

Operating Instructions DVD Video Camera

Model No. **VDR-D105**

Before using

Setup

Recording

Playback

Editing

Disc management

With other products

Others

Before connecting, operating or adjusting this product, please read the instructions completely. Spanish Quick Use Guide is included. Guía para rápida consulta en español está incluida.



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

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. VDR-D105

Serial No.

Safety Precautions


WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

CAUTION: TO PREVENT FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.


CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE.

CAUTION: USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.


- Since this product gets hot during use, operate it in a well ventilated place; do not install this equipment in a confined space such as a bookcase or similar unit.




CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL



This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.



This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

AC Adaptor

- The rating plate is on the underside of the AC Adaptor.

**CLASS 1
LASER PRODUCT**

IEC 60825-1:2001

CAUTION

This product contains a laser diode of higher class than 1. To ensure continued safety, do not remove any covers or attempt to gain access to the inside of the product. Refer all servicing to qualified personnel.

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.: VDR-D105
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.

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.

Panasonic VDR-D105



Tested To Comply
With FCC Standards

FOR HOME OR OFFICE USE

IMPORTANT SAFETY INSTRUCTIONS

- 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 the 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 it will be left 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 when the 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.



S3125A

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.

CAUTION

- **DO NOT AIM YOUR CAMERA AT THE SUN OR OTHER BRIGHT OBJECTS**
- **DO NOT LEAVE THE CAMERA WITH THE EVF AIMED DIRECTLY AT THE SUN AS THIS MAY CAUSE DAMAGE TO THE INTERNAL PARTS OF THE EVF**
- **DO NOT EXPOSE YOUR CAMERA TO EXTENDED HIGH TEMPERATURE** ... Such as, in direct sunlight, inside a closed car, next to a heater, etc... This action could permanently damage the internal parts of your camera.

- **AVOID SUDDEN CHANGES IN TEMPERATURE** ... If the unit is suddenly moved from a cold place to a warm place, moisture may form on the disc 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.

■ Indemnity concerning recording content

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

IMPORTANT

■ Carefully observe copyright laws

Whatever you have recorded and created can be used for your personal entertainment only. Under copyright laws, other materials cannot be used without obtaining permission from the holders of the copyrights.

-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.



- Apparatus Claims of U.S. Patent Nos. 4,631,603, 4,577,216, and 4,819,098, licensed for limited viewing.

This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

- Manufactured under license from Dolby Laboratories.
“Dolby” and the double-D symbol are trademarks of Dolby Laboratories.
- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

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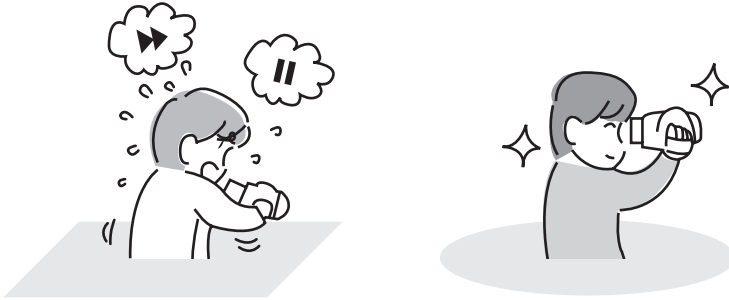
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Features

■ Easy recording! (→ 36)

No need to search for the recording start position.

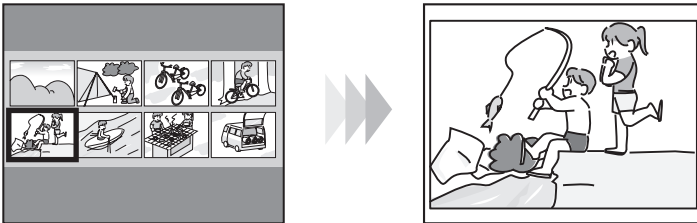
The new recording will not overwrite any previously recorded scene.



■ Easy playback! (→ 53)

Recorded scenes are displayed as thumbnails.

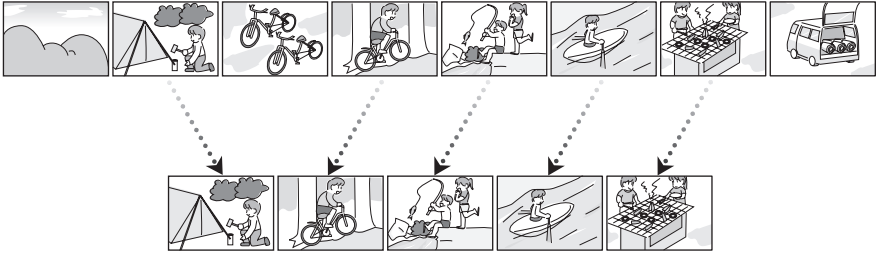
You can easily search for the scenes you want to watch.



Features

■ Editing scenes! (→ 56, 60)

You can create an original video (playlist) by collecting your favorite scenes together and then easily record (dub) this video to a VCR or a DVD recorder hard disk.

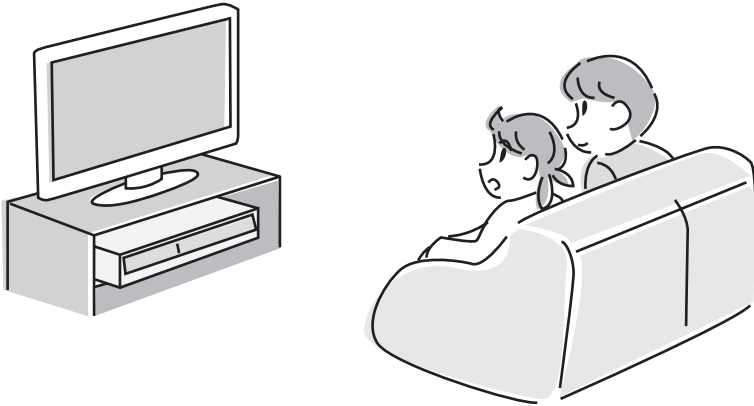


■ Using with DVD player/recorder! (→ 75)

Just insert the disc into a DVD player/recorder compatible with 8 cm (3") discs to play back the scenes recorded with this unit on it.

If you have a DVD recorder with hard disk, you can copy (dub) scenes recorded on a disc with this unit to the hard disk.

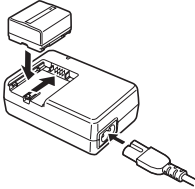
Before using



Quick Guide

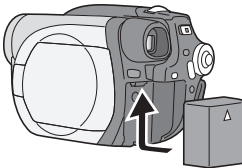
■ Charging the battery

- 1 Connect the AC cable to the AC adaptor and the AC outlet.
- 2 Put the battery on the battery mount by aligning the mark, and then securely plug it in.



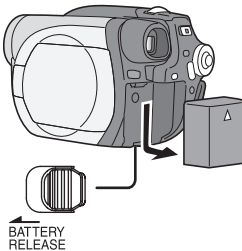
■ Fitting the battery

Push the battery against the battery holder and slide it until it clicks.



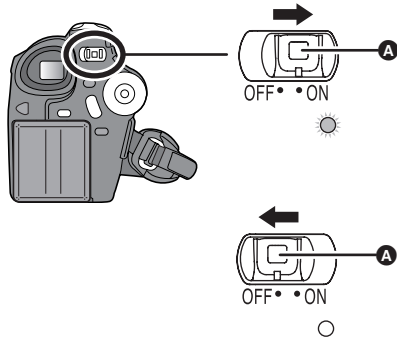
■ Removing the battery

While sliding the BATTERY RELEASE lever, slide the battery to remove it.



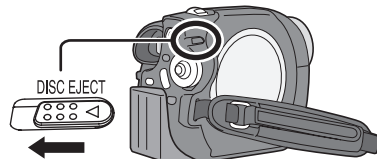
■ How to turn on/off the power

While pressing the button **A**, set the OFF/ON switch to ON/OFF.

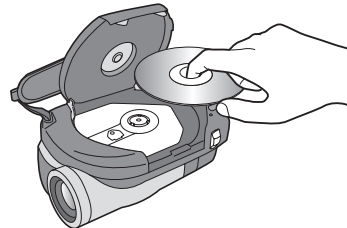


■ Inserting/removing a disc

- 1 Slide the DISC EJECT lever once and release it.




- 2 Open the cover of the disc compartment by hand and insert/remove the disc.

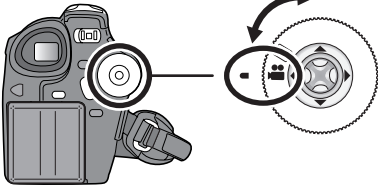


- 3 Push the section marked "PUSH CLOSE" on the cover of the disc compartment to close the cover.

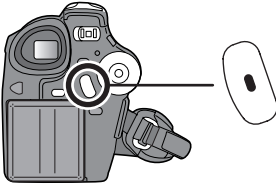
Quick Guide

■ Recording motion pictures

- Rotate the mode dial to select .




- 1 Press the recording start/stop button to start recording.

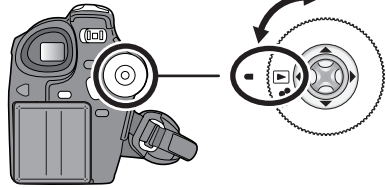


- 2 Press the recording start/stop button again to pause recording.

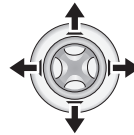


■ Motion picture playback

- Rotate the mode dial to select .



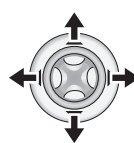
- 1 Select the scene to be played back.



- 2 Press the joystick.



- 3 Move the joystick to operate.



▶/||: Playback/Pause

◀◀ (Move): Skip playback (backward)

◀◀ (Move and hold): Review playback

▶▶ (Move): Skip playback (forward)

▶▶ (Move and hold): Cue playback

■: Stops the playback and shows the thumbnails.

Accessories

Check the accessories before using this unit.

Battery pack

CGA-DU12



AV/S cable

K2KZ9CB00001



AC adaptor

PV-DAC14D



USB cable

K1HA05CD0014



DC cable

K2GJ2DC00011

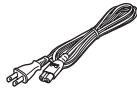


8 cm (3") DVD-RAM disc (Single sided)



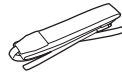
AC cable

K2CA2CA00029 or
K2CA2CA00025



Shoulder strap

VFC3506-1A



Before using

CAUTION:

This unit will operate on 110/120/220/240 V AC. An AC plug adaptor may be required for voltages other than 120 V AC. Please contact either a local or foreign electrical parts distributor for assistance in selecting an alternate AC plug. We recommend using the accessory power plug adaptor (VJSS0070) in an area which has special AC outlets.

■ To download the DVD-RAM Driver from the website

If your computer is able to connect to the Internet, you can download the DVD-RAM Driver from the website below.

<http://www.panasonic.com/consumerdownloads>

1) Download the DVD-RAM Driver software and execute it.

2) Follow the on-screen instructions for installation and reboot the computer after installation is complete.

- Use the supplied USB cable when connecting to the computer. (Operation is not guaranteed with any other USB cables.)

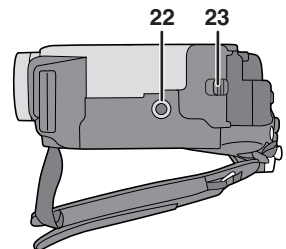
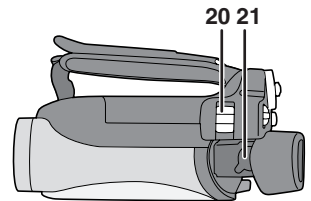
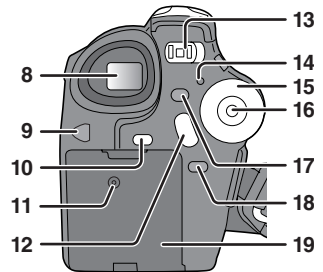
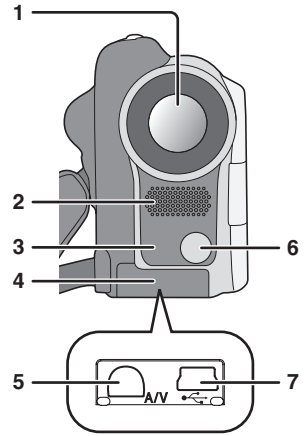
Parts identification and handling

Before using

- 1 Lens
- 2 Microphone (built-in, stereo)
- 3 White balance sensor (→ 51)
- 4 Terminal cover
- 5 Audio-video output terminal [A/V] (→ 74, 77)
- 6 Video light (→ 46)
- 7 USB terminal [↔]
- 8 Viewfinder (→ 17, 34)

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

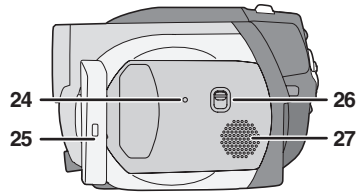
- 9 LCD monitor open button [PUSH OPEN] (→ 17)
- 10 Video light button [LIGHT] (→ 46)
- 11 DC input terminal [DC/C.C. IN] (→ 24)
- 12 Recording start/stop button (→ 36)
- 13 Power switch [OFF/ON] (→ 24)
- 14 Status indicator (→ 24)
- 15 Mode dial (→ 27)
- 16 Joystick (→ 28)
 - Move up, down, left or right to select items.
 - Press the center to enter the selection.
- 17 Delete button [⏮] (→ 56, 67)
- 18 Menu button [MENU] (→ 31)
- 19 Battery holder (→ 22)
- 20 Zoom lever [W/T] (→ 38)
- Volume lever [-VOLUME+] (→ 54)
- 21 Eyepiece corrector knob (→ 34)
- 22 Tripod receptacle (→ 16)
- 23 Battery release lever [BATTERY RELEASE] (→ 22)



24 Reset button [RESET] (→ 88)

25 LCD monitor (→ 17)

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



26 Mode select switch [AUTO/MANUAL/FOCUS] (→ 47)

27 Speaker

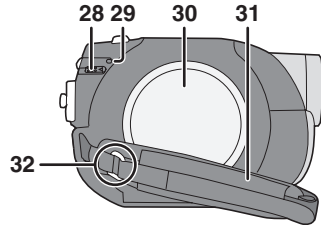
28 Disc eject lever [DISC EJECT] (→ 25)

29 Disc access lamp [ACCESS/PC] (→ 25)

30 Disc compartment (→ 25)

31 Grip belt (→ below)

32 Shoulder strap fixture (→ below)

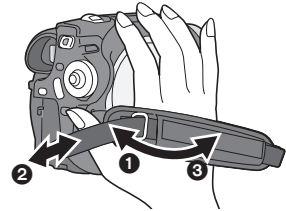


Using grip belt

Adjust the belt length so it fits your hand.

Adjust the belt length and the pad position.

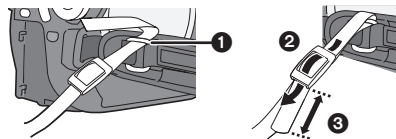
- 1 Flip the belt.
- 2 Adjust the length.
- 3 Fix the belt.



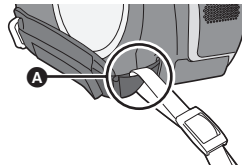
Before using

Shoulder strap fixture

Put the strap through the fixture 1 and through the stopper 2 so it will not come off. Extend part 3 by at least 2 cm (1").



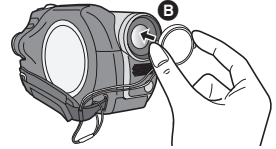
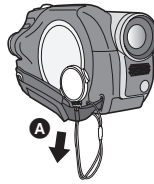
- Put the opposite end of the strap through A and attach it in the same way.



Fitting the lens cap

Fit the lens cap to protect the surface of the lens.
The lens cap and lens cap cord comes preattached to the grip belt.

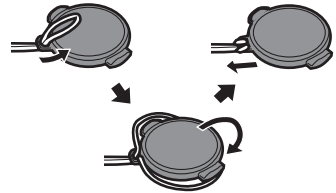
- When not using the lens cap, pull the lens cap cord in the direction of the arrow. **A**
- When you are not recording, be sure to cover the lens with the lens cap for protection. **B**



- When you remove the lens cap, press the knobs firmly.

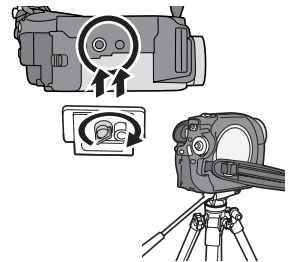


- If the lens cap cord has come off
Pass the end of the lens cap cord through the attached eye on the lens cap. Then pass the lens cap through the loop made by itself and pull tight.



Tripod receptacle

This is a hole for attaching the unit to the optional tripod. (Please carefully read the operating instructions for how to attach the tripod to the unit.)



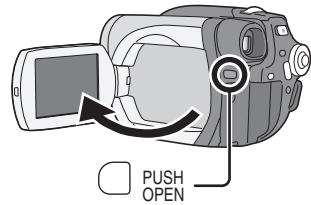
Using the LCD monitor

You can record the image while viewing it on the LCD monitor.

1 Press the PUSH OPEN button. The LCD monitor opens slightly.

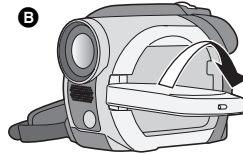
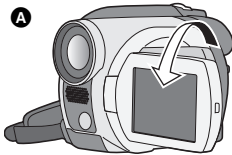
Pull the LCD monitor out in the direction of the arrow.

- The viewfinder is now deactivated.
- It can open up to 90°.



2 Adjust the angle of the LCD monitor according to your preference.

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



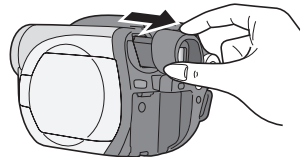
- The brightness and color level of the LCD monitor can be adjusted from the menu. (→ 34)
- If it is forcibly opened or rotated, the unit may be damaged or fail.
- When the LCD monitor is rotated by 180° towards the lens (when recording yourself), the LCD monitor and the viewfinder will be simultaneously activated.

Before using

Using the viewfinder








Pull out the viewfinder.

(→ 34, Adjusting viewfinder)



Discs

Discs that can be used on this unit

Disc type	DVD-RAM 8 cm (3") Single sided/ double sided	DVD-RW 8 cm (3") Single sided/double sided		DVD-R 8 cm (3") Single sided/ double sided
	 (DVD-RAM Ver. 2.1)	 [DVD-RW Ver. 1.1/ 2X-SPEED (2X/1X)]		 (DVD-R for General Ver. 2.0)
Recording format	DVD Video Recording format (VR format)	DVD Video Recording format (VR format)	DVD-Video format (Video format)	DVD-Video format (Video format)
Characteristic	Rewritable disc	Rewritable disc	One time recording disc*1	One time recording disc
Display on the screen				
Indication in these instructions	RAM	-RW(VR)	-RW(V)	-R
Functions				
• Editing on this unit	●	●	—	—
• Playback on other products*2	●*3	●*4	●*5	●*5
• Recording after finalizing	—	●	●*6	—

●: available —: not available

*1 By formatting the disc, it can be used repeatedly. (→ 69)

*2 DVD players and DVD recorders that support 8 cm (3") discs.

*3 Playback is possible on compatible products.

*4 Playback is possible on compatible products. (May have to be finalized on this unit.)

*5 Must be finalized on this unit. (→ 70)

*6 Un-finalize the disc. (→ 71)

- **Still pictures cannot be recorded on a disc with this unit.**
- When using double sided disc, you cannot record or play continuously from one side of the disc to the other. You will need to eject the disc and turn it over.
- Discs inserted in a holder, cartridge, or caddy case cannot be used. Always remove bare discs from these containers prior to use.
- It is recommended that you use Panasonic discs. Usually discs compatible with the DVD standard can be used for recording and playback with no problems. However, some commercially available discs do not meet the DVD standard for quality and performance. If you use one of these discs, you may not be able to record or playback normally. (The message "RECOMMENDED TO USE PANASONIC DISC" appears.) Refer to the following support site for information about discs that have been confirmed as compatible by Panasonic.
http://panasonic.co.jp/pavc/global/cs/e_cam (This website is in English only.)
- Discs recorded on this unit may not be playable on other products.
- Recording on DVD-R in DVD Video Recording format is not supported.
- When using DVD-RW or DVD-R, do not perform the following, as doing so may make the disc unusable.
 - Record on a disc with other products after recording on it with this unit.
 - Record on a disc with this unit after recording on it with other products.
 - Insert an un-finalized disc in any other products.

■ About format types

What is the DVD Video Recording format (VR format)?

This is a format for recording on DVD discs which allows you to record and erase repeatedly and create playlists. You can record on DVD-RAM and DVD-RW in DVD Video Recording format with this unit.

What is the DVD-Video format (Video format)?

By finalizing the disc, it can be played back on most DVD players.

You can record on DVD-RW and DVD-R in DVD-Video format with this unit.

■ Examples of discs that cannot be used on this unit

- DVD-RAM (2.6 GB) Ver. 1.0
- DVD-R (3.9 GB) Ver. 1.0
- DVD-R (4.7 GB) for Authoring Ver. 2.0
- +RW
- +R
- DVD-R DL
- Discs other than those with diameter of 8 cm (3")
- Dual/double layer discs
- DVD-ROM
- DVD-Video
- CD-R
- CD-RW
- CD
- LD
- MO
- MD
- iD
- Floppy disk
- CD-ROM

When using brand-new DVD-RW

When using DVD-RW, select whether to record in DVD Video Recording format (VR format) or DVD-Video format (Video format) and then format the disc. (→ 19, About format types)

- 1 **When a brand-new DVD-RW is inserted in this unit, the screen on the right appears. Select [YES], then press the joystick.**



- 2 **Select format type, then press the joystick.**

VIDEO: DVD-Video format

VR: DVD Video Recording format



- 3 **When the confirm screen appears, select [YES], then press the joystick.**

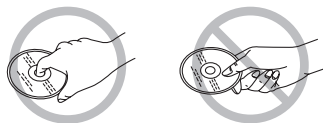
- To change the format type, format the disc again. (→ 69)

If the disc is formatted, then all the data recorded on the disc will be erased.

Disc handling

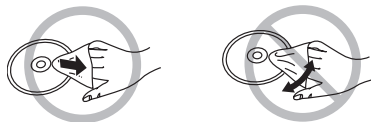
■ How to hold a disc

Do not touch the recorded surface.



■ If there is dirt or condensation on the disc

Wipe with a damp cloth and then wipe dry.



■ Handling precautions

- Be careful about scratches and dirt.
- Do not attach labels or stickers to discs. (This may cause disc warping and un-balanced rotation, rendering it unusable.)
- Write on the label side of the disc only with a soft, oil-based felt pen. Do not use ballpoint pens or other hard writing implements.
- Do not use record cleaning sprays, benzene, thinner, static electricity prevention liquids or any other solvent.
- Do not use scratch-proof protectors or covers.
- Do not drop, stack, or impact discs. Do not place objects on them.
- Do not use the following discs:
 - Discs with exposed adhesive from removed stickers or labels.
 - Discs that are badly warped or cracked.
 - Irregularly shaped discs, such as heart shapes.



- Do not place 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 discs, return them to their cases when you are not using them.

Power supply

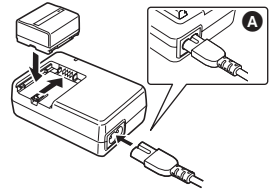
Charging the battery

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

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

- 1 Connect the AC cable to the AC adaptor and the AC outlet.
- 2 Put the battery on the battery mount by aligning the mark, and then securely plug it in.

- The output plug of the AC cable is not completely connected to the AC adaptor jack. As shown in **A**, there is a gap.



■ Charging lamp

Lights up: Charging

Goes off: Charging completed

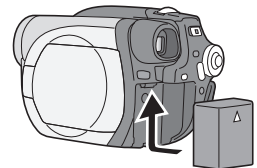
Flashing: The battery is over discharged (discharged excessively). In a while, the lamp will light up and normal charging will start.

When the battery temperature is excessively high or low, the CHARGE lamp flashes and the charging time will be longer than normal.

- Battery charging time (→ 23)
- We recommend using Panasonic batteries.
- If you use other batteries, we cannot guarantee the quality of this product.

Fitting the battery

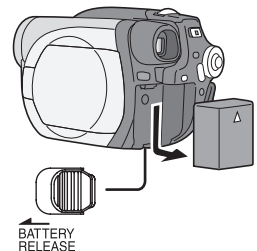
Push the battery against the battery holder and slide it until it clicks.



Removing the battery

While sliding the BATTERY RELEASE lever, slide the battery to remove it.

- Hold the battery with your hand so it does not fall.



- Be sure to turn off the power on this unit and check that the status indicator and the access lamp are both off before removing the battery.

Charging time and recordable time

The times shown in the tables below are for when the temperature is 25 °C (77 °F) and the humidity is 60%. If the temperature is higher or lower than 25 °C (77 °F), the charging time will become longer.

■ Charging time

Battery model number	Voltage/capacity	Charging time
Supplied battery/ CGA-DU12 (optional)	7.2 V/1150 mAh	2 h 25 min
CGA-DU21 (optional)	7.2 V/2040 mAh	3 h 55 min

- “2 h 25 min” indicates 2 hours 25 minutes.
- The charging time shown in the table are approximations.

■ Recordable time

- The times indicate the recordable time when the viewfinder is used. The times in parentheses indicate the recordable time when the LCD monitor is used.



(When using a DVD-RAM disc)

Battery model number	Voltage/capacity	Recording mode	Maximum continuously recordable time
Supplied battery/ CGA-DU12 (optional)	7.2 V/1150 mAh	XP	1 h 50 min (1 h 40 min)
		SP	2 h 5 min (1 h 50 min)
		LP	2 h 15 min (2 h)
CGA-DU21 (optional)	7.2 V/2040 mAh	XP	3 h 30 min (3 h 10 min)
		SP	3 h 55 min (3 h 30 min)
		LP	4 h 20 min (3 h 50 min)

- “1 h 50 min” indicates 1 hour 50 minutes.
- The maximum continuously recordable time shown in the table are approximations.

- Along with the reduction of the battery capacity, the display will change:

 →  →  →  → .

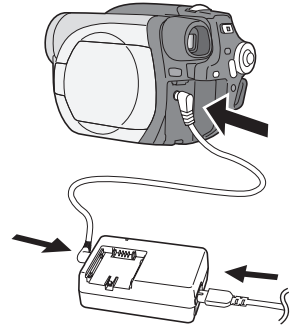
If the battery discharges, then  () will flash.

- The recordable time will become shorter when you use both the viewfinder and the LCD monitor simultaneously while rotating the LCD monitor forward to record yourself, etc.

- The batteries heat up after use or charging. This unit will also heat up while being used. This is not a malfunction.
- Be aware that the operating time of the battery will become shorter in low temperatures. We recommend charging a spare battery for use when recording.

Connecting to the AC outlet

- 1 **Connect the AC cable to the AC adaptor and the AC outlet.**
- 2 **Connect the DC cable to the AC adaptor.**
- 3 **Connect the DC cable to this unit.**
 - Do not use the AC cable for other equipment since the AC cable is exclusively designed for this unit. Do not use the AC cable from other equipment for this unit.



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

Turning the unit on/off

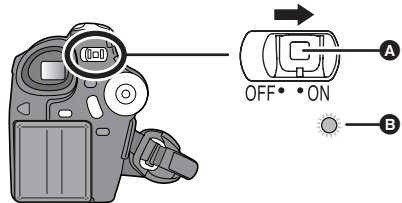
- When recording, remove the lens cap before turning the unit on. If the unit is turned on with the lens cap fitted, the automatic white balance adjustment may not function properly.

How to turn on the power

While pressing the button **A**, set the OFF/ON switch to ON.

The status indicator **B** lights red.

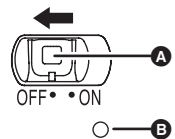
- The date and time display flashes. Set this. (→ 33)



How to turn off the power

While pressing the button **A**, set the OFF/ON switch to OFF.

The status indicator **B** goes off.



When the power is turned on for the first time after changing the disc or battery, the unit carries out a recognition procedure to check that there are no problems with the disc.

This takes approximately 25 seconds with DVD-RAM.

If you want to start using the unit as soon as you turn on the power, do the following.

- 1) Turn on the power.
- 2) After "READING DISC..." disappears from the screen, turn off the power.

You can start recording approximately 8 seconds after you turn on the power again.

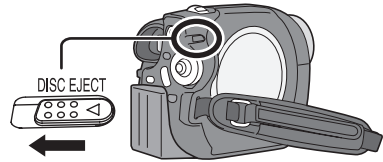
- Depending on the condition of the disc, it may take longer than this.
- If the date and time are not set, this function does not work.

Inserting/removing a disc

When inserting or removing the disc, fit the charged battery pack or connect the AC adaptor to the unit. The cover of the disc compartment will not open unless the unit is powered.

1 Slide the DISC EJECT lever once and release it.

A few moments after the ACCESS/PC lamp blinks, the cover of the disc compartment will open slightly.

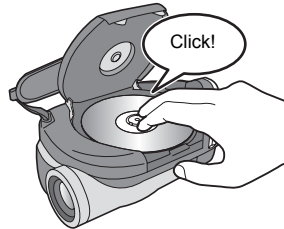
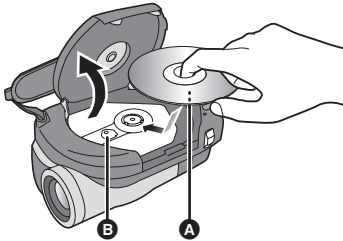


2 Open the cover of the disc compartment by hand and insert/remove the disc.

■ Inserting disc

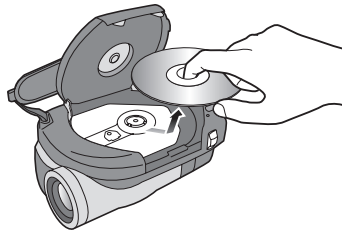
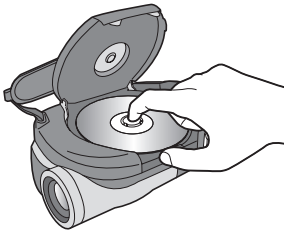
Fit the disc onto the spindle in the center.

- Ⓐ Recording/playback side
- Ⓑ Pickup lens



■ Removing disc

While pressing down on the spindle, grasp the edge of the disc and gently lift it out.



3 Push the section marked "PUSH CLOSE" on the cover of the disc compartment to close the cover.

Inserting/removing a disc

■ Identifying recording/playback sides of disc

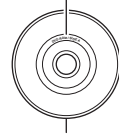
Single sided disc:

The recording/playback side is opposite to the labelled side.

Double sided disc:

The "SIDE A" recording/playback side is opposite to the "SIDE A" marked side. The "SIDE B" recording/playback side is the "SIDE A" marked side.

"SIDE A" mark



The opposite side is the "SIDE A" recording/playback side.

- Do not use excessive force when opening the cover.
- Do not touch the pickup lens or the recording/playback side of the disc.
This may impair recording and playback.
- Insert the disc securely to prevent damage.
- When you open the cover, the ACCESS/PC lamp flashes red. Do not leave the cover open.
- If the cover is open, the power will not turn off even if the OFF/ON switch is set to OFF.
- If the disc is not correctly inserted, the cover will not close. Never try to forcibly close the cover. This could cause damage. Reinsert the disc properly.
- If a single sided disc is inserted into the unit with the printed label facing the inside, an error message will appear. Remove the disc and reinsert it with its recording/playback side facing the inside.
- Do not allow the recording/playback side to become dirty or scratched.
- Do not remove the battery pack or disconnect the AC adaptor while removing the disc or until power is completely turned off. If you do, the cover will not open. If this happens, reattach the battery pack or reconnect the AC adaptor, slide the DISC EJECT lever once, and then release it. A repair disc message may be displayed when the power is turned back on. (→ 83, About recovery)
- Do not insert anything other than the 8 cm (3") DVD-RAM, DVD-RW or DVD-R disc into the disc compartment. Doing so could cause malfunctions.
- Do not touch the pickup lens or other parts inside the disc compartment. Be sure not to touch the area around the pickup lens for it becomes extremely hot.

After inserting a disc/After recording finishes

While the ACCESS/PC lamp is lit, the disc is rotating and disc information is being recorded. If the power supply is interrupted at this time, the disc may become unusable. Do not disconnect the AC adaptor or remove the battery. Also, do not strongly shake or cause impact to the unit.

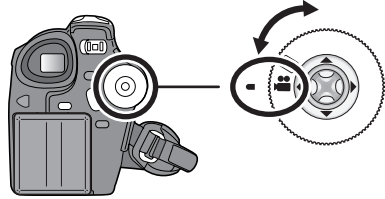
Selecting a mode



The mode dial is used to switch between recording and playback modes.

Rotate the mode dial slowly but surely.

- Do not forcefully turn the dial.

Rotate the mode dial, and set the desired mode pictograph to the position shown in the illustration.



 Disc recording mode (→ 36)	Use this to record motion pictures on a disc.
 Disc playback mode (→ 53)	Use this to play back motion pictures on a disc.

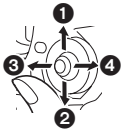
How to use the joystick

This unit has a joystick for selecting functions, performing operations, etc. so it is easy to operate this unit with one hand.

Basic operations

Operations on the menu screen and selection of files on the thumbnail view screen, etc.

Move the joystick up, down, left, or right to select an item or file, and then press the joystick to set it.



- ❶ Select by moving up.
- ❷ Select by moving down.
- ❸ Select by moving left.
- ❹ Select by moving right.
- ❺ Press the joystick to select the item.

- Menu screen operations (→ 31)

Joystick and screen display

Press the center of the joystick, and icons will be displayed on the screen. Each press switches the display as follows depending on the mode.

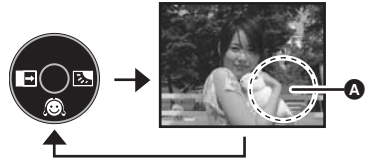
(In the disc playback mode, the icons will be automatically displayed on the screen.)



Disc recording mode

(AUTO/MANUAL/FOCUS switch is set to AUTO)

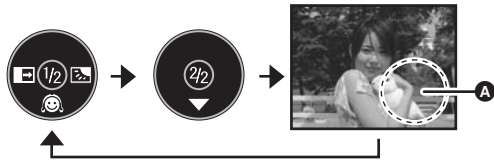
- Ⓐ: The operation icon is off.



Icon	Direction	Function	Page
	▼	Soft skin mode	40
	◀	Fade	41
	▶	Backlight compensation	43

Disc recording mode
(AUTO/MANUAL/FOCUS switch is set to MANUAL)

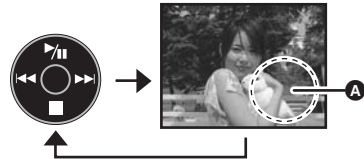
A: The operation icon is off.



Icon	Direction	Function	Page	
(1/2)		▼	Soft skin mode	40
		◀	Fade	41
		▶	Backlight compensation	43
(2/2)		▲	Manual white balance set (Only when manual white balance adjustment mode is selected)	51
	▼	▼	White balance	50
		▼	Shutter speed	52
		▼	Iris or gain value	52
	- +	◀▶	White balance mode selection, manual adjustments	49, 50, 52

Disc playback mode


A: The operation icon is off.



Icon	Direction	Function	Page	
-	▶/	▲	Playback/pause	53
	■	▼	Stop playback and show thumbnails	53
	◀◀	◀	Rewind, skip (during playback)	53
	◀		Reverse slow/frame playback (during pause)	54
	▶▶	▶	Fast forward, skip (during playback)	53
	▶		Forward slow/frame playback (during pause)	54

Switching the language

You can switch the language on the screen display or the menu screen.

- 1 Press the **MENU** button, then select [ **LANGUAGE**] and press the joystick.



- 2 Select [English] and press the joystick.

Using the menu screen

Refer to "Menu list" (→ 78) for information about the menus.

1 While stopped, press the MENU button.

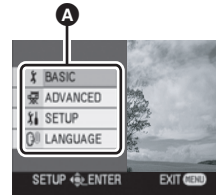
The menu displayed differs depending on the position of the mode dial.

- Do not switch the mode dial when the menu is displayed.

MENU

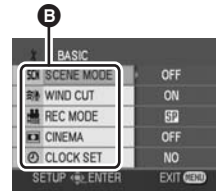


2 Move the joystick up or down in order to select the desired top menu **A**.



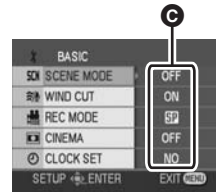
3 Move the joystick right or press the joystick.

The submenu **B** is displayed.



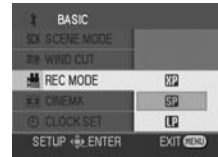
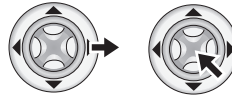
4 Move the joystick up or down in order to select the submenu item.

- C** Current settings on menus

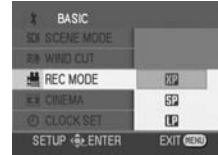


Using the menu screen

- 5 Move the joystick right or press the joystick.



- 6 Move the joystick up or down in order to select the desired item.

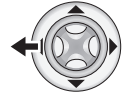


- 7 Press the joystick to enter the selection.



To get back to the previous screen

Move the joystick left.



To exit the menu screen

Press the MENU button.





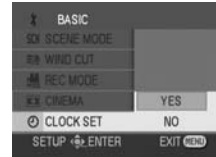
- The menu screen does not appear during recording or playing. You cannot start other operations while the menu screen appears.

Setting date and time

If the screen shows the incorrect date/time, then adjust it.

◇ Rotate the mode dial to select .

1 Press the MENU button, then select [ BASIC] → [ CLOCK SET] → [YES] and press the joystick.



2 Move the joystick left or right to select the item to be set. Then, move the joystick up or down to set the desired value.



- The year will change as follows:
2000, 2001, ..., 2099, 2000, ...
- The 12-hour system is used to display the time.



3 Press the joystick to enter the selection.

- After pressing the MENU button to finish the setting, check the date and time display.
- The clock function starts at [00] seconds.



■ Changing the display style

Press the MENU button, then select [ SETUP] → [ DATE FORMAT] → desired display style and press the joystick.

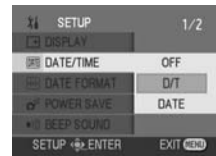
Display style	Y/M/D	M/D/Y	D/M/Y
Screen display	3:30 PM 2006.12.15	3:30 PM 12.15.2006	3:30 PM 15.12.2006




■ Changing the date and time display style

Press the MENU button, then select [ SETUP] → [ DATE/TIME] → desired display style and press the joystick.

[DATE]	[D/T]	[OFF]
12.15.2006	3:30 PM 12.15.2006	



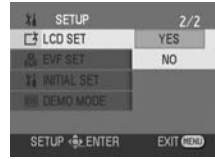
- The date and time function are driven by a built-in lithium battery.
- Make sure to check the time before recording.
- If [] or [-] is indicated when this unit is turned on, then the built-in lithium battery runs down. After charging the battery using the steps below, set the clock.

Connect the AC adaptor to this unit or place the battery on this unit, and the built-in lithium battery will be recharged. Leave this unit as is for approx. 24 hours, and the battery will save the date and time for approx. 6 months. (Even if the OFF/ON switch is set to OFF, the battery is still being recharged.)

Adjusting LCD monitor/viewfinder

Adjust the brightness and color level.

- 1 Press the MENU button, then select [SETUP] → [LCD SET] or [EVF SET] → [YES] and press the joystick.



- 2 Move the joystick up or down to select the item to be adjusted. Then, move the joystick left or right to make the adjustment.

The bar display moves.

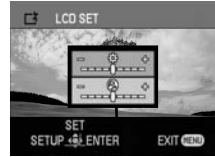
[LCD SET]

: Brightness of the LCD monitor

: Color level of the LCD monitor

[EVF SET]

EVF : Brightness of the viewfinder

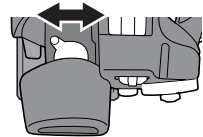


- In order to adjust the brightness of the viewfinder, close the LCD monitor, and the viewfinder will be activated.
- When the LCD monitor is rotated by 180° towards the lens, the brightness of the LCD monitor cannot be adjusted.
- These settings will not affect the images actually recorded.

Adjusting the field of view

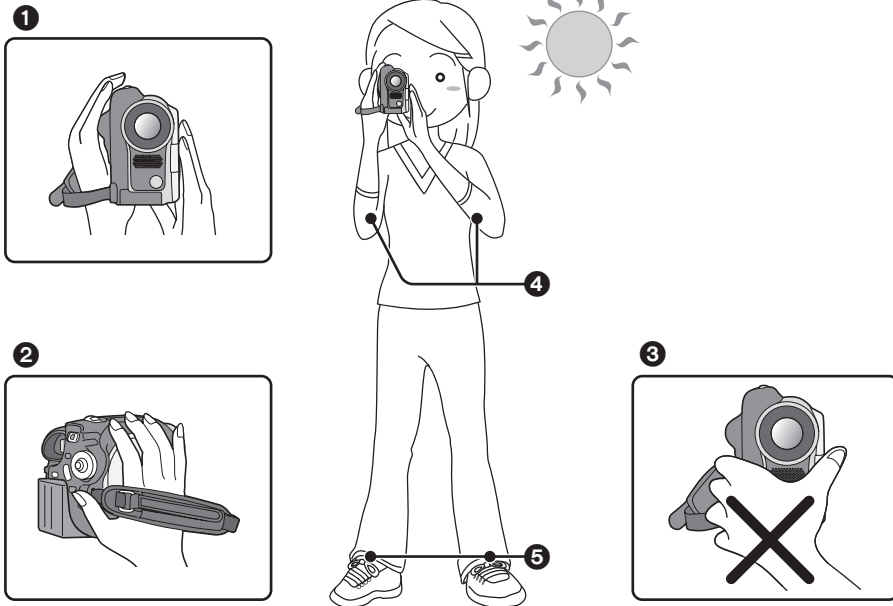
Adjust the focus by sliding the eyepiece corrector knob.

- You can adjust the brightness of the viewfinder from the menu. (→ above)



Before recording

Basic camera positioning



- ❶ Hold the camera with both hands.
 - ❷ Run your hand through the grip belt.
 - ❸ Do not cover the microphones or sensors with your hands.
 - ❹ Keep your arms near your body.
 - ❺ Slightly open your legs.
- When you are outdoors, record pictures with the sunlight behind you. If the subject is backlit, it will become dark in the recording.

Recording motion pictures

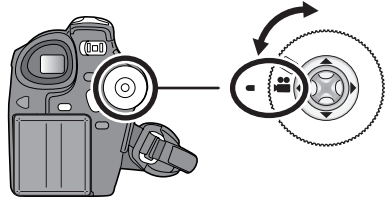
RAM -RW(VR) -RW(V) -R

Record motion pictures onto a disc.

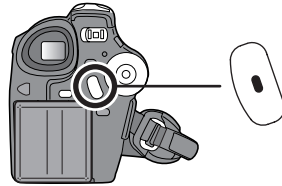
1 Remove the lens cap, then turn the unit on.

If the unit is turned on with the lens cap fitted, the automatic white balance adjustment may not function properly.

2 Rotate the mode dial to select .






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



To end the recording

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

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



- The images recorded between pressing the recording start/stop button to start recording and pressing it again to pause recording become one scene.
- When about 5 minutes has passed without any operation, this unit automatically turns off to prevent the battery from running down. When you use this unit, turn it on again. This setting can also be set to [OFF]. (→ 79, POWER SAVE)

- The maximum number of scenes on a disc (per side): 999 (Even if there is remaining capacity for recording on a disc, you may not be able to record 999 scenes.)
- While "WRITING THE INFORMATION ON THE DISC." is displayed, do not disconnect the AC cable or remove the battery as doing so may make the disc unusable.
- Sound is recorded in Dolby Digital from the internal stereo microphone on the front of the unit. Take care not to block this microphone.
- Each time the unit enters the recording pause mode, the counter display will be reset to "0h00m00s".

Screen indications in the disc recording mode

- A** Remaining time left for recording
(When the remaining time is less than 1 minute, [R 0h00m] flashes red.)
- B** Recording mode
- C** Recording time elapsed

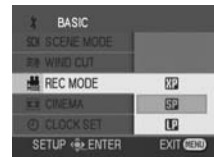


- While motion picture recording is in progress, do not disconnect the battery or AC adaptor. If you do, a repair disc message may be displayed when the power is turned back on. (→ 83, About recovery)

Immediately after recording finishes the ACCESS/PC lamp lights. While it lights, the disc is rotating and disc information is being recorded. If you run while holding the unit or swing it, the recorded images may be distorted so do not strongly shake or cause impact to it.

Changing the recording mode of the motion picture

Press the MENU button, then select [BASIC] → [REC MODE] → desired item and press the joystick.



Recording modes and recordable time available for the motion picture

This unit records in VBR. VBR is an abbreviation for Variable Bit Rate. VBR recording automatically varies the bit rate (amount of data in a fixed time) depending on the subject being recorded. This means if a subject with sharp movements is recorded, the recording time is reduced.

Recording mode		Recordable time (on single side)
XP	(High quality)	Approx. 18 min
SP	(Normal)	Approx. 37 min
LP	(Long play)	Approx. 75 min



Image quality prioritized

Recording time prioritized

- Mosaic-pattern noise may appear on a playback image in the following cases.
 - When there is a complicated pattern in the background
 - When the unit is moved too much or too fast
 - When a subject with sharp movements has been recorded
(Particularly if [REC MODE] was set to [] during recording.)

Various recording functions

Zoom in/out function

RAM -RW(VR) -RW(V) -R

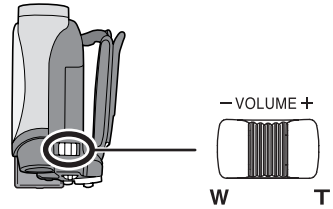
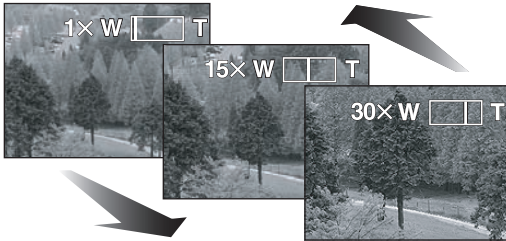
You can zoom in up to 30× optically.

◇ Rotate the mode dial to select .

Move the zoom lever.

T side: To bring distant people or objects appear closer for recording (zoom in)

W side: To make sights appear more distant for recording (zoom out)





- When zooming in while holding this unit by hand, we recommend using the image stabilizer function. (→ 45)
- When distant subjects are brought closer, they are focused at about 1.3 m (4.3 feet) or more.
- When the zoom magnification is 1×, this unit can focus on a subject approx. 2 cm (0.8") away from the lens. (Macro function)
- The zoom speed varies depending on the range over which the zoom lever is moved.
- When the zoom speed is high, the subject may not be focused easily.

Digital zoom function

RAM -RW(VR) -RW(V) -R

If the zoom magnification exceeds 30×, then the digital zoom function will be activated. The maximum magnification provided by the digital zoom can be switched.

◇ Rotate the mode dial to select .

Press the MENU button, then select [ ADVANCED] → [ D.ZOOM] → desired item and press the joystick.

[OFF]: Optical zoom only (Up to 30×)

[50×]: Up to 50×

[1000×]: Up to 1000×




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

To use the zoom microphone function

RAM -RW(VR) -RW(V) -R

Interlocked with the zooming operation, the microphone will collect sounds clearly far away with the tele-shot or those in the vicinity with the wide-angle shot.

◇ Rotate the mode dial to select .

Press the MENU button, then select [ ADVANCED] → [ ZOOM MIC] → [ON] and press the joystick.




Recording yourself

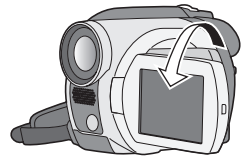
RAM -RW(VR) -RW(V) -R

You can record yourself while viewing the LCD monitor. You can record persons in front of the unit while showing them the image. The image is horizontally flipped as if you see a mirror image. (However the image recorded is the same as a normal recording.)

◇ Rotate the mode dial to select .

Rotate the LCD monitor towards the lens side.

- When the LCD monitor is opened, the viewfinder automatically turns off. However if the LCD monitor is then rotated towards the lens side, the viewfinder is activated.
- When the LCD monitor is rotated towards the lens side, the icon will not be displayed even if you press the joystick.
- 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. (→ 82)



Recording

Soft skin mode

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

RAM -RW(VR) -RW(V) -R

This is more effective if you record the bust image of a person.

◇ Rotate the mode dial to select .

1 Press the joystick to display the icon shown in the illustration.



2 Move the joystick down to select .



To cancel the soft skin mode

Select  again.

- 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.

Fade in/fade out function

RAM -RW(VR) -RW(V) -R

Fade in: The image and audio gradually appear.

Fade out: The image and audio gradually disappear.

◇ Rotate the mode dial to select .

To fade in

1 While recording is paused, press the joystick to display the icon shown in the illustration.



2 Move the joystick left to select [].



3 Press the recording start/stop button.

Start recording. (fade in)

When you start recording, the image/audio disappears completely and the image/audio gradually appears.



Recording

To fade out

1 During recording, press the joystick to display the icon shown in the illustration.



2 Move the joystick left to select [].



Various recording functions

3 Press the recording start/stop button.

Pause recording. (fade out)

The image/audio gradually disappears. After the image/audio completely disappears, recording stops.





To cancel fading

Select [] again.

To select the color for fade in/out

The color which appears in fading pictures can be selected.

Press the MENU button, then select [ ADVANCED] → [ FADE COLOR] → [WHITE] or [BLACK] and press the joystick.

- By operating the OFF/ON switch, the fade in/fade out function is canceled.
- While the fade in/fade out function is selected, it takes several seconds to display the image when you start recording. It also takes several seconds to pause recording.
- The thumbnails of scenes recorded using fade in become black (or white).

Backlight compensation function

This is for protecting a backlit subject from being darkened.

RAM -RW(VR) -RW(V) -R

Use this function when the light is emanating from behind the subject and the subject appears dark.

◇ Rotate the mode dial to select .

1 Press the joystick to display the icon shown in the illustration.



2 Move the joystick right to select .

The image on the screen will become brighter.



To return to normal recording

Select  again.



- By operating the OFF/ON switch or mode dial, the backlight compensation function is canceled.

Wind noise reduction function

This is for reducing the wind noise coming into the microphone when recording.



RAM -RW(VR) -RW(V) -R

◇ Rotate the mode dial to select .

Press the MENU button, then select [ BASIC] → [ WIND CUT] → [ON] and press the joystick.



To cancel the wind noise reduction function

Press the MENU button, then select [ BASIC] → [ WIND CUT] → [OFF] and press the joystick.

- This function's default setting is [ON].
- Depending on the wind strength, the wind noise is reduced. (If this function is activated in strong winds, the stereo effect may be reduced. When the wind weakens, the stereo effect will be restored.)



Cinema mode

This allows you to record images compatible with wide-screen TVs.

RAM -RW(VR) -RW(V) -R



Images are recorded with a black belt appearing along the top and bottom of the screen so that they look like theater movies.

◇ Rotate the mode dial to select .

Press the MENU button, then select [ BASIC] → [ CINEMA] → [ON] and press the joystick.



To cancel the cinema mode

Press the MENU button, then select [ BASIC] → [ CINEMA] → [OFF] and press the joystick.

- Images played back vary depending on the TV connected. Please refer to the operating instructions for your TV.
- When images are played back on a TV screen, the date display may be erased in some cases.
- Depending on the TV, the picture quality may deteriorate.
- When a cinema picture is imported onto a personal computer, the imported picture may not be displayed correctly, depending on the software used.

MagicPix function

This allows recording in dark locations.



RAM -RW(VR) -RW(V) -R

This function allows you to record color subjects in dark locations to stand out against the background.

Attach this unit to a tripod, and you can record images free from vibration.

- Recorded scene is seen as if frames were missed.

◇ Rotate the mode dial to select .



Press the MENU button, then select [ ADVANCED] → [ MAGICPIX] → [ON] and press the joystick.

After exiting the menu screen, the unit is in manual focus mode. Move the joystick left or right to bring the subject into focus manually. (→ 49)

- If the manual focus indication is not displayed, press the joystick twice and then focus the subject.



To cancel the MagicPix function

Press the MENU button, then select [ ADVANCED] → [ MAGICPIX] → [OFF] and press the joystick.

- The MagicPix function makes the signal charging time of CCD up to approximately 30× longer than usual, so that dark scenes invisible to the naked eye can be recorded brightly. For this reason, bright dots that are usually invisible may be seen, but this is not a malfunction.
- By operating the OFF/ON switch or mode dial, the MagicPix function is canceled.
- If set in a bright place, the screen may become whitish for a while.



Image stabilizer function

This is for reducing image shakes during recording.

RAM -RW(VR) -RW(V) -R

Reduces the image shaking due to hand movement when recording.

◇ Rotate the mode dial to select .

Press the MENU button, then select [ ADVANCED] → [ EIS] → [ON] and press the joystick.



To cancel the image stabilizer function

Press the MENU button, then select [ ADVANCED] → [ EIS] → [OFF] and press the joystick.

- This function's default setting is [ON].
- When a tripod is used, we recommend that you turn the image stabilizer off.
- In the following cases, the image stabilizer function may not work effectively.
 - When the digital zoom is used
 - When the unit is shaken greatly
 - When you record a moving subject while tracking it

Recording with the video light

This built-in video light is for recording in dark places.

RAM -RW(VR) -RW(V) -R

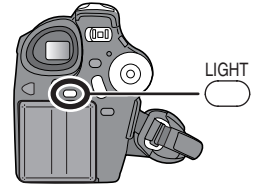
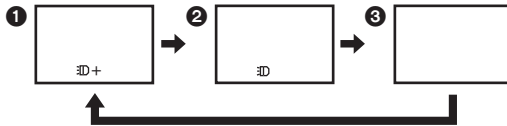
Gain up mode works with the video light to enhance the light's brightness and brighten the natural colors in a scene.

◇ Rotate the mode dial to select .

Press the LIGHT button.

Each time you press the button:

- 1 Video light and gain up mode on:**
Brighter than when only the video light is on, but washed out images will appear.
- 2 Video light on:**
To eliminate washed out images, use this mode.
- 3 Video light off**



- The subject should be within 1.5 m (5 feet) of the unit.
- Using the video light reduces battery time.
- Set the video light to off when not in use.
- Do not look directly into the light.
- If the video light is used with a conversion lens attached, a slight vignetting (darkening around edges) effect occurs on the screen.
- Using the MagicPix function at the same time will make conditions even brighter.
- The video light enables brightening of the images taken in a dimly-lit place. We also recommend using it in a bright place to obtain high quality images.
- By operating the OFF/ON switch or mode dial, the video light is turned off.

Manual recording functions

When the AUTO/MANUAL/FOCUS switch is set to AUTO, the unit adjusts automatically the following settings.

- White balance
- Shutter speed
- Iris/gain value
- Focus



Above settings may not be adjusted automatically depending on light sources or scenes. If so, adjust the settings manually.

Scene mode

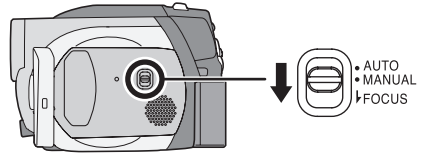
This is for recording in various situations.


RAM -RW(VR) -RW(V) -R

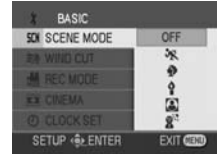
When you record images in different situations, this mode automatically sets optimum shutter speeds and apertures.






◇ Rotate the mode dial to select .

1 Set the AUTO/MANUAL/FOCUS switch to **MANUAL**.




2 Press the MENU button, then select [ BASIC] → [SCN SCENE MODE] → desired item and press the joystick.




Display	Mode	Recording conditions
	Sports	To record sports scenes or scenes where there are quick motions
	Portrait	To make people stand out against the background
	Low light	To make the scene brighter in dark conditions
	Spotlight	To make the subject under a spotlight look more attractive
	Surf & snow	To record images in bright places such as ski slopes and beaches

To cancel the scene mode function

Press the MENU button, then select [ BASIC] → [SCN SCENE MODE] → [OFF] and press the joystick.

- You can also cancel the scene mode function by setting the AUTO/MANUAL/FOCUS switch to AUTO.

Sports mode

- For slow-motion playback or playback pause of recorded pictures, this mode helps diminish camera shake.
- During normal playback, the image movement may not look smooth.
- Avoid recording under fluorescent light, mercury light or sodium light because the color and brightness of the playback image may change.
- If you record a subject illuminated with strong light or a highly reflective subject, vertical lines of light may appear.
- If the brightness is insufficient, the sports mode does not function. The [] display flashes.
- If this mode is used indoors, the screen may flicker.

Portrait mode

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

Low light mode

- Extremely dark scenes may not be able to be recorded finely.

Spotlight mode

- If the recording subject is extremely bright, the recorded image may become whitish and the periphery of the recorded image extremely dark.

Surf & snow mode

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

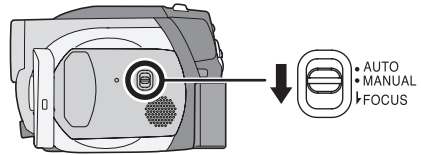
Manual focus adjustment

RAM -RW(VR) -RW(V) -R

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

◇ Rotate the mode dial to select .

1 Set the AUTO/MANUAL/FOCUS switch to MANUAL.



2 Move the switch down and set it to FOCUS position.

The manual focus indication [▶MF] is displayed.



3 Move the joystick left or right to bring the subject into focus.

- When focused with a wide angle, the subject may not be in focus when zoomed in. First, zoom in on the subject, and then focus on it.



To restore to the automatic adjustment

Press the AUTO/MANUAL/FOCUS switch down again to the FOCUS position.

- You can also restore the auto focusing by setting the AUTO/MANUAL/FOCUS switch to AUTO.

White balance

This is for recording in natural colors.

RAM -RW(VR) -RW(V) -R

The 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.

◇ Rotate the mode dial to select .

1 Set the AUTO/MANUAL/FOCUS switch to MANUAL.

The icon shown in the illustration is displayed automatically.







2 Move the joystick down to select the white balance display (such as).




3 Move the joystick left or right to select the white balance mode.



Display	Mode	Recording conditions
	Auto white balance adjustment	—
	Indoor mode (for recording under incandescent lamps)	Incandescent lights, halogen lamps
	Outdoor mode	Outdoors under a clear sky
	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 restore to the automatic adjustment

Set the white balance mode to .

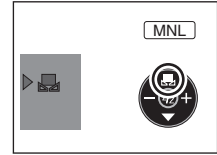
- You can also restore the automatic adjustment by setting the AUTO/MANUAL/FOCUS switch to AUTO.

To set the white balance manually

Select [WB] mode, fill the screen with a white subject and then move the joystick up to select [MNL].

When the [WB] display changes from flashing to on, setting is complete.

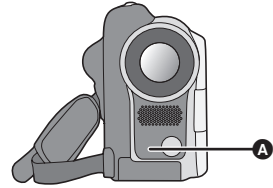
- When the [WB] display continues flashing green, the white balance cannot be set because the place is dark etc. In this case, use the automatic white balance.



■ About the white balance sensor **A**

The white balance sensor detects the type of light source during recording.

Do not cover the white balance sensor during recording, or it may not function properly.



- When the [WB] display flashes white, the manual white balance previously adjusted is stored. Whenever recording conditions change, re-set the white balance for correct adjustment.
- When the unit is turned on with the lens cap fitted, the automatic white balance adjustment may not function properly. Please turn the unit on after removing the lens cap.
- When setting both the white balance and the iris/gain, set the white balance first.

Manual shutter speed/aperture adjustment

RAM -RW(VR) -RW(V) -R

Shutter Speed: Adjust it when recording fast-moving subjects.

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

◇ Rotate the mode dial to select .

1 Set the AUTO/MANUAL/FOCUS switch to MANUAL.

The icon shown in the illustration is displayed automatically.



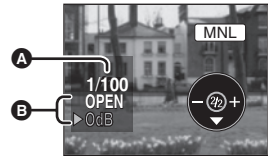
2 Move the joystick down several times and select the shutter speed indication (such as 1/100) or iris/gain indication (such as F2.4, 0dB).



3 Move the joystick left or right to make the adjustment.

A Shutter speed: 1/60 to 1/8000
 ● The shutter speed closer to 1/8000 is faster.

B Iris/Gain value:
 CLOSE → (F16 to F2.0) → OPEN → 0dB → 18dB
 ● Value closer to [CLOSE] darkens the image.
 ● Value closer to [18dB] brightens the image.
 ● Values with [dB] are gain values.



To restore to automatic adjustment

Set the AUTO/MANUAL/FOCUS switch to AUTO.

- When setting both the shutter speed and the iris/gain value, set the shutter speed and then set the iris/gain value.
- When recording in an extremely bright place, the screen may change color or flicker. If so, adjust the shutter speed manually to [1/60] or [1/100].

■ Manual shutter speed adjustment

- Avoid recording under fluorescent light, mercury light or sodium light because the color and brightness of the playback image may change.
- If you increase the shutter speed manually, the sensitivity lowers and accordingly the gain value increases automatically, which may increase the noises on the screen.
- You may see vertical lines of light in the playback image of a brightly shining subject or highly reflective subject, but this is not a malfunction.
- During normal playback, image movement may not look smooth.

■ Manual iris/gain adjustment

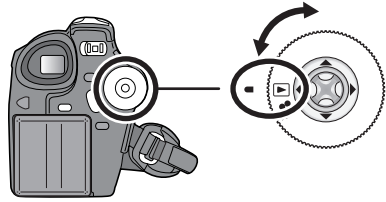
- If the gain value is increased, the noise on the screen increases.
- Depending on the zoom magnification, there are iris values that are not displayed.

Motion picture playback

RAM -RW(VR) -RW(V) -R

1 Rotate the mode dial to select .

The motion pictures recorded on the disc are displayed as thumbnails.

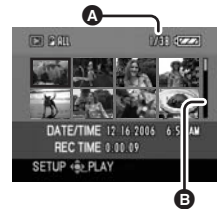


2 Select the scene to be played back.

- A** Scene number
- B** Scroll bar display

The selected scene will be encircled by a red frame.

- When 9 or more scenes have been recorded, the next (or previous) page is displayed by moving the joystick.
- If you move and hold the joystick up or down, you can advance 8 scenes at a time. The screen will not change at this time, but the scene numbers and scroll bar display will change so release the joystick when you have arrived at the page with the scene you want to display.









3 Press the joystick.

The selected scene is played back on the full screen.

The operation icon is automatically displayed on the screen.



4 Move the joystick to operate.

- : Playback/Pause
-  (Move): Skip playback (backward)
-  (Move and hold): Review playback
-  (Move): Skip playback (forward)
-  (Move and hold): Cue playback
- : Stops the playback and shows the thumbnails.

- During playback, the recording time is not displayed on the screen.
- No sound will be heard except during normal playback.
- If pause play is continued for 5 minutes, the screen returns to the thumbnails.
- When the amount of time recorded on the scene is short, playback may not be possible.
- The thumbnails of motion pictures that cannot be played back are displayed in shades of blue and white.

Slow-motion playback

- 1 Move the joystick up during playback to pause the playback.
- 2 Move and hold the joystick right.
(Slow-motion pictures will be played back in reverse when you move and hold the joystick left.)
 - Normal playback is restored when you move the joystick up.



Frame-by-frame playback

The motion picture is advanced one frame at a time.

- 1 Move the joystick up during playback to pause the playback.
- 2 Move the joystick right.
(The frames will be advanced one at a time in the reverse direction when you move the joystick left.)
 - Normal playback is restored when you move the joystick up.



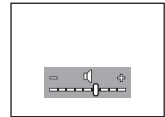
To adjust the volume

Adjust the speaker volume during playback.

Move the volume lever to change the volume level.

Towards “+”: increases the volume
Towards “-”: decreases the volume

- The further the [] indicator moves to the right (towards the “+” end), the higher the volume level becomes.
- When the adjustment is completed, the volume setting display will disappear.



Playing back motion pictures by date

Recorded scenes are grouped by date on this unit.
Scenes recorded on the same day can be played back in succession.

1 Press the MENU button, then select

[▶] **PLAY SETUP** → [■] **PLAY MODE** → [BY DATE] and press the joystick.

- When [PLAY MODE] is set to [VIEW ALL], all recorded motion pictures will be played back in succession. ([▶] ALL) is displayed.)



2 Select the date for playback, then press the joystick.

The scenes recorded on the same day are displayed as thumbnails.



3 Select the scene to be played back.

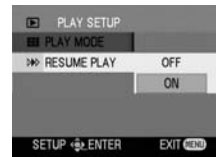
- Even if scenes are recorded on the same day, they are grouped separately in the following cases.
 - When the number of scenes exceeds 99 **RAM** **-RW(VR)** **-RW(V)** **-R**
 - When the disc is removed **-RW(V)** **-R**
 - When the disc is repaired **-RW(V)** **-R**
 - When the mode dial is switched **-R**
 - When the power is turned off **-R**

Resuming the previous playback

Press the MENU button, then select [▶] **PLAY SETUP** → [▶▶] **RESUME PLAY** → [ON] and press the joystick.

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

- If playback is stopped at any point during a motion picture while [RESUME PLAY] is set to [OFF], the next time the motion picture is played back, it will be from the beginning.



- The resume position memorized is cleared if the unit is turned off, but the menu setting is not cleared.

Editing scenes

Deleting scenes

This is for deleting scenes recorded on discs.

RAM -RW(VR)

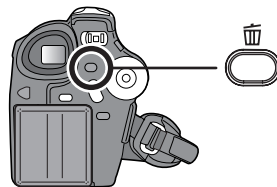
The deleted scenes cannot be restored.

- Scenes on DVD-RW (Video format) and DVD-R cannot be deleted.

Deleting scenes one at a time

◇ Rotate the mode dial to select .




- 1 Press the  button during playback.



- 2 When the confirmation message appears, select [YES], then press the joystick.

Deleting multiple scenes from the thumbnail display

◇ Rotate the mode dial to select .

- 1 Press the MENU button, then select [DELETE] → [SELECT] or [ALL] and press the joystick.

- When [ALL] is selected, the following scenes will be deleted. Proceed to step 4.
 - When [PLAY MODE] is set to [VIEW ALL]: All the scenes on the disc
 - When [PLAY MODE] is set to [BY DATE]: All the scenes selected by date




- 2 (Only when [SELECT] is selected in step 1)
Select the scene to be deleted, then press the joystick.

The selected scene is encircled by a yellow frame.

- When the joystick is pressed again, the selected scene will be canceled.
- Up to 8 scenes displayed on a page can be set in succession.



- 3 (Only when [SELECT] is selected in step 1)

Press the  button.

- 4 When the confirmation message appears, select [YES], then press the joystick.

(Only when [SELECT] is selected in step 1)

To continue deleting other scenes

Repeat steps 2-4.

To complete editing

Press the MENU button.

- To delete an unwanted part of a scene, divide the scene first, and then delete the unnecessary part. (→ 58)
- In case of [ALL], the deletion may take time if there are many scenes on the disc.
- Do not turn off this unit while deleting.
- When you delete scenes, use a battery with sufficient battery power or use the AC adaptor.
- It may not be possible to delete scenes that have been divided. Combine the divided scenes, and then delete them.

Dividing a scene

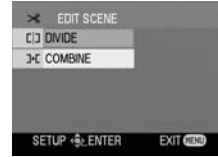
This is for dividing a scene into two.

RAM -RW(VR)

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

◇ Rotate the mode dial to select .

- 1 Press the MENU button, then select [⌘ EDIT SCENE] → [⌘ DIVIDE] and press the joystick.



- 2 Select the scene to be divided, then press the joystick.

The selected scene is played back.



- 3 When you reach the area where you want to divide the scene, move the joystick down to set the dividing point.



- 4 When the confirmation message appears, select [YES], then press the joystick.

To continue dividing other scenes

Repeat steps 2-4.

To complete editing

Press the MENU button.

Combining scenes

This function is only for combining two consecutive scenes into one.

RAM -RW(VR)

◇ Rotate the mode dial to select .

1 Press the MENU button, then select [⌘ EDIT SCENE] → [⌘ COMBINE] and press the joystick.



2 Select the scene to be combined, then press the joystick.

- The selected scene and the next scene are combined.
- If you wish to combine scenes that are not next to each other or scenes with different recording dates, first create a playlist and then combine the scenes on the playlist. (→ 61, 66)



3 When the confirmation message appears, select [YES], then press the joystick.

To continue combining other scenes

Repeat steps 2-3.

To complete editing

Press the MENU button.

Using playlists

What is a playlist?

You can create a playlist by gathering your favorites from the recorded scenes.

Since the playlist is not created by copying data, you will consume little of the disc capacity by making a playlist.

- If you create or delete playlists, the original scenes will not be modified. Editing scenes on a playlist will not affect the original scenes.

Recorded scenes



Playlist



- The maximum number of items on a disc (per side)
 - Playlists: 99
 - Playlist scenes: 999
- If original scenes are deleted, the portion of playlists created with these scenes is also deleted.

Creating a new playlist

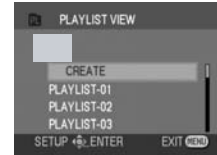
RAM -RW(VR)

◇ Rotate the mode dial to select .

- 1 Press the MENU button, then select [ PLAY SETUP] → [ PLAY MODE] → [PLAYLIST] and press the joystick.



- 2 Select [CREATE], then press the joystick.



- 3 Select the scene to be added to the playlist, then press the joystick.

The selected scene is encircled by a yellow frame.

- When the joystick is pressed again, the selected scene will be canceled.
- Up to 8 scenes can be set in succession.
- The scenes are registered in the playlist in the order that they were selected. After creating a playlist, the order of the scenes in it can be changed by [MOVE] function. (→ 64)



- 4 Press the MENU button.

- 5 When the confirmation message appears, select [YES], then press the joystick.

The thumbnail view screen of the created playlist is displayed.

To add another scene to the same playlist

Select [ADD]. (→ 63)



To playback a playlist

Select the scene to start playback, then press the joystick.

Playing back a playlist

RAM -RW(VR)

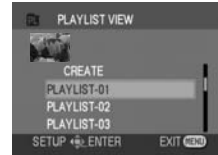
◇ Rotate the mode dial to select .

- 1 Press the MENU button, then select [ PLAY SETUP] → [ PLAY MODE] → [PLAYLIST] and press the joystick.



- 2 Select the playlist to be played back, then press the joystick.

Scenes in the selected playlist are displayed as thumbnails.





- 3 Select the scene to start playback, then press the joystick.



To select a different playlist

When the first scene is selected in the playlist thumbnail view screen, move the joystick left. The screen returns to the PLAYLIST VIEW (step 2).

To return to showing the original scenes

Press the MENU button, then select [ PLAY SETUP] → [ PLAY MODE] → [VIEW ALL] or [BY DATE] and press the joystick.

Editing a playlist

RAM -RW(VR)

Editing scenes on a playlist will not affect the original scenes.

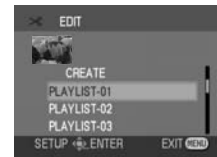
Adding scenes to playlist

◇ Select playlist playback mode. (→ 62, steps 1 and 2)

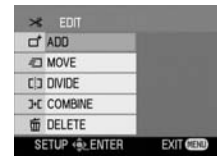
1 Press the MENU button, then select [⊗ EDIT] and press the joystick.



2 Select the playlist to be edited, then press the joystick.



3 Select [⊞ ADD], then press the joystick.

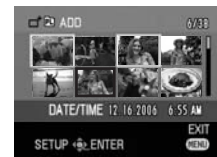


4 Select the scene to be added, then press the joystick.

The selected scene is encircled by a yellow frame.

- When the joystick is pressed again, the selected scene will be canceled.
- Up to 8 scenes can be set in succession.
- The scenes are added to the playlist in the order that they were selected.

The order of the scenes in the playlist can be changed by [MOVE] function. (→ 64)



5 Press the MENU button.

6 When the confirmation message appears, select [YES], then press the joystick.

The thumbnail view screen of the playlist that scenes were added to is displayed.

To continue adding scenes to the playlist

Repeat steps 1-6.

Moving scenes

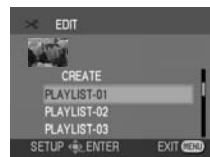
The scenes in a playlist can be moved.

◇ Select playlist playback mode. (→ 62, steps 1 and 2)

- 1 Press the MENU button, then select [⌘ EDIT] and press the joystick.



- 2 Select the playlist to be edited, then press the joystick.

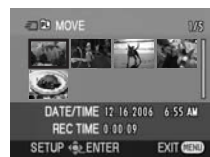


- 3 Select [⇐ MOVE], then press the joystick.

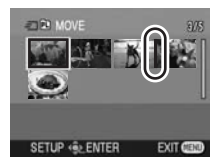


- 4 Select the scene to be moved, then press the joystick.

The selected scene is encircled by a yellow frame, and the position to insert is shown by a red bar.



- 5 Select the position to insert the scene, then press the joystick.



To continue moving other scenes in the playlist

Repeat steps 4-5.

To complete editing

Press the MENU button.

Dividing a scene

You can divide a scene into two parts.

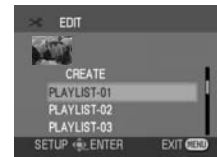
- Dividing scenes on a playlist will not affect the original scenes.

◇ **Select playlist playback mode. (→ 62, steps 1 and 2)**

- 1 Press the MENU button, then select [⊗ EDIT] and press the joystick.**



- 2 Select the playlist to be edited, then press the joystick.**



- 3 Select [□ DIVIDE], then press the joystick.**



- 4 Select the scene to be divided, then press the joystick.**

The selected scene is played back.



- 5 When you reach the area where you want to divide the scene, move the joystick down to set the dividing point.**



- 6 When the confirmation message appears, select [YES], then press the joystick.**

To continue dividing other scenes

Repeat steps 4-6.

To complete editing

Press the MENU button.

Combining scenes

Two scenes can be combined into one.

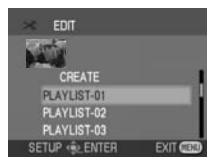
- Combining scenes on a playlist will not affect the original scenes.

◇ Select playlist playback mode. (→ 62, steps 1 and 2)

- 1 Press the MENU button, then select [X EDIT] and press the joystick.



- 2 Select the playlist to be edited, then press the joystick.



- 3 Select [COMBINE], then press the joystick.



- 4 Select the scene to be combined, then press the joystick.

- The selected scene and the next scene are combined.



- 5 When the confirmation message appears, select [YES], then press the joystick.

To continue combining other scenes

Repeat steps 4-5.

To complete editing

Press the MENU button.

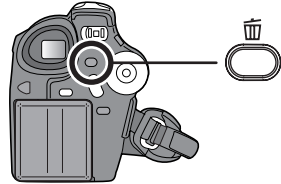
Deleting scenes

- Deleting scenes on a playlist will not affect the original scenes.

Deleting scenes one at a time:

◇ Select playlist playback mode. (→ 62, steps 1 and 2)


1 Press the  button during playback.



2 When the confirmation message appears, select [YES], then press the joystick.

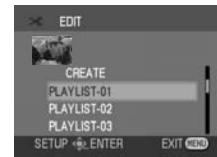
Deleting multiple scenes from the thumbnail display:

◇ Select playlist playback mode. (→ 62, steps 1 and 2)

1 Press the MENU button, then select [ EDIT] and press the joystick.



2 Select the playlist to be edited, then press the joystick.



3 Select [ DELETE] → [ SELECT] or [ ALL] and press the joystick.

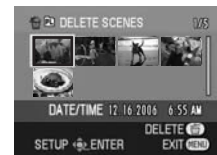
- When [ALL] is selected, the selected playlist will be erased. Proceed to step 6.



4 (Only when [SELECT] is selected in step 3)
Select the scene to be deleted, then press the joystick.


The selected scene is encircled by a yellow frame.

- When the joystick is pressed again, the selected scene will be canceled.
- Up to 8 scenes displayed on a page can be set in succession.



Using playlists

5 (Only when [SELECT] is selected in step 3)

Press the  button.

6 When the confirmation message appears, select [YES], then press the joystick.

(Only when [SELECT] is selected in step 3)

To continue deleting other scenes

Repeat steps 4-6.

To complete editing

Press the MENU button.

- Deleting scenes on a playlist will not increase the remaining capacity for recording.
- The playlist itself is deleted if you delete all the scenes in it.
- When a playlist is deleted, the number of each subsequent playlist decreases by one.
- It may not be possible to delete scenes that have been divided. Combine the divided scenes, and then delete them.



Formatting discs

RAM -RW(VR) -RW(V)

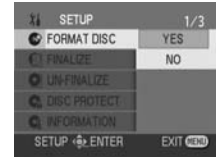
This is for initializing discs.

- Please be aware that if a disc is formatted, then all the data recorded on the disc will be erased.

◇ Rotate the mode dial to select .

1 Press the MENU button, then select [ SETUP] → [ FORMAT DISC] → [YES] and press the joystick.

- When formatting a DVD-RAM, skip to step 3.



2 (When formatting a DVD-RW only)

Select format type (→ 19), then press the joystick.



3 When the confirmation message appears, select [YES], then press the joystick.

- When formatting is complete, press the MENU button to exit the message screen.

- During formatting, do not turn this unit off.
- When you format the disc, use a battery with sufficient battery power or the AC adaptor.
- In the case of a double sided disc, format each side.
- It may not be possible to format a disc with many scratches or dirt. Such discs cannot be used.
- Use this unit to format discs. This unit may not recognize some discs that have been formatted using a computer or a device other than this unit.

Finalizing a disc

Finalizing a disc

This is for enabling discs to be played on other devices.

-RW(VR) **-RW(V)** **-R**

To play back a DVD-RW (Video format) or a DVD-R on other devices e.g. a DVD player, finalize the disc.

■ Finalizing video format discs

Be sure to finalize the disc on this unit, before using it on other devices.

DVD-RW (Video format): After finalizing, the disc becomes play-only. You can record on the disc after un-finalizing (→ 71) or formatting (→ 69).

DVD-R: After finalizing, the disc becomes play-only and you can no longer record.



■ Finalizing VR format discs

DVD-RAM: It is not necessary to finalize DVD-RAM.

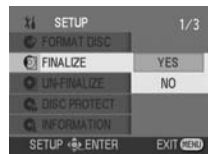
DVD-RW (VR format): Finalizing a DVD-RW (VR format) increases its compatibility with other products. DVD-RW (VR format) after finalization can be recorded and edited in the same way as DVD-RW (VR format) before finalization.

◇ **Connect this unit to the AC adaptor.** (Finalization cannot be executed using a battery.)

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

1 Press the MENU button, then select [ SETUP] → [ FINALIZE] → [YES] and press the joystick.

● When finalizing a DVD-RW (VR format), skip to step 3.



2 [When finalizing a DVD-RW (Video format) or DVD-R]

Select whether or not to create a top menu, then press the joystick.

YES: After finalizing, a top menu containing thumbnails appears first during playback.

NO: A top menu is not created. Playback starts from the first scene.

3 When the confirmation message appears, select [YES], then press the joystick.

● When finalizing is complete, press the MENU button to exit the message screen.



- Do not finalize a disc recorded on this unit using any other device.
- In the case of a double sided disc, finalize each side.
- The top menu created when finalizing does not appear on this unit. Play back the disc on a DVD player.
- It may take time to finalize a disc.
- If this unit becomes hot or is shaken strongly or impacted while finalizing, the finalization will fail and the disc may become unplayable on other devices.
- If the power supply stops while finalizing, the finalization will fail and the disc may become unplayable on other devices even if disc repair is carried out.

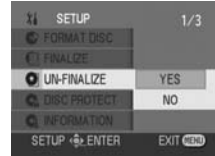
Un-finalizing a DVD-RW

This is for un-finalizing a DVD-RW (Video format) so that it can be used for recording.

-RW(V)

◇ Rotate the mode dial to select .

1 Press the MENU button, then select [ SETUP] → [ UN-FINALIZE] → [YES] and press the joystick.



2 When the confirmation message appears, select [YES], then press the joystick.

• When un-finalizing is complete, press the MENU button to exit the message screen.



- When you un-finalize the disc, use a battery with sufficient battery power or the AC adaptor.
- DVD-R cannot be un-finalized.
- DVD-RW (VR format) cannot be un-finalized. DVD-RW (VR format) after finalization can be recorded and edited in the same way as DVD-RW (VR format) before finalization.

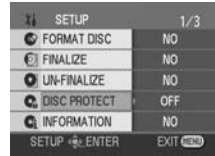
Protecting a disc



RAM -RW(VR)

This is for preventing recorded contents from being deleted or edited by mistake. Further recording and editing is not possible on protected discs until the protection is released.

◇ Rotate the mode dial to select .



- 1 Press the MENU button, then select [ SETUP] → [ DISC PROTECT] and press the joystick.



SETUP	1/3
FORMAT DISC	NO
FINALIZE	NO
UN-FINALIZE	NO
DISC PROTECT	OFF
INFORMATION	NO
SETUP 	ENTER
EXIT 	

- 2 When the confirmation message appears, select [YES], then press the joystick.

To release disc protection


- 1) Press the MENU button, then select [ SETUP] → [ DISC PROTECT] and press the joystick.
- 2) When the confirmation message appears, select [YES], then press the joystick.



- If the disc has been protected on another device, it may not be possible to release the protection on this unit. In this case, release the protection on the device that you used to protect it.

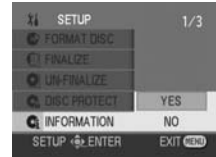
Displaying disc information

RAM -RW(VR) -RW(V) -R

Information such as the number of recorded scenes, the remaining space and whether or not the disc is finalized or protected is displayed.

◇ Rotate the mode dial to select .

Press the MENU button, then select [ SETUP] → [ INFORMATION] → [YES] and press the joystick.



To exit the information screen

Press the MENU button.

With a TV

Playback on TV

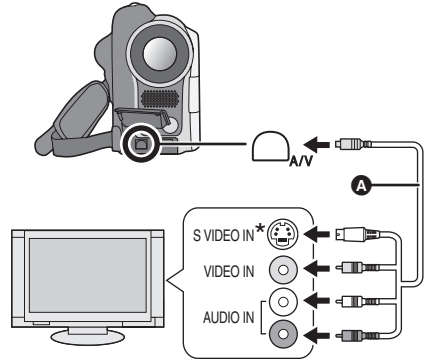
RAM -RW(VR) -RW(V) -R

Images recorded by this unit can be played back on a TV.

- Use the AC adaptor to free you from worrying about the battery running down.

1 Connect this unit and a TV.

- **A** AV/S cable (supplied)
 - Insert the plugs as far as they will go.



* If the TV has an S Video terminal, also connect the S Video plug to it. This allows you to enjoy more beautiful pictures.

2 Turn on this unit, then rotate the mode dial to select .

3 Change the input channel on the TV.

Example: Set the channel to "VCR2", etc. (The channel set will differ depending on the terminal to which the unit is connected.)

4 Start playback on this unit.

The image and audio are output on the TV.

■ If the image or audio from this unit is not output on the TV

- Check that the plugs are inserted as far as they go.
- Check the connected terminal.
- Check the TV's input setting (input switch). (For more information, please read the operating instructions for the TV.)

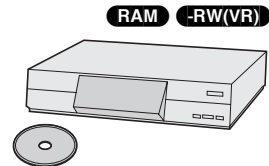
With a DVD recorder/player

Playback on DVD recorder/player

- When playing back a disc on a DVD recorder/player, place the device so that the disc lies flat.

Playing back a DVD-RAM or a DVD-RW (VR format)

Insert the disc in the DVD recorder/player, then play it back.

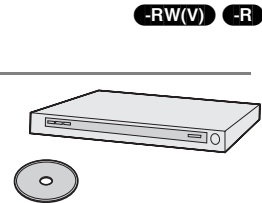


- Playback is only possible on devices that support 8 cm (3") DVD-RAM or DVD-RW (VR format). See the operating instructions for DVD recorder/player.
- DVD-RW (VR format) may have to be finalized. In this case, finalize the disc on this unit. (→ 70)
- You cannot record images that allow "One time only recording" on a 8 cm (3") disc.

Playing back a DVD-RW (Video format) or a DVD-R

1 Finalize the disc on this unit. (→ 70)

2 Insert the disc in the DVD recorder/player, then play it back.



- Do not insert a disc that has not been finalized into a DVD recorder/player: the disc may be unusable. Also, a message asking you to format the disc may appear on the DVD recorder. Do not format the disc.
- Playback is possible on devices that support 8 cm (3") DVD-Video, but playback on all DVD players is not guaranteed.

Copying recordings onto a DVD recorder's hard disk

RAM -RW(VR) -RW(V) -R

If you have a DVD recorder with hard disk, images recorded by this unit can be stored on the hard disk.

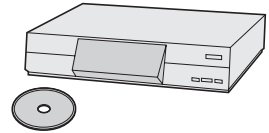
- If you want to record (dub) a disc that the DVD recorder is not compatible with, connect this unit and the DVD recorder with the AV/S cable and then record (dub) the disc. (→ 77)

1 [When copying (dubbing) a DVD-RW (Video format) or DVD-R]

Finalize the disc on this unit. (→ 70)

2 **Insert the disc in the DVD recorder, then copy (dub) the contents onto the hard disk.**

- For details on how to copy (dub) the images onto the hard disk, refer to the operating instructions of the DVD recorder.



- DVD-RW (VR format) may have to be finalized. In this case, finalize the disc on this unit. (→ 70)
- Do not insert a DVD-RW (Video format) or DVD-R that has not been finalized into a DVD recorder: the disc may be unusable. Also, a message asking you to format the disc may appear on the DVD recorder. Do not format the disc.
- You cannot record images that allow "One time only recording" on a 8 cm (3") disc.

With a VCR

Recording (dubbing) images onto other video devices

RAM -RW(VR) -RW(V) -R

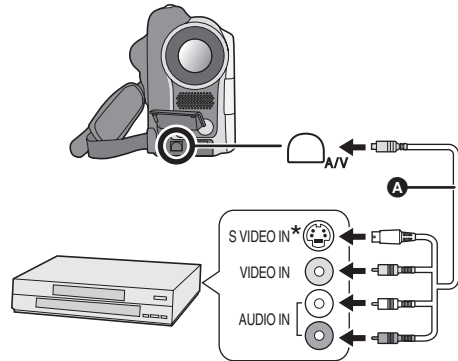
You can record (dub) images played back on this unit onto other video devices.

You can create a playlist by gathering the scenes you want to record (dub), then record (dub) the scenes in this playlist only to other devices. (→ 61)

- Use the AC adaptor to free you from worrying about the battery running down.

1 Connect this unit and a video device.

- **A** AV/S cable (supplied)
- Insert the plugs as far as they will go.



* If the video device has an S Video terminal, also connect the S Video plug into it. This allows you to enjoy more beautiful pictures.

2 Turn on this unit, then rotate the mode dial to select .

3 Change the input channel on the video device and TV.

Example: Set the channel to "LINE1", etc. on the video device. (The channel set will differ depending on the terminal to which the unit is connected.)

4 Start playback on this unit.

Then start recording on the connected device.

- See the operating instructions of the video device for details.

To stop recording (dubbing)

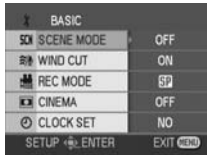
Stop recording on the connected device.

Then stop playback on this unit.






Menu

Menu list






Motion picture recording menus












■ [] BASIC

- [] SCENE MODE] (→ 47)
- [] WIND CUT] (→ 44)
- [] REC MODE] (→ 37)
- [] CINEMA] (→ 44)
- [] CLOCK SET] (→ 33)

■ [] ADVANCED

- [] D.ZOOM] (→ 38)
- [] EIS] (→ 45)
- [] MAGICPIX] (→ 45)
- [] FADE COLOR] (→ 42)
- [] ZOOM MIC] (→ 39)

■ [] SETUP

- [] DISPLAY] (→ 79)
- [] DATE/TIME] (→ 33)
- [] DATE FORMAT] (→ 33)
- [] POWER SAVE] (→ 79)
- [] BEEP SOUND] (→ 79)
- [] LCD SET] (→ 34)
- [] EVF SET] (→ 34)
- [] INITIAL SET] (→ 79)
- [] DEMO MODE] (→ 79)

■ [] LANGUAGE] (→ 30)

Motion picture playback menus



■ [] DELETE

(Only when [PLAY MODE] is set to [VIEW ALL] or [BY DATE])

[] SELECT] (→ 56)

[] ALL] (→ 56)

■ [] PLAY SETUP

[] PLAY MODE] (→ 55, 61, 62)

[] RESUME PLAY] (→ 55)

■ [] EDIT SCENE

(Only when [PLAY MODE] is set to [VIEW ALL] or [BY DATE])

[] DIVIDE] (→ 58)

[] COMBINE] (→ 59)

■ [] EDIT

(Only when [PLAY MODE] is set to [PLAYLIST])

[] ADD] (→ 63)

[] MOVE] (→ 64)

[] DIVIDE] (→ 65)

[] COMBINE] (→ 66)

[] DELETE] (→ 67)

■ [] SETUP

[] FORMAT DISC] (→ 69)

[] FINALIZE] (→ 70)

[] UN-FINALIZE] (→ 71)

[] DISC PROTECT] (→ 72)

[] INFORMATION] (→ 73)

[] DISPLAY] (→ 79)

[] DATE] (→ 33)

[] DATE FORMAT] (→ 33)

[] POWER SAVE] (→ 79)

[] BEEP SOUND] (→ 79)

[] LCD SET] (→ 34)

[] EVF SET] (→ 34)

■ [] LANGUAGE] (→ 30)

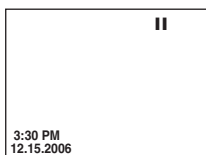
Setup menu

■ [DISPLAY

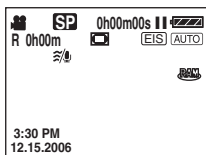
- OFF
- ON

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

OFF



ON



■ [BEEP SOUND]

- OFF
- ON

This allows operations such as starting and ending recording to be signaled by a beep. When [OFF] is set, no beep is heard when an operation such as recording is started or ended.

1 Beep

When you start recording
When you turn on the power

2 Beeps

When you pause recording
When you turn off the power

2 Beeps for 4 times

When an error occurs e.g. recording not starting. Check the sentence displayed on the screen. (→ 82)

■ [POWER SAVE]

- OFF
- 5 MINUTES

[OFF]: The power saving function is not activated.

[5 MINUTES]:

When about 5 minutes passed without any operation, this unit automatically turns off to prevent the battery from running down. When you use this unit, turn it on again.

- When using the AC adaptor, the unit will not turn off even if you set this to [5 MINUTES].

■ [INITIAL SET]

- YES
- NO


When there is a menu that cannot be selected depending on a combination of functions, set to [YES] for changing the menu settings back to the initial shipping condition.

(Language setting cannot be back to the initial shipping condition.)

■ [DEMO MODE]

- OFF
- ON

This item is used to start the unit demonstration.

(Only when using the AC adaptor and the mode dial is at the  position)

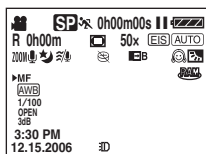
If you set this to [ON] without inserting a disc, this unit is automatically set to the demonstration mode for introducing its functions. If any button is pressed or operated, the demonstration mode is canceled. If no operations take place for approx. 10 minutes, the demonstration mode automatically starts.

To terminate the demonstration mode, insert a disc, or set this to [OFF]. For normal use, set this function to [OFF].

Indications

Indications

■ Recording indications



	Remaining battery power
R 0h00m	Remaining time for recording
0h00m00s	Elapsed recording time
3:30 PM 12.15.2006	Date/Time indication
●/II (Red)	Recording
II (Green)	Recording pause
	Digital zoom
(AUTO)	Auto mode
(MNL)	Manual mode
MF	Manual focus
2X	Zoom magnification indication
	Back light mode
(EIS)	Image stabilizer
1/100	Shutter speed
OPEN, F2.0	F number
0dB	Gain value
	Soft skin mode
W B	Fade (White) Fade (Black)
	MagicPix function
ID	Video light
ZOOM	Zoom microphone
	Wind noise reduction
XP, SP, LP	Motion picture recording mode

	Sports mode
	Portrait mode
	Low light mode
	Spotlight mode
	Surf & snow mode
(AWB)	Auto white balance
	Indoor mode (recording under incandescent lamp)
	Outdoor mode
	Manual adjustment mode
	Disc type
	DVD-RAM
	DVD-RW (VR format)
	DVD-RW (Video format)
	DVD-RW (unformatted)
	DVD-R

■ Playback indications



	Playback
	Pause
	Cue/Review playback
	Last/first scene paused
	Skip playback
	Slow motion playback
	Frame-by-frame playback
0h00m00s	Motion picture playback time
ALL 01 01	Play mode All scenes on the disc displayed Scenes recorded on the selected date displayed Scenes in the selected playlist displayed
No.10	Scene number
	Volume adjustment
R	Resume playback
	Contents that have been protected on another device.

■ Confirmatory indications

or --	The built-in battery is low. (→ 33)
	The warning/alarm indication appears when LCD monitor is rotated towards the lens side. Return the direction of the LCD monitor to normal position and check the warning/alarm indication.
	No disc is inserted.
	Unusable disc

Messages

CANNOT RECORD.	Data writing to the disc has failed.
NO DATA.	There are no images recorded on the disc.
THIS DISC IS INCOMPATIBLE.	You inserted an incompatible disc (copy-protected discs, etc.).
PLEASE CHECK THE DISC.	You inserted a disc that cannot be read on this unit (a disc recorded in PAL video format etc.).
RECOMMENDED TO USE PANASONIC DISC	You inserted a disc that does not meet the DVD standard for quality and performance so you may not be able to record normally. Refer to the following support site for information about discs that have been confirmed as compatible by Panasonic. http://panasonic.co.jp/pavc/global/cs/e_cam (This website is in English only.)
CANNOT RECORD. (THIS DISC IS FINALIZED)	A finalized DVD-RW (Video format) or DVD-R has been inserted. After finalizing, the discs become play-only and cannot record. If you un-finalize a DVD-RW (Video format), it can be used for recording. (→ 71)
CANNOT RECORD. DISC IS FULL.	The disc is full or the number of scenes has reached the maximum limit so no further data can be recorded. Delete unnecessary scenes (→ 56) or insert a new disc.
CANNOT RECORD. THE NUMBER OF SCENES HAS EXCEEDED THE MAXIMUM LIMIT.	
CANNOT OPERATE. TEMPERATURE IS HIGH. PLEASE TURN OFF AND WAIT A WHILE.	The temperature of the unit is high so it cannot be operated. Turn off the power, wait until the unit cools and then turn on the power again.
CANNOT UN-FINALIZE THIS DISC.	DVD-R cannot be un-finalized. DVD-RW (VR format) cannot be un-finalized. DVD-RW (VR format) after finalization can be recorded and edited in the same way as DVD-RW (VR format) before finalization.
PUSH THE RESET SWITCH.	An irregularity in the unit has been detected. Press the RESET button to restart the unit. (→ 88)
CHANGE TO MANUAL MODE.	You are attempting to use a function that cannot be used simultaneously.
CANCEL MAGICPIX MODE.	
TURN OFF THE VIDEO LIGHT.	

About recovery

It is possible that the system cannot complete writing of a file normally when, for example, power is turned off for some reason during recording or editing.

If faulty management information is found when a disc is accessed, the following message may appear. Be sure to follow the messages. (Repairing may take time depending on the error.)

DISC ERROR HAS OCCURRED. REPAIR DISC NOW?

- When you repair the disc, use a battery with sufficient battery power or the AC adaptor.
- Depending on the condition of the data, it may not be possible to completely repair the data.
- If the disc is removed without it being repaired, you will no longer be able to playback the scenes recorded before the power went off.
- Do not repair a disc that has been recorded on another device. This may cause the loss of data or the disc.

Functions that cannot be used simultaneously

Some functions in this unit are disabled or cannot be selected due to the unit's specifications. The table below shows examples of functions restricted by various conditions.

Functions	Conditions which disable the functions
Backlight compensation	<ul style="list-style-type: none"> • When the MagicPix function is used • When the video light is on (gain up mode) • When the iris/gain is set
MagicPix	<ul style="list-style-type: none"> • When the video light is on (gain up mode)
Image stabilizer	<ul style="list-style-type: none"> • When the MagicPix function is used • When the video light is on (gain up mode)
Video light on (gain up mode)	<ul style="list-style-type: none"> • When the MagicPix function is used.


Functions	Conditions which disable the functions
Scene mode	<ul style="list-style-type: none"> • When setting the AUTO/MANUAL/ FOCUS switch to AUTO • When the MagicPix function is used • When the video light is on
Change of white balance	<ul style="list-style-type: none"> • When digital zoom (30× or higher) is used • When the MagicPix function is used • When the video light is on (gain up mode)
Adjusting the shutter speed, iris/gain	<ul style="list-style-type: none"> • When the MagicPix function is used • When the video light is on (gain up mode) • When the scene mode is used

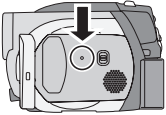
Frequently asked questions

What kind of discs can be used?	DVD-RAM, DVD-RW and DVD-R can be used if they are 8 cm (3") bare discs. (→ 18)
Can discs with a cartridge be used?	They can be used if the cartridge is removed.
Can double sided discs be used?	They can be used. However you cannot record or play continuously from one side of the disc to the other. You will need to eject the disc and turn it over.
Can I record continuously from one side of the disc to the other on a double sided disc?	You cannot record continuously from one side of the disc to the other. The recording time indicated on the disc package is the total time for both sides. You will need to eject the disc and turn it over to record on both sides.
Can DVD-R only be recorded to once only?	Recording can be started and stopped until the disc is full. However the data recorded on the DVD-R cannot be erased.
Is playback possible on a DVD player?	By finalizing a DVD-RW (Video format) or a DVD-R in this unit, it can be played back on a DVD player. DVD-RAM or DVD-RW (VR format) can be played back on a DVD recorder, DVD player etc. that supports DVD-RAM or DVD-RW (VR format). Refer to the operating instructions of the DVD recorder or DVD player. <ul style="list-style-type: none"> • DVD-RW (VR format) may have to be finalized. In this case, finalize the disc on this unit.

Troubleshooting

Problem	Check points
This unit cannot be turned on.	<ul style="list-style-type: none"> ● Is the battery fully charged? → Charge the battery using the AC adaptor. (→ 22)
This unit is turned off automatically.	<ul style="list-style-type: none"> ● If you do not use the unit for approximately 5 minutes, the power is automatically turned off to conserve the battery charge. To resume recording, turn the power back on. The power will not turn off automatically when the power save function (→ 79) is set to [OFF].
This unit does not stay on long enough.	<ul style="list-style-type: none"> ● Is the battery low? → If the remaining battery power indication is flashing or the message "LOW BATTERY." is displayed, the battery has run down. Charge the battery. (→ 22)
Battery runs down quickly.	<ul style="list-style-type: none"> ● Is the battery fully charged? → Charge it with the AC adaptor. (→ 22) ● Are you using the battery in an extremely cold place? → The battery is affected by ambient temperature. In cold places, the operating time of the battery becomes shorter. ● Has the battery worn out? → The battery has a limited life. If the operating time is still too short even after the battery is fully charged, the battery has worn out and can no longer be used.
<p>This unit cannot be operated though powered up.</p> <p>This unit does not operate normally.</p>	<ul style="list-style-type: none"> ● Press the RESET button. (→ 88) If normal conditions are not restored yet, remove the battery or AC adaptor, wait about 1 minute and then reconnect the battery or AC adaptor. Then about 1 minute later, turn on the power again. (Conducting the above operation when the access lamp is on may destroy the data on the disc.)
The screen has changed suddenly.	<ul style="list-style-type: none"> ● Has the demonstration started? → If you set [DEMO MODE] to [ON] without inserting a disc in disc recording mode, the unit is automatically set to the demonstration mode for introducing its functions. Normally this should be set to [OFF]. Press the MENU button, then select [SETUP] → [DEMO MODE] → [OFF] and press the joystick.
The DISC EJECT lever does not work.	<ul style="list-style-type: none"> ● The disc cover will not open unless the unit is powered. → Connect a charged battery or AC adaptor.

Problem	Check points
<p>A function indication such as mode indication, remaining time indication, or elapsed time indication is not shown.</p>	<ul style="list-style-type: none"> ● If you set [SETUP]→[DISPLAY]→[OFF], indications other than warnings and date indications disappear.
<p>Recording does not start although power is supplied to this unit and the disc is correctly inserted.</p>	<ul style="list-style-type: none"> ● Is the DVD-RAM or the DVD-RW (VR format) write-protected? → Release the protection. (→ 72) If the DVD-RAM or DVD-RW (VR format) was protected on another device, release the protection on the same device. ● Has the DVD-RW (Video format) or DVD-R been finalized? → After finalizing, the discs become play-only and cannot record. If you un-finalize a DVD-RW (Video format), it can be used for recording. (→ 71) ● Is the memory of the disc full? → If the disc has no more available memory, free up some memory by deleting unnecessary scenes (→ 56) or use a new disc. ● Is the unit set to the disc recording mode? → No recording is possible unless the mode dial is at . ● Is the disc cover open? → If the cover is open, this unit may not operate normally. Close the disc cover.
<p>Recording starts but stops immediately. The playback picture breaks up for a moment.</p>	<ul style="list-style-type: none"> ● Is the disc scratched or dirty? → Clean the disc. (→ 21) ● The unit is hot. Follow the messages on the display. To use the unit again, turn the unit off and leave it for a while.
<p>Auto focus function does not work.</p>	<ul style="list-style-type: none"> ● Is manual focus mode selected? → Set the AUTO/MANUAL/FOCUS switch to AUTO. ● Are you trying to record a scene which is hard to bring into focus in auto focus mode? → There are some recording subjects and surroundings for which the auto focus does not operate correctly. (→ 94) If so, use the manual focus mode to adjust the focus. (→ 49) ● Is the MagicPix function set? → When the MagicPix function is working, focusing shifts into the manual mode.

Problem	Check points
<p>Sound is not played back from the built-in speaker of this unit.</p>	<ul style="list-style-type: none"> ● Is the volume too low? → During playback, move the volume lever to display the volume indication and adjust it. (→ 54)
<p>Although this unit is correctly connected to a TV, playback images cannot be seen.</p>	<ul style="list-style-type: none"> ● Have you selected video input on the TV? → Please read the operating instructions of your TV and select the channel that matches the input used for the connection.
<p>Scenes cannot be deleted or edited.</p>	<ul style="list-style-type: none"> ● Is the DVD-RAM or the DVD-RW (VR format) write-protected? → Release the protection. (→ 72) If the disc or the contents on the disc have been protected on another device, release the protection on the same device. ● It may not be possible to delete scenes that have been divided. → Combine the divided scenes, and then delete them. (→ 59) ● Scenes displayed as thumbnails in shades of blue and white may not be deleted. If the scenes are unnecessary, format the disc to erase the data. (→ 69) Please be aware that if a disc is formatted then all the data recorded on the disc will be erased.
<p>Even if a disc is formatted, it cannot be used.</p>	<ul style="list-style-type: none"> ● Either this unit or the disc may be damaged. Please consult a dealer.
<p>The indication disappears. The screen is frozen. No operation can be performed.</p>	<ul style="list-style-type: none"> ● Turn off the power to this unit. If the power cannot be turned off, press the RESET button, or remove the battery or AC adaptor and then reattach it. After that, turn on the power again. If normal operation is still not restored, detach the power connected, and consult the dealer who you purchased this unit from.
<p>“PUSH THE RESET SWITCH.” is displayed.</p>	<ul style="list-style-type: none"> ● The unit has automatically detected an error. Press the RESET button with the projecting part of the lens cap. This will restart the unit. ● If you do not press the RESET button, the power to this unit is turned off automatically about 1 minute later. ● Even after you press the RESET button, the indication may still appear repeatedly. If so, this unit needs repair. Detach the power connected, and consult the dealer who you purchased this unit from. Do not attempt to repair the appliance by yourself. 

Cautions for use

About this unit

- The unit and disc become warm after long operation, but this is not a malfunction.

Keep the unit away from magnetized products/mobile phones, microwave ovens, TVs and video game products.

- If you use the unit on or near a TV, the images or sound may be disturbed due to electromagnetic wave radiation.
- Do not use near cell phone because doing so may cause noise to adversely affect the picture and sound.
- Recordings may be damaged, or images may be distorted, by the strong magnetic fields created by speakers or large motors.
- Electromagnetic wave radiation generated by digital circuits including microprocessors may adversely affect the unit, causing the disturbance of images and sounds.
- If the unit is affected by such products and does not function properly, turn off the unit and detach the battery or AC adaptor. Then connect the battery or AC adaptor again.

Do not use the unit near radio transmitters or high-voltage cables.

- If you record pictures near radio transmitters or high-voltage cables, recorded images or sounds may be adversely affected.

Make sure to use the supplied cords and cables. If you use optional accessories, use the cords and the cables supplied with them.

Do not extend the cords and the cables.

Do not spray insecticides or volatile chemicals onto the unit.

- If the unit is sprayed with such chemicals, its body may be marred and the surface finish may peel off.
- Do not leave rubber or plastic products in contact with the unit for a long time.

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

Also, keep the unit away from sea water.

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

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

- A strong impact can break the unit's casing, causing it to malfunction.

Do not use benzine, paint thinner or alcohol for cleaning the unit.

- Before cleaning, detach the battery or pull out the AC cable from the AC outlet.
- The camera body may be discolored and the surface finish may peel off.
- Wipe the unit with a soft dry cloth to remove dust and fingerprints. To remove stubborn stains, thoroughly wring a cloth that has been soaked in a neutral detergent diluted with water and wipe the unit with it. Afterwards, wipe it with a dry cloth.
- When you use a chemical dust cloth, follow the instructions that came with the cloth.

Do not touch the laser pickup lens.

- If you touch the laser pickup lens directly it may cause malfunctions.

Do not use a commercial available 8 cm (3") CD lens cleaner.

- Using 8 cm (3") CD lens cleaner could cause this unit to malfunction.

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

- If you use the unit for a long time, heat will build up inside it and this may cause a malfunction.
- This unit is not intended for business use.

When you are not going to use the unit for an extended time

- When storing the unit in a cupboard or cabinet, it is recommended that you place a desiccant (silica gel) in with it.

About the battery

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

Be sure to detach the battery after use.

- If the battery is left attached, a minute amount of current continues to flow even if the unit's power is off. Keeping the unit in this state may result in over discharge of the battery. This may result in you not being able to use the battery even after it is charged.

Prepare spare batteries when going out for recording.

- In cold places such as a ski resort, the period during which you can record pictures is shortened.
- When you travel, do not forget to bring an AC adaptor (supplied) so that you can recharge the batteries at your destination.

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

- Attaching a battery with damaged terminals can damage the unit.

Tips for storing the battery

- The battery should be stored in the vinyl bag so metal does not come into contact with the terminals.
- The battery should be stored in a cool place free from humidity, with as constant temperature as possible. (Recommended temperature: 15 °C to 25 °C (59 °F to 77 °F), Recommended humidity: 40% to 60%)
- Extremely high temperatures or low temperatures will shorten the life of the battery.
- If the battery is kept in high-temperature, high-humidity, or oily-smoky places, the terminals may rust and cause malfunctions.
- To store the battery for a long period of time, we recommend you charge it once every

year and store it again after you have completely used up the charged capacity.

- Dust and other matter attached to the battery terminals should be removed.

Do not throw old battery into fire.

- Heating a battery or throwing it into a fire may result in an explosion.
- If the operating time is very short even after the battery has been recharged, the battery has worn out. Please purchase a new battery.

About the AC adaptor

- Be sure to use the supplied AC adaptor.
- If you use the AC adaptor near a radio, radio reception may be disturbed. Keep the AC adaptor 1 m (3.3 feet) or more away from the radio.
- When using the AC adaptor, it may generate whirring sounds. However, this is normal.
- After use, be sure to disconnect the AC adaptor. (If it is left connected, a minute amount of current is consumed.)
- Always keep the electrodes of the AC adaptor and battery clean.

Put this unit near the outlet to make it easy for the interrupting device (plug) to reach it.

About charging errors

When the charging lamp flashes rapidly or slowly, one of the following situations may be to blame.

When the lamp blinks slowly:

- The battery may have excessively discharged. It can be recharged but in some cases it may take several hours until regular charging commences.

When the lamp blinks rapidly:

- The battery has not been recharged. Remove the battery from the AC adaptor, and try charging it again.
- The battery temperature or ambient temperature may be extremely high or low. Wait until the appropriate temperature is restored before charging the battery again. If the battery still fails to charge, something may be wrong with the battery or AC adaptor. Contact your dealer.

When the lamp is off:

- Charging is completed.
- When the lamp is off but charging is not completed, trouble may have occurred in the AC adaptor or the battery. Contact your dealer.

About the disc

- **If there is dust, a scratch, or dirt on disc or if it is warped, the following phenomena may occur:**
 - Block noise in playback image
 - Momentary stop of playback image
 - Sound interrupted during playback, or abnormal sound
 - Thumbnail display with shades of blue and white
 - Disc cannot correctly be recognized
 - Delay between video and audio
- When recording images, this unit may avoid the portions of disc where recording is not possible, due to dust, scratches, etc. (It will pause at such a portion and automatically restart recording.)

When the access lamp is illuminated (during access to the disc), do not open the disc cover, turn off the power, or cause any vibrations or impacts.

DVD-R

- For optimum recording on DVD-R disc, this unit writes control data to the disc in order to automatically make adjustments when it is inserted and ejected accompanying recording. If the disc has no area for control data to be written, recording may not be possible. To prevent this, do not insert a DVD-R which has been recorded on more than 50 times.
- Do not insert a DVD-R recorded on this unit that has not been finalized into a recordable device, such as a DVD recorder. The recorded data may be damaged.

LCD monitor/viewfinder

- When the LCD monitor gets dirty, wipe it with a dry soft cloth.
- In a place with drastic temperature changes, condensation may form on the LCD monitor. Wipe it with soft dry cloth.
- When the unit has become very cold, for example due to storage in a cold area, its LCD monitor will be slightly darker than usual immediately after the power is turned on. The normal brightness will be restored when the unit's internal temperature rises.

Extremely high precision technology is employed to produce the LCD Monitor screen featuring a total of approximately 105,000 pixels. The result is more than 99.99% effective pixels with a mere 0.01% of the pixels inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

Extremely high precision technology is employed to produce the viewfinder screen featuring a total of approximately 123,000 pixels. The result is more than 99.99% effective pixels with a mere 0.01% of the pixels inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

About condensation

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

Causes of condensation

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

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

When this unit is taken to a location with a significant temperature difference such as from a cold place to a hot place.

If, for example, you have used this unit for recording on a ski slope and are taking it into a heated room, place the unit inside a plastic bag, remove as much of the air from inside the bag as possible, then seal the bag. Leave the unit for about an hour in the room so the temperature of the unit is close to the ambient temperature of the room, then use it.

What to do with the lens is fogged up.

Remove the battery or AC adaptor and leave the unit for about 1 hour. When the unit becomes close to the ambient temperature, the fog disappears naturally.

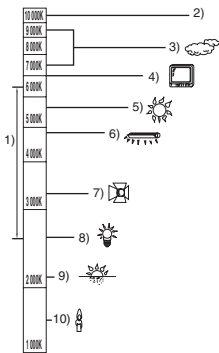
Explanation of terms

Automatic white balance

White balance adjustment recognizes the color of light and adjusts so the white color will become a purer white. The unit determines the hue of light that comes through the lens and white balance sensor, thereby judging the recording condition, and selects the closest hue setting.

This is called automatic white balance adjustment.

However, since the unit only stores white color information under several light sources, automatic white balance adjustment does not function normally under other light sources.



The illustration above shows the range over which the auto white balance functions.

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

Outside of the effective range of automatic white balance adjustment, the image will become reddish or bluish. Even within the effective range of automatic white balance adjustment, the automatic white balance adjustment may not function properly if there is more than one light source. For light outside the functional automatic white balance

adjustment range, use the manual white balance adjustment mode.

White balance

The images recorded by the unit may become bluish or reddish under the influence of certain light sources. To avoid such phenomena, adjust the white balance.

White balance adjustment determines the white color under different light sources. By recognizing which is the white color under sunlight and which is the white color under a fluorescent light, the unit can adjust the balance among the other colors.

Since the white color is the reference for all the colors (that make up light), the unit can record pictures in a natural hue if it can recognize the reference color white.

Auto focus

The lens is moved forward or backward automatically to bring the subject into focus.

Auto focus has the following characteristics.

- Adjusts so that the vertical lines of a subject are seen more clearly.
- Attempts to bring an object with higher contrast into focus.
- Focuses on the screen center only.

Due to these characteristics, auto focus does not work correctly in the following situations. Record pictures in the manual focus mode.

Recording distant and close-up objects at the same time

Since the unit focuses on whatever is at the center of the screen, it is difficult to bring the background into focus when close-up objects are placed in focus. When recording people with distant mountains in the background, you cannot focus on both the subject which is close-up and the objects which are in the distance.

Recording a subject behind dirty or dusty window

The subject behind the window will not be focused because the focus is on the dirty window.

Similarly, when recording something on the opposite side of a road with heavy traffic, a vehicle that happens to pass by may be brought into focus.

Recording a subject that is surrounded by objects with glossy surfaces or by highly reflective objects

Since whatever is shiny or glistens is brought into focus, it is hard to focus on the subject to be recorded. The focus may become blurry when recording subjects at the seashore, in night views or in scenes involving fireworks or special lights.

Recording a subject in dark surroundings

The unit cannot focus correctly because the light information that comes through the lens decreases considerably.

Recording a fast-moving subject

As the focus lens-inside moves mechanically, it cannot keep up with a fast-moving subject. When, for example, recording a sports event with fast moving subjects, the focus may lose its sharpness.

Recording a subject with little contrast

It is easy to bring subjects with a sharp contrast or vertical lines or stripes into focus. This means that a subject with little contrast, such as a white wall, may become blurry because the unit achieves focus based upon the vertical lines of an image.

Specifications

DVD Video Camera: Information for your safety

Power source:	DC 7.9 V/7.2 V
Power consumption:	6.0 W

Signal system	EIA Standard: 525 lines, 60 fields NTSC color signal
Recording format	DVD Video Recording format (DVD-RAM, DVD-RW) DVD-Video format (DVD-RW, DVD-R)
Image sensor	1/6-inch CCD image sensor Total pixels approx. 680 K Effective pixels Motion picture: approx. 340 K
Lens	30× power zoom F1.8–F3.9 (f = 1.90 mm to 57.0 mm, 35 mm equivalent: 35.7 mm to 1072 mm)
Filter diameter	30.5 mm
Zoom	30× optical zoom, 50/1000× digital zoom
Monitor	2.5" LCD monitor (approx. 105 K pixels)
Viewfinder	Color electric viewfinder (approx. 123 K pixels)
Microphone	Stereo (with a zoom function)
Speaker	1 round speaker \varnothing 20 mm
Standard illumination	1,400 lx
Minimum required illumination	12 lx (2 lx with the MagicPix function)
Video output level	1.0 Vp-p 75 Ω
S-Video output level	Y: 1.0 Vp-p, 75 Ω C: 0.286 Vp-p, 75 Ω
Audio output level (Line)	316 mV, 600 Ω
USB	USB 2.0 compliant (Hi-Speed)

Specifications

Dimensions	Approx. 53 mm (W) × 87 mm (H) × 129 mm (D) [Approx. 2.087 inch (W) × 3.425 inch (H) × 5.079 inch (D)] (excluding projecting parts)
Mass	Approx. 480 g (1.058 lbs.) (without supplied battery, lens cap and a disc)
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Operating humidity	10% to 80%

Motion pictures

Recording media	8 cm (3") DVD-RAM Ver. 2.1 8 cm (3") DVD-RW Ver. 1.1/2X-SPEED (2X/1X) 8 cm (3") DVD-R for General Ver. 2.0
Compression	MPEG2
Recording mode and transfer rate	XP: 9 Mbps (VBR) SP: 5 Mbps (VBR) LP: 2.5 Mbps (VBR)
Audio compression	Dolby Digital (Dolby AC3), 16 bit (48 kHz/2 ch)

AC adaptor: Information for your safety








Power source:	AC 110 V to 240 V, 50/60 Hz
Power consumption:	19 W
DC output:	DC 7.9 V, 1.4 A (Unit operation) DC 8.4 V, 0.65 A (Battery charging)

Dimensions	Approx. 61 mm (W) × 32 mm (H) × 91 mm (D) [Approx. 2.40 inch (W) × 1.26 inch (H) × 3.58 inch (D)]
Mass	Approx. 110 g (0.24 lbs.)

Mass and dimensions are approximate values.
Specifications may change without prior notice.

Optional accessories

DVD video camera accessories

Accessory No.	Figure	Description
LM-AF30U		8 cm (3") DVD-RAM (single sided)
LM-AF60U		8 cm (3") DVD-RAM (double sided)
LM-RW30U		8 cm (3") DVD-RW (single sided)
LM-RW60U		8 cm (3") DVD-RW (double sided)
LM-RF30V		8 cm (3") DVD-R (single sided)
PV-DAC14		AC adaptor with AC Cable and DC Cables
CGA-DU12A/1B*		1150 mAh/Rechargeable Lithium Ion Battery Pack
CGA-DU21A/1B*		2040 mAh/Rechargeable Lithium Ion Battery Pack
N2QAEC000019		IR Remote Control

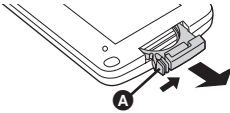
* Please refer to page 23 concerning the battery charging time and available recording time.

NOTE: Accessories and/or model numbers may vary by country. Please consult your local dealer.

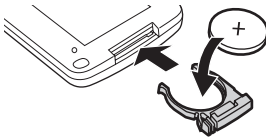
■ When using the remote control (not supplied)

Install the button-type battery (not supplied) in the remote control before using it.

- 1 While pressing the stopper **A**, pull out the battery holder.



- 2 Set the button-type battery with its (+) mark facing upward and slide the battery holder back into place.



Warning

Danger of explosion if battery is incorrectly installed.

Install only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

Risk of fire, explosion and burns. Do not recharge, disassemble, heat above 100 °C (212 °F) or incinerate. Keep the Button-Type battery out of the reach of children. Never put Button-Type battery in mouth. If swallowed, call your doctor.

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

Accessory Order Form

Please photocopy this form when placing an order.

1. Model # _____

2. Items Ordered

Accessory #	Description	Price Each	Quantity	Total Price
Subtotal				
Your State & Local Sales Tax				
Shipping & Handling				6.95
Total Enclosed				

3. Method of payment (check one)

- Check of Money Order enclosed (NO C.O.D.SHIPMENTS)
- VISA Credit Card # _____
- MasterCard Expiration Date _____
- Discover Customer Signature _____

Make Check or Money Order Payable to: PANASONIC ACCESSORIES

(Please do not send cash)

4. Shipping information (UPS delivery requires complete street address)

Ship To:

Mr.

Mrs.

Ms. _____

First

Last

Phone#:

Day () _____

Street Address

Night () _____

City

State

Zip

TO OBTAIN ANY OF OUR ACCESSORIES YOU CAN DO ANY OF
THE FOLLOWING:

VISIT YOUR LOCAL PANASONIC DEALER

OR

CALL PANASONIC'S ACCESSORY ORDER LINE AT 1-800-332-5368

[6 AM-5 PM M-F, 6 AM-10:30 AM SAT, PACIFIC TIME]

OR

MAIL THIS ORDER TO: PANASONIC SERVICES COMPANY ACCESSORY ORDER OFFICE

20421 84th Avenue South Kent, WA. 98032

Request for Service Notice

Please photocopy this form when making a request for service notice, in the unlikely event this product needs service.

Request for Service Notice:

- Please include your **proof of purchase.**
(Failure to do so will delay your repair.)
 - To further speed your repair, please provide an explanation of what is wrong with the unit and any symptom it is exhibiting.
-
-
-
-

Mail this completed form and your Proof of Purchase along with your unit to:
Panasonic Services Company
410B Airport Road
Elgin, IL 60123-9333
Attn: Camcorder Repair

Limited Warranty

PANASONIC CONSUMER ELECTRONICS
COMPANY, DIVISION OF PANASONIC
CORPORATION OF NORTH AMERICA
One Panasonic Way, Secaucus, New Jersey 07094

PANASONIC PUERTO RICO, INC.
Ave. 65 de Infantería, Km. 9.5 San Gabriel Industrial Park,
Carolina, Puerto Rico 00985

Panasonic Video Products Limited Warranty

Limited Warranty Coverage

If your product does not work properly because of a defect in materials or workmanship, Panasonic Consumer Electronics Company or Panasonic Puerto Rico, Inc. (collectively referred to as "the warrantor") will, for the length of the period indicated on the chart below, which starts with the date of original purchase ("warranty period"), at its option either (a) repair your product with new or refurbished parts, or (b) replace it with a new or a refurbished product. The decision to repair or replace will be made by the warrantor.

Product	Parts	Labor	Service	Contact Number
Camcorder	One (1) Year (except CCD Image Sensor) CCD Image Sensor - 6 (Six) Months	Ninety (90) Days Ninety (90) Days	Carry-In or Mail-In	1-800-211-PANA(7262)
DVD/VCR Deck, AV Mixer	One (1) Year	Ninety (90) Days	Carry-In or Mail-In	1-800-211-PANA(7262)
TV/VCR, TV/DVD, TV/DVD/VCR Combination	One (1) Year (except CRT) CRT - Two (2) Years	Ninety (90) Days Ninety (90) Days	Carry-In: 21" CRT and Smaller In-Home or Carry-In: 22" CRT and Larger	1-800-211-PANA(7262)
TV/HDR Combination	One (1) Year (except CRT) CRT - Two (2) Years	Ninety (90) Days Ninety (90) Days	In-Home or Carry-In	1-888-843-9788
Rechargeable Batteries (in exchange for defective item)	Ten (10) Days	Not Applicable	Carry-In or Mail-In	1-800-211-PANA(7262)
Tape (in exchange for defective item)	Five (5) Days	Not Applicable	Carry-In or Mail-In	1-800-211-PANA(7262)
Memory Cards (in exchange for defective item)	Ninety (90) Days	Not Applicable	Carry-In or Mail-In	1-800-211-PANA(7262)

During the "Labor" warranty period there will be no charge for labor. During the "Parts" warranty period, there will be no charge for parts. You must carry-in or mail-in (prepaid) your product or arrange for in-home service, as applicable, during the warranty period. If non-rechargeable batteries are included, they are not warranted. This warranty only applies to products purchased and serviced in the United States or Puerto Rico. This warranty is extended only to the original purchaser of a new product which was not sold "as is". A purchase receipt or other proof of the original purchase date is required for warranty service.

Carry-In, Mail-in (Prepaid) or In-Home Service

For Carry-In, Mail-In (prepaid) or In-Home Service (as applicable) in the United States call toll free contact number listed above or visit Panasonic Web Site: <http://www.panasonic.com>

For assistance in Puerto Rico call Panasonic Puerto Rico, Inc. (787)-750-4300 or fax (787)-768-2910.

In-Home service, if applicable, requires clear, complete and easy access to the product by the authorized servicer and does not include removal or re-installation of an installed product. It is possible that certain in-home repairs will not be completed in-home, but will require that the product, or parts of the product, be removed for shop diagnosis and/or repair and then returned.

Limited Warranty Limits And Exclusions

This warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage, nor does it cover markings or retained images on the picture tube resulting from viewing fixed images (including, among other things, letterbox pictures on standard 4:3 screen TV's, or non-expanded standard 4:3 pictures on wide screen TV's, or onscreen data in a stationary and fixed location). The warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by products not supplied by the warrantor, or failures which result from accidents, misuse, abuse, neglect, bug infestation, mishandling, misapplication, alteration, faulty installation, set-up adjustments, misadjustment of consumer controls, improper maintenance, power line surge, lightning damage, modification, or commercial use (such as in a hotel, office, restaurant, or other business), rental use of the product, service by anyone other than a Factory Servicenter or other Authorized Servicer, or damage that is attributable to acts of God.

THERE ARE NO EXPRESS WARRANTIES EXCEPT AS LISTED UNDER "LIMITED WARRANTY COVERAGE". THE WARRANTOR IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT, OR ARISING OUT OF ANYBREACH OF THIS WARRANTY.

(As examples, this excludes damages for lost time, cost of having someone remove or re-install an installed unit if applicable, or travel to and from the servicer, loss of media or images, data or other memory or recorded content. The items listed are not exclusive, but are for illustration only.)

ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY, ARE LIMITED TO THE PERIOD OF THE LIMITED WARRANTY.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. If a problem with this product develops during or after the warranty period, you may contact your dealer or Servicenter. If the problem is not handled to your satisfaction, then write to the warrantor's Consumer Affairs Department at the addresses listed for the warrantor.

PARTS AND SERVICE (INCLUDING COST OF AN IN-HOME SERVICE CALL, WHERE APPLICABLE) WHICH ARE NOT COVERED BY THIS LIMITED WARRANTY ARE YOUR RESPONSIBILITY.

Customer Services Directory

Obtain Product Information and Operating Assistance; locate your nearest Dealer or Servicenter; purchase Parts and Accessories; or make Customer Service and Literature requests by visiting our Web Site at:

<http://www.panasonic.com/consumersupport>

or, contact us via the web at:

<http://www.panasonic.com/contactinfo>

You may also contact us directly at:

1-800-211-PANA (7262),

Monday-Friday 9 am-9 pm; Saturday-Sunday 10 am-7 pm, EST

For hearing or speech impaired TTY users, TTY : 1-877-833-8855

Accessory Purchases

Purchase Parts, Accessories and Instruction Books online for all Panasonic Products by visiting our Web Site at:

<http://www.pasc.panasonic.com>

or, send your request by E-mail to:

npcparts@us.panasonic.com

You may also contact us directly at:

1-800-332-5368 (Phone) 1-800-237-9080 (Fax Only) (Monday – Friday 9 am to 8 pm, EST.)

Panasonic Services Company

20421 84th Avenue South,

Kent, WA 98032

(We Accept Visa, MasterCard, Discover Card, American Express, and Personal Checks)

For hearing or speech impaired TTY users, TTY : 1-866-605-1277

Product Repairs

Centralized Factory Servicenter

MAIL TO:

Panasonic Services Company

410B Airport Road

Elgin, IL 60123-9333

Attention: Camcorder Repair

Please carefully pack and ship, prepaid and insured, to the Elgin Centralized Factory Servicenter Customer's in Puerto Rico, please ship or carry in to location below ("Service in Puerto Rico").

Service in Puerto Rico

Panasonic Puerto Rico, Inc.

Ave. 65 de Infantería, Km. 9.5, San Gabriel Industrial Park,

Carolina, Puerto Rico 00985

Phone (787)750-4300, Fax (787)768-2910

As of October 2005

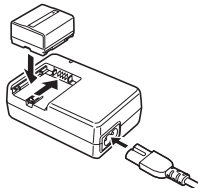
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Spanish Quick Use Guide/Guía española para el uso rápido

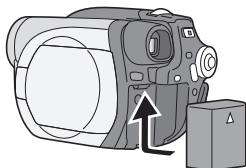
■ Carga de la batería

- 1 Conecte el cable eléctrico de CA al adaptador de CA y a la toma de la red de CA.
- 2 Meta la batería en el respectivo soporte alineando la marca, luego encájela.



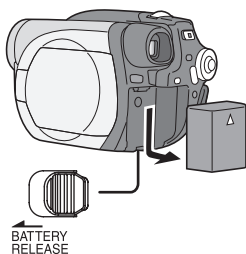
■ Montaje de la batería

Empuje la batería contra el porta batería y hágala deslizar hasta que dispare.



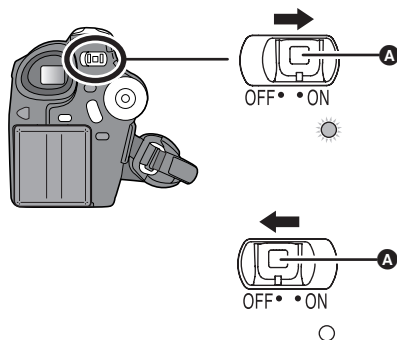
■ Cómo quitar la batería

Mientras hace deslizar la palanca BATTERY RELEASE, haga deslizar la batería para quitarla.



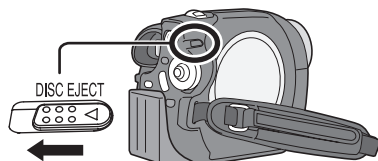
■ Cómo encender/apagar la alimentación

Mientras pulsa el botón **A**, ajuste el interruptor OFF/ON a ON/OFF.

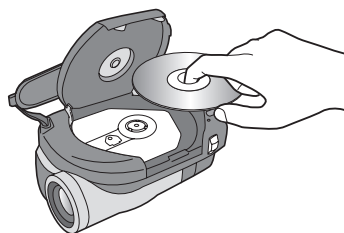


■ Insertar/quitar un disco

- 1 Haga deslizar la palanca DISC EJECT una vez y la deje.




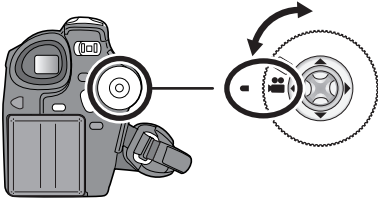
- 2 Abra la tapa del compartimiento del disco manualmente e inserte/saque el disco.



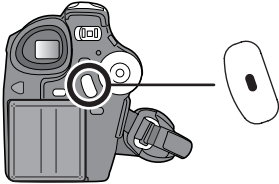
- 3 Empuje la sección marcada "PUSH CLOSE" en la tapa del compartimiento del disco para cerrarla.

■ Grabación de imágenes dinámicas

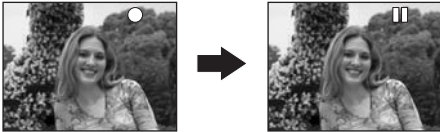
- Gire el selector de modo para seleccionar .




- 1 Pulse el botón de inicio/parada de la grabación para empezar a grabar.

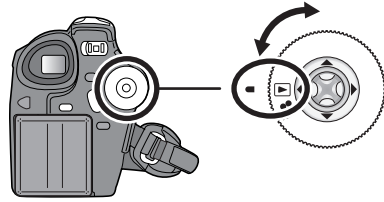


- 2 Pulse de nuevo el botón de inicio/parada de la grabación para detener brevemente la grabación.



■ Reproducción de imágenes dinámicas

- Gire el selector de modo para seleccionar .



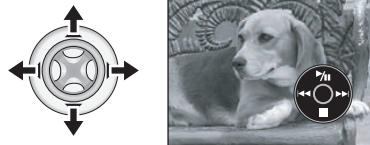
- 1 Seleccione la escena a ser reproducida.



- 2 Pulse el joystick.



- 3 Mueva el joystick para obrar.



- ▶|||: Reproducción/Pausa
- ◀◀ (Mueva): Salto de reproducción (hacia atrás)
- ◀◀ (Mueva y mantenga): Reproducción regresiva
- ▶▶ (Mueva): Salto de reproducción (en adelante)
- ▶▶ (Mueva y mantenga): Reproducción progresiva
- : Detiene la reproducción y muestra las miniaturas.

**Panasonic Consumer Electronics Company,
Division of Panasonic Corporation of North America**

One Panasonic Way, Secaucus, NJ 07094

Panasonic Puerto Rico, Inc.

Ave. 65 de Infantería, Km. 9.5, San Gabriel Industrial Park, Carolina, Puerto Rico 00985



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