

NIDEK

OPHTHALMIC SURGICAL SYSTEM

Model CV-24000

OPERATOR'S MANUAL



NIDEK CO., LTD.

* Specifications are subject to change without notice for improvement.



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BEFORE USE OR MAINTENANCE, READ THIS MANUAL.



**THIS MANUAL CONTAINS ONLY INFORMATION TO UNDERSTAND
THE OPERATING PROCEDURES AND MAINTENANCE.**

The Operator's Manual contains information necessary for the operation of the NIDEK OPHTHALMIC SURGICAL SYSTEM Model CV-24000.

This manual includes the operating procedures, cautions for safety, specifications and maintenance instructions.

This manual complies with IEC 60601. This manual is required to correctly use this system. Especially, the cautions for safety and operating procedures must be thoroughly understood before using the instrument. Keep this manual handy to verify use whenever necessary.

Use of this system is limited to the cataract and vitreous surgery by qualified physicians only. The physicians are responsible for the application of this system to various surgical techniques. If you encounter any problems or have questions about the instrument, contact NIDEK or your authorized distributor.


[NOTE]

There are 3 types of the CV-24000. To make a distinction, each system is abbreviated according to the specifications and abbreviated names such as A type (or A), AP type (or AP), and P type (or P) are used in this manual to simplify descriptions (see below). In addition, it is possible to select the language indicated on the screen between English and Japanese, however, in this manual, English version is presented.

Model name	Types	Abbreviations
CV-24000	For cataract surgery	A type (or A)
	For cataract and vitreous surgeries	AP type (or AP)
	For vitreous surgery	P type (or P)



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§1 INTRODUCTION

1.1 Outline

NIDEK OPHTHALMIC SURGICAL SYSTEM Model CV-24000 is a system for cataract and vitreous surgeries and has 3 available types, for cataract surgery, for cataract and vitreous surgeries, and for vitreous surgery.

The system for cataract surgery (A type) has the functions such as the irrigation control, vacuum pressure/aspiration flow control, ultrasound power control, anterior vitrectomy, and diathermy.

The system for cataract and vitreous surgeries (AP type) has the functions such as the posterior vitrectomy, fluid/gas exchange, intraocular scissors driving, and intraocular illumination in addition to the functions of the system for cataract surgery.

The system for vitreous surgery (P type) has the functions such as the vacuum pressure/aspiration flow control, posterior vitrectomy, fluid/gas exchange, intraocular scissors driving, intraocular illumination, and diathermy.

These 3 systems are comprised of a main body, foot pedal, and accessories. To enhance the usability of each function of the system, the CV-24000 adopts the followings:

- (1) A color LCD touch panel and infrared wireless remote control*¹ achieve easy input of setting values and check of the system condition.
- (2) An automatic loading-type tube cassette enables you to perform quick setting and cleaning of tubes.
- (3) A built-in printer makes it possible to print surgery data of US Time/US Energy, vacuum pressure, etc.

The CV-24000 is the user-friendly system whose functions of cataract and vitreous surgeries and their operabilities are successfully combined.

*1 An infrared wireless remote control is for A and AP types only, not for P type.

1.2 Principles

(a) Phacoemulsification

When a voltage is applied to an oscillator inside the US handpiece, the oscillator is vibrated according to the amplitude and frequency of the AC voltage.

The obtained vibration is transmitted to the US tip via a trumpetlike part called as a horn.

In phacoemulsification, the AC voltage is applied to the oscillator at a ultrasound range of frequency, and the obtained ultrasound vibration is amplified by the horn and transmitted to the US tip. Then, the end of US tip fragmentates the lens nucleus and the emulsification is achieved.

(b) Irrigation

The irrigation solution flows into the eye via a tube and handpiece by gravitation. Because the irrigation pressure changes according to the height between the eye to be operated and the fluid level of the irrigation bottle, the pressure can be controlled by raising or lowering the motorized pole, which the irrigation bottle is hung on, with the switch operation.

Furthermore, the built-in pinch valve supplies and stops the irrigation solution.

(c) Aspiration

When the peristaltic pump rotates, the fluid inside the aspiration tube is pressed out by the roller, the vacuum pressure is generated, and substance inside the eye is aspirated. In other words, as the volume of pressed-out fluid is equal to the flow rate, it can be controlled by the rotation speed of pump.

In addition, the pressure sensor monitors and controls the vacuum pressure.

(d) Vitrectomy

When the air pressure generated by the built-in air compressor or external compressed air source is intermittently supplied to the vitrectomy cutter, the inner blade at the tip of the cutter is vibrated. The cutting speed is controlled by the intermittent period of the supplied air pressure which is controlled by the special solenoid valve.

(e) Intraocular scissors

The scissors are opened or closed when the air pressure generated by the built-in air compressor or external compressed air source is intermittently supplied to the intraocular scissors. The cutting speed is controlled by the intermittent period of the supplied air pressure which is controlled by the special solenoid valve. It is also possible to open or close the scissors by the air pressure according to the pressing amount of foot pedal.

(f) Fluid/gas exchange

When the compressed air adjusted by the built-in small pump is conveyed to the inside of the eye via sclera, the air pressure presses the fluid out of the vitreous cavity and the pressed-out fluid is drained. Then, the fluid is exchanged with gas.

(g) Intraocular illumination

The illumination adopts the halogen lamp as a light source, whose infrared ingredients are eliminated by the filter inside the illumination unit in advance. The illumination is led to the inside of the eye by the acrylic light guide probe.

(h) Diathermy

The Joule heat is generated when the electrical current is applied to tissue. Diathermy is to dehydrate, coagulate the tissue with the Joule heat, stop bleeding, or prevent bleeding of the incised area.

(i) Fragmentation

This is used for the pars plana lensectomy. From the incision made at the pars plana, the special US tip is inserted into the vitreous cavity and the lens is fragmented and aspirated by the ultrasound oscillation of the US tip.

1.3 Classifications

[Protection method against electric shock] Class I

CV-24000 is classified into a Class I system.

A Class I system is a system in which the protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in such a way that means are provided for the connection of accessible conductive parts to the protective (earth) conductor in the fixed wiring of the installation in such a way that accessible conductive parts cannot become live in the event of a failure of the basic insulation.

[Degree of protection against electric shock] Type BF applied part, Type B applied part

The diathermy of CV-24000 is classified into a Type BF applied part and others are classified into a Type B applied part.

A Type BF applied part is isolated from other parts of the medical/electrical equipment to such a degree that no current higher than the patient leakage current allowable in single fault condition flows if 1.1 times of maximum rated supply voltage is applied between the applied part and earth.

A Type B applied part contains an internal electrical power source providing an adequate degree of protection against electric shock particularly regarding;

- allowable leakage currents
- reliability of the protective earth connection (if present)

[Degree of protection by the enclosure]

The main body of the CV-24000 is classified as IP20, and the foot switch is classified as IPX8.

An IP20 system is protected against an ingress of solid foreign objects, such as a finger having a diameter of 12.5mm or greater, however, it is an ordinary system without protection against an ingress of liquids. Be careful not to get water on the main body and control box.

An IPX8 system is a waterproof system provided with an enclosure preventing the effects caused by immersion in water.

[Sterilization methods recommended by the manufacturer]

Non-sterilized instruments of CV-24000 should be autoclaved under 132°C.

[Degree of safety in the presence of flammable anesthetics and/or flammable cleaning agents]

CV-24000 should be used in an environments where no flammable anesthetics and/or flammable cleaning agents are present.

[Mode of operation]

CV-24000 is an intermittent operation system.

[Classification by transference]

CV-24000 is classified into a transportable system.

1.4 Symbol Information



This symbol indicates that important descriptions related to operation or maintenance are contained in the operator's manual and that an operator must refer to the operator's manual prior to operation and maintenance.



This symbol indicates that the degree of protection against electric shock is a type B applied part.



This symbol indicates that the degree of protection against electric shock is a type BF applied part.



This symbol indicates that the applied part is non-grounding type according to the high frequency.



This symbol indicates that the system should be operated only with alternating current.



This symbol indicates the master switch setting. When the switch is flipped to the symbol side, the power is not supplied to the system.



This symbol indicates the master switch setting. When the switch is flipped to the symbol side, the power is supplied to the system.



This symbol indicates the fuse rating.



This symbol indicates the function to raise or lower the irrigation pole.



This symbol indicates the slot where the memory card is inserted. When inserting the memory card, align the symbol on the memory card with the one on the main body.



This symbol indicates the connector to which the foot pedal shall be connected.



This symbol indicates the switch to eject a cassette.



This symbol indicates the switch to display the Dia mode screen.



This symbol indicates the switch to display the Irr mode screen. The symbol on the cassette indicates the connection line with the irrigation bottle.



This symbol indicates the switch to display the US mode screen. The symbol on the cassette indicates the connection line with the US handpiece.



This symbol indicates the switch to display the I/A mode screen. The symbol on the cassette indicates the connection line with the I/A handpiece.



This symbol indicates the switch to display the Vit mode screen.



This symbol indicates the switch to display the Asp mode screen.



This symbol indicates the switch to display the Scis mode screen.



This symbol indicates the switch to indicate the setting of the intraocular illumination.



This symbol indicates the switch to indicate the setting of the gas exchange.



This symbol indicates the effective number of use and means the prohibition of reuse.




This symbol indicates the method of sterilization and means that the radiation sterilization has been performed.






This symbol indicates the time period over which the part can be used safely.

§2 SAFETY

In this manual, Signal Words are used to designate a degree or level of safety alerting, whose definitions are as follows.

 **WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage accident.

Some items described in  **WARNING** and  **CAUTION** may cause a serious accident according to the circumstances. Follow all the instructions mentioned below since they are very important.

2.1 Storing, Transport, and Installation

CAUTION

- Prior to storage, verify that the storage area meets the following conditions:
 - Not exposed to ultraviolet rays and direct sunlight.
 - Not splashed with rain or water.
 - No chemical agents and organic solvent are present.
 - No salt, sulfur content, toxic gas or large amounts of dust is contained in the air.
 - Level and stable without vibration and shock.
 - The following environmental conditions in storage and transport (packed condition) specified in the specification are met.
 - Temperature: -10 to 60°C / Humidity: 30 to 90% (non-condensing)
 - Atmospheric pressure: 700 to 1060 hPa
- Lower the irrigation pole to the lowest position before transporting the system.
In addition, fold the irrigation hook and store it inside the pole.
Failure to do so may bump the pole or catch the hook.
- Transport the system after hanging the foot pedal and cords on their special hooks on the stand.
If the system is transported without the foot pedal and cords properly stored, the cords may be caught causing a fall of system and break of cords.

CAUTION

- Hold the handle on the stand when transporting the system. Avoid sudden operation at the start/stop of transportation.
Otherwise, the system may fall down and an injury or system malfunction may result.
- Never drag the system by holding the power cord or cable of the foot pedal when transporting the system.
Otherwise, the system may fall down and an injury or system malfunction may result.
- If the temperature differs substantially before and after the transport, condensation may occur in the system. After transport, confirm that the system is at room temperature before turning on the power of the system.
If the power is turned on while the condensation is happening, malfunction or electric shock may result from short-circuit.
- Prior to installation, verify that the installation area meets the following conditions:
 - Level and stable without vibration and shock.
 - Not exposed to liquids such as water.
 - No flammable gases (including anesthetic gas) or solvents are present.
 - No large amount of dust is contained in the air.
 - Not exposed to direct air-conditioning flow.
 - Not exposed to direct sunlight or ultraviolet rays.
 - The following environmental conditions in installation (unpacked condition) are met.
Temperature: 10 to 30°C / Humidity: 30 to 75% (non-condensing)
Atmospheric pressure: 860 to 1060 hPa
- Install the system where it is not exposed to strong electromagnetic waves during operation.
Strong electromagnetic waves may cause the system to malfunction.
- Install the system so as not to block the ventilation hole on the cover of the main body.
The cooling fan cannot radiate heat properly and the system may be adversely affected.

2.2 Wiring and Connection

CAUTION

- Use a grounded power outlet which meets the power requirements labeled on the system.
Otherwise, the system may not perform sufficiently or may be damaged. If the power outlet is not a grounded type and a leakage of current occurs because of a system malfunction, an electric shock may result.
Moreover, it may cause electromagnetic interference for other devices or hum noise.
- Do not overload the electrical outlet.
Abnormal heat generation may occur and result in fire.
- Always pull the plug, not the cord, when unplugging the power cord.
The cable core may break, and an ignition or electric shock due to a short-circuit may result.
- Be sure not to get the power cord pinched under a heavy object such as the system.
The cable sheath may break, and a short-circuit or electric shock may result.
- If the inside wires of the power cord are exposed, do not continue using the system but unplug the power cord and contact NIDEK or your authorized distributor.
An electric shock or fire may occur.
- Never remove the cover that holds the power cord except in order to replace the fuse.
If the power cord is disconnected during the operation, the result of the surgery may be seriously affected.
- After inserting the cable plug of the foot pedal, lock the plug with the ring to hold it.
If the cable plug becomes loose during the operation, the result of the surgery may be seriously affected.
- Securely connect the plug of connecting cables for the handpiece, etc. and the luer connector for the tube, etc. following the instructions on this operator's manual.
Otherwise, the system may not work normally and an accident or malfunction may occur.
- Hold the plug, not the cable or cord, to when connecting or disconnecting the US handpiece or diathermy cord.
If the inside wires of the cable or cord break, ultrasound oscillation and diathermy become impossible.

2.3 During Use

2.3.1 In general

CAUTION

- Never use this system for purposes other than cataract surgery.
If any accident occurs because of use for other purposes, NIDEK assumes no responsibility.
- Prior to the first use of the system each day, perform the system test and function checks referring to the Pre-operation check manual (18214-P912A). NIDEK assumes no responsibility if failure occurs during the operation of each mode without performing the test and checks.
- If any abnormality occurs to the system, do not touch the inside of the system. Unplug the power cord from the power outlet and contact NIDEK or your authorized distributor.
- In case of failure of the system, take backup measures for the surgery to be performed.
- Do not modify or touch the inside of the system.
To do so may cause an electric shock or system malfunction.
- This system is provided with a Type B applied part. Avoid the combined use of this system and other systems which contact the patient during use.
- Do not touch the LCD touch panel with anything other than fingers during operation. Do not touch 2 or more places at the same time.
Touching with a hard or sharp object (such as ball-point pen) may scratch the panel. If 2 or more places are touched at the same time, a system malfunction may occur.
- Make sure that the LCD touch panel is not exposed to the direct sunlight or ultraviolet rays during operation.
The LCD touch panel may be damaged.
- Contents of cassette pack and connection set are disposable items. Never open the package until just before use. Be sure to dispose of them after use and never reuse them.
- Use the specified infusion tube (another package including the cassette pack) only.
Using unspecified infusion tube may cause an insufficient irrigation flow and the anterior chamber or eyeball to collapse.
- When using the optional I/A tip (ϕ 0.5mm), pay special attention to the aspiration pressure so that it does not become so high.
If the I/A tip (ϕ 0.5mm) is used at the setting of the aspiration pressure over 300 mmHg, the anterior chamber may become shallow at the time of aspiration.

CAUTION

- Never let a hard substance contact the ends of tips (especially US tip), diathermy forceps, vitrectomy cutter and intraocular scissors.
They may be deformed or cannot be used any longer.
- The height of IV pole indicated on the screen is intended for use of a 500 mL glass bottle. Using other bottles may cause a gap between the indication and actual heights.
- Never splash water onto the main body. Besides, be sure not to splash water onto the foot pedal as much as possible.
Otherwise, a system malfunction or electric shock may result.
- Tray is to place the surgical instruments such as handpiece, etc. during surgery.
Do not place heavy objects or rest your weight on the tray.
Otherwise, it may be deformed or the system may fall down.

2.3.2 Sterilization

WARNING

- Be sure to sterilize all accessories that need to be sterilized before the surgery.
Otherwise, the physician, patient or assistant may be infected.

CAUTION

- Sterilize the accessories according to the specified method. (For details, refer to “4.1.1 Sterilization of instruments” (p.4-1).)
If not, they may be deformed or damaged.
- Confirm that no dirt or foreign object is on the instruments before sterilization. If dirt or foreign object is found, remove it by cleaning.
(For the details of cleaning, see “4.4 Cleaning the Instruments” (p.4-109).)
- Autoclave the parts observing their useful lifetime and the number of times they can be used that are written on the package.
If the useful lifetime or the number of uses is exceeded, the parts may have problems and may interfere with the surgery.

2.3.3 About the US handpiece and US tip

CAUTION

- Never modify the US handpiece or the US tip by bending, cutting, or engraving them.
The US handpiece or the US tip may break or malfunction.
- When autoclaving the US handpiece, always use a vacuum drying type sterilizer.
Using a sterilizer other than that of a vacuum drying type may damage or accelerate the deterioration of the US handpiece.
- Use only the NIDEK US tip for the US handpiece. Never use the I/A tip or other manufacturers' US tips.
Normal ultrasound oscillation may not be achieved. NIDEK assumes no responsibility for accidents caused by use of unspecified tips.
- Confirm that the plug of the US handpiece is completely dry before connecting it to the US connector.
Failure to do so may cause an electric shock and damage to the US handpiece.
- Connect the US tip to the US handpiece, and the cable plug of the US handpiece to the US connector of the main body securely.
Insecure connections may cause ultrasound oscillation failure and poor electrical contact.
- Never immerse the US handpiece and plug in a liquid.
Ultrasound oscillation failure or poor electrical contact may result.
- Use the US handpiece at ordinary temperatures. After autoclaving, leave it for approximately 15 minutes or more and check that it has cooled down before use.
Otherwise, burns may occur.
- If abnormal heat is generated from the US handpiece or US tip, do not touch the internal structure of the system. Disconnect the US handpiece from the system and contact NIDEK or your authorized distributor.
The ultrasound may not be oscillated and burns may occur to the patient or the user.

2.3.4 About ultrasound oscillation

CAUTION

- Never touch the US tip during ultrasound oscillation.
Injuries may occur.
- Never let the end of the US tip contact other medical devices (instrument for nuclear segmentation, etc.) during ultrasound oscillation.
The US tip or other medical devices may break and generate pieces of metal.
- Before ultrasound oscillation, check the setting values (ultrasound output power, aspiration pressure, aspiration flow rate, US control mode, etc.). During ultrasound oscillation, observe the motion of the US tip.
Otherwise, the US tip may be damaged beyond repair.
- When oscillating the ultrasound, make sure that the US tip operates with sufficient irrigation and aspiration (the US tip must be in the test chamber filled with the irrigation solution or in the eye).
Ultrasound oscillation without irrigation and aspiration may damage the US tip beyond repair.
- During ultrasound oscillation, do not move the US tip close to a side of the incision or perpendicular to the dome of the cornea.
The area around the incision may be burned.
- If the ultrasound is oscillated while the US tip is in the viscoelastic, the viscoelastic blocks the irrigation flow. It causes insufficient cooling of the US tip and, as a result, a burn.
Create a space filled with the irrigation solution between the lens and the viscoelastic in advance. Perform ultrasound oscillation with the irrigation and aspiration ports in the space.
- In phacoemulsification, a phenomenon, known as cavitation, may occur in which the ultrasonic vibration forms bubbles from the gas in the irrigation solution that flows through the US handpiece. If this bubbles enter the patient's eye, they may obstruct the physician's view and interfere with surgery. To control the formation of bubbles, use the pulse mode or other methods not to use ultrasound more than necessary. If the bubbles enter the patient's eye, aspirate them using the devices such as the US tip to secure the physician's view.

2.3.5 About use of the diathermy function

WARNING

- When using the diathermy function for patients with a cardiac pacemaker or its electrode implanted, consult the cardiac surgeon or manufacturer of the pacemaker.
The function of the pacemaker may be affected or the pacemaker may be damaged.

CAUTION

- The diathermy forceps and pencil, and the cord that are standard accessories can be used exclusively for the CV-24000. Do not connect them to unspecified terminals or other manufacturer's bipolar/monopolar device.
Especially, if the diathermy cord is connected to the monopolar output terminal, unexpected output voltage may be generated and serious adverse events may occur.
- Never modify the diathermy forceps, pencil, or cord by bending, cutting, or engraving them.
The diathermy forceps, pencil, or cord may break or malfunction.
- Connect the diathermy forceps or pencil and the cord securely.
Insecure connections may cause coagulation failure and poor electrical contact.
- When using the diathermy function, observe the following conditions to avoid a burn or electric shock:
 - Use the diathermy forceps and pencils, and the cords that are in the standard accessories.
 - Make sure that the diathermy cord is not deformed (change in shape or cracks).
 - Flammable gas should not be in the air.
 - The diathermy power selected should be as low as possible for the intended purpose.
 - The patient should not come into contact with metal parts which are earthed or which have an appreciable capacitance to earth (for example operating table supports, etc.).
 - The diathermy cord should be positioned in such a way that contact with the patient or other cords is avoided.
 - When physiological monitoring equipment is used simultaneously on the same patient, any monitoring electrodes should be placed as far as possible from the patient's eye.
 - Use monitoring systems incorporating high frequency current-limiting devices.

2.3.6 About use of the vitreous cutter

CAUTION

- Observe the following points when using the vitreous cutter to avoid trouble during the surgery:
 - Confirm the connections of the drive/aspiration tube and the leur adapter beforehand.
 - Before using the vitreous cutter, put the needle part in the water and check the operation. If it malfunctions, replace it.
- Even after the check described above, performance of the vitreous cutter may decrease due to failure of the system infrequently. Before moving the tip of the cutter away from the incision, check that the incision has been made completely.

If the tip of the cutter is moved away from the incision when the incision is incomplete, retinal tear may result.

2.4 After Use, Maintenance, and Check

2.4.1 Cleaning and sterilization

CAUTION

- Observe the following points in the first cleaning after use:
 - Use distilled water for the first cleaning instead of tap water to avoid rust or stain.
 - To avoid rust, use only enzyme detergent for cleaning. (Refer to the user's guide attached to the detergent before use.)
 - To avoid rust, wash the cleaned parts sufficiently and dry them as quickly as possible.
- Observe the following points in the first sterilization after use:
 - To avoid rust, use only glutaral preparation for cleaning. Do not use other preparations such as phtharal preparation. (Refer to the user's guide attached to the preparation before use.)
 - To avoid inflammation by touching the sterilized parts, wash them sufficiently and dry them as quickly as possible. (Refer to the user's guide attached to the preparation before use.)
- Observe the following points in the ultrasonic cleaning:
 - Do not subject the US handpiece and diathermy cord to the ultrasonic cleaning to avoid break of terminal or deterioration of the electrical characteristics that may occur depending on the conditions.
 - To protect the ends of the US tip, I/A tip, and diathermy forceps, put the rubber cap on them before using the ultrasonic cleaning for them.

CAUTION

- Observe the following points in the cleaning and sterilization of the US handpiece and diathermy cord:
 - To avoid contact failure from short circuit or rust, do not immerse the parts in the detergent or sterilizing solution.
 - Wipe the exterior of the US handpiece and the diathermy cord with gauze or absorbent cotton soaked in the detergent or sterilizing solution and wrung sufficiently. Do not wipe them with excessive force.
 - To avoid break of wire, wipe the areas where the cable and cord are attached with special care.
 - To avoid break of wire, do not press or pull the cables and cords forcefully when wiping them.

2.4.2 Others

CAUTION

- If the system will not be used for a long period of time, unplug the power cord from the power outlet.
If dust settles on the plug of the power cord, the dust absorbs moisture and may cause a short-circuit and fire.
- If the system is not being used, turn OFF the power and put the dust cover on the system.
Dust settles on the system and makes it dirty.
- Use the specified fuses only.
Otherwise, the system may not perform sufficiently and a system malfunction or fire may result.
- Use the specified lamp for intraocular illumination.
Otherwise, the system may not perform sufficiently and a system malfunction or fire may result.
- Use the specified printer paper.
Otherwise, data cannot be printed out or the printer paper may be jammed.

CAUTION

- When sending the system back to NIDEK for repair or maintenance, wipe the surface of the system (except the LCD touch panel) with a gauze dampened with glutaral preparation. Wipe the LCD touch panel with a gauze dampened with alcohol. Then, wipe the part which has been cleaned with glutaral preparation with a gauze dampened with sodium hypochlorite.
Failure to do so may cause personnel who repair or perform maintenance to become infected.
- Ask NIDEK for inspection of the system once a year.
According to the frequency of use, the part which drives the irrigation pole may need to be greased.
- Only service technicians properly trained by NIDEK can modify and repair the system.
NIDEK assumes no responsibility for accidents caused by improper repair.

2.5 Disposal

CAUTION

- Follow local governing ordinances and recycling plans regarding disposal or recycling of device components when disposing of the system.
Especially, the disposing method of lithium batteries varies according to the government. This system has electric circuit boards with lithium batteries in the main body. When disposing of the board, follow the instruction of the government.
- When disposing of packing materials, sort them by the materials and follow local governing ordinances and recycling plans.
- When disposing of the main body and foot pedal, wipe the surface of them with a gauze dampened with rubbing solution such as glutaric aldehyde.
Failure to do so may cause personnel who are involved in the disposal to become infected.
- When disposing of accessories such as tips, tubes, handpiece, forceps and scissors, follow the recommended disposal procedure for medical wastes such as needles from an injection or blood infusion tubes as specified by your local medical institution and ordinances against environmental pollution.

2.6 Safety Devices

[TEST mode]

This mode is to check the conditions of each part of the system before surgery, and performing this test prevents troubles from occurring during surgery.

CV-24000 automatically checks the following items according to the inserted cassette by pressing each switch in the “Test” box indicated on the LCD touch panel.

- Cataract surgery Motion check of irrigation and aspiration
 - * When the US handpiece is connected to the system, ultrasound output is also checked.
- Vitreous surgery Motion check of aspiration
 - * When the US handpiece is connected to the system, ultrasound output is also checked.
- Cataract & Vitreous surgeries
 - Anterior screen: Motion check of irrigation and aspiration
 - * When the US handpiece is connected to the system, ultrasound output is also checked.
 - Posterior screen: Motion check of aspiration
 - * When the US handpiece is connected to the system, ultrasound output is also checked.

If an abnormality is found by checking these items, error and contents are indicated on the display.

[Self-diagnostic function]

The system automatically checks the connecting condition of each part and own functions even during surgery. If an abnormality occurs, error and contents are indicated on the display and the beep sound is produced. (The beep sound stops by pressing the part indicated as an error.)

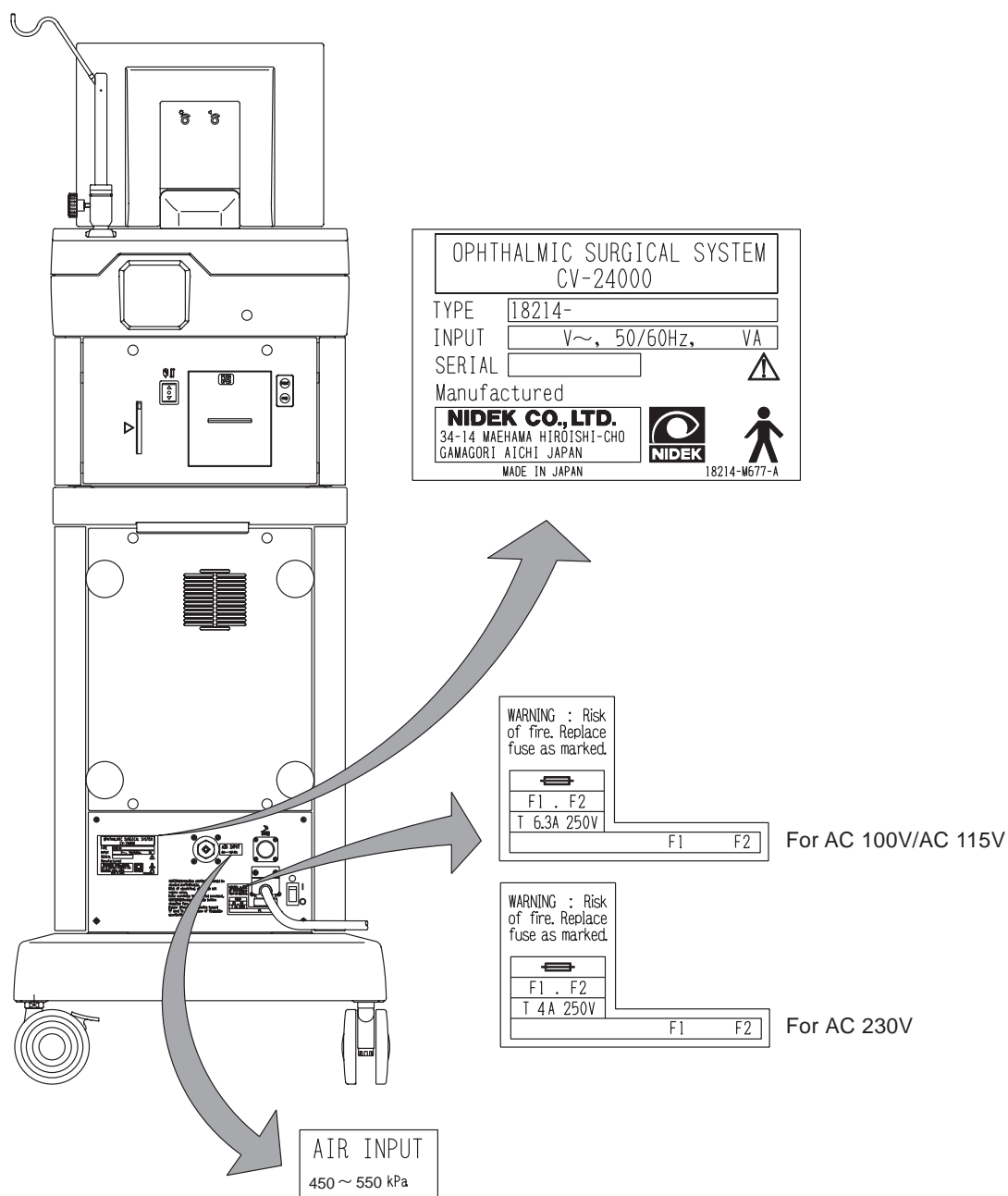
[Aspiration pump]

A peristaltic pump system which controls the aspiration flow rate by pressing the aspiration tube is adopted in order to achieve the ease of operation and stable aspiration.

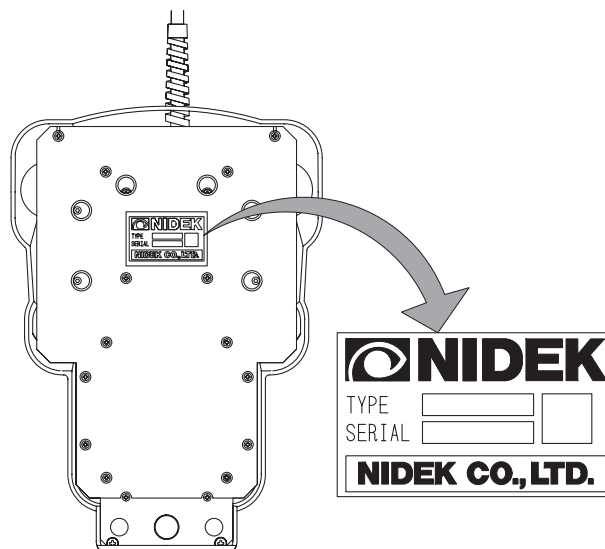
2.7 Labels

In order to call the operator's attention, the appropriate warning labels are affixed to the designated locations on the system.

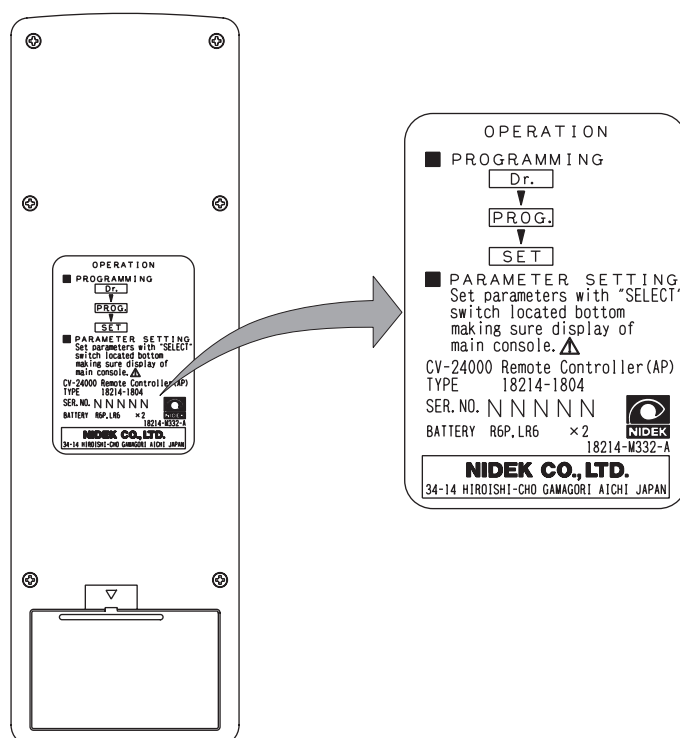
[Rear side of the main body (AP type)]



[Bottom side of the foot pedal]



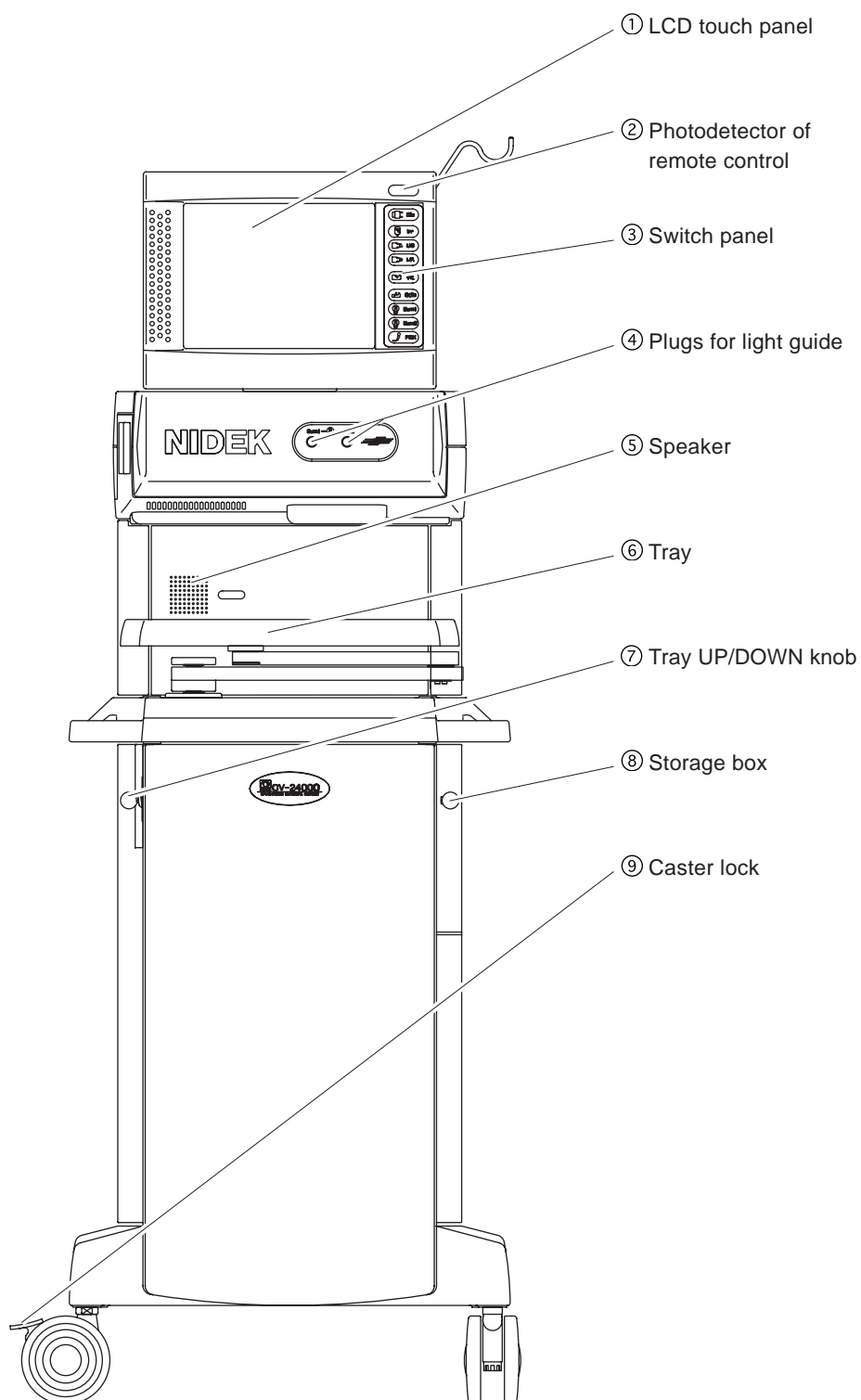
[Rear side of the remote control (AP type)]



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§3 SYSTEM DESCRIPTION

[Front side of the main body (AP type)]



① LCD touch panel

Displays various operation screens, setting values of each mode, and present system conditions.

By pressing the indicated operation switch, it is possible to change the mode and input/change the setting value.

② Photodetector of remote control

Receives the infrared signal from the remote control.

Do not block the anterior part of this photodetector. (P type does not have this function.)

③ Switch panel

Indicates available modes for each system type. By pressing these switches on this panel, the corresponded mode is selected.

Available modes for each system are as follows.

Type	Available modes
A type	Dia, Irr, US, I/A, Vit
AP type	Dia, Irr, US, I/A, Vit, Scis, Illum1, Illum2, ON/OFF of FGX
P type	Dia, Asp, Vit, Scis, Illum1, Illum2, ON/OFF of FGX

④ Plugs for light guide

For AP and P types, the connector of the light guide for intraocular illumination is inserted here.

⑤ Speaker

This is for a voice guidance, operation sound, and beep sound.

⑥ Tray

The remote control, each handpiece for US, I/A, and irrigation, vitrectomy cutter, intraocular scissors, and light guide probe are placed here.

Be sure not to place heavy object or rest your weight on this tray.

⑦ Tray UP/DOWN knob

Used to adjust the height of tray. While raising this knob with one hand, adjust the height of tray by holding the tray arm with the other hand.

Releasing this knob fixes the adjusted height.

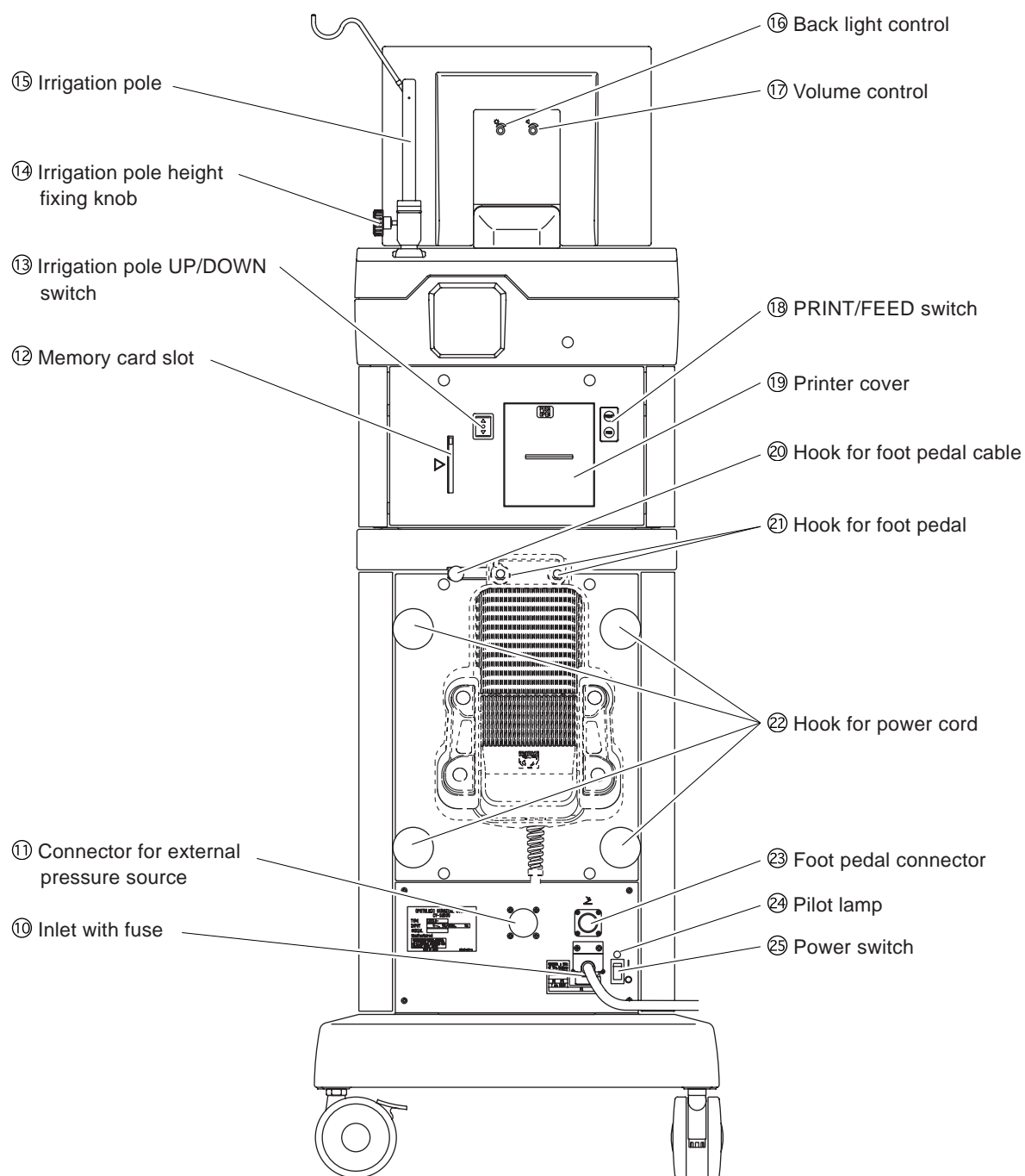
⑧ Storage box

The door of this storage box can be opened and closed with the knob.

⑨ Caster lock

Used to transport the system and fix the position of the system. The caster is locked by lowering the lever, and it is released by raising the lever.

[Rear side of the main body (AP type)]

**⑩ Inlet with fuse**

Inlet with the built-in fuse carrier.
The power cord is connected here.
When the power is not supplied to the system, there is a fear that fuses inside the carrier may be burnt.

⑪ Connector for external pressure source

When using a compressed air or nitrogen gas cylinder as a driving source for the vitrectomy cutter and intraocular scissors with AP or P type, the external pressure source is connected here.

⑫ Memory card slot

A memory card for storing data of surgery conditions is inserted here.

⑬ Irrigation pole UP/DOWN switch

Used to adjust the height of irrigation pole. By pressing the △ side, the irrigation pole is raised, and it is lowered by pressing the ▽ side.

⑭ Irrigation pole height fixing knob

When the adjustable range of the height is not enough with the irrigation pole UP/DOWN switch, loosen this knob and adjust the height of irrigation pole.

⑮ Irrigation pole

This is for hanging an irrigation bottle. The height of bottle can be adjusted with the electric switch. The irrigation bottle is hung on the hook at the top of this pole.

⑯ Back light control

Used to adjust the light quantity of the back light for LCD touch panel. Turning this control clockwise brightens the back light, and turning this control counterclockwise darkens the back light.

⑰ Volume control

Used to adjust the volume of speaker. Turning this control clockwise turns up the volume, and turning this control counterclockwise turns down the volume.

⑱ PRINT/FEED switch

When the PRINT switch is pressed, the surgery data displayed on the LCD touch panel is printed out.

When the FEED switch is pressed, the printer paper is fed. This switch is also used when the printer paper is replaced.

⑲ Printer cover

A printer is built in this cover. When “PUSH OPEN” at the top of this cover is pressed, the cover opens and it becomes possible to replace the printer paper.

⑳ Hook for foot pedal cable

A foot pedal cable is hung on here when the system is transported and stored.

㉑ Hook for foot pedal

A foot pedal is hung on here when the system is transported and stored.

㉒ Hook for power cord

A power cord is hung on here when transporting and storing the system.

㉓ Foot pedal connector

A connector of the foot pedal is connected here.

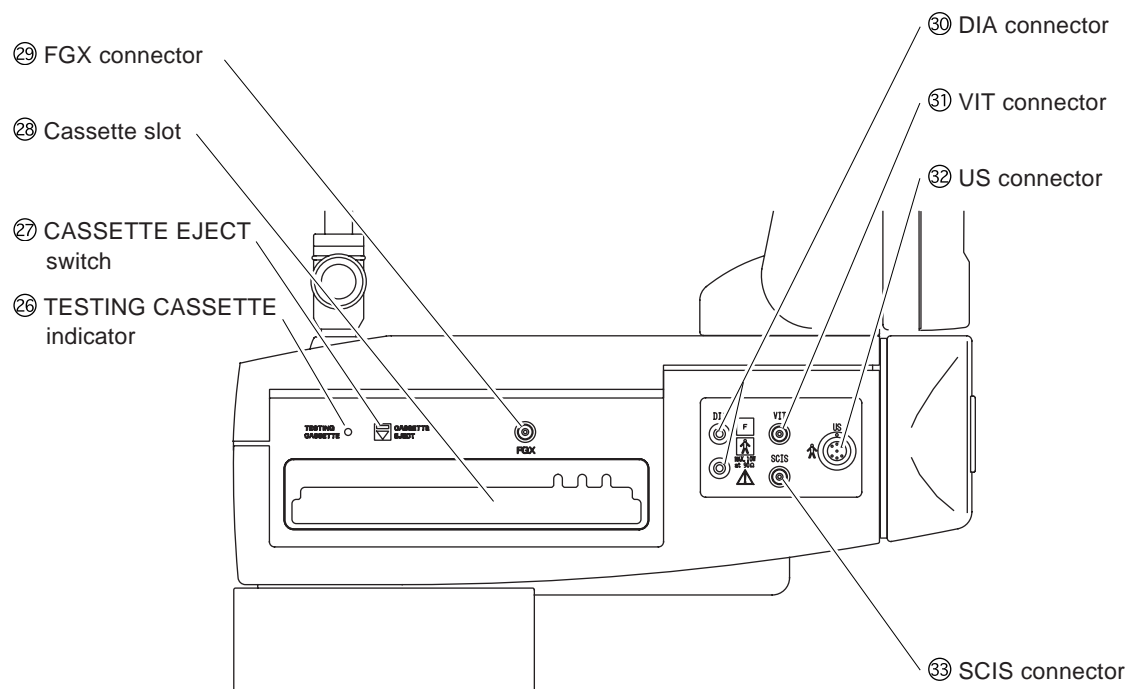
㉔ Pilot lamp

Lights up when the power is supplied to the system by turning ON (|) the power switch.

㉕ Power switch

Used to turn ON/OFF the power of the system. Pressing the “ | ” side turns ON the power, and pressing the “ ○ ” side turns OFF the power.

[Left side of the main body (AP type)]



②⑥ TESTING CASSETTE indicator

Blinks during a test.

②⑦ CASSETTE EJECT switch

To eject the cassette, press this switch. After the lock of cassette is unloaded, the cassette can be pulled out.

②⑧ Cassette slot

A cassette is inserted here.

②⑨ FGX connector

When fluid/gas used with AP or P type is exchanged, a tube connector for fluid/gas exchange is connected here via a microfilter.

③⑩ DIA connector

A banana plug of the diathermy connecting cord is connected here.

③⑪ VIT connector

A connector of the tube for driving the vitrectomy cutter is connected here.

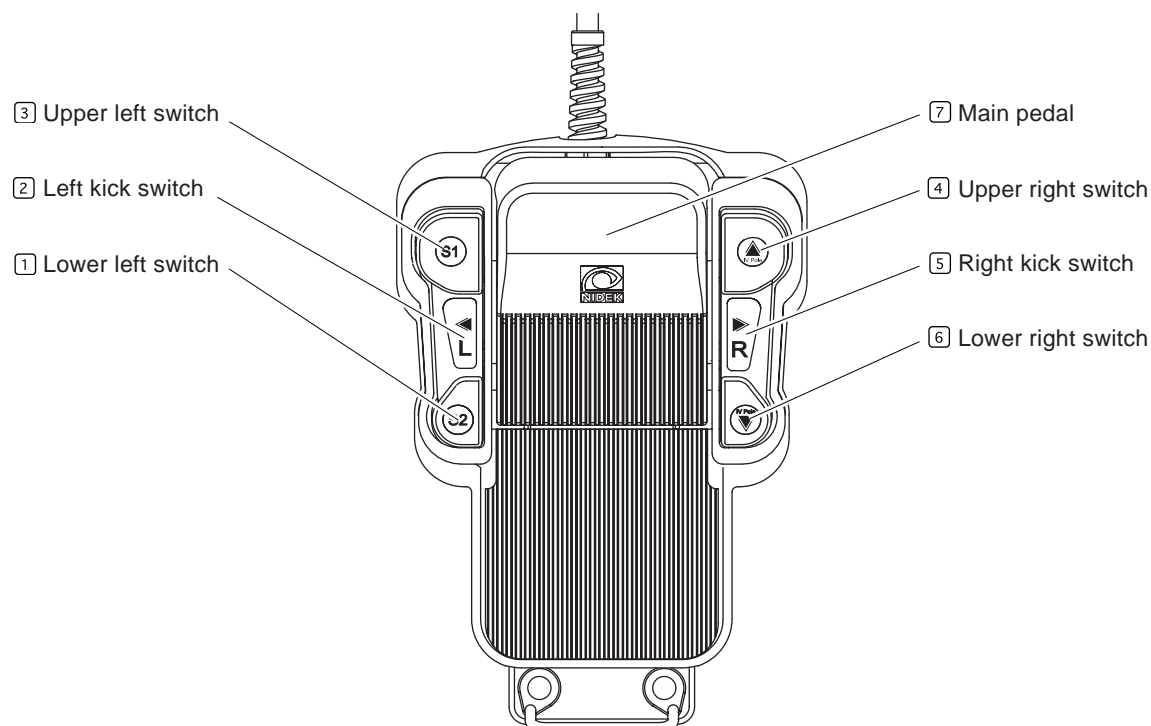
③⑫ US connector

A connector plug of the connecting cable for US handpiece is connected here when the US handpiece is used with A or AP type.

③⑬ SCIS connector

When the intraocular scissors is used with AP or P type, a connector for driving the intraocular scissors is connected here.

[Foot pedal]



Functions of each switch on the foot pedal can be changed with program setting. Here, the factory settings are described. (As for the change of foot switch patterns and the operation of each foot pedal position, see pages 3-10 and 3-11.)

* The factory setting is indicated with “Preset” on the LCD touch panel.

① Lower left switch

Used to switch the mode.

In the anterior mode, every time this switch is pressed, the mode during surgery is changed in the following order; Dia → Irr → US → I/A → Dia →

In the posterior mode, the mode during surgery is changed in the following order; Vit → ASP → Vit →

② Left kick switch

Used to reflux.

③ Upper left switch

When this switch is pressed while the diathermy output is possible, the diathermy is output with the set output power.

④ Upper right switch

While this switch is pressed, the irrigation pole is raised.

5 Right kick switch

In the anterior mode, the modulation is changed in the following order; US1 → US2 → (US3 →) US1 → ..., when the US mode is selected. When the I/A mode is selected, the modulation is changed in the following order; I/A1 → I/A2 → (I/A3 →) I/A1 →

In the Vit mode, the state of vitrectomy cutter is changed between READY and OFF with this switch.

In the posterior mode, this switch changes the state of vitrectomy cutter between READY and OFF when the Vit mode is selected. When the SCIS mode is selected, the insert mode is changed between ON and OFF with this switch.

If the US mode is selected, the ultrasound oscillation is changed between ON and OFF with this switch.

*Whether US3 or I/A3 mode can be used or not depends on the program setting.

6 Lower right switch

While this switch is pressed, the irrigation pole is lowered.

7 Main pedal

Controls the operation such as start/stop of irrigation, aspiration, ultrasound oscillation, vitrectomy cutter, and diathermy in the anterior mode.

In the posterior mode, it controls the operation of aspiration, vitrectomy cutter, intraocular scissors, and diathermy.

Followings are the operation of each foot pedal position.

[In anterior mode]

Mode Position	Dia	Irr	US	US (Propedal)
0	-	-	-	-
1	-	Irrigation	Irrigation	Irrigation + Aspiration ①
2	Diathermy	↑	Irrigation + Aspiration	Irrigation + Aspiration ② + US ①
3	↑	↑	Irrigation + Aspiration + US	Irrigation + Aspiration ③ + US ②

Mode Position	I/A	I/A (Propedal)	Vit
0	-	-	-
1	Irrigation	Irrigation + Aspiration ①	Irrigation
2	Irrigation + Aspiration	Irrigation + Aspiration ②	Irrigation + Aspiration + Cutter
3	↑	Irrigation + Aspiration ③	↑

* ON/OFF of “FreeFlow” has higher priority in the irrigation setting.

* Cutter operation in Vit mode depends on the setting of Ready/Off.

3 - 9

[In posterior mode]

Mode Position	Dia	Vit	Asp
OFF	-	-	-
ON	Diathermy	Aspiration + Cutter	Aspiration

Mode Position	US	Scis Auto	Scis Proportional
OFF	-	-	-
ON	Aspiration + US	Scissors cutting operation	Scissors linear operation

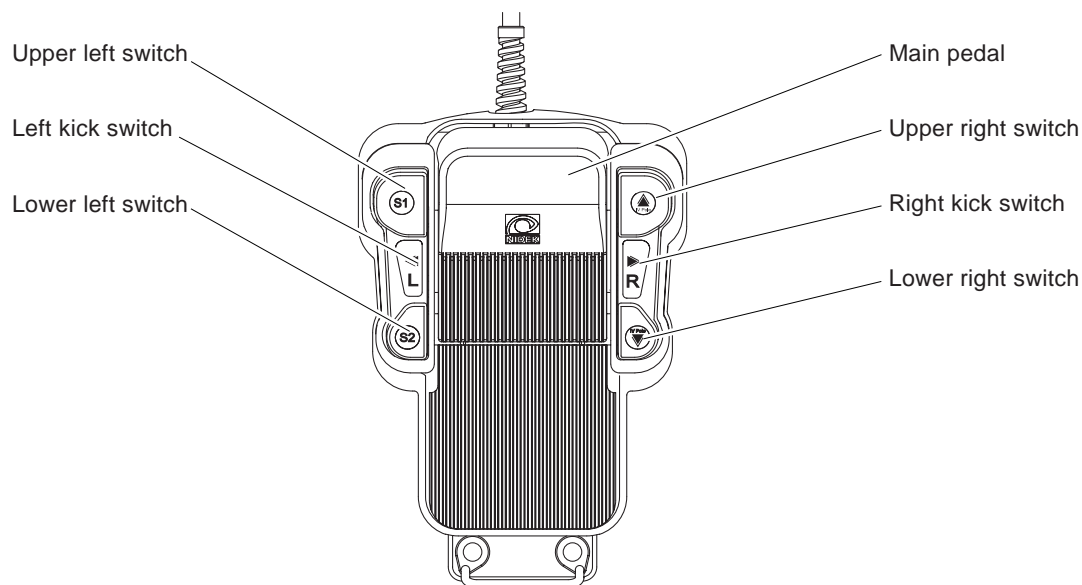
* Cutter operation in Vit mode depends on the setting of Ready/Off.

* Ultrasound oscillation in US mode is performed only when the right kick switch is ON during ultrasound oscillation.

[Foot switch patterns]

To change the function of each foot switch, press the **Preset** switch or **Pattern1** to **Pattern5** switch on the screen indicating each foot switch function, then select the desired pattern. (As for the changing method, see pages 4-97 and 4-103.)

The table below shows the function of switches in each pattern.



Switch \ Pattern	Preset	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5
Upper left switch	Diathermy output	Diathermy output	Diathermy output	Diathermy output	Reflux	FreeFlow ON/OFF
Left kick switch	Reflux	FreeFlow ON/OFF	Reflux	FreeFlow ON/OFF	FreeFlow ON/OFF	Reflux
Lower left switch	Mode switching	Mode switching	FreeFlow ON/OFF	Reflux	Mode switching	Mode switching
Upper right switch	POLE UP					
Right kick switch	Anterior: Switching the Modulation, Cutter READY/OFF Posterior: Cutter READY/OFF, Scissors insert mode ON/OFF, US oscillation ON/OFF					
Lower right switch	POLE DOWN					

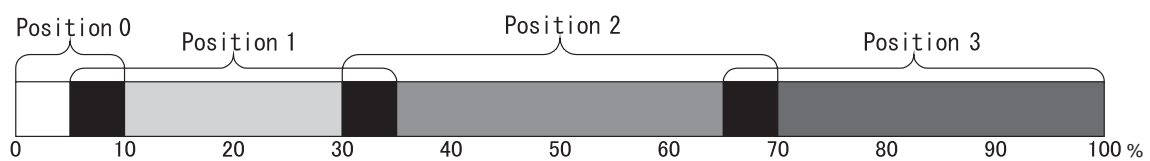
Switch \ Pattern	*Pattern 6	*Pattern 7	*Pattern 8
Upper left switch	Diathermy output	Diathermy output	Diathermy output
Left kick switch	Reflux	Vit1 ⇄ Vit2	Vit1 ⇄ Vit2
Lower left switch	Vit1 ⇄ Vit2	Mode switching	FGX ON/OFF
Upper right switch	POLE UP		
Right kick switch	Anterior: Switching the Modulation, Cutter READY/OFF Posterior: Cutter READY/OFF, Scissors insert mode ON/OFF, US oscillation ON/OFF		
Lower right switch	POLE DOWN		

* Pattern 6 to 8 are for vitreous surgery.

[Switch of main pedal position]

The position of main pedal is switched between Position 0 and Position 3 according to the pressing amount. (The illustration below shows each switching position.)

You feel a click just before the position is switched by holding the main pedal down. The reason why there is an overlap between positions is to surely perform the switching operation with the main pedal by setting different switching positions between the pressing and releasing of the pedal.

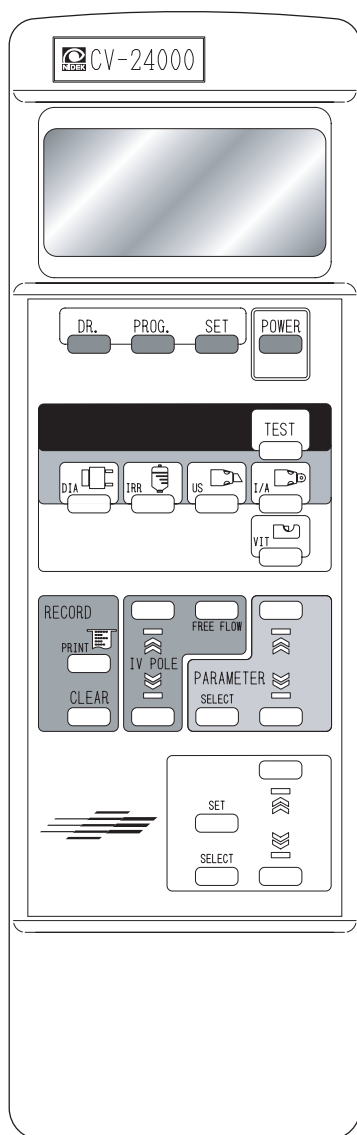


[Remote control]

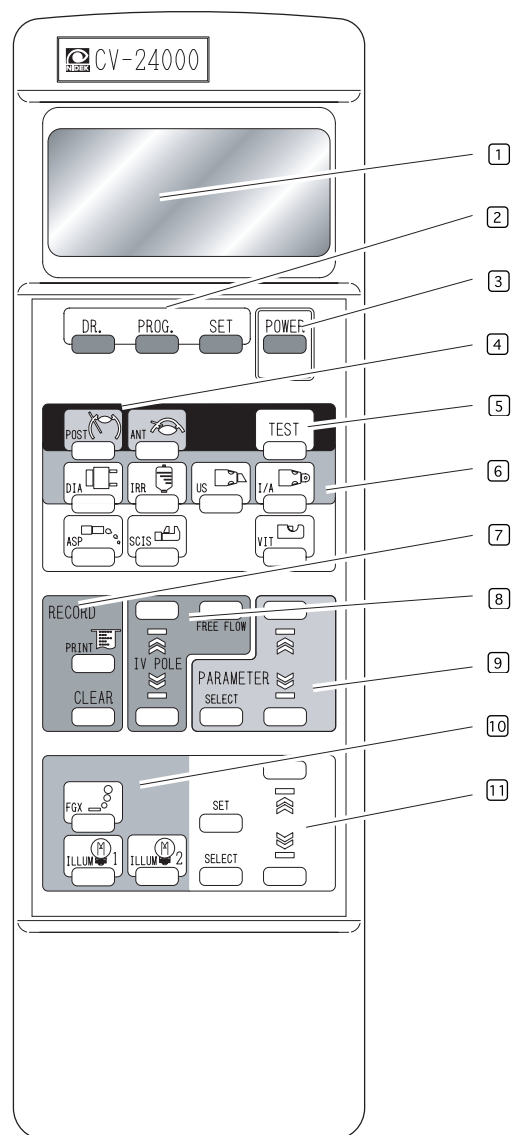
Type of remote control varies between A and AP types. Switches whose name and positions are the same have the same functions. (P type does not have a remote control.)

Each switch is positioned on the color-coded sheet according to its function.

Here, the descriptions are mainly for AP type.



[A type]



[AP type]

1 LCD monitor

Displays the name of pressed switch. Normally, the shift code (“RC 1”, “RC 2”, “RC 3”, “RC 4”) of the remote control is indicated.

Owing to the auto-power-off function, the power is turned OFF when no operation is executed for 30 minutes. The “OFF” indication starts blinking 1 minute before the power is automatically turned OFF.

The “BATT” indication appears when the amount of remaining battery time becomes small.

2 DR./PROG./SET switch

Used to change Doctor/Program.

When the DR. switch is pressed, the selected DR. being highlighted appears in the small screen for the change of Doctor. Keep pressing the DR. switch until the desired Doctor is highlighted, and press the SET switch to determine.

To change the Program, use the PROG. switch in the same manner.

* “Preset” means the factory setting.

* DR. cannot be changed on the screens during surgery.

3 POWER switch

Turns ON/OFF the power of the remote control.

4 ANT/POST switch (only for AP type)

Displays the main screen for Anterior/Posterior mode.

The main screen for Anterior mode appears by pressing the ANT switch, and the one for Posterior mode appears by pressing the POST switch.

When these switches are pressed on the screen during surgery, both switches works as the “Exit” switch.

5 TEST switch*2

Used to start the system test.

6 Mode selection switch*2

Used to display each mode screen. The function is the same as switches on the switch panel which is on the right side of LCD touch panel.

* ASP switch and SCIS switch are only for AP type.

7 PRINT/CLEAR switch

By pressing the PRINT switch, the surgery data can be printed out.

By pressing the CLEAR switch, the surgery data is cleared.

*2 By pressing the TEST switch, the message “US, Vit, Dia?” is displayed on the screen in the anterior mode, and the message “PPL, Vit, Dia?” is displayed in the posterior mode. To start the system test, wait 3 seconds, or press the TEST switch again. To start a test of a specific mode, press the switch of the mode to test while the message is displayed (within 3 seconds).

8 IV POLE/FREE FLOW switch

Pressing the up switch of IV POLE raises the irrigation pole, and it is lowered when the down switch is pressed.

Every time the FREE FLOW switch is pressed, FreeFlow is switched between ON and OFF.

9 PARAMETER SELECT switch

Used to change the setting of items which are not indicated on the small screens on the LCD touch panel. Changeable items are as follows;

- Dia Power • US Power • Vacuum • Cut Rate • Scis Pressure

(When the propedal is set, US Power and Vacuum can be set for each position.)

Keep pressing the SELECT switch until the blue triangle cursor showing the changeable item moves to the desired item, and press the up or down switch to change the setting. To clear the blue triangle cursor, wait for 5 seconds without any operation or press the SET switch.

10 FGX / ILLUM 1 / ILLUM 2 switch (only for AP type)

Every time the FGX switch is pressed, FGX is switched between ON and OFF.

Every time the ILLUM 1 or ILLUM 2 switch is pressed, the illumination is switched between ON and OFF.

(Functions of FGX, ILLUM 1, and ILLUM 2 switches are the same as switches on the switch panel which is on the right side of LCD touch panel.)

11 Small frame SELECT/SET switch

Used to indicate the small screen and change the setting of items.

Keep pressing the SELECT switch until the highlighted area moves to the desired item, and press the up or down switch to change the setting.

To clear the small screen, wait for 5 seconds without any operation or press the SET switch.

§4 OPERATING PROCEDURES

4.1 Preparation Before Surgery

CAUTION

- The words [SCRUB] or [CIRCULATOR] in the instructions indicate the personnel responsible to perform the task.
[SCRUB]: The operator or assistant who is in the sterile area.
[CIRCULATOR]: The personnel who operate the system in the nonsterile area.
Be sure to follow the instruction, [SCRUB] or [CIRCULATOR].

4.1.1 Sterilization of instruments

(Perform sterilization considering the time required to sterilize and dry instruments before surgery.)

1. [CIRCULATOR] places all the accessories to be sterilized on the tray after washing them.

[Accessories to be sterilized]

- Irrigation handpiece
- I/A tip
- US tip
- Diathermy forceps or pencil
- Diathermy cable
- I/A handpiece
- US handpiece
- Wrench for tip
- Other necessary instruments

CAUTION

- It is recommended to place the handpiece and tips in the sterilization case for sterilization.
Since they are the precision parts, there is a fear of loss or damage.

2. [CIRCULATOR] sterilizes the instruments together with the tray.

[CIRCULATOR]

(1) Method

Perform the autoclave sterilization.

(2) Sterilizer

Use a **vacuum drying type** sterilizer.

⚠ CAUTION

- Never fail to use a **vacuum drying type** sterilizer for autoclaving of the US handpiece.
Any sterilizers other than the vacuum drying type degrades the performance of the US handpiece.

(3) Sterilizing temperature and time

Because the relationship between temperature and time in autoclave sterilization depends on the characteristics of the autoclaving system and items to be sterilized, and the number of them, we cannot provide you with reliable conditions for the sterilization. Verify the autoclave sterilizer and the temperature and time of sterilization in your medical facility.

For reference, the following is standard number for the sterilization industry:

Sterilizing temperature at 132°C 12 minutes.

⚠ CAUTION

- Autoclave instruments at a temperature of 132°C or lower.
Otherwise, the instruments may be damaged because of overheating.
- Items in the sterilization case and parts of them covered with gauze, etc. are kept from the steam to some extent. Therefore, they need sterilizing longer than under normal conditions.

(4) Drying

After the sterilization, dry the instruments for at least 10 minutes (20 minutes is recommended).

⚠ CAUTION

- Drying is the final and an important process of autoclaving. If the drying is not enough, an adequate sterilization result cannot be expected. Therefore infection will be possible.

3. After cooling the sterilized instruments enough, store them in a clean, dry place without load on them.

4.1.2 Setup

CAUTION

- Prior to the first use of the system each day, perform the system test and function checks referring to the Pre-operation check manual (18214-P912A).
NIDEK assumes no responsibility if failure occurs during the operation of each mode without performing the test and checks.

1. [CIRCULATOR] sets the system on a convenient position for surgery.

When the system is set, lock the caster.

2. [CIRCULATOR] sets the foot pedal on the convenient position.

If the cable plug of the foot pedal is not connected, connect it to the foot pedal connector on the rear side of the system.

3. As for AP or P type, [CIRCULATOR] prepares the external pressure source if necessary.

If the system requires the external pressure source, connect the external pressure source to the external pressure source connector on the rear side of the system.

* Adjust the air pressure of external pressure source to 450 - 550 kPa.

4. [CIRCULATOR] plugs the power cord in the power outlet.

5. [CIRCULATOR] turns ON (|) the power switch on the rear side of the system.

The pilot lamp lights up.

6. [CIRCULATOR] verifies that the sterilization package has no wetness and break. Then, [CIRCULATOR] opens the package and hand the cassette to [SCRUB].

CAUTION

- If wetness or break is found, replace the sterilization package with another one.
- When opening the sterilization package and handing the contents to [SCRUB], pay attention not to let them get nonsterilized.

7. [SCRUB] receives the cassette from [CIRCULATOR]. [SCRUB] connects the cassette to the connection set that is appropriate for the surgery to be performed. Then [SCRUB] hands the cassette to [CIRCULATOR].

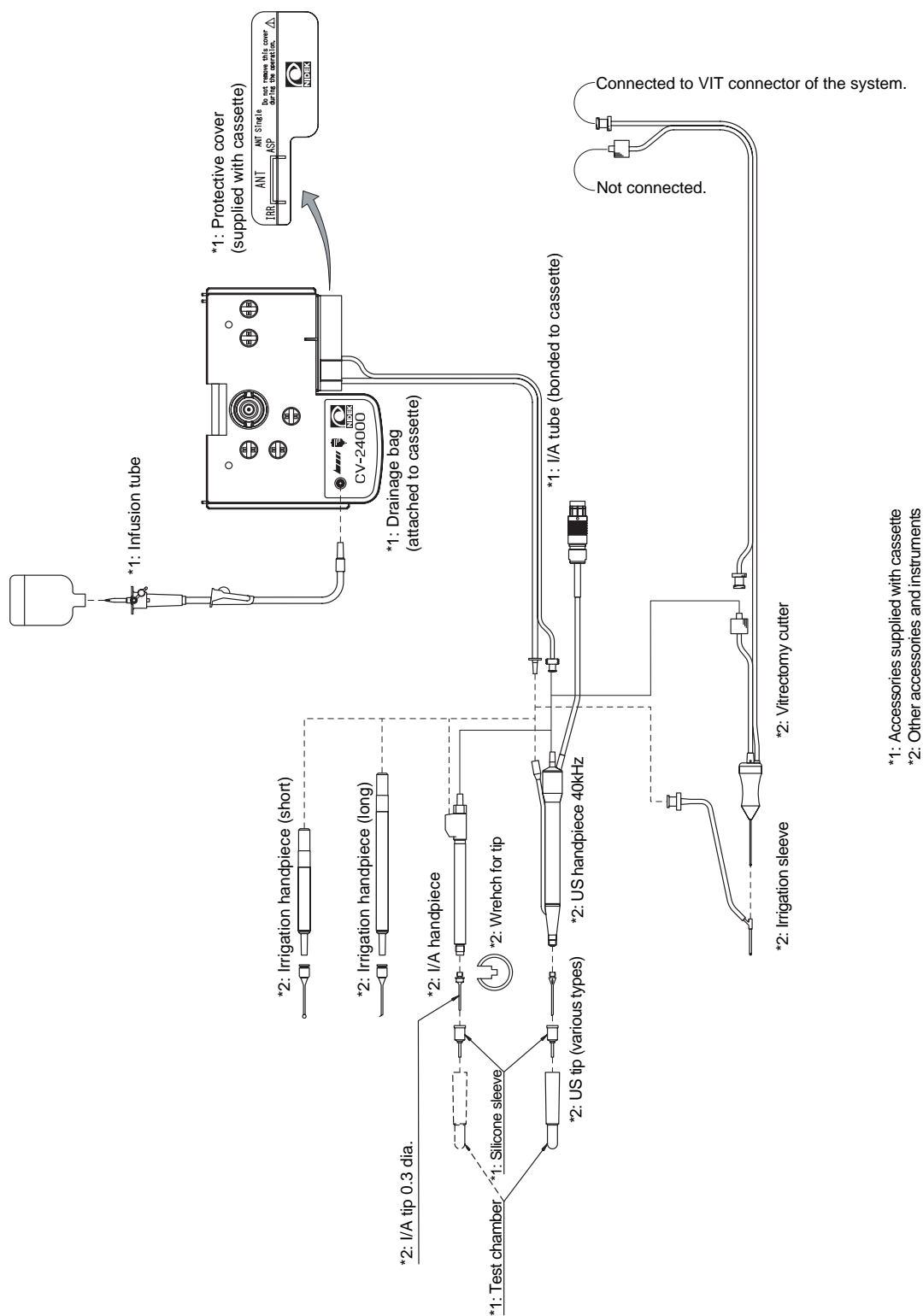
- 1) [SCRUB] places the cassette on a sterile and stable place.
- 2) When using a cassette other than the anterior single cassette, [SCRUB] replaces the connection set.
 - i) [SCRUB] removes the protective cover from the anterior single cassette.
 - ii) [SCRUB] connects the appropriate connection set to the position where the protection cover was removed while paying attention to the port from the cassette so that it is not contaminated.
 - * After the connection set is replaced, a lug is locked so that it cannot be removed. NIDEK does not assure the operation of system if the connection set is forcefully removed.
 - * Do not connect the connection set while the cassette is inserted into the system.
- 3) [SCRUB] hands only the cassette to [CIRCULATOR].

NOTE

- Procedure from here varies according to the cassette to be used in connection of tubes and test types. Verify the cassette type and refer to the description about the setting and test.
 - Setting and test for the anterior single cassette <A, AP> p. 4-5
 - Setting and test for the anterior dual cassette <A, AP> p. 4-9
 - Setting and test for the anterior/posterior dual cassette <AP> p. 4-13
 - Setting and test for the posterior dual cassette
(Posterior setting) <AP> p. 4-21
 - Setting and test for the posterior dual cassette
(ANT/POST setting) <AP> p. 4-27
 - Setting and test for the posterior dual cassette (Dual) <P> p. 4-34
 - Setting and test for the posterior dual cassette (Single) <P> p. 4-40
- Record the result of each test in the checklist of the Pre-operation check manual (18214-P912A).

4.2 Setting and Testing Each Cassette

4.2.1 For anterior single cassette -- For A and AP types




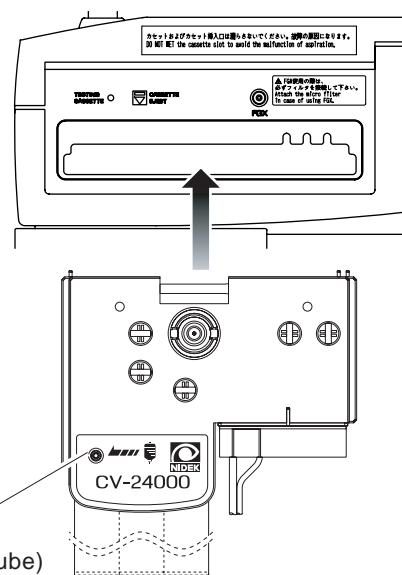
NOTE

- If aspiration is not performed properly during surgery, confirm the connection of the tube first. If that does not solve the problem, replace the cassette and perform the cassette and system tests again.
In addition, inform one of NIDEK's sales representative of the occurrence of the problem and the lot number of the I/A tube.
- If the drain bag becomes full during surgery, replace the cassette immediately and perform the cassette and system tests again.
The drained water may run through the system and cause malfunction.


1. Securely insert the anterior single cassette into the cassette slot.

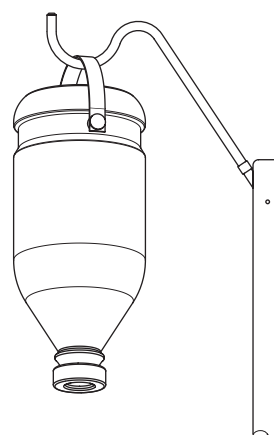
- 1) [CIRCULATOR] opens the disposable cassette pack. [SCRUB] takes out a cassette and hands it to [CIRCULATOR].
- 2) Insert the anterior single cassette into the cassette slot on the left side of the system as far as it goes. [CIRCULATOR]
 - * After the cassette is inserted, it is automatically tested. Wait until the cassette test is completed.

Luer of the  mark
(Connect the infusion tube)

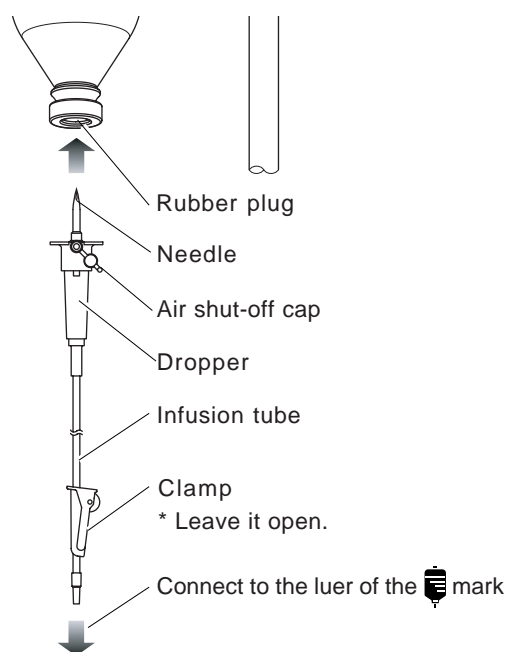


2. After the cassette test, [CIRCULATOR] connects the infusion tube.

- 1) Open the package of infusion tube and take out the infusion tube.
- 2) Close the clamp of infusion tube and remove the cap from the tip of spike. Then, securely fit the spike onto the rubber stopper of the irrigation bottle.
- 3) Connect the luer of infusion tube to the luer of the  mark on the cassette. (See step 1.)



- 3) Remove the protector from the needle and stick the needle straight to the rubber plug on the irrigation bottle.
- 4) Pinch the dropper slowly with fingers and release it so that the irrigation solution fills half of the dropper.



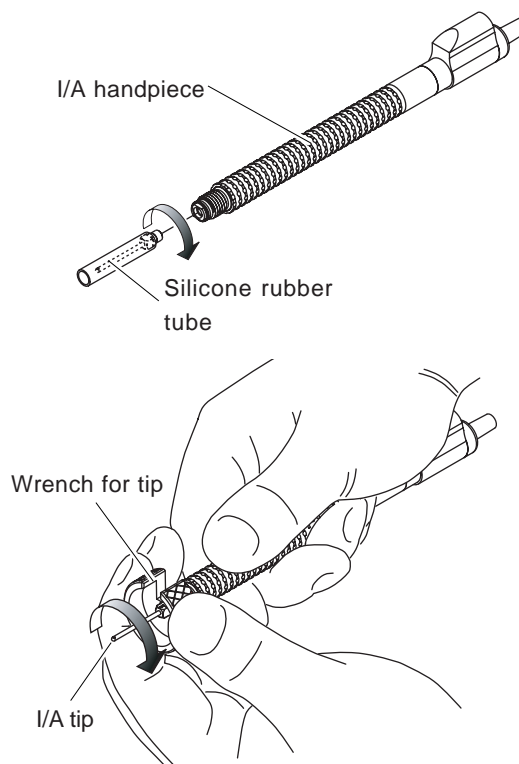
3. [SCRUB] receives a set of autoclaved instruments from [CIRCULATOR].

4. [SCRUB] sets the I/A handpiece.

- 1) Screw the I/A tip with the silicone rubber tube on into the I/A handpiece.
- 2) When the I/A tip is screwed as far as it goes, remove the silicone rubber tube.
- 3) Hold the wrench for the tip as illustrated on the right. Tighten the root of the I/A tip firmly with the wrench for the tip.

⚠ CAUTION

- If the tip wrench is held incorrectly, the user's hand may get injured with the US tip.



4) Put the silicone sleeve on the I/A tip. Then hold the thick part of the sleeve and screw it.

5) Adjust the position relationship of the silicone sleeve and I/A tip.

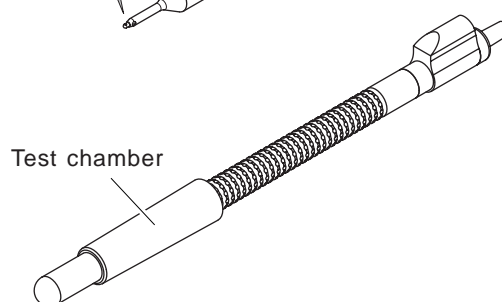
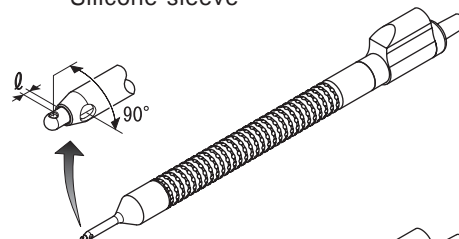
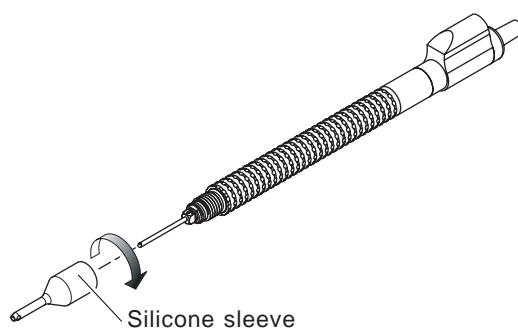
* The following is the standard:

- ① The distance ($= \ell$) between the end of the silicone sleeve and the port of the I/A tip is approximately the same as the diameter of the port.
- ② The angle that the irrigation port of the sleeve and the port of the I/A tip make is 90° .

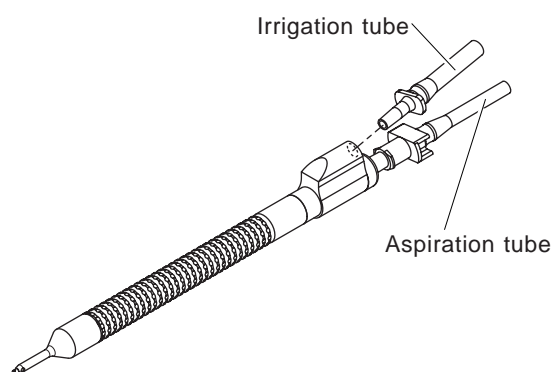
6) As necessary, put the test chamber on the tip of the I/A handpiece.

⚠ CAUTION

- Put the test chamber on the end of the I/A handpiece when it is not used to protect the I/A tip.



7) Connect the I/A tubes to the I/A handpiece as illustrated on the right as necessary.

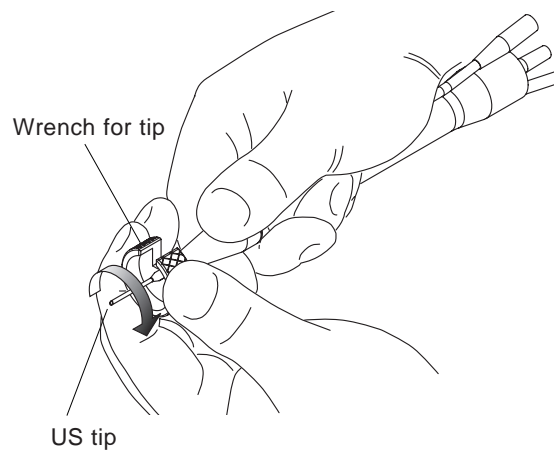
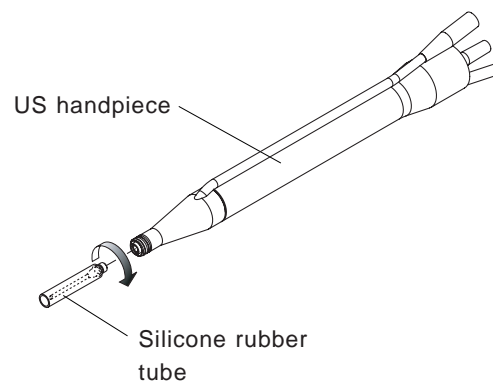


5. Set the US handpiece.

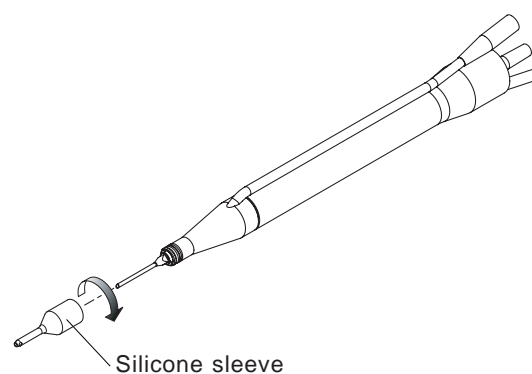
- 1) **[SCRUB]** screws the US tip with the silicone rubber tube on into the US handpiece.
- 2) When the US tip is inserted as far as it goes, **[SCRUB]** removes the silicone rubber tube.
- 3) **[SCRUB]** tightens the root of the US tip firmly with the wrench for the tip.

⚠ CAUTION

- If the root of the US tip is not tightened enough, failure of ultrasound oscillation may happen.
- If the tip wrench is held incorrectly, the user's hand may get injured with the US tip.



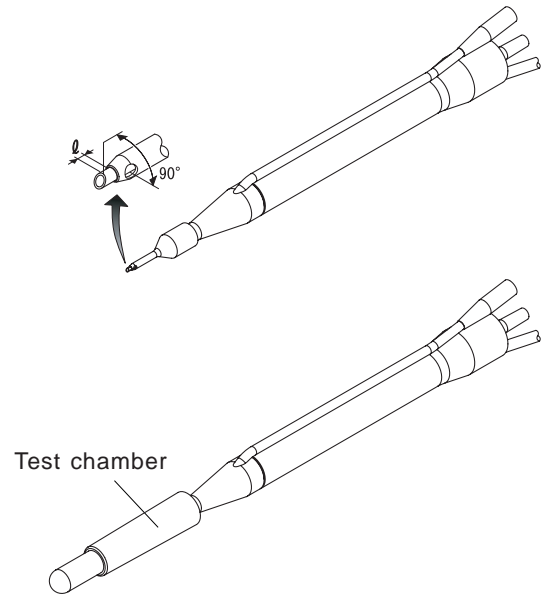
- 4) **[SCRUB]** puts the silicone sleeve on the US tip. Then hold the thick part of the sleeve and screw it.



- 5) **[SCRUB]** adjusts the position relationship of the silicone sleeve and US tip.

* The following is the standard:

- ① The distance ($= \varnothing$) between the end of the silicone sleeve and the aspiration port of the US tip is approximately the same as the diameter of the port.
- ② The angle that the irrigation port of the sleeve and the aspiration port of the US tip make is 90° .



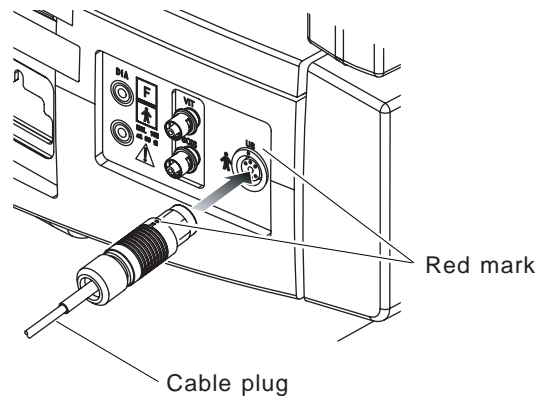
- 6) As necessary, **[SCRUB]** puts the test chamber on the tip of the US handpiece as necessary.

⚠ CAUTION

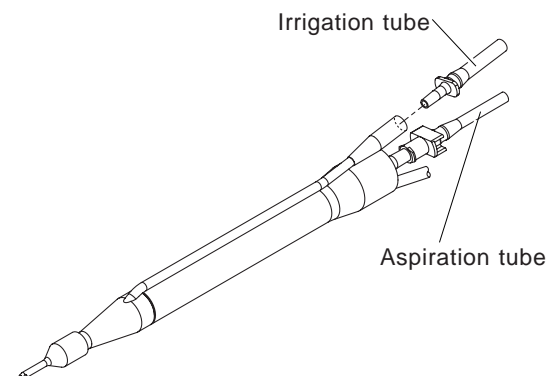
- Put the test chamber on the tip of the US handpiece when it is not used to protect the US tip.
- Be careful not to make the end of the US tip contact the test chamber and pierce a hole in it.

- 7) **[SCRUB]** hands the plug of the US handpiece to the **[CIRCULATOR]**.

- 8) **[CIRCULATOR]** aligns the red mark on the cable plug and the connector. Then insert the plug straight to the connector.



- 9) **[SCRUB]** connects the I/A tubes to the US handpiece as illustrated on the right as necessary.



6. [CIRCULATOR] performs the system test.

Press the System switch in the “Test” box on the main screen to perform the test of irrigation/aspiration. (If the plug of US handpiece is connected, ultrasound oscillation is also checked.)

* To operate with the remote control, press the TEST switch.

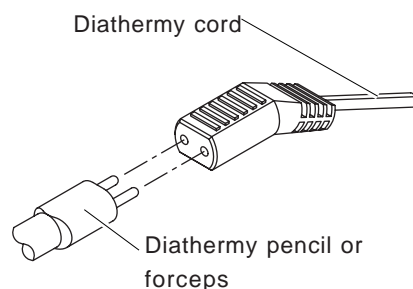
⚠ CAUTION

- Disconnect the plug of US handpiece when the test of ultrasound oscillation is not performed.
If the ultrasound oscillation is performed in the air while the plug is connected, the US handpiece may be damaged.
- Slightly hold the tip of test chamber during the system test so that the tip of the test chamber does not get sucked into its inside.
If the tip of the test chamber gets sucked into its inside during the system test, test error may result.

7. If necessary, set and test the diathermy.

- 1) [SCRUB] connects the diathermy cable to the diathermy forceps or pencil and hand the other side of the cable to [CIRCULATOR].

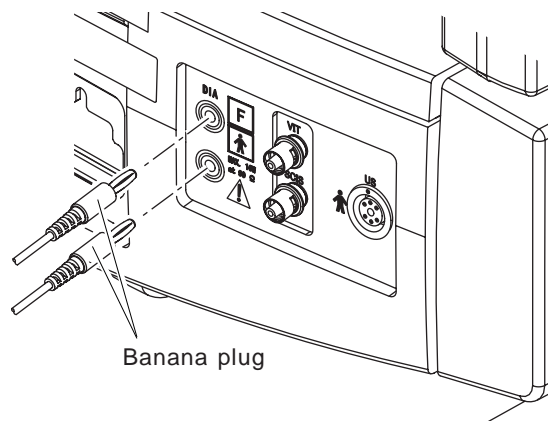
The connection can be made in either way because it has no polarity.



- 2) [SCRUB] hands the banana plugs of the diathermy cord to [CIRCULATOR].

- 3) [CIRCULATOR] connects the received banana plugs to the DIA connectors on the left side of the system.

The connection can be made in either way because they have no polarity.



- 4) As necessary, [SCRUB] has the [CIRCULATOR] press the **Dia** switch in the “Test” box on the main screen, and verify the operation of diathermy unit.
- * To operate with the remote control, press the TEST switch and then the Dia switch. (Press the Dia switch while the message “US, Vit, Dia?” is displayed.)

NOTE

- The diathermy test is just checking whether the diathermy unit inside the system properly works. Break in the diathermy cable or failure of diathermy forceps/pencil cannot be verified.

8. As necessary, perform the test of ultrasound oscillation.

NOTE

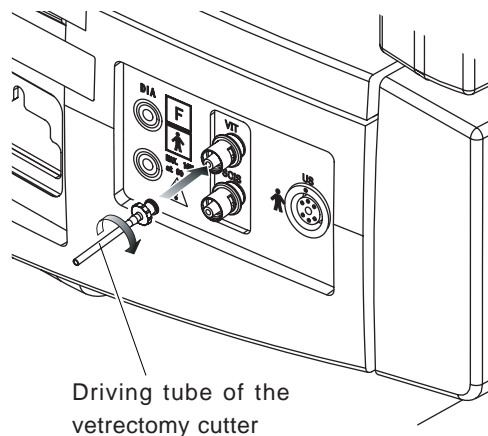
- Perform the test of ultrasound oscillation when the US handpiece or US tip is replaced during surgery.

[CIRCULATOR] presses the **US** switch in the “Test” box on the main screen to verify the ultrasound oscillation.

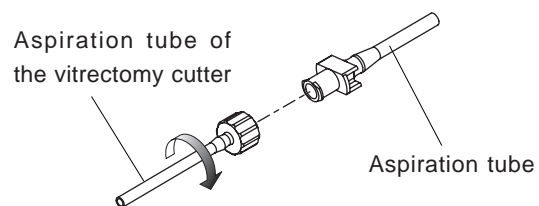
- * To operate with the remote control, press the TEST switch and then the US switch. (Press the US switch while the message “US, Vit, Dia?” is displayed.)

9. If necessary, perform the motion test of vitrectomy cutter.

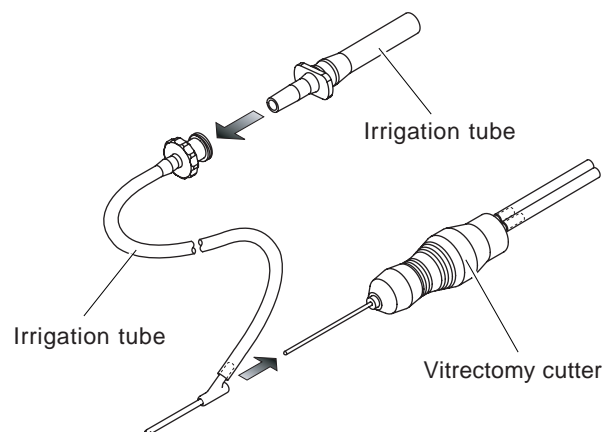
- 1) [CIRCULATOR] opens the sterilized package of vitrectomy cutter and has [SCRUB] take out the cutter.
- 2) [CIRCULATOR] hands the driving tube of vitrectomy cutter to [SCRUB].
- 3) [SCRUB] connects the driving tube of the vitrectomy cutter to the VIT connector on the left side of the system.
Align the luer of the tube and the center of the connector. Then insert the luer into the connector while turning to clockwise.



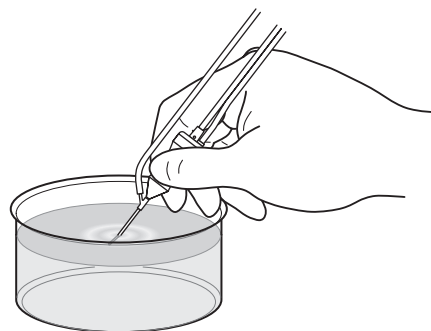
- 4) **[SCRUB]** connects the female luer of the aspiration tube to the male luer of the shorter aspiration tube of the vitrectomy cutter.



- 5) **[SCRUB]** inserts the needle of the vitrectomy cutter into the irrigation sleeve as far as it goes and connects the irrigation sleeve to the irrigation tube as illustrated on the right.



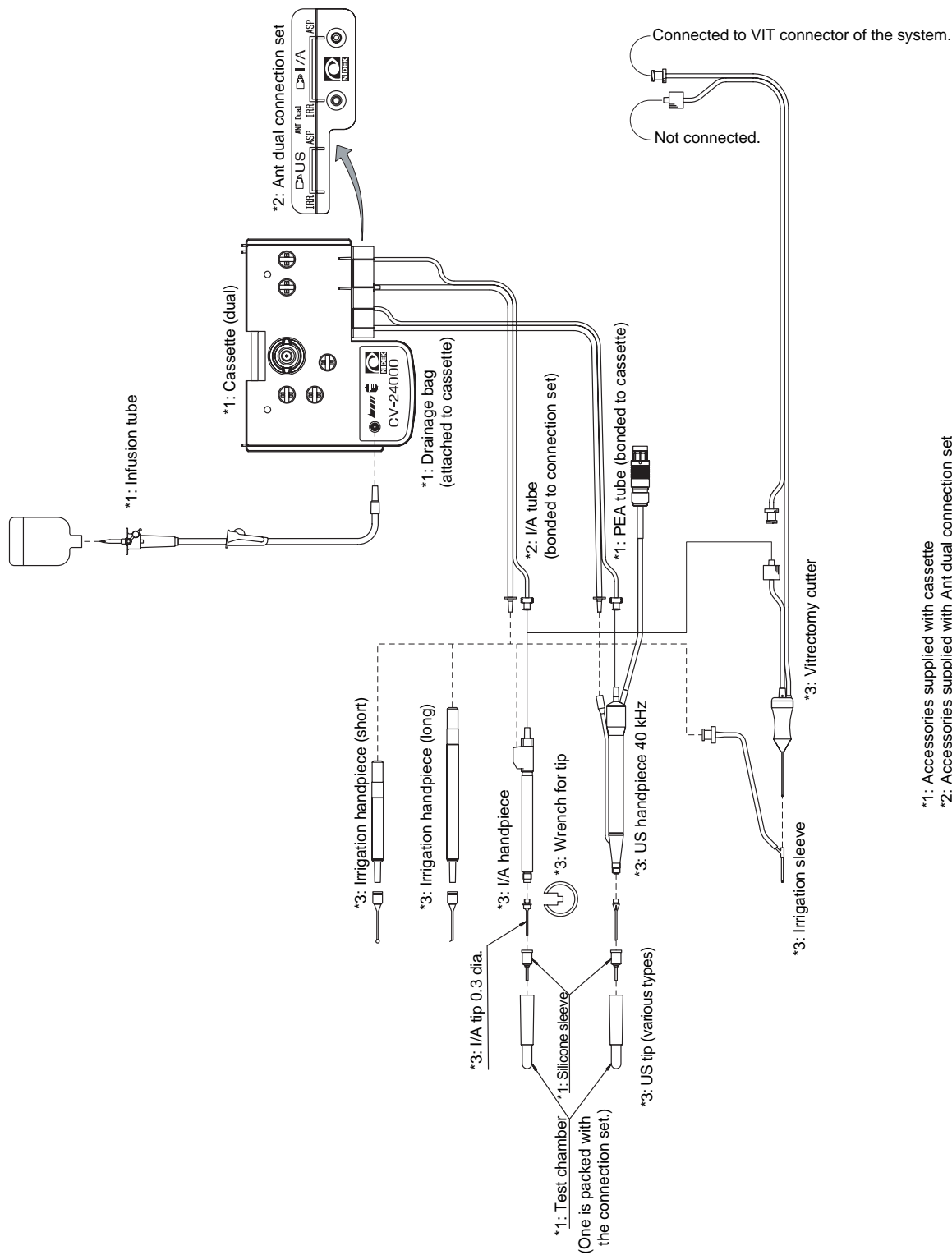
- 6) **[SCRUB]** immerses half of the needle tip of vitrectomy cutter in the irrigation solution.



- 7) **[SCRUB]** has **[CIRCULATOR]** press the **Vit** switch in the “Test” box on the main screen, and visually checks the motion of vitrectomy cutter.

* To operate with the remote control, press the TEST switch and then the Vit switch. (Press the Vit switch while the message “US, Vit, Dia?” is displayed.)

4.2.2 For anterior dual cassette -- For A and AP types



*1: Accessories supplied with cassette
 *2: Accessories supplied with Ant dual connection set
 *3: Other accessories and instruments

NOTE

- If aspiration is not performed properly during surgery, confirm the connection of the tube first. If that does not solve the problem, replace the cassette and perform the cassette and system tests again.
In addition, inform one of NIDEK's sales representative of the occurrence of the problem and the lot number of the I/A tube.
- If the drain bag becomes full during surgery, replace the cassette immediately and perform the cassette and system tests again.
The drained water may run through the system and cause malfunction.

1. Insert the anterior dual cassette into the cassette slot.

- 1) [SCRUB] takes the cassette and Ant dual connection set out of the sterilization package opened by [CIRCULATOR] and hands them to [CIRCULATOR].
- 2) [CIRCULATOR] connects the Ant dual connection set to the cassette.
- 3) [CIRCULATOR] securely inserts the anterior dual cassette into the cassette slot on the left side of the system.
* After the cassette is inserted, it is automatically tested. Wait until the cassette test is completed.

2. After the cassette test, [CIRCULATOR] connects the infusion tube.

See step 2 (pp. 4-6 to 4-7) for connection of the infusion tube.

3. [SCRUB] receives a set of sterilized instruments from [CIRCULATOR].

4. [CIRCULATOR] receives the plug of US handpiece from [SCRUB] and connects it to the US connector on the left side of the system.

See step 4 (pp. 4-7 to 4-8) for setting the I/A handpiece.

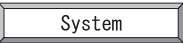
* Connect the I/A tube from the I/A side of the cassette to the I/A handpiece.

5. [SCRUB] assembles the handpiece.

See step 4 (pp. 4-7 to 4-8) for setting the I/A handpiece.

* Connect the I/A tube from the I/A side of the cassette to the I/A handpiece.

6. [CIRCULATOR] performs the system test.

[CIRCULATOR] presses the  switch in the “Test” box on the main screen to perform the test of irrigation/aspiration for each line of US and I/A sides. (If the plug of US handpiece is connected, ultrasound oscillation is also checked.)

* To operate with the remote control, press the TEST switch.

7. As necessary, set and test the diathermy.

1) See 1) to 3) of step 7 (p.4-11) and set for the diathermy.

2) As necessary, [SCRUB] has [CIRCULATOR] press the  switch in the “Test” box on the main screen, and verifies the operation of diathermy unit.

* To operate with the remote control, press the TEST switch and then the Dia switch. (Press the Dia switch while the message “US, Vit, Dia?” is displayed.)

NOTE

- The diathermy test is just checking whether the diathermy unit inside the system properly works. Break in the diathermy cable or failure of diathermy forceps/pencil cannot be verified.

8. If necessary, perform the test of ultrasound oscillation.

NOTE


- Perform the test of ultrasound oscillation when the US handpiece or US tip is replaced during surgery.

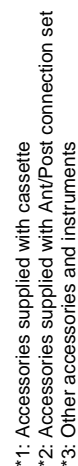
1) Confirm that the I/A tube from the US side of the cassette is connected to the US handpiece.

2) [CIRCULATOR] presses the  switch in the “Test” box on the main screen to verify the ultrasound oscillation.

* To operate with the remote control, press the TEST switch and then the US switch. (Press the US switch while the message “US, Vit, Dia?” is displayed.)

9. If necessary, perform the motion test of vitrectomy cutter.

- 1) See 1) to 3) of step 9 (p.4-12) and set the vitrectomy cutter to the system.
- 2) **[SCRUB]** inserts the needle of the vitrectomy cutter into the irrigation sleeve as far as it goes.
- 3) **[SCRUB]** connects the irrigation tube from the I/A side of cassette to the irrigation sleeve, and connects the aspiration tube from the I/A side of cassette to the relay point of the aspiration tube of vitrectomy cutter.
- 4) **[SCRUB]** immerses half of the needle tip of vitrectomy cutter in the irrigation solution.
- 5) **[SCRUB]** has **[CIRCULATOR]** press the  switch in the “Test” box on the main screen, and visually checks the motion of vitrectomy cutter.
 - * To operate with the remote control, press the TEST switch and then the Vit switch. (Press the Vit switch while the message “US, Vit, Dia?” is displayed.)




NOTE

- If aspiration is not performed properly during surgery, confirm the connection of the tube first. If that does not solve the problem, replace the cassette and perform the cassette and system tests again.
In addition, inform one of NIDEK's sales representative of the occurrence of the problem and the lot number of the I/A tube.
- If the drain bag becomes full during surgery, replace the cassette immediately and perform the cassette and system tests again.
The drained water may run through the system and cause malfunction.

1. Insert the anterior/posterior dual cassette into the cassette slot.

- 1) [SCRUB] takes the cassette and Ant/Post dual connection set out of the sterilization package opened by [CIRCULATOR] and hands them to [CIRCULATOR].
- 2) [CIRCULATOR] connects the Ant/Post dual connection set to the cassette.
- 3) [CIRCULATOR] securely inserts the anterior/posterior dual cassette into the cassette slot on the left side of the system.
* After the cassette is inserted, it is automatically tested. Wait until the cassette test is completed.

2. After the cassette test, [CIRCULATOR] connects the infusion tube.

- 1) Open the package of infusion tube and take out the infusion tube.
- 2) Close the clamp of infusion tube and remove the cap from the tip of spike. Then, securely fit the spike onto the rubber stopper of the irrigation bottle.
- 3) Connect the luer of infusion tube to  marked luer on the cassette, and open the clamp of infusion tube.

3. [SCRUB] receives a set of sterilized instruments from [CIRCULATOR].

4. [CIRCULATOR] receives the plug of US handpiece from [SCRUB] and connect it to the US connector on the left side of the system.

Align the red mark of the plug of US handpiece with that of the US connector on the left side of the system, and directly insert the plug as far as it will go.

5. [SCRUB] assembles the handpiece.

- 1) After putting the US tip and silicone sleeve to the US handpiece, put the test chamber on the silicone sleeve. Put the I/A tip and silicone sleeve to the I/A handpiece.
* If the US handpiece is not used, put the test chamber to the I/A handpiece.
- 2) Connect the I/A tube coming from the ANT side of cassette to the US handpiece.
* If the US handpiece is not used, connect the I/A tube coming from the ANT side of cassette to the I/A handpiece.

6. Connect the vitrectomy cutter.

- 1) [CIRCULATOR] opens the sterilized package of vitrectomy cutter and lets [SCRUB] take out the cutter.
- 2) [CIRCULATOR] connects the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.
- 3) [SCRUB] connects the end of aspiration tube of vitrectomy cutter to the ASP connector on the POST side of cassette.
* If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter. (If not necessary, connect luers of relay point.)


7. [SCRUB] connects the irrigation cannula.

Connect the irrigation cannula to the tip of irrigation tube coming from the POST side of cassette via the 3-way valve.

- ## CAUTION

- 9. [CIRCULATOR] performs the system test.**

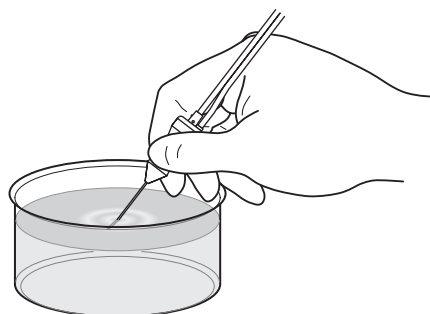
- 1) Call up the anterior mode screen (main screen).

- 2) Press the  switch in the “Test” box on the main screen to perform the test of irrigation/aspiration on the ANT side. (If the plug of US handpiece is connected, ultrasound oscillation is also checked.)

* To operate with the remote control, press the TEST switch.

- 3) When the test on the ANT side is completed, the test is suspended and the switch appears.

- 4) If there is no problem in the connection on the POST side, [SCRUB] immerses the needle tip of vitrectomy cutter in the irrigation solution.



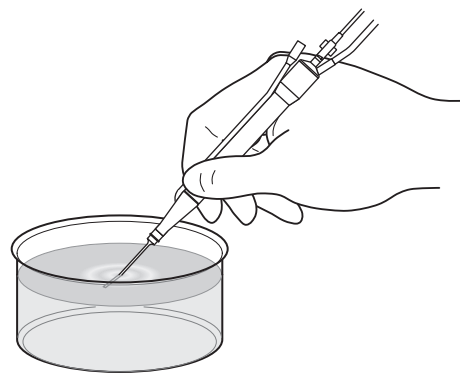
- 5) Press the  switch to perform the aspiration test on the POST side.

* It is also possible for [SCRUB] to perform the aspiration test on the POST side by pressing the main pedal or the TEST switch of the remote control instead of [CIRCULATOR] pressing the

Continue switch.

[When performing the fragmentation]

- 1) Call up the posterior mode screen (main screen).
- 2) Press the **System+PPL** switch in the “Test” box on the main screen to perform the test of irrigation/aspiration on the ANT side. (If the plug of US handpiece is connected, ultrasound oscillation is also checked.)
 - * To operate with the remote control, press the TEST switch.
- 3) When the test on the ANT side is completed, the test is suspended and the **Continue** switch appears.
- 4) If there is no problem in the connection on the POST side, **[SCRUB]** immerse the PPL tip of US handpiece in the irrigation solution.




- 5) Press the **Continue** switch to perform the test of aspiration on the POST side.
 - * It is also possible for **[SCRUB]** to perform the aspiration test on the POST side by pressing the main pedal or the TEST switch of the remote control instead of **[CIRCULATOR]** pressing the **Continue** switch.

NOTE

- If the system or ultrasound oscillation is tested on the posterior mode screen (main screen), it is impossible to use the system for the phacoemulsification. To perform the phacoemulsification, the system and ultrasound oscillation shall be tested on the anterior mode screen (main screen).

10. If necessary, set and test the diathermy.

- 1) **[SCRUB]** connects the diathermy cable to the diathermy forceps or diathermy pencil and hands the other side of the cable to **[CIRCULATOR]**.
- 2) **[CIRCULATOR]** connects the received diathermy cable to the DIA connector on the left side of the system.
- 3) **[SCRUB]** has **[CIRCULATOR]** press the  switch in the “Test” box on the main screen, and verify the operation of diathermy unit.
 * To operate with the remote control, press the TEST switch and then the Dia switch. (Press the Dia switch while the message “US, Vit, Dia?” or “PPL, Vit, Dia?” is displayed.)

NOTE


- The diathermy test is just checking whether the diathermy unit inside the system properly works. Break in the diathermy cable or failure of diathermy forceps/pencil cannot be verified.

11. If necessary, perform the test of ultrasound oscillation.


NOTE

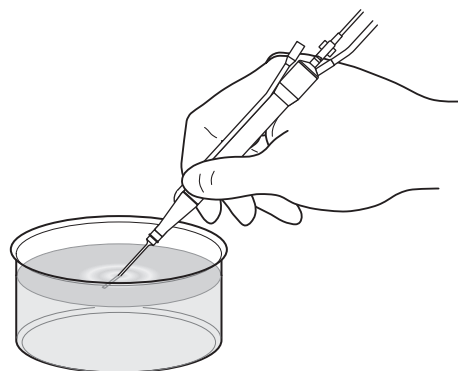
- Perform the test of ultrasound oscillation when the US handpiece or US tip is replaced during surgery.

[Anterior screen: when performing the phacoemulsification]

- 1) **[CIRCULATOR]** connects the plug of US handpiece to the US connector on the left side of the system.
- 2) **[SCRUB]** connects the I/A tube coming from the ANT side of cassette to the US handpiece.
- 3) After putting the US tip and silicone sleeve to the US handpiece, **[SCRUB]** puts the test chamber on the silicone sleeve.
- 4) **[CIRCULATOR]** presses the  switch in the “Test” box on the anterior main screen to verify the ultrasound oscillation.
 * To operate with the remote control, press the TEST switch and then the US switch. (Press the US switch while the message “US, Vit, Dia?” is displayed.)

[Posterior screen: when performing the fragmentation]


- 1) **[CIRCULATOR]** connects the plug of US handpiece to the US connector on the left side of the system.
- 2) **[SCRUB]** connects the extension tube to the aspiration port of the US handpiece and the 3-way valve at the relay point of vitrectomy cutter on the POST side.
- 3) **[SCRUB]** switches the aspiration line on the POST side to the US handpiece side using the 3-way valve.
- 4) **[SCRUB]** attaches the PPL tip to the US handpiece.
- 5) **[SCRUB]** immerses the PPL tip in the irrigation solution.
- 6) **[CIRCULATOR]** presses the  switch in the “Test” box on the posterior main screen to verify the ultrasound oscillation.
 * To operate with the remote control, press the TEST switch and then the US switch. (Press the US switch while the message “PPL, Vit, Dia?” is displayed.)



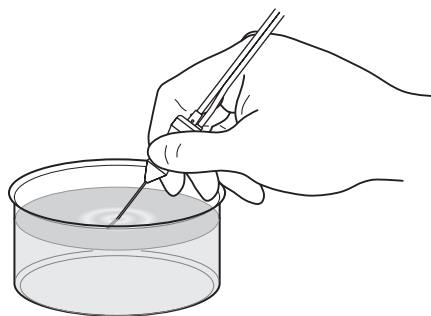
12. If necessary, perform the motion test of vitrectomy cutter.

- 1) **[CIRCULATOR]** opens the sterilized package of vitrectomy cutter and has **[SCRUB]** take out the cutter.
- 2) **[CIRCULATOR]** connects the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.
- 3) **[SCRUB]** connects the end of aspiration tube of vitrectomy cutter to the ASP connector on the POST side of cassette.
 * If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter.

4) **[SCRUB]** immerses the needle tip of vitrectomy cutter in the irrigation solution.

5) **[SCRUB]** has **[CIRCULATOR]** press the  switch in the “Test” box on the main screen, and visually checks the motion of vitrectomy cutter.

* To operate with the remote control, press the TEST switch and then the Vit switch. (Press the Vit switch while the message “US, Vit, Dia?” or “PPL, Vit, Dia?” is displayed.)

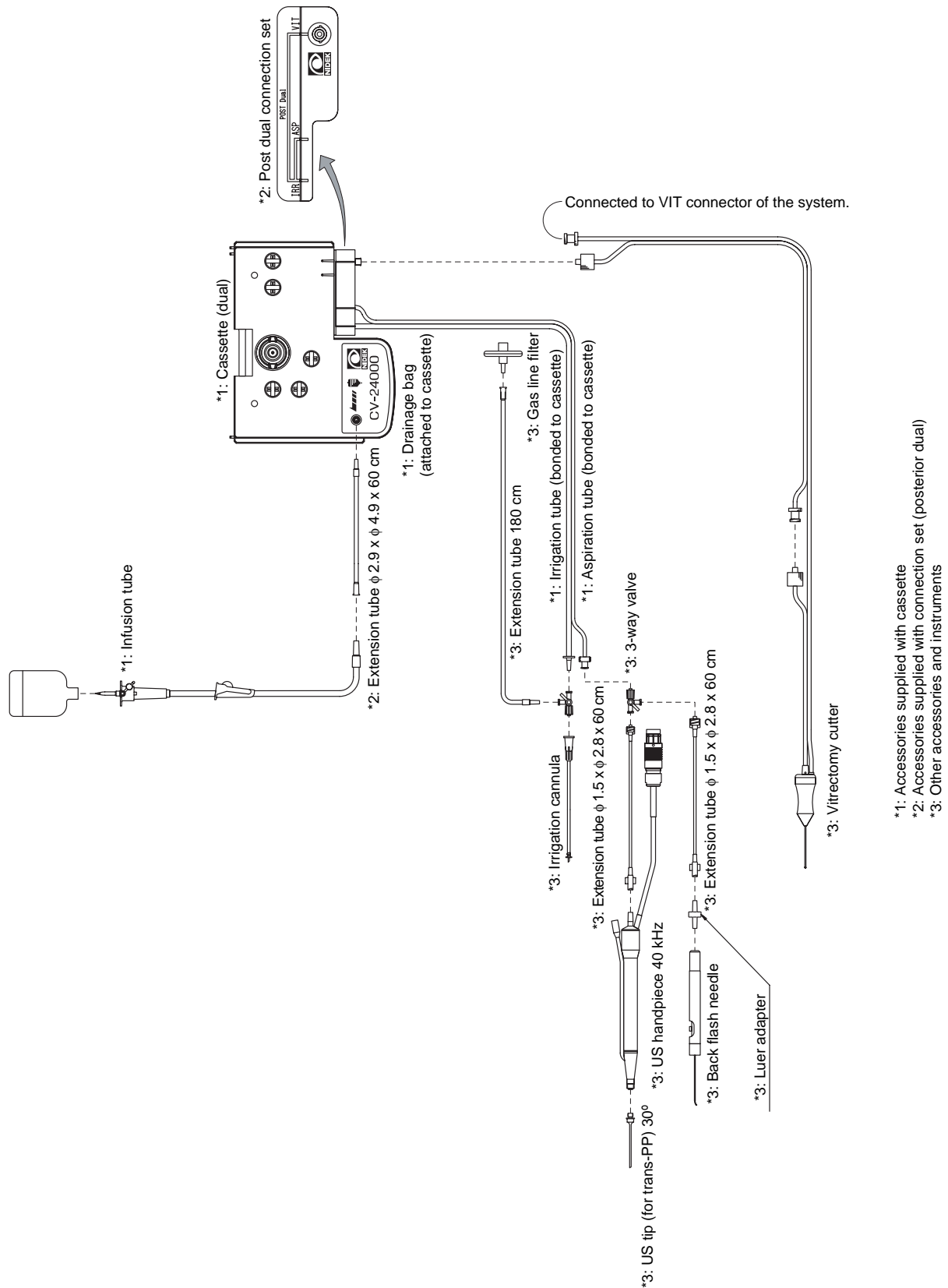


13. If necessary, set the intraocular scissors.

1) **[SCRUB]** hands the driving tube of intraocular scissors to **[CIRCULATOR]**.

2) **[CIRCULATOR]** connects the driving tube connector of intraocular scissors to the SCIS connector on the left side of the system.





4.2.4 For posterior dual cassette (Posterior setting) -- For AP type



NOTE

- If aspiration is not performed properly during surgery, confirm the connection of the tube first. If that does not solve the problem, replace the cassette and perform the cassette and system tests again.
In addition, inform one of NIDEK's sales representative of the occurrence of the problem and the lot number of the I/A tube.
- If the drain bag becomes full during surgery, replace the cassette immediately and perform the cassette and system tests again.
The drained water may run through the system and cause malfunction.


1. [CIRCULATOR] verifies that the setting of P/D Cassette on the custom setting screen is "Posterior".

- 1) Press the  switch on the posterior main screen to call up the custom setting screen.
- 2) Verify that the  switch on the right side of "P/D Cassette" is highlighted.
* If the switch is not highlighted, press the  switch to highlight.
- 3) Press the  switch to return to the posterior main screen.

2. Insert the posterior dual cassette into the cassette slot.

- 1) [SCRUB] takes the cassette and post dual connection set out of the sterilization package opened by [CIRCULATOR] and hands them to [CIRCULATOR].
- 2) [CIRCULATOR] connects the post dual connection set to the cassette.
- 3) [CIRCULATOR] securely inserts the posterior dual cassette into the cassette slot on the left side of the system.
* After the cassette is inserted, it is automatically tested. Wait until the cassette test is completed.

3. After the cassette test, [CIRCULATOR] connects the infusion tube.

- 1) Open the package of infusion tube and take out the infusion tube.
- 2) Close the clamp of infusion tube and remove the cap from the tip of spike. Then, securely fit the spike onto the rubber stopper of the irrigation bottle.
- 3) Connect the luer of infusion tube to  marked luer on the cassette, and open the clamp of infusion tube.

4. [SCRUB] receives a set of sterilized instruments from [CIRCULATOR].

5. [SCRUB] connects the irrigation cannula.

Connect the irrigation cannula to the tip of irrigation tube coming from the IRR side of cassette via the 3-way valve.

6. Connect the line for fluid/gas exchange.

- 1) [SCRUB] connects the extension tube for fluid/gas exchange to the 3-way valve which is connected to the irrigation cannula, and hands the other side of tube to [CIRCULATOR].
- 2) [CIRCULATOR] connects the extension tube for fluid/gas exchange received from [SCRUB] to the FGX connector on the left side of the system via the gas line filter.

CAUTION

- If the irrigation solution flows into the system from the FGX connector and is left inside of the system, the system may be damaged.
In such a case, contact NIDEK or your authorized distributor immediately and ask for maintenance.

7. Connect the aspiration line.

Connect the aspiration tube line coming from the cassette to the US handpiece or the back flash needle.

[A. When connecting the US handpiece]

- 1) [SCRUB] hands the plug of US handpiece to [CIRCULATOR].
- 2) [CIRCULATOR] receives the plug of US handpiece from [SCRUB] and connect it to the US connector on the left side of the system.
- 3) [SCRUB] attaches the PPL tip to the US handpiece.
- 4) [SCRUB] connects the aspiration tube to the US handpiece
* If necessary, connect the US handpiece via the extension tube and 3-way valve.

[B. When connecting the back flash needle]

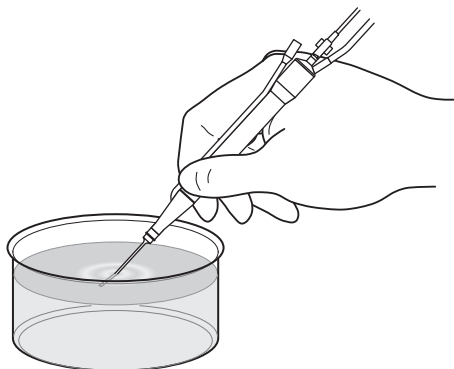
- 1) [SCRUB] connects the aspiration tube to the back flash needle via the luer adapter.
* If necessary, connect the aspiration tube via the extension tube and 3-way valve.

8. Connect the vitrectomy cutter.

- 1) **[CIRCULATOR]** opens the sterilized package of vitrectomy cutter and has **[SCRUB]** take out the cutter.
- 2) **[CIRCULATOR]** connects the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.
- 3) **[SCRUB]** connects the end of aspiration tube of vitrectomy cutter to the VIT connector of cassette.
 - * If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter. (If not necessary, connect luers of relay point.)

9. **[SCRUB]** immerses the tip of instrument, which is connected to the aspiration tube line, in the irrigation solution.

Immerse the tip of either US handpiece or the back flash needle, which is connected to the aspiration tube line, in the irrigation solution.



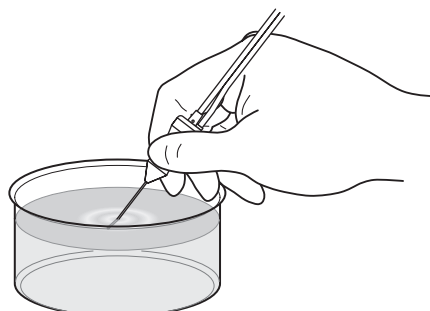
10. **[CIRCULATOR]** performs the system test.

- 1) Press the System switch in the “Test” box on the main screen to perform the test of aspiration on the ASP side. (If the plug of US handpiece is connected, ultrasound oscillation is also checked.)
 - * To operate with the remote control, press the TEST switch.

NOTE

- If the height of irrigation pole is low, an error may occur in the system test. In such a case, raise the height of irrigation pole 20 to 30 cm and then, perform the system test again.

- 2) When the test on the ASP side is completed, the test is suspended and the Continue switch appears.
- 3) If there is no problem in the connection on the VIT side, **[SCRUB]** immerses the needle tip of vitrectomy cutter in the irrigation solution.



- 4) Press the **Continue** switch (or pressing the main pedal of foot pedal by **[SCRUB]**) to perform the aspiration test on the VIT side.

* It is also possible to for **[SCRUB]** to perform the aspiration test on the VIT side by pressing the main pedal or the TEST switch of the remote control instead of **[CIRCULATOR]** pressing the **Continue** switch.

11. If necessary, set and test the diathermy.

- 1) **[SCRUB]** connects the diathermy cable to the diathermy forceps or diathermy pencil and hands the other side of the cable to **[CIRCULATOR]**.
 - 2) **[CIRCULATOR]** connects the received diathermy cable to the DIA connector on the left side of the system.
 - 3) **[SCRUB]** has **[CIRCULATOR]** press the **Dia** switch in the “Test” box on the main screen, and verify the operation of diathermy unit.
- * To operate with the remote control, press the TEST switch and then the Dia switch. (Press the Dia switch while the message “PPL, Vit, Dia?” is displayed.)

NOTE

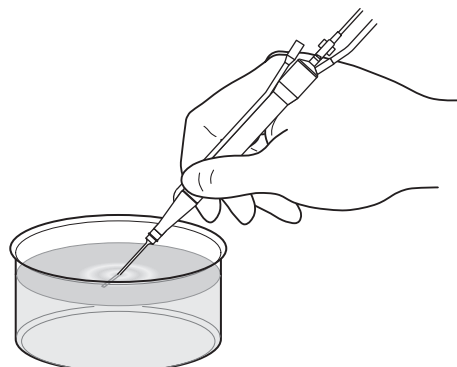
- The diathermy test is just checking whether the diathermy unit inside the system properly works. Break in the diathermy cable or failure of diathermy forceps/pencil cannot be verified.

12. If necessary, perform the test of ultrasound oscillation.

NOTE

- Perform the test of ultrasound oscillation when the US handpiece or US tip is replaced during surgery.

- 1) **[CIRCULATOR]** connects the plug of US handpiece to the US connector on the left side of the system.
- 2) **[SCRUB]** connects the aspiration tube coming from the cassette to the US handpiece.
- 3) **[SCRUB]** attaches the PPL tip to the US handpiece and immerse the tip in the irrigation solution.

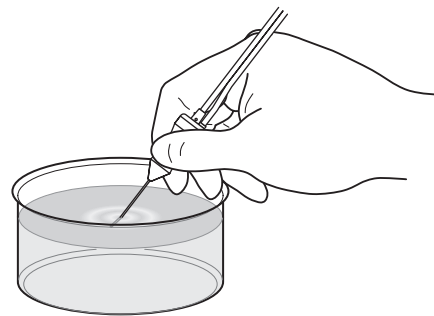



- 4) Press the  switch in the “Test” box on the main screen to verify the ultrasound oscillation. ([CIRCULATOR])

* To operate with the remote control, press the TEST switch and then the US switch. (Press the US switch while the message “PPL, Vit, Dia?” is displayed.)

13. If necessary, perform the motion test of vitrectomy cutter.

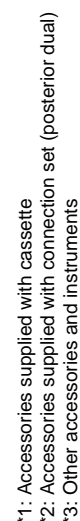
- 1) [CIRCULATOR] opens the sterilized package of vitrectomy cutter and has [SCRUB] take out the cutter.
- 2) [CIRCULATOR] Connect the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.
- 3) [SCRUB] connects the end of aspiration tube of vitrectomy cutter to the VIT connector of the cassette.
* If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter. (If not necessary, connect luers of relay point.)
- 4) [SCRUB] immerses the needle tip of vitrectomy cutter in the irrigation solution.



- 5) [SCRUB] has [CIRCULATOR] press the  switch in the “Test” box on the main screen, and visually checks the motion of vitrectomy cutter.
* To operate with the remote control, press the TEST switch and then the Vit switch. (Press the Vit switch while the message “PPL, Vit, Dia?” is displayed.)

14. If necessary, set the intraocular scissors.





- 1) [SCRUB] hands the driving tube of intraocular scissors to [CIRCULATOR].
- 2) [CIRCULATOR] connects the driving tube connector of intraocular scissors to the SCIS connector on the left side of the system.



NOTE

- If aspiration is not performed properly during surgery, confirm the connection of the tube first. If that does not solve the problem, replace the cassette and perform the cassette and system tests again.
In addition, inform one of NIDEK's sales representative of the occurrence of the problem and the lot number of the I/A tube.
- If the drain bag becomes full during surgery, replace the cassette immediately and perform the cassette and system tests again.
The drained water may run through the system and cause malfunction.


1. [CIRCULATOR] verifies that the setting of P/D Cassette on the custom setting screen is "ANT/POST".

- 1) Press the  switch on the posterior main screen to call up the custom setting screen.
- 2) Verify that the  switch on the right side of "P/D Cassette" is highlighted.
* If the switch is not highlighted, press the  switch to highlight.
- 3) Press the  switch to return to the posterior main screen.

2. Insert the posterior dual cassette into the cassette slot.

- 1) [SCRUB] takes the cassette and post dual connection set out of the sterilization package opened by [CIRCULATOR] and hands them to [CIRCULATOR].
- 2) [CIRCULATOR] connects the post dual connection set to the cassette.
- 3) [CIRCULATOR] securely inserts the posterior dual cassette into the cassette slot on the left side of the system.
* After the cassette is inserted, it is automatically tested. Wait until the cassette test is completed.

3. After the cassette test, [CIRCULATOR] connects the infusion tube.

- 1) Open the package of infusion tube and take out the infusion tube.
- 2) Close the clamp of infusion tube and remove the cap from the tip of spike. Then, securely fit the spike onto the rubber stopper of the irrigation bottle.
- 3) Connect the luer of infusion tube to  marked luer on the cassette, and open the clamp of infusion tube.

4. [SCRUB] receives a set of sterilized instruments from [CIRCULATOR].

5. [CIRCULATOR] receives the plug of US handpiece from [SCRUB] and connects it to the US connector on the left side of the system.

Align the red mark of the plug of US handpiece with that of the US connector on the left side of the system, and directly insert the plug as far as it will go.

6. [SCRUB] assembles the handpiece.

1) After putting US the tip and silicone sleeve to the US handpiece, put the test chamber on the silicone sleeve. Put the I/A tip and silicone sleeve to the I/A handpiece.

* If the US handpiece is not used, put the test chamber to the I/A handpiece.

2) Connect the I/A tube coming from the ANT side of cassette to the US handpiece.

* If the US handpiece is not used, connect the I/A tube coming from the ANT side of cassette to the I/A handpiece

7. Connect the vitrectomy cutter.

1) [CIRCULATOR] opens the sterilized package of vitrectomy cutter and has [SCRUB] take out the cutter.

2) [CIRCULATOR] connects the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.

3) [SCRUB] connects the end of aspiration tube of vitrectomy cutter to the VIT connector.

* If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter.
(If not necessary, connect luers of relay point.)

8. [SCRUB] prepares another set of irrigation bottle and infusion set and connects the irrigation cannula.

1) [CIRCULATOR] opens the package of infusion tube and takes out the infusion tube.

2) [CIRCULATOR] closes the luer of infusion tube and removes the cap from the tip of spike. Then, [CIRCULATOR] securely fits the spike onto the rubber stopper of the irrigation bottle.

3) [SCRUB] connects the irrigation cannula to the luer of irrigation bottle via the 3-way valve.

* If necessary, connect the extension tube between the infusion tube and 3-way valve.

9. Connect the line for fluid/gas exchange.

- 1) **[SCRUB]** connects the extension tube for fluid/gas exchange to the 3-way valve which is connected to the irrigation cannula, and hands the other side of tube to **[CIRCULATOR]**.
- 2) **[CIRCULATOR]** connects the extension tube for fluid/gas exchange received from **[SCRUB]** to the FGX connector on the left side of the system via the gas line filter.

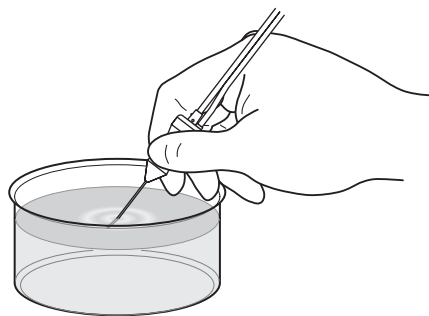
! CAUTION

- If the irrigation solution flows into the system from the FGX connector and is left inside of the system, the system may be damaged.
In such a case, contact NIDEK or your authorized distributor immediately and ask for maintenance.

10. **[CIRCULATOR]** performs the system test.

[When performing the phacoemulsification from anterior segment]

- 1) Call up the anterior mode screen (main screen).
- 2) Press the **System+US** switch in the “Test” box on the main screen to perform the test of irrigation/aspiration on the IRR/ASP side. (If the plug of US handpiece is connected, ultrasound oscillation is also checked.)
* To operate with the remote control, press the TEST switch.
- 3) When the test on the IRR/ASP side is completed, the test is suspended and the **Continue** switch appears.
- 4) If there is no problem in the connection on the VIT side, **[SCRUB]** immerses the needle tip of vitrectomy cutter in the irrigation solution.



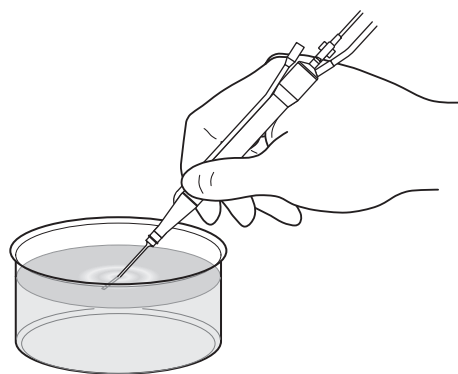
- 5) Press the **Continue** switch to perform the aspiration test on the VIT side.
* It is also possible to for **[SCRUB]** to perform the aspiration tests on the VIT side by pressing the main pedal or the TEST switch of the remote control instead of **[CIRCULATOR]** pressing the **Continue** switch.

[When performing the fragmentation]

- 1) Call up the posterior mode screen.
- 2) Press the **System+PPL** switch in the “Test” box on the main screen to perform the test of irrigation/aspiration on the ANT side. (Even if the plug of US handpiece is connected, ultrasound oscillation is not checked.)
* To operate with the remote control, press the TEST switch.

- 3) When the test on the ANT side is completed, the test is suspended and the **Continue** switch appears.

- 4) If there is no problem in the connection on the POST side, **[SCRUB]** immerses the PPL tip of US handpiece in the irrigation solution.




- 5) Press the **Continue** switch to perform the aspiration test on the POST side.
* It is also possible for **[SCRUB]** to perform the aspiration tests on the POST side by pressing the main pedal or the TEST switch of the remote control instead of **[CIRCULATOR]** pressing the **Continue** switch.

NOTE

- If the system or ultrasound oscillation is tested on the posterior screen (main screen), it is impossible to use the system for the phacoemulsification. To perform the phacoemulsification, the system and ultrasound oscillation shall be tested on the anterior screen (main screen).

11. If necessary, set and test the diathermy.

- 1) **[SCRUB]** connects the diathermy cable to the diathermy forceps or diathermy pencil and hands the other side of the cable to **[CIRCULATOR]**.
- 2) **[CIRCULATOR]** connects the received diathermy cable to the DIA connector on the left side of the system.

- 3) If necessary, [SCRUB] has [CIRCULATOR] press the  switch in the “Test” box on the main screen, and verifies the operation of diathermy unit.
 - * To operate with the remote control, press the TEST switch and then the Dia switch. (Press the Dia switch while the message “US, Vit, Dia?” or “PPL, Vit, Dia?” is displayed.)

NOTE


- The diathermy test is just checking whether the diathermy unit inside the system properly works. Break in the diathermy cable or failure of diathermy forceps/pencil cannot be verified.

12. If necessary, perform the test of ultrasound oscillation.

NOTE

- Perform the test of ultrasound oscillation when the US handpiece or US tip is replaced during surgery.


[Anterior screen: when performing the phacoemulsification]

- 1) [CIRCULATOR] connects the plug of US handpiece to the US connector on the left side of the system.
- 2) [SCRUB] connects the I/A tube coming from the IRR/ANT side of cassette to the US handpiece.
- 3) After putting the tip and silicone sleeve to the US handpiece, [SCRUB] put a test chamber filled with irrigation solution on the silicone sleeve.
- 4) [CIRCULATOR] presses the  switch in the “Test” box on the anterior main screen to verify the ultrasound oscillation.
 - * To operate with the remote control, press the TEST switch and then the US switch. (Press the US switch while the message “US, Vit, Dia?” is displayed.)

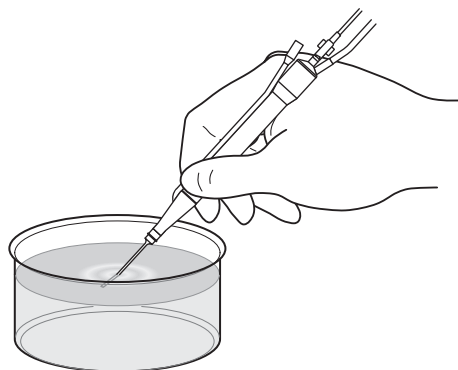
[Posterior screen: when performing the fragmentation]

- 1) [CIRCULATOR] connects the plug of US handpiece to the US connector on the left side of the system.
- 2) [SCRUB] connects the US handpiece to the 3-way valve at the relay point of vitrectomy cutter on the VIT side via the extension tube.
- 3) [SCRUB] switches the aspiration line on the ASP side of cassette to the US handpiece side using the 3-way valve.
- 4) [SCRUB] attaches the PPL tip to the US handpiece.

- 5) [SCRUB] immerses the tip of PPL tip in the irrigation solution.

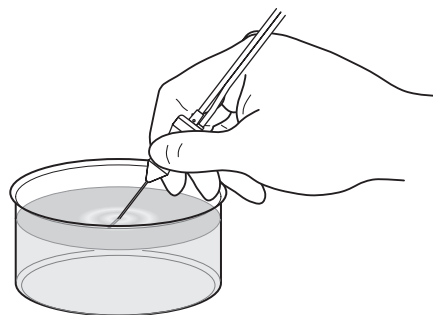
- 6) [CIRCULATOR] presses the  switch in the “Test” box on the posterior main screen to verify the ultrasound oscillation.

* To operate with the remote control, press the TEST switch and then the US switch. (Press the US switch while the message “PPL, Vit, Dia?” is displayed.)



13. If necessary, perform the motion test of vitrectomy cutter.

- 1) [CIRCULATOR] opens the sterilized package of vitrectomy cutter and has [SCRUB] take out the cutter.
- 2) [CIRCULATOR] connects the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.
- 3) [SCRUB] connects the end of aspiration tube of vitrectomy cutter to the VIT connector of cassette.
 - * If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter. (If not necessary, connect luers of relay point.)
- 4) [SCRUB] immerses the needle tip of vitrectomy cutter in the irrigation solution.



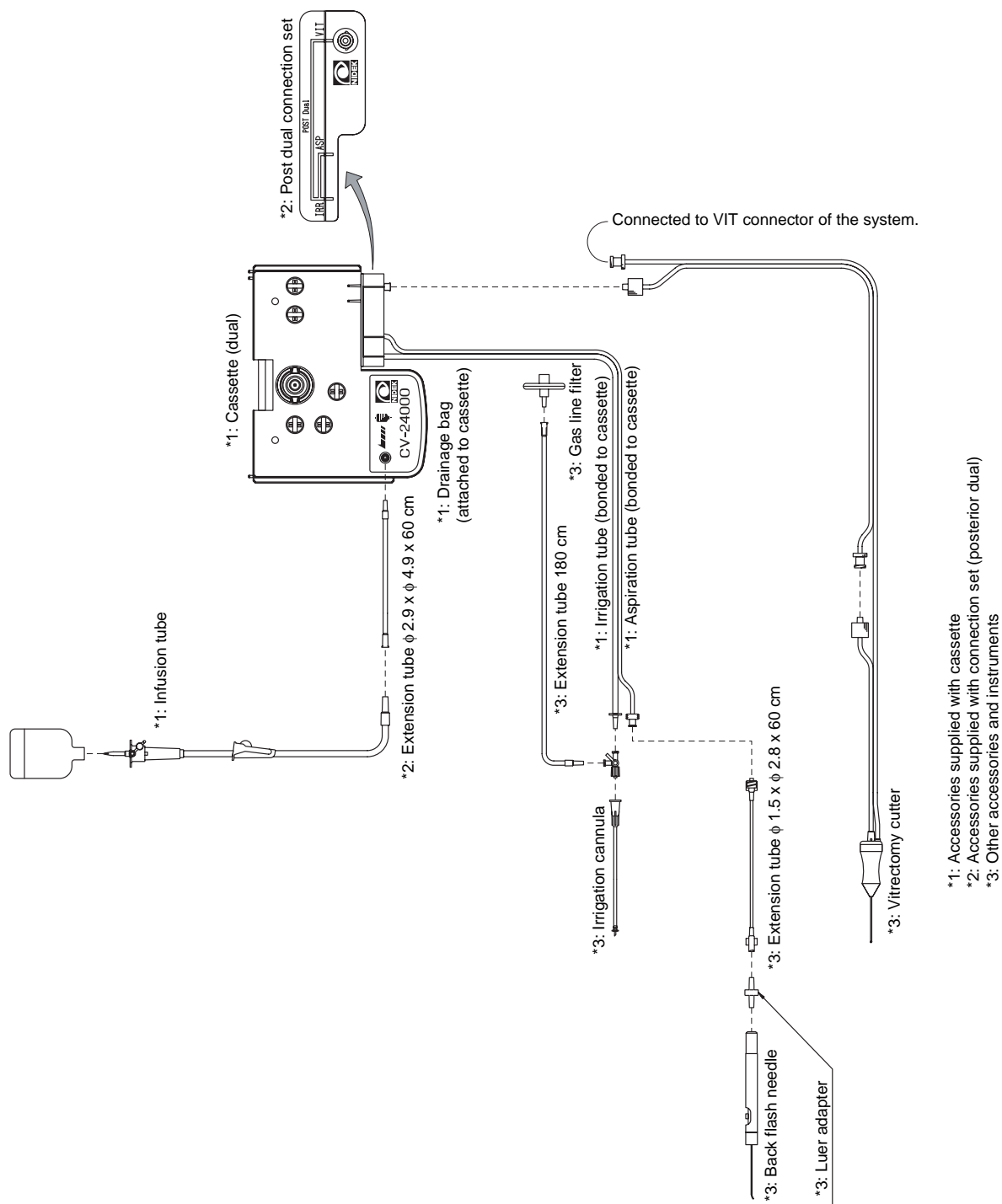
- 5) [SCRUB] has [CIRCULATOR] press the  switch in the “Test” box on the posterior main screen and visually checks the motion of vitrectomy cutter.

* To operate with the remote control, press the TEST switch and then the Vit switch. (Press the Vit switch while the message “US, Vit, Dia?” or “PPL, Vit, Dia?” is displayed.)

14. If necessary, set the intraocular scissors.

- 1) [SCRUB] hands the driving tube of intraocular scissors to [CIRCULATOR].
- 2) [SCRUB] connects the driving tube connector of intraocular scissors to the SCIS connector on the left side of the system.





4.2.6 For posterior dual cassette (Dual setting) --For P type



NOTE

- If aspiration is not performed properly during surgery, confirm the connection of the tube first. If that does not solve the problem, replace the cassette and perform the cassette and system tests again.
In addition, inform one of NIDEK's sales representative of the occurrence of the problem and the lot number of the I/A tube.
- If the drain bag becomes full during surgery, replace the cassette immediately and perform the cassette and system tests again.
The drained water may run through the system and cause malfunction.


1. [CIRCULATOR] verifies that the setting of P/D Cassette on the custom setting screen is "Dual".

- 1) Press the  switch on the posterior main screen to call up the custom setting screen.
- 2) Verify that the  switch on the right side of "P/D Cassette" is highlighted.
* If the switch is not highlighted, press the  switch to highlight.
- 3) Press the  switch to return to the posterior main screen.

2. Insert the posterior dual cassette into the cassette slot.

- 1) [SCRUB] takes the cassette and post dual connection set out of the sterilization package opened by [CIRCULATOR] and hands them to [CIRCULATOR].
- 2) [CIRCULATOR] connects the post dual connection set to the cassette.
- 3) [CIRCULATOR] securely inserts the posterior dual cassette into the cassette slot on the left side of the system.
* After the cassette is inserted, it is automatically tested. Wait until the cassette test is completed.

3. After the cassette test, [CIRCULATOR] connects the infusion tube.

- 1) Open the package of infusion tube and take out the infusion tube.
- 2) Close the clamp of infusion tube and remove the cap from the tip of spike. Then, securely fit the spike onto the rubber stopper of the irrigation bottle.
- 3) Connect the luer of infusion tube to  marked luer on the cassette, and open the clamp of infusion tube.

4. [SCRUB] receives a set of sterilized instruments from [CIRCULATOR].

5. [SCRUB] connects the irrigation cannula.

Connect the irrigation cannula to the tip of irrigation tube coming from the IRR side of cassette via the 3-way valve.

6. Connect the line for fluid/gas exchange.

- 1) [SCRUB] connects the extension tube for fluid/gas exchange to the 3-way valve which is connected to the irrigation cannula, and hands the other side of tube to [CIRCULATOR].
- 2) [CIRCULATOR] connects the extension tube for fluid/gas exchange received from [SCRUB] to the FGX connector on the left side of the system via the gas line filter.

CAUTION

- If the irrigation solution flows into the system from the FGX connector and is left inside of the system, the system may be damaged.
In such a case, contact NIDEK or your authorized distributor immediately and ask for maintenance.

7. Connect the aspiration line.

[SCRUB] connects the aspiration tube to the back flash needle via the luer adapter.

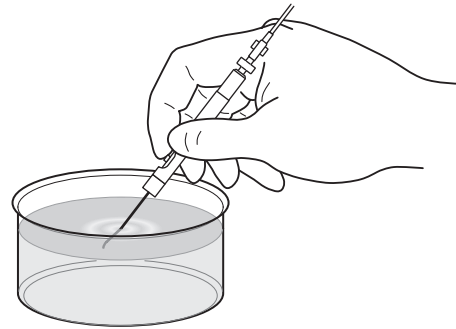
* If necessary, connect the aspiration tube via the extension tube and 3-way valve.

8. Connect the vitrectomy cutter.

- 1) [CIRCULATOR] opens the sterilized package of vitrectomy cutter and has [SCRUB] take out the cutter.
- 2) [CIRCULATOR] connects the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.
- 3) [SCRUB] connects the end of aspiration tube of vitrectomy cutter to the VIT connector of cassette.
* If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter.
(If not necessary, connect luers of relay point.)

9. [SCRUB] immerses the tip of instrument, which is connected to the aspiration tube line, in the irrigation solution.

Immerse the tip of the back flash needle, which is connected to the aspiration tube line, in the irrigation solution.



10. [CIRCULATOR] performs the system test.

- 1) Press the switch in the “Test” box on the main screen to perform the test of irrigation/aspiration on the IRR/ASP side. (If the plug of US handpiece is connected, ultrasound oscillation is also checked.)

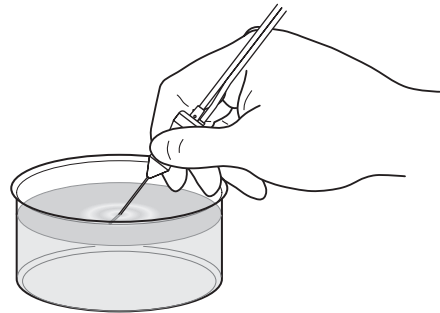
* To operate with the remote control, press the TEST switch.

NOTE

- If the height of irrigation pole is low, an error may occur in the system test. In such a case, raise the height of irrigation pole 20 to 30 cm and then, perform the system test again

- 2) When the test on the ASP side is completed, the test is suspended and the switch appears.


- 3) If there is no problem in the connection on the VIT side, [SCRUB] immerses the needle tip of vitrectomy cutter in the irrigation solution.



- 4) Press the switch to perform the aspiration test on the VIT side.

* It is also possible for [SCRUB] to perform the aspiration tests on the VIT side by pressing the main pedal or the TEST switch of the remote control instead of [CIRCULATOR] pressing the switch.


11. If necessary, set and test the diathermy.

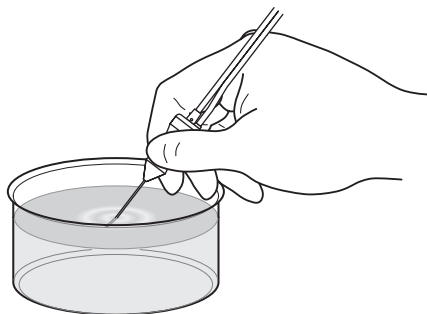
- 1) **[SCRUB]** connects the diathermy cable to the diathermy forceps or diathermy pencil and hands the other side of the cable to **[CIRCULATOR]**.
- 2) **[CIRCULATOR]** connects the received diathermy cable to the DIA connector on the left side of the system.
- 3) **[SCRUB]** has **[CIRCULATOR]** press the  switch in the “Test” box on the main screen, and verifies the operation of diathermy unit.
 - * To operate with the remote control, press the TEST switch and then the Dia switch. (Press the Dia switch while the message “PPL, Vit, Dia?” is displayed.)

NOTE

- The diathermy test is just checking whether the diathermy unit inside the system properly works. Break in the diathermy cable or failure of diathermy forceps/pencil cannot be verified.

12. If necessary, perform the motion test of vitrectomy cutter.

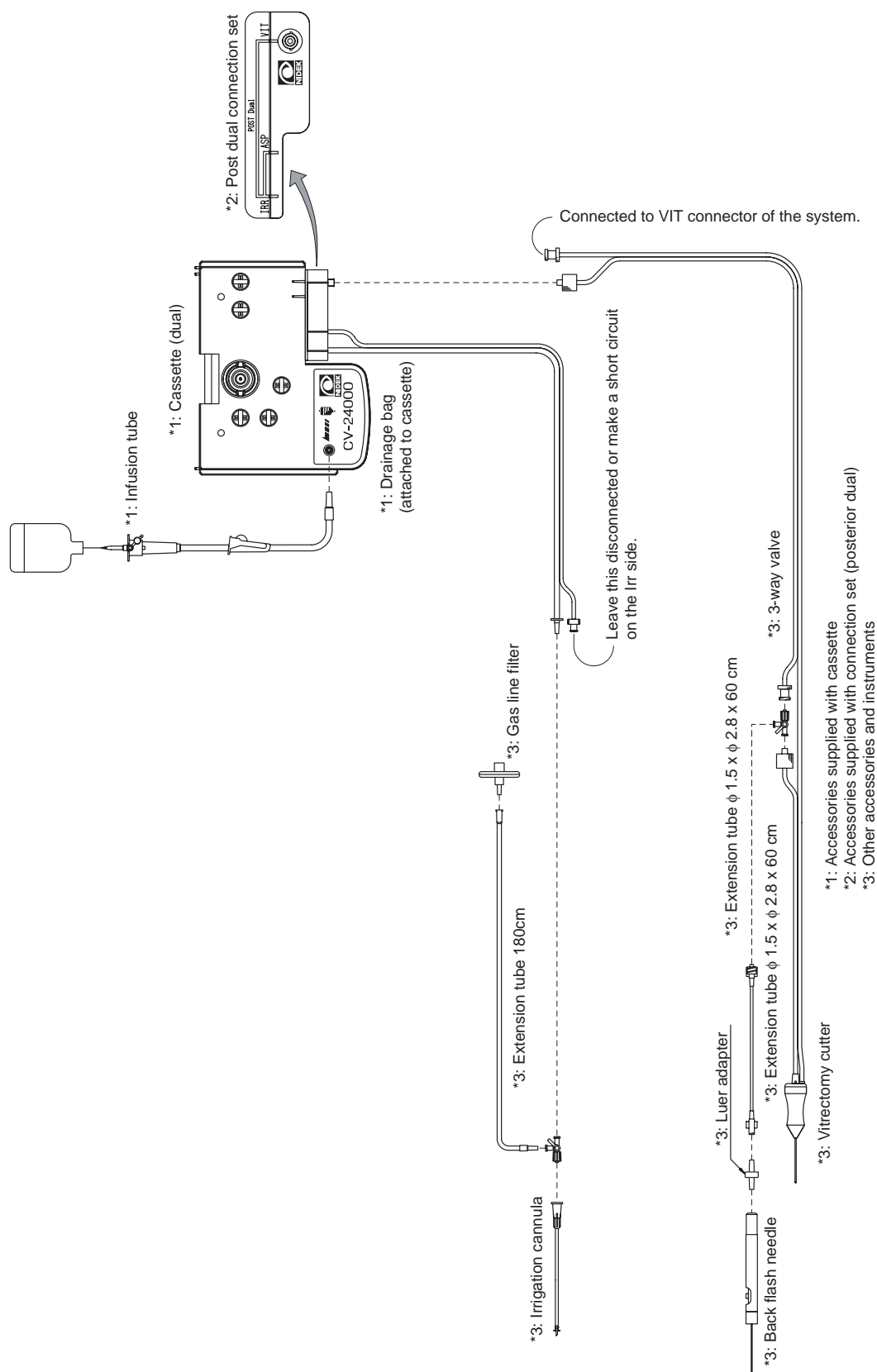
- 1) **[CIRCULATOR]** opens the sterilized package of vitrectomy cutter and has **[SCRUB]** take out the cutter.
- 2) **[CIRCULATOR]** connects the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.
- 3) **[SCRUB]** connects the end of aspiration tube of vitrectomy cutter to the VIT connector of the cassette.
 - * If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter. (If not necessary, connect luers of relay point.)
- 4) **[SCRUB]** immerses the needle tip of vitrectomy cutter in the irrigation solution.
- 5) **[SCRUB]** has **[CIRCULATOR]** press the  switch in the “Test” box on the posterior main screen and visually checks the motion of vitrectomy cutter.
 - * To operate with the remote control, press the TEST switch and then the Vit switch. (Press the Vit switch while the message “PPL, Vit, Dia?” is displayed.)



13. If necessary, set the intraocular scissors.

- 1) **[SCRUB]** hands the driving tube of intraocular scissors to **[CIRCULATOR]**.
- 2) **[CIRCULATOR]** connects the driving tube connector of intraocular scissors to the SCIS connector on the left side of the system.





4.2.7 For posterior dual cassette (Single setting) --For P type



NOTE

- If aspiration is not performed properly during surgery, confirm the connection of the tube first. If that does not solve the problem, replace the cassette and perform the cassette and system tests again.
In addition, inform one of NIDEK's sales representative of the occurrence of the problem and the lot number of the I/A tube.
- If the drain bag becomes full during surgery, replace the cassette immediately and perform the cassette and system tests again.
The drained water may run through the system and cause malfunction.


1. [CIRCULATOR] verifies that the setting of P/D Cassette on the custom setting screen is "SINGLE".

- 1) Press the  switch on the posterior main screen to call up the custom setting screen.
- 2) Verify that the  switch on the right side of "P/D Cassette" is highlighted.
* If the switch is not highlighted, press the  switch to highlight.
- 3) Press the  switch to return to the posterior main screen.

2. Insert the posterior dual cassette into the cassette slot.

- 1) [SCRUB] takes the cassette and post dual connection set out of the sterilization package opened by [CIRCULATOR] and hands them to [CIRCULATOR].
- 2) [CIRCULATOR] connects the post dual connection set to the cassette.
- 3) [CIRCULATOR] securely inserts the posterior dual cassette into the cassette slot on the left side of the system.
* After the cassette is inserted, it is automatically tested. Wait until the cassette test is completed.

3. After the cassette test, [CIRCULATOR] connects the infusion tube.

- 1) Open the package of infusion tube and take out the infusion tube.
- 2) Close the clamp of infusion tube and remove the cap from the tip of spike. Then, securely fit the spike onto the rubber stopper of the irrigation bottle.
- 3) Connect the luer of infusion tube to  marked luer on the cassette, and open the clamp of infusion tube.

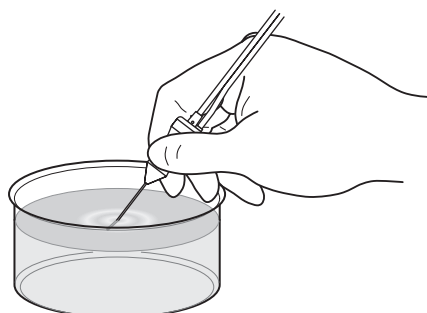
4. [SCRUB] receives a set of sterilized instruments from [CIRCULATOR].

5. Connect the vitrectomy cutter.

- 1) [CIRCULATOR] opens the sterilized package of vitrectomy cutter and has [SCRUB] take out the cutter.
- 2) [CIRCULATOR] connects the driving tube of vitrectomy cutter to the VIT connector on the left side of the system.
- 3) [SCRUB] connects the end of aspiration tube of vitrectomy cutter to the VIT connector of cassette.
 - * If necessary, use the 3-way valve at the relay point of the aspiration tube of vitrectomy cutter. (If not necessary, connect luers of relay point.)

6. [CIRCULATOR] performs the system test.

- 1) Connect the luers of the irrigation and aspiration tubes coming from the cassette.
- 2) Press the switch in the “Test” box on the main screen to perform the test.
 - * To operate with the remote control, press the TEST switch.
- 3) When the test on the IRR/ASP side is completed, the test is suspended and the switch appears.
- 4) Press the switch to perform the test on the VIT side.
 - * It is also possible for [SCRUB] to perform the aspiration tests on the VIT side by pressing the main pedal and the TEST switch of the remote control instead of [CIRCULATOR] pressing the switch.
- 5) If there is no problem in the connection on the VIT side, [SCRUB] immerses the needle tip of vitrectomy cutter in the irrigation solution.




7. Connect the irrigation cannula and the line for fluid/gas exchange.

- 1) [SCRUB] connects the irrigation cannula to the luer of irrigation tube via the 3-way valve.
- 2) [SCRUB] connects the extension tube for fluid/gas exchange to the 3-way valve which is connected to the irrigation cannula, and hands the other side of tube to [CIRCULATOR].
- 3) [CIRCULATOR] connects the extension tube for fluid/gas exchange received from [SCRUB] to the FGX connector on the left side of the system via the gas line filter.

CAUTION

- If the irrigation solution flows into the system from the FGX connector and is left inside of the system, the system may be damaged.
In such a case, contact NIDEK or your authorized distributor immediately and ask for maintenance.

8. If necessary, set and test the diathermy.

- 1) [SCRUB] connects the diathermy cable to the diathermy forceps or diathermy pencil and hands the other side of the cable to [CIRCULATOR].
- 2) [CIRCULATOR] connects the received diathermy cable to the DIA connector on the left side of the system.
- 3) [SCRUB] has [CIRCULATOR] press the  switch in the “Test” box on the main screen, and verifies the operation of diathermy unit.
* To operate with the remote control, press the TEST switch and then the Dia switch. (Press the Dia switch while the message “PPL, Vit, Dia?” is displayed.)

NOTE

- The diathermy test is just checking whether the diathermy unit inside the system properly works. Break in the diathermy cable or failure of diathermy forceps/pencil cannot be verified.




9. If necessary, set the intraocular scissors.

- 1) [SCRUB] hands the driving tube of intraocular scissors to [CIRCULATOR].
- 2) [CIRCULATOR] connects the driving tube connector of intraocular scissors to the SCIS connector on the left side of the system.

4.2.8 Selectable mode after test

- ① Dia mode and Scis mode are always usable.
 - * However, if an error is detected in the Dia test, it becomes impossible to use the Dia mode.
- ② Irr mode is usable if a cassette is inserted.
- ③ US mode becomes usable if the test is performed while the plug of US handpiece is connected to the US connector and the ultrasound oscillation passes the test. If the test is performed and its result is pass without connecting the plug, the US mode does not become usable.
 When the tests of system and ultrasound oscillation are performed on the anterior screen, the US mode becomes selectable on the anterior screen, however, it cannot be selected on the posterior screen. Besides, when the tests of system and ultrasound oscillation are performed on the posterior screen, the US mode becomes selectable on the posterior screen, however, it cannot be selectable on the anterior screen.
- ④ Other modes become usable when the system test is performed and the result is pass.


4.2.9 switch

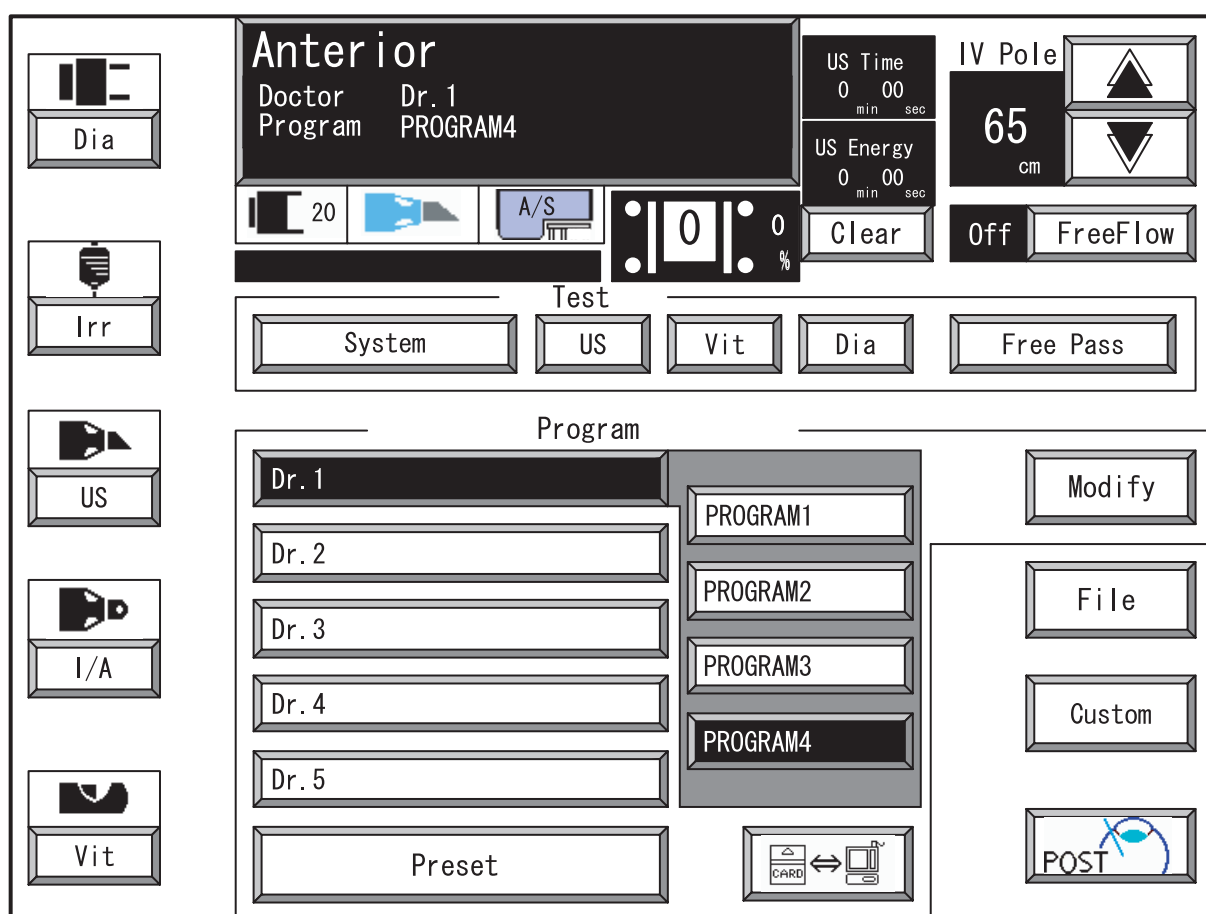
- ① It becomes possible to select all modes without test by pressing the  switch.
 - * However, if a cassette is not inserted, some modes which need the irrigation/aspiration (Irr, US, I/A, Vit, or Asp mode) can not be selected.
- ② The  switch is a function for emergency use. Basically, be sure to select each mode after performing the test. (NIDEK assumes no responsibility for malfunctions during surgery in a case where the  switch is pressed.)
 In addition, if the system is used without the test, following malfunctions may occur.

- As the leakage and clogging in the irrigation/aspiration lines cannot be detected in advance, a malfunction may occur during surgery.
- As the air in the irrigation/aspiration lines is not properly deflated, the start-up of aspiration or surge phenomenon may be adversely affected.
- As the data to control load of the ultrasound oscillation cannot be obtained, default data inside the system is used. In such a case, there is a fear that the ultrasound output may be weakened

4.3 Operation Screens

4.3.1 Anterior mode screen (main screen) --For AP and P types

This screen is for the anterior mode. When the power switch is turned ON (|), the opening screen appears, and then, the following screen automatically appears. This screen is called as main screen. When the system is equipped with the posterior unit (factory-installed option), the screen is changed to the main screen for the posterior mode by pressing the  switch on the right bottom.



1. Select the program on this screen.

Selected Dr./Program name is indicated in the message area at the top of display.
 If no program is selected, the “Preset” data is selected.
 Selectable programs are 20 programs (5 doctors × 4 programs).

2. Press the mode switch to select the surgery mode.

The dimmed mode switch on the left side of the main screen cannot be used since the test has not been passed.

3. The irrigation pole is raised or lowered by pressing the IV Pole   switch.

The irrigation pole can be also raised or lowered by pressing the irrigation pole UP/DOWN switch on the rear side of the system or pressing the upper/lower right switch on the foot pedal.

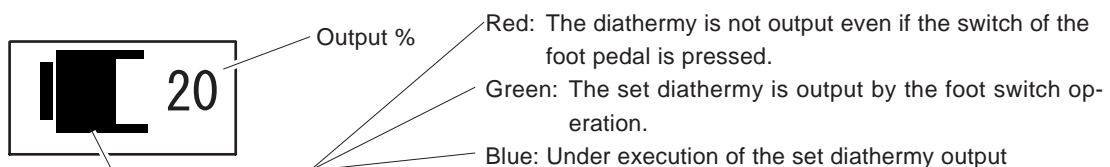
4. Every time the  switch is pressed, the irrigation valve is opened/closed.

5. US Time, US Energy and surgery data can be cleared by pressing the  switch.

6. Verify the functions and conditions of each part.

It is possible to verify the functions and conditions of diathermy, US handpiece, cassette, and foot pedal in the lower portion of the message area on the screen.

- a) Verify the condition of diathermy.



If any mode is selected, the diathermy is output by pressing the upper left switch (factory-set) on the foot pedal even if the Dia mode is not selected.

- b) Verify the connection of the plug of US handpiece.



When the plug of US handpiece is connected, this indication is colored.

c) Verify the condition and type of inserted cassette.



The cassette has not been inserted.



The anterior single cassette has been set.



The anterior dual cassette has been set.



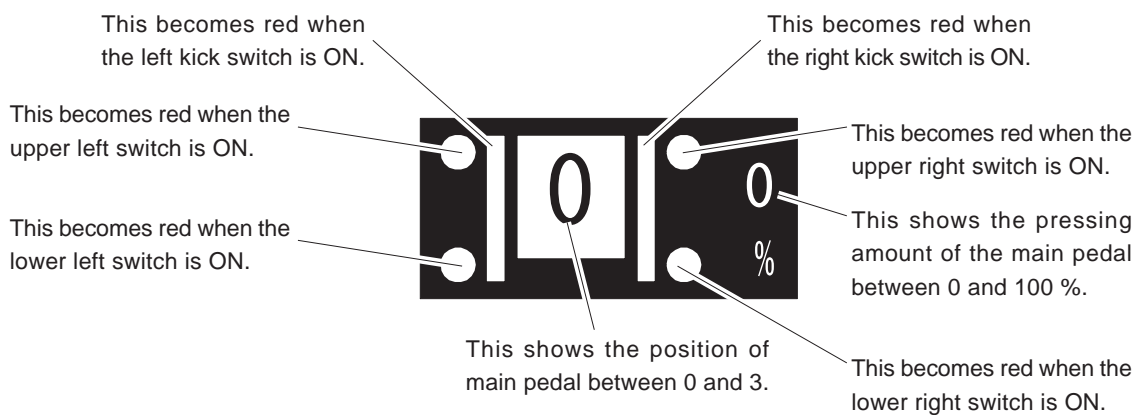
The anterior/posterior cassette has been set.




The posterior dual cassette has been set.

d) Verify the conditions and settings of the foot pedal and each switch.

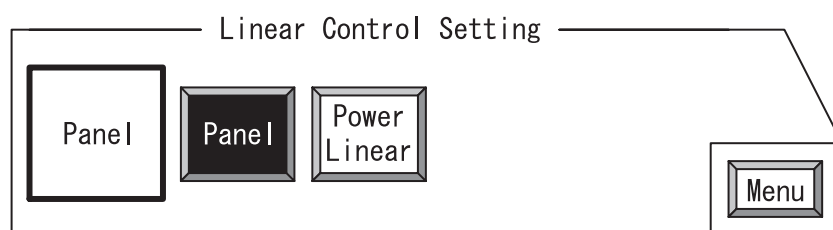
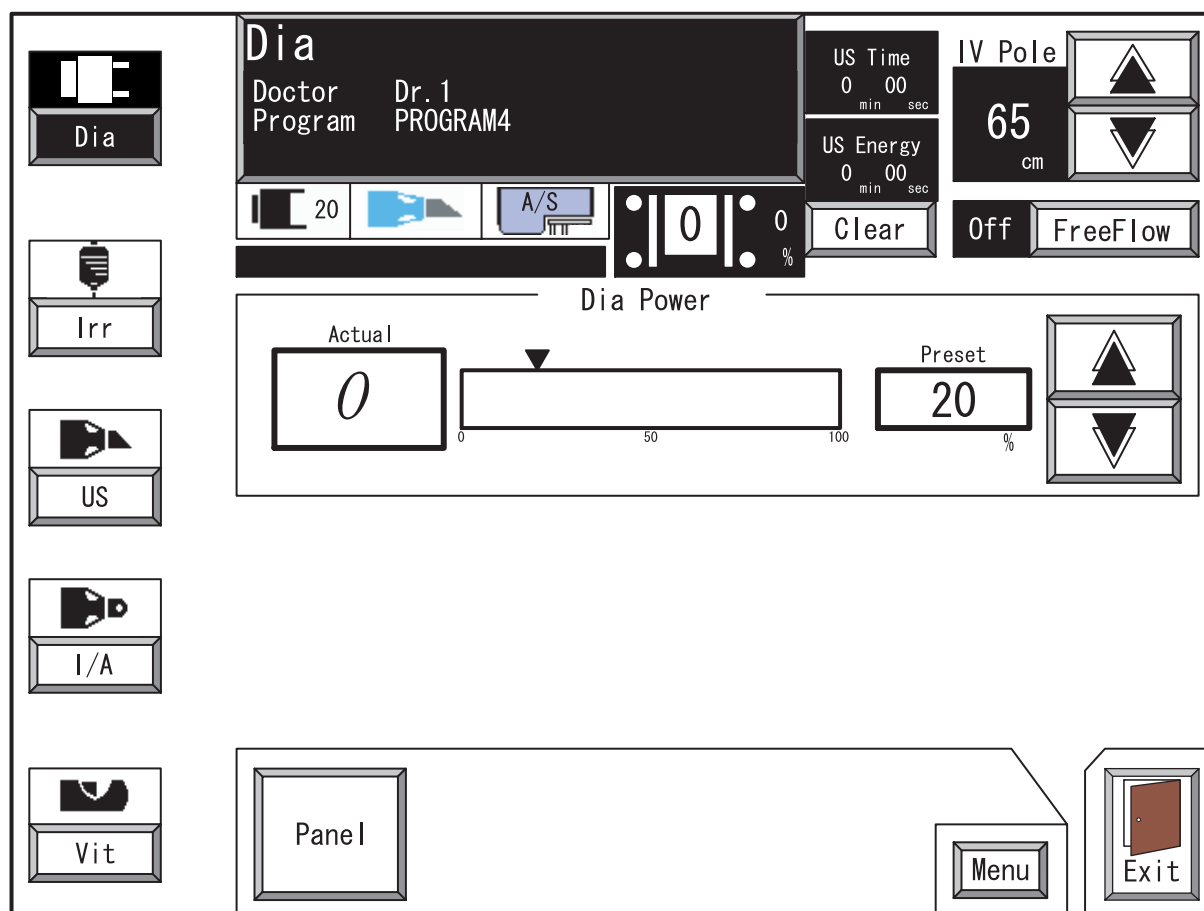
i) Verify the conditions of the foot pedal and each switch.





ii) Verify the settings of the foot pedal and each switch.

Functions of each switch on the foot pedal can be changed. To check the functions of each switch, press  mentioned in i) above. Then, the functions of each switch and illustration are indicated for 5 seconds.

4.3.2 Dia mode screen (anterior mode) --For AP and P types



1. Press the  switch to select the Dia mode.

2. Set the output of diathermy in the 0 to 100 % range by pressing the Dia Power   switch.

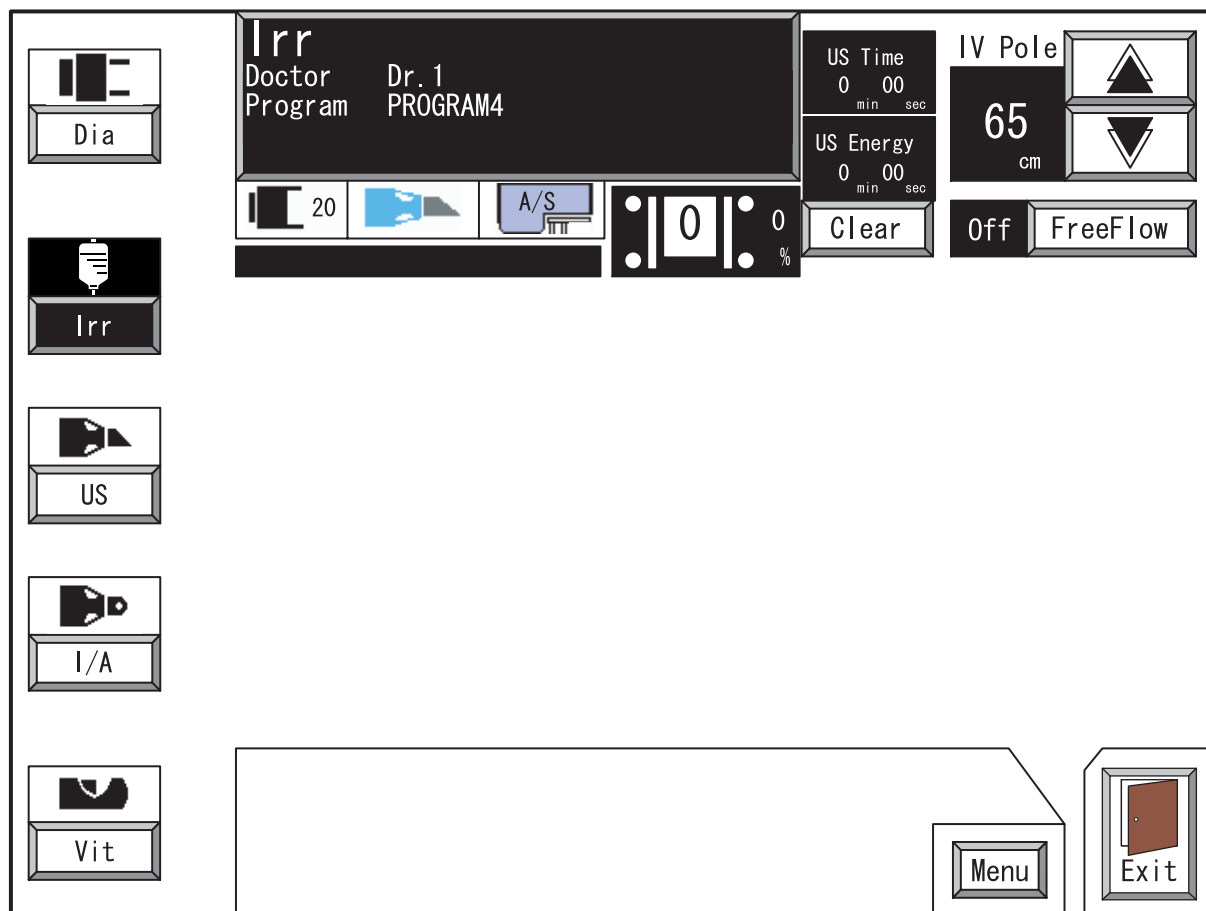
Pressing an arbitrary position on the bar graph with a finger sets the output of diathermy in 5 % increments.


3. Press the  switch to indicate the selection switches, and select “Panel” or “Power Linear” for the diathermy output control.

To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

4. The diathermy is output by pressing the foot pedal to Position 2 or more.
5. The output of diathermy is stopped when the foot pedal is released.

4.3.3 Irr mode screen (anterior mode) --For A and AP types



1. Press the  switch to select the Irr mode.
2. The irrigation valve is opened and the irrigation solution flows by pressing the foot pedal to Position 1 or more.
3. The irrigation valve is closed and the flow of irrigation solution stops when the foot pedal is released.

4.3.4 US mode screen (anterior mode) --For A and AP types

The main US mode screen displays the following information and controls:

- Left Panel:** Includes buttons for **Dia**, **Irr**, a vertical stack of **US1**, **US2**, and **US3** (with **US1** selected), **I/A**, and **Vit**.
- Top Center:** Shows **US1** and **Doctor Program Dr.1 PROGRAM4**.
- Top Right:** Displays **US Time** (0 min 00 sec), **US Energy** (0 min 00 sec), **IV Pole** (65 + 0 cm), and **Off** / **FreeFlow** buttons.
- Bottom Left:** Shows **20** and **A/S** buttons.
- Bottom Center:** Features a **US Power** slider with **Actual** (0) and **Preset** (40) values.
- Bottom Right:** Features a **Vacuum** slider with **Actual** (0) and **Preset** (150 mmHg) values.
- Bottom Bar:** Includes buttons for **Power Linear**, **Flow 0/28 mL/min**, **Pulse 0 45% 50 pps**, **AFC OFF**, **Menu**, and **Exit**.

The **Linear Control Setting** menu provides the following options:

- Power Linear** (selected)
- Panel**
- Vac. Linear**
- Flow Linear**
- Power Linear**
- Menu**

The **Flow Setting** menu provides the following options:

- 28 mL/min** (selected)
- Up/Down arrow buttons
- Menu**

The **US Pulse Setting** menu provides the following options:





- 45% 50 pps** (selected)
- Up/Down arrow buttons
- Cont.** / **Pulse** / **Incr.** buttons
- Menu**

The **Advanced Flow Control Setting** menu provides the following options:

- Off** (selected)
- On**
- Menu**

1. Press the  switch to select the US mode.

2. If necessary, select the   () switch and change each setting value.

Every time the US switch on the switch panel or right kick switch on the foot pedal is pressed, the modulation of US mode is selected in the following order;  →  → () →  → ...

* The  switch becomes selectable by changing the setting on the program contents screen.

3. If necessary, press the   switch in the “US Power” box to set the ultrasound power in the 0 to 100 % range.

Pressing an arbitrary position on the bar graph with a finger sets the ultrasound power in 5 % increments.

* When “Power Linear” is selected, the max US power differs according to the setting on the program contents screen.

4. If necessary, press the   switch in the “Vacuum” box to set the vacuum pressure in the 0 to 500 mmHg range.


Pressing an arbitrary position on the bar graph with a finger sets the vacuum pressure in 50 mmHg increments.

5. To change the linear/panel control related to the US mode, press the left end switch in the lowest box to indicate the “Linear Control Setting” box. Then, select the control method from among 4 types.


1) To set the panel control for the vacuum pressure, aspiration flow rate, and ultrasound output, press the  switch.

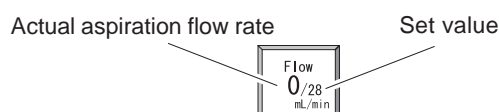
2) To set the linear control for the vacuum pressure, press the  switch.

3) To set the linear control for the aspiration flow rate, press the  switch.

4) To set the linear control for the ultrasound power, press the  switch.


5) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

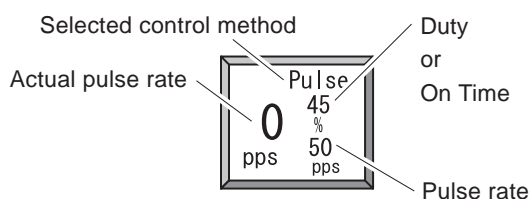
6. To change the aspiration flow rate, press the  switch in the lowest box to indicate the “Flow Setting” box. Then, set the aspiration flow rate.






1) The aspiration flow rate is set in the 0 to 50 mL/min range with the   switch.



2) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

7. To change the control mode of the ultrasound oscillation, press the  switch to indicate the “US Pulse Setting” box, and select either control method (and setting value).





- 1) Press the  switch to select the continuous control, press the  switch to select the pulse control, or press the  switch to select the incremental control.

* If the incremental control is selected, the pulse rate is increased by depressing the foot pedal starting from the setting pulse rate up to 90 pps.


- 2) To set the pulse rate in the pulse control or the incremental control, press the   switch. (The pulse rate can be set in 1 pps increments from 1 to 20 pps, 5 pps increments from 20 to 50 pps, and 10 pps increments from 50 to 90 pps.)

* When the pulse rate is set in the pulse control, the pulse rate (pps) and the duty (%) are displayed. (If the set pulse rate is within 25 and 90 pps, the duty can be changed. For the actual value, see the table on p.7-2.)

* When the pulse rate is set in the incremental control, the pulse rate (pps) and “On Time” (time of ultrasound oscillation per 1 pulse: msec) are displayed. If the set pulse rate is within 25 and 90 pps, pressing the   switch may not change the display to maintain consistency with the pulse control.

- 3) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

8. To change the setting of AFC between On and Off, press the  switch in the lowest box to indicate the “Advanced Flow Control Setting” box. Then, set On or Off of AFC.

When AFC is set to ON, the rise of vacuum pressure after the US tip is occluded is quickened. To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

9. Press the foot pedal to Position 1. The irrigation valve opens and the irrigation solution flows.

10. Press the foot pedal to Position 2. The aspiration pump works and starts aspirating.

11. Press the foot pedal to Position 3. The ultrasound output starts.

12. If necessary, press the switch on the left side of the foot pedal to reflux.

* The switch for reflux is factory-set to the left kick switch.

4.3.5 US Propedal mode screen (anterior mode) --For A and AP types

US propedal mode is a mode which enables the selection of the vacuum pressure, aspiration flow rate, ultrasound output, pulse rate, and pulse/linear control for each position of the foot pedal. With this mode, it is possible to perform more effective phacoemulsification. (When this mode is selected, AFC function cannot be used.)

* To use the US propedal mode, it is necessary to set the “Pro Pedal” to ON on the program contents screen.

The main screen displays the following information and controls:



- Top Left:** Icons for Dia, Irr, and a vertical stack of US1, US2, and US3 buttons.
- Top Center:** US1 Doctor Program Dr. 1 PROGRAM4. Below it, a small display shows 20 and A/S.
- Top Right:** US Time (0 00 min sec), US Energy (0 00 min sec), IV Pole (65 + 0 cm), and buttons for Off and FreeFlow.
- Center:** US Power and Vacuum sections. Each has an 'Actual' display (0), a horizontal slider bar, and a 'Preset' display (0 and 40 for US Power; 0, 150, and 150 for Vacuum).
- Bottom Left:** I/A and Vit buttons.
- Bottom Center:** Panel Panel Pow. Linear, Flow 0 mL/min, and Cont. Pulse 45% 50pps.
- Bottom Right:** Menu and Exit buttons.

The detailed settings screens are as follows:

- Linear Control Setting:** A vertical stack of Panel buttons (Panel, Panel, Power) followed by buttons for Panel, Vac. Linear, Flow Linear, and Power Linear, with a Menu button on the right.
- Flow Setting:** A display showing 0 mL/min, 28 mL/min, and 28 mL/min, with up/down arrow buttons and a Menu button on the right.
- US Pulse Setting:** A display showing Cont. and Pulse 45% 50pps, with up/down arrow buttons, buttons for Cont., Pulse, and Incr., and a Menu button on the right.

1. Press the  switch to select the US mode.

2. If necessary, select the   () switch and change each setting value.

Every time the US switch on the switch panel or right kick switch on the foot pedal is pressed, the modulation of US mode is selected in the following order;  →  → () →  → ...



* The  switch becomes selectable by changing the setting on the program contents screen.

3. If necessary, set the ultrasound power for Position 2 and Position 3 in the 0 to 100 % range.

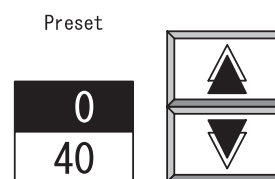
* Following settings of ultrasound power differ according to the settings on the program contents screen.

- Start position of ultrasound output in Position 2
- US power in Position 3 while “Power Linear” is selected

1) Select either Position 2 or Position 3.

Position 2 is selected by pressing the upper numeric switch on the left side of the   switch in the “US Power” box.

Position 3 is selected by pressing the lower numeric switch.





2) Make settings for Position 2 and Position 3.

Set the ultrasound power with the   switch. (Or press an arbitrary position on the bar graph with a finger to set the ultrasound power in 5 % steps.)

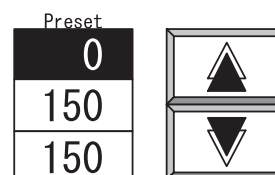
4. If necessary, set the vacuum pressure for Position 1, Position 2, and Position 3 in the 0 to 500 mmHg range.

1) Select Position 1, Position 2, or Position 3.



Position 1 is selected by pressing the upper numeric switch on the left side of the   switch in the “Vacuum” box.

Position 2 is selected by pressing the middle numeric switch.

Position 3 is selected by pressing the lower numeric switch.



2) Make settings for Position 1, Position 2, and Position 3.

Set the vacuum pressure with the   switch. (Or press an arbitrary position on the bar graph with a finger to set in 50 mmHg steps.)

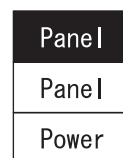
5. To change the linear/panel control of the US mode for Position 1, Position 2, and Position 3, press the left switch in the lowest box to indicated the “Linear Control Setting” box. Then, select the control method.

- 1) Select Position 1, Position 2, or Position 3.

Position 1 is selected by pressing the upper switch on the left side inside the “Linear Control Setting” box.

Position 2 is selected by pressing the middle switch.

Position 3 is selected by pressing the lower switch.



- 2) Select the control method of US mode for Position 1, Position 2, and Position 3.

* The linear control in the propedal mode is different from the normal one. The linear control is performed from the setting value for current Position to the setting value for next Position. Therefore, if the difference of setting values between the current Position and next Position is large, the setting value may largely differ even if the pressing amount of foot pedal is slight.

- i) To set the panel control for the vacuum pressure, aspiration flow rate, and ultrasound power, press the  switch.

- ii) To set the linear control for the vacuum pressure, press the  switch.

- iii) To set the linear control for the aspiration flow rate, press the  switch.

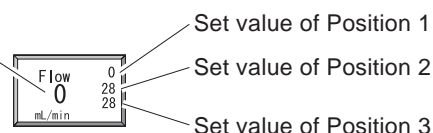
- iv) To set the linear control for the ultrasound output, press the  switch.

* It is impossible to set the linear control for the ultrasound output with Position 1.

- 3) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

6. To change the aspiration flow rate for Position 1, Position 2, and Position 3, press the middle switch in the lowest box to indicate the “Flow Setting” box. Then, set the aspiration flow rate.

Actual aspiration flow rate

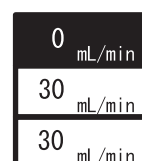


- 1) Select Position 1, Position 2, or Position 3.

Position 1 is selected by pressing the upper numeric switch on the left side inside the “Flow Setting” box.

Position 2 is selected by pressing the middle numeric switch.

Position 3 is selected by pressing the lower numeric switch.

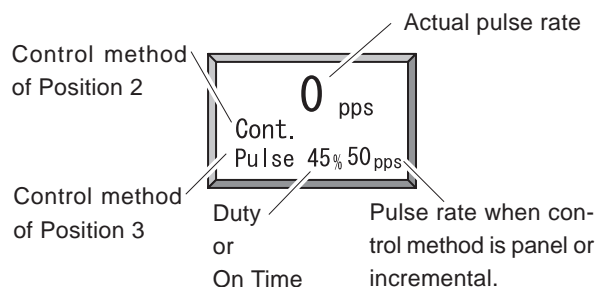


- 2) Make settings for Position 1, Position 2, and Position 3.

Set the aspiration flow rate with the   switch in the 0 to 50 mL/min range.

- 3) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

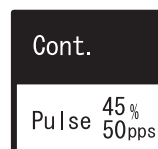
- 7. To change the control method of the ultrasound oscillation for Position 2 and 3, press the switch on the right side in the lowest box to indicate the “US Pulse Setting” box. Then, select the control method (and setting value).**



- 1) Select either Position 2 or 3.

Position 2 is selected by pressing the middle numeric switch on the left side in the “US Pulse Setting” box.



Position 3 is selected by pressing the lower numeric switch.





- 2) Select the control method of ultrasound power for Position 2 and Position 3.

To select the pulse control, press the  switch, or press the  switch to select the continuous control.

- 3) Set the pulse rate for Position 2 and Position 3.

To set the pulse rate in the pulse control or the incremental control, press the   switch. (The pulse rate can be set in 1 pps increments from 1 to 20 pps, 5 pps increments from 20 to 50 pps, and 10 pps increments from 50 to 90 pps.)

* When the pulse rate is set in the pulse control, the pulse rate (pps) and the duty (%) are displayed. (If the set pulse rate is within 25 and 90 pps, the duty can be changed. For the actual value, see the table on p.7-2.)

* When the pulse rate is set in the incremental control, the pulse rate (pps) and “On Time” (time of ultrasound oscillation per 1 pulse: msec) are displayed. If the set pulse rate is within 25 and 90 pps, pressing the   switch may not change the display to maintain consistency with the pulse control.

- 4) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

- 8. Press the foot pedal to Position 1. The irrigation valve opens and the irrigation solution flows. Then, the aspiration pump works and the aspiration starts at the setting value for Position 1.**



9. When the foot pedal is pressed to Position 2, the irrigation and aspiration start at the setting values for Position 2.

When the foot pedal position gets closer to Position 3, the ultrasound output starts at the setting value for Position 2.

* Start position of ultrasound output differs according to the setting on the program contents screen.

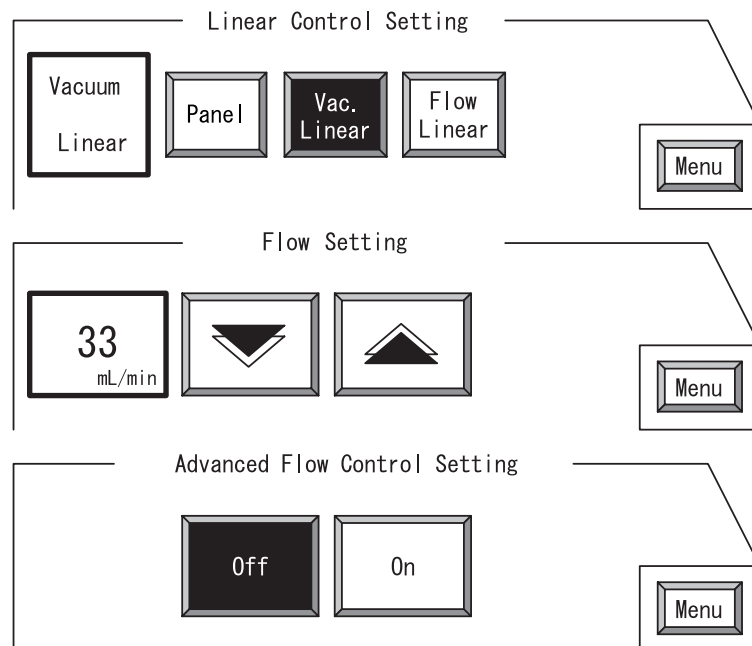
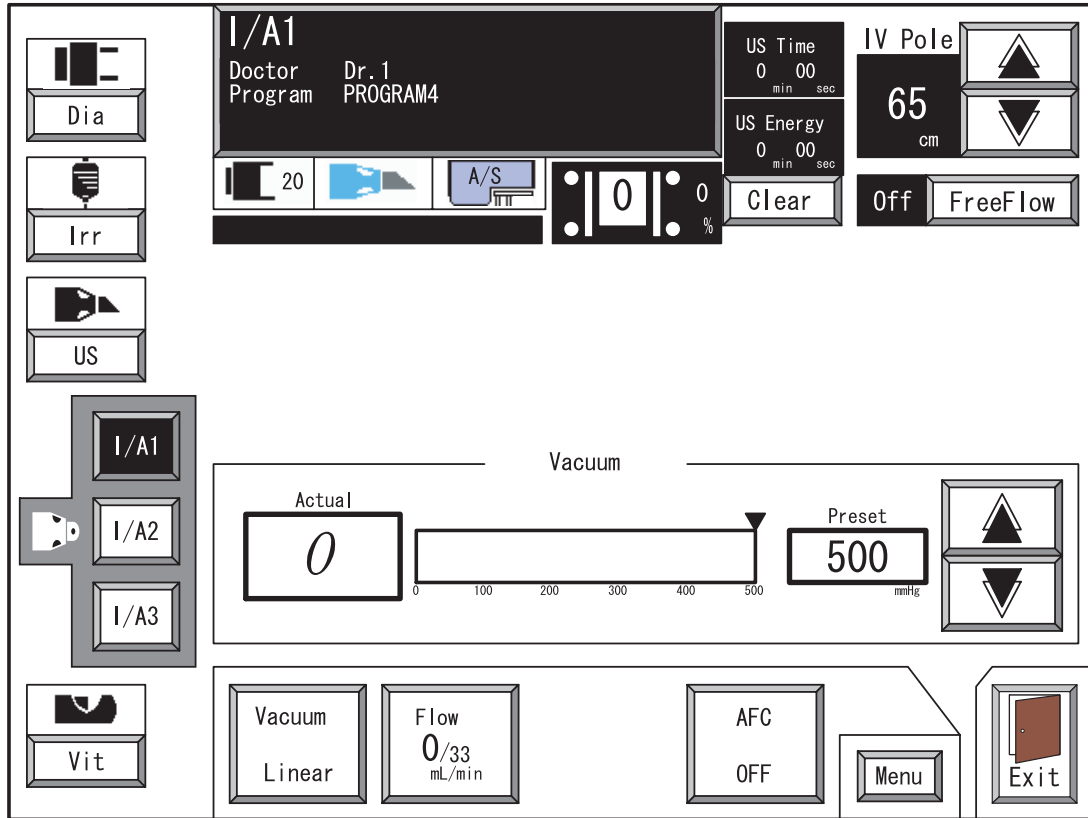
10. When the foot pedal is pressed to Position 3, the irrigation, aspiration, and ultrasound output start at the setting values for Position 3.

* While “Power Linear” is selected, the US power to start ultrasound output differs according to the setting on the program contents screen.




11. If necessary, press any switch on the left side of the foot pedal to reflux.

* The switch for reflux is factory-set to the left kick switch.

4.3.6 I/A mode screen (anterior mode) --For A and AP types



1. Press the  switch to select the I/A mode.

2. If necessary, select the / () switch and change each setting value.


Every time the I/A switch on the switch panel or right kick switch on the foot pedal is pressed, the modulation of I/A mode is selected in the following order;  →  → () →  → ...

* The  switch becomes selectable by changing the setting on the program contents screen.

3. If necessary, press the / switch in the “Vacuum” box to set the vacuum pressure in the 0 to 500 mmHg range.

Pressing an arbitrary position on the bar graph with a finger sets the vacuum pressure in 50 mmHg steps.


4. To change the linear/panel control of the I/A mode, press the left switch in the lowest box to indicate the “Linear Control Setting” box. Then, select the control method from among 3 types.

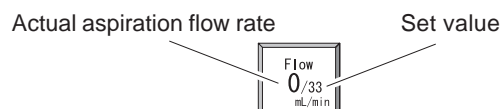
1) To set the panel control for the vacuum pressure and aspiration flow rate, press the  switch.

2) To set the linear control for the vacuum pressure, press the  switch.

3) To set the linear control for the aspiration flow rate, press the  switch.

4) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.


5. To change the aspiration flow rate, press the  switch in the lowest box to indicate the “Flow Setting” box. Then, set the aspiration flow rate.



1) The aspiration flow rate is set in the 0 to 50 mL/min range with the / switch.

2) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

- 6. To change the setting of AFC between On and Off, press the  switch in the lowest box to indicate the “Advanced Flow Control Setting” box. Then, set On or Off of AFC.**

When AFC is set to ON, the rise of vacuum pressure after the I/A tip is occluded is quickened. To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

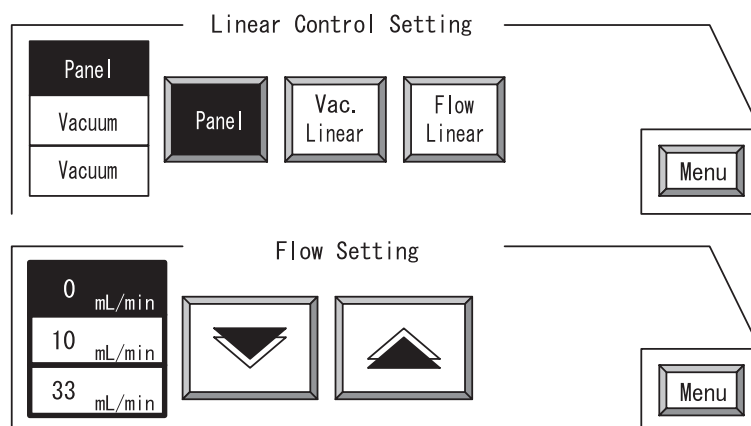
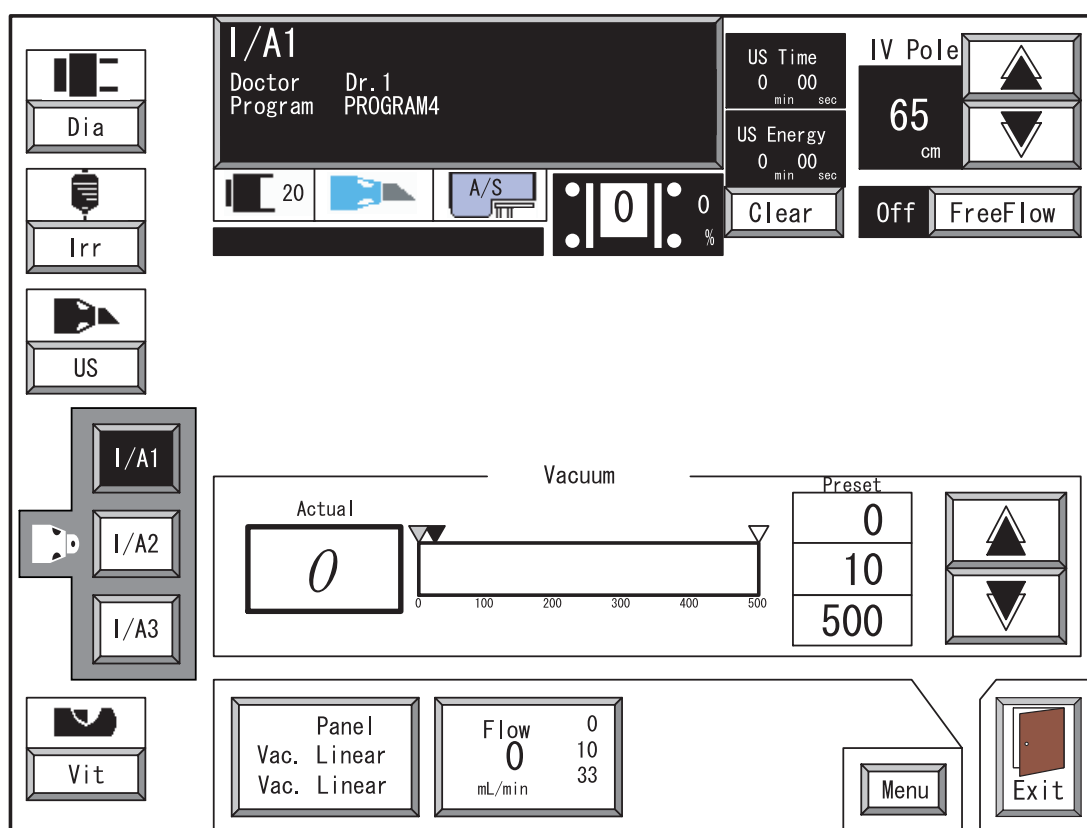
- 7. Press the foot pedal to Position 1. The irrigation valve opens and the irrigation solution flows.**
- 8. Press the foot pedal to Position 2 or 3. The aspiration pump works and starts aspirating.**
- 9. If necessary, press any switch on the left side of the foot pedal to reflux.**

* The switch for reflux is factory-set to the left kick switch.




4.3.7 I/A Propedal mode screen (anterior mode) --For A and AP types




I/A propedal mode is a mode which enables the selection of the vacuum pressure and aspiration flow rate for each position of the foot pedal. With this mode, it is possible to perform more effective aspiration of cortex. (When this mode is selected, AFC function cannot be used.)

* To use the I/A propedal mode, it is necessary to set the “Pro Pedal” to ON on the program contents screen.



1. Press the  switch to select the I/A mode.


2. If necessary, select the  /  (/ ) switch and change each setting value.

Every time the I/A switch on the switch panel or right kick switch on the foot pedal is pressed, the modulation of I/A mode is selected in the following order;  →  → ( →)  ...

* The  switch becomes selectable by changing the setting on the program contents screen.

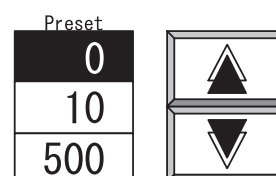
3. If necessary, set the vacuum pressure for Position 1, Position 2, and Position 3 to the 0 to 500 mmHg range.

1) Select Position 1, Position 2, or Position 3.



Position 1 is selected by pressing the upper numeric switch on the left side of the  switch in the “Vacuum” box.

Position 2 is selected by pressing the middle numeric switch.

Position 3 is selected by pressing the lower numeric switch.



2) Make settings for Position 1, Position 2, and Position 3.

Set the vacuum pressure with the  /  switch. (Or press an arbitrary position on the bar graph with a finger to set in 50 mmHg steps.)

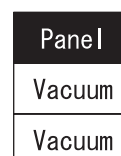
4. To change the linear/panel control of the I/A mode, press the left switch in the lowest box to indicate the “Linear Control Setting” box. Then, select the control method.

1) Select Position 1, Position 2, or Position 3.


Position 1 is selected by pressing the upper switch on the left side inside the “Linear Control Setting” box.

Position 2 is selected by pressing the middle switch.

Position 3 is selected by pressing the lower switch.



2) Select the control method of I/A mode for Position 1, Position 2, and Position 3.

i) To set the panel control for the vacuum pressure and aspiration flow rate, press the  switch.

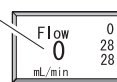
ii) To set the linear control for the vacuum pressure, press the  switch.

iii) To set the linear control for the aspiration flow rate, press the  switch.

3) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

- 5. To change the aspiration flow rate for Position 1, Position 2, and Position 3, press the middle switch in the lowest box to indicate the “Flow Setting” box. Then, set the aspiration flow rate.**

Actual aspiration
flow rate



- 1) Select Position 1, Position 2, or Position 3.

Position 1 is selected by pressing the upper numeric switch on the left side inside the “Flow Setting” box.

Position 2 is selected by pressing the middle numeric switch.

Position 3 is selected by pressing the lower numeric switch.



- 2) Make settings for Position 1, Position 2, and Position 3.

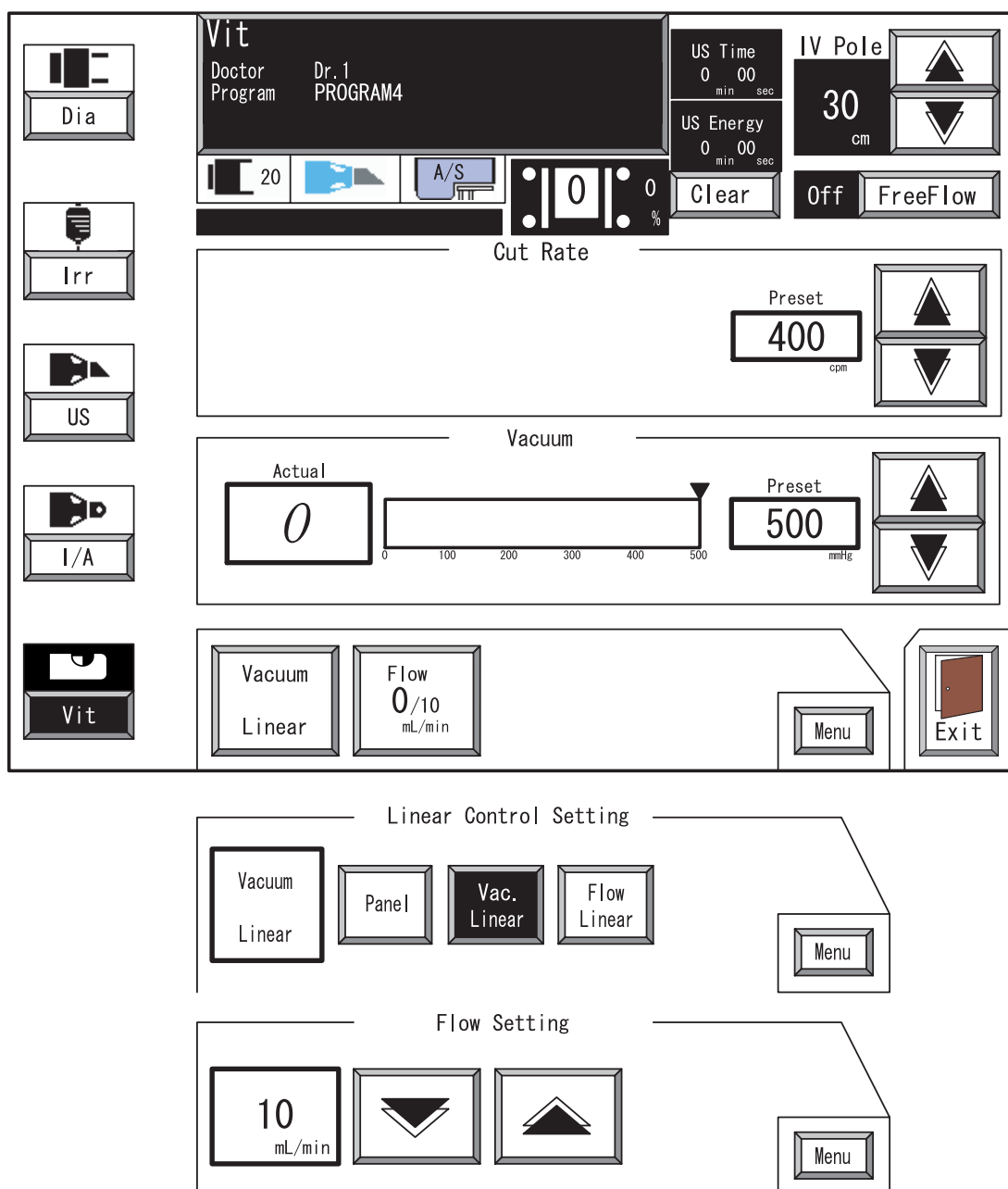
Set the aspiration flow rate with the   switch in the 0 to 50 mL/min range.




- 3) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

- 6. Press the foot pedal to Position 1. The irrigation valve opens and the irrigation solution flows. Then, the aspiration pump works and the aspiration starts at the setting value for Position 1.**
- 7. When the foot pedal is pressed to Position 2, the irrigation and aspiration start at the setting values set for Position 2.**
- 8. When the foot pedal is pressed to Position 3, the irrigation and aspiration start at the setting values set for Position 3.**
- 9. If necessary, press any switch on the left side of the foot pedal to reflux.**

* The switch for reflux is factory-set to the left kick switch.

4.3.8 Vit mode screen (anterior mode) --For A and AP types







1. Press the  switch to select the Vit mode.
2. If necessary, press the   switch in the “Cut Rate” box to set the cutting rate in the 0 to 600 cuts/min range.

When the cutting rate is set to 0 cuts/min, the blade of cutter is closed while the foot pedal is pressed so that the cutter works.

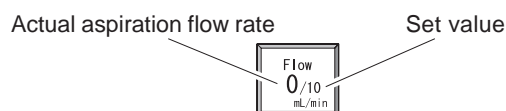
3. If necessary, press the   switch in the “Vacuum” box to set the vacuum pressure in the 0 to 500 mmHg range.




Pressing an arbitrary position on the bar graph with a finger sets the vacuum pressure in 50 mmHg steps.

4. To change the linear/panel control of the Vit mode, press the left switch in the lowest box to indicate the “Linear Control Setting” box. Then, select the control method.

- 1) To set the panel control for the vacuum pressure and aspiration flow rate, press the  switch.
- 2) To set the linear control for the vacuum pressure, press the  switch.
- 3) To set the linear control for the aspiration flow rate, press the  switch.
- 4) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

5. To change the aspiration flow rate, press the right switch in the lowest box to indicate the “Flow Setting” box. Then, set the aspiration flow rate.



- 1) The aspiration flow rate is set in the 0 to 50 mL/min range with the   switch.
 - 2) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.
6. Press the foot pedal to Position 1. The irrigation valve opens and the irrigation solution flows.

7. Press the foot pedal to Position 2 or 3. The aspiration pump works and starts aspirating.

At this time, if the vitrectomy cutter is in the READY state, the cutter also starts operation.


8. If necessary, press any switch on the left side of the foot pedal to reflux.


* The switch for reflux is factory-set to the left kick switch.

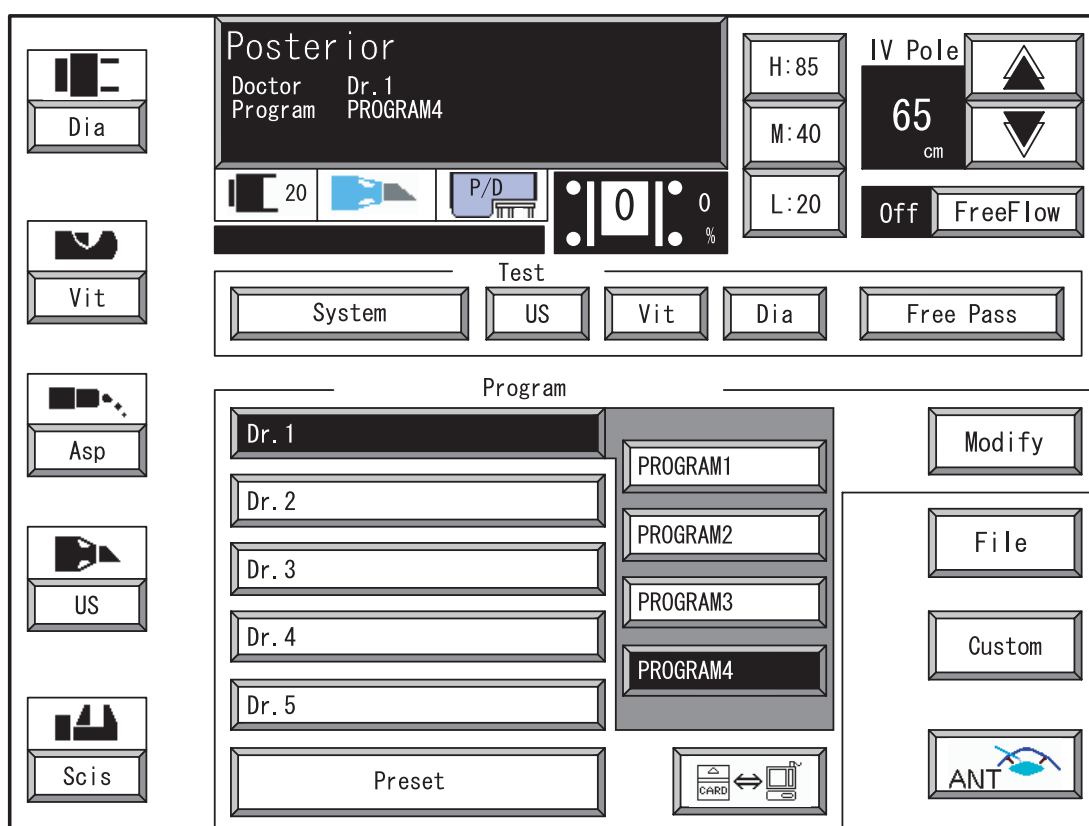
9. If necessary, press the right kick switch on the foot pedal to change the state of the cutter operation between READY and Off.

4.3.9 Posterior mode screen (main screen) --For AP and P types

This screen is for the posterior mode, and is displayed on A and AP types.

For AP type, when the power switch is turned ON (|), the opening screen appears, and then, the anterior mode screen (main screen) automatically appears. Press the  switch on the right bottom to display this screen. (It is possible to display the posterior mode screen (main screen) after the opening screen by changing the custom setting.)

For P type, when the power switch is turned ON (|), the opening screen appears, and then, the posterior mode screen (main screen) automatically appears. However, the  switch is dimmed and cannot be selected.



1. Select the program on this screen.

If no program is selected, the “Preset” data is selected.

Selectable programs are 20 programs (5 doctors × 4 programs).

2. Press the mode switch to select the surgery mode.

The dimmed mode switch on the left side of the main screen cannot be used since the test has not been passed.

3. The irrigation pole is raised or lowered by pressing the IV Pole  switch.

The irrigation pole can be also raised or lowered by pressing the irrigation pole UP/DOWN switch on the rear side of the system or pressing the upper/lower right switch on the foot pedal.

4. To set the height of irrigation pole with the touch of a switch, press the    switch.

Figures indicated on each switch mean the height of irrigation pole to be set when the switch is pressed.

- * The heights indicated on these switches are set on the program contents screen.
- * When any mode is selected, the irrigation pole is set to the selected height, H, M, or L, which is selected on the program contents screen.

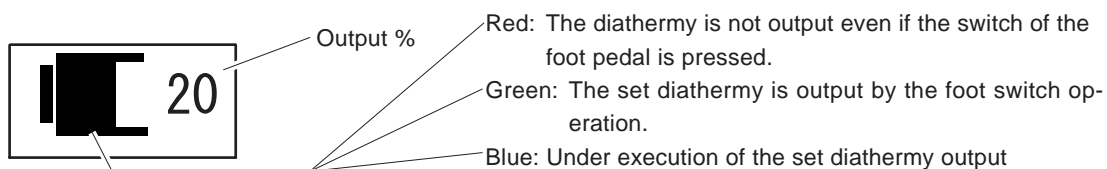
5. Every time the  switch is pressed, the irrigation valve is opened/closed.

6. To return to the anterior mode screen (main screen), press the  switch.

7. Verify the functions and conditions of each part.

It is possible to verify the functions and conditions of diathermy, US handpiece, cassette, and foot pedal in the lower portion of the message area on the screen.

- a) Verify the condition of diathermy.



If any mode is selected, the diathermy is output by pressing the upper left switch (factory-set) on the foot pedal even if the Dia mode is not selected.

- b) Verify the connection of the plug of US handpiece. (Only AP type can verify the plug. As for P type, the indication below does not appear.)



When the plug of US handpiece is connected, this indication is colored.

c) Verify the condition and type of inserted cassette.



The cassette has not been inserted.



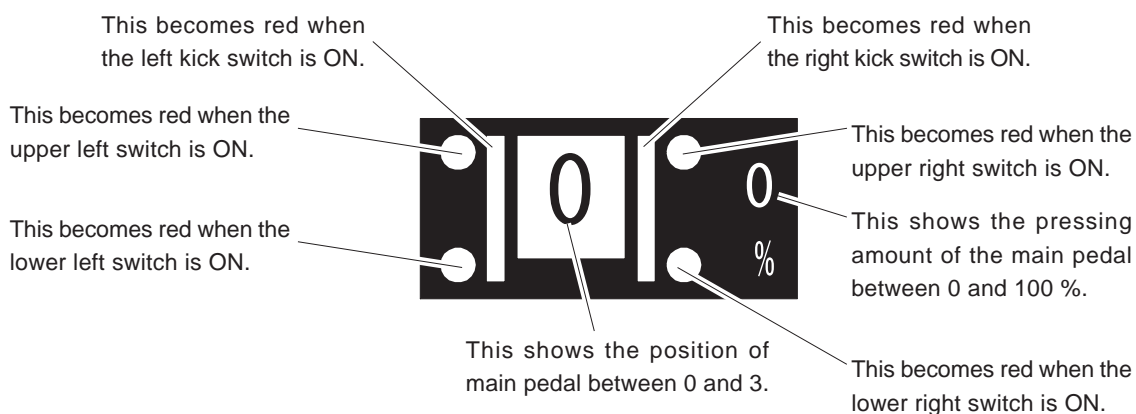
The anterior/posterior cassette has been set.




The posterior dual cassette has been set.

d) Verify the conditions and settings of the foot pedal and each switch.

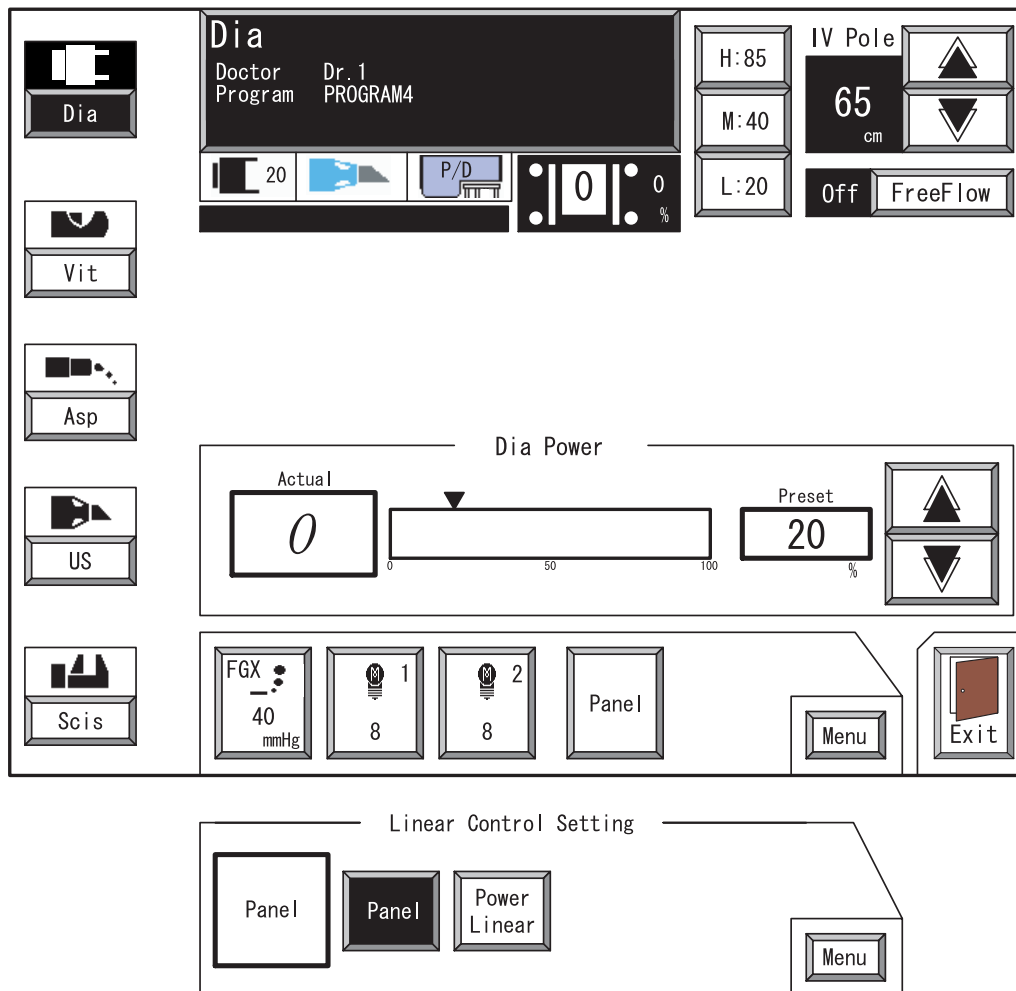
i) Verify the conditions of the foot pedal and each switch.






ii) Verify the settings of the foot pedal and each switch.

Functions of each switch on the foot pedal can be changed. To check the functions of each switch, press  mentioned in i) above. Then, the functions of each switch and illustration are indicated for 5 seconds.




4.3.10 Dia mode screen (posterior mode) --For AP and P types



1. Press the  switch to select the Dia mode.
2. If necessary, press the  /  switch in the “Dia Power” box to set the output diathermy in the 0 to 100 % range.

Pressing an arbitrary position on the bar graph with a finger sets the output of diathermy in 5 % steps.

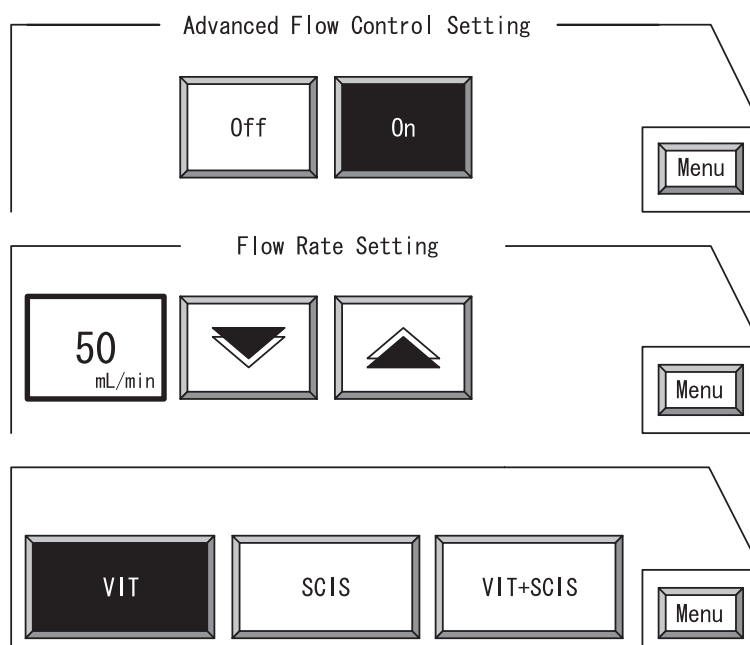
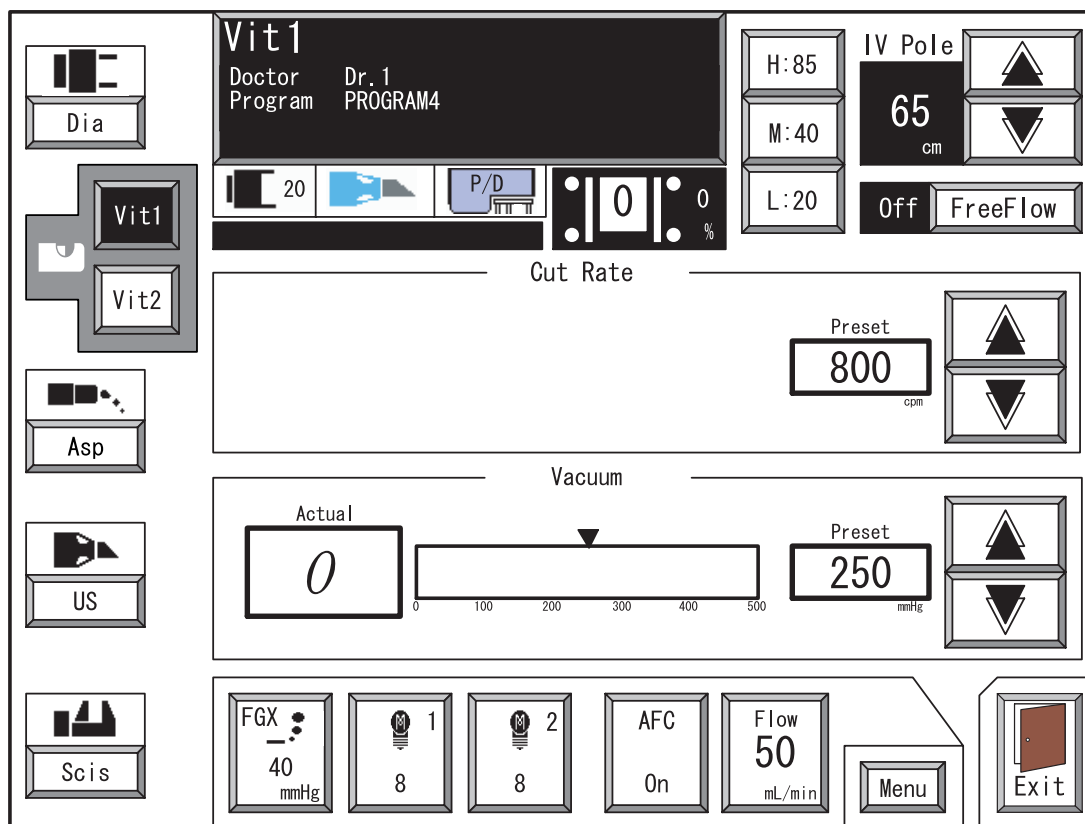
3. To change the control method of the diathermy, press the right end switch in the lowest box to indicate the “Linear Control Setting” box. Then, select the control method.

- 1) To select the panel control, press the  switch, or press the  switch to select the linear control.
- 2) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

4. The diathermy is output by pressing the foot pedal to Position 2 or more.

5. The output of diathermy is stopped when the foot pedal is released.

4.3.11 Vit mode screen (posterior mode) --For AP and P types



1. Press the  switch to select the Vit mode.

2. If necessary, press the   switch and change each setting.

Every time the Vit switch on the switch panel or Vit1 \leftrightarrow Vit2 switch on the foot pedal is pressed, the modulation of Vit mode is selected in the following order;  \rightarrow  \rightarrow 

3. If necessary, press the   switch in the “Cut Rate” box to set the cutting rate to continuous or in the 50 to 2500 cuts/min range.

The Cut Rate is set to “continuous” by setting the value to 0 cpm.

When the built-in small pump is used as a driving source, the setting is continuous or in the 50 to 800 cuts/min range. At this time, “Max 800 cpm” is indicated on the left side of the setting value.


4. If necessary, press the   switch in the “Vacuum” box to set the vacuum pressure of vitrectomy cutter in the 0 to 500 mmHg range.

Pressing an arbitrary position on the bar graph sets the vacuum pressure in 50 mmHg steps.

5. To change the setting of AFC between On and Off, press the  switch in the lowest box to indicate the “Advanced Flow Control Setting” box. Then, set On or Off of AFC.

Basically, the aspiration flow rate is determined by the vacuum pressure in the posterior mode, so there is a case where the aspiration flow rate is larger than the irrigation flow rate if the vacuum pressure is high.

When “AFC On” is selected, in such a condition, the aspiration flow rate is reduced. (However, according to the condition of irrigation, there is a case where the aspiration flow rate becomes larger.)

When “AFC On” is selected, the setting of aspiration flow rate becomes ineffective and the switch () disappears.

To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

- 6. To change the aspiration flow rate, press the right switch in the lowest box to indicate the Flow Setting” box. Then, set the aspiration flow rate.**



Actual aspiration flow rate
or set value

- 1) Select “AFC Off”.

The switch is indicated.

* When “AFC On” is selected, the aspiration flow rate cannot be set.

- 2) The aspiration flow rate is set in the 0 to 140 mL/min range with the   switch.

- 3) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

- 7. The aspiration pump works and starts aspirating by pressing the foot pedal.**

At this time, if the vitrectomy cutter is in the READY state, the cutter also starts operation.


- 8. If necessary, press any switch on the left side of the foot pedal to reflux.**

* The switch for reflux is factory-set to the left kick switch.

- 9. If necessary, press the right kick switch on the foot pedal to change the state of the cutter operation between READY and Off.**

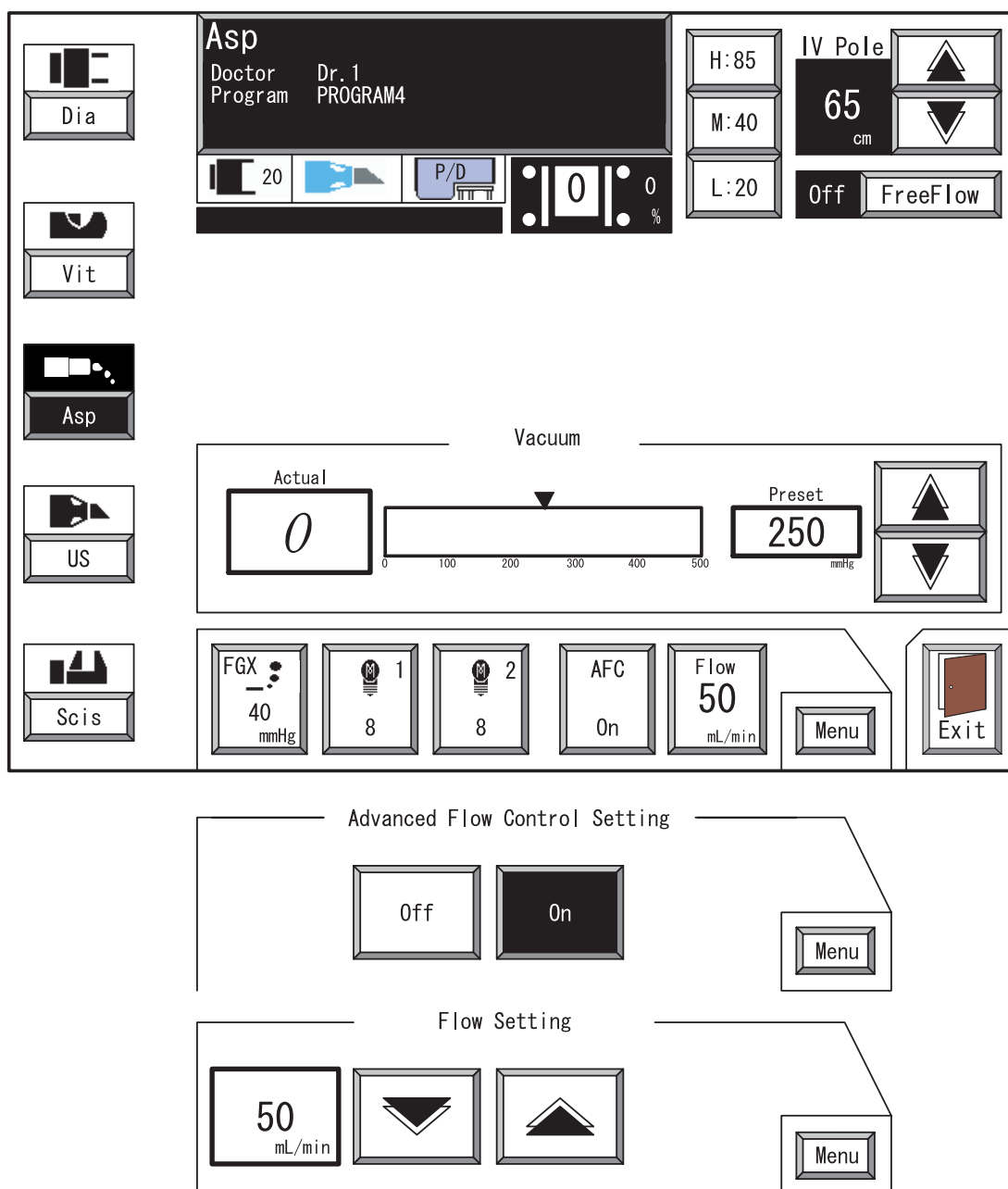
The state of cutter operation when the foot pedal is pressed is indicated as “Cutter Ready” or “Cutter Off” in the sub-message area.




- 10. If necessary, select the output port for cutter driving.**

Normally, the VIT port is selected. However, it is possible to change the output port to the SCSI port by pressing the  switch, as necessary, if the cutter driving becomes impossible with the VIT port.

* This function is for emergency use. Select the VIT port in normal times.

4.3.12 Asp mode screen (posterior mode) --For AP and P types




1. Press the  switch to select the Asp mode.
2. If necessary, press the   switch in the "Vacuum" box to set the vacuum pressure in the 0 to 500 mmHg range.

Pressing an arbitrary position on the bar graph with a finger sets the vacuum pressure in 50 mmHg steps.

- 3. To change the setting of AFC between On and Off, press the  switch in the lowest box to indicate the “Advanced Flow Control Setting” box. Then, set On or Off of AFC.**

There is a case where the aspiration flow rate is larger than the irrigation flow rate if the vacuum pressure is high.

When “AFC On” is selected, in such a condition, the aspiration flow rate is reduced. (However, according to the condition of irrigation, there is a case where the aspiration flow rate becomes larger.)

When “AFC On” is selected, the setting of aspiration flow rate becomes ineffective and the switch () disappears.

To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

- 4. To change the aspiration flow rate, press the right switch in the lowest box to indicate the “Flow Setting” box. Then, set the aspiration flow rate.**



Actual aspiration flow rate
or set value

- 1) Select “AFC Off”.

The switch is indicated.

* When “AFC On” is selected, the aspiration flow rate cannot be set.

- 2) The aspiration flow rate is set in the 0 to 140 mL/min range with the   switch.

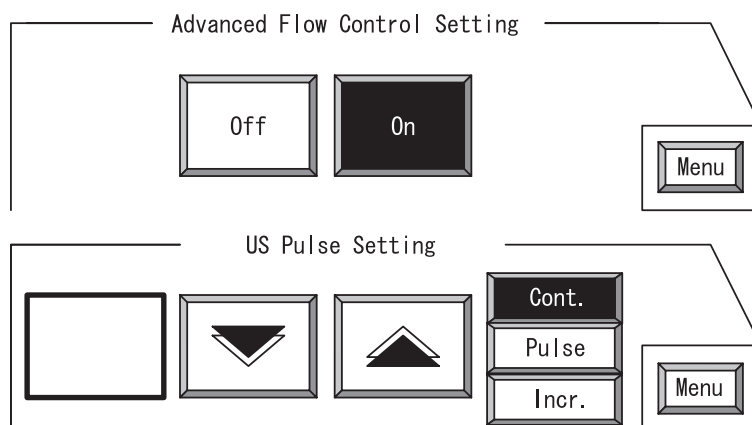
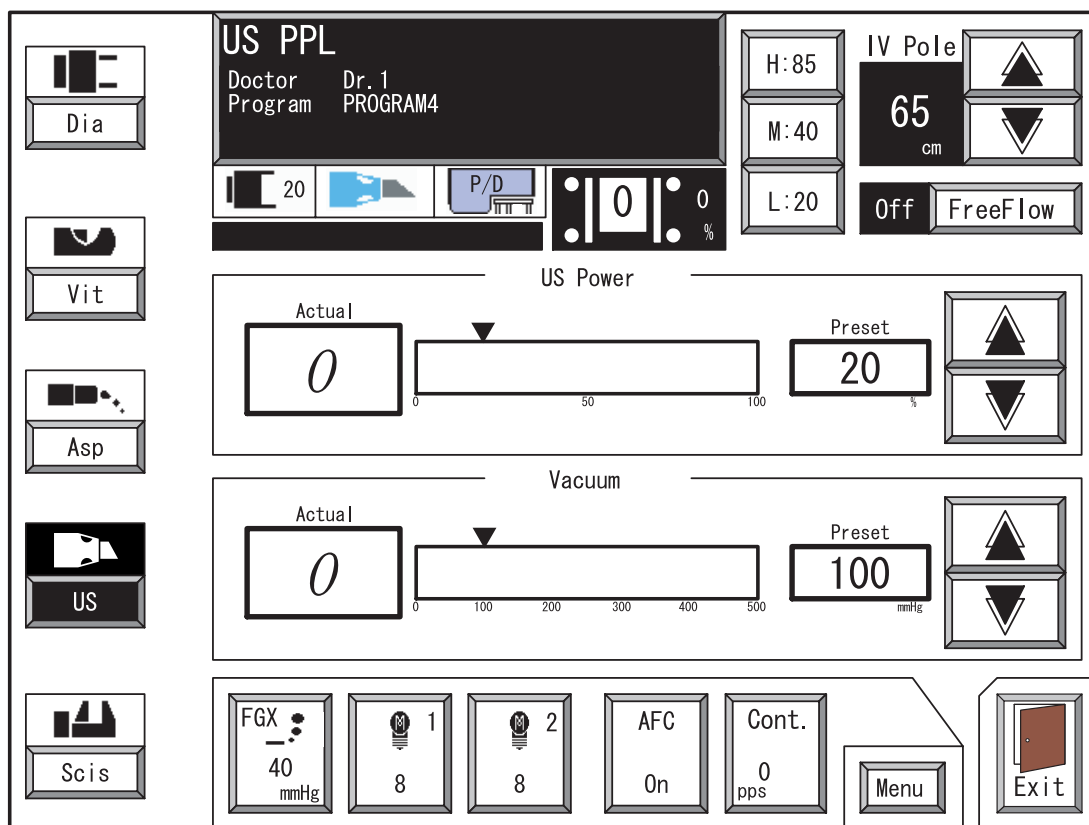
- 3) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.




- 5. The aspiration pump works and starts aspirating by pressing the foot pedal.**

- 6. If necessary, press any switch on the left side of the foot pedal to reflux.**

* The switch for reflux is factory-set to the left kick switch.

4.3.13 US PPL mode screen (posterior mode) --For AP type



1. Press the  switch to select the US PPL mode.
2. If necessary, press the  /  switch in the “US Power” box to set the ultrasound power in the 0 to 70 % range.

Pressing an arbitrary position on the bar graph sets the ultrasound power in 5 % steps.

3. If necessary, press the   switch in the “Vacuum” box to set the vacuum pressure in the 0 to 500 mmHg range.


Pressing an arbitrary position on the bar graph sets the vacuum pressure in 50 mmHg steps.

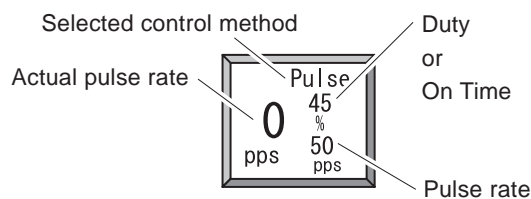
4. To change the setting of AFC between On and Off, press the  switch in the lowest box to indicate the “Advanced Flow Control Setting” box. Then, set On or Off of AFC.




There is a case where the aspiration flow rate is larger than the irrigation flow rate if the vacuum pressure is high.

When “AFC On” is selected, in such a condition, the aspiration flow rate is reduced. (However, according to the condition of irrigation, there is a case where the aspiration flow rate becomes larger.)



To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

5. To change the control method of the ultrasound oscillation between Pulse and Continuous, press the  switch to indicate the “US Pulse Setting” box, and select either control method (and setting value).





- 1) Press the  switch to select the continuous control, press the  switch to select the pulse control, or press the  switch to select the incremental control.

* If the incremental control is selected, the pulse rate is increased by depressing the foot pedal starting from the setting pulse rate up to 90 pps.

- 2) To set the pulse rate in the pulse control or the incremental control, press the   switch. (The pulse rate can be set in 1 pps increments from 1 to 20 pps, 5 pps increments from 20 to 50 pps, and 10 pps increments from 50 to 90 pps.)

* When the pulse rate is set in the pulse control, the pulse rate (pps) and the duty (%) are displayed. (If the set pulse rate is within 25 and 90 pps, the duty can be changed. For the actual value, see the table on p.7-2.)

* When the pulse rate is set in the incremental control, the pulse rate (pps) and “On Time” (time of ultrasound oscillation per 1 pulse: msec) are displayed. If the set pulse rate is within 25 and 90 pps, pressing the   switch may not change the display to maintain consistency with the pulse control.

- 3) To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

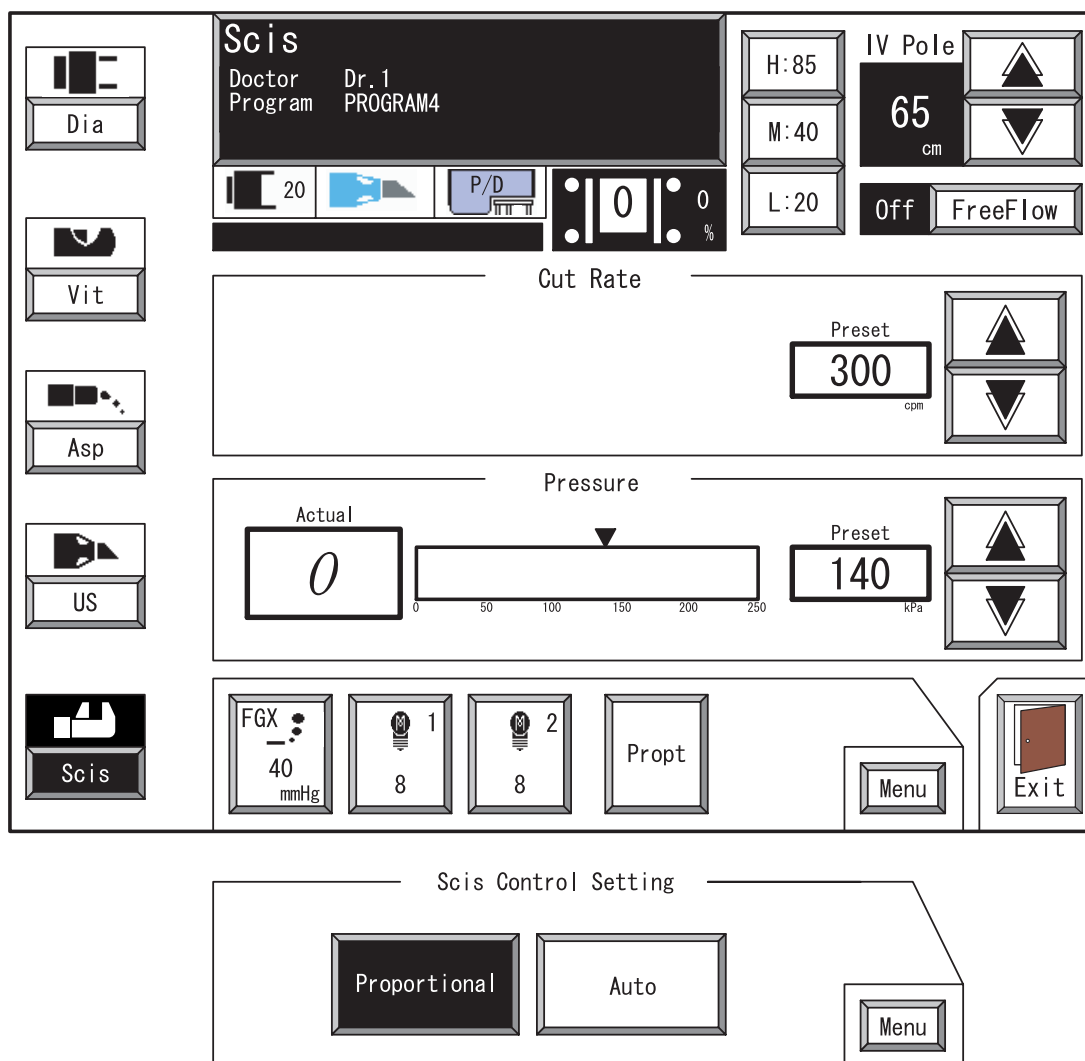
6. The aspiration pump works and starts aspirating by pressing the foot pedal.






At this time, the ultrasound starts by pressing the right kick switch of the foot pedal.

7. If necessary, press any switch on the left side of the foot pedal to reflux.

* The switch for reflux is factory-set to the left kick switch.

4.3.14 Scis mode screen (posterior mode) --For AP and P types



1. Press the  switch to select the Scis mode.
2. If necessary, press the   switch in the “Cut Rate” box to set the cutting rate to 0 (single) or in the 50 to 300 cuts/min range.
3. If necessary, press the   switch in the “Pressure” box to set the air pressure for driving the intraocular scissors in the 140 to 250 kPa range.

Pressing an arbitrary position on the bar graph sets the air pressure for driving the intraocular scissors in 10 kPa steps.

- 4. To change the scissors operation between Proportional and Auto, press the right switch in the lowest box to indicate the “Scis Control Setting” box. Then, select either operation with the  or  switch.**

- 5. The intraocular scissors work by pressing the foot pedal.**

The operation of intraocular scissors varies with modes, the Auto mode and Proportional mode. In the Auto mode, the intraocular scissors repeat the open/close operation of its scissors part at the set cutting rate while the foot pedal is pressed.



In the Proportional mode, the intraocular scissors open/close its scissors part in proportion to the pressing amount of foot pedal.

- 6. If necessary, press the right kick switch of the foot pedal to change the insert mode of intraocular scissors between On and Off.**

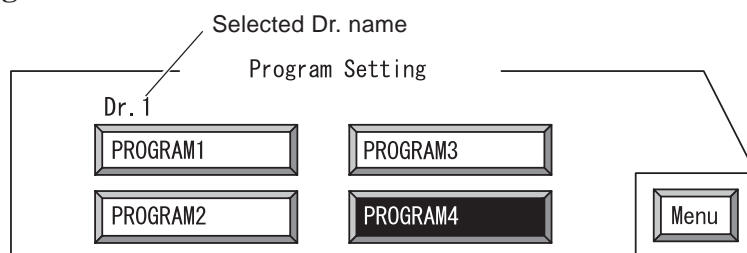
The selected insert mode is indicated as “Insert On” or “Insert Off” on the sub-message area.

* When the Auto mode is selected, set “Insert On” to insert or remove the intraocular scissors.

4.3.15 Small screens

On the operation screen for each mode, an enclosed area is placed at the lowest position, and the  switch, which is also enclosed, is placed inside the box. Here, a small screen which appears when the  switch is pressed and operation method of each switch on the small screen are described.


1. When the  switch is pressed once on the operation screen for each mode, the small screen is changed as follows.



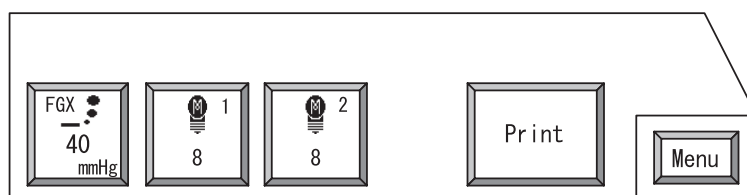
Only “Program” can be changed with switches in this “Program Setting” box, and “Doctor” cannot be changed. When “Preset” is selected, “Program” cannot be changed, and switches to select each program do not appear.





* To return to the previous screen, wait for 5 seconds without touching the LCD touch panel.

2. When the  switch is pressed again on the small screen mentioned in the step 1, the small screen is changed to one of the followings.

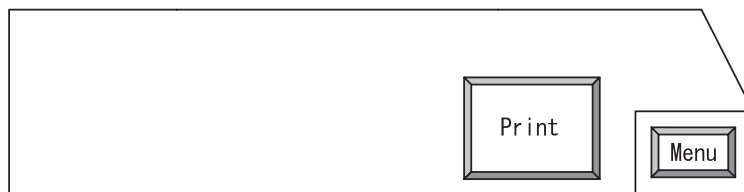
Indications differ according to whether the  switch is pressed on the operation screen in the anterior mode or posterior mode, or whether the system is equipped with the posterior unit or not.

[Anterior screen (for AP type)]



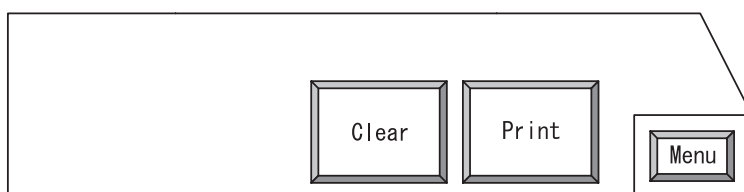
- i) When the  switch is pressed here, the FGX small screen appears.
(→ See [4.3.15.1 FGX small screen] (p. 4-83).)
- ii) When the  switch is pressed here, the Illum1 small screen appears.
(→ See [4.3.15.2 Illum1, Illum2 small screen] (p. 4-84).)
- iii) When the  switch is pressed here, the Illum2 small screen appears.
(→ See [4.3.15.2 Illum1, Illum2 small screen] (p. 4-84).)
- iv) When the  switch is pressed here, the surgery data is printed out.



[Anterior screen (for A type)]



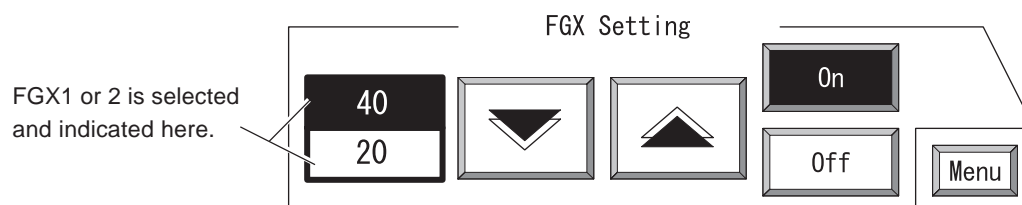
- i) When the  switch is pressed here, the surgery data is printed out.








[Posterior screen (for AP and P types)]



- i) When the  switch is pressed here, the surgery data is printed out.
- ii) When the  switch is pressed here, the surgery data is cleared.

4.3.15.1 FGX small screen

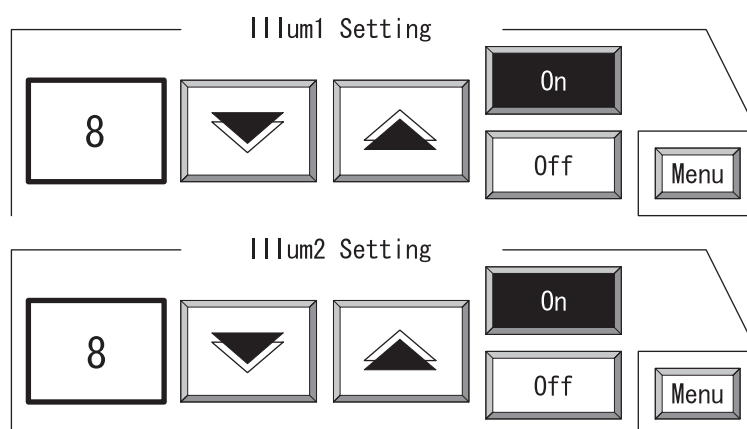






1. Press the  switch in the lowest box to indicate the “FGX Setting” box.
2. Press the display on the left of the /  switch to select “FGX1” or “FGX2”.
3. If necessary, press the /  switch to set the FGX output in the 10 to 99 mmHg range.
4. If necessary, press the /  switch to change the FGX output between On and Off.

It is also possible to change the FGX output between On and Off with the FGX switch on the switch panel. (Every time the FGX switch is pressed, On and Off is switched.)

5. To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

4.3.15.2 Illum1, Illum2 small screen



1. Press the  or  switch in the lowest box to indicate the “Illum1 Setting” / “Illum2 Setting” box.
2. If necessary, press the  /  switch in the “Illum1 Setting” / “Illum2 Setting” box to set the intraocular illumination level in the 1 to 10 range.

Normally, set the level between 1 and 8.

* Higher intensity can be obtained by setting the level to 9 or 10, however, this shortens the life of the lamp. In addition, in level 9 and 10, the indication color changes.


3. If necessary press the  /  switch in the “Illum1 Setting” / “Illum2 Setting” box to change the intraocular illumination between On and Off.



It is also possible to change the intraocular illumination between On and Off with the Illum1 or Illum2 switch on the switch panel. (Every time the Illum1 or Illum2 switch is pressed, On and Off is switched.)

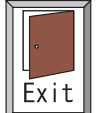


4. To return to the previous screen, press the  switch or wait for 5 seconds without touching the LCD touch panel.

4.3.16 Custom setting screen

Custom setting screen is to customize an use environment other than surgery conditions.

When the  switch on the main screen for anterior or posterior mode is pressed, following screen appears. (Screen shown below is in the initial settings for AP type, and highlighted (blue) switches mean that they are selected. In addition, if a setting item is not available, "Reserve" is indicated and there is no switch on the right side.)

Program	Preset	Sel Prog.	Anterior Preset
Voice	On	Off	5  
Language	English	Japanese	
Display Color	1	2	
Vacuum Sound	1	2	
US Sound	On	Off	
Auto Print	On	Off	
Date Type	YMD MDY	DMY	
RC Code	1 2	3 4	
Cassette Eject	Keep IV Pole	Lower IV Pole	
P/D Cassette	Posterior	ANT/POST	

2001/12/31 7:59	Adjust	 Exit
 	Set	

1. Make settings so that desirable program is indicated/selected immediately after the system start-up.

- 1) Call up the screen, anterior or posterior screen, which will be displayed after the system start-up.

Select Dr. and Program which are often used in the "Program" box on the main screen for anterior or posterior mode.

- 2) Press the  switch.

* According to the following settings, the main screen which is indicated when the switch is pressed, will be displayed immediately after the system start-up.



3) Press the or switch on the right side of “Program” to select the program which will be selected immediately after the system start-up.

* When the switch is pressed, the Preset settings for each main screen are selected immediately after the system start-up.

* When the switch is pressed, the Dr. and Program settings selected in the step 1) are selected when each main screen is displayed.

4) Look at the indication on the right side of the switch to confirm the main screen to be opened and the preset Program.

* For example, if the indication is , this means that the Preset program starts in the selected state on the anterior screen.

2. Set the voice guidance to On or Off with the or switch on the right side of “Voice”.

To enable the voice guidance/switch operation sound, press the switch, and press the switch to disable the voice guidance/switch operation sound.

When the voice guidance/switch operation sound is set to On, it is possible to set the sound level (between 1 and 9: initial setting is 5) with the / switch

* When the sound level is set to 5, the sound levels of the aspiration and the voice guidance become the same.

3. Set the language for error message with the or switch on the right side of “Message”.

To indicate the error message in Japanese, press the switch, and press the switch to indicate the message in English.

4. Set the color of display with the or switch on the right side of “Display Color”.

To darken the display color, press the switch, and press the switch to brighten the display color.

* When the switch is pressed, the switches whose functions are similar to the ones for each mode switch are changed to the same color.

5. Set the sound quality of vacuum sound with the or switch on the right side of “Vacuum Sound”.

To make the vacuum sound high, press the switch, and press the switch to make the vacuum sound low.

6. Set the beep sound for ultrasound output to On or Off with the ☐ On or ☐ Off switch on the right side of “US Sound”.

To enable the beep sound, press the ☐ On switch, and press the ☐ Off switch to disable the beep sound.

* Setting of “US Sound” is possible for both A and AP types. As for P type, this item is indicated as “Reserve”.

7. Set the auto-print to On or Off with the ☐ On or ☐ Off switch on the right side of “Auto Print”.

To enable the auto-print, press the ☐ On switch, and press the ☐ Off switch to disable the auto-print.

* In the case where ☐ On is set, the surgery data is automatically printed out by pressing the switch. Then, the data is cleared.

8. Set the indication form of date with the ☐ YMD, ☐ MDY, or ☐ DMY switch on the right side of “Date Type”.

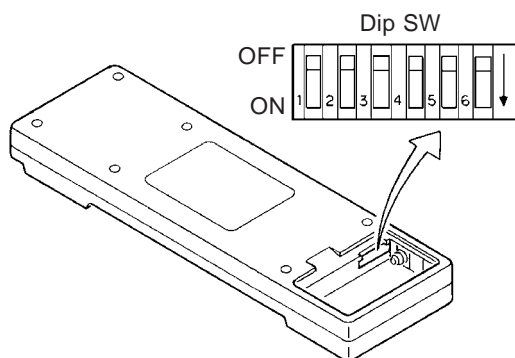
To set the indication form to “year/month/day”, press the ☐ YMD switch, press the ☐ MDY switch for the indication form “month/day/year”, and press the ☐ DMY switch for the indication form “day/month/year”.

9. Set the remote control shift code with the ☐ 1, ☐ 2, ☐ 3, or ☐ 4 switch on the right side of “RC Code”.


Same number shall be assigned to the system and the remote control. (The set shift code of the remote control (“RC 1” to “RC 4”) is indicated on the LCD while the power of remote control is ON.)



* To set the shift code, use the dip switch (DIP SW) which can be seen when the battery cover on the rear side of the remote control is opened. (There are 6 switches between 1 and 6, however, use only DIP SW 1 and DIP SW 2.)

* Setting of “RC Code” is possible for both A and AP types. As for P type, this item is indicated as “Reserve”.





Shift Code	Dip SW 1	Dip SW 2
1	OFF	OFF
2	ON	OFF
3	OFF	ON
4	ON	ON

- 10. Set the irrigation pole control, which is whether the irrigation pole is automatically lowered or not at the time of cassette ejection, with the  or  switch on the right side of “Cassette Eject”.**

When the  switch is pressed, the height of irrigation pole is not changed even if the cassette is ejected. When the  switch is pressed, the irrigation pole is lowered to its lowest level at the time of cassette ejection.

- 11. Set the method for use of the posterior dual cassette with the switches on the right side of “P/D Cassette”.**


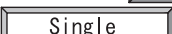
[For AP type]

When the  switch is pressed, the posterior dual cassette is used as a posterior dual cassette, and when the  switch is pressed, the posterior dual cassette is used as an anterior/posterior dual cassette.

* This setting cannot be done while the cassette is inserted.

[For P type]

The vacuum path of the P/D cassette is selected between 2 systems and 1 system.

When the  switch is pressed, the vacuum is performed with 2 systems. When the  switch is pressed, the vacuum is performed with 1 system.



* This setting cannot be done while the cassette is inserted.

[For A type]

* Setting of “P/D Cassette” is possible for both AP and P types. As for A type, this item is indicated as “Reserve”.


- 12. If necessary set the date and time.**

1) Press the  switch until the item to be adjusted can be selected.

2) Adjust the numeric values with the /  switch.

3) Press the  switch to determine the date and time indication.


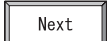
- 13. Memorize the changed custom data on the custom setting screen.**

Press the  switch to memorize the changed custom data in the memory of the system. At this time, an illustrated clock moving its hand appears on the LCD touch panel. Do not turn OFF the power of the system while this illustration is indicated.

Otherwise, the custom data cannot be memorized normally.

If the power of system is turned OFF without pressing the  switch, the changed data becomes ineffective.

4.3.17 Program contents screen

Program contents screen is to select the mode used for surgery and to change the setting values. This screen appears when the  switch is pressed on the anterior or posterior screen. However, the CV-24000 has various changeable contents, it is impossible to indicate all of them on a screen. Pressing the  switch on each screen switches the changeable contents indicated on the screen.

[Anterior screen] (switch order: ① → ② → ③ → ④ → ⑤ → ⑥ → ① →....)

- ① US mode program contents change screen
- ② I/A mode program contents change screen
- ③ Dia, Irr, and Vit mode program contents change screen
 - * It is also possible to change the contents of FGX1, FGX2, Illum1, and Illum2 for the system equipped with the posterior unit (factory-installed option).
- ④ Foot pedal function change screen
- ⑤ Program name change screen
- ⑥ Doctor name change screen

[Posterior screen] (switch order: ① → ② → ③ → ④ → ① →....)

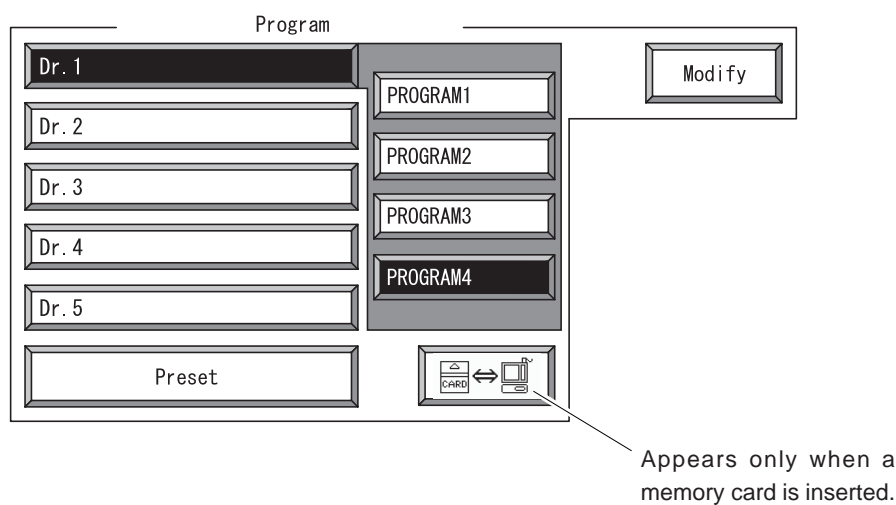
- ① Each mode program contents screen
 - * It is also possible to change the contents of FGX1, FGX2, Illum1, Illum2, and IV Pole High/Middle/Low.
- ② Foot pedal function change screen
- ③ Program name change screen
- ④ Doctor name change screen

4.3.17.1 Changing settings on the anterior screen

When “Preset” or any program in a memory card is selected, it is impossible to change the settings of program. Only a confirmation of contents is possible.


1. Select the program to be changed on the anterior main screen.




- 1) Press the Dr. name to be changed and then press the Program name in the Program box. Selected switches of Dr. name and Program name are highlighted.






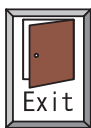



- 2) Press the  switch.

2. Change the settings on the US mode program contents change screen.











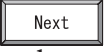

- 1) To change any settings other than the ones in the US mode, press the  switch. Then the I/A mode program contents change screen appears.

Dr. 1 PROGRAM1	US1			US2			US3		
	P1	P2	P3	P1	P2	P3	P1	P2	P3
Vaccum	0	200	150	0	250	200	0	300	300
Flow	0	28	30	0	28	28	0	30	30
US Power		0	40		0	40		0	40
US Control	① 		② 0			0			0
US Pulse		Cont	Cont		Cont	Cont		Cont	Pulse
Pulse Rate			45 50 % pps			45 50 % pps			45 50 % pps
Linear Control	Panel	Panel	Pow.	Panel	Panel	Pow.	Panel	Panel	Pow.
IV Pole Height	65			65			75		
Auto Pole Ctrl	0			0			0		
AFC	OFF			OFF			OFF		
Pro Pedal	OFF			OFF			OFF		









- 2) To make **US3** mode usable, touch the **US3**. Then, it is highlighted.
- * Touching the setting switches for ON/OFF, Cont/Pulse, and Linear/Panel make the switches effective.
- 3) To set the Pro Pedal to ON (each setting for **P1**, **P2**, and **P3** is possible), press the Pedal setting of US mode to be set to ON. Then, the setting is highlighted. Press the  switch to change the setting from OFF to ON.







- * When the Pro Pedal is set to OFF in the mode that the Pro Pedal mode is selectable, settings of each control item under **P3** are indicated in dark color.
- When the Pro Pedal is set to ON, settings of each control item are indicated in dark color under **P1**, **P2**, and **P3**.
- (P1, P2, and P3 mean Position 1, Position 2, and Position 3.)





- 4) To change the setting of “US Control” (① and ② in the figure), perform the procedure below.
 - ① The start position of ultrasound output in P2 while the Pro Pedal is ON is selectable. Touch the position shown in the figure with a finger and set an arbitrary level (between 1 and 8, initial setting: 5) with the /  switch.
 - * When level 8 (right end) is set, the ultrasound is output at the moment when P2 is switched to P3.
 - ② The US power of the ultrasound output in P3 while the Pro Pedal is ON is selectable. This setting is effective only when “Power Linear” is set in P3. Touch the position shown in the figure with a finger and set an arbitrary value (initial setting: 0%) with the /  switch.
 - * When 0% is set, the output power becomes the same as the max US power in P2.
- 5) To change other settings, press the position to be changed. Then, it is highlighted. Press the /  switch to change settings.
- 6) To reset the setting to the factory setting, press the  switch.
 - * Be aware that not only the settings on this screen but also all the settings of selected program are returned to factory setting.
- 7) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
 - * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.
- 8) To go to the next screen, press the  switch.
 - * The I/A mode program contents change screen appears.
- 9) To return to the anterior main screen, or to cancel the change of setting, press the  switch.

3. Change the settings on the I/A mode program contents change screen.

- 1) To change any settings other than the ones in the I/A mode, press the  switch. Then the Dia, Irr, and Vit mode program contents change screen appears.


Dr. 1 PROGRAM1	I/A1			I/A2			I/A3		
	P1	P2	P3	P1	P2	P3	P1	P2	P3
Vaccum	0	10	500	0	10	10	0	250	250
Flow	0	10	33	0	10	10	0	28	28
Linear Control	Panel	Vac.	Vac.	Vac.	Vac.	Vac.	Panel	Flow	Flow
IV Pole Height	65			65			65		
AFC	OFF			OFF			OFF		
Pro Pedal	OFF			OFF			OFF		










- 2) To make **I/A3** mode usable, touch the **I/A3**. Then, it is highlighted.
- 3) To set the Pro Pedal to ON (each setting for **P1**, **P2**, and **P3** is possible), press the Pedal setting of US mode to be set to ON. Then, the setting is highlighted. Press the /
 switch to change the setting from OFF to ON.
- * When the Pro Pedal is set to OFF in the mode that the Pro Pedal mode is selectable, settings of each control item under **P3** are indicated in dark color.
When the Pro Pedal is set to ON, settings of each control item are indicated in dark color under **P1**, **P2**, and **P3**.
(P1, P2, and P3 mean Position 1, Position 2, and Position 3.)
- 4) To change other settings, press the position to be changed. Then, it is highlighted. Press the /
 switch to change settings.

5) To reset the setting to the factory setting, press the  switch.


* Be aware that not only the settings on this screen but also all the settings of selected program are returned to factory setting.

6) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)

* Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.


7) To go to the next screen, press the  switch.

* The Dia, Irr, and Vit mode program contents change screen appears.

8) To return to the anterior main screen, or to cancel the change of setting, press the  switch.

4. Change the settings on the Dia, Irr, and Vit mode program contents change screen.



* Indications of FGX1, FGX2, Illum1, and Illum2 appear as shown below and their contents can be changed only when the system is A or AP type.

- 1) To change any settings other than the ones in the Dia, Irr, and Vit mode, press the  switch. Then the Foot pedal function change screen appears.

Dr. 1 PROGRAM1	Dia	Irr	Vit
Vaccum			500
Flow			10
Linear Control	Panel		Vac.
Dia Power	20		
Cut Rate			400
IV Pole Height		65	30

Vent Level	Maximum
------------	---------


FGX	Illum1	Illum2
20	8	8
40		









Initialize

Store


Next



- 2) To change the settings, press the position to be changed. Then, it is highlighted. Press the  switch to change settings.
- * In “Vent Level”, the selectable returning level of vacuum pressure is “Maximum”, “Medium”, or “Minimum”.
 - * The setting range of Illum1 and Illum2 is between 1 and 8. (9 and 10 cannot be set with the program.)
- 3) To reset the setting to the factory setting, press the  switch.
- * Be aware that not only the settings on this screen but also all the settings of selected program are returned to factory setting.
- 4) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
- * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.

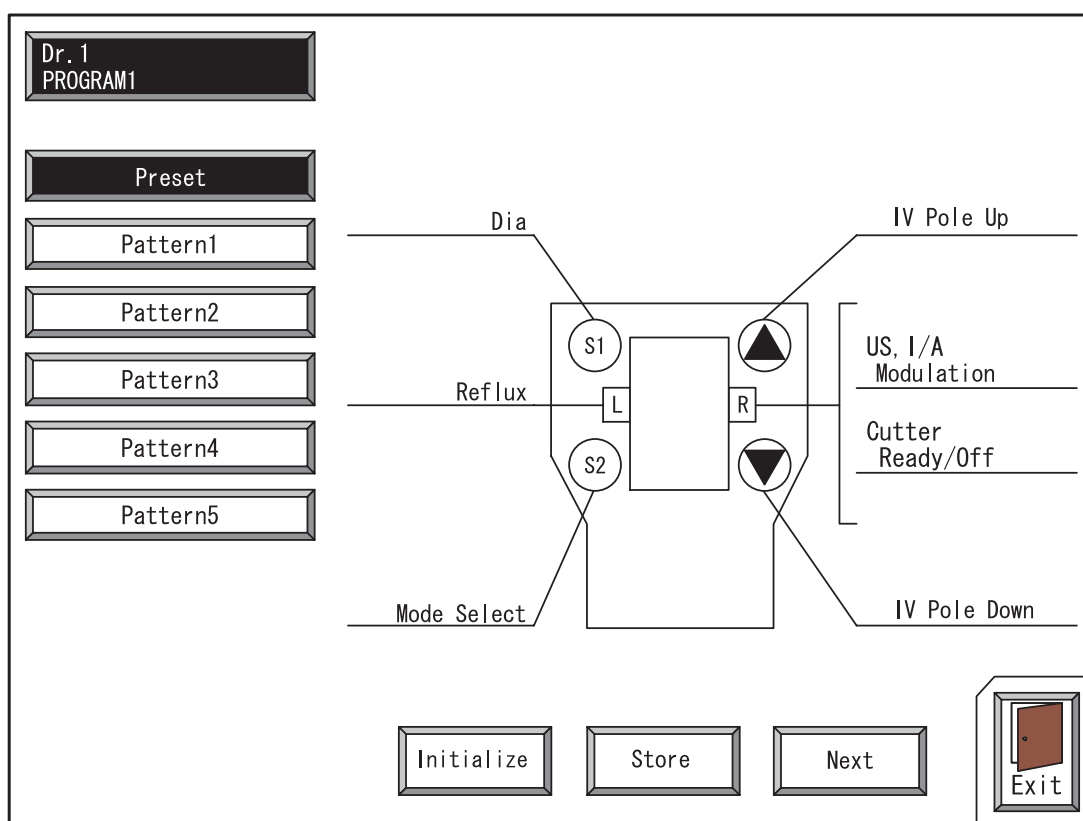
5) To go to the next screen, press the  switch.










* The Foot pedal function change screen appears.

6) To return to the anterior main screen, or to cancel the change of setting, press the  switch.


5. Change the settings on the Foot pedal function change screen.

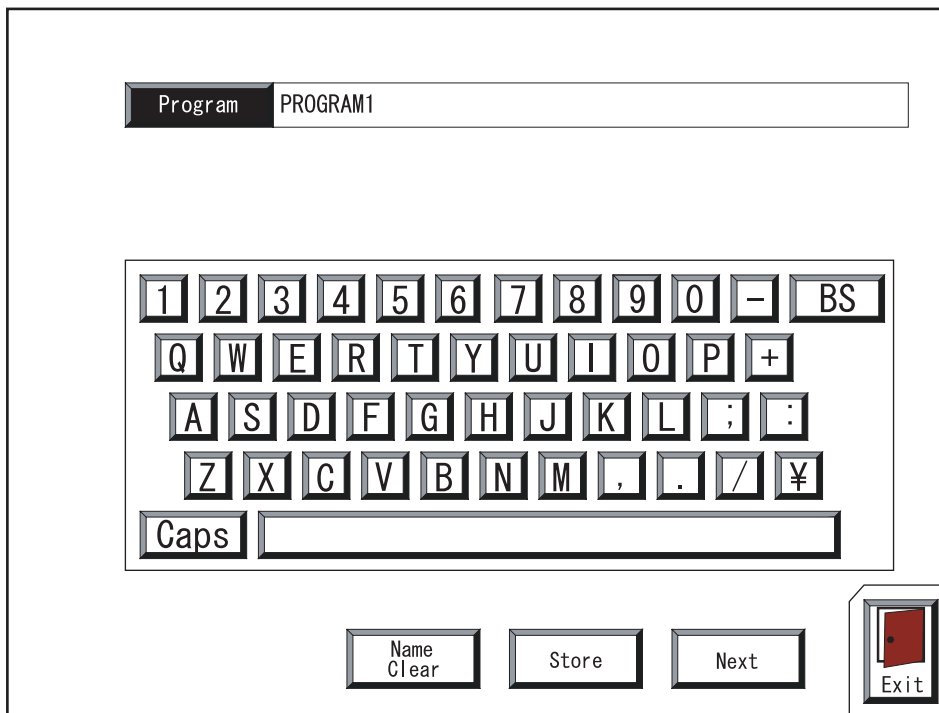
- 1) To change any settings other than the foot pedal function settings, press the  switch. Then the Program name change screen appears.







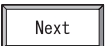



- 2) To change the function of foot pedal, press the  or  to  switch on the screen. Then, select the desired pattern.
- 3) To reset the setting to the factory setting, press the  switch.
 - * Be aware that not only the settings on this screen but also all the settings of selected program are returned to factory setting.
- 4) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
 - * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.
- 5) To go to the next screen, press the  switch.
 - * The Program name change screen appears.
- 6) To return to the anterior main screen, or to cancel the change of setting, press the  switch.


6. Change the program name on the Program name change screen.

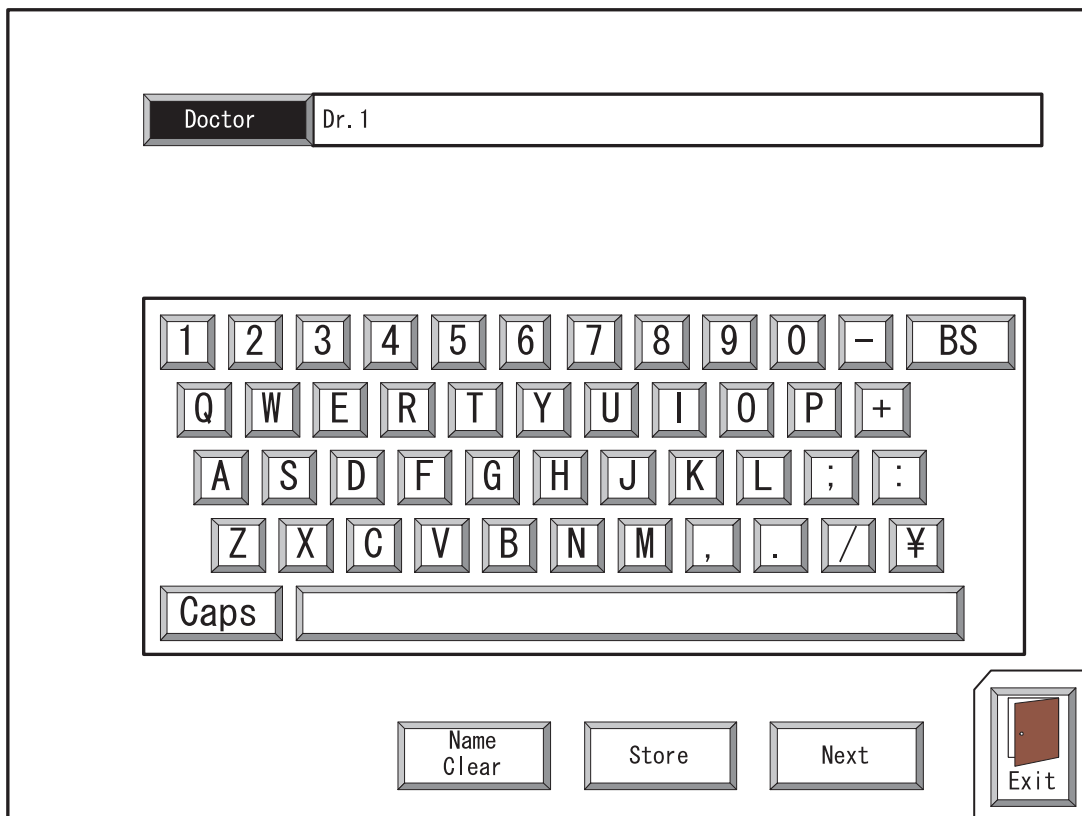
- 1) To change the Doctor name, press the  switch. Then the Doctor name change screen appears.











- 2) Enter the program name using a keyboard. (Up to 8 letters can be entered as a program name.)
- i) Letters of program name are deleted one by one from the right side every time the  switch is pressed.
 - ii) The letter can be changed between capital letter and small letter every time the  switch is pressed.
 - iii) The program name is deleted by pressing the  switch.
- 3) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
- * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.
- 4) To go to the next screen, press the  switch.
- * The Doctor name change screen appears.
- 5) To return to the anterior main screen, or to cancel the change of setting, press the  switch.

7. Change the Doctor name on the Doctor name change screen.

- 1) To change any settings other than the doctor name, press the  switch. Then the US mode program contents change screen appears.



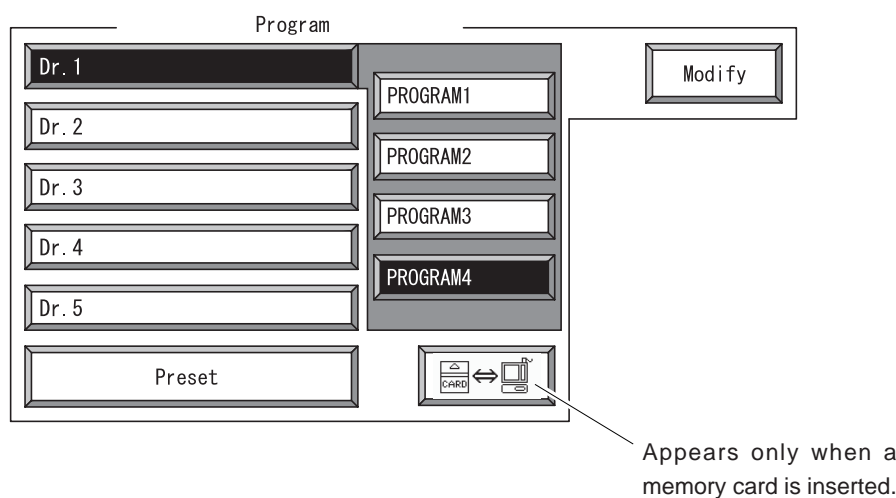
- 2) Enter the doctor name using a keyboard. (Up to 15 letters can be entered as a doctor name.)
- i) Letters of doctor name are deleted one by one from the right side every time the  switch is pressed.
 - ii) The letter can be changed between capital letter and small letter every time the  switch is pressed.
 - iii) The doctor name is deleted by pressing the  switch.
- 3) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
- * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.
- 4) To go to the next screen, press the  switch.
- * The US mode program contents change appears.
- 5) To return to the anterior main screen, or to cancel the change of setting, press the  switch.

4.3.17.2 Changing settings on the posterior screen

When “Preset” or any program in a memory card is selected, it is impossible to change the setting of program. Only a confirmation of contents is possible.

1. Select the program to be changed on the posterior main screen.

- 1) Press the Dr. name to be changed and then press the program name in the Program box.
Selected switches of Dr. name and Program name are highlighted.



- 2) Press the  switch.

2. Change the settings on each program contents change screen.







- 1) To change any settings other than the ones shown below, press the  switch. Then the Foot pedal function change screen appears.







Dr. 1 PROGRAM1	Dia	Vit1	Vit2	Asp	US	Scis
Vacuum		250	250	250	100	
Cut Rate		800	1200			300
Linear Control	Panel	AFC	AFC	AFC	AFC	Propt
Flow		50	50	50		
US/Dia Power	20				20	
US Pulse					Cont	
Pulse Rate						
Pressure						140

FGX	Illum1	Illum2
40	8	8
20		

IV Pole Height	High	Middle	Low
	85	40	20


Vent Level	Maximum

- 2) Press the item to be changed. Then, it is highlighted.
- 3) Press the   switch to change settings.
- * The setting range of FGX1 (upper) and FGX2 (lower) is between 1 and 99.
 - * The setting range of Illum1 and Illum2 is between 1 and 8. (9 and 10 cannot be set with the program.)
 - * In “IV Pole Height”, the selectable height of irrigation pole is “High”, “Middle”, or “Low”, and the irrigation pole is automatically set to the selected height when any mode is selected.
 - * In “Vent Level”, the selectable returning level of vacuum pressure is “Maximum”, “Medium”, or “Minimum”.
- 4) To reset the setting to the factory setting, press the  switch.
- * Be aware that not only the settings on this screen but also all the settings of selected program are returned to factory setting.
- 5) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
- * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.

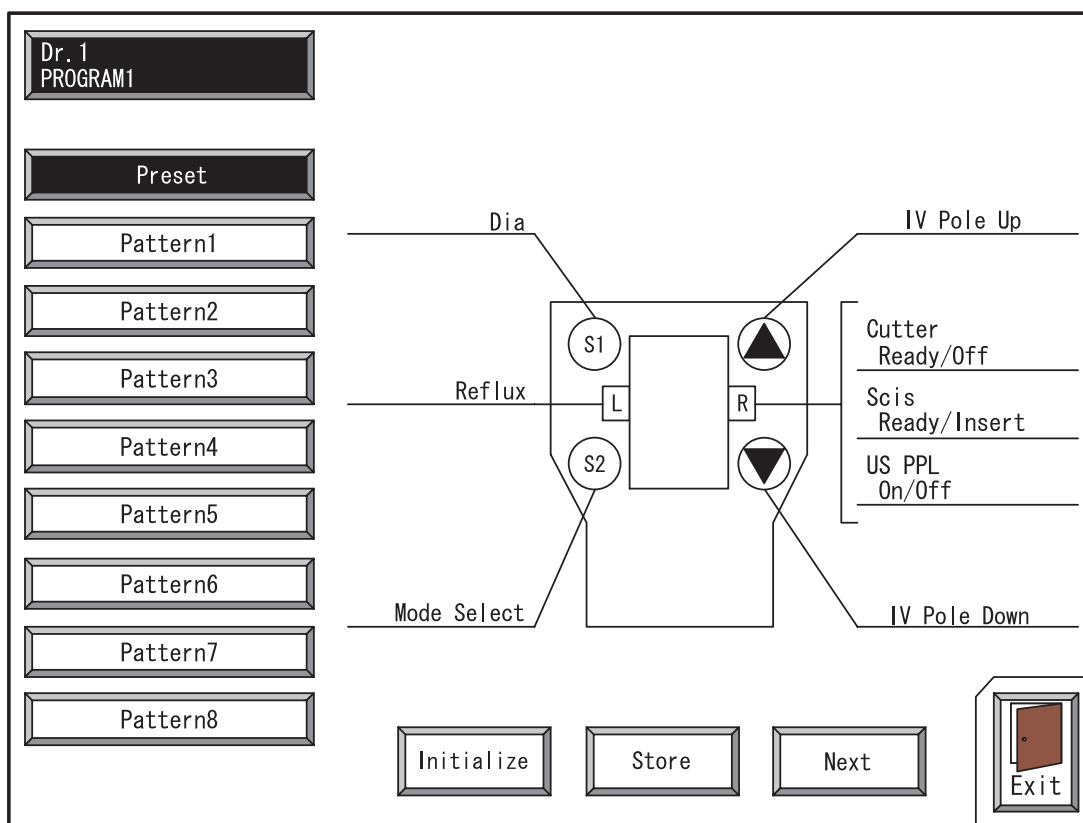
6) To go to the next screen, press the  switch.










* The Foot pedal function change appears.

7) To return to the posterior main screen, or to cancel the change of setting, press the  switch.


3. Change the settings on the Foot pedal function change screen.

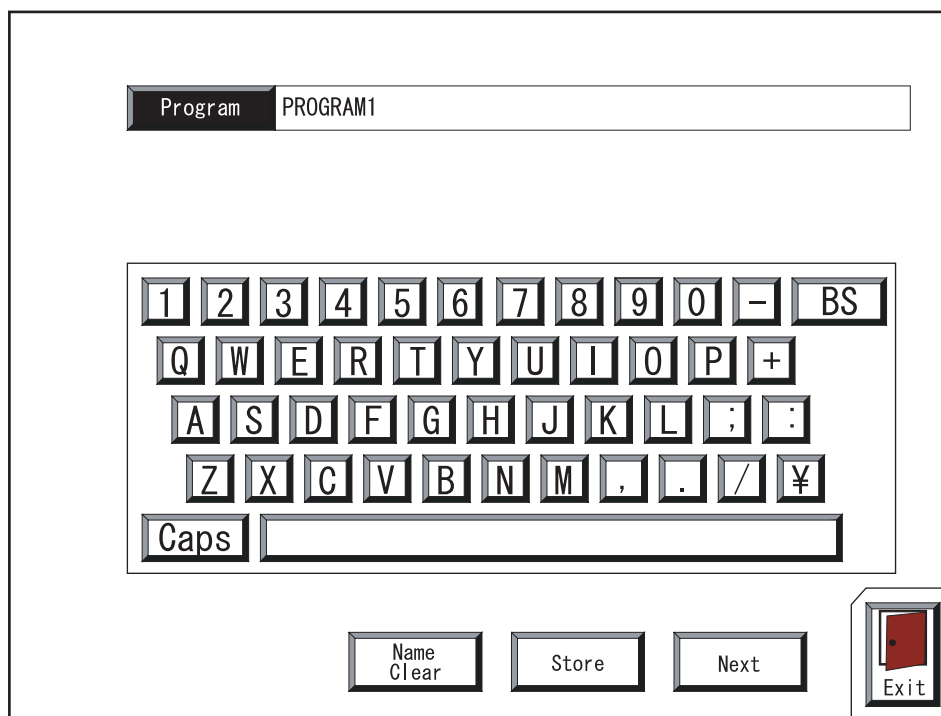
- 1) To change any settings other than the foot pedal function settings, press the  switch. Then the Program name change screen appears.











- 2) To change the function of foot pedal, press the  or  to  switch on the screen. Then, select the desired pattern.
- 3) To reset the setting to the factory setting, press the  switch.
 * Be aware that not only the settings on this screen but also all the settings of selected program are returned to factory setting.
- 4) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
 * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.
- 5) To go to the next screen, press the  switch.
 * The Program name change screen appears.
- 6) To return to the posterior main screen, or to cancel the change of setting, press the  switch.

4. Change the program name on the Program name change screen.

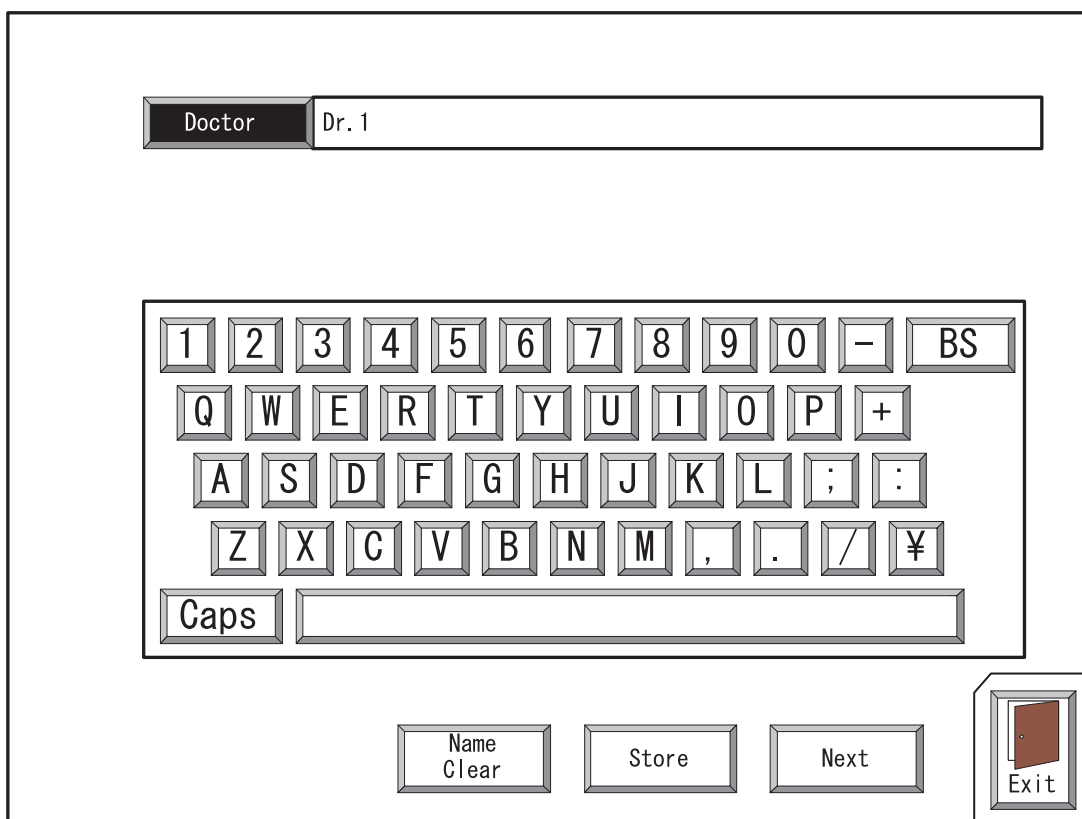
- 1) To change the Doctor name, press the  switch. Then the Doctor name change screen appears.











- 2) Enter the program name using a keyboard. (Up to 8 letters can be entered as a program name.)
- i) Letters of program name are deleted one by one from the right side every time the  switch is pressed.
 - ii) The letter can be changed between capital letter and small letter every time the  switch is pressed.
 - iii) The program name is deleted by pressing the  switch.
- 3) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
- * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.
- 4) To go to the next screen, press the  switch.
- * The Doctor name change screen appears.
- 5) To return to the posterior main screen, or to cancel the change of setting, press the  switch.

5. Change the Doctor name on the Doctor name change screen.

- 1) To change any settings other than the doctor name, press the  switch. Then the US mode program contents change screen appears.



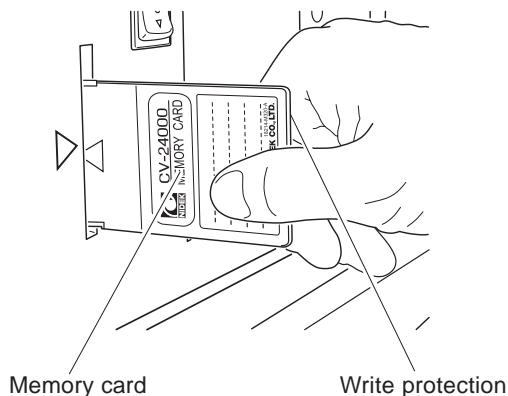
- 2) Enter the doctor name using a keyboard. (Up to 15 letters can be entered as a doctor name.)
 - i) Letters of doctor name are deleted one by one from the right side every time the  switch is pressed.
 - ii) The letter can be changed between capital letter and small letter every time the  switch is pressed.
 - iii) The doctor name is deleted by pressing the  switch.
- 3) To memorize the changed contents, press the  switch. (All the contents of selected program are memorized.)
 - * Be aware that the changed contents cannot be memorized when the  switch is pressed without a press of  switch.
- 4) To go to the next screen, press the  switch.
 - * The US mode program contents change screen appears.
- 5) To return to the posterior main screen, or to cancel the change of setting, press the  switch.

4.3.18 File screen


1. Insert the memory card into the memory card slot on the rear side of the system.



Align the ◁ mark on the memory card with the ▷ mark on the rear side of the system.

* To write data to a memory card, unlock the write protection in advance.






2. Press the  switch on the main screen to display the file screen.

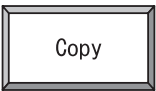
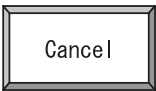
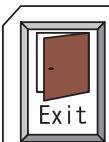
The  switch is to switch between the program in the main body and the one in a memory card.

The program of either memory card or CV-24000, whose illustration on the  switch is displayed in color, is indicated on this screen. Every time the  switch is pressed, the illustration, which is displayed in color, is switched, and the program to be indicated is also switched.

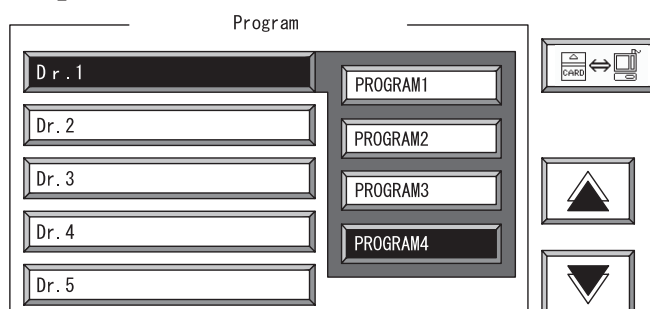
Program	
Dr. 1	PROGRAM1
Dr. 2	PROGRAM2
Dr. 3	PROGRAM3
Dr. 4	PROGRAM4
Dr. 5	

CV-24000 Dr. 1 PROGRAM1	Memory Card Dr. 1 PROGRAM4
Source	Destination

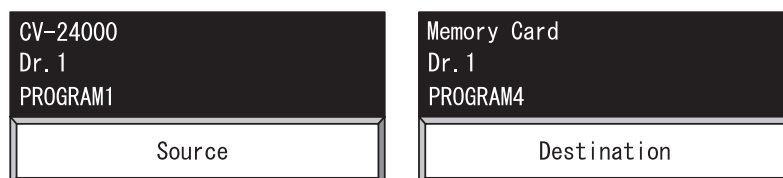
3. Select the data to be copied.

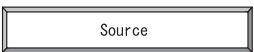


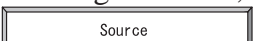
Select the Dr. name or Program name inside the CV-24000 or Memory Card.

If the data is for anterior mode, all data in the memory card cannot be indicated at a time, so use the   switch to scroll the data.

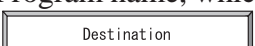
4. Copy the data.



- 1) After selecting the Dr. name or Program name to be copied, press the  switch to store the data temporarily.






Dr./Program name, which is stored as a source, is indicated in the indication area above the  switch.

- 2) Select the program to be a destination and press the  switch.

Dr./Program name, which is stored as a destination, is indicated in the indication area above the  switch.


- 3) Press the  switch to cancel the Dr./Program name of a source or destination.

5. Write the program.


When the  switch is pressed, the  or  switch indicated. Press the  switch to write the program. To cancel, press the  switch. Then, the previous screen appears.

* While the Program is written, and illustrated clock appears on the center of the LCD touch panel. Do not turn OFF the power switch while this illustration is indicated. Otherwise, the Program cannot be written normally.

* Moreover, do not eject the memory card while the memory card is selected on the file screen.

To change the memory card, press the  switch once to select the CV-24000 and exchange the memory card.

6. Press the switch to return to the main screen.

Do not eject the memory card while the memory card is selected on the file screen. To change the memory card, press the  switch once. When Dr./Program name of the CV-24000 appears, exchange the memory card.

In the memory card following data of both anterior and posterior mode can be stored;

[Anterior screen] 25 Doctors × 4 Programs = 100 Programs

[Posterior screen] 5 Doctors × 4 Programs = 20 Programs.

4.4 Cleaning the Instruments

CAUTION

- Observe the following points in the first cleaning after use:
 - Use distilled water for the first cleaning instead of tap water to avoid rust or stain.
 - To avoid rust, use only enzyme detergent for cleaning. (Refer to the user's guide attached to the detergent before use.)
 - To avoid rust, wash the cleaned parts sufficiently and dry them as quickly as possible.
- Observe the following points in the first sterilization after use:
 - To avoid rust, use only glutaral preparation for cleaning. Do not use other preparations such as phtharal preparation. (Refer to the user's guide attached to the preparation before use.)
 - To avoid inflammation by touching the sterilized parts, wash them sufficiently and dry them as quickly as possible. (Refer to the user's guide attached to the preparation before use.)
- Observe the following points in the ultrasonic cleaning:
 - Do not subject the US handpiece and diathermy cord to the ultrasonic cleaning to avoid break of terminal or deterioration of the electrical characteristics that may occur depending on the conditions.
 - To protect the ends of the US tip, I/A tip, and diathermy forceps, put the rubber cap on them before using the ultrasonic cleaning for them.
- Observe the following points in the cleaning and sterilization of the US handpiece and diathermy cord:
 - To avoid contact failure from short circuit or rust, do not immerse the parts in the detergent or sterilizing solution.
 - Wipe the exterior of the US handpiece and the diathermy cord with gauze or absorbent cotton soaked in the detergent or sterilizing solution and wrung sufficiently. Do not wipe them with excessive force.
 - To avoid break of wire, wipe the areas where the cable and cord are attached with special care.
 - To avoid break of wire, do not press or pull the cables and cords forcefully when wiping them.

1. Clean the following instruments with distilled water.

- Test chamber
- Wrench for tip
- Diathermy pencil or forceps

Leave them in the distilled water in a container for a while.

2. Disassemble the US and I/A handpieces.

Disassemble the US and I/A handpieces in the reverse order of the assembly.
Disassemble them into the tip, silicone sleeve, and handpiece.

3. Clean the exterior of the instruments with distilled water.

Clean the exterior of the instruments other than the tubes with clean gauze, etc. soaked in distilled water. Especially, clean the screw part of the tip and the handpiece carefully using a soft brush, etc.

NOTE

- The body of the US handpiece is cleaned here. However, the cable, plug, and diathermy cord are not cleaned here.

4. Clean the following instruments in the irrigation and aspiration line with distilled water.

- Irrigation handpiece
- I/A tip
- US tip
- Irrigation sleeve (for vitrectomy cutter)
- Irrigation needle (20G)(for vitrectomy cutter)
- I/A handpiece
- US handpiece
- Silicone sleeve

Clean their irrigation and aspiration line with strong flows of distilled water from a syringe. For stubborn dirt, use the brush that is attached to the US handpiece.

5. Blow off the water on the instruments that were cleaned in steps 3 - 4.

Blow off the water inside the instrument with compressed air or a strong flow of air from a syringe. Wipe off the water outside the instrument with a dry, clean, lint-free wiper.

6. Clean the handpiece cable and the diathermy cord.

Clean only the cable and the cord while paying attention not to pull them strongly. Wipe off the dirt on them with gauze or absorbent cotton that has been soaked in distilled water and wrung.

7. Check visually the exterior and interior of the instruments that were cleaned.

Check if there is any damage, dirt, or change in shape (not change in color). Then, check visually if there is any residue of the lens nucleus or cortex inside the I/A handpiece, US handpiece, US tip, or irrigation needle.

⚠ CAUTION

- Never fail to check visually the inside of the instruments. If the residue is left to get dry or altered by autoclaving, it becomes difficult to remove them. As a result, they gather more residue by catching parts of the lens nucleus and cortex and it becomes a continuing cycle.

8. Store the instruments that have been cleaned.

Store the instruments in a clean, dry place without any load on them.

§5 TROUBLESHOOTING

5.1 Error During Cassette Test

When an error is indicated, “No” described below is indicated after “E200” in the upper area on the screen. If the error cannot be corrected with the countermeasures described below, please inform NIDEK the “No.” which appears after “E200” for immediate correction.

No.	Details	Causes • Countermeasures
02	Cassette loading was not completed.	Insert the cassette again. If improvement cannot be seen, the aspiration unit may be broken. Contact NIDEK or your authorized distributor.
03	Cassette was not ejected.	Turn OFF the power of the system and turn it ON again. If the cassette cannot be ejected automatically, press the EJECT sw. If the same error occurs, the aspiration unit may be broken. Contact NIDEK or your authorized distributor. To eject the cassette under this condition, turn OFF the power of the system and remove the white cap on the rear side of the system. Then, eject the cassette by turning the inside shaft with a flatblade screwdriver.
04	The type of connection set was not properly judged.	Check the followings and insert the cassette again. If improvement cannot be seen, the aspiration unit may be broken. Contact NIDEK or your authorized distributor. • Isn't the connection set removed? • Isn't the lug to identify the connection set broken? • Isn't the connection set for vitreous surgery set to the system which is only for the phacoemulsification?
05	It was found that the pressure went out of tolerance at the time of atmospheric pressure detection.	Insert the cassette again. If improvement cannot be seen, replace the cassette with a new one and check again. If improvement cannot be seen after the replacement, the aspiration unit may be broken. Contact NIDEK or your authorized distributor. If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.
06	Abnormality was detected at the time of the motion check of the pressure detector of cassette.	When the motion check of the pressure detector of the cassette is performed, the positive pressure is brought to the inside of the cassette, however, the pressure did not reach the specified level. Insert the cassette again. If improvement cannot be seen, replace the cassette with a new one, and check again. If improvement cannot be seen after the replacement, the aspiration unit may be broken. Contact NIDEK or your authorized distributor. If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.

No.	Details	Causes • Countermeasures
07	Abnormality was detected at the time of the motion check of the pressure detector of cassette.	<p>When the motion check of the pressure detector of the cassette is performed, the negative pressure is brought to the inside of the cassette, however, the pressure did not reach the specified level.</p> <p>Insert the cassette again. If improvement cannot be seen, replace the cassette with a new one, and check again.</p> <p>If improvement cannot be seen after the replacement, the aspiration unit may be broken. Contact NIDEK or your authorized distributor.</p> <p>If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p>
08	Abnormality was detected at the time of leakage check of the cassette.	<p>Insert the cassette again. If improvement cannot be seen, replace the cassette with a new one and check again.</p> <p>If improvement cannot be seen after the replacement, the aspiration unit may be broken. Contact NIDEK or your authorized distributor.</p> <p>If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p>
09	Abnormality was detected at the time of motion check of the VENT mechanism.	<p>This error occurs when the infusion tube is connected to the port for infusion tube on the cassette.</p> <p>If the infusion tube is connected, disconnect it and insert the cassette again.</p> <p>If this error occurs while the infusion tube is not connected, replace the cassette with a new one.</p> <p>If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p> <p>If improvement cannot be seen after above countermeasures, the aspiration unit may be broken. Contact NIDEK or your authorized distributor.</p>
17	The connection set was removed during the cassette test.	<p>The connection set cannot be replaced during the cassette test. Check the connection of connection set and insert the cassette again.</p> <p>If this error occurs while the connection of connection set is not a problem, the aspiration unit may be broken. Contact NIDEK or your authorized distributor.</p>
18	The cassette was removed during the cassette test.	<p>Insert the cassette again. If improvement cannot be seen, the aspiration unit may be broken. Contact NIDEK or your authorized distributor.</p>

5.2 Error During System Test

When an error is indicated, “No” described below is indicated after “E200” in the upper area on the screen. If the error cannot be corrected with the countermeasures described below, please inform NIDEK the “No.” which appears after “E200” for immediate correction.

No.	Details	Causes • Countermeasures
17	The connection set was removed during the system test.	The connection set cannot be replaced during the system test. Check the connection of connection set and perform the system test again. If this error occurs while the connection of connection set is not a problem, the aspiration unit may be broken. Contact NIDEK or your authorized distributor.
31	Abnormality was detected at the time of motion check of the pressure detector of the cassette.	When the motion check of the pressure detector of the cassette is performed, the negative pressure is brought to the inside of the cassette, however the pressure did not reach the specified level. If improvement cannot be seen by performing the system test again, replace the cassette with a new one and check again. If improvement cannot be seen after the replacement, the aspiration unit may be broken. Contact NIDEK or your authorized distributor. If improvement can be seen by the replacement of cassette, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.
32	Leakage inside the cassette was detected.	Perform the system test again. If improvement cannot be seen, replace the cassette and perform the system test again. If improvement cannot be seen after the replacement, the aspiration unit may be broken. Contact NIDEK or your authorized distributor. If improvement can be seen after the replacement of cassette, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.
33	Abnormality was detected at the time of motion check of the VENT mechanism.	Check the followings and perform the system test again. •Is the infusion tube connected? •Is the irrigation bottle connected or isn't is empty? •Isn't the clamp of infusion tube closed? If improvement cannot be seen after the system test, replace the cassette and perform the system test again. If improvement cannot be seen after the replacement, the aspiration unit may be broken. Contact NIDEK or your authorized distributor. If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.

No.	Details	Causes • Countermeasures
34	Abnormality was detected at the time of the function check of the aspiration line 1.	<p>1. Is the irrigation tube securely connected to the handpiece? 2. Is the aspiration tube securely connected to the handpiece? 3. Is the test chamber securely put on the sleeve? Check the items above and perform the system test again. If improvement cannot be seen, remove the handpiece and directly connect the connectors of irrigation tube and aspiration tube. If using the US handpiece, remove the connector from the system. Then, perform the system test. If the test ends without abnormality, the handpiece may have a problem. Replace the handpiece. If the improvement cannot be seen after the replacement of handpiece, replace the cassette. Then, perform the system test. If improvement can be seen after the replacement of cassette, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor. If improvement cannot be seen by the replacement of cassette and handpiece, the main body may be broken. Contact NIDEK or your authorized distributor.</p>
35	Abnormality was detected at the time of the function check of the irrigation line 1.	<p>1. Doesn't the tip of the test chamber get sucked into its inside? Perform the system test again while slightly holding the tip of the test chamber so that it does not get sucked into its inside. 2. Is the remaining quantity in the irrigation bottle enough? If the infusion tube properly connected? Isn't the clamp closed? 3. Isn't there a bend in the aspiration and irrigation lines? Check the items above and perform the system test again. If improvement cannot be seen, remove the handpiece and directly connect the connectors of irrigation tube and aspiration tube. If using the US handpiece, remove the connector from the main body. Then, perform the system test. If the test ends without abnormality, the inside of the handpiece may be clogged. Replace the handpiece. If improvement cannot be seen after the system test again, replace the cassette and perform the system test. If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor. If improvement cannot be seen after the replacement of cassette and handpiece, the main body may be broken. Contact NIDEK or your authorized distributor.</p>

No.	Details	Causes ・ Countermeasures
36	The connection set of single cassette is not securely connected.	<p>Verify that the connection set is securely inserted, and perform the system test again.</p> <p>If improvement cannot be seen after the system test again, replace the cassette and perform the system test again.</p> <p>If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p>
37	Abnormality was detected at the time of the motion check of the aspiration line 2 in the anterior dual cassette.	<p>1. Is the irrigation tube securely connected to the handpiece?</p> <p>2. Is the aspiration tube securely connected to the handpiece?</p> <p>3. Is the test chamber securely put on the sleeve of the I/A handpiece?</p> <p>4. Is the connection set securely inserted?</p> <p>Check the items above and perform the system test again.</p> <p>If improvement cannot be seen, remove the handpiece and directly connect the connectors of irrigation tube and aspiratoin tube. Then, perform the system test. If the test ends without abnormality, the handpiece may have a problem. Replace the handpiece.</p> <p>If improvement cannot be seen after the system test again, replace the cassette and perform the system test.</p> <p>If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p> <p>If improvement cannot be seen after the replacement of cassette and handpiece, the main body may be broken. Contact NIDEK or your authorized distributor.</p>
38	Abnormality was detected at the time of the motion check of the irrigation line 2 in the anterior dual cassette.	<p>1. Doesn't the tip of the test chamber get sucked into its inside? Perform the system test again while slightly holding the tip of the test chamber so that it does not get sucked into its inside.</p> <p>2. Is the remaining quantity in the irribation bottle enough?</p> <p>3. Is the irrigation tube securely connected?</p> <p>4. Isn't there a bend in the aspiration and irrigation lines?</p> <p>Check the items above and perform the system test again.</p> <p>If improvement cannot be seen, remove the handpiece and directly connect the connectors of the irrigation tube and aspiration tube. Then, perform the system test. If the test ends without abnormality, the handpiece may have a problem. Replace the handpiece.</p> <p>If improvement cannot be seen after the system test again, replace the cassette and perform the system test.</p> <p>If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p> <p>If improvement cannot be seen after the replacement of cassette and handpiece, the main body may be broken. Contact NIDEK or your authorized distributor. Contact NIDEK or your authorized distributor.</p>

No.	Details	Causes • Countermeasures
39	Abnormality was detected at the time of the motion check of the aspiration line 2 in the anterior-posterior dual cassette.	<p>1. Isn't there are bend in the aspiration line 2?</p> <p>2. Is the tip of VIT cutter opened?</p> <p>3. Is the tip of handpiece immersed in the irrigation solution during the system test?</p> <p>Check the items above and perform the system test again.</p> <p>If the tip of VIT cutter is closed, replace the cutter.</p> <p>If improvement cannot be seen, perform the system test under the condition that the cutter is removed. If the test ends without abnormality, the cutter handpiece may have a problem. Replace the cutter.</p> <p>If improvement cannot be seen, replace the cassette and perform the system test.</p> <p>If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p> <p>If improvement cannot be seen after the replacement of cassette and handpiece, the main body may be broken. Contact NIDEK or your authorized distributor.</p>
40	Abnormality was detected at the time of the motion check of the aspiration line 1 in the posterior dual cassette.	<p>1. Isn't there a bend in the aspiration line 1?</p> <p>2. Is the tip of handpiece immersed in the irrigation solution during the system test ?</p> <p>Check the items above and perform the system test again.</p> <p>If improvement cannot be seen, perform the system test under the condition that the handpiece is removed. If the test ends without abnormality, the handpiece may have a problem. Replace the handpiece.</p> <p>If abnormality is found during the system test, replace the cassette and perform the system test again.</p> <p>If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p> <p>If improvement cannot be seen after the replacement of cassette and handpiece, the main body may be broken. Contact NIDEK or your authorized distributor.</p>

No.	Details	Causes • Countermeasure
41	Abnormality was detected at the time of the motion check of the aspiration line 2 in the posterior dual cassette.	<p>1. Isn't there are bend in the aspiration line 2? 2. Is the tip of VIT cutter opened? 3. Is the tip of handpiece immersed in the irrigation solution during the system test? Check the items above and perform the system test again. If the tip of VIT cutter is closed, replace the cutter. If improvement cannot be seen, perform the system test under the condition that the cutter is removed. If the test ends without abnormality, the cutter handpiece may have a problem. Replace the cutter. If improvement cannot be seen, replace the cassette and perform the system test. If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor. If improvement cannot be seen after the replacement of cassette and handpiece, the main body may be broken. Contact NIDEK or your authorized distributor.</p>
42	The atmospheric pressure was impossible to be detected.	<p>Insert the cassette again, and perform the system test. If improvement cannot be seen, replace the cassette and perform the system test again. If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor. If improvement cannot be seen, the main body may be broken. Contact NIDEK or your authorized distributor.</p>
43	The drainage bag is full.	<p>Isn't the drainage bag full? Replace the cassette. If this error occurs under the condition that the drainage bag is not full, the cassette may have a problem. If the cassette has a problem, check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor.</p>
44	The cassette could not be held.	<p>Insert the cassette again, and perform the system test. If improvement cannot be seen, replace the cassette and perform the system test again. If improvement can be seen after the replacement, the cassette may have a problem. Check the serial number indicated on the cassette package and contact NIDEK or your authorized distributor. If improvement cannot be seen, the main body may be broken. Contact NIDEK or your authorized distributor.</p>

5.3 Error During Use

When an error is indicated, the error code is indicated in the upper area on the screen. If the error cannot be corrected with the countermeasures described below, please inform NIDEK the error code and indication for immediate correction.

Code	Indication	Causes - Countermeasures
E004	System fail. Turn ON over again.	Failure of the system. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E005	System fail. Turn ON over again.	Failure of the system. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E016	System fail. Turn ON over again.	Failure of the system. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E017	System fail. Turn ON over again.	Failure of the system. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E018	System fail. Turn ON over again.	Failure of the system. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E019	System fail. Turn ON over again.	Failure to perform the system check at start-up. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E020	System fail. Turn ON over again.	Failure to perform the system check at start-up. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E021	System fail. Turn ON over again.	Failure to perform the system check at start-up. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.

Code	Indication	Causes • Countermeasures
E022	System fail. Turn ON over again.	Failure to perform the system check at start-up. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E023	System fail. Turn ON over again.	Failure to perform the system check at start-up. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E024	System fail. Turn ON over again.	Failure to perform the system check at start-up. While this error occurs, any operation cannot be accepted. Turn ON the power again. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E029	Memory mode fail. The Preset parameters are set.	Failure to read the "Program" data. Select the "Program" again to read data. Even if improvement can be seen, contact NIDEK or your authorized distributor. If the system is used in this state, the Preset "Program" data is read. Pay attention to the setting values to use the system.
E030	Memory mode fail. The Preset parameters are set.	Failure to read the "Program" data. Select the "Program" again to read data. Even if improvement can be seen, contact NIDEK or your authorized distributor. If the system is used in this state, the Preset "Program" data is read. Pay attention to the setting values to use the system.
E031	Memory mode fail. Please store again.	Failure to save the "Program" data. Press the "Store" switch again to save data. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E101	Voice driver fail.	There is a fear that the voice guidance is not properly sounded out. Attention shall be given when using the system because there is no voice guidance.
E102	Memory mode fail. Card, Modify screen: Please reoperate. Main, Operation screen: The Preset parameters are set.	On the "Program" contents screen and memory card screen: Failure to read/write the "Program" data. Read/write the data again. On the main screen: Failure to read/write the "Program" data. Select the "Program" again to read data. Even if improvement can be seen, contact NIDEK or your authorized distributor. If the system is used in this state, the Preset "Program" data is read. Pay attention to the setting values to use the system.
E103	Memory mode fail. Please reoperate.	Failure to save the "Program" data. Press the "Store" switch again to save data. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E104	Memory mode fail. Card, Modify screen: Please reoperate. Main, Operation screen: The Preset parameters are set.	On the "Program" contents screen and memory card screen: Failure to write the "Program" data. Write the data again. On the main screen: Failure to read the "Program" data. Select the "Program" again to read data. Even if improvement can be seen, contact NIDEK or your authorized distributor. If the system is used in this state, the Preset "Program" data is read. Pay attention to the setting values to use the system.

Code	Indication	Causes - Countermeasures
E110	Memory card fail. Reinsert the memory card.	Insert the memory card again and make a retry. If improvement cannot be seen, the memory card may be broken. The system does not accept any memory card other than NIDEK-manufactured memory card.
E111	Memory mode fail. Please reoperate.	Failure to write the "Program" data to memory card. Insert the memory card again and make a retry. If improvement cannot be seen, the memory card may be broken. The system does not accept any memory card other than NIDEK-manufactured memory card.
E112	Memory mode fail. Please reoperate.	Failure to read the "Program" data from memory card. Insert the memory card again and make a retry. If improvement cannot be seen, the memory card may be broken. The system does not accept any memory card other than NIDEK-manufactured memory card.
E200	Test cassette error./Check the cassette. Test system error./check the I/A line.	Error was detected during the cassette test and system test. Check the indicated error No. (indicated in red) and see items 5.1 and 5.2.
E210	Test US error. Check US handpiece.	Abnormality was detected during the test of US oscillation. Check the followings and perform the system test and Test US again. 1. Isn't the US tip loosened? 2. Is the sleeve securely attached? 3. Is the inside of the test chamber filled with the irrigation solution during the test? 4. Is the attached US tip proper? (Isn't the PPL tip attached in the Anterior mode or isn't the unspecified tip attached?) If improvement cannot be seen after these checks, replace the US handpiece and perform the test again. If improvement cannot be seen after the replacement, the US unit may be broken. Contact NIDEK or your authorized distributor.
E212	Test Dia error. Please retest.	Abnormality was detected during the Test Dia. The Dia unit may be broken. Contact NIDEK or your authorized distributor.
E300	IRR1 valve fail. Please retest.	Abnormality was detected in the IRR1 valve. The operation which performs the aspiration cannot be performed. Perform the system test and verify that there is no abnormality in the operation of IRR1 valve. When the system test is passed, the error becomes E331, and it becomes possible to perform the operation which performs the aspiration. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E301	IRR2 valve fail. Please retest.	Abnormality was detected in the IRR2 valve. The operation which performs the aspiration cannot be performed. Perform the system test and verify that there is no abnormality in the operation of IRR2 valve. When the system test is passed, the error becomes E332, and it becomes possible to perform the operation which performs the aspiration. Even if improvement can be seen, contact NIDEK or your authorized distributor.

Code	Indication	Causes - Countermeasures
E302	ASP1 valve fail. Please retest.	Abnormality was detected in the ASP1 valve. The operation which performs the aspiration cannot be performed. Perform the system test and verify that there is no abnormality in the operation of APS1 valve. When the system test is passed, the error becomes E333, and it becomes possible to perform the operation which performs the aspiration. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E303	ASP2 valve fail. Please retest.	Abnormality was detected in the ASP2 valve. The operation which performs the aspiration cannot be performed. Perform the system test and verify that there is no abnormality in the operation of APS2 valve. When the system test is passed, the error becomes E334, and it becomes possible to perform the operation which performs the aspiration. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E304	Fluid vent system fail. Please retest.	Abnormality was detected in the VENT valve. The operation which performs the aspiration cannot be performed. Perform the system test and verify that there is no abnormality in the operation of VENT valve. When the system test is passed, the error becomes E335, and it becomes possible to perform the operation which performs the aspiration. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E305	Vacuum monitor fail.	The aspiration sensor may be broken. If this error occurs during use, the operation which performs the aspiration cannot be performed. Perform the system test or cassette test, and if abnormality is not found, the error can be cleared. Even if improvement can be seen, contact NIDEK or your authorized distributor.
E306	Pump motor fail.	The aspiration motor may be broken. Contact NIDEK or your authorized distributor.
E307	Pump motor fail.	The position of aspiration motor head cannot be detected. It is possible to use the system under this state, however, be aware that the pulse during aspiration may become large. When the operation is completed, contact NIDEK or your authorized distributor.
W308	Incorrect connection set.	The connection set was removed during use. This error can be cleared by reconnecting the connecting set. When the single cassette is replaced with the dual cassette, perform the system check again. At this time, it is impossible to select the mode which performs the aspiration with the line 2 until the system test is performed. Once the dual connection set is inserted, the connection set cannot be replaced.
W309	Incorrect connection set.	The connection set for vitreous surgery was connected to the system which is only for the phacoemulsification. While this error occurs, the operation of the system becomes the one for the single cassette. This state can be cleared by ejecting the cassette.

Code	Indication	Causes • Countermeasures
E310	Cassette detector fail.	Sensor to judge the connection set is broken. Even if this error occurs during the operation, it is possible to use the system unless the cassette is replaced. Contact NIDEK or your authorized distributor after the operation. If this error occurs while the cassette is not inserted, the cassette cannot be properly identified.
W312	Cassette fail. Eject the cassette.	The cassette was inserted while it is inclined. Remove the cassette once, and directly insert the cassette. Verify that the lug of the cassette on the main body side is not broken. If improvement cannot be seen after the cassette is inserted again, the aspiration unit may be broken.
E313	Cassette system fail.	Abnormality was detected when the cassette was ejected. While this error occurs, the cassette cannot be inserted, so turn OFF the power. When the cassette cannot be ejected, remove the white cap on the rear side of the system and eject the cassette by turning the inside shaft with a flatblade screw driver. If the same symptom occurs after the replacement of cassette, the aspiration unit may be broken. Contact NIDEK or your authorized distributor.
W320	US handpiece is disconnected. Connect the US handpiece.	The connector of US handpiece was removed during the ultrasound oscillation. Verify that the connector is securely connected. If this error occurs while the connection is proper, replace the US handpiece. If improvement cannot be seen after the replacement of handpiece, the US unit may be broken. Contact NIDEK or your authorized distributor.
E322	Ultrasound fail. Please retest.	Failure was detected in the ultrasound oscillation. Verify the tightness of US tip and the attachment of sleeve, then, attach the test chamber and perform the Test US. If this error occurs, replace the US handpiece and perform the test again. If improvement cannot be seen, the US unit may be broken. Contact NIDEK or your authorized distributor.
E326	Diathermy output disable. Please retest.	The diathermy output was attempted with the upper left switch of the foot pedal under the condition that an error was detected as a result of the Test Dia. The diathermy cannot be output. If the Test Dia is passed, this error does not appear.
E328	Motorized IV pole fail.	There is a fear that the height of irrigation pole may shift. Attention shall be given because it becomes impossible to automatically adjust the height of irrigation pole. The height of pole can be electrically adjusted, however, be aware that the indication of height may shift.
E329	Motorized IV pole fail.	The control unit for irrigation pole may be broken. It becomes impossible to perform the Auto Pole Control, so pay attention to the irrigation pressure. If it is necessary to adjust the pole height, manually adjust it temporarily. Contact NIDEK or your authorized distributor.

Code	Indication	Causes - Countermeasures
E330	Motorized IV pole fail.	The control unit for irrigation pole may be broken. It becomes impossible to perform the Auto Pole Control, so pay attention to the irrigation pressure. If it is necessary to adjust the pole height, manually adjust it temporality. Contact NIDEK or your authorized distributor.
E331	IRR1 valve detector fail.	The sensor to detect the IRR1 valve position may be broken. The system can be used in this state, how ever, attention shall be given because the abnormality of valve cannot be detected. Contact NIDEK or your authorized distributor.
E332	IRR2 valve detector fail.	The sensor to detect the IRR2 valve position may be broken. The system can be used in this state, how ever, attention shall be given because the abnormality of valve cannot be detected. Contact NIDEK or your authorized distributor.
E333	ASP1 valve detector fail.	The sensor to detect the ASP1 valve position may be broken. The system can be used in this state, how ever, attention shall be given because the abnormality of valve cannot be detected. Contact NIDEK or your authorized distributor.
E334	ASP2 valve detector fail.	The sensor to detect the ASP2 valve position may be broken. The system can be used in this state, how ever, attention shall be given because the abnormality of valve cannot be detected. Contact NIDEK or your authorized distributor.
E335	VENT valve detector fail.	The sensor to detect the VENT valve position may be broken. The system can be used in this state, how ever, attention shall be given because the abnormality of valve cannot be detected. Contact NIDEK or your authorized distributor.
W400	Cooling down a lamp. Wait not turn OFF.	Do not turn OFF the power as the lamp is cooled down. * To prolong the life of lamp.
W401	Lamp house is too hot.	As the lamp is hot, do not replace the lamp.
E404	Ext. air pressure fail.	The pressure setting of external pressure source is different from the specifications of system. Readjust the setting so that it meets the specifications. While this error is indicated, the VIT cutter and SCIS in the posterior mode are operated with the built-in air compressor. The maximum cut rate of VIT cutter is 600 cpm regardless of the setting.
W405	Ext. air pressure is disconnected.	The external pressure source is not connected. While this error is indicated, the VIT cutter and SCIS in the posterior mode are operated with the built-in air compressor. The maximum cut rate of VIT cutter is 600 cpm regardless of the setting.
E408	FGX is out of order.	The FGX pressure is slightly different from the setting value. If leakage occurs in the route of FGX or the pressure is intentionally applied from the connection port, this error is indicated. This error is cleared when the system is returned to the normal state.
E409	FGX pressure is too high.	The pressure of FGX is out of control and higher than the setting value. When this error occurs, a message appears asking whether or not to switch the path to the FGX for emergency use. If necessary, switch the path to the FGX for emergency use. * The FGX for emergency use is designed to output stable pressure, approx. 30 mmHg. (The pressure is not adjustable.)

Code	Indication	Causes • Countermeasures
W410	Attention to FGX setting.	Be aware that the pressure setting of FGX is over 60 mmHg. A warning beep can be deadened by touching the message area.
E412	Scissors fail.	The removal of scissors probe was detected. Verify that the scissors probe is securely connected. If this error occurs while the connection is proper, the air pressure control unit may be broken. Contact NIDEK or your authorized distributor.
W500	Footpedal is disconnected. Connect the foot pedal.	The foot pedal is not connected. If the foot pedal has been connected, check the connection. When this error occurs even if the connection is proper, contact NIDEK or your authorized distributor.
E501	Footpedal treadle fail.	The operation of the main pedal of the foot pedal cannot be detected. Disconnect the foot pedal once, and reconnect it. While this error occurs, the diathermy output cannot be performed with the main pedal. When the foot pedal is disconnected, the error can be cleared. Contact NIDEK or your authorized distributor.
E502	Footpedal treadle fail.	The operation of the main pedal of the foot pedal cannot be detected. Disconnect the foot pedal once, and reconnect it. While this error occurs, the diathermy output cannot be performed with the main pedal. When the foot pedal is disconnected, the error can be cleared. Contact NIDEK or your authorized distributor.
E504	S1 switch of foot pedal fail.	The operation of the upper left switch of the foot pedal cannot be detected. Disconnect the foot pedal once, and reconnect it. While this error occurs, the diathermy output cannot be performed with the upper left switch. When the foot pedal is disconnected, the error can be cleared. Contact NIDEK or your authorized distributor.
W600	Check the printer paper.	The printer runs out of paper, or the lever is raised. Replace the printer paper. If the lever is raised, lower it. The data being printed is printed out again. If the "auto-print" is set to ON, it becomes impossible to clear the parameter such as US time while this error is indicated.
E604	Voice driver fail.	There is a fear that the voice guide is not properly sounded out. Attention shall be given when using the system because there is no voice guide.
E608	Low battery.	The remaining time of battery becomes small. It is possible to use the system, however, there is a fear that the printed time may be shift. To replace the battery, contact NIDEK or your authorized distributor.

§6 MAINTENANCE

6.1 List of Consumables and Maintenance Parts

Parts Name	Unit for Order	Order No.
Printer paper	3 rolls	806-20-0001
Halogen lamp (12V, 50W)	1 pc.	18261-M901
Fuse	1 pc. (for 100V, 115V: AC250V, T6.3A)	804-02-02121 × 2
	1 pc. (for 230V: AC250V, T4.0A)	804-02-02068 × 2

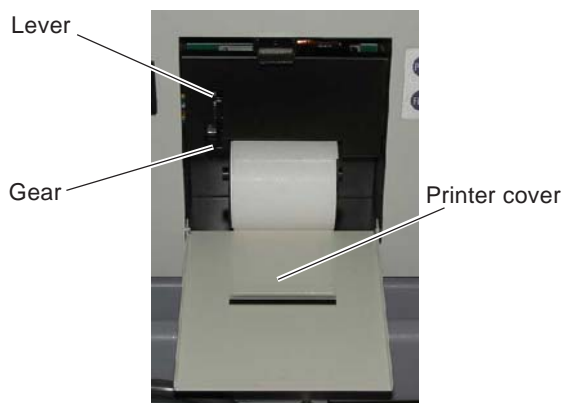
6.2 Replacement of Printer Paper

When a red line appears on either side of printer paper, it means that the paper is running short. Though the printing is not executed without paper, a message “Check the Printer paper” appears. In such a case, be sure to replace the paper with a new one as soon as possible.

1. Open the printer cover.

2. Take out the remaining printer paper.

Raise the lever on the left side when viewed from the rear side of the system, and turn the gear from the backward of the system to the forward to take out the printer paper.

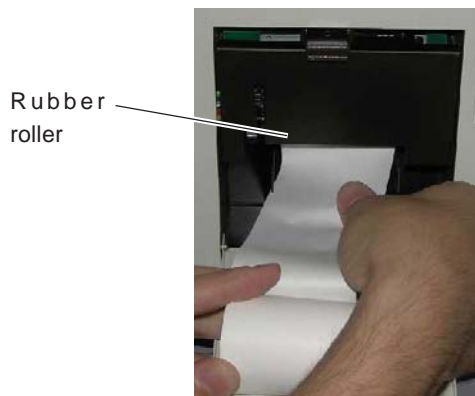


3. Prepare new printer paper.

Peel off the end of printer paper, and cut off the end with scissors to straighten it.

4. Set the new printer paper to the printer.

- 1) After inserting the end of the printer paper under the rubber roller, turn the gear from the forward to the backward of the system until the end of the printer paper comes out.
- 2) When the printer paper is passed through the cover, flip the left lever down.
- 3) Close the printer cover, and cut the redundant end of the printer paper with a cutter.



6.3 Replacement of Halogen Lamp

⚠ CAUTION

- Verify that the halogen lamp is cooled down before replacement.
You may get burned since just-burnt-out lamp is hot.
- Disconnect the power cord from the power outlet before replacing the halogen lamp.
- Never touch the glass part of the halogen lamp with bare hands.
Smearing oil from fingers or dirt on the glass part may reduce the life time of lamp.
When accidentally touching the glass part, wipe fingerprints with clean cloth dampened with alcohol.

1. Turn OFF the switch of the intraocular illumination and wait until the lamp is cooled down.

2. Pull the intraocular illumination light unit forward.

The attachment part of the lamp appears.



3. Pull out the burnt-out lamp.

4. Insert the new lamp into the socket.

Look into the plug of the light guide and verify that the filament can be seen.
If it cannot be seen, insert the lamp again.

5. Put the intraocular illumination unit back into position in the reverse order of the step 2.

Insert the unit until you feel a click.

6. Turn ON the switch of the intraocular illumination and verify that the lamp lights up.

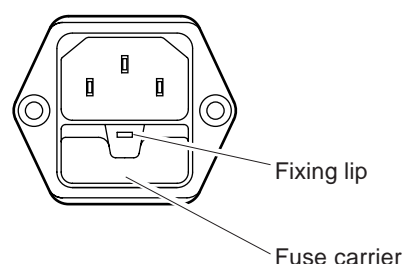
6.4 Replacement of Fuses

When the pilot lamp above the power switch on the rear side of the system does not light by turning ON (|) the power even though the power cord is connected properly, fuses may be blown. In such a case, replace fuses with new ones following the procedure below:

1. Turn OFF (○) the power switch.
2. Disconnect the power cord from the power outlet.

3. Remove the cover of the inlet.

Loosen the screw on the cover with a Phillips screwdriver and remove the cover.



4. Disconnect the power cord from the inlet.

5. Pull out the fuse carrier.

Pull out the fuse carrier while pushing the fixing lip with a flatblade screwdriver.

6. Replace fuses with new ones.

Fuse rating:

- For 100V, 115V: 250V T6.3A slow blow ($\phi 5 \times 20$ mm) \times 2 pcs.
- For 230V: 250V T4.0A slow blow ($\phi 5 \times 20$ mm) \times 2 pcs.

CAUTION

- Always use only the specified fuses.
If not, the system may not deliver performance sufficiently, or a system malfunction or fire may result.
- Always replace both fuses together.
- If the fuses burn again, contact NIDEK or your authorized distributor.

6 - 4

7. Attach the fuse carrier in the reverse order of the step 5.

8. Verify the fuses in the following steps.

- 1) Connect the power cord to the inlet and power outlet.
- 2) Turn ON (|) the power switch and verify that the pilot lamp lights up.

9. Attach the cover of the inlet in the reverse order of the step 3.

6.5 Cleaning

⚠ CAUTION

- When cleaning the exterior of the system and LCD touch panel, never use organic solvent such as thinner or abrasive detergent.
Otherwise, their surfaces may be damaged or scratched.
- Lightly wipe the exterior of the system and LCD touch panel.
Otherwise, their surface may be damaged or scratched.

6.5.1 Cleaning the exterior

Clean the dirty part if necessary.

[A. in the case of normal dirt]

1. **Immerse a soft cloth in water and tightly wring it. Then gently wipe the dirty part.**

Do not scrub the exterior even if the dirt cannot be removed by wiping once. In such a case, immerse the cloth in water, wring it, and wipe the dirt several times.

2. **Wipe the wet part with a dry and soft cloth.**

[B. In the case of stubborn dirt]

1. **Immerse a soft cloth in a neutral detergent diluted with water and tightly wring it. Then gently wipe the dirty part.**

Do not scrub the exterior even if the dirt cannot be removed by wiping once. In such a case, immerse the cloth in the neutral detergent, wring it, and wipe the dirt several times.

2. **Immerse a soft cloth in water, wring it tightly, and then gently wipe the part wet with a neutral detergent.**

Do not scrub the exterior even if the neutral detergent cannot be removed by wiping once. In such a case, immerse the cloth in water, wring it, and wipe the neutral detergent several times.



6.5.2 Cleaning the LCD touch panel

1. **Dampen a soft cloth in water with ethanol (70% pure) and gently wipe the dirty part with the cloth.**

Do not scrub the LCD touch panel even if the dirt cannot be removed by wiping once. In such a case, immerse the cloth in water or rubbing alcohol, wring it, and wipe the dirt several times.

§7 SPECIFICATIONS

7.1 Specifications of Each Part

1. Irrigation

- | | |
|---------------------------|--|
| 1-1. Irrigation pressure: | Controlled by the height of the irrigation pole.
Adjustable range is between 0 and 145 cm from the reference position. (Electrically 70 cm or more) |
| 1-2. Start/Stop: | Controlled by the pinch valve. (with Free Flow) |

2. Aspiration

- | | |
|-----------------------|---|
| 2-1. Aspiration pump | Peristaltic pump |
| 2-2. Vacuum pressure: | Atmospheric pressure is indicated as 0 mmHg. |
| • Pressure setting: | 0 to 500 mmHg (5 mmHg increments) |
| • Linear control: | When “linear” is selected, the linear control is possible according to the pressing amount of the foot pedal. |
| 2-3. Aspiration flow: | Controlled by the number of rotations of aspiration pump. (Maximum 70 mL/min) |
| • Flow rate: | (Cataract surgery)
0 to 50 mL/min (1 mL/min increments)
(Vitrectomy surgery)
0 to 140 mL/min (1 mL/min increments) |
| • Linear control: | When “linear” is selected, the linear control is possible according to the pressing amount of the foot pedal. |
| 2-4. Vent system: | Irrigation vent |
| 2-5. Reflux: | Irrigation pressure |

3. Ultrasound

- | | |
|------------------------|--|
| 3-1. Frequency: | 40 kHz |
| 3-2. Frequency tuning: | Auto tuning |
| 3-3. Output: | Indication is 100% of the maximum amplitude. |
| • Output setting: | 0 to 100 % (1 % increments) |
| • Linear control: | When “linear” is selected, the linear control is possible according to the pressing amount of the foot pedal. |
| 3-4. Pulse: | Continuous, 1 to 20 pulse/sec. (1 pulse increments),
25 to 50 pulse/sec. (5 pulse increments), and 50 to 90 pulse/sec. (10 pulse increments). |

* The pulse duty varies according to the pulse rate.

* When the pulse rate is within 25 and 90 pulse/sec., the duty can be changed with the same pulse rate. (For the detailed number, see the table on the next page.)

Pulse rate setting list

Pulse mode		Incremental mode		Pulse mode		Incremental mode	
Duty (%)	Pulse rate (pps)	On Time msec	Pulse rate (pps)	Duty (%)	Pulse rate (pps)	On Time msec	Pulse rate (pps)
20	1	8	1	36	30	8	30
23	2	↑	2	45	↑	↑	↑
24	3	↑	3	35	35	↑	35
28	4	↑	4	45	↑	↑	↑
31	5	↑	5	36	40	↑	40
33	6	↑	6	44	↑	↑	↑
32	7	↑	7	36	45	↑	45
32	8	↑	8	45	↑	↑	↑
33	9	↑	9	35	50	↑	50
33	10	↑	10	45	↑	↑	↑
33	11	↑	11	24	60	↑	60
32	12	↑	12	36	↑	↑	↑
32	13	↑	13	48	↑	↑	↑
32	14	↑	14	28	70	↑	70
33	15	↑	15	42	↑	↑	↑
33	16	↑	16	56	↑	↑	↑
32	17	↑	17	32	80	↑	80
32	18	↑	18	48	↑	↑	↑
32	19	↑	19	64	↑	↑	↑
32	20	↑	20	36	90	↑	90
35	25	↑	25	54	↑	↑	↑
45	↑	↑	↑	72	↑	↑	↑

* $\text{Duty} = \frac{\text{On Time}}{\text{Cycle Time}} \times 100 (\%)$

*On Time: oscillation time for a pulse

* In the incremental mode, pressing the   buttons may not change the value to achieve consistency when the pulse and the incremental modes are changed.

4. Vitrectomy cutter

4-1. Driving source:

Built-in air compressor

For vitreous surgery, it is possible to use 450 to 550 kPa compressed air or nitrogen gas cylinder, etc. as an external driving source. (For A and AP types)

4-2. Cutting speed:

[when the built-in air compressor is used as the driving source.]

- A-Vit Continuous, 50 to 600 cuts/min. (50 cuts/min increments)
- P-Vit Continuous, 50 to 800 cuts/min. (50 cuts/min increments)

[when the external pressure source is used as the driving source: 450 to 550 kPa.]

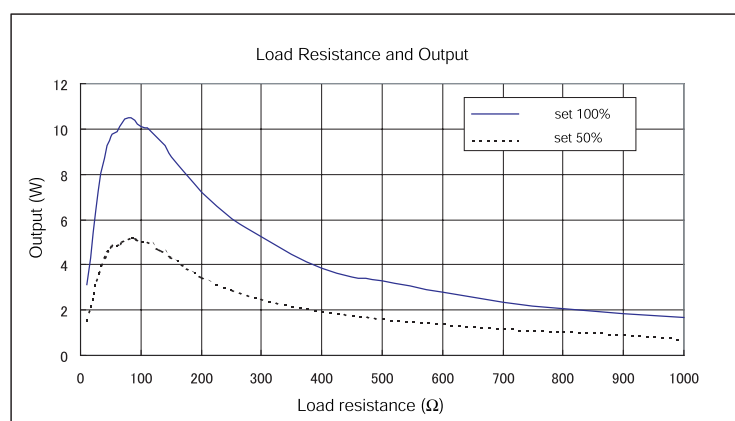
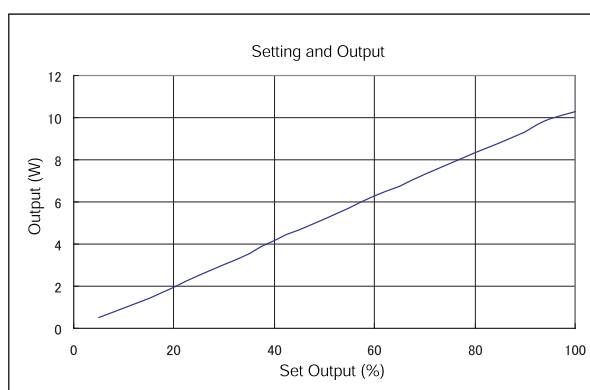
- Continuous, 50 to 2500 cuts/min. (50 cuts/min increments)

4-3. Driving pressure:

200 kPa

5. Diathermy

- 5-1. Frequency: 515 kHz
- 5-2. Output: Maximum 10 W (Output load is 90 Ω .)
(Maximum voltage at 100 % of output: 60 V)
- Output setting: 0 to 100 % (5 % increments)
 - Linear control: When “linear” is selected, the linear control is possible according to the pressing amount of the foot pedal.



6. Automatic intraocular scissors (AP and P types)

- 6-1. Driving source: Common to the vitrectomy cutter
- 6-2. Driving system: Pneumatic system
- 6-3. Driving pressure: 140 to 250 kPa
- 6-4. Number of driving: Single, 50 to 300 cuts/min (50 cuts/min increments)
- 6-5. Control: Proportional/Automatic

7. Fluid/gas exchange (AP and P types)

- 7-1. Air pressure source: Integral small pump (posterior unit)
- 7-2. Air pressure range: 10 to 99 mmHg/min (1 mmHg increments)

8. Intraocular illumination (AP and P types)

8-1. Light source:	12 V 50 W halogen lamp
8-2. Lifetime:	50 hours (when used with the illumination level 8.)
8-3. Replacement:	User can replace the lamp.
8-4. Safety filter:	Heat absorption filter is provided.
8-5. Light quantity adjustment:	10 steps (Voltage applied to the lamp is controlled.)
8-6. Output:	2 lamps can be used at one time.

9. Display

9-1. System:	10.4 inch color LCD + touch panel
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10. Foot pedal (Factory setting: anterior mode)

10-1. Main pedal control:	Irrigation, aspiration, ultrasound, diathermy
10-2. Left switch:	Reflux
10-3. Right switch:	US1, US2, (US3) or I/A1, I/A2, (I/A3), Cutter Ready/ Off
10-4. Auxiliary switches:	Irrigation pole up/down, mode switching, diathermy

11. Foot pedal (Factory setting: posterior mode (AP and P types))

11-1. Main pedal control:	Aspiration	- Vit, US, Asp mode
	Scissors	- Scis mode
	Diathermy	- Dia mode
	Reflux	- Vit, US, Asp mode
11-2. Left switch:	Vitreotomy cutter READY/OFF	- Vit mode
11-3. Right switch:	US oscillation	- US-PPL mode
	Insert mode	- Scis mode
	Irrigation pole up/down, mode switching, diathermy	
11-4. Auxiliary switches:		

12. Others

12-1. Voice output:	Voice guidance
12-2. Remote controller:	Wireless remote control (A and AP types)
12-3. Memory:	Anterior: 20 programs (A and AP types)
	Posterior: 20 programs (AP and P types)

13. Environmental conditions

a. In Use

a-1. Ambient temperature:	10 to 40 °C
a-2. Relative humidity:	30 to 85 % (non-condensing)
a-3. Atmospheric pressure:	860 to 1060 hPa

b. In Storage/Transport

b-1. Ambient temperature:	-10 to 60 °C
b-2. Relative humidity:	30 to 90 % (non-condensing)
b-3. Atmospheric pressure:	760 to 1060 hPa

7.2 Power Requirements and Others

1. Power source

- | | |
|-------------------------|---|
| 1-1. Voltage: | AC 100 V $\pm 10\%$, AC 115 V $\pm 10\%$, AC 230 V $\pm 10\%$ |
| 1-2. Frequency: | 49 to 61 Hz |
| 1-3. Power consumption: | A type: 400 VA
AP and P types: 600 VA |

2. Dimensions and weight

- | | |
|------------------|---|
| 2-1. Weight: | Approx. 75 kg (A type)
Approx. 80 kg (AP and P types) |
| 2-2. Dimensions: | 530 (W) \times 1400 (H) \times 580 (D) (without protrusion) |

§8 ACCESSORIES

8.1 Configurations for A Type

[Standard configurations]

• Main body	1
• Foot pedal	1
• Remote control	1
• Printer paper	1
• Dust cover	1
• Spare fuses	2
• Operator's manual	1

[Standard accessories]

• Irrigation handpiece (short)	1
• I/A tip 19G (straight port size 0.3 mm)	1
• Wrench for tip	1
• I/A handpiece	1
• Sterilization case (large)	1
• Sterilization case (small)	1
• US handpiece 40 kHz (titanium-sheathed)	1
• OS tip 30Deg * ²	1
• Diathermy cable	1
• Diathermy forceps (Coaptation)	1
• Diathermy pencil (18G straight)	1
• Vitrectomy cutter (disposable)	2
• Irrigation sleeve for vitrectomy cutter	1
• Disposable cassette pack (Phaco basic surgery set)	10
- Silicone sleeve (sterilized, 2 pcs. in 1 set)	
- Test chamber (sterilized, 1 pc. in 1 set)	
- Cassette (sterilized, 1 pc. in 1 set)	
- Tray cover (sterilized, 1 pc. in 1 set)	
- Bag for remote controller (sterilized, 1 pc. in 1 set)	
- Infusion tube (separately packed)	

*2 “OS” is an abbreviation of “Okamoto - Shirao” and means that this tip has been developed by both doctors.

8.2 Configurations for AP Type

[Standard configurations]

• Main body	1
• Foot pedal	1
• Remote control	1
• Printer paper	1
• Dust cover	1
• Spare fuses	2
• Operator's manual	1

[Standard accessories]

• Irrigation handpiece (short)	1
• I/A tip 19G (straight port size 0.3 mm)	1
• Wrench for tip	1
• I/A handpiece	1
• Sterilization case (large)	1
• Sterilization case (small)	1
• US handpiece 40 kHz (titanium-sheathed)	1
• OS tip 30Deg * ³	1
• Diathermy cable	2
• Diathermy forceps (coaptation)	2
• Diathermy pencil (18G straight)	2
• Vitrectomy cutter (disposable)	12
• Irrigation sleeve for vitrectomy cutter	1
• Disposable cassette pack (Phaco basic surgery set)	10
- Silicone sleeve (sterilized, 2 pcs. in 1 set)	
- Test chamber (sterilized, 1 pc. in 1 set)	
- Cassette (sterilized, 1 pc. in 1 set)	
- Tray cover (sterilized, 1 pc. in 1 set)	
- Bag for remote controller (sterilized, 1 pc. in 1 set)	
- Infusion tube (separately packed)	
• Light guide	10
• Extension tube (180cm)	50
• Disposable cassette pack (Post dual connection set)	10
• Halogen lamp (spare)	2
• High pressure hose S-S	1
• Gas line filter	50

*3 “OS” is an abbreviation of “Okamoto - Shirao” and means that this tip has been developed by both doctors.

8.3 Configurations for P Type

[Standard configurations]

• Main body	1
• Foot pedal	1
• Printer paper	1
• Dust cover	1
• Spare fuses	2
• Operator's manual	1

[Standard accessories]

• Sterilization case (large)	1
• Diathermy cable	1
• Diathermy forceps (coaptation)	1
• Diathermy pencil (23G straight)	1
• Vitrectomy cutter (disposable)	10
• Disposable cassette pack (Vit basic surgery set)	10
- Cassette (sterilized, 1 pc. in 1 set)	
- Tray cover (sterilized, 1 pc. in 1 set)	
- Infusion tube (separately packed)	
• Light guide	10
• Extension tube (180cm)	50
• Halogen lamp (spare)	2
• High pressure hose S-S	1
• Gas line filter	50

8.4 Option

8.4.1 Anterior mode

[Items]	[Unit for order]
• US tip Various types	1
• I/A tip Various types	1
• Aspiration handpiece	1
• Diathermy forceps Various types	1
• Phaco dual connection set	10

8.4.2 Posterior unit

[Items]	[Unit for order]
• Vitrectomy cutter	10
• Extension tube (180cm)	50
• Gas line filter	50
• Light guide	10
• Halogen lamp (spare)	2
• Automatic intraocular vertical scissors	10
• Automatic intraocular horizontal scissors (1.3 mm)	10
• Automatic intraocular horizontal scissors (1.7 mm)	10
• US tip PPL-type 30Deg	1
• Phaco/POST connection set	10
• Post dual connection set	10

8.4.3 Foot pedal

[Items]	[Unit for order]
• Basic type foot pedal	1

Words in this manual

To understand the contents of this manual easily, the following words are used.
Before reading this manual, grasp the meaning of the following words.

Aspiration Vacuuming intraocular liquid or tissue.

ENERGY TIME (total time for ultrasound output)

..... This value is obtained by converting the time for ultrasound output to the time for the ultrasound output at the maximum.

Foot pedal position Pressed position of the foot pedal where the operations such as irrigation and aspiration are switched. As a certain range is provided, the system executes the same operation if the foot pedal position differs within the range.

I/A Abbreviation of Irrigation and Aspiration.

Irrigation Flushing an eye with saline solution.

LINEAR/PANEL LINEAR control is to control the vacuum pressure and ultrasound output according to the pressing amount of the foot pedal while the upper limit is set on the control panel. PANEL control is to achieve the certain level of output set on the control panel when the foot pedal is pressed regardless of the pressing amount.

Reflux Back-flow of aspiration.