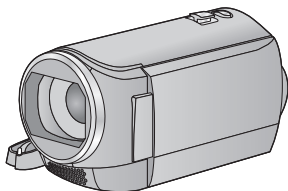


Basic Operating Instructions High Definition Video Camera

Model No. **HC-V160**



Please read these instructions carefully before using this product, and save this manual for future use.

More detailed operating instructions are available in “Operating Instructions (PDF format)”. To read it, download it from the website.

<https://www.pavc.panasonic.co.jp/hdw/oi/V160/>

- Click the desired language.

AVCHD™

HDMI



DOLBY
DIGITAL

Model number suffix “EB” denotes UK model.

Web Site: <http://www.panasonic.com>

Information for Your Safety

Dear Customer,

We would like to take this opportunity to thank you for purchasing this Panasonic High Definition Video Camera. Please read these Operating Instructions carefully and keep them handy for future reference. Please note that the actual controls and components, menu items, etc. of your High Definition Video Camera may look somewhat different from those shown in the illustrations in these Operating Instructions.

WARNING:

To reduce the risk of fire, electric shock or product damage,

- Do not expose this unit to rain, moisture, dripping or splashing.
- Do not place objects filled with liquids, such as vases, on this unit.
- Use only the recommended accessories.
- Do not remove covers.
- Do not repair this unit by yourself. Refer servicing to qualified service personnel.

CAUTION!

To reduce the risk of fire, electric shock or product damage,

- Do not install or place this unit in a bookcase, built-in cabinet or in another confined space. Ensure this unit is well ventilated.
- Do not obstruct this unit's ventilation openings with newspapers, tablecloths, curtains, and similar items.
- Do not place sources of naked flames, such as lighted candles, on this unit.

The mains plug is the disconnecting device. Install this unit so that the mains plug can be unplugged from the socket outlet immediately.

This unit is intended for use in moderate climates.

■ Concerning the battery

Warning

Risk of fire, explosion and burns. Do not disassemble, heat above 60 °C or incinerate.

CAUTION

- Danger of explosion if battery is incorrectly replaced. Replace only with the type recommended by the manufacturer.
- When disposing of the batteries, please contact your local authorities or dealer and ask for the correct method of disposal.

■ EMC Electric and magnetic compatibility

This symbol (CE) is located on the rating plate.

■ Product identification marking

Product	Location
High Definition Video Camera	Battery holder
AC adaptor	Bottom

■ Disposal of Old Equipment and Batteries

Only for European Union and countries with recycling systems



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries must not be mixed with general household waste. For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points in accordance with your national legislation.

By disposing of them correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment.

For more information about collection and recycling, please contact your local municipality.

Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.



Note for the battery symbol (bottom symbol):

This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.

■ Cautions for use

The unit and the SD card become warm during use. This is not a malfunction.

Keep this unit as far away as possible from electromagnetic equipment (such as microwave ovens, TVs, video games etc.).

- If you use this unit on top of or near a TV, the pictures and/or sound on this unit may be disrupted by electromagnetic wave radiation.
- Do not use this unit near cell phones because doing so may result in noise adversely affecting the pictures and/or sound.
- Recorded data may be damaged, or pictures may be distorted, by strong magnetic fields created by speakers or large motors.
- Electromagnetic wave radiation generated by microprocessors may adversely affect this unit, disturbing the pictures and/or sound.
- If this unit is adversely affected by electromagnetic equipment and stops functioning properly, turn this unit off and remove the battery or disconnect AC adaptor. Then reinsert the battery or reconnect AC adaptor and turn this unit on.

Do not use this unit near radio transmitters or high-voltage lines.

- If you record near radio transmitters or high-voltage lines, the recorded pictures and/or sound may be adversely affected.

About connecting to a TV

- Do not use any other AV cables except the supplied one.
- Always use a genuine Panasonic HDMI mini cable (RP-CDHM15, RP-CDHM30: optional).

About connecting to a PC

- Do not use any other USB cables except the supplied one.

Make sure to use the supplied cords and cables. If you use optional accessories, use the cords and the cables supplied with them.

Do not extend the cords and the cables.

Do not spray insecticides or volatile chemicals onto the unit.

- If the unit is sprayed with such chemicals, its body may be marred and the surface finish may peel off.
- Do not leave rubber or plastic products in contact with the unit for a long time.

Cleaning

- Before cleaning, detach the battery or pull the AC adaptor from the AC outlet, and then wipe the unit with a soft, dry cloth.
- If the unit is very dirty, dip a cloth in water and squeeze firmly, and then wipe the unit with the damp cloth. Next, dry the unit with a dry cloth.
- Use of benzine, paint thinner, alcohol, or dishwashing liquid may alter the camera body or peel the surface finish. Do not use these solvents.
- When using a chemical dust cloth, follow the instructions that came with the cloth.

When you are not going to use the unit for an extended time

- When storing the unit in a cupboard or cabinet, it is recommended that you place a desiccant (silica gel) in with it.

Be sure to detach the battery after use.

- If the battery is left attached, a minute amount of current continues to flow even if the unit is off. Keeping the unit in this state may result in over discharge of the battery. This may result in you not being able to use the battery even after it is charged.
- The battery should be stored in a cool place free from humidity, with as constant temperature as possible. (Recommended temperature: 15 °C to 25 °C, Recommended humidity: 40%RH to 60%RH)
- To store the battery for a long period of time, we recommend that you charge it once every year and store it again after you have completely used up the charged capacity.

If the operating time is very short even after the battery has been recharged, the battery has worn out. Please purchase a new battery.

About the SD card

- When the card access lamp is lit, do not:
 - Remove the SD card
 - Turn the unit off
 - Insert and remove the USB cable
 - Expose the unit to vibrations or shock

■ About the recording format for recording motion pictures

You can select from AVCHD, iFrame or MP4 recording formats to record motion pictures using this unit.

AVCHD:

It is suitable for viewing on a high-definition TV or for saving to disc.

iFrame:

This is a recording format suitable for playing back or editing on Mac (iMovie etc.).

- It is not compatible with motion pictures recorded in AVCHD format.

MP4:

This is a recording format suitable for playing back or editing on a PC.

- It is not compatible with motion pictures recorded in AVCHD format.

■ Indemnity about recorded content

Panasonic does not accept any responsibility for damages directly or indirectly due to any type of problems that result in loss of recording or edited content, and does not guarantee any content if recording or editing does not work properly. Likewise, the above also applies in a case where any type of repair is made to the unit.

■ About Condensation (When the lens or the LCD monitor is fogged up)

Condensation occurs when there is a change in temperature or humidity, such as when the unit is taken from outside or a cold room to a warm room. Please be careful, as it may cause the lens or LCD monitor to become soiled, moldy, or damaged.

When taking the unit to a place which has a different temperature, if the unit is accustomed to the room temperature of the destination for about one hour, condensation can be prevented. (When the difference in temperature is severe, place the unit in a plastic bag or the like, remove air from the bag, and seal the bag.) When condensation has occurred, remove the battery and/or the AC adapter and leave the unit like that for about one hour. When the unit becomes accustomed to the surrounding temperature, foggyiness will disappear naturally.

■ Cards that you can use with this unit

SD Memory Card, SDHC Memory Card and SDXC Memory Card

- 4 GB or more Memory Cards that do not have the SDHC logo or 48 GB or more Memory Cards that do not have the SDXC logo are not based on SD Memory Card Specifications.
- Refer to page 13 for more details on SD cards.

■ For the purposes of these operating instructions

- SD Memory Card, SDHC Memory Card and SDXC Memory Card are referred to as the "SD card".
- Functions that can be used for motion picture recording/motion picture playback are indicated by **VIDEO** in these operating instructions.
- Functions that can be used for still picture recording/still picture playback are indicated by **PHOTO** in these operating instructions.
- Scene(s) recorded in 1080/50i: "AVCHD scene(s)"
- Pages for reference are indicated by an arrow, for example: → 00

■ Installing HD Writer LE 3.0

Check the website below to download/install the software.

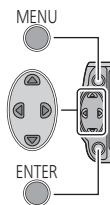
- The software is available for download until the end of March 2018.

http://panasonic.jp/support/global/cs/soft/download/f_le30.html

■ Downloading the Operating Instructions (PDF format)

You can check the URL of the website where you can download the Operating Instructions (PDF format) in [ONLINE MANUAL] in the Setup menu.

- 1 Press the **MENU** button.
- 2 Select **[SETUP]** using **▲/▼/◀/▶** and press the **ENTER** button.
- 3 Select **[ONLINE MANUAL]** using **▲/▼** and press the **ENTER** button.
- 4 Select the access method you want to check.



[URL display]:

Displays the URL of the website on the LCD monitor of this unit.

[USB connect]:

Displays the website on a PC connected to this unit with the USB cable. Click [OIBOOK], which will be displayed on the PC.

- You will need Adobe Reader to browse or print the Operating Instructions (PDF format). You can download and install a version of Adobe Reader that you can use with your OS from the following website. (As of October 2014)

<http://www.adobe.com/products/acrobat/readstep2.html>

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For United Kingdom and Ireland customers

■ Sales and Support Information

Customer Communications Centre

- For customers within the UK: 0844 844 3899
- For customers within Ireland: 01 289 8333
- Monday–Friday 9:00 am – 5:00 pm
(Excluding public holidays).
- For further support on your product,
please visit our website:
www.panasonic.co.uk

Direct Sales at Panasonic UK

- Order accessory and consumable items
for your product with ease and confidence
by phoning our Customer
Communications Centre Monday–Friday
9:00 am – 5:00 pm (Excluding public
holidays).
- Or go on line through our Internet
Accessory ordering application at
www.pas-europe.com.
- Most major credit and debit cards
accepted.
- All enquiries transactions and distribution
facilities are provided directly by
Panasonic UK.
- It couldn't be simpler!
- Also available through our Internet is
direct shopping for a wide range of
finished products. Take a browse on our
website for further details.

Accessories

Check the accessories before using this unit.

Keep the accessories out of reach of children to prevent swallowing.

Product numbers correct as of October 2014. These may be subject to change.

Battery pack

VW-VBY100

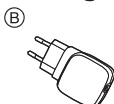
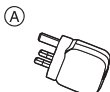


AC adaptor

VSK0784

(EB) ^(A)

(EP) ^(B)



AV cable

K2KYYYY00223



USB cable

K2KYYYY00225



Optional accessories

Some optional accessories may not be available in some countries.

(EB)
Battery charger (VW-BC10EB)
(EP)
Battery charger (VW-BC10E)
Battery pack (lithium/VW-VBY100)
Battery pack (lithium/VW-VBT190)
Battery pack (lithium/VW-VBT380)
HDMI mini cable (RP-CDHM15, RP-CDHM30)
Shoe adaptor (VW-SK12E)
(EB)
Accessory kit (VW-ACT190EB)
(EP)
Accessory kit (VW-ACT190E)
LED Video Light (VW-LED1E)*
Suction Cup Mount (VW-SCA100)
Video Camera Mount (For Handlebar) (RP-CMC10E)

* To use the LED Video Light/VW-LED1E, the Shoe adaptor/VW-SK12E is required.

Power supply

■ About batteries that you can use with this unit

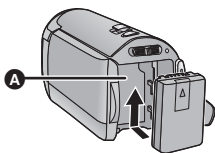
The battery that can be used with this unit is VW-VBY100/VW-VBT190/VW-VBT380.

It has been found that counterfeit battery packs which look very similar to the genuine product are made available to purchase in some markets. Some of these battery packs are not adequately protected with internal protection to meet the requirements of appropriate safety standards. There is a possibility that these battery packs may lead to fire or explosion. Please be advised that we are not liable for any accident or failure occurring as a result of use of a counterfeit battery pack. To ensure that safe products are used we would recommend that a genuine Panasonic battery pack is used.

Inserting/removing the battery

- Press the power button to turn off the unit. (→ 14)

Install the battery by inserting it in the direction shown in the figure.



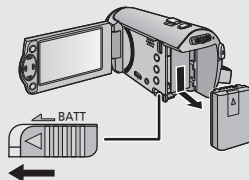
A Battery holder

Insert the battery until it clicks and locks.

Removing the battery

Be sure to hold down the power button until the status indicator goes off. Then remove the battery while supporting the unit to prevent it from dropping.

Move the battery release lever in the direction indicated by the arrow and remove the battery when unlocked.



Charging the battery

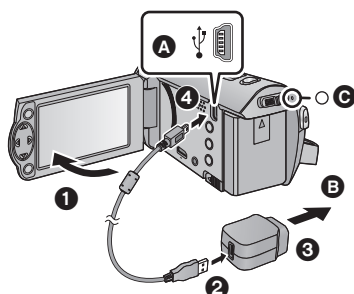
When this unit is purchased, the battery is not charged. Charge the battery fully before using this unit for the first time.

■ Charging with an AC adaptor.

The unit is in the standby condition when the AC adaptor is connected. The primary circuit is always "live" as long as the AC adaptor is connected to an electrical outlet.

Important:

- The AC adaptor and USB cable are for use with this unit only. Do not use them with other equipment. Similarly, do not use AC adaptors and USB cables from other equipment with this unit.
- The battery will not be charged if the unit is turned on. Press the power button to turn off the unit. (→ 14)
- It is recommended to charge the battery in a temperature between 10 °C and 30 °C. (The battery temperature should also be the same.)



A USB terminal

B To the AC outlet

- Insert the plugs as far as they will go.

- 1** Open the LCD monitor.
- 2** Connect the USB cable to the AC adaptor.
 - Check that the plug portion of the AC adaptor is not loose or misaligned.
- 3** Plug the AC adaptor into the AC outlet.
- 4** Connect the USB cable to the unit.

- The status indicator **C** will flash red with approx. 2 seconds period (off for approx. 1 second, on for approx. 1 second), indicating that charging has begun. It will turn off when the charging is completed.

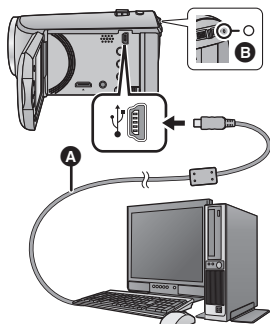
■ Connecting to the AC outlet

If you turn on the unit while connecting with the AC adaptor, you can use the unit with power supplied from the outlet.

When recording for a long time, keep the AC adaptor connected and use it together with the battery. This allows you to continue the recording even if a power failure occurs or the AC adaptor is unplugged from the AC outlet by accident.

■ Connecting to a PC and charging.

Charge the unit if you do not have the AC adaptor handy.



A USB cable (supplied)

- Insert the plugs as far as they will go.
- Press the power button and turn the unit off.
(→ 14)

1 Turn the power of the PC on.

2 Connect the USB cable.

- The status indicator **B** will flash red with approx. 2 seconds period (off for approx. 1 second, on for approx. 1 second), indicating that charging has begun. It will turn off when the charging is completed.
- Do not use any other USB cables except the supplied one. (Operation is not guaranteed with any other USB cables.)
- Always connect directly to a PC.
- You cannot charge when the status indicator flashes rapidly, or when it does not light at all. Charge using the AC adaptor. (→ 10)
- It will take 2 or 3 times longer to charge compared to when using the AC adaptor.

-
- Do not use any other AC adaptors except the supplied one.
 - We recommend using Panasonic batteries (→ 9).
 - If you use other batteries, we cannot guarantee the quality of this product.
 - Do not heat or expose to flame.
 - Do not leave the battery(ies) in a car exposed to direct sunlight for a long period of time with doors and windows closed.
 - If you do not intend to use the unit for an extended period, disconnect the USB cable from the unit for safety.
 - Charging may not be possible depending on the operating environment of the PC being used (such as custom-made PC).
 - Charging will stop when turning the power of the PC off or forcing it into sleep mode. Charging will start again when turning the power of the PC on again, or waking from sleep mode.
 - The unit will be charged if it is connected to a Panasonic Blu-ray disc recorder or DVD recorder with a USB cable, even if the unit is turned off.

Charging and recording time

■ Charging/Recording time

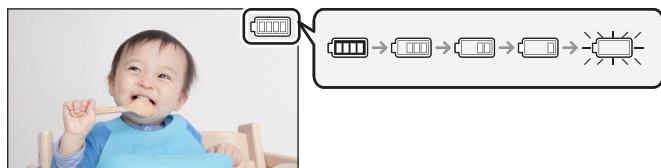
- Temperature: 25 °C/humidity: 60%RH
- Time in the parenthesis is charging time when this unit is connected to a PC, Panasonic Blu-ray disc recorder, or DVD recorder.







Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording format	Recording mode	Maximum continuously recordable time	Actual recordable time
Supplied battery/VW- VBY100 (optional) [3.6 V/970 mAh]	2 h 20 min (3 h 10 min)	AVCHD	[HA], [HG], [HE]	1 h 15 min	40 min
		iFrame	-	1 h 25 min	50 min
		MP4	-	1 h 30 min	

- These times are approximations.
- **The indicated charging time is for when the battery has been discharged completely. Charging time and recordable time vary depending on the usage conditions such as high/low temperature.**
- The actual recordable time refers to the recordable time when repeatedly starting/stopping recording, turning the unit on/off, moving the zoom lever etc.

■ Battery capacity indication

The battery capacity indication is displayed on the LCD monitor.



- The display changes as the battery capacity reduces.  →  →  →  → 
If the battery discharges, then  will flash red. Recharge the battery or replace it with a fully charged battery.

Recording to a card

The unit can record still pictures or motion pictures to an SD card. To record to an SD card, read the following.

Cards that you can use with this unit

Use SD cards conforming to Class 4 or higher of the SD Speed Class Rating for motion picture recording.

Please confirm the latest information about SD Memory Cards/SDHC Memory Cards/SDXC Memory Cards that can be used for motion picture recording on the following website.

http://panasonic.jp/support/global/cs/e_cam

(This website is in English only.)

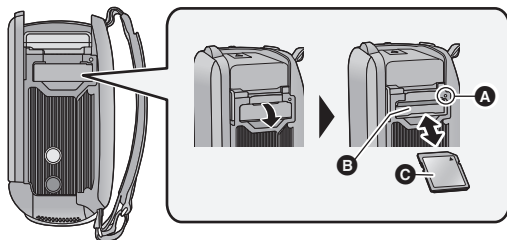
- Keep the Memory Card out of reach of children to prevent swallowing.

Inserting/removing an SD card

When using an SD card not from Panasonic, or one previously used on other equipment, for the first time on this unit, format the SD card. (→ 20) When the SD card is formatted, all of the recorded data is deleted. Once the data is deleted, it cannot be restored.

Caution:

Check that the access lamp has gone off.



Access lamp [ACCESS] A

- When this unit is accessing the SD card, the access lamp lights up.

1 Open the SD card cover and insert (remove) the SD card into (from) the card slot B.

- Face the label side C in the direction shown in the illustration and press it straight in as far as it will go.
- Press the centre of the SD card and then pull it straight out.

2 Securely close the SD card cover.

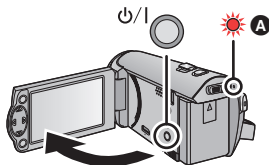
- Securely close it until it clicks.

Turning the unit on/off

You can turn the unit on and off using the power button or by opening and closing the LCD monitor.

Turning the unit on and off with the power button

Open the LCD monitor and press the power button to turn on the unit.



To turn off the unit

Hold down the power button until the status indicator goes off.

A The status indicator lights on.

The unit is turned on when the LCD monitor is opened, and unit is turned off when it is closed.

Setting date and time

The clock is not set at the time of purchase. Make sure to set the clock.

- When you turn on this unit, the message “Set home region and date/time.” may be displayed. Select [YES], and follow the steps below to make these settings:
 - Step 2 of “Setting your home region for the first time”
 - Steps 2–3 of “Setting date and time”

◇ Change the mode to .

1 Select the menu. (→ 20)

: [SETUP] → [CLOCK SET]

2 Select the date or time using ◀/▶ and set the desired value using ▲/▼.

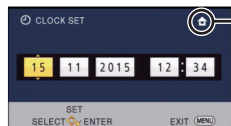
A Displaying the World time setting:

[HOME]/ [DESTINATION]

- The year can be set between 2000 and 2039.

3 Press the ENTER button.

- Press the MENU button to complete the setting.



Setting your home region for the first time

You can set your home region in [SET WORLD TIME].

1 Select the menu. (→ 20)

MENU : [SETUP] → [SET WORLD TIME]

- A message will be displayed. Press the ENTER button.

2 Select your home region using ◀▶ and press the ENTER button.

- When the clock is not set, the current time is displayed as "--:--".



ENTER

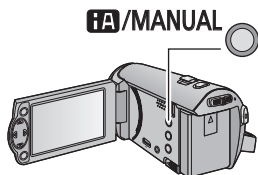


- A** The current time
- B** The time difference from GMT (Greenwich Mean Time)

-
- For information on how to change your home region or set the region of your travel destination, refer to the Operating Instructions (PDF format).

Intelligent Auto Mode

The modes (appropriate for the condition) are set just by pointing the unit to what you want to record.




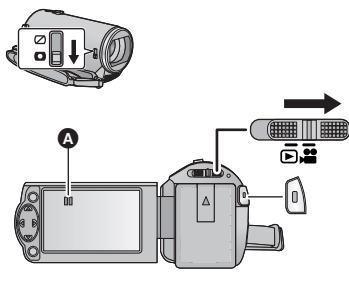
Intelligent auto/Manual button



Press this button to switch Intelligent Auto Mode/Manual Mode.

Recording motion pictures

- Open the lens cover before turning on the unit.

- 1 Change the mode to  and open the LCD monitor.
- 2 Press the recording start/stop button to start recording.



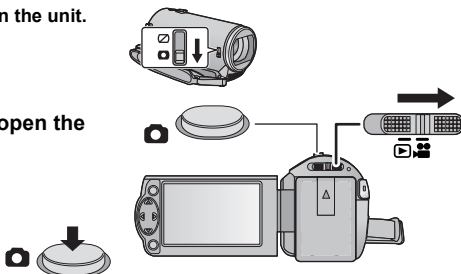
- A** When you begin recording,  changes to .


- 3 Press the recording start/stop button again to pause recording.

Recording still pictures


- Open the lens cover before turning on the unit.

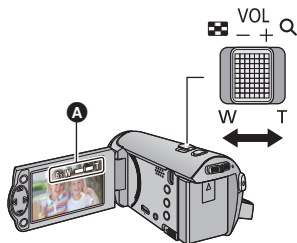
- 1 Change the mode to  and open the LCD monitor.
- 2 Press the  button.



- The still picture operating display () will turn red while recording still pictures.

Using the Zoom

- ◇ Change the mode to  .



Zoom lever

T side:

Close-up recording (zoom in)

W side:

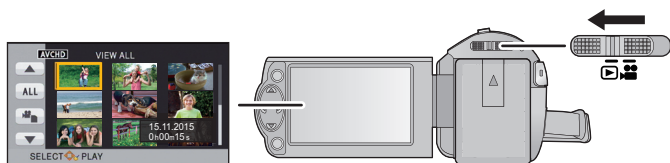
Wide-angle recording (zoom out)

- The zoom speed varies depending on the range over which the zoom lever is moved.

A Zoom bar

Zoom bar is displayed during the zoom operation.

Motion picture/Still picture playback



1 Change the mode to .

2 Select the play mode select icon **A** using $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ and press the ENTER button.

- This can also be set from the menu.
[VIDEO SETUP] or [PHOTO SETUP] → [MEDIA, VIDEO/PICTURE]



ENTER

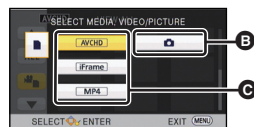


3 Select still picture **B** or motion picture **C** to playback using $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ and press the ENTER button.

- If you press the MENU button, or select motion picture/still picture and press the ENTER button, the setting is complete.
- When a motion picture item is selected, an icon will appear on the thumbnail display. (**AVCHD**, **Frame**, **MP4**)



ENTER

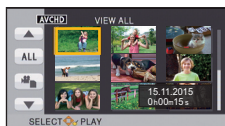


4 Select the scene or the still picture to be played back using $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$, then press the ENTER button.

- When you select $\blacktriangle/\blacktriangledown$ and press the ENTER button, the next (previous) page is displayed.



ENTER



5 Select the operation icon using $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$.

D Operation icon


- Press the ENTER button to display/not display the operation icon.
- Press \blacktriangle to start/pause playback of motion pictures.

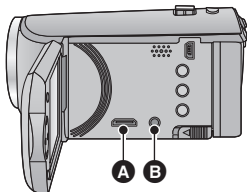


D

Watching Video/Pictures on your TV

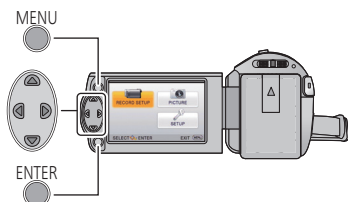
Connect this unit to a TV using an HDMI mini cable (optional) or an AV cable (supplied).

Change the mode to  to play back.



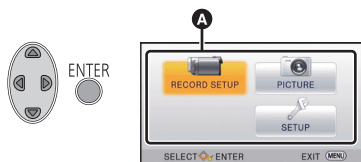
- A** HDMI mini connector [HDMI]
- B** AV connector [A/V]

Using the menu screen

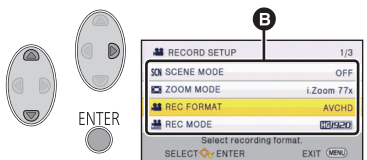


1 Press the **MENU** button.

2 Press **▲/▼/◀/▶** to select the top menu **A**, then press the **ENTER** button.



3 Select the submenu **B** using **▲/▼** and press **▶** or press the **ENTER** button.



4 Select the desired item using **▲/▼/◀/▶**, and press the **ENTER** button to set.



To get back to the previous screen

Press **◀** of the cursor button.

To exit the menu screen

Press the **MENU** button.

About the information display

Descriptions of the selected submenus and items displayed in Steps 3 and 4 are displayed.

About the operation icons



Select and press the **ENTER** button to switch page.



Select and press the **ENTER** button to return to previous screen.



Language selection

You can select the language on the screen display and the menu screen.

MENU : **[SETUP] → [LANGUAGE] →**
desired language

Formatting


Please be aware that if a medium is formatted, then all the data recorded on the medium will erase and cannot be restored. Back up important data on a PC, disc, etc.

MENU : **[SETUP] → [FORMAT MEDIA]**

- Do not format an SD card using any other equipment such as a PC. The card may not be used on this unit.

Troubleshooting

■ It is not a malfunction in the following cases

A clicking sound is heard when the unit is shaken.	<ul style="list-style-type: none"> This is the sound of the lens moving and is not a defect. This sound will no longer be heard when the unit is turned on and change the mode to .
Object seems to be warped.	<ul style="list-style-type: none"> Object seems to be warped slightly when the object moves across the image very fast, but this is because the unit is using MOS for the image sensor. This is not a malfunction.
The lens or LCD monitor fog up.	<ul style="list-style-type: none"> This is due to condensation. It is not a malfunction. Please refer to page 5.



Power

Problem	Check points
This unit cannot be turned on. This unit does not stay on long enough. Battery runs down quickly.	<ul style="list-style-type: none"> Charge the battery again to ensure it is sufficiently charged. (→ 10) In cold places, the battery using time becomes shorter. The battery has a limited life. If the operating time is still too short even after the battery is fully charged, the battery has worn out and needs to be replaced.
This unit cannot be operated though it is turned on. This unit does not operate normally.	<ul style="list-style-type: none"> Remove the battery or AC adaptor, wait about 1 minute and then reconnect the battery or AC adaptor. Then about 1 minute later, turn on the unit again. (Conducting the above operation while the media is being accessed may damage the data on the media.) If normal operation is still not restored, detach the power connected, and consult the dealer who you purchased this unit from.
"ERROR OCCURRED. PLEASE TURN UNIT OFF, THEN TURN ON AGAIN." is displayed.	<ul style="list-style-type: none"> The unit has automatically detected an error. Restart the unit by turning the unit off and on. The unit will be turned off in about 1 minute if the unit is not turned off and on. Repair is needed if it is repeatedly displayed even if it is restarted. Detach the power connected, and consult the dealer who you purchased this unit from. Do not attempt to repair the unit by yourself.

Recording

Problem	Check points
<p>Colour or brightness of the image changes, or you may see horizontal bars in the image.</p> <p>The LCD monitor flickers indoors.</p>	<ul style="list-style-type: none"> • Colour or brightness of the image may change, or you may see horizontal bars in the image when the object is recorded under fluorescent light, mercury light or sodium light, etc., but this is not a malfunction. • Record in Intelligent Auto Mode or set the shutter speed to 1/100 in areas where the power supply frequency is 50 Hz, or 1/125 in areas of 60 Hz.

Playback

Problem	Check points
<p>Scenes/still pictures cannot be played back.</p>	<ul style="list-style-type: none"> • Any scenes/still pictures where the thumbnails are displayed as  cannot be played back. • Motion pictures recorded with other devices may not be possible to play back on this unit. ( is displayed.)

Please refer to “Operating Instructions (PDF format)” for details.

Specifications

High Definition Video Camera

Information for your safety

Power source:	DC 5.0 V (When using AC adaptor) DC 3.6 V (When using battery)	
Power consumption:	Recording; 3.5 W	Charging; 5.3 W

Motion picture recording format:

[AVCHD]; AVCHD format version 2.0 compliant
[iFrame], [MP4]; MPEG-4 AVC file format
compliant (.MP4)

Motion picture compression:

MPEG-4 AVC/H.264

Audio compression:

[AVCHD]; Dolby® Digital/2 ch
[iFrame], [MP4]; AAC/2 ch

Recording mode and transfer rate:

[HA]; Average 17 Mbps (VBR)
[HG]; Average 13 Mbps (VBR)
[HE]; Average 5 Mbps (VBR)
[iFrame]; Maximum 28 Mbps (VBR)
[MP4]; Average 1.5 Mbps (VBR)
Refer to the operating instructions (PDF
format) for the picture size and recordable time
of a motion picture.

Still picture recording format:

JPEG (Design rule for Camera File system,
based on Exif 2.2 standard)
Refer to the operating instructions (PDF
format) for the number of recordable pictures.

Recording media:

SD Memory Card
SDHC Memory Card
SDXC Memory Card
Refer to page 13 for details on SD cards usable
in this unit.

Image sensor:

1/5.8 type (1/5.8") 1MOS image sensor
Total; 2510 K
Effective pixels;
Motion picture/Still picture; 2200 K (16:9)

Lens:

Auto Iris, 38× Optical Zoom, F1.8 to F4.2
Focal length;
2.35 mm to 89.3 mm
Macro (Full range AF)
35 mm equivalent;
Motion picture/Still picture; 32.3 mm to
1646 mm (16:9)
Minimum focus distance;
Normal; Approx. 3 cm (Wide)/Approx. 1.6 m
(Tele)

Zoom:

i.Zoom OFF 50×
77× i.Zoom, 100×/2500× Digital Zoom

Image stabilizer function:

Electronic

Creative Control:

[Miniature Effect]/[Silent movie]/[8mm movie]/
[Time Lapse Rec]

Monitor:

6.7 cm (2.7") wide LCD monitor (Approx. 230 K
dots)

Microphone:

Stereo

Minimum required illumination:

Approx. 4 lx (1/25 with Low Light mode in the
Scene Mode)
Approx. 1 lx with the Colour Night View
function

AV connector video output level:

1.0 Vp-p, 75 Ω, PAL system

HDMI mini connector video output level:

HDMI™ 1080i/576p

AV connector audio output level (Line):

251 mV, 600 Ω , 2 ch

HDMI mini connector audio output level:

[AVCHD]; Dolby Digital/Linear PCM

[iFrame], [MP4]; Linear PCM

USB:

Reader function

SD card; Read only (No copyright protection support)

Hi-Speed USB (USB 2.0), USB terminal Type Mini B

Battery charging function (Charges from USB terminal when the main unit is off)

Dimensions:

53 mm (W)×60 mm (H)×114 mm (D)
(including projecting parts)

Mass:

Approx. 181 g
[without battery (supplied) and an SD card (optional)]

Mass in operation:

Approx. 207 g
[with battery (supplied) and an SD card (optional)]

Operating temperature:

0 °C to 40 °C

Operating humidity:

10%RH to 80%RH

Battery operation time:

See page 12

AC adaptor

Information for your safety

Power source:

AC 110 V to 240 V, 50/60 Hz

Power consumption:

7 W

DC output:

DC 5.0 V, 1.0 A

(EB)

Dimensions:

49.7 mm (W)×49.0 mm (H)×80.9 mm (D)

Mass:

Approx. 64 g

(EP)

Dimensions:

48.9 mm (W)×32.8 mm (H)×95.6 mm (D)

Mass:

Approx. 58 g

About copyright

■ Carefully observe copyright laws

Recording of pre-recorded tapes or discs or other published or broadcast material for purposes other than your own private use may infringe copyright laws. Even for the purpose of private use, recording of certain material may be restricted.

■ Licenses

- SDXC Logo is a trademark of SD-3C, LLC.
- "AVCHD" and the "AVCHD" logo are trademarks of Panasonic Corporation and Sony Corporation.
- Manufactured under license from Dolby Laboratories.
Dolby and the double-D symbol are trademarks of Dolby Laboratories.
- HDMI, the HDMI Logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.
- Microsoft®, Windows® and Windows Vista® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- iMovie, Final Cut Pro, Mac and OS X are trademarks of Apple Inc. registered in the U.S. and other countries.
- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

This product is licensed under the AVC patent portfolio license for the personal and non-commercial use of a consumer 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 and non-commercial 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, LLC.
See <http://www.mpegla.com>.

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