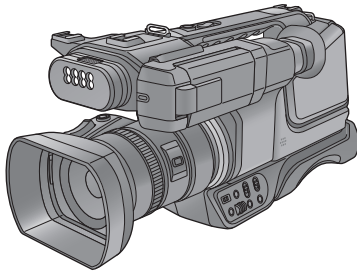


Panasonic®

Basic Operating Instructions

High Definition Video Camera

Model No. **HC-MDH3**



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/MDH3/>

- Click the desired language.



AVCHD™
Progressive

HDMI

**SD
XC™**

DOLBY AUDIO™

E GC GW

DVQX1483ZA

F0218AR0

Information for Your Safety

For the AC mains plug of three pins



■ Caution for AC mains lead

For your safety, please read the following text carefully.

This appliance is supplied with a moulded three pin mains plug for your safety and convenience.

A 5-ampere fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5-ampere and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark  or the BSI mark  on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local dealer.

Before use

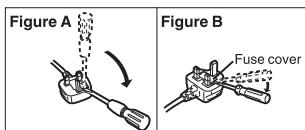
Remove the connector cover.

How to replace the fuse

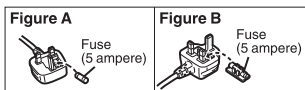
The location of the fuse differ according to the type of AC mains plug (figures A and B). Confirm the AC mains plug fitted and follow the instructions below.

Illustrations may differ from actual AC mains plug.

1. Open the fuse cover with a screwdriver.



2. Replace the fuse and close or attach the fuse cover.



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 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. (HC-MDH3E)

This unit is intended for use in moderate and tropical climates. (HC-MDH3GC/GW)

■ 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.

For Europe only

■ EMC Electric and magnetic compatibility

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

■ Product identification marking

Product	Location
High Definition Video Camera	Bottom
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.

AEEE Yönetmeliğine Uygundur.
AEEE Complies with Directive of Turkey.

[For India only]

AC adaptor information

IS 616/IEC 60065



R-41016268

Battery pack information

IS 16046/IEC 62133



R-41022500

Note regarding the Power Management function specified under COMMISSION REGULATION (EC) No 1275/2008 implementing Directive 2009/125/EC of the European Parliament and of the Council.

This device is designed and manufactured for use at a broadcasting station and/or in a similar environment.

This device is not equipped with a Power Management function or the Power Management function is set to OFF as it will prevent the device from fulfilling its intended purpose for the reasons below.

1. If the device is a Studio Camera, a Weather Camera, a Mixer or other processor:
A Power Management function may cause the device to suddenly stop during recording or while On Air.
2. If the device is a Studio Monitor:
A Power Management function may cause video for the confirmation of whether a signal is normal, or whether the signal has been lost, to be un-viewable.
3. If the device is a Camera Recorder:
A professional camera recorder must be able to start quickly at any time, but a Power Management function will cause an increase in the time taken to resume from Stand-by mode.

■ Cautions for use

About this unit

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 using a headphone

- Excessive sound pressure from earphones and headphones can cause hearing loss.
- Listening at full volume for long periods may damage the user's ears.

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.

When you use the unit in a sandy or dusty place such as a beach, do not let sand or fine dust get into the body and terminals of the unit.

Also, keep the unit away from sea water.

- Sand or dust may damage the unit. (Care should be taken when inserting and removing a card.)
- If sea water splashes onto the unit, wipe off the water with a well wrung cloth. Then wipe the unit again with a dry cloth.

When carrying the unit, do not drop or bump it.

- A strong impact can break the unit's casing, causing it to malfunction.
- When carrying this unit, please hold the handle, grip belt or shoulder strap firmly and treat it with care.

Cleaning

- Before cleaning, detach the battery or pull the AC cable 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 benzene, 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, it is recommended that you place a desiccant (silica gel) in with it.

Do not lift up this unit by the handle with the tripod still attached

- When the tripod is attached, its weight will also affect the unit's handle, possibly causing the handle to break and hurting the user.
- To carry the unit while the tripod is attached, take hold of the tripod.

Do not swing the unit around, shake it by, or allow it hang from the handle

- Do not jar, swing, or shake the unit by its handle. Any strong jolt to the handle may damage the unit or result in personal injury.

Do not allow the cord to drag on the ground or pull a connected cord along the passage

- The cord will be damaged, causing fire or electrical shock, when the cord gets caught by the feet, excite will also cause personal injury.

Do not look at the light-emitting portion of the built-in LED light directly while the light is turned on.

Do not bring the portion close to human eyes and turn on the light.

- The bright light may hurt the eyes.

Do not touch the light-emitting portion of the built-in LED light directly with your hands.

Do not use the built-in LED light if there is dust or other foreign matter on it.

Do not cover the built-in LED light with an object such as tape.

- Doing so may cause burns.
- Do not touch the built-in LED light for a while even after turning it off.
- Hold both the left and right sides of the supplied filter to remove it.

About the battery

The battery used in this unit is a rechargeable lithium-ion battery. It is susceptible to humidity and temperature and the effect increases the more the temperature rises or falls. In cold areas, the full charge indication may not appear or the low battery indication may appear about 5 minutes after starting use. At high temperatures, the protection function may be triggered, making it impossible to use the unit.

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 the vinyl bag so metal does not come into contact with the terminals.
- 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)
- Extremely high temperatures or low temperatures will shorten the life of the battery.
- If the battery is kept in high-temperature, high-humidity, or oily-smoky places, the terminals may rust and cause malfunctions.
- To store the battery for a long period of time, we recommend you charge it once every year and store it again after you have completely used up the charged capacity.
- Dust and other matter attached to the battery terminals should be removed.

Prepare spare batteries when going out for recording.

- Prepare batteries enough to last for 3 to 4 times the period you are planning to record for. Cold places such as a ski resort can shorten recording time.

If you drop the battery accidentally, check to see if the terminals are damaged.

- When this unit is attached with the terminal part in a deformed state, this unit may be damaged.

Do not throw old battery into fire.

- Heating a battery or throwing it into a fire may result in an explosion.

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 AC adaptor

- If the temperature of the battery is extremely high or extremely low, charging may take time or the battery may not be charged.
- If you use the AC adaptor near a radio, radio reception may be disturbed. Keep the AC adaptor 1 m or more away from the radio.
- When using the AC adaptor, it may generate whirring sounds. However, this is normal.
- After use, be sure to disconnect the AC cable from the AC outlet. (If you leave this unit connected, the AC adaptor will consume approximately 0.3 W.)
- Always keep the electrodes of the AC adaptor and battery clean.
- **Install the device near an AC outlet so that the power disconnection device (AC mains plug) can be accessed easily by hand.**

About charging lamp during charging

When the charging lamp is flashing, the following should be considered.

Flashing with approx. 4 second period (off for approx. 2 seconds, on for approx. 2 seconds):

- When the battery is over discharged or the temperature of the battery is too high or low. It can be charged, but it may take a few hours to complete the charging normally.
- Once normal charging starts, the charging lamp lights up green. However, depending on the conditions of use, even when normal charging is taking place, the charging lamp may keep flashing in approx. 4 second intervals until charging is completed.

Flashing with approx. 0.5 second period (off for approx. 0.25 second, on for approx.

0.25 second):

- The battery is not charged. Remove the battery from the unit, and try charging again.
- Check that the terminals of the unit or battery are not dirty or covered with a foreign object, and connect the battery correctly once again. If a foreign object or dirt is present, turn off the unit before removing.
- The battery or environment is at an extremely high or low temperature. Wait until the temperature has returned to an appropriate level and try charging again. If you are still unable to charge, there may be a fault in the unit, battery or AC adaptor.

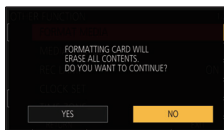
Off:

- Charging has finished.
- If the status indicator stays off despite the charging being unfinished, there may be a fault in the unit, battery or AC adaptor. Refer to page 6 for details on the battery.

About the SD card

When disposing of or giving away the SD card, note that:

- Formatting and deletion of this unit or computer only changes the file management information and does not completely delete the data in the SD card.
- It is recommended that the main SD card is either physically destroyed or the SD card is physically formatted using this unit when disposing of or giving away the SD card.
- To physically format, connect this unit to the AC adaptor, select [OTHER FUNCTION] → [FORMAT MEDIA] → [SD CARD 1] or [SD CARD 2] from the menu, and touch [YES]. Press and hold recording start/stop button in the following screen for three seconds. Screen to delete the SD card data is displayed, so select [YES] and follow the instruction on the screen.



- The customer is responsible for the management of the data in the SD card.

LCD monitor/viewfinder

- When the LCD screen is dirty or condensation has occurred, please wipe it using a soft cloth such as a lens cloth.
- Do not touch the LCD monitor with your finger nails, or rub or press with strong force.
- It may become hard to see or hard to recognize the touch when the LCD protection sheet is affixed.
- When the unit has become very cold, for example due to storage in a cold area, its LCD monitor will be slightly darker than usual immediately after the unit is turned on. The normal brightness will be restored when the unit's internal temperature rises.

Extremely high precision technology is employed to produce the LCD Monitor screen. The result is more than 99.99% effective dots with a mere 0.01% of the dots inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

Extremely high precision technology is employed to produce the viewfinder screen. The result is more than 99.99% effective dots with a mere 0.01% of the dots inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

About the recording method for recording motion pictures

This unit can record motion pictures using three different recording methods, including MOV, MP4 and AVCHD .

* AVCHD Progressive (1080/50p) supported.

MOV and MP4:

These recording methods are suitable for editing images. Audio is recorded in linear PCM.

- Those methods are not compatible with motion pictures recorded in AVCHD format.

AVCHD:

This recording method is suitable for playback on a high-definition TV.

Audio is recorded in Dolby Audio™.

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, the viewfinder or 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, the viewfinder 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, fogging will disappear naturally.

■ About security

Be careful about the possibility of theft or loss of the unit, and be careful not to leave the unit unattended. Please note that Panasonic does not accept any responsibility for the compromise, manipulation, and loss of information caused by these events.

■ Caution regarding laser beams

The lens may suffer damage if struck by a laser beam. Make sure that laser beams do not strike the lens when shooting in an environment where laser devices are used.

■ Caution regarding the lens and the viewfinder



Do not aim the lens or viewfinder at the sun or strong light. Doing so may cause the unit to malfunction.

■ Cards that you can use with this unit

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 22 for more details on SD cards.

■ For the purposes of these operating instructions

- The battery pack is referred to as the "Battery".
- SDHC Memory Card and SDXC Memory Card are referred to as the "SD card".
- Function that can be used for Recording Mode: 
- Function that can be used for Playback Mode: 
- Scene(s) recorded with [REC MODE] set to [MOV] or [MP4]: "MOV/MP4 scene(s)".
- Scene(s) recorded with [REC MODE] set to [AVCHD]: "AVCHD scene(s)".
- Notation of < > indicates the setup item name of the USER button that can be set with the menu of [USER SW]→[USER1] to [USER7].
- Pages for reference are indicated by an arrow, for example: → 00

For United Kingdom and Ireland customers

Sales and Support Information

Customer Communications Centre

- For customers within the UK: 0344 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.

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Accessories

Check the accessories before using this unit.

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

Product numbers correct as of Feb. 2018. These may be subject to change.

Battery pack

VW-VBD29



AC adaptor

SAE0011



AC cable

(HC-MDH3E/HC-MDH3GC)

(A) K2CT2YY00095

(B) K2CQ2YY00117

● In Saudi Arabia, always use

(A).



(HC-MDH3GW)

(C) K2CP2YY00083



Eyecup (→ 18)

VYC1080



Lens cap (→ 17)

SYA0073



Diffusion filter (white)

(→ 18)

1ZE1HCMDH3GCZ



Optional accessories

Some optional accessories may not be available in some countries.

Stereo microphone (VW-VMS10)
Battery pack (VW-VBD58/AG-VBR59/ AG-VBR89)
Battery charger (AG-BRD50)
Filter kit (VW-LF49N)

Product numbers correct as of Feb. 2018.

These may be subject to change.

What you can do with this unit

Recording to the SD card

It is possible to record motion pictures and still pictures to the SD card (SDHC Memory Card/SDXC Memory Card) using a variety of recording functions.

- This unit supports relay/simultaneous recording using double card slots.

Linking to external devices

Using an external media device for copying/playback

If you connect an external media device, such as USB HDD or USB flash memory (commercially-available) to this unit, you can copy motion pictures and still pictures recorded on this unit to the external media device.

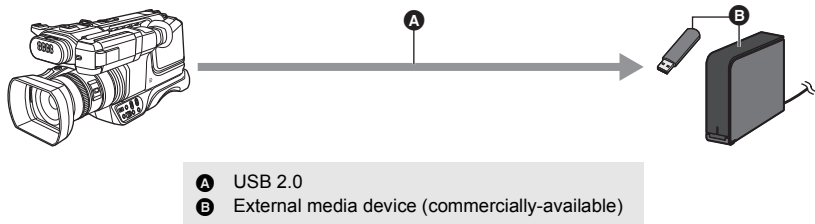
It can also play back the scenes and still pictures copied to the external media device.

- This unit supports USB 2.0.
- Use the USB cable supplied with a USB HDD.
If possible, we recommend using a cable with a length of 1.5 m or less.

Refer to the following support site for information about an external media device.

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

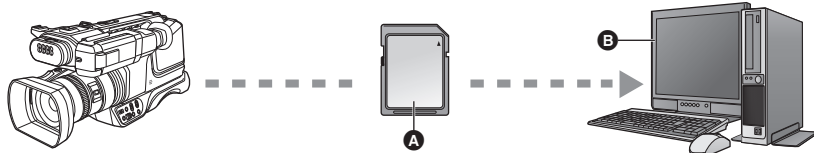
(This Site is English only)



Importing data to a PC

Image data can be imported to a PC for editing by inserting the SD card used for recording with the unit into that PC.

- A PC with an SD card slot or an SD card reader is required.

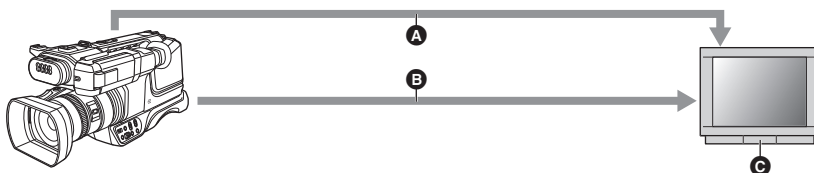


- Ⓐ SDHC Memory Card/SDXC Memory Card*
- Ⓑ PC

* SD cards are optional and not supplied with this unit.

Connecting to a TV

Connect to a TV to output images.

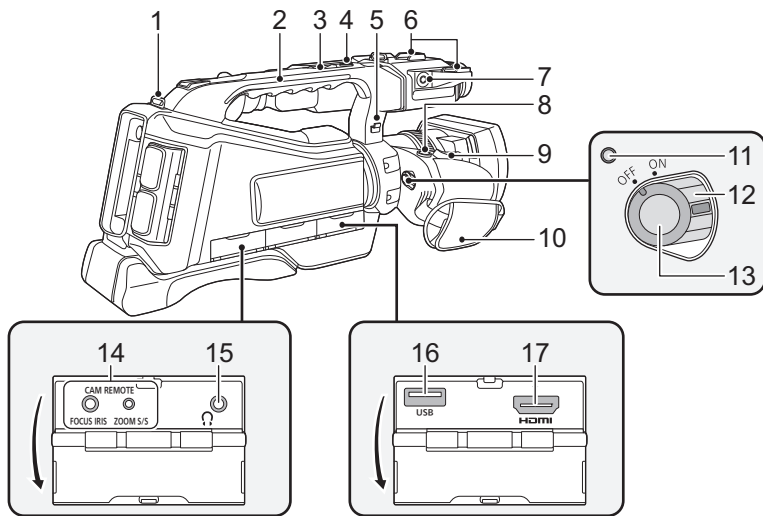


- Ⓐ AV cable (commercially-available)
- Ⓑ HDMI cable (commercially-available)
- Ⓒ TV

- Use a commercially-available AV cable.
- Use a commercially-available High Speed HDMI cable.
If possible, we recommend using a cable with a length of 3 m or less.

When connecting with an HDMI cable using an HDMI-to-DVI converter, etc., be sure to connect the HDMI cable to the connector of this unit last. Connecting the HDMI cable to the connector of this unit first may result in malfunction.

Names and Functions of Main Parts



1 Shoulder strap fixture

2 Handle

3 Sub zoom lever (→ 30)

- This lever functions in the same manner as the zoom lever.
- The zoom speed is controlled with this lever in a way different from the way it is controlled with the zoom lever.

4 Sub recording start/stop button

- This button functions in the same manner as the recording start/stop button.

5 Microphone cable holder

- You can fasten the excess cable by tucking it into the cable holder.

6 Accessory shoe

7 External microphone terminal [EXT MIC]

- A compatible plug-in powered microphone can be used as an external microphone.
- When the unit is connected with the AC adaptor, sometimes noise may be heard depending on the microphone type. In this case, please switch to the battery for the power supply and the noise will stop.

- Check that the unit is turned off. Connecting or removing the microphone while the unit is turned on may cause malfunction.

8 User 3 button [FOCUS ASSIST] (→ 35)

9 Zoom lever [T/W] (In Recording Mode) (→ 30)

Volume lever [+VOL-]/Thumbnail display switch [Q/] (In Playback Mode)

10 Grip belt (→ 17)

11 Status indicator (→ 24)

12 Power switch (→ 24)

13 Recording start/stop button (→ 28)

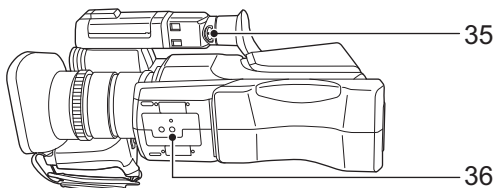
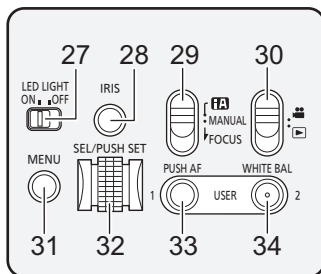
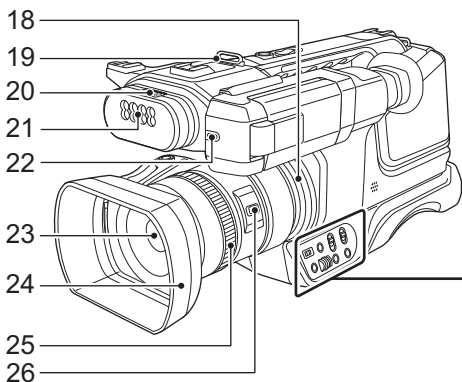
14 Camera remote terminal [CAM REMOTE]

- FOCUS IRIS terminal (3.5 mm diameter mini jack)
- ZOOM S/S terminal (2.5 mm diameter super mini jack)

15 Headphone terminal []

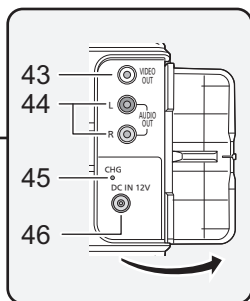
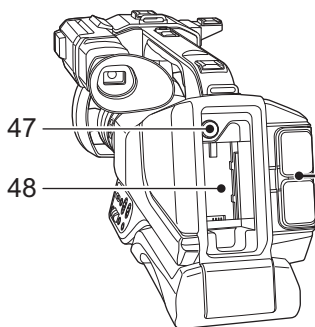
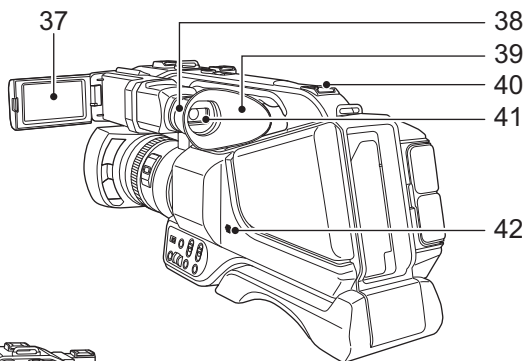
16 USB terminal

17 HDMI out terminal [HDMI]



- 18 Ring LED
- 19 Shoulder strap fixture
- 20 Built-in microphone
- 21 Built-in LED light
- 22 Recording lamp
- 23 Lens
- 24 Lens hood
- 25 Multi-manual ring (→ 31)
- 26 Camera function button [CAMERA FUNCTION] (→ 31)
- 27 LED LIGHT switch
 - Turns on/off the built-in LED light.
- 28 Iris button [IRIS] (→ 32)
- 29 Intelligent auto/Manual/Focus switch [i/MANUAL/FOCUS] (→ 29)
- 30 Mode switch [📷 / ▶]
- 31 Menu button [MENU] (→ 39)
- 32 Jog dial [SEL/PUSH SET] (→ 31, 32, 33, 34)
- 33 USER1 button [PUSH AF] (→ 35)
- 34 USER2 button [WHITE BAL] (→ 35)
- 35 Eyepiece corrector lever (→ 25)
- 36 Tripod receptacle
 - There are tripod receptacle that are compatible with 1/4-20UNC screws.

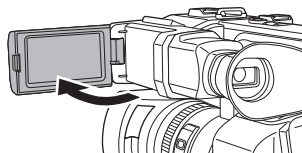
- Attaching a tripod with a screw length of 5.5 mm or more may damage the unit.



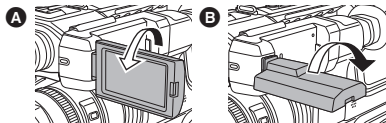
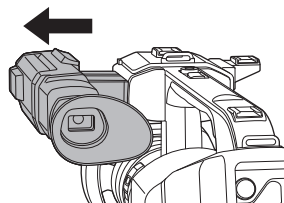
37 LCD monitor (Touch screen) (→ 24)

41 Viewfinder (→ 25)

- Extend the viewfinder before use.



- It can open up to 90°.



- It can rotate up to 180° **A** towards the lens or 90° **B** towards the opposite direction.

38 Eyecup mount (→ 18)

39 Eyecup (→ 18)

40 Accessory shoe

42 Speaker

43 VIDEO OUT terminal

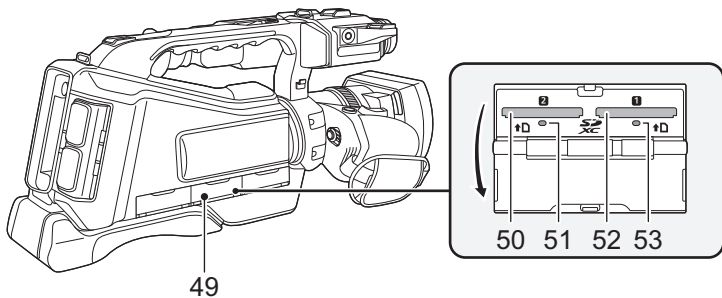
44 AUDIO OUT terminal

45 Charging lamp [CHG] (→ 20)

46 DC input terminal [DC IN] (→ 20)

47 Battery release button [PUSH] (→ 19)

48 Battery holder (→ 19)



49 SD Card slot cover (→ 23)

50 Card slot 2 (→ 23)

51 Access lamp (card 2) (→ 23)

52 Card slot 1 (→ 23)

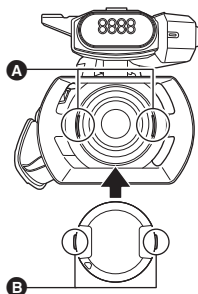
53 Access lamp (card 1) (→ 23)

■ Attaching/removing the lens cap

Protect the lens surface with the lens cap while the unit is not used.

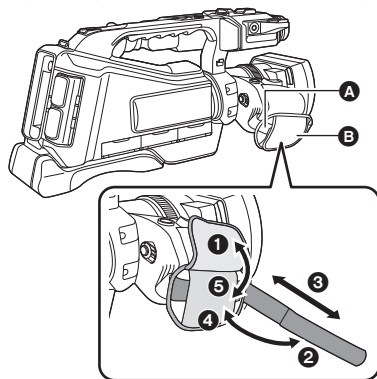
- Place your fingers in the recesses on the lens cap to hold it when attaching or removing it.
- To attach the lens cap, align its projections horizontally, and then push them into the slits on the lens hood until a clicking sound is heard.

- A** Slits
- B** Projections



■ Adjust the length of the grip belt so that it fits your hand.

Adjust the grip belt according to the size of your hand.

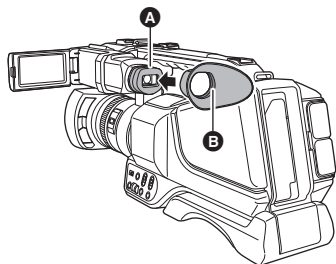


- A** Belt
- B** Belt cover

- 1, 2** Flip the belt cover and the belt.
- 3** Adjust the length.
- 4, 5** Replace the belt.

■ Attaching the eyecup

Attach by aligning the notch of the eyecup attachment part with the protrusion at the inside of the eyecup.



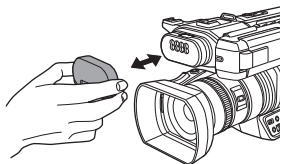
- A Notch
- B Protrusion

■ Using the diffusion filter (supplied) of the built-in LED light

The supplied diffusion filter softens the light by reducing its glare.
Use the diffusion filter when the built-in LED light is too bright.

Attaching/removing the filter for the built-in LED light

(How to attach/detach the filter)



- Push in until a clicking sound is heard.
- Hold both the left and right sides of the filter to remove it.

Power supply

■ About batteries that you can use with this unit (as of February 2018)

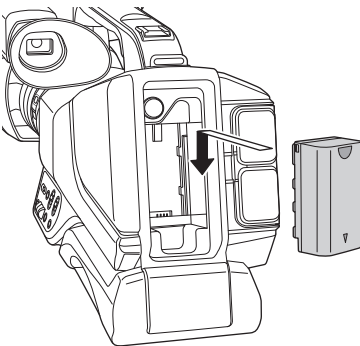
The battery that can be used with this unit is VW-VBD29/VW-VBD58/AG-VBR59/AG-VBR89.

For quick charging of a battery (AG-VBR59/AG-VBR89: optional), use a battery charger (AG-BRD50: optional).

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

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

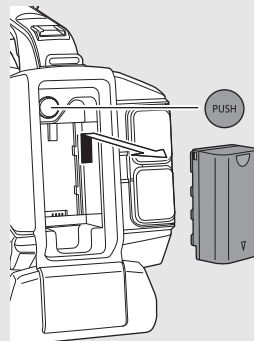


Insert the battery until it clicks and locks.

Removing the battery

Make sure that the power switch is set to OFF and the status indicator is turned off, and then remove by holding onto it taking care not to drop. (→ 24)

While pressing the battery release button, remove the battery.



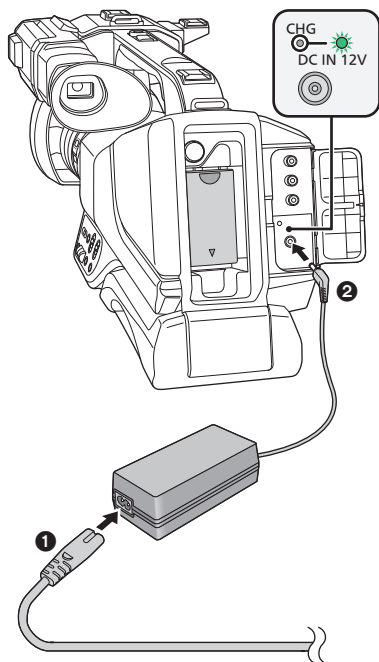
Charging the battery

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

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:

- Use the supplied AC adaptor. Do not use the AC adaptor of another device.
- Do not use the AC cable with any other equipment as it is designed only for this unit. Also, do not use the AC cable from other equipment with this unit.
- The battery can be charged while the unit is turned off. In Playback Mode, the battery can be charged even while the unit is turned on.
- It is recommended to charge the battery in a temperature between 10 °C and 30 °C. (The battery temperature should also be the same.)



1 Connect the AC cable to the AC adaptor and the AC outlet.

- Insert the plugs as far as they will go.

2 Connect the AC adaptor to the DC input terminal [DC IN].

- As the charging lamp lights up green, charging starts. It will turn off when the charging is completed.
- If the charging lamp flashes, refer to page 7.

■ Connecting to the AC outlet

It is possible to use this unit with power supplied from the AC outlet by turning on the unit with the AC adaptor connected.

Even when you use the AC adaptor for recording images, keep the battery connected. 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.

- Do not use any other AC adaptors except the supplied one.
- We recommend using Panasonic batteries (→ 11, 19).
- 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.

Charging and recording time

Charging/Recording time






- The times given apply when the ambient operating temperature is 25 °C and the relative operating humidity is 60%. Charging time may be longer at other temperatures and humidity levels.
- These charging times are for when the unit is turned off.
- The maximum continuous recordable times and the actual recordable times are based on the conditions below. These become shorter in other conditions.
 - When [REC MODE] is set to [AVCHD] and [REC FORMAT] is set to [PH 1080/50.00i]
 - When using the viewfinder (times in parentheses are when using the LCD monitor)
 - A cable is not inserted to the external output terminal

Battery model number	Voltage/Capacity (minimum)	Time required to charge this unit	Maximum continuous recordable time	Actual recordable time
Supplied battery (VW-VBD29)	7.2 V/2900 mAh	3 h 15 min	4 h 55 min (4 h 55 min)	2 h 35 min (2 h 35 min)

- "h" is an abbreviation for hour, "min" for minute and "s" for second.
- 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.**
- If this unit is turned on, charging may take longer than the values in the table above.

- The actual recordable time refers to the recordable time when repeatedly starting/stopping recording, turning the unit on/off, moving the zoom lever etc.
- The batteries heat up after use or charging. This is not a malfunction.

Battery capacity indication

- The display changes as the battery capacity reduces.  If the battery discharges, then  will flash red.
- If the unit is charged while it is turned on,  will be displayed on the screen.  will disappear after charging is complete.
- As long as the charging lamp is flashing, charging is not complete even after  has disappeared.

Preparation of SD cards

The unit can record motion pictures or still pictures to an SD card.

- We recommend that you use a Panasonic Memory Card.

This unit (an SDXC compatible device) is compatible with SDHC Memory Cards and SDXC Memory Cards. When using an SDHC Memory Card/SDXC Memory Card with other equipment, check the equipment is compatible with these Memory Cards.

Cards that you can use with this unit

■ About the Speed Class ratings for recording motion pictures

- Depending on [REC MODE] and [REC FORMAT], the required card differs.
Use a card that meets the following ratings of the SD Speed Class. Use of a non-compatible card may cause recording to stop suddenly.
- SD Speed Class is the speed standard regarding continuous writing. To check the class, see the labelled side, etc. of the card.

Recording modes	Recording function or Recording format	Speed Class ratings	Label examples
MOV/MP4	Super Slow Recording	Class10	CLASS 10
	50 Mbps		
AVCHD	All	Class4 or more	CLASS 4

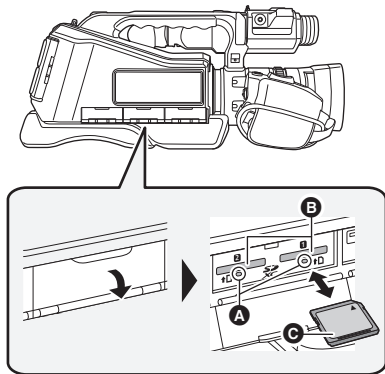
- Keep the memory card out of reach of children to prevent swallowing.

Inserting/removing an SD card

When using an SD card for the first time, it is necessary to format the SD card. (→ 27) 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 **A**

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

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

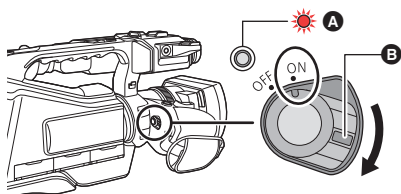
- One SD card can be inserted into each of the card slot 1 and the card slot 2.
- Face the labelled side **C** in the direction shown in the illustration and press it straight in as far as it will go.
- Press the center of the SD card and then pull it straight out.

2 Securely close the SD card slot cover.

- Do not touch the terminals on the back of the SD card.
- Do not apply strong shocks, bend, or drop the SD card.
- Electrical noise, static electricity or the failure of this unit or the SD card may damage or erase the data stored on 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 shockPerforming the above while the lamp is on may result in damage to data/SD card or this unit.
- Do not expose the terminals of the SD card to water, dirt or dust.
- Do not place SD cards in the following areas:
 - In direct sunlight
 - In very dusty or humid areas
 - Near a heater
 - Locations susceptible to significant difference in temperature (condensation can occur.)
 - Where static electricity or electromagnetic waves occur
- To protect SD cards, return them to their cases when you are not using them.
- About disposing of or giving away the SD card. (→ 7)

Turning the unit on/off

Set the power switch to ON while pressing the lock release button **B** to turn on the unit.



To turn off the unit

Set the power switch to OFF while pressing the lock release button. The status indicator goes off.

- A** The status indicator lights on.

- To turn on the unit again after the [ECONOMY (BATT)] or [ECONOMY (AC)] is activated, set the power switch to OFF once, and then to ON again.

Using the LCD monitor/Viewfinder

The viewfinder is turned off and the LCD monitor is turned on when the LCD monitor is opened. The viewfinder is turned on when the LCD monitor is closed.

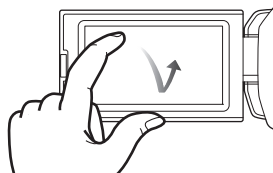
How to use the touch screen

You can operate by directly touching the LCD monitor (touch screen) with your finger.

■ Touch

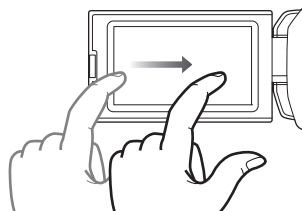
Touch and release the touch screen to select icon or picture.

- Touch the center of the icon.
- Touching the touch screen will not operate while you are touching another part of the touch screen.



■ Slide while touching

Move your finger while pressing on the touch screen.



■ About the operation icons



Touch when changing a page or performing settings.



- Do not touch the LCD monitor with hard pointed tips, such as ball point pens.

Viewfinder adjustment

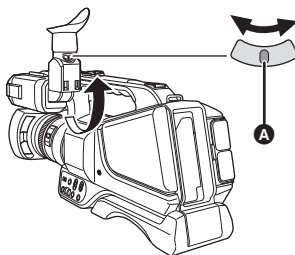
Adjusting the field of view

This setting will not affect the images actually recorded. It adjusts the field of view to show the image on the viewfinder clearly.

1 Adjust the viewfinder to suit your vision so that you can see the display images clearly.

- Be careful not to trap your fingers when moving the viewfinder.
- The viewfinder can be lifted vertically up to approximately 90°.
- Close the LCD monitor and turn on the viewfinder.

2 Adjust the focus by operating the eyepiece corrector lever **A**.




Setting date and time

When this unit is turned on, the message [SET TIME ZONE AND DATE/TIME] may appear. To make these settings, select [YES], and follow the instructions from Step 2-3 of the time zone setting procedure.

Time zone

Time difference from the Greenwich Mean Time can be set.

1 Select the menu. (→ 39)

 : [OTHER FUNCTION] → [TIME ZONE]

2 Touch / and set the region to record.


3 Touch [EXIT] to complete the setting.

- If the [CLOCK SET] screen appears, perform [CLOCK SET].

- When the time zone setting is changed, the date/time setting of the unit also changes automatically.

Clock setting

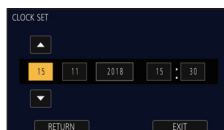
1 Select the menu. (→ 39)

 : [OTHER FUNCTION] → [CLOCK SET]

2 Touch the date or time to be set, then set the desired value using / .

- The year can be set between 2000 and 2039.

3 Touch [EXIT] to complete the setting.



- The date and time function is driven by a built-in lithium battery.
- If the time display becomes [- -], the built-in lithium battery needs to be charged. To recharge the built-in lithium battery, connect the AC adaptor or attach a charged battery to this unit. Leave the unit as it is for approx. 24 hours and the battery will maintain the date and time for approx. 6 months. (The battery is still being recharged even if the unit is off.)
- The way that time is displayed can be changed in the menu settings. [DISP SETUP] → [DATE/TIME] or [DATE FORMAT]



Selecting a media to record

[SD CARD 1] and [SD CARD 2] can be selected separately to record motion pictures or still pictures.

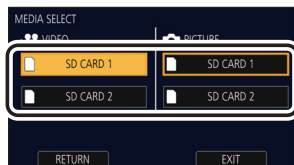
1 Select the menu. (→ 39)

MENU : [RECORD SETUP] → [MEDIA SELECT]

2 Touch the media to record motion pictures or still pictures.

- The media is selected separately for motion pictures or still pictures and is then highlighted in yellow.

3 Touch [EXIT] to complete the setting.



Formatting media

If you use the SD cards for the first time for recording with this unit, format the cards. Please be aware that if a medium is formatted, then all the data recorded on the medium will be erased and cannot be restored. Back up important data on a PC etc.

- When using two SD cards, format both SD cards.

1 Select the menu. (→ 39)

MENU : [OTHER FUNCTION] → [FORMAT MEDIA]

2 Touch [SD CARD 1] or [SD CARD 2].

- When formatting is complete, touch [EXIT] to exit the message screen.

- Do not turn this unit off or remove the SD card, while formatting. Do not expose the unit to vibrations or shock.

Use this unit to format media.

Do not format an SD card using any other equipment such as a PC. Otherwise it may not be possible to use the card on this unit.



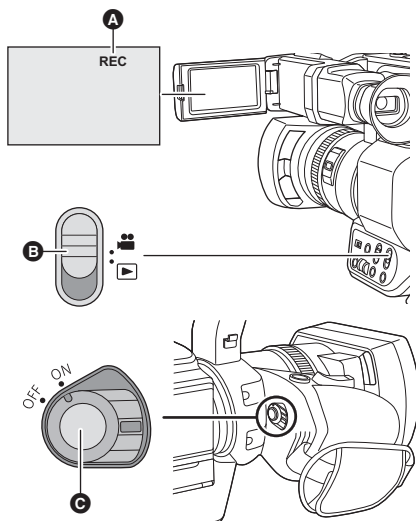
Recording motion pictures

1 Set the mode switch **B** to to switch to Recording Mode.

- Open the LCD monitor.

2 Press the recording start/stop button **C** to start recording.

- A** When you begin recording, REC (red) is displayed.
- Recording will stop when you press the recording start/stop button again.



Recording still pictures

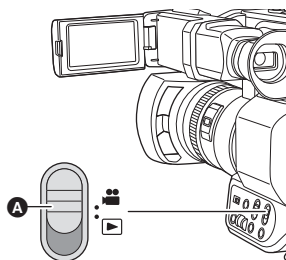
- Register <CAPTURE> to a USER button. (→ 35)

1 Set the mode switch **A** to to switch to Recording Mode.

- Open the LCD monitor.

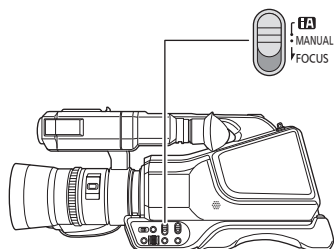
2 Press the USER button to which <CAPTURE> is registered or touch the applicable USER button icon to record a still picture.

- For information on the locations of the USER buttons and information on USER button icons, refer to page 35.
- When still pictures are being recorded, the remaining recordable number of still pictures and the still picture indication are displayed.





Intelligent Auto Mode/Manual Mode



iA/MANUAL/FOCUS switch

Slide the switch to change the Intelligent Auto Mode/Manual Mode.

- When you slide the switch to FOCUS, the unit will switch between Auto Focus Mode and Manual Focus Mode. (→ 31)
- **iA** appears on the screen in Intelligent Auto Mode.

■ Intelligent Auto Mode

When switching to Intelligent Auto Mode, the Automatic Tracking White Balance and Auto Focus operate and automatically adjust the color balance and focusing. Depending on the brightness of the subject etc., the Iris, gain and shutter speed are automatically adjusted for an optimum brightness.

- Color balance and focus may not be adjusted automatically depending on light sources or scenes. If so, manually adjust these settings. (→ 31, 33)
- The following settings in Manual Mode are canceled when you switch to Intelligent Auto Mode:
 - Focus (→ 31)
 - Focus Assist
 - Iris (→ 32)
 - GAIN (→ 32)
 - White Balance (→ 33)
 - Shutter speed (→ 34)
 - [SCENE MODE]

■ Camera controls that are disabled in Intelligent Auto Mode

The camera function button and the IRIS button are disabled in Intelligent Auto Mode.

■ USER buttons that are disabled in Intelligent Auto Mode

USER buttons 1 to 3 may be disabled in Intelligent Auto Mode, depending on the USER button functions registered to them. When any of the following USER button functions is registered, use it in Manual Mode:

- <FOCUS ASSIST 1>
- <FOCUS ASSIST 2>
- <SUPER GAIN>
- <AREA>
- <PUSH AF>
- <DRS>
- <FLASH BAND>
- <SUPER SLOW>



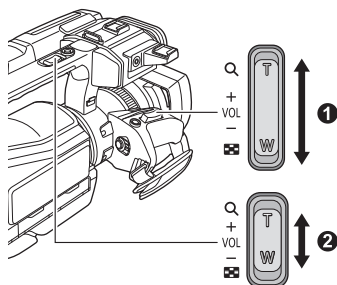
Using the zoom

It can be zoomed up to 20×.

- It can zoom up to approx. 40× when the [i.Zoom] is set to [ON].
- Zoom magnification can be checked in the screen display of Z00 to Z99. The value gets larger when zoomed in, and the value gets smaller when zoomed out.

If you set [i.Zoom] to [ON], the magnification level will be displayed as follows:

- iZ00 to iZ99: optical zoom range
- **iZ99**: i.Zoom



Zoom lever ①/Sub zoom lever ②

T side:

Close-up recording (zoom in)

W side:

Wide-angle recording (zoom out)

■ Zooming with the multi-manual ring

You can also perform zooming by rotating the multi-manual ring.

- You can also adjust focus and iris with the multi-manual ring. (→ 31)



Multi-manual ring ③

A side:

Wide-angle recording (zoom out)

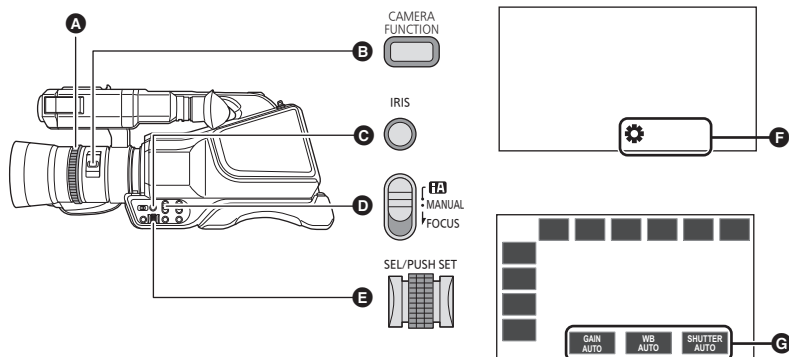
B side:

Close-up recording (zoom in)



Manual Recording

Zoom, focus, and iris can be adjusted by operating the multi-manual ring. Gain, White Balance and shutter speed can be adjusted by operating the manual icon and the jog dial.



- | | |
|---------------------------------|---|
| A Multi-manual ring | E Jog dial |
| B Camera function button | F Manual ring setting
[FOCUS], [ZOOM], [IRIS] |
| C IRIS button | G Manual icon |
| D iA/MANUAL/FOCUS switch | |

Focus

Use the multi-manual ring to adjust focus. If auto focusing is difficult due to the conditions, then use Manual Focus.

- **Switch to Manual Mode. (→ 29)**

1 Slide the iA/MANUAL/FOCUS switch to the FOCUS position.

- The iA/MANUAL/FOCUS switch will return to the MANUAL position.
- It will switch to MF from AF.
- The manual ring setting will change to [FOCUS].

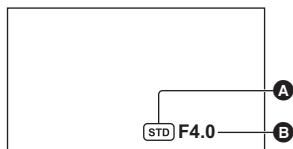
2 Rotate the multi-manual ring to adjust the focus.

Iris/Gain adjustment

When recording a scene that is too dark (or bright) or a scene in a similar situation, manually adjust the iris and gain.

Iris adjustment

- Switch to Manual Mode. (→ 29)
- 1 Press the IRIS button to switch to Manual Iris Mode.
 - [STD] disappears.
 - The manual ring setting will change to [⚙️ IRIS].
 - 2 Rotate the multi-manual ring to adjust the setting.



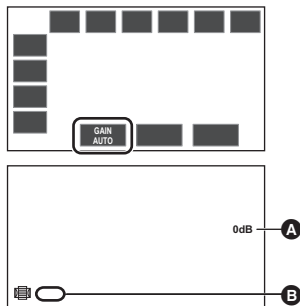
A Auto iris icon*

B Iris value

* It is displayed in Auto Iris Mode.

Gain adjustment

- Use the jog dial to change the settings.
 - Switch to Manual Mode. (→ 29)
- 1 Touch the LCD monitor in the recording screen.
 - Operation icons are displayed.
 - 2 Touch **GAIN AUTO** to switch to Manual Gain Mode.
 - The gain value will be displayed in dB.



A Gain value

• In Auto Gain Mode, "AGC" is displayed; in Manual Gain Mode, the gain value is displayed in dB.

B [GAIN]

- 3 Adjust the gain by rotating the jog dial.



White Balance

Automatic White Balance function may not reproduce natural colors depending on the scenes or lighting conditions. If so, you can adjust the White Balance manually.

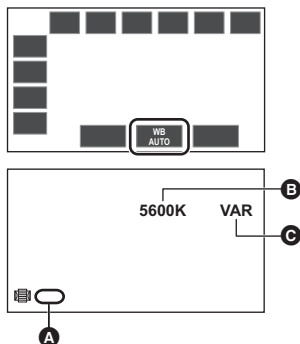
- Use the jog dial to change the settings.
- **Switch to Manual Mode. (→ 29)**

1 Touch the LCD monitor in the recording screen.

- Operation icons are displayed.

2 Touch to switch to Manual White Balance Mode.

- The previously used White Balance mode will be selected.



- A** [WB]
- B** Color temperature display
- Displayed when the White Balance mode is set to VAR.
- C** White Balance

3 Rotate the Jog dial to switch the White Balance mode.



Manual shutter speed

Adjust the shutter speed when recording fast-moving subjects.

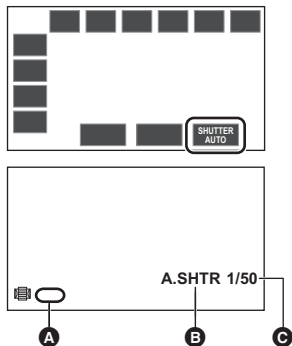
- Use the jog dial to change the settings.

- **Switch to Manual Mode.** (→ 29)

1 Touch the LCD monitor in the recording screen.

- Operation icons are displayed.

2 Touch  to switch to Manual Shutter Mode.



A [SHUTTER]

B Auto Shutter display

- This is displayed in Auto Shutter Mode.

C Shutter speed

3 Adjust the shutter speed by rotating the jog dial.




USER button

Each of the USER button can register one function from the 30 available functions.

- There are 3 USER buttons (USER1 to 3) on the main body and 4 USER button icons (USER4 to USER7) displayed on the LCD monitor.



Setting the USER button

1 Select the menu. (→ 39)

 : [USER SW] → [USER1] to [USER7]

- It is not possible to register functions to [USER4] to [USER7] in Playback Mode.

2 Touch the item to register.

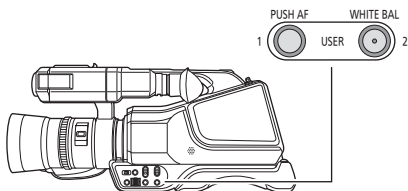
- For the functions of the USER button that can be registered, refer to page 36.
- Touch <INHIBIT> if not registering.
- Next (Previous) page can be displayed by touching  / .

3 Touch [EXIT] to complete the setting.

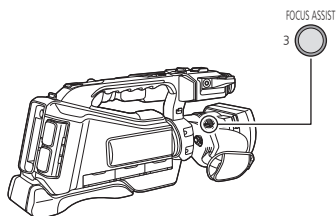
Using the USER button

To use the function assigned to a USER button or USER button icon, press the applicable USER button (one of the USER buttons 1 to 3), or touch the applicable USER button icon (one of the USER button icons 4 to 7) while operation icons are displayed.

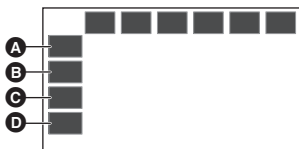
(When you use the USER1 to USER2 button)



(When you use the USER3 button)



(When using button icons USER4 to USER7)



- A** [USER4]
- B** [USER5]
- C** [USER6]
- D** [USER7]

Functions of the USER button

■ List of USER button functions

- Please refer to “Operating Instructions” (PDF format) for more information about the functions of the USER button.

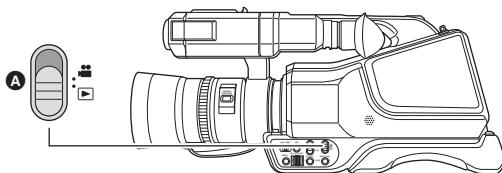
Item	Icon	Function
<INHIBIT>	[INH]	Invalid
<FOCUS ASSIST 1>	[FA1]	Focus Assist1*
<FOCUS ASSIST 2>	[FA2]	Focus Assist2*
<BACKLIGHT>	[B.Light]	Backlight Compensation
<BLACK FADE>	[B.FD]	Black Fade
<WHITE FADE>	[W.FD]	White Fade
<SLOT SEL>	[SlotSel]	Slot Selection
<ATW LOCK>	[ATW.L]	ATW Lock
<D.ZOOM>	[D.ZM]	Digital Zoom
<HISTOGRAM>	[HIST]	Histogram
<REC CHECK>	[REC.C]	Recording Check
<LAST SCN DEL>	[LstDel]	Last Scene Delete
<DRS>	[DRS]	DRS*
<FRZ FRAME>	[FRZ]	Freeze Frame
<SUPER GAIN>	[S.Gain]	Super Gain*
<AREA>	[AREA]	Area Mode*
<PUSH AF>	[PushAF]	Push AF*
<CAPTURE>	[Capture]	Capture
<EVF/LCD DETAIL>	[DETAIL]	EVF/LCD detail
<LCD/EVF OUTPUT>	[LCD/EVF]	LCD/EVF Output
<LEVEL GAUGE>	[Level]	Level Gauge
<LEVEL SHOT>	[LevelShot]	Level Shot Function
<FLASH BAND>	[FBC]	Flash band compensation*
<PRE-REC>	[PRE-REC]	PRE-REC
<SUPER SLOW>	[SuperSlow]	Super Slow Recording*
<AUTO REC>	[AutoRec]	Auto Rec
<O.I.S.>	[O.I.S.]	Optical Image Stabilizer
<ZEBRA>	[ZEBRA]	Zebra
<PICTURE TONE>	[P.TONE]	Picture Tone
<WHITE BAL>	[WB]	White Balance
<MENU>	[MENU]	Menu

* These functions are not available in Intelligent Auto Mode.

- The following USER button function can also be set from the menu.
 - [BACKLIGHT COMPENS.]
 - [HISTOGRAM]
 - [DRS]
 - [LEVEL GAUGE]
 - [LEVEL SHOT]
 - [EVF/LCD DETAIL]
 - [FLASH BAND COMPENSATION]
 - [PRE-REC]
 - [LCD/EVF OUTPUT]
 - [SUPER SLOW REC]
 - [PICTURE TONE]



Motion picture/Still picture playback



1 Set the mode switch **A** to to switch to Playback Mode.

2 Touch the play mode select icon **B**.

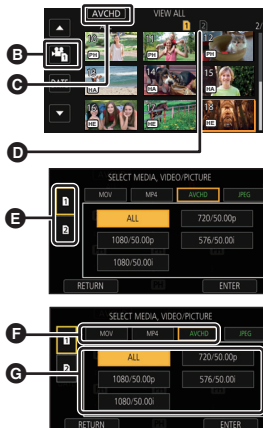
D Media display
The selected media is displayed in yellow.

3 Select the media **E** you wish to play back.

4 (To set this unit to Motion Picture Playback Mode)
Touch the desired recording mode **F** and recording format **G** for playback.

- Recording mode options with recorded scenes are displayed in green.
- The available recording format options differ depending on the recording mode option you have touched.
- Touch [ENTER].
- A recording mode icon **C** will be displayed on the thumbnail display. (/ /)
(If you have touched the recording mode option [MOV] or [MP4])
- After you have touched a recording format option, one of the following icons will be displayed on each thumbnail. The icon to be displayed differs depending on the size of recording format.
 - : Scenes recorded in FHD (1920×1080)
- If you touch the recording format option [ALL], all scenes of the same recording mode in the selected media are displayed.

The thumbnails of scenes recorded on other devices with different system frequencies are indicated with . This unit cannot play back these scenes.





- (If you have touched the recording mode option [AVCHD])
After you have touched a recording format option, one of the following icons will be displayed on each thumbnail.
 - **[PS]** : Scenes recorded in [PS 1080/50.00p]
 - **[PH]** : Scenes recorded in [PH 1080/50.00i]
 - **[HA]** : Scenes recorded in [HA 1080/50.00i]
 - **[HE]** : Scenes recorded in [HE 1080/50.00i]
 - **[PM]** : Scenes recorded in [PM 720/50.00p]
 - **[SA]** : Scenes recorded in [SA 576/50.00i]

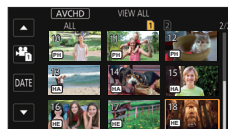
(To set this unit to Still Picture Playback Mode)

Touch the still picture (JPEG) .











5 Touch the scene or the still picture to be played back.



- Next (Previous) page can be displayed by touching  / .



6 Select the playback operation by touching the operation icon .

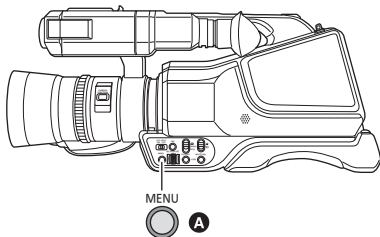


Motion picture playback	Still picture playback
<p>: Playback/Pause</p> <p>: Fast rewind playback*</p> <p>: Fast forward playback*</p> <p>: Stops the playback and shows the thumbnails.</p>	<p>: Slide show (playback of the still pictures in numerical order) start/pause.</p> <p>: Plays back the previous picture.</p> <p>: Plays back the next picture.</p> <p>: Stops the playback and shows the thumbnails.</p>

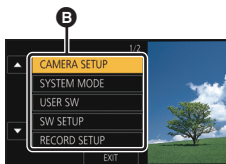
* When touched twice, the fast forward/fast rewind speed increases. (Screen display will change to  /  .)

- If you touch the screen while an operation icon is being displayed or do not touch the icon for a certain period, it will disappear. To display again, touch the screen.

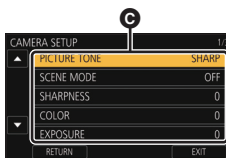
Using the menu screen



- 1 Press the MENU button **A**.
- 2 Touch the top menu **B**.



- 3 Touch the submenu **C**.
 - Next (Previous) page can be displayed by touching **▲** / **▼**.



- 4 Touch the desired item to enter the setting.
- 5 Touch [EXIT] to exit the menu setting.

Language Selection

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

MENU : [OTHER FUNCTION] → [LANGUAGE] → desired language

Menu structure

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

■ Menu structure in Recording mode

[CAMERA SETUP]	[PICTURE TONE]/[SCENE MODE]/[SHARPNESS]/[COLOR]/ [EXPOSURE]/[AWB Ach ADJUST]/[AWB Bch ADJUST]/ [BACKLIGHT COMPENS.]/[DRS]/[LEVEL SHOT]/[FLASH BAND COMPENSATION]/[NR CONTROL]
[SYSTEM MODE]	[REC MODE]/[REC FORMAT]/[ASPECT CONVERT]/ [CAMERA NUMBER SET]
[USER SW]	[USER1]/[USER2]/[USER3]/[USER4]/[USER5]/[USER6]/[USER7]/ [USER BUTTON DISPLAY]
[SW SETUP]	[IRIS RING]/[SUPER GAIN]/[AGC LIMIT]/[HYBRID O.I.S.]/[SLOW SHUTTER]/[FOCUS ASSIST 1]/[FOCUS ASSIST 2]/[PEAKING COLOR]/[PEAKING LEVEL]/[AREA MODE]/[ZEBRA MODE]/ [BARS TYPE]/[SUB REC BUTTON]/[SUB ZOOM]/[DIGITAL ZOOM]/[i.Zoom]
[RECORD SETUP]	[MEDIA SELECT]/[2 SLOTS FUNC.]/[INTERVAL REC]/[SUPER SLOW REC]/[PRE-REC]/[TCG]/[TC PRESET]
[AUDIO SETUP]	[AUDIO LOW CUT]/[AUDIO LEVEL]/[AUDIO ALC]
[OUTPUT SETUP]	[RESOLUTION]/[DOWN CONV.]/[REMOTE REC]/ [REMOTE REC LINK]/[HDMI TC OUTPUT]/[H/PHONE MODE]/ [VOLUME]/[TEST TONE]/[LCD/EVF OUTPUT]
[DISP SETUP]	[ZEBRA DETECT 1]/[ZEBRA DETECT 2]/[MARKER]/[GUIDE LINES]/[SAFETY ZONE]/[CENTER MARKER]/[REC COUNTER]/ [VIDEO OUT OSD]/[DATE/TIME]/[DATE FORMAT]/[LEVEL GAUGE]/[HISTOGRAM]/[AUDIO LEVEL METER]/[LENS STATUS]/ [CARD & BATTERY]/[OTHER DISPLAY]/[POWER LCD]/[LCD SET]/[EVF SET]/[SELF SHOOT]/[EVF COLOR]/[EVF/ LCD DETAIL]/[EVF/LCD PEAK LEVEL]/[EVF/LCD PEAK FREQ.]
[OTHER FUNCTION]	[FORMAT MEDIA]/[MEDIA STATUS]/[REC LAMP]/[CLOCK SET]/ [TIME ZONE]/[RING LED (BLUE)]/[RING LED (RED)]/[QUICK POWER ON]/[ALERT SOUND]/[ECONOMY (BATT)]/[ECONOMY (AC)]/[INITIAL SET]/[NUMBER RESET]/[LANGUAGE]
[MAINTENANCE]	[VERSION]/[UPDATE]/[HOUR METER]

■ Menu structure in Playback mode

[VIDEO SETUP] ^{*1}	[REPEAT PLAY]/[RESUME PLAY]/[SCENE PROTECT]/[DELETE]
[PICT. SETUP] ^{*2}	[SCENE PROTECT]/[DELETE]
[COPY]	[DIFFERENTIAL COPY] ^{*3} /[SELECT COPY]
[USER SW]	[USER1]/[USER2]/[USER3]
[OUTPUT SETUP]	[RESOLUTION]/[DOWN CONV.]/[HDMI TC OUTPUT] ^{*1} /[LCD/EVF OUTPUT]
[DISP SETUP]	[VIDEO OUT OSD]/[DATE/TIME]/[DATE FORMAT]/[AUDIO LEVEL METER] ^{*1} /[CARD & BATTERY]/[OTHER DISPLAY]/[POWER LCD]/[LCD SET]/[EVF SET]/[EVF COLOR]
[OTHER FUNCTION]	[FORMAT MEDIA]/[MEDIA STATUS]/[REC LAMP]/[CLOCK SET]/[TIME ZONE]/[RING LED (BLUE)]/[RING LED (RED)]/[ALERT SOUND]/[ECONOMY (BATT)]/[ECONOMY (AC)]/[INITIAL SET]/[NUMBER RESET]/[LANGUAGE]
[MAINTENANCE]	[VERSION]/[UPDATE]/[HOUR METER]

*1 The items are available in Motion Picture Playback Mode.

*2 The items are available in Still Picture Playback Mode.

*3 Only when connected to an external media device.

Troubleshooting

■ It is not a malfunction in following cases

The lens, the viewfinder 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 8.
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.




Power

Problem	Check points
<p>This unit cannot be turned on.</p> <p>This unit does not stay on long enough.</p> <p>Battery runs down quickly.</p>	<ul style="list-style-type: none"> ● Charge the battery again to ensure it is sufficiently charged. (→ 20) ● 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.
<p>This unit cannot be operated though it is turned on.</p> <p>This unit does not operate normally.</p>	<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.

Recording

Problem	Check points
The unit arbitrarily stops recording.	<ul style="list-style-type: none"> ● Use an SD card that can be used for motion picture recording. (→ 22) ● The recordable time may have shortened due to the deterioration of the data writing speed or repeated recording and deletion. Using the unit, format the SD card. (→ 27)
<p>Color 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"> ● Color 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. ● Change settings as follows: <ul style="list-style-type: none"> – Set this unit to Auto Shutter Mode. – Adjust the shutter speed to 1/50, 1/60 or 1/100.

Playback

Problem	Check points
Scenes/still pictures cannot be played back.	<ul style="list-style-type: none">● Any scenes/still pictures where the thumbnails are displayed as  cannot be played back.● In most cases,  is displayed for the following scenes:<ul style="list-style-type: none">– Scenes recorded with another device or edited with editing software– Scenes with damaged data● The thumbnails of scenes recorded on other devices with different system frequencies are indicated with . This unit cannot play back these scenes.

Refer to the "Operating Instructions" (PDF format) for more details.

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”, “AVCHD Progressive” and the “AVCHD Progressive” logo are trademarks of Panasonic Corporation and Sony Corporation.
- Dolby, Dolby Audio, and the double-D symbol are trademarks of Dolby Laboratories.
- The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc. in the United States 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 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>

This product incorporates the following software:

- (1) the software developed independently by or for Panasonic Corporation,
- (2) the software owned by third party and licensed to Panasonic Corporation,
- (3) the software licensed under the GNU General Public License, Version 2.0 (GPL V2.0),
- (4) the software licensed under the GNU LESSER General Public License, Version 2.1 (LGPL V2.1), and/or
- (5) open source software other than the software licensed under the GPL V2.0 and/or LGPL V2.1.

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At least three (3) years from delivery of this product, Panasonic will give to any third party who contacts us at the contact information provided below, for a charge no more than our cost of physically performing source code distribution, a complete machine-readable copy of the corresponding source code covered under GPL V2.0 or LGPL V2.1, as well as the respective copyright notice thereof.
Contact Information: oss-cd-request@gg.jp.panasonic.com


The source code and the copyright notice are also available for free in our website below.
<https://panasonic.net/cns/oss/index.html>

Specification

High Definition Video Camera

Power source:

7.2 V  (When using battery)

12 V  (When using AC adaptor)

Power consumption:

27.4 W (During recording: 9.2 W; during charging: 27.4 W)

 indicates safety information

Recording format:

[MOV]/[MP4]/

AVCHD version 2.0

(AVCHD Progressive)

Motion picture compression:

MPEG-4 AVC/H.264

Audio compression:

[MOV]/[MP4]; Linear PCM

[AVCHD]; Dolby Audio

Motion picture recording:

Recording method; MOV, MP4, AVCHD

Recording format;

- When [REC MODE] = [MOV], [MP4]
[FHD 1080/50.00p 50M]/
[FHD 1080/25.00p 50M]/
[FHD 1080/50.00i 50M];
Average 50 Mbps (VBR)
- When [REC MODE] = [AVCHD]
[PS 1080/50.00p]; Maximum 28 Mbps (VBR)
[PH 1080/50.00i]; Maximum 24 Mbps (VBR)
[HA 1080/50.00i]; Average 17 Mbps (VBR)
[HE 1080/50.00i]; Average 5 Mbps (VBR)
[PM 720/50.00p]; Average 8 Mbps (VBR)
[SA 576/50.00i]
(When [ASPECT CONVERT] = [SIDE
CROP], [SQUEEZE]);
Average 9 Mbps (VBR)

Refer to "Operating Instructions" (PDF format) for the picture size and recordable time of a motion picture.

Still picture recording:

Recording method; JPEG corresponding
(Design rule for Camera File system, based on Exif 2.2 standard)

Refer to "Operating Instructions" (PDF format) for picture size of a still picture and number of recordable pictures.

Recording media:

SDHC Memory Card (4 GB to 32 GB)/

SDXC Memory Card (48 GB to 128 GB)

Refer to page 22 for details on SD cards usable in this unit.

Recording slots:

2 slots

2 Slot function:

Relay, simultaneous

System frequency:

50.00 Hz

Image sensor:

1/3.1 type (1/3.1") MOS image sensor

Effective pixels;

Motion picture/Still picture;

Approx. 6030 K (16:9)

Lens:

Auto Iris optical zoom (Full range AF)

F value (focal length)

F1.8 to F3.6 (Focal length; 4.08 mm to 81.6 mm)

35 mm equivalent;

Motion picture/Still picture;

29.5 mm to 612.0 mm (16:9)

Minimum focus distance;

Approx. 3 cm (Wide)/

Approx. 1.5 m (Tele)

Filter diameter:

49 mm

Zoom:

20× optical zoom, 40× i.Zoom,

2×/5×/10× digital zoom

White balance adjustment:

[ATW], [ATW LOCK], [Ach], [Bch],
preset 3200K, preset 5600K, VAR (2000K to 15000K)

Shutter speed:

1/6 to 1/8000

1/100 to 1/8000 (During Super Slow Recording)

Super Slow Recording:

Recording frame rate; FHD 100 fps

Slow motion effect; 1/2 or 1/4 the normal speed

Image stabilizer function:

Optical (with 5-Axis Hybrid O.I.S.)

Level Shot Function:

[ON]/[OFF]

Monitor:

7.5 cm (3") wide LCD monitor

(Approx. 460 K dots)

Viewfinder:

0.6 cm (0.24") wide EVF

(Approx. 1555 K dots equivalent)

Microphone:

Stereo microphone

Minimum required illumination:Approx. 1.2 lx (at a Super Gain value of
36 dB and a shutter speed of 1/25)**Built-in LED light:**

Illumination level; Approx. 300 lx (1.0 m)

With the diffusion filter; Approx. 70 lx (1.0 m)

Illuminating angle; Approx. 30°

Color temperature; Approx. 5000 K

Video output:**HDMI Type A connector video output level;**

1080/50.00p/25.00p/50.00i,

720/50.00p, 576/50.00p,

VIERA Link not supported

AV connector video output level;

1.0 Vp-p, 75 Ω

Audio output:**HDMI Type A connector audio output level;**

Linear PCM

AV connector audio output level (Line);

2 ch

Headphone output;

3.5 mm stereo mini jack

Camera remote terminal:

2.5 mm super mini jack ×1 (ZOOM S/S)

3.5 mm mini jack ×1 (FOCUS/IRIS)

MIC input:-60 dBV (Mic sensitivity -40 dB equivalent,
0 dB=1 V/Pa, 1 kHz)

Input impedance; 5600 Ω

(Stereo mini jack)

USB:

USB terminal Type A

Hi-Speed USB (USB 2.0), (for external media
device connection*), bus power supported* External media device with a capacity of
32 GB or below or a capacity above 2 TB
cannot be used.**Dimensions:**

205 mm (W)×217 mm (H)×494 mm (D)

Mass:

Approx. 2330 g

[without the battery (supplied) and SD cards
(optional)]**Mass in operation:**

Approx. 2450 g

[with the battery (supplied) and two SD cards
(optional)]**Operating temperature:**

0 °C to 40 °C

Operating humidity:

10%RH to 80%RH

Battery operation time:

See page 21.

AC adaptor**Power source:**

100 V to 240 V ~ , 50 Hz/60 Hz, 1.2 A

79 VA (for 100 V ~)

99 VA (for 240 V ~)

Power output:

12 V = = , 3.0 A, 36 W

 indicates safety information**Ambient operating temperature:**

0 °C to 40 °C

Ambient operating humidity:

10%RH to 90%RH (no condensation)

Mass:


Approx. 225 g

Dimensions (W×H×D):

115 mm×37 mm×57 mm

(Excluding the DC cord portion)

The symbols on this product (including the
accessories) represent the following:

~	AC
= =	DC
	Class II equipment (The construction of the product is double-insulated.)

Limited Warranty (ONLY FOR AUSTRALIA)

Panasonic Warranty

- Subject to the conditions of this warranty Panasonic or its Authorised Service Centre will perform necessary service on the product, without charge for parts or labour, if in the opinion of Panasonic the product is found to have a manufacturing defect within one (1) year or (12 months) (the "warranty period") from the date of purchase appearing on your purchase receipt.
- This warranty only applies to Panasonic products purchased in Australia and sold by Panasonic Australia, it's Authorised Distributors, or Dealers, and only where the products are used and serviced within Australia or its territories. Warranty cover only applies to the services that are carried out by a Panasonic Authorised Service Centre and only if valid proof of purchase is presented when the warranty service is requested.
- This warranty only applies if the product has been installed and/or used in accordance with the manufacturer's recommendations (as noted in the operating instructions) under normal use and reasonable care (in the opinion of Panasonic). The warranty does not cover damage, malfunction or failure resulting from use of incorrect voltages, incorrect installation, accident, misuse, neglect, build-up of dirt or dust, abuse, maladjustment of customer controls, mains supply problems, thunderstorm activity, infestation by insects or vermin, tampering or repair by unauthorised persons (including unauthorised alterations), exposure to abnormally corrosive conditions, or any foreign object or matter having entered the product.
- This warranty does not cover the following items unless the fault or defect existed at the time of purchase:
 - Consumable parts
 - Cosmetic parts
 - Worn or damaged parts
 - Information stored on Hard Disk Drives, Optical Discs, USB Devices, SD Cards, Tapes
 - DTV reception issues caused by TV Aerial / Cabling / Wall socket(s)
- Some products may be supplied with Ethernet connection hardware. The warranty is limited on such products and will not cover:
 - Internet and or DLNA connection / setup related problems
 - Access fees and or charges incurred for internet connection
 - Incompatible software or software not specifically stipulated in the product operations manual; and
 - Any indirect or consequential costs associated with the incorrect use or misuse of the hardware, its connection to the internet or any other device.
- To claim warranty service, when required, you should:
 - Contact Panasonic's Customer Care Centre on 132 600 for Service Centre information.
 - Confirm the opening and acceptance times with the Authorised Service centre that you choose.
 - Then send or take the product to a Panasonic Authorised Service Centre together with your proof of purchase receipt.
 - Any freight and insurance costs associated with the transport of the product to and/or from your nearest Authorised Service Centre must be arranged and paid for by you.
- The warranties hereby conferred do not extend to, and exclude, any costs associated with the installation, de-installation or re-installation of a product, including costs related to the mounting, de-mounting or remounting of any screen, (and any other ancillary activities), delivery, handling, freighting, transportation or insurance of the product or any part thereof or replacement of and do not extend to, and exclude, any damage or loss occurring by reason of, during, associated with, or related to such installation, de-installation, re-installation or transit.

Panasonic Authorised Service Centres are located in major metropolitan areas and most regional centres of Australia, however, coverage will vary dependent on product. For advice on exact Authorised Service Centre locations for your product, please telephone our Customer Care Centre on 132600 or visit our website and use the Service Centre Locator.

In addition to your rights under this warranty, Panasonic products come with consumer guarantees that cannot be excluded under the Australian Consumer Law. If there is a major failure with the product, you can reject the product and elect to have a refund or to have the product replaced or if you wish you may elect to keep the goods and be compensated for the drop in value of the goods. You are also entitled to have the product repaired or replaced if the product fails to be of acceptable quality and the failure does not amount to a major failure.

If there is a major failure in regard to the product which cannot be remedied then you must notify us within a reasonable period by contacting the Panasonic Customer Care Centre. If the failure in the product is not a major failure then Panasonic may choose to repair or replace the product and will do so in a reasonable period of time from receiving notice from you.

THIS WARRANTY CARD AND THE PURCHASE DOCKET (OR SIMILAR PROOF OF PURCHASE) SHOULD BE RETAINED BY THE CUSTOMER AT ALL TIMES

If you require assistance regarding warranty conditions or any other enquiries, please visit the Panasonic Australia website www.panasonic.com.au or contact by phone on **132 600**
If phoning in, please ensure you have your operating instructions available.

Panasonic Australia Pty. Limited

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Panasonic Corporation
Web site: <http://www.panasonic.com>

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