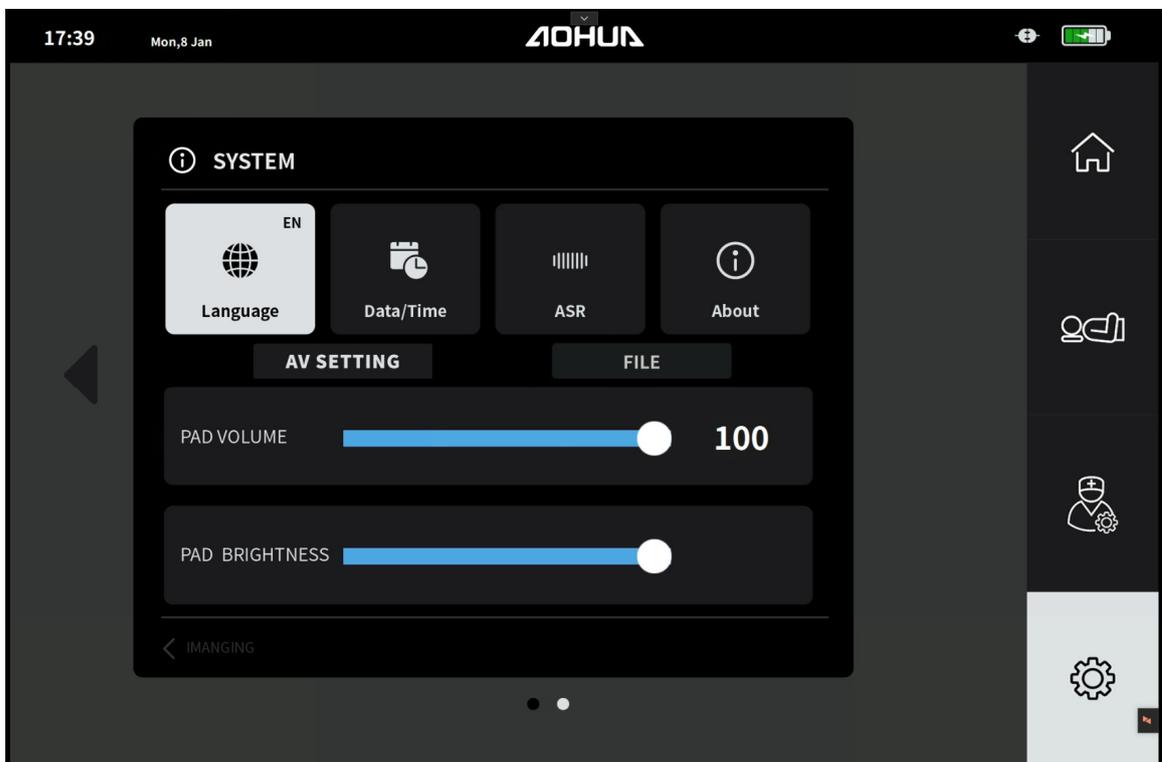
(Figure 4.4.2.6: Maintenance interface)

02 Nomenclature and Functions

2.1.5 Icon functions

The displayed icons shown in the table below indicate the current setting of the imaging processor.

- Login interface

Displayed Text	Description
	Face recognition login button
	Confirm login button
	User login selection box
	User password input box
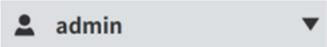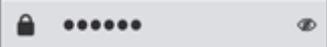
- Main interface:

Displayed Text	Description
	White balance adjustment
	Hemoglobin enhancement
	Zoom the image
	Enhancement type and level
	Airflow control
	Stopwatch control
	IRIS mode setting
	Video recording
	Replay image

FREEZE	Freeze image
RELEASE	Release the frozen image and save image
CBI Regular	CBI regular function switch
CBI Plus	CBI Plus function switch
ILLUMI.	Lamp control
Brightness 0	Brightness control of light source
Target Level − + 0	Dimming level control
M	Manual brightness adjustment mode
A	Automatic brightness adjustment mode
FLASH	Light source blinking
DUAL	Dual light switch (ON/OFF)
SWAP	Switch the image display mode
	Battery indicator
	Connection successfully/ or fail
	Home
	Patients' information
	User information
	Setup
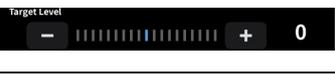
02 Nomenclature and Functions

● Patient information interface:

Displayed Text	Description
Patient information	
CLEAR	Clear patient information entered
SAVE	Save patient information
Description template	
DELETE	Delete the information in the template
NEW	Add new information in the template
SAVE	Save the template
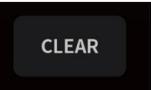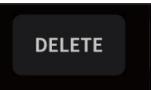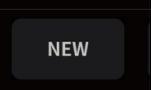
● User information interface
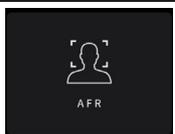
Displayed Text	Description
AFR	Switch the current user through face recognition
admin	Switch the current user through the drop-down box
CHANGE PASSWORD	Change the current user login password
ADD	Add new user
DELETE	Delete current user
ZOOM	Default zoom parameter settings used by the current user
PUMP	Default the current user's air pump status (ON/OFF)
P.LEVEL	Default the current user's air pump pressure (H/M/L)
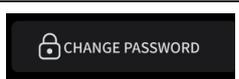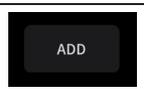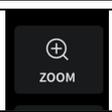
ENH		Default the current user's enhanced modes and levels for each mode
IRIS		Default the current user's metering mode and dimming level
RELEASE		Default the current user's stored image area and format when release
CBI Regular		Default the current user's CBI regular mode
CBI Plus		Default the current user's CBI Plus mode
COLOR		Default the current user's color setting
DUAL		Default the current user's dual light mode
SWTICH		Default the current user's remote switch control mode
ILLUMI.		Default the current user's light source status(ON/OFF)
LOCKTIME		Default screen lock time when the current user is not operating the touch panel
VIDEO QY		Default the current user's recording quality.
UNFRZ-SAVE		Default the function to save image when un-freeze
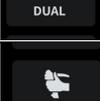
Maintenance interface

Displayed Text	Description
SD PAL **ANALOG VIDEO**	Change video output format
PIP	PIP(Picture-in-picture) function
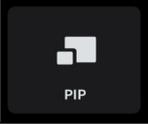
02 Nomenclature and Functions

RESET		Reset the touch panel settings
DENOISE		Image noise reduction switch
DARK-CORR		Dark area function switch
FRZ-PIC-SEL		Freeze-picture selection function switch
IMG-SIZE		Image size setting
DICOMSETTING		DICOM setting
EN Language		Operation interface language selection
Data/Time		Date and time settings
ASR		Voice control function switch
About		About
PAD VOLUME		Touch panel volume setting
PAD BRIGHTNESS		Touch panel brightness setting
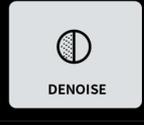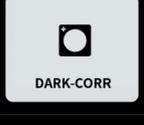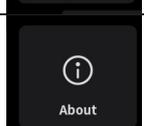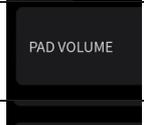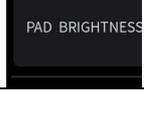
2.1.6 Keyboard

Quick operation functions of the keyboard as follows:

Nomenclature	Description
1. F1	Brightness adjustment mode (M/A)
2. F2	IRIS mode (Peak/Ave)

02 Nomenclature and Functions

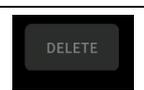| Nomenclature	Description
3. F3	Hemoglobin enhancement (HbE)
4. F4	Enhancement type（ENH Type）
5. F5	Enhancement level (ENH Level）
6. F6	Zoom the image (Zoom)
7. F7	Freeze/Release image (FREEZE)
8. F8	Release image (RELEASE)
9. F9	Replay image (PLAYBACK)
10. F10	Compound Band Imaging (CBI)
11. F11	Video record (Record/stop)

02 Nomenclature and Functions

2.2 Main electrical components

1. Three-pin plug and socket
2. Power switch
3. Axial fan
4. Switching mode power supply
5. Fuse (T 2.5A L 250V).
6. image processing circuit board
7. Video interposer
8. Touch Panel

2.3 Product characteristics

1. This equipment is classified as class I type of protection against electric shock and BF type applied part.
2. The ingress protection rating is common device.
3. Applied part of this instrument: Endoscope.
4. Manufacturer: Shanghai AOHUA Photoelectricity Endoscope Co.,Ltd.
5. Product name: Endoscope imaging processor
6. Model type: AQ-300/ AQ-300E/ AQ-300N/ AQ-300S
7. Operating mode: Continuous running.
8. Classified as non-AP device or APG device, according to the safety rating of performing in air and flammable anesthetic gas mixture; or oxygen/nitrous oxide and flammable anesthetic gas mixture

2.4 Performance characteristics

1. Equipped with white balance function.
2. Equipped with brightness adjustment function: Manual adjustment and Automatic adjustment.
3. Equipped with Hemoglobin enhancement function.
4. Equipped with structure enhancement function.
5. Equipped with edge enhancement function.

6   Equipped with combination enhancement function.

7   Equipped with color customization function.

8   Equipped with digital magnification function.

9   Equipped with Image freezing and replaying function.

10   Equipped with freeze selection function, freeze and real-time images can be displayed in parallel when freezing: the best image display can be automatically selected from the cached images within a certain time before the Image freeze is on to prevent the frozen image dragging caused by jitter.

11   Used with AQL-300L light source to perform chromoendoscopy and white light endoscopy (CBI) and reproduce two methods in a single display.

12   Equipped with image quality noise reduction function

13   Equipped with dark area correction function

14   Equipped with dual optical function

15   Equipped with foot switch function and endoscopic function button customization function.

16   Equipped with endoscopic automatic identification function.

17   Equipped with video recording function

18   Support connecting keyboard for functional operations

19   Support character input operation through the touch panel

20   Equipped with Y/C, VIDEO signal input interface, can input video images to the image processor, and in the form of PBP (Picture by Picture) on the screen, input signal interface can be selected in the menu Settings.

21   Supports a variety of signal output methods, including SDI, DVI, VIDEO, Y/C output, component output (RGB, SYNC), etc.

22   Equipped with network interface (LAN port).

23   Authorized user login

24   Administrator login

25   Equipped with USB portable memory function (It takes effect only after the authorized user successfully logs in).

26   Equipped with image processing and system control functions.

27   Supports input of patient information.

28   Display light source life information

29   Equipped with face recognition function
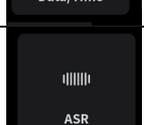
30   Equipped with the function of switching between Chinese and English interfaces.

02 | Nomenclature and Functions

2.5 Specifications

2.5.1 Operating environment

- Ambient temperature   : 5°C - 40°C
- Relative humidity   : 30% - 85%
- Atmospheric pressure   : 700 - 1060hPa
- Power supply   : 100-240V AC, 50/60Hz
- Input power   : 150VA

2.5.2 Product Structural Composition

This product is composed of image processing circuit, control circuit, switching mode power supply, and accessories including power cord, touch panel and interconnected data cord.

2.5.3 Compatible devices

This endoscope imaging processor is intended to be used with light source (AQL-300L), UHD series video endoscopes manufactured by Aohua, and other ancillary equipment that comply with relevant regulations and standards.

⚠ CAUTION

- All interconnected devices shall comply with the relevant requirements for safety use.

① Interconnected endoscope   : UHD series video endoscopes manufactured by Aohua.

② Interconnected Light Source   : AQL-300L light source manufactured by Aohua.

③ Interconnected Monitor   : Monitor with resolution higher than 1080 x 720 pixels (The monitor should comply with the relevant standards).

2.5.4 Imaging processor specifications

Dimensions	467mm (length) * 400mm (width) *103 mm (height)

Weight	7.5Kg
Software version	V1

Model	AQ-300	AQ-300N	AQ-300E	AQ-300S
Number of users be stored	500	50	100	10

03 | Preparation and Inspection

Prepare the endoscope imaging processor and compatible equipment before each use. Install and connect the equipment according to the procedures described in this chapter and the instruction manuals for ancillary equipment.

3.1　Endoscope imaging processor installation and connection

⚠ CAUTION

- Do not place any object on the top of the endoscope imaging processor. Otherwise, damage to the equipment may result.

- Do not cover or block the ventilation grills of the endoscope imaging processor. Ventilation grills blockage will overheat and cause damage to the device.

- Ensure reliable grounding. Power supply requirement:

  o Users need to provide 100V-240V AC and 50/60 Hz power supply; if the voltage is not stable, automatically regulated power supply must be provided (over 1000W, residential used voltage regulator shall not be used. Contact Aohua for any questions.) The same voltage regulator cannot be shared with other electrical products with large electricity consumption.

  o The user must provide the power supply with reliable and safe grounding.

  o For frequent power outage regions, UPS (Uninterruptible power supply) is recommended to use to ensure the normal operation of this system. Connect the power cord of the endoscope imaging processor with the power supply input inlet of the UPS.

- Turn OFF all system components before connecting them. Otherwise, equipment may be damaged.

- All ancillary equipment connected with the light source should be passive or safe extra-low voltage devices or devices with double insulation isolation from the supply mains and shall comply with the relevant requirements (such as IEC 60601-1, IEC 62368, IEC 60950, etc.).

03 Preparation and Inspection

3.1.1   Touch panel bracket installation

① According to the use of the site to choose the appropriate touch panel bracket installation method: trolley installation method or host installation method. Use special mounting parts to ensure that the connection is firm and reliable.

● Trolley installation method:

i.   Fix the rotating shaft on the mounting part of the bracket trolley with the inner hexagon screw A to form component A.
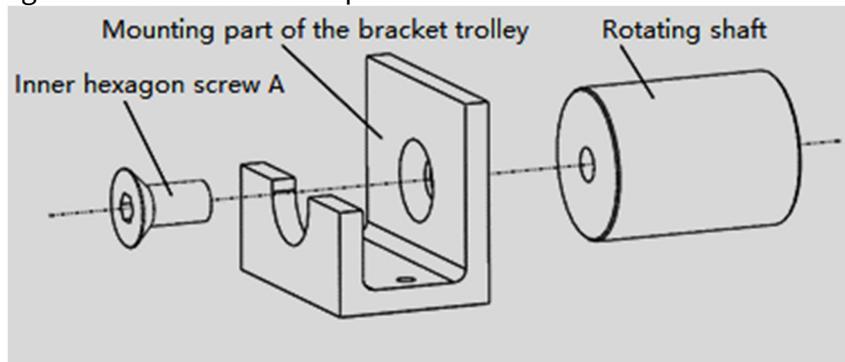
(Figure 3.1.1)

ii.   Install the installed component A on the trolley platform that place the Endoscope imaging processor AQ-300 using cross recessed screw A
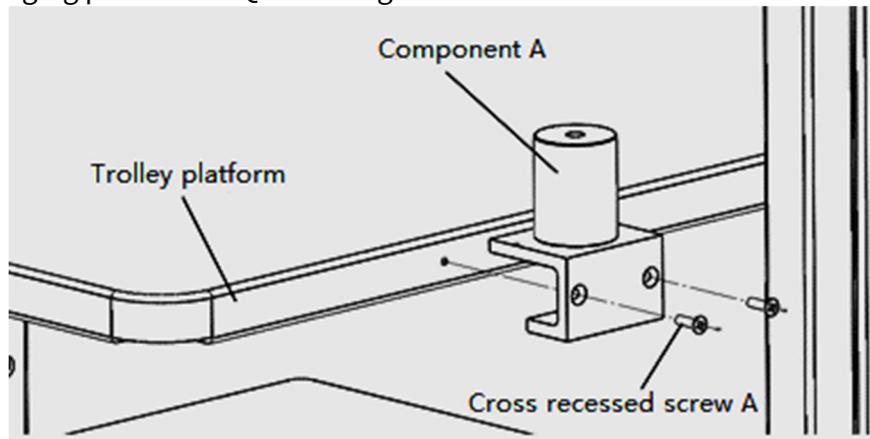
(Figure 3.1.2)

iii.   The base plate of the touch panel is fixed at the corresponding installation position of the bracket by using the inner hexagon screw B.
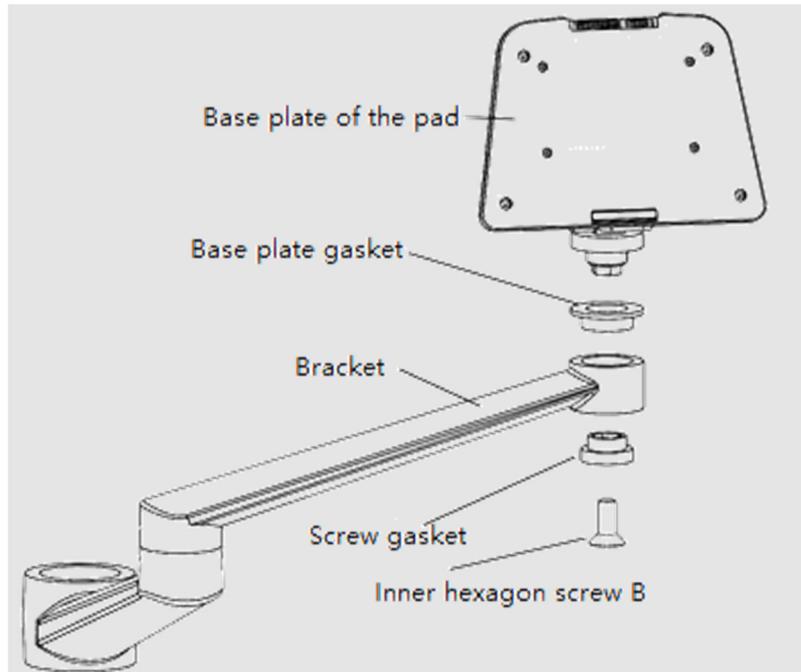
(Figure 3.1.3)

iv.   Install the bracket to the fixed component A, place the gasket at both ends of the bracket installation position, then install the retaining ring to the rotating shaft with the inner hexagon screw A to complete the bracket installation on the trolley.
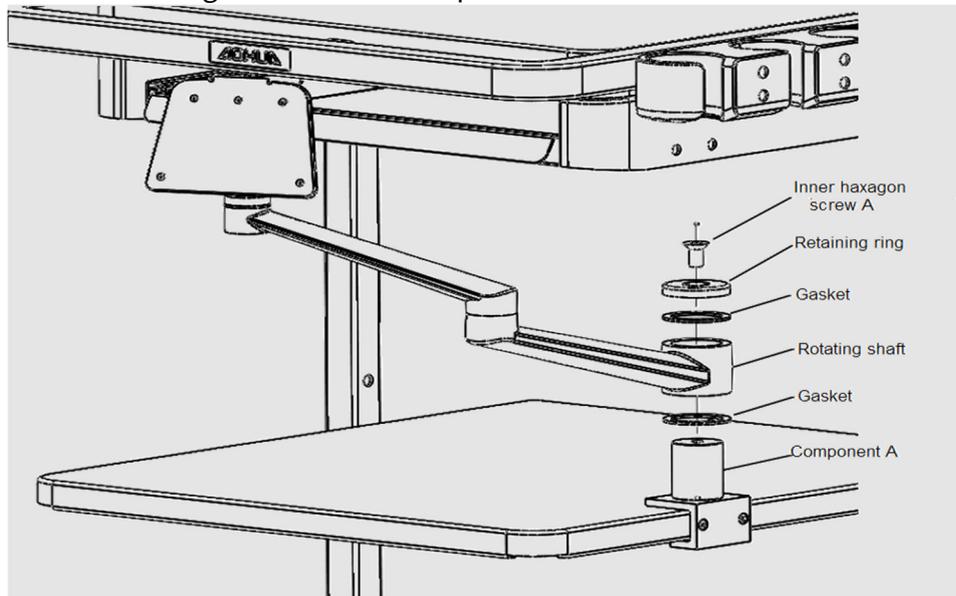
(Figure 3.1.4)

- Endoscope imaging processors installation method

  i.   Install the mounting part of the bracket host on the bottom plate of the endoscopic imaging processor using cross recessed screw A.
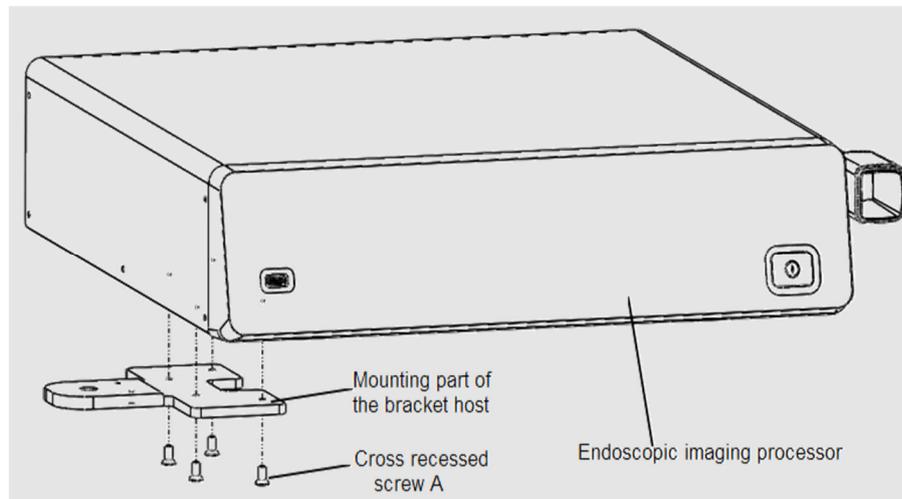
(Figure 3.1.5)

ii. Install the rotating shaft on the mounting part of bracket host using the inner hexagon screw A.
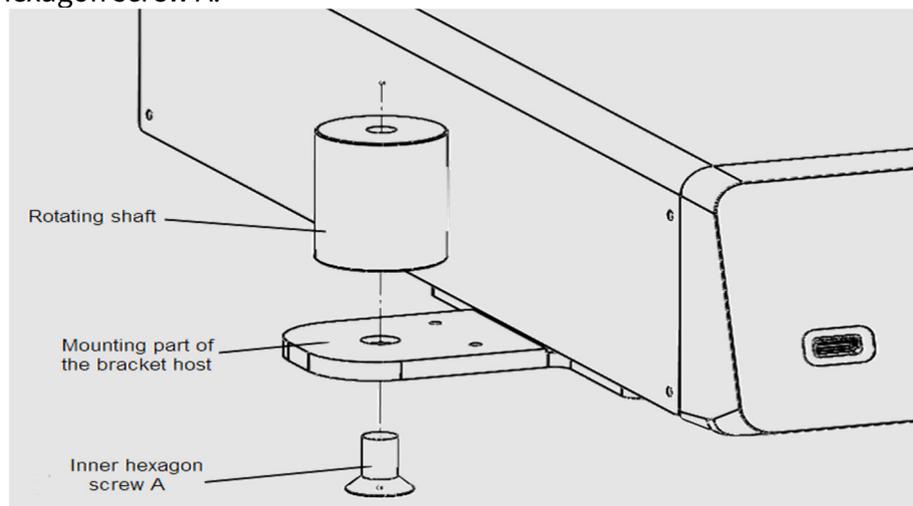
(Figure 3.1.6)

iii. Fix the base plate of touch panel on the corresponding installation position of the bracket using the inner hexagon screw B.

iv. Install the fixed rotating shaft on the bracket, place the gasket at both ends of the bracket installation position, then install the retaining ring to the rotating shaft with the inner hexagon screw A to complete the bracket installation on the endoscope imaging processor.
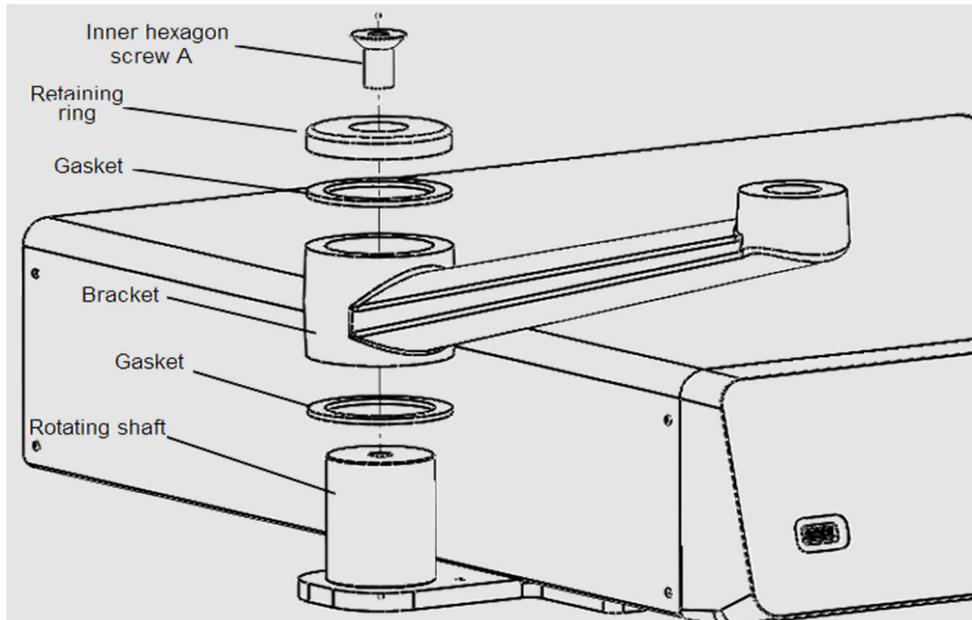
(Figure 3.1.7)

3.1.2 Endoscope imaging processor installation and connection

1 Inspect and ensure the reliable grounding is available, and the fuse is in good condition, and all ventilation grills are uncovered and unblocked.

2 Ensure that the power switches of the endoscope imaging processor and the light source are OFF.

3 Connect the keyboard with the USB port on the rear panel of the imaging processor as shown in Figure 3.1.8.
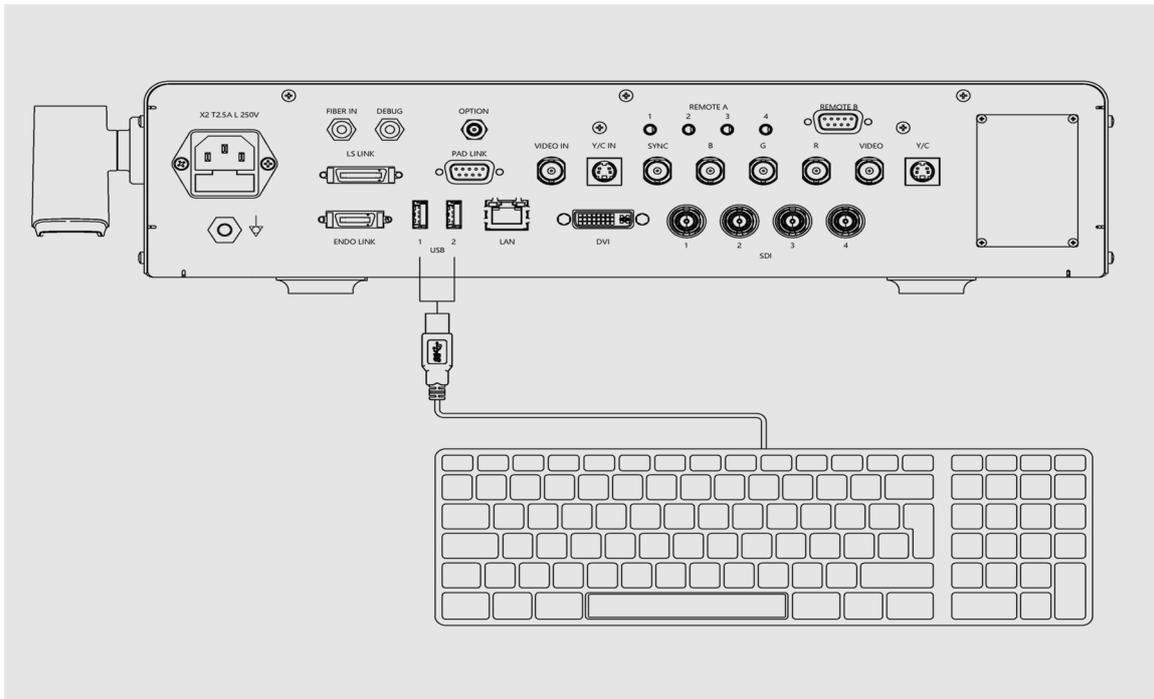
(Figure 3.1.8)

4 Connect the foot switch with the REMOTE B on the rear panel of the imaging processor if required.

5 Firmly insert the endoscope connector into the output socket of AQL-300L light source, and connect the light source and imaging processor with LS link cable, ENDO link cable and as shown in Figure 3.1.9.
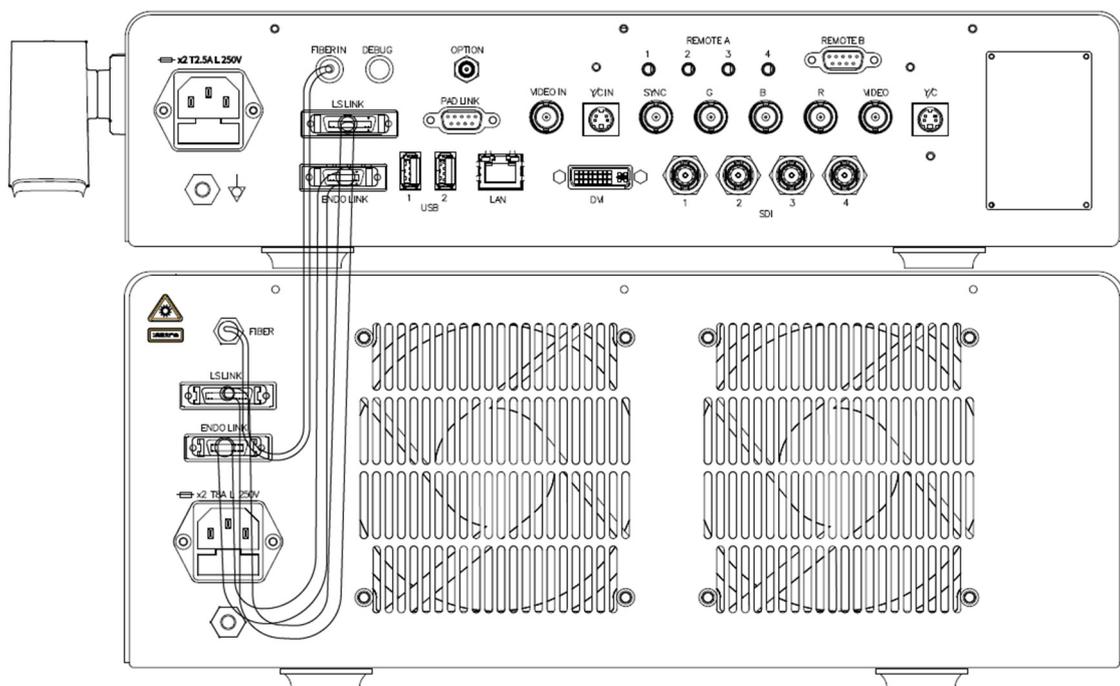
(Figure 3.1.9)

6 Connect the cable of the base plate of the touch panel to the PAD LINK terminal on the rear panel of the endoscope imaging processor. Connect the touch panel and the base plate and lock them tightly.

- Insert the touch panel obliquely from top to bottom into the base plate to make the plug on the top of the base plate into the base plate connection port behind the touch panel.
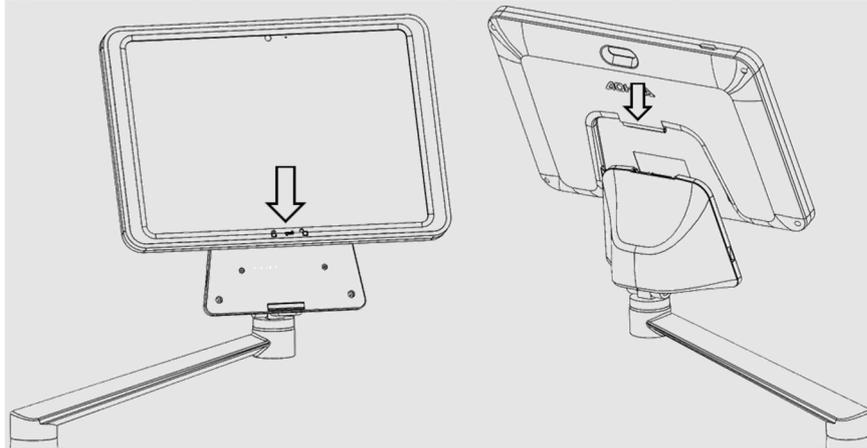
(Figure 3.1.10)

- After the touch panel is inserted into the base plate, push the low end of the touch panel into the base plate.
- Turn the support bracket switch at the bottom of the base plate to lock the touch panel and base plate.

⚠ CAUTION

- Do not pull out the touch panel from the base plate when using.

- The maximum load of the bracket is 1.0 kg. Do not hang anything on the bracket except the touch panel.

7 Connect the monitor to the imaging processors using any of follow ways below.
- Connect the Y/C Terminals of the imaging processor with the Y/C IN terminals of monitor using the S-VIDEO cables.
- Connect the S-VIDEO Terminals of the imaging processor with the SVIDEO IN terminals of monitor using the CVBS cables.
- Connect the SYNC/RGB terminals of the imaging processor with the SYNC/RGB IN terminals of the monitor using the CVBS cable.
- Connect the DVI terminals of the imaging processor with the DVI IN terminals of the monitor using the DVI cable.

- Connect the SDI terminals of the imaging processor with the SDI IN terminals of the monitor using the SDI cables.
- For PIP function, using the S-VIDEO cable to connect the Y/C IN terminal of the imaging processor with the Y/C terminal of external input equipment or using the CVBS cable to connect the VIDEO IN terminal of the imaging processor with VIDEO terminal of external input equipment.
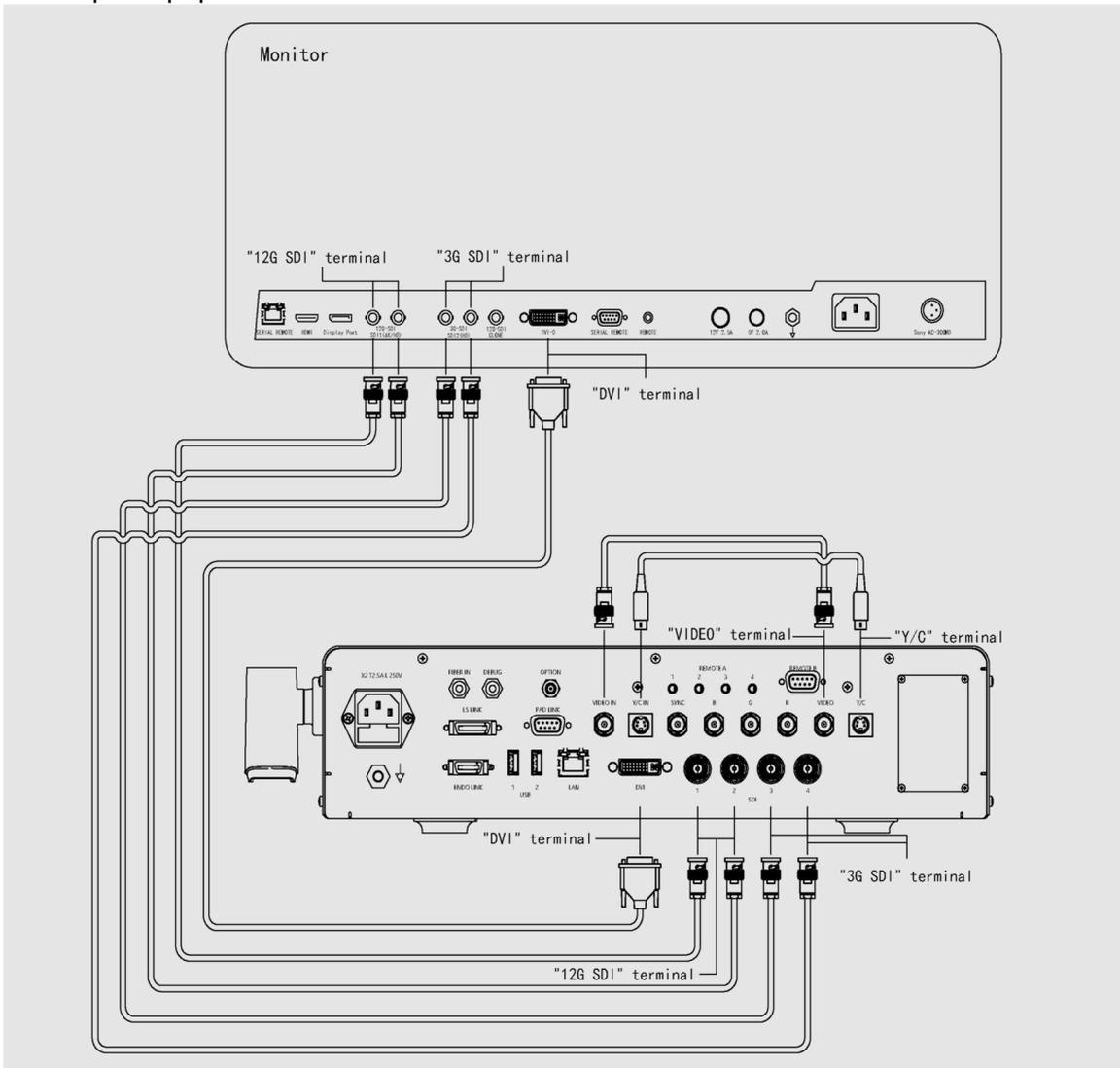
(Figure 3.1.11)

⚠ CAUTION

- For ancillary devices, consult Aohua to confirm equipment compatibility. Aohua is not responsible for any consequences caused by using of unapproved device.

03 Preparation and Inspection

- When install the imaging processor, keep it away from equipment with high energy and high power, or equipment emitting electromagnetic inference (such as CT equipment, X-ray equipment, microwave therapy apparatus, high frequency hyperthermia instrument, MRI equipment, radio communication device, etc.). Interruption of radio signals will appear on the display screen if the inference occurs, resulting in degradation on image quality. It is recommended to stay away from the inference source if the noise occurs.

- Do not hit the terminals on the front and rear panels the imaging processor with any hard or sharp objects. Otherwise, damage can be caused to the device.

- Do not touch the electric connecting points in the output socket of AQ-300 endoscope imaging processor.

- It is prohibited to use this product in the environment of flammable gas, otherwise a fire or explosions may result.

- It is strictly prohibited to frequently start the power switch of the imaging processor. Wait for at least 8 seconds for next initiation.

- The monitor used must be approved by Aohua and with resolution higher than 1080 x 720 pixels. Also, the monitor should comply with the relevant standards.

- For the information of high frequency coagulation device compatible with this imaging processor, refer to the instruction manual of the endoscope. Using the device not introduced in the endoscope instruction manual may cause the monitor to produce high frequency sound, and cause the endoscopic image to distort and disappear.

- The power plug is considered as a disconnection device, it should be put in the suitable station and easily to operate.

3.2 Inspection of the power supply

① Confirm that the ventilation grills are not covered or blocked with dust, and that the endoscope imaging processor is turned ON.

② Press the power switch of the endoscope imaging processor as shown in Figure 3.2.1. And the power indicator lights up.
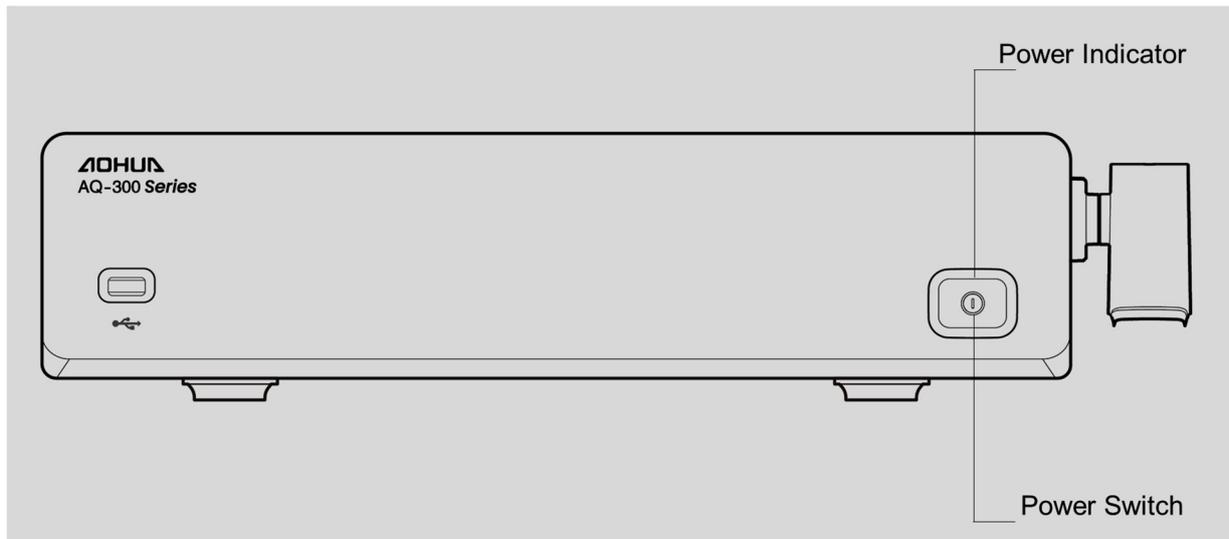
3   Confirm that air is ventilated by holding hand in front of the ventilation grills.

4   If the equipment fails to be turned ON, turn the endoscope imaging processor OFF. Then, confirm that the power cord is firmly connected. Then, turn the endoscope imaging processor ON again. If the equipment still fails to be turned ON, contact Aohua.

⚠ WARNING

- If air is not ventilated through the ventilation grills, do not use the light source and contact Aohua.

3.3 Inspection of the examination light

⚠ WARNING

- Do not look directly into the distal end of the endoscope or the output socket of the light source when they are emitting light. Eye injury may result.

Tap the "ILLUM" icon to ignite the examination lamp. Confirm the examination light is emitted from the distal end of the endoscope. Refer to the light source's instruction manual for operation.

03 Preparation and Inspection

3.4 Inspection of the automatic brightness adjustment

Confirm that the brightness of the examination lamp can be automatically adjusted.

⚠ WARNING

> ● Do not look directly into the distal end of the endoscope or the endoscope connector of the light source when they are emitting light. Eye injury may result.

① Confirm that the endoscope is connected to the light source, that the light source is connected to the imaging processor, and that both are turned ON.

② Tap the "ILLUMI" icon on the touch panel to ignite examination lamp.

③ Tap the bright adjustment mode icon on the touch panel of the endoscope imaging processor and select "A".

④ Point the distal end of the endoscope at a suitable object and vary the distance. Confirm that the light being emitted from the distal end varies with the distance.

⑤ Hold the distal end of the endoscope at a distance about 30mm to the object and tap the brightness enhancement and detraction icons. Confirm that the brightness of the light emitted from the distal end of the endoscope increases or decreases accordingly.

3.5 Inspection of the monitor display

⚠ CAUTION

> ● Before inspection, make sure that white balance adjustment is performed. See section 4.3, "Adjusting the white balance".

① Turn ON the video monitor display to confirm that the endoscopic image is displayed properly.

② Confirm that the text information is displayed on the monitor.

③ Confirm that the endoscope image is normal by observing any object such as your hand.

03 Preparation and Inspection

3.6 Inspection of the freeze and release function

⚠ WARNING

- Do not use the endoscope imaging processor when the live image cannot be displayed normally. Otherwise, patient injury may occur.

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① Tap the FREEZE icon on the touch panel to freeze image. Refer to Section 4.4.9 "Freezing/Releasing and save the image" for details.

② Confirm that the live image freezes.

③ Tap the FREEZE icon on the touch panel again to release frozen image. Refer to Section 4.4.9 "Freezing/Releasing and save the image" for details.

④ Confirm that the frozen image returns to the live image.

3.7 Inspection of the illumination mode selection

Confirm the available illumination mode by checking the text displayed on the touch panel.

① Tap the "CBI Regular" or "CBI Plus" icon on the touch panel to switch the regular white light to compound lights. The highlighted icon indicates the active status.

② Tap the "CBI Regular" or "CBI Plus" icon on the touch panel again to switch the compound lights to regular white light. The dimmed icon indicates the inactive status.

3.8 Inspection of the digital zoom function

Confirm that the image can be enlarged by tapping the icon and checking the displayed current zooming ratio on the touch panel.

① Tap and hold the "ZOOM" icon, the displayed zooming ratio appears in the cycle of "×1 ZOOM", "×1.2 ZOOM", "×1.5 ZOOM", "×1.8 ZOOM" and "×2 ZOOM".

03 Preparation and Inspection

3.9 Inspection of the structure and edge enhancement function

Confirm that the image can be enhanced by tapping the icon and checking the displayed current enhancement mode on the touch panel.

① Tap and hold the "ENH" icon, the highlighted icon indicates the current mode. Confirm that the displayed text on the screen changes in the cycle of "ENH S", "ENH E", "ENH Com".

② Tap the "ENH" in the "ENH S" or "ENH E" mode, confirm the displayed enhancement level changes in the cycle of "S1", "S2", "S3".

3.10 Inspection of the Hemoglobin enhancement function

Confirm that the Hemoglobin can be enhanced in the endoscopic image by tapping the icon and checking the displayed enhancement mode information on the touch panel.

① Tap the "HBE" icon on the touch panel. The highlighted icon indicates the active status.

② Tap the "HBE" icon on the touch panel again. The dimmed icon indicates the inactive status.

3.11 Inspection of power OFF

① Press the power switch of the endoscope imaging processor.

② Confirm that the endoscope imaging processor is turned OFF, that the power indicator is dark.

⚠ WARNING

- If the power indicator remains illumined after turning the endoscope imaging processor OFF, do not use it, unplug the power cord from the wall mains outlet and contact Aohua.

04 Operation

The operator of the endoscope imaging processor must be a medical practitioner capable of safely performing endoscopy after operation technique training. This manual does not explain or discuss clinical endoscopic procedures. It only describes basic operation of the endoscope imaging processor. Before using the endoscope, ensure to perform preparation and inspection on the endoscope imaging processor as described in Chapter 3, "Preparation and inspection".

4.1 Precautions

⚠ WARNING

- If any irregularity is observed, do not use the endoscope imaging processor. Electric shock may result.
- Do not hit the terminals of the front and rear panel of the endoscope imaging processor with sharp or hard objects. Otherwise, this instrument may be damaged.
- When operating the endoscope and performing the endoscopy, be sure to observe the live image. If operating the endoscope and performing the endoscopy while freezing or replaying the images, patient injury may occur.
- Do not touch the electrical connection points inside the AQ-300 series endoscope imaging processor connector.

⚠ CAUTION

- Before disconnecting the endoscope with the endoscope imaging processor, power supply must be turned OFF.
- Before disconnecting the light source with the endoscope imaging processor, power supply must be turned OFF.
- It is prohibited to use the imaging processor in the environment of flammable gas, otherwise a fire or explosions may result.
- It is forbidden to frequently turn ON the power switch of the imaging processor. Wait for at least 8 seconds for next start.
- Do not place this device where it is difficult to disconnect the power supply.

04 Operation

4.2 Turning the endoscope imaging processor ON

① Turn the ancillary equipment ON.

② Press the power switch to turn the endoscope imaging processor ON. The power indicator (Green light) lights up.

③ Confirm that the endoscopic image shows on the monitor normally.

NOTE

- Also refer to instruction manuals of ancillary equipment for safe use.

4.3 Adjusting the white balance

The white balance adjustment is used to display the correct image color on the monitor. Always adjust the white balance in the following cases:
- Before observation
- After exchanging the light source
- Any irregularities observed on the color of the image

① Refer to the instruction manual of the light source to turn ON the light source and to ignite the examination lamp.

② Check if the color of the endoscope image on the monitor is normal. If there is color deviation, the color should be reset.

③ Insert the distal end of the endoscope into white balance cap, tap and hold the white balance icon as described in Section 4.4.5, "White balance adjustment". The system will automatically perform white balance adjustment. Text information displayed on the monitor indicates successful adjustment.

⚠ WARNING

- Make sure that the endoscope and white balance cap are clean before adjustment.

⚠ CAUTION

- Do not turn OFF the endoscope imaging processor or disconnect the endoscope until the white balance adjustment is completed.
- Do not allow other light to enter the white balance cap when adjust the white balance.
- When adjust white balance, the distal end of the endoscope should be inserted into the white balance cap.
- The endoscope imaging processor has a white balance memory function. After the video endoscope is connected, the user should check whether the color of the endoscope image on the monitor is normal. If there is a color deviation, the color needs to be reset.

4.4 Touch panel operation

The touch panel icons can adjust the image display, perform edge enhancement, structure enhancement, hemoglobin enhancement and other image processing functions; and can freeze, replay, image zooming, turn the pump ON or OFF, turn the light source ON or OFF and adjust the light brightness. For the specific operation procedures, see Section 4.4.3, "Icon functions". The displayed text information shows the current status of the icons.

4.4.1 Turn the touch panel ON

① Turn the power switch on the top of the touch panel ON.
② Enter the name and password, then tap "Log in" Icon to enter the home. The login interface is shown in figure 4.4.1.1.

(Figure 4.4.1.1)

NOTE

- Face recognition: If the user has registered face recognition in the software, you can use this function to log in to the software.
- Login: Select the user's name admin and the original password is 123456. Other user name login, need to enter the registration password.

4.4.2   Illumination mode setting

When connecting with the light source, the emitting light provided to the endoscope can be changed among regular white light and compound lights.
The white light mode is the default mode.

4.4.2.1 CBI Regular

In the "CBI Regular" mode, the light emitted is compound light with two bands, which could provide intelligent chromo image at the time of visualization with endoscopy.

①   The default state is OFF when starting up. Tap the button to switch between OFF and user preset modes (CL, GT, AUTO). (See Figure 4.4.4.1, 4.4.4.2)

②   Tap and hold the "CBI Regular" icon to select the CBI mode between "Mode 1" and "Mode 2", the highlighted icon indicates the selected status, and then tap the "save" icon.

③ Tap the "CBI Regular" icon to switch the illumination mode between the white light mode and the selected CBI Regular mode. The highlighted icon indicates the active status.

④ The displayed text information on the monitor indicates the current illumination mode.

4.4.2.2 CBI Plus

In the "CBI Plus" mode, the light emitted is compound light with three bands, which could provide intelligent chromo image at the time of visualization with endoscopy.

① Tap the "CBI Plus" icon in the pop-up dialog box, select the mode of user preset CBI plus. You can select one or more options. CBI mode among "CBI Indigo", "CBI aqua" and "CBI amber", the highlighted icon indicates the selected status, and then tap the "save" icon. (See Figure 4.4.4.1, 4.4.4.2)

② Tap the "CBI Plus" icon to switch the illumination mode between the white light mode and the selected CBI Plus mode. The highlighted icon indicates the active status.

③ The displayed text information on the monitor indicates the current illumination mode.

(Figure 4.4.4.1)
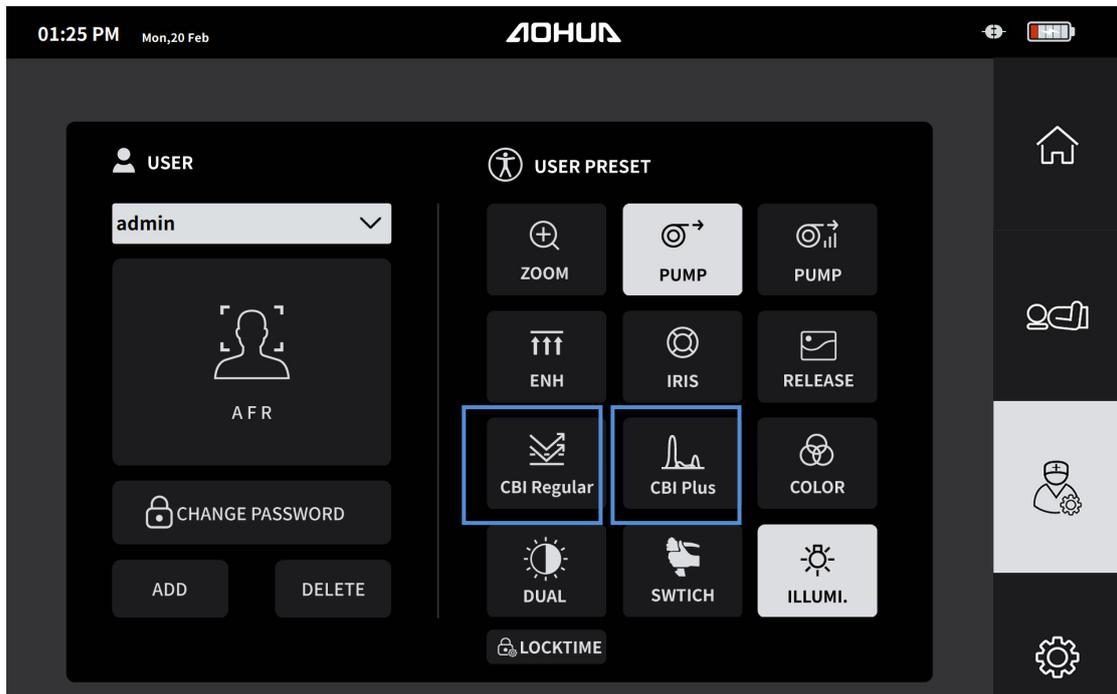
(Figure 4.4.4.2)

4.4.3 White balance adjustment

The white balance adjustment is used to display the correct image color on the monitor. Always adjust the white balance in the following cases:
- Before observation
- After exchanging the light source
- Any irregularities observed on the color of the image

The system can automatically adjust the white balance of the endoscopic image after tap the "WHITE BAL" icon.

① Insert the distal end of the endoscope into the white balance cap of the imaging processor; tap and hold the "WHITE BAL" icon (see Figure 4.4.5.1), the highlighted icon indicates the active status. Automatic white balance adjustment will be performed.

(Figure 4.4.5.1)

4.4.4 Structure and edge Enhancement

This operation changes the endoscopic image enhancement mode among structure enhancement, edge enhancement and compound enhancement modes.

① Tap the "ENH" icon (see Figure 4.4.6.1) to select the enhancement mode among "Edge"

(edge enhancement), "Structure" (structure enhancement) and "Com" (compound enhancement mode), the highlighted icon indicates the selected status, and then tap the "save" icon. The default image enhancement mode and level follow the user preset.

(Figure 4.4.6.1)

② Tap the "ENH" icon to turn ON or OFF the enhancement function. Highlighted icon indicates the successful activation, dimmed icon indicates the inactive status.

③ Tap the "ENH" icon in the activation status to adjust the enhancement level in current selected enhancement mode. The level for "Edge" is "E1 to E8", the level for "Structure" is "S1 to S8", the level for "Com" is "C1 to C8".

④ The text information displayed on the monitor indicates the current enhancement mode and enhancement level.

4.4.5 Hemoglobin enhancement

This operation can enhance the display of the blood vessels.

① Tap the "HBE" icon (See Figure 4.4.7.1) to turn ON or OFF the hemoglobin enhancement function. Highlighted icon indicates the successful activation, dimmed icon indicates the inactive status.

(Figure 4.4.7.1)

4.4.6　Digital zoom

The content of the endoscopic image can be enlarged by the digital zoom function. The zoom ratios are "×1.2", "×1.5", "×1.8" and "×2".

① Tap and hold the "ZOOM" icon (See Figure 4.4.8.1) to select the zoom ratios among "×1.2", "×1.5", "×1.8", and "×2" and it is optional, the highlighted icon indicates the selected status, and then tap "save" icon.

② Tap the "ZOOM" icon turn ON or OFF the digital zoom function. Highlighted icon indicates the successful activation, dimmed icon indicates the inactive status. The current zoom ratios displayed in the upper right corner of the icon.

(Figure 4.4.8.1)

③ Tap the "ZOOM" icon to switch the zoom ratio among the selected zoom ratio when the "ZOOM" on the active status. The text information displayed on the monitor indicates the current status of the magnification setting.

4.4.7 Freezing/Releasing and save the image

The endoscopic image can be frozen or release and save by this operation

① Tap the "FREEZE" icon to freeze image, Highlighted icon indicates the successful activation, dimmed icon indicates the inactive status, the "RELEASE" icon in the activation status meanwhile.

② Tap the "FREEZE" icon to unfreeze the image or tap the "RELEASE" icon to release and save frozen image. The frozen image will be temporarily stored in the imaging processor. The imaging processor is capable of temporarily storing 32 pictures at most. The first image will be covered when the thirty-third once is collected. (Note: When the power supply of the imaging processor is cut OFF, the temporarily stored images will be cleaned). (See Figure 4.4.9.1)
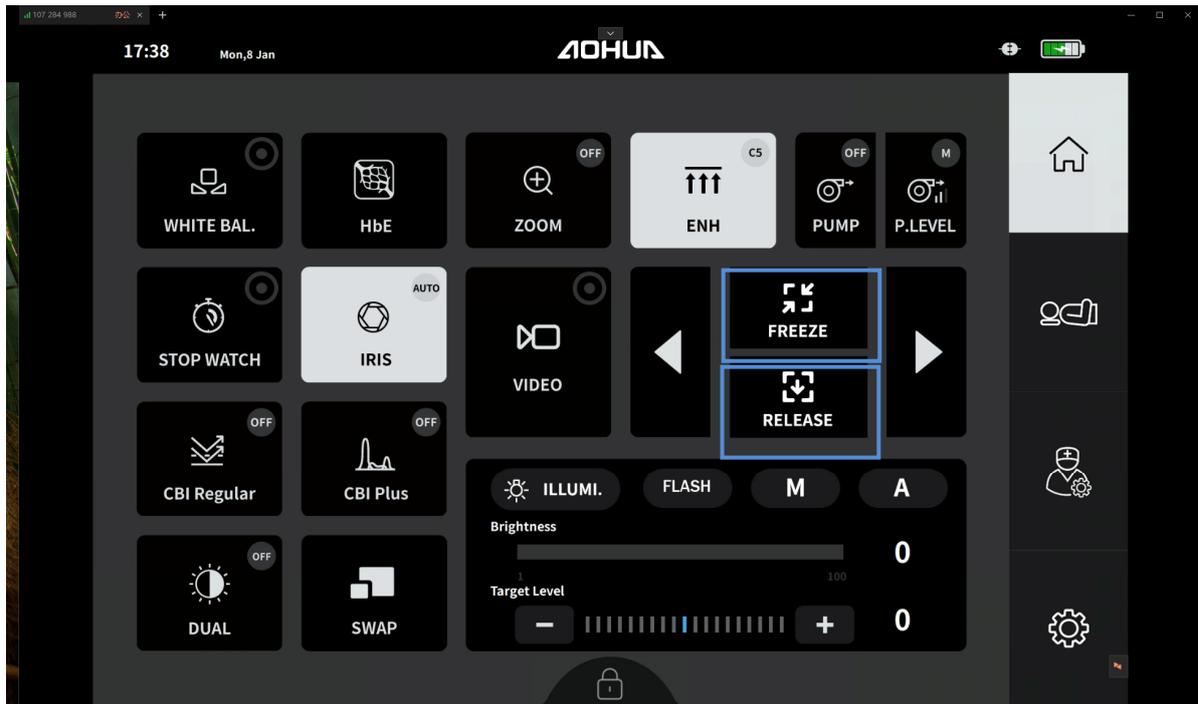
(Figure 4.4.9.1)

4.4.8 Freezing/Releasing and save the image

The frozen images can be replayed through this operation.

① Tap the "image replying" icon (see Figure 4.4.10.1) to replay stored frozen images.

② The information displayed on the monitor indicates the current page number of the replayed image.

(Figure 4.4.10.1)

4.4.9 IRIS mode setting

This operation changes the IRIS mode of endoscopic image among automatic mode, peak mode and average mode.

① The "IRIS" icon always in highlighted that indicates it on the successful activation status. Tap and hold the "IRIS" icon (see Figure 4.4.11.1) to select the IRIS mode among "Auto" (automatic mode), "PEAK" (peak mode) and "AVE" (average mode) and setting the "IRIS TARGET" on selected IRIS mode, the range of "IRIS TARGET" is -9 to 9. and then tap the "save" icon.

② Tap the "IRIS" icon to turn ON the IRIS mode setting function. The current IRIS mode displayed in the upper right corner of the icon.

(Figure 4.4.11.1)

③ The information displayed on the monitor indicates the selected IRIS mode.

4.4.10 Air feeding

This operation feed the air through the endoscope into the target area.

① Tap and hold the "PUMP" icon (See Figure 4.4.12.1) to switch the air pump on or off

② Tap and hold the "PUMP M" icon (See Figure 4.4.12.2) to select the airflow rate level among "H" (High)," M" (Middle)," L" (Low). The default level follows the user interface's presets.
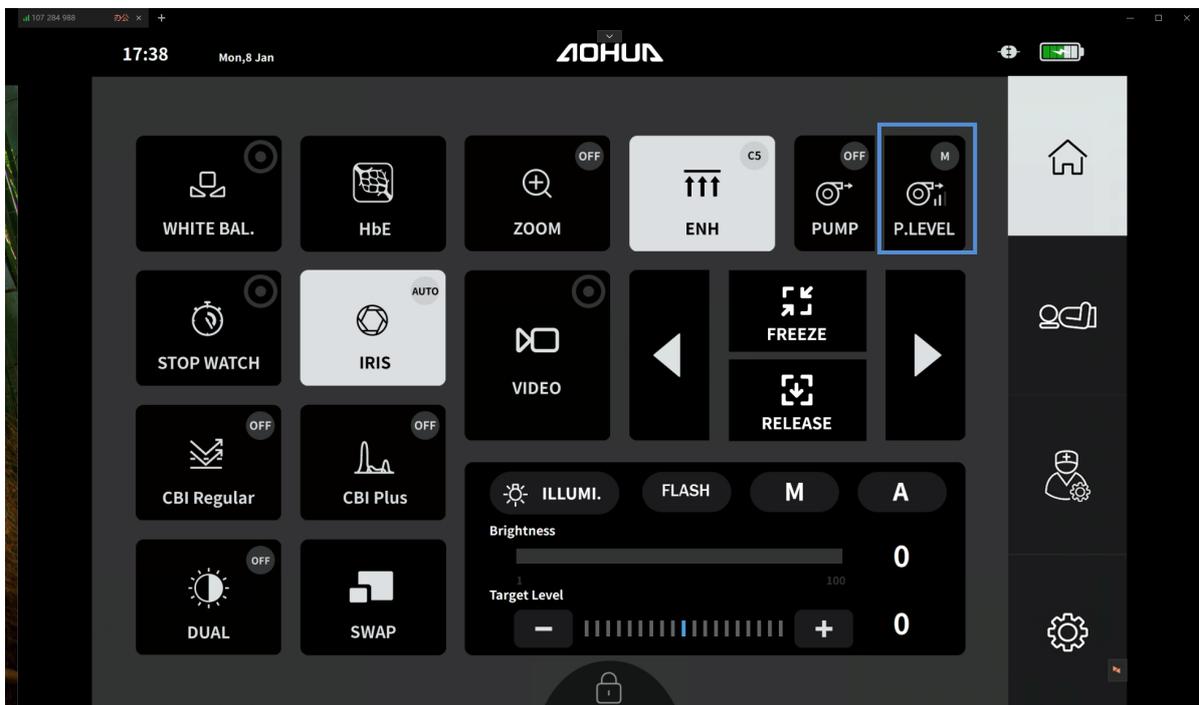
(Figure 4.4.12.1)

(Figure 4.4.12.2)

3 Tap the "PUMP" icon to activate the air feeding function. Highlighted icon indicates the successful activation, dimmed icon indicates the inactive status. The current airflow rate level displayed in the upper right corner of the icon.

4.4.11 Brightness adjustment mode setting

This operation changes the brightness of the emitting light of the examination lamp when the imaging processor connects with the light source.
The lamp brightness is automatically adjusted when the brightness adjustment mode is set to "A".
The lamp brightness is manually adjusted when the brightness adjustment mode is set to "M".

① Tap the "ILLUM" icon (see Figure 4.4.13.1) to turn on the brightness adjustment mode setting function. Highlighted icon indicates the successful activation, dimmed icon indicates the inactive status.

(Figure 4.4.13.1)

② The default mode is automatic brightness adjustment mode. Tap the "A" or "M" icon (see Figure 4.4.13.1) to switch the brightness adjustment mode between automatic brightness adjustment mode and manual brightness adjustment mode.

③ Slide the brightness bar (see Figure 4.4.13.1) in the manual brightness adjustment mode to adjust the brightness level, the brightness level is 0-100.

④ The text information displayed in monitor indicates the selected mode.

⚠ WARNING

- Always use minimum required level of brightness when operating a close view of mucous membranes for an extended period.
- Do not bring the disconnected end of the endoscope or optical fiber in contact with the body or any flammable objects after using the endoscope with intense illumination for a long period. A fire or burn may result due to the extremely high temperature.

4.4.12 Flash

This operation makes the examination lamp flickering when the imaging processor connects with the light source.
The examination lamp will flicker 5s~8s when tap the "Flash" icon (see Figure 4.4.14.1).

(Figure 4.4.14.1)

4.4.13 Video recording

The captured video can be recorded by this operation.

① Before to start the video recording function, the portable memory must be inserted into the

USB port on the front panel of the imaging processor. If the portable memory is identified, the displayed in monitor indicates the video and photo icon.

2 Tap and hold the "VIDEO" icon (see Figure 4.4.15.1) to start the video recording function. Re-tap the "VIDEO" icon to stop capturing video. The highlighted icon indicates the active status, the dimmed icon indicates the inactive status.

(Figure 4.4.15.1)

3 The video captured will be automatically saved into portable storage device. (The portable memory must be inserted into the USB port on the front panel of the imaging processor. Otherwise, this function is not available)

4.4.14 Timing

This operation timing the endoscopic observation time.

1 Tap and hold the "STOP WATCH" icon (see Figure 4.4.16.1) to select the operation among "Start/Pause", "Mark" and "Clear" icon. Tap the "Start/Pause" icon to start or stop timing, tap "Mark" icon to mark any point in time, and tap "Clear" icon to clear the time information. The highlighted icon indicates the active status.

2 The test information displayed in monitor indicates the timing information and marked point in time.

(Figure 4.4.16.1)

4.4.15 Dual light mode

This operation enables the regular white light image and the chromo image displayed simultaneously for observation.

① The dual light function is disabled by default when it is powered on. Tap the "DUAL" icon (see Figure 4.4.17.1) to switch between user preset mode and off mode, the highlighted icon indicates the active status.

(Figure 4.4.17.1)

②   Tap the "DUAL" icon (see Figure 4.4.17.2), select the user preset dual light mode in the pop-up dialog box, and you can select one or more; items include: WB & Indigo; WB & Aqua; WB & Regular.
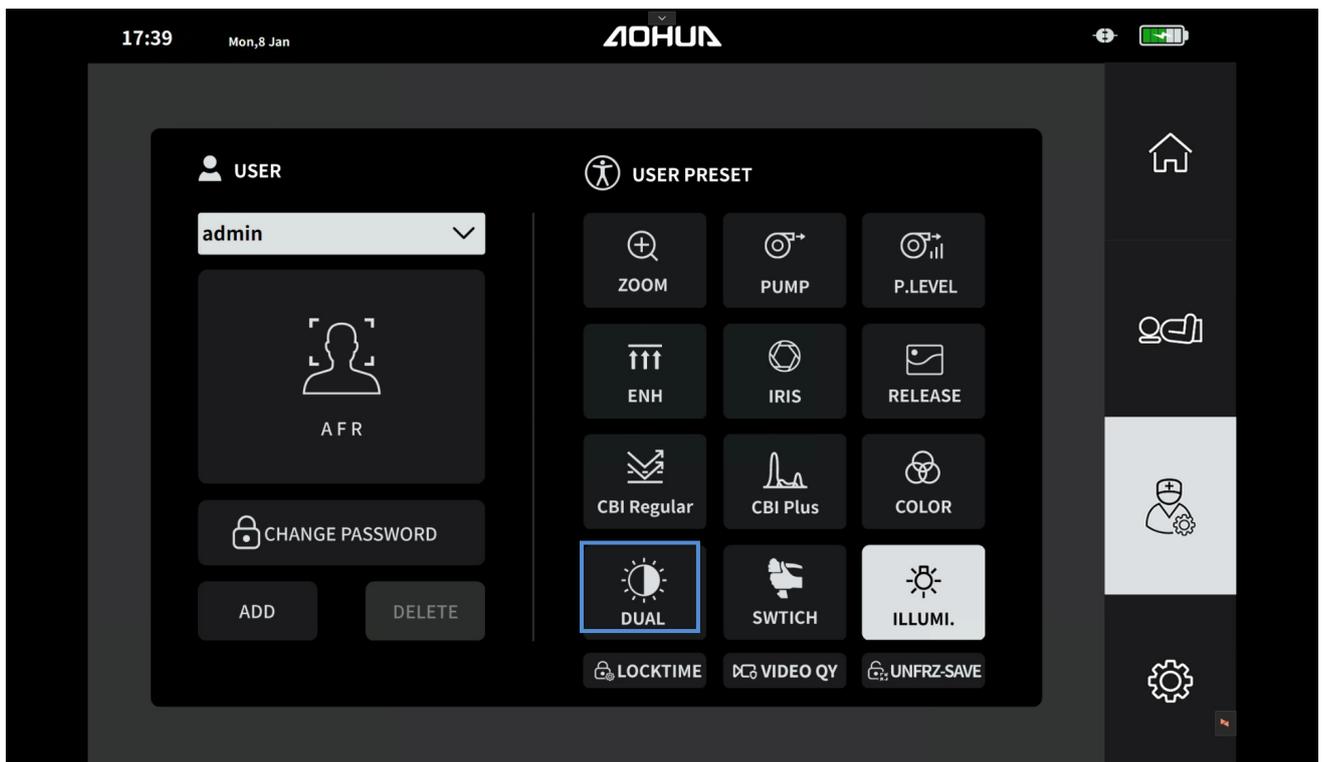
(Figure 4.4.17.2)

③ The default is the big picture display the regular white light image and the small picture display the chromo image.

4.4.16 Switch the big and small picture

This operation switches the display information in big and small picture.

① Tap the "SWAP" icon (see Figure 4.4.18.1) to switch the display information in big and small picture.

(Figure 4.4.18.1)

4.4.17 Switch the big and small picture

Before the observation, enter the patient information using the touch panel.

① Tap the "patient information" icon (see Figure 4.4.19.1) to enter the setting page.

(Figure 4.4.19.1)

② Tap the "NEW" icon (see Figure 4.4.19.2) to add new patient information.

③ Tap each corresponding dialog and enter each patient information. And then tap the "SAVE" icon to complete the adding or tap "DELETE" to delete the information. (See Figure 4.4.16.2)
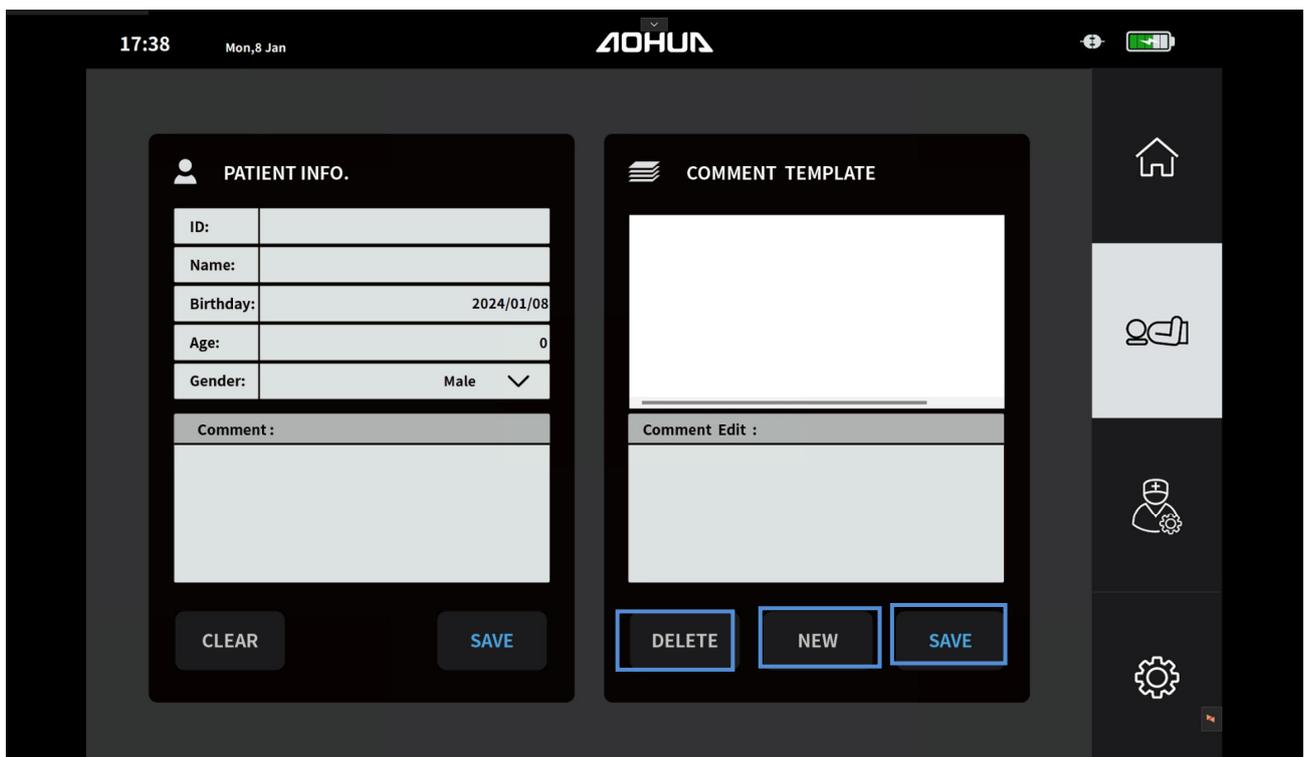
④ After that, tap "SAVE" or "CLEAR" icon to store or clear the input information. (See Figure 4.4.19.3)
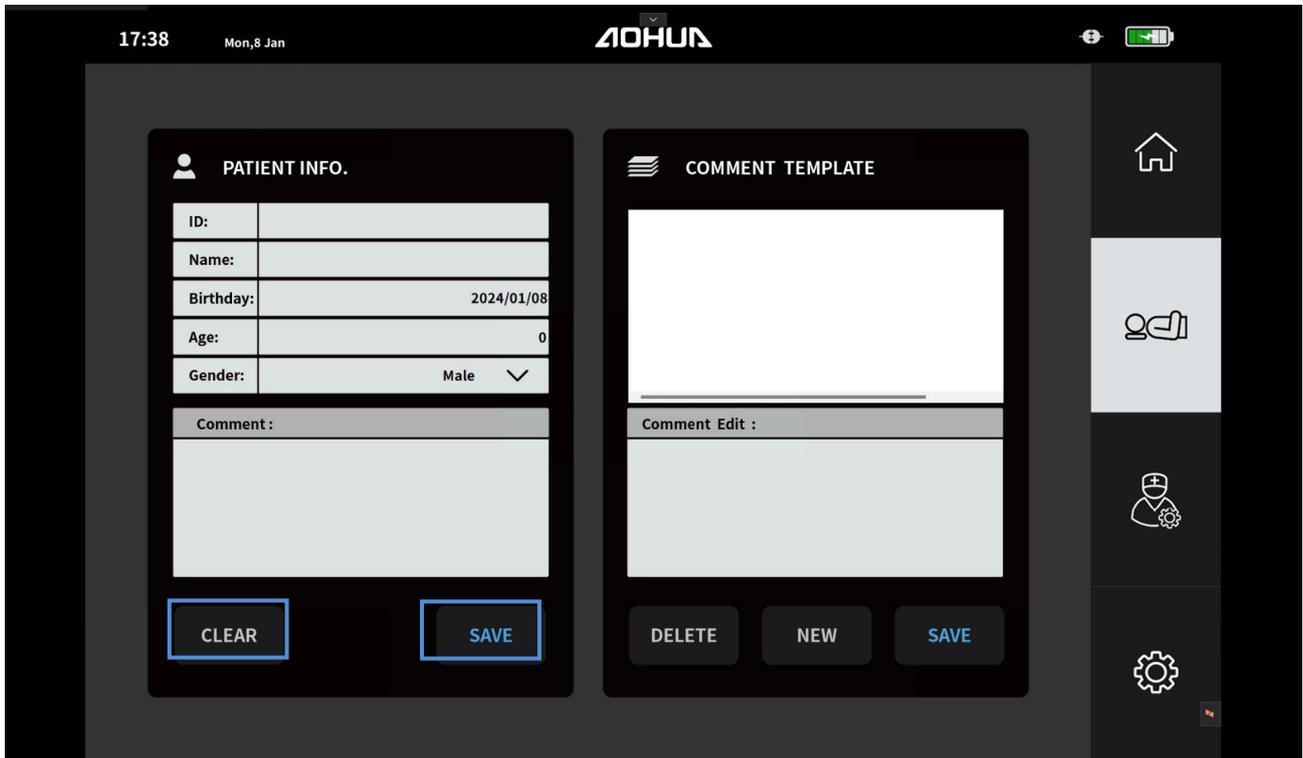
(Figure 4.4.19.3)

4.4.18 Loading the user setting

① Tap the "User option" icon (See Figure 4.4.20.1) to enter the setting page.

(Figure 4.4.20.1)

2 Tap the "ADD" icon (See Figure 4.4.20.2) to add new user. Set the information as required, and then tap the "SAVE" icon to save new user information.
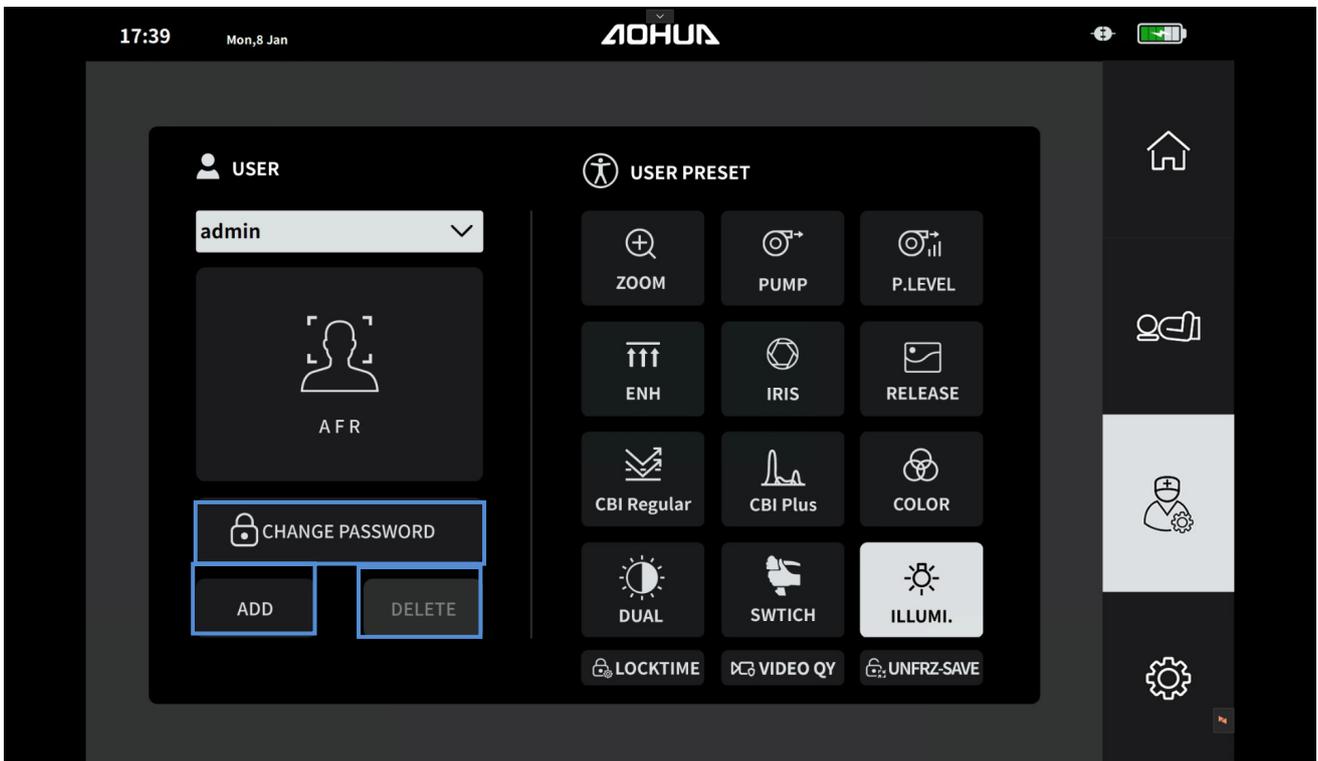
(Figure 4.4.20.2)

3　Tap "DELETE" icon to delete the user information, the admin cannot be deleted. (See Figure 4.4.20.2)

4　Tap "CHANGE PASSWORD" icon (See Figure 4.4.20.2) to reset the password. And then input the "Original password", "New password", "Confirm password" dialog, and then tap "SAVE" icon to complete setup or tap "RESET" to retype them or tap "Back" to return the user setting page.

5　Tap corresponding mode icons on "USER PRESET" icon (See Figure 4.4.20.3) area to set the auto-start, illumination mode, image enhancement mode and level, airflow rate, zoom ratio, IRIS mode, switch setting and color according the users' requirements.
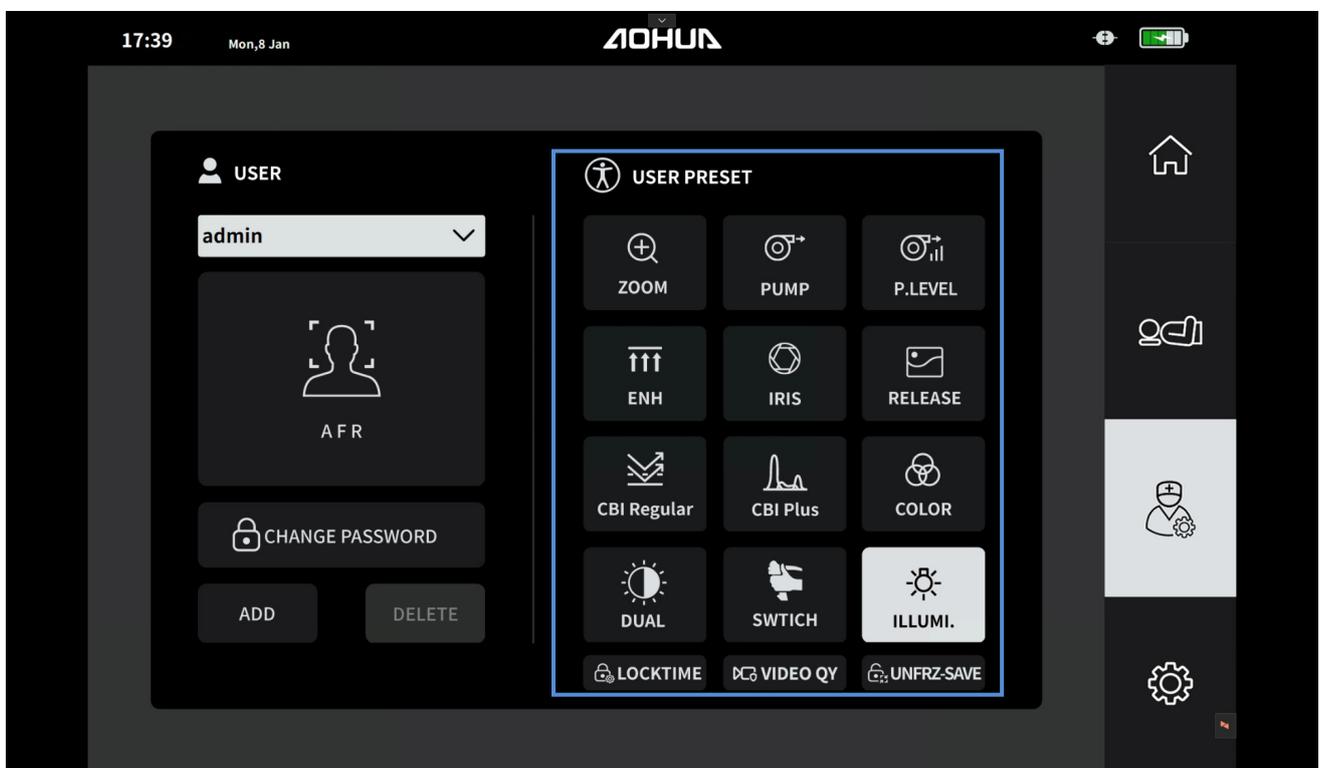
(Figure 4.4.20.3)

4.4.19　Setup

1　Tap the "Setup" icon (see Figure 4.4.21.1) to enter the setup page, this operation can be used for system setting and image setting.

(Figure 4.4.21.1)

4.4.19.1   Image setup

In this operation, set the image mode.

1. Tap the "ANALOG VIDEO" icon (see Figure 4.4.21.2) to switch the video output format between "SD NTSC" and "SD PAL".
2. Tap the "PIP" icon (see Figure 4.4.21.2) to turn the PIP function and switch it between "CVBS" and "Y/C";
3. Tap the "RESET" icon (see Figure 4.4.21.2) can restore the imaging processor factory setting (excluding date and time). And then input the password into the dialog.
4. Tap the "DENOISE" icon (see Figure 4.4.21.2) can reduce noise in real-time images.
5. Tap the "DARK-CORR" icon (see Figure 4.4.21.2) can correct the brightness of dark areas and keep the brightness of the bright areas in real-time images.
6. Tap the "FRZ-PIC-SEL" icon (see Figure 4.4.21.2), the system will freeze a high-quality image automatically.
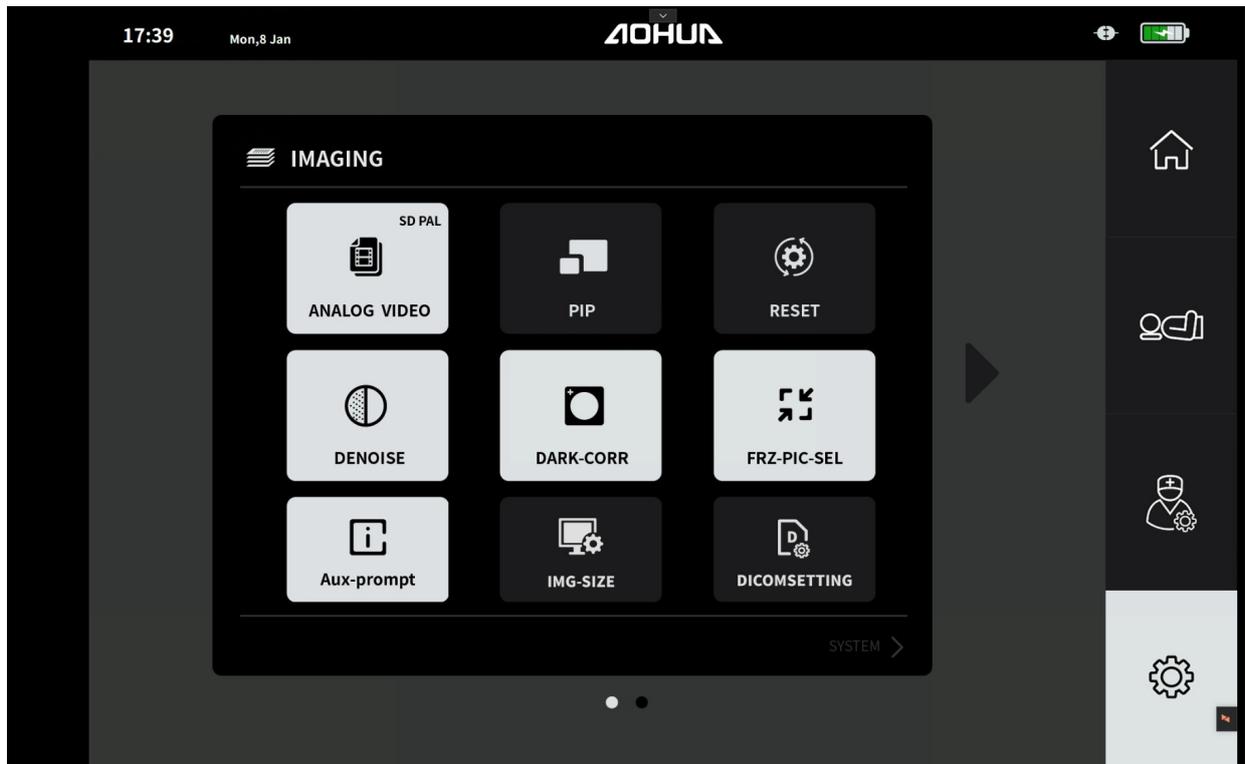
(Figure 4.4.21.2)

4.4.19.2   System setup

In this operation, set the system setup.

① Tap the "language" icon (see Figure 4.4.21.3) to set the language of the system between "CH" (Chinese) and "EN" (English).

② Tap "DATE/TIME" icon (see Figure 4.4.21.3) to set current date and time, then tap "save" icon to complete setup.

③ Tap "ASR" icon (see Figure 4.4.21.3) to turn on the speech control function by saying corresponding operation prompt.

④ Tap "ABOUT" icon (see Figure 4.4.21.3) to read the software version information of the imaging processor and the ancillary light sources, and the LED life indicates the current usage time of the light.

⑤ Tap "PAD VOLUME" icon (see Figure 4.4.21.3) to adjust the volume of the touch panel and the range of it is 0-100.

⑥ Tap "PAD BRIGHTNESS" icon (see Figure 4.4.21.3) to adjust the brightness.

(Figure 4.4.21.3)

4.5   Termination of the operation

When connecting with the light source, the emitting light provided to the endoscope can be changed among regular white light and compound lights.
The white light mode is the default mode.

⚠ CAUTION

- Before disconnecting the endoscope, ensure that the imaging processor is turned OFF. Otherwise, the sensor inside of the imaging processor may be damaged.

① Press the power switch on the front panel to turn the imaging processor OFF. Turn OFF other ancillary equipment.

4.6　Fuse replacement

If the equipment fails to function normally when the power switch is ON, the fuse may be damaged and need to be replaced.

⚠ WARNING

● Confirm that the power cord is unplugged from the power inlet before fuse replacement to prevent electric shock.
● Never install a fuse that has not been approved by Aohua or not fulfill the required specifications. Damage to the imaging processor, malfunction, electric shock or a fire may result.

① Confirm that the power switch is turned OFF and the power cord is unplugged from the wall mains outlet and the power inlet.
② Press the cover on the fuse socket and draw the fuse holder out as shown in Figure 4.7.

2. Draw the fuse holder out

1. Unplug the power cord
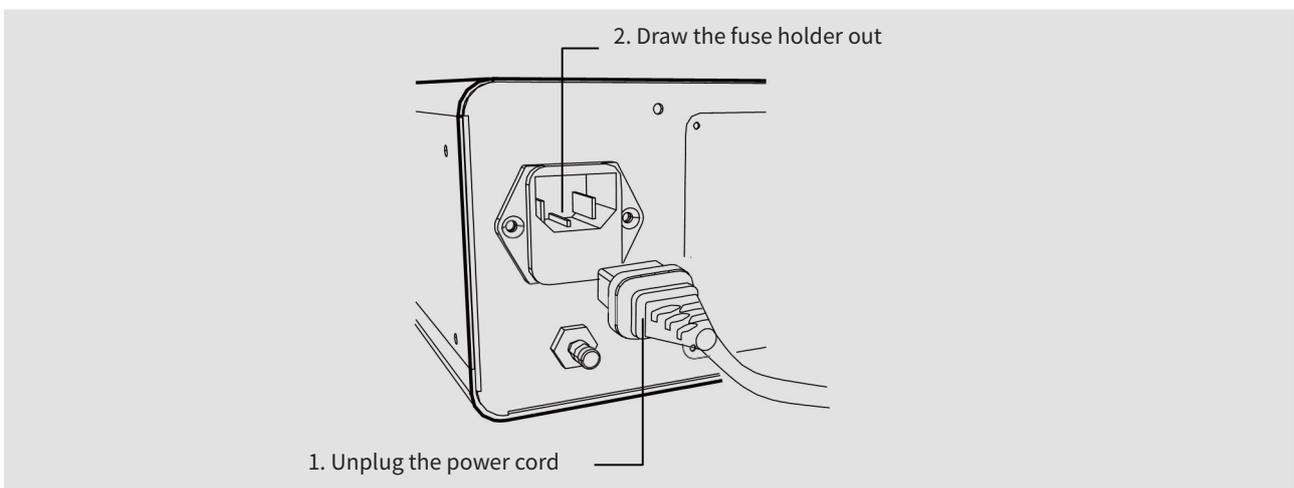
③ If the fuse has been melt, replace it with a new one.
④ Connect the power cord and turn ON the power switch, if the fuse is damaged again, turn OFF the power switch and disconnect power cord. And connect Aohua.

04 Operation

4.7 Maintenance, storage and disposal of the imaging processor

4.7.1 Maintenance

⚠ WARNING

- Prior to cleaning, pull out the power cord and make it sure.
- Ensure the power supply plug is dry to prevent electric shock accident from happening.
- Please do not wipe the power inlet or other terminals, damage to the imaging processor like distortion or corrosion may result.
- This equipment should be stored away from the direct sunlight, X-ray, radioactive ray or strong electromagnetic radiation. Otherwise, damage to the imaging processor may result.

⚠ CAUTION

- If any spare parts or electronic components of the AQ-300 endoscope imaging processor are broken, please be sure to use the spare parts or electronic components provided by Aohua. Aohua is not responsible for any damages caused by using spare parts or electronic components from the other companies.

Aohua recommends that user and purchase unit conduct the maintenance activities to the imaging processor by following the methods below daily.

1. Turn the imaging processor OFF and disconnect the power cord from the wall mains outlet.
2. Only use dry gauze to wipe the power switch, otherwise the switch may be damaged and electric shock may result.
3. Use soft gauze moistened with diluted detergent to wipe the external of the equipment. When wiping the rear panel, do not wet the power inlet and the USB ports. When wiping the front panel, do not wet the USB port. Otherwise, damp circuit of the imaging may lead to electric shock and short circuit.
4. If the equipment is soiled with any liquid, wipe off all debris timely and dry it completely, especially the electric circuit connection terminals.

4.7.2 Storage and disposal

04 Operation

⚠ **CAUTION**

- Before storage, turn OFF the power switch, and disconnect the power cord from the imaging processor.

- The imaging processor should be stored in the cool and dry room with relative humidity no more than 95% and good ventilation and without corrosive gas, flammable and explosive gas, liquid contamination, or chemicals.

The storage environment shall fulfill the following requirements.

1. Ambient temperature   : -40°C - +55°C
2. Relative humidity   : 10% - 95%
3. Atmospheric pressure   : 500hPa - 1060hPa

Comply with relevant waste disposition regulations to dispose the light source and its internal components needed to be discarded.

This symbol on the product or in the instructions means that your electrical and electronic equipment should be disposed at the end of its life separately from your household waste. There are separate collection systems for recycling in the EU. For more information, please contact the local authority.

⚠ **CAUTION**

- The three-pin plug and socket are necessary for the power supply of the suction pump and high frequency power supply device cooperatively used with endoscope imaging processor, and the power supply must have ground lead, any accidents, for instance electric shocks and burnings etc., resulted from not complying with the usage standard will be responsible by the users themselves.

- When using the video endoscope and the endoscope imaging processor, it will be better to connect a voltage regulator of power over 1000W, household power regulator is prohibited to use for endoscope imaging processor.

- If the imaging processor has abnormal situations, please instantly stop using it, shut OFF the grid power supply and contact Aohua.

- When this product and its internal components are scrapped, please handle them as per the relative national regulations of waste disposal.

05 Troubleshooting

5.1 Troubleshooting

⚠️ WARNING

- If any irregularities are observed or suspected, stop using the endoscope imaging processor. Consult Aohua. Otherwise, damages to the operator and/or the patient may result.
- If any of the following irregularities is observed, do not use the imaging processor and solve the problem as described in the following table.
- If the problem is not included in this section or cannot be resolved by the provided countermeasures, contact Aohua.

Irregularity description	Cause Analysis	Solution	Remarks
No power supply available for the medical endoscope imaging processor	Undesirable contact with power inlet.	Ensure the firm connection between the power cord and the power supply socket.	N/A
	Mains power supply outage.	Inspect the mains power supply.	N/A
	Fuse has been melt.	Replace with a new fuse.	Ensure the power supply has been cut OFF.
Failure in image display on the monitor	No connection between the imaging processor and the monitor through video output cable.	Connect the monitor and the imaging processor through the video output cable.	N/A
The endoscopic image is too dim or too bright.	Inappropriate IRIS mode setup.	Select appropriate IRIS mode.	N/A
	Malfunctions of the light source device.	Contact the distributor or Aohua.	N/A
Achromatic endoscopic image or abnormal image color	White balance adjustment has not been implemented.	Conduct white balance adjustment.	N/A
	Inappropriate color setup.	Reset the color.	N/A

	Inappropriate chromaticity settings of the monitor.	Set appropriate chromaticity of the monitor.	N/A
Still Endoscopic image	The frozen image is not released.	Tap the freeze icon again, resume real-time image.	N/A
Jitter, drift and interference ripples on image	Inappropriate monitor signal system is chosen.	Set the correct signal system.	N/A
	Interference source presents nearby.	Relocate the working space away from the interference source.	N/A

5.2 Returning the imaging processor for repair

⚠ CAUTION

- Aohua is not responsible for any injuries to the human or damages to the imaging processor resulted from repair activities attempted by non-Aohua personnel.
- If any spare parts or electronic components of the AQ-300 imaging processor are damaged, only use the spare parts or electronic components approved by Aohua. Aohua is not responsible for any damages caused by using unapproved spare parts or electronic components.
- Take a backup of the picture information inside this product, patient data, and user setting before returning to repair. These pieces of information are eliminated in the case of repair. Moreover, remove a portable memory.

When returning the imaging processor for repair, send the imaging processor with a description of the malfunction or damage and the name and telephone number of the individual at your site who is the most familiar with the problem. Also, include the warranty card.

06 Other Information

6.1 Manufacture date and service life

① Product Manufacture Date: refer to the product nameplate.

② Expected service life: 5 years.

⚠ **CAUTION**

> ● Before operation, inspect this instrument daily to ensure all technical requirements are fulfilled. If any nonconformity or damage is observed, contact Aohua.

NOTE

> ● The warranty period of the imaging processor is 1 year. After replacement, fuse and other consumables can function normally.

Appendix

The EMC information and the warranty card of product are provided in this appendix.

EMC Information

EMI compliance table

Phenomenon	Compliance	Electromagnetic environment
RF(Radio frequency) emissions	CISPR 11 Group 1, Class A	Professional healthcare facility environment
Harmonic distortion	IEC 61000-3-2 Class A	Professional healthcare facility environment
Voltage fluctuations and flicker	IEC 61000-3-3 Compliance	Professional healthcare facility environment

Table 1 – Emission

NOTE

- The emission characteristics of this equipment make it suitable for using in industrial environment and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required), this equipment may not perform adequate protection to radio-frequency communication services. The user may need to take mitigation measures, such as relocating or re-orienting the equipment.

EMS compliance table

NOTE

- Electromagnetic propagation is affected by absorption and reflection from structures, objects and people. An electromagnetic site survey should be considered to assess the electromagnetic environment. If the measured field strength in the location in which this model is used exceeds the applicable RF compliance level above, this model should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating this model.
- Electromagnetic interference may occur in the vicinity of high-frequency electrosurgical equipment and/or other equipment marked with the following symbol:

EMC Information

Phenomenon	Basic EMC standard	Electromagnetic environment
		Professional healthcare facility environment
Electrostatic Discharge	IEC 61000-4-2	±8 kV contact ±2kV, ±4kV, ±8kV, ±15kV air
Radiated RF EM field	IEC 61000-4-3	3V/m 80MHz-2.7GHz 80% AM at 1kHz
Proximity fields from RF wireless communications equipment	IEC 61000-4-3	Refer to table 3
Rated power frequency magnetic fields	IEC 61000-4-8	30A/m 50Hz or 60Hz

Table 2 - Enclosure Port

Test frequency (MHz)	Band (MHz)	Immunity test levels
		Professional healthcare facility environment
385	380-390	Pulse modulation 18Hz, 27V/m
450	430-470	FM, ±5kHz deviation, 1kHz sine, 28V/m
710	704-787	Pulse modulation 217Hz, 9V/m
745		
780		
810	800-960	Pulse modulation 18Hz, 28V/m
870		
930		
1720	1700-1990	Pulse modulation 217Hz, 28V/m
1845		
1970		
2450	2400-2570	Pulse modulation 217Hz, 28V/m
5240	5100-5800	Pulse modulation 217Hz, 9V/m

Test frequency (MHz)	Band (MHz)	Immunity test levels	
		Professional healthcare facility environment	
5500			
5785			

Table 3 - Proximity fields from RF wireless communications equipment

Phenomenon	Basic EMC standard	Immunity test levels
		Professional healthcare facility environment
Electrical fast transients/burst	IEC 61000-4-4	$\pm$2 kV 100kHz repetition frequency
Surges Line-to-line	IEC 61000-4-5	$\pm$0.5 kV, $\pm$1 kV
Surges Line-to-ground	IEC 61000-4-5	$\pm$0.5 kV, $\pm$1 kV, $\pm$2 kV
Conducted disturbances induced by RF fields	IEC 61000-4-6	3V, 0.15MHz-80MHz 6V in ISM bands between 0.15MHz and 80MHz 80%AM at 1kHz
Voltage dips	IEC 61000-4-11	0% U_T; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% U_T; 1 cycle and 70% U_T; 25/30 cycles Single phase: at 0°
Voltage interruptions	IEC 61000-4-11	0% U_T; 250/300 cycles

Table 4 – Input a.c. power Port

EMC Information

Phenomenon	Basic EMC standard	Immunity test levels
		Professional healthcare facility environment
Electrical fast transients/burst	IEC 61000-4-4	±1 kV 100kHz repetition frequency
Conducted disturbances induced by RF fields	IEC 61000-4-6	3V, 0.15MHz-80MHz 6V in ISM bands between 0.15MHz and 80MHz 80%AM at 1kHz

Table 5 – Signal input/output parts Port

Phenomenon	Basic EMC standard	Immunity test levels
		Professional healthcare facility environment
Electrostatic Discharge	IEC 61000-4-2	±8 kV contact ±2kV, ±4kV, ±8kV, ±15kV air
Conducted disturbances induced by RF fields	IEC 61000-4-6	3V, 0.15MHz-80MHz 6V in ISM bands between 0.15MHz and 80MHz 80%AM at 1kHz

Table 6 – Patient Coupling Port

⚠ WARNING

- The installation and operation procedures of this device shall strictly follow the EMC (Electromagnetic Compatibility) information provided by this instruction:
    - The essential performance of AQ-300 is that:
      live endoscopic image can be observed when the image freezing function is not activated;
      the endoscopic image can be shown with correct orientation when the equipment works together with the endoscopes;
      When the instructions for this device are strictly followed, the emitted light after connection with the endoscope imaging processors shall be photobiological safe.
    - The use of this device with other non-affirmed electrical equipment is prohibited, in order to avoid causing electromagnetic interference to this device.
    - Use of this equipment adjacent to or stacked with other equipment should be avoided; improper operation may result. If it cannot be avoided, normal use should

EMC Information

be observed, verified and ensured.
- It is prohibited to place and use this device together with equipment which has serious effect on patient' life or treatment, low current measuring or treatment equipment, and life-supporting equipment in a same room.
- It is prohibited or should be avoided to use this device in the proximity of portable devices and mobile communication devices. It may interfere the normal operation of the AQ-300 device.
- Use of accessories, transducers and cables which are not affirmed by the manufacturer may cause degradation of electromagnetic immunity due to the increase of electromagnetic emissions.
- The power cord of the AQ-300 is a 1.5 meters long cable without shield and magnetic rings.
- Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) away any part of the AQ-300, including cables specified by the manufacturer. Otherwise, degradation of the equipment performance may result.
- The AQ-300 is intended for use in professional healthcare facility environment.

Warranty Card of Product

User's Information (fill out it in detail)

User's Name	
Zip Code	
Specific Address	
Product Name	
Purchase Date	
Purchase Place	
Product No.	
Invoice No.	
Telephone	

★*The warranty card must be sent back to Aohua within one month after purchase of this product.*

Shanghai AOHUA Photoelectricity Endoscope Co., LTD.

Warranty policy:
Provide the original invoice (or copy) of the product and contact Aohua. Be sure to send the warranty card of the product within one month after purchasing this product.

Warranty conditions:
Within half year after purchasing, any quality failure of this product is warranted by Aohua free of charge.

The following cases are not covered by the warranty:
1. Any damage caused by the improper operation or storage of the user.
2. Any damage caused by the unauthorized disassembly of the user.

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