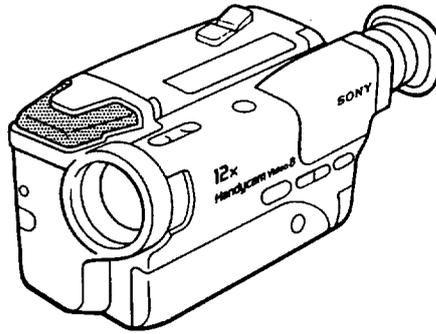


CCD-TR23/TR33/TR380/ TR380PK/TR460/TR460PK

RMT-708

SERVICE MANUAL



US Model
Canadian Model
CCD-TR23/TR33

E Model
CCD-TR380/TR380PK/TR460/TR460PK

Hong Kong Model
CCD-TR380/TR460

Handycam

A MECHANISM

CCD-TR380PK is model that carrying case and wireless remote commander are added in CCD-TR380.

CCD-TR480PK is model that carrying case are added in CCD-TR480.

CCD-TR380PK/TR460PK are different from CCD-TR380/TR460 only in the accessory and packing materials.

For MECHANISM ADJUSTMENTS, refer to the "8 mm Video MECHANICAL ADJUSTMENT MANUAL IV" (9-973-199-11).

SPECIFICATIONS

Video Camera Recorder

System

Video recording system

Two rotary heads, Helical scanning, FM system

Audio recording system

Rotary heads, FM system

Video signal

NTSC color, EIA standards

Usable cassette

8 mm video format cassette (standard 8 mm)

Tape speed

SP mode: Approx. 19/32 inches (1.43 cm)/second,

LP mode: Approx. 5/16 inches (0.72 cm)/second (playback only)

Recording time

SP mode 2 hours (P6-120)

Playback time

SP mode: 2 hours (P6-120)

LP mode: 4 hours (P6-120)

Fastforward/rewind time

Approx. 6 min. 30 sec. (P6-120)

Image device

CCD (Charge Coupled Device)

Viewfinder

Electronic viewfinder

CCD-TR23/TR380: Black and white

CCD-TR33/TR460: Color

Lens

12 x, Combined power zoom lens, Filter diameter 1½ inches (37 mm), TTL autofocus system inner focus wide macro system

Focal distance

7/32-2¼ in (5.4-64.8 mm)

1¼-18½ in (39-468 mm), when converted into a 35-mm still camera

Color temperature

Auto

Minimum illumination

0.8 lx at F1.8

Illumination range

0.8 - 100,000 lx

Recommended illumination

More than 100 lx

Output connector

Video output

Phono jack, 1 Vp-p, 75 Ω, unbalanced, sync negative

Audio output

Monaural, Phono jack 327 mV, (at output impedance 47 kΩ) impedance less than 2.2 kΩ

RFU DC OUT

Special minijack, DC 5 V

Earphone jack

Minijack (ø3.5 mm)

LANC jack

Stereo mini-minijack (ø 2.5 mm)

MIC jack

Minijack, 0.388 mV low impedance with 2.5 to 3 V DC, output impedance 6.8 kΩ (ø3.5 mm)

— Continued on next page —



8 VIDEO CAMERA RECORDER
SONY®

Before You Begin

Checking Your Model Number

The instructions in this manual are for two models listed below. Before you start reading and operating, check your model number by looking at the bottom of your camcorder. The CCD-TR33 is the model used for illustration purposes. Otherwise, the model name is indicated in the illustrations. Any differences in operation are clearly indicated in the text, for example, "CCD-TR33".

As you read through this manual, buttons and settings on the camcorder are shown in capital letters. e.g. Set the POWER switch to CAMERA.

Types of Differences

Model number	Viewfinder
CCD-TR23	B/W
CCD-TR33	Color

Note on TV Color Systems

TV color systems differ from country to country.

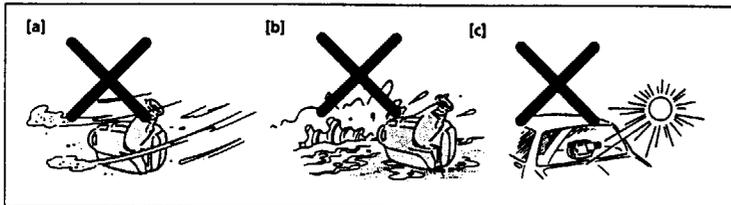
To view your recordings on a TV, you need an NTSC system based TV. When you want to use a PAL-M system based TV, you will need a NTSC/PAL-M transcoder (as this is an NTSC system based camcorder). Please check the list on page 35 to see the TV color system of your country.

Precaution on Copyright

Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

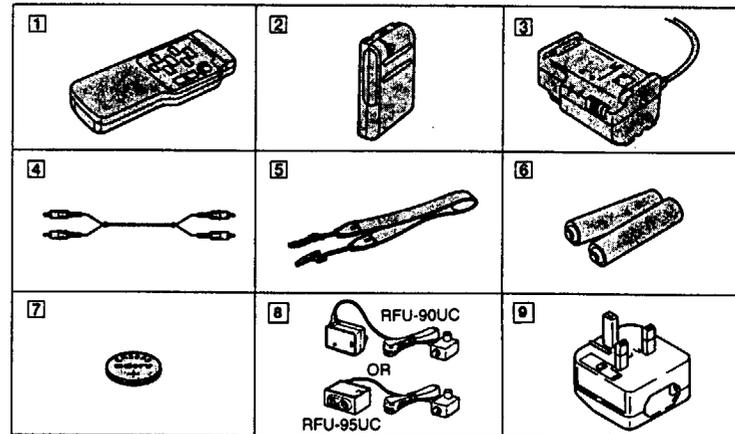
Precautions on Camcorder Care

- Do not let sand get into the camcorder. When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction and sometimes the malfunction cannot be repaired. [a]
- Do not let the camcorder get wet. Keep the camcorder from rain or sea water. It may cause a malfunction and sometimes the malfunction cannot be repaired. [b]
- Never leave the camcorder under temperatures above 140°F (60°C), such as in a car parked in the sun or under direct sunlight. [c]



Checking Supplied Accessories

Check that the following accessories are supplied with your camcorder.



- 1 Wireless remote commander (1) (Except TR380)
- 2 NP-55 Battery pack (1)
- 3 AC-V25A/V25B/V25C AC power adaptor (1)
- 4 A/V connecting cable (1)
- 5 Shoulder strap (1)
- 6 Size AA (R16) Battery for Remote Commander (2) (Except TR380)
- 7 CR2025 Lithium Battery (1)
Already installed in the camcorder.
- 8 RFU-90UC/95UC RFU adaptor (1) (E, Hong Kong Models)
- 9 AC CONVERSION ADAPTOR (1) (Hong Kong Model)

Getting Started

Charging and Installing the Battery Pack

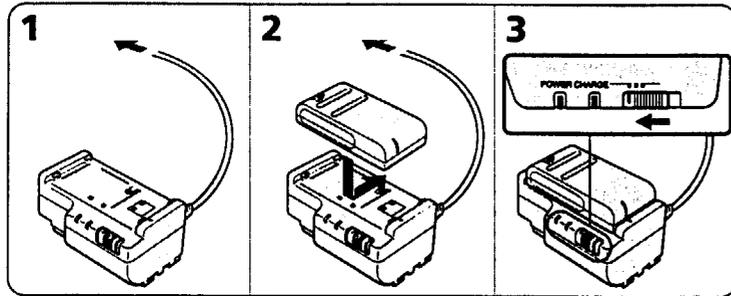
Before using your camcorder, you first need to charge and install the battery pack. To charge the battery pack, use the supplied AC-V25A/V25B/V25C AC power adaptor.

Charging the Battery Pack

Charge the battery pack on a flat place without vibration.

(1) Connect the AC power adaptor to a wall outlet. (2) Align the right side of the battery pack with the line on the AC power adaptor, then slide the battery pack in the direction of the arrow. (3) Set the selector to CHARGE. The POWER lamp (green) and the CHARGE lamp (orange) light up. Charging begins.

When charging is completed, the CHARGE lamp goes out. Set the selector to the center position and unplug the unit from the wall outlet. Then remove the battery pack and install it on the camcorder. To stop charging, set the selector to the center position.



Charging Time

Battery pack	NP-55 (supplied)	NP-80 NP-80D	NP-77H	NP-66H NP-68	NP-60D	NP-C65
Charging time*	70	190	170	125	90	105

* Approximate minutes to charge an empty pack using the AC-V25A/V25B/V25C (Lower temperatures require a longer charging time.)

Battery Life

CCD-TR23

Battery pack	NP-55	NP-80 NP-80D	NP-77H	NP-66H NP-68	NP-60D	NP-C65
Typical recording time**	30	90	85	60	45	50
Continuous recording time***	65	170	165	120	85	95

CCD-TR33

Battery pack	NP-55	NP-80 NP-80D	NP-77H	NP-66H NP-68	NP-60D	NP-C65
Typical recording time**	30	85	80	60	40	45
Continuous recording time***	60	165	155	115	80	90

** Approximate minutes when recording while you repeat recording start/stop, zooming and turning the power on/off. The actual battery life may be shorter.

*** Approximate continuous recording time indoors.

Important!

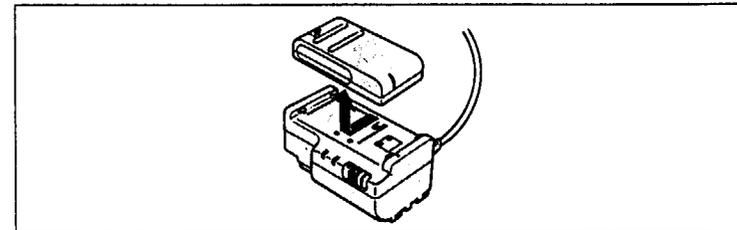
Use the battery completely before re-charging!

Before you recharge the battery, make sure the battery has been used up (discharged) completely. Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.

To use up the battery, remove the cassette and slide the POWER switch to CAMERA with the battery attached, and leave the camcorder until the indicator and the red lamp flash rapidly in the viewfinder.

Removing the Battery Pack

Slide the battery pack in the direction of the arrow.



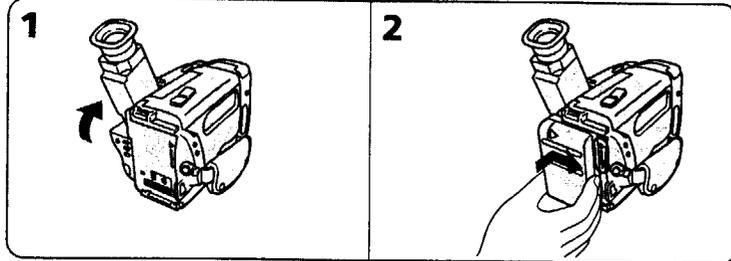
Notes on charging the battery pack

- The POWER lamp will remain lit for a while even if the battery pack is removed and the power cord is unplugged after charging the battery pack. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to CHARGE again.
- You cannot operate the camcorder using the AC power adaptor while charging the battery pack.

Charging and Installing the Battery Pack

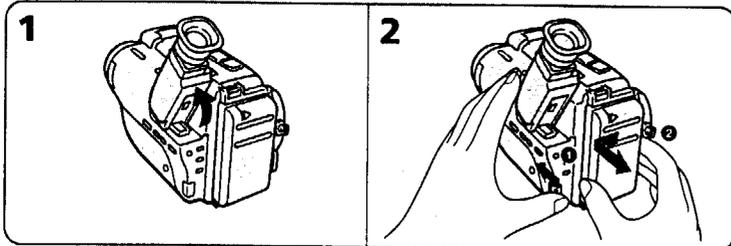
Installing the Battery Pack

(1) Lift up the viewfinder. (2) Align the right side of the battery pack with the white line on the camcorder, and slide the battery pack to the right.



Removing the Battery Pack

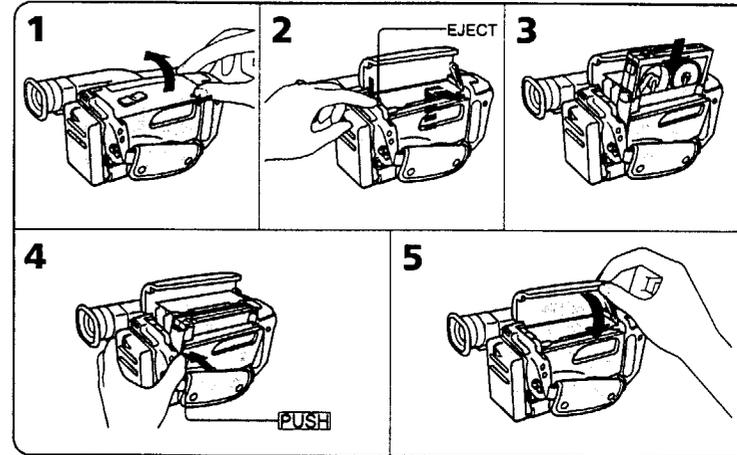
(1) Lift up the viewfinder. (2) While pressing BATT, slide the battery pack to the left.



Inserting a Cassette

Make sure that a power source is installed.

(1) While sliding the lid lock, lift up the lid. Then open it. (2) Press EJECT. The cassette compartment automatically lifts up and opens. (3) Insert a cassette (not supplied) with the window facing out. (4) Press the PUSH mark on the cassette compartment to close it. The cassette compartment automatically goes down. (5) Close the lid until it locks.



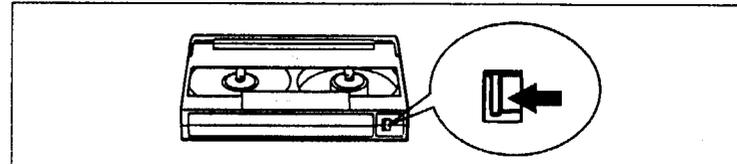
To Eject the Cassette

Press EJECT.

To Prevent Accidental Erasure

Slide the tab on the cassette to expose the red mark.

If you try to record with the red mark exposed, the  and  indicators flash in the viewfinder, and you cannot record on the tape. To re-record on this tape, slide the tab back out to cover the red mark.

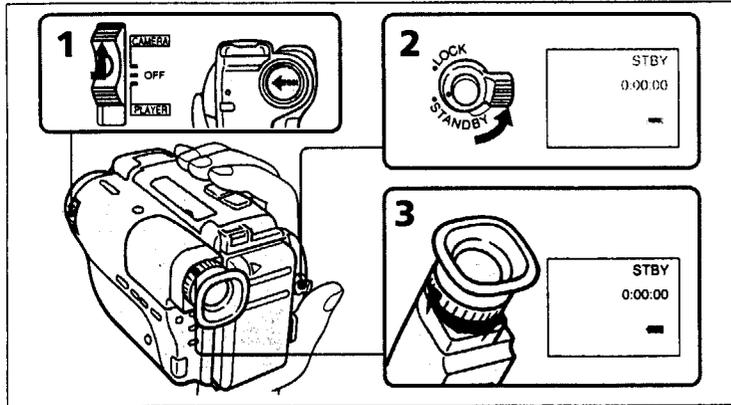


Charging and Installing the Battery Pack/Inserting a Cassette

Adjusting the Viewfinder Lens

Before you use the camcorder for the first time or after someone else has used it, focus the viewfinder lens. Make sure that the power source is connected to the camcorder.

(1) While pressing the small green button on the POWER switch, slide it to CAMERA. (2) Turn STANDBY up. (3) Turn the viewfinder lens adjustment ring so that the indicators in the viewfinder come into sharp focus.

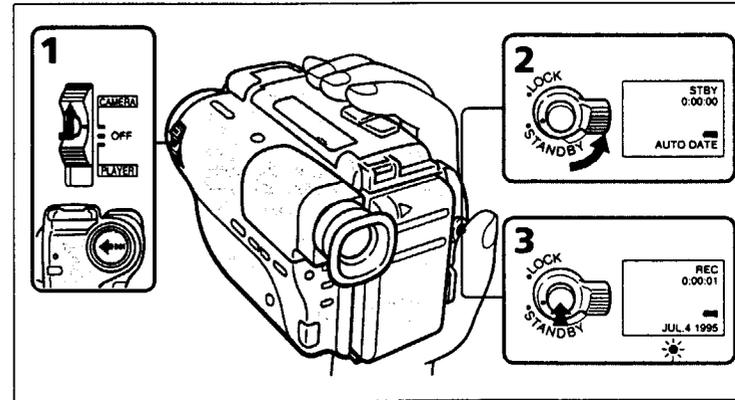


Basic Operations

Camera Recording

Make sure that a power source and a cassette is inserted. The date is automatically recorded for 10 seconds after you start recording (AUTO DATE feature). This feature works only once a day. Before you record one-time events, you may want to make a trial recording to make sure that you are using the camcorder correctly.

(1) While pressing the small green button on the POWER switch, slide it to CAMERA. (2) Turn STANDBY up. (3) Press START/STOP. The camcorder starts recording and the "REC" indicator appears in the viewfinder.



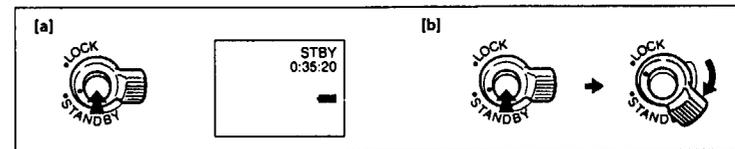
Adjusting the Viewfinder Lens/Camera Recording

To Stop Recording Momentarily [a]

Press START/STOP again. The "STBY" indicator appears in the viewfinder (Standby mode).

To Finish Recording [b]

Press START/STOP. Turn STANDBY down, and set the POWER switch to OFF. Then, eject the cassette (p. 9) and remove the battery (p. 8).



Camera Recording

Note on Standby mode

If you leave the camcorder for 5 minutes or more with a cassette inserted in Standby mode, the camcorder goes off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, turn STANDBY down once and turn it up again. To start recording, press START/STOP.

Note on recording

When you record from the beginning of the tape, run the tape for about 15 seconds before actual recording. This prevents the camcorder from missing any start-up scenes when you play back the tape. You can record tapes in SP (standard play) mode only.

Note on the tape counter

The tape counter indicates the recording or playback time. Use it as a guide. There will be a time lag of several seconds from the actual time. To set the counter to zero, press COUNTER RESET located below the viewfinder. You can know the approximate remaining tape by the remaining tape indicator (p. 45).

Note on the AUTO DATE feature

The clock is set to the East Coast Standard Time at the factory. You can reset the clock (p. 28). You can change the AUTO DATE setting by selecting ON or OFF in the menu system (p. 25).

- The AUTO DATE feature works once a day. However, the date may automatically appear more than once a day when:
 - you reset the date and time.
 - you eject and insert the tape again.
 - you stop recording within 10 seconds.
 - you set AUTO DATE to OFF once and set to ON in the menu system.
- Once the AUTO DATE feature turns off the date display 10 seconds after the start of recording, the date and time are displayed as follows:
 - if the date display setting has been made, the date is displayed.
 - if the time display setting has been made, the time is displayed.
 - if neither display setting has been made, nothing is displayed.

When moving from indoors to outdoors (or vice versa)

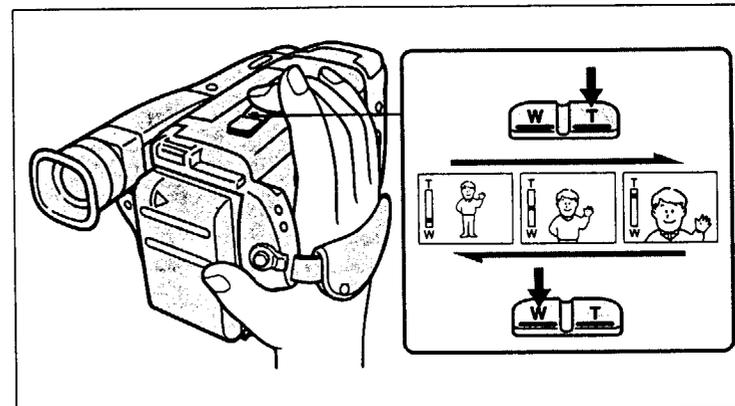
Turn STANDBY up and point the camcorder at a white object for about 15 seconds so that the white balance is properly adjusted.

Using the Zoom Feature

Zooming is a recording technique that lets you change the size of the subject in the scene. For more professional-looking recordings, use the zoom sparingly.

T side: for telephoto (subject appears closer)

W side: for wide-angle (subject appears farther away)



Camera Recording

Zooming Speed

Press the power zoom button firmly for a high-speed zoom. Press it softly for a relatively slow zoom.

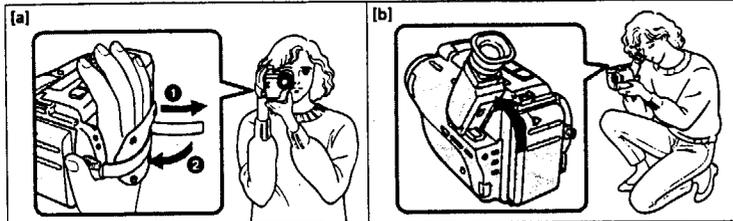
When you shoot a subject using a telephoto zoom

If you cannot get a sharp focus while in extreme telephoto zoom, press the W side of the power zoom button until the focus is sharp.

You can shoot a subject that is at least 3.3 feet (about 1 m) away from the lens surface in the telephoto position, or 1/2 inches (about 1cm) in the wide-angle position.

Hints for Better Shooting

For hand-held shots, you'll get better results holding the camcorder according to the following suggestions:



- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb. **[a]**
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it.
- Place your eye firmly against the viewfinder eyecup.
- Use the viewfinder frame as a guide to determine the horizontal plane.
- You can also record in a low position to get an interesting recording angle. Turn the viewfinder up for recording from a low position. **[b]**

Place the camcorder on a flat surface or use a tripod.

Try placing the camcorder on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder (p. 41). Make sure the tripod screw is shorter than 9/32 in (6.5mm).

To Use the Viewfinder as a Sports Finder **[c]**

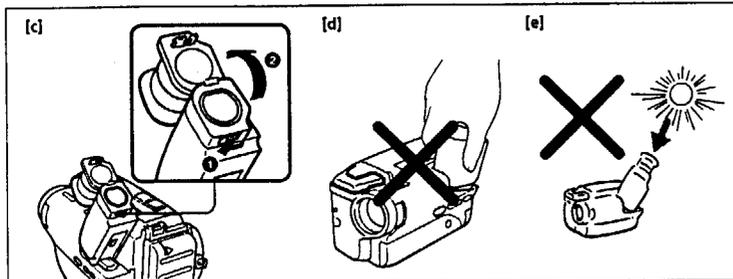
With the sports finder, you can monitor the picture while your eye is at a distance from the eyecup. The sports finder is convenient when moving around to shoot scenes. While sliding the viewfinder release knob to the left, flip open the viewfinder.

Note on the color viewfinder (for CCD-TR33 only)

You may find it difficult to use the color viewfinder as the sports finder for recording in light location.

Cautions on the viewfinder

- Do not pick up the camcorder by the viewfinder. **[d]**
- Do not place the camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder may be deformed. Be careful in placing the camcorder under sunlight or at the window. **[e]**

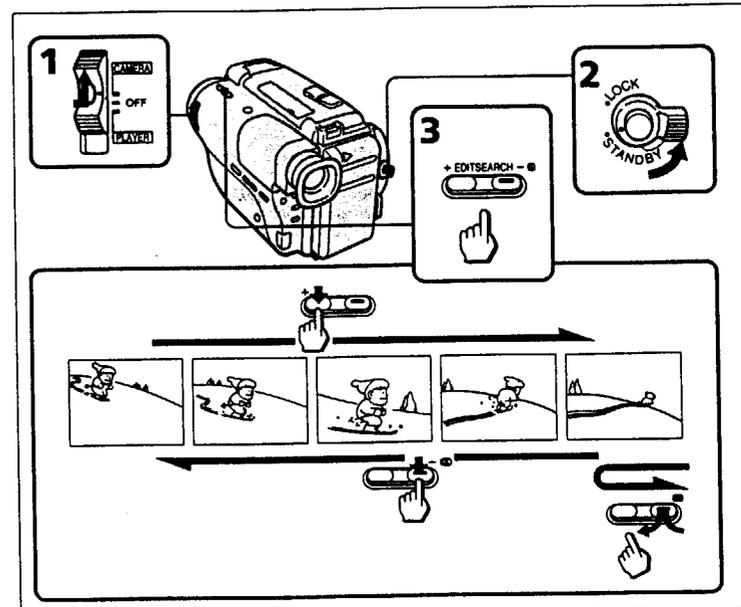


14

Checking the Recorded Picture

Using EDITSEARCH, you can review the last recorded scene or check the recorded picture in the viewfinder.

- (1) While pressing the small green button on the POWER switch, slide it to CAMERA.
 - (2) Turn STANDBY up. (3) Press EDITSEARCH. Press the - (⊖) side momentarily, the last few seconds of the recorded portion plays back (Rec Review). Keep pressing EDITSEARCH to play back the last recorded portion (Edit Search).
- + side: to view the forward playback picture
- side: to view the reverse playback picture



To Stop Playback

Release EDITSEARCH.

To Begin Re-recording

Press START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do not eject the tape, the transition between the last scene you recorded and the next scene you record will be smooth.

Monitoring the Sound While Viewing the Playback Picture in the Viewfinder

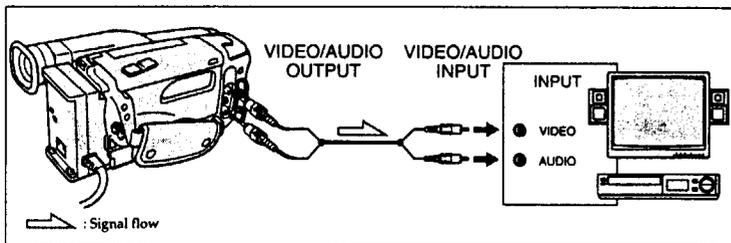
Connect an earphone (not supplied) to the Ⓜ jack. Play back the tape in PLAYER mode (p. 17).

Hints for Better Shooting/Checking the Recorded Picture

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Connections for Playback

You can use this camcorder as a VCR by connecting it to your TV for playback. It is recommended to use the house current as the power source (p. 19). Connect the camcorder to your TV by using the supplied A/V connecting cable. Set the TV/VCR selector to VCR on the TV. When connecting the camcorder to VCR, set the input selector on the VCR to LINE.

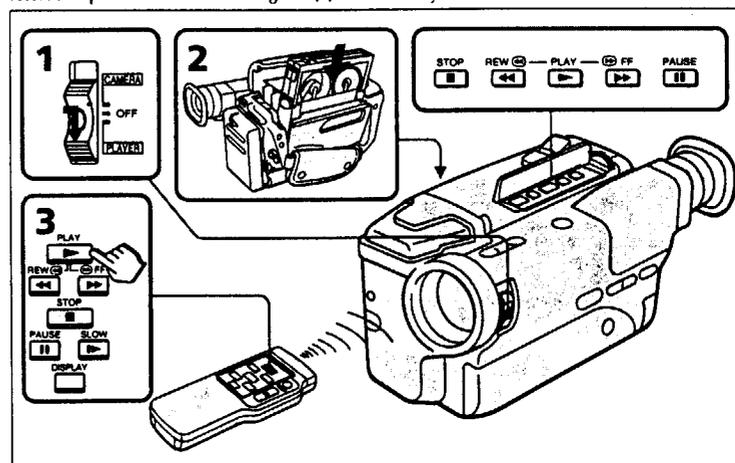


To connect a TV or a VCR without Video/Audio input jacks
Use the RFU-95UC RFU adaptor (not supplied).

Playing Back a Tape

You can monitor the playback picture in the viewfinder. You can also monitor on the TV screen, after connecting the camcorder to the TV/VCR. You can control playback using the supplied Remote Commander (p.43).

(1) While pressing the small green button on the POWER switch, slide it to PLAYER. (2) Insert the recorded tape with the window facing out. (3) Press ►. Playback starts.



To stop playback, press ■.
To rewind the tape, press ◀◀.
To advance the tape rapidly, press ▶▶.

Connections for Playback/Playing Back a Tape

See the next page for further information.

Playing Back a Tape

Various Playback Modes

To view a still picture (playback pause)

Press **II** during playback. To resume playback, press **II** or **▶**.

To locate a scene (Picture Search)

Keep pressing **◀◀** or **▶▶** during playback. To resume normal playback, release the button.

To monitor the high-speed picture during fastforward or rewind (Skip Scan)

Keep pressing **◀◀** while rewinding or **▶▶** while advancing the tape. To resume normal playback, press **▶**.

To view the picture in a sequence of stop-motion images

Press **EDITSEARCH** in playback pause mode. If you keep pressing **EDITSEARCH**, you can view the picture playback in the forward (+) or reverse (-) direction.

To view the picture at 1/5 speed (Slow Playback) (only with the Remote Commander)

Press **▶** on the Remote Commander during playback. To resume normal playback, press **▶**. If slow playback lasts for about 1 minute, it shifts to normal speed automatically.

Note on playback

- Streaks appear and the sound is muted in the various playback modes.
- When still picture mode lasts for 5 minutes or more, the camcorder automatically enters stop mode.

To display the viewfinder screen indicators on the TV

Press **DISPLAY** on the Remote Commander.
To erase the indicators, press **DISPLAY** again.

Advanced Operations

Using Alternate Power Sources

You can choose any of the following power sources for your camcorder: battery pack (P.6), house current, and 12/24 V car battery. Choose the appropriate power source depending on where you want to use your camcorder.

Place	Power sources	Accessory to be used
Indoors	House current	AC power adaptor AC-V25A/V25B/V25C (supplied), AC-S10, AC-V55
Outdoor	Battery pack	Battery pack NP-55 (supplied), NP-80/80D, NP-77H, NP-66H, NP-60D, NP-68, NP-C65
In the car	12 V or 24 V car battery	DC pack DCP-77

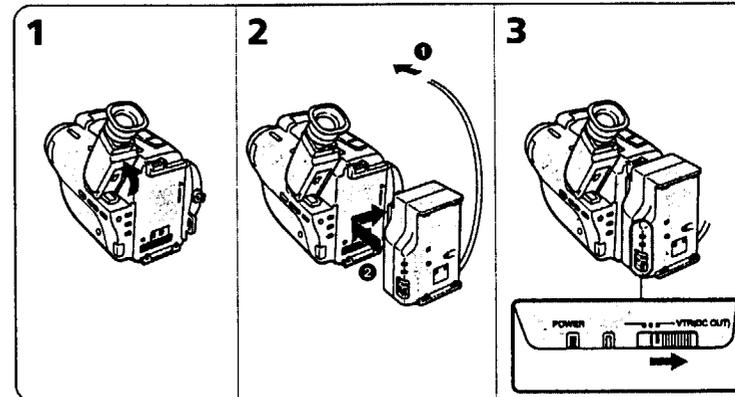


This mark indicates that this product is a genuine product related to our 8mm video equipment. When purchasing our 8mm video equipment, we recommend that you purchase related 8mm video products provided with the same mark or products provided with our logotype mark.

Using House Current

To use the supplied AC-V25A/V25B/V25C AC power adaptor:

(1) Lift up the viewfinder. (2) Connect the AC power cord to a wall outlet. Connect the bottom of the AC power adaptor to the battery mounting surface of the camcorder. (3) Set the selector to VTR (DC OUT).



Notes on the POWER lamp

- The POWER lamp will remain lit for a while even if the unit is unplugged after use. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to VTR (DC OUT) again.

To remove the adaptor

The adaptor is removed in the same way as the battery pack. (p.8)

Using Alternate Power Sources

Using a Car Battery

Use the DCP-77 DC pack (not supplied). Connect the cord of the DC pack to the cigarette lighter socket of a car (12 V or 24 V). Connect the DC pack to the battery mounting surface of the camcorder.

To remove the DC pack

The DC pack is removed in the same way as the battery pack. (p.8)

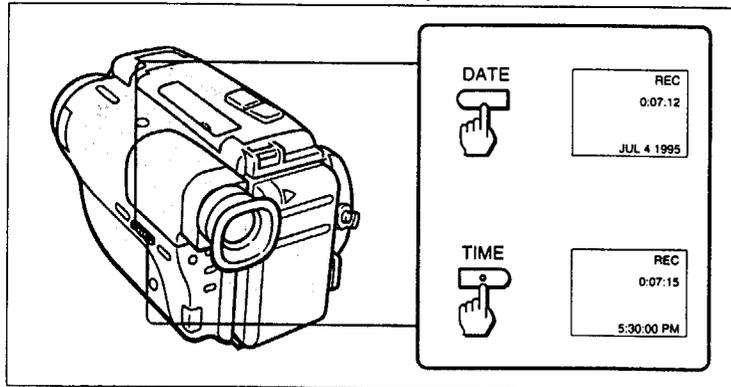
Options for Charging the Battery Pack

- AC-S10 AC power adaptor:
You can charge a battery pack whether it is used up or not with this adaptor because it has a discharging function.
- BC-S10 portable battery charger (ideal for travel):
You can charge a battery pack on 100 — 240 V AC current.

Recording with the Date or Time

Before you start recording, press DATE or TIME. You can record the date or time displayed in the viewfinder with the picture. You cannot record the date and time at the same time. Except for the date or time indicator, no indicator in the viewfinder is recorded.

The clock is set to the East Coast Standard Time at the factory.



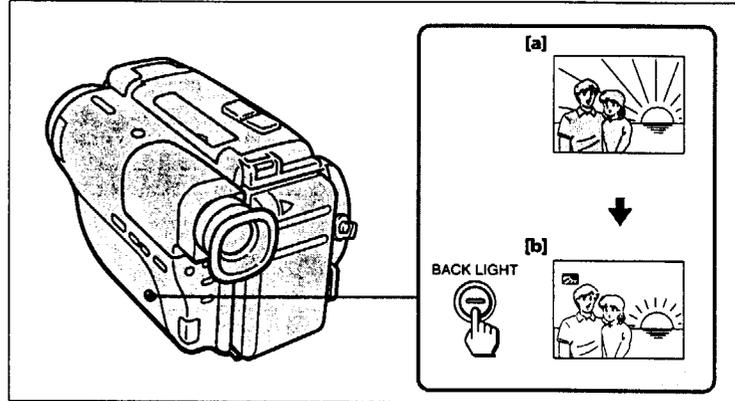
To Stop Recording with the Date or Time

Press DATE or TIME again. Recording continues.

Shooting with Backlighting

When you shoot a subject with the light source behind the subject or a subject with a light background, use the BACK LIGHT.

Press BACK LIGHT. The  indicator appears inside the viewfinder.



[a] Subject is too dark because of backlight.

[b] Subject becomes bright with backlight compensation.

After shooting

Press BACK LIGHT again to let the  indicator go out under normal lighting condition. Otherwise, the picture will be too bright under normal lighting condition.

This function is also effective under following conditions:

- On the snow e.g. at the ski resort
- At the beach under strong sunshine
- A subject with a light source nearby or a mirror reflecting light
- A white subject against a white background. Especially when you shoot a person wearing shiny clothes made of silk or synthetic fiber, his or her face tends to become dark if you do not use this function.

Using Alternate Power Sources/Recording with the Date or Time/
Shooting with Backlighting

Using the PROGRAM AE Function

You can select from four PROGRAM AE (Auto Exposure) modes to suit your shooting situation. When you use PROGRAM AE, you can get a Portrait effect (the subject is in focus and the background is out of focus), capture high-speed action or night views.

Selecting the Best Mode

Select the best mode by using the following examples.



Portrait mode

- A still subject such as a person or flower
- Subject behind an obstacle such as a net
- Zooming in on a subject in telephoto

Sports mode

- Outdoor sports scenes such as football, tennis, golf or skiing
- A landscape in a moving car

High-speed shutter mode

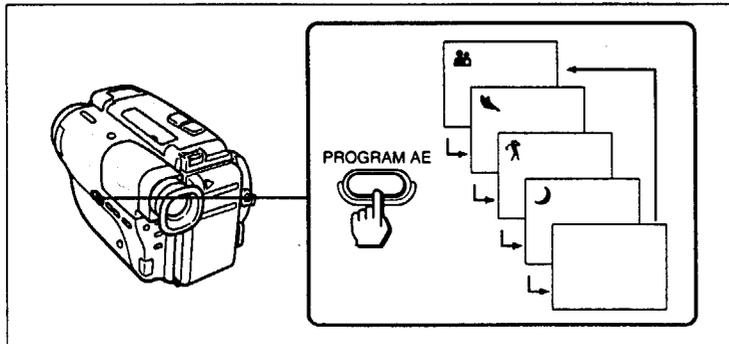
- A golf swing or a tennis match in fine weather with the ball captured clearly
- Playing back certain scenes with high-speed movements in clear, sharp picture

Twilight mode

- Recording night views neon signs or fireworks

Using the PROGRAM AE Function

Press PROGRAM AE repeatedly so that the desired mode indicator appears inside the viewfinder.



Note on shutter speed

The shutter speed in each PROGRAM AE mode is as follows:

Portrait mode - between 1/60 to 1/2000

Sports mode - between 1/60 to 1/500

High-speed shutter mode - 1/4000

Twilight mode - 1/60

Normal mode - 1/60

Fade-in and Fade-out

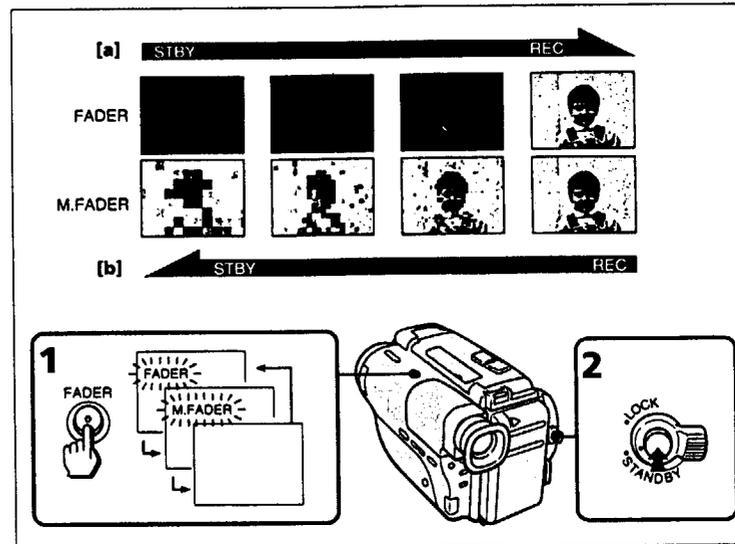
You can fade in or fade out to give your recording a professional appearance. When fading in, the picture will gradually appear from black or mosaic. The sound will also gradually increase. When fading out, the picture will gradually fade to black or mosaic. The sound will also decrease.

When Fading in [a]

- (1) During the camcorder is in Standby mode, press FADER. The fade indicator starts flashing.
- (2) Press START/STOP to start recording. The fade indicator stops flashing.

When Fading out [b]

- (1) During recording, press FADER. The fade indicator starts flashing.
- (2) Press START/STOP to stop recording. The fade indicator stops flashing and recording stops.



To Cancel the Fade-in/out Function

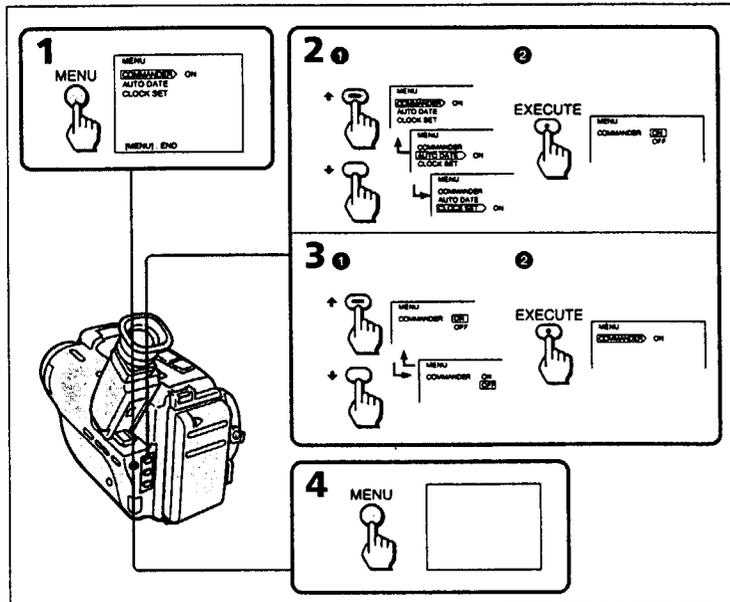
Before pressing START/STOP, press FADER once or twice until the fade indicator disappears.

When the date/time indicator is displayed

The date/time does not fade in nor fade out.

Changing the Mode Settings

You can change the mode settings in the menu system to further enjoy the features and functions. (1) Press MENU to display the menu in the viewfinder. (2) Press \uparrow or \downarrow to select the desired item, then press EXECUTE. (3) Press \uparrow or \downarrow to set the desired mode, then press EXECUTE. If you want to change the other modes, repeat steps 2 and 3. (4) Press MENU to erase the menu display.



Note on BACK UP

When BACK UP indicator appears on the menu display, the settings of items are retained even when the battery is removed, as long as the lithium battery is in place.

Selecting the Mode Setting of Each Item

Common Items in CAMERA and PLAYER Modes

COMMANDER <ON/OFF>

- Select ON when using the supplied Remote Commander for the camcorder.
- Select OFF when not using the Remote Commander for the camcorder.

Items in CAMERA mode

AUTO DATE <ON/OFF>

- Select ON to record the date of recording automatically (AUTO DATE feature p. 12).
- Select OFF otherwise.

CLOCK SET

Select this item when you need to reset the clock (p. 28).

Items in PLAYER mode

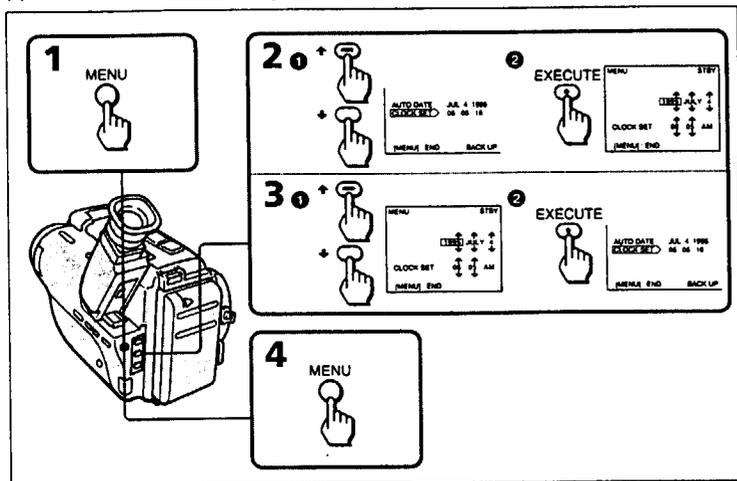
EDIT <ON/OFF>

- Select ON to minimize the picture deterioration when editing.
- Normally select OFF.

Resetting the Date and Time

Reset the date and time in the menu system.

- (1) Press MENU to display the menu.
- (2) Press \uparrow or \downarrow to select CLOCK SET item (p. 25). Press EXECUTE.
- (3) Set year, month, day, time, minute by pressing \uparrow , \downarrow and EXECUTE. Note that when you keep \uparrow and \downarrow pressed, the digits advance faster.
- (4) Press MENU to erase the menu display.



To Correct the Date and Time Setting

Repeat steps 2 to 3.

To Check the Date and Time

Press DATE to display the date indicator in the viewfinder. Press TIME to display the time indicator. When you press the same button again, the indicator goes out.

The year indicator changes as follows:

1995 ← 1996 → 2024

Note on the time indicator

The internal clock of the camcorder operates on a 12-hour cycle. 12:00:00 AM stands for midnight. 12:00:00 PM stands for noon.

Playback Modes

The playback mode is selected automatically according to the recording system (SP/LP mode) in which the tape was recorded.

LP (long play) mode

When you play back a tape recorded in LP mode, the LP indicator lights up in the viewfinder. This camcorder cannot record tape in LP mode.

Foreign 8 mm video

You cannot play software recorded on a different TV color system. Because the TV color systems differ from country to country, you may not be able to play back foreign pre-recorded software. Refer to page 35 to check the TV color system of foreign countries.

Tips for Using the Battery Pack

This section shows you how you can get the most out of your battery pack.

Preparing the Battery Pack

Always Carry Additional Batteries

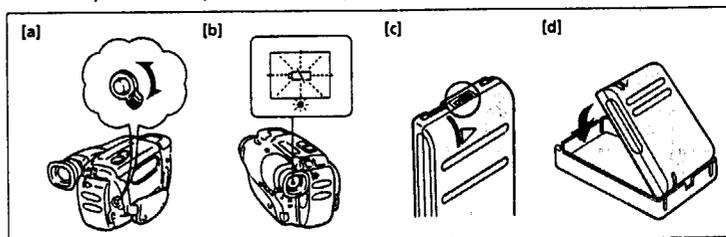
Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

Battery Life is Shorter in Cold Environment

Battery efficiency is decreased and the battery will be used up more quickly if you are recording in cold environment.

To Save Battery Power

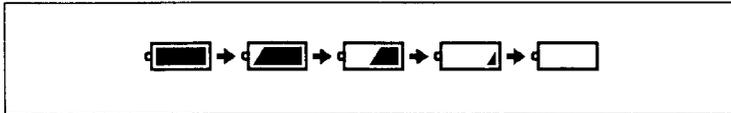
Turn the STANDBY switch on the camcorder down when not recording to save battery power. [a] A smooth transition between scenes can be made even if recording is stopped and started again. While positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.



Tips for Using the Battery Pack

When to Replace the Battery Pack

While you are using your camcorder, the remaining battery indicator decreases gradually as battery power is used up.



When the remaining battery indicator reaches the lowest point, the ∞ indicator appears and starts flashing in the viewfinder. [b] on page 29.

When the ∞ indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, slide the POWER switch to OFF on the camcorder and replace the battery pack. Leave the tape in the camcorder to obtain smooth transition between scenes after the battery pack is replaced.

Note on the remaining battery indicator

The remaining battery indicator of the camcorder may indicate a different remaining capacity from that of the battery pack with the remaining battery indicator (not supplied). The indicator of the battery pack is more accurate.

Notes on the Rechargeable Battery Pack

The Battery Heats Up

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

Battery Care

- Remove the battery pack from the camcorder after using the battery pack, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is set to OFF, which shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Therefore, you should charge the battery right before using the camcorder.

How to Use the Switch on the Battery Pack

This switch is provided so that you can mark the charged battery. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up (or in whichever direction you want to remind yourself). [c] on page 29.

The Life of the Battery Pack

If the ∞ indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Charging Temperature

You should charge batteries at temperatures from 50°F to 86°F (from 10°C to 30°C). Lower temperatures require a longer charging time.

Sony Batteries are Recommended

Use of non-Sony batteries may damage your Handycam camcorder.

Notes on Charging

A Brand-new Battery

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

Before Recharging a Used Battery Pack

- Make sure to use up the battery before recharging.
- If recording is completed before the ∞ indicator appears in the viewfinder, you should remove the tape, slide the POWER switch to CAMERA, turn STANDBY up, and leave the camcorder until the battery indicator flashes rapidly.
- When you use the AC-S10 power adaptor, you can use the discharging function.
- **Charging the usable battery causes a lowering of battery capacity. Battery capacity can be recovered if you fully discharge and charge the battery again.**

After Long Storage

Recharge the battery pack after a long period of storage. If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Notes on the Terminals

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened. When the terminals are not clean or when the battery pack has not been used for a long time, repeat installing and removing the battery pack. This improves the contact condition. Also, wipe the + and - terminals with a soft cloth or paper.

Be Sure to Observe the Following

- **To prevent an accident caused by a short circuit, do not allow metal objects such as a necklace to touch the battery terminals. Carry the battery pack attaching to the terminal cover. [d] on page 29.**
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

Maintenance Information and Precautions

Moisture Condensation

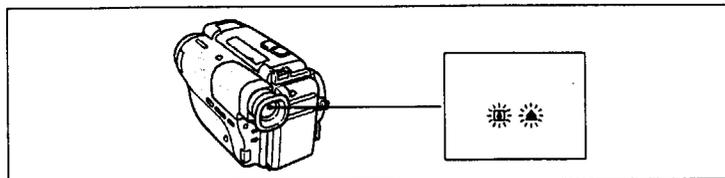
If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. If this happens, the tape may stick to the head drum and be damaged or the camcorder may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

Inside the Camcorder

When  and  indicators flash in the viewfinder, moisture has condensed inside the camcorder. If this happens, none of the functions except cassette ejection will work.

Eject the cassette turn off the camcorder, and leave it with the cassette compartment open for about 1 hour.

If the  indicator does not light up when you turn on the power, you can use the camcorder again.



On the Surface of the Tape

If there is moisture on the surface of the tape, when you insert cassette and press a tape transport button (▶ PLAY, etc.), the  indicator flashes in the viewfinder. If this happens, none of the functions except cassette ejection will work.

Eject the cassette and leave it for about 1 hour.

If the  indicator does not light up when you insert the cassette and press a tape transport button, you can use the camcorder again.

On the Lens

No indicator will appear, but the picture becomes dim. Turn off the power and do not use the camcorder for about 1 hour.

How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.

(1) Be sure to tightly seal the plastic bag containing the camcorder.

(2) Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about one hour).

Video Head Cleaning

To ensure clear pictures, clean the video heads periodically. When playback pictures are "noisy" or hardly visible, the video heads may be contaminated.



[a] Slight contamination

[b] Critical contamination

If this happens, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy", repeat the cleaning. (Do not repeat cleaning more than 5 times.)

Caution

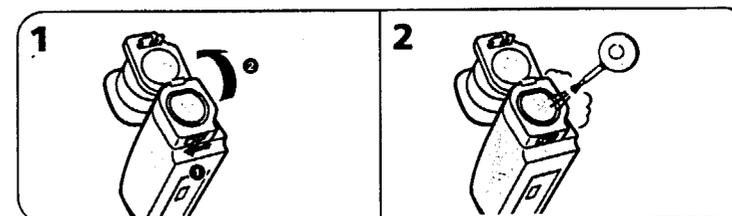
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note

If the V8-25CLH cleaning cassette is not available in your area, consult your nearest Sony dealer.

Removing Dust from inside the Viewfinder

(1) While sliding the viewfinder release knob to the left, flip open the viewfinder. (2) Clean the surface with a commercially available blower.



Maintenance Information and Precautions

Precautions

Camcorder Operation

- Operate the camcorder using 6.0 V (battery pack), or 7.5 V (AC power adaptor).
- For DC or AC operation, use only the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by your nearest Sony dealer before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF when not using the camera.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.

On Handling Tapes

Do not insert anything into the small holes on the rear of the cassette. These holes are used to sense the type, thickness of tape, or if the tab is out or in.

Camcorder Care

- When the camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on the lens, remove them with a soft cloth.
- Clean the camcorder body with a soft dry cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

AC Power Adaptor

Charging

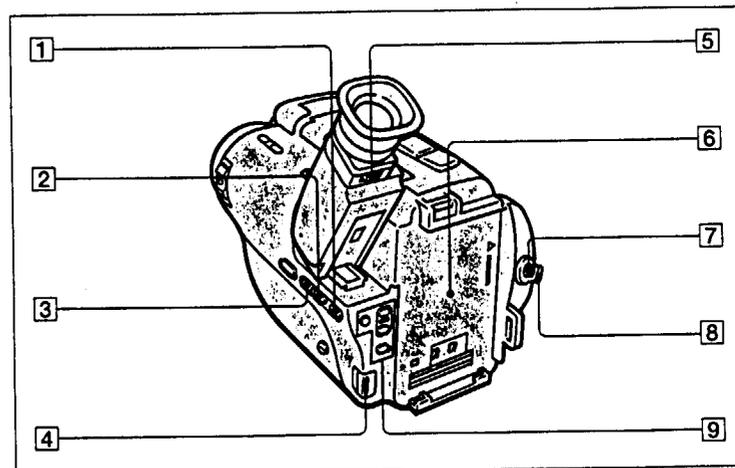
- Use only for the specified battery pack. This unit cannot be used to charge a lithium ion type battery.
- Attach the battery pack firmly.
- Charge the battery pack on a flat surface without vibration.

Others

- The model for USA or Canada: One blade of the plug is wider than the other for the purpose of safety and will fit into the power outlet only one way. If you are unable to insert the plug fully into the outlet, contact your dealer.
- Unplug the unit from the wall (mains) outlet when not in use for a long time. To disconnect the cord (mains lead), pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Do not bend the AC power cord forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or an electrical shock.
- Be sure that nothing metallic comes into contact with the metal parts of the connecting plate. If this happens, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
- The unit becomes warm while in use. This is normal.
- Do not place the unit in locations that are:
 - Extremely hot or cold
 - Dusty or dirty
 - Very humid
 - Vibrating

If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

Identifying the Parts



1 COUNTER RESET button (p. 12)

2 TIME button (p. 20)

3 DATE button (p. 20)

4 BATT (battery) release knob (p. 8)

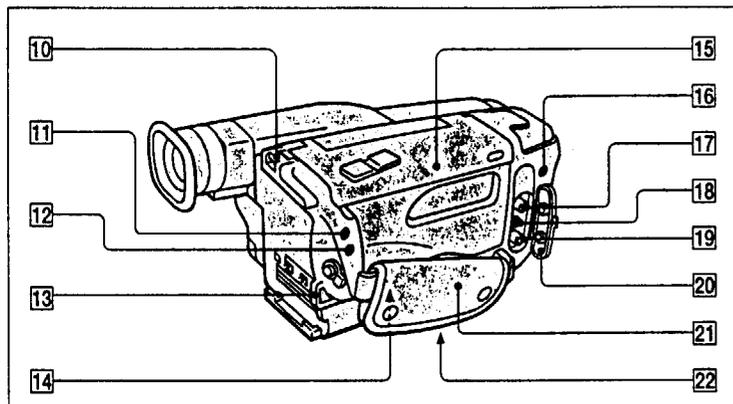
5 Viewfinder release knob (p. 14, 33)

6 Battery mounting surface (p. 8)

7 START/STOP button (p. 11)

8 STANDBY switch (p. 10, 11)

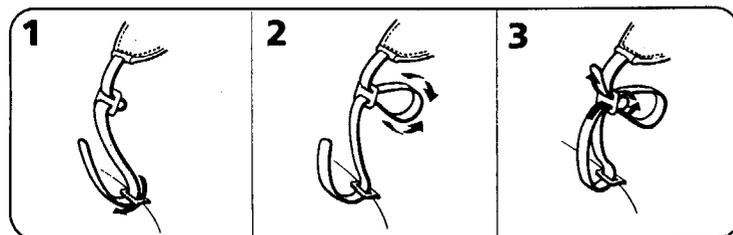
9 Menu operation buttons (p. 24, 28)



- 10 Hook for shoulder strap (below)
- 11 LANC Ⓡ control jack
Connect the LANC Ⓡ connecting cable to a wired remote control unit such as an editing controller. In this case, set the COMMANDER mode to OFF in the menu system (p. 25). Ⓡ stands for Local Application Control Bus system. The Ⓡ control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the connectors indicated as CONTROL L or REMOTE.
- 12 Ⓡ (earphone) jack (p. 15)
- 13 Hook for shoulder strap (below)
- 14 Lithium battery compartment (p. 27)
- 15 Cassette compartment lid (p. 9)
- 16 MIC (microphone) jack
- 17 VIDEO jack (p. 16)
- 18 RFU DC OUT (RFU adaptor DC out) jack
- 19 AUDIO jack (p. 16)
- 20 Jack cover
- 21 Grip strap (p. 14)
- 22 Tripod receptacle (p. 14)
Attach a tripod (not supplied) here. When attaching a non-Sony tripod, make sure that the length of the camera mounting screw is shorter than 9/32 inches (6.5 mm). Otherwise, the screw might damage the inner part of the camcorder.

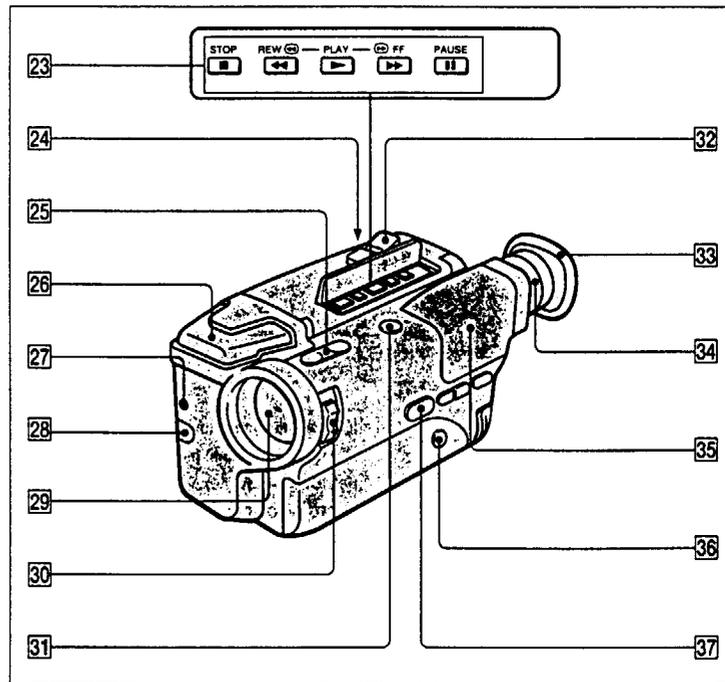
Attaching the shoulder strap

Attach the supplied shoulder strap to the hooks for the shoulder strap (10, 13).



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Identifying the Parts



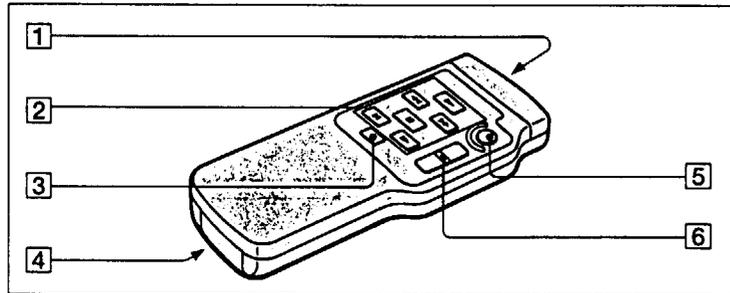
- 23 Tape transport buttons (p. 17, 18)
■ STOP
◀ REW (rewind)
▶ PLAY (playback)
▶▶ FF (fast forward)
|| PAUSE
These buttons will function in PLAYER mode.
- 24 EJECT button (p. 9)
- 25 EDITSEARCH button (p. 15)
- 26 Built-in microphone
- 27 Camera recording/battery lamp
- 28 Remote sensor (p. 44)
- 29 Lens cover
- 30 POWER switch (p. 10, 11, 15, 17)
- 31 FADER button (p. 23)
- 32 POWER ZOOM button (p. 13)
- 33 Eyecup (p. 14)
- 34 Viewfinder adjustment ring (p. 10)
- 35 Viewfinder (p. 10, 14)
- 36 BACK LIGHT button (p. 21)
- 37 PROGRAM AE button (p. 22)

Identifying the Parts

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Remote Commander

The buttons that have the same name on the Remote Commander and on the camcorder function identically.

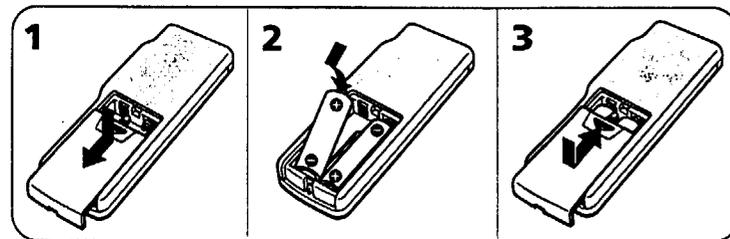


- | | |
|---|--|
| <p>1 Transmitter (p. 17, 44)
Point toward the remote sensor to control the camcorder after turning on the POWER switch on the camcorder.</p> <p>2 Tape transport buttons (p. 17, 18)</p> <p>3 DISPLAY button (p. 18)</p> | <p>4 Size AA (R6) battery holder</p> <p>5 START/STOP button</p> <p>6 Power zoom button
The zooming speed is unchangeable on the Remote Commander.</p> |
|---|--|

Preparing the Remote Commander

To use the Remote Commander, you must insert two size AA (R6) batteries. Use the supplied size AA (R6) batteries.

(1) Remove the battery cover from the Remote Commander. **(2)** Insert both of the size AA (R6) batteries with correct polarity. **(3)** Put the battery cover back onto the Remote Commander.



Note on battery life

The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

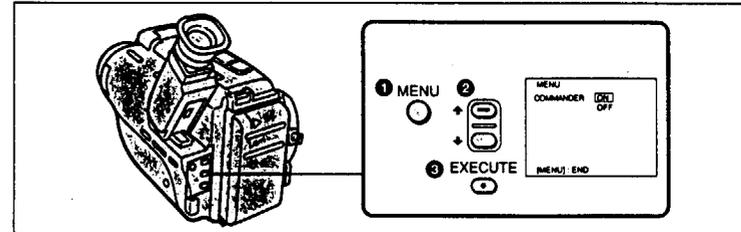
To avoid damage from possible battery leakage

Remove the batteries when you will not use the Remote Commander for a long time.

Identifying the Parts

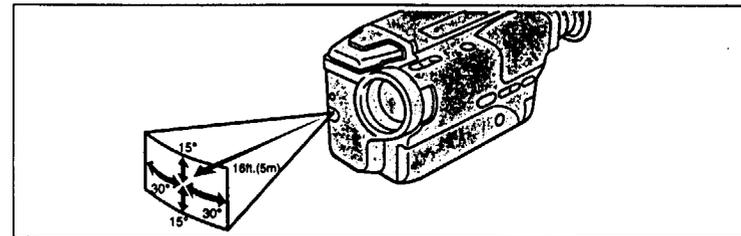
Using the Remote Commander

Make sure that the COMMANDER mode is set to ON in the menu system (p. 25).



Remote Control Direction

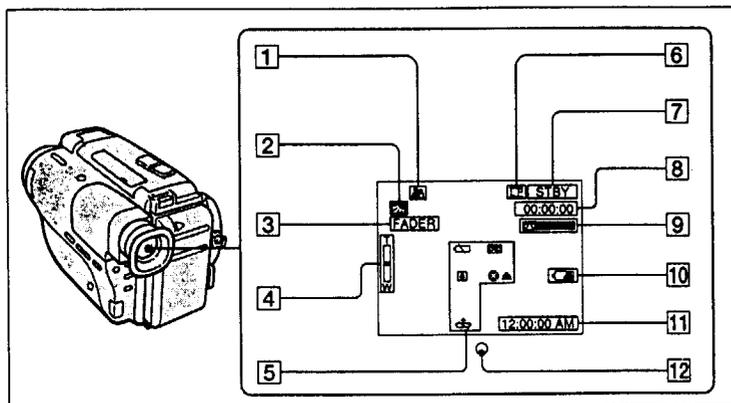
Aim the Remote Commander to the remote sensor within the range as shown below.



Notes on the Remote Commander

- Keep the remote sensor away from strong light sources such as direct sunlight or illumination. Otherwise, the remote control may not be effective.
- Be sure that there is no obstacle between the remote sensor and the Remote Commander.
- This camcorder works at commander mode VTR 2. The commander modes (1, 2, and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.

In the Viewfinder



- 1 PROGRAM AE mode indicator (p. 22)
- 2 Back light indicator (p. 21)
- 3 FADER indicator (p. 23)
- 4 Power zoom indicator (p. 13)
- 5 Warning indicator (p. 46)

- 6 Lights up when playing back a tape recorded in LP mode (p. 29)
- 7 Tape transport mode (p. 11)
- 8 Tape counter (p. 12)
- 9 Tape remaining indicator

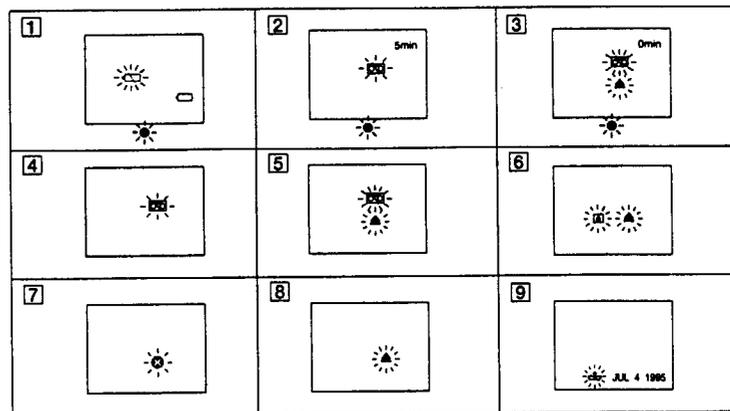
- 10 Battery remaining indicator (p. 30)

- 11 Date or Time (p. 20)
- 12 Recording lamp/Battery lamp (p. 11)

Identifying the Parts

Warning Indicators

If indicators flash in the viewfinder, or a caution lamp on the camcorder flashes, check the following:



- 1 Battery Remaining
Slow flashing: The battery is weak.
Fast flashing: The battery is dead.
- 2 The tape is near the end.
- 3 The tape has run out.
- 4 No tape has been inserted.
- 5 The tab on the tape is out (red) (p.9).

- 6 Moisture condensation has occurred (p. 32).
- 7 The video heads may be contaminated (p. 33).
- 8 Some other trouble has occurred.
Disconnect the power source and contact your Sony dealer or local authorized facility.
- 9 The lithium battery is weak or the lithium battery is not installed (p. 27).