

Datasheet of Reusable Laparoscopic Instrument Kit



	(three-blade and five-blade forceps)		Connecting Rod	Available for Component Code:221-05923	06Cr19Ni10	YY/T 0294.1-2016
				Available for Component Code:221-55923	20Cr13	YY/T 0294.1-2016
10	ENDO- Retractor	Rod			06Cr19Ni10	YY/T 0294.1-2016
		Retractor Head			20Cr13	YY/T 0294.1-2016
		Rod			20Cr13	YY/T 0294.1-2016
11	Myoma Drill	Drill Bit			20Cr13	YY/T 0294.1-2016
		Rod			06Cr19Ni10	YY/T 0294.1-2016
12	Veress Needle	Inner Tube			06Cr19Ni10	YY/T 0294.1-2016
		Outer Tube			06Cr19Ni10	YY/T 0294.1-2016
13	Knot Pusher	Jaw			06Cr19Ni10	YY/T 0294.1-2016
		Rod			06Cr19Ni10	YY/T 0294.1-2016

Table 1: Material Compositions of Corresponding Grades listed in DIN17660 and DIN17663 Standards

Material Grade	Chemical Composition Mass Fraction (%)									
		Cu	Pb	Zn	Al	Fe	Ni	Sn	Mn	Total Impurities
CuZn39Pb3	Min	57.0	2.5	Margin	-	-	-	-	-	-
	Max	59.0	3.5		0.1	0.5	0.5	0.4	-	0.2
CuNi7Zn39Mn5Pb3	Min	44.0	2.0	Margin	-	-	6.0	-	4.0	-
	Max	48.0	4.0		0.3	8.0	-	6.0	0.4	

3. Diagram of Patient-contacted Parts of the Instruments

The patient-contacted parts of the instruments are highlighted with the dotted lines below, with the corresponding structures and materials shown as follows:

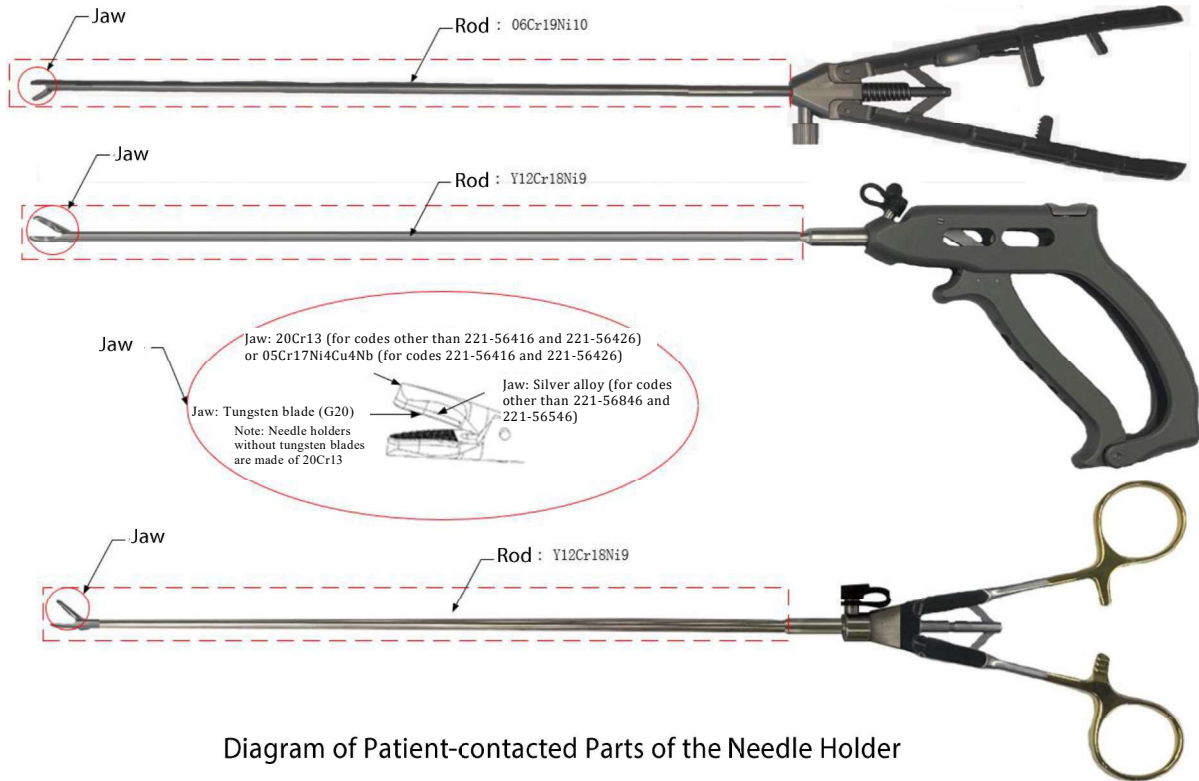


Diagram of Patient-contacted Parts of the Needle Holder

Diagram of Patient-contacted Parts of the Puncture Injection Needle

Titanium Clips



Titanium Clips & Clip Appliers

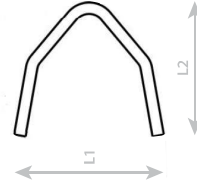
Product	Description	Code	Dimension
	Small Titanium Clip	191-00016	1#
	Endo Applier for Small Titanium Clip, Single action	221-55116	φ5X330

Product	Description	Code	Dimension
	Medium Titanium Clip	191-00026	2#
	Endo Applier for Medium Titanium Clip, Single action	221-05126	φ10X330

Product	Description	Code	Dimension
	Medium Large Titanium Clip	191-00036	3#
	Endo Applier for Medium Large Titanium Clip, Single action	221-05136	φ10X330

Product	Description	Code	Dimension
	Large Titanium Clip	191-00046	4#
	Endo Applier for Large Titanium Clip, Single action	221-05146	φ10X330

Dimension	L1	L2	Max. Ligation length	Pack Qty
1#	6mm	2mm	3.4mm	36cartridges/box; 9bxs/case
2#	9mm	2.5mm	5mm	36cartridges/box; 9bxs/case
3#	14.5mm	5mm	8.7mm	20cartridges/box; 9bxs/case
4#	18mm	8.3mm	11.9mm	20cartridges/box; 9bxs/case



User Manual (用户手册)

S5580P

55" 4K Surgical Medical Display

55" 4K 手术医用显示器

6 Technical specification

Monitor characteristics:	
Panel	55", TFT, color, LCD panel, anti-glare, hard coating
Active area (H x V)	1209.6±0.1 (H) x 680.4±0.1 (V) mm
Pixel pitch	0.315(H) x 0.315(V) mm
Resolution	3840 x 2160
Refresh rate	60 Hz
Color depth	10 bit
Contrast ratio (Typ. of panel)	1450:1
Viewing angle (CR > 10)	Horizontal: 178°
	Vertical: 178°
Luminance (Typ. of panel)	700cd/m ²
Backlight Type	WLED
Lifetime of backlight (Min.)	50000 hours
Response time (Typ.)	Ton:10ms, Toff:8ms
Power supply:	
Line voltage	AC100~240V
Current consumption	3.5 ~ 1.5 A
Power consumption (Max.)	<260W
Power consumption (Standby)	< 30W
Control and connection:	
Front	Power indicator Touch keypad
Bottom right	Control key
Back	DVI-IN *1/OUT *1 12G-SDI IN *1/OUT *1 3G-SDI IN *1/OUT *1 HDMI *1 RS232 *1 Ground stud*1 AC socket*1 Power switch*1
Mechanical characteristics:	
Housing components	metal
Ventilation openings	Natural heat dissipation
Protection level	Front IP45, Back IP20

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

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

Mobile Trolley

Operator's Manual



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- Release time: 2023-5
- Revision: 1.0















disposal of such products, to avoid contaminating or infecting the environment, other persons, or equipment.








1.1.3 Notes

NOTE

- **Keep this manual in the vicinity of the equipment so that it can be obtained conveniently when needed.**
 - **The mobile trolley with isolation transformer uses a mains plug as isolation means to the mains power. Locate the equipment in a place that is convenient to operate the mains plug.**
 - **This manual describes all features and options. Your equipment may not have all of them.**
-

1.2 Equipment Symbols

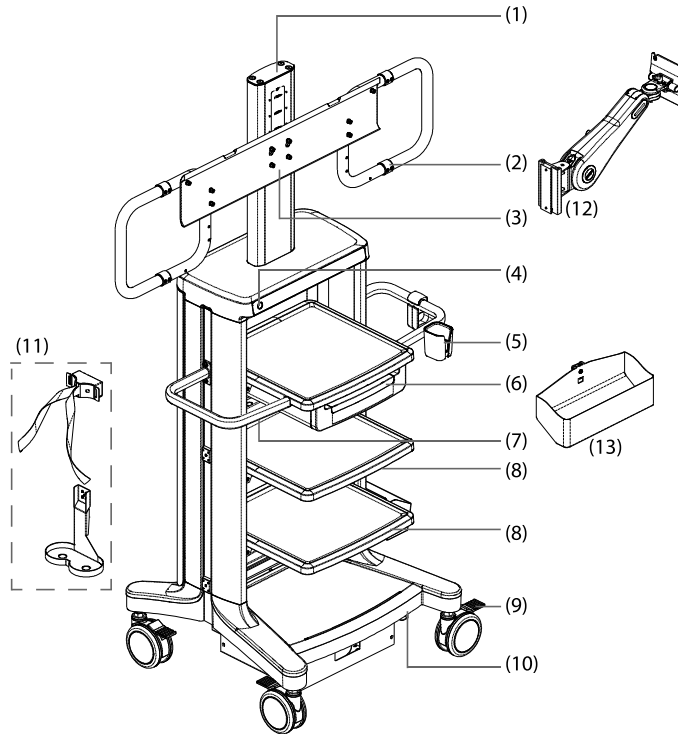
Symbol	Description	Symbol	Description
	Serial number		Equipotentiality
	Date of manufacture		Manufacturer
	Input		Output
	Heavy unit		Breaker
	Remote switch		Not exceeding
	Humidity limitation		Atmospheric pressure limitation
	Temperature limit		Unique device identifier

Symbol	Description	Symbol	Description
 (Blue)	Refer to instruction manual/ booklet		Dispose of in accordance to your country's requirements
	Authorized representative in the European Community		Medical Device
	Environmentally-friendly use periods of electronic products (20 years)		Warning
	The product bears CE mark indicating its conformity with the provisions of the REGULATION (EU) 2017/745 on medical devices and fulfills the general safety and performance requirements of Annex I of this regulation.		

NOTE

- **Some symbols listed above may not appear on your equipment.**

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.

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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.



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
RetroPeritoneum	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

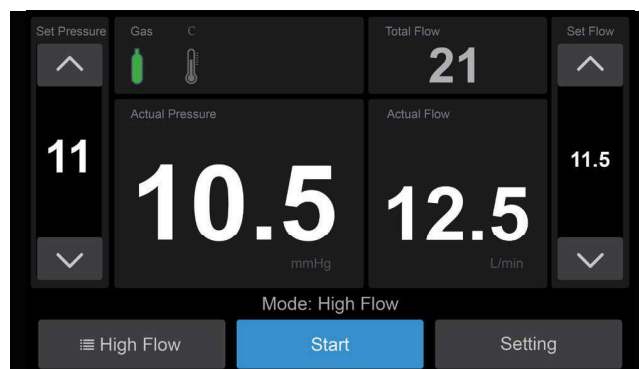
If there is too much smoke in the abdominal cavity during the surgery, the foot switch can be treaded to exhaust smoke quickly to ensure a clear surgical field.

www.mindray.com

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

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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

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healthcare within reach

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

Insufflator

Operator's Manual



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insufflator and the CO₂ gas cylinder are connected correctly shall the gas supply valve be opened. If the valve is opened before correct connection, the liquid CO₂ may flow into the insufflator, causing related pipelines frozen and thus affecting the normal injection of CO₂ gas; or the CO₂ gas may leak into the air.

- 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 CO₂ gas.
- Mindray bears no responsibility for injury or damages caused by improper connection of the gas cylinder.
- If obvious gas leak inside the insufflator is found, stop using immediately and contact Mindray.
- The maximum input gas pressure supported by this device shall not exceed 16MPa, otherwise the device might not work normally

CAUTION

- When connecting American-standard, British-standard, or German-standard gas cylinder, check whether the seal rings at joints of the reducing valve or high pressure tube are in good condition. In case of any loss or deformation, replace the seal rings.
- If CO₂ cylinder and the regulator are used, CO₂ supply pressure greater than 0.5 Mpa is recommended. For more information, refer to the instructions for use delivered with the cylinder regulator.

4.1.2.1 Using Reducing Valve and Its Connecting Tube to Connect Steel Cylinder

1. Connect the connecting tube of reducing valve and the adaptive end of the insufflator with the CO₂ gas inlet of the insufflator. Use a force of about 11.8N.m (1.2kgf.m) to fasten it. As shown in Figure 4-1.

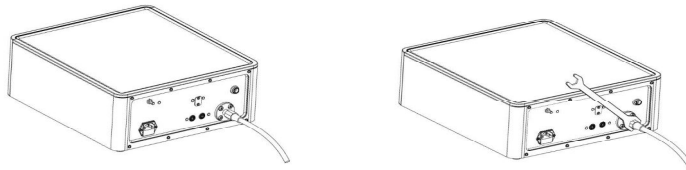


Figure 4-1 Connect the connecting tube of reducing valve and fasten it

2. Connect the steel cylinder joint of the reducing valve to the gas outlet of the steel cylinder. Use a force of about 29.4N.m (3kgf.m) to fasten it. As shown in Figure 4-2.

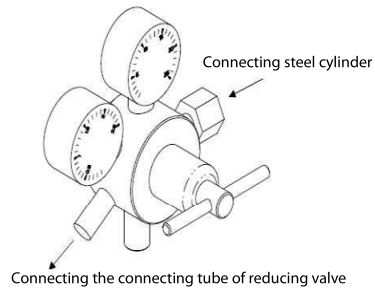


Figure 4-2 Connection of the reducing valve

3. Connect the connecting tube of reducing valve to the low pressure end of the reducing valve.
4. Confirm that the insufflator and the CO₂ 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.

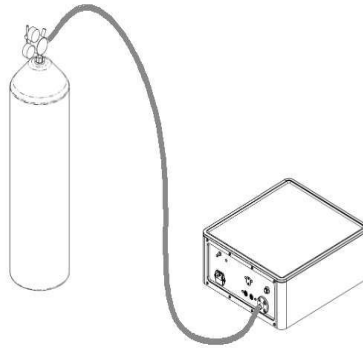


Figure 4-3 The insufflator connects with steel cylinder via the reducing valve

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 CO₂ 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 CO₂ 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 CO₂ gas cylinder are connected correctly, and slowly open the gas cylinder valve.

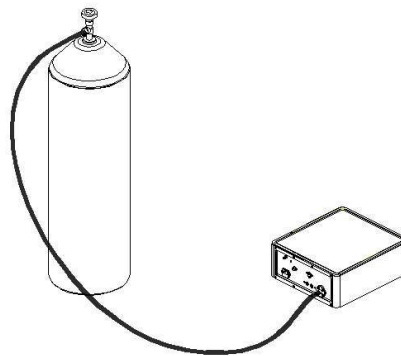


Figure 4-4 The insufflator directly connects with the CO₂ steel cylinder

4.1.3 Connecting the Central Gas Supply Pipe Joint

DANGER

- Using non-medical CO₂ 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 CO₂ 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 CO₂ gas.

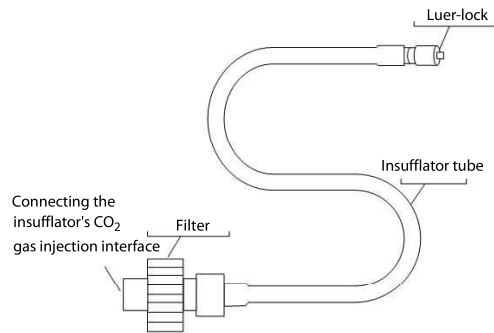


Figure 4-7 Installed insufflator pipe fitting (using filter)

3. Connect the installed pipe fitting to the CO₂ gas injection joint of the product. Guarantee that the interface is well inserted. As shown in Figure 4-8.

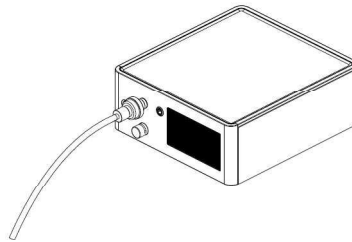


Figure 4-8 The insufflator pipe fitting connects with the insufflator (using filter)

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 4-6.
2. Please install the filter between the insufflator tube and the insufflator's CO₂ gas injection interface. As shown in Figure 4-9.

3. Connect the installed pipe fitting to the CO₂ 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.

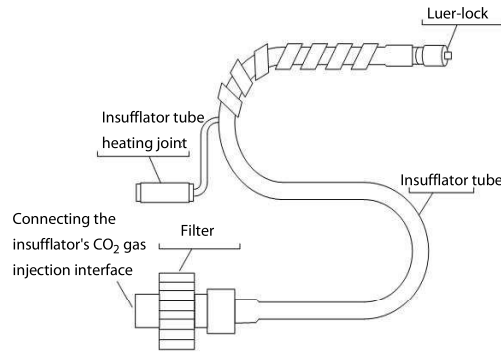


Figure 4-9 Installed heating insufflator pipe fitting (using filter)

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

1. Connect the Luer-lock, transparent hose, adapter tube, and slime tube. As shown in Figure 4-10.

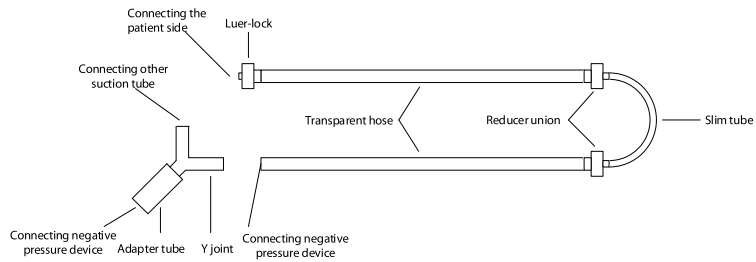


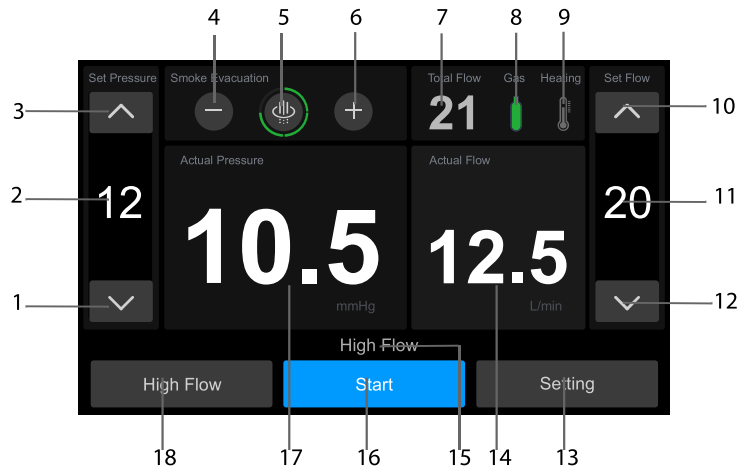
Figure 4-10 Installation of the suction pipe fitting

2. Connect the Luer-lock of the sterilized suction tube to the joint of the perforator near the part where smog generates.
3. Clip the slim tube into the groove of the smog exhaust control valve on the insufflator's front panel. To prevent the pipe fitting from collapsing, clip the middle of the $\Phi 5$ slim tube into the pinch valve and avoid twisting the suction tube. As shown in Figure 4-11.

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

6 Troubleshooting

WARNING

- If the insufflator has any obvious damages and cannot work properly, or any abnormal states are found during the self-test, please do not use it; and contact Mindray.
 - Some problems that are not related with the product malfunction can be resolved by consulting *6.1 Fault Analysis and Clearing*. After troubleshooting according to the stated solution, if the problem still persists, please stop using this device, and send it back to Mindray for repair.
 - In order to prevent cross infection and ensure the internal parts of the insufflator work properly, once the liquid flows into the gas inlet of the insufflator, the startup self-inspection will fail. The insufflator needs to be sent back to Mindray for repair.
-

NOTE

- Mindray is not responsible for repairing accessories. If any accessory is damaged, please contact Mindray to purchase a new one.
-

6.1 Fault Analysis and Clearing

For common minor faults and solutions for the equipment, the operator can troubleshoot them or contact the maintenance staff designated by Mindray.

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



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2.7 Applied Part

The applied part of the system is the endoscope that connect with the system.

2.8 Function Differences Among Models

Models	Hysteroscopic Modes	Laparoscopic Modes	Roller Quantity
HP100G	√	×	1
HP200G	√	×	2
HP200L	×	√	2
HP200D	√	√	2

NOTE

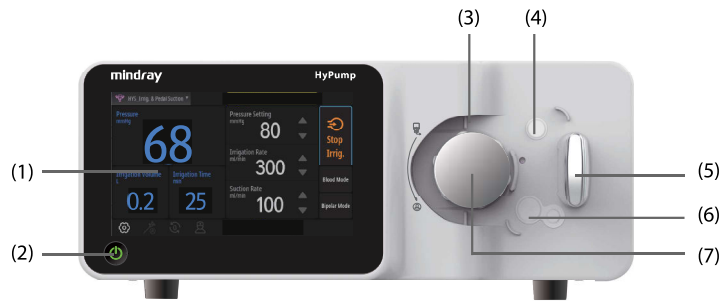
- “√” indicates “configured” while “×” indicates “not configured”.

2.9 System Components

This product consists of a main unit and power cords. A reusable irrigation tubing set, a reusable suction tubing set, and a foot switch are provided as well.

2.9.1 Front View of the Main Unit

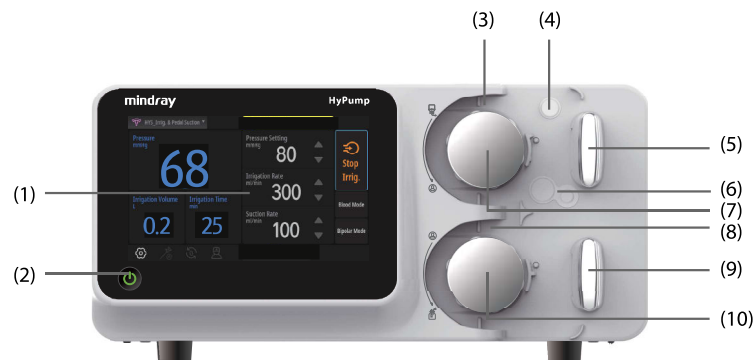
- The front view of HP100G is as follows:



- (1) Touchscreen: displays equipment status and changes settings.

- (2) Power switch: turns on or off the main unit.
The switch also has an embedded light that indicates the power status of the main unit:
 - Off: AC power is not connected.
 - Orange: AC power is connected, but main unit is off.
 - Green: the main unit is on.
- (3) Tubing channel: fixes the irrigation or suction tubing set.
- (4) Pressure sensor: detects the tube pressure.
- (5) Locking lever: locks or unlocks the irrigation or suction tubing set.
- (6) Pressure sensor: detects the tube pressure.
- (7) Pump roller for irrigation/suction

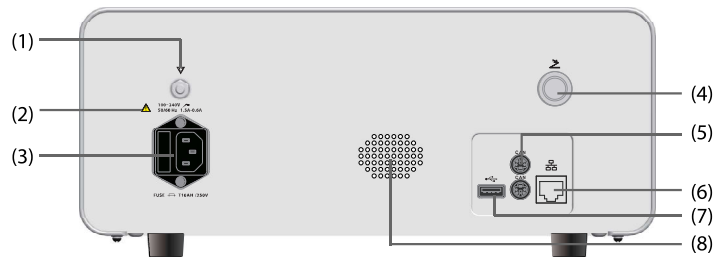
■ The front view of HP200G/HP200L/HP200D is as follows:



- (1) Touchscreen: displays equipment status and changes settings.
- (2) Power switch: turns on or off the main unit.
The switch also has an embedded light that indicates the power status of the main unit:
 - Off: AC power is not connected.
 - Orange: AC power is connected, but main unit is off.
 - Green: the main unit is on.
- (3) Irrigation tubing channel: fixes the irrigation tubing set.
- (4) Pressure sensor: detects the tube pressure.

- (5) Locking lever: locks or unlocks the irrigation tubing set.
- (6) Pressure sensor: detects the tube pressure.
- (7) Pump roller for irrigation
- (8) Suction tubing channel: fixes the suction tubing set.
- (9) Locking lever: locks or unlocks the suction tubing set.
- (10) Pump roller for suction

2.9.2 Back View of the Main Unit



- (1) Equipotential grounding terminal: when using the equipment together with other devices, connect their equipotential grounding terminals together to eliminate potential difference.
- (2) General warning sign
- (3) AC (Alternating Current) power input: connects the AC Mains.
- (4) Foot switch connector: connects the foot switch.
- (5) CAN (Controller Area Network) connector: connects external devices.
- (6) Network connector: supports software upgrade, for service personnel only.
- (7) USB connector: connects external devices, such as weighing system.
Note: Only FAT32 USB drives can be connected to this connector.
- (8) Speaker

- **Maintain and inspect the cleaning machine regularly.**
- **Place the tubing sets in a special tray and connect the tubes to the spray nozzles of the cleaning machine to ensure all parts can be flushed.**

Put the disassembled tubing sets in a cleaning machine for cleaning. To set the cleaning parameters, follow the procedure below:

1. Refer to the instructions for use of the machine to set the cleaning parameters. Recommended parameters are as follows:

Procedure	Time	Temperature	Cleanser
Pretreating	2min	Room temperature	/
Cleaning	10min	50°C	2 mL/L enzymatic cleanser (neodisher® MediClean forte)
Rinsing 1	2min	Room temperature	/
Rinsing 2	1min	Room temperature	/

2. After cleaning, you are advised to dry the tubing sets under 65°C to 75°C for 30 minutes. You can also dry the outer surfaces of the tubing sets with a disinfected lint-free cloth or an air gun, and dry the residual water inside the tubing sets with the air gun.

NOTE

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

8.4.6 Sterilizing the Tubing Sets

Sterilize the tubing sets as required in the local or your hospital's servicing schedule. You can perform autoclave sterilization to sterilize the tubing sets. Validate the sterilization procedure in accordance with the operating instructions of the sterilizer.

NOTE

- **Perform sterilization in accordance with the methods described in this chapter. Otherwise, the sterilization may fail.**
- **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 the international standards (such as ISO 17665), national standards, or hospital sterilization management rules related to autoclave sterilization.**

- **The sterilizer must be certified in accordance with DIN EN 285 and tested in accordance with DIN EN ISO 17665.**
- **After autoclave sterilization, allow the product to naturally cool down to room temperature. A quick cooling down may damage the product.**
- **The product is very sensitive to impacts at high temperature. Therefore, avoid impacting and vibrating the product at high temperatures.**

To sterilize the tubing sets, follow this procedure:

1. Before sterilization, check whether the tubing sets are intact and perform cleaning and disinfection by referring to **8.4.4 Manually Cleaning and Disinfecting Tubing Sets** or **8.4.5 Automatically Cleaning Tubing Sets**.
2. Before sterilization, place the tubing sets in a proper container and double wrap the container with sterile sheet or any other sterile packing materials, preventing tubing sets contamination during storage and transportation.
3. For autoclave sterilization, refer to the operating instructions of the corresponding sterilizer. The recommended sterilization parameters are as follows:

Device	Temperature	Required Minimum Time
Pre-vacuum	132°C - 134°C	4min

It has been tested that the tubing sets function well after 50 cycles of autoclave sterilization.

8.4.7 Storing the Tubing Sets

After sterilization and before next use, store the tubing sets in a pollution-free environment where bacteria are not easy to breed, for example, a dark, cool, and well ventilated room.

8.5 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 equipment
- Corrosion of metal parts
- Cracks or distortion of cords, connectors and the housing of the equipment
- Reduced service life of cords
- Degradation of performance
- Equipment malfunction

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

UP700/UP700B/UP700C/UP700D

**Ultrasonic Surgical & Electrosurgical
Energy Platform**

Operator's Manual



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



- A transducer (optional)

NOTE

- **Your product may not contain all of these components. For details about the availability of components, contact Mindray.**

2.5.1 UP700 Series Generator

UP700 series generator supplies electrical energy for ultrasonic assembly and bipolar instruments.

2.5.1.1 Front View of the Generator



- (1) Ultrasonic socket (applied part): connects a transducer.
- (2) Power switch: turns on or off the generator.
- (3) Monopolar socket 1 (applied part): connects a monopolar instrument.
- (4) Touchscreen: displays equipment status and changes settings.
- (5) Return electrode socket: connects a return electrode.
- (6) Monopolar socket 2 (applied part): connects a monopolar instrument.
- (7) Split return electrode indicator: indicates the connection status of the split return electrode. When the indicator is green, the split return electrode is properly connected.
- (8) Non-split return electrode indicator: indicates the connection status of the non-split return electrode. When the indicator is green, the non-split return electrode is properly connected.
- (9) Bipolar socket (applied part): connects a bipolar instrument.

2.7 Audio Indicators of the Generator

Audio Indicator	Volume	Remarks
Activation tone for coagulation mode of HF instrument	Lowest volume ≥ 45 dB(A) Highest volume ≥ 65 dB(A) (1m away from the rear of the generator)	The tone persists throughout the duration of activation.
Activation tone for cutting mode of HF instrument		
Activation tone for ultrasonic assembly		
Activation tone for electrode surgical instrument for Seal 7	≥ 45 dB(A) (1m away from the generator)	The tone persists throughout the duration of activation.
Coagulation success tone for electrode surgical instrument for Seal 7		/
Coagulation failure tone for electrode surgical instrument for Seal 7		
Information signals	Not higher than that of the system alarm of low priority	Simultaneously play the following tones: 365Hz \pm 5%, 730Hz \pm 5%, 1095Hz \pm 5%, 1460Hz \pm 5%, 1825Hz \pm 5% Last for 165 ms \pm 5%
System alarm tone	≥ 45 dB(A) (1m away from the generator)	This audio indicator complies with IEC 60601-1-8.
Return electrode alarm tone	≥ 65 dB(A) (1m away from the rear of the generator)	This audio indicator complies with IEC 60601-2-2 and IEC 60601-1-8.

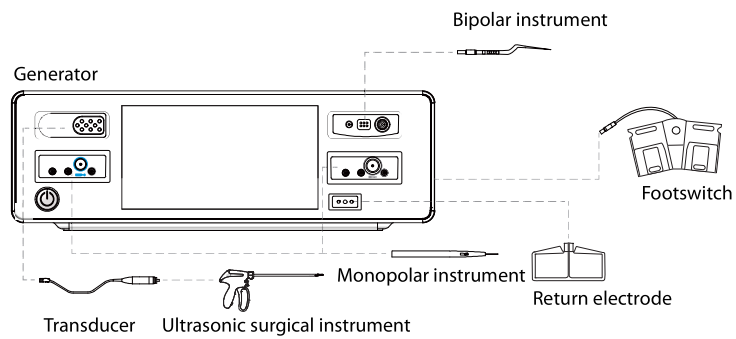
CAUTION

- **The alarm tone is different from the prompt tone.**
- **Make sure that the volume of alarm tones and activation tones are adjusted to a level that can be clearly heard by the surgical team. For detailed setting methods, refer to 4.11 Setting Volume.**

- **Make sure that the monopolar and bipolar sockets are correctly connected with instruments. Otherwise, patient burns may result due to unintentional activation.**

3.6.1 System Connection Diagram

The connection of the generator and accessories is as follows:



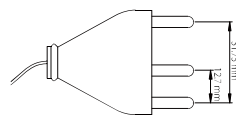
3.6.2 Compatible Plugs of HF Instruments

The generator provides one bipolar socket. For the position of the socket on the generator, refer to 2.5.1.1 *Front View of the Generator*.

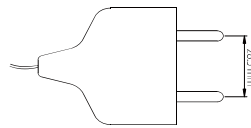
The following table lists compatible plugs for each socket:

Socket	Compatible Plug	Specification
Monopolar socket 1	1-pin banana plug	4 mm
	3-pin banana plug	4 mm
	1-pin monopolar plug	8 mm
Monopolar socket 2	1-pin banana plug	4 mm
	3-pin banana plug	4 mm
	Coaxial 2-pin monopolar plug	Outer diameter: 9mm Inner diameter: 5 mm

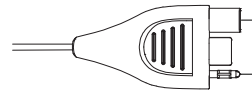
Socket	Compatible Plug	Specification
Bipolar socket	2-pin banana plug	4 mm
	Coaxial 2-pin bipolar plug	Outer diameter: 8 mm Inner diameter: 4 mm
	Seal 7 plug	4 mm



3-pin banana plug



2-pin banana plug



Seal 7 plug

NOTE

- **The 1-pin 4 mm banana plug shall only be connected to the rightmost slots of the monopolar socket 1 and 2. Connection to any other slots may cause equipment damage.**
- **The pin spacing of selected instrument plugs must be fixed and the pins must be inflexible.**

3.7 Connecting the AC Mains

The equipment is powered by AC power supply. Before connecting the equipment to the AC mains, check that the voltage and frequency ratings of the power line are the same as those indicated beside the AC power input.

To use the AC power source, follow this procedure:

1. Connect the female end of the power cord to the AC input on the back of the generator.
2. Connect the other end of the power cord with a wall AC outlet.

When the AC mains is correctly connected, the power indicator is illuminated in orange.

WARNING

- **Always use the power cord delivered with the equipment.**
- **Ensure that the equipment is supplied with continuous electric power during work. Sudden power failure may cause data loss or system failure.**

- 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.

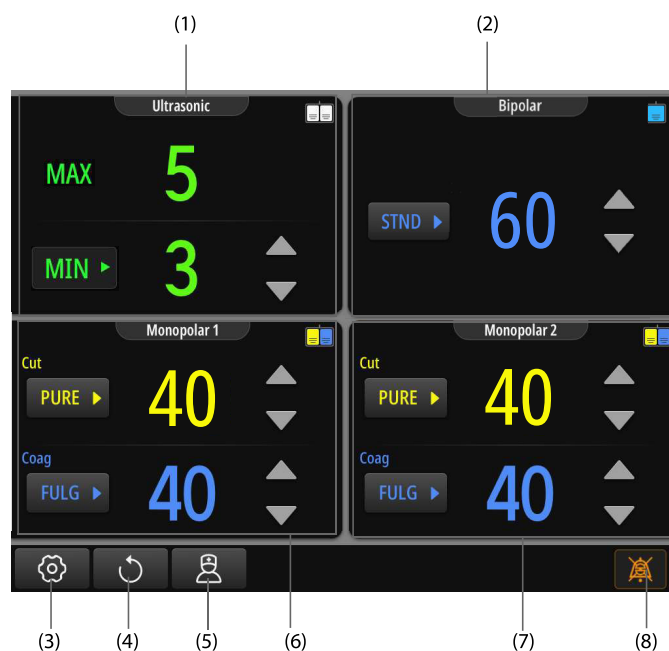
CAUTION

- **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](#).

- (3) Setup button  : select to display the setup menu.
- (4) Restore button  : selects to restore the latest HF instrument settings after restart.
- (5) Procedure button  : select to display the Procedure menu.
- (6) Monopolar area 1: Power levels and modes in this area is highlighted if the monopolar instrument is connected to the monopolar socket 1. The monopolar cutting area is highlighted in yellow, and the monopolar coagulation area is highlighted in blue. For detailed description, refer to 4.8.2 *Operation Area for Monopolar Instrument*.
- (7) Monopolar area 2: Power levels and modes in this area is highlighted if the monopolar instrument is connected to the monopolar socket 2. The monopolar cutting area is highlighted in yellow, and the monopolar coagulation area is highlighted in blue. For detailed description, refer to 4.8.2 *Operation Area for Monopolar Instrument*.
- (8) Alarm acknowledgment button  : selects to turn off alarm tones. After an alarm is acknowledged, the symbol is displayed as .

4.6.1 Locking the Touchscreen

The touchscreen can be automatically locked to avoid inadvertent operations. When this function is enabled, the touchscreen will be locked automatically if no operation is detected in one minute. For setting method, refer to 4.12.2 *Setting Lock Screen Function*.

4.6.2 Unlocking the Touchscreen

When the touchscreen is locked,  is displayed on the bottom of the touchscreen. To unlock the touchscreen:

1. Tap anywhere on the touchscreen. An unlocking bar is displayed:



2. Press  and slide it to the  position on the right. The touchscreen is unlocked.

4.7 Connecting Ultrasonic Assembly for Use

Connect the ultrasonic assembly to the generator. For detailed assembly procedure of transducer and ultrasonic surgical instrument, refer to the operator's manual of the ultrasonic surgical instrument.

4.7.1 Ultrasonic Surgical Instrument Test

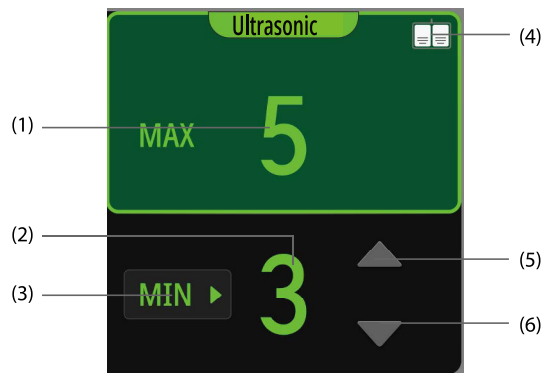
When the ultrasonic assembly is connected to the generator, the generator automatically starts the ultrasonic surgical instrument test. Follow the on-screen instructions to perform the test.





After the test passes, the prompt "Test Complete" appear, and then the operation screen displays. Now the generator is ready for use.

If the test fails, follow the on-screen instructions to deal with the issue. For detailed error messages and solutions, refer to 5.7 *Error Messages for Ultrasonic Assembly*.

4.7.2 Operation Area for Ultrasonic Assembly

The operation area for ultrasonic assembly is as follows:



- (1) MAX level: indicates the maximum power level. MAX level is 5 and cannot be adjusted. If the MAX mode is activated, the MAX area shows a yellow-green background.
- (2) MIN level: indicates the power level of the MIN mode. MIN level can be adjusted from 1 to 5. The default value is 3. If the MIN mode is activated, the MIN area shows a yellow-green background.
- (3) Mode Setting button: indicates the current mode that will be activated when you press the MIN button of the ultrasonic assembly. The default mode is MIN.
- (4) Footswitch symbol: indicates the status of the footswitch. If the instrument can be activated by footswitch and the footswitch is properly connected, the symbol is displayed as . If the instrument cannot be activated by footswitch, the symbol is displayed as .
- (5) Power Level Increase button : press to increase the power level.
- (6) Power Level Decrease button : press to decrease the power level.

4.7.3 Using Ultrasonic Assembly

To use the ultrasonic assembly, follow the procedure below:

1. Connect the ultrasonic assembly to the generator.
2. If the connected ultrasonic assembly supports the advanced features, press the Mode Setting button to select the MIN mode or the Enhanced Vessel Sealing (EVS) function:


- ◆ Select **MIN** to set the MIN mode. Adjust the power level by pressing the Power Level Increase button ▲ or the Power Level Decrease button ▼.
 - ◆ Select **EVS** to enable the EVS function, which uses advanced algorithms to adjust the power level in real time. You cannot manually adjust the power level. To turn off the function switch, refer to *4.7.4.2 Setting Advanced Features*.
3. Activate the MAX or MIN mode or the EVS function by pressing the buttons on the ultrasonic surgical instrument or using the footswitch. You can set the activation method by referring to *4.7.4.1 Setting Activation Type*.

4.7.4 Function Settings for Ultrasonic Assembly

On the touchscreen of the generator, you can set the activation type and advanced features, as well as perform the transducer test.


4.7.4.1 Setting Activation Type

To set the activation type for the ultrasonic assembly, follow the procedure below:

1. Select the Setup button  to display the setup menu.
2. Select **Ultrasonic**.
3. Set **Activation Type**.


4.7.4.2 Setting Advanced Features

To set the advanced features for the ultrasonic assembly, follow the procedure below:

1. Select the Setup button  to display the setup menu.
2. Select **Ultrasonic** → **Advanced Features**.
3. Switch on or switch off **STS(Smart Tissue Sensing)**.
4. Switch on or switch off **EVS(Enhanced Vessel Sealing)**.
5. Switch on or switch off **Activation Tone Change**.

4.7.4.3 Performing Transducer Test

You can perform the transducer test to check the transducer function. To perform the transducer test, follow the procedure below:

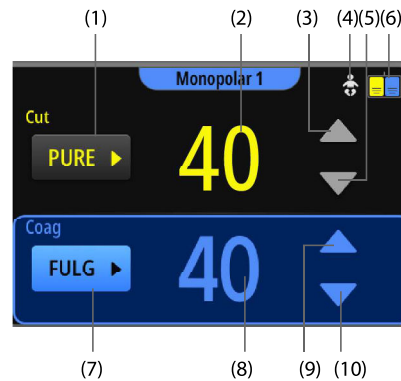
1. Select the Setup button  to display the setup menu.
2. Select **Ultrasonic** → **Transducer Test**.
3. Select **Test**, and then follow the screen prompts to assemble the test tip and transducer for the transducer test.

After test, if the transducer function is normal, the prompt "Test complete, transducer is functioning normally.", as well as remaining use times, phase margin, impedance, and other information of the transducer will be displayed.


- Long and continuous activations (for example more than one minute), longer duty cycles, or using higher currents may result in the temperature of the return electrode too high to burn the patient. To avoid burns, ensure adequate cooling between activations.
- Do not place the return electrode over scar tissue, skin folds, or bony prominences.
- Check the compatibility of the return electrode before connecting it. If the return electrode is incompatible, a return electrode alarm will appear in the monopolar area. In this case, monopolar energy output is disabled.
- In a 60s period, when the generator is activated with the maximum output current for 20s, the maximum heating factor of Pure Cut is 34.8 and that of Soft Coag is 58.5. However, during cutting or coagulation, the maximum output current does not last for more than 10s, and the heating factor does not exceed $30A^2s$. Therefore, there is no risk of high current mode.
- When a non-split return electrode is applied, the system does not monitor the contact quality. If contact between the patient skin and the return electrode is inadequate, no alarm is provided.
- Return electrodes are disposable accessories and must not be reused.

4.8.2 Operation Area for Monopolar Instrument

The screen display for monopolar instrument is as follows:



- (1) Mode Setting button: selects the cutting mode. If the monopolar cutting mode is activated, the monopolar cutting area shows a yellow background.
- (2) Power level: displays the power level currently used by the monopolar instrument for cutting.
- (3) Power Level Increase button ▲: press to increase the power level used by the monopolar instrument for cutting.

- (4) Neonate symbol: indicates that return electrode monitoring function for the neonate is enabled.
- (5) Power Level Decrease button ▼ : press to decrease the power level used by the monopolar instrument for cutting.
- (6) Footswitch symbol: indicates the status of the footswitch.  indicates that the footswitch is correctly connected.
- (7) Mode Setting button: selects the coagulation mode. If the monopolar coagulation mode is activated, the monopolar coagulation area shows a blue background.
- (8) Power level: displays the power level currently used by the monopolar instrument for coagulation.
- (9) Power Level Increase button ▲ : press to increase the power level used by the monopolar instrument for coagulation.
- (10) Power Level Decrease button ▼ : press to decrease the power level used by the monopolar instrument for coagulation.

4.8.3 Using Monopolar Instrument

To use the monopolar instrument, follow the procedure below:

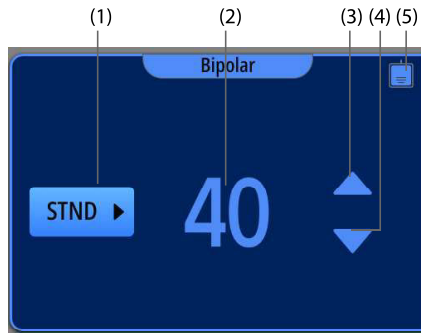
1. Connect the monopolar instrument to the generator.
2. Set the cutting mode or coagulation mode:
 - ◆ To set the cutting mode, press the Mode Setting button in the monopolar cutting area to select **Pure** or **Blend**. The default monopolar cutting mode is **Pure**. For technical parameters and description of each mode, refer to *6.3 Monopolar Cutting Modes*.
 - ◆ To set the coagulation mode, press the Mode Setting button in the monopolar coagulation area to select **Soft Coag**, **Fulgurate**, or **Spray**. The default monopolar coagulation mode is **Fulgurate**. For technical parameters and description of each mode, refer to *6.4 Monopolar Coagulation Modes*.
3. Set power level for the mode by pressing the Power Level Increase button ▲ or the Power Level Decrease button ▼ .
4. Activate the mode by using the footswitch or fingerswitch.



NOTE

- **After connecting a monopolar instrument with fingerswitch, you are advised to test the cutting and coagulation functions of the fingerswitch buttons. Make sure that the functions are normal by checking whether the corresponding areas of the main screen show correct background colors.**

4.9.1 Operation Area for Common Bipolar Instrument

The operation area for common bipolar instrument is as follows:



- (1) Mode Setting button: selects the bipolar coagulation mode. If the bipolar coagulation mode is activated, the bipolar coagulation area shows a blue background.
- (2) Bipolar power level: displays the power level currently used by the bipolar instrument.
- (3) Power Level Increase button ▲: press to increase the power level used by the bipolar instrument.
- (4) Power Level Decrease button ▼: press to decrease the power level used by the bipolar instrument.
- (5) Footswitch symbol: indicates the status of the footswitch for HF instrument. If the single-pedal footswitch is properly connected, the symbol is displayed as . If the double-pedal footswitch is properly connected, the symbol is displayed as .

4.9.2 Using Common Bipolar Instrument

To use the common bipolar instrument, follow the procedure below:

1. Connect the bipolar instrument to the generator.
2. Press the Mode Setting button to set the coagulation mode. The mode can be set to **Precise**, **Standard**, or **Macro**.
3. Set power level by pressing the Power Level Increase button ▲ or the Power Level Decrease button ▼.
4. Activate the mode by using the footswitch.

The default bipolar coagulation mode is **Standard**. You can also set the mode to **Bipolar Soft Coag**. To enable **Bipolar Soft Coag**, refer to 4.12.3 *Setting Bipolar Soft Coag*.

For technical parameters and description of each mode, refer to 6.5.1 *Technical Parameters of Bipolar Coagulation Modes*.

4.9.3 Using Electrode Surgical Instrument for Seal 7

To use the electrode surgical instrument for Seal 7, follow the procedure below:

The password must be 6 or less digits.

4.12.6 Setting Instrument Detection

To set the instrument detection function, follow the procedure below:

1. On the **User** menu, select **Settings** → **Instrument Detection**.
2. Switch on or switch off desired detection function.

The instrument detection function is enabled by default. If the instrument detection function is disabled, all instruments are considered as connected, and power levels and modes in the main screen are highlighted.

4.12.7 Setting Power Failure Protection

To set the power failure protection function, follow the procedure below:

1. On the **User** menu, select **Settings** → **Setting Memory**.
2. Select settings to be saved after power failure.

Restart the system for the settings to take effect. After the system is restarted, the main screen displays mode settings for HF instruments before the last shutdown.

4.12.8 Restoring Factory Settings

To restore factory settings of the system, follow the procedure below:

1. On the **User** menu, select **Settings** → **Factory Default**.
2. Select **Restore Factory Default**.
3. Select **OK** in the displayed dialog box and follow the prompted instructions.

4.12.9 Checking Configuration Information

On the **User** menu, select **System Information** → **Configuration information** to check the software version, generator ID, generator model, transducer model, remaining available times of the transducer, and ultrasonic surgical instrument model.

4.12.10 Checking Activation Times

On the **User** menu, select **System Information** → **Activation Number** to check the activation time of each socket.

4.12.11 Viewing History Records

The generator will save key operations as history records during use. On the **User** menu, you can select **History Record** to view operation records such as history mode and power settings.

5 System Alarm

5.1 Overview

This chapter describes the alarm function of the generator and lists error messages related to the ultrasonic assembly and HF instruments.

5.2 Introduction to Alarm Function

The system provides technical alarms only. Alarms are classified into high priority and low priority based on the alarm severity.

The alarm system only provides one alarm preset basing on electrical parameters. The alarm limits and algorithms cannot be changed. There is also a complete set of programs for monitoring operations of the generator and accessories. When an alarm generates, the generator gives alarm tones and displays error messages to alert the operator.

A system log of the generator records error messages and system power-off time. The generator can store 5000 history records in the log, and earlier data are overwritten by later ones if the memory is full.

The alarm system consists of latching alarms and non-latching alarms:



- A latching alarm continues to be displayed when the triggering event no longer exists and disappears after the generator is restarted.
- A non-latching alarm disappears when the triggering event no longer exists.

NOTE

- **The delay inherent in the determination of the alarm condition is less than 1s.**
 - **Alarm settings and system log are maintained when the system is power down. The duration of power interruption has no effect on the stored alarm information.**
-

5.3 Alarm Indicators

When an alarm occurs, the equipment indicates it to you through visual or audible alarm indications. For details, see the following table:

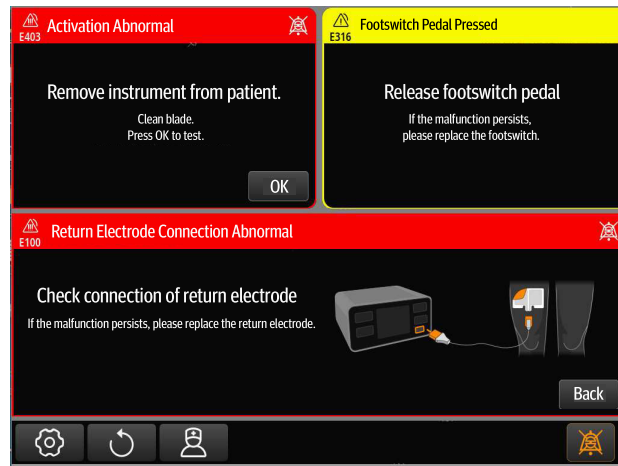
Alarm Priority	Audible Tone Pattern	Alarm Message	Symbol
High	Except return electrode alarms: Repeat pattern of 2 x 5 beep tones	White text and symbol inside a red box	
	Return electrode alarms: Low-pitched 3-beep tones		
Low	2-beep tones	Black text and symbol inside a yellow box	

NOTE

- **When a return electrode alarm occurs, the indicator on the return electrode socket lights up in red.**
- **When multiple error messages occur simultaneously in the same area, the message of the highest priority is displayed preferentially. You can view other error messages by swiping to turn pages.**
- **When multiple alarms of different priority levels occur simultaneously, the system selects the alarm of the highest priority to issue the alarm tone.**


5.4 Alarm Screen


An alarm provides a pop-up window that contains messages or pictures to help you identify the cause of the alarm, as shown in the following figure:



Keep observing error messages and take actions as instructed. If the equipment starts to beep, check the message immediately and take corrective actions.

5.5 Acknowledging Alarms

After an alarm is generated, you can select the Alarm acknowledgment button  to acknowledge the alarm and turn off the alarm tone. When the alarm system is acknowledged:

- The alarm sound is silenced.
- The symbol  is displayed, without affecting the generation of new alarms.

To set the alarm volume, refer to *4.11 Setting Volume*.

5.6 General Error Messages

Message	Possible Cause	Attemptable Solution	Alarm Priority	Latching or Not
System Malfunction	Communication failed. Or the generator software is faulty.	Restart the generator. If the problem persists, contact Mindray.	High	Yes
Generator Temperature Too High	The ventilation outlet is blocked. Or the room temperature has exceeded the specified range.	Clear the blockage from the ventilation outlet. Restart the generator. If the problem persists, contact Mindray.	High	Yes
Footswitch Pedal Pressed	When the footswitch is connected to the generator, a footswitch pedal has been pressed.	Ensure the footswitch pedals are released. Use a new footswitch. If the problem persists, contact Mindray.	Low	No

5.7 Error Messages for Ultrasonic Assembly

Message	Possible Cause	Attemptable Solution	Alarm Priority	Latching or Not
Ultrasonic Circuit Error	The power of the ultrasonic assembly is too high.	Restart the generator. If the problem persists, contact Mindray.	High	Yes
Ultrasonic Malfunction	Communication failed. Or the generator software is faulty.	Restart the generator. If the problem persists, contact Mindray.	High	Yes

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

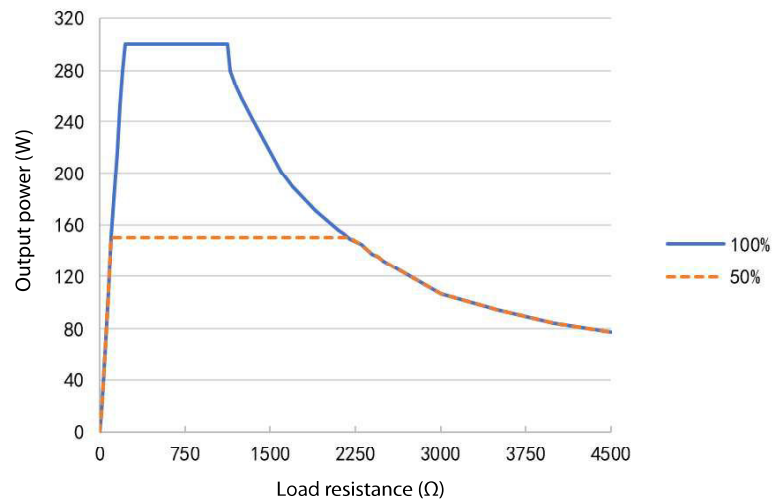
- **Any associated equipment and active accessories used in the Blend Cut mode must be rated to withstand the combination of actual voltage and crest factor.**

6.3.1 Technical Parameters of Monopolar Cutting Modes

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

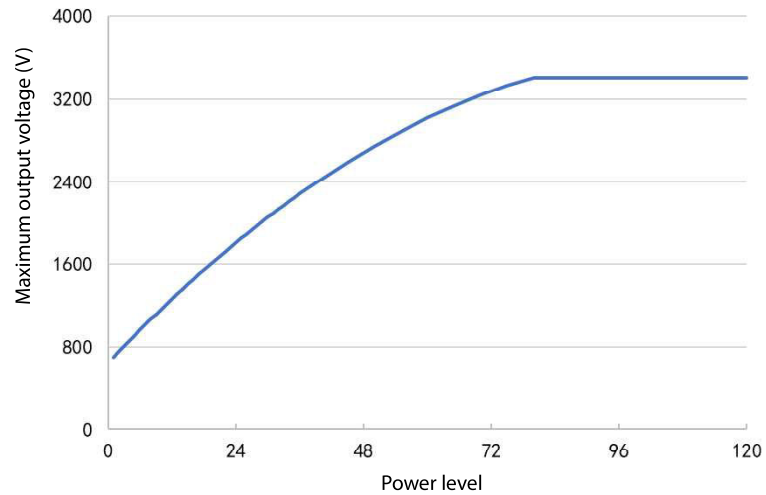
Parameter	Pure Cut	Blend Cut
Maximum output current	1.32A	1.05A
Crest factor (rated load)	1.5 ± 0.3	2.3 ± 0.3
Power ranges and step	--; 1 - 40 W (step: 1 W); 40 - 100 W (step: 5 W); 100 - 300 W (step: 10 W)	--; 1 - 40 W (step: 1 W); 40 - 100 W (step: 5 W); 100 - 200 W (step: 10 W)

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 \pm 10%	434 kHz \pm 10%	434 kHz \pm 10%
Modulation frequency	/	27.7 kHz \pm 10%	21.1 kHz \pm 10%
Duty cycle	100%	6.25% \pm 10%	4.76% \pm 10%
Rated load	100 Ω	500 Ω	500 Ω
Rated power	120 W \pm 15%	120 W \pm 15%	120 W \pm 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 \pm 0.3	5.3 \pm 0.3	6.1 \pm 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:

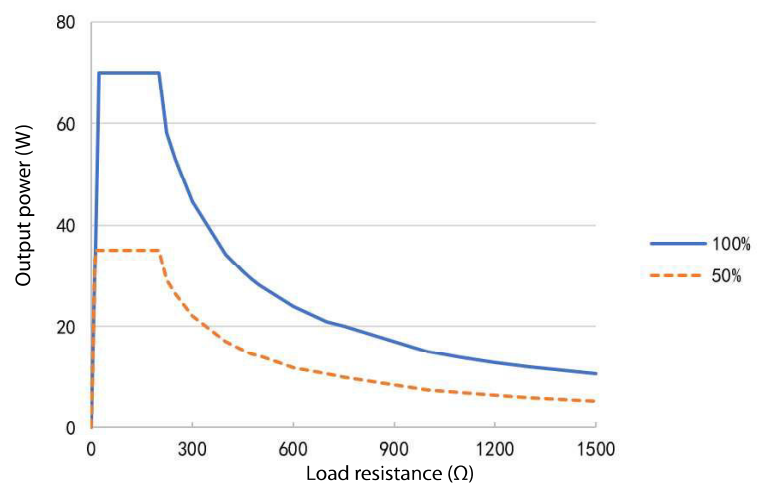
- The Precise Coag mode is applicable to low-voltage and fine coagulation of tissue. Using this mode prevents the generation of sparks and eschars and precisely controls the coagulation effect.
- The Standard Coag mode is applicable to most low-voltage bipolar coagulation of tissue. Using this mode prevents 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.

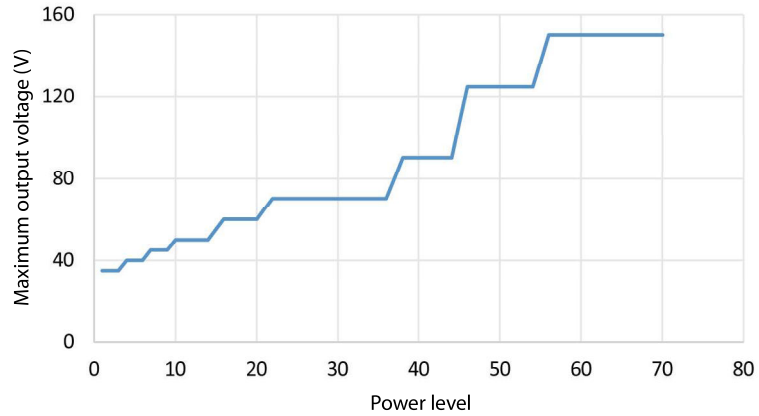
6.5.1 Technical Parameters of Bipolar Coagulation Modes

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 \pm 15%	70 W \pm 15%	70 W \pm 15%	70 W \pm 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 \pm 0.3	1.6 \pm 0.3	1.8 \pm 0.3	1.48 \pm 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





6.6 Seal 7 Mode

The applicability of the Seal 7 mode is as follows:

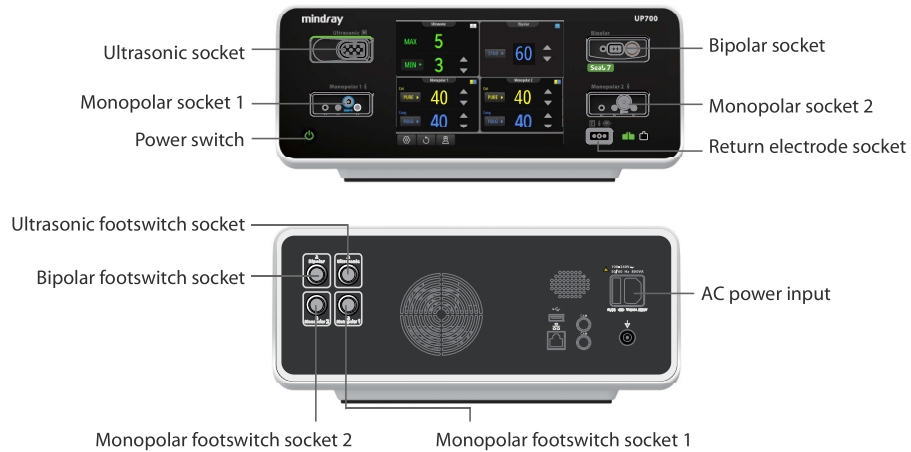
- The Seal 7 mode is applicable to sealing of arterial/venous vessels, lymph vessels, and tissue strands ≤ 7 mm in diameter using electrode surgical instrument for Seal 7 during surgery. The mode senses the change of tissue impedance through the ultrasonic surgical instrument to automatically control the HF energy output until the sealing is complete.

6.6.1 Technical Parameters of Seal 7 Mode

Parameter	Seal 7 (Effect 2)	Seal 7 (Effect 1)
Operating frequency	350 kHz \pm 10%	350 kHz \pm 10%
Rated load	25 Ω	25 Ω
Rated power	300 W \pm 15%	135 W \pm 15%
Maximum output voltage	220 V	220 V
Maximum output current	3.85 A	2.50 A
Crest factor (rated load)	1.4 \pm 0.3	1.4 \pm 0.3
Note: To set effects of the Seal 7 mode, contact Mindray service personnel.		

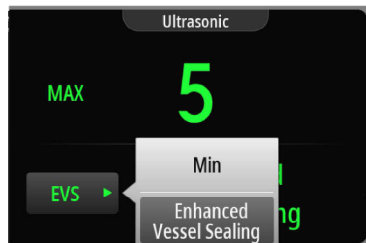
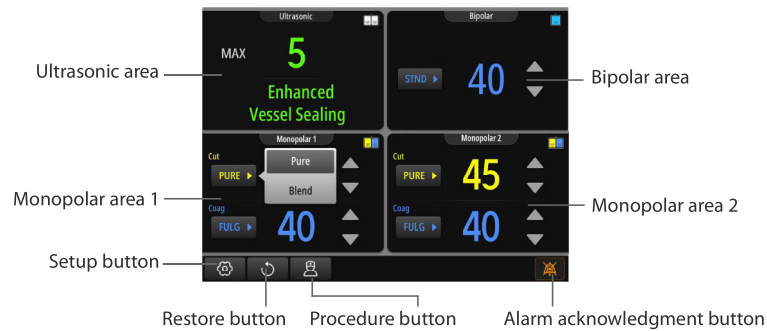
UP700 Series Generator Quick Start Guide

Product Overview



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

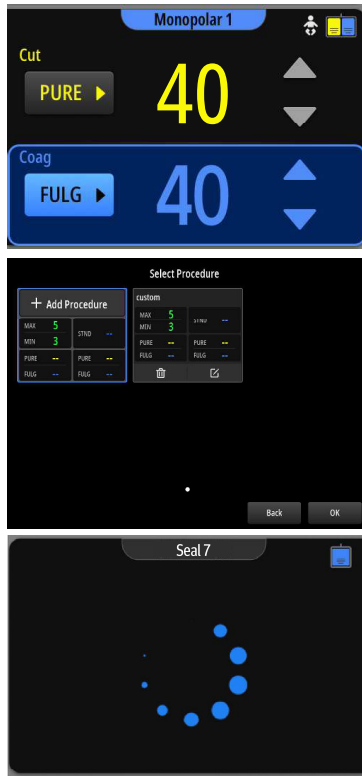
Using the Touchscreen



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.