

# HD Video Camera

## Instructions for Use

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

MCC-500MD



## Indications for Use/Intended Use

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

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

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

### Notes

- Output images from this equipment cannot be used for diagnostic use.
- This equipment is for medical professionals.
- This equipment is intended for use in medical environments, such as hospital operating rooms and hospital examination rooms.

## WARNING

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

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

**No modification of this equipment is allowed.**

## 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.

### Symbols on the product



#### 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 Importer, and appears next to the Importer's name and registered office address.



This symbol indicates the European Community representative, and appears next to the European Community representative's name and address.



This symbol indicates the UK Responsible Person, and appears next to the UK Responsible Person's name and address.



This symbol indicates the Swiss authorized representative, and appears next to the Swiss authorized representative's name and address.



This symbol indicates the medical device in the European Community.



This symbol indicates the date of manufacture.



This symbol indicates the serial number.



This symbol indicates the Unique Device Identifier (UDI), and appears next to the bar code representation of the Unique Device Identification.



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.

## **For 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 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 MCC-500MD 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.
- The MCC-500MD is intended for use in a professional healthcare facility environment.
- Portable and mobile RF communications equipment, such as cellular phones, can affect the MCC-500MD.

### Warning

- Portable RF communications equipment should be used no closer than 30 cm (12 inches) to any part of the MCC-500MD. Otherwise, degradation of the performance of this equipment could result.
- If the MCC-500MD will be used adjacent to or stacked with other equipment, normal operation of the MCC-500MD under such configurations should be verified via observation.
- 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.

List of cables used for EMC test	
Type of cable	Specifications
CCMC-SA15 cable	15 m, shielded
CCMC-EA05 cable	5 m, shielded

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 CISPR 11	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 CISPR 11	Class B	The MCC-500MD is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

### Guidance and manufacturer's declaration – electromagnetic immunity

The 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.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD)	±8 kV contact	±8 kV contact	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, a relative humidity of at least 30% is recommended.
IEC 61000-4-2	±15 kV air	±15 kV air	
Electrical fast transient/burst	±2 kV for power supply lines	±2 kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
IEC 61000-4-4	±1 kV for input/output lines	±1 kV for input/output lines	
Surge	±1 kV line(s) to line(s)	±1 kV differential mode	Mains power quality should be that of a typical commercial or hospital environment.
IEC 61000-4-5	±2 kV line(s) to earth	±2 kV common mode	
Voltage dips, short interruptions and voltage variations on power supply input lines	0% $U_T$ (100% dip in $U_T$ ) for 0.5/1 cycles <sup>a</sup>	0% $U_T$ (100% dip in $U_T$ ) for 0.5/1 cycles <sup>a</sup>	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.
IEC 61000-4-11	40% $U_T$ (60% dip in $U_T$ ) for 5 cycles	40% $U_T$ (60% dip in $U_T$ ) for 5 cycles	
	70% $U_T$ (30% dip in $U_T$ ) for 25/30 cycles <sup>a</sup> (for 0.5 sec)	70% $U_T$ (30% dip in $U_T$ ) for 25/30 cycles <sup>a</sup> (for 0.5 sec)	
	0% $U_T$ (100% dip in $U_T$ ) for 250/300 cycles <sup>a</sup> (for 5 sec)	0% $U_T$ (100% dip in $U_T$ ) for 250/300 cycles <sup>a</sup> (for 5 sec)	
Power frequency (50/60 Hz) magnetic field	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
IEC 61000-4-8			

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

<sup>a</sup> For example, 10/12 means 10 cycles at 50 Hz or 12 cycles at 60 Hz.



Radiated RF  IEC 61000-4-3	3 V/m  80 MHz to 2.7 GHz	3 V/m	<p>IEC 60601-1-2: 2007</p> <p><math>d = 1.2 \sqrt{P}</math> 80 MHz to 800 MHz</p> <p><math>d = 2.3 \sqrt{P}</math> 800 MHz to 2.5 GHz</p> <p>IEC 60601-1-2: 2014</p> <p><math>d = 2.0 \sqrt{P}</math> 80 MHz to 2.7 GHz</p> <p>Where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <math>d</math> is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,<sup>a</sup> should be less than the compliance level in each frequency range.<sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with following symbol:</p> 
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.			
<p>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.</p> <p>b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p> <p>c The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.</p>			

**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 W	Separation distance according to frequency of transmitter m				
	IEC 60601-1-2 : 2007			IEC 60601-1-2 : 2014	
	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 $d = 2.3 \sqrt{P}$	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 2.7 GHz $d = 2.0 \sqrt{P}$
0.01	0.12	0.12	0.23	0.12	0.20
0.1	0.38	0.38	0.73	0.38	0.63
1	1.2	1.2	2.3	1.2	2.0
10	3.8	3.8	7.3	3.8	6.3
100	12	12	23	12	20

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.

### Guidance and manufacturer's declaration – electromagnetic immunity

The MCC-500MD is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. Portable RF communications equipment should be used no closer than 30 cm (12 inches) to any part of the MCC-500MD. Otherwise, degradation of the performance of this equipment could result.

Immunity test	Band <sup>a</sup>	Service <sup>a</sup>	Modulation	IEC 60601 test level	Compliance level
Proximity fields from RF wireless communications equipment  IEC 61000-4-3	380 – 390 MHz	TETRA 400	Pulse modulation 18 Hz	27 V/m	27 V/m
	430 – 470 MHz	GMRS 460 FRS 460	FM ±5 kHz deviation 1 kHz sine	28 V/m	28 V/m
	704 – 787 MHz	LTE Band 13, 17	Pulse modulation 217 Hz	9 V/m	9 V/m
	800 – 960 MHz	GSM 800/ 900 TETRA 800 iDEN 820 CDMA 850 LTE Band 5	Pulse modulation 18 Hz	28 V/m	28 V/m
	1,700 – 1,990 MHz	GSM 1800 CDMA 1900 GSM 1900 DECT LTE Band 1, 3, 4, 25 UMTS	Pulse modulation 217 Hz	28 V/m	28 V/m
	2,400 – 2,570 MHz	Bluetooth WLAN 802.11 b/g/n RFID 2450 LTE Band 7	Pulse modulation 217 Hz	28 V/m	28 V/m
	5,100 – 5,800 MHz	WLAN 802.11 a/n	Pulse modulation 217 Hz	9 V/m	9 V/m

**NOTE:** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

<sup>a</sup> For some services, only the uplink frequencies are included.

## 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 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.

	<b>U.S.A. and Canada</b>
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”.

## 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.

## Caution

When installing, ensure the following space around the periphery of the unit, taking ventilation and servicing into consideration. Ensure at least 10 cm (4 in.) of space between the installation and walls.



## Caution

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

This equipment is not suitable for use in locations where children are likely to be present.

**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 <https://pro.sony/support-services/primesupport/support-professional-solutions-europe-standard-product-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

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### Safety precautions for using this unit

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- 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”.

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### Precautions when connecting this unit to medical equipment

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- 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.

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### Use with electrosurgical knives and similar devices

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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.

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### Usage and storage locations

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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

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### Precautions concerning laser beams

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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).

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### Do not subject the unit to strong impacts

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

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### Do not block the camera vents

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

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### Do not subject the unit to sudden changes in temperature

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Sudden changes in temperature may affect the camera picture output.

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## Do not leave the unit with the camera facing the sun

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

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## Cleaning

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Before cleaning the unit, be sure to disconnect the power cord.

### When the cabinet becomes dirty

- Clean the surface with a 50 to 70 v/v% concentration of isopropyl alcohol or a 76.9 to 81.4 v/v% concentration of ethanol.
- Stubborn stains may be removed with a soft cloth such as a cleaning cloth lightly dampened with mild detergent solution and then cleaned using the above chemical.
- Do not use solvents such as benzene or thinner, or acid, alkaline or abrasive detergent, or chemical cleaning cloth for cleaning the surface, as they will damage the surface.
- Do not use unnecessary force to rub the surface with a stained cloth. The surface may be scratched.

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## Transporting the unit

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

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## After use

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Press the  (on/standby) switch to turn the standby mode.

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## When not using the unit for a long period of time

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Disconnect the power cord.

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## On moisture condensation

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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.

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## Phenomena specific to the CMOS image sensor

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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.

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## Precautions concerning heat generation by the unit

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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.

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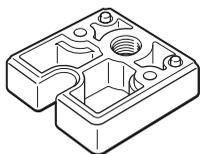
## Overview

# 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)
- Information for Customers in Europe (1)

## Features of This Unit

This equipment uses an image sensor to convert an image from an optical device, then into a signal processor which converts it into an electrical video signal output.

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.

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### Cutting-edge camera technologies

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#### 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 × 28 × 49 mm (approx. 1 1/8 × 1 1/8 × 1 15/16 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.).

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### Shooting modes for diverse imaging applications

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#### Picture profile function

This function allows the camera operator to easily call up customized picture tonal 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.

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**Two-camera support for 3D shooting**

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

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**Intuitive control via the front panel**

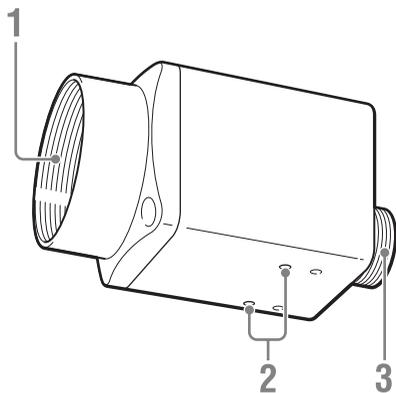
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The BRIGHTNESS, RED, and BLUE knobs on the front panel provide an intuitive way to adjust the picture. When turned to the right they increase their respective values (brightening the picture or strengthening colors), and when turned to the left they 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 23)

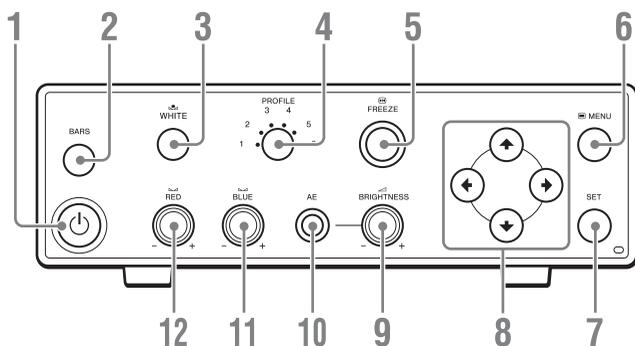
Use this to mount a C-mount lens, microscope adapter, etc.

### 2. Screw holes (M2, 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 24)

## Camera control unit (CCU) front panel



### 1. (on/standby) switch (page 27)

### 2. BARS (color bars) button (page 36)

### 3. WHITE (white balance) button (page 31)

### 4. PROFILE (Picture Profile selection) button (page 36)

### 5. FREEZE (still image) button (page 35)

### 6. MENU button (page 42)

### 7. SET (confirm) button (page 42)

### 8. (cursor) button (page 42)

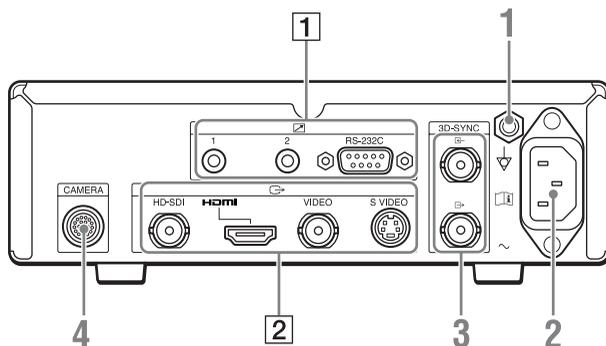
### 9. BRIGHTNESS (brightness adjustment) knob (page 34)

10. AE (automatic exposure) button (page 34)

11.  BLUE (B-gain) knob (page 32)

12.  RED (R-gain) knob (page 32)

## Camera control unit (CCU) rear panel



### 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.



### Caution

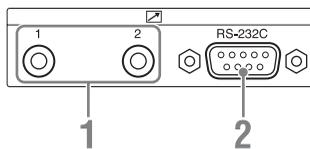
Do not come into contact with the terminals of the rear panel connectors and patients at the same time.

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.

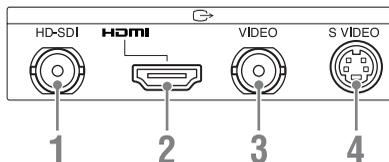
1.  **Equipotential ground connector**  
Used to make an equipotential ground connection.
2.  **(power) connector (page 27)**
3.  **3D-SYNC IN (3D-SYNC input) connector**,  **3D-SYNC OUT (3D-SYNC output) connector (BNC type) (page 51)**
4. **CAMERA connector (page 24)**

**1**  **REMOTE connector block**



- 1. Remote contact switch connector 1, 2 (stereo mini jack) (page 50)**
- 2. RS-232C connector (D-sub 9-pin) (page 52)**

**2**  **OUTPUT connector block**

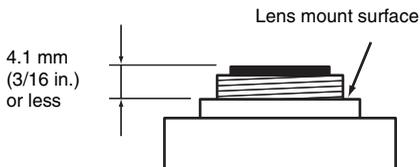


- 1. HD-SDI output connector (BNC type) (page 26)**
- 2. HDMI output connector (HDMI) (page 26)**
- 3. VIDEO (composite video) output connector (BNC type) (page 26)**
- 4. S VIDEO output connector (mini DIN 4-pin) (page 26)**

## Preparations

# Lens Mounting

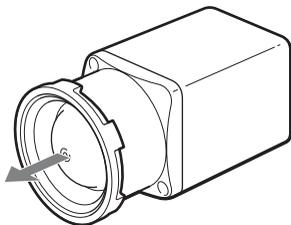
C-mount lenses with a protrusion of 4.1 mm (3/16 in.) or less from the lens mount surface can be attached to the camera head.



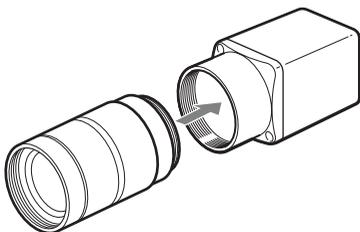
Be sure to use a lens whose protrusion from the lens mount surface is 4.1 mm (3/16 in.) or less. Mounting a lens with a maximum protrusion of 4.2 mm (3/16 in.) or more may damage the internal mechanism of the camera head.

## Mounting the lens

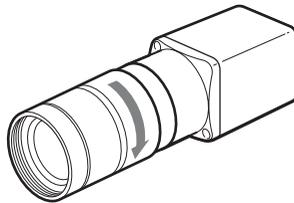
- 1 Remove the lens mount cap.



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

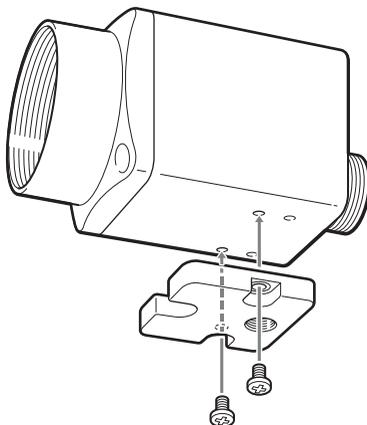


- 3 Slowly turn the lens clockwise to securely attach it to the camera.



## 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.))

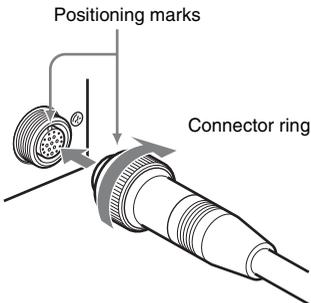
CCMC-SA15 (standard 15 m (49.2 ft.))

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



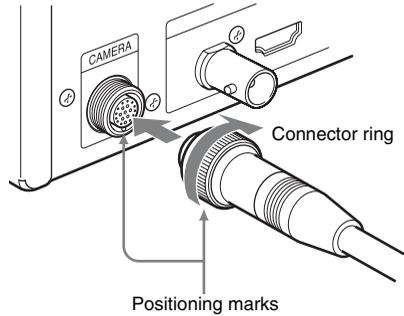
- 1 Align the positioning marks on the camera cable connector and the round camera cable plug, and then push the plug in.

- 2 Turn cable connector ring to tighten the connection.

### Note

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

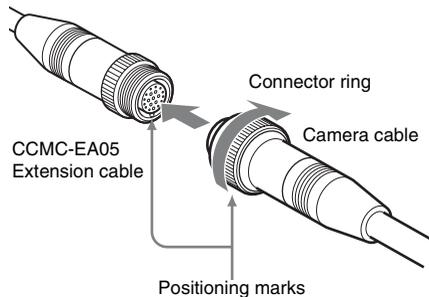
## Connecting the camera cable to the CAMERA connector on the CCU



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

## Connecting an extension cable

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.).

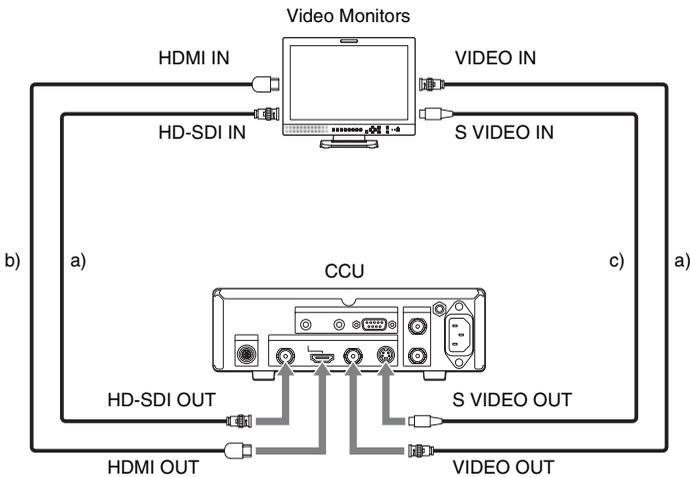
# Connecting Video Monitors

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.



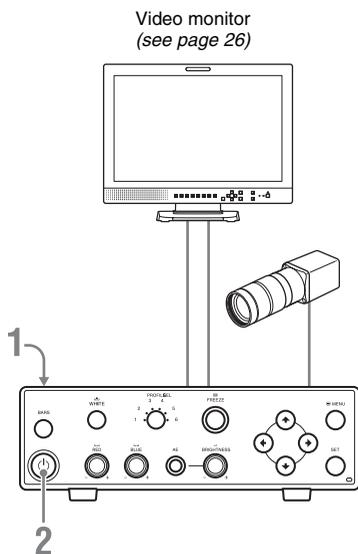
- a) 75  $\Omega$  coaxial cable
- b) HDMI cable
- c) S connector cable

## Note

We recommend using Sony HDMI cables (not supplied).

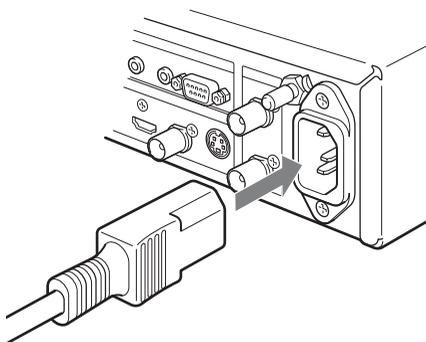
# Start-up

## Turning the power on



- 1 **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 ⏻ (on/standby) switch.**

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 ⏻ (on/standby) switch 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

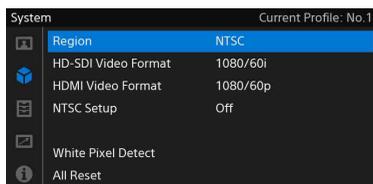
The output format for this unit can be set to NTSC or PAL. Set the output format according to where the unit will be used. The factory default setting is NTSC.

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.

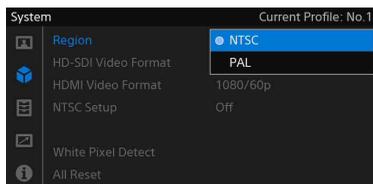
- 1 Display the [System] menu, select [Region], and then press the SET button.



For details on menu operations, see “Basic Menu Operations” (page 42).

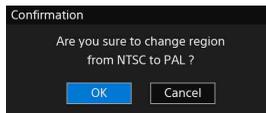
- 2 Press the / buttons to select an output format, and then press the SET button.

● 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

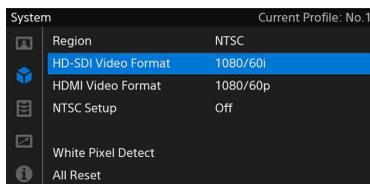
- When you change the [Region] setting, the HD-SDI and HDMI output signal formats will return to factory default values. Be sure to reconfigure the output signal formats if necessary.
- Setting the unit to standby mode will be the only operation immediately available after changing the [Region] setting.

## 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.

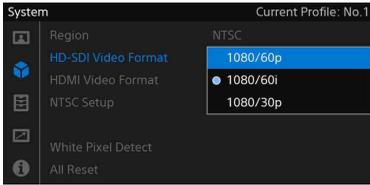
Select [HD-SDI Video Format] if an HD-SDI input video monitor is connected, and select [HDMI Video Format] if an HDMI input video monitor is connected.



For details on menu operations, see “Basic Menu Operations” (page 42).

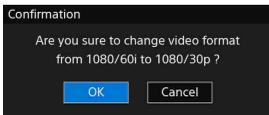
- 2 Press the / buttons to select an output signal format, and then press the SET button.

● 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

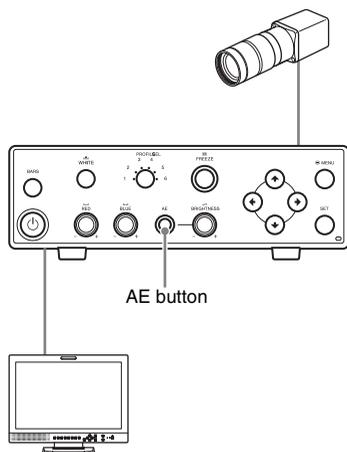
The type of signals output from the unit will differ depending on the settings in the [System] menu's [Region] option. Output signals are shown in the table below.

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

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 26).

### 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 33).

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

For details, see “Picture Profile” (page 36).

## 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 33).

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 46).

### [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.

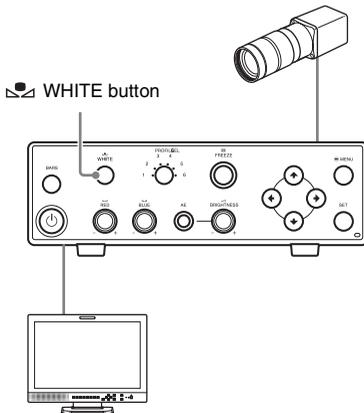
- When in [Auto] mode
- When [Fluorescein] is set to [On] in the [Function] menu

## 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 WHITE 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.

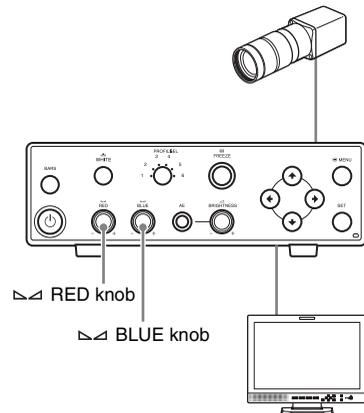
## Changing the camera picture output color balance

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  RED or  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 /  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  $\leftarrow/\rightarrow$  buttons increases the incremental speed at which the value changes, allowing you to set your target value faster.

## Adjusting the Brightness

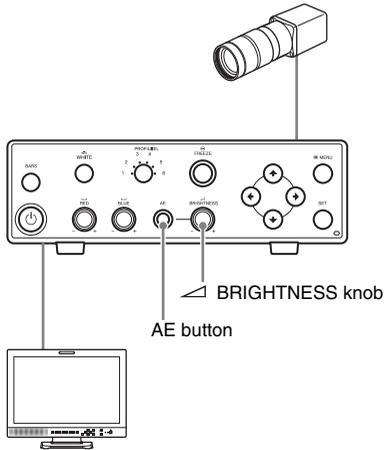
This unit is equipped with an AE function that automatically adjusts the brightness to optimum levels through a combination of settings of the gain and shutter speed. You can also make adjustments using the  $\sphericalangle$  BRIGHTNESS knob, which also adjusts the brightness through a combination of 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 44).



### 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  $\triangleleft$  BRIGHTNESS knob or using [Exposure] in the [Picture] menu.

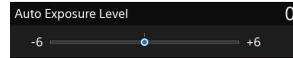
#### To set the AE level using the $\triangleleft$ BRIGHTNESS knob

When the AE function is on, you can also set the AE level by turning the  $\triangleleft$  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  $\triangleleft$  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  $\triangleleft/\triangleright$  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  $\triangleleft/\triangleright$  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  $\triangleleft$  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  $\triangleleft$  BRIGHTNESS knob for at least 1 second.

#### Note

When you use the  $\triangleleft$  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  $\triangleleft/\triangleright$  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.

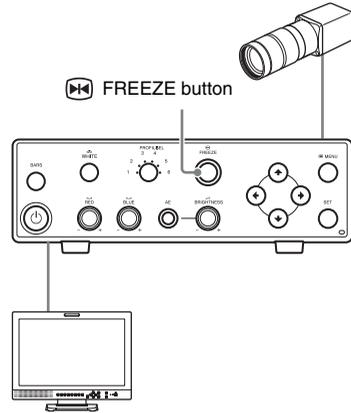
**Tip**

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.

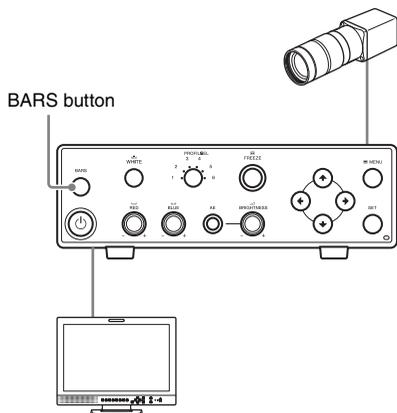
**Tips**

- 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.

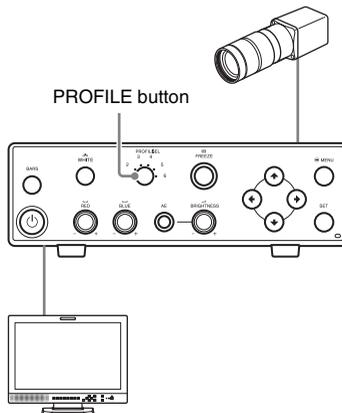
Simply select the picture profile to shoot at your preferred image quality settings.

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.



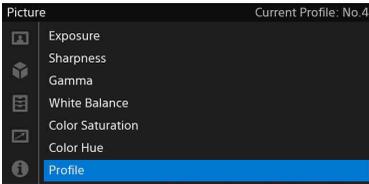
## Registering a picture profile

Register the current setting values as a picture profile.

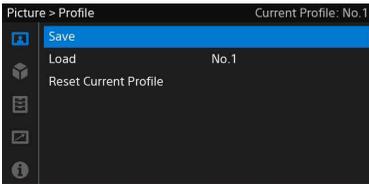
### 1 Press the MENU button.

The menu screen will appear.

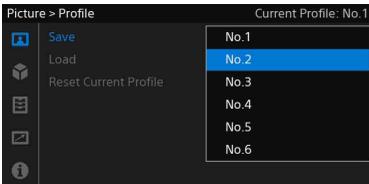
### 2 In the [Picture] menu, select [Profile] and press the SET button.



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

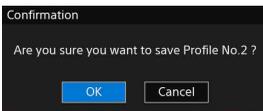


### 4 Select the number you want to register the profile as and press the SET button.



A confirmation message will appear.

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



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

### 6 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.

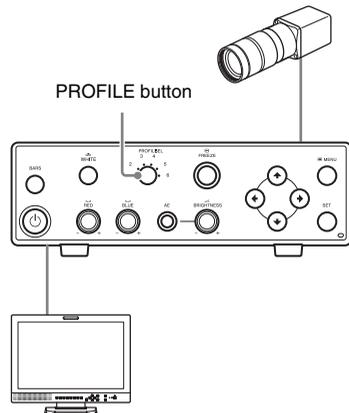
A confirmation message will appear after the settings are successfully saved.

## 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.

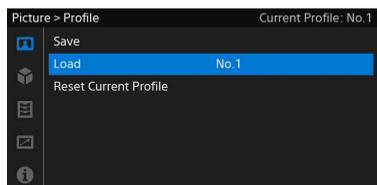


Each time the profile is changed, the unit will adjust the image quality according to the selected profile.

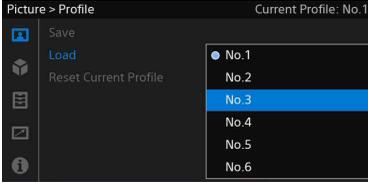
### To load a picture profile from the [Picture] menu

### 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.



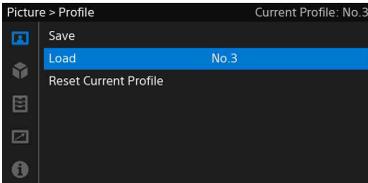
The unit will adjust the image quality according to the selected profile.

- 4 Press the  MENU button to close the menu screen.

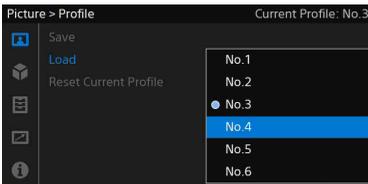
## Copying picture profile settings

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 37) and the loaded picture profile will be saved to the copy destination number.

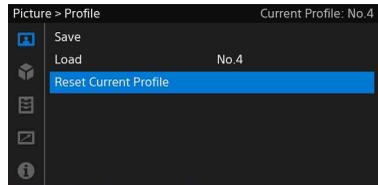
- 5 Once settings are complete, press the  MENU button to close the menu screen.

## Resetting the selected picture profile

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

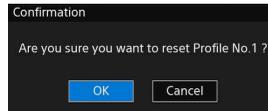
For details on factory default values, see “Picture profile standard setting values (factory default settings)” (page 39).

- 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.

- 5 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 44).

Item	Picture Profile						
	No.1 Standard configuration 1 for a xenon lamp	No.2 Standard configuration for a halogen bulb	No.3 Standard configuration for a white LED	No.4 Standard configuration 2 for a xenon lamp	No.5 Dynamic range priority configuration 1 for a halogen bulb	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 Balance	Mode	Xenon Lamp	Halogen Bulb	White LED	Xenon Lamp	Halogen Bulb	Halogen Bulb
	Red	0	0	0	0	0	0
	Blue	0	0	0	0	0	0
Color Saturation	Main Saturation	0	0	0	0	0	0
	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

Item	Picture Profile					
	No.1 Standard configuration 1 for a xenon lamp	No.2 Standard configuration for a halogen bulb	No.3 Standard configuration for a white LED	No.4 Standard configuration 2 for a xenon lamp	No.5 Dynamic range priority configuration 1 for a halogen bulb	No.6 Dynamic range priority configuration 2 for a halogen bulb
Flip	Off	Off	Off	Off	Off	Off
Fluorescein	Off	Off	Off	Off	Off	Off

## Menu Display and Detailed Settings

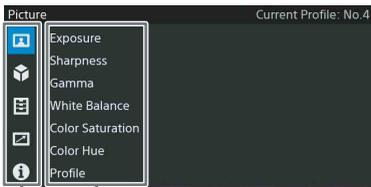
# Menu Structure and Layers

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 26).

## Menu structure

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



Menu

### [Picture] menu

Adjust the image quality and other settings related to shooting (page 44).

### [System] menu

Adjust settings related to output format and output signal (page 47).

### [Function] menu

Adjust the settings related to camera functions (page 48).

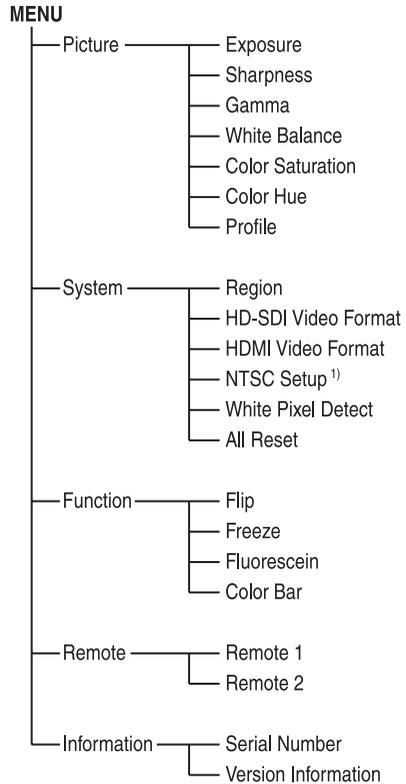
### [Remote] menu

Adjust settings for using the foot switch (page 49).

### [Information] menu

Displays the unit serial number and software version (page 49).

## Menu layers

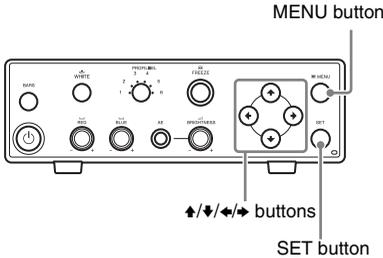


1) Appears only when [Region] is set to [NTSC].

# Basic Menu Operations

This section describes basic setting methods for menus.

## Menu controls



### MENU button

This button displays/hides the menu.

### ↕/↔/↔/↕ buttons

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.

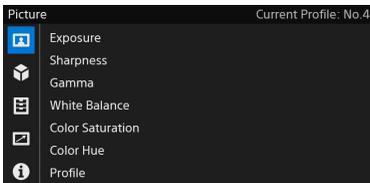
## Displaying the menu

Press the  MENU button.

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

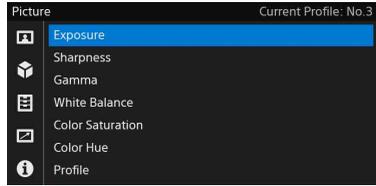
## Setting the menus

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



**2** Press the SET button or ➔ button.

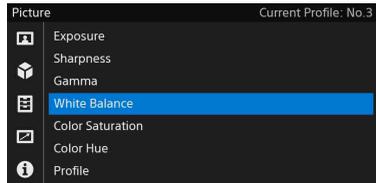
The cursor will move to the right side of the menu item area.



### Tip

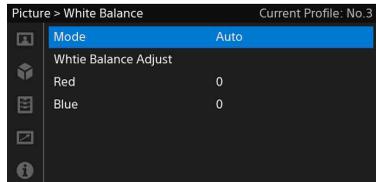
Press the ◀ button to return to the next higher menu layer.

**3** Press the ↕/↔ buttons to select a menu item.



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

The current setting value appears.

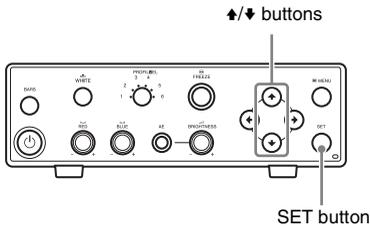


When a menu item is selected with an On/Off or switching only option without a detailed item, proceed to step 6.

**5** For menu items with submenu items, press the ↕/↔ buttons to select a menu item to set, and then press the SET button or ➔ button.

Other options will appear.

- 6 Press the  $\blacktriangle/\blacktriangledown$  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  $\blacktriangle/\blacktriangledown$  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  $\blacktriangle/\blacktriangledown$  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 values	Details
<b>Exposure</b>	Mode	Select a mode to adjust picture brightness. The available items will differ depending on the mode.
Picture brightness (exposure) adjustment	<b>Auto</b>	Auto: Brightness is automatically adjusted.
	Semi Manual	Semi Manual: Adjust the brightness manually. Setting values can be changed via $\triangleleft$ BRIGHTNESS and the menu's [Brightness] option.
	Full Manual	Full Manual: Adjust the brightness manually. The shutter speed and gain can be set.
<div style="background-color: #cccccc; padding: 2px;"><b>Tips</b></div> <ul style="list-style-type: none"> <li>• If the AE button is pressed when in [Semi Manual] or [Full Manual] modes, the camera will switch to [Auto] mode.</li> <li>• When the AE button is pressed when in [Auto] mode, the camera will switch to [Semi Manual] mode.</li> </ul>		
When in [Auto] mode		
	Auto Exposure Mode	Select an automatic brightness (exposure) adjustment mode.
	<b>Normal</b>	Normal: Operates as normal AE.
	High Sensitivity	High Sensitivity: Sets the maximum gain value and operates as high sensitivity.
	Low Noise	Low Noise: Ideal for well-lit subjects. Shoot an image with reduced noise.
	Auto Exposure Level	Set the exposure level.
	-6 to <b>0</b> to +6	
	Auto Exposure Speed	Select the amount of time needed (AE convergence time) to achieve the correct exposure.
	Slow	
	<b>Normal</b>	
	Fast	
	Slowest Shutter Speed	Select the low speed limit for the shutter speed.
	<b>1/60</b>	Setting a minimum shutter speed value allows you to shoot an image with reduced blur when shooting still images.
	1/125	
	1/250	
	1/500	
	1/1000	

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

Picture		
Menu items	Submenus and setting values	Details
<b>White Balance</b> White balance settings	Mode	Select a white balance mode.
	<b>Xenon Lamp</b>	Xenon Lamp: Mode ideal for when you are using a xenon lamp as the light source.
	Halogen Bulb	Halogen Bulb: Mode ideal for when you are using a halogen bulb as the light source.
	White LED	White LED: Mode ideal for when you are using a white LED as the light source.
	Auto	Auto: Auto tracing white balance.
	White Balance Adjust	Performs auto white balance.
<b>Color Saturation</b> Color vividness adjustment (color saturation adjustment)	Red -100 to <b>0</b> to +100	Adjust the amount of red.
	Blue -100 to <b>0</b> to +100	Adjust the amount of blue.
	Main Saturation -100 to <b>0</b> to +100	Adjust the overall color saturation.
	Red Area Saturation <sup>1)</sup> -100 to <b>0</b> to +100	Adjust the red area color saturation.
	Yellow Area Saturation <sup>1)</sup> -100 to <b>0</b> to +100	Adjust the yellow area color saturation.
	Green Area Saturation <sup>1)</sup> -100 to <b>0</b> to +100	Adjust the green area color saturation.
<b>Color Hue</b> Hue adjustment	Blue Area Saturation <sup>1)</sup> -100 to <b>0</b> to +100	Adjust the blue area color saturation.
	Main Hue -100 to <b>0</b> to +100	Adjust the overall hue.
	Red Area Hue <sup>1)</sup> -100 to <b>0</b> to +100	Adjust the red area hue.
	Yellow Area Hue <sup>1)</sup> -100 to <b>0</b> to +100	Adjust the yellow area hue.
	Green Area Hue <sup>1)</sup> -100 to <b>0</b> to +100	Adjust the green area hue.
	Blue Area Hue <sup>1)</sup> -100 to <b>0</b> 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 values	Details
<b>Profile</b> Picture Profile operations	Save	Register the current [Picture] menu setting values to the selected picture profile No.
	No.1	
	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 values	Details
<b>Region</b> Output Format Settings	<b>NTSC</b>	Select the appropriate output format for your region of use.
	PAL	<b>Note</b> Restart the unit whenever you change this setting.
<b>HD-SDI Video Format</b> HD-SDI output signal format settings	When [Region] is set to [NTSC] 1080/60p	Select the HD-SDI output signal format.
	<b>1080/60i</b>	<b>Tip</b> 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.
	1080/30p	
	When [Region] is set to [PAL] 1080/50p	
	<b>1080/50i</b>	
	1080/25p	
<b>HDMI Video Format</b> HDMI output signal format settings	When [Region] is set to [NTSC] 1080/60p	Select the HDMI output signal format.
	<b>1080/60i</b>	<b>Tips</b> <ul style="list-style-type: none"> <li>The 1080/59.94p, 1080/59.94i, 1080/29.97p, and 480/59.94p formats appear as [1080/60p], [1080/60i], [1080/30p], and [480/60p], respectively, on this unit's menus.</li> <li>If the connected video monitor does not support the selected format, the video monitor will display images in the format it supports.</li> </ul>
	1080/30p	
	480/60p	
	When [Region] is set to [PAL] 1080/50p	
	<b>1080/50i</b>	
1080/25p		
576/50p		
<b>NTSC Setup</b>	Available only when [Region] is set to [NTSC] <b>Off</b> 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
<b>White Pixel Detect</b>		Executes white pixel detection adjustment.
		<p><b>Notes</b></p> <ul style="list-style-type: none"> <li>• Be sure to block the entry of light by attaching the lens cap, for example, when performing white pixel detection adjustment.</li> <li>• White pixel detection adjustment may take several seconds or several minutes to complete.</li> <li>• Setting the unit to standby mode will be the only operation available while white pixel detection adjustment is in progress.</li> </ul>
<b>All Reset</b>		Resets all settings on the unit to their factory default values. However, the [Region] setting will not be reset to its factory default value.

## [Function] menu

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

## [Remote] menu

### Remote

Menu items	Submenus and setting values	Details
<b>Remote 1</b> Settings for remote contact switch connector 1	None <b>Freeze</b> 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...
<b>Remote 2</b> Settings for remote contact switch connector 2	<b>None</b> 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
<b>Serial Number</b> Serial number display		Displays the unit serial number.
<b>Version Information</b> Software version display		Displays the unit software version.

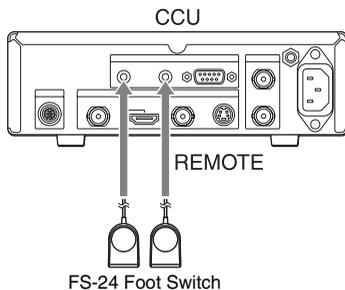
## System Operation Examples

# 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.



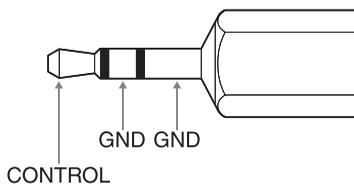
### Caution

The FS-24 has an Ingress Protection rating of IPX3. Therefore, do not operate it in 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)



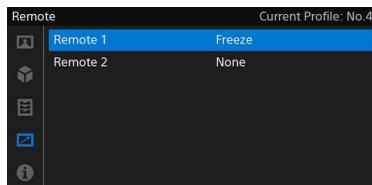
## Set the functions to use

Set the functions to use with the foot switch.

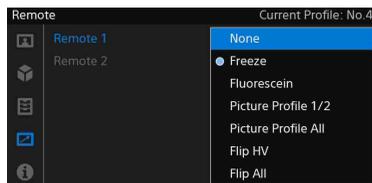
For details on the function controlled by the foot switch, see "[Remote] menu" (page 49).

- 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.**



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

# Using Two Cameras to Shoot 3D Images

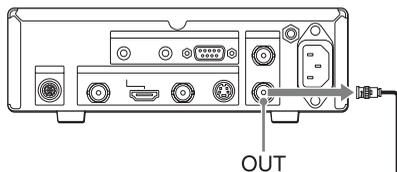
You can shoot 3D images by using two units connected as described below.

To connect two units, use a commercially-available 75  $\Omega$  coaxial cable.

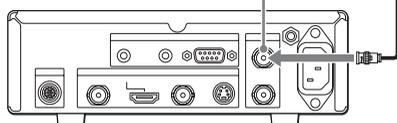
Recommended cable: 5CFB, length of 1 m (3.3 ft) or less

- 1 Using a commercially-available 75  $\Omega$  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



Unit 2



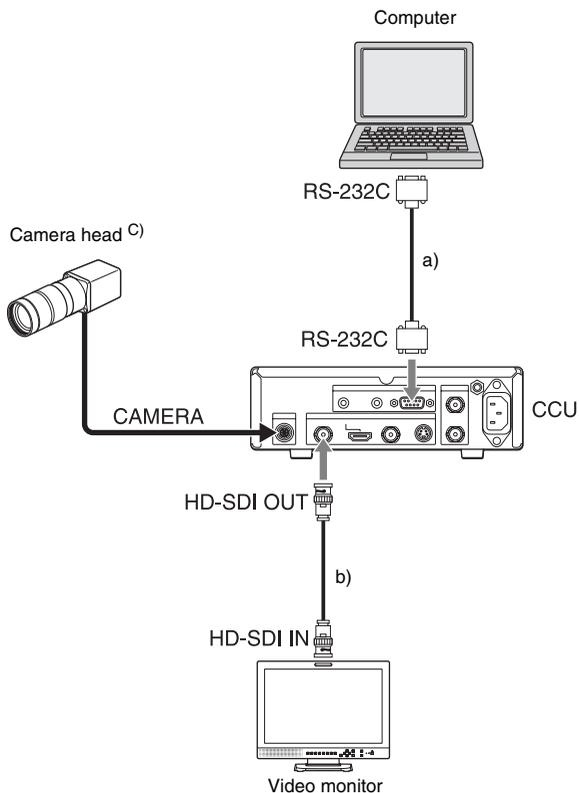
- 2 Set the video format and image quality settings so that they match on both units.**

## 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  $\Omega$  coaxial cable
- c) For details on connecting to the camera head, see *page 24*.

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

# Troubleshooting

Before you call for service, please check the problems and solutions described below. If you cannot solve the problem, contact the nearest authorized dealer.

## Power

Symptom	Cause	Solution
The unit does not power on when you press the  (on/standby) switch.	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 camera.	The camera head and CCU are not securely connected. The [System] menu's [Region] option setting differs from your video monitor settings.	Check the connection with the camera head. Correctly set the [System] menu's [Region] setting ( <i>see page 47</i> ). You can also change the [Region] setting as follows. To set to [NTSC]: Press the  (on/standby) switch to set the unit to standby mode while holding down the MENU and  buttons. To set to [PAL]: Press the  (on/standby) switch 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 camera connection.	Disconnect the power cord, and check the connections.

# Specifications

## General

### Power requirements

100 V 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% (no condensation allowed)

### Operating pressure

700 hPa to 1,060 hPa

### Storage and transport temperature

–20 °C to +60 °C (–4 °F to +140 °F)

### Storage and transport humidity

20% to 90% (no condensation allowed)

### Storage and transport pressure

700 hPa to 1,060 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 × 28 × 49 mm  
(approx. 1 1/8 × 1 1/8 × 1 15/16 in.)

Camera control unit:  
approx. 200 × 62 × 240 mm  
(approx. 7 7/8 × 2 1/2 × 9 1/2 in.)

### Supplied items

See “*Package Configuration*” (page 18)

## Camera head

### Image device

1/2.9 type, Exmor CMOS image sensor,  
single chip type  
Effective pixels: 1920 (H) × 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 Vp-p, 75 Ω (NTSC)  
C (BURST): 0.3 Vp-p, 75 Ω (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

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## Input/output connectors

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### CAMERA

20-pin, round

### RS-232C

D-sub 9-pin

### 3D SYNC IN, OUT

BNC

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## Other connector

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▽ Equipotential ground connector

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## Separately-sold accessories

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### 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

### Caution

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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