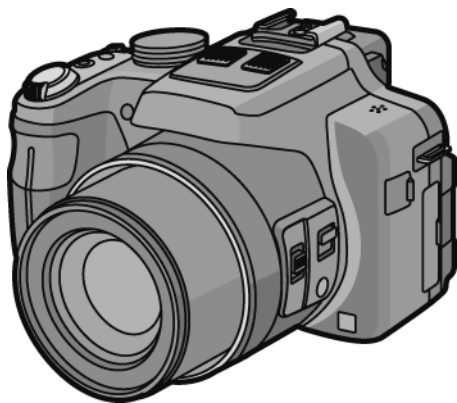


Service Manual

Digital Camera

LUMIX



Model No. **DMC-FZ150P**
DMC-FZ150PC
DMC-FZ150PU
DMC-FZ150EB
DMC-FZ150EE
DMC-FZ150EF
DMC-FZ150EG
DMC-FZ150EP
DMC-FZ150GC
DMC-FZ150GD
DMC-FZ150GK
DMC-FZ150GN
DMC-FZ150GT

Vol. 1

Colour

(K).....Black Type

⚠ 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.

Panasonic[®]

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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

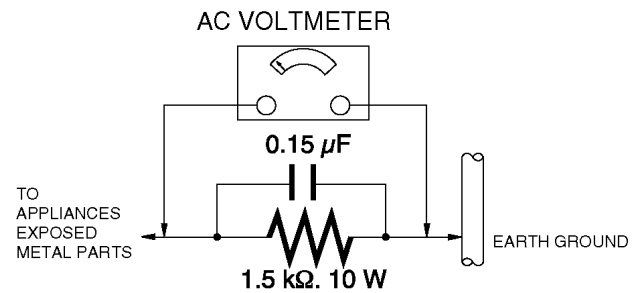


Figure. 1

1.4. How to Discharge the E.Capacitor on Flash P.C.B.

CAUTION:

1. Be sure to discharge the E.capacitor on FLASH P.C.B..
2. Be careful of the high voltage circuit on FLASH P.C.B. when servicing.

[Discharging Procedure]

1. Refer to the disassemble procedure and remove the necessary parts/unit.
2. Install the insulation tube onto the lead part of resistor (ERG5SJ102:1k Ω /5W).
(An equivalent type of resistor may be used.)
3. Place a resistor between both terminals of E.capacitor on the FLASH P.C.B. for approx. 5 seconds.
4. After discharging, confirm that the E.capacitor voltage is lower than 10V by using a voltmeter.

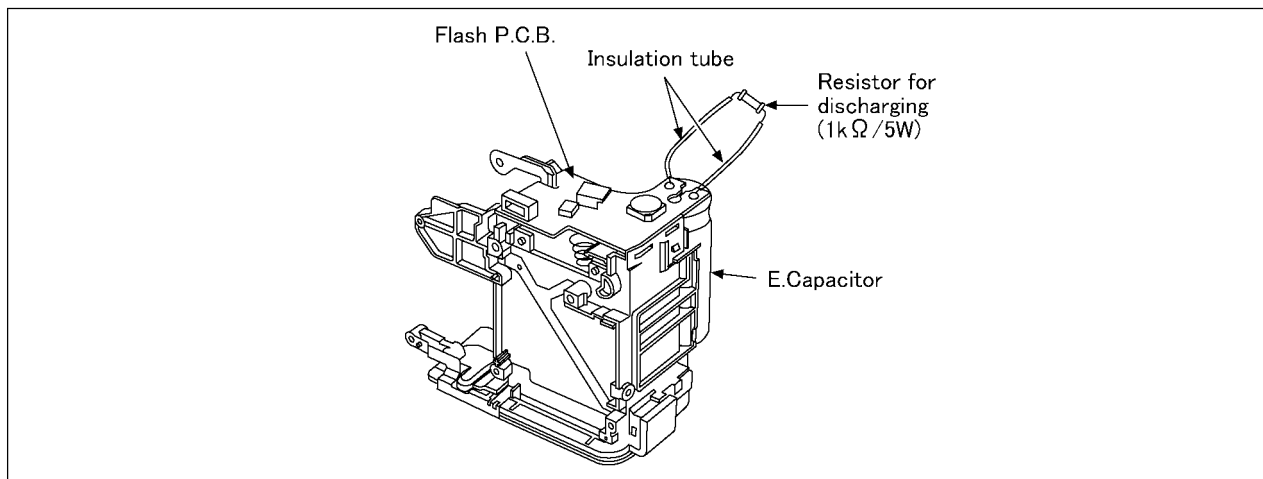


Fig. F1

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 IC (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 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 recyclable. 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.

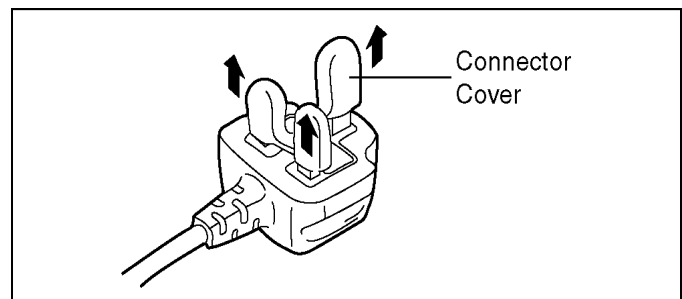
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

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.



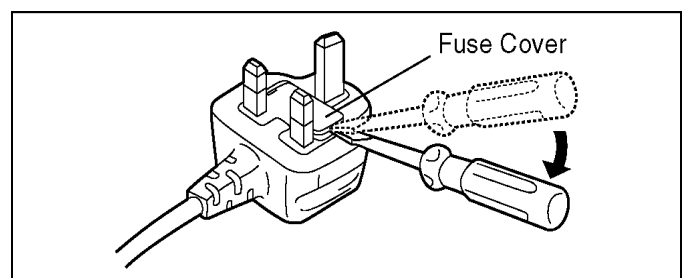
2.3.2.2. Before Use

Remove the Connector Cover as follows.

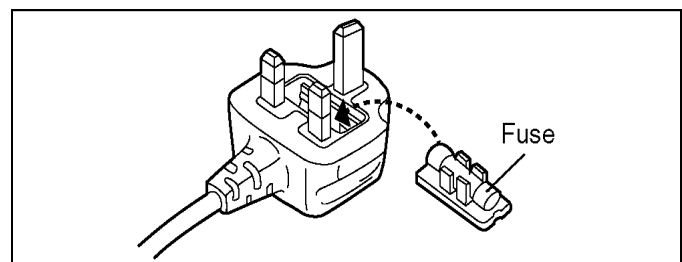


2.3.2.3. How to Replace the Fuse

1. Remove the Fuse Cover with a screwdriver.



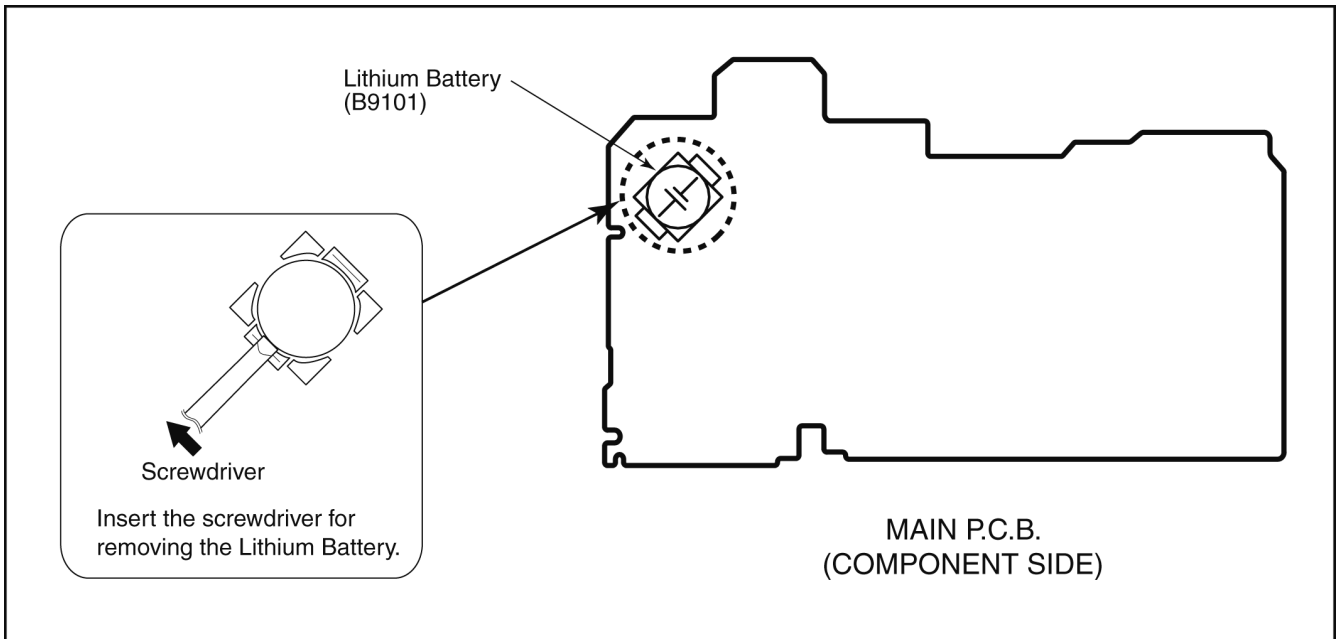
2. Replace the fuse and attach the Fuse cover.



2.4. How to Replace the Lithium Battery

2.4.1. Replacement Procedure

1. Remove the MAIN P.C.B.. (Refer to Disassembly Procedures.)
2. Remove the Lithium battery (Ref. No. "B9101" at component side of MAIN P.C.B.) and then replace it into new one.



NOTE:

This Lithium battery is a critical component.

(Type No.: ML614 **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 DMC-FZ150 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. Service Navigation

3.2.1. About lens block

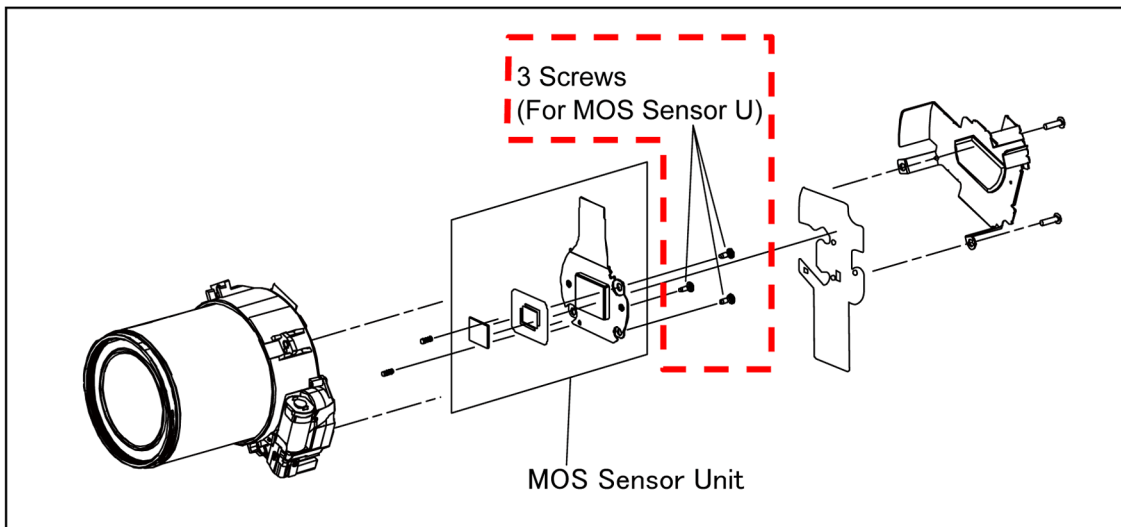
- The image sensor (MOS SENSOR) unit which are connected to the lens unit with 3 screws. These screws are locked with the screw locking glue, after performing the Optical tilt adjustment.

During servicing, if one of MOS SENSOR fixing screws are loosened, the Optical tilt adjustment must be performed.

(About the Optical tilt adjustment, refer to the "9.3.2 Adjustment Specifications" for details.)

NOTE:

- It is necessary to use the "DSC_Tilt" software to allow the "Optical tilt adjustment".
- The Adjustment software "DSC_Tilt" is available at "TSN Website". To download, click on "Support Information from NWBG/VDBG-AVC".



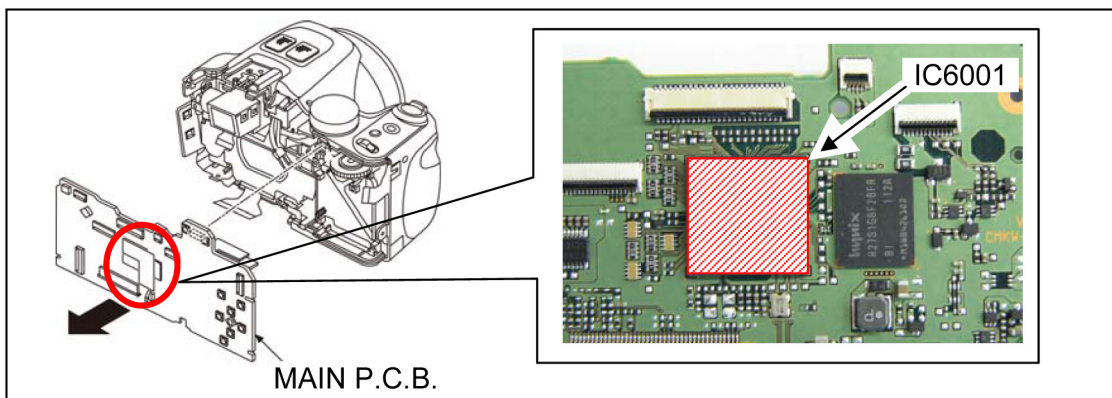
3.2.2. About VENUS ENGINE(IC6001) [Located on the Main P.C.B.]:

- The VENUS ENGINE (IC6001) consists of two IC chips, which are fixed together with solder.

(The so called, "Package On Package" type IC.)

NOTE:

- During servicing, do not press down hard on the surface of IC6001.



3.2.3. About Flexible Cable and Connector

Do not touch carelessly so that the foreign body should not adhere to the terminal part of flexible cable and connector.

Wipe off with a clean cloth and the cotton bud, etc. when the terminal part is dirty.

3.3. 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%

3.4. Important Notice 1:(Other than U.S.A. and Canadian Market)

1. The service manual does not contain the following information because of issues servicing to component level without necessary equipment/facilities.
 - a. Schematic diagram, Block Diagram and P.C.B. layout of MAIN P.C.B..
 - b. Parts list for individual parts for MAIN P.C.B..When a part replacement is required for repairing MAIN P.C.B., replace as an assembled parts. (MAIN P.C.B.)
2. The following category is/are recycle module part. please send it/them to Central Repair Center.
 - MAIN P.C.B. (VEP56145A: P/PC/PU/EE/GC/GD/GK/GN/GT): Excluding replacement of Lithium Battery.
 - MAIN P.C.B. (VEP56145B: EB/EF/EG/EP): Excluding replacement of Lithium Battery.

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









There are nine kinds of DMC-FZ150.

- a) DMC-FZ150 (Japan domestic model)
- b) DMC-FZ150P/PC
- c) DMC-FZ150EB/EF/EG/EP
- d) DMC-FZ150EE
- e) DMC-FZ150GT
- f) DMC-FZ150GK
- g) DMC-FZ150GD
- h) DMC-FZ150GN
- i) DMC-FZ150GC/PU

What is the difference is that the "INITIAL SETTINGS" data which is stored in Flash-ROM mounted on MAIN P.C.B..

3.5.1. Defining methods:

To define the model suffix to be serviced, refer to the nameplate which is putted on the bottom side of the Unit.

<p>a) DMC-FZ150 (Japan domestic model) The nameplate for this model shows the following Safety registration mark.</p> 
<p>b) DMC-FZ150P/PC The nameplate for these models show the following Safety registration mark.</p> 
<p>c) DMC-FZ150EB/EF/EG/EP The nameplate for these models show the following Safety registration mark.</p> 
<p>d) DMC-FZ150EE The nameplate for this model shows the following Safety registration mark.</p> 
<p>e) DMC-FZ150GT The nameplate for this model shows the following Safety registration mark.</p> 
<p>f) DMC-FZ150GK The nameplate for this model shows the following Safety registration mark.</p> 
<p>g) DMC-FZ150GD The nameplate for this model shows the following Safety registration mark.</p> 
<p>h) DMC-FZ150GN The nameplate for this model shows the following Safety registration mark.</p> 
<p>i) DMC-FZ150GC/PU The nameplate for these models do not show any above Safety registration mark.</p>

NOTE:

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

The service software is available at "TSN Website". To download, click on "Support Information from NWBG/VDBG-AVC".

3.5.2. INITIAL SETTINGS:

After replacing the MAIN P.C.B., make sure to perform the initial settings after achieving the adjustment by ordering the following procedure in accordance with model suffix of the unit.

1. IMPORTANT NOTICE:

Before proceeding Initial settings, make sure to read the following CAUTIONS.

CAUTION 1:(INITIAL SETTINGS)

--- AFTER REPLACING THE MAIN P.C.B. and/or FLASH-ROM ---

[Except "EG, EF, EB and EP" models : (VEP56145A is used as a Main P.C.B.)]

*. The model suffix can be chosen **JUST ONE TIME.**

(Effective model suffix : "P/PU/GD/GC/GT/GK/EE/GN/PC and NONE(JAPAN)")

*. Once one of the model suffix has been chosen, the model suffix lists will not be displayed, thus, it can not be changed.

[Only for "EG, EF, EB and EP" models : (VEP56145B is used as a Main P.C.B.)]

*. From the beginning, only "EG, EF, EB and EP" are displayed as model suffix lists, and these are displayed from the second times as well.

CAUTION 2:(Stored picture image data in the unit)

This unit employs "Built-in Memory" for picture image data recording.(Approx.70MB)
After proceeding "INITIAL SETTINGS", the picture image data stored in the unit is erased.

2. PROCEDURES:

• Precautions: Read the above "CAUTION 1" and "CAUTION 2", carefully.

• Preparation:

- Attach the Battery or AC Adaptor with a DC coupler to the unit.

(Since this unit has built-in memory, it can be performed without inserting SD memory card.)

• **Step 1. The temporary cancellation of "INITIAL SETTINGS":**

Set the mode dial to "[P] (Program AE mode)".

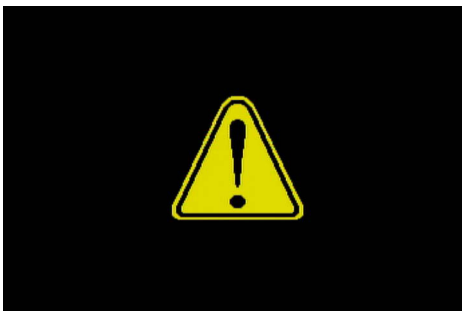
While pressing "[UP] of Cursor button" and [MOTION PICTURE] button simultaneously, turn the Power on.

• **Step 2. The cancellation of "INITIAL SETTINGS":**

Press the [PLAYBACK] button, then playback the picture.

Press "[UP] of Cursor button" and [MOTION PICTURE] button simultaneously, then turn the Power off.

The LCD displays the " ! " mark before the unit powers down.



• **Step 3. Turn the Power on:**

Set the mode dial to "[P] (Program AE mode)", and then turn the Power on.

• **Step 4. Display the INITIAL SETTING:**

While pressing [MENU/SET] and "[RIGHT] of Cursor buttons" simultaneously, turn the Power off.

The "INITIAL SETTINGS" menu is displayed.

There are two kinds of "INITIAL SETTINGS" menu form as follows:

[CASE 1. After replacing MAIN P.C.B.]

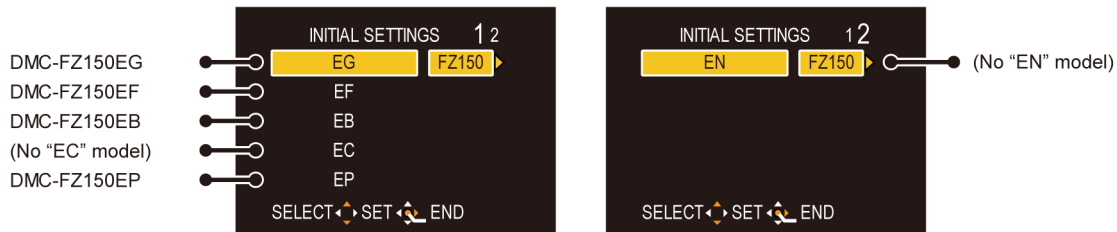
[Except "EG, EF, EB and EP" models: (VEP56145A is used as a Main P.C.B.)]

When MAIN P.C.B. has just been replaced, all of the model suffix is displayed as follows. (Four pages in total)



[Only "EG, EF, EB and EP" models: (VEP56145B is used as a Main P.C.B.)]

When MAIN P.C.B. has just been replaced, only 7 model suffix are displayed as follows. (Two pages in total)



[CASE 2. Other than "After replacing MAIN P.C.B."]



• **Step 5. Choose the model suffix in "INITIAL SETTINGS": (Refer to "CAUTION 1")**

[Caution: After replacing MAIN P.C.B.]

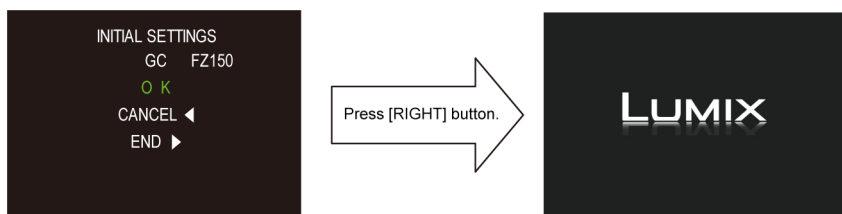
The model suffix can be chosen, **JUST ONE TIME**.

Once one of the model suffix have been chosen, the model suffix lists will not be displayed, thus, it can not be changed.

Therefore, select the area carefully.

Select the area with pressing "[UP] / [DOWN] of Cursor buttons".

- **Step 6. Set the model suffix in “INITIAL SETTINGS”:**
- Press the “[RIGHT] of Cursor buttons”.
- The only set area is displayed, and then press the “[RIGHT] of Cursor buttons” after confirmation.
(The unit is powered off automatically.)



- **Step 7. CONFIRMATION:**

Confirm the display of “PLEASE SET THE CLOCK” in concerned language when the unit is turned on again.

When the unit is connected to PC with USB cable, it is detected as removable media.

(When the “GT” or “GK” model suffix is selected, the display shows “PLEASE SET THE CLOCK” in Chinese.)

1) As for your reference, major default setting condition is as shown in the following table.

- **Default setting (After “INITIAL SETTINGS”)**

	MODEL	VIDEO OUTPUT	LANGUAGE	DATE	REMARKS
a)	DMC-FZ150 (Japan domestic model)	NTSC	Japanese	Year/Month/Date	
b)	DMC-FZ150P	NTSC	English	Month/Date/Year	
c)	DMC-FZ150PU	NTSC	Spanish	Month/Date/Year	
d)	DMC-FZ150GD	NTSC	Korean	Year/Month/Date	
e)	DMC-FZ150GC	PAL	English	Date/Month/Year	
f)	DMC-FZ150GT	NTSC	Chinese (traditional)	Year/Month/Date	
g)	DMC-FZ150GK	PAL	Chinese (simplified)	Year/Month/Date	
h)	DMC-FZ150EE	PAL	Russian	Date/Month/Year	
i)	DMC-FZ150GN	PAL	English	Date/Month/Year	
j)	DMC-FZ150PC	NTSC	English	Month/Date/Year	
k)	DMC-FZ150EG	PAL	English	Date/Month/Year	
l)	DMC-FZ150EF	PAL	French	Date/Month/Year	
m)	DMC-FZ150EB	PAL	English	Date/Month/Year	
n)	DMC-FZ150EP	PAL	English	Date/Month/Year	

4 Specifications

Digital Camera:

Information for your safety

Power Source:	DC 8.4 V
Power Consumption:	1.6 W (When recording with LCD Monitor) 1.4 W (When recording with Viewfinder) 1.0 W (When playing back with LCD Monitor) 0.9 W (When playing back with Viewfinder)

Camera effective pixels	12,100,000 pixels	
Image sensor	1/2.3" MOS sensor, total pixel number 12,800,000 pixels, Primary color filter	
Lens [NANO SURFACE COATING]	Optical 24× zoom, f = 4.5 mm to 108 mm (35 mm film camera equivalent: 25 mm to 600 mm) Wide: F2.8 to F8.0 (when recording motion pictures: F2.8 to F11) Tele: F5.2 to F8.0 (when recording motion pictures: F5.2 to F11)	
Image Stabilizer	Optical method	
Digital zoom	Max. 4×	
Extended optical zoom	Max. 46.9× (When set to 3,000,000 pixels [3M] or less)	
Focus range	AF	30 cm (0.99 feet) (Wide)/ 2 m (6.57 feet) (Tele) to ∞
	AF Macro/MF/ Intelligent Auto/ Motion Picture	1 cm (0.04 feet) (Wide)/ 1 m (3.28 feet) (Tele) to ∞
	Scene Mode	There may be differences in the above settings.
Shutter system	Electronic shutter+Mechanical shutter	
Burst recording	Burst speed	
For mechanical shutter	2 frames/sec, 5.5 frames/sec, 12 frames/sec	
For electronic shutter	40 frames/sec, 60 frames/sec	
During motion picture recording	2 frames/sec (Max. 40 frames/3.5 M), 5 frames/sec (Max. 40 frames/3.5 M), 10 frames/sec (Max. 40 frames/3.5 M)	
Minimum illumination	[NTSC areas] Approx. 9 lx (when i-low light is used, the shutter speed is 1/30th of a second) [PAL areas] Approx. 9 lx (when i-low light is used, the shutter speed is 1/25th of a second)	
Shutter speed		
Still picture	15 seconds to 1/2000th of a second [STARRY SKY] Mode: 15 seconds, 30 seconds	
Motion pictures	1/30 to 1/20000th of a second Creative Video Mode (Manual Exposure/Manual Focus): 1/8 to 1/20000th of a second	

Exposure (AE)	Program AE (P)/Aperture-Priority AE (A)/ Shutter-Priority AE (S)/Manual Exposure (M) Exposure compensation (1/3 EV Step, -3 EV to +3 EV)	
Metering mode	Multiple/Center weighted/Spot	
LCD monitor	3.0" TFT LCD (3:2) (Approx. 461,000 dots) (field of view ratio about 100%)	
Viewfinder	Color LCD Viewfinder (Approx. 202,000 dots) (field of view ratio about 100%) (with diopter adjustment -4 to +4 diopter)	
Flash	Built-in pop up flash Flash range: Approx. 30 cm (0.99 feet) to 9.5 m (31.16 feet) (Wide, [ISO AUTO] is set)	
Microphone	Stereo	
Speaker	Monaural	
Recording media	Built-in Memory (Approx. 70 MB)/SD Memory Card/ SDHC Memory Card/SDXC Memory Card	
Recording file format		
Still Picture	RAW/JPEG (based on "Design rule for Camera File system", based on "Exif 2.3" standard, DPOF corresponding)/MPO	
Motion pictures	AVCHD/MP4/QuickTime Motion JPEG	
Audio compression	AVCHD	AC3/2 ch
	MP4	AAC/2 ch
Interface		
Digital	"USB 2.0" (High Speed)	
Analog video	[NTSC areas]: NTSC [PAL areas]: NTSC/PAL Composite (Switched by menu)	
Audio	Audio line output (monaural)	
Terminal		
[MIC/REMOTE]	φ 2.5 mm jack	
[AV OUT/DIGITAL]	Dedicated jack (8 pin)	
[HDMI]	MiniHDMI TypeC	
Dimensions (excluding the projecting parts)	Approx. 124.3 mm (W)×81.7 mm (H)×95.2 mm (D) [4.89"(W)×3.20"(H)×3.74"(D)]	
Mass (weight)	Approx. 528 g/1.16 lb (with card and battery) Approx. 484 g/1.06 lb (excluding card and battery)	
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)	
Operating humidity	10%RH to 80%RH	

Battery Charger:

Information for your safety

Input:	AC ~ 110 V to 240 V, 50/60 Hz, 0.15 A
Output:	DC --- 8.4 V, 0.43 A

Equipment mobility:

Movable

Battery Pack (lithium-ion):

Information for your safety

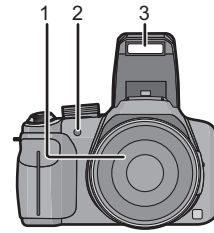
Voltage/capacity:	7.2 V/895 mAh
--------------------------	---------------

NOTE:(Only for "EB/EF/EG/EP" models)

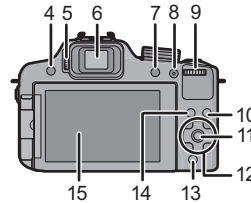
- Data from the PC can not be written to the camera using the USB connection cable.
- Motion pictures can be recorded continuously for up to 29 minutes 59 seconds.

5 Location of Controls and Components

- 1 Lens
- 2 Self-timer indicator
AF Assist Lamp
- 3 Flash



- 4 Flash open button
- 5 Diopter adjustment dial
- 6 Viewfinder
- 7 [EVF/LCD] button
- 8 [AF/AE LOCK] button
- 9 Rear dial
- 10 Playback button
- 11 [MENU/SET] button

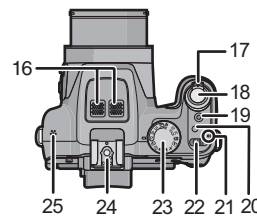


- 12 Cursor buttons
 - ▲/ Exposure compensation/
Auto Bracket/Flash output adjustment
 - ◀/ Self-timer button
 - ▶/ ISO
 - ▼/ Function button

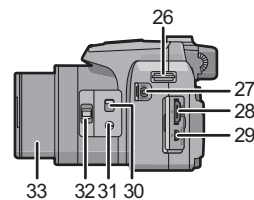
The following menus can be assigned.
[PHOTO STYLE]/[ASPECT RATIO]/[QUALITY]/[METERING MODE]/
[WHITE BALANCE]/[I.DYNAMIC]/[GUIDE LINE]/[REC AREA]/
[REMAINING DISP.]

- 13 [Q.MENU] button/Delete button
- 14 [DISPLAY] button
- 15 LCD monitor

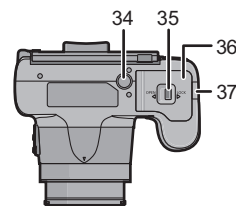
- 16 Stereo microphone
- 17 Zoom lever
- 18 Shutter button
- 19 Motion picture button
- 20 Burst Mode button
- 21 Power lamp
- 22 Camera ON/OFF switch
- 23 Mode dial
- 24 Hot Shoe
- 25 Speaker



- 26 Shoulder strap eyelet
- 27 [MIC/REMOTE] socket
- 28 [HDMI] socket
- 29 [AV OUT/DIGITAL] socket
- 30 Focus selector switch
- 31 [FOCUS] button
- 32 Side lever
- 33 Lens barrel



- 34 Tripod receptacle
- 35 Release lever
- 36 Card/Battery door
- 37 DC coupler cover
 - When using an AC adaptor, ensure that the Panasonic DC coupler and AC adaptor (optional) are used.
 - Always use a genuine Panasonic AC adaptor (optional).
 - It is recommended to use a fully charged battery or AC adaptor when recording motion pictures.
 - If while recording motion pictures using the AC adaptor and the power supply is cut off due to a power outage or if the AC adaptor is disconnected etc., the motion picture being recorded will not be recorded.

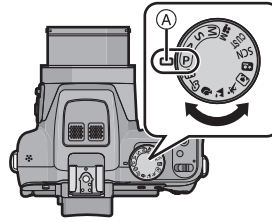


Selecting the Recording Mode

Switching the mode by rotating the mode dial.

Align a desired mode with part (A).

- Rotate the mode dial slowly and surely to adjust to each mode.



■ Basic

P	Program AE Mode
The subjects are recorded using your own settings.	
iA	Intelligent Auto Mode
The subjects are recorded using settings automatically selected by the camera.	

■ Advanced

A	Aperture-Priority AE Mode
The shutter speed is automatically determined by the aperture value you set.	
S	Shutter-Priority AE Mode
The aperture value is automatically determined by the shutter speed you set.	
M	Manual Exposure Mode
The exposure is adjusted by the aperture value and the shutter speed which are manually adjusted.	
M	Creative Video Mode
Record motion picture with manual settings.	
CUST	Custom Mode
Use this mode to take pictures with previously registered settings.	
SCN	Scene Mode
This allows you to take pictures that match the scene being recorded.	
CC	Creative Control Mode
Record while checking the image effect.	

■ Advanced Scene Mode

Portrait Mode
Use this mode to take pictures of people.
Scenery Mode
Use this mode to take pictures of scenery.
Sports Mode
Use this mode to take pictures of sporting events, etc.
Close-up Mode
Use this mode to take pictures of a close-by subject.
Night Portrait Mode
Use this mode to take pictures of night scenes and people against night time scenery.

6 Service Mode

6.1. Error Code Memory Function

1. General description

This unit is equipped with history of error code memory function, and can be memorized 16 error codes in sequence from the latest. When the error is occurred more than 16, the oldest error is overwritten in sequence.

The error code is not memorized when the power supply is shut down forcibly (i.e.,when the unit is powered on by the battery, the battery is pulled out) The error code is memorized to FLASH-ROM when the unit has just before powered off.

2. How to display

The error code can be displayed by ordering the following procedure:

• Preparation:

1. Attach the Battery or AC Adaptor with a DC coupler to the unit.

NOTE:

*Since this unit has built-in memory, it can be performed without inserting SD memory card.

• Step 1. The temporary cancellation of “INITIAL SETTINGS”:

Set the mode dial to “[P] (Program AE mode)”.

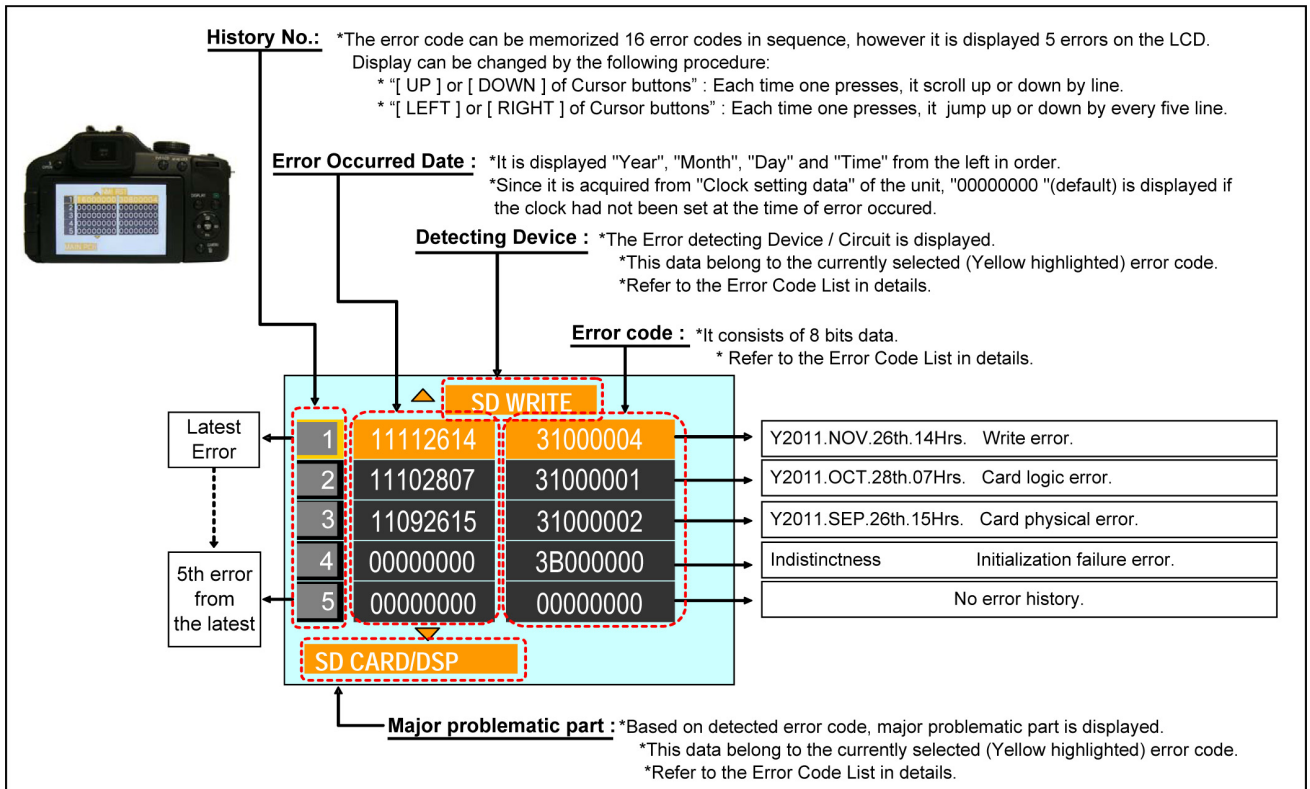
While pressing “[UP] of Cursor button” and [MOTION PICTURE] button simultaneously, turn the Power on.

• Step 2. Execute the error code display mode:

Press the “[LEFT] of Cursor button”, [MENU/SET] button and [MOTION PICTURE] button simultaneously.

The display is changed as shown below when the above buttons are pressed simultaneously.

Normal display → Error code display → Operation history display → Normal display →



Example of Error Code Display

• 3. Error Code List

The error code consists of 8 bits data and it shows the following information.

Attribute	Main item	Sub item	Error code		Contents (Upper line)	Error Indication		
			High 4 bits	Low 4 bits	Problematic Part & Check point (Lower line)	Detecting device	Problematic Part/Circuit	
LENS	Lens drive	OIS	18*0	1000	PSD (X) error. Hall element (X axis) position detect error in OIS unit. OIS Unit	OIS X	LENSu NG	
				2000	PSD (Y) error. Hall element (Y axis) position detect error in OIS unit. OIS Unit	OIS Y		
			3000	GYRO (X) error. Gyro (IC7101: X axis) detect error on MAIN P.C.B.. IC7101 (Gyro element) or IC6001 (VENUS ENGINE)	GYRO X	GYRO NG		
			4000	GYRO (Y) error. Gyro (IC7101: Y axis) detect error on MAIN P.C.B.. IC7101 (Gyro element) or IC6001 (VENUS ENGINE)	GYRO Y			
			6000	Drive voltage (X) error. LENS Unit, LENS flex breaks, IC6001 (VENUS ENGINE) AD value error,	OISX REF	LENSu/LENS FPC		
			7000	Drive voltage (Y) error. LENS Unit, LENS flex breaks, IC6001 (VENUS ENGINE) AD value error,	OISY REF			
			8000	OIS GYRO-Digital communication error IC7101(Gyro element) or IC6001(VENUS ENGINE)	(No indication)	(No indication)		
			Zoom	0?10	Collapsible barrel Low detect error (Collapsible barrel encoder always detects Low.) Mechanical lock, FP9005-(15) signal line or IC6001 (VENUS ENGINE)	ZOOM L	ZOOMm/LENSu	
		0?20			Collapsible barrel High detect error (Collapsible barrel encoder always detects High.) Mechanical lock, FP9005-(15) signal line or IC6001 (VENUS ENGINE)	ZOOM H		
		0?30		Zoom motor sensor error. Mechanical lock, FP9005-(1), (3) signal line or IC6001 (VENUS ENGINE)	ZOOM ENC			
				0?40		Zoom motor sensor error. (During monitor mode.) Mechanical lock, FP9005-(1), (3) signal line or IC6001 (VENUS ENGINE)		
				0?50		Zoom motor sensor error. (During monitor mode with slow speed.) Mechanical lock, FP9005-(1), (3) signal line or IC6001 (VENUS ENGINE)		
		0?60		Detection of zoom misregistration by impact such as fails. Lens Unit	(No indication)	(No indication)		
		Focus		0?01	HP Low detect error (Focus encoder always detects High, and not becomes Low) Mechanical lock, FP9005-(12) signal line or IC6001 (VENUS ENGINE)	FOCUS L		LENS FPC/DSP
					0?02	HP High detect error (Focus encoder always detects Low, and not becomes High) Mechanical lock, FP9005-(12) signal line or IC6001 (VENUS ENGINE)		
		Lens	10*8	0000	LENS cap error Zoom motor, Zoom pulse encoder2	(No indication)	(No indication)	
				18*1	0000	Power ON time out error. LENS drive system	LENS DRV	LENSu
			18*2	0000	Power OFF time out error. LENS drive system			
		Adj. History	OIS	19*0	2000	OIS adj. Yaw direction amplitude error (small)	OIS ADJ	OIS ADJ
					3000	OIS adj. Pitch direction amplitude error (small)		
					4000	OIS adj. Yaw direction amplitude error (large)		
					5000	OIS adj. Pitch direction amplitude error (large)		
					8000	OIS adj. Yaw direction off set error		
					9000	OIS adj. Pitch direction off set error		
	A000				OIS adj. Yaw direction gain error			
	B000				OIS adj. Pitch direction gain error			
	C000				OIS adj. Yaw direction position sensor error			
	D000				OIS adj. Pitch direction position sensor error			
	E000				OIS adj. other error			
	HARD				VENUS A/D	Flash		
		FLASH ROM (EEPROM Area)	FLASH ROM (EEPROM Area)	2B*0	0001	EEPROM read error IC6005 (FLASH ROM)	FROM RE	FROM
					0002	EEPROM write error IC6005 (FLASH ROM)	FROM WR	FROM
0005					Firmware version up error Replace the firmware file in the SD memory card.	(No indication)	(No indication)	
SYSTEM		RTC	2C*0	0001	SYSTEM IC initialize failure error Communication between IC6001 (VENUS ENGINE) and IC9101 (SYSTEM)	SYS INIT	MAIN PCB	
SOFT		CPU	Reset	30*0	0001	NMI reset Non Mask-able Interrupt (30000001-30000007 are caused by factors)	NMI RST	MAIN PCB
	CPU, ASIC hard	Stop	38*0	0001	Camera task finish process time out. Communication between Lens system and IC6001 (VENUS ENGINE)	LENS COM	LENSu/DSP	
				0002	Camera task invalid code error. IC6001 (VENUS ENGINE)	DSP	DSP	
					0100			File time out error in recording motion image IC6001 (VENUS ENGINE)
					0200			File data cue send error in recording motion image IC6001 (VENUS ENGINE)
				0300	Single or burst recording brake time out.			
				Memory area	3A*0	0008	USB work area partitioning failure USB dynamic memory securing failure when connecting	(No indication)
	Operation Zoom	Power on Zoom	3B*0	0000	FLASHROM processing early period of camera during movement.	INIT	(No indication)	
	Zoom	Zoom	3C*0	0000	Imperfect zoom lens processing Zoom lens	ZOOM	ZOOMm/LENSu	
				35*0	0000	Software error (0-7bit : command, 8-15bit : status)	DSP	DSP
					FFFF			
				35*1	0000	Though record preprocessing is necessary, it is not called.	(No indication)	(No indication)
35*2	0000	Though record preprocessing is necessary, it is not completed.	(No indication)	(No indication)				

Important notice about "Error Code List"

1) About "*" indication:

The third digit from the left is different as follows.

- In case of 0 (example: 1801000)

When the third digit from the left shows "0", this error occurred under the condition of INITIAL SETTINGS has been completed.

It means that this error is occurred basically at user side.

- In case of 8 (example: 1881000)

When the third digit from the left shows "8", this error occurred under the condition of INITIAL SETTINGS has been released.

(Example; Factory assembling-line before unit shipment, Service mode etc.)

It means that this error is occurred at service side.

2) About "?" indication: ("18*0 0?01" to "18*0 0?50"):

The third digit from the right shows one of the hexadecimal ("0" to "F") character.

• 4. How to exit from Error Code display mode:

Simply, turn the power off. (Since Error code display mode is executed under the condition of temporary cancellation of "INITIAL SETTINGS", it wake up with normal condition when turn off the power.)

NOTE:

The error code can not be initialized.

6.2. ICS (Indication of additional Camera Settings when picture was taken) function

1. General description

This unit is equipped with ICS (ICS: Indication of additional Camera Settings when picture was taken) function by playing back the concerned picture on the LCD display.

(This function is achieved by utilizing "maker note" data stored in Exif data area of recorded picture file.)

To proceed failure diagnosis, use this ICS function together with "displaying the recorded picture with picture information" function.

NOTE:

- The ICS function operates with a picture which is only taken with the same model. (It may not be displayed when the picture was taken with other model.)
- Since Exif data is not available after the picture is edited by PC, the ICS function may not be activated.

2. How to display

The ICS data is displayed by ordering the following procedure:

• Preparation:

1. Attach the Battery or AC Adaptor with a DC coupler to the unit.

NOTE:

Since this unit has built-in memory, it can be performed without inserting SD memory card.

• Step 1. The temporary cancellation of "INITIAL SETTINGS":

Set the mode dial to "[P] (Program AE mode)".

While pressing "[UP] of Cursor button" and [MOTION PICTURE] button simultaneously, turn the Power on.

• Step 2. Execute the ICS display mode:

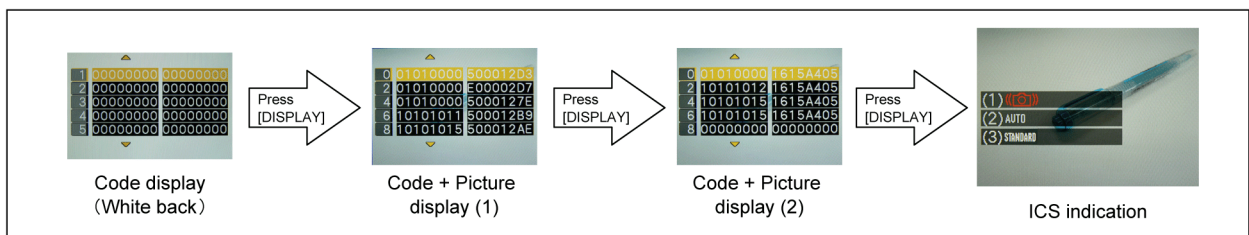
Press the [PLAYBACK] button, then playback the picture.

Press the "[LEFT] of Cursor button", [MENU/SET] button and [MOTION PICTURE] button simultaneously.

Press the [DISPLAY] button, 3 times.

The display condition is changed as shown below when the [DISPLAY] button is pressed.

Code display → Code + Picture display (1) → Code + Picture display (2) → ICS display → Code display



3. How to read

(1). Jitter alert was displayed or not:

This part shows that the "Jitter alert" mark was displayed or not when the picture has just before been taken.

- + .With "Jitter alert" mark : The "Jitter alert" mark was displayed.
- + .Without "Jitter alert" mark: The "Jitter alert" mark was not displayed.

[About "Jitter alert" mark]

Due to lacking the enough light amount etc, shooting condition prone to make a "hand jitter", the "Jitter alert" mark is displayed.

[Reference Guide]

(Applicable settings : Normal picture mode, ISO100, WIDE edge, Flash OFF)

- + .The "Jitter alert" mark is displayed when the shutter speed is 1/15th and below.

Normal playback screen
(Recorded picture with information)



*In playback mode, the picture information is displayed when pressing the [DISPLAY] button. (It can be confirmed at user as well.)

*Use this indication together with ICS function

(2). ISO Sensitivity Setting condition:

This part shows that the "ISO Sensitivity" setting condition when the picture had been taken.

(Note: The [i ISO] is displayed when the "Intelligent ISO" was selected.)

For instance, when the recorded picture information shows [ISO100], it can be confirmed the ISO setting condition ; [AUTO], [INTELLIGENT ISO] or [ISO 100](Fixed: set by user).

[Point for Confirmation]

*The symptom is "Picture with "hand jitter". Subject is not clearly stopped." in darker scene, does the picture was taken with lower ISO setting mode?

*The symptom is "Noisy picture. Rough picture image" in brighter scene, does the picture was taken with higher ISO setting mode?

(3). Color effect Setting condition:

This part shows that the "Color effect" setting condition when the picture had been taken in "iA" (intelligent auto) mode.

(The [STANDARD] is displayed when the picture had been taken other than "iA" mode.)

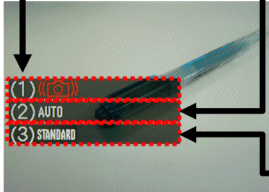
[Point for Confirmation]

*The symptom is "Color is strange. The picture is bluish (Yellowish) ", does the picture was taken with [Happy] / [B/W] / [SEPIA] settings?

NOTE: As for the symptom related with the color, confirm the picture information which is displayed in normal playback screen as well.

(In normal playback screen, the setting condition of "White balance" and "WB Adjustment" can be confirmed.)

[ICS display (Sample)]



- (1). Jitter alert mark : [Indicated]
- (2). ISO sens. setting : AUTO
- (3). Color effect setting: STANDARD

[Reference Guide : Settings "When taking picture"]

<ISO SENSITIVITY>

*This allows the sensitivity to light (ISO sensitivity) to be set. Setting to a higher figure enables pictures to be taken even in dark places without the resulting pictures coming out dark.

*In this unit, it can be set one of the [AUTO], [i ISO], [100], [200], [400], [800], [1600] and [3200] in "Normal shooting" mode.

*The setting is fixed to [AUTO] in Creative Control Mode.

*Setting items below will be selectable in Creative Video Mode.

[AUTO]/[100]/[200]/[400]/[800]/[1600]/[3200]/[6400]

*The setting is fixed to [iISO] in the following cases.

- In [INDOOR PORTRAIT] in [PORTRAIT]
- In [SPORTS]
- [BABY1]/[BABY2], [PET] and [FLASH BURST] in Scene Mode

*You cannot select [iISO] in Shutter-Priority AE Mode.

*You cannot select [AUTO] or [iISO] in Manual Exposure Mode.

ISO sensitivity	Settings
AUTO	The ISO sensitivity is automatically adjusted according to the brightness. • Maximum [ISO800]*
iISO (Intelligent)	The ISO sensitivity is adjusted according to the movement of the subject and the brightness. • Maximum [ISO1600] (With the flash on [ISO800])*
100/200/400/800/1600/3200	The ISO sensitivity is fixed to various settings. (When the [ISO INCREMENTS] in [REC] Mode menu is set to [1/3 EV], items of ISO sensitivity that can be set will increase.)

* When the [ISO LIMIT SET] of [REC] Mode menu is set to anything except [AUTO], it is set automatically within the value set in [ISO LIMIT SET].

	[ISO100] ←	→ [ISO3200]
Recording location (recommended)	When it is light (outdoors)	When it is dark
Shutter speed	Slow	Fast
Noise	Less	Increased
Jitter of the subject	Increased	Less

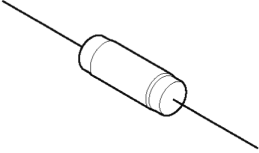
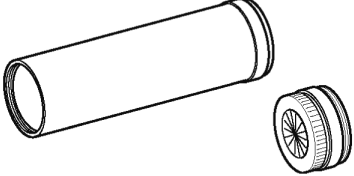
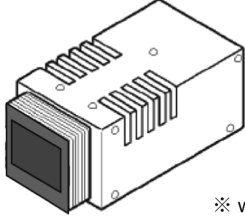
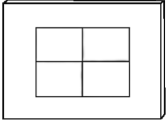


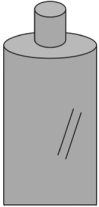
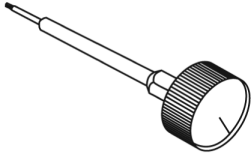
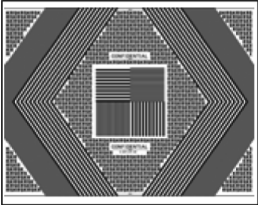
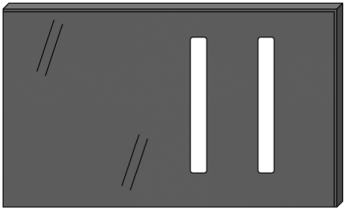


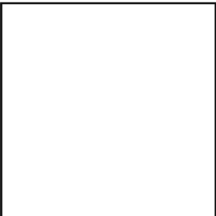
4. How to exit:

Simply, turn the power off. (Since ICS function is executed under the condition of temporary cancellation of "INITIAL SETTINGS", it wake up with normal condition when turn off the power.)

7 Service Fixture & Tools

7.1. Service Fixture and Tools

The following Service Fixture and tools are used for checking and servicing this unit.

<p>Resistor for Discharging ERG5SJ102</p>	<p>Infinity Lens (with Focus Chart) RFKZ0422</p>	<p>LIGHT BOX RFKZ0523</p>
 <p>An equivalent type of Resistor may be used.</p>		 <p>※ with DC Cable *VFK1164TDVLB can be used.</p>
<p>TR Chart RFKZ0443</p>	<p>Lens Cleaning Kit (BK) VFK1900BK</p>	<p>Grease (for lens) RFKZ0472</p>
	 <p>*Only supplied 10 set/box.</p>	
<p>Screw locking glue RFKZ0573</p>	<p>Driver (for optical axis adjustment) RFKZ0569</p>	<p>Optical axis adjustment chart RFKZ0570</p>
		
<p>Camera stand RFKZ0333J</p>	<p>Torque Driver RFKZ0542</p>	<p>Diffuser RFKZ0591</p>
		
<p>ND Filter (ND1.5) VFK1164ND15</p>		
		

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

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

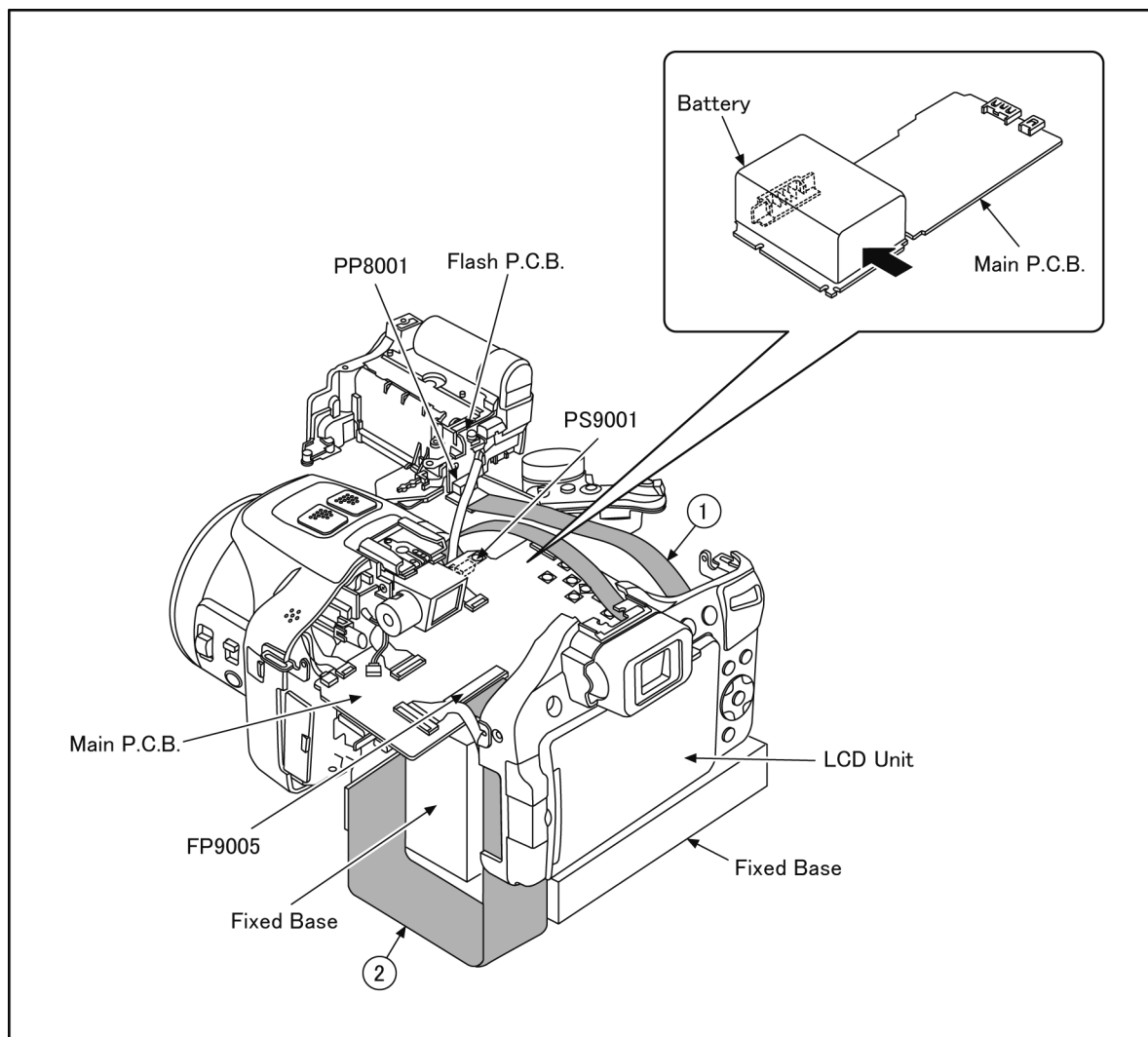
The service software is available at "TSN Website". To download, click on "Support Information from NWBG/VDBG-AVC".

7.3. Service Position

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

Table S1 Extension Cable List

No.	Parts No.	Connection	Form
1	VFK1906	PS9001 (MAIN) - PP8001 (FLASH)	20PIN B to B
2	VFK1953	FP9005 (MAIN) - LENS UNIT	40PIN 0.5 FFC



CAUTION-1. (When servicing FLASH P.C.B.)

1. Be sure to discharge the E.capacitor on FLASH P.C.B..

Refer to "HOW TO DISCHARGE THE E.CAPACITOR ON FLASH P.C.B.."

The E.capacitor voltage is not lowered soon even if the AC Cord is unplugged or the battery is removed.

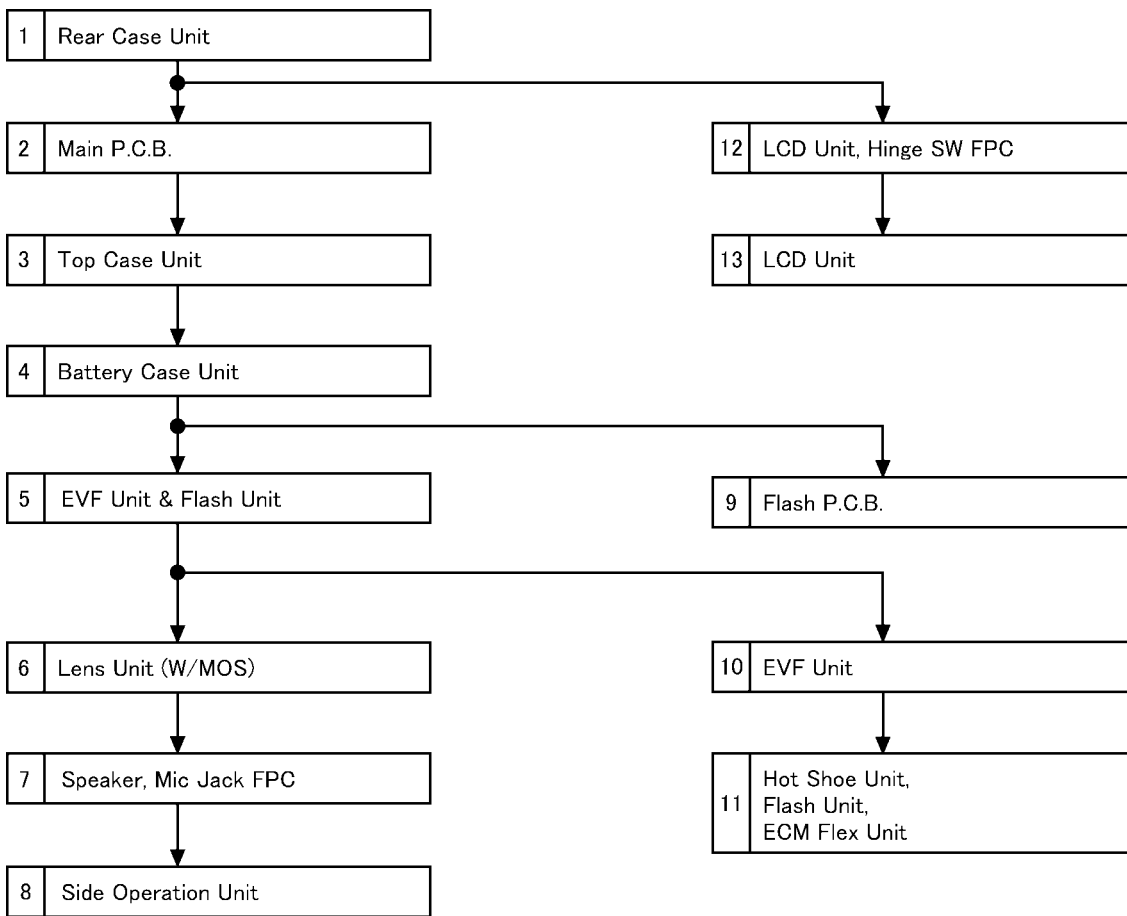
2. Be careful of the high voltage circuit on FLASH P.C.B..
3. DO NOT allow other parts to touch the high voltage circuit on FLASH P.C.B..

8 Disassembly and Assembly Instructions

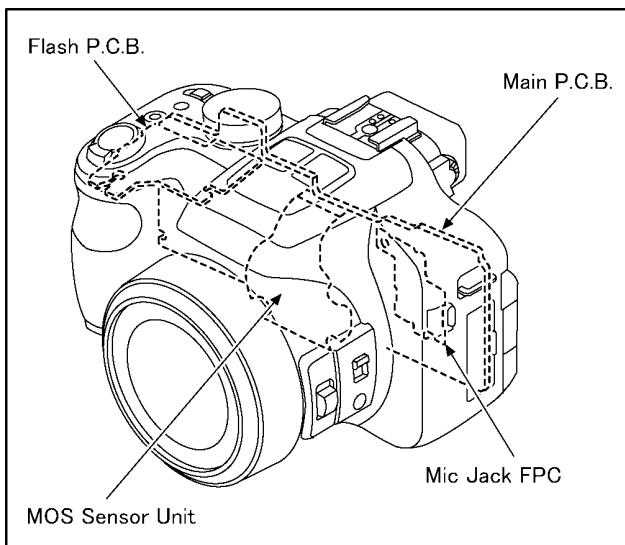
8.1. Disassembly Flow Chart

This is a disassembling chart.

When assembling, perform this chart conversely.



8.2. P.C.B. Location



8.3. Disassembly Procedure

No.	Item	Fig	Removal
1	Rear Case Unit	(Fig. D1)	Card
			Battery
			3 Screws (A)
			2 Screws (B)
			1 Locking tab
		(Fig. D2)	Shoe Spring
			2 Screws (C)
			FP9003(Flex)
			Rear Case Unit
2	Main P.C.B.	(Fig. D3)	1 Screw (D)
			2 Screws (E)
			FP9001(Flex)
			FP9002(Flex)
			FP9004(Flex)
			FP9005(Flex)
			FP9006(Flex)
			FP9008(Flex)
			FP9010(Flex)
			P9001(Connector)
		P9005(Connector)	
		(Fig. D4)	PS9001(Connector)
			Jack Holder
			Main P.C.B.
3	Top Case Unit	(Fig. D5)	1 Screw (F)
			Top Case Unit
4	Battery Case Unit	(Fig. D6)	1 Screw (G)
		(Fig. D7)	P8003(Connector)
			P8004(Connector)
			1 Locking tab
	Battery Case Unit		
5	EVF Unit & Flash Unit	(Fig. D8)	1 Screw (H)
			EVF Unit & Flash Unit
6	Lens Unit (W/MOS)	(Fig. D9)	2 Screws (I)
			Lens Heat Sink
			Lens Unit (W/MOS)
7	Speaker Mic Jack FPC	(Fig. D10)	1 Screw (J)
			Strap Holder
			1 Locking tab
			Side Frame (R)
			Jack Cover
			Speaker
			1 Screw (K)
		Connector (A)	
		(Fig. D11)	Remote Holder
			Remote Cover
Mic Jack FPC			
8	Side Operation Unit	(Fig. D12)	4 Locking tabs
			Side Operation Support
			Switch Unit
			Side Operation Unit
9	Flash P.C.B.	(Fig. D13)	3 Locking tabs
			Capacitor Cover
		(Fig. D14)	1 Screw (L)
			2 Hanging parts
			Flash P.C.B.
10	EVF Unit	(Fig. D15)	2 Locking tabs
			EVF Unit

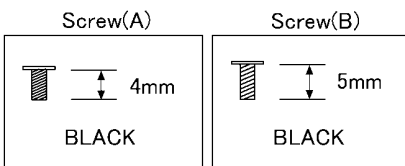
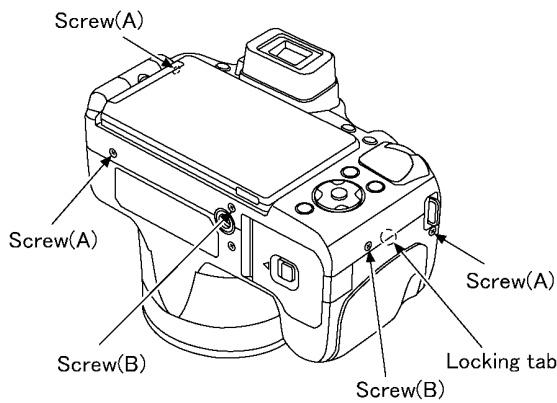
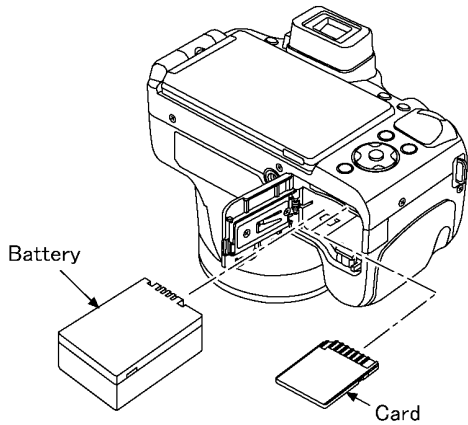
No.	Item	Fig	Removal
11	Hot Shoe Unit Flash Unit ECM Flex Unit	(Fig. D16)	3 Screws (M)
			2 Ribs
			Hot Shoe Unit
		(Fig. D17)	2 Screws (N)
			4 Locking tabs
			Flash Case Top Unit
			Flash Shaft
			Flash Pop Up Spring
		(Fig. D18)	2 Locking tabs
			1 Locking tab
			Flash Earth Plate
			2 Hooking parts
			MIC Damper
ECM Flex Unit			
MIC Cushion			
Flash Unit			
12	LCD Unit Hinge SW FPC	(Fig. D19)	2 Screws (O)
		(Fig. D20)	1 Locking tab
			Hinge Arm Cover Top
			1 Locking tab
			Hinge Arm Cover Bottom
			2 Screws (P)
			Hinge Plate
			FP7301(Flex)
		(Fig. D21)	3 Ribs
			LCD Unit
			DPR Sheet
			2 Locking tabs
	Rear Earth Plate B		
	2 Locking tabs		
	Hinge SW FPC		
13	LCD Unit	(Fig. D22)	2 Screws (Q)
			2 Screws (R)
			6 Locking tabs
			LCD Case (Top)
			Connector (B)
			LCD Hinge Unit
LCD Unit			
	LCD Case (Bottom)		

8.3.1. Removal of the Rear Case Unit

NOTE:

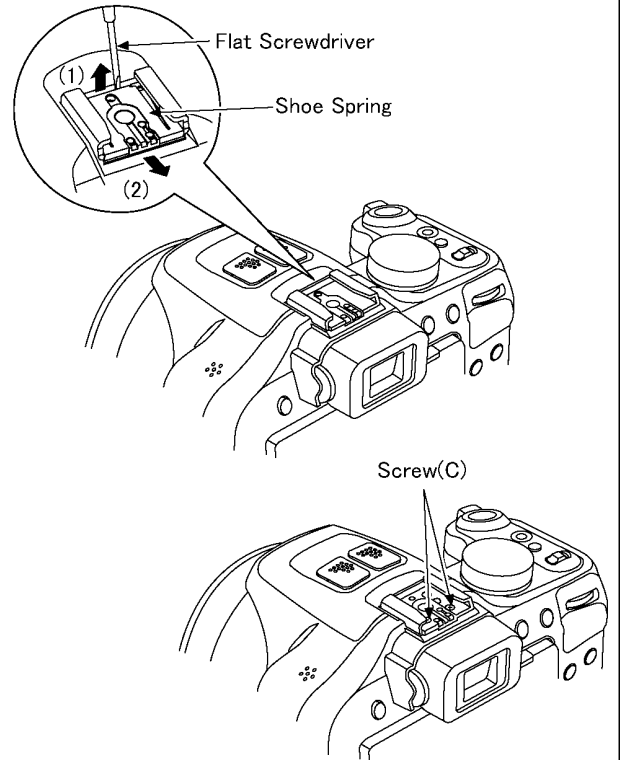
When servicing and reassembling, remove the card and battery from the unit.

- Card
- Battery
- Screw(A) × 3
- Screw(B) × 2
- Locking tab × 1



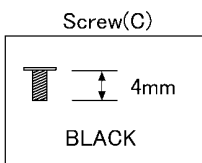
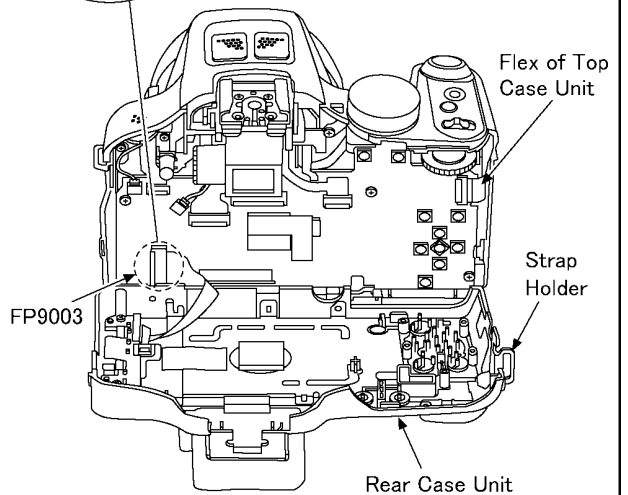
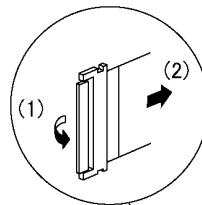
(Fig. D1)

- Shoe Spring
- FP9003(Flex)
- Screw(C) × 2



NOTE: (When Replacing)

- When remove the flex, pull up the locking tab in the direction of arrow (1), and then remove the flex in the direction of arrow (2).
- Take care not to damage the flex.

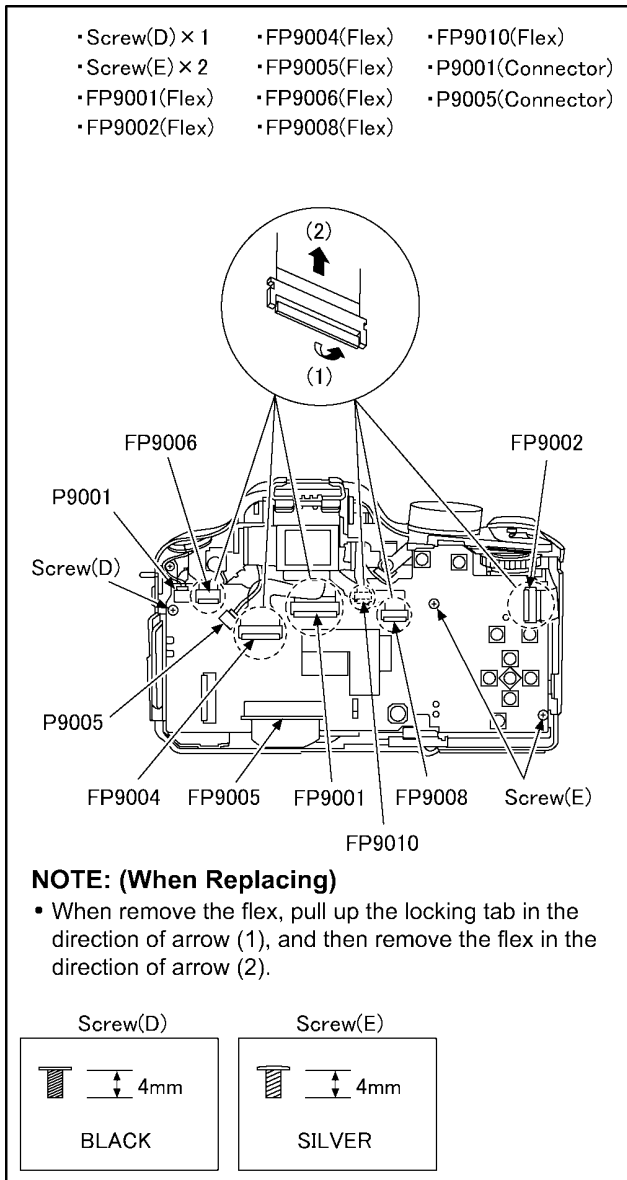


NOTE: (When Installing)

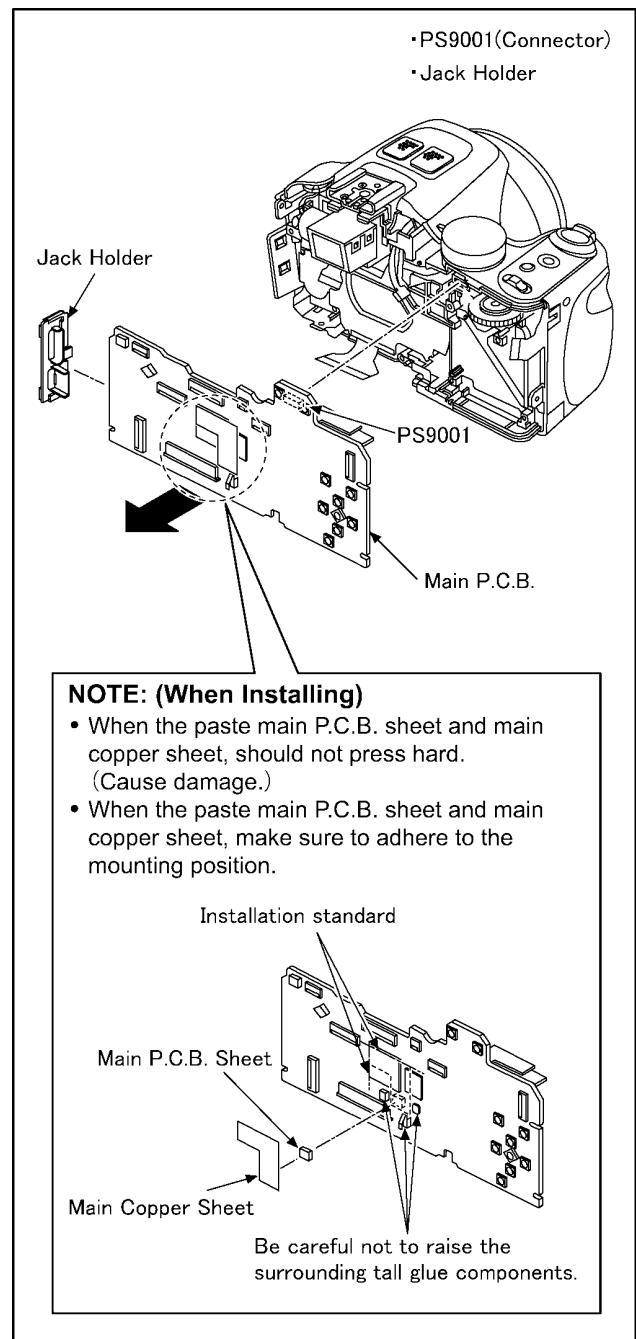
- When install the rear case unit, be careful not to damage the flex of top case unit by bracket of the strap holder.

(Fig. D2)

8.3.2. Removal of the Main P.C.B.

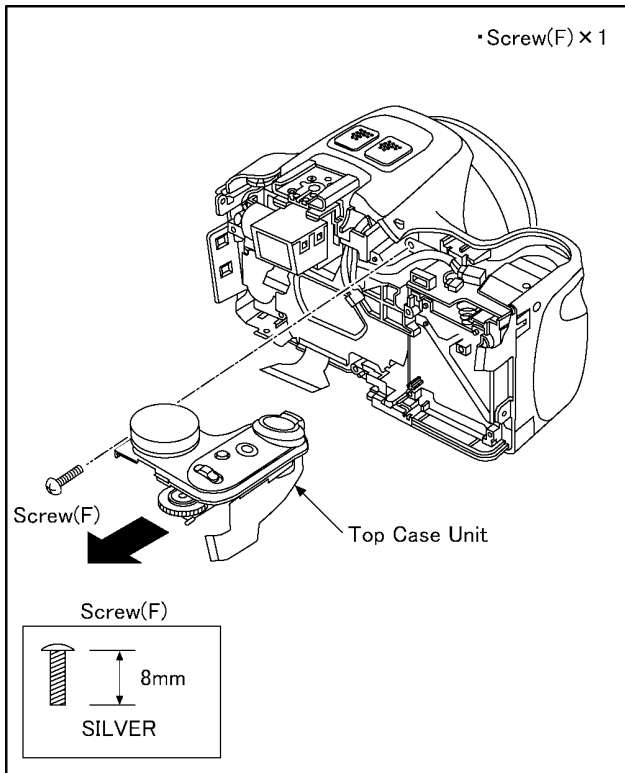


(Fig. D3)



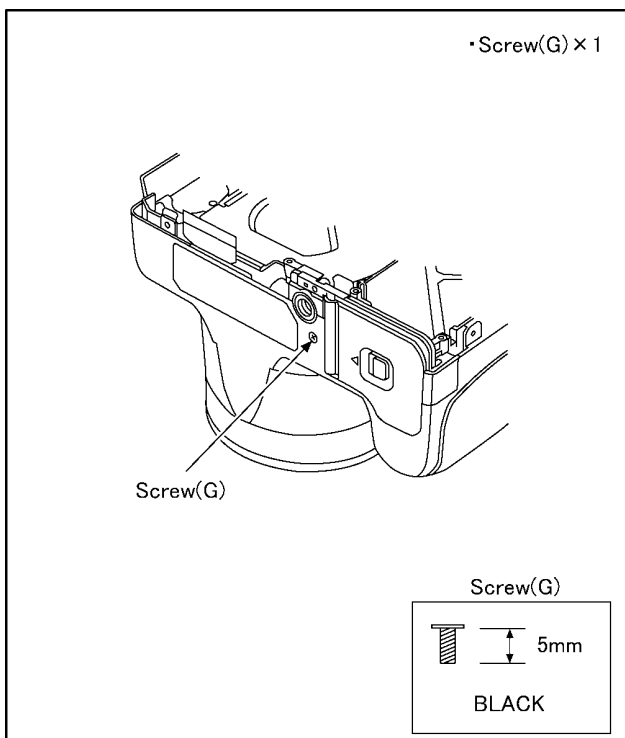
(Fig. D4)

8.3.3. Removal of the Top Case Unit



(Fig. D5)

8.3.4. Removal of the Battery Case Unit

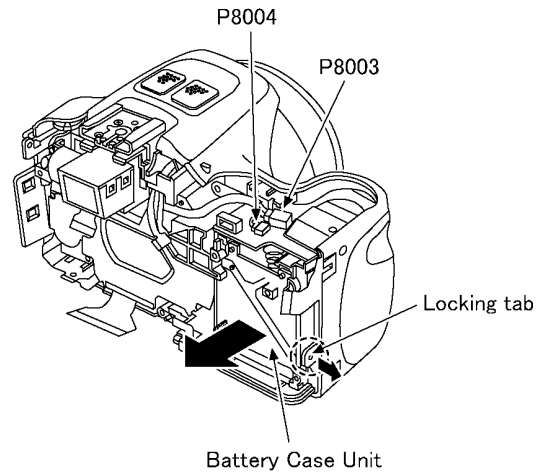


(Fig. D6)

IMPORTANT NOTICE:

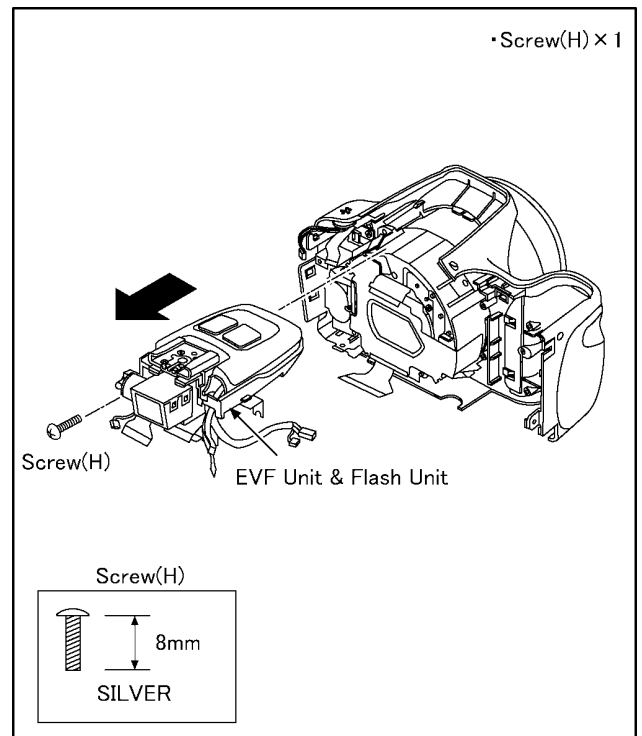
Take care not apply any bending load to the charging E.capacitor. It brings about the possibility of P.C.B. and/or component damage on the Flash P.C.B..

- P8003(Connector)
- P8004(Connector)
- Locking tab × 1



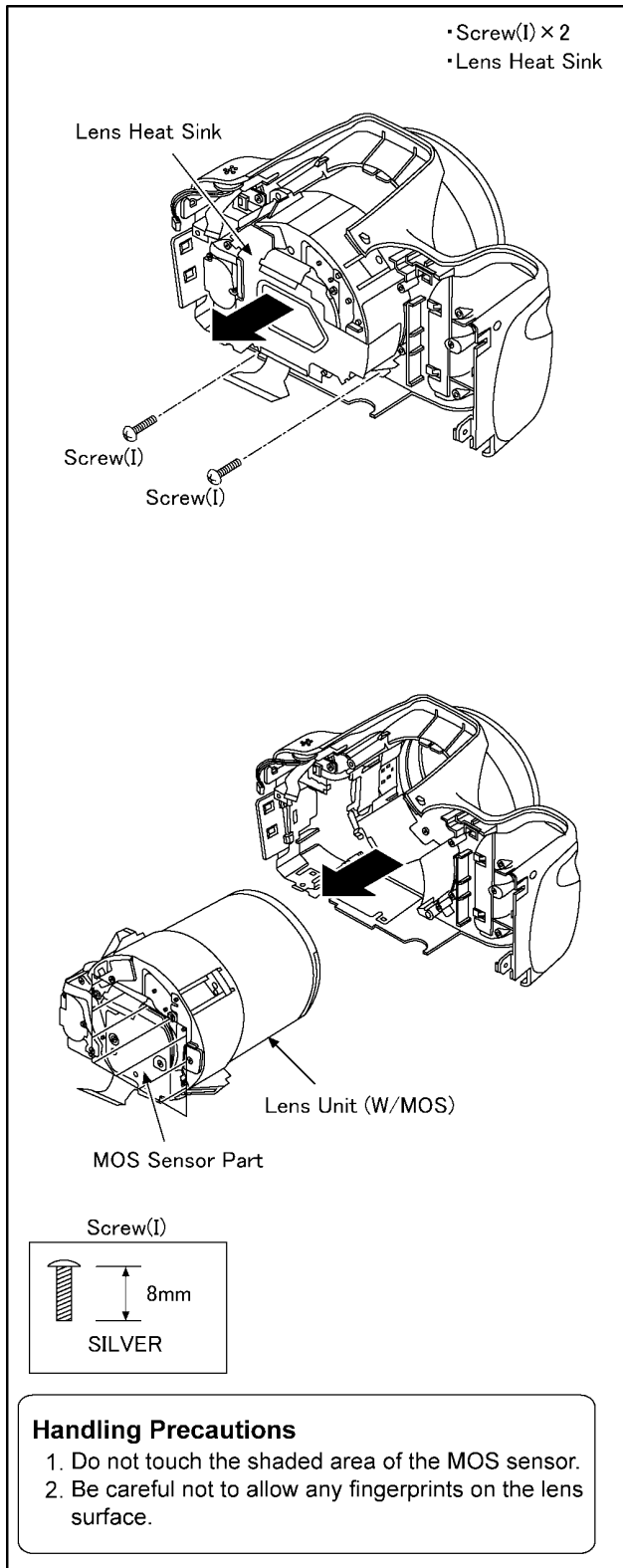
(Fig. D7)

8.3.5. Removal of the EVF Unit & Flash Unit



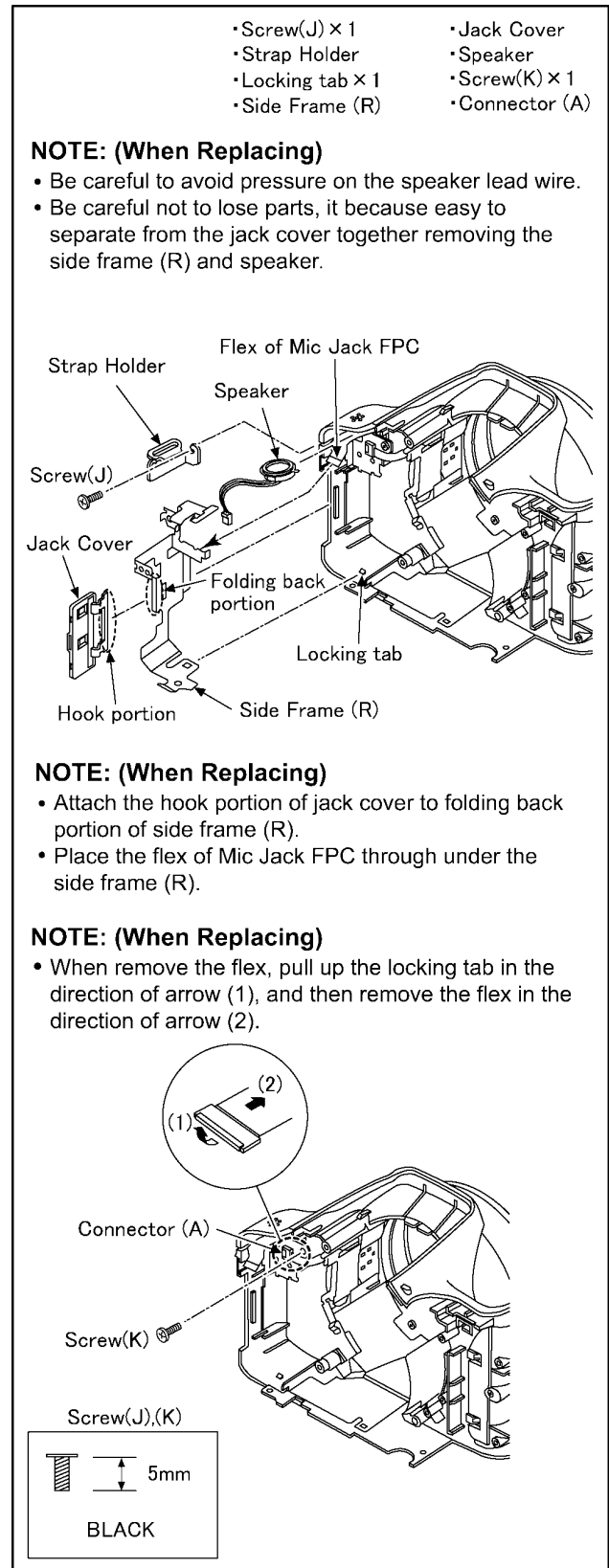
(Fig. D8)

8.3.6. Removal of the Lens Unit (W/MOS)

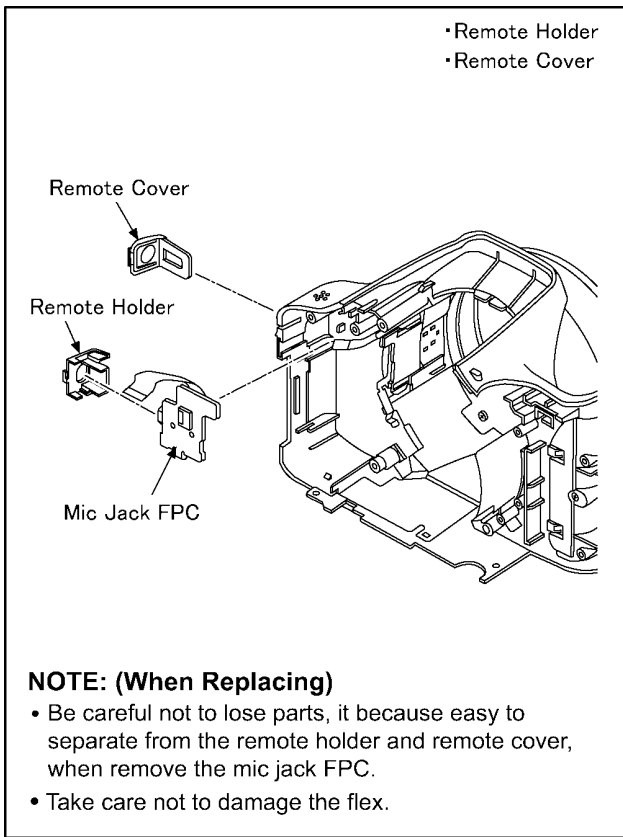


(Fig. D9)

8.3.7. Removal of the Speaker and Mic Jack FPC

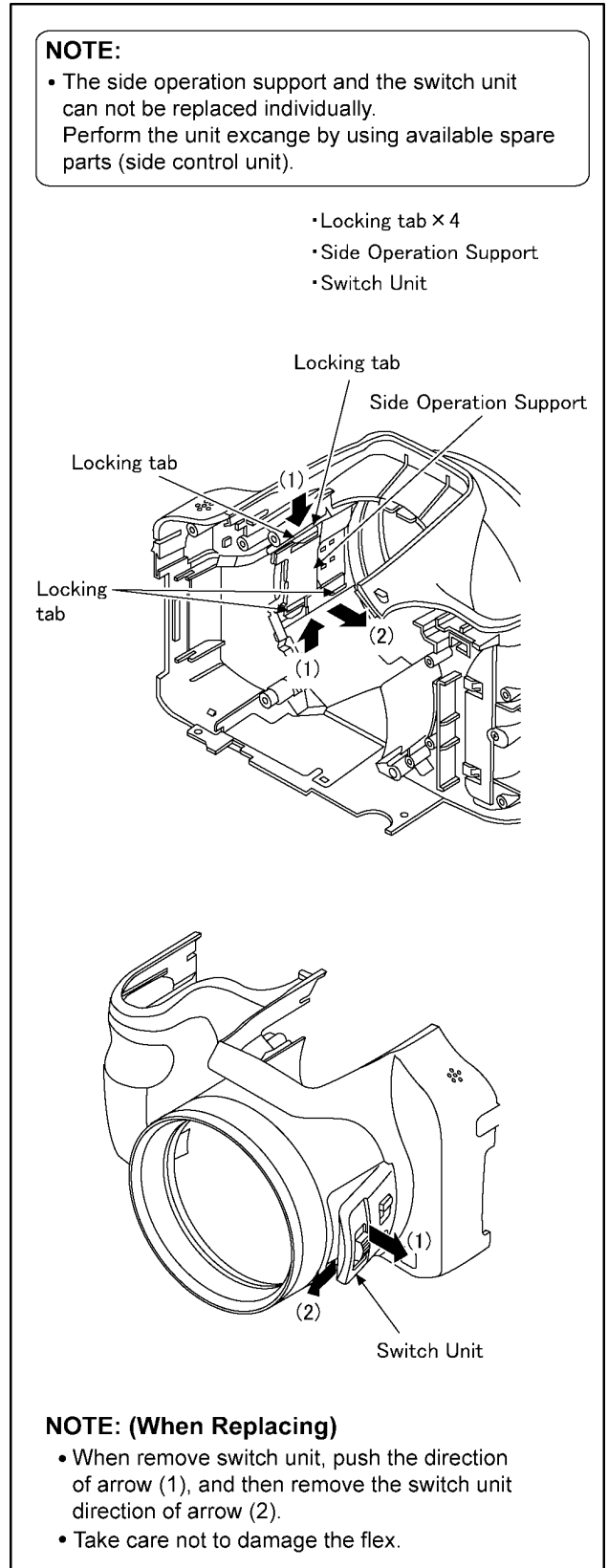


(Fig. D10)



(Fig. D11)

8.3.8. Removal of the Side Operation Unit



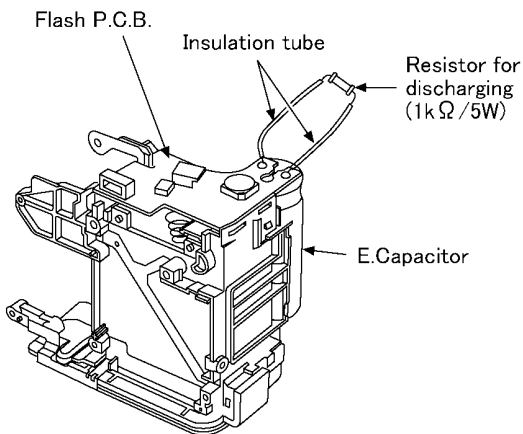
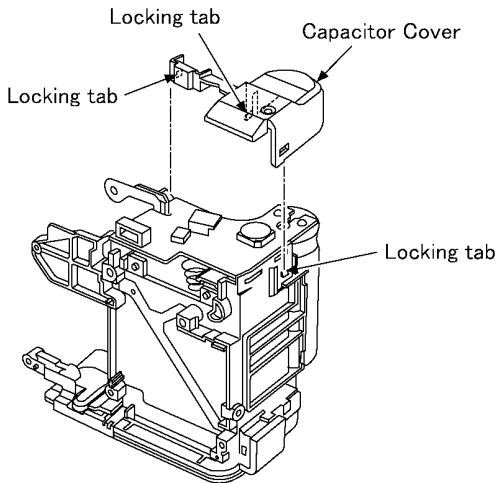
(Fig. D12)

8.3.9. Removal of the Flash P.C.B.

IMPORTANT NOTICE:

Take care not apply any bending load to the charging E.capacitor. It brings about the possibility of P.C.B. and/or component damage on the Flash P.C.B..

- Locking tab × 3
- Capacitor Cover

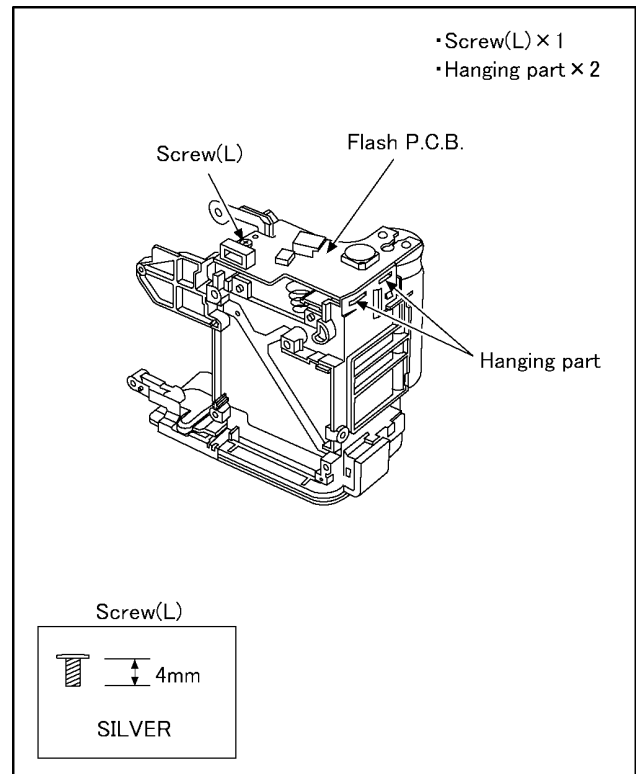


CAUTION

Be sure to discharge the E.capacitor on Flash P.C.B. before disassembling.

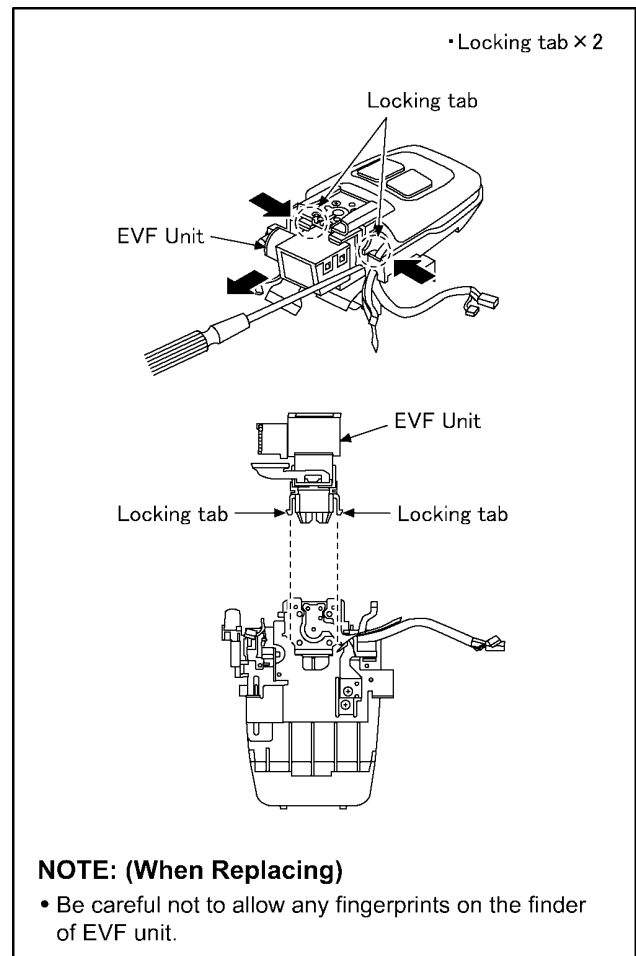
1. Remove the capacitor cover
2. Put the insulation tube on the lead part of resistor (ERG5SJ102: 1kΩ/5W).
3. Put the resistor between both terminals of E.capacitor unit for approx. 5 seconds.

(Fig. D13)



(Fig. D14)

8.3.10. Removal of the EVF Unit

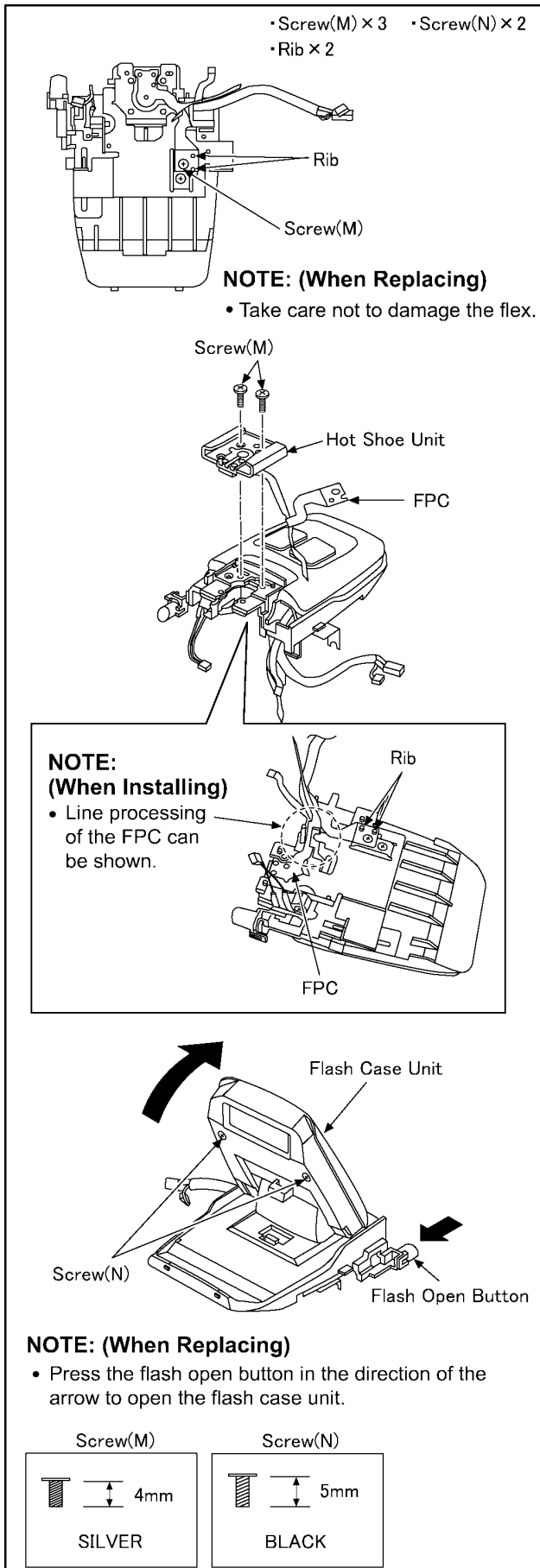


NOTE: (When Replacing)

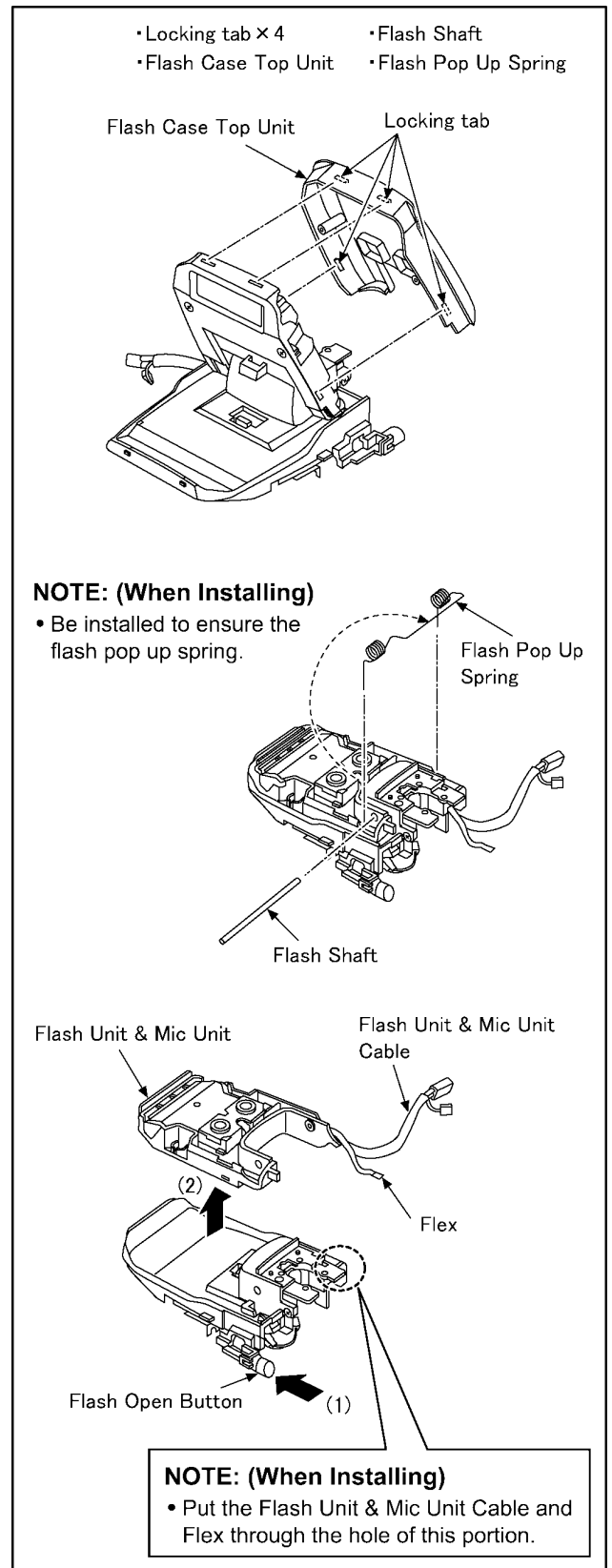
- Be careful not to allow any fingerprints on the finder of EVF unit.

(Fig. D15)

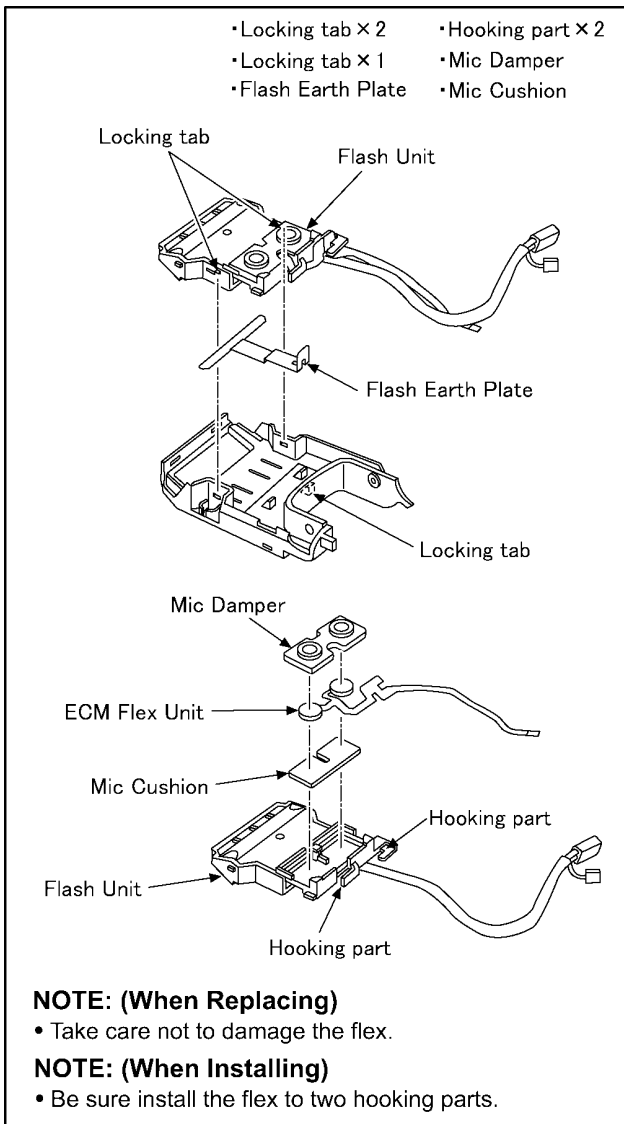
8.3.11. Removal of the Hot Shoe Unit, Flash Unit and ECM Flex Unit



(Fig. D16)

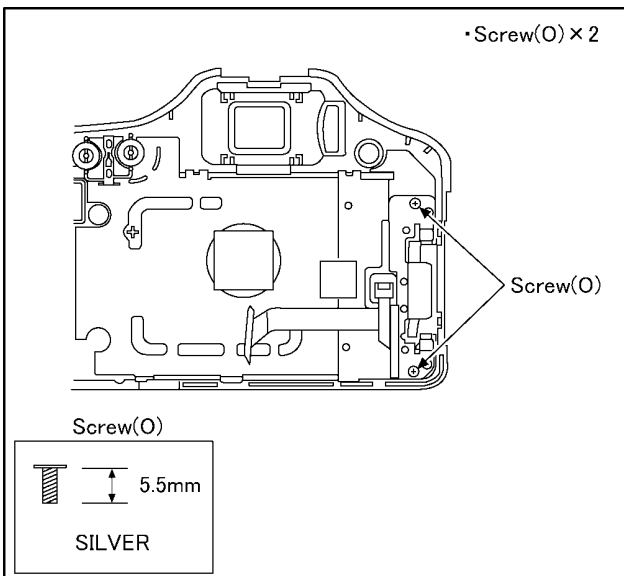


(Fig. D17)

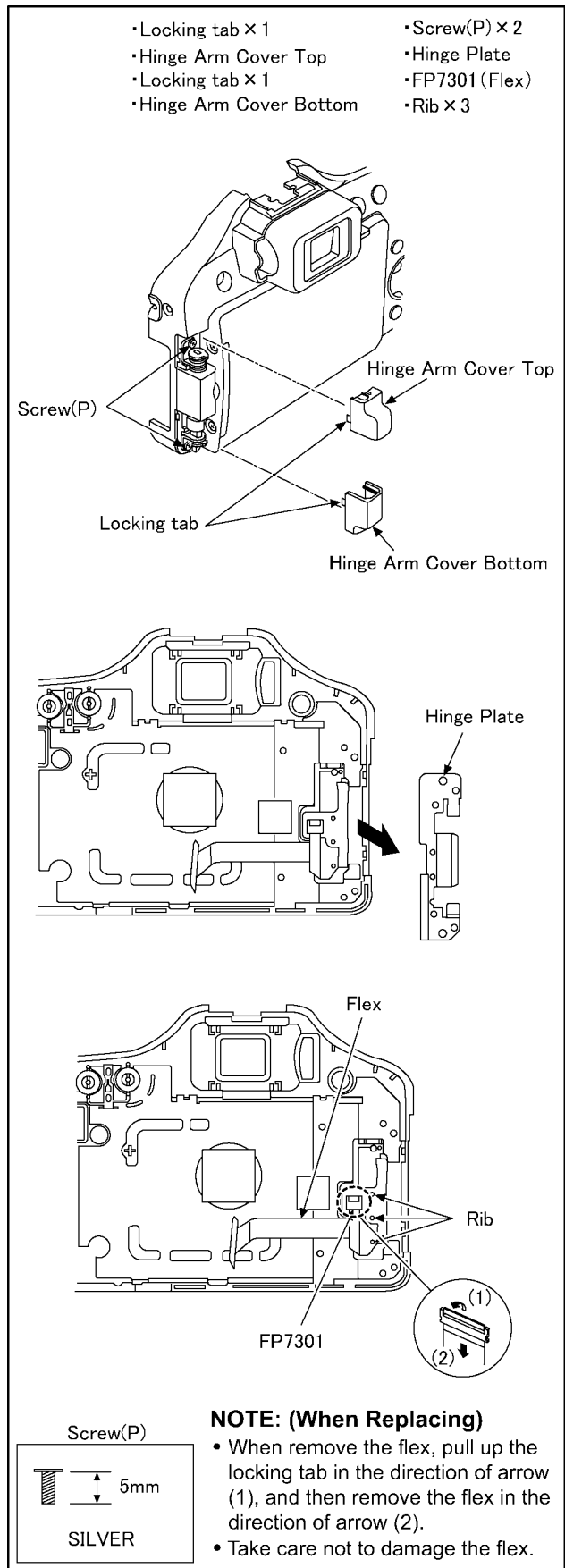


(Fig. D18)

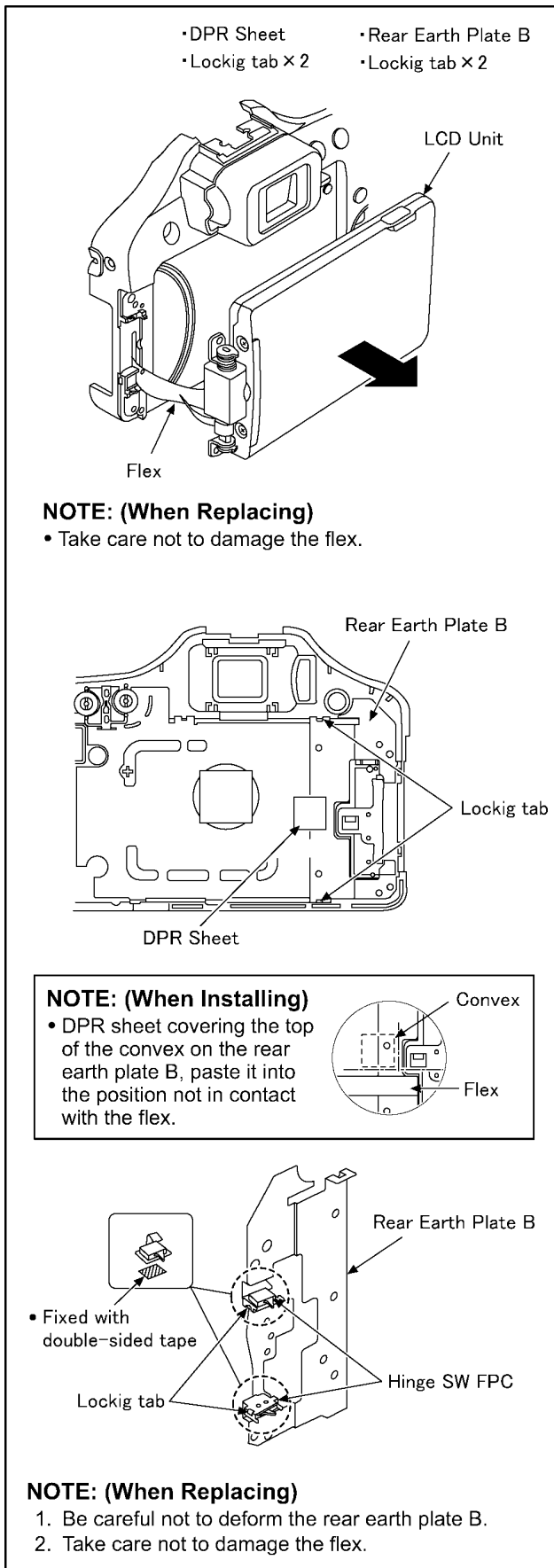
8.3.12. Removal of the LCD Unit and Hinge SW FPC



(Fig. D19)

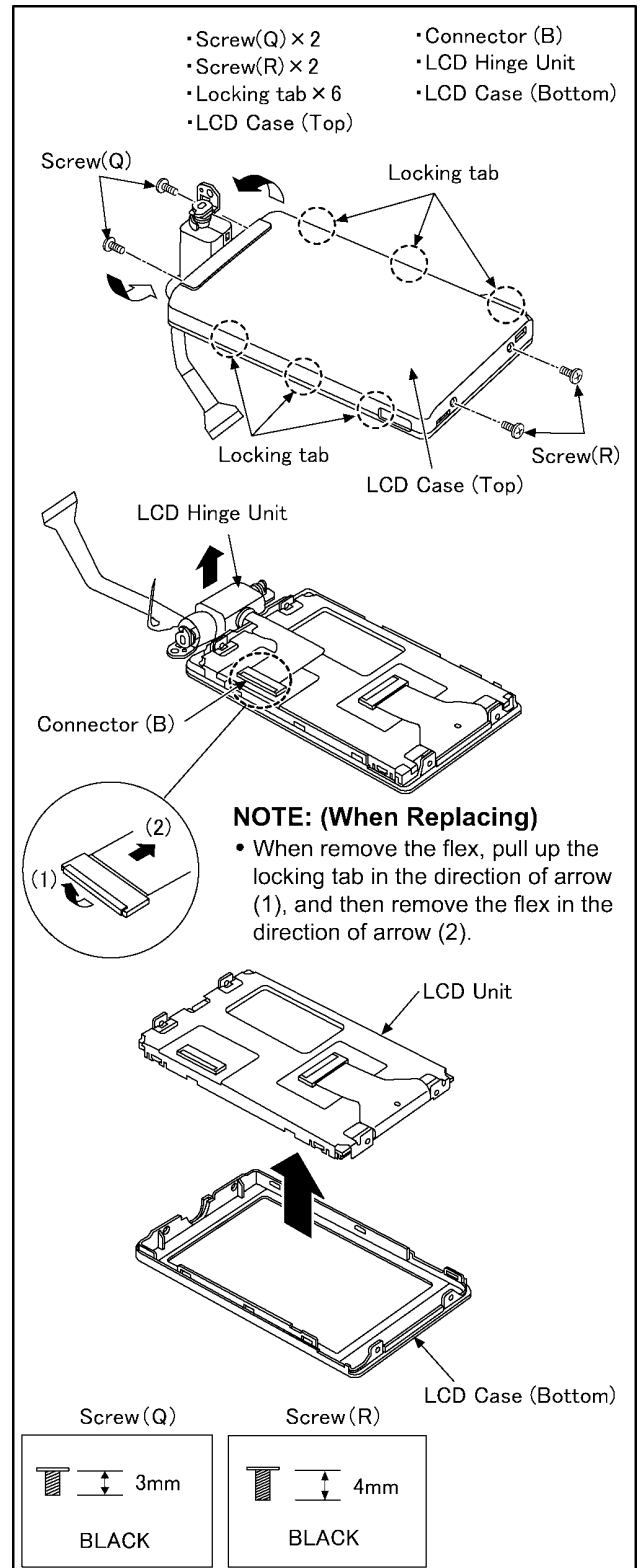


(Fig. D20)



(Fig. D21)

8.3.13. Removal of the LCD Unit



(Fig. D22)

NOTE: (When Installing)

Make sure to confirm the following points when installing:

- The screw is tightened enough.
- Installing conditions are fine. (No distortion, no abnormal-space.)
- No dust and/or dirt on Lens surfaces.
- LCD image is fine. (No dust and dirt on it, and no gradient images.)

8.4. Lens Disassembly Procedure

Precaution:

1. Do not remove the MOS SENSOR unit when disassembling or re-assembling the lens in order to maintain it clean.

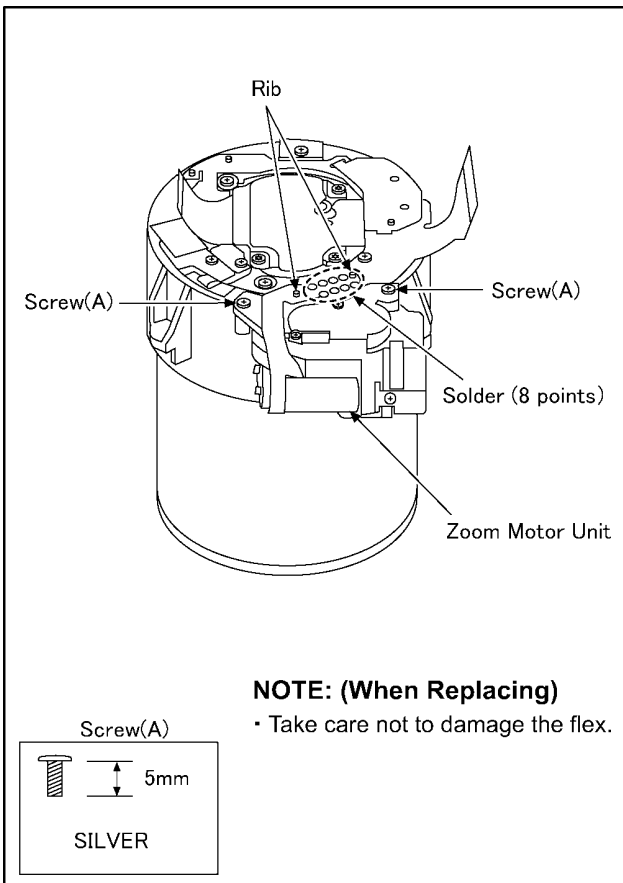
The screws for fixing the MOS SENSOR unit to the master flange unit are locked by glue with the adjustment of the installation angle of the MOS SENSOR unit to the lens (optical axis adjustment) finished.

When remove it, refer to item "8.5."

2. Keep dust or dirt away from the lens.
To remove dirt or dust from the lens, blow with dry air.
3. Do not touch the lens surface.
4. Use lens cleaning KIT (VFK1900BK).
5. Apply grease as shown on item "8.4.5" and "8.4.6" in the figure.

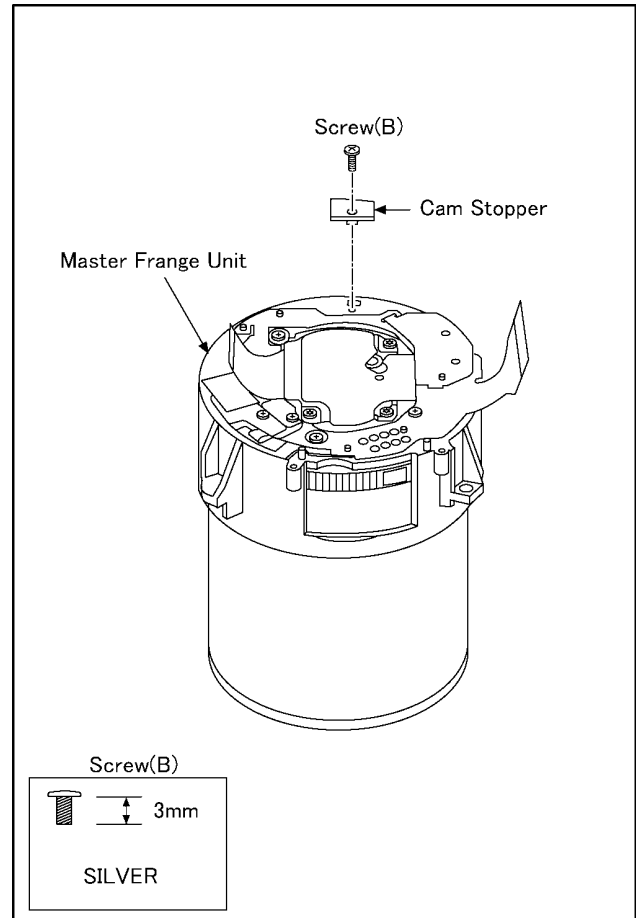
8.4.1. Removal of the Zoom Motor Unit

1. Remove the 8 solders.
2. Remove the 2 Ribs.
3. Unscrew the 2 screws (A).
4. Remove the zoom motor unit.



8.4.2. Removal of the 1st Lens Frame Unit and 2nd Lens Frame Unit

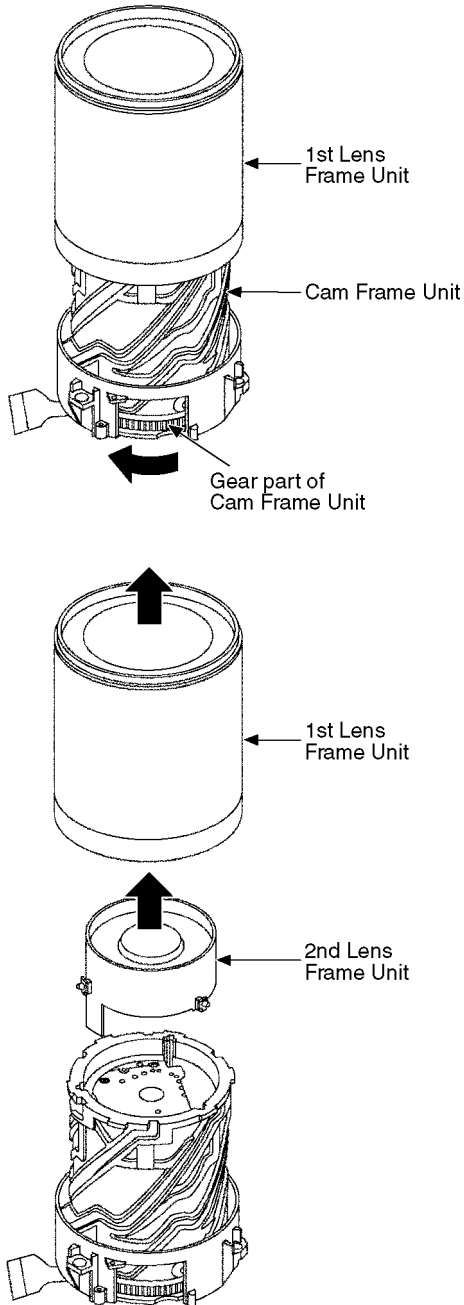
1. Unscrew the 1 screw (B).
2. Remove the cam stopper.



3. Turn the cam frame unit or gear part of cam frame unit in the direction of arrow fully.
4. Remove the 1st lens frame unit and 2nd lens frame unit.

CAUTION

- When remove and install, set the 1st lens frame unit at the upper side at all times, or there is the danger that the 2nd lens frame unit falls and be damaged.

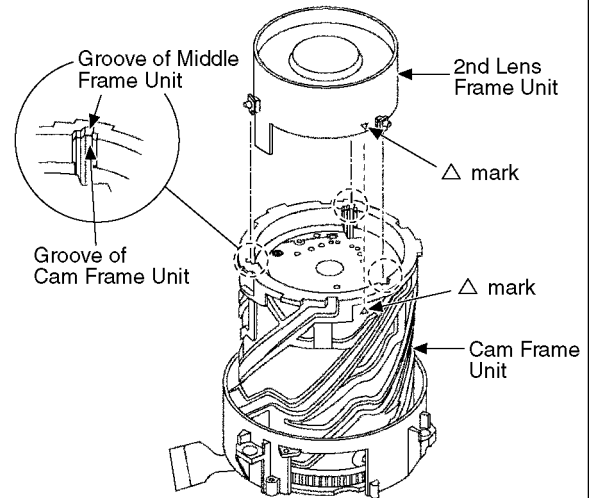


NOTE: (When Replacing)

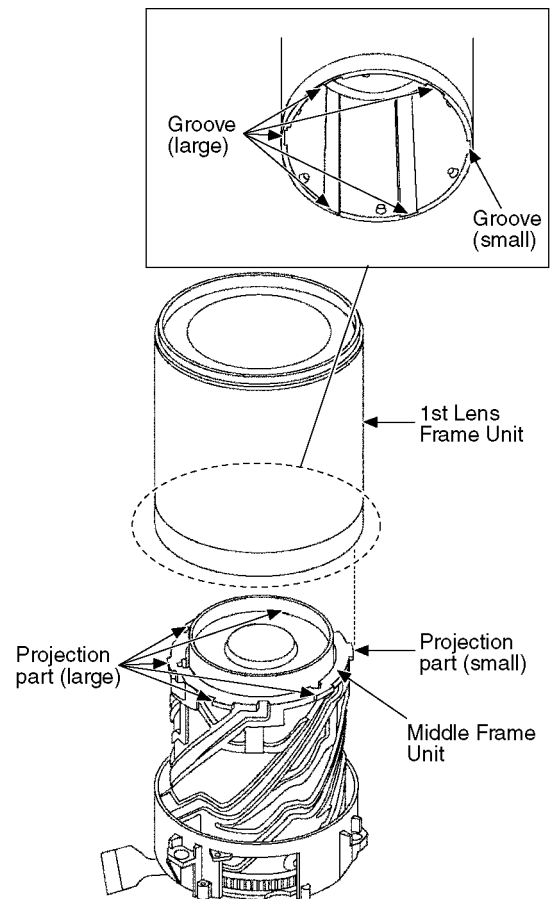
- When lift the 1st lens frame unit and the 2nd lens frame unit, take care not to put fingerprint of the lens.

NOTE: (When Replacing)

1. Align the phase of the groove of middle frame unit and the groove of cam frame unit (3 points).
2. Align the Δ mark of 2nd lens frame unit and the Δ mark of cam frame unit, and then install them.

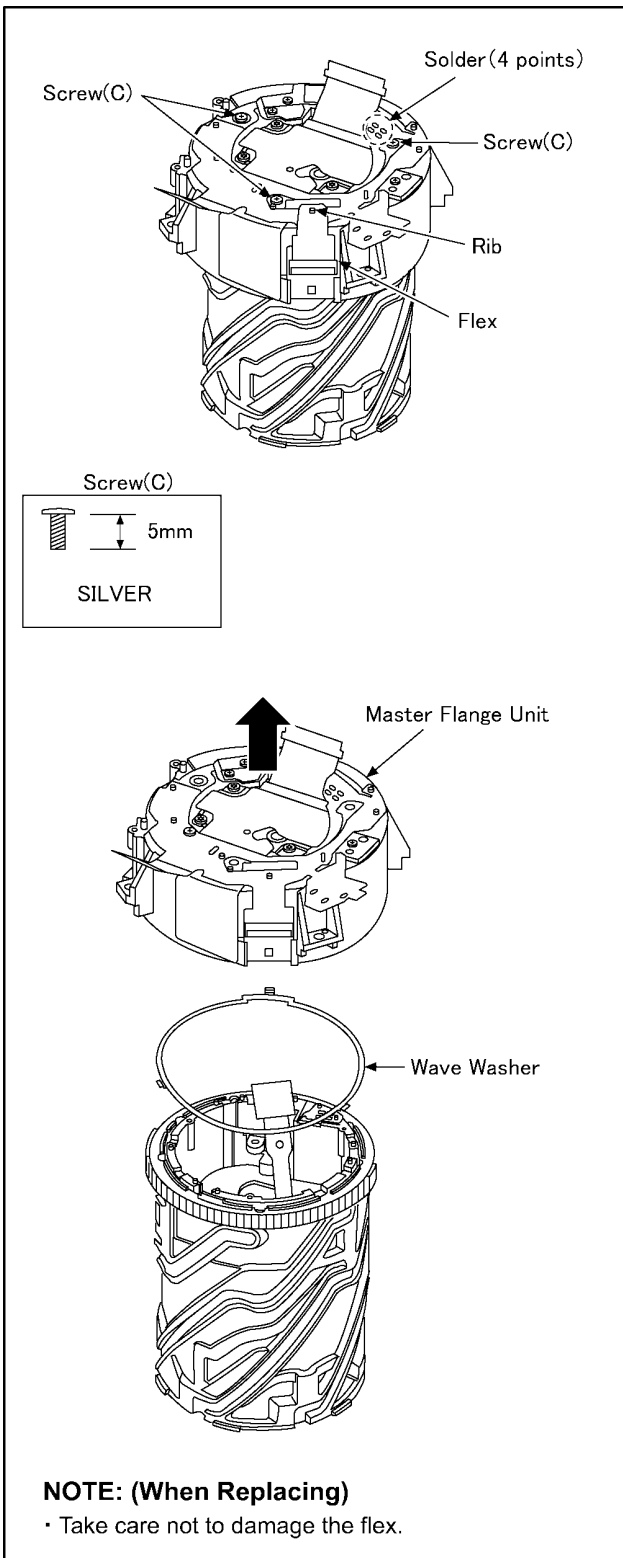


3. Align the groove (small) of 1st lens frame unit and the projection part (small) of middle frame unit, and then install them.



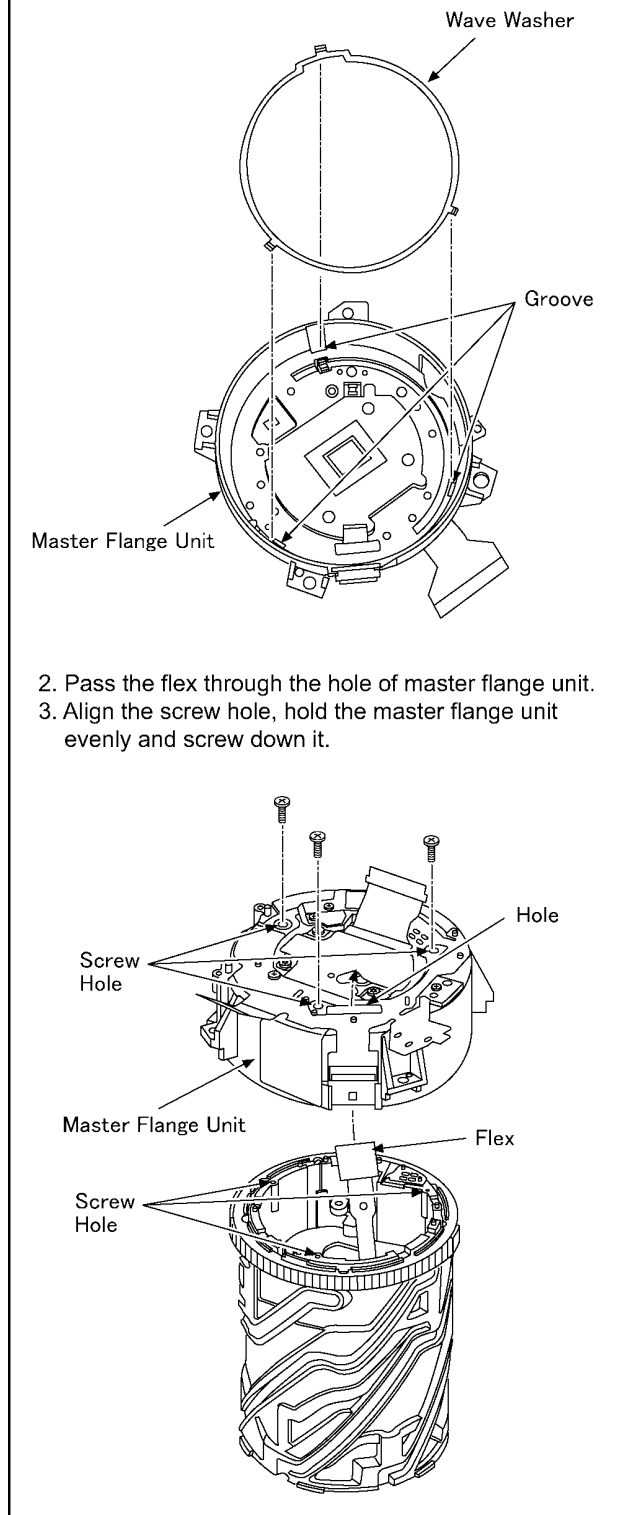
8.4.3. Removal of the Master Flange Unit

1. Remove the 1 rib.
2. Remove the flex from the connector.
3. Remove the 4 solders.
4. Unscrew the 3 screws (C).
5. Remove the master flange unit in the direction of arrow.



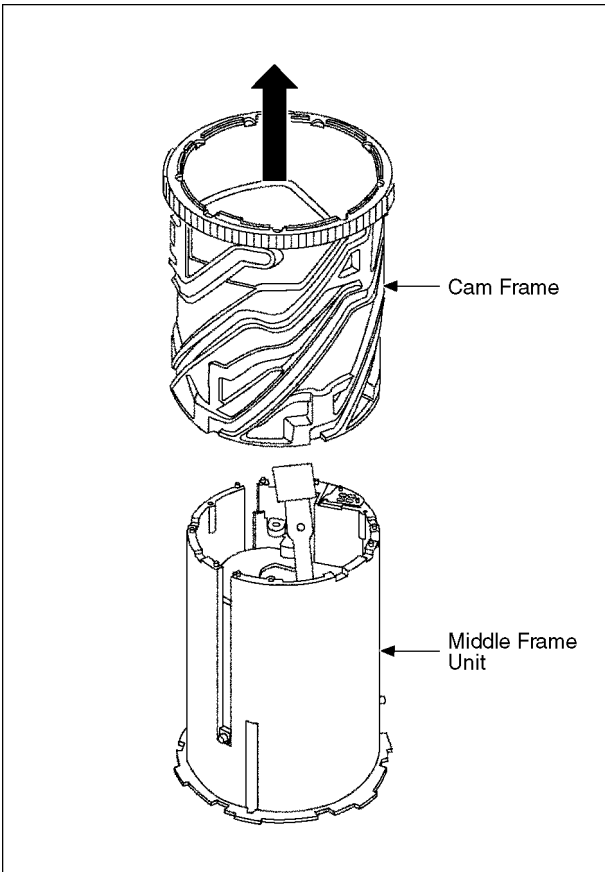
NOTE: (When Installing)

1. Install the wave washer to the master flange unit with aligning the groove of master flange unit as shown in the figure below.



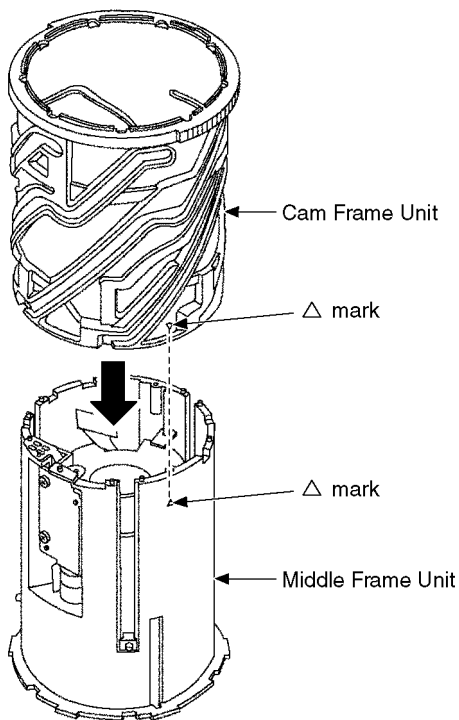
8.4.4. Removal of the Cam Frame Unit

1. Remove the cam frame unit in the direction of arrow.



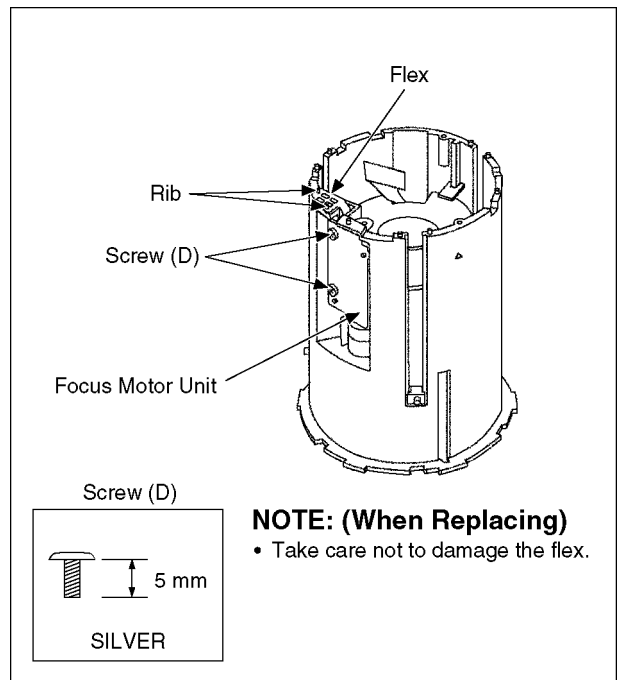
NOTE: (When Installing)

- Align the Δ mark of cam frame unit and the Δ mark of middle frame unit, and then install them.



8.4.5. Removal of the Focus Motor Unit

1. Detach the flex from 2 ribs.
2. Unscrew the 2 screws (D).



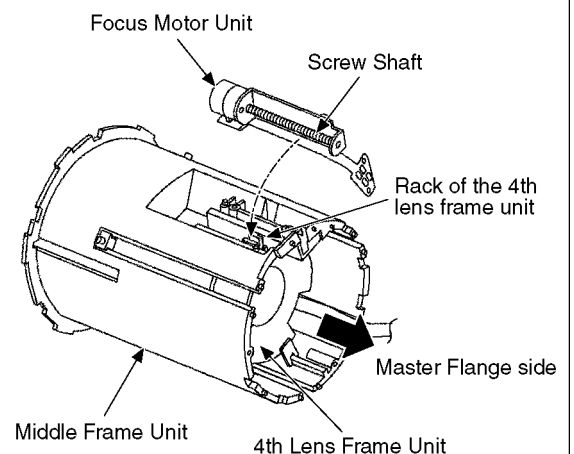
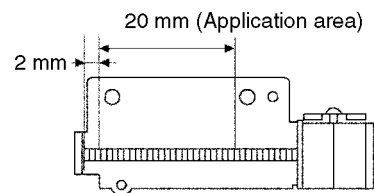
NOTE: (When Installing)

1. Blow air to the screw shaft of focus motor unit to prevent the adhesion of foreign material.
2. Apply grease to the screw shaft of focus motor unit.
3. Align the screw shaft to the rack of 4th lens frame unit for insertion.
(Set the 4th lens frame unit at the master flange side)

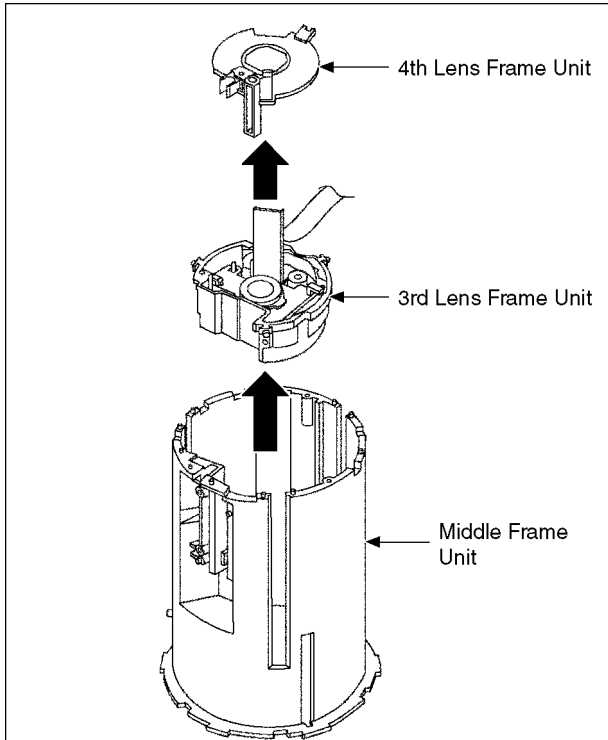
- Grease Application Area

Grease: RFKZ0472

Amount of application: 4.5 ± 0.3 mg



8.4.6. Removal of the 3rd Lens Frame Unit and 4th Lens Frame Unit

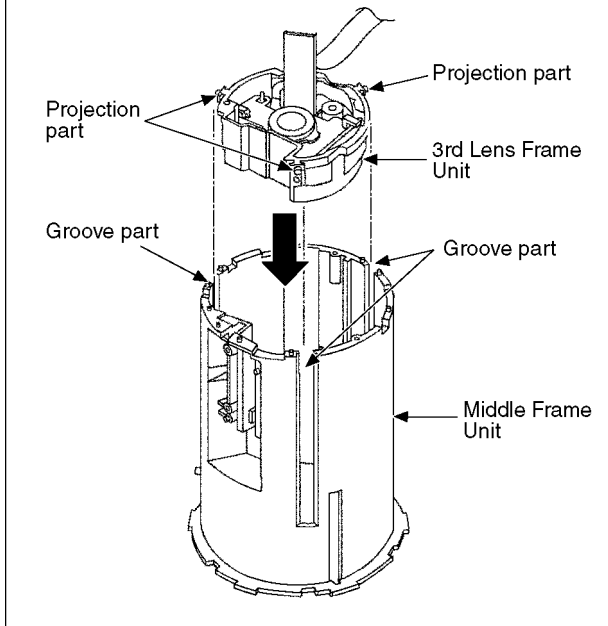


NOTE: (When Replacing)

- Take care not to damage the flex.
- When lift the 3rd lens frame unit and the 4th frame unit, take care not to put fingerprint of the lens.

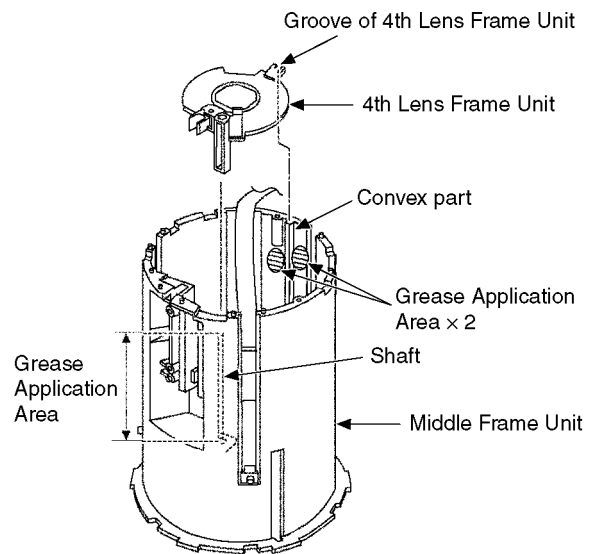
NOTE: (When Installing)

1. Align the projection part of 3rd lens frame unit and the groove part of middle frame unit, and then install them.



NOTE: (When Installing)

2. Align the 4th lens frame unit and both the shaft and convex part of middle frame unit, and the install them.



- Grease Application Area
- Convex part of middle frame unit × 2
Grease: RFKZ0472
Amount of application: $1.5 \pm 0.15\text{mg}$
- Shaft
Grease: RFKZ0472
Amount of application: $3 \pm 0.3\text{mg}$

8.5. Removal of the MOS SENSOR Unit

When remove the MOS SENSOR unit once (the screw(F) is loosened even a little), the optical tilt adjustment is required.

When loosen the screw(F), the optical tilt adjustment is necessary at the end of assembling.

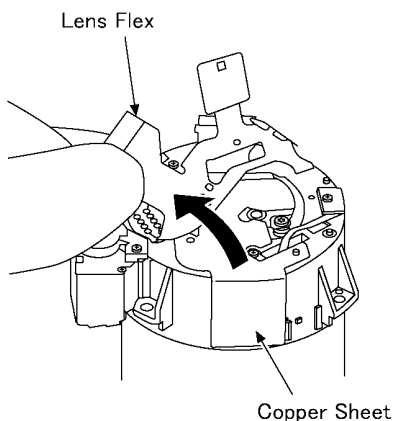
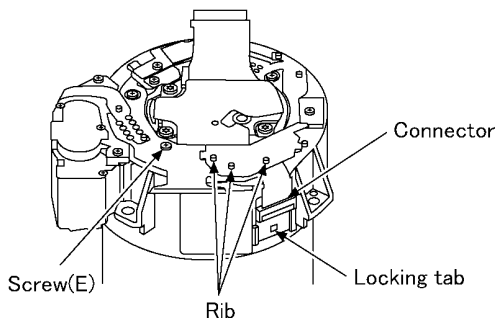
(Refer to item "9.3.2.")

To prevent the MOS SENSOR unit from catching the dust and dirt, do not remove the MOS SENSOR unit except replacing it.

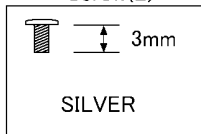
1. Unfix a locking tab.
2. Remove the screw(E).
3. Unfix 3 ribs.
4. Pull out the lens flex from the connector.
5. Pull up the lens flex in the direction of an arrow and remove the copper sheet.
6. Remove 3 screws(F).
7. Remove the MOS SENSOR unit.

CAUTION

- Don't reuse the copper sheet.
(When installing, use new copper sheet.)

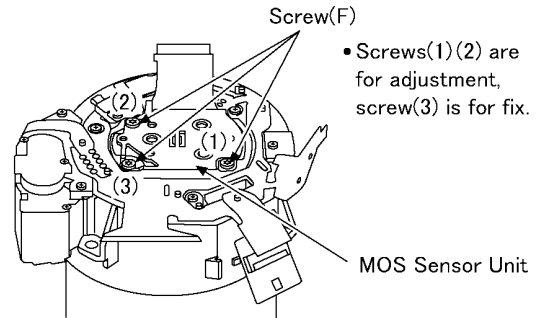


Screw(E)

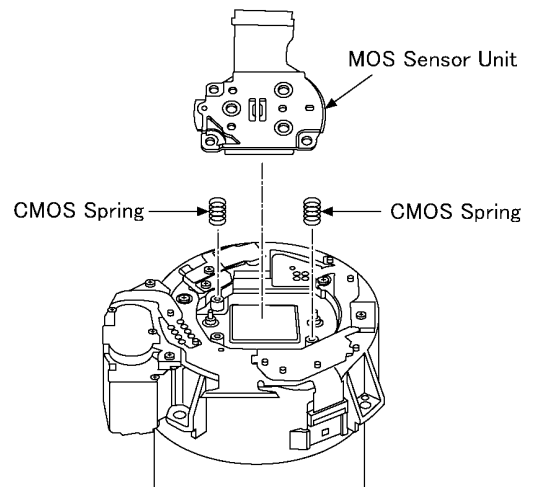
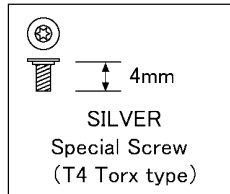


CAUTION

- The screw(F) is fixed by the screw locking glue with the optical tilt adjustment finished. When remove the MOS SENSOR unit, wipe the screw locking glue away.
- Don't reuse the screw(F) that the screw locking glue adheres to keep dust or dirt away from the MOS SENSOR unit.(When installing, use new screw(F).)

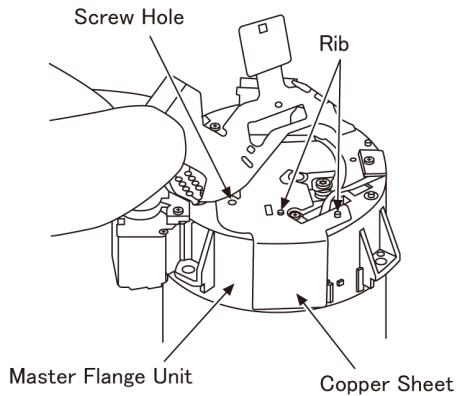


Screw(F)



■ A position to fix the copper sheet

- Fix the copper sheet like the following figure.
 1. Fit 3 holes of the copper sheet to 1 screw hole and 2 ribs.
 2. Fit the bottom edge of the copper sheet to the edge of the master flange unit.

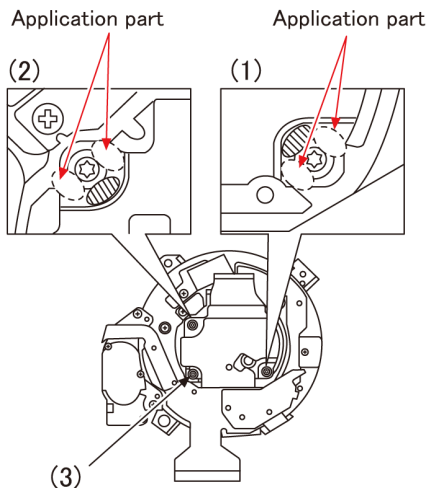


NOTE: (When Installing)

- Fix the copper sheet.
After fixing it necessarily, adjust the installation angle of the MOS SENSOR unit to the lens.
(optical tilt adjustment)
- Take new screw.
(Don't reuse the screw that the screw lockig glue adheres.)
Tighten the screw and the torque according to the following order.
* Install adjustment driver's bit in the torque driver.
Tighten the 3 special screws in order (3)→(1)→(2).
Screw torque: $10 \pm 1 \text{ N} \cdot \text{cm}$.
- Be sure to execute the optical tilt adjustment with the screw (1) and (2).
- After the adjustment is finished, apply the screw lockig glue as shown in the figure below.
- Apply the screw lockig glue thinly on the head of screw to the sheet metal with a toothpick.
- Don't apply the screw lockig glue where it is applied before disassembling.

(Example)

This is the case where the screw lockig glue is applied to the slash area.



9 Measurements and Adjustments

9.1. Introduction

When servicing this unit, make sure to perform the adjustments necessary based on the part(s) replaced. Before disassembling the unit, it is recommended to back up the camera data stored in flash-rom as a data file.

IMPORTANT NOTICE (After replacing the MAIN P.C.B.)

After replacing the MAIN P.C.B., it is necessary to use the "DIAS" software to allow the release of adjustment flag(s). The Adjustment software "DIAS" is available at "TSN Website". To download, click on "Support Information from NWBG/VDBG-AVC".

*DIAS (DSC Integrated Assist Software)

NOTE: (When replacing the Lens unit, Master flange unit and MOS SENSOR unit)

- When the MOS SENSOR unit is unavoidably removed for Lens unit, Master flange unit and MOS SENSOR unit replaced, an optical adjustment is necessary after parts are exchanged.
- The adjustment software (DSC_Tilt) is necessary to execute an optical adjustment.
- Please inquire the adjustment software of the service base or the CS promotion center.

9.2. Before Disassembling the unit

9.2.1. Initial Setting Release

The cameras specification are initially set in accordance with model suffix (such as EB, EG, GK, GC, and so on.). Unless the initial setting is not released, an automatic alignment software in the camera is not able to be executed when the alignment is carried out.

Note:

The initial setting should be again done after completing the alignment. Otherwise, the camera may not work properly. Therefore as a warning, the camera display a warning symbol "!" on the LCD monitor every time the camera is turned off. Refer to the procedure described in "3.5.2 INITIAL SETTINGS" for details.

[How to Release the camera initial setting]

Preparation:

1. Attach the Battery or AC Adaptor with a DC coupler to the unit.
(Since this unit has built-in memory, it can be performed without inserting SD memory card.)

Step 1. Temporary cancellation of "INITIAL SETTINGS":

Set the mode dial to "[P] (Program AE mode)". While pressing "[UP] of Cursor button" and [MOTION PICTURE] button simultaneously, turn the Power on.

Step 2. Cancellation of "INITIAL SETTINGS":

Press the [PLAYBACK] button, then playback the picture. Press "[UP] of Cursor button" and [MOTION PICTURE] button simultaneously. (The camera will beep after this.) Turn the Power off. (The warning symbol "!" is displayed on the LCD monitor.)

9.2.2. Flash-Rom Data Backup

When trouble occurs, it is recommended to backup the Flash-rom data before disassembling the unit.

There are two kinds of Flash-rom data backup methods:

[ROM_BACKUP (Method of Non-PC backup)]

1. Insert the SD-card into the camera.
2. Set the camera to “Temporary cancellation of the initial settings”.
3. Select the “SETUP” menu.
From the “SETUP” menu, select “ROM BACKUP”.

NOTE:

This item is not listed on the customer's “SETUP” menu.

4. When this “ROM_BACKUP” item is selected, the following submenus are displayed.



Fig.2-1



Fig.2-2

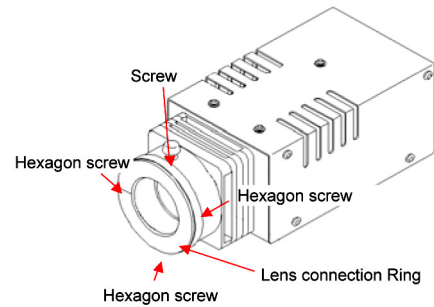
Item	Function	Details
DSC → SD	Save all the DSC's Flash-rom data to SD-CARD	*DSC's Flash-rom data is saved to the SD-CARD as a data file by the same format as the TATSUJIN software for the previous models. (DATA BACKUP) -File location: ROOT DIRECTORY in SD-CARD. -File Name: 1) User Setup Information data: <Model Number>U.txt [Example: DMC-FX66 : "FX66U.txt"] 2) Optical Adjustment data: <Model Number>F.txt [Example: DMC-FX66 : "FX66F.txt"] *If the concerned file already exists, "OVERWRITE?" message is displayed.
SDALL → DSC (ID CHECK)	Write the all data to DSC's Flash-rom from SD-CARD	*The backup data being stored in the SD card is transferred to DSC unit. *ID CHECK: When the model ID is different, data is not transferred.
SDALL → DSC (FORCE)	Write the all data to DSC's Flash-rom from SD-CARD	*FORCE: Even if the model ID is different, data is transferred. ※If the main PCB is replaced, select "SDALL → DSC (FORCE)".
SDUSER → DSC (FORCE)	Only "User setup information" is written from the saved file in the SD-CARD to DSC's Flash-rom.	*Only the user's "setup" setting condition is transferred to DSC unit. *FORCE: Even if the model ID is different, the data is transferred.
! → LUMIX	Shipping set without initializing "User setup information"	*Initial setting is executed without initializing the user's set up setting condition. ※ The initial setting must be perform while the Self-timer LED is blinking, ※ The picture data stored in the built-in memory of the DSC is not erased, with this operation.

[DSC Integrated Assist Software (Method of Using PC)]

Same as TATSUJIN software for previous models.

9.2.3. Light Box

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



9.3. Details of Electrical Adjustment

9.3.1. How to execute the Electrical Adjustment

It is not necessary to connect the camera to a PC to perform adjustments.

“Flag reset operation” and “Initial setting operation” are required when carrying out the alignment, follow the procedure below.

9.3.1.1. Startup Electrical Adjustment mode

1. Release the initial settings.
2. Insert a recordable SD card.
(Without a SD card, the automatic adjustment can not executed.)
3. Procedure to set the camera into adjustment mode:
 - a. Set the mode dial to “[P] (Program AE mode)”.
 - b. Turn the Power off.
 - c. Turn the Power on pressing [MENU/SET] and [MOTION PICTURE] simultaneously.
LCD monitor displays “SERVICE MODE”.(Refer to Fig. 3-1)

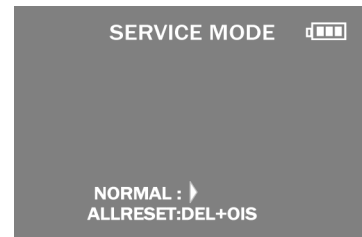


Fig.3-1

9.3.1.2. Status Adjustment Flag Setting

Reset (Not yet adjusted) the status flag condition.

1. After pressing the [DISPLAY] button, the LCD monitor displays the Flag status screen (Refer to Fig.3-2)
2. Select item by pressing the Cursor buttons. (Gray cursor is moved accordingly.)
3. Press the [Delete] button.

NOTE:

The selected item's flag has been changed from “F (green)” to “0 (yellow)”.

*Flag conditions:

F (green)

means that the alignment has been completed and the status flag condition is set. In this case, the flag condition should be reset, if you try to carry out the automatic alignment.

0 (yellow)

means that the alignment has been not “completed” and the status flag condition is “reset”. In this case, automatic alignment is available.

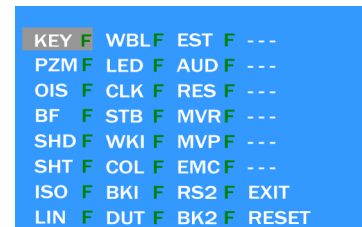


Fig.3-2

- In case of setting the status flag into set condition again without completion of the alignment, the status flag should be SET by using PC, or UNDO by using ROM BACKUP function.

9.3.1.3. Execute Adjustment (In case of “OIS Adjustment”)

1. Perform step “9.3.1.1.” to “9.3.1.2.”, to reset the OIS flag status “F” (Set) to “0” (Reset)
2. Press [DISPLAY] button after Flag reset.
OIS Adjustment screen is displayed on the LCD panel.
(Refer to Fig.3-3)
3. Press the [Shutter] button. The adjustment will start automatically.

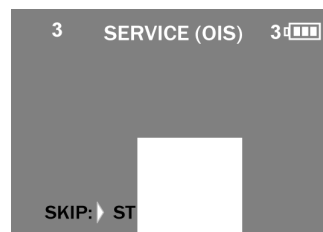


Fig.3-3

4. When the adjustment is completed successfully, adjustment report menu appears with Green OK on the LCD monitor. (Refer to Fig.3-4)

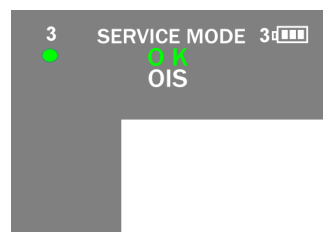


Fig.3-4

9.3.1.4. Attention point during Adjustment

1. Step “9.3.1.3.” procedure shows OIS adjustment as an example. To perform the adjustment, refer to the “9.3.2. Adjustment Specifications” table which shows key point for each adjustment.
2. Do not move the light box, the camera or the chart while adjusting. If one of these is moved accidentally, start the adjustment again.
3. Do not press any buttons/keys until the default menu (Fig.3-5) is displayed on the LCD monitor. Otherwise, adjustment data may not be stored properly.
4. If the adjustment is interrupted accidentally, the alignment data may not be properly saved in the Flash-rom.



Fig.3-5

9.3.1.5. Finalizing the Adjustment

1. Several adjustment flags can be reset (“F” into “0”) at the same time. In this case, when the adjustment has been completed, the screen will change showing the adjustment for the next item until all reset items are completed.
Also, when the shutter button is pressed, the screen jump to the next adjustment item.
2. To cancel the adjustment mode while in the process of performing the adjustment, follow this procedures.
 - (1) Press [Delete] button.
 - (2) Press [RIGHT] of Cursor button.

NOTE:

- If adjustment is cancelled with above procedure, adjustment is not completed. Make sure to adjust it later.
- Adjustment software “DIAS” is able to control the status of the adjustment flags.

9.3.2. Adjustment Specifications

The following matrix table shows the relation between the replaced part and the Necessary Adjustment.

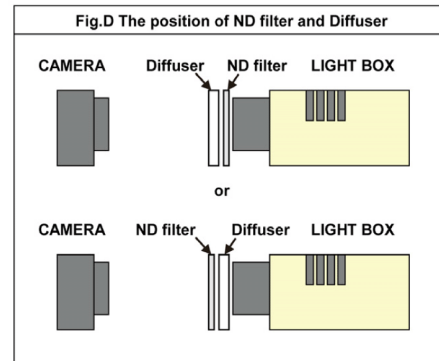
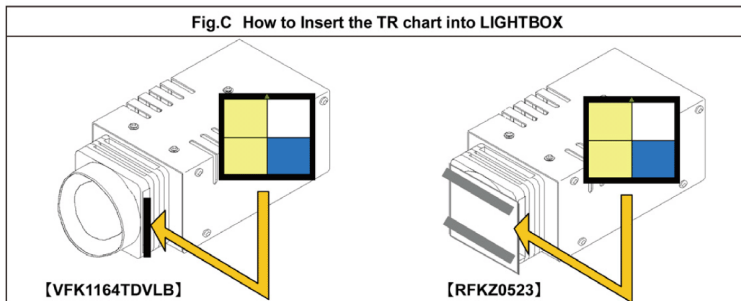
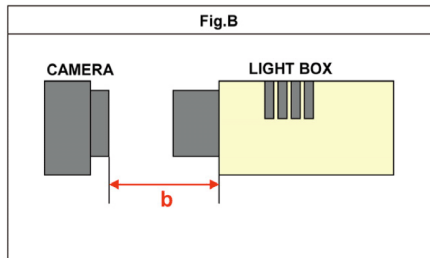
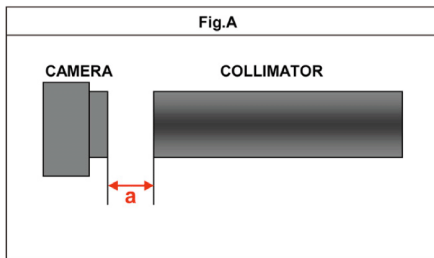
When a part is replaced, make sure to perform the necessary adjustment(s) in the order indicated.

The table below shows all the information necessary to perform each adjustment.

Adjustment order	Adjustment Item	FLAG	Purpose	Replacing Parts						JIG/TOOLS	SET UP	How to Operate
				MAIN P.C.B.	VENUS ENGINE (IC6001)	FLASH ROM (IC6005)	Lens part (Excluding MOS SENSOR)	MOS SENSOR UNIT	GYRO (IC7101)			
1	Optical Tilt	—	Align the image sensor installation angle to the Lens.	—	—	—	○	○	—	NOTE: *It is necessary to use the "DSC_Tilt" software to allow the "Optical tilt adjustment". *The Adjustment software "DSC_Tilt" is available at "TSN Website". To download, click on "Support Information from NWBG/VDBG-AVC".		
2	Venus Zoom	PZM	Venus Zoom Inspection	○	○	○	—	—	—	NONE	Connect the USB cable to the unit. (Do not connect any equipment to the other side of USB cable. It has to be opened.)	1)Press Shutter Button 2)After displaying "PZM", press Shutter Button again. 3)After completed, the "OK" menu appears.
3	OIS sensor	OIS	OIS sensor output level adjustment	○	○	○	○	—	—	NONE	NONE	1)Press Shutter Button (Do not apply any shock and vibration for the camera while adjusting) 2)After completed, the "OK" menu appears.
4	Backfocus / GYRO	BF	To have the focus tracking curve be appropriate shape and GYRO sensor adjustment	○	○	○	○	※1	○	-COLLIMATOR (RFKZ0422)	1)Set the camera in front of collimator so that the distance from collimator to camera becomes about 6 cm as shown in Fig.A. [NOTE] Please notice ! "NG" might happen while auto adjusting. - Do not put the black colored stuff at the back side of collimator near hunching chart to get some certain brightness. - Make sure the hunching chart has no dust and dirty condition. - Not connect the USB cable at this stage.	1)Press Shutter Button (Do not apply any shock and vibration for the camera while adjusting) 2)After completed, the "OK" menu appears.
5	Shutter	SHT	Shutter speed adjustment	○	○	○	○	○	—		1) Insert the TR chart into the slot of LIGHTBOX. 2) Set the camera in front of LIGHTBOX so that the distance from LIGHTBOX to camera becomes about 8.5 cm as shown in FigB. 3) Set the camera angle so that the color chart is displayed on the LCD monitor fully.	1)Press Shutter Button 2)After completed, the "OK" menu appears.
6	ISO	ISO	ISO sensitivity adjustment	○	○	○	○	○	—	-LIGHT BOX (RFKZ0523) (VFK1164TDVLB) -TR CHART (RFKZ0443)		1)Press Shutter Button 2)After completed, the "OK" menu appears.
7	High brightness coloration	LIN	High brightness coloration adjustment	○	○	○	○	○	—		[NOTE] - Since the lens position is automatically set into certain position after executing auto adjustment, confirm the angle after stopping the lens zoom position. - It is no problem even though the chart on to the LCD monitor slightly cut at the corner. - It is no problem even though the focusing slightly becomes out of focusing condition. - Not connect the USB cable at this stage.	1)Press Shutter Button 2)After completed, the "OK" menu appears.
8	White Balance	WBL	White balance adjustment under various color temperature	○	○	○	○	○	—			1)Press Shutter Button 2)After completed, the "OK" menu appears.
9	MOS SENSOR Missing Pixels (White) ※2	WKI	Compensation of MOS SENSOR Missing Pixels (White)	○	○	○	—	○	※1	NONE	NONE	1)Press Shutter Button 2)After completed, the "OK" menu appears.
10	Color reproduction inspection and Microphone check	COL	Color reproduction inspection and Microphone check	○	○	○	○	○	—	NONE	NONE	1)While speaking into the microphone, press Shutter Button (When zooming started, stop speaking.) 2)After completed, the "OK" menu appears.
11		BKI	Do not use "BK1" adjustment flag for this unit. Use "BK2" adjustment flag, instead. (In case of most DSC models, the adjustment flag for MOS SENSOR Missing Pixels is "BK1". But, in this model, "BK2" the adjustment flag for MOS SENSOR Missing Pixels.)									

Adjustment order	Adjustment Item	FLAG	Purpose	Replacing Parts						JIG/TOOLS	SET UP	How to Operate
				MAIN P.C.B.	VENUS ENGINE (IC6001)	FLASH ROM (IC6005)	Lens part (Excluding MOS SENSOR)	MOS SENSOR UNIT	GYRO (IC7101)			
12	MOS SENSOR Missing Pixels (Black) ※3	BK2	Compensation of MOS SENSOR Missing Pixels (Black)	○	○	○	—	○	※1	—	<p>•LIGHT BOX RFKZ0523 (VFK1164TDVLB)</p> <p>•ND FILTER VFK1164ND15</p> <p>•DIFFUSER RFKZ0591</p> <p>1) Prepare the LIGHTBOX (RFKZ0523). (The LIGHTBOX "VFK1164TDVLB" can be used if the front hood of VFK1164TDVLB is removed.)</p> <p>NOTE: Do not use "BK1" adjustment flag for this unit. Use "BK2" adjustment flag, instead.</p>	<p>1).Set the ND FILTER (VFK1164ND15 : ND1.5) and the DIFFUSER (RFKZ0591) to the LIGHTBOX.</p> <p>2).While no object between the LIGHTBOX and Camera, press the Shutter Button. (The lens starts zooming and stops automatically, then green ● mark is displayed on LCD).</p> <p>3).Set the LIGHTBOX and Camera (the edge of Lens ring front) so that distance becomes about 2.3 cm. (Refer to Fig. B) And, press the Shutter Button. (The 1st adjustment is executed, and then green ● mark is displayed on LCD).</p> <p>4).While no object between the LIGHTBOX and Camera, press the Shutter Button. (The green ● mark is displayed on LCD).</p> <p>5).Set the LIGHTBOX and Camera (the edge of Lens ring front) so that distance becomes about 4 cm. (Refer to Fig. B) And, press the Shutter Button. (The 2nd adjustment is executed, and then green ● mark is displayed on LCD).</p> <p>6).While no object between the LIGHTBOX and Camera, press the Shutter Button. (The green ● mark is displayed on LCD).</p> <p>7).Set the LIGHTBOX and Camera (the edge of Lens ring front) so that distance becomes about 6 cm. (Refer to Fig. B) And, press the Shutter Button. (The 3rd adjustment is executed, and then OK mark is displayed on LCD when the adjustment has been completed successfully.)</p>

- ※1 : Execute the adjustment when remove the MOS SENSOR unit and replace the MOS SENSOR unit
 ※2 : The pixel that always lights while shaded is called a white wound.
 ※3 : The pixel that does not light while complete exposed is called a black wound.
 *This unit does not have the LCD adjustment of the camera (LCD flicker adjustment etc.).



■ **IMPORTANT NOTICE** (After replacing the MAIN P.C.B.)
 After replacing the MAIN P.C.B., make sure to perform the "INITIAL SETTINGS" first, then release the "INITIAL SETTINGS" in order to proceed the electrical adjustment.

NOTE:

- 1). If electrical adjustment or data re-writing is executed before "INITIAL SETTINGS", suffix code list is never displayed, and it cannot be chosen suitable suffix code.
- 2). Never remove the battery during initial setting in process.

9.4. After Adjustment

9.4.1. Initial Setting

Since the initial setting has been released to execute the built-in adjustment software, it should be set up again before shipping the camera to the customer.

Refer to the procedure described in “3.5.2. INITIAL SETTINGS” for details.

[IMPORTANT]

1. The initial setting should be done again after completing the alignment. Otherwise, the camera will not work properly.
Therefore as a warning, the camera display a warning symbol “ ! ” on the LCD monitor every time the camera is turned off.
2. Confirm that status of all adjustment flag show “F”. Even if one of the adjustment flag shows “0”, initial setting programmed is never executed.
3. Adjustment software “DIAS” is able to control the status of the adjustment flags.
The Adjustment software “DIAS” is available at “TSN Website”, therefore, access to “TSN Website” at “Support Information from NWBG/VDBG-AVC”.

10 Maintenance

10.1. Cleaning Lens, Viewfinder and LCD Panel

Do not touch the surface of lens, Viewfinder and LCD Panel with your hand.

When cleaning the lens, use air-Blower to blow off the dust.

When cleaning the LCD Panel, dampen the lens cleaning paper with lens cleaner, and the gently wipe the its surface.

Note:

The Lens Cleaning KIT ; VFK1900BK (Only supplied as 10 set/Box) is available as Service Aid.

Service Manual

Diagrams and Replacement Parts List

Digital Camera

Model No.

DMC-FZ150P	DMC-FZ150GC
DMC-FZ150PC	DMC-FZ150GD
DMC-FZ150PU	DMC-FZ150GK
DMC-FZ150EB	DMC-FZ150GN
DMC-FZ150EE	DMC-FZ150GT
DMC-FZ150EF	
DMC-FZ150EG	
DMC-FZ150EP	

Vol. 1
 Colour
 (K).....Black Type

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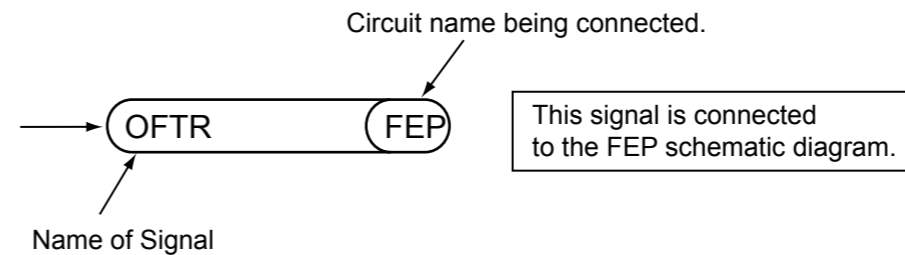
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S1. About Indication of The Schematic Diagram

S1.1. Important Safety Notice

COMPONENTS IDENTIFIED WITH THE MARK \triangle HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS USE ONLY THE SAME TYPE.

1. Although reference number of the parts is indicated on the P.C.B. drawing and/or schematic diagrams, it is NOT mounted on the P.C.B. when it is displayed with "\$" mark.
2. It is only the "Test Round" and no terminal (Pin) is available on the P.C.B. when the TP (Test Point) indicated as "●" mark.
3. The voltage being indicated on the schematic diagram is measured in "Standard-Playback" mode when there is no specify mode is mentioned.
4. Although the voltage and waveform available on here is measured with standard frame, it may be differ from actual measurement due to modification of circuit and so on.
5. The voltage being indicated here may be include observational-error (deviation) due to internal-resistance and/or reactance of equipment. Therefore, handle the value indicated on here as reference.
6. Use the parts number indicated on the Replacement Parts List .
7. Indication on Schematic diagrams:



S2. Voltage Chart

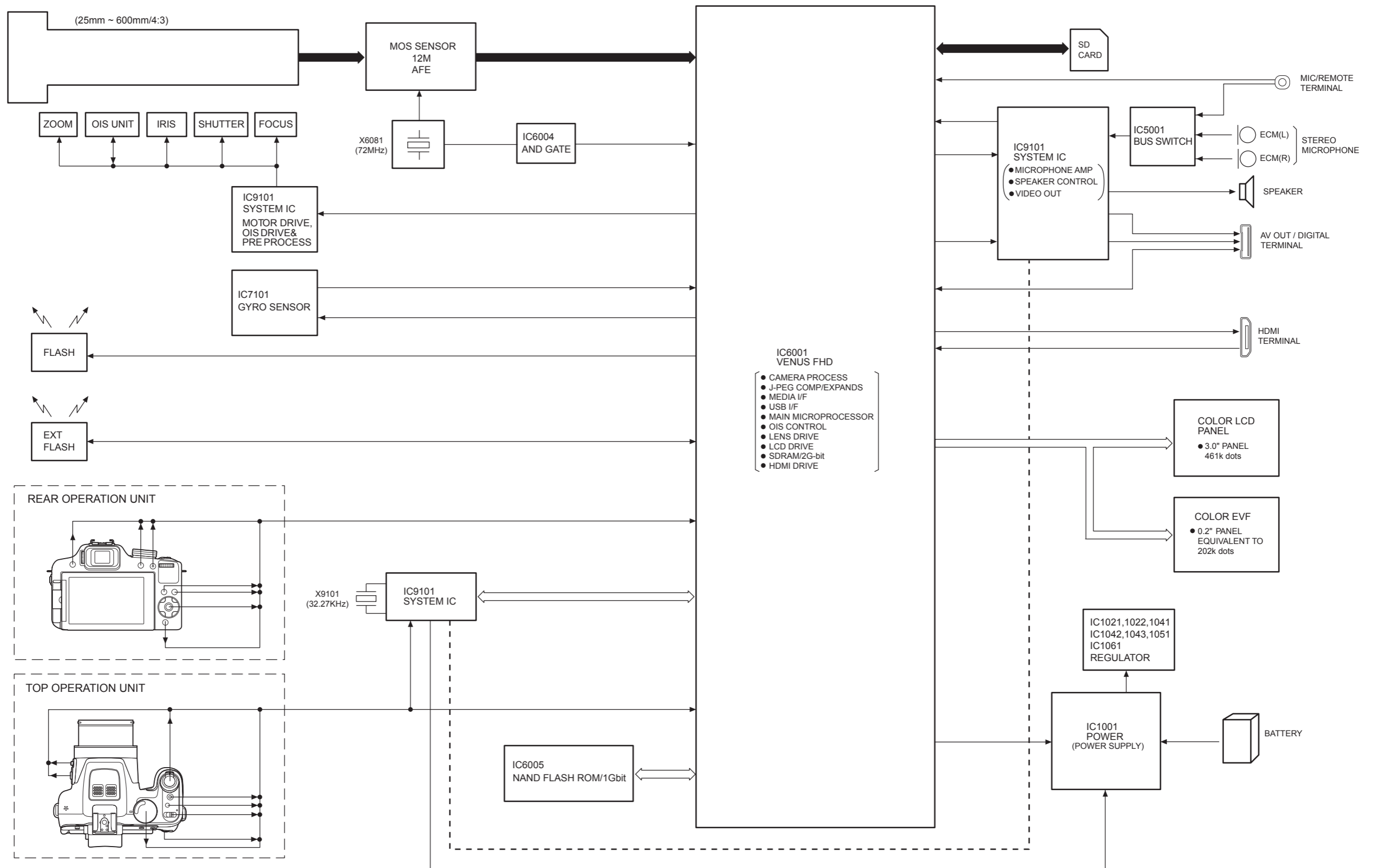
Note) Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

S2.1. Flash P.C.B.

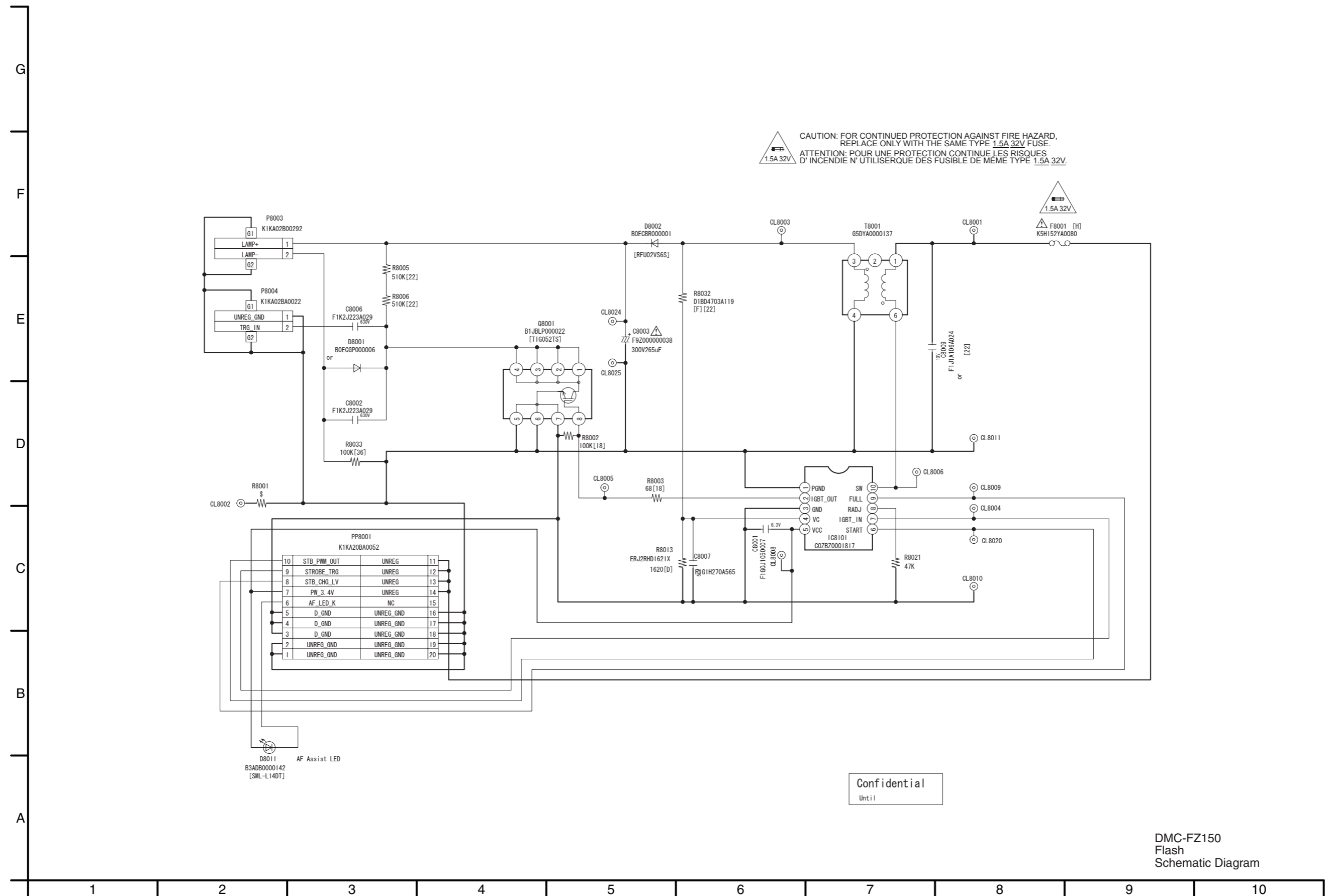
REF No.	PIN No.	POWER ON
IC8101	1	0
IC8101	2	0
IC8101	3	0
IC8101	4	0
IC8101	5	3.4
IC8101	6	0
IC8101	7	0
IC8101	8	0
IC8101	9	3.1
IC8101	10	7.1

S3. Block Diagram

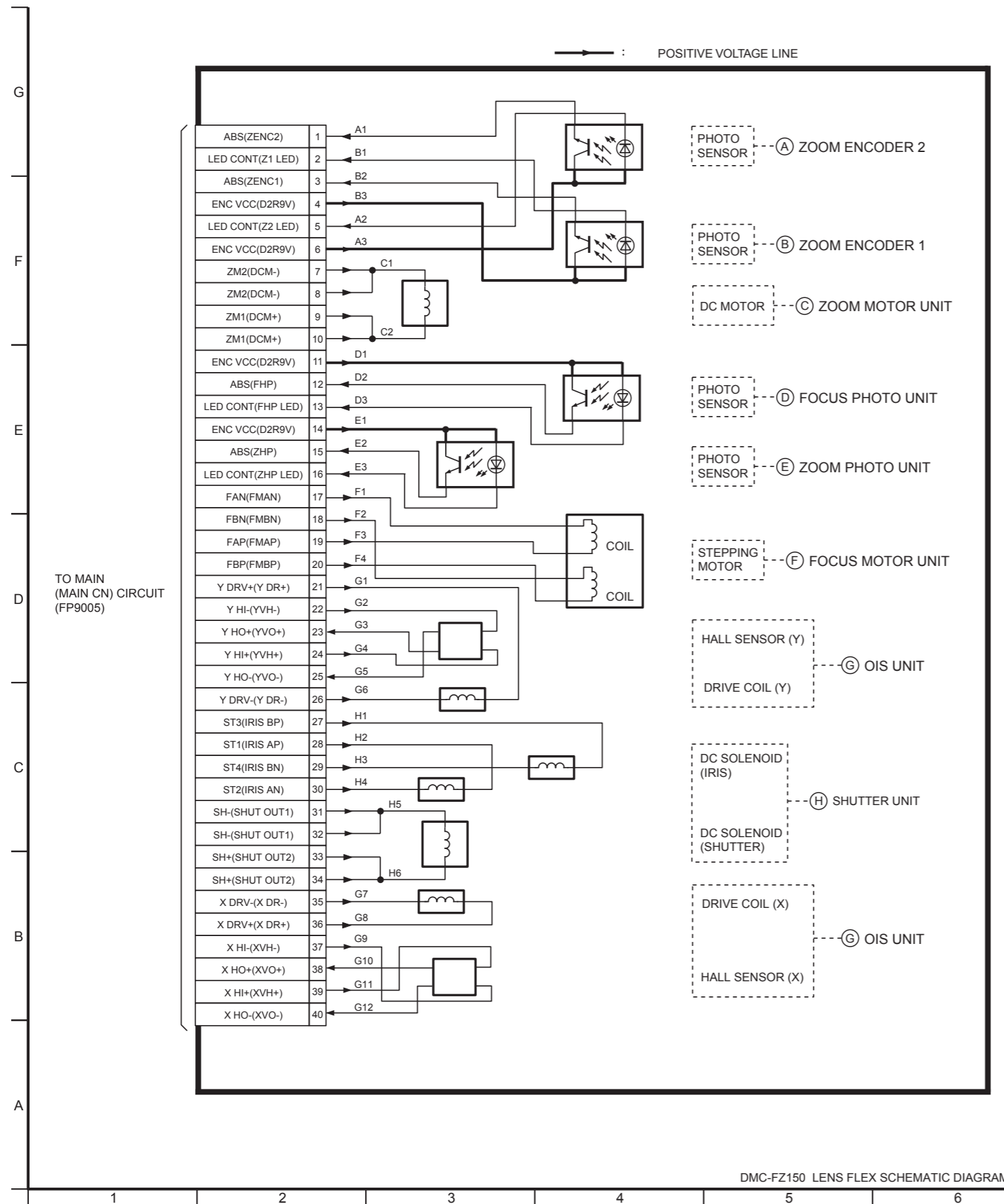
S3.1. Overall Block Diagram



S4.2. Flash Schematic Diagram

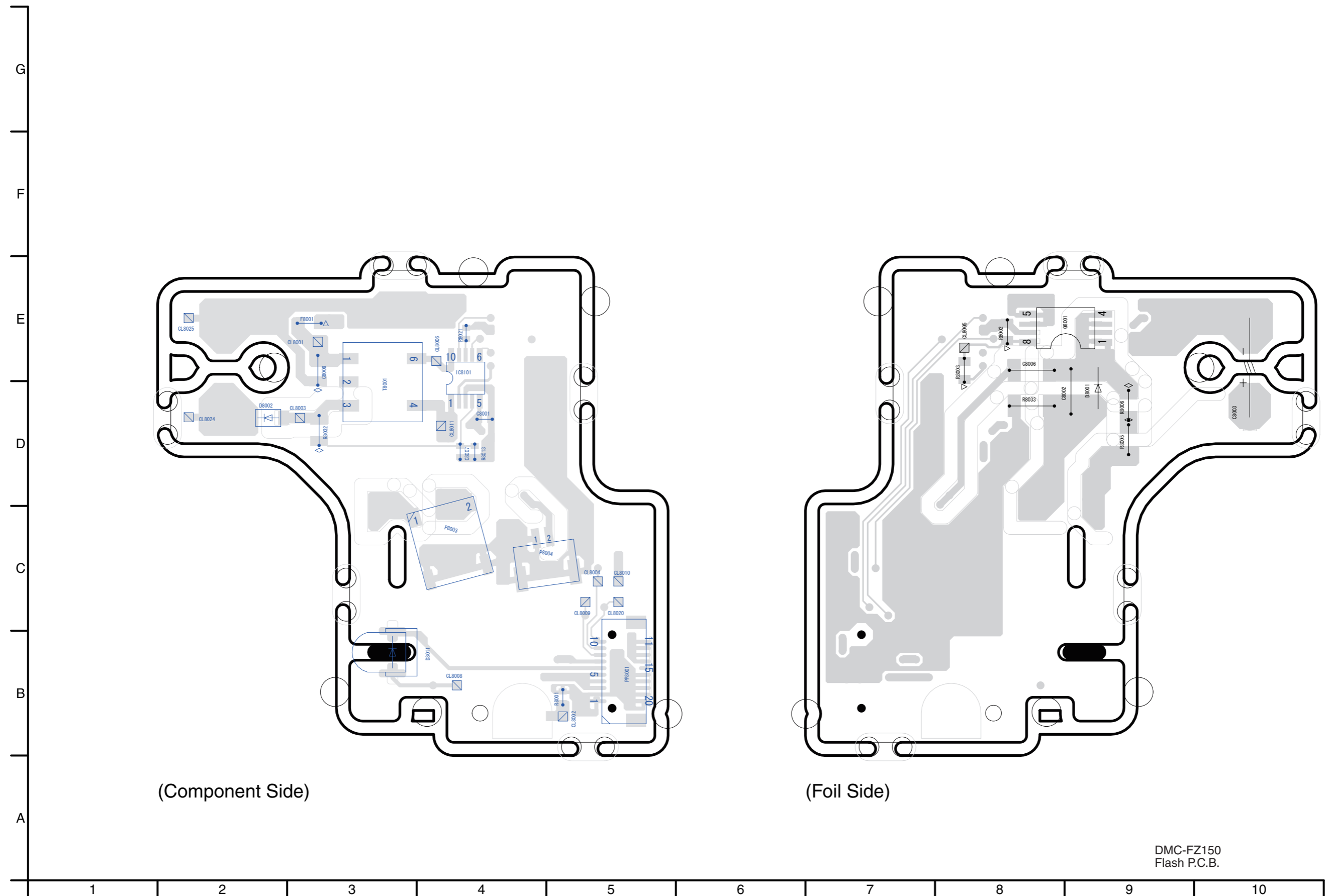


S4.3. Lens Flex Schematic Diagram

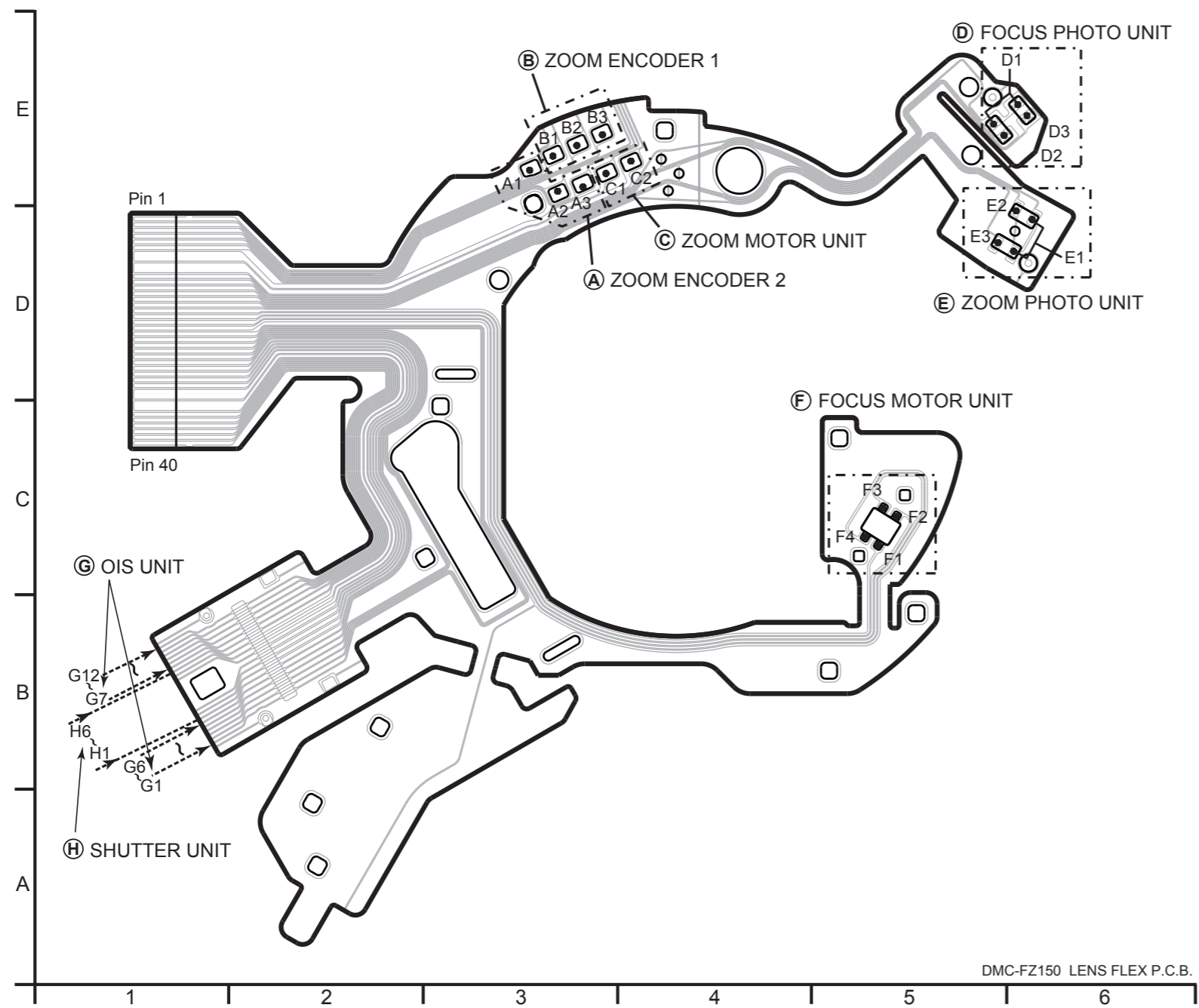


S5. Print Circuit Board

S5.1. Flash P.C.B.



S5.2. Lens Flex P.C.B.



S6. Replacement Parts List

- Note:
1. * Be sure to make your orders of replacement parts according to this list.
 2. **IMPORTANT SAFETY NOTICE**
Components identified with the mark \triangle have the special characteristics for safety.
When replacing any of these components, use only the same type.
 3. Unless otherwise specified,
All resistors are in OHMS, K=1,000 OHMS. All capacitors are in MICRO-FARADS (uf), P=uuF.
 4. The marking (RTL) indicates the retention time is limited for this item. After the discontinuation of this assembly in production, it will no longer be available.
 5. Supply of CD-ROM, in accordance with license protection, is allowable as replacement parts only for customers who accidentally damaged or lost their own.

E.S.D. standards for Electrostatically Sensitive Devices, refer to PREVENTION OF ELECTROSTATIC DISCHARGE (ESD) TO ELECTROSTATICALLY SENSITIVE (ES) DEVICES section.

Definition of Parts supplier:

1. Parts marked with [ENERGY] in the remarks column are supplied from Panasonic Corporation Energy Company.
2. Parts marked with [PAVCSG] in the remarks column are supplied from PAVCSG. Others are supplied from AVC-CSC-SPC.

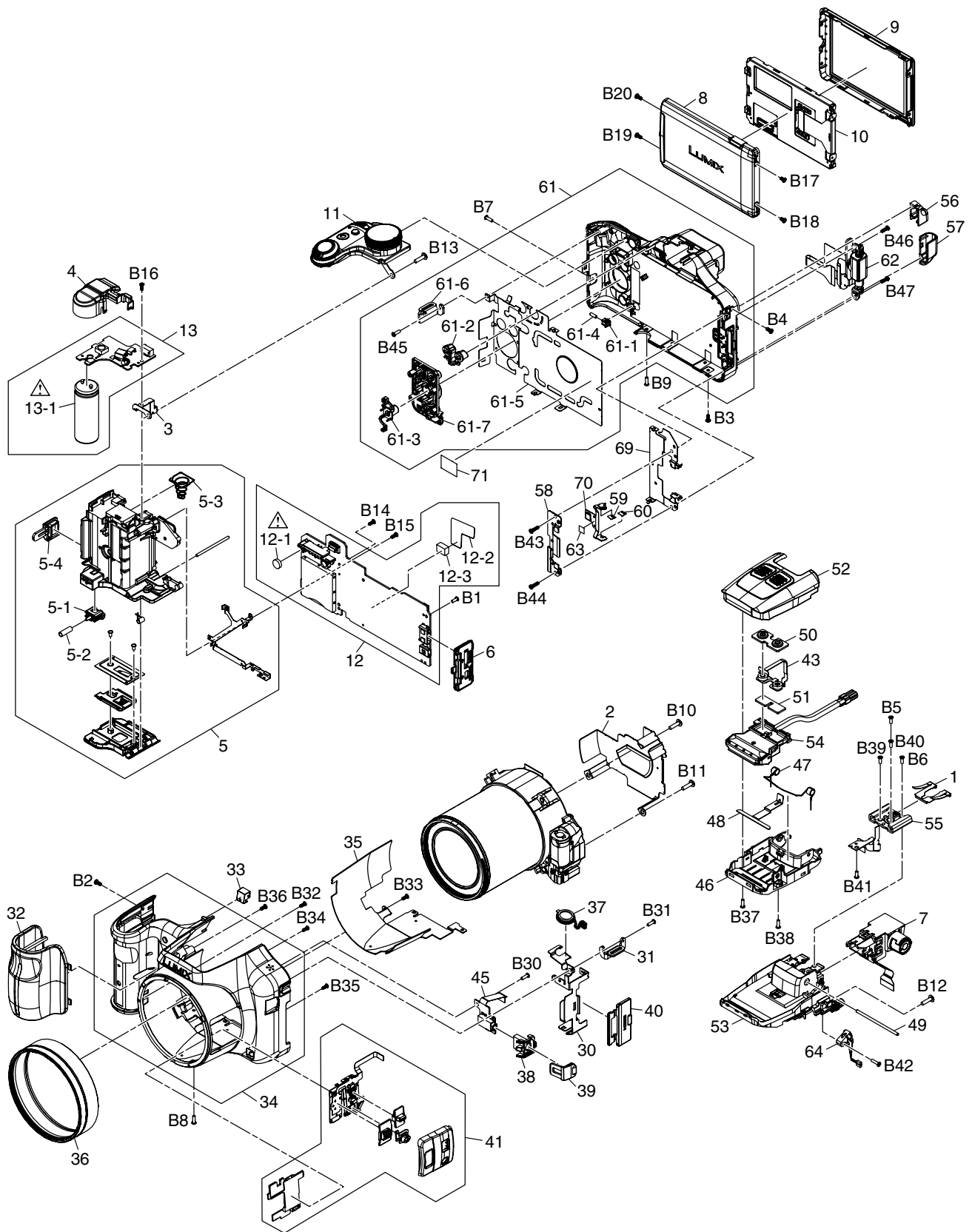
Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
1	VMC2111	SHOE SPRING	1	
2	VSC6334	LENS HEAT SINK	1	
3	VMC2128	BATTERY EARTH PLATE (TOP)	1	
4	VGQ0W94	CAPACITOR COVER	1	
5	VYK5C71	BATTERY CASE UNIT	1	
5-1	VGU0G12	BATTERY LOCK KNOB	1	
5-2	VMB4199	BATTERY LOCK SPRING	1	
5-3	VMB4385	BATTERY SPRING	1	
5-4	VGQ0M26	COUPLER COVER	1	
6	VGQ0W60	JACK HOLDER	1	
7	L5EDDXE00008	EVF UNIT	1	
8	VKM9529	LCD CASE (TOP)	1	
9	VKM9530	LCD CASE (BOTTOM)	1	
10	VYK5G58	LCD UNIT	1	
11	K0RB02500001	TOP CASE UNIT	1	
12	VEP56145B	MAIN P.C.B.	1	(RTL) E.S.D. EG,EP,EF,EB
12	VEP56145A	MAIN P.C.B.	1	(RTL) E.S.D. P,PC,PU,EE, GC,GT,GK,GN,GD
△ 12-1	ML-614S/ZTK	BATTERY	1	[ENERGY] (B9101)
12-2	VGQ1B62	MAIN COPPER SHEET	1	
12-3	VGQ0X92	MAIN PCB SHEET	1	
13	VEP58158A	FLASH P.C.B.	1	(RTL) E.S.D.
△ 13-1	F9Z000000038	E.CAPACITOR	1	(C8003)
30	VMP0A04	SIDE FRAME (R)	1	[PAVCSG]
31	VGQ0X73	STRAP HOLDER	1	[PAVCSG]
32	VGQ0X60	GRIP PIECE FRONT	1	[PAVCSG]
33	VGQ0X17	AF LIGHT CASE	1	[PAVCSG]
34	VYK5D00	FRONT CASE UNIT	1	[PAVCSG]
35	VSC6335	FRONT HEAT SINK	1	[PAVCSG]
36	VDW2331	LENS RING FRONT	1	[PAVCSG]
37	L0AA01A00118	SPEAKER	1	[PAVCSG]
38	VGQ0W52	REMOTE HOLDER	1	[PAVCSG]
39	VKF4915	REMOTE COVER	1	[PAVCSG]
40	VKF4917	JACK COVER	1	[PAVCSG]
41	VYK5N21	SIDE OPERATION UNIT	1	[PAVCSG]
43	VEP54016B	ECM FLEX UNIT	1	[PAVCSG]
45	VEP59106A	MIC JACK FPC	1	[PAVCSG]
46	VKM9520	FLASH CASE BOTTOM	1	[PAVCSG]
47	VMB4377	FLASH POP UP SPRING	1	[PAVCSG]
48	VMP9666	FLASH EARTH PLATE	1	[PAVCSG]
49	VMS7911-A	FLASH SHAFT	1	[PAVCSG]
50	VMT1962	MIC DAMPER	1	[PAVCSG]
51	VMT2011-A	MIC CUSHION	1	[PAVCSG]
52	VYK5C95	FLASH CASE TOP UNIT	1	[PAVCSG]
53	VYK5C97	FLASH BASE UNIT	1	[PAVCSG]
54	EFN-AMCM4ZD	FLASH UNIT	1	[PAVCSG]
55	VEK0S09	HOT SHOE UNIT	1	[PAVCSG]
56	VKM9531	HINGE ARM COVER TOP	1	[PAVCSG]
57	VKM9532	HINGE ARM COVER BOTTOM	1	[PAVCSG]
58	VMP0A09	HINGE PLATE	1	[PAVCSG]
59	VGQ0Y75	HINGE SW TAPE	1	[PAVCSG]
60	VGQ0Y75	HINGE SW TAPE	1	[PAVCSG]
61	VYK5F37	REAR CASE UNIT	1	[PAVCSG]
61-1	VGQ0W61	LCD LOCK PIECE	1	[PAVCSG]
61-2	VGU0J85	PLAY BUTTON	1	[PAVCSG]
61-3	VGU0J86	CURSOR BUTTON A	1	[PAVCSG]
61-4	VMB4373	LCD LOCK SPRING	1	[PAVCSG]
61-5	VMC2187	REAR EARTH PLATE A	1	[PAVCSG]
61-6	VGQ0X73	STRAP HOLDER	1	[PAVCSG]
61-7	VGU0K28	CURSOR BUTTON B	1	[PAVCSG]
62	VYK5L38	LCD HINGE UNIT	1	[PAVCSG]
63	VGQ0V71	TOP PCB SHEET	1	[PAVCSG]
64	VYQ3749	FLASH SW UNIT	1	[PAVCSG]
69	VMC2195	REAR EARTH PLATE B	1	[PAVCSG]
70	VEP59105A	HINGE SW FPC	1	[PAVCSG]
71	VGQ1C11	DPR SHEET	1	[PAVCSG]

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
B1	VHD2179	SCREW	1	
B2	VHD2179	SCREW	1	
B3	VHD2179	SCREW	1	
B4	VHD2179	SCREW	1	
B5	VHD2179	SCREW	1	
B6	VHD2179	SCREW	1	
B7	VHD1870	SCREW	1	
B8	VHD1870	SCREW	1	
B9	VHD1870	SCREW	1	
B10	XTV2+8JFN	SCREW	1	
B11	XTV2+8JFN	SCREW	1	
B12	XTV2+8JFN	SCREW	1	
B13	XTV2+8JFN	SCREW	1	
B14	XQN16+BJ4FN	SCREW	1	
B15	XQN16+BJ4FN	SCREW	1	
B16	XQN16+BJ4FN	SCREW	1	
B17	VHD2149	SCREW	1	
B18	VHD2149	SCREW	1	
B19	VHD2179	SCREW	1	
B20	VHD2179	SCREW	1	
B30	VHD1870	SCREW	1	[PAVCSG]
B31	VHD1870	SCREW	1	[PAVCSG]
B32	XQN16+BJ4FN	SCREW	1	[PAVCSG]
B33	XQN16+BJ4FN	SCREW	1	[PAVCSG]
B34	VHD2252-A	SCREW	1	[PAVCSG]
B35	VHD2252-A	SCREW	1	[PAVCSG]
B36	VHD2252-A	SCREW	1	[PAVCSG]
B37	VHD1870	SCREW	1	[PAVCSG]
B38	VHD1870	SCREW	1	[PAVCSG]
B39	VHD2150	SCREW	1	[PAVCSG]
B40	VHD2150	SCREW	1	[PAVCSG]
B41	VHD2150	SCREW	1	[PAVCSG]
B42	VHD2251-A	SCREW	1	[PAVCSG]
B43	VHD2281	SCREW	1	[PAVCSG]
B44	VHD2281	SCREW	1	[PAVCSG]
B45	VHD1870	SCREW	1	[PAVCSG]
B46	VHD2190	SCREW	1	[PAVCSG]
B47	VHD2190	SCREW	1	[PAVCSG]

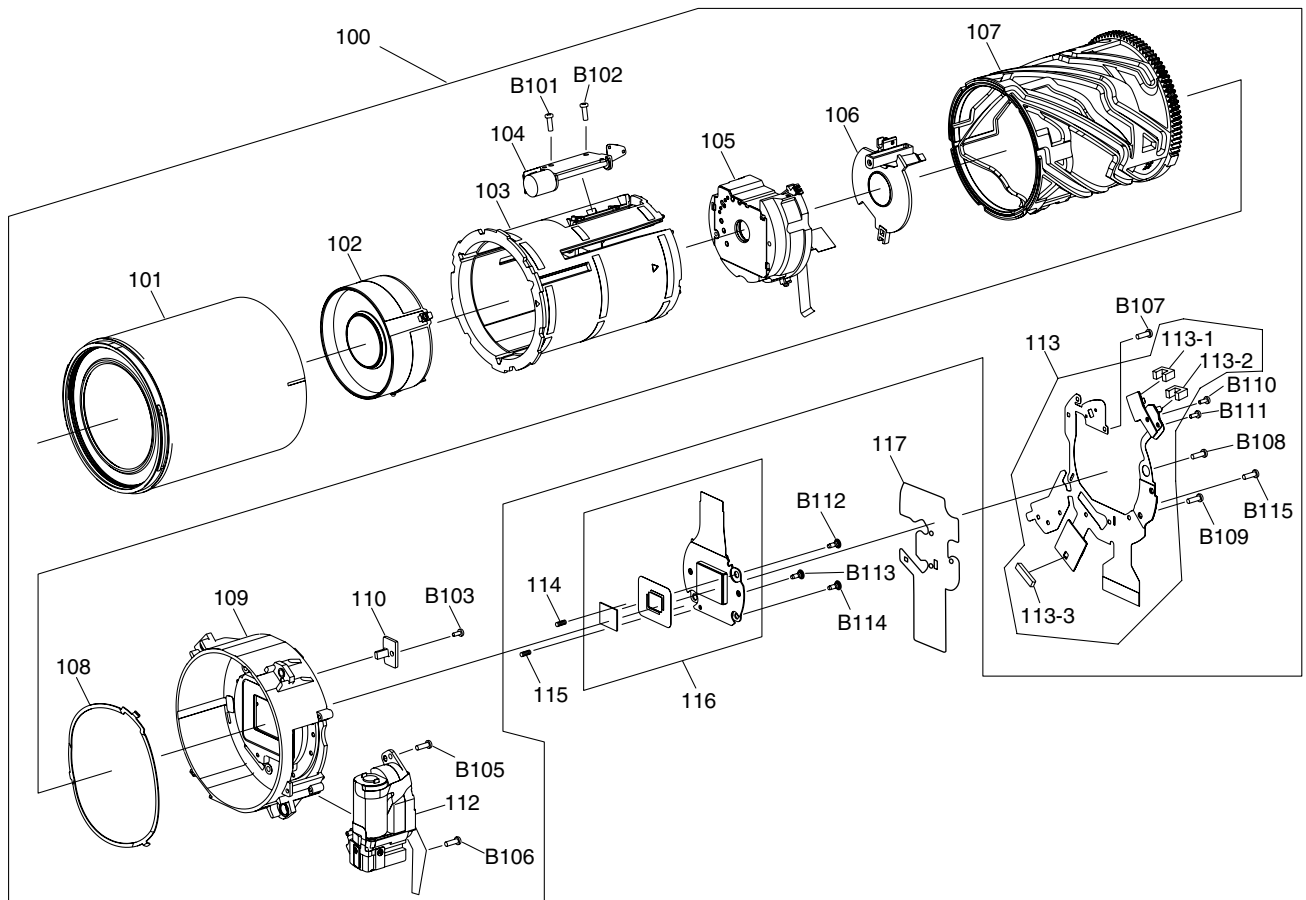
Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
△ 200	----	BATTERY	1	P,PC,PU,EG,EP,EF,EB,EE, GC,GT,GN,GD,GK	213	VQC8614	O/I SOFTWARE (ENGLISH/CANADIAN FRENCH)	1	P,PC
△ 201	DE-A84AB	BATTERY CHARGER	1	EG,EP,EF,EB,EE,GN	213	VQC8615	O/I SOFTWARE (SPANISH/PORTUGUESE)	1	PU
△ 201	DE-A83BA	BATTERY CHARGER	1	P,PC,PU	213	VQC8617	O/I SOFTWARE (FINNISH/SWEDISH/DANISH/ POLISH/CZECH/HUNGARIAN)	1	EP
△ 201	DE-A84BA	BATTERY CHARGER	1	GC,GK,GD	213	VQC8618	O/I SOFTWARE (FRENCH)	1	EF
△ 201	DE-A84CA	BATTERY CHARGER	1	GT	213	VQC8619	O/I SOFTWARE (ENGLISH)	1	EB,GN
202	K1HY08YY0017	USB CABLE W/PLUG	1	P,PC,PU,EG,EP,EF,EB,EE, GC,GT,GN,GD,GK	213	VQC8620	O/I SOFTWARE (RUSSIAN/UKRAINIAN)	1	EE
△ 203	VFF0856	CD-ROM (INSTRUCTION BOOK)	1	EG,EP,EF,EB	213	VQC8621	O/I SOFTWARE (ENGLISH/ CHINESE(TRADITIONAL)/ ARABIC/PERSIAN)	1	GC
△ 203	VFF0855	CD-ROM (INSTRUCTION BOOK)	1	P,PC,PU	213	VQC8622	O/I SOFTWARE (CHINESE(TRADITIONAL))	1	GT
△ 203	VFF0857	CD-ROM (INSTRUCTION BOOK)	1	EE	213	VQC8623	O/I SOFTWARE (CHINESE(SIMPLIFIED))	1	GK
△ 203	VFF0858	CD-ROM (INSTRUCTION BOOK)	1	GC,GN	213	VQC8582	O/I SOFTWARE (KOREAN)	1	GD
△ 203	VFF0859	CD-ROM (INSTRUCTION BOOK)	1	GT,GD	214	VQL2C67	OPERATING LABEL	1	PC
△ 203	VFF0860	CD-ROM (INSTRUCTION BOOK)	1	GK	214	VQL2C68-1	OPERATING LABEL	1	GT
204	VFC4453	SHOULDER STRAP	1	P,PC,PU,EG,EP,EF,EB,EE, GC,GT,GN,GD,GK	215	VFF0846-S	CD-ROM(OVERSEA)	1	EG,EP,EF,EB,EE,GC,GT,GN, GD,P,PC,PU See "Notes"
205	VYQ5607	LENS CAP UNIT	1	P,PC,PU,EG,EP,EF,EB,EE, GC,GT,GN,GD,GK	215	VFF0847-S	CD-ROM(CHINA)	1	GK See "Notes"
206	VYQ7134	LENS HOOD UNIT	1	P,PC,PU,EG,EP,EF,EB,EE, GC,GT,GN,GD,GK	△ 250	K2CT39A00002	AC CORD W/PLUG	1	EB,GC
207	VPF1166	CAMERA BAG	1	P,PC,PU,EG,EP,EF,EB,EE, GC,GT,GN,GD,GK	△ 251	K2CQ29A00002	AC CORD W/PLUG	1	EG,EP,EF,EE,GC
208	VYQ7016	PACKING CASE	1	GT,GD,PU	△ 251	K2CR29A00001	AC CORD W/PLUG	1	GD
208	VPK5089	PACKING CASE	1	EG,EP,EF,EB,EE,GC,GN	△ 252	K2CJ29A00002	AC CORD W/PLUG	1	GN
208	VPK5088	PACKING CASE	1	P,PC	△ 253	K2CA29A000021	AC CORD W/PLUG	1	GT
208	VYQ7017	PACKING CASE	1	GK	△ 253	K2CA2YY000070	AC CORD W/PLUG	1	GK
209	VPN7279	CUSHION	1	P,PC,PU,EG,EP,EF,EB,EE, GC,GT,GN,GD,GK					
211	VPF1230	BAG, POLYETHYLENE	1	P,PC,PU,EG,EP,EF,EB,EE, GC,GT,GN,GD,GK					
△ 212	VQT3S58	BASIC O/I (GERMAN/FRENCH)	1	EG					
△ 212	VQT3S59	BASIC O/I (ITALIAN/DUTCH)	1	EG					
△ 212	VQT3S60	BASIC O/I (SPANISH/PORTUGUESE)	1	EG					
△ 212	VQT3S61	BASIC O/I (TURKISH)	1	EG					
△ 212	VQT3S55	BASIC O/I (ENGLISH/SPANISH)	1	P					
△ 212	VQT3S56	BASIC O/I (ENGLISH/CANADIAN FRENCH)	1	PC					
△ 212	VQT3S57	BASIC O/I (SPANISH/PORTUGUESE)	1	PU					
△ 212	VQT3S62	BASIC O/I (SWEDISH/DANISH)	1	EP					
△ 212	VQT3S63	BASIC O/I (POLISH/CZECH)	1	EP					
△ 212	VQT3S64	BASIC O/I (HUNGARIAN/FINNISH)	1	EP					
△ 212	VQT3S65	BASIC O/I (FRENCH)	1	EF					
△ 212	VQT3S66	BASIC O/I (ENGLISH)	1	EB					
△ 212	VQT3S67	BASIC O/I (RUSSIAN/UKRAINIAN)	1	EE					
△ 212	VQT3S68	BASIC O/I (ENGLISH/ CHINESE(TRADITIONAL))	1	GC					
△ 212	VQT3S69	BASIC O/I (ARABIC/PERSIAN)	1	GC					
△ 212	VQT3S70	BASIC O/I (VIETNAMESE)	1	GC					
△ 212	VQT3S71	BASIC O/I (CHINESE(TRADITIONAL))	1	GT					
△ 212	VQT3S72	BASIC O/I (CHINESE(SIMPLIFIED))	1	GK					
△ 212	VQT3S73	BASIC O/I (ENGLISH)	1	GN					
△ 212	VQT3S74	BASIC O/I (KOREAN)	1	GD					
213	VQC8616	O/I SOFTWARE (GERMAN/FRENCH/ITALIAN/ DUTCH/SPANISH/ PORTUGUESE/TURKISH)	1	EG					

S7. Exploded View

S7.1. Frame and Casing Section



S7.2. Camera Lens Section



S7.3. Packing Parts and Accessories Section

