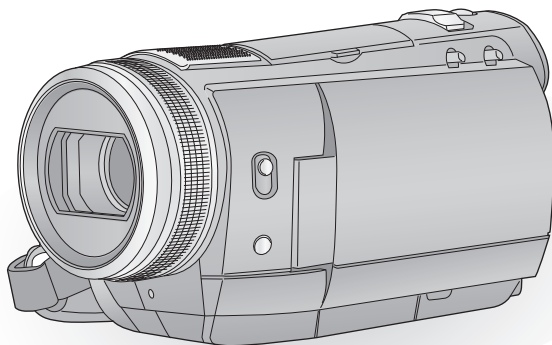


Panasonic®

Operating Instructions High Definition Video Camera

Model No. **HDC-SD100**



Before use, please read these instructions completely.

AVCHD™

DOLBY
DIGITAL
5.1 CREATOR

HDMI™
HIGH-DEFINITION MULTIMEDIA INTERFACE

PictBridge

SD™
CLASS 4

VIERA
Link

LEICA
DICOMAR

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

EP

VQT1T77

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.

Do not heat the batteries above the following temperatures or incinerate.

Button-type battery 60 °C

Battery pack 60 °C

■ **EMC Electric and magnetic compatibility**

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

Use only the recommended accessories.

- Do not use any other AV cables, Component cable and USB cables except the supplied one.
- When you use the cable which are sold separately, please make sure to use the one whose length is less than 3 metres.
- Keep the Memory Card out of reach of children to prevent swallowing.

Product Identification Marking is located on the bottom of units.

■ Information for Users on Collection and Disposal of Old Equipment and used Batteries



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries should not be mixed with general household waste.

For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/96/EC and 2006/66/EC.

By disposing of these products and batteries correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.

For more information about collection and recycling of old products and batteries, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.

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



For business users in the European Union

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

[Information on Disposal in other Countries outside the European Union]

These symbols are only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.



Cd

Note for the battery symbol (bottom two symbol examples):

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

■ Indemnity concerning recording content

The manufacturer shall in no event be liable for the loss of recordings due to malfunction or defect of this unit, its accessories or recordable media.

■ 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.

■ Cards that you can use with this unit

SD Memory Card and SDHC Memory Card

- 4 GB or more Memory Cards that do not have the SDHC 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 and SDHC Memory Card are referred to as the "SD card".
- Functions that can be used for motion picture recording/motion picture playback are indicated by **VIDEO** in these operating instructions.
- Functions that can be used for still picture recording/still picture playback are indicated by **PHOTO** in these operating instructions.
- "HD Writer 2.6E for HDC" is referred to as the "HD Writer 2.6E".
- Pages for reference are indicated by an arrow, for example: → 00

■ Licenses

- SDHC Logo is a trademark.
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- Manufactured under license from Dolby Laboratories.
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- HDAVI Control™ is a trademark of Matsushita Electric Industrial Co., Ltd.
- “x.v.Colour” is trademark.
- LEICA is a registered trademark of Leica Microsystems IR GmbH and DICOMAR is a registered trademark of Leica Camera AG.
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- AMD Athlon™ is a trademark of the Advanced Micro Devices, Inc.
- Apple, Mac OS is either registered trademarks or trademarks of Apple Inc. in the United States and/or other countries.
- PowerPC is a trademark of International Business Machines Corporation.
- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

This product is licensed under the AVC patent portfolio license for the personal and non-commercial use of a consumer to (i) encode video in compliance with the AVC Standard (“AVC Video”) and/or (ii) decode AVC Video that was encoded by a consumer engaged in a personal and non-commercial activity and/or was obtained from a video provider licensed to provide AVC Video. No license is granted or shall be implied for any other use. Additional information may be obtained from MPEG LA, LLC. See <http://www.mpegla.com>.

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Accessories

Check the accessories before using this unit.

Battery pack

VW-VBG130



AC adaptor

VSK0698



AC cable

K2CQ2CA00006



DC cable

K2GJYDC00002



Remote control

N2QAEC000023

Button-type battery

CR2025



AV cable

K2KC4CB00027



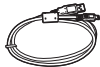
Component cable

K2KZ9DB00004



USB cable

K2KYYYY00050



CD-ROM



Optional accessories

Some optional accessories may not be available in some countries.

AC adaptor (VW-AD21E-K)*1
Battery pack (lithium/VW-VBG130)
Battery pack (lithium/VW-VBG260)
Battery pack (lithium/VW-VBG6)*2
Battery pack holder kit (VW-VH04)
HDMI mini cable (RP-CDHM15, RP-CDHM30)
Tele conversion lens (VW-T3714H)
Wide conversion lens (VW-W3707H)
Filter kit (VW-LF37WE)
Video DC light (VW-LDC103E)*3
Light bulb for video DC light (VZ-LL10E)
Stereo microphone (VW-VMS2E)
Shoe adaptor (VW-SK12E)
Tripod (VW-CT45E)
DVD burner (VW-BN1)

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

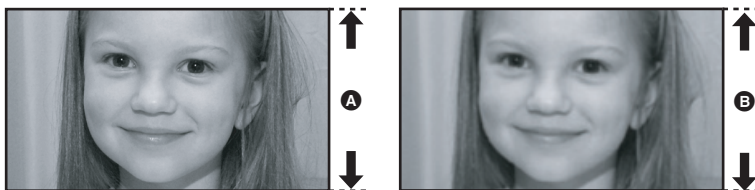
*2 The battery pack holder kit VW-VH04 (optional) is necessary.

*3 Available from Sep. 2008

Features

■ Very clear high definition pictures

This unit can record detailed high definition images to an SD card.



High definition images (1920×1080)*

A Number of available scan lines 1080

Standard images (720×576)

B Number of available scan lines 576

High definition images

• The still pictures above are images for explanation purposes.

* If the recording mode is HA/HG/HX.

What is the AVCHD?

This is a format for recording and playing back highly detailed high definition images.

Images are recorded based on the MPEG-4 AVC/H.264 codec for compressing images and audio is recorded with the Dolby Digital 5.1 Creator.

• Since the recording method is different from an ordinary DVD video etc., the data are not compatible.

■ Compatibility with other products

With other products	Available function	Picture quality
Watching Video/ Pictures on your TV (→ 84 to 90)	Playback with the HDMI mini cable – Playback using VIERA Link (HDAVI Control™) (→ 89)	High definition images
	Playback with the component cable [1080i]	
	Playback with the component cable [576i]	Standard images
	Playback with the AV cable	
Using a DVD burner (→ 92 to 98)	Connecting a DVD burner to copy to/play back a disc – Playing back the copied disc (→ 97)	High definition images
What you can do with a PC (→ 104 to 105)	Copying data to a PC and easy editing	
	Writing data to DVD discs and SD cards	
	Converting the motion picture data to MPEG2	Standard images
	Creating a DVD Video disc	
Dubbing images onto other video device (→ 99)	Dubbing images when connecting with the AV cable	

Preparation

Recording

Playback

Backup

With a PC

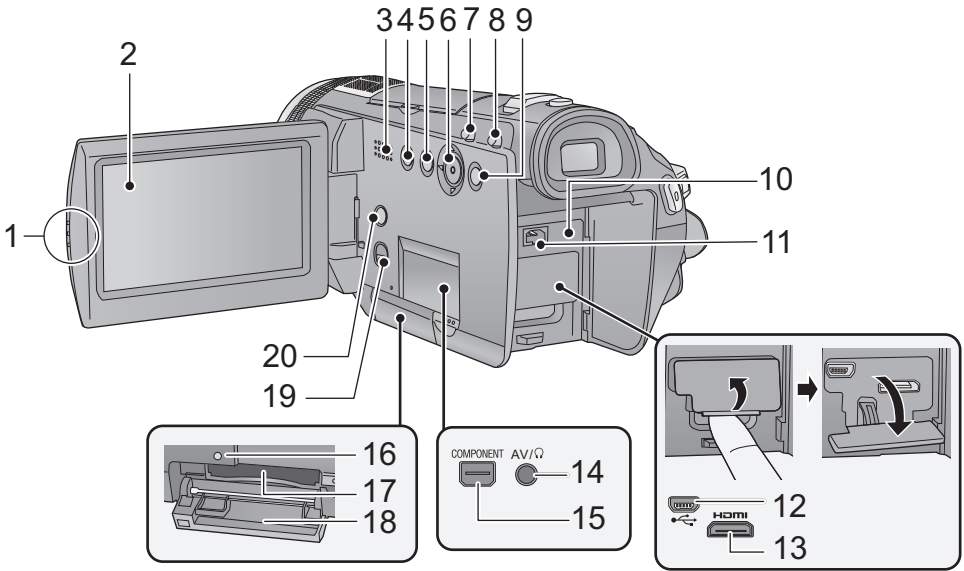
Others

10 Before using

15 Setup

1

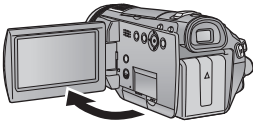
Parts identification and handling



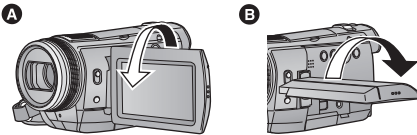
1 LCD monitor open part

2 LCD monitor (→ 29)

Pull the LCD monitor out in the direction of the arrow with your fingers.



- It can open up to 90°.



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

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.

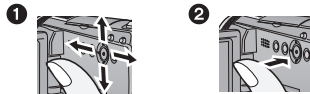
3 Speaker

4 Optical image stabilizer button [], O.I.S.] (→ 44)

5 Delete button [] (→ 78)

6 Cursor button

Use the cursor button to select the recording functions and playback operations, and to operate the menu screen.

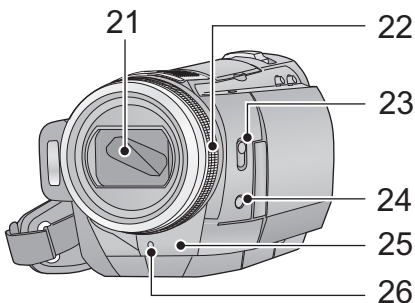
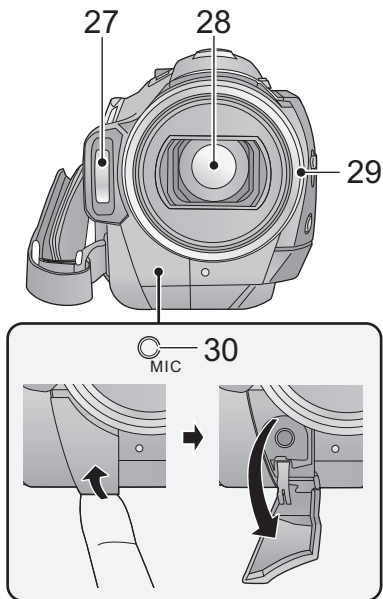


1 Select by moving up, down, left, right.

2 Set by pressing the centre.

- Menu screen operations (→ 22)
- To select the recording functions (→ 46, 52)
- Playback operations (→ 70)

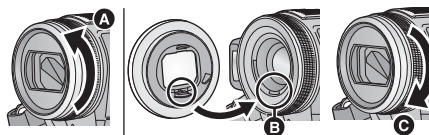
- 7 Intelligent auto button [iA] (→ 45)
- 8 PRE-REC button [PRE-REC] (→ 39)
- 9 Menu button [MENU] (→ 22)
- 10 Battery holder (→ 16)
- 11 DC input terminal [DC IN] (→ 18)
- 12 USB terminal [↔] (→ 92, 100, 111)
- 13 HDMI mini connector [HDMI] (→ 84, 89)
- 14 Audio-video/headphone output terminal [AV/🎧] (→ 24, 50, 84, 99)
 - Use the AV cable (only the supplied cable) or headphones.
 - Setup the [AV JACK] in the menu when the headphones are used. (→ 24)
 - Excessive sound pressure from earphones and headphones can cause hearing loss.
- 15 Component terminal [COMPONENT] (→ 84)
- 16 Card access lamp [ACCESS] (→ 20)
- 17 Card slot (→ 20)
- 18 SD card cover (→ 20)
- 19 SD card open lever [OPEN] (→ 20)
- 20 Disc copy button [DISC COPY] (→ 94, 96)



- 21 Lens cover
 - The lens cover opens in 📹 recording mode. (→ 21)
- 22 Multi manual ring (→ 64)
- 23 Mode select switch [AUTO, MANUAL, FOCUS/ZOOM] (→ 33, 58, 64)
- 24 Camera function button [CAM FUNC] (→ 64)
- 25 Remote control sensor (→ 14)
- 26 Recording lamp (→ 23)

- 27 Built-in flash (→ 55)
- 28 Lens (LEICA DICOMAR)
- 29 Lens hood

Rotate the lens hood counter-clockwise **A** to remove it. In order to attach it, place into slot **B**, and then rotate it clockwise **C**.



- Attach the MC protector or the ND filter of the Filter Kit (VW-LF37WE; optional) in front of the lens hood.
- When fitting the tele conversion lens (VW-T3714H; optional) or the wide conversion lens (VW-W3707H; optional), first remove the lens hood.

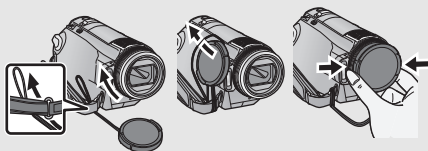
Be careful about the following.

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

(When fitting 2 lens accessories, first remove the lens hood and then fit them.)

Attaching the lens cap (Included in the Filter Kit (VW-LF37WE; optional))

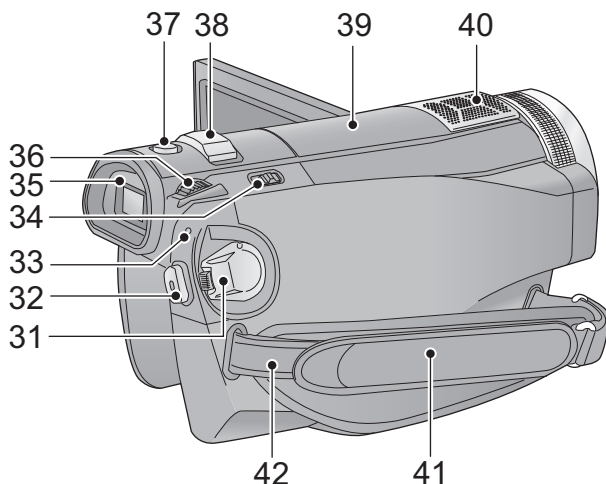
- When the filter kit (VW-LF37WE; optional) is used, protect the lens surface while the unit is not used with the lens cap supplied with the filter kit.



- To attach or remove the lens cap, hold both sides of the lens cap with the tips of your finger and thumb.

30 Microphone terminal [MIC]

- A compatible plug-in powered microphone can be used as an external microphone.
- Audio will be stereo (2 ch) with the external microphone input.
- Make sure that the microphone cable is out of the way from the lens so it will not be recorded in the images.
- When the unit is connected with the AC adaptor, sometimes noise may be heard depending on the microphone type. In this case, please switch to the battery for the power supply and the noise will stop.



31 Mode dial (→ 21)

32 Recording start/stop button (→ 35)

33 Status indicator (→ 21)

34 LCD/EVF select switch [EVF/LCD] (→ 29)

35 Viewfinder (→ 29)

38 Zoom lever [W/T] (In recording mode) (→ 43)

Volume lever [-VOL+] (In playback mode) (→ 71)

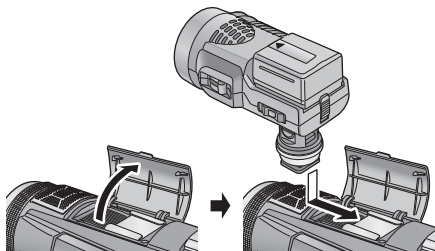
Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the viewfinder screen. However, this is not a malfunction and does not affect the recorded picture.

36 Eyepiece corrector dial (→ 30)

37 Photoshot button [] (→ 40)

39 Accessory shoe

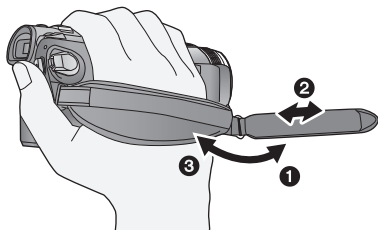
- The video DC light/VW-LDC103E (optional) should be mounted here.



40 Internal microphones (5.1 channel support)

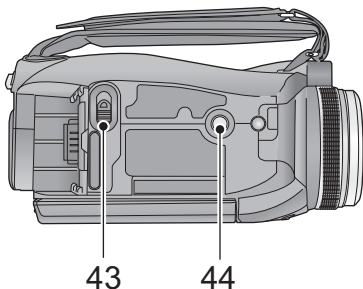
41 Grip belt

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



- 1 Flip the belt.
- 2 Adjust the length.
- 3 Replace the belt.

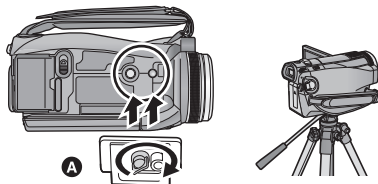
42 Shoulder strap fixture



43 Battery release lever [BATTERY] (→ 16)

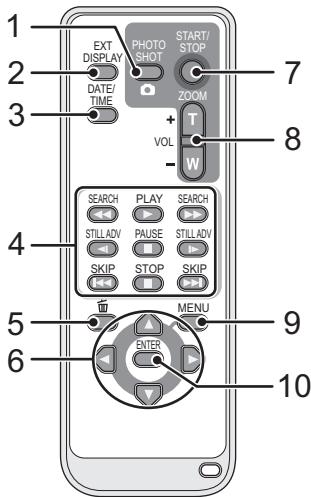
44 Tripod receptacle

This is a hole for attaching the unit to the optional tripod. (For details on mounting the tripod, refer to the operating instructions for the tripod.)



A Camera base

Remote control



- 1 Photoshot button [, PHOTO SHOT]*
- 2 On-screen display button [EXT DISPLAY] (→ 86)
- 3 Date/time button [DATE/TIME] (→ 26)
- 4 Playback operation buttons (→ 71)
- 5 Delete button []*
- 6 Direction buttons [▲, ▼, ◀, ▶]
- 7 Recording start/stop button [START/STOP]*
- 8 Zoom/volume buttons [ZOOM, VOL]*
- 9 Menu button [MENU]*
- 10 Enter button [ENTER]

These buttons operate similar to how the cursor button moves up/down/right/left on the unit.

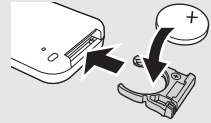
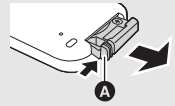
* means that these buttons function in the same manner as the corresponding buttons on the unit.

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.

Install a button-type battery (supplied)

- 1 While pressing the stopper **A**, pull out the battery holder.
- 2 Set the button-type battery with its (+) mark facing upward and then put the battery holder back in place.

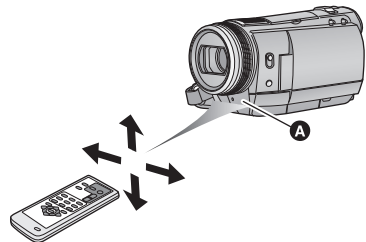


- When the button-type battery runs down, replace it with a new battery (part number: CR2025). The battery should normally last about 1 year, however this depends on how frequently the unit is used.

Warning

Keep the Button-Type battery out of the reach of children. Never put Button-Type battery in mouth. If swallowed call your doctor.

Remote control usable range



- A** Remote control sensor
Distance: Within approx. 5 m
Angle: Approx. 10° up and 15° down, left, and right

- The remote control is intended for indoor operation. Outdoors or under strong light, the unit may not operate properly even within the usable ranges.

■ About batteries that you can use with this unit

The Panasonic battery that can be used with this unit is VW-VBG130/VW-VBG260/VW-VBG6. VW-VBG130/VW-VBG260/VW-VBG6 come with a function to check whether the battery and unit can be safely used together.

- To use the VW-VBG6 for this unit, the battery pack holder kit VW-VH04 (optional) is required.

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.

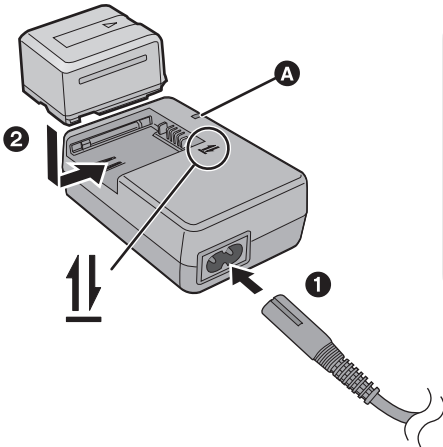
- Be aware that many batteries sold at extremely cheap prices or in situations where it is difficult to verify the actual products before purchase have proven to be counterfeit.

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:

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. (→ 133)

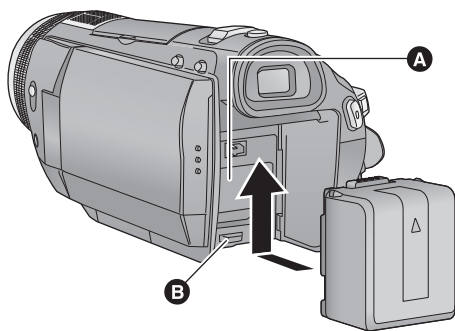
1 Connect the AC cable to the AC adaptor and the AC outlet.

2 Insert the battery into the battery charger by aligning the arrows.

- We recommend using Panasonic batteries (→ 7, 17).
- 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.

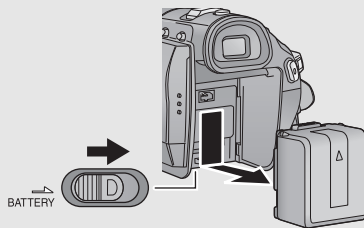


- A** Install the battery with the terminal cover securely closed.
- B** Insert the battery until it clicks and locks.

Removing the battery

Make sure to turn the mode dial to OFF and the status indicator is turned off, and then remove by holding onto it taking care not to drop.

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



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%
- When using the viewfinder (times in parentheses are when using the LCD monitor)

Battery model number	Charging time	Maximum continuously recordable time	Actual recordable time
Supplied battery/ VW-VBG130 (optional)	2 h 35 min	2 h 5 min (1 h 55 min)	1 h 20 min (1 h 10 min)
VW-VBG260 (optional)	4 h 40 min	3 h 50 min (3 h 35 min)	2 h 25 min (2 h 15 min)
VW-VBG6 (optional)*	9 h 25 min	9 h 35 min (8 h 55 min)	6 h (5 h 35 min)

- * The battery pack holder kit VW-VH04 (optional) is necessary.
 - These times are approximations.
 - The indicated charging time is for when the battery has been discharged completely. The charging time may vary depending on how the battery has been used. The charging time for the battery in hot/cold environments or a battery that has not been used for long time may be longer than normal.
-
- 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 recordable times will vary depending on the status of use. Be aware that the operating time of the battery will become shorter in low temperatures. We recommend charging a spare battery for use when recording.
 - The batteries heat up after use or charging. This is not a malfunction.
 - It is not necessary to consume the battery completely. The battery can be recharged even if some capacity remains.

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. It may take time to display the remaining battery capacity. The actual time can vary depending on your actual use.
- The maximum amount of remaining battery capacity able to be indicated is 9 hours 59 minutes. 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 turning the mode dial to switch modes, the time indication will turn off momentarily in order to recalculate the remaining battery capacity time.
- When using the AC adaptor or batteries made by other companies, the remaining battery capacity will not be shown.

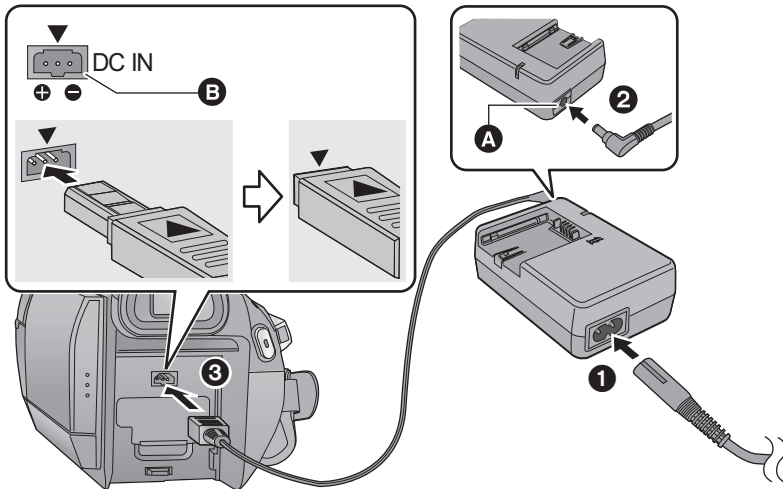
Connecting to the AC outlet

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. Do not use the AC cable from other equipment with this unit.**



A DC output terminal

B DC input terminal

Insert the DC cable so the  mark is pointing upward matching the  mark of the DC input terminal.

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].

This unit (an SDHC compatible device) is compatible with both SD Memory Cards and SDHC Memory Cards. You cannot use SDHC Memory Cards on devices that are only compatible with SD Memory Cards. When using an SDHC Memory Card on another device, confirm that the device supports the SDHC Memory Card.

Cards that you can use with this unit

Card type	Capacity	Motion picture recording	Still picture recording
		We recommend using SD cards conforming to Class 4 or higher of the SD Speed Class Rating* or the following SD cards made by Panasonic for motion picture recording.	
SD Memory Card	8 MB 16 MB	Cannot be used.	Can be used.
	32 MB 64 MB 128 MB 256 MB 512 MB	Cannot be guaranteed in operation. The recording may suddenly stop during motion picture recording depending on the SD card you use. (→ 37)	
	1 GB	RP-SDV01G	
	2 GB	RP-SDV02G, RP-SDM02G	
SDHC Memory Card	4 GB	RP-SDV04G, RP-SDM04G	
	6 GB	RP-SDM06G	
	8 GB	RP-SDV08G	
	12 GB	RP-SDM12G	
	16 GB	RP-SDV16G	
	32 GB	RP-SDV32G	

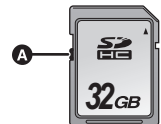
* The SD Speed Class Rating is the speed standard for successive writes.

- Please confirm the latest information about SD Memory Cards/SDHC 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.)

**Use this unit to format SD cards. (→ 83)
Do not format an SD card using any other equipment such as a PC. The card may not be used on this unit.**

- 4 GB or more Memory Cards that do not have the SDHC 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.

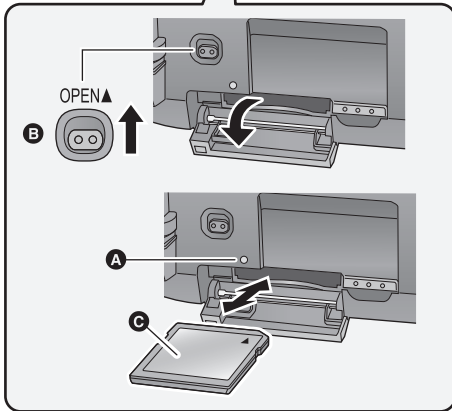
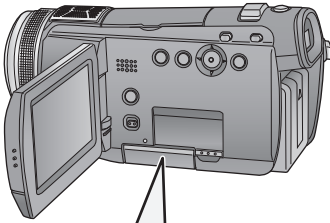


Inserting/removing an SD card

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. (→ 83) When the SD card is formatted, all of the recorded data is deleted. Once the data is deleted, it cannot be restored. Copy valuable data onto a PC, DVD disc etc. before proceeding with the formatting. (→ 92, 104)

Caution:

When the SD card is removed while the card access lamp is lit, this unit may malfunction or the data recorded on the SD card may be lost.



Card access lamp [ACCESS] (A)

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

1 Open the LCD monitor.

- Check that the card access lamp has gone off.

2 Open the SD card cover by sliding the OPEN lever (B).

3 Insert/remove the SD card.

- Face the label side (A) 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.

4 Securely close the SD card cover.



- Securely close it until it clicks.

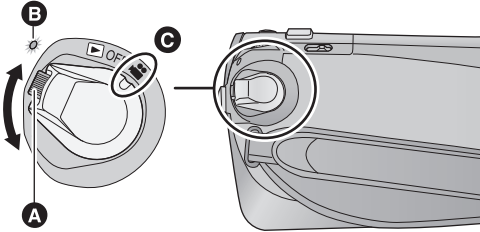
- Do not touch the terminals on the back of the SD card.
- Do not apply strong shocks, bend, or drop the SD card.
- Electrical noise, static electricity or the failure of this unit or the SD card may damage or erase the data stored on the SD card. We recommend saving the important data recorded on this unit to a PC, DVD disc etc. (→ 92, 104)
- 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.

3

Selecting a mode (Turning the unit on/off)

Rotate the mode dial to switch to recording, playback or power OFF.

Turn on the power by turning the mode dial to  or  while pressing the lock release button **A**.



- Rotate the mode dial while at the same time pressing in the lock release button if changing from OFF to another mode.
- Status indicator **B**
- Align with the mark **C**.



The status indicator lights and the power turns on.

- 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 set the date and time. (→ 26)


To turn off the power

Set the mode dial to OFF.

The status indicator **B** goes off and the power turns off.

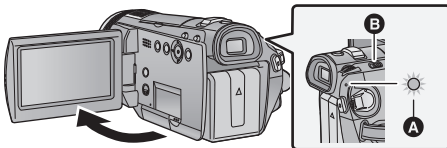
	Recording mode (→ 35, 40)
	Playback mode (→ 70, 75)
OFF	

Turning the power on and off with the LCD monitor

When the mode dial is set to , and the LCD/EVF select switch is set to LCD, power is turned on when the LCD monitor is opened, and power is turned off when it is closed.

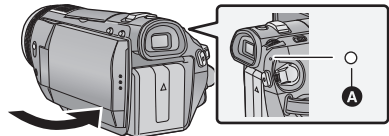
- When the LCD/EVF select switch is set to EVF, power will not turn on/off with the opening and closing of the LCD monitor.

■ To turn on the power



- A** The status indicator lights.
- B** LCD/EVF select switch

■ To turn off the power

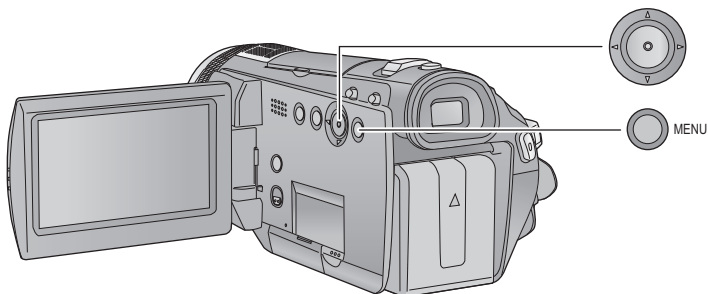


- A** The status indicator goes off.

Set the mode dial to OFF when this unit is not being used.

Using the menu screen

Operate the displayed menu screens with the cursor button.

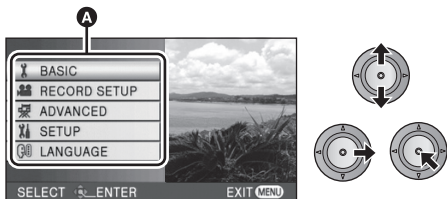


1 Press the MENU button.

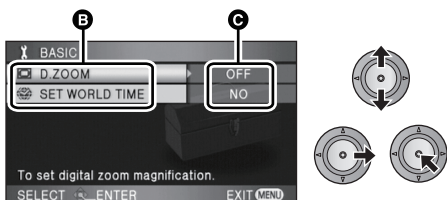


- The menu displayed differs depending on the position of the mode dial.

2 Select the top menu **A** and move the cursor button right or press the cursor button.



3 Select the submenu item **B** and move the cursor button right or press the cursor button.



- Current settings on menus

- Descriptions of submenus and current settings on menus are displayed scrolling at the bottom of the screen.

4 Select the desired setting and press the cursor button to enter the selection.



- Move the cursor button left to return to the previous screen. You can set other items continuously.

5 Press the MENU button to exit the menu screen.



- The menu screen does not appear during recording or playing. You cannot start other operations while the menu screen is displayed.

Language selection

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

1 Press the MENU button, then select [LANGUAGE] and press the cursor button.

2 Select [English] and press the cursor button.

Menu list

Recording mode

*1 It is not displayed when the AUTO/MANUAL switch is set to AUTO.

*2 It is not displayed when the intelligent auto mode is set to [ON].

Part of the menu will not be used depending on the used functions. (→ 121)

■ [BASIC]

[SCENE MODE]*1 (→ 58)

[D.ZOOM] (→ 43)

[GUIDE LINES]*2 (→ 52)

[SET WORLD TIME] (→ 28)

■ [RECORD SETUP]

[FACE FRAMING] (→ 49)

[REC MODE] (→ 38)

[DIGITAL CINEMA]*2 (→ 52)

[FADE COLOUR] (→ 47)

[WIND CUT]*1 (→ 59)

[MIC SETUP] (→ 53)

[MIC LEVEL]*1 (→ 60)

[AGS] (→ 33)

[HI-SPEED BURST]*2 (→ 54)

[FLASH] (→ 55)

[FLASH LEVEL] (→ 55)

[RED EYE] (→ 55)

[SHTR SOUND] (→ 55)

■ [ADVANCED]

[REC LAMP]

The recording lamp lights up during recording and flashes when the unit receives a signal from the remote control or when the self-timer is counting down. When this is set to [OFF], it does not light during recording.

[AUTO SLOW SHTR]*2 (→ 55)

[SHOOTING GUIDE] (→ 39)

[Digital Cinema Colour] (→ 56)

[PICTURE ADJUST]*1 (→ 61)

[MF ASSIST]*1 (→ 65)

[ZEBRA]*1 (→ 61)

[LUMINANCE]*1 (→ 62)

[HISTOGRAM]*1 (→ 63)

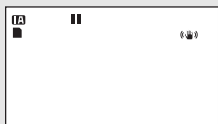
■ [SETUP]

[CLOCK SET] (→ 26)

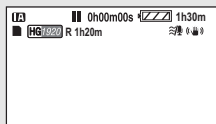
[DISPLAY]

The screen indications are selected as shown in the illustration below.

[OFF]



[ON]



[DATE/TIME] (→ 26)

[DATE FORMAT] (→ 26)

[POWER SAVE]

[OFF]:

The power saving function is not activated.

[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 for PC, DVD burner, printer
 - PRE-REC is used

[QUICK POWER ON] (→ 34)

[QUICK START] (→ 34)

[BEEP SOUND]

This allows operations such as starting and ending recording to be signaled by a beep.

1 Beep

When you start recording

When you turn on the power

When this unit is recognised by the PC or the printer, etc.

2 Beeps

When you pause recording

When you turn off the power

2 Beeps for 4 times

When an error occurs. Check the sentence displayed on the screen. (→ 119)

[POWER LCD] (→ 29)

[LCD AI]*1 (→ 30)

[LCD SET] (→ 29)

[EVF SET] (→ 29)

[COMPONENT OUT] (→ 88)

[HDMI RESOLUTION] (→ 87)

[VIERA Link] (→ 89)

[TV ASPECT] (→ 86)

[AV JACK] (→ 88)

Output from the AV/headphone output terminal can be set to [AV OUT] or [PHONE].

[AV OUT]:

When AV cable is used

[PHONE]:

When headphone is used

- You will hear a buzzing sound when it is set to [AV OUT] while using a headphone.

[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] (→ 83)

[DEMO MODE]



This item is used to start the unit demonstration.

(Only when the mode dial is at the  position)

If [DEMO MODE] is switched [ON] when there is no SD card inserted, the demonstration automatically starts. If any operation takes place, the demonstration is cancelled. However if no operations take place for approx. 10 minutes, the demonstration automatically starts again. To stop the demonstration, set [DEMO MODE] to [OFF] or insert an SD card.

■ [LANGUAGE] (→ 23)

Playback mode

- *1 When the disc playback tab [] is selected while a DVD burner (optional) is connected, or when [INTEL. SCENE] (→ 73) is selected, this does not appear.
- *2 Only when the disc playback tab [] is selected while a DVD burner (optional) is connected, this appears.

([] motion picture playback)

■ [VIDEO SETUP]

- [REPEAT PLAY] (→ 74)
- [RESUME PLAY] (→ 74)
- [SCENE PROTECT]*¹ (→ 81)
- [GUIDE LINES] (→ 52)

■ [EDIT SCENE]*¹

- [DIVIDE] (→ 80)
- [DELETE] (→ 79)

■ [DISC SETUP]*²

- [FORMAT DISC] (→ 98)
- [AUTO PROTECT] (→ 98)
- [DISC STATUS] (→ 98)

■ [SETUP]

- [CARD STATUS] (→ 83)

- For any other menus that are not described above, refer to menus with the same names for the recording mode.

([] still picture playback)

■ [PHOTO SETUP]

- [SLIDES INTERVAL] (→ 76)
- [SCENE PROTECT]*¹ (→ 81)
- [DPOF SET]*¹ (→ 82)
- [DELETE]*¹ (→ 79)

- For any other menus that are not described above, refer to menus with the same names for the recording mode and motion picture playback.

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.



◇ Rotate the mode dial to select .

1 Select the menu. (→ 22)

[SETUP] → [CLOCK SET] → [YES]

2 Select the date or time to be set, then set the desired value with the cursor button.



- The year will change as follows: 2000, 2001, ..., 2039, 2000, ...
- The 24-hour system is used to display the time.
- [] appears on the right top of the screen when [SET WORLD TIME] (→ 28) is set to [HOME], while [] appears when it is set to [DESTINATION].

3 Press the cursor button to enter the selection.

- The clock function starts at [00] seconds when the cursor button is pressed.

Changing the date and time display mode

Select the menu. (→ 22)

[SETUP] → [DATE/TIME] → desired display style

- You can also show or change the date and time display by repeatedly pressing the DATE/TIME button on the remote control.

[DATE]

15.11.2008

[D/T]

15.11.2008 12:34

[OFF]

Changing the date format

Select the menu. (→ 22)

[SETUP] → [DATE FORMAT] → desired display style

Display style	Screen display
[Y/M/D]	2008. 11. 15
[M/D/Y]	11 15 2008
[D/M/Y]	15. 11. 2008

- To set daylight saving time, select the daylight saving time in [HOME] for [SET WORLD TIME] after setting the clock.
- The date and time function is driven by a built-in lithium battery.
- If the time display becomes [- -], the built-in lithium battery needs to be charged. Use the following steps to charge the battery.

To recharge the built-in lithium battery

- Connect the AC adaptor or attach the battery to this unit, and the built-in lithium battery will be recharged. 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 mode dial is set to OFF.)

World time setting (Displaying the time of the travel destination)

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

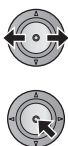
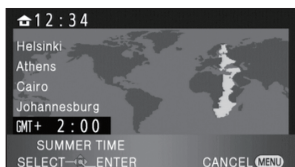
1 Select the menu. (→ 22)


[BASIC] → [SET WORLD TIME] → [YES]

- If the clock is not set, adjust the clock to the current time. (→ 26)
- When the [HOME] (your home region) is not set, such as the time for the initial settings, the message appears. Press the cursor button to move to Step 3.

2 (Only when setting your home region) Select [HOME] and press the cursor button.

3 (Only when setting your home region) Select your home region and enter the selection with the cursor button.



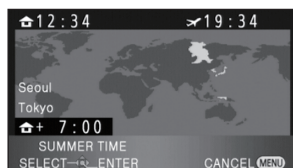
- When the home is in summer time period, move the cursor button up. [] appears and the summer time setting is turned on; the clock is set forward by one hour. Move the cursor button up again to return to the normal time setting.
- The current time appears on the left top of the screen. The time difference from GMT (Greenwich Mean Time) appears on the left bottom of the screen.



4 (Only when setting the region of your travel destination) Select [DESTINATION] and press the cursor button.

- 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 and enter the selection with the cursor button.



- When the destination is in summer time period, move the cursor button up. [] appears and the summer time setting is turned on; the clock is set forward by one hour. Move the cursor button up again to return to the normal time setting.
- The local time at the selected travel destination appears on the right top of the screen. The time difference between the travel destination and the home region appears on the left bottom of the screen.
- Close the setting by pressing the MENU button. [] appears and the time of the travel destination is indicated.

To return the display to the home setting

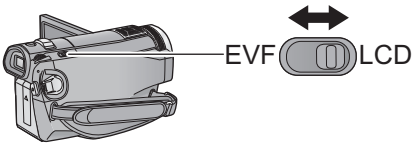
Set the home region using Step 1 to 3, and close the setting by pressing the MENU button.

- 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.

Adjusting LCD monitor/ viewfinder

- These settings will not affect the images actually recorded.
- When the [POWER LCD], [LCD SET] or [LCD AI] is set, set the LCD/EVF select switch to LCD. When the [EVF SET] is set or the viewfinder field of view is corrected, set the LCD/EVF select switch to EVF.

LCD/EVF select switch



LCD:

Record/play back with LCD monitor

EVF:

Record/play back with viewfinder

Increasing the brightness of the LCD monitor

Select the menu. (→ 22)

[SETUP] → [POWER LCD] → desired setting

[OFF]:

No setting (normal)



Makes brighter



Makes even brighter

- If you use the AC adaptor, the [E*] indication appears and the screen becomes brighter automatically when the power is turned on.

Adjusting the brightness and the colour level

1 Select the menu. (→ 22)

[SETUP] → [LCD SET] or [EVF SET] → [YES]

2 Select the item with the cursor button and press the cursor button.



LCD SET

[BRIGHTNESS]:

Brightness of the LCD monitor

[COLOUR]:

Colour level of the LCD monitor

EVF SET

[BRIGHTNESS]:

Brightness of the viewfinder

3 Adjust the settings with the cursor button.



- After adjustments are made if no operations are performed for about 2 seconds, the bar will disappear.
- Press the MENU button to exit the menu screen.

Changing the picture quality on the LCD monitor

1 Set the AUTO/MANUAL switch to **MANUAL** (→ 58)

2 Select the menu. (→ 22)

[SETUP] → [LCD AI] → [DYNAMIC] or [NORMAL]

[DYNAMIC]:

The image on the LCD monitor becomes clear and vivid. Optimum contrast and brightness are set depending on the scenes recorded. Clear and brilliant images are presented.

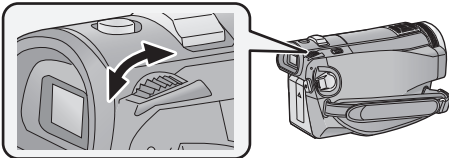
[NORMAL]:

Switches to the standard picture quality.

- When the brightness of the LCD monitor is increased (when the [POWER LCD] is set to [☀] or [☀]), or when the AUTO/MANUAL switch is set to AUTO, it is set to [DYNAMIC], and the setting cannot be changed.

Adjusting the viewfinder field of view

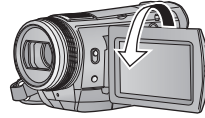
Adjust the focus by rotating the **eyepiece corrector dial**.



Recording showing the contents to a partner

◇ Rotate the mode dial to select  .

Rotate the LCD monitor towards the lens side.



- Both the LCD monitor and the viewfinder are turned on during the face-to-face recording regardless of the position of the LCD/EVF select switch.
 - The image is horizontally flipped as if you see a mirror image. (However the image recorded is the same as a normal recording.)
 - Record by viewing the image in the viewfinder during the face-to-face recording.
-
- Only some indications will appear on the screen. When [!] appears, return the direction of the LCD monitor to normal position and check the warning/alarm indication. (→ 119)
 - Following settings cannot be made during the face-to-face recording. Return the LCD monitor to normal position before making the settings.
 - POWER LCD
 - LCD SET

Preparation

Recording

Playback

Backup

With a PC

Others

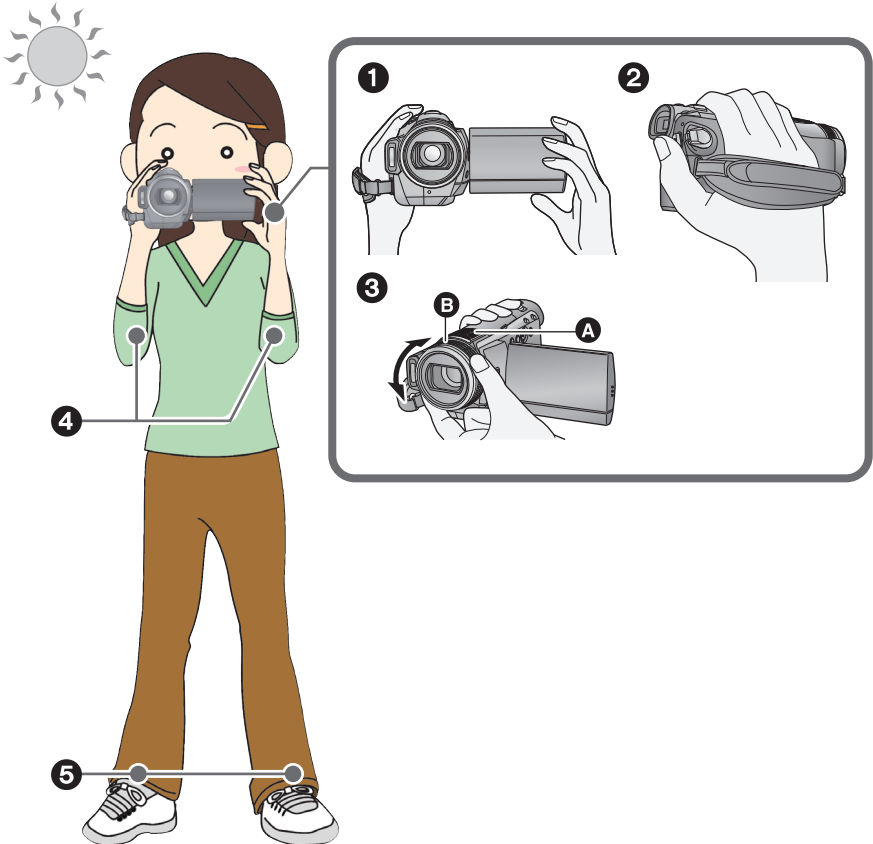
32 Recording (Basic)

46 Recording (Advanced)

Before recording

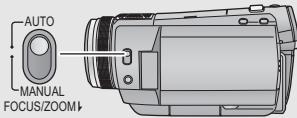
■ Basic camera positioning

- When you are outdoors, record pictures with the sunlight behind you. If the subject is backlit, it will become dark in the recording.
- When recording, make sure your footing is stable and there is no danger of colliding with another person or object.



- 1 Hold the unit with both hands.
- 2 Put your hand through the grip belt.
- 3 Do not cover the microphones **A**.
Turn the multi manual ring **B** as shown above.
- 4 Keep your arms near your body.
- 5 Separate your legs for better balance.

About auto mode



Colour balance (white balance) and focusing are adjusted automatically.

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


(The shutter speed is adjusted to a maximum of 1/250 in recording mode.)

- Automatic white balance (→ 135)
- Auto focus (→ 135)
- Colour balance and focus may not be adjusted automatically depending on light sources or scenes. If so, manually adjust these settings. (→ 58, 64)

Anti-Ground-Shooting (AGS)

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.



- ◇ Rotate the mode dial to select  .
- Select the menu. (→ 22)

[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. In these cases, set [AGS] to [OFF] then continue the recording.
- Use the recording start/stop button to pause the recording.

Quick start

This unit will resume recording pause mode about 0.6 seconds after the LCD monitor is reopened.

- When in quick start standby mode about 60% of the power used in recording pause mode is being consumed, so the recording time will be reduced.

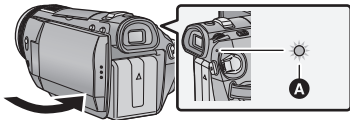
◇ Rotate the mode dial to select .

1 Set the LCD/EVF select switch to LCD. (→ 29)

2 Select the menu. (→ 22)

[SETUP] → [QUICK START] → [ON]

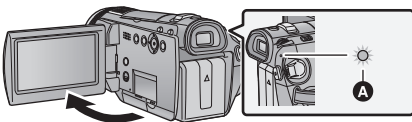
3 Close the LCD monitor while the mode dial is set to .




The status indicator **A** flashes green and the unit goes into quick start standby mode.

- The lens cover does not close.

4 Open the LCD monitor.




The status indicator **A** lights red and the unit is put into recording pause approx. 0.6 seconds after it is turned on.

- Set [QUICK START] to [OFF] to cancel the quick start mode.
- Quick start standby mode is cancelled if
 - about 5 minutes elapsed
 - mode dial is set to 
 - unit is turned off

- Time for quick start will be more than 0.6 seconds slower in the following conditions.
 - When the digital cinema is used
 - When the unit is exposed to vibration or shock
- In the quick start mode, it may take some time for automatic white balance to adjust, if the scene being recorded has a light source different from the scene last recorded. (When the colour night view function is used, however, the white balance of the scene last recorded is retained.)
- In the quick start mode, the zoom magnification becomes 1× and the picture size may differ from what it was before quick start standby mode.
- If [POWER SAVE] (→ 24) is set to [5 MINUTES] and the unit automatically goes into quick start standby mode, close the LCD monitor and then open it again.

Quick power on

The unit is put into recording pause approx. 1.9 seconds when the mode dial is set to  from OFF.

- Start time will not shorten if there is no SD card inserted.

◇ Rotate the mode dial to select .

Select the menu. (→ 22)

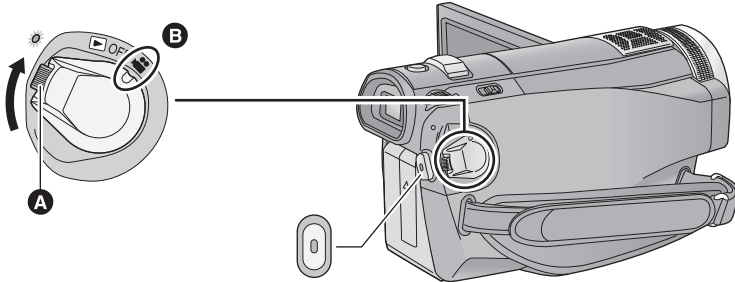
[SETUP] → [QUICK POWER ON] → [ON]

- This function's default setting is [ON].
 - Set [QUICK POWER ON] to [OFF] to cancel the quick power on.
-
- In the quick power on mode, the zoom magnification becomes 1× and the picture size may differ from what it was before turning power off.

VIDEO

This unit records high definition images that are compatible with the AVCHD format on an SD card. Sound is recorded with the Dolby Digital 5.1 Creator.

Use an SD card that can be used for motion picture recording. (→ 19)



- Rotate the mode dial while at the same time pressing in the lock release button **A** if changing from OFF to another mode.
- Align with the mark **B**.

1 Rotate the mode dial to select .




2 Set the LCD/EVF select switch to LCD or EVF. (→ 29)

- Open the LCD monitor when it is set to LCD.

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



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

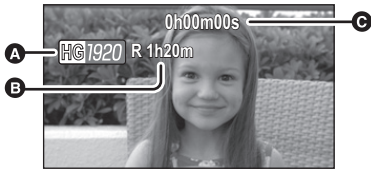
-  and  are red during recording. Do not move this unit until  is green.

- While recording is in progress, the recording will not stop even if the LCD monitor is closed.

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.
-
- The images recorded between pressing the recording start/stop button to start recording and pressing it again to pause recording become one scene.
 - When about 5 minutes have passed without any operation in recording pause, the unit automatically turns off to prevent the battery from running down. When you want to use the unit, turn it on again. This power save feature can also be set to [OFF]. ([POWER SAVE]: → 24)
 - (The maximum number of recordable pictures on a single SD card)
Maximum number of recordable scenes: 3900
Maximum number of different dates: 200 (→ 73)
When either of them reaches to the maximum limit, more scenes cannot be recorded.
 - When recording motion pictures, do not remove the battery or disconnect the AC adaptor. Also, do not remove the SD card while the card access lamp lights up. If you do either of the above, the recovery operation will begin when the SD card is next inserted or the power is turned back on. (→ 120)
 - Put the unit in pause mode when connecting or disconnecting an external microphone with the MIC terminal. If an external microphone is connected or disconnected while recording, the audio will not be recorded properly.
 - Still pictures can be recorded while recording the motion picture. (→ 40)

■ Screen indications in the recording mode



- A Recording mode**
- B Remaining time left for recording**
(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".

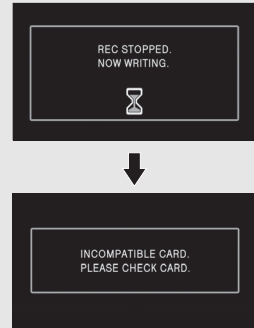
When motion picture recording stops suddenly

For some SD cards, the message appears suddenly, and recording stops.

Use a Panasonic SD card or another SD card which can be used to record motion pictures. (→ 19)

When the unit stops while a usable SD card for recording motion pictures (→ 19) is used, the data writing rate has deteriorated.

We recommend formatting the SD card being used. (→ 83) When an SD card is formatted, all the data recorded on it will be deleted so copy valuable data to the PC prior to formatting. (→ 104)



Recording modes/approximate recordable time

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

Select the menu. (→ 22)

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

		HA*1	HG*2	HX*3	HE*4
SD card	1 GB	7 min	9 min	14 min	21 min
	2 GB	15 min	20 min	30 min	45 min
	4 GB	30 min	40 min	1 h	1 h 30 min
	6 GB	45 min	1 h	1 h 30 min	2 h 15 min
	8 GB	1 h	1 h 20 min	2 h	3 h
	12 GB	1 h 30 min	2 h	3 h	4 h 30 min
	16 GB	2 h	2 h 40 min	4 h	6 h
	32 GB	4 h	5 h 20 min	8 h	12 h

A Image quality prioritized

B Recording time prioritized

1 1920×1080: Motion pictures can be recorded with the highest picture quality.

*2 1920×1080: Motion pictures can be recorded with high picture quality.

*3 1920×1080: Motion pictures can be recorded with normal picture quality.

*4 1440×1080: Motion pictures can be recorded for a longer time.

* This means the highest quality for this unit.

- **The recording is in high definition picture quality no matter what recording mode is used to record.**
- 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.
- This unit records in VBR (Variable Bit Rate). VBR recording automatically varies the bit rate (amount of data in a fixed time) depending on the subject being recorded. This means if a recording with a lot of movements is recorded, the recording time is reduced.
- 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).

Recordable time using the battery (→ 17)

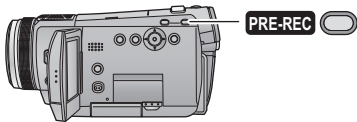
- Mosaic-pattern noise may appear on a playback image in the following cases.
 - When there is a complicated pattern in the background
 - When the unit is moved too fast
 - When a subject with sharp movements has been recorded (Particularly if it has been recorded in HE mode.)
- Many repeated recording and deletion of motion pictures may reduce the usable time for recording on an SD card. In that case, format the SD card using this unit. Since all data recorded on the SD card will be deleted once the SD card has been formatted, save important data to your PC etc.

PRE-REC

This prevents you missing a shot.

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

1 Press the PRE-REC button.



[**PRE-REC**] appears on the screen and the unit repeats the update by recording motion pictures for about 3 seconds onto the built-in memory and then deleting them.

- **Aim this unit at the subject and position it securely.**
- Press the PRE-REC button again to cancel the setting.

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

- Images and audio are recorded for about 3 seconds before pressing the recording start/stop button.
 - There is no beep sound.
 - After recording starts, the PRE-REC setting is cancelled.
 - To use the PRE-REC function again, press the PRE-REC button again.
-
- PRE-REC is cancelled in the following cases.
 - If you operate the mode dial.
 - If you open the SD card cover.
 - If you press the MENU button.
 - If you turn the unit off.
 - When the remaining time left for recording motion pictures is less than 1 minute, PRE-REC cannot be set.
 - If you start recording less than 3 seconds after pressing the PRE-REC button, or while the PRE-REC indication flashes within about 3 seconds after initiating the quick start operation, motion pictures for 3 seconds cannot be recorded.
 - When the recording start/stop button is pressed, image shake and operation sound may be recorded.

- The image when pressing the recording start/stop button appears in thumbnail view, and it is different from the image when starting playback.

Shooting guide

Message is displayed when this unit is moved rapidly.

Select the menu. (→ 22)

[**ADVANCED**] → [**SHOOTING GUIDE**] → [**ON**]

- This function's default setting is [**ON**].

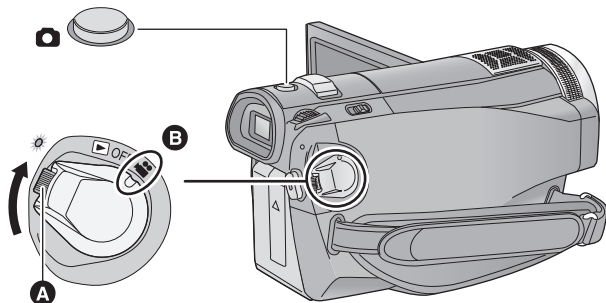


When “CAMERA PANNING IS TOO FAST.” appears, move the unit slowly while recording.

- **Set to [OFF] to turn off the message indication.**
-
- Message will not appear while pausing the recording. (Message will appear even if it is pausing the recording if [**DEMO MODE**] is set to [**ON**])
 - In some recording conditions, messages may not appear.

PHOTO

The number of pixels recorded for still pictures is [2.1M] 1920×1080 (16:9). Still pictures can also be recorded while recording motion pictures.



- Rotate the mode dial while at the same time pressing in the lock release button **A** if changing from OFF to another mode.
- Align with the mark **B**.

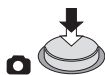
1 Rotate the mode dial to select .


2 Set the LCD/EVF select switch to LCD or EVF. (→ 29)

- Open the LCD monitor when it is set to LCD.

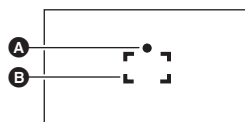
3 Press the button halfway. (For auto focus only)

Focus indication appears and the unit focuses on the subject automatically. (Focus on a subject manually when it is not easily focused automatically. → 65)




- If you set the optical image stabilizer function (→ 44) to on, then the image stabilizer function will be more effective. ([MEGA] ) (MEGA optical image stabilizer) will be displayed.)

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)

4 Press the button fully.

- In order to take better still pictures, the screen will brighten when the  button is fully pressed.










To record still pictures clearly

- While recording motion pictures or during the PRE-REC operation, the following arrangements are applied so that motion picture recording takes preference over still picture recording. For vivid still pictures, we recommend pausing motion picture recording and taking still pictures after releasing the PRE-REC mode.
 - Image quality is different from ordinary still pictures.
 - Pressing the  button halfway is disabled.
 - The remaining usable capacity (number of pictures that can be taken) indication does not appear.
- You can record stable pictures without shaking by using a tripod and the remote control. (When a remote control is used, pressing the  button halfway is disabled.)

■ About the screen indications when the button is pressed



- : Flash (→ 55)
- : Flash level (→ 55)
- : Red eye reduction (→ 55)
- : Size of still pictures
- 3000: Remaining number of still pictures (Flashes in red when [0] appears.)
- : Still picture operation indicator (→ 117)
-  : MEGA optical image stabilizer (→ 44)

- The sound cannot be recorded while recording still pictures.
- 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.

■ About the focus indication

- The focus indication indicates the status of the auto focus.
- The focus indication does not appear in manual focus mode.
- You can record still pictures even if the focus indication does not appear, but pictures may be recorded without being focused.
- The focus indication does not appear or has difficulty focusing in the following cases.
 - When the zoom magnification is high.
 - When the unit is shaken.
 - When the subject is moving.
 - When the subject stands in front of a light source.
 - 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.
 - When the scene lacks contrast.
 - When the colour night view function is used.

■ 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 intelligent auto (portrait mode) is used.
 - When the automatic face detection mode is used. (→ 49)
 - When the digital zoom (more than approx. 12×) is used.

Number of recordable pictures

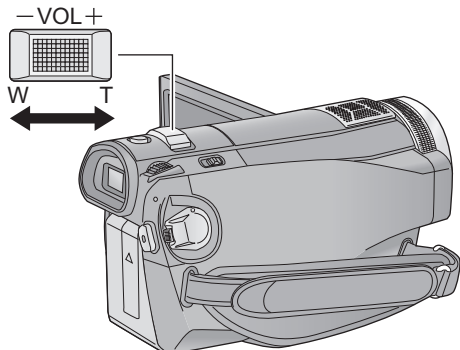
	Picture size	2.1m (1920×1080)
SD card	8 MB	4
	16 MB	10
	32 MB	20
	64 MB	47
	128 MB	94
	256 MB	200
	512 MB	410
	1 GB	820
	2 GB	1670
	4 GB	3290
	6 GB	5000
	8 GB	6690
	12 GB	10100
16 GB	13470	
32 GB	27030	

- **The number of recordable pictures depends on the subject being recorded.**
- The numbers shown in the table are approximations.

VIDEO **PHOTO**

The maximum optical zoom ratio is 12×.

◇ **Rotate the mode dial to select** .



when operating with the remote control.) When the zoom speed is high, the subject may not be focused easily.

- Zoom can also be operated using the multi manual ring. (→ 65)

Digital zoom function

If the zoom magnification exceeds 12×, then the digital zoom function will be activated. The maximum magnification provided by the digital zoom can be selected.

Select the menu. (→ 22)

[BASIC] → [D.ZOOM] → desired setting

- [OFF]: Optical zoom only (Up to 12×)
- [30×]: Up to 30×
- [700×]: Up to 700×

- If [30×] or [700×] is selected, the digital zoom range is displayed in blue while zooming.
- The larger the digital zoom magnification, the more the image quality is degraded.

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.

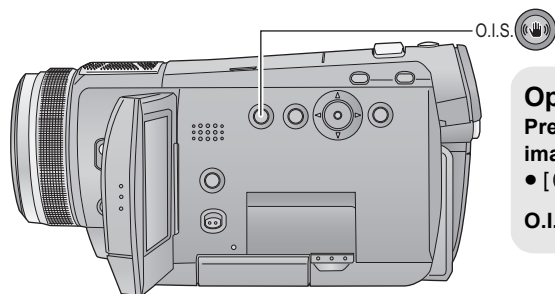
- If you take your finger off the zoom lever during zoom operation, the operation sound may be recorded. When returning the zoom lever to the original position, move it quietly.
- When the zoom magnification is 12×, the subjects are focused at about 1.2 m or more.
- When the zoom magnification is 1×, this unit can focus on a subject approx. 4 cm away from the lens. (Macro function)
- If the zoom lever is pushed to the end, you can zoom from 1× up to 12× in as fast as approx. 2.3 seconds. (The zoom speed does not vary

Optical image stabilizer function


VIDEO PHOTO

Optical image stabilizer can stabilize the image without decreasing the image quality as much.


◇ **Rotate the mode dial to select**  .



Optical image stabilizer button
Press this button to switch on/off the image stabilizer function.


• [] appears on the screen.

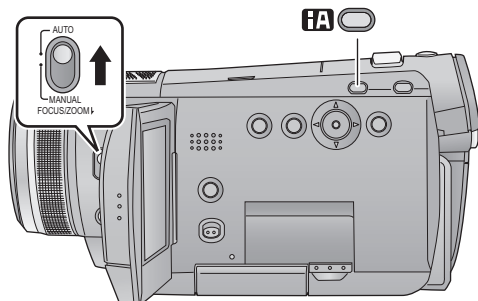
O.I.S.: Optical Image Stabilizer

- This function's default setting is [ON].
- Set the intelligent auto mode to [OFF] before turning the optical image stabilizer function to [OFF].
- In still picture recording mode, pressing the  button halfway increases the effect of the image stabilizer function. (MEGA optical image stabilizer)
- In the following cases, the image stabilizer function may not work effectively.
 - When the digital zoom is used
 - When the unit is shaken greatly
 - When you record a moving subject while tracking it
 - When the conversion lens is used

VIDEO PHOTO

It will make an optimal setting automatically depending on the objects and recording conditions.







◇ Set the mode dial to , and set the AUTO/MANUAL switch to AUTO. (→ 33)






Intelligent auto button

Press this button to switch on/off the intelligent auto mode.

It is automatically set to the following modes depending on the objects and recording conditions.

Mode	Scene/Effect
 Portrait 	When the object is a person <hr/> Faces are detected and focused automatically, and the brightness is adjusted so it is recorded clearly.
 Scenery 	Recording outdoors <hr/> The whole landscape will be recorded vividly without whiting out the background sky, which may be very bright.
 Spotlight 	Under a spotlight <hr/> Very bright object is recorded clearly.

Mode	Scene/Effect
 Low light 	Dark room or twilight <hr/> It can record very clearly even in a dark room or twilight.
 Normal	Other situations <hr/> Contrast is adjusted automatically for clear image.

- Due to conditions, a different mode may be identified for the same subject.
- Modes are selected automatically by the unit, so it may not choose desired mode depending on the recording conditions.
- Brightness may change suddenly or flicker when set to [ON].
- Optical image stabilizer function (→ 44) and intelligent contrast control (→ 48) are set to [ON] in all modes.
- If this is turned to [ON], the following functions are disabled.
 - Digital cinema
 - HD hi-speed burst shooting
 - Guide line

1

Recording functions of operation icons

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

◇ Rotate the mode dial to select .

1 Press the cursor button, and icons will be displayed on the screen.



















- The indication changes each time the cursor button is moved down.
- The operation icon appears or disappears each time the cursor button is pressed.

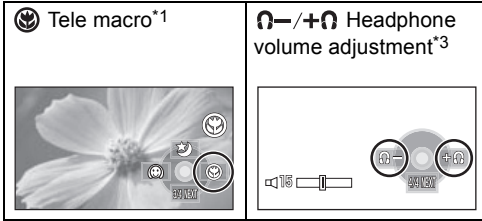
2 (e.g. Backlight compensation)
Select an icon with the cursor button.



- Select the icon again to cancel the function. (Refer to page 47 to cancel help mode, and page 48 to cancel self-timer.)

Operation icons


<p> Fade</p> 	<p> Backlight compensation</p> 	<p> Help mode*¹</p> 	<p> Self-timer*¹</p> 
<p> Intelligent contrast control*²</p> 	<p> Automatic face detection*²</p> 	<p> Soft skin mode*¹</p> 	<p> Colour night view*¹</p> 



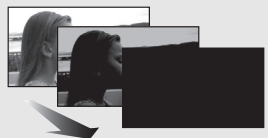

















*1 It is not displayed while recording.






*2 It is not displayed when the intelligent auto mode is [ON].





*3 It is displayed only when [AV JACK] is set to [PHONE].

- If you turn off the power or set the mode dial to  , help mode, colour night view, backlight compensation, self timer and tele macro functions are cancelled.
- If you turn off the power, the fade function is cancelled.

Function	Effect
<p> Fade</p> <p style="text-align: right;">VIDEO</p> <p>(Fade in)</p>  <p>(Fade out)</p> 	<p>When you start recording, the image/audio gradually appears. (Fade in) When you pause recording, the image/audio gradually disappears. (Fade out)</p> <ul style="list-style-type: none"> • For fade out, the recording stops and the fade setting is cancelled after the image and audio disappeared completely. <p>■ To select the colour for fade in/out Select the menu. (→ 22) [RECORD SETUP] → [FADE COLOUR] → [WHITE] or [BLACK]</p>
<p> Backlight compensation</p> <p style="text-align: right;">VIDEO PHOTO</p>	<p>This makes the image brighter to prevent darkening of a backlit subject.</p>
<p> Help mode</p> <p style="text-align: right;">VIDEO PHOTO</p> 	<p>Select the icon of the function that you want to know with the cursor button and then an explanation of the selected icon scrolls at the bottom of the screen. (Except headphone volume adjustment)</p> <ul style="list-style-type: none"> • To exit the help mode, press the MENU button or select [END].

Function	Effect
<p> Self-timer</p> <p style="text-align: right;">PHOTO</p>	<p>This is for recording still pictures using the timer.</p> <p>Each time the [] icon is selected, the indication changes by one setting in the following order: 10] → [2] → setting cancelled</p> <p>10: Records after 10 seconds 2: Records after 2 seconds</p> <ul style="list-style-type: none"> • When the  button is pressed, a still picture is recorded after the [10] or [2] display and the recording lamp flashes for the time which has been set. • After recording, the self-timer is cancelled. • In auto focus mode, if the  button is pressed halfway once and then fully, the lens focuses on the subject when the button is pressed halfway. • If the  button is pressed fully all at once, the lens focuses on the subject just before recording. • Depending on the time taken to bring the subject into focus, the recording may take longer than set to start. <hr/> <p><i>To stop the timer midway through</i> Press the MENU button.</p>
<p> Intelligent contrast control</p> <p style="text-align: right;">VIDEO PHOTO</p>	<p>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.</p>

Function	Effect
<p> Automatic face detection</p> <p>VIDEO PHOTO</p> 	<p>Brightness, quality, and focus are adjusted automatically so the face will be recorded clearly by detecting the face when it is recorded in the dark, such as when the light is shining from behind the objects.</p> <p>In the automatic face detection mode, detected faces appear with frames.</p> <ul style="list-style-type: none"> • Up to 15 frames are indicated. Larger faces and faces nearer to the centre of the screen take preference over others. • Faces that do not appear completely on the screen are not detected. <p>■ Prioritized face framing</p> <p>The face that is larger and nearer to the centre of the screen within the detected faces will be framed with an orange frame (prioritized face framing). Focus and adjustment of brightness will be performed against the prioritized face framing.</p> <ul style="list-style-type: none"> • Set the focus manually when set to manual focus. Prioritized face framing will not be displayed. • Focus will be set to prioritized face framing when the  button is pressed halfway when recording still pictures. Prioritized face framing will turn to green when the focus is set. <p>■ To display the face detection framing</p> <p>Select the menu. (→ 22)</p> <p>[RECORD SETUP] → [FACE FRAMING] → desired setting</p> <p>[OFF]: Not display</p> <p>[PRIMARY]: Only the prioritized face framing is displayed.</p> <p>[ALL]: All face detection framings are displayed.</p> <ul style="list-style-type: none"> • Set to [OFF] to not display the face detection framing. • This function's default setting is [ALL].
<p> Soft skin mode</p> <p>VIDEO PHOTO</p>	<p>This makes skin colours appear softer for a more attractive appearance.</p> <p>This is more effective if you record a person closely from the torso up.</p>
<p> Colour night view</p> <p>VIDEO PHOTO</p>	<p>This function allows you to record colour images in very low light situations. (Minimum required illumination: approx. 1 lx)</p>

Function	Effect
 Tele macro <div style="display: flex; justify-content: space-around; width: 100px;"> VIDEO PHOTO </div>	<p>This is for close-ups bringing only what you want to record into focus. By focusing only on the subject and blurring the background, the image can be impressive.</p> <ul style="list-style-type: none"> • The unit can focus on the subject at a distance of approx. 40 cm. • If the magnification is 12× or less, then it is automatically set to 12×.
 Headphone volume adjustment <div style="display: flex; justify-content: space-around; width: 100px;"> VIDEO </div>	<p>Adjusts the volume of the headphone while recording.</p> <p> :Increases the volume</p> <p> :Decreases the volume</p> <ul style="list-style-type: none"> • Actual volume to be recorded does not change.


Fade:

- The thumbnails of scenes recorded using fade in become black (or white).
- It will be cancelled automatically once the recording time for one scene exceeds 12 hours.

Help mode:

- When the help mode is used, functions cannot be set.
- When the help mode is used, motion pictures and still pictures cannot be recorded.

Self-timer:

- The self-timer standby mode is cancelled when you press the recording start/stop button to start motion picture recording. Even if you press the recording start/stop button while the self-timer is counting down, motion picture recording is not possible.
- Setting the self-timer to [2] is a good way to prevent image shake when the  button is pressed while using a tripod etc.

Intelligent contrast control:

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

Automatic face detection


- In the following case, faces may not be detected in some recording conditions.
 - Faces are not full-faces
 - Faces tilt
 - Faces are extremely bright or dark
 - Shadows on faces are a few
 - Faces are not completely exposed (for instance wearing sunglasses)
 - The size of a face is small on the screen.
 - The subject moves quickly.
 - When the hand shakes
 - When the digital zoom is used
 - When the unit is tilted
- In the following cases, the function may not operate properly even if faces are detected. If this occurs, turn off this function.
 - Nonhuman subjects are recognised as faces.
 - When the brightness or quality cannot be adjusted clearly since scenes are extremely dark, or the areas around the faces or the background is extremely bright.
- Since the brightness of the entire image is adjusted to record faces more vividly, brightness may change suddenly or images may flicker under some recording conditions.
- When the face detection frame disappears due to zooming, the brightness may change suddenly or the images may flicker.

 **Soft skin mode:**

- 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.

 **Colour night view:**

- **Recorded scene is seen as if frames were missed.**
- If set in a bright place, the screen may become washed out for a while.
- Colour night view function makes dark scenes that are usually invisible can be recorded in bright colours. For this reason, bright dots that are usually invisible may be seen, but this is not a malfunction.
- Attach this unit to a tripod, and you can record images free from vibration.
- In darker areas, auto focus may focus a bit slower. This is normal. If there is difficulty focusing with auto focus, manually adjust the focus.



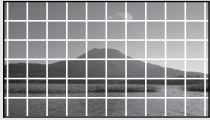


 **Tele macro:**

- The tele macro function is cancelled when the zoom magnification becomes lower than 12×.
- If a sharper focus cannot be achieved, adjust the focus manually. (→ 65)



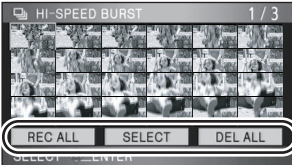

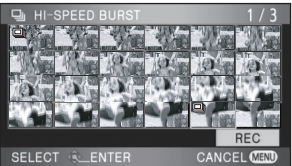
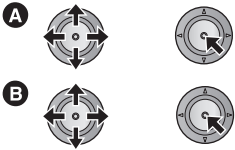
Recording functions of menus











◇ Rotate the mode dial to select .


- Set to [OFF] when the menus are not used.

Function	Effect/Setting method
<p>Guide line</p> <p><input type="checkbox"/> VIDEO <input type="checkbox"/> PHOTO</p> <p>A </p> <p>B </p> <p>C </p>	<p>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.</p> <p>A [HORIZONTAL] B [GRID1] C [GRID2]</p> <hr/> <ul style="list-style-type: none"> • The intelligent auto mode is set to [OFF]. (→ 45) <p>Select the menu. (→ 22) [BASIC] → [GUIDE LINES] → desired setting</p> <p>(When  (motion picture playback) tab is selected while the mode dial is set to . (→ 70))</p> <p>[VIDEO SETUP] → [GUIDE LINES] → desired setting</p> <ul style="list-style-type: none"> • The guide lines do not appear on the images actually recorded.
<p>Digital cinema</p> <p><input type="checkbox"/> VIDEO</p>	<p>Use this function to record an image with vivid colour, like an image on a movie film.</p> <hr/> <ul style="list-style-type: none"> • The intelligent auto mode is set to [OFF]. (→ 45) • Set the recording mode to HA or HG. (→ 38) <p>Select the menu. (→ 22) [RECORD SETUP] → [DIGITAL CINEMA] → [ON]</p> <ul style="list-style-type: none"> • When [DIGITAL CINEMA] is [ON], smooth viewing of the motion pictures may not be possible. • The picture will be recorded as 50i (→ 87) irrespective of the digital cinema mode setting.

Function	Effect/Setting method
<p>Microphone setup</p> <p style="text-align: right;">VIDEO</p> <p>[SURROUND]: Sound is recorded with 5.1 ch surround microphone.</p> <p>[ZOOM MIC]: 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).</p> <p>[FOCUS MIC]: Directivity of the centre is enhanced for recording audio near the front of the unit more clearly.</p>	<p>Directivity (sound sensitivity direction) of the built-in microphones can be adjusted.</p> <hr/> <p>Select the menu. (→ 22) [RECORD SETUP] → [MIC SETUP] → desired setting</p> <ul style="list-style-type: none"> • This function's default setting is [SURROUND].

Function	Effect/Setting method
<p>HD hi-speed burst shooting</p> <p>PHOTO</p>	<p>72 still pictures are recorded at a rate of 25 per second. Use this function to record an object with fast movement.</p> <hr/> <ul style="list-style-type: none"> The intelligent auto mode is set to [OFF]. (→ 45) <p>1 Select the menu. (→ 22) [RECORD SETUP] → [HI-SPEED BURST] → [ON]</p> <p>2 Press the  button.</p> <ul style="list-style-type: none"> Up to 72 still pictures can be taken in burst mode. ( flashes in red during recording.) <p>3 Select the setting to save with the cursor button and press the cursor button.</p> <div>  </div> <div>  </div> <p>[REC ALL]: All pictures are stored.</p> <p>[SELECT]: Pictures in the selected range are stored.</p> <p>[DEL ALL]: No picture is stored.</p> <ul style="list-style-type: none"> Select the thumbnail on the right bottom of the screen with the cursor button and move the cursor button right to display the next page. <p>4 (Only when the [SELECT] is selected) Select the range of pictures that will be stored.</p> <div>  </div> <div>  </div> <p>A Start point*</p> <p>B Finish point</p> <p>* Only select the picture for start point if only 1 picture is to be stored.</p> <p>Confirmation message is displayed when [REC] is selected and the cursor button is pressed after selecting the start point and the finish point. Select [YES] and press the cursor button.</p>

Function	Effect/Setting method
Built-in flash <div style="text-align: right; border: 1px solid black; padding: 2px;">PHOTO</div>	<p>When the  button is pressed, the flash is activated and the picture will be recorded. Use the built-in flash in order to record still pictures in dark places.</p> <hr/> <p>Select the menu. (→ 22) [RECORD SETUP] → [FLASH] → [AUTO] or [ON]</p> <ul style="list-style-type: none"> • This function's default setting is [AUTO]. • When the  button is pressed halfway, the flash indicator will appear in the bottom left corner of the screen. <p>[ON]:  [AUTO]:  [OFF]: </p> <ul style="list-style-type: none"> • When [AUTO] is set, the ambient brightness is automatically detected, and the flash will activate only when necessary. (If the flash is not necessary, the [] indicator will not appear when the  button is pressed halfway.) <p>■ To adjust the brightness of the flash Select the menu. (→ 22) [RECORD SETUP] → [FLASH LEVEL] → desired setting</p> <p>[-]: Less brighter [±0]: Normal [+]: Much brighter</p>
Red eye reduction <div style="text-align: right; border: 1px solid black; padding: 2px;">PHOTO</div>	<p>Reduces the phenomena where human eyes become red from flashes.</p> <hr/> <p>Select the menu. (→ 22) [RECORD SETUP] → [RED EYE] → [ON]</p>
Shutter sound <div style="text-align: right; border: 1px solid black; padding: 2px;">PHOTO</div>	<p>You can add a shutter sound when recording still pictures.</p> <hr/> <p>Select the menu. (→ 22) [RECORD SETUP] → [SHTR SOUND] → [ON]</p> <ul style="list-style-type: none"> • This function's default setting is [ON].
Auto slow shutter <div style="display: flex; justify-content: flex-end; gap: 5px;"> <div style="border: 1px solid black; padding: 2px;">VIDEO</div> <div style="border: 1px solid black; padding: 2px;">PHOTO</div> </div>	<p>You can record bright pictures even in dark places by slowing the shutter speed.</p> <hr/> <ul style="list-style-type: none"> • The intelligent auto mode is set to [OFF]. (→ 45) <p>Select the menu. (→ 22) [ADVANCED] → [AUTO SLOW SHTR] → [ON]</p> <ul style="list-style-type: none"> • The shutter speed is adjusted between 1/25 and 1/250 depending on the surrounding brightness. (When adjusting the shutter speed manually, it can be adjusted between 1/25 and 1/8000.) • If [AUTO SLOW SHTR] is set to [OFF], then the shutter speed will be set between 1/50 and 1/250. (When adjusting the shutter speed manually, it can be adjusted between 1/50 and 1/8000.)

Function	Effect/Setting method
Digital cinema colour 	Recording motion pictures with more vivid colours, using x.v.Colour™ technology. <hr/> Select the menu. (→ 22) [ADVANCED] → [Digital Cinema Colour] → [ON] <ul style="list-style-type: none"> • For more realistic colours, use an HDMI mini cable with a TV that supports the x.v.Colour™.



Digital cinema:

- [Digital Cinema Colour] is turned [ON] and is not changeable.





Microphone setup:

- If [MIC SETUP] is set to [FOCUS MIC] or [ZOOM MIC] when zooming in (close-up), sounds from the surrounding area are suppressed and sound near the front of the unit is recorded. If you wish to record higher quality sound and maintain realism even when zooming in, for instance recording a music recital, we recommend setting [MIC SETUP] to [SURROUND].

HD hi-speed burst shooting:

- If this is turned to [ON], motion pictures cannot be recorded. The following functions are also disabled.
 - Pressing the  button halfway
 - Digital zoom
 - Colour night view
 - Built-in Flash
 - Auto slow shutter
 - Digital cinema colour
 - Scene mode
 - Adjusting shutter speed and iris/gain
- If you turn off the power or set the mode dial to , this function is cancelled.
- The maximum number of times you can record on an SD card is 30.
- If a sharper focus cannot be achieved, adjust the focus manually. (→ 65)
- Noise increases in dark locations. Colour balance and brightness on the screen may change with some light sources such as fluorescent lamps.
- Image quality is different from ordinary still picture recording. To record more vivid still pictures, turn off this function before recording. (→ 40)

Built-in flash:

- Do not block the flash with your hand or by other means.
- Set the flash to [OFF] where using a flash is prohibited.
- Do not use the flash with the ND filter (optional) attached.
- The unit automatically determines if the flash is necessary even when it has been set to [OFF] by detecting the ambient brightness. (If it determines that the flash is necessary, the [] indication lights up in red when the  button is pressed halfway.)
- If the [] indication etc. flashes or is not displayed when the  button is pressed halfway, the flash is not activated.
- The available range of the flash is approx. 1 m to 2.5 m in dark places. Pictures will appear dark or reddish when they are recorded by using the flash at distances greater than 2.5 m.
- Using the flash fixes a shutter speed to 1/500 or slower.
- The picture may appear dark if the flash is lit in front of a white background.
- A conversion lens (optional) can block the flash and may cause a vignetting effect.
- If the flash is activated a large number of times, it may take longer to charge it.

Red eye reduction:

- The flash is activated 2 times. Do not move until the second flash is finished.
- Red eye phenomenon may appear depending on the recording conditions.


Auto slow shutter:

- If the scene is low in brightness or contrast, the subject may not be focused in on.
- When the shutter speed becomes 1/25, the screen may be seen as if frames are missed and afterimages may appear.

Digital cinema colour:

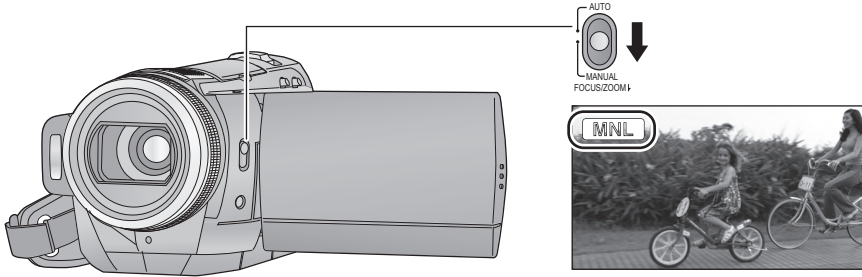
- To play back images recorded in the digital cinema colour with vivid colours of wider colour ranges, a device compatible with x.v.Colour™ is required. When these images are played back with devices other than ones compatible with x.v.Colour™, it is recommended to record the images after this function is turned [OFF].
- 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.
- 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.

Recording manually by setting the menu

◇ Rotate the mode dial to select  .

Set the AUTO/MANUAL switch to MANUAL.

[MNL] appears on the screen.









Scene mode




VIDEO | **PHOTO**

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

Select the menu. (→ 22)

[BASIC] → **[SCENE MODE]** → **[SET]** → desired setting

Icon	Mode/Recording conditions
	Sports Used to record fast action.
	Portrait To make people stand out against the background
	Low light For dark scenes, such as at dusk
	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

Icon	Mode/Recording conditions
	Sunset To make red in the sunrise or sunset vibrant
	Fireworks To capture the fireworks in the night sky beautifully
	Scenery For spatial scenery

- Set [SCENE MODE] to [OFF] or the AUTO/MANUAL switch to AUTO to cancel the function.

Sports mode

- For slow-motion playback or playback pause of recorded pictures, this mode helps diminish camera shake.
- During normal playback, the image movement may not look smooth.
- Colour or brightness of the screen might change under fluorescent light, mercury light or sodium light, etc.
- You may see a band of light around the object that is shining very bright, or having very high reflection.
- If the brightness is insufficient, the sports mode does not function. The [M] display flashes.
- If this mode is used indoors, the screen may flicker.

Portrait mode

- If this mode is used indoors, the screen may flicker. If so, change the scene mode setting to [OFF].

Low light mode

- The shutter speed is 1/25 or more.
- Extremely dark scenes may not be able to be recorded finely.

Spotlight mode

- If the recording subject is extremely bright, the subject may become washed out and the periphery extremely darkened.

Snow mode

- If the subject is extremely bright, the recorded image may become washed out.

Beach mode

- If the subject is extremely bright, the recorded image may become washed out.

Sunset mode

- The shutter speed is 1/25 or more.
- Image may get blurry when close object is recorded.

Fireworks mode

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

Scenery mode

- Image may get blurry when close object is recorded.

Wind noise reduction

VIDEO

This is for reducing the wind noise coming into the built-in microphones depending on the wind strength.

- Set the AUTO/MANUAL switch to MANUAL. (→ 58)

Select the menu. (→ 22)

[RECORD SETUP] → [WIND CUT] → [ON]

- When the AUTO/MANUAL switch is set to AUTO, [WIND CUT] is set to [ON].
- The sound quality may be changed if this function is activated in strong winds. However, the sound quality is automatically restored to the original quality when the wind weakens.

Microphone level

VIDEO

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

- Set the AUTO/MANUAL switch to MANUAL. (→ 58)

1 Select the menu. (→ 22)

[RECORD SETUP] → [MIC LEVEL] →
[SET+AGC] or [SET]

- Set to [AUTO] to return to normal setting.

[AUTO]:

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

[SET+AGC]:

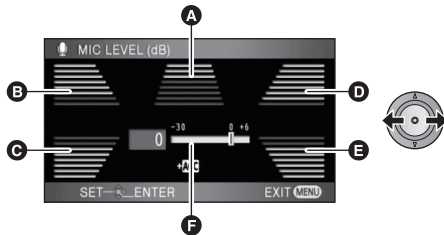
The desired recording level can be set. AGC will also be activated to reduce the amount of sound distortion.

[SET]:

AGC is not activated and so natural recording can be performed.

AGC: Auto Gain Control

2 Move the cursor button to adjust the microphone input level.



- A** Centre
- B** Front left
- C** Back left
- D** Front right
- E** Back right
- F** Microphone input level

- A gain value for each of the 5 built-in microphones is displayed. (The input level of the microphones cannot be set individually.)
- 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 Press the cursor button to set and then press the MENU button to finish the setting.



G Microphone input level meter

- When the AUTO/MANUAL switch is set to AUTO, [MIC LEVEL] is set to [AUTO].
- When [MIC SETUP] is [ZOOM MIC], the volume will be different depending on the zoom rate. Set [MIC SETUP] to [SURROUND] (→ 53) or set the microphone input level after adjusting the zoom rate.
- Audio becomes stereo (2 ch) when input is from an external microphone, and the front left and front right gain values only work.
- The microphone input level meter shows the largest volume for the microphones.
- You cannot record with the audio completely muted.

Picture adjustment

VIDEO PHOTO

Adjust the quality of the image while recording.

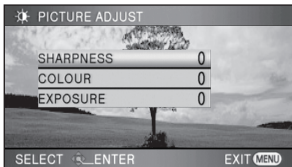
Adjust by outputting to a TV while adjusting the quality of the image.

- Set the **AUTO/MANUAL** switch to **MANUAL**. (→ 58)

1 Select the menu. (→ 22)

[ADVANCED] → [PICTURE ADJUST] → [YES]

2 Select the item with the cursor button and press the cursor button.



[SHARPNESS]:

Sharpness of the edge

[COLOUR]:

Depth of the colour of the image

[EXPOSURE]:

Brightness of the image

3 Adjust the settings with the cursor button.



- After adjustments are made if no operations are performed for about 2 seconds, the bar will disappear.
- Press the **MENU** button to complete the settings. [*] appears on the screen.

Zebra

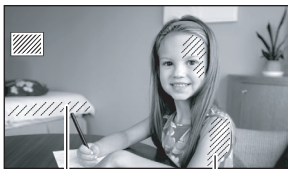
VIDEO PHOTO

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

- Set the **AUTO/MANUAL** switch to **MANUAL**. (→ 58)

Select the menu. (→ 22)

[ADVANCED] → [ZEBRA] → [ON]



A

A Zebra pattern

- You can record an image with little white saturation if you manually adjust the shutter speed or brightness (iris/gain) (→ 68).
- The zebra pattern does not appear on the images actually recorded.

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]. (→ 68)

- Set the AUTO/MANUAL switch to MANUAL. (→ 58)

Select the menu. (→ 22)

[ADVANCED] → [LUMINANCE] → desired setting

[OFF]:

Not display

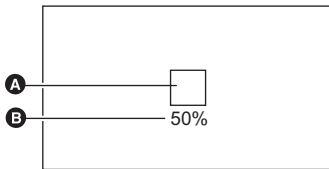
[ANYTIME]:

Constantly display

[ON ADJUST]:

Display only when [IRIS] is adjusted. (→ 68)

- This function's default setting is [ON ADJUST].



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%.
-
- When the luminance display is set to [ANYTIME] or [ON ADJUST], luminance is displayed while adjusting [IRIS] even if [DISPLAY] is set to [OFF].

Histogram

VIDEO PHOTO

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]. (→ 68)

- Set the **AUTO/MANUAL** switch to **MANUAL**. (→ 58)

Select the menu. (→ 22)

[ADVANCED] → [HISTOGRAM] → desired setting

[OFF]:

Not display

[ANYTIME]:

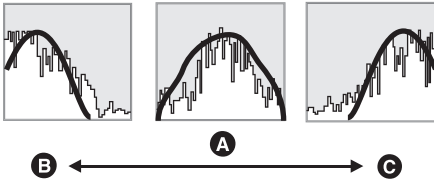
Constantly display

[ON ADJUST]:

Display only when [IRIS] is adjusted. (→ 68)

- This function's default setting is [ON ADJUST].

■ Example of the display



- Ⓐ Normal
- Ⓑ Dark
- Ⓒ Bright

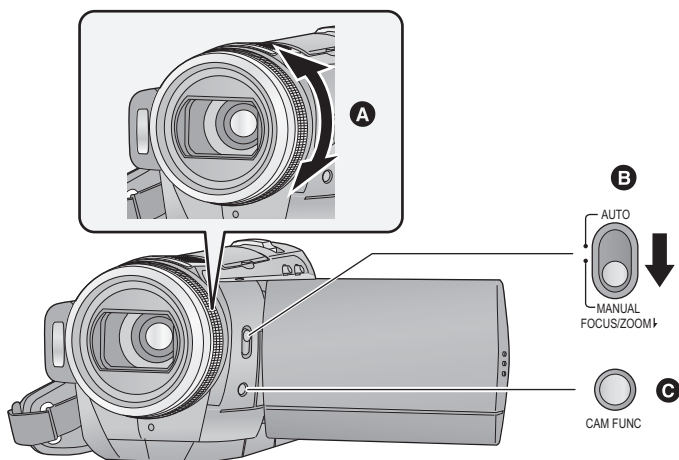
- When the histogram display is set to [ANYTIME] or [ON ADJUST], histogram is displayed while adjusting [IRIS] even if [DISPLAY] is set to [OFF].

Recording manually using the multi manual ring

Perform zoom operation, focus, white balance, shutter speed, and iris adjustments using the multi manual ring.

◇ Rotate the mode dial to select  .

Set the AUTO/MANUAL switch to MANUAL. (→ 58)



A Multi manual ring

Operate by rotating the ring

B Switching between manual zoom and manual focus

Manual zoom [**M_{ZOOM}**] and manual focus [**MF**] is switched every time the AUTO/MANUAL switch is moved to the FOCUS/ZOOM position.

[**M_{ZOOM}**]:

Manual zoom (→ 65)

[**MF**]:

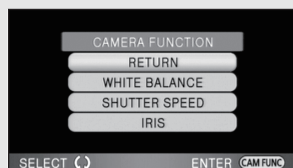
Manual focus (→ 65)

C Camera function button

It is used for white balance, shutter speed, and iris settings.

■ To select the items of the camera function

- 1 Press the camera function button.
- 2 Select the items by rotating the multi manual ring.
 - It cannot be selected by the cursor button.
- 3 Enter the selection by pressing the camera function button again.
 - Setup the selected item using the multi manual ring.
 - WHITE BALANCE (→ 66)
 - SHUTTER SPEED/IRIS (→ 68)



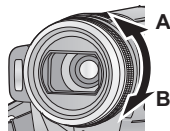
Zoom operation

VIDEO PHOTO

Zoom operation can be done using the multi manual ring.

- Move the **AUTO/MANUAL** switch from the **MANUAL** to **FOCUS/ZOOM** position, and display [M_{ZOOM}]. (→ 64)

Zoom by rotating the ring.



A side:

Close-up recording (zoom in)

B side:

Wide-angle recording (zoom out)

- The zoom speed varies depending on the speed to rotate the ring.

-
- Auto focus is on when [M_{ZOOM}] is displayed.

Manual focus adjustment

VIDEO PHOTO

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

- Move the **AUTO/MANUAL** switch from the **MANUAL** to **FOCUS/ZOOM** position, and display [MF]. (→ 64)

- 1 (When MF assist function is used)
Select the menu. (→ 22)

[ADVANCED] → [MF ASSIST] → [ON]

- This function's default setting is [ON].

2 Adjust the focus by rotating the ring.



The centre of the screen is enlarged. The normal screen returns approximately 2 seconds after you finish bringing the subject into focus.

- The centre of the screen is not enlarged when [MF ASSIST] is [OFF].
 - To return to auto focus, move the **AUTO/MANUAL** switch to **FOCUS/ZOOM** position and display [M_{ZOOM}], or set to **AUTO**.
-
- MF assist does not work if the zoom magnification is more than 12×.
 - The part of the screen that is enlarged is not enlarged on the image actually recorded.

White balance

VIDEO | PHOTO

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 AUTO/MANUAL switch to MANUAL. (→ 58)

1 Press the camera function button and select [WHITE BALANCE] by rotating the ring. (→ 64)









2 Enter the selection by pressing the camera function button.

3 Select the white balance mode by rotating the ring.




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

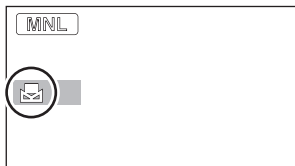
Icon	Mode/Recording conditions
	Auto white balance adjustment
	Sunny mode Outdoors under a clear sky
	Cloudy mode Outdoors under cloudy sky
	Indoor mode 1 Incandescent light, video lights like in the studio, etc.
	Indoor mode 2 Colour fluorescent light, sodium light, etc.
	Manual adjustment mode <ul 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.

4 Enter the selection by pressing the camera function button.

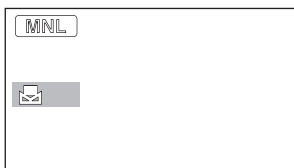
- Select [RETURN] with the ring, and press the camera function button again to complete the settings.
- Set the white balance mode to [**AWB**] or the AUTO/MANUAL switch to AUTO to restore to the automatic adjustment.




■ To set the white balance manually

- 1 Select [], fill the screen with a white subject.



- 2 Press the camera function button for about 1 second.



- 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 because it is too dark etc. In this case, use the automatic white balance.
-
- When the [] display flashes, the manual white balance previously adjusted is stored. Whenever recording conditions change, re-set the white balance for correct adjustment.
 - When setting both the white balance and the iris/gain, set the white balance first.

Manual shutter speed/iris adjustment

VIDEO PHOTO

Shutter Speed:

Adjust it when recording fast-moving subjects.

Iris:

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

- Set the AUTO/MANUAL switch to **MANUAL**. (→ 58)

1 Press the camera function button and select [SHUTTER SPEED] or [IRIS] by rotating the ring. (→ 64)



2 Enter the selection by pressing the camera function button.

3 Adjust by rotating the ring.



A Shutter speed:

1/50 to 1/8000

- If [AUTO SLOW SHTR] is set to [ON], the shutter speed will be set between 1/25 and 1/8000.
- The shutter speed closer to 1/8000 is faster.

B 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.

4 Enter the selection by pressing the camera function button.

- Select [RETURN] with the ring, and press the camera function button again to complete the settings.
- Set the AUTO/MANUAL switch to **AUTO** to restore to automatic adjustment.

- 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

- If you increase the shutter speed manually, the noise on the screen may increase.
- 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.
- Colour or brightness of the image may change, or you may see horizontal bars in the image when the object is recorded in extremely bright place or under fluorescent light, mercury light or sodium light, etc. In this case, record in 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. It is also possible not to display them. (→ 62)
- 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.

Preparation

Recording

Playback

Backup

With a PC

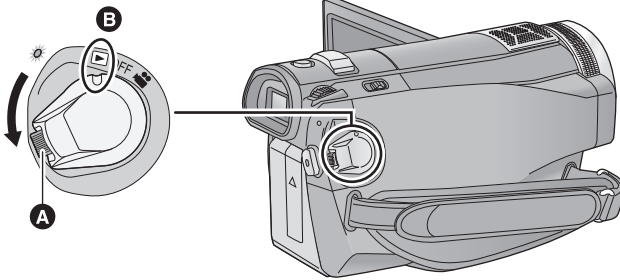
Others

70 Playback

78 Editing


84 With a TV

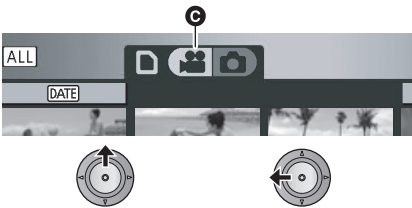
VIDEO



- A** Lock release button
- B** Align with the mark.
- Rotate the mode dial while at the same time pressing in the lock release button if changing from OFF to another mode.

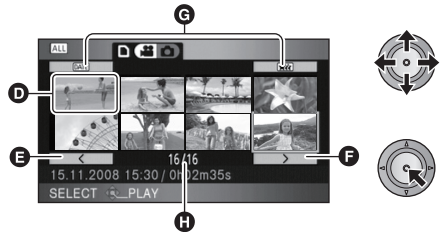
1 Rotate the mode dial to select  .

2 Select [] (motion picture playback) with the cursor button.



C Motion picture playback

3 Select the scene to be played back and press the cursor button.



- D** Thumbnail display
- E** Previous page
- F** Next page
- G** Play mode select button
- H** Scene number

The selected scene is played back on the full screen, and the operation icon is automatically displayed on the screen.