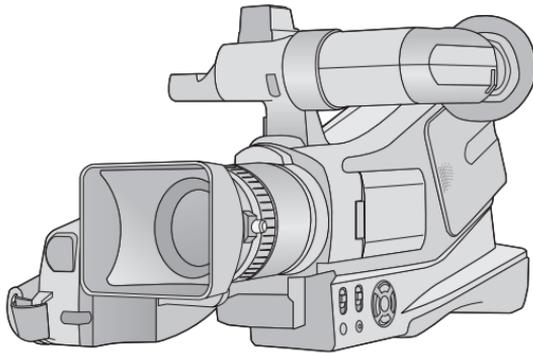


Panasonic®

Operating Instructions High Definition Video Camera

Model No. **HDC-MDH1**



Before use, please read these instructions completely.

AVCHD™

DOLBY
DIGITAL
STEREO CREATOR

SD™
XC

HDMI

VIERA
Link

Information for Your Safety

WARNING:

TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK OR PRODUCT DAMAGE,

- DO NOT EXPOSE THIS APPARATUS TO RAIN, MOISTURE, DRIPPING OR SPLASHING AND THAT NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHALL BE PLACED ON THE APPARATUS.
- USE ONLY THE RECOMMENDED ACCESSORIES.
- DO NOT REMOVE THE COVER (OR BACK); THERE ARE NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

CAUTION!

- DO NOT INSTALL OR PLACE THIS UNIT IN A BOOKCASE, BUILT-IN CABINET OR IN ANOTHER CONFINED SPACE. ENSURE THE UNIT IS WELL VENTILATED. TO PREVENT RISK OF ELECTRIC SHOCK OR FIRE HAZARD DUE TO OVERHEATING, ENSURE THAT CURTAINS AND ANY OTHER MATERIALS DO NOT OBSTRUCT THE VENTILATION VENTS.
- DO NOT OBSTRUCT THE UNIT'S VENTILATION OPENINGS WITH NEWSPAPERS, TABLECLOTHS, CURTAINS, AND SIMILAR ITEMS.
- DO NOT PLACE SOURCES OF NAKED FLAMES, SUCH AS LIGHTED CANDLES, ON THE UNIT.
- DISPOSE OF BATTERIES IN AN ENVIRONMENTALLY FRIENDLY MANNER.

The socket outlet shall be installed near the equipment and easily accessible.
 The mains plug of the power supply cord shall remain readily operable.
 To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from AC receptacle.

Warning

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

Use only the recommended accessories.

- Do not use any other AV cables, component cables and USB cables except the supplied one.
- Keep the Memory Card out of reach of children to prevent swallowing.

■ Product identification marking

Product	Location
High Definition Video Camera	Bottom
AC adaptor	Bottom

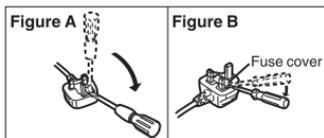
How to replace the fuse

The location of the fuse differ according to the type of AC mains plug (figures A and B).

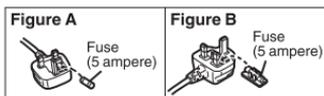
Confirm the AC mains plug fitted and follow the instructions below.

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.



-If you see this symbol-

Information on Disposal in other Countries outside the European Union



This symbol is only valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct

method of disposal.

■ **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.

■ **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 19 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 (including the still picture recording in motion picture recording mode)/still picture playback are indicated by **PHOTO** in these operating instructions.
- Pages for reference are indicated by an arrow, for example: → 00

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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 Aug. 2010. These may be subject to change.

Battery pack

VW-VBG260



Shoulder strap

VFC3877



AC adaptor

VSK0698



External stereo microphone

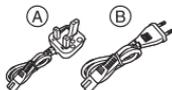
VW-VMS2A/1



AC cable

(A) K2CT39A00002

(B) K2CQ29A00002



Battery

R03NWC/BK



- (A) Hong Kong Special Administrative Region of China and Saudi Arabia
- (B) Areas Other than Hong Kong Special Administrative Region of China and Saudi Arabia

CD-ROM

Software

DC cable

K2GJYDC00004



AV cable

K2KA6CA00001



Component cable

K1HY10YY0005 or

K1HY10YY0009



USB cable

K1HY04YY0032



Stylus pen

VGQ0C14



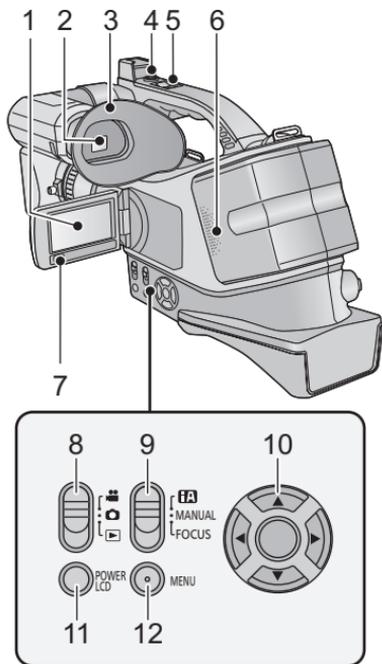
Lens cap

VKF3305



1

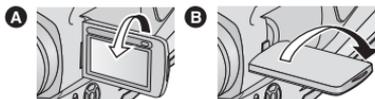
Parts identification and handling



1 LCD monitor (Touch screen) (→ 23)



- It can open up to 90°.



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

Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the LCD monitor screen. However, this is not a malfunction and does not affect the recorded picture.

2 Viewfinder (→ 24)

Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the viewfinder screen. However, this is not a malfunction and does not affect the recorded picture.

3 Eyecup

4 Sub recording start/stop button (→ 26)

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

5 Sub zoom lever (→ 43)

- This lever functions in the same manner as the zoom lever.

6 Speaker

7 Sub menu button [MENU] (→ 37)

- This button functions in the same manner as the menu button.

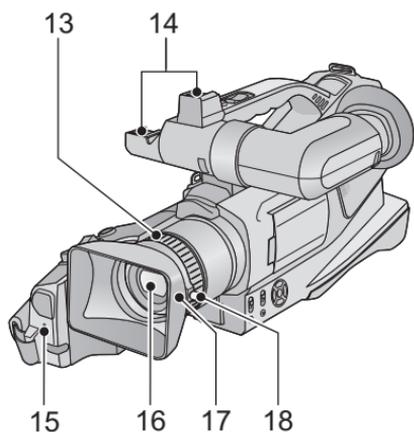
8 Mode switch (→ 22)

9 Intelligent auto/Manual/Manual focus switch [iA/MANUAL/FOCUS] (→ 32, 61, 64)

10 Cursor button

11 Power LCD button [POWER LCD] (→ 46)

12 Menu button [MENU] (→ 37)

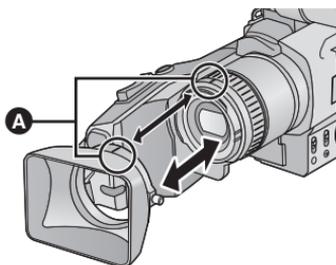


- 13 Focus ring (→ 64)
- 14 Accessory shoe (→ 13, 119)
- 15 Recording lamp (→ 40)
- 16 Lens
- 17 Lens hood

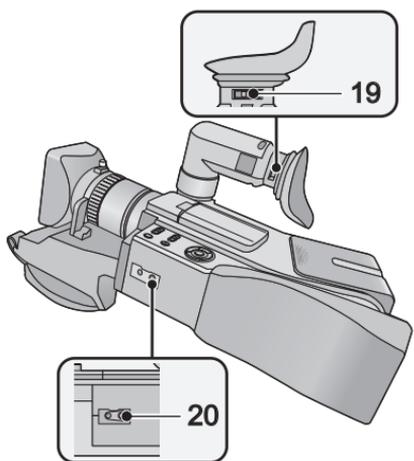
- This will reduce the extra light entering the lens in blight sunlight or backlight etc., making it possible to take clearer pictures.

18 Lens hood attachment knob

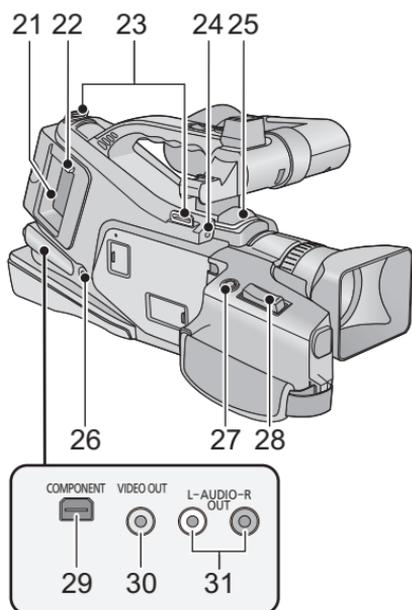
- When you remove the lens hood, first of all, loosen the lens hood attachment knob.
- When you attach the lens hood back, unite the mark **A** and fasten the lens hood attachment knob.



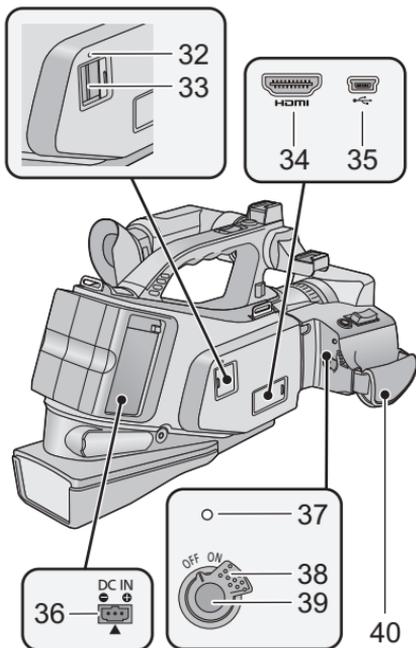
- If you use the filter kit (optional) or the conversion lens (optional), remove the lens hood. (→ 119)



- 19 Eyepiece corrector knob (→ 24)
- 20 Tripod receptacle



- 21 Battery holder** (→ 16)
- 22 Battery release button [PUSH]** (→ 16)
- 23 Shoulder strap fixture** (→ 12)
- 24 External microphone terminal [EXT MIC]** (→ 13)
- 25 Internal microphones**
- 26 Headphone terminal [PHONES]** (→ 50)
- Excessive sound pressure from earphones and headphones can cause hearing loss.
 - Listening at full volume for long periods may damage the user's ears.
- 27 Photoshot button** [] (→ 30)
- 28 Zoom lever [W/T]** (In motion picture recording mode or still picture recording mode) (→ 43)
- Thumbnail display switch** [ / ] / **Volume lever [-VOL+]** (In playback mode) (→ 36)
- 29 Component connector [COMPONENT]** (→ 76)
- Use the component cable (only the supplied cable).
- 30 Video output connector [VIDEO OUT]** (→ 76, 83)
- Use the AV cable (only the supplied cable).
- 31 Audio output connector [AUDIO OUT]** (→ 76, 83)
- Use the AV cable (only the supplied cable).



32 Access lamp [ACCESS] (→ 20)

33 Card slot (→ 20)

34 HDMI connector [HDMI]
(→ 76, 80)

35 USB terminal [-] (→ 92)

36 DC input terminal [DC IN] (→ 18)

- Always use the supplied AC adaptor or a genuine Panasonic AC adaptor (VW-AD21E/EB-K; optional).

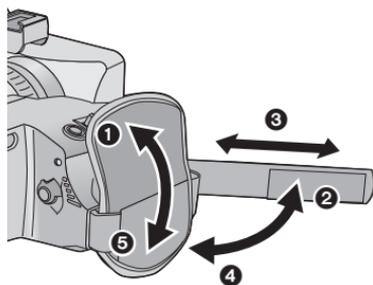
37 Status indicator (→ 21)

38 Power switch (→ 21)

39 Recording start/stop button (→ 28)

40 Grip belt

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

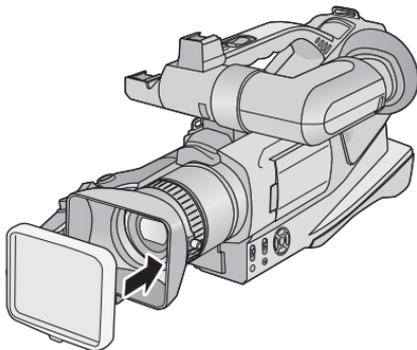


- 1, 2** Flip the belt.
- 3** Adjust the length.
- 4, 5** Replace the belt.

About the supplied accessories

■ About the Lens cap

When not using the unit, attach the lens cap to protect the lens.

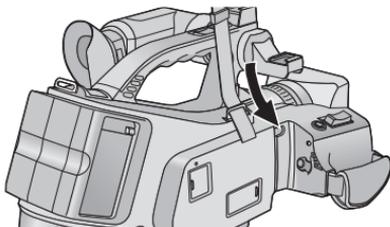


- When recording, always remove the lens cap before turning the unit on.

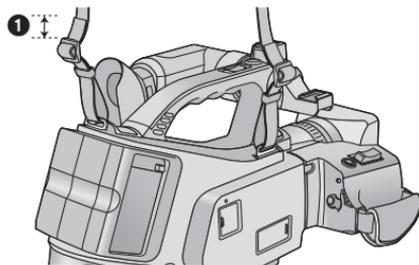
■ About the Shoulder strap

We recommend that you attach the shoulder strap before going out of doors to record so as to avoid dropping this unit.

- 1 Pull the end of the shoulder strap through the shoulder strap fixture on the unit.



- 2 Fold the tip of the shoulder strap, run it through the shoulder strap length adjuster, and pull it.

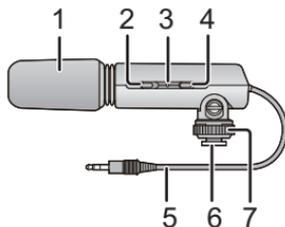


- Pull it out more than 2 cm (1) from the shoulder strap length adjuster so that it cannot slip off.

■ About the external stereo microphone

External stereo microphone

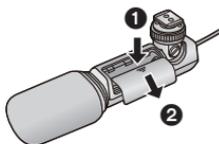
Supplied external stereo microphone can be switched to record sound in either stereo or monaural.



- 1 Wind Shield (Microphone condenser)
- 2 Off/On mode selector switch [OFF/ MONO/STEREO] (→ 14)
- 3 Battery check lamp [BATTERY] (→ 14)
- 4 [WIND CUT OFF/ON] switch (→ 14)
- 5 Stereo mini-plug cord (→ 13)
- 6 Shoe (→ 13)
- 7 Shoe lock (→ 13)

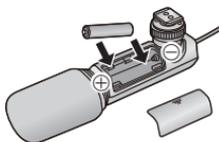
Inserting a battery

- 1 Remove the battery cover from the microphone.



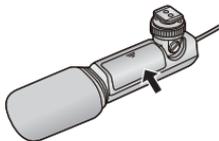
- Press the [▽] mark on the cover in the direction of arrow ① and slide the cover in the direction of arrow ②.

- 2 Insert the battery with the (-) end first as shown in the figure.



- Be sure to insert the battery with the (-) and (+) ends facing the proper directions.

- 3 Replace the battery cover.



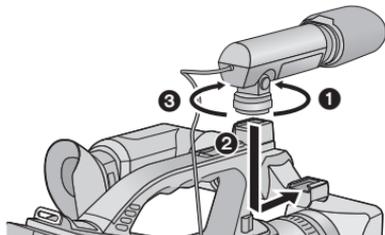
- When the battery is exhausted, purchase a new "AAA", "UM-4", "R03" or "LR03" type battery and insert it in the same way as explained above.
- Do not short-circuit the battery.
- Remove the battery if you will not use the microphone for one month or longer.
- Keep the AAA battery out of reach of children to prevent swallowing.

CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

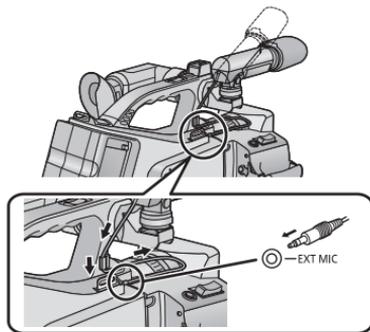
Attaching the external stereo microphone to the unit

- 1 Attach the microphone to the accessory shoe.



- ① Loosen the shoe lock.
- ② Attach the microphone.
- ③ Firmly tighten the shoe lock.

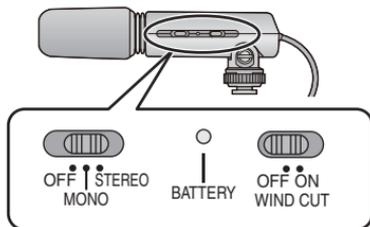
- 2 Connect the stereo mini-plug cord to the external microphone terminal.



- You can adjust the microphone angle within the range shown in the figure.
- Hold the shoe lock portion when attaching and removing the microphone.
- Be sure to turn the unit off before connecting the microphone.

Using the external stereo microphone

1 Set the OFF/MONO/STEREO switch to MONO or STEREO.



[OFF]:

Turn off the microphone power.

[MONO]:

Records sound in front of the unit in monaural.

[STEREO]:

Records sound in a wide area in stereo.

- Although you can change the setting of the OFF/MONO/STEREO switch while recording, the sound of the switch being changed may be recorded. Pause your recording before changing the setting of this switch.
- When the OFF/MONO/STEREO switch is changed from OFF to MONO or STEREO, the BATTERY lamp will light temporarily if there is still plenty of power in the battery. If the BATTERY lamp does not light temporarily, replace the battery with a new one.
- You can adjust the microphone sensitivity for recording. (→ 13)

Changing the WIND CUT OFF/ON switch

The microphone is equipped with a wind shield that is designed to cut down wind noise, but when the wind is so strong that even the wind shield is not adequate to keep down the noise, set the WIND CUT OFF/ON switch to ON to further reduce the wind noise.

[OFF]:

The microphone should usually be used with this position.

[ON]:

Set the WIND CUT OFF/ON switch to this position to reduce wind noise or bass noise.

- Although you can change the setting of the WIND CUT OFF/ON switch while recording, the sound of the switch being changed may be recorded. Pause your recording before changing the setting of this switch.

Caution for use about the external stereo microphone

- Do not expose the microphone to insecticides or volatile substances.
- Do not store the microphone in hot (approximately 60 °C or more) or humid (approximately 80%RH or more) places. In particular, do not leave the microphone inside a car in mid summer or near heating equipment.
- A dirty plug may result in faulty contact. Be sure to wipe the plug clean before connecting the microphone.
- Do not connect or disconnect the stereo mini-plug with turning the unit on.
- Do not use a Ni-Cd battery.

■ About batteries that you can use with this unit

The battery that can be used with this unit is VW-VBG130/VW-VBG260/VW-VBG6.

- The unit has a function for distinguishing batteries which can be used safely. The dedicated battery (VW-VBG130/VW-VBG260/VW-VBG6) supports this function. The only batteries suitable for use with this unit are genuine Panasonic products and batteries manufactured by other companies and certified by Panasonic. (Batteries which do not support this function cannot be used). Panasonic cannot in any way guarantee the quality, performance or safety of batteries which have been manufactured by other companies and are not genuine Panasonic products.

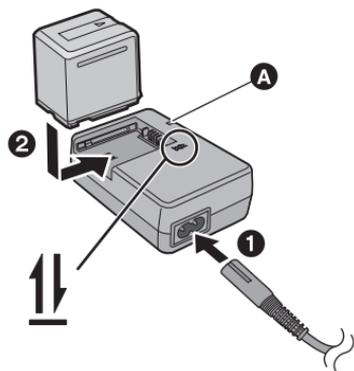
It has been found that counterfeit battery packs which look very similar to the genuine product are made available to purchase in some markets. Some of these battery packs are not adequately protected with internal protection to meet the requirements of appropriate safety standards. There is a possibility 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.

Charging the battery

When this unit is purchased, the battery is not charged. Charge the battery before using this unit.

Important:

If the DC cable is connected to the AC adaptor, then the battery will not charge. Remove the DC cable from the AC adaptor.



Charging lamp [CHARGE] **A**

Lights up:

Charging (Battery charging time: → 17)

Goes off:

Charging completed

Flashing:

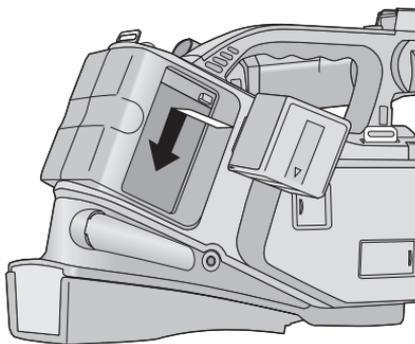
Be sure to connect the unit correctly
(→ 108)

- 1 Connect the AC cable to the AC adaptor and the AC outlet.
- 2 Insert the battery into the AC adaptor by aligning the arrows.

- We recommend using Panasonic batteries (→ 7, 17, 119).
- 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 an automobile exposed to direct sunlight for a long period of time with doors and windows closed.

Inserting/removing the battery

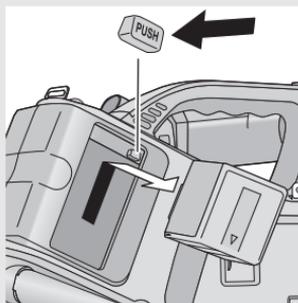
Install the battery by inserting it in the direction shown in the figure and slide it until it clicks and locks.



Removing the battery

Be sure to set the power switch to OFF and the status indicator goes off. Then remove the battery while supporting the unit to prevent it dropping.

While pushing the **PUSH** button, slide the battery in the direction indicated by the arrow.



CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Charging and recording time

■ Charging/Recording time

- Temperature: 25 °C/humidity: 60%RH

Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording mode	Maximum continuously recordable time	Actual recordable time
Supplied battery/ VW-VBG260 (optional) [7.2 V/2500 mAh]	4 h 40 min	HA/HG/HX/ HE	4 h 50 min	3 h
		SA/SX	5 h 5 min	3 h 10 min
VW-VBG130 (optional) [7.2 V/1250 mAh]	2 h 35 min	HA	2 h 30 min	1 h 30 min
		HG/HX/HE		1 h 35 min
		SA/SX	2 h 40 min	1 h 40 min
VW-VBG6 (optional) [7.2 V/5400 mAh]	9 h 25 min	HA/HG	11 h 55 min	7 h 20 min
		HX/HE	12 h	7 h 25 min
		SA/SX	12 h 35 min	7 h 50 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.
- 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 there is less than 3 minutes remaining, then  will become red. If the battery discharges, then  will flash.

- The remaining battery capacity is displayed when using the Panasonic battery that you can use for this unit. The actual time can vary depending on your actual use.
- If the actual remaining time exceeds 9 hours 59 minutes, the indication will stay green and will not change until the remaining time falls below 9 hours 59 minutes.
- When using the AC adaptor or batteries made by other companies, the remaining battery capacity will not be shown.

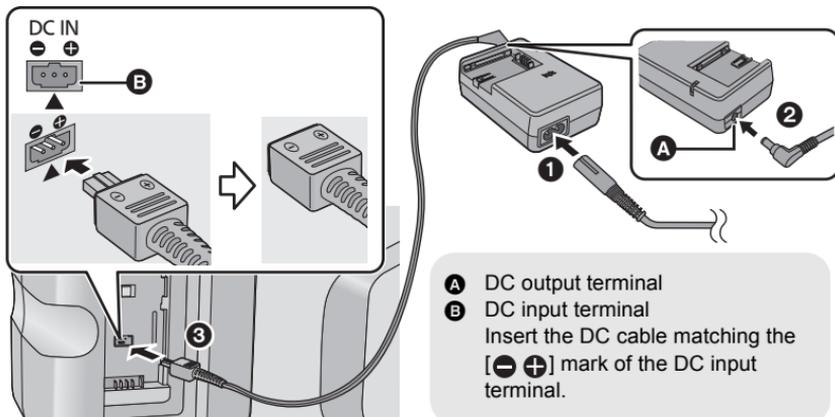
Connecting to the AC outlet

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:

While the DC cable is connected to the AC adaptor, the battery will not charge.

- 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.



- 1** Connect the AC cable to the AC adaptor and the AC outlet.
- 2** Connect the DC cable to the AC adaptor.
- 3** Connect the DC cable to the DC input terminal [DC IN].

-
- When removing the AC adaptor, be sure to set the power switch to OFF and the status indicator goes off. Then remove the AC adaptor.

This unit (an SDXC compatible device) is compatible with SD Memory Cards, 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

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

Card type	Capacity	Motion picture recording	Still picture recording
SD Memory Card	8 MB/16 MB	Cannot be used.	Can be used.
	32 MB/64 MB/ 128 MB/256 MB	Cannot be guaranteed in operation.	
	512 MB/1 GB/ 2 GB	Can be used.	
SDHC Memory Card	4 GB/6 GB/8 GB/ 12 GB/16 GB/ 24 GB/32 GB		
SDXC Memory Card	48 GB/64 GB		

* The SD Speed Class Rating is the speed standard for successive writes.

- 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.)

- 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.

- When the write-protect switch **A** on SD card is locked, no recording, deletion or editing will be possible on the card.
- Keep the Memory Card out of reach of children to prevent swallowing.

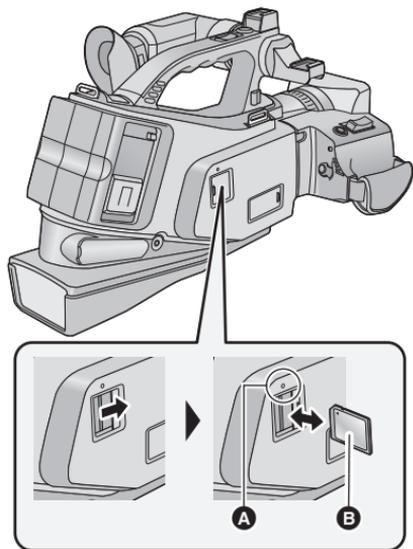


Inserting/removing an SD card

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. (→ 41) 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.

- Face the label side **B** 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.

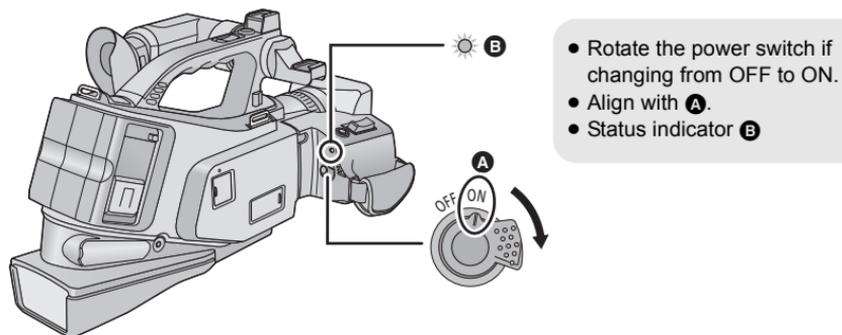
- Securely close it until it clicks.

- 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, garbage 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. (→ 109)

You can turn the unit on and off using the power switch.

Turning the unit on and off with the power switch

Set the power switch to ON to turn on the unit



The status indicator lights.

■ To turn off the unit

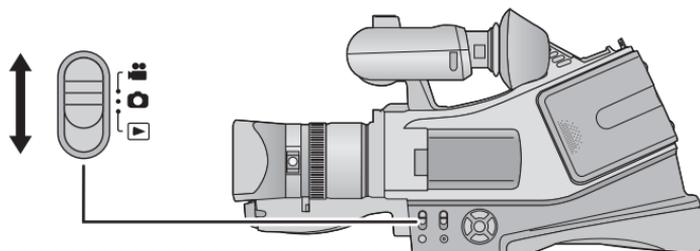
Set the power switch to OFF and the status indicator goes off.

4

Selecting a mode

Change the mode to recording or playback.

Operate the mode switch to change the mode to  ,  or  .



	Motion picture recording mode (→ 28)
	Still picture recording mode (→ 30)
	Playback mode (→ 34, 65)

How to use the touch screen

You can operate by directly touching the LCD monitor (touch screen) with your finger. It is easier to use the stylus pen (supplied) for detailed operation or if it is hard to operate with your fingers.

- The unit supports both operations using the cursor buttons and operations using the touch screen. Select the optimal method according to the situation.
- In this operating instructions, the majority of functions are described on the basis of operations using the cursor buttons.

■ Touch

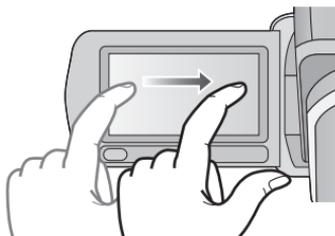
Touch and release the touch screen to select icon or picture.

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



■ Drag

Move your finger while pressing on the touch screen. Can be used during direct playback.



■ About the operation icons

- To operate the following icons using the cursor buttons, select the desired icon using the cursor buttons and then press the button in the centre. (Excluding some functions)



These icons are used to switch the menu and thumbnail display page, for item selection and setting etc.



This icon is used to return to the previous screen such as when setting menus.

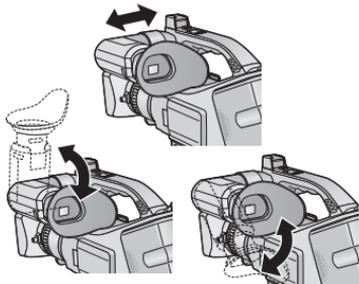


- Do not touch the LCD monitor with hard pointed tips, such as ball point pens.
- Perform the touch screen calibration when the touch is not recognised or wrong location is recognised. (→ 42)

Viewfinder adjustment

■ Using the viewfinder

Pull out the viewfinder and turn the viewfinder upward/downward by pinching the viewfinder extension knob.

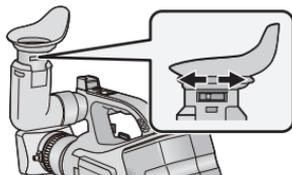


■ Adjusting the field of view

It adjusts the field of view to show the images on the viewfinder clearly.

Adjust the focus by sliding the eyepiece corrector knob.

- Close the LCD monitor to turn on the viewfinder.

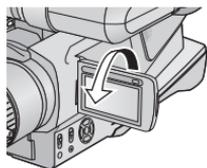


Recording showing the contents to a partner

◇ Change the mode to  or .

Rotate the LCD monitor towards the lens side.

- LCD monitor and viewfinder are turned on during the face-to-face recording when the LCD monitor is rotated towards the lens side.
- Record by viewing the image in the viewfinder during the face-to-face recording.



6

Setting date and time

When the unit is turned on for the first time, a message asking you to set the date and time will appear.

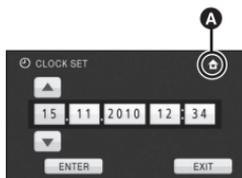
Select [YES] and perform steps 2 to 3 below to set the date and time.

◇ Change the mode to  or  .

1 Select the menu.

 MENU : [SETUP] → [CLOCK SET]

2 Select the date and time to be set using the cursor button right or left, then adjust the desired value using the cursor button up or down.



A Displaying the World time setting (→ 38):

 [HOME]/  [DESTINATION]

- The year can be set between 2000 and 2039.
- The 24-hour system is used to display the time.

3 Select [ENTER] and press the button in the centre.



- The clock function starts at [00] seconds.
- A message prompting for World time setting may be displayed. Perform the World time setting. (→ 38)
- Select [EXIT], then press the button in the centre or press the MENU button to complete the setting.

- The date and time function is driven by a built-in lithium battery.
- When this unit is purchased, the clock is set. 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 the 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.)

Before recording

Check the following by trying recording before important events such as weddings in order to verify that the image recording and audio recording work properly and that you know how to use the unit.

■ Holding the unit for recording

Normal recording



- When walking while recording, keep both eyes open so that you can see where you are going and what is happening around you.
- Place the unit on your right shoulder and hold it firmly with both hands.
- Hold the eyecup of the viewfinder as close as possible to your right eye.
- Take a firm stance with the legs slightly apart.
- For stable images, it is recommended to use a tripod (optional) whenever possible.

Low-angle recording



Adjust the angle of the LCD monitor according to the position in which the unit is held.

- If the unit is not held firmly in stable position, the picture in the LCD monitor cannot be watched properly.
- For easier low-angle recording, the sub recording start/stop button and the sub zoom lever on the front of the unit can be used.

Recording from a high position



For more stable pictures



- Stabilize the unit by resting your elbows on a table or another stable horizontal surface.

■ Basic motion picture recording

- The unit should normally be held steady when recording.
- If you move the unit when recording, do so slowly, maintaining a constant speed.
- The zoom operation is useful for recording subjects you cannot get close to, but overuse of zoom in and zoom out can make the resulting motion picture less enjoyable to watch.

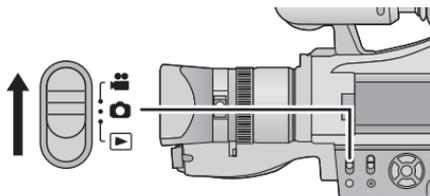
2

Recording motion
pictures

VIDEO

- Remove the lens cap before turning on the unit. (→ 12)

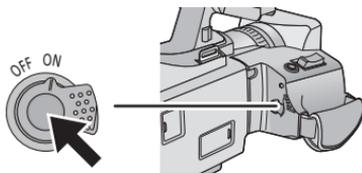
1 Change the mode to .



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

- When you begin recording,  changes to  on the screen.

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



- **Still pictures can be recorded while recording the motion picture. (→ 31)**
- The images recorded between pressing the recording start/stop button to start recording and pressing it again to pause recording become one scene.
- Maximum number of recordable scenes: Approx. 3900
Maximum number of different dates: Approx. 200 (→ 69)
When either of them reaches to the maximum limit, more scenes cannot be recorded.
(In the case of SD cards it is the maximum number of recordable scenes per card.)

■ Screen indications in the motion picture recording mode



- A Recording mode**
- B Approximate remaining recordable time**
(When the remaining time is less than 1 minute, [R 0h00m] flashes red.)
- C Recording time elapsed**
Each time the unit is put into recording pause, the counter display will be reset to "0h00m00s".
("h" is an abbreviation for hour, "m" for minute and "s" for second.)

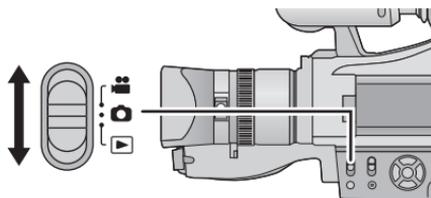
About the compatibility of the recorded motion pictures

- They are not compatible with devices other than those that support AVCHD. Images cannot be played with equipment that does not support AVCHD (ordinary DVD recorders). Confirm that your equipment supports AVCHD by referring to the operating instructions.
- There are some cases where the recorded motion pictures cannot be played back, even if the device supports AVCHD. In such cases, play the recorded motion picture with this unit instead.

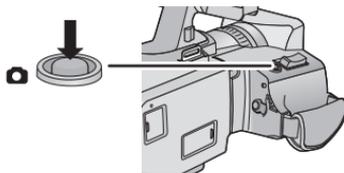
PHOTO

- Remove the lens cap before turning on the unit. (→ 12)

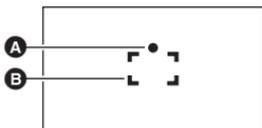
1 Change the mode to .



2 Press the button.



Focus indication:



- A** Focus indication
 - (The white lamp flashes.): Focusing
 - (The green lamp lights up.): When in focus
 - No mark: When focusing is unsuccessful.
- B** Focus area (area inside brackets)

- If you set the optical image stabilizer function (→ 44) to  (MODE1), then the image stabilizer function will be more effective. (MEGA (MEGA optical image stabilizer) will be displayed when the  button is pressed.)
- It is recommended using a tripod when recording still pictures in dark places because the shutter speed becomes slow.
- The screen will become darker when the  button is pressed if the shutter speed is 1/25 or slower.
- To print a picture, print using a PC or a printer.

■ About the screen indications in still picture recording



-  : Still picture operation indicator (→ 98)
-  : MEGA optical image stabilizer (→ 30)
-  : Optical image stabilizer (→ 44)
-  : Quality of still pictures (→ 60)
-  : Size of still pictures (→ 59)
- R3000: Remaining number of still pictures (Flashes in red when [0] appears.)

■ About the focus indication

- The focus indication indicates the status of the auto focus.
- The focus indication does not appear in manual focus mode.
- The focus indication does not appear or has difficulty focusing in the following cases.
 - When close subjects and far subjects are included in the same scene
 - When the scene is dark
 - When there is a bright part in the scene
 - When the scene is filled with only horizontal lines

■ About the focusing area

When there is a contrasting object ahead or behind the subject in the focus area, the subject may not be focused. If so, move the contrasting object out of the focus area.

- Focus area is not displayed in the following conditions.
 - When the Extra optical zoom is used

Recording still pictures in motion picture recording mode

You can record still pictures even in motion picture recording mode.

- ◇ **Change the mode to**  .

Press the  button (press to the bottom) to take the picture.



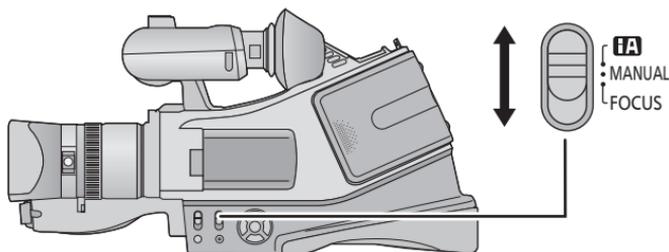
- It is possible to record still pictures while recording motion pictures. (Simultaneous recording)
 - Remaining number of recordable pictures is displayed while still pictures are being recorded.
-
- While recording motion pictures or during the PRE-REC operation, image quality is different from ordinary still pictures so that motion picture recording takes preference over still picture recording.
 - If simultaneous recording is used while recording a motion picture, the recordable time remaining will shorten. If the unit is turned off or the mode switch operated, the recordable time remaining may lengthen.

4

Intelligent auto mode

VIDEO PHOTO

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

**Intelligent auto/manual/manual focus switch**

Slide this switch to change intelligent auto mode/manual mode/manual focus mode.

- Please refer to page 61 about manual mode, page 64 about manual focus mode.

Mode	Scene	Effect
Scenery	Recording outdoors	The whole landscape will be recorded vividly without whitening out the background sky, which may be very bright.
^{*1} Spotlight	Under a spotlight	Very bright object is recorded clearly.
^{*2} Macro	Recording zooming in on a flower etc.	This allows recording while going near to the object of recording.
^{*1} Normal ^{*2}	Other situations	Contrast is adjusted automatically for clear image.

*1 In motion picture recording mode only

*2 In still picture recording mode only

- Depending on the recording conditions, the unit may not enter the desired mode.
- The zoom microphone is set to [OFF] in the intelligent auto mode. (→ 54)

■ Intelligent auto mode

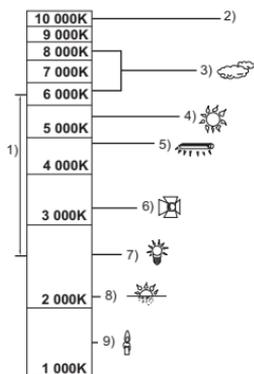
When switching to intelligent auto mode, the auto white balance and auto focus operate and automatically adjust the colour balance and focusing.

Depending on the brightness of the subject etc., the aperture and shutter speed are automatically adjusted for an optimum brightness.

- Colour balance and focus may not be adjusted automatically depending on light sources or scenes. If so, manually adjust these settings. (→ 62, 64)

Automatic white balance

The illustration shows the range over which automatic white balance functions.



- 1) The effective range of automatic white balance adjustment on this unit
- 2) Blue sky
- 3) Cloudy sky (rain)
- 4) Sunlight
- 5) White fluorescent lamp
- 6) Halogen light bulb
- 7) Incandescent light bulb
- 8) Sunrise or sunset
- 9) Candlelight

If the automatic white balance is not functioning normally, adjust the white balance manually. (→ 62)

Auto focus

The unit focuses automatically.

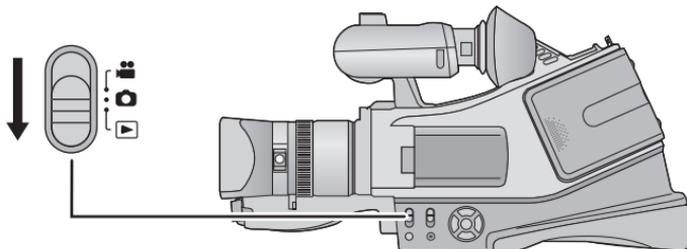
- Auto focus does not work correctly in the following situations. Record pictures in the manual focus mode. (→ 64)
 - Recording distant and close-up objects at the same time
 - Recording a subject behind dirty or dusty window
 - Recording a subject that is surrounded by objects with glossy surfaces or by highly reflective objects

5

Motion picture/Still
picture playback

VIDEO PHOTO

- You can also perform operations by touch operation. (→ 23)



- Change the mode to .
- Select the play mode select icon **A** using the cursor button, then press the button in the centre.



- Select [VIDEO] or [PICTURE] and press the button in the centre.



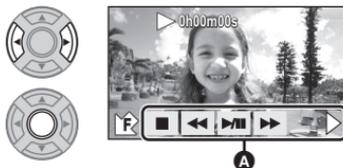
- Select the scene or the still picture to be played back and press the button in the centre.

- Next (previous) page can be displayed by using / .



5 Select the playback operation by selecting the operation icon and press the button in the centre.

- Select  /  and press the button in the centre to display/not-display the operation icon.

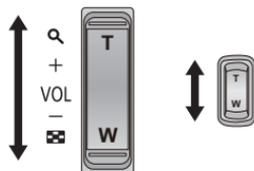


A Operation icon

Motion picture playback	Still picture playback
<p>: Playback/Pause</p> <p>: Rewind playback</p> <p>: Fast forward playback</p> <p>: Stops the playback and shows the thumbnails.</p> <p>: Displays the direct playback bar. (→ 66)</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>

Change the thumbnail display

While the thumbnail is displayed, the thumbnail display changes in the following order if the zoom lever or sub zoom lever are operated to  (T) side or  (W) side.
20 scenes \longleftrightarrow 9 scenes \longleftrightarrow 1 scene \longleftrightarrow
Time frame index* (\rightarrow 67)

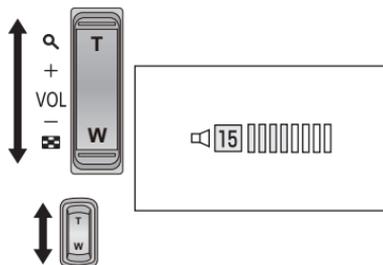


* Time frame index can only set in motion picture playback mode.

- 9 scenes display returns if the unit is turned off or the mode is changed.
- When the thumbnail display is changed to 1 scene during motion picture playback, the recording date and time can be checked. Similarly, when the thumbnail display is changed to 1 still picture during still picture playback, the recording date and file number can be checked.

Speaker/Headphone volume adjustment

Operate the volume lever or the sub zoom lever to adjust the speaker/headphone volume during motion picture playback.



Towards “+(T)”:

Increases the volume

Towards “-(W)”:

Decreases the volume

- Sound will be heard only during normal playback.
- If pause play is continued for 5 minutes, the screen returns to the thumbnails.
- The elapsed time for playback indication will be reset to “0h00m00s” each scene.

Motion picture compatibility

- This unit is based on the AVCHD format.
- The video signal that can be played back on this unit is 1920×1080/50i, 1920×1080/25p, 1440×1080/50i or 720×576/50i.
- This unit may degrade or not play back motion pictures recorded or created on other products, and other products may degrade or not play back motion pictures recorded on this unit, even if the products support AVCHD.

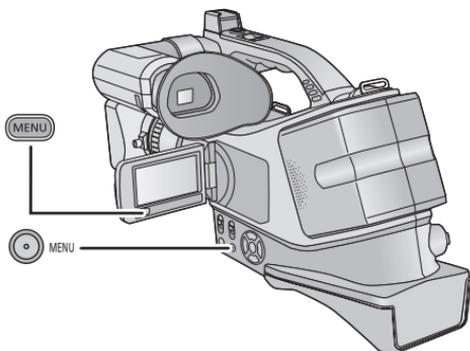
Still picture compatibility

- This unit is compliant with the unified standard DCF (Design rule for Camera File system) established by JEITA (Japan Electronics and Information Technology Industries Association).
- The file format of still pictures supported by this unit is JPEG. (Not all JPEG formatted files will be played back.)
- This unit may degrade or not play back still pictures recorded or created on other products and other products may degrade or not play back still pictures recorded on this unit.

1

Using the menu screen

- You can also perform operations by touch operation. (→ 23)

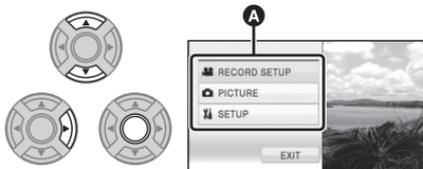


MENU (sub menu button) functions in the same manner as **MENU** (menu button).

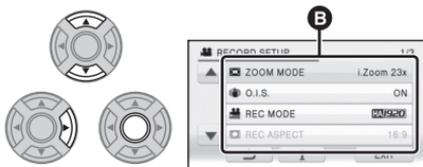
1 Press the MENU button.



2 Select the desired top menu **A** using the cursor button, then press the cursor button right or press the button in the centre.

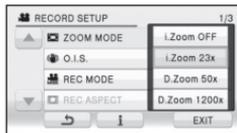


3 Select the submenu item **B**, then press the cursor button right or press the button in the centre.



- Next (previous) page can be displayed by using **▲** / **▼**.

4 Select the desired item, then press the button in the centre to enter the setting.



5 Select [EXIT], then press the button in the centre or press the MENU button to exit the menu setting.

■ About **i** guide display

After selecting **i** and press the button in the centre, selecting the submenus and items and press the button in the centre will cause function descriptions and settings confirmation messages to appear.

- After the messages have been displayed, the menu display is cancelled.

- The items displayed differ depending on the position and settings of the mode switch. **Select the menu.**

 MENU : [SETUP] → desired setting

[DISPLAY] [OFF]/[ON]

The screen display can be changed to [OFF] (a portion of information displayed) or [ON] (all information displayed).

[EXT. DISPLAY] [OFF]/[SIMPLE]/[DETAIL]

Please refer to page 78.

[CLOCK SET]

Please refer to page 25.

[SET WORLD TIME]

It is possible to display and record the time at the travel destination by selecting your home region and the travel destination.

- 1 **Select [SET WORLD TIME] using the cursor button and press the button in the centre.**
 - If the clock is not set, adjust the clock to the current time. (→ 25)
 - When the [HOME] (your home region) is not set, the message appears. Select [ENTER] and press the button in the centre, then proceed to step 3.
- 2 (Only when setting your home region)

Select [HOME] and press the button in the centre.

 - Select [ENTER] and press the button in the centre.
- 3 (Only when setting your home region)

Select your home region using the cursor button right or left, then select [ENTER] and press the button in the centre.

 - Select [SUMMER TIME SET] and press the button in the centre to set daylight saving time.  appears and the summer time setting is turned on; the time difference from GMT is set forward by one hour. Select [SUMMER TIME SET] and press the button in the centre again to return to the normal time setting.



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

4 (Only when setting the region of your travel destination)

Select [DESTINATION] and press the button in the centre.

- Select [ENTER] and press the button in the centre.
- When the home region is set for the first time, the screen for selecting home/travel destination appears after setting the home region successively. If the home region has already been set once, execute the menu operation for step 1.

5 (Only when setting the region of your travel destination)

Select your travel destination using the cursor button right or left, then select [ENTER] and press the button in the centre.

- Select [SUMMER TIME SET] and press the button in the centre to set daylight saving time. ☀️ appears and the summer time setting is turned on. The travel destination time and time difference from the home region time are set forward by one hour. Select [SUMMER TIME SET] and press the button in the centre again to return to the normal time setting.

- Close the setting by pressing the MENU button. ✈️ appears and the time of the travel destination is indicated.



C The local time at the selected travel destination

D The time difference between the travel destination and the home region

To return the display to the home setting

Set the home region using step 1 to 3, and close the setting by selecting [EXIT], then press the button in the centre or pressing the MENU button.

- If you cannot find your travel destination in the area shown on the screen, set it by using the time difference from your home region.

[DATE/TIME]

[OFF]/[D/T]/[DATE]

It is possible to change the date and time display mode.

[DATE FORMAT]

[Y/M/D]/[M/D/Y]/[D/M/Y]

It is possible to change the date format.

[ECONOMY]

[OFF]/[5 MINUTES]

When about 5 minutes have passed without any operation, this unit automatically turns off to save battery life.

- The power save function will not activate when:
 - connected to AC adaptor
 - using the USB cable for PC etc.
 - PRE-REC is used

[QUICK POWER ON]

[OFF]/[ON]

The unit is put into recording pause approx. 1 second when the unit is turned on with the mode set to  or .

- Depending on the recording conditions, start time may be longer than 1 second.
- In the quick power on mode, the zoom magnification becomes 1×.

[REC LAMP]

[OFF]/[ON]

The recording lamp lights up during recording. When this is set to [OFF], it does not light during recording.

[ALERT SOUND]

[OFF]/  / 

Touch screen operation, start and stop of recording and unit on/off can be confirmed with this sound.

 (Volume low) /  (Volume high)

2 Beeps for 4 times

When an error occurs. Check the sentence displayed on the screen. (→ 99)

[LCD SET]

It adjusts brightness and colour density on the LCD monitor.

- These settings will not affect the images actually recorded.

- 1 **Select [LCD SET] using the cursor button and press the button in the centre.**
- 2 **Select the desired setting item and press the button in the centre.**

[BRIGHTNESS]:

Brightness of the LCD monitor

[COLOUR]:

Colour level of the LCD monitor

- 3 **Adjust settings using the cursor button right or left.**
- 4 **Select [ENTER] and press the button in the centre.**



- Select [EXIT] and press the button in the centre or press the MENU button to exit the menu screen.

[EVF SET]

It adjusts the brightness of the viewfinder.

- These settings will not affect the images actually recorded.

- 1 **Select [EVF SET] using the cursor button and press the button in the centre.**
- 2 **Adjust settings using the cursor button right or left.**

- Adjust while checking the picture in the viewfinder.



- 3 **Select [ENTER] and press the button in the centre.**

- Select [EXIT] and press the button in the centre or press the MENU button to complete the setting.

[COMPONENT OUT] [576i]/[1080i]

Please refer to page 79.

[HDMI RESOLUTION] [AUTO]/[1080i]/[576p]

Please refer to page 79.

[VIERA Link] [OFF]/[ON]

Please refer to page 80.

[TV ASPECT] [16:9]/[4:3]

Please refer to page 78.

[INITIAL SET]

Set to [YES] for changing the menu settings back to the default condition.

- Settings for [CLOCK SET] and [LANGUAGE] will not be changed.

[FORMAT CARD]

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, DVD disc etc. (→ 84)

- When formatting is complete, select [EXIT] and press the button in the centre to exit the message screen.
 - Perform a physical formatting of the SD card when the SD card is to be disposed/transferred. (→ 109)
-
- 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. The card may not be used on this unit.

[CARD STATUS]

The amount of space left on the SD card can be checked.

(Only when the mode is at the )

- Select [EXIT] and press the button in the centre or press the MENU button to close the indication.
-
- The SD card requires some space to store information and manage system files, so the actual usable space is slightly less than the indicated value. The usable space is generally calculated as 1 GB=1,000,000,000 bytes. The capacities of this unit, PCs and software are expressed as 1 GB=1,024×1,024×1,024=1,073,741,824 bytes. Therefore, the indicated value of the capacity appears to be smaller.
 - Check the remaining recordable time for motion pictures in motion picture recording mode. (→ 29)

[CALIBRATION]

Perform the touch screen calibration if a different object to the one touched is selected.

● **This function can be performed only by touch operation.**

1 Open the LCD monitor.

2 Touch [CALIBRATION].

● Touch [ENTER].

3 Touch the [+] that appears on the screen with the supplied stylus pen.

● Touch [+] in sequence (up left → down left → down right → up right → centre).

4 Touch [ENTER].

● Calibration cannot be performed when the LCD monitor is turned 180°.

[LANGUAGE]

[English]/[中文]/[العربية]/[فارسی]/[ไทย]/[हिन्दी]

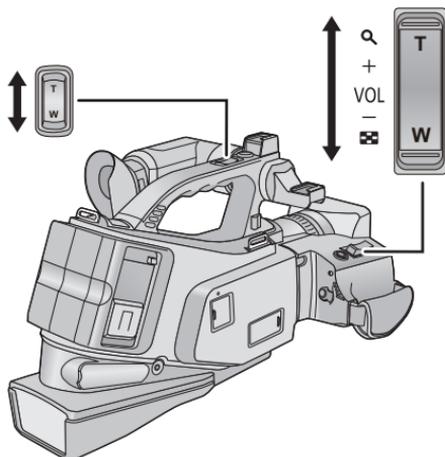
You can select the language on the screen display and the menu screen.

1

Zoom in/out function

The default setting of the [ZOOM MODE] is [i.Zoom 23×]. It can be extended to a maximum of 23× during motion picture recording mode. (→ 52)

◇ Change the mode to  or .

**Zoom lever/Sub 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.
- The sub zoom lever are useful for making fine adjustments to the zoom magnification.

Extra optical zoom**PHOTO**

When in still picture recording mode, it is possible to zoom up to a maximum of 40× without degrading the picture quality by setting the picture size to [4:3 0.3M]. (→ 59)

■ Extra optical zoom mechanism

When you set the picture size to [4:3 0.3M], the maximum [4:3 2.9M] area is cropped to the centre [4:3 0.3M] area, allowing a picture with a higher zoom effect.

- If you take your finger off the zoom lever during zoom operation, the operation sound may be recorded. When returning the zoom lever to the original position, move it quietly.
- When the zoom magnification is 20×, the subjects are focused at about 1.2 m or more.
- When the zoom magnification is 1×, this unit can focus on a subject approx. 4 cm away from the lens.
- The zoom speed does not vary when operating with the sub zoom lever.

VIDEO PHOTO

Use the image stabilizer to reduce the effects of shake during recording.

This unit is equipped with HYBRID O.I.S.

HYBRID O.I.S. is a hybrid of optical and electrical image stabilizer.

◇ Change the mode to  or .

■ Motion picture recording mode



MENU : [RECORD SETUP] → [O.I.S.] → [ON] or [OFF]

- When recording with a tripod in motion picture recording mode, we recommend that you set to [OFF].

(When [O.I.S.] is set to [ON])



MENU : [RECORD SETUP] → [HYBRID O.I.S.] → [ON] or [OFF]

When set to [ON], you can further improve image stabilization for recording while walking, or holding the unit and recording a distant subject with zoom.

- This function's default setting is [ON].
- When [HYBRID O.I.S.] is [ON],  is displayed. When [OFF],  is displayed.

■ Still picture recording mode



MENU : [RECORD SETUP] → [O.I.S.] → [OFF]/[MODE1]/[MODE2]

[OFF]:

Cancel the setting.

[MODE1]:

The function works all the time.

[MODE2]:

The function works when the  button is pressed. We recommend you are recording yourself or recording with a tripod in still picture recording mode.

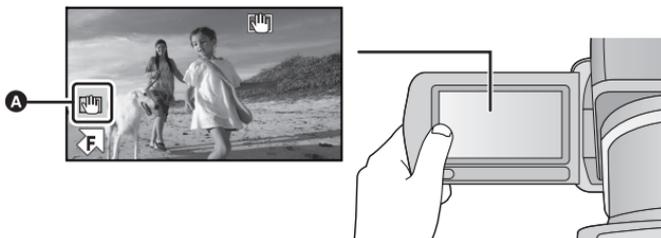
- When [O.I.S.] is [MODE1], ₁ is displayed. When [O.I.S.] is [MODE2], ₂ is displayed.

Optical image stabilizer lock

VIDEO PHOTO

In motion picture recording mode, you can further improve optical image stabilization by touching and holding O.I.S. LOCK icon. With this function, you can further reduce the effects of the shake that tends to occur when using zoom.

- **This function can be performed only by touch operation.**



A O.I.S. LOCK icon

- **Open the LCD monitor before using this function.**
- Set [O.I.S.] to [ON] to switch the image stabilizer to ON.
-  is displayed while you are touching icon.
- Optical image stabilizer lock is released when you remove your finger from the icon.
- Operation icon will disappear when no function is performed for a specific period of time if [DISPLAY] is set to [OFF]. Touch the screen to display it again.

■ Setting to display/not-display the O.I.S. LOCK icon

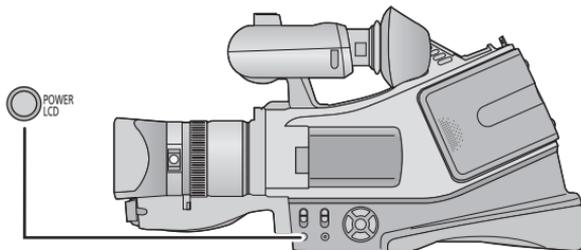


MENU : [RECORD SETUP] → [O.I.S. LOCK DISPLAY] → [ON] or [OFF]

- Stabilization may not be possible under strong shaking conditions.
- To record while moving the unit quickly, release optical image stabilizer lock.

This makes it easier to view the LCD monitor in bright places including outdoors.

- These settings will not affect the images actually recorded.



Power LCD button

Each time the POWER LCD button is pressed, the indication changes by one setting in the following order.

No display (Normal) → [-1]* (Makes less bright) → [A]* (Automatic adjustment) → [+2]* (Makes even brighter) → [+1]* (Makes brighter)

* It is not displayed in the manual mode or in the playback mode.

- When the AC adaptor is in use, the LCD monitor is set to [+1]* automatically.
- The recordable time will become shorter when you use this unit with the LCD monitor lit up.

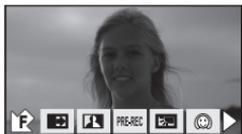
4

Recording functions of
operation icons

Select the operation icons to add different effects to the images to be recorded.

◇ Change the mode to  or .

1 Select  using the cursor button and press the button in the centre to display the operation icons on the screen.



- Select  at the bottom right of the screen and press the button in the centre to change the page.
- Select  /  and press the button in the centre to display/not-display the operation icon.

2 (e.g. Backlight compensation)
Select an operation icon and press the button in the centre.



- Select the operation icon and press the button in the centre again to cancel the function.

Operation icons

	Fade* ¹
	Intelligent contrast control* ^{1, 2}
PRE-REC	PRE-REC* ¹
	Intelligent exposure* ^{2, 3}
	Backlight compensation
	Soft skin mode* ²
	Tele macro
	Guideline
	Colour night view* ^{1, 2}
	Headphone volume adjustment* ⁴

*1 It is not displayed in still picture recording mode.

*2 It is not displayed in the intelligent auto mode.

*3 It is not displayed in motion picture recording mode.

*4 It is displayed only when a headphone is connected to the headphone output terminal.

- If you turn off the unit or change the mode to , PRE-REC, backlight compensation, colour night view and tele macro functions are cancelled.
- If you turn off the unit, the fade function is cancelled.
- It is possible to set from the menu. (Except for the PRE-REC)
- After setting [DISPLAY] to [OFF] if no operation is performed for a few seconds, the operation icon disappears. Press any cursor button to display the icon again.

Fade

VIDEO

When you start recording, the image/audio gradually appears. (Fade in)

When you pause recording, the image/audio gradually disappears. (Fade out)

- The fade setting is cancelled when the recording stops.

■ To select the colour for fade in/out

 MENU : [RECORD SETUP] → [FADE COLOUR] → [WHITE] or [BLACK]

(Fade in)



(Fade out)



-
- The thumbnails of scenes recorded using fade in become black (or white).

Intelligent contrast control

VIDEO

This brightens parts that are in shadow and difficult to see and suppresses white saturation in bright parts at the same time. Both bright and dark parts can be recorded clearly.

-
- If there are extremely dark or bright parts or the brightness is insufficient, the effect may not be clear.

PRE-REC

PRE-REC

This prevents you from missing a shot.

VIDEO

This allows recording of the pictures and sound to start approximately 3 seconds before the recording start/stop button is pressed.

-  appears on the screen.

• Aim the unit at the subject beforehand.

- There is no beep sound.
- PRE-REC is cancelled in the following cases.
 - If you change the mode.
 - If you remove the SD card.
 - If you press the MENU button.
 - If you turn the unit off.
 - If you start recording.
 - After 3 hours have passed
- After setting PRE-REC, if recording starts in less than 3 seconds, motion pictures taken 3 seconds before pressing the recording start/stop button cannot be recorded.
- Images displayed on the thumbnail in playback mode will differ from the motion pictures displayed at the start of playback.



Intelligent exposure

PHOTO

This brightens dark parts so the image can be recorded clearly.

- If there are extremely dark parts or the brightness is insufficient, the effect may not be clear.



Backlight compensation

VIDEO

PHOTO

This makes the image brighter to prevent darkening of a backlit subject.



Soft skin mode

VIDEO

PHOTO

This makes skin colours appear softer for a more attractive appearance. This is more effective if you record a person closely from the torso up.

- If the background or anything else in the scene has colours similar to the skin colour, they will also be smoothed.
- If the brightness is insufficient, the effect may not be clear.
- If you record a person in the distance, the face may not be recorded clearly. In this case, cancel soft skin mode or zoom in on the face (close-up) to record.



Tele macro

VIDEO

PHOTO

A more impressive image can be obtained by focusing on the object only in close-up and shading off the background.

- The unit can focus on the subject at a distance of approx. 50 cm.
 - If the magnification is 20× or less, then it is automatically set to 20×.
-
- The tele macro function is cancelled when the zoom magnification becomes lower than 20×.



Guideline

VIDEO

PHOTO

You can check if the image is level while recording or playing back motion pictures and still pictures. The function can also be used to estimate the balance of the composition.

■ Selecting the type of Guideline

→ → → Setting cancelled



- The guidelines do not appear on the images actually recorded.

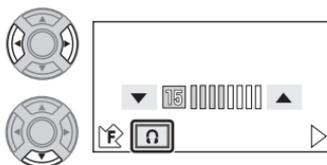
This function allows you to record colour images in very low light situations. (Minimum required illumination: approx. 1 lx)

- Recorded scene is seen as if frames were missed.
- If set in a bright place, the screen may become washed out for a while.
- Bright dots that are usually invisible may be seen, but this is not a malfunction.
- Using a tripod is recommended.
- In darker areas, auto focus may focus a bit slower. This is normal.

 **Headphone volume adjustment**

Adjust the volume of the headphone using the cursor button right or left while recording.

- Press the cursor button down to complete the setting.



- It is possible to adjust the volume of the headphone by using  (Increase the volume)/  (Decrease the volume) while recording. (When the LCD monitor is in use)
- Actual volume to be recorded does not change.

Recording functions of menus

[SCENE MODE]

VIDEO

PHOTO

When you record images in different situations, this mode automatically sets optimum shutter speeds and apertures.

- Change the mode to  or .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)



MENU : [RECORD SETUP] → [SCENE MODE] → desired setting

[OFF]:

Cancel the setting

 Sports:	To make fast moving scenes less shaky with slow playback and pause of playback
 Portrait:	To make people stand out against the background
 Spotlight:	Improved quality when subject is brightly illuminated.
 Snow:	Improved image quality when shooting on snowy locations.
 Beach:	To make blue in the sea or sky vibrant
 Sunset:	To make red in the sunrise or sunset vibrant
 Fireworks:	To capture the fireworks in the night sky beautifully
 Scenery:	For spatial scenery
 Low light:	For dark scenes, such as at dusk (In motion picture recording mode only)
 Night scenery:	To capture the evening or night scenery beautifully.
 Night portrait:	To capture a person and the background brightly. (In still picture recording mode only)

- **(Sports/Portrait/Spotlight/Snow/Beach/Sunset/Scenery)**
 - The shutter speed is 1/6 or more in still picture recording mode.
- **(Sunset/Low light)**
 - The shutter speed is 1/25 or more in motion picture recording mode.
- **(Sunset/Fireworks/Scenery/Night scenery)**
 - Image may get blurry when close object is recorded.
- **(Sports)**
 - During normal playback, the image movement may not look smooth.
 - Colour and screen brightness may change under indoor lighting.
 - If the brightness is insufficient, the sports mode does not function. The  display flashes.
- **(Portrait)**
 - Colour and screen brightness may change under indoor lighting.

- **(Fireworks)**

- The shutter speed is 1/25.
- Image may get washed out when recorded in bright surrounding.

- **(Night scenery/Night portrait)**

- The shutter speed is 1/2 or more in still picture recording mode.
- It is recommended using a tripod.

[ZOOM MODE]

VIDEO

PHOTO

Set the maximum zoom ratio for the motion picture recording mode.

- **Change the mode to**  .



MENU : [RECORD SETUP] → [ZOOM MODE] → desired setting

[i.Zoom OFF]:	Up to 20×
[i.Zoom 23×]:	This zoom function allows you to maintain high-definition picture quality. (Up to 23×)
[D.Zoom 50×]:	Digital zoom (Up to 50×)
[D.Zoom 1200×]:	Digital zoom (Up to 1200×)

- The larger the digital zoom magnification, the more the image quality is degraded.

- This function cannot be used in still picture recording mode.

[REC MODE]

VIDEO

Switch the picture quality of the motion pictures to be recorded.

- **Change the mode to**  .



MENU : [RECORD SETUP] → [REC MODE] → desired setting

(1920×1080)

(720×576)

[HA]/[HG]/[HX]/[HE]

[SA]/[SX]



- A** Image quality prioritised
- B** Recording time prioritised

- **Recordable time using the battery (→ 17)**

- This function's default setting is [HA] mode.
- Please refer to page 112 about approximate recordable time.
- When the unit is moved a lot or moved quickly, or when a fast-moving subject is recorded (particularly when recording in [HE]/[SX] mode), mosaic-type noise may appear at playback.

[REC ASPECT]

VIDEO

You can select an aspect ratio for the video you record.

- Change the mode to  .
- Set [REC MODE] to [SA] or [SX]. (→ 52)



MENU : [RECORD SETUP] → [REC ASPECT] → desired setting

[16:9]: Aspect ration of high-definition television, etc.

[4:3]: Aspect ration of 4:3 television

[AGS]

VIDEO

If the unit continues to be tilted upside down from the normal horizontal position while recording motion pictures, it is automatically put into recording pause.

- Change the mode to  .



MENU : [RECORD SETUP] → [AGS] → [ON]

- The AGS function may activate and cause the unit to pause the recording if you are recording a subject right above or right below you.

[Digital Cinema Colour]

VIDEO

Recording motion pictures with more vivid colours, using x.v.Colour™ technology.

- Change the mode to  .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)



MENU : [RECORD SETUP] → [Digital Cinema Colour] → [ON]

- For more realistic colours, use an HDMI mini cable with a TV that supports the x.v.Colour™ .
- This function cannot be used when set to intelligent auto mode.
- **When motion pictures recorded while this function is turned [ON] are played back with a TV not compatible with x.v.Colour™ , colours may not be reproduced properly.**
- To play back images recorded in the digital cinema colour with vivid colours of wider colour ranges, a device compatible with x.v.Colour™ is required. When these images are played back with devices other than ones compatible with x.v.Colour™ , it is recommended to record the images after this function is turned [OFF].
- x.v.Colour™ is a name for devices that are compatible with the xvYCC format, an international standard for expanded colour in motion pictures, and that follow the rules for signal transmission.

[WIND NOISE CANCELLER]

VIDEO

This will reduce the wind noise coming into the built-in microphones while maintaining the realism.

- Change the mode to .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)



MENU : [RECORD SETUP] → [WIND NOISE CANCELLER] → [ON]

- This function's default setting is [ON].
- When changing to intelligent auto mode, [WIND NOISE CANCELLER] is set to [ON], and the setting cannot be changed.
- You may not see the full effect depending on the recording conditions.
- If wind sound cannot be reduced with the wind noise canceller function alone, set [BASS SETTING] to [LOWCUT]. (→ 56)

[ZOOM MIC]

VIDEO

Directivity of the microphone is interlocked with the zoom operation. Sounds near the front of the unit are recorded more clearly if you zoom in (close-up) and surrounding sounds are recorded more realistically if you zoom out (wide angle).

- Change the mode to .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)



MENU : [RECORD SETUP] → [ZOOM MIC] → [ON]

When recording, the input level from the built-in microphones and the external microphone terminal can be adjusted.

- Change the mode to .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)

1 Select the menu.



MENU : [RECORD SETUP] → [MIC LEVEL] → desired setting

[AUTO]:

AGC is activated, and the recording level is adjusted automatically.

[SET+ **AGC**]/[SET]:

The desired recording level can be set.

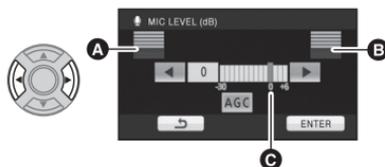
2 (When [SET+ **AGC**]/[SET] is selected)

Adjust the microphone input level using the cursor button right or left.

- Select **AGC** using the cursor button and press the cursor button in the centre to activate/disactivate AGC. When AGC is activated, the icon is surrounded by yellow and the amount of sound distortion can be reduced. When AGC is deactivated, natural recording can be performed.
- Adjust the microphone input level so that the last 2 bars of the gain value are not red.

(Otherwise, the sound is distorted.) Select a lower setting for microphone input level.

3 Select [ENTER] using the cursor button and press the button in the centre to determine the microphone input level, then select [EXIT] and press the button in the centre.



- A** Left
- B** Right
- C** Microphone input level

-  (Microphone input level meter) is displayed on the screen.
- When changing to intelligent auto mode, the setting is fixed to [AUTO] and cannot be changed.
- When [ZOOM MIC] is [ON], the volume will be different depending on the zoom rate.
- The microphone input level meter shows the larger of the inputs from the 2 built-in microphones.
- You cannot record with the audio completely muted.

[BASS SETTING]

VIDEO

Change the lower setting of the built-in microphone according to your choice.

- Change the mode to .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)



MENU : [RECORD SETUP] → [BASS SETTING] → desired setting

[0dB]/[+3dB]/[+6dB]/[LOWCUT]

- Normally set to [0dB].
- Select [+3dB] or [+6dB] to get strong power feeling at bass level.

[PICTURE ADJUST]

VIDEO

PHOTO

Adjust the quality of the image while recording.

Adjust by outputting to a TV while adjusting the quality of the image.

- Change the mode to  or .

(This setting is retained when you change between motion picture recording mode and still picture recording mode)

- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)

1 Select the menu.



MENU : [RECORD SETUP] → [PICTURE ADJUST]

- 2 Select the desired setting items using the cursor button and press the button in the centre.

[SHARPNESS]:	Sharpness of the edge
[COLOUR]:	Depth of the colour of the image
[EXPOSURE]:	Brightness of the image
[WB ADJUST]:	Picture colour balance

3 Adjust settings using the cursor button right or left.



4 Select [ENTER] and press the button in the centre.

- Select [EXIT] and press the button in the centre or press the MENU button to complete the settings.
-  appears on the screen.

[ZEBRA]

VIDEO

PHOTO

Parts where white saturation (colour saturation) is likely to occur (extremely brightly lit or shiny parts) are displayed with diagonal lines (zebra pattern).

- Change the mode to  or .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)



MENU : [RECORD SETUP] → [ZEBRA] → [ON]

- You can record an image with little white saturation if you manually adjust the shutter speed or brightness (iris/gain) (→ 63).
- The zebra pattern does not appear on the images actually recorded.



A

A Zebra pattern

[LUMINANCE]

VIDEO

PHOTO

Displays the luminance level of the centre of the screen (luminance display frame) in %. It makes the adjustment of the brightness of the object easier, by checking the luminance level of the object, when recording same object in different surroundings.

Adjust the brightness using [IRIS]. (→ 63)

- Change the mode to  or .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)



MENU : [RECORD SETUP] → [LUMINANCE] → desired setting

[OFF]:

Cancel the setting.

[ANYTIME]:

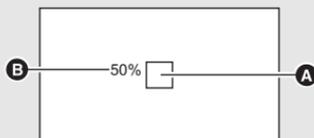
Constantly display.

[ON ADJUST]:

Display only when [IRIS] is adjusted. (→ 63)

A Luminance display frame

B Luminance level



- Luminance level is displayed between [0%] and [99%]. It will be displayed as [99%↑] when it is over 99%.
- Luminance is displayed while adjusting [IRIS] even if [DISPLAY] is set to [OFF].

A graph with brightness as horizontal axis and number of pixels at that brightness as vertical axis is displayed. It is possible to determine the exposure of the whole image by looking at the distribution in the graph.

Adjust the brightness using [IRIS]. (→ 63)

- Change the mode to  or .
- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)



MENU : [RECORD SETUP] → [HISTOGRAM] → desired setting

[OFF]:

Cancel the setting.

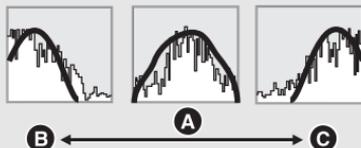
[ANYTIME]:

Constantly display.

[ON ADJUST]:

Display only when [IRIS] is adjusted. (→ 63)

- A Normal
- B Dark
- C Bright

■ Example of the display

- Histogram is displayed while adjusting [IRIS] even if [DISPLAY] is set to [OFF].

The higher the number of pixels, the higher the clarity of the picture when printing.

- Change the mode to  .



MENU : [PICTURE] → [PICTURE SIZE] → desired setting

Picture size and Maximum zoom ratio

Aspect ratio will change depending on the picture size.

4:3: Aspect ratio of 4:3 television

3:2: Aspect ratio of conventional film camera or prints (such as L-size print)

16:9: Aspect ratio of high-definition television, etc.

Picture size		Aspect ratio	Extra optical zoom (→ 43)
2.9M	1952×1464	4:3	—*
0.3M	640×480		40×
2.8M	2064×1376	3:2	—*
2.1M	1920×1080	16:9	—*

* Extra optical zoom cannot be used. The maximum zoom magnification is 20×.

Picture size in motion picture recording mode

Picture size will change depending on recording mode or aspect ratio.

Picture size		Aspect ratio	Recording mode
	1920×1080	16:9	HA/HG/HX/HE
			SA/SX
	640×480	4:3	SA/SX

- This function's default settings are [2.9M] in still picture recording mode and [] (1920×1080) in motion picture recording mode.
- The recording will become longer depending on the recording pixels.
- Please refer to page 113 about the number of recordable pictures.
- When the picture size is [2.9M], [0.3M], [2.8M] or [] (640×480), black bands may appear on the left and right of the screen.
- The edges of still pictures recorded on this unit with a 16:9 aspect ratio may be cut at printing. Check the printer or photo studio before printing.

[QUALITY]

PHOTO

Selecting the picture quality.

- Change the mode to  or .

 MENU : [PICTURE] → [QUALITY] → desired setting

 : Still pictures with a high picture quality are recorded.

 : Priority is given to the number of still pictures recorded. Still pictures are recorded in normal picture quality.

[SHTR SOUND]

PHOTO

You can add a shutter sound when recording still pictures.

- Change the mode to .

 MENU : [PICTURE] → [SHTR SOUND] → [OFF]/  / 

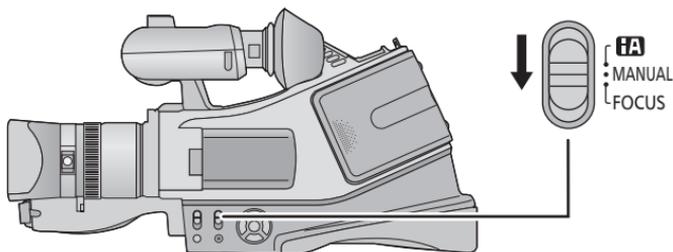
- No shutter sound is emitted in motion picture recording mode.

- ◇ Change the mode to  or .

(The white balance, shutter speed, brightness (Iris and Gain) settings are retained when you change between motion picture recording mode and still picture recording mode.)

Set the i/MANUAL/FOCUS switch to manual mode.

- **MNL** appears on the screen.



WB

White balance (→ 62)

SHTR

Manual shutter speed (→ 63)

IRIS

Iris adjustment (→ 63)

Perform the setting by selecting the desired item to be set with the cursor button and press the button in the centre.

- Select  and press the button in the centre to change the page.
- Select  /  and press the button in the centre to display/not-display the manual icon.

The automatic white balance function may not reproduce natural colours depending on the scenes or lighting conditions. If so, you can adjust the white balance manually.

- Set the iA/MANUAL/FOCUS switch to manual mode. (→ 61)

1 Select [WB] using the cursor button right or left and press the button in the centre.

2 Select white balance mode using the cursor button up or down and press the button in the centre.



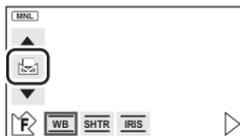
- Select the optimal mode by confirming the colour on the screen.

Icon	Mode/Recording conditions
	Auto white balance adjustment
	Sunny mode Outdoors under a clear sky
	Cloudy mode Outdoors under cloudy sky
	Indoor mode 1 Incandescent light, video lights like in the studio, etc.
	Indoor mode 2 Colour fluorescent lamps, sodium lamps in gymnasiums etc.
	Manual adjustment mode <ul style="list-style-type: none"> ● Mercury-vapor lamps, sodium lamps, some fluorescent lights ● Lights used for wedding receptions at hotels, stage spotlights in theaters ● Sunrise, sunset, etc.

- To return to auto setting, set to **AWB** or set the iA/MANUAL/FOCUS switch to intelligent auto mode.

■ To set the white balance manually

- 1 Select using the cursor button up or down, fill the screen with a white subject.
- 2 Select the blinking and press the button in the centre.



- When the screen turns black instantly and the display stops flashing and then lights constantly, the setting is complete.
- If the display continues flashing, the white balance cannot be set. In this case, use other white balance modes.

-
- If you turn on the unit with the lens cap attached, the auto white balance will not be performed correctly. Always remove the lens cap before turning on the unit.
 - When the display flashes, the manual white balance previously adjusted is stored. Whenever recording conditions change, re-set the white balance.
 - When setting both the white balance and the iris/gain, set the white balance first.
 - **AWB** is not displayed on the screen when **AWB** is being set.

Shutter Speed:

Adjust it when recording fast-moving subjects.

Iris:

Adjust it when the screen is too bright or too dark.

- Set the **iA/MANUAL/FOCUS** switch to manual mode. (→ 61)

- 1** Select **[SHTR]** or **[IRIS]** using the cursor button right or left and press the button in the centre.
- 2** Adjust settings using the cursor button up or down and press the button in the centre.

[SHTR] : Shutter speed:

1/50 to 1/8000

- The shutter speed closer to 1/8000 is faster.
- The shutter speed will be set between 1/2 and 1/2000 in still picture recording mode.

[IRIS] : Iris/Gain value:

CLOSE (↔ **F16 to F2.0**) ↔ **OPEN** (↔ **0dB to 18dB**)

- Value closer to **[CLOSE]** darken the image.
- Value closer to **[18dB]** brighten the image.
- When the iris value is adjusted to brighter than **[OPEN]**, it changes to the gain value.
- To return to auto setting, set the **iA/MANUAL/FOCUS** switch to intelligent auto mode.

- When setting both the shutter speed and the iris/gain value, set the shutter speed and then set the iris/gain value.

Manual shutter speed adjustment

- When the shutter speed is set lower than 1/12 in the still picture recording mode, it is recommended using a tripod. Also, white balance cannot be set. The shutter speed will be set to 1/25 when the unit is turned on again.
- You may see a band of light around the object that is shining very bright, or having very high reflection.
- During normal playback, image movement may not look smooth.
- If you record an extremely bright object or record under indoor lighting, colour and screen brightness may change or a horizontal line may appear on the screen. In this case, record in the 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.

Manual iris/gain adjustment

- Luminance level and histogram are displayed during the iris adjustment. (→ 57, 58)
- If the gain value is increased, the noise on the screen increases.
- Depending on the zoom magnification, there are iris values that are not displayed.

Recording with manual focus

VIDEO PHOTO

Perform focus adjustment using the focus ring.

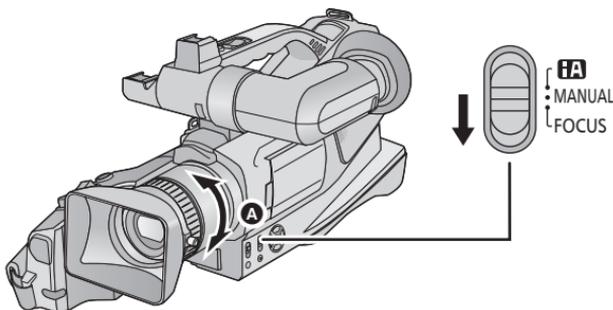
If auto focusing is difficult due to the conditions, then use manual focus.

◇ Change the mode to  or .

(The manual focus setting is retained when you change between motion picture recording mode and still picture recording mode.)

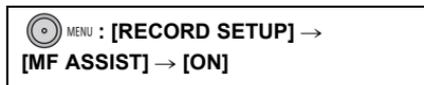
Set the iA/MANUAL/FOCUS switch to manual focus mode, then slide the iA/MANUAL/FOCUS switch to FOCUS.

• MF appears on the screen.



A Rotate the focus ring to adjust the focus.

1 (When MF assist function is used)
Select the menu.



2 Adjust the focus by rotating the focus ring.



B Part displayed in blue

The in-focus area is displayed in blue. The normal screen returns approximately 2 seconds after you finish bringing the subject into focus.

- When [MF ASSIST] is [OFF], the blue area is not displayed.
- To restore auto focus, slide the iA/MANUAL/FOCUS switch to FOCUS again or set the iA/MANUAL/FOCUS switch to intelligent auto mode.

• The blue display does not appear on the images actually recorded.

Motion picture playback using operation icon

VIDEO

For details on the basic playback operations, refer to page 34.

Playback operation	Playback display	Operating steps
Fast forward/ rewind playback	<p>During Playback</p> 	<p>Select ▶▶ using the cursor button and press the button in the centre during playback to fast forward. (Select ◀◀ and press the button in the centre to rewind.)</p> <ul style="list-style-type: none"> The fast forward/rewind speed increases if you select ▶▶/◀◀ and press the button in the centre again. (The display on the screen changes from ▶▶ to ▶▶▶.) Normal playback is restored when you select ▶/ and press the button in the centre.
Slow-motion playback	<p>During Pause</p> 	<p>With the playback paused, select ▶ and continue pressing the button in the centre. (◀ is for slow rewind playback)</p> <p>Playback is slow while pressing the button in the centre.</p> <ul style="list-style-type: none"> Normal playback is restored when you select ▶/ and press the button in the centre. When slow-motion pictures are played back in reverse, they will be shown continuously at approximately 2/3rd the speed of normal playback (intervals of 0.5 seconds).
Frame-by-frame playback The motion picture is advanced one frame at a time.		<p>With the playback paused, select ▶ and press the button in the centre. (Select ◀ and press the button in the centre to advance the frames one at a time in the reverse direction.)</p> <ul style="list-style-type: none"> Normal playback is restored when you select ▶/ and press the button in the centre. When the frames are advanced one at a time in the reverse direction, they will be shown in intervals of 0.5 seconds.

Playback operation	Playback display	Operating steps
Direct playback	<p>During Playback</p>	<ol style="list-style-type: none"> 1) Open the LCD monitor. 2) Touch ► to display the direct playback bar A. 3) Touch or drag the direct playback bar. (→ 23) <p>(This operation can be performed only by touch operation.)</p> <ul style="list-style-type: none"> • The playback pauses temporarily and skips to the touched or dragged position. • Playback will start by releasing your touching or dragging finger. • Touch ◀ to display the operation icon.

Creating still picture from motion picture

VIDEO

A single frame from the recorded motion picture can be saved as a still picture. Picture size of the still picture to be created will differ depending on the recording mode of the recorded motion picture.

Recording mode	Aspect ratio	Picture size after creating still picture	
HA/HG/HX/HE	16:9	2.1M	1920×1080
SA/SX	16:9	0.2M	640×360
	4:3	0.3M	640×480

1 Pause at the scene you want to save as a still picture during playback.

- It is convenient to use slow-motion playback and frame-by-frame playback.

2 Press the button.

- Date the motion picture was recorded will be registered as date of the still picture.
- Quality will be different from the normal still picture.

Time frame index

VIDEO

An image of one scene is displayed as a thumbnail at set search condition. Scene can be played back from any midway point of the scene you wish to see.

- Operate the zoom lever or the sub zoom lever to **Q (T)** side and change over the thumbnail display to Time frame index. (→ 36)

1 Go to the selected search condition using the cursor button, and press the button in the centre.

- Next (previous) scene can be displayed by using



2 Select the desired search condition and press the button in the centre.

[3 SECONDS]/[6 SECONDS]/[12 SECONDS]/
[MINUTES]

3 (When [MINUTES] is selected)

Set the time using the cursor button up or down.

- It can be set up to a maximum of 60 minutes.
- Select [ENTER] and press the button in the centre.



- A** Selected search condition
- B** Scene selection

4 Select the thumbnail to be played back and press the button in the centre.

- Next (previous) thumbnail can be displayed by using

Repeat playback

VIDEO

Playback of the first scene starts after playback of the last scene finishes.



MENU : [VIDEO SETUP] → [REPEAT PLAY] → [ON]

The indication appears on the full screen views.

- All the scenes are played back repeatedly. (When playing back motion pictures by date, all the scenes on the selected date are played back repeatedly.)

Resuming the previous playback

VIDEO

If playback of a scene was stopped halfway, the playback can be resumed from where it was stopped.



MENU : [VIDEO SETUP] → [RESUME PLAY] → [ON]

If playback of a motion picture is stopped,  appears on the thumbnail view of the stopped scene.

- The memorised resume position is cleared if you turn off the unit or change the mode. (The setting of [RESUME PLAY] does not change.)

Playing back motion pictures/still pictures by date

VIDEO PHOTO

The scenes or the still pictures recorded on the same day can be played back in succession.

- 1 Select the date select icon using the cursor button and press the button in the centre.**



A Date select icon

- 2 Select the playback date and press the button in the centre.**

The scenes or the still pictures recorded on the date selected are displayed as thumbnails.

- 3 Select the scene or the still picture to be played back and press the button in the centre.**

- Playing back of all the scenes or the still pictures returns if the unit is turned off or the mode is changed.
- Even if scenes are recorded on the same day, they are grouped separately in the following cases. -1, -2... is added after the recording date displayed on the screen.
 - When the number of scenes exceeds 99
 - When switching between scenes recorded using [HA], [HG], [HX] or [HE] and scenes recorded using [SA] or [SX] in playback mode
 - When the media is repaired
- Even if still pictures are recorded on the same day, they are grouped separately in the following cases.
 - When the number of still pictures exceeds 999
-  is displayed after the date in the list by date for the still pictures created from the motion picture. (→ 66)

Changing the playback settings and playing back the slide show

PHOTO

- 1** Select  using the cursor button and press the button in the centre.



- 2** Select the desired item and press the button in the centre.

[DATE SETUP]: Select the date to be played back.

[SLIDES INTERVAL]: Selects the interval between still pictures at playback.

[MUSIC SELECT]: Select the music to be played on playback.

- 3** (When [DATE SETUP] is selected)
Select the playback date and press the button in the centre.



(When [SLIDES INTERVAL] is selected)

Select the interval of playback for the slide show and press the button in the centre.

[SHORT]: Approx. 1 second

[NORMAL]: Approx. 5 seconds

[LONG]: Approx. 15 seconds

(When [MUSIC SELECT] is selected)

Select the desired sound and press the button in the centre.

- To adjust the volume of music during playback of the slide show or audio testing, operate the volume lever or the sub zoom lever. (→ 36)
- Select [ENTER] and press the button in the centre.

(To test the music audio)

Select [START], then press the button in the centre and start the audio testing.

- Select the other music option and press the button in the centre to change the music to be tested.
- When you select [STOP] and press the button in the centre, the music playback stops.

4 Select [START] and press the button in the centre.

5 Select the playback operation. (→ 34)

- When the playback is finished or stopped, the screen to select [REPLAY], [SELECT AGAIN] or [EXIT] is displayed. Select the desired item and press the button in the centre.



1

Deleting scenes/still pictures

VIDEO PHOTO

Deleted scenes/still pictures cannot be restored, so perform appropriate confirmation of the contents before proceeding with deletion.

◇ Change the mode to  .

■ Deleting multiple scenes/still pictures from the thumbnail display

1 Select the menu.



MENU : [EDIT SCENE] or [PHOTO SETUP] → [DELETE] → [ALL SCENES] or [SELECT]

- When [ALL SCENES] is selected, all the scenes or still pictures on the media will be deleted.
(In case of playing back scenes or still pictures by date, all the scenes or still pictures on the selected date will be deleted.)
- Protected scenes/still pictures cannot be deleted.

2 (When [SELECT] is selected in step 1)

Select the scene/still picture to be deleted and press the button in the centre.

- When the button in the centre is pressed, the scene/still picture is selected and  appears on the thumbnail. Select the scene/still picture again and press the button in the centre to cancel the operation.
- Up to 99 scenes can be selected to be deleted.

3 (When [SELECT] is selected in step 1)

Select [Delete], then press the button in the centre.

- To continuously delete other scenes/still pictures, repeat steps 2-3.

When you stop deleting halfway

Select [CANCEL], then press the button in the centre or press the MENU button while deleting.

- The scenes or still pictures that have already been deleted when the deletion is cancelled cannot be restored.

To complete editing

Press the MENU button.

-
- Scenes which cannot be played back (the thumbnails are displayed as ) cannot be deleted.
 - In case of [ALL SCENES], the deletion may take time if there are many scenes or still pictures.
 - If you delete scenes recorded on other products or still pictures conforming to DCF standard with this unit, all the data related to the scenes/still pictures may be deleted.
 - When still pictures recorded on an SD card by other products are deleted, a still picture (other than JPEG) that cannot be played back on this unit may be erased.

Dividing a scene to partially delete

VIDEO

To delete an unnecessary portion of a scene, first divide the scene and then delete the unnecessary portion.

- Change the mode to  .
- Select the play mode select icon and press the button in the centre to select [VIDEO] (→ 34)

1 Select the menu.

 MENU : [EDIT SCENE] → [DIVIDE] → [SET]

2 Select the scene to be divided and press the button in the centre.

3 Select and press the button in the centre to set the dividing point.

- Using slow-motion playback or frame-by-frame playback makes it easy to search for the point where you want to divide the scene. (→ 65)
- Select [YES] and press the button in the centre to continue dividing the same scene. To continue dividing other scenes, select [NO] and press the button in the centre and repeat steps 2-3.



4 Press the MENU button to complete dividing.

5 Delete the unnecessary scene. (→ 72)

To delete all the divided points

[DIVIDE] → [CANCEL ALL]

- The scenes that were deleted after division cannot be recovered.

- You cannot divide a scene if the number of scenes of a given date would exceed 99 scenes.
- It may not be possible to divide scenes with a short recording time.
- Data that has been recorded or edited on another device cannot be divided and the divided points cannot be deleted.

Protecting scenes/still pictures

VIDEO PHOTO

Scenes/still pictures can be protected so that they are not deleted by mistake.

(Even if you protect some scenes/still pictures, formatting the media will delete them.)

- Change the mode to  .

1 Select the menu.



MENU : [VIDEO SETUP] or [PHOTO SETUP] → [SCENE PROTECT]

2 Select the scene/still picture to be protected and press the button in the centre.

- When the button in the centre is pressed, the scene/still picture is selected and  appears on the thumbnail. Select the scene/still picture again and press the button in the centre to cancel the operation.
- Press the MENU button to complete the settings.

1

Watching Video/Pictures on your TV

VIDEO PHOTO

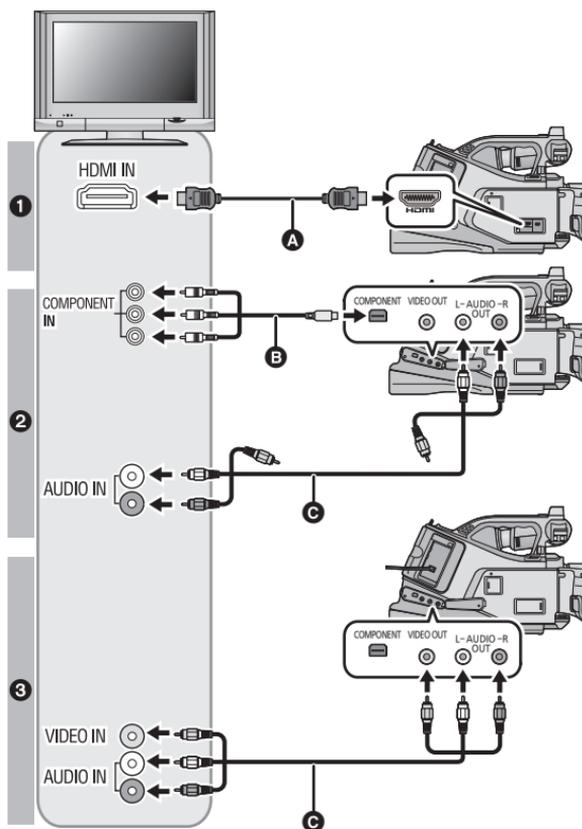
Confirm the terminals on your TV and use a cable compatible with the terminals. Image quality may vary with the connected terminals.

- 1 High quality
- 2 HDMI terminal
- 3 Component terminal
- 4 Video terminal



- Use the supplied component cable and AV cable. Use of the following Panasonic HDMI cables is recommended to connect the unit to the HDMI terminal.
- HDMI is the interface for digital devices. If you connect this unit to a HDMI compatible high definition TV and then play back the recorded high definition images, you can enjoy them in high resolution with high quality sound.

1 Connect this unit to a TV.



- A** HDMI cable (optional)
- Be sure to connect to the HDMI terminal.
- B** Component cable (supplied)
- C** AV cable (supplied)

Picture quality

- 1** High definition images when connecting to HDMI terminal
- 2** High definition images when connecting to component terminal compatible with 1080i Standard images when connecting to component terminal compatible with 576i
- 3** Standard images when connecting to video terminal

- Check that the plugs are inserted as far as they go.
- Always use a genuine Panasonic HDMI cable (RP-CDHG15, RP-CDHG30, RP-CDHG50; optional).
- Do not use any other component cables except the supplied one.
- When connecting to the component terminal of the TV, the yellow plug of the AV cable is not required.
- Do not use any other AV cables except the supplied one.

2 Select the video input on the TV.

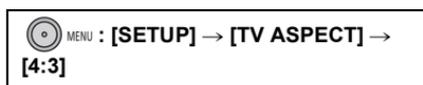
- Example:
 - Select the [HDMI] channel with a HDMI cable.
 - Select the [Component] channel with a component cable.
 - Select the [Video 2] channel with an AV cable.
 - (The name of the channel may differ depending on the connected TV.)
- Check the input setting (input switch) and the audio input setting on the TV. (For more information, please read the operating instructions for the TV.)

3 Change the mode to to play back.

Cables	Reference items
A HDMI cable (optional)	<ul style="list-style-type: none"> Connecting with a HDMI cable (→ 79) Playback using VIERA Link (HDAVI Control™) (→ 80)
B Component cable (supplied)	<ul style="list-style-type: none"> Connecting with the component cable (→ 79)

■ To watch images on a regular TV (4:3) or when both sides of the images do not appear on the screen

Change the menu setting to display the images correctly. (Check the TV setting.)



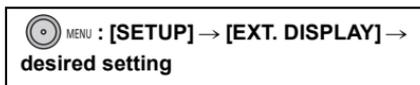
Example of images with a 16:9 aspect ratio on a regular TV (4:3)

[TV ASPECT] setting	
[16:9]	[4:3]
	

- If a wide-screen TV is connected, adjust the aspect setting on the TV. (Refer to the operating instructions of the TV for details.)

■ To display the on-screen information on the TV

When the menu setting is changed, the information displayed on the screen (operation icon and time code etc.) can be displayed/not displayed on the TV.



[OFF]:

Not displayed

[SIMPLE]*:

Information partially displayed

[DETAIL]:

All information displayed

* This setting is only available in recording mode.

- If the HDMI cable, component cable and AV cable are connected at the same time, output will be prioritised in order of the HDMI cable, component cable and AV cable.

Refer to the following support site for information about the Panasonic TVs that you can directly insert an SD card into the SD card slot on the TV and then play it back.
<http://panasonic.net/>

- It may not be possible to play back scenes on the TV depending on the recording mode.
- For details on how to play back, please read the operating instructions for the TV.

Connecting with a HDMI cable

Select the desired method of HDMI output.



MENU : [SETUP] → [HDMI RESOLUTION] → [AUTO]/[1080i]/[576p]

- [AUTO] determines the output resolution automatically based on information from the connected TV.
If the images are not output on the TV when the setting is [AUTO], switch to the method [1080i] or [576p] which enables the images to be displayed on your TV. (Please read the operating instructions for the TV.)
- Image will not display on TV for a few seconds in the following cases.
 - When switching between scenes recorded using [HA], [HG], [HX] or [HE] and scenes recorded using [SA] or [SX] in playback mode

Connecting with the component cable

Component output setting can be changed.



MENU : [SETUP] → [COMPONENT OUT] → desired setting

- [576i]:** When connecting to the component terminal on the TV compatible with 576i. (Playback is in standard quality.)
- [1080i]:** When connecting to the component terminal on the TV compatible with 1080i. (Playback is in high definition quality.)

What is the VIERA Link?

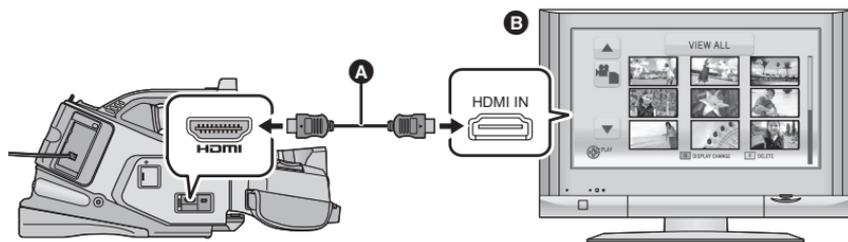
- This function allows you to use your remote control for the Panasonic TV for easy operations when this unit has been connected to a VIERA Link compatible device using a HDMI cable (optional) for automatic linked operations. (Not all operations are possible.)
- VIERA Link is a unique Panasonic function built on a HDMI control function using the standard HDMI CEC (Consumer Electronics Control) specification. Linked operations with HDMI CEC compatible devices made by other companies are not guaranteed. When using devices made by other companies that are compatible with VIERA Link, refer to the operating instructions for the respective devices.
- This unit is compatible with VIERA Link Ver.5. VIERA Link Ver.5 is the newest Panasonic version and is also compatible with existing Panasonic VIERA Link devices. (As of Dec 2009)

◇ Change the mode to  .

1 Select the menu.

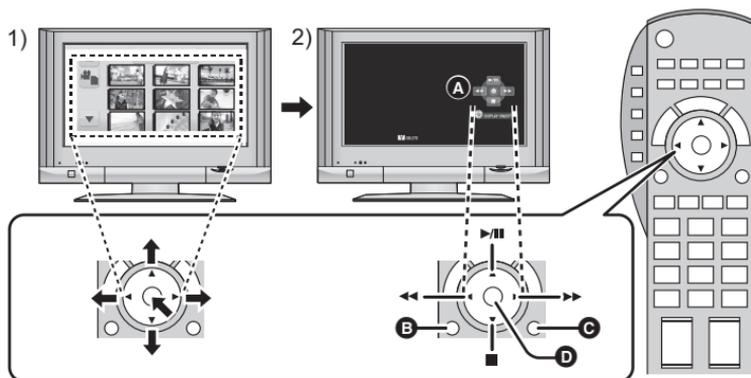
 MENU : [SETUP] → [VIERA Link] → [ON]

- If you are not using VIERA Link, set to [OFF].

2 Connect this unit to a Panasonic TV compatible with VIERA Link with a HDMI cable.

- A** HDMI cable (optional)
- B** Panasonic TV compatible with VIERA Link
- It is recommended to connect this unit to an HDMI terminal other than the HDMI1 if there are 2 or more HDMI input terminals on the TV.
- VIERA Link must be activated on the connected TV. (Read the operating instructions of the TV for how to set etc.)
- Always use a genuine Panasonic HDMI cable (RP-CDHG15, RP-CDHG30, RP-CDHG50; optional).

3 Operate with the remote control for the TV.



- 1) Press the button up, down, left or right to select a scene or still picture to be played back, and then press the button in the centre to set it.
- 2) Activate the operation icons that are displayed on TV screen with the remote control for the TV.

A Operation icons

B Display operation icons

C Cancel operation icons

D Display/Cancel operation icons

- The following operations are available by pressing the colour buttons on the remote control.

- Green: Switching the number of scenes/still pictures in thumbnail display (9 thumbnails → 20 thumbnails → 9 thumbnails...)

- Zoom in on still picture

- Yellow: Deleting scenes/still pictures

- Red: Zoom out from still picture

■ Other linked operations

Turning the unit off:

If you use the remote control for the TV to turn off the power, this unit also turns off.

Automatic input switching:

If you connect with a HDMI cable and then turn on this unit, the input channel on the TV automatically switches to this unit's screen. If the TV's power is in standby status, it will turn on automatically (if [Set] has been selected for the TV's [Power on link] setting).

- Depending on the HDMI terminal on the TV, the input channel may not switch automatically. In this case, use the remote control for the TV to switch the input channel.
-
- If you are unsure whether or not the TV and AV amplifier you are using are compatible with VIERA Link, read the operating instructions for the devices.
 - Available linked operations between this unit and a Panasonic TV is different depending on the types of Panasonic TVs even if they are compatible with VIERA Link. Refer to the operating instructions of the TV for the operations that support on the TV.
 - Operation is not possible with a cable that is not based on the HDMI standard.

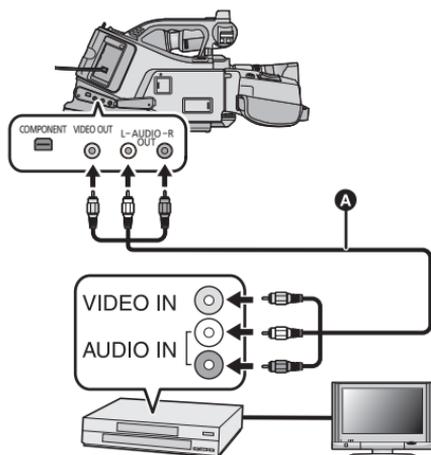
1

Dubbing images onto other video devices

VIDEO

Images played back on this unit can be dubbed onto a DVD recorder or video device.

- **Images are dubbed in standard quality.**
- Use the AC adaptor to free you from worrying about the battery running down.



Change the video input on the video device and TV that this unit is connected to.

- The channel set will differ depending on the terminal to which the unit is connected.
- See the operating instructions of the video device for details.
- Insert the plugs as far as they will go.
- Do not use any other AV cables except the supplied one.
- **A** AV cable (supplied)

1 Connect this unit to a video device and then change the mode to .

2 Start playback on this unit.

3 Start recording on the connected device.

- To stop recording (dubbing), stop playback on this unit after stopping recording on the recorder.

- If the date and time display and function indication are not wanted, cancel them before dubbing. (→ 39, 78)

If the dubbed images are played back on a wide-screen TV, the images may be stretched vertically.

In this case, refer to the operating instruction of the device you are connecting to or read the operating instructions of the wide-screen TV and set the aspect ratio to 16:9.

1

What you can do with a PC

HD Writer AE 2.5S

You can copy the motion/still picture data to the HDD of PCs or write to media like Blu-ray discs (BD), DVD discs or SD cards using HD Writer AE 2.5S, the software installed in the supplied CD-ROM.

Refer to the operating instructions of HD Writer AE 2.5S (PDF file) for details on how to use it.

■ Smart wizard

The Smart wizard screen is automatically displayed when you connect this unit to a PC with HD Writer AE 2.5S installed. (→ 92)



Copy to PC:

You can copy motion/still picture data to the HDD of PCs.

Copy to disc:

You can copy to disc in high definition picture quality or conventional standard picture quality (MPEG2 format).

- Select the function you wish to use and follow the on-screen instructions for easy copying.

Available function	Data type	Software required
Copying data to a PC	Motion picture and still picture	CD-ROM (supplied): HD Writer AE 2.5S
Copying in BD/AVCHD format		
Copying in DVD-Video format: • Converted to conventional standard quality (MPEG2 format).	Motion picture	
Editing: Editing motion picture data copied on an HDD of a PC • Title, Transition, Delete partially, Divide Scene • Converting the motion picture data to MPEG2 • Converting part of motion picture into still picture		
Playing back on a PC: Play back the motion picture data in high definition picture quality on a PC.		
Formatting discs: Depending on the type of disc that you use, formatting is necessary.		

Available function	Data type	Software required
Playing back on a PC	Still picture	HD Writer AE 2.5S or Standard Windows picture viewer or a commercially available picture viewer
Copying still pictures to a PC (→ 94)		Windows Explorer
Refer to page 96 if using a Mac.		

Important Notice

- When using an SDXC Memory Card, check the following support site.
<http://panasonic.net/avc/sdcard/information/SDXC.html>
- Do not insert a disc recorded in AVCHD format with HD Writer AE 2.5S in a device that does not support the AVCHD format. In some cases the disc may get stuck in the device. The disc will not play back on devices that do not support the AVCHD format.
- When inserting a disc containing recorded motion pictures into other devices, a message prompting you to format the disc may be displayed. Do not format the disc, since deleted data cannot be restored later.

- Motion pictures that have been recorded on another device cannot be written to the software supplied with this unit. To write motion picture data recorded with the Panasonic High Definition Video Camera sold previously, use the HD Writer supplied with the unit.
- We cannot guarantee operation if you use software other than that supplied to read/write motion picture.
- Do not start the software supplied with this unit and other software at the same time. Close any other software if you start the software supplied with this unit and close the software supplied with this unit if you start any other software.

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2

Operating environment

- Even if the system requirements mentioned in these operating instructions are fulfilled, some PCs cannot be used.
- A CD-ROM drive is necessary to install the supplied software applications. (A compatible BD/DVD writer drive and media are necessary for writing to a BD/DVD.)
- Operation is not guaranteed in the following cases.
 - When 2 or more USB devices are connected to a PC, or when devices are connected through USB hubs or by using extension cables.
 - Operation on an upgraded OS.
 - Operation on an OS other than the one pre-installed.
- This software is not compatible with Microsoft Windows 3.1, Windows 95, Windows 98, Windows 98SE, Windows Me, Windows NT and Windows 2000.

■ Operating environment for HD Writer AE 2.5S

PC	IBM PC/AT compatible PC
OS	Microsoft Windows XP (32 bit) Home Edition Service Pack 2/Service Pack 3 Microsoft Windows XP (32 bit) Professional Service Pack 2/Service Pack 3 Microsoft Windows Vista (32 bit) Home Basic Service Pack 1/Service Pack 2 Microsoft Windows Vista (32 bit) Home Premium Service Pack 1/Service Pack 2 Microsoft Windows Vista (32 bit) Business Service Pack 1/Service Pack 2 Microsoft Windows Vista (32 bit) Ultimate Service Pack 1/Service Pack 2 Microsoft Windows 7 (32 bit) Starter Microsoft Windows 7 (32 bit/64 bit) Home Basic Microsoft Windows 7 (32 bit/64 bit) Home Premium Microsoft Windows 7 (32 bit/64 bit) Professional Microsoft Windows 7 (32 bit/64 bit) Ultimate
CPU	High-Def. (1920×1080) Intel Core 2 Duo 2.16 GHz or higher or AMD Athlon 64 X2 Dual-Core 5200+ or higher <ul style="list-style-type: none"> • Intel Core 2 Quad 2.6 GHz or higher is recommended when using the editing function. Standard-Def. (720×576) Intel Pentium 4 1.8 GHz or higher <ul style="list-style-type: none"> • Intel Core 2 Duo 1.8 GHz or higher is recommended when using the editing function.
RAM	Windows 7: 1 GB or more (32 bit)/2 GB or more (64 bit) Windows Vista: 1 GB or more Windows XP: 512 MB or more (1 GB or more recommended)

Display	High Colour (16 bit) or more (32 bit or more recommended) Desktop resolution of 1024×768 pixels or more (1280×1024 pixels or more recommended) Windows Vista/Windows 7: DirectX 9.0c compatible video card (DirectX 10 recommended) with DirectDraw overlay Windows XP: DirectX 9.0c compatible video card Compatible with DirectDraw overlay PCI Express™ ×16 compatible recommended
Free hard disk drive space	Ultra DMA — 100 or more 450 MB or more (for installing the software) <ul style="list-style-type: none"> When writing to a DVD/BD/SD, more than double the amount of free space as the disc being created is necessary.
Sound	DirectSound Support
Interface	USB port [Hi-Speed USB (USB 2.0)]
Other requirements	Mouse or equivalent pointing device Internet connection

- Supplied CD-ROM is available for Windows only.
- Input is not supported in languages other than English, German, French and Simplified Chinese.
- Operation cannot be guaranteed on all BD/DVD drives.
- Operation is not guaranteed on Microsoft Windows Vista Enterprise, Windows XP Media Center Edition, Tablet PC Edition and Windows 7 Enterprise.
- This software is not compatible with a multi-boot environment.
- This software is not compatible with a multi-monitor environment.
- If using Windows XP, an administrative account user only can use this software. If using Windows Vista/Windows 7, administrative account and standard account users only can use this software. (An administrative account user should install and uninstall this software.)

■ To use the HD Writer AE 2.5S

You will need a high performance PC depending on the functions to be used. It may not properly play back or properly operate depending on the environment of the PC used. Refer to the operating environment and notes.

-
- Operation during the playback may become slow if the CPU or memory is not fulfilling the requirements of the operating environment.
 - Always use the most current driver for the video card.
 - Always make sure there is enough capacity on the HDD in the PC. It may become inoperable or the operation may stop suddenly if the capacity gets low.

■ Operating environment for the card reader function (mass storage)

PC	IBM PC/AT compatible PC
OS	Microsoft Windows XP (32 bit) Home Edition Service Pack 2/Service Pack 3 Microsoft Windows XP (32 bit) Professional Service Pack 2/Service Pack 3 Microsoft Windows Vista (32 bit) Home Basic Service Pack 1/Service Pack 2 Microsoft Windows Vista (32 bit) Home Premium Service Pack 1/Service Pack 2 Microsoft Windows Vista (32 bit) Business Service Pack 1/Service Pack 2 Microsoft Windows Vista (32 bit) Ultimate Service Pack 1/Service Pack 2 Microsoft Windows Vista (32 bit) Enterprise Service Pack 1/Service Pack 2 Microsoft Windows 7 (32 bit) Starter Microsoft Windows 7 (32 bit/64 bit) Home Basic Microsoft Windows 7 (32 bit/64 bit) Home Premium Microsoft Windows 7 (32 bit/64 bit) Professional Microsoft Windows 7 (32 bit/64 bit) Ultimate
CPU	Windows Vista/Windows 7: 1.0 GHz or higher Windows XP: Intel Pentium III 450 MHz or higher or Intel Celeron 400 MHz or higher
RAM	Windows 7: 1 GB or more (32 bit)/2 GB or more (64 bit) Windows Vista Home Basic: 512 MB or more Windows Vista Home Premium/Business/Ultimate/Enterprise: 1 GB or more Windows XP: 128 MB or more (256 MB or more recommended)
Interface	USB port
Other requirements	Mouse or equivalent pointing device

- The USB equipment operates with the driver installed as standard in the OS.

1

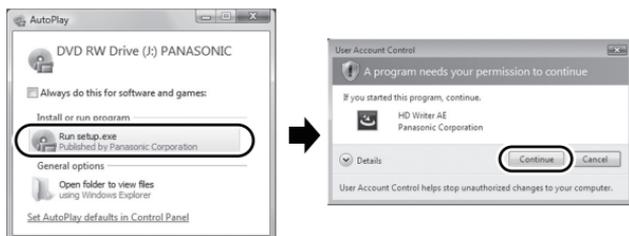
Installation

When installing the software, log on to your computer as the Administrator or with a user name with equivalent authorization. (If you do not have authorization to do this, consult your manager.)

- Before starting the installation, close all applications that are running.
- Do not perform any other operations on your PC while the software is being installed.
- Explanation of operations and screens is based on Windows Vista.

1 Insert the CD-ROM into the PC.

- The following screen is displayed automatically. Click [Run setup.exe] → [Continue].
- When using Windows 7 or if the following screen is not displayed automatically, select [Start] → [Computer] (or double-click on [Computer] on the desktop), and then double-click [PANASONIC].



2 Click [Next].

3 Read the [End User License Agreement], then place a check beside [I accept the terms of the license agreement] if you agree to them and click [Next].

4 Select where the application is to be installed, then click [Next].

5 Select [Yes] or [No] to create shortcut.

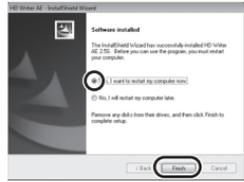
- A message regarding the playback in the environment used may be displayed depending on the performance of the PC used. Click [OK] after confirming.



6 When installation is complete, some notes will appear.
Check the contents, then close the window.

7 Select **[Yes, I want to restart my computer now.]**, then click **[Finish]**.

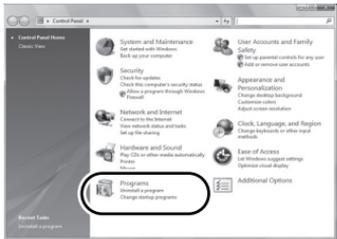
The PC must be rebooted for the application to work.



■ Uninstalling HD Writer AE 2.5S

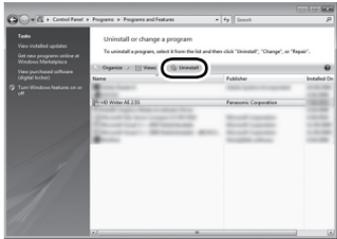
Follow the steps below to uninstall any software applications that you no longer require.

1 Select **[Start]** → **[Control Panel]** → **[Uninstall a Program]**.

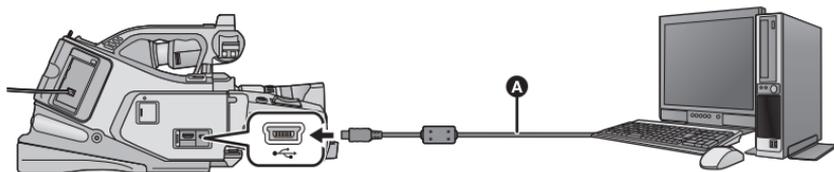


2 Select **[HD Writer AE 2.5S]**, then click **[Uninstall]**.

- Proceed with the uninstallation by following the on-screen instructions.
- After uninstalling the software, be sure to reboot the PC.



- Connect this unit to the PC after the software applications are installed.
- Remove the supplied CD-ROM from your PC.



- A** USB cable (supplied)

1 Connect this unit to the AC adaptor.

- It is possible to use it connected to the PC with the batteries only, but you will not be able to write data into the unit.

2 Turn on the unit.

- This function is available in all modes.

3 Connect this unit to a PC.

- The USB function selection screen will appear.

4 Touch [PC] on the screen of this unit.

- The Smart wizard screen is automatically displayed when HD Writer AE 2.5S is installed.
- This unit is automatically recognised as an external drive of the PC. (→ 94)
- When you select an option other than [PC], reconnect the USB cable.
- When using the battery, the LCD monitor turns off after about 5 seconds. Touch the screen to turn the LCD monitor on.

-
- Do not use any other USB cables except the supplied one. (Operation is not guaranteed with any other USB cables.)
 - **When the unit is connected to a PC it cannot be turned off.**
Disconnect the USB cable, before turning this unit off.
 - Do not disconnect the USB cable or the AC adaptor while the access lamp is on or card access icon () appears on the unit screen.
 - When performing reading/writing between a PC and an SD card, be aware that some SD card slots built into PCs and some SD card readers are not compatible with the SDHC memory card or SDXC memory card.
 - When using an SDXC Memory Card, check the following support site.
<http://panasonic.net/avc/sdcard/information/SDXC.html>

■ To disconnect USB cable safely

- 1 Double click the  icon in task tray displayed on the PC.
- Depending on your PC's settings, this icon may not be displayed.
- 2 Select [USB Mass Storage Device] and click [Stop].
- 3 Verify [MATSHITA HDC-MDH1/SD USB Device] is selected and click [OK].

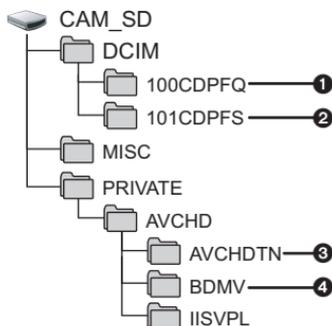
About the PC display

When the unit is connected to a PC, it is recognised as an external drive.

- Removable disk (Example:  CAM_SD (G:)) is displayed in [Computer].

We recommend using HD Writer AE 2.5S to copy or write back motion picture data. Using Windows Explorer or other programmes on the PC to copy, move or rename files and folders recorded with this unit will result in them being unusable with HD Writer AE 2.5S.

Example folder structure of an SD card:



The following data will be recorded.

- 1 Up to 999 still pictures in JPEG format ([S1000001.JPG] etc.)
- 2 JPEG format still pictures created from the motion picture
- 3 The motion picture thumbnails
- 4 AVCHD format motion picture files ([00000.MTS] etc.)

■ Copying your still pictures to your PC

Card reader function (mass storage)

Still pictures recorded with this unit can be copied to the PC with Explorer or other programmes.

- 1 Double click the folder that contains the still pictures. ([DCIM] → [100CDPFQ] etc.)
- 2 Drag and drop the still pictures onto the destination folder (on the PC's HDD).

- Do not delete the SD card's folders. Doing so may make the SD card unusable in this unit.
- When data not supported by this unit has been recorded on a PC, it will not be recognised by this unit.
- Always use this unit to format SD cards.

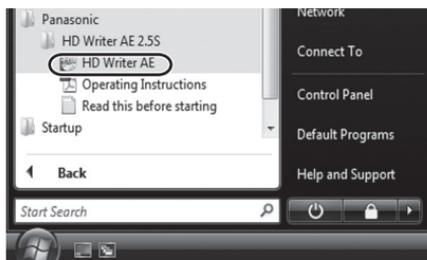
1

Starting HD Writer AE 2.5S

- When using HD Writer AE 2.5S on Windows XP, log on to your computer as Administrator (or with a login name equally authorized). If you log on with a login name other than Administrator, you cannot use the applications.
- When using HD Writer AE 2.5S on Windows Vista/Windows 7, log on to your computer as Administrator (or with a login name equally authorized) or with the user name for a standard user account. If you log on with a user name for a guest user account, the software cannot be used.

(On the PC)

Select **[Start]** → **[All Programs]** → **[Panasonic]** → **[HD Writer AE 2.5S]** → **[HD Writer AE]**.



- For details on how to use the software applications, read the PDF operating instructions of the software.

Reading the operating instructions of the software applications

- You will need Adobe Acrobat Reader 5.0 or later or Adobe Reader 7.0 or later to read the PDF operating instructions.

Select **[Start]** → **[All Programs]** → **[Panasonic]** → **[HD Writer AE 2.5S]** → **[Operating Instructions]**.

- HD Writer AE 2.5S is not available for Mac.

■ Operating environment

PC	Mac
OS	Mac OS X 10.5.8 Mac OS X 10.6
CPU	Intel Core Duo Intel Core 2 Duo
RAM	1 GB or more
Interface	USB port

- Even if the system requirements mentioned in these operating instructions are fulfilled, some PCs cannot be used.
- The USB equipment operates with the driver installed as standard in the OS.
- Supplied CD-ROM is available for Windows only.

■ Copying still pictures on PC

1 Connect this unit to a PC via the supplied USB cable.

- The USB function selection screen will appear.

2 Touch [PC] on the screen of this unit.

- This unit is automatically recognised as an external drive of the Mac.
- When you select an option other than [PC], reconnect the USB cable.
- When using the battery, the LCD monitor turns off after about 5 seconds. Touch the screen to turn the LCD monitor on.

3 Double-click [CAM_SD] displayed on the desktop.

- Files are stored in [100CDPFQ] or [101CDPFR] folder etc. in the [DCIM] folder.

4 Using a drag-and-drop operation, move the pictures you want to acquire or the folder storing those pictures to any different folder on the PC.

■ To disconnect USB cable safely

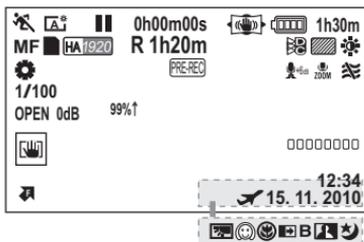
Drag [CAM_SD] disk icon to the [Trash], and then disconnect the USB cable.

1

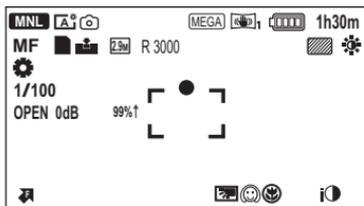
Indications

■ Recording indications

Motion picture recording mode



Still picture recording mode



Remaining battery power
(→ 17)

1h30m

Remaining battery time
(→ 17)

R 1h20m

Remaining time for motion
picture recording (→ 29)

0h00m00s

Elapsed recording time
(→ 29)

("h" is an abbreviation for hour, "m" for
minute and "s" for second.)

15. 11. 2010 Date indication (→ 25)

12:34 Time indication (→ 25)



World time setting (→ 38)

HA1920 / HC1920 / HX1920 / HE1920 / SA / SX

Motion picture recording mode (→ 52)

(White) Card recording possible
status

(Green) Recognising the card

●/II (Red) Recording

II (Green) Recording pause

PRE-REC PRE-REC (→ 48)

MNL Manual mode (→ 61)

fA / fA / fA / fA / fA

Intelligent auto mode (→ 32)

⌂ / ⌂ Operation icon is displayed/
not displayed. (→ 47)

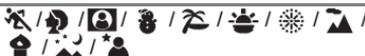
MF Manual focus (→ 64)

AWB / White balance (→ 62)

1/100 Shutter speed (→ 63)

OPEN/F2.0 Iris value (→ 63)

0dB Gain value (→ 63)



Scene mode (→ 51)

[+2* / +1* / -1* / A*]

Power LCD (→ 46)

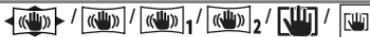


Image stabilizer (→ 44)/Optical image
stabilizer lock (→ 45)

Zebra (→ 57)

Picture adjustment (→ 56)

Digital cinema colour (→ 53)

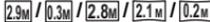
ZOOM Zoom microphone (→ 54)

Wind noise canceller (→ 54)

+3dB / +6dB / Bass setting (→ 56)

LOW CUT Microphone level (→ 55)

□□□□□□□□ Microphone level (→ 55)

	Backlight compensation (→ 49)
	Soft skin mode (→ 49)
	Tele macro (→ 49)
	Fade (White), Fade (Black) (→ 48)
	Colour night view function (→ 50)
	Intelligent contrast control (→ 48)
	Intelligent exposure (→ 49)
99%↑	Luminance level (→ 57)
○ (White)/● (Green)	
Focus indication (→ 30)	
	Picture quality (→ 60)
	
Number of recording pixels for still pictures (→ 31, 59, 66)	
In playback mode, the picture size is not displayed for still pictures recorded with other products that have different picture sizes from the sizes shown above.	
R3000	Remaining number of still pictures (→ 31)
 (White)	Still picture recording icon
 (Red)	Recording still picture
	MEGA OIS (→ 30)

■ Playback indications



Display during playback (→ 34, 65)

 Operation icon is displayed/not displayed. (→ 34)

0h00m00s Playback time (→ 34)

No.10 Scene number

 Repeat playback (→ 67)

 Resume playback (→ 68)

100-0001 Still picture folder/file name

 Protected motion pictures/still pictures (→ 75)

■ Indication of connection to other devices

 Accessing the card (→ 93)

■ Confirmatory indications

-- (Time display) The built-in battery is low. (→ 25)

 SD card is not inserted or is non-compatible.

Major confirmation/error messages to be indicated on the screen in text.

CHECK CARD.

This card is not compatible or it cannot be recognised by the unit.

If this message appears even though motion pictures and still pictures are recorded on an SD card, the card may be unstable. Reinsert the SD card, then turn the unit off and then on again.

THIS BATTERY CANNOT BE USED.

- Use a battery that is compatible with this unit. (→ 15)
If using a Panasonic battery compatible with this unit, remove the battery and then insert it again. If the message appears even after repeating this several times, this unit needs repair. Detach the power and consult the dealer who you purchased this unit from. Do not attempt to repair it by yourself.
- You are attempting to connect an AC adaptor not compatible with this unit. Use the supplied AC adaptor. (→ 18)

About recovery

If faulty management information is found, the messages may appear and a repair is performed. (Repairing may take time depending on the error.)

SOME SCENES NEED REPAIRING. PLAY SCENES TO BE REPAIRED. (IRREPARABLE SCENES WILL BE DELETED.)

- The above message is displayed when abnormal management information is detected when the scenes are displayed in thumbnail. To perform the repair, select the scene with  in the thumbnail, and start the playback. **Please be aware that if the repair fails, scenes with  will be deleted.**
- Use a sufficiently charged battery or the AC adaptor.
- Depending on the condition of the data, it may not be possible to completely repair the data.
- If recovery fails, it will not be possible to play back scenes recorded before the unit turned off.
- When data recorded on another device is recovered, it may not be possible to play back the data on this unit or the other device.
- If recovery fails, turn the unit off and on again after waiting a while. If recovery fails repeatedly, format a media on the unit. Please be aware that if a media is formatted, then all the data recorded on the media will be erased.
- If the thumbnail information is recovered, displaying the thumbnails may become slower.

Troubleshooting

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. (→ 15) • 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 is turned off automatically.</p>	<ul style="list-style-type: none"> • If the unit turns off when you turn off the power to the TV using the TV remote control, the VIERA Link is at work. If you are not using the VIERA Link, set [VIERA Link] to [OFF]. (→ 80)
<p>A clicking sound is heard when the unit is shaken.</p>	<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  or .
<p>Remaining battery indication is not displayed properly.</p>	<ul style="list-style-type: none"> • The remaining battery capacity indication is an approximation. If the remaining battery capacity indication is not displayed correctly, fully charge the battery, discharge it and then charge it again.
<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.
<p>Item other than the touched one is selected.</p>	<ul style="list-style-type: none"> • Calibrate the touch screen. (→ 42)

Problem

Check points

The remaining time indication or the elapsed time indication is not shown.



- [DISPLAY] of the [SETUP] is [OFF]. (→ 38)

The unit arbitrarily stops recording.



- Use an SD card that can be used for motion picture recording. (→ 19)
- 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. (→ 41)
- If [AGS] is [ON], record in the normal horizontal position or set [AGS] to [OFF]. (→ 53)

Auto focus function does not work.



- Set the iA/MANUAL/FOCUS switch to intelligent auto mode.
- If you are trying to record a scene which is hard to bring into focus in auto focus mode, use the manual focus mode to adjust the focus. (→ 33, 64)

Colour balance of images is strange when recording in a place such as a gymnasium.



- In a place with multiple light sources, such as a gymnasium or a hall, set the white balance setting to  (Indoor mode 2). If you cannot record clearly with the  (Indoor mode 2), set it to  (Manual adjustment mode). (→ 62)

Any scenes/still pictures cannot be played back.



- Any scenes/still pictures where the thumbnails are displayed as  cannot be played back.

Although this unit is correctly connected to a TV, images cannot be seen.



- Please read the operating instructions of your TV and select the channel that matches the input used for the connection.
- Change the [TV ASPECT] setting to match the aspect ratio of the TV. (→ 78)
- Change the setting of the unit depending on the cable connecting to the TV. (→ 79)

The images are squeezed horizontally.

Problem

Scenes cannot be deleted.



- Release the protect setting. (→ 75)
- Any scenes/still pictures where the thumbnails are displayed as  cannot be deleted. If the scenes/still pictures are unnecessary, format the media to erase the data. (→ 41) Please be aware that if a media is formatted then all the data recorded on the media is erased and cannot be recovered. Back up important data on a PC, disc etc.

If the SD card is inserted in this unit, it is not recognised.



- If the SD card is formatted on a PC, it may not be recognised by this unit. Use this unit to format SD cards. (→ 41)

If the SD card is inserted in another device, it is not recognised.



- Check that the device is compatible with the capacity or type of SD card (SD Memory Card/SDHC Memory Card/SDXC Memory Card) that you inserted. Refer to the operating instructions of the device for details.

Colour or brightness of the image changes, or you may see horizontal bars in the image.

The LCD monitor flickers indoors.



- 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.
- In motion picture recording mode, 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.
- In still picture recording mode, this will not affect the recorded image.

Object seems to be warped.



- 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.

Problem

White round spots like soap bubbles appear on the recorded picture.



- If you take a picture with the flash in a dark place or indoors, white round spots may appear on the picture caused by the flash reflecting of particles of dust in the air. This is not a malfunction. A characteristic of this is that the number of round spots and their position differ in every picture.



“ERROR OCCURRED. PLEASE TURN UNIT OFF, THEN TURN ON AGAIN.” is displayed.



- The unit has automatically detected an error. Restart the unit by turning 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.

VIERA Link does not work.



- [Setting on this unit]
- Connect with a HDMI cable (optional). (→ 80)
 - Press the MENU button, then select [SETUP] → [VIERA Link] → [ON] using the cursor button. (→ 80)
 - Turn the unit off and then back on again.
- [Setting on other devices]
- If the TV input does not switch automatically, switch the input using the TV remote control.
 - Check the VIERA Link setting on the connected device.
 - Please refer to the operating instructions of the connected device.

When connected by the USB cable, this unit is not detected by the PC.



- After re-inserting the SD card into the unit, reconnect the supplied USB cable.
- Select another USB terminal on the PC.
- Check the operating environment. (→ 87, 96)
- Connect the supplied USB cable again after restarting the PC and turning on this unit again.

Problem

When the USB cable is disconnected, an error message will appear on the PC.



- To disconnect the USB cable safely, double-click the  icon in the task tray and follow the instructions on the screen.

Cannot see the PDF operating instructions for HD Writer AE 2.5S.



- You will need Adobe Acrobat Reader 5.0 or later or Adobe Reader 7.0 or later to read the PDF operating instructions for HD Writer AE 2.5S.

Cannot copy scenes on the SD card by connecting to other equipment with the USB cable.



- Other equipment might have not recognised the SD card. Unplug the USB cable once, and reconnect it.

■ If scenes do not change smoothly when played back on another device

The images may be still for several seconds at the joins between the scenes if the following operations are performed when multiple scenes have been continuously played back using another unit.

- Just how smoothly the scenes will be played back depends on the playback unit. Depending on the unit used, the images may stop moving and become still for a moment even when none of the following conditions are applicable.
- A continuous recording of motion picture data that exceeds 4 GB may momentarily stop at every 4 GB of data when played back with another device.
- It may not play back smoothly when the editing of scenes was done with the HD Writer AE 2.5S, but it will play back smoothly if you set the seamless settings in the HD Writer AE 2.5S. Refer to the operating instructions for the HD Writer AE 2.5S.

Principal reasons for not playing back smoothly
● When the scenes were recorded on different dates
● When scenes lasting under 3 seconds have been recorded
● When PRE-REC was used for recording
● When deleting scenes
● When scenes recorded more than 99 scenes on the same date
● When switching between scenes recorded using [HA], [HG], [HX] or [HE] and scenes recorded using [SA] or [SX]

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.

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.

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.

Do not use the unit for surveillance purposes or other business uses.

- This unit was designed for consumer intermittent use. It was not intended for continuous use, or for any industrial or commercial application resulting in prolonged use.
- In certain situations, continuous use could cause the unit to overheat and cause a malfunction. Such use is strongly discouraged.

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.

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 appropriate to 3 to 4 times the period you are planning to record for. Cold places such as a ski resort can shorten the period which you can record for.

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

- Inserting a battery with damaged terminals can damage the unit or AC adaptor.

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.

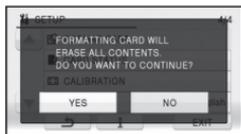
About the AC adaptor

- If the temperature of the battery is extremely high or extremely low, charging may take time or the battery may not be charged.
- If the charging lamp keeps flashing, make sure that the terminals of the battery or the AC adaptor are not exposed to dirt, foreign objects or dust, then reconnect them properly.
Disconnect the AC cable from the AC outlet when you remove dirt, foreign objects or dust on the terminals of the battery or the AC adaptor.
If the charging lamp is still flashing, the temperature of the battery may be extremely high or extremely low or something may be wrong with the battery or AC adaptor. Contact your dealer.
- 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 adaptor. (If it is left connected, a minute amount of current is consumed.)
- Always keep the electrodes of the AC adaptor and battery clean.

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 SD card is physically destroyed or the SD card is physically formatted using this unit when disposing of or giving away the SD card.
- To physically format the SD card, connect the unit via the AC adaptor, select [SETUP] → [FORMAT CARD] → [YES] from the menu, and then press and hold the recording start/stop button or sub recording start/stop button on the screen below for about 3 seconds. When the SD card data deletion screen appears, select [YES], and then follow the on-screen instructions.



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

LCD monitor/viewfinder

- When the LCD monitor gets dirty, wipe it with a soft cloth, such as eye glass cleaner.
- 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 recognise the touch when the LCD protection sheet is affixed.
- In a place with drastic temperature changes, condensation may form on the LCD monitor. Wipe it with a soft cloth, such as eye glass cleaner.
- 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 featuring a total of approximately 230,000 dots. 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 featuring a total of approximately 123,000 dots. 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 condensation

When condensation forms on the unit, the lens will cloud up and the unit may not work properly. Make every effort to ensure that condensation does not form. If it does form, take the actions described below.

Causes of condensation

Condensation takes place when the ambient temperature or humidity is changed as follows.

- When this unit is brought inside from the cold (e.g. a ski slope) to a warm room.
- When this unit is moved from an air-conditioned car to outside.
- When a cold room has been warmed up quickly.
- When cool wind from an air conditioner is directly blown onto this unit.
- After summer afternoon showers of rain.
- When this unit is in a very humid place where the air is thick with steam. (e.g. a heated swimming pool)

Helpful hint

If, for example, you have used this unit for recording on a ski slope and are taking it into a heated room, place the unit inside a plastic bag, remove as much of the air from inside the bag as possible, then seal the bag.

Leave the unit for about an hour in the room so the temperature of the unit is close to the ambient temperature of the room, then use it.

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

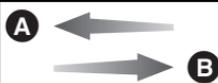
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- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

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>.

Recording modes/approximate recordable time

- SD cards are only mentioned with their main memory size. The stated times are the approximate recordable times for continuous recording.

							
Recording mode		HA	HG	HX	HE	SA	SX
Picture size		1920×1080				720×576	
SD card	4 GB	30 min	40 min	1 h	1 h 30 min	1 h	2 h
	8 GB	1 h	1 h 20 min	2 h	3 h 20 min	2 h	4 h
	16 GB	2 h	2 h 40 min	4 h 10 min	6 h 40 min	4 h	8 h
	32 GB	4 h 10 min	5 h 30 min	8 h 20 min	13 h 40 min	8 h	16 h
	48 GB	6 h 20 min	8 h 10 min	12 h 30 min	20 h 20 min	12 h	24 h
	64 GB	8 h 30 min	11 h	16 h 50 min	27 h 30 min	16 h 30 min	33 h

- A** Image quality prioritised
- B** Recording time prioritised

- If recording for long periods, prepare batteries for 3 or 4 times the period you wish to record for. (→ 17)
- The default setting is [HA] mode.
- Maximum continuously recordable time for one scene: 12 hours
- The recording is paused once when the recording time for one scene exceeds 12 hours, and the recording will automatically resume after a few seconds.
- If a recording with a lot movements is recorded, the recording time is reduced.
- The recordable time may be reduced if recording of short scene is repeated.
- Use time in the row of 4 GB in above table as a guideline for the time that can be copied onto one DVD disc (4.7 GB).

Approximate number of recordable pictures

- SD cards are only mentioned with their main memory size. The stated number is the approximate number of recordable pictures.

Aspect ratio		4:3			
Picture size		2.5M 1952×1464		0.3M 640×480	
Picture quality					
SD card	512 MB	300	500	3600	6100
	1 GB	600	1000	7400	12000
	2 GB	1200	2000	15000	25000
	4 GB	2500	4000	30000	50000
	8 GB	5000	8000	60500	102000
	16 GB	10000	16000	122000	205000
	32 GB	20000	32000	246000	414000
	64 GB	42000	66000	492000	829000

Aspect ratio		3:2		16:9	
Picture size		2.8M 2064×1376		2.1M 1920×1080	
Picture quality					
SD card	512 MB	300	500	440	690
	1 GB	600	1000	900	1400
	2 GB	1200	2000	1800	2800
	4 GB	2500	4000	3600	5600
	8 GB	5000	8000	7300	11000
	16 GB	10000	16000	14000	23000
	32 GB	20000	32000	29000	46000
	64 GB	42000	66000	59000	93000

- The number of recordable pictures depends on whether  and  are used together and on the subject being recorded.
- Maximum number of recordable pictures that can be displayed is 99999.
If the number of recordable pictures exceeds 99999, the number will not change when the picture is taken until the number of recordable pictures gets less than 99999.
- The memory capacity indicated on the label of an SD card is the total of the capacity for copyright protection and management and the capacity which can be used on the unit, a PC etc.

Specifications

High Definition Video Camera

Information for your safety

Power source: DC 9.3 V (When using AC adaptor)/DC 7.2 V (When using battery)

Power consumption: Recording; 5.0 W

Signal system:

AVCHD;1080/50i, 576/50i

Recording format:

AVCHD; AVCHD format compliant

Image sensor:

 1/4.1 type (1/4.1") 1MOS image sensor

Total; 3320 K

Effective pixels;

Motion picture; 1920 K to 1360 K (16:9), 1440 K to 1020 K (4:3)

Still picture; 2160 K to 1520 K (4:3), 2080 K to 1460 K (3:2), 1920 K to 1360 K (16:9)

Lens:

 Auto Iris, 16.8× Optical Zoom, F1.8 to F2.6

Focal length; 2.9 mm to 48.7 mm

Macro (Full range AF)

35 mm equivalent;

Motion picture; 35.8 mm to 716 mm (16:9)/43.9 mm to 878 mm (4:3)

Still picture; 35.8 mm to 716 mm (4:3/3:2/16:9)

Minimum focus distance;

Normal; Approx. 4 cm (Wide)/Approx. 1.2 m (Tele)

Tele macro; Approx. 50 cm (Tele)

Intelligent auto Macro; Approx. 1 cm (Wide)/Approx. 50 cm (Tele)

Zoom:

 i.Zoom OFF 20×, 23× i.Zoom, 50×/1200× Digital Zoom

Using image sensor effective area

Image Stabilizer Function:

Optical (HYBRID O.I.S., active mode, O.I.S. LOCK function)

Monitor:

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

Viewfinder:

 0.69 cm (0.27") wide EVF (Approx. 123 K dots)

Microphone:

 Stereo (with a zoom microphone function)

Speaker:

 1 round speaker, dynamic type

White balance adjustment: Auto tracking white balance system

Standard illumination: 1,400 lx

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

Component connector video output level;

Y; 1.0 Vp-p, 75 Ω /Pb; 0.7 Vp-p, 75 Ω /Pr; 0.7 Vp-p, 75 Ω

HDMI connector video output level: HDMI™ (x.v.Colour™) 1080i/576p

AV connector audio output level (Line): 316 mV, 600 Ω , 2 ch

Headphone output: 77 mV, 32 Ω (Stereo mini jack)

HDMI connector audio output level:

Dolby Digital/Linear PCM

MIC input:

−70 dBV (Mic sensitivity −50 dB equivalent, 0 dB=1 V/Pa, 1 kHz)

(Stereo mini jack)

USB:

Card reader/writer function (No copyright protection support)

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

Dimensions:

216 mm (W)×224 mm (H)×432 mm (D)

(excluding projecting parts)

Mass:

Approx. 1800 g [without battery (supplied) and an SD card (optional)]

Mass in operation:

Approx. 1913 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 17

■ Motion pictures

Recording media:

SD Memory Card (FAT12 and FAT16 system compliant)

SDHC Memory Card (FAT32 system compliant)

SDXC Memory Card (exFAT system compliant)

Refer to page 19 for details on SD cards usable in this unit.

Compression: MPEG-4 AVC/H.264

Recording mode and transfer rate:

HA; Approx. 17 Mbps (VBR)

HG; Approx. 13 Mbps (VBR)

HX; Approx. 9 Mbps (VBR)

HE; Approx. 5 Mbps (VBR)

SA; Approx. 9 Mbps (VBR)

SX; Approx. 4.5 Mbps (VBR)

Refer to page 112 for the recordable time.

Picture size:

HA/HG/HX/HE; 1920×1080/50i

SA/SX; 720×576/50i

Audio compression:

Dolby Digital/2ch

■ Still pictures

Recording media:

SD Memory Card (FAT12 and FAT16 system compliant)

SDHC Memory Card (FAT32 system compliant)

SDXC Memory Card (exFAT system compliant)

Refer to page 19 for details on SD cards usable in this unit.

Compression:

JPEG (Design rule for Camera File system, based on Exif 2.2 standard)

Picture size:

Picture aspect [4:3]; 1952×1464/640×480

Picture aspect [3:2]; 2064×1376

Picture aspect [16:9]; 1920×1080

Refer to page 113 for the number of recordable pictures.

AC adaptor

Information for your safety

Power source:	AC 110 V to 240 V, 50/60 Hz
Power consumption:	19 W
DC output:	DC 9.3 V, 1.2 A (Unit operation) DC 8.4 V, 0.65 A (Battery charging)

Dimensions:

92 mm (W)×33 mm (H)×61 mm (D)

Mass:

Approx. 115 g

Optional accessories

Product numbers correct as of Aug. 2010. These may be subject to change.
Some optional accessories may not be available in some countries.

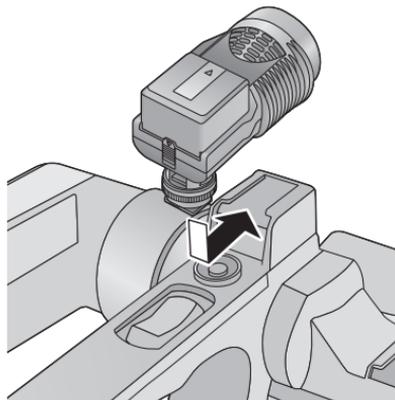
AC adaptor (VW-AD21E/EB-K) ^{*1}
Battery pack (lithium/VW-VBG130)
Battery pack (lithium/VW-VBG260)
Battery pack (lithium/VW-VBG6)
HDMI cable (RP-CDHG15, RP-CDHG30, RP-CDHG50)
Wide conversion lens (VW-W4607H)
Filter kit (VW-LF46NE) ^{*2}
Video DC light (VW-LDC103E)
Light bulb for video DC light (VZ-LL10E)
Stereo microphone (VW-VMS2E)

*1 The supplied DC cables cannot be used on this unit.

*2 When using the VW-LF46NE, remove the lens hood (supplied).

■ Attaching the optional accessories on the accessory shoe

The video DC light/VW-LDC103E (optional) etc. can be mounted the accessory shoe.



■ Attaching the conversion lens/ filter kit

Attach the wide conversion lens (VW-W4607H; optional), ND filter or MC protector of the Filter kit (VW-LF46NE; optional) in front of the lens.

- It is not possible to attach it to the front of the lens hood. (→ 9)

Be careful about the following.

When 2 lens accessories, such as the ND filter and wide conversion lens, are fitted and the zoom lever is pressed toward the W side, the 4 corners of an image will be darkened. (Vignetting)



VQT2Z66
F0810KK0 (7200 Ⓐ)



Panasonic Corporation
Web site: <http://panasonic.net>

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