

HD Video Camera

Instructions for Use

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

MCC-500MD





WARNING

To reduce the risk of fire or electric shock, do not expose this apparatus 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.

WARNING

THIS APPARATUS MUST BE EARTHED.

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 unplug the power plug.

Do not install the appliance in a confined space, such as book case or built-in cabinet.

CAUTION

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

Symbols on the products



General warning sign

Follow the warnings in the Instructions for use for parts of the unit on which this mark appears.

NOTE Background color: Yellow

Triangular band: Black
Symbol: Black



Consult the Instructions for use

Follow the directions in the Instructions for use for parts of the unit on which this mark appears.



This symbol indicates the manufacturer, and appears next to the manufacturer'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 equipotential terminal which brings the various parts of a system to the same potential.

For the 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 the customers in the U.S.A.

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

For the customers in Canada CAN ICES-3 (A)/NMB-3(A)

For the customers in Canada

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



WARNING on power connection

Use a proper power cord for your local power supply.

- 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.
- 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 connection for medical use

Please use the following power supply cord. With connectors (plug or female) and cord types other than those indicated in this table, use the power supply cord that is approved for use in your area.

	United States and Canada
Plug Type	HOSPITAL GRADE*
Cord Type	Min.Type SJT Min.18 AWG
Minimum Rating for Plug and Appliance Couplers	10A/125V
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'.

For the customers in the U.S.A and Canada

When you use this product connected to 240 V single phase, be sure to connect this product to a center tapped circuit.

Important safeguards/notices for use in the medical environments

- All the equipments connected to this unit shall be certified according to Standard IEC60601-1, IEC60950-1, IEC60065 or other IEC/ISO Standards applicable to the equipments.
- Furthermore all configurations shall comply with the system standard IEC60601-1-1. Everybody who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore, responsible that the system complies with the requirements of the system standard IEC60601-1-1.
 If in doubt, consult the qualified service personnel.
- The leakage current could increase when connected to other equipment.
- For this particular equipment, all accessory equipment connected as noted above, must be connected to mains via an additional isolation transformer conforming with the construction requirements of IEC60601-1 and providing at least Basic Insulation.
- This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause interference to other equipment. If this

unit causes interference (which can be determined by unplugging the power cord from the unit), try these measures: Relocate the unit with respect to the susceptible equipment. Plug this unit and the susceptible equipment into different branch circuit.

Consult your dealer. (According to standard IEC60601-1-2 and CISPR11, Class B, Group 1)

Important EMC notices for use in the medical environments

- The MCC-500MD needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this instructions for use.
- The portable and mobile RF communications equipment such as cellular phones can affect the MCC-500MD.

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 MCC-500MD.

Guidance and manufacturer's declaration-electromagnetic emissions								
	The MCC-500MD is intended for use in the electromagnetic environment specified below. The customer or the user of the MCC-500MD should assure that it is used in such an environment.							
Emission test	Compliance	Electromagnetic environment-guidance						
RF emissions	Group 1	The MCC-500MD 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	Class B	The MCC-500MD is suitable for use in all						
CISPR 11		establishments, including domestic establishments and those directly connected to the public low-voltage power						
Harmonic emissions	Class A	supply network that supplies buildings used for domestic purposes.						
IEC 61000-3-2								
Voltage fluctuations/ flicker emissions	Complies	mplies						
IEC 61000-3-3								

Warning

If the MCC-500MD should be used adjacent to or stacked with other equipment, it should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacturer's declaration - electromagnetic immunity							
The MCC-500MD is intended for use in the electromagnetic environment specified below. The customer or the user of the MCC-500MD should assure that it is used in such as environment.							
Immunity test IEC 60601 test Compliance Electromagnetic environment-level guidance							
Electrostatic discharge (ESD)	±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	±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 differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.				
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5% U _T (> 95% dip in U _T) for 0.5 cycle 40% U _T (60% dip in U _T) for 5 cycles 70% U _T (30% dip in U _T) for 25 cycles < 5% U _T (> 95% dip in U _T) for 5 sec	< 5% U _T (> 95% dip in U _T) for 0.5 cycle 40% U _T (60% dip in U _T) for 5 cycles 70% U _T (30% dip in U _T) for 25 cycles < 5% U _T (> 95% dip in U _T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the MCC-500MD requires continued operation during power mains interruptions, it is recommended that the MCC-500MD be powered from an uninterruptible power supply or a battery.				
Power frequency (50/60Hz) magnetic field	3 A/m	3 A/m	Power frequency magnetic fields should be at least 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 MCC-500MD is intended for use in the electromagnetic environment specified below. The customer or the user of the MCC-500MD should assure that it is used in such as 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 MCC-500MD, 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	<i>d</i> = 1.2√ <i>P</i>
IEC 61000-4-6	150 kHz to 80 MHz		
Radiated RF	3 V/m	3 Vrms	$d = 1.2\sqrt{P}$ 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:
			$((\overset{\bullet}{\bullet}))$

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.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

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 MCC-500MD is used exceeds the applicable RF compliance level above, the MCC-500MD should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the MCC-500MD.

Recommended separation distances between portable and mobile RF communications equipment and the MCC-500MD

The MCC-500MD is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the MCC-500MD can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the MCC-500MD as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter	Separation dista	Separation distance according to frequency of transmitter m			
transmitter W	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.

For the customers in Europe

This product has been manufactured by or on behalf of Sony Corporation, 1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan. Inquiries related to product compliance based on European Union legislation shall be addressed to the authorized representative, Sony Deutschland GmbH, Hedelfinger Strasse 61, 70327 Stuttgart, Germany. For any service or guarantee matters, please refer to the addresses provided in the separate service or guarantee documents.

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

<u>SONY LIMITED WARRANTY</u> - Please visit http://www.sonybiz.ca/solutions/Support.do 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.

Precautions for Use

Safety precautions for using this unit

- Viewing images may result in eye strain, fatigue, nausea, or other symptoms of discomfort. It is best to take frequent breaks when viewing content. Because the length and frequency of breaks will differ from person to person, be sure to trust your instincts when deciding to take breaks from viewing. When feelings of discomfort occur, stop viewing the images until the symptoms subside, and consult with a specialist physician if necessary.
- Avoid using this unit while walking or exercising, or in areas that shake violently, as doing so can increase the chances of feelings of discomfort.
- When connecting the unit to medical equipment, refer to "Precautions when connecting this unit to medical equipment".

Precautions when connecting this unit to medical equipment

- Before using this unit for medical purposes, be sure to confirm that use of this unit will not cause symptoms that may interfere with medical practice, such as eye strain, fatigue, and nausea, etc.
- Refrain from using this unit if symptoms occur that interfere with medical practice, or if such symptoms are likely to occur.
- Depending on the conditions of the video input to the unit (e.g., the steadiness, movement speed, and focus position of the video, the distance from subject, the area of the image the user is viewing) and the general health of the user, the user may experience visual fatigue, tiredness, and other discomfort.

Precautions when using a harmonic scalpel

Strong electromagnetic waves or voltage from equipment such as a harmonic scalpel may cause images may appear rough or distorted, etc., or disrupt proper operation of the unit when used at the same time. However, this does not indicate a malfunction.

When using this unit with equipment that emits strong electromagnetic waves or voltage, check the effects of such equipment beforehand and place the unit in a location where those effects will be limited, or discontinue use of the unit with such equipment.

Usage and storage locations

Store the unit in a level, well-ventilated place. Avoid using or storing the unit in the following places.

- Extremely cold or hot locations (Operating temperatures: 0 °C to 40 °C (32 °F to 104 °F))
- Locations in direct sunlight for long periods, or close to heating appliances (The inside of a vehicle can reach up to 50 °C (122 °F) in the summer when the windows are closed.)
- · Humid or dusty places
- Locations where the unit may be exposed to rain
- · Locations subject to strong vibrations
- · Locations close to strong magnetic fields
- Near TVs that emit strong electromagnetic waves, or near locations where radio waves are emitted
- · Locations with a strong risk of fire or explosion

Precautions concerning laser beams

Laser beams may damage the CMOS image sensor. When shooting scenes that include laser beams, be careful not to allow laser beams to hit the surface of the CMOS image sensor (do not let laser beams enter the lens).

Do not subject the unit to strong impacts

Dropping the camera head or exposing it to excessive shocks may damage it.

Do not block the camera vents

To prevent the interior of the unit from overheating, maintain a clearance of at least 10 cm (4 in.) around the unit.

Do not subject the unit to sudden changes in temperature

Sudden changes in temperature may affect the camera picture output.

Do not leave the unit with the camera facing the sun

Sunlight can enter the camera, be focused inside the unit and cause a fire

Cleaning

If the casing, panel, or camera cable becomes dirty, wipe them gently with a soft, dry cloth. For stubborn dirt, use a cloth wet with mild liquid detergent to wipe the unit, and then wipe it with a dry cloth. Using alcohol, thinner, benzine, insecticides, or other volatile substances may damage the surface of the unit or remove the finish.

Use isopropyl alcohol with a concentration of 50% to 70% (v/v) or ethanol with a concentration of 76.9% to 81.4% (v/v) to clean the surface of the unit.

Transporting the unit

When transporting the unit, use the original carton and packing to wrap it and ensure it is not subject to violent impacts.

After use

Press the \circlearrowleft (on/standby) button to turn the standby mode.

When not using the unit for a long period of time

Disconnect the power cord.

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.

Phenomena specific to the CMOS image sensor

The following phenomena are specific to the CMOS image sensor, and their presence on the shooting screen do not indicate malfunctions.

White spots

The CMOS image sensor is fabricated using extremely high-precision technology, however, in very rare cases, outside influence, such as cosmic rays, may cause minute white spots to appear on the screen. This not a malfunction, but is related to the principle of the imaging element.

White spots may also be visible in the following situations.

- When the unit is used in locations subject to high temperatures
- · When the gain is raised

Aliasing

When shooting fine patterns or lines, a jagged or flickering effect may occur.

Flicker

When shooting under discharge tube lighting, such as fluorescent lamps, sodium lamps, or mercury vapor lamps, the screen may flicker, change color, or horizontal stripes may appear to roll across the screen.

Focal plane

Due to characteristics of how the CMOS image sensor reads image signals, subjects that quickly move across the screen may appear slightly distorted.

Additionally, light from a flash or quickly flashing light sources may cause the brightness to change at the top and bottom of the screen.

Precautions concerning heat generation by the unit

Be careful during operation of the unit, as the metal surfaces of the unit may become hot. Generation of heat during operation of the unit is not a malfunction.

Intended Use

For the customers in the U.S.A.

The Sony MCC-500MD is intended to acquire HD color video images from surgical microscopes and other compatible medical imaging systems.

The acquired video image can be displayed on a compatible monitor for visualization during a surgical procedure as a secondary view to the microscope binoculars.

The MCC-500MD is a high-definition medical grade camera for use primarily with surgical microscope procedures including Neurology and Ophthalmology.

It is suitable for use in hospital operating rooms, surgical centers, clinics, doctors' offices and similar medical environments.

For the customers in countries other than the U.S.A.

- The Sony MCC-500MD is intended to acquire HD color video images from surgical microscopes and other compatible medical imaging systems.
 - The acquired video image can be displayed on a compatible monitor for visualization during a surgical procedure as a secondary view to the microscope binoculars.
 - The MCC-500MD is a high-definition medical grade camera for use primarily with surgical microscope procedures including Neurology and Ophthalmology.
 - It is suitable for use in hospital operating rooms, surgical centers, clinics, doctors' offices and similar medical environments.
- (2) The Sony MCC-500MD is also intended to acquire HD color video images from slit lamps and other compatible medical imaging systems.

The acquired video image can be displayed on a compatible monitor for visualization during an ophthalmological examination as a secondary view to the slit lamp binoculars. The MCC-500MD is a high-definition medical grade camera for use primarily with slit lamp diagnostics.

It is suitable for use in hospital examination

rooms, clinics, doctors' offices and similar medical environments.

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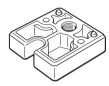
Overview

Package Configuration

Make sure the following items are supplied with the Sony MCC-500MD HD Video Camera (hereafter referred to as the "unit").

The number in parentheses indicates how many pieces of a particular item are supplied.

· Tripod adapter (1)



- Tripod adapter locking screws (2)
- Lens mount cap (1)
- Before Using This Unit (1)
- CD-ROM

(Instructions for Use in PDF format) (1)

- Warranty Booklet (1)
- Service Contact List (1)

Features of This Unit

This unit is a separated camera control unit-type HD video camera consisting of a camera control unit (CCU) and camera head equipped with a 1/2.9 type HD CMOS image sensor providing an effective resolution of approximately 2.07 million pixels (1920 × 1080).

This camera lets you shoot HD images with 1,080 effective scanning lines in progressive format, allowing you to capture details and movement in videos with greater clarity than in interlaced format.

Additionally, synchronized operation of two of these units allows you to shoot 3D videos.

Cutting-edge camera technologies

1/2.9 type Exmor CMOS sensor

Equipped with an Exmor CMOS sensor, this camera allows shooting in Full HD.

Compact, lightweight camera head

The camera head is compact (approx. $27 \times 28 \times 49 \text{ mm}$ (approx. $1^{1}/_{8} \times 1^{-1}/_{8} \times 1^{-15}/_{16} \text{ in.})$), and lightweight (approx. 40 g (approx. 1.4 oz.)), making it easy to install and attach anywhere. The camera cable (not supplied) between the camera head and camera control unit can be extended to up to 20 m (65.6 ft.).

Shooting modes for diverse imaging applications

Picture profile function

This function allows the camera operator to easily call up customized picturetonal settings to suit particular shooting conditions. You can register up to six picture profiles.

Picture flip

You can flip the camera picture output horizontally, vertically, or both horizontally and vertically.

Freeze function (still image)

You can freeze the video signal and output it as a still image.

Two-camera support for 3D shooting

Using the built-in 3D-SYNC IN/OUT connectors, you can synchronize the image signals from two cameras to shoot 3D images.

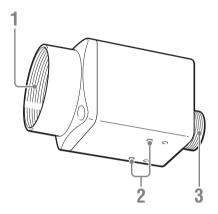
Intuitive control via the front panel

The BRIGHTNESS, RED, and BLUE knobs on the front panel provide an intuitive way to adjust the picture. When turned to the right they increase their respective values (brightening the picture or strengthening colors), and when turned to the left they decrease their values (darkening the picture or weakening colors).

Part Names and Functions

See the pages enclosed in parentheses for details about the corresponding function and how to use it.

Camera head

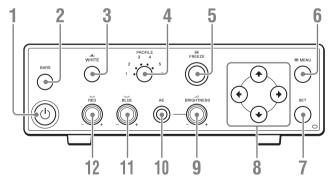


- 1. Lens mount (page 19)
 Use this to mount a C-mount lens, microscope adapter, etc.
- 2. Screw holes (M3, depth: 2.5 mm (1/8 inch))

Use these holes to attach the supplied tripod adapter to the camera head for mounting it on a wall, ceiling or tripod.

3. Camera cable connector (20 pin) (page 20)

Camera control unit (CCU) front panel

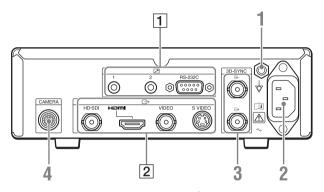


- 1. (b) (on/standby) button (page 23)
- 2. BARS (color bars) button (page 32)
- 3. № WHITE (white balance) button (page 27)
- 4. PROFILE (Picture Profile selection) button (page 32)
- 5. ► FREEZE (still image) button (page 31)
- 6. MENU button (page 38)
- 7. SET (confirm) button (page 38)
- 8. **★**/**♦**/**♦** (cursor) button (*page 38*)
- 9. ∠ BRIGHTNESS (brightness adjustment) knob (page 30)

10. AE (automatic exposure) button (page 30)

11. △ BLUE (B-gain) knob (page 28)

Camera control unit (CCU) rear panel





Warning

Using this unit for medical purposes

This equipment's connectors are not isolated. Do not connect any device other than one which conforms to IEC60601-1.

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 IEC60601-1.



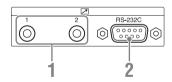
Caution

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.

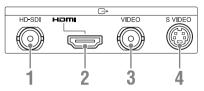
- \(\forall \) Equipotential ground connector
 Used to make an equipotential ground
 connection.
- 2. \sim (power) connector (page 23)
- 4. CAMERA connector (page 20)

1 REMOTE connector block



- 1. Remote contact switch connector 1, 2 (stereo mini jack) (page 46)
- 2. RS-232C connector (D-sub 9-pin) (page 48)

$2 \longrightarrow OUTPUT$ connector block

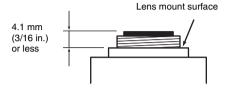


- 1. HD-SDI output connector (BNC type) (page 22)
- 2. HDMI output connector (HDMI) (page 22)
- 3. VIDEO (composite video) output connector (BNC type) (page 22)
- 4. S VIDEO output connector (mini DIN 4-pin) (page 22)

Preparations

Lens Mounting

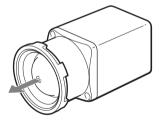
C-mount lenses with a protrusion of 4.1 mm (3/16 in.) or less from the lens mount surface can be attached to the camera head.



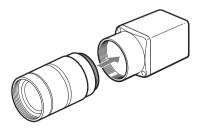
Be sure to use a lens whose protrusion from the lens mount surface is 4.1 mm (3/16 in.) or less. Mounting a lens with a maximum protrusion of 4.2 mm (3/16 in.) or more may damage the internal mechanism of the camera head.

Mounting the lens

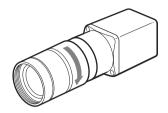
1 Remove the lens mount cap.



2 Align the threads of the lens mount and camera mount and insert the lens.

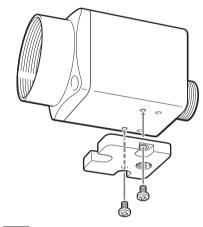


3 Slowly turn the lens clockwise to securely attach it to the camera.



Attaching the tripod adapter

Attach the tripod adapter when necessary.



Note

When handling a heavy lens, support the lens itself. Do not support the lens using the camera head only.

Connection between the Camera Head and CCU

Use a camera cable (not supplied) to connect the camera head to the CAMERA connector on the CCU.

You can use one of the following four types of camera cable.

CCMC-SA06 (standard 6 m (19.6 ft.))

CCMC-SA10 (standard 10 m (32.8 ft.))

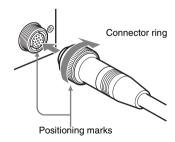
CCMC-SA15 (standard 15 m (49.2 ft.))

CCMC-EA05 (extension 5 m (16.4 ft.))

Notes on using camera cables

- When disconnecting or connecting the camera cable, be sure to turn off the power supply for the CCU and all equipment connected to the CCU. Doing so while the power is on may result in malfunctions to the equipment.
- Make sure that the camera head and CCU are connected via the camera cable before starting the unit.
- Insert the connector by pushing it straight in, taking care not to bend the pins.
- Make sure connectors are securely inserted. A loose connection may result in noise. When removing a connector, be sure to hold it by the connector itself and not the cable.

Connecting the camera cable to the camera head

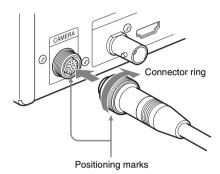


Align the positioning marks on the camera cable connector and the round camera cable plug, and then push the plug in. 2 Turn cable connector ring to tighten the connection.

Note

Do not connect this unit to camera heads and CCUs of different models.

Connecting the camera cable to the CAMERA connector on the CCU

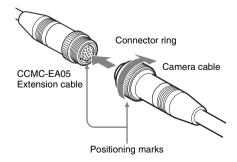


- Align the positioning marks on the CAMERA connector and the the round camera cable plug, and then push the
- 2 Turn cable connector ring to tighten the connection.

Connecting an extension cable

plug in.

When using the CCMC-EA05 extension cable (not supplied), connect it as shown below.



- 1 Align the positioning marks on the extension cable's round connector (female) and the camera cable's round connector (male), and then push them together.
- 2 Turn cable connector ring to tighten the connection.

Notes

- Use only one extension cable. Operation is not guaranteed when more than one extension cable is used.
- When used in conjunction with a standard CCMC-SA15 cable, the total cable length can be extended to up to 20 m (65.6 ft.).

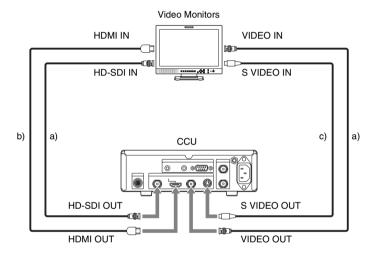
Connecting Video Monitors

Camera picture output is output from all of the video output connectors (VIDEO, S VIDEO, HDMI, HD-SDI) on the rear CCU panel. You can check the camera picture output by connecting a video monitor that supports the respective video output to any of these connectors.

Both sides of an SD image are cut from a 16:9 image and output as a 4:3 image.

Notes

- Before connecting the cables, make sure that the unit is turned off.
- When connecting video monitors, only do so using a direct cable. Using a conversion adapter may cause the camera picture output to output incorrectly.



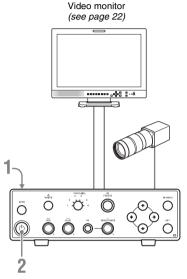
- a) 75 Ω coaxial cable
- b) HDMI cable
- c) S connector cable



We recommend using Sony HDMI cables (not supplied).

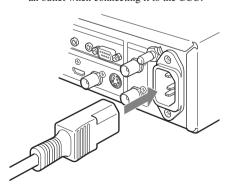
Start-up

Turning the power on



Connect the power cord to the ∼ (power) connector on the CCU rear panel.

Make sure the power cord is not plugged into an outlet when connecting it to the CCU.



2 Press the (1) (on/standby) button.

The indicator will turn green and camera picture output will appear on the video monitor.

Note

When you start the unit after replacing the camera head, startup may take longer than usual.

Entering standby mode

Press the (b) (on/standby) button again.
The unit enters standby mode, and the indicator turns off.

Note

If you disconnect the power cord without setting the unit to standby mode, setting information may be lost.

Output Format Settings

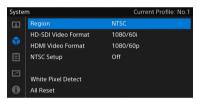
The output format for this unit can be set to NTSC or PAL. Set the output format according to where the unit will be used. The factory default setting is NTSC.

You can adjust unit settings by connecting it to a video monitor, pressing the MENU button, and then selecting items from the menu that is displayed on the screen.

Setting the output format

This is set in the [System] menu's [Region] option.

1 Display the [System] menu, select [Region], and then press the SET button.



For details on menu operations, see "Basic Menu Operations" (page 38).

- 2 Press the **★**/**♦** buttons to select an output format, and then press the SET button.
 - will appear in front of the currently set output method.



A confirmation message appears.

3 Select [OK], and press the SET button.



The output method is now set.

4 Restart the unit.

Restart the unit whenever you change the [Region] setting.

Notes

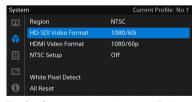
- When you change the [Region] setting, the HD-SDI and HDMI output signal formats will return to factory default values. Be sure to reconfigure the output signal formats if necessary.
- Setting the unit to standby mode will be the only operation immediately available after changing the [Region] setting.

Setting the output signal format

Set the output signal format according to the connected video monitor in the [System] menu's [HD-SDI Video Format] or [HDMI Video Format] option.

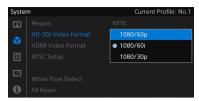
1 Display the [System] menu, select [HD-SDI Video Format] or [HDMI Video Format], and then press the SET button.

Select [HD-SDI Video Format] if an HD-SDI input video monitor is connected, and select [HDMI Video Format] if an HDMI input video monitor is connected.



For details on menu operations, see "Basic Menu Operations" (page 38).

- 2 Press the */* buttons to select an output signal format, and then press the SET button.
 - will appear in front of the currently set output signal format.



The output of the screen changes to the selected output signal format, and a confirmation message appears.

3 To confirm the selected output signal format, select [OK] and press the SET button.



Tip

If the video monitor does not support the selected output signal format, the confirmation message cannot be operated (i.e., the message will not appear). In such cases, the switching operation will be canceled in 15 seconds, and the output signal format will revert to the format from before the change.

4 Press the MENU button to close the menu screen.

Output signal types

The type of signals output from the unit will differ depending on the settings in the [System] menu's [Region] option. Output signals are shown in the table below.

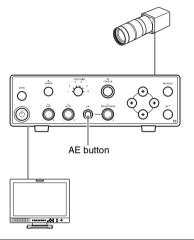
Region	HD-SDI output	HDMI output	VIDEO output / S VIDEO output
NTSC	1080/59.94p,	1080/59.94p,	NTSC1)
	1080/59.94i,	1080/59.94i,	
	1080/29.97PsF	1080/29.97p,	
		480/59.94p	
PAL	1080/50p,	1080/50p,	PAL ¹⁾
	1080/50i,	1080/50i,	
	1080/25PsF	1080/25p,	
		576/50p	

¹⁾ The left and right edges of a 16:9 image are cropped, and the image is output as a 4:3 image.

Shooting

Shooting

When the unit starts up, camera picture output being shot on this unit is output from the video output connectors (VIDEO, S VIDEO, HDMI, HD-SDI) on the rear panel of the CCU.



Viewing camera picture output

Connect a video monitor to any of the video output connectors.

For details, see "Connecting Video Monitors" (page 22).

Adjusting camera picture output

You can automatically adjust the brightness.

To automatically adjust the brightness

Press the AE button to activate the indicator. The AE function is now activated. The gain value and shutter speed change automatically, and the brightness is adjusted automatically at all times.

To adjust the brightness manually, turn the AE function off. For details, see "Adjusting the Brightness" (page 29).

You can also activate saved Picture Profiles to adjust camera picture output.

For details, see "Picture Profile" (page 32).

Adjusting the White Balance

The white balance must be adjusted according to the color temperature of the light source.

You can save adjustment values as Picture Profiles to internal memory.

• For details on Picture Profiles, see "Adjusting the Brightness" (page 29).

The following white balance modes can be selected on this unit depending on the light source.

The factory default setting (standard status) is [Xenon Lamp] mode. If you are not using a xenon lamp as the light source, change the white balance mode. Modes can be selected in the [Picture] menu's [White Balance] option (see page 42).

[Xenon Lamp] mode

Select this when using a xenon lamp as the light source.

[Halogen Bulb] mode

Select this when using a halogen bulb as the light source.

[White LED] mode

Select this when using a white LED as the light source.

[Auto] (Auto-Tracing White balance) mode

This mode automatically adjusts the white balance to optimize it for the shooting conditions. When the color temperature of the light source changes, the white balance will automatically be adjusted to match.

Executing auto white balance

You can adjust the white balance automatically by pressing the № WHITE button on the CCU front panel. You can perform auto white balance in the [Xenon Lamp], [Halogen Bulb], and [White LED] modes.

Note

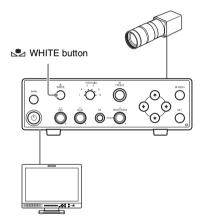
Auto white balance is not available in the following cases.

- When in [Auto] mode
- When [Fluorescein] is set to [On] in the [Function] menu
- 1 Place a white object (such as a piece of white paper) under the same conditions as the light source illuminating the subject, and zoom in so that the screen is filled with the white object.

A white object (white cloth or wall) close to the subject may be used as a substitute. Make sure that no high-intensity spotlights are in the screen.

2 Press the MHITE button.

Auto white balance adjustment begins.



A message will appear on the video monitor during adjustment.

When white balance adjustment finishes normally, a completion message appears.

 After performing auto white balance, the white balance information is stored, and the unit returns to the normal shooting mode.

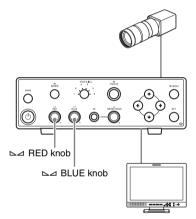
Changing the camera picture output color balance

If you want to intensify the red or the blue in the camera output picture, for example, adjust the offset value of the white balance, and change the color balance.

Perform adjustments using the knobs or using [White Balance] in the [Picture] menu.

You can also save the configured offset value to internal memory. (Doing so allows you to recall the value even after readjusting the white balance.)

Using the knobs



Turn the △ RED or △ BLUE knob to adjust the R or B white gain offset value. When turned clockwise, the offset values increase (blue tones will be strengthened with the △ BLUE knob), and when turned counterclockwise, the offset values decrease (red tones will be strengthened with the △ BLUE knob).

You can reset the offset value to 0 (factory default setting) by holding down the $\triangleright \triangleleft$ RED or $\triangleright \triangleleft$ BLUE knobs for one second or longer.

Using the [White Balance] setting in the [Picture] menu

You can adjust the white balance offset value by selecting [Red] or [Blue] for [White Balance] in the [Picture] menu.

Press the 4/4 buttons to set the value on the slider that appears.



The gray circle on the slider indicates the setting value before the change, and the blue circle indicates the current setting value.

Tip

When a slider is displayed, holding down the \d -buttons increases the incremental speed at which the value changes, allowing you to set your target value faster.

Adjusting the Brightness

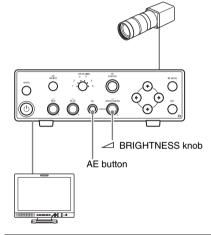
This unit is equipped with an AE function that automatically adjusts the brightness to optimum levels through a combination of settings of the gain and shutter speed. You can also make adjustments using the
BRIGHTNESS knob, which also adjusts the brightness through a combination of the gain and shutter speed settings. However, you can also set the gain and shutter speed separately in the [Picture] > [Exposure] menu for special shooting conditions.

Note

If the knobs are turned too quickly, adjustments may not be registered. Be sure to turn the knobs slowly.

Using the AE function

To turn on the AE function, press the AE button to light it. The gain and shutter speed change automatically based on shooting conditions, and the brightness is adjusted to optimal settings. The AE function adjustment level (AE level), the adjustment mode, and the upper and lower limit values can all be set in the [Picture] menu by going to [Exposure] > [Mode] and selecting [Auto] (see page 40).



Setting the AE level

The AE level sets the automatic brightness level adjustment by specifying how much brighter or darker it is than the standard level. Perform sets using the

BRIGHTNESS knob or using [Exposure] in the [Picture] menu.

To set the AE level using the ∠ BRIGHTNESS knob

When the AE function is on, you can also set the AE level by turning the ✓ BRIGHTNESS knob. Turning the knob clockwise will raise the AE level (brighter than the standard level), and turning it counterclockwise will lower the AE level (darker than the standard level). You can reset the AE level to factory default settings by holding down the ✓ BRIGHTNESS knob for one second or longer.

To set the AE level using the [Exposure] setting in the [Picture] menu

In [Picture] menu's [Exposure] > [Mode], select [Auto], and then set [Auto Exposure Level].

Press the 4/* buttons to set the value on the slider that appears.



The gray circle on the slider indicates the setting value before the change, and the blue circle indicates the current setting value.

Tip

When a slider is displayed, holding down the ◆/◆ buttons increases the incremental speed at which the value changes, allowing you to set your target value faster.

Using the BRIGHTNESS knob

By turning the
BRIGHTNESS knob with the AE function off, you can adjust the brightness with a combination of gain and shutter speed settings. Turning the knob clockwise will brighten the image (higher gain or a slower shutter speed), and turning it counterclockwise will darken the image (lower gain or a faster shutter speed).

You can reset the AE level to its factory default value by holding down the

BRIGHTNESS knob for at least 1 second.

Note

When you use the

BRIGHTNESS knob to change the brightness while [Exposure] > [Mode] is set to [Full Manual] in the [Picture] menu, the setting will automatically change to [Semi Manual].

Using the [Exposure] > [Brightness] setting in the [Picture] menu

Select [Semi Manual] for [Exposure] > [Mode] in the [Picture] menu, and adjust the brightness with the [Brightness] setting.

Press the \d > buttons to set the value on the slider that appears.



The gray circle on the slider indicates the setting value before the change, and the blue circle indicates the current setting value.

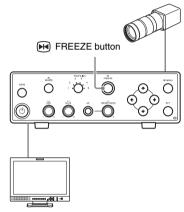
Tip

When a slider is displayed, holding down the ◆/◆ buttons increases the incremental speed at which the value changes, allowing you to set your target value faster.

Outputting a Still Image

To output a still image

Press the FREEZE button on the CCU front panel to output camera images as a still image. When still image output is enabled, the FREEZE button lights.



To return to normal picture

Press the FREEZE button again.

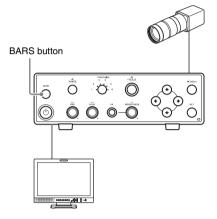
Tips

- Adjustments to image quality settings may be made in the [Picture] menu during still image output, however, these changes will not be reflected in the still images. Once you switch back to normal picture, the image quality changes can be checked.
- During still image output, effects will not be reflected when switching Picture Profiles. Once you switch back to normal picture, Picture Profile changes can be checked.
- Color bar output will be disabled when you switch to still image output.

Changing the Picture to Color Bars

To display the color bar

When you press the BARS button on the CCU front panel, the camera output picture switches to a color bar.



To return to normal picture

Press the BARS button again.

Tips

- Adjustments to image quality settings may be made in the [Picture] menu during color bar output, however, these changes will not be reflected in color bar display. Once you switch back to normal picture, the image quality changes can be checked.
- Still image output will be disabled when you switch to color bar output.

Picture Profile

You can customize settings to match shooting conditions and save these as a picture profile to load when necessary.

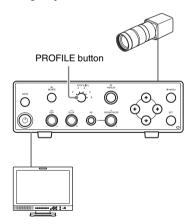
Simply select the picture profile to shoot at your preferred image quality settings.

You can save up to six different picture profiles on this unit (No. 1 to No. 6). There are six factory presets stored as defaults.

To register a picture profile, use the [Picture] menu's [Profile] option. To activate a picture profile, press the PROFILE button.

Registering/activating picture profiles

By pre-registering a picture profile, you can easily switch to registered settings just by activating the profile.



Registering a picture profile

Register the current setting values as a picture profile.

- 1 Press the MENU button.
 The menu screen will appear.
- 2 In the [Picture] menu, select [Profile] and press the SET button.



3 Select [Save], and press the SET button.

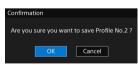


4 Select the number you want to register the profile as and press the SET button.



A confirmation message will appear.

5 Select [OK], and press the SET button.



The number you selected will be registered as a picture profile.

Once settings are complete, press the
 MENU button to close the menu screen.

Tip

You can save the current setting values to the currently selected picture profile by pressing the PROFILE button while holding down the SET button

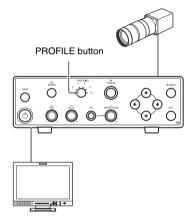
A confirmation message will appear after the settings are successfully saved.

Selecting a picture profile

To select a picture profile with PROFILE button

Press the PROFILE button and select the picture profile you want to activate.

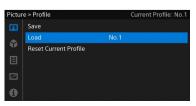
Each time this button is pressed, the indicator will switch between 1, 2, 3, 4, 5, 6 and back to 1 in sequential order, activating the respective picture profile.



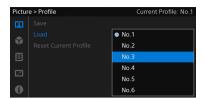
Each time the profile is changed, the unit will adjust the image quality according to the selected profile.

To load a picture profile from the [Picture] menu

- 1 Display the menu screen, and in the [Picture] menu, select [Profile] and then press the SET button.
- 2 Select [Load], and press the SET button.



3 Select the profile to load, and press the SET button.



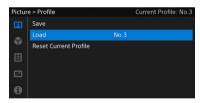
The unit will adjust the image quality according to the selected profile.

4 Press the MENU button to close the menu screen.

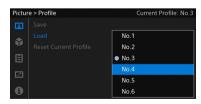
Copying picture profile settings

You can register the setting information for the selected picture profile as a separate profile number.

- 1 Display the menu screen, and in the [Picture] menu, select [Profile] and then press the SET button.
- 2 Select [Load], and press the SET button.



3 Select the original profile to copy, and press the SET button.



The selected picture profile will load.

4 Follow steps 3 to 5 in "Registering a picture profile" (page 33) and the loaded picture profile will be saved to the copy destination number.

5 Once settings are complete, press the

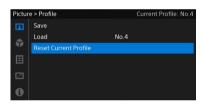
MENU button to close the menu
screen.

Resetting the selected picture profile

You can return the selected picture profile settings to factory defaults (standard values).

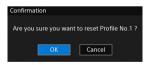
For details on factory default values, see "Picture profile standard setting values (factory default settings)" (page 35).

- 1 Press the PROFILE button and select the picture profile you want to reset.
- 2 Display the menu screen, and in the [Picture] menu, select [Profile] and then press the SET button.
- 3 Select [Reset Current Profile], and press the SET button.



A confirmation message will appear.

4 Select [OK], and press the SET button.



The values will be reset to factory default settings.

Once settings are complete, press the MENU button to close the menu screen.

Picture profile standard setting values (factory default settings)

Setting values for each item in the [Picture] menu are preset in picture profiles No. 1 to No. 6. For details on each item, see "[Picture] menu" (page 40).

		Picture Pro	file				
Item			No.2 Standard configuration for a halogen bulb		No.4 Standard configuration 2 for a xenon lamp	priority	No.6 Dynamic range priority configuration 2 for a halogen bulb
Exposure	Mode	Auto	Auto	Auto	Auto	Auto	Auto
	Auto Exposure Mode	Normal	Normal	Normal	Low Noise	High Sensitivity	High Sensitivity
	Auto Exposure Level	0	0	0	0	0	0
	Auto Exposure Speed	Normal	Normal	Normal	Normal	Normal	Normal
	Slowest Shutter Speed	1/60	1/60	1/60	1/60	1/60	1/60
	Brightness	0	0	0	0	0	0
	Shutter Speed	1/60	1/60	1/60	1/60	1/60	1/60
	Gain	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
Sharpness	Mode	Weak	Weak	Weak	Fine	Fine	Fine
	Level	0	0	0	+5	+5	+5
Gamma	Mode	Normal	Normal	Normal	Normal	Medium	Medium
	Visibility Enhance	Off	Off	Off	Off	On	On
White	Mode	Xenon Lamp	Halogen Bulb	White LED	Xenon Lamp	Halogen Bulb	Halogen Bulb
Balance	Red	0	0	0	0	0	0
	Blue	0	0	0	0	0	0
Color	Main Saturation	0	0	0	0	0	0
Saturation	Red Area Saturation	0	0	0	+7	0	0
	Yellow Area Saturation	0	0	0	0	0	0
	Green Area Saturation	0	0	0	0	0	0
	Blue Area Saturation	0	0	0	0	0	0
Color Hue	Main Hue	0	0	0	0	0	0
	Red Area Hue	0	0	0	-4	0	-3
	Yellow Area Hue	0	0	0	+3	0	-3
	Green Area Hue	0	0	0	-4	0	0
	Blue Area Hue	0	0	0	-4	0	0

	Picture Pro	Picture Profile					
Item	Ü	No.2 Standard configuration for a halogen bulb	~	No.4 Standard configuration 2 for a xenon lamp	priority	No.6 Dynamic range priority configuration	
	штр	builo	LLD	шпр	1 for a halogen bulb	2 for a	
Flip	Off	Off	Off	Off	Off	Off	
Fluorescein	Off	Off	Off	Off	Off	Off	

Menu Display and Detailed Settings

Menu Structure and Layers

On this unit, you can adjust settings necessary for shooting by using the menus displayed on a video monitor.

For details on connecting a video monitor, see "Connecting Video Monitors" (page 22).

Menu structure

Press the MENU button to display the menu and select various menu items.



[Picture] menu

Adjust the image quality and other settings related to shooting (page 40).

[System] menu

Adjust settings related to output format and output signal (page 43).

[Function] menu

Adjust the settings related to camera functions (page 44).

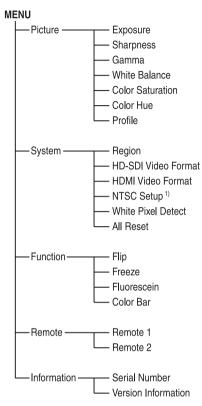
[Remote] menu

Adjust settings for using the foot switch (page 45).

(i) [Information] menu

Displays the unit serial number and software version (page 45).

Menu layers



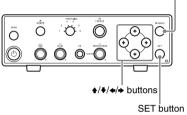
1) Appears only when [Region] is set to [NTSC].

Basic Menu Operations

This section describes basic setting methods for menus

Menu controls





MENU button

This button displays/hides the menu.

These buttons are used to select menu items or setting values.

SET button

This button is used to confirm setting values for selected menu items and to execute operations.

Displaying the menu

Press the MENU button.

The menu's home screen will appear on the video monitor.

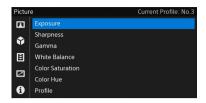
Setting the menus

1 Press the **♦/**♦ buttons to select a menu to set.



2 Press the SET button or → button.

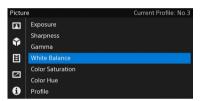
The cursor will move to the right side of the menu item area.



Tip

Press the ♦ button to return to the next higher menu layer.

3 Press the **↑/**♦ buttons to select a menu item.



4 Press the SET button or **→** button.

The current setting value appears.

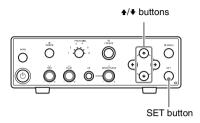


When a menu item is selected with an On/Off or switching only option without a detailed item, proceed to step 6.

5 For menu items with submenu items, press the 4/♦ buttons to select a menu item to set, and then press the SET button or ♦ button.

Other options will appear.

6 Press the */* buttons to select a value to set, and then press the SET button to confirm.



The setting will change and the changed status will be displayed.

If the SET button is pressed for executable items, the respective functions will execute.

A slider for setting values will appear depending on the menu item.

In that case, press the ◆/→ buttons to set the value.



The gray circle on the slider indicates the setting value before the change, and the blue circle indicates the current setting value.

Tip

When a slider is displayed, holding down the ★/★ buttons increases the incremental speed at which the value changes, allowing you to set your target value faster.

Hiding the menu

Press the MENU button.

The menu will disappear.

Menu List

Functions and setting values for each menu item are as follows. Factory default values are shown in bold (Ex.: **Auto**).

[Picture] menu

Picture		
Menu items	Submenus and setting valu	ues Details
Exposure Picture brightness (exposure) adjustment	Mode Auto Semi Manual Full Manual	Select a mode to adjust picture brightness. The available items will differ depending on the mode. Auto: Brightness is automatically adjusted. Semi Manual: Adjust the brightness manually. Setting values can be changed via BRIGHTNESS and the menu's [Brightness] option. Full Manual: Adjust the brightness manually. The shutter speed and gain can be set.
		 If the AE button is pressed when in [Semi Manual] or [Full Manual] modes, the camera will switch to [Auto] mode. When the AE button is pressed when in [Auto] mode, the camera will switch to [Semi Manual] mode.
	When in [Auto] mode	
	Auto Exposure Mode Normal High Sensitivity Low Noise	Select an automatic brightness (exposure) adjustment mode. Normal: Operates as normal AE. High Sensitivity: Sets the maximum gain value and operates as high sensitivity. Low Noise: Ideal for well-lit subjects. Shoot an image with reduced noise.
	Auto Exposure Level -6 to 0 to +6	Set the exposure level.
	Auto Exposure Speed Slow Normal Fast	Select the amount of time needed (AE convergence time) to achieve the correct exposure.
	Slowest Shutter Speed 1/60 1/125 1/250 1/500 1/1000	Select the low speed limit for the shutter speed. Setting a minimum shutter speed value allows you to shoot an image with reduced blur when shooting still images.

Picture Menu items	Submenus and setting valu	ues Details
Exposure	When in [Semi Manual] mode	
Picture brightness (exposure)	Brightness -12 to 0 to +12	Adjust the brightness.
adjustment	When in [Full Manual] mode	
	Shutter Speed 1/60 1/100 1/125	Select the shutter speed.
	1/250 1/500 1/1000 1/2000 1/5000 1/10000	
	Gain 0 dB 3 dB 6 dB 9 dB 12 dB 15 dB 18 dB 21 dB 21 dB	Select the gain.
Sharpness Image edge enhancement settings	Mode Weak Fine Medium Fine Medium Coarse	Select the sharpness mode. Weak: Faint Fine: Perform strong contour enhancement for fine edges. Medium Fine: Perform strong contour enhancement for somewhat fine edges. Medium: Perform strong contour enhancement for medium edges. Coarse: Perform strong contour enhancement for thick edges.
	Level -10 to 0 to +10	Adjust the sharpness mode level. Sharpness is disabled when it is set to -10.
Gamma Gamma settings	Mode Normal Medium Dynamic Range Priority	Adjust the way the image appears such as for scenes with intense light, reflections and overexposed areas. Normal: Normal setting. Medium: Medium setting. Dynamic Range Priority: Suppress blown-out highlights while prioritizing dynamic range.
	Visibility Enhance Off On	Use this to perform correction for dim, poorly lit areas. Off: Disabled On: Enabled

Picture		
Menu items	Submenus and setting values	Details
White Balance White balance settings	Mode Xenon Lamp Halogen Bulb White LED Auto	Select a white balance mode. Xenon Lamp: Mode ideal for when you are using a xenon lamp as the light source. Halogen Bulb: Mode ideal for when you are using a halogen bulb as the light source. White LED: Mode ideal for when you are using a white LED as the light source. Auto: Auto tracing white balance.
	White Balance Adjust	Performs auto white balance.
	Red -100 to 0 to +100	Adjust the amount of red.
	Blue -100 to 0 to +100	Adjust the amount of blue.
Color Saturation	Main Saturation -100 to 0 to +100	Adjust the overall color saturation.
Color vividness adjustment (color saturation	Red Area Saturation ¹⁾ -100 to 0 to +100	Adjust the red area color saturation.
saturation adjustment)	Yellow Area Saturation ¹⁾ -100 to 0 to +100	Adjust the yellow area color saturation.
	Green Area Saturation ¹⁾ -100 to 0 to +100	Adjust the green area color saturation.
	Blue Area Saturation ¹⁾ -100 to 0 to +100	Adjust the blue area color saturation.
Color Hue Hue adjustment	Main Hue -100 to 0 to +100	Adjust the overall hue.
	Red Area Hue ¹⁾ -100 to 0 to +100	Adjust the red area hue.
	Yellow Area Hue ¹⁾ -100 to 0 to +100	Adjust the yellow area hue.
	Green Area Hue ¹⁾ -100 to 0 to +100	Adjust the green area hue.
	Blue Area Hue ¹⁾ -100 to 0 to +100	Adjust the blue area hue.

¹⁾ Only enabled when the [Mode] for [White Balance] is set to [Xenon Lamp] or [Halogen Bulb].

Picture		
Menu items	Submenus and setting v	values Details
Profile	Save	Register the current [Picture] menu setting values to the
Picture Profile	No.1	selected picture profile No.
operations	No.2	
	No.3	
	No.4	
	No.5	
	No.6	
	Load	Load the selected picture profile.
	No.1	
	No.2	
	No.3	
	No.4	
	No.5	
	No.6	
	Reset Current Profile	Return the currently selected picture profile content to factory default values.

[System] menu

System		
Menu items	Submenus and setting value	s Details
Region Output Format Settings	NTSC PAL	Select the appropriate output format for your region of use. Note Restart the unit whenever you change this setting.
HD-SDI Video Format HD-SDI output signal format settings	When [Region] is set to [NTSC] 1080/60p 1080/60i 1080/30p When [Region] is set to [PAL] 1080/50p 1080/50i	Select the HD-SDI output signal format. Tip The 1080/59.94p, 1080/59.94i, 1080/29.97PsF, and 1080/ 25PsF formats appear as [1080/60p], [1080/60i], [1080/30p], and [1080/25p], respectively, on this unit's menus.
HDMI Video Format HDMI output signal format settings	1080/25p When [Region] is set to [NTSC] 1080/60p 1080/60i 1080/30p 480/60p When [Region] is set to [PAL] 1080/50p 1080/50i 1080/25p 576/50p	Select the HDMI output signal format. Tips • The 1080/59.94p, 1080/59.94i, 1080/29.97p, and 480/59.94p formats appear as [1080/60p], [1080/60i], [1080/0], and [480/60p], respectively, on this unit's menus. • If the connected video monitor does not support the selected format, the video monitor will display images in the format it supports.
NTSC Setup	Available only when [Region] is set to [NTSC] Off On	Select whether to add 7.5% setup to the signals output from the VIDEO and S VIDEO connectors when [Region] is set to [NTSC].

System		
Menu items	Submenus and setting values Details	
White Pixel	Executes white pixel detection	adjustment.
Detect	Notes	
	for example, when performi adjustment. • White pixel detection adjust or several minutes to comple	tement may take several seconds etc. node will be the only operation
All Reset	Resets all settings on the unit However, the [Region] setting default value.	•

[Function] menu

Function		
Menu items	Submenus and setting values	Details
Flip	Off	Flip output image.
Image flip	HV Flip	Off: Does not flip image.
	H Flip	HV Flip: Flips image horizontally and vertically.
	V Flip	H Flip: Flips image horizontally.
		V Flip: Flips image vertically.
Freeze	Off	Output the picture as a still image.
Still image output	On	Off: Outputs a normal picture.
		On: Outputs a still image.
Fluorescein	Off	Switch between activated/deactivated for fluorescein mode,
Fluorescein mode	On	which reduces blue light during fluorescein shooting.
settings		Off: Deactivated
		On: Activated
Color Bar	Off	Output a color bar rather than camera images.
Color bar output	On	Off: Outputs a camera picture.
		On: Outputs a color bar.

[Remote] menu

Remote Menu items	Submenus and setting va	alues Details
Remote 1 Settings for remote contact switch connector 1	None Freeze Fluorescein Picture Profile 1/2 Picture Profile All Flip HV Flip All	Select a function to execute using the foot switch connected to the remote contact connector 1. None: Does nothing. Freeze: Switch between On/Off for still image output. Fluorescein: Switch between activated/deactivated for fluorescein mode. Picture Profile 1/2: Switch between picture profile No. 1 and No. 2. Picture Profile All: Switch between picture profiles No. 1 through No. 6 in sequential order. Flip HV: Switches the status of the image flip function as follows. Do not flip → horizontal and vertical flip → do not flip Flip All: Switches the status of the image flip function as follows. Do not flip → horizontal and vertical flip → horizontal flip → vertical flip → do not flip
Remote 2 Settings for remote contact switch connector 2	None Freeze Fluorescein Picture Profile 1/2 Picture Profile All Flip HV Flip All	Select a function to execute using the foot switch connected to remote contact connector 2. None: Does nothing. Freeze: Switch between On/Off for still image output. Fluorescein: Switch between activated/deactivated for fluorescein mode. Picture Profile 1/2: Switch between picture profile No. 1 and No. 2. Picture Profile All: Switch between picture profiles No. 1 through No. 6 in sequential order. Flip HV: Switches the status of the image flip function as follows. Do not flip → horizontal and vertical flip → do not flip Flip All: Switches the status of the image flip function as follows. Do not flip → horizontal and vertical flip → horizontal flip → vertical flip → do not flip

[Information] menu

Information Menu items	Submenus and setting values	Details
Serial Number Serial number display		Displays the unit serial number.
Version Information Software version display		Displays the unit software version.

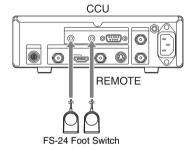
System Operation Examples

Using the Foot Switch

You can connect the foot switch to the remote contact switch connector 1 to 2 on the rear CCU panel to use functions on this unit. You can connect up to two foot switches.

Connecting the foot switch

Connect the foot switch to the remote contact switch connector 1 to 2.

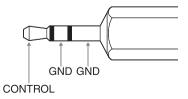


Note

The FS-24 has an Ingress Protection rating of IPx3. Therefore, do not operate it environments exposed to splashing liquids (e.g., surgical operating rooms). For safety, use a device with a rating of IPx6 or higher when operating in such environments.

Remote contact switch connectors 1 and 2

Connector specifications (stereo mini jack)



Set the functions to use

Set the functions to use with the foot switch.

For details on the function controlled by the foot switch, see "[Remote] menu" (page 45).

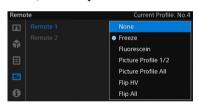
- 1 Press the MENU button.
 The menu screen will appear.

2 In the [Remote] menu, select [Remote 1] or [Remote 2] and press the SET button.

When connected to remote contact switch connector 1, select [Remote 1], and when connected to remote contact switch connector 2, select [Remote 2].



3 Select the functions to use with the foot switch, and then press the SET button.



- When two foot switches are connected, select functions to use with the second foot switch as well.
- Once settings are complete, press the MENU button to close the menu screen.

Using Two Cameras to Shoot 3D Images

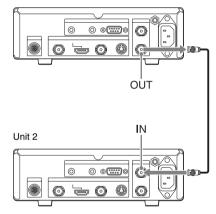
You can shoot 3D images by using two units connected as described below.

To connect two units, use a commercially-available 75 Ω coaxial cable.

Recommended cable: 5CFB, length of 1 m (3.3 ft) or less

Using a commercially-available 75 Ω coaxial cable, connect the first unit's 3D-SYNC OUT connector on the CCU to the second unit's 3D-SYNC IN connector on the CCU.

Unit 1



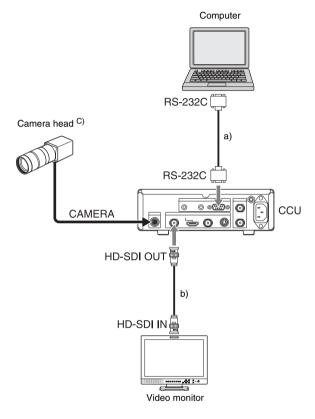
2 Set the video format and image quality settings so that they match on both units.

Notes

- When adjusting the installation of two camera heads, be sure to keep 3D standards in mind so as not to adversely effect human subjects.
- Use camera cables of equal length for both of the cameras.

Controlling the Unit with a Computer

This unit can be controlled from a computer using the RS-232C interface.



- a) D-sub 9-pin remote control cable
- b) 75 Ω coaxial cable
- c) For details on connecting to the camera head, see page 20.

For specifications on the cable that connects from the unit to a computer, or details about RS-232C control, contact Sony service representative.

Appendices

Troubleshooting

Power

Symptom	Cause	Solution
The unit does not power on when you press the (b) (on/standby) button.	The unit is not connected to AC power.	Connect AC Power.
All of the LED indicators on the front panel are blinking.	A system error occurred.	Remove the power cord and check the camera cable and connection with other devices. If the problem persists, contact Sony service representative.

Shooting

Symptom	Cause	Solution
No picture is output from the	The camera head and CCU are not securely connected.	Check the connection with the camera head.
camera.	The [System] menu's [Region] option setting differs from your video monitor settings.	Correctly set the [System] menu's [Region] setting (see page 43). You can also change the [Region] setting as follows. To set to [NTSC]: Press the ♂ (on/standby) button to set the unit to standby mode while holding down the MENU and ◆ buttons. To set to [PAL]: Press the ♂ (on/standby) button to set the unit to standby mode while holding down the MENU and ◆ buttons.
Camera picture output is distorted (does not display properly).	The camera head and CCU are not securely connected.	Check the camera cable connection. Insert the camera cable's connector fully, and turn the connector ring to secure it.

Errors/Warnings

When an error occurs on this unit, a warning or precautionary message will appear on all outputs. In addition, all of the LED indicators on the front panel may blink, depending on the message. Follow the instructions in the message to solve the problem.

Error display

When the following messages appear, all of the LED indicators on the front panel will blink rapidly.

Message	Explanation
System Error: XX	"XX" stands for the error number. When this message appears, contact Sony service
	representative with the error number.

Warning display

When the following messages appear, all of the LED indicators on the front panel will blink.

Message	Explanation
Camera head disconnected.	The camera head is not connected.
Turn off camera and check	Disconnect the power cord, and check the connections.
camera connection.	

Specifications

General

Power requirements

100 to 240 V AC, 50/60 Hz

Input current

0.27 A - 0.18 A

Operating temperature

0 °C to 40 °C (32 °F to 104 °F)

Operating humidity

20% to 80% (without condensation)

Operating pressure

700 hPa to 1060 hPa

Storage and transport temperature

-20 °C to +60 °C (-4 °F to +140 °F)

Storage and transport humidity

20% to 90% (without condensation)

Storage and transport pressure

700 hPa to 1060 hPa

Weight

Camera head: approx. 40 g

(approx. 1.4 oz.)

Camera control unit: approx. 2.3 kg

(approx. 5 lb. 1.1 oz.)

Dimensions (WHD, excluding longest protrusions)

Camera head:

approx. $27 \times 28 \times 49 \text{ mm}$

(approx. $1^{1}/_{8} \times 1^{1}/_{8} \times 1^{15}/_{16}$ in.)

Camera control unit:

approx. $200 \times 62 \times 240 \text{ mm}$

(approx. $7^{7}/_{8} \times 2^{1}/_{2} \times 9^{1}/_{2}$ in.)

Supplied items

See "Package Configuration" (page 14)

Camera head

Image device

1/2.9 type, Exmor CMOS image sensor,

single chip type

Effective pixels: $1920 (H) \times 1080 (V)$

Lens mount

C-mount

Sensitivity

F5.6 (Typical) (At 1080/59.94i, 89.9% reflection, 2000 lx)

Picture S/N

55 dB (Y) (Typical)

Horizontal resolution

900 TV lines or more

Gain

0 dB to 27 dB

Shutter speed

 $^{1}/_{60}$ to $^{1}/_{10000}$

Camera cable connector

20-pin, round

Camera control unit

Input connectors

Remote contact switch connectors 1, 2

Stereo mini jack

Output connectors

VIDEO OUT

BNC, 1.0 Vp-p, 75 Ω , unbalanced

S VIDEO OUT

4-pin mini DIN connector

Y: 1.0 Vp-p, 75 Ω, unbalanced

C (BURST): 0.286 Vpp, 75Ω (NTSC)

C (BURST): 0.3 Vpp, 75Ω (PAL)

HDMI OUT

HDMI connector

HD-SDI OUT

BNC, HD/3G: 0.8 Vp-p/75 Ω

HD: Conforms to SMPTE 292M

3G: Conforms to SMPTE 424M

Input/output connectors

CAMERA

20-pin, round

RS-232C

D-sub 9-pin

3D SYNC IN, OUT

Other connector

4

Equipotential ground connector

Separately-sold accessories

Camera cable

CCMC-SA06 (standard 6 m (19.6 ft.))
Mass Approx. 470 g (1 lb. 0.58 oz.)
CCMC-SA10 (standard 10 m (32.8 ft.))
Mass Approx. 745 g (1 lb. 10 oz.)
CCMC-SA15 (standard 15 m (49.2 ft.))
Mass Approx. 1,100 g (2 lb. 6.8 oz.)
CCMC-EA05 (extension 5 m (16.4 ft.))
Mass Approx. 400 g (14 oz.)

Foot switch

FS-24

Note

The FS-24 has an Ingress Protection rating of IPx3. Therefore, do not operate it environments exposed to splashing liquids (e.g., surgical operating rooms). For safety, use a device with a rating of IPx6 or higher when operating in such environments.

Medical Specifications

Protection against electric shock:

Class I

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

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.
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