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 Product Introduction

2.1 Intended Purpose

This product is used to carry endoscopic surgical devices, including monitor, endoscope camera system, light source, insufflator, hysteroscopy pump, video recorder, ultrasonic surgical & electrosurgical energy platform, light cable, footswitch, and cables. Except TV300, the mobile trolley can turn on or off mounted devices by pressing the power switch on the trolley.

2.2 Differences Among Models

Model	Applicable Monitor	110V Isolation Transformer	220V Isolation Transformer	Power Switch On the Trolley
TV-300	32-inch	×	×	×
TV-300T(200V)	32-inch	×	√	√
TV-300T(110V)	32-inch	√	×	√
TV-500	32-inch/55-inch	×	×	√
TV-500T(200V)	32-inch/55-inch	×	√	√
TV-500T(110V)	32-inch/55-inch	√	×	√
Note: The shelf materials of the TV -300 series are different from that of the TV-500 series.				

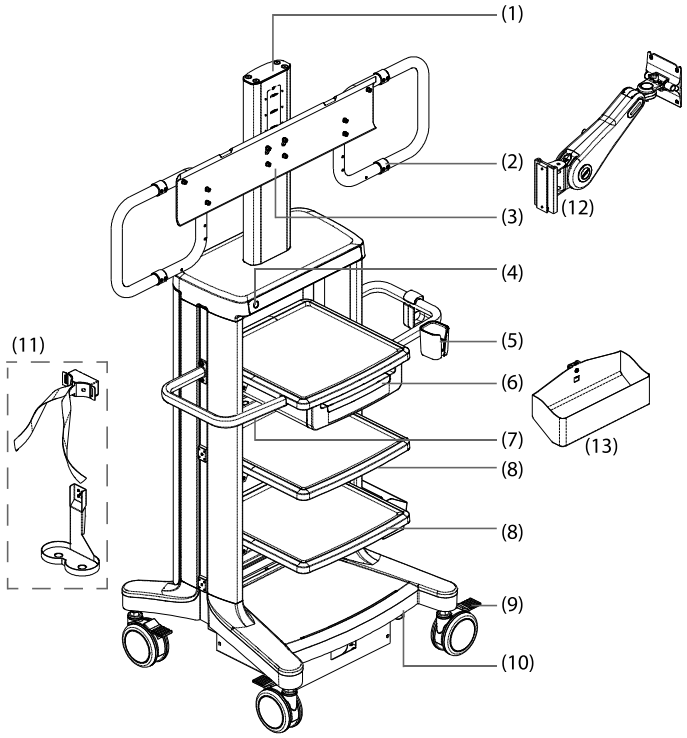
NOTE

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

2.3 System Components

This product consists of shelves, open storage space, closed storage space, cable management box, handles, columns, castors, base plate, etc. Monitor arm, CO2 holder assembly, keyboard tray, and footswitch holder are also available for this product.

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.

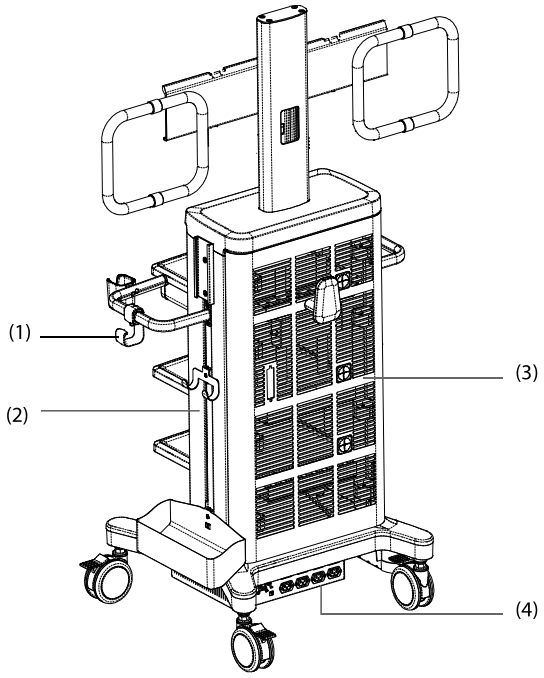
(10) Base plate: an isolation transformer (if configured) is installed under the base plate.

(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.

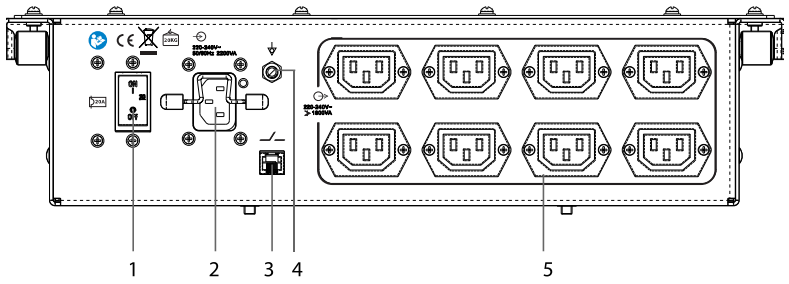
(2) Trolley column: accessories such as the monitor arm and footswitch holder are secured on the slide rail of the trolley column.

(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.

2.3.3 Back View of the Isolation Transformer

Taking TV-300T(220V)/ TV-500T(220V) as an example, the back view of the isolation transformer is as follows:



(1) Circuit breaker: used to protect the circuit. It is turned on in normal status.

(2) Input power socket: connects the AC Mains.

(3) RJ11 connector: used to supply power to the power switch of the trolley.

(4) Equipotential grounding terminal: when using the isolation transformer together with other devices on the trolley, connect their equipotential grounding terminals together to eliminate potential difference.

(5) Output power socket: connects the devices on the trolley.

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

A.3 Isolation Transformer Specifications

TV-300T(110V)/ TV-500T(110V)	Input voltage	110-120 VAC (±10%)
	Frequency	50-60 Hz (±3 Hz)
	Input power	1100 VA
	Output power	1000 VA
TV-300T(220V)/ TV-500T(220V)	Input voltage	220-240 VAC (±10%)
	Frequency	50-60 Hz (±3 Hz)
	Input power	2000 VA
	Output power	1800 VA

A.4 Physical Specifications

Dimension	Mobile trolley	Depth: 665 ± 10 mm Width: 1210 ± 10 mm (55-inch monitor stand) Height: 1800 ± 10 mm (including the castors: 148 ± 5mm)
	Shelf	Width: 424.4 ± 2mm Depth: 424.2 ± 2mm Note: The dimension of the mounted devices shall not exceed that of the shelves.
	Drawer	Depth: 323 ± 5 mm Width: 295 ± 5 mm Height: 75 ± 5 mm
	Rear door	Depth: 55.5 ± 5 mm Width: 518 ± 5 mm Height: 930 ± 5 mm
Weight of the mobile trolley		No more than 100 kg (excluding the optional modules)
Load capacity	Monitor arm	Dimension: 27-inch monitor (maximum) Weight: less than 8 kg
	Shelf	No more than 20 kg
	Monitor stand	55-inch: no more than 50 kg 32-inch: no more than 15 kg
	CO2 holder assembly	No more than 18 kg
	Total load capacity	No more than 160 kg

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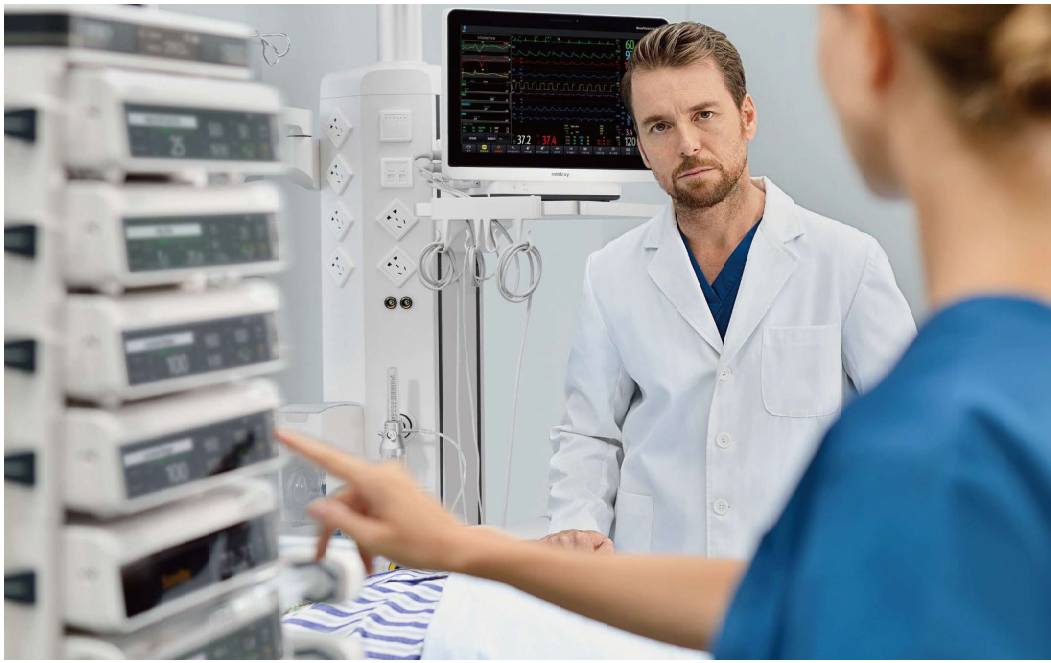


HyPort Series

Ceiling supply unit

HyPort P Series

With higher overall healthcare requirements, both patients and hospitals demand that medical technologies improve clinical work flow. Mindray recognized these needs and merged innovative and ergonomic design with leading-edge technology into the new generation of medical supply unit HyPort series.

HyPort P30

HyPort P60

HyPort P90

HyPort Series

Ceiling supply unit

HyPort R80
(II)

HyPort R80
(I)

HyPort R80 Series

The HyPort R80 is the newest generation of bedside device management systems with innovative designs among lighting system, workflow management and infection control. It helps caregivers provide safer and greater medical care by allowing for a more optimized, comfortable and efficient ICU environment.

PN : 115-018877-00
DESCRIPTION : Suction regulator, with CE mark, with overflow protection, with Pahsco probe, DIN.
PN : 115-018881-00
DESCRIPTION : Suction regulator, with CE mark, with overflow protection, with Gentec probe, British.
PN : 115-095806-00
DESCRIPTION : Vac regulator,DIN,Pahsco, for HyPort P series.

PN : 115-029383-00
DESCRIPTION : Monitor arm, rail-mount version, double arms including the second spring arm, up and down, gross load capacity: 3.2Kg~9.1Kg, L=273+379mm.

PN : 115-029385-00
DESCRIPTION : Monitor arm, pole -mount version, double arms including the second spring arm, up and down, gross load capacity: 3.2Kg~9.1Kg, L=273+379mm.

PN : 115-029389-00
DESCRIPTION : Monitor arm, rail-mount version, double arms including the second spring arm, up and down, gross load capacity: 6.35Kg~13.61Kg, L-225+344mm.

PN : 115-029391-00
DESCRIPTION : Monitor arm, pole -mount version, double arms including the second spring arm, up and down, gross load capacity:6.35Kg~13.61Kg, L=225+344mm.

PN : 115-029395-00
DESCRIPTION : GCX-Monitor arm, rail-mount version, double arms including the second spring arm, up and down, gross load capacity: 2.3Kg~10Kg, L=356+425mm.

PN : 115-029397-00
DESCRIPTION : GCX-Monitor arm, pole -mount version, double arms including the second spring arm, up and down, gross load capacity: 2.3Kg~10Kg, L=356+425mm.

PN : 115-029407-00
DESCRIPTION : Double swivel rail for 38 mm tube.

SONY

LMD-XH320MT

32-inch 4K 3D/2D LCD medical monitor

Specifications

Picture Performance	
Panel	TFT Active Matrix LCD
Picture Size (Diagonal)	800.757 mm (31.53 inches)
Effective Picture Size (H x V)	697.92 x 392.58 mm (27.48 x 15.46 inches)
Pixel pitch	0.18175 x 0.18175 mm (0.00716 x 0.00716 inches)
Resolution (H x V)	3,840 x 2,160 pixels
Aspect	16:9
Pixel Efficiency	99.99%
Backlight	LED
Panel Technology	LCD with IPS
Luminance (Panel	650cd/m2 (Typical) 1750cd/m2

Specification)	(Typical, Peak)
Contrast Ratio	1,000,000:1 (typical)
Colors	10 bit colors (1,073,741,824)
Panel Frame Rate	50/60 Hz
Viewing Angle (Panel Specification)	89°/89°/89°/89° (up/down/left/right contrast > 10:1)
Vertical Viewing Angle (3D Mode)	32°at a viewing distance more than 690mm, crosstalk ratio less than 7% (Typical)
Gamma	1.8, 2.0, 2.2, 2.4, 2.6, DICOM, Highlight, HLG

Input

HDMI Input	HDMI connector (x1), HDCP 2.3 correspondence
DVI-D Input	DVI-D (x1) (TMDS single link, HDCP 1.4 correspondence)
SDI Input	BNC (x2) 12G/3G/HD-SDI BNC (x1) 3G/HD/SD-SDI
Display Port	Display Port (x1) (SST HDCP 1.3 correspondence)

Serial Remote (LAN)	D-sub 9-pin (RS-232C) (x1), RJ-45 (x1) (Ethernet, 10BASE-T/100BASE-TX)
Remote	Stereo mini jack (x1)
AC input	AC input connector (x1) AC 100-240 V, 50/60 Hz
DC Input	DC input connector (x1) DC 26 V

Output

SDI Output	BNC (x2) 12G/3G/HD-SDI BNC (x1) 3G/HD/SD-SDI
CLONE Output	BNC (x1), 12G/3G-SDI
DC 5 V / 12 V Output	5 V Output (x1) 2.0 A max 12 V Output (x1) 2.5 A max

General

Power Requirements	AC IN: 100 V - 240 V, 50/60 Hz, 2.4 A - 1.1 A DC IN: 26 V, 8.8 A (supplied from AC adaptor)
Power Consumption	Approx. 230 W (max.)
Operating Temperature	0°C to 40°C (32°F to 104°F)

UX4/UX410/UX420/UX430/UX450/UX460/ UX470

UX5/UX510/UX520/UX530/UX550/UX560/ UX570/UX5–SIM/UX5–NOR/UX5–TEC

UX7/UX7-TEC/UX7-NOR/ UX7-SIM

Endoscope Camera System

Operator's Manual

CE

■ Release time: 2024-11

■ Revision: 1.0

(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.

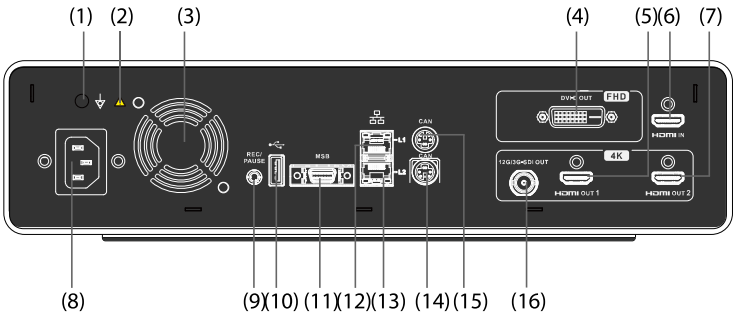
(2) Camera head connector: connects a camera head.

(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.

2.9.2 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: connects an external video source device for video input, supporting video input with a maximum resolution of 2K. The external input source can only be connected to this interface.

(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.

is installed in a chassis, sufficient space shall be left in front and behind of the chassis to facilitate operation or maintenance. To maintain good ventilation, sufficient space, i.e. at least 2 inches (5 cm), shall be left for each side of the equipment.

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 Installation of the Main Unit

The system can be installed as follows:

- On a flat surface
- On a medical supply unit
- On a trolley

NOTE

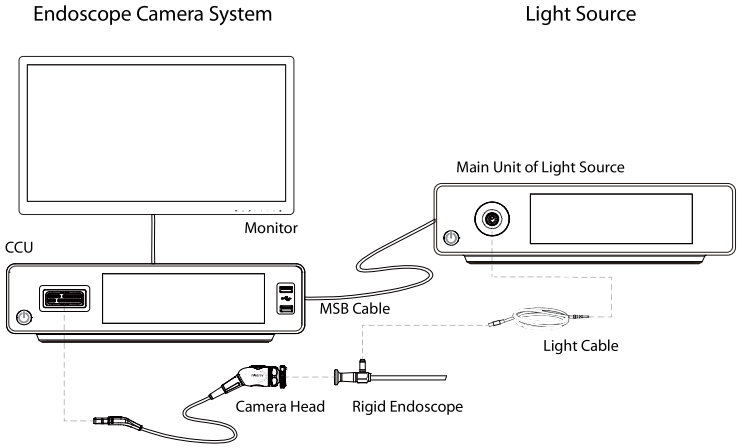
- **You are advised to install the main unit on a stable trolley rather than on the floor.**
- **If the equipment is to be used with a trolley, there will be risks of falling or collision during movement. For more safety instructions, refer to the instructions for use accompanied with the trolley.**
- **If the equipment is installed on a trolley, make sure the capacity of the trolley is higher than the total power consumption of all the equipment connected to the mains outlet of the trolley. If the power supply voltage is reduced due to insufficient capacity, tripping may occur, turning off the main unit and all other equipment connected to the trolley.**

3.6 Device Connection

Read this operator's manual carefully before using the system. Familiarize yourself with its function and operation, and observe the warnings and cautions included in the manual.

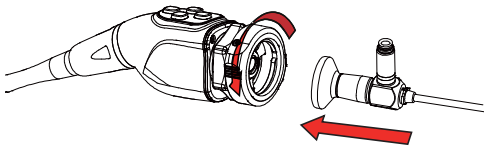
3.6.1 System Connection

The equipment can be connected with endoscopes, light sources and monitors to provide high definition images through denoise in multiple dimensions combining spatial and time domains. The connection of the modular-designed system is shown as below:



To connect devices in the diagram, follow the procedure below:

1. Connect a monitor to a correct video output connector on the back of the CCU with a video cable. Select a video cable that matches the video output connector. More than one monitors can be connected simultaneously to the CCU.
2. Connect a light source to the MSB connector on the back of the CCU with a MSB cable (System Ctrl Cable-Light Source).
3. Plug the connector of the camera head to the camera head connector on the front panel of the CCU.
4. To connect the camera head and endoscope, follow the procedure below:
   a Rotate the endoscope coupler as indicated by the arrow on it.
   b Align the eye piece of the endoscope with the endoscope coupler on the camera head.



   c Push the endoscope to the camera head and release the endoscope coupler.
   d Pull the endoscope slightly to check if the endoscope is secured.

To remove the endoscope, follow the procedure below:

1. Hold the camera head with one hand, and the endoscope with the other.

- **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.**

3.6.5 Connecting USB Drive

Images and videos can be stored in USB drives connected to the CCU. Before recording, plug USB drives to the USB connector on the front panel. You can connect two USB drives simultaneously. The system detects the status of the USB drives automatically and displays on the touchscreen. Besides, if one USB drive is out of memory, images and videos will be stored to the other USB drive.

Select NTFS, FAT32, or exFAT USB drives from a qualified manufacturer. The CCU supports connecting hard drives with memory greater than or equal to 6 TB. You are advised to choose a USB drive with memory greater than 32 GB. The following are the recommended USB drives:

Video Quality	Recommended Manufacturer
4K quality, HD High Quality	SanDisk Z25 series SSD Samsung T7 series SSD
HD Standard Quality	SanDisk CZ600 series U disk SanDisk CZ880 series U disk

You are advised to format the USB drive before use. For details about formating USB drives, refer to ***5.6.3 Formatting USB Drive***.

You are advised to use the PotPlayer or KMPlayer to play videos stored in the USB drives.

CAUTION

- **Select USB drives from qualified manufacturers. Otherwise file corruption or system failure could result. It is not recommended that you use a card reader instead of an USB drive.**
- **Formatting a USB drive will clear all data stored in it. Make sure a backup of data you need is made.**

3.7 Using the Touchscreen

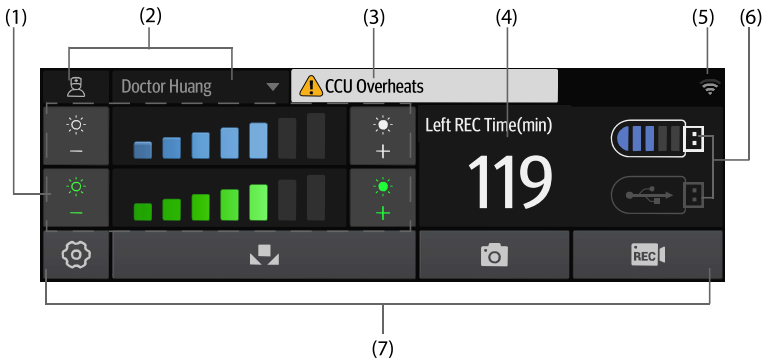
The equipment is configured with a LCD touchscreen on which you can operate and set the equipment, and view operation information.

NOTE

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

3.7.1 Operation Screen Introduction

The following figure shows the operating screen of the equipment:



(1) Brightness setting area: displays the current brightness level and fluorescence intensity. Select a button to set the brightness of the image displayed or the fluorescence intensity. 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) System status area: displays the network connection status.

(6) 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.

(7) 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.
	About 20% memory is occupied.		About 40% memory is occupied.
	About 60% memory is occupied.		About 80% memory is occupied.
	(Yellow) The USB drive is nearly full.		The USB drive is already full.
	Identifying USB drive.		Failed to identify the USB drive.
	Wireless network is connected. The solid part indicates network signal strength.		Wireless network is not connected.
	The CCU is matched with a location.		Failed to match the location.
	The touchscreen is unlocked		The touchscreen is locked

3.7.3 Available Buttons

The following table lists the available buttons displayed on the main screen:

Button	Description	Button	Description
	Setup button: select to display the setup menu.		White balance button: select to adjust the white balance.
	Camera button: select to capture images.		Record button: select to start/ stop recording.

4.5 Check Before Operation

It is required to check and ensure that the equipment works properly. After turning on the equipment, check the following items:

- The system does not emit abnormal noise, smell, or excessive heat.
- Put a hand near the ventilation outlet and check that there is air flowing out.
- The touchscreen displays and functions correctly.
- Aim the tip of the endoscope to an object and check that the image quality displayed on the monitor is normal.

CAUTION

- **Do not put the system in use before the system is checked and works normally.**
- **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 Setting Interconnected Light Source

After the CCU is correctly connected to the Mindray light source, if the light source is in auto mode, the CCU can automatically adjust the light brightness based on the current surgical field of view to ensure a clear surgical field of view and balanced light brightness.

You can turn on or off the light source by pressing the camera head button. For details about how to set the functions of camera head buttons, refer to ***5.5 Setting Camera Head Functions***.

4.7 Selecting User Configuration

Through the user configuration function, you can save some customized parameters in the setup menu. For details about the list of customized parameters, refer to ***C Default Settings***.

Select the drop-down list in the user configuration area on the main screen to select a saved user configuration.

To update the current user configuration, or delete a saved user configuration, refer to ***5.2 Setting User Configuration***.

4.8 Performing White Balance

The white balance function is used to calibrate the color of the image displayed on the monitor.

It has be to performed:

- before starting the surgery;

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

4.11 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.

4.12 Zoom In/Out

In 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***.

4.13 Switching Display Modes

The system provides the following display modes:

- WhiteLight: displays the visible light image.
- Overlay: detected near-infrared light (NIR) signal is overlaid on white light image in green.
- Monochromatic: displays the NIR signal without white light.
- Intensity Map: detected NIR signal is overlaid on white light image in pseudo color.
- WL-Quad Screen: the monitor displays in split-screen mode, by default with WhiteLight image on the right, Monochromatic image on the top left, Intensity Map image on the middle left, and Overlay image on the bottom left.
- OL-Quad Screen: the monitor displays in split-screen mode, by default with Overlay image on the right, WhiteLight image on the top left, Intensity Map image on the middle left, and Monochromatic image on the bottom left.
- Mono-Quad Screen: the monitor displays in split-screen mode, by default with Monochromatic image on the right, WhiteLight image on the top left, Intensity Map image on the middle left, and Overlay image on the bottom left.
- IS-Quad Screen: the monitor displays in split-screen mode, by default with Intensity Map image on the right, WhiteLight image on the top left, Monochromatic image on the middle left, and Overlay image on the bottom left.

When different camera head or 3D video endoscope is connected to the CCU, the supported display modes are as follows:

CCU Model	Camera Head or 3D Video Endoscope	Display Mode
UX4 series	Fluorescence camera head	All modes
	White light camera head 3D video endoscope	**WhiteLight** only
UX5 series	Fluorescence camera head	All modes
	White light camera head 3D video endoscope	**WhiteLight** only
UX7 series	Fluorescence camera head G series 3D video endoscope	All modes
	White light camera head M series 3D video endoscope	**WhiteLight** only

You can customize the short-press function of P, W, or M button on the camera head to **Mode Cycle**, and short press the button to switch the display mode. For details about how to set the functions of camera head buttons, refer to ***5.5 Setting Camera Head Functions***.

In addition, you can switch modes on the **Display Mode** page. For detailed setting method, refer to ***5.3.3 Setting External Input Source***.

4.14 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 Bit width: 10bit or 8bit Encoding standard: H.265

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.

4.15 Connecting the Wireless Network

You can add wireless networks for the system. The CCU can interconnect with external devices supporting open communication protocols via wireless networks to send, receive, and display device parameters or status. For detailed setting method, refer to ***5.7.2.3 Setting Wireless Network***.

If connecting the current wireless network fails, the CCU automatically connects other wireless networks in the order when they were added.

CAUTION

- **The maximum distance of distinct vision between the equipment and a wireless interconnected device is 30 m.**
- **Wireless network designing, deploying, debugging, and maintenance should be executed by Mindray service personnel or authorized technicians.**
- **Always set the wireless network according to local wireless regulations.**
- **Use the 5 GHz band as much as possible since the 2.4 GHz band has more interference.**
- **Private AP/wireless routers are not allowed, which will cause data loss.**
- **Data communication must be performed within a closed network provided by a hospital for all network functions. The hospital is responsible for ensuring the security of the network.**
- **Adopt WPA2-PSK and WPA2-Enterprise authentication and encryption as far as possible. Failure to use them may cause device malfunction or patient information leakage. You are advised to use WPA2-Enterprise and long-password encryption.**
- **Keep network authentication information (such as password) safe, protecting the network from being accessed by unauthorized users.**

- **Do not connect non-medical devices to the network of the main unit.**
- **If wireless network signal is poor, there may be a risk of data loss.**
- **RF interference may result in wireless network disconnection.**
- **Disconnecting from the network may result in data loss and function failure. Check the patient in case of network disconnection and solve the network problem as soon as possible.**
- **Ensure that the IP address setting is correct. Changing the network settings may result in network disconnection. Contact your service personnel if you have any problems on setting the IP address.**

NOTE

- **When the network is reconnected, the wireless connection is restored automatically.**

4.16 Error Messages

Message	Possible Cause	Attemptable Solution
Light Source Disconnected.	The light source is not properly connected to the CCU.	Connect the light source to the CCU by referring to ***3.6.1 System Connection***.
	The light source is not turned on.	Turn on the light source.
Incompatible Light Source.	The light source connected to the CCU is not compatible.	Use the light source specified by Mindray.
DVR Initialization Error	The DVR module failed to initialize.	Restart the CCU. If the problem persists, contact Mindray. If USB storage is not required, the surgery will not be affected.
Camera Head Connection Error	The camera head is not properly connected.	Reconnect the camera head.
	The camera head is faulty.	Replace the camera head.
Camera Head Disconnected	The camera head is not properly connected.	Connect the camera head to the correct connector on the CCU.
	The camera head cable is broken.	Replace the camera head.
Incompatible Camera Head	The camera head connected to the CCU is not compatible.	Use the camera head specified by Mindray.

- Select **Mode 1** to display the external input image in the main window on the right and the image captured by the system in the small window on the left.
- Select **Mode 2** to display the image captured by the system in the main window on the right and the external input image in the small window on the left.

4. If two monitors are connected, you can select **Dual-Screen Display**, and set **Dual-Screen Display**.
   - When **Close** is selected, the monitors will display only image captured by the system.
   - Select **Dual-Screen Display** to display the external input image and the image captured by the system on each of the two monitors.

5.3.4 Setting 3D View Effects

When connecting a 3D video endoscope, to set the 3D view effects, follow the procedure below:

1. In the setup menu, select **Display → 3D Setup**.
2. Set **View Mode** to **2D**, **2D AutoRotate**, **3D**, or **3D AutoRotate.**
   - 2D: displays 2D image.
   - 2D AutoRotate: displays 2D image. Image can automatically rotate.
   - 3D: displays 3D image.
   - 3D AutoRotate: displays 3D image. Image can automatically rotate.
3. Select **Advanced Setup** to enter the **Advanced Setup** page.
4. Select the + or - icon to set **Parallax Setup** or select **Reset** to restore the factory defaults.
5. Select the + or - icon to set **Autoswitch Angle** and **Set Transition Angle.**
6. Switch on or switch off **Direction Indication Arrow.**
   - If it is switched on, an arrow is displayed to indicate the actual forward direction in 2D AutoRotate or 3D AutoRotate mode.
   - If it is switched off, no arrow is displayed.

NOTE

- **To select a 3D view mode, set the monitor to 3D display mode in advance.**
- **For details about the view modes, refer to the operator's manual of the 3D video endoscope.**

3. Switch on or switch off **Tone Enhancement**. After switching on it:
   - Set **Tone Enhancement Mode** to **Mode R** or **Mode G** as needed. After setting, the system enhances the image color contrast by color inversion.
   - Set **Display Mode** to **Full Screen** or **Dual Split** as needed.

5.5 Setting Camera Head Functions

Select the Setup button on the main screen to access the setup menu. Select the **Camera Head** tab. On this tab, you can set functions of the P, W, and M buttons to performing white balance, taking photos, recording, or controlling the brightness of light.

5.5.1 Introduction to Short-press/Long-press Functions

The following table lists the short-press functions that you can set for the buttons:

Short-Press Function	Description
Capture	Short press the button to capture the image displayed on the monitor.
Mode Cycle	Short press the camera head button to cycle through display modes.
Image Zoom	Short press the button to zoom in or out of the image displayed on the monitor.
WL Brightness	Short press the button to increase or decrease the image brightness.
Fluor Intensity	Short press the button to increase or decrease the fluorescence intensity.
3D/2D Switching (with 3D video endoscope)	Short press the button to cycle through 3D view modes.
External Source	Short press the button to display the external input source on the monitor.
Interconnection	Short press the button to display parameters of interconnected devices on the monitor.
Tone Enhancement	Short press the button to cycle through the tone enhancement modes.
Counter	Short press the button to start/stop timing or reset the timer. The recorded time is displayed on the monitor.
Smoke Evacuation	Short press the button to turn on or off the smoke exhaust function of the interconnected insufflator.
Anti-fog	Short press the button to turn on or off the image defogging function.

Short-Press Function	Description
Image Flip	Short press the button to switch the image flip mode.
No Function	Short-press of the button will not activate any function.

The following table lists the long-press functions that you can set for the buttons:

Long-Press Function	Description
Capture	Long press the button to capture the image displayed on the monitor.
REC	Long press the button to start/stop recording video displayed on the monitor.
White Balance	Long press the button to start white balance.
3D/2D Switching (with 3D video endoscope)	Long press the button to cycle through 3D view modes.
External Source	Long press the button to display the external input source on the monitor.
Interconnection	Long press the button to display parameters of interconnected devices on the monitor.
Tone Enhancement	Long press the button to cycle through the tone enhancement modes.
Counter	Long press the button to start, stop timing or reset the timer. The recorded time is displayed on the monitor.
Insufflator Switch	Long press the button to turn on or off the inflation function of the interconnected insufflator. Prompts of insufflation status and insufflator parameters will be displayed on the monitor.
Smoke Evacuation	Long press the button to turn on or off the smoke exhaust function of the interconnected insufflator.
Light Switch	Long press the button to stop the interconnected light source from emitting light or turn on the brightness automatic adjustment.
Anti-fog	Long press the button to turn on or off the image defogging function.
Image Flip	Long press the button to switch the image flip mode.
No Function	Long-press of the button will not activate any function.

5.5.2 Setting Button Functions

To set the functions of the camera head buttons, follow the procedure below:

1. In the setup menu, select **Camera Head**.
2. On the **P Key** page, set the short-press function and long-press function of the P button.
3. On the **W Key** page, set the short-press function and long-press function of the W button.
4. On the **M Key** page, set the short-press function and long-press function of the M button.
5. If the short-press function is set to **Mode Cycle**, set **Display Mode Selection** as needed.
6. If the short-press function is set to **Image Zoom**, set **Image Zoom Selection** as needed.
7. If the short-press or long-press function is set to **External Source**, set **Display External Source** as needed. For detailed introduction of the display modes, refer to***5.3.3 Setting External Input Source***.
8. If the short-press or long-press function is set to **Tone Enhancement**, set **Tone Enhancement Mode Selection** as needed.
9. If the short-press or long-press function is set to **Counter**, set **Reminder Interval** as needed.

5.6 Setting Recording Function

Select the Setup button on the main screen to access the setup menu. Select the **REC** tab. On this tab, you can set recording or screenshot function, or format USB drives.

5.6.1 Setting Recording Function

To set the recording function, follow the procedure below:

1. In the setup menu, select **REC → REC Setup**.
2. Set **Storage Location**.
   - **Internal Recorder**: Videos and images are saved to USB drives by default.
   - **External Recorder**: Videos and images are saved to the external video recorder.
   - **Internal&External Recorder**: Videos and images are saved to USB drives and the external video recorder at the same time.
3. Select **Video Segment** to set the size of each video saved to USB drives.
4. Select **Video Quality** to set the quality of the videos saved to USB drives.
   - **4K HQ**: Record video at 120 Mbps.

3. Under the running water, rotate the focusing ring and endoscope coupler of the camera head 3 times by referring to the figures in ***7.4.3.1 Washing***.

4. Flush the equipment parts with complex structures, such as screw threads and gaps, with a syringe with a volume of at least 10 ml. Repeat this step 3 times.

NOTE

- **For rinsing, use purified water.**
- **Do not use water for rinsing repeatedly.**

7.4.3.3 Drying

Dry the outer surfaces of the camera head with a disinfected lint-free cloth, and dry the equipment parts with complex structures by using an air gun.

7.4.4 Disinfecting the Camera Head

Disinfect the camera head as required in the local or your hospital's servicing schedule. Use the disinfectants in accordance with the instructions of use provided by their manufacturers. Use only the disinfectants recommended in this chapter for disinfection.

The following table lists the recommended disinfectants for the camera head:

Product Name	Disinfection Method
Ethanol, 75%	Wiping
Glutaraldehyde, 2% - 2.5%	Immersing

NOTE

- **In case the high-level disinfection required by your hospital or local regulations needs to be achieve, select the glutaraldehyde immersion disinfection method.**
- **Do not disinfect the camera head with ultraviolet light, long time exposure to which may cause damage to the imaging element of the camera head.**

7.4.4.1 Rinsing After Disinfection

After immersing the camera head in glutaraldehyde for disinfection, follow the procedure below to rinse the camera head:

1. After disinfection, immerse the camera head in a sterile container filled with rinsing water.

2. In the container, wipe the outer surfaces of the camera head with a sterile lint-free cloth.

3. Under the running water, rotate the focusing ring and endoscope coupler of the camera head 3 times by referring to the figures in ***7.4.3.1 Washing***.

4. Repeat step 1 to step 3 three times. Change the rinsing water each time.
5. Take out the camera head and place it in another sterile container.
6. Dry the outer surfaces of the camera head with a disinfected lint-free cloth, and dry the equipment parts with complex structures by using an air gun.

NOTE

- **After cleaning and disinfection, check the equipment surface for stains. Repeat the cleaning and disinfection procedure if necessary.**

7.4.5 Sterilizing the Camera Head

Sterilize the camera head as required in the local or your hospital's servicing schedule. The camera head can withstand ethylene oxide (EO) sterilization and low temperature plasma sterilization.

WARNING

- **Use one of the recommended methods consistently on the same equipment. Using different sterilization methods may change equipment appearance.**

7.4.5.1 Packaging

Place the camera head in a proper container and double wrap the container with sterile sheet, preventing equipment contamination during storage and transportation.

Recommended specifications of the sterile sheet are as follows:

Dimension	Gram Weight	Materials
1.2m x 1.2m	45g	100% polypropylene, 5-layer SMMMS laminates

7.4.5.2 EO Sterilization

To sterilize the camera head, follow this procedure:

1. Clean and disinfect the camera head and its cable as instructed in the previous sections.
2. Place the packaged container into the sterilizer.
3. Sterilize the equipment following the instructions for use of the sterilizer. You are advised to apply the following EO sterilization parameters that have been tested:

EO Concentration	Temperature	Relative Humidity	Sterilization Time
About 760 mg/L	55°C	40% - 85%	60min

4. To ensure the EO residues remain at a level that does no harm to the human body, the sterilized equipment should go through a 12-hour resolution or longer in a well-ventilated room at 55°C before reuse.

7.4.6 Low Temperature Plasma Sterilization

Validate the sterilization procedure of the low temperature hydrogen-peroxide plasma sterilizer in accordance with the operating instructions of the sterilizer.

To perform low temperature plasma sterilization, follow the procedure below:

1. Clean and disinfect the camera head and its cable as instructed in the previous sections.
2. Place the container into the sterilizer, and ensure:
   - ◆ The container is adequately exposed in the hydrogen peroxide plasma.
   - ◆ Do not allow any object to contact the inner sides of the sterilizer.
3. Sterilize the equipment following the instructions for use of the sterilizer. You are advised to use the following low temperature hydrogen peroxide plasma sterilizer that has been tested:

Manufacturer	Product	Cycle Mode
Advanced Sterilization Products (ASP)	STERRAD™ 100NX Sterilizer with ALLClear™ Technology	Standard circulation (Full period)

After sterilization, cool the equipment down to room temperature before use. If not, the lens might fog or the camera head be damaged.

CAUTION

- **Without compromising the efficacy of sterilization, select a method that would least corrode the camera head.**
- **Make sure the camera head works normally before use. In case of any damage, remove it from use immediately, or patient or operator injury might result.**

NOTE

- **After long time of sterilization, the color of part of the camera head might fade. It is natural and will not affect the sealability or performance of the camera head.**

A.8 Product Performance

Image transfer pixels	3840*2160 or 4096*2160 ultra high definition
Equipment noise	≤ 55 dBA
Defibrillation recovery time	1s

A.9 Wireless Network Specifications

Wi-Fi connector	
Protocol	IEEE 802.11 a/b/g/n/ac
Operating frequency	2412MHz to 2472MHz, 5180MHz to 5320MHz, 5500MHz to 5700MHz, 5745MHz to 5825MHz
Data security	Standards: WPA/WPA2-PSK, WPA/WPA2-Enterprise, WPA/WPA2 CCKM EAP method: LEAP, EAP-TTLS, EAP-TLS, EAP-FAST, PEAP-MsChapV2, PEAP-GTC, PEAP-TLS Encryption method: TKIP and AES
Modulation mode	BPSK, QPSK, 16QAM, 64QAM, 256QAM
Output power	< 20 dBm (CE requirement, detection mode: RMS) < 30 dBm (FCC requirement, detection mode: peak power)
UWB connector	
Protocol	IEEE 802.15.4-2015, IEEE 802.15.4z
Operating frequency	UWB CH5 (center frequency: 6489.6 MHz) & UWB CH9 (center frequency: 7987.2 MHz)
Data security	AES encryption
Modulation mode	BPM/BPSK
Output power spectral density	≤ -41.3 dBm/MHz

This brochure can be applicable to the following models:

Monitor:
LMD-XH320T/LMD-XH550T/S3180P

Trolley:
TV-500/TV-300

Endoscope Camera System:
UX7/UX7-TEC

Endoscope Light Source:
HB500R/HB500

4K 3D Video Endoscope:
G 31030A/G 31000A/M 31030A/M 31000A

Camera Head:
CH5-SR100/CH5-SR110/CH5-SW100/CH5-SW110

Rigid Endoscope:
G 01030A/G 01000A/G 00530A/G 00500A/G 10530A/
G 10500A/M 01030A/M 01000A

www.mindray.com

P/N: ENG-UX7 Series 4K&NIR&3D Endoscope Camera System-210285X12P-20241205

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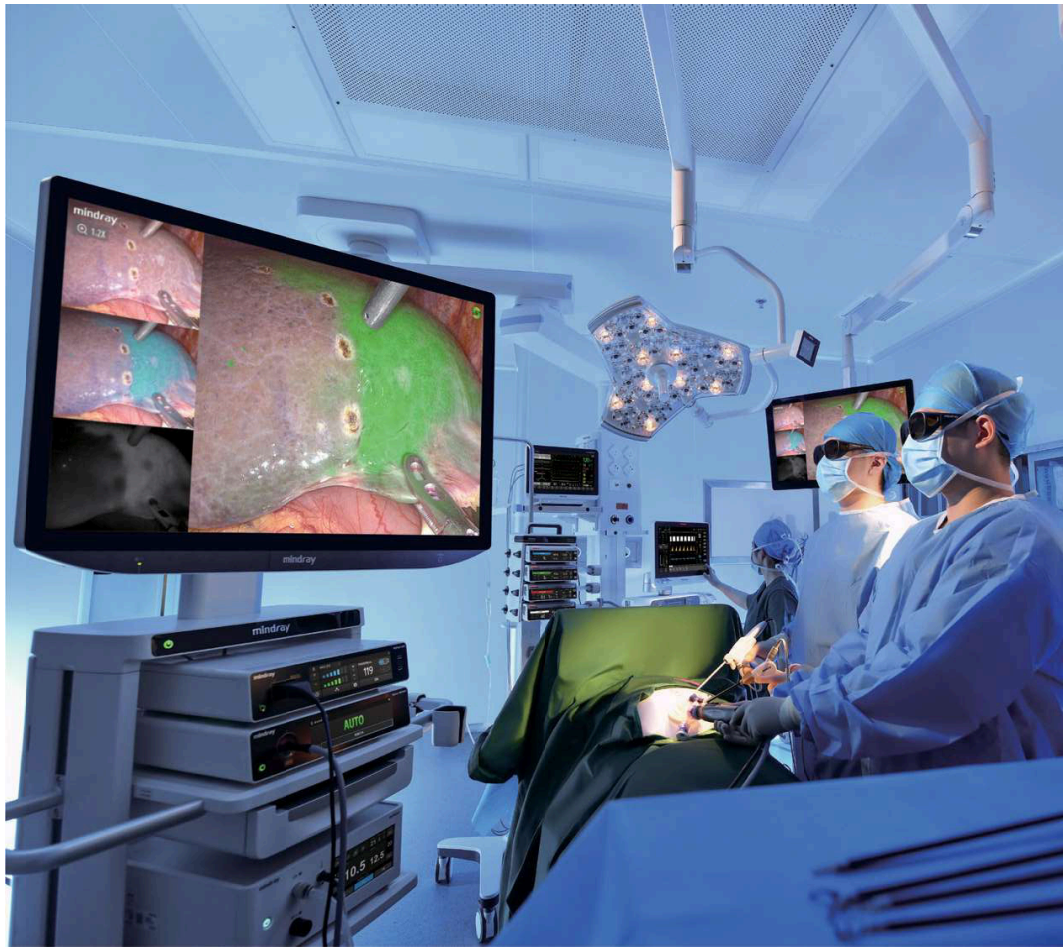
UX7 Series *4K&NIR&3D*

Endoscope Camera System

Vision beyond Imagination



Full-chain Independent R&D

The advancement of minimally invasive technology has significantly generates the demand for precision surgeries. This has led to increased requirements for the resolution, real-time navigation, and accurate restoration of 3D structures within the cavity.

Based on full-chain independent R&D, Mindray's new generation UX Series Endoscope Camera System has been innovatively integrated with 4K fluorescence and 3D technologies. It provides a comprehensive enhancement in imaging performance and operational experience, enabling clinical breakthroughs in complex surgical procedures.

With various configuration options suitable for multiple departments, it is a truly "all in one imaging platform" for the operating room.

Light Source → Rigid Endoscope → Sensor → Image Algorithm → Customized Monitor → 4K Recording

4K Monitor
Options of 32 inch and 55 inch
Options of 2D and 3D
• Recommend: LMD-XH320T/LMD-XH550T

Master Control Trolley
One-touch to start the entire set of equipment on the trolley
• Recommend: TV-500

Endoscope Camera System
Integrated with 4K Fluorescence and 3D Technologies
• Recommend: UX7

Endoscope Light Source
White Light/Fluorescence
• Recommend: HB500R

4K 3D Video Endoscope
White Light/Fluorescence
Selectable viewing angles of 0° and 30°
• Recommend: G 31030A

Camera Head
Multiple focal lengths available
White light camera head weight: 190 g
Fluorescence camera head weight: 240 g
• Recommend: CH5-SR100/CH5-SR110

Rigid Endoscope
Selectable diameters of 10 mm, 5 mm and 3 mm
• Recommend: G 01030A

Medical Digital Video Recorder
Access to hospital PACS system
Available to record dual-channel simultaneously
• Recommend: UR-NEXT4KHC

Gastroenterology
Gynecology
Thoracic surgery
Hepatobiliary pancreatology
Urology
ENT

mindray
healthcare within reach

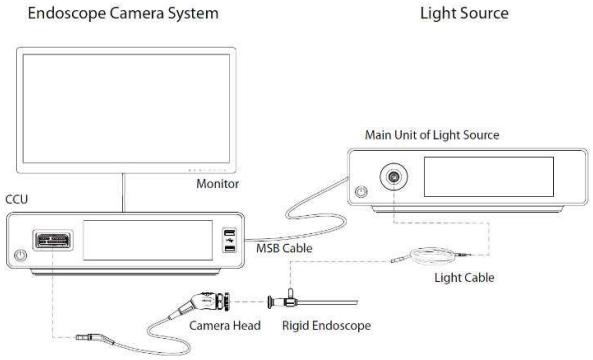
UX7 Series

Endoscope Camera System

Vision Beyond Your Imagination

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

Endoscope Camera System——UX7 Series



Dimension	380mm x 350mm x 80mm
Weight(CCU)	⩽10 kg
Weight(White light Camera head)	⩽190 g (excluding the cable)
Weight(Fluorescence Camera head)	⩽240 g (excluding the cable)
Resolution	3840*2160 or 4096*2160 pixels
Image Sensor	2-chip CMOS
Scan Mode	Progressive
Refresh Frame Rate	50/60 fps
Signal Output	12G-SDI x1, HDMI x 2, DVI x 1,3G-SDI x 1
Recording Videos	4 video quality options with Built-in USB 4K HQ/4K SQ/HD HQ/HD SQ
Protection Against Harmful Ingress of Water	Camera head IPX7
Protection Against Electric shock	Class I TYPE CF APPLIED PART

Differences Among Models

Model	Color Style			
	Standard	Bright	Gentle	Vivid
UX7	√	√	√	√
UX7-TEC	√	√	√	×
UX7-SIM	√	√	×	×
UX7-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.

Camera Head

UX7 series camera system is compatible with the following models of 2D camera head:

Model	Focal Length	Standard Cable Length	Function
CH5-SW100	29mm	4.5m	Supports white light imaging.
CH5-SW110	23mm	3m	Supports white light imaging.
CH5-SR100	29mm	4.5m	Supports white light and fluorescence imaging.
CH5-SR110	23mm	3m	Supports white light and fluorescence imaging

Endoscope Light Source——HB500 Series

Dimension	380mm x 350mm x 80mm
Weight	⩽10Kg
Lamp	High Brightness White LED
Power consumption	135W
Lamp Life	Over 60,000h
Color Temperature	3000-7000K
Protection Against Electric Shock	Class I, Type CF
Intensity	≥3,000,000Lux（max center）
Noise	≤55dB
Color rendering index	⩾90, in the white light mode
Output Luminous	2000 lm

Model	Levels of Light Intensity	Output Light
HB500R	12	Output of white light and near infrared light is provided.
HB500R-TEC	10	
HB500	12	Output of white light is provided.
HB500-TEC	10	

55″/32″ 2D Monitor (S5580P/S3180P)

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

55″/32″ 3D Monitor (LMD-XH320T/LMD-XH550T)

LCD Size	55/32 inch
Weight	10.5Kg(32 inch) 27Kg(55 inch)
Resolution	3840 * 2160 pixels
Contrast Ratio	1,000,000 : 1
Refresh Rate	50/60 Hz
Backlight Brightness	650 cd/㎡(55″ Monitor) 550 cd/㎡(32″ 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

Rigid Endoscope

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

4K 3D Video Endoscope

Model*	Imaging Bands (nm)	Standard Cable Length	Direction of View
M 31000A M 31000PA	400~760	4,5m	0°
M 31030A M 31030PA	400~760	4,5m	30°
G 31000A G 31000PA	400~760, 800~880	4,5m	0°
G 31030A G 31030PA	400~760, 800~880	4,5m	30°
	*: "A" in the model indicates that products of this model can be autoclave sterilized.		

Max. Width of Insertion Portion	Φ10mm
Field of View	80° ±15%
Working Length	325mm ±3%
Weight (insertion portion & handle)	⩽ 420 g
Range of effective depth of field	3 - 200 mm
Video display pixels	Dual-channel 4K CMOS, supporting 3840 x 2160 and 4096 x 2160 pixels UHD video display Note: The pixel product is about 8.29 million and 8.85 million.

Digital Video Recorder

Front LCD Monitor		7-inch Touch Display
Data Storage	Internal Media	HDD 2TB
	External Media*	USB HDD* / SDD* / Flash Memory* / DVD* / Blu-ray™ Disc*
Video Resolution		4K / 4096 x 2160p, UHD / 3840×2160, Full HD / 1920x1080p, 720p
Frame Rate		60Hz, 30Hz
Multi-input mode		Dual-channel, 3D
3D mode		Line by Line, Side by Side
Recording Format		Side by Side, Top and Bottom
Video& Audio	Compression	H.264, H.265-HEVC, AAC
	File	MP4, TS
Photo	Compression	JPEG, PNG, Uncompressed
	File	JPG, PNG, TIFF
Video Input		HDMI 2.0 Type A x (2)
Video Output	HDMI 2.0	Type A x (1)
	DP	Display Port* x (1)
Audio Input		MIC (3.5mm stereo mini jack), HDMI
Audio Output		Line (3.5mm stereo mini jack)
USB Ports	Front	USB3.2 Type A x (2) for Recording
	Rear	USB3.2 Type A x (4) for Accessories
LAN		RJ-45 (1000BASE-T/100BASE)
External Trigger		3.5mm Stereo Mini Jack x (2)

G 31030A/G 31000A/G 31030PA/G 31000PA

4K 3D Video Endoscope

Operator's Manual

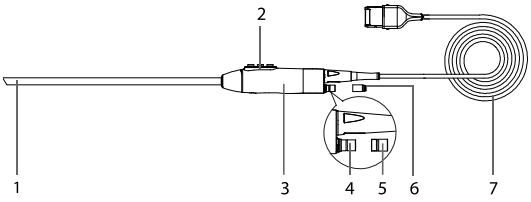
CE 1639

- Release time: 2024-11
- Revision: 1.0

NOTE

- **4K 3D video endoscope is hereinafter referred to as "video endoscope".**

2.10.1 Front View of the Video Endoscope



(1) Tip: includes two 1/3-inch 4K CMOS image sensors and two sets of imaging light paths.

(2) Buttons: press to control the functions of camera control unit (hereinafter referred to as "CCU").

(3) Handle: hold during use.

(4) Light cable connector: available for ACMI/Olympus Pro light cables.

(5) Light cable adapter: available for Mindray/Richard Wolf light cables.

(6) Light cable adapter: available for STORZ light cables.

(7) Video connecting cable: connects the CCU.

2. Point the tip of the endoscope at a bright light source, such as an indoor lighting source, other than a cold light source, and slightly move the tip.
3. Observe whether any black dots or distortion exists in your field of view. If yes, do not use the endoscope and contact your service personnel.

NOTE

- **Do not use the equipment if surfaces of the fiber optics, sapphire, or lens body have been damaged or if there are stains on the surfaces. For any problem, contact your service personnel.**

3.6 Device Connection

This equipment can be connected to light cables, CCUs, and light sources, assisting in endoscopic diagnosis and treatment.

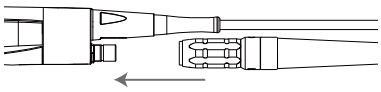
The equipment meets the requirements of type CF applications.

WARNING

- **Before use, ensure that all devices and accessories connected with the equipment are compatible.**
- **Medical devices or accessories used with the equipment should at least meet the requirements for type CF applications. If this equipment is used together with a CCU or light source that does not meet such requirements, the leakage current may be multiplied.**
- **Before use, check the equipment, cables and accessories, to ensure they work properly and safely.**

3.6.1 Connecting Light Cable to Video Endoscope

1. Connect the connector (to endoscope) of the light cable to the light cable connector of the endoscope, as shown in the figure below:



2. Rotate the connector (to endoscope) of the light cable clockwise to secure the connection.

If necessary, connect an appropriate light cable adapter, and then connect the light cable.

3.6.1.1 Risks Associated with the Use of Light Cable

When connecting a light cable, be careful about the following:

- Select an appropriate adapter for the connector (to endoscope) of the light cable to connect the light cable for cold light source.
- Check the diameter of the light cable and select one that matches the endoscope. Otherwise, heat may accumulate.
- Wait until the equipment is sufficiently cooled down before unplugging the light cable. When connecting or unplugging the light cable, grasp the plastic part of the connector, and avoid the metal part to prevent the risk of burns.

WARNING

- **If the light cable is incorrectly connected to the endoscope, the image displayed on the monitor may suddenly disappear during surgery, causing patient injury.**
- **Keep the light cable connector clean, otherwise the light may turn yellow or illumination may fail.**

3.6.2 Connecting Video Endoscope and Light Source

Insert the connector (to light source) of the light cable to the corresponding interface on the light source, connecting the video endoscope and the light source.

When the equipment is used with a cold light source, the following risks may exist:

- Irreversible damage to a patient's tissues or unnecessary coagulation may occur.
- Surgical instruments (such as surgical drapes, plastic materials, etc.) may be combusted or burnt.
- If the light source is damaged during use, it may be a danger to patients. Therefore, a backup light source should be provided or a light source with extra bulbs is used.

WARNING

- **After long time light emitting, the surface temperature on the light cable connector and metal hood of the eyepiece end may exceed 41°C. Do not contact with these parts to avoid burns.**

3.6.3 Connecting Video Endoscope to CCU

Connect the video connecting cable of the endoscope to the CCU specified by Mindray. The equipment is applicable to the UX4/UX410/UX420/UX430/UX450/UX460/UX470/UX5/UX510/UX520/UX530/UX550/UX560/UX570/UX5-TEC/UX5-NOR/UX5-SIM/UX7/UX7-TEC/UX7-NOR/UX7-SIM camera system only.

3.6.3.1 Checking Image Quality

1. Place a piece of paper with texts about 50 mm in front of the tip of the endoscope.
2. Observe whether image blurring, loss of focus, or dark area exists in your field of view. If yes, replace the endoscope.

3.6.3.2 Selecting View Mode

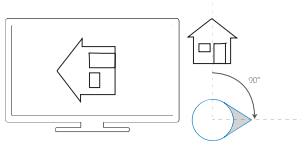
You can select one of the following view modes by setting on the CCU or by pressing a video endoscope button after customizing its function.

- 2D: displays 2D image.
- 2D AutoRotate: displays 2D image. Image can automatically rotate.
- 3D: displays 3D image.

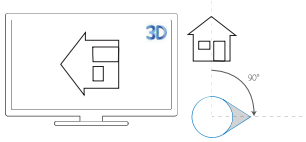
- 3D AutoRotate: displays 3D image. Image can automatically rotate.

The following are examples of image rotation in different view modes at the viewing angle of 90°.

2D:

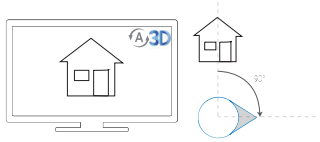


3D:



2D AutoRotate:

3D AutoRotate:



You can also set the functions of **Autoswitch Angle**, **Parallax Setup** and **Image Zoom** on the CCU. For details about the setting method, refer to the operator's manual of the CCU (UX4/UX410/UX420/

preventing equipment contamination during storage and transportation.

Recommended specifications of the sterile sheet are as follows:

Dimension	Gram Weight	Materials
1.2m x 1.2m	45g	100% polypropylene, 5-layer SMMMS laminates

4.7.3 Autoclave Sterilization

As the sterilizer and its operating conditions may affect sterilization, it is recommended that the sterilization process be reconfirmed and monitored before sterilization in accordance with related international standards (for example, ISO 17665), national standards, or hospital management rules.

To perform autoclave sterilization, follow the procedure below:

1. Place the packaged container into the sterilizer.
2. Sterilize the equipment following the instructions for use of the sterilizer.

Sterilization parameters of autoclave sterilizer are as follows:

Device	Temperature	Required minimum time
Pre-vacuum	132°C	4min
	134°C	

CAUTION

- **After autoclave sterilization, do not use liquid to forcibly cool the endoscope. Otherwise, the endoscope may be damaged.**

4.7.4 Low Temperature Plasma Sterilization

You are advised to use the following low temperature hydrogen peroxide plasma sterilizer that has been tested:

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 your service personnel.**

A.3 Physical Specifications

Weight (insertion portion & handle)	≤ 420 g
Dimension	Length (insertion portion & handle): 470±10mm Width (handle): 32±3mm Hight (handle): 43±3mm

A.4 Basic Parameters

Field of view, 2W (°)	80 ± 15%
Direction of view, θ (°)	G 31030A/G 31030PA: 30 ± 10 G 31000A/G 31000PA: 0 ± 10
Working length (mm)	325 ± 3%
Maximum width of the insertion portion (mm)	10.45
Diameter of the insertion portion (mm)	10 ± 0.45

A.5 Optical Performance

On-axis angular resolution $r_a(d)$ (white light imaging mode)	9.02 C/(°), tolerance -10%. **Note**: It can be converted to 13.68 lp/mm.

mindray

4K 3D Video Endoscope

Vision beyond Imagination

This brochure can be applicable to the following models:

G 31030A/G 31000A/M 31030A/M 31000A

www.mindray.com

P/N: ENG- 4K 3D Video Endoscope -210285X4P-20241126

mindray

healthcare within reach

Model: M31030A
Order PA Code: F21EB-PA00005
Name: 4K 3D Video Endoscope
Descripcion: DOV 30°,Φ10mm, 3D white light

Model: M31000A
Order PA Code: F21EB-PA00006
Name: 4K 3D Video Endoscope
Descripcion: DOV 0°,Φ10mm, 3D white light

Model: G31030A
Order PA Code: F21EB-PA00003
Name: 4K 3D Video Endoscope
Descripcion: DOV 30°,Φ10mm, 3D NIR

Model: G31000A
Order PA Code: F21EB-PA00004
Name: 4K 3D Video Endoscope
Descripcion: DOV 0°,Φ10mm, 3D NIR

Order PA Code: 115-098836-00
Name: 3D Glasses
Descripcion: 3D Glasses(On-Ear,Large,5EA)

Order PA Code: 115-098837-00
Name: 3D Glasses
Descripcion: 3D glasses (Clip-on, Large, 5EA)

HB500R/HB500R-TEC/HB500/HB500-TEC

Endoscope Light Source

Operator's Manual

CE 0123

CE

■ Release time: 2023-10

■ Revision: 2.0

For endoscopic interventions, the responsible physician must decide whether the prescribed application is admissible based on the general condition of the patient.

2.6 Differences Among Models

The differences among models are shown below:

Model	Levels of Light Intensity	Output Light
HB500R	12	Output of white light and near infrared light is provided.
HB500R-TEC	10	
HB500	12	Output of white light is provided.
HB500-TEC	10	

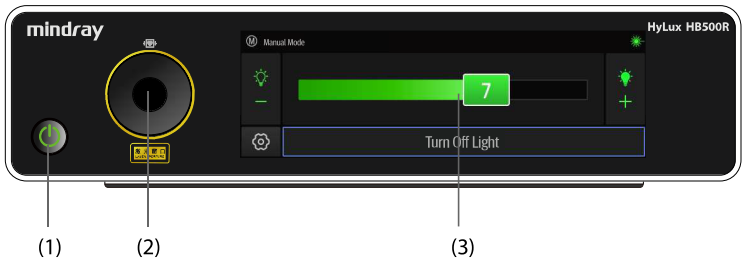
2.7 Applied Part

Light cable is considered as type CF applied part except the proximal end connected to the main unit of light source.

2.8 System Components

The light source consists of a main unit and cables.

2.8.1 Front View of the Main Unit



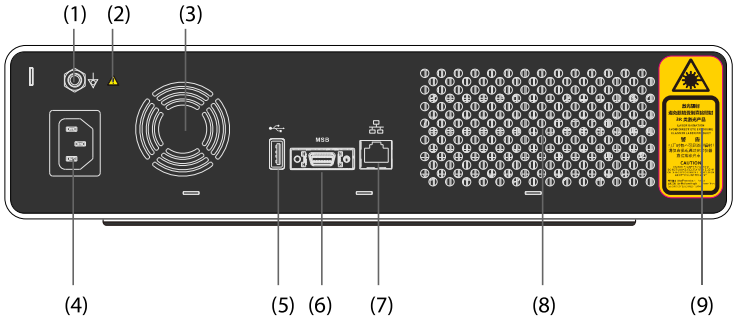
(1) Power switch: turns on or off the main unit. The switch also has an embedded light that indicates the power status of the main unit:

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

(2) Light outlet and light cable connector: the light outlet, used to connect a light cable.

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

2.8.2 Back View of the Main Unit



(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) AC power input: connects the AC Mains.

(5) USB connector:connects a USB drive for system upgrade.

(6) MSB (Mindray Serial Bus) connector: connects to a camera control unit (CCU).

(7) Network connector: supports software upgrade.

(8) Ventilation outlet: used for heat dissipation.

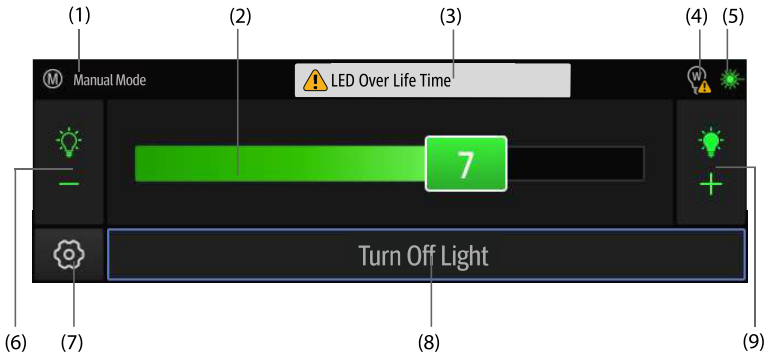
(9) Laser warning label: read the messages carefully to avoid any possible safety risks.

NOTE

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

3.7.1 Operation Screen Introduction

The following figure shows the operating screen of the equipment:



(1) Mode area: indicates the current mode. Select this area to switch between the manual mode and auto mode.

(2) Brightness indication area: indicates the current brightness of light. Move the slider to adjust the brightness of light. If the equipment is in the auto mode, "AUTO" is displayed in this area.

(3) Error message area: displays error messages.

(4) Bulb status symbol: indicates the service life status of the bulb. For detailed introduction of the symbols, refer to ***3.7.2 On-screen Symbols***.

(5) Laser diode (LD) status symbol: indicates the status of LD output. This symbol is dimmed when the LD is off. For detailed introduction of the symbols, refer to ***3.7.2 On-screen Symbols***.

(6) 

Brightness decrease button — : select to decrease the brightness of light (the illumination intensity of the light source).

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

(8) Light control button: select to turn on/off the light output.

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 UX5 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 UX5 series CCU is interconnected, you can turn on the light by using a camera head button or the CCU touchscreen. For detailed setting method, refer to the operator manual of the CCU.

For HB500R/HB500R-TEC, after you select the Light control button, white light is emitted by default. Further, if a Mindray UX5 series CCU is interconnected, when you enable the IR display mode, the light source emits LD. You can also turn on LD on the touchscreen. For detailed operations, refer to ***4.9.1 Changing Function Setup***.

WARNING

- **To reduce the impact of laser on the human body, turn on the LD only when the endoscope enters the human body and the fluorescence observation is**

necessary. Turn the LD off immediately after the fluorescence observation is completed.

NOTE

- **After a compatible CCU is interconnected, if you press the white balance button, the light source begins emitting light automatically and quickly adjusts the brightness to a proper level. If you press any other camera head button, the light source begins emitting light as well, but in slower way to minimize damage to the operator's eyes. Once the endoscope is withdrawn from the patient, the light will automatically dim. For detailed setting method, refer to the operator's 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.

NOTE

- **Always adjust the equipment to the minimum brightness necessary for the observation, to avoid the risk of burns.**
- **Do not use strong light for a long time.**

4.9 Changing Settings

4.9.1 Changing Function Setup

Select the Setup button on the main screen to access the setup menu. The **Light Source** tab is displayed. In this tab, you can set **Upper Limit**. For HB500R/HB500R-TEC, you can also switch on or switch off **NIR**.

NOTE

- **If the white light is not turned on, the switch of NIR is unavailable.**

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	HB500R/HB500R-TEC: LED, which outputs white light, and semiconductor lasers (class 3R), which output near-infrared light HB500/HB500-TEC: LED, which outputs white light

Service life of bulb	LED: over 60000 hours Semiconductor lasers: over 15000 hours
Bulb specification	LED: 3.5 V, 27 A Semiconductor lasers: 4 V, 8.5 A
Diameter of light outlet	Φ7.2 ± 0.5 mm

A.6 Performance Specifications

Maximum central illumination	≥ 3000000 Lux
Color temperature	3000K - 7000K
Color rendering index	≥90, in the white light mode
Maximum noise	≤ 55 dBA
Defibrillation recovery time	1s

A.7 Laser Performance (for HB500R/HB500R-TEC)

Laser wavelength	780nm ± 10nm ; Full width at half maximum (FWHM): 5 nm ± 5nm
Beam divergence angle	70° ± 10°
Classification	3R
Test value of laser output safety sign	≤ 50 mW

A.8 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.

April 16, 2026

LETTER OF DECLARATION

To: Center for Centralized Public Procurement in Health

For tender nr: 21584038

Date of tender 20 apr 2026

We, Shenzhen Mindray Bio-Medical Electronics Co., Ltd., with office at Floor1-4，Mindray Building, Keji 12th Rd. South, Hi-tech Park, Nanshan, Shenzhen, P. R. China, manufacturer of **Light cable (LC0005S and LC0003S) and Light Source (HB500, HB500R, HB300, HB100),**

We hereby declare that

the light source socket and fiber-optic cable connector of our product have been tested and verified to be compatible with Karl Storz fiber-optic cables.

Sun Jing
General Manager of PMLS Sales and Marketing Department (ROW & EU)
Shenzhen Mindray Bio-Medical Electronics Co., Ltd.

SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO.,LTD
Mindray Building, Keji 12th Road South, High-tech Industrial Park, Nanshan,
Shenzhen 518057，P.R. China
Tel: +86 755 26582888
Fax: +86 755 26582680
Website: www.mindray.com

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.

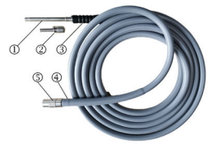
NOTE

- 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

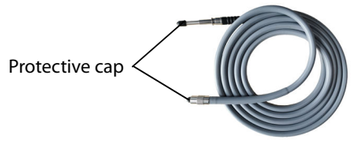
Pulling the cable may damage the product.

- 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.
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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

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。

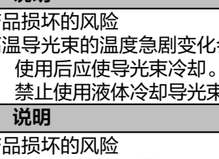
一、预期用途

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

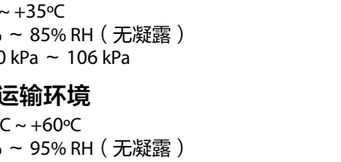
拉拽缆线会损坏产品。

- 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。



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	132°C ~ 134°C	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：0°C ~ +35°C
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：-20°C ~ +60°C
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

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