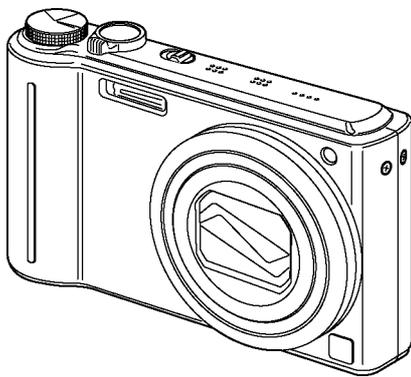


Service Manual

Digital Camera



- Model No. **DMC-TZ6EB**
DMC-TZ6EE
DMC-TZ6EF
DMC-TZ6EG
DMC-TZ6EP
DMC-TZ6GC
DMC-TZ6GN
DMC-TZ6PR
DMC-ZS1GH
DMC-ZS1GK
DMC-ZS1P
DMC-ZS1PC
DMC-ZS1PU

VOL.1

Colours

(S).....Silver Type (except DMC-TZ6PR)

(K).....Black Type

WARNING

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

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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 \triangle 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 $1M\Omega$ and $5.2M\Omega$. 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 $1.5k\Omega$, 10 W resistor, in parallel with a $0.15\mu F$ 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 $1 k\Omega/V$ 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 $1/2$ 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

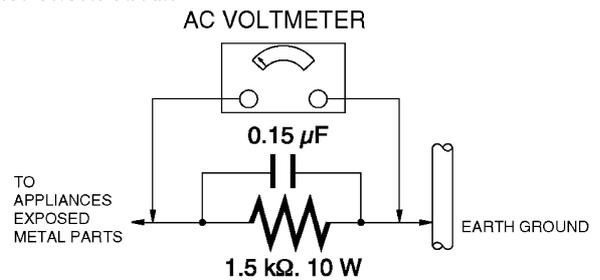


Figure 1

1.4. How to Discharge the Capacitor on Flash PCB

CAUTION:

1. Be sure to discharge the capacitor on Flash PCB.
2. Be careful of the high voltage circuit on Flash PCB when servicing.

[Discharging Procedure]

1. Refer to the disassemble procedure and remove the necessary parts/unit.
2. Put the insulation tube onto the lead part of Resistor (ERG5SJ102:1k Ω /5W).
(an equivalent type of resistor may be used.)
3. Put the resistor between both terminals of capacitor on Flash PCB for approx. 5 seconds.
4. After discharging confirm that the capacitor voltage is lower than 10V using a voltmeter.

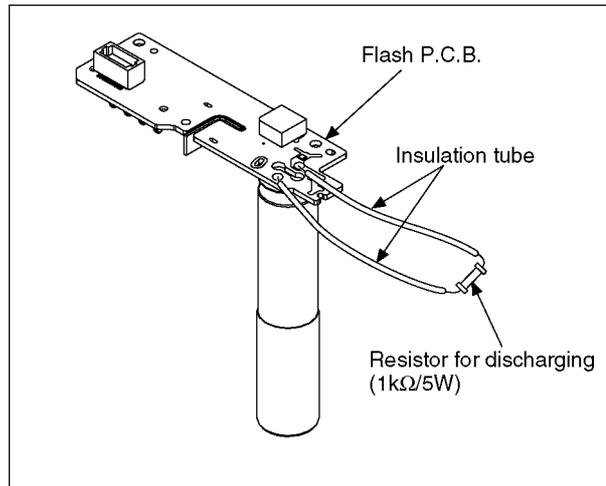


Fig. F1

2 Warning

2.1. Prevention of Electrostatic Discharge (ESD) to Electrostatic 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/polymer battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY for information on how to recycle this battery.

FRANÇAIS



L'appareil que vous vous êtes procuré est alimenté par une batterie au lithium-ion/polymère 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 ASRA 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:

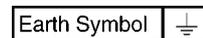
Blue	Neutral
Brown	Live

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.

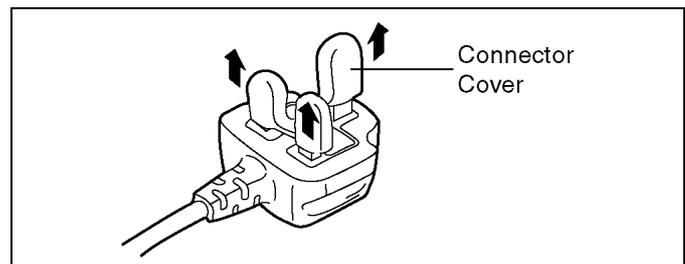
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

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.



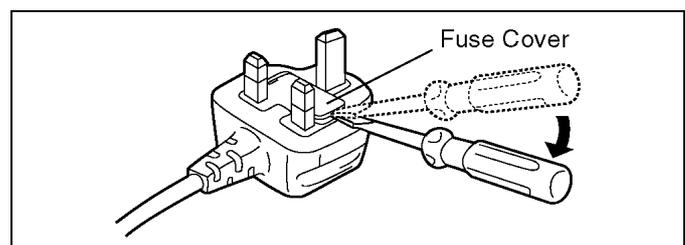
2.3.2.2. Before Use

remove the Connector Cover as follows.

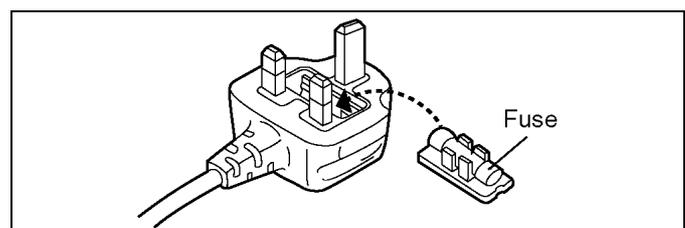


2.3.2.3. How to Replace the Fuse

1. Remove the Fuse Cover with a screwdriver.



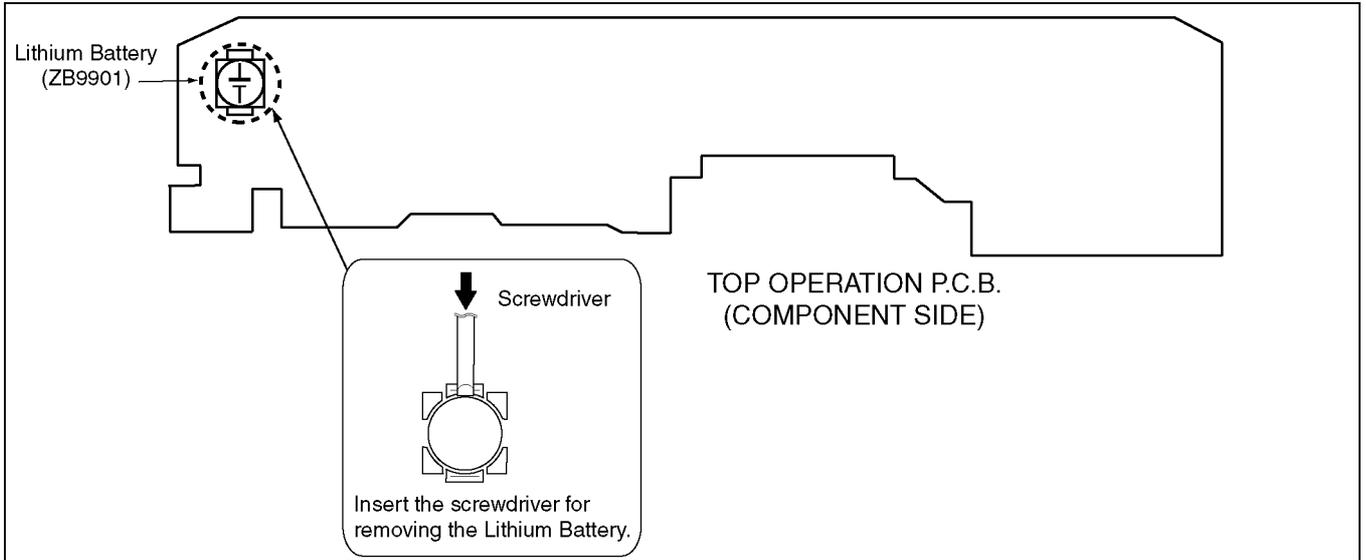
2. Replace the fuse and attach the Fuse cover.



2.4. How to Replace the Lithium Battery

2.4.1. Replacement Procedure

1. Remove the Top Operation PCB. (Refer to Disassembly Procedures.)
2. Remove the Lithium battery (Ref. No. **ZB9901** at component side of Top Operation PCB) and then replace it into new one.



CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

CAUTION

The battery used in this device may present a risk of fire or chemical burn if mistreated.
Do not recharge, disassemble, heat above 100 C (212 F), or incinerate.
Replace battery with Panasonic part number ML-421S/ZTK only.
Use of another battery may present a risk of fire or explosion.
Dispose of used battery promptly.
Keep away from children.
Do not disassemble and do not dispose of in fire.

Note:

The lithium battery is a critical component.

(Type No.: ML-421S/ZTK **Manufactured by Energy Company, Panasonic Corporation.**)

It must never be subjected to excessive heat or discharge.

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

Replacement batteries must be of the 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-TZ6/ZS1 series, as well.

3 Service Navigation

3.1. Introduction

This service manual contains technical information, which will 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.

Definition of PCB Lead Free Solder being used

The letter of PbF is printed either foil side or components side on the PCB 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 PCB 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 PCB 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 degrees 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 the impossibility of servicing at component level without concerned equipment/facilities.
 - a. Schematic diagram, Block Diagram and PCB layout of MAIN PCB and SUB PCB.
 - b. Parts list for individual parts for MAIN PCB and SUB PCB.When a part replacement is required for repairing MAIN PCB and/or SUB PCB, replace as an assembled parts. (MAIN PCB/ SUB PCB)
2. The following category is/are recycle module part. please send it/them to Central Repair Center.
 - MAIN PCB : VEP56081B
 - SUB PCB : VEP51024B

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

There are eight kinds of DMC-TZ6/ZS1, regardless of the colours.

- a) DMC-ZS1P/PC
- b) DMC-TZ6EB/EF/EG/EP
- c) DMC-TZ6EE
- d) DMC-TZ6GN
- e) DMC-ZS1GK
- f) DMC-TZ6GC/PR, DMC-ZS1GH/PU

What is the difference is that the "INITIAL SETTINGS" data which is stored in Flash ROM mounted on Main PCB.

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.

a) DMC-ZS1P/PC

The nameplate for these models show the following Safety registration mark.



b) DMC-TZ6EB/EF/EG/EP

The nameplate for these models show the following Safety registration mark.



c) DMC-TZ6EE

The nameplate for this model show the following Safety registration mark.



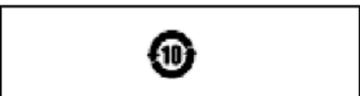
d) DMC-TZ6GN

The nameplate for these models show the following Safety registration mark.



e) DMC-ZS1GK

The nameplate for these models show the following Safety registration mark.



f) DMC-TZ6GC/PR, DMC-ZS1GH/PU

The nameplate for these models do not show any above safety registration mark.



NOTE:

After replacing the MAIN PCB, 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 PCB, 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 : DMC-TZ6; "EB/EE/EF/EG/EP/GC/GN/PR ", DMC-ZS1; "GH/GK/P/PC/PU")
- *.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, EP, EF, EB and EE" models]

- *.When one of the "EG, EP, EF, EB and EE" has been chosen, only "EG, EP, EF, EB and EE" 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.
2. Set the mode dial to the NORMAL PICTURE mode.

NOTE: If the mode dial position 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 pressing "UP of Cursor button" and DISPLAY button simultaneously, turn the Power on.

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

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

Press "UP of Cursor button" and [DISPLAY 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 SETTINGS" menu:**

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

While keep pressing MENU/SET and "RIGHT of Cursor button" simultaneously, turn the Power off.

The "INITIAL SETTINGS" menu is displayed.

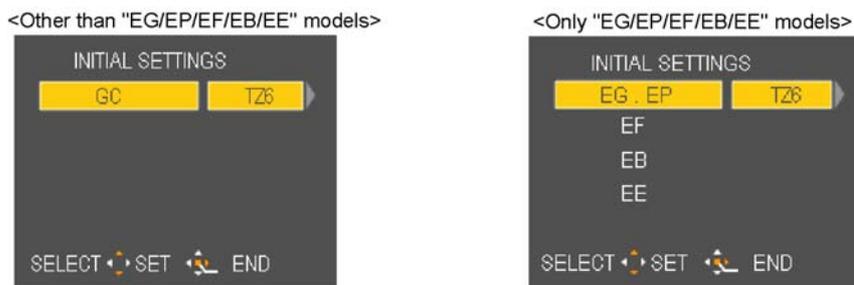
There are two kinds of "INITIAL SETTINGS" menu form as follows:

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

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



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



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

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

(Especially, other than "EG, EP, EF, EB and EE" models :).

The model suffix can be chosen, JUST ONE TIME.

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

Therefore, select the area carefully.

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

• Step 6. Set the model suffix at "INITIAL SETTINGS":

Press the "RIGHT" of Cursor buttons".

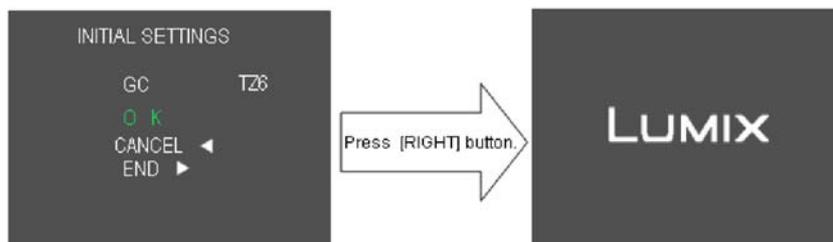
The only set area is displayed. Press the "RIGHT" of Cursor buttons" after confirmation.

(The unit is powered off automatically.)

• Step 7. CONFIRMATION:

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

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



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-TZ6EB	PAL	English	Date/Month/Year	
b)	DMC-TZ6EE	PAL	Russian	Date/Month/Year	
c)	DMC-TZ6EF	PAL	French	Date/Month/Year	
d)	DMC-TZ6EG	PAL	English	Date/Month/Year	
e)	DMC-TZ6EP	PAL	English	Date/Month/Year	
f)	DMC-TZ6GC	PAL	English	Date/Month/Year	
g)	DMC-TZ6GN	PAL	English	Date/Month/Year	
h)	DMC-TZ6PR	NTSC	Spanish	Month/Date/Year	
i)	DMC-ZS1GH	PAL	English	Date/Month/Year	
j)	DMC-ZS1GK	PAL	Chinese (simplified)	Year/Month/Date	No Underwater mode.
k)	DMC-ZS1P	NTSC	English	Month/Date/Year	
l)	DMC-ZS1PC	NTSC	English	Month/Date/Year	
m)	DMC-ZS1PU	NTSC	Spanish	Month/Date/Year	

4 Specifications

Power Source	DC 5.1 V
Power Consumption	When recording: 1.2 W When playing back: 0.6 W
Camera effective pixels	10,100,000 pixels
Image sensor	1/2.5" CCD, total pixel number 10,300,000 pixels Primary colour filter
Lens	Optical 12 x zoom f=4.1 mm to 49.2 mm (35 mm film camera equivalent: 25 mm to 300 mm)/ F3.3 to F4.9
Digital zoom	Max. 4 x
Extra optical zoom	Max. 21.4 x
Focus	Normal/AF Macro/Macro zoom Face detection/AF tracking/11-area-focusing/ 1-area-focusing (High speed)/1-area-focusing/Spot-focusing
Focus range	
Normal/Motion picture	50 cm (1.64 feet) (Wide)/2 m (6.57 feet) (Tele) to ∞
Macro/Intelligent Auto/Clipboard	3 cm (0.1 feet) (Wide)/1 m (3.28 feet) (Tele) to ∞ (2 m (6.57 feet) unless max.T)
Scene mode	There may be difference in above settings.
Shutter system	Electronic shutter + Mechanical shutter
Motion picture recording	848 x 480 pixels* / 640 x 480 pixels* / 320 x 240 pixels (* Only when using an SD Memory Card) 30 frames/second with audio
Burst recording	
Burst speed	2.5 pictures/second (Burst), Approx. 2 pictures/second (Unlimited)
Number of recordable pictures	Max. 5 pictures (Standard), max. 3 pictures (Fine), Depends on the remaining capacity of the built-in memory or the card (Unlimited).
Hi-speed burst	
Burst speed	Approx. 10 pictures/second (Speed priority) Approx. 7 pictures/second (Image priority)
Number of recordable pictures	Approx. 15 pictures (When using the built-in memory, immediately after formatting) Max. 100 pictures (When using a card, it may differ depending on the type of card and the recording conditions)
ISO sensitivity	AUTO/80/100/200/400/800/1600 [HIGH SENS.] mode: 1600 - 6400
Shutter speed	8 to 1/2000 th [STARRY SKY] mode: 15 seconds, 30 seconds, 60 seconds
White balance	AUTO/Daylight/Cloudy/Shade/Halogen/White set
Exposure (AE)	AUTO (Programme AE) Exposure compensation (1/3 EV Step, -2 EV to +2 EV)
Metering mode	Multiple/Centre weighted/Spot

LCD monitor	2.7" amorphous silicon TFT LCD (Approx. 230,400 dots) (field of view ratio about 100 %)
Flash	Flash range: (ISO AUTO) Approx. 60 cm (1.97 feet) to 5.3 m (17.4 feet) (Wide AUTO, AUTO/Red-eye reduction, Forced flash ON (Forced flash ON/Red-eye reduction), Slow sync./Red-eye reduction, Forced flash OFF)
Microphone	Monaural
Speaker	Monaural
Recording media	Built-in Memory (Approx. 40 MB)/SD Memory Card/SDHC Memory Card/MultiMediaCard (Still pictures only)
Picture size	
Still picture	When the aspect ratio setting is [4:3] 3648 x 2736 pixels / 3072 x 2304 pixels / 2560 x 1920 pixels / 2048 x 1536 pixels / 1600 x 1200 pixels / 640 x 480 pixels
	When the aspect ratio setting is [3:2] 3648 x 2432 pixels / 3072 x 2048 pixels / 2560 x 1712 pixels / 2048 x 1360 pixels
	When the aspect ratio setting is [16:9] 3648 x 2056 pixels / 3072 x 1728 pixels / 2560 x 1440 pixels / 1920 x 1080 pixels
Motion pictures	848 x 480 pixels* / 640 x 480 pixels* / 320 x 240 pixels (* Only when using an SD Memory Card)
Quality	Fine/Standard
Recording file format	
Still Picture	JPEG (based on Design rule for Camera File system, based on Exif 2.21 standard)/DPOF corresponding
Still pictures with audio	JPEG (based on Design rule for Camera File system, based on Exif 2.21 standard) + QuickTime
Motion pictures	QuickTime Motion JPEG
Interface	Digital: USB 2.0 (High Speed) Data from the PC can not be written to the camera using the USB connection cable. Analogue video/audio: NTSC/PAL Composit (Switched by menu), Audio line output (monaural)
Terminal	AV/DIGITAL/MULTI: Dedicated jack (14 pin)
Dimensions (excluding the projection part)	Approx. 103.3 mm (W) x 59.6 mm (H) x 32.8 mm (D) [4.07" (W) x 2.35" (H) x 1.29" (D)]
Mass	Excluding card and battery: Approx. 206 g (7.3 oz) With card and battery: Approx. 229 g (8.1 oz)
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Operating humidity	10 % to 80 %

Battery charger
(Panasonic DE-A66A): Information for your safety

Output	CHARGE 4.2 V --- 0.65 A
Input	110 V to 240 V 50/60Hz, 0.2 A

Battery Pack (lithium-ion)
(Panasonic DMW-BCG10E): Information for your safety

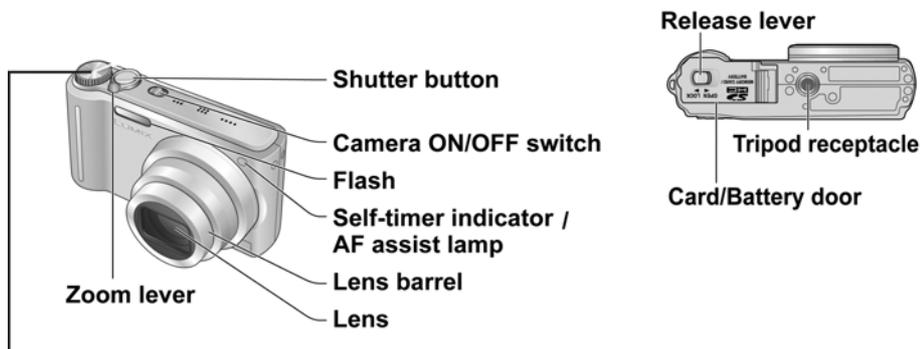
Voltage/capacity (Minimum)	3.6 V / 895 mAh
-----------------------------------	-----------------

NOTE:

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

- Data from the PC can not be written to the camera using the USB connection cable.
- Motion pictures can be recorded continuously for up to 15minutes.
The maximum continuous recording time (up to 15minutes) is displayed on the screen.

5 Location of Controls and Components



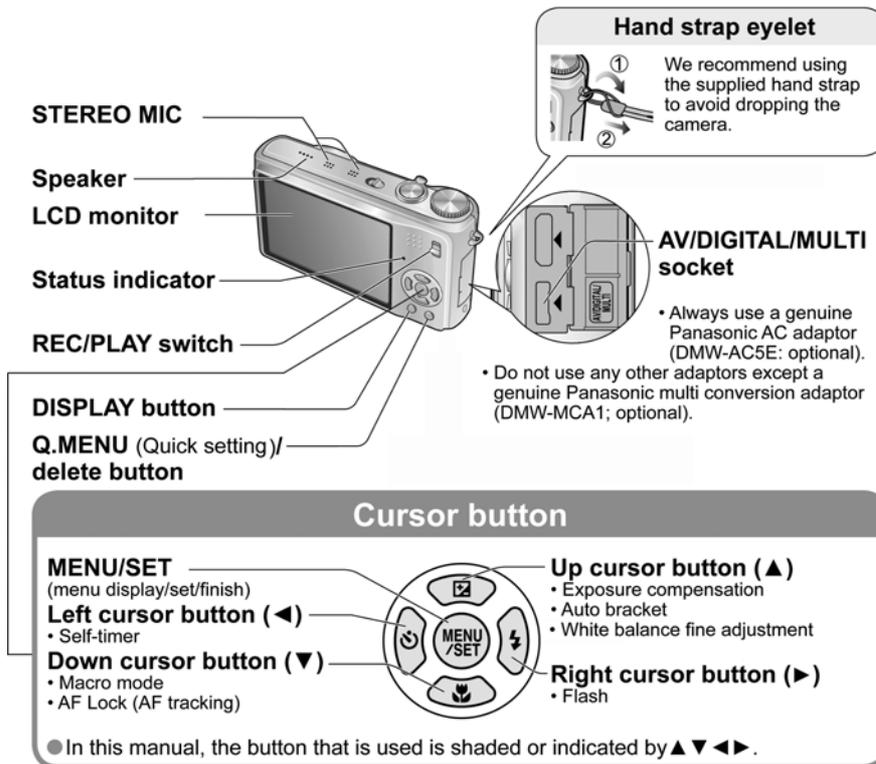
Mode dial

Align to
correct mode

INTELLIGENT AUTO

The current mode will be displayed on the LCD monitor when the mode dial is turned.

	INTELLIGENT AUTO Mode	Take pictures with automatic settings.
	NORMAL PICTURE Mode	Take pictures with customized settings.
MS	MY SCENE MODE	Taking pictures in frequently-used scene modes.
SCN	SCENE MODE	Take pictures according to scene.
	MOTION PICTURE Mode	Take motion pictures.
	CLIPBOARD Mode	Take pictures as memos.



About the Battery

- This unit has a function that can distinguish useable batteries. Exclusive batteries are supported by this function. (Conventional batteries not supported by this function cannot be used.)

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.

*Set the mode dial other than "CLIPBOARD (memo)" mode (such as normal picture/ iA / MS1/MS2/SCN) 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 pressing "UP of Cursor button" and DISPLAY button simultaneously, turn the Power on.

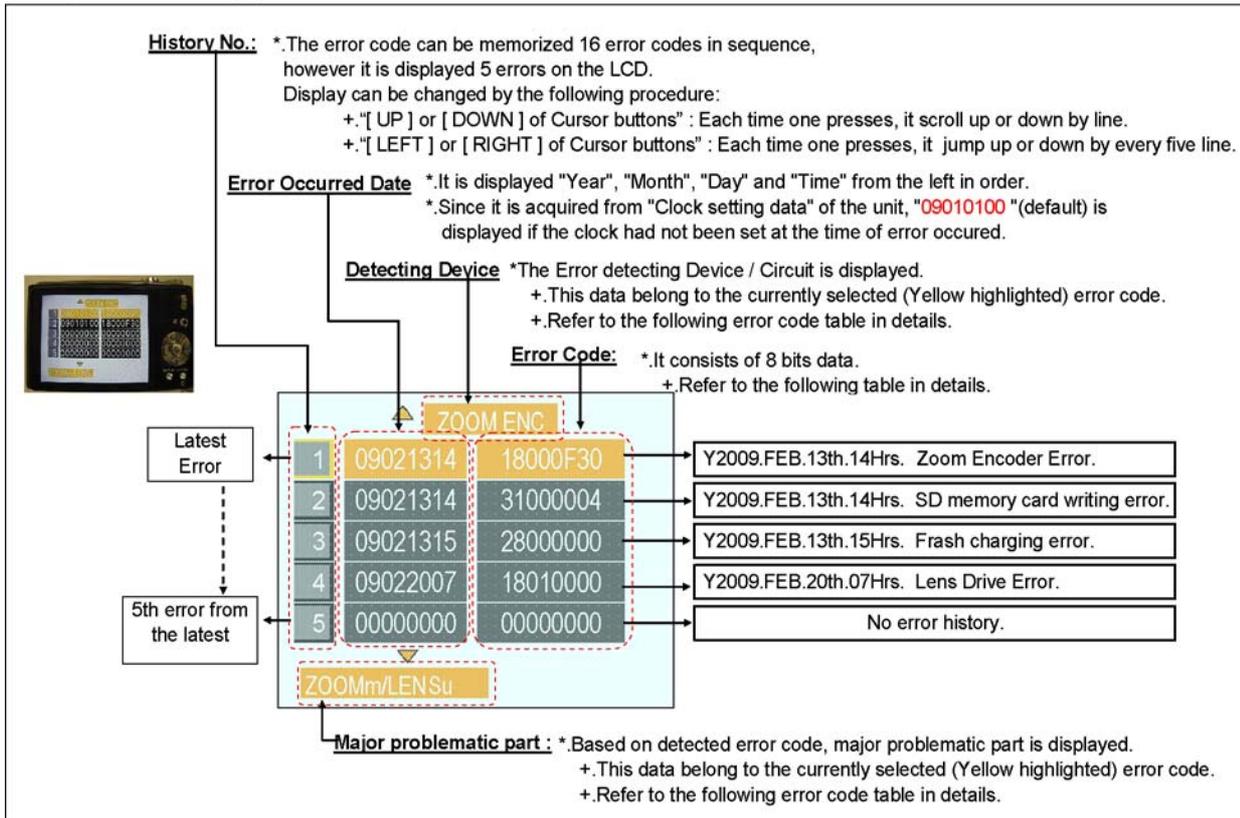
• Step 2. Execute the error code display mode:

Press the "LEFT of Cursor button", MENU/SET button and DISPLAY 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)	Error Indication		
			High 4bits	Low 4 bits	Check point (Lower)	Detecting device	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) detect error on Main P.C.B.. IC7101 (Gyro element) or IC6001 (VENUS 4)	JYRO X	JYRO NG		
				4000	GYRO (Y) error. Gyro (IC7101) detect error on Main P.C.B.. IC7101 (Gyro element) or IC6001 (VENUS 4)		JYRO Y	
			5000	MREF error (Reference voltage error). IC9101 (LENS drive) 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	
			7000	Drive voltage (Y) error. LENS Unit, LENS flex breaks, IC6001(VENUS 4) AD value error, etc.	OISY REF	LENSu/LENS FPC		
				Zoom (C.B.)	0?10		Collapsible barrel Low detect error (Collapsible barrel encoder always detects Low.) Mechanical lock, FP9005-(26) signal line or IC6001 (VENUS 4)	ZOOM L
			0?20			Collapsible barrel High detect error (Collapsible barrel encoder always detects High.) Mechanical lock, FP9005-(26) signal line or IC6001 (VENUS 4)	ZOOM H	
			0?30		Zoom motor sensor error. Mechanical lock, FP9005-(37), (40) signal line or IC6001 (VENUS 4)	ZOOM ENC		
		0?40			Zoom motor sensor error. (During monitor mode.) Mechanical lock, FP9005-(37), (40) signal line or IC6001 (VENUS 4)			
		0?50	Zoom motor sensor error. (During monitor mode with slow speed.) Mechanical lock, FP9005-(37), (40) signal line or IC6001 (VENUS 4)					
			Focus		0?01	HP High detect error (Focus encoder always detects High, and not becomes Low) Mechanical lock, FP9005-(26) signal line or IC6001 (VENUS 4)	FOCUS L	LENS FPC/DSP
		0?02			HP Low detect error (Focus encoder always detects Low, and not becomes High) Mechanical lock, FP9005-(26) signal line or IC6001 (VENUS 4)	FOCUS H		
		Lens	18*1	0000	Power ON time out error. Lens drive system	LENS DRV	LENSu	
				18*2	0000			Power OFF time out error. Lens drive system
		Adj.History	OIS	19*0	2000	OIS adj. Yaw direction amplitude error (small)	OIS ADJ	OIS ADJ
					3000	OIS adj. Pitch direction amplitude error (small)		
					4000	OIS adj. Yaw direction amplitude error (large)		
					5000	OIS adj. Pitch direction amplitude error (large)		
					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		

Attribute	Main item	Sub item	Error code		Contents (Upper)	Error Indication		
			High 4bits	Low 4 bits	Check point (Lower)	Detecting device	Part/Circuit	
				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	
					IC6001-(AA17) signal line or Flash charging circuit			
	FLASH ROM (EEPROM Area)	FLASH ROM (EEPROM Area)	2B*0	0001 0003 0004	EEPROM read error	FROM RE	FROM	
					IC6002 (FLASH ROM)			
					0002	EEPROM write error	FROM WR	FROM
					0005	Firmware version up error	(No indication)	(No indication)
						Replace the firmware file in the SD memory card.		
					0008 0009	SDRAM error		
	SDRAM Mounting defective							
	SYSTEM	RTC	2C*0	0001	SYSTEM IC initialize failure error	SYS INIT	MAIN PCB	
				Communication between IC6001 (VENUS 4) and IC9101 (SYSTEM)				
SOFT	CPU	Reset	30*0	0001 0007	NMI reset Non Mask-able Interrupt (30000001-30000007 are caused by factors)	NMI RST	MAIN PCB	
	Card	Card	31*0	0001	Card logic error	SD CARD	SD CARD/DSP	
					SD memory card data line or IC6001 (VENUS 4)			
				0002	Card physical error	SD WRITE		
					SD memory card data line or IC6001 (VENUS 4)			
	0004	Write error						
		SD memory card data line or IC6001 (VENUS 4)						
	39*0	0005	Format error	INMEMORY	FROM			
	CPU, ASIC hard	Stop	Memory area	38*0	0001	Camera task finish process time out.	LENS COM	LENSu/DSP
						Communication between Lens system and IC6001 (VENUS 4)		
					0002	Camera task invalid code error.	DSP	DSP
						IC6001 (VENUS 4)		
					0100	File time out error in recording motion image		
						IC6001 (VENUS 4)		
					0200	File data cue send error in recording motion image		
						IC6001 (VENUS 4)		
	0300	Single or burst recording brake time out.						
	0008	work area partitioning failure			(No indication)	(No indication)		
					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	Imperfect zoom lens processing	ZOOM	ZOOMm/LENSu		
				Zoom lens				
		35*0	0000 FFFF	Software error (0-7bit : command, 8-15bit : status)	DSP	DSP		
35*1	0000	Though record preprocessing is necessary, it is not called.	(No indication)	(No indication)				
35*2	0000	Though record preprocessing is necessary, it is not completed.						

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:

- *Set the mode dial other than "CLIPBOARD (memo) "mode (such as normal picture/ iA / MS1/MS2/SCN) 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 pressing "UP of Cursor button" and DISPLAY button simultaneously, turn the Power on.

• Step 2. Execute the ICS display mode:

Set the REC/PLAYBACK selector switch to PLAYBACK.

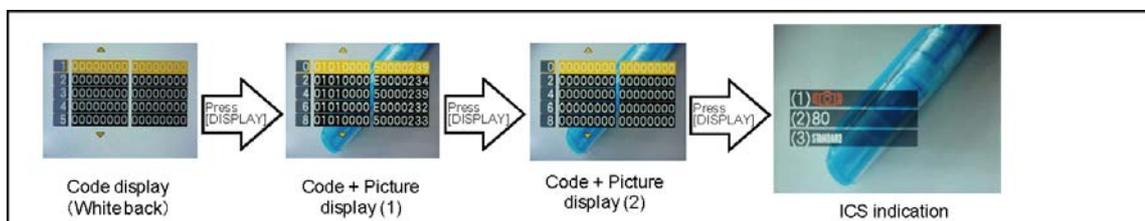
Select the concerned picture by pressing the "LEFT" and "RIGHT" of Cursor button".

Press the "LEFT" of Cursor button", MENU/SET button and DISPLAY 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 →



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 [ISO1000] 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)



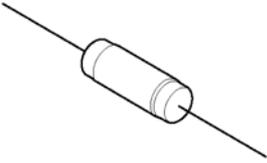
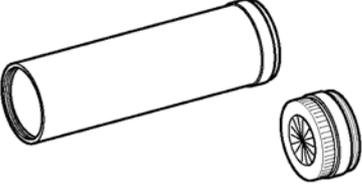
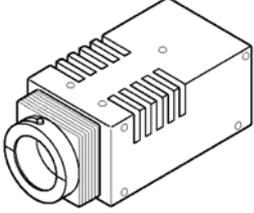
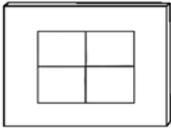
*In playback mode, the picture information is displayed when pressing the [DISPLAY] button. (It can be confirmed at user as well.)
 *Use this indication together with ICS function.

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 (Built-in Focus Chart) VFK1164TCM02	LIGHT BOX VFK1164TDVLB
 <p>An equivalent type of Resistor may be used.</p>	 <p>※ RFKZ0422 can be used.</p>	 <p>※ with DC Cable</p>
TR Chart RFKZ0443	Lens Cleaning Kit (BK) VFK1900BK	Grease (for Lens) (for focus motor) RFKZ0472
	 <p>* Only supplied as 10 set/box.</p>	

7.2. When Replacing the Main PCB

After replacing the MAIN PCB, be sure to achieve adjustment.

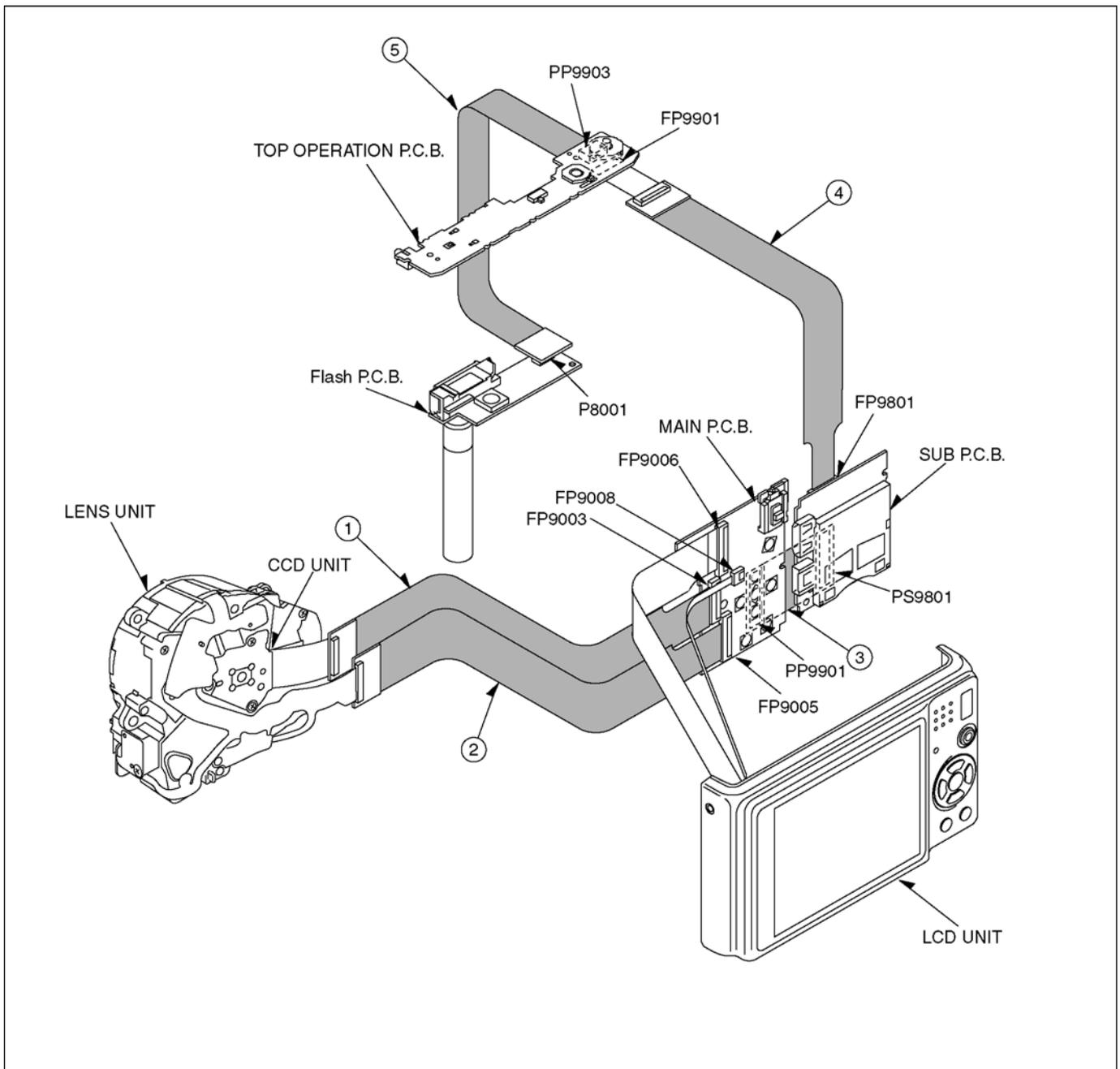
The adjustment instruction is available at "software download" on the "Support Information from NWBG/VDBG-AVC" web-site in "TSN system", together with Maintenance software.

7.3. Service Position

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

No.	Parts No.	Connection	Form
1	RFKZ0416	FP9003 (MAIN) - CCD UNIT	41PIN 0.3 FFC
2	RFKZ0477	FP9005 (MAIN) - LENS UNIT	45PIN 0.4 FFC
3	RFKZ0445	PP9901 (MAIN) - PS9801(SUB)	100PIN B to B
4	RFKZ0416	FP9801 (SUB) - FP9901 (TOP OPERATION P.C.B.)	41PIN 0.3 FFC
5	VFK1906	P8001 (FLASH PCB) - PP9903 (TOP OPERATION P.C.B.)	20PIN B to B

7.3.1. Extension Cable Connections

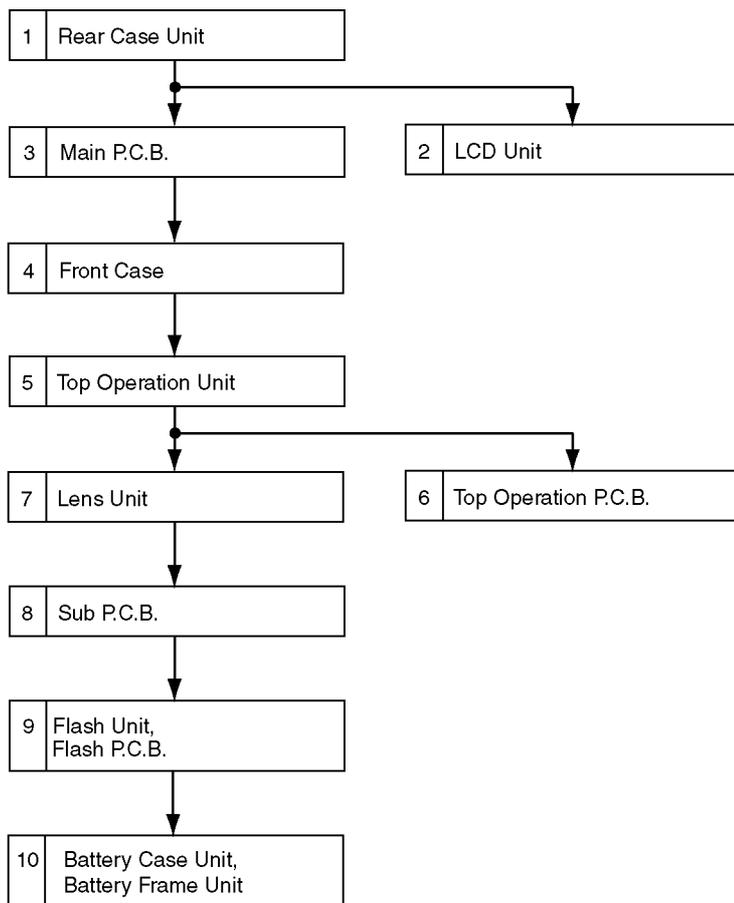


CAUTION-1. (When servicing FLASH PCB)

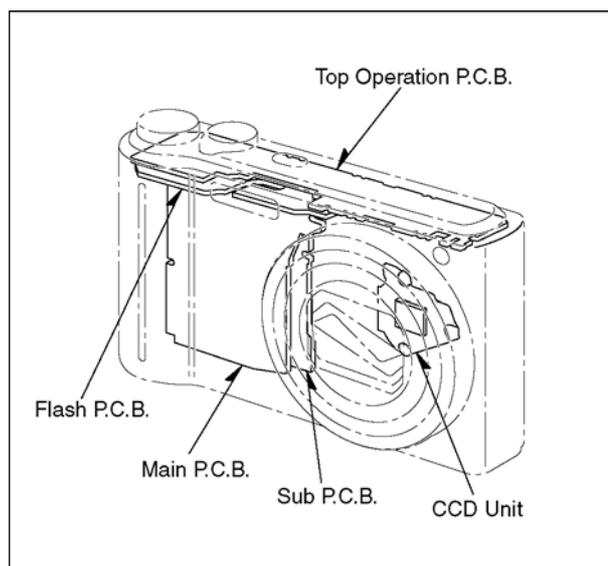
1. Be sure to discharge the capacitor on FLASH PCB.
Refer to "HOW TO DISCHARGE THE CAPACITOR ON FLASH PCB".
The capacitor voltage is not lowered soon even if the AC Cord is unplugged or the battery is removed.
2. Be careful of the high voltage circuit on FLASH PCB.
3. DO NOT allow other parts to touch the high voltage circuit on FLASH PCB.

8 Disassembly and Assembly Instructions

8.1. Disassembly Flow Chart



8.2. PCB Location



8.3. Disassembly Procedure

No.	Item	Fig.	Removal			
1	Rear Case Unit	Fig.D1	SD Card			
			Battery			
		Fig.D2	6 Screws (A)			
			FP9006 (Flex)			
			FP9008 (Flex)			
2	LCD Unit	Fig.D3	Rear Case Unit			
			5 Locking tabs			
			LCD Unit			
			LCD Panel			
		Fig.D4	LCD (1)			
3	Main P.C.B.	Fig.D5	NOTE: (When Replacing)			
			FP9003 (Flex)			
			FP9005 (Flex)			
			PP9901 (Connector)			
			DPR Sheet (A)			
4	Front Case	Fig.D6	Main P.C.B.			
			5 Screws (B)			
5	Top Operation Unit	Fig.D7	Front Case			
			FP9801 (Flex)			
			PP9903 (Connector)			
			2 Locking tabs			
			Top Operation Unit			
6	Top Operation P.C.B.	Fig.D8	AF Panel Light			
			2 Locking tabs			
			Top FPC			
			FP9901 (Flex)			
			FP9902 (Flex)			
			2 Screws (C)			
			3 Locking tabs			
			Top Operation P.C.B.			
			7	Lens Unit	Fig.D9	TRIPOD
						2 Locking tabs
3 Screws (D)						
Lens Unit						
Sub P.C.B.						
8	Sub P.C.B.	Fig.D10	1 Screw (E)			
			2 Locking tabs			
			DPR Sheet (B)			
			2 Locking tabs			
			PCB Spacer			
			Sub P.C.B.			
			Flash Unit, Flash P.C.B.	Fig.D11	2 Screws (F)	
Flash Unit						
10	Battery Frame Unit, Battery Case Unit	Fig.D12	Flash P.C.B.			
			Earth Plate			
			EMC Plate			
		Fig.D13	5 Locking tabs			
			6 Locking tabs			
	Battery Frame Unit					
	Battery Case Unit					

8.3.1. Removal of the Rear Case Unit

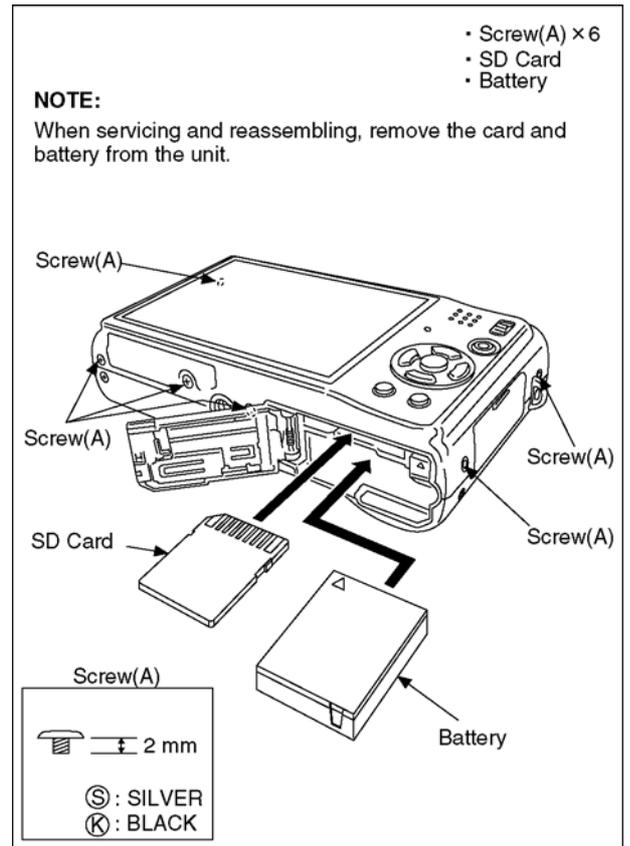


Fig. D1

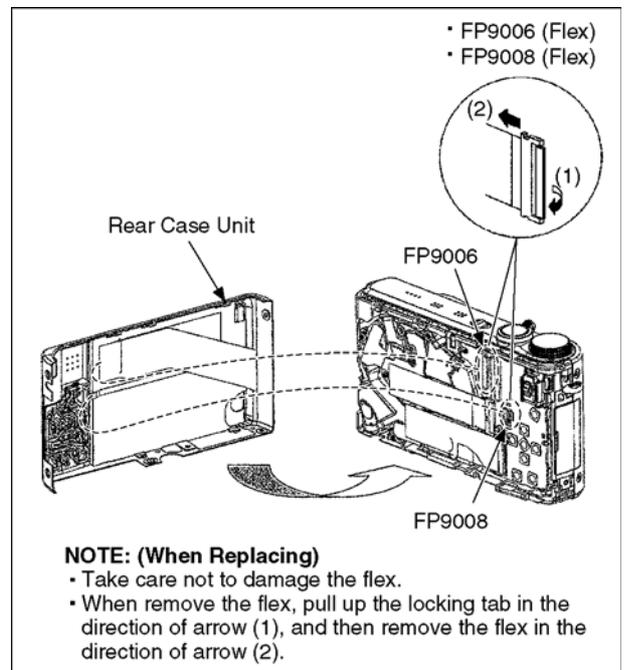


Fig. D2

8.3.2. Removal of the LCD Unit

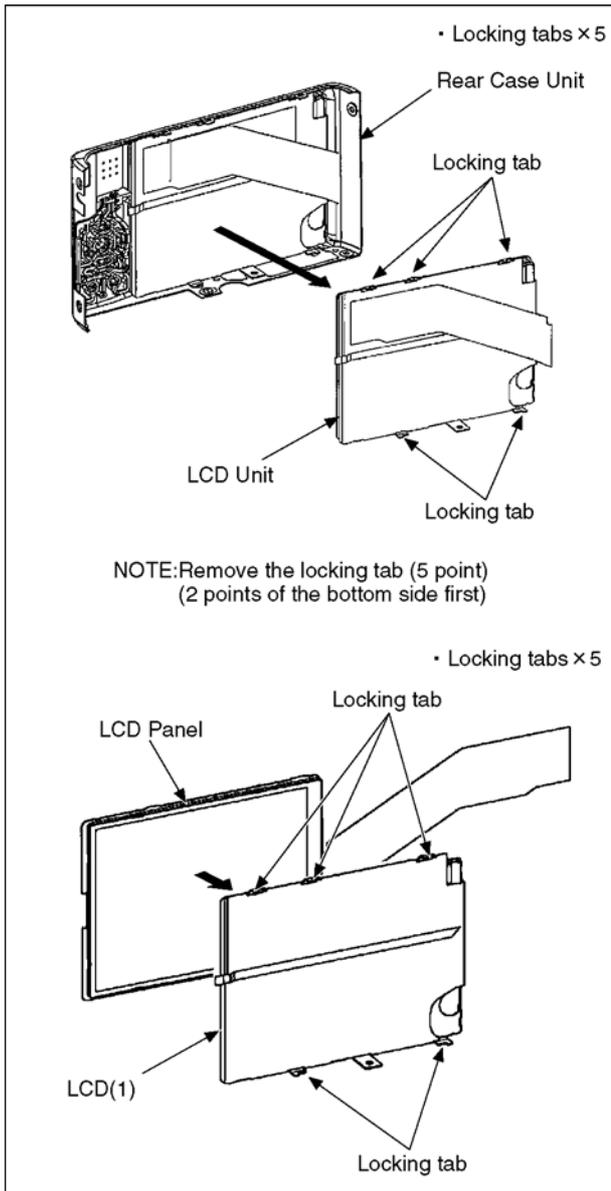


Fig. D3

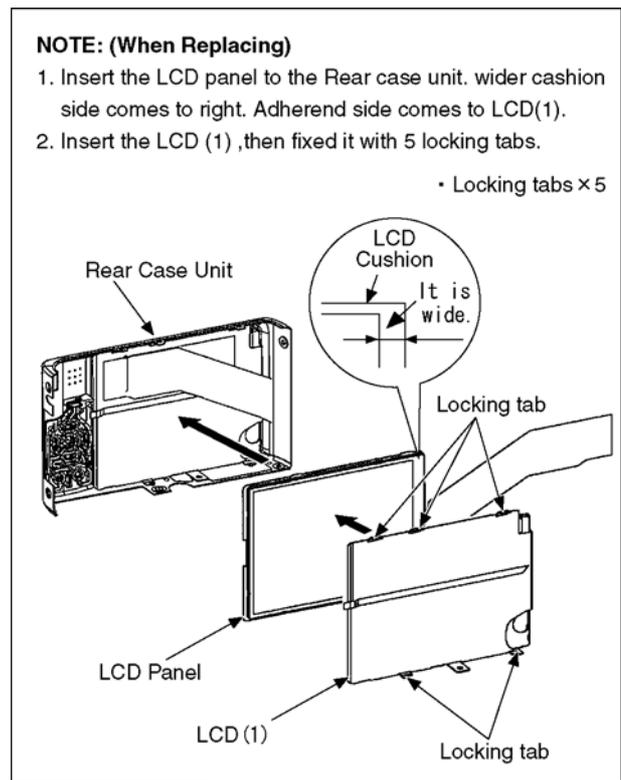


Fig. D4

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

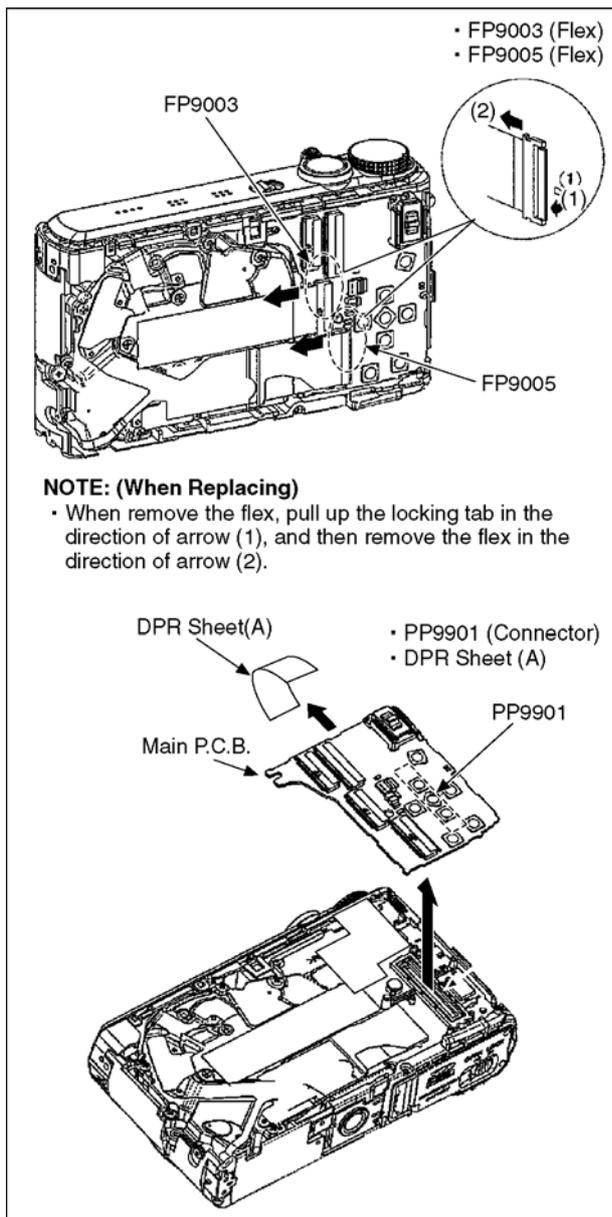


Fig. D5

8.3.4. Removal of the Front Case

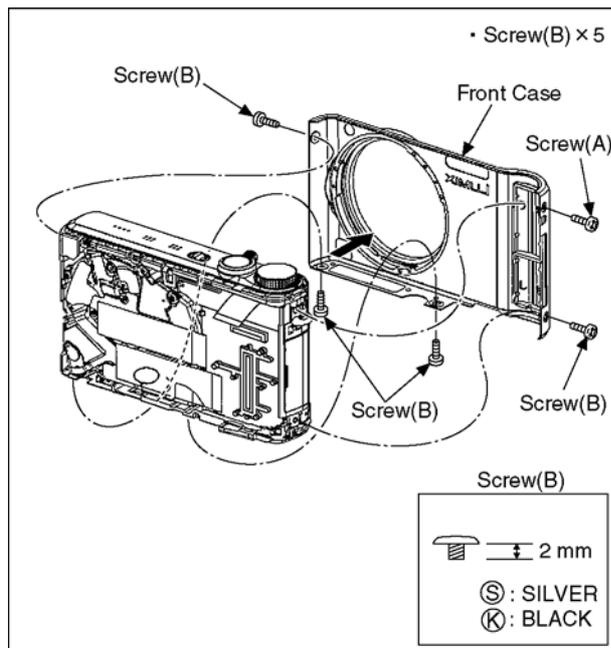


Fig. D6

8.3.5. Removal of the Top Operation Unit

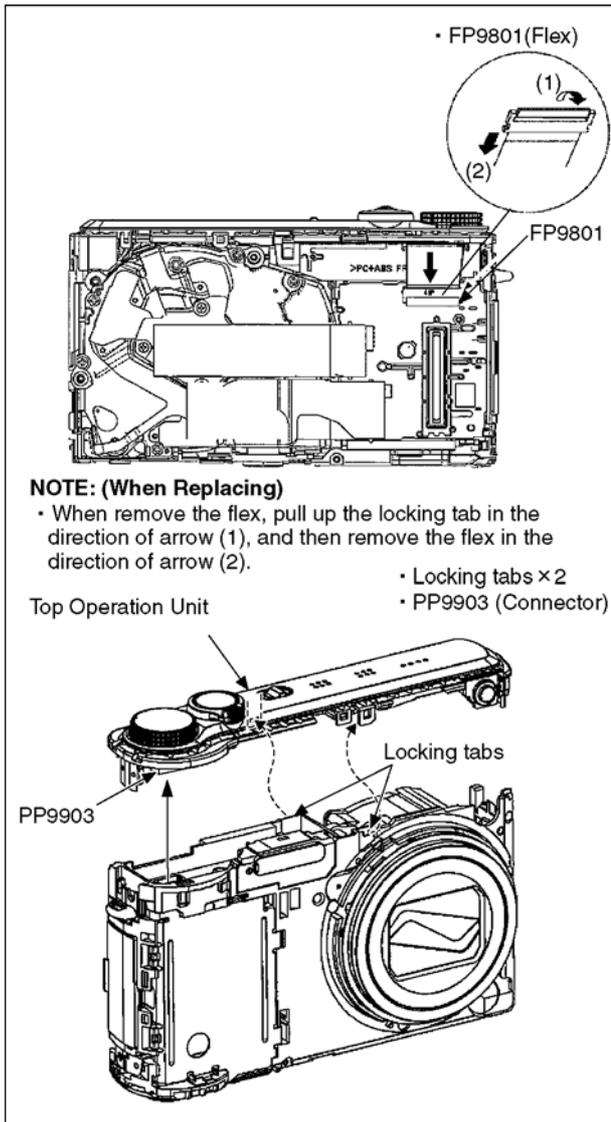


Fig. D7

8.3.6. Removal of the Top Operation P.C.B.

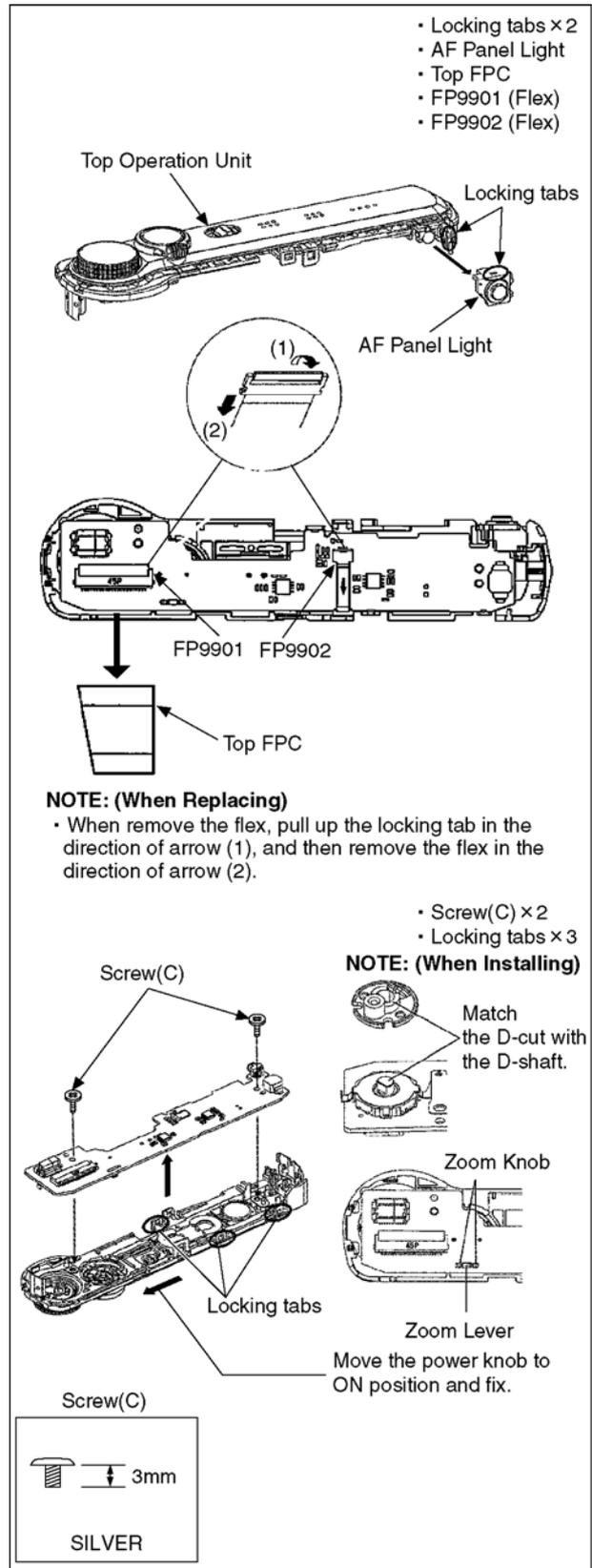


Fig. D8

8.3.7. Removal of the Lens Unit

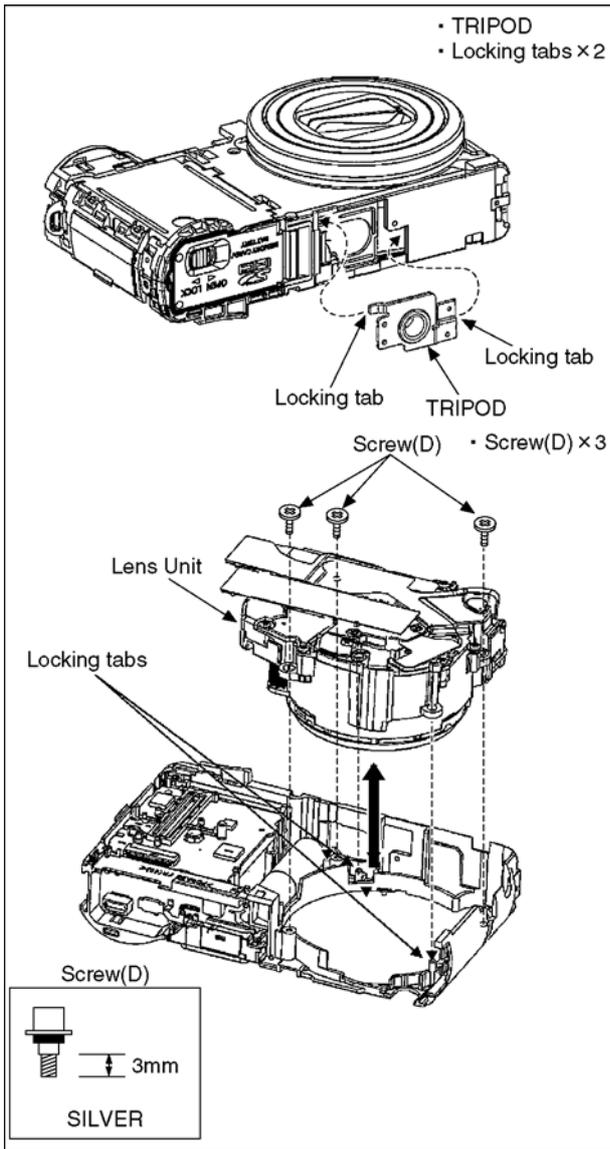


Fig. D9

8.3.8. Removal of the Sub P.C.B.

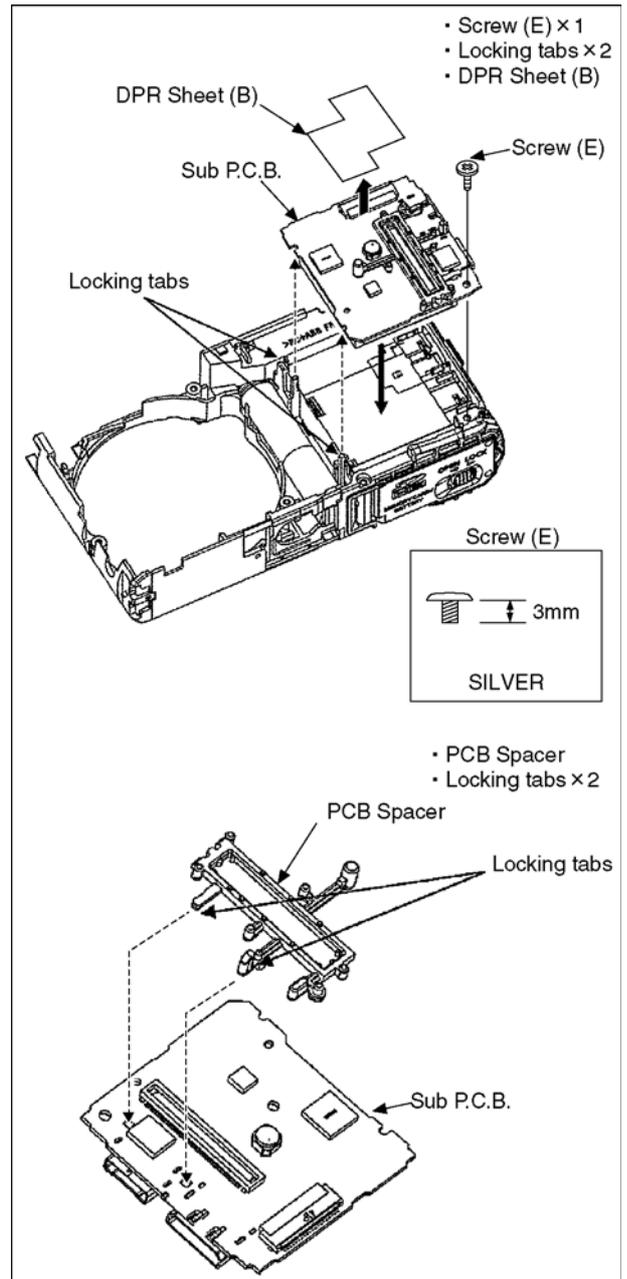


Fig. D10

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

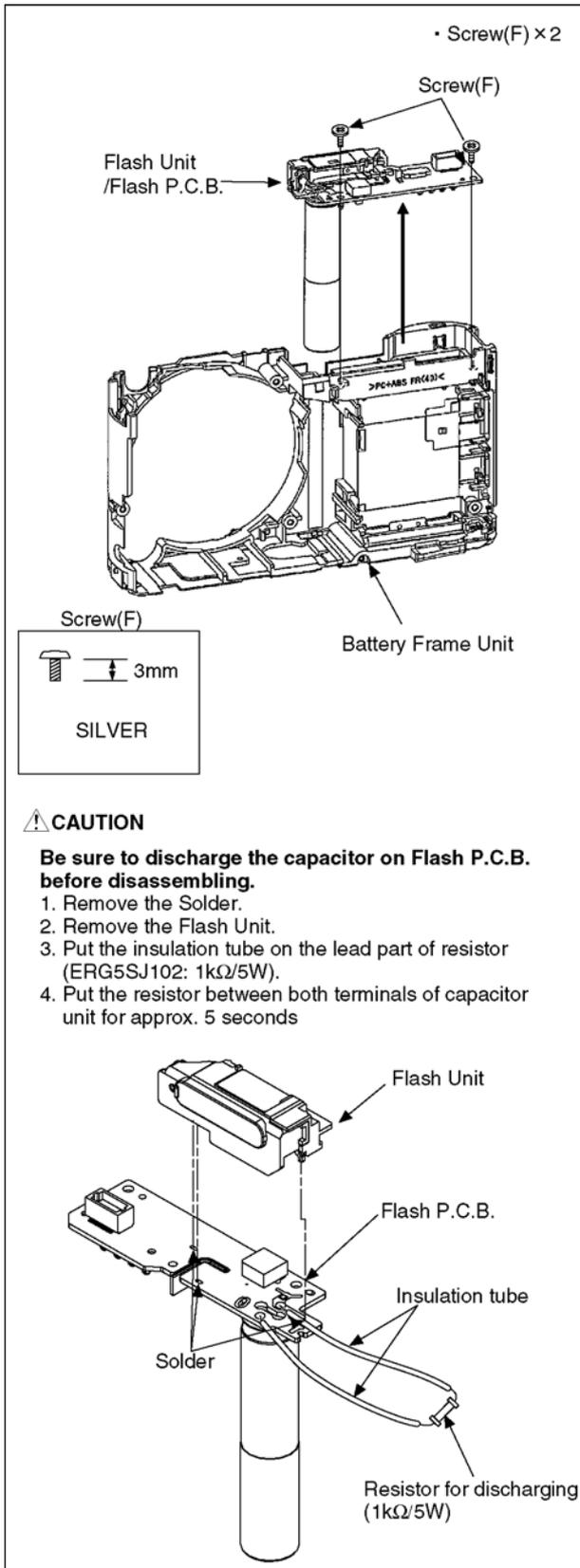


Fig. D11

8.3.10. Removal of the Battery Frame Unit, Battery Case Unit

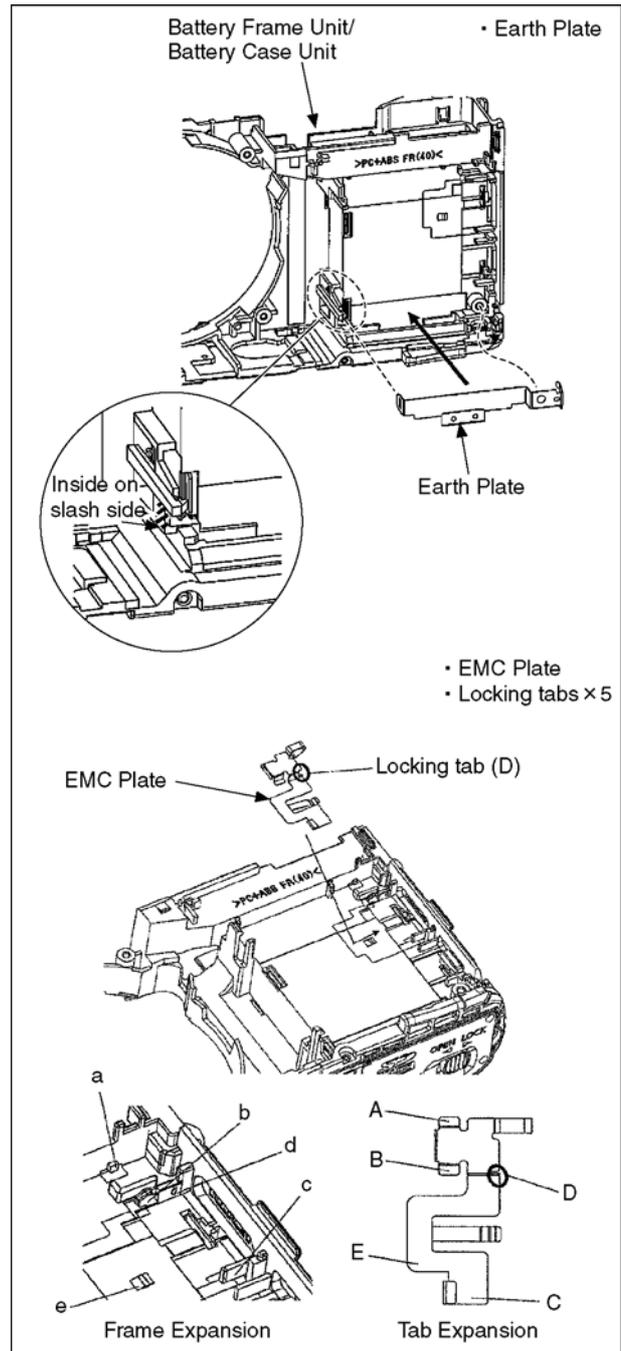


Fig. D12

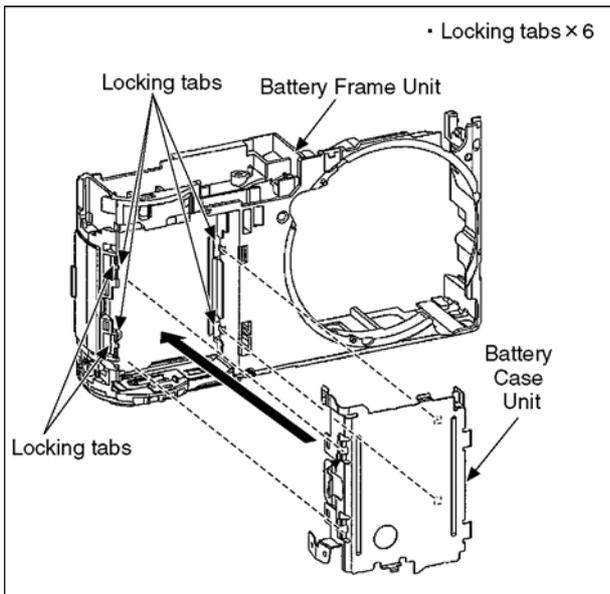


Fig. D13

NOTE: (When Assembling)

Be sure to confirm the following points when assembling.

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

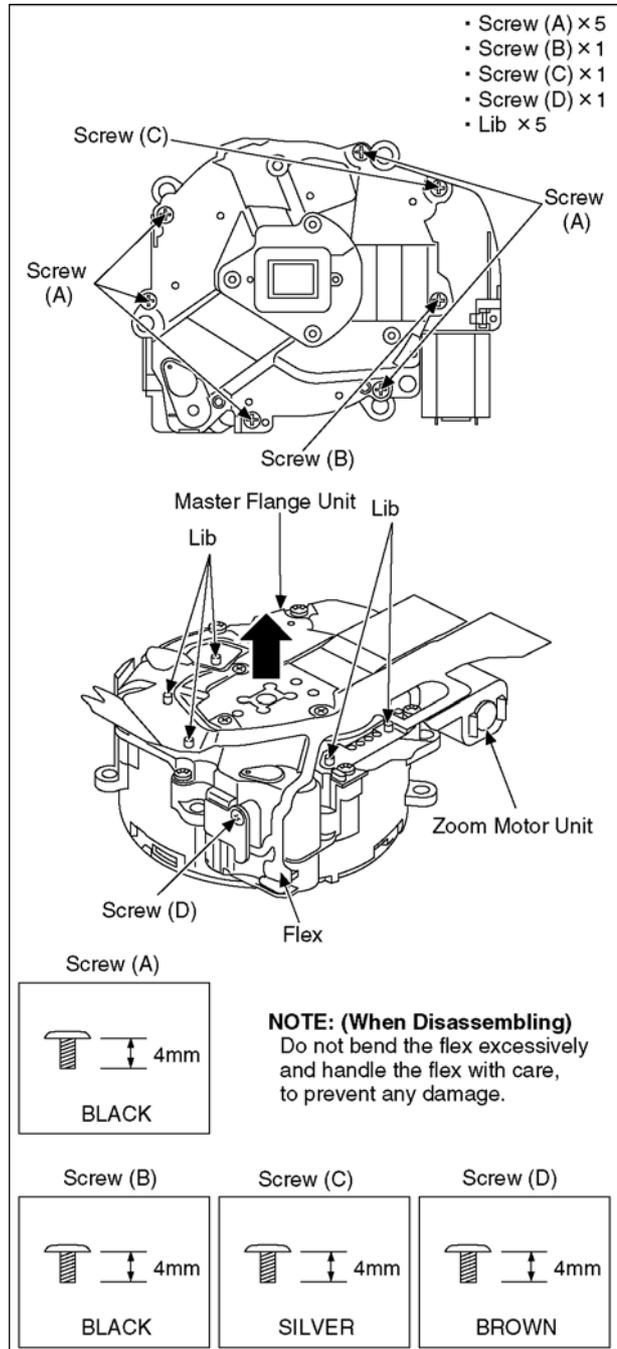
8.4. Disassembly Procedure for the Lens

NOTE: When Disassembling and Assembling for the Lens

1. To minimize the possibility of the CCD being dirt, perform disassemble and/or assemble under the condition of the CCD is being mounted.
Disassembling procedures for the CCD unit, refer to item 8.6.
2. Take care that the dust and dirt are not entered into the lens.
In case of the dust is putted on the lens, blow off them by airbrush.
3. Do not touch the surface of lens.
4. Use lens cleaning KIT (BK)(VFK1900BK).
5. Apply the grease to the point where is shown to "Grease apply" in the figure.

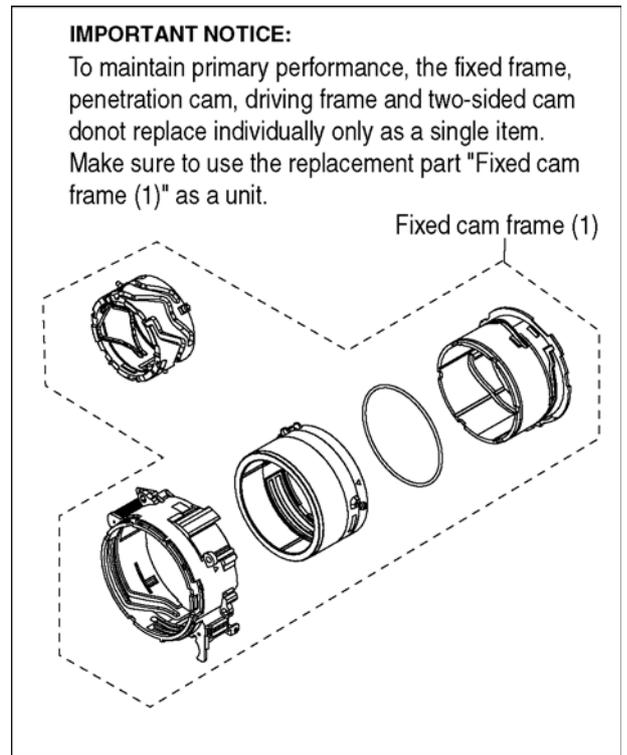
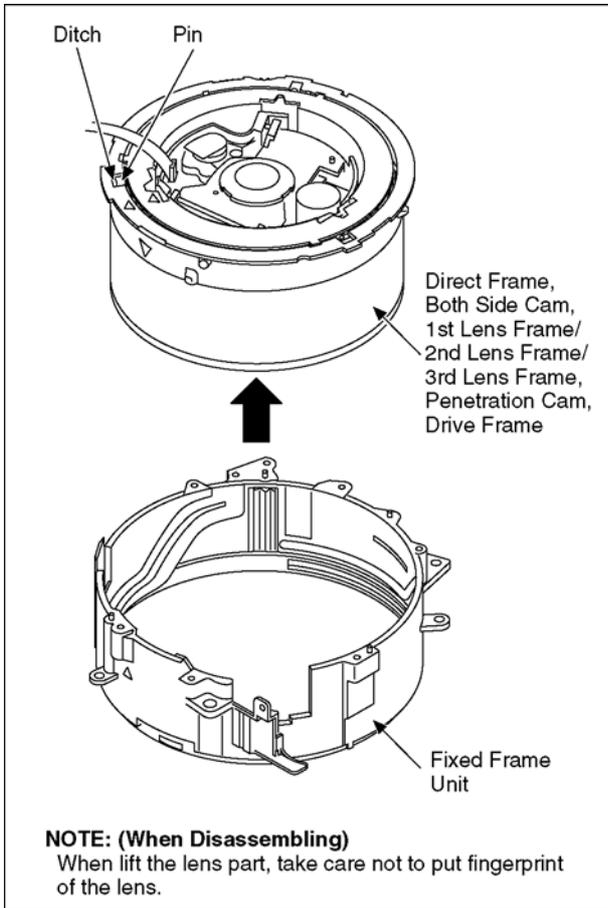
8.4.1. Removal of the Zoom Motor Unit and Master Flange Unit

1. Remove the libs (5 points).
2. Unscrew the 5 screws (A).
3. Unscrew the 1 screw (B).
4. Unscrew the 1 screw (C).
5. Unscrew the 1 screw (D).
6. Remove the zoom motor unit.
7. Remove the master flange unit.



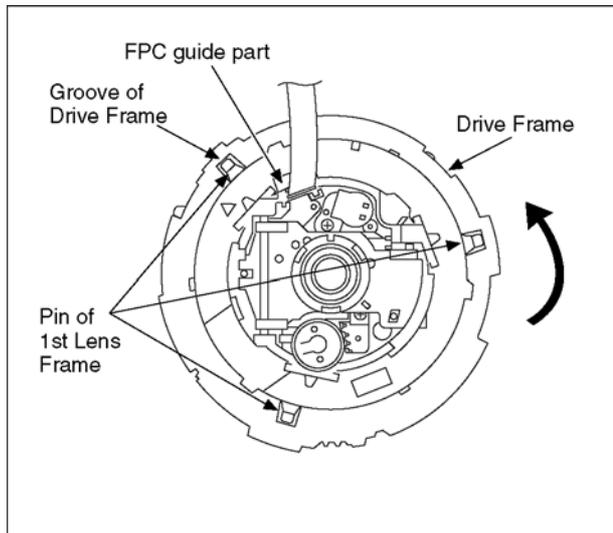
8.4.2. Removal of the Direct Frame, Both Side Cam, 1st Lens Frame/2nd Lens Frame/3rd Lens Frame, Penetration Cam and Drive Frame

- Push the penetration cam to the indicated by arrow from lens side, and then remove the unit of direct frame, both side cam, 1st lens frame/2nd lens frame/3rd lens frame, penetration cam and drive frame from the fixed frame unit.

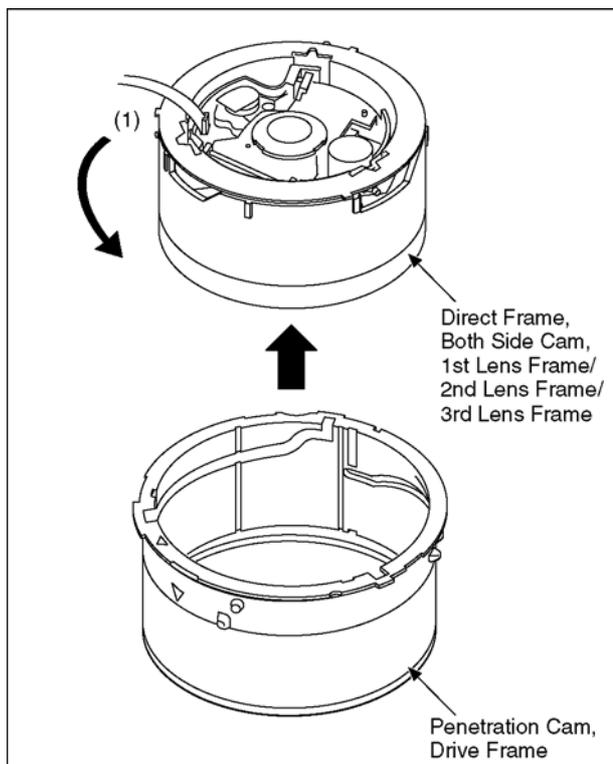


8.4.3. Removal of the Direct Frame, Both Side Cam and 1st Lens Frame/2nd Lens Frame/3rd Lens Frame

1. Turn the drive frame, and then Align the groove of drive frame and pin of 1st lens frame.

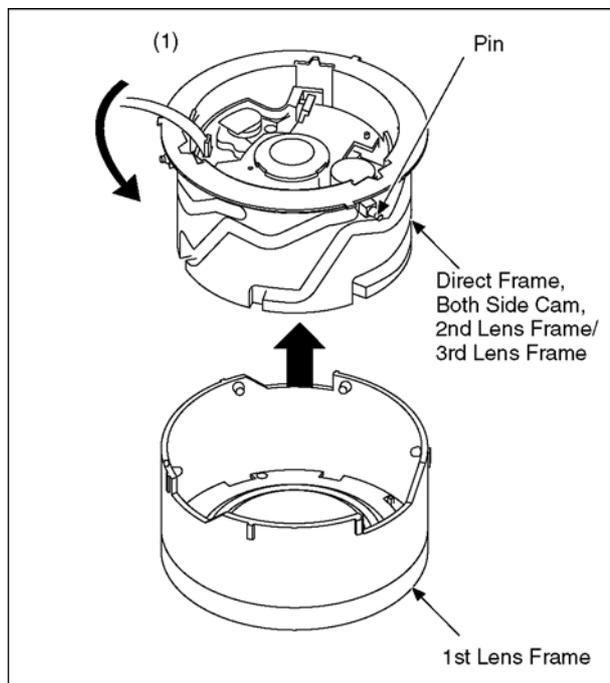


2. Push the 1st lens frame to the indicated by arrow from lens side, and then remove the unit of direct frame, both side cam and 1st lens frame/2nd lens frame/3rd lens frame from the penetration cam and drive frame.



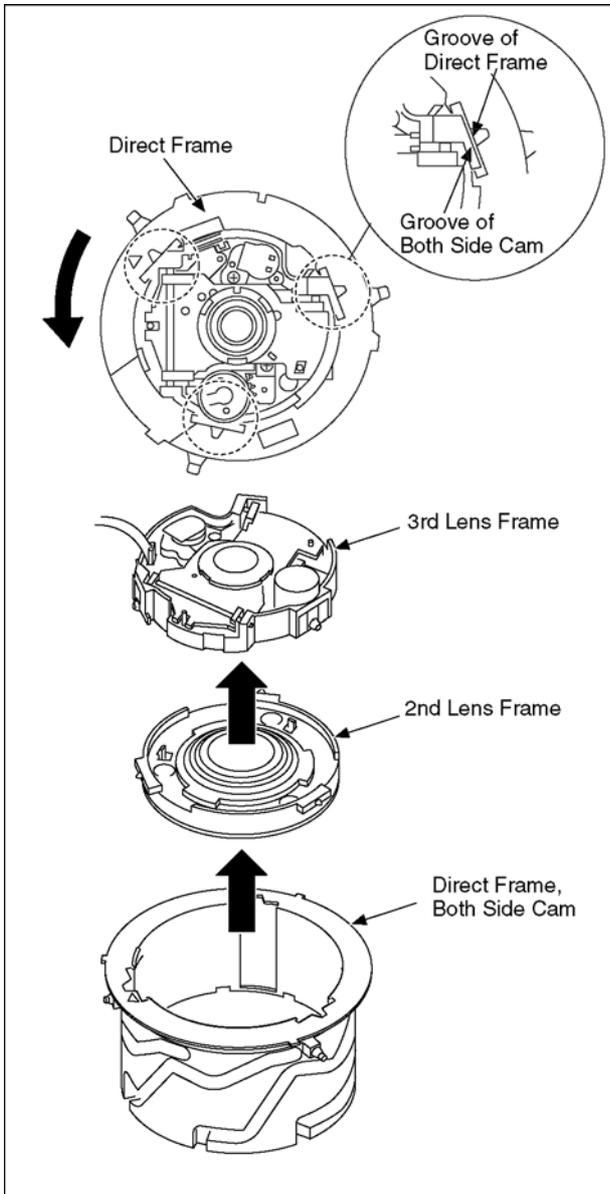
8.4.4. Removal of the Direct Frame, Both Side Cam and 2nd Lens Frame/3rd Lens Frame

- Turn to the indicated by arrow(1) while picking the pin, and then remove the unit of direct frame, both side cam and 2nd lens frame/3rd lens frame from the 1st lens frame.



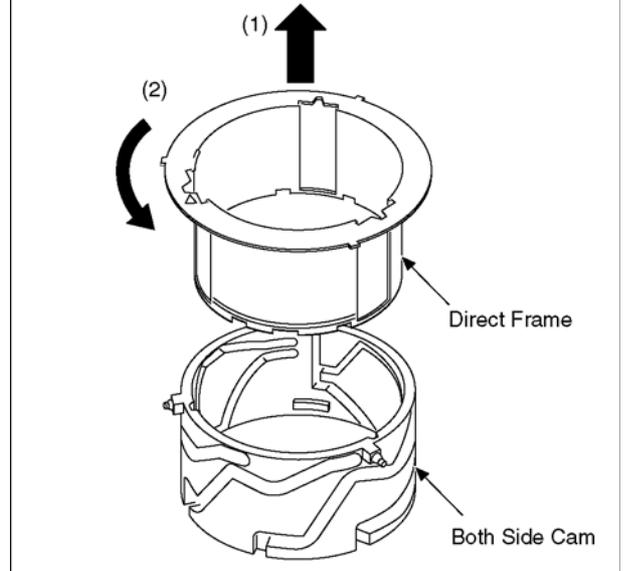
8.4.5. Removal of the 3rd Lens Frame and 2nd Lens Frame

1. Turn the direct frame, and then Align the groove of direct frame and groove of both side cam.
2. Remove the 3rd lens frame and 2nd lens frame from the direct frame, both side cam.



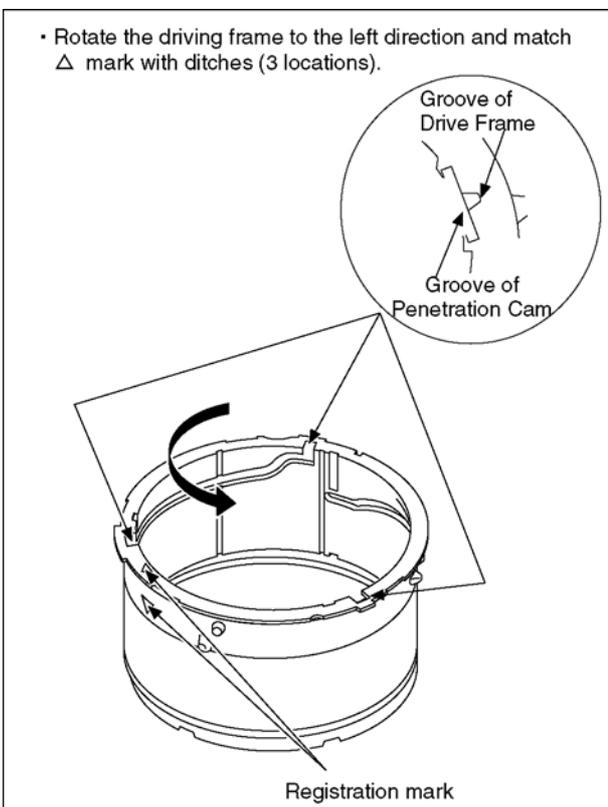
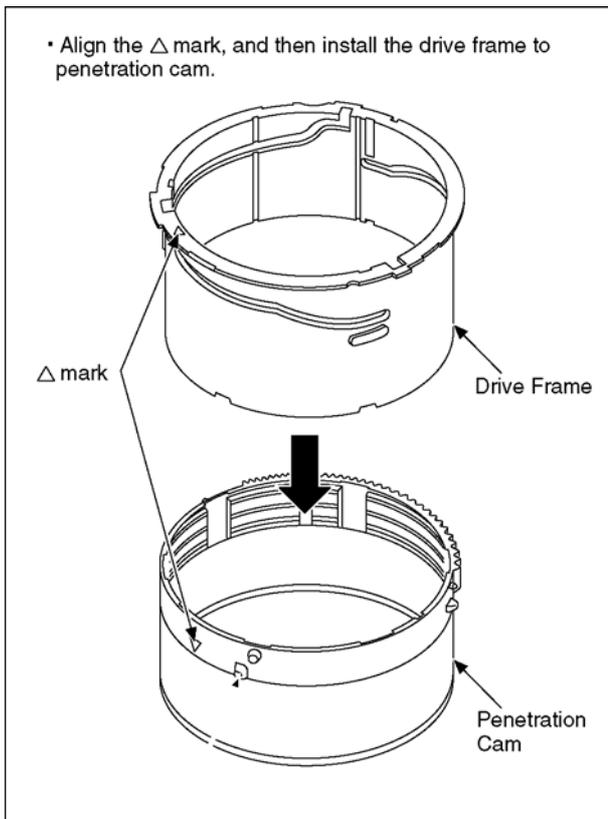
8.4.6. Removal of the Direct Frame

Pull the direct frame to the indicated by arrow (1), and then turn the direct frame in the indicated by arrow (2).

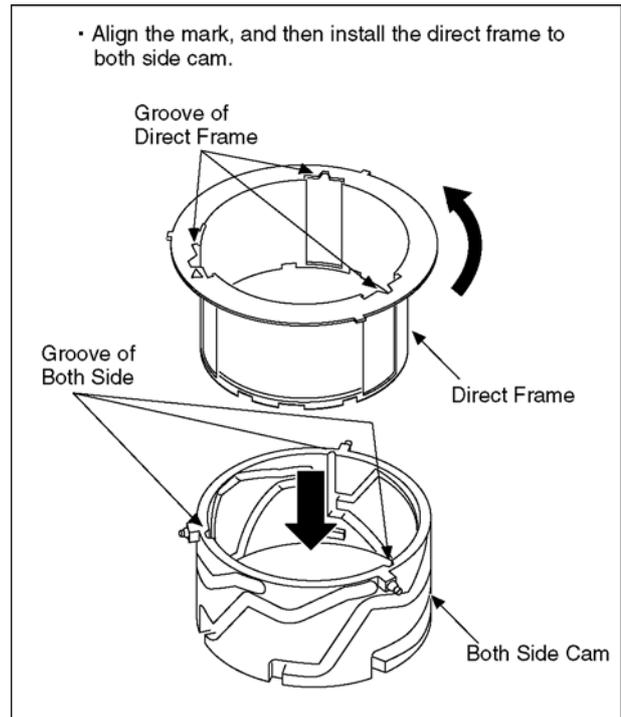


8.5. Assembly Procedure for Lens

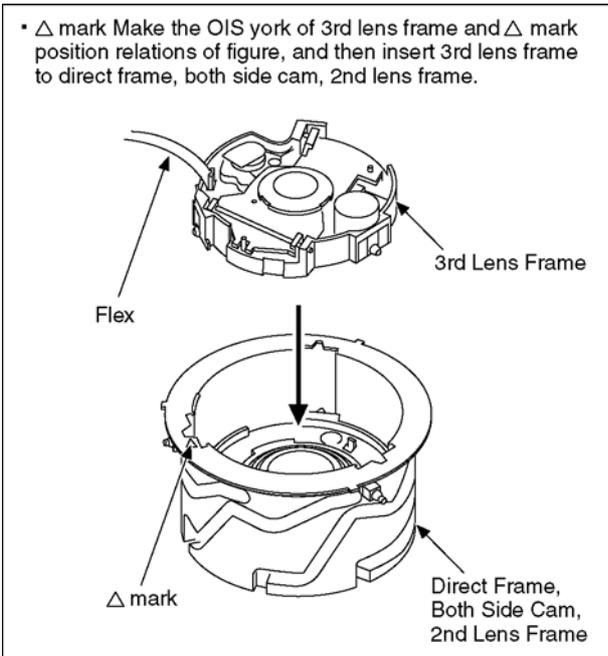
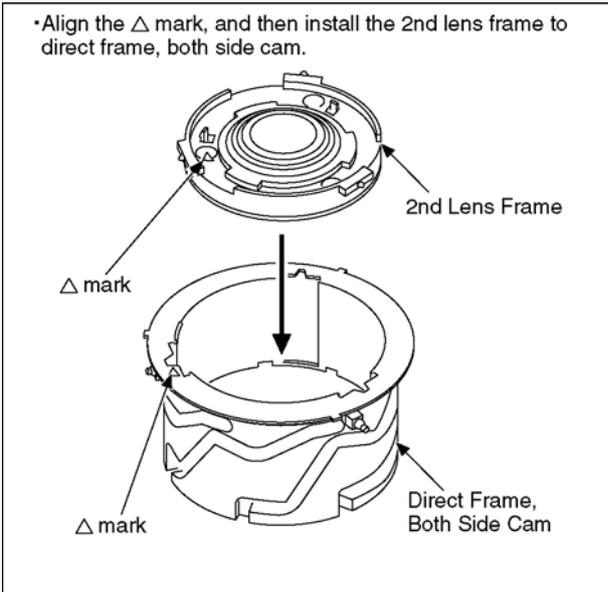
8.5.1. Phase alignment of the Penetration Cam and Drive Frame



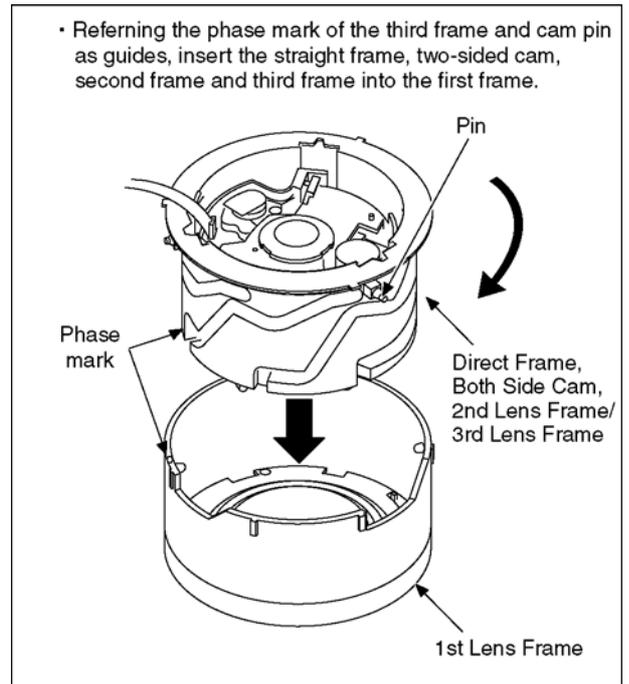
8.5.2. Phase alignment of the Direct Frame and Both Side Cam



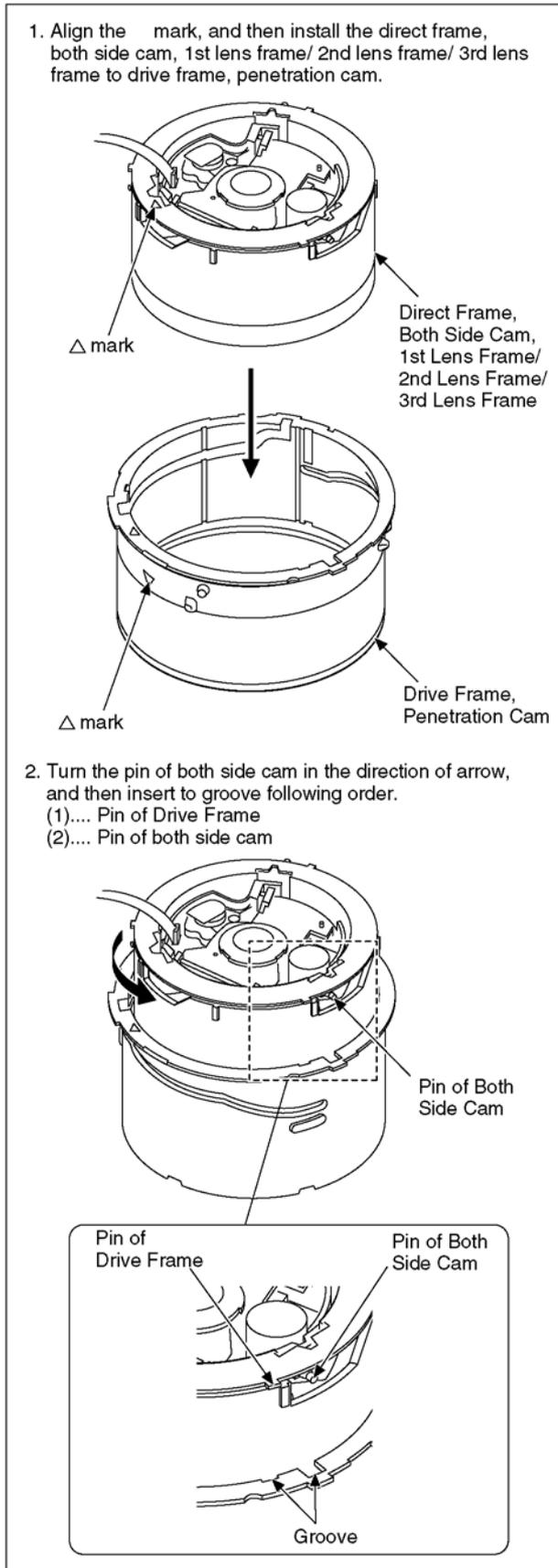
8.5.3. Assembly for the 2nd Lens Frame and 3rd Lens Frame



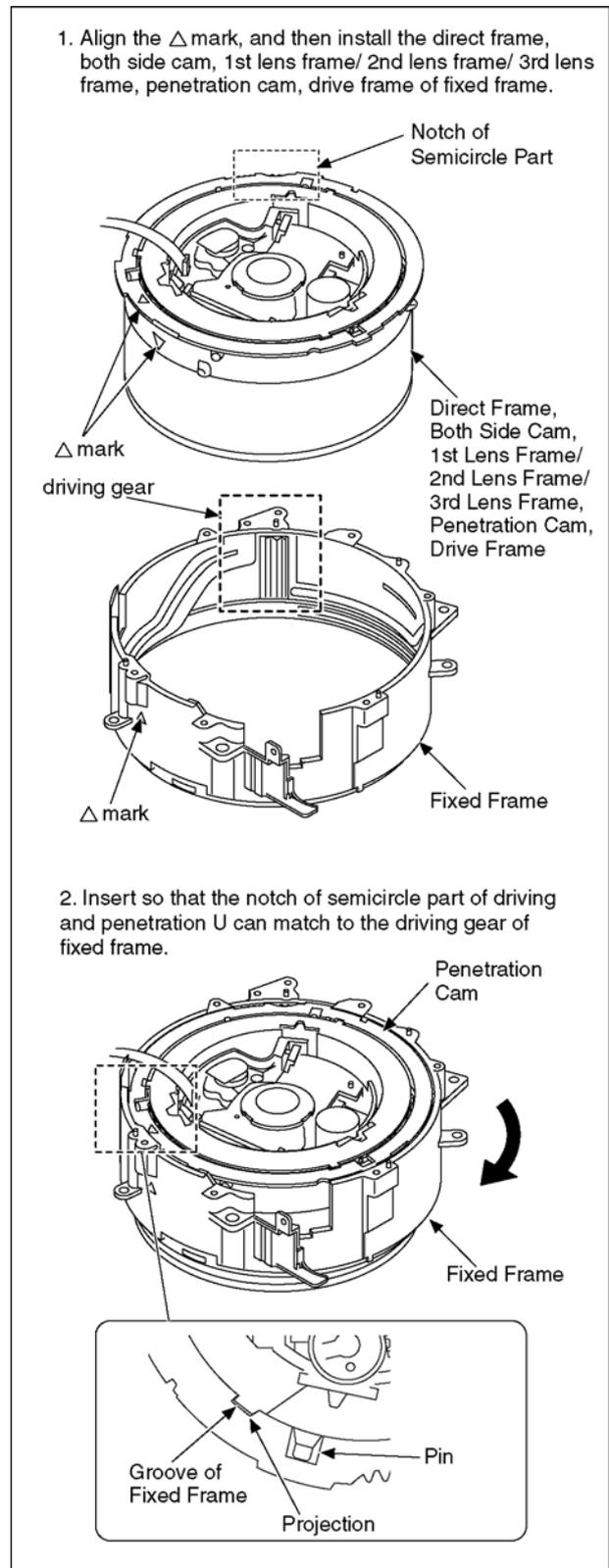
8.5.4. Assembly for the Direct Frame, Both Side Cam and 2nd Lens Frame/3rd Lens Frame



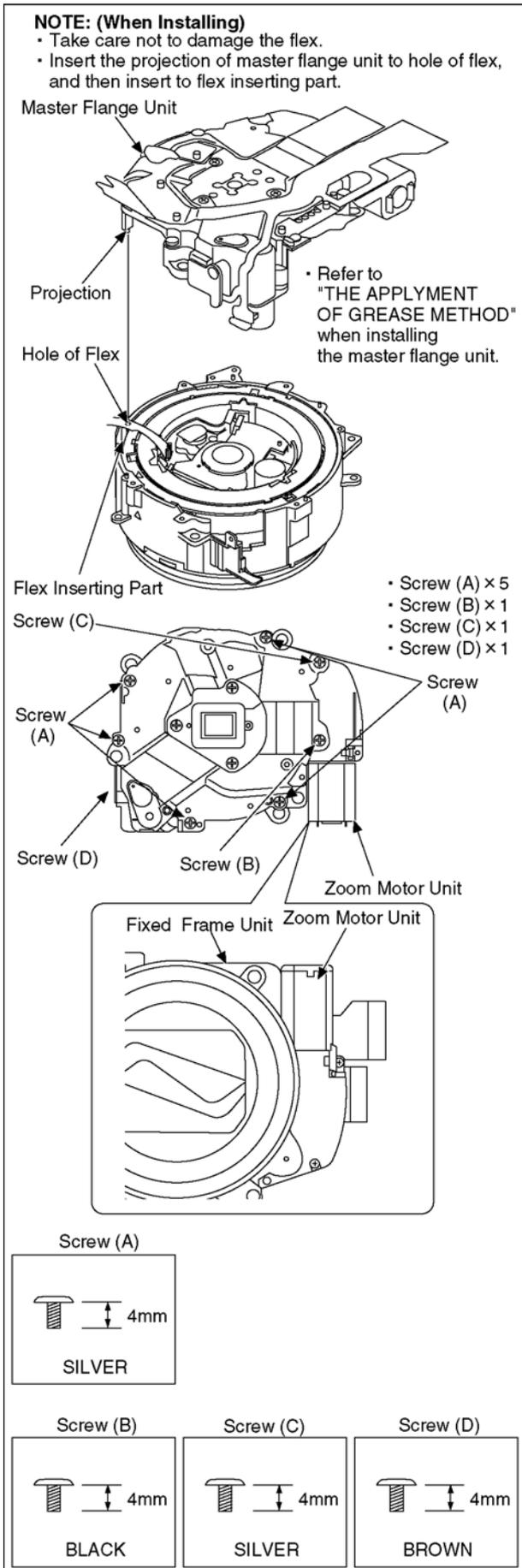
8.5.5. Assembly for the Direct Frame, Both Side Cam and 1st Lens Frame/ 2nd Lens Frame/ 3rd Lens Frame



8.5.6. Assembly for the Direct Frame, Both Side Cam and 1st Lens Frame/ 2nd Lens Frame/ 3rd Lens Frame, Penetration Cam and Drive Frame

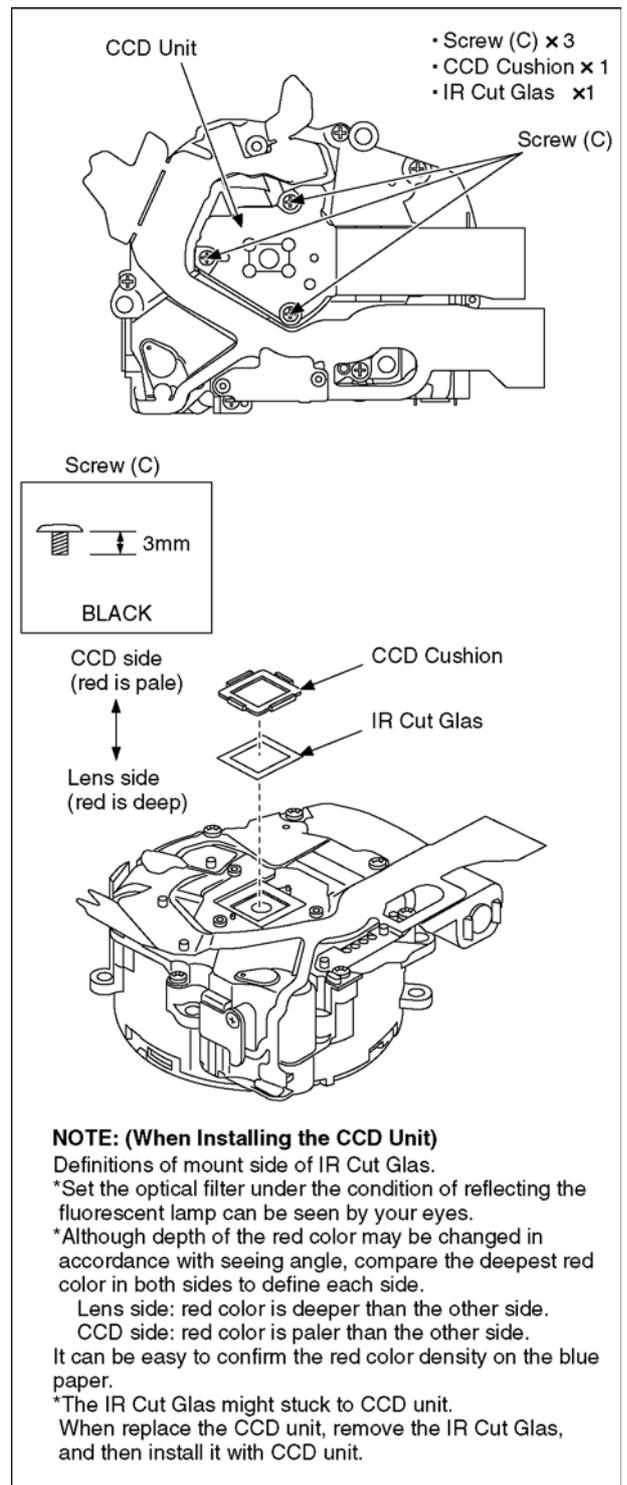


8.5.7. Assembly for the Zoom Motor Unit and Master Flange Unit

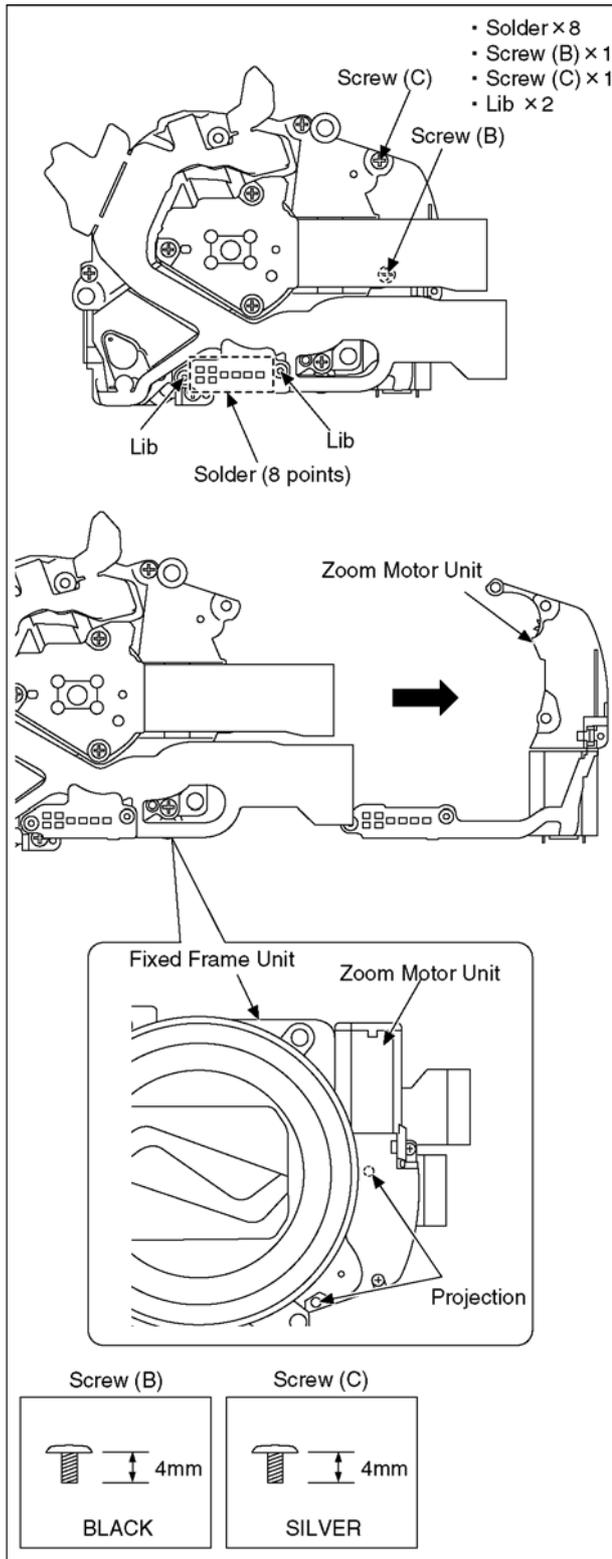


8.6. Removal of the CCD Unit

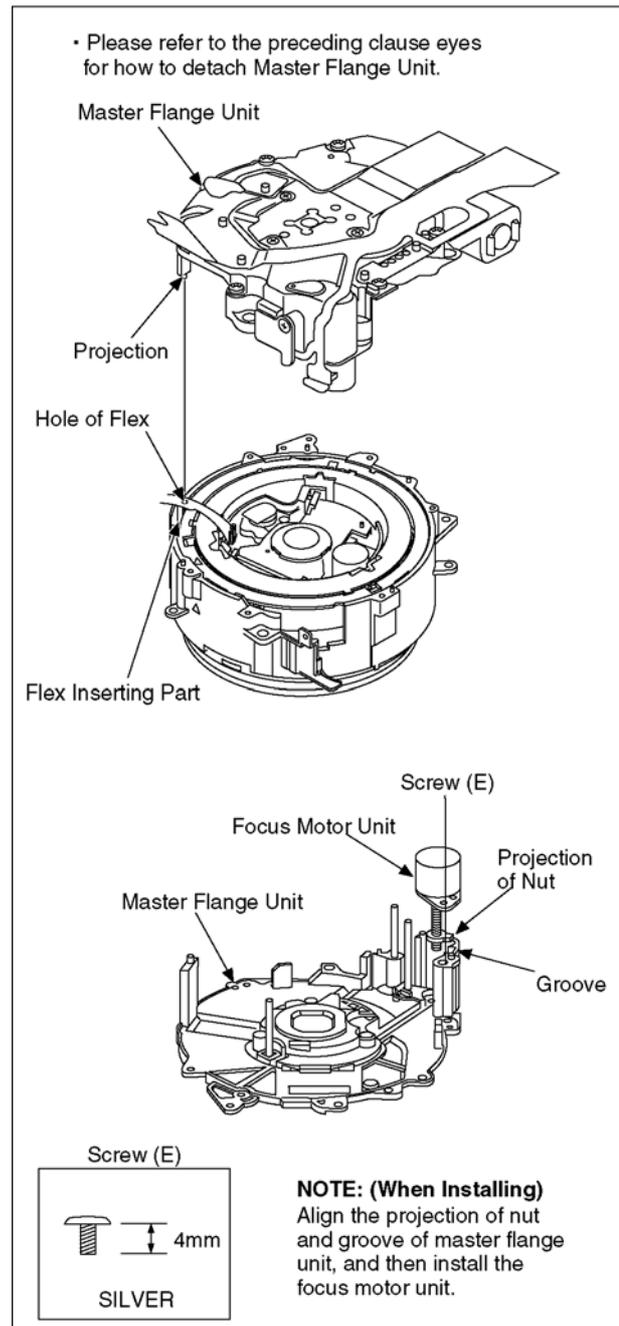
To prevent the CCD unit from catching the dust and dirt, do not remove the CCD unit except for replacing.



8.7. Removal of the Zoom Motor Unit



8.8. Removal of the Focus Motor Unit



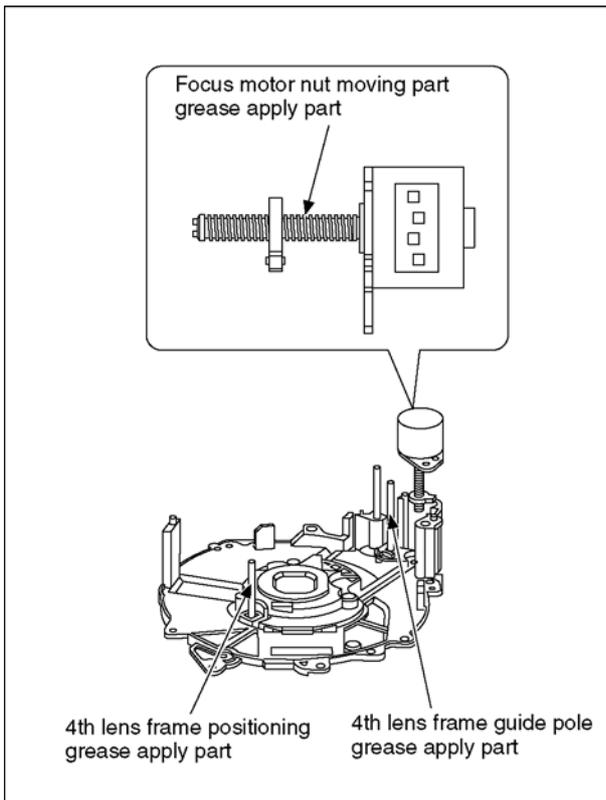
8.9. The Applyment of Grease Method

The grease apply point of lens unit are as follows.

Apply grease additionally in the specified position if necessary.

When the grease is applied, use a toothpick and apply thinly.

- Focus motor nut moving part
 - Grease: RFKZ0472
 - Amount of apply: 3 - 5 mg
- 4th lens frame positioning pole, guide pole
 - Grease: RFKZ0472
 - Amount of apply: 0.15 - 0.35 mg



9 Measurements and Adjustments

9.1. Matrix Chart for Replaced Part and Necessary Adjustment

The relation between Replaced part and Necessary Adjustment is shown in the following table.

When concerned part is replaced, be sure to achieve the necessary adjustment(s).

As for Adjustment condition/procedure, consult the "Adjustment Manual" which is available in Adjustment software.

The Adjustment software is available at "TSN Website", therefore, access to "TSN Website" at "Support Information from NWBG/VDBG-AVC".

NOTE:

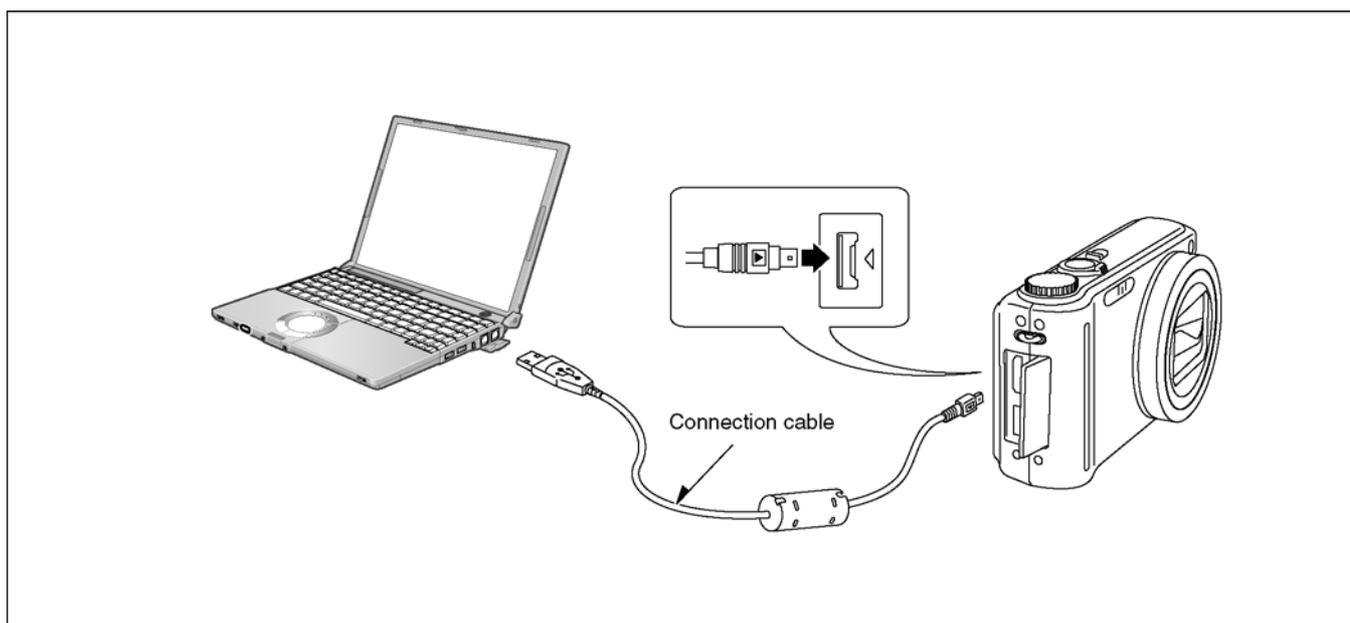
After adjustments have been terminated, make sure to achieve "INITIAL SETTINGS".

Adjustment Item		Replaced Part				
		Main P.C.B.	VENUS (IC6001)	Flash-ROM (IC6002)	Lens Part (Excluding CCD)	CCD Unit
Camera Section	OIS hall element adjustment (OIS)	○	○	○	○	-
	Back focus adjustment (BF)	○	○	○	○	○*1
	Shutter adjustment (SHT)	○	○	○	○	○
	ISO sensitivity adjustment (ISO)	○	○	○	○	○
	AWB adjustment High brightness coloration inspection (WBL)	○	○	○	○	○
	CCD white scratch compensation (WKI)	○	○	○	-	○*1
	CCD black scratch compensation (BKI)	○	○	○	-	○*1
	Venus zoom inspection (PZM)	○	○	○	-	-
	Monitor linearity inspection (MLN)	○	○	○	○	○
	Color reproduction inspection /mic inspection (COL)	○	○	○	○	○

*1 This adjustment is necessary, not only replacing CCD unit but also removing it from the lens unit.

NOTE:

*There is no LCD adjustment in this model.



10 Maintenance

10.1. Cleaning Lens, Viewfinder and LCD Panel

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

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

When cleaning the LCD Panel, dampen the lens cleaning paper with lens cleaner, and the gently wipe the their 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-TZ6EB	DMC-TZ6PR
DMC-TZ6EE	DMC-ZS1GH
DMC-TZ6EF	DMC-ZS1GK
DMC-TZ6EG	DMC-ZS1P
DMC-TZ6EP	DMC-ZS1PC
DMC-TZ6GC	DMC-ZS1PU
DMC-TZ6GN	

Vol. 1

Colour

(S).....Silver Type (except DMC-TZ6PR)

(K).....Black Type

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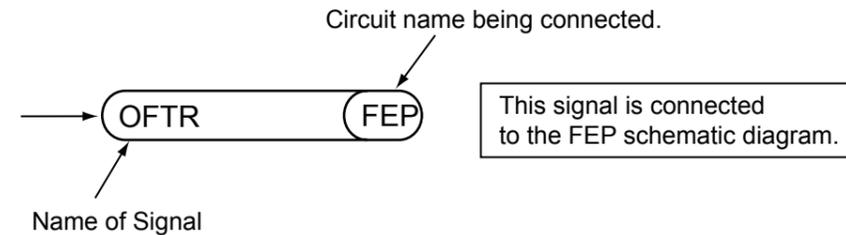
S1. About Indication of The Schematic Diagram	S-1	S5.2. Flash P.C.B.	S-11
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S4. Schematic Diagram.....	S-4	S7.2. Packing Parts and Accessories Section.....	S-20
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S1. About Indication of The Schematic Diagram

S1.1. Important Safety Notice

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

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



S2. Voltage Chart

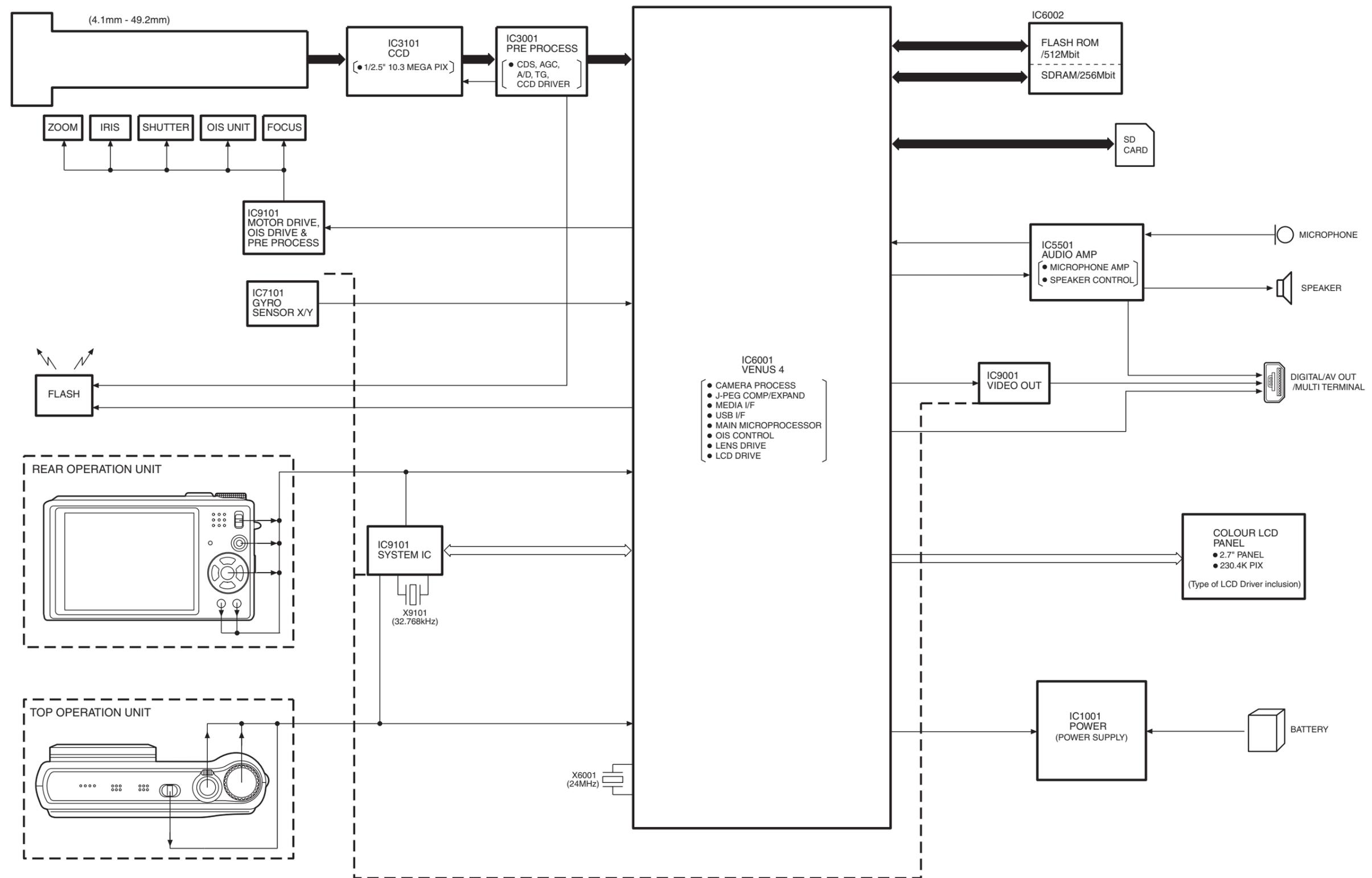
Note) Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

S2.1. Flash P.C.B.

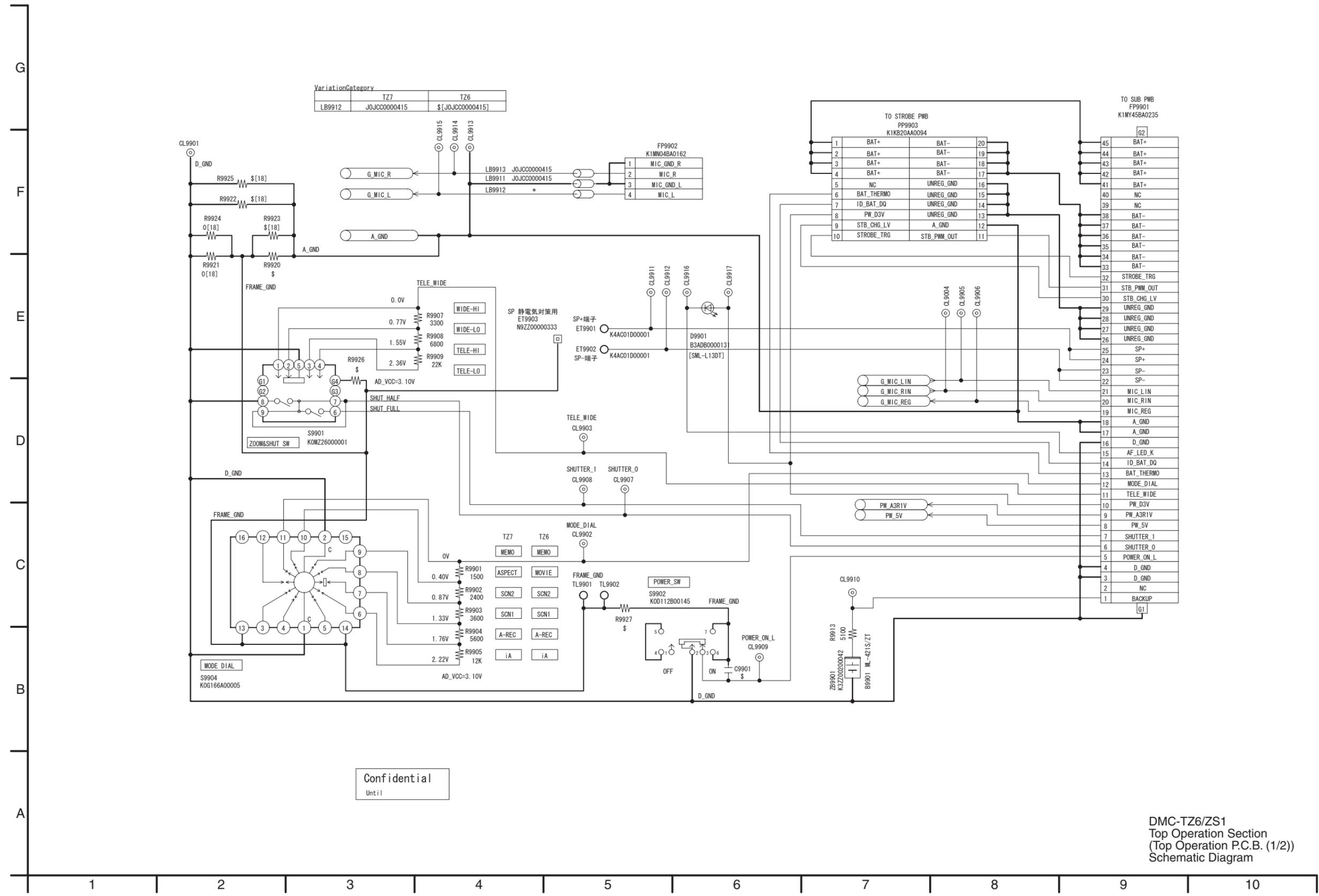
REF No.	PIN No.	POWER ON
IC8001	1	3
IC8001	2	0
IC8001	3	0
IC8001	4	0
IC8001	5	3
Q8009	1	5.1
Q8009	2	5.1
Q8009	3	0
Q8009	4	0
Q8009	5	5.1
Q8009	6	5.1

S3. Block Diagram

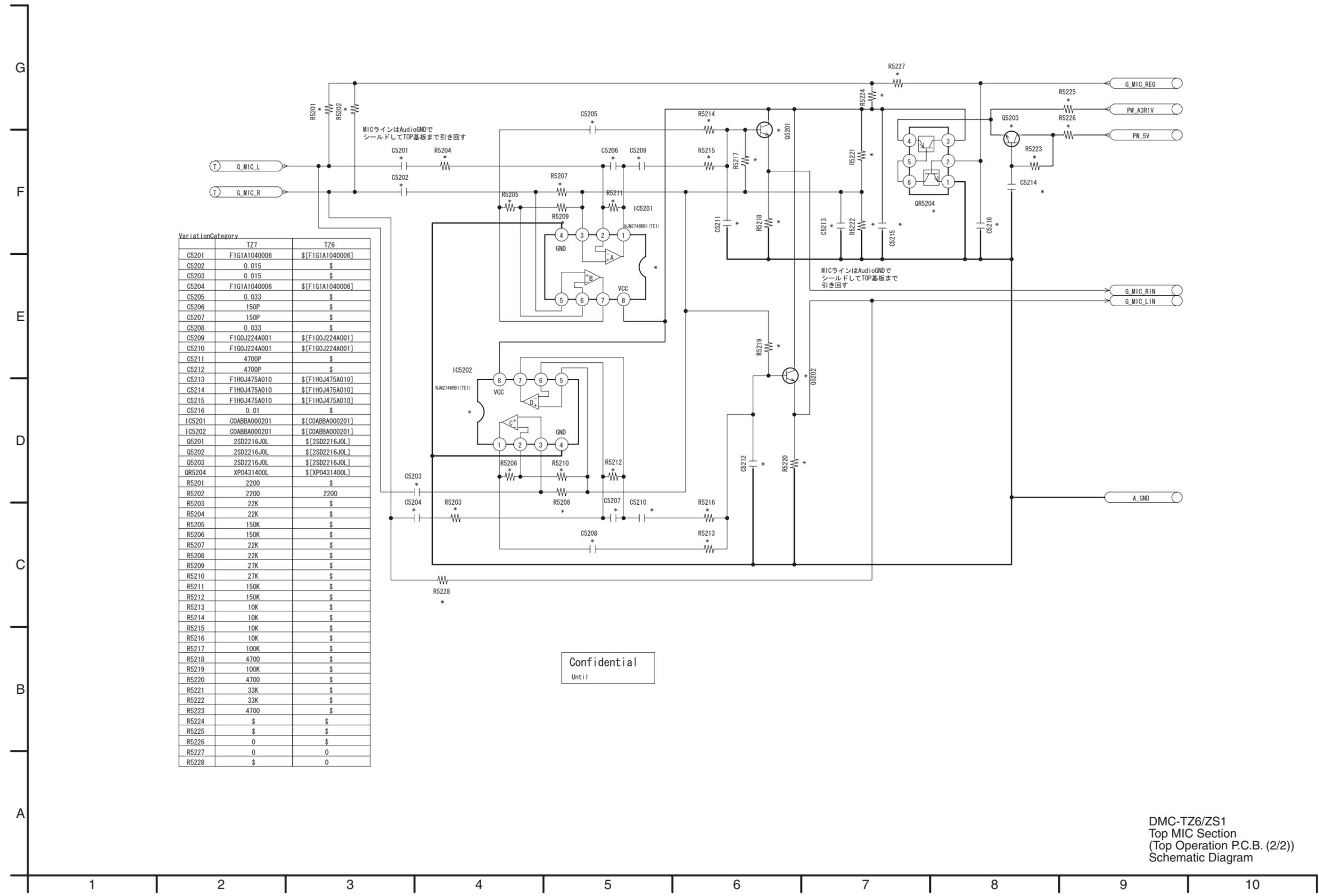
S3.1. Overall Block Diagram



S4.2. Top Operation Schematic Diagram



S4.3. Top MIC Schematic Diagram

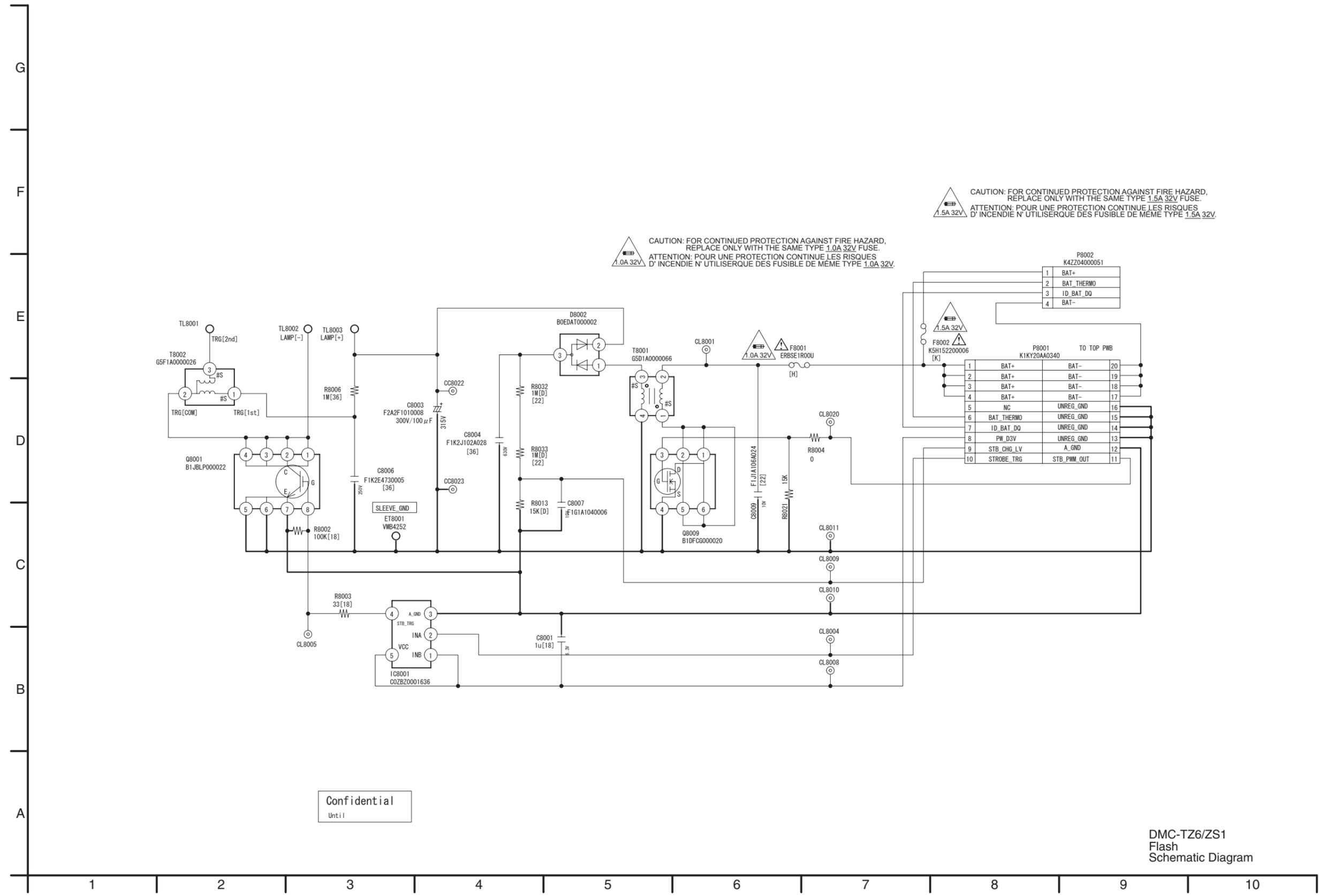


VariationCategory	T27	T26
C5201	F1G1A1040006	\$(F1G1A1040006)
C5202	0.015	\$
C5203	0.015	\$
C5204	F1G1A1040006	\$(F1G1A1040006)
C5205	0.033	\$
C5206	150P	\$
C5207	150P	\$
C5208	0.033	\$
C5209	F1G0J224A001	\$(F1G0J224A001)
C5210	F1G0J224A001	\$(F1G0J224A001)
C5211	4700P	\$
C5212	4700P	\$
C5213	F1H0J475A010	\$(F1H0J475A010)
C5214	F1H0J475A010	\$(F1H0J475A010)
C5215	F1H0J475A010	\$(F1H0J475A010)
C5216	0.01	\$
I05201	COABBA000201	\$(COABBA000201)
I05202	COABBA000201	\$(COABBA000201)
Q5201	2SD2216JOL	\$(2SD2216JOL)
Q5202	2SD2216JOL	\$(2SD2216JOL)
Q5203	2SD2216JOL	\$(2SD2216JOL)
QR5204	XP0431400L	\$(XP0431400L)
R5201	2200	\$
R5202	2200	2200
R5203	22K	\$
R5204	22K	\$
R5205	150K	\$
R5206	150K	\$
R5207	22K	\$
R5208	22K	\$
R5209	27K	\$
R5210	27K	\$
R5211	150K	\$
R5212	150K	\$
R5213	10K	\$
R5214	10K	\$
R5215	10K	\$
R5216	10K	\$
R5217	100K	\$
R5218	4700	\$
R5219	100K	\$
R5220	4700	\$
R5221	33K	\$
R5222	33K	\$
R5223	4700	\$
R5224	\$	\$
R5225	\$	\$
R5226	0	\$
R5227	0	0
R5228	\$	0

Confidential
Until

DMC-TZ6/ZS1
Top MIC Section
(Top Operation P.C.B. (2/2))
Schematic Diagram

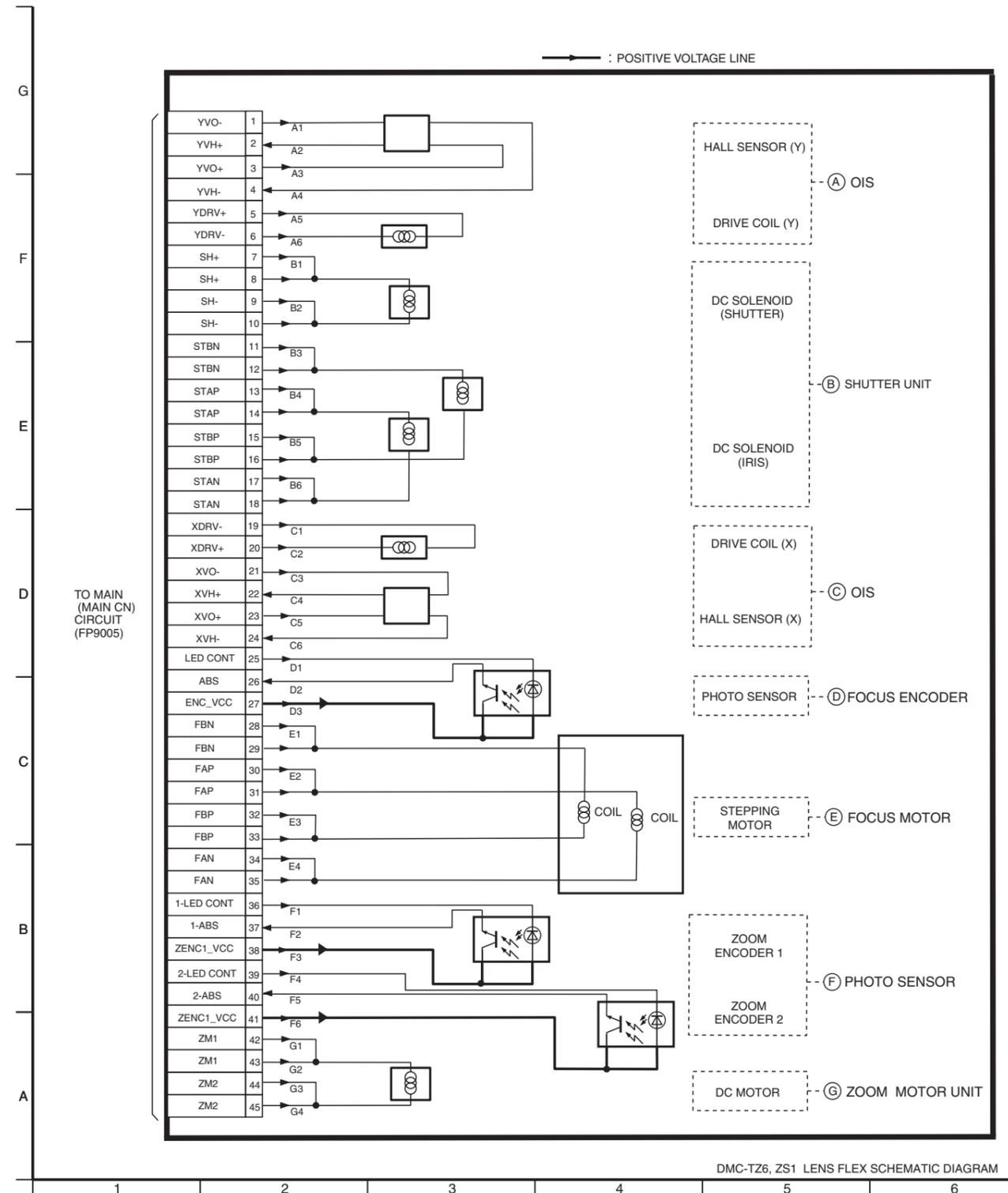
S4.4. Flash Schematic Diagram



Confidential
Until

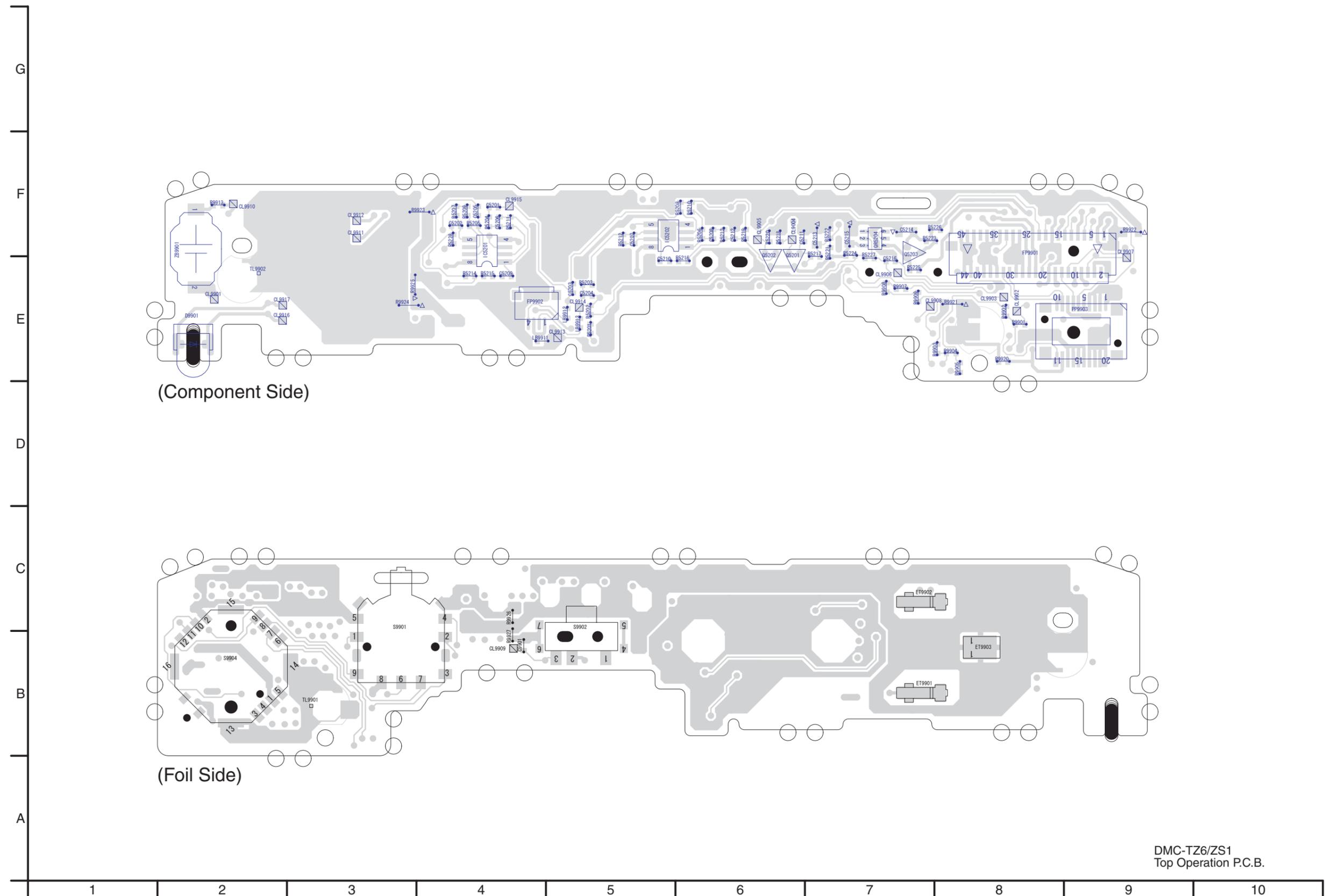
DMC-TZ6/ZS1
Flash
Schematic Diagram

S4.6. Lens Flex Schematic Diagram



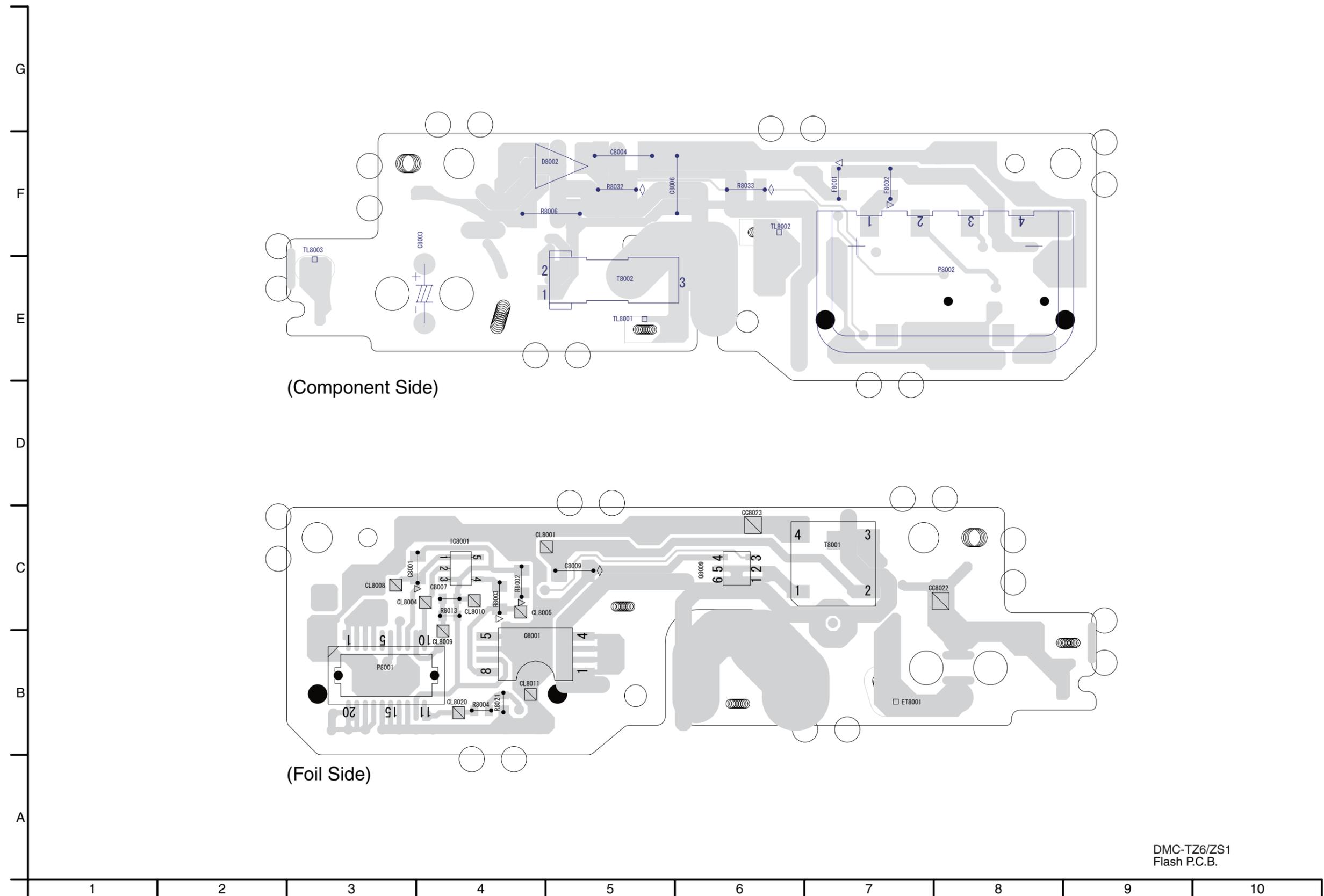
S5. Print Circuit Board

S5.1. Top Operation P.C.B.

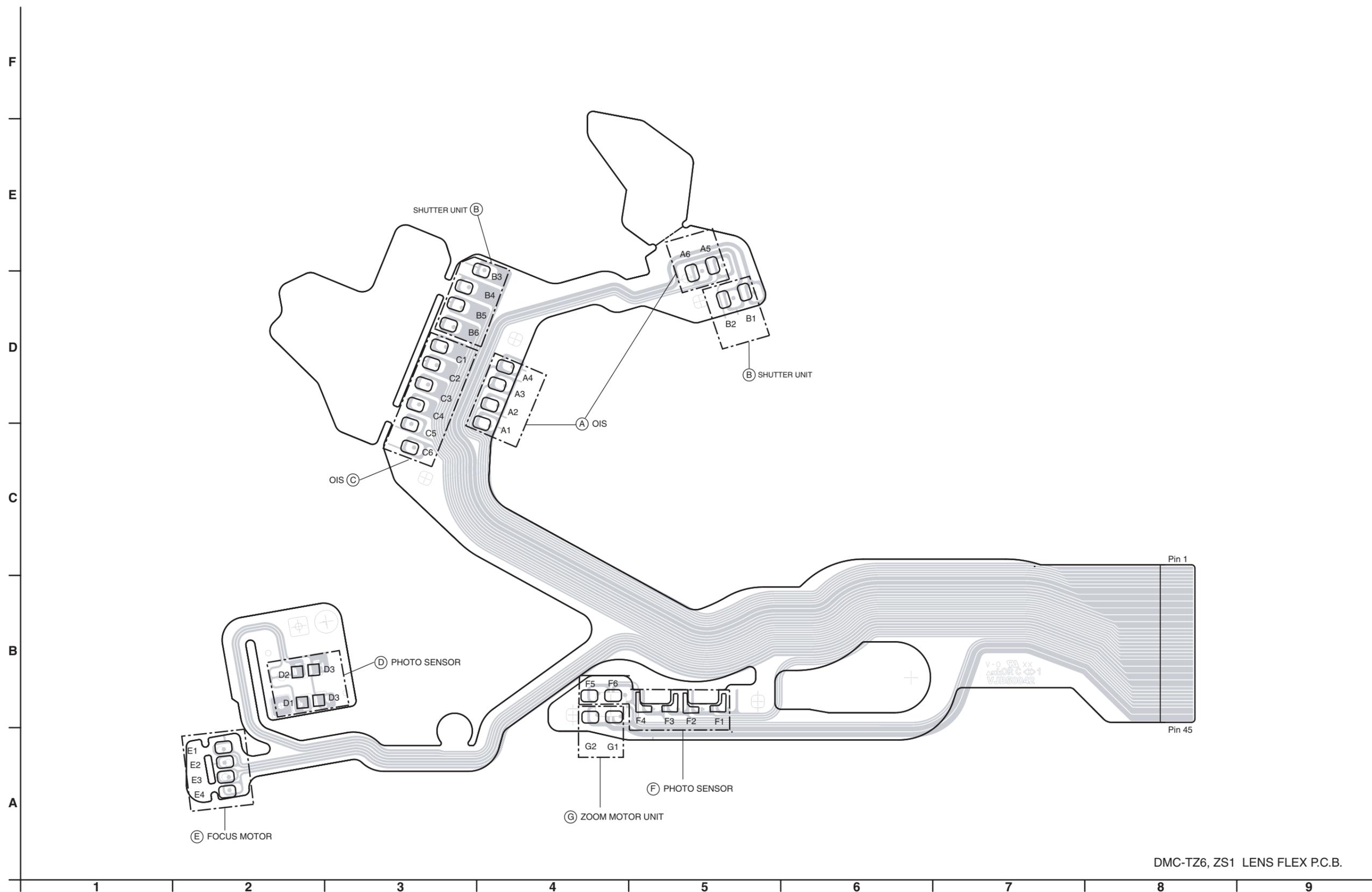


DMC-TZ6/ZS1
Top Operation P.C.B.

S5.2. Flash P.C.B.



S5.4. Lens Flex P.C.B.



S6. Replacement Parts List

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

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

Definition of Parts supplier:

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

DMC-TZ6EB/EE/EF/EG/EP/GC/GN/PR, ZS1GH/GK/P/PC/PU

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
1	VEP56081B	MAIN P.C.B.	1	(RTL) E.S.D.	B1	XQN16+BJ3FN	SCREW	1	
2	VEP51024B	SUB P.C.B.	1	(RTL) E.S.D.	B2	VHD2071	SCREW	1	
3	VGQ0C47	PCB SPACER	1		B3	VHD2071	SCREW	1	
4	L0AA01A00032	SPEAKER	1		B4	VHD2071	SCREW	1	
5	L0CBAB000130	MICROPHONE U	1		B5	VHD2103	SCREW	1	(-K)
6	VGL1268	AF PANEL LIGHT	1		B5	VHD2102	SCREW	1	(-S)
7	VMP9274	TOP PLATE L	1		B6	VHD2103	SCREW	1	(-K)
8	VMP9275	TOP PLATE R	1		B6	VHD2102	SCREW	1	(-S)
9	VEP50038B	TOP OPERATION P.C.B.	1	(RTL) E.S.D.	B7	VHD2103	SCREW	1	(-K)
10	VYK3D88	TOP CASE UNIT	1	(DMC-TZ6)	B7	VHD2102	SCREW	1	(-S)
10	VYK3D89	TOP CASE UNIT	1	(DMC-ZS1)	B8	VHD2103	SCREW	1	(-K)
11	VMP9280	FRAME	1		B8	VHD2102	SCREW	1	(-S)
12	VKF4453	JACK DOOR	1	(-K)	B9	VHD2103	SCREW	1	(-K)
12	VKF4452	JACK DOOR	1	(-S)	B9	VHD2102	SCREW	1	(-S)
13	VKH0431	STRAP HOLDER	1		B10	VHD2103	SCREW	1	(-K)
14	VMS7893	JACK DOOR SHAFT	1		B10	VHD2102	SCREW	1	(-S)
15	VMS7967	BATTERY DOOR SHAFT	1		B11	VHD2103	SCREW	1	(-K)
16	VYK3D69	BATTERY DOOR ASS'Y	1	(-K)	B11	VHD2102	SCREW	1	(-S)
16	VYK3B82	BATTERY DOOR ASS'Y	1	(-S)	B12	VHD2103	SCREW	1	(-K)
17	EFN-FSAJ5ZC	FLASH U	1		B12	VHD2102	SCREW	1	(-S)
18	VEP58079A	FLASH P.C.B.	1	(RTL) E.S.D.	B13	VHD2103	SCREW	1	(-K)
19	VGQ0C56	SLIDE GUIDE	1		B13	VHD2102	SCREW	1	(-S)
20	VML3984	SLIDE KNOB	1		B14	VHD2103	SCREW	1	(-K)
21	VWJ2080	FPC	1		B14	VHD2102	SCREW	1	(-S)
22	VYK3D75	FRONT CASE ASSY	1	(-K)	B15	VHD2103	SCREW	1	(-K)
22	VYK3D74	FRONT CASE ASSY	1	(-S)	B15	VHD2102	SCREW	1	(-S)
22-1	VGQ0C44	LENS ORNAMENT	1		B16	VHD1924	SCREW	1	
24	VYK3D81	LCD UNIT	1		B17	VHD1924	SCREW	1	
25	VYK3D80	LCD PANEL ASSY	1		B18	VHD1924	SCREW	1	
31	VYK3F13	REAR CASE ASSY	1	(-K)	B19	VHD1924	SCREW	1	
31	VYK3F12	REAR CASE ASSY	1	(-S)	B20	XQN16+BJ3FN	SCREW	1	
31-1	VGL1293	REAR PANEL LIGHT	1		B21	XQN16+BJ3FN	SCREW	1	
31-2	VGU0D99	CURSOR BUTTON	1		B22	XQN16+BJ3FN	SCREW	1	
32	F2A2F1010008	E.CAPACITOR CH 300V 100UF	1	(C8003)					
33	ML-421SIZTK	BUTTON BATTERY	1	(B9901) [ENERGY]					
34	VMB4252	EARTH SPRING	1						
35	VMB4150	BATTERY DOOR SPRING	1						
36	VMB4232	BATTERY SPRING	1						
37	VMP9277	BATTERY CASE	1						
38	VMP9375	EMC PLATE	1		201	VMX3650	CCD CUSHION RUBBER	1	
39	VGQ0C48	TRIPOD	1		202	VEK0N78	CCD UNIT	1	E.S.D.
40	VML3983	BATTERY LOCK KNOB	1		203	VDL2318	OPTICAL FILTER	1	
41	VMB3962	BATTERY LOCK SPRING	1		204	L6DA8BEC0004	ZOOM MOTOR UNIT	1	
42	VMP9278	EARTH PLATE	1		207	VDW1786	2nd/3rd DIRECT FRAME	1	
43	VMP9319	SCREW PLATE	1		208	VXP3172	1st LENS FRAME UNIT	1	
44	VGQ0G03	DPR SHEET B	1		210	VXP3178	2nd LENS FRAME UNIT	1	
45	VGQ0F73	DPR SHEET A	1		211	VXP3179	3rd LENS FRAME UNIT	1	
46	VGQ0G29	LCD SPACER	1		214	VXQ1710	MASTER FRANGE UNIT	1	
47	VGQ0G36	SPACER SHEET C	1		214-1	L6HA86NC0001	FOCUS MOTOR UNIT	1	
48	VGQ0G73	CONDENCER CUSHION	1		214-2	VMB4251	FOCUS SPRING	1	
					216	VXW1034	LENS UNIT	1	
					218	VEK0N75	LENS FPC	1	
					220	VXP3250	FIX CAM FRAME U	1	
					B201	VHD1871	SCREW	1	
					B202	VHD1871	SCREW	1	
					B203	VHD1871	SCREW	1	
					B205	XQN14+CJ4FN	SCREW	1	
					B207	VHD2109	SCREW	1	
					B211	XQN14+BJ4FNK	SCREW	1	
					B212	XQN14+BJ4FNK	SCREW	1	
					B213	XQN14+BJ4FNK	SCREW	1	
					B214	XQN14+BJ4FNK	SCREW	1	
					B215	XQN14+BJ4FNK	SCREW	1	
					B216	XQN14+BJ4FNK	SCREW	1	
					B217	XQN14+BJ4FNK	SCREW	1	

DMC-TZ6EB/EE/EF/EG/EP/GC/GN/PR, ZS1GH/GK/P/PC/PU

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
301	VPF1318	CAMERA BAG	1	
△ 302	DE-A66AA	BATTERY CHARGER	1	EB,EF,EG,EP,GN
△ 302	DE-A66BA	BATTERY CHARGER	1	EE,GC,GH,GK
△ 302	DE-A65BA	BATTERY CHARGER	1	P,PC,PU
△ 302	DE-A66DA	BATTERY CHARGER	1	PR
△ 303	K2CT3CA00004	AC CORD W/PLUG	1	EB,GC,GH
△ 303	K2CQ2CA00006	AC CORD W/PLUG	1	EE,EF,EG,EP,GC
△ 303	K2CJ2DA00008	AC CORD W/PLUG	1	GN
△ 303	K2CJ2DA00006	AC CORD W/PLUG	1	PR
△ 303	K2CA2CA000020	AC CORD W/PLUG	1	GK
△ 304	-----	BATTERY PACK	1	EB,EE,EF,EG,EP, GC,GN,PR,GH,PU
△ 304	-----	BATTERY PACK	1	GK
△ 304	-----	BATTERY PACK	1	P,PC
305	K1HA14AD0001	USB CABLE	1	
306	K1HA14CD0001	AV CABLE	1	
307	VFC4297	HAND STRAP	1	
308	VFF0446-S	CD-ROM (SOFT)	1	GK
308	VFF0445-S	CD-ROM (SOFT)	1	EB,EE,EF,EG,EP,GC,GN, PR,GH,P,PC,PU
△ 309	VFF0470	CD-ROM (INSTRUCTION BOOK)	1	EG,EP,PR
△ 309	VFF0471	CD-ROM (INSTRUCTION BOOK)	1	GC,GH
△ 309	VFF0473	CD-ROM (INSTRUCTION BOOK)	1	PU
310	VGQ0E45	BATTERY CARRYING CASE	1	
311	VPK3836	PACKING CASE	1	EBK,EEK,EFK,EGK,EPK,GCK, GNK,PRK
311	VPK3832	PACKING CASE	1	EBS,EES,EFS,EGS,EPS,GCS, GNS
311	VPK3837	PACKING CASE	1	GHK,PUK
311	VPK3833	PACKING CASE	1	GHS,PUS
311	VPK3838	PACKING CASE	1	GKK
311	VPK3834	PACKING CASE	1	GKS
311	VPK3835	PACKING CASE	1	PK,PCK
311	VPK3831	PACKING CASE	1	PS,PCS
312	VPN6666	PAD	1	EB,GC,GH
312	VPN6664	PAD	1	EE,EF,EG,EP,GN,PR,GK,PU
313	VPN6809	CUSHION	1	
314	VQT1W18	O/I SOFTWARE (ENGLISH)	1	EB,GN
314	VQT1W19	O/I SOFTWARE (RUSSIAN/UKRAINIAN)	1	EE
314	VQT1W17	O/I SOFTWARE (FRENCH)	1	EF
314	VQT1W15	O/I SOFTWARE (GERMAN/ITALIAN/FRENCH/ DUTCH/SPANISH/ PORTUGUESE)	1	EG,PR
314	VQT1W16	O/I SOFTWARE (FINNISH/SWEDISH/DANISH/ POLISH/CZECH/HUNGARIAN)	1	EP
314	VQT1W20	O/I SOFTWARE (ENGLISH/ CHINESE(TRADITIONAL)/ ARABIC/PERSIAN)	1	GC,GH
314	VQT1X99	O/I SOFTWARE (CHINESE(SIMPLIFIED))	1	GK
314	VQT1W13	O/I SOFTWARE (ENGLISH/CANADIAN FRENCH)	1	P,PC
314	VQT1W14	O/I SOFTWARE (SPANISH/PORTUGUESE)	1	PU
△ 315	VQT1Z93	OPERATING INSTRUCTIONS (ENGLISH)	1	EB
△ 315	VQT1Z94	OPERATING INSTRUCTIONS (RUSSIAN)	1	EE
△ 315	VQT1Z95	OPERATING INSTRUCTIONS (UKRAINIAN)	1	EE
△ 315	VQT1Z92	OPERATING INSTRUCTIONS (FRENCH)	1	EF
△ 315	VQT2A01	OPERATING INSTRUCTIONS (ENGLISH)	1	GN
△ 315	VQT2A00	OPERATING INSTRUCTIONS (CHINESE(SIMPLIFIED))	1	GK
△ 315	VQT1Z82	OPERATING INSTRUCTIONS (ENGLISH)	1	P,PC
△ 315	VQT1Z83	OPERATING INSTRUCTIONS (SPANISH)	1	P

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
△ 315	VQT1Z84	OPERATING INSTRUCTIONS (CANADIAN FRENCH)	1	PC
△ 316	VQT1Z86	BASIC O/I (GERMAN/FRENCH)	1	EG
△ 316	VQT1Z87	BASIC O/I (ITALIAN/DUTCH)	1	EG
△ 316	VQT1Z88	BASIC O/I (SPANISH/PORTUGUESE)	1	EG,PR
△ 316	VQT1Z89	BASIC O/I (SWEDISH/DANISH)	1	EP
△ 316	VQT1Z90	BASIC O/I (POLISH/SZECH)	1	EP
△ 316	VQT1Z91	BASIC O/I (HUNGARIAN/FINNISH)	1	EP
△ 316	VQT1Z96	BASIC O/I (ENGLISH/ CHINESE(TRADITIONAL))	1	GC,GH
△ 316	VQT1Z97	BASIC O/I (ARABIC/PERSIAN)	1	GC
△ 316	VQT1Z85	BASIC O/I (SPANISH/PORTUGUESE)	1	PU
317	VQL1L48-6	OPERATING LABEL	1	PC
318	VPF1294	BAG, POLYETHYLENE	1	

S7. Exploded View

S7.1. Frame and Casing Section

