PENTAX™

VIDEO PROCESSOR

EPK-i

OWNER'S MANUAL

INTENDED USE:

This electro-medical device (Video Processor) is intended to be used for endoscopic diagnosis and treatment. Together, this Video Processor and PENTAX video endoscope may provide optical visualization of, and/or therapeutic access to, various body cavities, organs and canals. Do not use this device for any purpose other than that for which it has been designed.

This device should only be used by physicians who have thoroughly studied all the characteristics of this device and who are familiar with the proper techniques of endoscopy.

IMPORTANT:

This manual describes the recommended procedures for inspecting and preparing the EPK-i Video Processor prior to its use and the care and maintenance after its use. It does not describe how an actual procedure is to be performed, nor does it attempt to teach the beginner the proper technique or any medical aspects regarding the use of the equipment.

Failure to follow the instructions in this manual may result in damage to and/or malfunction of the equipment. Do not use this device for any other purpose than that for which it has been designed.

If you have any questions regarding any of the information in this manual or concerns pertaining to the safety and/ or use of this equipment, please contact your local PENTAX representative.

CAUTION:

Federal (USA) law restricts this device to sale by, or on the order of a physician or other appropriately licensed medical professional.

Contents

1. SAFETY PRECAUTIONS- IMPORTANT ⚠

The following precautions should always be exercised with the use of all electro-medical equipment to ensure safety to all involved parties - user(s), patient(s), etc.

Please carefully read and follow this owner's manual.

1-1. TRAINING

1. This equipment should only be used under the supervision of a trained physician in a medical facility. Do not use in other locations or for any other purposes than the intended application.

1-2. INSTALLATION

1. This equipment should NEVER be installed or used in areas where the unit could get wet or be exposed to any environmental conditions such as high temperature, humidity, direct sunlight, dust, salt, etc., which could adversely affect the equipment.
2. This equipment should NEVER be installed or used in the presence of flammable or explosive gases or chemicals.
3. This equipment should NEVER be installed, used or transported in an inclined position nor should it be subjected to impact or vibration.
4. For safety reasons, this equipment must be properly grounded. (This equipment should be connected to a three (3) prong hospital grade receptacle in U.S.A. or Canada.)
5. Ensure that all power requirements are met and conform to those specified on the rating plate located on the rear panel.
6. Do not block the air intake vent of this equipment.
7. Do not allow the power cord to become twisted, crushed or pulled taut.
8. When using an isolation transformer for any ancillary equipment, ensure the power requirements of the devices do not exceed the capacity of the isolation transformer. For further information, contact your local PENTAX distributor.

1-3. PRIOR TO USE

1. Confirm that this equipment functions properly and check the operation of all switches, indicators, etc.
2. To prevent electrical shock when used with endoscopes, this equipment is insulated (type BF electro-medical equipment). Do not allow it to be grounded to other electrical devices being used on the patient. Rubber gloves should always be worn to prevent grounding through user(s).
3. Confirm that other devices used in conjunction with this equipment function properly and that these other devices will not adversely affect the operation or safety of this equipment. If any component of the endoscopic system is not properly functioning, the procedure should not be performed.
4. Check and confirm that all cords or cables are connected correctly and securely.
5. The lamp life when used in this equipment is 400 hours. Prior to use, check the lamp life indicator on the operation panel to ensure the indicator is lit green. After 400 hours of use, the indicator turns red and the image quality will deteriorate.

1-4. DURING USE

1. To prevent electric shock, the endoscope and/or any other ancillary device should NEVER be applied directly to the heart.
2. Make sure that no contact is made between the patient and this equipment.
3. To avoid damage to the luminous display and flat membrane switches, do not press any keys with any sharp or pointed objects.
4. The light emitted by the Xenon lamp is extremely intense. Avoid looking directly at the light exiting the endoscope and/or this equipment.
5. To protect the users eyes and avoid risk of thermal injury during an endoscopic examination, use only the minimum amount of brightness required.
6. During clinical procedures, avoid unnecessary prolonged use which could compromise patient/user safety.
7. Continually monitor this equipment and the patient for any signs of irregularities.
8. In the event that some type of irregularity is noted to the patient or this equipment, take the appropriate action to ensure patient safety.
9. If the operation of any of the components of the endoscopic system fails during the procedure and the visualization of the procedure is lost or compromised, place the endoscope in the neutral position and slowly withdraw the endoscope.
10. This equipment should only be used according to the instruction and operating conditions described in this manual. Failure to do so could result in compromised safety, equipment malfunction or instrument damage.

1-5. AFTER USE

1. Refer to the operating instructions supplied with all the components of the endoscopic system to establish the right order in which components should be turned off. Some peripheral devices may have to be turned off first to avoid compromising their operation.
2. Wipe all surfaces clean with gauze slightly dampened with alcohol.
3. Be sure connector interfaces and ventilation ports are not allowed to become wet or splashed with liquids.

1-6. STORAGE

1. This equipment should NEVER be stored in areas where the unit could get wet or be exposed to any environmental conditions such as high temperature, humidity, direct sunlight, dust, salt, etc., which could adversely affect the equipment.
2. This equipment should NEVER be stored in the presence of flammable or explosive gases or chemicals.
3. This equipment should NEVER be stored or transported in an inclined position, nor should it be subjected to impact or vibration.
4. Cords, accessories, etc., should be cleaned and neatly stored.
5. This equipment should be maintained in a clean condition during storage and be ready for subsequent use.

1-7. SERVICE

1. Alterations/modifications to the equipment should NEVER be made. Repairs should only be performed by an authorized PENTAX service facility.
2. When replacing the lamp, use only the lamp recommended by PENTAX and follow all PENTAX instructions provided.

1-8. MAINTENANCE

1. Periodically this equipment and any applicable accessories should be inspected for operation and safety.

1-9. DISPOSAL

1. The equipment should be returned for disposal to PENTAX.
   Contact your local PENTAX representative or service facility.

POWER REQUIREMENTS

Check the standard power plug configurations that are used in your country. If the appropriate power cord is not included in your product, notify your local PENTAX distributor.

SYMBOLS ON MARKING

Alternating current

Type BF applied part (Safety degree specified by IEC 60601-1)

POWER Switches the power on and off.

Attention, consult Owner's Manual

Dangerous Voltage

Protective earth (ground)

Equipotentiality

CONVENTIONS

The following conventions have been established in the text of this manual to aid in the identification of potential hazards of operation;

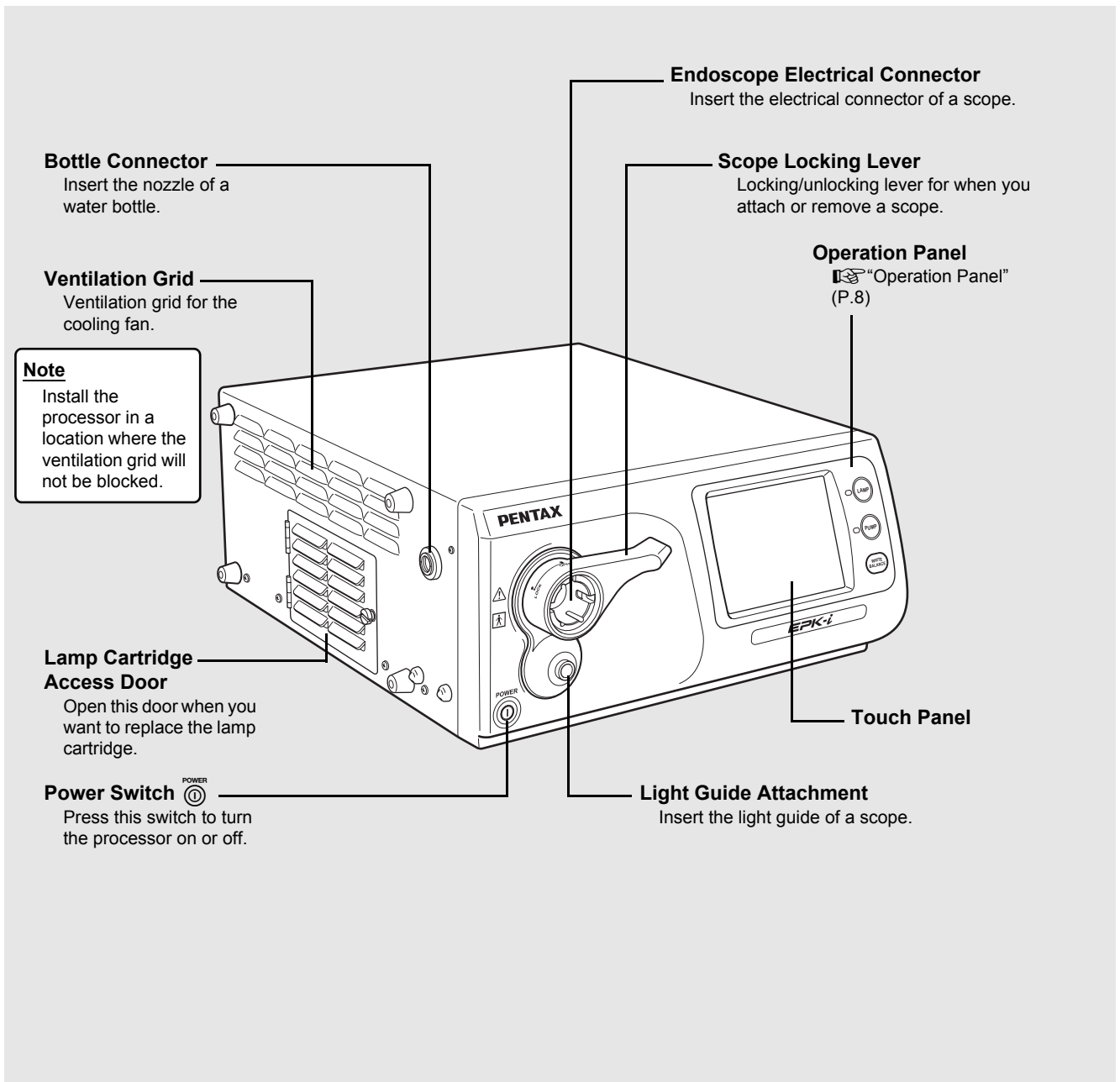**⚠ WARNING** : Could result in death or serious injury.

⚠ CAUTION : May result in minor or moderate injury or property-damage.

NOTE : May result in property-damage. Also, advises owner/operator about important information on the use of this equipment.
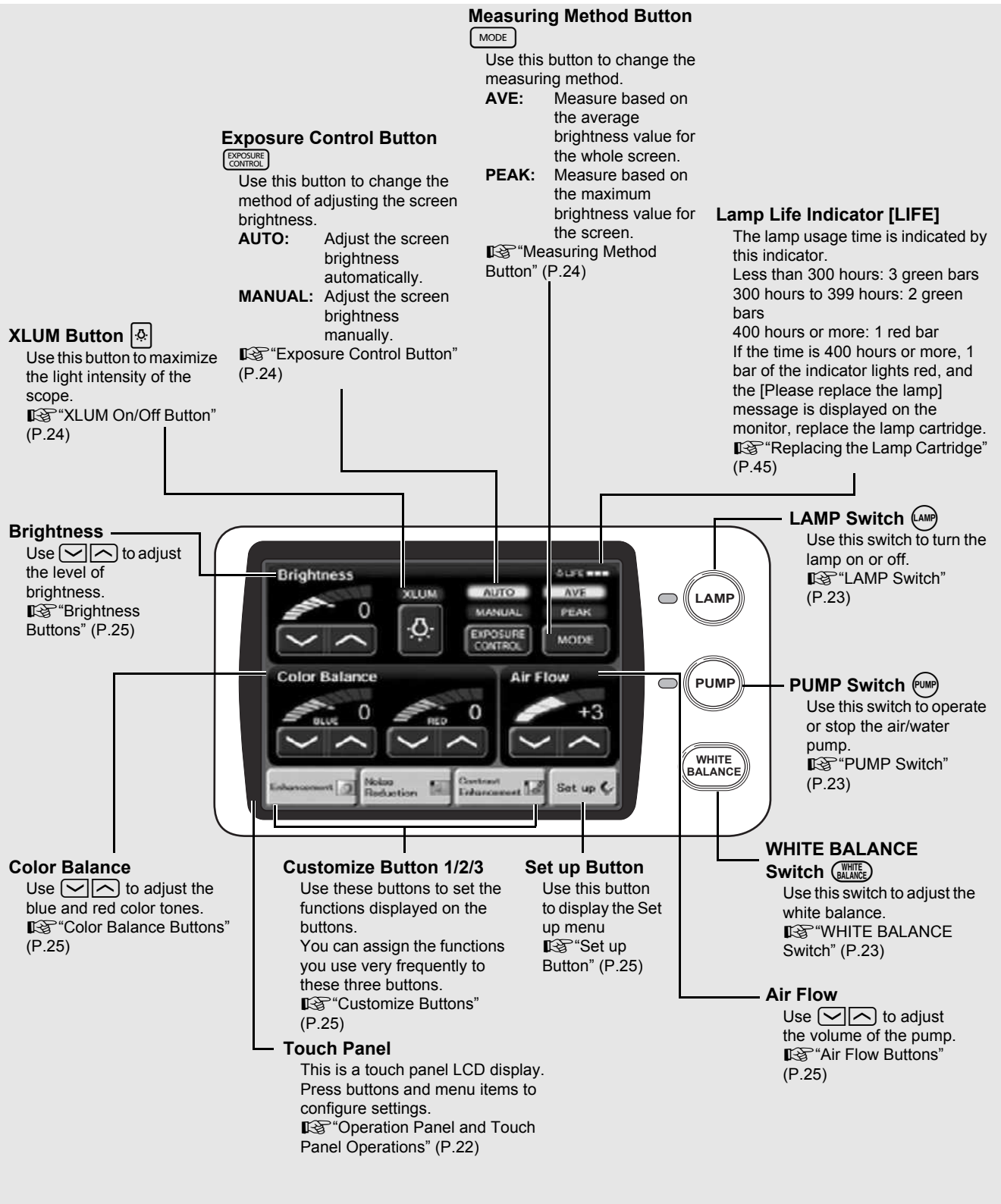
1 Names and Functions of Parts

Main Unit

Endoscope Electrical Connector
Insert the electrical connector of a scope.

Scope Locking Lever
Locking/unlocking lever for when you attach or remove a scope.

Operation Panel
☞"Operation Panel" (P.8)

Bottle Connector
Insert the nozzle of a water bottle.

Ventilation Grid
Ventilation grid for the cooling fan.

Note
Install the processor in a location where the ventilation grid will not be blocked.

Lamp Cartridge Access Door
Open this door when you want to replace the lamp cartridge.

Power Switch ⓞ POWER
Press this switch to turn the processor on or off.

PENTAX

EPK·i

Touch Panel

Light Guide Attachment
Insert the light guide of a scope.

NOTE

Be sure to turn off the processor before you attach or remove the scope.

⚠ **CAUTION**

The light guide and electrical connector of the scope and the pins may be hot immediately after use. Do not touch these parts. Hold a plastic part of the scope when, for example, removing the scope.

Operation Panel

1

Measuring Method Button
[MODE]
Use this button to change the measuring method.
AVE: Measure based on the average brightness value for the whole screen.
PEAK: Measure based on the maximum brightness value for the screen.
☞"Measuring Method Button" (P.24)

Exposure Control Button
[EXPOSURE CONTROL]
Use this button to change the method of adjusting the screen brightness.
AUTO: Adjust the screen brightness automatically.
MANUAL: Adjust the screen brightness manually.
☞"Exposure Control Button" (P.24)

Lamp Life Indicator [LIFE]
The lamp usage time is indicated by this indicator.
Less than 300 hours: 3 green bars
300 hours to 399 hours: 2 green bars
400 hours or more: 1 red bar
If the time is 400 hours or more, 1 bar of the indicator lights red, and the [Please replace the lamp] message is displayed on the monitor, replace the lamp cartridge.
☞"Replacing the Lamp Cartridge" (P.45)

XLUM Button [☼]
Use this button to maximize the light intensity of the scope.
☞"XLUM On/Off Button" (P.24)

Brightness
Use [∨][∧] to adjust the level of brightness.
☞"Brightness Buttons" (P.25)

LAMP Switch (LAMP)
Use this switch to turn the lamp on or off.
☞"LAMP Switch" (P.23)

PUMP Switch (PUMP)
Use this switch to operate or stop the air/water pump.
☞"PUMP Switch" (P.23)

WHITE BALANCE Switch (WHITE BALANCE)
Use this switch to adjust the white balance.
☞"WHITE BALANCE Switch" (P.23)

Color Balance
Use [∨][∧] to adjust the blue and red color tones.
☞"Color Balance Buttons" (P.25)

Customize Button 1/2/3
Use these buttons to set the functions displayed on the buttons.
You can assign the functions you use very frequently to these three buttons.
☞"Customize Buttons" (P.25)

Set up Button
Use this button to display the Set up menu
☞"Set up Button" (P.25)

Air Flow
Use [∨][∧] to adjust the volume of the pump.
☞"Air Flow Buttons" (P.25)

Touch Panel
This is a touch panel LCD display. Press buttons and menu items to configure settings.
☞"Operation Panel and Touch Panel Operations" (P.22)

NOTE

The lamp life is 400 hours. Check the LIFE indicator (lamp life indicator) on the touch panel before you use the processor. Replace the lamp cartridge if 1 red bar is displayed on the LIFE indicator.
☞"Replacing the Lamp Cartridge" (P.45)

Rear Panel

Y/C OUT
(Video/Printer Outputs)
These connectors (separated video outputs) are for outputting separate video signals (video signals separated into luminance signals and color signals) to send to a monitor or printer image processor.

RGB (Video/Printer Outputs)
These connectors are for outputting video signals (RGB color signals and synchronous signals) to send to a monitor or printer image processor.

DVI
This connector is for DVI or VGA.

SERIAL OUT1 DV
This connector is for outputting video signals to send to DV equipment.

KEYBOARD
This connector is for connecting a keyboard. You can connect either the supplied keyboard designed specifically for use with the processor or a commercially available keyboard (US layout).

SA-P2
This connector is for connecting the SA-P2 water supply system.

FTSW
This connector is for connecting foot switches (OS-A61) for operating peripheral devices.

CONTROL
These connectors are for when you want to operate peripheral devices remotely.

RS232C
This connector (D-sub 9-pin connector) is for connecting an external output device. It is an RS-232C compliant interface.

VIDEO IN
(Composite Video Input)
This connector (BNC connector) is for inputting composite video signals to display on the touch panel.

VIDEO OUT (Video Output)
This connector (BNC connector) is for outputting composite video signals to send to a monitor or image processor.

AUDIO IN (DV)
This connector is for inputting audio signals to send to DV equipment.

Rating Plate
This plate shows the processor rating specifications, acquired standards, etc.

Fuse Box
This fuse box contains two fuses.

Potential Equalization Terminal
This terminal is used with a potential equalization busbar to equalize the potential of other equipment connected to the processor.

Power Input Socket
Connect the AC power cord.

Ventilation

Note
Install the processor in a location where the ventilation grid will not be blocked.

RJ45
This connector is exclusively for communication.

SERIAL OUT3/4
These connectors are for outputting the digital data of still images.

Names and Functions of Parts | **9**

Water Bottle (OS-H4)

Air/Water Supply Tube
The inside of the tube is split into two for air and water supply.

Water Bottle Nozzle
Insert this into the processor.

A/W (Air/Water Supply) and DRAIN (Drain) Switch Lever
Use this to switch between air/water supply and drain. Align the switch to the A/W position before use.

Cap
Attach this so that no air leaks out.

Air/Water Supply Plug
Connect this to the air/water supply connector of the scope.

Bottle Tube
This is for sucking water from inside the bottle.

Bottle
This bottle is for sterile water.

1

2 Preparation

System Configuration

The following shows examples of system configurations for using the processor.

K-series and i-series Endoscopes

Display Devices

LCD Monitor   CRT Monitor

**EPK-i Processor
(This Processor)**

Cart

Recording Devices

VTR   Magneto Optical Disk Recorder

DVD Recorder   Printer

USB Flash Memory

Isolation Transformer

Input Devices

Keyboard   Foot Switches
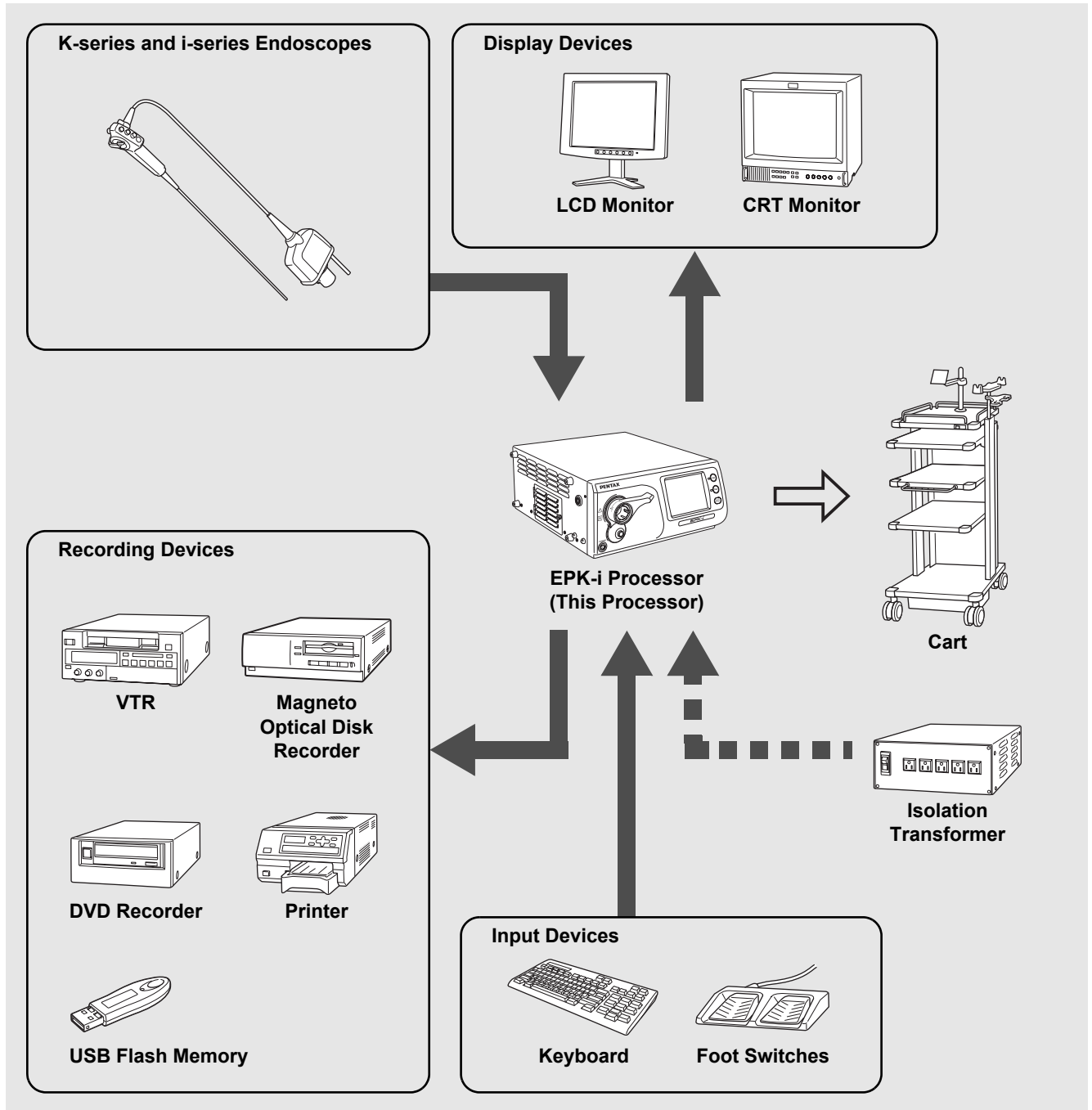
■ Installing the Processor in a Cart

Install the processor and peripheral devices while referring to the installation examples in "System Configuration" (P.11). Install the processor and peripheral devices in a cart. Make sure the cart is on a stable and level surface.

⚠ CAUTION

- Do not install the processor in any of the following locations.
  - Where the processor is likely to be exposed to water.
  - Where flammable or explosive gas is present.
  - In hot and humid locations.
  - Where the processor will be exposed to direct sunlight.
- Install the processor in a location where the ventilation grids will not be blocked.
- Install the processor in a location where dust will not enter inside. Wipe off any dust on the processor. Excessive amounts of dust accumulating inside the unit may cause the processor to malfunction, emit smoke, or catch fire.

■ Connecting an Isolation Transformer

Connect the processor and peripheral devices to an isolation transformer. To reduce the possibility of an electric shock, be sure to supply power to the processor and peripheral devices from the SAT-1300 isolation transformer specified by PENTAX or another medical isolation transformer.
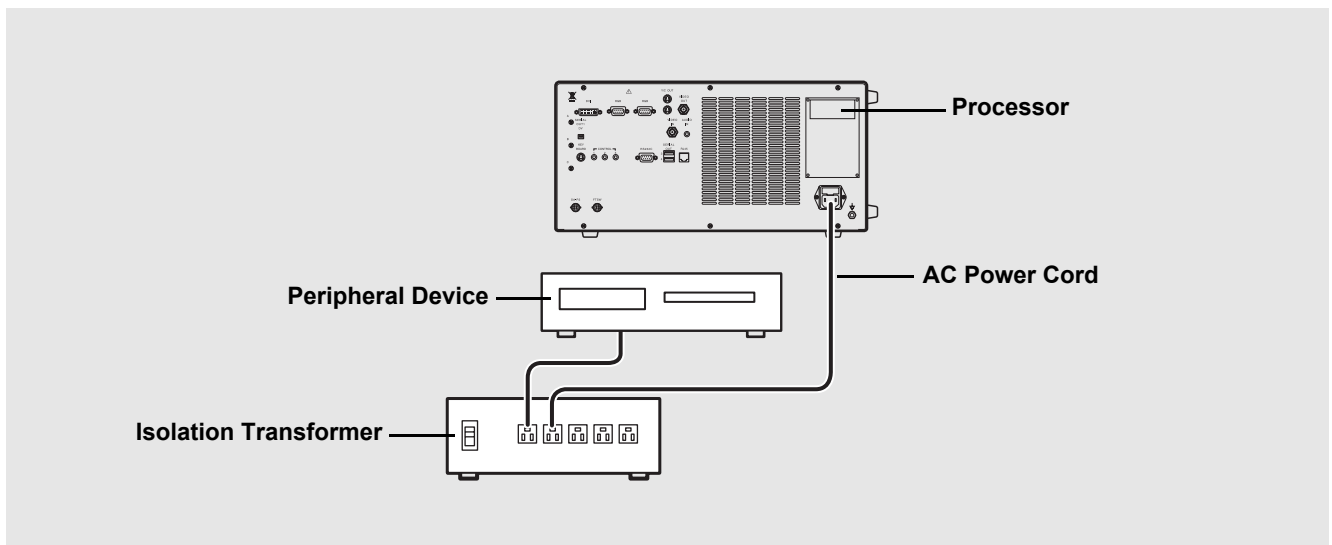
1 **Connect the power cord of the isolation transformer to a three-prong power outlet that meets the power rating indicated on the rating plate.**

2 **Use the AC power cord to connect the power input socket on the rear panel of the processor to the isolation transformer.**

   • Make sure the processor is turned off beforehand.

3 **Connect the peripheral devices to the isolation transformer.**

   • Make sure the peripheral devices are turned off prior to installation.
   • For details on a peripheral device, refer to the instruction manual for the peripheral device.

⚠ CAUTION

- Do not connect any electrical devices other than the processor and peripheral devices of the processor to the isolation transformer.
- Make sure the voltage, current, and power consumption of the processor and peripheral devices do not exceed the maximum ratings indicated on the isolation transformer.
- Be sure to securely connect the power cord of the isolation transformer to a three-prong power outlet.

■ Connecting Peripheral Devices

Connect peripheral devices to the processor. Make sure the processor and peripheral devices are turned off beforehand.

● Connecting a Monitor

Connect a monitor to the processor. For details, refer to the instruction manual for the monitor.

DVI (DVI/VGA Monitors)

RGB (Video/Printer Outputs)
Y/C OUT (Video/Printer Outputs)
VIDEO OUT (Video Output)
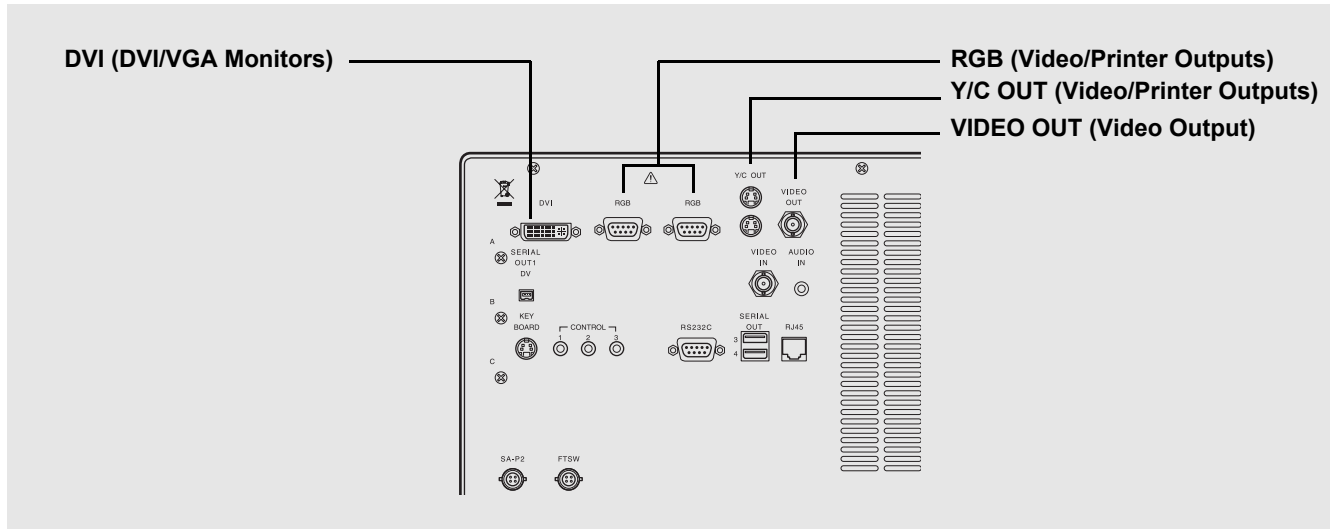
Connecting a monitor with a DVI or VGA input

Use a DVI cable to connect the DVI connector to a DVI input of the monitor or a VGA cable to connect a VGA connector to a VGA input of the monitor.
☞[Set up] → [Initial] → [Selection of the DVI or VGA] (P.28)

Connecting a monitor with a composite video input

Use a BNC video cable (OS-A17) to connect the VIDEO OUT (video output) connector to a composite video input of the monitor.

Connecting a monitor with an RGB video input (BNC)

Use an RGB cable (OS-A25) to connect an RGB (video/printer output) connector to an RGB video input (BNC) of the monitor.

Connecting a monitor with a 4-pin mini-DIN connector

Use a Y/C cable (OS-A24) to connect a Y/C OUT (video/printer output) connector to a 4-pin mini-DIN connector of the monitor.

● Connecting a Printer

Connect a printer to the processor. For details, refer to the instruction manual for the printer.
Connecting a printer recommended by PENTAX enables you to match the colors of printouts to those of images on the monitor.

RGB (Video/Printer Outputs)
Y/C OUT (Video/Printer Outputs)

SERIAL OUT (USB Printer Output)

RS232C
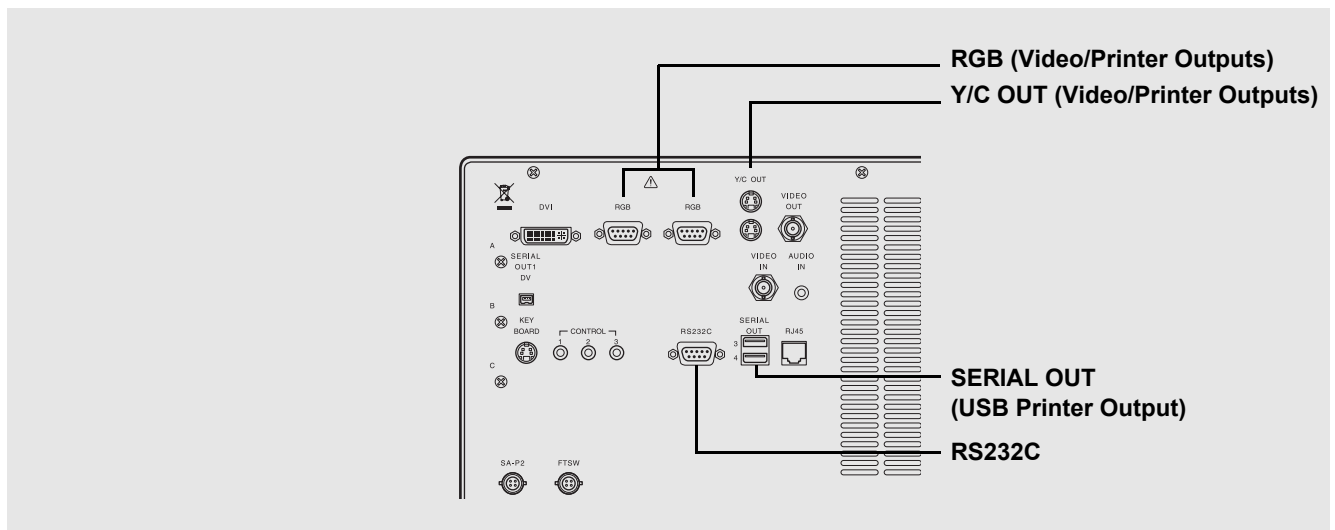
Using RGB output method

Use an RGB cable (OS-A25) to connect an RGB (video/printer output) connector to the connector of the printer.

Using Y/C output method
Use a Y/C cable (OS-A24) to connect the Y/C OUT (video/printer output) connector to the connector of the printer.

Connecting a video printer (Sony UP-50 series) with an RS-232C input
Use an RS-232C cable to connect the RS232C connector to the connector of the printer.

☞ [Set up] → [Initial] → [RS232C Connection] (P.28)
　[Set up] → [Initial] → [Printer setting] (P.28)

● Connecting a Keyboard, Foot Switches, and Remote Controller
For details, refer to the corresponding instruction manuals.
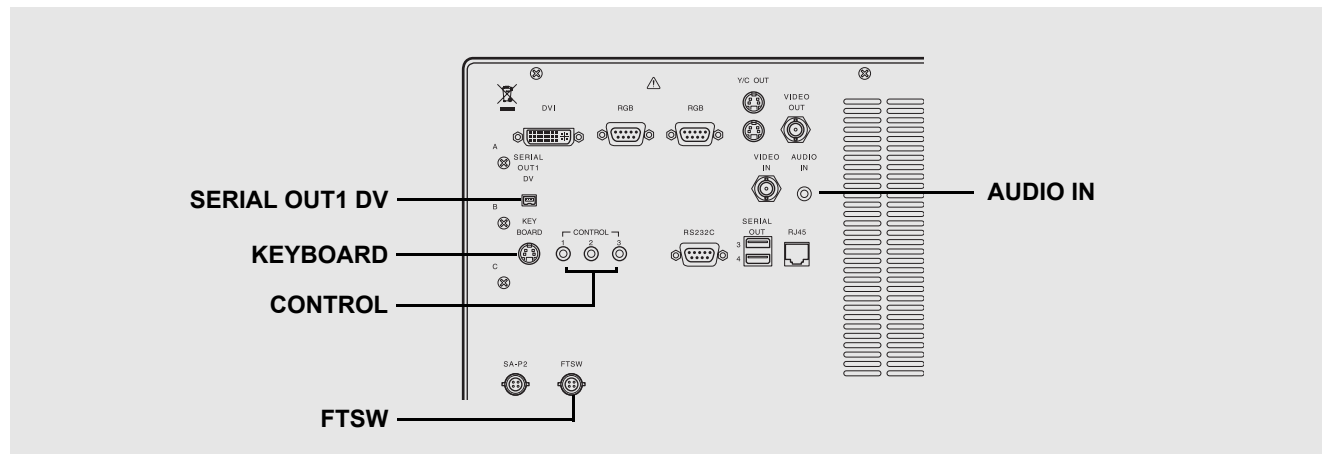
Connecting a keyboard
Connect a keyboard (OS-A70 or commercially available keyboard (US layout) to the KEYBOARD connector.

Connecting foot switches
Connect foot switches (OS-A61) to the FTSW connector.

Connecting a remote controller
When you want to use a peripheral device that includes support for remote (trigger) input, use a control cable (OS-A58) to connect the CONTROL connectors to the remote connectors of the peripheral device. For details on a peripheral device, refer to the instruction manual for the peripheral device.

Connecting to a video signal input of DV equipment
Connect the SERIAL OUT1 DV connector to a video signal input of DV equipment.

If you want to record video with audio, connect a microphone to the AUDIO IN connector. Use a microphone (with the following specifications) recommended by PENTAX.
Type: Stereo mini plug (three pins)
Support for plug-in power
Audio characteristics: –40 to –50 dB

> **NOTE**
>
> When you want to use a commercially available keyboard, use a keyboard with a US layout.

Connecting an Endoscope

Connect a scope to the processor. Connect the water bottle and suction unit to the scope. For details on the scope, refer to the instruction manual for the scope.

1 **Align the scope locking lever of the processor to the OPEN position.**

2 **Insert the electrical connector and light guide of the scope into the corresponding scope electrical connector ① and light guide attachment of the processor and move the scope locking lever in the direction of ② until it clicks into the LOCK position.**
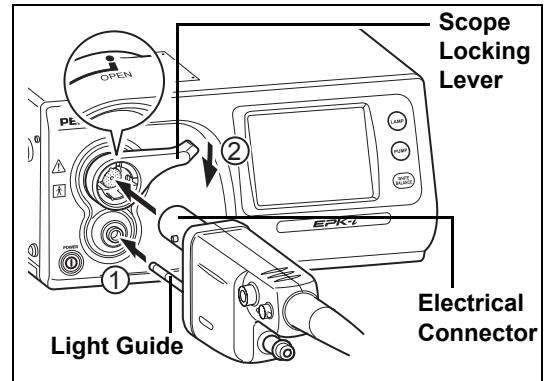
3 **Pour sterile water into the water bottle until the bottle is about two thirds full and then securely tighten the cap.**

4 **Insert the water bottle nozzle into the bottle connector of the processor.**

5 **Align the A/W and DRAIN switch lever of the water bottle to the A/W (air/water supply) position.**
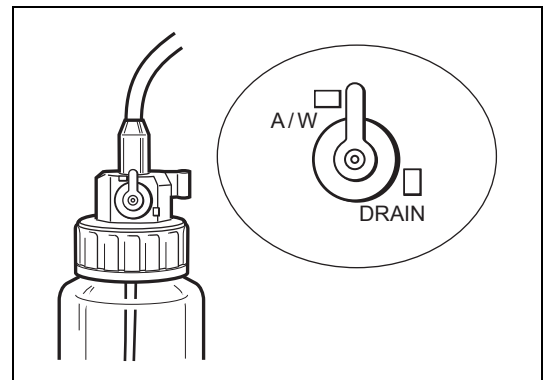
• Insert the air/water supply plug into the holder.
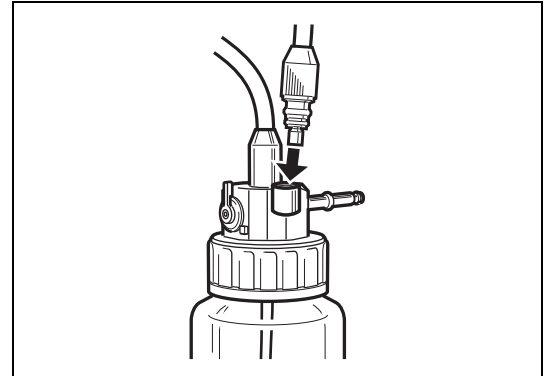
6 **Insert the air/water supply plug of the water bottle into the air/water supply connector of the scope.**

Air/Water Supply Connector

Air/Water Supply Plug
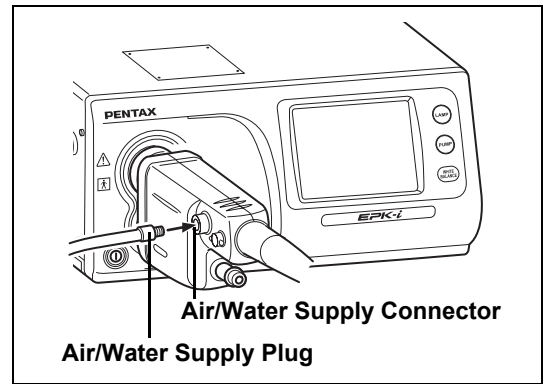
2

7 **Attach the suction tube of the suction unit to the suction nipple of the scope.**

⚠ CAUTION

- Be sure to use sterile water for the water bottle, and replace the water everyday.
- Be careful not to turn the water bottle upside down, or squeeze it. Doing so may result in water flowing out of the bottle.
- Make sure the scope is inserted slowly and correctly.
- Do not hold the scope locking lever when you move the processor.

3 Pre-use Inspections

Be sure to perform the following inspections before you use the processor. If you discover any abnormality, stop using the processor immediately and contact our service personnel.

Check the following before you begin the inspections.
- The processor is turned off.
- The processor is installed in a stable and level location.
- The water bottle is prepared appropriately and connected properly.
- The scope is connected properly.
- The keyboard is connected properly.

⚠ WARNING

Be sure to supply power to the processor and peripheral devices from the SAT-1300 isolation transformer specified by PENTAX or another medical isolation transformer.

Power and Lamp Inspection

1 **Turn on the monitor and peripheral devices.**

2 **Press ⊚ to turn on the processor and make sure the ⊚ LED lights green.**

- The touch panel lights after approximately 1 minute.
- Make sure two or three bars of the LIFE indicator (lamp life indicator) on the touch panel are lit green.
- If pressing ⊚ does not turn on the processor, check the fuses.
  ☞"Replacing the Fuses" (P.47)

⚠ CAUTION

The lamp life is 400 hours. Check the LIFE indicator (lamp life indicator) on the touch panel before you use the processor. Replace the lamp cartridge if one bar of the LIFE indicator lights red and the [Please replace the lamp] message appears on the monitor.
☞"Replacing the Lamp Cartridge" (P.45)

3 **Press (LAMP).**

4 **Make sure the processor main lamp and (LAMP) LED light and the distal end of the scope emits light.**

⚠ WARNING

Do not look directly at light emitted from the distal end of the scope.

NOTE

If lamp fails to ignite, do not attempt to perform an endoscopic examination, contact your PENTAX service facility.

Automatic Brightness Control Inspection

Check the video images from the scope on the monitor while the lamp is lit.

1 **Bring the distal end of the scope to about 1 cm from the palm of your hand and then slowly move it away until it is about 5 cm from your hand while making sure the brightness of your hand displayed on the monitor is uniform. (Refer to Figure 3.1.)**
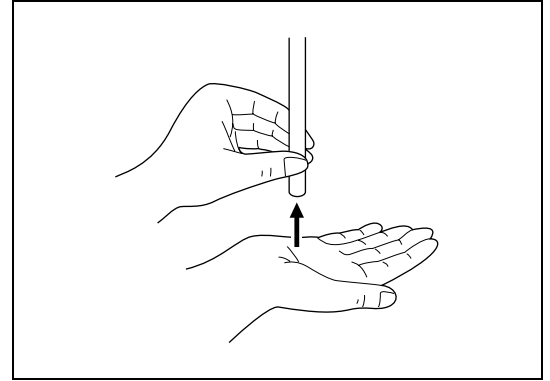
Figure 3.1

3

Scope Control Button Inspection

1 **Press each button on the control body of the endoscope and make sure a confirmation tone sounds. (Refer to Figure 3.2.)**

• For details on each of the buttons on the control body of the endoscope, refer to the instruction manual for the scope.
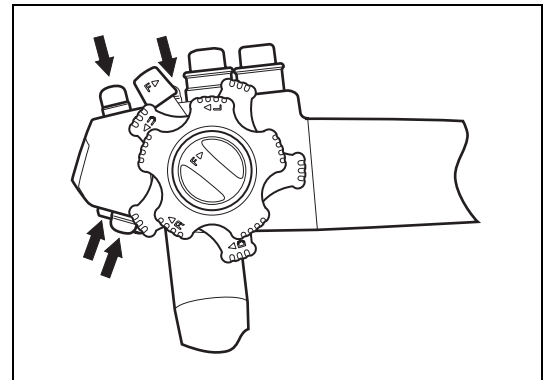
Figure 3.2

Exposure and Measurement Inspection

1 **Press [EXPOSURE CONTROL] on the touch panel and select [MANUAL].**

• The selected item lights green. Each press switches the item between [AUTO] and [MANUAL].

2 **Press [∨][∧] of [Brightness] and make sure the indication of the indicator changes.**

3 **Press [EXPOSURE CONTROL] and select [AUTO].**

• The selected item lights green. Each press switches the item between [AUTO] and [MANUAL].
• Selection is not possible when a scope is not connected.

4 **Press [MODE] and select [AVE] or [PEAK].**

• The selected item lights green. Each press switches the item between [AVE] and [PEAK].
• Selection is not possible when a scope is not connected.

Color Tone Inspection

1 **Adjust the white balance before you inspect the color tones.**

☞"WHITE BALANCE Switch" (P.23)

2 **Gently place a hand around the distal end of the scope and make sure the color tones of your hand displayed on the monitor are natural. (Refer to Figure 3.3.)**
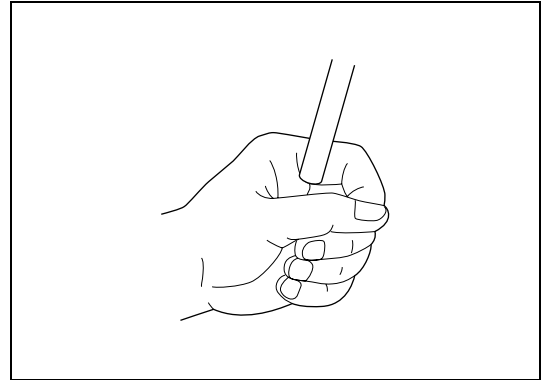
Figure 3.3

3 **Press ⌄⌃ for each of [BLUE] and [RED] of [Color Balance] and make sure the indications of the indicators and the color tones of your hand displayed on the monitor change.**

Suction Inspection

1 **Fully press the suction control valve of the scope and make sure water is sucked through the distal end of the scope. (Refer to Figure 3.4.)**

• Perform this operation on an endoscope with an instrument channel.

Suction
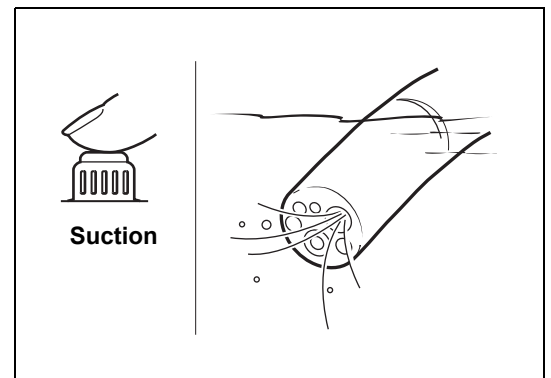
Figure 3.4

Air/Water Supply Inspection

1 **Press ⊙(PUMP) on the operation panel and make sure the ⊙(PUMP) LED lights and you can hear the pump operating.**

2 **Press ⌄⌃ of [Air Flow] on the touch panel and make sure the strength of the air flow changes accordingly.**

3 **Place a finger on the opening on the air/water supply button of the scope and make sure air flows from the distal end of the scope.**
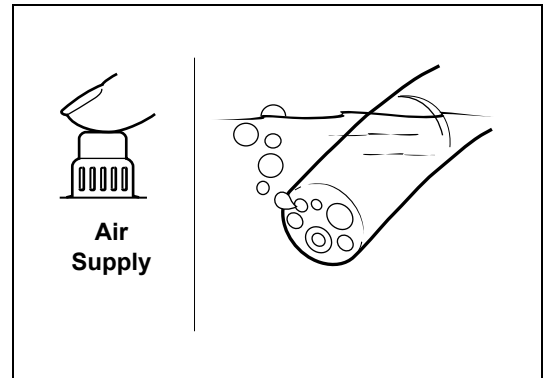
Air Supply

4 **Fully press the air/water supply button of the scope and make sure water comes out of the distal end of the scope.**

Water Supply
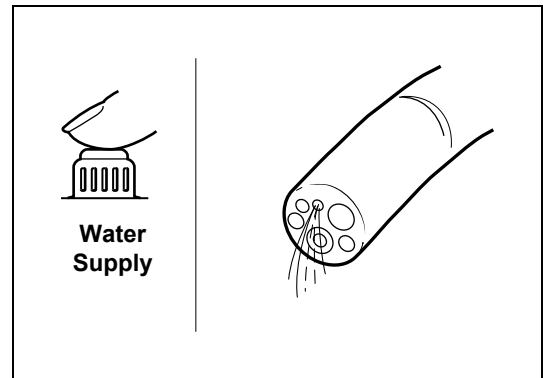
⚠ CAUTION

Only perform an endoscopic examination if all the inspection items are working properly. If any of the above functions is not working properly or you feel there is an abnormality, stop using the scope immediately and contact our service personnel.

4 Operating Procedure

Turning On/Off the Processor

1 **Press ⊚ on the front of the processor. (Refer to Figure 4.1.)**

- The processor turns on, the touch panel lights, and the screen for normal mode appears on the monitor.
  ☞"Normal Screen" (P.21)
- The patient information and user information displayed immediately prior to turning off the processor last time appear on the monitor.

2 **Press ⊚ again to turn off the processor.**
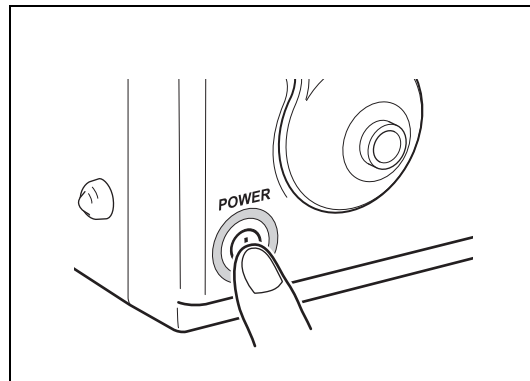
Figure 4.1

⚠ CAUTION

- After the processor has been turned off, wait at least 30 seconds before turning it back on again. A fuse may be blown if you turn the power on and off repeatedly within a short period of time.
  ☞"Replacing the Fuses" (P.47)
- Do not use a sharp object such as the tip of a pen to press the buttons and touch panel on the operation panel.
- Do not use the end of the light guide of the scope to operate the buttons or the touch panel.

Monitor Screens

■ Normal Screen

The normal screen shown below appears on the monitor when you turn on the processor.
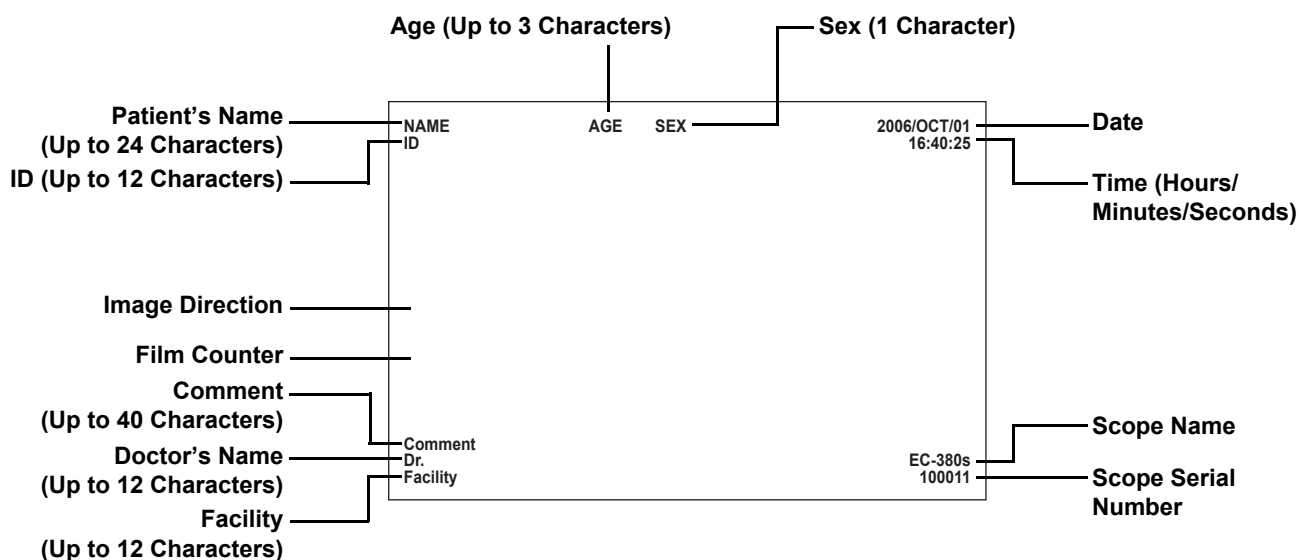
■ Freeze Screen

While frozen, the scope video is displayed in a sub-screen on the monitor.
The [Date] and [Time] are hidden when the sub-screen is displayed.
(When the sub-screen is positioned on the top right.)
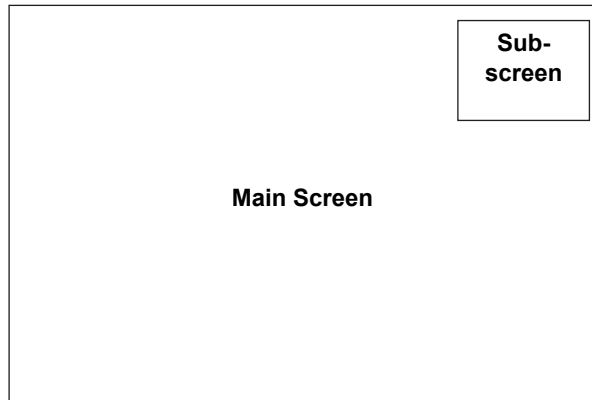
Operation Panel and Touch Panel Operations

⚠ CAUTION

- Do not use a sharp object such as the tip of a pen to press the switches and touch panel on the operation panel.
- Do not use the end of the light guide of the scope to operate the buttons or the touch panel.

(LAMP) LAMP Switch

1   Press (LAMP).

- The processor main lamp and (LAMP) LED light green. When the main lamp lights, the distal end of the scope connected to the processor emits light.
- If the lamp does not light, the auxiliary lamp lights and the (LAMP) LED flashes green.

NOTE

- About the lamp life:
  The lamp life is 400 hours. Check the LIFE indicator (lamp life indicator) on the touch panel before you use the processor. Replace the lamp cartridge if one bar of the LIFE indicator lights red and the [Please replace the lamp] message appears on the monitor.
  ☞"Replacing the Lamp Cartridge" (P.45)
- If the lamp does not light:
  If the main lamp does not light even if you press (LAMP), check the LIFE indicator on the touch panel. If one bar is lit red, perform the procedure in "Replacing the Lamp Cartridge" (P.45). If two or three bars are lit green, the lamp or lamp cartridge is broken.
  ☞"Troubleshooting" (P.48)
- To turn off the lamp:
  After use, be sure to press (LAMP) to turn the main lamp off.

(PUMP) PUMP Switch

1   Press (PUMP).

- The (PUMP) LED lights and the air/water pump starts. Press the switch again to stop the pump.
- You can use ⌄ ⌃ of [Air Flow] on the touch panel to set the volume of the air flow for the pump.
  ☞"Air Flow Buttons" (P.25)

(WHITE BALANCE) WHITE BALANCE Switch

Adjust the white balance each time you turn on the processor or connect a scope to the processor. You can also adjust it whenever you feel that it needs to be adjusted.

1   Connect the scope to the processor, turn on the processor, and set the exposure control method to [AUTO].

2   Press (LAMP) to emit light from the distal end of the scope.

3   Insert the distal end of the scope into the supplied white balance adjuster and position it so that the image of the circle at the bottom of the adjuster fills the monitor. (Refer to Figure 4.2.)
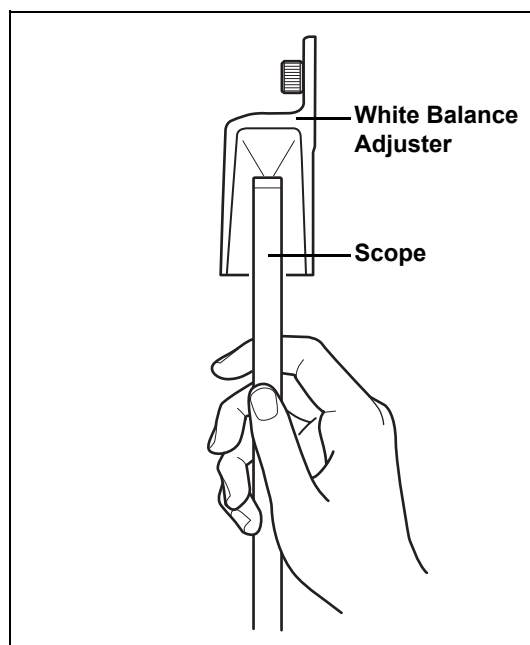

White Balance Adjuster

Scope

Figure 4.2

4 **Fix the distal end of the scope in place and press** (WHITE BALANCE) **for at least 2 seconds.**

- The white balance is adjusted. After the white balance is set, [White Balance OK!] appears on the monitor for about 5 seconds.
- If adjustment of the white balance fails, [W/B Failed! Please Retry] appears on the monitor. Try adjusting the white balance again.

Normal Screen　　　　　**Circle at the Bottom of the Adjuster**
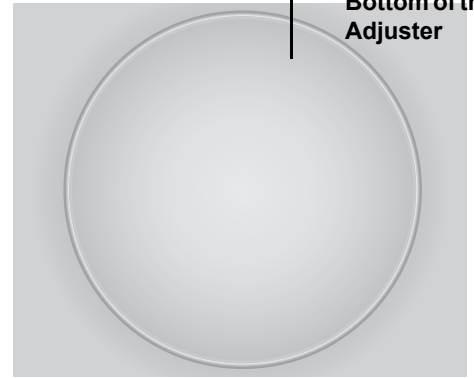
EXPOSURE CONTROL Exposure Control Button

You can select from two exposure control methods for adjusting the brightness of images appearing on the monitor.
[AUTO]:　　The brightness set with ∨ ∧ of [Brightness] is automatically adjusted so that it is uniform across the monitor. Selection is possible when a scope is connected.
[MANUAL]: The brightness set with ∨ ∧ of [Brightness] is displayed as is without any adjustments being made.

1 **Press** EXPOSURE CONTROL **repeatedly and select a setting.**

- Each press switches the item between [AUTO] and [MANUAL].
- The selected item lights green.
- When changing the brightness, press ∨ or ∧ of [Brightness] to set a level.

MODE Measuring Method Button

If the exposure control method is set to [AUTO], you can select from two measuring methods.
[AVE]: Control exposure based on the average brightness value for the whole screen.
[PEAK]: Control exposure based on the maximum brightness value for the screen.

1 **Set the exposure control method to [AUTO] and then press** MODE **repeatedly and select a setting.**

- Each press switches the item between [AVE] and [PEAK].
- The selected item lights green.

⚙ XLUM On/Off Button

Use this button when you want to know the position of the distal end of the scope from outside of the body. When set to on, the light intensity of the scope is set to maximum and you can confirm the position of the distal end of the scope from outside the body.

1 **Press** ⚙ **.**

- When turned on, ⚙ lights green and the [Brightness] indicator indicates the maximum value.
- Press the button again to turn it off.

⚠ **CAUTION**

Normally, do not use the XLUM On function.

⌄ ⌃ Brightness Buttons

You can manually adjust the brightness of images appearing on the monitor.

1 Press ⌄ or ⌃ of [Brightness].

- Each press of ⌄ or ⌃ decreases or increases the brightness. Each press of ⌄ decreases the brightness by one step and each press of ⌃ increases the brightness by one step.
- When you adjust the brightness, the level is indicated on the indicator and the value is displayed on the monitor. Note that the standard value is 0 when you make adjustments.

⌄ ⌃ Color Balance Buttons

You can manually adjust the color tones of images appearing on the monitor.

1 Press ⌄ or ⌃ of [BLUE] and ⌄ or ⌃ of [RED].

- Each press of ⌄ or ⌃ decreases or increases the color tone.
- When you adjust a color tone, the level is indicated on the indicator and the value is displayed on the monitor. Note that the standard value is 0 when you make adjustments.

NOTE

> The measuring method, brightness, and color balance settings are stored in memory even if you turn off the processor.
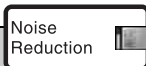
⌄ ⌃ Air Flow Buttons

These buttons set the strength of the air and water supply for the pump.

1 Press ⌄ or ⌃ of [Air Flow].

- When you set the air flow, the level and value are indicated as one of five steps on the indicator.

NOTE

> The air flow setting is reset to "+1" when the processor is turned off.

Noise Reduction Customize Buttons

These buttons set the functions that are assigned to them. Depending on the functions registered, you can change a setting by just pressing a customize button repeatedly or you can display a setting screen by just pressing a customize button.
You can change the function assigned to a customize button with [Customize button settings] of [Option] in the [Set up] menu.
☞"Customize button settings" (P.31)

1 Press the desired customize button.

- The setting changes or the setting screen appears.
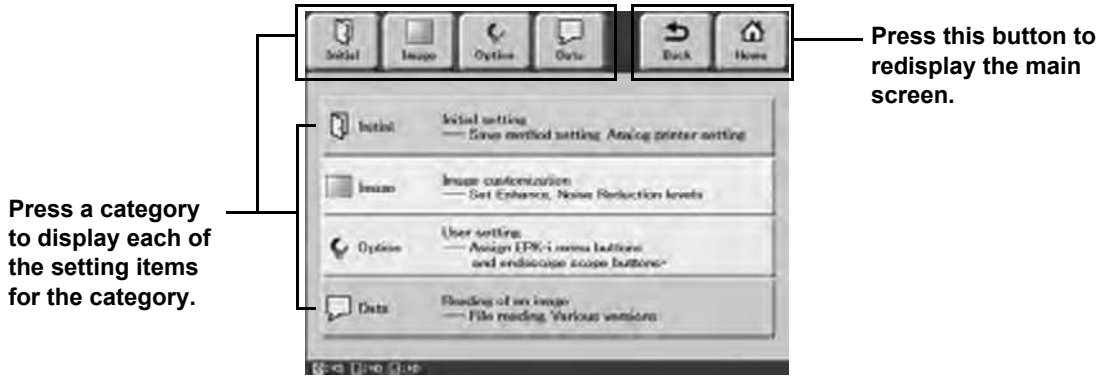
Set up ↻ Set up Button

This button displays the [Set up] menu for configuring the settings of [Initial], [Image], [Option], and [Data].

1 Press [Set up].

- The Set up menu appears.
  ☞"Set Up Menu Operations" (P.26)

Set Up Menu Operations

Press [Set up] on the touch panel to display the Set up menu.

Press a category to display each of the setting items for the category.

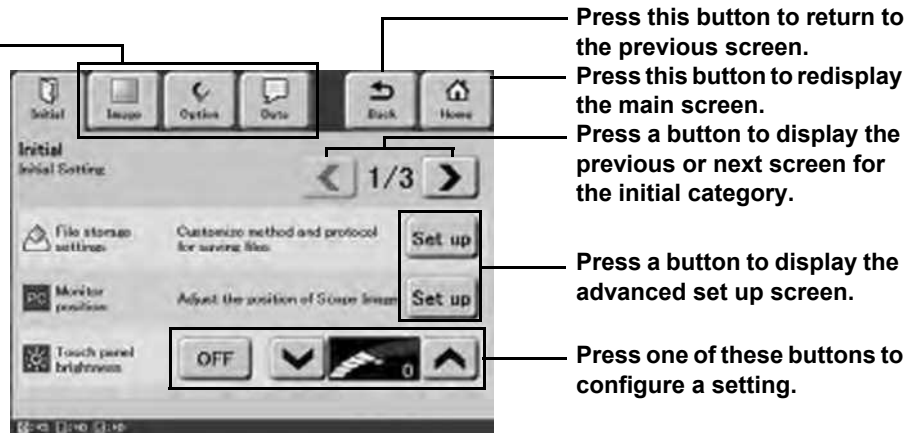Press this button to redisplay the main screen.

The Set up menu includes the following categories.

Initial: Enables you to configure settings related to saving endoscopic images and settings related to the processor main unit and peripheral devices such as the monitor and printer. Be sure to verify the settings before using the processor for the first time.
Image: Enables you to configure the settings of image processing performed for endoscopic images.
Option: Enables you to configure the settings for the customize buttons, scope buttons, and foot switches, as well as other settings related to device functions.
Data: Enables you to display saved endoscopic images.

Initial Category

Press [Initial] to display the following screens. There are three screens for the initial category.

Press these buttons to display each of the categories.

Press this button to return to the previous screen.
Press this button to redisplay the main screen.
Press a button to display the previous or next screen for the initial category.

Press a button to display the advanced set up screen.

Press one of these buttons to configure a setting.

■ File storage settings

Configure settings related to saving endoscopic images.

1   Press [Set up] of [File storage settings].

- The File storage settings screen appears.

2   Configure and verify each of the following items.

Select a drive (Device3/Device4)
Select the device to save endoscopic images.
Select a USB flash memory device connected to the SERIAL OUT on the rear panel. If the USB flash memory was connected after the processor was turned on, touch [Refresh]. The connected device appears.

Folder Name and File Name (Name/ID/Date)
- Select from [Name], [ID], and [Date] for the names of the folders to save endoscopic images.
- Select from [Name], [ID], and [Date] for the names of the endoscopic image files to save.

Alert Disk Size
Specify a value for the remaining free space alert of the disk for storing data. Use the numeric keypad of the touch panel to specify a value.

Select data type to save
Specify one of three data types to save for endoscopic images, and set whether to add patient information and whether to stop the external input image when in freeze mode.

- Save endoscopic image only: Saves only an endoscopic image.
- Save images as separate file: Saves an endoscopic image and external input image as separate files.
- Save images as one file: Saves an endoscopic image and external input image as one file.

Press [Toggle] to specify the data type to save.
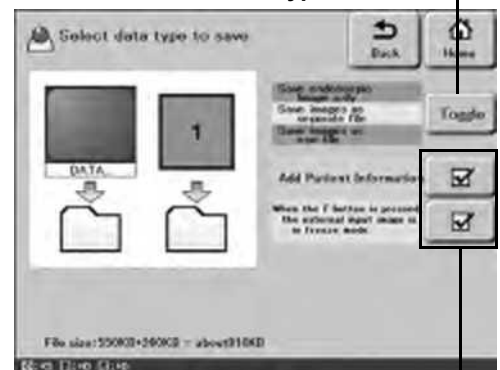
Press a checkbox to add/ remove a checkmark.

File format (.bmp/.jpeg (Low compression)/.jpeg (High compression))
Specify the file format and compression ratio for when endoscopic images are saved.

■ Monitor position

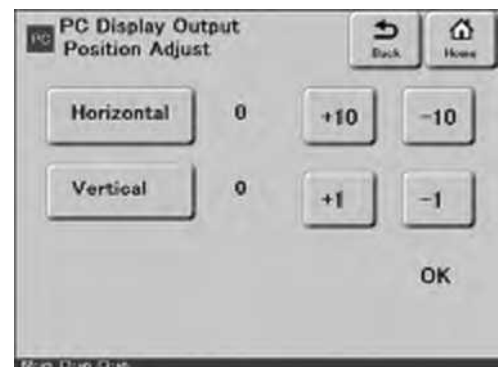Adjust the output position for the monitor.

1   Press [Set up] of [Monitor position].

- The PC Display Output Position Adjust screen appears.

2   Press [Horizontal] or [Vertical].

- The direction button for adjusting the position lights yellow.

3   Use [+10], [–10], [+1], and [–1] to adjust the position.

■ Touch panel brightness

Adjust the brightness of the touch panel.

1 **Press ⌄ ⌃.**

- The brightness of the touch panel changes and the brightness level is indicated by the indicator.
- If you press [OFF], the touch panel turns off. When the touch panel is turned off, press any place on the touch panel to turn it back on.
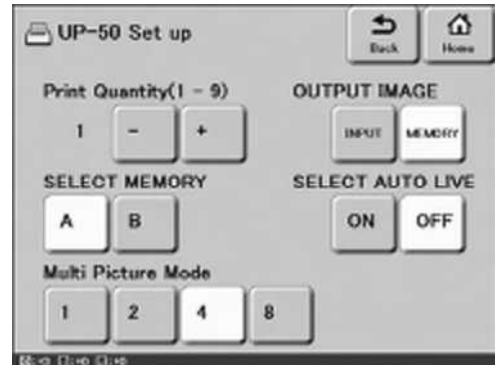
■ Printer setting

Set up the UP-50 video printer. For details on the settings, refer to the instruction manual for the printer.

1 **Press [Set up] of [Printer setting].**

- The UP-50 Set up screen appears.

2 **Configure and verify each item.**

⚠ CAUTION

The printer setting is not enabled until you set [RS232C Connection] of [Initial] to [Printer].

■ Selection of the DVI or VGA

Set the output method of the monitor connected to the DVI output connector.

1 **Press [DVI] or [VGA].**

■ RS232C Connection

Change the RS232C connection.

1 **Press one of [OFF], [Endonet], [IMS], and [Printer].**

■ iPRO

Set whether to use an iPRO series network camera.

1 **Press [OFF] or [ON].**

■ Factory Shipment Reset

Return all settings to their initial values.
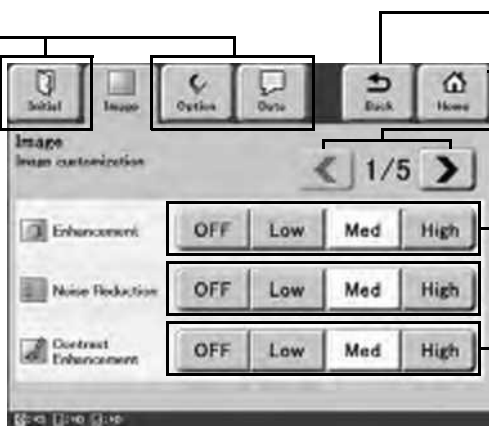
1 **Press [RESET].**

- A confirmation message appears.

2 **Press [Yes].**

Image Category

Press [Image] to display the following screens. There are five screens for the image category.

Press these buttons to display each of the categories.

Press this button to return to the previous screen.

Press this button to redisplay the main screen.

Press a button to display the previous or next screen for the image category.

Press one of these buttons to configure a setting.

■ Enhancement

Configure the edge enhancement setting.

1 **Press one of [OFF], [Low], [Med], and [High].**

• If no scope is connected to the processor, the [Please connect endoscope] message is displayed.

■ Noise Reduction

Configure the noise reduction level.

1 **Press one of [OFF], [Low], [Med], and [High].**

■Contrast Enhancement

Configure the contrast enhancement level.

1 **Press one of [OFF], [Low], [Med], and [High].**

■Surface Enhancement

Configure the surface enhancement level.

1 **Press one of [OFF], [Low], [Med], and [High].**

■Freeze Set Up (k series)

Select the freeze level for a K-series endoscope.
[Frame Freeze]:　Captures still images of even higher resolution.
[Field Freeze]:　　Captures even stabler still images.

1 **Press [Frame Freeze] or [Field Freeze].**

■Freeze Set Up (i series)

Select the freeze level for an i-series endoscope.
[Field Freeze]:　　Captures even stabler still images
[HD Freeze]:　　　Captures still images of even higher resolution.

1 **Press [Field Freeze] or [HD Freeze].**

■Zoom

Set the zoom for endoscopic images displayed on the monitor.

1 **Press [Set Up] of [Zoom].**

  • The Zoom setting screen appears.

2 **Press [k series] or [i series] to select the scope.**

3 **Press a zoom magnification button to set the magnification.**

  • Press [Wide] or [Tele] repeatedly to increase or reduce the magnification.
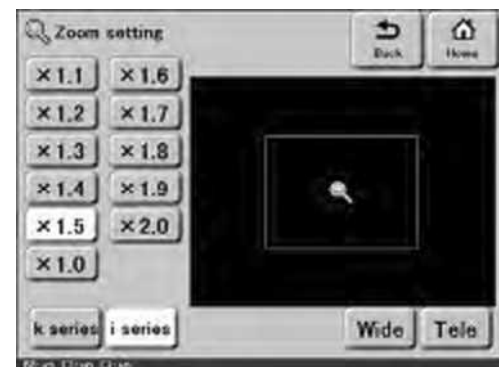
■Sub screen position

Set the position for displaying the sub-screen on the monitor.

1 **Press one of [upper right], [lower right], [upper left], and [lower left].**
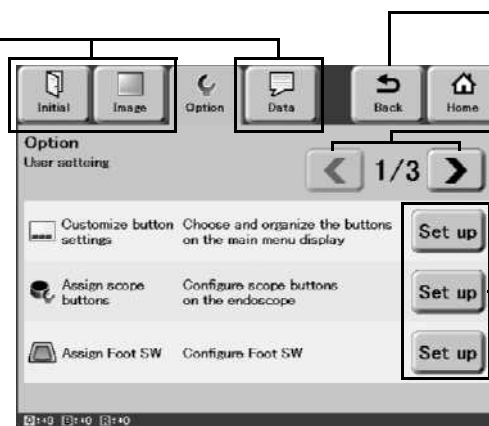
■Sub screen position (side)

Set the position for displaying the sub-screen on the side monitor.

1 **Press one of [upper right], [lower right], [upper left], and [lower left].**

Option Category

Press [Option] to display the following screens. There are three screens for the option category.

Press these buttons to display each of the categories.

Press this button to return to the previous screen.

Press this button to redisplay the main screen.

Press a button to display the previous or next screen for the option category.

Press a button to display the advanced set up screen and configure the settings.

Customize button settings	Choose and organize the buttons on the main menu display	Set up
Assign scope buttons	Configure scope buttons on the endoscope	Set up
Assign Foot SW	Configure Foot SW	Set up

Option — User setting 1/3

Option — User setting 2/3

Scope Enhancement	OFF	ON
DV Control	DV is not Connectted	
Film Counter Reset	Reset the Film Counter	RESET

Option — User setting 3/3

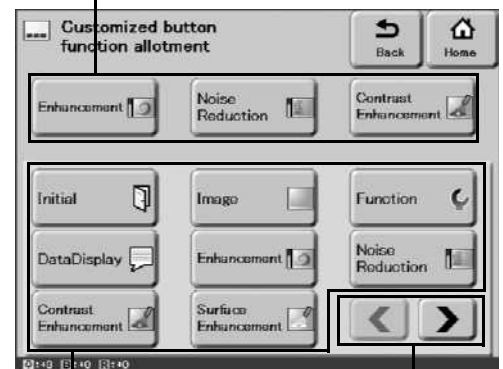|		
Character display	OFF	ON

■ Customize button settings

Assign functions to the customize buttons (three buttons at the bottom of the main screen).

1 Press [Set up] of [Customize button settings].

- The Customized button function allotment screen appears.
- You can also press 〈 〉 to display the other functions you can assign.

2 Press the customize button to which you want to assign a function.

- The selected customize button lights yellow.

3 Press the button of the function to assign.

- The name of the selected function appears on the customize button.

Customize buttons
The assigned functions are indicated.

Customized button function allotment

Enhancement	Noise Reduction	Contrast Enhancement

|		
Initial	Image	Function
DataDisplay	Enhancement	Noise Reduction
Contrast Enhancement	Surface Enhancement	〈 〉

Functions you can assign.

Use these buttons to display the other functions you can assign.

■Assign scope buttons

Assign functions to the scope buttons.

1 **Press [Set up] of [Assign scope buttons].**

- The Assign scope buttons screen appears.

2 **Press the scope button to which you want to assign a function.**

- The tab of the selected scope button moves to the front and the functions you can assign are displayed.
- You can also press [<] [>] to display the other functions you can assign.

3 **Press the button of the function to assign.**

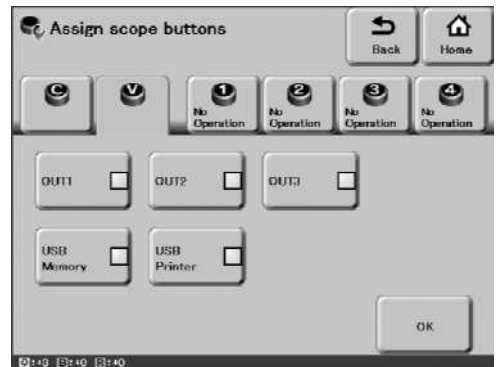- The name of the selected function appears on the scope button.

Configure advanced settings for the [Copy] function.

Configure advanced settings for the [VTR] function.

Scope buttons
The assigned functions are indicated.
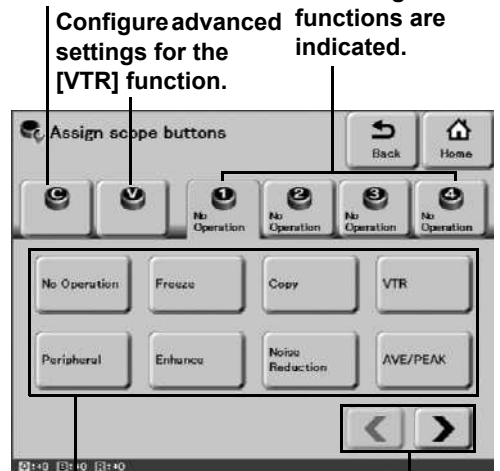
Functions you can assign. **Use these buttons to display the other functions you can assign.**

4 **If you set [Copy] or [VTR], use [C] or [V] to configure the advanced settings. After you finish the settings, press [OK].**

- [USB Memory] and [USB Printer] cannot be set at the same time.

■Assign Foot SW

Assign functions to the foot switches.

1 **Press [Set up] of [Assign Foot SW].**

- The Foot switch screen appears.

2 **Press the foot switch to which you want to assign a function.**

- The tab of the selected foot switch moves to the front and the functions you can assign are displayed.
- You can also press [<] [>] to display the other functions you can assign.

3 **Press the button of the function to assign.**

- The name of the selected function appears on the foot switch.

Foot switches
The assigned functions are indicated.

Functions you can assign. **Use these buttons to display the other functions you can assign.**

■ Scope Enhancement

Set whether to use scope enhancement or processor enhancement.
    [ON]:   Processor enhancement is used.
    [OFF]: Scope enhancement is used.

1   **Press [ON] or [OFF].**

⚠ CAUTION

An i-series endoscope only uses processor enhancement.

■ DV Control

Save video to DV equipment.

1   **Press [REC].**

- Recording to DV equipment starts. The scope video is recorded to DV equipment.

2   **Press [STOP].**

- Recording is paused.

■ Film Counter Reset

Reset the film counter.

1   **Press [RESET].**

- The film counter indication on the monitor changes to [1].
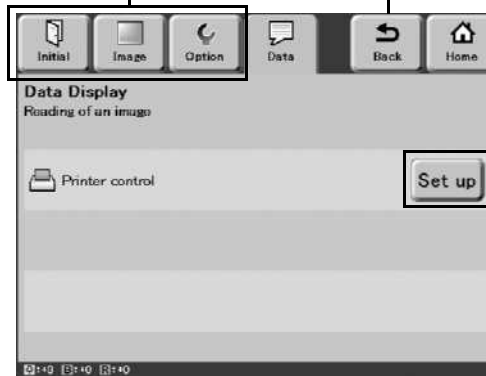
■ Character Display

Select [ON] to show the character display and [OFF] to hide the character display.

1   **Press [ON] or [OFF].**

4

Data Category

Press [Data] to display the following screens.

Press these buttons to display each of the categories.

Press this button to return to the previous screen.

Press this button to redisplay the main screen.

Press a button to display the set up screen.

■ Printer control

Operate the printer while verifying the image to print. Video needs to be being input via the VIDEO IN connector.
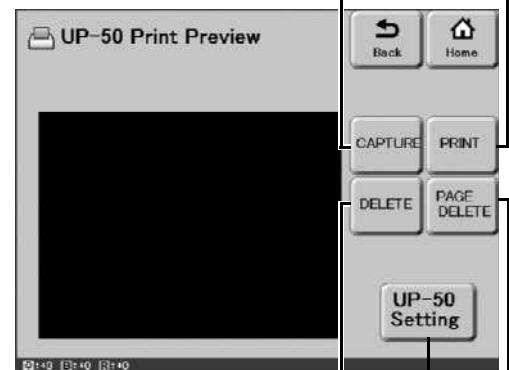
1 **Press [Set up] of [Printer control].**

• The UP-50 Print Preview screen appears.

2 **Perform the desired operation while verifying the image to print.**

Press this button to print the displayed image.
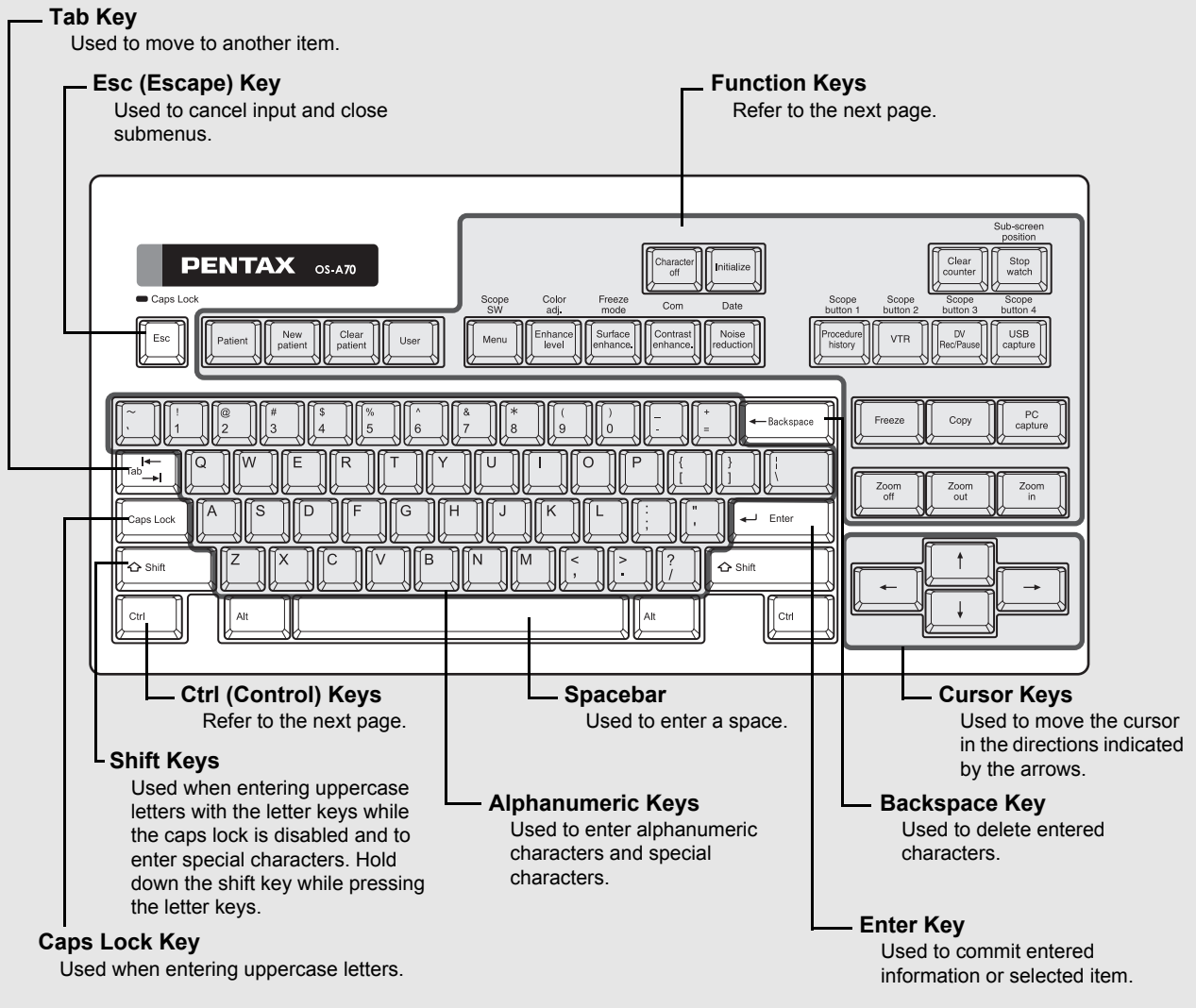
Press this button to capture the image.

Press this button to delete the displayed image.

Press this button to configure the settings of the UP-50 image printer.

Press this button to delete by page.

Keyboard Operations
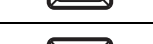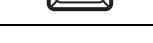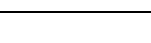
■Key Assignment

Tab Key
Used to move to another item.

Esc (Escape) Key
Used to cancel input and close submenus.

Function Keys
Refer to the next page.

Ctrl (Control) Keys
Refer to the next page.

Spacebar
Used to enter a space.

Cursor Keys
Used to move the cursor in the directions indicated by the arrows.

Shift Keys
Used when entering uppercase letters with the letter keys while the caps lock is disabled and to enter special characters. Hold down the shift key while pressing the letter keys.

Alphanumeric Keys
Used to enter alphanumeric characters and special characters.

Backspace Key
Used to delete entered characters.

Caps Lock Key
Used when entering uppercase letters.

Enter Key
Used to commit entered information or selected item.

■ Function Key Operations

The following list shows the functions assigned to the function keys of the keyboard designed specifically for use with the processor.

Pentax Keyboard OS-A70	Commercially available Keyboard	Key Name	Function Outline
Patient	F1	[Patient] key	Display the patient list.
New patient	F2	[New patient] key	Register new patient data.
Clear patient	F3	[Clear patient] key	Clear patient data.
User	F4	[User] key	Display the user list.
Menu	F10	[Menu] key	Display the configuration screen.
Enhance level	—	[Enhance level] key	Set the screen enhancement.
Noise reduction	—	[Noise reduction] key	Change the noise reduction setting.
Surface enhance.	—	[Surface] key	Change the surface setting.
Contrast enhance.	—	[Contrast] key	Change the contrast setting.
Character off	—	[Character off] key	Show/hide the text information items.
Procedure history	—	[Procedure history] key	Save the procedure history (to a compact flash card).
Initialize	—	[Initialize] key	Initialize the settings.
Clear counter	—	[Clear counter] key	Reset the film counter.
Stop watch	—	[Stop watch] key	Operate the stop watch.
Ctrl + Procedure history	—	[Scope button 1] key	Activate the function assigned to scope button 1.
Ctrl + VTR	—	[Scope button 2] key	Activate the function assigned to scope button 2.
Ctrl + DV Rec/Pause	—	[Scope button 3] key	Activate the function assigned to scope button 3.
Ctrl + USB capture	—	[Scope button 4] key	Activate the function assigned to scope button 4.
DV Rec/Pause	Ctrl + V	[Digital video Rec / Pause] key	Save the video (DV equipment).

4

Pentax Keyboard OS-A70	Commercially available Keyboard	Key Name	Function Outline
[Freeze]	[Ctrl] + [F]	[Freeze] key	Switch between freeze mode and video mode.
[PC capture]	—	[PC capture] key	Output the image to a PC.
[Zoom out]	—	[Zoom out] key	Zoom out.
[Zoom in]	—	[Zoom in] key	Zoom in.
[Zoom off]	—	[Zoom off] key	Disables zoom.
[Ctrl] + [Menu]	—	[Scope SW] key	Assign a function to the scope button.
[Ctrl] + [Contrast enhance.]	—	[Freeze mode] key	Set freeze mode.
[Ctrl] + [Noise reduction]	—	[Date] key	Set date and time.

4

Configuration Screen Operations

Press the [Menu] key on the keyboard to display the configuration screen on the monitor.
The configuration screen contains the [Patient List Preset] tab, [User List Preset] tab, and [Setup] tab. This section describes the functions you can configure in the configuration screen.

1 Position the cursor on a tab and use the [←][→] keys to select a tab.

2 Use the [↑] or [↓] key to select a setting of a menu and press the [→] key.

- How to configure a setting depends on the setting. Some settings require pressing the [←] or [→] key repeatedly to change the value and some settings require advanced settings to be configured on a sub-screen.

3 Press the [Enter] key or [Esc] key.

- Press the [Enter] key to return to the normal screen where any changes to the settings are reflected.
- Press the [Esc] key to return to the normal screen where any changes to the settings are not reflected.

[Patient List Preset] Tab   **[Setup] Tab**
[User List Preset] Tab

```
Patient List Preset
No Name                    ID          Age Sex
 1
 2
 3
 4
 5
 6
 7
 8
 9
10
                               Page Change 1/3
Right:select
Up/Down:select                          Esc:end
```
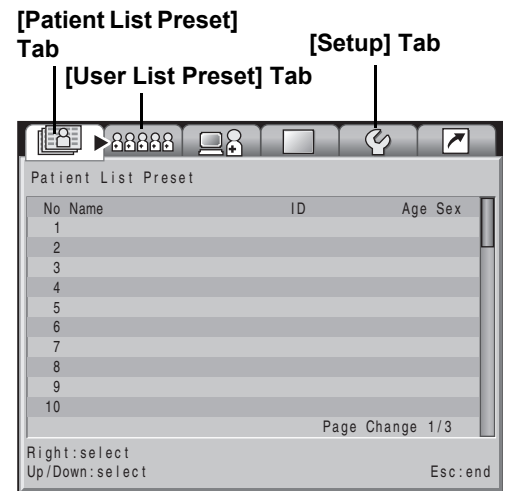
4

Operations in the [Patient List Preset] Tab

▐ Registering New and Editing Existing Patient Data

Display the patient list. Then, register new patient data or edit registered patient data. You can register the following patient data items: [Name], [ID], [Age], [Sex], and [Comment].

1 In the configuration screen, use the [←][→] keys to select the [Patient List Preset] tab.

- The [Patient List Preset] screen (registration numbers 1 to 10) appears.

2 Use the [↑][↓] keys to select a patient. To register a new patient, select a number with no patient registered. To edit existing patient data, select the corresponding patient.

- To change the page of the patient list, use the [↓] key to align the cursor with [Page Change */*] and then press [←] or [→].
- Press the [DEL] key to delete the selected patient from the patient list.

[Patient List Preset] Screen

```
Patient List Preset
No Name                    ID          Age Sex
 1
 2
 3
 4
 5                                          ▶
 6
 7
 8
 9
10
                               Page Change 1/3
Right:edit                          Delete:delete
Up/Down:select               Enter:OK Esc:end
```

3 Press the [→] key.

- The [New Patient Data] screen or the [Patient Data Edit] screen of the selected patient appears.
- You can use the following procedure to enter and change data in the [New Patient Data] screen or [Patient Data Edit] screen. Be sure to enter a name in the [Name] field.

  ① Use the [↑][↓] keys to select an item.

  ② Use the alphanumeric keys to enter or change data.

  ③ Press the [Enter] key or [Esc] key. The [Patient List Preset] screen reappears.
  Press the [Enter] key to reflect any data entered and changes made and press the [Esc] key to discard any data entered and changes made.

[New Patient Data] Screen

```
Patient List Preset
  Patient Data Edit
  Name    _
  ID
  Age
  Sex
  Comment
Right/Left:select   BackSpace:backSpace Delete:delete
Up/Down:select                    Enter:OK Esc:Cancel
```

4 To enter or change data for another patient, use the [↑][↓] keys to select a patient and repeat Step 3.

5 Press the [Enter] key or [Esc] key.

- Press the [Enter] key to return to the normal screen where the information of the patient selected in the [Patient List Preset] screen is displayed.
- Press the [Esc] key to return to the normal screen displayed prior to the [Patient List Preset] screen.

⚠ CAUTION

If the capture function is enabled, do not use any special symbols such as the ones below for [Name] and [ID].
Examples of symbols not to use: / , * ? " < >

▉ Deleting Patient Data

Press the [DEL] key while the [Patient List Preset] screen is displayed to delete the data for those patients. Each press of the [DEL] key while the normal screen or [Patient Data Edit] screen is displayed deletes one character of the selected item.

1 Press the [DEL] key.

- A confirmation message for deleting the data appears.

Screen Displayed	When [Yes] is Selected	When [No] is Selected
[Patient List Preset] Screen	The displayed patient data is deleted.	The registered data is retained.
[Patient Data Edit] Screen		
Normal Screen		

2 Use the [↑] or [↓] key to select [Yes] or [No] and press the [Enter] key.

- The normal screen reappears.
- Press the [ESC] key to return to the normal screen without deleting patient data.

[Patient List Preset] Screen

```
Patient List Preset

No Name                ID           Age Sex
 1
 2
 3
 4
 5                                      ▶
 6
 7
 8
 9
10
                          Page Change 1/3
Right:edit                      Delete:delete
Up/Down:select                  Enter:OK Esc:end
```

[Patient Data Edit] Screen

```
Patient List Preset

 Patient Data Edit

  Name    1234567890

  ID      ABCDEFGHI

  Age     55

  Sex     M

  Comment zyxwvutsrqponmlkjihgfedcba

Right/Left:select   BackSpace:backSpace Delete:delete
Up/Down:select                  Enter:OK Esc:Cancel
```
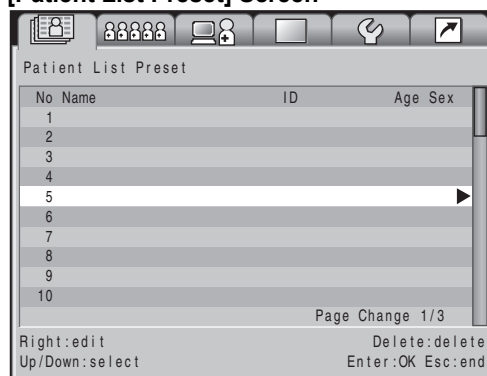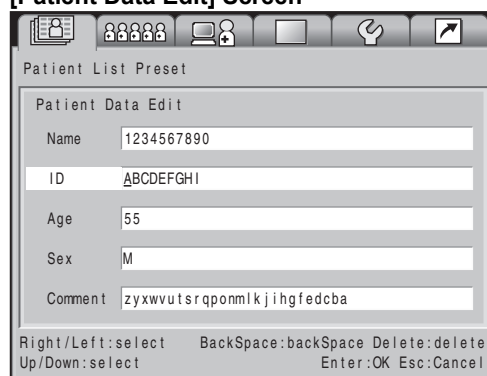
Operations in the [User List Preset] Tab

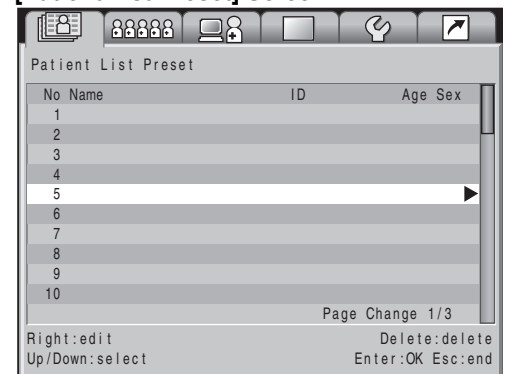### ■ Registering New and Editing Existing User Data

Display the user list. Then, register new user data or edit registered user data. You can register the following user data items: [User Name], [Character Display], [Scope C/V Buttons], [Scope 1/2/3/4 Buttons], and [Foot Switch 1/2 Set].
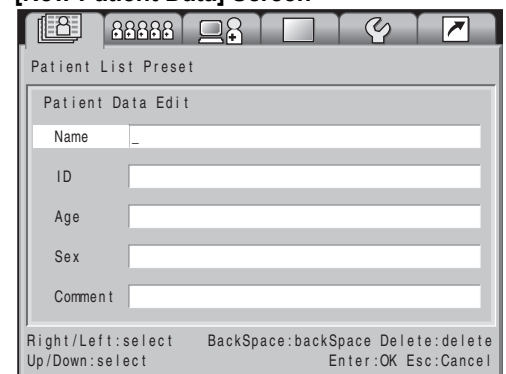
1 **In the configuration screen, use the [←] [→] keys to select the [User List Preset] tab.**

- The [User List Preset] screen (registration numbers 1 to 10) appears.

2 **Use the [↑] or [↓] key to select a user. To register a new user, select [New] or a number with no user registered. To edit existing user data, select the corresponding user.**

- To change the page of the user list, use the [↓] key to align the cursor with [Page Change */*] and then press [←] or [→].
- Press the [DEL] key to delete the selected user from the user list.
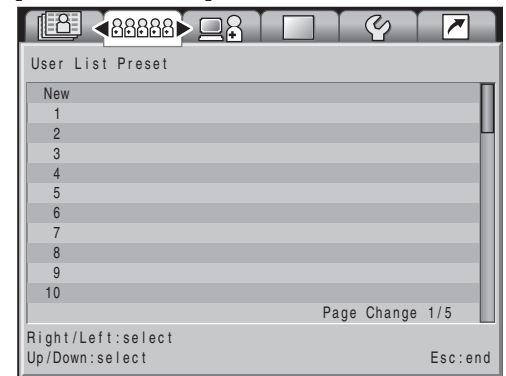
3 **Press the [→] key.**

- The [User List Data Edit] Screen appears.
- You can use the following procedure to enter and change data in the [User List Data Edit] screen.

  ① Use the [↑][↓] keys to select an item.

  ② Press the [→] key. Each of the configuration screens appears.

  ③ Use the alphanumeric keys to enter or change data. Use the [↑][↓][←][→] keys to select and configure more items.

  ④ Press the [Enter] key or [Esc] key. The [User List Preset] screen reappears.
  Press the [Enter] key to reflect any data entered and changes made and press the [Esc] key to discard any data entered and changes made.

[User List Preset] Screen

```
User List Preset
 New
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
                                    Page Change 1/5
Right/Left:select
Up/Down:select                              Esc:end
```

[User List Data Edit] Screen

```
User List Preset
 User List Data Edit
 User Name                                       ▶
 Charactor Display
 Scope C/V Buttons
 Scope 1/2/3/4 Buttons
 Foot Switch 1/2 Set

Right:edit
Up/Down:select                    Enter:OK Esc:Cancel
```
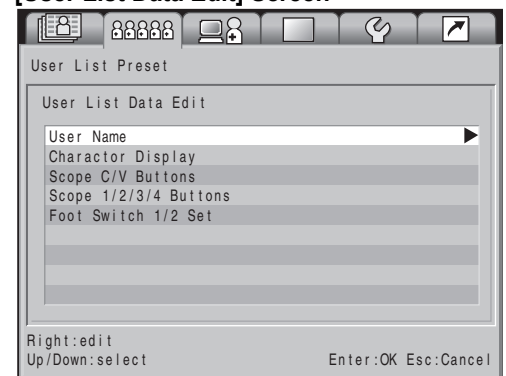
4 **To enter or change data for another user, use the [↑][↓] keys to select a user and repeat Step 3.**

*5* **Press the [Enter] key or [Esc] key.**

- The normal screen reappears.
- Press the [Enter] key to return to the normal screen where the information of the user selected in the [User List Preset] screen is displayed.
- Press the [Esc] key to return to the normal screen displayed prior to the [User List Preset] screen.

■ Settings in the [User List Data Edit] Screen

You can configure the following settings for each user.

[User Name]
Enter the user name.

[Character Display]
Set the items to appear on the monitor. Select [ON] for each of the [Patient Name], [ID], [Age], [Sex], [Dr. Name], [Facility], [Comment], and [Date] items you want to display, and [OFF] for each of the items you do not want to display.

[Scope C/V Buttons]
Configure more advanced settings if the copy and video functions are assigned to scope buttons.

[Scope 1/2/3/4 Buttons]
Assign a function to each of scope buttons 1, 2, 3, and 4.
☞"Assign scope buttons" (P.32)

[Foot Switch 1/2 Set]
Assign a function to each of foot switches 1 and 2.

Settings in the [Setup] Tab

■ Additional Settings for Newly Registered Patient Information

Set whether to register newly registered patient data to the patient list.

1 **In the configuration screen, use the [←] or [→] key to select the [Setup] tab.**

- The [Setup] screen appears.

2 **Use the [↑] or [↓] key to select [Save New Patient Data].**

3 **Press the [→] key.**

- The settings appear.
  [List]: The patient data is reflected in the patient list.
  [Temporary]: The patient data is not reflected in the patient list.

[Setup] Screen

```
[icons] ◀ (🔧) ▶ [↗]
Setup
  Save New Patient Data          List
  Clear All Patient Data
  Clear All User Data
  Facility Name                  Facility




Right/Left:select
Up/Down:select                        Esc:end
```

4 **Use the [↑] or [↓] key to select [List] or [Temporary] and press the [Enter] key.**

- The [Setup] screen reappears.

[Save New Patient Data] Screen

```
[icons]        (🔧)      [↗]
Setup
  Save New Patient Data  ▶  List
  Clear All Patient Data     Temporary
  Clear All User Data
  Facility Name






Up/Down:select              Enter:OK Esc:Cancel
```
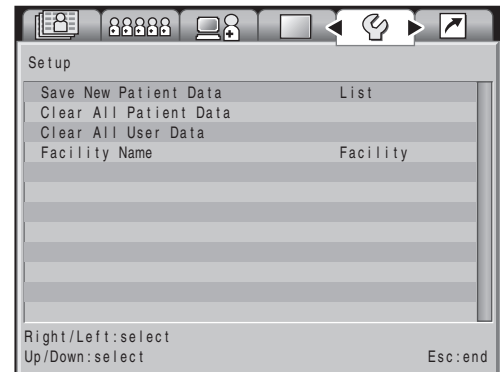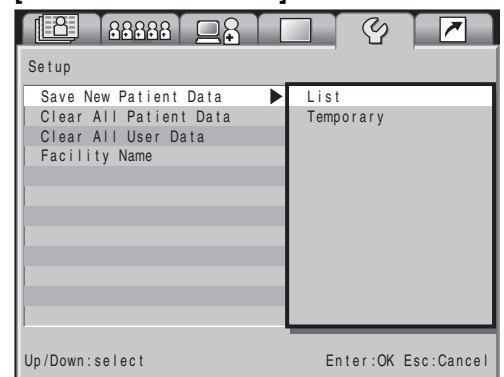
■ Initializing the Patient List

Initialize the patient list.

1 **In the [Setup] screen, use the [↑] or [↓] key to select [Clear All Patient Data].**

2 **Press the [→] key.**

- The screen for selecting to initialize the patient list appears.

3 **Use the [↑] or [↓] key to select [Yes] and press the [Enter] key.**

- A confirmation message appears. Select [Yes] and press the [Enter] key. The [Setup] screen reappears.
- Press the [ESC] key while the screen for selecting to initialize the patient list or the confirmation message is displayed to return to the [Setup] screen without initializing the patient list.

[Clear All Patient Data] Screen

```
[icons]        (🔧)      [↗]
Setup
  Clear All Patient Data






              ( Yes )
              ( No )


Up/Down:select              Enter:OK Esc:Cancel
```

■ Initializing the User List

Initialize the user list.

1 **In the [Setup] screen, use the [↑] or [↓] key to select [Clear All User Data].**

2 **Press the [→] key.**

- The screen for selecting to initialize the user list appears.

3 **Use the [↑] or [↓] key to select [Yes] and press the [Enter] key.**

- A confirmation message appears. Select [Yes] and press the [Enter] key. The [Setup] screen reappears.
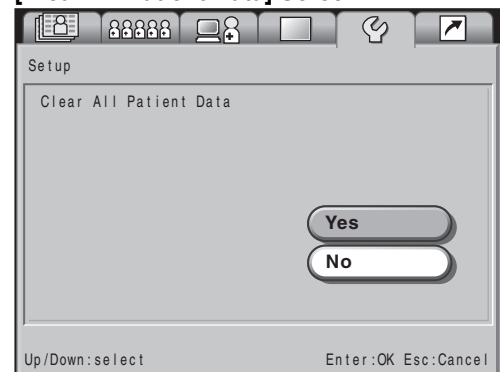- Press the [ESC] key while the screen for selecting to initialize the user list or the confirmation message is displayed to return to the [Setup] screen without initializing the user list.

[Clear All User Data] Screen

Setup

Clear All User Data

Yes

No

Up/Down:select   Enter:OK Esc:Cancel
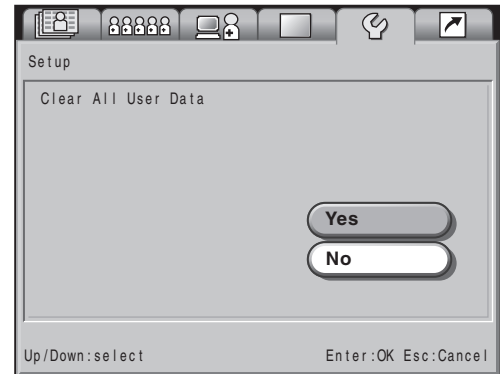
■ Facility Name

Enter the facility name.

1 **In the [Setup] screen, use the [↑] or [↓] key to select [Facility Name].**

2 **Press the [→] key.**

- The screen for entering the facility name appears.

3 **Use the alphanumeric keys to enter the facility name.**

4 **Press the [Enter] key.**

- The [Setup] screen reappears.

[Facility Name] Screen

Setup

Facility Name

PENTAX_

Right/Left:select   BackSpace:backSpace Delete:delete
                                    Enter:OK Esc:Cancel

5 | Maintenance and Storage
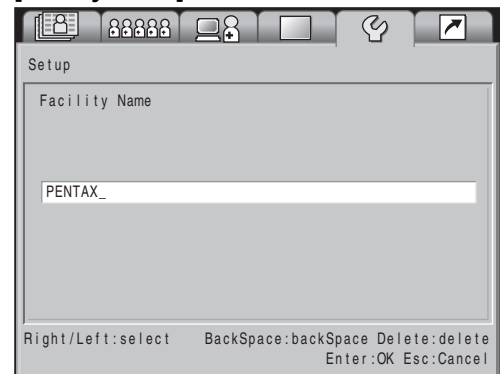
After Use Care and Storage

Follow the procedure below after using the processor.

1. **Turn off the peripheral devices. For details on operating peripheral devices, refer to the instruction manuals for the peripheral devices.**

2. **Press ⓞ to turn off the processor.**

3. **Remove the scope from the processor. (Refer to Figure 5.1.)**
   - Remove the scope while keeping it straight and making sure not to use excessive force on the connector part.

4. **Remove the air/water supply plug of the water bottle from the scope.**

5. **Remove the air/water supply plug of the water bottle from the air/water supply connector of the scope.**

6. **Remove the water bottle nozzle from the bottle connector of the processor.**

7. **Disconnect the power cord.**

8. **Wipe the surfaces of the processor with a gauze that has been dampened with alcohol and well wrung out.**

9. **For details on after use care of the scope, refer to the instruction manual for the scope.**
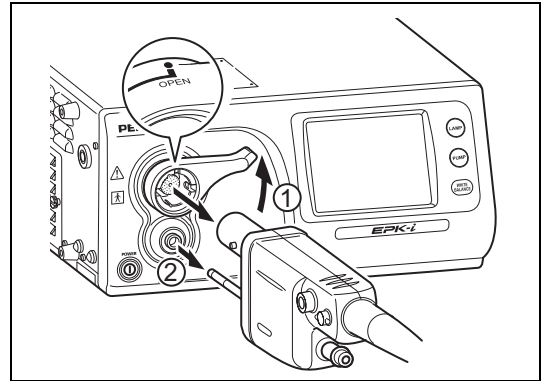
Figure 5.1

NOTE

- Turning off the processor prior to turning off any connected peripheral devices may cause the peripheral devices to malfunction.
- Make sure no water gets on the processor when you are performing the after care procedure. In particular, getting the connector parts and ventilation grids wet may cause a malfunction.

⚠ CAUTION

Observe the following points on storage.
- Be sure to turn off the processor and disconnect the power cord prior to storage.
- Do not store the processor in a hot and humid location, or where it is likely to be exposed to water or direct sunlight.
- Store the processor in a location where dust will not enter inside. Wipe off any dust on the processor. Excessive amounts of dust accumulating inside the unit may cause the processor to malfunction, emit smoke, or catch fire.
- Take care not to drop the processor or subject it to an excessive mechanical shock. The processor may become unsafe to use or damaged. If the processor is subject to an excessive mechanical shock, stop using it and contact our service personnel.

Care and Storage of the Water Bottle Set

After each use, follow the procedure below to wash and sterilize the water bottle set. To ensure it is sterilized properly, be sure to wash it thoroughly prior to the sterilization process.

1   **Wash the water bottle, cap, and tube.**

   • Use cleaning fluid and a gauze or brush to wash the water bottle set while rinsing it under running tap water.
   • Use an enzyme detergent to clean off dirt that is difficult to remove.

NOTE

> To ensure parts that cannot be reached by hand are thoroughly cleaned, ultrasonic cleaning of the whole water bottle set is recommended after Step 1. When conducting ultrasonic cleaning, use the following settings for cleaning.
> Frequency: At least 44 kHz ±6%
> Time: 5 minutes

2   **Further rinse the water bottle set thoroughly under tap water after cleaning is finished.**

3   **Use, for example, a gauze to wipe off water and then dry the water bottle set.**

   • The water bottle set can be easily dried using alcohol for disinfection and compressed air.

4   **Use one of the following methods for the sterilization process.**

⚠ WARNING

> Thoroughly clean and dry the water bottle set prior to sterilization. Failure to thoroughly dry all surface areas could result in incomplete or ineffective sterilization. Moisture could prevent contact of the ETO gas with the actual contaminated surfaces.

Option A: Steam Sterilization (Autoclaving)
PENTAX water bottle assemblies, Model OS-H4 have been designed to withstand high-pressure steam sterilization procedures providing the following parameters are adhered to:

   Sterilizer Type :   Prevacuum
   Temperature :   132 ~ 135°C (270 ~ 275°F)
   Time :   5 minutes

During steam sterilization, ensure that the cap and tubing section have been removed from the water bottle container. Make sure that the drain lever on the water bottle cap has been set on the A/W position (upright).

Option B: Ethylene-Oxide Gas Sterilization

   ① Ethylene Oxide (ETO) gas sterilization can be performed on PENTAX water bottles, provided they have first been properly cleaned and thoroughly dried.

   ② The parameters below are proposed for ETO sterilization.
   Temperature :   55°C (131°F)
   Relative Humidity :   50%RH
   EO Concentration :   600-650mg/L
   Gas Exposure Time :   5 Hours
   Aeration :   12 Hours at 55°C (131°F)

Replacing the Lamp Cartridge

Check the LIFE indicator (lamp life indicator) on the touch panel before you use the processor. Follow the procedure below to replace the lamp cartridge (OL-X25) if one bar of the LIFE indicator lights red and the [Please replace the lamp] message appears.

> **NOTE**
>
> - The lamp life is 400 hours.
> - If the total usage time of the lamp becomes 400 hours or more, one bar of the LIFE indicator lights red and the [Please replace the lamp] message appears on the monitor.

■ Removing the Lamp Cartridge

1 **Press ⓞ to turn off the processor and disconnect the power cord.**

> **⚠ CAUTION**
>
> Make sure the power cord is disconnected before you replace the lamp cartridge.

2 **Turn the screw at the top of the lamp cartridge access door counterclockwise and open the access door. (Refer to Figure 5.2.)**

> **⚠ CAUTION**
>
> Since the whole lamp cartridge is hot immediately after use, be sure to leave sufficient time for cooling prior to replacement.
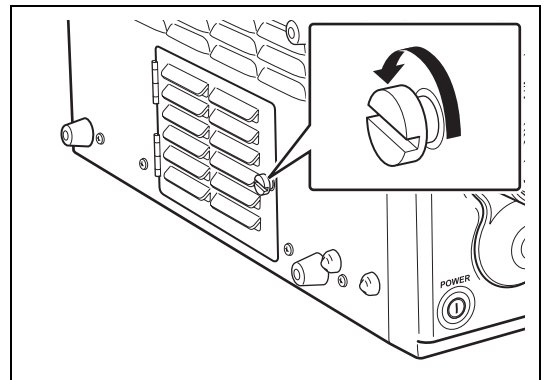
Figure 5.2

3 **Turn the two screws at the top of the lamp cartridge counterclockwise and remove the lamp cartridge while supporting it with a hand. (Refer to Figure 5.3.)**

4 **Draw out the lamp cartridge towards you while making sure it does not bang against the lamp cartridge housing.**

Lamp Cartridge

Figure 5.3

5 **Contact PENTAX with regards to the disposal of lamp cartridges because we accept used lamp cartridges.**

> **⚠ WARNING**
>
> Replace the entire lamp cartridge with the model OL-X25 lamp cartridge designed specifically for use with the EPK-i. Do not replace the lamp only because doing so may result in a failure of the processor, etc.

■ Installing a New Lamp Cartridge

1 **Hold the lamp cartridge so that the two screws on the lamp cartridge are at the front and fully insert it into the housing while keeping it straight. (Refer to Figure 5.4.)**

2 **Turn the screws of the lamp cartridge clockwise to fix the lamp cartridge into place.**

3 **Close the lamp cartridge access door and turn the screw at the top of the access door clockwise.**
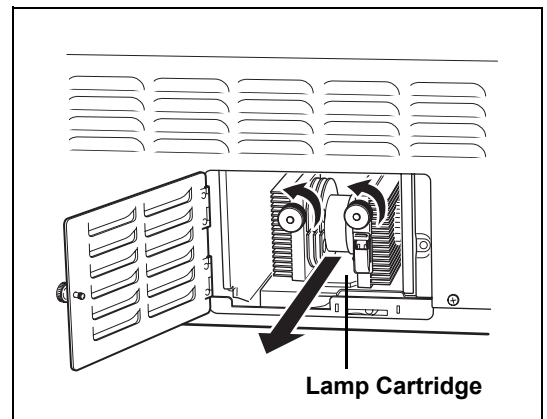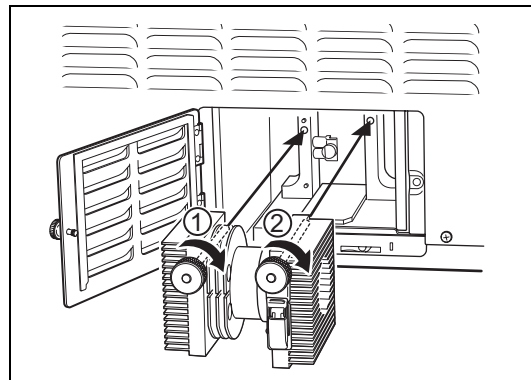

Figure 5.4

⚠ CAUTION

Be sure to turn screw ① of the lamp cartridge first to fix the lamp cartridge in place.

■ Resetting the Lamp Life Indicator

Follow the procedure below to reset the lamp life indicator on the operation panel after you replace the lamp cartridge.

1 **Connect the power cord and press ⓞ to turn on the processor.**

2 **Press the [Menu] key.**

   • The setup screen appears.

3 **Position the cursor on a tab and use the [←][→] keys to select [Set up].**

4 **Use the [↑] or [↓] key to select [Lamp Data].**

5 **Use the [↑] or [↓] key to select [Life Count Time Reset] and press the [←] or [→] key.**

6 **Use the [↑] or [↓] key to select [YES] and press the [Enter] key.**

   • The confirmation message disappears, the normal screen reappears, and the lamp replacement life is reset.

7 **Press ⓞ to turn off the processor and then press ⓞ again to turn the processor back on. Make sure all bars of the LIFE indicator on the touch panel light green.**

⚠ CAUTION

If the lamp life indicator is not reset after the lamp cartridge is replaced, a warning message prompting you to replace the lamp cartridge continues to be displayed.

Replacing the Fuses

If the processor does not work even if you press ⊚ to turn on the processor, check whether the fuses have blown.

1   **Press ⊚ to turn off the processor and disconnect the power cord.**

2   **Insert a screwdriver on the left/right side of the fuse box and use it to pull out the fuse box. (Refer to Figure 5.5.)**
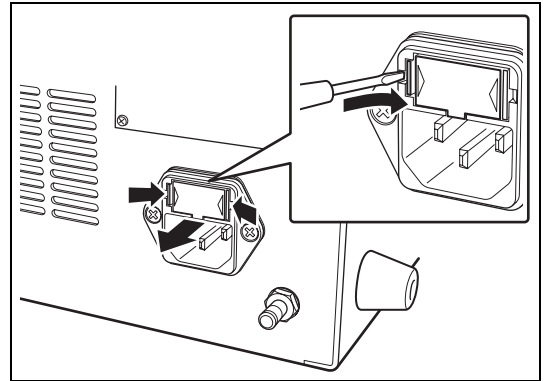
Figure 5.5

3   **Position the fuse box so that its back is facing you and remove the fuses. (Refer to Figure 5.6.)**

4   **Check both fuses.**

   • If even one fuse has blown, both fuses must be replaced.

NOTE

   ● When replacing the fuses, be sure to use only specified fuses (∅5 × 20, 6.3 A).
   ● If both fuses have not blown, contact our service personnel.
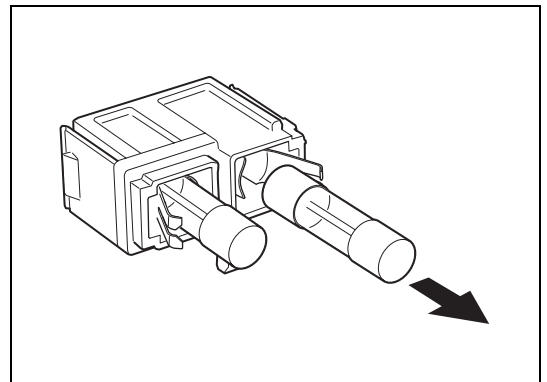
Figure 5.6

5   **Reinsert the fuse box.**

6   **Connect the power cord, press ⊚ to turn on the processor, and make sure the ⊚ LED lights.**

NOTE

   If the processor cannot be turned on even after the fuses have been replaced with new ones, immediately turn off the power, disconnect the power cord, and contact our service personnel.

Repair

Before submitting the processor for repair, be sure to follow the instructions in "Maintenance and Storage" (P.43) in order to prevent infections.

Observe the following points when sending the processor for repair.
   • Use appropriate packing to prevent the processor from being broken or damaged during transport.
   • Make sure you write down and include details of the malfunction, the processor manufacturing number, your name and contact details, and the destination address.
   • Send all accessories that you think may be in any way related to the malfunction together with the processor.

NOTE

   PENTAX is responsible for any repairs it undertakes. Note, however, that PENTAX is in no way liable for any injuries to patients or users, damage or malfunction of the processor, and disinfection or sterilization problems resulting from repairs being undertaken by any party other than PENTAX.

Symptom	Cause	Solution	Reference Page
Cannot turn on the processor.	The power cord is not connected properly.	Securely connect the power cord to the power input socket and isolation transformer.	P.12
	A fuse has blown.	Replace the fuses.	P.47
The lamp is not lit.	The life of the lamp is over.	Replace the lamp cartridge if one bar of the LIFE indicator on the touch panel lights red and the [Please replace the lamp] message appears on the monitor.	P.45
No image appears on the monitor.	The monitor settings are not configured properly.	Turn on the monitor.	P.21
		Set the proper video input signal.	P.13
		Reset the adjustment values for the monitor.	*1
	A cable is not connected properly.	Connect all cables properly.	P.13
	The scope is not connected properly.	Align the scope locking lever to the LOCK position.	P.15
	The lamp is not lit.	Press (LAMP) on the operation panel to turn on the lamp.	P.23
Images are black and white.	The lamp is not lit.	Press (LAMP) on the operation panel to turn on the lamp.	P.23
Text is not displayed on the monitor or cannot be input.	The keyboard is not connected properly.	Connect the keyboard to the processor properly.	P.14
The scope buttons do not work and the peripheral devices cannot be operated.	The peripheral devices are not connected properly.	Connect the peripheral devices to the processor properly.	P.13-15
A long beep tone sounds and the COPY and VTR functions do not work.	[Assign scope buttons] of [Option] of [Set up] is not configured properly or the PC or a peripheral device is not connected properly.	① Change the settings for the COPY and VTR functions in the Assign scope buttons screen of [Assign scope buttons]. Remove the selection for any unused or turned off peripheral device. ② Connect the PC and peripheral devices properly and turn them on. ③ If the capture function is selected and enabled, make sure Endoimage (OS-I1) is working properly.	P.32 P.14 —

*1: For details, refer to the instruction manual for the monitor.

NOTE

- If there is no response even if you press any key on the keyboard, turn off the processor and contact our service personnel.
- If there is a problem that cannot be resolved with any of the above solutions, contact our service personnel.

■ Error Messages

If there is a problem that cannot be resolved with any of the above solutions, contact our service personnel.

Message	Meaning	Solution	Reference Page
Please be prepared to replace the lamp soon.	Almost time to replace the lamp cartridge.	Prepare to replace the lamp.	P.45
Please replace the lamp.	It is time to replace the lamp cartridge.	Press (LAMP) on the operation panel to turn on the lamp.	P.23
Scope is not connected.	The scope is not connected.	Connect the scope.	P.15
Check SCOPE Connection.	Communication with the scope failed.	Connect the scope.	P.15
W/B Failed! Please Retry.	The white balance is incorrect.	Set the white balance again.	P.23
Check DV Tape	Cannot record to DV equipment.	Check or replace the tape of the DV equipment.	–
Check DV Connection	The DV equipment is not connected properly or not connected.	Connect the DV equipment to the processor properly.	–
Capture Failed	Failed to capture the scope image.	Try capturing the scope image again.	–
Check USB Memory	No USB memory is connected or there is insufficient space.	Connect USB memory that has sufficient space to the processor.	–
Check Video Printer	No printer is connected.	Connect a printer to the processor.	–
PUSH LAMP SWITCH! AUX LAMP is ON.	The auxiliary lamp is lit.	Press (LAMP) on the operation panel to turn on the lamp.	P.23
No Response from VCU	Communication with Endonet is abnormal.	Connect Endonet properly.	–
No VCU Connection	No Endonet is connected.	Connect Endonet properly.	–

6

7 Specifications

Power Requirements	Voltage		120 VAC
	Frequency		60 Hz
	Input current		5.4 A
	Voltage fluctuation		±10%
Operating Environment	Ambient temperature		10 - 40°C
	Relative humidity		30 - 85%
	Air pressure		700 - 1060 hPa
Storage Environment	Ambient temperature		–20 - 60°C
	Relative humidity		0 – 85%
	Air pressure		700 - 1060 hPa
Illumination	Lamp		Xenon lamp Model: OL-X25
	Color temperature		6,000 K
	Brightness control		Selection - Automatic/Manual
Scope Compatibility			PENTAX color video endoscopes (i-series and K-series)
			PENTAX fiberscopes (with use of color module)
Air Feed System	Air pump system		DC Diaphragm
	Pressure setting at flow rate of 0		45 - 70 KPa (maximum pressure)
	Standard air feed volume at inlet of water bottle		Level 1: 2.0 - 2.8 L/min Level 2: 2.9 - 3.4 L/min Level 3: 3.5 - 4.0 L/min Level 4: 4.1 - 4.5 L/min Level 5: 4.6 - 7.2 L/min
Water Feed System	Water bottle assembly pressurized by pump		Bottle capacity = 250mL
Brightness Control System	Automatic/Manual		Selection - Average/Peak ±5 step adjustment
Color System	Color correction		Red/Blue ±5 step adjustment
Freeze Function			Live video is displayed in a sub-screen on the main screen while freeze mode is activated.
Cooling			Forced air cooling
Video Signals	Digital output	DV	1 set
		Serial output	2 sets
		DVI	1 set
	Analog output	RGB	2 sets
		Y/C	2 sets
		Composite	1 set
		VGA	1 set
	Analog input	Composite	1 set
Voice Signals	Microphone		1 set
Control Signals	RS-232C		1 set
	Remote		3 sets
	Keyboard		1 set
	Foot switches		1 set
	SA-P2		1 set
Image Recording Media	USB flash memory		
Classification as Electro Medical Equipment	Type of protection against electric shock		Class I equipment
	Degree of protection against electric shock		Type BF (Body Floating), using insulated endoscope. Use on a heart is prohibited.
	Degree of explosion proofing		Do not use in potentially flammable surroundings.* * The processor is not suitable for use in a mixture of air and flammable anesthetic gas or a mixture of nitrous oxide and flammable anesthetic gas.
Compliance			IEC60601-1
Size (excluding protrusions)			430 mm (W) × 205 mm (H) × 485 mm (D)
Weight			26.5 kg
EMC Standards			IEC60601-1-2 (2004)

8 Electromagnetic Compatibility

Guidance and manufacturer's declaration-electromagnetic emissions		
The EPK-i is intended for use in the electromagnetic environment specified below. The customer or the user of the EPK-i should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment-guidance**
RF emissions CISPR 11	Group 1	The EPK-i uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The EPK-i is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration-electromagnetic immunity			
The EPK-i is intended for use in the electromagnetic environment specified below. The customer or the user of the EPK-i should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment-guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±(2, 4, 6) kV contact ±(2, 4, 8) kV air	±(2, 4, 6) kV contact ±(2, 4, 8) kV air	Floors should be wood, concrete or ceramic tile, if floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fest transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for signal lines	±2 kV for power supply lines ±1 kV for signal lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment, if the user of the EPK-i requires continued operation during power mains interruptions, it is recommended that the EPK-i be powered from an uninterruptible power supply.
Power frequency (60/60 Hz) magnetic field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels cheracteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration-electromagnetic immunity			
The EPK-i is intended for use in the electromagnetic environment specified below. The customer or the user of the EPK-i should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
			Portable and mobile RF communications equipment should be used no closet to any part of the EPK-i, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1.2\ \sqrt{P}$ $d = 1.2\ \sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\ \sqrt{P}$ 800 MHz to 2.5 GHz where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interferance may occur in the vicinity of equipment marked with the following symbol:
NOTE1 At 80 MHz and 800 MHz, the higher frequency range applies. **NOTE2** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EPK-i is used exceeds the applicable RF complience level above, the EPK-i should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary such as reorlenting or relocating the EPK-i. [b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Recommended separation distances between portable and mobile RF communications equipment and the EPK-i			
The EPK-i is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the EPK-i can help prevent electromagnetic interference by mainteining a minimum distance between portable and mobile RF communications equipment (transmitters) and the EPK-i as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3 \sqrt{P}$
0.01	0.12 m	0.12 m	0.23 m
0.1	0.38 m	0.38 m	0.73 m
1	1.2 m	1.2 m	2.3 m
10	3.8 m	3.8 m	7.3 m
100	12 m	12 m	23 m
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. **NOTE 1** At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. **NOTE 2** These quidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

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MEMO

MEMO

Our representative in your area:

● Specifications are subject to change without notice and without any obligation on the part of the manufacturer.