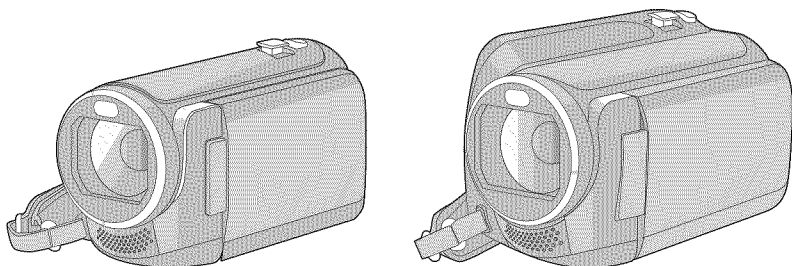


Panasonic®

Owner's Manual High Definition Video Camera

Model No. **HDC-SD80P/PC**
HDC-TM80P/PC
HDC-HS80P/PC



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

AVCHD™

DOLBY
DIGITAL
STEREO CREATOR

SD™
XC

HDMI VIERA Link™

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

VQT3J15

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 underside 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 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-SD80P/HDC-TM80P/HDC-HS80P
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.



THE FOLLOWING APPLIES ONLY IN CANADA.

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

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.

■ Concerning the battery

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.

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, heat above 60 °C (140 °F) or incinerate.

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.

■ 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 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.

■ About the recording format for recording motion pictures

You can select from either AVCHD or iFrame recording formats to record motion pictures using this unit. (→ 61)

AVCHD:

You can record high definition quality images with this format. It is suitable for viewing on a large format TV or for saving to disc.

iFrame:

This is a recording format suitable for viewing and editing with a Mac (iMovie'11). When using the iMovie'11, you can import motion pictures in iFrame format quicker than with AVCHD. You can also make the file size of the imported motion picture smaller than when importing AVCHD.

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

■ Indemnity about recorded content

Panasonic does not accept any responsibility for damages directly or indirectly due to any type of problems that result in loss of recording or edited content, and does not guarantee any content if recording or editing does not work properly. Likewise, the above also applies in a case where any type of repair is made to the unit (including any other non-built-in memory/HDD related component).

■ Handling of built-in memory [HDC-TM80]

This unit is equipped with the built-in memory. When using this component, pay attention to the following points.

Back up data periodically.

The built-in memory is temporary storage. In order to avoid erasing data due to static electricity, electromagnetic waves, breakage, and failures, back up the data to a PC or DVD disc. (→ 100, 110)

- Access lamp [ACCESS] (→ 18)
illuminates while the SD card or built-in memory is being accessed (initialization,

recording, playback, deleting etc.). Do not perform the following operations when the lamp illuminates. It may damage the built-in memory or cause a malfunction in the unit.

- Turn the unit off (remove the battery)
 - Insert and remove the USB cable
 - Expose the unit to vibrations or shock
- About disposing of or giving away this unit. (→ 135)

■ Handling of HDD [HDC-HS80]

This unit is equipped with the built-in HDD. While the HDD is capable of storing a large amount of data, there are a few things to look out for. When using this component, pay attention to the following points.

Do not expose the HDD to vibrations and shocks.

Due to the environment and handling conditions, the HDD may be subject to partial damages or may not be able to read, record, and play back data. Do not expose the unit to vibrations or shock, and do not turn off the unit during recording or playback.

If the unit is used in a place with loud sounds, such as a club or similar venue, the recording may stop due to sound vibrations. Recording data on an SD card is recommended in these places.

Back up data periodically.

The HDD is temporary storage. In order to avoid erasing data due to static electricity, electromagnetic waves, breakage, and failures, back up the data to a PC or DVD disc. (→ 100, 110)

If the HDD experiences any abnormality, back up data immediately.

Failure in the HDD may produce continuous noise or choppy sound during recording or playing back. Continuous use will cause further deterioration, and may eventually disable the HDD. If these phenomena are observed, copy the data on the HDD to a PC, a DVD disc etc. immediately and contact consumer support. (→ 152, 153)
Once the HDD is out of order, data cannot be restored.

Operation may stop in hot or cold environments.

The unit is disabled in order to protect the HDD.


Do not use the unit in low atmospheric pressures.

The HDD may fail if it is used at altitudes of 3000 m (9800 feet) or higher above sea level.

Transportation

When the unit is transported, turn off the unit and be careful not to shake, drop, or cause impact to the unit.

Falling detection

[] is indicated on the screen when it detects a falling state (a weightless state). If the falling state is detected repeatedly, the unit may stop the recording or playback operation in order to protect the HDD.



- HDD access lamp [ACCESS HDD] (→ 19) illuminates while the HDD is being accessed (initialization, recording, playback, deleting etc.). Do not perform the following operations when the lamp illuminates. It may damage the HDD or cause a malfunction in the unit.
 - Turn the unit off (remove the battery)
 - Insert and remove the USB cable
 - Expose the unit to vibrations or shock
- About disposing of or giving away this unit. (→ 135)

■ 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 24 for more details on SD cards.

■ For the purposes of this owner's manual

- 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 Mode: 
Functions that can be used for Still Picture Recording Mode: 
- Functions that can be used for Motion Picture Playback Mode: **VIDEO**
Functions that can be used for Still Picture Playback Mode: **PHOTO**
- Pages for reference are indicated by an arrow, for example: → 00

This owner's manual is designed for use with models **HDC-SD80**, **HDC-TM80** and **HDC-HS80**. Pictures may be slightly different from the original.

- The illustrations used in this owner's manual show model **HDC-SD80**, however, parts of the explanation refer to different models.
- Depending on the model, some functions are not available.
- Features may vary, so please read carefully.
- Not all models may be available depending on the region of purchase.

Contents

Accessories.....	12
Quick Guide.....	13

Preparation

Parts identification and handling	17
Power supply.....	20
Inserting/removing the battery.....	20
Charging the battery	21
Charging and recording time.....	22
Recording to a card	24
Cards that you can use with this unit.....	24
Inserting/removing an SD card.....	25
Turning the unit on/off.....	26
Turning the unit on and off with the power button	26
Turning the unit on and off with the LCD monitor	26
Selecting a mode	27
How to use the touch screen	27
About the Touch Menu	28
Setting date and time.....	29

Basic

Before recording	30
Selecting a media to record	31
[HDC-TM80/HDC-HS80]	31
Recording motion pictures	32
Recording still pictures	34
Recording still pictures in Motion Picture Recording Mode.....	35
Intelligent Auto Mode	36
Motion picture/Still picture playback	38
Using the menu screen	41
Using the Setup Menu	42

Advanced (Recording)

Zoom in/out function	49
Extra Optical Zoom	49
Image Stabilizer Function	50
Recording with the Touch function.....	51
Touch function icons	51
Recording functions of operation icons	54
Operation icons	54
Recording functions of menus.....	60
Manual recording.....	72
White balance	73
Manual shutter speed/ iris adjustment.....	74
Manual focus adjustment.....	75

Advanced (Playback)

Playback Operations	76
Motion picture playback using operation icon	76
Creating still picture from motion picture	77
Highlight & Time frame index.....	78
Repeat playback	78
Resuming the previous playback.....	79
Zooming in on a still picture during playback (Playback zoom).....	79
Various playback functions	80
Playing back motion pictures/ still pictures by date	80
Highlight Playback	81
Changing the playback settings and playing back the slide show	83
Deleting scenes/still pictures	85
Dividing a scene (AVCHD).....	86
Dividing a scene to partially delete (iFrame)	87
Deleting personal information	88
Protecting scenes/still pictures	88
DPOF setting	89
Relay scene combining [HDC-TM80]	90

Watching Video/Pictures on your TV	92
Connecting with a HDMI mini cable	95
Connecting with the AV multi cable	95
Playback using VIERA Link™	96

Copy/Dubbing

Copying between SD card and Built-in Memory/HDD	
[HDC-TM80/HDC-HS80]	98
Connecting a DVD burner to copy to/ play back a disc	100
Preparing for copying/ playing back	100
Copying to discs	102
Playing back the copied disc	104
Managing the copied disc	105
Dubbing with a Blu-ray disc recorder, video, etc.	106

With a PC

What you can do with a PC	110
End User License Agreement	112
Operating environment	113
Installation	116
Connecting to a PC	118
About the PC display	120
Starting HD Writer AE 3.0	121
Reading the operating instructions of the software applications	121
If using Mac	122

Others

Indications	123
Messages	126
About recovery	127
Troubleshooting	128
Cautions for use	134
About copyright	140
Recording modes/approximate recordable time	141
Approximate number of recordable pictures	142
Specifications	143
Optional accessories	148
Accessory Order Form (For USA and Puerto Rico Customers)	150
Limited Warranty (ONLY FOR U.S.A. AND PUERTO RICO)	151
Warranty (For Canadian Customers)	153
Index	154
Spanish Quick Use Guide/ Guía española para el uso rápido	156

Accessories

Check the accessories before using this unit.

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

Product numbers correct as of Dec. 2010. These may be subject to change.

Battery pack

VW-VBK180



AC adaptor

VSK0711



AC cable

K2CA2CA00025



AV multi cable

K1HY12YY0008



USB cable

K1HA05AD0007



Stylus pen

VGQ0C14



- This is used for operations that are hard to operate with your fingers or performing detailed operations with the touch screen operation. (→ 27, 48)

CD-ROM

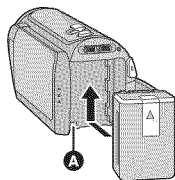
Software



Quick Guide

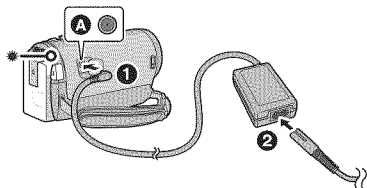
■ Inserting the battery

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



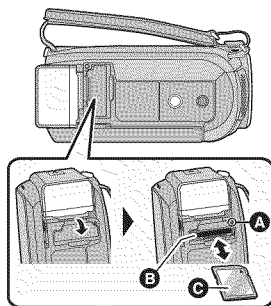
- A** Insert the battery until it clicks and locks.

■ Charging the battery



- A** DC input terminal
- 1** Connect the AC adaptor to the DC input terminal.
- 2** Connect the AC cable to the AC adaptor, then the AC outlet.
- The status indicator will flash red at an interval of 2 seconds, indicating that charging has begun. It will turn off when the charging is completed.

■ Inserting/removing an SD card



Access lamp [ACCESS] **A**

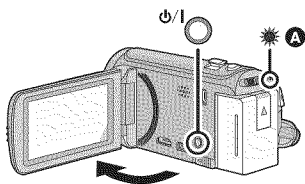
- When this unit is accessing the SD card or built-in memory, the access lamp lights up.

- Check that the access lamp has gone off.
- 1) Open the SD card cover and insert (remove) the SD card into (from) the card slot **B**.
 - 2) Securely close the SD card cover.
- Face the label side **C** in the direction shown in the illustration and press it straight in as far as it will go.
 - Press the center of the SD card and then pull it straight out.
 - Securely close it until it clicks.

■ Turning the unit on/off

Turning the unit on and off with the power button

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

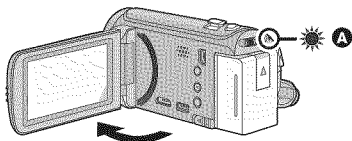


- A** The status indicator lights on.
- To turn off the unit, hold down the power button until the status indicator goes off.

Turning the unit on and off with the LCD monitor

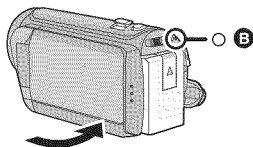
Opening the LCD monitor turns on the unit. Closing the LCD monitor turns off the unit.

To turn on the unit




- A** The status indicator lights on.

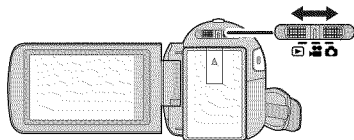
To turn off the unit






- B** The status indicator goes off.

■ Selecting a mode

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



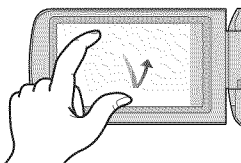
	Motion Picture Recording Mode (→ 32)
	Still Picture Recording Mode (→ 34)
	Playback Mode (→ 38, 76)

■ 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.

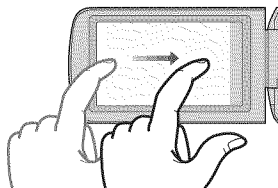
Touch

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





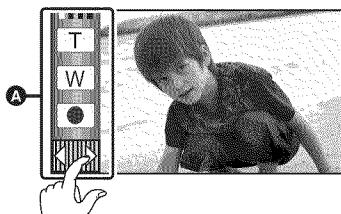
Slide while touching

Move your finger while pressing on the touch screen.



Touch Menu

Touch  to display the Touch Menu.
Touch ◀ (left side)/▶ (right side) of  on the Touch Menu to switch the operation icons.





A Touch Menu

■ Language selection

- 1) Touch [MENU], then touch [SETUP] → [LANGUAGE].
- 2) Touch desired language.


■ Selecting a media to record [HDC-TM80/HDC-HS80]

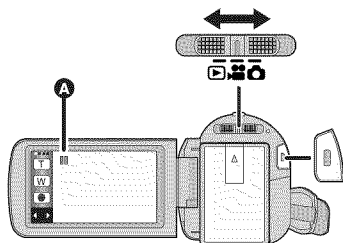
- 1) Change the mode to  or .
- 2) Select the menu.



MENU : [MEDIA SELECT]

- 3) Touch the media to record motion pictures or still pictures.
 - Touch [VIDEO/SD CARD] or [PICTURE/SD CARD] to record to the SD card.
HDC-TM80
Touch [VIDEO/Built-inMemory] or [PICTURE/Built-inMemory] to record to the built-in memory.
 - **HDC-HS80**
Touch [VIDEO/HDD] or [PICTURE/HDD] to record to the HDD.
- The media is selected separately to motion pictures or still pictures is highlighted in yellow.
- 4) Touch [ENTER].



■ Recording motion pictures

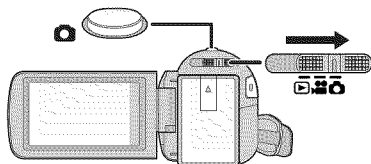
- 1) Change the mode to .
- 2) Open the LCD monitor.
- 3) Press the recording start/stop button to start recording.




A When you begin recording,  changes to .

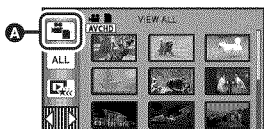
■ Recording still pictures

- 1) Change the mode to .
- 2) Open the LCD monitor.
- 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 **A**.

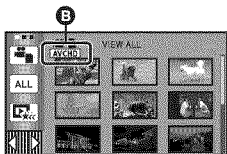


- 3) **HDC-SD80**
Select the [VIDEO/PICTURE] you wish to play back.

HDC-TM80 / **HDC-HS80**

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

- Touch [ENTER].
- 4) Touch the scene or the still picture to be played back.



- B** **AVCHD** is displayed when [AVCHD] is touched or **iFrame** is displayed when [iFrame] is touched in step 3.

- To display the next (previous) page:
 - Slide the thumbnail display upward (downward) while touching it.
 - Switch the Touch Menu, and then touch ▲ (up) / ▼ (down) on the thumbnail scroll lever.



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



- C** Operation icon

- Operation icons and screen display will disappear when no function is performed for a specific period of time. To display them again, touch the screen.

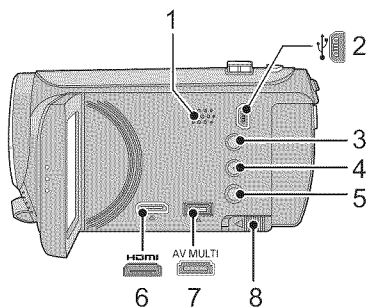
(Motion picture playback)

- ▶/||: Playback/Pause
- ◀◀: Rewind playback
- ▶▶: Fast forward playback
- : Stops the playback and shows the thumbnails.

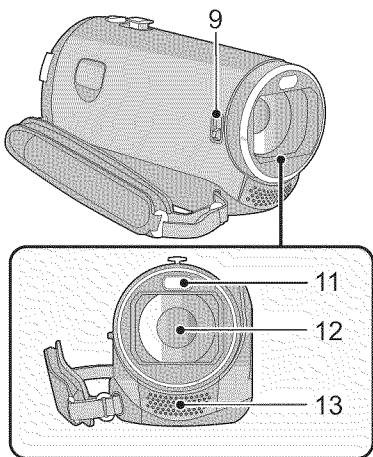
(Still picture playback)

- ▶/||: 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.

Parts identification and handling



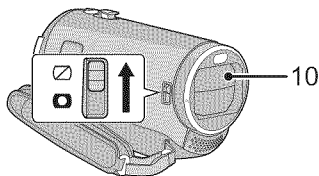
- 1 Speaker
- 2 USB terminal [⏏] (→ 101, 106, 118)
- 3 Intelligent auto/Manual button [iA/MANUAL] (→ 36, 72)
- 4 Optical image stabilizer button [O.I.S.] (→ 50)
- 5 Power button [⏻/⏷] (→ 26)
- 6 HDMI mini connector [HDMI] (→ 92, 96)
- 7 AV multi connector (→ 92, 109)
 - Use the AV multi cable (only the supplied cable).
- 8 Battery release lever [BATT] (→ 20)



9 Lens cover closing switch

The lens cover will open automatically when set to Motion Picture Recording Mode or Still Picture Recording Mode. (→ 27)
When not using the unit, close the lens cover to protect the lens.

- Lens cover does not close automatically.
- Slide the Lens cover closing switch to close the cover.



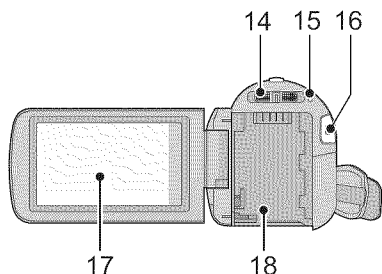
10 Lens cover

11 LED light

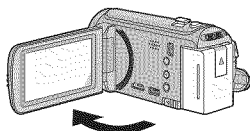
- It can be used as a Video light or Photo light. (→ 57, 71)

12 Lens

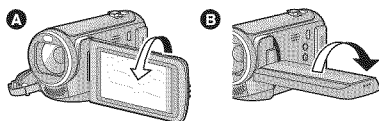
13 Internal stereo microphones



- 14 Mode switch (→ 27)
- 15 Status indicator (→ 26)
- 16 Recording start/stop button (→ 32)
- 17 LCD monitor (Touch screen) (→ 27)



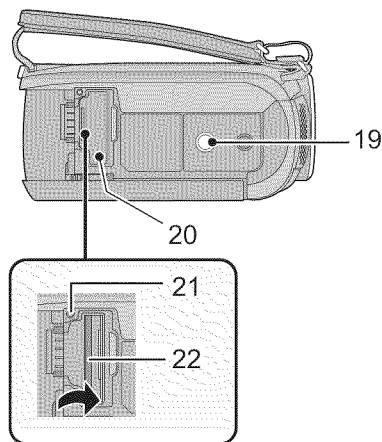
- It can open up to 90°.



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

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

18 Battery holder (→ 20)



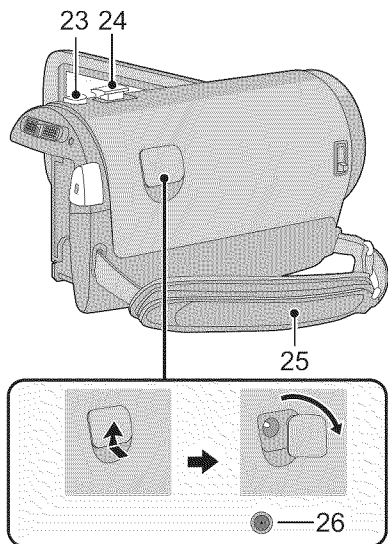
19 Tripod receptacle




- If you attach a tripod which has 5.5 mm (0.22") screw or larger, it may damage this unit.

20 SD card cover (→ 25)

21 Access lamp [ACCESS] (→ 25)

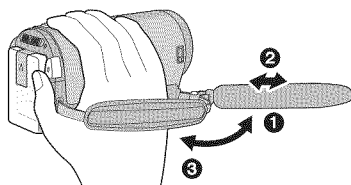
22 Card slot (→ 25)



- 23 Photoshot button [] (→ 34)
 24 Zoom lever [W/T] (In Motion Picture Recording Mode or Still Picture Recording Mode) (→ 49)
 Thumbnail display switch [ / ]/
 Volume lever [-VOL+] (In Playback Mode) (→ 39)

25 Grip belt

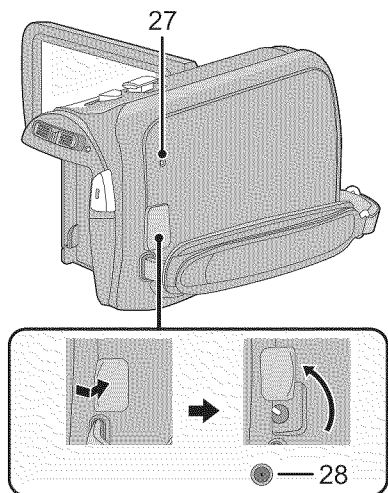
Adjust the length of the grip belt so that it fits your hand.



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

26 DC input terminal [DC IN] (→ 21)

- Do not use any other AC adaptors except the supplied one.



27 HDD access lamp [ACCESS HDD]

28 DC input terminal [DC IN] (→ 21)

- Do not use any other AC adaptors except the supplied one.

Power supply

■ About batteries that you can use with this unit

The battery that can be used with this unit is VW-VBK180/VW-VBK360.

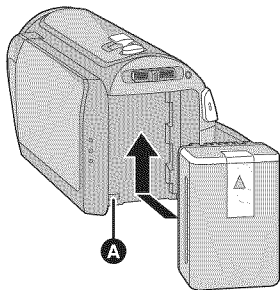
- The unit has a function for distinguishing batteries which can be used safely. The dedicated battery (VW-VBK180/VW-VBK360) supports this function. The only batteries suitable for use with this unit are genuine Panasonic products and batteries manufactured by other companies and certified by Panasonic. (Batteries which do not support this function cannot be used). Panasonic cannot in any way guarantee the quality, performance or safety of batteries which have been manufactured by other companies and are not genuine Panasonic products.

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

Inserting/removing the battery

- Press the power button to turn off the unit. (→ 26)

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

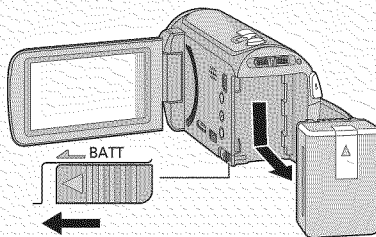


- A** Insert the battery until it clicks and locks.

Removing the battery

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

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

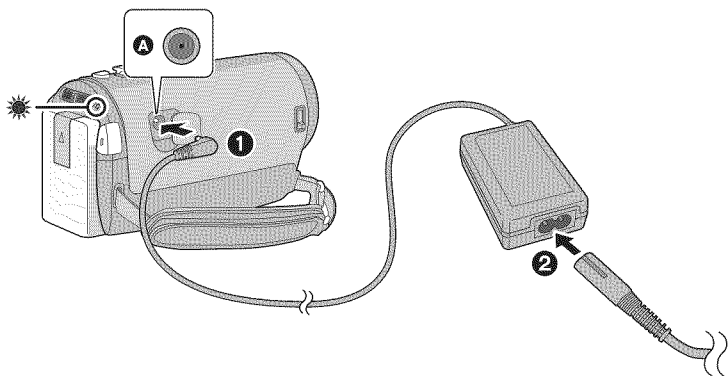


Charging the battery

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

Important:

- Use the supplied AC adaptor. Do not use the AC adaptor of another device.
- Do not use the AC cable with any other equipment as it is designed only for this unit. Also, do not use the AC cable from other equipment with this unit.
- The battery can also be charged using a battery charger (VW-BC10PP; optional).
- The battery will not be charged if the unit is turned on.
- It is recommended to charge the battery in a temperature between 10 °C to 30 °C (50 °F to 86 °F). (The battery temperature should also be the same.)



- **A** DC input terminal
- Insert the plugs as far as they will go.

1 Connect the AC adaptor to the DC input terminal.

2 Connect the AC cable to the AC adaptor, then the AC outlet.

- The status indicator will flash red at an interval of 2 seconds, indicating that charging has begun. It will turn off when the charging is completed.

■ Connecting to the AC outlet

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

- If the status indicator flashes at a particularly fast or slow rate, refer to page 137.
- We recommend using Panasonic batteries (→ 12, 22, 23, 148).
- 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.

Charging and recording time

■ Charging/Recording time

- Temperature: 25 °C (77 °F)/humidity: 60%RH (When using AC adaptor)

HDC-SD80				
Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording mode	Maximum continuous recordable time	Actual recordable time
Supplied battery/ VW-VBK180 (optional) [3.6 V/1790 mAh]	2 h 25 min	[HA], [HG]	1 h 50 min	55 min
		[HX], [HE]	1 h 55 min	
		[iFrame]	2 h	1 h
VW-VBK360 (optional) [3.6 V/3580 mAh]	4 h 20 min	[HA], [HG], [HX], [HE]	3 h 45 min	1 h 55 min
		[iFrame]	3 h 55 min	2 h

HDC-TM80				
Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording mode	Maximum continuous recordable time	Actual recordable time
Supplied battery/ VW-VBK180 (optional) [3.6 V/1790 mAh]	2 h 25 min	[HA], [HG]	1 h 50 min	55 min
		[HX], [HE]	1 h 55 min	
		[iFrame]	2 h	1 h
VW-VBK360 (optional) [3.6 V/3580 mAh]	4 h 20 min	[HA], [HG], [HX], [HE]	3 h 45 min	1 h 55 min
		[iFrame]	3 h 55 min	2 h

HDC-HS80

Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording destination	Recording mode	Maximum continuous recordable time	Actual recordable time
Supplied battery/ VW-VBK180 (optional) [3.6 V/1790 mAh]	2 h 25 min	HDD	[HA], [HG], [HX], [HE]	1 h 35 min	50 min
			[iFrame]	1 h 45 min	
		SD	[HA], [HG], [HX], [HE]	1 h 40 min	50 min
			[iFrame]	1 h 45 min	55 min
VW-VBK360 (optional) [3.6 V/3580 mAh]	4 h 20 min	HDD	[HA], [HG], [HX], [HE]	3 h 15 min	1 h 40 min
			[iFrame]	3 h 25 min	1 h 45 min
		SD	[HA], [HG], [HX], [HE]	3 h 25 min	1 h 45 min
			[iFrame]	3 h 35 min	1 h 50 min



- These times are approximations.
- The indicated charging time is for when the battery has been discharged completely. Charging time and recordable time vary depending on the usage conditions such as high/low temperature.

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

Battery capacity indication

- The display changes as the battery capacity reduces.



If there is less than 3 minutes remaining, then  will become red. If the battery discharges, then  will flash.

- The remaining battery capacity is displayed when using the Panasonic battery that you can use for this unit. The actual time can vary depending on your actual use.
- When using the AC adaptor or batteries made by other companies, the remaining battery capacity will not be shown.

Recording to a card

The unit can record still pictures or motion pictures to an SD card, built-in memory or HDD. To record to an SD card, read the following.

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.	Cannot be guaranteed in operation.
	64 MB/128 MB/256 MB	Cannot be guaranteed in operation.	
	512 MB/1 GB/2 GB	Can be used.	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		

* SD Speed Class Rating is the speed standard regarding continuous writing. Check via the label on the card, etc.

e.g.:

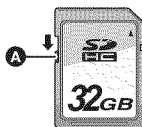


- Please confirm the latest information about SD Memory Cards/SDHC Memory Cards/SDXC Memory Cards that can be used for motion picture recording on the following website.

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

(This website is in English only.)

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

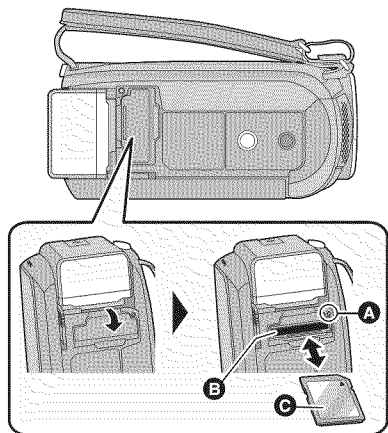


Inserting/removing an SD card

When using an SD card not from Panasonic, or one previously used on other equipment, for the first time on this unit, format the SD card. (→ 46, 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] **A**

- When this unit is accessing the SD card or built-in memory, the access lamp lights up.

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

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

2 Securely close the SD card cover.

- Securely close it until it clicks.

- Do not touch the terminals on the back of the SD card.
- Do not apply strong shocks, bend, or drop the SD card.
- Electrical noise, static electricity or the failure of this unit or the SD card may damage or erase the data stored on the SD card.
- When the card access lamp is lit, do not:
 - Remove the SD card
 - Turn the unit off
 - Insert and remove the USB cable
 - Expose the unit to vibrations or shockPerforming the above while the lamp is on may result in damage to data/SD card or this unit.
- Do not expose the terminals of the SD card to water, 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. (→ 138)

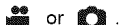
Turning the unit on/off

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

A clicking sound is heard when the unit is shaken.

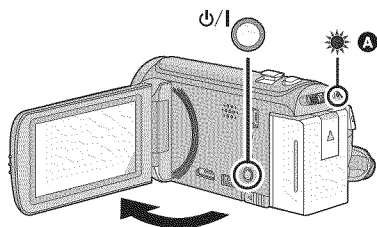
- This is the sound of the lens moving and is not a defect.

This sound will no longer be heard when the unit is turned on and change the mode to



Turning the unit on and off with the power button

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



To turn off the unit

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

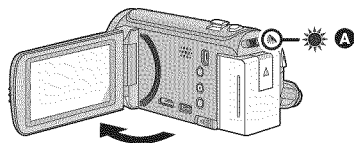
- A** The status indicator lights on.

Turning the unit on and off with the LCD monitor

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

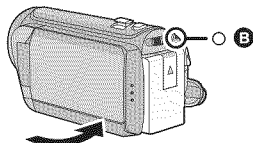
During normal use, opening and closing of the LCD monitor can be conveniently used to turn the unit on/off.

■ To turn on the unit



- A** The status indicator lights on.

■ To turn off the unit



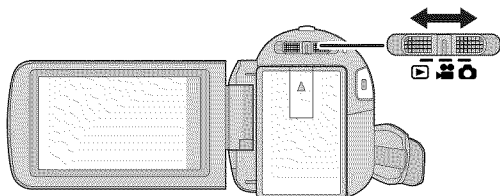
- B** The status indicator goes off.




- The unit will not turn off while recording motion pictures even if the LCD monitor is closed.
- In the following cases, opening the LCD monitor 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 switch to change the mode to  ,  or  .



	Motion Picture Recording Mode (→ 32)
	Still Picture Recording Mode (→ 34)
	Playback Mode (→ 38, 76)

How to use the touch screen

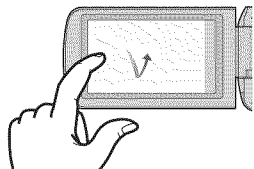
You can operate by directly touching the LCD monitor (touch screen) with your finger.

It is easier to use the stylus pen (supplied) for detailed operation or if it is hard to operate with your fingers.

■ Touch

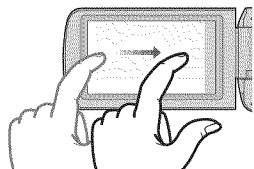
Touch and release the touch screen to select icon or picture.

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

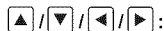


■ Slide while touching

Move your finger while pressing on the touch screen.



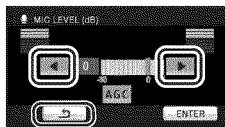
■ About the operation icons




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.



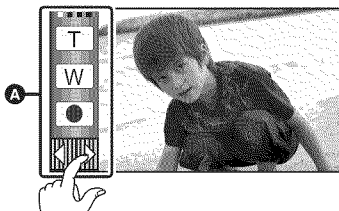
About the Touch Menu

Touch ◀ (left side)/▶ (right side) of  on the Touch Menu to switch the operation icons.

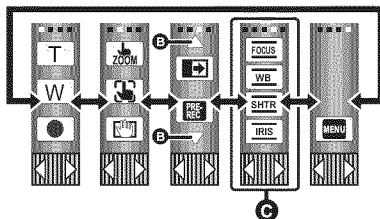
Touch ◀ (left side)/▶ (right side) of  on the Touch Menu.

- It is also possible to switch the operation icons by sliding the Touch Menu right or left while touching it.

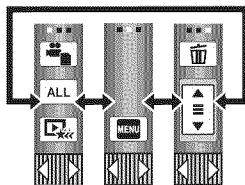
A Touch Menu



Recording Mode




Playback Mode



- B** Touch these icons to switch pages upward or downward.
- C** Displayed only during the Manual Mode.

■ To display the Touch Menu



The Touch Menu will disappear when no function is performed for a specific period of time during Recording mode. To display it again, touch .

- 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. (→ 48)

Preparation



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.

1 Select the menu. (→ 41)

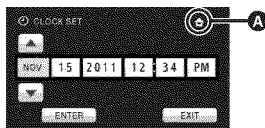
MENU : [SETUP] → [CLOCK SET]

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

A 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.



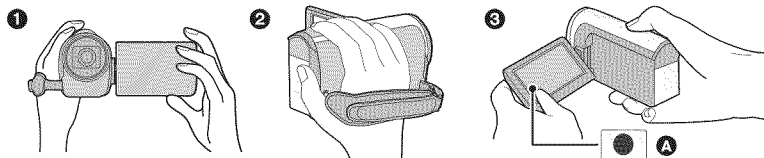
3 Touch [ENTER].

- A message prompting for World time setting may be displayed. Perform the World time setting by touching the screen. (→ 42)
- Touch [EXIT] 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. 4 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 Recording button icon **A** 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 with your hand etc.

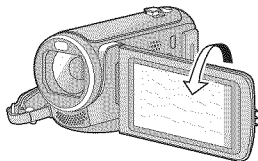
■ Basic motion picture recording

- 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.

■ Recording Yourself

Rotate the LCD monitor towards the lens side.

- The image is horizontally flipped as if you see a mirror image. (However the image recorded is the same as a normal 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. (→ 126)





Selecting a media to record

[HDC-TM80/HDC-HS80]

The card, built-in memory and HDD media can be selected separately to record motion pictures or still pictures.

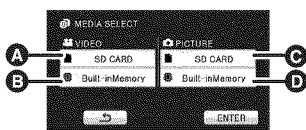
1 Change the mode to or .

2 Select the menu. (→ 41)

MENU : [MEDIA SELECT]

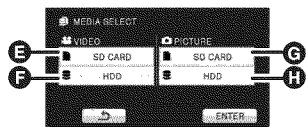
3 Touch the media to record motion pictures or still pictures.

HDC-TM80



- A [VIDEO/SD CARD]
- B [VIDEO/Built-inMemory]
- C [PICTURE/SD CARD]
- D [PICTURE/Built-inMemory]

HDC-HS80




- E [VIDEO/SD CARD]
- F [VIDEO/HDD]
- G [PICTURE/SD CARD]
- H [PICTURE/HDD]

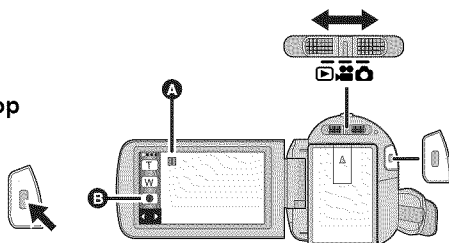
- The media is selected separately to motion pictures or still pictures is highlighted in yellow.



4 Touch [ENTER].



Recording motion pictures

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



- A** When you begin recording,  changes to .
- B** Recording button icon
- Recording can also be started/stopped by touching the Recording button icon. This icon functions in the same manner as the recording start/stop button.

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

■ Screen indications in the Motion Picture Recording Mode



- A** Recording mode
 - B** 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.)
 - C** Approximate remaining recordable time
(When the remaining time is less than 1 minute, R 0h00m flashes red.)
- Screen display will disappear when no function is performed for a specific period of time. To display it again, touch the screen.
(It is not displayed when the AF/AE tracking is set.)

- There are 2 recording formats that can be used with this unit: AVCHD that records high-definition motion pictures, and iFrame that records motion pictures suitable for playback and editing on Mac (iMovie'11). To change the recording format, change the Recording Mode. (→ 61)
- Still pictures can be recorded while recording the motion picture. (→ 35)
- The images recorded between pressing the recording start/stop button to start recording and pressing it again to pause recording become one scene.
When you record with the [REC MODE] set to [iFrame], the scenes longer than approximately 20 minutes will be automatically divided. (Recording will continue.)
- (Maximum recordable scenes of a single SD card, built-in memory or HDD)

Recording formats	[HA]/[HG]/[HX]/[HE]	[iFrame]
Recordable scenes	Approx. 3900	Approx. 89100
Different dates (→ 80)	Approx. 200	Approx. 900

- Maximum number of recordable scenes and maximum number of different dates will be less than above when there are both iFrame scenes and still pictures recorded on an SD card, built-in memory or HDD.
- While recording is in progress, the recording will not stop even if the LCD monitor is closed.
- Please refer to page 141 about approximate recordable time.

About the compatibility of the recorded motion pictures

When motion picture is recorded in AVCHD format



- Only motion pictures recorded with the recording format set to AVCHD are supported by AVCHD compatible equipment. 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.
- It is not always possible to play back motion pictures recorded with the recording format set to AVCHD on AVCHD compatible equipment. In such a case, play back on this unit instead.

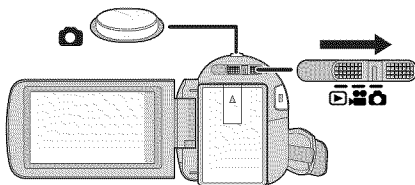
When motion picture is recorded in iFrame format

- You can play back on a Mac (iMovie'11).
- It is not compatible with motion picture recorded in AVCHD format.



Recording still pictures

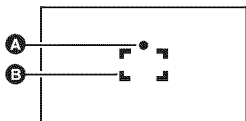
- 1 Change the mode to .
- 2 Open the LCD monitor.
- 3 Press the  button halfway.
(For Auto focus only)






- 4 Press the  button fully.











Focus indication:



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

- If you set the Optical image stabilizer function (→ 50) to  1 ([MODE1]), then the Image Stabilizer function will be more effective. (MEGA) (MEGA Optical Image Stabilizer) will be displayed when the  button is pressed halfway.)
- In dark environments, the Photo light will flash. (→ 57)
- Focus indication will change to registered focus icon when [FACE RECOG.] is set to [ON]. (→ 64)
- Using a Photo light 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.
- You can also take a picture just by touching the subject to focus. (Touch Shutter: → 53)
- To print a picture, save the picture to the SD card (→ 98) and print using a PC or a printer.

■ About the screen indications in Still Picture Recording

-  : Still picture operation indicator (→ 123)
- R3000: Remaining number of still pictures
(Flashes in red when [0] appears.)
-  : Quality of still pictures (→ 70)
-  : Size of still pictures (→ 69)
-  : MEGA optical image stabilizer (→ 34)
-  : Optical image stabilizer (→ 50)
- AF* : AF assist lamp (→ 71)
-  : Photo light (→ 57)
-  : Photo light level (→ 57)
-  : Red-eye reduction (→ 58)



- Screen display will disappear when no function is performed for a specific period of time. To display it again, touch the screen. (It is not displayed when the AF/AE tracking or the Touch Shutter is set.)

■ 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 it is necessary to turn on the AF assist lamp (→ 71)

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.



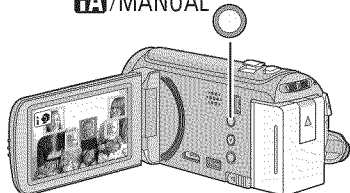
- Photo light, Red-eye reduction, Self-timer (→ 58) do not work.
- While recording motion pictures or during the PRE-REC operation, image quality is different from ordinary still pictures so that motion picture recording takes preference over still picture recording.
- If simultaneous recording is used while recording a motion picture, the recordable time remaining will shorten. If the unit is turned off or the mode switch operated, the recordable time remaining may lengthen.



Intelligent Auto Mode

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










iA/MANUAL



Intelligent auto/Manual button

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

- Please refer to page 72 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, or Low light mode, the face will be surrounded by a white frame when detected. In the Portrait mode, a subject that is bigger and close to center of the screen will be surrounded by an orange frame. (→ 65)
- 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.
- [ZOOM MIC] is set to [OFF] in the Intelligent Auto Mode. (→ 67)

■ 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.

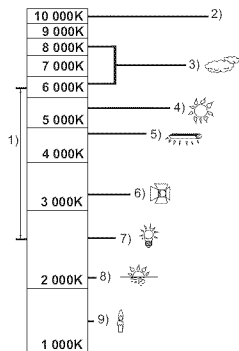
- Color balance and focus may not be adjusted automatically depending on light sources or scenes. If so, manually adjust these settings. (→ 73, 75)

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. (→ 73)

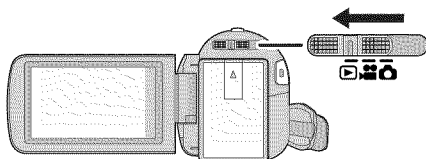


Auto focus

The unit focuses automatically.

- Auto focus does not work correctly in the following situations. Record pictures in the Manual Focus Mode. (→ 75)
 - 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

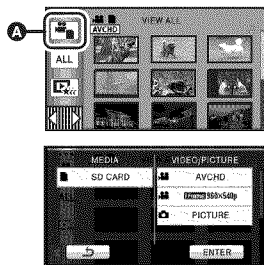
Motion picture/Still picture playback

VIDEO PHOTO


- 1 Change the mode to .
- 2 Touch the play mode select icon (→ 28)

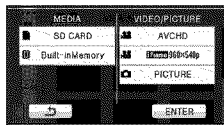
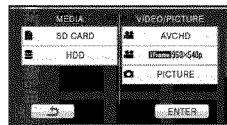
- 3 HDC-SD80
Select the [VIDEO/PICTURE] you wish to play back.

- Touch [ENTER].


HDC-TM80 / HDC-HS80

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

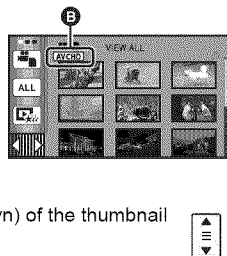
- Touch [ENTER].

HDC-TM80

HDC-HS80


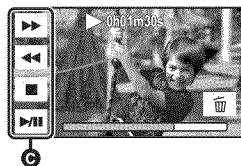
- 4 Touch the scene or the still picture to be played back.

- AVCHD is displayed when [AVCHD] is touched or iFrame is displayed when [iFrame] is touched in step 3.

- To display the next (previous) page:
 - Slide the thumbnail display upward (downward) while touching it.
 - Switch the Touch Menu, and then touch (up) / (down) of the thumbnail scroll lever.



5 Select the playback operation by touching the operation icon.





C Operation icon

- Operation icons and screen display will disappear when no function is performed for a specific period of time. To display them again, touch the screen.

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

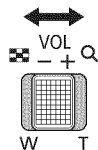
■ Change the thumbnail display

While the thumbnail is displayed, the thumbnail display changes in the following order if the zoom lever is operated to  side or  side.
 20 scenes ↔ 9 scenes ↔ 1 scene ↔ Highlight & Time frame index*
 (→ 78)

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

Even in Motion Picture Playback Mode, [FACE] and [HIGHLIGHT] cannot be used when [iFrame] is selected.

- 9 scenes display returns if the unit is turned off or the mode is changed.
- By displaying in 1 scene or pressing and holding the thumbnail in the 20 scenes or 9 scenes display, recording date and time are displayed when playing back motion pictures, and recording date and file number when playing back still pictures.



■ Speaker volume adjustment

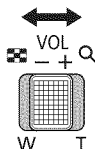
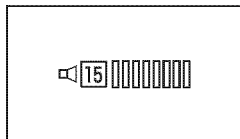
Operate the volume lever to adjust the speaker volume during motion picture playback.

Towards “+”:

Increases the volume

Towards “-”:

Decreases the volume



- Sound will be heard only during normal playback.
- If pause play is continued for approx. 5 minutes, the screen returns to the thumbnails.
- The elapsed time for playback indication will be reset to 0h00m00s for each scene.
- When playing back iFrame scenes, the image will pause momentarily and the screen may turn black when the scenes are switching.



Motion picture compatibility

- This unit is based on AVCHD format/MPEG-4 AVC file format.
- Video signals for the AVCHD that can be played back with this unit are 1920×1080/60i, 1920×1080/24p and 1440×1080/60i.
- Video signals for the iFrame that can be played back with this unit are 960×540/30p.
- 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 or iFrame.
- Motion pictures recorded in AVCHD and iFrame are not compatible with each other.

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.

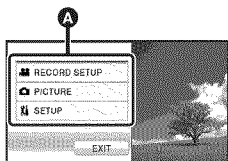
Using the menu screen

- Touch ◀ (left side)/▶ (right side) of  on the Touch Menu to display . (→ 28)

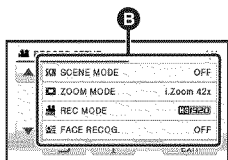
1 Touch [MENU].





2 Touch the top menu **A**.

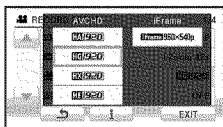


3 Touch the submenu **B**.




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

4 Touch the desired item to enter the setting.



5 Touch [EXIT] to exit the menu setting.

■ About guide display

After touching , 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 Setup Menu

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

MENU : [SETUP] → desired setting

[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].



- 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.



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

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 touching [EXIT].  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].

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




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

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

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

It is possible to change the date format.

[ZOOM/REC DISPLAY] [OFF]/[ON]

You can set the display method of the zoom button icons (/) and recording button icon (.

[OFF]: If no operation is performed for approx. 5 seconds, the icon disappears.

[ON]: Always displayed.

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



Please refer to page 94.

[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.

- **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.**



[HDC-SD80]

Quick start will not work if there is no SD card inserted.

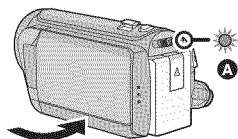
[HDC-TM80] / [HDC-HS80]

Quick start will not work if the [SD CARD] is selected in the [MEDIA SELECT], even if there is no SD card inserted.

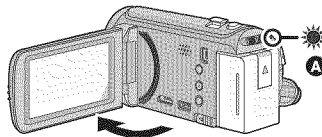
- Change the mode to  or .


- 1 Set [QUICK START] to [ON].
- 2 Close the LCD monitor while the mode is set to  or .

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

**3 Open the LCD monitor.**

The status indicator **A** 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 
- Depending on the recording conditions and menu settings, time for Quick start may be longer than 0.6 seconds.
- It may take some time for Automatic white balance to adjust.
- In the Quick Start Mode, the zoom magnification becomes 1×.

- If [ECONOMY] (→ 44) is set to [5 MINUTES] and the unit automatically goes into Quick Start Standby Mode, close the LCD monitor and then open it again.
- Turn the unit off using the power button.

[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. (→ 126)

[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.

[+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.
- When the LCD monitor is bright, the recordable time with the battery will be shorter.

[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

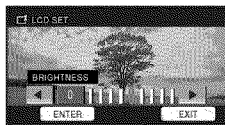
[COLOR]:

Color level of the LCD monitor

3 Touch [◀]/ [▶] to adjust settings.

4 Touch [ENTER].

- Touch [EXIT] to exit the menu screen.



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

Please refer to page 95.

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

Please refer to page 95.

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

Please refer to page 95.

[VIERA Link]**[OFF]/[ON]**

Please refer to page 96.

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

Please refer to page 94.

[INITIAL SET]

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

- Settings for [MEDIA SELECT]^{*}, [CLOCK SET] and [LANGUAGE] will not be changed.

* For users who have **HDC-SD80**, this menu is not displayed.

[NUMBER RESET]

Set the file number of the iFrame and still picture recorded next to 0001.

- Folder number is updated and file number will start from 0001. (→ 120)
- To reset the folder number, format the SD card, built-in memory or HDD, and then perform [NUMBER RESET].
- 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. (→ 100, 110)

HDC-SD80**[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. (→ 100, 110)

- 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. (→ 138)
-
- 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.

[FORMAT MEDIA]

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. (→ 100, 110)

1 Touch **[FORMAT MEDIA]**.

2 **HDC-TM80**

Touch **[SD CARD]** or **[Built-inMemory]**.

HDC-HS80

Touch **[SD CARD]** or **[HDD]**.

- 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. (→ 138)
- Perform a physical formatting of the built-in memory/HDD when this unit is to be disposed/transferred. (→ 135)

-
- 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.

Formatting built-in memory or HDD is only available with this unit.

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 used space and remaining recordable time of the SD card can be checked.

- When the mode switch is set to  , remaining recordable time for the selected recording mode is displayed.
 - Touch **[EXIT]** 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 $1\text{ GB}=1,000,000,000\text{ bytes}$. The capacities of this unit, PCs and software are expressed as $1\text{ GB}=1,024\times 1,024\times 1,024=1,073,741,824\text{ bytes}$. Therefore, the indicated value of the capacity appears to be smaller.

[MEDIA STATUS]

The used space and remaining recordable time of the SD card, built-in memory and HDD can be checked.

- Touching [CHANGE MEDIA] switches the unit between the display for the SD card and the display for the built-in memory/HDD.
- When the mode switch is set to , remaining recordable time for the selected recording mode is displayed.
- Touch [EXIT] to close the indication.

- The SD card, built-in memory or built-in HDD requires some space to store information and manage system files, so the actual usable space is slightly less than the indicated value. The usable built-in memory/HDD 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.

[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].**[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 and while this unit is connected to the AC adaptor, 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)

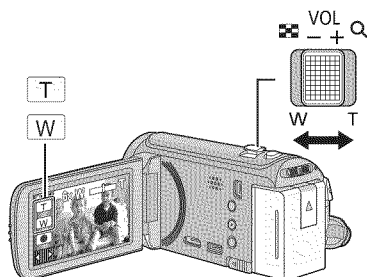
Touch [O.I.S. DEMO], the demonstration automatically starts.

When you touch [EXIT], the demonstration will be canceled.

[LANGUAGE]

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

Zoom in/out function



Zoom lever/Zoom button icons

T side:

Close-up recording (zoom in)

W side:

Wide-angle recording (zoom out)

- Maximum zoom ratio for recording motion pictures can be set with [ZOOM MODE]. (→ 61)
- You can also perform zoom operation by simply touching the LCD monitor. (Touch Zoom: → 51)

■ About the zoom speed

The zoom speed will be faster in the order of zoom lever, zoom button icon, and then touch zoom.

- The zoom speed varies depending on the range over which the zoom lever is moved.
- The zoom operation using the zoom button icon or touch zoom will be performed at a constant speed respectively.

Extra Optical Zoom

When in Still Picture Recording Mode, it is possible to take a picture with zoom up to a maximum of 60× without degrading the picture quality

- Extra Optical Zoom ratio varies depending on the setting of [PICTURE SIZE]. (→ 69)

■ Extra optical zoom mechanism

For example, when you set the picture size to [4:3 0.3M], the maximum [4:3 2.6M] area is cropped to the center [4:3 0.3M] area, allowing a picture with a higher zoom effect.

- If you take your finger off the zoom lever during zoom operation, the operation sound may be recorded. When returning the zoom lever to the original position, move it quietly.
- When the zoom magnification is at its maximum, the subjects are focused at about 1.6 m (5.3 feet) or more.
- When the zoom magnification is 1×, this unit can focus on a subject approx. 3 cm (1.2") away from the lens.



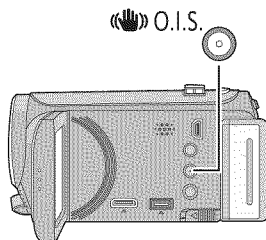
Image Stabilizer Function

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

This unit is equipped with Hybrid Optical Image Stabilizer.

Hybrid Optical Image Stabilizer is a hybrid of optical and electrical image stabilizer.

- Please refer to page 53 for details about the Optical Image Stabilizer Lock.



Optical image stabilizer button

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

(Motion Picture Recording Mode)

◀ [Hand Icon] ▶ / [Hand Icon] → [Hand Icon] (setting canceled)

- When [HYBRID O.I.S.] is [ON], ▶ [Hand Icon] is displayed.
- When [OFF], [Hand Icon] is displayed.
- When recording with a tripod in Motion Picture Recording Mode, we recommend that you set the image stabilizer off.

(Still Picture Recording Mode)

[Hand Icon]₁ / [Hand Icon]₂ → [Hand Icon] (setting canceled)

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


Recording with the Touch function

You can record using convenient functions just by the easy operation of touching the screen.

- 1 Touch ◀ (left side)/▶ (right side) of  on the Touch Menu to display Touch function icons. (→ 28)







- 2 (e.g. AF/AE tracking)
Touch the Touch function icon.

- To cancel, touch the Touch function icon again. (Optical Image Stabilizer Lock is canceled by releasing the finger touching .)



Touch function icons

	Touch Zoom
	AF/AE tracking
	Optical Image Stabilizer Lock*1
	Touch Shutter*2

*1 In Motion Picture Recording Mode only

*2 In Still Picture Recording Mode only.



- An icon is displayed in the **A** position when the Touch function icon is set.




Touch Zoom



Zoom operation can be performed by touching the touch zoom bar.

- Touch zoom function is useful for making fine adjustments to the zoom magnification.

- 1 Touch .
 - Touch zoom bar appears.
 - The touch zoom bar will disappear when no function is performed for a specific period of time. To display it again, touch the screen.
- 2 Touch and hold the touch zoom bar.
 - It will zoom to the position you are touching.
 - It will zoom in when T side is touched, and zoom out when W side is touched.
 - It is also possible to perform zoom operation by touching and sliding the touch zoom bar toward the T side or the W side.



- B** Touch zoom bar
- C** Zoom magnification position

- Screen display will disappear when no function is performed for a specific period of time. To display it again, touch the screen while the touch zoom bar is displayed.
- Please refer to page 49 for details about the zoom speed.






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)

1 Touch .

- When [FACE RECOG.] (→ 62) is [ON] and a registered face is detected, the target is automatically locked.

2 Touch the object and lock the target.


- 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.)



A Target frame

3 Start recording.

■ About target frame

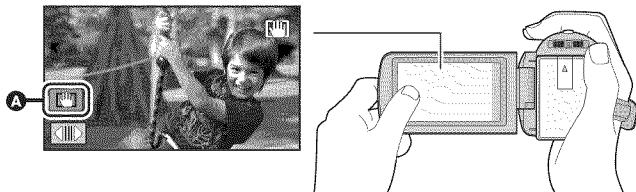
- When target lock fails, the target frame blinks in red and then disappears. Touch a characteristic part (color etc.) on the object to lock onto it again.
 - When the  button is pressed halfway in Still Picture Recording Mode, the focus is set to the object that is locked. The target frame turns green 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 AF assist lamp (→ 71) may be performed.
 - 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 recording of yourself.




Optical Image Stabilizer Lock




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



A Optical Image Stabilizer Lock icon

- 1 Press the Optical Image Stabilizer button to turn the image stabilizer on.
- 2 Touch and hold .

-  is displayed while you are touching the icon.
- Optical Image Stabilizer Lock is released when you remove your finger from the icon.

■ To set the display method of the Optical Image Stabilizer Lock icon

MENU : [RECORD SETUP] → [O.I.S. LOCK DISPLAY] → desired setting

- [OFF]:** If no operation is performed for approx. 5 seconds, the icon disappears.
- [ON]:** Always displayed.


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



Touch Shutter



It is possible to focus and record a still picture of a subject that is touched.

- 1 Touch .
- 2 Touch the subject.

- Focus area is displayed at the touched position, and a still picture is recorded.



- Depending on the recording conditions or recognition of the touched position, it may not be possible to record the intended picture.

Recording functions of operation icons

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

1 Touch ◀ (left side)/▶ (right side) of on the Touch Menu to display the operation icons. (→ 28)

- Touch ▲/▼ on Touch Menu to switch pages upward or downward.










2 (e.g. Backlight compensation)







Touch an operation icon.

- Select the operation icon again to cancel the function. Refer to the respective pages for canceling the following functions.
 - Smile shot (→ 56)
 - Video light (→ 57)
 - Photo light (→ 57)
 - Self-timer (→ 58)
 - Guideline (→ 59)



Operation icons


	Fade* ¹
	Intelligent contrast control* ^{1, 2}
	PRE-REC* ¹
	Smile shot* ¹
	Video light* ¹
	Photo light* ³
	Red-Eye Reduction* ^{2, 3}

	Self-timer* ³
	Intelligent exposure* ^{2, 3}
	Backlight compensation
	Soft skin mode* ²
	Tele macro
	Guideline
	Color Night Rec* ^{1, 2}

*¹ Not displayed in Still Picture Recording Mode.

*² Not displayed in the Intelligent Auto Mode.

*³ Not displayed in Motion Picture Recording Mode.

- If you turn off the unit or change the mode to , PRE-REC, Backlight compensation, Color night rec, Self-timer and Tele macro functions are canceled.
- If you turn off the unit, the Fade function is canceled.
- It is possible to set from the menu. (Except for the PRE-REC)


Fade

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

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

- The Fade setting is canceled when the recording stops.

■ To select the color for Fade in/out

 : [RECORD SETUP] → [FADE COLOR] → [WHITE] or [BLACK]

(Fade in)



(Fade out)



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

Intelligent contrast control

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





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



PRE-REC

This prevents you from missing a shot.

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

-  appears on the screen.
- Aim the unit at the subject beforehand.
- There is no beep sound.
- PRE-REC is canceled in the following cases.
 - If you change the mode
 -  If you remove the SD card
 -  /  If you remove the SD card while [MEDIA SELECT] is set to [VIDEO/SD CARD]
 - If you touch [MENU]
 - If you turn the unit off
 - If you start recording
 - After 3 hours have passed

- After setting PRE-REC, if recording starts in less than 3 seconds, or while the PRE-REC indication flashes within about 3 seconds after initiating the Quick start operation, motion pictures taken 3 seconds before pressing the recording start/stop button cannot be recorded.
- Images displayed on the thumbnail in Playback Mode will differ from the motion pictures displayed at the start of playback.



Smile shot



When a smiling face is detected during motion picture recording, the unit automatically records a still picture.

The icon changes each time it is touched.

([ON]) → ([FACE RECOG.]) → [OFF]

: The unit records a still picture on detecting a smiling face.

: Still pictures are only recorded when the face of a person registered using Face Recognition (→ 62) is detected.


[OFF]: Cancel the setting.




- During Smile Shot recording, the face detected as a smiling face is surrounded by a green frame and / are red.
- Smile Shot recording will not work in the following cases. (/ will flash)
 - **HDC-SD80**
When there is no SD card inserted
 - **HDC-TM80** / **HDC-HS80**
When it is set to [PICTURE/SD CARD] in [MEDIA SELECT], and there is no SD card inserted
 - When it is set to Manual Focus
 - When [FACE RECOG.] is set to [OFF], or no one is registered (In ([FACE RECOG.]) only)

-
- Depending on the recording conditions (type of smile, camera shake, etc.), the face of the subject may not be detected correctly.
 - The number of recording pixels are **3M** (2304×1296) or **2.1M** (1920×1080). (→ 69)
 - When still pictures that have been recorded using the Smile Shot are displayed as thumbnails, the appears.
 - When the AF/AE tracking function is target locking a face of the subject, still pictures are only recorded if a smiling face is detected on the locked subject. When the Smile Shot function is set to ([FACE RECOG.]), it will record only if the face of a subject registered with [FACE RECOG.] is locked as a target.


Video light

It is possible to record with illumination even in dark places with Motion Picture Recording Mode.

Each time the  icon is selected, the indication changes by one setting in the following order.

 ([ON]) →  ([AUTO]) →  ([OFF])

 : Always on.

 : Turns on/off automatically according to brightness of the surroundings.

 : Cancel the setting.








-
- When set to  ([AUTO]), the video light turns on in Low Light Mode in Intelligent Auto Mode.
 - When the video light is in use, the recordable time when using the battery is shortened.
 - The subject should be within 1.2 m (3.9 feet) of the unit.
 - Using the Color Night Rec Function at the same time will make conditions even brighter.


Photo light

The Photo light flashes and a still picture is recorded when the  button is pressed. Use this function to take a picture in dark places.



Each time the  icon is selected, the indication changes by one setting in the following order.

 ([ON]) →  ([AUTO]) →  ([OFF])

 : Always flashes.

 : Photo light will flash automatically by determining the ambient brightness.


 : Cancel the setting.

- The unit automatically determines if the Photo light is necessary even when it has been set to  by detecting the ambient brightness. (If it determines that the Photo light is necessary, the  indication lights up in red.)





■ To adjust the brightness of the Photo light

 : [PICTURE] → [PHOTO LIGHT LEVEL] → desired setting

 : Less bright

 : Normal

 : Much brighter

-
- If the [AF ASSIST LAMP] is set to [AUTO] (→ 71) and the Photo light is set to  ([AUTO]) or  ([OFF]), the Photo light will turn on when taking pictures at a dark place to make the focusing easier.
 - If the  indication etc. flashes when the  button is pressed halfway, the Photo light is not activated.
 - The subject should be within 1.2 m (3.9 feet) of the unit.
 - When the Photo light flashes, the shutter speed is adjusted automatically by determining the ambient brightness.
 - It may not flash when the LED light is very hot.


Red-Eye Reduction








Reduces the phenomena where human eyes become red from Photo light.

- The Photo light is activated 2 times.
- The red-eye phenomenon tends to appear in certain recording conditions and more with some people than with others.
- When faces are detected in the Intelligent Auto Mode, the Red-Eye Reduction is set to on.

Self-timer



This is for recording still pictures using the timer.

Each time the  icon is selected, the indication changes by one setting in the following order:

- 10 (Records after 10 seconds) → 2 (Records after 2 seconds) → setting canceled
- When you press the  button, 10 or 2 flashes for the set period before a still picture is recorded. After recording, the Self-timer is canceled.
 - In Auto Focus Mode, if the  button is pressed halfway and then fully, the lens focuses on the subject when the button is pressed halfway. If the  button is pressed fully all at once, the lens focuses on the subject just before recording.

To stop the timer midway through

Touch [CANCEL].

- Setting the Self-timer to 2 is a good way to prevent image shake when the  button is pressed while using a tripod etc.

Intelligent exposure

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

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

Backlight compensation

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

Soft skin mode

This makes skin colors appear softer for a more attractive appearance.

This is more effective if you record a person closely from the torso up.

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



Tele macro



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

- The unit can focus on the subject at a distance of approx. 70 cm (28").
- When the Tele macro is set with the zoom magnification less than 37× in Motion Picture Recording Mode, it will automatically be set to 37×.
- When the Tele Macro is set in the still picture recording mode with the picture size set to [16:9 3M]/[16:9 2.1M], zoom factor is set automatically to 37× if the zoom factor is less than 37×. It will be set automatically to 34× when the picture size is set to [4:3 2.6M]/[4:3 0.3M]/[3:2 2.8M].

- Tele Macro function is canceled when the zoom magnification becomes lower than 37× in Motion Picture Recording Mode.
- Tele Macro function is canceled automatically when the zoom magnification becomes lower than the below in Still Picture Recording Mode:
 - Lower than 37× (when picture size is [16:9 3M]/[16:9 2.1M])
 - Lower than 34× (when picture size is [4:3 2.6M]/[4:3 0.3M]/[3:2 2.8M])



Guideline



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

It will switch every time the icon is touched.

→ → → Setting canceled

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

■ Displaying Guidelines at playback

- Change the mode to and touch the play mode select icon. Then set [VIDEO/PICTURE] to [AVCHD] or [iFrame]. (→ 38)

: [VIDEO SETUP] → [GUIDE LINES] → desired setting

- To cancel the Guideline function during playback, set to [OFF].
- It cannot be set while in Still Picture Playback Mode.



Color Night Rec



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

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












Recording functions of menus


[SCENE MODE]



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

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

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

- **(Sports/Portrait/Spotlight/Snow/Beach/Sunset/Scenery)**
 - The shutter speed is 1/8 or more in Still Picture Recording Mode.
- **(Sunset/Low light)**
 - The shutter speed is 1/30 or more in Motion Picture Recording Mode.
- **(Sunset/Fireworks/Scenery/Night scenery)**
 - Image may get blurry when a close object is recorded.
- **(Sports)**
 - During normal playback, the image movement may not look smooth.
 - Color and screen brightness may change under indoor lighting.
 - If the brightness is insufficient, the Sports Mode does not function. The  display flashes.
- **(Portrait)**
 - Color and screen brightness may change under indoor lighting.
- **(Fireworks)**
 - The shutter speed is 1/30.
 - Image may get washed out when recorded in bright surroundings.

- **(Night scenery/Night portrait)**
 - The shutter speed is 1/2 or more in Still Picture Recording Mode.
 - Using a tripod is recommended.
- **(Night portrait)**
 - The Photo light is set to [ON].

[ZOOM MODE]



Set the maximum zoom ratio for the Motion Picture Recording Mode.

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

[i.Zoom OFF]:	Up to 37×
[i.Zoom 42×]:	This zoom function allows you to maintain high-definition picture quality. (Up to 42×)
[D.Zoom 90×]:	Digital zoom (Up to 90×)
[D.Zoom 2000×]:	Digital zoom (Up to 2000×)

- The larger the digital zoom magnification, the more the image quality is degraded.
- This function cannot be used in Still Picture Recording Mode.

[REC MODE]



Switch the quality and recording format of the motion picture to record.

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

[HA]/[HG]/[HX]/[HE]* ¹ :	Set the recording mode to AVCHD.
[iFrame]* ² :	Set the recording mode to iFrame.

*¹ Recording will have higher quality in the order of [HA], [HG], [HX], and [HE].

*² [iFrame] is a format suitable for Mac (iMovie'11). It is recommended for when using a Mac.

- **Recordable time using the battery (→ 22)**
- This function's default setting is [HG] mode.
- Please refer to page 141 about approximate recordable time.
- When the unit is moved a lot or moved quickly, or when a fast-moving subject is recorded (particularly when recording in [HE] mode), mosaic-type noise may appear at playback.

**[RELAY REC]**

It is possible to continuously record motion picture to an SD card when there is no space available in the built-in memory. (It allows you to record only to SD card from built-in memory.)

- Set [MEDIA SELECT] to [Built-inMemory].
- Set [REC MODE] to [HA], [HG], [HX] or [HE]. (→ 61)
- Insert an SD card.

MENU : [RECORD SETUP] → [RELAY REC] → [ON]

- ⇨ is displayed on the screen. ⇨ will disappear when space in the built-in memory is gone and the recording to the SD card starts.
 - Relay recording can only be performed once.
 - **Combine the scenes that were relay-recorded using the [RELAY SCENE COMBINE] into the SD card. (→ 90, 98)**
 - Once you have performed [RELAY SCENE COMBINE], you can use the Relay Recording function again. If the [RELAY REC] is set to [ON] without performing the [RELAY SCENE COMBINE], a message is displayed. You will be able to perform Relay Recording by touching [YES], but you will not be able to perform the [RELAY SCENE COMBINE] after that.
-
- Still pictures are recorded to the SD card after Relay recording.
 - is displayed on the thumbnail display during the playback of a scene that was relay-recorded on the built-in memory.

[FACE RECOG.]

Face Recognition is a function for finding faces that resemble faces which have already been registered and automatically prioritizing focus and exposure for those faces. This function makes it possible to keep the face of your loved ones in focus even when they are at the back or on the end of a line in a group picture.

MENU : [RECORD SETUP] → [FACE RECOG.] → desired setting

- [OFF]: Cancel the setting
- [ON]: The Face Recognition function is available
- [SET]: Face Recognition registration/editing/cancellation

■ Registering a face for face recognition

MENU : [RECORD SETUP] → [FACE RECOG.] → [SET] → [SET]

- Up to a maximum of 6 people can be registered.

1 Align the person's face with the guide.

- Take a picture of the person's face from the front, ensuring that their hair does not hide the outline of their face, their eyes or their eyebrows.

2 Touch [REC] or press the button fully.

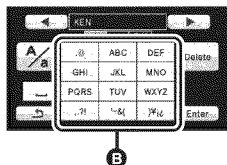
- Touch [ENTER].
- It may not be possible to register a face depending on the recording conditions. In this case, try recording the face again.

3 Entering the person's name.

- Touch the text entry icon in the center of the screen and enter the name.
- After entering the name, touch [Enter].






A Guide



B Text entry icon

Entering text

Icon	Description of operation
[A] etc.	Enters a character.
	Moves cursor left.
	Moves cursor right.
[A/a]	Switches between [A]/[a] (alphabet) and [&/1] (symbols/numbers).
	Enter a space.
[Delete]	Deletes a character. Deletes the previous character if the cursor is in an empty space.
[Enter]	Ends text entry.

- A maximum of 9 characters can be entered.

4 Touch [ENTER] to end registration.


- Touch [EXIT].

■ Changing the information of a registered person

1 Select the menu.

MENU : [RECORD SETUP] → [FACE RECOG.] → [SET] → [EDIT]

2 Touch the desired item to enter the setting.

- Up to 3 face shots can be registered. To additionally register or to change/delete the registered face shots, touch  or the face shot.
- If you register several face shots of the same person (up to 3 face shots can be registered), each with a different facial expression or different background, it is more likely that face recognition will be successful.



[SET NAME]:

Change the name.

[PRIORITY]:

Focus and exposure will be set in priority according to the registration order setting from the first person. Target will be locked according to the registration order setting from the first person when AF/AE tracking is active.

- To change the registration order, select the person you wish to change.

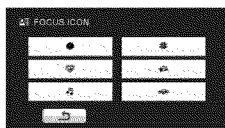


[FOCUS ICON]:

This changes the focus indication icon that appears during still picture recording. (Only displayed when Face Recognition is in use.)

- Touch the icon you wish to have displayed.


3 Touch [ENTER].



■ Canceling a registered person

1 Select the menu.

MENU : [RECORD SETUP] → [FACE RECOG.] → [SET] → [DELETE] or [DELETE ALL]

- Touching [DELETE ALL] cancels all the registered people.
- 2 (When [DELETE] is selected)
Touch the person to cancel.
 - When touched, the person is selected and  is displayed. To cancel the selected person, touch again.
 - Touch [ENTER].

- Since face recognition searches for faces that resemble the registered faces, there is no guarantee of positive recognition.
- It may not be possible to correctly recognize a person who has been registered due to differences in facial expression and environment.
- Perform the registration again if recognition becomes unstable in cases such as when facial features change with age.

[NAME DISPLAY]



When a registered person is detected by face recognition during recording, the name registered for that person is displayed.

MENU : [RECORD SETUP] → [NAME DISPLAY] → desired number

[OFF]/[1]/[2]/[3]

- Displayed name will disappear after a while.
- It is displayed according to the registration order setting from the first person.
- This function is not displayed during the recording of yourself or Playback Mode.

[FACE FRAMING]



Detected faces appear with frames.

MENU : [RECORD SETUP] → [FACE FRAMING] → desired setting

[OFF]:

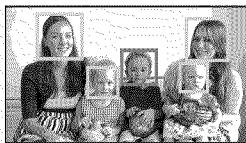
Cancel the setting.

[PRIMARY]:

Only the prioritized face framing is displayed.

[ALL]:


All face detection framings are displayed.



- Up to 15 frames are indicated. Larger faces and faces nearer to the center of the screen take preference over others. When [FACE RECOG.] is [ON] registered people are given priority.

■ Prioritized face framing

Prioritized face framing is displayed as orange frames. Focus and adjustment of brightness will be performed against the prioritized face framing.

- Prioritized face framing is only displayed with Portrait Mode in the Intelligent Auto Mode.
- The white frame is for face detection only.
- Focus will be set to prioritized face framing and the brightness adjusted when the unit is set to Portrait mode in Intelligent Auto Mode.
- Focus will be set to prioritized face framing when the  button is pressed halfway when recording still pictures. Prioritized face framing will turn to green when the focus is set.

[AGS]



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

MENU : [RECORD SETUP] → [AGS] → [ON]

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

[AUTO SLOW SHTR]



You can record bright pictures even in dark places by slowing the shutter speed.

- **Switch to Manual Mode. (→ 72)**

MENU : [RECORD SETUP] → [AUTO SLOW SHTR] → [ON]

- The shutter speed is set to 1/30 or more depending on the surrounding brightness.
- This function cannot be used in Still Picture Recording Mode.
- When the shutter speed becomes 1/30, the screen may be seen as if frames are missed and afterimages may appear.

[Digital Cinema Color]



Recording motion pictures with more vivid colors, using x.v.Color™ technology.

- **Switch to Manual Mode. (→ 72)**
- **Set [REC MODE] to [HA], [HG], [HX] or [HE]. (→ 61)**

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

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

[SHOOTING GUIDE]



Message is displayed when this unit is moved rapidly.

MENU : [RECORD SETUP] → [SHOOTING GUIDE] → [ON]

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

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

[WIND NOISE CANCELER]



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

- Switch to Manual Mode. (→ 72)

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

- This function's default setting is [ON].
- When switching to Intelligent Auto Mode, [WIND NOISE CANCELER] is set to [ON], and the setting cannot be changed.
- You may not see the full effect depending on the recording conditions.

[ZOOM MIC]



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

- Switch to Manual Mode. (→ 72)

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

[MIC LEVEL]



When recording, the input level from the built-in microphones can be adjusted.

- Switch to Manual Mode. (→ 72)

1 Select the menu.

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

[AUTO]: AGC is activated, and the recording level is adjusted automatically.

[SET+AGC]/[SET]: The desired recording level can be set.

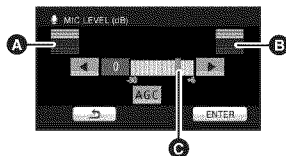
2 (When [SET+AGC]/[SET] is selected)

Touch / to adjust.

- Touch **AGC** to activate/disactivate AGC. When AGC is activated, the icon is surrounded by yellow and the amount of sound distortion can be reduced. When AGC is deactivated, natural recording can be performed.
- Adjust the microphone input level so that the last 2 bars of the gain value are not red. (Otherwise, the sound is distorted.) Select a lower setting for microphone input level.

3 Touch **[ENTER]** to set the microphone input level and then touch **[EXIT]**.

- (Microphone input level meter) appears on the screen.



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

- When switching to Intelligent Auto Mode, the setting is fixed to [AUTO] and cannot be changed.
- When [ZOOM MIC] is [ON], the volume will be different depending on the zoom rate.
- The microphone input level meter shows the larger of the inputs from the 2 built-in microphones.
- You cannot record with the audio completely muted.

[PICTURE ADJUST]



Adjust the quality of the image while recording.

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

- This setting is retained when you change between Motion Picture Recording Mode and Still Picture Recording Mode.
- Switch to Manual Mode. (→ 72)

1 Select the menu.

: [RECORD SETUP] → [PICTURE ADJUST]

2 Touch the desired setting items.

[SHARPNESS]: Sharpness of the edge

[COLOR]: Depth of the color of the image

[EXPOSURE]: Brightness of the image

[WB ADJUST]: Picture color balance

3 Touch / to adjust settings.

4 Touch [ENTER].

- Touch [EXIT] to complete the settings.
- appears on the screen.



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

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

Picture size and Maximum zoom ratio

Aspect ratio will change depending on the picture size.

- 4:3**: Aspect ratio of 4:3 television
- 3:2**: Aspect ratio of conventional film camera or prints (such as L-size print)
- 16:9**: Aspect ratio of high-definition television, etc.

Picture size		Aspect ratio	Extra optical zoom (→ 49)
[4:3] 2.6M]	1856×1392	4:3	—*
[4:3] 0.3M]	640×480		60×
[3:2] 2.8M]	2064×1376	3:2	—*
[16:9] 3M]	2304×1296	16:9	37×
[16:9] 2.1M]	1920×1080		37×

* Extra optical zoom cannot be used. The maximum zoom magnification is 34×

Picture size in Motion Picture Recording Mode

- Change the mode to

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

Picture size		Aspect ratio
[3M]	2304×1296	16:9
[2.1M]	1920×1080	

- This function's default settings are [16:9] 3M] in Still Picture Recording Mode and [3M] in Motion Picture Recording Mode.
- When you record still picture with [REC MODE] set to [iFrame], the picture size will be set to [2.1M].
- The recording will become longer depending on the picture size.
- Please refer to page 142 for details about the number of recordable pictures.
- When the picture size is [4:3] 2.6M], [3:2] 2.8M] or [4:3] 0.3M] black bands may appear on the left and right of the screen.
- The edges of still pictures recorded on this unit with a 16:9 aspect ratio may be cut at printing. Check the printer or photo studio before printing.

[QUALITY]



Selecting the picture quality.

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

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

[HI-SPEED BURST]



Recording is done continuously at the rate of 30 or 60 still pictures per second. Use this function to record an object with fast movement.

1 Select the menu.

MENU : [PICTURE] → [HI-SPEED BURST] → desired setting

- [OFF]:** Cancel the setting.
- [30 frames/sec]:** 90 still pictures are recorded continuously at the rate of 30 per second.
The picture size is **2.1M** (1920×1080).
- [60 frames/sec]:** 180 still pictures are recorded continuously at the rate of 60 per second.
The picture size is **0.9M** (1280×720).

2 Press the button.

- flashes in red during recording.
- First press the button halfway, then press it fully to set the focus and record. It will automatically focus if you press fully once, so it is convenient when recording objects moving back and forth.

3 Touch [Record] or [Delete].

[Record]: Pictures are stored.

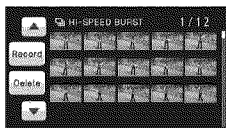
[Delete]: All pictures are deleted.

4 (When [Record] is selected in step 3)

Touch **[REC ALL]** or **[SELECT]**.



[REC ALL]: All pictures are stored.

[SELECT]: Pictures are stored by specifying range.



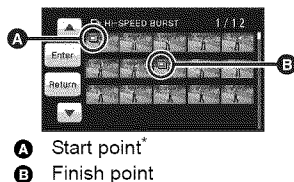
5 (When [SELECT] is selected in step 4)

Touch the range of pictures that will be stored.

- Previous (Next) page is displayed by touching  / .

* Only select the picture for start point if only 1 picture is to be stored.

- A confirmation message is displayed when [Enter] is touched after selecting the start point and finish point. Touch [YES] to store the pictures.



- If you turn off the unit or change the mode, this function is canceled.
- The maximum number of times you can record on a media is 15.
(In the case of SD cards it is the maximum number of recordable scenes per card.)
- Color balance and brightness on the screen may change with some light sources such as fluorescent lamps.
- Image quality is different from ordinary still picture recording.



[AF ASSIST LAMP]



The Photo light is turned on to make it easier to focus when you are recording in dark places where it is hard to focus.

- **Switch to Manual Mode. (→ 72)**

 : [PICTURE] → [AF ASSIST LAMP] → [AUTO]

- Set the Photo light to  ([AUTO]) or  ([OFF]). (→ 57)

- When switching to Intelligent Auto Mode, the setting is fixed to [AUTO] and cannot be changed.
- It may not turn on when the LED light is very hot.

[SHTR SOUND]



You can add a shutter sound when recording still pictures.

 : [PICTURE] → [SHTR SOUND] → desired setting

[OFF]: Cancel the setting.

 : Volume low

 : Volume high

- No shutter sound is emitted in Motion Picture Recording Mode.

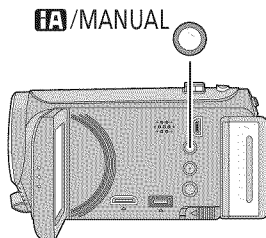


Manual recording

- The manual focus, white balance, shutter speed, brightness (Iris and Gain) settings are retained when you change between Motion Picture Recording Mode and Still Picture Recording Mode.

Press the **iA/MANUAL** button to switch to Manual Mode.

- **MNL** appears on the screen.



A Manual icons

- FOCUS** Focus (→ 75)
- WB** White balance (→ 73)
- SHTR** Manual shutter speed (→ 74)
- IRIS** Iris adjustment (→ 74)

White balance



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

- Press the **iA/MANUAL** button to switch to **Manual Mode**. (→ 72)

1 Touch **[WB]**.

2 Touch / to select **White balance mode**.

- Select the optimal mode by confirming the color on the screen.
- Touch **[WB]** to select the mode.



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

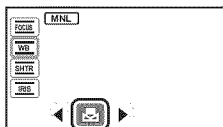
- To return to auto setting, set to **AWB** or press the **iA/MANUAL** button again.

■ To set the white balance manually

1 Select , fill the screen with a white subject.

2 Touch and set the blinking .

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



- When the display flashes, the manual white balance previously adjusted is stored. Whenever recording conditions change, re-set the white balance.
- When setting both the white balance and the iris/gain, set the white balance first.
- **AWB** is not displayed on the screen when **AWB** is being set.

Manual shutter speed/iris adjustment



Shutter Speed:

Adjust it when recording fast-moving subjects.

Iris:

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

- Press the **iA/MANUAL** button to switch to **Manual Mode**. (→ 72)

1 Touch **[SHTR]** or **[IRIS]**.

2 Touch **◀/▶** to adjust settings.

- Touch **[SHTR]/[IRIS]** to end the adjustment.

SHTR Shutter speed:

1/60 to 1/8000

- If **[AUTO SLOW SHTR]** is set to **[ON]**, the shutter speed will be set between 1/30 and 1/8000.
- The shutter speed closer to 1/8000 is faster.
- The shutter speed will be set between 1/2 and 1/2000 in Still Picture Recording Mode.

IRIS Iris/Gain value:

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

- Value closer to **CLOSE** darkens the image.
- Value closer to **18dB** brightens the image.
- When the iris value is adjusted to brighter than **OPEN**, it changes to the gain value.
- To return to auto setting, press the **iA/MANUAL** button again.

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

Manual shutter speed adjustment

- When the shutter speed is set lower than 1/15 in the Still Picture Recording Mode, using a tripod is recommended. Also, white balance cannot be set. The shutter speed will be set to 1/30 when the unit is turned on again or when the Quick start is performed.
- You may see a band of light around an object that is shining very bright, or highly reflective.
- During normal playback, image movement may not look smooth.
- If you record an extremely bright object or record under indoor lighting, color and screen brightness may change or a horizontal line may appear on the screen. In this case, record in the Intelligent Auto Mode or set the shutter speed to 1/60 in areas where the power supply frequency is 60 Hz, or 1/100 in areas of 50 Hz.

Manual iris/gain adjustment

- If the gain value is increased, the noise on the screen increases.
- Depending on the zoom magnification, there are iris values that are not displayed.

Manual focus adjustment



If auto focusing is difficult due to the conditions, then use Manual Focus.

- Press the iA/MANUAL button to switch to Manual Mode. (→ 72)

1 (When MF assist function is used)

Select the menu.

MENU : [RECORD SETUP] → [MF ASSIST] → [ON]

- Touch  to display the Manual icon.

2 Touch [FOCUS].

3 Touch [MF] to change to Manual Focus.

- MF appears on the screen.

4 Adjust the focus by touching $\overset{+}{MF}$ / $\overset{-}{MF}$.

$\overset{+}{MF}$: To focus on a close subject

$\overset{-}{MF}$: To focus on a faraway subject



A Part displayed in blue

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

- Touch [FOCUS] to end the adjustment.
- When [MF ASSIST] is [OFF], the blue area is not displayed.
- To restore Auto Focus, touch [AF] in step 3 or press the iA/MANUAL button again.



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


Playback Operations

Motion picture playback using operation icon

VIDEO

For details on the basic playback operations, refer to page 38.

Playback operation	Playback display	Operating steps
Fast forward/ rewind playback	During Playback 	Touch ▶▶ during playback to fast forward. (Touch ◀◀ to rewind.) <ul style="list-style-type: none"> The fast forward/rewind speed increases if you touch ▶▶/◀◀ again. (The display on the screen changes from ▶▶ to ▶▶▶.) Normal playback is restored when you touch ▶/ .
Skip playback (to the start of a scene)		During playback, touch the LCD monitor and slide quickly from right to left (from left to right) before releasing your finger.
Slow-motion playback	During Pause 	With the playback paused, continue touching ▶▶ . (◀◀ is for slow rewind playback) Playback is slow while touching. <ul style="list-style-type: none"> Normal playback is restored when you touch ▶/ . When slow-motion pictures are played back in reverse, they will be shown continuously at approximately 2/3rd the speed of normal playback (intervals of 0.5 seconds). Slow-motion playback for iFrame scenes will be in 1 second intervals.
Frame-by-frame playback The motion picture is advanced one frame at a time.		With the playback paused, touch ▶▶ . (Touch ◀◀ to advance the frames one at a time in the reverse direction.) <ul style="list-style-type: none"> Normal playback is restored when you touch ▶/ . When the frames are advanced one at a time in the reverse direction, they will be shown in intervals of 0.5 seconds. Frame-by-frame playback for iFrame scenes will be in 1 second intervals.

Playback operation	Playback display	Operating steps
Direct playback	<p>During Playback</p> 	<p>Touch the Direct playback bar or slide it while touching.</p> <ul style="list-style-type: none"> • The playback pauses temporarily and skips to the position touched or slid to while touching. • Playback will start by releasing your touching or sliding finger.

Creating still picture from motion picture

VIDEO

A single frame from the recorded motion picture can be saved as a still picture.
 Picture size of the still picture to be recorded is **2.1M** (1920×1080).

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

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


2 Press the button fully.

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



Highlight & Time frame index

VIDEO

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

- Operate the zoom lever to  side and change over the thumbnail display to Highlight & Time frame index. (→ 39)

1 Touch .

- To display the next (previous) page:
 - Slide the thumbnail display upward (downward) while touching it.
 - Switch the Touch Menu, and then touch  (up) /  (down) on the thumbnail scroll lever.



2 Touch the desired search condition.

[3 SECONDS]/[6 SECONDS]/[12 SECONDS]/[MINUTES]/[FACE]*/[HIGHLIGHT]*

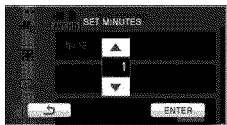
* It is not displayed on iFrame scenes.

- When select [FACE], it will select the portion for which face recognition was performed from the scenes judged to be clearly recorded. This will then be displayed as a thumbnail.
- A portion judged to be clearly recorded will be detected and displayed in thumbnail if you select [HIGHLIGHT].



3 (When [MINUTES] is selected)

Touch  /  to set the time.

- It can be set up to a maximum of 60 minutes.
- Touch [ENTER].



4 Touch the thumbnail to be played back.

- Next (previous) thumbnail can be displayed by touching  / .

Repeat playback

VIDEO

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

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

The  indication appears on the full screen views.

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

Resuming the previous playback

VIDEO

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

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

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

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

Zooming in on a still picture during playback (Playback zoom)

PHOTO

You can zoom in by touching a still picture during playback.

1 Touch and hold the part you wish to zoom in on during still picture playback.

- It will display enlarged in order of normal display ($\times 1$) → $\times 2$ → $\times 4$. Keep on touching the screen to enlarge $\times 1$ → $\times 2$. Touch the screen to enlarge $\times 2$ → $\times 4$.
- The still picture is zoomed in on, centering on the part you touched.

2 Move to the zoomed in position by touching **▲/▼/◀/▶** or slide while touching the screen.

- The location of the zoom displays for about 1 second when zooming in (zooming out) or moving the displayed location.
- The more picture is enlarged, the more its quality deteriorates.



- A** Displayed location of the zoom

Zooming out from the zoomed still picture

Touch **⊞** to zoom out. ($\times 4$ → $\times 2$ → $\times 1$)

- Touch **1x** to return to normal playback ($\times 1$).

- You can also perform zoom operations using the zoom lever.

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