Technical Information

Samsung camera   samsung PL70

Contents

1. Firmware

• Product Name

	Product Name	Mondrian 125W VE
Product Name	Korean	VLUU PL70
	Abroad	SAMSUNG PL70
	For USA	SAMSUNG SL720
Barrel	Barrel Name	E2
	Applied Product	_

1. Firmware

• **Checking Firmware**

   Initialization

      1. Turn on the Camera

2. Press and hold the WIDE + Down and then press the Power OFF.

②Power Off

①

3. Turn on the camera and check whether the camera is reset or not.

1. Firmware

• **Checking Firmware**

   Checking version

   1. Power source should be full-charged battery.

   2. Remove the memory card from the camera & turn off the camera.

   3. Press the Shutter + Down and then press the Power ON.

②Power On

①

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4. After checking Firmware version, turn off the camera.
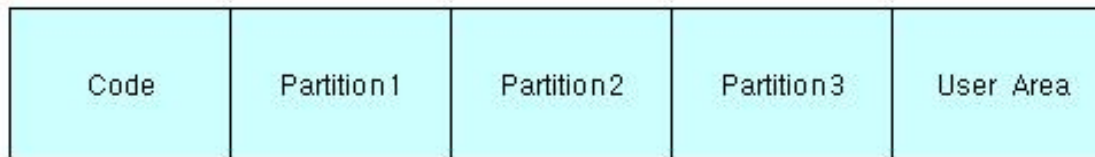
1. Firmware

• **Upgrading Firmware**

   General Firmware

   How To Upgrade Firmware

   Firmware File Construction :

   - Code Area : Being Included Operation codes for camera driving.

   - Partition[1:3] : Being Included all kind of resources for camera driving.
       => Defective Pixel & Lens shading adjustment data goes to save in Partition3.

   - User Area : Being saved all setting data while customer played their camera function,
                   and other adjustment data, also.

Code	Partition 1	Partition 2	Partition 3	User Area

   ▷ **[Reference] General F/W**

   - Upgrading the general firmware means that real action is occurred on "Code" area + "Partition[1:2]" .
   - Do not change what saved on "User Area" & "Partition3"

1. Firmware

1. Insert the memory card included F/W file & Upgrading script file.

* Being asked 2 files for FW Upgrading, those are F/W data file & Upgarding Script file.

* Recommendation: When do the upgrading process, whole data should be back-up before.

(Otherwise, whole data saved in Flash Memory will be deleted.)

2. Use the AC adapter or a fully charged battery.

* To upgrade the firmware, the battery level indicator on the LCD monitor must be full (level three).

3. Turn on the camera.

1. Firmware

4. F/W ver which will be upgraded is shown on LCD, automatically.
   To start the upgrading process, press the Shutter button.

5. Upgrading process is doing while displayed the F/W ver on LCD.

**6. After completing the upgrade, the camera is turned off automatically.**

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1. Firmware

• **Upgrading Firmware**

Full Firmware

How to do Full Ver F/W upgrading

Firmware File Construction :

- **Code Area : Being Included Operation codes for camera driving.**

- **Partition[1:3] : Being Included all kind of resources for camera driving.**
  => Defective Pixel & Lens shading adjustment data goes to save in Partition3.

- **User Area : Being saved all setting data while customer played their camera function,**
  and other adjustment data, also.

Code	Partition 1	Partition 2	Partition 3	User Area
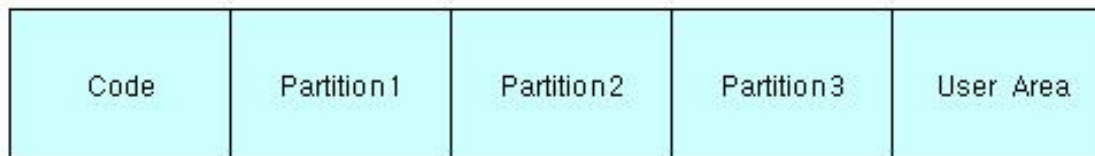
▷**[Reference] Full F/W**

- **Upgrading the general firmware means that real action is occurred on "Code" area + "Partition[1:2]" .**
- **Do not change what saved on "User Area" & "Partition3"**

1. Firmware

▷[Reference] Full F/W

- Upgrading Full Firmware means that real action is occurred on "Code" area + "Partition[1:3]"

- Some adjustment data saved on "User Area" will not be changed.

- Defective Pixel & Lens Shading adjustment data have to be reset,
   cause those files are saved on Partition3. Do not forget to re-adjust or do the back-up process for
     adjustments so that previous adjustment files are restored.

- While done the FULL F/W upgrading, adjustment files will be saved into the external memory card,
   automatically. Then, do uploading those adjustment files according to below steps. (No.1 ~ No.7)

- Automatically saved files into the external memory card
   : LSCLUT0.BIN, DefectivePixel0.bin, DefectivePixel1.bin (3 types)

1. Firmware

1. Insert the memory card included F/W file & Upgrading script file.

* Being asked 2 files for FW Upgrading, those are F/W data file & Upgarding Script file.

* Recommendation: When do the upgrading process, whole data should be back-up before.

(Otherwise, whole data saved in Flash Memory will be deleted.)

2. Use the AC adapter or a fully charged battery.

* To upgrade the firmware, the battery level indicator on the LCD monitor must be full (level three).

3. Turn on the camera.

4. F/W ver which will be upgraded is shown on LCD, automatically.

5. To start the upgrading process, press the **Shutter button.**
Then, process will be done, automatically.

5-1. Before done the Full F/W upgrading,
being done some adjustment files are back-up to the external memory card, automatically.

5-2. Then, Full F/W upgrading also will be progressed. (Blinking the Green LED)

5-3. After completing the full ver. upgrading, the camera is turned off automatically.

6. Re-boot the camera body in order to re-write files which are BACK-UP previously.

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7. Press the **SHUTTER (S1)** Button then back up process will be done.

8. After completed the Back-up process, comes out to Power Off status.

9. Check the adjustment data status whether recovered or not on Ver. checking screen.
(D0, D1, L0 contents - OK)

FW VER : 812221
   1101.0479.b07f
18:36:00 Dec 22 2008
   DEBUG DV2 (OIS Ver :0.8)
S/N:
D0 : 916   OK
D1 : 12364 OK
L0 : 812   OK

1. Firmware

A. Delete all data exception with 3 adjustment files
which are being back-up to the external memory card.SD card.
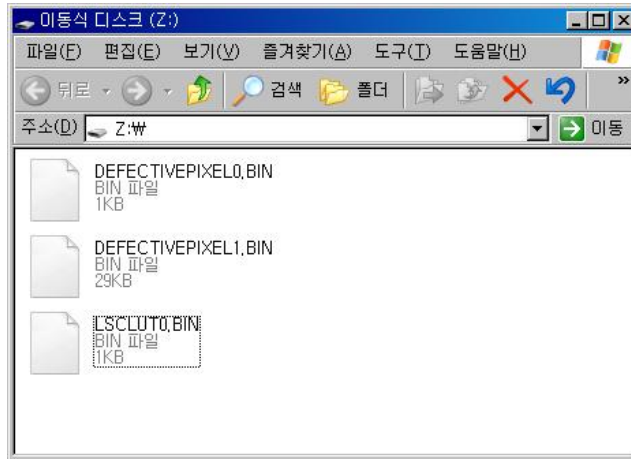
B. Insert the SD memory card with the saved adjustment data

C. While pressed SHUTTER Button + DOWN Button, then turn on the camera.

D. Turn Off the body, manually.

2. Adjustment

• **Basic Information of Adjustment**

Adjustment Caution

You have to make adjustments for each feature after replacing an electronic item in the PL70.

The following table represents necessary adjustments for each item replacement.

1. Adjust for each feature after replacing an electronic item, referring to the following table.

	MAIN PCB	POWER PCB	BARREL ASSY	CCD ASSY
FIRMWARE UPGRADE	●		●	
PUNT ADJ	●		●	●
SHUTTER CLOSE TIME ADJ	●		●	●
FLASH ADJ	●	●		
BATTERY LEVEL ADJ	●	●		
BURNING TEST & CCD DEFECT CELL	●	●	●	●
EEPROM READ				
EEPROM WRITE				

2. Adjustment

2. Adjustment Equipment

- AE TESTER : AE Tester supporting **LV 12**

- Infinitive collimator for PUNT adjustment.

- Gray Chart for FLASH & AWB adjustment.(18%) , DARK BOX

- POWER SUPPLY : 4.2V / 2A

3. Adjustment program file

For each of the adjustments, copy the program for each of the adjustments into the External Memory card.
The file names for each adjustment are the same as **"mondrian_125W VE_adj.txt"**

2. Adjustment

4. Adjustment Flow Chart
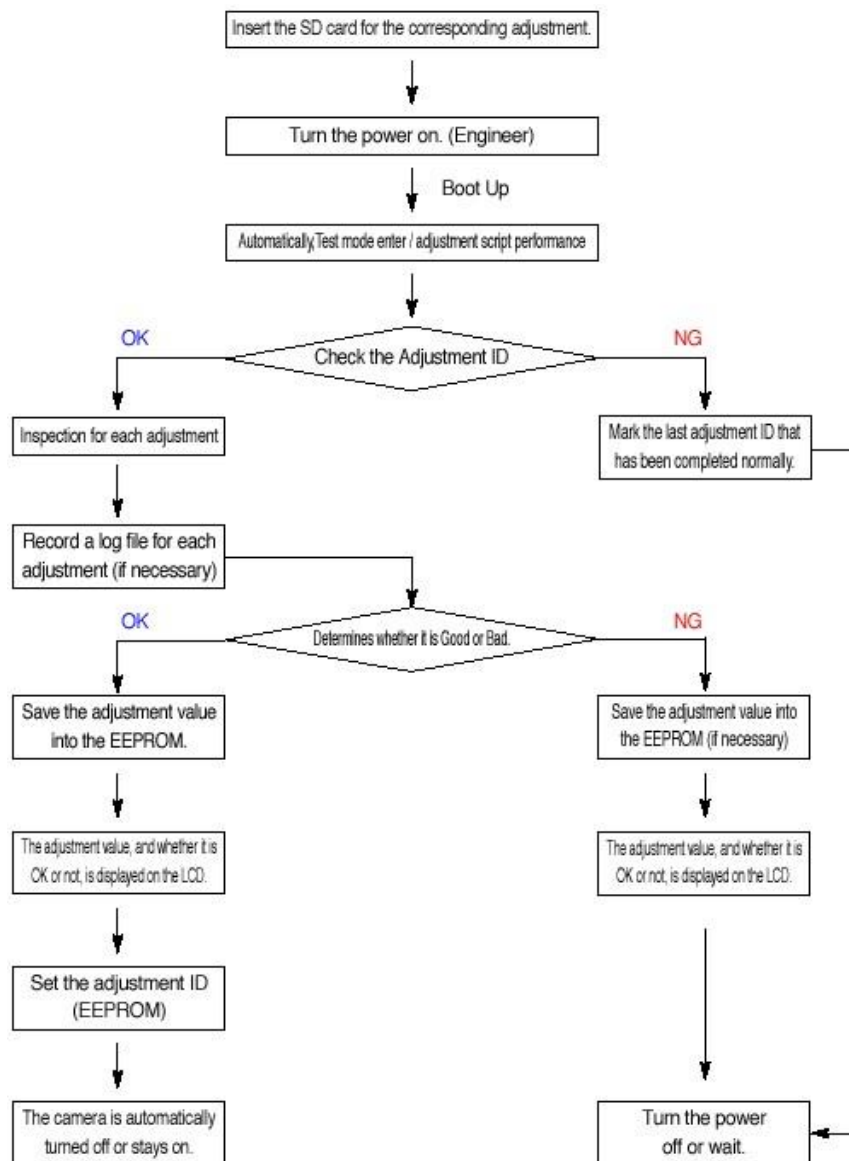
2. Adjustment

• OB Setting ADJ

Defines the valid data range of conditions with low brightness by precisely determining the low signal level from the input signals by carrying out OB settings for preview and capture respectively.

< Adjustment Procedures >

a...Save the corresponding adjustment file into the External Memory card.

b...Put inl the External Memory card containing the program file and turn the camera on.

c...The adjustment is conducted automatically.

① Check the brightness value for the preview with the shutter closed, and find an OB value by referring to the brightness value for the preview.

② Write the result of the adjustment value for the preview OB in the data file by referring to the CARD WRITE data.

③ Write the adjustment value for the preview in the EEPROM by referring to the EEPROM WRITE data.

2. Adjustment

④ Check the brightness value for capture with the shutter closed, and find an OB value
   by referring to the brightness value for the preview.

⑤ Write the result of the adjustment value for the capture OB in the data file
   by referring to the CARD WRITE data.

⑥ Write the adjustment value for the preview in the EEPROM
   by referring to the EEPROM WRITE data.

⑦ Change the ISO and repeat steps 4 to 6.

d...When the adjustment is complete, the camera will automatically be turned off.

< Adjustment Method >

Open and check a CSV file created in the memory card for adjustment.

2. Adjustment

• Lens Shading Adjustment

Adjust the lens shading for the brightness of the periphery of the lens for each camera.

Brighten the periphery of the lens by adjusting its brightness per set,

since the brightness of the periphery of the lens per set is darker than the center.

< Adjustment Procedures >

a...Prepare the AE Tester.

* The luminance specification for the Light Source Box is **12 LV**.

* The position of the Light Box is 10mm±1mm when the lens barrel is opened.

* The Colour Temperature of the Light Box is 3300K.

2. Adjustment

b...Save the corresponding adjustment file into the External Memory card.

**c...Insert the External Memory card containing the program file into the camera
and set the camera for the AE Tester.**

Light source box
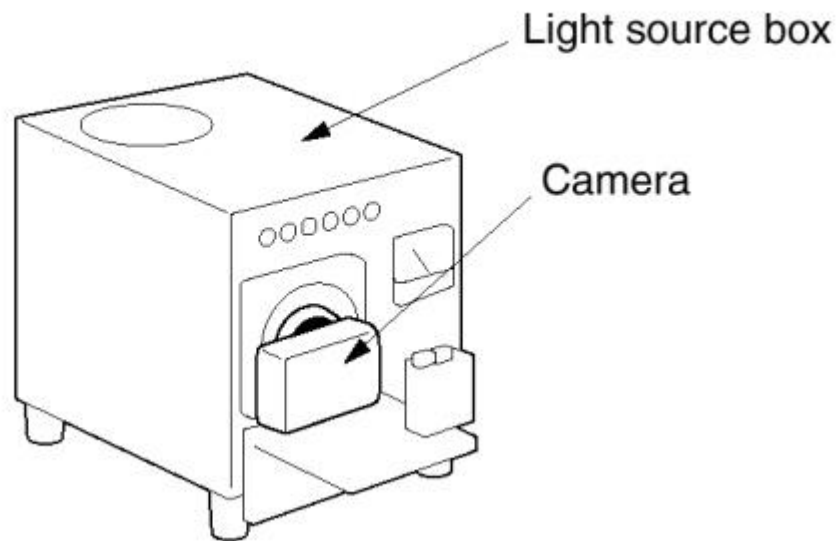
Camera

d...Mount the camera onto the AE meter and adjust the LV value to **12**.

2. Adjustment

e...If you turn the camera on, the adjustment is progressed automatically.

① Adjust the lens shading at the zoom "0" of the aperture.

② Write the result of the adjustment value in the EEPROM
by referring to the EEPROM WRITE data.

③ Write the result of the adjustment value in the data file
by referring to the CARD WRITE data.

④ Set the lower and upper specifications.

f...When the adjustment is complete, the camera will automatically be turned off.

< Adjustment Method >

Open and check a CSV file created in the memory card for adjustment.

2. Adjustment

• **Shutter Close Adjustment**

You can adjust the close timing of the camera's mechanical shutter.

Compensate for a particular camera's shutter timing deviation
because each individual camera is different.

The AWB Low item and CCD Gain item are adjusted simultaneously.

< Adjustment Procedures >

a...Prepare an AE Tester that supports LV **12**.
b...Place the camera onto the AE Tester.
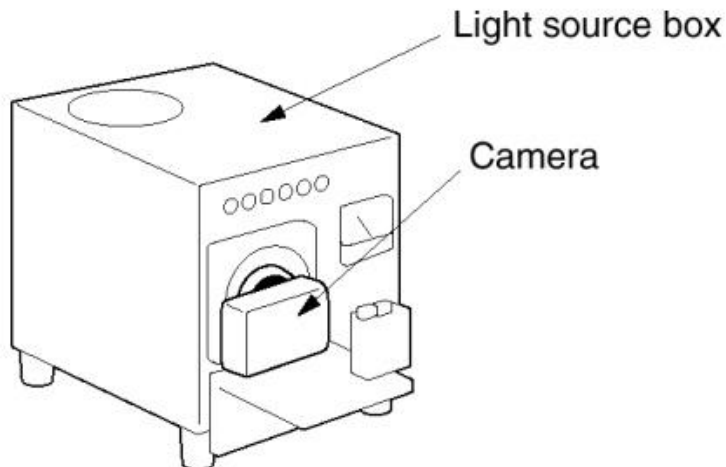
* The luminance specification for the Light Source Box is **12 LV**.
* The Colour Temperature of the Light Box is **3300K**.

2. Adjustment

c...Put inl the External Memory card containing the program file and turn the camera on.

d...The adjustment is conducted automatically.

① Check the number of maximum adjustments which have been set,
and adjust the shutter closing time.

② Carry out inspection by referring to the specifications for brightness.
- The line delay and sub delay are adjusted to find the appropriate values
for the specifications for brightness.

③ If the result of the line delay falls within the min. to max. range,
treat it as if it is OK. Otherwise treat it as if it is NG.

④ Write the adjustment value in the EEPROM by referring to the EEPROM WRITE data.

⑤ Write the result of the adjustment value in the data file by referring to the CARD WRITE data.

e...When the adjustment is complete, the camera will automatically be turned off.

< Adjustment Method >

Open and check a CSV file created in the memory card for adjustment.

2. Adjustment

• CCD GAIN Adjustment

There are a difference for CCD saturation level upon CCD set.

That why we adjust the basic analog gain value for reducing the brightness difference value
upon each samples.

< Adjustment Procedures >

a...Prepare the AE TESTER.

  * The luminance specification for the Light Source Box is **12 LV**.
  * The position of the Light Box is 10mm±1mm when the lens barrel is opened.
  * The Colour Temperature of the Light Box is 3300K.

b...Save the corresponding adjustment file into the External Memory card.

c...Insert the External Memory card containing the program file into the camera
      and set the camera for the AE Tester.

2. Adjustment

Light source box
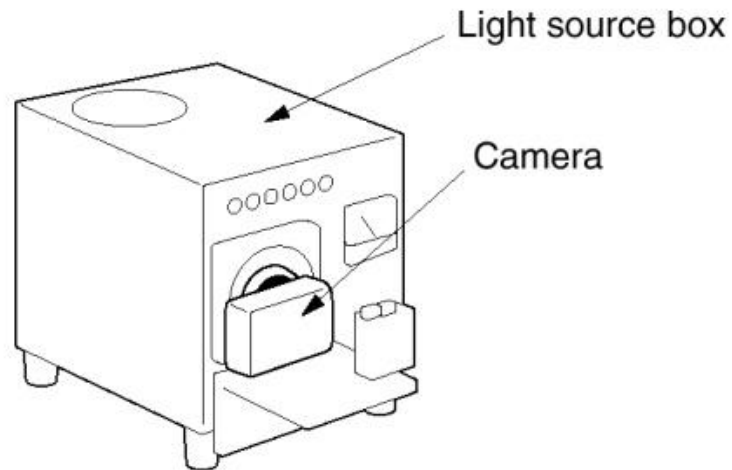
Camera

d...Mount the camera onto the AE meter and adjust the LV value to **12**.

e...If you turn the camera on, the adjustment is progressed automatically.

① Adjust the Gain adjustment.

② Write the result of the adjustment value in the EEPROM
   by referring to the EEPROM WRITE data.

③ Write the result of the adjustment value in the data file
   by referring to the CARD WRITE data.

④ Set the lower and upper specifications.

2. Adjustment

f…When the adjustment is complete, the camera will automatically be turned off.

< Adjustment Method >

Open and check a CSV file created in the memory card for adjustment.

2. Adjustment

• Flash Adjustment

Limit range of brightness of the flash in order to identify hardware defects.

Fires the flash 2 times in order to identify cameras that are out permitted specification range,
and acquires the R and B gain of the flash. AWB HIGH will be adjusted at the same time.

< Adjustment Procedures >

a...Put up a piece of 18% Reflector Paper in the darkroom (Dark box).

b...Set the camera up in a darkroom, using a tripod.

c...Set the distance between the Reflector Paper and the camera at **50cm.**
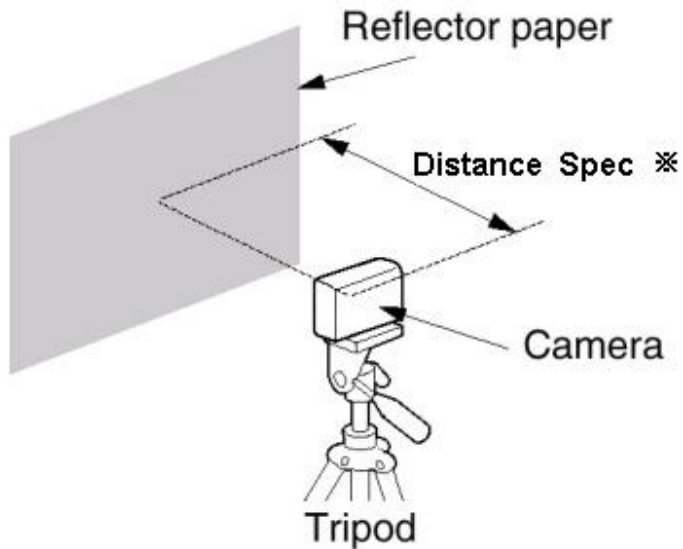
d...Save the corresponding adjustment file into the External Memory card.

e...Put in the External Memory card containing the program file and turn the camera on.

f...The adjustment is conducted automatically.

① Flash 2 times & determine whether or not it is good compared
to each standard brightness.

② Determine whether or not it is good after checking the R and B gains,
with average value for 2 times flashing.

③ Write the R and B gains in the EEPROM if the R and B gains,
as well as the flash process, are successful.

< Adjustment Method >

Open and check a CSV file created in the memory card for adjustment.

2. Adjustment

• **Focus Adjustment**

**Objective : Determine the searching range of the AF for optimal focus control of the barrel,
after replaced Main PCB & Barrel**

Required Equipment : Infinite Collimator

< Adjustment Procedures >

1. Save the corresponding adjustment file into the External Memory card.

2. Do the focus adjustment according to the below standard.

[2-1] Standard for Infinite Collimator

   -. Set the brightness of Collimator as 6 LV.

   -. Set the Camera Lens to infinite Collimator' lens into 1cm less.

   -. Do not touch the camera body while done the adjustment process.

Infinity Callimator

Camera

Tripod

2. Adjustment

[2-2] Standard for Infinite object

-. Set the camera body on the tripod.

-. Head the camera lens to an object put an infinite distance or over 500m. (Without Chart)

-. Choose the object having high contrast value, building etc
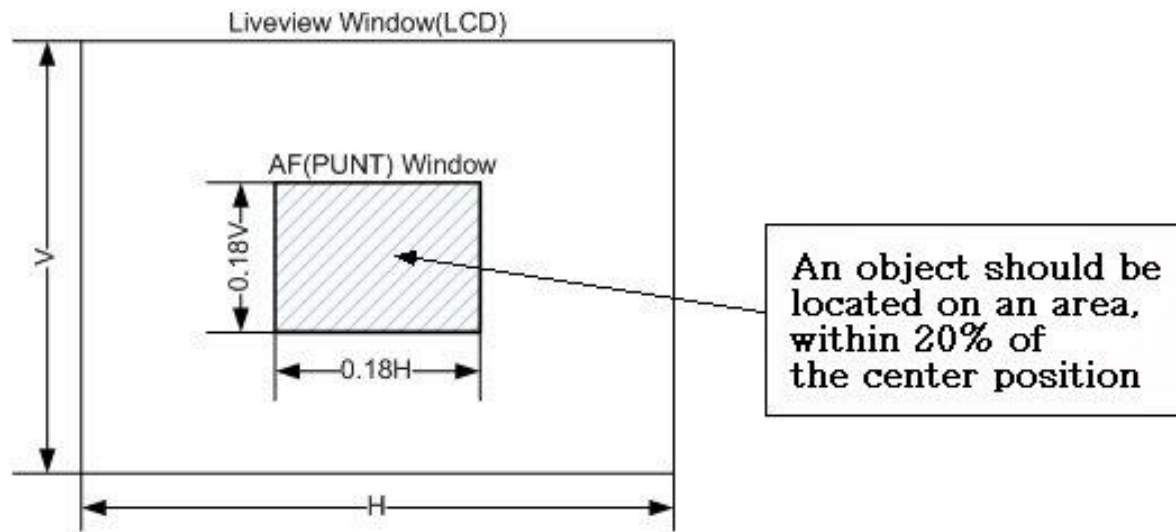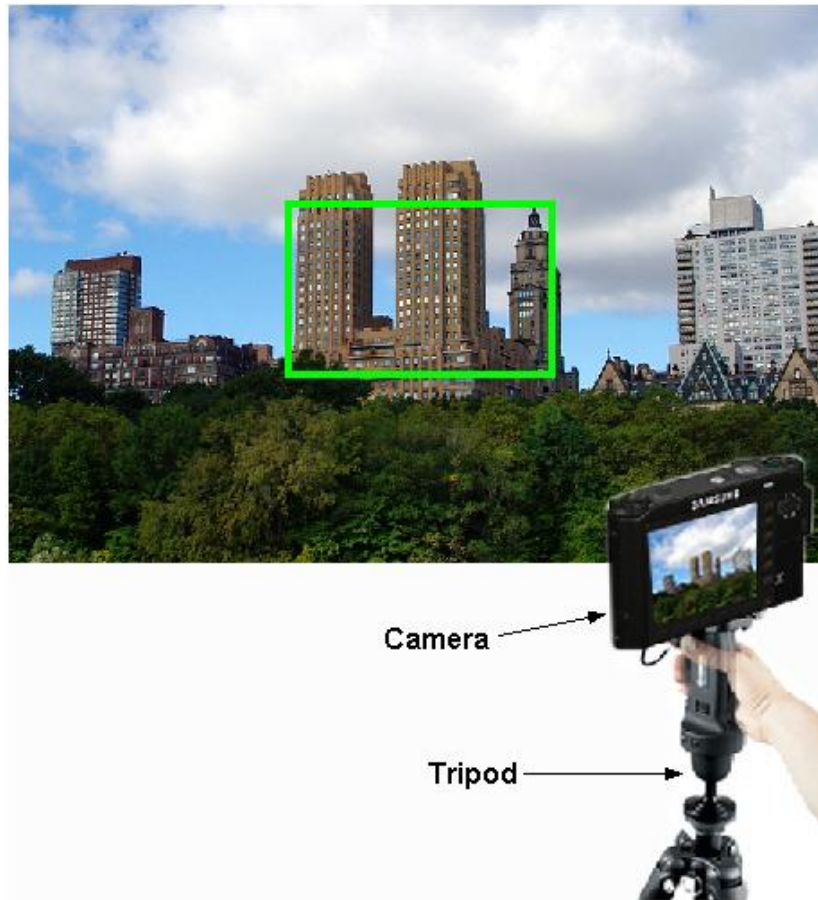
※ Caution

Avoid the whole-glass building or what having low contrast value as an object, and do not operate focus adjustment at night.

If being operated the focus adjustment with upper condition, then the result will not be correct. (e,s Tele or Macro status)

2. Adjustment

3. Turn the camera on.

4. .The adjustment is conducted automatically.

< Adjustment Method >

Open and check a CSV file created in the memory card for adjustment.

2. Adjustment

• B/T LEVEL TEST

You can adjust the voltage threshold for the battery level indicator.

< Adjustment Procedures >

a...Prepare the power supply.

b...Connect the power supply and the camera using the battery jig.

c...Set the voltage to **4V. (Available Voltage : 4.5V)**

d...Save the corresponding adjustment file into the External Memory card.

e...Put in the External Memory card containing the program file and turn the camera on.

2. Adjustment

f...The adjustment is conducted automatically. Blank screen will be displayed during the adjustment.

① **Carry out A/D conversion with the power on.**

② **Measure a value for A/D conversion for supply voltage,**
   and check if the value for A/D conversion falls within the tolerance range (idle mode).

[Min. A/D conversion value] <= [A/D conversion value for supply voltage] <= [Max. A/D conversion value]

③ **Carry out inspection by referring to warnings and specifications for prohibited levels.**

④ **Write the adjustment value in the EEPROM by referring to the EEPROM WRITE data.**

⑤ **Write the result of the adjustment value in the data file by referring to the CARD WRITE data.**

g...When the adjustment is complete, the camera will automatically be turned off.

2. Adjustment

• CCD Defect Pixel Adjustment

You can compensate for any defective CCD pixels in the camera.

< Adjustment Procedures >

a...Save the corresponding adjustment file into the External Memory card.

b...Put in the External Memory card containing the program file and turn the camera on.

c...The adjustment is conducted automatically.

① Check the reference level and exposure time which has been set,
　and compensate for defective pixels.

② Carry out inspection by referring to the specifications (max. number of defective cells).

③ Write the number of defective cells in the data file
　by referring to the CARD WRITE data.

d...When the adjustment is complete, the camera will automatically be turned off.

< Adjustment Method >

Open and check a CSV file created in the memory card for adjustment.

2. Adjustment

• BackLash Adjustment

Objective : To adjust the error, occurred while moving the lens inside.

< Adjustment Procedures >

a...Save the corresponding adjustment file into the External Memory card.

b...insert the External Memory card containing the program file into the camera and turn the camera on.

c...the adjustment is progressed automatically

① Close the Lens barrel.

② PI count error value can be obtained, after completed lens barrel moving (From Tele to initial status)

③ Get the average value from PI Count error value after repeated same process.

④ Check whether the calculated avg value is included into the Max_backLash Range.

⑤ After write down the log-file, then shift to Wide status.

d...When the adjustment is complete, the camera will automatically be turned off.

< Adjustment Method >

Open and check a CSV file created in the memory card for adjustment.

2. Adjustment

• **Burning Test**

This is to detect hardware or software defects in a camera by repeated use of the camera functions.

a...Save the corresponding adjustment file into the External Memory card.

b...Put inl the External Memory card containing the program file and turn the camera on.

c...The camera operates automatically in sequence of set functions.

① Start booting.

② Start the functions after checking the preset repetitive motions cycle
   and the number of functions testing

   - function 1, function 2 and so on (the number is unlimited).

 * Save the completed functions codes and the remaining number of cycles in the EEPROM
   when a functional motion is completed (for malfunction differentiation).

 □ **EEPROM Address**
 □ **- Mondrian_125W : Address 744(burn count) , Address 746(Completed Cycle)**

③ After the burning process, the camera turns off automatically.

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3. Disassembly

• **Disassemble Camera**

Caution

1. Do the disassembling and assembling camera
   where the blocking static electricity mat is on the table.

2. When handling the major PCBs of camera, please wearing the band
   which cuts off the electric current on the wrist.

3. When handling the major parts, be careful of below caution.

Parts	Caution
F PCB type	When assembling the F PCB to the CONNECTOR by using pincette, be careful of tearing and hooking.
CCD & IR CUT	Be careful of the handprinting while handling them. Using the pincette which has soft tip. The spot will be shown by using normal alchol when cleaning them. Do the repairing where is no dust.
PCB type	Wearing the band which cuts off the electric current and do the reparing where the blocking static electricity mat is on by preventing the defect of parts.
CONTACT type	Be careful of defect and change by pincette.

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3. Disassembly

• **Disassemble Camera**

    Procedure of disassembly

        1. Remove 2 screws.

2. Remove 2 screws

3. Remove 2 screws.

4. Separate the FRONT COVER ASSY
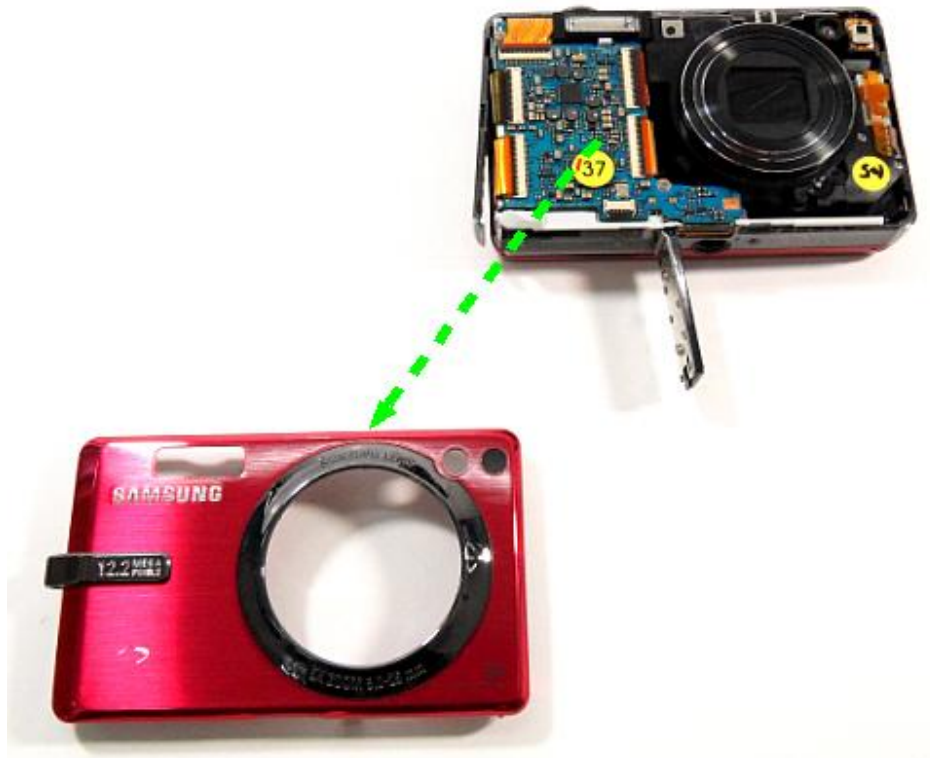
5. Separate the BACK COVER ASSY

6. Separate the SIDE COVER ASSY

7. Separate the BARREL ASSY PCB & CCD ASSY PCB from the connector.
   Remove 3 screws as same below.
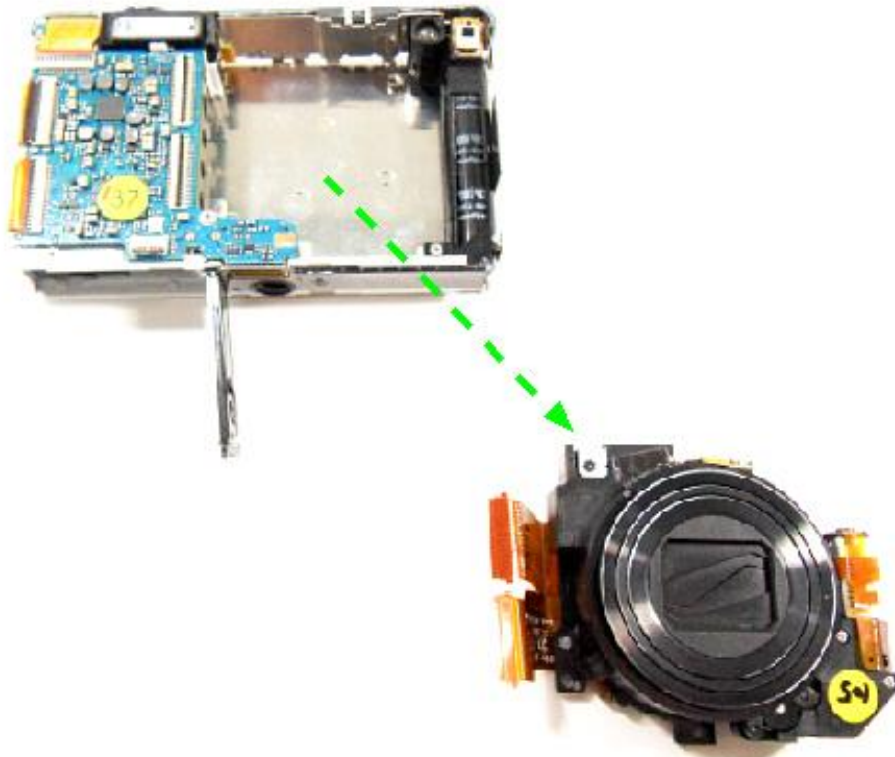
8. Separate the BARREL ASSY.

9. Separate the BUTTON PCB ASSY from the connector.
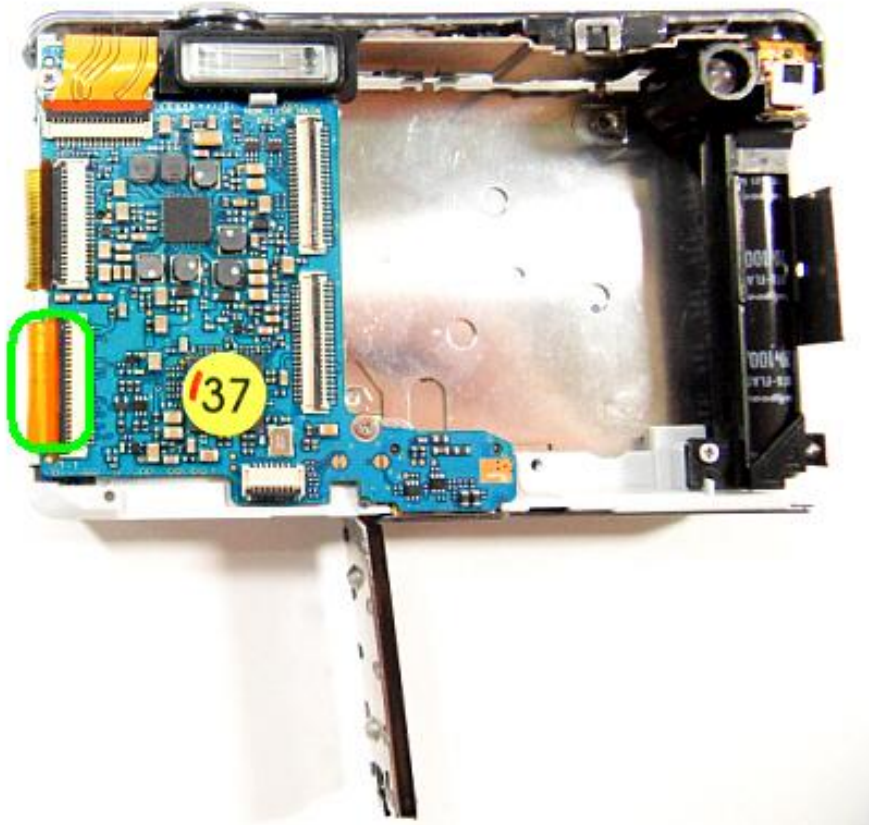
10. Remove the screws on BUTTON PCB ASSY.
Give attention to bottom side of PCB.
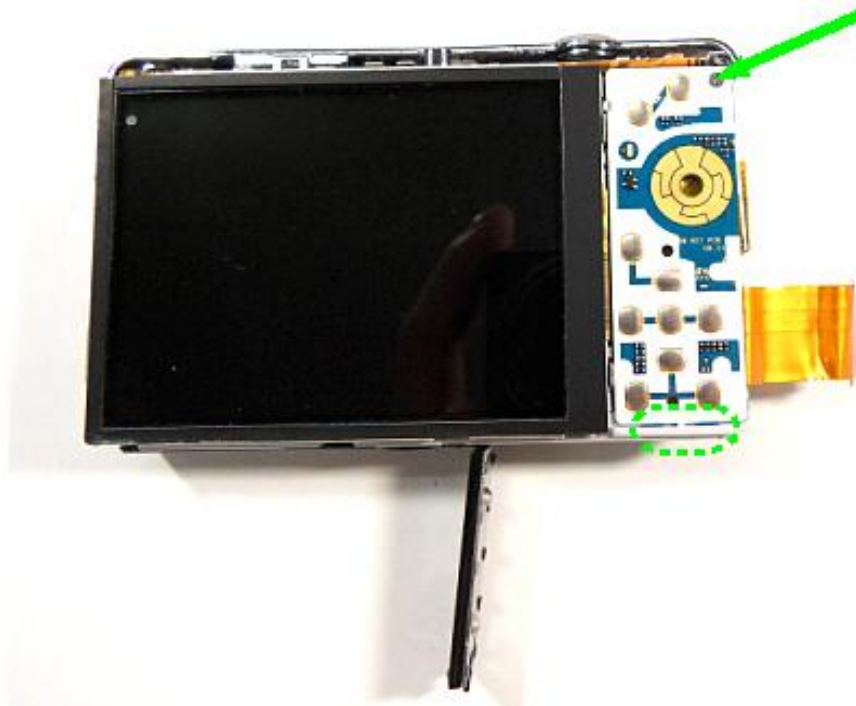
11. Separate the BUTTON PCB ASSY
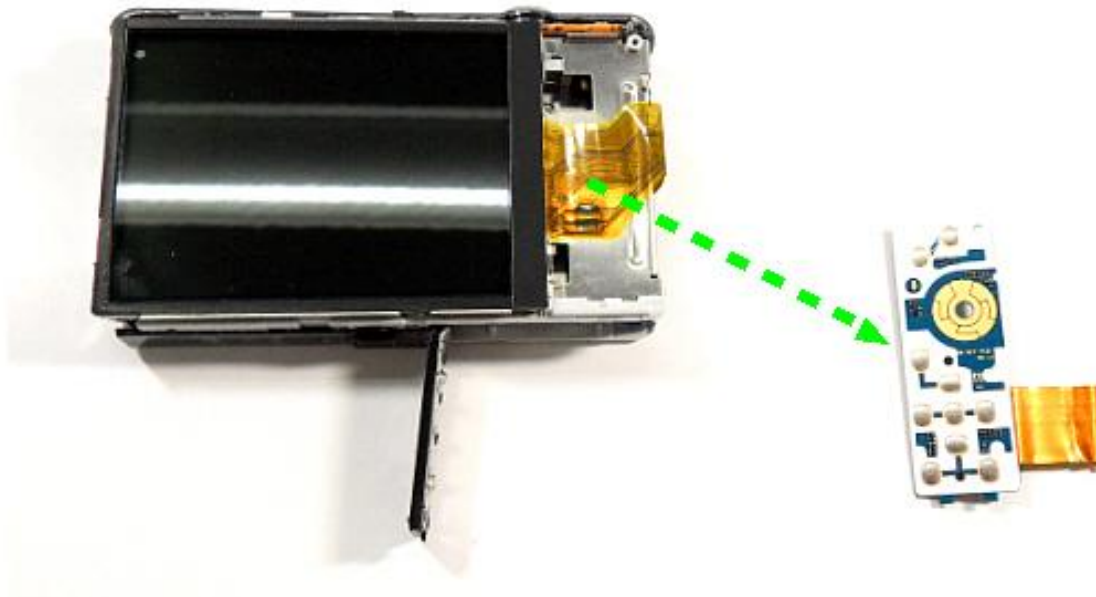
12. Separate the LCD ASSY PCB from connector.

13. Separate the LCD ASSY.
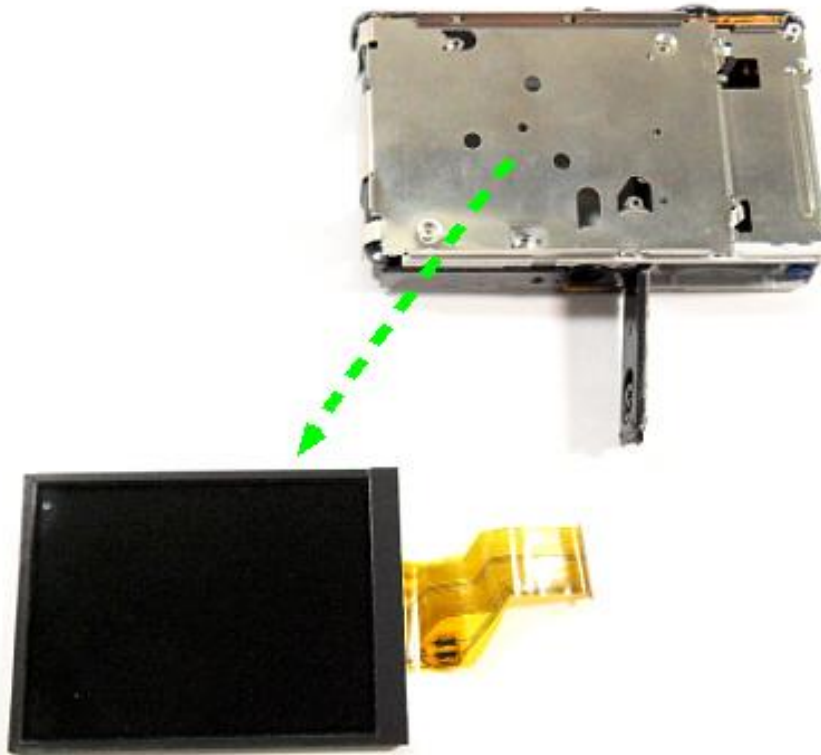
14. Separate the FLASH PCB ASSY from the connector.
   Remove 2 screws on MAIN PCB ASSY.
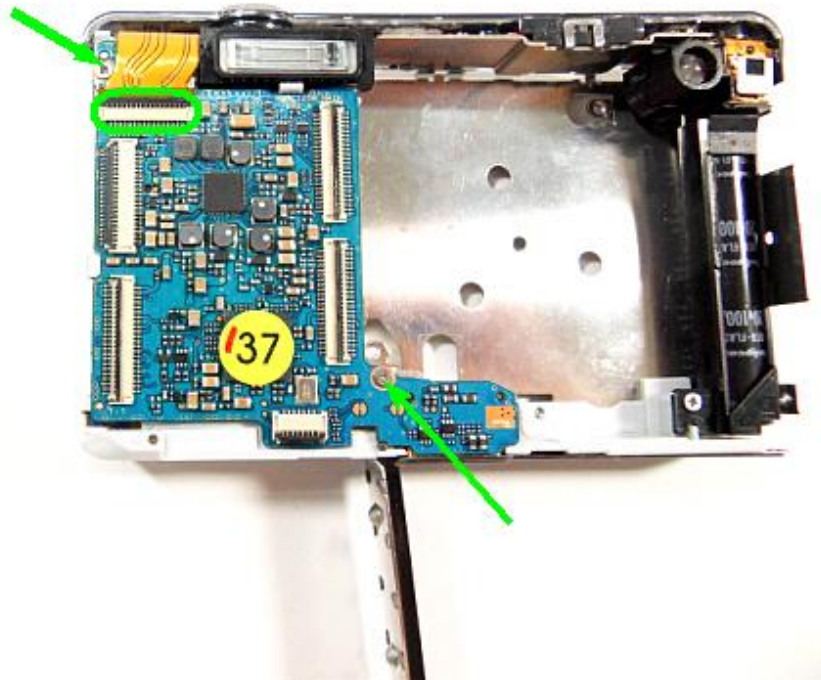
15. Separate the MAIN PCB ASSY.
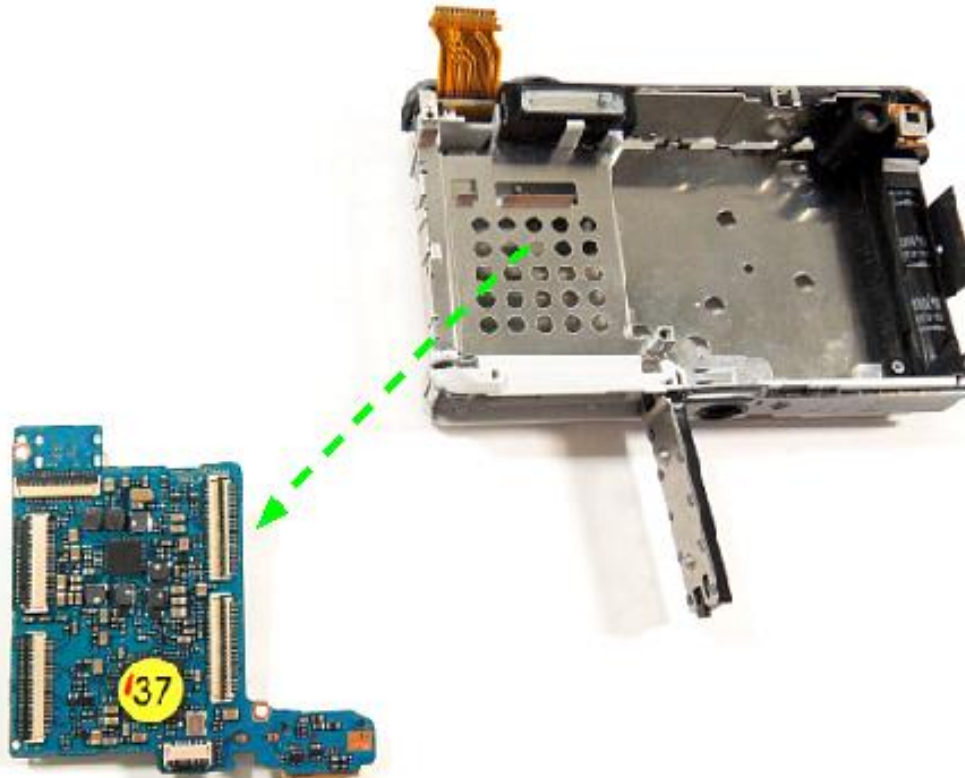
16. Remove the screws on FLASH PCB ASSY.
   Give attention to left side of PCB.
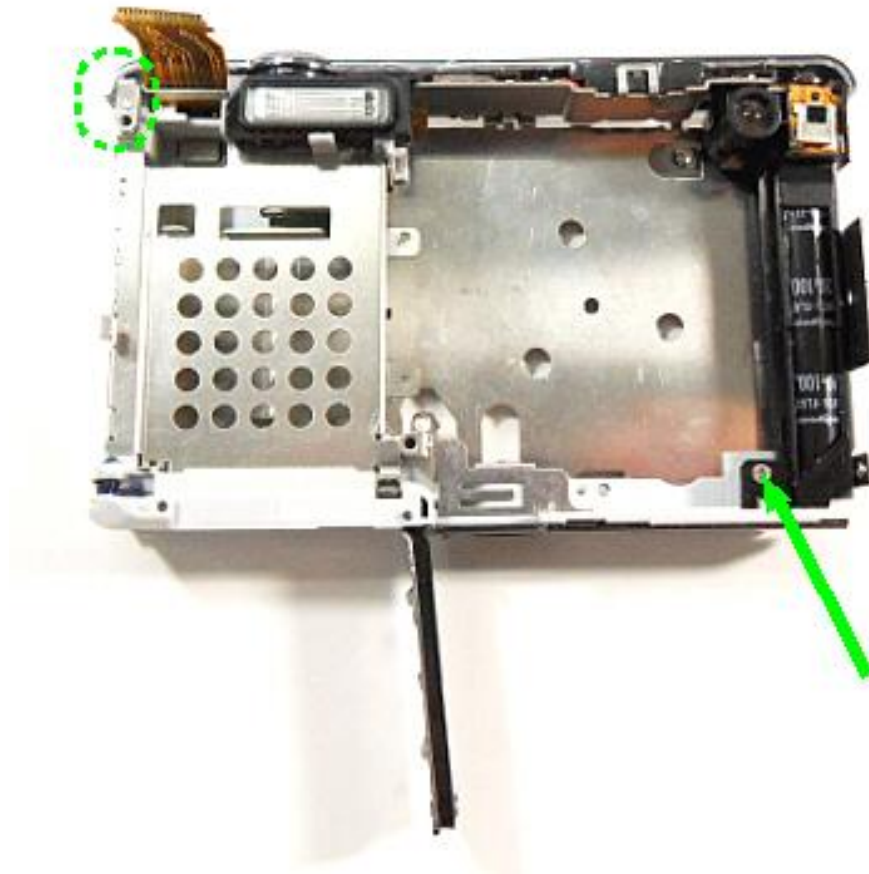
17. Separate the FLASH PCB ASSY.
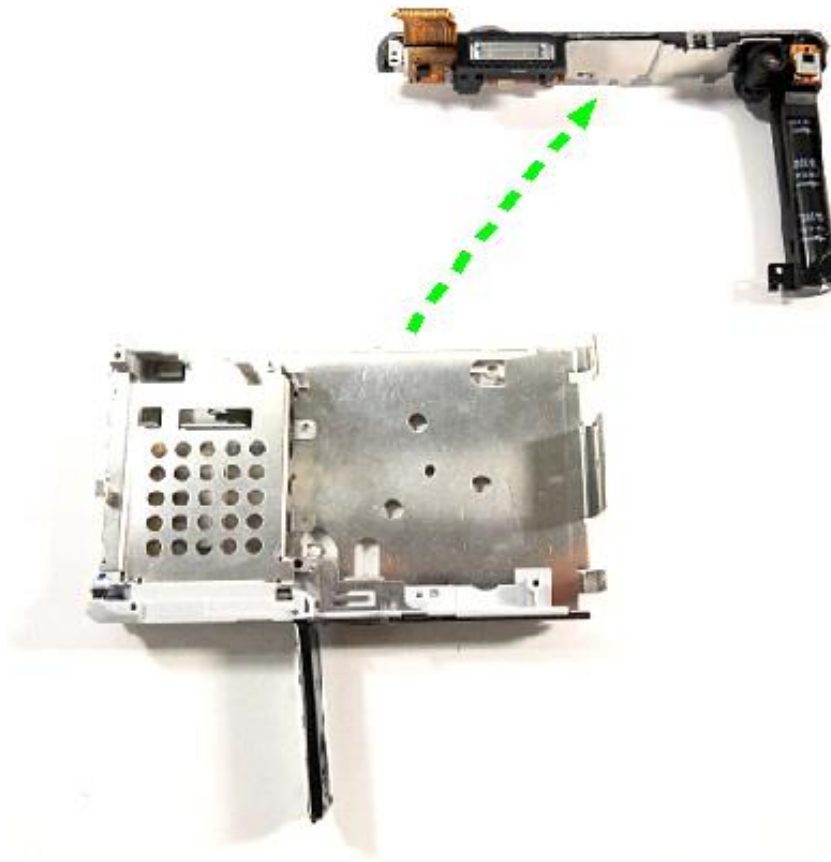
3. Disassembly

• **Disassemble Barrel**

1. Remove 3 screws for the CCD PCB ASSY.

2. Separate the CCD PCB ASSY.
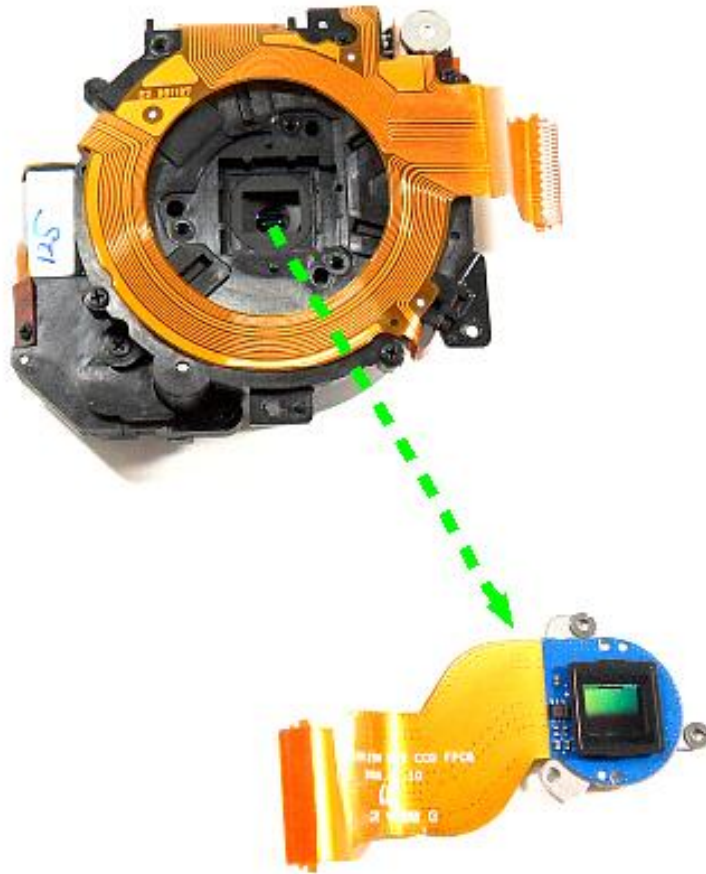
3. Separate the Shutter PCB Connector.

4. Remove 2 screws on MOTOR ASSY.
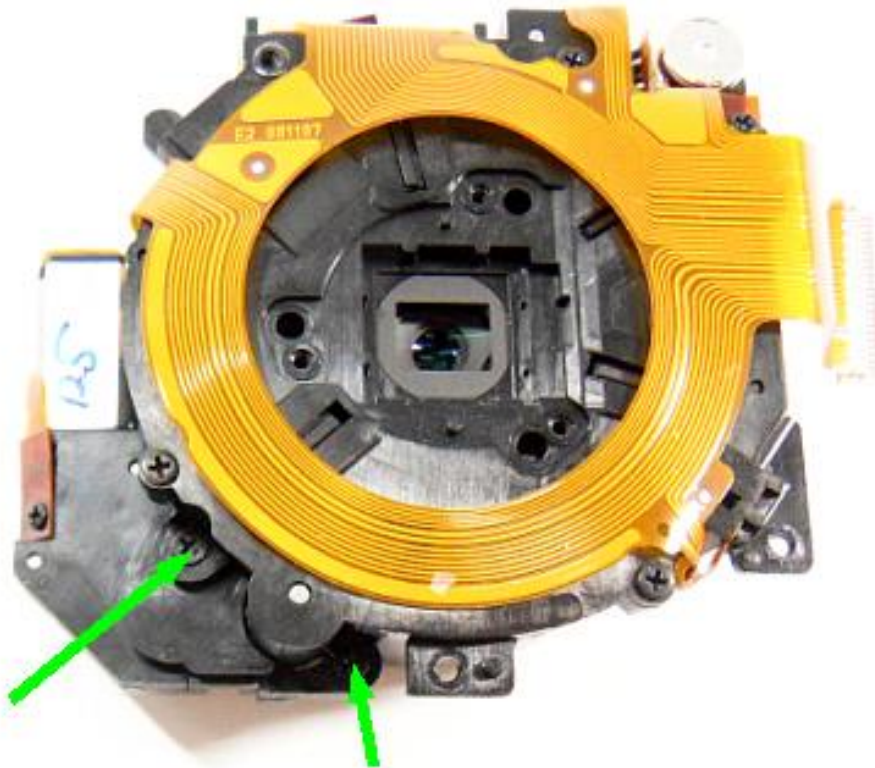
5. Remove 3 screws on LENS BASE ASSY.
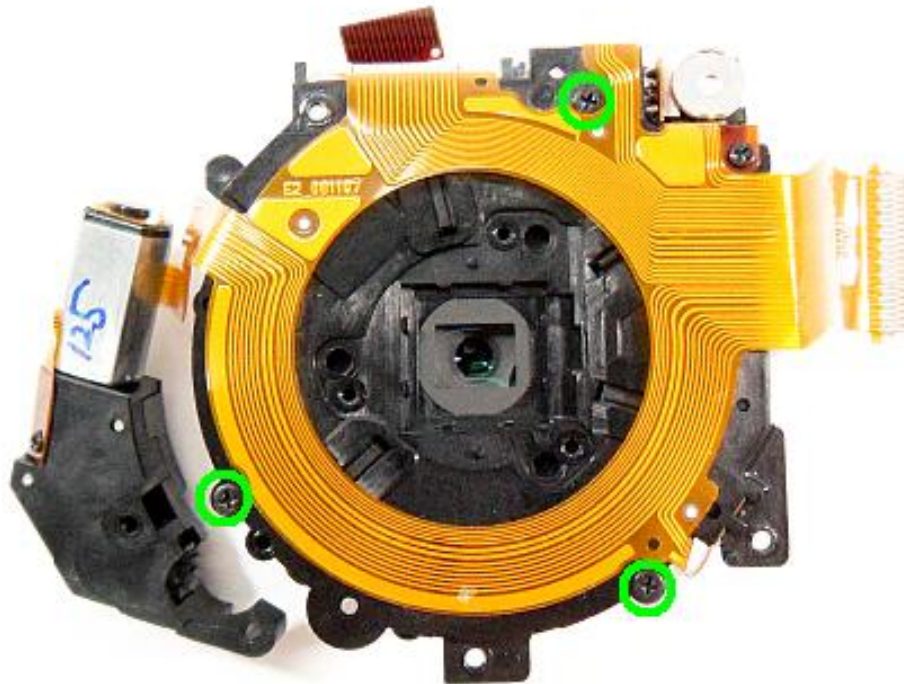
6. Separate the LENS BASE ASSY.
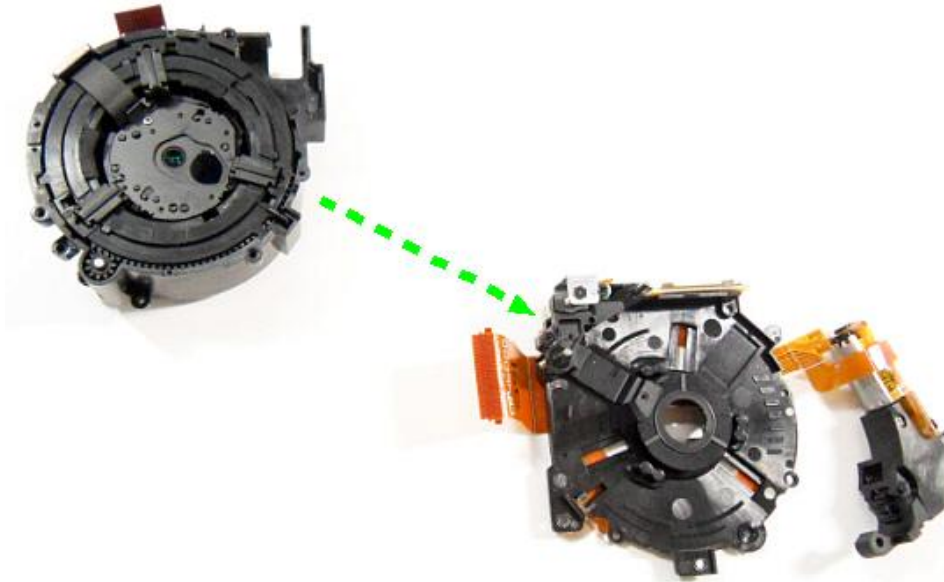
7. Separate the ZOOM GEAR.

8. Separate the SHUTTER ASSY PCB.
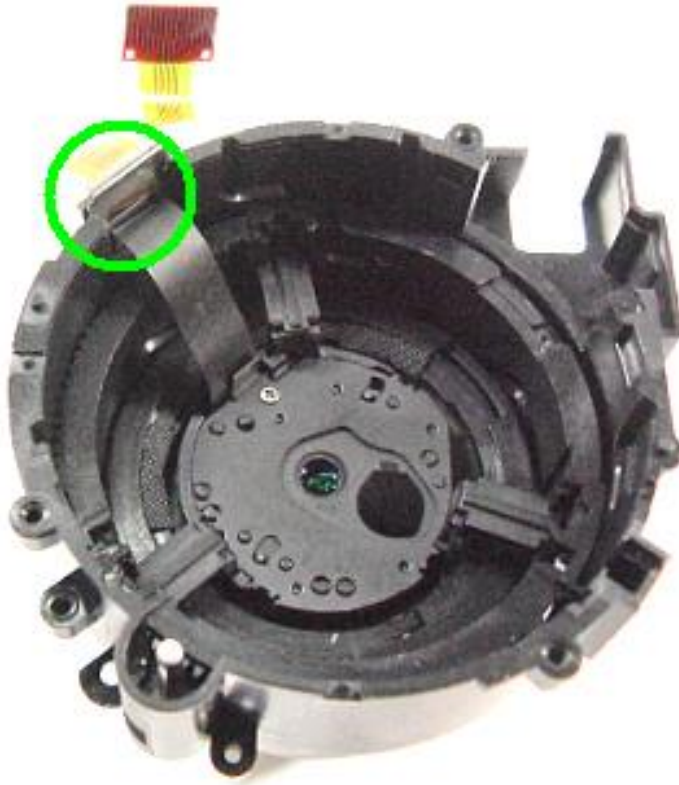
9. Separate the CAM BARREL ASSY from OUTER CAM BARREL.

10. Separate the CAM BARREL ASSY.
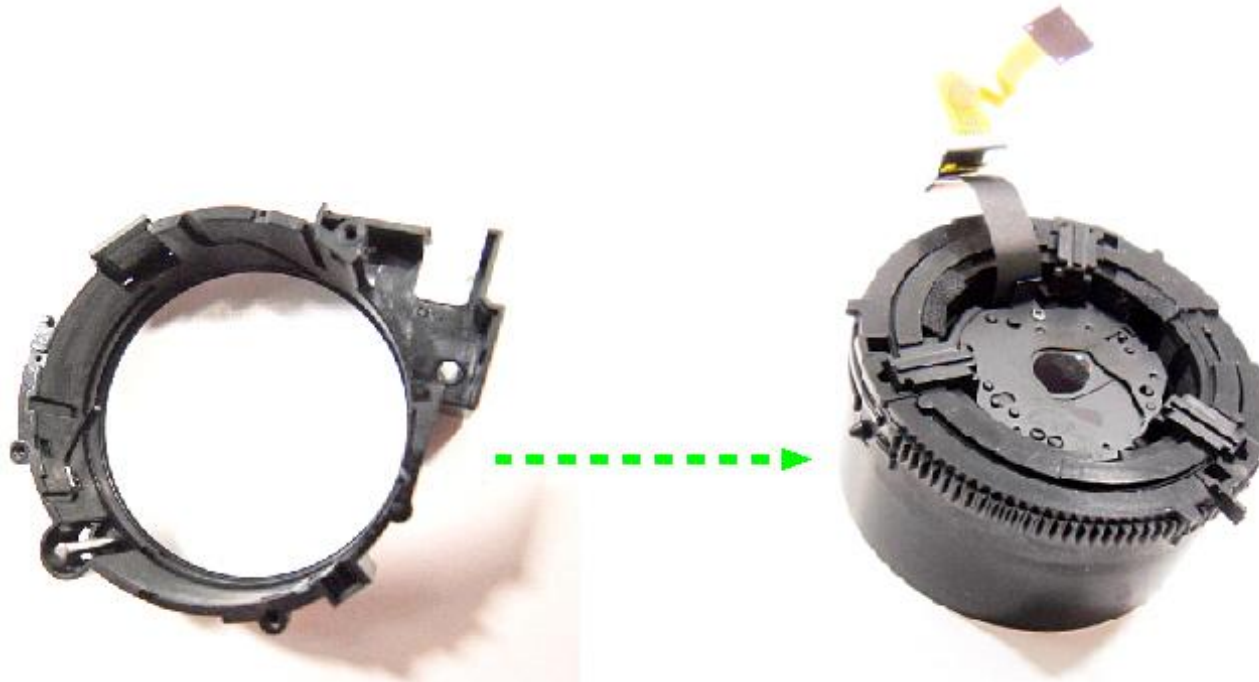
11. Separate the INNER CAM BARREL ASSY from GUIDE BARREL

12. Take apart INNER CAM BARREL ASSY.
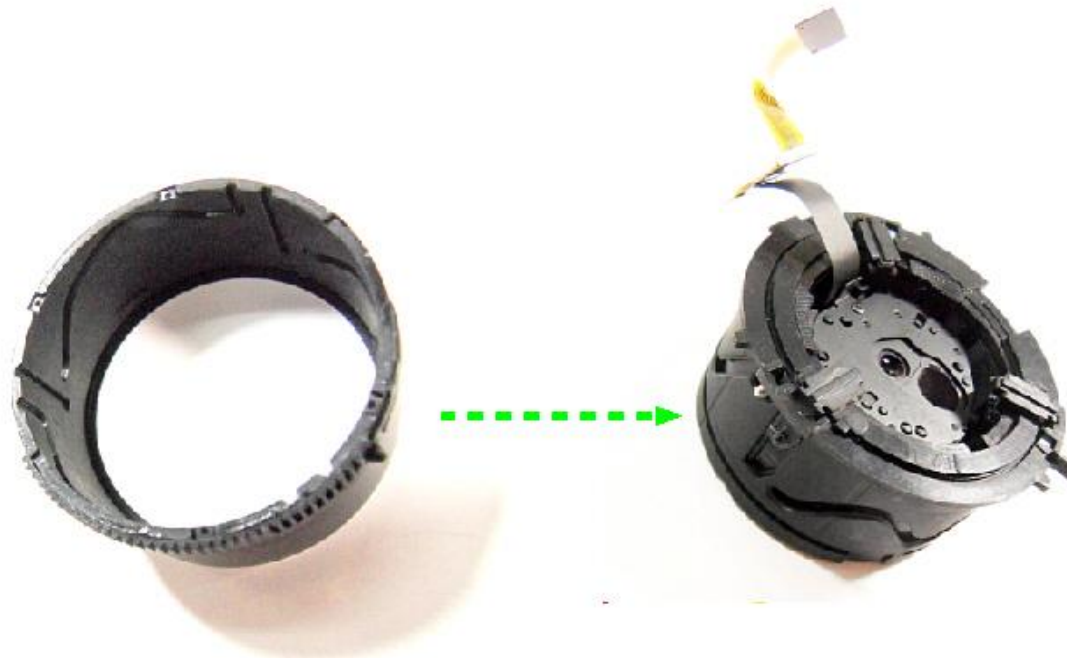
13. Separate the 2ND, 3RD BARREL ASSY from INNER CAM BARREL.

14. Take apart 2ND, 3RD BARREL ASSY.
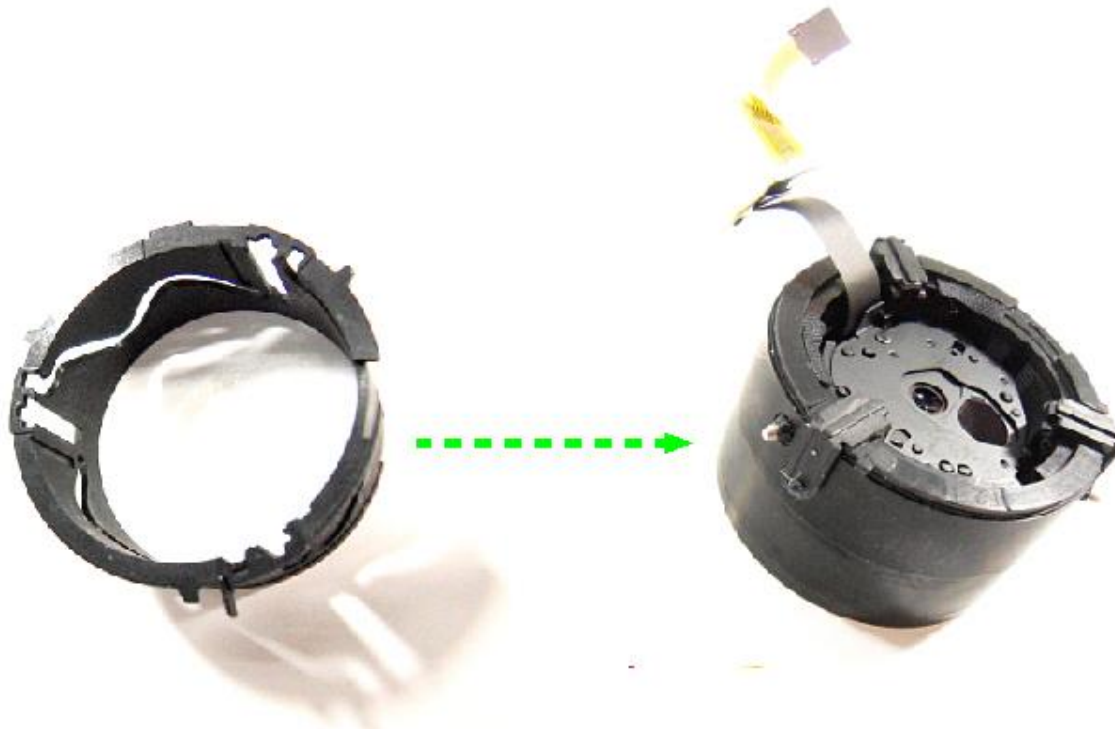
15. Separate the SHUTTER ASSY from 2ND, 3RD BARREL ASSY
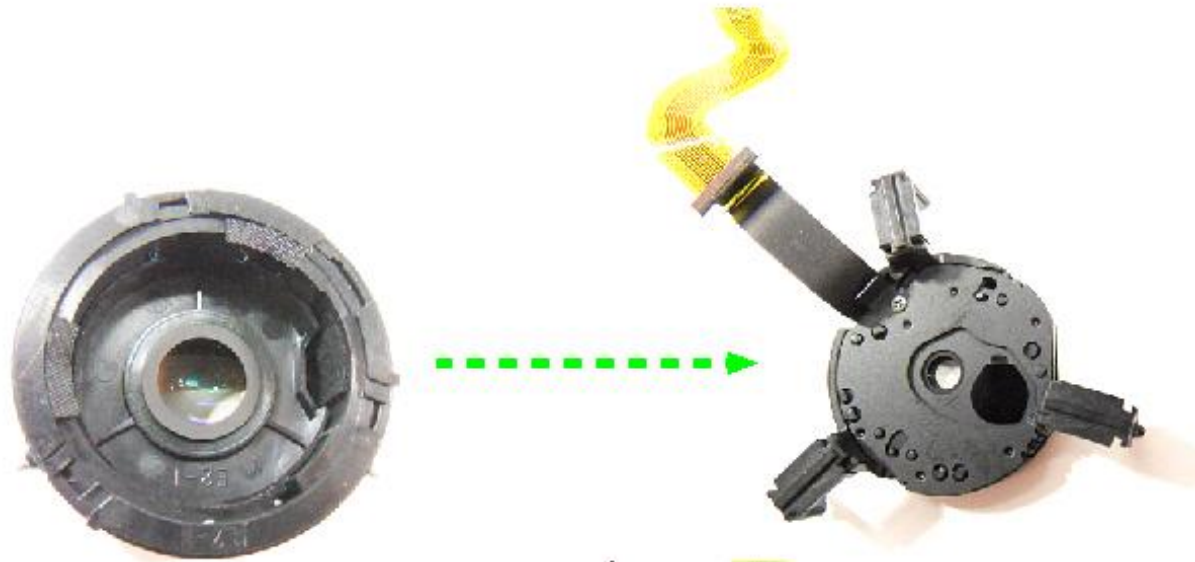
16. Take aparat 2ND, 3RD BARREL from ZOOM RING.
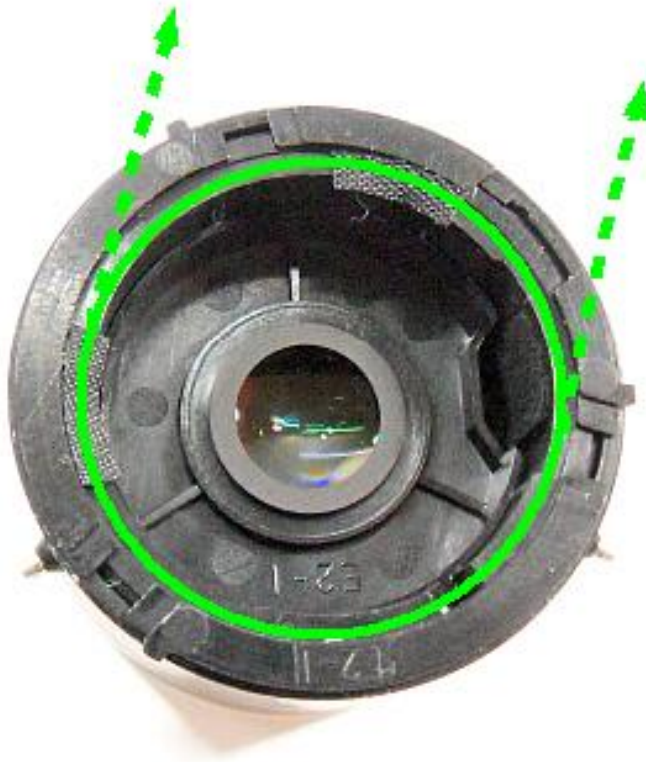
17. Take apart 2ND, 3RD BARREL.
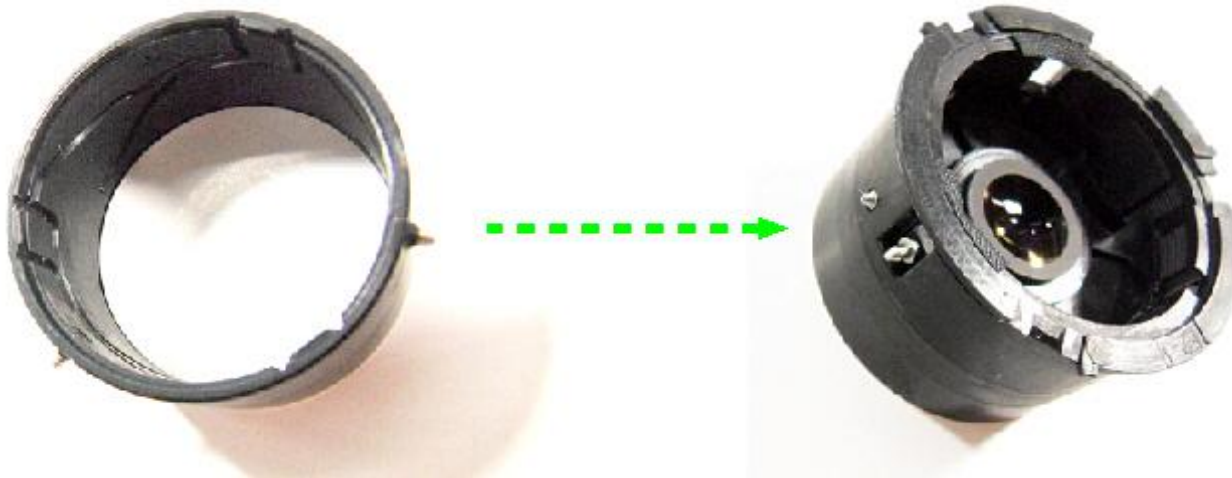
18. Separate the 2ND, 3RD BARREL from LENS CAP ASSY
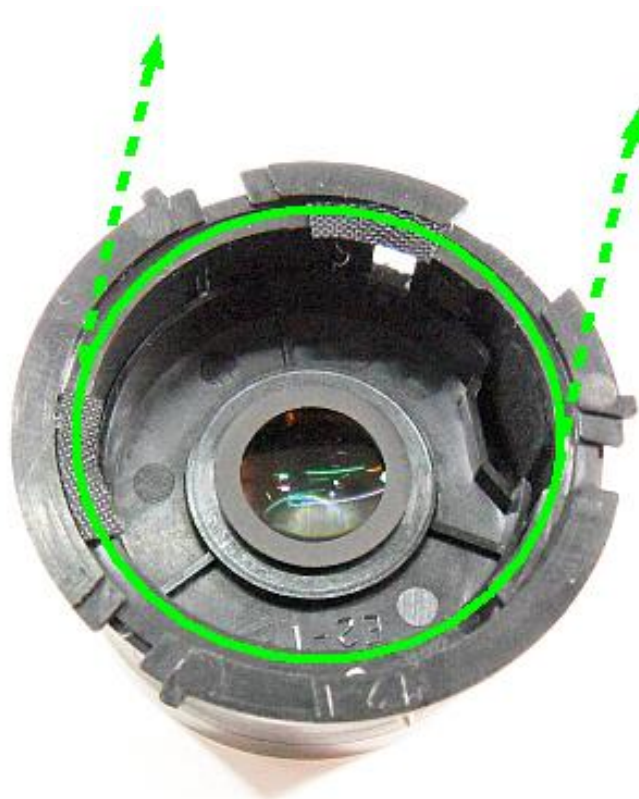
19. Take apart LENS CAP ASSY.

• **Assemble Barrel**

       * Reference for assembling BARREL ass'y

       1. Caution for the LENS CAP ASSY & 2ND, 3RD BARREL :
          Should be matched with "A" area & "a" area.
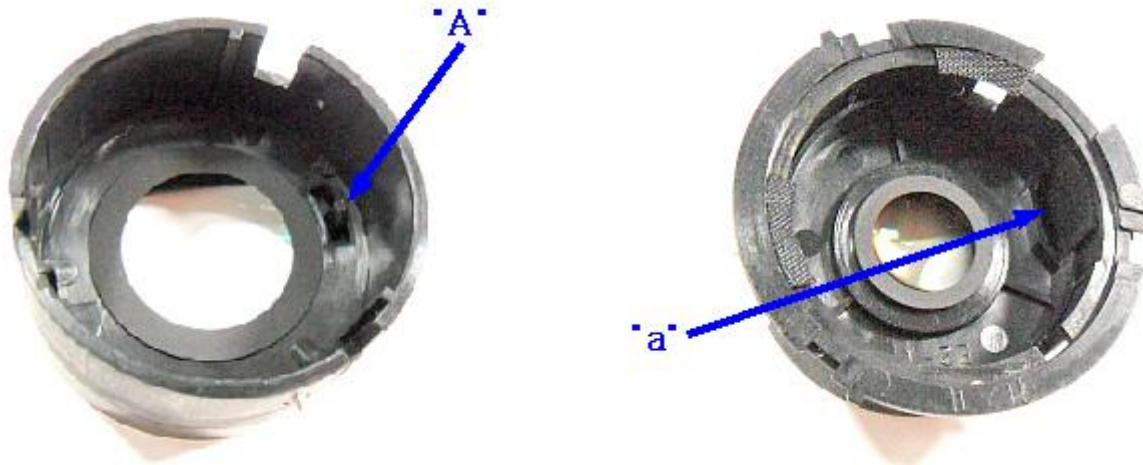
2. Caution for the ZOOM RING & 2ND, 3RD BARREL ASSY :
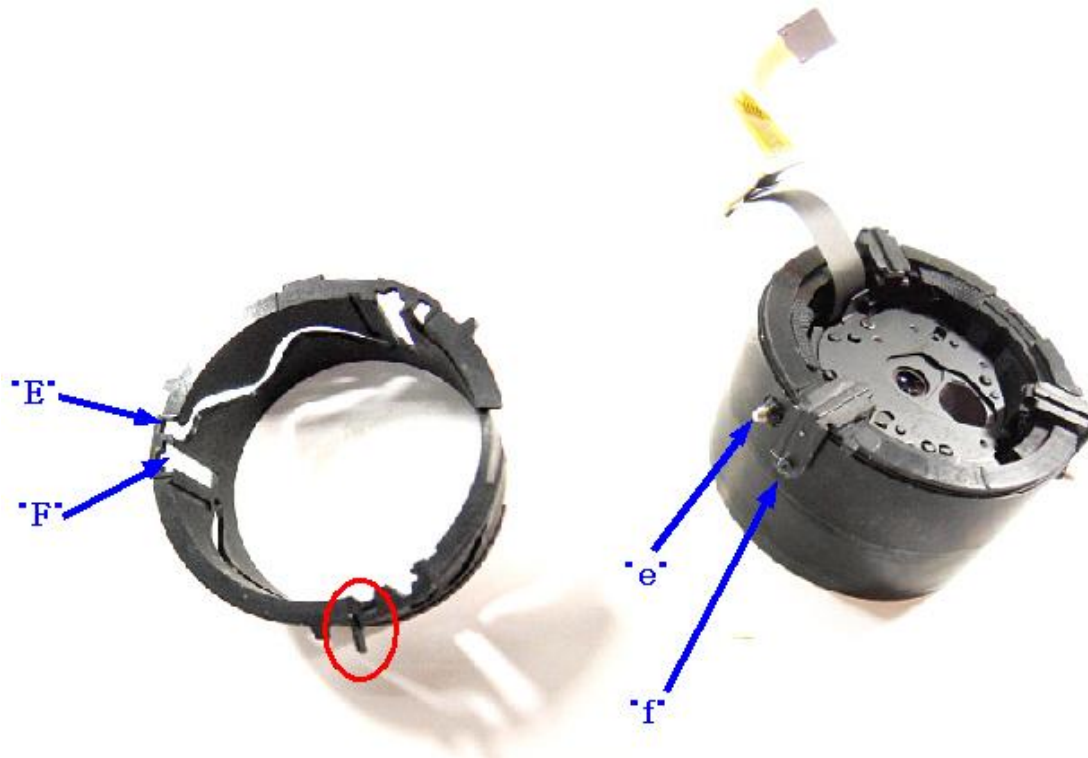   Should be matched with "C", "D" & "c", "d".
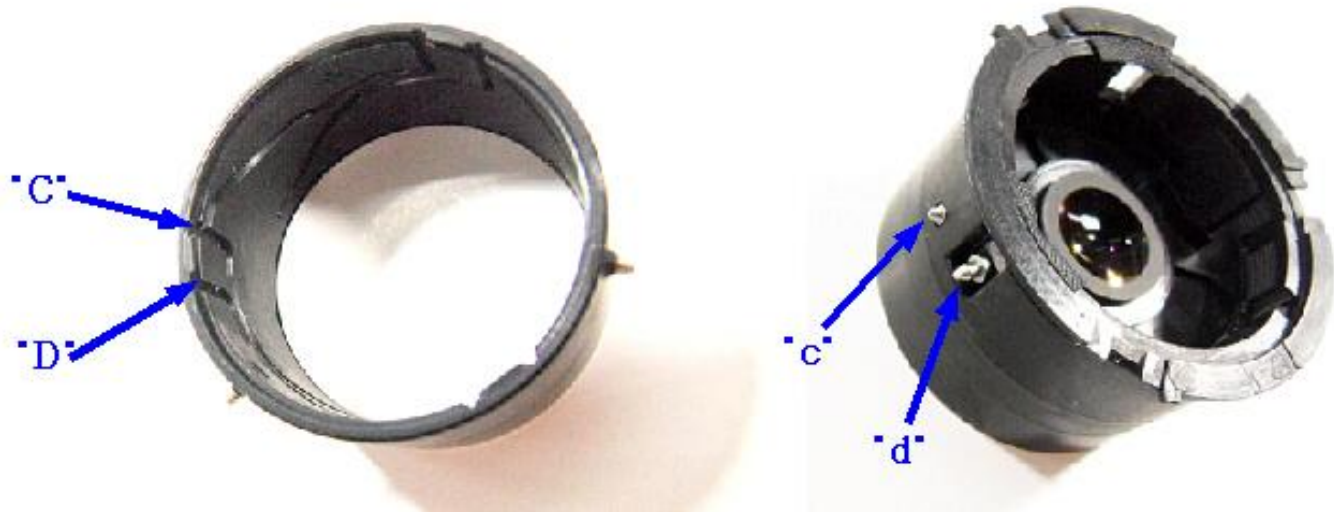
3. Assemble the ZOOM RING ASSY .

4. Caution for the SHUTTER ASSY : Should be matched with "B" & "b".
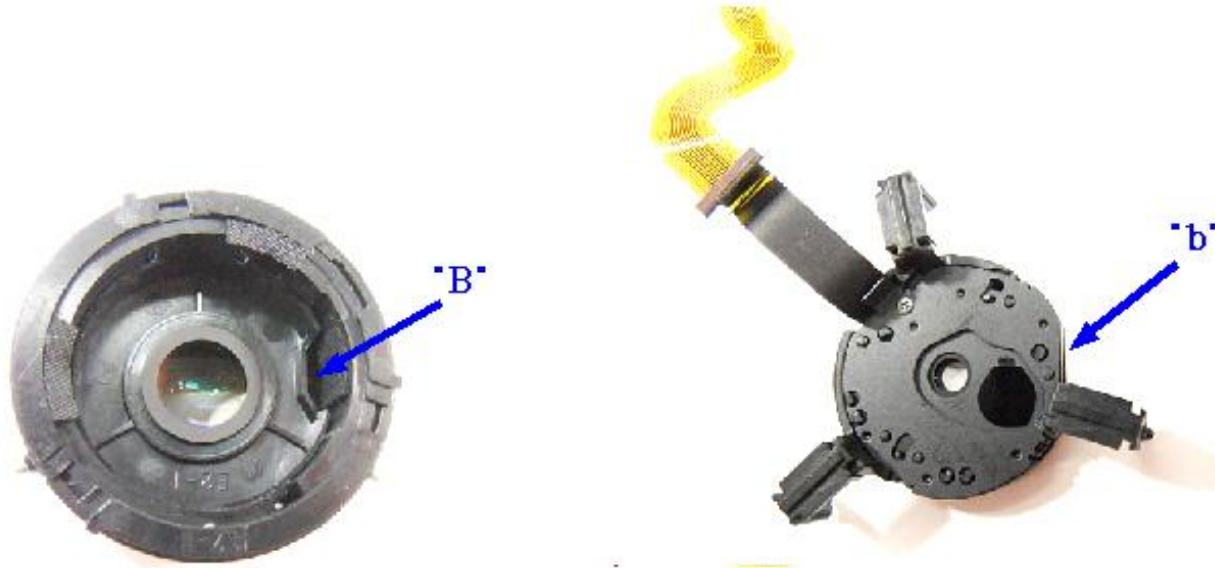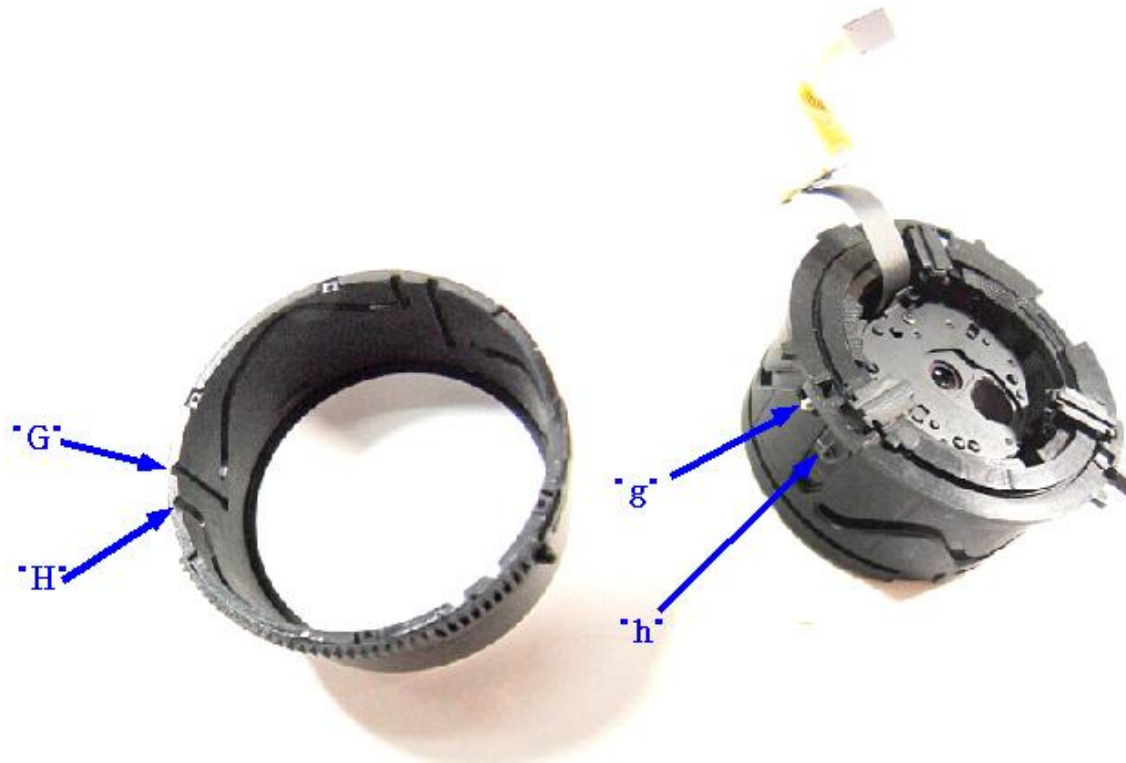
5. Should be matched with "E", "F" & "e", "f".

6. Assemble INNER CAM BARREL ASSY.

7. Caution for the GUIDE BARREL & INNER CAM BARREL ASSY :
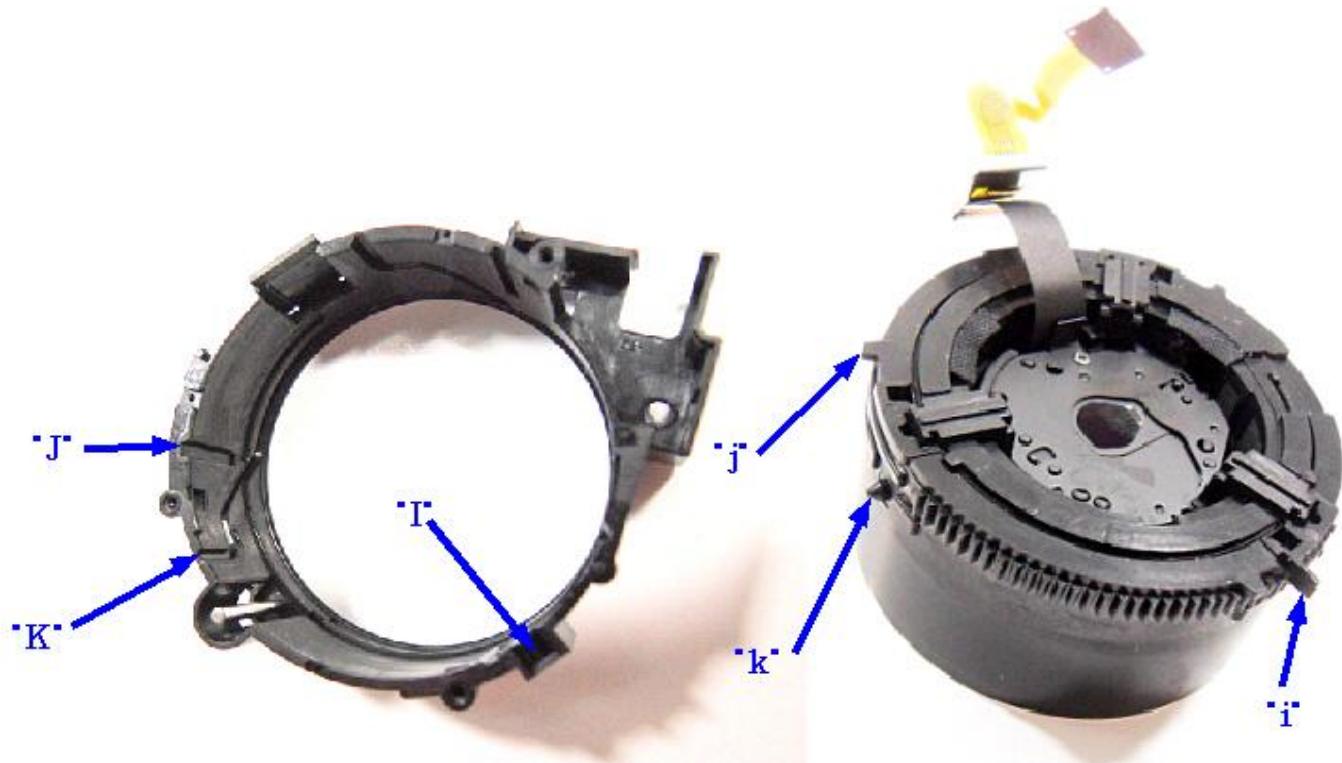   Should be matched with "G", "H" & "g", "h".

8. Assemble the CAM BARREL ASSY.

9. Caution for the OUTER CAM BARREL & CAM BARREL ASSY :
    Should be matched each points.

10. Assemble the OUTER CAM BARREL ASSY.

Thank you