The illustration here shows how the handle unit is attached using the unit supplied with GY-HM200U/GY-HM200E. GY-HM170U/GY-HM170E do not come with a handle unit. 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-HM200U/GY-HM170U
Serial No. ________________________________

IM 1.00

B5A-0453-00
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
CAUTION
FOR USA AND CANADA
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.
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.

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.

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).

---

6 Safety Precautions
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:

Blue to N (Neutral) or Black
Brown to L (Live) or Red

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.

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:

<table>
<thead>
<tr>
<th>Port</th>
<th>Cable Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>Exclusive Cable</td>
<td>1.8 m</td>
</tr>
<tr>
<td>USB Mini</td>
<td>Shielded Cable</td>
<td>1.2 m</td>
</tr>
<tr>
<td>AV OUT</td>
<td>Exclusive Cable</td>
<td>1.4 m</td>
</tr>
<tr>
<td>HDMI</td>
<td>Shielded Cable</td>
<td>1.8 m</td>
</tr>
<tr>
<td>REMOTE</td>
<td>Exclusive Cable</td>
<td>1 m</td>
</tr>
<tr>
<td>SDI OUT</td>
<td>Coaxial Cable</td>
<td>1 m</td>
</tr>
<tr>
<td>AUDIO INPUT 1/2 HDL</td>
<td>Shielded Cable</td>
<td>2 m</td>
</tr>
<tr>
<td>HEADPHONE</td>
<td>Exclusive Cable</td>
<td>2 m</td>
</tr>
<tr>
<td>AUX</td>
<td>Shielded Cable</td>
<td>3 m</td>
</tr>
</tbody>
</table>

The inrush current of this apparatus is 11.0 A.

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.

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.
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 into an AC outlet.

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

FOR EUROPE

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 JVC KENWOOD Corporation ist:
JVC Technical Services Europe GmbH
Konrad-Adenauer-Allee 1-11
61118 Bad Vilbel
Deutschland

Dear Customer
This apparatus is in conformance with the valid European directives and standards regarding electromagnetic compatibility and electrical safety. European representative of JVC KENWOOD Corporation is:

JVC Technical Services Europe GmbH
Konrad-Adenauer-Allee 1-11
61118 Bad Vilbel
Germany

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.

FOR EUROPE

Manufacturer
JVC KENWOOD Corporation
3-12, Moriya-cyo, Kanagawa-ku,
Yokohama-shi,
Kanagawa 221-0022, Japan

Importer (EU only)
JVC Professional Europe Ltd.
JVC House
JVC Business Park
12 Priestley Way, London NW2 7BA,
United Kingdom

Dear Customer
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Deutschland

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.
  When transporting, carry the battery in a plastic bag.
  ... 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.
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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.

GY-HM200U/GY-HM200E only.
GY-HM170U/GY-HM170E only.

Feature available on
Feature available on

K : Feature available on
O : 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.

<table>
<thead>
<tr>
<th>Accessories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Warranty Card (U model only)</td>
<td>1</td>
</tr>
<tr>
<td>INSTRUCTIONS (BASIC)</td>
<td>1</td>
</tr>
<tr>
<td>Document Disc</td>
<td>1</td>
</tr>
<tr>
<td>AC Adapter</td>
<td>1</td>
</tr>
<tr>
<td>Power Cord (U model: 1, E model: 2)</td>
<td>1</td>
</tr>
<tr>
<td>Battery</td>
<td>1</td>
</tr>
<tr>
<td>Handle Unit 200</td>
<td>1</td>
</tr>
<tr>
<td>Hood</td>
<td>1</td>
</tr>
</tbody>
</table>

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

1. Built-in Microphone
2. Handle Unit

* GY-HM170U/GY-HM170E does not come with the handle unit. For details on purchasing the handle unit, please contact the local dealers in your area.

Memo:
- The handle unit is detached from the camera recorder unit in the factory shipment.

3. [MODE] Camera/Media Mode Selection Button
4. [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.
5. [POWER/CHARGE] Power/Charging Display Lamp
7. Visibility Adjustment Lever
8. Battery
9. Viewfinder
10. Eyepiece
11. [REC/7] Record Trigger Button
12. Zoom Lever at the Grip
13. [EXPANDED FOCUS/8] Expanded Focus Assist/User 8 Button
   - You can also use it as a user button by assigning a specific feature in the menu setting to this button.
14. Tally Lamp
15. Tripod Mounting Hole
**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
6. LCD monitor
7. ▲ / ▼ Volume Buttons/[+/-] Selection Buttons
8. [SHUTTER] Shutter Speed 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**

**Rear Terminal**

**GY-HM200U/GY-HM200E**

1. [HOST] USB Host Terminal
2. [DEVICE] USB Mini Terminal
3. [HDMI] HDMI Output Terminal
4. [SDI OUT] SDI Output Terminal

**GY-HM170U/GY-HM170E**

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

**Memo:**
- This button is interlocked with the [REC/HOLD] record trigger button at the top of the handle.
### LCD Monitor

1. **LCD Monitor**
2. **[CANCEL/STOP]** Cancel Button
3. **[MENU/THUMB]** Menu/Thumbnail Button
4. **[LOLUX/3]** Low-light Shooting/User 3 Button
5. **[C.REVIEW/4]** Clip Review/User 4 Button
6. **[DISPLAY]** Display Button
7. **[STATUS]** Status Screen Display Button
8. **Monitor Speaker**
9. **SD Card Slot**
10. **Card Slot A/B Status Indicator**
11. **[SLOT SEL]** Card Slot Selection Button

### Handle Unit

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 L/M/H]** Zoom Speed Switch
8. **[REC/HOLD]** Record Trigger Button/Lock Switch

**Memo:**
- This switch is interlocked with the [REC] button on the rear terminal.
- [REC] button on the rear terminal is not locked.

### Lens Section

1. **Filter Built-In Screw**
   - Installable filter types: Φ62 mm P0.75
2. **Focus Ring**
3. **Zoom Ring**
4. **Iris Dial**
Attaching the Handle Unit

The handle unit is detached from the camera recorder unit in the factory shipment.

* GY-HM170U/GY-HM170E does not come with the handle unit.
For details on purchasing the handle unit, please contact the local dealers in your area.
To use the handle unit, attach it by following the steps below.

1 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:

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

Adjusting the Grip Belt

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

Caution:

Charging the Battery

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

* The battery is not charged when purchased.

Charging the Battery

Preparations

14 Attaching the Handle Unit
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.

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

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

<table>
<thead>
<tr>
<th>Charging time</th>
<th>Battery</th>
<th>Approximate Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSL-JVC50 (accessory) 200</td>
<td>Approx. 4 hrs</td>
<td></td>
</tr>
<tr>
<td>BN-VF823 (accessory) 170</td>
<td>Approx. 3 hrs</td>
<td></td>
</tr>
</tbody>
</table>

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

Memo:

1 Alternates between a blinks orange light (blinks once) and light off (1 second) | Less than 100 % |

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

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

Continuous operating time

<table>
<thead>
<tr>
<th>Battery</th>
<th>Approximate Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSL-JVC50 (accessory) 200</td>
<td>Approx. 4 hrs 40 mins (*1)</td>
</tr>
<tr>
<td>BN-VF823 (accessory) 170</td>
<td>Approx. 2 hrs 20 mins (*2)</td>
</tr>
</tbody>
</table>

*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 and battery charger, please contact the local dealers in your area.
Attaching/Detaching 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.

Detaching the Hood
- To detach the hood, turn the hood in the direction opposite to attaching it (counterclockwise).

Caution:
- Remove the hood when attaching a filter, teleconverter or wide converter to the front of the lens.

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.

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

<table>
<thead>
<tr>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
</tr>
<tr>
<td>Français</td>
</tr>
<tr>
<td>Español</td>
</tr>
</tbody>
</table>

For E models

<table>
<thead>
<tr>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
</tr>
<tr>
<td>Français</td>
</tr>
<tr>
<td>Deutsch</td>
</tr>
<tr>
<td>Italiano</td>
</tr>
<tr>
<td>Español</td>
</tr>
<tr>
<td>Русский</td>
</tr>
</tbody>
</table>
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

   ![Initial Setting Screen](image1)

   - For E models

   ![Initial Setting Screen](image2)

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”.

Configuring the Initial Settings
Usable Cards

Format Setting and Usable SD Card Combinations

<table>
<thead>
<tr>
<th>System</th>
<th>Format</th>
<th>Bit Rate</th>
<th>Usable SD Card</th>
</tr>
</thead>
<tbody>
<tr>
<td>4K</td>
<td>-</td>
<td>-</td>
<td>UHS-I U3 or higher</td>
</tr>
<tr>
<td>HD</td>
<td>QuickTime</td>
<td>50M (YUV422), 50M (XHQ)</td>
<td>Class 10 or higher</td>
</tr>
<tr>
<td></td>
<td>AVCHD</td>
<td>-</td>
<td>Class 4 or higher</td>
</tr>
<tr>
<td>SD</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Web</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

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 [Main Menu] ➔ [System] ➔ [Record Set] ➔ [Record Format] ➔ [Format] is set to “AVCHD”**

<table>
<thead>
<tr>
<th>System</th>
<th>4K</th>
<th>HD 1080p/1080i</th>
<th>SD 480i/576i</th>
<th>Web 480p</th>
</tr>
</thead>
<tbody>
<tr>
<td>4GB</td>
<td>3</td>
<td>9</td>
<td>12</td>
<td>47</td>
</tr>
<tr>
<td>8GB</td>
<td>6</td>
<td>18</td>
<td>25</td>
<td>95</td>
</tr>
<tr>
<td>16GB</td>
<td>12</td>
<td>36</td>
<td>50</td>
<td>190</td>
</tr>
<tr>
<td>32GB</td>
<td>25</td>
<td>72</td>
<td>100</td>
<td>380</td>
</tr>
<tr>
<td>64GB (SDXC)</td>
<td>50</td>
<td>145</td>
<td>200</td>
<td>760</td>
</tr>
<tr>
<td>128GB (SDXC)</td>
<td>100</td>
<td>290</td>
<td>400</td>
<td>1520</td>
</tr>
</tbody>
</table>

(Bit Rate: XHQ, UHQ, HQ, LP)

(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.

**SD Card Slot**

1. SD Card Cover
2. SD Card
3. SD Card Slot
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.

#### Preparations

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.

<table>
<thead>
<tr>
<th>System</th>
<th>A Format/ B Format</th>
<th>Record Folder</th>
</tr>
</thead>
<tbody>
<tr>
<td>4K/HD/SD/</td>
<td>QuickTime</td>
<td>DCIM</td>
</tr>
<tr>
<td>Web</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD/SD/</td>
<td>AVCHD</td>
<td>PRIVATE/AVCHD</td>
</tr>
<tr>
<td>Web</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 [Main Menu] ➔ [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

ABC0001

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 [Main Menu] ➔ [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

<table>
<thead>
<tr>
<th>Preparations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Supply battery or AC adapter power to the camera recorder.</td>
</tr>
<tr>
<td>2 Insert an SD card.</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>4 Adjust the angle of the LCD monitor and viewfinder.</td>
</tr>
<tr>
<td>5 Set [System], [Format], [Resolution], [Frame Rate] and [Bit Rate] in [Main Menu] ➔ [System] ➔ [Record Set] ➔ [Record Format].</td>
</tr>
</tbody>
</table>

- 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)

<table>
<thead>
<tr>
<th>Shooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

- 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 [Main Menu] ➔ [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 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 [x] terminal. When a headphone is connected to the [x] 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: 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 or [HDMI] terminal is connected, configure the settings in the [A/V Set] menu according to the monitor to be connected.

Connecting via SDI

- 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.
Loading Clips to the PC

- You can load clips to a PC by connecting the camera recorder to the PC via the USB port. Doing so enables clips stored in the SD card to be managed and edited on the PC.
- Files on the SD card can be managed/edited on the connected PC in this mode only for USB mass storage class devices that are recognized by the said PC as a peripheral drive.

Memo:
- Files cannot be written to the SD card.

1. Connect the camera recorder to the PC using a USB cable.
   A confirmation message “Change to USB Mode?” to enable the USB connection appears.

2. Select [Change] using the cross-shaped button (▲▼), and press the Set button (●).
   The camera recorder switches to USB mode.

Memo:
- If recording is in progress, the “Change to USB Mode?” message appears after recording stops.
- If playback is in progress, the camera recorder switches to USB mode after the file closes automatically, such as when playback stops.

Disconnecting
- Disable the connection on the PC, then remove the USB cable from the camera recorder.
- Doing so exits the USB mode and switches the camera recorder to Camera mode.

Memo:
- The procedure for disabling the USB connection varies according to the PC in use. For details, refer to the instruction manual of the PC.
Functions of Network Connection

- 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.

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.
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 “INSTRUCTIONS” provided in the supplied CD-ROM.
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.

<table>
<thead>
<tr>
<th>Operation Buttons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the operation buttons on the side control panel of the camera recorder or the buttons on the LCD monitor to operate the menu.</td>
</tr>
</tbody>
</table>

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] 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.

Display 1 screen

* Appears only during warnings

Display 2 screen

* Appears only during warnings

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

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.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="FTP icon" /></td>
<td>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.</td>
</tr>
<tr>
<td><img src="image" alt="Error icon" /></td>
<td>Error has occurred during FTP transfer.</td>
</tr>
</tbody>
</table>
Memo:

- This item is not displayed when [Main Menu] ➔ [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)
  - When recording is performed to only one of the slots while [Main Menu] ➔ [System] ➔ [Record Set] ➔ [Slot Mode] is set to "Dual".
  - When recording is performed to only one of the slots while [Main Menu] ➔ [System] ➔ [Record Set] ➔ [Record Format] ➔ [System] is set to "HD+Web".
- The displayed time is an estimate.

Resolution
Displays the video image resolution.

Memo:

- This item is not displayed when [Main Menu] ➔ [LCD/VF] ➔ [Display Settings] ➔ [Record Format] is set to "Off".

Frame Rate/Bit Rate
Displays the frame rate and bit rate in pairs.

Memo:

- This item is not displayed when [Main Menu] ➔ [LCD/VF] ➔ [Display Settings] ➔ [Record Format] is set to "Off".

Audio Level Meter
- Displays the audio levels of CH1 and CH2.
- The \( \text{\textregistered} \) icon appears on the screen when in Manual mode.

Image Stabilizer Mark
Displayed when the image stabilizer is ON.

\( \text{\textregistered} \) : When [Level] of [OIS] is set to "Normal".
\( \text{\textregistered} \) : When [Level] of [OIS] is set to "High".

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

FULL AUTO ON/OFF
Press and hold the [FULL AUTO] button to switch on or off.
If FULL AUTO is enabled, the \( \mathcal{A} \) icon appears.
10 AE Lock
   The AE Lock icon is displayed during AE lock.

11 White Balance Mode
   Displays the current white balance mode.
   (**K indicates color temperature)
   A<*****K> : When the white balance is set to A.
   B<*****K> : When the white balance is set to B.
   P<*****K> : When the white balance is set to PRST.
   P<*****K> : The color temperature setting with respect to the Auto WB value is appropriate when white balance is set to PRST and the WB indicator to “On”;
   <WBL> : 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 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”,  icon appears on the left side of “AE”.

16 ND Filter Position
   Displays the current ND filter position.

Memo :
   * This item is not displayed when [Main Menu] ➔ [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 value of the focal length 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.
   * If [Main Menu] ➔ [Camera Function] ➔ [AF Assist] is set to “Area”, the  icon appears on the left side of .

Memo :
   * You can specify whether to display the focus value (“Feet”/“Meter”) or turn off the display in [Main Menu] ➔ [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.
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.

Date/Time Display
Displays the current date and time.

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

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 99
Dynamic Zoom On: Z100 to 149

Memo:
- You can specify the display method (Number/Bar) and whether to turn off the display 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.

Network Connection Icon
The network connection status is displayed when [Main Menu] ➔ [System] ➔ [Network] is set to "On".
This icon is not displayed when "Off" is selected.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>Connection is not established (starting up, preparing for connection)</td>
</tr>
<tr>
<td>[ ] Yellow</td>
<td>Connection is not established (preparing for connection)</td>
</tr>
<tr>
<td>[ ] Connection is established</td>
<td></td>
</tr>
<tr>
<td>[ ] When a USB adapter different from the connection settings is detected</td>
<td></td>
</tr>
<tr>
<td>(No display)</td>
<td>When an incompatible USB adapter is detected, or when [Network] is set to &quot;Off&quot;</td>
</tr>
</tbody>
</table>

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.

Time Code [I]/User’s Bit [J] 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:

00:00:00:00

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

- Example of user’s bit display:

FF 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.
Live streaming mark
When [Main Menu] → [System] → [Network]/[Settings] → [Live Streaming Set] → [Live Streaming] is set to “On”, the distribution status is displayed.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Red" alt="Live Streaming Icon" /></td>
<td>Distribution in progress (good connection quality)</td>
</tr>
<tr>
<td><img src="Red" alt="Live Streaming Icon" /></td>
<td>Distribution in progress (poor connection quality)</td>
</tr>
<tr>
<td><img src="Yellow" alt="Live Streaming Icon" /></td>
<td>Connection pending or connection failed</td>
</tr>
</tbody>
</table>

Event/Warning Display Area
Displays error messages.

Media Status
- **STBY**: No card found in the selected slot
- **REC**: Recording standby
- **REVIEW**: Recording
- **STBY P**: Pre Rec recording standby
- **REC P**: Pre Rec recording
- **STBY C**: Clip Continuous Rec recording
  (displayed in yellow)
- **REC C**: Clip Continuous Rec recording
- **STBY I**: Interval Rec recording standby
  (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

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 [Main Menu] → [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)

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

- 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.

- Voltage/Battery Power
  - Displays the current status of the power supply in use.

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

- Resolution
  - Displays the video image resolution.

- Frame Rate/Bit Rate
  - Displays the frame rate and bit rate in pairs.

- Operation Guide
  - Displays a guide for the current operation buttons.

- Audio Level Meter
  - Displays the audio levels of CH1 and CH2.

  Memo:
  - This item is not displayed when [Main Menu] ➔ [LCD/VF] ➔ [Display Settings] ➔ [Audio Meter] is set to “Off”.

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

- 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)
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.

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].

Time Code (I)/User’s Bit (J) 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:

```
00:00:00:00
```

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

Example of user’s bit display:

```
FF 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 [Main Menu] ➔ [LCD/VF] ➔ [Display Settings].
**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] button at each status screen (other than the [Camera 1] screen) to enter the setting screen.
- Use the cross-shaped button (►) to switch screens as follows:

* These are screen examples of GY-HM200U/GY-HM200E. The contents displayed are different depending on the model and settings.
## Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Action</th>
</tr>
</thead>
</table>
| Power does not turn on.                                                | • 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.                                             | • Is the record trigger button/lock switch on the handle turned on?  
  • 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.  | • 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 (●). | • 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. | • 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 [Main Menu] ⇒ [LCD/VF] ⇒ [LCD/VF Peaking]. |
| The [CH1/CH2] recording level adjustment knob does not work. [HDL]    | • Is the [CH1/CH2 AUTO/MANUAL] switch set to “AUTO”?  
  • Is Full Auto enabled?  
  Is [AV Set] ⇒ [Audio Set] ⇒ [Audio On FULL AUTO] set to “Auto” in Full Auto mode? |
| SD card cannot be initialized (formatted).                             | • 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.            | • Is the battery too old? |
| The time code and user’s bit are not displayed.                        | • 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.                                   | • 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”. |

**Others**
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect display on the viewfinder.</td>
<td>• 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.</td>
</tr>
<tr>
<td>The actual recording time is shorter than the estimated time.</td>
<td>• The recordable time may be shorter depending on the shooting conditions or the subject.</td>
</tr>
</tbody>
</table>
| Cannot connect to wireless LAN. [002]                                   | • 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. [002] | • The network path is congested.  
Wait a while before refreshing (reloading) the web browser.                                                                                                                                            |
| The clips cannot be uploaded to the FTP server. [002]                  | • 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. [002]                                | • 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. [002]      | • 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

<table>
<thead>
<tr>
<th>Storage and Usage Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Allowable ambient temperature and humidity</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>■ Strong electromagnetic waves or magnetism</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>■ Avoid using or placing this unit in the following places.</td>
</tr>
<tr>
<td>• Places subject to extreme heat or cold</td>
</tr>
<tr>
<td>• Places with excessive dirt or dust</td>
</tr>
<tr>
<td>• Places with high humidity or moisture</td>
</tr>
<tr>
<td>• Places subject to smoke or vapor such as near a cooking stove</td>
</tr>
<tr>
<td>• Places subject to strong vibrations or unstable surfaces</td>
</tr>
<tr>
<td>• In a parked car under direct sunlight or near a heater for long hours</td>
</tr>
<tr>
<td>■ Do not place this unit at places that are subject to radiation or X-rays, or where corrosive gases occur.</td>
</tr>
<tr>
<td>■ Protect this unit from being splashed with water. (Especially when shooting in the rain)</td>
</tr>
<tr>
<td>■ 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.</td>
</tr>
<tr>
<td>■ Protect this unit against penetration of dust when using it in a place subject to sandy dust.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Do not drop or hit this unit against a hard object when transporting.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ When this unit is not in use, be sure to set the [POWER ON/OFF] switch to “OFF” in order to reduce power consumption.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Turn off the power before performing any maintenance.</td>
</tr>
<tr>
<td>■ 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rechargeable Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ 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.</td>
</tr>
<tr>
<td>■ Charge the battery first before using.</td>
</tr>
<tr>
<td>■ 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.</td>
</tr>
<tr>
<td>■ 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.</td>
</tr>
<tr>
<td>■ Store the removed battery with the battery cap attached in a dry place between 15 °C and 25 °C (59 °F and 77 °F).</td>
</tr>
<tr>
<td>■ For details, refer to the instruction manual of the battery.</td>
</tr>
</tbody>
</table>

**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.
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 turn off the [POWER ON/OFF] switch or remove the power cable during recording or playback.
- Do not turn off the [POWER ON/OFF] switch or remove the power cable during recording or playback.

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.
- 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.
- This camera recorder makes use of M+FONTS.

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.

License Notices

- MPEG LA AVC
  This product is licensed under the AVC Patent Portfolio License for the personal use of a consumer or other uses in which it does not receive remuneration to (i) encode video in compliance with the AVC standard ("AVC video") and/or (ii) decode AVC video that was encoded by a consumer engaged in a personal activity and/or was obtained from a video provider licensed to provide AVC video. No license is granted or shall be implied for any other use. Additional information may be obtained from MPEG LA, L.L.C. See http://www.mpegla.com

- MPEG LA MPEG-2 Patent
  Any use of this unit in any manner other than personal use that complies with the MPEG-2 standard for encoding video information for packaged media is expressly prohibited without a license under applicable patents in the MPEG-2 Patent Portfolio, which license is available from MPEG LA, LLC, 6312 S. Fiddlers Green circle, Suite 400E, Greenwood Village, Colorado 80111 U.S.A.

Encryption in Network Connection

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

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- Intel Core 2 Duo is a trademark or registered trademark of Intel Corporation or its subsidiaries in the United States and other countries.
- The company name of Fontworks, Fontworks, and the name of the fonts are registered trademarks of Fontworks Inc.
- Zixi and the Zixi logo are trademarks of Zixi LCC.
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### Specifications

#### General

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power DC 12 V</td>
<td></td>
</tr>
<tr>
<td>Power consumption K</td>
<td>Approx. 7.9 W (*1)</td>
</tr>
<tr>
<td></td>
<td>Approx. 7.3 W (*2)</td>
</tr>
<tr>
<td></td>
<td>Approx. 7.6 W (*1)</td>
</tr>
<tr>
<td></td>
<td>Approx. 6.7 W (*2)</td>
</tr>
<tr>
<td>Mass K</td>
<td>Approx. 1.6 kg (with battery)</td>
</tr>
<tr>
<td></td>
<td>Approx. 1.2 kg (with battery)</td>
</tr>
<tr>
<td>Allowable operating temperature</td>
<td>0 °C to 40 °C (32 °F to 104 °F)</td>
</tr>
<tr>
<td>Allowable operating humidity</td>
<td>30 %RH to 80 %RH</td>
</tr>
<tr>
<td>Allowable storage temperature</td>
<td>-20 °C to 50 °C (-4 °F to 122 °F)</td>
</tr>
<tr>
<td>Dimensions (W × H × D)</td>
<td>149 mm × 191 mm × 307 mm (including handle unit)</td>
</tr>
<tr>
<td></td>
<td>149 mm × 112 mm × 307 mm</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[SDI OUT] terminal</td>
<td>(480i or 576i: Downconverted 720p/1080i/1080p: embedded audio), BNC (unbalanced)</td>
</tr>
<tr>
<td>3G-SDI</td>
<td>Compliant with SMPTE ST424</td>
</tr>
<tr>
<td>HD-SDI</td>
<td>Compliant with SMPTE ST292</td>
</tr>
<tr>
<td>SD-SDI</td>
<td>Compliant with SMPTE ST259</td>
</tr>
<tr>
<td>[INPUT1/INPUT2] terminal</td>
<td>HDL</td>
</tr>
<tr>
<td>[LINE]</td>
<td>+4 dBu, 10 kΩ, XLR (balanced)</td>
</tr>
<tr>
<td>[MIC]</td>
<td>-50 dBu, 4 kΩ, XLR (balanced), +48 V output (phantom power supply)</td>
</tr>
<tr>
<td>[AUX] terminal</td>
<td>Ø3.5 mm stereo mini jack</td>
</tr>
<tr>
<td></td>
<td>-22 dBu 10 kΩ</td>
</tr>
<tr>
<td>[AV] terminal</td>
<td>Ø3.5 mm 4-pin mini jack</td>
</tr>
<tr>
<td>Video signal</td>
<td>1.0 V (p-p)</td>
</tr>
<tr>
<td>Audio signal</td>
<td>-8 dBu (during reference level input), 1 kΩ (unbalanced)</td>
</tr>
</tbody>
</table>

#### Lens Section

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens</td>
<td>F1.2, 12x, f= 4.67 mm to 56.04 mm</td>
</tr>
<tr>
<td></td>
<td>(35 mm equivalent: 29.6 mm to 355 mm)</td>
</tr>
<tr>
<td>Filter diameter</td>
<td>Ø62 mm</td>
</tr>
</tbody>
</table>

#### Camera Section

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image pickup device</td>
<td>1/2.5-inch Progressive CMOS</td>
</tr>
<tr>
<td>Sync system</td>
<td>Internal sync (built-in SSG)</td>
</tr>
<tr>
<td>Optical filter</td>
<td>OFF, 1/4, 1/16</td>
</tr>
<tr>
<td>Gain</td>
<td>0dB, 3dB, 6dB, 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, Lolux (30dB, 36dB), AGC</td>
</tr>
<tr>
<td>Electronic shutter</td>
<td>1/6 to 1/10000, EEI</td>
</tr>
<tr>
<td>LCD monitor</td>
<td>3.5-inch LCD, 16:9 920K pixels</td>
</tr>
<tr>
<td>Viewfinder</td>
<td>0.24-inch LCOS, 16:9 1.56M pixels (960 x 540 x 3)</td>
</tr>
</tbody>
</table>

#### Storage Section

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported media</td>
<td>SDHC/SDXC</td>
</tr>
<tr>
<td>Slots</td>
<td>x 2</td>
</tr>
</tbody>
</table>
## Video/Audio

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recording time</strong></td>
<td>Approx. 25 minutes (8 GB SD card, 35 Mbps, VBR mode)</td>
</tr>
<tr>
<td>4K mode</td>
<td></td>
</tr>
<tr>
<td>Recording file format</td>
<td>QuickTime File Format</td>
</tr>
<tr>
<td>Video</td>
<td>MPEG-4 AVC/H.264 150 Mbps (Max) 3840x2160/30p, 25p, 24p</td>
</tr>
<tr>
<td>Audio</td>
<td>LPCM 2ch, 48 kHz/16 Bit</td>
</tr>
<tr>
<td>HD mode (QuickTime)</td>
<td></td>
</tr>
<tr>
<td>Recording file format</td>
<td>QuickTime File Format</td>
</tr>
<tr>
<td>Video</td>
<td>YUV422 mode, XHQ mode MPEG-4 AVC/H.264 50 Mbps (Max) 1920x1080/59.94p, 29.97p, 23.98p, 50p, 50i, 25p</td>
</tr>
<tr>
<td>UHQ Mode</td>
<td>MPEG-4 AVC/H.264 35 Mbps (Max) 1920x1080/59.94i, 30p, 23.98p, 50i, 25p, 1280x720/60p, 50p</td>
</tr>
<tr>
<td>Audio</td>
<td>LPCM 2ch, 48 kHz/16 Bit</td>
</tr>
<tr>
<td>HD mode (AVCHD)</td>
<td></td>
</tr>
<tr>
<td>Recording file format</td>
<td>AVCHD File Format</td>
</tr>
<tr>
<td>Video</td>
<td>HQ mode MPEG-4 AVC/H.264 28 Mbps (Max) 1920x1080/60p, 50p, 50i, 960x540/29.97p, 23.98p, 50p, 50i</td>
</tr>
<tr>
<td>SP mode</td>
<td>MPEG-4 AVC/H.264 17 Mbps 1920x1080/59.94i, 50i</td>
</tr>
<tr>
<td>Audio</td>
<td>Dolby Digital 2ch, 48 kHz/16 Bit, 256 kbps</td>
</tr>
<tr>
<td>SD mode (QuickTime)</td>
<td></td>
</tr>
<tr>
<td>Recording file format</td>
<td>QuickTime File Format</td>
</tr>
<tr>
<td>Video</td>
<td>MPEG-4 AVC/H.264, 8 Mbps 720x480/59.94i (U model only), 720x576/50i (E model only)</td>
</tr>
<tr>
<td>Audio</td>
<td>LPCM 2ch, 48 kHz/16 Bit</td>
</tr>
<tr>
<td>SD mode (AVCHD)</td>
<td></td>
</tr>
<tr>
<td>Recording file format</td>
<td>AVCHD File Format</td>
</tr>
<tr>
<td>Video</td>
<td>MPEG-4 AVC/H.264, 8 Mbps 720x480/59.94i (U model only), 720x576/50i (E model only)</td>
</tr>
<tr>
<td>Audio</td>
<td>Dolby Digital 2ch, 48 kHz/16 Bit, 256 kbps</td>
</tr>
</tbody>
</table>

### Item (QuickTime)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recording file format</strong></td>
<td>QuickTime File Format</td>
</tr>
<tr>
<td>Video</td>
<td>Mode other than HQ, LP MPEG-4 AVC/H.264, 8 Mbps 720x480/59.94i, 720x576/50i</td>
</tr>
<tr>
<td>Audio</td>
<td>LPCM 2ch, 48 kHz/16 Bit</td>
</tr>
<tr>
<td>HD mode (AVCHD)</td>
<td></td>
</tr>
<tr>
<td>Video</td>
<td>Mode other than HQ, LP MPEG-4 AVC/H.264, 9 Mbps 1440x1080/59.94i, 50i</td>
</tr>
<tr>
<td>Audio</td>
<td>μ-law 2ch 16 kHz</td>
</tr>
</tbody>
</table>

### Item (AVCHD)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recording file format</strong></td>
<td>AVCHD File Format</td>
</tr>
<tr>
<td>Video</td>
<td>Mode other than LP, EP MPEG-4 AVC/H.264, 8 Mbps 720x480/59.94i, 720x576/50i</td>
</tr>
<tr>
<td>Audio</td>
<td>Dolby Digital 2ch, 48 kHz/16 Bit, 256 kbps</td>
</tr>
</tbody>
</table>

### Streaming Mode

- 1920x1080 (60i/50i) Audio AAC 128 k 12/8/5/3 Mbps
- 1280x720 (30p/25p) Audio AAC 128 k 8/5/3/1.5 Mbps
- 720x480 (60i) 720x576 (50i) Audio AAC 128 k 8/5/3/1.5/0.8/0.3/0.2 Mbps
- 480x270 (30p/25p) Audio AAC 32 k 0.2 Mbps

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