



4K MEMORY CARD CAMERA RECORDER

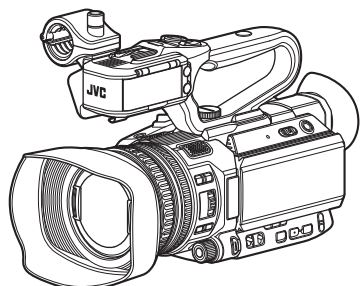
GY-HM250U/GY-HM250E

GY-HM180U/GY-HM180E

GY-HM170U/GY-HM170E

INSTRUCTIONS (BASIC)

GY-HM250U(G)/GY-HM250E(G)
GY-HM180U(G)/GY-HM180E(G)
GY-HM170U(G)/GY-HM170E(G)



AVCHD™ Progressive

This manual provides a brief explanation on operating this camera recorder. For detailed operation methods and camera settings, please refer to the following Mobile User Guide.

The illustration here shows how the handle unit is attached using the unit supplied. The specifications and appearance of this product are subject to changes for further improvement without prior notice.

Please check the latest version of the INSTRUCTIONS from the following Mobile User Guide. You can also download the PDF from the Mobile User Guide.

Mobile User Guide

When you are outside, you can refer to the instructions from your Android phone or iPhone.

<http://manual3.jvckenwood.com/pro/mobile/global/>

You can view the Mobile User Guide using the browser on your Android phone or iPhone.



For Customer Use:

Enter below the Serial No. which is located on the body.

Retain this information for future reference.

Model No. GY-HM250U/GY-HM180U/GY-HM170U

Serial No. _____

Please read the following before getting started:

Thank you for purchasing this product. Before operating this unit, please read the instructions carefully to ensure the best possible performance.

In this manual, each model number is described without the last letter (U/E) which means the shipping destination.

(U: for USA and Canada, E: for Europe)

Only "U" models (GY-HM250U/GY-HM180U/GY-HM170U) have been evaluated by UL.

FOR USA

These are general **IMPORTANT SAFEGUARDS** and certain items may not apply to all appliances.

IMPORTANT SAFEGUARDS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
10. Only use attachments/accessories specified by the manufacturer.
11. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus.
When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel.
Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



CAN ICES-3 A / NMB-3 A

For USA-California Only

This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material – special handling may apply.

See www.dtsc.ca.gov/hazardouswaste/perchlorate

Safety Precautions

FOR USA AND CANADA



CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN



CAUTION:
TO REDUCE THE RISK OF ELECTRIC SHOCK. DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

This device complies with Part 15 of 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.

Changes or modifications not approved by JVC could void the user’s authority to operate the equipment. 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 instructions, 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.

POUR CANADA**ATTENTION**

RISQUE
D'ELECTROCUTION
NE PAS OUVRIR



ATTENTION:
POUR EVITER TOUT RISQUE
D'ELECTROCUTION NE PAS
OUVRIR LE BOITIER. AUCUNE
PIECE INTERIEURE N'EST A
REGLER PAR L'UTILISATEUR. SE
REFERER A UN AGENT QUALIFIE
EN CAS DE PROBLEME.



Le symbole de l'éclair à l'intérieur d'un triangle équilatéral est destiné à alerter l'utilisateur sur la présence d'une "tension dangereuse" non isolée dans le boîtier du produit. Cette tension est suffisante pour provoquer l'électrocution de personnes.



Le point d'exclamation à l'intérieur d'un triangle équilatéral est destiné à alerter l'utilisateur sur la présence d'opérations d'entretien importantes au sujet desquelles des renseignements se trouvent dans le manuel d'instructions.

Ces symboles ne sont utilisés qu'aux Etats-Unis.

CAUTION:

The mains plug shall remain readily operable.

- Remove the mains plug immediately if the camera functions abnormally.

WARNING:

The battery pack, the camera with battery installed, and the remote control with battery installed should not be exposed to excessive heat such as direct sunlight, fire or the like.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

AVERTISSEMENT : POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, NE PAS EXPOSER L'APPAREIL A LA PLUIE NI A L'HUMIDITE.

NOTES:

- The rating plate and safety caution are on the bottom and/or the back of the main unit.
- The serial number plate is on the bottom of the unit.
- The rating information and safety caution of the AC adapter are on its upper and lower sides.

REMARQUES :

- La plaque d'identification et l'avertissement de sécurité se trouvent sous l'appareil et/ou au dos.
- La plaque du numéro de série est située sur la partie inférieure de l'appareil.
- Les informations d'identification et l'avertissement de sécurité de l'adaptateur secteur sont situés sur ses côtés supérieur et inférieur.

Caution on Replaceable lithium battery

The battery used in this device may present a fire or chemical burn hazard if mistreated.

Do not recharge, disassemble, heat above 100°C (212°F) or incinerate.

Replace battery with Panasonic, Sanyo, Sony or Maxell CR2025.

Danger of explosion or risk of fire if the battery is incorrectly replaced.

- Dispose of used battery promptly.
- Keep away from children.
- Do not disassemble and do not dispose of in fire.

When the equipment is installed in a cabinet or on a shelf, make sure that it has sufficient space on all sides to allow for ventilation (10 cm (3-15/16") or more on both sides, on top and at the rear). Do not block the ventilation holes. (If the ventilation holes are blocked by a newspaper, or cloth etc. the heat may not be able to get out.) No naked flame sources, such as lighted candles, should be placed on the apparatus. When discarding batteries, environmental problems must be considered and the local rules or laws governing the disposal of these batteries must be followed strictly.

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

Do not point the lens directly into the sun. This can cause eye injuries, as well as lead to the malfunctioning of internal circuitry. There is also a risk of fire or electric shock.

CAUTION!

The following notes concern possible physical damage to this unit and to the user.

Carrying or holding this unit by the LCD monitor can result in dropping the unit, or in a malfunction.

Do not use a tripod on unsteady or unlevel surfaces. It could tip over, causing serious damage to the unit.

CAUTION!

Connecting cables (Audio/Video, etc.) to this unit and leaving it on top of the TV is not recommended, as tripping on the cables will cause the unit to fall, resulting in damage.

When using the AC adapter in areas other than the USA

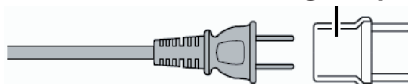
The provided AC adapter features automatic voltage selection in the AC range from 110 V to 240 V.

USING HOUSEHOLD AC PLUG ADAPTER

In case of connecting the unit's power cord to an AC wall outlet other than American National Standard C73 series type, use an AC plug adapter called a "Siemens Plug" as shown.

For this AC plug adapter, please contact the local dealers in your area.

Plug Adapter



- Remove the AC adapter from the AC wall outlet when not in use.
- Do not leave dust or metal objects adhered to the AC wall outlet or AC adapter (power/DC plug).

IMPORTANT (for owners in the U.K.) Connection to the mains supply in the United Kingdom.

DO NOT cut off the mains plug from this equipment.

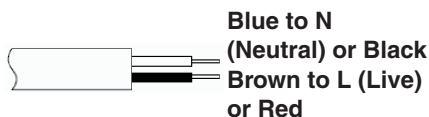
If the plug fitted is not suitable for the power points in your home or the cable is too short to reach a power point, then obtain an appropriate safety approved extension lead or contact the local dealers in your area.

BE SURE to replace the fuse only with an identical approved type, as originally fitted, and to replace the fuse cover.

If nonetheless the mains plug is cut off be sure to remove the fuse and dispose of the plug immediately, to avoid possible shock hazard by inadvertent connection to the mains supply.

If this product is not supplied fitted with a mains plug then follow the instructions given below:

DO NOT make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with the following code:



If these colours do not correspond with the terminal identifications of your plug, connect as follows:

Blue wire to terminal coded N (Neutral) or coloured black.

Brown wire to terminal coded L (Live) or coloured Red.

If in doubt — consult a competent electrician.

CAUTIONS:

- To prevent shock, do not open the cabinet. No user serviceable parts inside.
Refer servicing to qualified personnel.
- When you are not using the AC adapter for a long period of time, it is recommended that you disconnect the power cord from AC outlet.

FOR EUROPE

This equipment is in conformity with the provisions and protection requirements of the corresponding European Directives. This equipment is designed for professional video appliances and can be used in the following environments:

- Controlled EMC environment (for example, purpose-built broadcasting or recording studio), and rural outdoors environments.

In order to keep the best performance and furthermore for electromagnetic compatibility we recommend to use cables not exceeding the following lengths:

Port	Cable	Length
DC	Exclusive Cable	1.8 m
USB Mini	Shielded Cable	1.2 m
AV OUT	Exclusive Cable	1.4 m
HDMI	Shielded Cable	1.8 m
REMOTE	Exclusive Cable	1 m
SDI OUT	Coaxial Cable	1 m
AUDIO INPUT 1/2 HDL	Shielded Cable	2 m
HEADPHONE	Exclusive Cable	2 m
AUX	Shielded Cable	3 m

The inrush current of this apparatus is 11.0 A.

CAUTION:

Where there are strong electromagnetic waves or magnetism, for example near a radio or TV transmitter, transformer, motor, etc., the picture and the sound may be disturbed. In such case, please keep the apparatus away from the sources of the disturbance.

Dear Customer

This apparatus is in conformance with the valid European directives and standards regarding electromagnetic compatibility and electrical safety.

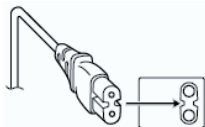
European representative of
JVCKENWOOD Corporation is:
JVCKENWOOD Deutschland GmbH
Konrad-Adenauer-Allee 1-11
61118 Bad Vilbel
GERMANY

Sehr geehrter Kunde, sehr geehrte Kundin, dieses Gerät stimmt mit den gültigen europäischen Richtlinien und Normen bezüglich elektromagnetischer Verträglichkeit und elektrischer Sicherheit überein.

Die europäische Vertretung für die
JVCKENWOOD Corporation ist:
JVCKENWOOD Deutschland GmbH
Konrad-Adenauer-Allee 1-11
61118 Bad Vilbel
DEUTSCHLAND

CAUTION:

To avoid electric shock or damage to the unit, first firmly insert the small end of the power cord into the AC Adapter until it is no longer wobbly, and then plug the larger end of the power cord in to an AC outlet.



FOR EUROPEAN

WARNING

Operation of this equipment in a residential environment could cause radio interference.

The plastics packaging bags may cause suffocation when they are covered over the head. Tear them open, and keep them away from the reach of infants and children by ensuring that they are disposed of properly.

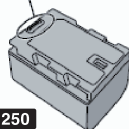
Battery Pack

The supplied battery pack is a lithium-ion battery. Before using the supplied battery pack or an optional battery pack, be sure to read the following cautions:

• To avoid hazards

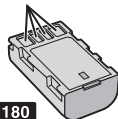
... **do not** burn.
... **do not** short-circuit the terminals. Keep it away from metallic objects when not in use.

Terminals



When transporting, carry the battery in a plastic bag.

Terminals




... **do not** modify or disassemble.

... **do not** expose the battery to temperatures exceeding 60°C (140°F), as this may cause the battery to overheat, explode or catch fire.

... use only specified chargers.

• To prevent damage and prolong service life

- ... do not subject to unnecessary shock.
- ... charge within the temperature range of 10°C to 30°C (50°F to 86°F). Cooler temperatures require longer charging time, or in some cases stop charging at all. Warmer temperatures prevent complete charging, or in some cases stop charging at all.
- ... store in a cool, dry place. Extended exposure to high temperatures will increase natural discharge and shorten service life.
- ... keep a 30% battery level () if the battery pack is not to be used for a long period of time.
- ... remove from charger or powered unit when not in use, as some machines use current even when switched off.
- ... do not drop or subject to strong impact.

■ Para Brasil

Informação sobre eliminação de baterias

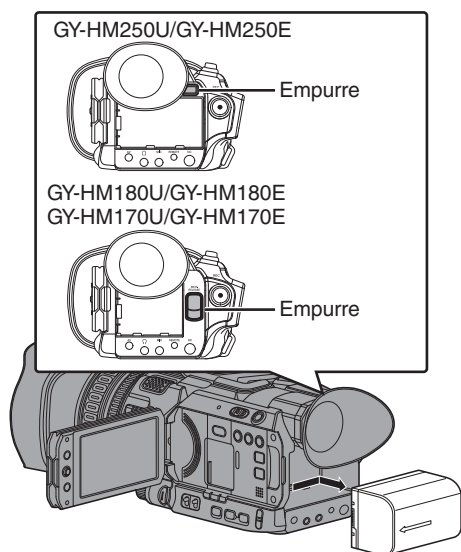
Este produto não deverá ser eliminado como lixo doméstico em geral.

Devolva a bateria velha ao comerciante ou para a rede autorizada, para que seja devolvida ao fabricante ou importador.

A reciclagem e eliminação de lixo em uma maneira adequada, ajudarão para preservar recursos, prevenindo, ao mesmo tempo, contra efeitos prejudiciais sobre a nossa saúde e o meio ambiente.

Para Retirar a Bateria Recarregável

Pressione botão e puxe a bateria para fora.



Importer (UK only)

JVCKENWOOD U.K. Limited
First Floor, Gleneagles, the Belfry, Colonial Way,
Watford, Hertfordshire WD24 4WH,
UNITED KINGDOM

Importeur (Nur EU)

JVCKENWOOD Deutschland GmbH
Konrad-Adenauer-Allee 1-11, 61118 Bad Vilbel,
DEUTSCHLAND

Importatore (Solo EU)

JVCKENWOOD Italia S.p.A.
Via G. Sirtori 7/9, 20129 Milano, ITALIA

Importeur (Alleen EU)

JVCKENWOOD Europe B.V.
Amsterdamseweg 37, 1422 AC Uithoorn,
NEDERLAND

Manufacturer

JVCKENWOOD Corporation

3-12, Moriya-cho, Kanagawa-ku, Yokohama-shi,
Kanagawa, 221-0022, JAPAN

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Content of this Manual

Symbols used

- Caution** : Describes precautions concerning the operation of this product.
- Memo** : Describes reference information, such as functions and usage restrictions of this product.
- 250** : Feature available on GY-HM250U/GY-HM250E only.
- 180** : Feature available on GY-HM180U/GY-HM180E only.
- 170** : Feature available on GY-HM170U/GY-HM170E only.
- HDL** : Function that operates only when the handle unit is attached.

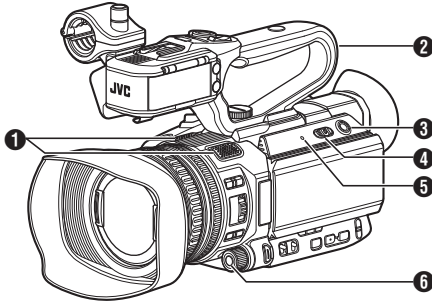
Verifying the Accessories

Verify that the following accessories are included with the camera recorder before using.

Accessories	
Warranty Card (U model only)	1
INSTRUCTIONS (BASIC)	1
AC Adapter	1
Power Cord (U model: 1, E model: 2)	
Battery	1
Handle Unit	1
Hood	1
Anti-reflective Film	1

* Eyepiece and lens cap are attached to the camera recorder.

Names of Parts

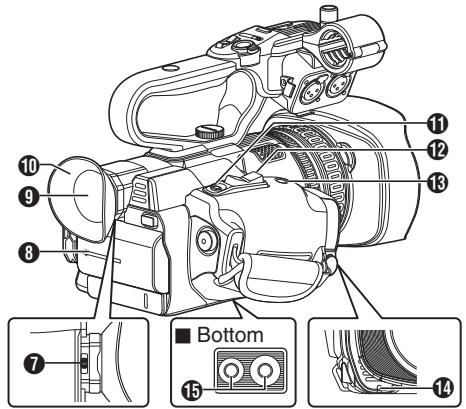


- ❶ Built-in Microphone
- ❷ Handle Unit

Memo : _____

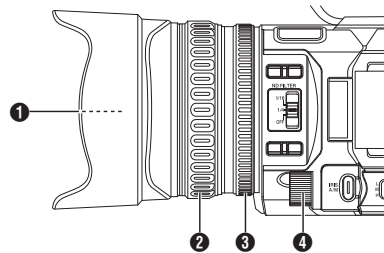
- The handle unit is detached from the camera recorder unit in the factory shipment. For details on attaching the handle unit, please refer to [Attaching the Handle Unit] .

- ❸ [MODE] Camera/Media Mode Selection Button
- ❹ [POWER ON/OFF] Lock Power ON/OFF Switch Turns ON/OFF the power.
 - Hold down the lock button (blue) in the center to toggle ON/OFF.
 - When the power is turning OFF, "P.OFF" appears on the LCD monitor and viewfinder.
 - Wait for 5 seconds or more to turn on the power again.
- ❺ [POWER/CHARGE] Power/Charging Display Lamp
- ❻ [AWB/9] Auto White Balance/User 9 Button



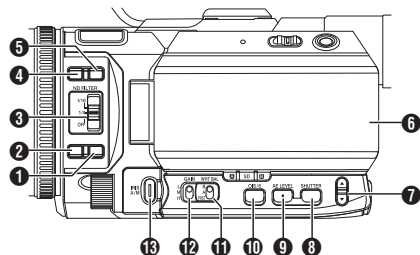
- ❷ Visibility Adjustment Lever
- ❸ Battery
- ❹ Viewfinder
- ❺ Eyepiece
- ❻ [REC/7] Record Trigger/User 7 Button
- ❼ Zoom Lever at the Grip
- ❽ [EXPANDED FOCUS/8] Expanded Focus Assist/User 8 Button
- ❹ Tally Lamp
- ❺ Tripod Mounting Hole

Lens Section



- ❶ Filter Built-In Screw
 - Installable filter types: $\Phi 62$ mm P0.75
- ❷ Focus Ring
- ❸ Zoom Ring
- ❹ Iris Dial

Side Control Panel



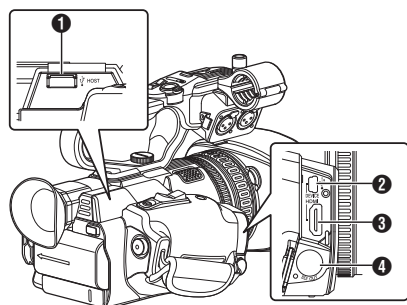
- 1** [FULL AUTO] Full Auto Selection Button
Press and hold the button to switch the Full Auto mode ON and OFF.
Full Auto mode adjusts the Iris, Gain, Shutter and White Balance automatically.

Memo : _____

- This camera recorder is set to Full Auto mode in the factory default.

- 2** [AF/MF] Focus Selection Button
3 [ND FILTER] ND Filter Switch
4 [F.ASSIST/1] Focus Assist/User 1 Button
5 [TC/2] Time Code/User 2 Button
6 LCD monitor
7 ▲ / ▼ Volume Buttons/[+/-] Selection Buttons
8 [SHUTTER] Shutter Speed Button
9 [AE LEVEL] Automatic Brightness Adjustment (AE) Level Setting Button
10 [OIS/6] Optical Image Stabilizer/User 6 Button
11 [WHT BAL B/A/PRST] White Balance Switch
12 [GAIN L/M/H] Gain Switch
13 [IRIS A/M] Auto Iris/Manual Iris Button

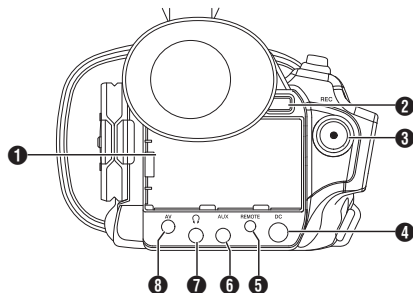
Side Terminal Section



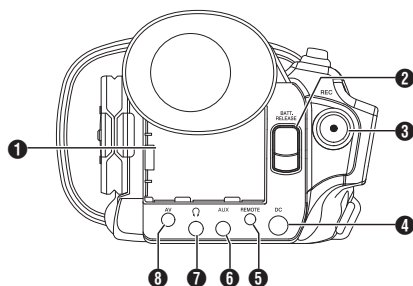
- 1** [HOST] USB Host Terminal **250**
2 [DEVICE] USB Mini Terminal
3 [HDMI] HDMI Output Terminal
4 [SDI OUT] SDI Output Terminal **250** **180**

Rear Terminal

GY-HM250U/GY-HM250E



GY-HM180U/GY-HM180E GY-HM170U/GY-HM170E



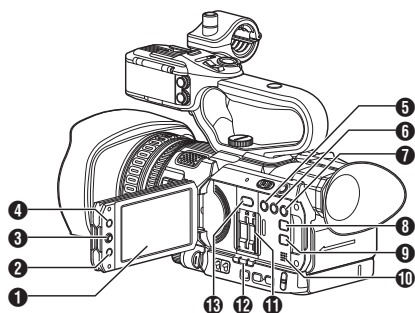
- 1** [BATTERY] Terminal
2 [BATT. RELEASE] Battery Lock Release Button
3 [REC] Record Trigger Button

Memo : _____

- This button is interlocked with the [REC/HOLD] record trigger button **9** on the the handle unit.

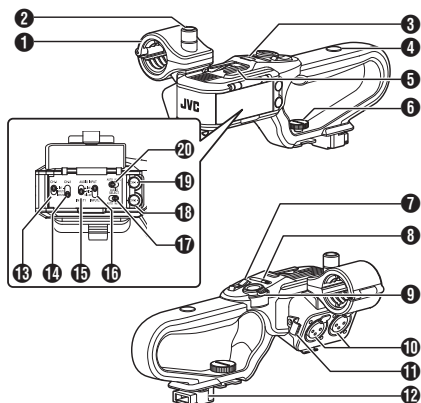
- 4** [DC] DC Input Terminal
5 [REMOTE] Remote Terminal
6 [AUX] AUX Input Terminal (Φ3.5 mm)
7 [⌚] Headphone Jack (Φ3.5 mm)
8 [AV] AV Output Terminal

LCD Monitor



- 1 LCD Monitor
- 2 [CANCEL/STOP] Cancel/Stop Button
- 3 LCD Cross-Shaped Button (▲▼◀▶)/Set Button (●)
- 4 [MENU/THUMB] Menu/Thumbnail Button
- 5 [LOLUX/3] Low-light Shooting/User 3 Button
- 6 [C.REVIEW/4] Clip Review/User 4 Button
- 7 [ZEBRA/5] Zebra/User 5 Button
- 8 [DISPLAY] Display Button
- 9 [STATUS] Status Screen Display Button
- 10 Monitor Speaker
- 11 SD Card Slot
- 12 Card Slot A/B Status Indicator
- 13 [SLOT SEL] Card Slot Selection Button

Handle Unit Section



- 1 Microphone Holder
- 2 Microphone Holder Lock Knob
- 3 Handle Tally Lamp
- 4 Accessory Mounting Screw Hole
- 5 Shoe
- 6 Handle Unit Fastening Screw
- 7 Zoom Lever on Handle
- 8 [ZOOM L/M/H] Zoom Speed Switch
- 9 [REC/HOLD] Record Trigger Button/Lock Switch

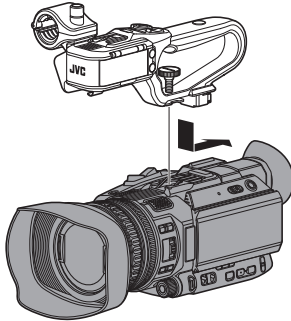
Memo :

- This switch is interlocked with the [REC] button 3 on the rear terminal.
 - [REC] button 3 on the rear terminal is not locked.
- 10 [INPUT1/INPUT2] Audio Input Terminal 1, 2 (XLR 3-pin x 2)
 - 11 Cable Clamp for Microphone
 - 12 Handle Terminal
 - 13 [CH-1] CH1 Audio Input Signal Selection Switch
 - 14 [CH-2] CH2 Audio Input Signal Selection Switch
 - 15 [AUDIO INPUT INPUT1] Audio Input Signal Selection Switch
 - 16 [AUDIO INPUT INPUT2] Audio Input Signal Selection Switch
 - 17 [AUDIO SELECT CH-2 AUTO/MANU] CH2 Audio Recording Mode Switch
 - 18 [CH-2] CH2 Recording Level Adjustment Knob
 - 19 [CH-1] CH1 Recording Level Adjustment Knob
 - 20 [AUDIO SELECT CH-1 AUTO/MANU] CH1 Audio Recording Mode Switch

Attaching the Handle Unit

The handle unit is detached from the camera recorder unit in the factory shipment. To use the handle unit, attach it by following the steps below.

* Attach or detach the handle unit when the power is turned off.



1 Fit the handle terminal at the bottom of the handle unit to the handle unit mount at the top of the camera recorder.

- Fit the handle unit carefully, paying attention not to damage the terminals at the bottom of the unit.

2 Slide the handle unit in the direction indicated by the arrow to attach it to the hot shoe of the camera recorder.

3 Press the screw on the handle unit and turn it in the clockwise direction. Tighten it securely to fasten the unit to the camera recorder.

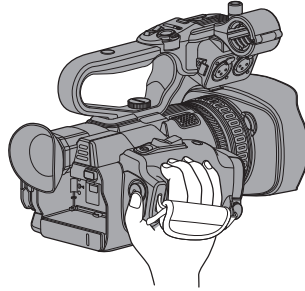
- The handle unit may be unsteady if the screw is not securely fastened, and may fall off during use.

Caution : _____

- Attach or detach the handle unit when the power is turned off. Doing so when the power is turned on can result in malfunction.

Adjusting the Grip Belt

Open the pad and adjust the position of the grip belt accordingly.



Caution : _____

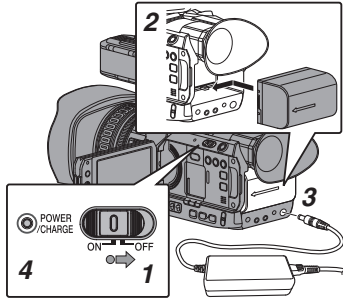
- If the grip is loose, the camera recorder may fall off resulting in injuries or malfunction.

Charging the Battery

Charging the Battery

Charge the battery immediately after purchase or when the battery power is running low.

* The battery is not charged when purchased.



- 1 Hold down the lock button (blue) at the center of the [POWER ON/OFF] switch to set to "OFF".
- 2 Attach the supplied battery. Slide it in until you hear a click.
- 3 Connect the supplied AC adapter to the [DC] terminal. Open the cover of the [DC] terminal and connect as shown in the diagram.
- 4 Connect the AC adapter to a power outlet.
 - The [POWER/CHARGE] lamp blinks during charging and will go out after charging is complete.
 - Remove the AC adapter after charging is complete.

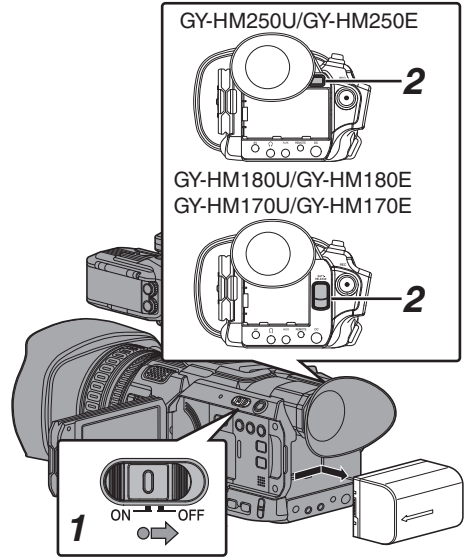
Memo : _____

- Blinking of the [POWER/CHARGE] lamp during charging indicates the charge level.

[POWER/CHARGE] Lamp	Charge Level
Alternates between a blinking orange light (4 times) and light off (1 second)	Less than 25 %
Alternates between a blinking orange light (3 times) and light off (1 second)	Less than 50 %
Alternates between a blinking orange light (2 times) and light off (1 second)	Less than 75 %
Alternates between a blinking orange light (blinks once) and light off (1 second)	Less than 100 %
Light goes out	Fully charged

- You can charge the battery even when operating the camera recorder using the AC adapter.

Removing the Battery



- 1 Hold down the lock button (blue) at the center of the [POWER ON/OFF] switch to set to "OFF".
- 2 While pressing and holding the [BATT. RELEASE] button, push up and remove the battery in the direction of the arrow.

Caution : _____

- Do not remove the battery when the [POWER ON/OFF] switch is "ON".
- Do not insert or remove the DC cable when the battery is in use.
- Leaving the camera recorder unused with the battery inside will deplete the battery power even if you set the [POWER ON/OFF] switch to "OFF". Remove the battery if you are not using the camera recorder.

Estimated Charging and Continuous Operating Times

■ Charging time

SSL-JVC50 (accessory) **250** : Approx. 4 hrs
 BN-VC826 (accessory) **180** : Approx. 3 hrs 40 mins
170

* When the [POWER ON/OFF] switch is set to "OFF"

Memo : _____

- If you charge the battery immediately after using while the battery is still warm, it may not be fully charged.

180 170

- It is recommended that you charge the battery in an environment between 10 °C and 30 °C (50 °F and 86 °F). The battery may not be fully charged or the charging time may be prolonged if charged under low temperatures (below 10 °C/50 °F). In addition, charging the battery under high temperature (above 30 °C/86 °F) condition may shorten the battery life.

250

- For details, refer to the "INSTRUCTIONS" of the battery.

■ Continuous operating time

SSL-JVC50 (accessory) : Approx. 4 hrs (*1)
250 Approx. 4 hrs 30 mins (*2)

BN-VC826 (accessory) : Approx. 1 hr 55 mins (*1)
180 170 Approx. 2 hrs 15 mins (*2)

- *1 When [System] is set to "4K" and all other settings are in factory default
- *2 When [System] is set to "HD" and all other settings are in factory default

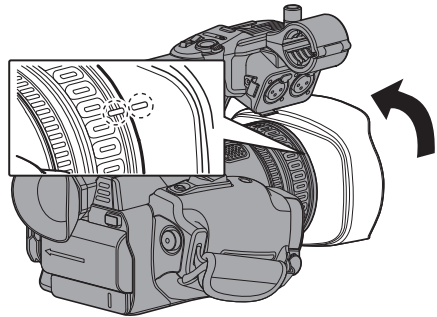
Memo : _____

- Actual operating times may differ depending on the age of the battery, charging condition, and operating environment.
- Operating time is shortened in cold environment.
- The operating time may shorten when power zoom is used, accessories are connected, or when the LCD monitor is frequently used.
- For purchase of spare batteries, please contact the local dealers in your area.

Attaching the Hood

Attaching the Hood

Align the markings on the camera recorder and hood; turn the hood in the direction of the arrow (clockwise) until it is locked.



Attaching the Anti-reflective Film

Attach the supplied anti-reflective film onto the LCD monitor if necessary, such as when you are recording in the day or outdoors. Doing so helps to cut down reflection of outside light, thus improving the visibility.

- 1 Wipe off any dirt, dust or stains on the surface of the LCD monitor.**
- 2 Peel off the backing of the anti-reflective film halfway.**
Pay attention to prevent fingerprints from being left on the adhesive face.
- 3 Attaching the Anti-reflective Film**
 - Align and paste the anti-reflection film on the LCD monitor screen without trapping any air bubbles.
 - Squeeze the air bubbles out.
 - You may repaste the anti-reflection film if air bubbles are accidentally trapped.

Memo : _____

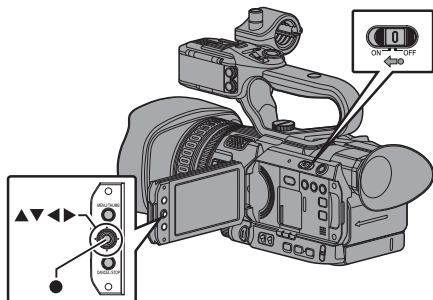
- Do not press the LCD monitor surface with excessive force when attaching the film.
- For additional orders of the anti-reflective film, please consult the authorized dealer from which this camera recorder was purchased, or our service center.

Configuring the Initial Settings

When the power is first turned on, the Initial Setting screen for performing the initial settings in the camera recorder appears.

Set the date/time of the built-in clock in the [Initial Setting] screen.

All operations are disabled until initial settings are complete.



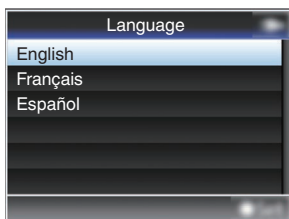
Memo : _____

- It is recommended to use the AC adapter as the power supply.
- Attach the lens cap.

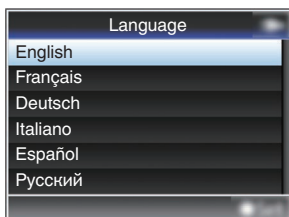
1 Hold down the lock button (blue) at the center of the [POWER ON/OFF] switch to set to "ON".

A language selection screen appears.

- For U models



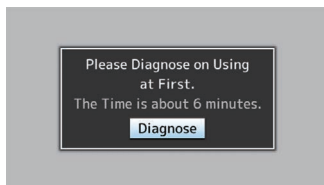
- For E models



Memo : _____

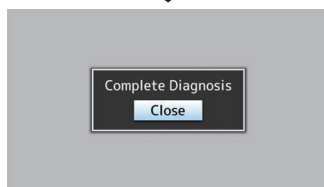
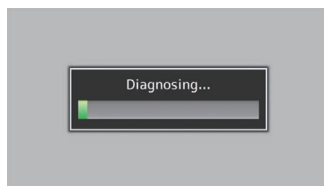
- The menus and messages on the screen of the LCD monitor or viewfinder are displayed in the selected language.

2 Select a language using the cross-shaped button (▲▼), and press the Set button (●). The Initial Setting screen appears.



3 Ensure the lens cap is attached, and press the Set button (●).

- Self-diagnosis starts.
- A progress bar appears, and "Complete Diagnosis" appears when the diagnosis is complete.



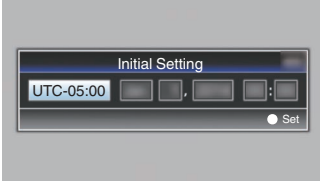
Memo : _____

- It takes about 6 minutes to complete the diagnosis. During the diagnosis, do not operate or turn off the camera recorder.

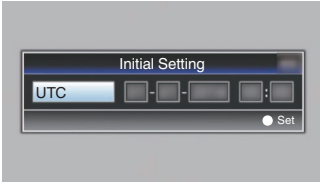
4 Press the Set button (●) after confirming the exit screen.

The [Initial Setting] screen appears.

- For U models



- For E models



Memo : _____

- The [Initial Setting] screen appears when the power is turned on for the first time and when the power is turned on after the built-in battery is fully discharged.
- The configured date/time data is saved in the built-in rechargeable battery even if the power is turned off.

5 Set the time zone and date/time.

- ① Move the cursor with the cross-shaped button (◀▶) and select the setting item.
- ② Change the values with the cross-shaped button (▲▼).

6 Press the Set button (●) after setting is complete.

The clock is set to 0 seconds of the input date/time.

Memo : _____

- The configured date/time data can be displayed on the LCD monitor and viewfinder and be recorded to the SD card.
- The value of the year can be set in the range of "2000" to "2099".

Usable Cards

Format Setting and Usable SD Card Combinations

System	Format	Bit Rate	Usable SD Card
High-Speed 4K	QuickTime	50M (XHQ) 35M (UHQ)	UHS-I U3 or higher
		150M	
		70M	Class 10 or higher
HD		50M (YUV422), 50M (XHQ)	
		35M (UHQ)	
		AVCHD	-
Exchange*	-		
SD	-	-	
Web	-	-	

Caution : _____

- Using cards other than those from Panasonic, TOSHIBA or SanDisk may result in recording failure or data loss.
- If an UHS-I card with no classification indication is used, it may not be possible to perform HD recording.

Estimated Recordable Time of SD Cards

The estimated recordable time is only a guide. Differences may occur depending on the SD card in use and the battery condition.

- When [System] → [Record Set] → [Record Format] → [Format] is set to “AVCHD”

Resolution	1080p	1080i					480i/ 576i
	Bit Rate	HQ	HQ	SP	LP	EP	-
4GB	16	19	25	46	82	50	
8GB	33	39	50	95	168	103	
16GB	67	78	100	190	336	209	
32GB	135	156	200	380	672	420	
64GB (SDXC)	270	312	400	760	1344	842	
128GB (SDXC)	540	624	800	1520	2688	1687	

(Unit: minute)

- When [System] → [Record Set] → [Record Format] → [Format] is set to “QuickTime”

System	4K		HD		SD	Web	
Resolution	2160p		1080i/ 1080p		480i/ 576i	960p	480p
Bit Rate	150M	70M	XHQ	UHQ	-	HQ	LP
4GB	3	6	9	12	47	130	285
8GB	6	13	18	25	95	270	580
16GB	12	26	36	50	190	540	1160
32GB	25	52	72	100	380	1080	2320
64GB (SDXC)	50	105	145	200	760	2160	4720
128GB (SDXC)	100	210	290	400	1520	4320	9440

(Unit: minute)

- When [Main Menu] → [System] → [Record Set] → [Record Format] → [Format] is set to “Exchange” (U model only)

System	HD	
	1080p	720p
Resolution	1080p	720p
Bit Rate	12M	8M
4GB	32	47
8GB	64	94
16GB	128	188
32GB	256	376
64GB (SDXC)	512	752
128GB (SDXC)	1024	1504

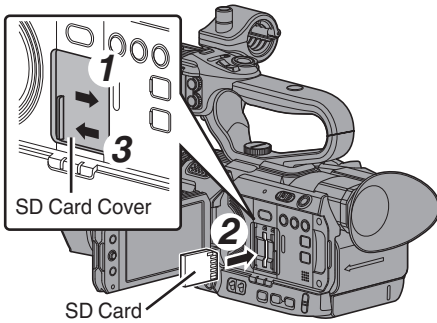
(Unit: minute)

Memo : _____

- If the SD card contains files recorded by devices other than this camera recorder or files that are saved from a PC, the recordable time may be shorter or data may not be properly recorded.
- For each file format, up to 600 clips can be recorded to one SD card on this camera recorder. When 600 clips are recorded to one card, the remaining space is displayed as 0 min regardless of the estimated recordable time, and no further recording can be performed.
- When the file format is set to “AVCHD”, up to 4000 clips can be recorded to one SD card.

Inserting an SD Card

This camera recorder comes with two card slots (Slot A and B) for video/audio recording and playback.



- 1 Open the SD card cover by sliding the cover in the direction indicated by the arrow.
- 2 Insert an SD card with the notched corner pointing up.
The status indicator of the card slot to which the card was inserted lights up in red.
- 3 Close the SD card cover in the direction indicated by the arrow.

Formatting (Initializing) SD Cards

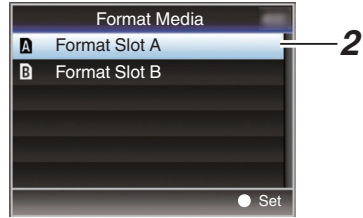
When the following cards are inserted, [!FORMAT] appears at the remaining media display area. Format the card using the camera recorder menu.

- Unformatted SD cards
- SD cards formatted under different specifications

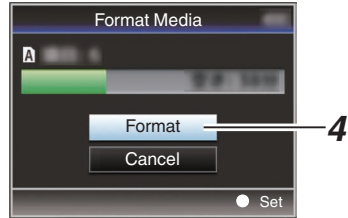
Caution :

- Be sure to format the SD card on this camera recorder. SD cards formatted on a PC and other peripheral equipment cannot be used on this camera recorder.
- [!RESTORE] appears at the remaining media display area when an SD card that requires restoring is inserted.

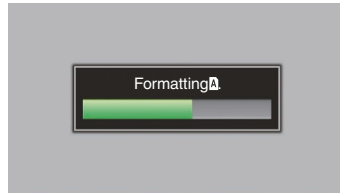
- 1 Select [System] → [Media] → [Format Media].
- 2 Select the slot of the SD card to be formatted and press the Set button (●).



- 3 The status of the selected SD card appears.
- 4 Select [Format] and press the Set button (●).



- 5 Formatting starts.



- 6 Formatting is complete.

When formatting is complete, "Complete" appears and the camera recorder returns to the [Format Media] screen.

Memo : _____

- During formatting, menu operation is unavailable but you can start recording. However, this is only available when a recordable SD card is inserted in the other slot.
- Formatting cannot be performed in the following cases.
 - Recording is in progress on the SD card to be formatted.
 - SD card is not inserted.
 - Write-protect switch of the SD card is set (🔒 is displayed).

Caution : _____

- If you format the SD card, all data recorded on the card, including video data and setup files, will be deleted.

Clips Recorded to SD Cards

Folders in the SD Card

The captured image is recorded into different folders according to the [System] and [A]Format/[B]Format settings.

System	A]Format/ B]Format	Record Folder
High-Speed/ 4K/HD/SD/Web	QuickTime	DCIM
HD/SD/Web	AVCHD	PRIVATE/AVCHD
HD	Exchange*	DCIM

* U model only

Memo : _____

- By formatting (initializing) the SD card from the [Format Media] menu on the camera recorder, folders required for recording in the current [System] settings will be generated.
- When the [System] settings and [QuickTime] settings are changed, folders required for recording in those settings will be automatically generated.

Caution : _____

- When a clip inside the folder is moved or deleted using the Explorer (Windows) or Finder (Mac), recording to the SD card may fail if formatting (initializing) of the card is not performed.

Clip (Recorded Data) and Clip Name

- When recording is stopped, the images, audio and accompanying data which are recorded from start to stop are recorded as one “clip” on the SD card.
- An 8-character clip name is automatically generated for the recorded clip. (“Clip Name Prefix” + “Clip Number”)
- When [System] → [Record Set] → [Record Format] → [A]Format is set to “AVCHD”, the clip name generated consists of only the Clip Number (5-digit number).

Example: QuickTime

ABCG0001

Clip Number

A number in automatic ascending order is assigned in the recording order.

The Clip Number can be reset in the menu.*

Clip Name Prefix (any four alphanumeric characters)

This is set to “xxxG” (“xxx” denotes the last 3 digits of the serial number) by default.

* [Clip Set] → [Reset Clip Number]

Memo : _____

- Before recording starts, you can set any characters for the clip name prefix by using [System] → [Record Set] → [Clip Set] → [Clip Name Prefix].
- Changes cannot be made after recording.

Recorded Clips

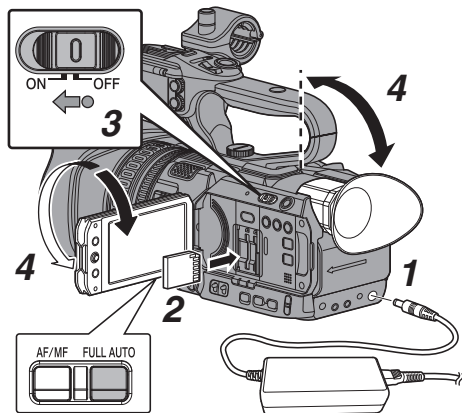
- The recorded materials may be split into several files but they can be played back continuously on the camera recorder.
- Clips may be recorded across the two SD cards in card slots A and B depending on the recording time of the clip.

Caution : _____

- A clip recorded across several cards cannot be played back continuously. Continuous playback is only possible when the recording is made on one card.

Basic Shooting Procedures

Preparations



1 Supply battery or AC adapter power to the camera recorder.

2 Insert an SD card.

3 Turn on the power of the camera recorder. Hold down the lock button (blue) at the center of the [POWER ON/OFF] switch to set to "ON". The camera recorder starts up in Camera mode and is ready for recording.

4 Adjust the angle of the LCD monitor and viewfinder.

5 Set [System], [Format], [Resolution], [Frame Rate] and [Bit Rate] in [Main Menu] → [System] → [Record Set] → [Record Format].

- You can select the resolution of the recorded videos (4K, HD, SD, or Web), file format for recording/playback, and the video recording format on this camera recorder.
- Press the [MENU/THUMB] button on the LCD monitor to display the menu screen on the LCD monitor and viewfinder.
- The following setting values are the factory defaults.

[System]: HD

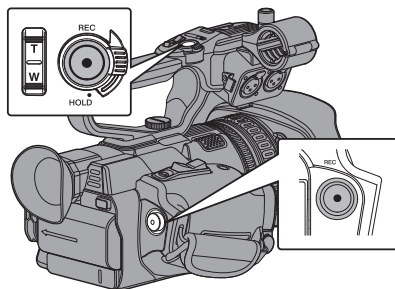
[Format]: QuickTime

[Resolution]: 1920x1080

[Frame Rate]: 60i (U model) or 50i (E model)

[Bit Rate]: 35M(UHQ)

Shooting



1 Press the [REC] button to start recording to the SD card.

This camera recorder has two [REC] buttons. Any of the [REC] buttons can be used to start/stop recording by default.

The tally lamp lights up in red during recording.

- Zoom Operation
- Adjusting the Focus

Memo : _____

- If both the slots are loaded with recordable cards in the factory default, pressing the [REC] button starts recording only to the media in the selected slot.

When [System] → [Record Set] → [Slot Mode] is set to "Dual", recording can be performed simultaneously to the cards in both the slots.

- The tally lamp can be turned off in [System] → [Tally Lamp].

Miscellaneous Functions for Shooting and Recording Methods

This camera recorder is equipped with various functions for shooting. The functions described here are the typical functions of the camera recorder.

Miscellaneous Functions for Shooting

- **Assignment of user buttons:**
You can assign functions to the buttons and use them as user buttons.
Functions can be assigned to the buttons according to the usability.
- **AF assist:**
Allows you to set the auto focus point to the preferred area or to near and far directions.
- **Focus Assist:**
The focused area is displayed in color to allow easy and accurate focusing.
- **Expanded focus:**
Magnifies the preferred area to enable precise focus to be established easily.
- **Zebra pattern:**
Diagonal lines (zebra pattern) are displayed only at the area with the specified luminance levels.
- **Marker:**
Displays the marker and safety zone when determining the angle of view for the image according to the shooting purpose.

Recording Methods

① Recording using both slots A and B

- **Continuous recording (Series Rec):**
Enables seamless long hour continuous recordings over the slots.
- **Record simultaneously at the same definition (Dual Rec):**
Allows you to create two clips of the same content at the same time only on this camera recorder.
- **Backup Rec:**
Allows you to record only the preferred scenes to one slot using the record and stop operations while the other slot is continuously recording.

② Special recording

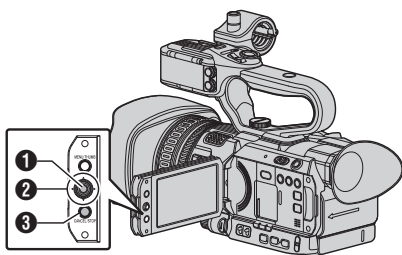
- * Special recording can be specified in conjunction with ① under given conditions.
- **Pre Rec:**
Enables recording to go back to the specified duration in seconds of the video and audio before the actual recording start time. This allows you to record a complete event without missing the initial scenes even if you start the recording late.
- **Clip Continuous Rec:**
Allows you to consolidate several rounds of “startstop recording” into one clip. You can consolidate the clips while recording when shooting on-and-off and shooting several scenes.
- **Frame Rec:**
Records as a single clip only in the specified frame rate until the recording is stopped. Useful for shooting clay animation.
- **Interval Rec:**
Records and pauses repeatedly at the specified time interval and frame rate, and records as a single clip until the recording is stopped. Useful for observation recording.

③ Other recordings

- **Clip cutter trig:**
You can split the clips freely without having to stop recording during shooting.

Playing Recorded Clips

Use the operation buttons on the side control panel of the camera recorder to play back.



- 1 Set Button (●)**
 - Plays back/pauses the clip pointed by the cursor.
 - You can press the cross-shaped button (◀▶) to perform frame-by-frame forward playback during pause mode.
- 2 Cross-shaped Button (▲▼◀▶)**
 - [▲/▼] Button:
Skips in the reverse or forward direction.
 - [◀/▶] Button:
 - During Playback:
Fast forwards in the reverse or forward direction.
 - While paused:
Frame-by-frame playback in the reverse or forward direction.
- 3 [CANCEL/STOP] Cancel/Stop Button**
Stops playback.

- 1 In the thumbnail screen, move the cursor to the clip to be played back.**
Move the cursor to the clip to be played back using the cross-shaped button (▲▼◀▶).
- 2 Press the Set button (●).**
Playback of the selected clip starts.

Audio Output during Playback

- You can confirm the playback sound from the monitor speaker, or the headphone connected to the [Φ] terminal. When a headphone is connected to the [Φ] terminal, sound cannot be output from the monitor speaker.
- Adjust the volume of the monitor speaker and headphone using the ▲ / ▼ volume buttons on the side of the camera recorder.

Displaying Information during Shooting

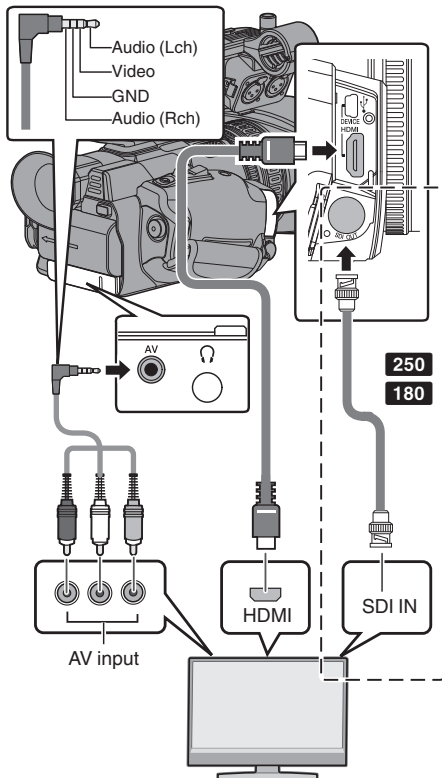
Pressing the [DISPLAY] button during playback displays the display screen. Pressing the [OIS/6] button each time changes the shooting information displayed (camera information display and hide display).

Connecting External Monitor

- To output live or playback video images and audio sound to an external monitor, select the output signals from the camera recorder, and connect using an appropriate cable according to the monitor to be used.
- Choose the most suitable terminal according to the monitor in use.
- [SDI OUT] terminal **250 180**:
Outputs either the 3G-SDI/HD-SDI signal or SD-SDI signal.
- [AV] terminal:
Outputs composite video and audio signals.
- [HDMI] terminal:
Outputs HDMI signals.

Memo : _____

- If the [SDI OUT] terminal **250 180** or [HDMI] terminal is connected, configure the settings in the [A/V Set] menu according to the monitor to be connected.
- If you are connecting with an output signal at 4K(2160p), use an 4K compatible HDMI cable.



- * Select the output signal in [A/V Set] → [HDMI/SDI Out]. **250 180**
- * Select the output signal in [A/V Set] → [HDMI Out]. **170**
- * When [Record Format] → [System] is set to “SD”, only SD-SDI signals are output. **250 180**
- * To display the menu screen or display screen on an external monitor, set [A/V Set] → [Video Set] → [Display On TV] to “On”.

Connecting via SDI **250 180**

- Digital video signals, together with embedded (superimposed) audio signals and time code signals, are output for both the 3G-SDI/HD-SDI and SD-SDI signals.

Memo : _____

- The sampling frequency for embedded (superimposed) audio signals is 48 kHz. Time code of the built-in time generator as well as playback time code are also output.

Setting the Aspect

- For setting the mode to convert images with a 16:9 aspect ratio to display on a 4:3 aspect ratio screen.
- Set using [A/V Set] → [Video Set] → [SD Aspect].
- The available modes include “Letter” (blackened at the top and bottom) and “Squeeze” (full size, compressed at the left and right).

Memo : _____

- When [Record Format] → [System] is set to “SD”, and [SD Aspect] is set to “4:3”, this item cannot be selected.

Functions of Network Connection **250**

- The network function can be operated by connecting one of the following adapters to the [HOST] terminal at the side terminal section.
 - Wireless LAN adapter
 - Ethernet adapter
 - Cellular adapter
- The network feature comprises web-browser-based functions using devices such as a smartphone, tablet terminal, or PC, as well as FTP and live streaming functions that run via thumbnail screens and menu operation.

Memo : _____

- The network feature is disabled when [System] → [Record Set] → [Record Format] → [System] is set to “High-Speed”.
- The network feature is disabled when [System] → [Record Set] → [Record Format] → [Bit Rate] is set to “150M(YUV422)” or “70M(YUV422)”.

List of Functions

Importing Metadata

You can download a metadata settings file (XML format) from the FTP server and store metadata in the camera recorder.

Uploading Recorded Clips

You can upload clips recorded in the SD card to a preset FTP server.

Memo : _____

- Uploading can also be performed via a web browser.

Editing Metadata

- Planning Metadata
You can access the page for editing the camera recorder’s metadata via a web browser on devices such as a smartphone, tablet terminal, or PC, and edit the metadata that is to be applied to clips to be recorded.
- Clip Metadata
You can access the page for editing the metadata via a web browser on devices such as a smartphone, tablet terminal, or PC, and display or rewrite the metadata that is recorded to a clip.

View Remote

You can access via a web browser on devices such as a smartphone, tablet terminal, or PC to check the live image or remotely control the camera.

Camera Control

You can access via a web browser on devices such as a smartphone, tablet terminal, or PC to remotely control the camera.

Live streaming

By combining with the decoder or PC application that supports live streaming, you can perform audio and video streaming via the network.

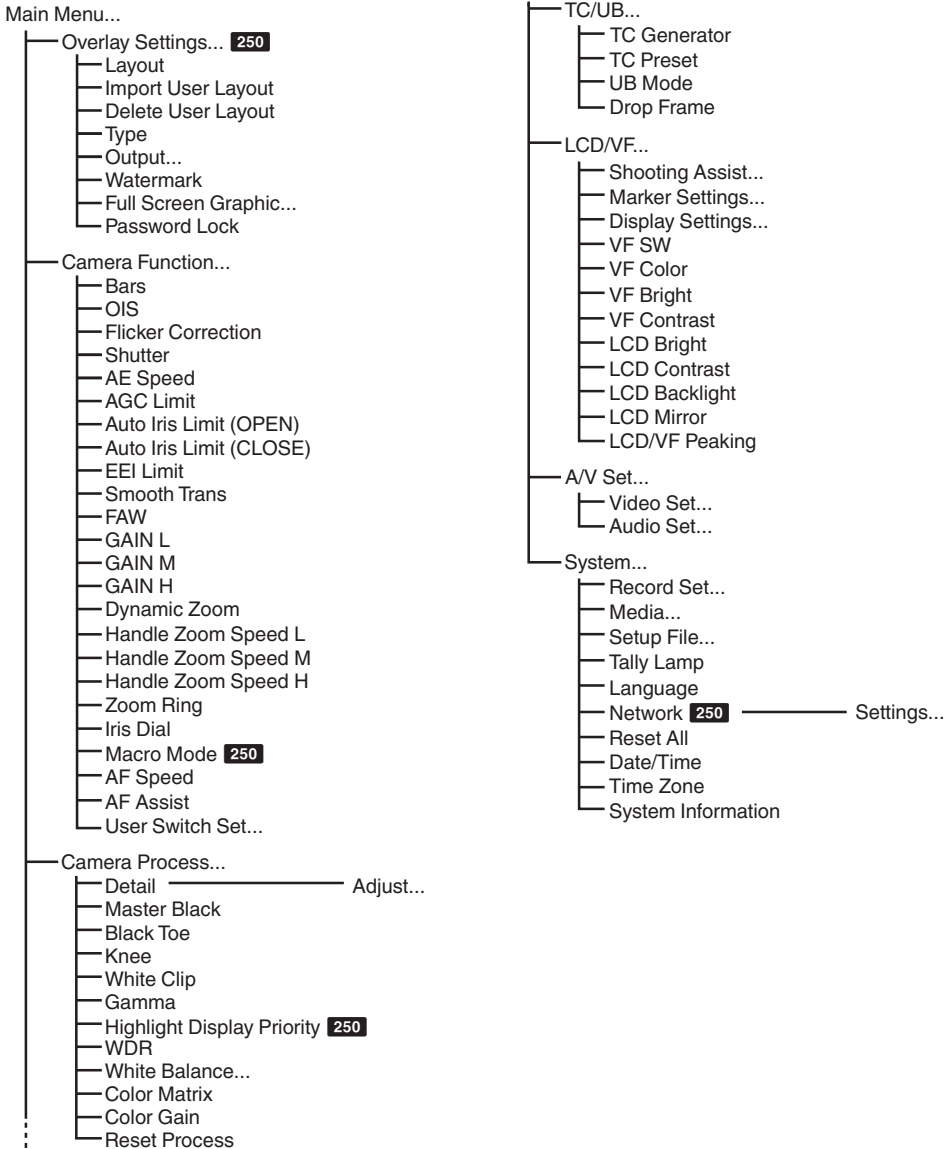
Memo : _____

- Live streaming is disabled when [System] is set to “4K” or “HD+Web”.

Overlay on Broadcast Video

Texts, images and watermark can be overlaid onto recorded video and live stream video. In addition, changes such as changing the image are possible with the SDP Generator app.

Menu Screen Hierarchical Chart



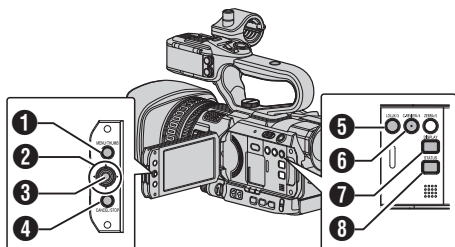
* Only menu items that can be set using this camera recorder are introduced here. For details on each item, please refer to the "Mobile User Guide".

Basic Operations in Menu Screen

- Press the [MENU/THUMB] button on the LCD monitor to display the menu screen on the LCD monitor and viewfinder.
- Various settings for shooting and playback can be configured on the menu screen.
- There are two types of menu screens - [Main Menu] and [Favorites Menu].
- [Main Menu] contains all the setting items of the camera recorder, classified according to functions and uses, while [Favorites Menu] allows users to customize the menu items freely.
- The operating procedures and main screen displays are the same for both menus.
- The menu screen can also be displayed on external monitors connected to the video signal output terminal.

Operation Buttons

Use the operation buttons on the side control panel of the camera recorder or the buttons on the LCD monitor to operate the menu.



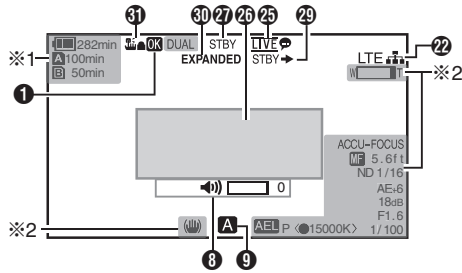
- 1 [MENU/THUMB] Button
 - Displays the menu screen. The [Main Menu] screen is displayed by default.
 - During normal usage, [Main Menu] is displayed if the previous menu operation ended at [Main Menu], and [Favorites Menu] if the previous menu operation ended at [Favorites Menu].
 - Press this button to close the menu screen during menu display and return to the normal screen.
 - Pressing and holding down the button while the menu is displayed switches the [Main Menu] screen to the [Favorites Menu] or vice versa.
- 2 Cross-shaped Button (▲▼◀▶)
 - ▲ : Moves the cursor upward.
 - ▼ : Moves the cursor downward.
 - ◀ : Moves back to the previous item.
 - ▶ : Moves forward to the next item.
- 3 Set Button (●)
Sets the values and items.
- 4 [CANCEL/STOP] Button
Cancels settings and returns to the previous screen.
- 5 [LOLUX/3] Button
Adds the selected menu or submenu item to the [Favorites Menu].
- 6 [C.REVIEW/4] Button
Resets settings in the [TC Preset] or [UB Preset] setting screen. This button is disabled in other screens.
- 7 [DISPLAY] Button
Switches between the [Main Menu] and [Favorites Menu] screens.
- 8 [STATUS] Button
Displays a simple Help menu. Simple Help appears only when the selected menu item supports this function.

Display Screen

Display Screen in Camera Mode

Display 0 screen

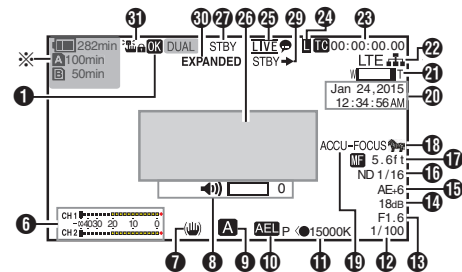
This screen displays the event. It is also used to display warnings only.



*1 Appears only during warnings

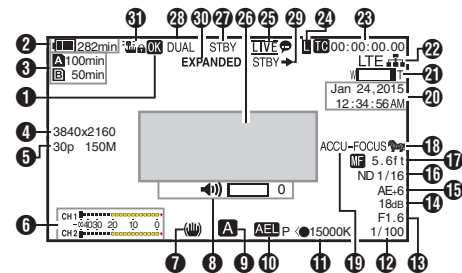
*2 Appears only during operation

Display 1 screen



* Appears only during warnings

Display 2 screen



1 OK Mark

Displayed when OK mark has been appended.

2 Voltage/Battery Power

Displays the current status of the power supply in use.

Memo : _____

- Displayed in the Display 0 and Display 1 screens during warnings only.

3 Remaining Space on Media

Displays the remaining recording time of the SD cards in slot A and slot B separately.

A : Currently selected slot. (White card)

A ↑ : Write-protect switch of SD card is set.

A!INVALID : SD card cannot be read or written to, or restored.

A!FORMAT : SD card requires formatting.

A!RESTORE : SD card requires restoring.

A!INCORRECT :

- When an SD card lower than UHS-I U3 is inserted while in the 4K mode.
- When Record Set is set to other than "AVCHD"/"SD"/"Web" with a Class 4 SD card inserted.
- When the SD card is not supported.
- When an SD card lower than Class 10 is inserted while in the XHQ mode.

A!REC INH :

- When attempting to record in 50i(HQ)/50i(SP) to an SD card recorded in AVCHD60i(HQ)/60i(SP) (or vice versa).
- When attempting to record more than 4 GB while a media that does not support recording of more than 4 GB is inserted.

The following icons are displayed during FTP upload. **250**

Icon	Status
	FTP transfer is in progress. Three images are alternately displayed, and the arrows become animated. In this case, instead of the recordable time of the SD card, an estimated value of the remaining transfer time is displayed.
	Error has occurred during FTP transfer. (Yellow)

Memo : _____

- This item is not displayed when [LCD/VF] → [Display Settings] → [Media Remain] is set to “Off”. However, warnings will be displayed.
- Displayed on the Display 0 and Display 1 screens only in the case of warnings. (When the remaining time is shorter than 3 minutes)
The icons appear on all display screens in the following cases.
 - When recording is performed to only one of the slots while [System] → [Record Set] → [Slot Mode] is set to “Dual”.
 - When recording is performed to only one of the slots while [System] → [Record Set] → [Record Format] → [System] is set to “HD+Web”.
- The displayed time is an estimate.

4 Resolution

Displays the video image resolution.

Memo : _____

- This item is not displayed when [LCD/VF] → [Display Settings] → [Record Format] is set to “Off”.


5 Frame Rate/Bit Rate

Displays the frame rate and bit rate in pairs.

Memo : _____

- This item is not displayed when [LCD/VF] → [Display Settings] → [Record Format] is set to “Off”.

6 Audio Level Meter

- Displays the audio levels of CH1 and CH2.
- The  icon appears on the screen when in Manual mode.







- When [System] → [Record Set] → [Rec Mode] is set to “Frame Rec” or “Interval Rec”, audio cannot be recorded and the audio level meter is grayed out.

Memo : _____


- This item is not displayed when [LCD/VF] → [Display Settings] → [Audio Meter] is set to “Off”.

7 Image Stabilizer Mark

The following is displayed when the image stabilizer and the electronic image stabilizer is ON/OFF.

OIS	Electronic image stabilizer	Icon
Off	Off	No display
Normal	On	 D
	Off	 D
High	On	 D
	Off	 D

Memo : _____

- If image stabilizer is set to “OFF” when the Display 0 screen is displayed,  appears for 3 seconds.
- Displayed in the Display 0 screen only when there is a change.

8 Volume Operation Indicator

The display appears when the volume (0 to 15) of the headphone or speaker changes.



Memo : _____

- There is no audio output from the speaker in Camera mode.

9 FULL AUTO ON/OFF

Press and hold the [FULL AUTO] button to switch on or off.

If FULL AUTO is enabled, the  icon appears.

10 AE Lock

The **AEL** icon is displayed during AE lock.

11 White Balance Mode

Displays the current white balance mode.
(****K indicates color temperature)

A< ****K> : When the [WHT BAL B/A/PRST] switch is set to "A" in the Manual White Balance mode.

B< ****K> : When the [WHT BAL B/A/PRST] switch is set to "B" in the Manual White Balance mode.

P< ****K> : When the [WHT BAL B/A/PRST] switch is set to "PRST" in the Manual White Balance mode.

A< ● ****K>/ : The white balance of the subject with respect to the color temperature setting is appropriate when the WB indicator is set to "On" in the Manual White Balance mode.

B< ● ****K>/ : Locked in the Full Auto White Balance mode.

P< ● ****K> : Locked in the Full Auto White Balance mode.

Memo : _____

- Displayed in the Display 0 screen only when there is a change.

12 Shutter

- The current shutter speed is displayed when the shutter is set to "Manual".
- The shutter speed display disappears when the [FULL AUTO] button is pressed and held down to set to "ON" to enable the Full Auto shooting mode, or when the [SHUTTER] button is pressed and held down to enable the Automatic Shutter mode.

Memo : _____

- The variable range of the shutter speed varies according to the video format settings.
- Displayed in the Display 0 screen only when there is a change.

13 Iris F-Number

Displays F-number of the lens iris.


14 Gain

- Displays the gain value when in the Manual Gain mode.
- The gain value is not displayed in the "AGC" mode.
- "LUX30" or "LUX36" is displayed when in the low-light shooting mode.

Memo : _____

- Displayed in the Display 0 screen only when there is a change.

15 AE Level

- Displayed when the AE function is activated.
- When operated while manual operation is disabled, "AE" blinks for about 5 seconds.
- When face detection is enabled and [Face Detect] is set to "AF&AE",  appears on the left side of "AE".









16 ND Filter Position

Displays the current ND filter position.

Memo : _____

- This item is not displayed when [LCD/VF] → [Display Settings] → [ND Filter] is set to "Off".
- Displayed in the Display 0 screen only when there is a change.


17 Focus Display

- Displays the approximate distance to the subject in focus during manual focus.
- There is no icon display in Auto Focus mode. However, the Auto Focus icon  appears with  only when face detection is enabled.
- When [Camera Function] → [User Switch Set] → [Face Only AF] is set to "On", the  ONLY  icon will be displayed when face detection is enabled. When face detection is not enabled, the  ONLY  icon will be displayed in gray.
- If [Camera Function] → [AF Assist] is set to "Area", the  icon appears on the left side of .

Memo : _____

- You can specify the display method (Feet/Meter) in [LCD/VF] → [Display Settings] → [Focus]. This item will not be displayed when "Off" is selected.
- Displayed in the Display 0 screen only when there is a change.

18 Zebra pattern

During zebra pattern display,  (zebra icon) is displayed on the display screen in Camera mode.

- 19 Focus Assist
- “FOCUS” is displayed when auto focus is activated.
 - When ACCU-Focus is enabled, “ACCU-FOCUS” blinks for about 10 seconds while Focus Assist starts up, after which the “FOCUS” indicator lights up.
 - If recording starts while [ACCU-Focus] is active, [ACCU-Focus] will be forcibly deactivated.

Memo : _____

- Displayed in the Display 0 screen only when there is a change.

- 20 Date/Time Display
Displays the current date and time.

Memo : _____

- The date/time display style can be specified in [LCD/VF] → [Display Settings] → [Date Style]/[Time Style].
- This item is not displayed when [LCD/VF] → [Display Settings] → [Date/Time] is set to “Off”.
- When [System] → [Record Set] → [Time Stamp] is set to “On”, this item is not displayed.

- 21 Zoom Display
- Displays the zoom position. (Zoom bar or value)
- Dynamic Zoom Off:



Dynamic Zoom On:



- The zoom bar will only be displayed for 3 seconds after the zoom operation is activated.
- The value will always be displayed.
- Dynamic Zoom Off: Z00 to Z99 (During concurrent use of electronic image stabilizer: Z10 to Z105)
- Dynamic Zoom On: Z00 to Z149 (During concurrent use of electronic image stabilizer: Z10 to Z149)

Dynamic Zoom Off : Z00 to 99
Dynamic Zoom On : Z100 to 149

Memo : _____

- You can specify the display method (Number/Bar) in [LCD/VF] → [Display Settings] → “Zoom”. This item will not be displayed when “Off” is selected.
- Displayed in the Display 0 screen only when there is a change.

- 22 Network Connection Icon **250**
- The network connection status is displayed when [System] → [Network] is set to “On”. This icon is not displayed when “Off” is selected.

Icon	Status
(Blink)	Connection is not established (starting up, preparing for connection)
(Yellow)	Connection is not established (preparing for connection)
	Connection is established
	When a USB adapter different from the connection settings is detected
(No display)	When an incompatible USB adapter is detected, or when [Network] is set to “Off”

Memo : _____

- When a cellular adapter that supports LTE connection display is in use, “LTE” will appear to the left of the above icon when LTE connection is detected.

- 23 Time Code (TC)/User’s Bit (UB) Display

- Displays the time code (hour: minute: second: frame) or user’s bit data.
- Example of time code display:

TC00:00:00:00

- * Colon (:) denotes non-drop frames and dot (.) denotes drop frames.

- Example of user’s bit display:




UBFF EE DD 20

Memo : _____

- You can specify whether to display the time code, user’s bit, or turn off the display in [LCD/VF] → [Display Settings] → [TC/UB]. This item will not be displayed when “Off” is selected.

- 24 Time Code Lock Indicator
- When the built-in time code generator is synchronized with the external time code data input, lights up.

- 25 Live streaming mark **250**
 When [System] → [Network]/[Settings] → [Live Streaming Set] → [Live Streaming] is set to “On”, the distribution status is displayed.

Icon	Status
 (Red)	Distribution in progress (good connection quality)
 (Red)	Distribution in progress (poor connection quality)
 (Yellow)	Connection pending or connection failed

- 26 Event/Warning Display Area
 Displays error messages.

27 Media Status

- : No card found in the selected slot
- STBY : Recording standby
- REC : Recording
- REVIEW : Clip Review
- STBY **P** : Pre Rec recording standby
- REC **P** : Pre Rec recording
- STBY **C** : Clip Continuous Rec recording standby
- REC **C** : Clip Continuous Rec recording
- STBY **C** : Clip Continuous Rec recording pause
 (displayed in yellow)
- STBY **I** : Interval Rec recording standby
- STBY **I** : Interval recording pause
 (displayed in red)
- REC **I** : Interval Rec recording
- STBY **F** : Frame Rec recording standby
- REC **F** : Frame Rec recording
- STBY **F** : Frame Rec recording pause
 (displayed in yellow)
- STOP : Unable to record to the card in the slot
- P.OFF : Power OFF

- 28 Dual Rec/Backup Rec Display
 “DUAL” is displayed in the Dual Rec mode and “BACKUP” is displayed in the Backup Rec mode.

Memo : _____

- This item is not displayed when [Slot Mode] is set to “Series”.
- This item is not displayed when [LCD/VF] → [Display Settings] → [Media Remain] is set to “Off”. However, warnings will be displayed.
- Displayed in the Display 0 and Display 1 screens during warnings only. (When the remaining time is shorter than 3 minutes)

- 29 Record Trigger
 STBY → : When [Rec Trigger] is set to “On” and recording is stopped
 REC → : When [Rec Trigger] is set to “On” and recording is in progress

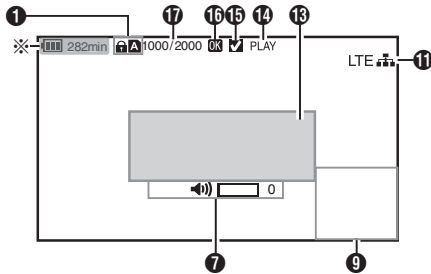
- 30 Expanded focus
 “EXPANDED” (yellow) is displayed during expanded focus.

- 31 Operation lock
 The  icon appears during operation lock.

Display Screen in Media Mode

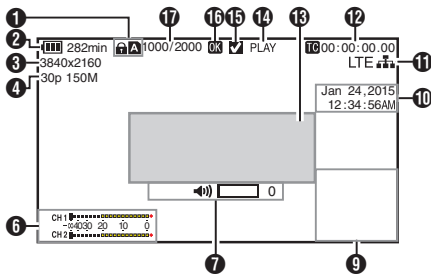
Media Display 0 Screen

This screen displays the media status or event. It is also used to display warnings only.



* Appears only during warnings

Media Display 1 Screen



1 Media

- Displays the media slot (A or B) of the currently played clip.
- appears when the write-protect switch of the SD card is set.

2 Voltage/Battery Power

Displays the current status of the power supply in use.

Memo :

- Displayed in the Media Display 0 screen during warnings only.

3 Resolution

Displays the video image resolution.

4 Frame Rate/Bit Rate

Displays the frame rate and bit rate in pairs.

5 Operation Guide

Displays a guide for the current operation buttons.

6 Audio Level Meter

Displays the audio levels of CH1 and CH2.



Memo :

- This item is not displayed when [LCD/VF] → [Display Settings] → [Audio Meter] is set to "Off".

7 Volume Operation Indicator

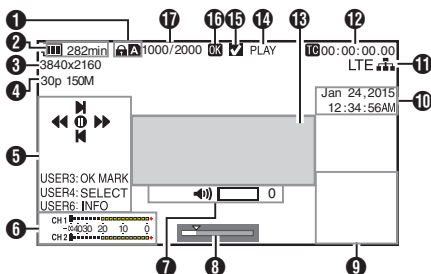
- The display appears when the volume (0 to 15) of the headphone or speaker changes.

8 Position Bar

Displays the current position in the video. During trimming, the position bar appears in green, and icons for the in and out points are displayed.

- ▼ : Current position of the video
- ▲ : Position to start trimming (In point)
- ▲ : Position to end trimming (Out point)

Media Display 2 Screen

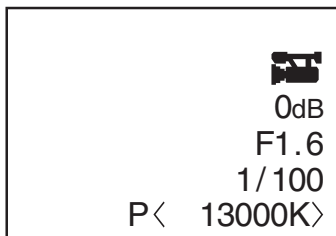


Others

9 Information Display

The camera information display turns on and off each time you press the [OIS/6] button.

- Camera information display displays only information of Gain, Iris, Shutter and White Balance that have been recorded.



Camera Information Display

Memo : _____

- Trimming information is displayed while trimming is in progress. In this case, pressing the [OIS/6] button does not switch the display.

10 Date/Time Display

Displays the date/time that is recorded on the currently played SD card.

Memo : _____

- The date/time display style can be specified in [LCD/VF] → [Display Settings] → [Date Style]/[Time Style].

11 Network Connection Icon 250

The network connection status is displayed when [System] → [Network] is set to "On". This icon is not displayed when "Off" is selected.

(P 0 [Network 250])

Icon	Status
(Blink)	Connection is not established (starting up, preparing for connection)
(Yellow)	Connection is not established (preparing for connection)
	Connection is established
	When a USB adapter different from the connection settings is detected
(No display)	When an incompatible USB adapter is detected, or when [Network] is set to "Off"

Memo : _____

- When a cellular adapter that supports LTE connection display is in use, "LTE" will appear to the left of the above icon when LTE connection is detected.

12 Time Code (TC)/User's Bit (UB) Display

- Displays the time code (hour: minute: second: frame) or user's bit data recorded in the SD card being played back.
- Example of time code display:

TC00:00:00:00

↓

- * Colon (:) denotes non-drop frames and dot (.) denotes drop frames.

- Example of user's bit display:

UBFF EE DD 20

Memo : _____

- You can specify whether to display the time code, user's bit, or turn off the display in [TC/UB] of [LCD/VF] → [Display Settings].

13 Event/Warning Display Area

Displays error messages.

14 Media Status

- PLAY : Playing
- STILL : Still picture playback mode
- FWD * : High-speed playback in the forward direction (* playback speed: 5x, 15x, 60x, or 360x)
- REV * : High-speed playback in the reverse direction (* reverse playback speed: 5x, 15x, 60x, or 360x)
- STOP : Stop mode
- P.OFF : Power OFF

15 Check Mark

Displayed when the currently played clip is selected.

16 OK Mark

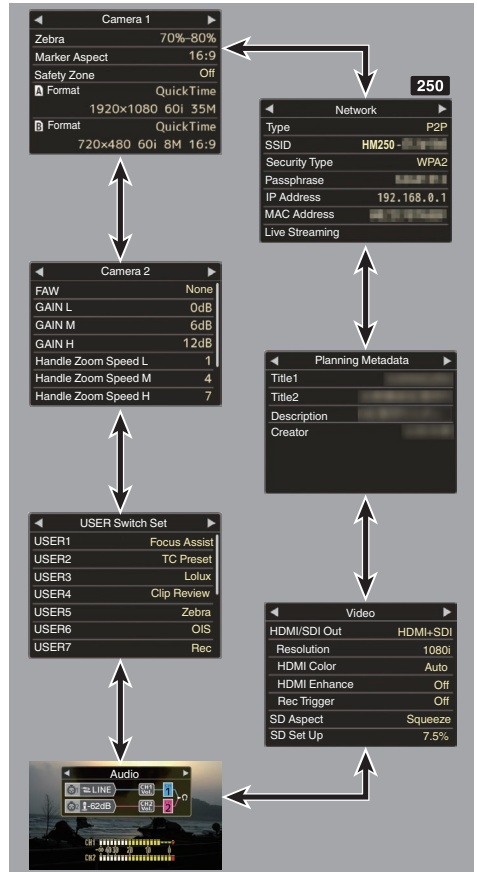
Displayed when OK mark has been appended.

17 Clip Information

Displays current clip number/total number of clips.

Status Screen

- This screen allows you to check the current settings.
- To display the status screen, press the [STATUS] button in the normal screen.
- The status display differs according to the operation mode (two types).
- Press the [STATUS] button to switch to the display screen.
- Press the [MENU/THUMB] button at each status screen (other than the [Camera 1] screen) to enter the setting screen.
- Use the cross-shaped button (◀▶) to switch between the screens.



* These are screen examples. The contents displayed are different depending on the model and settings.

Troubleshooting

Symptom	Action
Power does not turn on.	<ul style="list-style-type: none"> • Is the AC adapter properly connected? • Is the battery charged? • Is the power turned on immediately after it is turned off? Make sure to wait for an interval of at least 5 seconds before turning on the power again.
Unable to start recording.	<ul style="list-style-type: none"> • Is the record trigger button/lock switch on the handle turned on? HDL • Is the write-protect switch of the SD card turned on? Make sure that the write-protect switch is turned off. • Is the camera recorder set to the Camera mode? Use the [MODE] selection button to switch to the Camera mode. • Is the SD card inserted compatible with the recording format?
Camera image is not output on the LCD monitor and viewfinder screen.	<ul style="list-style-type: none"> • Is the camera recorder set to the Camera mode? Use the [MODE] selection button to switch to the Camera mode.
Playback does not start after selecting a clip thumbnail and pressing the Set button (●).	<ul style="list-style-type: none"> • Is the selected clip a playable clip? Playback is not possible if the clip has a different video format setting.
Images on the LCD monitor and viewfinder screen appear dark or blurred.	<ul style="list-style-type: none"> • Readjust the brightness of the LCD monitor and viewfinder. • Is the [ND FILTER] switch set to "1/16"? • Is the iris closed? • Is the shutter speed setting too high? • Is the amount of peaking too little? Use the [LCD/VF Peaking] menu to adjust the contour for the LCD monitor image and viewfinder image by adjusting the contour of the viewfinder image. (The contour of the LCD monitor will also be adjusted at the same time.) Adjust using [LCD/VF] → [LCD/VF Peaking].
The [CH-1/CH-2] recording level adjustment knob does not work. HDL	<ul style="list-style-type: none"> • Is the [AUDIO SELECT CH-1/CH-2 AUTO/MANU] switch set to "AUTO"? • Is Full Auto enabled? Is [A/V Set] → [Audio Set] → [Audio On FULL AUTO] set to "Auto" in Full Auto mode?
SD card cannot be initialized (formatted).	<ul style="list-style-type: none"> • Is the write-protect switch of the SD card turned on? Make sure that the write-protect switch is turned off.
Battery alarm appears even after loading a charged battery.	<ul style="list-style-type: none"> • Is the battery too old?
The time code and user's bit are not displayed.	<ul style="list-style-type: none"> • Even in Camera mode or Media mode, the time code and user's bit may not be displayed depending to the type of display. • Is [LCD/VF] → [Display Settings] → [TC/UB] set to "Off"? To display the time code or user's bit, set it to "TC" or "UB".
The date and time are not displayed.	<ul style="list-style-type: none"> • The date and time are only displayed on the Display 1 and Display 2 screens in the Camera mode (during shooting). • Is [System] → [Record Set] → [Time Stamp] set to "On"? To display the date and time, set it to "Off".

Symptom	Action
Incorrect display on the viewfinder.	<ul style="list-style-type: none"> Is [LCD/VF] → [VF SW] set to “Enable”, and is the viewfinder in use without being pulled out? To use the viewfinder in this setting, pull out the viewfinder.
The actual recording time is shorter than the estimated time.	<ul style="list-style-type: none"> The recordable time may be shorter depending on the shooting conditions or the subject.
Cannot connect to wireless LAN. 250	<ul style="list-style-type: none"> Check the mode of connection and method of setting ([SSID] and [Passphrase] in cases other than WPS). Even if the Passphrase is wrong, “Completed the Setup Wizard. Please Input the Passphrase into Your Device.” may appear at the browser setting depending on the type of encryption. Adjust [Passphrase] again.
The View Remote screen turns black. The screen flickers. The screen freezes. Cannot perform remote operation. 250	<ul style="list-style-type: none"> The network path is congested. Wait a while before refreshing (reloading) the web browser.
The clips cannot be uploaded to the FTP server. 250	<ul style="list-style-type: none"> Adjust the [Clip Server] settings. The maximum size of the recorded clip is 64 GB. If a file size limit is set in the FTP server settings, set the size limit to more than 64 GB.
The wireless LAN is disconnected. 250	<ul style="list-style-type: none"> The wireless LAN may be disconnected depending on the environment. Change the usage environment. Connect via wired LAN.
The images and audio sound during live streaming are choppy. 250	<ul style="list-style-type: none"> Depending on the type of network adapter used and the connection, streaming may not be possible with the encoding bit rate specified. Please reduce the encoding bit rate.

Precautions for Proper Use

Storage and Usage Locations

- Allowable ambient temperature and humidity
Be sure to use this unit within the allowable temperature range of 0 °C to 40 °C (32 °F to 104°F) and a relative humidity of 30 % to 80 %. Using this unit at a temperature or humidity outside the allowable ranges could result not only in malfunction but also serious impact on the CMOS elements as small white spots may be generated. Please exercise care during use.
- Strong electromagnetic waves or magnetism
Noise may appear in the picture or audio and/or the colors may be incorrect if this unit is used near a radio or television transmitting antenna, in places where strong magnetic fields are generated by transformers, motors, etc., or near devices emitting radio waves, such as transceivers or cellular phones.
- Use of wireless microphone near this unit
When a wireless microphone or wireless microphone tuner is used near this unit during recording, the tuner could pick up noise.
- Avoid using or placing this unit in the following places.
 - Places subject to extreme heat or cold
 - Places with excessive dirt or dust
 - Places with high humidity or moisture
 - Places subject to smoke or vapor such as near a cooking stove
 - Places subject to strong vibrations or unstable surfaces
 - In a parked car under direct sunlight or near a heater for long hours
- Do not place this unit at places that are subject to radiation or X-rays, or where corrosive gases occur.
- Protect this unit from being splashed with water. (Especially when shooting in the rain)
- Protect this unit from getting wet when shooting on a beach. In addition, salt and sand may adhere to the body. Be sure to clean the unit after use.
- Protect this unit against penetration of dust when using it in a place subject to sandy dust.

Carrying the Camera

- Do not drop or hit this unit against a hard object when transporting.

Power Saving

- When this unit is not in use, be sure to set the [POWER ON/OFF] switch to "OFF" in order to reduce power consumption.

Maintenance

- Turn off the power before performing any maintenance.
- Wipe the external cabinet of the unit with a soft cloth. Do not wipe the body with benzene or thinner. Doing so may cause the surface to melt or turn cloudy. When it is extremely dirty, soak the cloth in a solution of neutral detergent, wipe the body with it, and then use a clean cloth to remove the detergent.

Rechargeable Battery

- Be sure to use only the specified batteries. We do not guarantee the safety and performance of this device if an unspecified battery is used.
- **180 170**
 - Charge the battery first before using.
 - If you are not using the battery for a prolonged period of time, remove and keep the battery at a 30 % to 40 % charge level to prevent deterioration.
 - Recharge the battery to a level of 10 % to 20 % once every six months when storing the battery.
Storing the battery at a fully discharged state will result in over discharging and inability to charge the battery.
 - Store the removed battery with the battery cap attached in a dry place between 15 °C and 25 °C (59 °F and 77 °F).
- **250**
 - For details, refer to the "INSTRUCTIONS" of the battery.

ATTENTION:



The product you have purchased is powered by a rechargeable battery that is recyclable. Please call 1-800-8-BATTERY for information on how to recycle this battery.

Regular Inspection (Maintenance)

- Under normal environment, dust will accumulate on the camera recorder when it is used over a long period. Dust may enter the camera recorder especially if it is used outdoors. This may affect the image and sound quality of the camera recorder. Check and replace the fan after every 9000 hours (suggested guideline). You can check the usage time of the fan in [System] → [System Information] → [Fan Hour]. If the fan is used for more than 9000 hours without replacement, "Fan Maintenance Required" will be displayed every time you turn on the power.

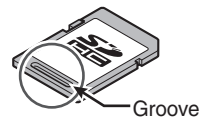
SDHC/SDXC Cards

- SDHC/SDXC card is referred to as SD card in this manual.
- This camera recorder saves the recorded images and audio sound on the SD card (sold separately) in the card slot.
- If the SD card contains files recorded by devices other than this camera recorder or files that are saved from a PC, the recordable time may be shorter or data may not be properly recorded. In addition, the remaining space on the card may not increase even when files are deleted using a PC.
- For details on the combinations of usable SD card and format setting, refer to the following.
- * Using cards other than those from Panasonic, TOSHIBA or SanDisk may result in recording failure or data loss.

Handling of SD Cards

- The status indicator lights up in red when data on the SD card is being accessed. Do not remove the SD card during data access (such as recording, playback, or formatting). Do not turn off the power or remove the battery and AC adapter during access either.
- Do not use or store the SD card in a place that is subject to static electricity or electrical noise.
- Do not place the SD card near locations that are exposed to strong magnetic fields or radio waves.
- Inserting the SD card incorrectly may result in damage of this unit or the SD card.

- We are not liable for any accidental loss of data stored on the SD card. Please back up any important data.
- Make use of the SD card within the prescribed conditions of use. Do not use it at the following locations. Places that are subject to direct sunlight, high humidity or corrosion, places near thermal equipment, sandy or dusty places, or in a car under the sun with the doors and windows closed.
- Do not bend or drop the SD card, or subject it to strong impact or vibration.
- Do not splash the SD card with water.
- Do not dismantle or modify the SD card.
- Do not touch the terminals with your hands or with a metal object.
- Do not allow dust, dirt, water, or foreign objects to adhere to the terminals.
- Do not remove the labels or stick other labels or stickers on the SD cards.
- Do not use pencils or ballpoint pens to write on the SD cards. Always use oil-based pens.
- If you format (initialize) the SD card, all data recorded on the card, including video data and setup files, will be deleted.
- You are recommended to use cards that are formatted (initialized) on this camera recorder.
 - The SD card may be damaged if the camera recorder is not operated correctly. Formatting (Initializing) the SD card may allow it to operate correctly.
 - SD cards that have been formatted (initialized) on other cameras, computers or peripheral equipment may not operate correctly. In this case, format (initialize) the SD card on this camera recorder.
- If you want to wipe out all information by completely erasing the data, we recommend either using commercially available software that is specially designed for that purpose, or by physically destroying the SD card with a hammer, etc. When formatting or erasing data using the camera recorder, only the file administration information is changed. The data is not completely erased from the SD card.
- Some commercially available SD cards may be harder to be removed from this unit. Remove them by hooking onto the groove on the cards.
 - It will be easier to remove the cards after several times.
 - Do not stick any stickers on the cards.



- The SD card may pop out when it is being removed. Be careful not to lose the card.

LCD Monitor and Viewfinder

- The LCD monitor and viewfinder screen are manufactured using high-precision technology. Black spots may appear on the LCD monitor and viewfinder screen, or red, blue, and/or white spots may not disappear. However, this is not a malfunction and these spots are not recorded on the SD card.
- If you use this unit continuously for a long period of time, the characters displayed in the viewfinder may temporarily remain on the screen. This is not recorded on the SD card. They will not appear after you turn the power off and then on again.
- If you use this unit in a cold place, the images may appear to lag on the screen, but this is not a malfunction. Retained images are not recorded on the SD card.
- Do not press against the surface with force or subject it to strong impact. Doing so may damage or break the screens.
- Noise may appear in the viewfinder when switching between the live video and playback images.
- Due to the characteristic of the viewfinder display device, colors may appear on the images when you blink your eyes. It does not affect the recorded images, SDI output, or HDMI output.

Copyright

- Any recordings made on this camera recorder that are played back for profit or public preview may infringe on the rights of the owner of the recordings. Do not use the recordings for purpose other than personal enjoyment without prior consent from the owner.

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Encryption in Network Connection 250

- Wireless LAN connections make use of an encryption function. This encryption is designed for commercially-sold equipment, and it cannot be altered.

Others

- Do not insert objects other than the memory card into the card slot.
- Do not block the vent on the unit. Blocking of the vent causes internal heating and may lead to burns and fires.
- Do not turn off the [POWER ON/OFF] switch or remove the power cable during recording or playback.
- The camera recorder may not show stable pictures for a few seconds immediately after the power is turned on, but this is not a malfunction.
- When the video signal output terminals are not in use, put on the covers to prevent damage to the terminals.
- Do not drop this unit or subject it to strong impact or vibration as it is a precision equipment.
- Optical performance of lens
Due to the optical performance of the lens, color divergence phenomena (magnification chromatic aberration) may occur at the periphery of the image. This is not a camera malfunction.
- Noise may appear in the image when switching modes.
- If placed on its side, heat release efficiency will deteriorate.
- Use the supplied AC adapter as the power supply. Do not use the supplied AC adapter on other devices.
- Use the supplied power cord. And do not use the supplied power cord for any other devices.
- When the connectors that come with connector covers are not in use, put on the covers to prevent damage to the connectors.
- This camera recorder makes use of fonts by Fontworks Inc.
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This manual is for (G) products manufactured after June 2021.

Specifications

General

Item	Description
Power	DC 12 V
Power consumption	250 • Approx. 9.2 W (*1) • Approx. 8.3 W (*2) 180 170 • Approx. 8.9 W (*1) • Approx. 7.6 W (*2)
Mass	250 • Approx. 1.6 kg (with battery) 180 170 • Approx. 1.5 kg (with battery)
Allowable operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Allowable operating humidity	30 %RH to 80 %RH
Allowable storage temperature	-20 °C to 50 °C (-4 °F to 122 °F)
Dimensions (W × H × D)	149 mm × 191 mm × 307 mm (including handle unit)

*1 When [System] is set to "4K" and all other settings are in factory default

*2 When [System] is set to "HD" and all other settings are in factory default

Terminal Section

Item	Description
[SDI OUT] terminal (480i or 576i: Downconverted 720p/1080i/1080p: embedded audio), BNC (unbalanced)	250 180
3G-SDI	Compliant with SMPTE ST424
HD-SDI	Compliant with SMPTE ST292
SD-SDI	Compliant with SMPTE ST259
[HDMI] Output Terminal	Type A
[INPUT1/INPUT2] terminal	HDL
[LINE]	+4 dBu, 10 kΩ, XLR (balanced)
[MIC]	-50 dBu, 4 kΩ, XLR (balanced), +48 V output (phantom power supply)
[AUX] terminal	Φ3.5 mm stereo mini jack -22 dBu 10 kΩ
[AV] terminal	Φ3.5 mm 4-pin mini jack
Video signal	1.0 V (p-p)
Audio signal	-8 dBu (during reference level input), 1 kΩ (unbalanced)

Item	Description
[Ⓜ] terminal	Φ3.5 mm stereo mini jack
Output	-18 dBu, 16 Ω load (reference level at -20 dBFS, and at maximum headphone volume)
[REMOTE] terminal	Φ2.5 mm wired remote control
[Ⓢ] terminal	
[DEVICE]	Mini USB-B type, USB 2.0, slave function (mass storage class) only
[HOST] 250	USB-A type, USB2.0, network connection function only
[DC] terminal	For use with the supplied AC adapter

Lens Section

Item	Description
Lens	F1.2 to F3.5, 12x, f = 4.67 mm to 56.04 mm (35 mm equivalent: 29.6 mm to 355 mm)
Filter diameter	Φ62 mm

Camera Section

Item	Description
Image pickup device	1/2.3-inch Progressive CMOS
Sync system	Internal sync (built-in SSG)
Optical filter	OFF, 1/4, 1/16
Gain	0dB, 3dB, 6dB, 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, Lolux (30dB, 36dB), AGC
Electronic shutter	1/6 to 1/10000, EEI
LCD monitor	3.45-inch LCD, 16:9, approx. 2.76-megapixels
Viewfinder	0.24-inch LCOS, 16:9 1.56M pixels (960 x 540 x 3)

Storage Section

Item	Description
Supported media	SDHC/SDXC
Slots	x 2

Video/Audio

Item	Description
4K mode	
Recording file format	QuickTime File Format
Video	
Modes other than YUV422	MPEG-4 AVC/H.264 150/70 Mbps (Max) 3840x2160/29.97p, 25p, 23.98p
YUV422 mode 250	MPEG-4 AVC/H.264 150/70 Mbps (Max) 3840x2160/29.97p, 25p, 23.98p
Audio	LPCM 2ch, 48 kHz/16 Bit

Item	Description
HD mode (QuickTime)	
Recording file format	QuickTime File Format
Video	
YUV422 mode, XHQ mode	MPEG-4 AVC/H.264 50 Mbps (Max) 1920x1080/59.94p, 59.94i, 29.97p, 23.98p, 50p, 50i, 25p
UHQ Mode	MPEG-4 AVC/H.264 35 Mbps (Max) 1920x1080/59.94i, 29.97p, 23.98p, 50i, 25p 1280x720/59.94p, 50p
Audio	LPCM 2ch, 48 kHz/16 Bit
HD mode (High-Speed)	
Recording file format	QuickTime File Format
Video	
XHQ mode	MPEG-4 AVC/H.264 50 Mbps 119.88/59.94p, 100/50p, 119.88/29.97p, 59.94/29.97p, 100/25p, 50/25p, 119.88/23.98p, 59.94/23.98p
UHQ mode	MPEG-4 AVC/H.264 35 Mbps 119.88/59.94p, 100/50p, 119.88/29.97p, 59.94/29.97p, 100/25p, 50/25p, 119.88/23.98p, 59.94/23.98p
Audio	LPCM 2ch, 48 kHz/16 Bit
HD mode (AVCHD)	
Recording file format	AVCHD File Format
Video	
HQ mode	MPEG-4 AVC/H.264 28 Mbps (Max) 1920x1080/59.94p, 50p MPEG-4 AVC/H.264 24 Mbps (Max) 1920x1080/59.94i, 50i
SP mode	MPEG-4 AVC/H.264, 17 Mbps 1920x1080/59.94i, 50i
Audio	Dolby Digital 2ch, 48 kHz/16 Bit, 256 kbps
HD mode (Exchange, U model only)	
Recording file format	MP4 File Format
Video	
LP mode	MPEG-4 AVC/H.264 12 Mbps (Max) 1920x1080/60p MPEG-4 AVC/H.264 8 Mbps (Max) 1280x720/60p
Audio	AAC 2ch, 48 kHz/16 Bit, 128 kbps

Item	Description
SD mode (QuickTime)	
Recording file format	QuickTime File Format
Video	
	MPEG-4 AVC/H.264, 8 Mbps 720x480/59.94i (U model only), 720x576/50i (E model only)
Audio	LPCM 2ch, 48 kHz/16 Bit
SD mode (AVCHD)	
Recording file format	AVCHD File Format
Video	
	MPEG-4 AVC/H.264, 8 Mbps 720x480/59.94i (U model only), 720x576/50i (E model only)
Audio	Dolby Digital 2ch, 48 kHz/16 Bit, 256 kbps
Web mode (QuickTime)	
Recording file format	QuickTime File Format
Video	
Mode other than HQ, LP	MPEG-4 AVC/H.264, 8 Mbps 720x480/59.94i, 720x576/50i
HQ mode	MPEG-4 AVC/H.264, 3 Mbps 960x540/29.97p, 23.98p, 25p
LP mode	MPEG-4 AVC/H.264, 1.2 Mbps 480x270/29.97p, 23.98p, 25p
Audio	
Mode other than HQ, LP	LPCM 2ch, 48 kHz/16 Bit
HQ mode, LP mode	μ-law 2ch, 16 kHz
Web mode (AVCHD)	
Recording file format	AVCHD File Format
Video	
Mode other than LP, EP	MPEG-4 AVC/H.264, 8 Mbps 720x480/59.94i, 720x576/50i
LP mode	MPEG-4 AVC/H.264, 9 Mbps 1440x1080/59.94i, 50i
EP mode	MPEG-4 AVC/H.264, 5 Mbps 1440x1080/59.94i, 50i
Audio	Dolby Digital 2ch, 48 kHz/16 Bit, 256 kbps
Streaming Mode	1920x1080 (59.94i/50i) 12/8/5/3 Mbps 1280x720 (59.94p/50p/29.97p/25p) 12/8/5/3/1.5 Mbps 720x480 (59.94i)/720x576 (50i) 8/5/3/1.5/0.8/0.3 Mbps 640x360 (59.94p/50p/29.97p/25p) 3/1.5/0.8/0.3 Mbps 720x720 (59.94p/50p) 5/3/1.5 Mbps 404x720 (59.94p/50p) 5/3/1.5 Mbps

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- ③ Select [System] → [System Information] → [Open Source License].

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GY-HM180U/GY-HM180E
GY-HM170U/GY-HM170E
4K MEMORY CARD CAMERA RECORDER**

JVC