

LCD Monitor

Instructions for Use

Before operating the unit, please read this manual thoroughly and retain it for future reference.

LMD-X310MT

LMD-X550MT



Indications for Use/Intended Use

The LCD Monitor is intended to provide 4K, 3D and 2D color video displays of images from endoscopic/laparoscopic camera systems, surgical microscope and other compatible medical imaging systems.

The LCD Monitor is a widescreen, 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, examination rooms, and operating rooms.

Essential performance is to display image and operate functions normally.

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 (LMD-X310MT only)

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 European Community representative, and appears next to the European Community representative'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 A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. 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.

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.

Rx
ONLY

For customers in Canada

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.
 - 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)

Important EMC notices for use in medical environments

- The LMD-X310MT/X550MT 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 LMD-X310MT/X550MT.

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 LMD-X310MT/X550MT.

Guidance and manufacturer's declaration – electromagnetic emissions		
The LMD-X310MT/X550MT is intended for use in the electromagnetic environment specified below. The customer or the user of the LMD-X310MT/X550MT should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The LMD-X310MT/X550MT 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	
Harmonic emissions IEC 61000-3-2	Not applicable (LMD-X310MT) Class D (LMD-X550MT)	The LMD-X310MT/X550MT 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.
Voltage fluctuations/flicker emissions IEC 61000-3-3	Not applicable (LMD-X310MT) Complies (LMD-X550MT)	

WARNING

If the LMD-X310MT/X550MT will be used adjacent to or stacked with other equipment, normal operation of the LMD-X310MT/X550MT under such configurations should be verified via observation.

Guidance and manufacturer's declaration – electromagnetic immunity


The LMD-X310MT/X550MT is intended for use in the electromagnetic environment specified below. The customer or the user of the LMD-X310MT/X550MT should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level		Electromagnetic environment – guidance
		LMD-X310MT	LMD-X550MT	
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	±6 kV contact ±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 fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	 ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Not applicable	±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	Not applicable	< 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 LMD-X310MT/X550MT requires continued operation during power mains interruptions, it is recommended that the LMD-X310MT/X550MT be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	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.

NOTE: U_T is the a.c. mains voltage prior to application of the test level.

Guidance and manufacturer's declaration – electromagnetic immunity

The LMD-X310MT/X550MT is intended for use in the electromagnetic environment specified below. The customer or the user of the LMD-X310MT/X550MT should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the LMD-X310MT/X550MT, including cables, than the recommended separation distance calculated from the equation appliance to the frequency of the transmitter. Recommended separation distance $d = 1.2 \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	
			$d = 1.2 \sqrt{P}$ 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). 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 LMD-X310MT/X550MT is used exceeds the applicable RF compliance level above, the LMD-X310MT/X550MT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the LMD-X310MT/X550MT.

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 LMD-X310MT/X550MT

The LMD-X310MT/X550MT is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the LMD-X310MT/X550MT can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the LMD-X310MT/X550MT 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	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.

WARNING

The apparatus shall not be exposed to dripping or splashing. No objects filled with liquids, such as vases, shall be placed on the apparatus.

WARNING

To prevent injury, if mounting the unit using a mounting arm, wall fixture, or other mounting device prepared by the customer, mount the unit securely as described in the instruction manual provided with the mounting device. When fixing the unit, use more than 4 of the supplied screws for the VESA mount or specified screws. Fasten the screws to the hole positions firmly and symmetrically to the upper and lower, left and right positions towards the center of the monitor. Check beforehand that the mounting device used has sufficient strength to support the added weight of the unit.

Check yearly that the mounting device is securely attached.

Caution

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

- Rear side: 4 cm (1 5/8 in.) or more
- Left/Right sides: 10 cm (4 in.) or more
- Bottom side: 6 cm (2 3/8 in.) or more
- Top side: 30 cm (11 7/8 in.) or more

Consult with Sony qualified personnel for the following types of installation location.

- Wall mount
- Floor mount (LMD-X310MT only)



Caution

Do not use the device in a MR (Magnetic Resonance) environment.

It may cause a malfunction, fire, and unwanted movement.

LMD-X550MT only

WARNING

To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

WARNING

This unit has no power switch.

To disconnect the main power, unplug the power plug. When installing the unit, incorporate a readily accessible disconnect device in the fixed wiring, or connect the power plug to an easily accessible socket-outlet near the unit.

Do not position the ME equipment where it is difficult to unplug the power plug.

If a fault should occur during operation of the unit, operate the disconnect device to switch the power supply off, or disconnect the power plug.



Warning on power connections

Use a proper power cord for your local power supply.

1. Use the approved Power Cord (3-core mains lead) / Appliance Connector / Plug with earthing-contacts that conforms to the safety regulations of each country if applicable.
2. Use the Power Cord (3-core mains lead) / Appliance Connector / Plug conforming to the proper ratings (Voltage, Ampere).

If you have questions on the use of the above Power Cord / Appliance Connector / Plug, please consult a qualified service personnel.



Warning on power connections for medical use

Customers in the U.S.A. and Canada should use the following type of power cord.

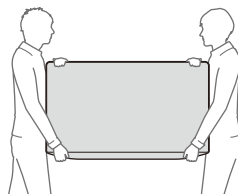
Customers in other countries or regions should use the power cord prescribed by their country or region.

	U.S.A. and Canada
Plug type	HOSPITAL GRADE*
Cord type	Min. Type SJT
	Min. 18 AWG
Minimum rating for plug and appliance couplers	10 A / 125 V
Safety approval	UL Listed and CSA

* Note: Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked "Hospital Only" or "Hospital Grade".

Caution

- This unit is heavy. Make sure to unpack and move the unit with two or more people.
- Firmly grip the bottom of this unit as shown below.



**Disposal of Old Electrical & Electronic Equipment
(Applicable in Republic of India)**



This symbol indicates that this product and its components, consumables, parts or spares thereof shall not be treated as household waste and may not be dropped in garbage bins. Product owners are advised to deposit their product at the nearest collection point for the recycling of electrical and electronic equipment. Your co-operation shall facilitate proper disposal & help prevent potential negative consequences/hazards to the environment and human health, which could otherwise be caused by inappropriate waste disposal including improper handling, accidental breakage, damage and/ or improper recycling of e-waste. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local civic office, your household waste disposal service provider or the store where you made the purchase. You may contact our company's toll free number in India for assistance.

Toll Free: 1800-103-7799

Visit: www.sony.co.in for product recycling

**Reduction in the Use of Hazardous Substances in
Electrical & Electronic Equipment (Applicable in
Republic of India)**

This product and its components, consumables, parts or spares comply with the hazardous substances restriction of India's E-Waste (Management) Rules. The maximum allowable concentrations of the restricted substances are 0.1% by weight in homogenous materials for Lead, Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBB) and Polybrominated Diphenyl Ethers (PBDE), and 0.01% by weight in homogenous materials for Cadmium, except for the exemptions specified in Schedule II of the aforesaid Rules.

For the customers in the U.S.A.

SONY LIMITED WARRANTY - Please visit <http://www.sony.com/psa/warranty> for important information and complete terms and conditions of Sony's limited warranty applicable to this product.

For the customers in Canada

SONY LIMITED WARRANTY - Please visit <http://www.sonybiz.ca/pro/lang/en/ca/article/resources-warranty> for important information and complete terms and conditions of Sony's limited warranty applicable to this product.

For the customers in Europe

Sony Professional Solutions Europe - Standard Warranty and Exceptions on Standard Warranty. Please visit <http://www.pro.sony.eu/warranty> for important information and complete terms and conditions.

For the customers in Korea

SONY LIMITED WARRANTY - Please visit <http://bpeng.sony.co.kr/handler/BPAS-Start> for important information and complete terms and conditions of Sony's limited warranty applicable to this product.

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The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc. in the United States and other countries.

Precaution

On Safety

- LMD-X310MT is a DC powered device. Use with the supplied AC adaptor (AC-300MD).
- LMD-X550MT is an AC powered device.
- Operate the unit on 100-240 V AC only.
- The nameplate indicating operating voltage, etc. is located on the AC adaptor.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for several days or more.
- To disconnect the AC power cord, pull it out by grasping the plug. Never pull the cord itself.
- The socket-outlet shall be installed near the equipment and shall be easily accessible.

On Installation

- Prevent internal heat build-up allowing adequate air circulation.
Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation holes.
- Do not install the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Do not place the monitor near equipment which generates magnetism, such as a transformer or high voltage power lines.

Precautions for using this unit safely

- 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 watching the display 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.

Precautions for connecting this unit with other medical devices

- 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.
- Before you utilize this unit, check if the image of the connected medical device is displayed properly on the screen of this unit.

Cautions for RESPONSIBLE ORGANIZATION when connecting this equipment to IT-NETWORK

- connection of the PEMS to an IT-NETWORK that includes other equipment could result in previously unidentified RISKS to PATIENTS, OPERATORS or third parties;
- the RESPONSIBLE ORGANIZATION should identify, analyze, evaluate and control these RISKS;
- subsequent changes to the IT-NETWORK could introduce new RISKS and require additional analysis; and
- changes to the IT-NETWORK include:
 - changes in the IT-NETWORK configuration;
 - connection of additional items to the IT-NETWORK;
 - disconnecting items from the IT-NETWORK;
 - update of equipment connected to the IT-NETWORK; and
 - upgrade of equipment connected to the IT-NETWORK.

On simultaneous use with an electrosurgical knife, etc.

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.

Recommendation to Use more than One Unit

As problems can occasionally occur for the monitor, when the monitor is used for safety control of personnel, assets or stable picture, or for emergencies, we strongly recommend you use more than one unit or prepare a spare unit.

LCD image display

Due to the physical characteristics of LCD panels, there may be a decrease in brightness or change in color temperature over a long period of use. These problems are not a malfunction.

In addition, these occurrences will not affect recorded data.

About the LCD Display Panel

- The LCD panel fitted to this unit is manufactured with high precision technology, giving a functioning pixel ratio of at least 99.99%. Thus a very small proportion of pixels may be “stuck”, either always off (black), always on (red, green, or blue), or flashing. In addition, over a long period of use, because of the physical characteristics of the liquid crystal display, such “stuck” pixels may appear spontaneously. These problems are not a malfunction.
- Do not leave the LCD screen facing the sun as it can damage the LCD screen. Take care when you place the unit by a window.
- Do not push or scratch the LCD screen. Do not place a heavy object on the LCD screen. This may cause the screen to lose uniformity.
- If the unit is used in a cold place, a residual image may appear on the screen. This is not a malfunction. When the monitor becomes warm, the screen returns to normal.
- The screen and the cabinet become warm during operation. This is not a malfunction.

About the Screen Protect Panel

The screen protect panel is made of toughened glass, but there is a possibility that it may crack. Handle with care.

- Avoid strong impact, such as dropping from a high place.
- Do not damage the panel with a sharp object. The glass may crack due to the damage.

On a Long Period of Use

Due to the characteristics of LCD panel, displaying static images for extended periods, or using the unit repeatedly in a high temperature/high humidity environments may cause image smearing, burn-in, areas of which brightness is permanently changed, lines, or a decrease in overall brightness.

In particular, continued display of an image smaller than the monitor screen, such as in a different aspect ratio, may shorten the life of the unit.

Avoid displaying a still image for an extended period, or using the unit repeatedly in a high temperature/high humidity environment such as an airtight room, or around the outlet of an air conditioner.

To prevent any of the above issues, we recommend reducing brightness slightly, and to turn off the power whenever the unit is not in use.

On Burn-in

For LCD panel, permanent burn-in may occur if still images are displayed in the same position on the screen continuously, or repeatedly over extended periods.

Images that may cause burn-in

- Masked images with aspect ratios other than 17:9 for the LMD-X310MT and 16:9 for the LMD-X550MT
- Color bars or images that remain static for a long time
- Character or message displays that indicate settings or the operating state

To reduce the risk of burn-in

- Turn off the character displays
Press the MENU button to turn off the character displays. To turn off the character displays of the connected equipment, operate the connected equipment accordingly. For details, refer to the operation manual of the connected equipment.
- Turn off the power when not in use
Turn off the power if the monitor is not to be used for a prolonged period of time.

Handling the 3D Glasses

- For the method and cautions of handling the supplied 3D Eye Shield Kit (CFV-E30SK), see the instructions for use of CFV-E30SK.
- Do not touch the lens surface of the 3D glasses.
- Do not leave the 3D glasses in ambient high-temperature, such as near heating equipment or inside a car.
- Do not put extra pressure on the 3D glasses to avoid them becoming misshapen.
- Make sure hard accessories or buckles not to touch the lens surface of 3D glasses while holding or transporting.
- Avoid wearing the 3D glasses when they are aging, breaking or being damaged. Tiny scratches on the lens surface may interfere with your viewing enjoyment.
- Laying down or looking away from the screen will lessen the 3D effect or shifts image colors.

On Fan Error

The fan for cooling the unit is built in. When the fan error indication appears on the screen, turn off the power and contact an authorized Sony dealer.

On Temperature Error

When this unit is used in a high temperature environment and the internal temperature rises, an error is displayed on the screen. When the error is displayed, contact an authorized Sony dealer.

On Moisture 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.

On Cleaning

For the method and cautions of handling the supplied 3D Eye Shield Kit (CFV-E30SK), see the instructions for use of CFV-E30SK.

Before cleaning

Be sure to disconnect the AC power cord from the AC outlet.

On cleaning the monitor and 3D glasses

A material that withstands disinfection is used for the front protection plate of the medical use LCD monitor. The protection plate surface is specially treated to reduce light reflection, as are the 3D glasses. When solvents such as benzene or thinner, or acid, alkaline or abrasive detergent, or chemical cleaning cloth are used for the protection plate surface/monitor surface/3D glasses, the performance of the monitor/3D glasses may be impaired or the finish of the surface may be damaged. Take care with respect to the following:

- Clean the protection plate surface/monitor surface/3D glasses with a 50 to 70 v/v% concentration of isopropyl alcohol or a 76.9 to 81.4 v/v% concentration of ethanol using a swab method. Wipe the protection plate surface gently (wipe using less than 1 N force).
- Stubborn stains may be removed with a soft cloth such as a cleaning cloth lightly dampened with mild detergent solution using a swab method and then clean using the above chemical solution. Never use solvents such as benzene or thinner, or acid, alkaline or abrasive detergent, or chemical cleaning cloth for cleaning or disinfection, as they will damage the protection plate surface/monitor surface/3D glasses.
- Do not use unnecessary force to rub the protection plate surface/monitor surface/3D glasses with a stained cloth. The protection plate surface/monitor surface/3D glasses may be scratched.
- Do not keep the protection plate surface/monitor surface/3D glasses in contact with a rubber or vinyl resin product for a long period of time. The finish of the surface may deteriorate.

On Repacking

Do not throw away the carton and packing materials. They make an ideal container which to transport the unit.

If you have any questions about this unit, contact your authorized Sony dealer.

Disposal of the Unit

Do not dispose of the unit with general waste.

Do not include the monitor with household waste.

About this manual

The instructions in this manual are for the following models:

- LMD-X310MT
- LMD-X550MT

The illustration of LMD-X310MT is used for the explanations. Any differences in specifications are clearly indicated in the text.

Features

The LCD Monitor is to provide color video displays of images from medical imaging systems on LCD (liquid crystal display) panel.

Liquid crystal and color filters are laid on the front of flat light source (backlight) on the LCD panel. And then, the LCD panel displays images by controlling the aperture of the liquid crystal according to input signals.

Compliance with medical safety standards in U.S.A., Canada and Europe

IEC 60601-1 and product safety standards in the U.S.A., Canada and Europe have been obtained for this monitor. The monitor is designed for use in the medical treatment field, with the sheet switch, screen protect panel, etc.

High brightness/high-resolution 4K panel

A 4K high-resolution panel and high brightness/ultra-wide field of view technology enables you to use the monitor under various lighting conditions and in numerous ways (installing on the wall, using several monitors to view an image, etc.). Because a color filter with wide-color reproduction and LCD materials with high response speed are used, the motion picture of the video signal is displayed more clearly.

A.I.M.E. (Advanced Image Multiple Enhancer) function

There are two modes in the A.I.M.E. function – the “Structure Enhancement mode” and “Color Enhancement mode.”

Users can select four levels for the Structure Enhancement mode and eight levels for the Color Enhancement mode, depending on their preference. By utilizing the A.I.M.E. function, users can expect the following effects on displayed images.

- Color Enhancement Function
This function clarifies color tone differences between objects.
- Structure Enhancement Function
This function improves recognition of the outline of objects. Visibility becomes clear making it easy to see objects.

The A.I.M.E. Color Enhancement Function emphasizes the contrast of R, G, B signals automatically but does not allow users to select a specific color.

Users can only select the degree of contrast, which increases from levels C1 (minimum) to C8 (maximum).

The A.I.M.E. Structure Enhancement Function emphasizes the outline and edges of objects.

Users can select the degree of the structure enhancement level, which increases from levels S1 (minimum) to S4 (maximum).

The image may seem blurred by applying the A.I.M.E. Color Enhancement Function.

The blur can be compensated for by using the A.I.M.E. Structure Function at the same time.

Users can select the degree of the structure enhancement from levels S1 (minimum) to S4 (maximum) for this purpose according to their preference.

A.I.M.E. is a registered trademark of Sony Corporation. A.I.M.E. is an optional function for enhancing the color or structure of the displayed image.

Like the other settings of the monitor, users must adjust or deactivate A.I.M.E. when appropriate.

Screen protect panel



OptiContrast
Panel

OptiContrast panel

The “OptiContrast” design that fills up the air layer between the LCD panel and screen protect panel with bonding resin is employed. By eliminating the air layer, this panel prevents diffused reflection and decrease in contrast. It also prevents condensation due to rapid temperature change.

Control panel

Assigns functions frequently used during an operation to buttons on the front surface of the monitor. The panel provides an user interface superior in operability through navigation by luminescent colors and status of the buttons.

3D

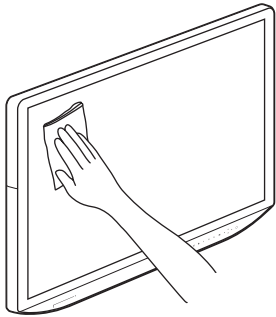
This unit is a high definition and high performance multi-format LCD monitor compatible with the micro-polarizer 3D.

Exclusive 3D glasses optimized for this unit are supplied considering long-time work.

You can use it for both 2D and 3D with the 2D/3D selection function.

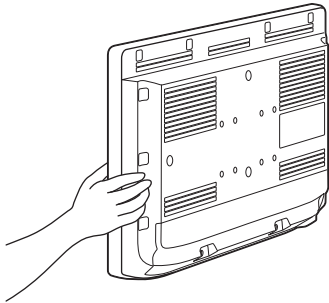
Flat surface for better maintenance

The design allows the user to easily wipe liquids and gel off the LCD panel and control buttons – ensuring a high standard of disinfection and cleanliness.



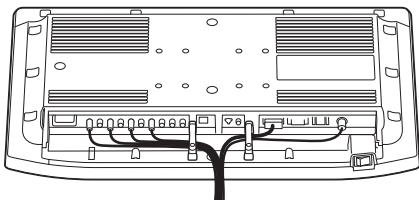
Grip that is easy to hold

The easy-to-grip ergonomic design enables the user to make tiny adjustments simply and quickly.

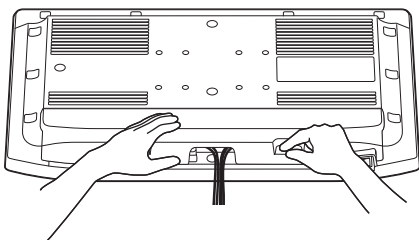


Simple connector notation

All the connectors face downwards, allowing for easy and organized cable connection.

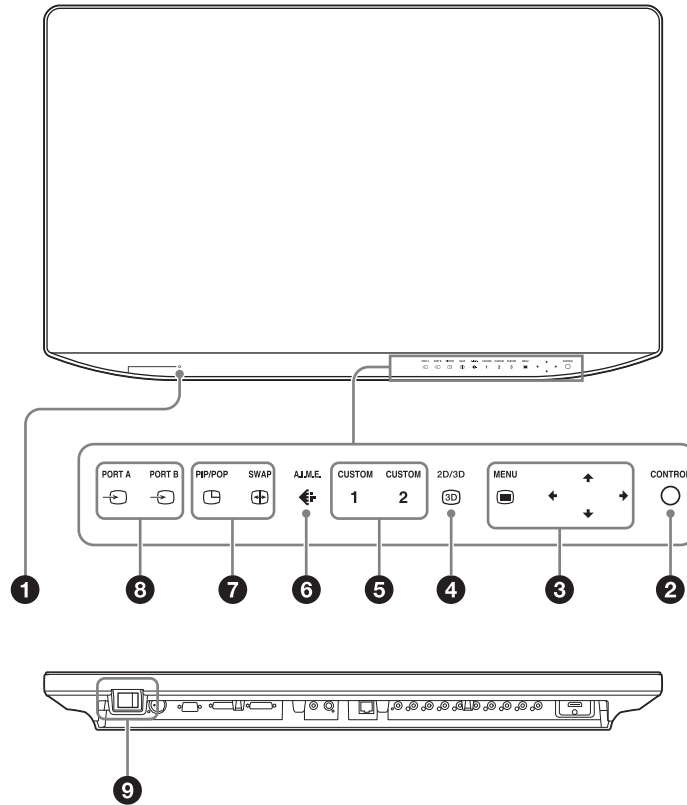


Cover designed for attachment



Location and Function of Parts and Controls

Front Panel



1 Power indicator

When the power is turned on, the power indicator lights in green.

When the protection function is activated and the display brightness is reduced due to the rise in temperature, it flashes in amber.

2 ○ CONTROL button

Displays or clears the operating buttons on the front panel.

Selects the items depending on the menu types.

3 OSD menu operation buttons

▢ MENU button

Press to display the on-screen menu.

Press again to clear the menu.

▲/▼/◀/▶ buttons

Press to select the items and setting values.

4 2D/3D select button

Switches between 2D and 3D displays.

5 CUSTOM button

Turns on or off the assigned function. You can adjust the assigned function by pressing the ◀/▶ buttons. (Refer to the custom buttons of the system configuration menu on page 31 and of the default setting on page 32.)

The following functions are assigned in the default setting.

CUSTOM 1: Brightness

CUSTOM 2: Contrast

6 ◀ A.I.M.E. button

Sets the A.I.M.E. ¹⁾ function to Off and On. When the A.I.M.E. function is set to On, A.I.M.E. Structure and A.I.M.E. Color can be adjusted.

1) A.I.M.E.: Enables better image reproduction and display.

7 2 or 3 screen display setting buttons

▢ PIP/POP: For displaying the 2 or 3 screen display or switching the 2 or 3 screen display mode.

⊕ SWAP: For swapping between the main display and the sub display.

8 Input select buttons

▢ PORT A: Displays the input signal assigned to PORT A. When the input signal of PORT A is

displayed, a menu which allows you to select the input signal to be assigned to PORT A is displayed.

⊖ **PORT B:** Displays the input signal assigned to PORT B. When the input signal of PORT B is displayed, a menu which allows you to select the input signal to be assigned to PORT B is displayed.

⑨ | (On)/ ⏻ (Standby) switch

Press the | side to turn the monitor on. Press the ⏻ side to switch the unit to the standby state, and the indicator light turns off.

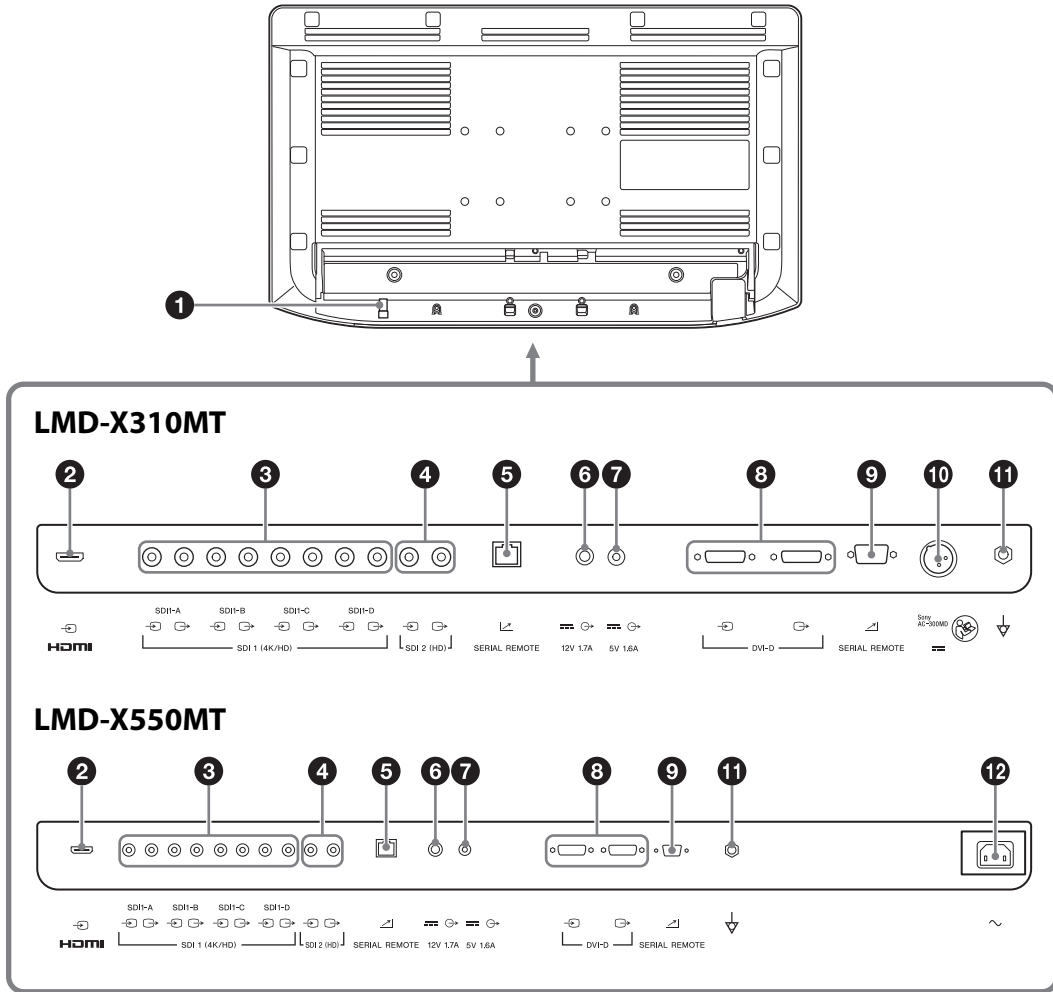
Input Signals and Adjustable/Setting Items

Item	Input signal					
	SDI 1	SDI 2	DVI-D		HDMI	
			Video	PC	Video	PC
Gamma	○	○	○	○	○	○
Phase	○	○	○	○	○	○
Chroma	○	○	○	○	○	○
Brightness	○	○	○	○	○	○
Contrast	○	○	○	○	○	○
A.I.M.E.	○	○	○	○	○	○
Gradation Extension	○	○	○	○	○	○
Color Temperature	○	○	○	○	○	○
Mono	○	○	○	○	○	○
Sharpness H	○	○	○	○	○	○
Sharpness V	○	○	○	○	○	○
RGB Range	×	×	○	○	○	○
Color Space	○	○	○	○	○	○
4K Scan Size	○ ¹⁾	×	×	×	○ ¹⁾	×
HD Scan Size	○ ²⁾	○ ²⁾	○ ²⁾	×	○ ²⁾	×
SD Scan Size	○ ³⁾	○ ³⁾	○ ³⁾	×	○ ³⁾	×
Zoom	○	○	○	○	○	○
Flip Pattern	○	○	○	○	○	○
SD Aspect	○ ³⁾	○ ³⁾	○ ³⁾	×	○ ³⁾	×
Interface Mode	○	×	×	×	×	×
2D/3D Select	○	○	○	○	○	○
3D Signal Format	○	○	○	○	○	○
3D Disparity	○	○	○	○	○	○
L/R Priority	○	○	○	○	○	○

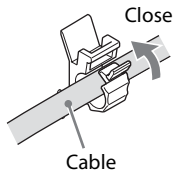
○ : Can be adjusted/set
 × : Cannot be adjusted/set

- 1) Reflected on the screen only when the 4K signal is input.
- 2) Reflected on the screen only when the HD signal is input.
- 3) Reflected on the screen only when the SD signal is input.
- 4) The setting value can be changed but is not applied to the screen when the PC signal is input.

Rear/Bottom Panel



- 1 HDMI cable holder**
Secures the HDMI cable (Ø7 mm or less).



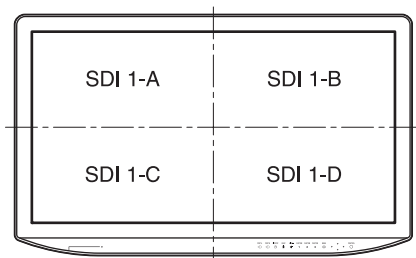
- 2 HDMI input connector**
Input connector for HDMI signals.
Use HighSpeed HDMI Cable with Cable Type Logo.
(Recommend Sony Cable.)

- 3 3G/HD/SD-SDI input/output connector (BNC type)**
SDI 1 (4K/HD)
connector (input)
Input connector for serial digital component signals ¹⁾
²⁾.
connector (output)

Signals input to the input connector are output to the output connector.

- 1) Serial digital component signals are SMPTE ST 259 compliant (SD)/SMPTE ST 292-1 compliant (HD)/ SMPTE ST 424 compliant (3G).
- 2) Transmission distance
3G-SDI: 70 m (approx. 230 ft) max. (When using 5C-FB coaxial cables (Fujikura. Inc.) or equivalent.)
HD-SDI: 100 m (approx. 328 ft) max. (When using 5C-FB coaxial cables (Fujikura. Inc.) or equivalent.)
SD-SDI: 200 m (approx. 656 ft) max. (When using 5C-2V coaxial cables (Fujikura. Inc.) or equivalent.)

For the HD/SD quad view setting, each connector is compatible with the four division-images shown below.



4 3G/HD/SD-SDI input/output connector (BNC type)

SDI 2 (HD)

connector (input)

Input connector for serial digital component signals ¹⁾ ₂₎.

connector (output)

Signals input to the input connector are output to the output connector.

- 1) Serial digital component signals are SMPTE ST 259 compliant (SD)/SMPTE ST 292-1 compliant (HD)/SMPTE ST 424 compliant (3G).
- 2) Transmission distance
 3G-SDI: 70 m (approx. 230 ft) max. (When using 5C-FB coaxial cables (Fujikura. Inc.) or equivalent.)
 HD-SDI: 100 m (approx. 328 ft) max. (When using 5C-FB coaxial cables (Fujikura. Inc.) or equivalent.)
 SD-SDI: 200 m (approx. 656 ft) max. (When using 5C-2V coaxial cables (Fujikura. Inc.) or equivalent.)

5 SERIAL REMOTE connector (RJ-45)

Connect to the network by using a 10BASE-T/100BASE-TX LAN cable (non-shielded type of 5 or more category, optional).

The monitor can be operated according to control commands sent from connected external equipment. Consult your dealer in order to utilize the function.

Caution

- For safety, do not connect the connector to peripheral device wiring that might have excessive voltage. Follow the instructions for use for this port.
- The connection speed may be affected by the network system. This unit does not guarantee the communication speed or quality of 10BASE-T/100BASE-TX.

6 == ⇄ 12V 1.7A output connector

Outputs 12 volts. (A connector for an option for future use)

7 == ⇄ 5V 1.6A output connector

Outputs 5 volts. (A connector for an option for future use)

8 DVI-D input/output connector

connector (input)

Input DVI Rev.1.0 applicable digital signal.

connector (output)

Active through output connector of the DVI digital signal.

Note

Signals are output when the power is on. No signal is output when the power is off. Signals protected with HDCP ¹⁾ cannot be output.

- 1) HDCP (High-bandwidth Digital Content Protection) is a copyright protection technology using encryption technology of digital video signals.

9 SERIAL REMOTE RS-232C connector (D-sub 9-pin, female)

The monitor can be operated according to control commands sent from connected external equipment.

10 (DC 26 V input) connector (LMD-X310MT only)

Connects the DC connector of the supplied AC adaptor.



Caution

Connect the DC connector to the unit, then connect the power cord of the AC adaptor.

To remove the DC connector, remove the power cord of the AC adaptor, then remove the DC connector.



WARNING

For the DC power supply, make sure to use the supplied AC adapter, AC-300MD.

If another power supply is used, there is a risk of fire or electric shock.

11 ⚡ (equipotential) terminal

Connects the equipotential plug.

12 ~ (AC input) connector (LMD-X550MT only)

Connects the supplied AC power cord.



Caution

Do not come into contact with the terminals of the rear panel connectors and patients at the same time.

Doing so may result in a generation of voltage that can be harmful to patients if the unit is malfunctioning.

Always disconnect the power cord before connecting and disconnecting connectors.



WARNING

Using this unit for medical purposes

The connectors on this unit are not isolated.

Do not connect any device other than one which conforms to IEC 60601-1 standards.

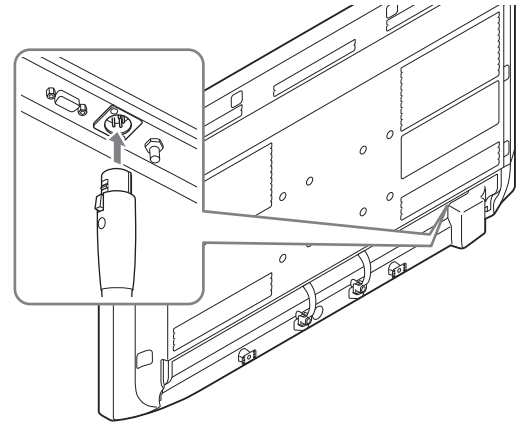
When an information technology device or AV device that uses an alternating current is connected, current leakage may result in an electric shock to the patient or operator.

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.

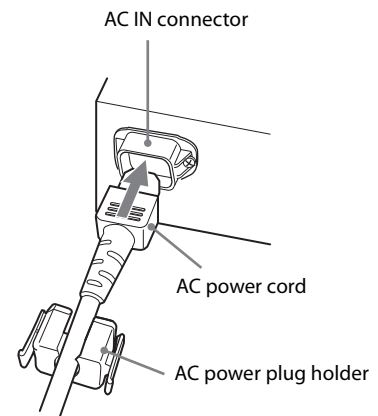
Connecting the AC Power Cord

LMD-X310MT

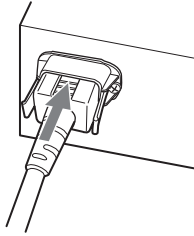
- 1 Make sure that the | (On)/ ⏻ (Standby) switch is set to ⏻ (in a standby state).
- 2 Insert the DC connector to the DC 26 V input connector of the rear panel until it locks.



- 3 Plug the AC power cord into the AC IN connector of the AC adaptor and attach the AC power plug holder to the AC power cord.



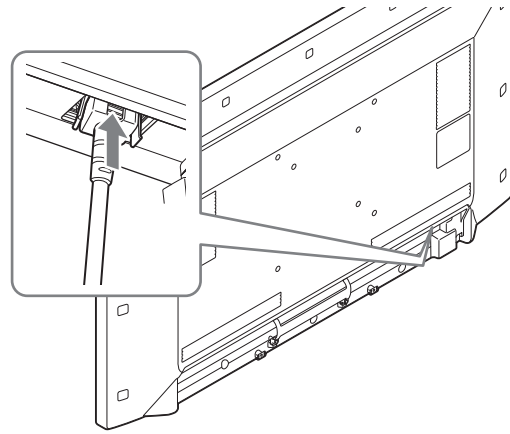
- 4 Insert the AC power plug holder until the fixing lever locks.



- 5 Connect the plug of the AC power cord to an AC outlet.

To remove the AC power cord

Press the | (On)/ ⏻ (Standby) switch to the ⏻ side and switch the unit to the standby state, then remove the AC power cord from the AC power plug holder by holding the fixing levers of the holder from both sides to release the lock. Then, remove the DC connector from the unit.



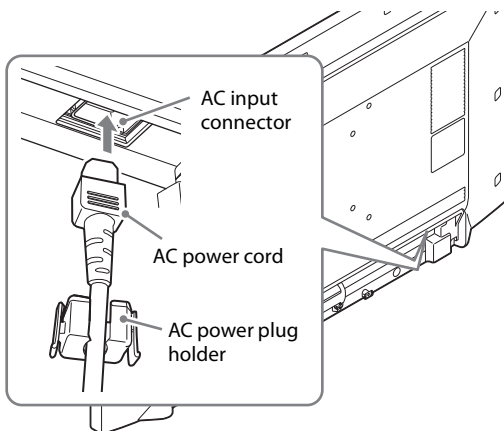
- 4 Connect the plug of the AC power cord to an AC outlet.

To remove the AC power cord

Press the | (On)/ ⏻ (Standby) switch to the ⏻ side and switch the unit to the standby state, then remove the AC power cord from the AC power plug holder by holding the fixing levers of the holder from both sides to release the lock.

LMD-X550MT

- 1 Make sure that the | (On)/ ⏻ (Standby) switch is set to ⏻ (in a standby state).
- 2 Insert the AC power cord to the AC input connector of the rear panel and attach the AC power plug holder to the AC power cord.



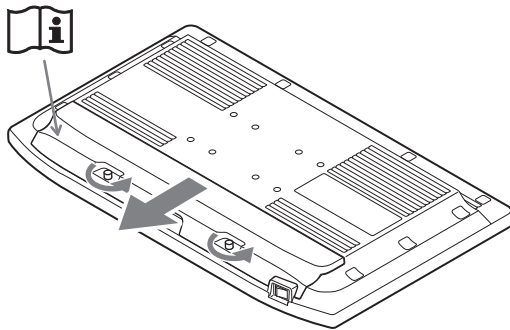
- 3 Insert the AC power plug holder until the fixing lever locks.

Removing the Connector Cover

To use the connector, remove the connector cover as follows.

Before removing the connector cover, disconnect the power cord.

- 1 Loosen the two screws.
- 2 Slide the connector cover in the direction of the arrow and remove it.



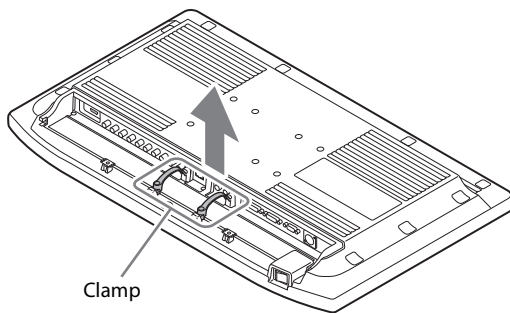
- 3 Remove the two screws and cable clamp.



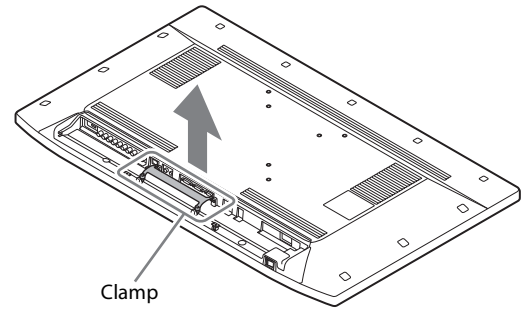
Caution

Do not remove screws other than the two screws fixing the clamp. Doing so may cause electric shock.

LMD-X310MT



LMD-X550MT



- 4 Position the connecting cable under the attaching cable clamp.
- 5 Attach the connector cover.

Note

When using a thick connecting cable that cannot be positioned under the attaching cable clamp or connector cover, do not forcefully fix the cable. Use the unit with the connector cover removed.



Caution

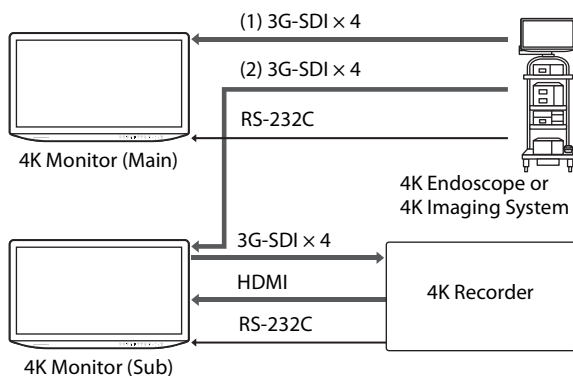
This unit with the connector cover attached conforms to the waterproofed standard. (LMD-X310MT: See page 34, LMD-X550MT: See page 35)

Be sure not to use the unit with the connector cover removed since waterproofed performance is not guaranteed.

Configuration Example: 4K Surgical Endoscope

The 4K monitors can be configured with a 4K endoscope and 4K recorder as below.

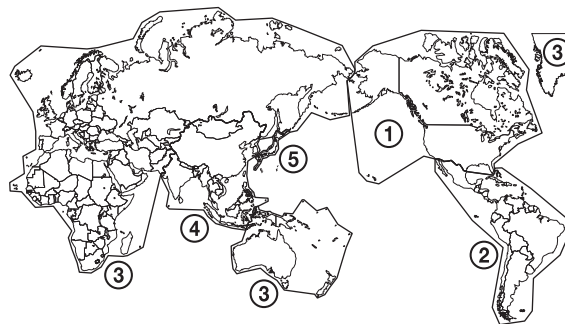
The monitor parameter can be controlled from an external device via RS-232C interface.



Initial Setting

When you turn on the unit for the first time after purchasing it, select the area and language where you intend to use this unit from among the options.

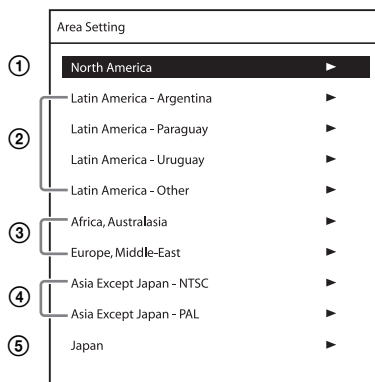
To set the using area



	Color Temperature
North America	D65
Latin America - Argentina	D65
Latin America - Paraguay	D65
Latin America - Uruguay	D65
Latin America - Other	D65
Africa, Australasia	D65
Europe, Middle-East	D65
Asia Except Japan - NTSC	D65
Asia Except Japan - PAL	D65
Japan	D93

1 Turn on the unit.

The Area Selection screen appears.



2 Press the CONTROL button.

- Press the **▲** or **▼** button to select the area where you intend to use the unit and press the **▶** button.

When the confirmation screen is displayed, press the **◀** or **▶** button to select Yes and press the CONTROL button.

④ If you select Asia Except Japan

Customers who will use this unit in the shaded areas shown in the map below except for Japan should select NTSC AREA.

Other customers should select PAL AREA.



- The Area Selection screen disappears and the menu item settings suitable for the selected area are applied.

Note

When you have selected the wrong area, set the following items using the menu.

- Color Temperature (on page 27)
- See “To set the using area” (page 23) on the setting value.

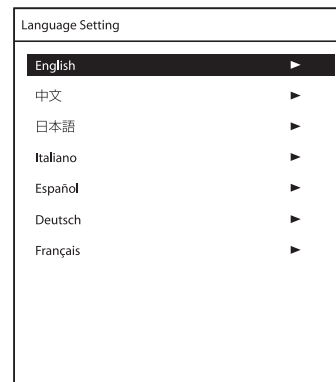
To set the using language

You can select one of seven languages (English, Chinese, Japanese, Italian, Spanish, German, French) for display on the menu and other on-screen displays. The default menu language is set to “English.”

- Turn on the unit.

Select the area where you intend to use this unit on the Area Selection screen. (See page 23.)

- The Language Setting screen is displayed.



- Press the **▲** or **▼** button to select the language and press the **▶** button.

When the confirmation screen is displayed, press **◀** or **▶** button to select Yes and press the CONTROL button.

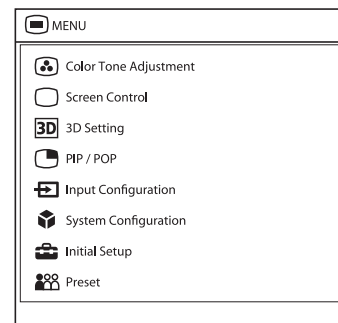
To change the menu language

Select the area and language which you use. See this section when you change the using language.

- Press the MENU button.

The menu-selecting screen appears.

The menu presently selected is shown in blue.

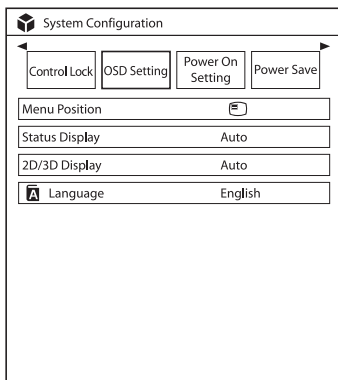


- Press the **▲/▼** button to select “System Configuration.”

When you press the **▶** or CONTROL button, the “System Configuration” menu is displayed and the selected tab is shown in blue.

- Press the **◀/▶** button to select the “OSD Setting” tab.

The “OSD Setting” menu appears.



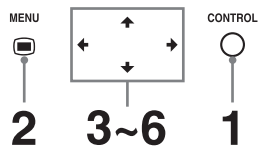
- 4** Press the \uparrow/\downarrow button to select “Language.”
The selected item is displayed in blue.
- 5** Press the \leftarrow/\rightarrow button to select a language.
The menu changes to the selected language.

To clear the menu

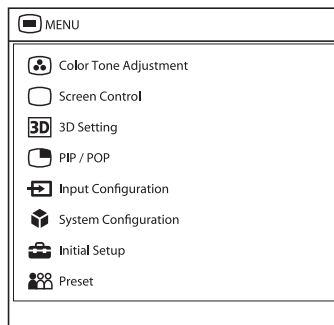
Press the MENU button.
The menu disappears automatically if a button is not pressed for one minute.

Using the Menu

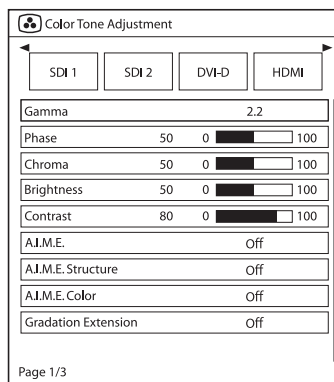
The unit is equipped with an on-screen menu for making various adjustments and settings such as picture control, input setting, setting change, etc.
To change the menu language, refer to “To change the menu language” on page 24.



- 1** Press the CONTROL button.
The operation buttons are displayed.
- 2** Press the MENU button.
The menu-selecting screen appears.
The menu presently selected is shown in blue.




- 3** Press the \uparrow/\downarrow button to select a menu.
When you press the \rightarrow or CONTROL button, the selected menu appears and setting items of the selected tab are displayed.



- 4** Press the \leftarrow/\rightarrow button to select the tab.



The selected tab is shown in blue, and setting items of the selected tab appear.

5 Select an item.


Press the  button to select the item.
The item to be changed is displayed in blue.

6 Make the setting or adjustment on an item.

When changing the adjustment level:

To increase the number, press the  button.
To decrease the number, press the  button.

When selecting the setting:

Press the  button to select the setting.

Note

If the Control Lock is set to “On,” the setting cannot be changed.
For details about Control Lock, see page 30.

About the memory of the settings

The settings are automatically stored in the monitor memory.

When the power is turned off, the setting value of A.I.M.E. is set to “Off.”

About the control navigation

Depending on the state, the operating buttons of the unit light as shown below:

White light: Operable state.

Green light: Operating state.

Off: Unable to operate.

Adjustment Using the Menus

Items

The screen menu of this monitor consists of the following items.

 **Color Tone Adjustment**

- Gamma
- Phase
- Chroma
- Brightness
- Contrast
- A.I.M.E.
- A.I.M.E. Structure
- A.I.M.E. Color
- Gradation Extension
- Color Temperature
- Gain R Offset
- Gain G Offset
- Gain B Offset
- Bias R Offset
- Bias G Offset
- Bias B Offset
- Mono
- Sharpness H
- Sharpness V
- RGB Range
- Color Space

 **Screen Control**

- 4K Scan Size
- HD Scan Size
- SD Scan Size
- Zoom
- Flip Pattern
- SD Aspect
- Interface Mode

 **3D Setting**

- 2D/3D Select
- 3D Signal Format
- 3D Disparity
- L/R Priority

 **PIP / POP**

- 3 Screen Display
- Clipping Size
- Sub Screen Position

Pattern Skip

Input Configuration

Input Name
HDCP Setting

System Configuration

Control Lock
OSD Setting
Power On Setting
Power Save
Serial Remote
Ethernet Setting
Custom Button
Panel Display
Monitor Information

Initial Setup

Language
Pattern Skip
PIP / POP
Custom Button

Preset

Load User Setting
Save User Setting
User Name
Load Default

Adjusting and changing the settings

Color Tone Adjustment menu

The Color Tone Adjustment menu is used to adjust picture quality for each input.

You need to use the measurement instrument to adjust the color temperature.

Recommended: Konica Minolta color analyzer CA-310

Submenu	Setting
Gamma	Select the appropriate gamma mode from among “1.8,” “2.0,” “2.2,” “2.4,” “2.6,” “DICOM,” “Highlight.” “DICOM” is for reference, not diagnostic, purposes only.
Phase	Adjusts color tones. The higher the setting, the more greenish the picture. The lower the setting, the more purplish the picture.
Chroma	Adjusts color intensity. The higher the setting, the greater the intensity. The lower the setting, the lower the intensity.
Brightness	Adjusts brightness.

Submenu	Setting
Contrast	Adjusts contrast.
A.I.M.E.	Select from among “Off,” “On” and “Check Mode.” When you select “Check Mode,” two images of A.I.M.E. ¹⁾ being “Off” / “On” are displayed. 1) A.I.M.E.: Enables better image reproduction and display.
Notes	
<ul style="list-style-type: none">A.I.M.E. Logo is displayed on the display area where the A.I.M.E. function is activated.When the HD/SD quad view is set, A.I.M.E. functions for only the SDI 1-A input.When the PIP/POP view is set, A.I.M.E. functions for only the main display.The “Check Mode” is available only in 2D. When selected in 3D, “On” functions.	
A.I.M.E. Structure	Adjusts the contrast enhancement.
A.I.M.E. Color	Adjusts the color enhancement.
Gradation Extension	Displays the expanded gradation of a specific color. Select “On” or “Off.”
Color Temperature	Select the color temperature from among “D65,” “D93.”
Note	
If the setting is changed, Gain R/G/B Offset and Bias R/G/B Offset are restored to 0 respectively.	
Gain R Offset Gain G Offset Gain B Offset	Adjust color temperature in detail, and color balance (Gain).
Bias R Offset Bias G Offset Bias B Offset	Adjust color temperature in detail, and color balance (Bias).
Mono	Sets the display to a monochrome picture. Set to “On” for a monochrome picture, set to “Off” for a normal (chromatic) picture.
Sharpness H	Adjusts the horizontal sharpness. The higher the setting, the sharper the picture. The lower the setting, the softer the picture.
Sharpness V	Adjusts the vertical sharpness. The higher the setting, the sharper the picture. The lower the setting, the softer the picture.
RGB Range	Sets the RGB signal range. Select from among “Auto,” “Limited,” “Full.” If you set to “Auto,” this item is set to “Limited” when inputting video signal, and “Full” when inputting PC signals.
Color Space	Select the color gamut from among “BT.709,” “Native,” “BT.2020,” “Auto.”

□ Screen Control menu

The Screen Control menu is used to set the image display setting for each input.

Submenu	Setting
4K Scan Size	Select the scan size for the 4K signal display. Select “Off” or “Mode7.”
HD Scan Size	Sets the scan size for the HD signal display of 1920 × 1080. Select from among “Off,” “Mode2,” “Mode3,” “Mode4,” “Mode5,” “Mode6.”
SD Scan Size	Sets the scan size for the SD signal display. Select from among “Off,” “Mode1.”
Zoom	Video signals can be enlarged in the specified ratio. Select from among “Off,” “x1.2,” “x1.5,” “x2.0.”
<div style="background-color: black; color: white; padding: 2px; text-align: center;">Notes</div> <ul style="list-style-type: none"> • Zoom is available only when the horizontal resolution is 1280 dots or more. • When displaying 2 or 3 screen display, zoom is available only in the main screen of PIP view. • When the horizontal resolution of 3D display is less than 1920 dots and the 3D signal format is set to “Side by Side,” Zoom is not available. • When Zoom is reflected, “4K Scan Size,” “HD Scan Size,” and “SD Scan Size” are not available. 	
Flip Pattern	Sets the flip pattern of the display. Select from among “Off,” “Rotation.”
<div style="background-color: black; color: white; padding: 2px; text-align: center;">Note</div> <p>When images are rotated, the delay amount will be one frame longer than the normal time. Use the unit considering the delay amount of the entire system.</p>	
SD Aspect	Sets the aspect ratio of the SD signal display. Select from among “4:3,” “16:9.”

Submenu	Setting
Interface Mode	Select the interface mode. <ul style="list-style-type: none"> • 4K Quad: Select to display the 4K signal input to the A to D connector of SDI 1. • 4K Dual: Select to display the 4K signal input to the A or B connector of SDI 1. • HD Dual: Select to display the HD signal input to the A or B connector of SDI 1. • HD/SD Single: Select to display the HD or SD signal input to the A connector of SDI 1. • HD/SD Quad View: Select to display the HD or SD signal input to the A to D connector of SDI 1 in images divided in four.
<div style="background-color: black; color: white; padding: 2px; text-align: center;">Note</div> <p>When set to “HD/SD Quad View,” the 3G Level B-DS 3D-Dual Stream signal is not available to the A to D connectors of SDI 1. The input signal is displayed in black.</p>	

3D 3D Setting menu

Submenu	Setting
2D/3D Select	Switches between 2D and 3D displays. <ul style="list-style-type: none"> • 2D: Select to display input signals in 2D. • 3D: Select to display input signals in 3D. • 3D to 2D Convert: Select to display input signals of 3D in 2D.
<div style="background-color: black; color: white; padding: 2px; text-align: center;">Notes</div> <ul style="list-style-type: none"> • For 3D signal input, set to “3D” or “3D to 2D Convert.” • When displaying 2 or 3 screen display, the sub screen displays in 2D. • When the interface mode for SDI 1 is set to “HD/SD Quad View,” the screen displays in 2D. 	

Submenu	Setting
3D Signal Format	<p>Select the 3D signal format.</p> <ul style="list-style-type: none"> • Dual Stream: Select to display signals of the Dual Stream system in 3D. • Side by Side: Select to display signals of the Side by Side system in 3D. • Top & Bottom: Select to display signals of the Top & Bottom system in 3D. • Line by Line: Select to display signals of the Line by Line system in 3D. • Auto: Switches automatically among displays of 2D or 3D according to the channel assign information when 3G-SDI signals of the 3G Level-B system are input. When “2D/3D Select” is set to “2D,” images are always displayed in 2D.
	<p>Notes</p> <ul style="list-style-type: none"> • For the 4K signal, “Dual Stream” is not available. • For the Interlace and YUV420 signals, “Line by Line” is not available.
3D Disparity	Sets the setting of the 3D Disparity adjustment.
L/R Priority	Sets the channel displayed in the top of the screen of an effective display. Select “L Line First” or “R Line First.”
	<p>Note</p> <p>When the setting is wrong, the screens for left eye and right eye are displayed conversely.</p>

PIP / POP menu

The PIP / POP menu is used to set the display mode for the 2 or 3 screens display and for each input.

Note

3D is not available for the sub display.

Submenu	Setting
3 Screen Display	
Port C Display	Sets the display of the sub screen for the third screen. Select “On” or “Off.”

Submenu	Setting
Port C Input	<p>Sets the input connector for the third screen.</p> <p>Select from among “SDI 1,” “SDI 2,” “DVI-D,” “HDMI.”</p>
	<p>Notes</p> <ul style="list-style-type: none"> • When inputting the signals equivalent to 4K to the sub screens for the second and third screens of 2 or 3 screen display, the third screen displays in black. • When the main screen displays in “3D” or “3D to 2D Convert” for “2D/3D Select,” the third screen is not displayed even though “Port C Display” is set to “On.”
Clipping Size	<p>Sets the HD of 1920 × 1080 clipping size for each port when using 2 or 3 screens display.</p> <p>Select from among “Normal,” “4:3,” “5:4,” “Overscan.”</p>
Sub Screen Position	
PIP	<p>Sets the sub screen position for the 2 or 3 screens display (PIP).</p> <p>Select from among “Lower Left,” “Upper Left,” “Upper Right,” “Lower Right.”</p>
POP	<p>Sets the sub screen position for the 2 or 3 screens display (POP).</p> <p>Select from among “Right,” “Left.”</p>
	<p>Note</p> <p>Signals equivalent to 4K can display only 1 screen for multiple displays. For the signal type for using signals equivalent to 4K, refer to “Available signal formats” (page 37).</p>
Pattern Skip	<p>Sets the pattern that is skipped when changing the displaying pattern by pressing the PIP/POP button on the front panel while displaying 2 or 3 screen displays.</p> <p>Set to “Not Skip” or “Skip” for the PIP1, PIP2, POP1, or POP2 pattern.</p>

Input Configuration menu

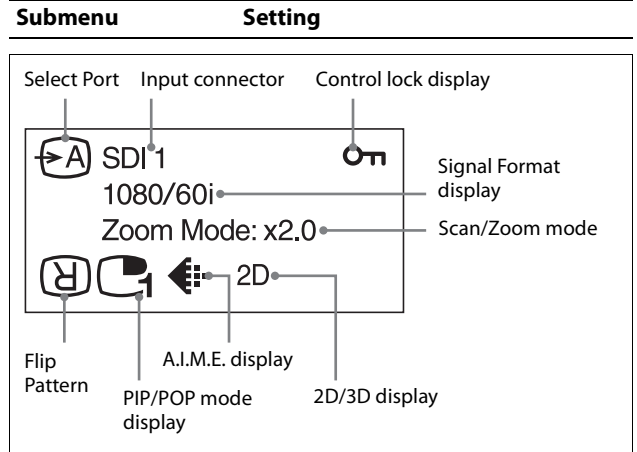
Submenu	Setting
Input Name	<p>Sets the name for each input connector. Set the name of the SDI 1, SDI 2, DVI-D, HDMI connector.</p> <ul style="list-style-type: none"> • Endoscope • Laparoscope • Ultrasound • Recorder • Printer • PACS • C-arm • Room Camera • Surgical Camera • Microscope • Vital Device
HDCP Setting	<p>Sets the HDCP setting for signals input in the DVI-D connector.</p> <ul style="list-style-type: none"> • Enable: Sets to use the signals protected with HDCP. • Disable: Sets to use the signals not protected with HDCP. When “Disable” is set for the signals not protected with HDCP, signals are output from the DVI-D connector.

Note

When “Disable” is set for the signals protected with HDCP, images are not displayed.

System Configuration menu

Submenu	Setting
Control Lock	
Control Lock	<p>Set when you want to limit the operation of the control panel. Set to “Off” for no limit, “On” to limit.</p>
Lock Mode	<p>Sets the range to limit the operation of the control panel. This setting is available when “Control Lock” is set to “On.”</p> <ul style="list-style-type: none"> • Menu: Limits the menu operations other than the control lock setting. • Menu&Button: Limits all operations other than the control lock setting.
OSD Setting	
Menu Position	<p>Sets the menu position. Select from among “Upper Left,” “Upper Right,” “Lower Right,” and “Lower Left.”</p>
Status Display	<p>Port, input connector name, control lock, signal format, Scan/Zoom mode, Flip Pattern, PIP/POP mode, A.I.M.E., and 2D/3D are displayed.</p>



- **Auto:** The format and scan mode are displayed for about 3 seconds when the content of Status Display is changed.
- **On:** The format and scan mode are always displayed.
- **Off:** The format and scan mode are not displayed.

Notes

- Even if the setting is set to “Auto” or “Off,” the flip pattern is available.



- For details about the signal format, refer to no signal and incompatible signal displays.

Input	Signal format display
No signal	No Sync
Non compatible signal (except for DVI-D, HDMI)	Unknown
Non compatible signal (DVI-D, HDMI)	Out Of Range

2D/3D Display

- Select the display method of OSD to show the currently set display method from among 2D, 3D, or 3D to 2D Convert.
- **Auto:** The method is displayed for about 3 seconds after the status of 2D, 3D, or 3D to 2D Convert is changed, or when Status Display is displayed.
 - **On:** The method is always displayed.
 - **Off:** The method is not displayed.

Submenu	Setting
Language	You can select the menu or message language from the following languages. <ul style="list-style-type: none"> • English: English • 中文: Chinese • 日本語: Japanese • Italiano: Italian • Español: Spanish • Deutsch: German • Français: French
Power On Setting	
Power On Mode	Selects the setting when the monitor is turned on from the following settings. <ul style="list-style-type: none"> • Last: The setting when the monitor was last turned off. • Default Setting: The setting that is set in the default setting. • User1 to 20: The selected user setting.
Logo	Select the logo when the power turns on from among “On - 5sec,” “On - 10sec,” “Off.”
Power Save	
Energy Saving Mode	Selects the energy saving mode. <ul style="list-style-type: none"> • Off: Turns the energy saving mode off. • On: Dims the backlight.
Sleep Mode	Sets the sleep mode to on or off. When you set to “On,” the monitor enters into power saving mode by turning off the backlight if there is no input signal from the selected connector for more than 1 minute.
Serial Remote	
Serial Remote	Selects the using mode. <ul style="list-style-type: none"> • Off: Disables the serial remote function. • RS-232C: Controls this unit via RS-232C command. • Ethernet: Controls this unit via Ethernet command.
Ethernet Setting	Sets the Ethernet. <ul style="list-style-type: none"> • IP Address: Sets the IP Address. • Subnet Mask: Sets the Subnet Mask. • Default Gateway: Sets “On” or “Off” of the Default Gateway. • Address: Sets the Default Gateway.

Submenu	Setting
Custom Button	Assigns the function to the CUSTOM 1 or CUSTOM 2 button on the front panel, and can set the following functions to on or off. <ul style="list-style-type: none"> • No Setting • Scan Size • Zoom • Flip • POP Sub Screen Position • Gamma • Mono • Phase • Chroma • Brightness • Contrast • 3D Signal Format • 3D Disparity • Port C Display
Panel Display	
Backlight	Adjusts the brightness of the display. A higher setting increases the brightness of the display, and a lower setting darkens the display.
3D Color Temp Offset	Select the mode for reflecting the color temperature correction when using 3D glasses. <ul style="list-style-type: none"> • Auto: The correction value is not applied to the 2D and 3D to 2D Convert displays. The correction value is applied to the 3D display. • On: The correction value is applied regardless of the display type. • Off: The correction value is not applied regardless of the display type.
Monitor Information	
Software Version	Displays the software version.

Initial Setup menu

The Initial Setup menu is used to make the basic settings to use the unit.

Submenu	Setting
Language	You can select the menu or message language from the following languages. <ul style="list-style-type: none"> • English: English • 中文: Chinese • 日本語: Japanese • Italiano: Italian • Español: Spanish • Deutsch: German • Français: French
Pattern Skip	Sets the pattern that is skipped when changing the displaying pattern by pressing the PIP/POP button on the front panel while using 2 or 3 screens display. Set to “Not Skip” or “Skip” for the PIP1, PIP2, POP1, or POP2 pattern.

Submenu	Setting
PIP / POP	
PIP Sub Screen Position	Sets the sub screen position for the 2 or 3 screen displays (PIP). Select from among “Lower Left,” “Upper Left,” “Upper Right,” “Lower Right.”
POP Sub Screen Position	Sets the sub screen position for the 2 or 3 screen displays (POP). Select from among “Left,” “Right.”
PORT A/PORT B HD Clipping Size	Sets the HD of 1920 × 1080 clipping size for each port when displaying 2 or 3 screen displays.
Custom Button	Assigns the function to the CUSTOM 1 or CUSTOM 2 button on the front panel, and can set the following functions to on or off. <ul style="list-style-type: none"> • No Setting • Scan Size • Zoom • Flip • POP Sub Screen Position • Gamma • Mono • Phase • Chroma • Brightness • Contrast • 3D Signal Format • 3D Disparity • Port C Display


Preset menu

The Preset menu is used to set the user 1 to 20 preset settings.

Submenu	Setting
Load User Setting	Loads the settings that are stored User1 to 20.
Save User Setting	Stores the current settings to User1 to 20.
User Name	Registers the user names to User1 to 20.
Load Default	Loads the default settings.

Troubleshooting

This section may help you isolate the cause of a problem and as a result, eliminate the need to contact technical support.

- **The unit cannot be operated** → The key protection function is enabled. Set the Control Lock setting to Off in the Control Lock menu.
- **The black bars appear at the upper and lower positions of the display** → When the signal aspect ratio is different from that of the panel, the black bars appear. This is not a failure of the unit.
- **Fan noise occurs.** → When the unit is used in a high temperature environment, the fan operates to lower the temperature. Noise will occur, but this is not due to failure.
- **The DVI-D signal image is not displayed.** → When inputting the signal protected with HDCP in the DVI-D  connector and the HDCP setting is set to “Disable,” the image is not displayed on the screen. Set the HDCP setting to “Enable.”
- **The display is dark.** → When the unit is used in a high temperature environment, the brightness of the display backlight is reduced to lower the temperature inside the unit. When this function is activated, the power indicator flashes in amber.

Error Messages

When the following messages appear on the screen, turn off the power and contact an authorized Sony dealer.

Messages	Description
Fan Error	A malfunction occurs in the fan.
Temperature Error	The temperature of this unit has increased to an abnormal level.

Specifications

LMD-X310MT

Picture performance

LCD panel	a-Si TFT Active Matrix
Pixel efficiency	99.99%
Viewing angle (Panel specification)	89°/89°/89°/89° (typical) (up/down/left/right, contrast > 10:1)
Efficient picture size	697.958 × 368.064, 789.06 mm (w/h, dia) (27 1/2 × 14 1/2, 31 1/8 inches)
Resolution	H 4,096 dots, V 2,160 lines
Aspect ratio	17:9

Input

HDMI input connector	HDMI connector (1), HDCP 1.4 correspondence
DVI-D input connector	DVI-D connector (1) TMDS single link, HDCP 1.4 correspondence
3G/HD/SD-SDI input connector	BNC type (5), 75Ω SD: SMPTE ST 259 compliant HD: SMPTE ST 292-1 compliant 3G: SMPTE ST 424 compliant
Remote input connector	Serial remote D-sub 9-pin (RS-232C) (1) RJ-45 modular connector (ETHERNET) (1)
DC IN connector	DC 26 V

Output

DVI-D output connector	DVI-D connector (1)
3G/HD/SD-SDI output connector	BNC type (5)
DC 12V OUT	Round type pin (female) (1)
DC 5V OUT	Round type pin (female) (1)

General

Power	DC IN: 26 V 6.9 A (Supplied from AC adaptor)
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Operating conditions

Temperature

0 °C to 40 °C (32 °F to 104 °F)

Recommended temperature

20 °C to 30 °C (68 °F to 86 °F)

Humidity 30% to 85% (no condensation)

Pressure 700 hPa to 1060 hPa

Storage and transport conditions

Temperature

-20 °C to +60 °C (-4 °F to +140 °F)

Humidity 0% to 90%

Pressure 700 hPa to 1060 hPa

Accessories supplied

3D Eye Shield Kit (CFV-E30SK) (1)

- Frame (1)
- 3D shield (3)

AC adaptor (AC-300MD) (1)

AC power plug holder (2)

Before Using This Unit (1)

Instructions for Use of the AC Adaptor (1)

Instructions for Use of the 3D Eye Shield Kit (1)

CD-ROM (including the Instructions for Use) (1)

Screws for the VESA mount, M4 × 12 mm (4)

Service Contact List (1)

Information for Customers in Europe (1)

Optional accessories

3D glasses (glasses-type)
BKM-30GM

3D glasses (clip-on-type)
BKM-31GM

Shield Frame
CFV-B100

3D Eye Shield
CFV-E30D

2D Eye Shield Kit
CFV-E20SK

2D Eye Shield
CFV-E20D

Monitor stand
SU-600MD

IP Converter Bracket
NUA-BK10

Medical Specifications

Protection against harmful ingress of water:
IPX2

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

LMD-X550MT

Picture performance

LCD panel a-Si TFT Active Matrix

Pixel efficiency 99.99%

Viewing angle (Panel specification)

89°/89°/89°/89° (typical) (up/down/left/right, contrast > 10:1)

Efficient picture size

1209.6 × 680.4, 1387.8 mm (w/h, dia)
(47 ⁵/₈ × 26 ⁷/₈, 54 ³/₄ inches)

Resolution H 3,840 dots, V 2,160 lines

Aspect ratio 16:9

Input

HDMI input connector

HDMI connector (1), HDCP 1.4
correspondence

DVI-D input connector

DVI-D connector (1)
TMDS single link, HDCP 1.4
correspondence

3G/HD/SD-SDI input connector

BNC type (5), 75Ω
SD: SMPTE ST 259 compliant
HD: SMPTE ST 292-1 compliant
3G: SMPTE ST 424 compliant

Remote input connector

Serial remote

D-sub 9-pin (RS-232C) (1)
RJ-45 modular connector
(ETHERNET) (1)

AC IN connector

100 V to 240 V, 50/60 Hz

Output

DVI-D output connector

DVI-D connector (1)

3G/HD/SD-SDI output connector

BNC type (5)

DC 12V OUT Round type pin (female) (1)

DC 5V OUT Round type pin (female) (1)

General

Power AC IN: 100 V-240 V, 50/60 Hz, 3.2 A-1.3 A

Operating conditions

Temperature

0 °C to 40 °C (32 °F to 104 °F)

Recommended temperature

20 °C to 30 °C (68 °F to 86 °F)

Humidity 30% to 85% (no condensation)

Pressure 700 hPa to 1060 hPa

Storage and transport conditions

Temperature

-20 °C to +60 °C (-4 °F to +140 °F)

Humidity 0% to 90%

Pressure 700 hPa to 1060 hPa

Accessories supplied

3D Eye Shield Kit (CFV-E30SK) (1)

- Frame (1)
- 3D shield (3)

AC power plug holder (2)

Before Using This Unit (1)

Instructions for Use of the 3D Eye Shield Kit (1)

CD-ROM (including the Instructions for Use) (1)

Screws for the VESA mount, M6 × 12 mm (4)

Service Contact List (1)

Information for Customers in Europe (1)

Optional accessories

3D glasses (glasses-type)
BKM-30GM

3D glasses (clip-on-type)
BKM-31GM

Shield Frame
CFV-B100

3D Eye Shield
CFV-E30D

2D Eye Shield Kit
CFV-E20SK

2D Eye Shield
CFV-E20D

Medical Specifications

Protection against electric shock:

Class I

Protection against harmful ingress of water:

IPX2

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

Design and specifications are subject to change without notice.

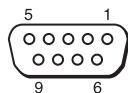
Notes

- 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.
- SONY WILL NOT BE LIABLE FOR CLAIMS OF ANY KIND MADE BY USERS OF THIS UNIT OR MADE BY THIRD PARTIES.
- SONY WILL NOT BE LIABLE FOR THE TERMINATION OR DISCONTINUATION OF ANY SERVICES RELATED TO THIS UNIT THAT MAY RESULT DUE TO CIRCUMSTANCES OF ANY KIND.

Pin assignment

SERIAL REMOTE (RS-232C) connector

D-sub 9-pin, female



Pin number	Signal
1	NC
2	RX
3	TX
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

Available signal formats

The unit is compatible with the signal systems shown below:

Signal format			SDI 1	SDI 2
SD-SDI				
720 × 487/60I ^{1) 7)}	4 : 2 : 2 YCbCr 10bit		○	○
720 × 576/50I	4 : 2 : 2 YCbCr 10bit		○	○
HD-SDI				
1920 × 1080/60I ¹⁾	4 : 2 : 2 YCbCr 10bit		○	○
1920 × 1080/50I	4 : 2 : 2 YCbCr 10bit		○	○
1280 × 720/60P ¹⁾	4 : 2 : 2 YCbCr 10bit		○	○
1280 × 720/50P	4 : 2 : 2 YCbCr 10bit		○	○
3G-SDI				
1920 × 1080/60P ¹⁾	4 : 2 : 2 YCbCr 10bit	Level A / Level B-DL	○	○
1920 × 1080/50P	4 : 2 : 2 YCbCr 10bit	Level A / Level B-DL	○	○
1920 × 1080/60I ¹⁾	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	○	○
	4 : 4 : 4 YCbCr 10bit			
	4 : 4 : 4 RGB 12bit			
	4 : 4 : 4 YCbCr 12bit			
1920 × 1080/50I	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	○	○
	4 : 4 : 4 YCbCr 10bit			
	4 : 4 : 4 RGB 12bit			
	4 : 4 : 4 YCbCr 12bit			
1280 × 720/60P ¹⁾	4 : 4 : 4 RGB 10bit	Level A	○	○
	4 : 4 : 4 YCbCr 10bit			
1280 × 720/50P	4 : 4 : 4 RGB 10bit	Level A	○	○
	4 : 4 : 4 YCbCr 10bit			
1920 × 1080/60I ¹⁾	4 : 2 : 2 YCbCr 10bit	Level B-DS	○	○
1920 × 1080/50I	4 : 2 : 2 YCbCr 10bit	Level B-DS	○	○
1280 × 720/60P ¹⁾	4 : 2 : 2 YCbCr 10bit	Level B-DS	○	○
1280 × 720/50P	4 : 2 : 2 YCbCr 10bit	Level B-DS	○	○
Dual Link HD-SDI				
1920 × 1080/60I ¹⁾	4 : 2 : 2 YCbCr 10bit		○	×
1920 × 1080/50I	4 : 2 : 2 YCbCr 10bit		○	×
1280 × 720/60P ¹⁾	4 : 2 : 2 YCbCr 10bit		○	×
1280 × 720/50P	4 : 2 : 2 YCbCr 10bit		○	×
Dual Link 3G-SDI				
1920 × 1080/60P ¹⁾	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	○	×
	4 : 4 : 4 YCbCr 10bit			
	4 : 4 : 4 RGB 12bit			
	4 : 4 : 4 YCbCr 12bit			
1920 × 1080/50P	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	○	×
	4 : 4 : 4 YCbCr 10bit			
	4 : 4 : 4 RGB 12bit			
	4 : 4 : 4 YCbCr 12bit			
1920 × 1080/60P ¹⁾	4 : 2 : 2 YCbCr 10bit	Level A / Level B-DL	○	×

Signal format				SDI 1	SDI 2
1920 × 1080/50P	4 : 2 : 2 YCbCr 10bit	Level A / Level B-DL	3D-Dual Stream	○	×
1920 × 1080/60I ¹⁾	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	3D-Dual Stream	○	×
	4 : 4 : 4 YCbCr 10bit				
	4 : 4 : 4 RGB 12bit				
	4 : 4 : 4 YCbCr 12bit				
1920 × 1080/50I	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	3D-Dual Stream	○	×
	4 : 4 : 4 YCbCr 10bit				
	4 : 4 : 4 RGB 12bit				
	4 : 4 : 4 YCbCr 12bit				
1280 × 720/60P ¹⁾	4 : 4 : 4 RGB 10bit	Level A	3D-Dual Stream	○	×
	4 : 4 : 4 YCbCr 10bit				
1280 × 720/50P	4 : 4 : 4 RGB 10bit	Level A	3D-Dual Stream	○	×
	4 : 4 : 4 YCbCr 10bit				
Dual Link 3G-SDI ²⁾					
3840 × 2160/30P ^{1) 8)}	4 : 2 : 2 YCbCr 10bit	Level B-DS ³⁾	2-sample interleave division / Square division	○	×
3840 × 2160/25P ⁸⁾	4 : 2 : 2 YCbCr 10bit	Level B-DS ³⁾	2-sample interleave division / Square division	○	×
4096 × 2160/30P ^{1) 8)}	4 : 2 : 2 YCbCr 10bit	Level B-DS ³⁾	2-sample interleave division / Square division	○	×
4096 × 2160/25P ⁸⁾	4 : 2 : 2 YCbCr 10bit	Level B-DS ³⁾	2-sample interleave division / Square division	○	×
Quad Link HD-SDI					
3840 × 2160/30P ^{1) 8)}	4 : 2 : 2 YCbCr 10bit		Square division	○	×
3840 × 2160/25P ⁸⁾	4 : 2 : 2 YCbCr 10bit		Square division	○	×
4096 × 2160/30P ^{1) 8)}	4 : 2 : 2 YCbCr 10bit		Square division	○	×
4096 × 2160/25P ⁸⁾	4 : 2 : 2 YCbCr 10bit		Square division	○	×
Quad Link 3G-SDI ²⁾					
3840 × 2160/60P ^{1) 8)}	4 : 2 : 2 YCbCr 10bit	Level A / Level B-DL	2-sample interleave division / Square division	○	×
3840 × 2160/50P ⁸⁾	4 : 2 : 2 YCbCr 10bit	Level A / Level B-DL	2-sample interleave division / Square division	○	×
3840 × 2160/30P ^{1) 8)}	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	2-sample interleave division / Square division	○	×
	4 : 4 : 4 YCbCr 10bit				
	4 : 4 : 4 RGB 12bit				
	4 : 4 : 4 YCbCr 12bit				
3840 × 2160/25P ⁸⁾	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	2-sample interleave division / Square division	○	×
	4 : 4 : 4 YCbCr 10bit				
	4 : 4 : 4 RGB 12bit				
	4 : 4 : 4 YCbCr 12bit				
4096 × 2160/60P ^{1) 8)}	4 : 2 : 2 YCbCr 10bit	Level A / Level B-DL	2-sample interleave division / Square division	○	×
4096 × 2160/50P ⁸⁾	4 : 2 : 2 YCbCr 10bit	Level A / Level B-DL	2-sample interleave division / Square division	○	×

Signal format		SDI 1	SDI 2
4096 × 2160/30P ^{1) 8)}	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	2-sample interleave division / Square division
	4 : 4 : 4 YCbCr 10bit		
	4 : 4 : 4 RGB 12bit		
	4 : 4 : 4 YCbCr 12bit		
4096 × 2160/25P ⁸⁾	4 : 4 : 4 RGB 10bit	Level A / Level B-DL	2-sample interleave division / Square division
	4 : 4 : 4 YCbCr 10bit		
	4 : 4 : 4 RGB 12bit		
	4 : 4 : 4 YCbCr 12bit		

Signal format		DVI-D	HDMI
640 × 480/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	×	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
720 × 480/60P ^{1) 5)}	4 : 4 : 4 RGB 12/10bit ⁴⁾	×	○
	4 : 4 : 4 RGB 8bit	○	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
1280 × 720/60P ¹⁾	4 : 4 : 4 RGB 12/10bit ⁴⁾	×	○
	4 : 4 : 4 RGB 8bit	○	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
1920 × 1080/60I ¹⁾	4 : 4 : 4 RGB 12/10bit ⁴⁾	×	○
	4 : 4 : 4 RGB 8bit	○	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
720 × 576/50P ⁵⁾	4 : 4 : 4 RGB 12/10bit ⁴⁾	×	○
	4 : 4 : 4 RGB 8bit	○	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
1280 × 720/50P	4 : 4 : 4 RGB 12/10bit ⁴⁾	×	○
	4 : 4 : 4 RGB 8bit	○	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
1920 × 1080/50I	4 : 4 : 4 RGB 12/10bit ⁴⁾	×	○
	4 : 4 : 4 RGB 8bit	○	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
1920 × 1080/60P ¹⁾	4 : 4 : 4 RGB 12/10bit ⁴⁾	×	○
	4 : 4 : 4 RGB 8bit	○	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○

Signal format		DVI-D	HDMI
1920 × 1080/50P	4 : 4 : 4 RGB 12/10bit ⁴⁾	×	○
	4 : 4 : 4 RGB 8bit	○	○
	4 : 4 : 4 YCbCr 12/10/8bit ⁴⁾	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
3840 × 2160/30P ^{1) 8)}	4 : 4 : 4 RGB 8bit	×	○
	4 : 4 : 4 YCbCr 8bit	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
3840 × 2160/25P ⁸⁾	4 : 4 : 4 RGB 8bit	×	○
	4 : 4 : 4 YCbCr 8bit	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
4096 × 2160/30P ^{1) 8)}	4 : 4 : 4 RGB 8bit	×	○
	4 : 4 : 4 YCbCr 8bit	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
4096 × 2160/25P ⁸⁾	4 : 4 : 4 RGB 8bit	×	○
	4 : 4 : 4 YCbCr 8bit	×	○
	4 : 2 : 2 YCbCr 12bit	×	○
3840 × 2160/60P ^{1) 8)}	4 : 2 : 0 YCbCr 8bit	×	○
3840 × 2160/50P ⁸⁾	4 : 2 : 0 YCbCr 8bit	×	○
4096 × 2160/60P ^{1) 8)}	4 : 2 : 0 YCbCr 8bit	×	○
4096 × 2160/50P ⁸⁾	4 : 2 : 0 YCbCr 8bit	×	○
800 × 600/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1024 × 768/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1152 × 864/75P ⁶⁾	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1280 × 960/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1280 × 1024/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1360 × 768/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1400 × 1050/60P(RB) ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1400 × 1050/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1440 × 900/60P(RB) ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1440 × 900/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1600 × 1200/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1680 × 1050/60P(RB) ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1680 × 1050/60P ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1792 × 1344/60P ^{1) 6) 8)}	4 : 4 : 4 RGB 8bit	×	○
1856 × 1392/60P ^{1) 6) 8)}	4 : 4 : 4 RGB 8bit	×	○
1920 × 1200/60P(RB) ^{1) 6)}	4 : 4 : 4 RGB 12/10/8bit ⁴⁾	○	○
1920 × 1200/60P ^{1) 6) 8)}	4 : 4 : 4 RGB 8bit	×	○
1920 × 1440/60P ^{1) 6) 8)}	4 : 4 : 4 RGB 8bit	×	○
2560 × 1600/60P(RB) ^{1) 6) 8)}	4 : 4 : 4 RGB 8bit	×	○

PC signal (DVI)

Range of DVI input signal (Compatible with up to 1920 × 1080/60 Hz)

Vertical frequency: 50.0 Hz to 85.1 Hz

Horizontal frequency: 31.5 kHz to 75.0 kHz

Dot clock: 25.175 MHz to 148.5 MHz

Picture size, phase: automatic discrimination by the DE (Data Enable) signal

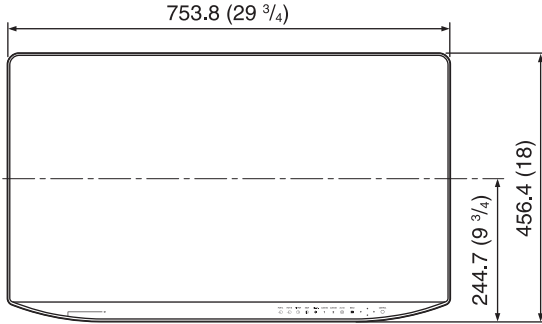
Displays normally up to the maximum horizontal resolution, 2048 dots (LMD-X310MT) or 1920 dots (LMD-X550MT).

- 1) Also compatible with the frame rate 1/1.001.
- 2) The square division signal is described as “Quad Link 3G-SDI,” “Quad Link HD-SDI,” or “Dual Link 3G-SDI” in this manual.
- 3) For the Square division signal.
- 4) Switches automatically between RGB/YCbCr format and 8/10/12bit according to the input signals. However, the DVI-D input is supported only for 8bit.
- 5) The signals 720×480 and 720×576 are described as “SD signal of HDMI” in this manual.
- 6) This signal is described as “Computer signal of HDMI” in this manual.
- 7) The signal $720 \times 487/60i$ is described as “480/60i” with the signal format of OSD menu in this manual.
- 8) This signal is described as “equivalent of 4K signal” in this manual.

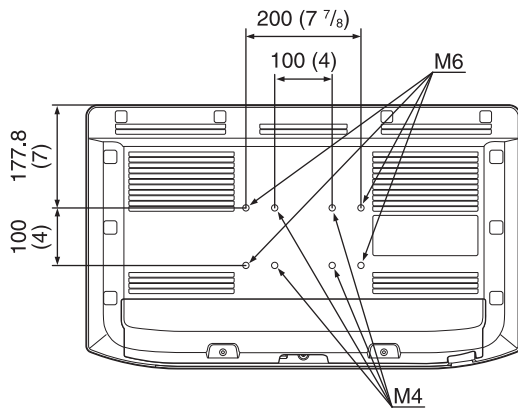
Dimensions

LMD-X310MT

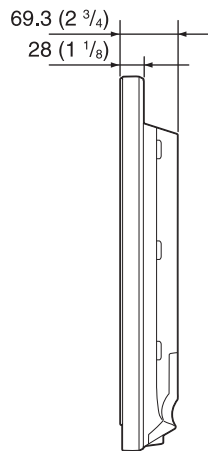
Front



Rear



Side

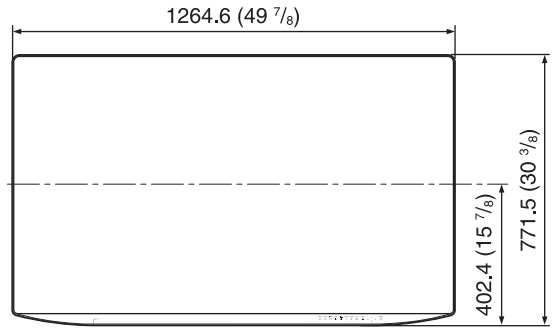


Mass:
Approx. 11.8 kg (26 lb 0.23 oz)

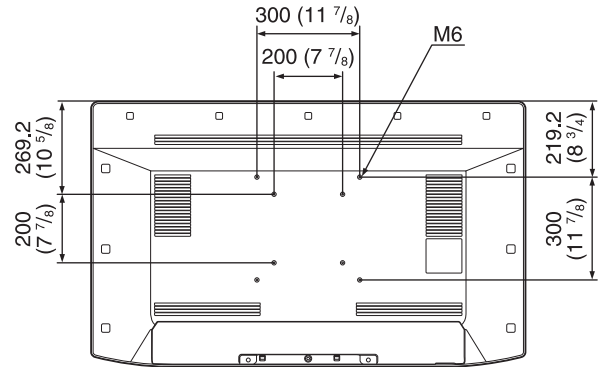
Unit: mm (inches)

LMD-X550MT

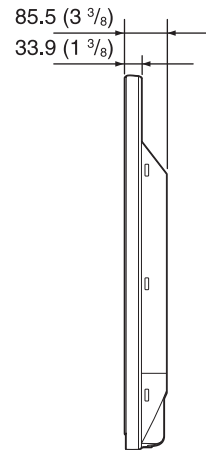
Front



Rear



Side

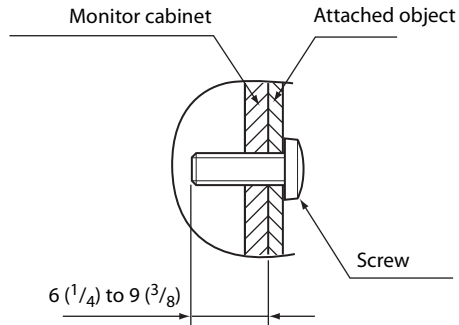


Mass:
Approx. 35.2 kg (77 lb 9.6 oz)

Unit: mm (inches)

LMD-X310MT/X550MT

* Length of M4/M6 screws

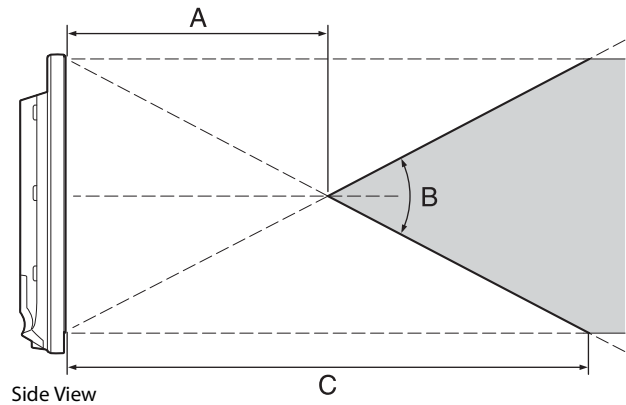


* The specification of the screw is for the VESA mount.

Unit: mm (inches)

The supplied screws are compatible with an attached object which has a thickness from 1 to 3 mm ($\frac{1}{16}$ to $\frac{1}{8}$ inches).

3D Viewing Angle (vertical)



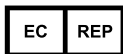
3D Viewing Angle (vertical)

Crosstalk ratio $\leq 7\%$

	A (Typical)	B (Typical)	C (Typical)
LMD-X310MT	775 mm	27°	1550 mm
LMD-X550MT	1200 mm	32°	2400 mm



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Da Vincilaan 7-D1,
1935 Zaventem, Belgium



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