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Head Mounted Image Processor Unit

Indications for Use/Intended Use

The Sony HMS-3000MT is intended to provide 3D and 2D color video displays of images from surgical endoscopic/laparoscopic camera systems and other compatible medical imaging systems. The HMS-3000MT is a high-definition, medical grade monitor for real-time use during minimally invasive surgical procedures and is suitable for use in hospital operating rooms, surgical centers, clinics, doctors' offices and similar medical environments.

Notes

- This equipment is for medical professionals.
- This equipment is intended for use in medical environments, such as clinics, consulting rooms, examination rooms, and operating rooms.

WARNING

To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

No modification of this equipment is allowed.

Symbols on the product

Safety sign

Follow the warnings in the instructions for use for parts of the unit on which this symbol appears.

NOTE Background color: Blue Symbol: White



Consult the instructions for use

Follow the directions in the instructions for use for parts of the unit on which this symbol appears.



This symbol indicates the manufacturer, and appears next to the manufacturer's name and address.



This symbol indicates the EU Importer, and appears next to the EU Importer's name and address.





This symbol indicates the date of manufacture.



This symbol indicates the serial number.



This symbol indicates the version of the accompanying document.



This symbol indicates the equipotential terminal which brings the various parts of a system to the same potential.



Storage and transport temperature

This symbol indicates the acceptable temperature range for storage and transport environments.



Storage and transport humidity

This symbol indicates the acceptable humidity range for storage and transport environments.



Storage and transport pressure

This symbol indicates the acceptable atmospheric pressure range for storage and transport environments.

For customers in the U.S.A.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

All interface cables used to connect peripherals must be shielded in order to comply with the limits for a digital device pursuant to Subpart B of part 15 of FCC Rules.

 Connect the unit and the affected devices to different branch circuits.
 For more information, consult qualified Sony service

personnel.

(Applicable standard: IEC 60601-1-2)

For customers in Canada

CAN ICES-3 (B)/NMB-3(B)

This unit has been certified according to Standard CAN/ CSA-C22.2 No.60601-1.

Important safeguards and notices for use in the medical environments

- 1. All devices connected to the unit must be certified or compliant according to IEC 60601-1, IEC 60950-1, and IEC 60065 standards and other IEC/ISO standards applicable to the devices.
- 2. Furthermore, the system as a whole must comply with IEC 60601-1 standards. All peripheral devices connected to the signal input/output sections of the unit constitute the medical-use system, and therefore, the user is responsible for ensuring that the system as a whole complies with IEC 60601-1 standards. If in doubt, consult qualified Sony service personnel.
- 3. Connecting the unit to other devices may increase the leakage current.
- 4. For all peripheral devices connected to the unit that operate on commercial power supplies and do not comply with IEC 60601-1 standards, incorporate an isolation transformer that complies with IEC 60601-1 standards and connect to the commercial power supply via the transformer.
- 5. The unit generates, uses, and may radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause interference on other devices. If the unit causes interference (which can be determined by disconnecting the power cord from the unit), try the following.
 - Relocate the unit with respect to the affected devices.

Important EMC notices for use in medical environments

- The HMI-3000MT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the instructions for use.
- Portable and mobile RF communications equipment, such as cellular phones, can affect the HMI-3000MT.

WARNING

The use of accessories and cables other than those specified, with the exception of replacement parts sold by Sony Corporation, may result in increased emissions or decreased immunity of the HMI-3000MT.

| List of cables used for EMC test | |
|--|-------------------|
| Type of cable | Specifications |
| HMO-CA50M : Head Mounted Display Cable | 5 m, Shield cable |

Guidance and manufacturer's declaration – electromagnetic emissions

The HMI-3000MT is intended for use in the electromagnetic environment specified below. The customer or the user of the HMI-3000MT should assure that it is used in such an environment.

| Emission test | Compliance | Electromagnetic environment – guidance |
|-----------------------------------|----------------|---|
| RF emissions CISPR 11 | Group 1 | The HMI-3000MT 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 HMI-3000MT is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage |
| Harmonic emissions | Not applicable | power supply network that supplies buildings used for domestic purposes. |
| Voltage | | |
| fluctuations/flicker emissions | Not applicable | |
| IEC 61000-3-3 | | |

WARNING

If the HMI-3000MT will be used adjacent to or stacked with other equipment, normal operation of the HMI-3000MT under such configurations should be verified via observation.

Guidance and manufacturer's declaration - electromagnetic immunity

The HMI-3000MT is intended for use in the electromagnetic environment specified below. The customer or the user of the HMI-3000MT should assure that it is used in such an environment.

| Immunity test | IEC 60601 test level | Compliance level | Electromagnetic environment – guidance |
|--|---|----------------------------------|---|
| Electrostatic discharge (ESD) | ±6 kV contact | ±6 kV contact | Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%. |
| IEC 61000-4-2 | ±8 kV air | ±8 kV air | |
| Electrical fast transient/burst | ±2 kV for power supply lines | | Mains power quality should be that of a typical commercial or hospital environment. |
| IEC 61000-4-4 | ±1 kV for input/ output lines | ±1 kV for input/ output lines | |
| Surge | ±1 kV line(s) to line(s) | Not applicable | Mains power quality should be that of a typical commercial or hospital environment. |
| IEC 61000-4-5 | ±2 kV line(s) to earth | | |
| Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11 | < 5% $U_{\rm T}$ (> 95% dip in $U_{\rm T}$) for 0.5 cycle 40% $U_{\rm T}$ (60% dip in $U_{\rm T}$) for 5 cycles 70% $U_{\rm T}$ (30% dip in $U_{\rm T}$) for 25 cycles < 5% $U_{\rm T}$ (> 95% dip in $U_{\rm T}$) for 5 sec | Not applicable | Mains power quality should be that of a typical commercial or hospital environment. If the user of the HMI-3000MT requires continued operation during power mains interruptions, it is recommended that the HMI-3000MT be powered from an uninterruptible power supply or a battery. |
| Power frequency (50/60 Hz) magnetic field | 3 A/m | 3 A/m | Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment. |
| IEC 61000-4-8 | | | |
| NOTE: U _T is the a | a.c. mains voltage | prior to application | of the test level. |

Guidance and manufacturer's declaration – electromagnetic immunity

The HMI-3000MT is intended for use in the electromagnetic environment specified below. The customer or the user of the HMI-3000MT 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 closer to any part of the HMI- 3000MT, including cables, than the recommended separation distance calculated from the equation appliance to the frequency of the transmitter. |
| | | | Recommended separation distance |
| Conducted RF | 3 Vrms | 3 Vrms | $d = 1.2 \sqrt{P}$ |
| IEC 61000-4-6 | 150 kHz to 80 MHz | | |
| Radiated RF | 3 V/m | 3 V/m | $d = 1.2 \sqrt{P}$ 80 MHz to 800 MHz |
| IEC 61000-4-3 | 80 MHz to 2.5 GHz | | $d = 2.3 \sqrt{P}$ 800 MHz to 2.5 GHz Where <i>P</i> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <i>d</i> is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, a should be less than the compliance level in each frequency range. b Interference may occur in the vicinity of equipment marked with following symbol: |

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: 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 HMI-3000MT is used exceeds the applicable RF compliance level above, the HMI-3000MT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the HMI-3000MT.

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 HMI-3000MT

The HMI-3000MT is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the HMI-3000MT can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the HMI-3000MT as recommended below, according to the maximum output power of the communications equipment.

| Rated maximum output power of | Separation distance according to frequency of transmitter m | | |
|-------------------------------|--|--|---|
| W | 150 kHz to 80 MHz <i>d</i> = 1.2 √ <i>P</i> | 80 MHz to 800 MHz <i>d</i> = 1.2 √ <i>P</i> | 800 MHz to 2.5 GHz <i>d</i> = 2.3 √ <i>P</i> |
| 0.01 | 0.12 | 0.12 | 0.23 |
| 0.1 | 0.38 | 0.38 | 0.73 |
| 1 | 1.2 | 1.2 | 2.3 |
| 10 | 3.8 | 3.8 | 7.3 |
| 100 | 12 | 12 | 23 |

For transmitters rated 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 guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Caution

When you dispose of the unit or accessories, you must obey the laws in the relative area or country and the regulations in the relative hospital regarding environmental pollution.

Caution

When installing, ensure the following space around the periphery of the unit, taking ventilation and servicing into consideration.

- Rear side: 10 cm (4 in.) or more
- Left/Right sides: 4 cm ($1 \frac{5}{8}$ in.) or more



For customers in the U.S.A.

Caution

Federal law (United States of America) restricts this device to sale by or on the order of a licensed healthcare practitioner.



Caution

Do not use the device in a MR (Magnetic Resonance) environment. It may cause a malfunction, fire, and unwanted movement.

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Precautions

This device is designed and manufactured for use in medical purposes. Do not use the device for any other purpose.

Precautions for safe operation

- Some people may experience discomfort (such as eye strain, fatigue, or nausea) while watching video images. Sony recommends that all viewers take regular breaks while watching video images. The length and frequency of necessary breaks will vary from person to person. You must decide what works best. If you experience any discomfort, you should stop watching the video images until the discomfort ends; consult a doctor if you believe necessary.
- Avoid wearing the unit in environments where your head may shake, or while you are walking or performing exercise, because there is a higher possibility that you experience discomfort.
- If you intend to connect the unit to other medical equipment, be sure to read the "Precautions when connected to other medical equipment" section.

Precautions when connected to other medical equipment

- Before you utilize this device and/or connect this device to any other medical device, please be aware of and abide by the following precautions:
 - (a) Before actually using this device for medical practice, please check and confirm that you do not experience any discomfort in your use that could be disruptive or impeditive in conducting your intended activity or medical practice.
 - (b) If you experience or are likely to experience such discomfort, please refrain from using this device.
 - (c) Generally, discomfort (such as eye strain, fatigue, nausea, or motion sickness) can be provoked by such factors as quick movements or shakiness of video picture, focal position of video pictures, distance between objects and image capturing modules, user's point of gaze in video pictures, other varying conditions of video pictures to be input to this device, and individual user's health conditions.

Preparing for unforeseen circumstances

Be prepared for unforeseen circumstances by using a stationary monitor, for example, in conjunction with this unit. In addition, prepare a backup unit if necessary.

Attaching the head mounted monitor before use

Before using the unit in an actual medical procedure, attach the head mounted monitor in the same time frame envisioned for the medical procedure and check that none of the following problems occur.

• Check that there is no discomfort (fatigue due to head pain, pressure, or weight) that interferes with the medical procedure.

Any head discomfort may be alleviated if the head mounted monitor is attached correctly. For details read "Mounting the Head Mounted Monitor" (page 21) when attaching the unit. If you experience any discomfort that interferes with the medical procedure, do not use the unit.

• Check that the head mounted monitor does not shift positions repeatedly.

This may be alleviated if the head mounted monitor is attached correctly. For details read "Mounting the Head Mounted Monitor" (page 21) when attaching the unit. If the position of the head mounted monitor shifts during a medical procedure, correct the error by referring to "Correcting Displacement" (page 25). If the head mounted monitor shifts repeatedly, cease using the unit.

- Check before use that there is no rash or itching due to allergies or other problem caused by contact with the pads on the head mounted monitor. If you experience any rash or itching that interferes with the medical procedure, do not use the unit.
- Make sure to finish all setup before using the unit in a medical procedure.
- If the head mounted monitor does not match your head size, do not use the unit.

Use with electrosurgical knives and similar devices

If this unit is used together with an electrosurgical knife, etc., the picture may be disturbed, warped or otherwise abnormal as a result of strong radio waves or voltages from the device. This is not a malfunction.

When you use this unit simultaneously with a device from which strong radio waves or voltages are emitted, confirm the effect of this before using such devices, and install this unit in a way that minimizes the effect of radio wave interference.

Preliminary connection testing

Connect the unit to any medical devices you intend to use and verify correct operation before using the unit and the devices in an actual medical procedure.

Storage location

Store the unit in a sanitary location, and do not operate or store the unit in the following kinds of locations.

- Locations subject to constant vibration
- Locations exposed to direct sunlight
- · Locations with high humidity
- · Locations subject to extreme cold

The unit is not splash proof. Avoid splashing the unit with water, cleaning or disinfecting solutions, or any other liquids, and do not immerse the unit in liquid.

Comfortable operation

The head mounted monitor is designed for viewing images at a distance.

Individuals that use spectacles or contact lenses in daily life should wear them when using the unit (excludes reading glasses etc. for seeing nearby objects). Wearers of bifocal spectacles and contact lenses may have

difficulty operating the unit comfortably.

Using the head mounted monitor

- Use only when mounted correctly.
 - For details about mounting, see "Mounting the Head Mounted Monitor" (page 21).
 - Confirm that there is no position offset between the left and right displays as described in step 3 of "Configuring Initial Settings" (page 26) before use.
 - A left-right position offset may occur if the unit is dropped or otherwise subject to vibrations.
- The supported interpupillary distance (between eyes) range is 53 mm to 76.7 mm $(2^{1}/_{8} \text{ in. to } 3^{1}/_{8} \text{ in.})$. Individuals outside this range will be unable to operate the head mounted monitor.

Contact with the head mounted monitor during a medical procedure

The head mounted monitor cannot be sterilized. Do not touch the head mounted monitor with scrubbed hands during a medical procedure. If the head mounted monitor shifts during a medical procedure, correct the error by referring to "Correcting Displacement" (page 25).

Cables

• Use the unit with the head mounted monitor connection cables secured in the correct position. If the connection cables are not secured, they may interfere with the medical procedure. If the connection cables become loose, reposition the cables in the cable clamper.



• Make sure that the HMO-CA50M head mounted display cable (hereinafter called the display cable) does not become caught around feet and legs. If the display cable is caught and jerked, there is a risk that the head of the wearer will also be jerked.

Carrying the unit

Hold the unit firmly when moving around with the head mounted monitor or HMI-3000MT head mounted image processor unit (hereinafter called the image processor unit) to avoid dropping the unit. Dropping the unit may cause an injury. Also, the unit contains high-precision components that may be damaged if the unit is dropped. If the unit is dropped, contact your local Sony distributor or sales representative.

FS-24 foot switch (not supplied)

Caution

The FS-24 has an Ingress Protection Rating of IPX3. Therefore, it cannot be used in locations subject to splashing liquids (e.g., operating rooms). For safety, use a product with a rating of IPX6 or higher in such environments.

In addition, if a malfunction occurs with the foot switch during operation, disconnect it from the image processor unit, and perform operations from the front panel.

Condensation

If the unit is suddenly taken from a cold to a warm location, or if ambient temperature suddenly rises, moisture may form on the outer surface of the unit and/or inside of the unit. This is known as condensation. If condensation occurs, turn off the unit and wait until the condensation clears before operating the unit. Operating the unit while condensation is present may damage the unit.

Deterioration of contact pad surface

If the surface of the pads (front pad, side pad, top pad) or headband deteriorates, starts to peel off, or looks like it will peel off, cease using the unit in medical procedures and contact your local Sony distributor or service representative.

Storage of packaging materials

If you need to transport the unit for repair or any other reason, use the same box and cushion materials provided when the unit was purchased.

Before storing the head mounted monitor in the box, adjust the headband and rear band so that they are as short as possible, and set the headband lock switch to the locked position.

If the unit is not used for an extended period of time

- Turn off the power supply to the head mounted monitor and image processor unit, in that order, and disconnect the AC power supply cord of the AC adaptor.
- Adjust the rear band of the head mounted monitor so that it is as short as possible.



Cleaning

Before cleaning, always remove the power supply plug from the power outlet.

Do not sterilize or use an autoclave on the unit.

Cleaning the image processor unit

The image processor unit is manufactured with materials that can be disinfected. However, depending on the disinfectant used, performance may be impaired or the surface finish may be damaged. Observe the following points to protect the unit.

- Wipe the surfaces of the unit with 50% to 70% v/v concentration isopropyl alcohol or 76.9% to 81.4% v/v ethanol.
- To remove stubborn dirt, wipe with a soft cleaning cloth using mild detergent diluted in water, and then clean using the chemical solutions above.
- Do not use benzine or thinners, acidic cleaning solutions, alkaline cleaning solutions, abrasive cleaning agents, or chemically-treated wipes that may damage the surfaces for cleaning or disinfection.
- Do not wipe with force using a cloth that may have dust or other particles adhering to it. Doing so may scratch the surfaces.
- Do not place rubber or plastic objects on the unit for an extended period of time. Doing so may cause surface deterioration or cause the surface to peel.

Cleaning the head mounted monitor

The head mounted monitor, excluding the lens, is manufactured with materials that can be disinfected. However, depending on the disinfectant used, performance may be impaired or the surface finish may be damaged. Observe the following points to protect the unit.

- Wipe the surfaces of the unit with 50% to 70% v/v concentration isopropyl alcohol or 76.9% to 81.4% v/v ethanol.
- To remove stubborn dirt, wipe with a soft cleaning cloth using mild detergent diluted in water, and then clean using the chemical solutions above.
- Do not use benzine or thinners, acidic cleaning solutions, alkaline cleaning solutions, abrasive cleaning agents, or chemically-treated wipes that may damage the surfaces for cleaning or disinfection.
- Do not wipe with force using a cloth that may have dust or other particles adhering to it. Doing so may scratch the surfaces.
- Do not place rubber or plastic objects on the unit for an extended period of time. Doing so may cause surface deterioration or cause the surface to peel.

Cleaning the lens

If the lens becomes cloudy or dusty, clean using the following method.

- Wipe lightly with a soft, lens cloth.
- Do not use lens cleaning fluid, alcohol, water, or other solutions.

Cleaning the rear pad

If dirt is difficult to remove from the surface of the rear pad, remove the rear pad and wash separately. After washing, wipe off any moisture with a dry cloth and then reattach to the head mounted monitor.

• Removing the rear pad

The rear pad is attached using six clasps. Stretch the pad upwards and remove the pad from the upper clasps, then remove the pad from the lower clasps.



• Attaching the rear pad

Attach the pad using the lower clasps, then stretch the pad upwards and attach the pad using the upper clasps.

Note

Check that the holes in the rear pad fit in all six clasps. The pad may come off if it is not secured by all the clasps.

If unsanitary matter adheres to the unit

Follow the cleaning instructions above, and wipe it off.

Overview

This product consists of two main components: the head mounted image processor unit that includes functions such as input/output functions (SDI/DVI-D) for video signals sent from such devices as endoscopic video cameras, quality adjustment functions, and stereoscopic (i.e., 3D) functions; and the head mounted monitor equipped with HD OLED panels.¹⁾

1) This device is not intended for performing diagnoses or diagnostic analysis.

The input signals are processed such as enlargement, reduction, rotation, synthesis and color adjustment with semiconductor in image processor unit. The processed images are transmitted to the head mount monitor. The head mount monitor separates the images for right eye and left eye and displays image to OLED display units in the head mount monitor. A user can look 3D or 2D images by setting a head mount monitor on your head and arranging OLED display units on each eye.

The head mounted monitor allows for freedom of movement during procedures that is not possible with conventional external displays.

Compared to having to view a stationary external display, this unit requires minimal movement of your field of view during a medical procedure.



Features

HMI-3000MT Head Mounted Image Processor Unit

- Switch between 2D and 3D video display.
- SDI and DVI-D connectors that support both 2D and 3D signals.
- Picture-in-picture (PinP) function that can simultaneously display two signals.
- Left/right flip and 180-degree rotation functions for videos that allow opposing users to view the same video.
- Pass-through function that allows transfer of video input signals to another monitor.

• Supports a variety of image formats. (For details on supported formats, see "Input/output supported signals" in the "Specifications" section (page 35).)

HMM-3000MT Head Mounted Monitor

- View your hands, even while the unit is mounted. (Be sure to verify proper mounting and adjustment during use.)
- Designed to allow wide 45-degree horizontal viewing angle.
- Equipped with Sony HD OLED panels.
- Left-eye and right-eye videos are displayed on separate OLED panels, eliminating crosstalk (i.e., layered appearance of video) that commonly occurs when left and right videos are displayed on one screen.

Device Components

The HMI-3000MT Head Mounted Image Processor Unit is supplied with the HMS-3000MT Head Mounted Display System. In addition to the HMI-3000MT, the HMS-3000MT system also includes the HMM-3000MT Head Mounted Monitor and the HMO-CA50M Head Mounted Display Cable.

The units and accessories supplied with the HMS-3000MT system are as follows.

HMI-3000MT Head Mounted Image Processor Unit

- Image processor unit
- Before Using this Unit
- CD-ROM (Instructions for Use)
- AC adaptor
- Instructions for Use for AC adaptor
- Service Contact List

HMM-3000MT Head Mounted Monitor

- Head mounted monitor
- Instructions for Use

HMO-CA50M Head Mounted Display Cable

- Cable
- Instructions for Use

Parts Identification

Image Processor Unit

Front



(1) ((on/standby) button

Turns the image processor unit on or standby. The button lights green when the unit is turned on. If an error occurs, this blinks orange. For details on error message displays and how to respond to them, see "Troubleshooting" (page 32).

② → INPUT (input selection) button

Selects the input signal to display on the head mounted monitor's screen. For details, see "Selecting the Input Signal" (page 27).

③ Input mode indicator

Indicates the input mode.

If the PinP sub-screen is being displayed, this indicates the input mode of the sub-screen. When the input mode of the sub-screen is indicated, the dot (SUB) at the bottom right of the indicator lights.

If the PinP sub-screen is not being displayed, this indicates the input mode of the main screen. In such cases, the dot (SUB) at the bottom right does not light. For details, see "Selecting the Input Signal" (page 27).

④ PIP (PinP on/off) button

Turns the sub-screen display on or off.

(5) Flip display indicator

Indicates the current flip display mode.

6 FLIP (flip display selection) button

Selects the display mode for the signal (normal, left/right flip, 180-degree rotation). For details, see "Flipping the Image" (page 27).

⑦ HMM indicator

Lights green when the head mounted monitor is turned on, and orange when it is in the standby state. If an error occurs, this blinks orange. For details on error message displays and how to respond to them, see "Troubleshooting" (page 32).

(8) HMM output connector

Connects to the head mounted monitor via the display cable.



Caution

Use only the dedicated HMO-CA50M connection cable to connect the HMI-3000MT and HMM-3000MT. The use of a different cable or extension cable may cause the unit to operate incorrectly.



Overviev

(1) \Rightarrow Equipotential grounding terminal

Equalizes potential for all devices connected to the unit.

$(2 \rightarrow \text{INPUT connectors})$

• SDI 1(2D) input connector

Inputs SDI signals for 2D or 3D video. When inputting the left and right eye videos of a 3D video via separate cables, input the left eye video to this connector.

• SDI 2(3D) input connector

Inputs SDI signals for 3D video. When inputting the left and right eye videos of a 3D video via separate cables, input the right eye video to this connector.

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Caution

Do not touch the patient while touching the center pin of the SDI connector.

If there is a fault with the unit or the AC adaptor, a voltage may be generated that may harm the patient.

• DVI-D 1(2D) input connector

Inputs DVI signals for 2D or 3D video. When inputting the left and right eye videos of a 3D video via separate cables, input the left eye video to this connector.

• DVI-D 1(3D) input connector

Inputs DVI signals for 3D video. When inputting the left and right eye videos of a 3D video via separate cables, input the right eye video to this connector.

$(3) \hookrightarrow OUTPUT \text{ connectors}$

• SDI 1(2D) output connector

Connects to a monitor or another image processor unit, and outputs SDI signals for 2D or 3D video. When outputting the left and right eye videos of a 3D video via separate cables, output the left eye video from this connector.

• SDI 2(3D) output connector

Connects to a monitor or another image processor unit, and outputs SDI signals for 3D video. When outputting the left and right eye videos of a 3D video via separate cables, output the right eye video from this connector.

• DVI-D 1(2D) output connector

Connects to a monitor or another image processor unit, and outputs DVI signals for 2D or 3D video. When outputting the left and right eye videos of a 3D video via separate cables, output the left eye video from this connector.

• DVI-D 1(3D) output connector

Connects to a monitor or another image processor unit, and outputs DVI signals for 3D video. When outputting the left and right eye videos of a 3D video via separate cables, output the right eye video from this connector.

④ Z REMOTE connectors

Connect to FS-24 foot switches (not supplied) or other remote controllers. Two connectors are available for HMM-A and HMM-B.

(5) == DC IN connector

Connects to the supplied AC adaptor.



WARNING

The connectors on this unit are not isolated. Do not connect any device other than one which conforms to IEC 60601-1 standards.

When an information technology device or AV device that uses an alternating current is connected, current leakage may result in an electric shock to the patient or operator. If use of such a device is unavoidable, isolate its power supply by connecting an isolation transformer, or by connecting an isolator between the connecting cables. After implementing these measures, confirm that the reduced risk now conforms to IEC 60601-1 standards.



Caution

Connect the DC connector to the equipment, and then connect the AC power cord of the AC adaptor. When disconnecting the DC connector, disconnect the AC power cord of the AC adaptor before disconnecting the DC connector. Do not touch the patient and the pin of the DC connector at the same time.

The pin of the DC connector applies a voltage of 24 V, which may harm the patient.

Connect the 24 V DC power cable here. Use a Hosiden–manufactured connector to connect. Part no: TCP8927-53 Power cable: The following specifications is recommended (60 V voltages rating or higher, 2 A current rating or higher.)





Warning on power supply devices

For the DC power supply, be sure to use the AC adaptor that is supplied or one that is recommended, or a device that complies with IEC 60601-1 standards and is protected by double insulation or reinforced insulation. Be sure to use a power supply device capable of supplying a voltage of 24 V and a current of 1.5 A or more. However, the device should not be capable of supplying 240 VA for 60 seconds or more (10 A or less at 24 V). Use of power supply devices other than the above may result in fire or electric shock.

Class I devices should only be connected to a power outlet that is properly earthed to avoid the risk of electric shock.

For information on how to shut off the main power supply, refer to the instructions for use supplied with the power supply device.

If the information is not available for whatever reason, obey the following.

- To shut off the main power, disconnect the power plug from the outlet.
- When installing the unit, incorporate a readily accessible shutoff device in the fixed wiring, or connect the power plug to a power outlet near the unit that can be easily accessed during use.
- Do not install the ME unit in a position that will make unplugging the power plug difficult.
- If a malfunction occurs, cut power via the shutoff device, or disconnect the power plug from the outlet.

Head Mounted Monitor



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Caution

To reduce discomfort while the unit is mounted, this unit is not equipped with a drop prevention strap or other restraining device.

When mounting the unit or detaching the unit, take care not to drop the unit.

If the unit is dropped and becomes damaged or operates abnormally, cease operating the unit and request repair from your Sony service representative.

(1) Front pad

Make sure your forehead is in contact with this during use. The head mounted monitor's display will turn off automatically if your forehead is not in contact with the front pad.

② Top pad

③ Cable clamp

Holds the connection cable and secures it in place.

- (4) Headband
- **(5)** $\stackrel{\frown}{\mathbb{I}}$ Headband lock switch

6 ((on/standby) button

Press and hold this to switch from "on" to "standby."

⑦ Control buttons (▲/▼/◄/► buttons and MENU button)

Press the MENU button to display the setup menu or to confirm selected setting items.



Caution

For details on menu operations, see "Modifying Settings" (page 28).

- (8) Lens span adjusters
- **9** Position adjustment window



- **10** Side pads
- (1) Lens
- 12 Rear band adjustment knob
- **13** Rear band
- (1) J J J Front pad angle adjustment switch
- (15) **Front pad lock lever**
- **(16)** Display cable connector

⑦ Cable relay box

Connects to the image processor unit via the display cable.



Caution

Use only the dedicated HMO-CA50M connection cable to connect the HMI-3000MT and HMM-3000MT.

The use of a different cable or extension cable may cause the unit to operate incorrectly.

(18) Connection cable

Operation

Connections

- 1 Connect the DC power cable of the AC adaptor to the DC IN connector on the image processor unit.
- **2** Connect the output signal from a medical device to the INPUT connector on the rear of the image processor unit.

Connect the cables to the appropriate connectors based on the signal type (SDI/DVI) and the video type (2D/3D).

When outputting the left and right eye videos of a 3D video via separate cables, input the left eye video to the 2D input connector and the right eye video to the 3D input connector.

- **3** Connect a remote controller to the REMOTE connector if necessary.
- **4** Use the display cable to connect the cable relay box of the head mounted monitor to the HMM output connector on the image processor unit.
- **5** Connect the AC power cord of the AC adaptor to an AC power supply.
- 6 Press the on/standby button on the image processor unit to turn it on.

When the HMM indicator on the image processor unit lights orange, press the on/standby button on the head mounted monitor to turn it on.

7 Turn on the medical device that will act as the signal source.

Mounting the Head Mounted Monitor

Note

You will not be able to see your surroundings when the unit is mounted. We recommend reading the "Mounting the Head Mounted Monitor", "Configuring Initial Settings", and "Operating the Image Processor Unit" sections beforehand and reviewing the general flow of operations.

The head mounted monitor cannot be sterilized. Therefore, do not contaminate your hands by mounting, adjusting, or otherwise touching the head mounted monitor during a medical procedure.

We recommend mounting the unit using one of the following methods.

- Wear a pair of sterilized gloves after mounting the unit with your bare hands.
- Wear two pairs of sterilized gloves, and remove the outer pair after mounting the unit.

Mount Points



- A: Rest the rear band near the area where the back of your neck meets your head.
- B: Make the distance between the arms of the band and your ears as small as possible.
- C: Make sure your nose does not come into contact with the head mounted monitor.
- D: Tighten the rear band and headband to a comfortable position.

Adjusting and balancing the tightness of the rear band and headband secures the head mounted monitor to your head. Excessive tightening can result in discomfort and head pain during prolonged use.

Mounting

1

Release the headband lock switches on the left and right sides of the headband, and extend the headband.

2 Turn the rear band adjustment knob, and extend the rear band.



3 Mount the head mounted monitor on your head with the rear band at the bottom.

Rest the rear band near the area where the back of your neck meets your head.



4 Tilt the head mounted monitor forward so that the display is directly in front of your eyes.

Make sure that rear band does not shift away from the position at the back of your neck.

Note

The monitor will not display if your forehead is not in contact with the front pad. Adjust the front pad so that it rests firmly on your forehead.



5 Adjust the positioning.

Shift the unit up, down, left, and right to so that the display is centered and in the optimal viewing position.



6 Tighten the rear band while holding the head mounted monitor with your other hand.

Note

Excessive tightening of the rear band can result in discomfort and head pain during prolonged use. The rear band and headband function together to prevent displacement. Therefore, you do not need to tighten the band to prevent completely movement yet. Hold the unit with your other hand during adjustment to prevent movement from the display's optimal viewing position.



7 Adjust the left and right balance of the headband.

Adjust the positioning so that it remains stable, even when your hands are not holding it in place.



Notes

• You can leave a space between the headband and the top of your head. Forcibly positioning the unit so that there is no space may result in discomfort in the temporal regions of your head and may prevent proper positioning.



• If the rear band is not positioned properly at the back of your neck, displacement may occur. Repeat the procedure from step **2**.

Tips

Mounting the head mounted monitor so that the distance between its arms and your ears is as small as possible positions the rear band to the area where the back of your neck meets your head.



8 Lock the headband lock switches on the left and right sides of the headband.



9 Clip the cable relay box to your surgical gown at the back of your shoulder.



Notes

- Attach the clip so that there is sufficient slack in the connection cable. Providing slack will prevent your neck from being pulled backward should your foot get caught in the display cable, for example.
- Attach the display cable so that it runs along the wearer's back. The cable may interfere during medical procedures if it is attached in the front.

Adjusting for Comfort

Adjusting the front pad

The front pad can be moved forward and backward and its angle adjusted. You can adjust the distance between your eyes and the display and the angle of the display by adjusting the front pad. To ensure proper fitting during use, be sure to adjust the front pad beforehand.

To move the front pad forward or backward

The front pad can be moved forward or backward into one of three positions. Slide the front pad lock lever to the left, and move the front pad forward or backward.

Adjust this when you want to adjust the focus, move the head mounted monitor away from your nose, make space for your glasses, expand the field of view for your hands, or otherwise adjust the fitting.



To adjust the angle of the front pad



The angle of the front pad can be adjusted into one of three positions. Set the front pad adjustment switch to the left or right.

You can adjust the angle of the display by adjusting the angle of the front pad. Adjust this when you have to look upward or downward to view the display or when you want to expand the field of view for your hands or otherwise adjust the fitting.

The head mounted monitor will point upward when the front pad is raised and downward when the front pad is lowered.



This illustration emphasizes the differences between angles.

Note

Make sure that the front pad is always in contact with your forehead during use. Otherwise, the display will turn off automatically.

Correcting Displacement

If the head mounted monitor shifts during a medical procedure, use one of the following methods to reposition it without contaminating your hands.

(1) Look down, then look forward again.

If the head mounted monitor has shifted slightly down, bending your neck forward until the front pad is no longer in contact with you forehead will shift the head mounted monitor slightly forward. After doing this, the head mounted monitor may shift up when you face forward again, correcting its positioning.



(2) Have someone correct the positioning using the position adjustment windows.

Have someone adjust the head mounted monitor so that the line guides on the left and right position adjustment windows line up with the center of the wearer's pupils. The wearer should direct the person making the adjustment based their ability to view the display. The person making the adjustment should also make sure that the center of the head mounted monitor lines up with



the wearer's nose.

(3) Wear a second pair of gloves, then reposition yourself. Wear another pair of gloves over the gloves used during the medical procedure, and correct the positioning yourself by hand. After repositioning, remove the outer pair of gloves and resume the medical procedure.

Removing the Head Mounted Monitor

Loosen the rear band, and then remove the head mounted monitor. If you remove the head mounted monitor without loosening the rear band, the rear pad may detach.





Configuring Initial Settings

Configure settings for the head mounted monitor's display. These settings will be required each time you turn on the monitor.

Select a language (first time only).

Use the \blacktriangle and \blacktriangledown buttons to select a language, and then press the MENU or \blacktriangleright button.

Tips

The language selection screen will not appear again after the first selection is made. If you want to change the language, display the setup menu and change the setting. For details, see "Modifying Settings" (page 28).



2 Adjust the distance between lenses.

The lens span adjustment screen appears. Move the lens span adjusters to perform adjustment until the display is clearly visible.

When you are finished adjusting, press the MENU or ▶ button.



Tips

- If the display is not visible even after adjusting the lens span, repeat the procedure in "Mounting the Head Mounted Monitor" (page 21).
- If you are having trouble with adjustments, try resetting the left and right adjusters to their middle positions before attempting to adjust again.

3 Read the instructions that appear on the screen.

After confirming its content, press the MENU or ► button.

4 Check the "I" mark and horizontal line displays.

Confirm that the horizontal line intersects each of the three "I" marks that appear on the screen, and then press the MENU or ▶ button. The line does not need to intersect across the middle of the screen.

Note

If the line fails to intersect even one of the "I" marks, do not use the unit.

Correct display



Display error



5 Read the warning that appears concerning the risks of prolonged use.

After confirming its content, press the MENU or > button.

Tips

You can disable the appearance of this warning by setting [Prolonged viewing warning] to [Off] in the setup menu (page 30).

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Operating the Image Processor Unit

You can switch the video display of the head mounted monitor by operating the front panel of the image processor unit.

Setting configurations will be stored, even after you turn off the image processor unit.

Selecting the Input Signal

Use the INPUT buttons to switch input signals. When using PinP display, you can switch the input signals for the main screen and sub-screen separately.

To switch the input signal for the main screen

If the sub-screen is displayed, press the PIP button to turn off the sub-screen display, and then press the INPUT button.

To switch the input signal for the sub-screen Press the PIP button to turn on the sub-screen display, and then press the INPUT button.

When you press the INPUT button, the input signal is switched in the order indicated by the following table. The input mode appears in the SUB display on the front of the unit. When the input mode is "6," pressing the INPUT button resets it to "1."

| Input mode | Description |
|------------|---|
| 1 | Displays video from the DVI-D 1(2D) input connector in 2D. |
| 2 | Displays video from the DVI-D 2(3D) input connector in 3D. This mode supports only videos in split left/ right format. |
| 3 | Displays video in 3D when the left-eye and right-eye videos of a 3D video are input via separate cables to the DVI-D 1(2D) and DVI-D 2(3D) input connectors. This mode cannot be used at the same time as modes 1 and 2. |
| 4 | Displays video from the SDI 1(2D) input connector in 2D. |
| 5 | Displays video from the SDI 2(3D) input connector in 3D. This mode supports only videos in split left/ right format. |
| 6 | Displays video in 3D when the left-eye and right-eye videos of a 3D video are input via separate cables to the SDI 1(2D) and SDI 2(3D) input connectors. This mode cannot be used at the same time as modes 4 and 5. |

When a remote controller is connected, control signal inputs perform the same function as the INPUT button and allow you to switch the input signal.

Holding down the INPUT button resets the input mode to "1." If you select the wrong input mode using a remote controller, press the remote controller switch repeatedly until you select the correct mode.

Displaying a Sub-Screen (PinP)

Press the PIP button to display the sub-screen of the PinP function.

Pressing the PIP button again turns off the sub-screen.

Flipping the Image

Press the FLIP button to flip the video image. The display changes in the following order with each press of the FLIP button. The current flip mode is displayed on the front panel of the unit.

| R | Normal display |
|---|-----------------------------|
| R | Left/right flip display |
| E | 180-degree rotation display |

When the left/right flip and 180-degree rotation display modes are selected, the flip mode will also be reflected in the head mounted monitor's display.

Head mounted monitor's screen



If the sub-screen is displayed when you press the FLIP button, the sub-screen's display will change. If only the main screen is displayed, the main screen's display will change.

If you want to change the main screen's display while the sub-screen is displayed, press the PIP button to turn off the sub-screen first.

Flip display settings are stored for each input mode.

Modifying Settings

Menu Operations

You can access the setup menu at any time to change or adjust the unit's various settings. Press the MENU button on the head mounted monitor to access the setup menu.

Notes

- Settings that are changed in the menu are stored separately for each HMM output connector on the image processor unit.
- If you connect the head mounted monitor to the other HMM output connector on the same image processor unit, its settings will not carry over.
- If you connect the head mounted monitor to a different image processor unit, its settings will not carry over.

- **1** Press the MENU button on the head mounted monitor.
- 2 Use the A/V buttons to select a setting category, and then press the MENU button.
- **3** Use the $\blacktriangle/\bigtriangledown$ buttons to select a setting menu, and then press the MENU button.
- 4 Use the A/V/ < > buttons to change or adjust the setting, and then press the MENU button.

Tips

- To return to a previous menu, press the \triangleleft button.

Menus

The underlined values are the factory defaults.

Lens span adjustment

| Back | Returns to the previous menu. |
|----------------------|--|
| Lens span adjustment | Adjusts the lens span of the head mounted monitor to match the distance between your eyes (interpupillary distance) for optimal viewing. Use the lens span adjusters on the head mounted monitor to adjust the lens span. For details, see "Configuring Initial Settings" (page 26). |
| | Note |
| | Proper operation is not possible without correct lens span adjustment. Always adjust the lens span before use. |

3D Settings

| Back | Returns to the previous menu. |
|------------|---|
| Reset | Resets all items under [3D Settings] to their factory default values. |
| 3D Display | Used to perform adjustments for the unit, etc. Do not change this setting under normal circumstances. If you accidentally change this setting, execute the above [Reset] setting. |

Display

| Back | R | Returns to the previous menu. |
|---|--|--|
| Picture Mode The [Picture Mode] yo here can be adjusted using the following se [Reset] to [Contrast R | ou select Si in detail ttings from Co emaster]. | Vivid: Produces vivid colors and sharp contrast. Standard: Emphasizes a natural picture to produce a standard quality for a variety of video sources. Custom: Stores your customized quality adjustments from the original flat picture. |
| Reset | Ri va | Resets all adjustment values for the mode selected in [Picture Mode] to their factory default alues. |
| Picture | A | djusts the contrast of the video. |
| Brightness | A | djusts the brightness of the video. |
| Color Tempera | ture Ad Cd M W Th (w | Adjusts the color temperature. Cool: Produces bluish color tones. Medium: Produces color tones that are between [Cool] and [Warm 1] / [Warm 2]. Varm 1 / Warm 2: Produces reddish color tones. [Warm 2] is redder than [Warm 1]. The factory default setting is [Medium] (when [Picture Mode] is set to [Vivid]) or [Warm 1] when [Picture Mode] is set to [Standard] or [Custom]). |
| Sharpness | Ei | nhances edges in the video to make them stand out, or softens them. |
| Frame Noise R | eduction R Hi O Th [P | Reduces random static-like noise in the video. High / Medium / Low: Specify the strength of this function. Off: Disables this function. The factory default setting is [Medium] (when [Picture Mode] is set to [Vivid]), [Low] (when Picture Mode] is set to [Standard]), or [Off] (when [Picture Mode] is set to [Custom]). |
| Block Noise Ro | eduction R Hi O | Reduces mosaic-like block noise in the video. ligh / Medium / Low: Specify the strength of this function. <u>)ff</u> : Disables this function. |
| Mosquito Nois | Reduction R Hi O Th [P | Reduces minute mosquito noise that occurs around edges in the video. ligh / Medium / Low: Specify the strength of this function. Off: Disables this function. The factory default setting is [Low] (when [Picture Mode] is set to [Vivid]) or [Off] (when Picture Mode] is set to [Standard] or [Custom]). |
| Panel Drive Mo | de Se No Cl | Selects the motion display method for video. <u>Iormal</u> : Standard video display. Clear: Reduces blurring for fast-moving images. |
| | • | Notes Although selecting [Clear] reduces blurring for fast-moving images, it also darkens the image as a whole. If this is a concern, select [Normal]. Depending on the video signal input, the image as a whole may appear to flicker. If this is a concern, select [Normal]. |
| Clear Black | Adlo | djusts the appearance of black areas in the video. This produces clearer blacks, without a bas to overall shading. |
| Contrast Rema | ster O fa Hi O Th or | Optimizes black and white levels automatically to produce high contrast quality, without aded blacks or whites. High / Medium / Low: Specify the strength of this function. Off: Disables this function. The factory default setting is [Medium] (when [Picture Mode] is set to [Vivid] or [Standard]) or [Off] (when [Picture Mode] is set to [Custom]). |

General Setup

| Back | Returns to the previous menu. |
|--------------------------|---|
| Power off when unmounted | <u>On</u> : Turns the unit off automatically 30 minutes after the head mounted monitor is removed. Off: Disables this function. |
| | Tips Regardless of this setting, the head mounted monitor's display will turn off automatically 10 seconds after the unit is removed. |

|||||||| Operation

| Language setting | Selects the language used for menus and other interface elements. |
|---------------------------|--|
| Prolonged viewing warning | <u>On</u> : Displays a warning after the unit is left on continuously for 6 hours. Off: Disables this function. |
| Startup viewer warning | <u>On</u> : Displays a startup warning when the unit is turned on. Off: Disables this function. |
| Reset to factory settings | Resets all setting items to their factory default values. |

Reattaching the Pads

If the front pad detaches

Push in the pad while paying attention to its orientation.



If the side pads detach

Push in the pads while paying attention to their orientation.





If the top pad detaches Reattach the pad as follows.

1 Pull out the top pad attachment board.



2 Insert the rails on the top pad attachment board into the grooves in the top pad.





3 Slide the top pad.



Troubleshooting

Power supply

| The unit does not turn on. | Check the AC adaptor and DC power cord connections. Make sure that the display cable is securely connected to the HMM output connector on the image processor unit. Make sure that the display cable is securely connected to the cable relay box of the head mounted monitor. Check whether the LED of the on/standby button on the image processor unit lights green when the button is pressed. Then, after waiting for the HMM indicator to light orange, press and hold the on/standby button on the head mounted monitor for at least 1 second. |
|-----------------------------|--|
| | Both the image processor unit and head mounted monitor take a few seconds to start up. |
| The unit does not turn off. | Firmly press the on/standby button on the image processor unit. |

Display

| Video does not appear or is distorted. | Make sure that the display cable and connection cable are properly connected. Make sure that the device connected to the input connectors of the image processor unit is turned on. Make sure that the input signal format is supported by the unit. For details on supported signal formats, see "Specifications" (page 35). The display cable may not be connected securely. Make sure that the cable is securely connected. If the problem persists, the cable may be damaged. If the cable is damaged, replace the cable with a new one. If the external device is connected to this unit via a signal switcher, connect the device directly to this unit. For details, refer to the instructions for use supplied with the device. Always use the dedicated HMO-CA50M display cable. For details, contact your Sony service representative. When using DVI cables, use commercially available cables for which high-speed support is indicated. If the connected medical device includes a deep color output setting, disable it. |
|--|---|
| The display is dark or blurry. | Make sure that the display cable and connection cable are properly connected, and that the head mounted monitor is properly mounted. Lens span adjustment may not have been performed properly. Perform adjustments under [Lens span adjustment] in the setup menu. If the surface of the lens area inside the head mounted monitor is dirty, clean it with a dry cloth. |
| The display turns off suddenly. | Mount the head mounted monitor properly. If the head pad's mount sensor detects that the unit has been unmounted for 10 seconds, the display will turn off automatically. For details, see "Power off when unmounted" (page 29). |
| The image dims after a certain amount of time. | If a still image or nearly motionless video is displayed for prolonged periods, the display may gradually dim over time. This is not a malfunction. Operate this unit or the connected device to restore the original brightness. |
| Certain pixels do not light or are always lit. | The OLED panels are manufactured with high precision technology. However, a very small proportion of pixels may be "stuck," either always off (black) or always on (red, green, or blue). This is not a malfunction. |
| The image as a whole appears to flicker. | When [Panel Drive Mode] is set to [Clear], the image as a whole may appear to flicker, depending on the video signal input. For details, see "Panel Drive Mode" (page 29). |

| Video does not display in 3D. | If similar images appear side-by-side horizontally or vertically on the display, the cables for the 3D video may not be connected properly. For details, see "Connections" (page 21). 3D percention varies among individuals. |
|-------------------------------|--|
| | If the I3D DisplayI menu appears but video is not displayed in 3D, turn off the connected |
| | device that is outputting the 3D video and turn it on again. |
| | This unit does not support 2D to 3D conversion (i.e., simulated 3D). |
| | Check the settings on the connected medical device. |

Miscellaneous

| There is no audio. | This unit does not include an audio output function. Connection of headphones and similar equipment is also not supported. |
|---|---|
| The on/standby button on the image processor unit blinks (orange) continuously. | If the indicator blinks twice every 3 seconds, the head mounted monitor, image processor unit, or cables may be damaged. For details, contact your Sony service representative. If the indicator blinks three times every 3 seconds, the image processor unit is overheated. Wait a moment for the unit to cool off. Do not obstruct the ventilation holes on the image processor unit, and ensure proper ventilation. If the above problem persists, contact your Sony service representative. |
| The HMM indicator on the image processor unit blinks (orange) continuously. | If the indicator blinks twice every 3 seconds, the head mounted monitor, image processor unit, or cables may be damaged. For details, contact your Sony service representative. If the indicator blinks three times every 3 seconds, the image processor unit is overheated. Wait a moment for the unit to cool off. Do not obstruct the ventilation holes on the image processor unit, and ensure proper ventilation. If the above problem persists, contact your Sony service representative. If the indicator blinks four times every 3 seconds for 1 minute, the head mounted monitor is overheated. Wait a moment for the unit to cool off. If the above problem persists, contact your Sony service representative. If the indicator blinks five times every 3 seconds for 1 minute, the head mounted monitor is overheated. Wait a moment for the unit to cool off. If the above problem persists, contact your Sony service representative. If the indicator blinks five times every 3 seconds for 1 minute, both the head mounted monitor and the image processor unit are overheated. Wait a moment for the units to cool off. If the above problem persists, contact your Sony service representative. |
| The buttons on the head mounted monitor are unresponsive. | The buttons on the head mounted monitor do not function unless the unit is mounted. |
| "DEMO" appears at the top right of the setup menu screen. | Contact your Sony service representative. |
| Cannot change the language setting due to the setup menu being in an unfamiliar language. | If you have not completed initial setup, press the ◄ repeatedly to return to the language selection screen, and then select your language. If you completed initial setup, restore the factory default settings as follows, and select your language while performing initial setup again. Press the MENU button to display the setup menu. Press the ▼ button to select the [General Setup] icon. Press the ▼ button to move the cursor to the right. Press the ▼ button to move the cursor to the very bottom. Press the ▼ button. (The confirmation message for [Restore to factory settings] will appear.) Press the ◄ button, and then press the MENU button. (The unit will restart.) When initial setup begins, press the ▲/▼ button to select your language, and then press the ▶ button to confirm. Follow the instructions on the screen to complete initial setup. |

Error Messages

Error messages appear on the head mounted monitor screen when errors occur on the image processor unit or the head mounted monitor. The background color of the error display changes according to the severity of the error.

|||||| Miscellaneous

| Message | Cause and solution |
|-----------------------------|---|
| No SYNC | The input signal may not be selected properly. Make sure the input signal selected with the INPUT button matches the connectors to which cables are connected on the image processor unit. The input signal may not be connected properly. Make sure that the cables are properly connected to the image processor unit The format of the video signals output by the connected medical device may not be supported by the unit. For details on supported signals, see "Input/output supported signals" in the "Specifications" section (page 35) and refer to the instructions for use supplied with the connected medical device. |
| Unknown Signal | The input signal is not correct. The format of the video signals output by the connected medical device may not be supported by the unit. For details on supported signals, see "Input/output supported signals" in the "Specifications" section (page 35) and refer to the instructions for use supplied with the connected medical device. |
| HMM Temp Error (light blue) | The head mounted monitor is overheating. Remove anything that may be covering the head mounted monitor. Move the unit away from any heat sources. |
| HMM Temp Error (yellow) | The head mounted monitor is overheating. Forced shutdown may occur if this display appears continuously. Take immediate safety precautions and prepare a backup unit, or discontinue use of the unit. |
| HMI Temp Error (light blue) | The image processor unit is overheating. Remove anything that may be covering the image processor unit. Move the unit away from any heat sources. |
| HMI Temp Error (yellow) | The image processor unit is overheating. Forced shutdown may occur if this display appears continuously. Take immediate safety precautions and prepare a backup unit, or discontinue use of the unit. |
| Temp Error (light blue) | The head mounted monitor and the image processor unit are overheating. Remove anything that may be covering the units. Move the units away from any heat sources. |
| Temp Error (yellow) | The head mounted monitor and the image processor unit are overheating. Forced shutdown may occur if this display appears continuously. Take immediate safety precautions and prepare backup units, or discontinue use of the units. |
| Go to Shutdown | The unit has reached the extreme temperature limit and will shut down shortly. Take immediate safety precautions, and discontinue use of the unit. |
| FAN Error | A fan error has occurred. If an object is caught in the fan, remove the object. Press the on/standby button to turn off the unit, and then turn it on again. If this error persists, contact your Sony service representative. |

Specifications

General

Power requirement 24 V DC (supplied from AC adaptor) Input current 1.5 A Operating conditions Temperature: 5 °C to 35 °C (41 °F to 95 °F) Humidity: 25% to 80% (no condensation allowed) Pressure: 700 hPa to 1060 hPa Storage and transport conditions Temperature: -20 °C to +60 °C $(-4 \,^{\circ}F \text{ to } +140 \,^{\circ}F)$ Humidity: 20% to 80% (no condensation allowed) Pressure: 700 hPa to 1060 hPa Dimensions (width / height / depth, excluding maximum protrusions) Approx. 306 mm \times 56.5 mm \times 358 mm $(12\frac{1}{8} \text{ in.} \times 2\frac{1}{4} \text{ in.} \times 14\frac{1}{8} \text{ in.})$ Approx. 3.3 kg (7 lb. 4.4 oz.) (excluding Mass power cord)

Input/output connectors

DVI input connectors DVI-D connectors (2) TMDS single link

SDI input connectors

BNC type (2)

SMPTE 292M standard compliance

DC IN connector

3-pin DIN, 24 V AC adaptor (AC-81MD etc.)

REMOTE connectors

Stereo mini jack (2)

DVI output connectors

DVI-D connectors (2) TMDS single link

SDI output connectors

BNC type (2)

SMPTE 292M standard compliance

HMM output connector Dedicated 20-pin (2) (connects to HMO-CA50M)

Input/output supported signals

Video input (2D)

720/50p, 720/60p, 1080/50i, 1080/60i, 1080/50p, 1080/60p

Video input (3D)

Side-by-side, Dual stream 720/50p, 720/60p, 1080/50i, 1080/60i Output signal In

Input signal is output as-is. Note that the following signals are not supported. DVI signals:

- Signals with HDCP (also not output to the HMM-3000MT)
- Signals with HDMI functions
- Signals with resolution higher than Full HD
- SDI signals:
- Audio signals
- 3G-SDI signals or higher

Supplied accessories

Before Using this Unit (1) CD-ROM (Instructions for Use) (1) AC adaptor (1) Instructions for Use for AC adaptor (1) Service Contact List (1) Information for Customers in Europe (1)

Optional accessories

HMM-3000MT head mounted monitor HMO-CA50M head mounted display cable FS-24 foot switch

Caution

The FS-24 has only an IPX3 splash proof rating, and should not be used in locations where it may be exposed to fluids (e.g., operating rooms). For safety, products with IPX6 or higher rating should be used in such instances.

Remote control using REMOTE connector

Sending the remote control pulse signal, illustrated below, via the REMOTE connector performs the same operations as pressing the INPUT button.

Timing pulse for REMOTE connector

REMOTE pin assignment







Specifications and external appearance are subject to change without notice for product improvement.

Medical Specifications

Protection against harmful ingress of water:

Ordinary

Degree of safety in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide:

Not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide

Mode of operation: Continuous

Notes

- Always verify that the unit is operating properly before use. SONY WILL NOT BE LIABLE FOR DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION OR REIMBURSEMENT ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS DUE TO FAILURE OF THIS UNIT, EITHER DURING THE WARRANTY PERIOD OR AFTER EXPIRATION OF THE WARRANTY, OR FOR ANY OTHER REASON WHATSOEVER.
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Reverse engineering, reverse assembly, reverse compilation, and other analysis procedures in regard to the source code of the software included in this product are prohibited.

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