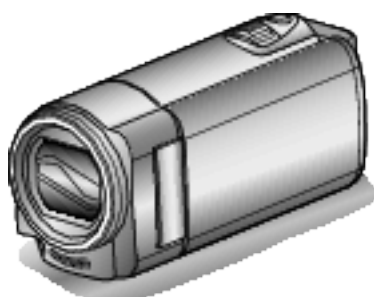


JVC

CAMCORDER

Detailed User Guide

**GZ-HM670/GZ-HM650/
GZ-HM448/GZ-HM445**



Everio

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Charging

- Refer to the operating instructions found in the animation on the Detailed User Guide.

Recording

- Refer to the operating instructions found in the animation on the Detailed User Guide.

Playback

- Refer to the operating instructions found in the animation on the Detailed User Guide.

Shooting Tips

Basic Way to Hold a Camcorder ~ Recording Stable Images ~



This is the standard way of shooting while standing up.
Be sure to master this basic technique in order to achieve stable images.

■ [Getting Ready]

- 1 Open your feet to the width of your shoulders.
- 2 Keep the elbow of your right arm, which is holding the camcorder, close to your side.
- 3 Hold the LCD monitor with your left hand and adjust the angle accordingly.

Extending Your Hands to Shoot ~ High-Angle Shooting ~



Extend your hand when your subject is being hidden behind a crowd of people.

■ [Getting Ready]

- 1 Open your feet to the width of your shoulders.
- 2 Extend your right hand and hold the camcorder over your head.
- 3 Hold the LCD monitor with your left hand and adjust the angle accordingly.

Caution :

- Use this way of shooting only as a last resort as it is difficult to achieve stable images.
 - Set to the wide angle as much as possible as the image will be prone to camera shake.
 - Be considerate. Do not inconvenience the people around you.
-

Squatting and Shooting at Eye Level



Staying low is a common position to take when shooting small children. By recording from the eye level of the child, you can capture all his cute expressions clearly.

■ [Getting Ready]

- 1 Kneel down with your left knee while keeping your right foot on the ground.
- 2 Place the elbow of your right arm, which is holding the camcorder, on your right knee.
- 3 Hold the LCD monitor with your left hand and adjust the angle accordingly.

Panning

- Refer to the operating instructions found in the animation on the Detailed User Guide.

Use this method to shoot a wide angle of view.

■ [Getting Ready]

- 1 Shoot by rotating your body instead of moving your arms while keeping the basic way of holding a camcorder as stated above.
- 2 Stand facing the direction where the rotation will stop.
- 3 Twist your upper body to the direction where recording will start.
- 4 Press the start button and record for 2 seconds, then slowly twist back your body to face the front.
Record for another 2 seconds while facing the front, then press the stop button.
(The 90 degrees rotation should take about 5 seconds, giving the feeling of a slow motion.)

Holiday Season/Christmas

Record the happy Christmas celebration with your family!



Decorating the Tree and Preparing the Dinner

The decoration of tree and preparation of dinner are part of the joy of Christmas. Be sure to record these happy family times!

■ Decorating the tree



A tree is the most important thing to bring out the mood of Christmas. Simply the scene of all family members engaging in the decorating of a fir tree with various colorful ornaments is full of the feeling of happiness.

■ Preparing the Dinner



Record the scenes as everyone helps to prepare the feast of the night. You can film the mother who is cooking, the children who are helping, and of course, the process of making a cake!

Recording the Christmas Party



After all preparations, it is finally the Christmas party itself. Not only should you record the candle-blowing scene, but also the smiles of the family while being surrounded by good food, or even the father who is slightly drunk from champagne!

Finding the Presents



For children, the greatest joy of Christmas is receiving presents the next morning.

Their expression of delight when finding a present next to their pillow is a recording opportunity not to be missed. Get ready to shoot before the children wake up!

Wedding

Create an awesome wedding video for the bride and groom!



Discussing and Planning Before the Event

Before the day of the wedding reception, it is important to discuss with the bride and groom about various details such as the order of the ceremony and whether there are any entertainment programs or change of clothes. By understanding the preferences of the bride and groom, you will be able to shoot more appropriately.

■ Finding out the route of entrance



The highlight of a wedding reception is the entrance of the bride and groom. Find out which door they will enter from and the route they will take from the person-in-charge of the wedding hall in advance. Set up the tripod at a place where you can follow the couple using zoom without having to move around.

■ Number of times and timing of clothes-changing

Find out the timing of any changing of clothes so as to capture the scene well when the bride and groom enter again.

You can also make use the time while the bride and groom are changing to record comments of well wishes from the guests.

Finding the Right Angle to Capture Both Bride and Groom

■ Composing the picture with the groom in front and the guests at the back



The main characters of a wedding are of course the bride and groom. Record their expressions clearly during the toast, speech, entertainment programs, and other scenes.

Another recommendation is to capture the face shots of the guests, then pan towards the groom. Picture composition containing the crowd of guests only lacks fun, so be sure to pay attention to the shooting angle and size.

Recording the Expressions and Comments of Guests

■ Setting the shot from eye level to chest level



You can record comments from the guest by going around asking, "Please say a few words for the bride and groom".

This can be done at the guests' waiting room, when the bride and groom are changing, or during the entertainment programs.

Closing Up on the Bride's Face During the Thank You Speech

The climax of the event finally comes during the bride and groom's thank you speech and presentation of flowers. The touching words of appreciation from the bride and tears of joy from the parents are scenes that must not be missed.

Start by closing up on the bride's face using zoom. As the tears start to form in the bride's eyes, continue shooting for a little longer. Then, slowly zoom out to the wide angle to show the parents who are moved by the speech.

Advanced Operation with Two Camcorders

If video-editing is to be done, record using two camcorders so that a video with varying scenes can be created. You can try asking a close friend who has a camcorder at home.

Set the borrowed camcorder on a tripod to focus on taking close-up shots of the bride and groom. In this way, the other camcorder can be moved around to record other scenes, enabling an interesting video with changing scenes to be created through editing and compilation.

As most people own at least a digital camera nowadays, even if you are really unable to find an extra camcorder, inserting still pictures to the video at various points is also a good way to add variety. Do give it a try!

■ <Camcorder 1>

Closing up on the bride and groom all the time



■ <Camcorder 2>

Recording the congratulatory messages from friends at the same time



Travel

Capture all the good times of your domestic or overseas trips!



Bringing the Necessary Equipment

The necessary things to bring on a trip depends on your traveling purpose and the destination.

For overseas trips in particular, you have to think about what to bring in accordance to the local conditions.

Here are some suggestions for your consideration.

■ Camcorder

Think about how many hours of shooting you will usually perform in a day. Be sure to prepare enough recording medium especially for long overseas trips.

If you are recording in SD cards, get ready the sufficient number of cards, including some for backup.

■ Battery Pack

Prepare a battery pack that is ready for double the expected recording time in a day. For example, if you plan to record for 2 hours a day, prepare a battery pack that is ready for 4 hours (actual recording time).

For a day trip, you can prepare a battery with low capacity but for a long trip, do prepare a few batteries with high capacities.

■ AC Adapter

The JVC AC adapter supports voltages from 100 V to 240 V, and hence can be used anywhere in the world.

Bring along the adapter if you are traveling for a long time. Charge the battery pack while sleeping so that you can record with full battery power the next day.

■ Power Plug Adapter



The shape of the power plug varies according to countries. Be sure to check the shape of the power plug beforehand, and bring the appropriate power plug adapter.

"Charging the Battery Pack Overseas" (p. 24)

■ Battery Charger



Recording cannot be performed when an AC adapter is connected to the camcorder for battery charging. You can bring an additional battery charger to charge battery packs if you plan to use the camcorder for recording at night. You can also charge multiple battery packs by using both the battery charger and this camcorder at the same time.

■ Tripod



A tripod is an essential item to take stable images. Select an appropriate tripod in accordance to your purpose and style of traveling, such as a compact one to be used on a table or one that is at least 1 m tall.

Recording the Excitement Before Departure

It may be a little abrupt to start your travel video at the destination suddenly. Record also the preparations prior to departure if it is a family trip, or the time when everyone is gathered at the meeting place if you are traveling with your friends.

For overseas trips, taking a shot of the signs and displays at the airport of the flight you are taking may be useful for future reference.



Using Pan at the Places of Interest

Tourists spots with beautiful scenery or historical sites are places that you would certainly want to record.

To capture the magnificence of a scene which cannot be fitted into a single frame, try the panning technique.

Refer to the "Shooting Tips" found in this website on how to use panning effectively.

In addition, you may also like to take a shot of the signs or monuments that can often be found at the tourist spots.



Showing Everyone Having a Good Time

When taking a video, it is rather dull to shoot only the scenery or historical sites.

Talk about your feelings while recording the breath-taking scenery of an attraction so that it will be an interesting scene to view later.

Amusement Park

Take more shots of the smiling faces of everyone in the family!



Taking Videos or Still Images According to the Attraction

You may choose to take videos all the time. However, you may want to take some still images too.

The following section explains the scenarios suitable for taking videos or still images.

■ Scenarios suitable for taking videos



Scenarios with changes in body movement are suitable for taking videos. This includes situations where there are rapid changes in facial expressions or voices of surprise and delight.

*Some amusement parks do not allow passengers to perform any recording. Be sure to check beforehand.

[Examples]

- Merry-go-round, go kart, coffee cup, etc.

■ Scenarios suitable for taking still images (photos)



Scenarios with little movement of the subject are suitable for taking still images.

Try to take the still images from an angle such that the surroundings can be seen clearly.

[Examples]

- Carousel, ferris wheel, fun bicycle rides, etc.

Inducing Responses by Calling Out



Videos with no waving of hands nor laughter are not only dull when you view them later, but also put the capability of the audio-recording function of the camcorder to a waste.

When recording, induce more reactions by enthusiastically waving your hands or shouting out "Is it fun?" and the like.

Capturing the Best Moment in a Video as a Still Image



Shots with the eyes closed are often taken by accident. To reduce such mistakes, make use of the function to capture still images from videos. As videos are actually continuous recording of 60 still images within 1 minute, using this function allows you to select the best moment and save it as a still image.

"Capturing a Still Image in the Video during Playback" (p. 60)

Advanced Operation with Backlight Compensation

When the subject's face is in backlight or when the expression cannot be seen clearly, the Intelligent Auto function of this unit automatically increases its brightness for recording.

If Intelligent Auto fails to function as expected or if the brightness correction is insufficient, you can increase the brightness by using backlight compensation in the Manual mode.

"Setting Details" (p. 35)

■ <Without backlight compensation>



■ <With backlight compensation>



Key Features

Key features of your camcorder

- 1** Full High Definition (1920×1080 pixels) Video Recording
- 2** 3.2 M (2400×1344 pixels) Still Image Recording (GZ-HM670/GZ-HM650)
- 3** i.AUTO (Intelligent Auto Recording): Detects 12 types of pre-set scenes
“Scenes of Intelligent Auto” (📖 p. 27)
- 4** 2.7” Touch Screen
“Using the Touch Screen” (📖 p. 20)
- 5** Enhanced Digital Image Stabilizer
“Reducing Camera Shake” (📖 p. 44)
- 6** 40x Optical Zoom
“ZOOM” (📖 p. 95)
- 7** Personal Authentication and Face Registration: Registering Human Face Personal Authentication Information
“Registering Human Face Personal Authentication Information” (📖 p. 37)
- 8** Zoom-in Picture: Record while viewing both overall and zoomed-in images
“Recording while Displaying a Magnified View of a Selected Face (FACE SUB-WINDOW)” (📖 p. 43)
- 9** Smile Shot: Just smile and your happy face will be automatically detected and captured!
“Capturing Smiles Automatically (SMILE SHOT)” (📖 p. 42)
- 10** TOUCH PRIORITY AE/AF: Coordinate exposure and focus area through face or color tracking
“Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (📖 p. 41)
- 11** Auto Recording: Automatically starts recording when subject enters the detecting area
“Recording Automatically by Sensing Movements (AUTO REC)” (📖 p. 46)
- 12** Time-lapse Recording: Watch long hours of recording in a few seconds
“Recording at Intervals (TIME-LAPSE RECORDING)” (📖 p. 44)
- 13** Fun Animation Effects for Recording
“Creating Animation Effects (ANIMATION EFFECT)” (📖 p. 36)
- 14** Eye-Fi Card Ready: Upload Videos through your home Wi-Fi networks
“Using an Eye-Fi Card” (📖 p. 17)
- 15** Easy Uploading to YouTube with the supplied software Everio MediaBrowser 3
“Copying to Windows PC” (📖 p. 82)




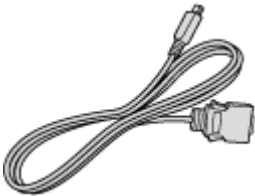


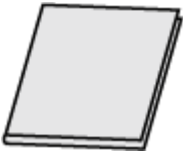
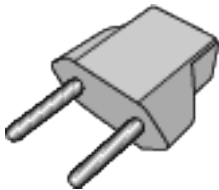
Model Differences

Confirm the model name of your camcorder.

Model	Recording Media	Built-in Memory	Memory Card Slot	LED Light	Image Sensor	Pict. Size (16:9) Max. Pict. Size (Super Resolution)	Seamless Recording	Copy/Move Files	Component Connector
GZ-HM445	SDHC/SDXC	-	Dual SD	Light	1/5.8" 1.50M CMOS	2M	Slot A → Slot B	Slot A → Slot B	Yes
GZ-HM448	SDHC/SDXC	-	Dual SD	-	1/5.8" 1.50M CMOS	2M	Slot A → Slot B	Slot A → Slot B	-
GZ-HM650	SDHC/SDXC/ Built-in Memory	8 GB	SD	Light	1/4.1" 3.32M BSI CMOS	2M (SR 3.2M)	Built-in memory → SD card	Built-in memory → SD card	Yes
GZ-HM670	SDHC/SDXC/ Built-in Memory	32 GB	SD	Light	1/4.1" 3.32M BSI CMOS	2M (SR 3.2M)	Built-in memory → SD card	Built-in memory → SD card	Yes

Verifying the Accessories

If any of the items are missing or defective, consult your JVC dealer or the nearest JVC service center.

Illustration	Description
	<p>AC Adapter AC-V10M</p> <ul style="list-style-type: none"> Connects to this unit to charge the battery pack. It can also be used when recording or playing back videos indoors.
	<p>Power Cord</p>
	<p>Battery Pack BN-VG114E/BN-VG114AC</p> <ul style="list-style-type: none"> Attaches to this unit to supply power.
	<p>Component Cable (GZ-HM445/GZ-HM650/GZ-HM670)</p> <ul style="list-style-type: none"> Connects this unit to a TV to play back recorded images on the TV in a better quality.
	<p>AV Cable</p> <ul style="list-style-type: none"> Connects this unit to a TV to play back recorded images on the TV.
	<p>USB Cable (Type A - Mini Type B)</p> <ul style="list-style-type: none"> Connects this unit to a computer.
	<p>Basic User Guide</p> <ul style="list-style-type: none"> Read well and keep in a safe place where it can be accessed easily when necessary.
	<p>Plug Adapter (certain AS destinations only)</p>

Memo :

- SD cards are sold separately.
- "Types of Usable SD Card" (p. 16)

“Using an Eye-Fi Card” (🔍 p. 17)

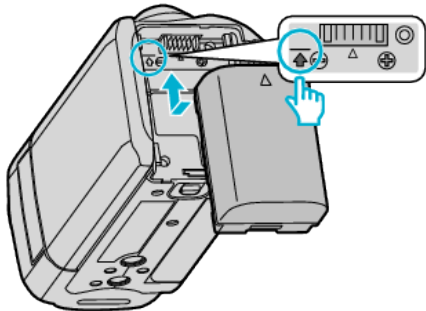
- When using the AC adapter overseas, please prepare a commercially available converter plug for the country or region of visit.

“Charging the Battery Pack Overseas” (🔍 p. 24)

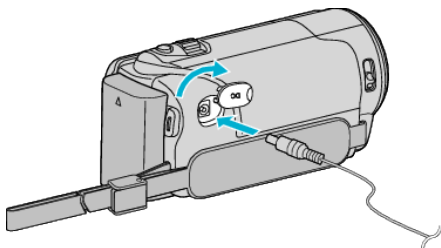
Charging the Battery Pack

Charge the battery pack immediately after purchase and when the remaining battery power is low.
The battery pack is not charged at the time of purchase.

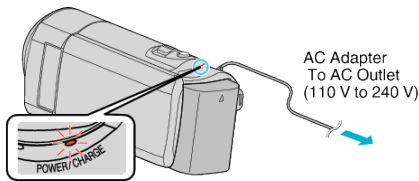
1 Attach the battery pack.



- Align the top of the battery with the mark on this unit, and slide in until the battery clicks into place.
- 2 Connect the AC adapter to the DC connector.



3 Plug in the power.



- The charging lamp blinks when charging is in progress. It goes out when charging is finished.



Caution : Be sure to use JVC battery packs.

- If you use any other battery packs besides JVC battery packs, safety and performance cannot be guaranteed.
- Charging time: Approx. 2 h 30 m (using supplied battery pack)
The charging time is when the unit is used at 25°C. If the battery pack is charged outside the room temperature range of 10°C to 35°C, charging may take a longer time or it may not start. The recordable and playable time may also be shortened under some usage conditions such as at low temperature.

Be sure to use the supplied JVC AC adapter.

- If you use any other AC adapters besides the supplied JVC AC adapter, malfunctions may occur.

Rechargeable Batteries :

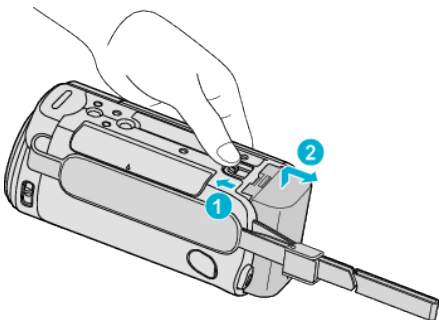
- When using the battery in a low temperature environment (10°C or below), the operating time may be shortened, or it may not function properly. When using this unit outdoors in the winter weather, warm the battery, such as by placing it in the pocket, before attaching it. (Keep away from direct contact with a warm pack.)
- Do not expose the battery to excessive heat, such as direct sunlight or fire.
- After removing the battery, store it in a dry place between 15°C to 25°C.
- Keep a 30 % battery level () if the battery pack is not to be used for a long period of time. In addition, fully charge and then fully discharge the battery pack every 2 months, then continue to store it at a 30 % battery level ().

Memo :

- You can connect this unit to the AC adapter to record for long hours indoors.

(Battery charging begins when the LCD monitor is closed.)

Detaching the Battery Pack




Slide the battery release lever to detach the battery from this unit.

Approximate Battery Charging Time (Using AC Adapter)

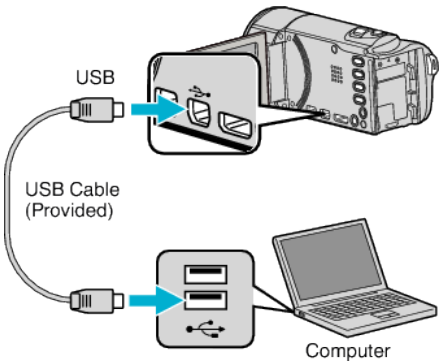
Battery Pack	Charging Time
BN-VG114E/BN-VG114AC (Supplied)	2 h 30 m
BN-VG121E/BN-VG121AC	3 h 30 m
BN-VG138E	6 h 10 m

- When the battery life is reached, the recording time becomes shorter even if the battery pack is fully charged.
(Replace the battery pack with a new one.)

* The charging time is when the unit is used at 25°C. If the battery pack is charged outside the room temperature range of 10°C to 35°C, charging may take a longer time or it may not start. The recordable and playable time may also be shortened under some usage conditions such as at low temperature. "Approximate Recording Time (Using Battery)" ( p. 50)

Charging with USB Cable

- Close the LCD monitor to turn off the camcorder and disconnect the AC adapter as well as battery pack from the camcorder.
- Turn on the computer and connect the USB cable to the camcorder.



- Do not attach the battery pack before connecting the USB cable.
- 3 Attach the battery pack.
- The charging lamp blinks when charging is in progress. It goes out when charging is finished.

Memo :

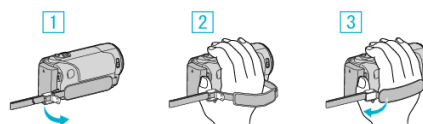
- USB charging is not possible while the AC adapter is connected to the camcorder.
- Do not turn off or set the computer to sleep mode during charging (the charging will stop).
- With some types of computers, charging is possible even when the computer is turned off. Refer to the instruction manual of the computer or consult its manufacturer.

- Charging is also possible with an optional USB AC adapter (AC-V10L). If you use any other USB AC adapters besides JVC AC adapters, safety and performance cannot be guaranteed.
- If charging does not start, detach the battery pack and try again from step 1.
- You cannot record or play back videos while the camcorder is connected to a computer. Disconnect the USB cable after charging.

Approximate Battery Charging Time (Using USB Cable)

Battery Pack	Charging Time
BN-VG114E/BN-VG114AC (Supplied)	18 h 30 m
BN-VG121E/BN-VG121AC	25 h
BN-VG138E	45 h 30 m

Grip Adjustment



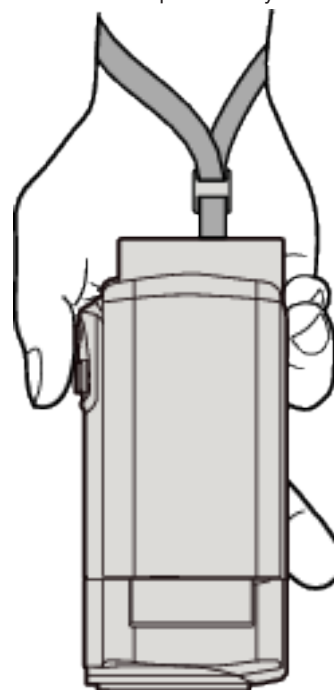
- 1 Open the lever on the strap lock
- 2 Adjust the length of the belt
- 3 Close the lever

Caution :

- Be sure to fasten the grip belt properly.
If the belt is loose, this unit may drop and result in injuries or damages.

Using as a Hand Strap

Adjust the length of the belt and loop it around your wrist.

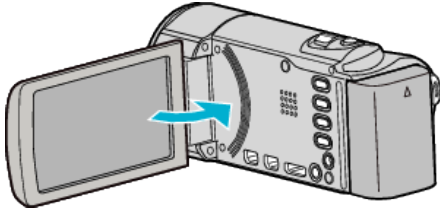


Inserting an SD Card (GZ-HM650/GZ-HM670)

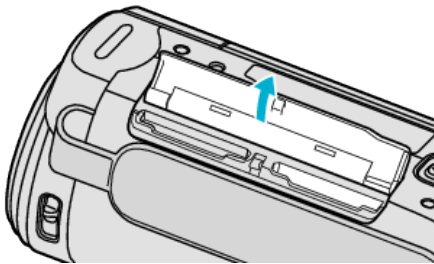
When a commercially available SD card is inserted, recordings can still be made to the card without stopping when the remaining recording time on the built-in memory runs out.

- “Types of Usable SD Card” (p. 16)
- “Using an Eye-Fi Card” (p. 17)
- “Approximate Video Recording Time” (p. 50)

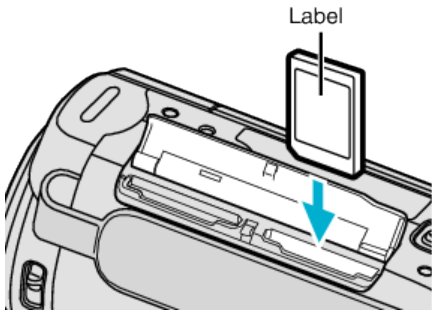
1 Close the LCD monitor.



2 Open the cover.



3 Insert an SD card.



- Insert with the label facing outward.

Warning

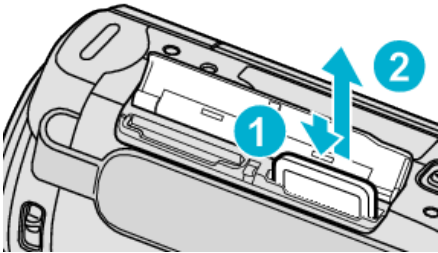
- Make sure not to insert the card in the wrong direction. It may cause damage to the unit and card.
- Turn off the power of this unit before inserting or removing a card.
- Do not touch the metal contact area when inserting the card.

Memo :

- When “SEAMLESS RECORDING” is set to “ON”, recordings can still be made to the SD card without stopping when the remaining recording time on the built-in memory runs out.
- “SEAMLESS RECORDING” (p. 96)
- To record to the card, it is necessary to perform media settings. When no card is available, set media settings to “BUILT-IN MEMORY” for recording.
- “REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)” (p. 108)
- “REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)” (p. 108)
- To use cards that have been used on other devices, it is necessary to format (initialize) the card using “FORMAT SD CARD” from media settings.
- “FORMAT SD CARD” (p. 117)

Removing the Card

Push the SD card inward once, then pull it out straight.



Types of Usable SD Card

The following SD cards can be used on this unit. Operations are confirmed on the SD cards from the following manufacturers.

- Panasonic
- TOSHIBA
- SanDisk
- Eye-Fi

SD Card



- This unit supports 256 MB to 2 GB SD cards.
- Use a Class 4 or higher compatible SD card (2 GB) for video recording.

SDHC Card



- Use a Class 4 or higher compatible SDHC card (4 GB to 32 GB) for video recording.

SDXC Card



- Use a Class 4 or higher compatible SDXC card (Max. 64 GB).

Memo :

- Using SD cards (including SDHC/SDXC cards) other than those specified above may result in recording failure or data loss.
- To record videos with "VIDEO QUALITY" set to "UXP", use of a Class 6 compliant SDHC/SDXC card is recommended.
- Class 4 and Class 6 are guaranteed to have a minimum transfer rate of 4 MB/s and 6 MB/s respectively during reading or writing of data.
- You can also use a Class 10 compliant SDHC/SDXC card.
- To protect the data, do not touch the terminals of the SD card.

When your computer cannot recognize the SDXC card

Confirm and update the OS of your computer.

Windows XP / Windows XP SP1	Necessary to update to SP2 or higher.
Windows XP SP2 / Windows XP SP3	Necessary to download the update software. (KB955704) http://www.microsoft.com/downloads/details.aspx?FamilyID=1cbe3906-ddd1-4ca2-b727-c2dff5e30f61&displaylang=en
Windows Vista	Necessary to update to SP1 or higher.
Windows Vista SP1 / Windows Vista SP2	Necessary to download the update software. (KB975823) <ul style="list-style-type: none"> • 32 bit version http://www.microsoft.com/downloads/en/details.aspx?FamilyID=2d1abe01-0942-4f8a-abb2-2ad529de00a1 • 64 bit version http://www.microsoft.com/downloads/en/details.aspx?FamilyID=7d54c53f-017c-4ea5-ae08-34c3452ba315
Windows 7	Necessary to download the update software. (KB976422) <ul style="list-style-type: none"> • 32 bit version http://www.microsoft.com/downloads/en/details.aspx?FamilyID=3ee91fc2-a9bc-4ee1-aca3-2a9aff5915ea • 64 bit version http://www.microsoft.com/downloads/en/details.aspx?FamilyID=73f766dd-7127-4445-b860-47084587155f
Mac OS X 10.4 Tiger / Mac OS X 10.5 Leopard	Not compatible.
Mac OS X 10.6 Snow Leopard	Necessary to upgrade to 10.6.5.

Using an Eye-Fi Card

Eye-Fi is an SD memory card with wireless LAN function.

Using an Eye-Fi card, you can transfer videos and still images to a computer or the web. (A broadband wireless LAN environment is required.)

Use of Eye-Fi card may be illegal and prohibited in countries and regions where it has not been approved by competent authorities. Please contact Eye-Fi support for the details of approved countries and regions.

Types of Cards

The following Eye-Fi cards can be used on this unit.

Eye-Fi X2 Series

- Eye-Fi Connect X2
- Eye-Fi Explore X2
- Eye-Fi Pro X2

Using the Eye-Fi Card

Make settings on the Eye-Fi card with Eye-Fi Center.

For how to install and operate the Eye-Fi Center, refer to its instruction manual.

- Recorded videos and still images are automatically transferred. (The files already transferred earlier are not transferred again.)

Memo :

- You cannot transfer files during the recording mode, editing and formatting of the card.
- You cannot transfer video files larger than 2 GB. (as of December, 2010)
- Transfer may take long or be interrupted depending on the connection conditions.

Icon	Description
	Identifying the Eye-Fi card
	Ready for transfer from the Eye-Fi card
	Transferring from the Eye-Fi card (animated)

- We recommend using the AC adapter when transferring files of large size.
- If it doesn't operate properly, first make use of Eye-Fi Helper to confirm that the settings of the Eye-Fi card are correct. In addition, try the data transfer by inserting the Eye-Fi card into other equipment such as a computer.
- Do not use the camcorder in places where wireless use is prohibited such as on a plane.
- Before deleting a file, check that you have transferred it to a computer or uploaded it to a video sharing website.
- For the latest information on the Eye-Fi card, refer to the website of Eye-Fi, Inc.

<http://www.eye.fi/>

Inserting an SD Card (GZ-HM445/GZ-HM448)

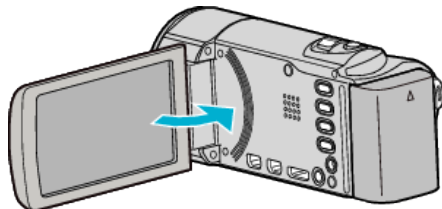
Insert a commercially available SD card before recording. This unit comes with two SD card slots. When two SD cards are inserted, recordings can be continued on the other card even if one card is full.

“Types of Usable SD Card” (p. 18)

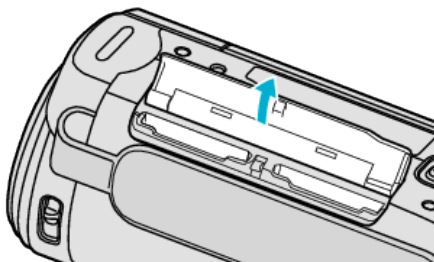
“Using an Eye-Fi Card” (p. 19)

“Approximate Video Recording Time” (p. 50)

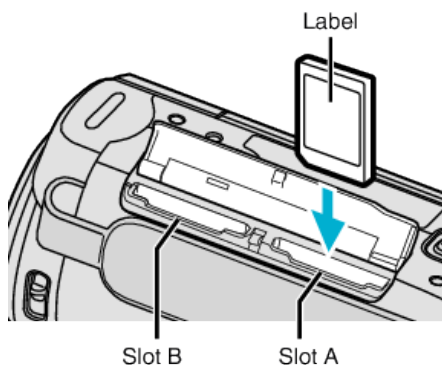
- 1 Close the LCD monitor.



- 2 Open the cover.



- 3 Insert an SD card into slot A.



- Insert with the label facing outward.

Caution :

- Make sure not to insert the card in the wrong direction. It may cause damage to the unit and card.
- Turn off the power of this unit before inserting or removing a card.
- Do not touch the metal contact area when inserting the card.

Memo :

- Recording switches automatically from slot A to slot B after the card in slot A is full.

“SEAMLESS RECORDING” (p. 96)

- To record to the card, it is necessary to perform media settings.

“REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)

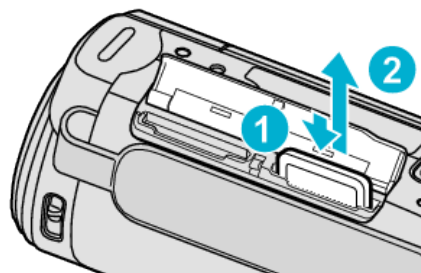
“REC STILL TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)

- To use cards that have been used on other devices, it is necessary to format (initialize) the card using “FORMAT SD CARD” from media settings.

“FORMAT SD CARD” (p. 117)

Removing the Card

Push the SD card inward once, then pull it out straight.



Types of Usable SD Card

The following SD cards can be used on this unit.

Operations are confirmed on the SD cards from the following manufacturers.

- Panasonic
- TOSHIBA
- SanDisk
- Eye-Fi

SD Card



- This unit supports 256 MB to 2 GB SD cards.
- Use a Class 4 or higher compatible SD card (2 GB) for video recording.

SDHC Card



- Use a Class 4 or higher compatible SDHC card (4 GB to 32 GB) for video recording.

SDXC Card



- Use a Class 4 or higher compatible SDXC card (Max. 64 GB).

Memo :

- Using SD cards (including SDHC/SDXC cards) other than those specified above may result in recording failure or data loss.
- To record videos with "VIDEO QUALITY" set to "UXP", use of a Class 6 compliant SDHC/SDXC card is recommended.
- Class 4 and Class 6 are guaranteed to have a minimum transfer rate of 4 MB/s and 6 MB/s respectively during reading or writing of data.
- You can also use a Class 10 compliant SDHC/SDXC card.
- To protect the data, do not touch the terminals of the SD card.

When your computer cannot recognize the SDXC card

Confirm and update the OS of your computer.

Windows XP / Windows XP SP1	Necessary to update to SP2 or higher.
Windows XP SP2 / Windows XP SP3	Necessary to download the update software. (KB955704) http://www.microsoft.com/downloads/details.aspx?FamilyID=1cbe3906-ddd1-4ca2-b727-c2dff5e30f61&displaylang=en
Windows Vista	Necessary to update to SP1 or higher.
Windows Vista SP1 / Windows Vista SP2	Necessary to download the update software. (KB975823) <ul style="list-style-type: none"> • 32 bit version http://www.microsoft.com/downloads/en/details.aspx?FamilyID=2d1abe01-0942-4f8a-abb2-2ad529de00a1 • 64 bit version http://www.microsoft.com/downloads/en/details.aspx?FamilyID=7d54c53f-017c-4ea5-ae08-34c3452ba315
Windows 7	Necessary to download the update software. (KB976422) <ul style="list-style-type: none"> • 32 bit version http://www.microsoft.com/downloads/en/details.aspx?FamilyID=3ee91fc2-a9bc-4ee1-aca3-2a9aff5915ea • 64 bit version http://www.microsoft.com/downloads/en/details.aspx?FamilyID=73f766dd-7127-4445-b860-47084587155f
Mac OS	Not compatible.

Using an Eye-Fi Card

Eye-Fi is an SD memory card with wireless LAN function.

Using an Eye-Fi card, you can transfer videos and still images to a computer or the web. (A broadband wireless LAN environment is required.)

Use of Eye-Fi card may be illegal and prohibited in countries and regions where it has not been approved by competent authorities. Please contact Eye-Fi support for the details of approved countries and regions.

Types of Cards

The following Eye-Fi cards can be used on this unit.

Eye-Fi X2 Series

- Eye-Fi Connect X2
- Eye-Fi Explore X2
- Eye-Fi Pro X2

Video and still image files cannot be transferred without the Eye-Fi X2 series.

Using the Eye-Fi Card

Make settings on the Eye-Fi card with Eye-Fi Center.

For how to install and operate the Eye-Fi Center, refer to its instruction manual.

- Recorded videos and still images are automatically transferred. (The files already transferred earlier are not transferred again.)

Memo :

- You cannot transfer files during the recording mode, editing and formatting of the card.
- You cannot transfer video files larger than 2 GB. (as of December, 2010)
- Transfer may take long or be interrupted depending on the connection conditions.

Icon	Description
	Identifying the Eye-Fi card
	Ready for transfer from the Eye-Fi card
	Transferring from the Eye-Fi card (animated)

- We recommend using the AC adapter when transferring files of large size.
- If it doesn't operate properly, first make use of Eye-Fi Helper to confirm that the settings of the Eye-Fi card are correct. In addition, try the data transfer by inserting the Eye-Fi card into other equipment such as a computer.
- Do not use the camcorder in places where wireless use is prohibited such as on a plane.
- Before deleting a file, check that you have transferred it to a computer or uploaded it to a video sharing website.
- For the latest information on the Eye-Fi card, refer to the website of Eye-Fi, Inc.

<http://www.eye.fi/>

Using the Touch Screen

Icon operation buttons, thumbnails, and menu items are displayed on the touch screen according to the mode in use.

- There are two ways to operate the touch screen, namely “tap” and “drag”. The following are some examples.

- A

Tap the displayed button (icon) or thumbnail (file) on the touch screen to make selection.
- B

Drag the thumbnails on the touch screen to search for the desired file.

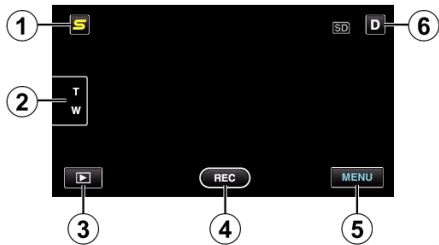


- Memo :**
- The touch screen of this unit is pressure-sensitive. When the touch screen does not respond smoothly, apply slightly more force to your fingertip.
 - Tap the buttons (icons) on the touch screen accurately. The buttons may not respond if they are not tapped on the right area.
 - Do not press or rub with excessive force.
 - If you apply a protect sheet or a sticker, the touch screen may not respond smoothly.
 - Do not operate the touch screen using an object with a sharp or hard tip.
 - Pressing two or more places at a time may cause a malfunction.
 - Perform “TOUCH SCREEN ADJUST” if the reactive area of the screen is misaligned with the touched area. (Adjust by lightly tapping with a corner of an SD card, etc. Do not press with an object with a sharp tip or do not press hard.)
- “TOUCH SCREEN ADJUST” (p. 111)

Names of Buttons and Functions on the LCD Monitor

The following screens are displayed during the video and still image modes, and operate as the touch screens.

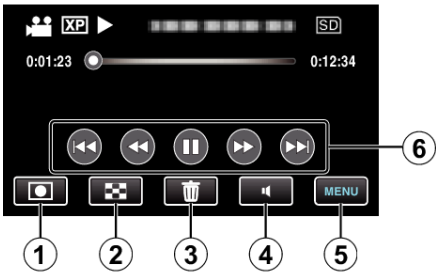
Recording Screen (Video/Still Image)



- 1 Face Short Cut Menu Button
 - Displays a short cut screen of face recognition functions.“Operating the Face Short Cut Menu” (p. 89)
- 2 Zoom Button
 - “Zooming” (p. 29)
- 3 Playback Mode Button
 - Switches to the playback mode.
- 4 Recording Start/Stop Button
 - REC: Video Recording Start Button
 - ●||: Video Recording Stop Button
 - : Still Image Recording Button
- 5 Menu Button
 - “Operating the Menu” (p. 89)
- 6 Display Button
 - Some displays disappear after approximately 3 seconds. Use the D button to change the displays as shown below.
 - Tap D button
 - Displays appear for approximately 3 seconds with every tap.

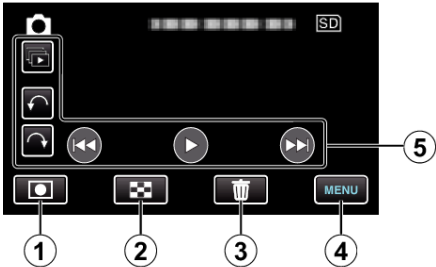
- Tap and hold D button
 - Displays are fixed such that they do not disappear. After setting, the display button changes from D to D^L.
 - Tap D^L to release the displays.

Playback Screen (Video)



- 1 Recording Mode Button
 - Switches to the recording mode.
- 2 Index Screen Button
 - “Operation Buttons for Video Playback” (p. 51)
- 3 Delete Button
 - “Deleting the Currently Displayed File” (p. 58)
- 4 Volume Adjustment Button
 - “Adjusting the Volume of Videos” (p. 52)
- 5 Menu Button
 - “Operating the Menu” (p. 89)
- 6 Operation Buttons
 - “Operation Buttons for Video Playback” (p. 51)

Playback Screen (Still Image)



- 1 Recording Mode Button
 - Switches to the recording mode.
- 2 Index Screen Button
 - “Operation Buttons for Still Image Playback” (p. 53)
- 3 Delete Button
 - “Deleting the Currently Displayed File” (p. 58)
- 4 Menu Button
 - “Operating the Menu” (p. 89)
- 5 Operation Buttons
 - “Operation Buttons for Still Image Playback” (p. 53)

Index Screen



- 1 Date Button
“Operation Buttons for Video Playback” (p. 51)
“Operation Buttons for Still Image Playback” (p. 53)
- 2 Recording Mode Button
• Switches to the recording mode.
- 3 Delete Button
“Deleting Selected Files” (p. 58)
- 4 Playback Media Button
• Switches between SD card and built-in memory or slot A and slot B (GZ-HM445/GZ-HM448).
- 5 Menu Button
“Operating the Menu” (p. 89)
- 6 Page Forward/Back Button
“Operation Buttons for Video Playback” (p. 51)
“Operation Buttons for Still Image Playback” (p. 53)

Menu Screen

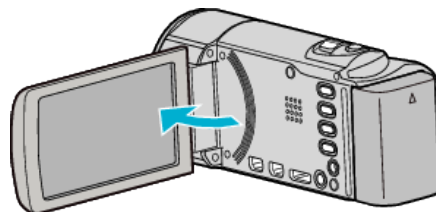


- 1 Help Button
- 2 Menu Items
- 3 Return Button
- 4 Common Menu Button
- 5 Close Button
“Operating the Menu” (p. 89)

Clock Setting

The “SET DATE/TIME!” screen appears when you turn on this unit for the first time after purchase, when it has not been used for a long time, or when the clock is not set yet.
Set the clock before recording.

- 1 Open the LCD monitor.

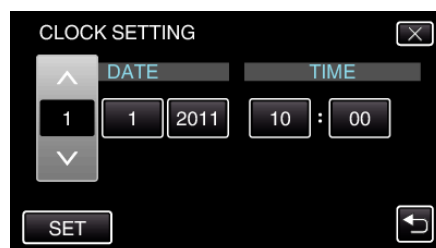


- The unit turns on.
- When the LCD monitor is closed, the unit turns off.

- 2 Tap “YES” when “SET DATE/TIME!” is displayed.



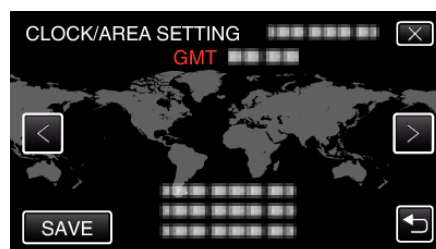
- 3 Set the date and time.



- When the year, month, day, hour, or minute item is tapped, “^” and “v” will be displayed.
- Tap ^ or v to adjust the year, month, day, hour, and minute.

- 4 After setting the date and time, tap “SET”.

- 5 Select the region where you live and tap “SAVE”.



- The city name and time difference are displayed.
- Tap < or > to select the city name.

Memo :

- The clock can be reset again later.
- “Resetting the Clock” (p. 22)
- When using this unit overseas, you can set it to the local time for recording.
- “Setting the Clock to Local Time when Traveling” (p. 24)
- “SET DATE/TIME!” is displayed when you turn on this unit after it has not been used for a prolonged period.
- Connect the AC adapter for more than 24 hours to charge the internal clock battery of this unit before setting the clock.

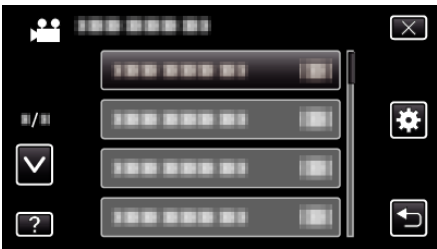
Resetting the Clock

Set the clock with “CLOCK ADJUST” from the menu.

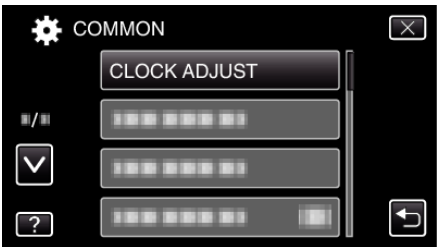
1 Tap “MENU”.



2 Tap “⚙️”.



3 Tap “CLOCK ADJUST”.

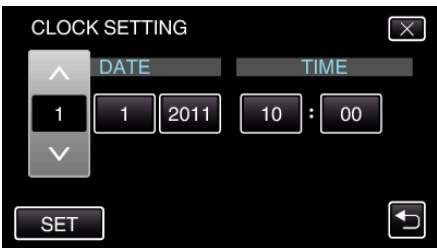


- Tap ^ or v to move upward or downward for more selection.

4 Tap “CLOCK SETTING”.



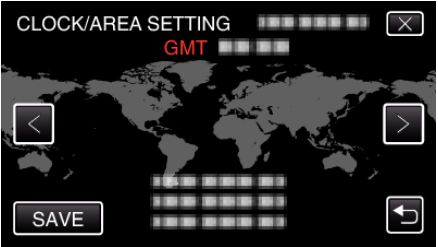
5 Set the date and time.



- When the year, month, day, hour, or minute item is tapped, “^” and “v” will be displayed.
- Tap ^ or v to adjust the year, month, day, hour, and minute.

6 After setting the date and time, tap “SET”.

7 Select the region where you live and tap “SAVE”.

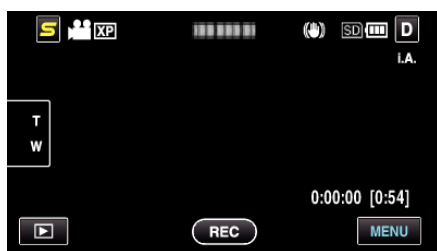


- The city name and time difference are displayed.
- Tap < or > to select the city name.

Changing the Display Language

The language on the display can be changed.

- 1 Tap "MENU".





- 2 Tap .

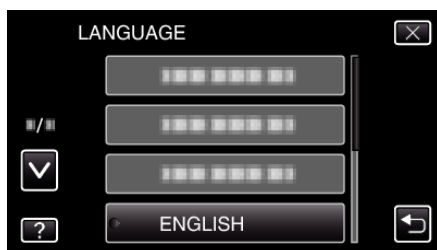




- 3 Tap "LANGUAGE".



- Tap  or  to move upward or downward for more selection.

- 4 Tap to the desired language.



- Tap  or  to move upward or downward for more selection.

Holding this Unit

When holding this unit, keep your elbows close to your sides to prevent camera shake.



Caution :

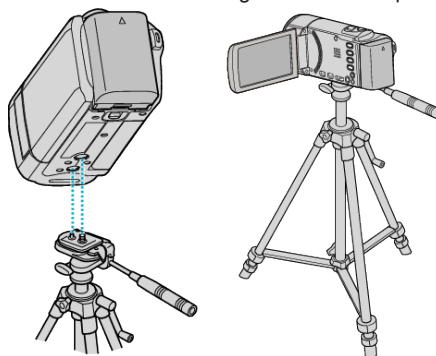
- Be careful not to drop this unit during transportation.
- Guardians should pay close attention when this unit is being used by children.

Memo :

- If camera shake is excessive, use the digital image stabilizer. "Reducing Camera Shake" (p. 44)

Tripod Mounting

This unit can be mounted on a tripod (or monopod). This is useful for preventing camera shake and recording from the same position.




- To prevent this unit from falling off, check the tripod mounting screw holes and positioning holes on the unit carefully before mounting, and turn the screws until they are fastened firmly.

Caution :

- To prevent injuries or damages which may result if this unit falls off, read the instruction manual of the tripod (or monopod) to be used and make sure that it is securely attached.

Memo :

- It is recommended to use a tripod or monopod when recording in conditions prone to camera shake (such as in dark places or when zoomed to the telephoto end).
- Set the digital image stabilizer to  (OFF) when using a tripod for recording.

"Reducing Camera Shake" (p. 44)

Using this Unit Overseas

The shape of the power outlet varies according to countries and regions. To charge the battery pack, you need a converter plug that matches the shape of the outlet.

“Charging the Battery Pack Overseas” (p. 24)

Change the date and time display to the local time by selecting your travel destination in “AREA SETTING” of “CLOCK ADJUST”.

“Setting the Clock to Local Time when Traveling” (p. 24)

When “ON” is selected in “DST SETTING” of “CLOCK ADJUST”, the time is set 1 hour ahead.

“Setting Daylight Saving Time” (p. 25)

Charging the Battery Pack Overseas

The shape of the power outlet varies according to countries and regions. To charge the battery pack, you need a converter plug that matches the shape of the outlet.

A	B	BF	C	O
North America	Europe	Oceania		Middle East
United States A	Iceland C	Australia O		Israel C
Canada A	Ireland C	Guam A		Iran C
Mexico A	United Kingdom B,BF	Tahiti C		Kuwait B,C
	Italy C	Tonga O		Jordan B,BF
Asia	Austria C	New Zealand O		
India B,C,BF	Netherlands C	Fiji O		Africa
Indonesia C	Canary Islands C			Algeria A,B,BF,C
Singapore B,BF	Greece C	Latin		Egypt B,BF,C
Sri Lanka B,C,BF	Switzerland C	Argentina O		Guinea C
Thailand A,BF,C	Sweden C	Colombia A		Kenya B,C
South Korea A,C	Spain A,C	Jamaica A		Zambia B,BF
China A,B,BF,C,O	Denmark C	Chile B,C		Tanzania B,BF
Japan A	Germany C	Haiti A		Republic of South Africa B,C,BF
Nepal C	Norway C	Panama A		Mozambique C
Pakistan B,C	Hungary C	Bahamas A		Morocco C
Bangladesh C	Finland C	Puerto Rico A		
Philippines A,BF,O	France C	Brazil A,C		
Vietnam A,C	Belgium C	Venezuela A		
Hong Kong Special	Poland B,C	Peru A,C		
Administrative Region B,BF	Portugal B,C			
Macau Special	Romania C			
Administrative Region B,C				
Malaysia B,BF,C				

Setting the Clock to Local Time when Traveling

Change the date and time display to the local time by selecting your travel destination in “AREA SETTING” of “CLOCK ADJUST”. Restore the region settings after you returned from the trip.

- 1 Tap “MENU”.
-
- 2 Tap “⚙️”.
-
- 3 Tap “CLOCK ADJUST”.
-
- Tap \wedge or \vee to move upward or downward for more selection.
- 4 Tap “AREA SETTING”.
-
- 5 Select the area you are traveling to and tap “SAVE”.
-
- The city name and time difference are displayed.
 - Tap < or > to select the city name.

Memo :

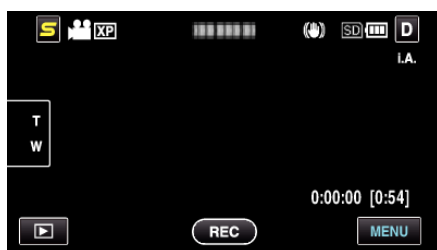
- Setting “AREA SETTING” changes the clock time such that time difference is accounted for.

After returning to your country, re-select the region that was set initially to restore the original clock settings.

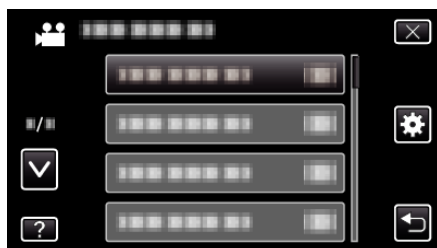
Setting Daylight Saving Time

When "ON" is selected in "DST SETTING" of "CLOCK ADJUST", the time is set 1 hour ahead.

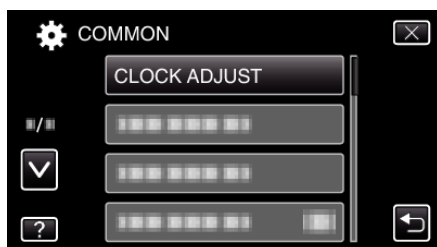
- 1 Tap "MENU".



- 2 Tap "⚙️".



- 3 Tap "CLOCK ADJUST".

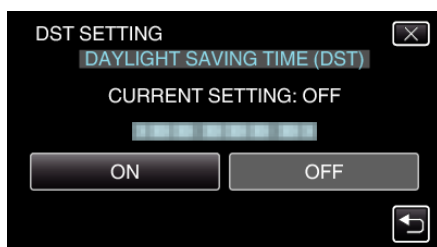


- Tap ^ or v to move upward or downward for more selection.

- 4 Tap "DST SETTING".



- 5 Tap "ON".



Memo :

- What is daylight saving time?
Daylight saving time is the system of setting the clock 1 hour ahead for a fixed period in summer.
It is used mainly in the Western countries.
- Restore the daylight saving time settings after you returned from the trip.

Optional Accessories

You can record for a longer time by using the optional battery pack.

Product Name	Description
Battery Pack <ul style="list-style-type: none"> • BN-VG114E/BN-VG114AC • BN-VG121E/BN-VG121AC • BN-VG138E 	<ul style="list-style-type: none"> • Provides a longer recording time. It can also be used as a spare battery pack.
Battery Charger <ul style="list-style-type: none"> • AA-VG1 	<ul style="list-style-type: none"> • Enables the battery pack to be charged without using this unit.
Component Cable <ul style="list-style-type: none"> • QAM1266-001 	<ul style="list-style-type: none"> • For viewing in high picture quality. • Consult your nearest JVC service center.
HDMI Cable <ul style="list-style-type: none"> • VX-HD310ES • VX-HD315ES • VX-HD320 • VX-HD330 	<ul style="list-style-type: none"> • For viewing in high picture quality. • Transmits video, audio, and control signals between devices.

Memo :

- For more information, refer to the catalog.
- BN-VG114E/BN-VG114AC is the same battery pack that comes with this unit.

Approximate Recording Time (Using Battery)

Battery Pack	Actual Recording Time		Continuous Recording Time	
	GZ-HM445/ GZ-HM448	GZ-HM650/ GZ-HM670	GZ-HM445/ GZ-HM448	GZ-HM650/ GZ-HM670
BN-VG114E/BN-VG114AC (Supplied)	1 h (1 h 5 m)	1 h (1 h 5 m)	1 h 50 m (2 h)	1 h 50 m (1 h 55 m)
BN-VG121E/BN-VG121AC	1 h 35 m (1 h 40 m)	1 h 30 m (1 h 35 m)	2 h 50 m (3 h 5 m)	2 h 45 m (2 h 55 m)
BN-VG138E	2 h 50 m (3 h)	2 h 40 m (2 h 55 m)	5 h 5 m (5 h 30 m)	4 h 55 m (5 h 20 m)

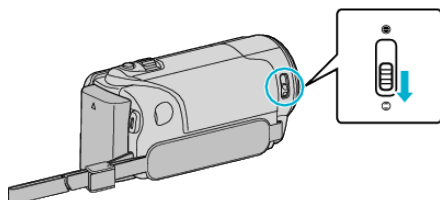
- The above are values when "LIGHT" is set to "OFF" and "MONITOR BRIGHTNESS" is set to "4" (brighter).
(): Values when "LIGHT" is set to "OFF" and "MONITOR BRIGHTNESS" is set to "3" (standard)
- The actual recording time may be shorter if zooming is used or if recording is stopped repeatedly.
(It is recommended to prepare battery packs ready for three times the expected recording time.)
- When the battery life is reached, the recording time becomes shorter even if the battery pack is fully charged.
(Replace the battery pack with a new one.)

Taking Videos in Intelligent Auto Mode

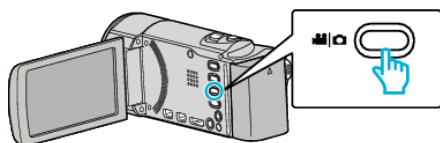
You can record without worrying about the setting details by using the Intelligent Auto mode. Settings such as exposure and focus will be adjusted automatically to suit the shooting conditions.

- In case of specific shooting scenes such as night view (🌙), person (👤) etc., its icon is displayed on the screen.
- Before recording an important scene, it is recommended to conduct a trial recording.

1 Open the lens cover.

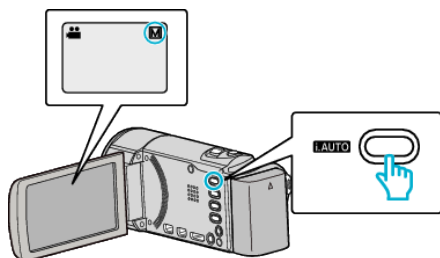


2 Open the LCD monitor and select the video mode.



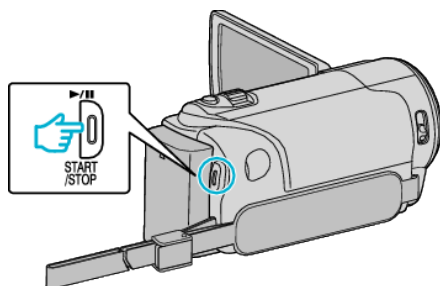
- The video mode icon appears.

3 Check if the recording mode is Intelligent Auto.



- If the mode is **M** Manual, press the i.AUTO button to switch. The mode changes between Intelligent Auto and Manual with every press.

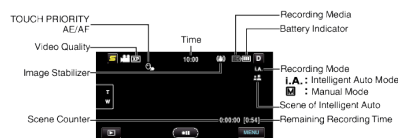
4 Start recording.



- Press again to stop.
- Some displays disappear after approximately 3 seconds. Use the **D** button to change the displays.

“Operation Buttons for Video Recording” (p. 28)



Indications During Video Recording



Display Icon	Description
Time	Displays the current time. “Clock Setting” (p. 21)
Touch Priority AE/AF	Displays the setting of “TOUCH PRIORITY AE/AF”. By default, it is set to “FACE TRACKING”. “Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (p. 41)
Video Quality	Displays the icon of the “VIDEO QUALITY” setting selected in the recording menu. “VIDEO QUALITY” (p. 95)
Image Stabilizer	Sets whether to reduce camera shake. “Reducing Camera Shake” (p. 44)
Scene Counter (Recorded Time)	Displays the elapsed time of the video that is currently being recorded.
Remaining Recording Time	Displays the remaining time for video recording.
Recording Mode	Press the i.AUTO button to switch the recording mode between i.A. (Intelligent Auto) and M (Manual).
Battery Indicator	Displays the approximate remaining battery power. Details of the battery power can be displayed by pressing the INFO button. “Remaining Recording Time/Battery Power” (p. 49)
Recording Media	Displays the icon of the media where videos are recorded to. The recording media can be changed. “REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)” (p. 108) “REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)

Scenes of Intelligent Auto

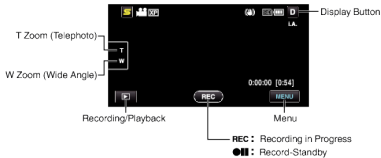
Display Icon	Description
	Captures one's skin beautifully.
	Allows people to be captured naturally.
	Focuses at a far distance and captures a sharp image with vivid colors.
	Records with minimal noise in the overall image.
	Allows night scenes to be captured accurately with minimal noise in the overall image.
	Prevents colors from fading even when recording in a bright environment.
	Records while focusing on a near object.
	Reproduces the green color of trees vividly.
	Reproduces the colors of sunset naturally.
	Adjusts settings so that the subject does not appear too dark due to backlight.




	Allows people to be captured naturally with minimal noise in the overall image.
	Records while focusing on a near object even in a dark environment.

Memo : _____

- Scenes can be detected according to the shooting conditions and automatically adjusted in Intelligent Auto mode.
- Some functions may not work properly depending on the shooting conditions.

Operation Buttons for Video Recording



Operation Button	Description
T/W Zoom	Allows the same functions as the zoom lever to be performed. Camera shake that often occurs when using the zoom lever can be minimized. “Zooming” (p. 29)
Playback Mode 	Switches to the playback mode.
Recording Start  Record-Standby 	Functions as the START/STOP button.
MENU	Displays the various menus of video recording. “Operating the Menu” (p. 89)
Display Button D	Some displays disappear after approximately 3 seconds. Use the D button to change the displays as shown below. <ul style="list-style-type: none">• Tap D button Displays appear for approximately 3 seconds with every tap.• Tap and hold D button Displays are fixed such that they do not disappear. After setting, the display button changes from D to D^L. Tap D^L to release the displays.

Useful Settings for Recording

- When “QUICK RESTART” is set to “ON”, this unit turns on immediately if you open the LCD monitor within 5 minutes after the power is turned off by closing the monitor.
“QUICK RESTART” (p. 111)
- When “AUTO POWER OFF” is set to “ON”, this unit turns itself off automatically to conserve power when it is not operated for 5 minutes. (only when using the battery pack)
“AUTO POWER OFF” (p. 110)
- When “TOUCH PRIORITY AE/AF” is set to “FACE TRACKING”, this unit detects faces and automatically adjusts its brightness and focus to record the faces more clearly.
“Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (p. 41)
- If the remaining space on the built-in memory runs out while “SEAMLESS RECORDING” is set to “ON”, recording continues after switching to the SD card.
“SEAMLESS RECORDING” (p. 96)

Caution : _____

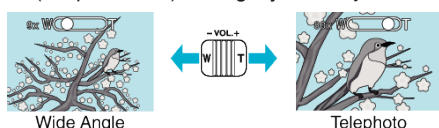
- Do not expose the lens to direct sunlight.
 - Do not use this unit in the rain, snow, or places with high humidity like the bathroom.
 - Do not use this unit in places subject to excessive humidity or dust, as well as places exposed to steam or smoke directly.
 - Do not remove the battery pack, AC adapter, or SD card when the access lamp is lighted. The recorded data may become unreadable.
- “ACCESS (Access) Lamp” (p. 118)
- This unit is a microcomputer-controlled device. Electrostatic discharge, external noise and interference (from a TV, a radio, etc.) might prevent it from functioning properly. In such a case, turn off the power, then remove the AC adapter and battery pack. This unit will be reset.
 - Make a backup of important recorded data.
It is recommended to copy your important recorded data to a DVD or other recording media for storage.
JVC will not be responsible for any lost data.

- Memo :** _____
- Check the remaining recording time in the media before you start shooting. If there is not enough space, move (copy) the data to a computer or disc.
 - When there are many files in the media, it may take time for them to be displayed on the playback screen. Wait for a while as the access lamp appears blinking, which indicates normal operation.
 - Do not forget to make copies after recording!
 - Recording stops automatically as it cannot be performed for 12 or more consecutive hours according to specifications. (It may take some time to resume recording.)
 - For long recordings, the file is split into two or more files if the size exceeds 4 GB.
 - You can connect this unit to the AC adapter to record for long hours indoors.

Zooming

The angle of view can be adjusted using zoom.

- Use the W end (wide angle end) to shoot a wider field of view.
- Use the T end (telephoto end) to magnify the subject for shooting.



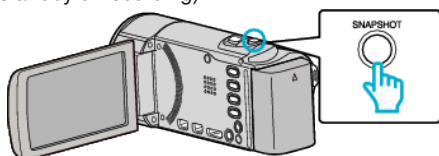
Memo :

- When digital zoom is used, the image becomes grainy as it is digitally enlarged.
- The zoom ratio range can be changed.

“ZOOM” (p. 95)

Capturing Still Images During Video Recording

Still images can be captured by pressing the SNAPSHOT button while in the video mode (standby or recording).



- “PHOTO” lights up on the screen when a still image is being captured.



- The still images captured during video recording are saved to the destination set in “REC MEDIA FOR IMAGE” or “REC STILLS TO SLOTS”.

Memo :

- The size of the still image that is captured in the video mode is 1920 x 1080.
- Operation is invalid under the following conditions:
 - when menu is being displayed
 - when file information or remaining battery power is being displayed
 - when “FACE SUB-WINDOW” is set
 - when “ANIMATION EFFECT” is set

“Recording while Displaying a Magnified View of a Selected Face (FACE SUB-WINDOW)” (p. 43)

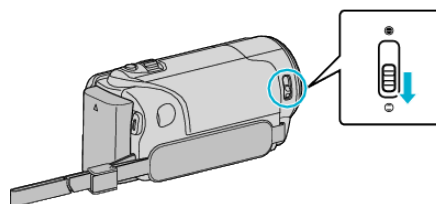
“Creating Animation Effects (ANIMATION EFFECT)” (p. 36)

- Still images cannot be captured during video recording when cables are connected to the HDMI (with output other than 1080i) or AV connector.

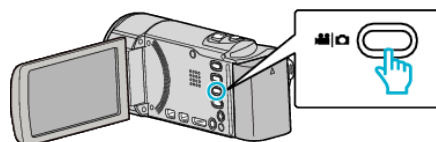
Taking Still Images in Intelligent Auto Mode

You can record without worrying about the setting details by using the Intelligent Auto mode.

- 1 Open the lens cover.

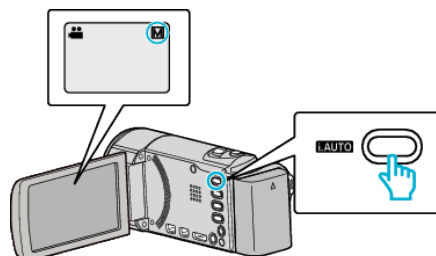


- 2 Open the LCD monitor and select the still image mode.



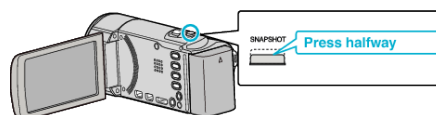
- The still image mode icon appears.

- 3 Check if the recording mode is Intelligent Auto.



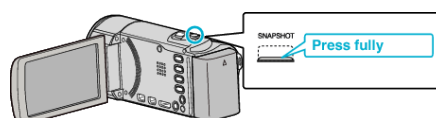
- If the mode is **M** Manual, press the i.AUTO button to switch. The mode changes between Intelligent Auto and Manual with every press.

- 4 Set the focus on the subject.



- When focused, the focus icon lights up in green.

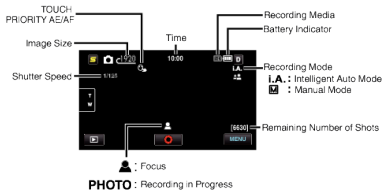
- 5 Take a still image.



- PHOTO lights up when a still image is being captured.
- Some displays disappear after approximately 3 seconds. Use the **D** button to change the displays.

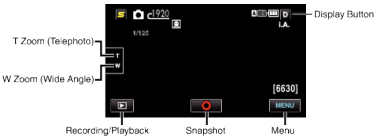
“Operation Buttons for Still Image Recording” (p. 30)

Indications During Still Image Recording



Display Icon	Description
Time	Displays the current time. “Clock Setting” (p. 21)
Touch Priority AE/AF	Displays the setting of “TOUCH PRIORITY AE/AF”. By default, it is set to “FACE TRACKING”. “Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (p. 41)
Image Size	Displays the icon of the image size. <ul style="list-style-type: none">The size of still images can be changed. “IMAGE SIZE” (p. 100)
Shutter Speed	Displays the shutter speed.
Focus	Lights up in green when focused.
Recording in Progress	Appears when a still image is being captured.
Remaining Number of Shots	Displays the remaining number of shots for still image recording.
Scene of Intelligent Auto	Displays the selected scene of Intelligent Auto. “Scenes of Intelligent Auto” (p. 27)
Recording Mode	Press the i.AUTO button to switch the recording mode between i.A. (Intelligent Auto) and M (Manual).
Battery Indicator	Displays the approximate remaining battery power. Details of the battery power can be displayed by pressing the INFO button. “Remaining Recording Time/Battery Power” (p. 49)
Recording Media	Displays the icon of the media where still images are recorded to. The recording media can be changed. “REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)” (p. 108) “REC STILLs TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)

Operation Buttons for Still Image Recording



Operation Button	Description
T/W Zoom	Allows the same functions as the zoom lever to be performed. Camera shake that often occurs when using the zoom lever can be minimized. “Zooming” (p. 31)
Playback Mode	Switches to the playback mode.
Snapshot	Functions as the SNAPSHOT button. However, focus cannot be set by pressing halfway.
Menu	Displays the various menus of still image recording. “Operating the Menu” (p. 89)
Display Button D	Some displays disappear after approximately 3 seconds. Use the D button to change the displays as shown below. <ul style="list-style-type: none">Tap D button Displays appear for approximately 3 seconds with every tap.Tap and hold D button Displays are fixed such that they do not disappear. After setting, the display button changes from D to Df. Tap Df to release the displays.

Useful Settings for Recording

- When “AUTO POWER OFF” is set to “ON”, this unit turns itself off automatically to conserve power when it is not operated for 5 minutes. (only when using the battery pack)
“AUTO POWER OFF” (p. 110)
 - When “TOUCH PRIORITY AE/AF” is set to “FACE TRACKING”, this unit detects faces and automatically adjusts its brightness and focus to record the faces more clearly.
“Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (p. 41)
 - To perform recording in a dark location, do so after setting “LIGHT”.
- “LIGHT (GZ-HM445/GZ-HM650/GZ-HM670)” (p. 99)

Caution :

- Do not expose the lens to direct sunlight.
- Do not use this unit in the rain, snow, or places with high humidity like the bathroom.
- Do not use this unit in places subject to excessive humidity or dust, as well as places exposed to steam or smoke directly.
- Do not remove the battery pack, AC adapter, or SD card when the access lamp is lighted. The recorded data may become unreadable.
- This unit is a microcomputer-controlled device. Electrostatic discharge, external noise and interference (from a TV, a radio, etc.) might prevent it from functioning properly. In such a case, turn off the power, then remove the AC adapter and battery pack. This unit will be reset.

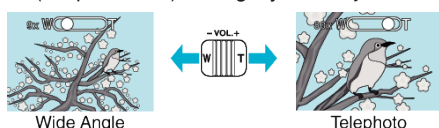
Memo :

- Before recording an important scene, it is recommended to conduct a trial recording.
- The digital image stabilizer does not work when recording still images.

Zooming

The angle of view can be adjusted using zoom.

- Use the W end (wide angle end) to shoot a wider field of view.
- Use the T end (telephoto end) to magnify the subject for shooting.



- The following zoom options are available:
 - Optical Zoom (1 – 40x)

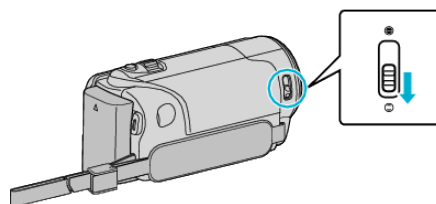
Memo :

- Only optical zoom is available in the still image recording mode.

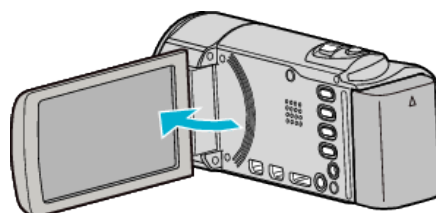
Manual Recording

You can adjust settings, such as brightness, by using the manual mode. Manual recording can be set for both video and still image modes.

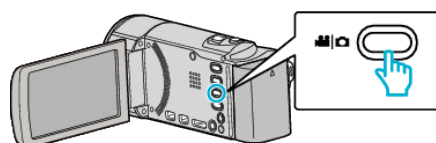
- 1 Open the lens cover.



- 2 Open the LCD monitor.

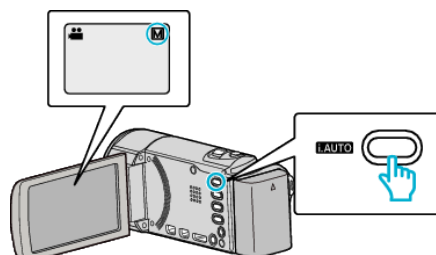


- 3 Open the LCD monitor and select the video or still image mode.



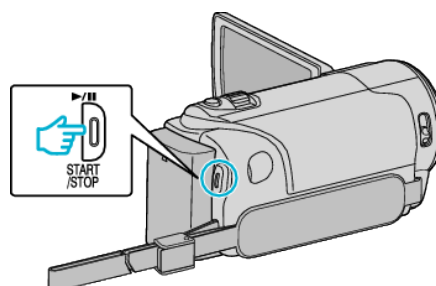
- The video or still image mode icon appears.

- 4 Select the Manual recording mode.



- If the mode is Intelligent Auto, press the i.AUTO button to switch. The mode changes between Intelligent Auto and Manual with every press.

- 5 Start recording.









- Press again to stop.

Memo :

- The manual settings are displayed only in the manual mode.

Manual Recording Menu

The following items can be set.

Name	Description
 SCENE SELECT	<ul style="list-style-type: none">Recordings that suit the shooting conditions can be performed easily. “Scene Selection” (📖 p. 32)
 FOCUS	<ul style="list-style-type: none">Use manual focus if the subject is not focused automatically. “Adjusting Focus Manually” (📖 p. 33)
 BRIGHTNESS ADJUST	<ul style="list-style-type: none">Overall brightness on the screen can be adjusted.Use this when recording in a dark or bright location. “Adjusting Brightness” (📖 p. 34)
 WHITE BALANCE	<ul style="list-style-type: none">Overall color on the screen can be adjusted.Use this when the color on the screen appears differently from the actual color. “Setting White Balance” (📖 p. 34)
 BACKLIGHT COMP.	<ul style="list-style-type: none">Corrects the image when the subject appears dark due to backlight.Use this when shooting against the light. “Setting Backlight Compensation” (📖 p. 35)
 TELE MACRO	<ul style="list-style-type: none">Use this to take close-up (macro) shots of the subject. “Taking Close-up Shots” (📖 p. 35)

Scene Selection

Common scenes that are often encountered can be recorded with the most suitable settings.

1 Tap “MENU”.

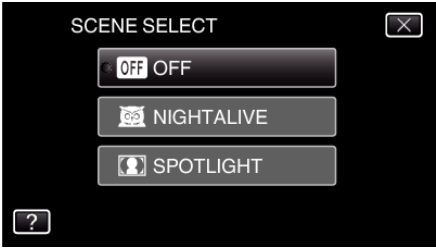


2 Tap “SCENE SELECT”.









- Tap ^ or v to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap ↶ to return to the previous screen.

3 Tap the appropriate scene.



- Tap X to exit the menu.
- After setting, the selected scene is immediately put on view.

*The image is only an impression.

Setting	Effect
 NIGHTALIVE	Increases gain and brightens the scene automatically using a slow shutter when the surrounding is dark. To prevent camera shake, use a tripod. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> OFF  </div> <div style="text-align: center;"> ON  </div> </div>
 SPOTLIGHT	Prevents the human subject from appearing too bright under light. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> OFF  </div> <div style="text-align: center;"> ON  </div> </div>

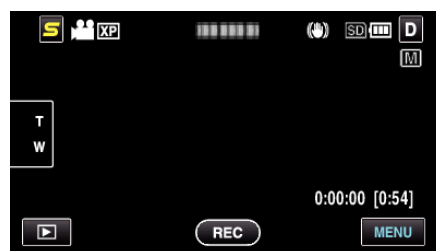
Memo :

- All scenes of "SCENE SELECT" cannot be set during "TIME-LAPSE RECORDING".

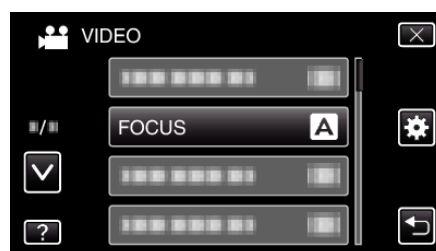
Adjusting Focus Manually

Set this when the focus is not clear in Intelligent Auto or when manual focusing is desired.

- 1 Tap "MENU".

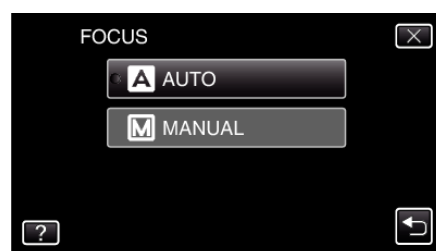


- 2 Tap "FOCUS".



- Tap ^ or v to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap ↶ to return to the previous screen.

- 3 Tap "MANUAL".

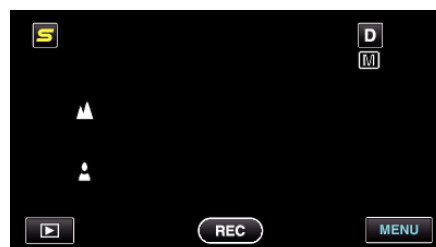


- 4 Adjust the focus.



- Tap ▲ to focus on a distant subject.
- Tap ■ to focus on a near subject.

- 5 Tap "SET" to confirm.



- When focus is confirmed, the focusing frame disappears and ▲ and ■ are displayed. (The icons may appear blinking.)

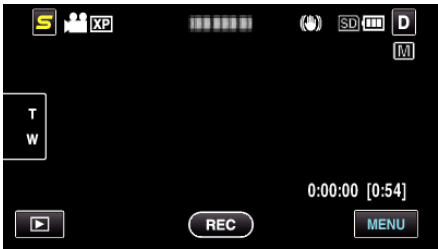
Memo :

- A subject that is focused at the telephoto (T) end remains in focus when it is zoomed out to the wide angle (W) end.

Adjusting Brightness

You can adjust the brightness to your preferred level.

1 Tap “MENU”.

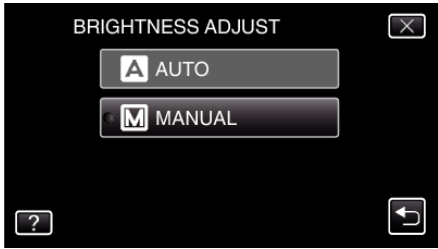


2 Tap “BRIGHTNESS ADJUST”.



- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

3 Tap “MANUAL”.



4 Adjust the brightness value.



- Compensation range during video recording: -6 to +6
- Compensation range during still image recording: -2.0 to +2.0
- Tap \wedge to increase the brightness.
- Tap \vee to decrease the brightness.

5 Tap “SET” to confirm.



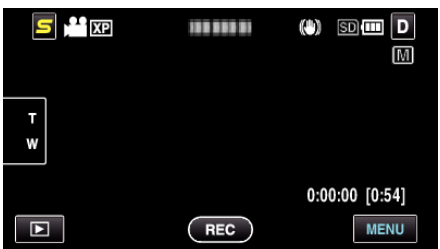
Memo : _____

- Settings can be adjusted separately for videos and still images.

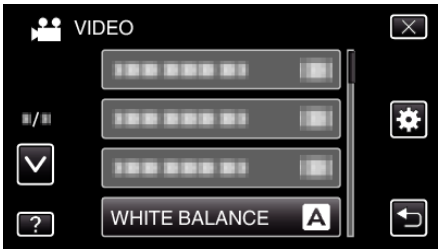
Setting White Balance

You can set the color tone to suit the light source.

1 Tap “MENU”.



2 Tap “WHITE BALANCE”.



- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.


3 Tap the appropriate shooting environment.



- Tap \wedge or \vee to move upward or downward for more selection.

Setting	Details
AUTO	Adjusts automatically to the natural colors.
MWB	Use this when the problem of unnatural colors is not resolved.
FINE	Set this when shooting outdoors on a sunny day.
CLOUD	Set this when shooting on a cloudy day or inside a shade.
HALOGEN	Set this when shooting under illumination such as a video light.
MARINE:BLUE	Set this when shooting the sea at deep water area (water appears blue) using an optional marine case.
MARINE:GREEN	Set this when shooting the sea at shallow water area (water appears green) using an optional marine case.

Using MWB

- 1 Hold a sheet of plain white paper in front of the lens so that the white paper fills the screen.
- 2 Tap “MWB” and keep touching while the icon appears and blinks.
- 3 Release your touch after the menu disappears and  lights up.

Memo : _____

- The setting will not change if “MWB” is being tapped too fast (less than 1 second).

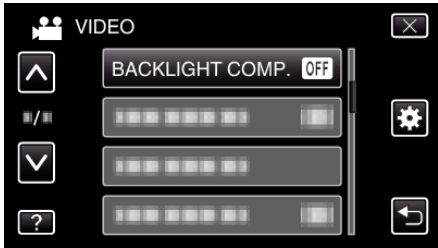
Setting Backlight Compensation

You can correct the image when the subject appears too dark due to backlight.

1 Tap "MENU".

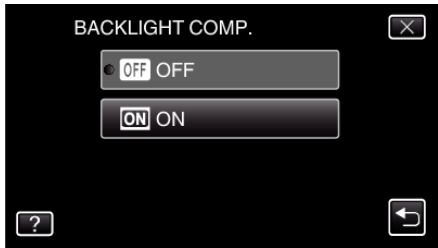


2 Tap "BACKLIGHT COMP.".



- Tap \wedge or \vee to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

3 Tap "ON".



- After setting, the backlight icon  appears.

Taking Close-up Shots

You can take close-up shots of an object using the tele macro function.

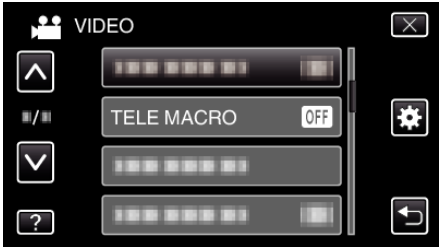


*The image is only an impression.

1 Tap "MENU".




2 Tap "TELE MACRO".



- Tap \wedge or \vee to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

3 Tap "ON".



- After setting, the tele macro icon  appears.

Setting	Details
OFF	Enables close-up shots up to 1 m at the telephoto (T) end. Enables close-up shots up to 5 cm at the wide angle (W) end.
ON	Enables close-up shots up to 50 cm at the telephoto (T) end. Enables close-up shots up to 5 cm at the wide angle (W) end.

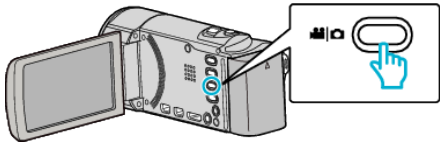
Caution :

- When you are not taking close-up shots, set "TELE MACRO" to "OFF". Otherwise, the image may be blur.

Creating Animation Effects (ANIMATION EFFECT)

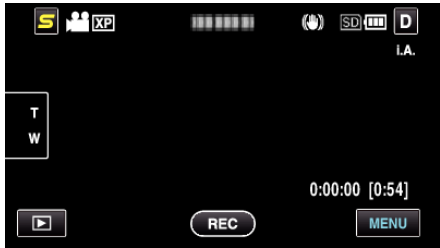
You can add various effects to videos to create a different atmosphere from the usual recording.

1 Open the LCD monitor and select the video mode.

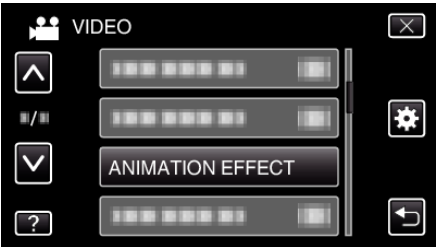


- The video mode icon appears.

2 Tap “MENU”.

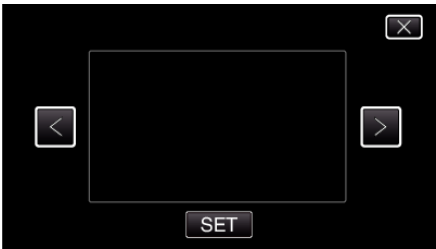


3 Tap “ANIMATION EFFECT”.



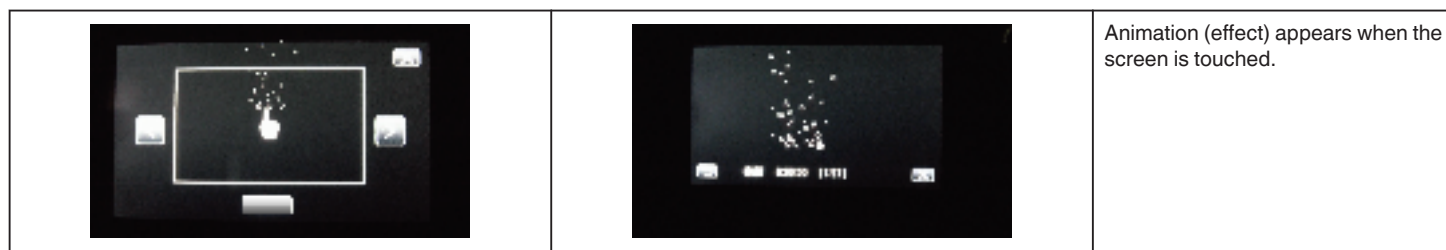
- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

4 Select a desired effect and tap “SET”.



- Tap $<$ or $>$ to move left or right for more selection.
- Tap \hookrightarrow to return to the menu, or tap \times to exit.

During Setting	After Setting	Note
		Animation (effect) appears when smiles are detected.
		Animation (effect) appears when smiles are detected.
		Animation (effect) appears when smiles are detected.
		Animation (effect) appears when smiles are detected.



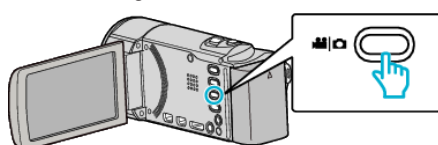
Animation (effect) appears when the screen is touched.

Registering Human Face Personal Authentication Information

By registering the face of a person beforehand, focus and brightness can be adjusted automatically by the face tracking function. Up to 6 faces, together with names and priority levels, can be registered.

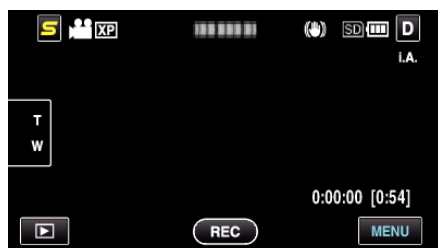
It is recommended to register the faces that are often being recorded by this camera beforehand.

- 1 Select video or still image mode.

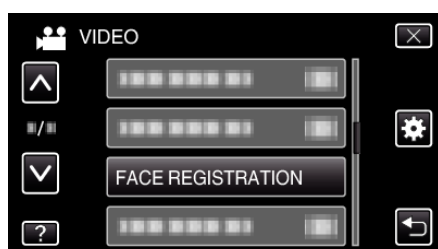


- The video or still image mode icon appears.

- 2 Tap "MENU".

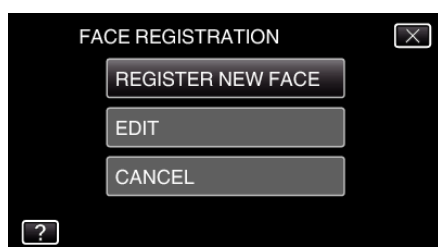


- 3 Tap "FACE REGISTRATION".

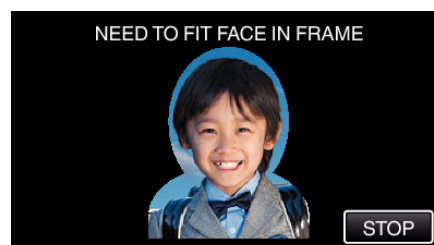


- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

- 4 Tap "REGISTER NEW FACE".



- 5 Point the camera toward the human subject.



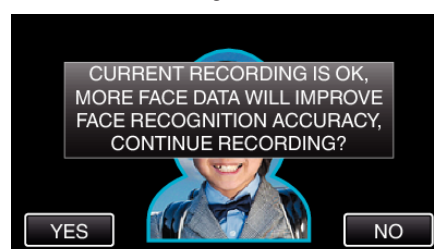
- Information is collected before face registration recording. The frame appears blinking while information is being collected.
- Adjust to fit the face within the frame while it is blinking. The frame stops blinking and lights up after information collection is complete.
- To cancel the registration, tap "STOP". When "CANCEL FACE RECOGNITION?" appears, tap "YES" to return to the normal recording mode.

- 6 Tap "RECORD" and record the face from the front.



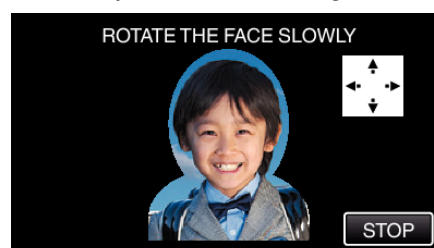
- A face is captured to be used on the face registration index screen.
- Other than tapping "RECORD", you can also record by pressing the SNAPSHOT button fully.
- A sound can be heard when recording is complete.
- To cancel the registration, tap "STOP". When "CANCEL FACE RECOGNITION?" appears, tap "YES" to return to the normal recording mode.

- 7 Tap "YES" to continue recording.



- To proceed to collect face information in the four directions of up, down, left, and right, tap "YES". It is recommended to continue recording to increase the accuracy of face recognition.
- To end face registration recording, tap "NO". Go to step 10.

- 8 Rotate the face slowly in four directions to register the face information.



- Rotate the face slowly while looking at the camera. A sound can be heard when recording is complete for each direction. (4 times in total)

Repeat the step until recording (registration) is complete for all directions.

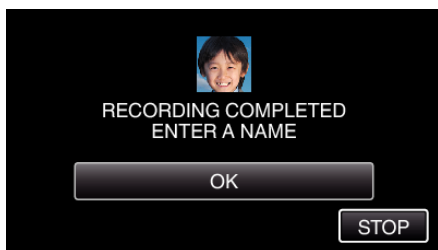
- Registration of the four directions may fail depending on the shooting environment. In this case, tap “STOP” to cancel recording, then tap “NO” and go to step 10.
- If the face cannot be properly recognized during recording, register the face again.

9 Face the camera with a smiling face.



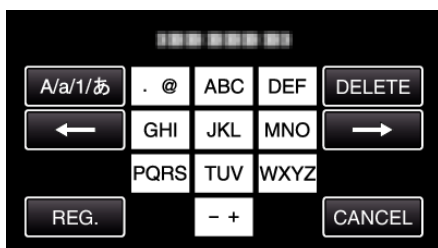
- Recording starts automatically. Using the smile % display as a reference, smile such that the value is as high as possible.
- A sound can be heard when recording is complete.
- To cancel recording of smiling face and proceed to enter a name, tap “STOP”, then tap “NO” and go to step 10.

10 Tap “OK”.



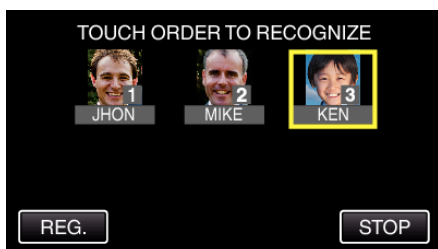
- Tapping “OK” registers the recorded face and the screen for entering a name appears.
- To cancel the registration, tap “STOP”. When “CANCEL FACE RECOGNITION?” appears, tap “YES” to return to the normal recording mode.

11 Tap on the on-screen keyboard to enter a name, then tap “REG.”.

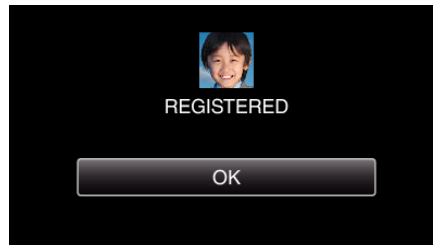


- Tap “DELETE” to delete a character.
- Tap “CANCEL” to exit.
- Tap “A/a/1” to select character input type from upper case letter, lower case letter, and number.
- Tap ← or → to move one space to the left or right.
- Up to 8 characters can be entered.
- How to input characters
Example: To enter “KEN”
Tap “JKL” 2 times → Tap “DEF” 2 times → Tap “MNO” 2 times

12 Tap the desired priority level, then tap “REG.”.



- Upon registration, the last number is assigned as the priority level. During face detection, the subject with the highest priority (lowest number) will be detected.
- You can change the priority level of a subject by tapping on the number.
Example: To change the priority level of number 3 to number 1, tap number 1. The priority level of the registered subject becomes number 1, while the priority levels of the original number 1 and the ones below drop by one place. (In this example, the original number 1 becomes number 2, and the original number 2 becomes number 3.)
- When “REG.” is tapped, the registration complete screen appears.



- Tap “OK” to complete the registration.
- You can edit registered face information in “EDIT”.

“Editing the Registered Face Information” (p. 39)

Memo :

- Faces may not be registered correctly in the following cases:
 - when the face appears either too small or too large compared to the frame
 - when it is too dark or too bright
 - when the face appears horizontal or slanted
 - when a part of the face is hidden
 - when there are multiple faces within the frame
- To increase the accuracy of face recognition, fit only one face within the frame and register in a bright environment.
- Faces may not be recognized correctly depending on the shooting conditions and environment. In this case, register the face again.
- Faces may not be recognized correctly during recording if the face recognition level is low. In this case, register the face again.
- Face tracking, face sub-window, and name display may not work properly depending on the registered faces, shooting conditions (distance, angle, brightness, etc.), and expressions.
- Face tracking, face sub-window, and name display may not work properly for people with similar facial features, such as siblings, parents, children, etc.

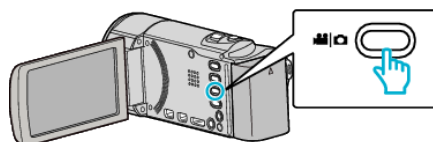
Setting SMILE%/NAME DISPLAY

“SMILE%/NAME DISPLAY” allows you to set the items to display when faces are detected.

This item is only displayed when “TOUCH PRIORITY AE/AF” is set to “FACE TRACKING”.

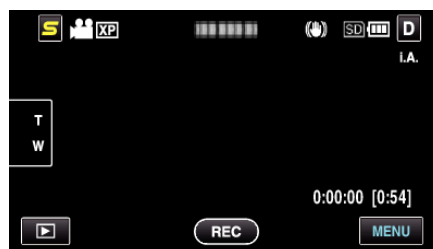
“Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (p. 41)

1 Open the LCD monitor and select the video or still image mode.



- The video or still image mode icon appears.

2 Tap “MENU”.



3 Tap “SMILE%/NAME DISPLAY”.



4 Tap the desired setting.



Setting	Details
OFF	Displays only the frames when faces are detected.
ON	Displays the frames, names, and smile levels (%) when faces are detected.

- Frame: Appears around detected faces.
- Name: Appears for faces that are registered.
- Smile level: Appears in value (0 % - 100 %) for detected smiles.



Memo :

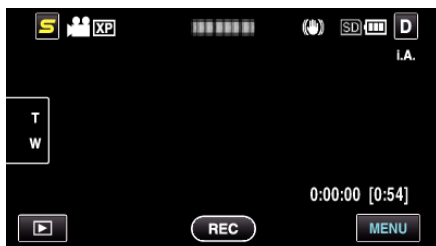
- The camera is able to detect up to 16 faces. Smile levels will be displayed for up to 3 of the largest faces displayed on the screen.
 - Some faces may not be detected depending on the shooting environment.
 - You can register personal authentication information like face, name, and priority level of person before recording.
 - Up to 3 registered names will be displayed according to the priority level.
- “Registering Human Face Personal Authentication Information” (p. 37)

Editing the Registered Face Information

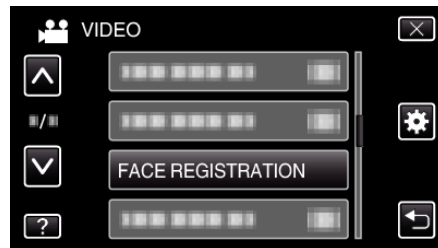
Editing Registered Face Information

You can change the name, priority level, and face information that are registered.

1 Tap “MENU”.

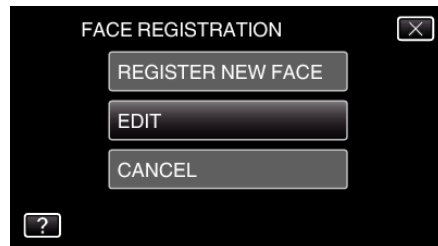


2 Tap “FACE REGISTRATION”.

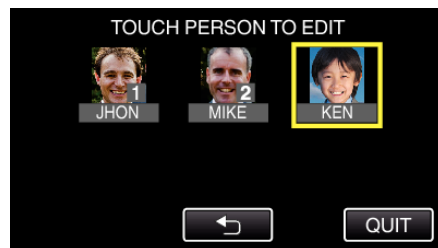


- Tap ^ or v to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap ↶ to return to the previous screen.

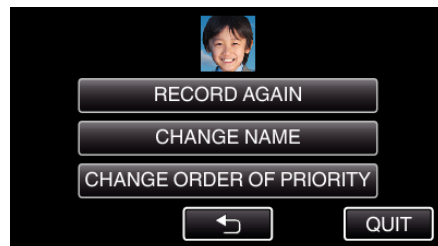
3 Tap “EDIT”.



4 Tap the person to edit.



5 Tap the item to edit.

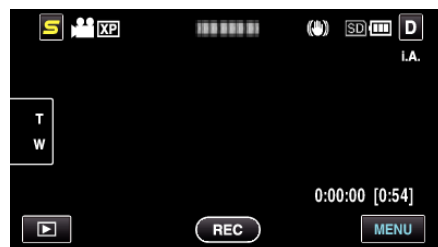


- If you select “RECORD AGAIN”, proceed to step 5 in “Registering Human Face Personal Authentication Information” (p. 37).
 - If you select “CHANGE NAME”, proceed to step 11 in “Registering Human Face Personal Authentication Information” (p. 38).
 - If you select “CHANGE ORDER OF PRIORITY”, proceed to step 12 in “Registering Human Face Personal Authentication Information” (p. 38).
- “Registering Human Face Personal Authentication Information” (p. 37)

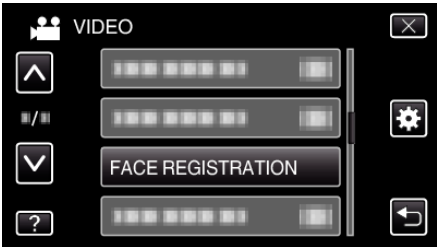
Canceling (Deleting) Registered Face Information

You can cancel (delete) the face information that is registered.

1 Tap “MENU”.

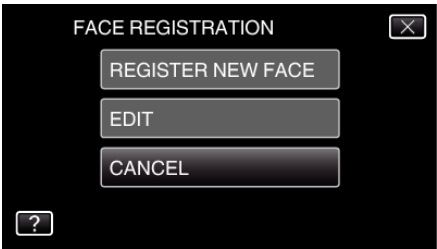


2 Tap “FACE REGISTRATION”.

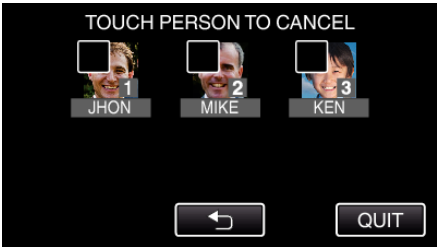


- Tap ^ or v to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap ↶ to return to the previous screen.

3 Tap “CANCEL”.

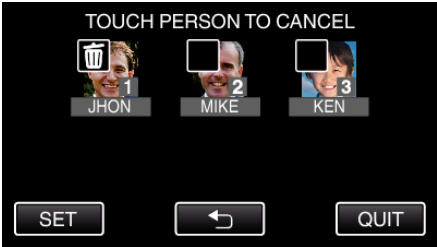


4 Tap the person to cancel registration of.



- 🗑 appears on the selected person.
- To remove 🗑 from a person, tap on the person again.

5 Tap “SET”.



6 Tap “YES”.



- Tap “YES” to delete the face information of the selected person.
- Tap “NO” to return to the previous screen.
- Tap “OK” when the deletion complete screen appears.

7 Tap “QUIT”.

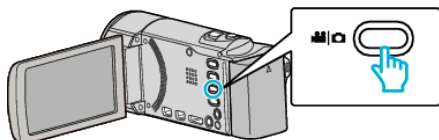
Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)

“TOUCH PRIORITY AE/AF” is a function that adjusts focus and brightness based on a tapped position.

By registering the face of a person beforehand, you can enable tracking of the person even without specific selection during recording.

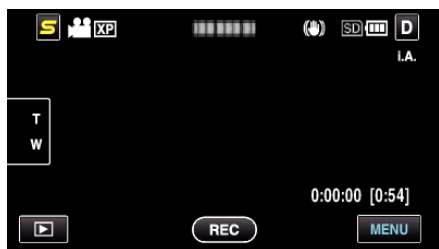
This function is available for both videos and still images.

- 1 Select video or still image mode.

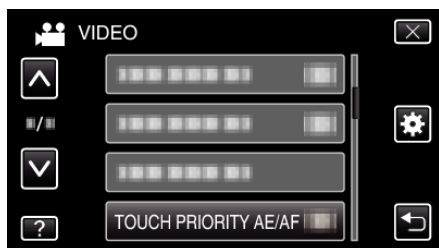


- The video or still image mode icon appears.

- 2 Tap “MENU”.

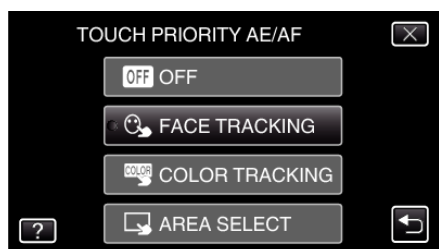


- 3 Tap “TOUCH PRIORITY AE/AF”.



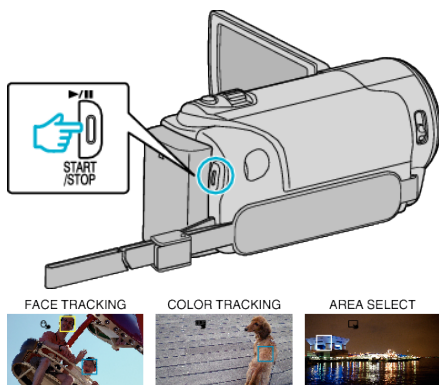
- Tap \wedge or \vee to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

- 4 Tap the desired setting.



- Focus and brightness will be adjusted automatically according to the selected item. In addition, a blue or white frame appears around the subject which the focus and brightness adjustments are based on.

- 5 Start recording and tap the desired position.



- Focus and brightness will be adjusted automatically based on the tapped position (face/color/area). A blue frame appears around the selected subject (face/color), while a white frame appears around the selected area.
- To cancel the setting, tap on a position outside the blue or white frame.
- To reset, tap the desired position (face/color/area) again.

Setting	Details
OFF	Deactivates the function.
FACE TRACKING	appears on the screen. Recording is performed while tracking and automatically adjusting the tapped face (subject) with appropriate focus and brightness. In addition, a blue frame appears around the tapped face (subject). (When the face of a person is registered, it becomes the main subject and the blue frame appears even without specific selection.)
COLOR TRACKING	appears on the screen. Recording is performed while tracking and automatically adjusting the tapped color (subject) with appropriate focus and brightness. In addition, a blue frame appears around the tapped color (subject).
AREA SELECT	appears on the screen. Recording is performed while automatically adjusting the tapped area (fixed position) with appropriate focus and brightness. In addition, a white frame appears around the tapped area.

Memo :

- When “TOUCH PRIORITY AE/AF” is set, “FOCUS” will be set to “AUTO” automatically.
- Tap the selected position (face/color/area) again to cancel the setting. (Setting remains for registered faces.)
- Tap on an unselected position (face/color/area) to reset.
- If the camera loses track of a subject, tap the subject again.
- Settings are canceled when zoom operation is performed. (“AREA SELECT” only)
- When “FACE TRACKING” is set after face registration, the blue frame appears around the face with the highest priority registered.
- When recording registered faces using “FACE TRACKING”, focus and brightness will be adjusted automatically even without specific selection. In addition, registered faces may be tracked back again even if they are lost. Therefore, it is recommended to register the faces that are often being recorded by this camera beforehand.

“Registering Human Face Personal Authentication Information” (p. 37)

- When “COLOR TRACKING” is set, the targeted subject (color) may change if similar colors are detected. In this case, tap the subject again. The targeted subject (color) may also be tracked back again if it appears in the center of the screen within a specific time.

Caution :

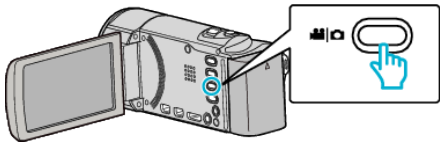
- Subjects near the sides of the LCD monitor may not respond or be recognized when tapped. In this case, move the subject to the center and tap again.
- “COLOR TRACKING” may not function properly in the following cases:
 - when recording subjects with no contrast
 - when recording subjects that are moving at high speed
 - when recording in a dark place
 - when the surrounding brightness changes
- When “FACE TRACKING” is set, the subject may be lost if the camera is moved vertically or horizontally very fast. For unregistered faces, they cannot be tracked back again. To track back the subject, tap on it again. For registered faces, focus and brightness will be adjusted automatically even without specific selection. In addition, registered faces may be tracked back again even if they are lost. Therefore, it is recommended to register the faces that are often being recorded by this camera beforehand.

“Registering Human Face Personal Authentication Information” (p. 37)

Capturing Smiles Automatically (SMILE SHOT)

“SMILE SHOT” automatically captures a still image upon detection of a smile. This function is available for both videos and still images.

1 Select video or still image mode.



- The video or still image mode icon appears.

2 Tap “MENU”.

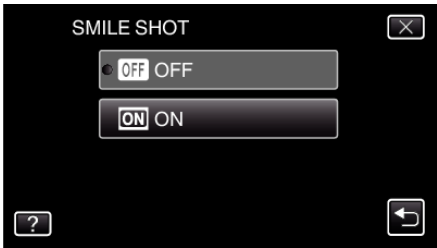


3 Tap “SMILE SHOT”.



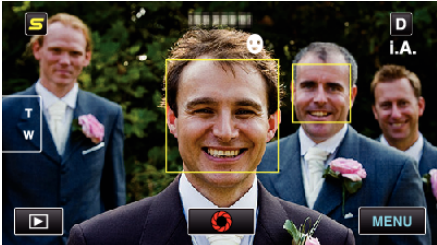
- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

4 Tap “ON”.



5 Point the camera toward the human subject.

- A still image is automatically captured when smiles are detected.



- PHOTO lights up when a still image is being captured.
- You can display the name and smile level (%) together with the frame by setting “SMILE%/NAME DISPLAY” in the menu to “ON” before recording.

“Setting SMILE%/NAME DISPLAY” (p. 38)

Memo :

- This function may not work properly depending on the shooting conditions (distance, angle, brightness, etc.) and the subject (direction of face, smile level, etc.). It is also difficult to detect a smile in backlight.

- After a smile is detected and captured, it takes time before the next recording may be performed.
- “SMILE SHOT” does not work in the following cases:
 - when menu is being displayed
 - when file information or remaining battery power is being displayed
 - when cables are connected to the HDMI (with output other than 1080i) or AV connector during video recording
 - when “FACE SUB-WINDOW” is set
 - when “ANIMATION EFFECT” is set

“Recording while Displaying a Magnified View of a Selected Face (FACE SUB-WINDOW)” (p. 43)

“Creating Animation Effects (ANIMATION EFFECT)” (p. 36)

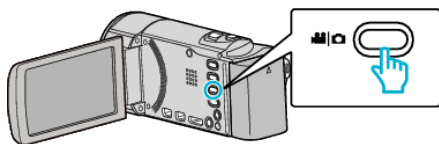
Caution :

- When “TOUCH PRIORITY AE/AF” is set to “AREA SELECT” or “COLOR TRACKING”, “SMILE SHOT” does not work.
- If appropriate results cannot be obtained, record with “SMILE SHOT” set to “OFF”.

Recording while Displaying a Magnified View of a Selected Face (FACE SUB-WINDOW)

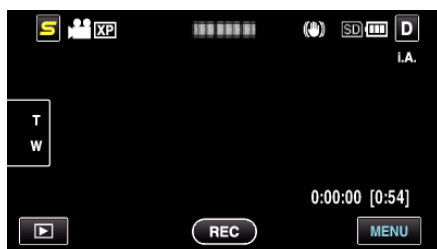
You can record while viewing both the overall image of the scene and magnified image of a subject's expression. Frames appear around the faces that can be magnified. Tap a frame to track and magnify the face in a sub-window.

- 1 Open the LCD monitor and select the video mode.

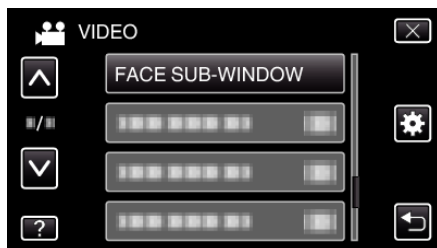


- The video mode icon appears.

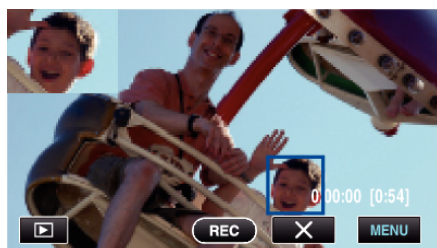
- 2 Tap "MENU".



- 3 Tap "FACE SUB-WINDOW".



- 4 Start recording and tap on the face to magnify.



- When the face within a frame is tapped, it is displayed in a sub-window. The display position of the sub-window is set automatically according to the position of the tapped face.
- The frame of the tapped face changes to blue.
- When the tapped face disappears from the screen, the sub-window disappears too. For registered faces, the sub-window is displayed again automatically when they reappear on the screen.
- To exit "FACE SUB-WINDOW", tap "X".

Caution :

- Take note of the following when "FACE SUB-WINDOW" is set.
 - Functions such as digital zoom, zoom operation on the touch screen, simultaneous still image recording, "TIME-LAPSE RECORDING", and "AUTO REC" are not available.
 - Settings such as "FOCUS" and "BRIGHTNESS ADJUST" are set to "AUTO" automatically.
 - If "TOUCH PRIORITY AE/AF" is set to "FACE TRACKING", appropriate focus and brightness will be adjusted for the person displayed in the sub-window.
 - "ANIMATION EFFECT" is not available.
- The sub-window display will also be recorded.

Memo :

- When a face is magnified and displayed in the sub-window, only the name of the person will be displayed.
- The face sub-window mode is canceled when the power is turned off.

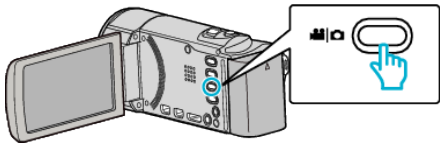
- Frames do not appear around the faces in the face sub-window mode as easily as in the other modes. They appear around the faces that can be magnified only. The frames do not appear in the following cases:
 - when the face of the subject is extremely small
 - when the surrounding is too dark or too bright
 - when the face appears horizontal or slanted
 - when the face appears bigger than the sub-window (such as when it is zoomed in)
 - when a part of the face is hidden

"Registering Human Face Personal Authentication Information" (p. 37)

Reducing Camera Shake

When the image stabilizer is set, camera shake during recording can be effectively reduced.

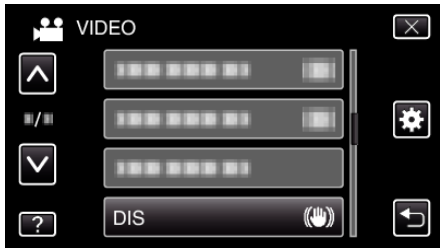
- 1 Open the LCD monitor and select the video mode.



- 2 Tap "MENU".

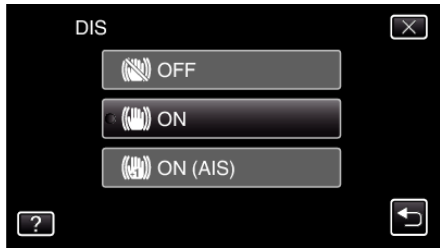


- 3 Tap "DIS" (image stabilizer).



- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

- 4 Tap the desired setting.



Display	Setting
OFF	Deactivates image stabilizer.
ON	Reduces camera shake under normal shooting conditions.
ON (AIS)	Reduces camera shake more effectively when shooting bright scenes on the wide angle end. Only on the wide angle end (approx. 5x).

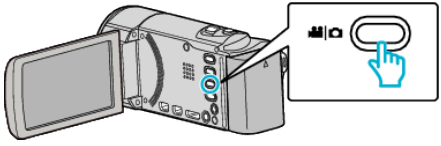
Memo :

- It is recommended to set the image stabilizer to "OFF" when shooting a subject of little movement with the unit on a tripod.
- Complete stabilization may not be possible if camera shake is excessive.
- This setting is effective for video recording only.

Recording at Intervals (TIME-LAPSE RECORDING)

Enables the changes of a scene that occur slowly over a long period to be shown within a short time by taking frames of it at a certain interval. This is useful for making observations such as the opening of a flower bud.

- 1 Open the LCD monitor and select the video mode.



- The video mode icon appears.

- 2 Tap "MENU".

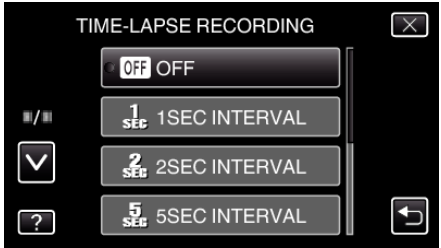


- 3 Tap "TIME-LAPSE RECORDING".



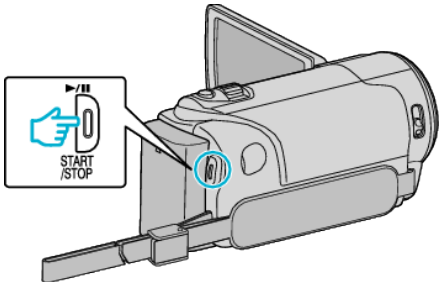
- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

- 4 Tap to select a recording interval (1 to 80 seconds).



- The greater the number of seconds, the longer the recording interval.
- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

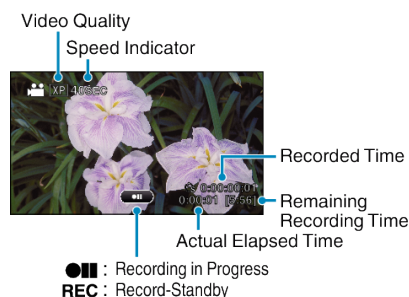
- 5 Start recording.



- A frame is taken at intervals of the selected period.
- When the recording interval is set to "20SEC INTERVAL" or higher, this unit switches to the power-saving mode between recordings. At the next point to record, the power-saving mode will be turned off and recording will start automatically.

- Press the START/STOP button again to stop recording.

Indications During Time-Lapse Recording



Display	Description
Speed Indicator	Displays the recording interval that is set.
Video Quality	Displays the icon of the video quality that is set.
Remaining Recording Time	Remaining time left to record with the currently selected video quality.
Recording in Progress	Appears when video recording is in progress. When in the power-saving mode, it blinks.
Record-Standby	Appears when video recording is paused.
Actual Elapsed Time	Displays the actual elapsed time after recording starts.
Recorded Time	Displays the actual recorded time of the video. Recorded time increases in units of frames.

Time-Lapse Setting

The greater the number of seconds, the longer the recording interval.

Setting	Details
OFF	Deactivates the function.
1SEC INTERVAL	Takes a frame at 1-second intervals. Recorded videos will be played back at 30 times speed.
2SEC INTERVAL	Takes a frame at 2-second intervals. Recorded videos will be played back at 60 times speed.
5SEC INTERVAL	Takes a frame at 5-second intervals. Recorded videos will be played back at 150 times speed.
10SEC INTERVAL	Takes a frame at 10-second intervals. Recorded videos will be played back at 300 times speed.
20SEC INTERVAL	Takes a frame at 20-second intervals. Recorded videos will be played back at 600 times speed.
40SEC INTERVAL	Takes a frame at 40-second intervals. Recorded videos will be played back at 1 200 times speed.
80SEC INTERVAL	Takes a frame at 80-second intervals. Recorded videos will be played back at 2 400 times speed.

Caution :

- Audio cannot be recorded during time-lapse recording.
- Zooming, simultaneous still image recording, and image stabilizer are not available in time-lapse recording.
- When recording is stopped with the recorded time less than "0:00:00:14", the video will not be saved.
- Seamless recording is disabled in time-lapse recording.

Memo :

- Settings of time-lapse recording are not saved when the power is turned off.
- Recording stops automatically 99 hours after it is started.
- Make use of a tripod and AC adapter for time-lapse recordings with long intervals.
It is also recommended to fix the focus and white balance manually.

"Tripod Mounting" (p. 23)

"Adjusting Focus Manually" (p. 33)

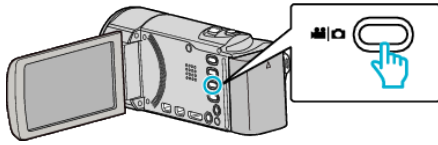
"Setting White Balance" (p. 34)

Recording Automatically by Sensing Movements (AUTO REC)

This function enables the unit to record automatically by sensing the changes in subject's movement (brightness) within the red frame displayed on the LCD monitor. (AUTO REC)

It can be set for both video and still image modes.

- 1 Select video or still image mode.

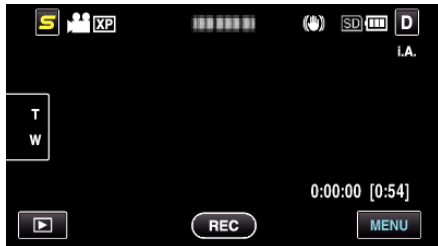


- The video or still image mode icon appears.

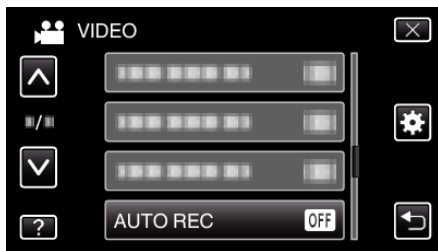
- 2 Compose the picture according to the subject.

- Adjust the angle of view with the zoom, etc.

- 3 Tap "MENU".

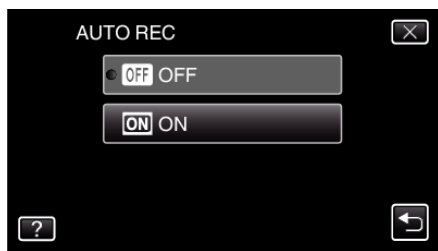


- 4 Tap "AUTO REC".

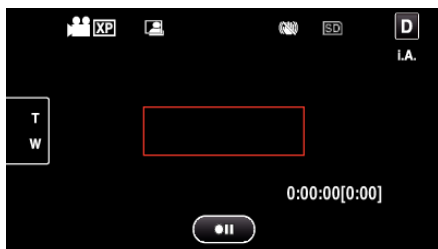


- Tap ^ or v to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap ↶ to return to the previous screen.

- 5 Tap "ON".



- 6 Recording starts automatically when the subject within the red frame moves.



- A red frame appears 2 seconds after the menu display disappears.
- For video recording, recording continues while there are still movements of the subject (changes in brightness) within the red frame. When there are no more movements of the subject (changes in brightness) within the red frame, recording will stop in 5 seconds.

- To stop video recording manually, press the START/STOP button. However, as the "AUTO REC" setting remains at "ON" even after the video recording is stopped, recording starts again when movements of the subject (changes in brightness) are detected within the red frame. To cancel "AUTO REC", set it to "OFF".

Caution :

- The only manual recording setting available is "TELE MACRO". The rest are all set to "AUTO".
- Digital zoom, image stabilizer, self-timer, and continuous shooting are not available after "AUTO REC" is set.
- "AUTO REC" cannot be used together with "TIME-LAPSE RECORDING". When both are set, priority is given to "TIME-LAPSE RECORDING".
- "IMAGE SIZE" cannot be changed after "AUTO REC" is selected. Set it before selecting "AUTO REC".
- The auto power off and power-saving modes are not available after "AUTO REC" is set.

Memo :

- Recording stops when there are no changes for 5 seconds during video recording.
- Settings of "AUTO REC" are not saved when the power is turned off.
- Recording may not start when the movements of the subject within the red frame are too fast or the changes in brightness are too small.
- Recording may start due to changes in brightness even if there is no movement within the red frame.
- While zooming, recording cannot be started.

Taking Group Shots (Self-timer)

The 10-second self-timer and Face Detection self-timer are convenient functions for taking group photos.

The 2-second self-timer is useful for preventing camera shake caused by pressing the shutter button.

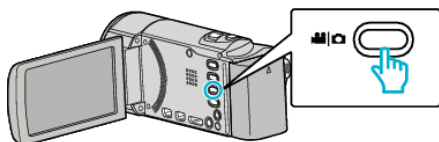
Memo :

When shooting a photo using the self-timer function, use of a tripod is recommended.

“Tripod Mounting” (p. 23)

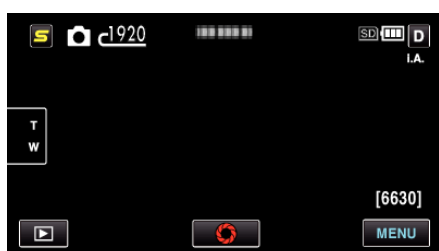
Using the 2-/10-second Self-timer

- 1 Select still image mode.



- The still image mode icon appears.

- 2 Tap “MENU”.



- 3 Tap “SELF-TIMER”.

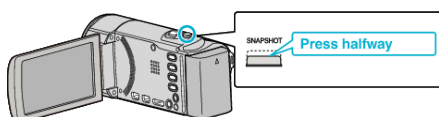


- Tap ^ or v to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap ↶ to return to the previous screen.

- 4 Tap “2SEC” or “10SEC”.

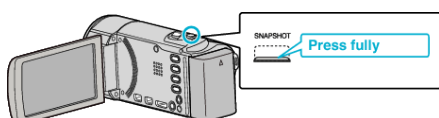


- 5 Set the focus on the subject.



- When focused, the focus icon lights up in green.

- 6 Take a still image.

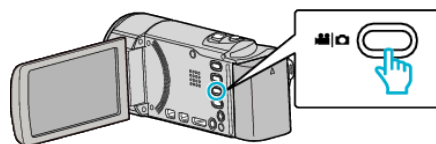


- A timer appears and countdown to shooting starts.
- To stop the self-timer, press the SNAPSHOT button again.

Using the Face Detection Self-timer

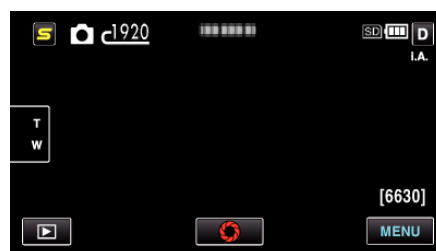
Pressing the SNAPSHOT button starts face detection, and shooting is performed three seconds after another person enters the frame. This function is useful when you want to include the photographer in the group photo.

- 1 Select still image mode.



- The still image mode icon appears.

- 2 Tap “MENU”.



- 3 Tap “SELF-TIMER”.

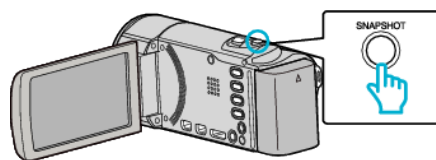


- Tap ^ or v to move upward or downward for more selection.
- Tap X to exit the menu.
- Tap ↶ to return to the previous screen.

- 4 Tap “FACE DETECTION”.



- 5 After making sure that everyone is facing the camera, press the SNAPSHOT button.



- Frames appear around the faces of the subjects.
- Pressing the SNAPSHOT button again starts the 10-second self-timer.

6 The photographer enters the frame.



- The shutter is released three seconds after the photographer enters the frame.
- To stop the self-timer, press the SNAPSHOT button again.

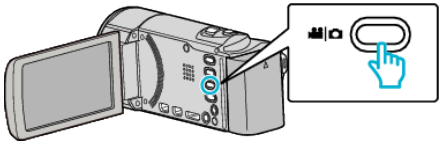
Memo : _____
• The “FACE DETECTION” function may fail to detect faces depending on the shooting environment.

Setting the USER Button

By assigning one of manual adjustment functions that you frequently use to the USER button, you can access the function quickly.

Assigning a Function to the USER Button

1 Select video or still image mode.



- The video or still image mode icon appears.

2 Tap “MENU”.

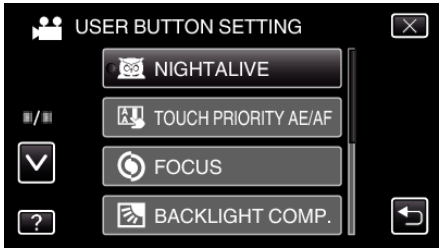


3 Tap “USER BUTTON SETTING”.



- Tap \wedge or \vee to move upward or downward for more selection.
- Tap \times to exit the menu.
- Tap \hookrightarrow to return to the previous screen.

4 Select the desired function.



You can select one of the following functions.

- NIGHTALIVE
- TOUCH PRIORITY AE/AF
- FOCUS
- BACKLIGHT COMP.
- WHITE BALANCE
- DIS (video mode)
- SELF-TIMER (still image mode)

Making Adjustments with the USER Button

Operate as follows.

■ **In the case of functions that are turned on or off (NIGHTALIVE, BACKLIGHT COMP., DIS, SELF-TIMER)**

Press the USER button to turn on or off the function.

■ **In the case of FOCUS**

Press the USER button to switch FOCUS between automatic and manual. To adjust focus manually, refer to “Adjusting Focus Manually” (p. 33). “Adjusting Focus Manually” (p. 33)

■ **In the case of functions that have settings to be selected**

(TOUCH PRIORITY AE/AF, WHITE BALANCE)

- 1) Press the USER button.
- 2) Tap the desired function to set.

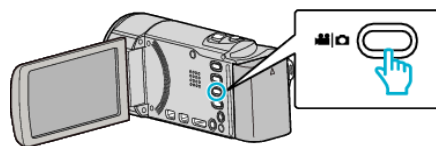
Memo : _____

- The USER button is invalid when the menu is displayed.

Remaining Recording Time/Battery Power

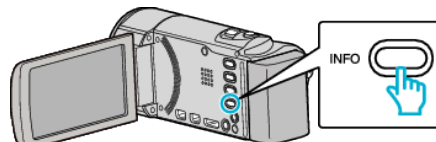
You can check the remaining video recording time on the built-in memory and SD card as well as the remaining battery power.

- 1 Open the LCD monitor and select the video or still image mode.



- The video or still image mode icon appears.



- 2 Press the INFO button.



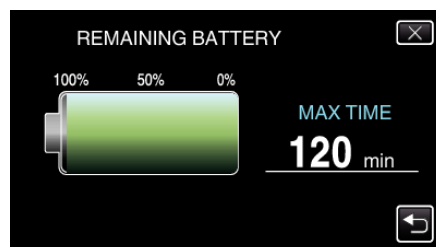
- If in the still image mode, go directly to step 4.


- 3 Display the remaining recording time.



- The remaining recording time is displayed only in the video recording mode.
- Press the INFO button to check the remaining recording time of each recording media.
- To display the remaining battery power, tap .
- Tap  to return to the recording mode.
- To exit the display, tap X.

- 4 Display the remaining battery power.



- For video recording, tap  to return to the remaining recording time display. For still image recording, tap to return to the recording mode.
- To exit the display, press the INFO button or tap X.
- Remaining battery power will not be displayed when the AC adapter is connected.

Memo : _____

- You can change to the desired video quality by tapping on it from the remaining recording time display.

Recording

Approximate Video Recording Time

Quality	Built-in Memory		SDHC/SDXC Card					
	GZ-HM650 8 GB	GZ-HM670 32 GB	4 GB	8 GB	16 GB	32 GB	48 GB	64 GB
UXP	40 m	2 h 50 m	20 m	40 m	1 h 20 m	2 h 50 m	4 h 20 m	5 h 50 m
XP	50 m	4 h	30 m	1 h	2 h	4 h 10 m	6 h 10 m	8 h 20 m
SP	1 h 20 m	5 h 40 m	40 m	1 h 20 m	2 h 50 m	5 h 50 m	8 h 40 m	11 h 50 m
EP	3 h 20 m	14 h 20 m	1 h 40 m	3 h 40 m	7 h 10 m	14 h 50 m	21 h 50 m	29 h 50 m
SSW	2 h 30 m	11 h 10 m	1 h 20 m	2 h 50 m	5 h 40 m	11 h 30 m	17 h	23 h
SEW	5 h 20 m	23 h	2 h 50 m	5 h 50 m	11 h 40 m	23 h 50 m	35 h 10 m	47 h 40 m

- The actual recording time may shorten depending on the shooting environment.

Approximate Number of Still Images (Unit: Number of Shots)

Image Size	Built-in Memory		SDHC Card	
	GZ-HM650 8 GB	GZ-HM670 32 GB	4 GB	8 GB
640×480 (4:3)	9999	9999	9999	9999
1440×1080 (4:3)	8800	9999	4300	8800
1920×1080 (16:9)	6700	9999	3200	6700
2400×1344 (16:9) *	4300	9999	2100	4300

* GZ-HM650/GZ-HM670

- Up to 9999 still images may be recorded on SD cards with at least 32 GB capacity (regardless of image size).

Approximate Recording Time (Using Battery)

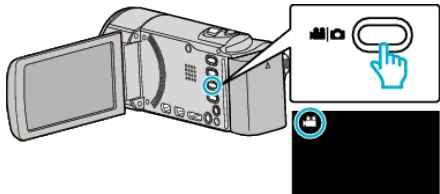
Battery Pack	Actual Recording Time		Continuous Recording Time	
	GZ-HM445/ GZ-HM448	GZ-HM650/ GZ-HM670	GZ-HM445/ GZ-HM448	GZ-HM650/ GZ-HM670
BN-VG114E/BN-VG114AC (Supplied)	1 h (1 h 5 m)	1 h (1 h 5 m)	1 h 50 m (2 h)	1 h 50 m (1 h 55 m)
BN-VG121E/BN-VG121AC	1 h 35 m (1 h 40 m)	1 h 30 m (1 h 35 m)	2 h 50 m (3 h 5 m)	2 h 45 m (2 h 55 m)
BN-VG138E	2 h 50 m (3 h)	2 h 40 m (2 h 55 m)	5 h 5 m (5 h 30 m)	4 h 55 m (5 h 20 m)

- The above are values when “LIGHT” is set to “OFF” and “MONITOR BRIGHTNESS” is set to “4” (brighter).
(): Values when “LIGHT” is set to “OFF” and “MONITOR BRIGHTNESS” is set to “3” (standard)
- The actual recording time may be shorter if zooming is used or if recording is stopped repeatedly.
(It is recommended to prepare battery packs ready for three times the expected recording time.)

Playing Back Videos

You can select and play back the recorded videos from an index screen (thumbnail display).

1 Select video mode.



2 Tap to select the playback mode.



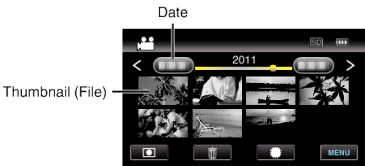
3 Tap on the file to start playback.



- Tap to select the media for playback.
- Tap to pause.
- Tap to return to the index screen.
- Tap to return to the recording mode.

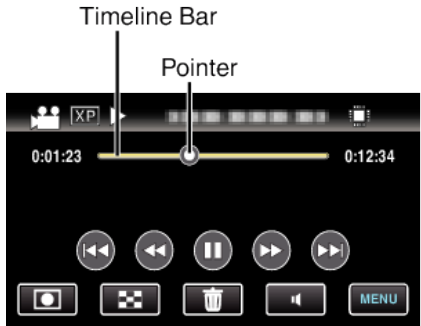
Operation Buttons for Video Playback

During Index Screen Display



Display	Description
Date	Moves to the previous/next date
<	Displays the previous index screen (thumbnail display)
>	Displays the next index screen (thumbnail display)
Thumbnail (File)	Tap on thumbnail - Starts playback Flick to right - Scrolls to the right to show the previous index screen (thumbnail display) Flick to left - Scrolls to the left to show the next index screen (thumbnail display)
Zoom Lever	Displays the previous/next index screen (thumbnail display)
Recording Mode	Switches to recording mode
	Displays the index screen (thumbnail display) to perform deletion
	Switches between the index screen of the built-in memory and SD card
MENU	Displays the menu screen

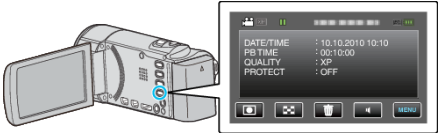
During Video Playback



Display	Description
Pointer	Displays the current estimated playback position within the scene
Timeline Bar	Tap on a random position - Moves to the tapped position Drag playback point to the left or right - Starts playback from the new position
	Returns to the beginning of the scene
	Reverse search
	Playback/pause

	Forward search
	Advances to the next video
Recording Mode	Switches to recording mode
	Stop (returns to index screen)
	Deletes the currently selected file
	Volume adjustment
MENU	Displays the menu screen

- Memo :**
- Tap or drag on the operation area of the touch screen.
 - Operations buttons on the touch screen disappear if the unit is not operated for about 3 seconds. Tap on the screen to display the operation buttons again.
 - You can search for a specific file by the recording date.
- “Date Search” (p. 55)

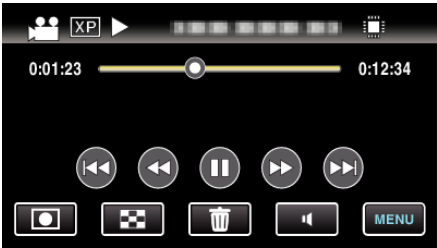


- Caution :**
- Make a backup of important recorded data.
It is recommended to copy your important recorded data to a DVD or other recording media for storage.
 - This unit is a microcomputer-controlled device. Electrostatic discharge, external noise and interference (from a TV, a radio, etc.) might prevent it from functioning properly. In such a case, turn off the power, then remove the AC adapter and battery pack. This unit will be reset.

Adjusting the Volume of Videos

You can tap on the volume adjustment button to control the volume.

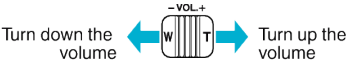
1 Tap



2 Tap “+” or “-”.



- Volume can also be adjusted using the zoom lever during playback.



- When is tapped, the volume adjustment bar remains on the screen even after 1 second of no operation.
- Tap X to exit volume adjustment.
- Volume adjustment is disabled when an AV cable (audio/video) or HDMI cable is connected.

Checking the Recording Date and Other Information

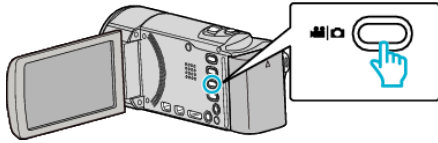
1 Press the INFO button.

You can display the recording date and duration of the selected file.

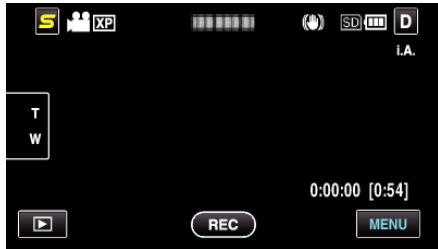
Playing a Video with Defective Management Information

The management information of a video may be damaged if recording is not performed correctly, such as turning off the power in the middle of recording. You can perform the following operations to play back the videos with defective management information.

- 1 Select video mode.



- 2 Tap to select the playback mode.



- 3 Tap "MENU".



- 4 Tap "PLAYBACK OTHER FILE".



- 5 Tap on the file to start playback.



"Playing Back Videos" (p. 51)

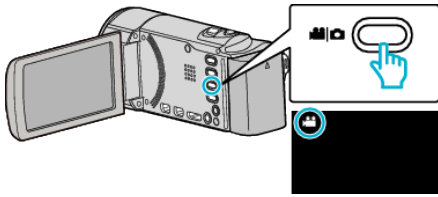
Memo :

- An MTS file is created in the EXTMOV folder when management information is corrupted.
- Depending on the condition of the damaged file, playback might fail or may not run smoothly.

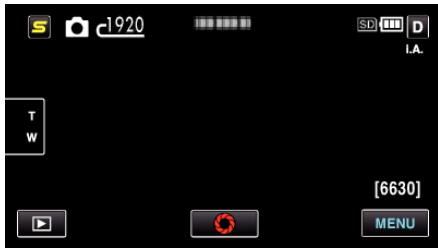
Playing Back Still Images

You can select and play back the recorded still images from an index screen (thumbnail display).

- 1 Select still image mode.



- 2 Tap to select the playback mode.



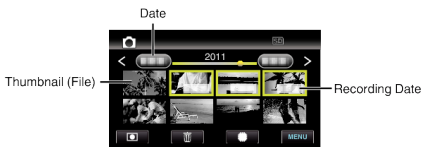
- 3 Tap on the file to start playback.



- Still images that are recorded continuously within 2 seconds or with the continuous shooting mode will be grouped together. Only the first recorded file is shown and the group is displayed with a green frame.
- Tap to select the media for playback.
- Tap to return to the index screen.
- Tap to return to the recording mode.

Operation Buttons for Still Image Playback

During Index Screen Display



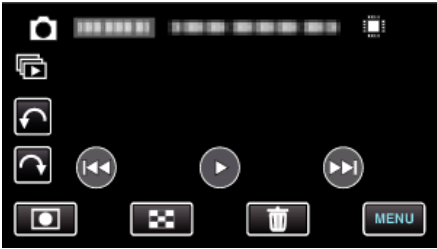
- Still images that are recorded continuously within 2 seconds or with the continuous shooting mode will be grouped together. Only the first recorded file is shown and the group is displayed with a green frame.

Display	Description
Date	Moves to the previous/next date
<	Displays the previous index screen (thumbnail display)
>	Displays the next index screen (thumbnail display)
Thumbnail (File)	Tap on thumbnail - Starts playback

Playback

	Flick to right - Scrolls to the right to show the previous index screen (thumbnail display) Flick to left - Scrolls to the left to show the next index screen (thumbnail display)
Recording Mode	Switches to recording mode
SD	Switches between the index screen of the built-in memory and SD card
	Displays the index screen (thumbnail display) to perform deletion
MENU	Displays the menu screen
Recording Date	Recording date (only displayed on the first file of each date)

During Still Image Playback



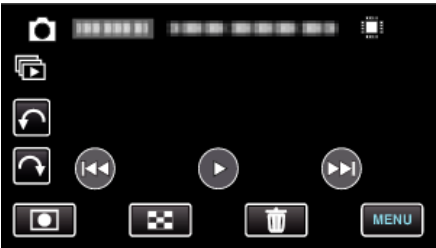
Display	Description
◀◀	Returns to the previous still image
▶ /	Starts/pauses slideshow “Slideshow Playback” (p. 54)
◀	Reverse playback during slideshow
▶	Normal playback during slideshow
▶▶	Advances to the next still image
Recording Mode	Switches to recording mode
	Returns to index screen
	Deletes the currently selected file
MENU	Displays the menu screen
↶	Rotates to the left (rotates by -90° with each tap)
↷	Rotates to the right (rotates by 90° with each tap)
	Continuous playback of still images captured by continuous shooting

Memo :

- Tap or drag on the operation area of the touch screen.
 - Operations buttons on the touch screen disappear if the unit is not operated for about 3 seconds. Tap on the screen to display the operation buttons again.
 - You can rotate a still image 90° to the right or left during playback. Rotation applies to the on-screen display only.
 - You can search for a specific file by the recording date. This is useful when searching from a large number of files.
- “Date Search” (p. 55)

Caution :

- This unit is a microcomputer-controlled device. Electrostatic discharge, external noise and interference (from a TV, a radio, etc.) might prevent it from functioning properly. In such a case, turn off the power, then remove the AC adapter and battery pack. This unit will be reset.



“Operation Buttons for Still Image Playback” (p. 53)

Memo :

- Effects can be added to the transitions in slideshow playback.
- “SLIDE SHOW EFFECTS” (p. 103)

Slideshow Playback

Still images can be played back in a slideshow.
Tap ▶ during still image playback to start the slideshow.

Searching for a Specific Video/Still Image

When there is a large number of recorded videos and still images, it is difficult to look for the desired file from the index screen.

Use the search function to find the file you want.

“To search by recording dates” (p. 55)

Date Search

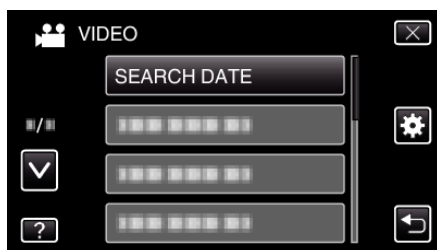
You can search and play videos or still images according to recording dates.

1 Tap “MENU”.

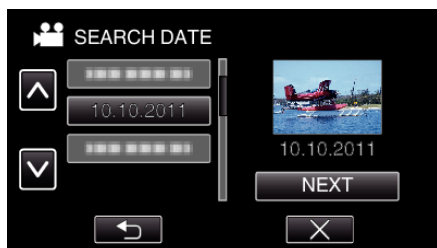


- Tap to select the media for playback.
- Searching can be performed in both the video and still image modes.
*The image shows the video mode.

2 Tap “SEARCH DATE”.

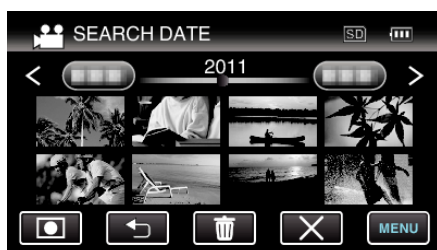


3 Tap a recording date, then tap “NEXT”.



- Tap again to cancel the selected date.

4 Tap on the file to start playback.



- You can select videos in the video mode and still images in the still image mode.
- Only the files recorded on the selected date are displayed.
- Tap to stop searching and return to the index screen (thumbnail display).

Deleting Files of a Selected Date: _____

Tap on the index screen (thumbnail display) to delete unwanted files.

“Deleting Unwanted Files” (p. 58)

Connecting to and Viewing on TV

You can connect this unit to a TV for playback. The image quality on TV varies with the type of TV and the connecting cable. Select the connector that best suits your TV.

- Refer also to the instruction manual of the TV in use.

“Connecting via the HDMI Mini Connector” (p. 56)

“Connecting via the Component Connector” (p. 57)

“Connecting via the AV Connector” (p. 57)

Unnatural Displays on TV

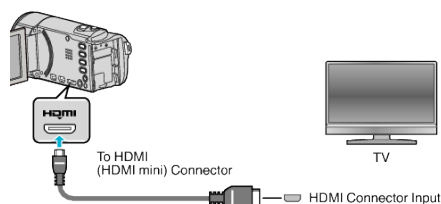
Trouble	Action
Images do not appear on the TV properly.	<ul style="list-style-type: none"> • Disconnect the cable and connect again. • Turn off and on this unit again. • When connected via the component connector, check if the setting of “COMPONENT OUTPUT” in the connection settings menu suits the connected TV. (Set to “1080i” by default) “COMPONENT OUTPUT (GZ-HM445/GZ-HM650/GZ-HM670)” (p. 113)
Images are projected vertically on the TV.	<ul style="list-style-type: none"> • Set “VIDEO OUTPUT” in the “COMMON” menu to “4:3”. “VIDEO OUTPUT” (p. 113)
Images are projected horizontally on the TV.	<ul style="list-style-type: none"> • Adjust the TV's screen accordingly.
The color of images looks strange.	<ul style="list-style-type: none"> • If the video was recorded with “x.v.Color” set to “ON”, set the x.v.Color setting of the TV to on. “x.v.Color” (p. 96) • Adjust the TV's screen accordingly.
HDMI-CEC functions do not work properly, and the TV does not work in conjunction with this unit.	<ul style="list-style-type: none"> • TVs may operate differently depending on the specifications, even if they are HDMI-CEC compliant. Therefore, the HDMI-CEC functions of this unit cannot be guaranteed to operate in combination with all the TVs. In such cases, set “HDMI CONTROL” to “OFF”. “HDMI CONTROL” (p. 114)
The language on the display changed.	<ul style="list-style-type: none"> • It may occur when you connect this unit to a TV with different language setting using an HDMI mini cable.

Connecting via the HDMI Mini Connector

If you are using an HDTV, you can play back in HD quality by connecting to the HDMI connector.

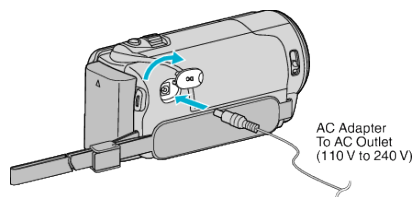
- Use a High Speed HDMI mini cable as the HDMI mini cable when not using the provided one.
- Refer also to the instruction manual of the TV in use.

1 Connect to a TV.



- Turn off the camcorder by pressing the button for about 2 seconds.

2 Connect the AC adapter to this unit.



3 Press the external input button on the TV to switch to the input from this unit via the connected connector.



4 Play back a file.



"Playing Back Videos" (p. 51)
 "Playing Back Still Images" (p. 53)

Memo :

- Even if "DISPLAY ON TV" in the common menu is set to "ON" during video playback, buttons (icons) and date/time will not be displayed on the connected TV. In addition, buttons (icons) and date/time displayed on the LCD monitor of this unit will not disappear even after 3 seconds.
- Change the settings in "HDMI OUTPUT" according to the connection.
 "HDMI OUTPUT" (p. 114)
- When connected to the TV via the HDMI mini cable, images and sounds may not be output properly depending on the TV connected. In such cases, perform the following operations.
 1) Disconnect the HDMI mini cable and connect it again.
 2) Turn off and on this unit again.
- For questions about the TV or method of connection, contact your TV's manufacturer.

Operating in Conjunction with TV via HDMI

Connecting this unit to an HDMI-CEC-enabled TV using the HDMI cable allows linked operations with the TV to be performed.

- HDMI-CEC (Consumer Electronics Control) is an industry standard that enables interoperability between HDMI-CEC compliant devices that are connected via HDMI cables.

Memo :

- Not all HDMI-control devices comply with the HDMI-CEC standard. The HDMI control function of this unit will not work when connected to these devices.
- This unit is not guaranteed to operate with all HDMI-CEC-enabled devices.
- Depending on the specifications of each HDMI-CEC-enabled device, some functions may not work with this unit. (For details, refer to the instruction manual of your TV.)
- Unintended operations may occur with some connected devices. In these cases, set "HDMI CONTROL" to "OFF".

"HDMI CONTROL" (p. 114)

Preparations

- Connect an HDMI cable between this unit and the TV.
 "Connecting via the HDMI Mini Connector" (p. 56)
- Turn on the TV and set the HDMI-CEC related setting to "ON". (For details, refer to the instruction manual of the TV.)
- Turn on this unit and set "HDMI CONTROL" to "ON".

"HDMI CONTROL" (p. 114)

Operation Method 1

- 1 Turn on this unit.
- 2 Select the playback mode.
- 3 Connect the HDMI cable.
 - TV turns on automatically and switches to HDMI input mode when this unit is turned on.

Operation Method 2

- 1 Turn off the TV.
 - This unit turns off automatically.

Memo :

- Depending on the TV connected, the display language of this unit will automatically switch to the language that is selected for the TV when this unit is turned on.
 (This is applicable only if this unit supports the language selected for the TV.) To use this unit with a language that differs from the display language of the TV, set "HDMI CONTROL" to "OFF".
- The display language of the TV will not switch automatically, even if the display language of this unit is changed.
- These functions may not work correctly when devices such as amplifier and selector are connected. Set "HDMI CONTROL" to "OFF".
- If HDMI-CEC does not work properly, turn off and on this unit again.

Caution :

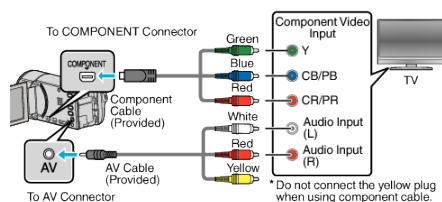
- Do not remove the recording medium or perform any other operation (such as turning off the power) while accessing files. Also, be sure to use the provided AC adapter, as the data on the recording medium may be corrupted if the battery becomes exhausted during operation. If the data on the recording medium becomes corrupted, format the recording medium to use the medium again.

Connecting via the Component Connector

You can connect this unit to the component connector of a TV to play back videos in analog high-definition quality.

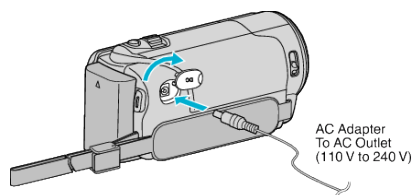
- Refer also to the instruction manual of the TV in use.

1 Connect to a TV.



- Turn off the camcorder by pressing the button for about 2 seconds.

2 Connect the AC adapter to this unit.



3 Press the external input button on the TV to switch to the input from this unit via the connected connector.



4 Play back a file.



"Playing Back Videos" (p. 51)

"Playing Back Still Images" (p. 53)

Memo :

- Even if "DISPLAY ON TV" in the common menu is set to "ON" during video playback, buttons (icons) and date/time will not be displayed on the connected TV. In addition, buttons (icons) and date/time displayed on the LCD monitor of this unit will not disappear even after 3 seconds.

"DISPLAY ON TV" (p. 112)

- When playing back in HD quality, set "COMPONENT OUTPUT" in the common menu to "1080i".

- The video is output in standard quality if the setting remains at "576i".

"COMPONENT OUTPUT (GZ-HM445/GZ-HM650/GZ-HM670)"

(p. 113)

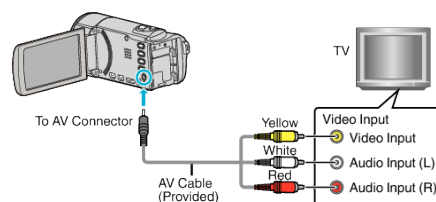
- For questions about the TV or method of connection, contact your TV's manufacturer.

Connecting via the AV Connector

By connecting the supplied AV cable to the AV connector, videos can be played back on a TV.

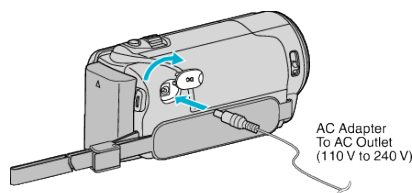
- Refer also to the instruction manual of the TV in use.

1 Connect to a TV.



- Turn off the camcorder by pressing the button for about 2 seconds.

2 Connect the AC adapter to this unit.



3 Press the external input button on the TV to switch to the input from this unit via the connected connector.



4 Play back a file.



"Playing Back Videos" (p. 51)

"Playing Back Still Images" (p. 53)

Memo :

- For questions about the TV or method of connection, contact your TV's manufacturer.

Deleting Unwanted Files

Delete unwanted videos and still images when the space in the recording media is running out.
The capacity of the recording media can be restored after deleting the files.
“Deleting the Currently Displayed File” (p. 58)
“Deleting Selected Files” (p. 58)

Memo :

- Deleted files cannot be restored.
- Files that are protected cannot be deleted.
Release protection before deleting the file.

“Protecting Files” (p. 59)

- Be sure to back up important files on a computer.

“Backing Up All Files” (p. 84)

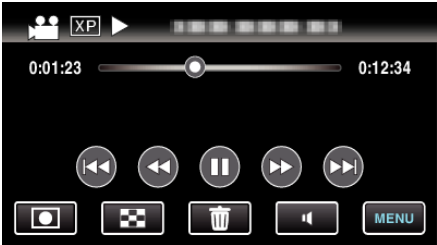
Deleting the Currently Displayed File

Deletes the currently displayed file.

Caution :

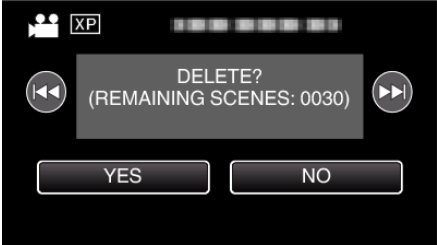
- Deleted files cannot be restored.



1 Tap .



- While the video mode is shown in the image, the same operations apply for the still image mode.

2 Tap “YES”.



- Tap  /  to select the previous or next file.
- When no file remains, the screen returns to the index screen.

Memo :

- Files that are protected cannot be deleted.
Release protection before deleting the file.

“Protecting Files” (p. 59)

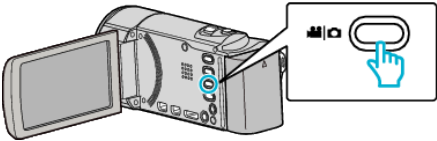
Deleting Selected Files


Deletes the selected files.

Caution :

- Deleted files cannot be restored.

1 Select video or still image mode.



2 Tap  to select the playback mode.




- While the video mode is shown in the image, the same operations apply for the still image mode.

3 Tap .

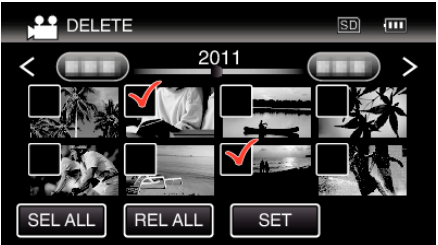


4 Tap on the files to delete.

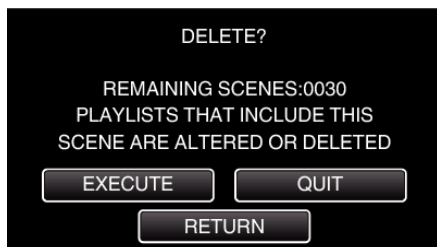


- ✓ appears on the selected files.
To remove ✓ from a file, tap on the file again.
- Tap “SEL ALL” to select all files.
- Tap “REL ALL” to release all selections.
- Still images that are recorded continuously within 2 seconds or with the continuous shooting mode will be grouped together. Only the first recorded file is shown and the group is displayed with a green frame. When this is tapped, an index screen of the grouped files appears. Tap on the files to delete, then tap “

5 Tap “SET”.



6 Tap “EXECUTE” to confirm the deletion.



- After deleting is complete, tap “OK”.
- To cancel the deletion, tap “QUIT”.

Memo :

- Files that are protected cannot be deleted.
Release protection before deleting the file.
- “Protecting Files” (p. 59)

Protecting Files

Prevent important videos/still images from being deleted accidentally by protecting them.

“Protecting/Releasing Protection of the Currently Displayed File”

(p. 59)

“Protecting/Releasing Protection of Selected Files” (p. 59)

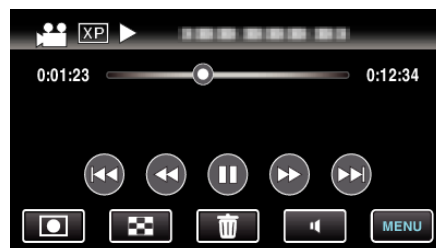
Caution :

- When the recording media is formatted, even the protected files will be deleted.

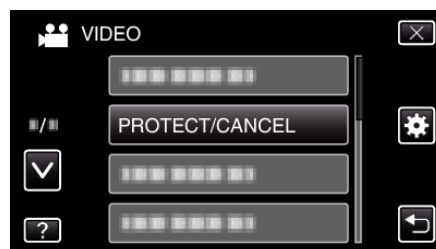
Protecting/Releasing Protection of the Currently Displayed File

Protects or releases protection of the currently displayed file.

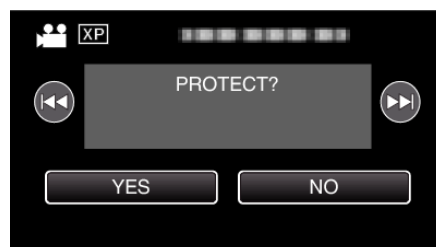
- 1 Tap “MENU”.



- 2 Tap “PROTECT/CANCEL”.



- 3 Tap “YES”.

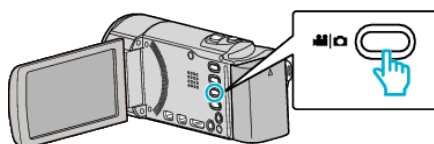


- Tap ◀◀/▶▶ to select the previous or next file.
- After setting, tap “OK”.

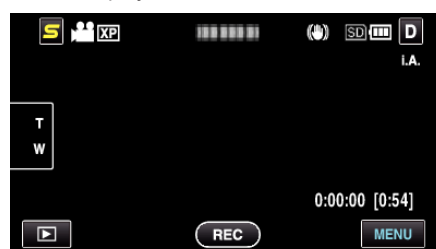
Protecting/Releasing Protection of Selected Files

Protects or releases protection of the selected files.

- 1 Select video or still image mode.



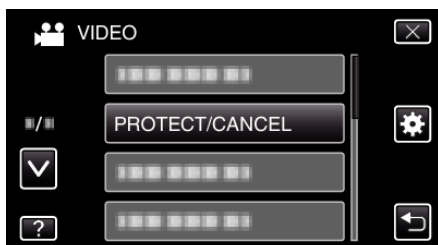
- 2 Tap ▶ to select the playback mode.



3 Tap "MENU".



4 Tap "PROTECT/CANCEL".



5 Tap on the files to protect or release protection of.



- ✓ appears on the selected files.
To remove ✓ from a file, tap on the file again.
- On and ✓ are displayed on the files that are already protected.
To release protection of a file, tap on the file such that ✓ is removed.
- Tap "SEL ALL" to select all files.
- Tap "REL ALL" to release all selections.
- Still images that are recorded continuously within 2 seconds or with the continuous shooting mode will be grouped together. Only the first recorded file is shown and the group is displayed with a green frame. When this is tapped, an index screen of the grouped files appears. Tap on the files to protect or release protection of, then tap "↶".



- If the transfer mode of Eye-Fi Helper is set to "Selective Share" or "Selective Transfer", will be displayed.

6 Tap "SET" to complete the setting.

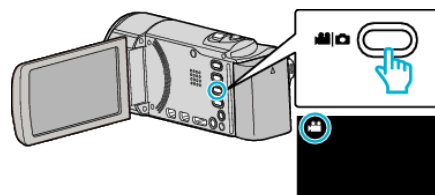


- Protect marks appear on the selected files.
Protect marks disappear from the deselected files.

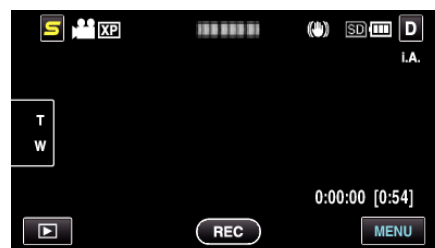
Capturing a Still Image in the Video during Playback

You can capture still images of the scenes you like in the recorded videos.

1 Select video mode.



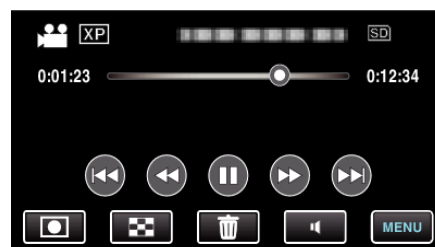
2 Tap to select the playback mode.



3 Tap on the desired video.

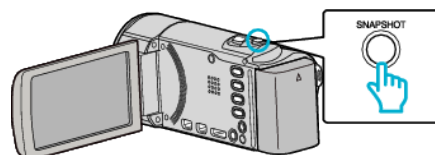


4 Tap pause at the desired scene during playback.



- After pausing the video, you can fine-tune the point to capture by tapping forward slow-motion and reverse slow-motion .

5 Capture a still image.



Memo :

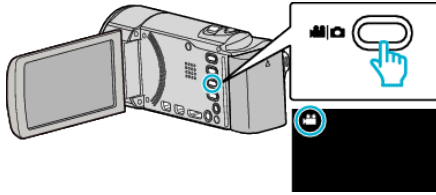
- Still images are captured with a size of 1920×1080.
- Captured still images are stored in the media where the video is being played back from.

Combining Videos Recorded by Seamless Recording

Videos that are recorded on two separate media and with "SEAMLESS RECORDING" in the video recording menu enabled can be combined into a single video.

"SEAMLESS RECORDING" (p. 96)

- 1 Select video mode.



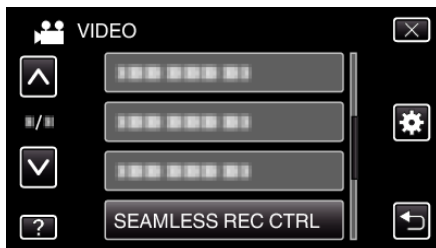
- 2 Tap to select the playback mode.



- 3 Tap "MENU".



- 4 Tap "SEAMLESS REC CTRL".

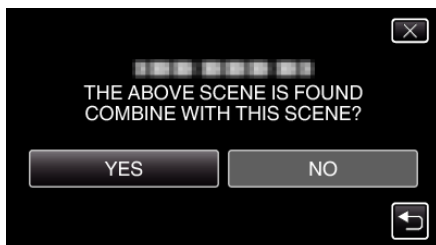


- 5 Tap "COMBINE SCENES".

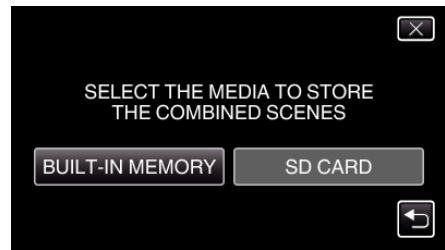


- This unit starts a search to detect seamless videos. Combining cannot be performed if no seamless videos are found.

- 6 Tap "YES".



- 7 Tap the media to store to.

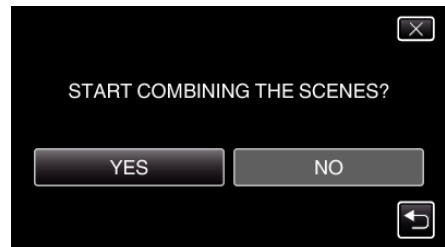


(GZ-HM450/GZ-HM650/GZ-HM670/GZ-HM690)



(GZ-HM440)

- 8 Tap "YES".



- Combining of the videos starts.
- After videos are combined, tap "OK".

Memo :

- Seamless videos cannot be combined if there is not enough free space in the built-in memory or SD card. Check the amount of remaining free space before combining.

How to Enable Seamless Video Recording Again

To start seamless recording again after the previous session is complete, it is necessary to combine seamless videos, or delete the combination information of the seamless videos.

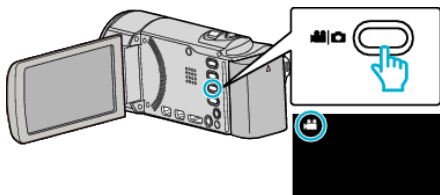
To delete the combination information of seamless videos, select "DEL COMBINED SCENES" in step 5.

Capturing a Required Part in the Video (TRIMMING)

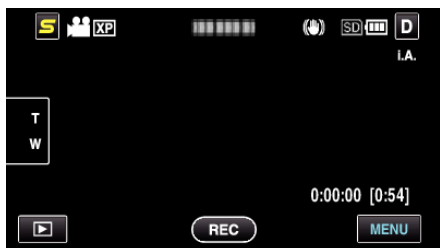
Select the required part of a video and save it as a new video file.

- The original video remains in its existing location.

1 Select video mode.



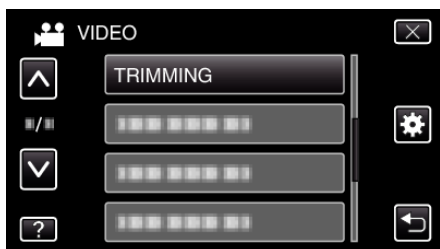
2 Tap to select the playback mode.



3 Tap "MENU".



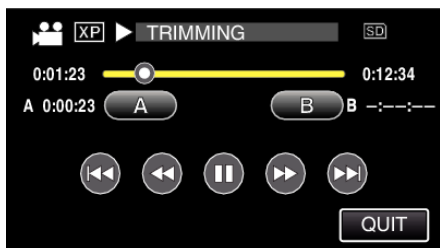
4 Tap "TRIMMING".



5 Tap the video to edit.

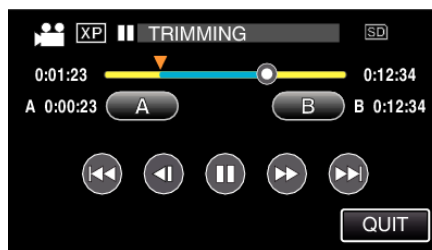


6 Tap to pause playback at the desired start point, then tap "A".



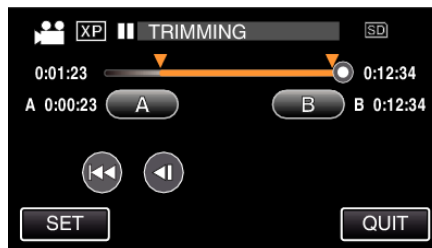
- When "A" is tapped, the start point is set.
- After setting the start point, tap to continue playback.

7 Tap to pause playback at the desired end point, then tap "B".



- When "B" is tapped, the end point is set.
- To reset the start or end point, tap "A" or "B" at the desired scene (position).

8 Tap "SET".



- When "SET" is tapped, the trimming area is confirmed.

9 Tap "YES".



- After copying, tap "OK".
- When copying finishes, the copied file is added to the index screen.

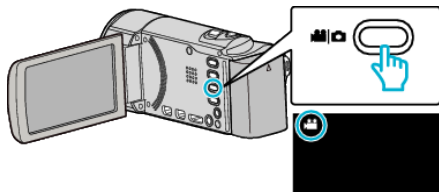
Memo :

- The division point may deviate slightly from the selected scene.

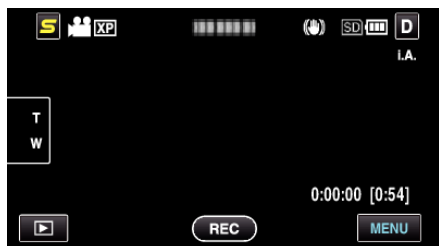
Capturing Videos for Uploading to YouTube

Capture and copy a part of a recorded video (maximum 15 minutes) for uploading to YouTube, and save it as a YouTube video. When capturing videos for YouTube, the duration cannot be longer than 15 minutes.

- 1 Select video mode.



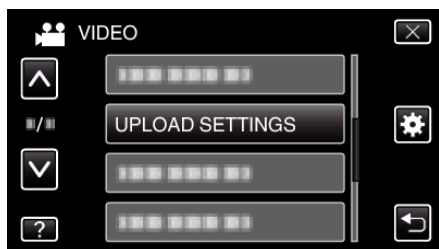
- 2 Tap to select the playback mode.



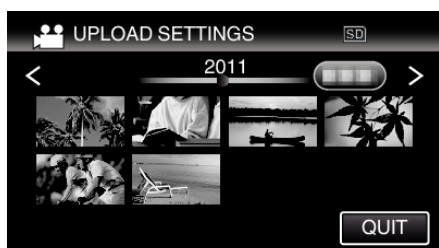
- 3 Tap "MENU".



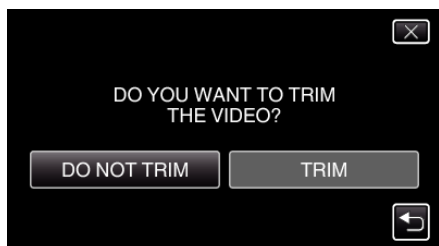
- 4 Tap "UPLOAD SETTINGS".



- 5 Tap the video to edit.

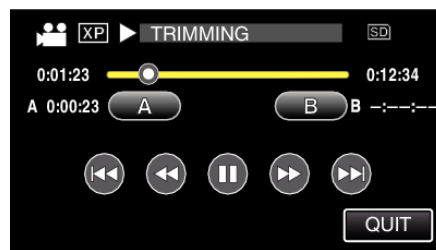


- 6 Tap "TRIM".
 - When trimming is not necessary, tap "DO NOT TRIM".

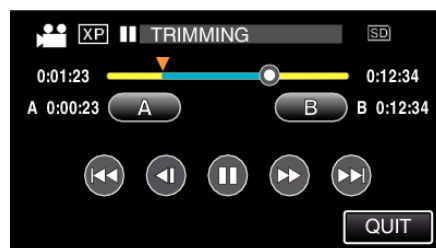


- If the selected video is more than 15 minutes, trimming is necessary.

- 7 Tap to pause playback at the desired start point, then tap "A".

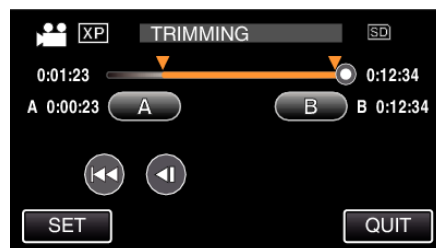


- 8 Tap to pause playback at the desired end point, then tap "B".

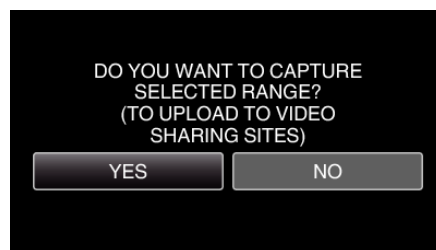


- To reset the start or end point, tap "A" or "B" at the desired scene (position).
- When capturing videos for YouTube, the duration cannot be longer than 15 minutes.

- 9 Tap "SET".



- 10 Tap "YES".



- After copying, tap "OK".
- When copying finishes, the copied file is added to the index screen.
- To exit upload settings, tap "STOP" on the upload settings screen.

Memo : _____
 • The division point may deviate slightly from the selected scene.

Uploading Videos to YouTube

You can upload your videos to YouTube using the provided software Everio MediaBrowser 3. Install the software on your PC and connect this unit to the PC.

- For details on how to use the software, refer to the help file.

"Installing the Provided Software (Built-in)" (p. 82)

"Connecting this Unit to PC" (p. 84)

Trouble with Uploading Videos: _____

- Check if you have created an account with YouTube. (You need a YouTube account to upload files to YouTube.)
- Refer to "Q&A", "Latest Information", "Download Information", etc. in "Click for Latest Product Info" in the help file of the provided software Everio MediaBrowser 3.

Creating Discs with a DVD Writer

You can copy the recorded files to discs or play back the created discs using an optional DVD writer.

Compatible DVD Writers

Product Name	Description
DVD Writer <ul style="list-style-type: none">CU-VD3U	<ul style="list-style-type: none">Enables the images recorded on this unit to be copied to a DVD without using a PC.

Creating Discs with a DVD Writer

■ Preparing a DVD Writer

“Preparing a DVD Writer (CU-VD3)” (p. 64)

■ Copying to Discs

“Copying All Files” (p. 64)

“Copying Files by Date” (p. 66)

“Copying Selected Files” (p. 67)

■ Other Operations

“Playing Back with a DVD Writer” (p. 68)

“Finalizing Discs After Copying” (p. 68)

Memo :

- When there are many files to back up, it may take time for the backup to be completed. Wait for a while as the access lamp appears blinking, which indicates normal operation.

Changing the Media of the DVD Writer

Set the type of media according to the loaded DVD.

- Prepare a DVD writer.
“Preparing a DVD Writer (CU-VD3)” (p. 64)
- Tap “CHANGE REC. MEDIA” in the “BACK-UP” menu.



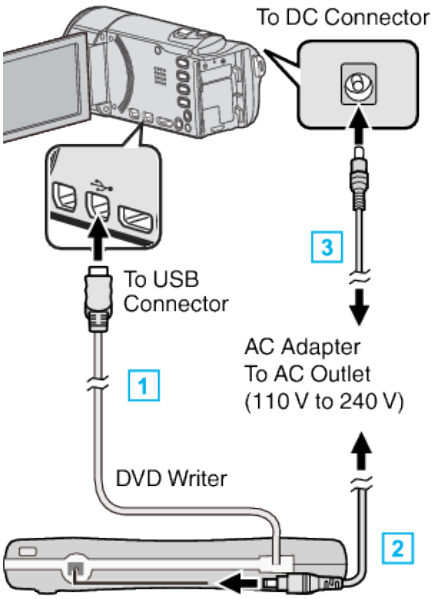
- Tap “DVD(AVCHD)” or “DVD-Video”.



- The media changes to the tapped item. Select the appropriate setting according to the disc.
- Selecting “DVD(AVCHD)” enables you to save videos in a DVD in the high definition quality.
- Selecting “DVD-Video” enables you to save videos in a DVD after converting to the standard image quality.

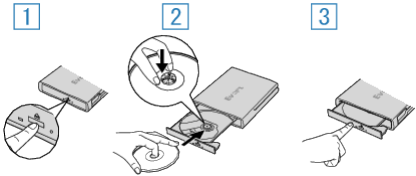
Preparing a DVD Writer (CU-VD3)

- Connect the USB cable and the AC adapter.
 - Turn off the camcorder by pressing the power button for about 2 seconds.



- Connect the USB cable of the DVD writer to this unit.
- Connect the AC adapter of the DVD writer.
- Connect the AC adapter to this unit.
 - This unit powers on automatically when the AC adapter is connected.
 - This unit turns on and the “BACK-UP” menu appears.
 - While the USB cable is connected, the “BACK-UP” menu is displayed.
 - Refer also to the instruction manual of the DVD writer.

- Insert a new disc.



- Press the eject button to open the disc tray.
- Pull out the tray completely and load a new disc properly.
- Push the disc tray in until it clicks into place.

Caution :

- Be sure to turn off the power when connecting the devices. Otherwise, electric shocks or malfunctions may occur.

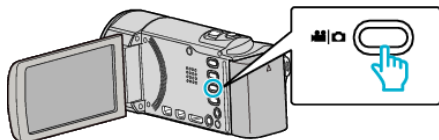
Creating a Disc

- Prepare a DVD writer.
 - Insert a new disc into the DVD writer.“Preparing a DVD Writer (CU-VD3)” (p. 64)
- Copy files to the disc with the following methods.
 - “Copying All Files” (p. 64)
 - “Copying Files by Date” (p. 66)
 - “Copying Selected Files” (p. 67)

Copying All Files

All videos or still images recorded on this unit will be copied. You can also select and copy only the videos or still images that have never been copied.

- Select video or still image mode.



- 2 Tap "CREATE FROM ALL" (video) or "SAVE ALL" (still image).

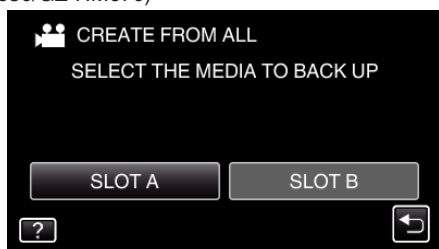


- While the video mode is shown in the image, the same operations apply for the still image mode.

- 3 Tap on the media to copy.

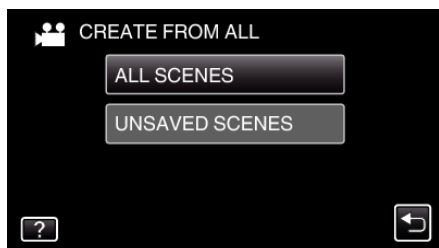


(GZ-HM650/GZ-HM670)



(GZ-HM445/GZ-HM448)

- 4 Tap the desired method.



- While the video mode is shown in the image, the same operations apply for the still image mode.
- "ALL SCENES" (video)/"ALL IMAGES" (still image):**
All videos or still images in this unit are copied.
- "UNSAVED SCENES" (video)/"UNSAVED IMAGES" (still image):**
Videos or still images that have never been copied are automatically selected and copied.

- 5 Tap "EXECUTE".



- The number of discs required to copy the files is displayed. Prepare the discs accordingly.

- 6 Tap "YES" or "NO". (Mode only)



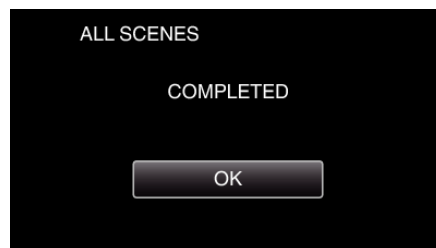
- When "YES" is selected, videos with similar recording dates are displayed in groups.
- When "NO" is selected, videos are displayed according to recording dates.


- 7 Tap "EXECUTE".



- When "INSERT NEXT DISC" appears, change the disc.

- 8 After copying, tap "OK".



- 9 Press and hold the  button for 2 seconds or more to turn off this unit and disconnect the USB cable.

Caution :

- Do not turn off the power or remove the USB cable until copying is complete.
- Files that are not on the index screen during playback cannot be copied.

Memo :

- To check the created disc, refer to "Playing Back with a DVD Writer" (p. 68).

"Playing Back with a DVD Writer" (p. 68)

When "DO YOU WANT TO FINALIZE?" appears

This appears when "AUTO FINALIZE" in the "COMMON" menu is set to "OFF".

"AUTO FINALIZE" (p. 115)

- To play back on other devices, tap "YES".
- To add more files to the DVD later, tap "NO".

Memo :

- When two or more DVDs are created simultaneously, all the discs other than the last one will be finalized automatically even when "AUTO FINALIZE" is set to "OFF".
- You can finalize a DVD even when "FINALIZE" is selected in the "BACK-UP" menu.

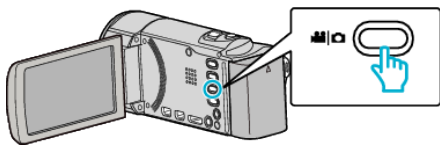
"Finalizing Discs After Copying" (p. 68)

- To play back a BD-R disc on other devices, select "FINALIZE" after creating the disc.
(The "AUTO FINALIZE" function in the "COMMON" menu can only be used for creating DVDs.)

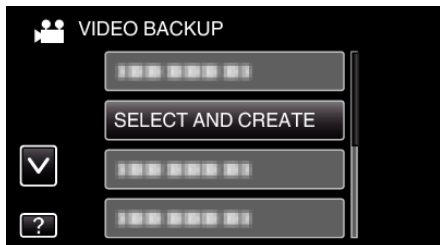
Copying Files by Date

Videos or still images are sorted and copied according to the date on which they were recorded.

- 1 Select video or still image mode.



- 2 Tap "SELECT AND CREATE" (video) or "SELECT AND SAVE" (still image).



- While the video mode is shown in the image, the same operations apply for the still image mode.

- 3 Tap on the media to copy.

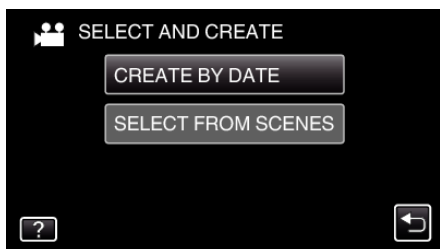


(GZ-HM650/GZ-HM670)



(GZ-HM445/GZ-HM448)

- 4 Tap "CREATE BY DATE" (video) or "SAVE BY DATE" (still image).



- While the video mode is shown in the image, the same operations apply for the still image mode.

- 5 Tap to select a recording date.



- 6 Tap "EXECUTE".



- The number of discs required to copy the files is displayed. Prepare the discs accordingly.

- 7 Tap "YES" or "NO". (mode only)



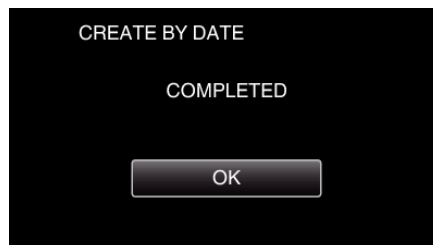
- When "YES" is selected, videos with similar recording dates are displayed in groups.
- When "NO" is selected, videos are displayed according to recording dates.

- 8 Tap "EXECUTE".



- When "INSERT NEXT DISC" appears, change the disc.

- 9 After copying, tap "OK".



- 10 Press and hold the button for 2 seconds or more to turn off this unit and disconnect the USB cable.

Caution :

- Do not turn off the power or remove the USB cable until copying is complete.
- Files that are not on the index screen during playback cannot be copied.

Memo :

- To check the created disc, refer to "Playing Back with a DVD Writer" (p. 68).

"Playing Back with a DVD Writer" (p. 68)

When "DO YOU WANT TO FINALIZE?" appears

This appears when "AUTO FINALIZE" in the "COMMON" menu is set to "OFF".

"AUTO FINALIZE" (p. 115)

- To play back on other devices, tap "YES".
- To add more files to the DVD later, tap "NO".

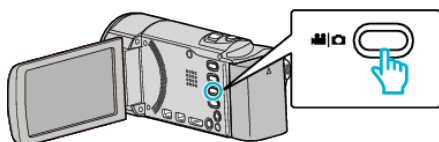
Memo :

- When two or more DVDs are created simultaneously, all the discs other than the last one will be finalized automatically even when “AUTO FINALIZE” is set to “OFF”.
 - You can finalize a DVD even when “FINALIZE” is selected in the “BACK-UP” menu.
- “Finalizing Discs After Copying” (p. 68)
- To play back a BD-R disc on other devices, select “FINALIZE” after creating the disc.
(The “AUTO FINALIZE” function in the “COMMON” menu can only be used for creating DVDs.)

Copying Selected Files

Select and copy the desired videos or still images individually.

- 1 Select video or still image mode.

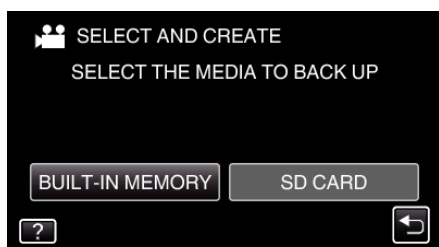


- 2 Tap “SELECT AND CREATE” (video) or “SELECT AND SAVE” (still image).

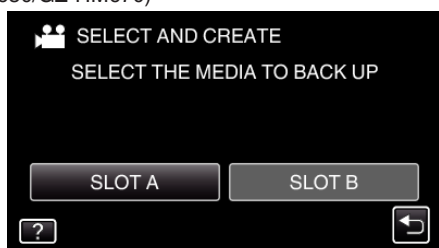


- While the video mode is shown in the image, the same operations apply for the still image mode.

- 3 Tap on the media to copy.

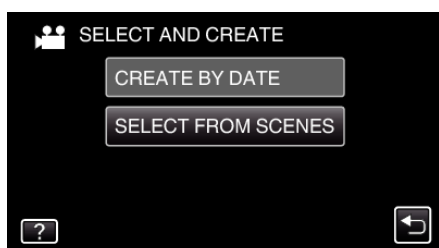


(GZ-HM650/GZ-HM670)



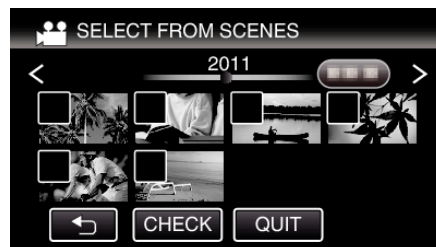
(GZ-HM445/GZ-HM448)

- 4 Tap “SELECT FROM SCENES” (video) or “SELECT FROM IMAGES” (still image).



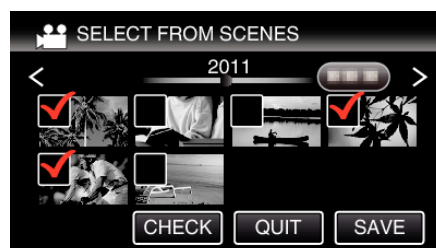
- While the video mode is shown in the image, the same operations apply for the still image mode.

- 5 Tap on the videos or still images to copy.



- A check mark appears on the selected file.
To remove the check mark, tap on the file again.
- Tap “CHECK” to check the file.
- While the video mode is shown in the image, the same operations apply for the still image mode.

- 6 After selecting all the files, tap “SAVE”.



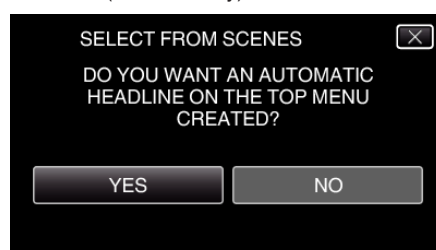
- While the video mode is shown in the image, the same operations apply for the still image mode.

- 7 Tap “EXECUTE”.



- The number of discs required to copy the files is displayed.
Prepare the discs accordingly.

- 8 Tap “YES” or “NO”. (mode only)



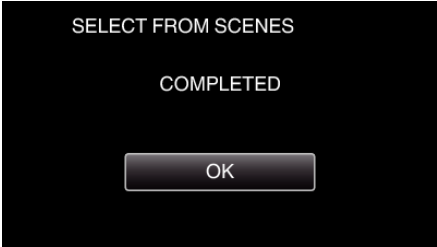
- When “YES” is selected, videos with similar recording dates are displayed in groups.
- When “NO” is selected, videos are displayed according to recording dates.

- 9 Tap “EXECUTE”.



- When “INSERT NEXT DISC” appears, change the disc.

- 10 After copying, tap “OK”.



11 Press and hold the button for 2 seconds or more to turn off this unit and disconnect the USB cable.

Caution :

- Do not turn off the power or remove the USB cable until copying is complete.
- Files that are not on the index screen during playback cannot be copied.

Memo :

- To check the created disc, refer to ““Playing Back with a DVD Writer” (p. 68) ”.

“Playing Back with a DVD Writer” (p. 68)

When “DO YOU WANT TO FINALIZE?” appears

This appears when “AUTO FINALIZE” in the “COMMON” menu is set to “OFF”.

“AUTO FINALIZE” (p. 115)

- To play back on other devices, tap “YES”.
- To add more files to the DVD later, tap “NO”.

Memo :

- When two or more DVDs are created simultaneously, all the discs other than the last one will be finalized automatically even when “AUTO FINALIZE” is set to “OFF”.
- You can finalize a DVD even when “FINALIZE” is selected in the “BACK-UP” menu.

“Finalizing Discs After Copying” (p. 68)

- To play back a BD-R disc on other devices, select “FINALIZE” after creating the disc.
(The “AUTO FINALIZE” function in the “COMMON” menu can only be used for creating DVDs.)

Playing Back with a DVD Writer

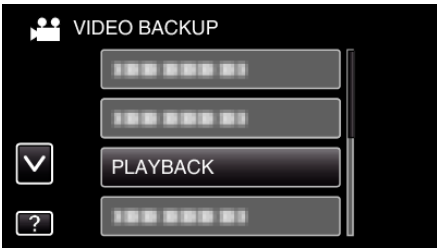
You can play back the DVDs created on this unit.

1 Prepare a DVD writer.

- Insert the DVD to play back into the DVD writer.

“Preparing a DVD Writer (CU-VD3)” (p. 64)

2 Tap “PLAYBACK” in the BACK-UP menu.



- An index screen (thumbnail display) of the videos in the disc appears.

3 Tap on the file to start playback.



- Tap “” to return to the “BACK-UP” menu.

- For details on video playback, refer to ““Operation Buttons for Video Playback” (p. 51) ”.
- “Operation Buttons for Video Playback” (p. 51)
- To exit, stop playback and turn off the camcorder by pressing the button for about 2 seconds. Then, disconnect the USB cable.

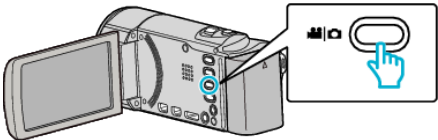
Memo :

- When playing back a disc created in DVD-Video format, no information such as date and time will be displayed.

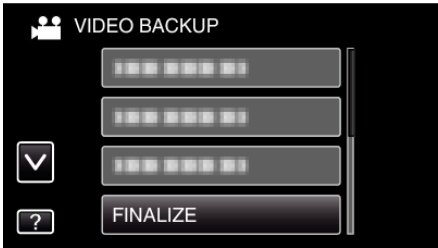
Finalizing Discs After Copying

Finalize the disc after copying is finished. This enables the disc to be played back using this unit, PC, DVD writer, DVD player, or external Blu-ray drive that supports the BD-MV and AVCHD formats.

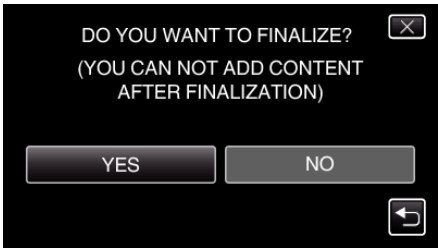
1 Select video or still image mode.



2 Tap “FINALIZE”.



3 Tap “YES”.



- After finalizing, tap “OK”.

Creating Discs with an External Blu-ray Drive

You can copy the recorded files to discs or play back the created discs using an optional external Blu-ray drive.

Compatible External Blu-ray Drives

You can use BRD-3DU8, BRD-UH8LE, or BRD-UH8S from I-O DATA. (as of December, 2010)

Memo :

For the latest information on external Blu-ray drives, refer to the following websites.

- I-O DATA:

<http://www.iodata.jp/everio/>

- JVC:

<http://www.victor.co.jp/dvmain/>

Creating Discs with an External Blu-ray Drive

■ Preparing an External Blu-ray Drive

“Preparing an External Blu-ray Drive” (p. 69)

■ Copying to Discs

“Copying All Files” (p. 69)

“Copying Files by Date” (p. 70)

“Copying Selected Files” (p. 71)

Select and copy the desired videos or still images individually.

■ Other Operations

“Playing Back with an External Blu-ray Drive” (p. 72)

Memo :

- The recordable time on the disc varies according to the way of recording.
- When there are many files to back up, it may take time for the backup to be completed. Wait for a while as the access lamp appears blinking, which indicates normal operation.

Changing the Media of the External Blu-ray Drive

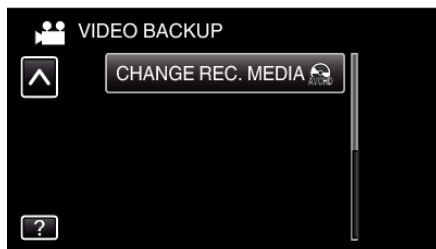
Set the type of media according to the loaded Blu-ray disc or DVD.

- 1 Prepare an external Blu-ray drive.

- Insert a disc into the external Blu-ray drive.

“Preparing an External Blu-ray Drive” (p. 69)

- 2 Tap “CHANGE REC. MEDIA” in the “BACK-UP” menu.



- 3 Tap “Blu-ray DISC”, “DVD(AVCHD)”, or “DVD-Video”.

- The media changes to the tapped item. Select the appropriate setting according to the disc.
- Selecting “Blu-ray DISC” enables you to save videos in a Blu-ray disc in the high definition quality.
- Selecting “DVD(AVCHD)” enables you to save videos in a DVD in the high definition quality.
- Selecting “DVD-Video” enables you to save videos in a DVD after converting to the standard image quality.

Preparing an External Blu-ray Drive

Memo :

When connecting to the external Blu-ray drive, use a USB cable with Mini-A (Male) – B (Male) connectors.

The USB cable provided with this unit cannot be used.

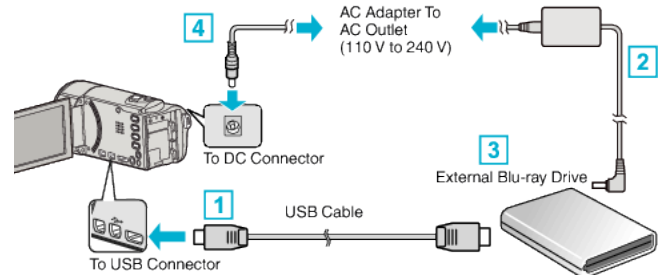
- I-O DATA: USB-MAB/100 Mini-A (Male) – B (Male)

To use the USB cable provided with the external Blu-ray drive, purchase the USB extension cable.

- Mini-A (Male) – A (Female)
(Part number: QAM0852-001)

- 1 Connect the USB cable and the AC adapter.

- Turn off the camcorder by pressing the button for about 2 seconds.



- 1 Connect the USB cable of the external Blu-ray drive to this unit.

- 2 Connect the AC adapter of the external Blu-ray drive.

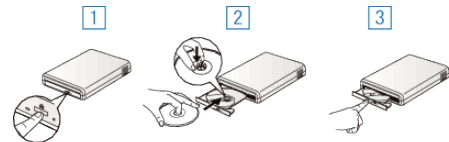
- 3 Turn on the external Blu-ray drive.

- 4 Connect the AC adapter to this unit.

- This unit powers on automatically when the AC adapter is connected.
- This unit turns on and the “BACK-UP” menu appears.
- While the USB cable is connected, the “BACK-UP” menu is displayed.
- Refer also to the instruction manual of the external Blu-ray drive.

- 2 Insert a new disc.

- Press the power button on the external Blu-ray drive to turn on the power.



- 1 Press the eject button to open the disc tray.

- 2 Pull out the tray completely and load a new disc properly.

- 3 Push the disc tray in until it clicks into place.

Caution :

- Be sure to turn off the power when connecting the devices. Otherwise, electric shocks or malfunctions may occur.

Creating a Disc

Creating a Disc

- 1 Prepare an external Blu-ray drive.

- Insert a new disc into the external Blu-ray drive.

“Preparing an External Blu-ray Drive” (p. 69)

- 2 Copy files to the disc with the following methods.

“Copying All Files” (p. 69)

“Copying Files by Date” (p. 70)

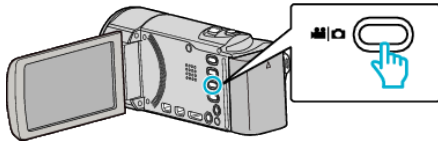
“Copying Selected Files” (p. 71)

Copying All Files

All videos or still images recorded on this unit will be copied.

You can also select and copy only the videos or still images that have never been copied.

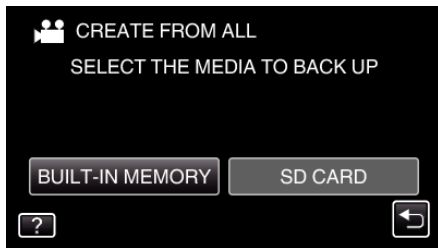
- 1 Select video or still image mode.



- 2 Tap "CREATE FROM ALL" (video) or "SAVE ALL" (still image).



- 3 Tap on the media to copy.

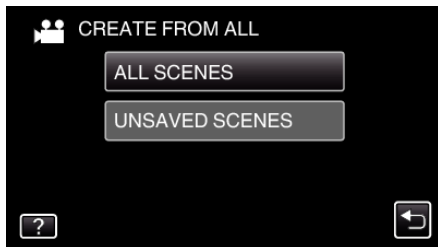


(GZ-HM650/GZ-HM670)



(GZ-HM445/GZ-HM448)

- 4 Tap the desired method.



- **"ALL SCENES" (video)/"ALL IMAGES" (still image):**

All videos or still images in this unit are copied.

- **"UNSAVED SCENES" (video)/"UNSAVED IMAGES" (still image):**

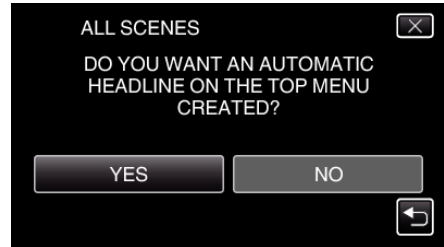
Videos or still images that have never been copied are automatically selected and copied.

- 5 Tap "EXECUTE".



- The number of discs required to copy the files is displayed. Prepare the discs accordingly.

- 6 Tap "YES" or "NO". (mode only)



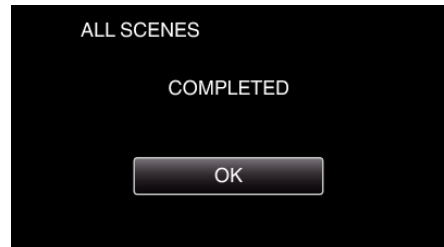
- When "YES" is selected, videos with similar recording dates are displayed in groups.
- When "NO" is selected, videos are displayed according to recording dates.

- 7 Tap "EXECUTE".



- When "INSERT NEXT DISC" appears, change the disc.

- 8 After copying, tap "OK".



- 9 Press and hold the button for 2 seconds or more to turn off this unit and disconnect the USB cable.

Caution :

- Do not turn off the power or remove the USB cable until copying is complete.
- Files that are not on the index screen during playback cannot be copied.

Memo :

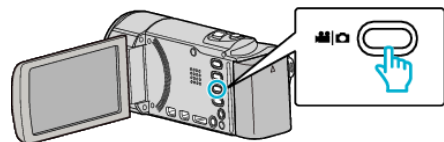
- To check the created disc, refer to "Playing Back with an External Blu-ray Drive" (p. 72).

"Playing Back with an External Blu-ray Drive" (p. 72)

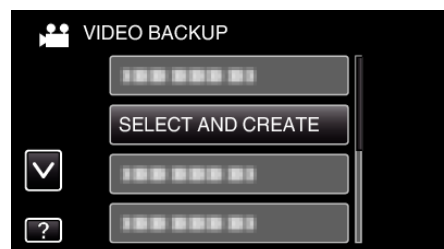
Copying Files by Date

Videos or still images are sorted and copied according to the date on which they were recorded.

- 1 Select video or still image mode.

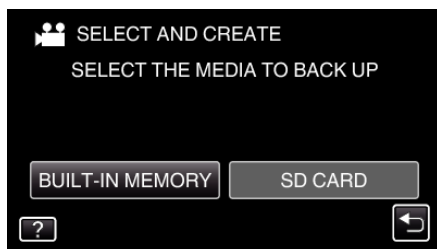


- 2 Tap "SELECT AND CREATE" (video) or "SELECT AND SAVE" (still image).



- While the video mode is shown in the image, the same operations apply for the still image mode.

3 Tap on the media to copy.

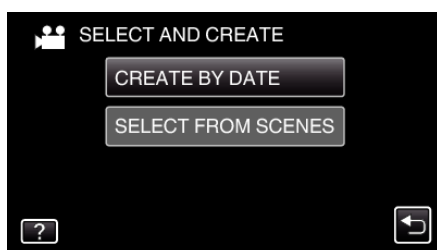


(GZ-HM650/GZ-HM670)



(GZ-HM445/GZ-HM448)

4 Tap "CREATE BY DATE" (video) or "SAVE BY DATE" (still image).



- While the video mode is shown in the image, the same operations apply for the still image mode.

5 Tap to select a recording date.

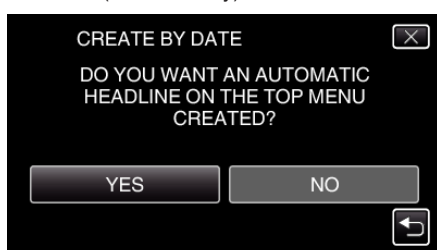


6 Tap "EXECUTE".



- The number of discs required to copy the files is displayed. Prepare the discs accordingly.

7 Tap "YES" or "NO". (👤 mode only)



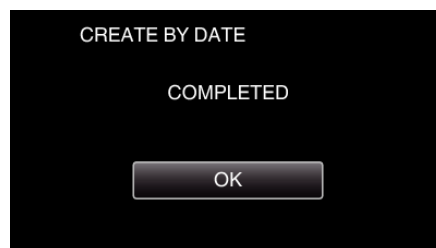
- When "YES" is selected, videos with similar recording dates are displayed in groups.
- When "NO" is selected, videos are displayed according to recording dates.

8 Tap "EXECUTE".



- When "INSERT NEXT DISC" appears, change the disc.

9 After copying, tap "OK".



10 Press and hold the button for 2 seconds or more to turn off this unit and disconnect the USB cable.

Caution :

- Do not turn off the power or remove the USB cable until copying is complete.
- Files that are not on the index screen during playback cannot be copied.

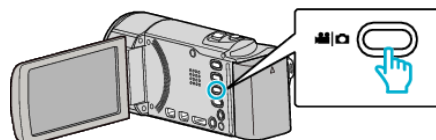
Memo :

- To check the created disc, refer to "“Playing Back with an External Blu-ray Drive” (p. 72)".
- "Playing Back with an External Blu-ray Drive" (p. 72)

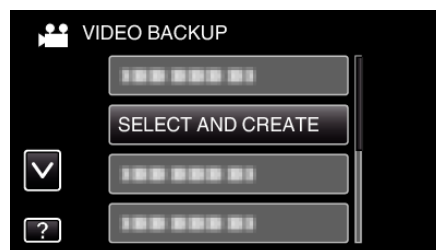
Copying Selected Files

Select and copy the desired videos or still images individually.

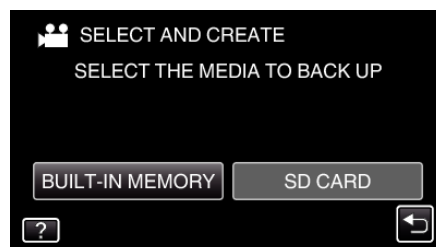
1 Select video or still image mode.



2 Tap "SELECT AND CREATE" (video) or "SELECT AND SAVE" (still image).



3 Tap on the media to copy.



(GZ-HM650/GZ-HM670)



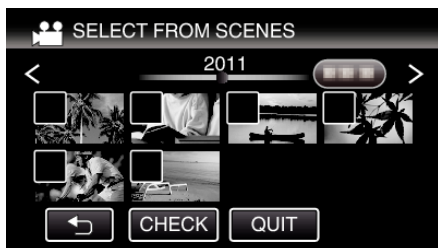
(GZ-HM445/GZ-HM448)

- 4 Tap "SELECT FROM SCENES" (video) or "SELECT FROM IMAGES" (still image).



- While the video mode is shown in the image, the same operations apply for the still image mode.

- 5 Tap on the videos or still images to copy.



- A check mark appears on the selected file. To remove the check mark, tap on the file again.
- Tap "CHECK" to check the file.

- 6 After selecting all the files, tap "SAVE".



- 7 Tap "EXECUTE".



- The number of discs required to copy the files is displayed. Prepare the discs accordingly.

- 8 Tap "YES" or "NO". (mode only)



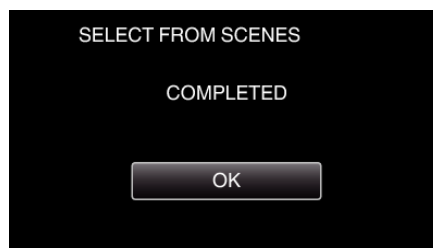
- When "YES" is selected, videos with similar recording dates are displayed in groups.
- When "NO" is selected, videos are displayed according to recording dates.

- 9 Tap "EXECUTE".



- When "INSERT NEXT DISC" appears, change the disc.

- 10 After copying, tap "OK".



- 11 Press and hold the button for 2 seconds or more to turn off this unit and disconnect the USB cable.

Caution :

- Do not turn off the power or remove the USB cable until copying is complete.
- Files that are not on the index screen during playback cannot be copied.

Memo :

- To check the created disc, refer to "Playing Back with an External Blu-ray Drive" (p. 72).

"Playing Back with an External Blu-ray Drive" (p. 72)

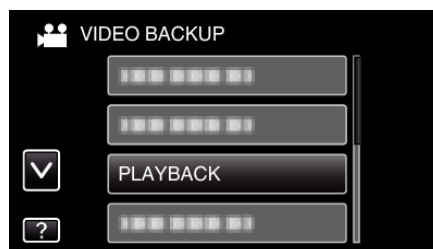
Playing Back with an External Blu-ray Drive

You can play back the Blu-ray discs created on this unit.

- 1 Prepare an external Blu-ray drive.

- Insert the Blu-ray disc to play back into the external Blu-ray drive. "Preparing an External Blu-ray Drive" (p. 69)

- 2 Tap "PLAYBACK" in the BACK-UP menu.




- An index screen (thumbnail display) of the videos in the disc appears.
- Tap to return to the "BACK-UP" menu.

- 3 Tap on the file to start playback.



- For details on video playback, refer to ““Operation Buttons for Video Playback” (p. 51) ”.

“Operation Buttons for Video Playback” (p. 51)

- To exit, stop playback and turn off the camcorder by pressing the  button for about 2 seconds. Then, disconnect the USB cable.

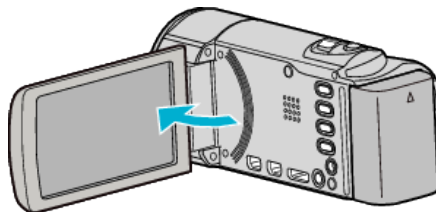
Memo :

- When playing back a disc created in DVD-Video format, no information such as date and time will be displayed.

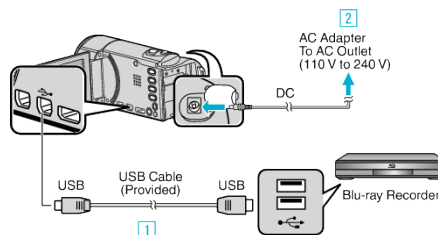
Creating a Disc Using a Connected Blu-ray Recorder

You can create discs using a Blu-ray recorder by connecting it to this unit using a USB cable.

- 1 Open the LCD monitor.



- 2 Connect to a Blu-ray recorder.



- 1 Connect using the provided USB cable.

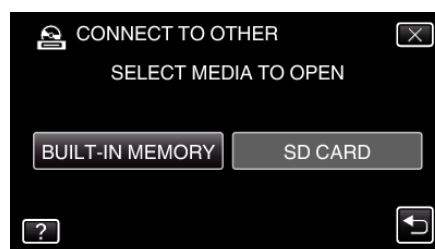
- 2 Connect the AC adapter to this unit.

- This unit powers on automatically when the AC adapter is connected.
- Be sure to use the supplied JVC AC adapter.
- 3 The “SELECT DEVICE” screen appears.

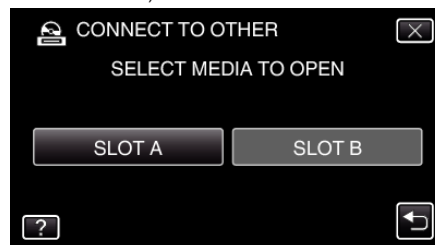
- 3 Tap “CONNECT TO OTHER”.



- 4 Tap the desired media.



(GZ-HM650/GZ-HM670)



(GZ-HM445/GZ-HM448)

- “BUILT-IN MEMORY” is applicable to GZ-HM670/GZHM650 only.

- 5 Perform dubbing on the Blu-ray recorder.

- Refer also to the instruction manual of the Blu-ray recorder.

Memo :

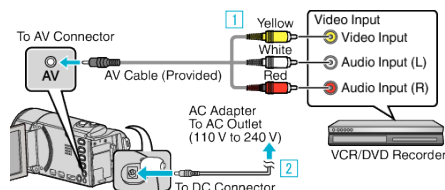
- The created discs are playable only on AVCHD compatible devices (such as Blu-ray recorders).

Dubbing Files by Connecting to a DVD Recorder or VCR

You can dub videos in standard quality by connecting to a DVD recorder or VCR.

- Refer also to the instruction manuals of the TV, DVD recorder, VCR, etc.

1 Connect to a VCR/DVD recorder.

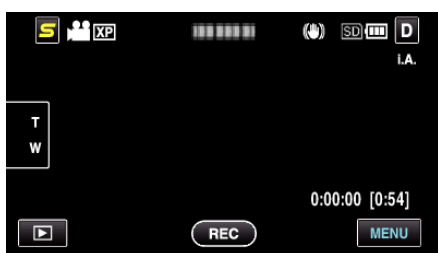


1 Connect using the provided AV cable.

2 Connect the AC adapter to this unit.

- This unit powers on automatically when the AC adapter is connected.
- Be sure to use the supplied JVC AC adapter.

2 Tap to select the playback mode.



- Tap to return to the recording mode.
- The mode changes between recording and playback with every tap.

3 Prepare the TV/VCR for recording.

- Switch to a compatible external input.
- Insert a DVD-R or video tape.

4 Prepare this unit for playback.

- Set "VIDEO OUTPUT" in the "COMMON" menu to the aspect ratio ("4:3" or "16:9") of the connecting TV.

"VIDEO OUTPUT" (p. 113)

5 Start recording.

- Start playback on this unit and press the record button on the recorder.

"Playing Back Videos" (p. 51)

- After playback is complete, stop the recording.

Using a USB External Hard Disk Drive

You can copy video and still image files to a USB external hard disk drive from this unit. You can also play the files in the USB external hard disk drive on this unit.

- Refer also to the instruction manual of the external hard disk drive.

Compatible External Hard Disk Drives

You can use the HDJ-U or HDCA-U series from I-O DATA. (as of December, 2010)

Memo :

Before purchasing, check the compatible devices on the I-O DATA website.

- I-O DATA:

<http://www.iodata.jp/everio/>

- USB external hard disk drives up to 2 TB can be used.

Copying and Playback with a USB External Hard Disk Drive

"Preparing a USB External Hard Disk Drive" (p. 75)

"Copying All Files" (p. 75)

"Playing Back Files in the USB External Hard Disk Drive" (p. 76)

"Deleting Folders in the USB External Hard Disk Drive" (p. 77)

Memo :

- Format the USB external hard disk drive when connecting it to this unit for the first time. (All data will be deleted.)

"Formatting the USB External Hard Disk Drive" (p. 77)

- Refer to the help file of the provided Everio MediaBrowser 3 software when you use the PC to operate the data in the USB external hard disk drive directly copied from this unit.
- USB external hard disk drives with the capacity over 2 TB cannot be used.
- Copying may take time. (For example, saving 1 hour video in XP mode takes about 20 minutes.)
- When there are many files to back up, it may take time for the backup to be completed. Wait for a while as the access lamp appears blinking, which indicates normal operation.
- Sound or video may be interrupted during playback.

Caution :

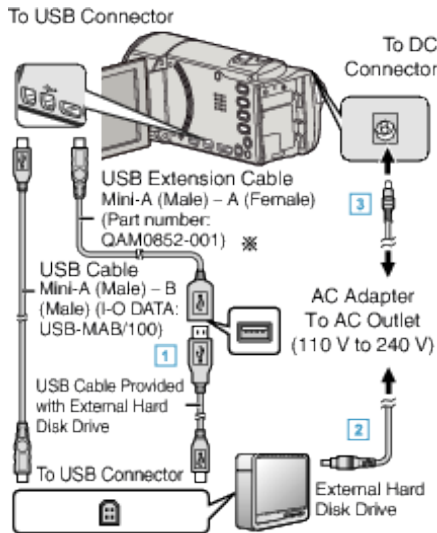
- Do not connect a USB hub between this unit and the USB external hard disk drive.
- Disconnect the USB external hard disk drive when using other USB devices such as DVD writer, external Blu-ray drive, or another USB external hard disk drive.
- Avoid the following operations during copying and playing back.
 - Turning off the unit or the USB external hard disk drive.
 - Disconnecting the USB cable.
- Do not format the USB external hard disk drive using the PC. If you did, format again using this unit. (All the data in the USB external hard disk drive will be erased.)
- Avoid the following operations using the PC.
 - Deleting files or folders in the USB external hard disk drive.
 - Moving files or folders in the USB external hard disk drive.
 - Changing the name of files or folders in the USB external hard disk drive. These operations make the data impossible to be played back on this unit.
- When you use the PC to edit the data in the USB external hard disk drive, copy the data to the PC before editing. Editing the data in the USB external hard disk drive directly from the PC makes the data impossible to be played back on this unit.

Preparing a USB External Hard Disk Drive

Memo :

- When connecting to the external hard disk drive, use a USB cable with Mini-A (Male) – B (Male) connectors.
The USB cable provided with this unit cannot be used.
- I-O DATA: USB-MAB/100 Mini-A (Male) – B (Male)
To use the USB cable provided with the external hard disk drive, purchase the following USB extension cable.
- Mini-A (Male) – A (Female)
(Part number: QAM0852-001)

- Connect the USB cable and the AC adapter.
 - Turn off the camcorder by pressing the button for about 2 seconds.



- Connect the USB cable with the USB external hard disk drive.
- Connect the AC adapter of the USB external hard disk drive.
- Connect the AC adapter to this unit.
 - This unit powers on automatically when the AC adapter is connected.
 - This unit turns on and the “BACK-UP” menu appears.
 - While the USB cable is connected, the “BACK-UP” menu is displayed.
 - Refer also to the instruction manual of the external hard disk drive.

- Turn on the external hard disk drive.

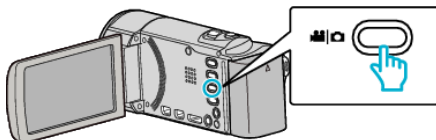
Caution :

- Be sure to turn off the power when connecting the devices.
Otherwise, electric shocks or malfunctions may occur.
- Do not connect a USB hub between this unit and the USB external hard disk drive.

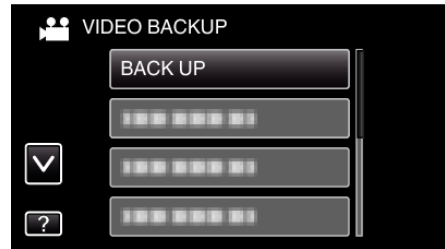
Copying All Files

All videos or still images recorded on this unit will be copied.
You can also select and copy only the videos or still images that have never been copied.

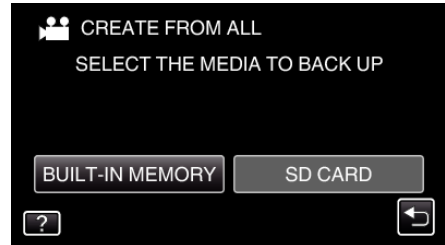
- Select video or still image mode.



- Tap “BACK UP”.



- Tap on the media to copy.

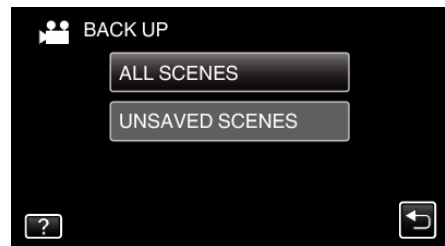


(GZ-HM650/GZ-HM670)



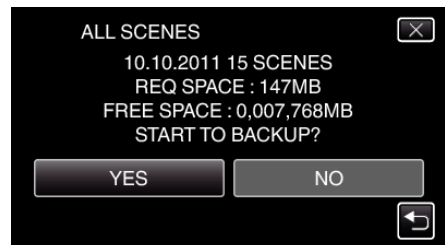
(GZ-HM445/GZ-HM448)

- Tap the desired method.



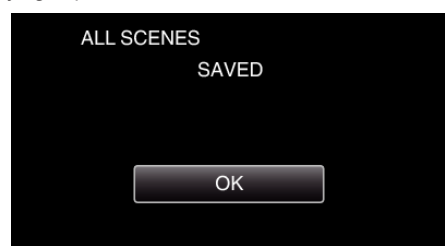
- “ALL SCENES” (video)/“ALL IMAGES” (still image):
All videos or still images in this unit are copied.
- “UNSAVED SCENES” (video)/“UNSAVED IMAGES” (still image):
Videos or still images that have never been copied are automatically selected and copied.


- Check that there is sufficient remaining space on the hard disk drive and tap “YES”.



- Backup starts when “YES” is tapped.

- After copying, tap “OK”.



7 Press and hold the  button for 2 seconds or more to turn off this unit and disconnect the USB cable.

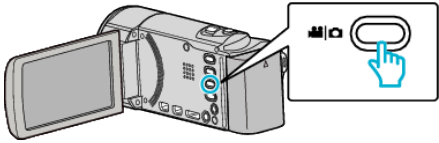
Caution :

- Do not turn off the power or remove the USB cable until copying is complete.
- Files that are not on the index screen during playback cannot be copied.
- Copying may take time. (For example, saving 1 hour video in XP mode takes about 20 minutes.)

Playing Back Files in the USB External Hard Disk Drive

Videos or still images saved in an external hard disk drive can be played back on this unit.

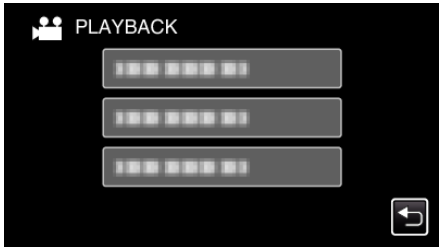
1 Select video or still image mode.




2 Tap “PLAYBACK”.





3 Tap on the folder to play back.



- Tap “” to return to the “BACK-UP” menu.

4 Tap on the file to play back.



- Tap “” to return to the folder index screen.
 - For details on video playback, refer to ““Operation Buttons for Video Playback” (p. 51) ”.
- “Operation Buttons for Video Playback” (p. 51)
- To exit, stop playback and turn off the camcorder by pressing the  button for about 2 seconds. Then, disconnect the USB cable.

Memo :

- Sound or video may be interrupted during playback.

Deleting Folders in the USB External Hard Disk Drive

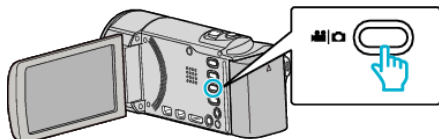
Files that are copied to the external hard disk drive can be deleted.

Caution :

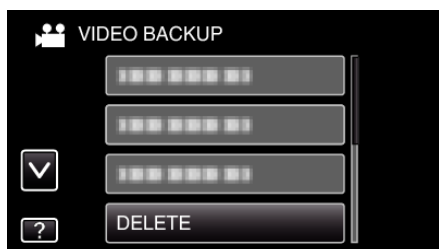
- Deleted files cannot be restored.
- Be sure to back up important files on a PC.

“Backing Up All Files” (p. 84)

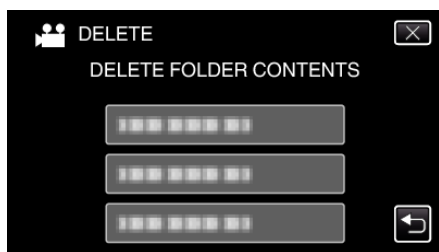
- 1 Select video or still image mode.



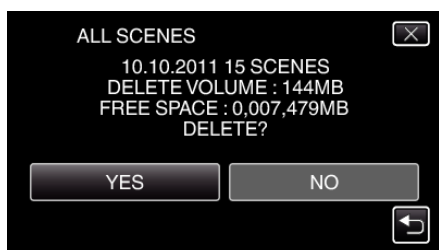
- 2 Tap “DELETE”.



- 3 Tap on the folder to delete.



- 4 Tap “YES”.



- After deleting, tap “OK”.

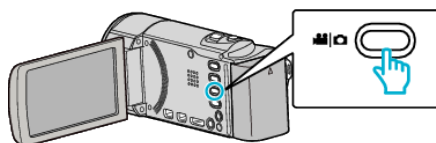
Formatting the USB External Hard Disk Drive

All files on the external hard disk drive can be deleted.

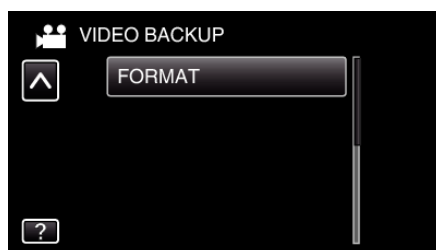
Caution :

- All data on the external hard disk drive will be deleted when it is formatted. Copy all files on the card to a PC before formatting.

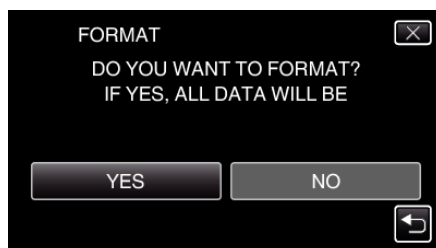
- 1 Select video or still image mode.



- 2 Tap “FORMAT”.



- 3 Tap “YES”.

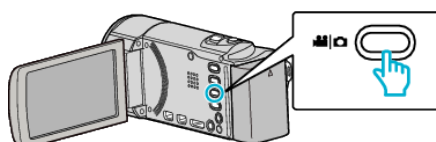


- After formatting, tap “OK”.

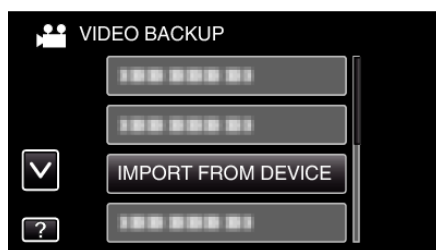
Importing Files from the USB External Hard Disk Drive

You can copy video files from a USB external hard disk drive to the built-in memory of this unit or an SD card.

- 1 Select video mode.



- 2 Tap “IMPORT FROM DEVICE” in “BACK-UP”.



- 3 Tap “USB HDD→BUILT-IN MEM”, “USB HDD→SD”, “USB HDD→SLOT A”, or “USB HDD→SLOT B”.



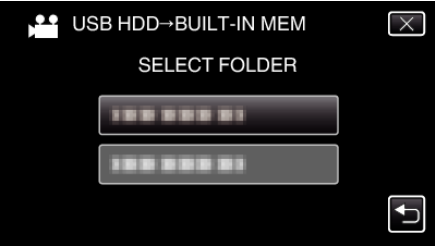
(GZ-HM650/GZ-HM670)



(GZ-HM445/GZ-HM448)

- Files will be imported to the selected media.

4 Tap on the folder to import.

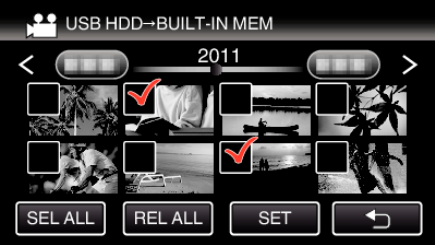


5 Tap on the files to import.

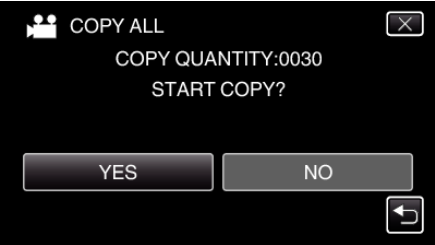


- ✓ appears on the selected files.
To remove ✓ from a file, tap on the file again.
- Tap “SEL ALL” to select all files.
- Tap “REL ALL” to release all selections.
- “SET” is deactivated when no file is selected.

6 Tap “SET”.

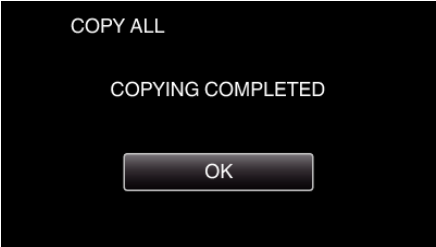



7 Tap “YES”.



- Importing starts when “YES” is tapped.
- To cancel importing of files, tap “STOP”, then tap “YES”.

8 After importing, tap “OK”.



9 Press and hold the  button for 2 seconds or more to turn off this unit and disconnect the USB cable.

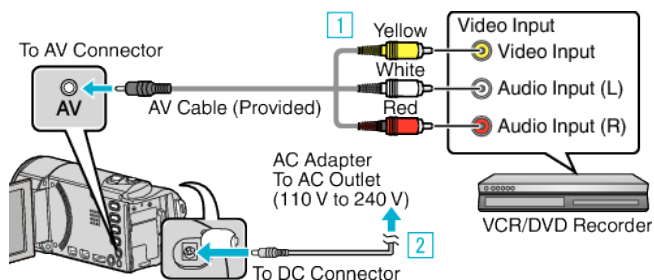
Memo : _____
• Files that are saved to the USB external hard disk drive from other devices cannot be copied to this unit.

Dubbing Files to a VHS Tape Using a VCR

You can dub videos in standard quality by connecting to a VCR.

- Refer also to the instruction manuals of the TV and VCR.

1 Connect to a VCR/DVD recorder.

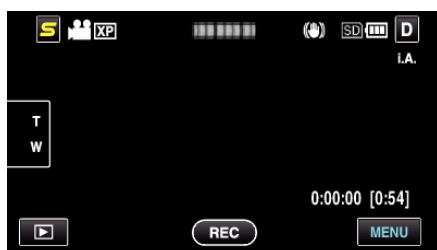


1 Connect using the provided AV cable.

2 Connect the AC adapter to this unit.

- This unit powers on automatically when the AC adapter is connected.
- Be sure to use the supplied JVC AC adapter.

2 Tap to select the playback mode.



3 Prepare the TV/VCR for recording.

- Switch to a compatible external input.
- Insert a video tape.

4 Prepare this unit for playback.

- Set "VIDEO OUTPUT" in the "COMMON" menu to the aspect ratio ("4:3" or "16:9") of the connecting TV.

"VIDEO OUTPUT" (p. 113)

5 Start recording.

- Start playback on this unit and press the record button on the recorder.

"Playing Back Videos" (p. 51)

- After playback is complete, stop the recording.

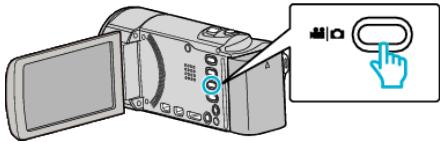
Copying Files to an SD Card

You can copy videos and still images from the built-in memory to SD card or from slot A to slot B.
Copying still images to cards makes it convenient to bring them to the shop for printing (developing).

Caution :

- Make sure that there is enough space left in the destination medium.
- Videos in the SD card cannot be copied to the built-in memory.

1 Select video or still image mode.



2 Tap to select the playback mode.



- Tap to return to the recording mode.
- The mode changes between recording and playback with every tap.

3 Tap "MENU".



4 Tap "COPY".



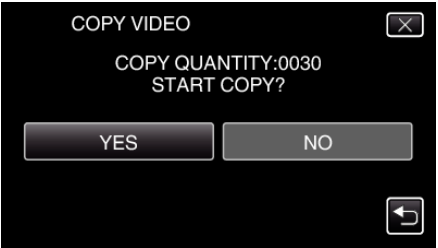
5 Tap on the files to copy.



- ✓ appears on the selected files.
To remove ✓ from a file, tap on the file again.
- Tap "SEL ALL" to select all files.
- Tap "REL ALL" to release all selections.
- "SET" is deactivated when no file is selected.

6 Tap "SET".

7 Tap "YES".



- Copying starts.
- After copying, tap "OK".

Moving Files to an SD Card

You can move videos and still images from the built-in memory to SD card or from slot A to slot B.

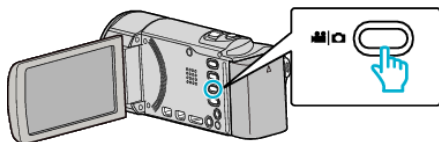
Files that are moved will be deleted from the built-in memory or slot A.

Moving still images to SD cards makes it convenient to bring them to the shop for printing (developing).

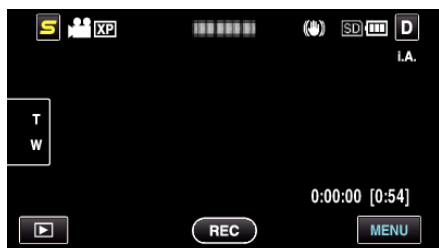
Caution :


- Make sure that there is enough space left in the destination medium.
- Videos in the SD card cannot be moved to the built-in memory or from slot B to slot A.

- 1 Select video or still image mode.



- 2 Tap  to select the playback mode.

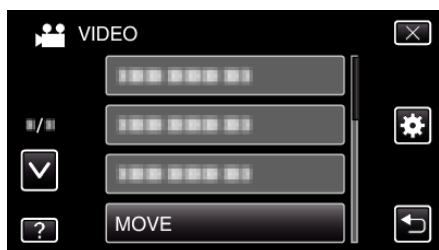


- Tap  to return to the recording mode.
- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



- 4 Tap "MOVE".



- 5 Tap on the files to move.



- ✓ appears on the selected files.
To remove ✓ from a file, tap on the file again.
- Tap "SEL ALL" to select all files.
- Tap "REL ALL" to release all selections.
- "SET" is deactivated when no file is selected.

- 6 Tap "SET".



- 7 Tap "YES".



- Moving of files starts.
- After moving, tap "OK".

Copying to Windows PC

You can copy files to a computer using the provided software.
DVDs can also be created using the computer's DVD drive.
If the provided software is not installed, this unit will be recognized as an external storage when connected.

Memo :

- To record to discs, a recordable DVD or Blu-ray drive is required for the computer in use.
- Still images cannot be recorded to discs using the provided software.

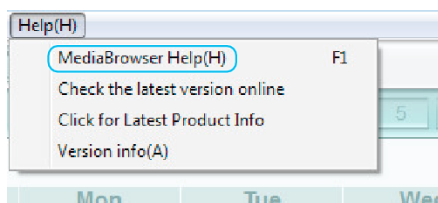
Trouble with Using the Provided Software Everio MediaBrowser 3

Consult the customer service center below.

- Pixela User Support Center

Telephone	USA and Canada (English): +1-800-458-4029 (toll-free) Europe (UK, Germany, France, and Spain) (English/German/French/Spanish): +800-1532-4865 (toll-free) Other Countries in Europe (English/German/French/Spanish): +44-1489-564-764 Asia (Philippines) (English): +63-2-438-0090 China (Chinese): 10800-163-0014 (toll-free)
Homepage	http://www.pixela.co.jp/oem/jvc/mediabrowser/e/

- For details on how to upload to YouTube or transfer files to iTunes, refer to "MediaBrowser Help" in the "Help" menu of Everio MediaBrowser 3.



Verifying System Requirements (Guideline)

Right-click on "Computer" (or "My Computer") in the "Start" menu and select "Properties" to check the following items.

Windows Vista/Windows 7

- Refer to the operating instructions found in the animation on the Detailed User Guide.

Windows XP

- Refer to the operating instructions found in the animation on the Detailed User Guide.

	Windows Vista/Windows 7	Windows XP
OS	Windows Vista 32/64-bit Home Basic or Home Premium (Pre-installed versions only) Service Pack 2 Windows 7 32/64-bit Home Premium (Pre-installed versions only)	Windows XP Home Edition or Professional (Pre-installed versions only) Service Pack 3
CPU	Intel Core Duo, CPU 1.66 GHz or higher (Intel Core 2 Duo, CPU 2.13 GHz or higher recommended)	Intel Core Duo, CPU 1.66 GHz or higher (Intel Core 2 Duo, CPU 2.13 GHz or higher recommended)
RAM	At least 2 GB	At least 1 GB
Video editing	Intel Core i7, CPU 2.53 GHz or higher recommended	Intel Core i7, CPU 2.53 GHz or higher recommended

Other requirements

Display: 1024x768 pixels or above (1280x1024 pixels or above recommended)
Graphic: Intel G965 or higher recommended

Memo :

- If your PC does not meet the above system requirements, operations of the provided software cannot be guaranteed.
- For more information, contact your PC's manufacturer.

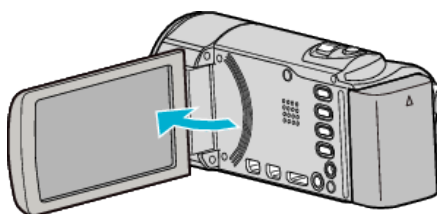
Installing the Provided Software (Built-in)

You can display the recorded images in calendar format and perform simple editing using the provided software.

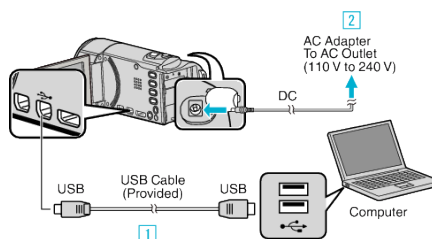
Preparations

Connect this unit to a computer with a USB cable.

- 1 Open the LCD monitor.



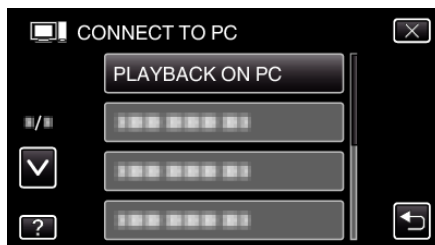
- 2 Connect the USB cable and the AC adapter.



- 1 Connect using the provided USB cable.
 - 2 Connect the AC adapter to this unit.
- This unit powers on automatically when the AC adapter is connected.
 - Be sure to use the supplied JVC AC adapter.
 - 3 The “SELECT DEVICE” menu appears.
- 3 Tap “CONNECT TO PC”.



- 4 Tap “PLAYBACK ON PC”.



- Tap X to exit the menu.
- Tap ↶ to return to the previous screen.
- “Everio Software Setup” appears on the computer.
The subsequent operations are to be performed on the computer.

Memo :

- If “Everio Software Setup” doesn’t appear, double-click “JVCCAM_APP” in “My Computer”, then double-click “install.exe”.
- If the auto play dialog box appears, select “Open folder to view files” and click “OK”. Then, click “install.exe” in the folder.

Installation Procedure

■ Windows Vista/Windows 7

- Refer to the operating instructions found in the animation on the Detailed User Guide.

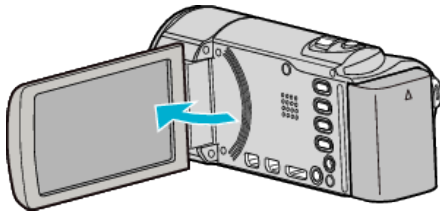
■ Windows XP

- Refer to the operating instructions found in the animation on the Detailed User Guide.

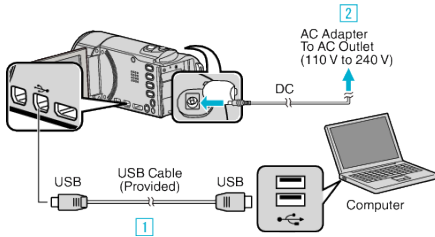
Backing Up All Files

Before making backup, make sure that enough free space is left in the computer's hard disk (HDD).

- 1 Open the LCD monitor.



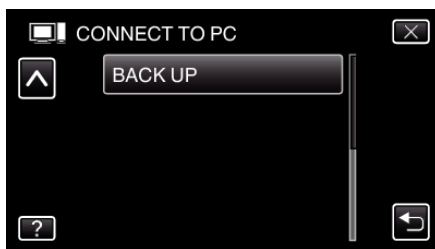
- 2 Connect the USB cable and the AC adapter.



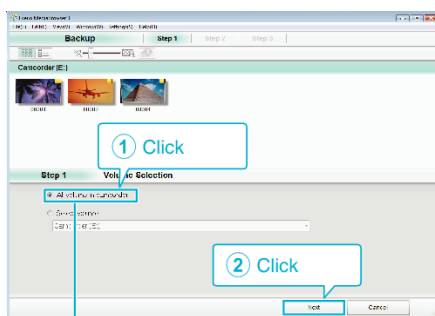
- 1 Connect using the provided USB cable.
 - 2 Connect the AC adapter to this unit.
- This unit powers on automatically when the AC adapter is connected.
 - Be sure to use the supplied JVC AC adapter.
 - 3 The "SELECT DEVICE" menu appears.
- 3 Tap "CONNECT TO PC".



- 4 Tap "BACK UP".



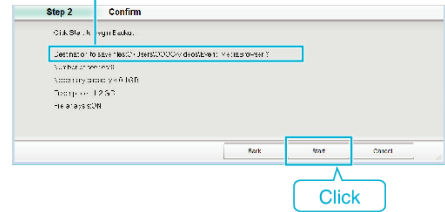
- Tap X to exit the menu.
 - Tap ↶ to return to the previous screen.
 - The provided software Everio MediaBrowser 3 starts up on the computer.
- The subsequent operations are to be performed on the computer.
- 5 Select "Back-up".



Click "All volume in camcorder"

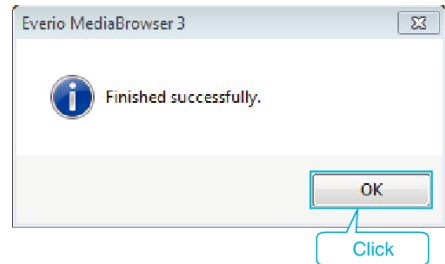
- 6 Start backup.

Saving Destination (PC)



- Backup starts.

- 7 After backup is complete, click "OK".



Memo :

- Before making backup, load the SD card in which the videos and still images are stored on this unit.
- If you encounter any problems with the provided software Everio MediaBrowser 3, please consult the "Pixela User Support Center".

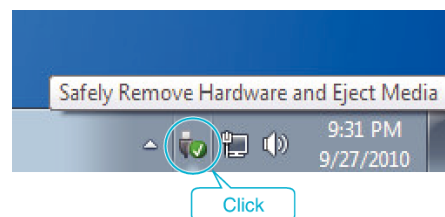
Telephone	USA and Canada (English): +1-800-458-4029 (toll-free) Europe (UK, Germany, France, and Spain) (English/German/French/Spanish): +800-1532-4865 (toll-free) Other Countries in Europe (English/German/French/Spanish): +44-1489-564-764 Asia (Philippines) (English): +63-2-438-0090 China (Chinese): 10800-163-0014 (toll-free)
Homepage	http://www.pixela.co.jp/oem/jvc/mediabrowser/e/

- Delete unwanted videos before making backup.
It takes time to back up many videos.

"Deleting Unwanted Files" (p. 58)

Disconnecting this Unit from Computer

- 1 Click "Safely Remove Hardware and Eject Media".



- 2 Click "Safely Remove USB Mass Storage Device".
- 3 (For Windows Vista) Click "OK".
- 4 Disconnect the USB cable and close the LCD monitor.

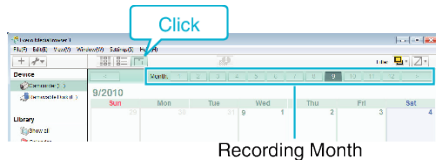
Organizing Files

After backing up your files, organize them by adding labels such as "Family Trip" or "Athletic Meet". This is useful not only for creating discs, but for viewing the files too.

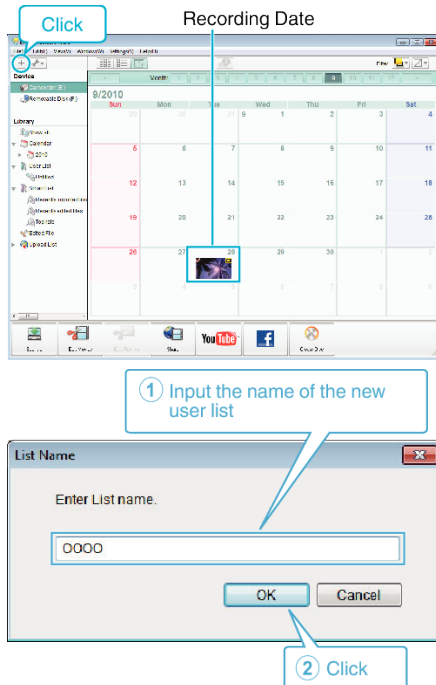
- 1 Double-click on the Everio MediaBrowser 3 icon.
 - The provided software starts up.



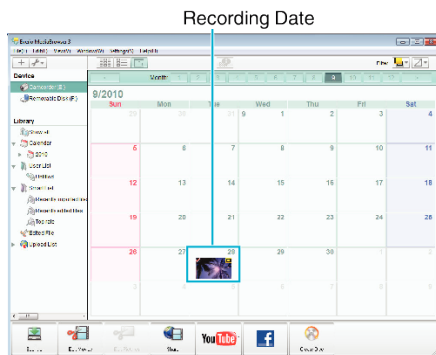
- 2 Display the month of the files to organize.
 - Click on the 'Month' button in the top right corner of the 'Recording Date' window.



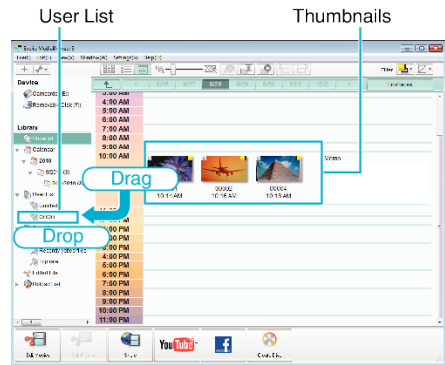
- 3 Create a user list.
 - Click on the 'User List' button in the top left corner of the 'Recording Date' window.



- A new user list is added to the user list library.
- 4 Click on the recording day.
 - The thumbnails of the files recorded on the day are displayed.



- 5 Register files to the created user list.



Identifying Video or Still Image :

- You can select files using the "SELECT" menu on the top right of the screen.
- Check the video/still image icon on the top right corner of the thumbnail.



Memo :

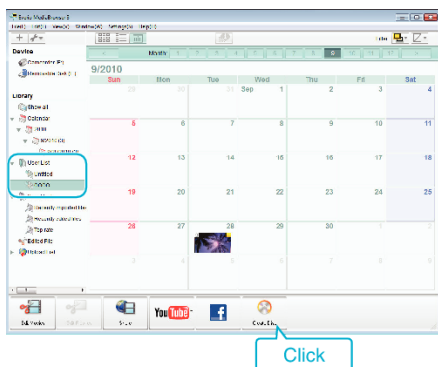
- If you encounter any problems with the provided software Everio MediaBrowser 3, please consult the "Pixela User Support Center".

Telephone	USA and Canada (English): +1-800-458-4029 (toll-free) Europe (UK, Germany, France, and Spain) (English/German/French/Spanish): +800-1532-4865 (toll-free) Other Countries in Europe (English/German/French/Spanish): +44-1489-564-764 Asia (Philippines) (English): +63-2-438-0090 China (Chinese): 10800-163-0014 (toll-free)
Homepage	http://www.pixela.co.jp/oem/jvc/mediabrowser/e/

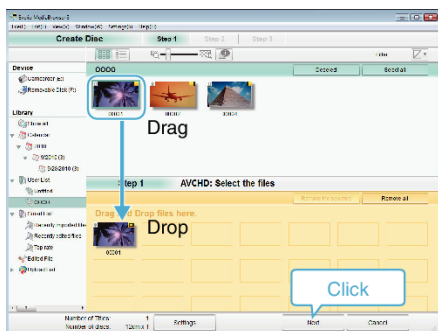
Recording Videos to Discs

Copy the files that are arranged using the user list to DVDs.

- 1 Insert a new disc into the PC's recordable DVD or Blu-ray drive.
- 2 Select the desired user list.

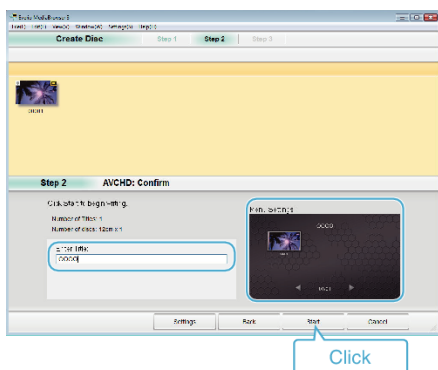


- 3 Select the files to copy to disc in order.



- Click "Settings" to select the disc type.
Image quality is set to standard when DVD-Video is selected.
- Click "Select all" to select all the displayed files.
- After selecting, click "Next".

- 4 Set the title of the top menu of the disc.



- Click "Settings" to select the menu background.
- After setting, click "Start".

- 5 After copying is complete, click "OK".

Memo :

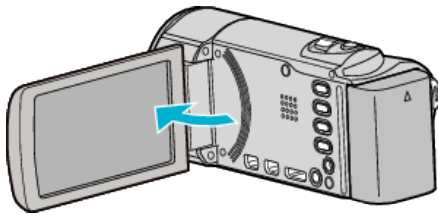
- The following types of discs can be used on the provided software Everio MediaBrowser 3.
DVD-R
DVD-R DL
DVD-RW
DVD+R
DVD+R DL
DVD+RW
- Everio MediaBrowser 3 supports 2 disc formats: DVD-Video and AVCHD.
- Use Everio MediaBrowser 3 Player to play back an AVCHD disc. Refer to the help file of the provided Everio MediaBrowser 3 software to operate.
- To view the help file of Everio MediaBrowser 3, select "Help" from the Everio MediaBrowser 3's menu bar or press F1 on the keyboard.
- If you encounter any problems with the provided software Everio MediaBrowser 3, please consult the "Pixela User Support Center".

Telephone	USA and Canada (English): +1-800-458-4029 (toll-free) Europe (UK, Germany, France, and Spain) (English/German/French/Spanish): +800-1532-4865 (toll-free) Other Countries in Europe (English/German/French/Spanish): +44-1489-564-764 Asia (Philippines) (English): +63-2-438-0090 China (Chinese): 10800-163-0014 (toll-free)
Homepage	http://www.pixela.co.jp/oem/jvc/mediabrowser/e/

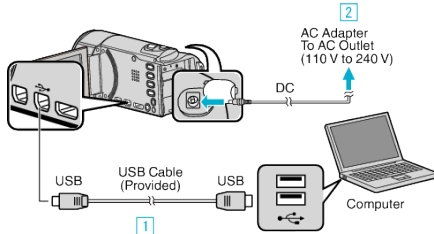
Backing Up Files Without Using Provided Software

Copy the files to a computer using the following method.

- 1 Open the LCD monitor.



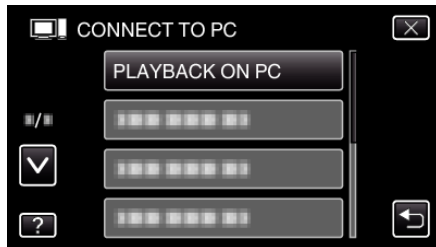
- 2 Connect the USB cable and the AC adapter.



- 1 Connect using the provided USB cable.
 - 2 Connect the AC adapter to this unit.
- This unit powers on automatically when the AC adapter is connected.
 - Be sure to use the supplied JVC AC adapter.
 - 3 The "SELECT DEVICE" menu appears.
- 3 Tap "CONNECT TO PC".



- 4 Tap "PLAYBACK ON PC".



- Tap X to exit the menu.
 - Tap ↶ to return to the previous screen.
 - Close the Everio MediaBrowser 3 program, if it starts.
 - The subsequent operations are to be performed on the computer.
- 5 Select "Computer" (Windows Vista) / "My Computer" (Windows XP) / "Computer" (Windows 7) from the "Start" menu, then click on the "JVCCAM_MEM" or "JVCCAM_SD" icon.
 - Open the folder with the desired files.
- "List of Files and Folders" (p. 87)
- "JVCCAM_MEM" is applicable to GZ-HM670/GZ-HM650 only.
- 6 Copy the files to any folder in the computer (desktop, etc).

Caution :

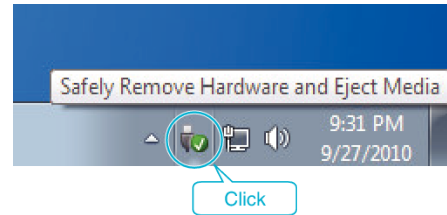
- When the folders or files are deleted/moved/renamed in the computer, they cannot be played back on this unit anymore.

Memo :

- To edit/view the files, use a software that supports AVCHD (video)/JPEG (still image) files.
- The above operations on computer may vary with the system used.

Disconnecting this Unit from Computer

- 1 Click "Safely Remove Hardware and Eject Media".

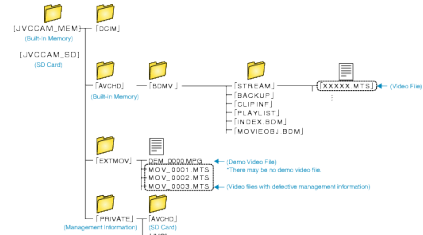


- 2 Click "Safely Remove USB Mass Storage Device".
- 3 (For Windows Vista) Click "OK".
- 4 Disconnect the USB cable and close the LCD monitor.

List of Files and Folders

Folders and files are created in the built-in memory and SD card as shown below.

They are created only when necessary.



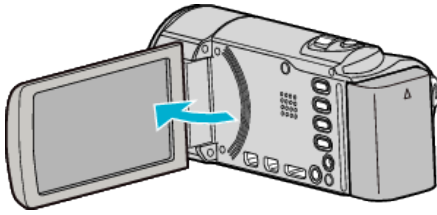
Caution :

- When the folders or files are deleted/moved/renamed in the computer, they cannot be played back on this unit anymore.

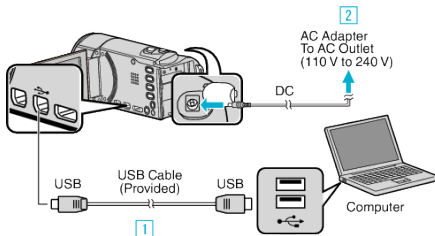
Copying to Mac Computer

Copy the files to a Mac computer using the following method.

- 1 Open the LCD monitor.



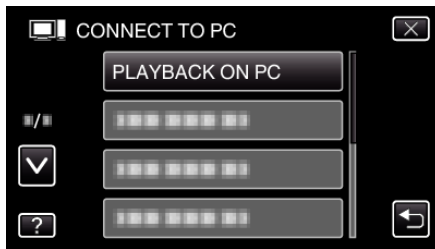
- 2 Connect the USB cable and the AC adapter.



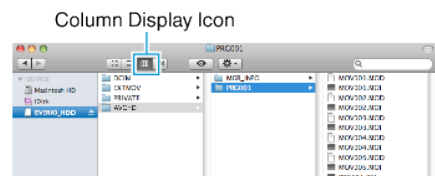
- 1 Connect using the provided USB cable.
- 2 Connect the AC adapter to this unit.
 - This unit powers on automatically when the AC adapter is connected.
 - Be sure to use the supplied JVC AC adapter.
 - 3 The "SELECT DEVICE" menu appears.
- 3 Tap "CONNECT TO PC".



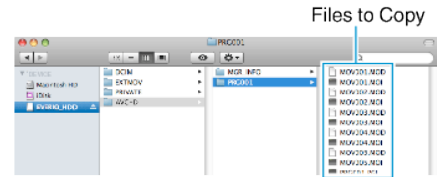
- 4 Tap "PLAYBACK ON PC".



- Tap X to exit the menu.
 - Tap ↶ to return to the previous screen.
 - Close the Everio MediaBrowser 3 program, if it starts.
 - The subsequent operations are to be performed on the computer.
- 5 Click on the "JVCCAM_MEM" or "JVCCAM_SD" icon on the desktop.
 - The folder opens.
 - "JVCCAM_MEM" is applicable to GZ-HM670/GZHM650 only.
 - 6 Click on the column display icon.



- Open the folder with the desired files.
- "List of Files and Folders" (p. 87)
- 7 Copy the files to any folder in the computer (desktop, etc).



Caution :

- When the folders or files are deleted/moved/renamed in the computer, they cannot be played back on this unit anymore.
- MTS files that are copied to a Mac computer cannot be imported to iMovie. To use MTS files with iMovie, import the files using iMovie.

Memo :

- To edit/view the files, use a software that supports AVCHD (video)/JPEG (still image) files.
- When removing this unit from the computer, drag and drop the "JVCCAM_MEM" or "JVCCAM_SD" icon on the desktop to the trash bin.

iMovie and iPhoto

- You can import files from this unit to a computer using Apple's iMovie '08, '09, '11 (video) or iPhoto (still image). To verify the system requirements, select "About This Mac" from the Apple menu. You can determine the operating system version, processor and amount of memory.
- For the latest information on iMovie or iPhoto, refer to the Apple website.
 - For details on how to use iMovie or iPhoto, refer to the help file of the respective software.
 - There is no guarantee that the operations will work with all computer environments.

Operating the Menu

There are three types of menus in this unit.

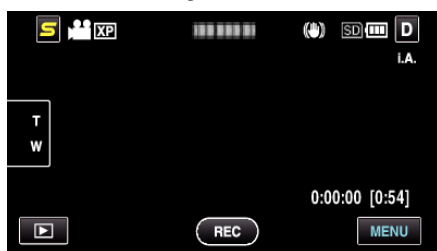
- Main menu - Menu that contains all the items specific to the video recording, still image recording, video playback, and still image playback modes respectively.
- (COMMON) menu in the main menu - Menu that contains all common items in the video recording, still image recording, video playback, and still image playback modes.
- (face short cut) menu - Menu that picks up the face-related functions in the main menu in either the video or still image recording mode.

Operating the Common Menu

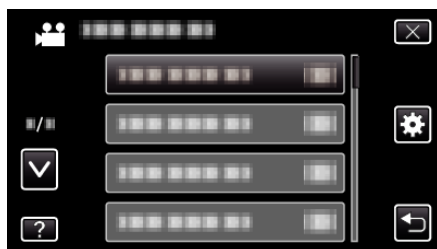
You can configure common setting items regardless of the mode using the common menu.

1 Tap "MENU".

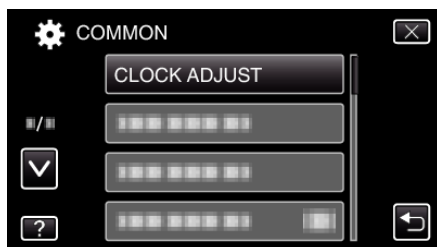
- The menu differs according to the mode in use.



2 Tap .



3 Tap the desired setting.



Memo :

- To exit the screen
Tap "X" (quit).
- To return to the previous screen
Tap "←" (return).
- To display the help file
Tap "?" (help) and tap the item.

Operating the Main Menu

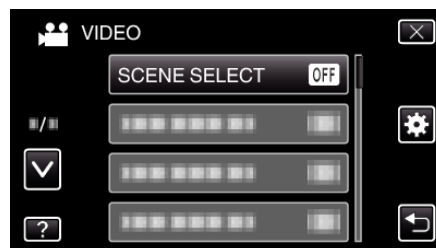
You can configure various settings using the menu.

1 Tap "MENU".

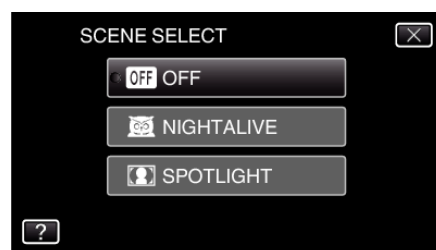
- The menu differs according to the mode in use.



2 Tap the desired menu.



3 Tap the desired setting.



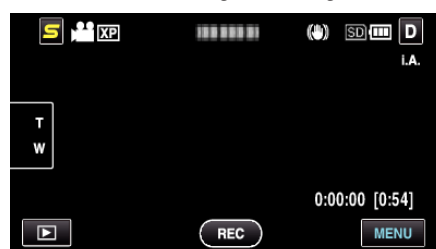
Memo :

- To exit the screen
Tap "X" (quit).
- To return to the previous screen
Tap "←" (return).
- To display the help file
Tap "?" (help) and tap the item.
Help file may not be available for some items.

Operating the Face Short Cut Menu

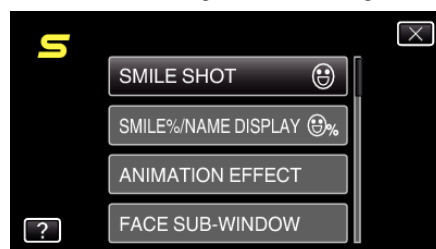
You can configure various settings of face-related functions in either the video or still image recording mode using the face short cut menu.

1 Tap in the video or still image recording mode.

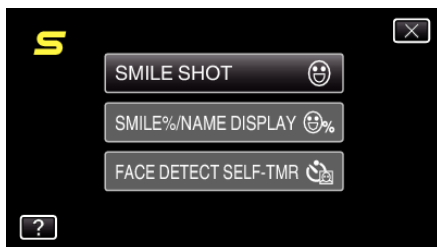


2 Tap the desired menu and setting.

- Face Short Cut Menu During Video Recording Mode



- Face Short Cut Menu During Still Image Recording Mode



Memo : _____

- To exit the screen

Tap “X” (quit).

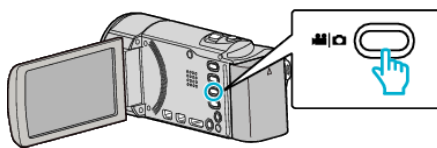
- To display the help file


Tap “?” (help) and tap the item.

Main Menu for Video Recording

You can adjust various settings, such as brightness and white balance, to suit the subject or purpose. You can also change settings such as picture quality and gain.

- 1 Select video mode.

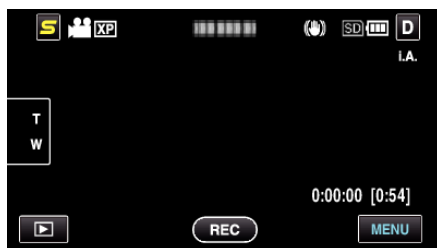


- 2 Tap  to select the recording mode.



- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



Setting	Details
SCENE SELECT	Settings to suit the shooting condition can be selected. "Scene Selection" (p. 32) *Displayed only in the manual recording mode.
FOCUS	Focus can be adjusted manually. "Adjusting Focus Manually" (p. 33) *Displayed only in the manual recording mode.
BRIGHTNESS ADJUST	Adjusts the overall brightness of the screen. "Adjusting Brightness" (p. 34) *Displayed only in the manual recording mode.
WHITE BALANCE	Adjusts the color according to the light source. "Setting White Balance" (p. 34) *Displayed only in the manual recording mode.
BACKLIGHT COMP.	Corrects the image when the subject appears dark due to backlight. "Setting Backlight Compensation" (p. 35) *Displayed only in the manual recording mode.
TELE MACRO	Enables close-up shots when using the telephoto (T) end of the zoom. "Taking Close-up Shots" (p. 35) *Displayed only in the manual recording mode.
TOUCH PRIORITY AE/AF	Automatically adjusts focus and brightness based on the subjects' faces or selected area. "Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)" (p. 41)
LIGHT	Turns on/off the light. "LIGHT (GZ-HM445/GZ-HM650/GZ-HM670)" (p. 93)
DIS	Camera shake during recording can be effectively reduced. "Reducing Camera Shake" (p. 44)
GAIN UP	Makes the subject appear bright automatically when recording in dark places. "GAIN UP" (p. 93)
WIND CUT	Reduces the noise caused by wind. "WIND CUT" (p. 94)

Menu Settings

ANIMATION EFFECT	Records videos or still images with special effects. “Creating Animation Effects (ANIMATION EFFECT)” (p. 36)
TIME-LAPSE RECORDING	Enables the changes of a scene that occur slowly over a long period to be shown within a short time by taking frames of it at a certain interval. “Recording at Intervals (TIME-LAPSE RECORDING)” (p. 44)
AUTO REC	This function enables the unit to record automatically by sensing the changes in subject’s movement (brightness) within the red frame displayed on the LCD monitor. “Recording Automatically by Sensing Movements (AUTO REC)” (p. 46)
FACE SUB-WINDOW	Magnifies and displays a registered face in a sub-window. “Recording while Displaying a Magnified View of a Selected Face (FACE SUB-WINDOW)” (p. 43)
SMILE SHOT	Automatically captures a still image upon detection of a smile. “Capturing Smiles Automatically (SMILE SHOT)” (p. 42)
SMILE%/NAME DISPLAY	Sets the items to display when faces are detected. “Setting SMILE%/NAME DISPLAY” (p. 38)
FACE REGISTRATION	Registers the faces of people who are often shot with this unit. “Registering Human Face Personal Authentication Information” (p. 37)
VIDEO QUALITY	Sets the video quality. “VIDEO QUALITY” (p. 95)
ZOOM	Sets the maximum zoom ratio. “ZOOM” (p. 95)
SEAMLESS RECORDING	Continues recording on the SD card without stopping when the remaining space on the built-in memory or slot A runs out. “SEAMLESS RECORDING” (p. 96)
x.v.Color	Captures the true colors. (Use an x.v.Color compatible TV for playback.) “x.v.Color” (p. 96)
USER BUTTON SETTING	Assigns a frequently used function to the USER button. “Setting the USER Button” (p. 48)

SCENE SELECT

Settings to suit the shooting condition can be selected.

Operating Details

“Scene Selection” (p. 32)

FOCUS

Focus can be adjusted manually.

Operating Details

“Adjusting Focus Manually” (p. 33)

BRIGHTNESS ADJUST

Adjusts the overall brightness of the screen.

Operating Details

“Adjusting Brightness” (p. 34)

WHITE BALANCE

Adjusts the color according to the light source.

Operating Details

“Setting White Balance” (p. 34)

BACKLIGHT COMP.

Corrects the image when the subject appears dark due to backlight.

Operating Details

“Setting Backlight Compensation” (p. 35)

TELE MACRO

Enables close-up shots when using the telephoto (T) end of the zoom.

Operating Details

“Taking Close-up Shots” (p. 35)

TOUCH PRIORITY AE/AF

Automatically adjusts focus and brightness based on the subjects’ faces or selected area.

Operating Details

“Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (p. 41)

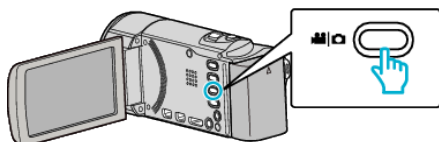
LIGHT (GZ-HM445/GZ-HM650/GZ-HM670)

Turns on/off the light.

Setting	Details
OFF	Does not light up.
AUTO	Lights up automatically when the surrounding is dark.
ON	Lights up at all times.

Displaying the Item

- 1 Select video mode.

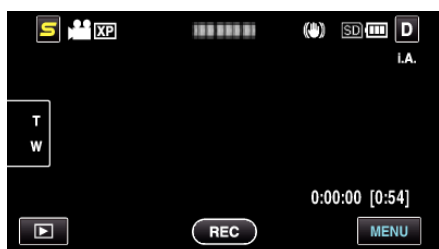


- 2 Tap  to select the recording mode.

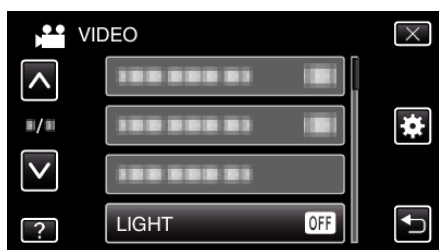


- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



- 4 Tap "LIGHT".

**DIS**

Camera shake during recording can be effectively reduced.
Operating Details

"Reducing Camera Shake" (p. 44)

GAIN UP

Makes the subject appear bright automatically when recording in dark places.

Setting	Details
OFF	Deactivates the function.
ON	Electrically brightens the scene when it is dark.
AUTO SLOW-SHUTTER	Automatically brightens the scene when it is dark.

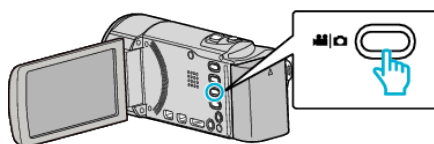
Memo :


- Although "AUTO SLOW-SHUTTER" brightens the scene more than "AGC", movements of the subject may become unnatural.
- Setting can be adjusted separately for still images.

"GAIN UP (Still Image)" (p. 99)

Displaying the Item

- 1 Select video mode.

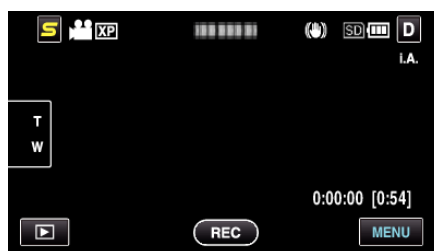


- 2 Tap  to select the recording mode.

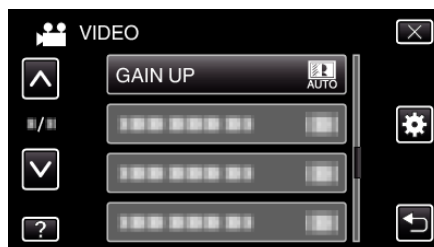


- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



- 4 Tap "GAIN UP".



Menu Settings

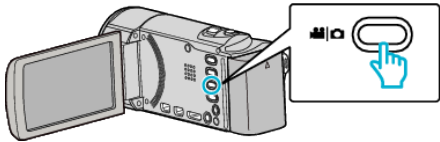
WIND CUT

Reduces the noise caused by wind.

Setting	Details
OFF	Deactivates the function.
ON	Activates the function.

Displaying the Item

1 Select video mode.



2 Tap to select the recording mode.

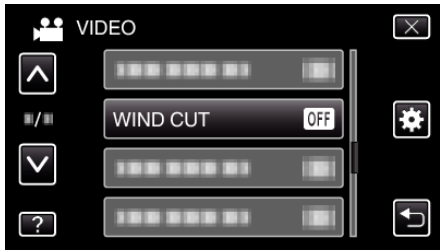


- The mode changes between recording and playback with every tap.

3 Tap "MENU".



4 Tap "WIND CUT".



ANIMATION EFFECT

Records videos or still images with special effects.

Operating Details

"Creating Animation Effects (ANIMATION EFFECT)" (p. 36)

TIME-LAPSE RECORDING

Enables the changes of a scene that occur slowly over a long period to be shown within a short time by taking frames of it at a certain interval.

This is useful for making observations such as the opening of a flower bud.

Operating Details

"Recording at Intervals (TIME-LAPSE RECORDING)" (p. 44)

AUTO REC

Starts/stops recording automatically by sensing the changes in subject's movement (brightness) within the red frame displayed on the LCD monitor.

Operating Details

"Recording Automatically by Sensing Movements (AUTO REC)" (p. 46)

FACE SUB-WINDOW

Magnifies and displays a registered face in a sub-window.

Operating Details

"Recording while Displaying a Magnified View of a Selected Face (FACE SUB-WINDOW)" (p. 43)

SMILE SHOT

Automatically captures a still image upon detection of a smile.

Operating Details

"Capturing Smiles Automatically (SMILE SHOT)" (p. 42)

SMILE%/NAME DISPLAY

Sets the items to display when faces are detected.

Operating Details

"Setting SMILE%/NAME DISPLAY" (p. 38)

FACE REGISTRATION

Registers the faces of people who are often shot with this unit.

Operating Details

"Registering Human Face Personal Authentication Information" (p. 37)

VIDEO QUALITY

Sets the video quality.

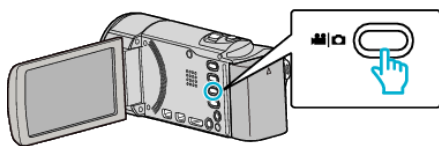
Setting	Details
UXP	Enables recording in the best picture quality. <ul style="list-style-type: none"> Applies to Blu-ray discs only. Videos taken in high-definition quality cannot be saved to DVDs.
XP	Enables recording in high picture quality.
SP	Enables recording in standard quality.
EP	Enables long recordings.
SSW	Enables recording in standard definition (16:9).
SEW	Enables recording in standard definition (16:9) with a lower bit rate than "SSW".


Memo :

- Set to "UXP" or "XP" mode when recording fast-moving scenes or scenes with extreme changes of brightness to avoid noise.
- Use an external Blu-ray drive to save videos recorded in "UXP" mode.
- You can change to the desired "VIDEO QUALITY" by tapping on it from the remaining recording time display.
- "SSW" and "SEW" are not available when "FACE SUB-WINDOW", "LIGHT", or "x.v.Color" are set.

Displaying the Item

- 1 Select video mode.

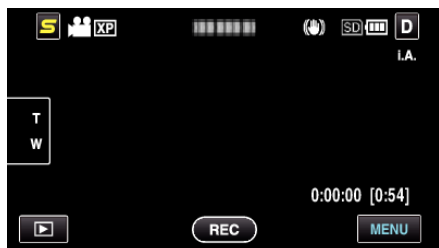


- 2 Tap  to select the recording mode.

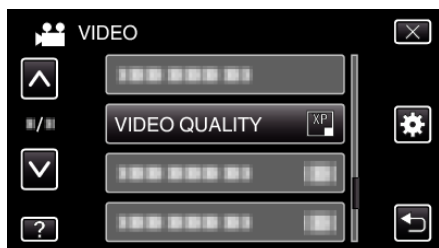


- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



- 4 Tap "VIDEO QUALITY".



ZOOM

Sets the maximum zoom ratio.

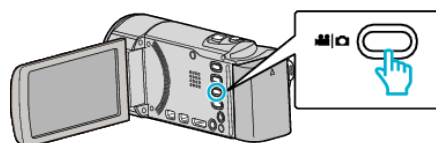
Setting	Details
40x/OPTICAL	Enables zooming up to 40x.
70x/DYNAMIC	Enables zooming up to 70x.
80x/DIGITAL	Enables zooming up to 80x.
200x/DIGITAL	Enables zooming up to 200x.


Memo :

- When digital zoom is used, the image becomes grainy as it is digitally enlarged.

Displaying the Item

- 1 Select video mode.

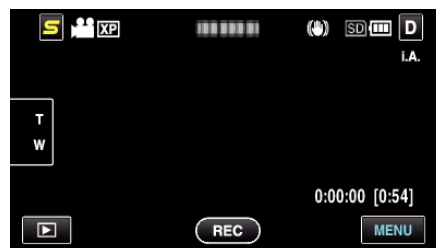


- 2 Tap  to select the recording mode.

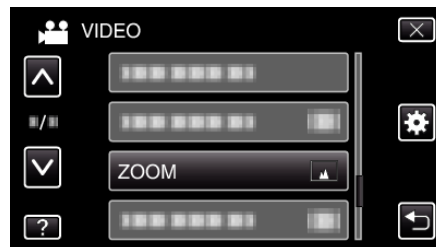


- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



- 4 Tap "ZOOM".



SEAMLESS RECORDING

Continues recording on the SD card without stopping when the remaining space on the built-in memory or slot A runs out.

Setting	Details
OFF	Does not switch recording media automatically.
ON	Switches recording media automatically.

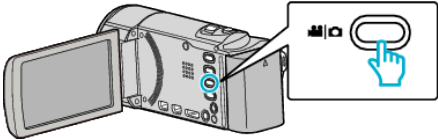
Memo :

- Seamless recording cannot be performed if there is not enough free space in the SD card.
- The seamless recording setting switches to “OFF” automatically after seamless recording is complete.
- To start seamless recording again after the previous session is complete, it is necessary to combine seamless videos, or delete the combination information of the seamless videos.

“Combining Videos Recorded by Seamless Recording” (p. 61)

Displaying the Item

- 1 Select video mode.



- 2 Tap to select the recording mode.



- The mode changes between recording and playback with every tap.

- 3 Tap “MENU”.



- 4 Tap “SEAMLESS RECORDING”.



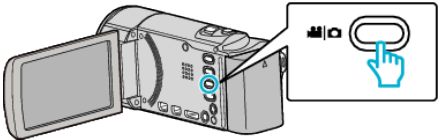
x.v.Color

Captures the true colors.
(Use an x.v.Color compatible TV for playback.)

Setting	Details
OFF	Captures colors with the same standard as TV broadcasting.
ON	Captures the true colors. (for TVs that supports x.v.Color)

Displaying the Item

- 1 Select video mode.



- 2 Tap to select the recording mode.

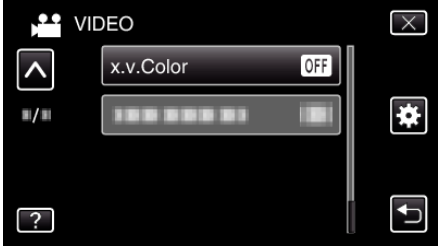


- The mode changes between recording and playback with every tap.

- 3 Tap “MENU”.



- 4 Tap “x.v.Color”.



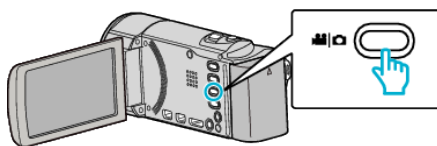
USER BUTTON SETTING


Assigns a frequently used function to the USER button.
Operating Details
“Setting the USER Button” (p. 48)

Main Menu for Still Image Recording

You can adjust various settings, such as brightness and white balance, to suit the subject or purpose. You can also change settings such as picture quality and gain.

- 1 Select still image mode.

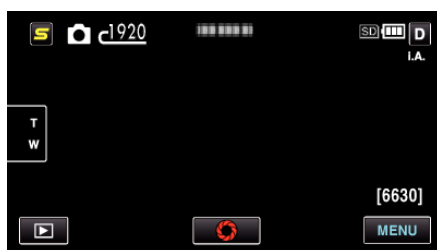


- 2 Tap  to select the recording mode.



- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



Setting	Details
SCENE SELECT	Settings to suit the shooting condition can be selected. "Scene Selection" (p. 32) *Displayed only in the manual recording mode.
FOCUS	Focus can be adjusted manually. "Adjusting Focus Manually" (p. 33) *Displayed only in the manual recording mode.
BRIGHTNESS ADJUST	Adjusts the overall brightness of the screen. "Adjusting Brightness" (p. 34) *Displayed only in the manual recording mode.
WHITE BALANCE	Adjusts the color according to the light source. "Setting White Balance" (p. 34) *Displayed only in the manual recording mode.
BACKLIGHT COMP.	Corrects the image when the subject appears dark due to backlight. "Setting Backlight Compensation" (p. 35) *Displayed only in the manual recording mode.
TELE MACRO	Enables close-up shots when using the telephoto (T) end of the zoom. "Taking Close-up Shots" (p. 35) *Displayed only in the manual recording mode.
TOUCH PRIORITY AE/AF	Automatically adjusts focus and brightness based on the subjects' faces or selected area. "Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)" (p. 41)
LIGHT	Turns on/off the light. "LIGHT (GZ-HM445/GZ-HM650/GZ-HM670)" (p. 99)
SELF-TIMER	Use this when taking a group photo. "Taking Group Shots (Self-timer)" (p. 47)
GAIN UP	Makes the subject appear bright automatically when recording in dark places. "GAIN UP" (p. 99)
AUTO REC	Enables the unit to record still images automatically by sensing the changes in brightness within the red frame displayed on the LCD monitor.

Menu Settings

	“Recording Automatically by Sensing Movements (AUTO REC)” (p. 46)
SHUTTER MODE	Continuous shooting settings can be adjusted. “SHUTTER MODE” (p. 99)
SMILE SHOT	Automatically captures a still image upon detection of a smile. “Capturing Smiles Automatically (SMILE SHOT)” (p. 42)
SMILE%/NAME DISPLAY	Sets the items to display when faces are detected. “Setting SMILE%/NAME DISPLAY” (p. 38)
FACE REGISTRATION	Registers the faces of people who are often shot with this unit. “Registering Human Face Personal Authentication Information” (p. 37)
IMAGE SIZE	Sets the image size (number of pixels) for still images. “IMAGE SIZE” (p. 100)
USER BUTTON SETTING	Assigns a frequently used function to the USER button. “Setting the USER Button” (p. 48)

SCENE SELECT

Settings to suit the shooting condition can be selected.

Operating Details

“Scene Selection” (p. 32)

FOCUS

Focus can be adjusted manually.

Operating Details

“Adjusting Focus Manually” (p. 33)

BRIGHTNESS ADJUST

Adjusts the overall brightness of the screen.

Operating Details

“Adjusting Brightness” (p. 34)

WHITE BALANCE

Adjusts the color according to the light source.

Operating Details

“Setting White Balance” (p. 34)

BACKLIGHT COMP.

Corrects the image when the subject appears dark due to backlight.

Operating Details

“Setting Backlight Compensation” (p. 35)

TELE MACRO

Enables close-up shots when using the telephoto (T) end of the zoom.

Operating Details

“Taking Close-up Shots” (p. 35)

TOUCH PRIORITY AE/AF

Automatically adjusts focus and brightness based on the subjects' faces or selected area.

Operating Details

“Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (p. 41)

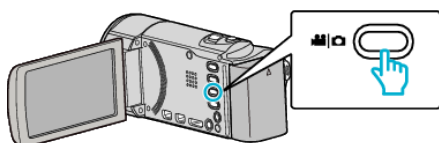
LIGHT (GZ-HM445/GZ-HM650/GZ-HM670)


Turns on/off the light.

Setting	Details
OFF	Does not light up.
AUTO	Lights up automatically when the surrounding is dark.
ON	Lights up at all times.

Displaying the Item

- 1 Select still image mode.

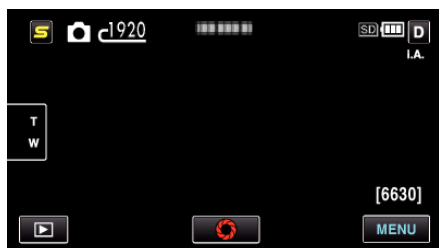


- 2 Tap  to select the recording mode.

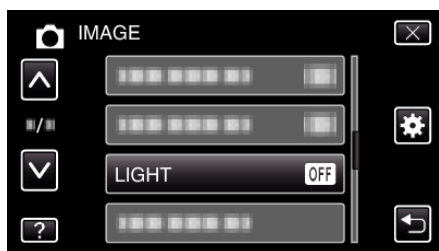


- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



- 4 Tap "LIGHT".

**SELF-TIMER**

Use this when taking a group photo.

Operating Details

"Taking Group Shots (Self-timer)" (p. 47)

GAIN UP

Makes the subject appear bright automatically when recording in dark places.

Setting	Details
OFF	Deactivates the function.
ON	Electrically brightens the scene when it is dark.

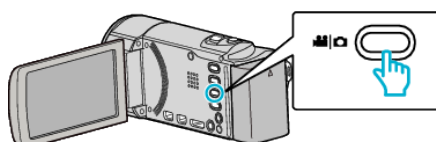
Memo :

- Setting can be adjusted separately for videos.

"GAIN UP (Video)" (p. 93)

Displaying the Item

- 1 Select still image mode.

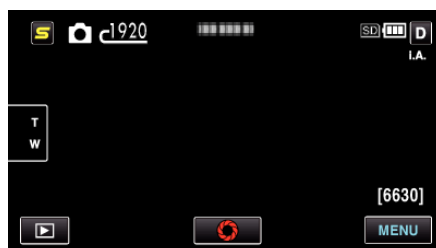


- 2 Tap  to select the recording mode.

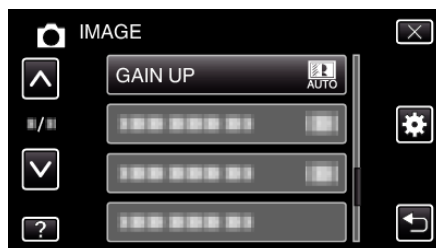


- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



- 4 Tap "GAIN UP".

**AUTO REC**

Starts/stops recording automatically by sensing the changes in subject's movement (brightness) within the red frame displayed on the LCD monitor.

Operating Details

"Recording Automatically by Sensing Movements (AUTO REC)" (p. 46)

SHUTTER MODE

Continuous shooting settings can be adjusted.

Setting	Details
RECORD ONE SHOT	Records one still image.

Menu Settings

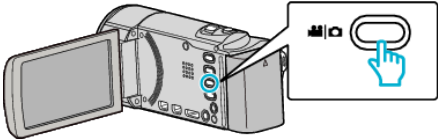
CONTINUOUS SHOOTING	Records still images continuously while the SNAPSHOT button is pressed.
---------------------	---


Memo :

- Some SD cards may not support continuous shooting.
- The continuous shooting speed will drop if this function is used repeatedly.
- “CONTINUOUS SHOOTING” may not work when “IMAGE SIZE” is set to “2400X1344(3.2M)”. (GZ-HM650/GZ-HM670)

Displaying the Item

1 Select still image mode.



2 Tap  to select the recording mode.

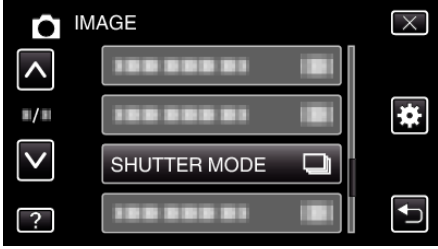


- The mode changes between recording and playback with every tap.

3 Tap “MENU”.



4 Tap “SHUTTER MODE”.



SMILE SHOT

Automatically captures a still image upon detection of a smile.
Operating Details
“Capturing Smiles Automatically (SMILE SHOT)” (p. 42)

SMILE%/NAME DISPLAY

Sets the items to display when faces are detected.
Operating Details
“Setting SMILE%/NAME DISPLAY” (p. 38)

FACE REGISTRATION

Registers the faces of people who are often shot with this unit.
Operating Details
“Registering Human Face Personal Authentication Information” (p. 37)

IMAGE SIZE

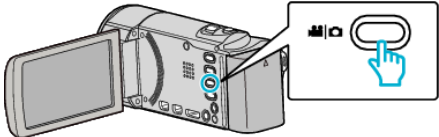
Sets the image size (number of pixels) for still images.


Setting	Details
2400X1344(3.2M) * 1920X1080(2M)	Takes still images with aspect ratio 16:9. <ul style="list-style-type: none">• The sides of still images recorded in 16:9 aspect ratio may be cut off when printed.
1440X1080(1.5M) 640X480(0.3M)	Takes still images with aspect ratio 4:3.

* GZ-HM650/GZ-HM670

Displaying the Item

1 Select still image mode.



2 Tap  to select the recording mode.

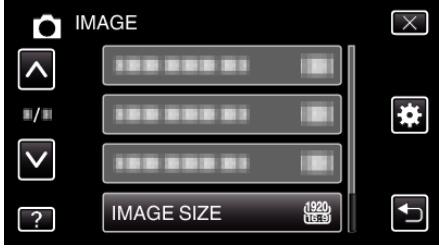


- The mode changes between recording and playback with every tap.

3 Tap “MENU”.



4 Tap “IMAGE SIZE”.



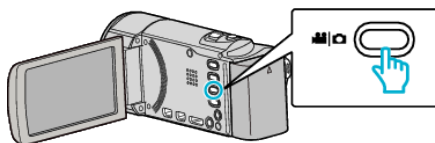
USER BUTTON SETTING


Assigns a frequently used function to the USER button.
Operating Details
“Setting the USER Button” (p. 48)

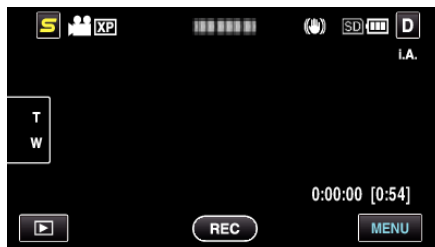
Main Menu for Video Playback

You can delete or look for specific videos.

- 1 Select video mode.



- 2 Tap  to select the playback mode.



- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



Setting	Details
SEARCH DATE	You can search and play videos or still images according to recording dates. "Date Search" (p. 55)
PROTECT/CANCEL	Protects files from being deleted accidentally. "Protecting/Releasing Protection of the Currently Displayed File" (p. 59) "Protecting/Releasing Protection of Selected Files" (p. 59)
COPY	Copies files to another media. "Copying Files to an SD Card" (p. 80)
MOVE	Moves files to another media. "Moving Files to an SD Card" (p. 81)
TRIMMING	Select the required part of a video and save it as a new video file. "Capturing a Required Part in the Video (TRIMMING)" (p. 62)
UPLOAD SETTINGS	Capture and copy a part of a recorded video (maximum 15 minutes) for uploading to YouTube. "UPLOAD SETTINGS" (p. 102)
PLAYBACK OTHER FILE	Plays videos with defective management information. "Playing a Video with Defective Management Information" (p. 53)
SEAMLESS REC CTRL	Videos that are recorded on two separate media and with "SEAMLESS RECORDING" in the video recording menu enabled can be combined into a single video. "Combining Videos Recorded by Seamless Recording" (p. 61)
K2 TECHNOLOGY	Reproduces small or high-pitched sounds that cannot be recorded during recording, and plays back with a sound quality close to the original. "K2 TECHNOLOGY" (p. 102)

SEARCH DATE

Narrows down the video index screen according to recording dates.

Operating Details

"Date Search" (p. 55)

PROTECT/CANCEL

Protects files from being deleted accidentally.

Operating Details

"Protecting/Releasing Protection of the Currently Displayed File" (p. 59)

"Protecting/Releasing Protection of Selected Files" (p. 59)

COPY

Copies files to another media.

Operating Details

"Copying Files to an SD Card" (p. 80)

MOVE

Moves files to another media.
Operating Details
“Moving Files to an SD Card” (p. 81)

TRIMMING

Select the required part of a video and save it as a new video file.
Operating Details
“Capturing a Required Part in the Video (TRIMMING)” (p. 62)

UPLOAD SETTINGS

Capture and copy a part of a recorded video (maximum 15 minutes) for uploading to YouTube.
Operating Details
“Capturing Videos for Uploading to YouTube” (p. 63)

PLAYBACK OTHER FILE

Plays videos with defective management information.
Operating Details
“Playing a Video with Defective Management Information” (p. 53)

SEAMLESS REC CTRL

Videos that are recorded on two separate media and with “SEAMLESS RECORDING” in the video recording menu enabled can be combined into a single video.
Operating Details
“Combining Videos Recorded by Seamless Recording” (p. 61)

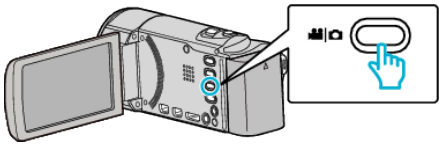
K2 TECHNOLOGY

Reproduces small or high-pitched sounds that cannot be recorded during recording, and plays back with a sound quality close to the original.

Setting	Details
OFF	Deactivates K2 TECHNOLOGY.
ON	Activates K2 TECHNOLOGY.

Displaying the Item

1 Select video mode.



2 Tap to select the playback mode.



- The mode changes between recording and playback with every tap.

3 Tap “MENU”.



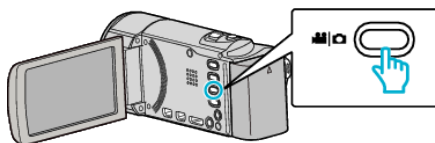
4 Tap “K2 TECHNOLOGY”.




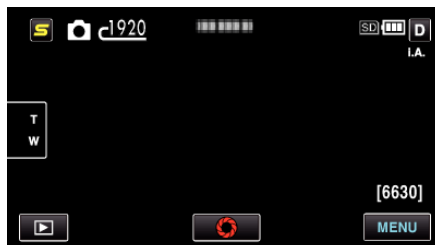
Main Menu for Still Image Playback

You can delete or look for specific still images.

- 1 Select still image mode.



- 2 Tap  to select the playback mode.



- The mode changes between recording and playback with every tap.

- 3 Tap "MENU".



Setting	Details
SEARCH DATE	You can search and play videos or still images according to recording dates. "Date Search" (p. 55)
SLIDE SHOW EFFECTS	Sets the transition effects in slideshow playback. "SLIDE SHOW EFFECTS" (p. 103)
PROTECT/CANCEL	Protects files from being deleted accidentally. "Protecting/Releasing Protection of the Currently Displayed File" (p. 59) "Protecting/Releasing Protection of Selected Files" (p. 59)
COPY	Copies files to another media. "Copying Files to an SD Card" (p. 80)
MOVE	Moves files to another media. "Moving Files to an SD Card" (p. 81)

SEARCH DATE

Narrows down the still image index screen according to recording dates.

Operating Details

"Date Search" (p. 55)

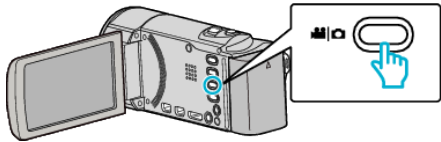
SLIDE SHOW EFFECTS


Sets the transition effects in slideshow playback.

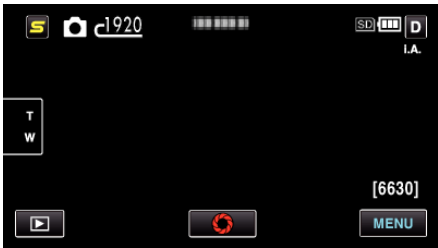
Setting	Details
SLIDE	Switches the screen by sliding in from right to left.
BLINDS	Switches the screen by dividing into vertical strips.
CHECKERBOARD	Switches the screen by changing through a checkered pattern.
RANDOM	Switches the screen with a random effect from "SLIDE", "BLINDS", and "CHECKERBOARD".

Displaying the Item

- 1 Select still image mode.



2 Tap  to select the playback mode.

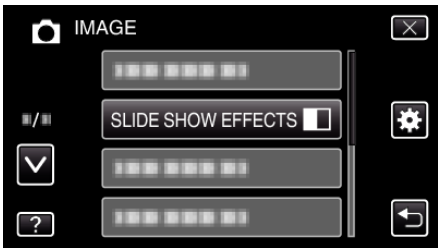


- The mode changes between recording and playback with every tap.

3 Tap “MENU”.



4 Tap “SLIDE SHOW EFFECTS”.



PROTECT/CANCEL

Protects files from being deleted accidentally.
Operating Details
“Protecting/Releasing Protection of the Currently Displayed File” (📖 p. 59)
“Protecting/Releasing Protection of Selected Files” (📖 p. 59)

COPY

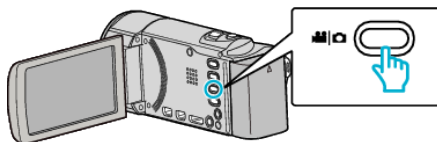
Copies files to another media.
Operating Details
“Copying Files to an SD Card” (📖 p. 80)

MOVE

Moves files to another media.
Operating Details
“Moving Files to an SD Card” (📖 p. 81)

Common Menu

- 1 Select video or still image mode.



- 2 Tap to select the playback mode.



- 3 Tap "MENU".



- 4 Tap .



Setting	Details
CLOCK ADJUST	Resets the current time or sets to the local time when using this unit overseas. "Clock Setting" (p. 21) "Setting the Clock to Local Time when Traveling" (p. 24) "Setting Daylight Saving Time" (p. 25)
DATE DISPLAY STYLE	Sets the order of year, month, day and the time display format (24H/12H). "DATE DISPLAY STYLE" (p. 106)
LANGUAGE	The language on the display can be changed. "Changing the Display Language" (p. 23)
MONITOR BRIGHTNESS	Sets the brightness of the LCD monitor. "MONITOR BRIGHTNESS" (p. 107)
REC MEDIA FOR VIDEO	Sets the recording/playback media of videos. "REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)" (p. 108)
REC MEDIA FOR IMAGE	Sets the recording/playback media of still images. "REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)" (p. 108)
REC VIDEO TO SLOTS	Sets the recording/playback SD card slot of videos. "REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)" (p. 109)
REC STILL TO SLOTS	Sets the recording/playback SD card slot of still images. "REC STILL TO SLOTS (GZ-HM445/GZ-HM448)" (p. 109)
OPERATION SOUND	Turns on or off the operation sound. "OPERATION SOUND" (p. 110)

AUTO POWER OFF	Prevents the situation of forgetting to turn off the power when this is set. “AUTO POWER OFF” (p. 110)
QUICK RESTART	Reduces the power consumption within 5 minutes after the LCD monitor is closed to 1/3 of that used during recording. “QUICK RESTART” (p. 111)
DEMO MODE	Introduces the special features of this unit in digest form. “DEMO MODE” (p. 111)
TOUCH SCREEN ADJUST	Adjusts the response position of the buttons on the touch screen. “TOUCH SCREEN ADJUST” (p. 111)
DISPLAY ON TV	Displays icons and date/time on a TV screen. “DISPLAY ON TV” (p. 112)
VIDEO OUTPUT	Sets the aspect ratio (16:9 or 4:3) according to the connecting TV. “VIDEO OUTPUT” (p. 113)
COMPONENT OUTPUT	Sets the definition of the video output from the COMPONENT connector. “COMPONENT OUTPUT (GZ-HM445/GZ-HM650/GZ-HM670)” (p. 113)
HDMI OUTPUT	Sets the definition of the video output from the HDMI mini connector. “HDMI OUTPUT” (p. 114)
HDMI CONTROL	Sets the linked operations ON/OFF when the TV and this unit are connected using the HDMI mini connector. “HDMI CONTROL” (p. 114)
AUTO FINALIZE	Finalizes the discs created automatically so that they can be played back on compatible devices. “AUTO FINALIZE” (p. 115)
FACTORY PRESET	Returns all the settings to their default values. “FACTORY PRESET” (p. 115)
UPDATE	Updates the functions of this unit to the latest version. “UPDATE” (p. 116)
PC SOFTWARE UPDATE	Updates the built-in PC software of this unit to the latest version. “PC SOFTWARE UPDATE” (p. 116)
FORMAT BUILT-IN MEM.	Deletes all files on the built-in memory. “FORMAT BUILT-IN MEM. (GZ-HM650/GZ-HM670)” (p. 116)
FORMAT SD CARD	Deletes all files on the SD card. “FORMAT SD CARD” (p. 117)
ERASE ALL DATA	Execute this process when disposing of this unit or passing it to another person. “ERASE ALL DATA (GZ-HM650/GZ-HM670)” (p. 117)

CLOCK ADJUST

Resets the current time or sets to the local time when using this unit overseas.
Operating Details
“Clock Setting” (p. 21)
“Setting the Clock to Local Time when Traveling” (p. 24)
“Setting Daylight Saving Time” (p. 25)



DATE DISPLAY STYLE

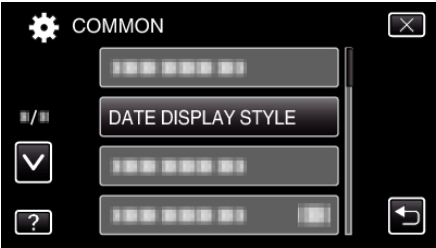
Sets the order of year, month, day and the time display format (24H/12H).

1 Tap “MENU”.

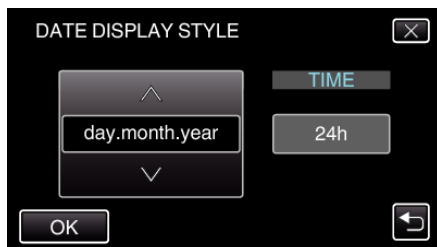


2 Tap “⚙️”.

3 Tap “DATE DISPLAY STYLE”.



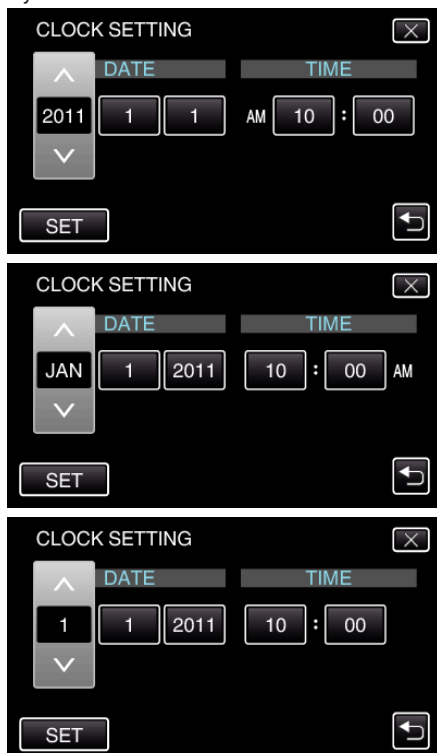
4 Tap to set the style of date and time display.



- For date display, set to any format from “month.day.year”, “year.month.day”, and “day.month.year”.
- For time display, set to any format from “12h” and “24h”.
- Tap the operation buttons \wedge or \vee to move the cursor.
- After setting, tap “OK”.

Clock Set Style

The clock set style of this unit varies with the models.



- The order of “Year, Month, Day, Time” changes according to the date display style.

LANGUAGE

The language on the display can be changed.

Operating Details

“Changing the Display Language” (p. 23)

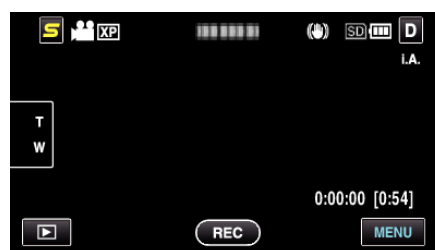
MONITOR BRIGHTNESS

Sets the brightness of the LCD monitor.

Setting	Details
4	Brightens the backlight of the monitor regardless of the surrounding conditions.
3	Sets to the standard brightness.
2	Darkens the backlight of the monitor regardless of the surrounding conditions.
1	Sets to dim brightness. Helps to save battery life when selected.
AUTO	Sets the brightness automatically to “4” when using outdoors and to “3” when using indoors.

Adjusting Monitor Brightness

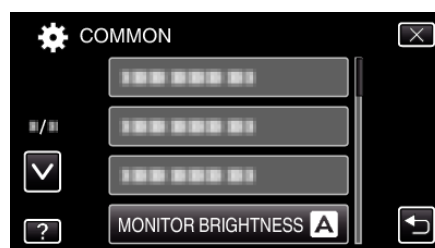
- 1 Tap “MENU”.



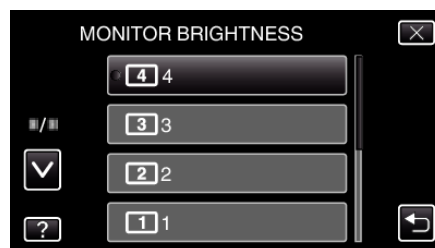
- 2 Tap ⚙ .



- 3 Tap “MONITOR BRIGHTNESS”.



- 4 Tap the desired monitor brightness.



- By default, “MONITOR BRIGHTNESS” is set to “AUTO”. To adjust the brightness, tap \wedge , then tap a value between “1” to “4”.
- Tap \wedge or \vee to move upward or downward for more selection.

Menu Settings

REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)

Sets the recording/playback media of videos.

Setting	Details
BUILT-IN MEMORY	Records videos to this unit's built-in memory.
SD CARD	Records videos to the SD card.

Displaying the Item

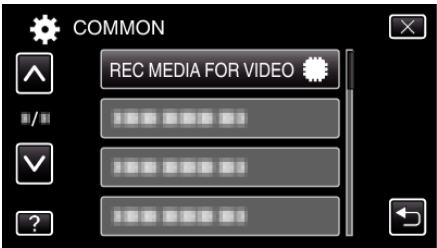
1 Tap “MENU”.



2 Tap .



3 Tap “REC MEDIA FOR VIDEO”.



REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)

Sets the recording/playback media of still images.

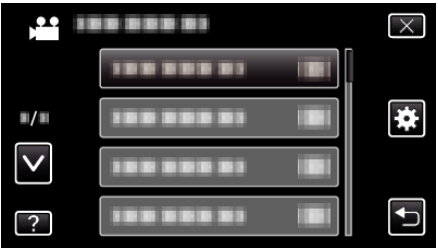
Setting	Details
BUILT-IN MEMORY	Records still images to this unit's built-in memory.
SD CARD	Records still images to the SD card.

Displaying the Item

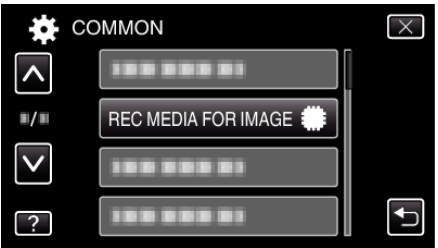
1 Tap “MENU”.



2 Tap .



3 Tap “REC MEDIA FOR IMAGE”.



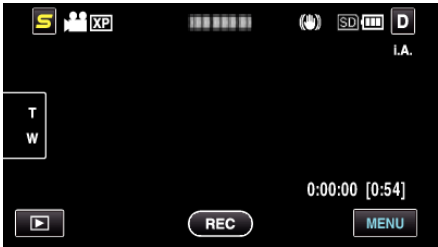
REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)

Sets the recording/playback SD card slot of videos.

Setting	Details
SLOT A	Records videos to the SD card in slot A.
SLOT B	Records videos to the SD card in slot B.

Displaying the Item

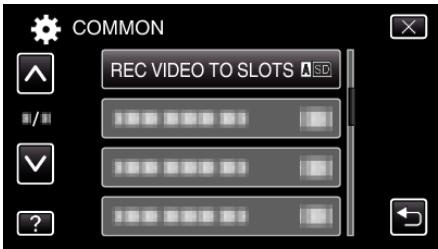
- 1 Tap “MENU”.



- 2 Tap .



- 3 Tap “REC VIDEO TO SLOTS”.



REC STILLs TO SLOTS (GZ-HM445/GZ-HM448)

Sets the recording/playback SD card slot of still images.

Setting	Details
SLOT A	Records still images to the SD card in slot A.
SLOT B	Records still images to the SD card in slot B.

Displaying the Item

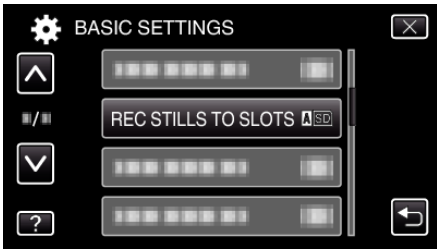
- 1 Tap “MENU”.



- 2 Tap .



- 3 Tap “REC STILLs TO SLOTS”.



Menu Settings

OPERATION SOUND

Turns on or off the operation sound.

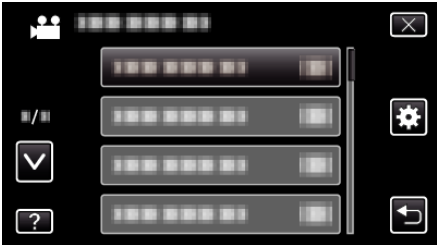
Setting	Details
OFF	Turns off the operation sound.
ON	Turns on the operation sound.

Displaying the Item

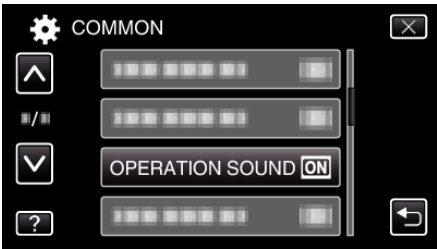
1 Tap “MENU”.



2 Tap “⚙️”.



3 Tap “OPERATION SOUND”.



AUTO POWER OFF

Prevents the situation of forgetting to turn off the power when this is set.

Setting	Details
OFF	Power is not turned off even if this unit is not operated for 5 minutes.
ON	Turns off the power automatically if this unit is not operated for 5 minutes.

Memo :

- When using battery, power is turned off automatically if this unit is not operated for 5 minutes.
- When using the AC adapter, this unit goes into standby mode.

Displaying the Item

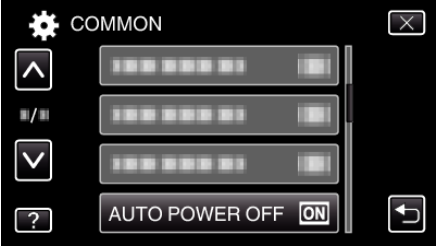
1 Tap “MENU”.



2 Tap “⚙️”.



3 Tap “AUTO POWER OFF”.



QUICK RESTART

Enables the power to turn on quickly when the LCD monitor is opened again within 5 minutes.

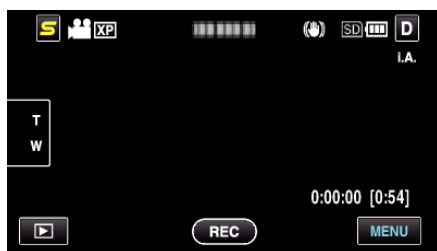
Setting	Details
OFF	Deactivates the function.
ON	Enables the power to turn on quickly when the LCD monitor is opened again within 5 minutes.

Memo :

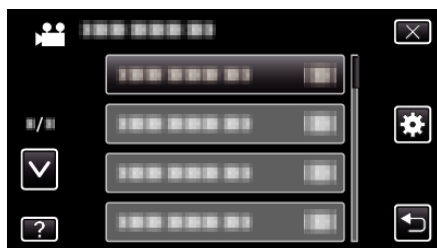
- The power consumption within 5 minutes after the LCD monitor is closed is reduced.

Displaying the Item

- 1 Tap "MENU".



- 2 Tap "⚙️".



- 3 Tap "QUICK RESTART".



- The power consumption within 5 minutes after the LCD monitor is closed is reduced.

DEMO MODE

Plays a demonstration of the special features of this unit.

Setting	Details
OFF	Deactivates the function.
ON	Plays a demonstration of the special features of this unit.

Displaying Demo Mode

- 1 Remove the battery pack and SD card.
- 2 Connect the AC adapter.
- 3 Open the LCD monitor and turn on the power.

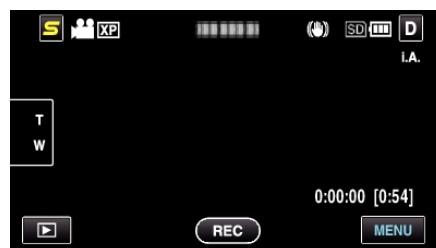
- Demonstration starts playing after 3 minutes.
- To stop playback, tap on the screen.

Memo :

- This mode is not available in the playback mode.

Displaying the Item

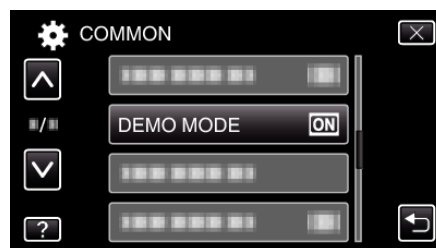
- 1 Tap "MENU".



- 2 Tap "⚙️".



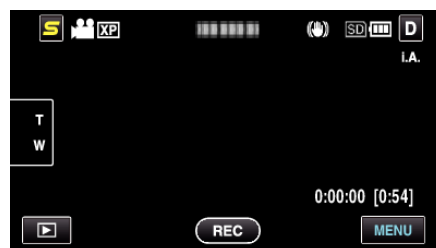
- 3 Tap "DEMO MODE".



TOUCH SCREEN ADJUST

Adjusts the response position of the buttons on the touch screen.

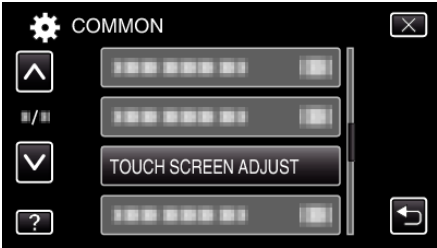
- 1 Tap "MENU".



- 2 Tap "⚙️".



3 Tap “TOUCH SCREEN ADJUST”.



- The touch screen adjustment screen appears.

4 Tap “+”. (3 times in total)



- Keep tapping “+” as its position changes with every tap.

5 Tap “+” again to confirm the adjusted positions. (3 times in total)



- Keep tapping “+” as its position changes with every tap.
- If areas on the adjustment screen other than the “+” mark are tapped, errors will occur. In this case, try again from step 4.

6 Tap “OK”.

- Setting ends and returns to the menu screen.

Caution : —————
• Do not tap areas other than the “+” mark during touch screen adjustment (steps 4 - 5). Doing so may cause the touch screen to malfunction.

Memo : —————
• Adjust by lightly tapping with a corner of an SD card, etc.
• Do not press with an object with a sharp tip or do not press hard.

DISPLAY ON TV

Displays icons and date/time on a TV screen.

Setting	Details
OFF	Does not display icons and date/time on TV.
ON	Displays icons and date/time on TV.

Memo : —————
• If connected to a TV via the HDMI connector, buttons (icons) and date/ time will not be displayed on the TV during video playback even if set to “ON”.

Displaying the Item

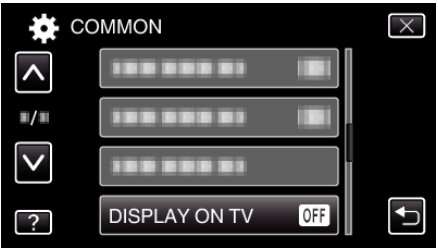
1 Tap “MENU”.



2 Tap “⚙️”.



3 Tap “DISPLAY ON TV”.



VIDEO OUTPUT

Sets the aspect ratio (16:9 or 4:3) according to the connecting TV.

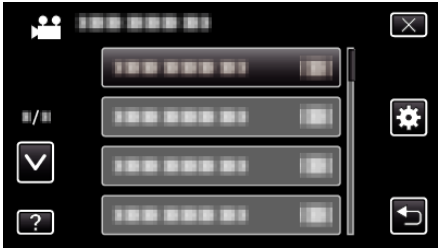
Setting	Details
4:3	Select this when connecting to a conventional TV (4:3).
16:9	Select this when connecting to a widescreen TV (16:9).

Displaying the Item

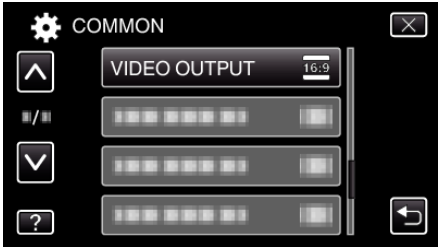
- 1 Tap “MENU”.



- 2 Tap “⚙️”.



- 3 Tap “VIDEO OUTPUT”.



COMPONENT OUTPUT (GZ-HM445/GZ-HM650/GZ-HM670)

Sets the definition of the video output from the COMPONENT connector.

Setting	Details
576i	Outputs at 576i.
1080i	Outputs at 1080i.

Displaying the Item

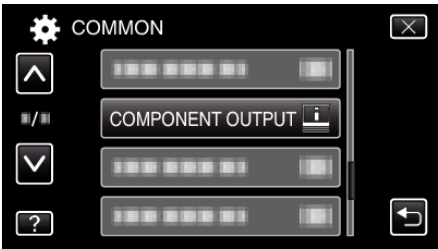
- 1 Tap “MENU”.



- 2 Tap “⚙️”.



- 3 Tap “COMPONENT OUTPUT”.



Menu Settings

HDMI OUTPUT

Sets the output from the HDMI connector of this unit when it is connected to a TV.

Setting	Details
AUTO	It is recommended to select "AUTO" usually.
576p	Select this when the video is not output in "AUTO" correctly.

Displaying the Item

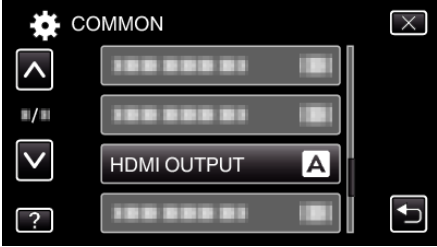
1 Tap "MENU".



2 Tap "⚙️".



3 Tap "HDMI OUTPUT".



HDMI CONTROL

Sets whether to link operations with an HDMI-CEC compliant TV.

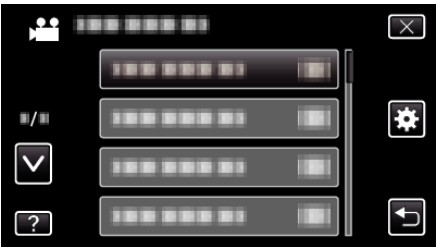
Setting	Details
OFF	Turns off linked operations.
ON	Turns on linked operations.

Displaying the Item

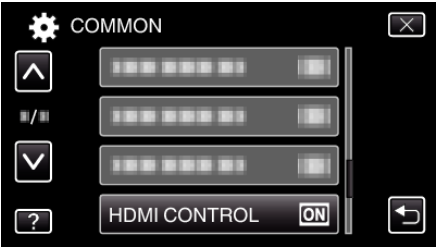
1 Tap "MENU".



2 Tap "⚙️".



3 Tap "HDMI CONTROL".



AUTO FINALIZE

Finalizes the discs created automatically so that they can be played back on compatible devices.

Setting	Details
OFF	Does not finalize the disc. Data can be added to the disc later.
ON	Finalizes the disc and sets it to a readable state.

Displaying the Item

1 Tap "MENU".



2 Tap "⚙️".



3 Tap "AUTO FINALIZE".



FACTORY PRESET

Returns all the settings to their default values.

1 Tap "MENU".



2 Tap "⚙️".



3 Tap "FACTORY PRESET".



4 Tap "YES".



- All settings return to their default values.

UPDATE

Updates the functions of this unit to the latest version.
For details, refer to the JVC homepage.
(When no program to update the software of this unit is available, nothing will be provided on the homepage.)
<http://www.jvc-victor.co.jp/dvmain/support/download/index.html>

PC SOFTWARE UPDATE

Updates the built-in PC software of this unit to the latest version.
For details, refer to the JVC homepage.
(When no program to update the PC software is available, nothing will be provided on the homepage.)
<http://www.jvc-victor.co.jp/dvmain/support/download/index.html>

FORMAT BUILT-IN MEM. (GZ-HM650/GZ-HM670)

Deletes all files on the built-in memory.

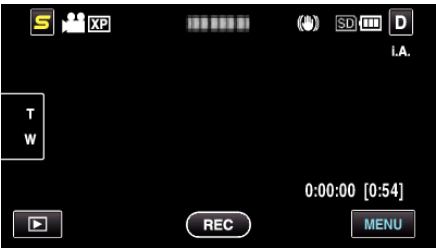
Setting	Details
FILE	Deletes all files on the built-in memory.
FILE + MANAGEMENT NO	Deletes all files on the built-in memory and resets the folder and file numbers to "1".

Caution :

- All data on the built-in memory will be deleted when it is formatted. Copy all files on the built-in memory to a computer before formatting.
- Connect the AC adapter when formatting the built-in memory. Formatting cannot be performed if the AC adapter is not connected.

Displaying the Item

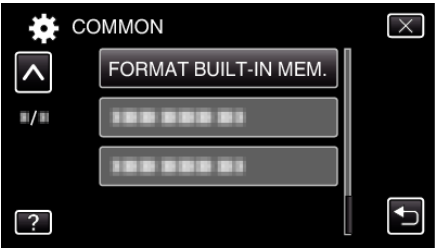
1 Tap "MENU".



2 Tap "⚙️".



3 Tap "FORMAT BUILT-IN MEM.".



FORMAT SD CARD

Deletes all files on the SD card.

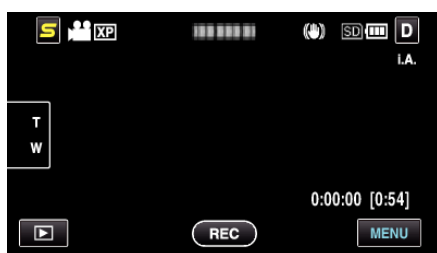
Setting	Details
FILE	Deletes all files on the SD card.
FILE + MANAGEMENT NO	Deletes all files on the SD card and resets the folder and file numbers to "1".

Caution :

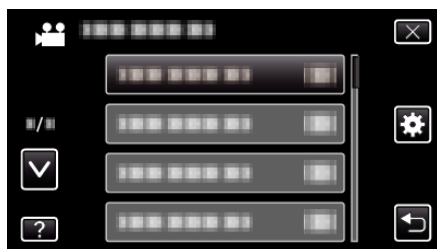
- Not available for selection when no SD card is inserted.
- All data on the card will be deleted when it is formatted. Copy all files on the card to a computer before formatting.
- Make sure that the battery pack is fully charged or connect the AC adapter as the formatting process may take some time.

Displaying the Item

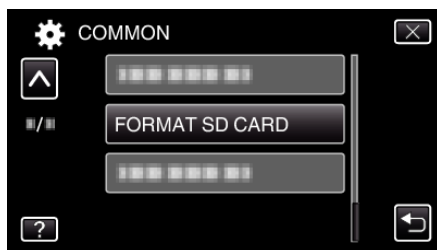
- 1 Tap "MENU".



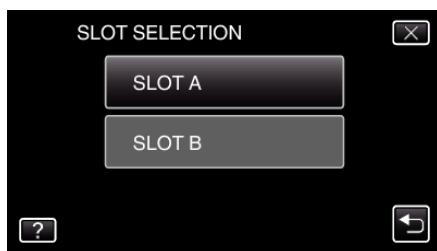
- 2 Tap "⚙️".



- 3 Tap "FORMAT SD CARD".

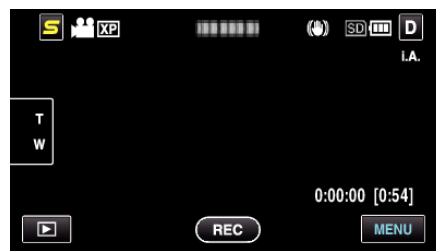


- 4 (GZ-HM445/GZ-HM448) Select the card slot.

**ERASE ALL DATA (GZ-HM650/GZ-HM670)**

Execute this process when disposing of this unit or passing it to another person.

- 1 Tap "MENU".



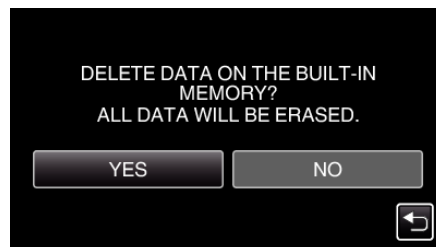
- 2 Tap "⚙️".



- 3 Tap "ERASE ALL DATA".



- 4 Tap "YES".



- After deleting is complete, tap "OK".

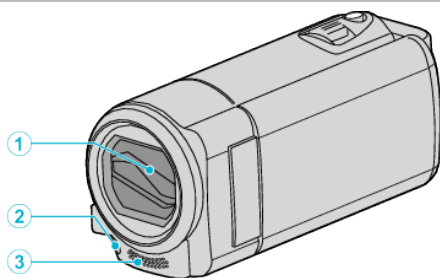
Caution :

- Connect the AC adapter when erasing all data on the built-in memory. Erasing cannot be performed if the AC adapter is not connected.

Memo :

- Repeat the process to make data restoration even more difficult.

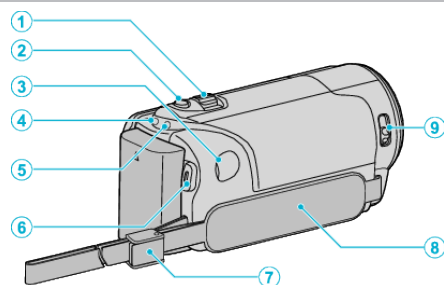
Front



- 1 Lens Cover**
 - Do not touch the lens and lens cover.
 - Do not cover the lens with your fingers during recording.
- 2 Light**
 - Turn on the light when shooting in dark places.

"LIGHT (GZ-HM445/GZ-HM650/GZ-HM670)" (p. 93)
- 3 Stereo Microphone**
 - Do not cover the microphone with your fingers during video recording.

Rear

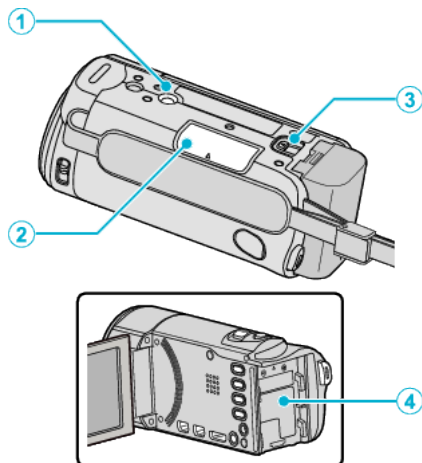


- 1 Zoom/Volume Lever**
 - During shooting: Adjusts the shooting range.
 - During playback (index screen): Moves to the next or previous page.
 - During video playback: Adjusts the volume.
- 2 SNAPSHOT (Still Image Recording) Button**
 - Takes a still image.
- 3 DC Connector**
 - Connects to an AC adapter to charge the battery.
- 4 ACCESS (Access) Lamp**
 - Lights up/blinks during recording or playback.

Do not remove the battery pack, AC adapter, or SD card.
- 5 POWER/CHARGE (Power/Charge) Lamp**
 - Lights up: Power "ON"
 - Blinks: Charging in progress
 - Goes out: Charging finished
- 6 START/STOP (Video Recording) Button**
 - Starts/stops video recording.
- 7 Strap Lock**
- 8 Grip Belt**
 - Pass your hand through the grip belt to hold this unit firmly.

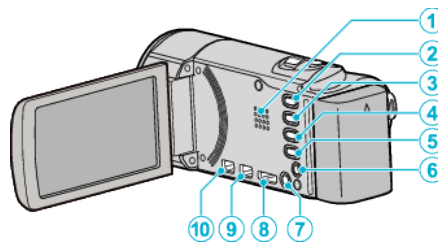
"Grip Adjustment" (p. 15)
- 9 Lens Cover Switch**
 - Opens and closes the lens cover.

Bottom



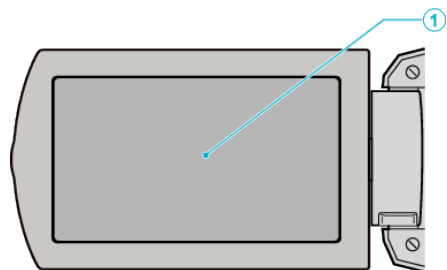
- 1** Tripod Mounting Hole
“Tripod Mounting” (p. 23)
- 2** SD Card Slot
 - Insert an optional SD card.
“Inserting an SD Card (GZ-HM650/GZ-HM670)” (p. 16)
“Inserting an SD Card (GZ-HM445/GZ-HM448)” (p. 18)
- 3** Battery Release Lever
“Charging the Battery Pack” (p. 14)
- 4** Battery Mount

Interior



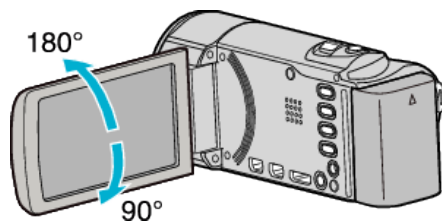
- 1** Speaker
 - Outputs audio sound during video playback.
- 2** i.AUTO Button
 - Switches between Intelligent Auto and Manual modes.
- 3** USER Button
“Setting the USER Button” (p. 48)
- 4** (Video/Still Image) Button
 - Switches between video and still image modes.
- 5** INFO (Information) Button
 - Recording: Displays the remaining time (for video only) and battery power.
 - Playback: Displays file information such as recording date.
- 6** AV Connector
 - Connects to a TV, etc.
- 7** (Power) Button
 - Press and hold to turn the power on/off while the LCD monitor is opened.
- 8** HDMI Connector
 - Connects to an HDMI TV.
- 9** USB Connector
 - Connects to computer using a USB cable.
- 10** COMPONENT (Component) Connector
 - Connects to a TV, etc.

LCD Monitor



1 LCD Monitor

- Turns the power on/off by opening and closing.
- Enables self-portraits to be taken by rotating the monitor.



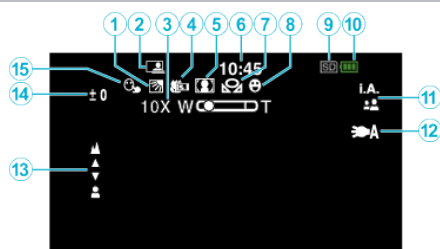
“Using the Touch Screen” (p. 20)

“Names of Buttons and Functions on the LCD Monitor” (p. 20)

Caution :

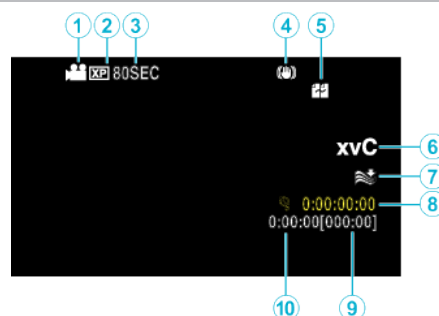
- Do not press against the surface with force or subject it to strong impact. Doing so may damage or break the screen.

Common Recording Indications



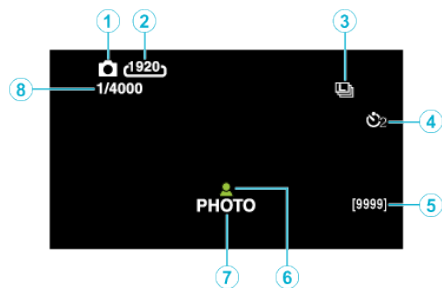
- 1** Backlight Compensation
“Setting Backlight Compensation” (p. 35)
- 2** Auto REC
“Recording Automatically by Sensing Movements (AUTO REC)” (p. 46)
- 3** Zoom
“ZOOM” (p. 95)
- 4** Tele Macro
“Taking Close-up Shots” (p. 35)
- 5** Scene Select
“Scene Selection” (p. 32)
- 6** Date/Time
“Clock Setting” (p. 21)
- 7** White Balance
“Setting White Balance” (p. 34)
- 8** Smile Shot
“Capturing Smiles Automatically (SMILE SHOT)” (p. 42)
- 9** Media
“REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)” (p. 108)
“REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)” (p. 108)
“REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)
“REC STILL TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)
- 10** Battery Indicator
“Remaining Recording Time/Battery Power” (p. 49)
- 11** Recording Mode
“Taking Videos in Intelligent Auto Mode” (p. 27)
“Manual Recording” (p. 31)
- 12** Light
“LIGHT (GZ-HM445/GZ-HM650/GZ-HM670)” (p. 93)
- 13** Focus
“Adjusting Focus Manually” (p. 33)
- 14** Brightness
“Adjusting Brightness” (p. 34)
- 15** Touch Priority AE/AF
“Capturing Subjects Clearly (TOUCH PRIORITY AE/AF)” (p. 41)

Video Recording



- 1** Video Mode
“Video/Still Image Button” (p. 119)
- 2** Video Quality
“VIDEO QUALITY” (p. 95)
- 3** Time-Lapse Recording
“Recording at Intervals (TIME-LAPSE RECORDING)” (p. 44)
- 4** Digital Image Stabilizer
“Reducing Camera Shake” (p. 44)
- 5** Seamless Recording
“SEAMLESS RECORDING” (p. 96)
- 6** x.v.Color
“x.v.Color” (p. 96)
- 7** Wind Cut
“WIND CUT” (p. 94)
- 8** Time-Lapse Recording Counter
“Recording at Intervals (TIME-LAPSE RECORDING)” (p. 44)
- 9** Remaining Recording Time
“Remaining Recording Time/Battery Power” (p. 49)
- 10** Scene Counter

Still Image Recording



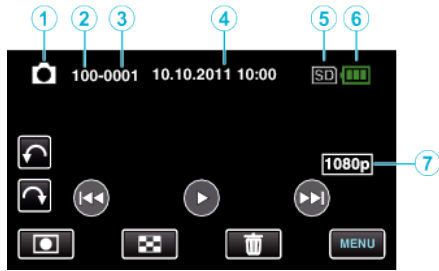
- 1 Still Image Mode
"Video / Still Image Button" (p. 119)
- 2 Image Size
"IMAGE SIZE" (p. 100)
- 3 Continuous Shooting
"SHUTTER MODE" (p. 99)
- 4 Self-Timer
"Taking Group Shots (Self-timer)" (p. 47)
- 5 Remaining Number of Shots
- 6 Focus
"Taking Still Images in Intelligent Auto Mode" (p. 29)
- 7 Recording in Progress
- 8 Shutter Speed

Video Playback



- 1 Video Mode
"Video / Still Image Button" (p. 119)
- 2 Video Quality
"VIDEO QUALITY" (p. 95)
- 3 Operation Indicator
"Operation Buttons for Video Playback" (p. 51)
- 4 Date/Time
"Clock Setting" (p. 21)
- 5 Media
"REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)" (p. 108)
"REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)" (p. 109)
- 6 Battery Indicator
"Remaining Recording Time/Battery Power" (p. 49)
- 7 Playback Time
"Playing Back Videos" (p. 51)
- 8 x.v.Color
"x.v.Color" (p. 96)
- 9 1080p Output
"HDMI OUTPUT" (p. 114)
- 10 Scene Counter

Still Image Playback



- 1 Still Image Mode
“ (Video/Still Image) Button” (p. 119)
- 2 Folder Number
- 3 File Number
- 4 Date/Time
“Clock Setting” (p. 21)
- 5 Media
“REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)” (p. 108)
“REC STILLs TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)
- 6 Battery Indicator
“Remaining Recording Time/Battery Power” (p. 49)
- 7 1080p Output
“HDMI OUTPUT” (p. 114)

Battery Pack

Unable to turn on the power when using the battery pack.

Recharge the battery pack.

“Charging the Battery Pack” (☞ p. 14)

If the terminal of this unit or the battery pack is dirty, wipe it with a cotton swab or something similar.

If you use any other battery packs besides JVC battery packs, safety and performance cannot be guaranteed. Be sure to use JVC battery packs.

Short usage time even after charging.

Battery deterioration occurs when a battery pack is charged repeatedly.

Replace the battery pack with a new one.

“Optional Accessories” (☞ p. 26)

Unable to charge the battery pack.

When the battery pack is fully charged, the lamp does not flash.

If the terminal of this unit or the battery pack is dirty, wipe it with a cotton swab or something similar.

Using a non-original AC adapter may result in damage to this unit. Be sure to use an original AC adapter.

The remaining battery display is not correct.

Remaining battery power is not displayed when the AC adapter is connected.

If this unit is used for long periods of time in high or low temperatures, or if the battery pack is repeatedly charged, the amount of remaining battery may not be displayed correctly.

The battery depletes even when the AC adapter is connected.

Please use a JVC AC adapter (AC-V11).

Recording

Recording cannot be performed.

Check the  button.

“Interior” (☞ p. 119)

Set to the recording mode by tapping the  button.

Recording stops automatically.

Recording stops automatically as it cannot be performed for 12 or more consecutive hours according to specifications. (It may take some time to resume recording.)

Turn off this unit, wait for a while, and turn it on again. (This unit stops automatically to protect the circuit when the temperature rises.)

The continuous shooting speed of still images is slow.

The continuous shooting speed will drop if this function is used repeatedly. Continuous shooting speed may drop depending on the SD card or under certain recording conditions.

The focus is not adjusted automatically.

If you are recording in a dark place or a subject that has no contrast between dark and light, adjust the focus manually.

“Adjusting Focus Manually” (☞ p. 33)

Wipe the lens with a lens cleaning cloth.

Cancel manual focus on the manual recording menu.

“Adjusting Focus Manually” (☞ p. 33)

Zoom does not work.

Digital zoom is not available in the still image recording mode.

Zoom operation is not available in time-lapse recording. (Simultaneous still image recording and image stabilizer are also not available.)

To use digital zoom, set “ZOOM” in the menu to “80x/DIGITAL” or “200x/DIGITAL”.

“ZOOM” (☞ p. 95)

Mosaic-type noise occurs when recording scenes with fast movements or extreme changes in brightness.

Set the “VIDEO QUALITY” to “UXP” or “XP” for recording.

“VIDEO QUALITY” (☞ p. 95)

Vertical lines appear on recorded images.

Such a phenomenon occurs when shooting a subject illuminated by bright light. This is not a malfunction.

Card

Cannot insert the SD card.

Make sure not to insert the card in the wrong direction.

“Inserting an SD Card (GZ-HM650/GZ-HM670)” (p. 16)

“Inserting an SD Card (GZ-HM445/GZ-HM448)” (p. 18)

Unable to copy to SD card.

To record to the card, it is necessary to perform media settings.

“REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)” (p. 108)

“REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)” (p. 108)

“REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)

“REC STILLS TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)

To use cards that have been used on other devices, it is necessary to format (initialize) the card using “FORMAT SD CARD” from media settings.

“FORMAT SD CARD” (p. 117)

Playback

Sound or video is interrupted.

Sometimes playback is interrupted at the connecting section between two scenes. This is not a malfunction.

The same image is displayed for a long time.

Use a high speed SD card (Class 4 or higher).

“Types of Usable SD Card” (p. 16)

Clean the terminals of the SD card with a dry cotton swab or something similar.

Execute “FORMAT SD CARD” in the “COMMON” menu. (All data will be deleted.)

“FORMAT SD CARD” (p. 117)

The motion is choppy.

Use a high speed SD card (Class 4 or higher).

“Types of Usable SD Card” (p. 16)

Clean the terminals of the SD card with a dry cotton swab or something similar.

Execute “FORMAT SD CARD” in the “COMMON” menu. (All data will be deleted.)

“FORMAT SD CARD” (p. 117)

Verify the system requirements of your PC when using Everio MediaBrowser 3 to play back.

“Verifying System Requirements (Guideline)” (p. 82)

Cannot find a recorded file.

Cancel the date search function.

“Searching for a Specific Video/Still Image” (p. 55)

Change the playback media by tapping  on the touch screen.

“Operation Buttons for Video Playback” (p. 51)

“Operation Buttons for Still Image Playback” (p. 53)

Change the setting in “REC MEDIA FOR IMAGE”, “REC MEDIA FOR VIDEO”, “REC VIDEO TO SLOTS”, or “REC STILLS TO SLOTS”. (Files on other media are not displayed.)

“REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)” (p. 108)

“REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)” (p. 108)

“REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)

“REC STILLS TO SLOTS (GZ-HM445/GZ-HM448)” (p. 109)

Select “PLAYBACK OTHER FILE” in the menu. (Video files that have damaged management information can be played back.)

“Playing a Video with Defective Management Information” (p. 53)

Images do not appear on the TV properly.

Disconnect the cable and connect again.

“Connecting via the HDMI Mini Connector” (p. 56)

Turn off and on this unit again.

When connected via the component connector, check if the setting of

“COMPONENT OUTPUT” in the connections setting menu is suitable for the connected TV. (Set to “1080i” by default)

“COMPONENT OUTPUT (GZ-HM445/GZ-HM650/GZ-HM670)”

(p. 113)

Images are projected vertically on the TV.

Set “VIDEO OUTPUT” in the “COMMON” menu to “4:3”.

“VIDEO OUTPUT” (p. 113)

Adjust the TV's screen accordingly.

The image displayed on TV is too small.

Set “VIDEO OUTPUT” in the “COMMON” menu to “16:9”.

“VIDEO OUTPUT” (p. 113)

When connected to the TV via the HDMI mini cable, proper images and sounds are not output.

Images and sounds may not be output properly depending on the TV connected. In such cases, perform the following operations.

① Disconnect the HDMI mini cable and connect it again.

② Turn off and on this unit again.

“Connecting via the HDMI Mini Connector” (p. 56)

Editing/Copying

Unable to dub to a Blu-ray recorder.

Dubbing cannot be performed by connecting this unit to a Blu-ray recorder with a USB cable. Connect and dub using the supplied AV cable.

“Dubbing Files by Connecting to a DVD Recorder or VCR” (🔍 p. 74)

Unable to delete file.

Files (videos/still images) that are protected cannot be deleted. Release protection before deleting the file.

“Protecting Files” (🔍 p. 59)

Unable to copy/move files to SD card.

If the SD card is write protected, set it to off.

BACK UP menu does not disappear.

While the USB cable is connected, the “BACK UP” menu is displayed.

Unable to turn off the BACK UP menu.

Turn off the power of this unit and the DVD writer, or remove the AC adapter.

Computer

Unable to copy files to the computer's HDD.

Connect the USB cable correctly.

“Backing Up All Files” (🔍 p. 84)

If the provided software Everio MediaBrowser 3 is not installed, some functions may not work properly.

“Installing the Provided Software (Built-in)” (🔍 p. 82)

Before making backup, make sure that enough free space is left in the computer's hard disk (HDD).

Unable to copy files to DVD with a computer.

To record to discs, a recordable DVD drive is required for the computer in use.

Cannot upload the file to YouTube.

Check if you have created an account with YouTube. (You need a YouTube account to upload files to YouTube.)

Changing videos to the file format for uploading cannot be performed on this unit.

Refer to “Q&A”, “Latest Information”, “Download Information”, etc. in “Click for Latest Product Info” in the help file of the provided software Everio MediaBrowser 3.

I am using a Mac computer.

Copy the files to a Mac computer using the following method.

“Copying to Mac Computer” (🔍 p. 88)

The computer cannot recognize the SDXC card.

Confirm and update the OS of your computer.

“When your computer cannot recognize the SDXC card” (🔍 p. 17)

Screen/Image

The LCD monitor is difficult to see.

The LCD monitor may be difficult to see if used in bright areas such as under direct sunlight.

A band or a ball of bright light appears on the LCD monitor.

Change the direction of this unit to prevent the light source from coming into view. (A band or a ball of bright light may appear when there is a bright light source near this unit, but this is not a malfunction.)

The recorded subject is too dark.

Use backlight compensation when the background is bright and the subject is dark.

“Setting Backlight Compensation” (p. 35)

Use “LIGHT” in the menu.

“LIGHT (GZ-HM445/GZ-HM650/GZ-HM670)” (p. 93)

Use “NIGHTALIVE” in SCENE SELECT.

“Scene Selection” (p. 32)

Use “GAIN UP” in the menu.

“GAIN UP” (p. 93)

Set “BRIGHTNESS ADJUST” in the recording menu to the “+” side.

“Adjusting Brightness” (p. 34)

The recorded subject is too bright.

Set the backlight compensation to “OFF” if it is being used.

“Setting Backlight Compensation” (p. 35)

Set “BRIGHTNESS ADJUST” in the recording menu to the “-” side.

“Adjusting Brightness” (p. 34)

The color looks strange. (Too bluish, too reddish, etc.)

Wait for a while until natural colors are achieved. (It may take some time for white balance to be adjusted.)

Set “WHITE BALANCE” in the recording menu to “MANUAL”. Select from “FINE”/“CLOUD”/“HALOGEN” according to the light source.

Select “MWB” and adjust accordingly.

“Setting White Balance” (p. 34)

The color looks different.

Set “WHITE BALANCE” in the recording menu to “MANUAL”. Select from “FINE”/“CLOUD”/“HALOGEN” according to the light source.

Select “MWB” and adjust accordingly.

“Setting White Balance” (p. 34)

When the video was recorded with “x.v.Color” set to “ON”, change the setting as desired on TV.

“x.v.Color” (p. 96)

There are bright or dark spots on the screen.

While the LCD monitor screen has more than 99.99% effective pixels, 0.01% of the pixels may be bright spots (red, blue, green) or dark spots. This is not a malfunction. The spots will not be recorded.

Other Problems

The image is grainy.

When digital zoom is used, the image becomes grainy as it is digitally enlarged.

This unit heats up.

This is not a malfunction. (This unit may become warm when used for a long time.)

The language on the display changed.

It may occur when you connect this unit to a TV with different language setting using an HDMI mini cable.

“Operating in Conjunction with TV via HDMI” (p. 56)

HDMI-CEC functions do not work properly, and the TV does not work in conjunction with this unit.

TVs may operate differently depending on the specifications, even if they are HDMI-CEC compliant. Therefore, the HDMI-CEC functions of this unit cannot be guaranteed to operate in combination with all the TVs. In such cases, set “HDMI CONTROL” to “OFF”.

“HDMI CONTROL” (p. 114)

The unit operates slowly when switching between video mode and still image mode, or when switching the power on or off.

It is recommended that you copy all videos and still images onto your computer, and erase the files from this unit. (If there are many recorded files on this unit, it takes time for the unit to respond.)

This unit does not function properly and error messages appear.

This unit is a microcomputer-controlled device. Electrostatic discharge, external noise and interference (from a TV, a radio, etc.) might prevent it from functioning properly. In such a case, turn off the power, then remove the AC adapter and battery pack. This unit will be reset.

Make a backup of important recorded data.

It is recommended to copy your important recorded data to a DVD or other recording media for storage.

JVC will not be responsible for any lost data.

Error Message?

CHECK LENS COVER

Open the lens cover.

SET DATE/TIME!

Connect the AC adapter, charge the battery for more than 24 hours and set the clock. (If the message still appears, the clock battery is exhausted. Consult your nearest JVC dealer.)

“Clock Setting” (🔍 p. 21)

COMMUNICATION ERROR

Reconnect the USB cable.
Turn off this unit and the devices connected to it, and turn them on again.
Reattach the battery pack.

FORMAT ERROR!

Check the operating procedure, and perform once again.
“FORMAT BUILT-IN MEM. (GZ-HM650/GZ-HM670)” (🔍 p. 116)
Turn off and on this unit again.

DATA DELETION ERROR

Check the operating procedure, and perform once again.
“ERASE ALL DATA (GZ-HM650/GZ-HM670)” (🔍 p. 117)
Turn off and on this unit again.

ERROR IN BUILT-IN MEMORY!

Turn off and on this unit again.
If the above does not solve the problem, back up your files and execute “FORMAT BUILT-IN MEM.” in the “COMMON” menu. (All data will be deleted.)
“FORMAT BUILT-IN MEM. (GZ-HM650/GZ-HM670)” (🔍 p. 116)

MEMORY CARD ERROR!

Turn off and on this unit again.
Remove the AC adapter and battery pack, then remove and re-insert the SD card.
Remove any dirt from the SD card terminals.
If the above does not solve the problem, back up your files and execute “FORMAT SD CARD” in the “COMMON” menu. (All data will be deleted.)
“FORMAT SD CARD” (🔍 p. 117)

NOT FORMATTED

Select “OK”, then select “YES” on the “DO YOU WANT TO FORMAT?” screen.

RECORDING FAILURE

Turn off and on this unit again.

CANNOT TAKE MORE STILL IMAGES AT THE MOMENT

Stop video recording before taking still images. (If the SD card is removed and inserted during video recording, still images cannot be recorded.)

PLAYBACK FAILED

Remove and re-insert the SD card.
“Inserting an SD Card (GZ-HM650/GZ-HM670)” (🔍 p. 16)
Remove any dirt from the SD card terminals.
Insert the SD card before turning on the power.
Do not subject this unit to any strong impact or vibration.

VIDEO MANAGEMENT FILE IS DAMAGED, RECOVERY IS REQUIRED TO RECORD/PLAYBACK, RECOVER?

Select “OK” to restore. (Videos that cannot be restored will not be displayed on the index screen, but you may be able to play them back using “PLAYBACK OTHER FILE” in the menu.)
“Playing a Video with Defective Management Information” (🔍 p. 53)

UNSUPPORTED FILE!

Use files recorded with this unit. (Files recorded with other devices may not be playable.)

UNSUPPORTED SCENE!

Use files recorded with this unit. (Files recorded with other devices may not be playable.)

THIS FILE IS PROTECTED

Switch off the “PROTECT/CANCEL” function in the “EDIT” menu.
“Protecting Files” (🔍 p. 59)

CHECK CARD'S WRITE PROTECTION SWITCH

Set the write protect switch of the SD card to off.

INSUFFICIENT AVAILABLE SPACE

Delete files, or move files to a computer or other devices.
Replace the SD card with a new one.
Seamless videos cannot be combined if there is not enough free space in the built-in memory or SD card. Check the amount of remaining free space before combining.

MAXIMUM QUANTITY RECORDING FOLDERS/ FILES HAS BEEN REACHED

- ① Move the files or folders to a computer or other device. (Back up your files.)
- ② Select “FILE + MANAGEMENT NO” in “FORMAT BUILT-IN MEM.” or “FORMAT SD CARD” of the media settings menu. (All data on the built-in memory or SD card will be deleted.)

SCENE QUANTITY EXCEEDED LIMIT

- ① Move the files or folders to a computer or other device. (Back up your files.)
- ② Select “FILE + MANAGEMENT NO” in “FORMAT BUILT-IN MEM.” or “FORMAT SD CARD” of the media settings menu. (All data on the built-in memory or SD card will be deleted.)

NUMBER OF FOLDERS OVERFLOW

- ① Move the files or folders to a computer or other device. (Back up your files.)
- ② Select “FILE + MANAGEMENT NO” in “FORMAT BUILT-IN MEM.” or “FORMAT SD CARD” of the media settings menu. (All data on the built-in memory or SD card will be deleted.)

FILE QUANTITY LIMIT EXCEEDED

- ① Move the files or folders to a computer or other device. (Back up your files.)
- ② Select “FILE + MANAGEMENT NO” in “FORMAT BUILT-IN MEM.” or “FORMAT SD CARD” of the media settings menu. (All data on the built-in memory or SD card will be deleted.)

CAMERA TEMPERATURE IS TOO COLD KEEP CAMERA POWER ON PLEASE WAIT

Leave this unit turned on for a while.
If the warning still does not disappear, turn off the power and move the unit to a warm place while taking care to avoid a sudden temperature change.
Turn on the power again after a while.

NO FILES

Change the setting of “REC MEDIA FOR IMAGE”, “REC MEDIA FOR VIDEO”, “REC VIDEO TO SLOTS”, or “REC STILLS TO SLOTS” in the “COMMON” menu, and check that files are not recorded to the other media.
“REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)” (🔍 p. 108)
“REC MEDIA FOR IMAGE (GZ-HM650/GZ-HM670)” (🔍 p. 108)
“REC VIDEO TO SLOTS (GZ-HM445/GZ-HM448)” (🔍 p. 109)
“REC STILLS TO SLOTS (GZ-HM445/GZ-HM448)” (🔍 p. 109)

RECORDING CANCELLED

Set "REC MEDIA FOR VIDEO" to "SD", then record to an SD card.

"REC MEDIA FOR VIDEO (GZ-HM650/GZ-HM670)" (p. 108)

Turn off and on this unit again.

Protect the unit from vibration and shock.

Maintenance

Perform regular maintenance of this unit to enable it to be used for a long time.

Caution :

- Be sure to detach the battery pack, AC adapter, and power plug before performing any maintenance.
-

Camcorder

- Wipe this unit with a dry, soft cloth to remove any dirt.
- When it is extremely dirty, soak the cloth in a solution of neutral detergent, wipe the body with it, and then use a clean cloth to remove the detergent.

Caution :

- Do not use benzene or thinner. Doing so may cause damage to the unit.
 - When using a chemical cloth or cleaner, be sure to observe the warning labels and instructions of the product.
 - Do not leave the device in contact with rubber or plastic products for a long time.
-

Lens/LCD Monitor

- Use a lens blower (commercially available) to remove any dust, and a cleaning cloth (commercially available) to wipe off any dirt.
Mold may form if the lens is left dirty.

Camera

Item	Details
Power supply	Using AC adapter: DC 5.2 V Using battery pack: DC 3.5 V - 3.6 V
Power consumption	GZ-HM445/GZ-HM448: 2.3 W (when "MONITOR BRIGHTNESS" is set to "3" (standard)) 2.5 W (when "MONITOR BRIGHTNESS" is set to "4" (brighter)) GZ-HM650/GZ-HM670: 2.4 W (when "MONITOR BRIGHTNESS" is set to "3" (standard)) 2.6 W (when "MONITOR BRIGHTNESS" is set to "4" (brighter)) Rated Current Consumption: 1A
Dimensions (mm)	51 mm x 55 mm x 111 mm (W x H x D: excluding grip belt)
Mass	Approx. 195 g (camera only), Approx. 235 g (including supplied battery pack)
Operating environment	Allowable operating temperature: 0°C to 40°C Allowable storage temperature: -20°C to 50°C Allowable relative humidity: 35 % to 80 %
Image pickup device	GZ-HM445/GZ-HM448: 1/5.8" 1,500,000 pixels (progressive CMOS) GZ-HM650/GZ-HM670: 1/4.1" 3,320,000 pixels (progressive CMOS)
Recording area (Video)	GZ-HM445/GZ-HM448: (UXP/XP/SP/EP) 630,000 to 1,050,000 pixels (AIS ON) 630,000 to 1,250,000 pixels (AIS OFF) (SSW/SEW) 340,000 to 1,050,000 pixels (dynamic zoom ON) 630,000 to 1,050,000 pixels (dynamic zoom OFF) GZ-HM650/GZ-HM670: (UXP/XP/SP/EP) 1,220,000 pixels (AIS ON) 1,440,000 pixels (AIS OFF) (SSW/SEW) 390,000 to 1,220,000 pixels (dynamic zoom ON) 1,220,000 pixels (dynamic zoom OFF)
Recording area (Still image)	GZ-HM445/GZ-HM448: (4:3) 470,000 to 930,000 pixels (16:9) 630,000 to 1,250,000 pixels GZ-HM650/GZ-HM670: (4:3) 1,080,000 pixels (16:9) 1,440,000 pixels
Lens	F1.8 - 6.3, f \approx 2.9 mm to 116.0 mm GZ-HM445/GZ-HM448: (UXP/XP/SP/EP) 35 mm conversion: 45.6 mm to 1,824 mm (AIS ON) 35 mm conversion: 42.0 mm to 1,680 mm (AIS OFF) (SSW/SEW) 35 mm conversion: 45.6 mm to 3,182 mm (dynamic zoom ON) 35 mm conversion: 45.6 mm to 1,824 mm (dynamic zoom OFF) GZ-HM650/GZ-HM670: (UXP/XP/SP/EP) 35 mm conversion: 45.0 mm to 1,800 mm (AIS ON) 35 mm conversion: 41.4 mm to 1,656 mm (AIS OFF) (SSW/SEW) 35 mm conversion: 45.0 mm to 3,150 mm (dynamic zoom ON) 35 mm conversion: 45.0 mm to 1,800 mm (dynamic zoom OFF)

Lowest illumination	GZ-HM445/GZ-HM448: 9 lux 1 lux (SCENE SELECT: NIGHTALIVE) GZ-HM650/GZ-HM670: 4 lux 1 lux (SCENE SELECT: NIGHTALIVE)
Zoom (during video recording)	Optical zoom: Up to 40x Dynamic zoom: Up to 70x (SSW/SEW) Digital zoom: Up to 200x
Zoom (during still image recording)	Optical zoom: Up to 40x
LCD monitor	2.7", 23 megapixels, color LCD
Recording media	GZ-HM445/GZ-HM448: SDHC/SDXC card (commercially available) Eye-Fi card (commercially available) GZ-HM650: Built-in memory (8 GB) SDHC/SDXC card (commercially available) Eye-Fi card (commercially available) GZ-HM670: Built-in memory (32 GB) SDHC/SDXC card (commercially available) Eye-Fi card (commercially available) "Types of Usable SD Card" (p. 16)
Clock battery	Rechargeable battery

Specifications

Connectors

Item	Details
HDMI output connector	HDMI™ mini connector
Component output connector (GZ-HM445/GZ-HM650/GZ-HM670)	Y, Pb, Pr component output Y: 1.0 V (p-p), 75 Ω Pb/Pr: 0.7 V (p-p), 75 Ω
AV output connector	Video output: 1.0 V (p-p), 75 Ω Audio output: 300 mV (rms), 1 KΩ
USB connector	Mini USB Type AB, USB 2.0 compliant

Video

Item	Details
Recording/ Playback format	AVCHD standard Video: AVC/H.264 Audio: Dolby Digital 2ch
Extension	.MTS
Signal system	PAL standard
Image quality (Video)	UXP 1920 x 1080 pixels Average Approximate 24 Mbps XP 1920 x 1080 pixels Average Approximate 17 Mbps SP 1920 x 1080 pixels Average Approximate 12 Mbps EP 1920 x 1080 pixels Average Approximate 4.8 Mbps SSW (16:9) 720 x 576 pixels (Interlaced) Average Approximate 6.2 Mbps SEW (16:9) 720 x 576 pixels (Interlaced) Average Approximate 3 Mbps
Sound quality (Audio)	48 kHz, 256 kbps

Still Image

Item	Details
Recording format	JPEG standard
Extension	.JPG
Image size	“Approximate Number of Still Images (Unit: Number of Shots)” (p. 50)
Quality	FINE / STANDARD

AC Adapter (AC-V10M)

Item	Details
Power supply	AC 110 V to 240 V, 50 Hz/60 Hz
Output	DC 5.2 V, 1 A
Allowable operating temperature	0°C to 40°C (10°C to 35°C during charging)
Dimensions (mm)	83 mm x 28 mm x 40 mm (W x H x D: excluding cord and AC plug)
Mass	Approx. 77 g

Battery Pack (BN-VG114E/BN-VG114AC)

Item	Details
Power voltage	3.6 V
Capacity	1400 mAh
Dimensions (mm)	31 mm x 21.5 mm x 43 mm (W x H x D)
Mass	Approx. 40 g

Memo : _____

- The specifications and appearance of this product are subject to changes for further improvement without prior notice.

