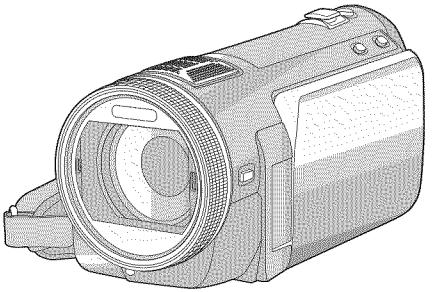
Panasonic

Operating Instructions

High Definition Video Camera

Model No. **HDC-SDT750PP**



Before connecting, operating or adjusting this product, please read the instructions completely.

AVCHD TM DOLBY DIGITAL 5.1 CREATOR LEICA DICOMAR SD XC TM

HDMI VIERA Link TM 3D

For USA and Puerto Rico assistance, please call: 1-800-211-PANA(7262) or, contact us via the web at: http://www.panasonic.com/contactinfo

For Canadian assistance, please call: 1-800-561-5505 or visit us at www.panasonic.ca

VQT3B18

Things You Should Know

Thank you for choosing Panasonic!
You have purchased one of the most sophisticated and reliable products on the market today. Used properly, we're sure it will bring you and your family years of enjoyment. Please take time to fill in the information on the right.
The serial number is on the tag located on the back of your camera. Be sure to **retain this manual** as your convenient camera information source.

Date of Purchase _____

Dealer Purchased From _____

Dealer Address _____

Dealer Phone No. _____

Model No. _____

Serial No. _____

Safety Precautions

WARNING:

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

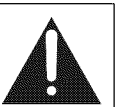
- **DO NOT EXPOSE THIS APPARATUS TO RAIN, MOISTURE, DRIPPING OR SPLASHING AND THAT NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHALL BE PLACED ON THE APPARATUS.**
- **USE ONLY THE RECOMMENDED ACCESSORIES.**
- **DO NOT REMOVE THE COVER (OR BACK); THERE ARE NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING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

The following mark and symbols are located on bottom of the unit.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE SCREWS. NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

THE FOLLOWING APPLIES ONLY IN THE U.S.A.

FCC Note:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: To assure continued compliance, follow the attached installation instructions and use only shielded interface cables with ferrite core when connecting to computer or peripheral devices.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Declaration of Conformity

Trade Name:	Panasonic
Model No.:	HDC-SDT750PP
Responsible party:	Panasonic Corporation of North America One Panasonic Way, Secaucus, NJ 07094
Support Contact:	Panasonic Consumer Electronics Company 1-800-211-PANA (7262)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FC Panasonic
HDC-SDT750PP

THE FOLLOWING APPLIES ONLY IN CANADA.

This Class B digital apparatus complies with Canadian ICES-003.

Batteries

1 Battery pack (Lithium ion battery pack)

- Use the specified unit to recharge the battery pack.
- Do not use the battery pack with equipment other than the specified unit.
- Do not get dirt, sand, liquids, or other foreign matter on the terminals.
- Do not touch the plug terminals (+ and −) with metal objects.
- Do not disassemble, remodel, heat or throw into fire.

2 Button-type battery (Lithium battery)

- Insert with poles aligned.
- Do not touch the terminals (+ and −) with metal objects.
- Do not recharge, disassemble, remodel, heat or throw into fire.
- Keep out of reach of children.

If any electrolyte should come into contact with your hands or clothes, wash it off thoroughly with water.
If any electrolyte should come into contact with your eyes, never rub the eyes. Rinse eyes thoroughly with water, and then consult a doctor.

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 (140 °F)**
Battery pack	**60 °C (140 °F)**

AC adaptor

This AC adaptor operates on AC between 110 V and 240 V.
But

- In the U.S.A. and Canada, the AC adaptor must be connected to a 120 V AC power supply only.
- When connecting to an AC supply outside of the U.S.A. or Canada, use a plug adaptor to suit the AC outlet configuration.
- When connecting to a supply of greater than AC 125 V, ensure the cord you use is suited to the voltage of the AC supply and the rated current of the AC adaptor.
- Contact an electrical parts distributor for assistance in selecting a suitable AC plug adaptor or AC cord set.

The unit should be installed near an accessible AC power outlet, with the power cord connected directly to it.
To completely disconnect power from the unit, unplug the power cord from the AC power outlet.

■ Product Identification Marking

Product	Location
High Definition Video Camera	Battery holder
AC adaptor	Bottom

U.S.A./CANADA CONSUMERS: ATTENTION:

A lithium ion/polymer battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY for information on how to recycle this battery.

<For USA-California only>
This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material – special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate.

IMPORTANT SAFETY INSTRUCTIONS

Read these operating instructions carefully before using the unit. Follow the safety instructions on the unit and the applicable safety instructions listed below. Keep these operating instructions handy for future reference.

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this apparatus near water.

6) Clean only with dry cloth.

7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11) Only use attachments/accessories specified by the manufacturer.

12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13) Unplug this apparatus during lightning storms or when unused for long periods of time.

14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Precautions

USE & LOCATION

⚠ WARNING

- **TO AVOID SHOCK HAZARD** ... Your camera and power supply should not be exposed to rain or moisture. Do not connect the power supply or operate your camera if it gets wet. Your camera has been designed for outdoor use, however it is not designed to sustain direct exposure to water, rain, sleet, snow, sand, dust, or a direct splashing from a pool or even a cup of coffee. This action could permanently damage the internal parts of your camera. Do not attempt to disassemble this unit. There are no user serviceable parts inside. Unplug your camera from the power supply before cleaning.
- **AS WITH ANY SMALL OBJECT, SD CARDS CAN BE SWALLOWED BY YOUNG CHILDREN. DO NOT ALLOW CHILDREN TO HANDLE THE SD CARD.**

⚠ CAUTION

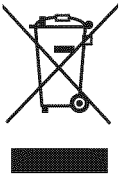
- **DO NOT AIM YOUR CAMERA AT THE SUN OR OTHER BRIGHT OBJECTS**
- **DO NOT LEAVE THE CAMERA WITH THE EVF AIMED DIRECTLY AT THE SUN AS THIS MAY CAUSE DAMAGE TO THE INTERNAL PARTS OF THE EVF**
- **DO NOT EXPOSE YOUR CAMERA TO EXTENDED HIGH TEMPERATURE** ... Such as, in direct sunlight, inside a closed car, next to a heater, etc... This action could permanently damage the internal parts of your camera.
- **AVOID SUDDEN CHANGES IN TEMPERATURE** ... If the unit is suddenly moved from a cold place to a warm place, moisture may form on the SD card and inside the unit.
- **DO NOT LEAVE YOUR CAMERA OR THE POWER SUPPLY TURNED ON WHEN NOT IN USE.**
- **STORAGE OF YOUR CAMERA** ... Store and handle your camera in a manner that will not subject it to unnecessary movement (avoid shaking and striking). Your camera contains a sensitive pick-up device which could be damaged by improper handling or storage.

CARE

- **TO CLEAN YOUR CAMERA** ... Do not use strong or abrasive detergents when cleaning your camera body.
- **TO PROTECT THE LENS** ... Do not touch the surface of the lens with your hand. Use a commercial camera lens solution and lens paper when cleaning the lens. Improper cleaning can scratch the lens coating.
- **TO PROTECT THE FINISH OF YOUR CAMERA** ... Before handling your camera, make sure your hands and face are free from any chemical products, such as suntan lotion, as it may damage the finish.

-If you see this symbol-

Information on Disposal in other Countries outside the European Union



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

■ Indemnity about recorded content

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

■ Cards that you can use with this unit

SD Memory Card, SDHC Memory Card and SDXC Memory Card

- 4 GB or more Memory Cards that do not have the SDHC logo or 48 GB or more Memory Cards that do not have the SDXC logo are not based on SD Memory Card Specifications.
- Refer to page 23 for more details on SD cards.

■ For the purposes of these operating instructions

- SD Memory Card, SDHC Memory Card and SDXC Memory Card are referred to as the "SD card".
- Functions that can be used for motion picture recording/motion picture playback are indicated by VIDEO in these operating instructions.
- Functions that can be used for still picture recording (including the still picture recording in Motion Picture Recording Mode)/still picture playback are indicated by PHOTO in these operating instructions.
- Pages for reference are indicated by an arrow, for example: ➜ 00

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Accessories

Check the accessories before using this unit.
Keep the accessories out of reach of children to prevent swallowing.
Product numbers correct as of Aug. 2010. These may be subject to change.

Battery pack
VW-VBG130

AC adaptor
VSK0697

AC cable
K2CA2CA00025

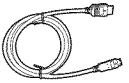
DC cable
K2GJYDC00004

Remote control
(Built-in battery)
N2QAEC000024

AV multi cable
K1HY12YY0004

USB cable
K1HY04YY0032

HDMI mini cable
VFA0531



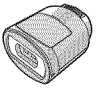
Stylus pen
VGQ0C14

Lens hood
VDW2053

Shoe adaptor
VYC0996

CD-ROM
Software

3D Conversion Lens



Lens storage bag
VFC4619

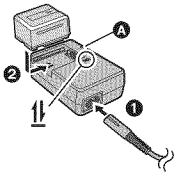
Lens front cap*
VYK4K64

Lens rear cap*
VGQ0M57

* This is attached to the 3D Conversion Lens at the time of purchase.

Quick Guide

■ Charging the battery



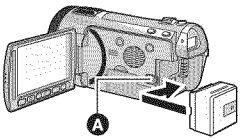
Charging lamp [CHARGE] Ⓐ

Lights up:
Charging
Goes off:
Charging completed

❶ Connect the AC cable to the AC adaptor and the AC outlet.
❷ Insert the battery into the AC adaptor by aligning the arrows.

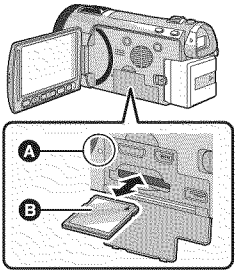
■ Inserting the battery

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



Ⓐ Insert the battery until it clicks and locks.

■ Inserting/removing an SD card



Access lamp [ACCESS] Ⓐ
- When this unit is accessing the SD card, the access lamp lights up.

1) Open the LCD monitor.
- Check that the access lamp has gone off.

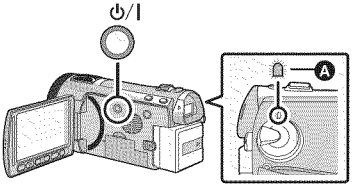
2) Open the SD card/terminal cover and insert (remove) the SD card into (from) the card slot.
- Face the label side Ⓑ in the direction shown in the illustration and press it straight in as far as it will go.
- Press the center of the SD card and then pull it straight out.

3) Securely close the SD card/terminal cover.
- Securely close it until it clicks.

■ Turning the unit on/off

Turning the unit on and off with the power button

Press the power button to turn on the unit.

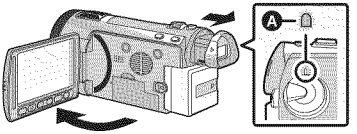


Ⓐ The status indicator lights on.
- To turn off the unit, hold down the power button until the status indicator goes off.

Turning the unit on and off with the LCD monitor/viewfinder

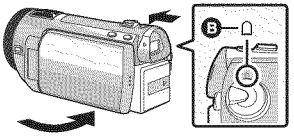
Opening the LCD monitor or extending the viewfinder turns on the unit. Closing the LCD monitor/viewfinder turns off the unit.

To turn on the unit



Ⓐ The status indicator lights on.

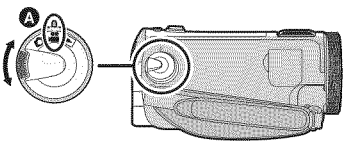
To turn off the unit



Ⓑ The status indicator goes off.

■ Selecting a mode

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



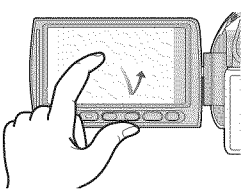
● Align with the status indicator Ⓐ.

	Motion Picture Recording Mode (➜ 31)
	Still Picture Recording Mode (➜ 33)
	Playback Mode (➜ 37, 90)

■ How to use the touch screen

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

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

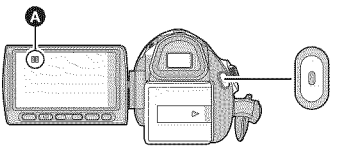


■ Language selection

1) Press the MENU button, then touch [SETUP] → [LANGUAGE].
2) Touch [English].

■ Recording motion pictures

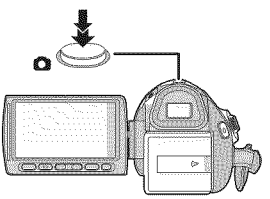
1) Change the mode to .
2) Open the LCD monitor or extend the viewfinder.
3) Press the recording start/stop button to start recording.



Ⓐ When you begin recording, ❚❚ changes to ●.

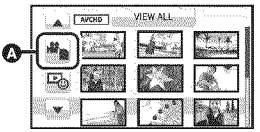
■ Recording still pictures

1) Change the mode to .
2) Open the LCD monitor or extend the viewfinder.
3) Press the button fully to take the picture.



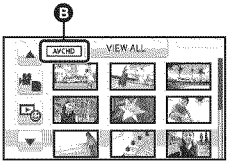
■ Motion picture/Still picture playback

1) Change the mode to [▶].
2) Touch the play mode select icon Ⓐ.



3) Select the [VIDEO/PICTURE] you wish to play back.
- Touch [ENTER].

4) Touch the scene or the still picture to be played back.



Ⓑ [1080/60p] is displayed when [1080/60p] is touched or [AVCHD] is displayed when [AVCHD] is touched in step 3.

- Next (previous) page can be displayed by touching [▲]/[▼].

5) Select the playback operation by touching the operation icon.

Ⓒ Operation icon

(Motion picture playback)

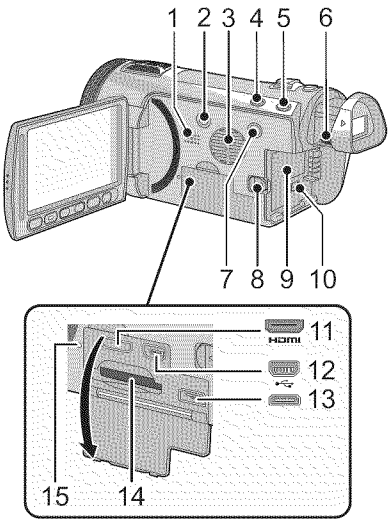
▶/❚❚: Playback/Pause
◀◀: Rewind playback
▶▶: Fast forward playback
■: Stops the playback and shows the thumbnails.
▶: Displays the direct playback bar. (➜ 91)

(Still picture playback)

▶/❚❚: Slide show (playback of the still pictures in numerical order) start/pause.
◀❚❚: Plays back the previous picture.
❚❚▶: Plays back the next picture.
■: Stops the playback and shows the thumbnails.

- Touch [F]/[F] to display/not-display the operation icon.

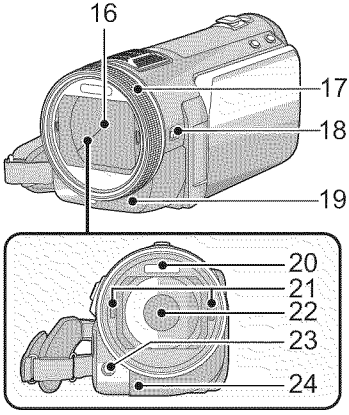
Parts identification and handling



1 **Speaker**
2 **Power button [⏻/I] (➜ 25)**
3 **Inlet (cooling fan) (➜ 30)**
4 **Intelligent auto/Manual button [iA/MANUAL] (➜ 35, 86)**
5 **Optical image stabilizer button [O.I.S.] (➜ 52)**
6 **Eyepiece corrector dial (➜ 28)**
7 **1080/60p button [1080/60p] (➜ 55)**
8 **Battery release lever [BATT] (➜ 20)**
9 **Battery holder (➜ 20)**
10 **DC input terminal [DC IN] (➜ 22)**
- Always use the supplied AC adaptor or a genuine Panasonic AC adaptor (VW-AD21PP-K; optional).

11 **HDMI mini connector [HDMI] (➜ 104, 110)**
12 **USB terminal [] (➜ 113, 120, 133)**
13 **AV multi connector (➜ 104, 122)**
- Use the AV multi cable (only the supplied cable).

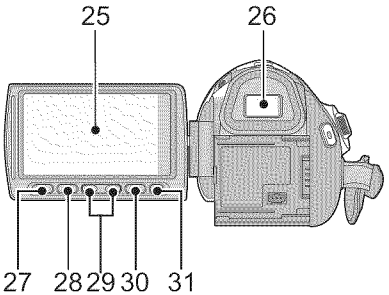
14 **Card slot (➜ 24)**
15 **Access lamp [ACCESS] (➜ 24)**



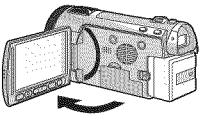
16 **Lens cover**
- The lens cover opens in Motion Picture Recording Mode or Still Picture Recording Mode. (➜ 26)

17 **Multi manual ring (➜ 86, 89)**
18 **Camera function button [CAMERA FUNCTION] (➜ 86)**
19 **Remote control sensor (➜ 50)**
20 **Built-in flash (➜ 65)**
21 **3D Conversion Lens attachment part (concave) (➜ 56)**
22 **Lens (LEICA DICOMAR)**
- Please refer to page 30 for details about attaching the lens hood.

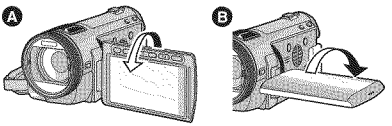
23 **AF assist lamp (➜ 85)**
24 **Recording lamp (➜ 45)**



25 LCD monitor (Touch screen) (➜ 27)



- It can open up to 90°.



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

26 Viewfinder (➜ 28)

> 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.

27 Quick menu button [Q.MENU] (➜ 41)

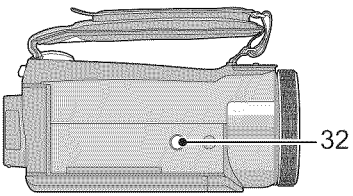
28 Sub recording start/stop button (➜ 30)

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

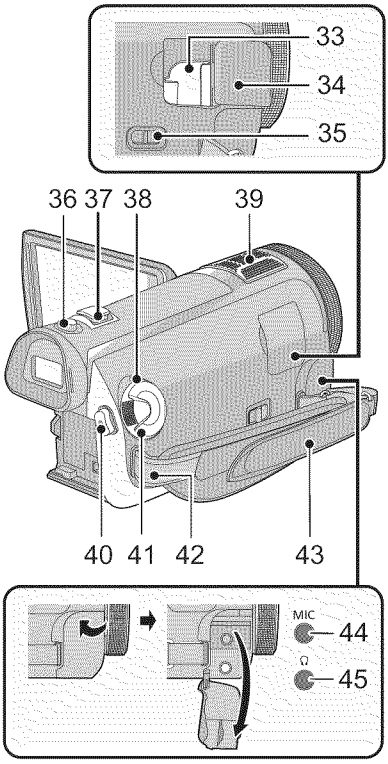
29 Adjust zoom buttons (➜ 51)

30 Menu button [MENU] (➜ 40)

31 Delete button [🗑] (➜ 99)

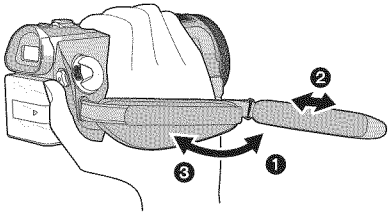


32 Tripod receptacle



33 Shoe adaptor mount (➜ 166)
34 Shoe adaptor cover (➜ 166)
35 Shoe adaptor release lever [SHOE ADAPTOR RELEASE] (➜ 166)
36 Photoshot button [📷] (➜ 33)
37 Zoom lever [W/T] (In Motion Picture Recording Mode or Still Picture Recording Mode) (➜ 51)
Thumbnail display switch [▦ / 🔍]/ Volume lever [−VOL+] (In Playback Mode) (➜ 39)
38 Status indicator (➜ 25)
39 Internal microphones
40 Recording start/stop button (➜ 31)
41 Mode dial (➜ 26)
42 Shoulder strap fixture
43 Grip belt

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



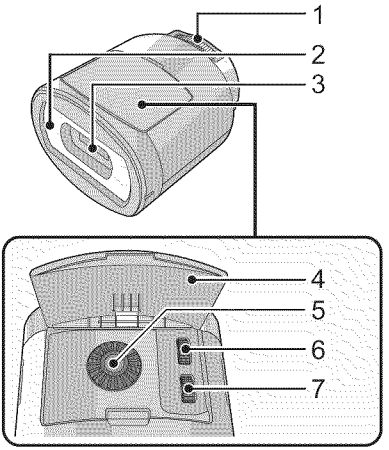
❶ Flip the belt.
❷ Adjust the length.
❸ Replace the belt.

44 Microphone terminal [MIC]

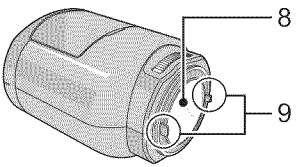
- A compatible plug-in powered microphone can be used as an external microphone.
- Audio will be stereo (2 ch) with the external microphone input.
- When the unit is connected with the AC adaptor, sometimes noise may be heard depending on the microphone type. In this case, please switch to the battery for the power supply and the noise will stop.

45 Headphone terminal [🎧] (➜ 67)

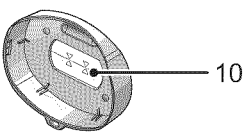
■ About the 3D Conversion Lens (➜ 56)



1 Attachment screw
2 Protective glass (front)
3 Lens
4 Adjustment dial cover
5 Vertical position adjustment dial [2]
6 Vertical alignment adjustment dial [3]
7 Horizontal image position adjustment dial [1]
8 Protective glass (rear)
9 Camera body attachment part (convex)

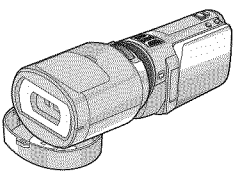


Lens front cap



10 Horizontal line for adjustment

- Use to adjust the lens attachment position.
- If you use the lens front cap as a stand as shown below, you can leave the unit with the 3D Conversion Lens attached.



Power supply

■ About batteries that you can use with this unit

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

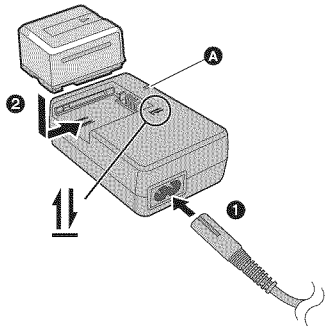
- The unit has a function for distinguishing batteries which can be used safely. The dedicated battery (VW-VBG130/VW-VBG260/VW-VBG6) supports this function. The only batteries suitable for use with this unit are genuine Panasonic products and batteries manufactured by other companies and certified by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

Charging the battery

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

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: ➜ 21)

Goes off:
Charging completed

Flashing:
Be sure to connect the unit correctly. (➜ 151)

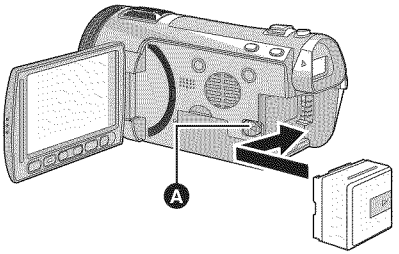
1 Connect the AC cable to the AC adaptor and the AC outlet.

2 Insert the battery into the AC adaptor by aligning the arrows.

- We recommend using Panasonic batteries (➜ 11, 21, 164).
- 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.

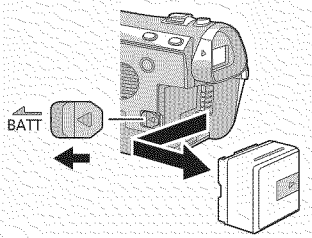


Ⓐ Insert the battery until it clicks and locks.

Removing the battery

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

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



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 (77 °F)/humidity: 60%RH

Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording mode	Maximum continuous recordable time	Actual recordable time
Supplied battery/ VW-VBG130 (optional) [7.2 V/1250 mAh]	2 h 35 min	1080/60p	1 h 35 min	55 min
		HA, HG, HX, HE	1 h 40 min	1 h
VW-VBG260 (optional) [7.2 V/2500 mAh]	4 h 40 min	1080/60p	3 h	1 h 50 min
		HA, HG, HX, HE	3 h 10 min	1 h 55 min
VW-VBG6 (optional)* [7.2 V/5400 mAh]	9 h 25 min	1080/60p	7 h 30 min	4 h 40 min
		HA, HG, HX	7 h 50 min	4 h 50 min
		HE	7 h 55 min	4 h 55 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. Charging time and recordable time vary depending on the usage conditions such as high/low temperature.**
- Recordable time of 3D recording mode is the same.
  (During 3D recording mode, 1080/60p recording mode cannot be used.)

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

Battery capacity indication

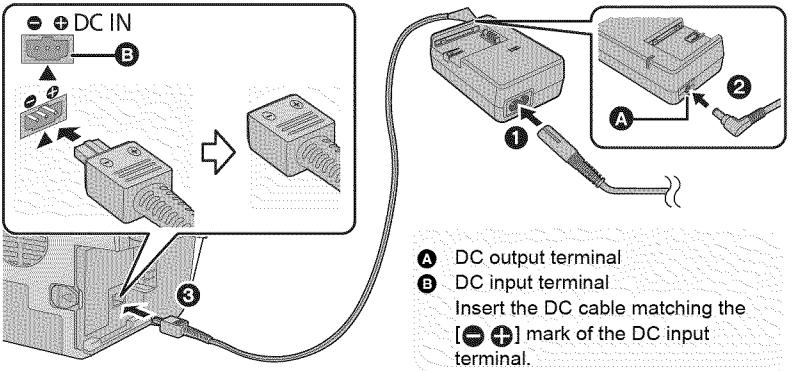
- The display changes as the battery capacity reduces.
  → → → → →
  If there is less than 3 minutes remaining, then will become red. If the battery discharges, then will flash.
- The remaining battery capacity is displayed when using the Panasonic battery that you can use for this unit. The actual time can vary depending on your actual use.
- If the actual remaining time exceeds 9 hours 59 minutes, the indication will stay green and will not change until the remaining time falls below 9 hours 59 minutes.
- When using the AC adaptor or batteries made by other companies, the remaining battery capacity will not be shown.

Connecting to the AC outlet

Important:

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

- **Do not use the AC cable with any other equipment as it is designed only for this unit. Also, do not use the AC cable from other equipment with this unit.**



Ⓐ DC output terminal
Ⓑ DC input terminal
Insert the DC cable 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].

- When removing the AC adaptor, be sure to hold down the power button until the status indicator goes off. Then remove the AC adaptor.

Recording to a card

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

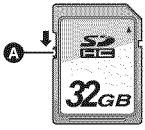
Cards that you can use with this unit

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

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

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

- 4 GB or more Memory Cards that do not have the SDHC logo or 48 GB or more Memory Cards that do not have the SDXC logo are not based on SD Memory Card Specifications.
- When the write-protect switch Ⓐ on SD card is locked, no recording, deletion or editing will be possible on the card.

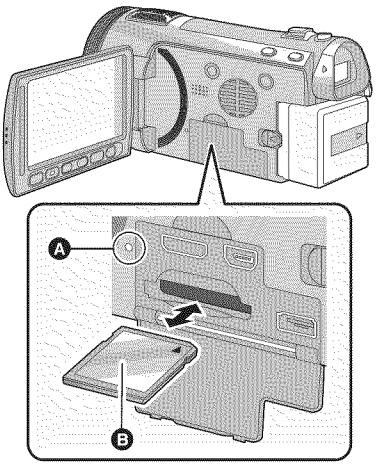


- Keep the Memory Card out of reach of children to prevent swallowing.

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. (➜ 47) When the SD card is formatted, all of the recorded data is deleted. Once the data is deleted, it cannot be restored.

Caution:
Check that the access lamp has gone off.



Access lamp [ACCESS] Ⓐ
- When this unit is accessing the SD card, the access lamp lights up.

1 Open the LCD monitor.

2 Open the SD card/terminal cover and insert (remove) the SD card into (from) the card slot.

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

3 Securely close the SD card/ terminal cover.

- Securely close it until it clicks.

- Do not touch the terminals on the back of the SD card.
- Do not apply strong shocks, bend, or drop the SD card.
- Electrical noise, static electricity or the failure of this unit or the SD card may damage or erase the data stored on the SD card.
- When the card access lamp is lit, do not:
  - Remove the SD card
  - Turn the unit off
  - Insert and remove the USB cable
  - Expose the unit to vibrations or shock

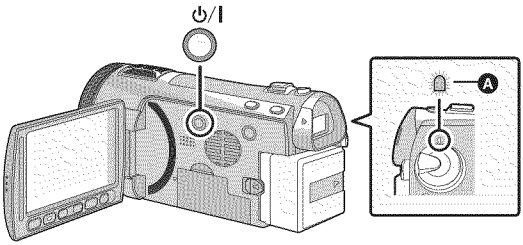
  Performing the above while the lamp is on may result in damage to data/SD card or this unit.
- Do not expose the terminals of the SD card to water, dirt or dust.
- Do not place SD cards in the following areas:
  - In direct sunlight
  - In very dusty or humid areas
  - Near a heater
  - Locations susceptible to significant difference in temperature (condensation can occur.)
  - Where static electricity or electromagnetic waves occur
- To protect SD cards, return them to their cases when you are not using them.
- About disposing of or giving away the SD card. (➜ 153)

Turning the unit on/off

You can turn the unit on and off using the power button, the LCD monitor or the viewfinder.

Turning the unit on and off with the power button

Press the power button to turn on the unit.



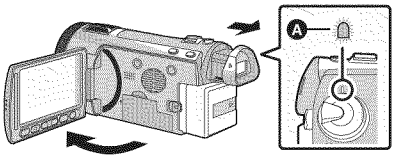
To turn off the unit
Hold down the power button until the status indicator goes off.

Ⓐ The status indicator lights on.

Turning the unit on and off with the LCD monitor/viewfinder

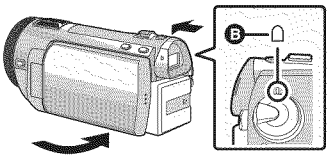
Opening the LCD monitor or extending the viewfinder turns on the unit. Closing the LCD monitor/viewfinder turns off the unit.
During general use, you may find it convenient to turn the unit on/off using the LCD monitor or viewfinder.

■ To turn on the unit



Ⓐ The status indicator lights on.

■ To turn off the unit



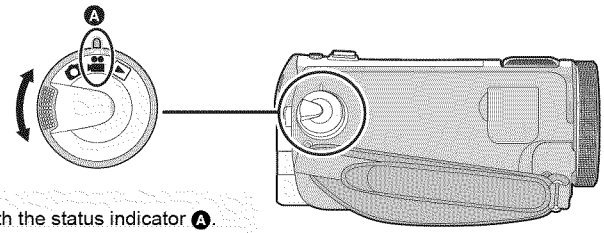
Ⓑ The status indicator goes off.

- The unit will not turn off unless the LCD monitor is closed and the viewfinder is retracted.
- The unit will not turn off while recording motion pictures even if the LCD monitor is closed and the viewfinder is retracted.
- In the following cases, opening the LCD monitor or extending the viewfinder does not turn on the unit. Press the power button to turn on the unit.
  – When the unit is originally purchased
  – When you have turned off the unit using the power button

Selecting a mode

Change the mode to recording or playback.

Operate the mode dial to change the mode to 🎥 , 📷 or ▶ .



- Align with the status indicator A.

🎥	**Motion Picture Recording Mode (➜ 31)**
📷	**Still Picture Recording Mode (➜ 33)**
▶	**Playback Mode (➜ 37, 90)**

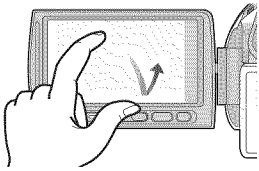
Adjusting LCD monitor/ viewfinder

How to use the touch screen

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

■ Touch

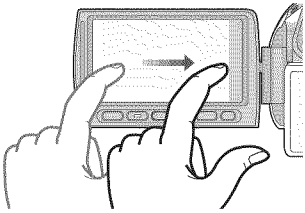
Touch and release the touch screen to select icon or picture.



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

■ Drag

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



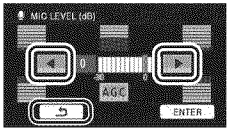
■ About the operation icons

[▲]/[▼]/[◀]/[▶]:

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

↩ :

Touch to return to the previous screen such as when setting menus.



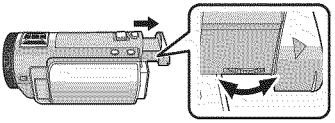
- Do not touch on the LCD monitor with hard pointed tips, such as ball point pens.
- Perform the touch screen calibration when the touch is not recognized or wrong location is recognized. (➜ 47)

Viewfinder adjustment

■ Adjusting the field of view

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

Adjust the focus by rotating the eyepiece corrector dial.

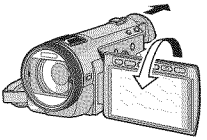


- Extend the viewfinder and close the LCD monitor to turn on the viewfinder.

Recording showing the contents to a partner

◇ **Change the mode to 🎥 or 📷.**

Extend the viewfinder and rotate the LCD monitor towards the lens side.



- LCD monitor and viewfinder are turned on during the face-to-face recording when the viewfinder is extended.
- 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. (➜ 141)

Setting date and time

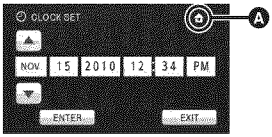
When the unit is turned on for the first time, a message asking you to set the date and time will appear.
Select [YES] and perform steps 2 to 3 below to set the date and time.

◇ **Change the mode to 🎥 or 📷 .**

1 Select the menu.

(MENU) : **[SETUP] → [CLOCK SET]**

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



Ⓐ **Displaying the World time setting (➜ 42):**
🏠 [HOME]/ ✈ [DESTINATION]

- The year can be set between 2000 and 2039.
- The 12-hour system is used to display the time.

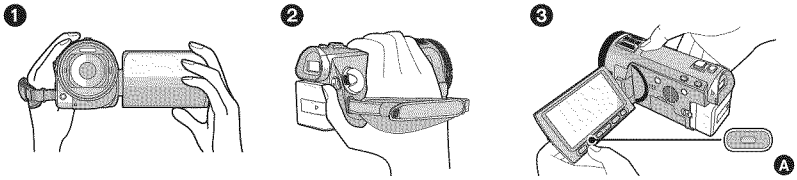
3 Touch [ENTER].

- The clock function starts at [00] seconds.
- A message prompting for World time setting may be displayed. Perform the World time setting by touching the screen. (➜ 42)
- Touch [EXIT] or press the MENU button to complete the setting.

- The date and time function is driven by a built-in lithium battery.
- When this unit is purchased, the clock is set. If the time display becomes [- -], the built-in lithium battery needs to be charged. To recharge the built-in lithium battery, connect the AC adaptor or attach the battery to this unit. Leave the unit as it is for approx. 24 hours and the battery will maintain the date and time for approx. 6 months. (The battery is still being recharged even if the unit is off.)

Before recording

■ Basic camera positioning



❶ Hold the unit with both hands.
❷ Put your hand through the grip belt.
❸ It is convenient to use the Sub-recording Start/Stop button Ⓐ when holding the unit at waist level.

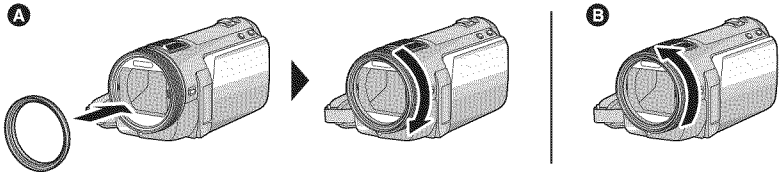
- When recording, make sure your footing is stable and there is no danger of colliding with another person or object.
- When you are outdoors, record pictures with the sunlight behind you. If the subject is backlit, it will become dark in the recording.
- Keep your arms near your body and separate your legs for better balance.
- Do not cover the microphones or the cooling fan inlet with your hand etc.

■ Basic motion picture recording

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

■ Attaching/Removing the lens hood

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



Ⓐ Attaching the lens hood
Ⓑ Removing the lens hood

- If you use the Filter Kit (optional), the Conversion Lens (optional) or the 3D Conversion Lens (supplied), remove the lens hood.

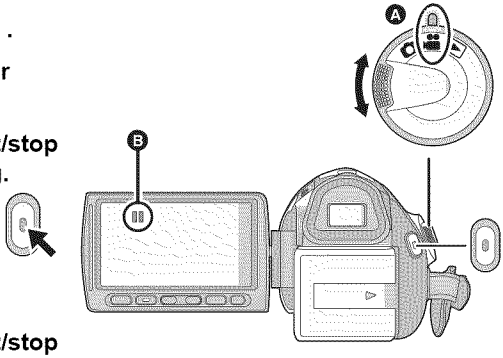
Recording motion pictures

VIDEO

1 Change the mode to 🎥 .

2 Open the LCD monitor or extend the viewfinder.

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



Ⓑ When you begin recording, ❚❚ changes to ●.

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

● Align with the status indicator Ⓐ.

- **Still pictures can be recorded while recording the motion picture. (➜ 34)**
- The images recorded between pressing the recording start/stop button to start recording and pressing it again to pause recording become one scene.
- Maximum number of recordable scenes: Approx. 3900
  Maximum number of different dates: Approx. 200 (➜ 94)
  When either of them reaches to the maximum limit, additional scenes cannot be recorded.
  (In the case of SD cards it is the maximum number of recordable scenes per card.)
- While recording is in progress, the recording will not stop even if the LCD monitor is closed and the viewfinder is retracted.
- Put the unit in Pause mode when connecting or disconnecting an external microphone with the MIC terminal.

■ Screen indications in the Motion Picture Recording Mode

Ⓐ **Recording mode**

Ⓑ **Approximate remaining recordable time**
(When the remaining time is less than 1 minute, [R 0h00m] flashes red.)

Ⓒ **Recording time elapsed**
Each time the unit is put into recording pause, the counter display will be reset to "0h00m00s".
("h" is an abbreviation for hour, "m" for minute and "s" for second.)

About the compatibility of the recorded motion pictures

Please refer to page 55 about 1080/60p

- 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.

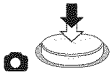
Recording still pictures

PHOTO

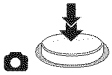
1 **Change the mode to 📷 .**

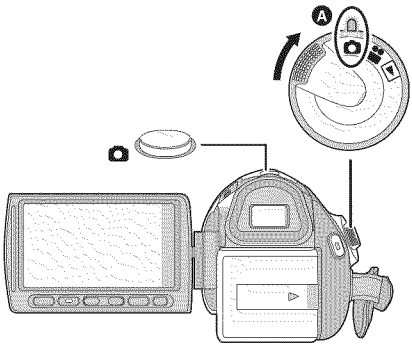
2 **Open the LCD monitor or extend the viewfinder.**

3 **Press the 📷 button halfway. (For Auto focus only)**



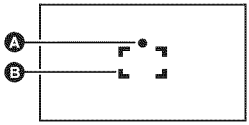
4 **Press the 📷 button fully.**





● Align with the status indicator Ⓐ.

Focus indication:



Ⓐ Focus indication
○ (The white lamp flashes.): Focusing
● (The green lamp lights up.): When in focus
No mark: When focusing is unsuccessful.

Ⓑ Focus area (area inside brackets)

- If you set the Optical image stabilizer function (➜ 52) to (MODE1), then the Image Stabilizer function will be more effective. (MEGA (MEGA Optical Image Stabilizer) will be displayed when the 📷 button is pressed halfway.)
- The AF assist lamp lights in dark places.
- Focus indication will change to registered focus icon when [FACE RECOG.] is set to [ON]. (➜ 73)
- Using a flash or tripod is recommended when recording still pictures in dark places because the shutter speed becomes slow.
- The screen will become darker when the 📷 button is pressed halfway if the shutter speed is 1/30 or slower.
- To print a picture, use a PC or a printer.

■ About the screen indications in Still Picture Recording

📷:	Still picture operation indicator (➜ 139)
⚡:	Flash (➜ 65)
⚡−:	Flash level (➜ 65)
👁:	Red-eye reduction (➜ 65)
MEGA:	MEGA optical image stabilizer (➜ 33)
1:	Optical image stabilizer (➜ 52)
▪:	Quality of still pictures (➜ 83)
14.2M:	Size of still pictures (➜ 82)
R3000:	Remaining number of still pictures (Flashes in red when [0] appears.)
AF:	AF assist lamp (➜ 85)

■ About the focus indication

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

■ About the focusing area

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

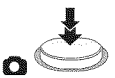
- Focus area is not displayed in the following conditions.
  - When the Intelligent Auto Mode (Portrait) is used
  - When AF/AE tracking is used
  - When the Extra Optical Zoom is used
  - When the unit determines that the AF assist lamp is necessary

Recording still pictures in Motion Picture Recording Mode

You can record still pictures even in Motion Picture Recording Mode.

◇ **Change the mode to 🎥 .**

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



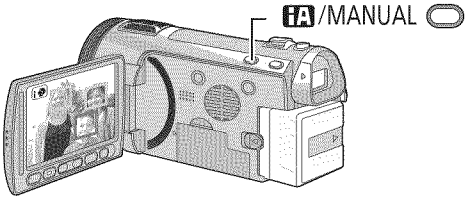
- It is possible to record still pictures while recording motion pictures. (Simultaneous recording)
- Remaining number of recordable pictures is displayed while still pictures are being recorded.

- Built-in flash, Red-eye reduction, Self-timer (➜ 66) do not work.
- While recording motion pictures or during the PRE-REC operation, image quality is different from ordinary still pictures so that motion picture recording takes preference over still picture recording.
- If simultaneous recording is used while recording a motion picture, the recordable time remaining will shorten. If the unit is turned off or the mode dial operated, the recordable time remaining may lengthen.

Intelligent Auto Mode

VIDEO PHOTO

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



Intelligent auto/Manual button

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

- Please refer to page 86 for details about Manual Mode.

Mode		Scene	Effect
	Portrait	**When the object is a person**	Faces are detected and focused automatically, and the brightness is adjusted so it is recorded clearly.
	Scenery	**Recording outdoors**	The whole landscape will be recorded vividly without whiting out the background sky, which may be very bright.
*1	**Spotlight**	**Under a spotlight**	Very bright object is recorded clearly.
*1	**Low light**	**Dark room or twilight**	It can record very clearly even in a dark room or twilight.
*2	**Night portrait**	**Recording night portrait**	A subject and the background are recorded with near real-life brightness.
*2	**Night scenery**	**Recording night scenery**	You can record night scenery vividly by slowing the shutter speed.
*2	**Macro**	**Recording zooming in on a flower etc.**	This allows recording at very close proximity to the object of recording.
*1 *2	**Normal**	**Other situations**	Contrast is adjusted automatically for clear images.

*1 In Motion Picture Recording Mode only
*2 In Still Picture Recording Mode only

- Depending on the recording conditions, the unit may not enter the desired mode.
- In the Portrait, Spotlight and Low light mode, a subject that is bigger and close to center of the screen will be surrounded by an orange frame. (➜ 74)

- Using a tripod is recommended in Night Portrait and Night Scenery Mode.
- Faces cannot be detected depending on the recording conditions, such as when faces are of certain sizes or at certain tilts or when digital zoom is used.
- The microphone setup is set to surround in the Intelligent Auto Mode. (➜ 77)

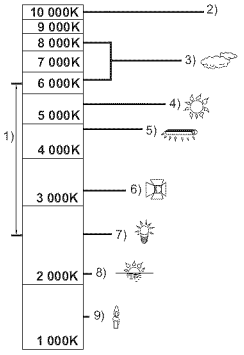
■ Intelligent Auto Mode

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

- Color balance and focus may not be adjusted automatically depending on light sources or scenes. If so, manually adjust these settings. (➜ 87, 89)

Automatic white balance

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



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

If the automatic white balance is not functioning normally, adjust the white balance manually. (➜ 87)

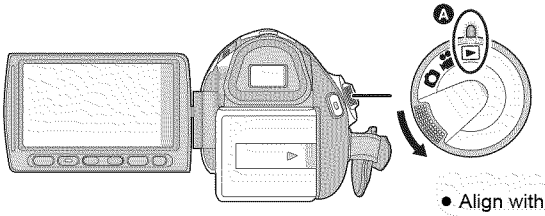
Auto focus

The unit focuses automatically.

- Auto focus does not work correctly in the following situations. Record pictures in the Manual Focus Mode. (➜ 89)
  - Recording distant and close-up objects at the same time
  - Recording a subject behind a dirty or dusty window
  - Recording a subject that is surrounded by objects with glossy surfaces or by highly reflective objects

Motion picture/Still picture playback

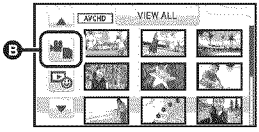
VIDEO PHOTO



- Align with the status indicator A.

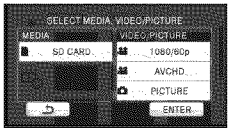
1 Change the mode to [▶].

2 Touch the play mode select icon B.



3 Select the [VIDEO/PICTURE] you wish to play back.

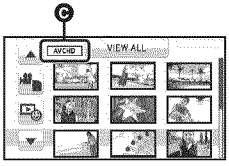
- Touch [ENTER].



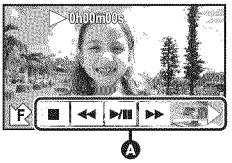
4 Touch the scene or the still picture to be played back.

C [1080/60p] is displayed when [1080/60p] is touched or [AVCHD] is displayed when [AVCHD] is touched in step 3.

- Next (previous) page can be displayed by touching [▲]/[▼].



5 Select the playback operation by touching the operation icon.



Ⓐ Operation icon

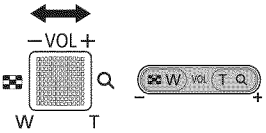
- Touch / to display/not-display the operation icon.

Motion picture playback	Still picture playback
▶/❚❚: Playback/Pause ◀◀: Rewind playback ▶▶: Fast forward playback ■: Stops the playback and shows the thumbnails. ▶: Displays the direct playback bar. (➜ 91)	▶/❚❚: Slide show (playback of the still pictures in numerical order) start/pause. ◀❚❚: Plays back the previous picture. ❚❚▶: Plays back the next picture. ■: Stops the playback and shows the thumbnails.

■ Change the thumbnail display

While the thumbnail is displayed, the thumbnail display changes in the following order if the zoom lever or adjust zoom buttons are operated to Q side or ▦ side.

20 scenes ⟷ 9 scenes ⟷ 1 scene ⟷ Highlight&Time frame index* (➜ 92)

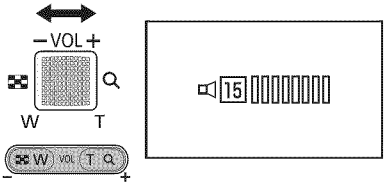


* Highlight&Time frame index can only set in Motion Picture Playback Mode.

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

■ Speaker/Headphone volume adjustment

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



Towards "+":
Increases the volume
Towards "−":
Decreases the volume

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

Motion picture compatibility

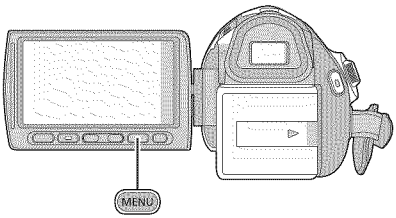
Please refer to page 55 about 1080/60p.

- This unit is based on the AVCHD format.
- The video signal that can be played back on this unit is 1920×1080/60i, 1920×1080/24p or 1440×1080/60i.
- This unit may degrade or not play back motion pictures recorded or created on other products, and other products may degrade or not play back motion pictures recorded on this unit, even if the products support AVCHD.

Still picture compatibility

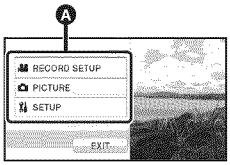
- This unit is compliant with the unified standard DCF (Design rule for Camera File system) established by JEITA (Japan Electronics and Information Technology Industries Association).
- The file format of still pictures supported by this unit is JPEG. (Not all JPEG formatted files will be played back.)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

Using the menu screen

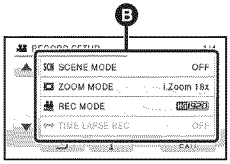


1 Press the MENU button. (MENU)

2 Touch the top menu Ⓐ.

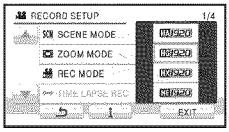


3 Touch the submenu Ⓑ.



- Next (previous) page can be displayed by touching [▲]/[▼].

4 Touch the desired item to enter the setting.



5 Touch [EXIT] or press the MENU button to exit the menu setting.

■ About [i] guide display

After touching [i], touching the submenus and items will cause function descriptions and settings confirmation messages to appear.

- After the messages have been displayed, the guide display is canceled.

Using the quick menu

This allows quick setting of some of the menus.

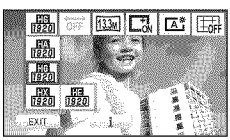
1 Press the Q.MENU button.

The following menus can be set.
Touch the desired menu.

- The items displayed differ depending on the position of the mode dial or settings.

Icon	Function	Page
	[REC MODE]	➜ 69
	[TIME LAPSE REC]	➜ 70
/	[PICTURE SIZE]	➜ 82
	[DISPLAY]	➜ 42
	[POWER LCD]	➜ 45
	[GUIDE LINES]	➜ 67
	[MIC LEVEL]	➜ 78
	[MF ASSIST]	➜ 89
	[ZEBRA]	➜ 80
	[LUMINANCE]	➜ 80
	[HISTOGRAM]	➜ 81

2 Touch the desired item to enter the setting.



3 Touch [EXIT] or press Q.MENU button to exit the quick menu.

Using the Setup Menu

- **The items displayed differ depending on the position or settings of the mode dial.**

Select the menu.

(MENU) : **[SETUP] → desired setting**

[DISPLAY] [OFF]/[ON]

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

- It is possible to set from the quick menu. (➜ 41)

[CLOCK SET]

Please refer to page 29.

[SET WORLD TIME]

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

1 **Touch [SET WORLD TIME].**

- If the clock is not set, adjust the clock to the current time. (➜ 29)
- When the [HOME] (your home region) is not set, the message appears. Touch [ENTER] and proceed to Step 3.

2 (Only when setting your home region)
Touch [HOME].

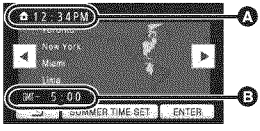
- Touch [ENTER].

3 (Only when setting your home region)
Touch [◀]/[▶] to select your home region and touch [ENTER].

- **Touch [SUMMER TIME SET] to set daylight saving time. (☀) appears and the summer time setting is turned on; the time difference from GMT is set forward by one hour. Touch [SUMMER TIME SET] again to return to the normal time setting.**

4 (Only when setting the region of your travel destination)
Touch [DESTINATION].

- Touch [ENTER].



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

- 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)
Touch [◀]/[▶] to select your travel destination and touch [ENTER].

- **Touch [SUMMER TIME SET] to set daylight saving time. appears and the summer time setting is turned on. The travel destination time and time difference from the home region time are set forward by one hour. Touch [SUMMER TIME SET] again to return to the normal time setting.**
- Close the setting by pressing the MENU button. appears and the time of the travel destination is indicated.

C The local time at the selected travel destination
D The time difference between the travel destination and the home region

To return the display to the home setting

Set the home region using Step 1 to 3, and close the setting by touching [EXIT] or pressing the MENU button.

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

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

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

[DATE FORMAT] [Y/M/D]/[M/D/Y]/[D/M/Y]

It is possible to change the date format.

[ECONOMY] [OFF]/[5 MINUTES]

When about 5 minutes have passed without any operation, this unit automatically turns off to save battery life.
- The Power Save function will not activate when:
  - connected to AC adaptor
  - using the USB cable for PC, DVD burner etc.
  - PRE-REC is used

[QUICK POWER ON] [OFF]/[ON]

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

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

[QUICK START] [OFF]/[ON]

This unit is put into recording pause approx. 0.6 seconds after the LCD monitor is reopened or the viewfinder is extended.

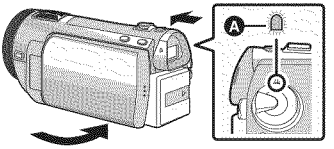
- **When in Quick start standby mode about 80% of the power used in Recording pause mode is being consumed, so the recording time will be reduced.**
- Quick start will not work if there is no SD card inserted.
- **Change the mode to 🎥 or 📷 .**

1 Set [QUICK START] to [ON].

2 Close the LCD monitor and retract the viewfinder while the mode is set to 🎥 or 📷 .

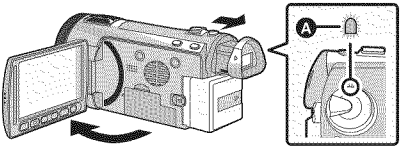
The status indicator Ⓐ flashes green and the unit goes into Quick start standby mode.

- The lens cover does not close.



3 Open the LCD monitor or extend the viewfinder.

The status indicator Ⓐ lights red and the unit is put into recording pause.



- Quick Start Standby Mode is canceled if
  - about 5 minutes have elapsed
  - mode is set to ▶
- Time for Quick start will be more than 0.6 seconds slower when the Digital cinema is used.
- Depending on the recording conditions, time for Quick Start may be more than 0.6 seconds slower in Still Picture Recording Mode.
- It may take some time for Automatic white balance to adjust.
- In the Quick Start Mode, the zoom magnification becomes 1×.
- If [ECONOMY] (➜ 43) is set to [5 MINUTES] and the unit automatically goes into Quick Start Standby Mode, close the LCD monitor and viewfinder and then open the LCD monitor or extend the viewfinder again.
- Turn the unit off using the power button.
- Quick start standby mode cannot be released by the remote control.

[REMOTE CONTROL] [OFF]/[ON]

Please refer to page 49.

[REC LAMP] [OFF]/[ON]

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.

[ALERT SOUND] [OFF]/ ◻) / ◻)))

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

◻) (Volume low)/ ◻))) (Volume high)

2 Beeps for 4 times

When an error occurs. Check the sentence displayed on the screen. (➜ 141)

[POWER LCD] +2*/+1*/0*/-1*/A*

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

- These settings will not affect the images actually recorded.
- It is possible to set from the quick menu. (➜ 41)

+2* (Makes even brighter)/ +1* (Makes brighter)/ 0* (Normal)/ -1* (Makes less bright)/ A* *(Automatic adjustment)

* It is not displayed in the Manual Mode or in the Playback Mode.

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

[LCD SET]

It adjusts brightness and color density on the LCD monitor.

- These settings will not affect the images actually recorded.

1 Touch [LCD SET].

2 Touch the desired setting item.

[BRIGHTNESS]:

Brightness of the LCD monitor

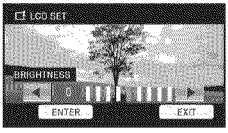
[COLOR]:

Color level of the LCD monitor

3 Touch ◀/▶ to adjust settings.

4 Touch [ENTER].

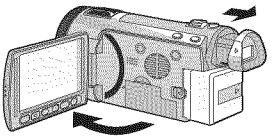
- Touch [EXIT] or press the MENU button to exit the menu screen.



[EVF SET]

It adjusts the brightness of the viewfinder.

- These settings will not affect the images actually recorded.



1 Extend the viewfinder and open the LCD monitor.

2 Touch [EVF SET].

- The viewfinder turns on.

3 Touch [◀]/[▶] to adjust the setting.

- Adjust while checking the picture in the viewfinder.

4 Touch [ENTER].

- Touch [EXIT] or press the MENU button to complete the setting.

[AV MULTI] [COMPONENT]/[AV OUT]

Please refer to page 107.

[COMPONENT OUT] [480i]/[1080i]

Please refer to page 107.

[HDMI RESOLUTION] [AUTO]/[1080p]/[1080i]/[480p]

Please refer to page 107.

[VIERA Link] [OFF]/[ON]

Please refer to page 110.

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

Please refer to page 106.

[3D PLAYBACK] [3D]/[2D]

Please refer to page 108.

[INITIAL SET]

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

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

[FORMAT CARD]

Please be aware that if a medium is formatted, then all the data recorded on the medium will be erased and cannot be restored. Back up important data on a PC, DVD disc etc. (➜ 112, 124)

- When formatting is complete, touch [EXIT] to exit the message screen.
- Perform a physical formatting of the SD card when the SD card is to be disposed/ transferred. (➜ 153)

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

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

[CARD STATUS]

The amount of space left on the SD card can be checked.
(Only when the mode is at the [▶] position)

- Touch [EXIT] or press the MENU button to close the indication.

- The SD card requires some space to store information and manage system files, so the actual usable space is slightly less than the indicated value. The usable space is generally calculated as 1 GB=1,000,000,000 bytes. The capacities of this unit, PCs and software are expressed as 1 GB=1,024×1,024×1,024=1,073,741,824 bytes. Therefore, the indicated value of the capacity appears to be smaller.
- Check the remaining recordable time for motion pictures in Motion Picture Recording Mode. (➜ 32)

[CALIBRATION]

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

1 Touch [CALIBRATION].

- Touch [ENTER].

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

- Touch [+] in sequence (up left → down left → down right → up right → center).

3 Touch [ENTER].

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

[DEMO MODE] [OFF]/[ON]

This item is used to start the unit demonstration.
(Only when the mode is at the 🎥 or 📷 position)
If [DEMO MODE] is switched to [ON] and you touch [EXIT] when there is no SD card inserted, the demonstration automatically starts.
If any operation takes place, the demonstration is canceled. 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.

[O.I.S. DEMO]

This item is used to start the Optical Image Stabilizer demo.
(Only when the mode is at the 🎥 position)
Touch [O.I.S. DEMO], the demonstration automatically starts.
When you touch [EXIT], the demonstration will be canceled.

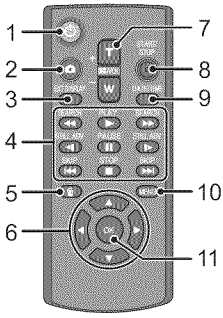
[LANGUAGE] [English]/[Français]/[Español]

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

Using with the remote control

Select the menu.

(MENU) : [SETUP] → [REMOTE CONTROL] → [ON]



1 Power on/off button [⏻]

Unit can be turned on/off when the LCD monitor is opened or the viewfinder is extended.

- Unit cannot be turned on by the power on/off button when 36 hours have passed after the unit is turned off. Press the power button on the unit and turn the unit back on.
- Unit cannot be turned off when it is connected to the PC or the DVD burner.

2 Photoshot button [📷]*

3 On-screen display button [EXT DISPLAY] (➜ 106)

4 Playback operation buttons (➜ 37, 90)

These buttons function in the same manner as the corresponding playback operation icon being displayed on screen.
[Excluding skip playback (➜ 90)]

5 Delete button [🗑]*

6 Direction buttons [▲,▼,◀,▶]

7 Zoom/volume/thumbnail display switch buttons [T, W, ▦ /VOL]*

8 Recording start/stop button [START/STOP]*

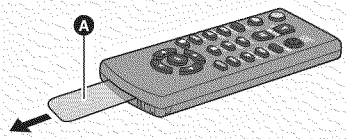
9 Date/time button [DATE/TIME] (➜ 43)

10 Menu button [MENU]*

11 OK button [OK]

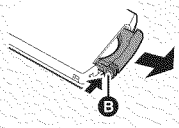
* means that these buttons function in the same manner as the corresponding buttons on the unit.

Remove the insulation sheet Ⓐ before using.

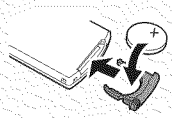


Replacing a button-type battery

1 While pressing the stopper Ⓑ, 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.



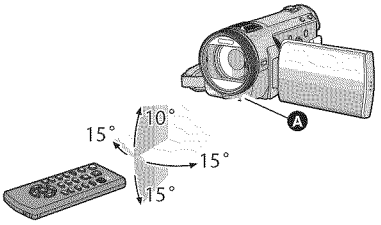
- When the button-type battery runs down, replace it with a new battery (part number: CR2025). The battery should normally last about 1 year, however this depends on how frequently the unit is used.
- Keep the button-type battery out of reach of children to prevent swallowing.

CAUTION

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

Replace battery with Panasonic PART NO. CR2025 only. Use of another battery may present a risk of fire or explosion. Caution: Battery may explode if mistreated.
Dispose of used battery promptly. Keep away from children.
Do not recharge, disassemble or dispose of in fire.

■ Remote control usable range

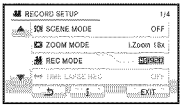


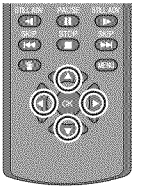
Ⓐ Remote control sensor
Distance: Within approx. 5 m (16 feet)
Angle: Approx. 10° up and 15° down, left, and right

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

Operation of direction buttons/OK button

1 Press a direction button.

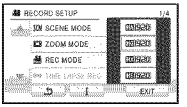




- Selected item will become yellow.

2 Select the item with the direction button.

3 Confirm the selection by pressing the OK button.

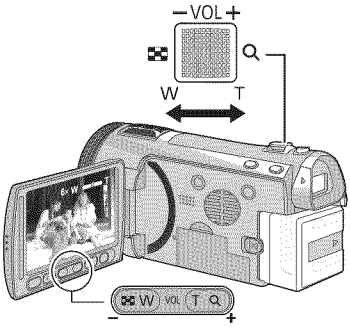


- Selection/confirmation of operation icons, thumbnail display etc. can be operated.
- All touch operations on the unit can also be operated by the remote control (some exceptions).

Zoom in/out function

The maximum optical zoom ratio is 12×.
The default setting of the [ZOOM MODE] is [i.Zoom 18×]. It can be extended to a maximum of 18× during Motion Picture Recording Mode. (➜ 69)

◇ **Change the mode to 🎥 or 📷 .**



Zoom lever/Adjust zoom buttons

T side:
Close-up recording (zoom in)
W side:
Wide-angle recording (zoom out)

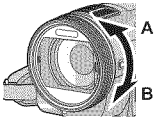
- The zoom speed varies depending on the range over which the zoom lever is moved.
- The adjust zoom buttons are useful for making fine adjustments to the zoom magnification.

Ring zoom

VIDEO PHOTO

Zoom operation can be done using the multi manual ring.

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.

Extra Optical Zoom

PHOTO

If the number of the recording pixels is set to anything other than the maximum number of recording pixels in Still Picture Recording Mode, the still picture can be recorded with a zoom ratio of a maximum of 25× without degrading the picture quality.

- Extra optical zoom ratio varies depending on the setting of [PICTURE SIZE] and [ASPECT RATIO]. (➜ 82, 83)

■ Extra optical zoom mechanism

When you set the picture size to 0.3M , the maximum 12.2M area is cropped to the center 0.3M area, allowing a picture with a higher zoom effect.

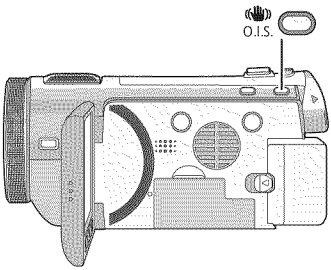
- If you take your finger off the zoom lever during zoom operation, the operation sound may be recorded. When returning the zoom lever to the original position, move it quietly.
- When the zoom magnification is 12×, the subjects are focused at about 1.2 m (3.9 feet) or more.
- When the zoom magnification is 1×, this unit can focus on a subject approx. 4 cm (1.6″) away from the lens.
- The zoom speed does not vary when operating with the adjust zoom buttons and the remote control.

Image Stabilizer Function

VIDEO PHOTO

Use the image stabilizer to reduce the effects of shake during recording.
This unit is equipped with HYBRID O.I.S.
HYBRID O.I.S. is a hybrid of optical and electrical image stabilizer.

◇ **Change the mode to 🎥 or 📷 .**



Optical image stabilizer button

Press the button to turn optical image stabilizer on/off.

(Motion Picture Recording Mode)

◀✋▶/✋ → OFF

- When [HYBRID O.I.S.] is [ON], ◀✋▶ is displayed. When [OFF], ✋ is displayed.
- When recording with a tripod in Motion Picture Recording Mode, we recommend that you set to OFF.

(Still Picture Recording Mode)

✋1/✋2 → OFF

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

■ Changing Image Stabilizer Mode

(Motion Picture Recording Mode)

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

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

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

(Still Picture Recording Mode)

MENU : **[RECORD SETUP] → [O.I.S.] → [MODE1] or [MODE2]**

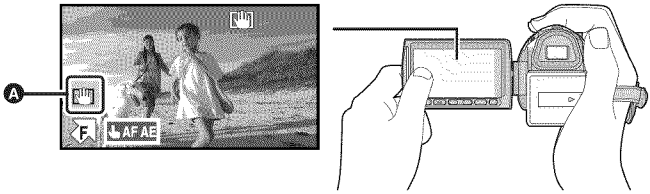
[MODE1]:
The function works all the time.

[MODE2]:
The function works when the 📷 button is pressed. We recommend using this mode when you are recording yourself or recording with a tripod in Still Picture Recording Mode.

Optical Image Stabilizer Lock

VIDEO PHOTO

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



Ⓐ O.I.S. LOCK icon

- Press the Optical Image Stabilizer button to switch the image stabilizer to ON.
- is displayed while you are touching the icon.
- Optical Image Stabilizer Lock is released when you remove your finger from the icon.
- Operation icon will disappear when no function is performed for a specific period of time if [DISPLAY] is set to [OFF]. Touch the screen to display it again.

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

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

- Stabilization may not be possible under strong shaking conditions.
- To record while moving the unit quickly, release Optical Image Stabilizer Lock.

AF/AE tracking

VIDEO PHOTO

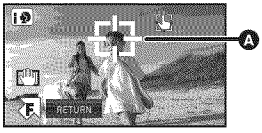
It is possible to set the focus and exposure to the subject specified on the touch screen. The focus and exposure will keep following the subject automatically even if it moves. (Dynamic tracking)

◇ **Change the mode to 🎥 or 📷 .**

1 Touch [AF AE].

- will be displayed on the screen.
- When [FACE RECOG.] (➜ 71) is [ON] and a registered face is detected, the target is automatically locked.

2 Touch the object and lock the target.



A Target frame

- When you touch the head of the object, the target frame on the head gets locked and tracking starts.
- Touch the object to be changed again when you want to change the target.
- When the Intelligent Auto Mode is selected, the setting becomes (Normal) and touched object is tracked. Selection becomes (Portrait) when target frame is locked on a face. (It may turn to (Normal) even if the target is locked on the face when a spotlight is shining or with a dark scene.)

3 Start recording.

- When you touch [RETURN], the tracking function will be canceled.

■ About target frame

- When target lock fails, the target frame blinks in red and then disappears. Touch a characteristic part (color etc.) on the object to lock onto it again.
- When the 📷 button is pressed halfway in Still Picture Recording Mode, the focus is set to the object that is locked. The target frame turns green when it focuses, and the target cannot be changed.

- This function cannot be used in Manual Mode. When Manual Mode is set in Still Picture Recording Mode, it can only be used with some settings in Scene Mode.
- It may track different objects or may not lock the target depending on the recording conditions such as the following:
  - When the object is too large or too small
  - When color of the object is similar to the background
  - When the scene is dark
- When the target is locked in Still Picture Recording Mode, the screen may become dark or the AF assist lamp may turn on.
- AF/AE tracking will be canceled in the following cases.
  - When the mode is changed
  - When the unit is turned off
  - When the Scene mode is set
  - Switch to Intelligent Auto Mode/Manual Mode
  - Switch to face-to-face recording
- After setting [DISPLAY] to [OFF] if no operation is performed for a few seconds, the operation icon disappears. Touch the screen to display the icon again. When the AF/AE tracking is used, the icon does not disappear.

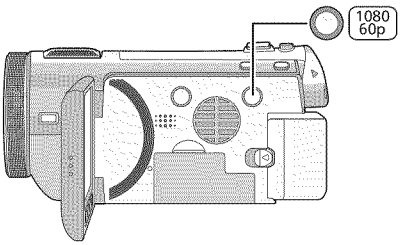
1080/60p recording

VIDEO

This is a 1080/60p (1920×1080/60 progressive) recording mode that can record in maximum quality*.
* This means the highest quality for this unit.

Latest information, such as which Panasonic TVs can play back the scenes recorded in 1080/60p recorded with this unit, can be found on the following support site.
(As of Aug. 2010)
http://panasonic.jp/support/global/cs/e_cam/index.html

◇ **Change the mode to 🎥 .**



1080/60p button

To set to 1080/60p recording mode, press and hold the button until 1080/60p is displayed.

- To return to normal recording mode, press and hold the button until 1080/60p disappears.

- Please refer to page 156 for details about approximate recordable time.

1080/60p

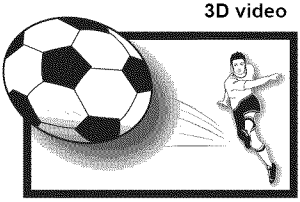
- The scenes recorded in 1080/60p can be saved or played back by this unit or by using the HD Writer AE 2.6T software.

Recording 3D video

VIDEO

With the supplied 3D Conversion Lens attached, you can record life-like and powerful 3D video. To view 3D video, a television that supports 3D is required.

3D video



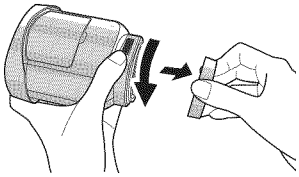
The image is an illustration.

- **In the unit, the recordable 3D videos are side-by-side format (2-screen structure).**
- Since the 3D video is recorded in side-by-side format, the recorded 3D video is not of high definition picture quality.

■ Attaching the 3D Conversion Lens

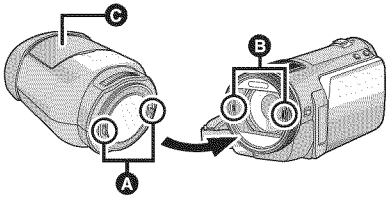
1 Rotate the lens rear cap in the direction indicated by the arrow.

- Rotate the lens rear cap while pushing on the attachment screw with your fingers.

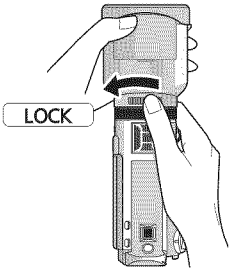


2 Match the position of the convex Ⓐ on the 3D Conversion Lens with the concave Ⓑ in the unit.

- Attach with the adjustment dial cover Ⓒ of the 3D Conversion Lens facing upwards.
- You cannot attach the 3D Conversion Lens together with the lens hood or a filter etc.



3 Tighten the attachment screw of the 3D Conversion Lens by rotating to LOCK.



- Be careful not to overtighten. If the 3D Conversion Lens is overtightened, you may not be able to remove it from the unit.
- Attach the 3D Conversion Lens securely so it will not tilt or move.

■ Recording 3D video

When using for the first time, be sure to adjust the 3D Conversion Lens attachment position.

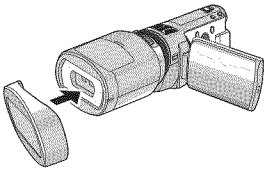
- **Turn off the unit.**
- **Change the mode to 🎥 .**

1 Attach the 3D Conversion Lens to the unit. (➜ 56)

2 Turn on the unit.

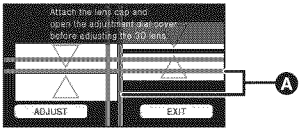
- Turn on with the unit in a horizontal state.
- The 3D Conversion Lens adjustment mode screen will appear automatically after performing the initial setting.
- **If the 3D Conversion Lens adjustment mode screen does not appear automatically, set from the menu.**
  ([SETUP] → [3D CONV. LENS SETUP])
- If the unit is turned on with the USB cable still connected, the USB connection will take priority.

3 Attach the lens front cap to the 3D Conversion Lens.



- 2 screens will appear.
- The horizontal line for adjustment on the lens front cap is displayed on the screen.

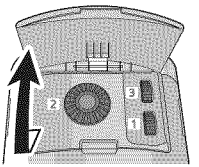
Ⓐ Guide Line



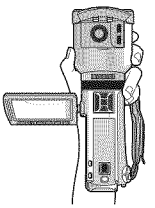
4 Touch [ADJUST].

- If the black vertical line and the black horizontal line are within the red guidelines Ⓐ and adjustment is not required, touch [EXIT] and proceed to Step 11.
- Perform the adjustment in a bright location where the horizontal line for adjustment will be clearly visible.
- The 3D Conversion Lens cannot be adjusted using the viewfinder.

5 Open the adjustment dial cover.

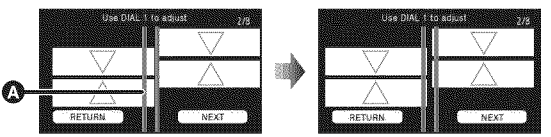


- When turning the adjustment dials, hold the 3D Conversion Lens in the palm of your hand from the bottom and operate with the fingers of your other hand without applying too much force from above. When checking the adjustment, check with your fingers off the adjustment dials.



6 (After checking the operation description, touch [NEXT].)

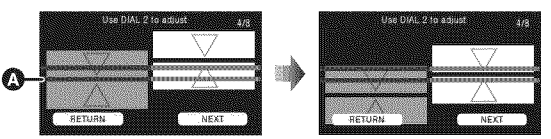
To adjust the horizontal position, rotate the horizontal image position adjustment dial 1 so that the black vertical line is between the red guidelines A.



- Touch [NEXT].

7 (After checking the operation description, touch [NEXT].)

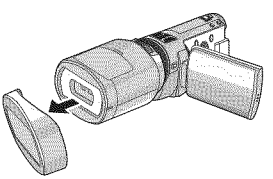
To adjust the vertical position, rotate the vertical position adjustment dial 2 so that the black horizontal line at the right of the screen is in the center of the red guidelines A.



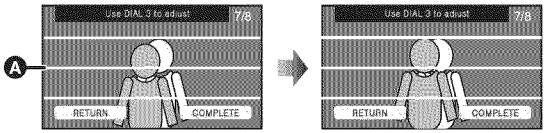
- Touch [NEXT].

8 Removing the lens front cap.

- Touch [NEXT].



9 (After checking the operation description, touch [NEXT].)
Adjust the vertical alignment adjustment dial 3 to align the vertical position of the subject shown duplicated.



- Aim the unit at a subject from a distance of approximately 1.2 m (3.9 feet) to 2 m (6.6 feet), and keep the image shown level by using the guidelines A.
- Difference in horizontal direction is characteristic of 3D video.
- It is recommended to stabilize the unit using the lens front cap as a platform when performing the adjustment. (➜ 18)
- Touch [COMPLETE].

10 Touch [EXIT] to end the adjustment.

- After adjustment, a single screen appears.
- **When re-attaching the 3D Conversion Lens or after an impact etc., it is recommended that you perform the adjustment again.**

B 3D appears.

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

- When the 3D Conversion Lens is attached, the zoom position is fixed, and the zoom operation is disabled.
- When recording in 3D, the image will appear with black frame around it. The black frame will be recorded in the video.

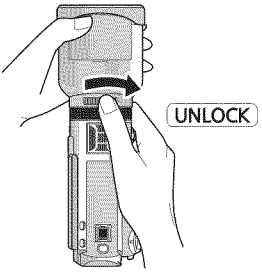
To ensure that the 3D video can be safely viewed, pay attention to the following points when recording.
- Where possible, record with the unit in a horizontal state.
- Do not get too close to the subject. (record from a distance of at least 1.2 m (3.9 feet).)
- When moving the unit as you record, move it slowly.
- Try to hold the unit as steady as possible when recording while riding in a vehicle or walking.

- Use of a tripod is recommended for recording with a stable picture.
- The reception range for the remote control might become narrow at the upper side of the unit, so operate from the lower side. (➜ 50)
- You will hear a sound when the unit is moved rapidly with the 3D Conversion Lens attached, but this is not a malfunction.
- When the adjustment dial is rotated too much, you will hear a "clapping" sound and the adjustment screen will stop moving. In such a case, rotate the adjustment dial in the opposite direction until the adjustment screen starts moving.
- [ECONOMY] will not work while you adjust the 3D Conversion Lens attachment position.
- When the 3D Conversion Lens is attached, the auto slow shutter setting is [AUTO SLOW SHTR (3D)]. The default setting of [AUTO SLOW SHTR (3D)] is [ON]. (➜ 75)
- While 3D recording if moving the unit fast, the message is more likely to appear.

■ Removing the 3D Conversion Lens

Rotate the attachment screw to UNLOCK to loosen and then remove.

- Place the unit on a stable location such as a table, and be careful not to drop the 3D Conversion Lens.



- Be careful not to lose the lens caps.
- When storing, always attach the lens caps to avoid scratching the protective glass.

■ Functions that cannot be used during 3D recording

When recording with the 3D Conversion Lens, you cannot use certain functions.

Functions not available during 3D recording

(Button/lever operations)

- Zoom in/out function*1
- HYBRID O.I.S.*2
- Intelligent auto mode*3
- AF/AE tracking
- 1080/60p recording*4
- Still picture recording (Still Picture Recording Mode, and still picture recording in Motion Picture Recording Mode)
- Manual operations*5 (focus, shutter speed, iris)
- [EXT DISPLAY] (remote control)

(Setup menu)

- Quick power on
- Quick start
- Initial set
- O.I.S.demo

(Recording functions)

- Intelligent contrast control
- Smile shot
- Soft skin mode
- Tele macro
- Guideline
- Color night rec
- Scene mode
- Zoom mode
- Digital cinema
- Face recognition
- Name display
- Face framing
- Digital cinema color
- Shooting guide
- Zoom microphone
- Picture adjust
- Luminance
- Histogram
- Picture size
- Quality
- MF assist function

*1 The zoom position is fixed, and the zoom operation is disabled.

*2 The Optical Image Stabilizer and Optical Image Stabilizer Lock can be used.

*3 Intelligent Auto Mode is canceled. Intelligent Auto Mode stays canceled after removal of the 3D Conversion Lens. To set Intelligent Auto Mode, press the iA/MANUAL button.

*4 The 1080/60p recording mode is canceled, and the video is recorded with AVCHD picture quality. The AVCHD picture quality is retained after removal of the 3D Conversion Lens.

*5 Only white balance can be used. Touch to display the manual icon.

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