mindray

UX1 Series

Endoscope Camera System

Vision Beyond Imagination

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www.mindray.com

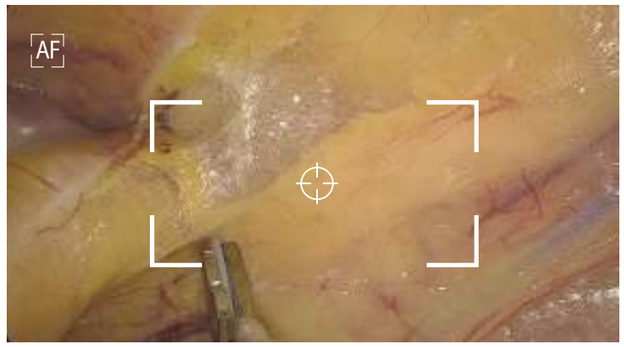
P/N:ENG-UX1 Series 4K Endoscope Camera System-210285X8P-20241022

mindray
healthcare within reach

Smart View Exceptional Image Quality

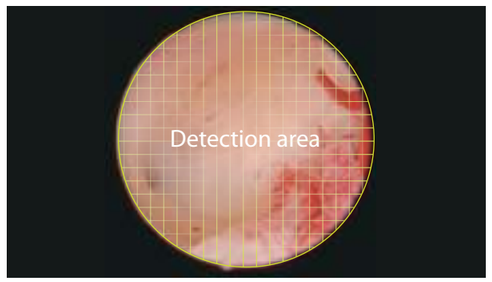
AutoFocus※, and high quality image achieved with one touch

The perfect combination of mechanical structure, optical design, and the powerful computing capability of the new imaging chip brings precise, efficient focusing, reducing the need for manual adjustments. This allows the surgeon to concentrate fully on the surgery, with a perfect image※.

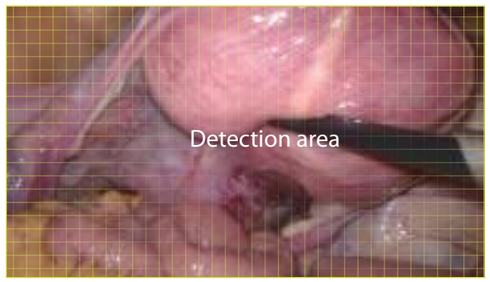


Automatic scene recognition, intelligent brightness adjustment

Smart exposure: The system identifies different detection areas based on the scene and accurately matches the exposure parameters, eliminating the need to switch modes manually.



Small diameter scope scene (e.g. hysteroscope)



Laparoscope scene

Automatic dimming: The camera system adjusts the light source intensity in real time, ensuring optimal brightness according to the current image's exposure needs.

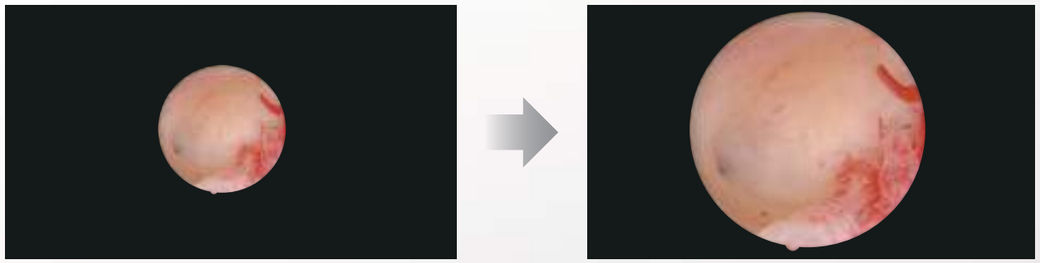
※ AutoFocus configuration is optional.

※ Resolution can support 4K at most.

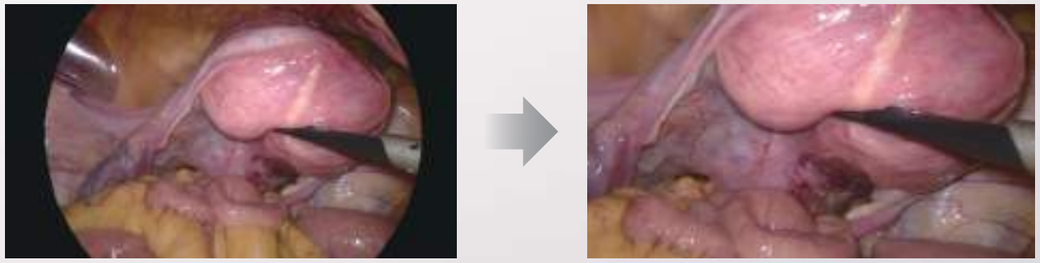
Intelligent Control Flexible Mastery

Automatic Adaptive Zoom achieved with one touch

Intelligent recognition of the endoscope type and automatic adjustment with adaptive zoom minimizes the need for repeated manual adjustments, ensuring optimal visibility for various surgeries.



Small diameter scope - One Touch to adaptive Zoom



Laparoscope - One Touch to Full Screen

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

High-quality 4K/HD video recording vividly captures the entire surgical process, facilitating quality academic sharing. With Variable BitRate and H.265 encoding, the file size is reduced by 50% without compromising quality, offering efficient storage solutions.

UX1/UX1–TEC/UX1–NOR/UX1–SIM

Endoscope Camera System

Operator's Manual

■ Release time: 2024-4

■ Revision: 1.0

Model	Standard	Bright	Gentle	Vivid	Color Enhancement	Homogenous Brightness	Tone Enhancement	
							Single Screen	Split Screen
UX1	√	√	√	√	×	×	√	×
UX1-TEC	√	√	√	×	×	×	√	×
UX1-SIM	√	√	×	×	×	×	√	×
UX1–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.

Color Enhancement: improves color differentiation.

Homogenous Brightness: enhances the brightness of dark areas.

Tone Enhancement: improves the contrast between red and other colors in an image.

NOTE

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

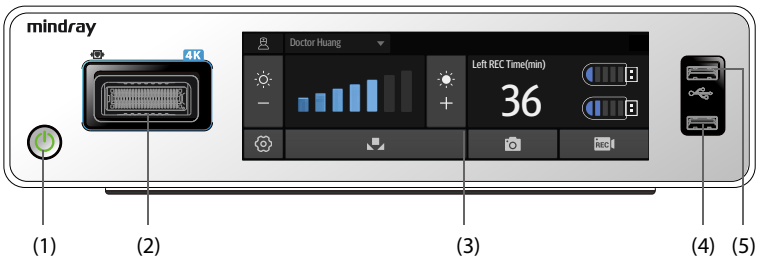
2.7 Applied Part

The applied part of the system is camera head.

2.8 System Components

The system consists of a camera control unit (hereinafter referred to as the CCU) and a camera head.

2.8.1 Front View of the CCU



(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.

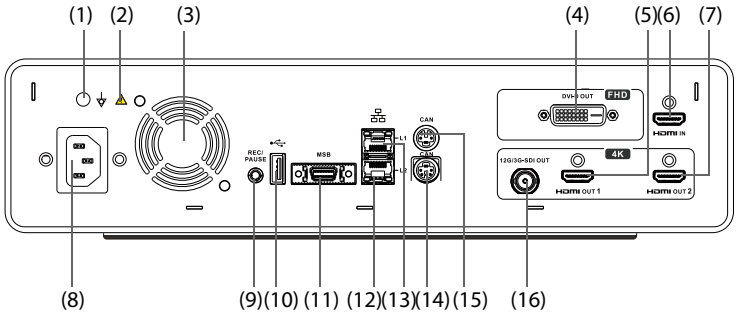
(2) Camera head connector: connects a camera head.

(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 a 1/1.8-inch progressive scan CMOS for white light imaging, supporting 4K output display.

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

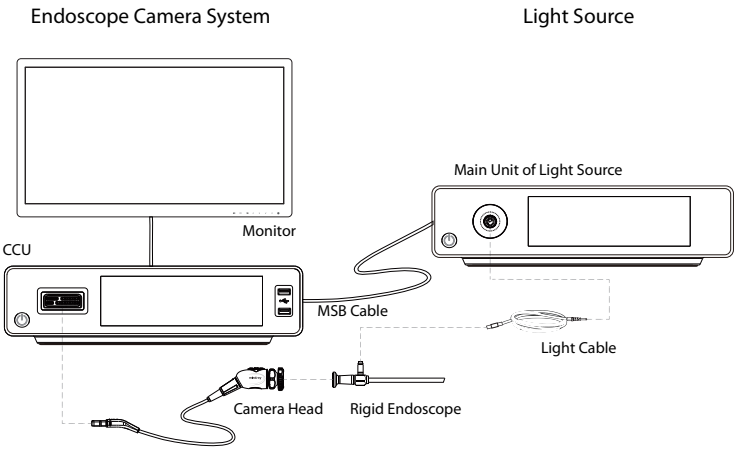
- **You are advised to install the main unit on a stable trolley rather than on the floor.**
- **If the equipment is to be used with a trolley, there will be risks of falling or collision during movement. For more safety instructions, refer to the instructions for use accompanied with the trolley.**
- **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.

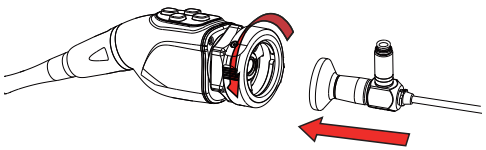
3.6.1 System Connection

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.

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.**

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 (HB100/HB100-TEC), 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;

- 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***.

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.
Tone Enhancement	Long press the button to cycle through the tone enhancement modes.
Insufflator Switch	Long press the button to turn on or off the inflation function of the interconnected insufflator.
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.
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 **Image Zoom**, set **Image Zoom Selection** as needed.
6. If the short-press or long-press function is set to **Tone Enhancement**, set **Tone Enhancement Mode Selection** 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.

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.**

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	360 VA

A.4 Physical Specifications

Dimension (CCU)	Depth: 380 ± 5 mm Width: 350 ± 5 mm Height: 80 ± 5 mm (excluding the rubber feet)
Length (camera head, excluding the cable)	White light camera head: ≤ 131 mm
Weight	CCU: ≤ 10 kg White light camera head (excluding the cable): ≤ 190 g

A.5 Hardware Specifications

Display type (CCU)	Touchscreen
Display size (CCU)	7.8 inches
Signal output	3 4K channels and 2 HD channels
Diameter of eyepiece cup connector	φ31.75, ± 0.10 mm

HB100/HB100-TEC

Endoscope Light Source

Operator's Manual

■ Release time: 2024-11

■ Revision: 2.0

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

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

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).

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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	132°C - 134°C	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: 0°C - +35°C
2. Humidity: 30% - 85% RH, non-condensing
3. Atmospheric pressure: 70 kPa - 106 kPa

IX. Storage and Transportation Environment

1. Temperature: -20°C - +60°C
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
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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。

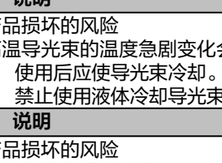
一、预期用途

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

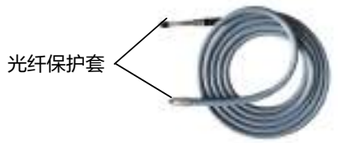
拉拽缆线会损坏产品。

- 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	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

Rigid Endoscope

Operator's Manual

(M 01030A/M 01000A/M 01030PA/M 01000PA/G 01030A/G 01000A/G 01030PA/G 01000PA/M 00530A/G 00530A/M 00500A/G 00500A/M 10530A/G 10530A/M 10500A/G 10500A/M 00530PA/G 00530PA/M 00500PA/G 00500PA/M 10530PA/G 10530PA/M 10500PA/G 10500PA)

CE 0123

■ Release time: 2023-5

■ Revision: 1.0

NOTE

- **"PA" in the model indicates that endoscope of this model is not configured with light cable adapter, Storz.**
- **In addition to the difference of basic parameters above, there are differences in some optical parameters between the 10 mm series and 5 mm series.**

2.11 Product Components

Taking M 00500A as an example, this product consists of the following parts:

(1) Eyepiece

(2) Main body

(3) Light cable connector (available for ACMI/Olympus Pro light cables)

(4) Light cable adapter (available for Mindray/Richard Wolf light cables)

(5) Light cable adapter (available for STORZ light cables)

(6) Objective lens

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

NOTE

- **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.**

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

Model	Weight
M 01000A/ M 01000PA/G 01000A/ G 01000PA/M 01030A/ M 01030PA/G 01030A/G 01030PA	≤220g
M 00530A/M 00530PA/G 00530A/G 00530PA/M 00500A/M 00500PA/G 00500A/G 00500PA	≤130g
M 10530A/M 10530PA/G 10530A/G 10530PA/M 10500A/M 10500PA/G 10500A/G 10500PA	≤145g

A.4 Basic Parameters

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

www.mindray.com

P/N:ENG-Reusable Laparoscopic Instruments-210285X20P-20241122

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healthcare within reach

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Reusable Laparoscopic Instruments

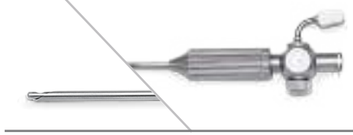
User Friendly & Future Proof

Trocars

Product	Description	Dimension	Code	
	Pyramidal Trocar	ϕ 5X95	221-51155	👍
		ϕ 10X95	221-01155	👍
		ϕ 12X95	221-81155	
		ϕ 5X150	221-53155	👍
		ϕ 10X150	221-03155	👍
		ϕ 12X150	221-83155	👍
	Auto Shield Trocar	ϕ 5X95	221-51255	
		ϕ 10X95	221-01255	
		ϕ 12X95	221-81255	
		ϕ 5X150	221-53255	
		ϕ 10X150	221-03255	
		ϕ 12X150	221-83255	
	Pyramidal Trocar with Screw	ϕ 5X95	221-51165	
		ϕ 10X95	221-01165	
		ϕ 12X95	221-81165	
	Auto Shield Trocar with Screw	ϕ 5X95	221-51265	
		ϕ 10X95	221-01265	
		ϕ 12X95	221-81265	

Trocars

- To avoid blood contamination when inserting the telescope and to reduce times of cleaning the tip of the telescope by controlling the sealing flap opening and closing.

Product	Description	Dimension	Code	
	Veress Needle	ϕ 2X120	221-21127	
		ϕ 2.7X150	221-27157	👍
	Reducer Sleeve	ϕ 10 - ϕ 5	221-01785	
		ϕ 12 - ϕ 5	221-81785	
	Sealing Cap	ϕ 5	221-50925	👍
		ϕ 10	221-00925	👍
		ϕ 12	221-80925	👍
	Reducer	ϕ 10 - ϕ 5	221-00725	👍
		ϕ 12 - ϕ 5	221-80725	👍
	Reducer	ϕ 10 - ϕ 5	221-00715	

The "Relia" Reusable Electrode Surgical Instruments

Safe

Insulated sleeve exposes a shorter metal base to avoid the accidental damage caused by electrical leakage.

Durable

Strictly selected materials plus special production processes greatly extend the product's life.

Ergonomic

One-click to disassemble into three parts for more thorough cleaning and sterilization.

Dissecting and Grasping Forceps

- **Diamond serration clamp teeth**
  Stronger grasping force with less tissue damage
- **Shorter metal base**
  Less unintentional electrical injury
- **No obvious bulge at the opening joint**
  Reduce blood and tissue residues, easy to clean and reduce cross infection

Product	Description	Dimension	Code	
 16mm	KELLY Dissecting and Grasping forceps, Maryland	ϕ 5X360	222-5S3013	👍
		ϕ 5X360, With Ratchet	222-5T3013	
		ϕ 5X430	222-5S4013	
		ϕ 5X430, With Ratchet	222-5T4013	
 22mm	KELLY Dissecting and Grasping forceps, long, Maryland	ϕ 5X360	222-5S3023	👍
		ϕ 5X360, With Ratchet	222-5T3023	
		ϕ 5X430, With Ratchet	222-5T4023	
 16mm	Dissecting and Grasping forceps, right-angled	ϕ 5X360	222-5S3123	👍
		ϕ 5X360, With Ratchet	222-5T3123	
		ϕ 5X430, With Ratchet	222-5T4123	
 23mm	Straight Dissecting and Grasping forceps, atraumatic	ϕ 5X360	222-5S3043	
		ϕ 5X360, With Ratchet	222-5T3043	
 43mm	Dissecting and Grasping forceps, atraumatic	ϕ 10X360	222-0S3103	
		ϕ 10X360, With Ratchet	222-0T3103	
 26mm	Dissecting and Grasping forceps, right-angled	ϕ 10X360	222-0S3133	👍
		ϕ 10X360, With Ratchet	222-0T3133	

Grasping Forceps


No Ratchet


With Ratchet

Product	Description	Dimension	Code	
 18mm	Bowel Grasper, fenestrated, short	ϕ 5X360	222-5S3213	👍
		ϕ 5X360, With Ratchet	222-5T3213	
 24mm	Atraumatic Grasping forceps	ϕ 5X360	222-5S3633	👍
		ϕ 5X360, With Ratchet	222-5T3633	
		ϕ 5X430, With Ratchet	222-5T4633	
 27mm	CROCE-OLMI Grasping forceps, atraumatic, curved	ϕ 5X360	222-5S3453	👍
		ϕ 5X360, With Ratchet	222-5T3453	
		ϕ 5X430, With Ratchet	222-5T4453	
 26mm	Grasping forceps, w specially fine atraumatic serration	ϕ 5X360	222-5S3473	
		ϕ 5X360, With Ratchet	222-5T3473	
		ϕ 5X430	222-5S4473	
		ϕ 5X430, With Ratchet	222-5T4473	
 37mm	Bowel Grasper, fenestrated	ϕ 5X360	222-5S3303	👍
		ϕ 5X360, With Ratchet	222-5T3303	
 18mm	BABCOCK Grasping forceps	ϕ 5X360	222-5S3553	
		ϕ 5X360, With Ratchet	222-5T3553	👍
 14mm	Grasping forceps, 2X4 teeth	ϕ 5X360	222-5S3393	
		ϕ 5X360, With Ratchet	222-5T3393	

Grasping Forceps

No Ratchet

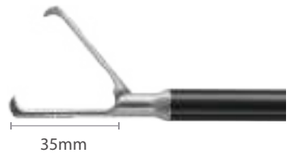
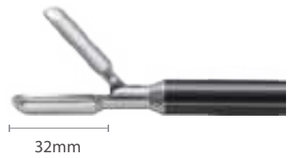
With Ratchet

Product	Description	Dimension	Code
 28mm	Grasping forceps, atraumatic	ϕ 5X360	222-5S3333
		ϕ 5X360, With Ratchet	222-5T3333
 15mm	VANCAILLIE Adhesion Forceps, one jaw fenestrated	ϕ 5X360	222-5S3493
		ϕ 5X360, With Ratchet	222-5T3493
 15mm	MANHES biopsy forceps	ϕ 5X360	222-5S3903
		ϕ 5X360, With Ratchet	222-5T3903
 14mm	MANHES Grasping forceps, "tiger-jaws", 2X4 teeth	ϕ 5X360	222-5S3363
		ϕ 5X360, With Ratchet	222-5T3363
 16mm	Claw forceps, 2X3 teeth, short	ϕ 10X360	222-0S3403
		ϕ 10X360, With Ratchet	222-0T3403
 34mm	SAWALHE Tissue Grasping forceps	ϕ 10X360	222-0S3423
		ϕ 10X360, With Ratchet	222-0T3423
 30mm	BABCOCK Grasping forceps	ϕ 10X360	222-0S3573
		ϕ 10X360, With Ratchet	222-0T3573

Grasping Forceps

No Ratchet

With Ratchet

Product	Description	Dimension	Code	
 35mm	Claw forceps, 2X3 teeth	ϕ 10X360	222-0S3413	
		ϕ 10X360, With Ratchet	222-0T3413	👍
 32mm	Spoon forceps	ϕ 10X360	222-0S4883	
		ϕ 10X360, With Ratchet	222-0T4883	👍
 13mm	VANCAILLIE Oviduct Forceps	ϕ 5X360	222-5S3583	👍
		ϕ 5X360, With Ratchet	222-5T3583	
 18mm	Dissecting and Grasping forceps, “alligator jaws”	ϕ 5X360	222-5S3773	
		ϕ 5X360, With Ratchet	222-5T3773	
 31mm	DeBAKEY Grasping forceps, curved and slender jaws	ϕ 5X360	222-5S3813	
		ϕ 5X360, With Ratchet	222-5T3813	
 19mm	Grasping forceps, atraumatic, spoon-shaped	ϕ 5X360	222-5S3223	
		ϕ 5X360, With Ratchet	222-5T3223	
 14mm	MANHES Dissecting and Grasping forceps, "duckbill"	ϕ 5X360	222-5S3283	
		ϕ 5X360, With Ratchet	222-5T3283	

Monopolar Scissors

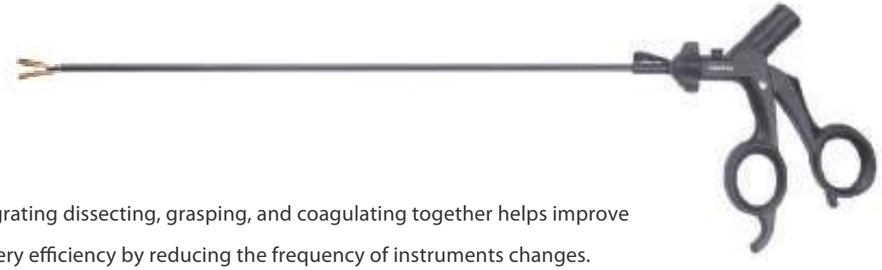
- **Sharp**
  The sharpest blade enables fast cutting.

- **Smooth**
  Involute design of blade line ensures more smooth cutting.

- **Durable**
  The vacuum heat treatment process makes sure that the metal hardness control accuracy reaches HRC1 (Rockwell hardness), increasing the metal life by 3-4 times compared with the traditional method.

Product	Description	Dimension	Code	
 15mm	METZENBAUM Scissors, curved	ϕ 5X360	222-5S3022	👍
		ϕ 5X430	222-5S4022	👍
 20mm	Scissors, spoon-shaped blades, serrated, curved	ϕ 5X360	222-5S3012	
		ϕ 5X430	222-5S4012	
 15mm	Scissors, straight	ϕ 5X360	222-5S3092	
		ϕ 5X430	222-5S4092	

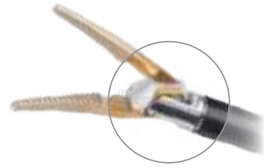
Bipolar Dissecting Forceps



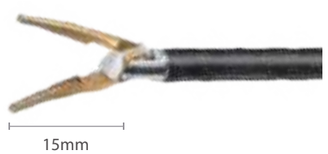
Integrating dissecting, grasping, and coagulating together helps improve surgery efficiency by reducing the frequency of instruments changes.

- **Innovative anti-sticking:**
  Sticking prevention with coated jaw.

- **Strong grasping:**
  Enhanced force with wider opening angle to achieve better grasping.



- **Guaranteed Safety:**
  Advanced insulation design guarantees the safety and reliability of bipolar coagulation.

Product	Description	Dimension	Code	
 15mm	Bipolar Straight Dissecting Forceps	ϕ 5X360	222-5S3011	👍
		ϕ 5X430	222-5S4011	👍
 15mm	Bipolar Curved Maryland Dissecting Forceps	ϕ 5X360	222-5S3021	👍
		ϕ 5X430	222-5S4021	

Monopolar Electrodes

Product	Description	Dimension	Code	
	Hook Tip Coagulation Electrode	ϕ 5X330	222-51110	👍
	Ball Tip Coagulation Electrode	ϕ 5X330	222-51220	
	Spatula Tip Coagulation Electrode	ϕ 5X330	222-51440	👍
	Rod Tip Coagulation Electrode	ϕ 5X330	222-51610	👍

Cables

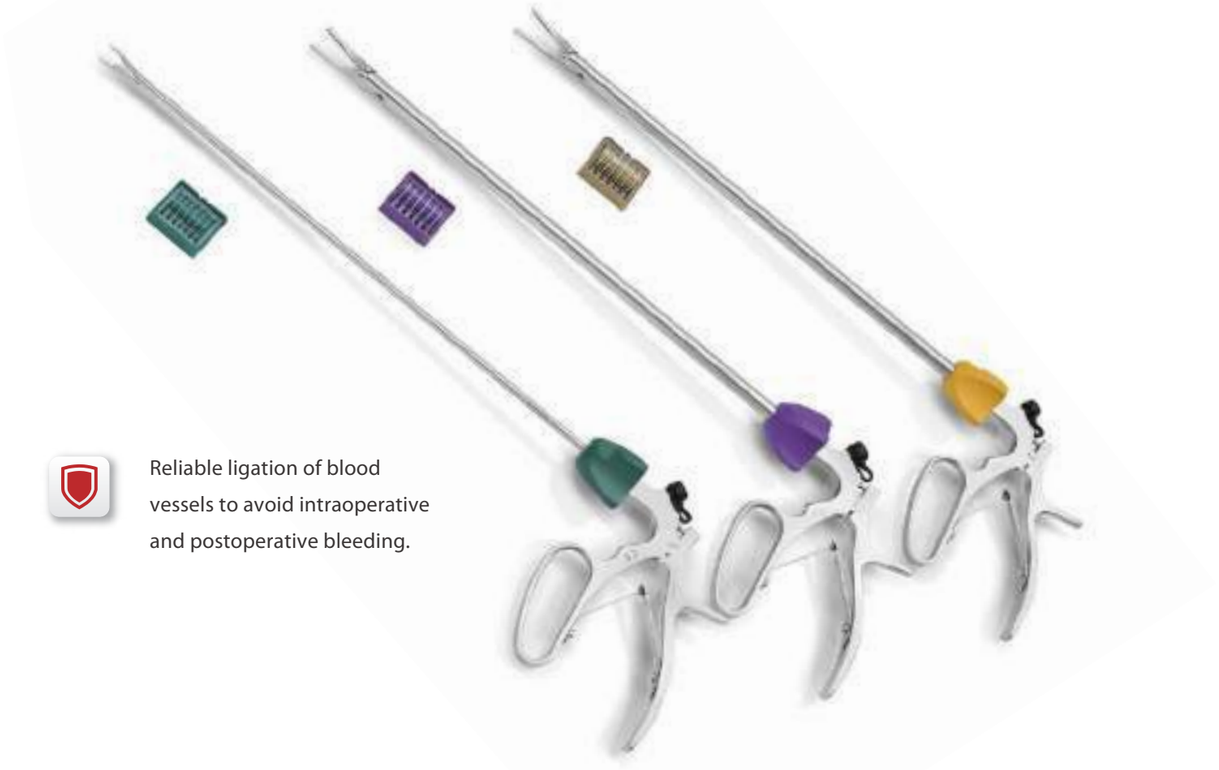
All cables are autoclavable.

Product	Description	Dimension	Code	
	Monopolar cable	3200mm	999-030	👍
	Bipolar Cable	3200mm	999-031	👍

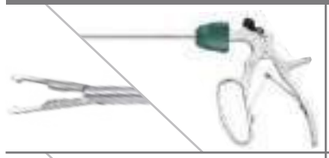
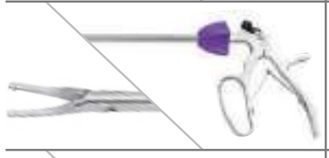
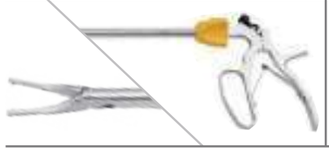
Instrument Trays

Product	Description	Dimension	Code	
	Double-decker Instrument Tray	540X250X100	X TR5425A0	
	Long Double-decker Instrument Tray	600X250X100	X TR6025A0	👍
	Long Three-decker Instrument Tray	600X250X140	X TR6025E4	

Clip Appliers



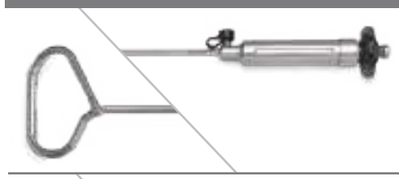
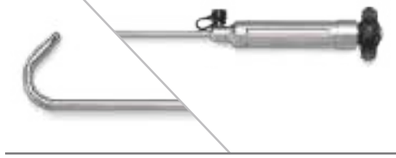
Reliable ligation of blood vessels to avoid intraoperative and postoperative bleeding.

Product	Description	Dimension	Code	
	Endo Applier for Medium Large polymer locking Clip	ϕ 5X330	221-55636	
	Endo Applier for Large polymer locking Clip	ϕ 10X330	221-05646	
	Endo Applier for Extra Large polymer locking Clip	ϕ 10X330	221-05656	

Clip Appliers

Product	Description	Dimension	Code	
	Endo Applier for Small Titanium Clip, Single action	ϕ 5X330	221-55116	
	Endo Applier for Medium Titanium Clip, Single action	ϕ 10X330	221-05126	
	Endo Applier for Medium Large Titanium Clip, Single action	ϕ 10X330	221-05136	
	Endo Applier for Large Titanium Clip, Single action	ϕ 10X330	221-05146	
	Open Surgery Applier for Small Titanium Clip	28 cm	221-00516	
	Open Surgery Applier for Small Titanium Clip	18 cm	221-01516	
	Open Surgery Applier for Medium Titanium Clip	28 cm	221-00526	
	Open Surgery Applier for Medium Titanium Clip	23 cm	221-01526	
	Open Surgery Applier for Medium Large Titanium Clip	28 cm	221-00536	
	Open Surgery Applier for Large Titanium Clip	28 cm	221-00546	

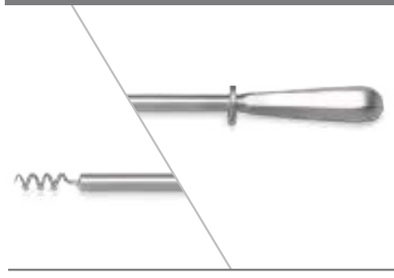
ENDO-Retractors

Product	Description	Dimension	Code	
	ENDO-Retractor	ϕ 5X360	221-53013	
	ENDO-Retractor	ϕ 5X360	221-53023	👍

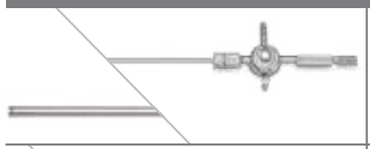
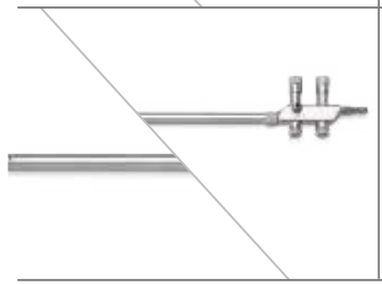
Fans Dissecting Forceps

Product	Description	Dimension	Code	
	3 Finger Retractor	ϕ 5X330	221-55923	
	5 Finger Retractor	ϕ 10X330	221-05923	👍

Myoma Drills

Product	Description	Dimension	Code	
	Myoma Drill	ϕ 5X330	221-53109	👍
		ϕ 5X420	221-54109	
		ϕ 10X330	221-03109	
		ϕ 10X420	221-04109	

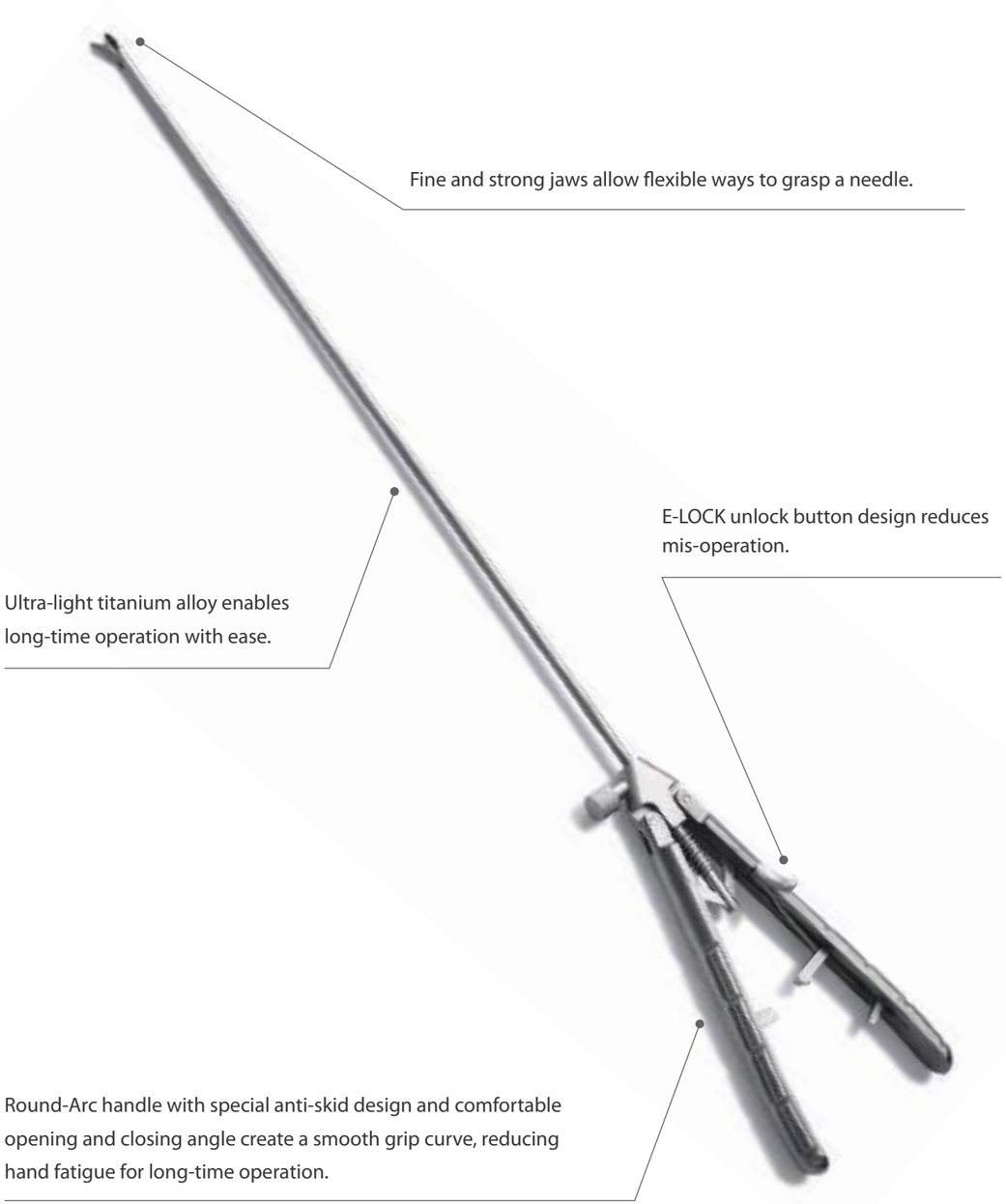
Suction & Irrigation Apparatus

Product	Description	Dimension	Code	
	Suction and irragation	ϕ 5X330	221-53114	
	Suction and irragation	ϕ 5X330	221-53224	👍
		ϕ 10X330	221-03224	

Puncture Injection Needles

Description	Pinhead	Dimension	Code	
Puncture Injection Needle（7#）	0.7mm	ϕ 5X330	221-53015	
Puncture Injection Needle（9#）	0.9mm	ϕ 5X330	221-53025	
Puncture Injection Needle（13#）	1.3mm	ϕ 5X330	221-53035	👍
Puncture Injection Needle（16#）	1.6mm	ϕ 5X330	221-53055	
Puncture Injection Needle（18#）	1.8mm	ϕ 5X330	221-53065	

Needle Holders



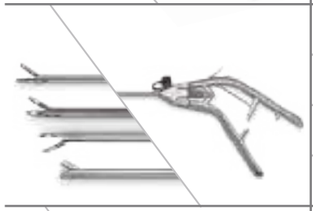
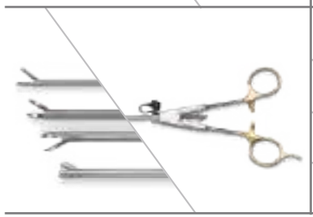
Fine and strong jaws allow flexible ways to grasp a needle.

E-LOCK unlock button design reduces mis-operation.

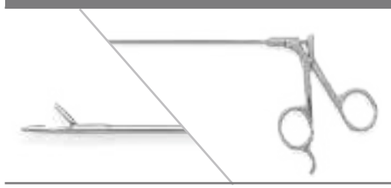
Ultra-light titanium alloy enables long-time operation with ease.

Round-Arc handle with special anti-skid design and comfortable opening and closing angle create a smooth grip curve, reducing hand fatigue for long-time operation.

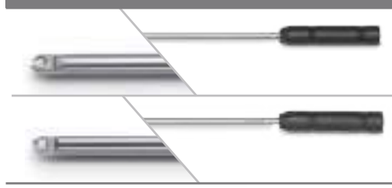
Needle Holders

Product	Description	Dimension	Code	
	V Handle Straight Needle Holder	ϕ 5X330	221-56416	
	V Handle Left Curved Needle Holder	ϕ 5X330	221-56426	👍
	Pistol Handle Straight Needle Holder	ϕ 5X330	221-56516	
	Pistol Handle Left Curved Needle Holder	ϕ 5X330	221-56526	
	Pistol Handle Right Curved Needle Holder	ϕ 5X330	221-56536	
	Pistol Handle Needle Holder with Reposition Function	ϕ 5X330	221-56546	
	O Handle Straight Needle Holder	ϕ 5X330	221-56816	
		ϕ 5X450	221-56876	
	O Handle Left Curved Needle Holder	ϕ 5X330	221-56826	
		ϕ 5X450	221-56886	👍
	O Handle Right Curved Needle Holder	ϕ 5X330	221-56836	
	O Handle Needle Holder with Reposition Function	ϕ 5X330	221-56846	

Suture Fascia Fix Forceps

Product	Description	Dimension	Code	
	Suture Fascia Fix Forceps	ϕ 3X200	221-32013	👍

Knot Pushers

Product	Description	Note	Dimension	Code	
	Knot Pusher	Half Ring	ϕ 4X330	221-43019	👍
		Full Ring	ϕ 4X330	221-43029	

User Manual

PV27

27” FHD Surgical Medical LCD Monitor

6 Technical specification

Monitor characteristics：	
Panel technology	27”, TFT, color, LCD screen, anti-glare, hard coating
Active area（H x V）	597.89 (H) x 336.31 (V) mm
Pixel pitch	0.3114(H) x 0.3114(V) mm
Resolution	1920（RGB）x 1080
Refresh rate	60 Hz
Color depth	10 bit
Luminance (Typ. of panel)	1000 cd/m^2
Contrast ratio (Typ. of panel)	1000:1
Viewing angle（CR > 10） (Typ.)	Horizontal: 178°
	Vertical: 178°
Backlight	WLED
Lifetime of backlight (Min.)	30000 hours
Response time (Typ.)	T_{GTG} :14ms
Power supply：	
DC IN	24 V，5.0 A (supplied from AC adapter)
Power consumption	< 90 W
Standby	< 18 W
Control and connection：	
Front	Power indicator Touch keypad
Back	DVI -IN *1 DVI -OUT *1 VGA -IN *1 SDI -IN *1/OUT *1 DP *1 HDMI *1 RS232 *1 DC 5V/0.8A-OUT*1 Ground stud*1 DC socket*1 Power switch*1
Mechanical characteristics：	
Housing components	Plastic、glass
Ventilation openings	Natural heat dissipation
Protection level	IP65（Front）、IP20（back）

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

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

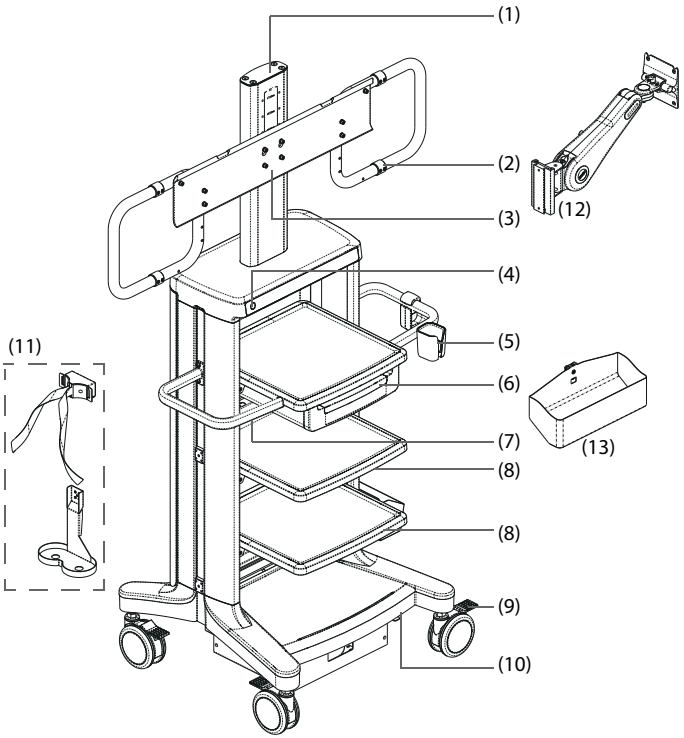
Mobile Trolley

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.

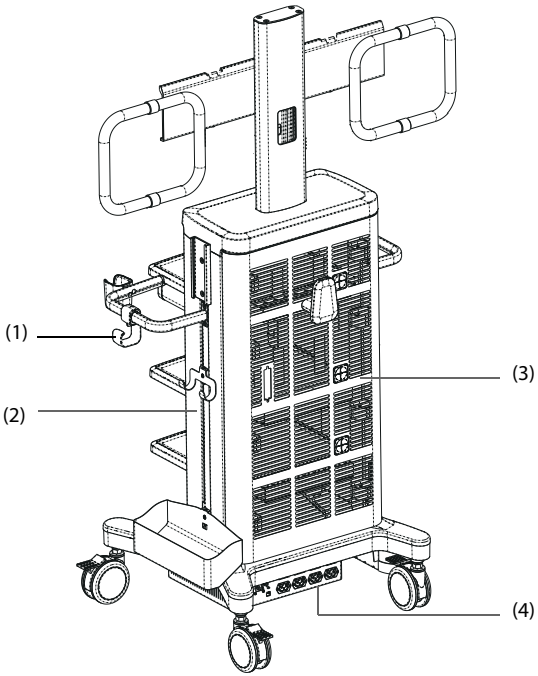
(10) Base plate: an isolation transformer (if configured) is installed under the base plate.

(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

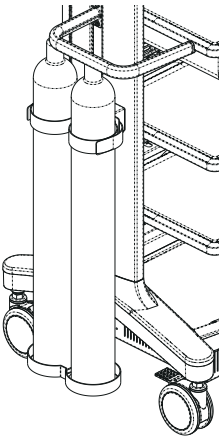


(1) Hook: holds light cables and other cables.

(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.



The optional CO2 holder assembly can support 2 E-size cylinders of 865 mm height and 102 mm diameter.

It is recommended that heavy components be loaded onto the trolley by 2 people. Note that the gravity center of the system will vary with the load weight on the trolley.

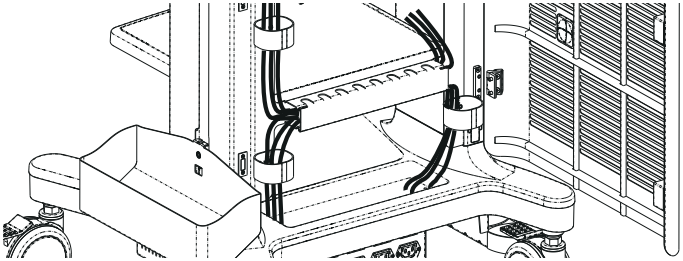
WARNING

- **Do not install or use the monitor arm and monitors on an empty trolley. Otherwise, the trolley may lose stability and fall over, causing equipment damage or injury to personnel.**
- **Before using the medical devices on the trolley for medical purposes, check their electromagnetic compatibility.**

4.4.2 Routing Device Cables

To route cables of the devices on the trolley, follow the procedure below:

1. Place the trolley on a flat surface and lock all castors.
2. Open the rear door.
3. Connect cables of the mounted devices. Route the cables through the cable management box on the rear side of shelves, and secure the cables using cable ties on the trolley column, as shown in the following example:



4. Connect the mounted devices to the AC mains. For detailed operation, refer to ***4.4.3 Connecting the Equipotential Line***.
5. Lock the rear door.

Pay attention to the following items when routing cables:

- The cable must be long enough to avoid cable damage or device failure when the trolley moves.
- When rotating the monitor arm, avoid contacting other connected cables.
- Do not pull or drag sagging cables.
- When adding or removing cables, avoid contacting other connected cables to avoid accidental power interruption.

4.4.3 Connecting the Equipotential Line

An equipotential terminal is used to balance the electric potential of the protective grounding between the electrical equipment in the system. If an isolation transformer is used in the system, connect the equipotential line to each equipotential terminal of the mounted devices and the isolation transformer, or an electrical shock will occur.

WARNING

- **When connecting or disconnecting the equipotential line, turn off the equipment power supply. Or an electrical shock will occur.**

4.4.4 Connecting the AC Mains

The electrical devices on the trolley are powered by AC power supply. Before connecting the devices to the AC mains, check that the voltage and frequency ratings of the power lines are the same as those indicated beside the AC power input of the devices.

For TV300 and TV500 trolleys, to connect the AC mains, follow the procedure below:

1. Place the trolley on a flat surface and lock all castors.

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

mindray

HS-50F

50L High Flow Insufflator

Ultimate Experience
Intelligent Control

HS-50F

Main features

High Speed Insufflation

The HS-50F offers an increased maximum flow rate of 50L per minute. In addition, the display mode provides clear visualization of the pressure, flow rate and volume in real time for monitoring the status of the HS-50F.

Gas Heating Functions

Using a heated insufflator tube (optional) can maintain the output gas at approximately 37°C, reducing telescope fogging and minimizing the need for the surgeon to frequently wipe the telescope.

100 times autoclavable, outer diameter-12mm, inner diameter-8mm

Multi-modes available

The equipment provides the following operating mode:

Operating mode	Description	Pressure(mmHg)	Flow(L/min)
High Flow	Designed for laparoscopies performed on normal weight adult patients.	1 - 30	1 - 45
Pediatric	Designed for laparoscopies performed on children.	1 - 15	0.1 - 20
Bariatric	Designed for laparoscopies performed on obese adult patients.	1 - 30	1 - 50
RetroPeritonenum	Designed for laparoscopies performed in retroperitoneum.	1 - 30	1 - 20
Custom	You can customize the operating mode as necessary.	1 - 30	0.1 - 50

Automatic Smoke Evacuation

If there is too much smoke in the abdominal cavity during the surgery, the foot switch can be treaded to exhaust smoke quickly to ensure a clear surgical field.

User-friendly design

HS-50F features 7-inch touch screen with a user-friendly interface, and it provides audible and visible alarm messages to promptly alert the surgeon of high pressure situations and etc., thereby ensuring the safety of the surgery.

With the Auto Leakage Compensation function, if there is a gas leakage, the machine automatically replenishes the gas to maintain stable abdominal pressure.

Specifications

Dimension	Length (front to back): 380 mm Width (left to right): 350 mm Height (top to bottom): 141 mm (excluding the rubber feet)
Weight	10 kg
Mechanical noise	≤ 50dBA
Gas source	Gas supply with gas cylinder / Central gas supply / Connection using reducing valve
Pressure range	0.4-16 Mpa
Gas type	CO_2
Gas flow	Max 50 L/min
Input voltage	AC 100 -240V~
Rated frequency	50/60 Hz
Maximum current	0.75A-0.35A
Fuse	T3.15AH250V

www.mindray.com

P/N:ENG-HS-50F-210285X2P-20240723

mindray
healthcare within reach

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

Insufflator

Operator's Manual

CE 0123

■ Release time: 2022-6

■ Revision: 7.0

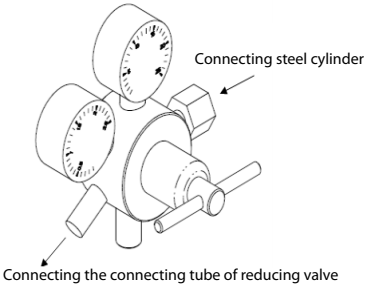


Figure 4-2 Connection of the reducing valve

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.

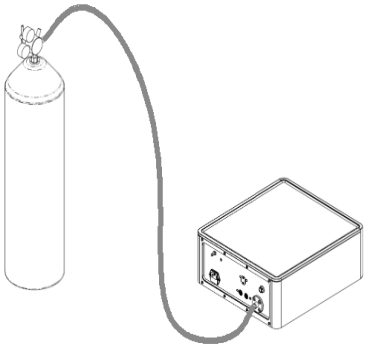


Figure 4-3 The insufflator connects with steel cylinder via the reducing valve

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.

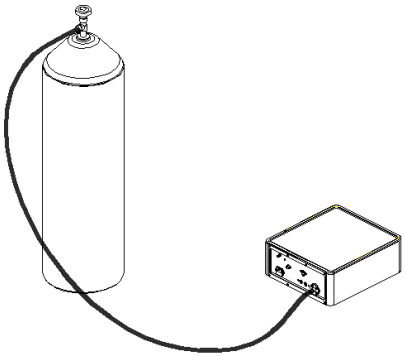


Figure 4-4 The insufflator directly connects with the CO2 steel cylinder

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.

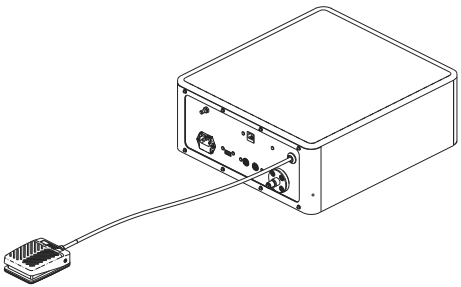


Figure 4-5 Connect with the foot switch

WARNING

- **The Luer-lock can only be used to connect the pipe fitting. Never use the Luer-lock to connect other accessories.**

4.1.6.2 Connecting the Heating Insufflator Tube (only for HS-50F/HS-50H models)

1. Connect the sterilized pipe fitting to the sterilized Luer-lock. As shown in Figure 4-7.
2. Please install the filter between the insufflator tube and the insufflator's CO_2 gas injection interface. As shown in Figure 4-10.
3. Connect the installed pipe fitting to the CO_2 gas injection joint of the product. Guarantee that the interface is well inserted.
4. Connect the heating joint to the insufflator tube heating joint on the front panel of the product.

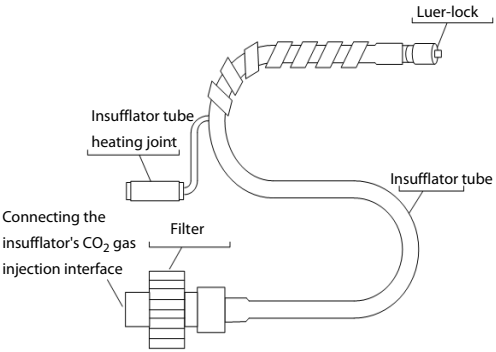


Figure 4-10 Installed heating insufflator pipe fitting (using filter)

4.1.7 Connecting the Suction Tube (only for HS-50F/HS-50V models)

1. Connect the Luer-lock, transparent hose, adapter tube, and slim tube. As shown in Figure 4-11.

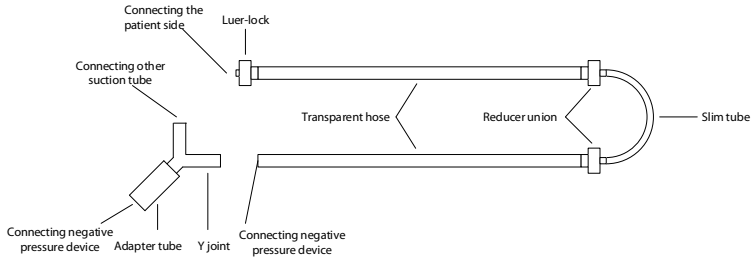


Figure 4-11 Installation of the suction pipe fitting

2. Connect the Luer-lock of the sterilized suction tube to the joint of the perforator near the part where smoke generates.

3. Clip the slim tube into the groove of the smoke exhaust control valve on the insufflator's front panel. To prevent the pipe fitting from collapsing, clip the middle of the Φ5 slim tube into the pinch valve and avoid twisting the suction tube. As shown in Figure 4-12.

4. Install the transparent hose into the suction bottle of the suction device. To connect multiple suction tubes in a negative-pressure suction device, connect the transparent hose and adapter tube to the Y joint as shown in Figure 4-11. (The adapter tube should be connected to the straight end of the Y joint.) In this way, the adapter tube can be connected to the negative-pressure suction device, and the other end of the Y joint can be connected to other suction tubes. See Figure 4-11.

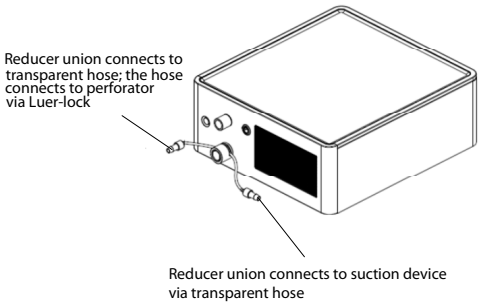


Figure 4-12 Connection diagram of the suction tube

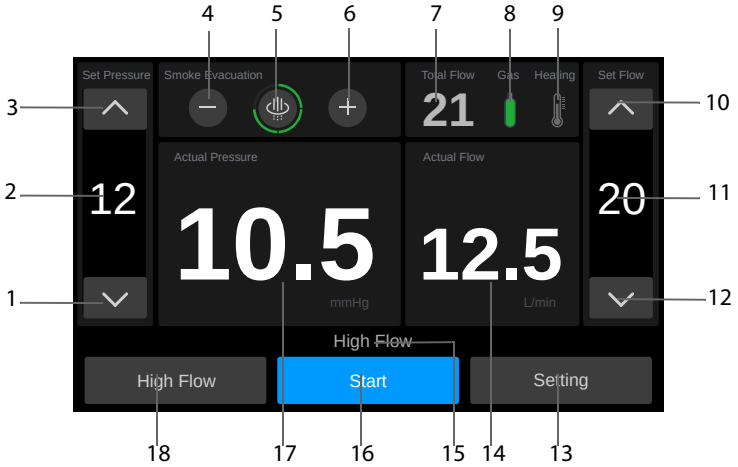
NOTE

- **It is suggested to adjust the pressure range of the suction device within 0.04MPa-0.06MPa. If the negative pressure is too high, the exhaust will be**

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 smoke exhausting rate
(5)	Smoke exhausting indicator
(6)	Increase smoke 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

Symptom	Possible cause	Solution
Prompt tone of insufficient gas supply rings continuously	Valve of the gas cylinder is closed.	Open the gas cylinder valve.
	Remaining gas in the gas cylinder is not enough.	Replace a new gas cylinder.
	The filter at the gas inlet is blocked.	Replace the filter at the gas inlet.
	The high pressure tube or medical gas pipeline hose is not connected.	Correctly connect the high pressure tube or medical gas pipeline hose.
	The pressure of CO_2 central gas source is too low.	Restore the CO_2 central gas supply.
Self-inspection failure	The internal system of the insufflator is faulty, and the screen prompts nothing listed above.	Turn off the insufflator and open it again. If prompt tone rings continuously, please contact Mindray.
LCD screen prompts gas temperature exceeds standard	The heating insufflator tube is faulty.	Disconnect the heating port of the heating insufflator tube immediately. And discard this heating insufflator tube after surgery.
LCD screen prompts other faults	Peripheral equipment is not connected properly, or there is fault inside the insufflator.	Resolve the faults according to the LCD screen prompts. If the issue can't be solved, turn off the insufflator and open it again. If prompt shows up continuously, please contact Mindray.

6.2 Common Prompts and Their Triggering Conditions

"Audio prompt" in the table below indicates times the buzzer rings;

"Text prompt" indicates text information shown on the display screen.

Text prompt	Triggering condition	Audio prompt
OverPressure	Pressure exceeds the set value, 5mmHg.	Yes
Gas Supply ?	Cylinder supply mode: Pressure is lower than 1MPa. Central gas supply: Pressure is lower than 0.1MPa.	Yes

HP100G/

HP200G/HP200L/HP200D

Fluid Management System

Operator's Manual

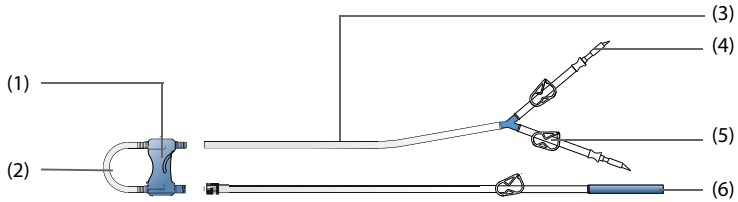
CE 1639

■ 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)

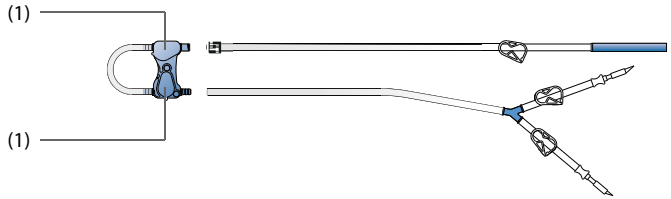
(4) Spike: connects the irrigation bag.

(5) Robert clamp

(6) Irrigation tubing (patient end):

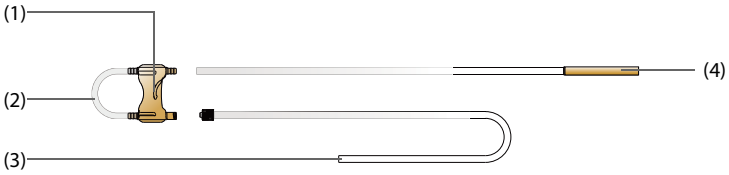
- in the hysteroscopic modes (for HP100G/HP200G/HP200D), connects to the inlets of the hysteroscope.
- in the laparoscopic modes (for HP200L/HP200D), connect based on the actual situation.

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):

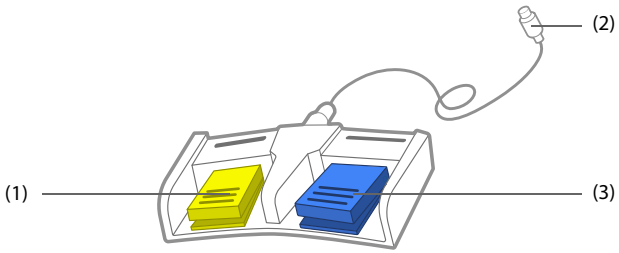
- in the hysteroscopic modes (for HP100G/HP200G/HP200D), connects to the fluid collector.
- in the laparoscopic modes (for HP200L/HP200D):
  - when directly using on target area: connects to the fluid collector.
  - when using with vacuum suction bottle: being left open to air.

(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



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

UP700/UP700B/UP700C/UP700D

Ultrasonic Surgical & Electrosurgical Energy Platform

Operator's Manual

CE 1639

- Release time: 2024-4
- Revision: 6.0
- Software Version: 02.xx.xx.xx

2.1.5 Contraindications

For the surgical treatment, the responsible physician of radio frequency or ultrasonic surgery must decide whether the prescribed application is admissible based on the general condition of the patient.

The instruments are not indicated for incising bone.

The instruments are not indicated for tubal coagulation.

2.2 Clinical Benefits

Compared with traditional surgical instruments, the product can reduce operation time and bleeding in clinical use.

2.3 Applied Part

The applied parts of the system are as follows:

- HF instruments
- Return electrode
- Jaws and shaft sleeve of the ultrasonic surgical instrument
- HF instrument cords and plugs
- HF instrument sockets on the generator and patient circuit

2.4 Function Differences Among Models

Generator Model		Activation Count			Monopolar Mode
		Ultrasonic Mode	Monopolar Mode	Bipolar Mode	
UP700 series	UP700	★	★	★	★
	UP700B	☆	★	★	★
	UP700C	★	☆	★	★
	UP700D	★	★	☆	★

NOTE

- **★ indicates "configured" while ☆ indicates "not configured".**

2.5 System Components

The system consists of the following components:

- A generator

- Surface of the equipment and peripheral devices have no signs of distortion, damage, or contamination.
- The coating of the blade is not peeled or damaged.
- The parts of surgical instruments that will be put inside the patient have no rough surface, sharp edges, or protrusions.
- No tissue residues are on the surgical instruments. All cords are intact and well routed.
- Connectors or plugs are not loose, distorted, damaged, contaminated, or blocked.
- All instruments and adapters are correctly connected and metal parts on connectors are not exposed
- No irrelevant objects are on top of the equipment and the ventilation outlet is not covered by dust or other objects
- No obstacles are in the movement range of the system or near the ventilation outlet.

CAUTION

- **If using instruments not specified by Mindray, check its compatibility and especially insulation performance. Make sure that the output voltage of the generator does not exceed the rated voltage of the instruments.**

4.4 Starting the System

Press the power switch on the front panel to turn on the generator. After startup, the power indicator changes from orange to green.

4.5 Check Before Operation

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

- During startup, a normal startup tone is heard.
- The system self check passes and no alarm is generated.
- After startup, the indicator lights and the color is correct.
- The touchscreen displays correctly.
- 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.

CAUTION

- **Do not put the system into 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 Using the Touchscreen

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

If all HF instruments and ultrasonic assembly are connected, the touchscreen display of the generator is as follows.

(1) Ultrasonic area: Power levels in this area is highlighted if the ultrasonic assembly is connected. For detailed description, refer to *4.7.3 Using Ultrasonic Assembly*.

(2) Bipolar area: Power levels and modes in this area is highlighted if the bipolar instrument is connected. For detailed description, refer to *4.9.1 Operation Area for Common Bipolar Instrument*.

6 Energy Output Modes of Generator

6.1 Overview

This chapter introduces all energy output modes of the generator, including applicability, output parameters, and characteristic diagrams of each mode. For the values stated in the diagrams:

- Maximum output voltage includes tolerances.
- Resistance measurement accuracy is within 2.5%.
- Output power is measured by using Mindray-specified instruments only.

6.2 Ultrasonic Modes

The ultrasonic assembly can be used in the MAX or MIN mode. Their applicability is as follows:

- The MIN mode is applicable to cutting and sealing of vessels up to and including 5 mm in diameter or of other soft tissue.
- The MAX mode is applicable to cutting of soft tissue when bleeding control and minimal thermal injury are needed.

After setting on the generator, you can use the following functions:

- Smart Tissue Sensing (STS): By using STS, the ultrasonic surgical instrument automatically senses changes in tissue status, and the generator adjusts energy output accordingly with sound feedback. Using this mode can improve cutting efficiency and reduce the thermal injured area, thereby making surgical procedure safer and more efficient.
- Enhanced Vessel Sealing (EVS): By using EVS, energy output is adjusted in real time based on advanced algorithms, and tissue status automatically sensed by the instrument. This can significantly enhance the sealing effect on vessels.

The EVS function is disabled by default. To use the function, switch it on. For detailed setting methods, refer to *4.7.4 Function Settings for Ultrasonic Assembly*.

6.2.1 Output Parameters of Ultrasonic Modes

Output parameters of the two modes on the generator are as follows.

Power	≥ 60 W (unless otherwise specified in the instrument's instructions for use)

Frequency	30 - 80 kHz (typical value: 55.5 kHz, unless otherwise specified in the instrument's instructions for use)

6.2.2 Selection of Ultrasonic Power Level

The power level of the MIN mode can be adjusted from 1 to 5 and the power level of the MAX mode is fixed to 5. You can select power levels by following suggestions below:

- For vascular tissue: As the power level increases, the cutting efficiency increases. The maximum power level is usually used to cut tissue containing small vessels. Cutting larger vessels by using the MIN mode is less efficient. However, considering the sealing effect and cutting time, you are advised to select the power level 3 to cut and seal vessels in normal cases. To seal large vessels, you can use the EVS function for optimal sealing even though the cutting efficiency is further reduced.
- For tissue such as muscle, liver, and mesentery: As the power level increases, the cutting efficiency increases. You are advised to select the power level 5 to cut for efficient surgical operation.

6.3 Monopolar Cutting Modes

The equipment provides two monopolar cutting modes: Pure Cut and Blend Cut. Their applicability is as follows:

- The Pure Cut mode is applicable to smooth and precise cutting of soft tissue with little or without hemostasis.
- The Blend Cut mode is applicable to slow and dry cutting of soft tissue with significant hemostasis.

NOTE

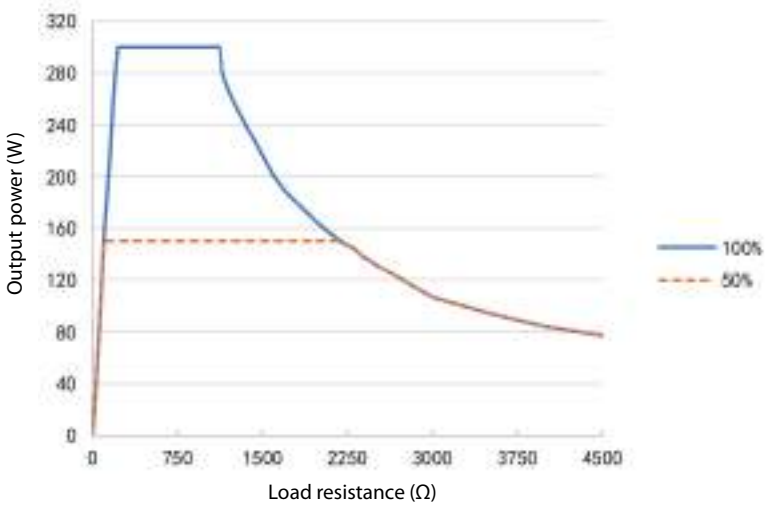
- **Any associated equipment and active accessories used in the Blend Cut mode must be rated to withstand the combination of actual voltage and crest factor.**

6.3.1 Technical Parameters of Monopolar Cutting Modes

Parameter	Pure Cut	Blend Cut
Operating frequency	434 kHz ± 10%	434 kHz ± 10%
Modulation frequency	/	27.7 kHz ± 10%
Duty cycle	100%	50% ± 10%
Rated load	300 Ω	300 Ω
Rated power	300 W ± 15%	200 W ± 15%
Maximum output voltage	1287 V_p	2178 V_p

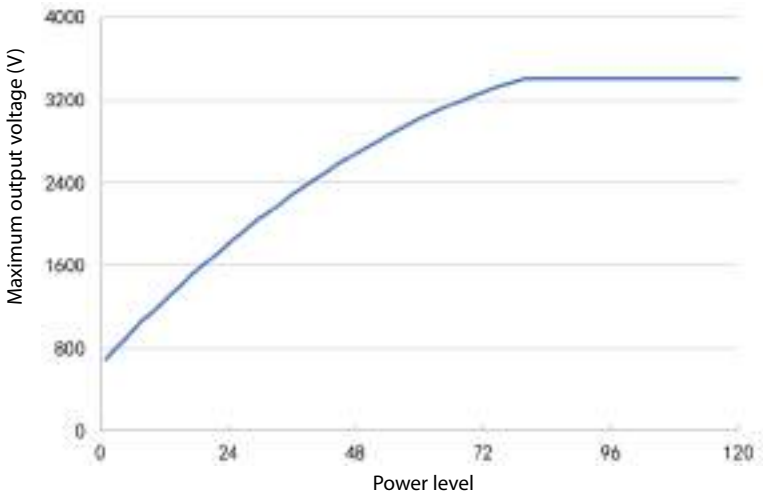
Parameter	Pure Cut	Blend Cut
Maximum output current	1.32A	1.05A
Crest factor (rated load)	1.5 ± 0.3	2.3 ± 0.3
Power ranges and step	--; 1 - 40 W (step: 1 W); 40 - 100 W (step: 5 W); 100 - 300 W (step: 10 W)	--; 1 - 40 W (step: 1 W); 40 - 100 W (step: 5 W); 100 - 200 W (step: 10 W)

6.3.2 Characteristic Diagrams of Pure Cut Mode



6.4.1 Technical Parameters of Monopolar Coagulation Modes

Parameter	Soft Coag	Fulgurate Coag	Spray Coag
Operating frequency	434 kHz ± 10%	434 kHz ± 10%	434 kHz ± 10%
Modulation frequency	/	27.7 kHz ± 10%	21.1 kHz ± 10%
Duty cycle	100%	6.25% ± 10%	4.76% ± 10%
Rated load	100 Ω	500 Ω	500 Ω
Rated power	120 W ± 15%	120 W ± 15%	120 W ± 15%
Maximum output voltage	264 V_p	3448 V_p	3932 V_p
Maximum output current	1.71A	1.05A	1.05A
Crest factor (rated load)	1.5 ± 0.3	5.3 ± 0.3	6.1 ± 0.3
Power ranges and step	--; 1 - 40 W (step: 1 W); 40 - 100 W (step: 5 W); 100 - 120 W (step: 10 W)	--; 1 - 40 W (step: 1 W); 40 - 100 W (step: 5 W); 100 - 120 W (step: 10 W)	--; 1 - 40 W (step: 1 W); 40 - 100 W (step: 5 W); 100 - 120 W (step: 10 W)



6.5 Bipolar Coagulation Modes

The generator provides four bipolar coagulation modes: Precise Coag, Standard Coag, Macro Coag, and Bipolar Soft Coag. The applicability is as follows:

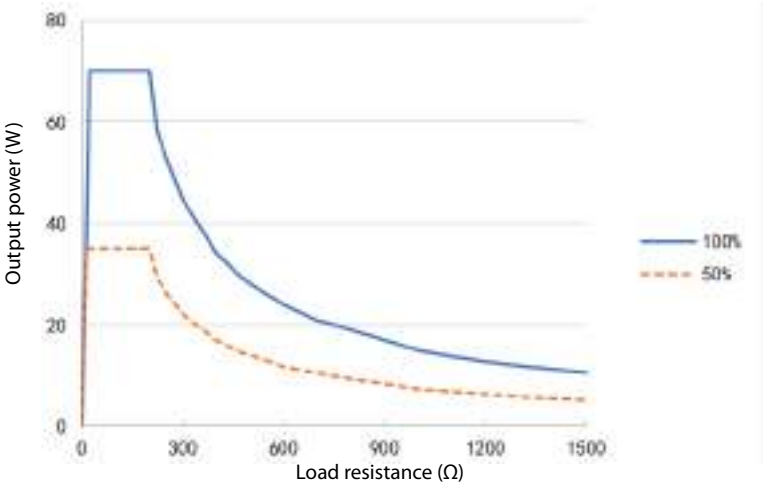
- The Precise Coag mode is applicable to low-voltage and fine coagulation of tissue. Using this mode prevents the generation of sparks and eschars and precisely controls the coagulation effect.
- The Standard Coag mode is applicable to most low-voltage bipolar coagulation of tissue. Using this mode prevents the generation of sparks and eschars and achieves consistent coagulation effect.
- The Macro Coag mode is applicable to bipolar cutting and rapid coagulation. Compared with other bipolar modes, Macro Coag delivers higher voltage and greater power.
- The Bipolar Soft Coag mode is applicable to slow and deep bipolar coagulation with no sparks. Using this mode causes practically no tissue carbonization or adhesions.

6.5.1 Technical Parameters of Bipolar Coagulation Modes

Parameter	Precise Coag	Standard Coag	Macro Coag	Bipolar Soft Coag
Operating frequency	434 kHz ± 10%	434 kHz ± 10%	434 kHz ± 10%	350 kHz ± 10%

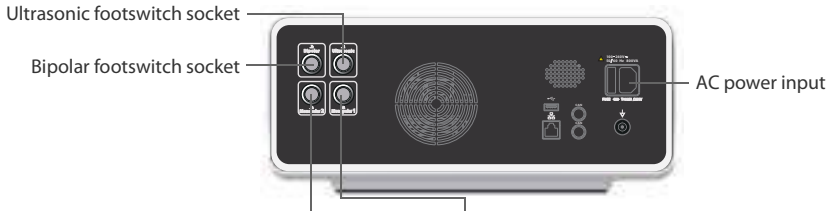
Parameter	Precise Coag	Standard Coag	Macro Coag	Bipolar Soft Coag
Duty cycle	100%	100%	100%	100%
Rated load	100 Ω	100 Ω	100 Ω	50 Ω
Rated power	70 W ± 15%	70 W ± 15%	70 W ± 15%	70 W ± 15%
Maximum output voltage	284 V_p	415 V_p	530 V_p	150 V_p
Maximum output current	1.98A	1.98A	1.87A	2.2A
Crest factor (rated load)	1.6 ± 0.3	1.6 ± 0.3	1.8 ± 0.3	1.48 ± 0.3
Power ranges and step	--; 1 - 40 W (step: 1 W); 40 - 70 W (step: 5W)	--; 1 - 40 W (step: 1 W); 40 - 70 W (step: 5W)	--; 1 - 40 W (step: 1 W); 40 - 70 W (step: 5W)	--; 1 - 10 W (step: 1 W); 10 - 70 W (step: 2W)

6.5.2 Characteristic Diagrams of Precise Coag



UP700 Series Generator Quick Start Guide

Product Overview



Note: Multiple instruments can be connected to the generator at the same time, but they cannot be activated simultaneously.

Using the Touchscreen

Using the EVS Function

When using an ultrasonic assembly, you can switch between the EVS function and the MIN mode in the ultrasonic area. **EVS(Enhanced Vessel Sealing)** is switched on by default.

Press the MIN button on the ultrasonic surgical instrument or press the left pedal of footswitch to activate the EVS function.

Enabling Neonatal Return Electrode Monitoring

When using a monopolar instrument, you can switch on **Neonatal Return Electrode Monitoring** in the setup menu.

Then the neonate symbol is displayed in the monopolar area, indicating that the return electrode monitoring for neonate is enabled.

Setting Procedure

Select the Procedure button on the touchscreen to display the **Select Procedure** page.

On the **Select Procedure** page, you can either add a Procedure, or edit or select a saved one.

A maximum of 500 Procedures can be added.

Setting Seal 7 Mode

Connect the electrode surgical instrument for Seal 7 to the generator. The generator automatically identifies the instrument and enter the Seal 7 mode.

The prompt tone will change when the sealing is finished.

Troubleshooting

Symptom	Attemptable Solution
There is no energy output when the instrument is activated.	Set the power level and reactivate the instrument.
	Properly connect the instrument to the generator. Make sure that the relevant instrument tests have been performed according to the on screen prompts.
When the generator is activated, the operation of other devices is interfered.	Keep the generator and cords connected to the generator away from other electronic devices.

Note: If the problem persists, remove the system from use immediately. Contact your service personnel.

Recommended Power Levels

GI Surgery  Monopolar: Blend 40W Monopolar: Fulgurate 40W	**Hepatobiliary Surgery**  Monopolar: Blend 40W Monopolar: Fulgurate 40W Monopolar: Spray 80W (Optional) Bipolar: Standard 50W	**Gynecological Surgery**  Monopolar: Blend 40W Monopolar: Fulgurate 40W Bipolar: Standard 50W	**Thyroid Surgery**  Monopolar: Blend 30W Monopolar: Fulgurate 30W Bipolar: Precise 10W
Breast Surgery  Monopolar: Blend 40W Monopolar: Fulgurate 40W	**Esophageal and Lung Surgery**  Monopolar: Blend 30W Monopolar: Fulgurate 35W	**Spine Surgery**  Monopolar: Blend 40W Monopolar: Fulgurate 40W Bipolar: Standard 12W	**Brain Surgery**  Monopolar: Pure 30W Bipolar: Precise 8W
Arthroscopic Surgery  Monopolar: Blend 25W Monopolar: Fulgurate 25W	**ENT Surgery** 	**Cardiothoracic Surgery** 	
Ophthalmic Surgery  Bipolar: Precise 2W	**ENT (Needle Electrode)** Monopolar: Fulgurate 15W **ENT (Blade Electrode)** Monopolar: Fulgurate 30W	**Cardiothoracic (Heart Surface)** Monopolar: Fulgurate 10W **Cardiothoracic (Vessels)** Monopolar: Blend 30W Monopolar: Fulgurate 25W	**Cardiothoracic (Coronary Artery Bypass)** Monopolar: Fulgurate 20W **Cardiothoracic (Sternum)** Monopolar: Spray 75W

Note: The listed recommended power levels were derived from clinical feedback for reference only. The actual power level applied may vary significantly due to the surgery situation, patient differences, or electrode type. You are advised start with a low power level and increase it cautiously for optimal effect.

To obtain more maintenance information:

046-025723-00(1.0)

www.mindray.com

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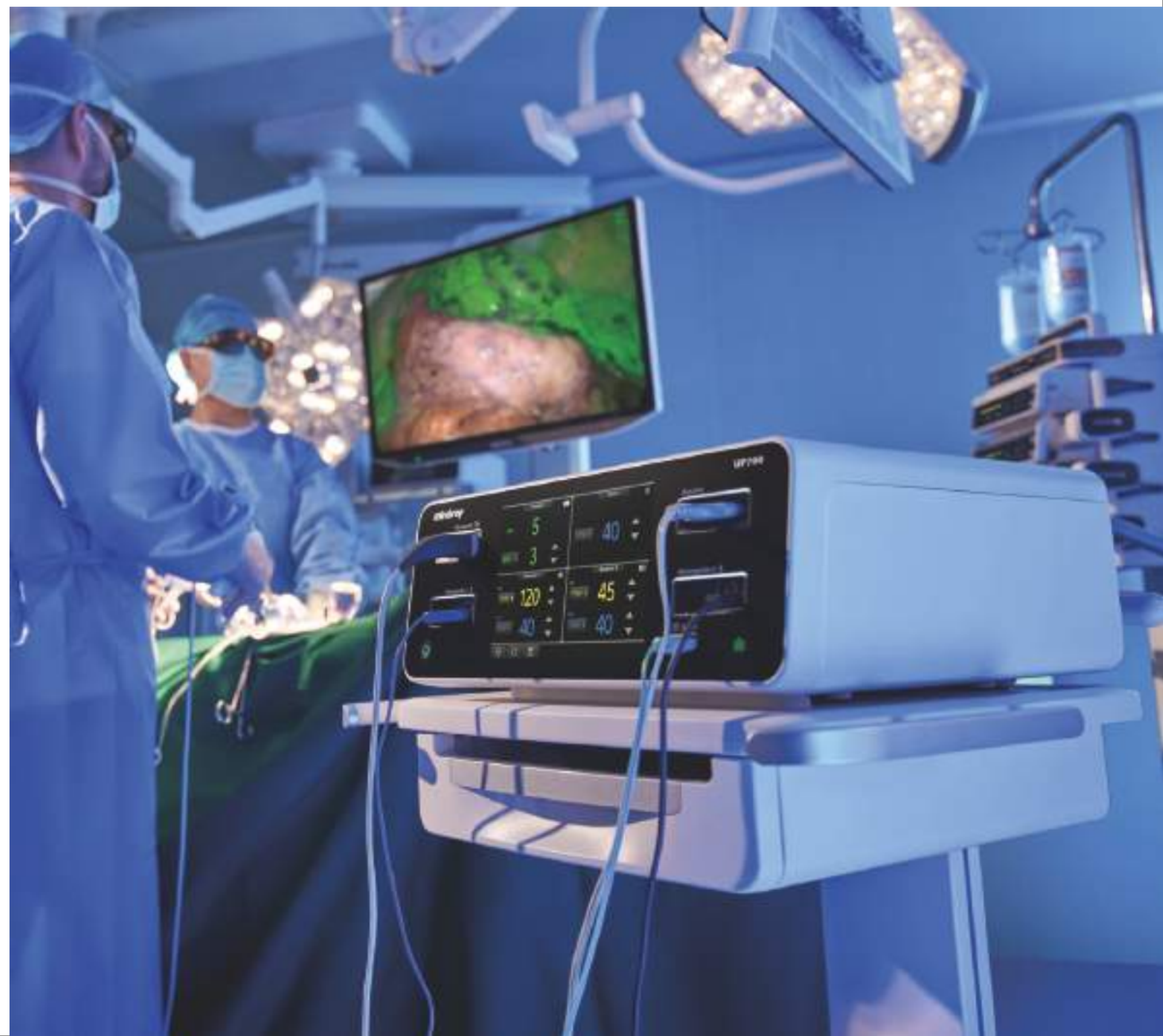
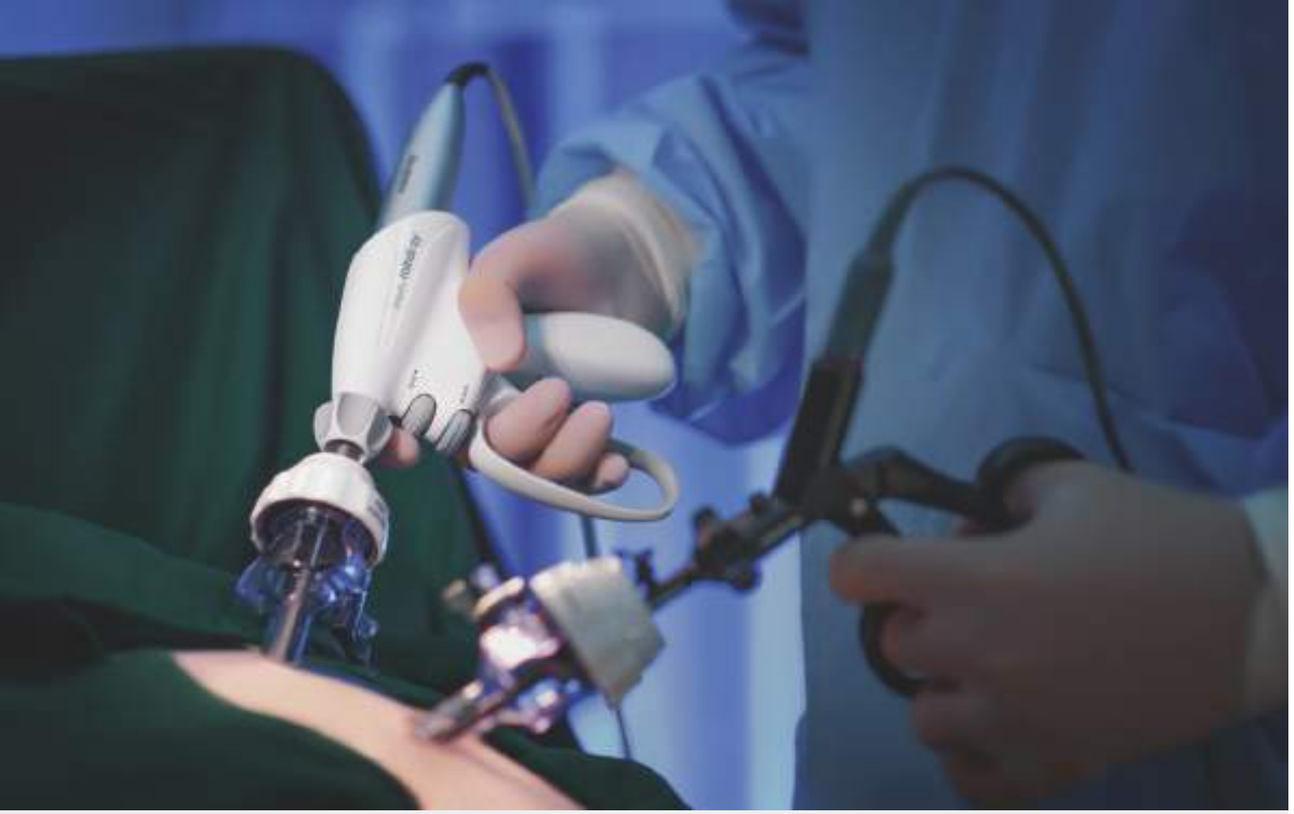
Higher Precision, Easier Operation





Energy devices are an integral part of surgery.
How can they provide added value to surgeons and patients?

Tapping into the needs of healthcare, focusing on clinical pain points, and breaking through technology blockades to create Advanced compact, Advanced accurate and Advanced precise surgical equipment.

Advanced Compact

Integrated ultrasonic surgical and HF instruments free up more space in the OR and require less maintenance

One generator for multiple energy devices

Mode switching and power level adjustment in one simple tap

Flat Menu Design

4-Quadrant Interactive UI

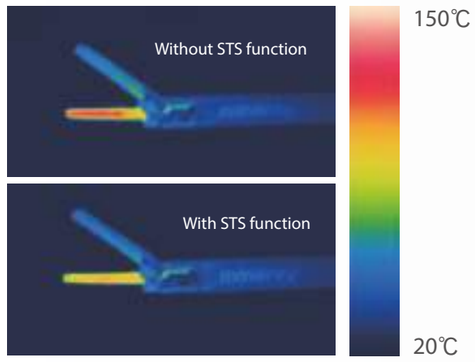
Simplified and Intuitive

Advanced Accurate

Ultrasonic Module

STS™ (Smart Tissue Sensing)

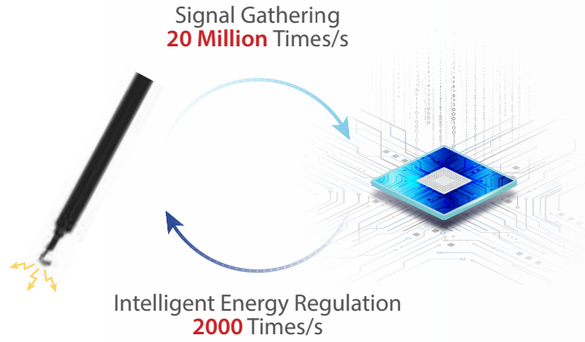
Comparison of Heat Maps of Forceps
(1 second after disconnection)



Automatic reduction of output power after tissue disconnection means less risk of accidental scalding from ultrasonic surgical instrument.

HF Electrosurgical Module

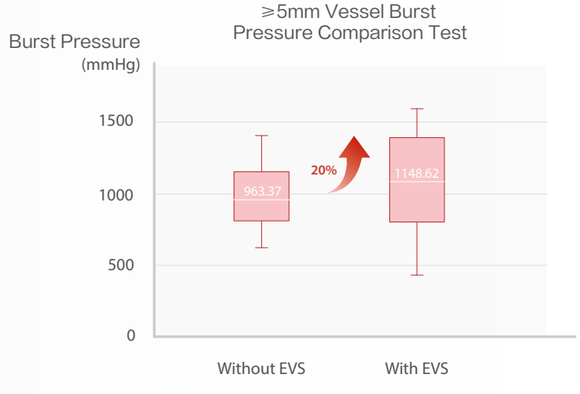
Precise Energy Control Algorithm



Real-time precise energy regulation based on tissue characteristics ensures smooth cutting of different tissues with HF instrument.

EVS™ (Enhanced Vessel Sealing)

Precise output of energy based on the status of the blood vessel, providing firmer and safer 5mm vessel sealing.



Extraordinary Energy Compensation Algorithm

By compensating for transmission loss, the advanced algorithm ensures consistent energy delivery to tissues aligned with your settings, to eliminate attenuation over time.

Advanced Precise

Thin and narrow design more for greater manoeuvrability in tight spaces

20% Thinner
Compared to Original Design

20% Narrower
Compared to Original Design

Rounded edges and corners to avoid scratching the blood vessels. All-round coating to reduce adhesion and wiping during surgery.

Anti-Adhesion Coating

Anti-Scratch Blade Tip

Energy Platform Generator

Different combinations of functions for specific clinical scenarios

UP700

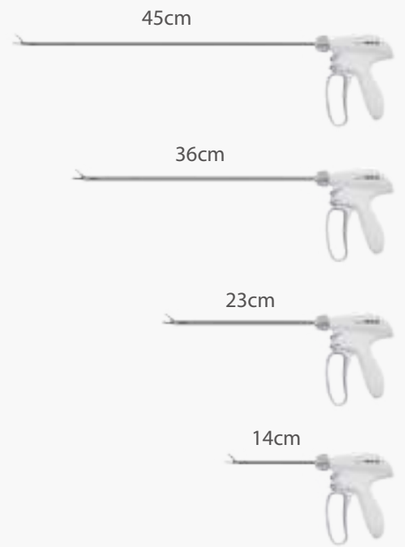
Ultrasonic + Bipolar + Monopolar

UP510

Ultrasonic + Bipolar

Ultrasonic Surgical Instrument

Different lengths for various types of surgery



Trolley

Fixed position structure for generator and self-locking wheel design

Transducer

Supports 100 operations

TD55/TD55T Transducer

User Guide

046-029460-00(1.0)

Company Contact

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Scan the QR code or visit the website below to see multilingual manuals:

https://www.mindray.com/en/resources-center/energy-platform-manual

Note: You can contact Mindray Customer Service Department or sales representative to obtain the multilingual manuals in paper form.

Statement

The user guide is not intended as a replacement of the Operator's Manual. Prior to operating the equipment, read the Operator's Manual of Ultrasonic Surgical & Electrosurgical Energy Platform carefully and follow the instructions to ensure the safety of the operator, patient and equipment.

The issue date of this user guide is 2024-4.

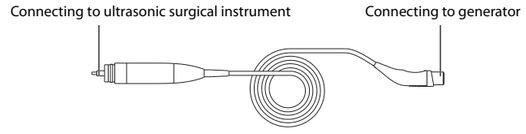
1.1 Safety

CAUTION

- **Temperature of the transducer may increase after activation of the ultrasonic assembly. When feeling uncomfortable due to high temperature, stop using the device immediately and ensure adequate cooling to avoid burns.**
- **Do not tap or drop the transducer while in use, as this may damage the instrument.**
- **This device must be operated by skilled/trained clinical professionals.**
- **Use an ultrasonic surgical instrument specified by Mindray. Using other accessories may cause damage to the system, patient injury, or failure to meet the claimed specifications.**
- **Before the surgery, prepare backup device to avoid surgery interruption due to possible system failure.**
- **At the end of its service life, the device must be disposed of in compliance with the local or hospital's guidelines regulating the disposal of such products, to avoid contaminating or infecting the environment, other persons, or device.**

1.2 Product Introduction

Transducer is an accessory of the Ultrasonic Surgical & Electrosurgical Energy Platform. A transducer is intended to be assembled with an ultrasonic surgical instrument, forming an ultrasonic assembly. For how to assemble and disassemble the ultrasonic assembly, refer to the operator's manual of the ultrasonic surgical instrument.



1.2.1 Operating Logic

The transducer can be used for 100 times. No matter how long the operation time is or how many times the ultrasonic assembly is activated during a surgery, the remaining available times of the transducer is reduced only by one time. That is, a new transducer can support 100 surgeries.

1.3 Routine Maintenance

The transducer is reusable. After the transducer is connected to the generator, you can check the remaining available times of the transducer on the generator.

The transducer is not intended to come into contact with the patient. Thus, it is not disinfected before leaving the factory. Clean, disinfect, and sterilize the device before the first use and after each use.

1.3.1 Cleaning the Transducer

After surgery, remove the transducer and clean it immediately to avoid blood clotting on the transducer.

To clean the transducer, follow this procedure:

1. Clean the surface of the device with a mild cleanser. For detailed operation instructions, refer to the instructions for use of the cleanser.
2. Remove the cleanser residue from the surface and dry the device.

Below is cleansers of which the efficacy has been tested:

- Water
- Ethanol, 75%
- 3M Biofilm Removal Multi-Enzyme Cleaner

1.3.2 Disinfecting the Transducer

Disinfect the device as required in the local or your hospital's servicing schedule. Clean the device before disinfection. Dilute and 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:

Product Name	Manufacturer
CIDEX® OPA	Gilag GmbH International Advanced Sterilization products
HEALTH ESSENCE Disinfecting Effervescent Tablets	Beijing ChangJiangMai Medical Science Technology Co. Ltd.
HEALTH ESSENCE Surface Disinfectant	Beijing ChangJiangMai Medical Science Technology Co. Ltd.
Health Essence Bis-QACs Disinfectant	Beijing ChangJiangMai Medical Science Technology Co. Ltd.
Dian'erkang Surface Wipes	Shanghai Likang Disinfectant Hi-Tech Co., Ltd
Dian'erkang Surface Disinfectant	Shanghai Likang Disinfectant Hi-Tech Co., Ltd
Ethanol, 75%	/
Gigasept® AF forte	Schülke & Mayr GmbH
Gigasept® FF(New)	Schülke & Mayr GmbH
Gigasept® Instru AF	Schülke & Mayr GmbH
Gigasept® PAA concentrate	Schülke & Mayr GmbH
Gigasept® pearls	Schülke & Mayr GmbH

1.3.3 Sterilizing the Transducer

Sterilize the transducer as required in the local or your hospital's servicing schedule. The transducer can be sterilized by ethylene oxide (EO) or autoclave sterilization.

NOTE

- **Use one of the recommended methods consistently on the same equipment. Using different sterilization methods may decline equipment performance.**
- **The product is very sensitive to impacts at high temperature. Therefore, avoid impacting and vibrating the product at high temperatures.**
- **Perform sterilization in accordance with the methods described in this chapter. Otherwise, the sterilization may fail.**

1.3.3.1 EO Sterilization

Before sterilization, place the transducer in a proper container and double wrap the container with sterile sheet or any other sterile packing materials, preventing equipment contamination during storage and transportation.

You are advised to use the following validated EO sterilization parameters:

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

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

1.3.3.2 Autoclave Sterilization

Before sterilization, place the equipment in a proper container and double wrap the container with sterile sheet or any other sterile packing materials, preventing equipment contamination during storage and transportation.

For autoclave sterilization, refer to the operating instructions of the corresponding sterilizer.

Autoclave sterilization parameters are as follows:

Device	Temperature	Sterilization Time
Pre-vacuum	134°C	4 min

1.3.4 Consequences Caused by Inappropriate Cleaning, Disinfection and Sterilization

Using detergents or methods other than those recommended might cause the following consequences:

- Color change on the surface of the device
- Corrosion of metal parts
- Cracks or distortion of cords, connectors and the housing of the device
- Reduced service life of cords
- Equipment malfunction

Foto POM-36


Model: POM-36
P/N (1PCS)
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x5
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