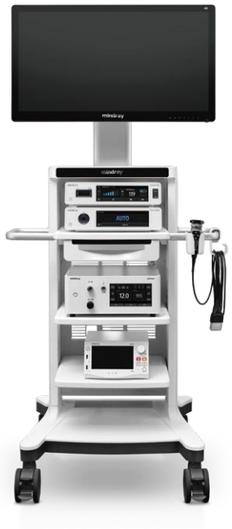
mindray

UX3 Series-*4K*

Endoscope Camera System

Vision Beyond Imagination



Digitally signed by Prodan Sveatoslav
Date: 2025.09.24 12:41:49 EEST
Reason: MoldSign Signature
Location: Moldova
MOLDOVA EUROPEANĂ

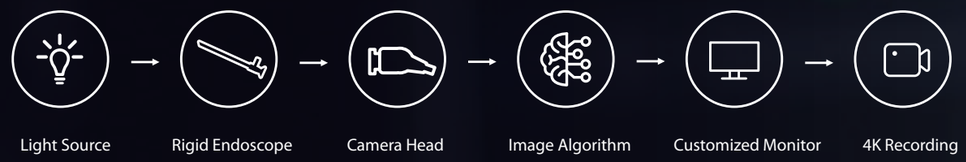
mindray
healthcare within reach

www.mindray.com

P/N:ENG-UX3 Series 4K Endoscope Camera System-210285X8P-20240322

Full-chain Independent R&D

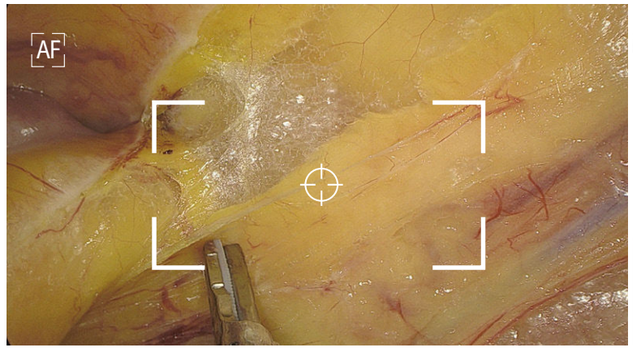
The integration of the new generation hardware platform with novel software algorithms greatly elevates image performance. AutoFocus, Automatic Scene Recognition and the Intelligent Image Algorithm work together to present high quality images.



Smart View Exceptional Image Quality

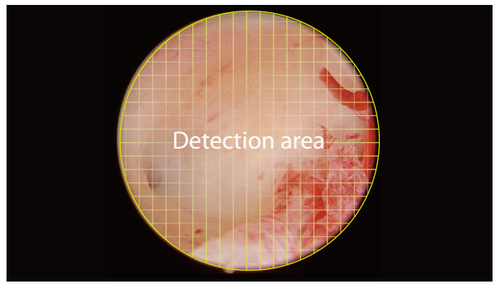
AutoFocus, and high quality image achieved with one touch

The perfect combination of mechanical structure, optical design, and the powerful computing power of the new imaging chip brings effective precision focusing and reduces manual operations, allowing the surgeon to focus on the surgery with a perfect image.

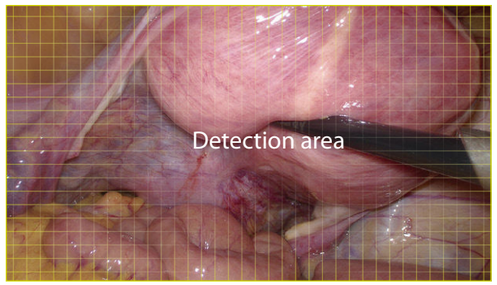


Automatic scene recognition, intelligent brightness adjustment

Smart exposure: Determine different detection areas according to different scene and accurately match the exposure parameters without the need to manually switch department modes.



Small diameter scope scene (e.g. hysteroscope)



Laparoscope scene

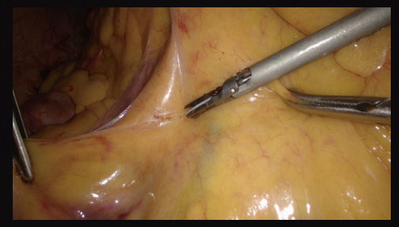
Automatic dimming: The camera system can automatically adjust the intensity of the light source in real time according to the exposure requirements of the current image, and ensure appropriate brightness.

eImage Intelligent Image Algorithm, Even in Extreme Circumstances

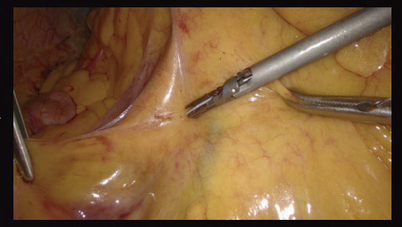
A variety of image post-processing algorithms make up for uneven lighting, local overexposure, thick fog etc., delivering clear, structured and layered images even in extreme scenarios.

BRT.
Homogenous Brightness

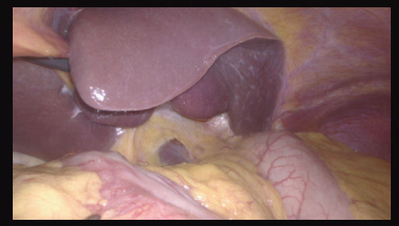
Before

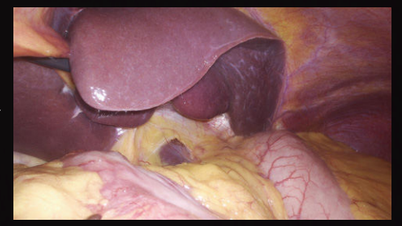


After

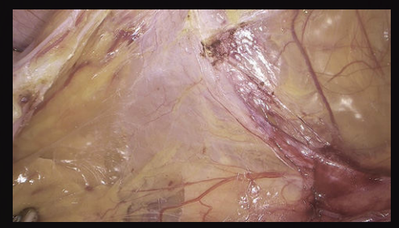


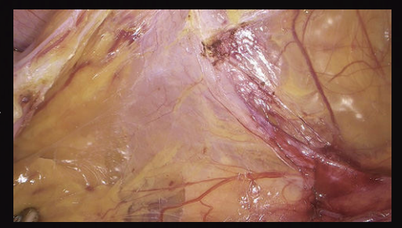
DTL.
Detail Enhancement





CLR.
Color Enhancement

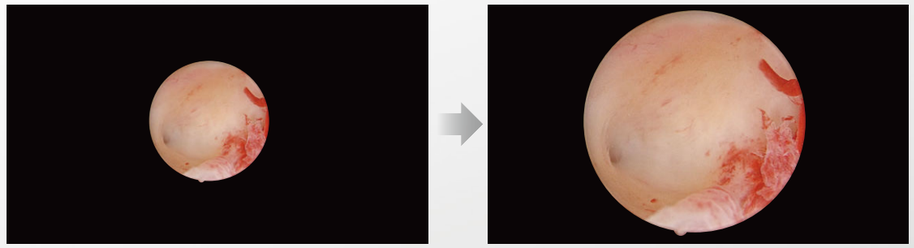




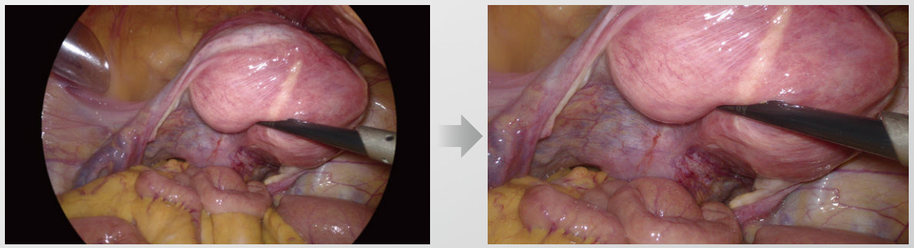
Intelligent Control Flexible Mastery

Automatic Adaptive Zoom achieved with one touch

Intelligent recognition of endoscope type and automatic adjustment with adaptive zoom reduces the need for repeated manual adjustment, and ensures ideal visibility for different surgeries.



Small diameter scope - One Touch to adaptive Zoom



Laparoscope - One Touch to Full Screen

Built-in 4K recording with Variable BitRate + H.265 encoding

4K high-quality video recording vividly reproduces the whole process of surgery, bringing quality academic sharing. Meanwhile, Variable BitRate and H.265 encoding reduce the file size of the same quality by 50%, meaning less worry about storage.

4K
Variable BitRate

H.265
HEVC

32/55 inch 4K Monitor

4K Endoscope Camera System

LED Light Source

Automatic dimming of the whole series

White Light Camera Head

Weight: 190 g
Focal Length:22mm /29mm

Insufflator

50L/mm

10/5 mm Rigid Endoscope

Multi-specification rigid endoscopes available

Digital Video Recorder

Access to hospital PACS system
Simultaneous recording of two signal sources available

TV-300/TV-300T(220V)/TV-300T(110V)/

TV-500/TV-500T(220V)/TV-500T(110V)

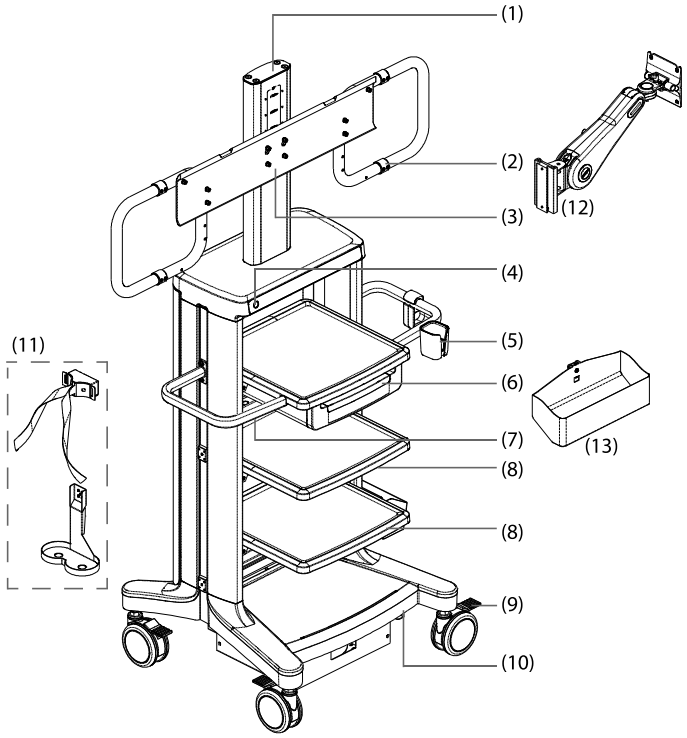
Mobile Trolley

Operator's Manual

■ Release time: 2023-5

■ Revision: 1.0

2.3.1 Front View of the Mobile Trolley



(1) Monitor column: supports a monitor stand. For details about the monitor stands of different sizes for different models, refer to ***3.5 Fixing Position of the Monitor Stand***.

(2) Monitor stand handle: hold to adjust the monitor position, available only for 55-inch monitor stands.

(3) Monitor stand: secures a monitor screen.

(4) Power switch: press to turn on/off all powered medical devices on the trolley.

- Orange: AC power is properly connected to the trolley with isolation transformer, but the power switch is off.
- Green: AC power is properly connected, and the power switch is on.

(5) Camera head holder: holds camera head.

(6) Drawer: stores accessories, including keyboard tray (optional).

(7) Drawer handle: hold to move the trolley.

(8) Shelves: used to place main units, such as insufflator and light source.

(9) Castor brake: apply the castor brake to lock or unlock the castors.

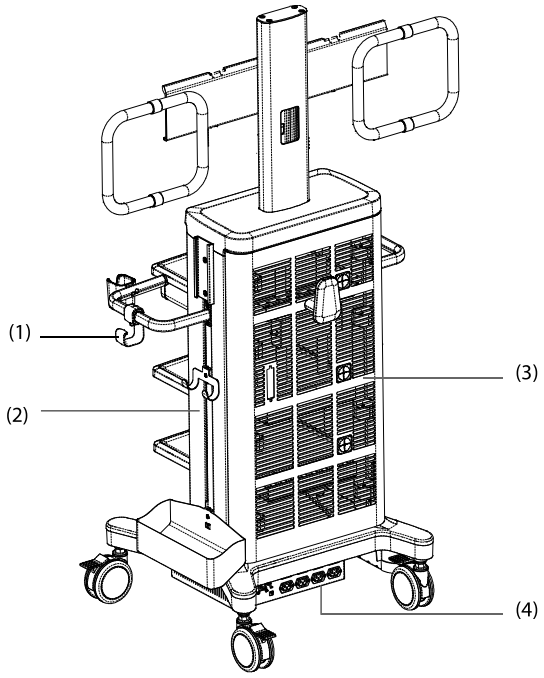
(10) Base plate: an isolation transformer (if configured) is installed under the base plate.

(11) CO2 holder assembly (optional): holds CO2 cylinders, and includes a cylinder strap rack and a cylinder holder.

(12) Monitor arm (optional): secures a side-screen monitor.

(13) Footswitch holder: stores footswitches.

2.3.2 Back View of the Mobile Trolley



(1) Hook: holds light cables and other cables.

(2) Trolley column: accessories such as the monitor arm and footswitch holder are secured on the slide rail of the trolley column.

(3) Rear door: lock it when moving the trolley.

(4) Isolation transformer: if the trolley is equipped with an isolation transformer, you can connect the power connectors of the mounted devices to the output power sockets of the isolation transformer.

3 Equipment Preparation

3.1 Overview

This chapter describes the preparation and necessary check before putting the mobile trolley into use.

3.2 Safety Information About Equipment Preparation

CAUTION

- **The equipment should be installed by authorized Mindray personnel.**
- **Assemble the mobile trolley by using parts supplied by Mindray (such as screws and Allen key), or those with models and specifications specified in this manual. Using other parts may cause damage to the equipment or failure to meet the claimed specifications.**
- **Load devices onto the trolley properly and make sure they are adequately protected from potential damage caused by falling, hitting, strong vibration or other external mechanical force.**
- **Before moving the trolley, make sure all peripheral devices connected have been secured, in case of device falling and damage.**
- **Magnetic and electrical fields are capable of interfering with the proper performance of the equipment. For this reason, make sure that all external devices operated in the vicinity of the equipment comply with the relevant electromagnetic compatibility EMC requirements. Mobile phones, X-ray equipment or MRI devices are possible sources of interference as they may emit higher levels of electromagnetic radiation.**
- **Do not use the system in strong electric or magnetic fields (where a transformer presents, for example), or near high-frequency devices (such as mobile phones). Performance degradation or system failure might occur.**
- **The equipment might be contaminated during storage and transport. Before use, verify whether the packages are intact. In case of any damage, do not apply it to patients.**
- **Make sure that the operating environment of the equipment meets the specific requirements. Otherwise unexpected consequences, e.g. damage to the equipment, could result.**

- **Keep the equipment dry. Do not move the equipment directly from a place of low temperature to a warm one, which may cause condensation or water drops, resulting in a short circuit.**

NOTE

- **Put the equipment in a location where you can easily view and operate the equipment.**
- **Keep this manual in the vicinity of the equipment so that it can be obtained conveniently when needed.**
- **Save the packing case and packaging materials for possible shipment or storage in the future.**

3.3 Unpacking and Checking

Before unpacking, examine the packing case carefully for signs of damage. If any damage is detected, contact the carrier immediately. Open the package and remove the equipment and accessories carefully. Check all materials against the packing list and check for any mechanical damage. Contact Mindray in case of any problems.

3.4 Environmental Requirements

The operating environment of the equipment must meet the requirements specified in this manual.

The environment where the equipment is used should be reasonably free from noises, vibration, dust, as well as corrosive, flammable, and explosive substances.

When the equipment is moved from one place to another, condensation may occur as a result of temperature or humidity difference. In this case, wait until the condensation disappears before using the equipment.

3.5 Fixing Position of the Monitor Stand

The mobile trolley can be configured with one of the following monitor stands:

Model	32-Inch Monitor Stand (Without Pan/Tilt Functions)	32-Inch Monitor Stand (With Pan/Tilt Functions*)	55-Inch Monitor Stand
TV-300	√	√	×
TV-300T(200V)	√	√	×
TV-300T(110V)	√	√	×
TV-500	×	√	√

Model	32-Inch Monitor Stand (Without Pan/Tilt Functions)	32-Inch Monitor Stand (With Pan/Tilt Functions*)	55-Inch Monitor Stand
TV-500T(200V)	×	√	√
TV-500T(110V)	×	√	√
*: The monitor stand provides up to 20° tilting movement and 75° panning movement.			

NOTE

- **√ indicates "configured" while × indicates "not configured".**

You can select the position of the monitor stand as needed. A 32-inch monitor stand can be adjusted to the following 3 heights:

- 1600 mm (center of the monitor)
- 1650 mm (center of the monitor)
- 1700 mm (center of the monitor)

A 55-inch monitor stand can be adjusted to the following 2 heights:

- 1650 mm (center of the monitor)
- 1630 mm (center of the monitor)

3.6 Fixing Position of the Shelves

The mobile trolley has 4 layers of space. The distance between shelves (excluding the thickness of the shelves) is as follows:

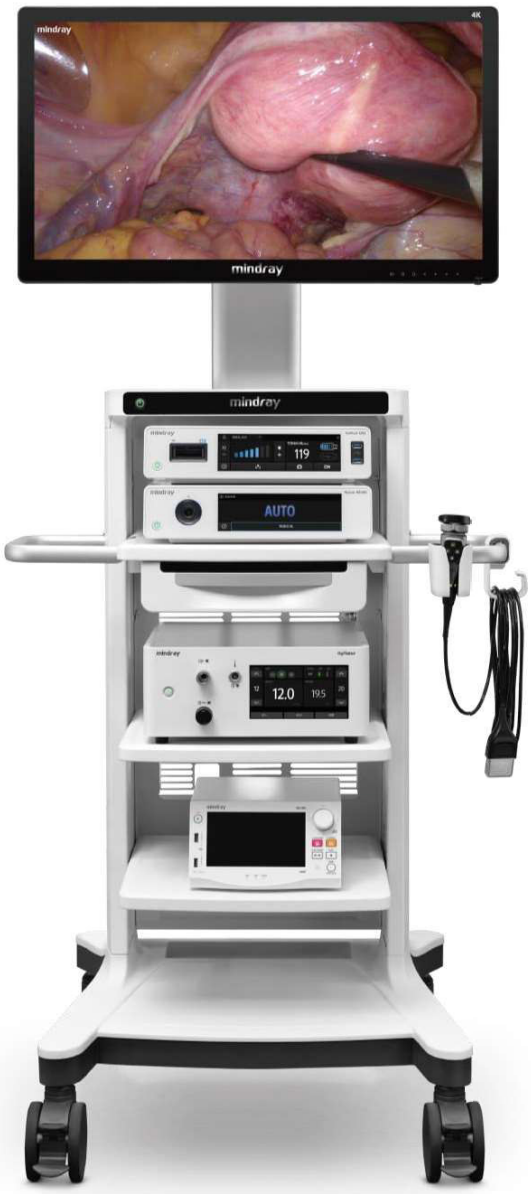
- Layer 1: 202 ±5 mm
- Layer 2: 200 ±5 mm
- Layer 3: 200 ±5 mm
- Layer 4: 200 ±5 mm

mindray
healthcare within reach

UX3 Series

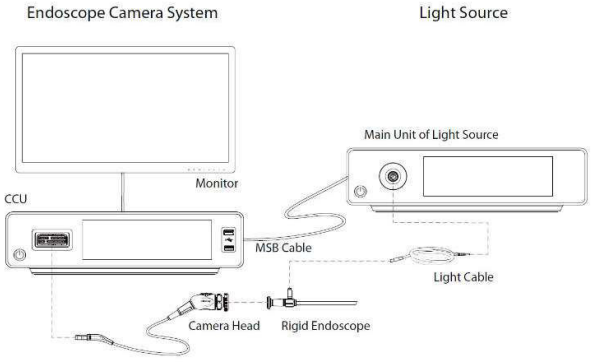
Endoscope Camera System

Vision Beyond Imagination



The equipment adopts modular design, can be connected with endoscopes, light sources and monitors to provide real-time white images for intraoperative. The connection is shown as below:

Endoscope Camera System——UX3 Series



Dimension	380mm x 350mm x 80mm
Weight(CCU)	≤10 kg
Weight(White light Camera head)	≤190 g (excluding the cable)
Resolution	3840*2160 or 4096*2160 pixels
Image Sensor	1-chip 4K CMOS
Scan Mode	Progressive
Refresh Rate	50/60 Hz
Signal Output	12G-SDI x1, HDMI x 2, DVI x 1,3G-SDI x 1
Data Management	Full HD Recording with Built-in USB Storage Flash Disk(up to 6TB)
Protection Against Moisture	Camera head IPX7
Protection Against Electric shock	Class I DEFIBRILLATION-PROOF Type CF

Differences Among Models

Model	Color Style			
	Standard	Bright	Gentle	Vivid
UX3	√	√	√	√
UX3-TEC	√	√	√	×
UX3-SIM	√	√	×	×
UX3-NOR	√	×	×	×

Standard: The saturation level and red-blue hues are set to the default values.
Bright: The saturation level is higher than the default value of Standard, and the red-blue hues remain unchanged.
Gentle: The saturation level is lower than the default value of Standard, and the red-blue hues remain unchanged.
Vivid: The saturation level and blue hue remain unchanged, and the red hue is higher than the default value of Standard.

Endoscope Light Source——HB300 Series

Dimension	380mm x 350mm x 80mm
Weight	≤10Kg
Lamp	High Brightness White LED
Power consumption	260VA
Lamp Life	Over 60,000h
Color Temperature	3000-7000K
Protection Against Electric Shock	Class I, Type CF
Intensity	≥3000000Lux (max center)
Noise	≤55dB
Color rendering index	≥90, in the white light mode

55"/32"2D Monitor

LCD Size	55/32 inch
Weight	11.8±0.5Kg(32 inch) 38.5±2.0Kg(55 inch)
Resolution	3840 * 2160 pixels
Contrast Ratio	1500 : 1 (32 inch) 1200 : 1 (55 inch)
Refresh Rate	50/60 Hz
Backlight Brightness	850 cd/㎡(32" Monitor) 800 cd/㎡(55" Monitor)
Input Signal	HDMI,12G-SDI,DVI, 3G-SDI
Max Viewing Angel	178°
Loop Out	Yes
Picture in Picture	Yes

Insufflator

Model	HS-50F	HS-50H	HS-50V	HS-50S	HS-30S
Flow Rate	0.1-50L/min	0.1-50L/min	0.1-50L/min	0.1-50L/min	0.1-30L/min
Heating	√	√	×	×	×
Smoke Evacuation	√	×	√	×	×
Modes	5	5	5	5	5
Touch Screen	√	√	√	√	√

Dimension	380mm x 350mm x 141mm
Weight	10.0Kg
Pressure Range	1 - 30mmHg
Modes	Bariatric, Adult, Pediatric, Retroperitoneum, Customize
Heating function(HS-50F/HS-50H)	Yes, Temperature ≤41°C
Display	7 inch color touch screen
Protection against harmful ingress of water or particulate matter	Foot pedal IPX8 The insufflator is an ordinary-type device (sealed device that does not protect from liquid inlet)
Protection against electric shock	Type CF
Method of sterilization	By other methods validated and described by the manufacturer

Laparoscope

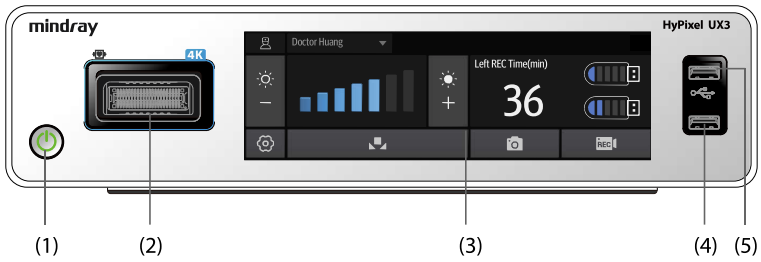
Model	Field of View	Direction of View	Working Length	Max. Width of Insertion Portion
M 01000A M 01000PA	80° ±15%	0°±10°	321mm ±3%	Φ10mm
M 01030A/ M 01030PA	80°±15%	30°±10°	321mm ±3%	Φ10mm
M 00530A M 00530PA	85°±15%	30°±10°	300mm ±3%	Φ5.45mm
M 00500A M 00500PA	85°±15%	0°±10°	300mm ±3%	Φ5.45mm
M 10530A M 10530PA	85°±15%	30°±10°	450mm ±3%	Φ5.45mm
M 10500A M 10500PA	85°±15%	0°±10°	450mm ±3%	Φ5.45mm

UX3/UX3–TEC/UX3–NOR/UX3–SIM

Endoscope Camera System

Operator's Manual

- Release time: 2024-3
- Revision: 3.0



(1) Power switch: turns on or off the CCU. Color of the power switch indicator indicates the power status of the equipment:

- Off: AC power is not connected.
- Orange: AC power is connected, but main unit is off.
- Green: the main unit is on.

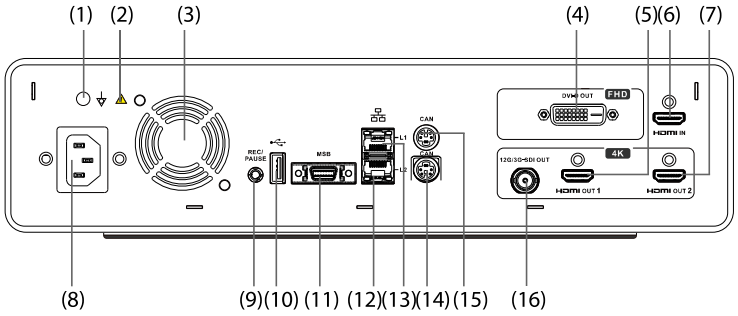
(2) Camera head connector: connects a camera head.

(3) Touchscreen: displays equipment status and changes settings.

(4) USB (Universal Serial Bus) connector 1: connects a USB drive for video storage, supporting USB 3.0 protocol. The supported storage formats include NTFS, FAT32, and exFAT.

(5) USB connector 2: connects a USB drive for video storage, supporting USB 3.0 protocol. The supported storage formats include NTFS, FAT32, and exFAT.

2.8.2 Back View of the CCU



(1) Equipotential grounding terminal: when using the equipment together with other devices, connect their equipotential grounding terminals together to eliminate potential difference.

(2) General warning sign

(3) Ventilation outlet: used for heat dissipation.

(4) DVI (Digital Visual Interface) out: connects a high definition video device for high definition video output, such as monitor.

(5) HDMI (High Definition Multimedia Interface) out 1: connects a 4K video device for 4K video output, such as monitor.

(6) HDMI in 3: reserved.

(7) HDMI out 2: connects a 4K video device for 4K video output, such as monitor.

(8) AC (Alternating Current) power input: connects the AC Mains.

(9) External control extension connector: connects an external video recorder, and supports starting/stopping recording and taking screenshots.

(10) USB connector 3: connects a USB drive for system software upgrade, supporting USB 2.0 protocol.

(11) MSB (Mindray Serial Bus) connector: connects to a light source, controlling the brightness of the light source.

(12) Network connector 1: reserved.

(13) Network connector 2: supports software upgrade.

(14) CAN (Controller Area Network) connector 1: connects external devices other than light source.

(15) CAN connector 2: connects external devices other than light source.

(16) 3G/12G SDI (Serial Digital Interface) out: connects a high definition/4K video device for high definition/4K video output, such as monitor.

2.8.3 Endoscope Camera Head

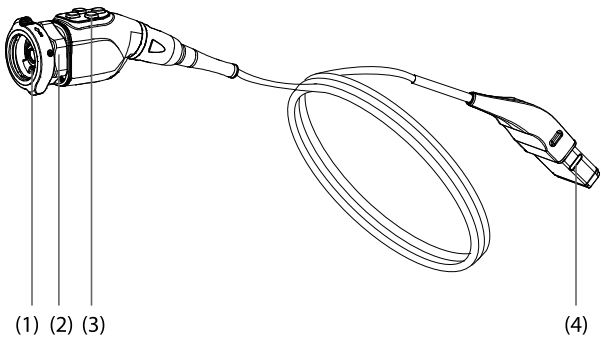
This system is compatible with the following models of camera head:

Model	Standard Cable Length	Function
CH3-SW100	4.5m	Supports white light imaging.
CH3-SW110	3m	Supports white light imaging.

2.8.3.1 Working Principle of Endoscope Camera Head

The camera head is used together with the CCU to support visible light imaging. It provides progressive scan CMOS for white light imaging, supporting 4K output display.

2.8.3.2 Front View of the Camera Head



(1) Endoscope coupler: connects and secures the endoscope.

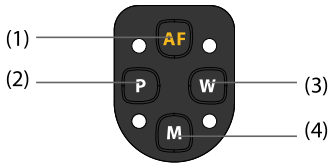
(2) Focusing ring: rotate the ring to focus the camera head.

(3) Camera head buttons: four functional buttons.

(4) CCU connector: connects the CCU.

2.8.3.3 Camera Head Buttons

There are four buttons on the camera head, and three of them can be set to perform different functions. After the camera head is connected to the CCU, the button functions are displayed on the monitor. After a button is pressed, the function prompt disappears. More descriptions are shown below:



(1) AF: press to perform autofocus.

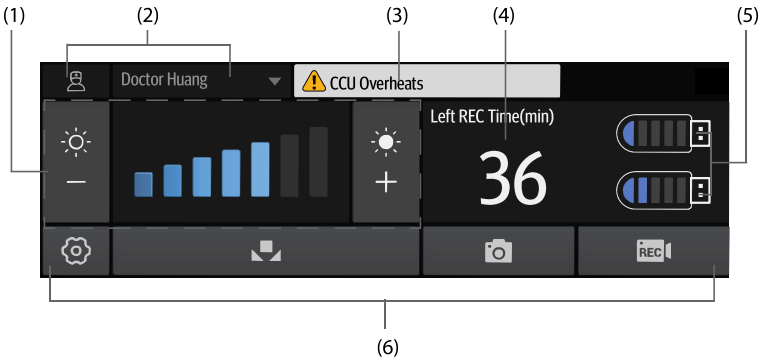
(2) P: short press to take photos and long press to record videos by default. This button can also be set to other functions. For details, refer to ***5.5.2 Setting Button Functions***.

(3) W: long press to perform white balance by default. This button can also be set to other functions. For details, refer to ***5.5.2 Setting Button Functions***.

(4) M: short press to zoom the image by default. This button can also be set to other functions. For details, refer to ***5.5.2 Setting Button Functions***.

3.7.1 Operation Screen Introduction

The following figure shows the operating screen of the equipment:



(1) Brightness setting area: displays the current brightness level. Select a button to set the brightness of the image displayed. There are 7 levels that can be adjusted.

(2) User configuration area: displays the current user configuration. Select the User configuration button to customize the configuration.

(3) Error message area: displays error messages.

(4) Left REC Time (min): indicates the estimated recording time (in minutes) the current connected USB drive supports.

(5) USB status area: indicates the current status of the USB drive connected to the USB connector on the front panel.

NOTE: Keep observing the Left REC Time (min) value and replace the USB drive if necessary.

(6) Button area: displays available buttons. For detailed introduction of the buttons, refer to ***3.7.3 Available Buttons***.

3.7.2 On-screen Symbols

The following table lists the on-screen symbols displayed on the main screen:

Symbol	Description	Symbol	Description
	No USB drive is connected.		About 0% memory is occupied.

- after the light source is changed; and,
- when the color of the image is anomalous.

To perform white balance, follow the procedure below:

1. Ensure that the connected light source is emitting light.
2. Point the camera head or endoscope to a white gauze or any white object, and make sure your sight is filled with white. Do not shake the camera head or the endoscope in the process.
3. Adjust the brightness to an appropriate level and avoid overexposure.
4. Short press the W button on the camera head to start white balance. You can also press the white balance button on the main screen to start the function.
5. Check the prompt message on the monitor. If white balance is indicated to be failed, repeat the procedure.

When the white balance is successfully performed, the displayed image color becomes natural. If the white balance is not performed, the white balance parameters set last time are used by default.

The long-press function of W button on the camera head is set to **White Balance** by default. The long-press function of P or M button can also be customized to **White Balance**. For details about how to customize the button function, refer to ***5.5 Setting Camera Head Functions***.

4.9 Adjusting Image Brightness

Select the brightness increase button + or brightness decrease button − on the main screen to adjust the image brightness. The brightness slider in the middle indicates the current brightness level. You can also drag the slider to the left or right to adjust the brightness.

In addition, if the short-press function of P, W, or M button on the camera head is set to **WL Brightness**, you can short press the button to adjust the brightness. For details about how to set the functions of camera head buttons, refer to ***5.5 Setting Camera Head Functions***.

4.10 Adjusting Image Focus

Camera heads compatible with the CCU does not support detachable lenses. The focal length of the camera heads is 25 mm ± 20%.

You can press the AF button on the camera head to perform autofocus, or rotate the focusing ring to perform manual focus.

4.11 Zoom In/Out

On the setup menu, select **Image Zoom** to zoom in/out on the displayed image. For detailed setting method, refer to ***5.3.1 Adjusting Image View***.

In addition, if the function of P, W, or M button on the camera head is set to **Image Zoom**, you can press the button to adjust the image magnification. For details about how to set the functions of camera head buttons, refer to ***5.5 Setting Camera Head Functions***.

4.12 Taking Photos or Recording Videos

During surgery, you can press the buttons on the touchscreen or press the camera head buttons to take photos or record videos. The images and videos can be stored in the USB drives or an external video recorder. The specification of images and videos are as follows:

Item	Storage Format	Performance
Image	.jpeg	Highest storage resolution: 4K
Video	MP4	Frame rate: 60 fps, Encoding specifications: H.265/10bit

After startup, set the storage location and video quality by referring to ***5.6 Setting Recording Function***.

After setting, when you take photos or videos for the first time, a new file directory will be generated under the storage location, and images and videos recorded during this surgery will be saved to this file directory.

The name of a file directory shows the time of the corresponding surgery, and the name of a video screenshot indicates the name of the corresponding video. The name formats of file directory, video and image are as follows:

Item	Example of Name	Format Meaning
File directory	20230510_1202	year month day_hour minute
Video	Section01_0510_120212.mp4	Section No._month day_hour minute second.mp4
Image (not video screenshot)	Section00_120745.jpeg	Section00_hour minute second.jpeg
Image (video screenshot)	Section01_000402.jpeg	Section No._hour minute second.jpeg

When recording is stopped and "Saving Video" is displayed in the lower left corner of the monitor, do not disconnect the USB drives or the external video recorder.

4.13 Error Messages

A Product Specifications

A.1 Safety Specifications

The device is classified, according to IEC 60601-1:

Type of protection against electrical shock	Class I equipment
Degree of protection against electrical shock	TYPE CF APPLIED PART
Protection against harmful ingress of water	Camera head: IPX7
Recommended methods of disinfection and sterilization	As recommended by the manufacturer
Degree of safety of application in the presence of flammable anesthetic mixture with air or with oxygen or nitrous oxide	The equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
Mode of operation	Continuous operation
If the equipment is provided with applied parts that protect against the effects of the discharge of a cardiac defibrillator	Yes
Installation type	Non-permanently installed equipment

A.2 Environmental Specifications

Item	Temperature (°C)	Relative Humidity (Non-condensing)	Barometric (kPa)
Operating condition	0 - 35	30% - 85%	70.0 - 106.0
Storage condition	-20 - 60	30% - 95%	70.0 - 106.0
Transportation condition	-20 - 60	30% - 95%	70.0 - 106.0

C.3 Camera Head Button Setup

Menu/Tab	Parameter	Default Setting	Saved in User Configuration
P Key	Short Press	Capture	Yes
	Long Press	REC	Yes
W Key	Short Press	No Function	Yes
	Long Press	White Balance	Yes
M Key	Short Press	Image Zoom	Yes
	Long Press	No Function	Yes

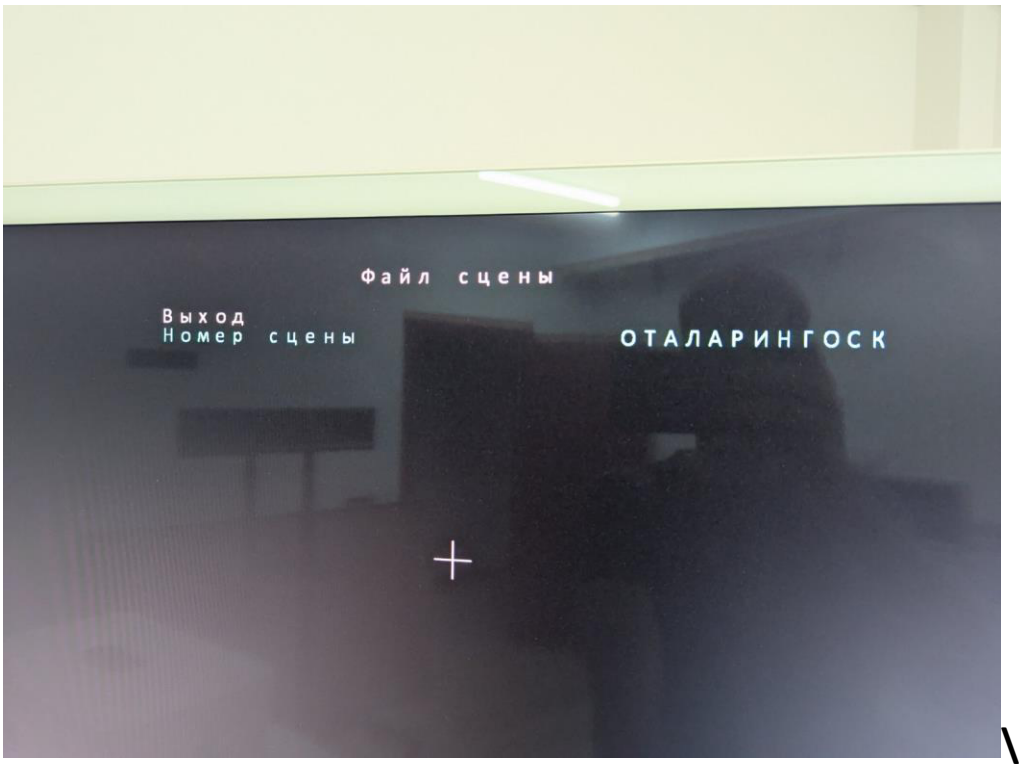
C.4 REC Setup

Menu/Tab	Parameter	Default Setting	Saved in User Configuration
REC Setup	Storage Location	Internal Recorder	No
	Video Segment	8GB	No
	Video Quality	HD SQ	No
	Record Color Depth	8 bit	No
Photo Setting	Time Of Preview	2s	Yes

C.5 System Setup

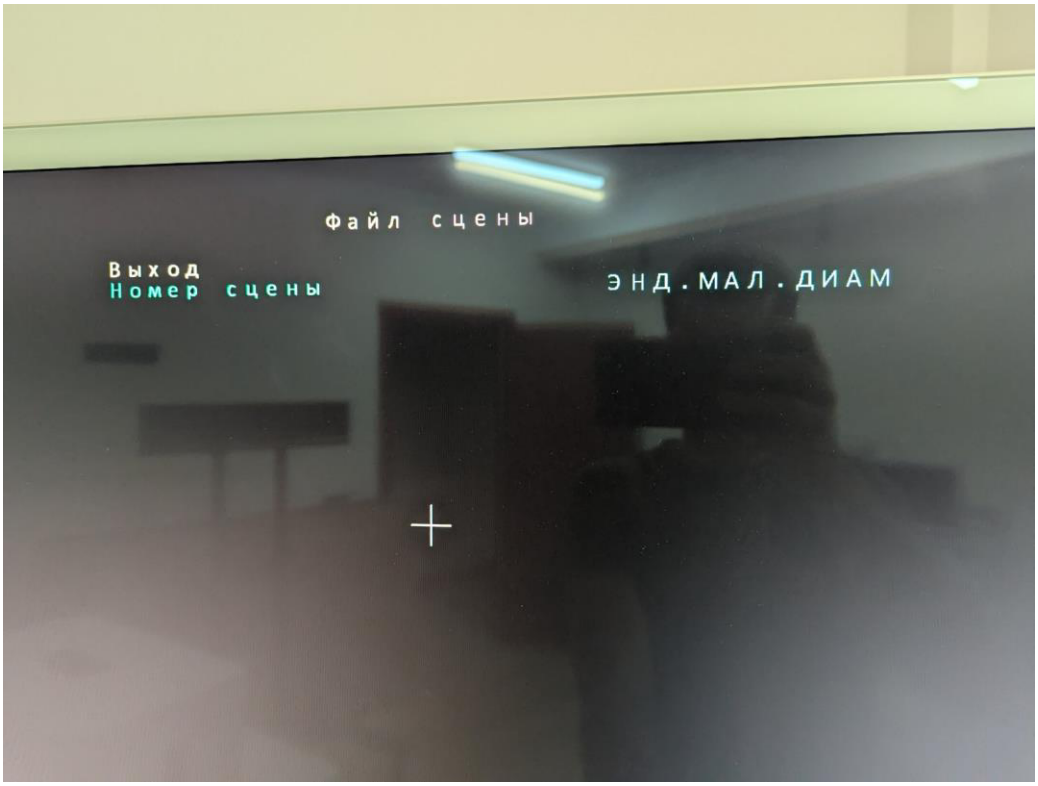
Menu/Tab	Parameter	Default Setting	Saved in User Configuration
General Setup	Image Zoom Threshold	2.0X	Yes
	Logo	ON	No
	Screen Lock Function	ON	No
	Language	/	No
	System Date	/	No
	System Time	/	No
	Version	/	No

Foto programe prestabilite



\


Файл сцены
Выход
Номер сцены
ФИБРОСКОП


Файл сцены
Выход
Номер сцены
ЭНД.МАЛ.ДИАМ

HB300/HB300-TEC

Endoscope Light Source

Operator's Manual

- Release time: 2024-2
- Revision: 3.0

CAUTION

- **Do not put the system in use before the system is checked and works normally.**
- **Do not use an optical observer (such as an amplifier) to or directly look at the light outlet of the light source.**
- **If you need to connect or disconnect a light cable when the light source is on, make sure that the light source is not emitting light. Otherwise, eye injury may result.**
- **When no light cable is connected, the equipment generates a prompt and does not emit light by default. However, do not look directly at the light outlet in case the light cable detection fails.**
- **In case of any failure, stop and remove equipment from use. Otherwise, injury to the patient or operator or damage to the equipment might result.**

4.6 Switching Between Manual and Auto Modes

Select the Mode area on the main screen to switch between manual and auto modes.

- In manual mode, you can adjust the brightness of light on the main screen. For detailed operations, refer to ***4.8 Adjusting the Brightness of Light***.
- After the light source is connected to a Mindray UX3 series CCU, you can switch to the auto mode. In Auto mode, the CCU can automatically adjust the brightness of light.

4.7 Turning On the Light

The light source does not emit light after startup. You can select the Light control button on the main screen to turn on the light.

When a Mindray UX3 series CCU is interconnected, you can turn on the light by using a camera head button. For detailed setting method, refer to the operator manual of the CCU.

4.8 Adjusting the Brightness of Light

In manual mode, you can press the Brightness decrease button  or Brightness increase button  on the main screen to decrease or increase the brightness of light, meeting the brightness requirements of different clinical operations. You can also move the slider in the Brightness indication area to the left or right to adjust the brightness.

CAUTION

- **Use the equipment only in environment that meets the specific requirements. Otherwise, the equipment may not meet the performance specifications or unexpected consequences, e.g. damage to the equipment, could result. If the performance of the equipment is degraded due to aging or environmental conditions, contact the service personnel.**

A.3 Power Supply Specifications

Working power supply	100-240VAC (±10%), 50/60 Hz (±3 Hz)
Input power	260VA

A.4 Physical Specifications

Dimension	Depth: 380 ± 5 mm Width: 350 ± 5 mm Height: 80 ± 5 mm (excluding the rubber feet)
Weight	≤ 10 kg

A.5 Hardware Specifications

Display type (CCU)	Touchscreen
Display size (CCU)	7.8 inches
Device interfaces	Power socket: 1, connecting the AC Mains
	MSB connector: 1, supporting serial communication protocol
	USB connector: 1, supporting USB 2.0 protocol. Fixed time synchronization pulse specified by the USB protocol
	Network connector: 1, RJ45 interface, supporting 100BASE-TX protocol. Calibration protocol of TCP/IP
	Light cable connector: 1, connecting the light cable
Bulb type	LED, which outputs white light
Service life of bulb	LED: over 60000 hours

Bulb specification	LED: 3.5 V, 27 A
Diameter of light outlet	Φ7.2 ± 0.5 mm

A.6 Performance Specifications

Maximum central illumination	≥ 3000000 Lux
Color temperature	3000K - 7000K
Maximum noise	≤ 55 dBA
Defibrillation recovery time	1s

A.7 Operating Environment

Hardware configuration	CPU: 500 MHz RAM: 2 Gb Flash: 4 GB
Software environment	LINUX

NOTE: The above is the minimum requirements of operating environment.

LC0005S/LC0003S Light Cable Instructions for Use

Statement

SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD. (hereinafter called Mindray) owns the intellectual property rights to this product and this manual. Disclosure of the information in this manual in any manner whatsoever without the written permission of Mindray is strictly forbidden.

This manual provides the instructions necessary to operate the product in accordance with its function and intended use. Observance of this manual is a prerequisite for proper performance and correct operation, and ensures patient and operator safety.

Mindray is responsible for the effects on safety, reliability and performance of this product, only if:

(1) this product is used in accordance with the instructions for use.

(2) this product is not damaged by human factors. Human factors refer to unintentional falling, intentional damaging, etc.

In the event that it becomes necessary to return a unit to Mindray, please contact the Mindray Service Department and obtain a Mindray Customer Service Authorization Number. The Mindray Customer Service Authorization Number must appear on the outside of the shipping container. Return shipments will not be accepted if the Mindray Customer Service Authorization Number is not clearly visible. Please provide the model number, serial number, and a brief description of the reason for return. The customer is responsible for freight charges when this product is shipped to Mindray for service (including any relevant customs fees or other freight related charges).

mindray is the registered trademark owned by Mindray in China and other countries.

The issue date of this manual is 2021-5.

Notification of Adverse Events

As a health care provider, you may report the occurrence of certain events to SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD., and possibly to the competent authority of the Member state in which the user and/or patient is established.

These events, include device-related death and serious injury or illness. In addition, as part of our Quality Assurance Program, SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD. requests to be notified of device failures or malfunctions. This information is required to ensure that SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD. provides only the highest quality products.

Important Information

1. It is the customer's responsibility to maintain and manage the product after delivery.
2. The warranty does not cover the following items, even during the warranty period:
   (1) Damage or loss due to misuse or abuse.
   (2) Damage or loss caused by force majeure such as fires, earthquakes, floods, and lightning.
   (3) Damage or loss involving the product purchased from a channel other than Mindray or its authorized agency.
3. This product shall not be modified without permission.
4. In no event shall Mindray be liable for the damage caused by alteration, modification, or repair performed by personnel other than those designated by Mindray.
5. At the end of the service life of the product, please contact Mindray or its agency. Mindary shall not be liable for the result if you do not consult Mindray or its agency about disposal of the product.
6. This manual contains warnings regarding foreseeable potential dangers, but you shall always be alert to dangers other than those indicated as well.
7. Mindray shall not be liable for damage or loss that results from negligence or from ignoring the precautions and operating instructions described in this manual.
8. This manual shall always be kept properly so that it can be obtained conveniently as needed.

I. Intended Use

The light cable is used to transmit light during the endoscopic diagnosis and treatment. In the medical field, it is used with the cold light source of endoscopes.

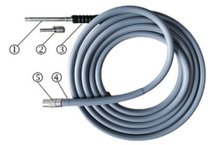
NOTE

- According to the conclusion of clinical evaluation and residual risk evaluation, for the intended patients, there is no known side effects that can occur during or after the use of the medical device. And there is no need for the operator to make extra preparations. Thus, no residual risk associated with using the medical device should be disclosed due to the risk management report.

II. Specifications

Model	LC0005S	LC0003S
Length of light cable	3000 mm ± 10%	
Diameter of exit optical fiber	Φ4.8 mm ± 0.1mm	Φ3.5 mm ± 0.1mm
Minimum bending radius	50mm	

III. Introduction



1. Connector (to light source)
2. Light source adapter
3. Connector sleeve
4. Anti-bending device
5. Connector (to endoscope)

IV. Safety Precautions

⚠ WARNING

Risk of patient injury

- Ensure that all endoscopic equipment is properly connected and functioning before inserting the endoscope into a patient.
- Use this product only along with the endoscopic device specified by Mindray.

⚠ CAUTION

Risk of patient injury

Light source produces a lot of heat, causing a high temperature at the connector and front end of the endoscope. It may result in the following risk:

- ➢ Scalding the patient (for example, when the small cavity of the lumen is exposed to excessive lighting, or the front end of the endoscope is close to the tissue).
- ➢ Burn of the patient or user's skin.
- ➢ Combustion or burning-out of surgical instruments (such as surgical drapes, and plastic materials).

- It is forbidden to place the endoscopic equipment on the patient's skin, flammable materials, or temperature-sensitive materials.
- Adjust the output power of the light source to make the minimum brightness required to illuminate the target area. Avoid excessive exposure to strong light.

⚠ CAUTION

Risk of user injury

When the light source is on, do not look straight at the endoscopic connector of the light cable because that may cause eye injury.

V. Removal After Use

⚠ CAUTION

Risk of user injury

Touching the light cable connector when its temperature is high may cause scalding.

- Cool the light cable after use.

INSTRUCTION

Risk of product damage

Sudden change in temperature may cause damage to the product.

- Cool the light cable after use.
- It is forbidden to use liquid to cool the light cable.

INSTRUCTION

Risk of product damage

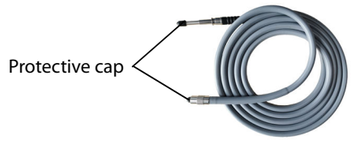
Pulling the cable may damage the product.

- To unplug the light cable from the light source, grasp the plastic shell of the connector.

VI. Cleaning, Disinfection, and Sterilization

Clean, disinfect and sterilize this product regularly based on the local or hospital's regulations related to cleaning, disinfection, and sterilization.

A protective cap is provided together with the product before delivery, as shown in the following figure. Remove the protector before cleaning, disinfection, and sterilization.



1. Cleaning and Disinfection

(1) Disconnect the light cable from the devices, including light source and endoscope.

(2) Use a soft cloth dipped in an appropriate amount of water to remove leftover on the surface of the light cable.

(3) Use a clean soft cloth dipped in an appropriate amount of ethanol (75%) to wipe the surface of the light cable.

(4) Use a dry soft cloth to wipe off detergent on the surface of the light cable, and place the light cable in a ventilated and cool environment to air dry it.

2. Sterilization

The recommended sterilization method is pressure steam sterilization. For loading method of pressure steam sterilization, please refer to the corresponding sterilizer operation instructions.

The procedure is as follows:

(1) Remove the light source adapter from the light cable.

(2) Put the product in a sterilization box, and wrap two layers of sterile sheets to prevent contamination during storage and transportation after sterilization.

(3) Perform pressure steam sterilization as instructed in the manual for using the sterilizer.

The pressure steam sterilization parameters are as follows:

Sterilization process	Temperature	Minimum required time
Pulsation vacuum	132ºC - 134ºC	4min

⚠ WARNING

Risk of patient/medical staff injury

Improper or inadequate cleaning, disinfection, and sterilization may result in infection of the patient or medical staff or product damage.

- Clean, disinfect, and sterilize the product for the first use and before each use.
- Clean, disinfect and sterilize the product properly according to this manual.

VII. Warranty

If a user or unauthorized person repairs or modifies the product privately, the warranty of the Mindray becomes invalid. The product damage caused by improper use is not covered by the warranty.

VIII. Operating Environment

1. Temperature: 0ºC - +35ºC
2. Humidity: 30% - 85% RH, non-condensing
3. Atmospheric pressure: 70 kPa - 106 kPa

IX. Storage and Transportation Environment

1. Temperature: -20ºC - +60ºC
2. Humidity: 30% - 95% RH, non-condensing
3. Atmospheric pressure: 70 kPa - 106 kPa

Put clean and disinfected products in packages capable of isolating the products from bacteria, and store them in a dark, cool, and well-ventilated room.

X. Equipment Symbols

Symbol	Description
MD	Medical Device
	Manufacturer
	Date of manufacture
	TYPE CF APPLIED PART
LOT	Batch code
	Temperature limit
	Humidity limitation
	Atmospheric pressure limitation
CE	The product bears CE mark indicating its conformity with the provisions of the Council Directive 93/42/EEC concerning medical devices and fulfils the essential requirements of Annex I of this directive. Note: The product complies with the Council Directive 2011/65/EU.
	Refer to instruction manual/booklet
EC REP	Authorized representative in the European community
	Comply with the requirements of Directive 2012/19/EU Waste Electrical & Electronic Equipment

Company Contact

Manufacturer:	Shenzhen Mindray Bio-Medical Electronics Co., Ltd.
Address:	Mindray Building, Keji 12th Road South, High-tech Industrial Park, Nanshan, Shenzhen 518057, P.R.China
Website:	www.mindray.com
E-mail Address:	service@mindray.com
Tel:	+86 755 81888998
Fax:	+86 755 26582680
EC-Representative:	Shanghai International Holding Corp. GmbH (Europe)
Address:	Eiffestraβe 80, 20537 Hamburg, Germany
Tel:	0049-40-2513175
Fax:	0049-40-255726

mindray

LC0005S/LC0003S

导光束
使用说明书

Light Cable
Instructions for Use

046-020513-00(3.0)

声明

本产品及其使用说明书的知识产权属于深圳迈瑞生物医疗电子股份有限公司（以下简称迈瑞公司）。

迈瑞公司拥有本使用说明书的最终解释权。未经迈瑞公司书面许可，任何个人或组织不得复制、修改或翻译本使用说明书。

本说明书详细地介绍了产品的用途、功能和操作使用。使用本产品之前，请认真阅读并理解本说明书中的内容，以保证能够正确地使用本产品，并确保病人和操作者安全。在下列条件都满足的情况下，迈瑞公司将对产品的安全性、可靠性和性能负责：

(1) 按照《使用说明书》使用本产品。

(2) 非人为因素造成的产品损坏。人为因素是指不小心摔落、蓄意破坏等。

确实需要向迈瑞公司退货时，请联系迈瑞公司售后服务部，告知产品型号和系列号，并简述原因。若产品的系列号模糊不可辨认，退货请求将不予接受。

说明书编制日期：2021 年 5 月

mindray和**迈瑞**是迈瑞公司的注册商标或者商标。

重要信息

1. 购买本产品后，客户对产品的维护和管理负全部责任。
2. 即使在保修期内，对下列情况迈瑞将不负责保修：
   (1) 由于操作不当或故意损坏造成的损坏。
   (2) 由于不可抗力如火灾、地震、洪水、闪电等造成的损坏。
   (3) 不是从迈瑞公司或指定的分销商手中购买的迈瑞产品，如果发生损坏，将不予保修。
3. 禁止擅自对本产品做任何改动。
4. 非迈瑞公司指定人员对设备进行的重新改装、改动或维修造成的损坏，迈瑞将不负任何责任。
5. 产品报废处理前请联系迈瑞公司或其代理机构。未向迈瑞公司或其代理机构咨询而对产品进行处理，迈瑞公司不对其所产生的后果负责。
6. 本说明书对可以预见的危险做出了警告。但请在任何时间保持警惕以防出现其他危险。
7. 由于疏忽没有按照说明书中的指引而产生的问题，迈瑞公司将不对此负责。
8. 请妥善保管本说明书，以确保管理和操作人员可以随时查阅。

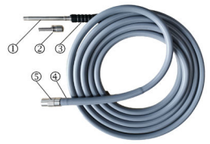
一、预期用途

导光束用于在内窥镜诊断和治疗中传输光线。医学领域中，它与医用内窥镜冷光源配套使用。

二、主要技术参数

型号	LC0005S	LC0003S
导光束长度	3000 mm ± 10%	
出射端光纤直径	Φ4.8 mm，允差 ±0.1mm	Φ3.5 mm，允差 ±0.1mm
最小可弯曲半径	50mm	

三、导光束结构



1. 导光束接头（光源侧）
2. 导光束光源适配套
3. 接头套管
4. 防折弯装置
5. 导光束接头（内窥镜侧）

四、安全注意事项

⚠ 警告

患者受伤的风险

- 将内窥镜插入患者体内之前，应始终正确连接内窥镜设备。
- 本产品仅可与迈瑞指定的内窥镜设备配合使用。

⚠ 小心

患者受伤的风险

光源会产生大量热量，导致内窥镜接头与先端部温度升高。可能会存在以下风险：

- ➢ 患者组织烫伤（例如，管腔较小的腔隙暴露在过强的照明下，或内镜先端部与组织距离过近）。
- ➢ 患者或用户皮肤烧伤。
- ➢ 手术器械燃烧或烧毁（例如，手术铺巾，塑料材料等）。

- 禁止将内窥镜设备放置在患者皮肤、可燃性材料或对温度敏感的材料上。
- 调节光源的输出功率，达到照亮目标区域所需的最低亮度。避免强光的过度暴露。

⚠ 小心

用户受伤的风险

在光源打开的情况下，直视导光束的内镜接头可能导致眼睛损伤。因此，光源打开的情况下，禁止直视导光束的内镜接口。

五、使用后拆卸

⚠ 小心

用户受伤的风险

导光束上的接头温度过高时，触摸接头可能会导致烫伤。

- 使用后应使导光束冷却。

说明

产品损坏的风险

高温导光束的温度急剧变化会损伤产品。

- 使用后应使导光束冷却。
- 禁止使用液体冷却导光束。

说明

产品损坏的风险

拉拽缆线会损坏产品。

- 从光源上拔下导光束时，应拉动接头的塑料外壳。

六、清洗、消毒和灭菌

请根据当地或医院关于医疗设备清洁消毒的规定定期对本产品进行清洁、消毒和灭菌。

本产品出厂时配送光纤保护套，如下图所示，清洁消毒及灭菌前请先取下保护套。

光纤保护套

1. 清洁和消毒

(1) 断开导光束与光源、内窥镜等设备的连接。
(2) 使用一块软布蘸取适量的水除去导光束表面的残留物。
(3) 使用干净的软布蘸取适量乙醇（75%）擦拭导光束表面。
(4) 用干的软布擦去导光束表面的清洁剂，并将导光束置于通风阴凉的环境下风干。

2. 灭菌

推荐使用经验证过的灭菌方法：压力蒸汽灭菌。

压力蒸汽灭菌的装载方法，请参照相应灭菌器的操作说明。

步骤如下：

(1) 卸下导光束光源适配套。
(2) 将产品放置在灭菌盒中，并包裹两层无菌单，以防止灭菌后在存放、运输过程中染菌。
(3) 参照灭菌器的使用说明书执行压力蒸汽灭菌。

压力蒸汽灭菌器灭菌参数如下：

设备类别	温度	所需最短时间
预真空式	132ºC ~ 134ºC	4min

⚠ 警告

患者 / 医务人员受伤的风险

清洗、消毒和灭菌不当或不充分可能导致患者或医务人员感染和产品损坏。

- 首次及此后每次使用产品之前，应该进行清洗、消毒和灭菌。
- 按照本说明书，正确进行产品清洗、消毒和灭菌。

七、保修

如果用户或未经授权的人员私自维修或改造产品，则迈瑞公司的保修将失效。因使用不当导致的产品损坏不在保修范围之内。

八、工作环境

1. 温度：0ºC ~ +35ºC
2. 湿度：30% ~ 85% RH（无凝露）
3. 大气压：70 kPa ~ 106 kPa

九、存储和运输环境

1. 温度：-20ºC ~ +60ºC
2. 湿度：30% ~ 95% RH（无凝露）
3. 大气压：70 kPa ~ 106 kPa

将清洗和消毒处理后的产品置于能隔离细菌的包装中，存放在避光、阴冷、通风良好的室内。

十、符号

符号	说明
	注意！查阅随机文件
	生产日期
	CF 型应用部分
	批次代码
	温度极限
	湿度极限
	大气压力极限
	电子产品环保使用年限（20 年）

售后服务单位

单位名称：深圳迈瑞生物医疗电子股份有限公司
单位地址：深圳市南山区高新技术产业园区科技南十二路迈瑞大厦
邮政编码：518057
网址：www.mindray.com
24 小时服务热线：4007005652
电话：+86 755 81888998
传真：+86 755 26582680

www.mindray.com

P/N:ENG-Rigid Endoscope-210285X4P-20230822

mindray

healthcare within reach

mindray

Rigid Endoscope

Small Diameter, Big Vision

Small Diameter, Big Vision

The heatable front end provides effective anti-fogging, which helps deliver smooth surgery.

The Standard 300mm and Lengthened 450mm Type are adaptable for use in various surgeries.

A large depth of field of 3-200mm provides consistently clear views, eliminating the need for repeated refocusing.

The control body has been specially polished to retain grease more easily, allowing for smooth entry and exit of trocars.

A channel diameter of Φ5.45mm ensures greater luminous flux while smoothly passing through a variety of 5mm-size trocars.

The format size is consistent with that of the Φ10mm endoscope, which enables easy full-screen view.

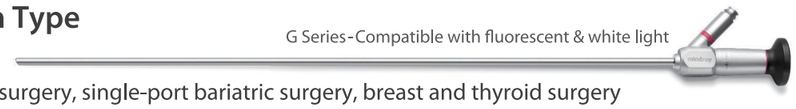
Rigid Endoscope

Standard 5mm Type

Recommended Surgery: Single-port gynecologic surgery, thoracic surgery

Product	Diameter	Working Length	Field of View	Code
0°	5.45mm	300mm	85°	G 00500A
30°	5.45mm	300mm	85°	G 00530A

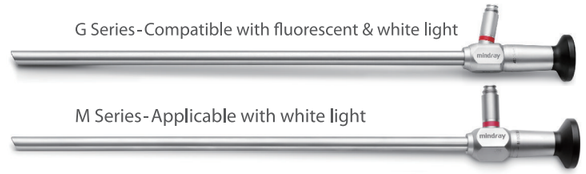
Lengthened 5mm Type



Recommended Surgery:
Single-port gynecologic surgery, single-port bariatric surgery, breast and thyroid surgery

Product	Diameter	Working Length	Field of View	Code
0°	5.45mm	450mm	85°	G 10500A
30°	5.45mm	450mm	85°	G 10530A

Standard 10mm Type



Recommended Surgery: General Surgery

Product	Diameter	Working Length	Field of View	Code
0°	10mm	321mm	80°	M 01000A / G 01000A
30°	10mm	321mm	80°	M 01030A / G 01030A

Rigid Endoscope Tray

Product Name	Placed Items	Dimensions (mm)	Code
Small Rigid Endoscope Tray	Standard 5 or 10mm Rigid Endoscope	496×90×44	X TR500944
Long Rigid Endoscope Tray	Lengthened 5mm or 3D Electronic Endoscope	643×158×75	X TR641675

HP100G/

HP200G/HP200L/HP200D

Fluid Management System

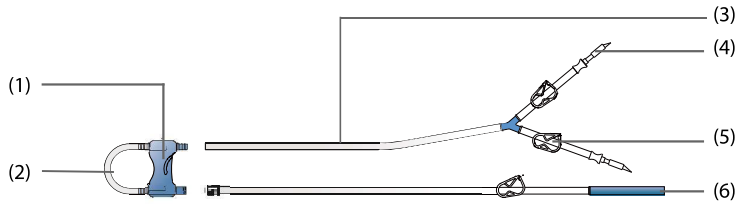
Operator's Manual

CE 1639

- Release time: 2023-8
- Revision: 3.0

2.9.3 Irrigation Tubing Set

2.9.3.1 Front View of the Irrigation Tubing Set



(1) Tube fixing block

(2) Roller tube

(3) Inflow tubing (device end)

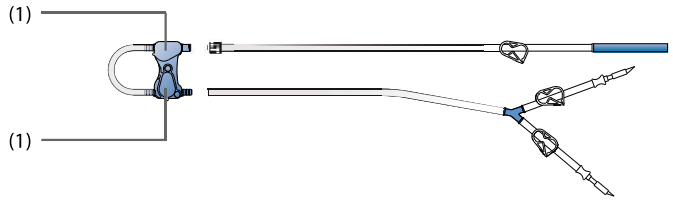
(4) Spike: connects the irrigation bag.

(5) Robert clamp

(6) Irrigation tubing (patient end):

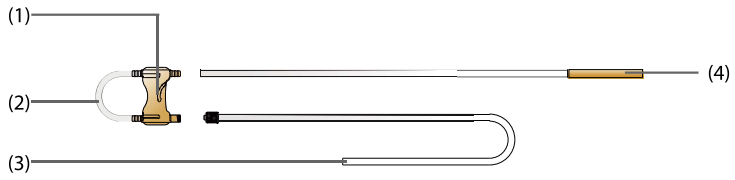
- in the hysteroscopic modes (for HP100G/HP200G/HP200D), connects to the inlets of the hysteroscope.
- in the laparoscopic modes (for HP200L/HP200D), connect based on the actual situation.

2.9.3.2 Back View of the Irrigation Tubing Set



(1) Pressure sensing membrane: 2 more are provided for each irrigation tubing set as spares.

2.9.4 Suction Tubing Set



(1) Tube fixing block

(2) Roller tube

(3) Outflow tubing (device end):

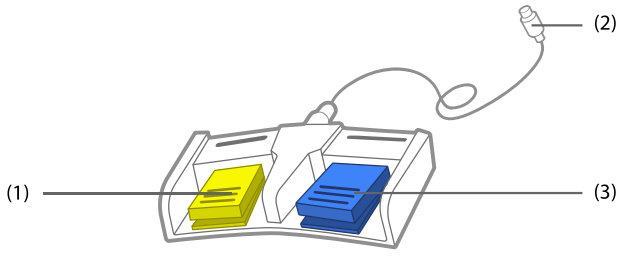
- in the hysteroscopic modes (for HP100G/HP200G/HP200D), connects to the fluid collector.
- in the laparoscopic modes (for HP200L/HP200D):
  - when directly using on target area: connects to the fluid collector.
  - when using with vacuum suction bottle: being left open to air.

(4) Suction tubing (patient end):

- in the hysteroscopic modes (for HP100G/HP200G/HP200D), connects to the outlets of the hysteroscope.
- in the laparoscopic modes (for HP200L/HP200D):
  - when directly using on target area: connect based on the actual situation.
  - when using with vacuum suction bottle: connects to the vacuum suction bottle.

Note: In the laparoscopic modes, you are advised to directly use the suction tubing on the target area. Using a vacuum suction bottle will prolong the suction time and reduce the suction flow rate.

2.9.5 Foot switch



- **Ensure that the equipment is supplied with continuous electric power during work. Sudden power failure may cause data loss or system failure.**
- **If the power supply is unstable, the system might not work properly. It is recommended to use uninterrupted power supply.**
- **The equipment shall only be connected to mains power with protective earth. Do not use multiple portable socket outlets, which might cause interference, electric shock or equipment damage. Do not use a power socket that is not grounded.**
- **The equipment can also be connected to a separate power supply. Ensure that the rated output of the power supply matches the input of the equipment. The power supply and this equipment constitute an ME SYSTEM together, meeting the requirements of IEC 60601-1.**
- **Before connecting the equipment to the AC mains, check that the voltage and frequency ratings of the power supply are the same as those indicated on the equipment's label or in this manual.**

3.8 Using the Touchscreen

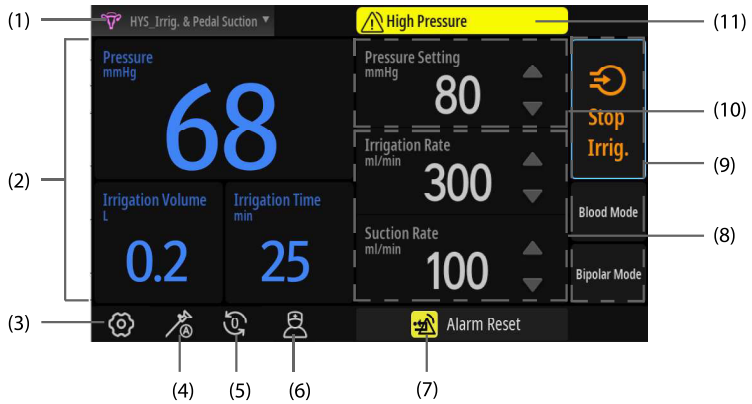
The equipment is configured with an LCD touchscreen on which you can operate and set the equipment, and view operation information.

NOTE

- **Dry the equipment immediately in case of rain or water spray.**

3.8.1 Screen Display

During irrigation, an example of the screen is as follows:



(1) Mode area: displays the application mode. To switch modes, refer to ***4.4.3 Selecting an Application Mode***.

(2) Real-time information area: displays real-time pressure, deficit (total loss of the output volume), irrigation time, and some system prompts, such as "Purging" and "Purge paused".

(3) Setup button : select to display the setup menu.

(4) Sheath select button : select to display the sheath selection list. This button is unavailable during irrigation/suction. In the Auto mode, the button is displayed as .

(5) Clear button : select to clear history data in the real-time information area. This button is unavailable during irrigation/suction.

(6) Doctor configuration button : select to display the custom configuration menu. This button is unavailable during irrigation/suction.

(7) Alarm reset button : select this button to reset the alarm system. For details about alarm reset, refer to ***5.6 Resetting Alarms***.

(8) Flow rate setting area: displays the current irrigation/suction flow rate. You can select this area to set the irrigation/suction flow rate.

(9) Irrigation/Suction control button: select to start or stop irrigation/suction. If the bipolar mode or blood mode is enabled, the bipolar mode or blood mode control button will be displayed here. For detailed introduction of different control buttons, refer to ***3.8.2 On-Screen Buttons and Symbols***.

(10) Pressure setting area: displays the configured irrigation pressure. You can select this area to set the irrigation pressure.

(11) Alarm information area: displays the alarm status, alarm symbols, and alarm or prompt messages.

3.8.2 On-Screen Buttons and Symbols

The following table lists the irrigation/suction control buttons and on-screen symbols displayed on the operation screen.

Symbol	Description	Symbol	Description
	Start irrigation (blue).		Stop irrigation (orange).

A Product Specifications

A.1 Safety Specifications

The device is classified, according to IEC 60601-1:

Type of protection against electrical shock	Class I equipment
Degree of protection against electrical shock	TYPE CF APPLIED PART
Protection against harmful ingress of solid and water	Main unit: IPX2 Foot switch: IPX8
Recommended methods of disinfection and sterilization	As recommended by the manufacturer
Degree of safety of application in the presence of flammable anesthetic mixture with air or with oxygen or nitrous oxide	The equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
Mode of operation	Continuous operation
Protection against the effects of the discharge of a cardiac defibrillator	All applied parts are provided for protection against the effects of the discharge of a cardiac defibrillator
Installation type	Portable equipment

A.2 Environmental Specifications

Item	Temperature (°C)	Relative Humidity (Noncondensing)	Barometric (kPa)
Operating condition	10 - 40	15% - 80%	70 - 108
Storage/transportation condition	-30 - 60	10% - 95%	16 - 108

Data interfaces	USB connector: 1, USB 2.0 protocol. Fixed time synchronization pulse specified by the USB protocol
	Network connector: 1, standard RJ45 interface, supporting wired network 10/100Mbps, and complied with technical standard IEEE802.3. TCP/IP protocol Calibration protocol of TCP/IP The intended information flow is from the equipment to the server in the client site.
	CAN connector: 2, PS/2 interfaces, complied with CAN 2.0 standards.
Other interfaces	Foot switch connector (optional): 1, used for transmitting analog signal from Mindray specified foot switch, complied with Mindray internal standard
Signal output	Alarm tune volume: 45 dBA - 65 dBA (within 1m away from the main unit)

A.6 Product Performance

Irrigation flow rate in the hysteroscopic modes (for HP100G/HP200G/HP200D)	Adjustment range: ≥ 0 - 500 mL/min Adjustment step: ≥ 10 mL/min
Suction flow rate in the hysteroscopic modes (for HP100G/HP200G/HP200D)	Adjustment range: ≥ 0 - 200 mL/min Adjustment step: ≥ 10 mL/min
Irrigation/Suction flow rate in the laparoscopic modes (for/HP200L/HP200D)	Adjustment range: ≥ 100 - 1300 mL/min Adjustment step: ≥ 100 mL/min
Flow rate accuracy	Flow rate tolerance: ± 10% when flow rate ≥ 100 mL/min; ± 10 mL/min when flow rate < 100 mL/min
Pressure limit in the hysteroscopic modes	Adjustment range: ≥ 0 - 200 mmHg Adjustment step: 1,2,5, or 10 mmHg
Accuracy of preset pressure limit	Pressure limit tolerance: ± 5% when pressure limit ≥ 50mmHg; ± 2.5 mmHg when pressure limit < 50 mmHg

HS-50F, HS-50V, HS-50H, HS-50S, HS-30S

Insufflator

Operator's Manual

CE 0123

- Release time: 2021-5
- Revision: 5.0

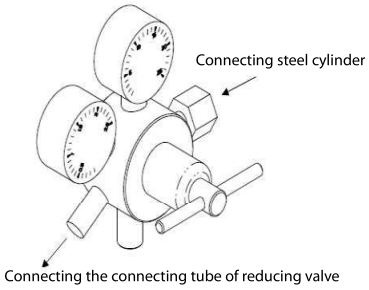


Figure 4-2 Connection of the reducing valve

3. Connect the connecting tube of reducing valve to the low pressure end of the reducing valve.
4. Confirm that the insufflator and the CO_2 gas cylinder are connected correctly, and slowly open the gas cylinder valve. As shown in Figure 4-3.
5. Slowly open the valve of the reducing valve.

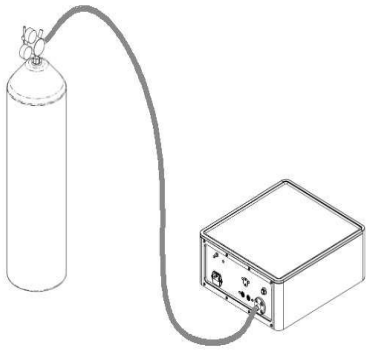


Figure 4-3 The insufflator connects with steel cylinder via the reducing valve

WARNING

- **The pressure to use for the reducing valve shall be suitable. The suggested pressure is 0.5~1Mpa to meet the inflation requirements.**

4.1.2.2 Directly Connecting the Insufflator with the CO_2 Steel Cylinder

1. Check whether the high pressure tube used for the direct connection of steel cylinder is damaged, has cracks or other anomalies.

2. Use a wrench to connect the high pressure tube to the CO_2 gas inlet on the insufflator's rear panel, with a force of 11.8N.m (1.2kgf.m) to fasten it. As shown in Figure 4-4.
3. Connect the steel cylinder joint of the high pressure connecting tube to the gas outlet of the steel cylinder. Use a force of about 29.4N.m (3kgf.m) to fasten it.
4. Confirm that the insufflator and the CO_2 gas cylinder are connected correctly, and slowly open the gas cylinder valve.

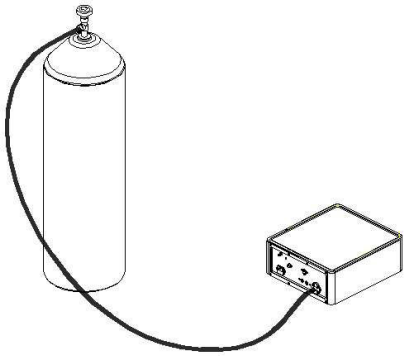


Figure 4-4 The insufflator directly connects with the CO2 steel cylinder

4.1.3 Connecting the Central Gas Supply Pipe Joint

DANGER

- **Using non-medical CO_2 gas may cause fire, poisoning, complications, etc. Besides, the oil stains, impurities and other substances may permeate into the insufflator, preventing the proper injection of CO_2 gas.**

WARNING

- **First connect the gas supply hose to the insufflator, and then connect it to the central gas supply joint, otherwise a serious gas leak might occur.**
- **Do not use grease and oils to lubricate the joint parts of the device/hoses. Otherwise the grease, oils or other impurities may permeate into the insufflator, affecting normal operation and the normal injection of CO_2 gas.**

- **Confirm that the gas pressure for the medical gas pipeline shall be higher than 343.2kPa (3.5 kgf/cm2) and lower than the upper limit stipulated in ISO7396 (1400kPa), to ensure the normal injection of CO_2 gas.**
- **If obvious gas leak inside the insufflator is found, stop using immediately and contact Mindray.**

1. Use a wrench to connect the insufflator joint of the gas supply hose to the CO_2 gas inlet on the insufflator's rear panel, with a force of 11.8N.m (1.2kgf.m) to fasten it. As shown in Figure 4-1.
2. Connect the gas supply hose to the CO_2 central gas supply port.

4.1.4 Connecting the Foot Switch (only for HS-50F/HS-50V models)

WARNING

- **Do not connect any other devices to the foot switch interface.**
- **The joint part of the foot switch is not waterproof. Please keep it away from liquids.**

1. Insert the foot switch plug into the foot switch interface on the insufflator's rear panel as indicated by the arrow, until it fits in.
2. When taking down the foot switch, hold the cusp of the foot switch to pull if out straightly.

4.1.5 Connection with the Power Grid

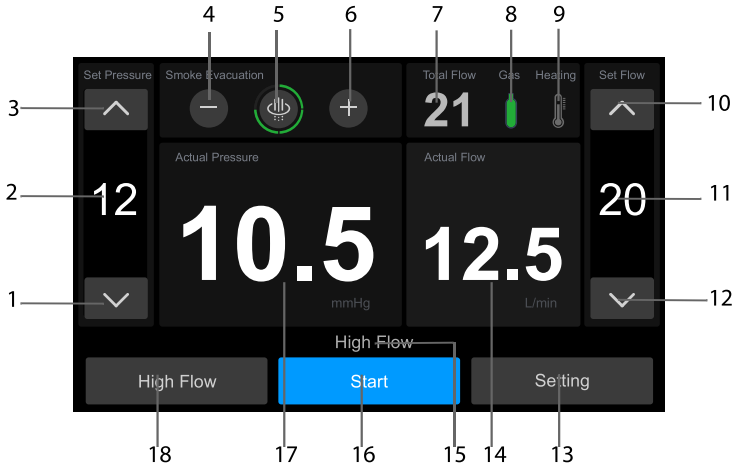
WARNING

- **Connect the equipotential wire before inserting the power supply plug into socket. Similarly, to avoid electrical shock, pull the system plug away from the socket before unplugging the equipotential wire.**
- **When other equipment is connected to the system, equipotential cables must be used to connect to each equipotential terminal, or an electrical shock will occur.**
- **When connecting or disconnecting protective grounding wires, turn off the equipment power supply. Or an electrical shock will occur.**
- **If the circuit breaker and fuse of for a socket are the same as that used in this system and are used to control the current of equipment such as a life support system, do not connect the system to such socket. Because once the system operates abnormally, overcurrent is generated, or there is transient**

4.2 Use

4.2.1 Using the Touchscreen

The insufflator is configured with a touchscreen on which you can operate and set the equipment. Below is an introduction of content displayed on the touchscreen:



(1)	Decrease CO_2 pressure
(2)	CO_2 pressure setting
(3)	Increase CO_2 pressure
(4)	Decrease smog exhausting rate
(5)	Smog exhausting indicator
(6)	Increase smog exhausting rate
(7)	Total CO_2 exhaust (press to clear the value)
(8)	Gas source indicator
(9)	Heating indicator
(10)	Increase CO_2 flow
(11)	CO_2 flow setting
(12)	Decrease CO_2 flow

7 Accessories

WARNING

- **Use accessories specified in this chapter. Using other accessories may cause damage to the device or not meet the claimed specifications.**
- **Single use accessories are not designed to be reused. Reuse may cause a risk of contamination and affect the measurement accuracy.**

CAUTION

- **The accessories may not meet the performance specifications if stored or used outside the specified temperature and humidity ranges. If accessory performance is degraded due to aging or environmental conditions, contact your service personnel.**
- **Check the accessories and their packages for any sign of damage. Do not use them if any damage is detected.**
- **Use the accessories before the expiry date if their expiry date is indicated.**

Part No.	Description
0020-20-12524	Power cord (EU, 2.5 m)
0020-20-12522	Power cord (International, 250 V, 10 A, 2.5 m)
0020-20-12523	Power cord (US, 110 V, 13 A, 2.5 m)
009-000567-00	Power cord (US, 110 V, 13 A, 2.5 m)
009-001075-00	Power cord (Brazil, 250 V, 10 A, 3 m)
DA8K-10-14453	Power cord (UK)
0000-10-10903	Power cord (India, 1.8 m)
009-001791-00	Power cord (South Africa, 250 V, 16 A, 3 m)
009-004940-00	Power cord (Australia)
009-008233-00	Serial port cable
1000-21-00122	Grounding cable

Part No.	Description
M07-00130F---	FUSE Time-lag 250V 3.15AD5X20
040-003541-01	Heating insufflator tube
115-050308-00	Reusable insufflator tube
115-050309-00	Reusable suction tube
082-002806-00	Central gas supply pipe (German)
082-002807-00	Central gas supply pipe (DISS)
082-002808-00	Central gas supply pipe (Japan)
040-001571-00	Disposable bacterial filter, large size
082-002970-00	Reducing valve filter kit, 5um
095-003190-00	Wrench
009-008492-02	Foot switch
009-011909-00	Foot switch extension cord
040-004013-00	Reusable connector, straight, 22-10
082-003735-00	CO_2 hight pressure tube (CGA320)
082-003736-00	CO_2 hight pressure tube (DIN477)
082-003737-00	CO_2 hight pressure tube (YORK940)
082-003738-00	CO_2 hight pressure tube (ISO5145)
082-003784-00	CO_2 hight pressure tube (BS341)
082-003739-00	Pressure regulator, 452C-150 (CGA320)
082-003740-00	Pressure regulator, 452C-150 (DIN477)
082-003742-00	Pressure regulator, 452C-150 (YORK940)
082-003743-00	Pressure regulator, 452C-150 (ISO5145)
082-003785-00	Pressure regulator, 452C-150 (BS341)
082-003734-00	CO_2 low pressure tube (DISS)

A Product Specifications

A.1 Basic Parameters and Performance

Gas pressure adjustment	1 mmHg ~ 30 mmHg	
Accuracy of preset gas pressure	±2 mmHg	
Accuracy of displayed pressure	±2 mmHg	
Overpressure prompt	Prompts when gas pressure difference is 5 mmHg (allowable difference ±2 mmHg)	
Overpressure release	20s	
Underpressure supplement	10s	
Accuracy of set flow	≤10 L/min, allowable difference ±2 L/min	
	>10 L/min, allowable difference ±20%	
Accuracy of displayed flow	≤10 L/min, allowable difference ±2 L/min	
	>10 L/min, allowable difference ±20%	
Accuracy of displayed gas consumption	Allowable difference ±20%	
Smog exhaust flow	Maximum Smog exhaust flow ≥20 L/min at negative suction pressure of 0.04-0.06MPa	
Flow adjustment range	HS-50F	0.1-50 L/min
	HS-50V	0.1-50 L/min
	HS-50H	0.1-50 L/min
	HS-50S	0.1-50 L/min
	HS-30S	0.1-30 L/min
Heating	37°C±2°C under typical conditions (ambient temperature: 24°C±2°C; pressure: 12 mmHg; flow: 20 L/min)	
Gas source monitoring	Prompt of low gas pressure Prompt of gas exhaust	