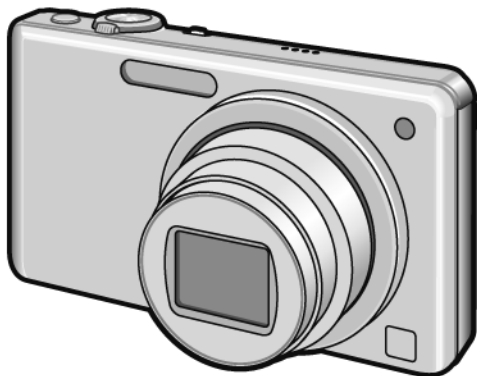


Service Manual

Digital Camera

LUMIX



Model No. **DMC-FS33EB**

DMC-FS33EE

DMC-FS33EF

DMC-FS33EG

DMC-FS33EP

DMC-FH22P

DMC-FH22PC

DMC-FH22PU

DMC-FH22GC

DMC-FH22GF

DMC-FH22GK

DMC-FH22GN

Vol. 1

Colour

[DMC-FS33]

(S).....Silver Type (except EF)

(K).....Black Type

(R).....Red Type

[DMC-FH22]

(S).....Silver Type (except PC)

(K).....Black Type

(R).....Red Type (except GN)

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

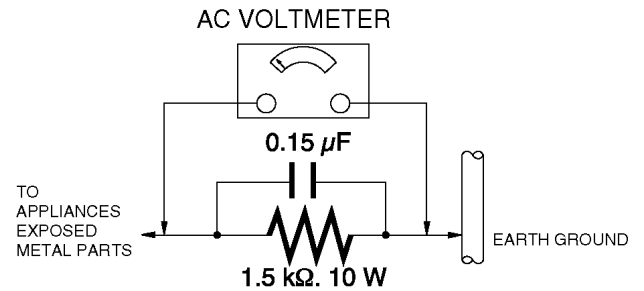


Figure. 1

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

CAUTION:

1. Be sure to discharge the capacitor on FLASH TOP P.C.B..
2. Be careful of the high voltage circuit on FLASH TOP 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 capacitor on the FLASH TOP P.C.B. for approx. 5 seconds.
4. After discharging, confirm that the capacitor voltage is lower than 10V using a voltmeter.

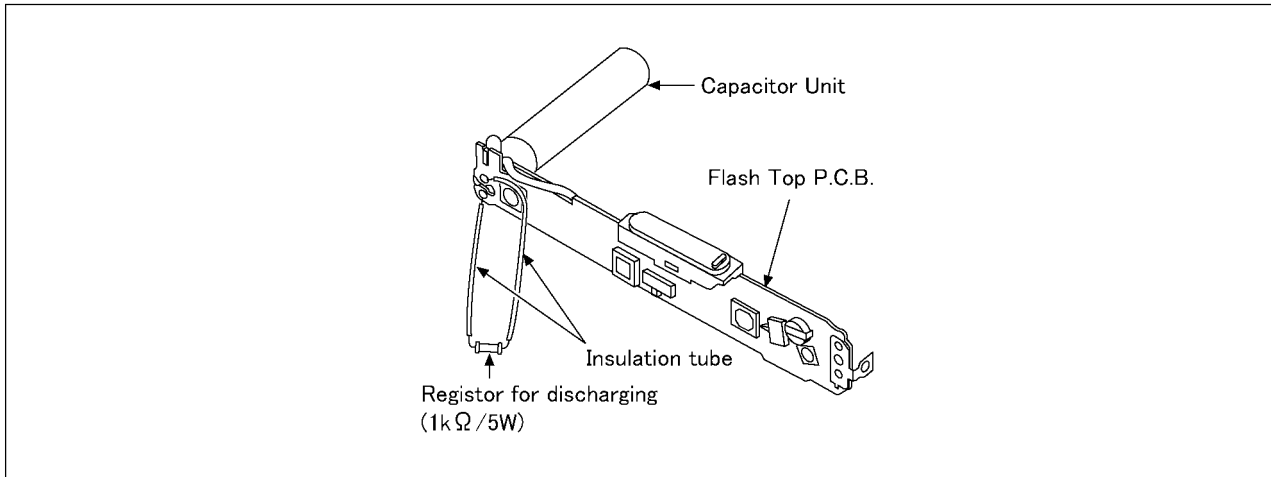


Fig. F1

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 CCD image sensor, 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.

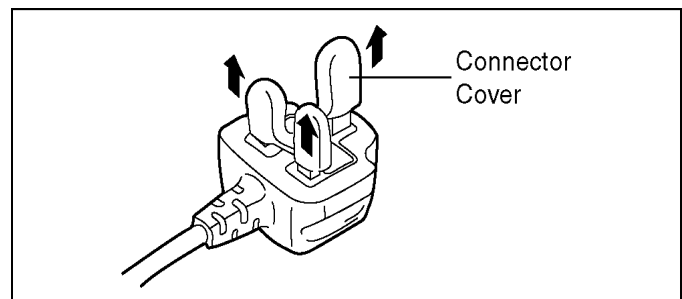
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

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.



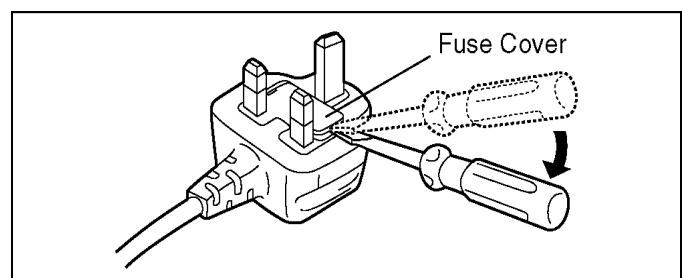
2.3.2.2. Before Use

Remove the Connector Cover as follows.

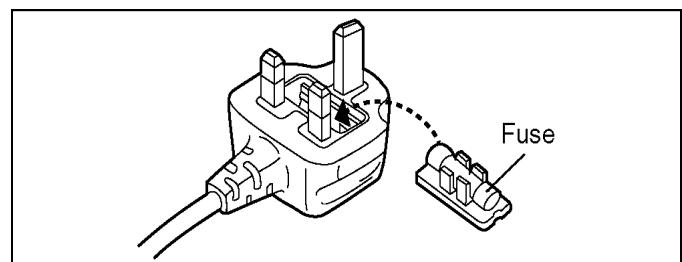


2.3.2.3. How to Replace the Fuse

1. Remove the Fuse Cover with a screwdriver.



2. Replace the fuse and attach the Fuse cover.



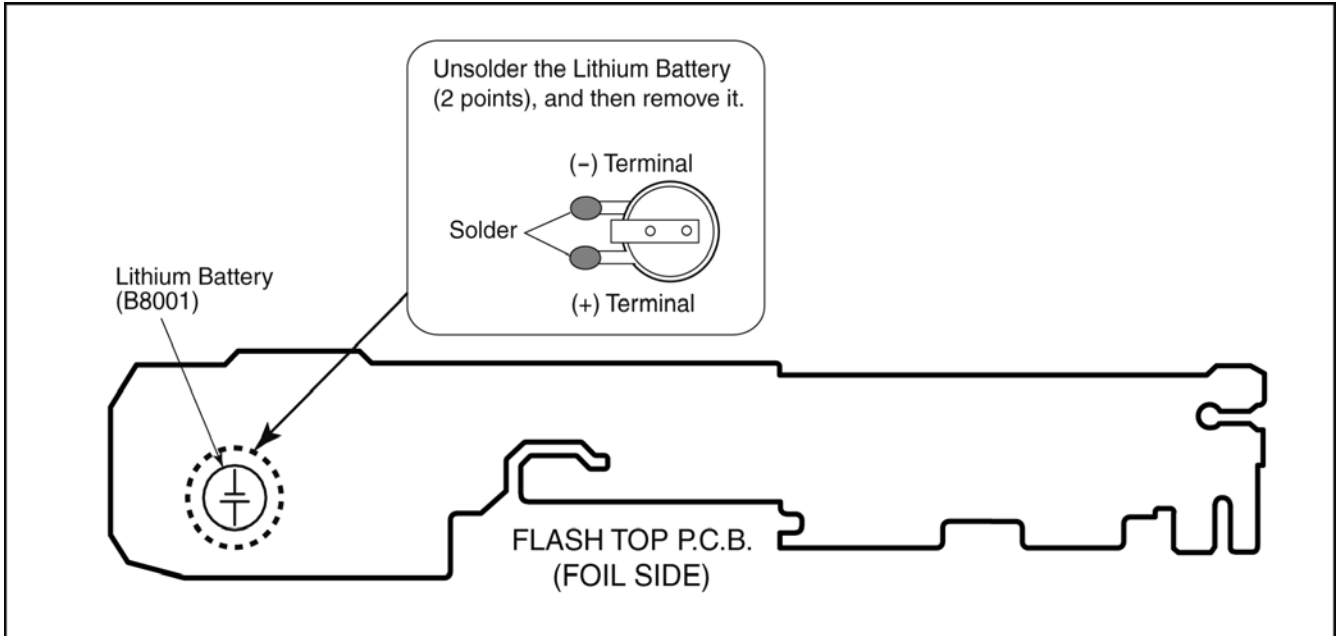
2.4. How to Replace the Lithium Battery

2.4.1. Replacement Procedure

1. Remove the FLASH TOP P.C.B.. (Refer to Disassembly Procedures.)
2. Unsolder the each soldering point of electric lead terminal for Lithium battery (Ref. No. "B8001" at foil side of FLASH TOP P.C.B.) and remove the Lithium battery together with electric lead terminal. Then replace it into new one.

NOTE:

The Type No. ML421 includes electric lead terminals.



NOTE:

This Lithium battery is a critical component.

(Type No.: ML421 **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 fabricant.

NOTE:

Above caution is applicable for a battery pack which is for DMC-FS33/FH22 series, as well.

3 Service Navigation

3.1. Introduction

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

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

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

3.2. General Description About Lead Free Solder (PbF)

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

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

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

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

PbF

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

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

Recommended Lead Free Solder (Service Parts Route.)

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

Note

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

3.3. 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. and SUB OPERATION P.C.B..
 - b. Parts list for individual parts for MAIN P.C.B. and SUB OPERATION P.C.B..When a part replacement is required for repairing MAIN P.C.B. and/or SUB OPERATION P.C.B., replace as an assembled parts. (MAIN P.C.B. / SUB OPERATION P.C.B.)
2. The following category is/are recycle module part. please send it/them to Central Repair Center.
 - MAIN P.C.B. (VEP56098B)
 - SUB OPERATION P.C.B. (VEP59077A)

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






There are six kinds of DMC-FS33/FH22, regardless of the colours.

- a) DMC-FH22P/PC
- b) DMC-FS33EB/EF/EG/EP
- c) DMC-FS33EE
- d) DMC-FH22GK
- e) DMC-FH22GN
- f) DMC-FH22PU/GC/GF

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

3.4.1. 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-FH22P/PC The nameplate for these models show the following Safety registration mark.</p> 
<p>b) DMC-FS33EB/EF/EG/EP The nameplate for these models show the following Safety registration mark.</p> 
<p>c) DMC-FS33EE The nameplate for this model show the following Safety registration mark.</p> 
<p>d) DMC-FH22GK The nameplate for this model show the following Safety registration mark.</p> 
<p>e) DMC-FH22GN The nameplate for this model show the following Safety registration mark.</p> 
<p>f) DMC-FH22PU/GC/GF 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 adjustment instruction is available at "software download" on the "Support Information from NWBG/VDBG-AVC" web-site in "TSN system", together with Maintenance software.

3.4.2. INITIAL SETTINGS:

After replacing the MAIN P.C.B., be 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, be sure to read the following CAUTIONS.

CAUTION 1:(INITIAL SETTINGS)

---AFTER REPLACING THE MAIN P.C.B. ---

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

(Model suffix : "P/EG/PU/GC/GK/EF/EB/EE/GN/PC/EP and GF")

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

[NOTE:Only for "EG, EF, EB, EE and EP" models]

*.When one of the "EG, EF, EB, EE and EP" has been chosen, only "EG, EF, EB, EE and EP" are displayed from second times.

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

This unit employs "Built-in Memory" for picture image data recording.(Approx.40MB)

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:

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.)

2. Set the recording mode to the [NORMAL PICTURE] mode.

(Press the [MODE] button and select the [NORMAL PICTURE] by touching the Touch Panel.)

NOTE:

If the unit is other than [NORMAL PICTURE] mode, it does not display the initial settings menu.

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

Set the [REC]/[PLAYBACK] selector switch to "[REC] (Camera mark)".

While keep turning the Zoom Lever to [Wide] and pressing [iA] button simultaneously, turn the Power on.

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

Set the [REC]/[PLAYBACK] selector switch to "[PLAYBACK]".

Press the [iA] button and [MODE] button simultaneously, then turn the Power off.

• **Step 3. Turn the Power on:**

Set the [REC]/[PLAYBACK] selector switch to "[REC] (Camera mark)", and then turn the Power on.

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

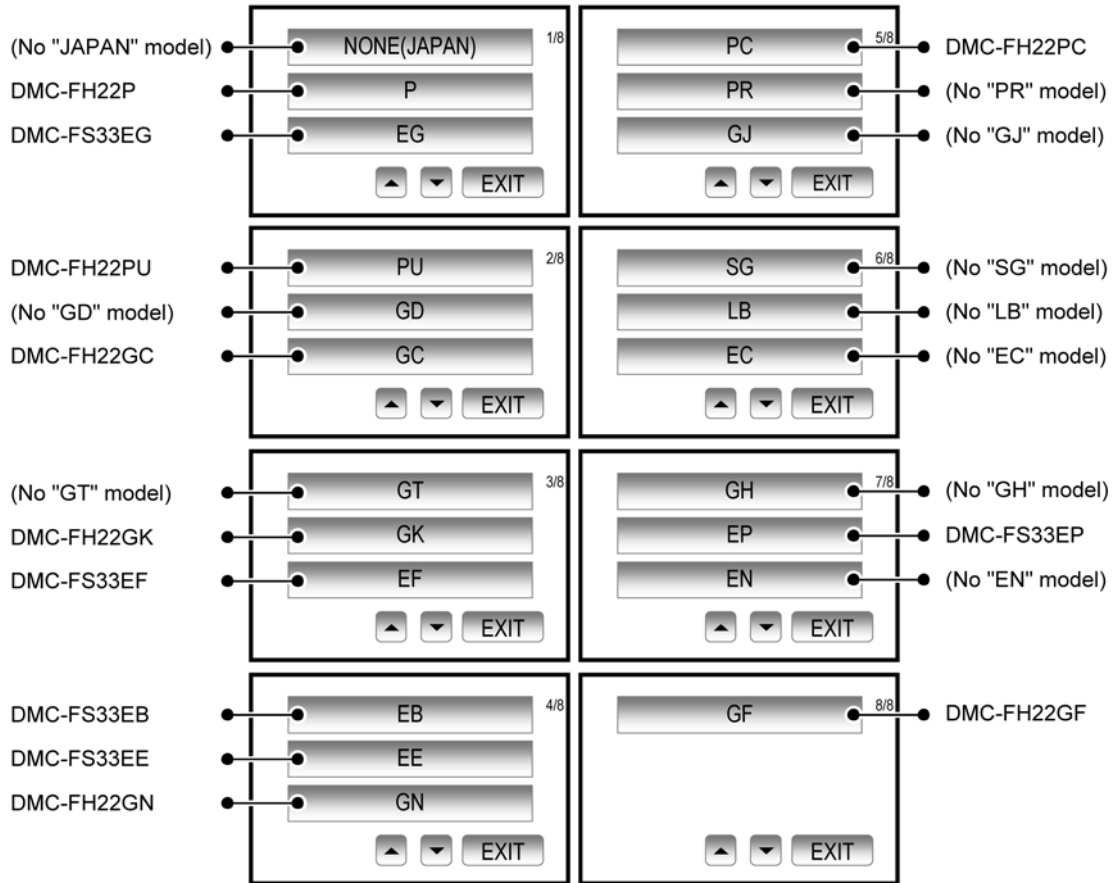
While keep turning the Zoom Lever to [Tele] and pressing [MENU] button simultaneously, turn the Power off.

The "INITIAL SETTINGS" menu is displayed.

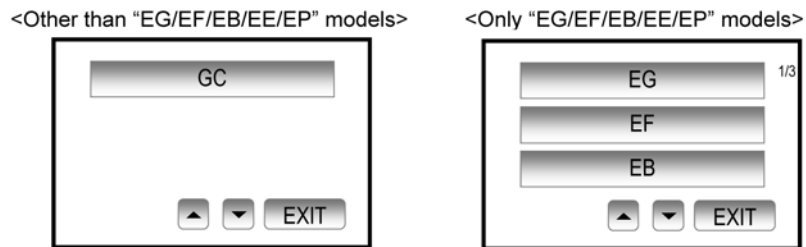
There are two kinds of "INITIAL SETTINGS" menu form as follows:

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

When MAIN P.C.B. has just been replaced, all of the model suffix is displayed as follows. (Eight 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.]

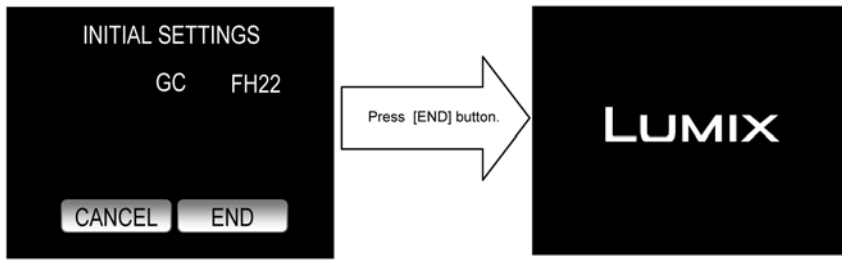
The model suffix can be chosen, **JUST ONE TIME.**

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

Therefore, select the area carefully.

Select the page by [UP] / [DOWN] of Touch Panel or [Wide] / [Tele] of Zoom Lever, and then select the area by touching the Touch Panel.

- **Step 6. Set the model suffix in “INITIAL SETTINGS”:**
- The only set area is displayed, and then select the [END] by touching the Touch Panel.
(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.

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-FH22P	NTSC	English	Month/Date/Year	
b)	DMC-FS33EG	PAL	English	Date/Month/Year	
c)	DMC-FH22PU	NTSC	English	Month/Date/Year	
d)	DMC-FH22GC	PAL	English	Date/Month/Year	
e)	DMC-FH22GK	PAL	Chinese (simplified)	Year/Month/Date	
f)	DMC-FS33EF	PAL	French	Date/Month/Year	
g)	DMC-FS33EB	PAL	English	Date/Month/Year	
h)	DMC-FS33EE	PAL	Russian	Date/Month/Year	
i)	DMC-FH22GN	PAL	English	Date/Month/Year	
j)	DMC-FH22PC	NTSC	English	Month/Date/Year	
k)	DMC-FS33EP	PAL	English	Date/Month/Year	
l)	DMC-FH22GF	PAL	English	Date/Month/Year	

4 Specifications

Digital Camera:	Information for your safety
Power Source:	DC 5.1 V
Power Consumption:	1.1 W (When recording) 0.6 W (When playing back)
Camera Effective pixels:	14,100,000 pixels
Image sensor:	1/2.33" CCD
Total pixels:	14,500,000 pixels Primary color filter
Lens:	Optical 8 × zoom, f=5 to 40 mm [35 mm film camera equivalent: 28 to 224 mm] / F3.3 to F5.9
Digital zoom:	Max. 4 ×
Extended optical zoom:	Max. 16.9 ×
Focus:	Normal / AF macro / Macro zoom / Touch AF area selection Face detection / 9-area-focusing / 1-area-focusing / Touched area (during Touch AF area selection)
Focus range:	Normal : 50 cm (1.64 feet) (Wide) / 2 m (6.57 feet) (Tele) to ∞ Macro / Intelligent auto: 5 cm (0.17 feet) (Wide) / 1 m (3.28 feet) (Tele) to ∞ Scene mode: settings may be different to those shown above
Shutter system:	Electronic shutter+Mechanical shutter
Burst recording	
Burst speed:	Approx. 1.5 pictures/second
Number of recordable pictures:	Depends on the remaining capacity of the built-in memory or the card.
Hi-speed burst	
Burst speed:	Approx. 4.6 pictures/second
Picture size:	3M (4:3), 2.5M (3:2) or 2M (16:9) is selected as the picture size.
Number of recordable pictures:	Approx. 15 to 100
Shutter speed:	8 seconds to 1/1,600th of a second [STARRY SKY] mode:15 seconds, 30 seconds, 60 seconds
Exposure (AE):	Auto (Program AE) Exposure compensation (1/3 EV Step, -2 EV to +2 EV)
Metering mode:	Multiple
LCD monitor:	TFT LCD 3.0 (Approx. 230,400 dots) (field of view ratio about 100%)
Flash:	Flash range: Approx. 0.6 m (1.97 feet) to 5.8 m (19.03 feet) (Wide [ISO]) AUTO, AUTO / Red-eye reduction, Forced ON (Forced ON / Red-eye reduction), Slow sync. / Red-eye reduction, Forced OFF

Microphone:	Monaural
Speaker:	Monaural
Recording media:	Built-in Memory (Approx. 40 MB) / SD Memory Card / SDHC Memory Card / SDXC Memory Card
Recording file format	
Still Picture:	JPEG (based on "Design rule for Camera File system", based on "Exif 2.21" standard)/DPOF corresponding
Motion pictures:	"QuickTime Motion JPEG" (motion pictures with audio)
Interface	
Digital:	USB 2.0 (Full Speed)
Analog video / audio:	NTSC/PAL composite (switched by menu), Audio line output (monaural)
Terminal	
AV OUT/DIGITAL:	Dedicated jack (8 pin)
Dimensions:	Approx. 100.0 mm (W) × 56.5 mm (H) × 27.2 mm (D) (3.9" (W) × 2.3" (H) × 1.1" (D)) (excluding the projection part)
Mass (Weight):	Approx. 162 g/0.36 lb (with Memory Card and battery) Approx. 140 g/0.31 lb (excluding Memory Card and battery)
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10% to 80%

Battery Charger:	Information for your safety
Input:	110 V to 240 V ~ 50/60 Hz, 0.2 A
Output:	4.2 V = 0.65 A (Battery charging)

Equipment mobility: Movable

Battery Pack (lithium-ion):	Information for your safety
Voltage/capacity (Minimum):	3.6 V/740 mAh

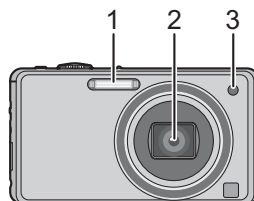
NOTE:(Only for "EB/EF/EG/EP" models)

- 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 15 minutes.
The maximum continuous recording time (up to 15 minutes) is displayed on the screen.

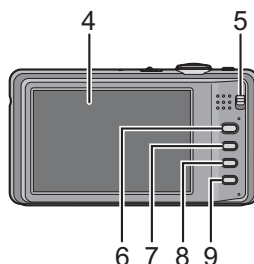
5 Location of Controls and Components

Names of the Components

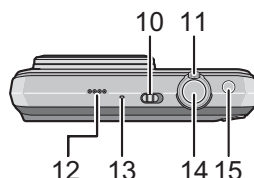
- 1 Flash
- 2 Lens
- 3 Self-timer indicator
AF assist lamp



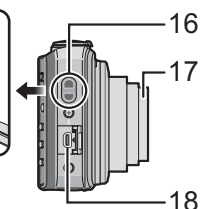
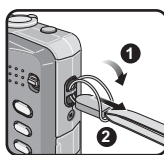
- 4 Touch Panel/LCD Monitor
- 5 [REC]/[PLAYBACK] selector switch
- 6 [MODE] button
- 7 [DISPLAY] button
- 8 [MENU] button
- 9 [Q.MENU]/Delete button



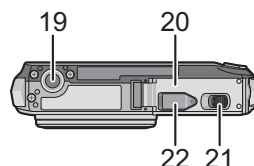
- 10 Camera ON/OFF switch
- 11 Zoom lever
- 12 Speaker
- 13 Microphone
- 14 Shutter button
- 15 Intelligent auto button



- 16 Hand strap eyelet
 - Be sure to attach the hand strap when using the camera to ensure that you will not drop it.
- 17 Lens barrel
- 18 [AV OUT/DIGITAL] socket



- 19 Tripod receptacle
 - When you use a tripod, make sure the tripod is stable when the camera is attached to it.
- 20 Card/Battery door
- 21 Release lever
- 22 DC coupler cover
 - When using an AC adaptor, ensure that the Panasonic DC coupler and AC adaptor are used.



How to Use the Touch Panel

You can operate by directly touching the LCD Monitor (Touch Panel) with your finger.

■ Touch

To touch and release the Touch Panel.
It is used to select icon or picture.

■ Drag

A movement performed without releasing the Touch Panel. It is used to forward or rewind the image during playback.

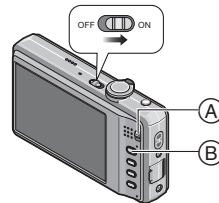
Selecting the [REC] Mode

iA Intelligent Auto Mode

The subjects are recorded using settings automatically selected by the camera.

■ To select a [REC] Mode from the [REC] Modes list

- 1** Turn the camera on.
Ⓐ [REC]/[PLAYBACK] selector switch
Ⓑ [MODE] button
- 2** Slide the [REC]/[PLAYBACK] selector switch to [📷].
- 3** Press [MODE].
- 4** Touch the Mode.



■ List of [REC] Modes

📷 Normal Picture Mode

The subjects are recorded using your own settings.

MS My Scene Mode

Pictures are taken using previously registered recording scenes.

SCN Scene Mode

This allows you to take pictures that match the scene being recorded.

📹 Motion Picture Mode

This mode allows you to record motion pictures with audio.

About the Battery

- The camera has a function for distinguishing batteries which can be used safely. The dedicated battery supports this function. The only batteries suitable for use with this unit are genuine Panasonic products and batteries manufactured by other companies and certified by Panasonic. (Batteries which do not support this function cannot be used.) Panasonic cannot in any way guarantee the quality, performance or safety of batteries which have been manufactured by other companies and are not genuine Panasonic products.

It has been found that counterfeit battery packs which look very similar to the genuine product are made available to purchase in some markets. Some of these battery packs are not adequately protected with internal protection to meet the requirements of appropriate safety standards. There is a possibility that these battery packs may lead to fire or explosion. Please be advised that we are not liable for any accident or failure occurring as a result of use of a counterfeit battery pack. To ensure that safe products are used we would recommend that a genuine Panasonic battery pack is used.

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.

*It is not a matter of the setting condition of Recording mode (such as "normal picture/scene/motion picture" mode) to display the error code.

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

Set the [REC]/[PLAYBACK] selector switch to "[REC] (Camera mark)".

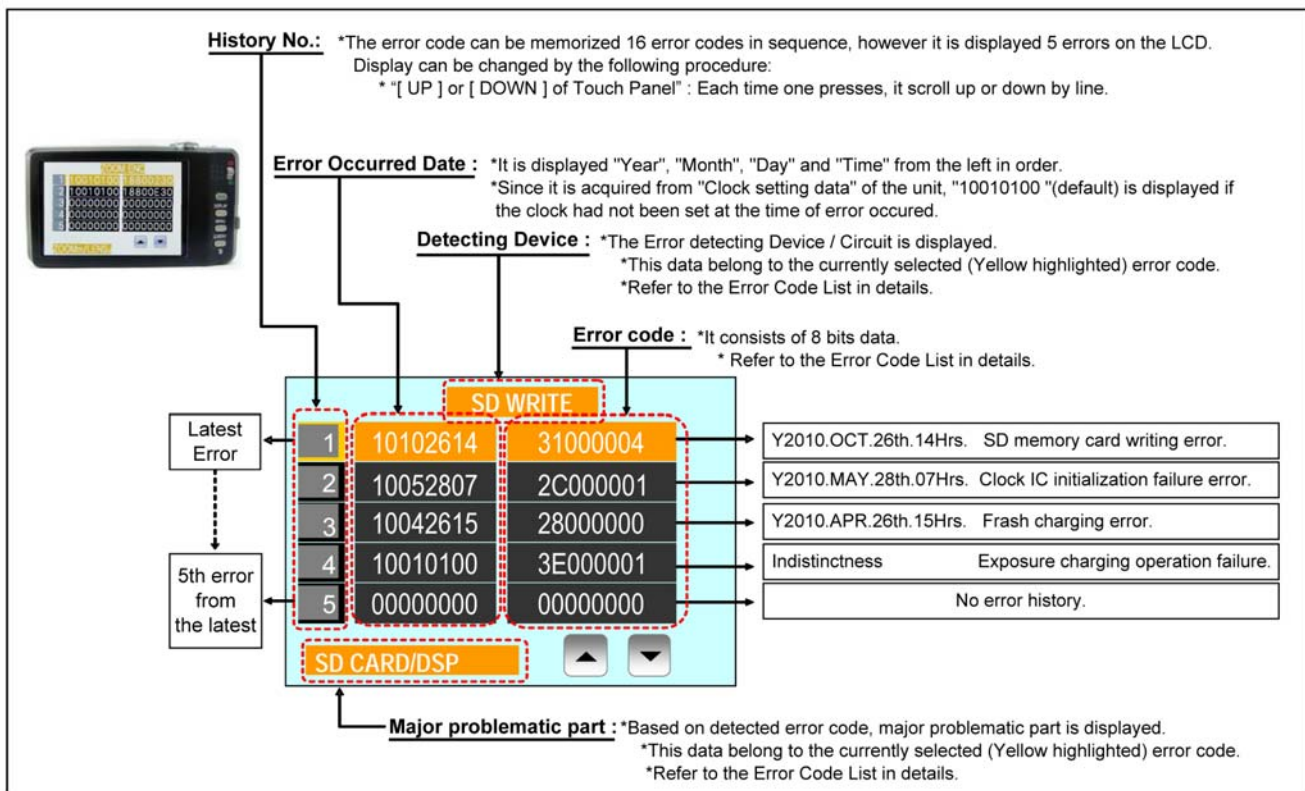
While keep turning the Zoom Lever to [Wide] and pressing [iA] button simultaneously, turn the Power on.

• Step 2. Execute the error code display mode:

Turn the Zoom Lever to [Wide] and press the [iA] button and [MENU] 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 Sub Operation P.C.B., IC7101 (Gyro element) or IC6001 (VENUS 4)		GYRO X	GYRO NG					
			4000	GYRO (Y) error. Gyro (IC7101: Y axis) detect error on Sub Operation P.C.B., IC7101 (Gyro element) or IC6001 (VENUS 4)		GYRO Y							
			5000	MREF error (Reference voltage error).	IC9101 (SYSTEM) or IC6001 (VENUS 4)	OIS REF	LENSsd/DSP NG						
			6000	Drive voltage (X) error.	LENS Unit, LENS flex breaks, IC6001 (VENUS 4) AD value error, etc.	OISX REF	LENSu/LENS FPC						
			7000	Drive voltage (Y) error.	LENS Unit, LENS flex breaks, IC6001 (VENUS 4) AD value error, etc.	OISY REF							
		Zoom	0710	Collapsible barrel Low detect error (Collapsible barrel encoder always detects Low.)	Mechanical lock, FP9002-(2) signal line or IC6001 (VENUS 4)	ZOOM L	ZOOMm/LENSu						
				0720	Collapsible barrel High detect error (Collapsible barrel encoder always detects High.)	Mechanical lock, FP9002-(2) signal line or IC6001 (VENUS 4)		ZOOM H					
				0730	Zoom motor sensor error.	Mechanical lock, FP9002-(32), (35) signal line or IC6001 (VENUS 4)		ZOOM ENC					
			0740	Zoom motor sensor error. (During monitor mode.)	Mechanical lock, FP9002-(32), (35) signal line or IC6001 (VENUS 4)								
			0750	Zoom motor sensor error. (During monitor mode with slow speed.)	Mechanical lock, FP9002-(32), (35) signal line or IC6001 (VENUS 4)								
			0701	HP High detect error (Focus encoder always detects High, and not becomes Low)	Mechanical lock, FP9002-(2) signal line or IC6001 (VENUS 4)	FOCUS L							
			Focus	0702	HP Low detect error (Focus encoder always detects Low, and not becomes High)	Mechanical lock, FP9002-(2) signal line or IC6001 (VENUS 4)		FOCUS H	LENS FPC/DSP				
		Lens		18*1	0000	Power ON time out error.	LENS DRV	LENSu					
			18*2	0000	Power OFF time out error.								
		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)								
	6000				OIS adj. MREF error								
	7000				OIS adj. time out error								
	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	28*0			0000	Flash charging error.	STRB CHG	STRB PCB/FPC	
	FLASH ROM (EEPROM Area)				FLASH ROM (EEPROM Area)	2B*0			0001	EEPROM read error	IC6002 (FLASH ROM)	FROM RE	FROM
									0002	EEPROM write error	IC6002 (FLASH ROM)	FROM WR	FROM
									0005	Firmware version up error	Replace the firmware file in the SD memory card.	(No indication)	(No indication)
		0008	SDRAM error	SDRAM Mounting defective									
	SYSTEM	RTC	2C*0	0001	SYSTEM IC initialize failure error	Communication between IC6001 (VENUS 4) and IC9101 (SYSTEM)	SYS INIT	MAIN PCB					
SOFT	CPU	Reset	30*0	0001	NMI reset	NMI RST	MAIN PCB						
				0007	Non Mask-able Interrupt (30000001-30000007 are caused by factors)								
	Card	Card	31*0	0001	Card logic error	SD CARD	SD CARD/DSP						
				0002	SD memory card data line or IC6001 (VENUS 4)								
				0004	Card physical error								
				0004	Write error								
				0004	SD memory card data line or IC6001 (VENUS 4)								
	39*0	0005	Format error	INMEMORY	FROM								
	CPU, ASIC hard	Stop	38*0	0001	Camera task finish process time out.	LENS COM	LENSu/DSP						
				0002	Communication between Lens system and IC6001 (VENUS 4)								
				0100	Camera task invalid code error.								
				0200	IC6001 (VENUS 4)								
				0200	File time out error in recording motion image								
				0200	File data cue send error in recording motion image								
	0300	IC6001 (VENUS 4)											
0300	Single or burst recording brake time out.												
Memory area	3A*0	0008	USB work area partitioning failure	(No indication)	(No indication)								
		0008	USB dynamic memory securing failure when connecting										
Operation	Power on	3B*0	0000	FLASHROM processing early period of camera during movement.	INIT	(No indication)							
Zoom	Zoom	3C*0	0000	Inperfect zoom lens processing	ZOOM	ZOOMm/LENSu							
			0000	Zoom lens									
			0000	Software error (0-7bit : command, 8-15bit : status)			DSP	DSP					
			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: 18**0**01000)

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: 18**8**01000)

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:

It is not a matter or the setting condition of Recording mode (such as "normal picture/scene/motion picture" mode) to display the ICS data.

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

Set the [REC]/[PLAYBACK] selector switch to " [REC] (Camera mark)".

While keep turning the Zoom Lever to [Wide] and pressing [iA] button simultaneously, turn the Power on.

• Step 2. Execute the ICS display mode:

Set the [REC]/[PLAYBACK] selector switch to [PLAYBACK].

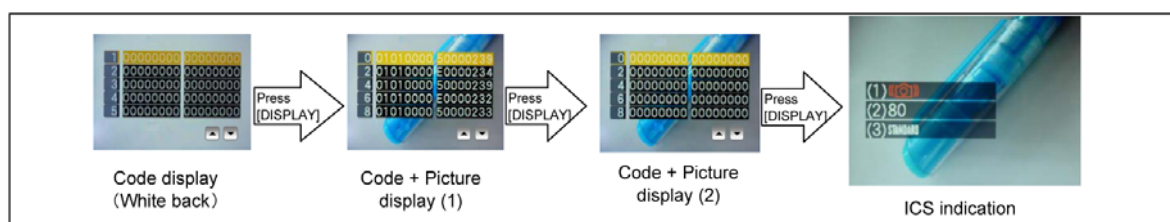
Select the concerned picture by [LEFT] / [RIGHT] of Touch Panel.

Turn the Zoom Lever to [Wide] and press the [iA] button and [MENU] 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.

(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 [ISO80], it can be confirmed the ISO setting condition : [AUTO], [INTELLIGENT ISO] or [ISO 80](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 mode Setting condition:
 This part shows that the "Color mode" setting condition when the picture had been taken.
 [Point for Confirmation]
 *The symptom is "Color is strange. The picture is bluish (Yellowish) ", does the picture was taken with [SEPIA] / [COOL] / [WARM] 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.)

[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], [80], [100], [200], [400], [800] and [1600] in "Normal shooting" mode.
 (The ISO sensitivity setting is not available when the [INTELLIGENT ISO] is being used.)
 *When setting to [AUTO], the ISO sensitivity is automatically adjusted to a maximum of [ISO400] according to the brightness.
 (It can be adjusted to a maximum of [ISO1600] when using the flash.)
 *To avoid picture noise, we recommend that you either reduce the ISO sensitivity level or set [COLOR MODE] to [NATURAL], and then take pictures.


ISO sensitivity	80	↔	1600
Recording location (recommended)	When it is light (outdoors)		When it is dark
Shutter speed	Slow		Fast
Noise	Less		Increased

<COLOR MODE>
 *Using these modes, the pictures can be made sharper or softer, the colors of the pictures can be turned into sepia colors or other color effects can be achieved.
 *In this unit, it can be set one of the following effects in "Normal shooting" mode.

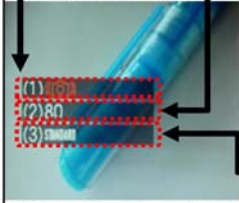
[STANDARD] : This is the standard setting.	[B/W] : The picture becomes black and white.
[NATURAL] : The picture becomes softer.	[SEPIA] : The picture becomes sepia.
[VIVID] : The picture becomes sharper.	[COOL] : The picture becomes bluish.
	[WARM] : The picture becomes reddish.

NOTE: You cannot set [NATURAL], [VIVID], [COOL] or [WARM] in Intelligent auto mode.
 *When you take pictures in dark places, noise may become visible. To avoid noise, we recommend setting to [NATURAL].

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



[ICS display (Sample)]

(1). Jitter alert mark : [Indicated]
 (2). ISO sens. setting : ISO80 (Fixed)
 (3). Color mode setting: Standard

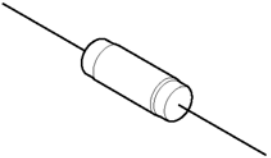
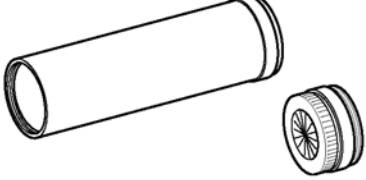
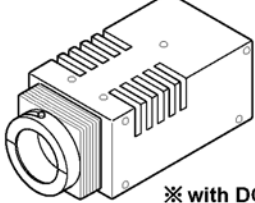
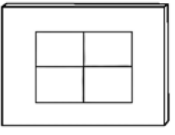


4. How to exit:

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.

Resistor for Discharging ERG5SJ102	Infinity Lens (with Focus Chart) VFK1164TCM02	LIGHT BOX VFK1164TDVLB
 An equivalent type of Resistor may be used.	 * VFK1164TCM03 can be used. * RFKZ0422 can be used.	 ※ with DC Cable * RFKZ0523 can be used.
TR Chart RFKZ0443	Lens Cleaning Kit (BK) VFK1900BK	Grease (for lens) RFKZ0472
	 * Only supplied as 10 set/box.	

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

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

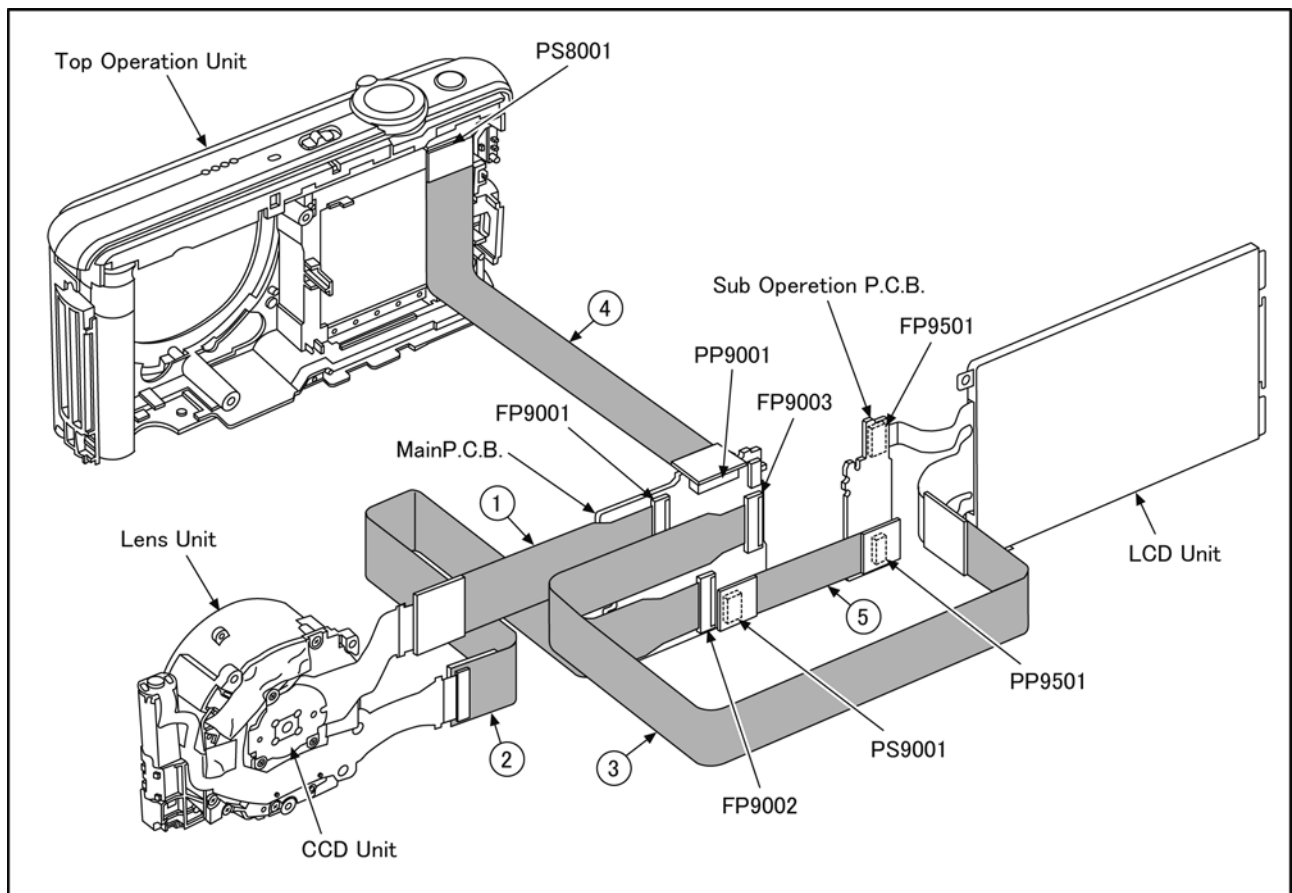
The adjustment instruction is available at "software download" on the "Support Information from NDBG/VDBG-AVC" web-site in "TSN system", together with Maintenance software.

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	RFKZ0494	FP9001 (MAIN) - CCD UNIT	45PIN 0.3 FFC
2	RFKZ0416	FP9002 (MAIN) - LENS UNIT	41PIN 0.3 FFC
3	RFKZ0416	FP9003 (MAIN) - LCD UNIT	41PIN 0.3 FFC
4	RFKZ0418	PP9001 (MAIN) - PS8001 (FLASH TOP)	30PIN B to B
5	RFKZ0548	PS9001 (MAIN) - PP9501 (SUB OPERATION)	20PIN B to B



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

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

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

The 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 TOP P.C.B..

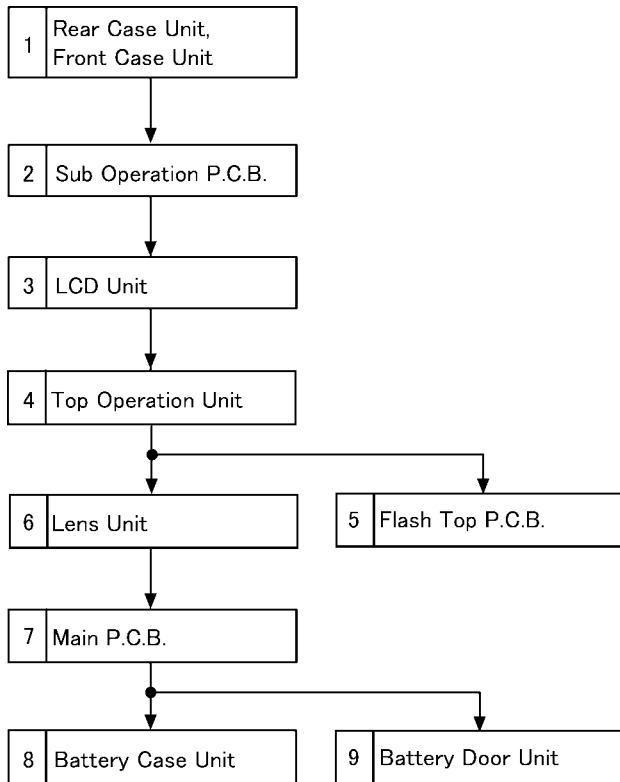
3. DO NOT allow other parts to touch the high voltage circuit on FLASH TOP P.C.B..

8 Disassembly and Assembly Instructions

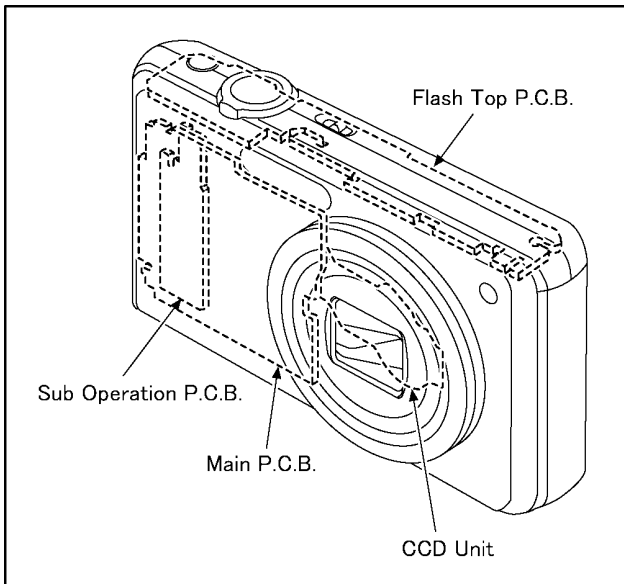
8.1. Disassembly Flow Chart

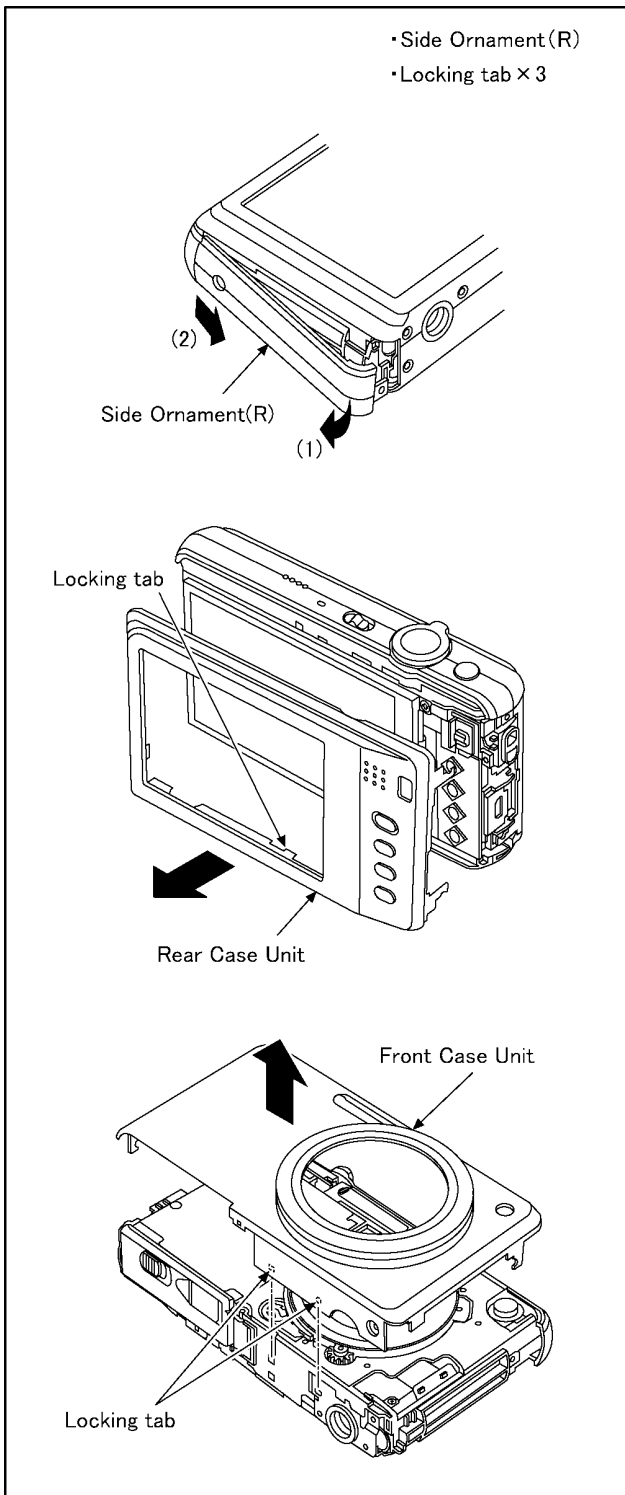
This is a disassembling chart.

When assembling, perform this chart conversely.



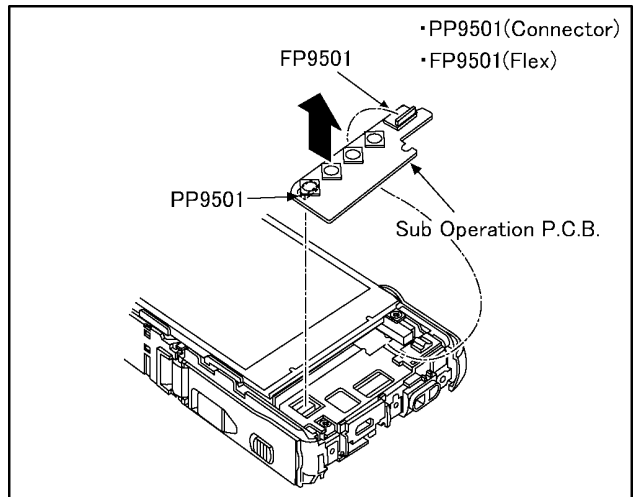
8.2. PCB Location





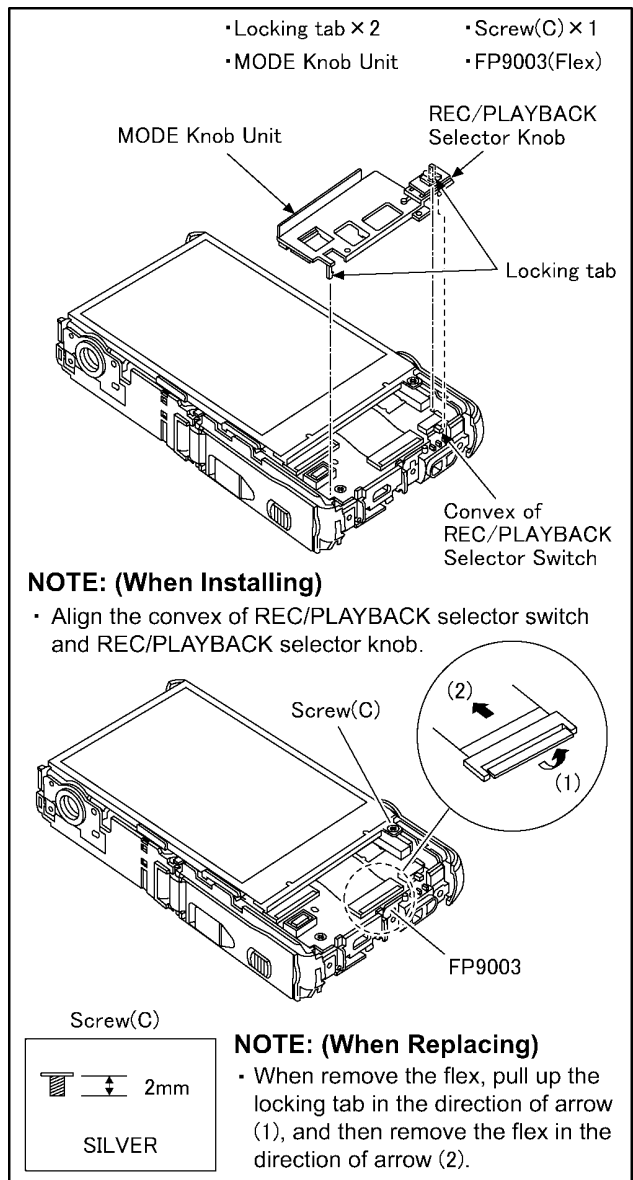
(Fig. D2)

8.3.2. Removal of the Sub Operation P.C.B.

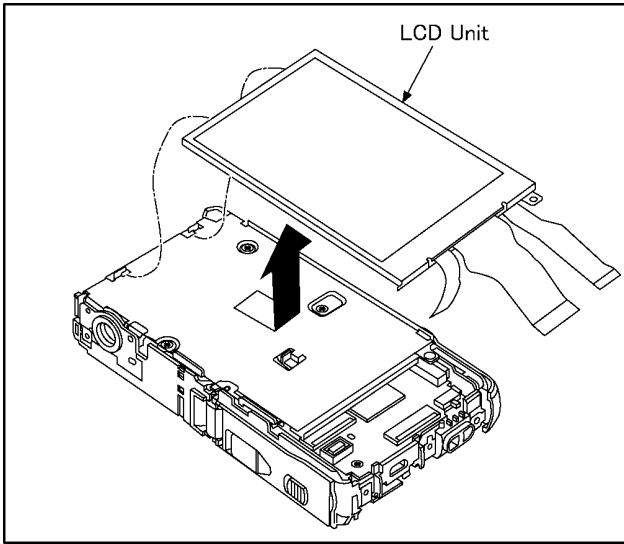


(Fig. D3)

8.3.3. Removal of the LCD Unit

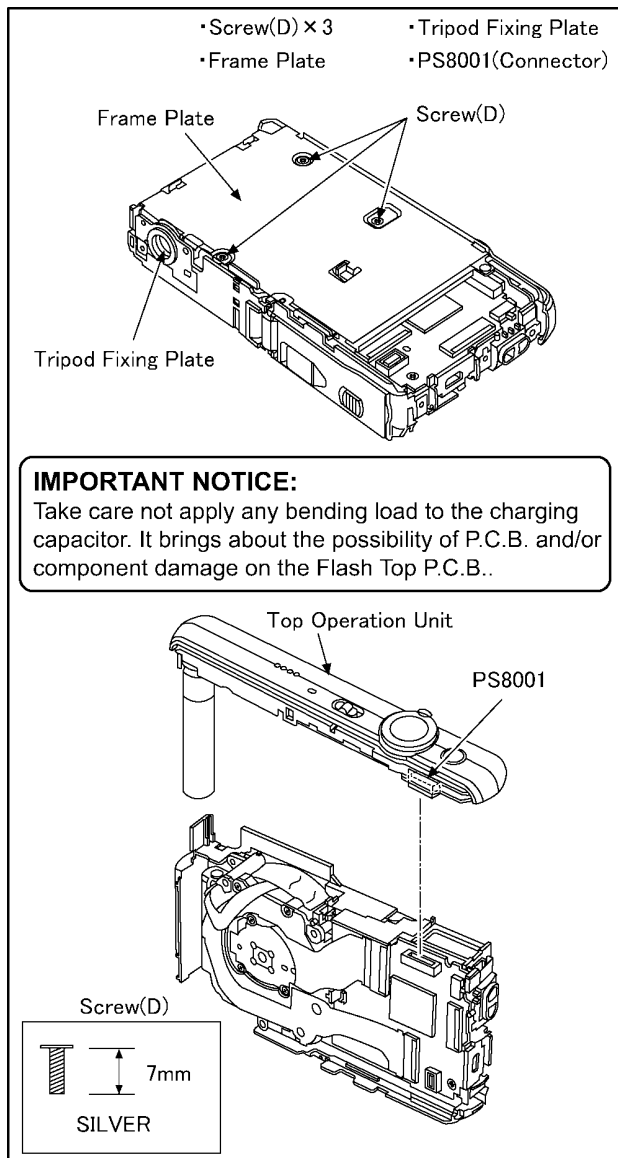


(Fig. D4)



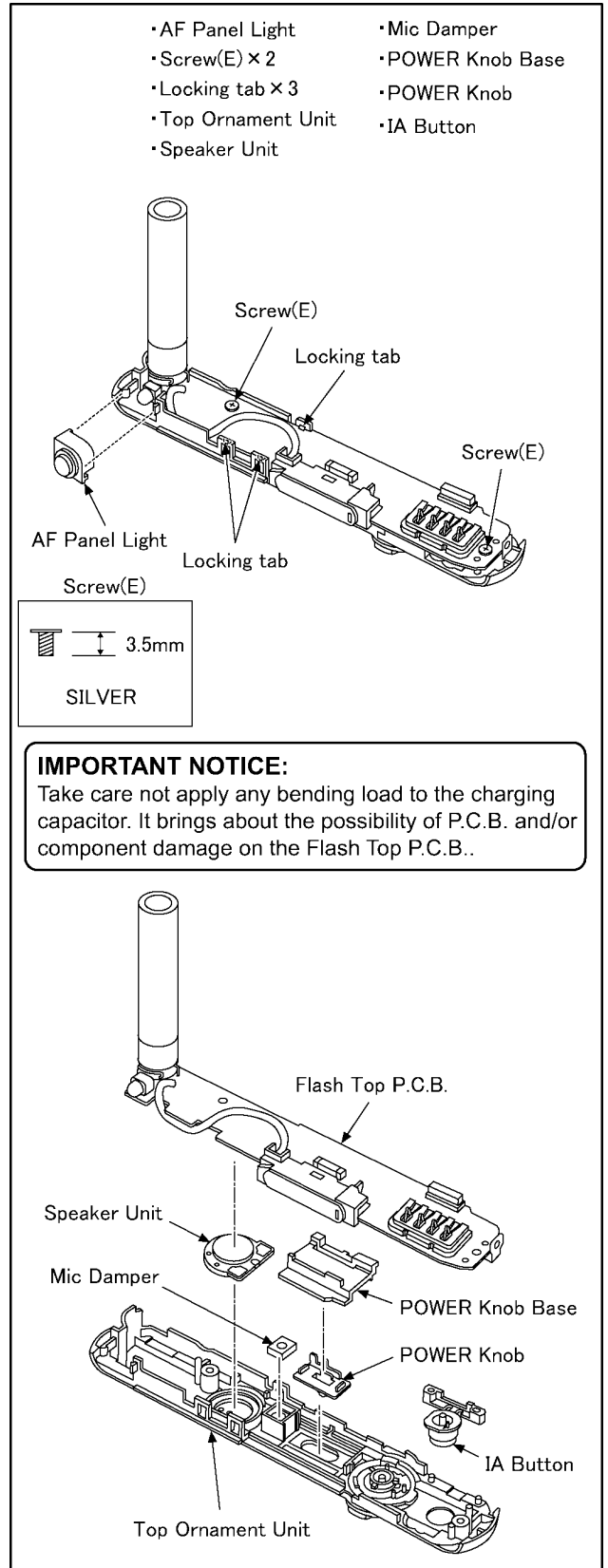
(Fig. D5)

8.3.4. Removal of the Top Operation Unit

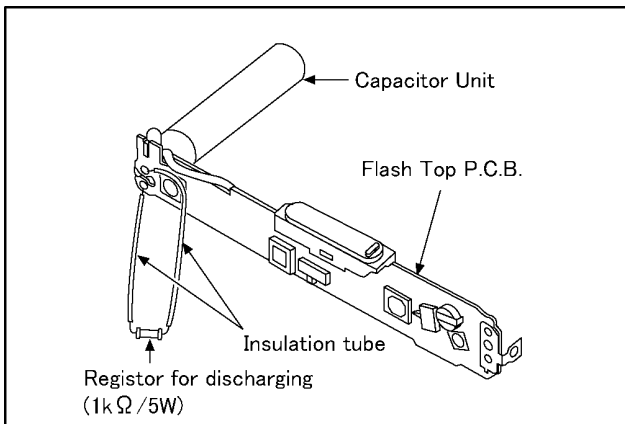


(Fig. D6)

8.3.5. Removal of the Flash Top P.C.B.



(Fig. D7)



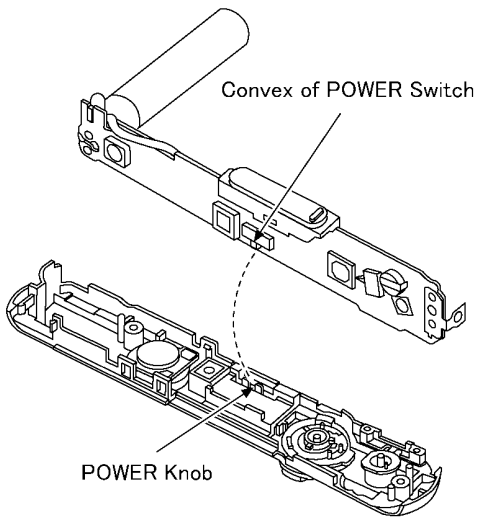
CAUTION

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

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

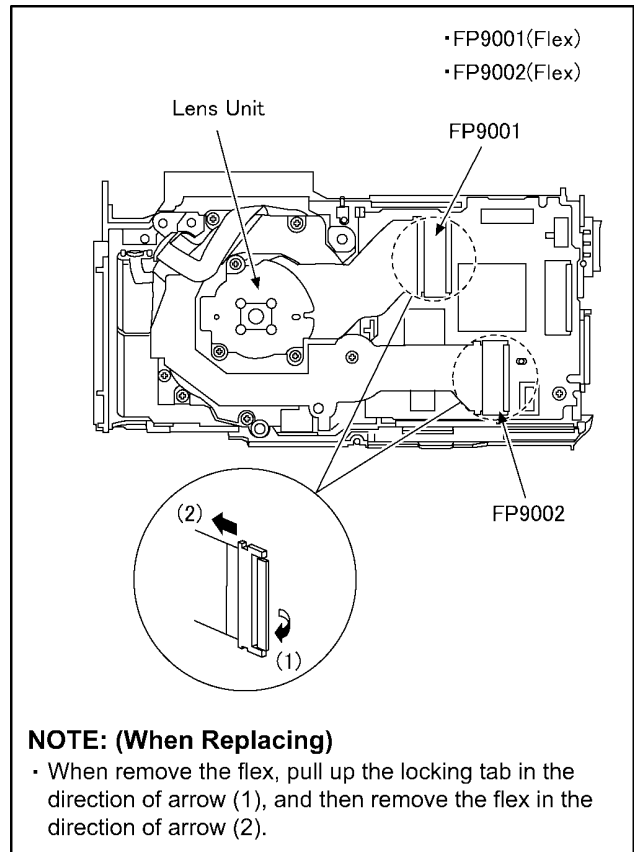
NOTE: (When Installing)

- Align the convex of power switch and power knob.



(Fig. D8)

8.3.6. Removal of the Lens Unit

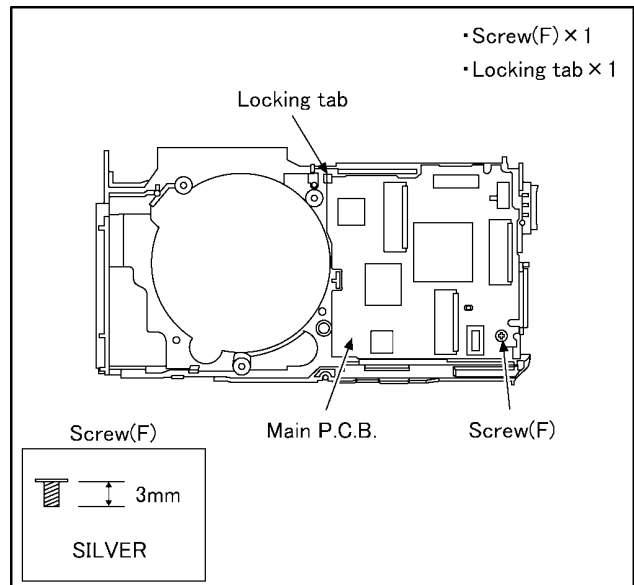


NOTE: (When Replacing)

- 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).

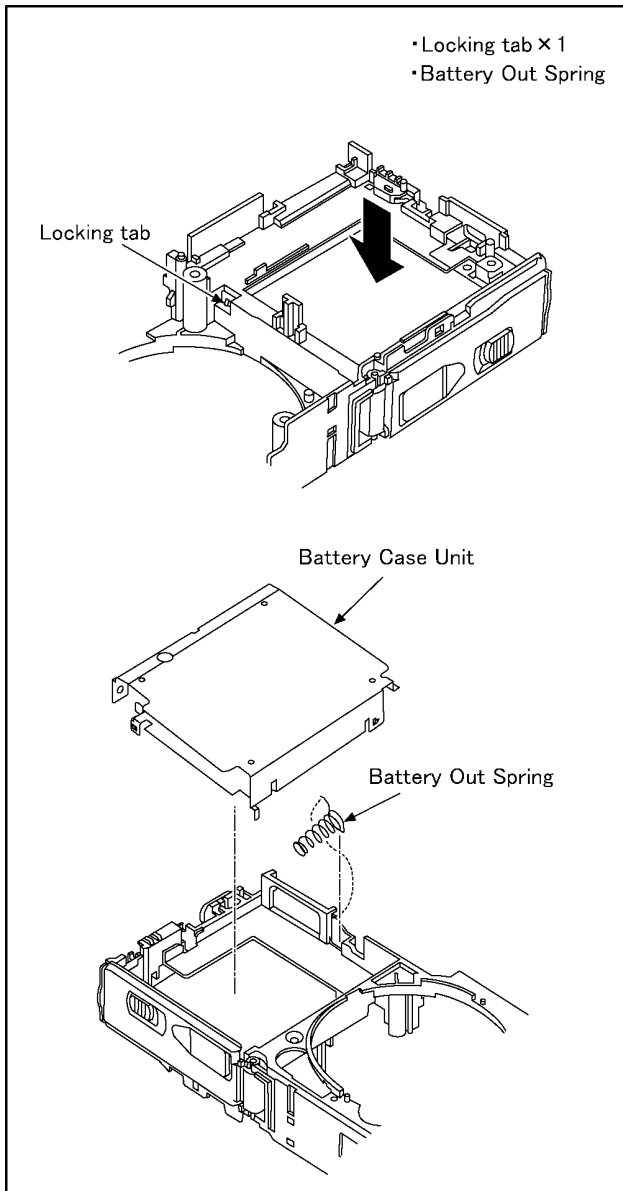
(Fig. D9)

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



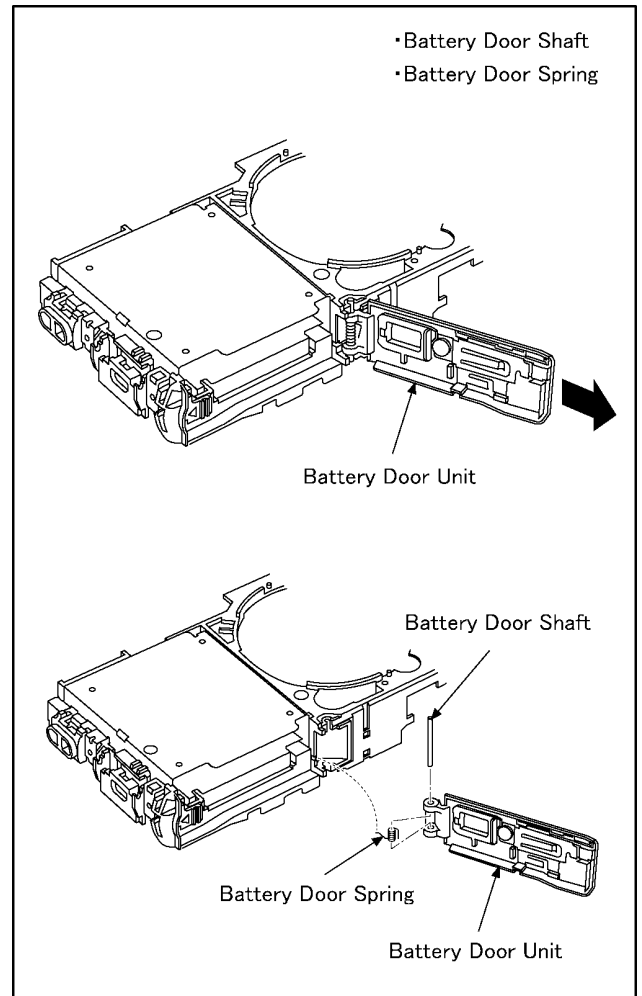
(Fig. D10)

8.3.8. Removal of the Battery Case Unit



(Fig. D11)

8.3.9. Removal of the Battery Door Unit



(Fig. D12)

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.)

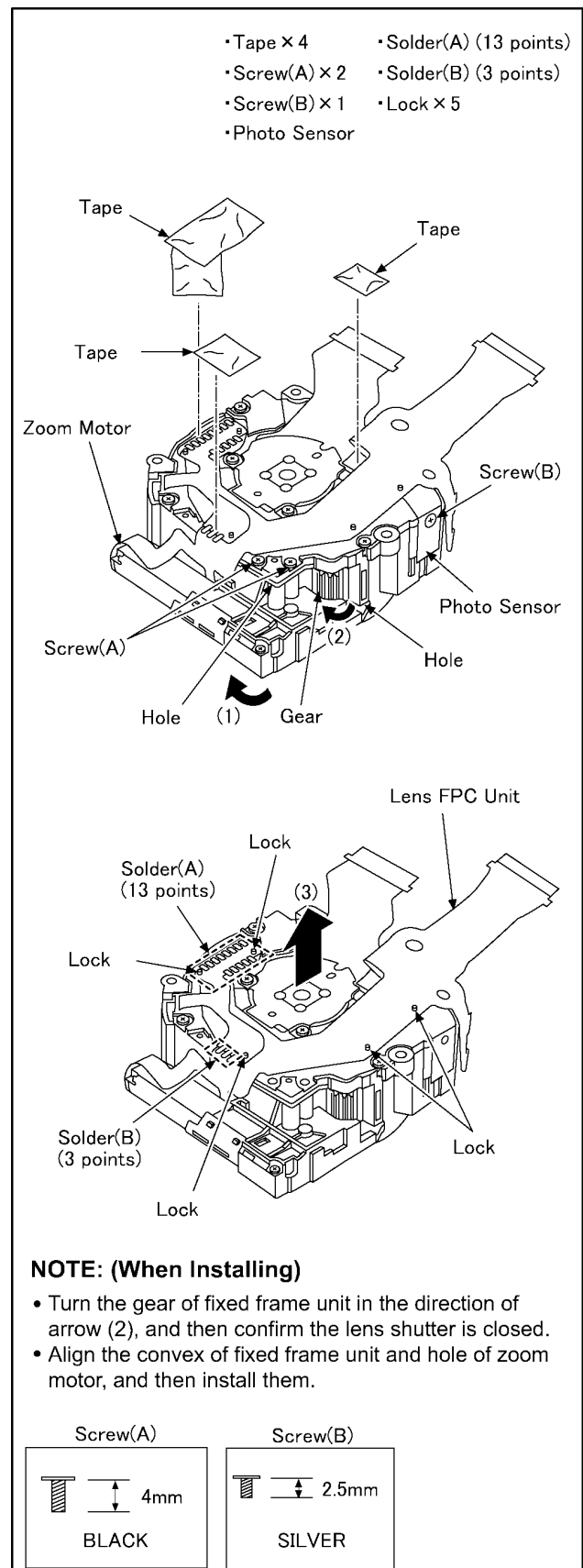
8.4. Lens Disassembly Procedure

Precaution:

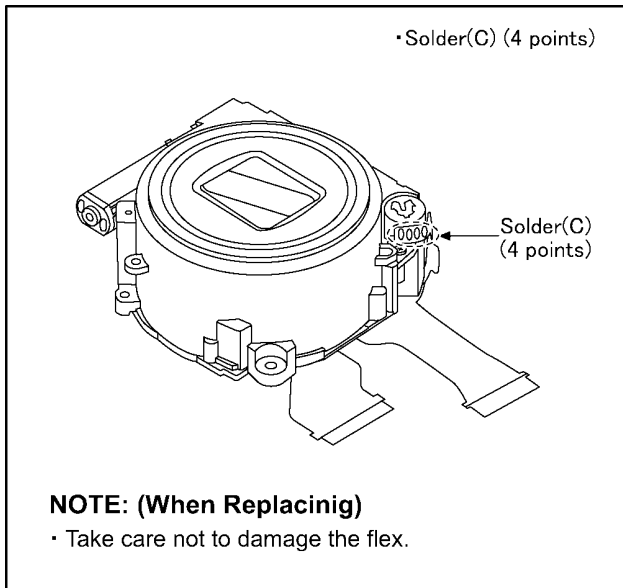
1. Do not remove the CCD when disassembling or re-assembling the lens in order to maintain it clean.
When remove it, refer to item "8.6."
2. Keep dust or dirt away from the lens.
3. To remove dirt or dust from the lens, blow with dry air.
4. Do not touch the lens surface.
5. Apply grease (RFKZ0472) as shown on "THE APPLICATION OF GREASE METHOD" in the figure.
6. Apply a light coat of grease using an object similar to a toothpick.
7. The drive frame unit and penetration cam frame should be replaced as a unit.

8.4.1. Removal of the Zoom Motor and Lens FPC Unit

1. Remove the 4 tapes.
2. Unscrew the 2 screws (A).
3. Shift the zoom motor to the direction of arrow (1).
4. Unscrew the 1 screw (B).
5. Remove the photo sensor.
6. Remove the 13 solders (A).
7. Remove the 3 solders (B).
8. Remove the 5 locks.

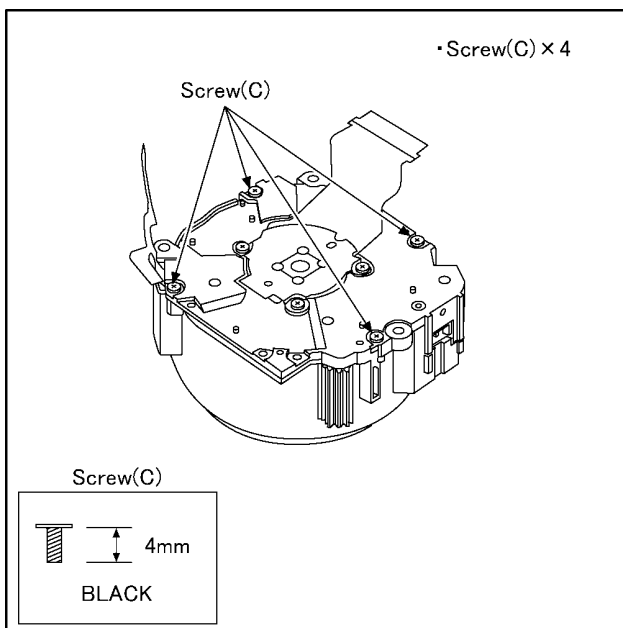


9. Remove the 4 solders (C).
10. Remove the lens FPC unit to the direction of arrow (3).

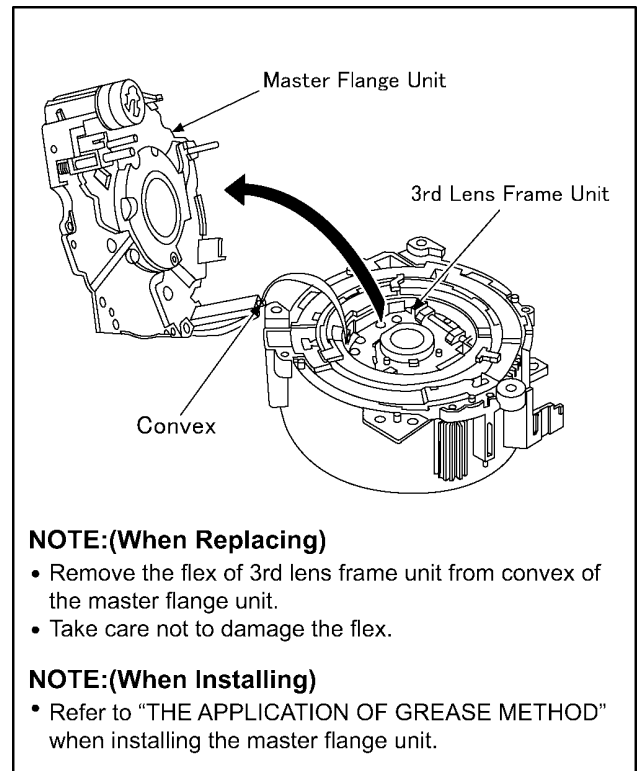


8.4.2. Removal of the Master Flange Unit

1. Unscrew the 4 screws (C).



2. Remove the master flange unit.

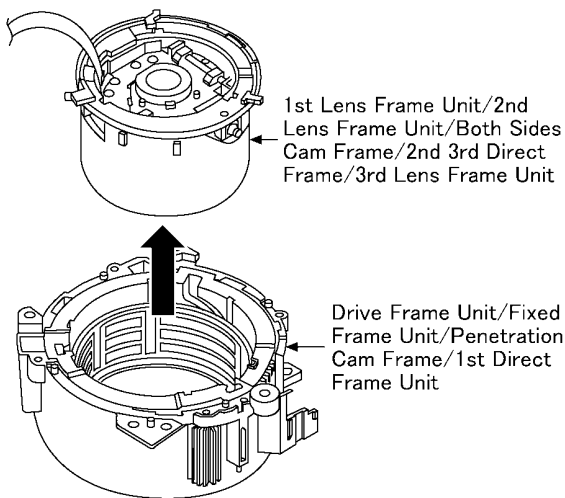


8.4.3. Removal of the 1st Lens Frame Unit/2nd Lens Frame Unit/Both Sides Cam Frame/2nd 3rd Direct Frame/3rd Lens Frame Unit

1. Push the both sides cam frame from the lens front side in the direction of arrow, and then remove the unit of 1st lens frame unit/2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit from the fixed frame unit/drive frame unit/penetration cam frame/1st direct frame unit.

■ CAUTION

- The "Drive/Penetration Frame Unit" should be replaced as a unit. Do not replace/exchange only single part, individually.

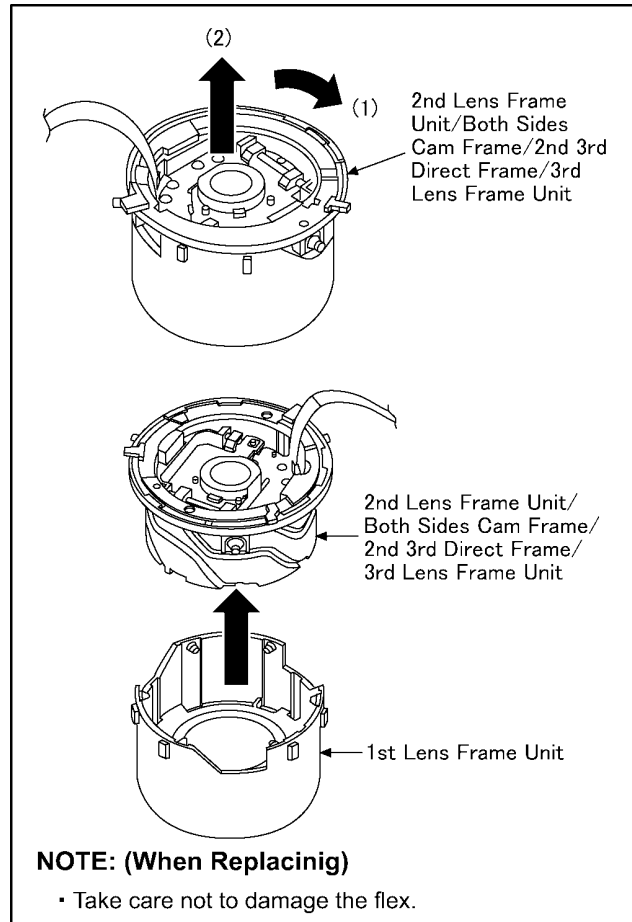


NOTE: (When Replacing)

- Take care not to damage the flex.
- When lift the 1st lens frame unit/2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit, take care not to put fingerprint of the lens.

8.4.4. Removal of the 2nd Lens Frame Unit/Both Sides Cam Frame/2nd 3rd Direct Frame/3rd Lens Frame Unit

1. Turn the 2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit in the direction of the arrow (1) fully, and then remove them in the direction of the arrow (2).

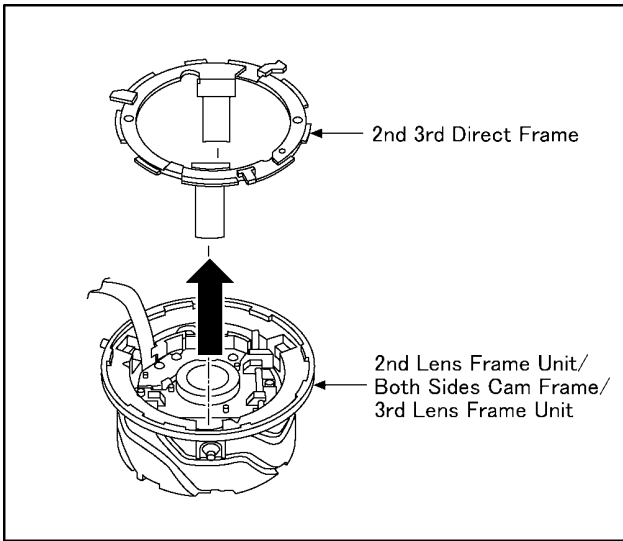


NOTE: (When Replacinig)

- Take care not to damage the flex.

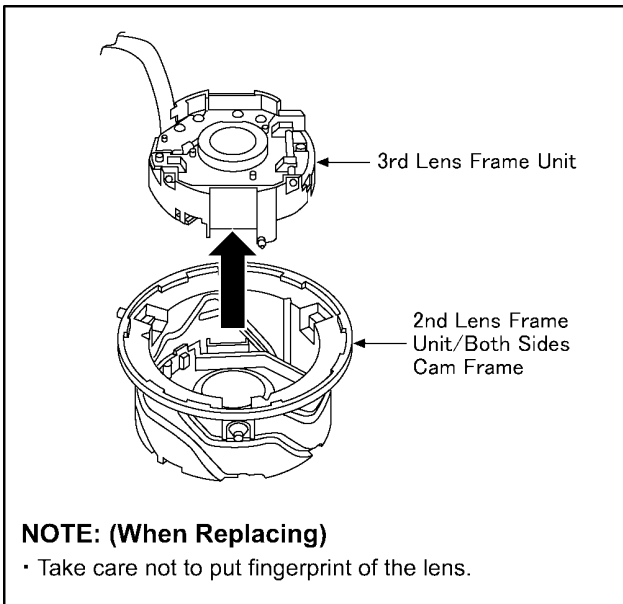
8.4.5. Removal of the 2nd 3rd Direct Frame

1. Remove the 2nd 3rd direct frame in the direction of the arrow.



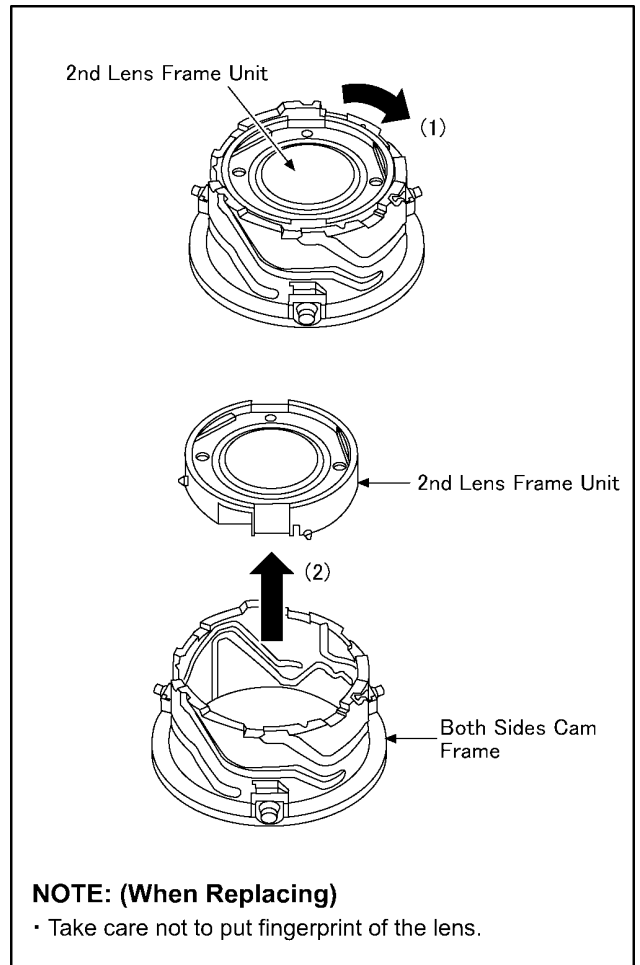
8.4.6. Removal of the 3rd Lens Frame Unit

1. Remove the 3rd lens frame unit in the direction of the arrow.



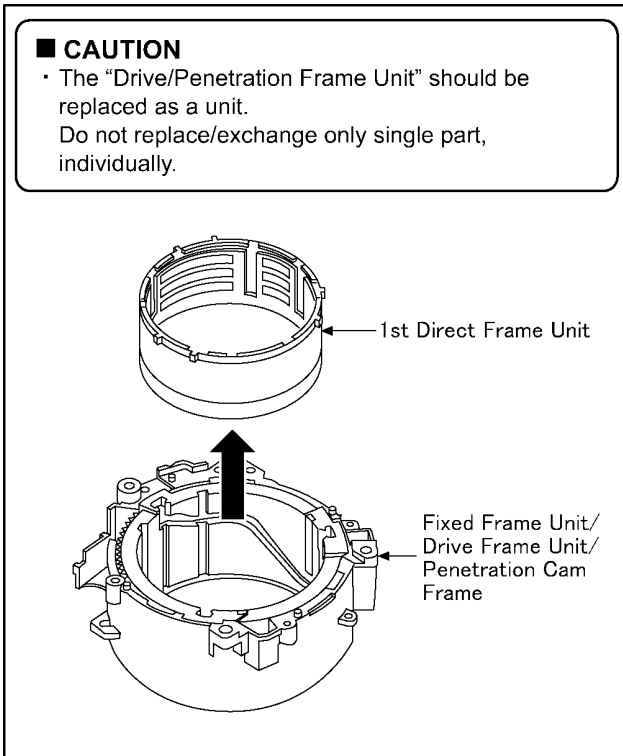
8.4.7. Removal of the 2nd Lens Frame Unit

1. Turn the 2nd lens frame unit in the direction of the arrow (1) fully, and then remove it in the direction of the arrow (2).



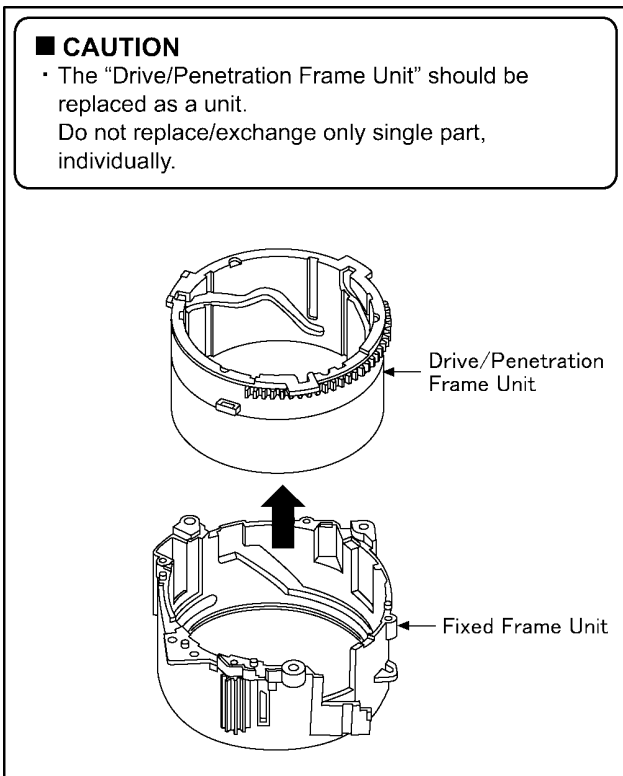
8.4.8. Removal of the 1st Direct Frame Unit

1. Remove the 1st direct frame unit in the direction of the arrow.



8.4.9. Removal of the Drive/Penetration Frame Unit

1. Remove the drive/penetration frame unit in the direction of the arrow.

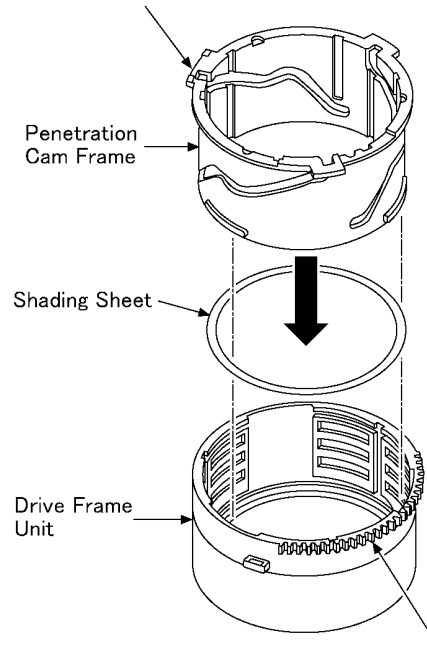


8.5. Assembly Procedure for the Lens

8.5.1. Phase alignment of the Penetration Cam Frame and Drive Frame Unit

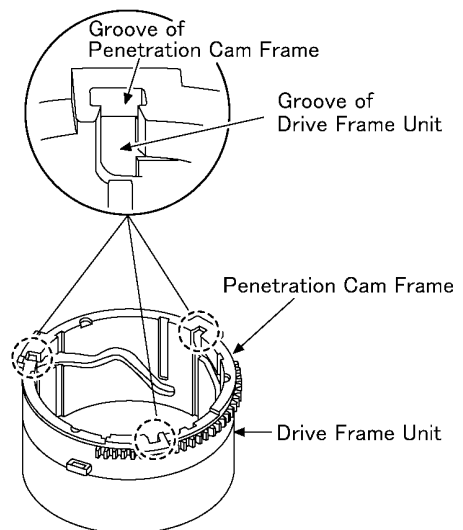
1. Insert the shading sheet to drive frame unit.
(When insert the shading sheet, so that the luster side facing to subject side.)
2. Set the projection part(most wide) of penetration cam frame at the upper left and the gear part of drive frame unit at the lower right, and then install the penetration cam frame to drive frame unit.

Set the projection part(most wide) at the upper left.



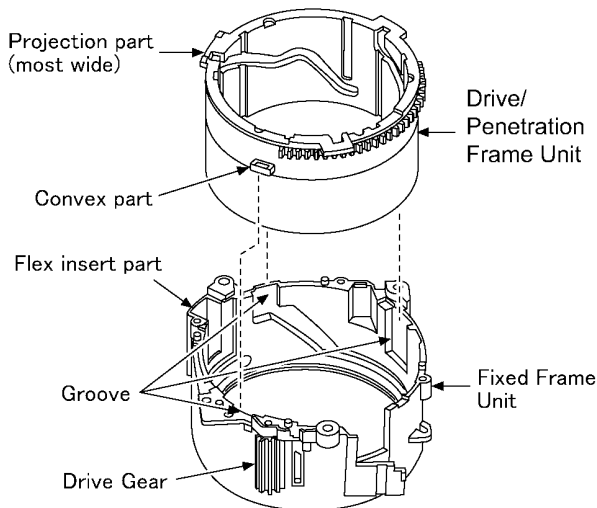
Set the gear part at the lower right.

- Align the phase of the groove of penetration cam frame and the groove of drive frame unit (3 points).



8.5.2. Phase alignment of the Drive/Penetration Frame Unit and Fixed Frame Unit

1. Align the projection part(most wide) of drive/penetration frame unit and the flex insert part of fixed frame unit.
2. Align the convex part of drive/penetration frame unit and the groove of fixed frame unit, and then install the drive/penetration frame unit to fixed frame unit.

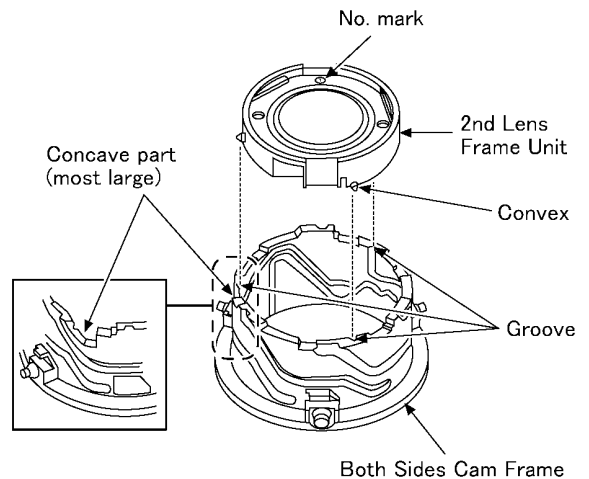


NOTE: (When Installing)

- With aligning the phase of the drive/penetration frame unit and the fixed frame unit, confirm the gear of drive frame unit is engaged with the gear of fixed frame unit firmly.

8.5.3. Phase alignment of the 2nd Lens Frame Unit and Both Sides Cam Frame

1. Set the No. mark of 2nd lens frame unit at the upper side and the concave part(most large) of both sides cam frame at the left.
2. Align the convex of 2nd lens frame unit and the groove of both sides cam frame, and then install the 2nd lens frame unit to both sides cam frame.

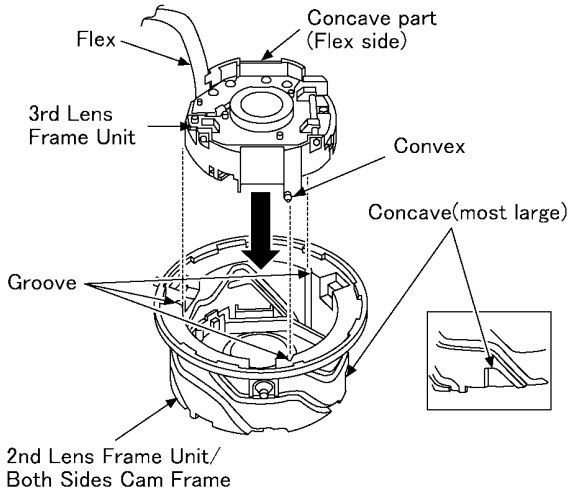


NOTE: (When Installing)

- Take care not to put fingerprint of the lens.

8.5.4. Phase alignment of the 3rd Lens Frame Unit and 2nd Lens Frame Unit/Both Sides Cam Frame

1. Set the concave part(flex side) of 3rd lens frame unit at the upper side and the concave(most large) of 2nd lens frame unit/both sides cam frame at the right.
2. Align the convex of 3rd lens frame unit and the groove of 2nd lens frame unit/both sides cam frame, and then install the 3rd lens frame unit to 2nd lens frame unit/both sides cam frame.

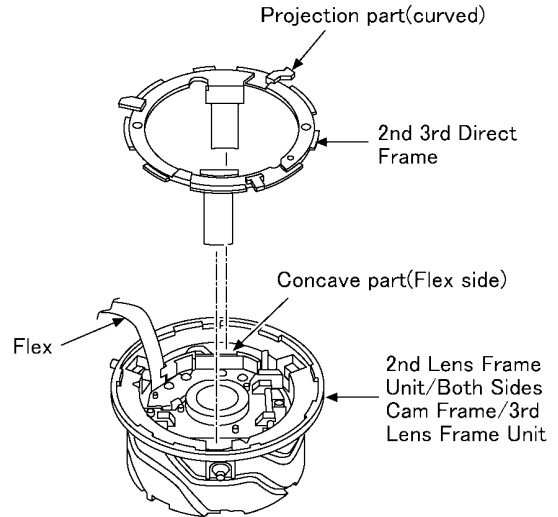


NOTE: (When Installing)

- Take care not to put fingerprint of the lens.
- Take care not to damage the flex.

8.5.5. Phase alignment of the 2nd 3rd Direct Frame and 2nd Lens Frame Unit/Both Sides Cam Frame/3rd Lens Frame Unit

- Align the projection part(curved) of 2nd 3rd direct frame and the concave part(flex side) of 2nd lens frame unit/both sides cam frame/3rd lens frame unit, and then install the 2nd 3rd direct frame to 2nd lens frame unit/both sides cam frame/3rd lens frame unit.

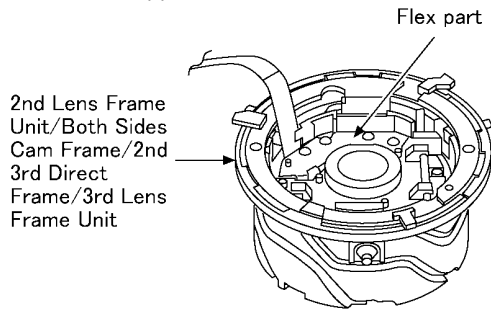


NOTE: (When Installing)

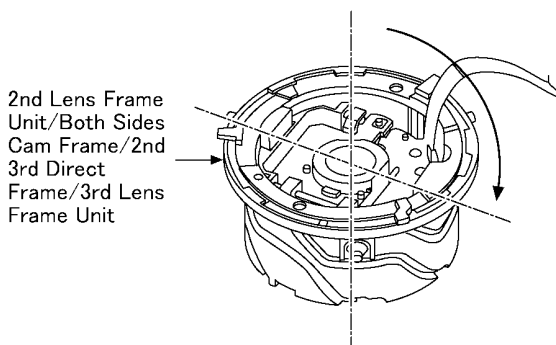
- Take care not to put fingerprint of the lens.

8.5.6. Phase alignment of the 2nd Lens Frame Unit/Both Sides Cam Frame/2nd 3rd Direct Frame/3rd Lens Frame Unit and 1st Lens Frame Unit

1. Set the flex part of 2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit at the upper side.

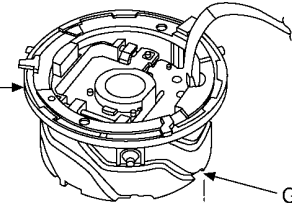


2. Rotate the 2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit in a clockwise direction approx. 110 degrees.



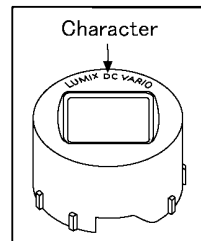
3. Set the "LUMIX DC VARIO" character on the front side of 1st lens frame unit at the upper side.
4. Align the groove of 2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit and the convex of 1st lens frame unit, and then install the 2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit to 1st lens frame unit. (The 2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit rotates in a counterclockwise direction while installing.)

2nd Lens Frame Unit/Both Sides Cam Frame/2nd 3rd Direct Frame/3rd Lens Frame Unit



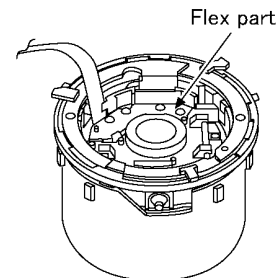
Groove

Convex



1st Lens Frame Unit

5. The flex part of 2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit is seen at the upper side when install is finished.

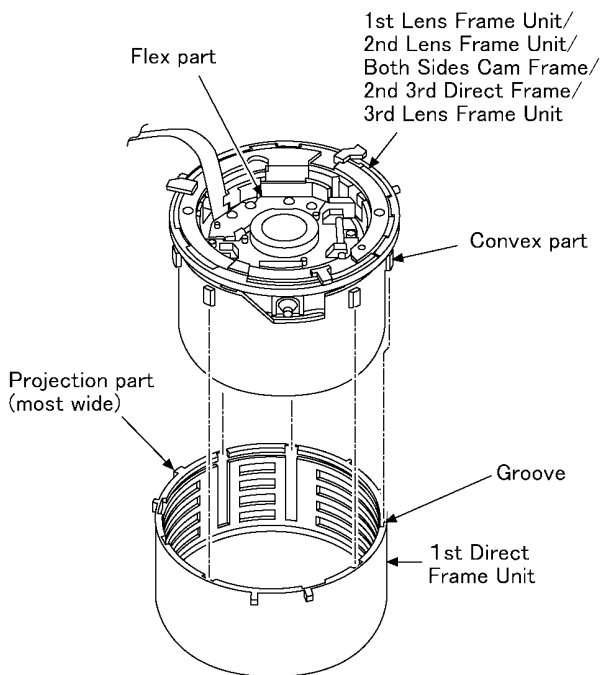


NOTE: (When Installing)

- Take care not to put fingerprint of the lens.
- Take care not to damage the flex.

8.5.7. Phase alignment of the 1st Lens Frame Unit/2nd Lens Frame Unit/ Both Sides Cam Frame/2nd 3rd Direct Frame/3rd Lens Frame Unit and 1st Direct Frame Unit

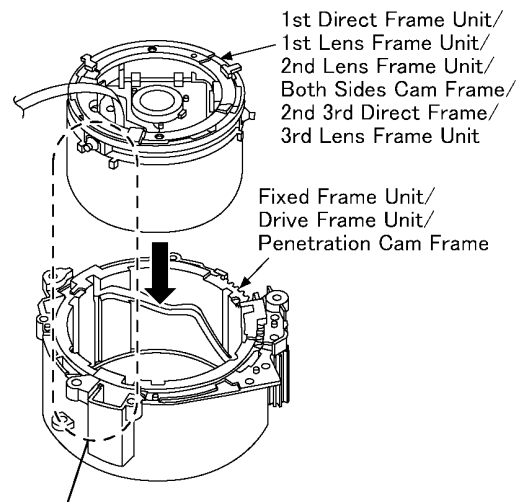
1. Set the flex part of 1st lens frame unit/2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit at the upper side and the projection part(most wide) of 1st direct frame unit at the upper left side.
2. Align the convex part of 1st lens frame unit/2nd lens frame unit/both sides cam frame/2nd 3rd direct frame /3rd lens frame unit and the groove of 1st direct frame unit, and then install the 1st lens frame unit/ 2nd lens frame unit/both sides cam frame/2nd 3rd direct frame/3rd lens frame unit to 1st direct frame unit.



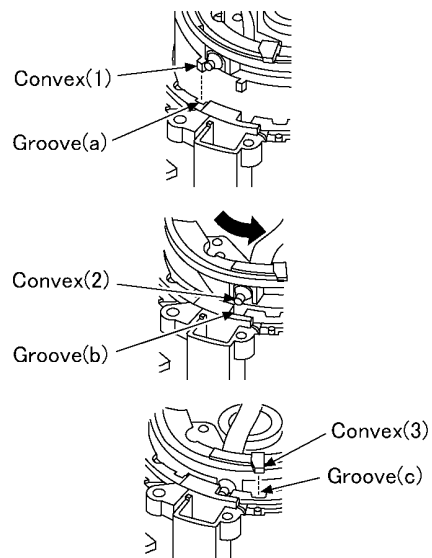
NOTE: (When Installing)

- Take care not to put fingerprint of the lens.
- Take care not to damage the flex.

8.5.8. Phase alignment of the 1st Direct Frame Unit/1st Lens Frame Unit/ 2nd Lens Frame Unit/Both Sides Cam Frame/2nd 3rd Direct Frame/ 3rd Lens Frame Unit and Fixed Frame Unit/Drive Frame Unit/Pene- tration Cam Frame

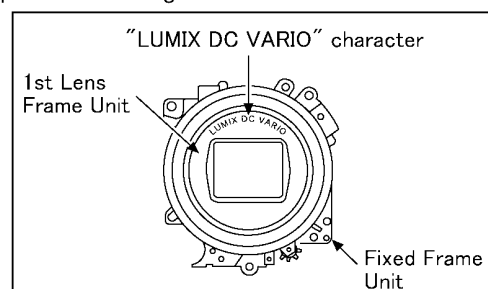


- Insert the convex(1), convex(2) and convex(3) to grooves(a,b,c) in order.

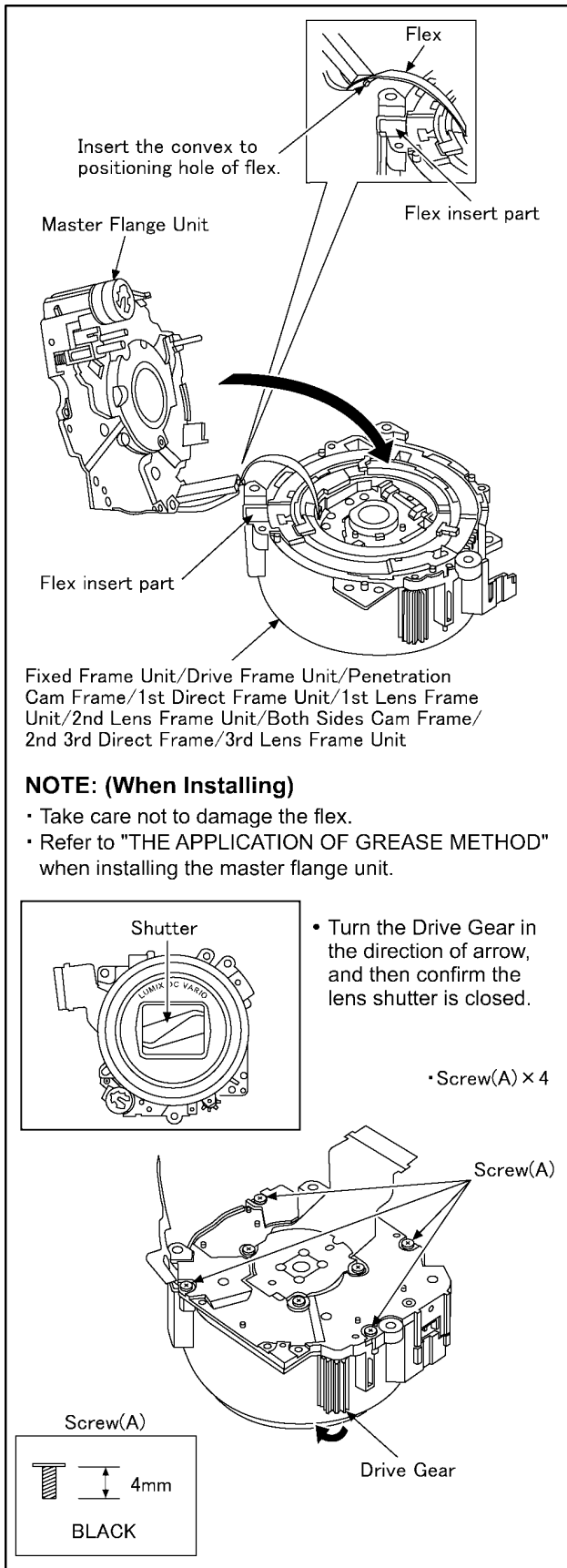


FRONT VIEW

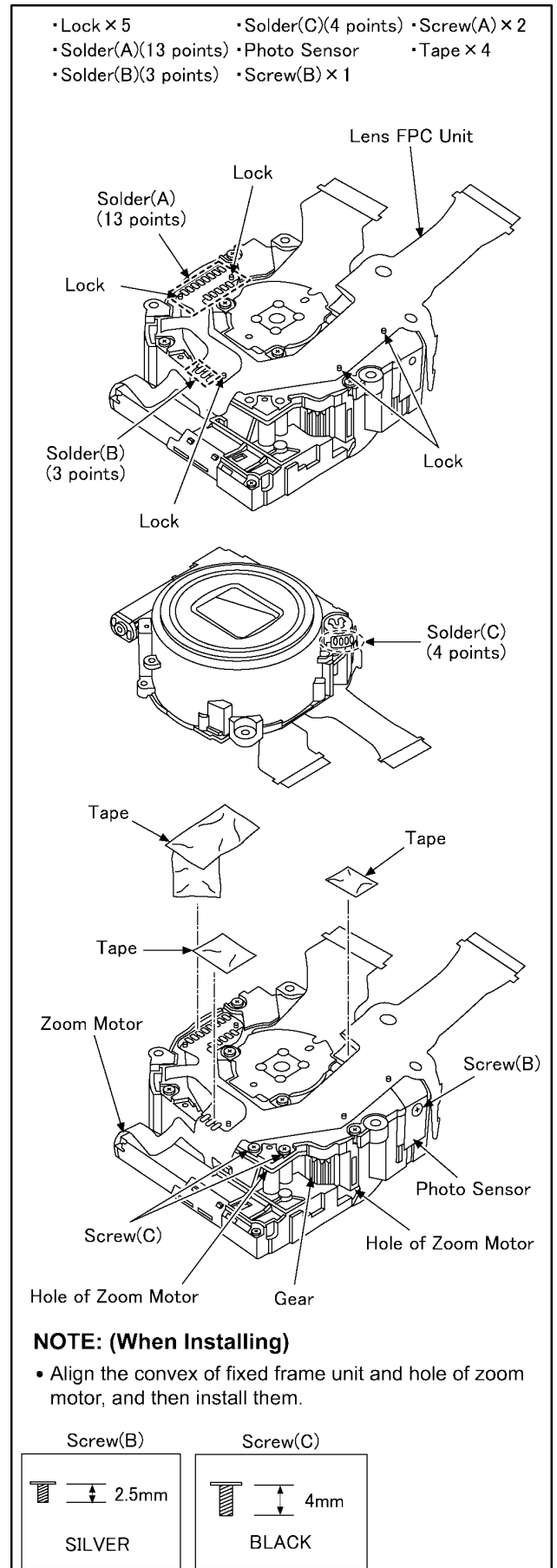
- Install the 1st lens frame unit so that the "LUMIX DC VARIO" character may become the position of the figure below.



8.5.9. Install of the Master Flange Unit



8.5.10. Install of the Lens FPC Unit and Zoom Motor



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)

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 "3.4.2 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.)
2. Set the recording mode to the [NORMAL PICTURE] mode.
(Press the [MODE] button and select the [NORMAL PICTURE] by touching the Touch Panel.)

Step 1. Temporary cancellation of "INITIAL SETTINGS":

Set the [REC]/[PLAYBACK] selector switch to "[REC] (Camera mark)".

While keep turning the Zoom Lever to [Wide] and pressing [iA] button simultaneously, turn the Power on.

Step 2. Cancellation of "INITIAL SETTINGS":

Set the [REC]/[PLAYBACK] selector switch to "[PLAYBACK]".

Press the [iA] button and [MODE] 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:

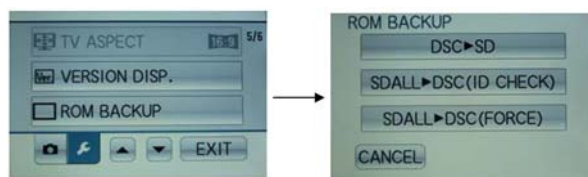
[ROM_BACKUP (Method of Non-PC backup)]

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.



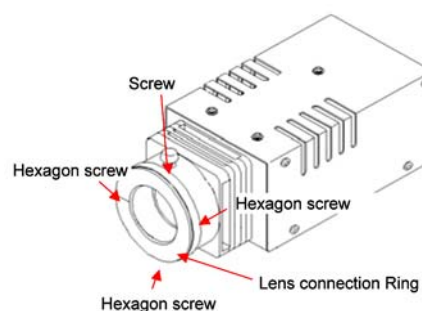
Item	Function	Details
DSC → SD	Save all the DSC's EEPROM data to SD-CARD	<ul style="list-style-type: none"> •DSC's EEPROM data is saved to the SD-CARD by the same format as the TATSUJIN software for the previous models. -File location: ROOT DIRECTORY in SD-CARD. -File Name: <ol style="list-style-type: none"> 1)User Setup Information data: <FILENAME>U.txt 2)Optical Adjustment data: <FILENAME>F.txt ※File name is changed from 2009 Spring models.
SDALL → DSC (ID CHECK)	Write the all data to DSC's EEPROM from SD-CARD	<ul style="list-style-type: none"> •ID CHECK: When the model ID is different, can not write •FORCE: Even if the model ID is different, can write. ※In case of replacing main PCB, it is not useful "SDALL → DSC (ID CHECK)" but "SDALL → DSC (FORCE)".
SDALL → DSC (FORCE)	Write the all data to DSC's EEPROM from SD-CARD	
SDUSER → DSC (FORCE)	Only "User setup information" is write from the saved file in the SD-CARD to DSC's EEPROM.	<ul style="list-style-type: none"> •FORCE: Even if the model ID is different, can write.

[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 hexagon 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 into [NORMAL PICTURE] mode.
 - b. Set the [REC]/[PLAYBACK] selector switch to “[REC] (Camera mark)”.
 - c. Turn the Power off.
 - d. Turn the Power on pressing [iA] and [MENU] 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 Zoom lever (Tele/Wide).
(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)”.

*(Refer to Fig. 3-3)

*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.

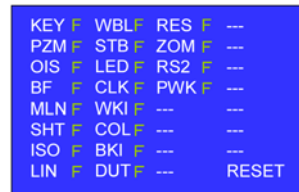


Fig. 3-2



Fig. 3-3

<Example: OIS flag is reset. >

- 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.3-4)
3. Press the [Shutter] button. The adjustment will start automatically.



Fig. 3-4

4. When the adjustment is completed successfully, adjustment report menu appears with Green OK on the LCD monitor. (Refer to Fig.3-5)



Fig. 3-5

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.3-6) 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. 3-6

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) Turn the zoom lever to [TELE].

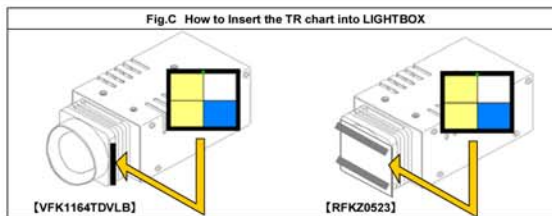
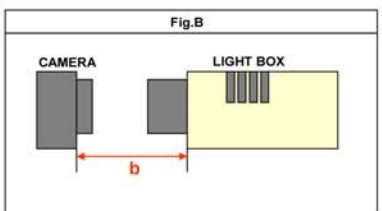
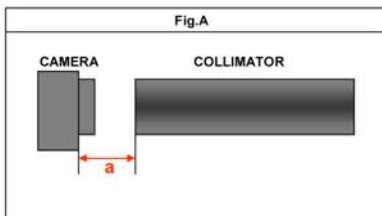
NOTE:

- 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 Item	FLAG	Purpose	Replacing Parts						JIG/TOOLS	SET UP	How to Operate
			MAIN PCB VENUS(IC8001)	MCP(IC6002)	Lens Parts (except for CCD)	CCD Unit	GYRO (IC7101)				
1 Venus Zoom	PZM	Venus Zoom Inspection	○	○	○	○	○	○	NONE	NONE	1)Press Shutter Button 2)After displaying "PZM", press Shutter Button again. 3)After completed, the "OK" menu appears.
2 OIS sensor	OIS	OIS sensor output level adjustment	○	○	○	○	○	○	NONE	NONE	1)Press Shutter Button (Do not offer any shock and vibration for the camera while adjusting) 2)After completed, the "OK" menu appears.
3 Backfocus / GYRO	BF	To have the focus tracking curve be appropriate shape and GYRO sensor adjustment	○	○	○	○	○	○	•COLLIMATOR (VFK1164TCM02 or VFK1164TCM03 or RFK20422)	1)Set the camera in front of collimator so that the distance from collimator to camera becomes about 4 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 offer any shock and vibration for the camera while adjusting) 2)Press Shutter Button again after displayed "green circle" on LCD display 3)After completed, the "OK" menu appears.
4 Monitor Linearity	MLN	Monitor Linearity adjustment	○	○	○	○	○	○	•LIGHT BOX (VFK1164TDVLB or RFK20523)	1)Set the camera in front of LIGHTBOX so that the distance from collimator to camera becomes about 15 cm as shown in Fig.B.	1)Press Shutter Button 2)After completed, the "OK" menu appears.
5 Shutter	SHT	Shutter speed adjustment	○	○	○	○	○	○	•LIGHT BOX (VFK1164TDVLB or RFK20523) •TR CHART (RFK20443)	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 15 cm as shown in Fig.B. 3) Set the camera angle so that the color chart is displayed on the LCD monitor fully. 【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.
6 ISO	ISO	ISO sensitivity adjustment	○	○	○	○	○	○		1)Press Shutter Button 2)After completed, the "OK" menu appears.	
7 White Balance	WBL	White balance adjustment under various color temperature	○	○	○	○	○	○		1)Press Shutter Button 2)After completed, the "OK" menu appears.	
8 High brightness coloration	LIN	High brightness coloration adjustment	○	○	○	○	○	○		1)Press Shutter Button 2)After completed, the "OK" menu appears.	
9 CCD Missing Pixels (White)	WKI	Compensation of CCD Missing Pixels (White)	○	○	○	○	○	○	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)Press Shutter Button 2)After completed, the "OK" menu appears.
11 CCD Missing Pixels (Black)	BKI	Compensation of CCD Missing Pixels (Black)	○	○	○	○	○	○	•LIGHT BOX (VFK1164TDVLB or RFK20523)	1)Set the camera in front of LIGHTBOX so that the distance from collimator to camera becomes about 15 cm as shown in Fig.B.	1)Press Shutter Button 2)After completed, the "OK" menu appears.
12 Touch Panel Control	TPC	Touch Panel Inspection	○	○	○	○	○	○	NONE	NONE	1)Press the GUI Buttons in order of number (1→2→3→4), then GUI Button is disappear. 2)Flick the LCD monitor from left to right, then white color is displayed. 3)Flick the LCD monitor from left to right again, then black color is displayed. 4)Flick the LCD monitor from left to right again, then normal picture is displayed. 5)Press the Shutter Button, then OK is displayed.



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

If you intend to proceed adjustment after replacing the MAIN P.C.B. (include FLASH_ROM) and/or FLASH_ROM, it should be execute "INITIAL SETTINGS" FIRST, then release the "INITIAL SETTINGS" in order to proceed the electrical adjustment.

※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.

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 "3.4.2. 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 and LCD Panel

Do not touch the surface of lens 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-FS33EB	DMC-FH22GF
DMC-FS33EE	DMC-FH22GK
DMC-FS33EF	DMC-FH22GN
DMC-FS33EG	DMC-FH22P
DMC-FS33EP	DMC-FH22PC
DMC-FH22GC	DMC-FH22PU

Vol. 1
 Colour
 (S).....Silver Type (except EF/PC)
 (K).....Black Type
 (R).....Red Type (except GN)

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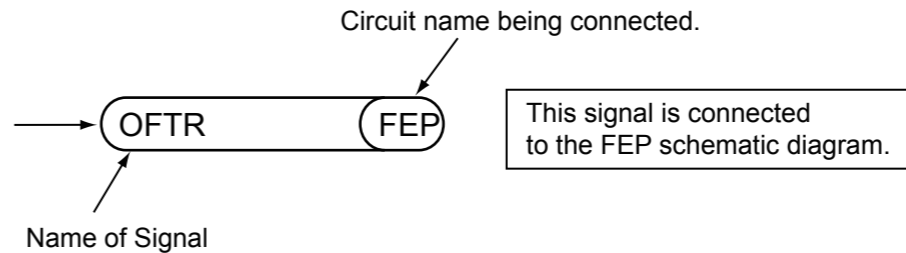
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S1. About Indication of The Schematic Diagram

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

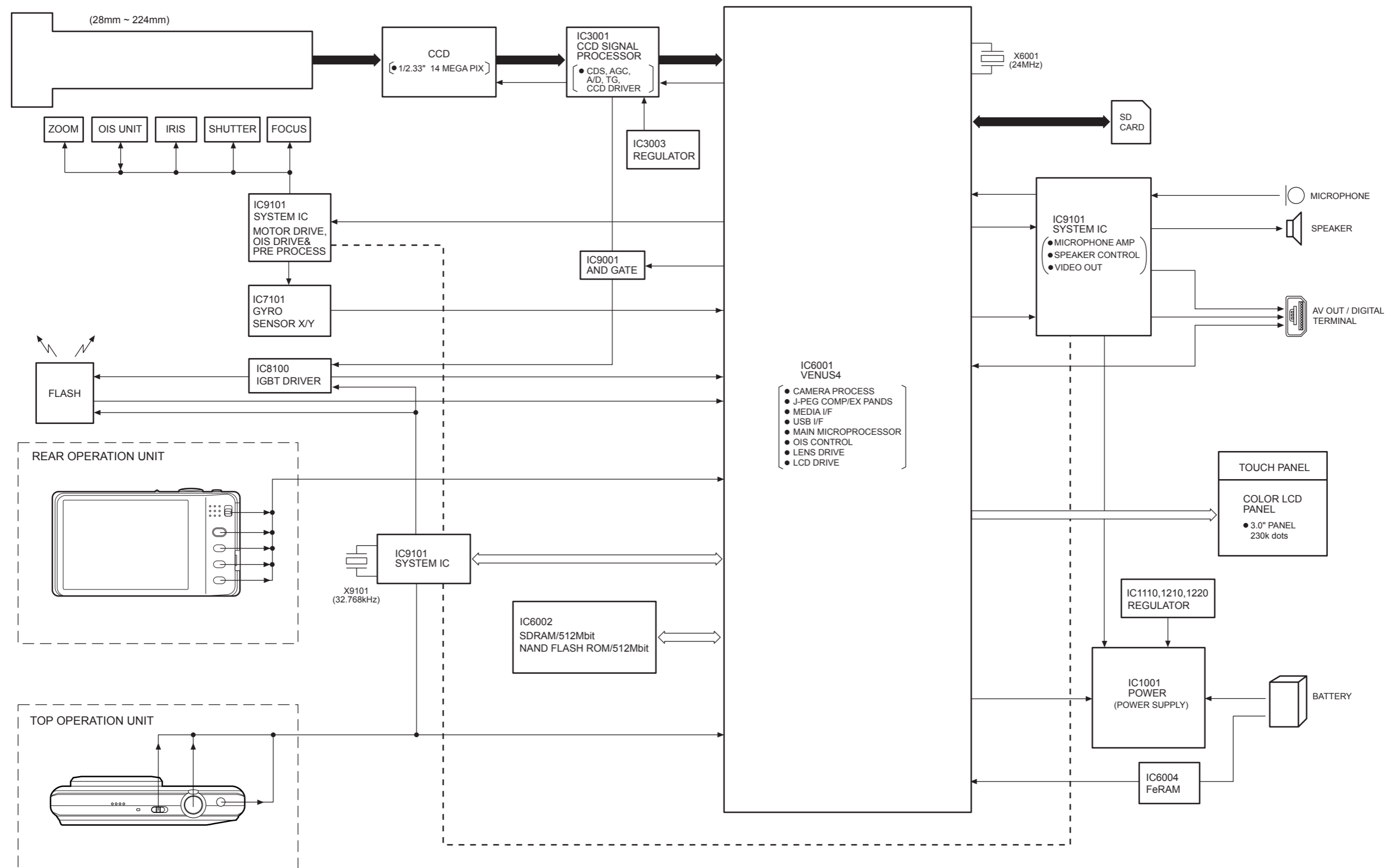
Note) Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

S2.1. Flash Top P.C.B.

REF No.	PIN No.	POWER ON
IC8100	1	0
IC8100	2	0
IC8100	3	0
IC8100	4	0
IC8100	5	3.0
IC8100	6	0
IC8100	7	0
IC8100	8	0
IC8100	9	3.0
IC8100	10	3.6

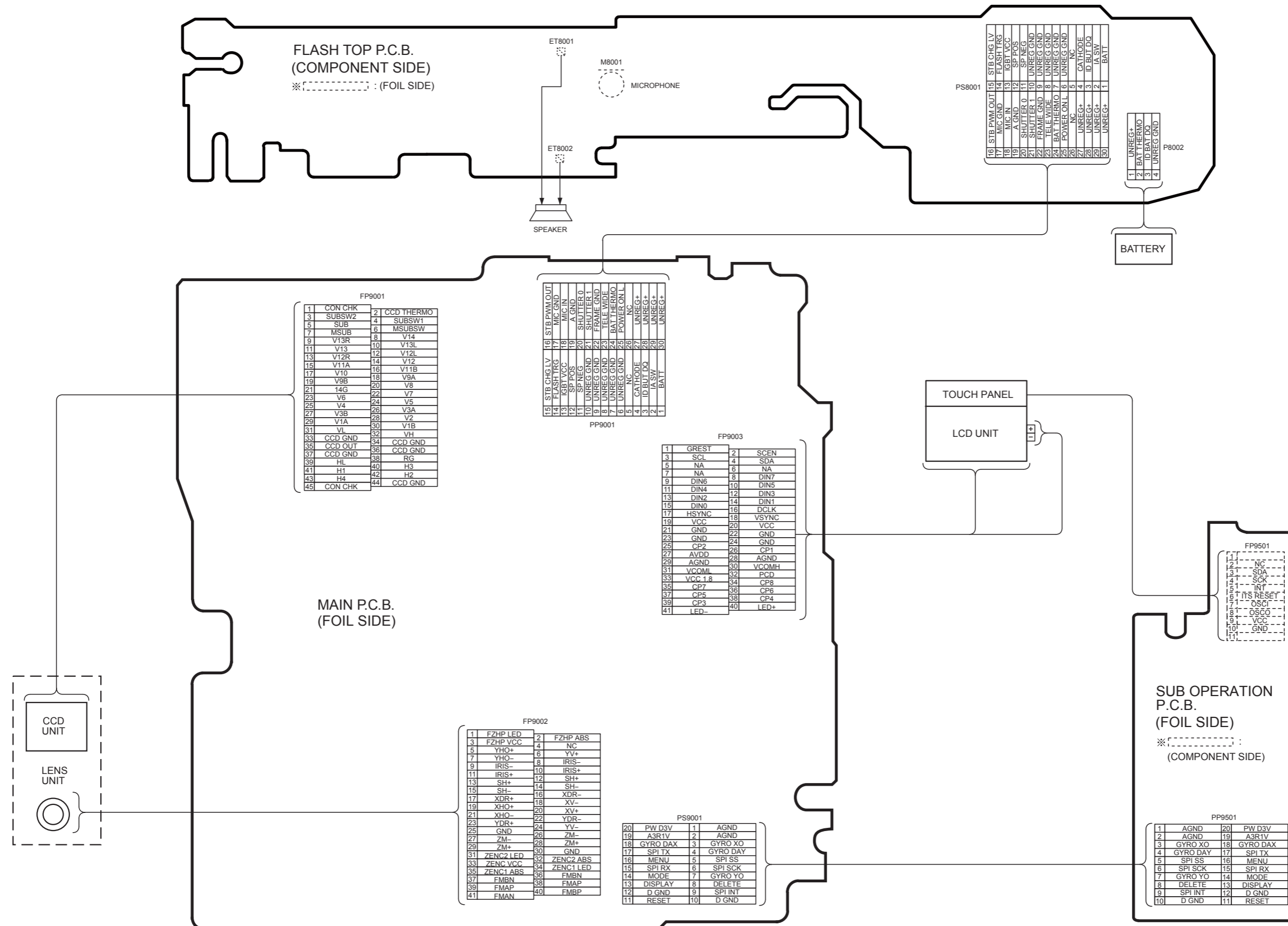
S3. Block Diagram

S3.1. Overall Block Diagram

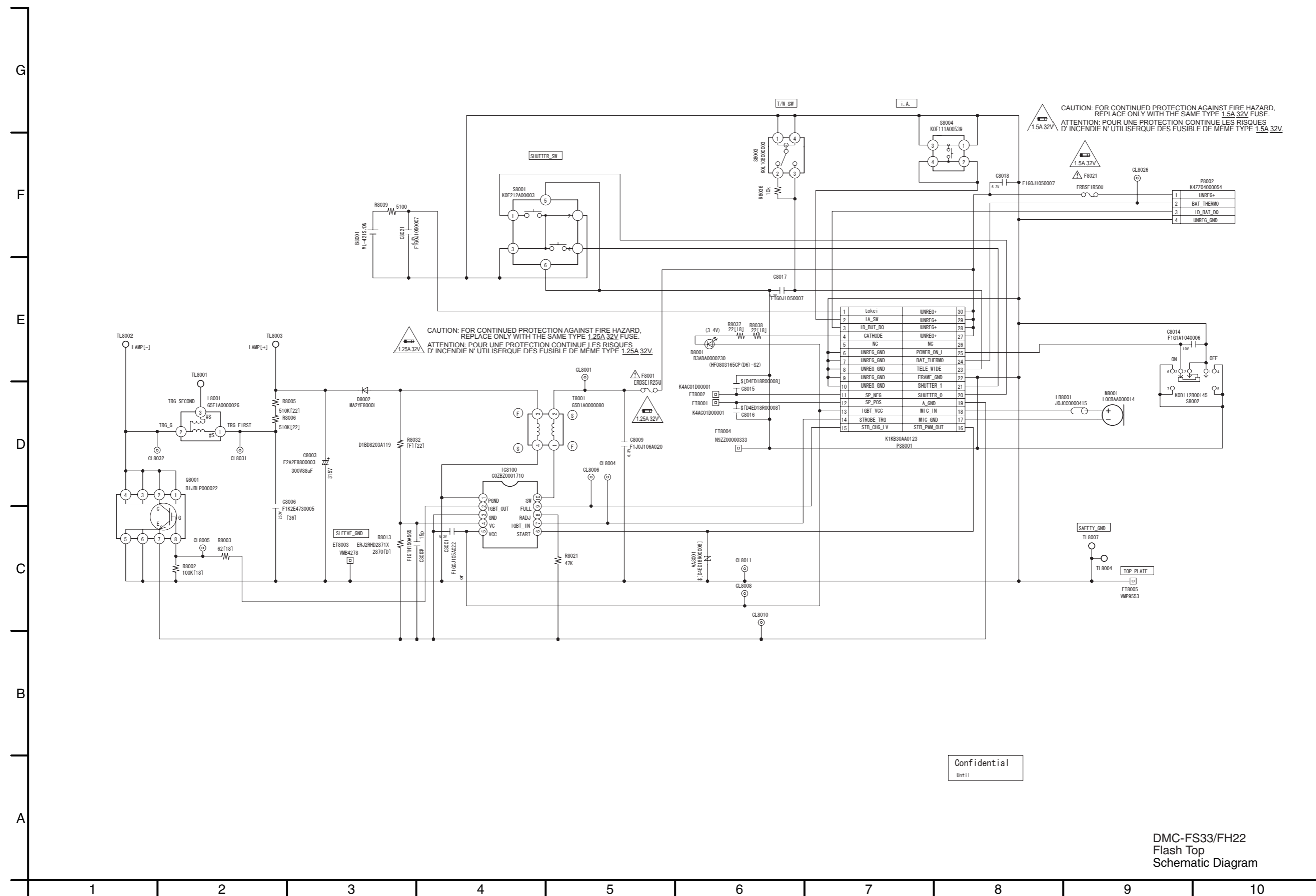


S4. Schematic Diagram

S4.1. Interconnection Diagram

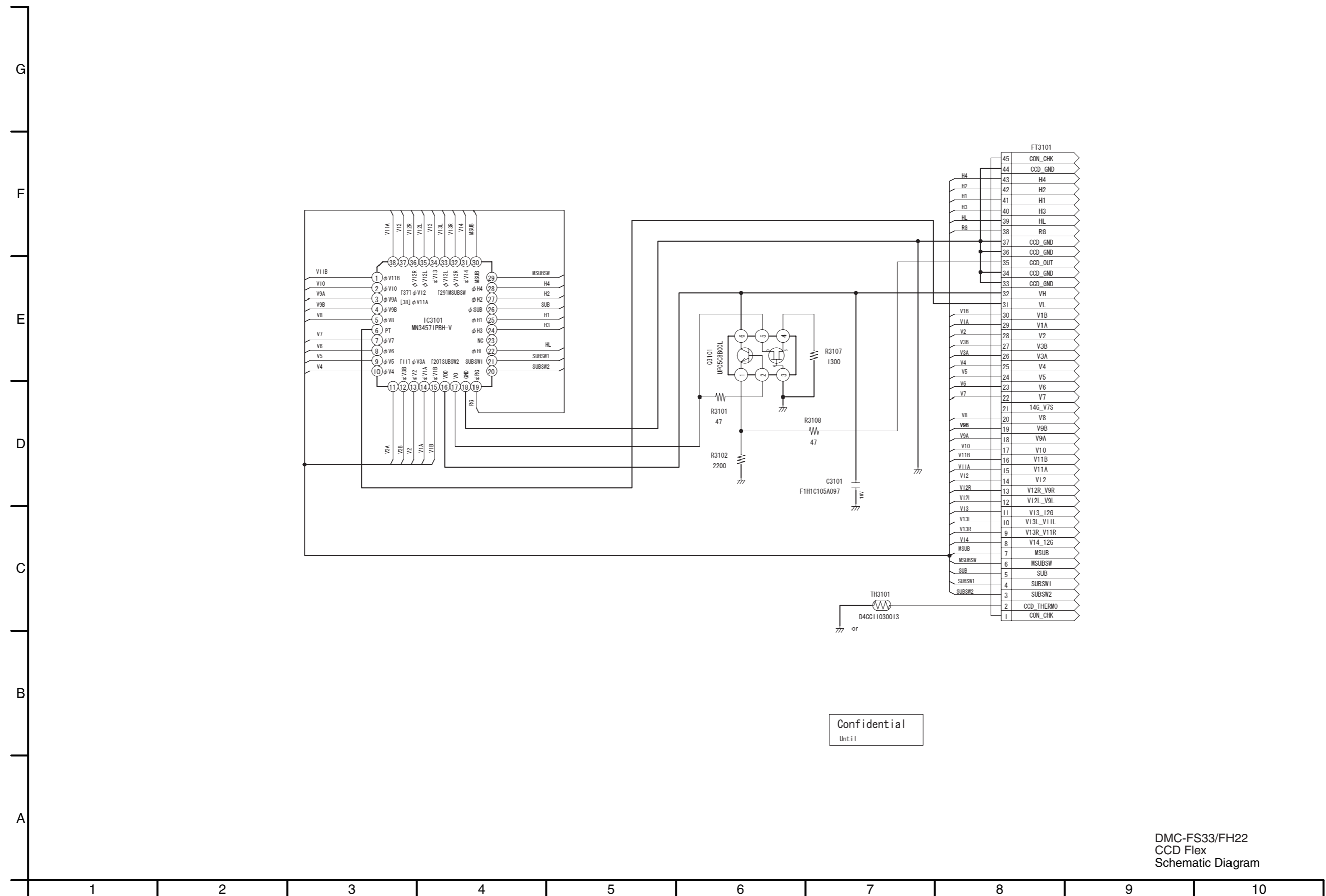


S4.2. Flash Top Schematic Diagram



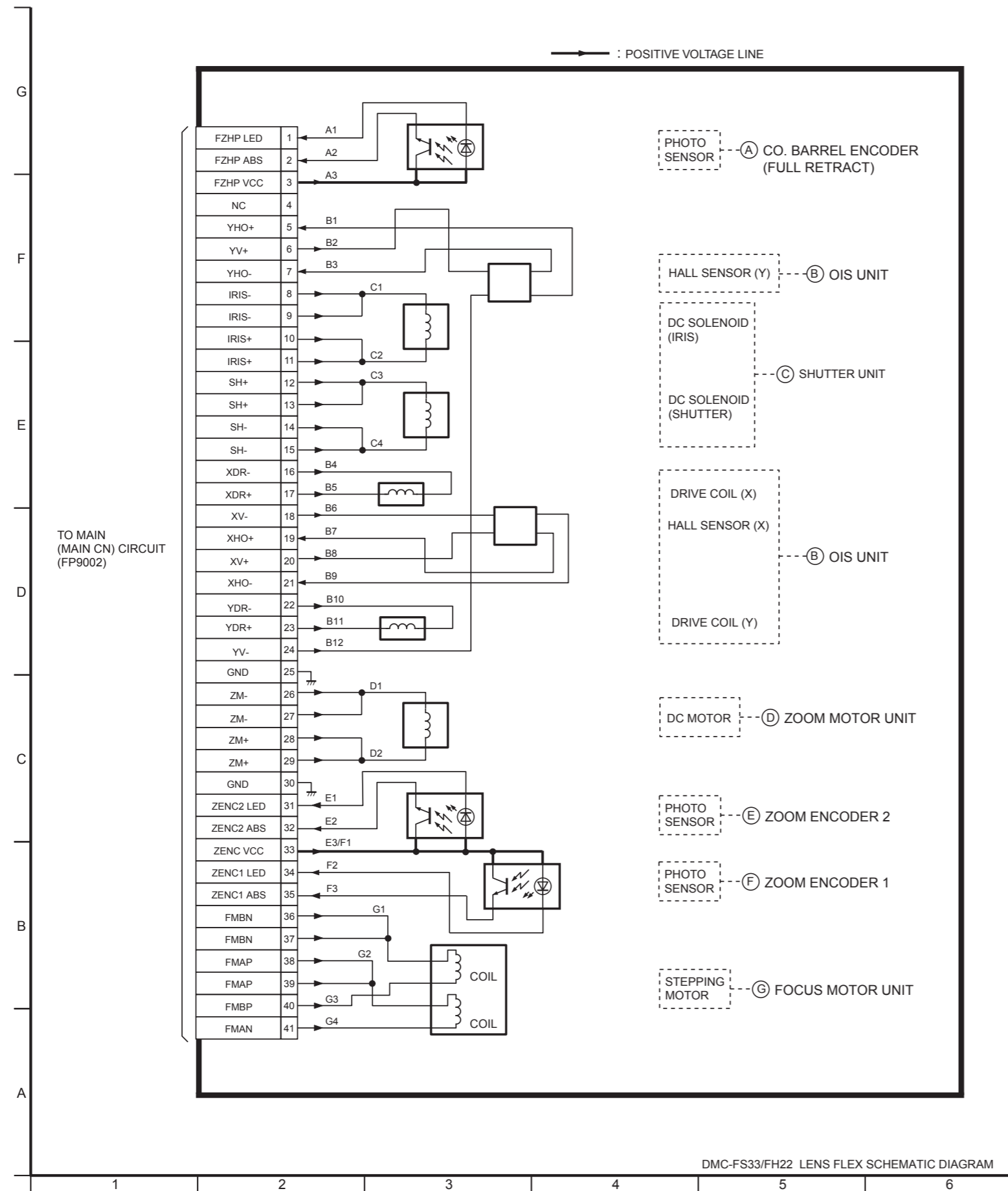
Confidential
Until

S4.3. CCD Flex Schematic Diagram



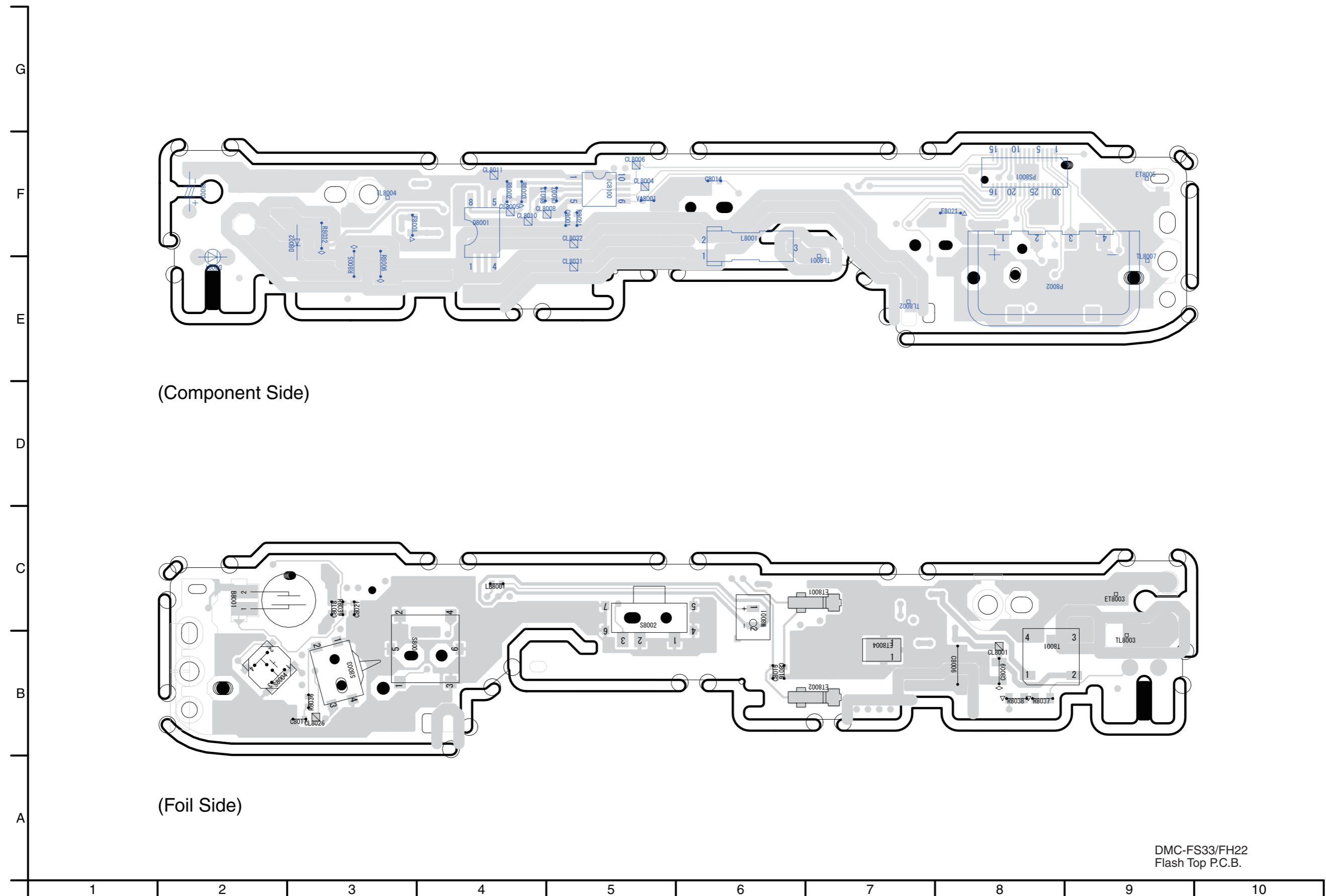
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S4.4. Lens Flex Schematic Diagram



S5. Print Circuit Board

S5.1. Flash Top P.C.B.

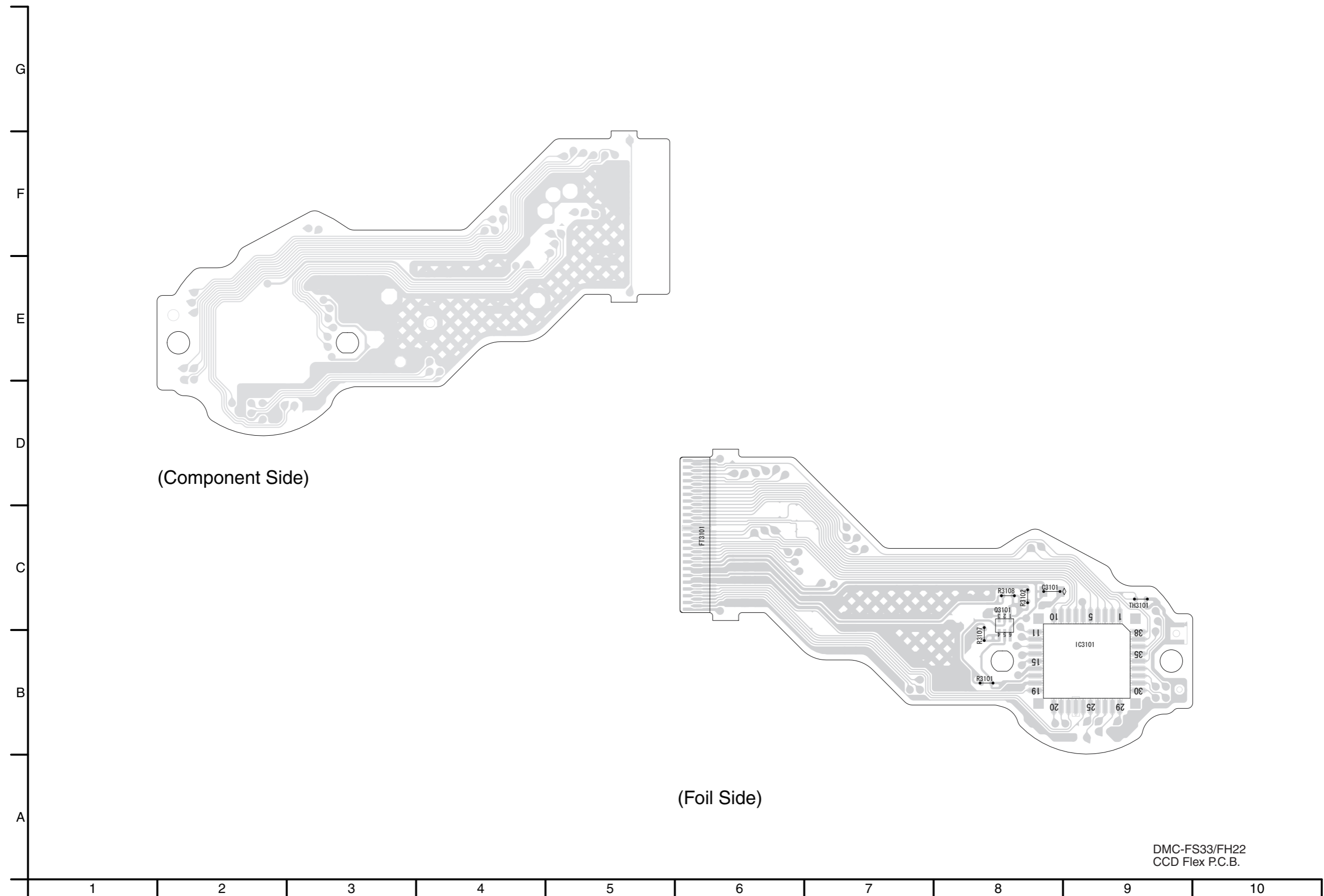


(Component Side)

(Foil Side)

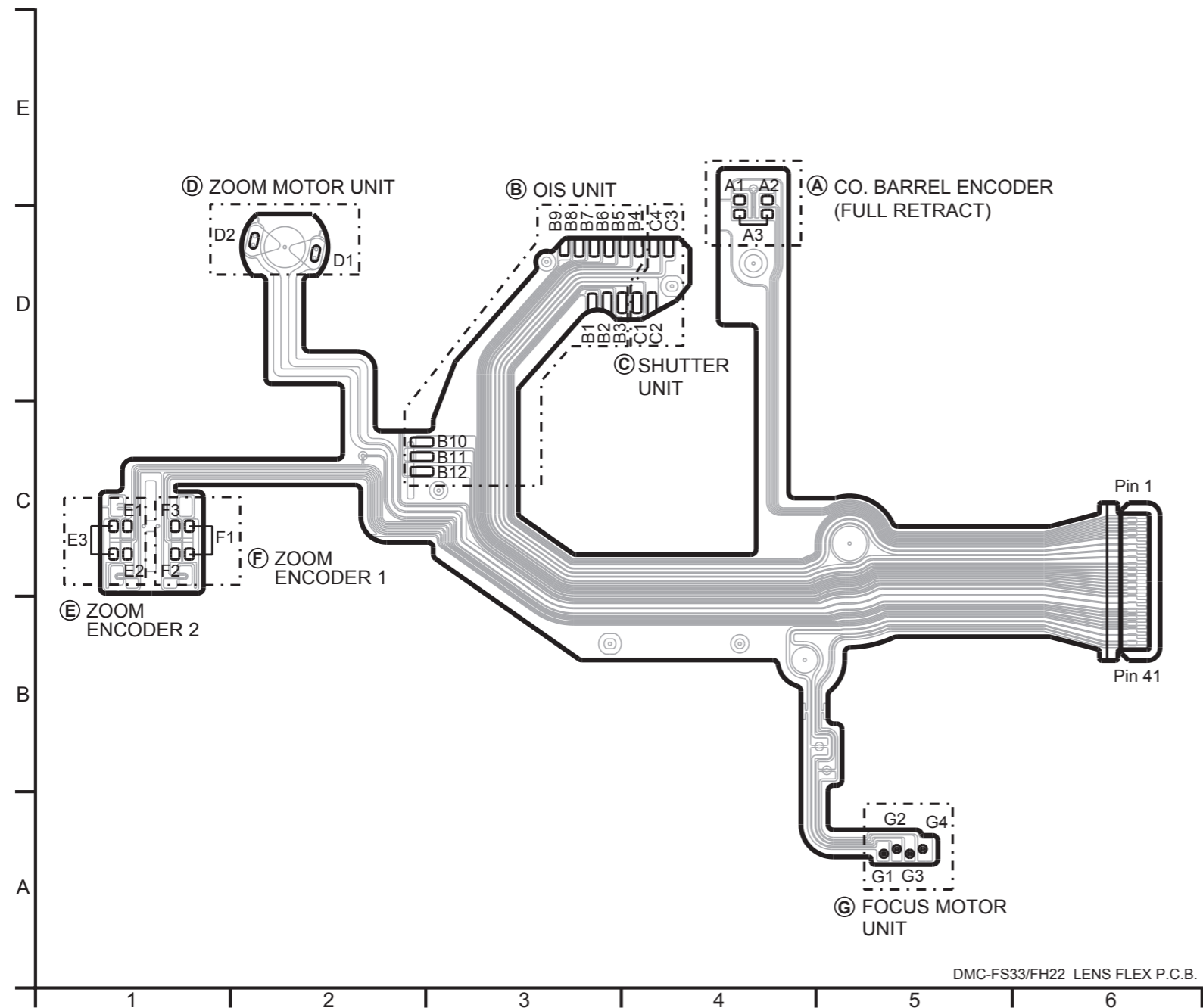
DMC-FS33/FH22
Flash Top P.C.B.

S5.2. CCD Flex P.C.B.




DMC-FS33/FH22
CCD Flex P.C.B.

S5.3. Lens Flex P.C.B.



DMC-FS33/FH22 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  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:

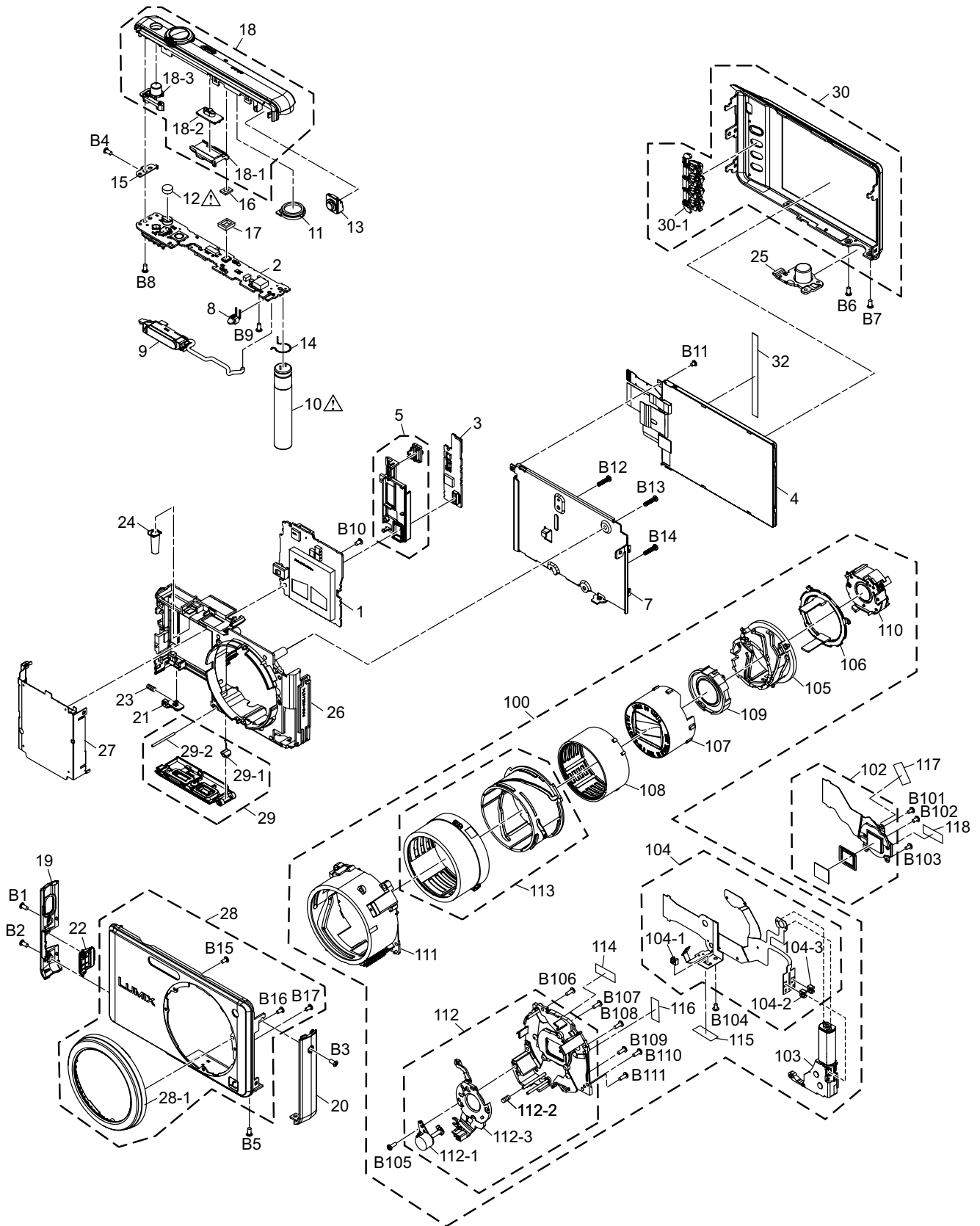
1. **Parts marked with [ENERGY] in the remarks column are supplied from Panasonic Corporation Energy Company.**
2. **Parts marked with [SPC] in the remarks column are supplied from AVC-CSC-SPC. Others are supplied from PAVCSG.**

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
1	VEP56098B	MAIN P.C.B.	1	(RTL) E.S.D.	B1	VHD2081	SCREW	1	
2	VEP58107A	FLASH TOP P.C.B.	1	(RTL) E.S.D.	B2	VHD2081	SCREW	1	
3	VEP59077A	SUB OPERATION P.C.B.	1	(RTL) E.S.D.	B3	VHD2081	SCREW	1	
4	L5EDDXM00009	LCD UNIT	1		B4	VHD2081	SCREW	1	(-S/R)
5	VYQ5640	MODE KNOB UNIT	1		B4	VHD2082	SCREW	1	(-K)
7	VMP9563	FRAME PLATE	1		B5	VHD2081	SCREW	1	(-S/R)
8	B3ADA0000230	AF LED	1	(D8001)E.S.D.	B5	VHD2082	SCREW	1	(-K)
9	EFN-AMAM2AZD	FLASH	1		B6	VHD2081	SCREW	1	(-S/R)
△ 10	F2A2F8800003	E.CAPACITOR	1	(C8003)	B6	VHD2082	SCREW	1	(-K)
11	L0AA01A00047	SPEAKER	1		B7	VHD2081	SCREW	1	(-S/R)
△ 12	ML-421S/DN	BUTTON BATTERY	1	[ENERGY] (B8001)	B7	VHD2082	SCREW	1	(-K)
13	VGL1290	AF PANEL LIGHT	1		B8	VHD1998	SCREW	1	
14	VMB4278	C-EARTH SPRING	1		B9	VHD1998	SCREW	1	
15	VMP9553	TOP PLATE	1		B10	VHD2004	SCREW	1	
16	VMT1968	MIC DAMPER	1		B11	VHD2210	SCREW	1	
17	VMT2029	IRIS DAMPER	1		B12	XQN16+BJ7FN	SCREW	1	
18	VYK3S59	TOP CASE UNIT	1	EG,EP,EF,EB,EE	B13	XQN16+BJ7FN	SCREW	1	
18	VYK3S57	TOP CASE UNIT	1	P,PC,PU,GC,GF,GK,GN	B14	XQN16+BJ7FN	SCREW	1	
18-1	VGQJ75	POWER KNOB BASE	1		B15	VHD1909	SCREW	1	
18-2	VGUOF56	POWER KNOB	1		B16	VHD1909	SCREW	1	
18-3	VGUOF59	IA BUTTON	1		B17	VHD1909	SCREW	1	
19	VGK3603	SIDE ORNAMENT L	1						
20	VGK3604	SIDE ORNAMENT R	1		B101	VHD1871	SCREW	1	[SPC]
21	VGQ9717	BATTERY LOCK KNOB	1		B102	VHD1871	SCREW	1	[SPC]
22	VKF4645	JACK DOOR	1		B103	VHD1871	SCREW	1	[SPC]
23	VMB4152	BATTERY LOCK SPRING	1		B104	VHD2011	SCREW	1	[SPC]
24	VMB4337	BATTERY OUT SPRING	1		B105	XQN14+BJ4FNK	SCREW	1	[SPC]
25	VMP9240	TRIPOD	1		B106	XQN14+BJ4FNK	SCREW	1	[SPC]
26	VMP9564	FRAME	1		B107	XQN14+BJ4FNK	SCREW	1	[SPC]
27	VMP9566	BATTERY CASE	1		B108	XQN14+BJ4FNK	SCREW	1	[SPC]
28	VYK3U04	FRONT CASE UNIT	1	EG-S,EP-S,EB-S,EE-S,PU-S, GC-S,GF-S,GK-S,GN-S	B109	XQN14+BJ4FNK	SCREW	1	[SPC]
28	VYK3S61	FRONT CASE UNIT	1	EG-K,EP-K,EF-K,EB-K,EE-K, PC-K,PU-K,GC-K,GF-K,GK-K, GN-K	B110	XQN14+BJ4FNK	SCREW	1	[SPC]
28	VYK3S62	FRONT CASE UNIT	1	EG-R,EP-R,EF-R,EB-R,EE-R, PC-R,PU-R,GC-R,GF-R,GK-R	B111	XQN14+BJ4FNK	SCREW	1	[SPC]
28	VYK3Z51	FRONT CASE UNIT	1	P-S					
28	VYK3Z41	FRONT CASE UNIT	1	P-K					
28	VYK3Z42	FRONT CASE UNIT	1	P-R					
28-1	VGK3602	LENS RING	1						
29	VYK3U05	BATTERY DOOR UNIT	1	(-S)					
29	VYK3S66	BATTERY DOOR UNIT	1	(-K)					
29	VYK3S67	BATTERY DOOR UNIT	1	(-R)					
29-1	VMB4143	BATTERY DOOR SPRING	1						
29-2	VMS7863	BATTERY DOOR SHAFT	1						
30	VYK3U06	REAR CASE UNIT	1						
30-1	VGUOF55	MENU BUTTON	1						
32	VGQOM53	LCD SHEET D	1						
100	VXW1105	LENS UNIT(W/O CCD)	1	[SPC]					
102	VEK0Q32	CCD UNIT	1	[SPC] E.S.D.					
103	L6DA8DFC0002	ZOOM MOTOR	1	[SPC]					
104	VEK0P74	LENS FPC UNIT	1	[SPC]					
104-1	B3NBA0000011	PHOTO SENSOR	1	[SPC]					
104-2	B3NBA0000011	PHOTO SENSOR	1	[SPC]					
104-3	B3NBA0000011	PHOTO SENSOR	1	[SPC]					
105	VDW1958	BOTH SIDES CAM FRAME	1	[SPC]					
106	VDW1962	2ND 3RD DIRECT FRAME	1	[SPC]					
107	VXP3345	1ST LENS FRAME UNIT	1	[SPC]					
108	VXP3348	1ST DIRECT FRAME UNIT	1	[SPC]					
109	VXP3349	2ND LENS FRAME UNIT	1	[SPC]					
110	VXP3350	3RD LENS FRAME UNIT	1	[SPC]					
111	VXQ1831	FIX FRAME UNIT	1	[SPC]					
112	VXQ1832	MASTER FLANGE UNIT	1	[SPC]					
112-1	L6HA64NC00020	FOCUS MOTOR UNIT	1	[SPC]					
112-2	VMB4333	FOCUS SPRING	1	[SPC]					
112-3	VXP3358	4TH LENS FRAME UNIT	1	[SPC]					
113	VXP3355	DRIVE/PENETRATION FRAME UNIT	1	[SPC]					
114	VZT0938	TAPE A	1	[SPC]					
115	VZT0938	TAPE A	1	[SPC]					
116	VZT0939	TAPE B	1	[SPC]					
117	VZT0814	LENS TAPE	1	[SPC]					
118	VZT0814	LENS TAPE	1	[SPC]					

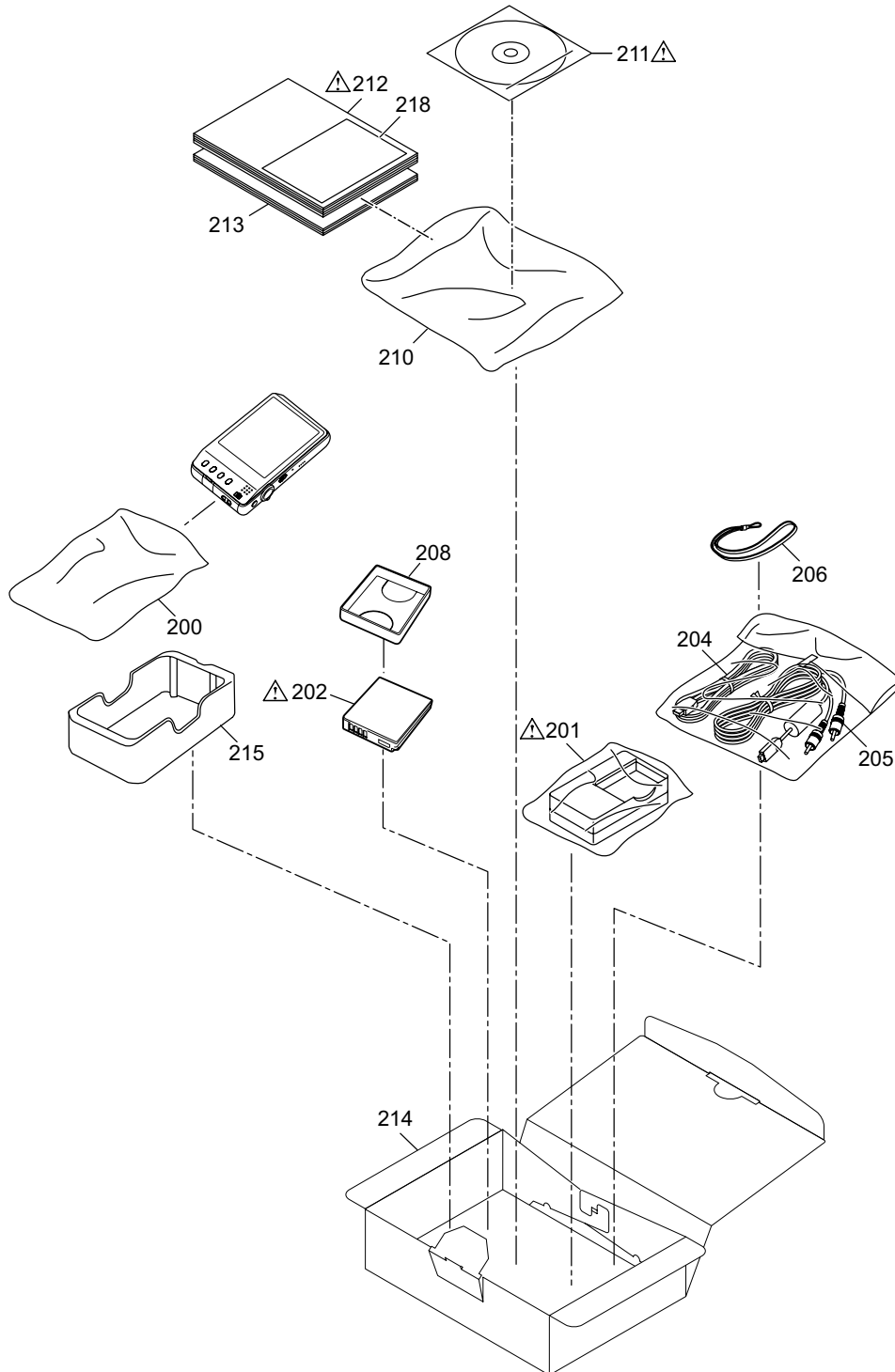
Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	
	300	VPF1372	CAMERA BAG	1	(EXCEPT P,PC,PU)	314	VPK4257	PACKING CASE	1	EG-K,EP-K,EF-K,EB-K,EE-K
△	301	DE-A60BB/SX	BATTERY CHARGER	1	EE,GC,GF,GK	315	VPN6982	CUSHION	1	(EXCEPT P,PC,PU)
△	301	DE-A60AA/SX	BATTERY CHARGER	1	EG,EP,EF,EB,GN	△ 319	K2CT39A00002	AC CORD W/PLUG	1	EB,GC
△	302	----	BATTERY	1	(EXCEPT P,PC,PU)	△ 320	K2CQ29A00002	AC CORD W/PLUG	1	EG,EP,EF,EE,GF
	304	K1HA08AD0001	USB CABLE W/PLUG	1	(EXCEPT P,PC,PU)	△ 321	K2CJ29A00002	AC CORD W/PLUG	1	GN
	305	K1HA08CD0027	AV CABLE W/PLUG	1	(EXCEPT P,PC,PU)	△ 322	K2CA2YY00070	AC CORD W/PLUG	1	GK
	306	VFC4297-B	HAND STRAP	1	(EXCEPT P,PC,PU)					
	308	VGQ0D56	BATTERY PROTECTION CASE	1	(EXCEPT P,PC,PU)					
	310	VPF1378	BAG, POLYETHYLENE	1	(EXCEPT P,PC,PU)					
△	311	VFF0565-S	CD-ROM	1	EE					
			(SOFTWARE/INSTRUCTION BOOK)		[SPC] See "Notes"					
△	311	VFF0564-S	CD-ROM	1	EG,EP,EF,EB					
			(SOFTWARE/INSTRUCTION BOOK)		[SPC] See "Notes"					
△	311	VFF0566-S	CD-ROM	1	GC,GF,GN					
			(SOFTWARE/INSTRUCTION BOOK)		[SPC] See "Notes"					
△	311	VFF0567-S	CD-ROM	1	GK					
			(SOFTWARE/INSTRUCTION BOOK)		[SPC] See "Notes"					
△	312	VQT2L04	SIMPLIFIED O/I	1	GC,GF					
			(ENGLISH/ CHINESE(TRADITIONAL))							
△	312	VQT2L03	SIMPLIFIED O/I	1	EE					
			(RUSSIAN/UKRAINIAN)							
△	312	VQT2L05	SIMPLIFIED O/I	1	GC,GF					
			(ARABIC/PERSIAN)							
△	312	VQT2L02	SIMPLIFIED O/I	1	EB					
			(ENGLISH)							
△	312	VQT2L06	SIMPLIFIED O/I	1	GK					
			(CHINESE(SIMPLIFIED))							
△	312	VQT2K94	SIMPLIFIED O/I	1	EG					
			(GERMAN/FRENCH)							
△	312	VQT2K98	SIMPLIFIED O/I	1	EP					
			(SWEDISH/DANISH)							
△	312	VQT2L07	SIMPLIFIED O/I	1	GN					
			(ENGLISH)							
△	312	VQT2K95	SIMPLIFIED O/I	1	EG					
			(ITALIAN/DUTCH)							
△	312	VQT2K99	SIMPLIFIED O/I	1	EP					
			(POLISH/CZECH)							
△	312	VQT2L01	SIMPLIFIED O/I	1	EF					
			(FRENCH)							
△	312	VQT2K96	SIMPLIFIED O/I	1	EG					
			(SPANISH/PORTUGUESE)							
△	312	VQT2L00	SIMPLIFIED O/I	1	EP					
			(HUNGARIAN/FINNISH)							
△	312	VQT2K97	SIMPLIFIED O/I	1	EG					
			(TURKISH)							
	313	VQT2K44	O/I SOFTWARE	1	GC,GF					
			(ENGLISH/ CHINESE(TRADITIONAL)/ ARABIC/PERSIAN)							
	313	VQT2K43	O/I SOFTWARE	1	EE					
			(RUSSIAN/UKRAINIAN)							
	313	VQT2K42	O/I SOFTWARE	1	EB,GN					
			(ENGLISH)							
	313	VQT2K46	O/I SOFTWARE	1	GK					
			(CHINESE(SIMPLIFIED))							
	313	VQT2K39	O/I SOFTWARE	1	EG					
			(GERMAN/FRENCH/ITALIAN/ DUTCH/SPANISH/PORTUGUESE/ TURKISH)							
	313	VQT2K40	O/I SOFTWARE	1	EP					
			(FINNISH/SWEDISH/DANISH/ POLISH/CZECH/HUNGARIAN)							
	313	VQT2K41	O/I SOFTWARE	1	EF					
			(FRENCH)							
	314	VPK4263	PACKING CASE	1	GC-R					
	314	VPK4264	PACKING CASE	1	GF-R					
	314	VPK4251	PACKING CASE	1	GC-S,GN-S					
	314	VPK4252	PACKING CASE	1	GF-S					
	314	VPK4265	PACKING CASE	1	GK-R					
	314	VPK4256	PACKING CASE	1	GC-S,GN-K					
	314	VPK4258	PACKING CASE	1	GF-K					
	314	VPK4253	PACKING CASE	1	GK-S					
	314	VPK4259	PACKING CASE	1	GK-K					
	314	VPK4262	PACKING CASE	1	EG-R,EP-R,EF-R,EB-R,EE-R					
	314	VPK4250	PACKING CASE	1	EG-S,EP-S,EB-S,EE-S					

S7. Exploded View

S7.1. Frame and Casing Section



S7.2. Packing Parts and Accessories Section (1)



S7.3. Packing Parts and Accessories Section (2)

