

Service Manual

High Definition Video Camera

AVCHD™
Progressive

HDMI

SD
XC™

DOLBY
DIGITAL

DLNA
CERTIFIED™

WiFi®
CERTIFIED

WI-FI
DIRECT
SETUP

N™

Model No. **HC-W850P**

HC-W850PC

HC-W850PU

HC-W850EB

HC-W850EE

HC-W850EF

HC-W850EG

HC-W850EP

HC-W850GC

HC-W850GK

HC-W850GW

HC-W858EG

HC-W850MGK

HC-W850MGN

HC-V750P

HC-V750PC

HC-V750EB

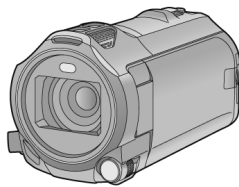
HC-V750EE

HC-V750EF

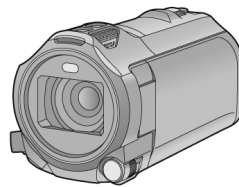
HC-V750EG

HC-V750EP

HC-V750GC



HC-W850/W858/W850M



HC-V750/V757/V750M/V730

Panasonic®

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HC-V757EG HC-V750MGN

HC-V730EE

Colour

(K).....Black Type

(W).....White Type (only HC-W850EF/W858EG/V757EG/V730EE)

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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1 Safety Precautions

1.1. General Guidelines

1. IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by

⚠ in the Schematic Diagrams, Circuit Board Layout, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent X-RADIATION, shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

2. An Isolation Transformer should always be used during the servicing of AC Adaptor whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect AC Adaptor from being damaged by accidental shorting that may occur during servicing.
3. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
4. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
5. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

1.2. Leakage Current Cold Check

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between $1\text{ M}\Omega$ and $5.2\text{ M}\Omega$. When the exposed metal does not have a return path to the chassis, the reading must be infinity.

1.3. Leakage Current Hot Check (See Figure. 1)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a $1.5\text{ k}\Omega$, 10 W resistor, in parallel with a $0.15\text{ }\mu\text{F}$ capacitor, between each exposed metallic part on the set and a good earth ground, as shown in Figure. 1.
3. Use an AC voltmeter, with $1\text{ k}\Omega/\text{V}$ or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 V RMS . A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed $1/2\text{ mA}$. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

Hot-Check Circuit

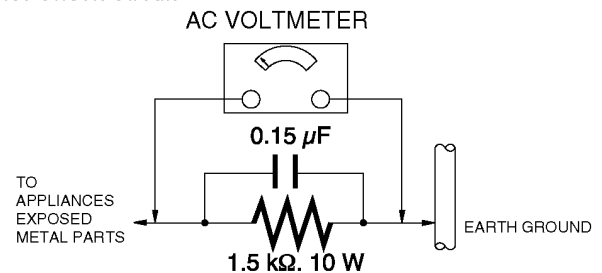


Figure. 1

2 Warning

2.1. Prevention of Electrostatic Discharge (ESD) to Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by electrostatic discharge (ESD).

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any ESD on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging ESD wrist strap, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an antistatic solder removal device. Some solder removal devices not classified as "antistatic (ESD protected)" can generate electrical charge sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION :

Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity (ESD) sufficient to damage an ES device).

2.2. How to Recycle the Lithium Ion Battery (U.S. Only)

ENGLISH



A lithium ion/polymer battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY for information on how to recycle this battery.

FRANÇAIS



L'appareil que vous vous êtes procuré est alimenté par une batterie au lithium-ion/lithium-polymère. Pour des renseignements sur le recyclage de la batterie, veuillez composer le 1-800-8-BATTERY.

2.3. Caution for AC Cord (For EB/GC)

2.3.1. Information for Your Safety

IMPORTANT

Your attention is drawn to the fact that recording of pre-recorded tapes or discs or other published or broadcast material may infringe copyright laws.

WARNING

To reduce the risk of fire or shock hazard, do not expose this equipment to rain or moisture.

CAUTION

To reduce the risk of fire or shock hazard and annoying interference, use the recommended accessories only.

FOR YOUR SAFETY

DO NOT REMOVE THE OUTER COVER

To prevent electric shock, do not remove the cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

2.3.2. Caution for AC Mains Lead

For your safety, please read the following text carefully.

This appliance is supplied with a moulded three-pin mains plug for your safety and convenience.

A 5-ampere fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5 amperes and it is approved by ASTA or BSI to BS1362

Check for the ASTA mark or the BSI mark on the body of the fuse.



If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover, the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local Panasonic Dealer.

If the fitted moulded plug is unsuitable for the socket outlet in your home then the fuse should be removed and the plug cut off and disposed of safely.

There is a danger of severe electrical shock if the cut off plug is inserted into any 13-ampere socket.

If a new plug is to be fitted please observe the wiring code as shown below.

If in any doubt, please consult a qualified electrician.

2.3.2.1. Important

The wires in this mains lead are coloured in accordance with the following code:

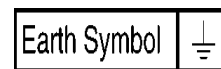
Blue	Neutral
Brown	Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.

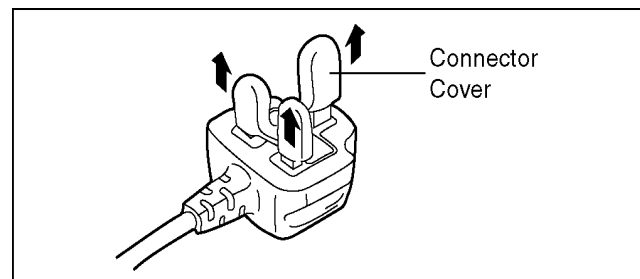
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth Symbol.



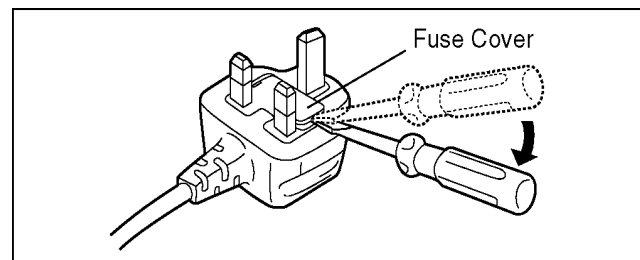
2.3.2.2. Before Use

Remove the Connector Cover as follows.

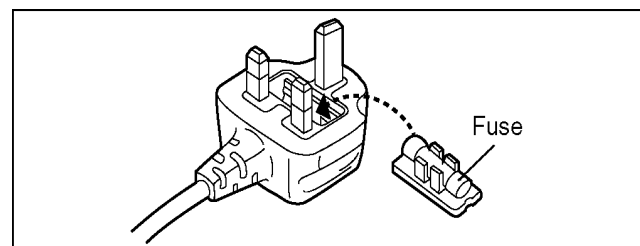


2.3.2.3. How to Replace the Fuse

1. Remove the Fuse Cover with a screwdriver.



2. Replace the fuse and attach the Fuse cover.



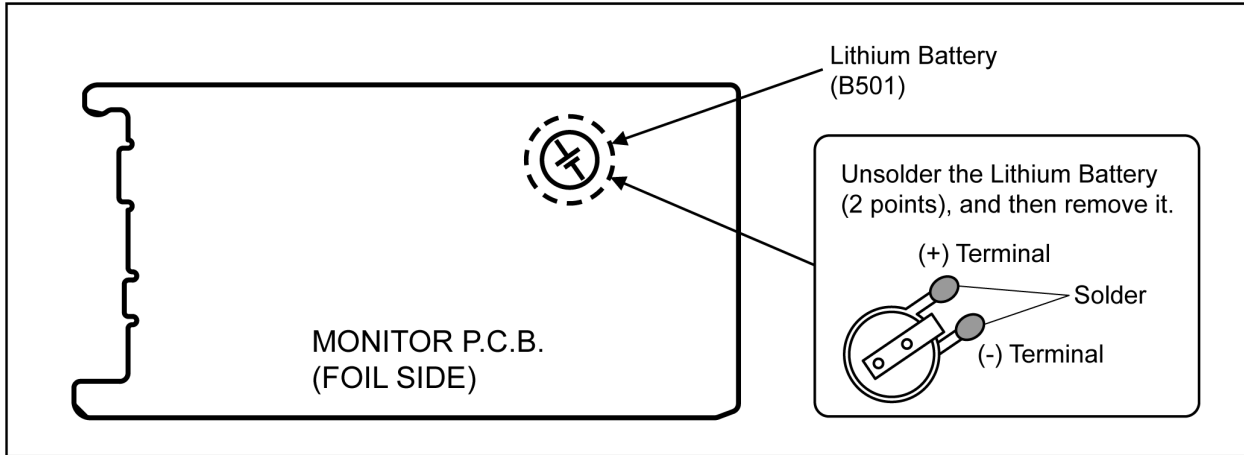
2.4. How to Replace the Lithium Battery

2.4.1. Replacement Procedure

1. Remove the MONITOR P.C.B.. (Refer to Disassembly Procedures.)
2. Unsolder the each soldering point of electric lead terminal for Lithium battery (Ref. No. "B501" at foil side of MONITOR P.C.B.) and remove the Lithium battery together with electric lead terminal. Then replace it into new one.

NOTE:

The Type No. ML-614S/DN includes electric lead terminals.



NOTE:

This Lithium battery is a critical component.

(Type No.: ML-614S/DN **Manufactured by Energy Company, Panasonic Corporation**)

It must never be subjected to excessive heat or discharge.

It must therefore only be fitted in requirement designed specifically for its use.

Replacement batteries must be of same type and manufacture.

They must be fitted in the same manner and location as the original battery, with the correct polarity contacts observed.

Do not attempt to re-charge the old battery or re-use it for any other purpose.

It should be disposed of in waste products destined for burial rather than incineration.

(For English)

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

Dispose of used batteries according to the manufacturer's instructions.

(For German)

ACHTUNG

Explosionsgefahr bei falschem Anbringen der Batterie. Ersetzen Sie nur mit einem äquivalentem vom Hersteller empfohlenem Typ.

Behandeln Sie gebrauchte Batterien nach den Anweisungen des Herstellers.

(For French)

MISE EN GARDE

Une batterie de remplacement inappropriée peut exploser. Ne remplacez qu'avec une batterie identique ou d'un type recommandé par le fabricant. L'élimination des batteries usées doit être faite conformément aux instructions du manufacturier.

NOTE:

Above caution is applicable for a battery pack which is for HC-W850/W858/W850M/V750/V757/V750M/V730 series, as well.

3 Service Navigation

3.1. Introduction

This service manual contains technical information, which allow service personnel's to understand and service this model.

Please place orders using the parts list and not the drawing reference numbers.

If the circuit is changed or modified, the information will be followed by service manual to be controlled with original service manual.

3.2. General Description About Lead Free Solder (PbF)

The lead free solder has been used in the mounting process of all electrical components on the printed circuit boards used for this equipment in considering the globally environmental conservation.

The normal solder is the alloy of tin (Sn) and lead (Pb). On the other hand, the lead free solder is the alloy mainly consists of tin (Sn), silver (Ag) and Copper (Cu), and the melting point of the lead free solder is higher approx.30°C (86°F) more than that of the normal solder.

Distinction of P.C.B. Lead Free Solder being used

The letter of "PbF" is printed either foil side or components side on the P.C.B. using the lead free solder.(See right figure)	PbF
--------------------------------------------------------------------------------------------------------------------------------	-----

Service caution for repair work using Lead Free Solder (PbF)

- The lead free solder has to be used when repairing the equipment for which the lead free solder is used.
(Definition: The letter of "PbF" is printed on the P.C.B. using the lead free solder.)
- To put lead free solder, it should be well molten and mixed with the original lead free solder.
- Remove the remaining lead free solder on the P.C.B. cleanly for soldering of the new IC.
- Since the melting point of the lead free solder is higher than that of the normal lead solder, it takes the longer time to melt the lead free solder.
- Use the soldering iron (more than 70W) equipped with the temperature control after setting the temperature at 350±30°C (662±86°F).

Recommended Lead Free Solder (Service Parts Route.)

- The following 3 types of lead free solder are available through the service parts route.
RFKZ03D01KS----- (0.3mm 100g Reel)
RFKZ06D01KS----- (0.6mm 100g Reel)
RFKZ10D01KS----- (1.0mm 100g Reel)

Note

* Ingredient: tin (Sn) 96.5%, silver (Ag) 3.0%, Copper (Cu) 0.5%, Cobalt (Co) / Germanium (Ge) 0.1 to 0.3%

3.3. How to Define the Model Suffix (NTSC or PAL model)









There are nine kinds of HC-W850/W858/W850M/V750/V757/V750M/V730.

- a) HC-W850M, V750M (Japan domestic model)
- b) HC-W850P, V750P
- c) HC-W850PC, V750PC
- d) HC-W850EB/EF/EG/EP, W858EG, V750EB/EF/EG/EP, V757EG
- e) HC-W850EE, V750EE
- f) HC-V730EE
- g) HC-W850GK, W850MGK
- h) HC-W850MGN, V750MGN
- i) HC-W850PU/GC/GW, V750GC

What is the difference is that the "INITIAL SETTING" data which is stored in Flash ROM mounted on Main P.C.B..

3.3.1. Defining methods:

To define the model suffix to be serviced, refer to the rating label and caution label which are putted on the Unit.

<p>a) HC-W850M, V750M (Japan domestic model) The nameplate for these models show the following Safety registration mark.</p> 
<p>b) HC-W850P, V750P The nameplate for these models show the following Safety registration mark.</p> 
<p>c) HC-W850PC, V750PC The nameplate for these models show the following Safety registration mark.</p> 
<p>d) HC-W850EB/EF/EG/EP, W858EG, V750EB/EF/EG/EP, V757EG The nameplate for these models show the following Safety registration mark.</p> 
<p>e) HC-W850EE, V750EE The nameplate for these models show the following Safety registration mark.</p> 
<p>f) HC-V730EE The nameplate for this model shows the following Safety registration mark.</p> 
<p>g) HC-W850GK, W850MGK The nameplate for these models show the following Safety registration mark.</p> 
<p>h) HC-W850MGN, V750MGN The nameplate for these models show the following Safety registration mark.</p> 
<p>i) HC-W850PU/GC/GW, V750GC The nameplate for these models does not show any above Safety registration mark.</p>

NOTE:

After replacing the MAIN P.C.B., be sure to achieve adjustment.

3.4. Formatting

The following formatting is for HC-W850EB/EP, HC-V750EB/EP.

The page number in this page does not show the page number of this service manual.

[FORMAT MEDIA]

Please be aware that if a medium is formatted, then all the data recorded on the medium will be erased and cannot be restored. Back up important data on a PC, DVD disc etc. (→ 188)

MENU : [SETUP] → [FORMAT MEDIA] → desired media

[Built-inMemory]^{*1}/[SD CARD]/[HDD]^{*2}

*1 **HC-W850M**/ **HC-V750M** only.

*2 Displayed when connecting a USB HDD. (→ 127)

- **HC-W850**/ **HC-W858**/ **HC-V750**/ **HC-V757**/ **HC-V730**
Media selection screen is not displayed when the USB HDD is not connected. Touch [YES].
- When formatting is complete, touch [EXIT] to exit the message screen.
- Perform a physical formatting of the SD card when the SD card is to be disposed/ transferred. (→ 216)
- **HC-W850M**/ **HC-V750M**
Perform a physical formatting of the built-in memory when this unit is to be disposed/ transferred. (→ 214)

- Do not turn this unit off or remove the SD card, while formatting. Do not expose the unit to vibrations or shock.

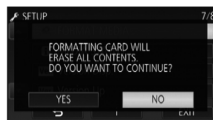
Use this unit to format media.

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

Do not format an SD card using any other equipment such as a PC. The card may not be used on this unit.

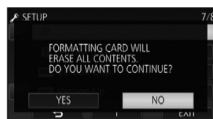
When disposing of or giving away the SD card, note that:

- 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 SD card.
- It is recommended that the SD card is physically destroyed or the SD card is physically formatted using this unit when disposing of or giving away the SD card.
HC-W850/ **HC-W858**/ **HC-V750**/ **HC-V757**/ **HC-V730**
To physically format the SD card, connect the unit via the AC adaptor, select [SETUP] → [FORMAT MEDIA] → [YES] from the menu, and then press and hold the recording start/ stop button on the screen below for about 3 seconds. When the SD card data deletion screen appears, select [YES], and then follow the on-screen instructions.



HC-W850M/ **HC-V750M**

To physically format the SD card, connect the unit via the AC adaptor, select [SETUP] → [FORMAT MEDIA] → [SD CARD] from the menu, and then press and hold the recording start/ stop button on the screen below for about 3 seconds. When the SD card data deletion screen appears, select [YES], and then follow the on-screen instructions.



- The customer is responsible for the management of the data in the SD card.

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

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

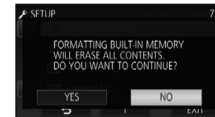
HC-W850M/ **HC-V750M**

When disposing of or giving away this unit, note that:

- Formatting and deletion simply change the file management information and cannot be used to completely erase the data in built-in memory of this unit. The data can be recovered using commercially available software or the like.

- We recommend that you physically format the built-in memory before disposing of or giving away this unit.

To physically format the built-in memory, connect the unit via the AC adaptor, select [SETUP] → [FORMAT MEDIA] → [Built-inMemory] from the menu, and then press and hold the recording start/ stop button on the screen below for about 3 seconds. When the built-in memory data deletion screen appears, select [YES], and then follow the on-screen instructions.



- Please look after the data in your built-in memory carefully. Panasonic will not be held responsible in the unlikely case that private data is divulged.

3.5. Baking of replacement IC and defective P.C.B.

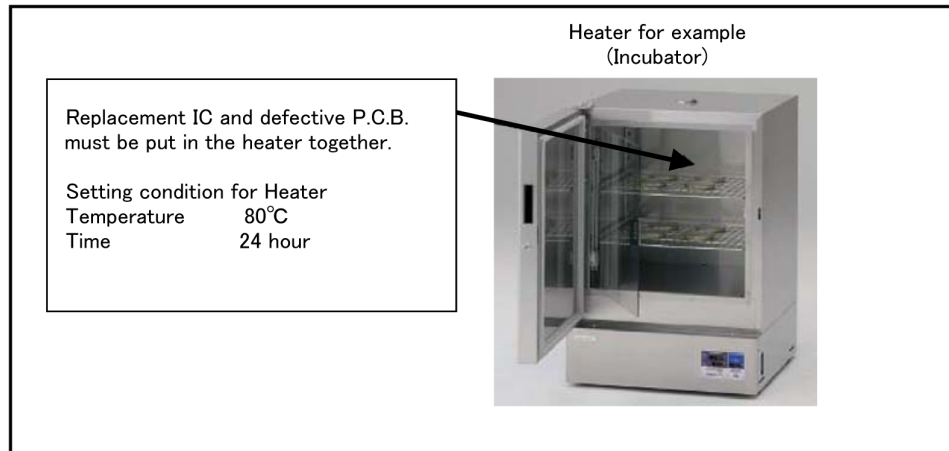
When replacing the CSP/BGA/QFN type IC mounted on the P.C.B., the problem of IC crack or foil pattern breaking in the P.C.B. might sometimes occur by rapid heating.

In order to improve the success rate of IC replacement for repair, it would be required to work out baking of replacement IC and defective P.C.B. before replacing IC.

Please refer the way of baking as follows.

Replacement IC and defective P.C.B. must be put in the heater together.

- Baking temperature and time (Hour)
80°C / 24 hour



4 Specifications

The following specification is for HC-W850EB/EP, HC-V750EB/EP.

Some specifications may differ depending on model suffix.

The page number in this chapter does not show the page number of this service manual.

High Definition Video Camera

Information for your safety

Power source:

DC 5.0 V (When using AC adaptor)

DC 3.6 V (When using battery)

Power consumption:

Recording;

[HC-W850] / [HC-W858] / [HC-W850M]

7.0 W

[HC-V750] / [HC-V757] / [HC-V750M] /

[HC-V730]

6.2 W

Charging: 7.7 W

Motion picture recording format:

[AVCHD];

AVCHD format version 2.0 compliant (AVCHD

Progressive)

[MP4/iFrame];

MPEG-4 AVC file format compliant (.MP4)

Motion picture compression:

MPEG-4 AVC/H.264

Audio compression:

[AVCHD];

Dolby® Digital/5.1 ch (built-in microphone),

2 ch (built-in microphone/external microphone)

[MP4/iFrame];

AAC/2 ch

Recording mode and transfer rate:

[AVCHD]

[1080/50p];

Maximum 28 Mbps (VBR)

[PH];

Maximum 24 Mbps (VBR)

[HA];

Average 17 Mbps (VBR)

[HG];

Average 13 Mbps (VBR)

[HE];

Average 5 Mbps (VBR)

[MP4/iFrame]

[1080/50M];

Maximum 50 Mbps (VBR)

[1080/28M];

Maximum 28 Mbps (VBR)

[720];

Average 9 Mbps (VBR)

[iFrame];

Maximum 28 Mbps (VBR)

Refer to the operating instructions (PDF format) for the picture size and recordable time of a motion picture.

Still picture recording format:

JPEG (Design rule for Camera File system, based on Exif 2.2 standard)

Refer to the operating instructions (PDF format) for picture size of a still picture and number of recordable pictures.

Recording media:

SD Memory Card

SDHC Memory Card

SDXC Memory Card

Refer to the operating instructions (PDF format) for details on SD cards usable in this unit.

[HC-W850M] / [HC-V750M]

Built-in memory; 16 GB

Image sensor:

1/2.3 type (1/2.3") 1MOS image sensor

Total; 12760 K

Effective pixels;

Motion picture; 6030 K (16:9)^{*1}

Still picture; 6030 K (16:9), 4720 K (4:3),

5210 K (3:2)

*1 When Level Shot Function is set to normal or off

Lens:

Auto Iris, 20× optical zoom, F1.8 to F3.6

Focal length;

4.08 mm to 81.6 mm

(Full range AF)

35 mm equivalent;

Motion picture;

29.5 mm to 612 mm (16:9)^{*2}

Still picture;

29.5 mm to 612 mm (16:9),

36.2 mm to 724.6 mm (4:3),

33.5 mm to 669.9 mm (3:2)

*2 When Level Shot Function is set to normal or off

Minimum focus distance;

Normal; Approx. 3 cm (Wide)/

Approx. 1.5 m (Tele)

Intelligent Auto Macro;

Approx. 1 cm (Wide)

Filter diameter:

49 mm

Zoom:

20× optical zoom, 50× i.Zoom, 60×/1500× digital zoom

Image stabilizer function:

Optical (Hybrid Optical Image Stabilizer, Active Mode (Rotation correction), Optical Image Stabilizer Lock function)

Level Shot Function:

Off/Normal/Strong

Creative Control:

[Miniature Effect]/[Silent movie]/[8mm movie]/

[Time Lapse Rec]

Monitor:

7.5 cm (3.0") wide LCD monitor (Approx. 460 K dots)

Microphone:

5.1 channel surround microphone/

Zoom microphone/Focus microphone/

Stereo microphone

Minimum required illumination:

Approx. 2 lx (1/25 with Low Light Mode in the Scene Mode)

[HC-W850]/[HC-W858]/[HC-W850M]

Approx. 1 lx with the Night Mode ([COLOUR]) function

0 lx with the Night Mode ([Infrared]) function

[HC-V750]/[HC-V757]/[HC-V750M]/

[HC-V730]

Approx. 1 lx with the Night Mode function

AV connector video output level:

1.0 Vp-p, 75 Ω, PAL system

HDMI mini connector video output level:

HDMI™ (x.v.Colour™) 1080p/1080i/576p

AV connector audio output level (Line):

251 mV, 600 Ω, 2 ch

Headphone output:

61 mV, 32 Ω (Stereo mini jack)

HDMI mini connector audio output level:

[AVCHD];

Dolby Digital/Linear PCM

[iFrame], [MP4];

Linear PCM

MIC input:

−60 dBV (Mic sensitivity −40 dB equivalent,

0 dB=1 V/Pa, 1 kHz)

(Stereo mini jack)

USB:

Reader function

SD card; Read only (No copyright protection support)

[HC-W850M]/[HC-V750M]

Built-in memory; Read only

Hi-Speed USB (USB 2.0), USB terminal Type

micro AB

USB host function (for USB HDD)

Battery charging function (Charges from USB terminal when the main unit is off)

Flash:

Available range; Approx. 1.5 m or less

Dimensions:

65.0 mm (W)×73 mm (H)×139 mm (D)
(including projecting parts)

Mass:

HC-W850 / **HC-W858**

Approx. 360 g
[without battery (supplied) and an SD card
(optional)]

HC-W850M

Approx. 361 g
[without battery (supplied)]

HC-V750 / **HC-V757**

Approx. 353 g
[without battery (supplied) and an SD card
(optional)]

HC-V750M

Approx. 354 g
[without battery (supplied)]

HC-V730

Approx. 350 g
[without battery (supplied) and an SD card
(optional)]

Mass in operation:

HC-W850 / **HC-W858**

Approx. 405 g
[with battery (supplied) and an SD card
(optional)]

HC-W850M

Approx. 404 g
[with battery (supplied)]

HC-V750 / **HC-V757**

Approx. 398 g
[with battery (supplied) and an SD card
(optional)]

HC-V750M

Approx. 397 g
[with battery (supplied)]

HC-V730

Approx. 395 g
[with battery (supplied) and an SD card
(optional)]

AC adaptor

Information for your safety

Power source:

AC 110 V to 240 V, 50/60 Hz

AC input:

0.25 A

DC output:

DC 5.0 V, 1.8 A

Dimensions:

(VSK0815L)
66.4 mm (W)×72 mm (H)×46.3 mm (D)
(VSK0815K)
66.4 mm (W)×78.8 mm (H)×31 mm (D)

Mass:

(VSK0815L)
Approx. 70 g
(VSK0815K)
Approx. 65 g

Operating temperature:

0 °C to 40 °C

Operating humidity:

10%RH to 80%RH

Battery operation time:

See page 11

HC-W850 / **HC-W858** / **HC-W850M** /

HC-V750 / **HC-V757** / **HC-V750M**

Wireless transmitter:

Compliance standard; IEEE802.11b/g/n

Frequency range used;

Central frequency 2412 MHz to 2462 MHz [11ch]

Encryption method; Wi-Fi compliant WPA™/
WPA2™/WEP

Access method; Infrastructure mode

NFC:

Compliance standard; ISO/IEC 18092 NFC-F
(Passive Mode)

HC-W850 / **HC-W858** / **HC-W850M**

Sub Camera**Image sensor:**

1/4 type (1/4") 1MOS image sensor

Total; 5270 K

Lens:

F2.2

Focal length;

3.54 mm

35 mm equivalent (Motion picture);

37.2 mm

Minimum focus distance;

Approx. 30 cm

Recording modes/approximate recordable time

- SD cards are only mentioned with their main memory size. The stated times are the approximate recordable times for continuous recording.

Recording format		[AVCHD]				
Recording mode		[1080/50p]	[1080/50i]			
Picture size/Frame rate		[PH]	[HA]	[HG]	[HE]	
SD card	4 GB	1920×1080/50p	1920×1080/50i	1920×1080/50i	1920×1080/50i	1920×1080/50i
	16 GB	19 min	21 min	30 min	40 min	1 h 30 min
	64 GB	1 h 20 min	1 h 30 min	2 h	2 h 40 min	6 h 40 min
Built-in memory*	16 GB	5 h 20 min	6 h	8 h 30 min	11 h	27 h 30 min
		1 h 20 min	1 h 30 min	2 h	2 h 40 min	6 h 40 min

- A** Favours image quality
- B** Favours Recording time

Recording format		[MP4/iFrame]			
Recording mode		[1080/50M]	[1080/28M]	[720]	[iFrame]
Picture size/Frame rate		1920×1080/50p	1920×1080/50p	1280×720/25p	960×540/25p
SD card	4 GB	11 min	19 min	1 h	19 min
	16 GB	45 min	1 h 20 min	4 h 10 min	1 h 20 min
	64 GB	3 h	5 h 20 min	16 h 50 min	5 h 20 min
Built-in memory*	16 GB	45 min	1 h 20 min	4 h 10 min	1 h 20 min

* [HC-W850M]/[HC-V750M] only

- "h" is an abbreviation for hour, "min" for minute and "s" for second.
- If recording for long periods, prepare batteries for 3 or 4 times the period you wish to record for. (→ 14)
- The default setting for [REC FORMAT] is [AVCHD], and the default setting for [REC MODE] is [HG].
- Maximum continuously recordable time for one scene: 6 hours
- The recording is paused once when the recording time for one scene exceeds 6 hours, and the recording will automatically resume after a few seconds.
- The recordable time may be reduced if recording with a lot of action is recorded or recording of short scene is repeated.
- Use time in the row of 4 GB in above table as a guideline for the time that can be copied onto one DVD disc (4.7 GB).

Approximate number of recordable pictures

- SD cards are only mentioned with their main memory size. The stated number is the approximate number of recordable pictures.

Picture size	24M 6528×3672	12.6M 4736×2664	2.1M 1920×1080	
Aspect ratio	16:9			
SD card	4 GB	250	500	3200
	16 GB	1100	2100	12500
	64 GB	4700	8500	52000
Built-in memory*	16 GB	1100	2100	12500

Picture size	18M 4896×3672	8M 3264×2448	0.3M 640×480	
Aspect ratio	4:3			
SD card	4 GB	350	750	28000
	16 GB	1500	3100	117000
	64 GB	6000	12500	475000
Built-in memory*	16 GB	1500	3100	117000

Picture size	20M 5472×3648	10.6M 3984×2656	2M 1728×1152	
Aspect ratio	3:2			
SD card	4 GB	300	600	2200
	16 GB	1300	2400	8500
	64 GB	5500	10000	36000
Built-in memory*	16 GB	1300	2400	8500

* [HC-W850M] / [HC-V750M] only

- The number of recordable pictures depends on the subject being recorded.
- Maximum number of recordable pictures that can be displayed is 9999. If the number of recordable pictures exceeds 9999, R 9999+ is displayed. The number will not change when the picture is taken until the number of recordable pictures is 9999 or less.
- The memory capacity indicated on the label of an SD card is the total of the capacity for copyright protection and management and the capacity which can be used on the unit, a PC etc.

Cards that you can use with this unit

Use SD cards conforming to Class 4 or higher of the SD Speed Class Rating* for motion picture recording.

When recording a motion picture with [REC MODE] set to [1080/50M] (→ 77) or in FULL HD Slow Motion Video Mode (→ 58), use an SD card conforming to Class 10 of the SD Speed Class Rating. If the SD Speed Class Rating is lower than Class 10, recording may suddenly stop.

Card type	Capacity
SD Memory Card	512 MB/1 GB/2 GB
SDHC Memory Card	4 GB/6 GB/8 GB/12 GB/16 GB/24 GB/32 GB
SDXC Memory Card	48 GB/64 GB

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



- Please check the latest information on the support website below.
http://panasonic.jp/support/global/cs/e_cam
(This website is in English only.)
- When using an SDHC Memory Card/SDXC Memory Card with other equipment, check the equipment is compatible with these Memory Cards.
- An Eye-Fi X2 series SD card is required to use functions related to Eye-Fi. (→ 137)
- We do not guarantee the operation of SD cards other than the ones above. Further, SD cards with a capacity of less than 32 MB cannot be used for motion picture recording.
- 4 GB or more Memory Cards that do not have the SDHC logo or 48 GB or more Memory Cards that do not have the SDXC logo are not based on SD Memory Card Specifications.

Charging and recording time

■ Charging/Recording time

- Temperature: 25 °C/humidity: 60%RH
- Charging times in parentheses are when charging from the USB terminal.
- (HC-W850)/(HC-W858)/(HC-W850M)
Maximum continuous recordable times and actual recordable times in parentheses are when recording with the Sub Camera*.

* These include times when  is displayed on the screen.

Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording format	Recording mode	Maximum continuous recordable time	Actual recordable time
Supplied battery/ VW-VBT190 (optional) [3.6 V/1940 mAh]	2 h 20 min (5 h 20 min)	[AVCHD]	[1080/50p], [PH],[HA]	1 h 45 min (1 h 25 min)	55 min (45 min)
			[HG],[HE]	1 h 45 min (1 h 30 min)	
		[MP4/ iFrame]	[1080/50M]	1 h 40 min (1 h 25 min)	50 min (45 min)
			[1080/28M]	1 h 45 min (1 h 25 min)	55 min (45 min)
			[720], [iFrame]	2 h (1 h 35 min)	1 h (50 min)
VW-VBT380 (optional) [3.6 V/3880 mAh]	3 h 45 min (9 h 45 min)	[AVCHD]	[1080/50p]	3 h 40 min (3 h 5 min)	1 h 55 min (1 h 35 min)
			[PH],[HA]	3 h 45 min (3 h 5 min)	
			[HG],[HE]	3 h 45 min (3 h 10 min)	
		[MP4/ iFrame]	[1080/50M]	3 h 35 min (3 h)	1 h 50 min (1 h 35 min)
			[1080/28M]	3 h 40 min (3 h 5 min)	1 h 55 min (1 h 35 min)
			[720]	4 h 10 min (3 h 25 min)	2 h 10 min (1 h 45 min)
			[iFrame]	4 h 15 min (3 h 30 min)	

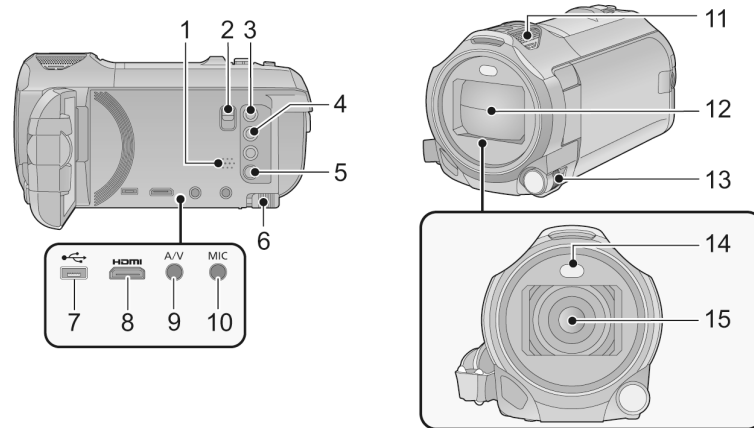
- "h" is an abbreviation for hour, "min" for minute and "s" for second.
- These times are approximations.
- **The indicated charging time is for when the battery has been discharged completely.**
Charging time and recordable time vary depending on the usage conditions such as high/low temperature.

5 Location of Controls and Components

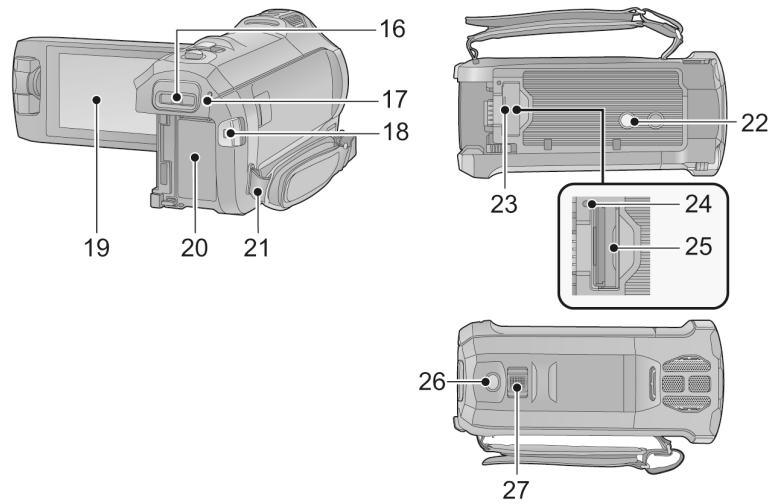
The following description is for HC-W850EB/EP, HC-V750EB/EP.

Some descriptions may differ depending on model suffix.

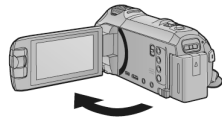
The page number in this chapter does not show the page number of this service manual.



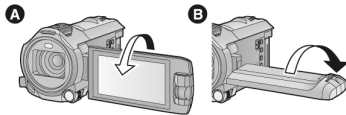
- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1 Speaker 2 Shoe adaptor release lever
[SHOE ADAPTOR RELEASE] (→ 222) 3 Recording/playback button [/]
(→ 19) 4 Level Shot Function button []
(→ 45) 5 Power button [/] (→ 18) 6 Battery release lever [BATT] (→ 11) 7 USB terminal [] (→ 127, 134, 196) 8 HDMI mini connector [HDMI]
(→ 119) 9 A/V connector [A/V] (→ 119, 136) 10 Microphone terminal [MIC] <ul style="list-style-type: none"> • A compatible plug-in powered microphone can be used as an external microphone. • (Microphone input level meter) is displayed when the external microphone is connected. (→ 84) • When the unit is connected with the AC adaptor, sometimes noise may be heard depending on the microphone type. In this case, please switch to the battery for the power supply and the noise will stop. | <ol style="list-style-type: none"> 11 Internal microphones 12 Lens cover <ul style="list-style-type: none"> • The lens cover opens in Motion Picture Recording Mode or Still Picture Recording Mode. (→ 19) 13 Multi Manual Dial [CAMERA FUNCTION]
(→ 61, 85) 14 Built-in flash/Video light (→ 72, 74, 87) 15 Lens |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



- 16 Shoe adaptor mounting part [SHOE ADAPTOR] (→ 222)
- 17 [HC-W850]/[HC-W858]/[HC-W850M]/[HC-V750]/[HC-V757]/[HC-V750M] Status indicator (→ 18, 171)
[HC-V730] Status indicator (→ 18)
- 18 Recording start/stop button (→ 25)
- 19 LCD monitor (Touch screen) (→ 20)

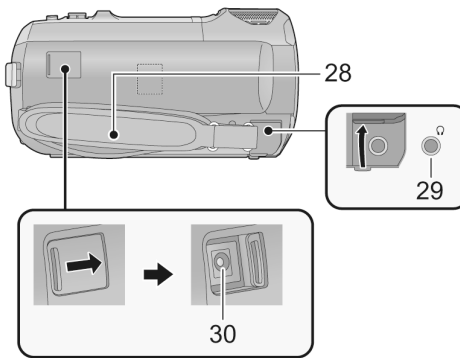


- It can open up to 90°.



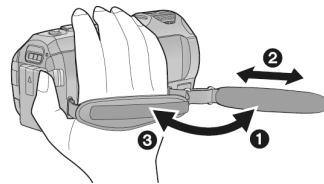
- It can rotate up to 180° **A** towards the lens or 90° **B** towards the opposite direction.
- 20 Battery holder (→ 11)
- 21 Shoulder strap fixture

- 22 Tripod receptacle
 - Attaching a tripod with a screw length of 5.5 mm or more may damage the unit.
- 23 SD card cover (→ 17)
- 24 Access lamp [ACCESS] (→ 17)
- 25 Card slot (→ 17)
- 26 Photoshot button [] (→ 27)
- 27 Zoom lever [W/T] (In Motion Picture Recording Mode or Still Picture Recording Mode) (→ 44)/ Thumbnail display switch []/ Volume lever [-VOL+] (In Playback Mode) (→ 31)



28 Grip belt

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



- ❶ Flip the belt.
- ❷ Adjust the length.
- ❸ Replace the belt.

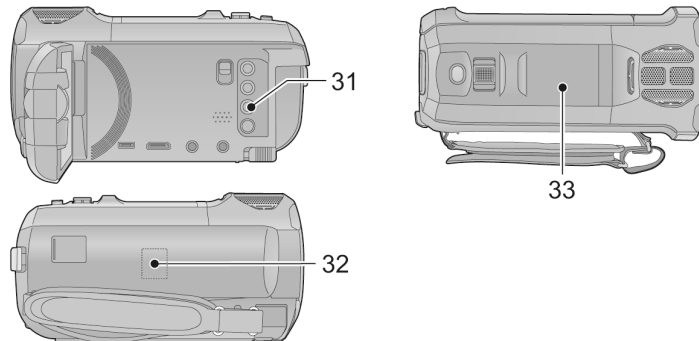
29 Headphone terminal [🔊] (→ 75)

- Excessive sound pressure from earphones and headphones can cause hearing loss.
- Listening at full volume for long periods may damage the user's ears.

30 DC input terminal [DC IN] (→ 12)

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

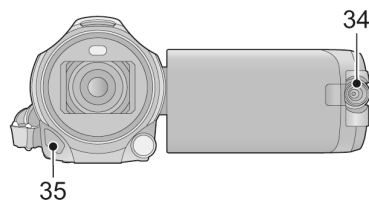
HC-W850 / HC-W858 / HC-W850M / HC-V750 / HC-V757 / HC-V750M



- 31 Wi-Fi button [Wi-Fi]**
(→ 142, 148, 151, 158, 160, 164, 179, 182)
- 32 Wi-Fi Transmitter (→ 141)**

- 33 NFC touch area [👆] (→ 144, 152)**

HC-W850 / HC-W858 / HC-W850M



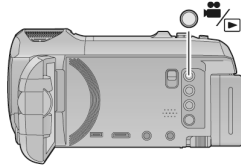
- 34 Sub Camera (→ 46)**
- 35 Infrared light (→ 74)**

Selecting a mode

You can switch this unit between Recording Mode (Motion Picture Recording Mode/Still Picture Recording Mode) and Playback Mode by pressing the recording/playback button. If you touch the recording mode switching icon in Recording Mode, this unit can be switched between Motion Picture Recording Mode and Still Picture Recording Mode.

Motion Picture Recording Mode (→ 25)	Recording motion pictures.
Still Picture Recording Mode (→ 27)	Recording still pictures.
Playback Mode (→ 29, 88)	Motion picture/Still picture playback.

Switching this unit between Recording Mode and Playback Mode



Recording/playback button
Press the button to switch this unit between Recording Mode and Playback Mode.



- When you turn on this unit, it starts up in Recording Mode.

Switching this unit between Motion Picture Recording Mode and Still Picture Recording Mode

Touch the recording mode switching icon displayed on the LCD monitor (touch screen) to switch this unit between Motion Picture Recording Mode and Still Picture Recording Mode.

1 Press the recording/playback button to switch this unit to Recording Mode.

- The recording mode switching icon **A** is displayed on the screen.

	Motion Picture Recording Mode
	Still Picture Recording Mode



(Motion Picture Recording Mode)

2 Touch the recording mode switching icon.

- Refer to page 20 for touch screen operation.

To display the recording mode switching icon

Display of the recording mode switching icon will disappear when no touch operation is performed for a specific period of time. To display it again, touch the screen.

- If the recording start/stop button is pressed in Still Picture Recording Mode or Playback Mode, this unit will be switched to Motion Picture Recording Mode. During motion picture/still picture playback or in other conditions, even if the recording start/stop button is pressed, the recording mode may not be switched.

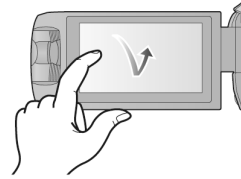
How to use the touch screen

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

■ Touch

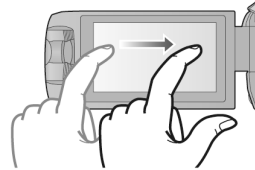
Touch and release the touch screen to select icon or picture.

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



■ Slide while touching

Move your finger while pressing on the touch screen.



■ About the operation icons

▲ / ▼ / ◀ / ▶ :

Touch when changing a page or performing settings.

↶ :

Touch to return to the previous screen.

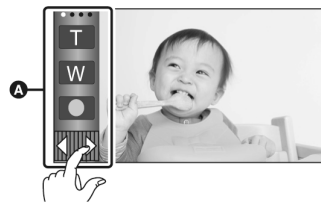


About the Touch Menu

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

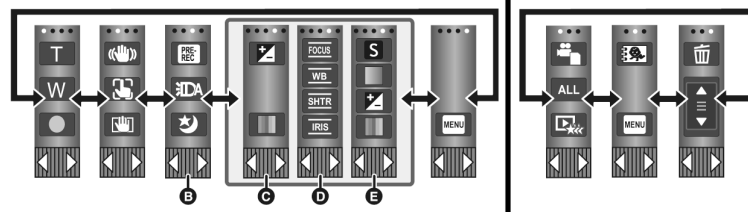
- It is also possible to switch the operation icons by sliding the Touch Menu right or left while touching it.

A Touch Menu



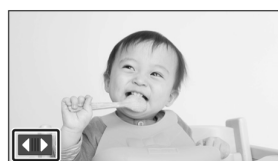
Recording Mode


Playback Mode



- B** You can change the operation icons to display. (→ 38)
- C** Displayed only in Intelligent Auto Plus Mode (→ 53) and [Miniature Effect]/[8mm movie]/[Silent movie] of the Creative Control Mode (→ 53).
- D** Displayed only in [Time Lapse Rec] of the Creative Control Mode (→ 53), Scene Mode (→ 57), FULL HD Slow Motion Video Mode (→ 58), Stop Motion Animation Assist Mode (→ 60) and Manual Mode (→ 61).
- E** Displayed only when you adjust the picture quality with the Multi Manual Dial (→ 85)

■ To display the Touch Menu



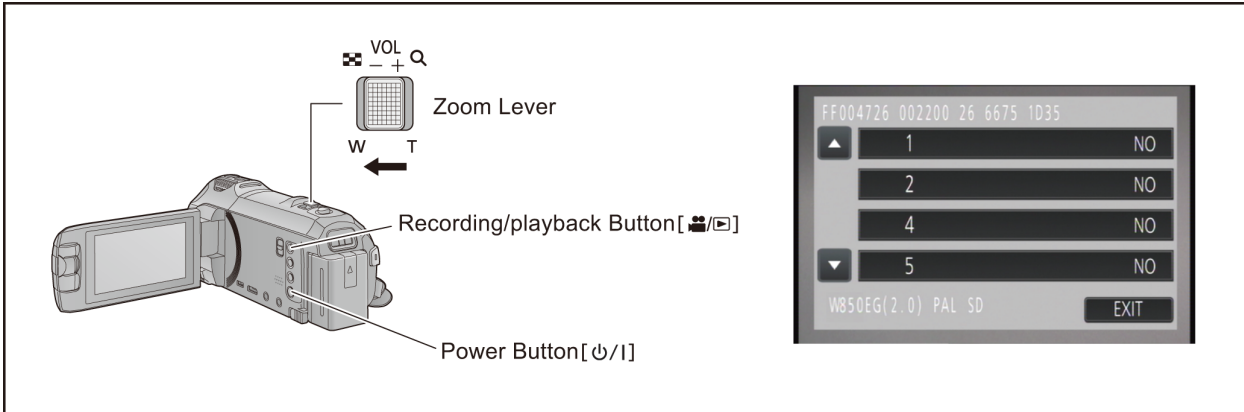
Display of the Touch Menu will disappear when no touch operation is performed for a specific period of time during recording of motion picture/still picture. To display it again, touch .

- Do not touch on the LCD monitor with hard pointed tips, such as ball point pens.

6 Service Mode

Indication method of the service menu

1. Keep pressing the "Power" button, "Zoom lever" to W side and "Recording/Playback" button for more than 3 seconds until the top screen of the Service Mode Menu being displayed.



Service mode menu

Screen display	Contents	Function
1	Factory settings	Function to throw a product up in a factory shipment state.
2	Model/Destination settings	Change the Model/Destination. (Selectable models and destinations are displayed.)
4	Lock search history indication	Display the main and sub ^(*) camera system error cord for each three histories saved in EEPROM.
5	Power ON self check result display	Power ON self check (function to diagnose correct function of the device and interface between devices) result display.
14	Adjutment function for the service	The service adjustment do setup and adjustment of the following items required in the field service.
15	Restore the backed up adjustment data	Restore the adjustment data to new or repaired Main P.C.B. from SD card that the data backed up from original Main P.C.B. before repairs or replacement.
16	Touch panel calibration	Calibrate the touch positions of the touch panel.
17	NFC initialization (except HC-V730)	Performs the Initialization of the NFC chip and erase the settings like as Wi-Fi connection etc..

(*) HC-W850/W858/W850M only

NOTE:

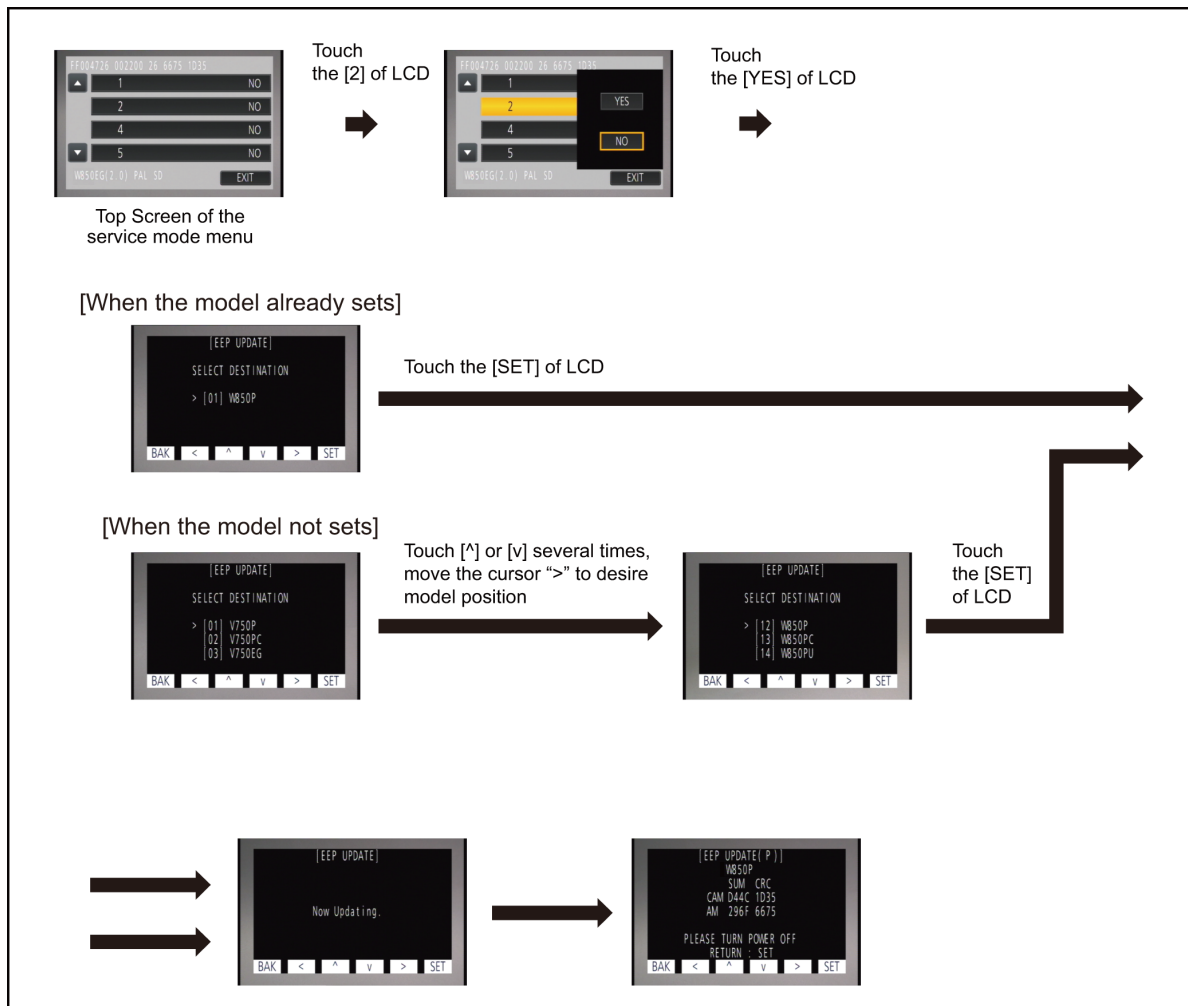
Do not using service mode except above table of Service mode menu.

2. End method of the top screen of the service mode menu
Touch the [EXIT] of LCD to end the service mode, and then POWER OFF.

6.1. Model/Destination Settings

Touch the [2] of LCD, select model/destination settings.

Operation specifications



Function description

- Change the Model/Destination

Display the lists of model/distination which the unit can be changed, if a shipment setup is finished.

Therefore in some cases, the model/destination that is currently set is only displayed.

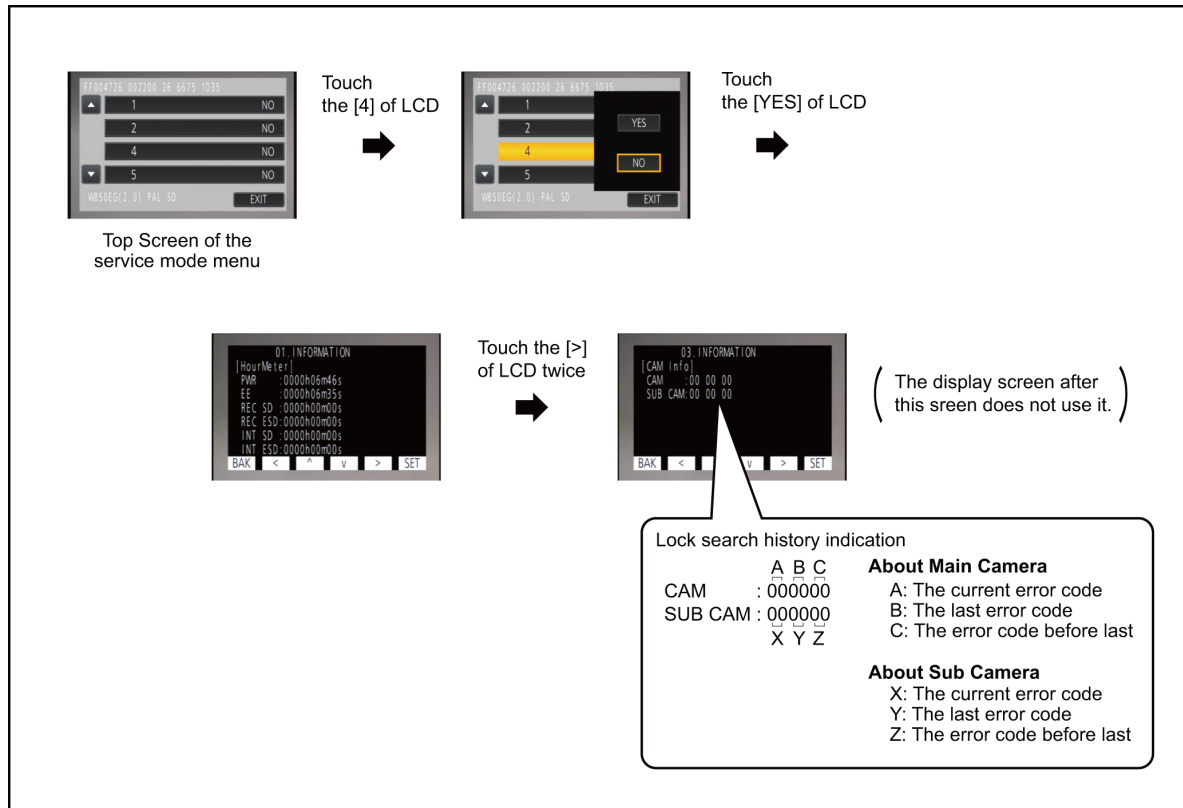
End method of operation

- Touch the [SET] of LCD to exit the mode/destination settings, and then POWER OFF.

6.2. Lock Search and Error History Indication

Touch the [4] of LCD, select Lock search and error history indication.

Operation specifications



Indication contents

1. Main Camera

- Lock search history indication of main camera
Display the main camera system error cord for three histories saved in EEPROM.
- The error cord contents which are displayed

Error code	Description
51	Focus control is abnormal
52	Zoom control is abnormal
53	OIS lens control is abnormal
54	Zoom control is abnormal (2)
71	Lens barrier open/close is abnormal

2. Sub Camera (HC-W850/W858/W850M only)

- Lock search history indication of sub camera
Display the sub camera system error cord for three histories saved in EEPROM.
(Display always "--" for no sub camera models.)
- The error cord contents which are displayed

Error code	Description
91	Sub camera error

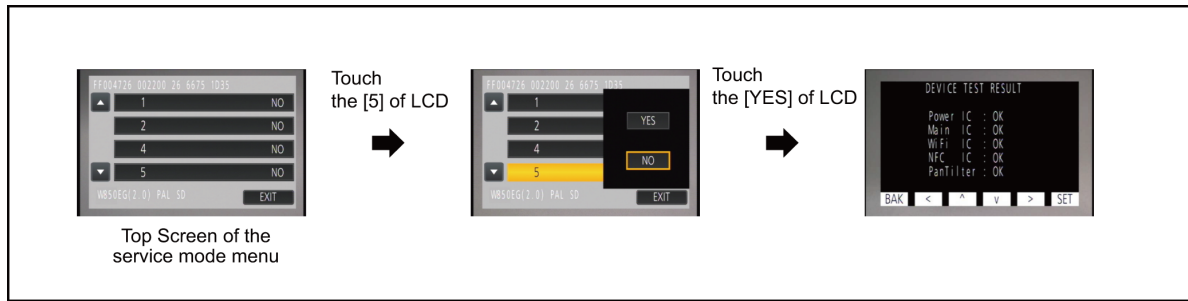
End method of operation

- Touch the [BAK] of LCD to exit the lock search and error history indication, and then POWER OFF.

6.3. Power ON Self Check Result Display

Touch the [5] of LCD, select Power ON self check result display.

Operation specifications



Indication contents

- Power ON self check result display

Function to diagnose correct function of the device and interface between devices result display.

Display the following communication test result.

- Power IC : Communication test between IC3401 and IC1503
- Main IC : DDR. Communication test between IC3401 and IC3402/IC3403
- Wi-Fi IC : Communication test between IC3401 and Wi-Fi P.C.B.. (except HC-V730)
- NFC IC : Communication test between IC3401 and NFC P.C.B. unit. (except HC-V730)

Display other than “OK” are abnormalities of each lines.

- PanTilter : Error display of the Remote Pan Tilt Cradle (VW-CTR1)
(When not connected the remote pan tilt cradle, display “--”.)

When error is occurred, display “NG” with the error code.

Error Code	Description
NG 01	Battery undercut
NG 04	The start-up state of the update error factor
NG 10	The failure of Tilt motor
NG 80	USB Communication Error

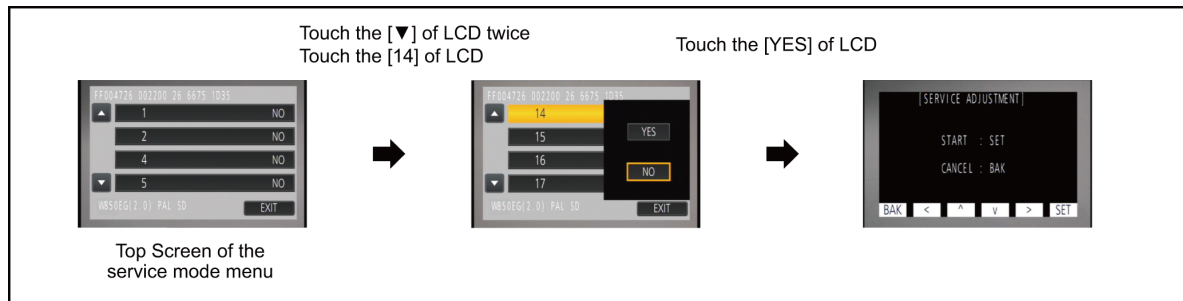
End method of operation

- Touch the [BAK] of LCD to exit the power on self check result display, and the POWER OFF.

6.4. Adjustment function for the Service

Touch the [14] of LCD, select the adjustment function for the service.

Operation Specifications (until before the start of the adjustment)



Function description

The service adjustment do setup and adjustment of the following items required in the field service.

For a detailed content, such as the adjustment procedure, refer to “9 Measurements and Adjustments”.

- Model setting
- Setting of the file name for adjustment data backup to SD card.
- Execution of adjustment data backup to SD card
- Checking of Switches
- Camera adjustment (Iris, Gyro, OIS and Missing pixels)
- Zoom Tracking adjustments (with Zoom hysteresis adjustment)
- Indoor White Balance Adjustment (CH-GAIN, PWM, WB)
- Outdoor White Balance Adjustment (PWM, WB)
- Level shot adjustment

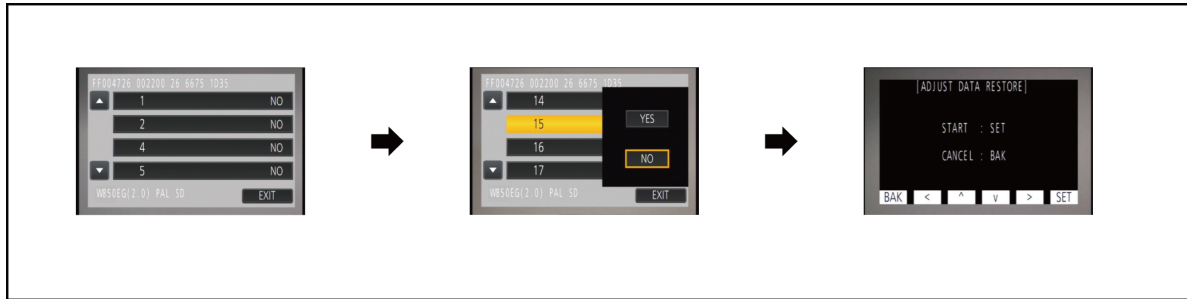
End method of operation

- Press the power button to turn the unit off.

6.5. Restore the backed up adjustment data

Touch the [15] of LCD, select restoring the backed up adjustment data from SD card to the unit.

Operation Specifications

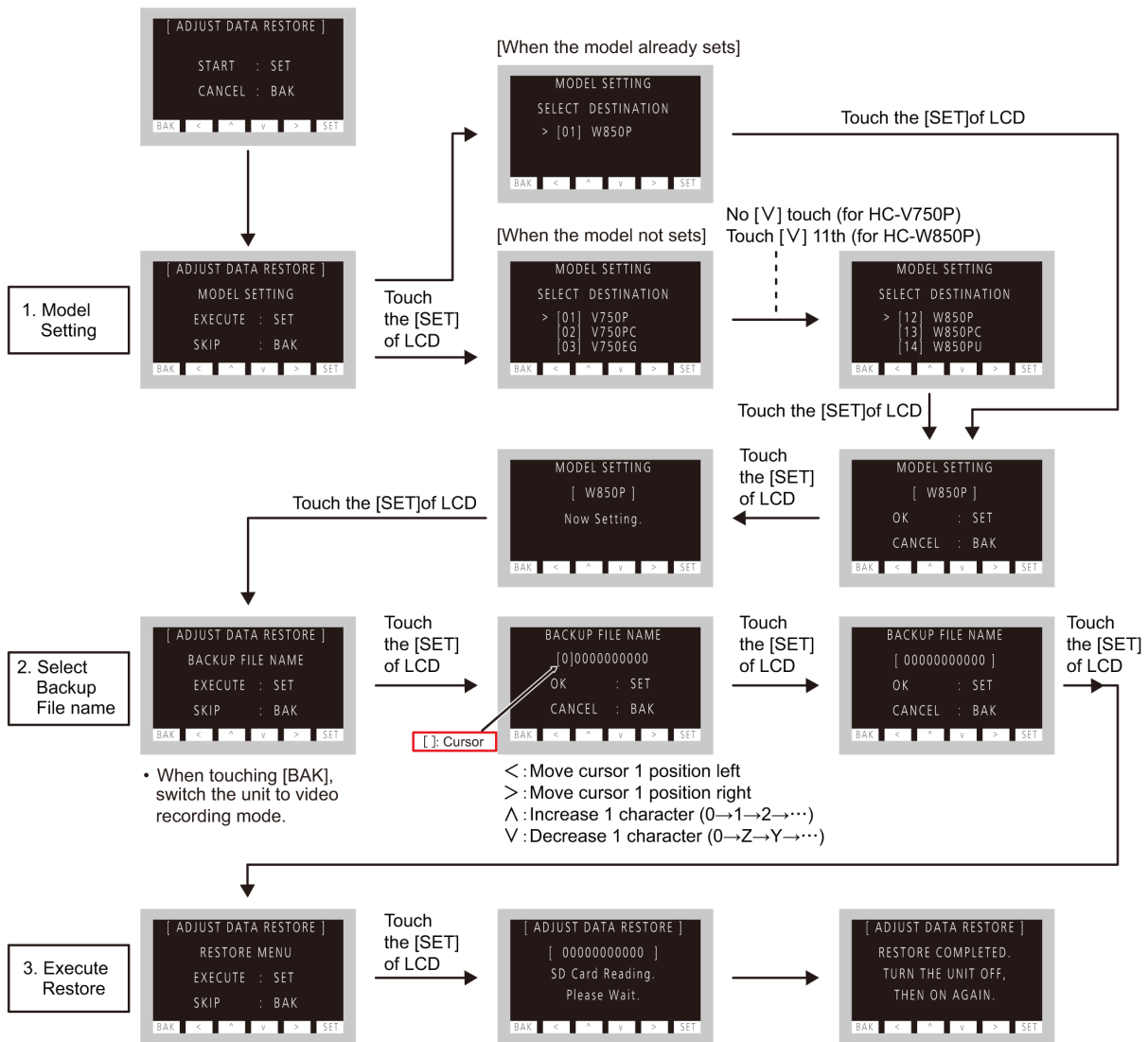


Function description

Restore the adjustment data to new or repaired Main P.C.B. from SD card that the data backed up from original Main P.C.B. before repairs or replacement.

To backup the adjustment data, use "6.4. Adjustment function for the Service".

Restoring procedure



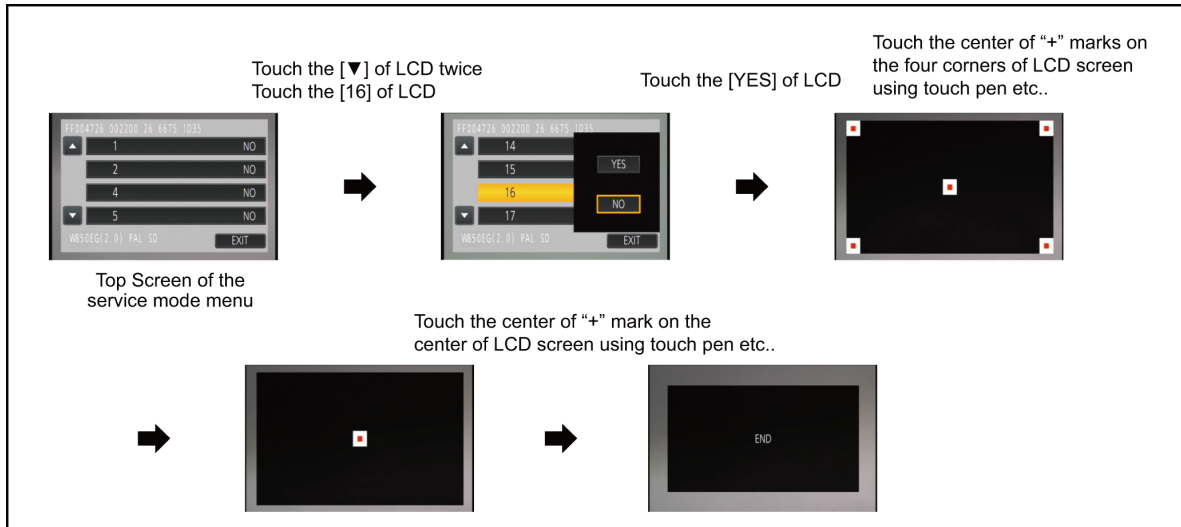
End method of operation

- Press the power button to turn the unit off.

6.6. Touch Panel Calibration

Touch the [16] of LCD, select the calibration of touch panel.

Operation Specifications



Function description

Calibrate the touch positions of the touch panel.

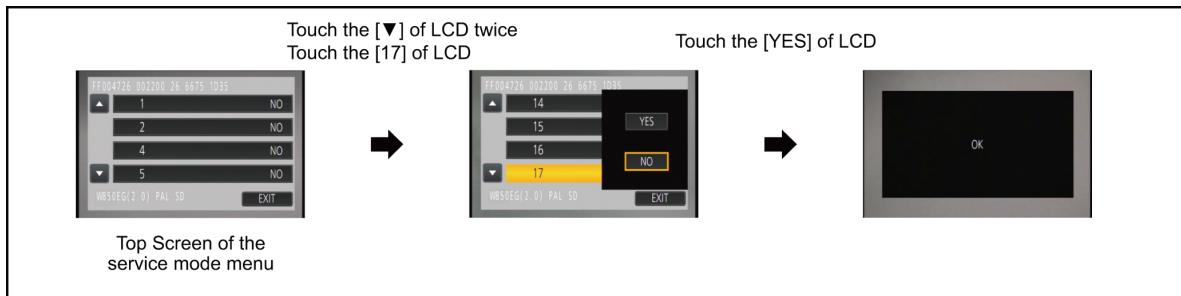
End method of operation

- Press the power button to turn the unit off.

6.7. NFC Initialization (except HC-V730)

Touch the [17] of LCD, select initialization of NFC (Near Field Communication) function.

Operation Specifications



Function description

This function performs the initialization of the NFC chip and erase the settings like as Wi-Fi connection etc..

End method of operation

- Press the power button to turn the unit off.

7 Service Fixture & Tools

7.1. When Replacing the Main P.C.B.

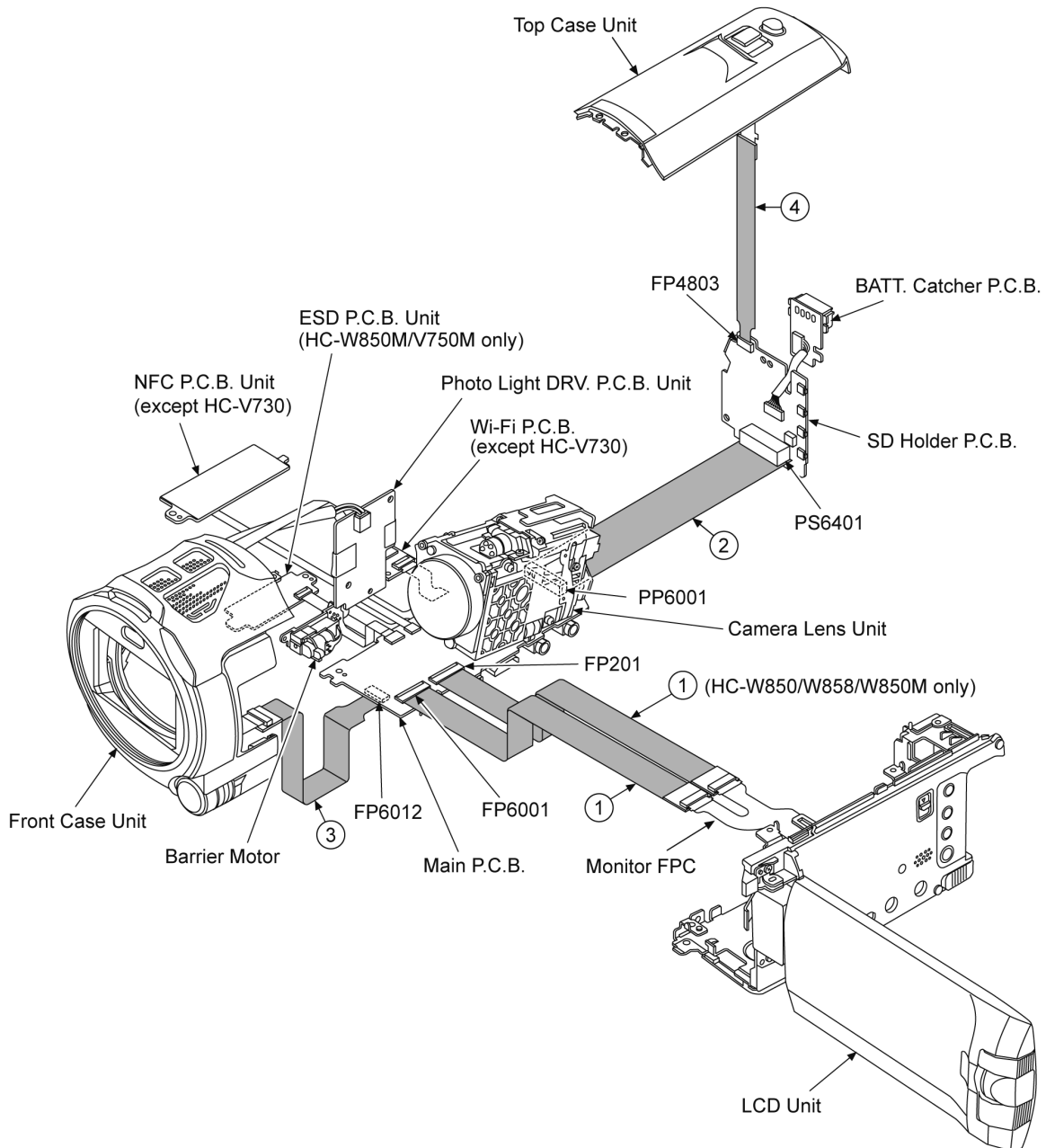
After replacing the MAIN P.C.B., be sure to achieve adjustment.

7.2. Service Position

This Service Position is used for checking and replacing parts. Use the following Extension cables for servicing.

No.	Parts No.	Connection	Form
1	RFKZ0354	FP6001(MAIN) - MONITOR FPC	37PIN 0.3 FFC
1	RFKZ0354	FP201(MAIN) - MONITOR FPC (HC-W850/W858/W850M only)	37PIN 0.3 FFC
2	VFK1581	PP6001(MAIN) - PS6401(SD HOLDER)	60PIN 0.5 B to B
3	VFK1388	FP6012(MAIN) - FRONT FFC	12PIN 0.5 FFC
4	VFK1440	FP4803(SD HOLDER) - TOP CASE UNIT	10PIN 0.5 FFC

7.2.1. Extention Cable Connection

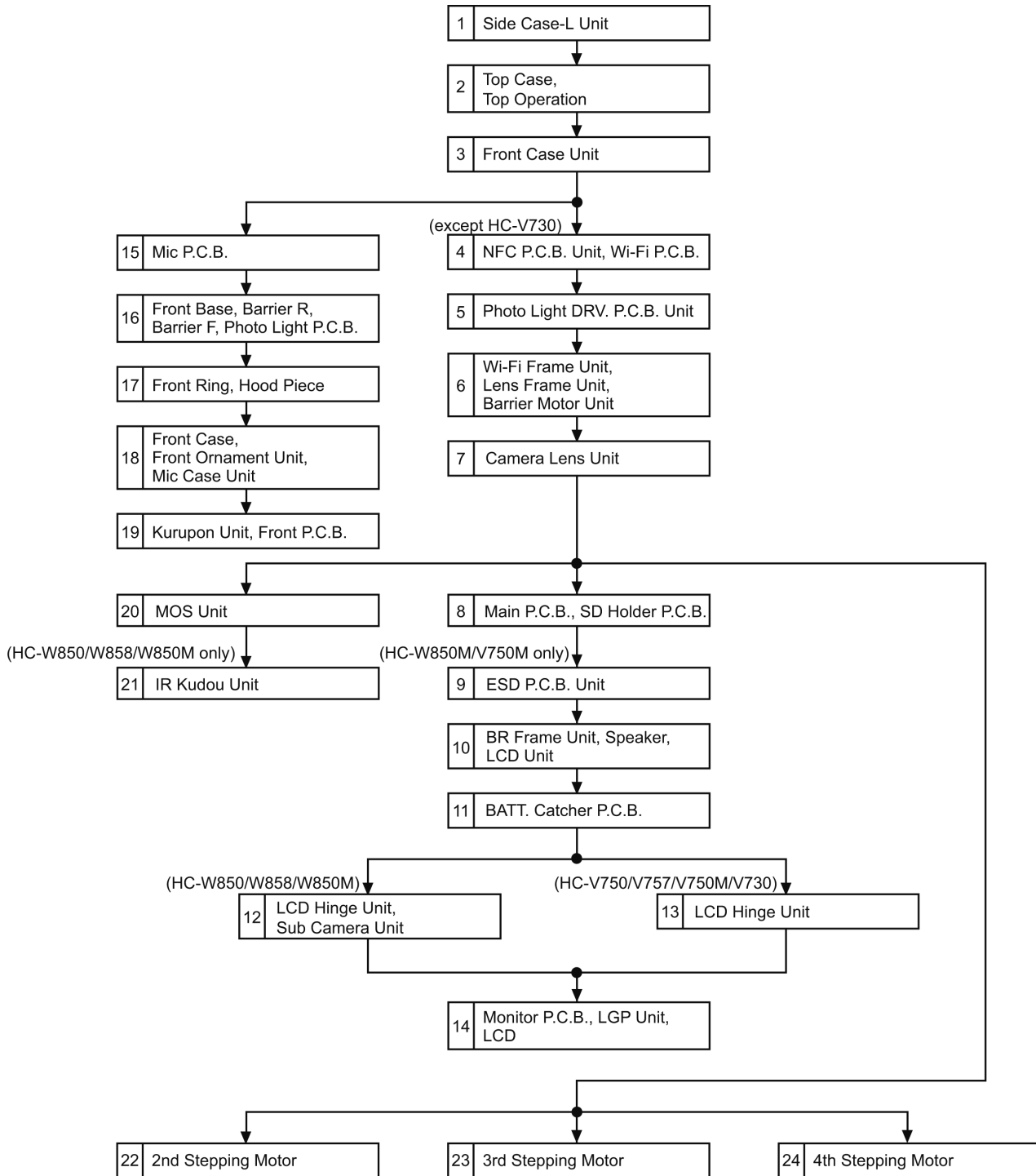


8 Disassembly and Assembly Instructions

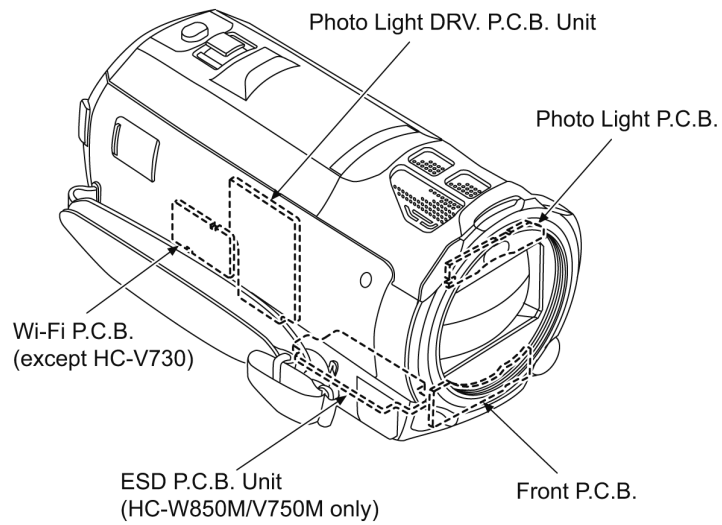
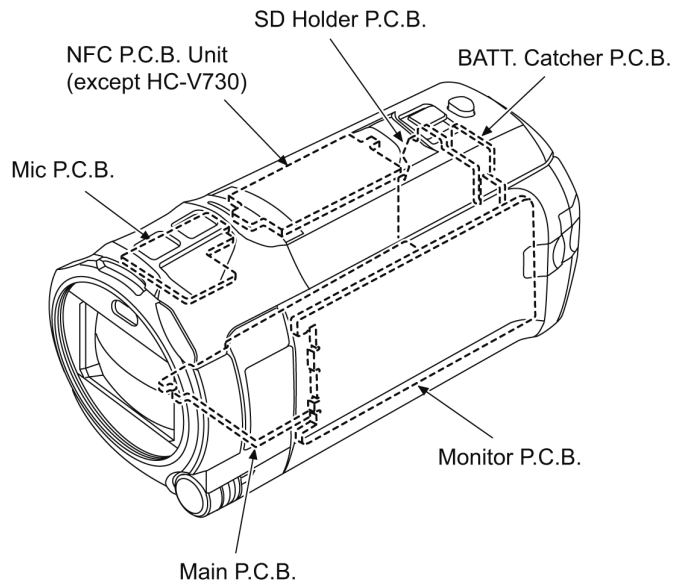
8.1. Disassembly Flow Chart for the Unit

This is a disassembling chart.

When assembling, perform this chart conversely.



8.2. PCB Location



8.3. Disassembly Procedure for the Unit

No.	Item	Fig.	Removal
1	Side Case-L Unit	(Fig. D1)	Screw (A) x 3
			Screw (B) x 2
		(Fig. D2)	Screw (C) x 3
			Locking tab x 3
			Side Case-L Unit
		(Fig. D3)	Screw (D) x 1
			Jack Cover Piece
			Locking tab x 1
			SS Lever
			SS Button
			Jack Door Spring
			DC Jack Cover Unit
			Screw (E) x 2
			HP Jack Cover Piece
			HP Jack Cover
			Locking tab x 2 (HC-W850/W858/W850M only)
			IR Piece (HC-W850/W858/W850M only)
2	Top Case, Top Operation	(Fig. D4)	Screw (F) x 1
			Screw (G) x 1
			Screw (H) x 1
			Locking tab x 1
		(Fig. D5)	Projection part x 2
			FP4803 (Flex)
		(Fig. D6)	Screw (I) x 4
			Convex x 2
			Top Shoe Angle
			Screw (J) x 3
Top Operation			
Power Panel Light			
3	Front Case Unit	(Fig. D7)	Screw (K) x 1
			Screw (L) x 2
		(Fig. D8)	Flex A
			Lead wire A
			Screw (M) x 1
			Locking tab x 1
			Convex x 1
			FP6012 (Flex)
			Front Case Unit
			Top Case
4	(except HC-V730) NFC P.C.B. Unit, Wi-Fi P.C.B.	(Fig. D9)	Screw (N) x 1
			FP6007 (Flex)
			Hooking part x 1
			NFC P.C.B. Unit
			Screw (O) x 1
			Flex B
			Hooking part x 1 Wi-Fi P.C.B.
5	Photo Light DRV. P.C.B. Unit	(Fig. D10)	Screw (P) x 2
			Flex C
			Photo Light DRV. P.C.B. Unit

No.	Item	Fig.	Removal
6	Wi-Fi Frame Unit Lens Frame Unit, Barrier Motor Unit	(Fig. D11)	Screw (Q) x 2
			Convex x 3
		(Fig. D12)	Hooking part x 2
			Wi-Fi Frame Unit
			Screw (R) x 1
(Fig. D13)	Hooking part x 3		
	FP6005 (Flex)		
	Screw (S) x 2		
	Lens Frame Unit Barrier Motor Unit		
7	Camera Lens Unit	(Fig. D14)	FP6001 (Flex)
			FP301 (Flex)
			Convex x 2
8	Main P.C.B., SD Holder P.C.B.	(Fig. D15)	Camera Lens Unit
			Screw (T) x 5
			Hooking part x 3
		(Fig. D16)	Heat Radiation Plate Unit
			P6003 (Connector)
			P6401 (Connector)
			FP201 (Flex) (HC-W850/W858/W850M only)
			FP6001 (Flex)
			Hooking part x 1
			FP611 (Flex) (HC-W850M/V750M only)
(Fig. D17)	Main P.C.B.		
	SD Holder P.C.B.		
9	(HC-W850M/V750M only) ESD P.C.B. Unit	(Fig. D18)	Screw (U) x 1
			ESD P.C.B. Unit
10	BR Frame Unit, Speaker, LCD Unit	(Fig. D19)	Screw (V) x 2
			Screw (W) x 2
			Screw (X) x 2
			Locking tab x 2
		(Fig. D20)	Convex x 4
			BR Frame Unit
			Shoe Lock Knob
			Shoe Lock Spring
			Speaker
			LCD Lever
(Fig. D21)	Convex x 3		
	Convex x 2		
11	BATT. Catcher P.C.B.	(Fig. D22)	LCD Unit
			Hooking part x 2
			BATT. Frame BATT. Catcher P.C.B.
12	(HC-W850/W858/W850M) LCD Hinge Unit, Sub Camera Unit	(Fig. D23)	Screw (Y) x 2
			Screw (Z) x 2
			Locking tab x 9
			LCD Case (T) Unit
			FP251 (Flex)
		(Fig. D24)	FP901 (Flex)
			LCD Hinge Unit
			Screw (a) x 1
			Convex x 3
			LCD Frame A
Sub Camera Unit	FP252 (Flex)		
	Convex x 1		
	Sub Camera Unit		

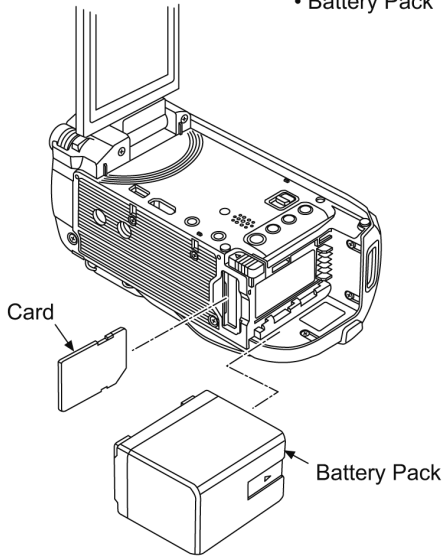
No.	Item	Fig.	Removal			
13	(HC-V750/V757/V750M/V730) LCD Hinge Unit	(Fig. D25)	Screw (Y) x 2			
			Screw (Z) x 2			
			Locking tab x 9			
			LCD Case (T) Unit			
		(Fig. D26)	FP901 (Flex)			
			LCD Hinge Unit			
			Screw (a) x 1			
14	Monitor P.C.B., LGP Unit, LCD	(Fig. D27)	Convex x 3			
			LCD Frame A			
			FP904 (Flex)			
			FP905 (Flex)			
			Locking tab x 1			
			Hooking part x 1			
			Monitor P.C.B.			
			Locking tab x 4			
			LGP Unit			
			LCD			
		Convex x 1				
		SC Rotate Earth Plate (HC-W850/W858/W850M only)				
		(Fig. D28)	Reflection Sheet			
			Light Guide Plate			
Diffusion Sheet						
Prism Sheet (B)						
15	Mic P.C.B.	(Fig. D29)	Prism Sheet (A)			
			LGP Holder			
			Screw (b) x 1			
			FP4802 (Flex)			
			Mic P.C.B.			
			16	Front Base, Barrier R, Barrier F, Photo Light P.C.B.	(Fig. D30)	LCD Case (T) Unit
						FP901 (Flex)
						Screw (c) x 5
					(Fig. D31)	Front Base
						Barrier R
						Barrier F
17	Front Ring, Hood Piece	(Fig. D32)	Hooking part x 1			
			Convex x 2			
			Photo Light P.C.B.			
			Screw (d) x 2			
			Front Ring			
			LED Light Lens			
			Convex x 2			
			Locking tab x 6			
			LED Light Cover			
			Hood Piece			
Hood Mask						
18	Front Case, Front Ornament Unit Mic Case Unit	(Fig. D33)	Screw (e) x 1			
			Screw (f) x 1			
			Convex x 1			
			Locking tab x 1			
			Convex x 2			
			Locking tab x 1			
			Front Case			
			Locking tab x 2			
			MF Ornament			
			Front Ornament Unit			
		(Fig. D34)	Screw (g) x 2			
			Mic Earth Plate			
			Mic Case Unit			
			Mic Net Cover			

No.	Item	Fig.	Removal
19	Kurupon Unit, Front P.C.B.	(Fig. D35)	Screw (h) x 2
			Locking tab x 2
			Convex x 2
			FR Earth Angle
			Kurupon Unit
			Locking tab x 1
			Convex x 2
20	MOS Unit	(Fig. D36)	Front P.C.B.
			Screw (i) x 3
			Convex x 2
21	(HC-W850/W858/W850M) IR Kudou Unit	(Fig. D37)	MOS Unit
			Solder x 2 points
			Screw (j) x 1
			Convex x 2
22	2nd Stepping Motor	(Fig. D38)	IR Kudou Unit
			Solder x 4 points
			Screw (k) x 3
23	3rd Stepping Motor	(Fig. D39)	2nd Stepping Motor
			Solder x 4 points
			Screw (m) x 3
			Convex x 1
24	4th Stepping Motor	(Fig. D40)	3rd Stepping Motor
			Solder x 4 points
			Screw (n) x 2
			Convex x 2
			4th Stepping Motor

NOTE:

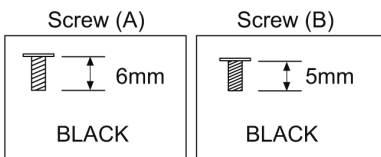
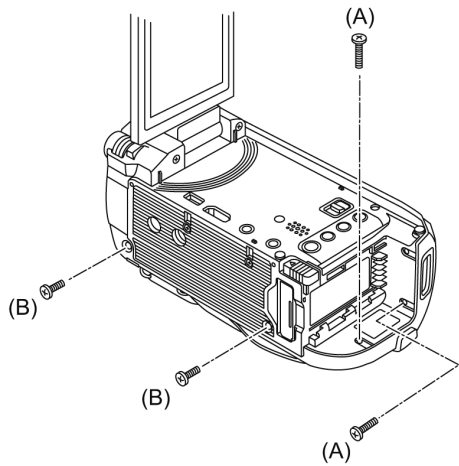
When servicing and reassembling, remove the Card and battery pack from the unit.

- Card
- Battery Pack



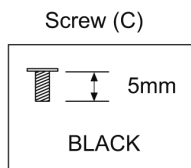
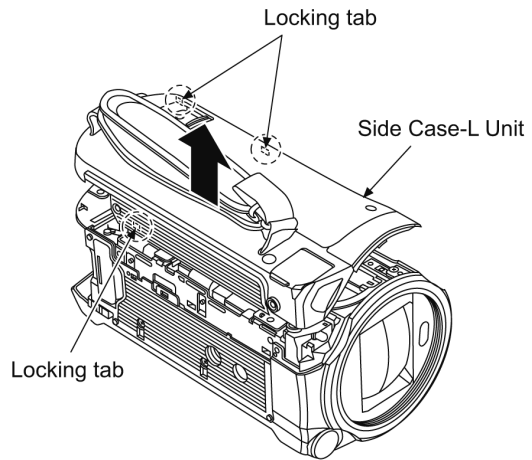
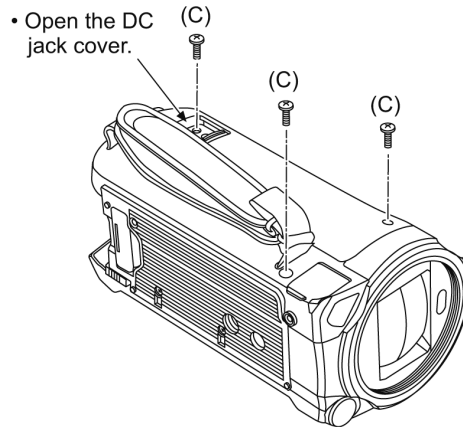
8.3.1. Removal of the Side Case-L Unit

- Screw (A) × 2
- Screw (B) × 2

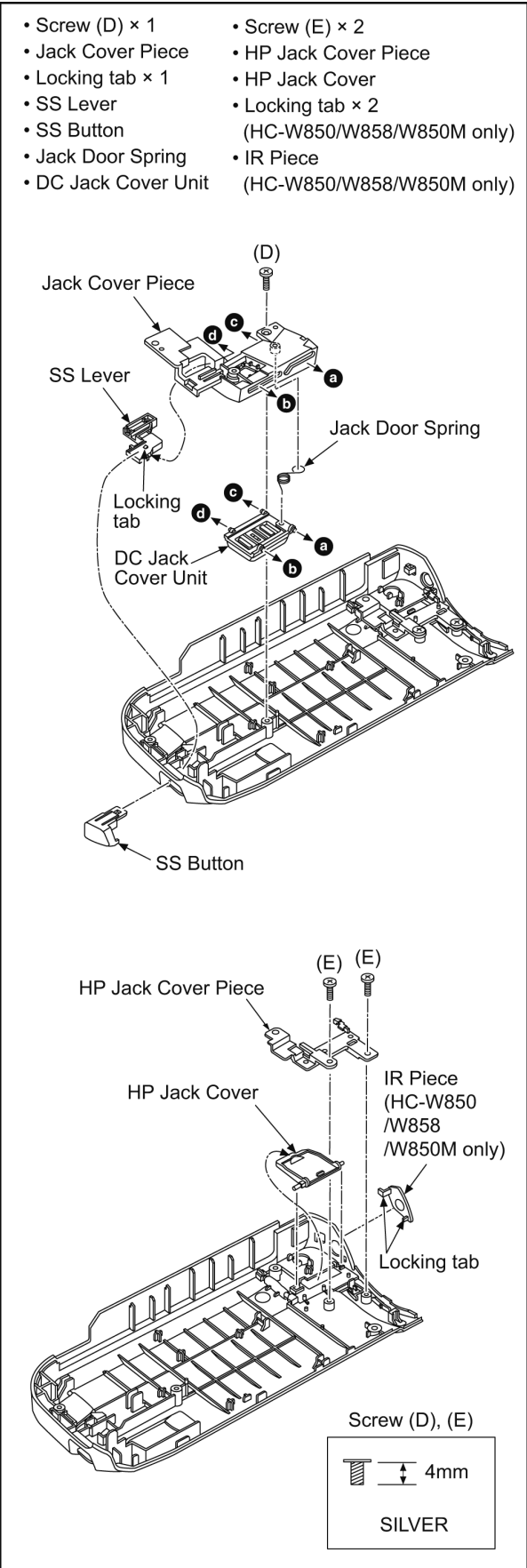


(Fig. D1)

- Screw (C) × 3
- Locking tab × 3

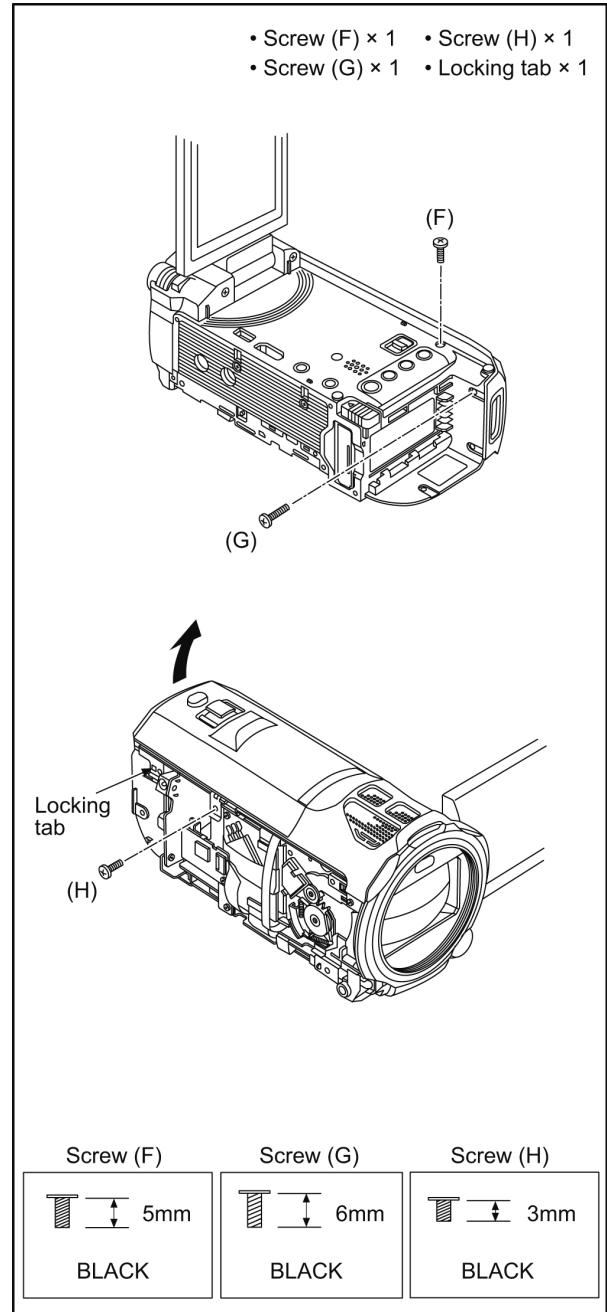


(Fig. D2)

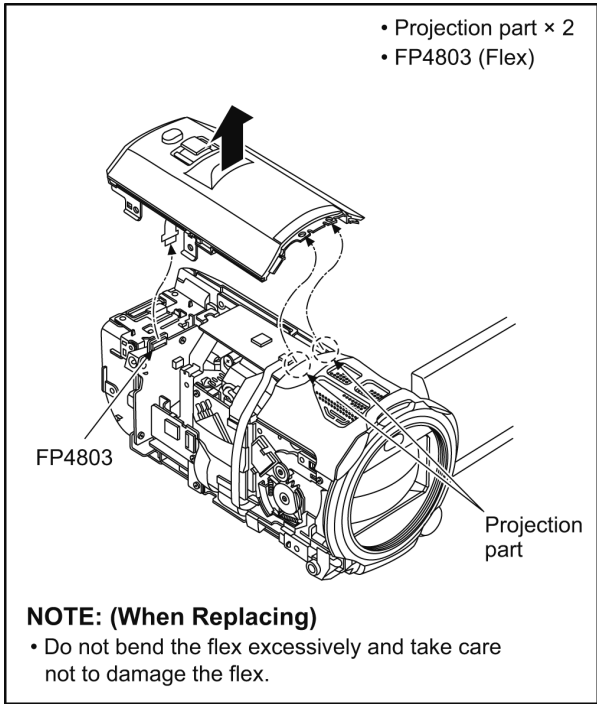


(Fig. D3)

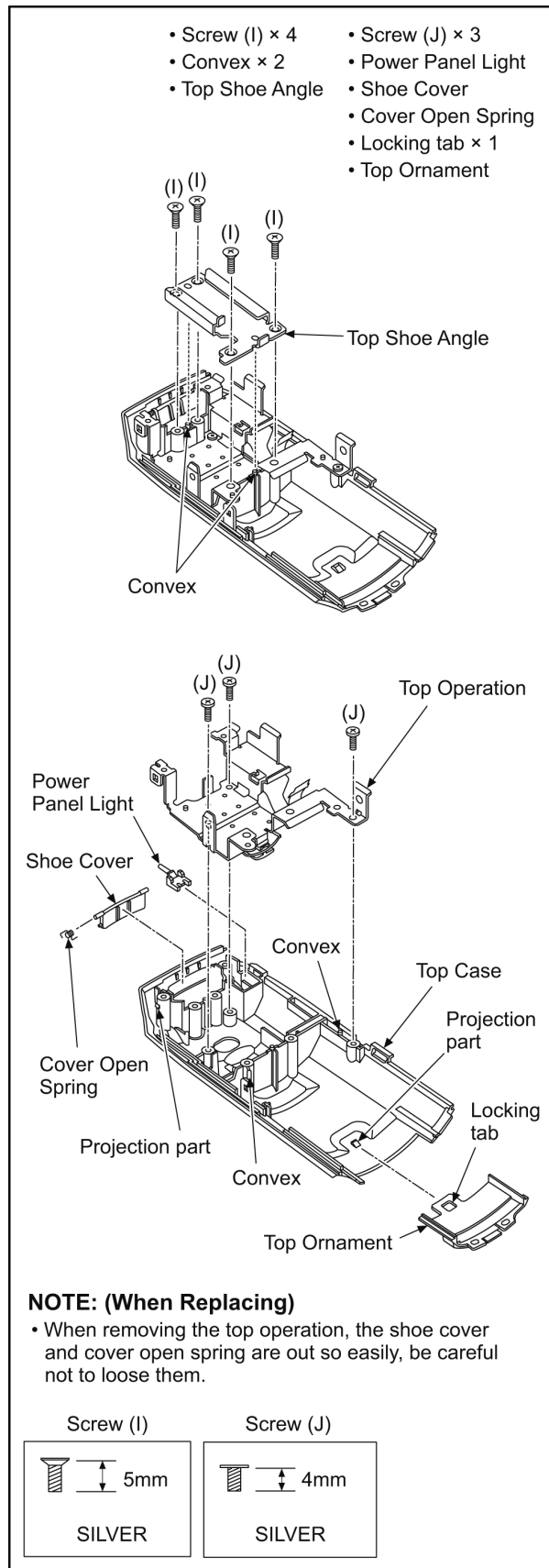
8.3.2. Removal of the Top Case, Top Operation



(Fig. D4)

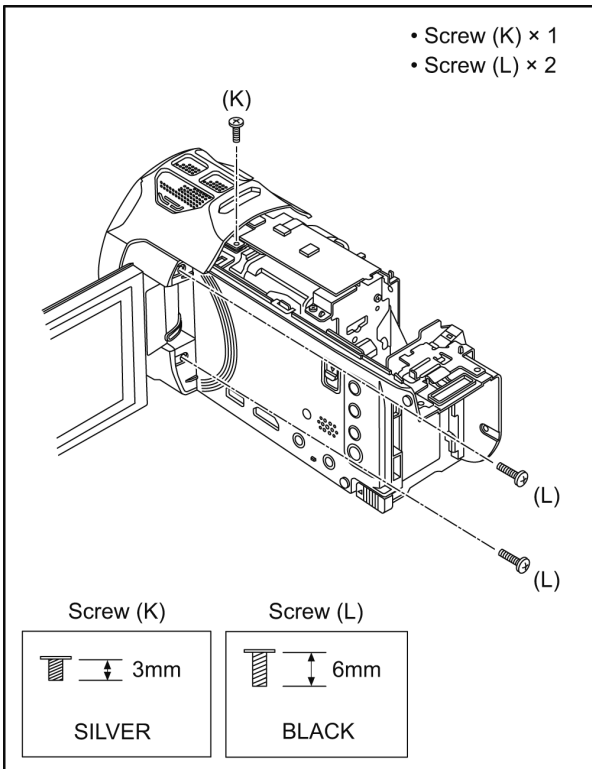


(Fig. D5)

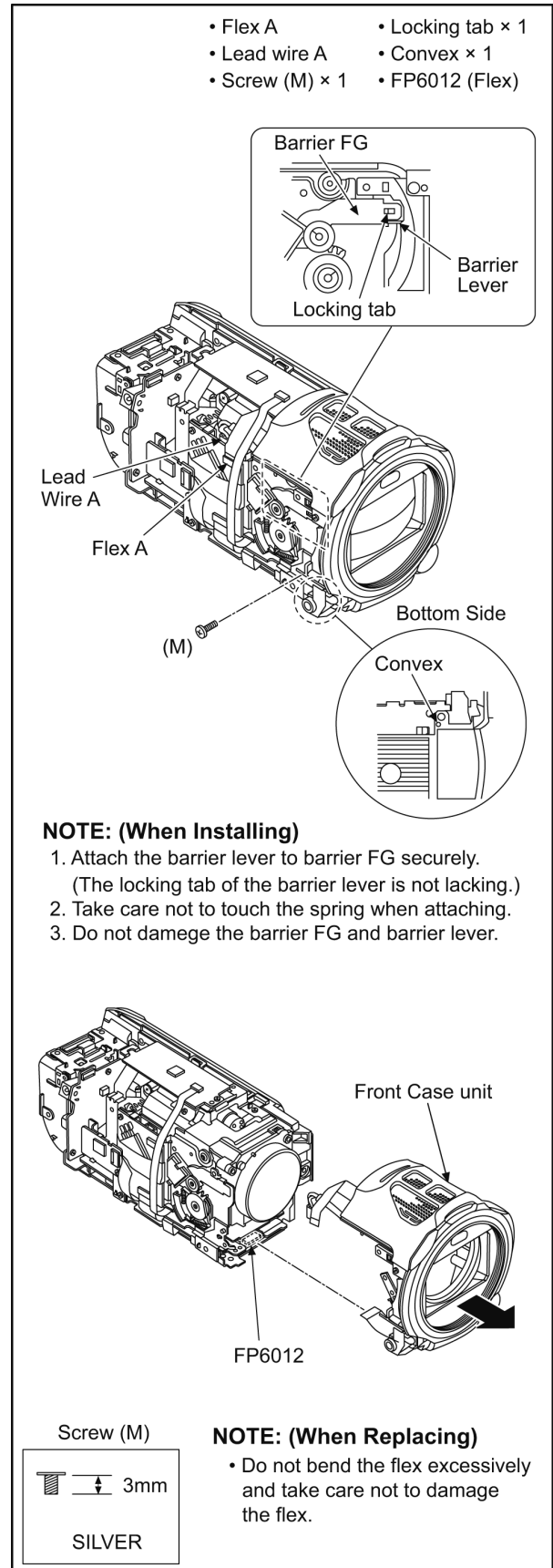


(Fig. D6)

8.3.3. Removal of the Front Case Unit

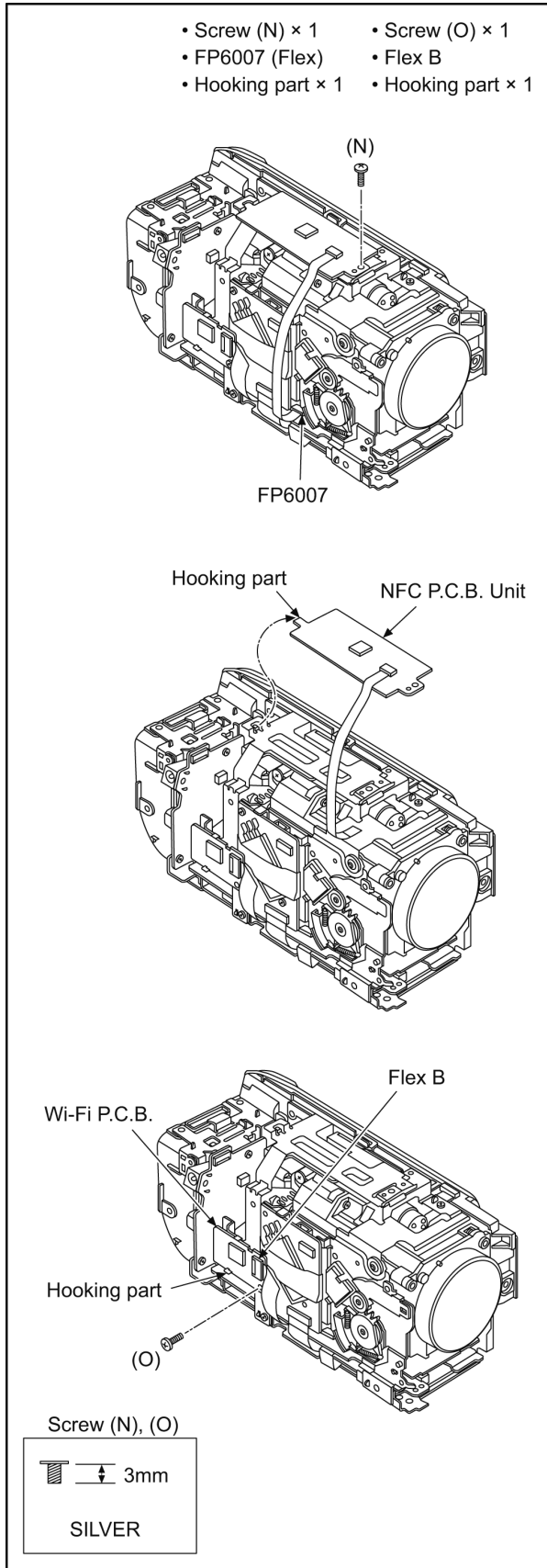


(Fig. D7)



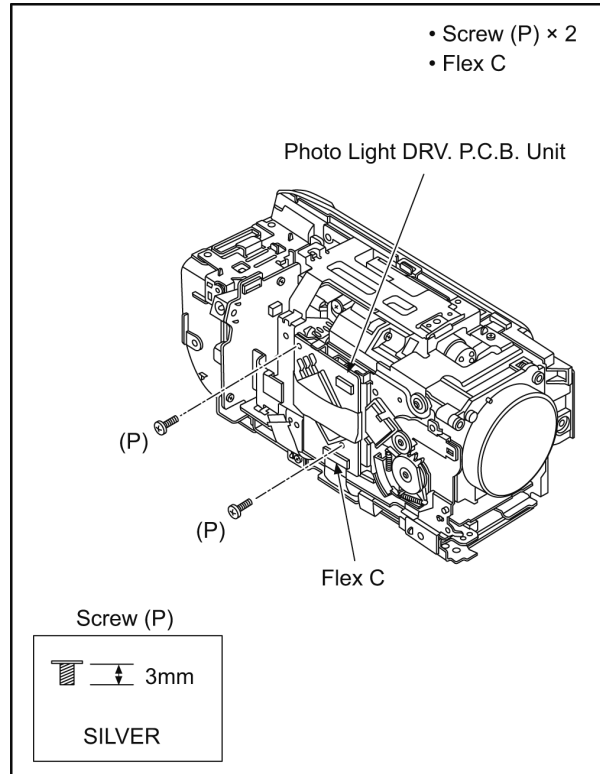
(Fig. D8)

8.3.4. (except HC-V730) Removal of the NFC P.C.B. Unit, Wi-Fi P.C.B.



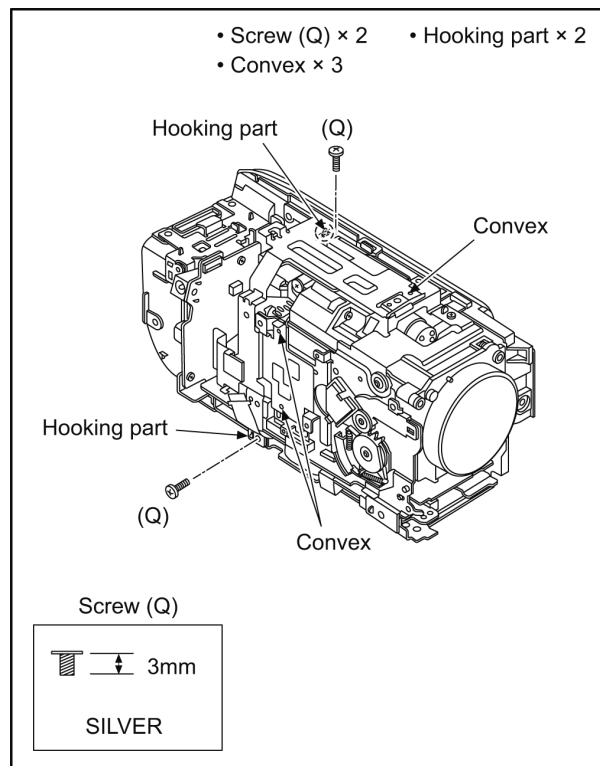
(Fig. D9)

8.3.5. Removal of the Photo Light DRV. P.C.B. Unit

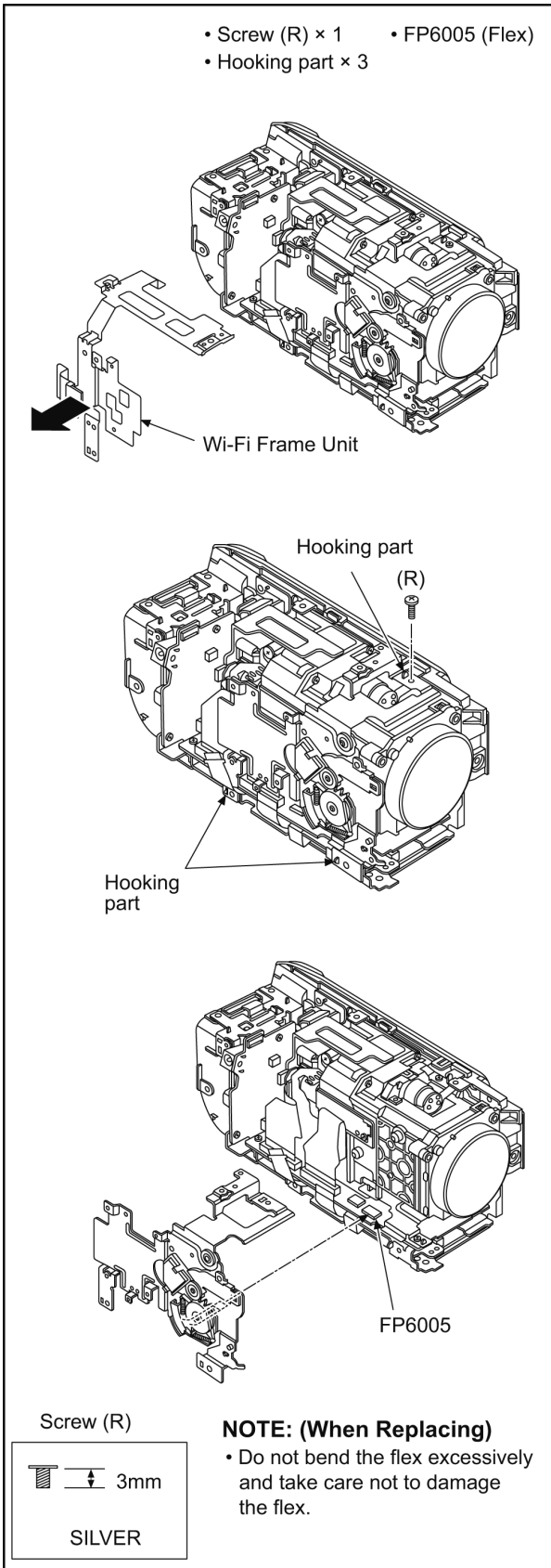


(Fig. D10)

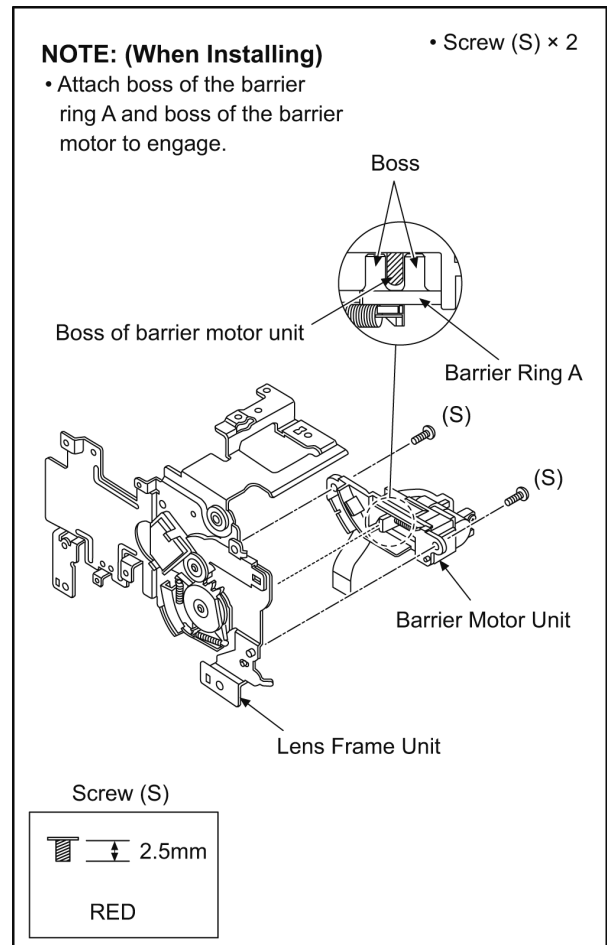
8.3.6. Removal of the Wi-Fi Frame Unit, Lens Frame Unit, Barrier Motor Unit



(Fig. D11)

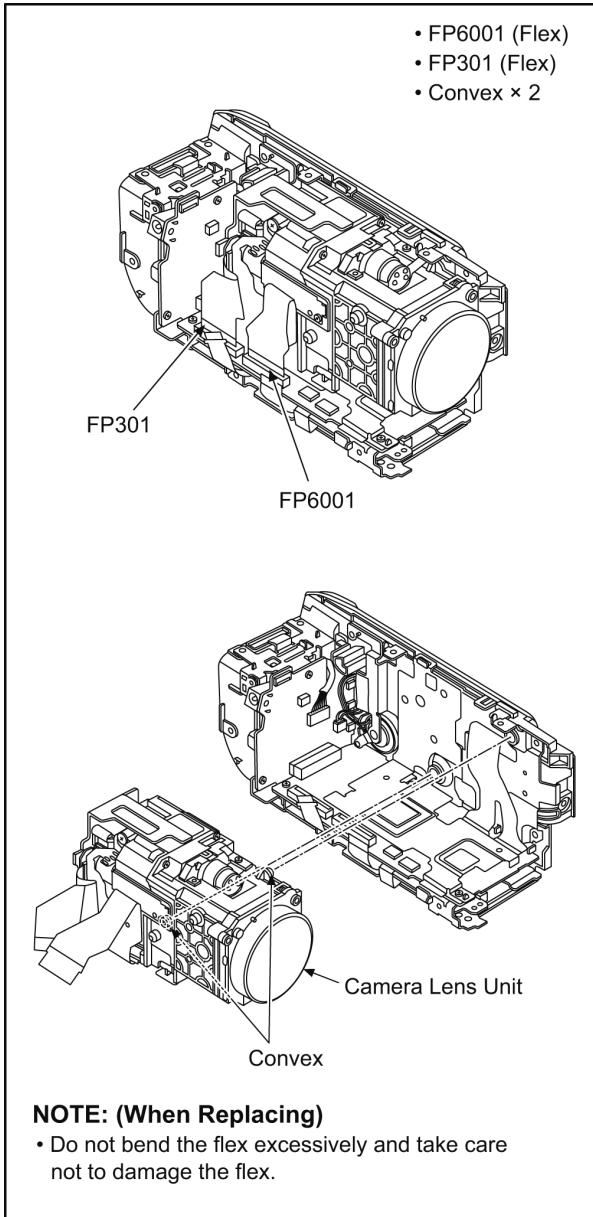


(Fig. D12)



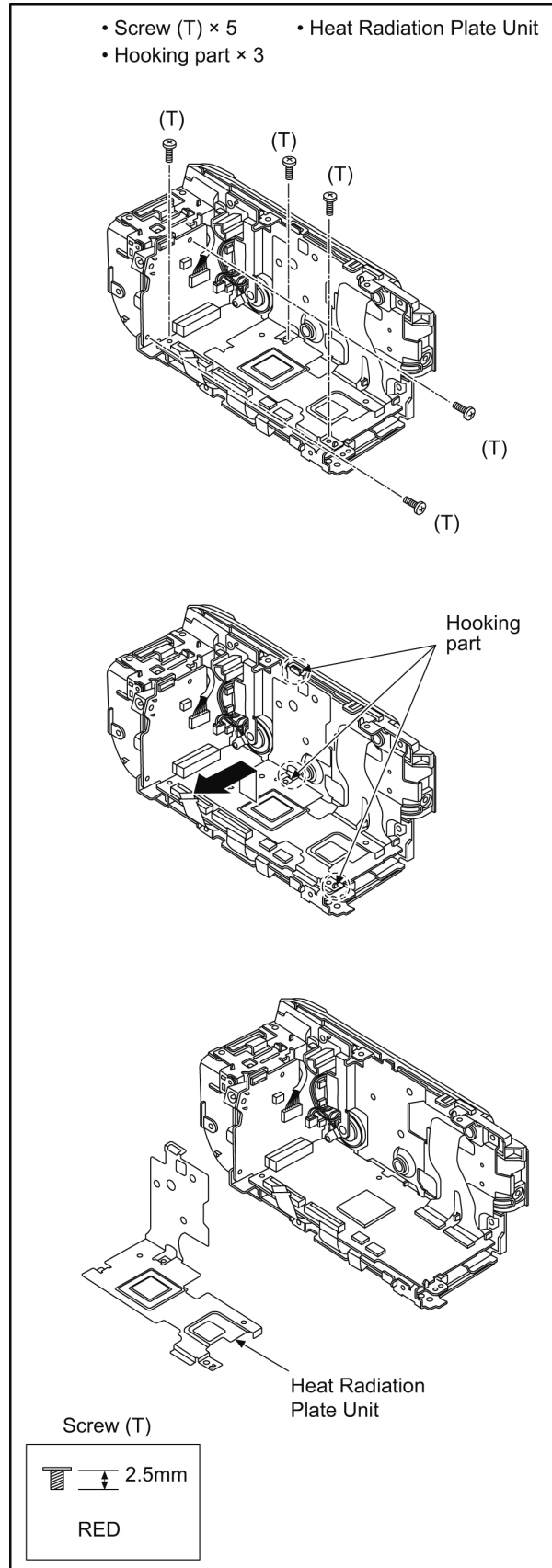
(Fig. D13)

8.3.7. Removal of the Camera Lens Unit



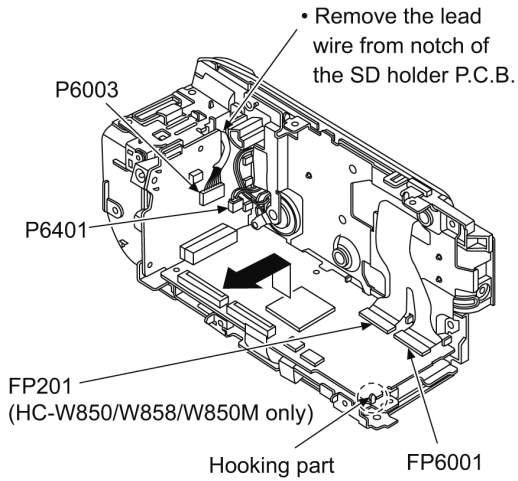
(Fig. D14)

8.3.8. Removal of the Main P.C.B., SD Holder P.C.B.



(Fig. D15)

- P6003 (Connector)
- P6401 (Connector)
- FP201 (Flex)
(HC-W850/W858/W850M only)
- FP6001 (Flex)
- Hooking part × 1
- FP6011 (Flex)
(HC-W850M/V750M only)



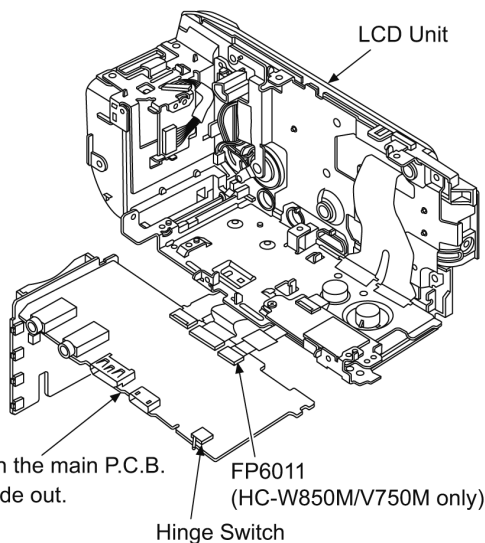
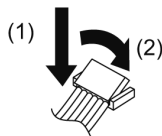
NOTE: (When Removing)

- When removing the connector (P6003), raise the tip, and then detach the connector.



NOTE: (When Installing)

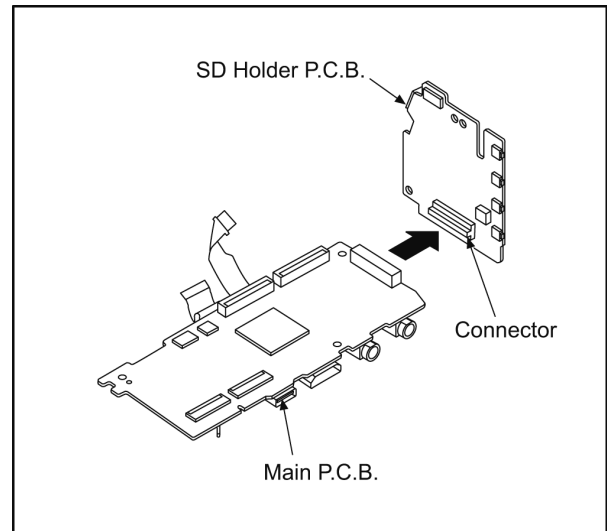
- When install the connector (P6003), Insert the base of the connector first, and then press the tip.



NOTE: (When Installing)

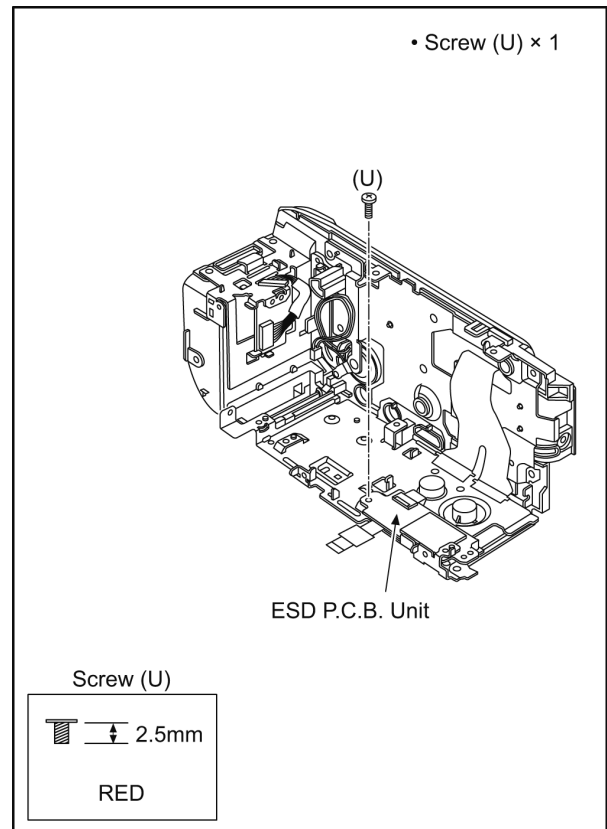
- When installing the Main P.C.B. & SD holder P.C.B., LCD unit keep it close.
(To prevent damage to the hinge switch.)

(Fig. D16)



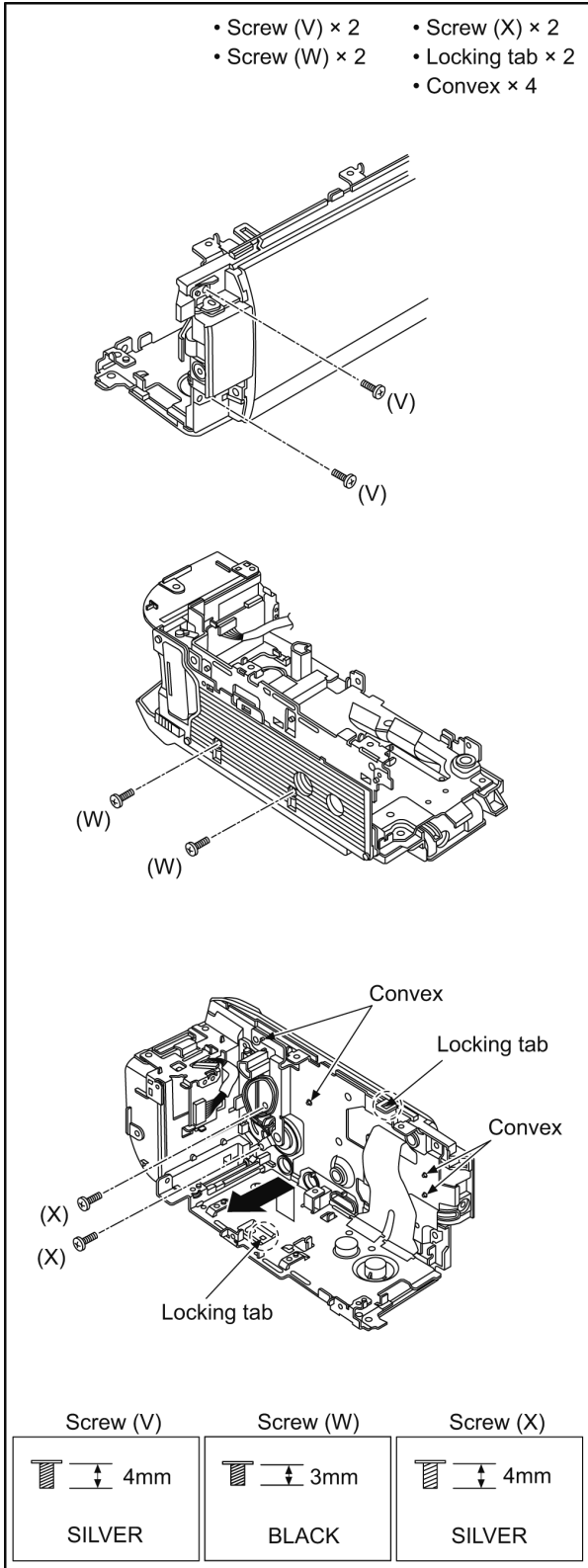
(Fig. D17)

8.3.9. (HC-W850M/V750M only) Removal of the ESD P.C.B. Unit

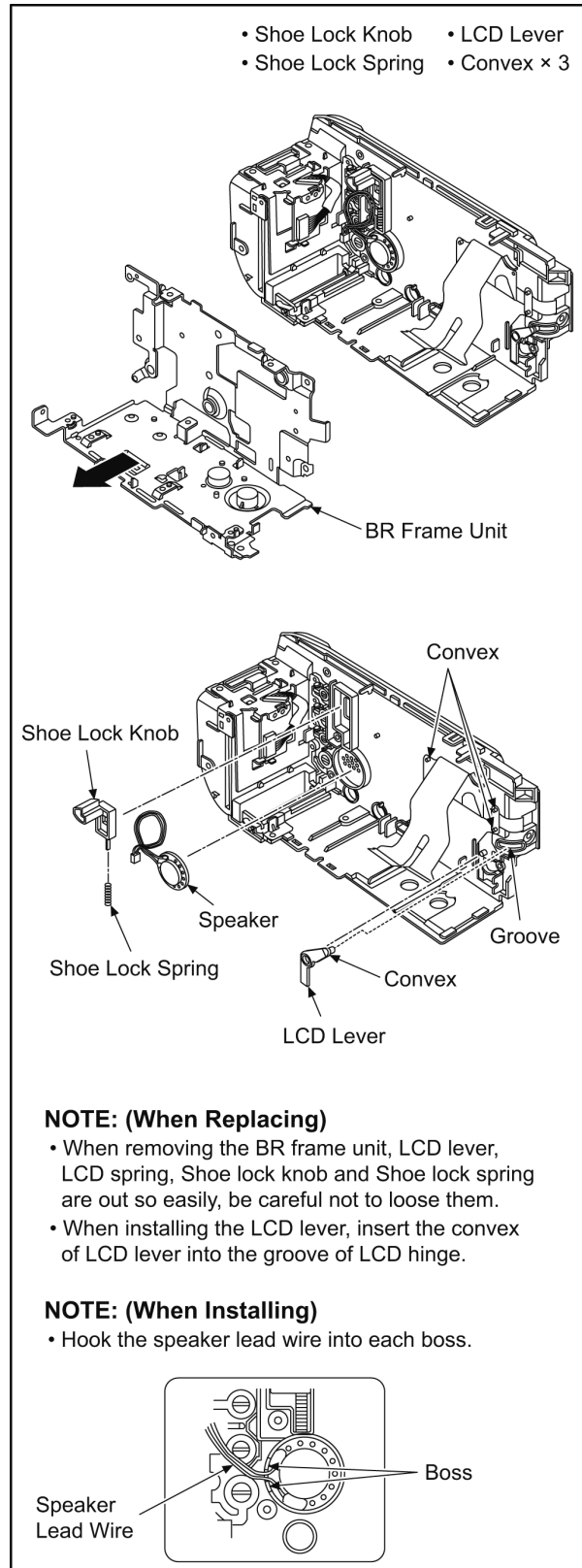


(Fig. D18)

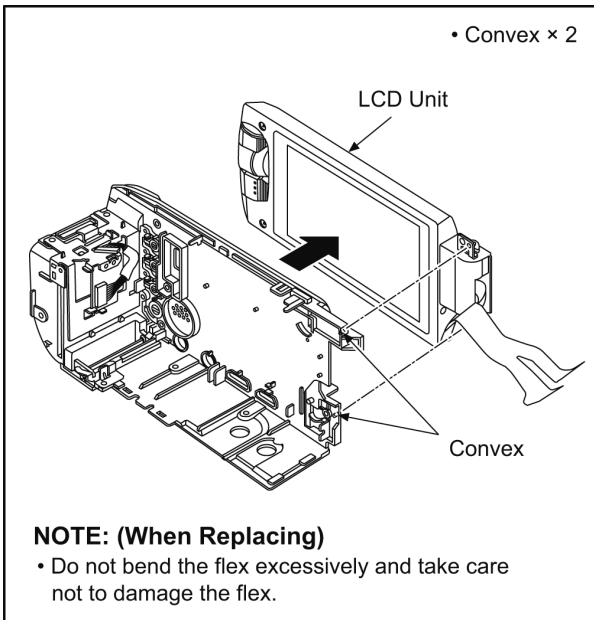
8.3.10. Removal of the BR Frame Unit, Speaker, LCD Unit



(Fig. D19)

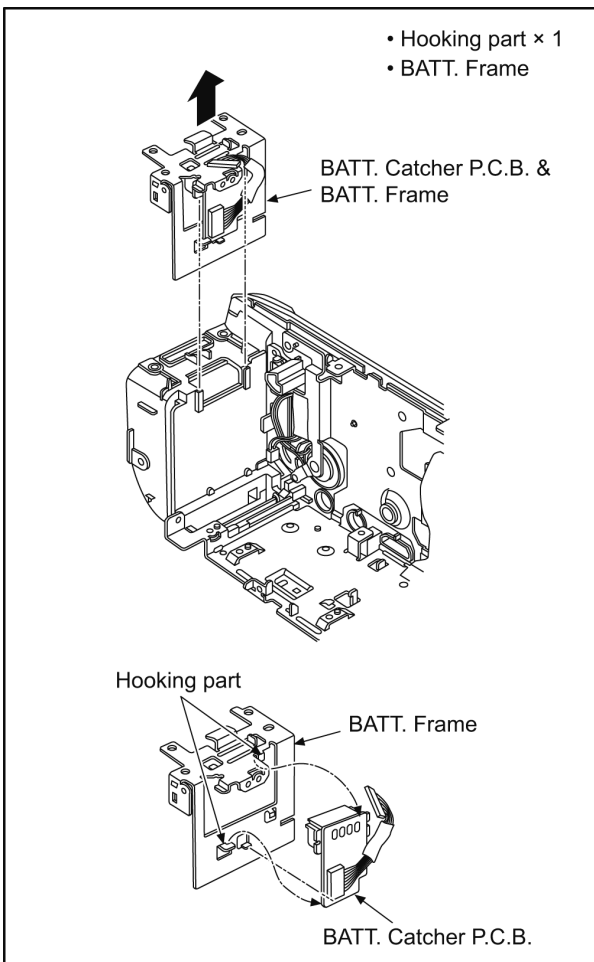


(Fig. D20)



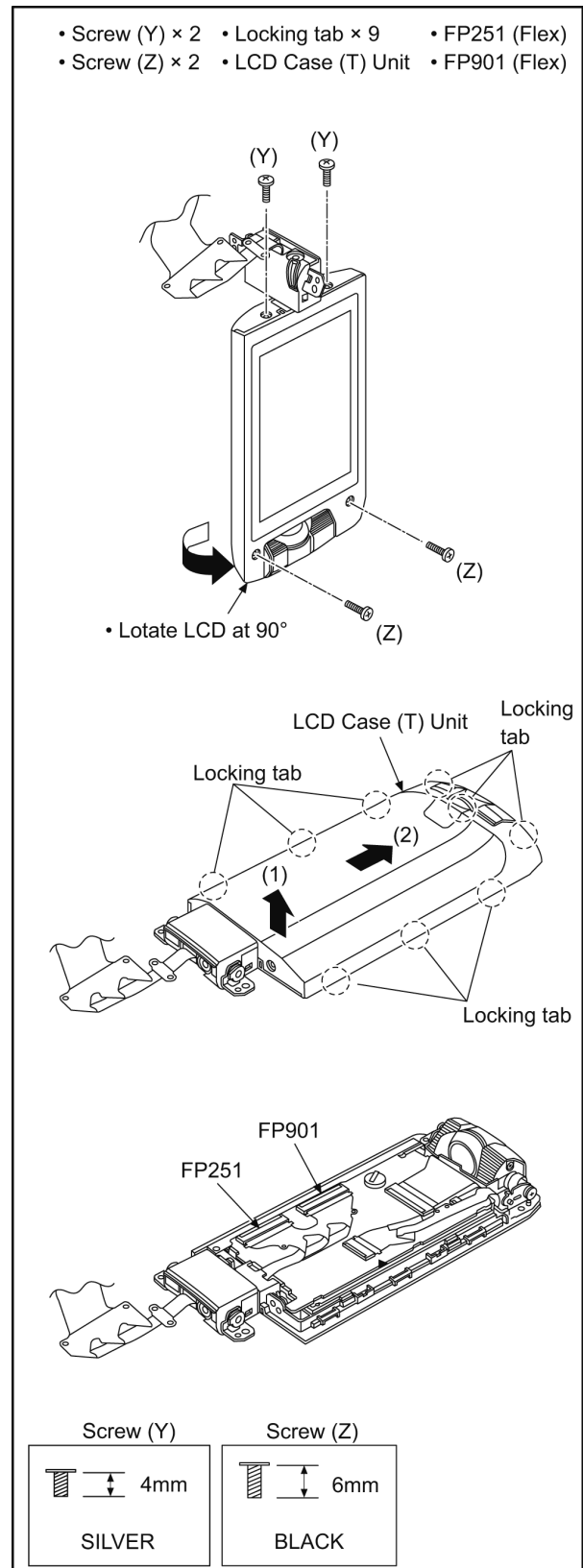
(Fig. D21)

8.3.11. Removal of the BATT. Catcher P.C.B.

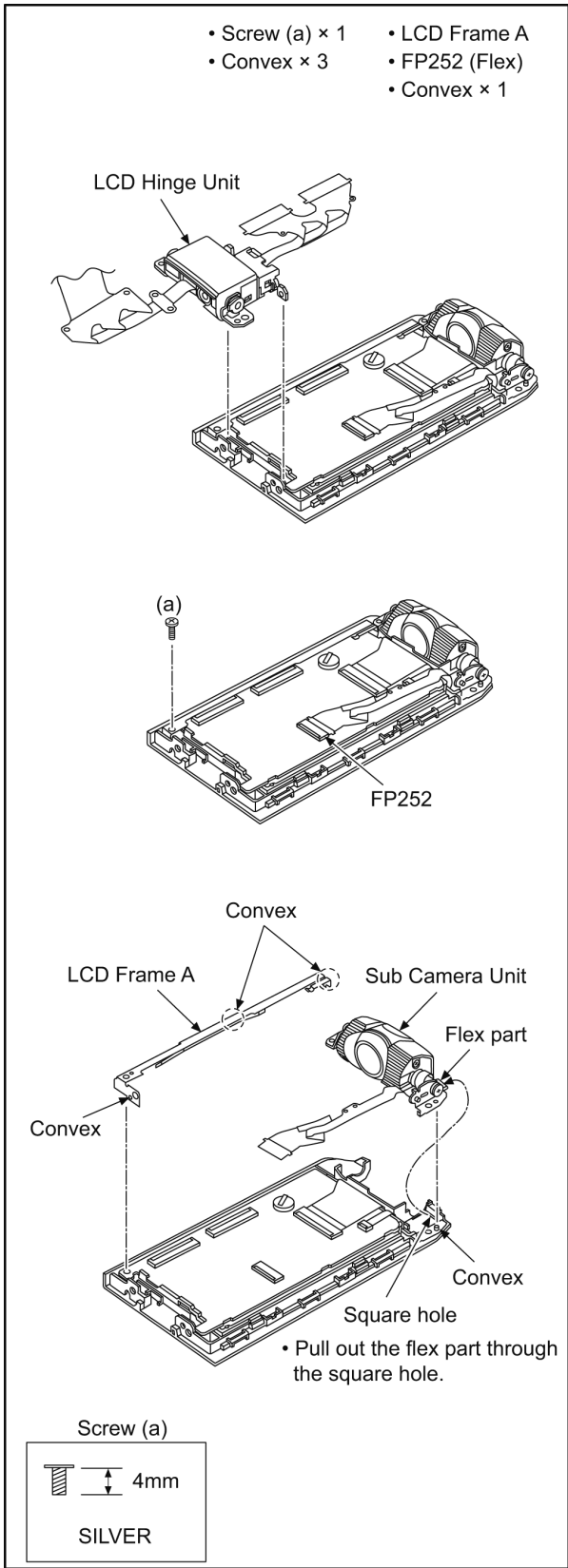


(Fig. D22)

8.3.12. (HC-W850/W858/W850M) Removal of the LCD Hinge Unit, Sub Camera Unit

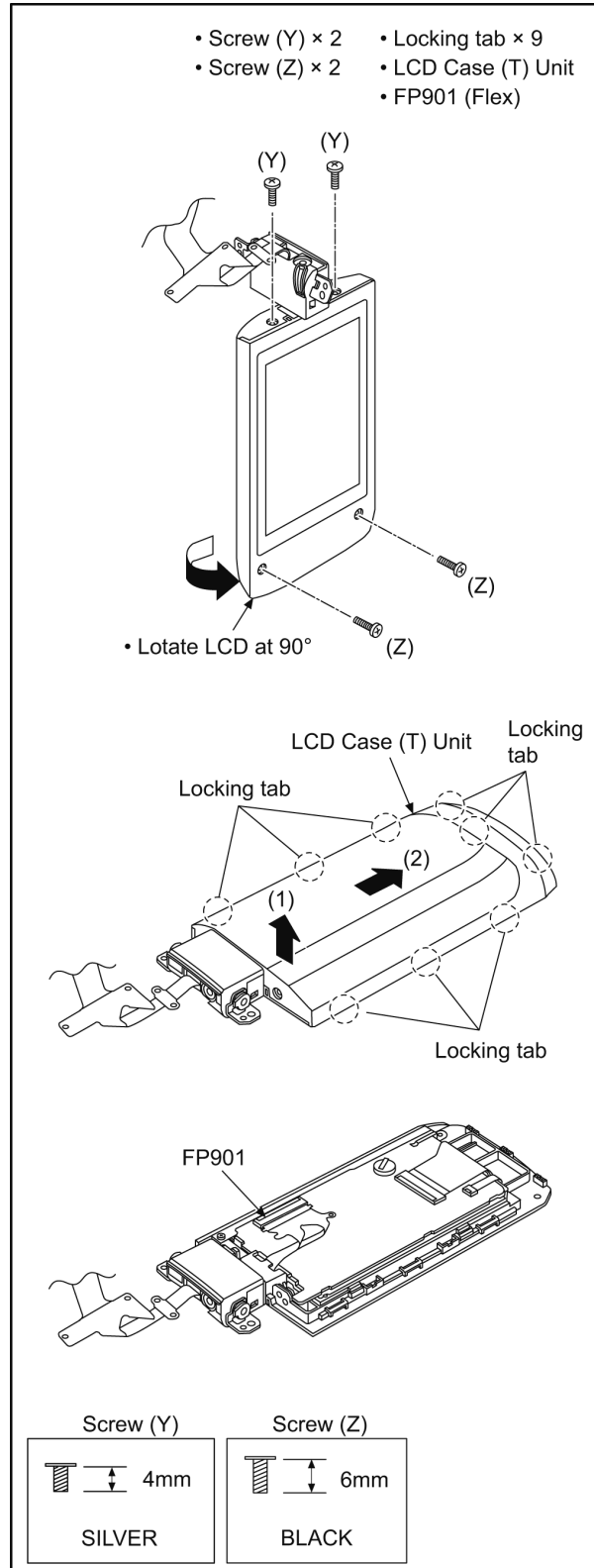


(Fig. D23)

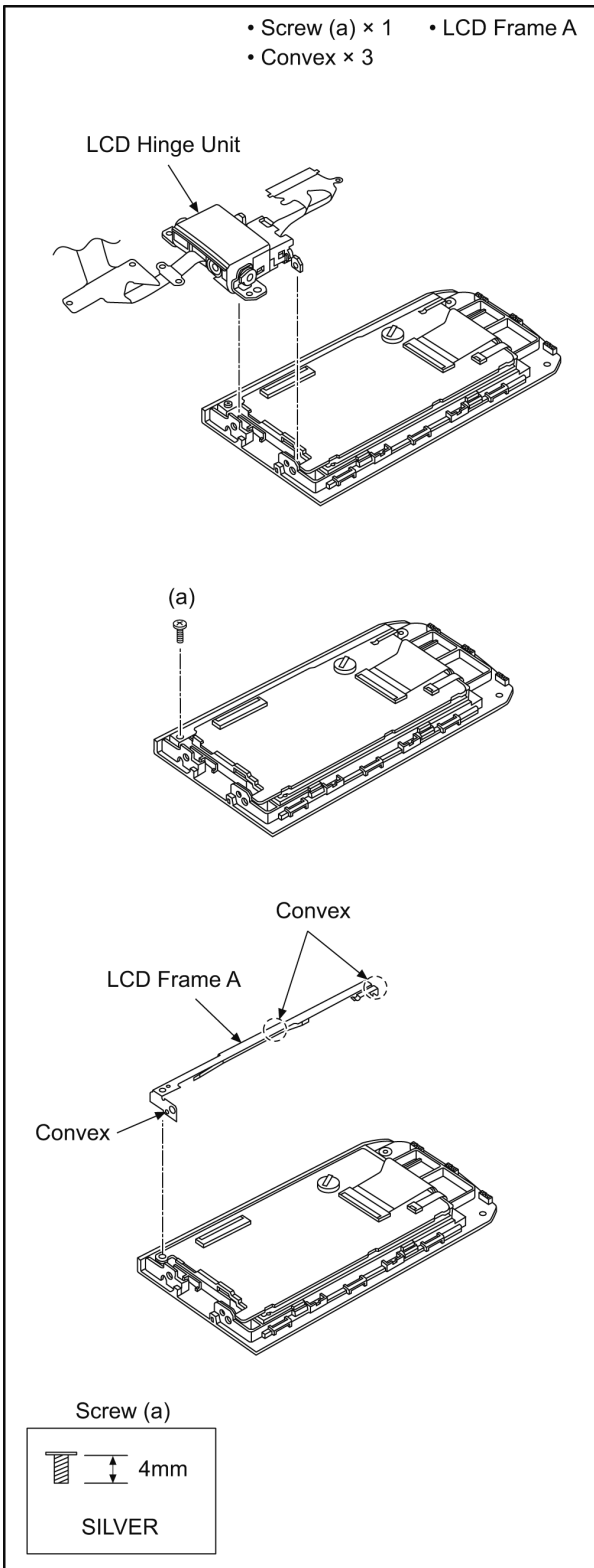


(Fig. D24)

8.3.13. (HC-V750/V757/V750M/V730) Removal of the LCD Hinge Unit

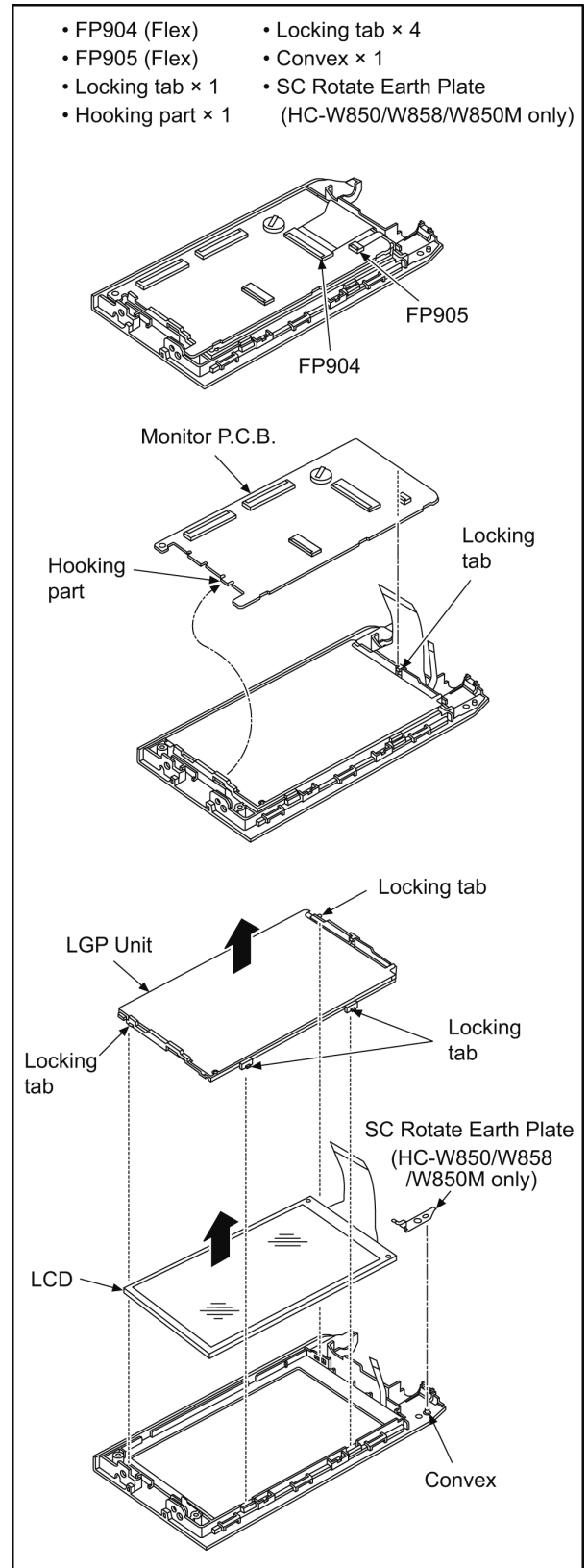


(Fig. D25)

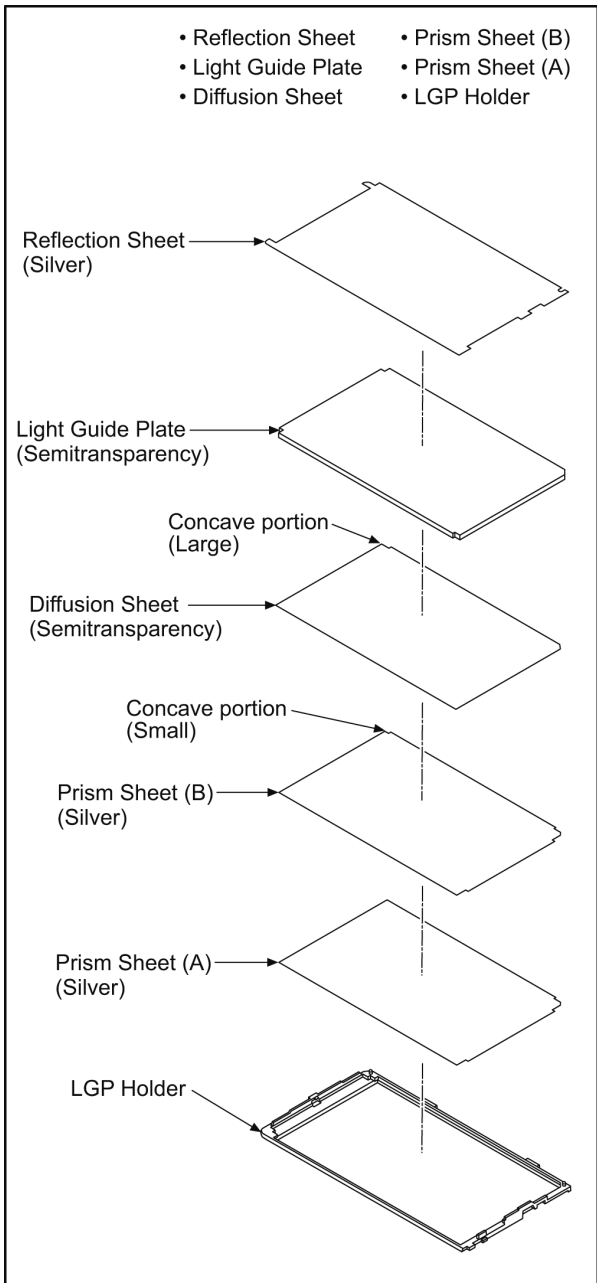


(Fig. D26)

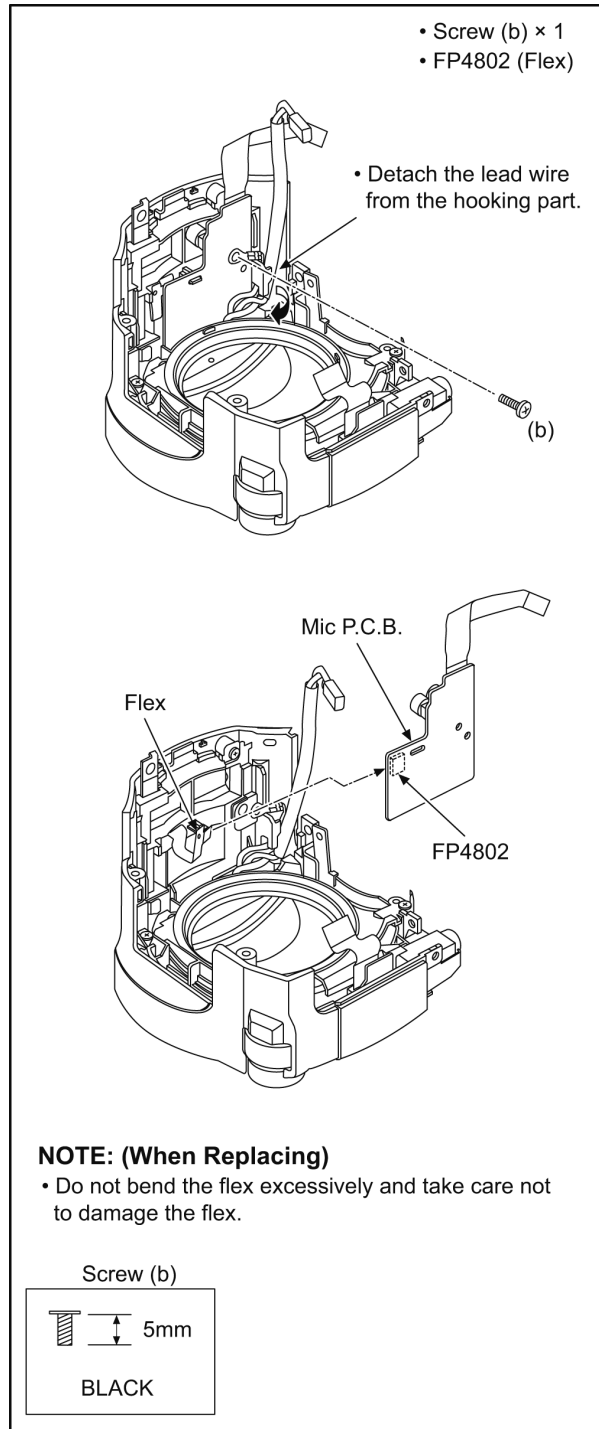
8.3.14. Removal of the Monitor P.C.B., LGP Unit, LCD



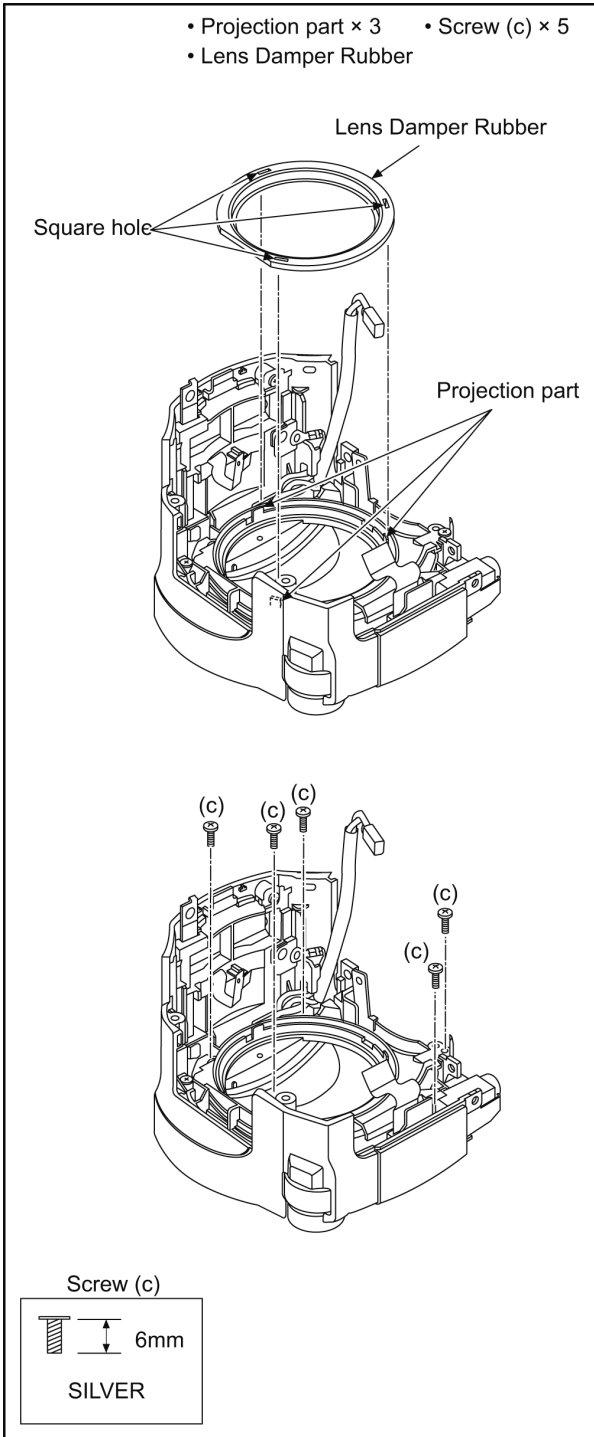
(Fig. D27)



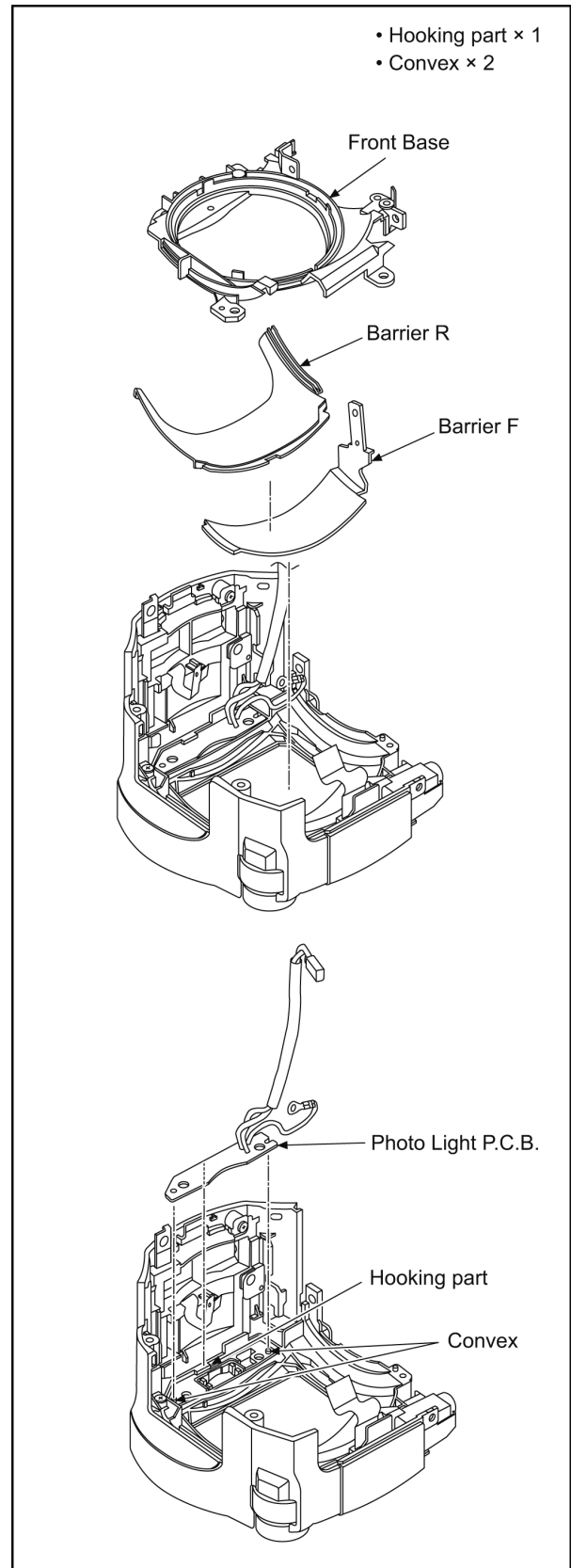
8.3.15. Removal of the Mic P.C.B.



8.3.16. Removal of the Front Base, Barrier R, Barrier F, Photo Light P.C.B.

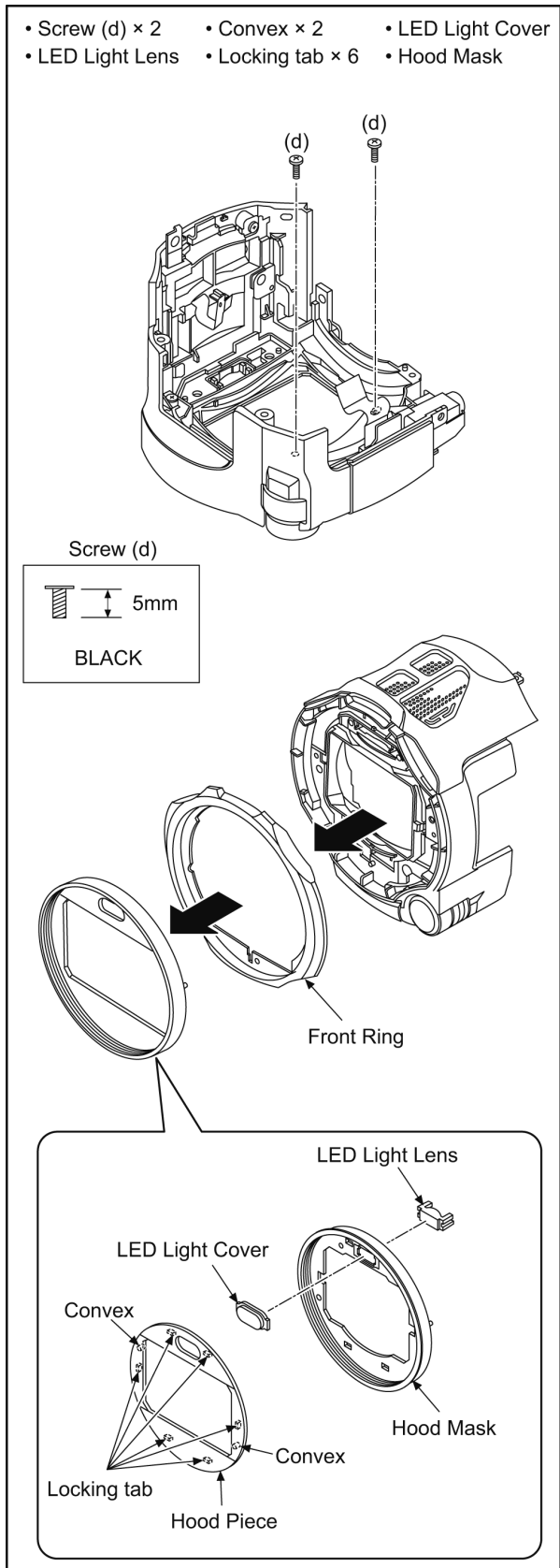


(Fig. D30)



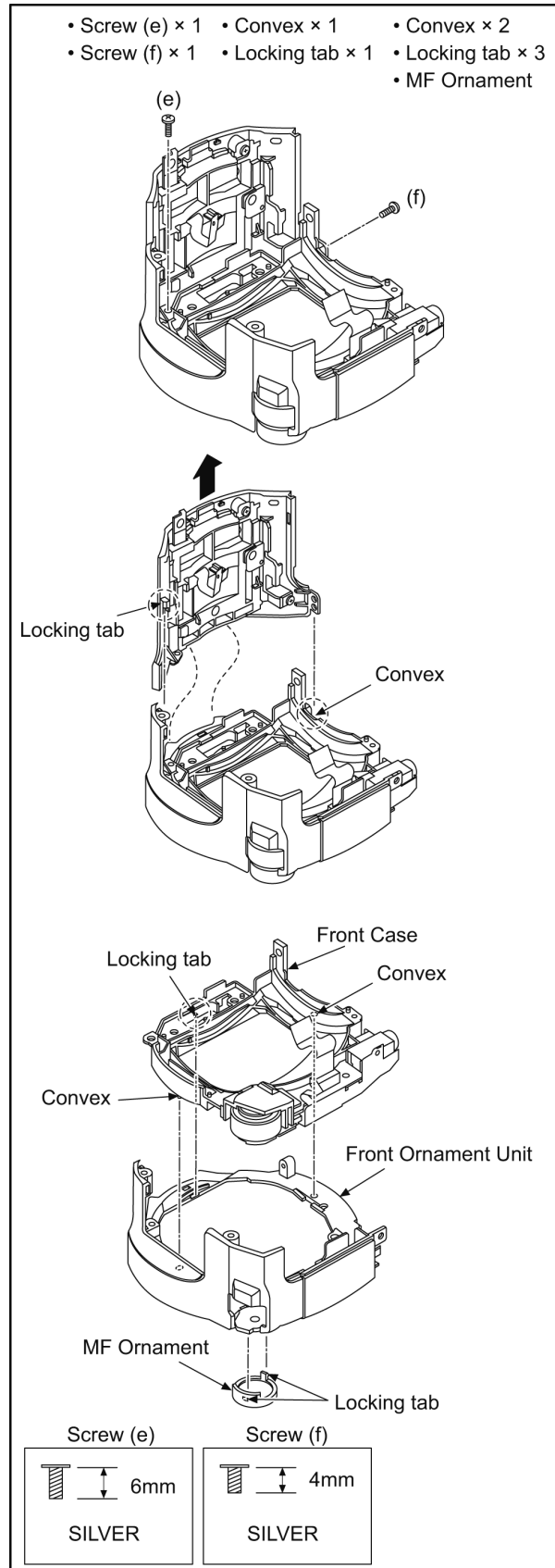
(Fig. D31)

8.3.17. Removal of the Front Ring, Hood Piece



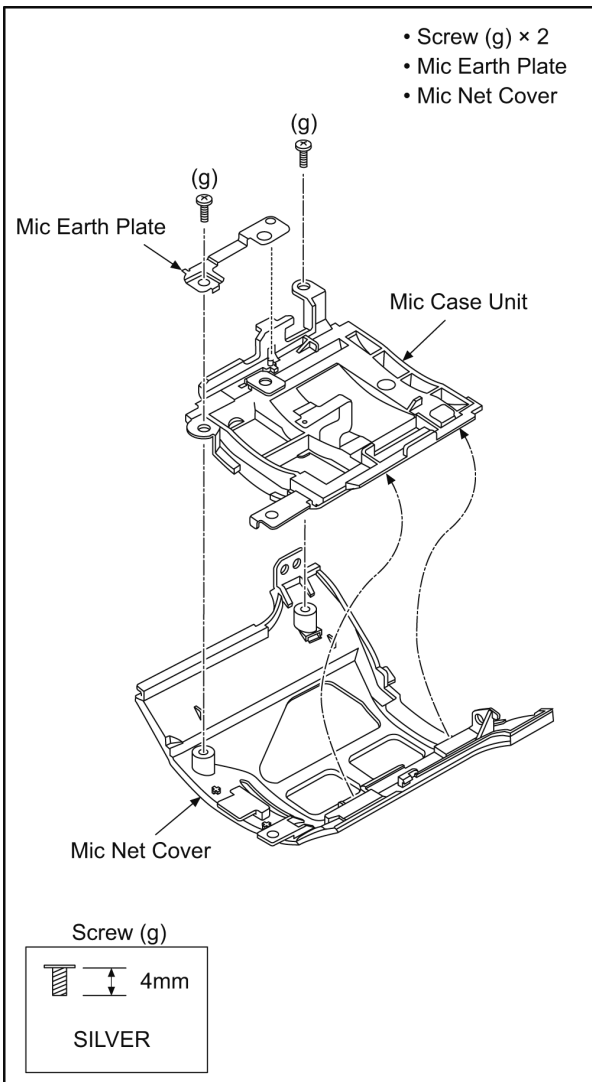
(Fig. D32)

8.3.18. Removal of the Front Case, Front Ornament Unit, Mic Case Unit

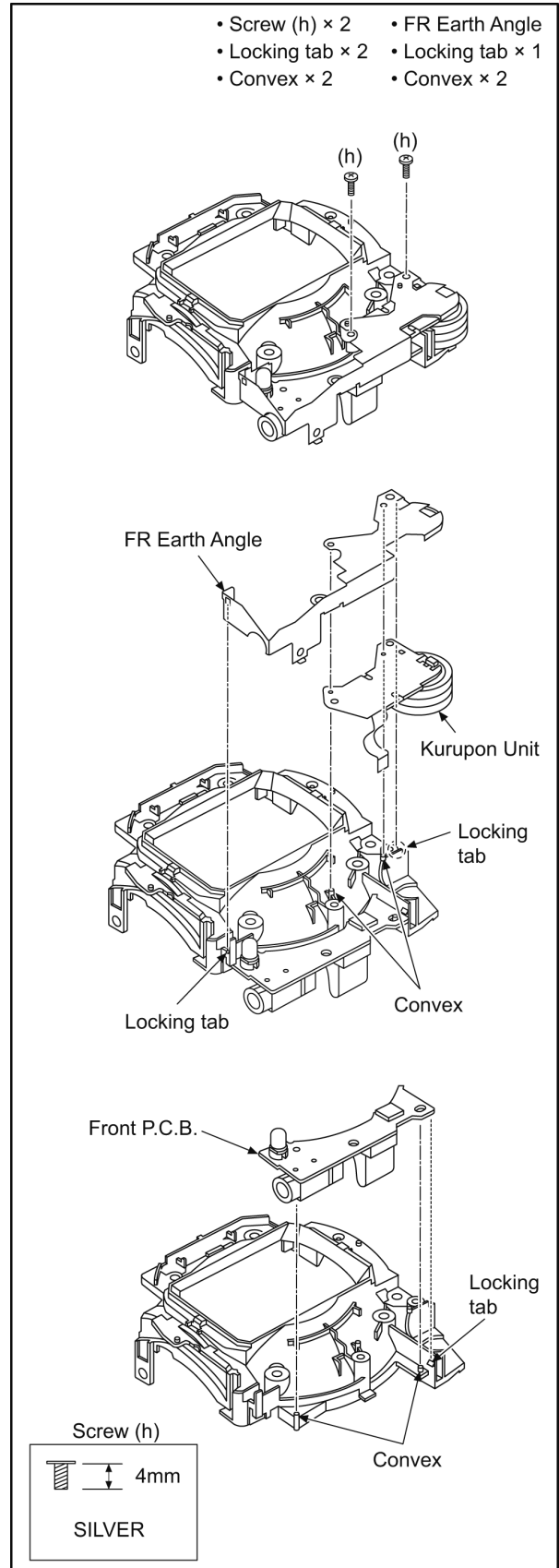


(Fig. D33)

8.3.19. Removal of the Kurupon Unit, Front P.C.B.

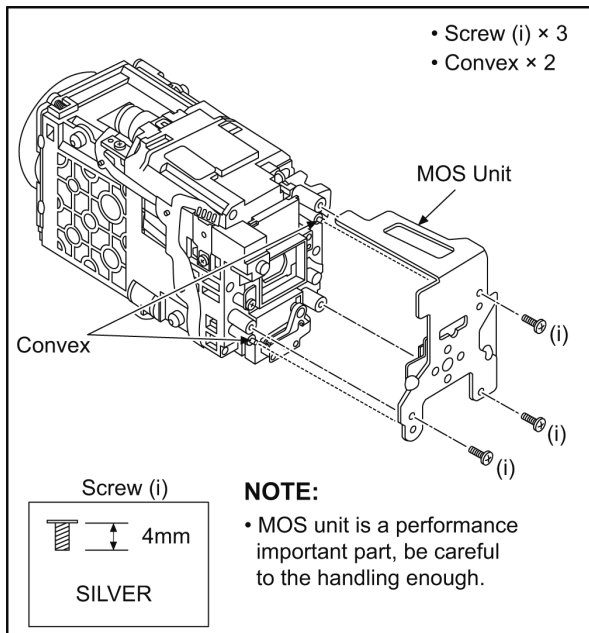


(Fig. D34)



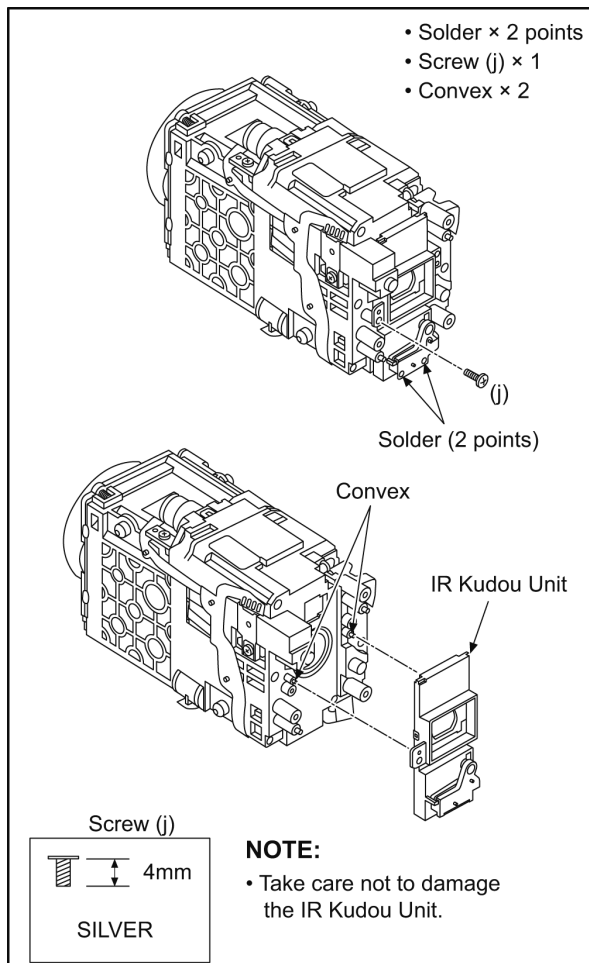
(Fig. D35)

8.3.20. Removal of the MOS Unit



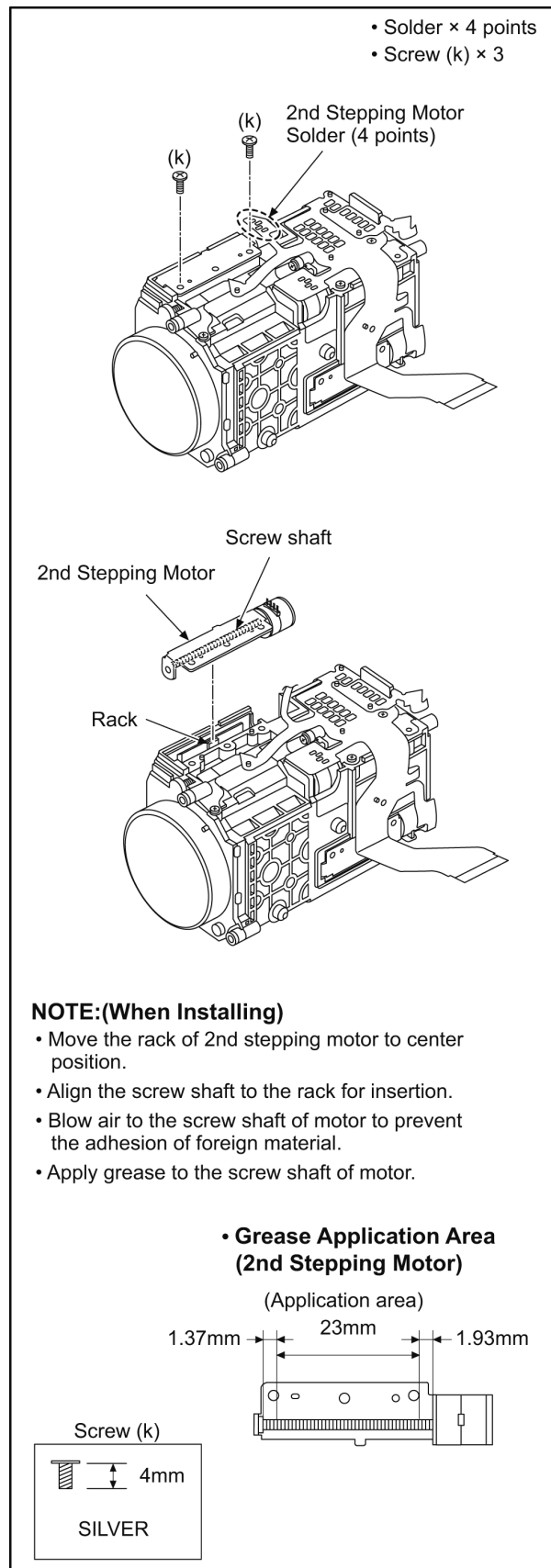
(Fig. D36)

8.3.21. (HC-W850/W858/W850M) Removal of the IR Kudou Unit



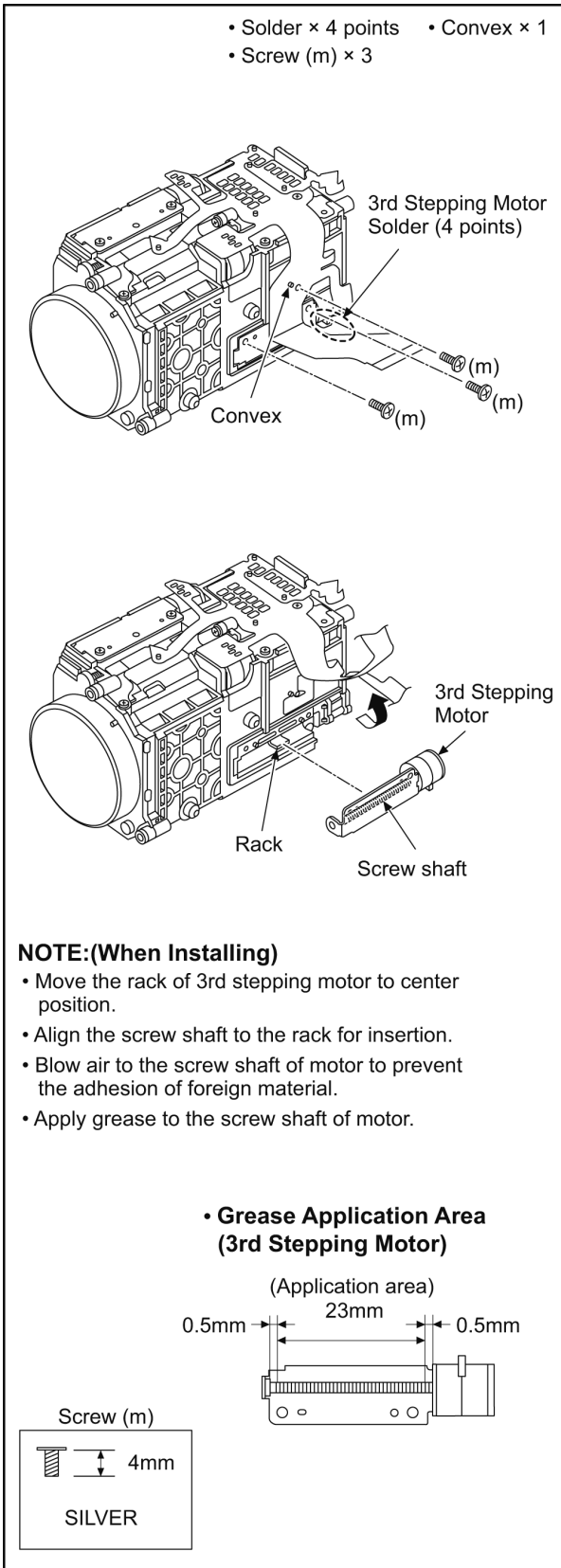
(Fig. D37)

8.3.22. Removal of the 2nd Stepping Motor



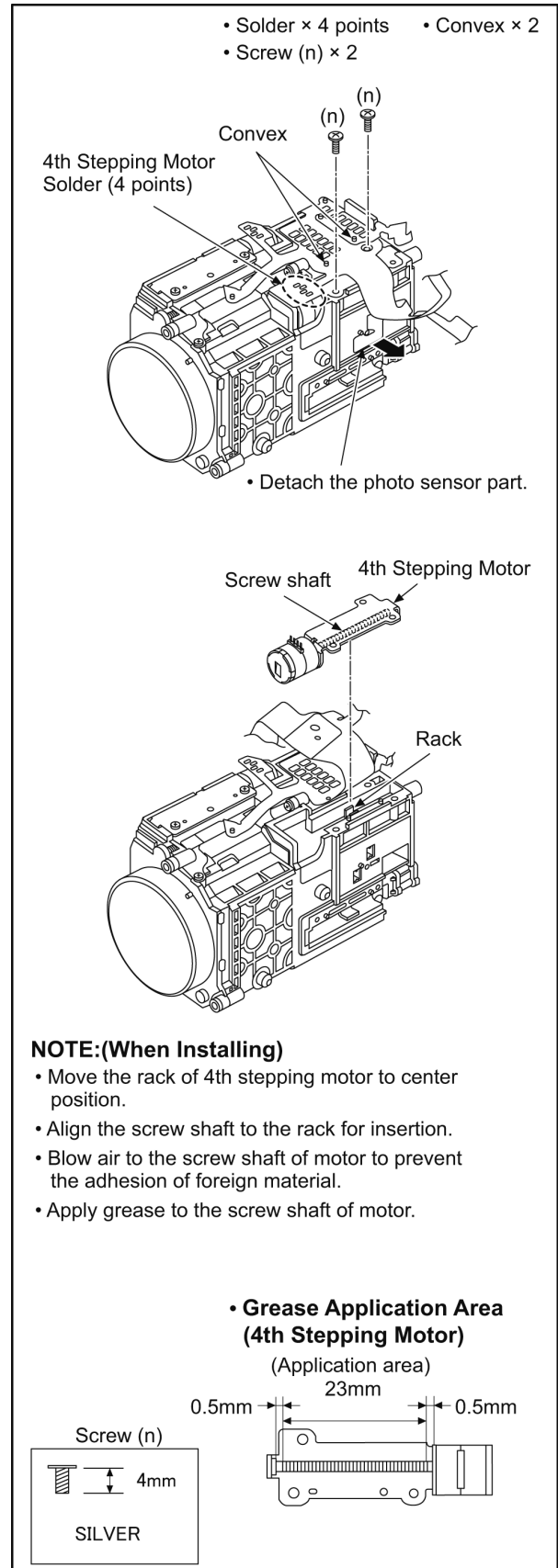
(Fig. D38)

8.3.23. Removal of the 3rd Stepping Motor



(Fig. D39)

8.3.24. Removal of the 4th Stepping Motor



(Fig. D40)

9 Measurements and Adjustments

9.1. Electric Adjustment

- Adjustment method is different from a conventional High definition video camera.
- An exclusive jig are necessary for electric adjustment.
- Connection method of the main unit and an exclusive adjustment jig as follows.

Figure of connection

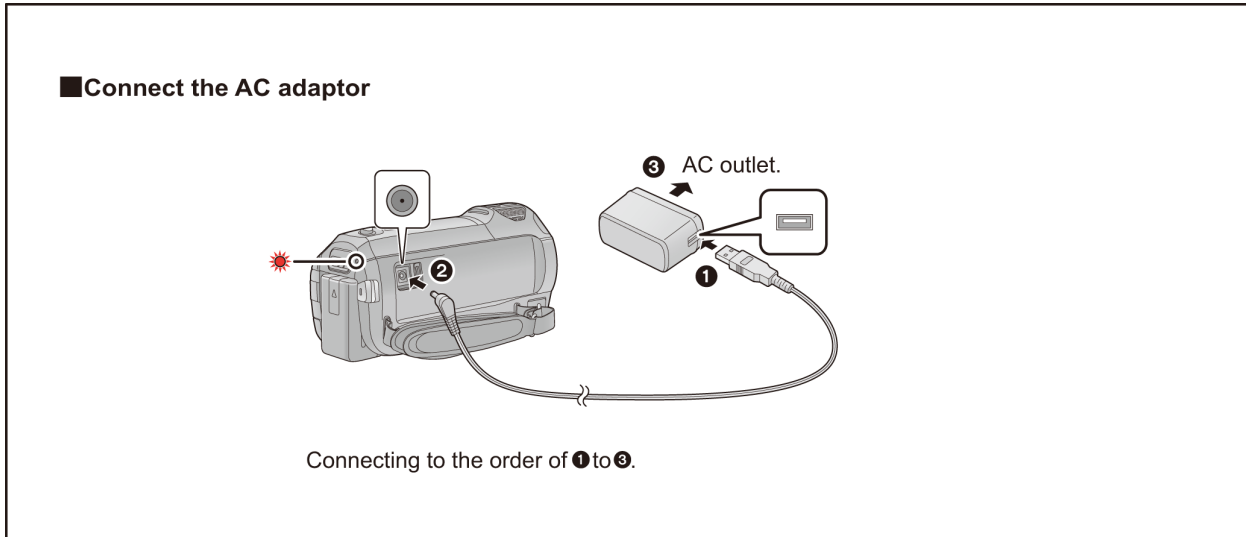
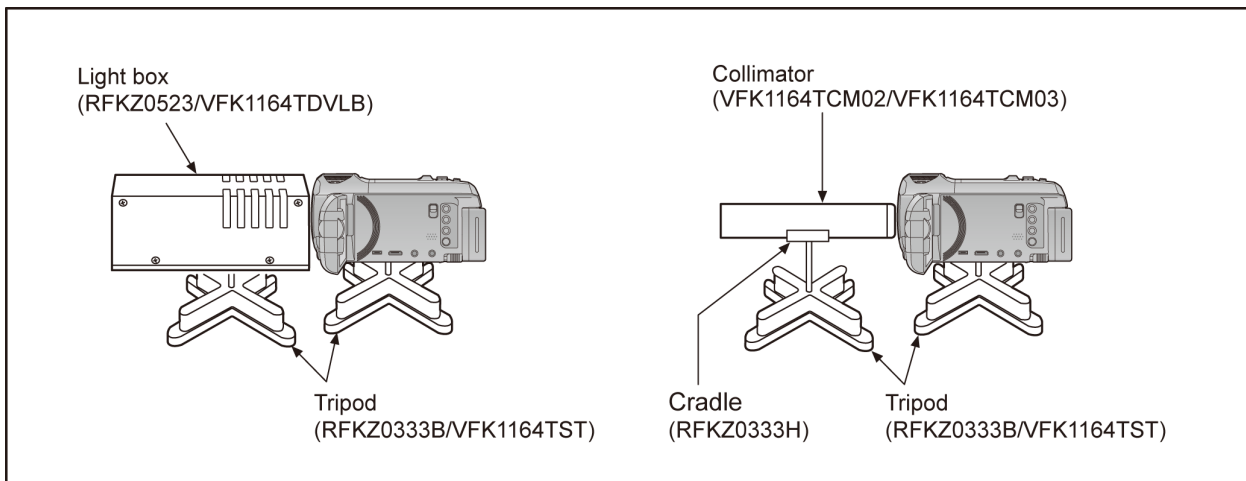


Figure of image when adjustment



Part Number of jig

1. Basic Jig

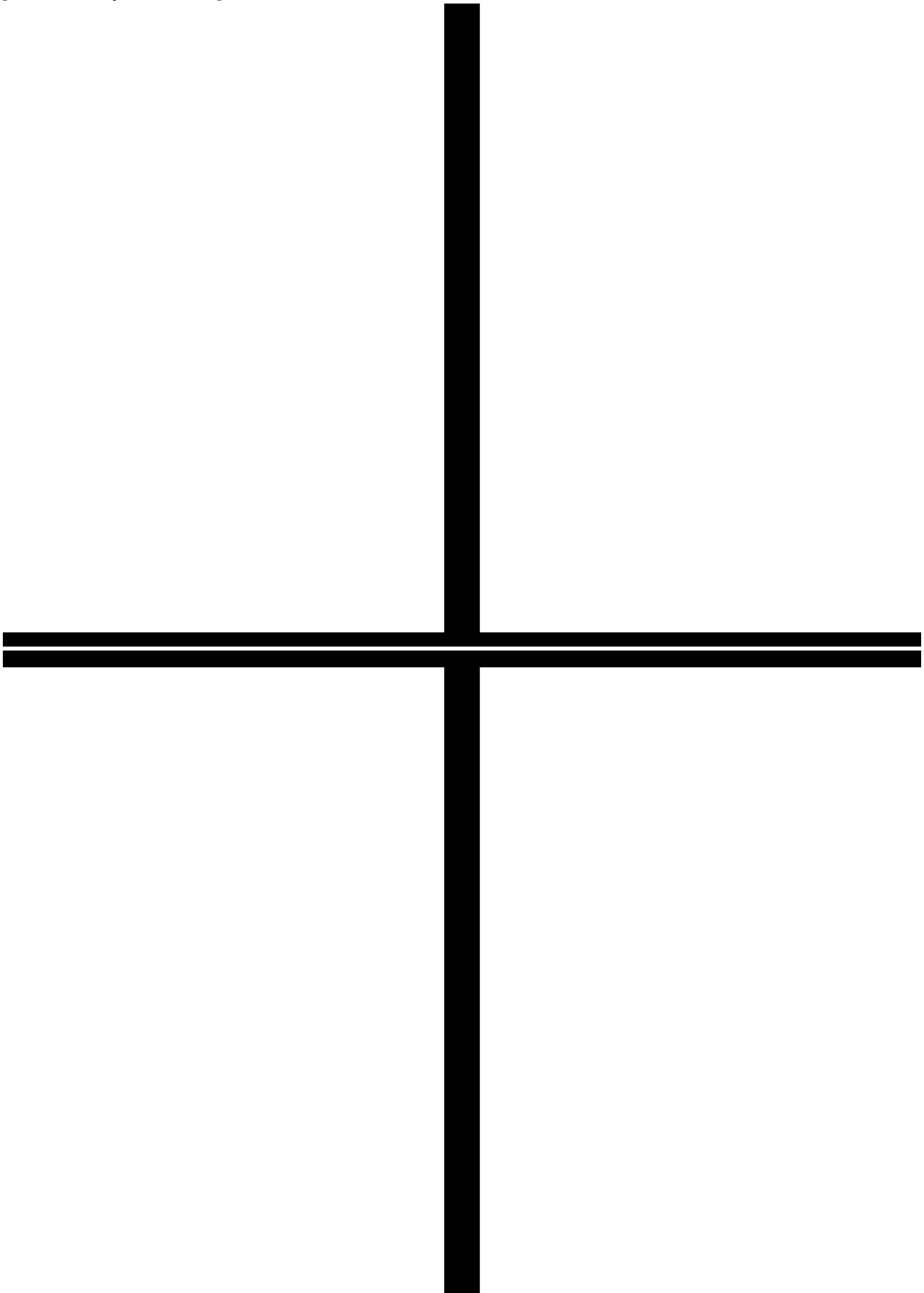
Item	Contents
AC adaptor	Banded with camcorder
AC Cable	Banded with camcorder

2. Optical Jig for Camera Adjustment

Item	Part number	Remarks
Light box	VFK1164TDVLB/RFKZ0523*	Need external power supply: 12V \pm 0.1V /1.8A or over
Collimator with focus chart	VFK1164TCM02/VFK1164TCM03	Same as DSC
CC filter	3100K/5100K VFK1164CC10G	Need 2 set. For indoor/outdoor white balance adjustment
C2 Filter	5100K VFK1164LBB2	For outdoor white balance adjustment
C8 Filter	5100K VFK1164LBB8	For outdoor white balance adjustment
ND Filter 0.1	3100K VFK1164ND01	For indoor white balance adjustment
ND Filter 0.6	3100K VFK1164ND06	For indoor white balance adjustment
Adjustment chart for Level Shot	Banded with this Manual	For Level shot adjustment

* RFKZ0523 (same as DSC) is recommended.

[Level Shot Adjutment Chart]

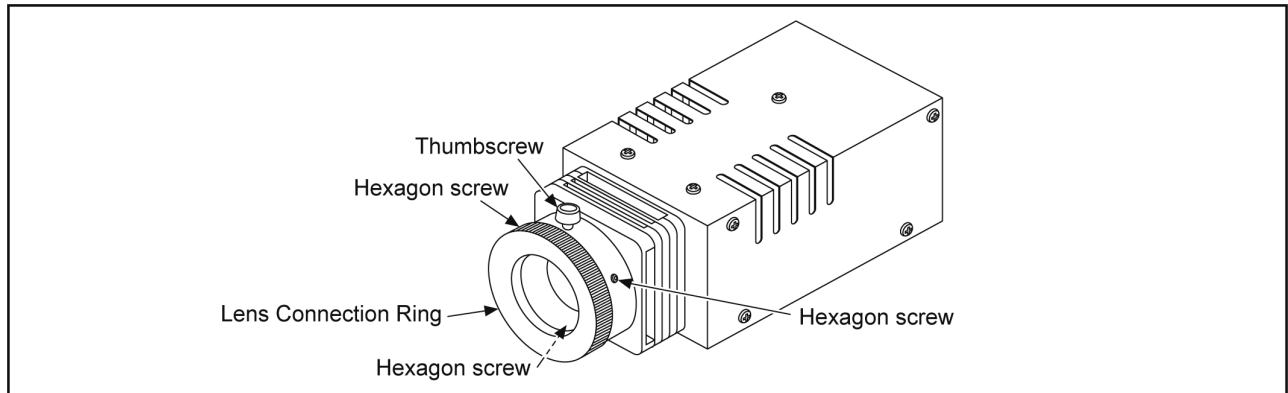


9.1.1. About Light Box

When using VFK1164TDVLB Light Box

If using VFK1164TDVLB Light Box, remove the lens connection ring by loosening thumbscrew and three hexagon screws.

* RFKZ0523 Light Box has no lens connection ring.



How to remove the Front Hood

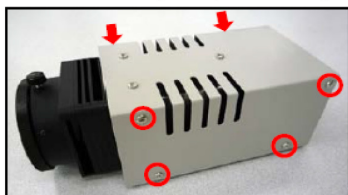
In order to utilize maximum of the diffusing surface of light box, some adjustment items need the distance between diffusing surface of light box and camera body becomes several cent-meters.

Before the adjustments, remove the front hood of light box following steps below.

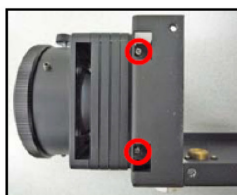
[For VFK1164TDVLB Light Box]



(1) Unscrew the 8 screws.
Slide the body case, then lift it up.



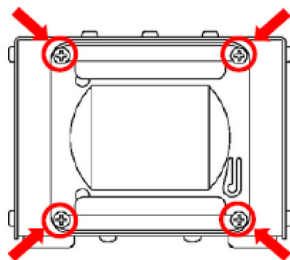
(2) Unscrew the 4 screws.



(3) Remove the front hood. Install the body case, then tighten the 8 screws.



[For RFKZ0523 Light Box]



Unscrew the 4 screws, then remove the front hood.

9.1.2. Adjustment Items

Adjustment item as follows.

Adjustment item			Adjustments						Settings		
			Camera Adjustments *1	Zoom Tracking Adjustment	Indoor White Balance Adjustment	Outdoor White Balance Adjustment	Level Shot adjustment *2	Touch Panel Calibration	Model setting	Factory settings	NFC initialization *3
Replacement part											
MAIN P.C.B.			○	○	○	○	○	-	○	○	○
	IC701	LENS DRIVE IC	○	○	-	-	○	-	-	-	-
	IC751	ROLL GYRO	○	-	-	-	○	-	-	-	-
	IC1001	7CH DC/DC IC	○	○	○	○	○	-	-	-	-
	IC1421	REG3V I/O	○	○	○	○	○	-	-	-	-
	IC3401	VENUS ENGINE	-	-	-	-	○	-	-	-	-
	IC3404	FLASH ROM	○	○	○	○	○	-	○	○	○
SD HOLDER P.C.B.			○	-	-	-	○	-	-	-	-
	IC6401	PIT/YAW GYRO	○	-	-	-	○	-	-	-	-
	IC6411	ACCELEROMETER	-	-	-	-	○	-	-	-	-
ESD P.C.B. *4			-	-	-	-	○	-	-	-	-
Wi-Fi P.C.B. *3			-	-	-	-	○	-	-	○	○
NFC P.C.B. UNIT *3			-	-	-	-	○	-	-	○	○
LENS UNIT			○	○	○	○	○	-	-	-	-
MOS UNIT			○	○	○	○	○	-	-	-	-
LCD CASE (B) UNIT			-	-	-	-	○	○	-	-	-

*1...IRIS adjustment, OIS hall amp adjustment, Missing pixels compensation, OIS gyro adjustment, AGS adjustment

*2... Accelerometer : Since the assembly is accompanied, always need to be adjusted.

*3...Except HC-V730

*4...HC-W850M/V750M only

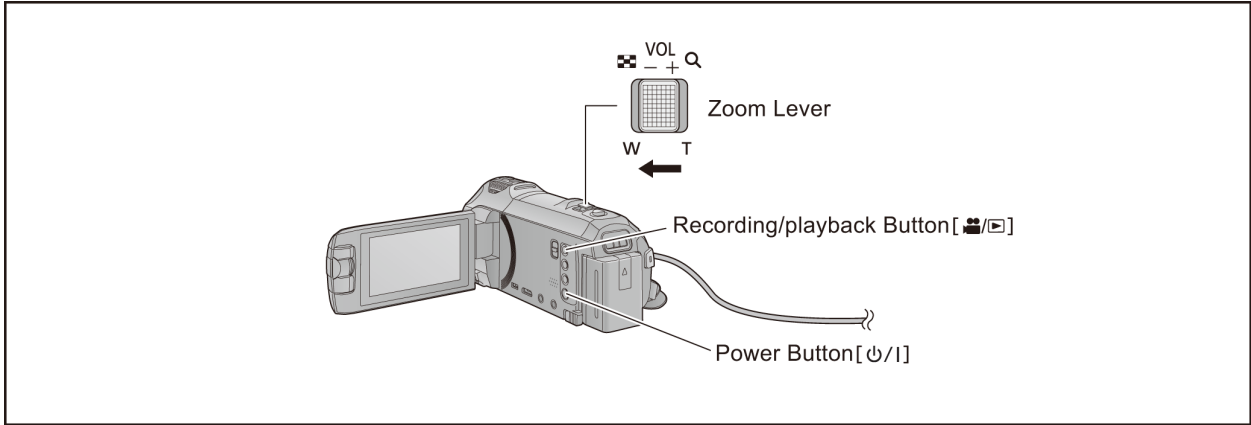
9.1.3. Adjustment Procedure

All adjustments except "Touch Panel Calibration", "Factory Setting" and "NFC Initialization" performs using "14 Adjustment function for the service" in service mode menu.

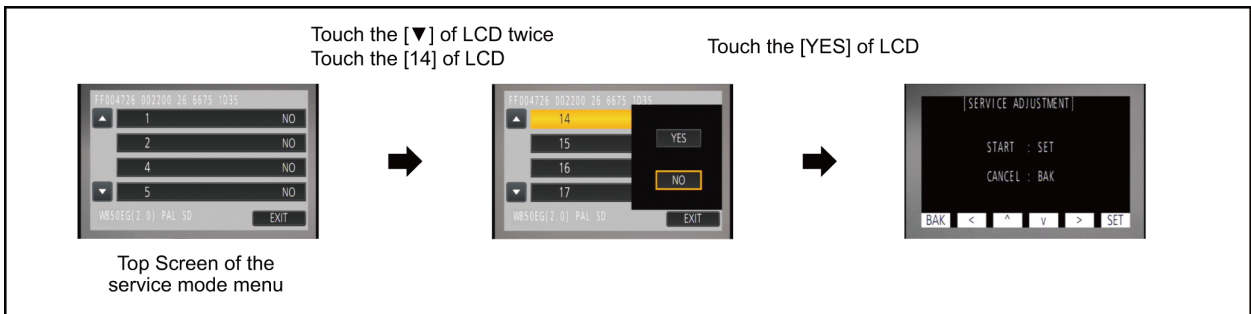
"Touch Panel Calibration" is performed using 16 of service mode menu and "Factory Setting" is performed using 1, "NFC Initialization" is performed using 17 of service mode menu. Refer to "6 Service mode" and "10 Factory Setting".

[Execute adjustment function for service]

1. While the power is turned OFF, keep pressing the "Power" button, "Zoom lever" to W side and "Recording/Playback" button for more than 3 seconds until the top screen of the Service Mode Menu being displayed.



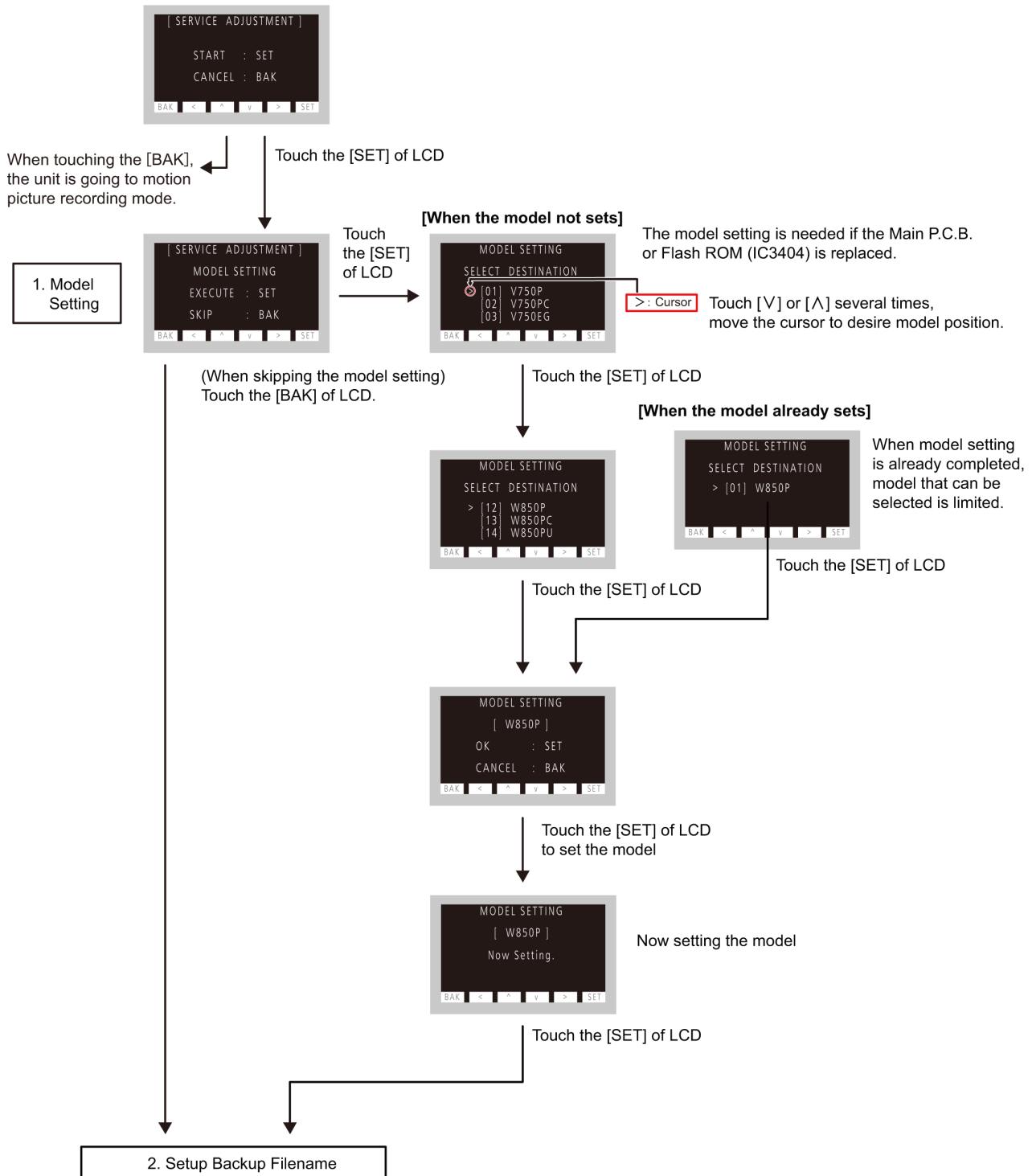
2. Touch the ▼ twice then touch the [14] of LCD.
3. Touch the [YES] of LCD.



[Adjustment Procedure]

Adjustments and settings are performed following order:

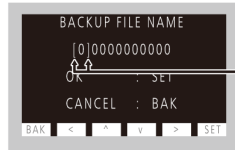
1. Model setting
2. Filename setting for backup to SD card
3. Backing up adjustment data to SD card
4. Checking switches
5. Camera adjustment (Iris, Gyro, OIS, Missing pixels)
6. Zoom/tracking adjustment (with Zoom hysteresis adjustment)
7. Indoor white balance adjustment (CH GAIN, PWM, WB)
8. Outdoor white balance adjustment (PWM, WB)
9. Level shot adjustment



2. Setup Backup Filename



Touch the [SET] of LCD

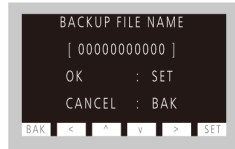


- < : Move cursor 1 position left
- > : Move cursor 1 position right
- ^ : Increase 1 character (0→1→2→...)
- v : Decrease 1 character (0→Z→Y→...)

(When skipping the setup)
Touch the [BAK] of LCD.
Backup filename: 00000000000 (Default)
or
xxxxxxxxxx (Previously set)
(The backup filename is stored in Flash ROM.)

Touch the [SET] of LCD

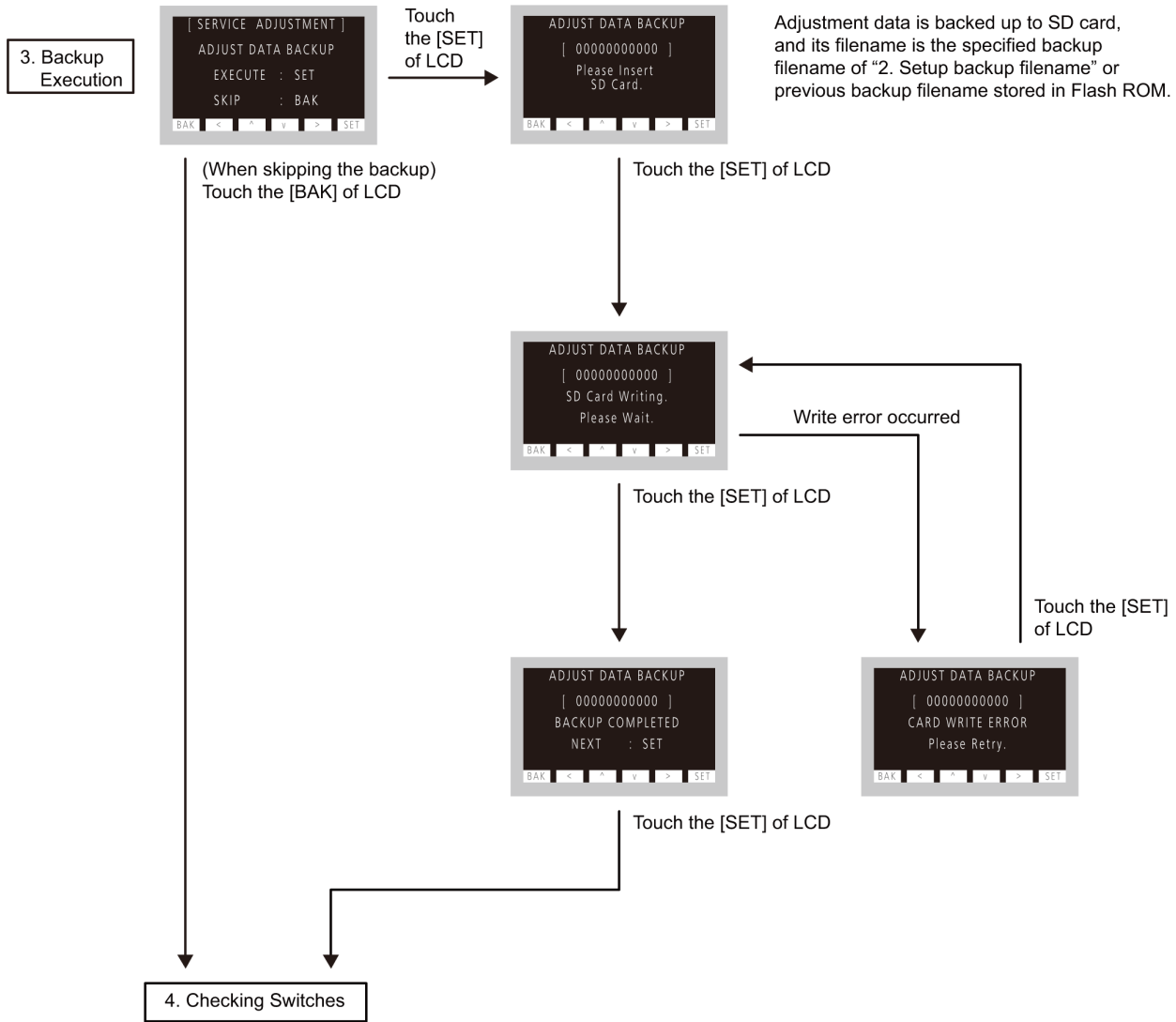
For example, "ABCDE123456" as the specified backup filename;
First, a new folder (folder name is "\W850" for HC-W850, "\V750" for HC-V750.) is created at root folder of SD card.
Next, a new folder that is named first 5 letter of specified backup filename is created inside of model-named folder.
Then, the adjustment data backup file which filename is last 6 letter of specified backup filename is created inside of above folder.

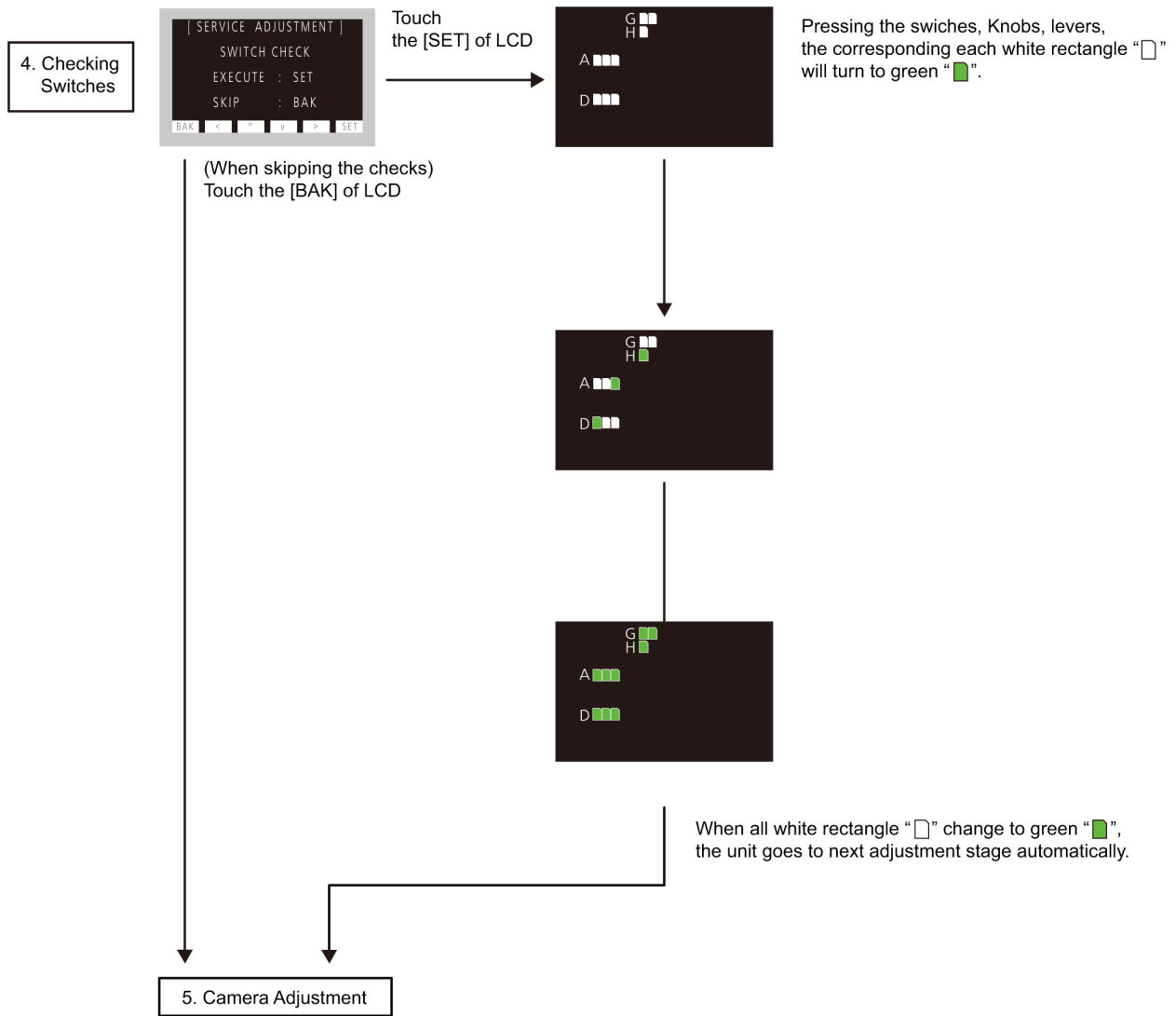


Touch the [BAK] of LCD

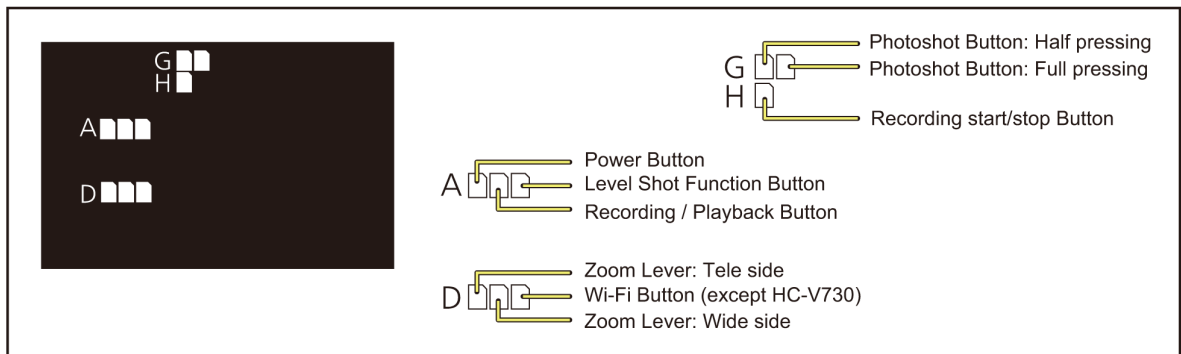
Touch the [SET] of LCD

3. Backup Execution

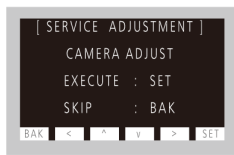




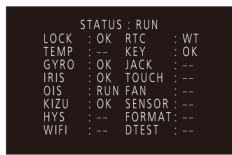
< Switches arrangement >



5. Camera Adjustment



Touch the [SET] of LCD

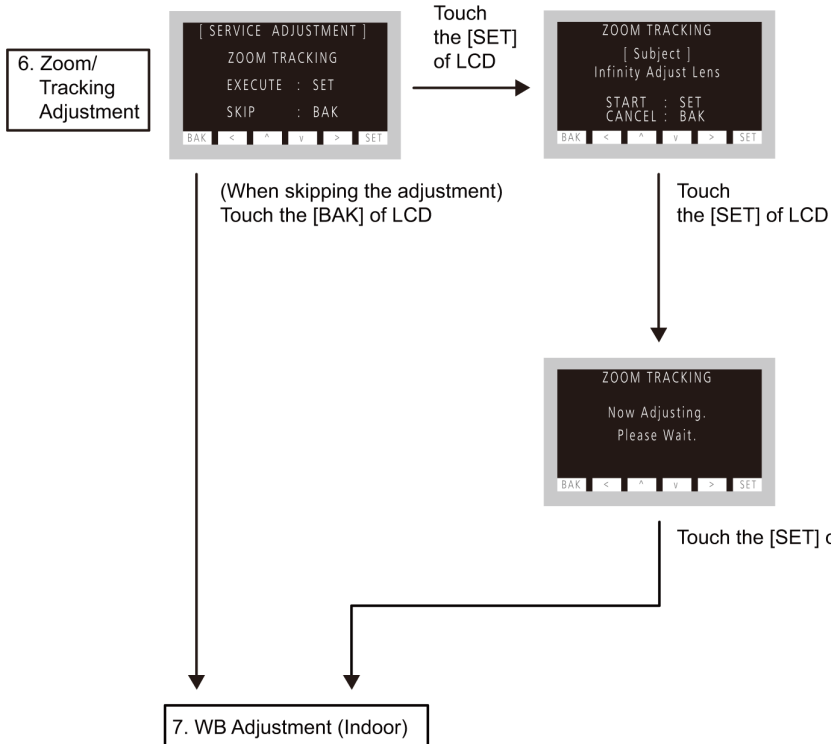


WT : Waiting for Adjust
 RUN : Now adjusting
 OK : Normal Condition
 NG : Abnormal Condition
 -- : Excluded

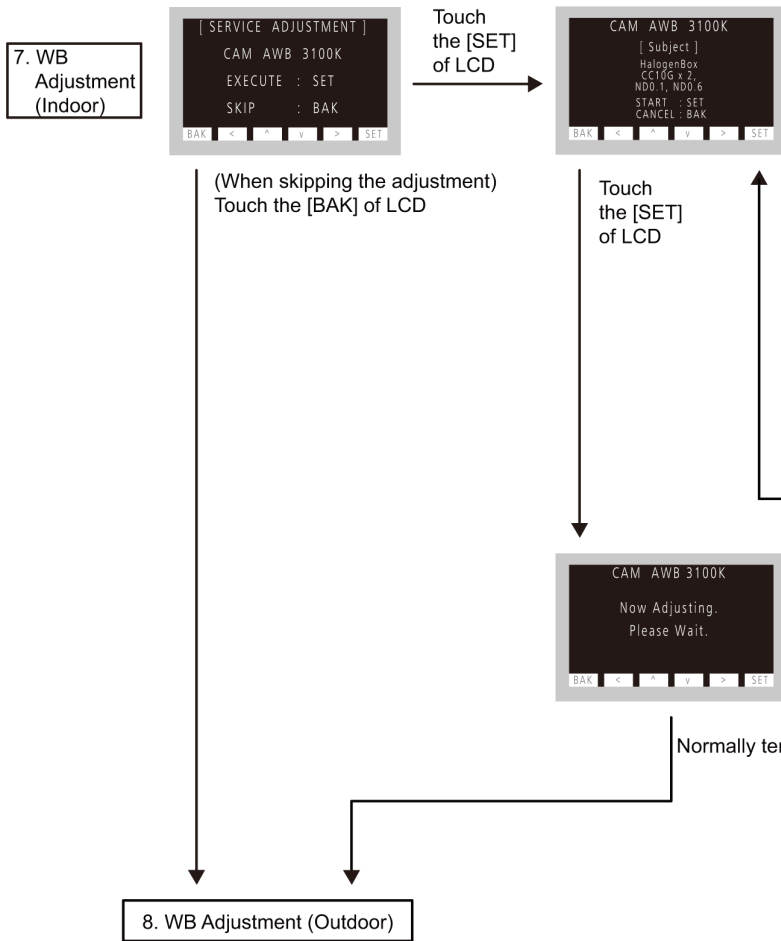
(When skipping the adjustment)
 Touch the [BAK] of LCD

Adjustment Item	
LOCK	Confirmation that the lens lock has not occurred.
TEMP	(Excluded)
GYRO	Result of Gyro DC compensation.
IRIS	Result of Iris adjustment.
OIS	Result of OIS adjustment.
KIZU	Result of missing pixels compensation.
HYS	(Excluded)
WIFI	(Excluded)
RTC	Result of the RTC working normally.
KEY	Confirmation that all switches on the unit are released.
JACK	(Excluded)
TOUCH	(Excluded)
FAN	(Excluded)
SENSOR	(Excluded)
FORMAT	(Excluded)
DTEST	(Excluded)

6. Zoom/Tracking Adjustment



- **Adjustment Conditions**
- Set up the collimator with focus chat in front of the lens.
 - Set up the angle of view into near the center of the test chart at the tele edge.
- **Adjustment Jig**
- Collimator with focus chart.
- **Other**
- The focus adjustment value always starts from initial value.
 - *Supposing the adjustment after the lens replacement.

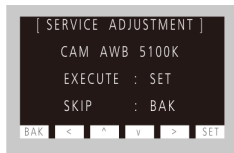


- **Adjustment Conditions**
- Set up the position of light box to be fully displayed at the LCD.
 - Stack two piece of CC filter and set up them in front of the lens.
 - Stack ND filter (0.1) and (0.6), then set up then in front of the lens.
- **Adjustment Jig**
- Light box
 - CC filter x 2
 - ND filter (0.1)
 - ND filter (0.6)
- **Adjustment Item**

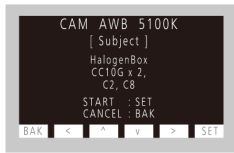
CH GAIN	Channel Gain : Indoor
PWM	WB gain depend on IRIS/PWM : Indoor
WB	White Balance : Indoor

- * Too high or too low brightness causes adjustment error.
- * Check the adjustment environment.

8. WB Adjustment (Outdoor)



Touch the [SET] of LCD



Touch the [SET] of LCD



Error Occurred



Normally terminated

9. Level Shot Adjustment

(When skipping the adjustment) Touch the [BAK] of LCD

■ Adjustment Conditions

- Set up the position of light box to be fully displayed at the LCD.
- Stack two piece of CC filter and set up them in front of the lens.
- Stack C2 filter and C8 filter, then set up them in front of the lens.

■ Adjustment Jig

- Light box
- CC filter x 2
- C2 filter
- C8 filter

■ Adjustment Item

PWM	WB gain depend on IRIS/PWM : Outdoor
WB	White Balance : Outdoor

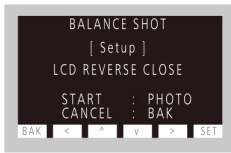
Touch the [SET] of LCD

- * Too high or too low brightness causes adjustment error.
- * Check the adjustment environment.

9. Level Shot Adjustment



Touch the [SET] of LCD



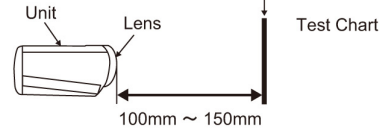
(When skipping the adjustment) Touch the [BAK] of LCD

Press the [Photo shot] button

■ Adjustment Conditions

- Open the LCD and turn reverse, then close.
- Shot the test chart to be displayed in full screen.

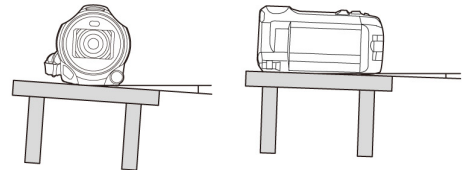
Distance (between end of lens and the chart):
100mm ~ 150mm



• Unit Installation Condition

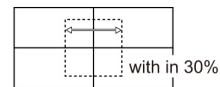
Horizontal Tilt (ROLL) :
with in $\pm 2^\circ$

Vertical Tilt (PITCH) :
with in $\pm 1^\circ$



■ Adjustment Jig

- Test Chart



[Chart Size]

A4

Print the test chart that white line to be 0.7mm width inside the vertical line.

[Test Angle]

Confirm that the vertical line is with in $\pm 30\%$ of the center of the screen.

Confirm that the horizontal line is displayed in both ends of screen.

[Test Chart Levelness]

Horizontal tilt (ROLL) : with in $\pm 0.1^\circ$

Horizontal tilt (YAW) : with in $\pm 5.0^\circ$

Vertical tilt (PITCH) : with in $\pm 5.0^\circ$

Touch the [SET] of LCD



Error Occurred

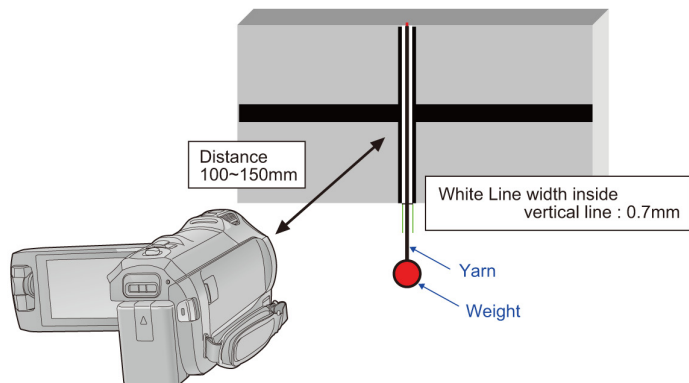


Normally terminated



Press the power button and turn off. Adjustment completed.

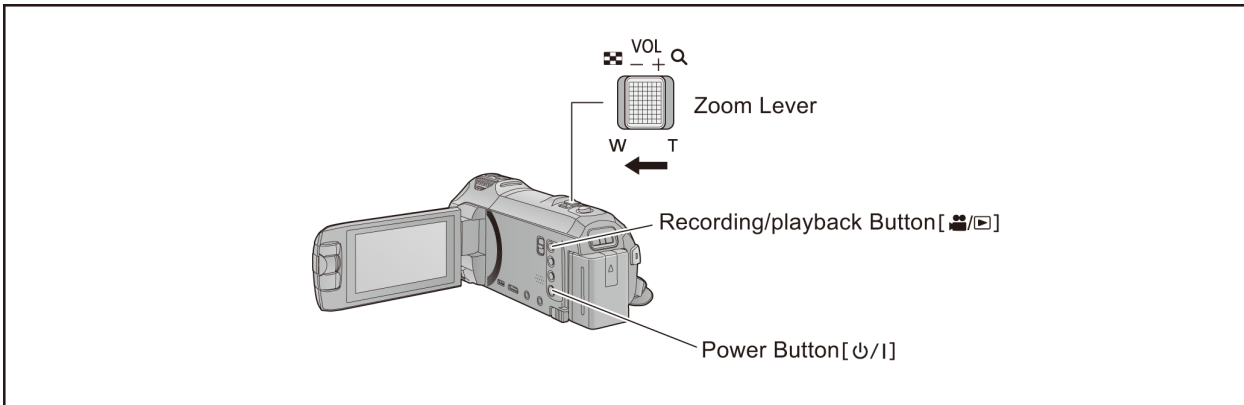
◇ Level Management by Yarn Hanging



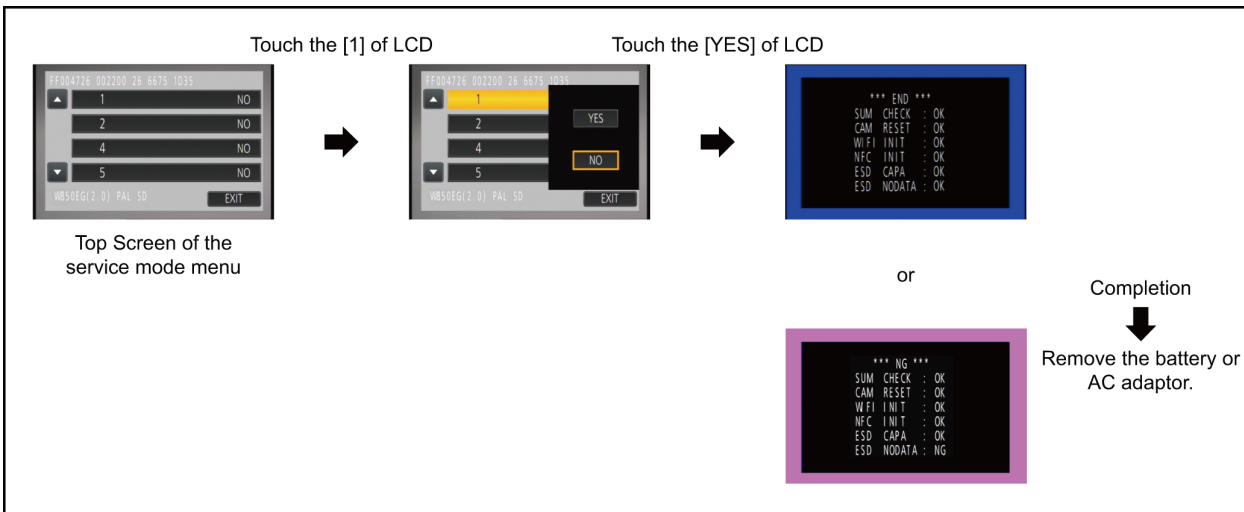
10 Factory Setting

10.1. How To Turn On The Factory Settings?

1. While the power is turned OFF, keep pressing the “Power” button, “Zoom lever” to W side and “Recording/Playback” button for more than 3 seconds until the top screen of the Service Mode Menu being displayed.



2. Touch the [1] of LCD.
3. Touch the [YES] of LCD.
4. After few seconds “END” is displayed or “ESD NODATA” as “NG” is displayed on LCD monitor. Cutting of battery connection or AC power supply connection as a completion of the “FACTORY SETTINGS”.
(After recording at least once, even if the physical format of the build-in memory will be performed, “ESD NODATA” as “NG” is indicated, but “FACTORY SETTINGS” is completed.)



10.2. What Is The Factory Settings?

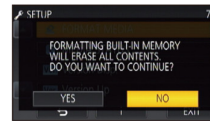
The factory settings clean up and/or refresh the following settings.

1. Setting Values of menu.
2. Clear the time and date setting.
3. Close the lens cover
4. Initialize the Wi-Fi data settings (except HC-V730)
5. Initialize the NFC data settings (except HC-V730)
6. Confirm that the data area of built-in memory is cleared. (HC-W850M/V750M only)
7. Confirm that the built-in memory cappacity is correct. (HC-W850M/V750M only)
(Checking of the built-in memory mounting error.)

(HC-W850M/V750M only)

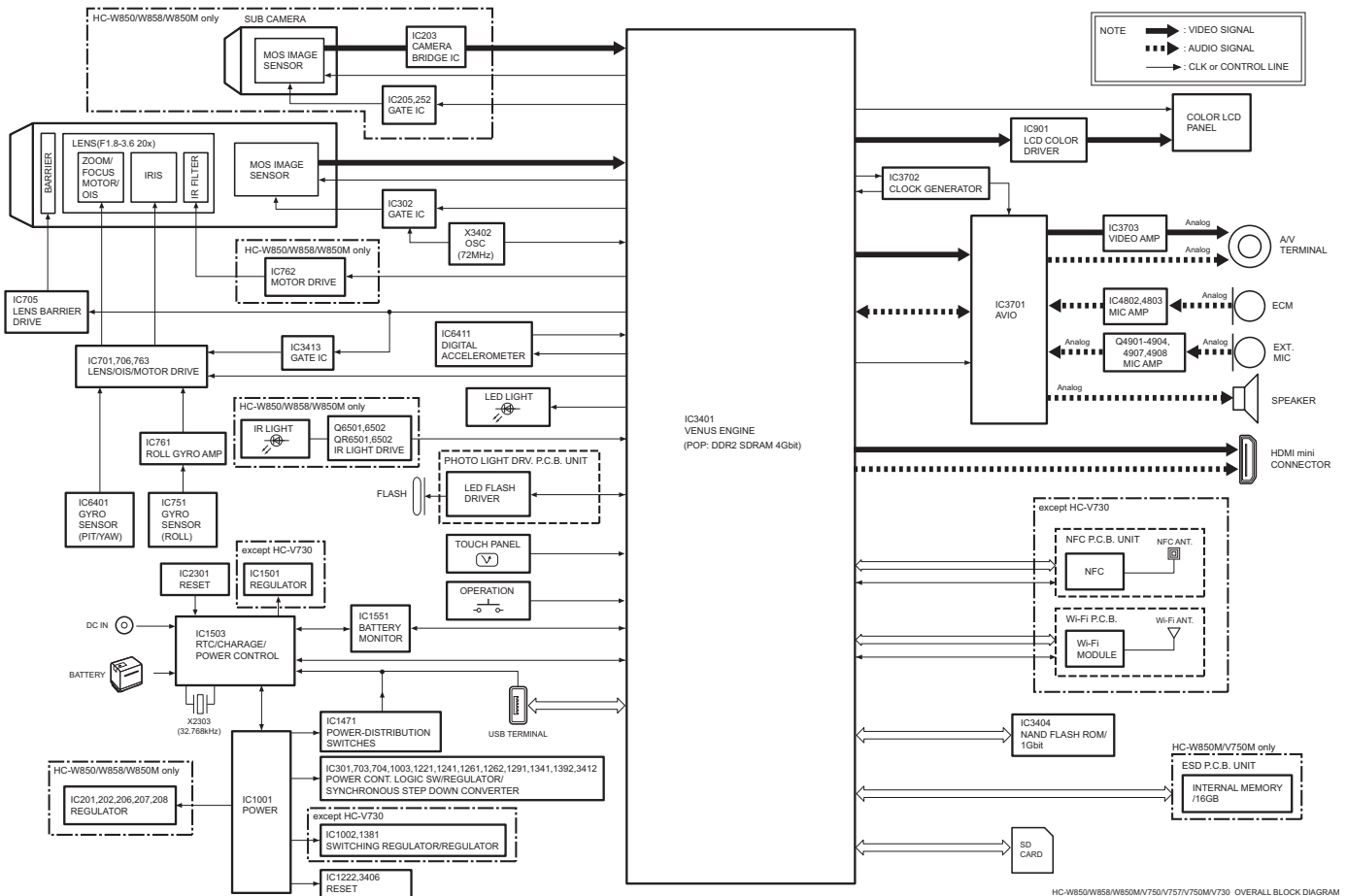
If the “Factory Settings” is completed, physical format of the build-in memory is not performed, execute physical format according to the following procedure.

To physically format the built-in memory, connect the unit via the AC adaptor, select [SETUP] → [FORMAT MEDIA] → [Built-inMemory] from the menu, and then press and hold the recording start/stop button on the screen below for about 3 seconds. When the built-in memory data deletion screen appears, select [YES], and then follow the on-screen instructions.

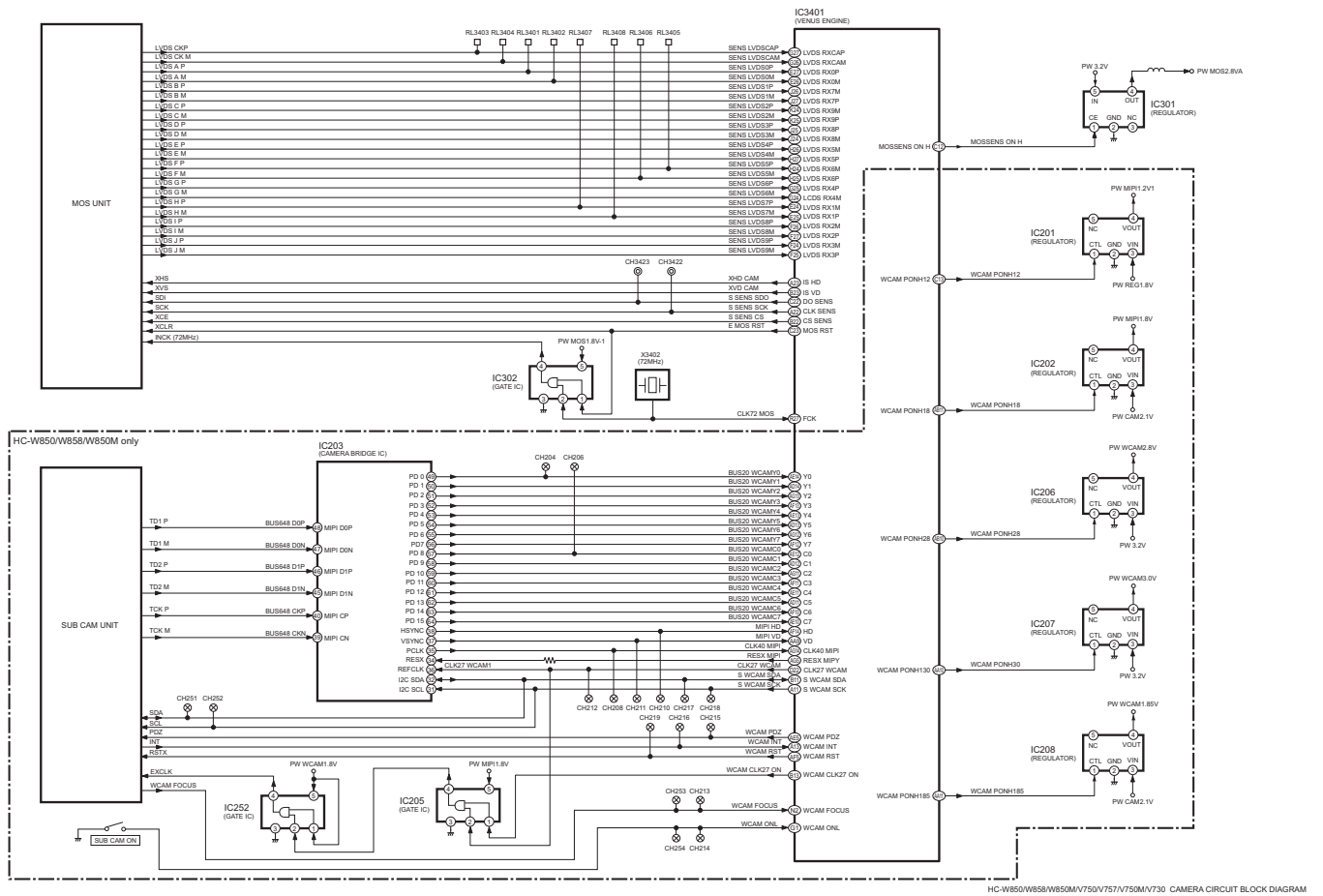


11 Block Diagram

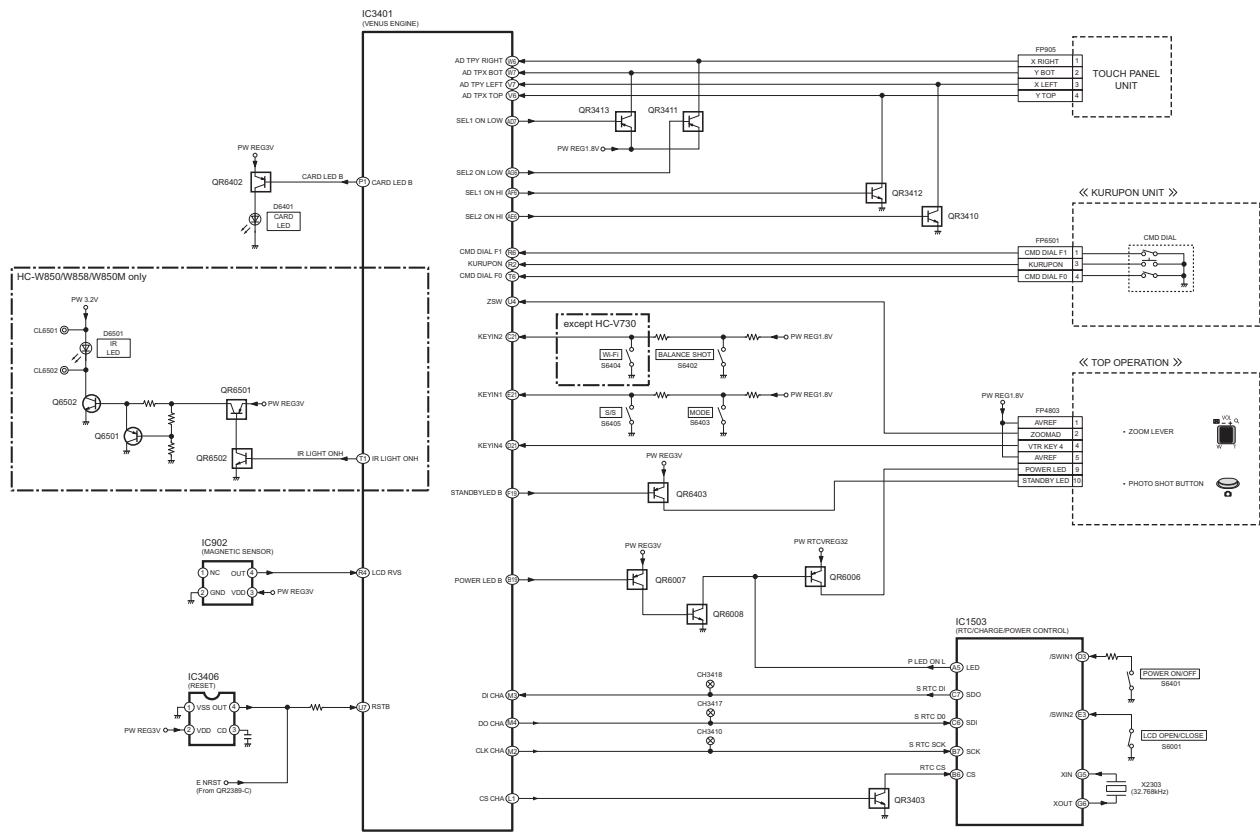
11.1. Overall Block Diagram



11.2. Camera Circuit Block Diagram

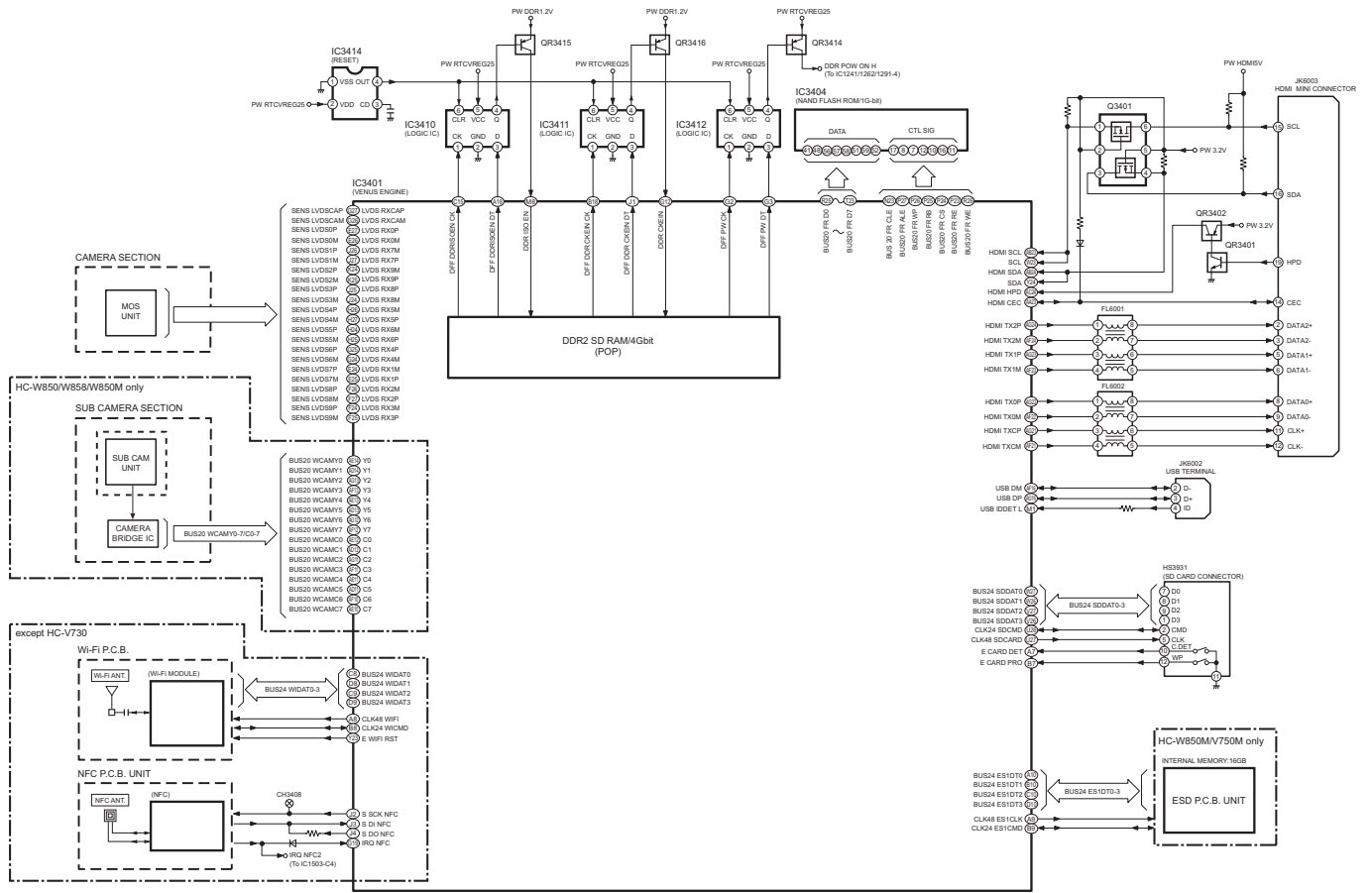


11.3. System Control Circuit Block Diagram



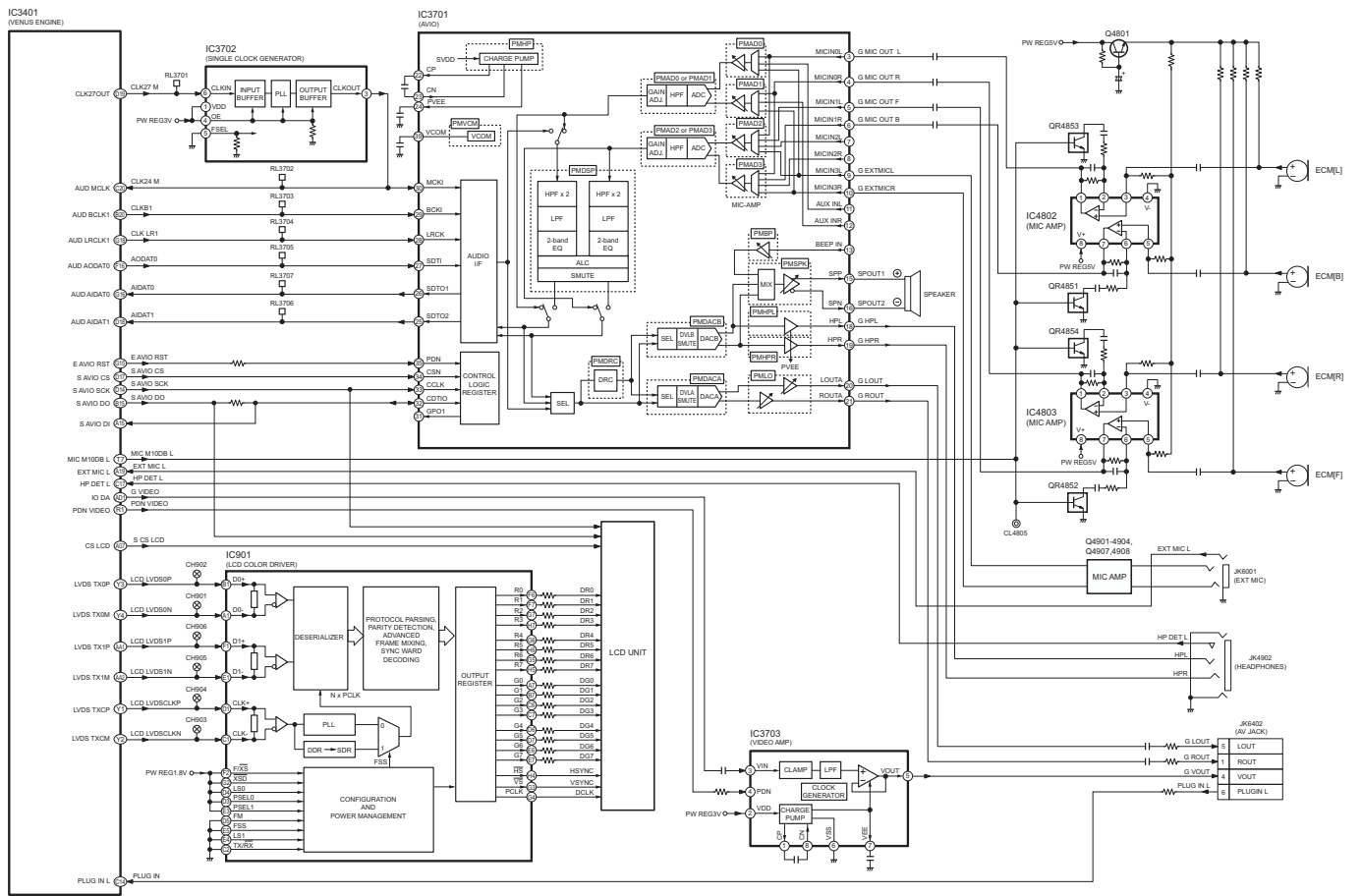
HC-W850/W858/W850M/V750/V757/V750M/V730 SYSTEM CONTROL CIRCUIT BLOCK DIAGRAM

11.4. Video/Audio Signal Process(1) Circuit Block Diagram



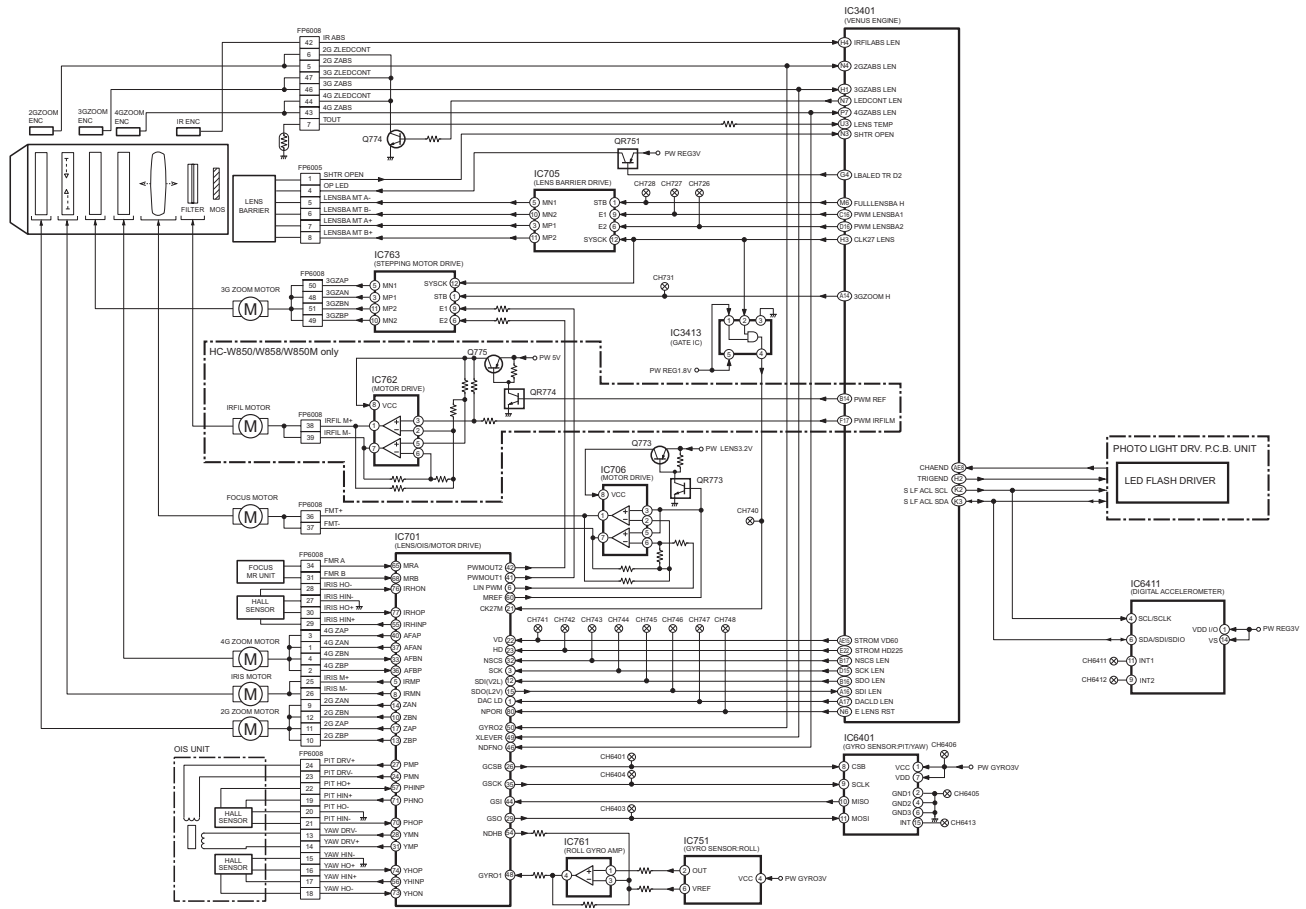
HC-W850/W858/W850M/V750/V757/V750M/V730 VIDEO/AUDIO PROCESS(1) CIRCUIT BLOCK DIAGRAM

11.5. Video/Audio Signal Process(2) Circuit Block Diagram



HC-W850/W858/W850M/V750/V757/V750M/V730 VIDEO/AUDIO PROCESS(2) CIRCUIT BLOCK DIAGRAM

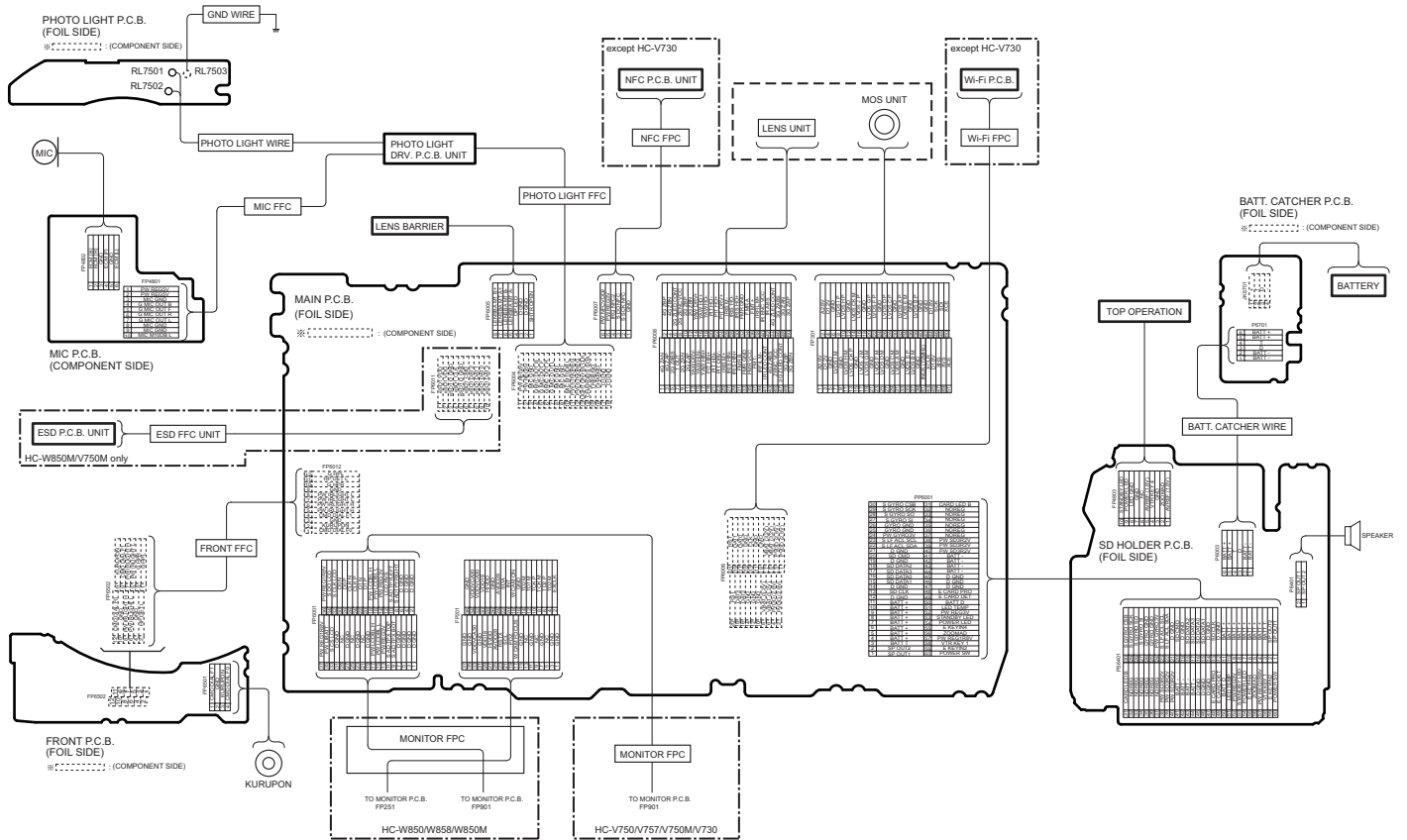
11.6. Lens Drive Circuit Block Diagram



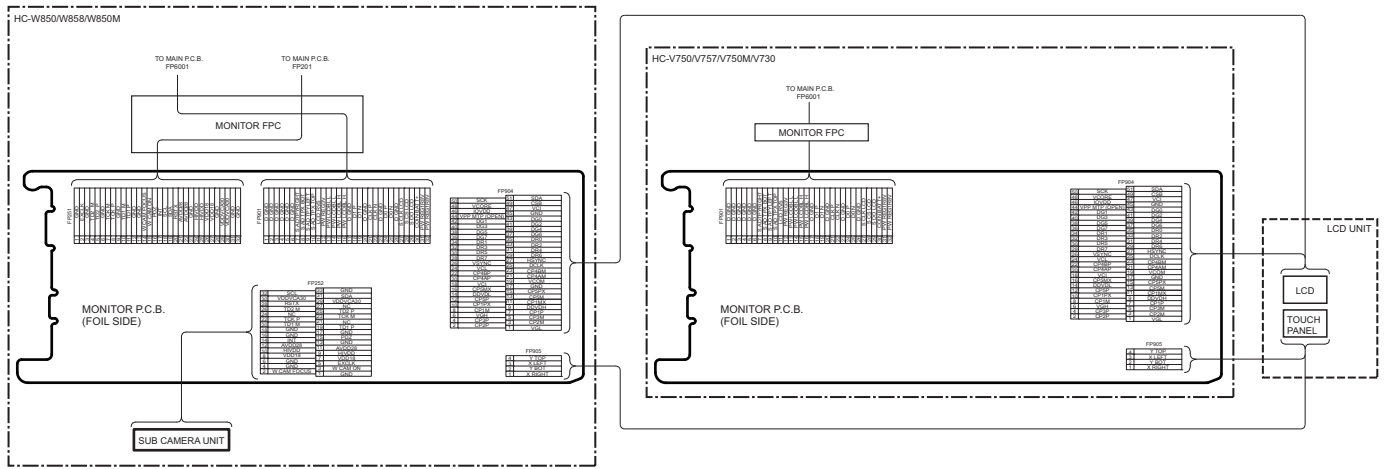
HC-W850/W858/W850M/V750/V757/V750M/V730 LENS DRIVE CIRCUIT BLOCK DIAGRAM

12 Wiring Connection Diagram

12.1. Interconnection Diagram



HC-W850/W858/W850M/V750/V757/V750M/V730 INTERCONNECTION DIAGRAM (1)



HC-W850/W858/W850M/V750/V757/V750M/V730 INTERCONNECTION DIAGRAM (2)