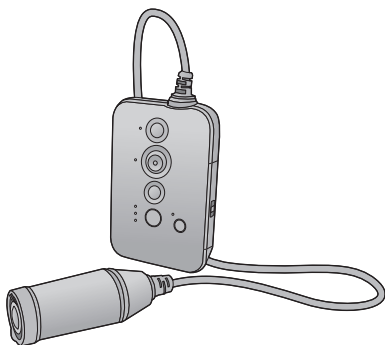# Panasonic®

Owner's Manual
Wearable Camera

Model No. **HX-A100**

Please read these instructions carefully before using this product, and save this manual for future use.

microSDHC™   dlna CERTIFIED™   Wi-Fi CERTIFIED   WI-FI PROTECTED SETUP

Register online at www.panasonic.com/register (U.S. customers only)

VQT4X94

Contents

(Important) About the Waterproof/Dustproof

Waterproof/Dustproof Performance
This unit's waterproof/dustproof rating complies with the "IP58" rating. Provided the care and maintenance guidelines described in this document are strictly followed, this unit can operate underwater, to a depth not exceeding 1.5 m (5 feet) for a time not exceeding 30 minutes. *

This does not guarantee no destruction, no malfunction, or waterproofing in all conditions.

* This means that this unit can be used underwater for specified time in specified pressure in accordance with the handling method established by Panasonic.

■ Handling of this unit

● Waterproofing is not guaranteed if the unit is subject to an impact as a result of being hit or dropped etc. If an impact to this unit occurs, it should be inspected (subject to a fee) by a Panasonic's Service Centre to verify that the waterproofing is still effective.
● The waterproof performance may be degraded due to the strong water pressure when this unit is used deeper than 1.5 m (5 feet) underwater.
● When this unit is splashed with detergent, soap, hot spring, bath additive, sun oil, sun screen, chemical, etc., wipe it off immediately.
● Do not rinse with running water, such as tap water.
● Waterproof function of this unit is for sea water and fresh water only.
● Any malfunction caused by customer misuse, or mishandling will not be covered by the warranty.
● Cards are not waterproof. Do not handle with a wet hand. Also, do not insert wet card into this unit.
● Do not open or close the side cover when your hands are wet or water droplets are present on this unit. Failure to do so may lead to damage such as rusty terminals caused by water droplets.
● **Foreign objects may adhere to the inner side of the side cover (around the rubber seal or connecting terminals) when the side cover is opened or closed in places with sand or dust etc. If you close the side cover with foreign objects adhering to it, water may enter the inside. Be very careful because doing so may cause malfunctions.**
● Do not leave this unit for a long period of time in places where temperature is very low (at high altitude etc.) or very high (inside a car under strong sunlight, close to a heater, on the beach, etc.) Waterproof performance may be degraded.
● The inside of this unit is not waterproof. Water leakage will cause malfunction.
● **If any foreign object has adhered to the inner side of the side cover, remove it.**
● **If any liquid such as water droplets has adhered to this unit or inner side of the side cover, wipe off with a soft dry cloth. Do not open or close the side cover near the water, when underwater, using wet hands, or when this unit is wet. It may cause water leakage.**
● The alert sound and shutter sound may be lowered when using this unit. This is for ensuring the waterproof performance of this unit, and not a malfunction. Opening and closing the side cover will restore the original volume.

■ When inner side of the lens is fogged (condensation)

Condensation may form and the inner side of the lens may steam up if this unit undergoes a significant change in temperature or humidity, such as when this unit is moved from a cold place like a high-altitude location to a warm place.

It is not a malfunction or failure of this unit. It may be caused by the environment in which this unit is used.

● Be careful of condensation since it causes lens stains, fungus and unit malfunction.

What to do when inner side of the lens is fogged

● Turn off this unit and open the side cover in a place with constant ambient temperature, away from high temperatures, humidity, sand and dust. The fog will disappear naturally in about 2 hours with the side cover open when the temperature of this unit gets close to the ambient temperature.

● Contact Panasonic's Service Centre if the fogging does not disappear.

Check before using underwater

Do not open or close the side cover in places with sand and dust, close to water, or with wet hands. Sand or dust adhering may cause water leaks.

1   **Open the side cover.**

   ❶   **Slide the LOCK switch Ⓐ to the left to unlock the side cover.**

   Ⓑ: Unlocked when the red indicator is visible

   ❷   **Slide the side cover downward to open it.**
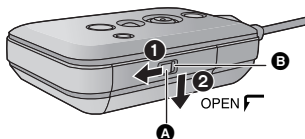
2   **Check that there are no foreign objects on the inner side of the side cover.**

● If there are any foreign objects, such as lint, hair, sand, etc., on the surrounding area, water will leak within a few seconds causing malfunction.

3   **If there is foreign matter adhering to the unit, remove it.**

● Be extremely careful to remove any sand etc. that may adhere to the sides and corners of the rubber seal.

● Wipe it off with a dry soft cloth if there is any liquid. It may cause water leaks and malfunction if you use this unit with liquid adhered.

4   **Check for cracks and deformation of the rubber seal on the side cover.**

● The integrity of the rubber seals may decrease after about 1 year, with use and age. To avoid permanently damaging this unit the seals should be replaced once every two years. Please contact Panasonic's Service Centre for related costs and other information.

5   **Close the side cover securely.**

   ❶   **Close the side cover and slide it upward.**

   ❷   **Slide the LOCK switch to the right to lock the side cover.**

   ● Lock securely to the points where the red portion of the LOCK switch is no longer visible.

   ● Securely close it until it clicks.
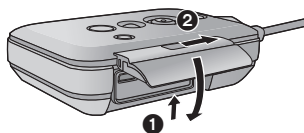
● To prevent water seeping into this unit, be careful not to trap foreign objects such as liquids, sand, hair or dust etc.

Using this unit underwater

- Use this unit underwater at a depth of down to 1.5 m (5 feet) with the water temperature between 0 °C and 35 °C (32 °F and 95 °F).
- Do not use this unit at a depth of over 1.5 m (5 feet).
- Do not use it in hot water over 35 °C (95 °F) (in a bath or hot spring).
- Do not use this unit underwater not longer than 30 minutes continuously.
- Do not open or close the side cover.
- Do not apply shock to this unit underwater. (Waterproof performance may not be maintained, and there is a chance of water leak.)
- Do not dive into the water holding this unit. Do not use this unit in a location where the water will splash strongly, such as rapid flow or waterfall. (Strong water pressure may be applied, and it may cause malfunction.)
- This unit will sink in the water. Take care not to drop this unit.

Caring for this unit after using it underwater

Do not open or close the side cover until the sand and dust is removed by rinsing the camera with water.
Make sure to clean the camera after using it.
- Thoroughly wipe off any water droplets, sand, and saline matter on your hands, body, hair, etc.
- It is recommended to clean the camera indoors, avoiding places where water spray or sand may fall.

Do not leave this unit uncared for longer than 60 minutes after using it underwater.
- Leaving this unit with foreign objects or saline matter on it may cause damage, discoloration, corrosion, unusual odor, or deterioration of the waterproof performance.

1   Rinse with water with the side cover closed.
- After use at the seaside or underwater, soak the unit in fresh water pooled in a shallow container for about 10 minutes.

2   Drain water by holding this unit and shaking it lightly a few times.
- After using this unit at the seaside or underwater, or after washing it, water will remain at the speaker site or mic site of this unit for a while and it may cause lower sound or sound distortion.
- Pay careful attention to prevent this unit from dropping.

3   Wipe off water drops on this unit with a soft, dry cloth and dry this unit in a shaded area that is well ventilated.
- Dry this unit approx. 1 hour or more.
- Dry this unit on a dry cloth.
- Do not dry this unit with hot air from dryer or similar. It will deteriorate the waterproof performance or cause failure due to deformation.
- Do not use chemicals such as benzine, thinner, alcohol or cleanser, soap or detergents.

4   Confirm that there are no water droplets, open the side cover, and wipe off any water droplets or sand left inside using a soft, dry cloth.
- Water droplets may adhere to the card, etc. when the side cover is opened without thoroughly drying. Also, water may accumulate in the gap around the card slot or the terminal connector. Be sure to wipe any water off with a soft, dry cloth.
- The water droplets may seep into this unit when the side cover is closed while it is still wet, causing condensation or failure.

In case water enters this unit, stop the use and consult your dealer.
Malfunctions resulting from water leakage due to wrong handling by customers are not subject to compensation.

Read this first

■ About recording formats and compatibility of this unit

● This unit is an MP4 format (MPEG-4 AVC file standard) Wearable Camera for recording high-definition motion pictures.
● AVCHD and MPEG2 motion pictures are different formats, and are not therefore supported by this unit.

■ About the portrait rights

Be sure to pay special attention to the privacy, the portrait rights, etc. of the subject when you use this unit. Use it at your own risk.

■ Indemnity about recorded content

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

■ About the clock setting

Make sure to set date and time before recording. (➜ 20)

■ For the purposes of this owner's manual

● Pictures may be slightly different from the original.
● Depending on the firmware version you are using, captured screens described in this Owner's Manual may differ from the actual screens.
● Names, icons, contents and services of applications may be changed with no prior notice. Please note that they may differ from the descriptions of this Owner's Manual.
● microSD Memory Card and microSDHC Memory Card are referred to as the "microSD card".
● Smartphone and tablet computer are referred to as the "smartphone".
● Pages for reference are indicated by an arrow, for example: ➜ 00

■ Cards that you can use with this unit

microSD Memory Card and microSDHC Memory Card

What you can do with this unit

You can enjoy a variety of functions by connecting this unit to a smartphone or an access point.

DLNA-compatible devices

Playback on DLNA-compatible devices
You can play back the contents stored in this unit on the DLNA-compatible devices. (➔ 43)

Live broadcasting [*1]
Using the "LUMIX CLUB" and USTREAM services, you can broadcast live motion pictures. (➔ 37)

Connecting to Access Point

LUMIX CLUB

USTREAM

Image App

Connecting direct to the smartphone [*2]

● **Live view (➔ 22)**
● **Remote control (➔ 22)**
● **Playback (➔ 27)**
● **Deletion/Copy (➔ 29, 32)**
● **Data uploading to web services (➔ 33)**

● Facebook
● YouTube™, etc.

Recording [*3] **(➔ 22)**

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*1 Once you make the settings, you can perform a live broadcast with only the button operation on this unit from the next time on.
*2 The functions available for the direct connection to the smartphone are also available for the connection via an access point.
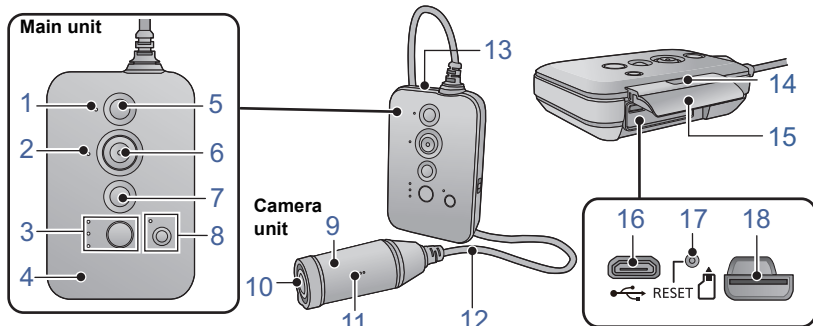*3 You can record motion pictures or still pictures without connecting to the smartphone.

Names and Functions of Main Parts

Main unit

Camera unit

RESET

1. **Power lamp (→ 12, 15)**
2. **Access lamp (→ 14)**
3. **Wi-Fi®/WPS button [WiFi] (→ 17, 35, 40, 41, 53)**
   Wi-Fi mode lamp (→ 17, 35, 40, 41, 53)
   Switches to Wi-Fi mode. Each press of the button switches the lamp.
   ● [☐]: Smartphone mode
   ● [(ᵚ)]: Live broadcasting mode
   ● [🛜]: Access point mode
   ● Off: Wi-Fi mode is turned off
4. **Wi-Fi Transmitter**
5. **Power button [⏻/I] (→ 15, 53)**
6. **Recording start/stop button (→ 22)**
7. **Photoshot button [📷] (→ 22)**
8. **Hold button [🔒]**
   Hold lamp [🔒]

Hold function
The lock lamp [🔒] lights up, and the operation buttons on this unit are locked.
● Even when the operation buttons are locked, you can perform operation from a smartphone. (when connected to Wi-Fi)

Press and hold the button for approx. 2 seconds.

To release the Hold function:
Press and hold the button for approx. 2 seconds when the Hold function is activated.
● Even when the operation buttons are locked, you can perform operation by pressing any of them while pressing and holding the hold button [🔒].

9. **Camera (→ 10)**
10. **Lens (→ 4)**
11. **Mic**
12. **Camera/main unit connection cable**
● This cable is not removable.
13. **Speaker**
14. **LOCK switch (→ 4, 11, 14)**
15. **Side cover (→ 4, 11, 14)**
16. **USB terminal [•⟵] (→ 11)**
17. **Reset button [RESET]**
● If this unit fails to operate correctly, such as when this unit cannot be turned on/off, press the reset button by using a paper clip or a similar object.
18. **Card slot (→ 14)**

Wearing this unit

Wear the main unit and camera unit.

- If you have felt discomfort after a long period of use, stop the use or loosen the tight fit by slightly loosening the adjuster, etc.
- For the direction of the camera, check the actual image on the Live view screen. (→ 23)

Camera unit
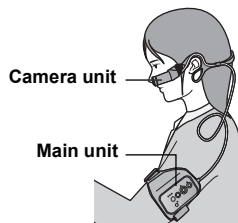
Main unit

Fastening the main unit using the Armband Case

1 Insert so that you can see the buttons on the main unit.

3 Fasten to your arm.

- When fastening the main unit, try not to drop the camera unit to avoid a shock and try not to scratch the lens.
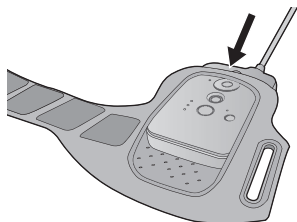
2 If the band is not long enough, attach the extended band ⒞.
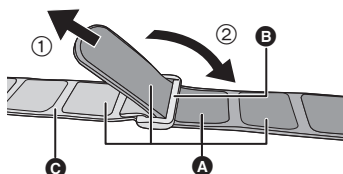
ⓐ: Hook and loop fastener
- Attach by passing the tip of the armband through the buckle portion ⓑ of the extended band.

■ About the Armband Case

The Armband Case can be used as a portable holder.

- When fastening to your arm, remove the camera unit from the armband case.

- When removing the camera/main unit from the Armband Case, avoid pulling the camera/main unit connection cable.
- You can use an optional Multi Mount (VW-MKA100) for a variety of scenes.

Attaching the camera unit to the earhook to wear

1 **Insert the camera unit until it clicks into place.**
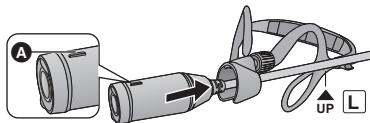
● Insert so that the projecting part Ⓐ of the camera will face up.

2 **Loosen the camera/main unit connection cable Ⓑ to the shape of an ear, and fit it in the holder Ⓒ.**

3 **Hook the earpieces Ⓓ to ears so that the camera unit will be positioned on the left, and adjust the size.**
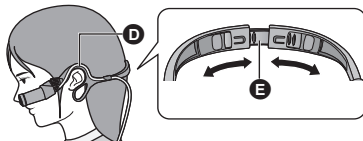
● Adjust by slowly pulling the adjuster Ⓔ sideways.
● If you adjust in such a way that the camera unit comes into close contact with the cheek, you can record less blurry images.
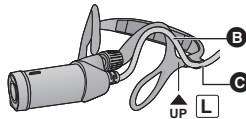
4 **Hold the camera attachment portion Ⓕ , and adjust the direction of the lens.**
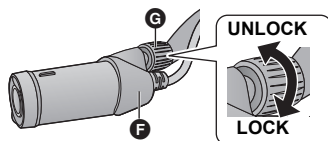
● If the direction of the lens cannot be changed, loosen the adjustment knob Ⓖ slightly and tighten it after adjusting the direction of the lens.
● If the camera unit is shaky, tighten the adjustment knob Ⓖ.

■ How to remove the camera

Hold the camera attachment portion as shown in the figure, and remove the camera unit in the direction of the arrow.
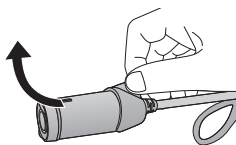
■ How to attach the adjuster (Large) (supplied)

When the earhook is too tight, remove the adjuster of the earhook, and replace it with the supplied adjuster (Large).

1 Press Ⓗ in the direction of the arrow using the supplied adjuster (Large) to pull out the attached adjuster.
● Pull out the one on the other side in the same way.
2 Insert the both side of supplied adjuster (Large) until it clicks into place.
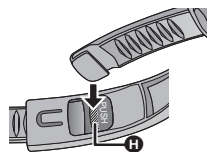
● Do not touch the lens or pull the cable while attaching or removing.
● When you adjust the adjuster, do so slowly without applying too much force.
● If the adjustment knob comes off, attach it as indicated in the right figure.

Power supply

Charging the battery

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

- **This unit has a built-in rechargeable lithium-ion battery. Do not remove except when disposing of this unit. (→ 61)**
- **The battery will not be charged if this unit is turned on. Connect it with the PC to charge the battery after turning it off.**
- It is recommended to charge the battery in a temperature between 10 °C and 30 °C (50 °F and 86 °F).
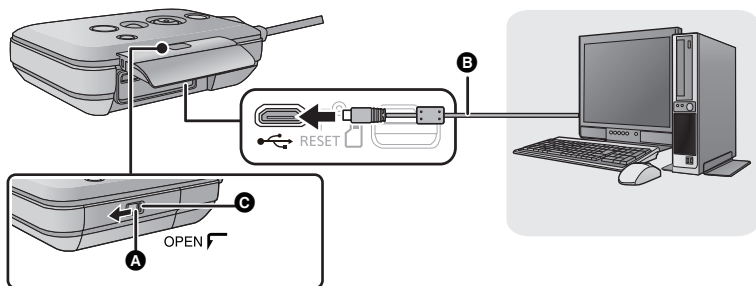
Ⓐ: LOCK switch
Ⓑ: USB cable (supplied)
Ⓒ: Unlocked when the red indicator is visible

1 Slide Ⓐ to the left to unlock the side cover and slide the side cover downward to open it.

2 Connect the USB terminal of this unit to a PC with the USB cable Ⓑ (supplied).

- Insert the USB cable securely all the way.
- The Power lamp will flash red at an interval of 2 seconds (approximately 1 second on, 1 second off), indicating that charging has begun.
  It will turn off when the charging is completed.

- Do not use any other USB cables except the supplied one. (Operation is not guaranteed with any other USB cables.)
- Do not heat or expose to flame.
- Do not leave the unit (including built-in battery) in a car exposed to direct sunlight for a long period of time with doors and windows closed.
- If operating time is short even after fully charging the battery, the battery is worn out and needs to be replaced. Please contact your dealer.
- When the PC is in a power saving mode such as a standby state, the battery may not be charged. Cancel the power saving mode, and connect this unit again.
- Operation is not guaranteed when devices are connected through USB hubs or by using extension cables.
- Operation cannot be guaranteed on all devices having a USB terminal.

Charging and recording time

■ Charging/Recording time

● Temperature: 25 °C (77 °F)/humidity: 60%RH

Charging time	Recording mode	Maximum continuous recordable time	Actual recordable time
4 h 30 min	1920×1080/60p	1 h 50 min	55 min
	1920×1080/30p	2 h 20 min	1 h 10 min
	1280×720/60p	2 h 5 min	1 h 5 min
	1280×720/30p	2 h 35 min	1 h 20 min
	848×480/30p	2 h 40 min	1 h 20 min
	1920×1080/60fps	1 h 50 min	55 min
	1280×720/120fps	2 h 5 min	1 h 5 min
	848×480/240fps	2 h 15 min	1 h 10 min

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

● The actual recordable time refers to the recordable time when repeatedly starting/stopping recording, turning this unit on/off, etc.
● The main unit heats up after use or charging. This is not a malfunction.
● The power lamp flashes (Flashing with approx. 0.5 second period) when the remaining battery time becomes low.
  The remaining battery capacity is displayed on the screen when using Image App (➜ 17).
● For information about charging with a mobile USB charger or an AC adaptor, check the support site.
  http://panasonic.jp/support/global/cs/e_cam/index.html
  (This site is English only.)

The power plug is the disconnecting device. Install this unit so that the power plug can be unplugged from the socket outlet immediately.

When the Power lamp is flashing during charging

Flashing with approx. 0.5 second period (off for approx. 0.25 second, on for approx. 0.25 second):
● Check that the USB terminals of this unit or the connecting device, such as PC are not dirty or covered with a foreign object, and reconnect correctly. If a foreign object or dirt is present, turn off this unit before removing.
● The environment is at an extremely high or low temperature. Wait until the temperature has returned to an appropriate level and try charging again. If you are still unable to charge, there may be a fault in this unit or the connecting device.
Flashing with approx. 2 second period (off for approx. 1 second, on for approx. 1 second):
During charging normally (➜ 11)
Flashing with approx. 4 second period (off for approx. 2 seconds, on for approx. 2 seconds):
● When the battery is over discharged or the temperature of the battery is too high or low. It can be charged, but it may take a few hours to complete the charging normally.
● It will flash in approx. 2 second intervals when normal charging resumes. Even in such cases, it may start flashing in approx. 4 second intervals until charging is completed depending on the conditions of use.

Recording to a card

This unit can record motion pictures or still pictures to a microSD card.

Cards that you can use with this unit

Use microSD Memory Card (512 MB/1 GB/2 GB) or microSDHC Memory Card (4 GB/8 GB/ 16 GB/32 GB) conforming to Class 4[*2] or higher of the SD Speed Class Rating[*1] for motion picture recording.

● Operation of microSD cards other than described above is not guaranteed.

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

CLASS④

*2   Use microSD cards conforming to Class 6 or higher of the SD Speed Class Rating for "Slow motion mode" (→ 24). If you use microSD cards conforming to Class 4 or less of that, the recording may stop suddenly.

● Please check the latest information on the support website below.
http://panasonic.jp/support/global/cs/e_cam/index.html
(This website is in English only.)

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

Inserting/removing a microSD card

Caution:

Check that the access lamp Ⓐ has gone off.
● When this unit is accessing the microSD card (such as recognition, recording, playback and deletion), the access lamp lights up.
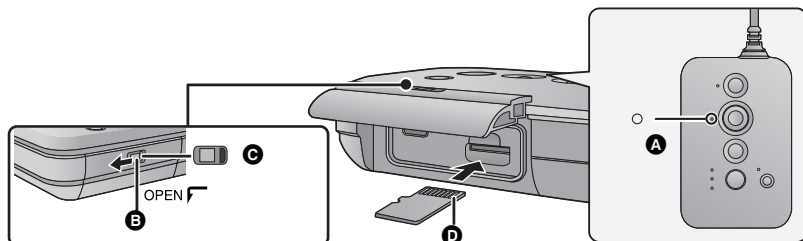
Ⓒ: Unlocked when the red indicator is visible

1 Slide the LOCK switch Ⓑ to the left to unlock the side cover and slide the side cover downward to open it and then insert (remove) the microSD card into (from) the card slot.

● Face the terminal side Ⓓ upward and press it straight in as far as it will go.
● Press the center of the microSD card and then pull it straight out.

2 Close the side cover and slide the LOCK switch Ⓑ to the right to lock it.

● Close the side cover and slide it upward and then lock it.
● Securely close it until it clicks.

When using a microSD card not from Panasonic, or one previously used on other equipment, for the first time on this unit, format the microSD card. (→ 21) When the microSD card is formatted, all of the recorded data is deleted. Once the data is deleted, it cannot be restored.

● When the microSD card is removed, a notification sound emits, and the access lamp flashes fast. (a state in which a microSD card is not inserted)
● Do not touch the terminals on the back of the microSD card.
● For handling of microSD card, refer to page 59.
● **If you insert or remove the microSD card while this unit is in playback mode, Wi-Fi mode will turn off and this unit will lose the connection.**

■ About the access lamp

● When the access lamp is lit, do not:
  − Remove the microSD card
  − Turn this unit off
  − Insert and remove the USB cable
  − Expose this unit to vibrations or shock
  Performing the above while the lamp is on may result in damage to data/microSD card or this unit.

Turning this unit on/off

Press the power button to turn on this unit.

The power lamp is turned on.
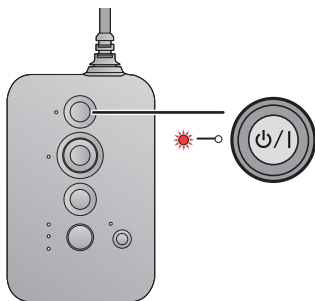
To turn off this unit
Hold down the power button until the power lamp goes off.

Proceed to "Connecting directly with a smartphone" (→ 17) and "Setting up with Setup wizard" (→ 19) to finish the setup of this unit.
You can enjoy the functions of this unit after finishing the setup.

Wi-Fi® function

■ Use this unit as a wireless LAN device

When using equipment or computer systems that require more reliable security than wireless LAN devices, ensure that the appropriate measures are taken for safety designs and defects for the systems used. Panasonic will not take any responsibility for any damage that arises when using the camera for any purpose other than as a wireless LAN device.

■ Use of the Wi-Fi function of this unit is presumed to be in countries where this unit is sold

There is the risk that this unit violates the radiowave regulations if used in countries other than those where this unit is sold, and Panasonic takes no responsibility for any violations.

■ There is the risk that data sent and received via radio waves may be intercepted

Please note that there is the risk that data sent and received via radio waves may be intercepted by a third party.

■ Do not use the camera in areas with magnetic fields, static electricity or interference

- Do not use this unit in areas with magnetic fields, static electricity or interference, such as near microwave ovens. Radio waves may not reach the camera.
- Using the camera near devices such as cordless telephones or any other wireless LAN device that use the 2.4 GHz radio wave band may cause a decrease in performance in both devices.

■ Do not connect to the wireless network you are not authorized to use

Do not attempt to connect to the wireless networks that you are not authorized to use (SSID*) as it may be considered as unauthorized access.

* SSID refers to the name of device that is used to identify a network over a wireless LAN connection. If the SSID matches for both devices, transmission is possible.

■ Before use

To use a Wi-Fi function with this unit, you need an access point or destination device equipped with a wireless LAN function.

- Do not connect to the wireless LAN connection via unknown wireless access point.
- Use a IEEE802.11b, IEEE802.11g or IEEE802.11n compatible device when using an access point.
- When using an access point, we strongly recommend that you set a encryption to maintain information security.
- Before sending motion pictures or still pictures, we recommend you charge the battery fully.
- When sending data on a mobile network or tethering, high packet communication fees may be incurred depending on the details of your contract.
- This unit may not connect to an access point depending on the radio wave condition.
- When using the Wi-Fi function, do not cover the Wi-Fi transmitter with your hand.
- The Wi-Fi transmitter may become warm when using the Wi-Fi function; however this is not a sign of a malfunction.

Connecting directly with a smartphone

Installing Image App

The Image App is an application for the smartphone provided by Panasonic.

Required Operating Systems for Image App
The following Operating Systems of the smartphone are supported.

Android^{TM} device: **Android 2.2 to Android 4.2**
iOS device: **iOS 4.3 to iOS 6.0**

- The service may not be able to be used properly depending on the type of smartphone being used. For compatible devices, see the following support site.
  http://panasonic.jp/support/global/cs/e_cam/index.html (This Site is English only.)

1 **Connect your device (Android or iOS) to a network.**

2 **Android device: Select "Play Store".**
iOS device: Select "App Store^{SM}".

3 **Enter "Panasonic Image App" into the search box.**

4 **Select "Image App" and install it.**
- The icon will be added to the menu.

Connecting this unit with a smartphone

Connecting with a WPS-compatible smartphone

Please read the manual of your smartphone and check if the smartphone is compatible with WPS*.
- If your smartphone is not compatible with WPS, connect this unit with the smartphone according to "Selecting SSID of this unit to connect with a smartphone". (→ 18)
* WPS stands for "Wi-Fi Protected Setup^{TM}".

1 **Press the Wi-Fi/WPS button continuously to change the Wi-Fi mode lamp to [ ].**
- The Wi-Fi mode lamp [ ] flashes.

2 **Set the Wi-Fi function to ON on the smartphone setup menu.**
- Refer to the manual of your smartphone.

3 **Press and hold the Wi-Fi/WPS button for 3 seconds or more.**
- The Wi-Fi mode lamp [ ] flashes faster.

4 **Select the connection using the WPS button (or WPS function) in the Wi-Fi settings of the smartphone within 3 minutes.**
- **Wi-Fi mode lamp [ ] will turn on when the connection is completed.**

Selecting SSID of this unit to connect with a smartphone

Select this unit's SSID (Wireless network name) on a smartphone and enter password to connect with the smartphone.
● Change the default SSID and password after completing the first setting. (→ 19)

1 Press the Wi-Fi/WPS button continuously to change the Wi-Fi mode lamp to [☐].
● The Wi-Fi mode lamp [☐] flashes.

2 Set the Wi-Fi function to ON on the smartphone setup menu.
● Refer to the manual of your smartphone.

3 Tap the SSID of this unit (below) on the Wi-Fi network screen of the smartphone.
● **Password entry screen is displayed.**

4 Enter password (below).
● **Wi-Fi mode lamp [☐] will turn on when the connection is completed.**

Default setting	
SSID:	**A100-wearable**
Password:	**paR9We58n**

● Wi-Fi mode and Wi-Fi mode lamp will turn off if this unit cannot be connected with the smartphone in approx. 30 minutes. Retry the connection setting from the Step1.
● If this unit and the smartphone are too far apart from each other when making the settings, the connection may not be established. Move the devices closer to each other before making the settings.
● Even if you have changed the SSID/password, the default SSID/password (above) are restored when you initialize the network settings. (→ 53) We recommend you keep this manual in a safe place.

Starting Image App

Start Image App.
● If a screen asking you to select a connection destination is displayed, select the SSID for this unit.
● When the [Date & time] screen appears, perform the clock setting. (→ 20)

● **If a connection attempt with this unit fails, set the Wi-Fi function to OFF on the setup menu of the smartphone, set it to ON again, and reconnect.**

Setting up with Setup wizard

After making the settings according to the setup wizard screens, you can use the main functions of this unit.
Proceed to complete the setup by following the on-screen instructions.
● The setup wizard is displayed at the time of purchase and after a long period of non-use during which the battery ran down.

1 Synchronize the time of this unit with that of smartphone.
● Once the clock is set, recording, live broadcasting, and other functions of this unit can be used correctly.
● It may take approximately 60 seconds to synchronize the time of the smartphone with that of this unit.

2 Change the SSID and password for this unit.

● **If the default SSID and password for this unit are used, a third party may obtain compromised information or use the SSID and password for unlawful purposes. Make sure to change the SSID and password.**
● **We recommend you periodically change the SSID and password for this unit.**
● **Set a password different from an SSID. Avoid setting a password that can be easily guessed, and set the one consisting of both alphabetic and numeric characters.**
● **If a new SSID and password have been written down on a piece of paper, etc., manage them so that they will not be compromised.**

● When the SSID and password for this unit are set to the default ones, the setup wizard is displayed.
● Change the SSID and password for this unit.
  − Enter an SSID consisting of alphanumeric characters and/or symbols. The length must be between 1 to 32 characters.
  − Enter a password consisting of both alphabetic and numeric characters. The length must be between 8 to 64 characters.
  − If the SSID and password have been changed, they will be set when this unit is turned on again or the Wi-Fi of this unit is turned on again.

3 Make the connection settings for the access point mode to use devices connected to a wireless router, etc.
● Enter the SSID and password (authentication key) of the access point.

■ When connecting by 📷🔍 (If the device is Android)
❶ Tap 📷🔍 .
❷ **Tap the wireless access point to connect.**
❸ **Enter password.**
● This allows you to operate this unit via an access point using your smartphone.

4 Make the connection destination settings for a live broadcast.
● Enter the SSID and password (authentication key) of the access point.
  Up to three access points can be registered. Register the access point you use, such as the wireless router in your home or the mobile router you use outside.
● The settings can also be made from the Image App menu. (➜ 36)
● You can perform a live broadcast by setting the following.
  − Make the live broadcast settings. (➜ 37)

For compatible access points, see the following support site.
http://panasonic.jp/support/global/cs/e_cam/index.html (This Site is English only.)

■ **If the connection between this unit and the smartphone has been interrupted**

The connection between this unit and the smartphone may be interrupted temporarily depending on radio wave conditions.
An attempt to reconnect is made automatically when radio wave interference, etc. is eliminated. Please note the following.

● If you have been recording a motion picture or recording in the [Interval rec mode], the recording will continue even after the connection interruption. To stop the recording, operate this unit.
● If Image App has been used in playback mode, if reconnecting takes 30 seconds or more, this unit turns to recording mode and Image App will run in recording mode after the connection is restored.
● If this unit has been deleting files, cutting unwanted scenes or formatting, the operation will continue even after the connection interruption.
Do not remove the microSD card while the Access lamp of this unit lights.

Setting date and time

The clock of this unit is synchronized with that of the smartphone.
Synchronize to adjust the clock, etc.

When you start Image App connecting with this unit for the first time, a message asking you to set the date and time will appear. (This message will also be displayed if this unit remains unused for a long period of time.)
Perform Steps 2 below to set the date and time.

Preparation: **Connect this unit with the smartphone and start Image App. (→ 17)**

1 **Tap** 📋 **→ [Camera setup].**

2 **Tap [Date & time].**

● When you want to adjust the clock, change the time of the smartphone first, and then synchronize the time with this unit.
● It may take approximately 60 seconds to synchronize the time of the smartphone with that of this unit.
● When the built-in clock battery runs down, the clock setting returns to the default state. When the battery of this unit is in a charged state, the built-in clock battery is also charged automatically. If you leave the battery in this unit in a charged state for approximately 24 hours, the built-in clock battery stores the clock setting for approximately 4 months.
● The setting range from 1 January 2013 through 31 December 2039 is available for time synchronization with the smartphone.

Using the Setup Menu

For settings on the Setup menu, tap [icon] → **[Camera setup]** → **respective items on the Image App screen.**

Alert Sound

Starting and stopping of recording, unit on/off and occurring errors can be confirmed with this sound. (High/Low/OFF) (➜ 57)

Economy

When about 5 minutes have passed without any operation, this unit automatically turns off to save the battery life.
● This unit will not automatically turn off during Wi-Fi mode or when using this unit as the card reader.

Initial Set

Settings of this unit return to the default condition.
● Wi-Fi network settings will not be changed.
● When this unit is in playback mode, this item is not displayed.

Format

Please be aware that if a microSD card is formatted, then all the data recorded on the microSD card will be erased and cannot be restored. Back up important data on a PC, etc. (➜ 45)
● Do not turn this unit off or remove the microSD card while formatting. Do not expose this unit to vibrations or shock.
● **Do not format a microSD card using any other equipment such as a PC. The card may not be used on this unit.**

Date & time

Please refer to page 20.

Number Reset

Set the file number of the motion picture and still picture recorded next to 0001.
● Folder number is updated and file number will start from 0001. (➜ 47)
● To reset the folder number, format the microSD card, and then perform [Number Reset].

Device info. display

The firmware version of this unit is displayed.

Recording

Record motion pictures or still pictures using the smartphone as a remote control.
● For details, refer to the help of the Image App.

Preparation: Connect this unit with the smartphone and start Image App. (→ 17)

Angle of view
Select Standard or Wide mode.

Live view
Displays an image from the camera of this unit.
● Also outputs sound from the microphone of this unit.

Motion picture recording icon

Still picture recording icon

Recording motion pictures

1 Tap ⬛.
● This unit is set to the recording mode.

2 Tap the motion picture recording icon to start.
● Starts recording.

3 Tap the motion picture recording icon again to stop recording.
● Stops recording.

Recording still pictures

1 Tap ⬛.
● This unit is set to the recording mode.

### *2* Tap the Still picture recording icon to record still picture.
● Updating Live view images may stop while recording still pictures.

■ About recording with this unit

You can record images using this unit without any connection with this unit, turning the Wi-Fi mode off.
● Motion pictures and still pictures cannot be recorded at the same time.

Recording start/ stop button

Photoshot button
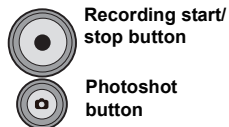
∎ Checks before recording

If you intend to record only with this unit by turning off the Wi-Fi mode, we recommend you make a test recording to check the settings such as the field of view mode, [Image stabilization] and [White balance] before recording. (➜ 22, 25, 26)

- Wear this unit, face the front, and then check them on the Live view screen (➜ 22).
- You can use [Shooting guidelines] (➜ 26) as a guide for balance in composition.
- This unit (camera unit) stabilizes if you wear it while placing it on your cheek.

- The period between the start and end of recording is recorded as one file. However, if the continuous recording time exceeds the following, the file is divided and the pieces are saved separately. (Thumbnails are also created separately, so automatic continuous playback will not be available)
  The amount of data varies depending on the recording image, so use the following as approximate indications.
    - 1920×1080/60p: approx.10 min
    - 1920×1080/30p: approx.19 min
    - 1280×720/60p: approx.15 min
    - 1280×720/30p and 848×480/30p: approx. 22 min
    - 1920×1080/60fps: approx. 9 min
    - 1280×720/120fps: approx. 5 min
    - 848×480/240fps: approx. 2 min
- Each microSD card can save up to approximately 89100 files and approximately 900 folders. When other motion pictures and still pictures have already been saved in the microSD card, the capacity becomes lower.
- Motion pictures are saved in separate folders according to the [Normal shooting mode] or [Slow motion mode] setting. (➜ 24) Still pictures that have been taken one at a time and those taken in [Interval rec mode] (➜ 25) are saved in separate folders. For details about the folders, refer to 47 page.
- If you set the field of view mode to wide, [Level Shot Function] (➜ 25) and [Image stabilization] (➜ 25) is set to OFF.
- If you set the field of view mode to standard and set [Image stabilization] to ON, the field of view becomes narrower.
- If you set the field of view mode to wide or you set the recording mode to [Slow motion mode], the picture size of a still picture will be approximately 5.3 M (3072×1728); if you set the mode to standard, the picture size will be approximately 3 M (2304×1296).
- Refer to page 60 for the approximate recordable time and number of recordable pictures.
- Field of view mode cannot be used when [Slow motion mode] is set to ON.
- If you record motion pictures in a dark place in [Slow motion mode], recorded motion pictures may be darker than those in [Normal shooting mode].
- If you record still pictures in a dark place, recorded still pictures may be darker than motion pictures.
- It may take approximately 3 seconds to stop recording. Confirm if the motion picture recording stops or not by the access lamp or Alert Sound.
- If you check an image or sound when recording motion pictures while this unit is connected wirelessly to a smartphone, etc., howling* may occur. In that case, lower the volume of the smartphone.
- * Refers to a phenomenon in which a microphone outputs an abnormal sound when it picks up a sound from a speaker.

Using the Recording menu

Tap ▤ → **[Record Setup]** → **respective items on the Image App screen.**
- For more information, refer to the help of the Image App.

Normal shooting mode

This sets the recording mode. The greater the number is, the higher the image quality is. However, the file size also becomes greater. (→ 60)
Set to ON to select Normal shooting mode in [Rec Mode]. (If [Normal shooting mode] is set to ON, [Slow motion mode] is automatically switched to OFF.)
- 1920×1080/60p or 1280×720/60p is set, live broadcasting is not available. (→ 37)

Slow motion mode

This records motion pictures in slow motion by setting a high frame rate (increasing the number of frames).
Set to ON to select Slow motion mode in [Rec Mode]. (If [Slow motion mode] is set to ON, [Normal shooting mode] is automatically switched to OFF.)
- Live view is not available during recording. (Video/audio cannot be output during recording.)
- Live broadcasting is not available.
- Sound cannot be recorded.
- [Color Night Rec], [Level Shot Function], [Image stabilization] and Angle switchover are not available.

Rec Mode

The following recording modes are available.
- **When [Normal shooting mode] is set to ON:**

1920×1080/60p	1920×1080/30p	1280×720/60p
1280×720/30p	848×480/30p	

- **When [Slow motion mode] is set to ON:**

1920×1080/60fps:	Plays back at 1/2 times normal speed. (actual playback time is twice as long as the recorded time)
1280×720/120fps:	Plays back at 1/4 times normal speed. (actual playback time is four times as long as the recorded time)
848×480/240fps:	Plays back at 1/8 times normal speed. (actual playback time is eight times as long as the recorded time)

Wind noise reduction

This reduces noise of the wind picked up by the built-in microphone.
- Default setting: OFF
- It may not reduce noise of the wind sufficiently, depending on the recording situation.

Interval rec mode

This is for recording still pictures at a set interval. (60 Seconds/30 Seconds/10 Seconds/5 Seconds/3 Seconds/OFF)

● **If you tap the still picture recording icon, intermittent recording starts. (Tap it again to stop recording.)**
● You can also start/stop intermittent recording by pressing the photoshot button on this unit.
● The access lamp of this unit flashes.
● Normal recording of still pictures/motion pictures is impossible while in [Interval rec mode].
● Updating Live view images may stop while recording still pictures.
● The Self Timer is canceled.

Self Timer

This is for recording still pictures using the timer.
If you record still pictures by setting this to [10 Seconds] or [2 Seconds], recording starts after the set time elapses.
● After recording, the Self-timer is canceled.

Level Shot Function

This is for automatically correcting the horizontal tilt of an image.
● [Level Shot Function] operates when starting to record a motion picture or still picture or when starting to perform a live broadcast.
● [Level Shot Function] will not work in the following cases:
  − When the tilt of the camera is large
  − When the recording mode is set to [1920×1080/60p] or [1280×720/60p].
  − When [Color Night Rec] is set to ON
  − While [Slow motion mode] is set to ON
  − When field of view is set to wide mode.
  − When motion is continuous

Image stabilization

This is for reducing camera shakes.
● [Image stabilization] cannot be set in the following cases:
  − When the recording mode is set to [1920×1080/60p] or [1280×720/60p].
  − When [Color Night Rec] is set to ON
  − While [Slow motion mode] is set to ON
  − When field of view is set to Wide mode.
● The compensation may not be as effective in an extremely dark place or when shakes are too strong.
● This may not work correctly when this unit is at rest.

White balance

When the color tone does not look natural due to a light source, etc., tap [Preset], and select the mode.
- When recording under mercury vapor lamps, sodium lamps, spotlights in a theater, etc. or when recording a sunset/sunrise, etc., fill the entire screen with the white subject, and tap [Custom] → [Set] to set. (The set value is stored in [User].)

Preset mode	Recording conditions
Auto White Balance	Automatic White Balance adjustment
Daylight	Outdoors under a clear sky
Cloudy	Outdoors under cloudy sky
Indoor 1	Incandescent light, video lights like in the studio, etc.
Indoor 2	Color fluorescent lamps, sodium lamps in gymnasiums etc.
User	The color tone set in [Custom]

Backlight Compens.

This makes the image brighter to prevent darkening of a backlit subject.
- It cannot be set while in [Color Night Rec].

Color Night Rec

This function allows you to record color images in very low light situations.
- It cannot be set while in [Slow motion mode].
- Recorded scene is seen as if frames were missed.
- If set in a bright place, the screen may become washed out for a while.
- Bright dots that are usually invisible may be seen, but this is not a malfunction.
- [White balance] setting cannot be changed while this function is activated.

Shooting guidelines

You can check if the image is level. The function can also be used to estimate the balance of the composition.
- The guidelines do not affect the actual images that will be recorded.

Shtr Sound

You can add a sound when recording still pictures. (High/Low/OFF)

Playback

Motion pictures or still pictures stored in this unit are played back with the smartphone.
● For more information, refer to the help of the Image App.

Preparation:　　　**Connect this unit with the smartphone and start Image App. (→ 17)**

1 Tap 　▣　.

● Thumbnails of motion picture or still picture stored in this unit are displayed.
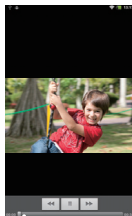
2 Tap 　MP4　 (　JPEG　).

■ For playing back motion pictures

3 Tap MP4.

4 Tap the thumbnail of motion picture you want to play back.

● Motion picture playback screen is displayed.

5 Tap the playback icon on the screen to play back motion pictures.

● Tapping or dragging the slide bar will start playback from the desired position of a motion picture file.

Ⓐ

Ⓐ: Slide bar

■ For playing back still pictures

3 Tap JPEG.

4 Tap the thumbnail of still picture you want to play back.

● Still picture playback screen is displayed.
● Dragging (Flicking) to right or left will play back the next or previous still picture.

■ To copy the data stored in this unit to the smartphone

Copy using "Picture Share" settings.
Set "Save to smartPH" to the picture share tab, and drag and drop the thumbnail of the file you want to copy. (→ 32)

● Copying motion picture files stored in this unit to a smartphone may not be possible depending on the smartphone you are using.
● If motion picture files have been copied to a smartphone, the thumbnails for them will be displayed, but playing them back may not be possible depending on the smartphone you are using.
● Refer to ""Picture Share" settings" (→ 32), "SPLIT & DELETE" (→ 29), and "Delete all" (→ 29) for information on deleting files.

Using the Playback menu

Playback settings

Tap **≡** → **[Playback settings]** → **respective items on the Image App screen.**
● For more information, refer to the help of the Image App.
● Please refer to page 32 for "Picture Share" settings.

Size:Copy from camera

If "Medium" is set, the data will be resized to 2.1M when copying still picture data in this unit to the smartphone. If "Large (original)" is set, the still picture data in this unit will be copied in its original state.

Size:Upl. to WEB

If "Small" is set, still pictures that will be uploaded on a WEB service will be resized to 0.2M. If "Medium" is set, they will be resized to 2.1M. If "Recommended" is set, they will be set to the optimal size. If "Large (original)" is set, the still picture data in this unit will be uploaded in its original state.

LUMIX CLUB settings

● Please refer to page 31 for [Start LUMIX CLUB function use] and page 31 for [Regist. WEB Service].

Manage login ID: A list of login information for registered WEB services is displayed. (→ 31)
                         ● This is displayed after selecting [Start LUMIX CLUB function use].

Camera function

Tap 🖼 → 📑 → **items in [Camera function] on the Image App screen.**
- For more information, refer to the help of the Image App.
- For "Play on TV", refer to "Playing back on a DLNA-compatible TV" (➜ 43).

SCENE PROTECT

Motion/still pictures can be protected so that they are not deleted by mistake.
(Even if you protect some motion/still pictures, formatting the microSD card will delete them.)

SPLIT & DELETE

This splits a motion picture into two and deletes the unnecessary part before or after the split point.
- It may not be possible to divide files with a short recording time.

Delete all

This deletes all files at once.
When MP4 thumbnails are displayed, only MP4 files are deleted all at once; when JPEG thumbnails are displayed, only JPEG files are deleted all at once.

Required settings for sending data, etc.

When you upload motion pictures and still pictures recorded with this unit on WEB services (Facebook, YouTube, etc.) or perform a live broadcast using "USTREAM", you are required to set the following.

● For more information, refer to the help of the Image App.

■ Required settings for uploading/live broadcasting

WEB services	Required settings	
	Android device	**iOS device**
Uploading on WEB services	● From the Play Store, etc., download the applications that perform uploading on the WEB services. ● ""Picture Share" settings" (➜ 32)	● "Registering "LUMIX CLUB"" (➜ 31) ● "Registering WEB services" (➜ 31) ● ""Picture Share" settings" (➜ 32)
Live broadcasting	● "Registering "LUMIX CLUB"" (➜ 31) ● "Registering WEB services" (➜ 31) ● "Live broadcast settings (synchronizing with this unit)" (➜ 32)	

Refer to the "LUMIX CLUB" site for details.
http://lumixclub.panasonic.net/eng/c/
To use the Live broadcast, access following website.
http://lumixclub.panasonic.net/eng/c/

"LUMIX CLUB" settings

If you intend to broadcast a live motion picture or use WEB services with an iOS device, you are required to register "LUMIX CLUB" and WEB services you use because uploading or live broadcasting is done via "LUMIX CLUB".

Registering "LUMIX CLUB"

Perform service user registration (free of charge) for the "LUMIX CLUB", acquire a login ID, and set the registered content on this unit.

1 **When this unit and a smartphone are connected directly (➜ 17), turn off the Wi-Fi setting of the smartphone to make the internet connection available.**
● When using an access point connection (➜ 41), proceed to step 2.

2 **Tap ☰ → [Playback settings] → [LUMIX CLUB settings] → [Start LUMIX CLUB function use] on the Image App screen to set ON.**
● If a login ID for the "LUMIX CLUB" has already been acquired on a PC, etc., the acquired login ID can also be used.

3 **Tap [Sign up].**

4 **Read through the [LUMIX CLUB] terms of use, and tap [Agree].**

5 **Enter the password on the next screen. → Tap [Register].**
● After the login, complete the registration according to the on-screen instructions. (When using an access point connection (➜ 41), step 6 is not required.)

6 **Close (or hide) the Image App, turn on the Wi-Fi setting, and connect this unit and smartphone. (➜ 17)**

Registering WEB services

Check the following site for supported WEB services.
http://lumixclub.panasonic.net/eng/c/

1 **When this unit and a smartphone are connected directly (➜ 17), turn off the Wi-Fi setting of the smartphone to make the internet connection available.**
● When using an access point connection (➜ 41), proceed to step 2.

2 **Acquire login information (login ID, password, etc.) on the WEB service you want to use.**

3 **Tap ☰ → [Playback settings] → [LUMIX CLUB settings] → [Regist. WEB Service] → any WEB services you want to use on the Image App screen, enter the login information acquired in Step2 and then complete the registration.**
● Follow on-screen instructions to register.

4 **Close (or hide) the Image App, turn on the Wi-Fi setting, and connect this unit and smartphone (➔ 17)**

Live broadcast settings (synchronizing with this unit)

When you perform a live broadcast with USTREAM, you are required to synchronize the "LUMIX CLUB" settings with this unit.

Tap [≣] → [Playback settings] → [LUMIX CLUB settings] → [Manage login ID] and tap [Register the same LUMIX CLUB login ID as the camera].

"Picture Share" settings

To upload on a WEB service from the Image App, you are required to make the "Picture Share" settings.
"Picture Share" settings are also used for copying or deleting motion pictures or still pictures recorded in this unit to a smartphone.
● For more information, refer to the help of the Image App.

1 **When this unit and a smartphone are connected directly (➔ 17), turn off the Wi-Fi setting of the smartphone to make the internet connection available.**
● When using an access point connection (➔ 41), proceed to step 2.

2 **Tap [≣] → [Playback settings] → ["Picture Share" settings] on the Image App screen.**

3 **Drag and drop the icons for uploading, copying and deleting to one of the tabs on the four sides of the screen to make the settings.**
● **Uploading, copying, deleting, etc. can be done by tapping and holding a thumbnail, and dragging and dropping it to the tab.**

4 **Close (or hide) the Image App, turn on the Wi-Fi setting, and connect this unit and smartphone (➔ 17)**

Data uploading

Uploads motion/still pictures stored on this unit to WEB services.
"LUMIX CLUB" settings, etc. are required for uploading. (→ 31) Refer to "Required settings for sending data, etc." (→ 30).
● For more information, refer to the help of the Image App.
Preparation: Connect this unit with the smartphone and start Image App. (→ 17)

When using the Android device

1 Tap ▣ .
● Thumbnails of motion picture or still picture stored in this unit are displayed. (→ 27)

2 Tap and hold the thumbnail of the motion picture or still picture you intend to upload.
● Tabs are displayed on four sides.

3 Drag and drop the thumbnail to the tab of the WEB service you intend to use.

When using the iOS device

1 Tap ▣ .
● Thumbnails of motion picture or still picture stored in this unit are displayed. (→ 27)

2 Tap and hold the thumbnail of the motion picture or still picture you intend to upload.
● Tabs are displayed on four sides.

3 Drag and drop the thumbnail to the tab of the WEB service you intend to use.

4 Enter a comment you intend to post on the WEB service.

5 Press the home button on the iOS device, and cancel the connection between this unit and the iOS device (turn off the Wi-Fi setting).
● Set the internet environment, such as the 3G network connection, to the one for the iOS device.

6 Restart the Image App.
● When a message indicating that a connection attempt is being made with the camera is displayed, close the message screen.

7 Tap ⇪ on the top right of the screen, tap the motion picture or still picture you want to upload from the list, and send it.
● After uploading, connect directly to the smartphone. (→ 17)

● When using an access point connection (→ 41), step 5 - 7 is not necessary if this unit and the smartphone (iOS device) are connected to the same network. Uploading starts when comments are entered.

- If 3G or other mobile connections are used for uploading motion pictures or still pictures, high data charges may be incurred depending on the content of your data plan.
  Uploading on WEB services can also be done with an access point connection. (→ 41)

Setting the connection destination for Live broadcasting (Connecting in Live broadcast mode)

This is the connection method for Live broadcasting using the "LUMIX CLUB" and "USTREAM" services.

● Check if the wireless access point is compatible with IEEE802.11b, IEEE802.11g, or IEEE802.11n.
● Access point settings are required specially for Live broadcasting.
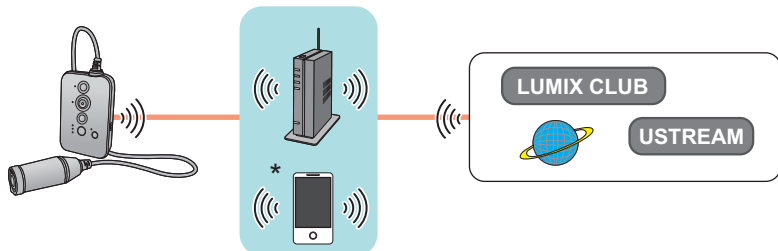
* Only the smartphone compatible with tethering is available.

Connecting this unit with an access point (such as a wireless router)

Connecting to a WPS-compatible access point

Please read the manual of your access point and check if the access point is compatible with WPS.

● If your access point is not compatible with WPS, connect this unit with an access point according to "Entering SSID to connect to an access point". (➔ 36)

1 Press the Wi-Fi/WPS button continuously to change the Wi-Fi mode lamp to [(ꙮ)].

● The Wi-Fi mode lamp [(ꙮ)] flashes. ("1 Beep" sounds 8 times.)

2 Press and hold the Wi-Fi/WPS button for 3 seconds or more.

● The Wi-Fi mode lamp [(ꙮ)] flashes faster.

3 Press the WPS button of your access point within 3 minutes. (Set to the WPS standby state.)

● When "2 Beeps" sound 8 times, the connection is completed.

Entering SSID to connect to an access point

Enter SSID (Wireless network name) and password of your access point to connect this unit to the access point.

Preparation: Connect this unit with the smartphone. (→ 17)

1 Check the SSID and password of your access point.

- The SSID and password of the access point (e.g. a wireless router) you use are described on the access point device or in its manual. For details, refer to the access point manual.

2 Tap [≡] → [Camera Wi-Fi settings] → [Live mode settings] → [Set connect. dest.] on the Image App screen and enter the SSID and password of your access point (Step1).

3 Press the Wi-Fi/WPS button continuously to change the Wi-Fi mode lamp to [(ᴗ)].

- The Wi-Fi mode lamp [(ᴗ)] flashes. ("1 Beep" sounds 8 times.)
- When "2 Beeps" sound 8 times, the connection is completed.

■ About the connection destination in Live broadcast mode

You can register up to three SSIDs for live broadcasting (step 2)
When perfoming a live broadcast, a connection attempt will be made with the first SSID, and if it fails, an attempt will be made with the second one, and so on.
- From [Live mode settings] → [Set connect. dest.], the following can be set.
    - Changing the priority order of the SSIDs for live broadcasting
    - Deleting connection destinations

- To disconnect from the access point, press the Wi-Fi/WPS button and turn off the Wi-Fi mode lamp.
- When the Wi-Fi mode lamp of this unit switches, the connection between this unit and the smartphone is canceled.

Live broadcasting

Using the "LUMIX CLUB" and "USTREAM" services, you can broadcast live motion pictures. (Live broadcasting)

● For the connection, refer to "Setting the connection destination for Live broadcasting (Connecting in Live broadcast mode)" (→ 35).
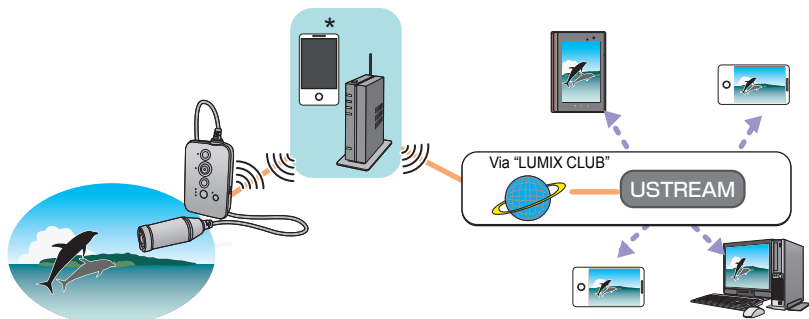
* Only the smartphone compatible with tethering is available.

Setting for Live broadcasting

Make the settings for performing a live broadcast on this unit.
For "LUMIX CLUB" settings, etc., refer to "Required settings for sending data, etc." (→ 30).

1 **Using the browser of a PC or smartphone, register to "USTREAM", and acquire an ID/password/program.**

> **About the USTREAM**
> With this video-sharing website, you can stream and watch motion pictures this unit is recording.
> **Refer to the USTREAM site for details.**
> http://www.ustream.tv/

2 **Make the "LUMIX CLUB" settings (→ 31)**

3 **From the Image App, tap ☰ → [Playback settings] → [LUMIX CLUB settings] → [Regist. WEB Service] → [USTREAM].**

4 **Make the coordination settings between the "LUMIX CLUB" and "USTREAM".**

● Enter the ID/password/program in step 1.
● Make the settings by following on-screen instructions.

Settings on this unit

Set the Image Quality, etc. for when in Live broadcast mode. (Direct connection to the smartphone is required for the settings. (→ 17))

From the Image App, tap ▦ → [Camera Wi-Fi settings] → [Live mode settings], and make the settings.

Items	Contents
Set connect. dest.	Up to three SSIDs can be registered for live broadcasting. Each of them will make a connection attempt in turns when performing a live broadcast. (→ 36)
E-mail Setup	This sends a notification e-mail for a live broadcast to e-mail addresses specified at the start of the "USTREAM" broadcast. ● If the e-mail setting is made, an e-mail will be sent for every broadcast. If you do not want to send it, set this to OFF.
E-mail date format	This sets the date display format of an e-mail, which will be sent when performing a live broadcast.
Save in USTREAM	This sets whether to save motion pictures that have been broadcast live on the "USTREAM" side.
Image Quality	This sets the image quality of motion pictures that will be broadcast.

● Depending on the e-mail rejection or firewall setting at the destination address, e-mails may not be delivered.

■ About Image Quality for Live broadcasting

Set the Image Quality from the following.
When [AUTO] is set, the Image Quality is checked and is automatically set to one of the options.
When broadcasting motion pictures or sound are interrupted or the line is disconnected, set the Image Quality according to your communication environment.

Image Quality	Recommended optimal speed (upstream)[1]	Motion pictures		Audio
		Resolution	Frame rate[2]	
High pic. quality	3Mbps or more	1280×720	5 to 30 fps (5 to 10 fps)	128kbps
Medium pic. quality	1Mbps or more	640×360	5 to 30 fps (5 to 10 fps)	128kbps
Low pic. quality	500kbps or more	320×176	5 to 30 fps (5 to 15 fps)	32kbps

[1] Recommended optimal speed (upstream) for the broadband line, mobile router (tethering), etc. connected to this unit (For information on the optimal speed, contact your service provider, etc.)
[2] Frame rate in parentheses are when recorded simultaneously.

- Depending on the line state, images or sound may be interrupted or the line may be disconnected. Set the Image Quality by referring to the values of the recommended optimal speeds (upstream) above as an approximate guide.
- Operation cannot be guaranteed for all devices.
- Even with a broadband line, the recommended optimal speed may not be reached depending on your environment.
- Narrowband lines such as analog modems cannot be used.
- When using a tethering function with a smartphone or a mobile router, an image or sound may be interrupted or the communication may be disconnected.
- Check your contract details carefully, as broadband contract details may result in high communication charges being incurred, or a limit placed on communication traffic.

Performing a live broadcast

Press the Wi-Fi/WPS button continuously to change the Wi-Fi mode lamp to [(ᵩ)].

- The Wi-Fi mode lamp [(ᵩ)] flashes and an alert sound is emitted while a live broadcast connection is being processed.
- Wi-Fi mode lamp [(ᵩ)] will turn on when the connection is completed.
- A live broadcast starts.
- If [E-mail Setup] is enabled, a broadcast notification e-mail is sent to the addresses that have been set.

■ To stop a live broadcast

Press the Wi-Fi/WPS button, and turn off the Wi-Fi mode lamp.

- If recording is taking place on this unit during a live broadcast, the live broadcast cannot be stopped. Stop the motion picture recording in advance.

■ About live broadcast images

You can record live broadcast images by pressing the recording start/stop button.
- The Image App cannot be used connecting with this unit in Live broadcast mode. Access the URL of the live broadcast to check the image.

■ When the Wi-Fi mode lamp [(ᵩ)] is flashing fast (flashing at an approximate interval of 0.5 second)

A live broadcast cannot be started.
- In the following cases, live broadcasting is not available.
  - When the recording mode is set to [1920×1080/60p] or [1280×720/60p]
  - When in [Slow motion mode]
  - While recording a motion picture
  - When in [Interval rec mode]
  - When the date setting is out of sync by a day or more
  - When two cameras simultaneously perform live broadcasts at the same account (The camera that has started the broadcast first will be disconnected from the broadcast)

- When settings for live broadcasts are completed and [E-mail Setup] in [Live mode settings] is set, a live broadcast starts and a notification e-mail is sent to all registered e-mail addresses each time the Wi-Fi mode lamp [(ᵩ)] lights up. When not sending, set to OFF.
- When you cannot view and listen to a broadcast using the USTREAM application of a television or a smartphone, the password of a distribution program is canceled. Please rebroadcast.
- If a live broadcast motion picture is saved on the "USTREAM" side, the file name will be the same as the channel name.
- The live broadcast stops as the elapsed broadcast time exceeds 8 hours 30 minutes, and then it starts again. (A separate file will be saved on the "USTREAM" side.)

Connecting to devices on the network (Connecting in Access Point mode)

The following connections are for controlling this unit from a smartphone via an access point (wireless router, etc.) or for playing back motion pictures in this unit on a DLNA-compatible TV. (The connections of both ① and ② are required)

● Check if the wireless access point is compatible with IEEE802.11b, IEEE802.11g, or IEEE802.11n.
● **Recording, playback and uploading using Image App, etc. are also available for the connection via an access point.**

DLNA-compatible devices

①   ②

Image App
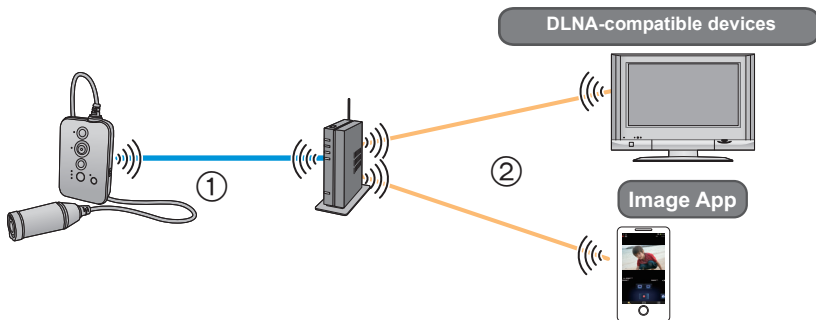
① Connecting this unit to an access point (such as a wireless LAN router)

Connecting to a WPS-compatible access point

Please read the manual of your access point and check if the access point is compatible with WPS.
● If your access point is not compatible with WPS, connect this unit with an access point according to "Entering SSID to connect to an access point". (→ 42)

1 **Press the Wi-Fi/WPS button continuously to change the Wi-Fi mode lamp to [ ].**
● The Wi-Fi mode lamp [ ] flashes.

2 **Press and hold the Wi-Fi/WPS button for 3 seconds or more.**
● The Wi-Fi mode lamp [ ] flashes faster.

3 **Press the WPS button of your access point within 3 minutes. (Set to the WPS standby state.)**
● Wi-Fi mode lamp [ ] will turn on when the connection is completed.

Enter SSID (Wireless network name) and password of your access point to connect this unit to the access point.

Preparation: Connect this unit with the smartphone. (→ 17)

1 Check the SSID and password of your access point.

● The SSID and password of the access point (e.g. a wireless broadband router) you use are described on the access point device or in its manual. For details, refer to the access point manual.

2 Tap [icon] → [Camera Wi-Fi settings] → [AP mode setup] → [Set connect. dest.] on the Image App screen and enter the SSID and password of your access point (Step1).

3 Press the Wi-Fi/WPS button continuously to change the Wi-Fi mode lamp to [[icon]].

● The Wi-Fi mode lamp [[icon]] flashes.
● Wi-Fi mode lamp [[icon]] will turn on when the connection is completed.

② **Connecting this unit and a device on the network**

1 Connect a smartphone or a DLNA-compatible device to the access point.

● Connect with an SSID connection or a WPS connection. For information on the connection method, refer to the operating instructions for your device or access point.

2 *When connecting to the smartphone*
From the Image App, tap [icon] → [Set connect. dest.], and tap this unit from the connection destination list.

● When the connection is complete, control this unit from the Image App.

When connecting with a DLNA-compatible device
On the DLNA device, select this unit from the list of devices that are connected to the access point.

● Refer to the operating instructions of your DLNA-compatible device.
● Refer to page 43 for how to play back on a DLNA-compatible TV.

● An access point connection cannot be started during motion picture recording.
● To disconnect from the access point, press the Wi-Fi/WPS button and turn off the Wi-Fi mode lamp.
● When the Wi-Fi mode lamp of this unit switches, the connection between this unit and the smartphone is canceled.

Playing back on a DLNA-compatible TV

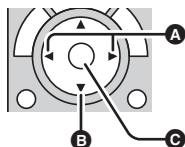Play back the data in this unit on a DLNA-compatible device, such as a DLNA-compatible TV.
● Refer to "Connecting to devices on the network (Connecting in Access Point mode)" (→ 41) for information on the connection. (To control this unit from a smartphone, you need to connect both the DLNA device and the smartphone to the same network.)
● For compatible devices, see the following support site. (This Site is English only.)
http://panasonic.jp/support/global/cs/e_cam/index.html

Controlling from a DLNA-compatible device

1 Select this unit (SSID) (→ 18) by the TV side.

2 Perform playback operations with the TV remote control.

● Playback operations may differ depending on the TV in use.
● The following operations can be performed if a color button is pushed.
Blue/Red: Skip playback
● Fast forward/Fast rewind playback cannot be performed.

(Examples of operations during motion picture playback)
Ⓐ   Skip playback
Ⓑ   Stop
Ⓒ   Playback/Pause

Controlling from a smartphone

Play back the data in this unit by using the smartphone.

1 From the "Image App", tap 🖻 → 🗐 → [Play on TV].

2 Tap the model name of DLNA-compatible TV you use for playback.

3 Perform playback operations with the smartphone.

● It may take time to start playing back.
● Motion picture files of [848×480/30p]/[848×480/240fps] can be played back on a DLNA-compatible device.
● The data in this unit cannot be saved on a DLNA-compatible device.
● Images or sound may be interrupted or the line may be disconnected.
● When playing back on a TV, the image being played back is not displayed on the Image App screen.

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About network information of this unit

For the network for this unit, tap ▤ → [Camera Wi-Fi settings] → [Camera SSID settings] from the Image App to make changes, etc.
The following settings can be made.
- − Changing the SSID/Changing the network password
- − Displaying the MAC address information (MAC address refers to a unique ID number assigned to devices that are capable of connecting to the network. MAC address is used for identifying those devices.)

What you can do with a PC

If you connect this unit to a PC while this unit is turned off, charging of this unit starts. (→ 11)
If you connect this unit to a PC while this unit is turned on, this unit is recognized as a card reader, so you can access the microSD card in this unit from the PC.
● If the battery has worn out with this unit, recharge sufficiently and turn on this unit.
● You can use HD Writer WE 1.0 when using with Windows. (→ 48)
    Use iMovie'11 when using with Mac. (For details about iMovie'11, please contact Apple Inc.)

∎ To connect this unit to a PC

Refer to "Charging the battery" (→ 11) for how to connect this unit to a PC.
● **Turn on this unit before connecting.**
● When the power lamp and access lamp lights up, the connection is complete.
● When using HD Writer WE 1.0, connect after installing the software.
● If the supplied CD-ROM is in the PC, connect after removing it.

Card reader function (mass storage)

Operating environment

When using this unit as a card reader, the following PC environment is required.
● Even if the system requirements mentioned in this owner's manual are fulfilled, some PCs cannot be used.
● The USB equipment operates with the driver installed as standard in the OS.

∎ For use with Windows

PC	IBM PC/AT compatible PC
OS	Windows 8 (32 bit/64 bit) Windows 7 (32 bit/64 bit) or SP1 Windows Vista (32 bit) (SP2) Windows XP (32 bit) (SP3)
CPU	Windows 8/Windows 7/Windows Vista: 1 GHz or higher 32-bit (×86) or 64-bit (×64) processor (including compatible CPU) Windows XP: Intel Pentium III 450 MHz or higher or Intel Celeron 400 MHz or higher
RAM	Windows 8/Windows 7: 1 GB or more (32 bit)/2 GB or more (64 bit) Windows Vista Home Basic: 512 MB or more Windows Vista Home Premium/Business/Ultimate/Enterprise: 1 GB or more Windows XP: 512 MB or more (1 GB or more recommended)
Interface	USB port
Other requirements	Mouse or equivalent pointing device

● This software is not compatible with Microsoft Windows 3.1, Windows 95, Windows 98, Windows 98SE, Windows Me, Windows NT and Windows 2000.
● Operation on an upgraded OS is not guaranteed.
● Operation on an OS other than the one pre-installed is not guaranteed.

■ For use with Mac

OS	Mac OS X 10.8.2
CPU	Intel Core 2 Duo or better
RAM	2 GB or more
Interface	USB port
Other requirements	Mouse or equivalent pointing device

Copying motion/still pictures on PC

Using with Windows

When using this unit as a card reader, removable disk (Example: CAM_SD (F:)) is displayed in [Computer].

> We recommend using HD Writer WE 1.0 (➔ 48) to copy motion picture files.
> Using Windows Explorer or other programs on the PC to copy, move or rename files and folders recorded with this unit will result in them being unusable with HD Writer WE 1.0.
> It is impossible to write files to microSD card on this unit from a PC.

1 Double-click the folder that contains the still pictures. ([DCIM] → [100CDPFQ] etc.)
2 Drag and drop the still pictures onto the destination folder (on the PC's HDD).

■ To disconnect USB cable safely

Select the icon in task tray displayed on the PC, and then click [Eject Panasonic Wearable Camera].

● Depending on your PC's settings, this icon may not be displayed.

Using with Mac

When using this unit as a card reader, [CAM_SD] is displayed on the desktop.
1 Double-click [CAM_SD] displayed on the desktop.
2 Using a drag-and-drop operation, move the pictures you want to acquire or the folder storing those pictures to any different folder on the PC.

■ To disconnect USB cable safely

Drag [CAM_SD] disk icon to the [Trash], and then disconnect the USB cable.

● Do not delete the microSD card's folders. Doing so may make the microSD card unusable in this unit.
● When a file not supported by this unit has been recorded on a PC, it will not be recognized by this unit.
● Always use this unit to format microSD cards.
● It is possible to play back still pictures on a PC using a image viewer standard to Windows or commercially available image browsing software, and copy still pictures to a PC using Windows Explorer.

About the PC display

The folder structure of a microSD card on which this unit has performed recording is as follows.

Example folder structure of a microSD card:

```
CAM_SD
  DCIM
      100CDPFQ ────────── ❶
      102YAPMW ────────── ❷
      103YCPMW ────────── ❸
      104XAPMW ────────── ❹
      105XCPMW ────────── ❺
      106SCPMW ────────── ❻
      107YTPMW ────────── ❼
      108XSPMW ────────── ❽
      109SRPMW ────────── ❾
      BACKUP.TMP ──────── ❿
      INDEX.DAT ───────── ⓫
      BACKUP.HST
```
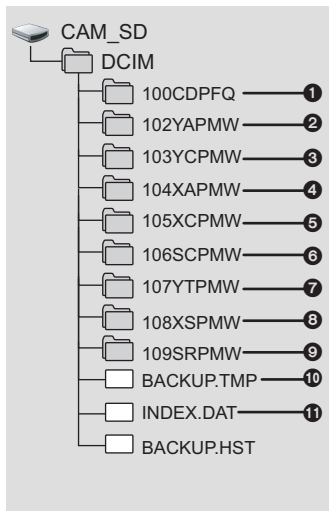
● **Folder numbers range from 100 to 999.**
  Four or five alphabetic characters after a three-digit number indicate the file type.
● **A new folder is created each time the date changes.**

❶ **Still pictures in JPEG format (Each folder stores a maximum of 999 still pictures) Intermittent recording (A new folder is created for each recording)**

❷ – ❻ **Motion picture files in MP4 format (Each folder stores a maximum of 99 files)**
  ❷ 1920×1080/60p
  ❸ 1920×1080/30p
  ❹ 1280×720/60p
  ❺ 1280×720/30p
  ❻ 848×480/30p

❼ – ❾ **Slow-motion pictures (MP4 format)**
  ❼ 1/2 times normal speed (1920×1080/60fps)
  ❽ 1/4 times normal speed (1280×720/120fps)
  ❾ 1/8 times normal speed (848×480/240fps)

❿ – ⓫ Administrative files

Using the HD Writer WE 1.0 (Windows only)

The feature of HD Writer WE 1.0

You can copy the motion/still picture files to the HDD of PCs or microSD cards using HD Writer WE 1.0, the software installed in the supplied CD-ROM.

What can be done with the HD Writer WE 1.0	Data type
Copying data to a PC	Motion picture and still picture
Editing: ● Editing motion picture data copied on an HDD of a PC ● Dividing, Trimming, Title, Effect, Transition, BGM, Delete partially ● Converting part of motion picture into still picture	Motion picture
Online sharing: You can upload motion pictures or still pictures on the Internet and share them with your family and friends.	Motion picture and still picture
Playing back on a PC: Play back the motion picture data in high-definition picture quality on a PC.	Motion picture and still picture

● Refer to the operating instructions of HD Writer WE 1.0 (PDF file) for details on how to use it.

● **It is impossible to write files to this unit from a PC.**
● **Motion pictures that have been recorded on another device cannot be written to the software supplied with this unit.**
● **When motion picture data is written to and read from the microSD card, correct operation of this unit cannot be guaranteed if software other than supplied with this unit is used.**
● Do not start the software supplied with this unit and other software at the same time. Close any other software if you start the software supplied with this unit and close the software supplied with this unit if you start any other software.

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Operating environment for HD Writer WE 1.0

When using HD Writer WE 1.0, the following PC environment is required.
- Even if the system requirements mentioned in this owner's manual are fulfilled, some PCs cannot be used.
- A CD-ROM drive is necessary to install the supplied software applications. (A compatible Blu-ray disc/DVD writer drive and media are necessary for writing to a Blu-ray disc/DVD.)

PC	IBM PC/AT compatible PC
OS	Windows 8 (32 bit/64 bit) Windows 7 (32 bit/64 bit) Starter/Home Basic/Home Premium/Professional/Ultimate (SP1) Windows Vista (32 bit) Home Basic/Home Premium/Business/Ultimate (SP2) Windows XP (32 bit) (SP3)
CPU	Intel Pentium 4 2.8 GHz or higher (including compatible CPU) - Intel Core 2 Duo 2.16 GHz or higher or AMD Athlon 64 X2 Dual-Core 5200+ or higher is recommended when using playback function. - Intel Core 2 Quad 2.6 GHz or higher is recommended when using editing function.
RAM	Windows 8/Windows 7: 1 GB or more (32 bit)/2 GB or more (64 bit) Windows Vista: 1 GB or more Windows XP: 512 MB or more (1 GB or more recommended)
Display	High Color (16 bit) or more (32 bit or more recommended) Desktop resolution of 1024×768 pixels or more (1920×1080 pixels or more recommended) Windows 8/Windows 7/Windows Vista: DirectX 9.0c compatible video card (DirectX 10 recommended) Windows XP: DirectX 9.0c compatible video card Compatible with DirectDraw overlay PCI Express™×16 compatible recommended Video memory of 256 MB or more recommended
Free hard disk drive space	Ultra DMA — 100 or more 450 MB or more (for installing the software)
Sound	DirectSound Support
Interface	USB port [Hi-Speed USB (USB 2.0)]
Other requirements	Mouse or equivalent pointing device Internet connection

- Operation is not guaranteed in the following cases.
  - When 2 or more USB devices are connected to a PC, or when devices are connected through USB hubs or by using extension cables.
  - Operation on an upgraded OS.
  - Operation on an OS other than the one pre-installed.
- This software is not compatible with Microsoft Windows 3.1, Windows 95, Windows 98, Windows 98SE, Windows Me, Windows NT and Windows 2000.
- Supplied CD-ROM is available for Windows only.
- Input is not supported in languages other than English, German, French and Russian.
- Operation is not guaranteed on Microsoft Windows Vista Enterprise, Windows XP Media Center Edition, Tablet PC Edition, Windows 7 Enterprise and Windows 8 Enterprise.
- This software is not compatible with a multi-boot environment.
- This software is not compatible with a multi-monitor environment.
- If using Windows XP, an administrative account user only can use this software. If using Windows Vista/Windows 7/Windows 8, administrative account and standard account users only can use this software. (An administrative account user should install and uninstall this software.)
- For Windows 8, this software is available only as a desktop application.

- You will need a high performance PC depending on the functions to be used. It may not properly play back or properly operate depending on the environment of the PC used. Refer to the operating environment and notes.
- Operation during the playback may become slow if the CPU or memory is not fulfilling the requirements of the operating environment.
- Always use the most current driver for the video card.
- Always make sure there is enough capacity on the HDD in the PC. It may become inoperable or the operation may stop suddenly if the capacity gets low.

Installation

When installing the software, log on to your computer as the Administrator or with a user name with equivalent authorization. (If you do not have authorization to do this, consult your manager.)
- Before starting the installation, close all applications that are running.
- Do not perform any other operations on your PC while the software is being installed.
- Explanation of operations is based on Windows 7.

1 Insert the CD-ROM into the PC.
- The [AutoPlay] screen is displayed automatically. Click [Run setup.exe] → [Yes].
- If the [AutoPlay] screen is not displayed automatically, select [Start] → [Computer] (or double-click on [Computer] on the desktop), and then double-click [Panasonic].

2 Click [Yes].

3 Click [Next].

- **Proceed with the installation by following the on-screen instructions.**
- If the country or region cannot be selected, select [NTSC Area].
- **The PC must be rebooted for the application to work.**

■ **Uninstalling HD Writer WE 1.0**

Follow the steps below to uninstall any software applications that you no longer require.

1 **Select [Start] → [Control Panel] → [Uninstall a program].**

2 **Select [HD Writer WE 1.0], then click [Uninstall].**
● Proceed with the uninstallation by following the on-screen instructions.
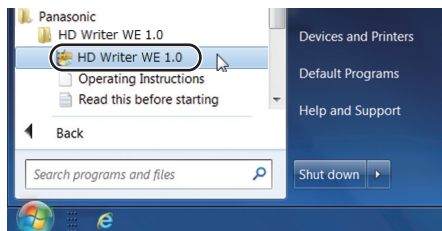● After uninstalling the software, be sure to reboot the PC.

Starting HD Writer WE 1.0

● To use the software, log on as an Administrator or as user name for standard user account (only for Windows 8/Windows 7/Windows Vista).
The software cannot be used with the user name for a guest account.
(On the PC)
Select [Start] → [All Programs] → [Panasonic] → [HD Writer WE 1.0] → [HD Writer WE 1.0].

● For details on how to use the software applications, read the PDF operating instructions of the software.

Reading the operating instructions of the software applications

● You will need Adobe Acrobat Reader 5.0 or later or Adobe Reader 7.0 or later to read the PDF operating instructions.

Select [Start] → [All Programs] → [Panasonic] → [HD Writer WE 1.0] → [Operating Instructions].
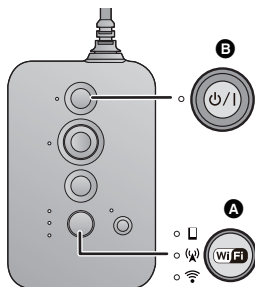
Initializing this unit

Initializing the network settings

This returns the following network-related settings to the default states.
● An SSID/password for this unit set after the purchase
  ([Camera Wi-Fi settings] → [Camera SSID settings] in the Image App)
● An SSID/password for the access point you use in Live broadcast mode
  ([Camera Wi-Fi settings] → [Live mode settings] → [Set connect. dest.] in the Image App)
● An SSID/password for the access point you use in Access Point mode
  ([Camera Wi-Fi settings] → [AP mode setup] → [Set connect. dest.] in the Image App)
● A login ID and password for the "LUMIX CLUB"
  ([Playback settings] → [LUMIX CLUB settings] → [Manage login ID] in the Image App)

Turn on this unit while pressing and holding the Wi-Fi/WPS button, and press and hold the Wi-Fi/WPS button Ⓐ and the power button Ⓑ for approximately 5 seconds.
● **When the Wi-Fi mode lamps [▯] [⟨ᵂ⟩] [⟨≋⟩] light up for approximately 1 second and turn off, the initialization of the network settings is complete.**

● When the operation buttons are locked (➜ 8), the network settings cannot be initialized.
● Initializing a login ID and password for the "LUMIX CLUB" will only delete them from this unit, and will not cancel the membership. The site remains available.

Troubleshooting

Problem	Check points
The lens fogs up.	● This is due to condensation. It is not a malfunction. Please refer to page 4.
This unit cannot be turned on. This unit does not stay on long enough. Battery runs down quickly.	● Charge the battery again to ensure it is sufficiently charged. (➔ 11) ● In cold places, the battery using time becomes shorter. ● If the operating time is very short even after the battery has been recharged sufficiently, the battery has worn out. Consult with your dealer.
If the microSD card is inserted in this unit, it is not recognized.	● If the microSD card is formatted on a PC, it may not be recognized by this unit. Use this unit to format microSD cards. (➔ 21)
The power lamp flashes for 5 seconds and the power turns OFF.	● The temperature has become high. Please wait until the temperature of this unit decreases.
The alert sound and shutter sound are low.	● This is for ensuring the waterproof performance of this unit, and not a malfunction. Opening and closing the side cover will restore the original volume.
The access lamp flashes for 5 seconds and the power turns off (a warning sounds).	● A card which is not guaranteed to work may have been inserted, or the number of folders or files on the inserted card may exceed the limit. Check the error details on the Image App screen.
This unit arbitrarily stops recording.	● Use a microSD card that can be used for motion picture recording. (➔ 13) ● The recordable time may have shortened due to the deterioration of the data writing speed or repeated recording and deletion. Using this unit, format the microSD card. (➔ 21) ● Using a microSD card with a speed class of 4 or less in [Slow motion mode] (➔ 24) may cause to stop recording suddenly. (➔ 13)
Pictures cannot be taken.	● Pictures cannot be taken while recording motion pictures. ● Pictures cannot be taken in [Interval rec mode]. ● Pictures cannot be taken during live broadcasting.
Color balance of images is strange when recording in a place such as a gymnasium.	● In a place with multiple light sources, such as a gymnasium or a hall, set the White Balance setting to [Indoor 2]. If you cannot record clearly with the [Indoor 2], set it with [Custom]. (➔ 26)
Recorded motion pictures flicker. Horizontal lines appear in recorded movies.	● If motion pictures are recorded in [Slow motion mode] (➔ 24) with the [1280×720/120fps]/[848×480/240fps] setting, flickering or horizontal lines may appear when recorded under a fluorescent light.

Problem	Check points
Mosaic-like noise appears and movement is jagged when viewing the live view screen on a smartphone.	● If the Recording Mode is set to [1920×1080/60p] or a motion picture recorded in [1920×1080/60p] is played back, mosaic-like noise may appear on the screen, and movement may not seem smooth. (The images to be recorded are not affected.)
A motion picture file is created that is longer than the recording time.	● Recording in [Slow motion mode] (→ 24) will create a motion picture file that is longer than the recording time. For example, the playback time of a motion picture recorded in [848×480/240fps] (1/8 slow-motion) will be 8-times longer than the actual recording time.
This unit does not change to playback mode.	● When this unit is recording a movie, Image App cannot change to playback mode.
Files cannot be played back.	● If a high-quality motion picture is copied to a smartphone, it may not be able to be played back on the smartphone. (→ 24)
Power of this unit does not turn OFF, even after closing Image App.	● The power of this unit can be turned OFF by tapping [icon] → [Camera function] → [Camera power off] from the Image App screen.
The Image App screen suddenly changes to recording mode.	● Image App changes to changes to recording mode if pressing the recording start/stop button or photoshot button on this unit while Image App is in playback mode.
When the USB cable is disconnected, an error message will appear on the PC.	● To disconnect the USB cable safely, double-click the [icon] icon in the task tray and follow the instructions on the screen. (Windows)
When connected by the USB cable, this unit is not detected by the PC.	● If the power of this unit is OFF, this unit starts charging when it is connected to a PC. ● After re-inserting the microSD card into this unit, reconnect the supplied USB cable. ● Select another USB terminal on the PC. ● Check the operating environment. (→ 45, 46, 50) ● Connect the supplied USB cable again after restarting the PC and turning on this unit again.
Cannot see the PDF operating instructions for HD Writer WE 1.0.	● You will need Adobe Acrobat Reader 5.0 or later or Adobe Reader 7.0 or later to read the PDF operating instructions for HD Writer WE 1.0.
It cannot connect to the access point or smartphone. **Radio waves get disconnected.**	● Check how to connect to the access point and how to set the security settings. ● If it takes time to complete the connection, the Wi-Fi connection will be aborted. Reset the connection settings. (→ 41) ● Make sure the SSID and password have been correctly input. (→ 44) ● When the radio waves are interrupted, the condition may improve by moving the location or changing the angle of the access point. ● Is any device, such as microwave oven, cordless phone, etc., that uses 2.4 GHz frequency operated nearby? Radio waves may get interrupted when used simultaneously. Use them sufficiently away from the device.

Problem	Check points
Access point is not displayed.	● Turn on the access point. ● Perform the connection closer to the access point. ● This unit may not display or connect to a access point depending on the radio wave condition. ● It may not display even if the radio waves exist depending on the setting of the access point. Check the settings of the access point.
It takes long time every time to connect to a smartphone.	● It may take longer time to connect depending on the Wi-Fi connection setting of the smartphone, but it is not a malfunction.
The Wi-Fi connection disconnects immediately.	● If the Android 4.0 or higher device is used and set to disable connections if the connection is weak in the Wi-Fi Setting menu, turn this setting OFF.
This unit is not displayed in the Wi-Fi setting screen of the smartphone.	● Try switching the ON/OFF of the Wi-Fi function in the Wi-Fi settings of the smartphone.
I have forgotten the Login ID or Password for the "LUMIX CLUB".	● Check the information in the login screen of "LUMIX CLUB". http://lumixclub.panasonic.net/eng/c/
Live broadcasting does not work even if live broadcasting is set.	● Live broadcasting cannot be performed if the date and time of the smartphone that is synchronized with this unit is not set correctly. First set the date and time of the smartphone correctly, then synchronize it with this unit. (→ 20)
Motion pictures or pictures cannot be sent to the WEB service.	● The WEB service site has some problem or connection may be congested. Try again after waiting a short while.
I have forgotten the SSID and password of this unit.	● The password can be checked from the Image App screen. Tap 📋 → [Camera Wi-Fi settings] → [Camera SSID settings]. (Image App does not require a Wi-Fi connection.) ● If the password cannot be checked using the procedure above, reset the network settings. (→ 53) Resetting this unit returns all Wi-Fi settings to the default settings, including the "LUMIX CLUB" login ID settings and registered SSID. (→ 18)

Alert Sound

If this unit is not operating correctly, take note of the alert sound to resolve any problems.

"2 Beeps" sound 4 times
- If the power is ON, the time of this unit has not been set. Set the date and time. (→ 20)   - If the power lamp flashes quickly and the power turns OFF, the following symptoms are possible.   - The remaining battery level is low. (Charge the battery.) (→ 11)   - This unit has become hot. (Turn ON the power after while a short while.)   - If the access lamp flashes quickly, the microSD card is defective. (Includes limit of card capacity, data errors, etc.)   The status of this unit can be checked by directly connecting to a smartphone, or on the Image App. (The status of this unit will be displayed as a message.)

"3 Beeps" sound and the Wi-Fi connection disconnects
● The connection environment has become worse. Move this unit closer to the connected device.

"4 Beeps" sound and Wi-Fi mode disconnects
● Wi-Fi mode disconnects automatically if Wi-Fi mode has not connected for approximately 30 minutes.

"1 Beep" sounds 8 times and live broadcasting does not start
● Cannot connect to the connection destination for live broadcasting. Check the settings (SSID or password), and communication environment (signal conditions or whether the Wi-Fi mode is correct). (→ 35)

"2 Beeps" sound 8 times and live broadcasting does not start
● This unit cannot log in to "LUMIX CLUB". Check whether the settings (login ID/password, synchronization of setting details with this unit) are correct and the "LUMIX CLUB" site has some problems. (→ 31)

"3 Beeps" sound 8 times and live broadcasting does not start
● This unit cannot log in to "USTREAM". Check whether the settings (login ID/password) are correct and the "USTREAM" site has some problems. (→ 31)

"4 Beeps" sound 8 times and live broadcasting does not start
● There is a problem with the "USTREAM" site. Check that multiple live broadcasts are not being performed with the same ID, that there are no problems with the program set for broadcasting, that the data communication speed is sufficient, and that this unit clock is set correctly.

"1 Beep" sounds 8 times and cannot connect to the access point
● Check the access point settings (SSID or password), and communication environment (whether the signal or Wi-Fi mode are correct).(→ 41)

Cautions for use

About this unit

This unit and the microSD card become warm during use. This is not a malfunction.

Keep this unit as far away as possible from electromagnetic equipment (such as microwave ovens, TVs, video games etc.).
● If you use this unit on top of or near a TV, the pictures and/or sound on this unit may be disrupted by electromagnetic wave radiation.
● Recorded data may be damaged, or pictures may be distorted, by strong magnetic fields created by speakers or large motors.
● Electromagnetic wave radiation generated by microprocessors may adversely affect this unit, disturbing the pictures and/or sound.

Do not use this unit near radio transmitters or high-voltage lines.
● If you record near radio transmitters or high-voltage lines, the recorded pictures and/or sound may be adversely affected.

Make sure to use the supplied cable.
Do not extend the cable.

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

When you use this unit in a sandy or dusty place such as a beach, do not let sand or fine dust get into the body and terminals of this unit.
● Sand or dust may damage this unit. (Care should be taken when inserting and removing a card.)

Do not use this unit in strenuous sports involving impacts and collisions.

When carrying this unit, do not drop or bump it.
● A strong impact can break this unit's casing, causing it to malfunction.

Cleaning
● Before cleaning, pull the USB cable from the PC, and then wipe this unit with a soft, dry cloth.
● If this unit is very dirty, dip a cloth in water and squeeze firmly, and then wipe this unit with the damp cloth. Next, dry this unit with a dry cloth.
● Use of benzine, paint thinner, alcohol, or dishwashing liquid may alter the camera body or peel the surface finish. Do not use these solvents.
● When using a chemical dust cloth, follow the instructions that came with the cloth.

Do not use this unit for surveillance purposes or other business uses.
● This unit was designed for consumer intermittent use. It was not intended for continuous use, or for any industrial or commercial application resulting in prolonged use.
● In certain situations, continuous use could cause this unit to overheat and cause a malfunction. Such use is strongly discouraged.

When you are not going to use this unit for an extended time
● Store this unit in a cool place with minimal humidity, and with a constant temperature where possible (recommended temperature: 15 ºC to 25 ºC (59 ºF to 77 ºF), recommended humidity: 40%RH to 60%RH).
● Always remove the card from this unit.
● When storing this unit for an extended time, it is recommended that you charge it once every year.
● The battery discharges slowly even if this unit is not used. The remaining battery level will decrease when this unit is not used for an extended time.
● When storing this unit in a cupboard or cabinet, it is recommended that you place a desiccant (silica gel) in with it.

Terminate usage of armband/earhook if a feeling of discomfort arises, including any skin reactions.

About personal information

Delete personal information from this unit when requesting repairs or handing it to others/ disposing of this unit in order to protect personal information. Wireless router and LUMIX CLUB ID/passwords are stored in this unit, so make a copy of this information and reset the network settings to prevent unauthorized use of the information. (➜ 53)
Also remember to remove the microSD card from this unit. (➜ 14)

Indemnity

● Information, including personal information, may be changed or lost as a result of mistaken operation, static electricity effects, accident, breakage, repair or other handling. It should be noted before use that Panasonic does not accept any responsibility for direct or indirect problems which occur as the result of the change to or loss of the information including personal information.

About the microSD card

● The memory capacity listed on the microSD card label is the total of the capacity that is used for protection and management of copyright, and capacity that can be used normally with this unit and computer.
● Do not subject the microSD card to strong shocks, bend it or drop it.
● Data on the microSD card may be damaged or deleted due to electrical noise, static electricity or malfunctions with this unit or the microSD card.

When disposing of or giving away the microSD card, note that:

● Formatting and deletion of data on this unit or computer only changes the file management information and does not completely delete the data in the microSD card.
● It is recommended that the microSD card is physically destroyed or the microSD card is physically formatted using commercially available data erasing software when disposing of or giving away the microSD card.
● The customer is responsible for the management of the data in the microSD card.

Cautions for using a microSD card

● Do not expose the terminals of the microSD card to water, dirt or dust.
● Do not place microSD cards in the following areas:
  − In direct sunlight
  − In very dusty or humid areas
  − Near a heater
  − Locations susceptible to significant difference in temperature (condensation can occur.)
  − Where static electricity or electromagnetic waves occur
● To protect microSD cards, return them to their cases when you are not using them.

About firmware updates

To update the firmware of this unit, copy the firmware update file to the microSD card and insert it into this unit, and turn the power of this unit ON by pressing the power button while holding the Wi-Fi/WPS button and photoshot button. (➜ 8)

> **For the latest update information, check the support website below. (As of January 2013)**
> http://panasonic.jp/support/global/cs/e_cam/index.html
> (This site is English only.)

About the battery

The battery used in this unit is a rechargeable lithium-ion battery. It is susceptible to humidity and temperature and the effect increases the more the temperature rises or falls.
If the operating time is very short even after the battery has been recharged, the battery has worn out.
**Consult with your dealer.**

Recordable time/Number of recordable pictures

microSD cards are only mentioned with their main memory size.

Recording modes/approximate recordable time

- The default setting is [1920×1080/30p] Mode.
- The stated times are the approximate recordable times for continuous recording.
- The recordable time may be reduced if recording with a lot of action is recorded or recording of short scene is repeated.
- Maximum continuously recordable time: 6 hours
- The recording is paused once when the continuous recording time exceeds 6 hours, and the recording will automatically resume after a few seconds.

Ⓐ: Favours image quality, Ⓑ: Favours Recording time

Normal shooting mode
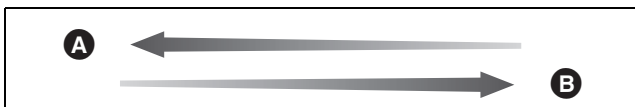
Picture size/ Frame rate		1920×1080 /60p	1920×1080/ 30p	1280×720/ 60p	1280×720/ 30p	848×480/30p
Transfer rate (VBR)		Max.28 Mbps	Average 15 Mbps	Average 15 Mbps	Average 9 Mbps	Average 4.5 Mbps
microSD card	**4 GB**	19 min	35 min	35 min	1 h	1 h 50 min
	8 GB	40 min	1 h 10 min	1 h 10 min	2 h	3 h 40 min
	16 GB	1 h 20 min	2 h 20 min	2 h 20 min	4 h 10 min	7 h 30 min
	32 GB	2 h 40 min	4 h 40 min	4 h 40 min	8 h 20 min	15 h

Slow motion mode

Picture size/ Frame rate		1920×1080/60fps	1280×720/120fps	848×480/240fps
Transfer rate (VBR)		Average 15 Mbps	Average 9 Mbps	Average 4.5 Mbps
microSD card	**4 GB**	15 min	13 min	13 min
	8 GB	30 min	27 min	27 min
	16 GB	1 h	55 min	55 min
	32 GB	2 h	1 h 50 min	1 h 50 min

Approximate number of recordable pictures

- **The number of recordable pictures depends on the subject being recorded.**

Picture size	microSD card			
	4 GB	8 GB	16 GB	32 GB
5.3M (3072×1728)	1100	2200	4500	8500
3M (2304×1296)	1600	3400	6500	13500

Requests when disposing of this unit

When disposing of your used products, remove the battery built into this unit after initializing the network settings (➜ 53), and please cooperate in recycling of the battery. Please refer to page 62 about how to remove the battery.

● Please make sure that the battery is disposed of at an officially assigned location, if there is one in your country.

Do not disassemble this unit other than when disposing of this unit.

This is the rechargeable battery for this unit.
Do not use other than with this unit.
Do not charge the rechargeable battery when it has been removed.

● Do not place in fire or heat it.
● Do not puncture with nails, subject it to impact, disassemble or modify it.
● Do not touch metal to the + and − terminals.
● Do not store or carry together with necklaces or hairpins, etc.
● Do not heat in microwaves or ovens, etc.
● Do not charge, use or leave in hot places such as next to fires or in extremely hot weather.
● Do not put into water.

This may cause leaking, overheating, fire or rupture.

● If a leak should occur, by no means touch the liquid with bare hands.
If the liquid gets on the body or clothes, wash well with water. If the liquid gets into your eyes, there is a danger of blindness. Do not rub the eyes; after washing immediately with clean water, consult your physician.

Keep removed screws etc. out of the reach of small children.
If accidentally ingested there will be adverse physical effects.

● Should you suspect that such an object has been ingested, consult your physician immediately.

Battery used for this unit

|	
Name:	Lithium ion (Li-ion) rechargeable battery
Nominal voltage:	DC 3.7 V

How to remove the battery

When disposing of your used products, delete personal information from this unit by initializing the network settings.

> This figure describes the disposal of this unit, it is not instruction for repair. If disassembled, repair is not possible.

- Disassemble after the battery runs out.
- If it cannot be removed smoothly, contact Panasonic's Service Center.
- Keep disassembled parts out of reach of children.

1 **Open the side cover, and remove all of the 6 screws indicated in the figure below.**
- Use a cross-slot screwdriver (commercially available).
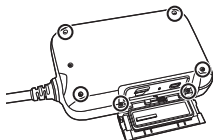
2 **Remove the circuit board on the front side (button side) of this unit, and remove the flexible circuit board Ⓐ.**
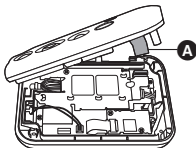
3 **After pulling out the built-in battery connector Ⓑ, pull out the flexible circuit board Ⓒ, and pull out the speaker connector Ⓓ upwards.**
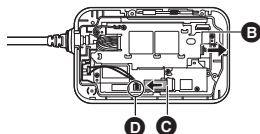
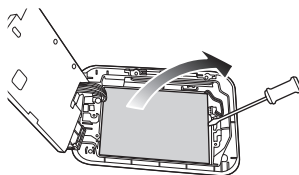4 **Remove the 4 screws indicated in the figure below, and remove the heatsink Ⓔ.**
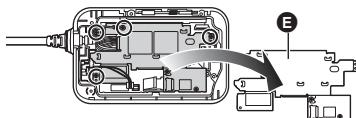
5 **Remove the connector Ⓕ of the camera unit, and lift up the circuit board.**
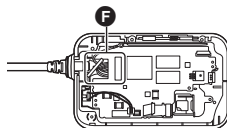
6 **Remove the battery by using a screwdriver.**

Regarding the handling of used batteries
- Insulate the terminals with cellophane tape or similar.
- Do not disassemble.

About copyright

■ Carefully observe copyright laws

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

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