REPAIR GUIDE

This repair guide section contains the disassembly and adjustment procedures.
For the assembly procedure, follow the reverse procedure.

SYMBOLS

■:Cautions and keypoints
G : Grease
B : Adhesive
T : Tool

CONTENTS Page

Precautions ---------- 2
Discharge ---------- 3
1. Disassembly of the exterior parts ---------- 4
2. Disassembly of the compl PWB TB-3, LCD ------ 8
3. Disassembly of the assy cabi front, compl PWB TB-3/CA-2/TC-1 ---------- 12
4. Disassembly of the compl PWB SY-1/ ST-1/PW-1/TB-1/SY-2/DM-1 ---------- 18
5. Disassembly of the CCD holder assy, the outer barrel assy and the 1st lens group moving barrel. ---------- 22
6. Disassembly of the outer barrel assy ---------- 25
7. Disassembly of the 4th moving barrel assy, the 3rd moving barrel assy and the 2nd lens group assy. ---------- 27
Arrangement plan of PCB ---------- 29

CONTENTS Page

Required adjustment, setting and confirmation items after repairing (exchanging parts) -------- 30
Related adjustment and required setting items --- 31
Preparing the 2782 adjustment program ---------- 32
Starting up the 2782 adjustment program (in the adjustment mode). ---------- 33
Contents of the adjustment program and CPU version readout ---------- 34
Setting the camera and the chart when adjusting the CCD perspective. ---------- 35
Adjustment of CCD perspective ---------- 37
Sensitivity adjustment (GAIN) ---------- 39
Adjusting the center part of CCD (CCD CENTER) ---------- 40
Adjustment of the frequency for camera shaking (ACT DRV FREQ) ---------- 41
Adjustment of the servo for camera shaking (SERVO GAIN) ---------- 41
Adjustment of the gyro for camera shaking (GYRO OFFSET) ---------- 42
Adjustment of the shutter (SHUTTER) ---------- 43
Adjustment of the defective pixel (DEFECT PIXEL) ---------- 43
Adjustment of the flash GN (FL GNo) ---------- 44
Adjustment of white balance (WB) ---------- 45
Adjustment of the focus (FCS INF POS) ---------- 46
Adjustment of the manual focus PI (MF PI) ------- 47
Adjustment of the camera shaking compensation (SHAKE OFFSET) ---------- 48
DESTINATION Setting (DESTINATION) -------- 49
Setting date and time (TOD) ---------- 49
Error code on adjustment program ---------- 50
Measuring instrument ---------- 51
Subsidiary Materials ---------- 52

■ Precautions

Chemicals

Handle chemicals of high volatility with care, use of which will affect to your health and environment.

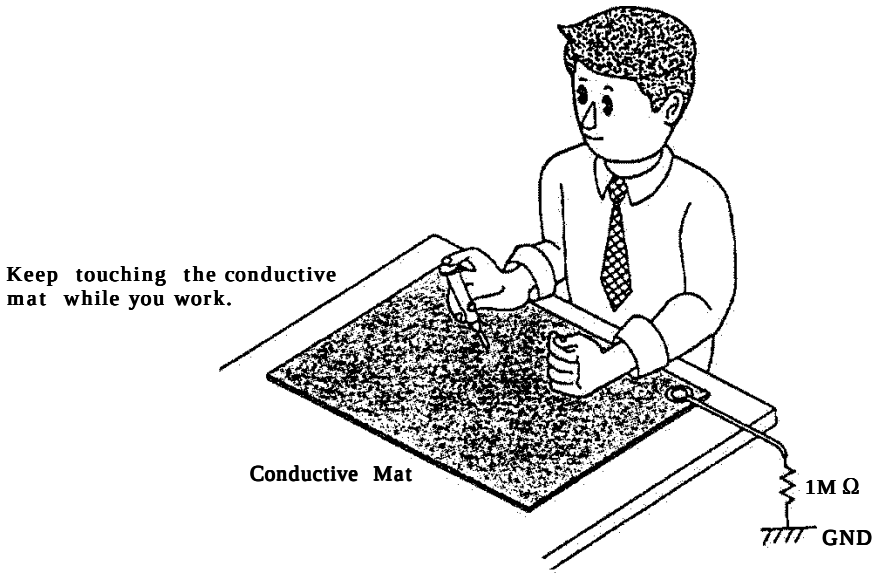
1. Store them sealed in a specific place to prevent exposure to high temperature or direct sunlight.
2. Avoid dividing them into small containers and prevent vaporization.
3. Keep containers sealed when not in use.
4. Avoid using them as much as possible. When required, remove only required amount from the container to make full use.

Plastic parts

1. When cleaning plastic parts, use cleaning paper or cloth. Never use thinner, ketone, ether.
2. When installing plastic parts, insert the specific screws vertically to the parts. (Be careful not to tighten too much.

PCBs

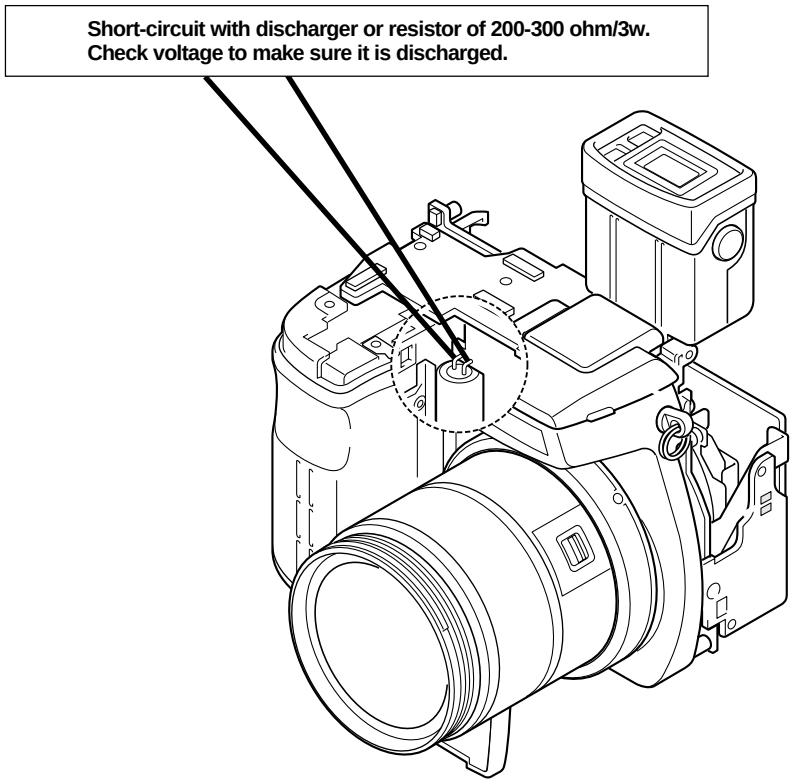
Since PCBs use MOS IC, you must reduce static electricity. When repairing a PCB itself, or when wiring, please perform your work as illustrated below.
If grounding is impossible, connect a cable to a steel desk or shelf.



Discharge

Before disassembly, be sure to discharge the main condenser in the following manner. (Fig. 1)

■ **Fig. 1**



1. Disassembly of the exterior parts

Disassemble it in order of step 1to 22

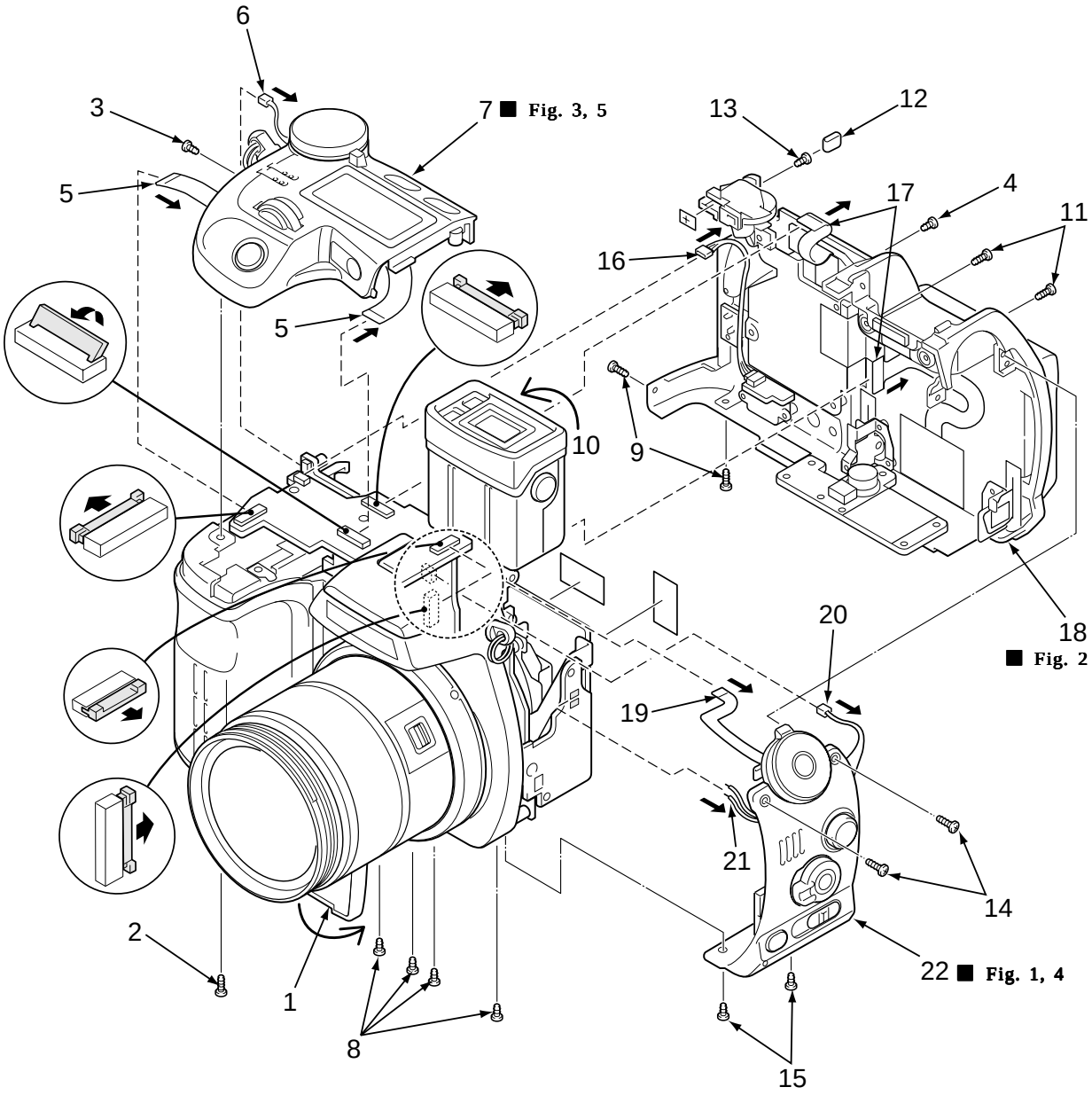
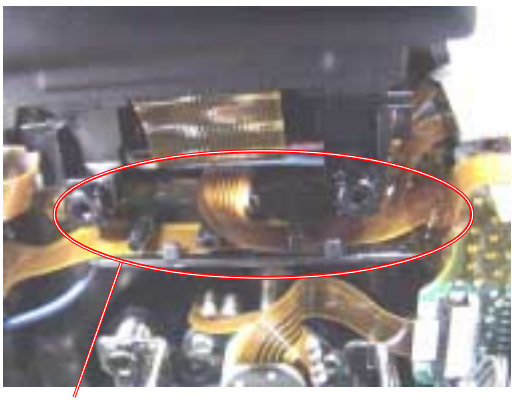


Fig. 1 Installation of the cabinet side

1. Arrange the FPC of the cabinet side as shown on the figure.
2. Stick 2782-1296 as shown on the figure to prevent the FPC of the cabinet side from unstableness.



FPC of the cabinet side

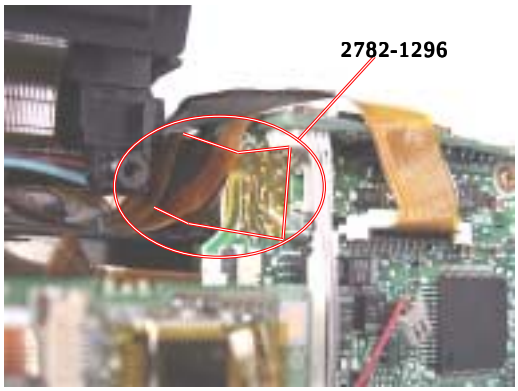


Fig. 2 Installation of the assy, cabi back

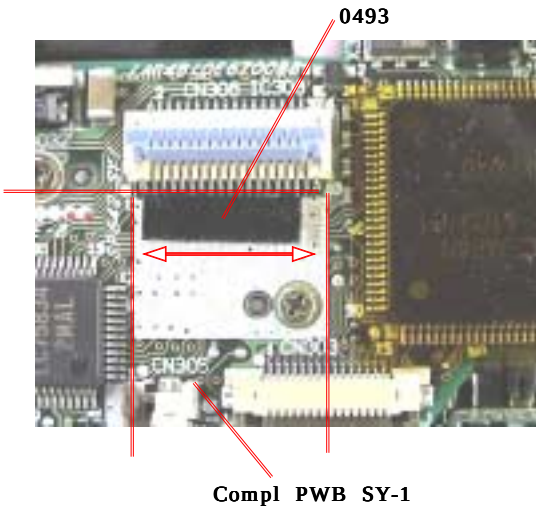
Install the assy cabi back with a care of the FPC of the cabinet side.

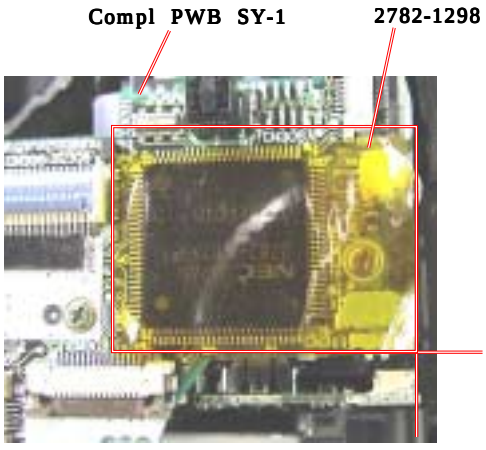


FPC of the cabinet side

Fig.3 Installation of the Cabinet top

1. Stick 0493 and 2782-1163 at the points on the figure.





2. Stick 2782- 1163 at the points on the figure.
3. Arrange the harness as shown on the figure to install the cabinet top.

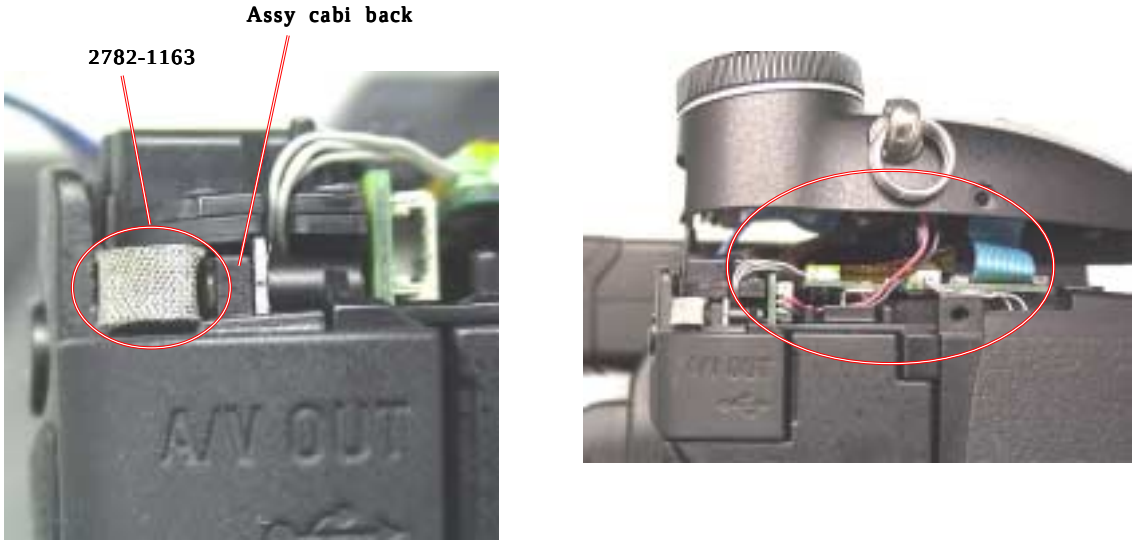


Fig.4 Assembly of the cabinet side

1. Solder the lead wire and harness and arrange them as shown on the figure.
2. Apply B-10 as shown on the figure.
3. Press the FPC of the control side unit in the arrowed direction to prevent it from unstableness.

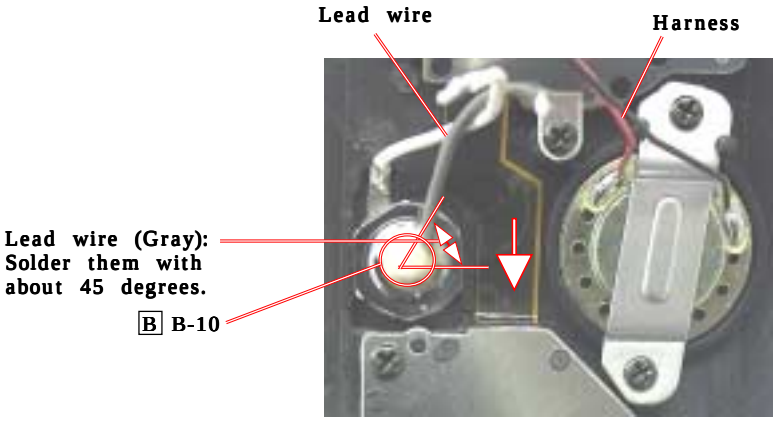
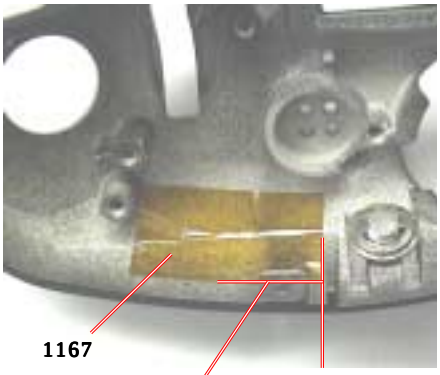


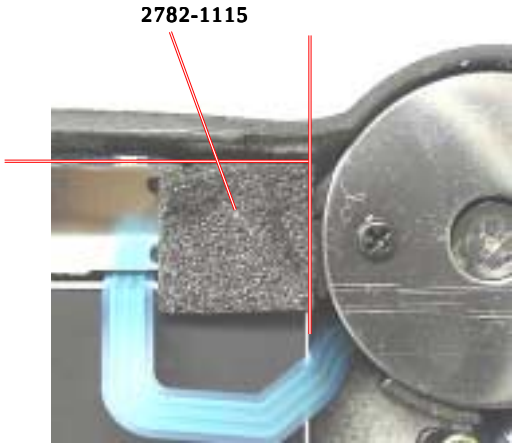
Fig.5 Assemble the cabinet top

Stick 1167, 1113, 2782-1115 and 2782-1118 as the direction.



About 2mm from the screw hole







2. Disassembly of the compl PWB TB-3, LCD

Disassemble it in order of step 1 to 29.

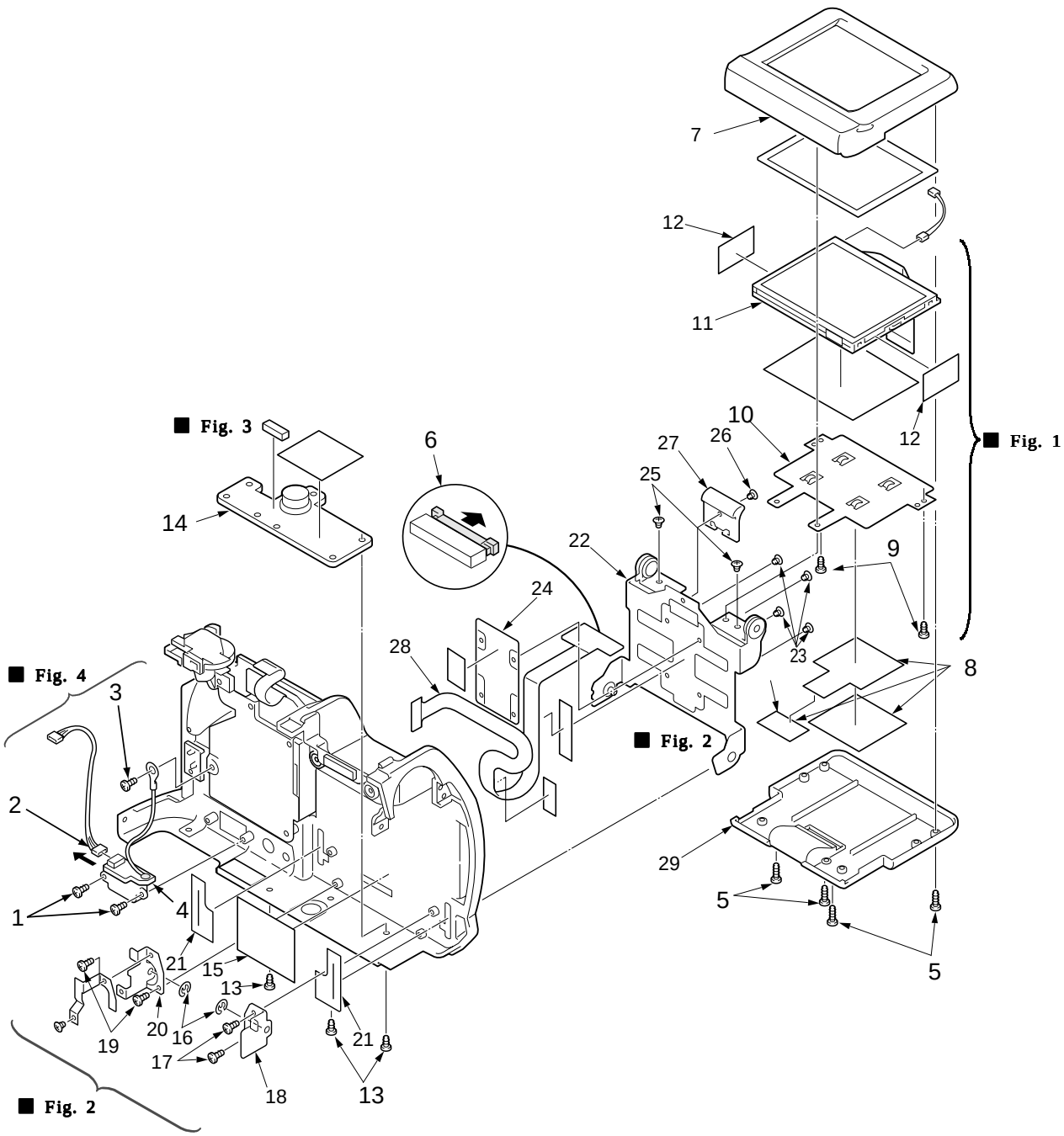
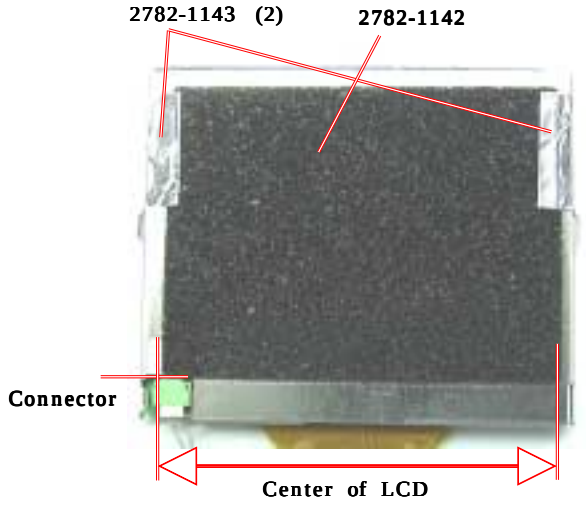
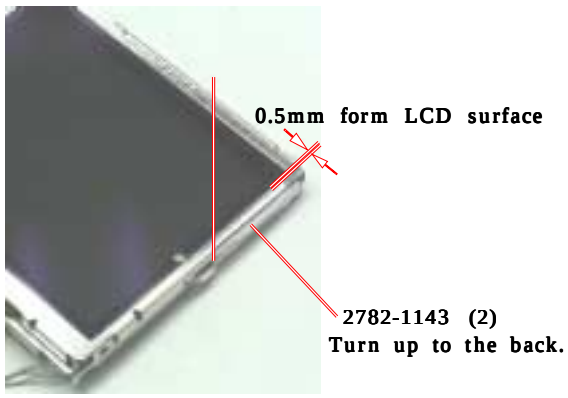
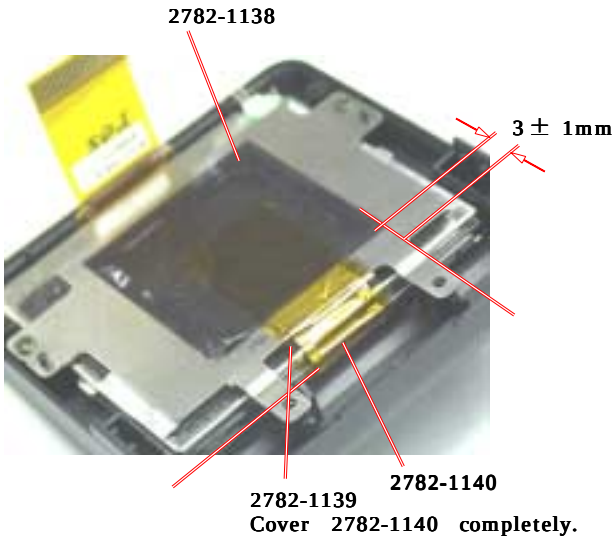


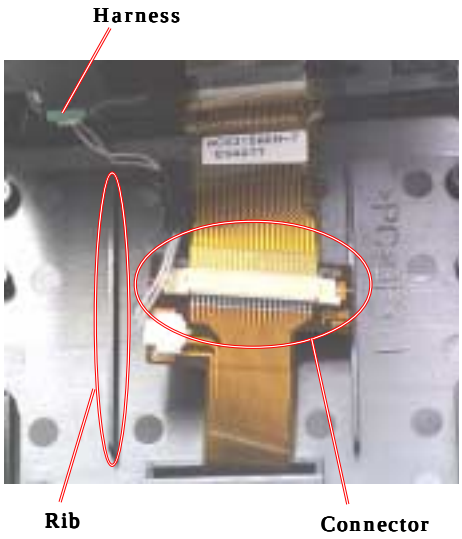
Fig. 1 Assembly of assy cabi back
Assembly of LCD part
1. Stick 2782-1142 and 2782-1143 as shown on the figure.





2. Stick 2782-1140, 2782-1138 and 2782-1139 as shown on the figure.
3. Attach the connector. The harness should not be on the rib on the figure.





4. Let the assy flexible PWB LCD be stuffed in the groove.



(OK) Assy flexible PWB LCD is put in the groove.



(NG) Assy flexible PWB LCD is raised.

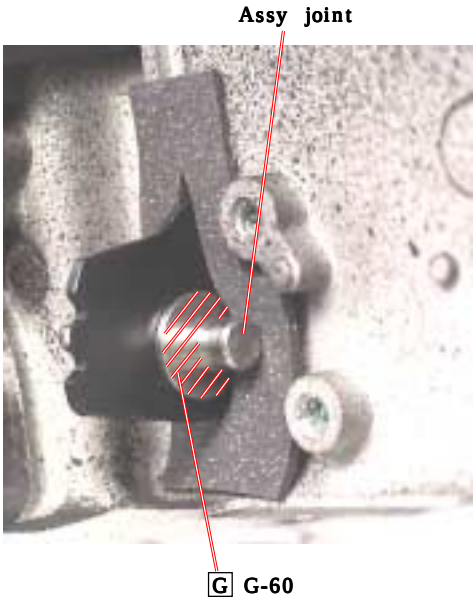
Fig.2 Assembly of the assy cabi back.

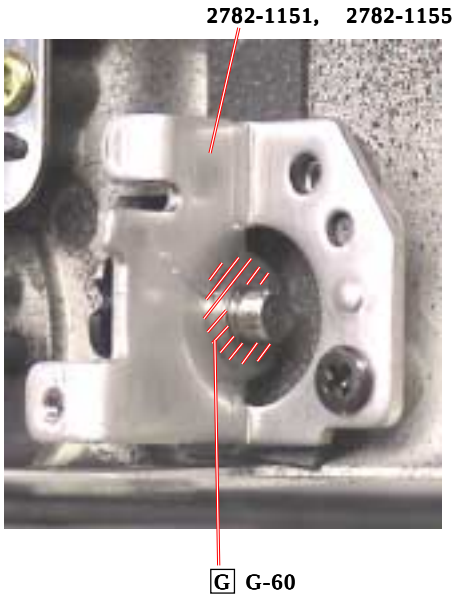
Installation of LCD part

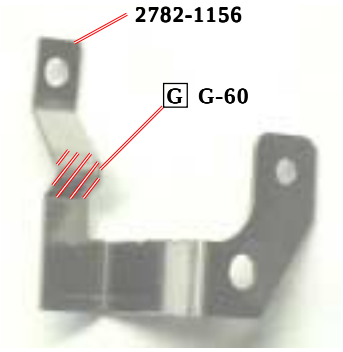
1. Stick the assy flexible PWB LCD with 2782-1134 as shown on the figure.



2. Apply G-60 to the axis part (two points on the left and right side) of the assy joint.
3. Apply G-60 to the shaded parts of 2782-1151 and 2782-1155.
4. Apply G-60 to the click part of 2782-1156.

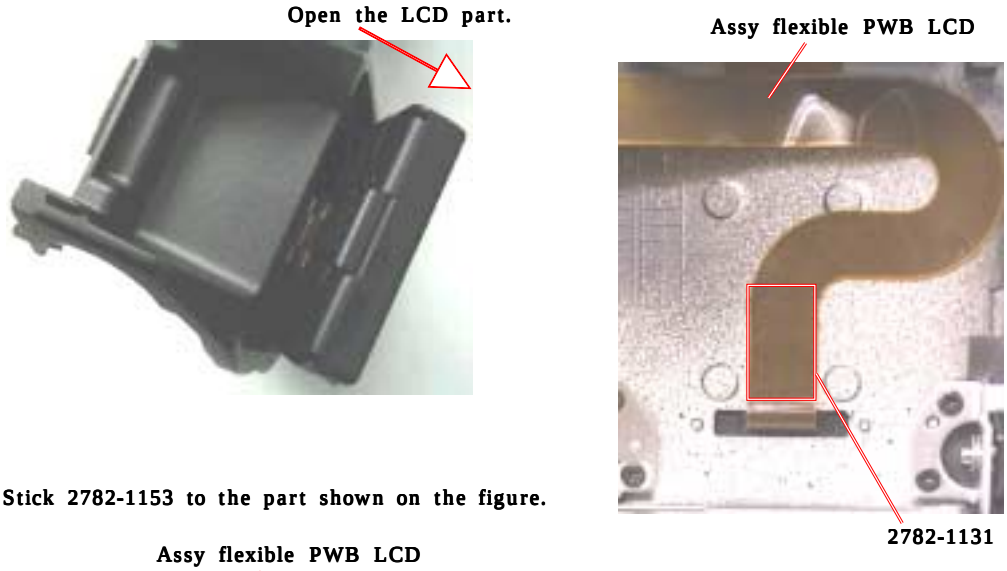






REPAIR GUIDE

4. Keep the LCD part opening as shown on the figure, and stick the assy flexible PWB LCD with 2782-1131.



5. Stick 2782-1153 to the part shown on the figure.

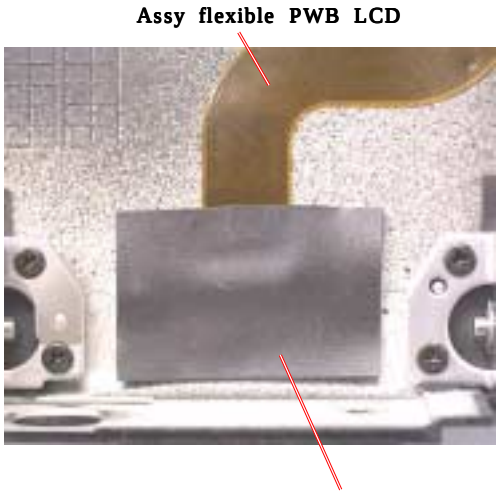


Fig.3 Assembly of the assy cabi back

Sticking the pad
Stick the pad to the part shown on the figure.

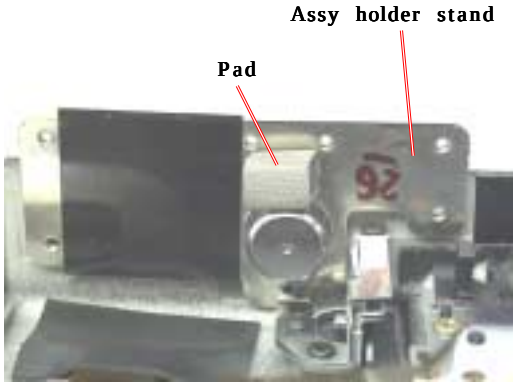
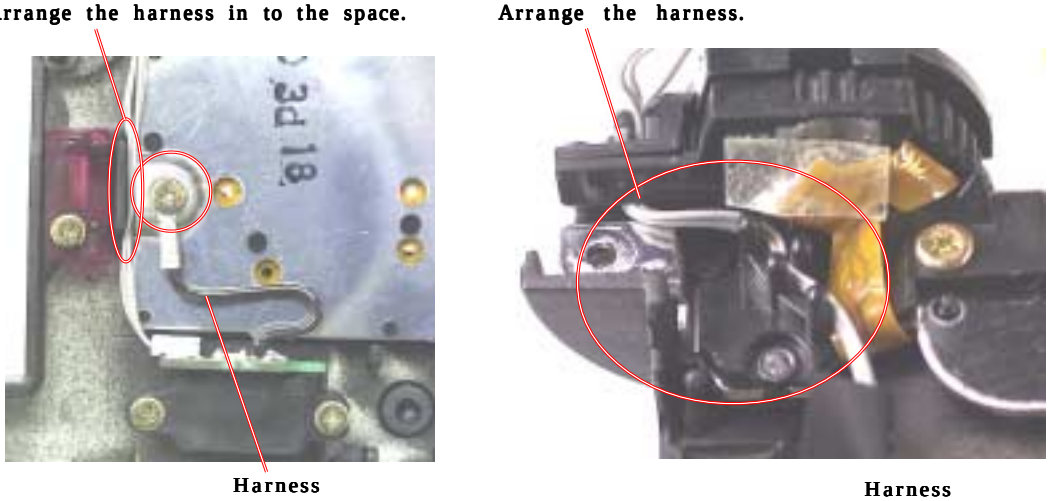


Fig4. Assembly of the assy cabi back.

Installation of the control back unit
1. Assemble the harness of the compl PWB TB-3 as shown on the figure.
2. Assemble the harness as shown on the figure and arrange it.



REPAIR GUIDE

3. Disassembly of the assy cabi front, compl PWB TB-3/CA-2/TC-1

Disassemble it in order of step 1 to 23.

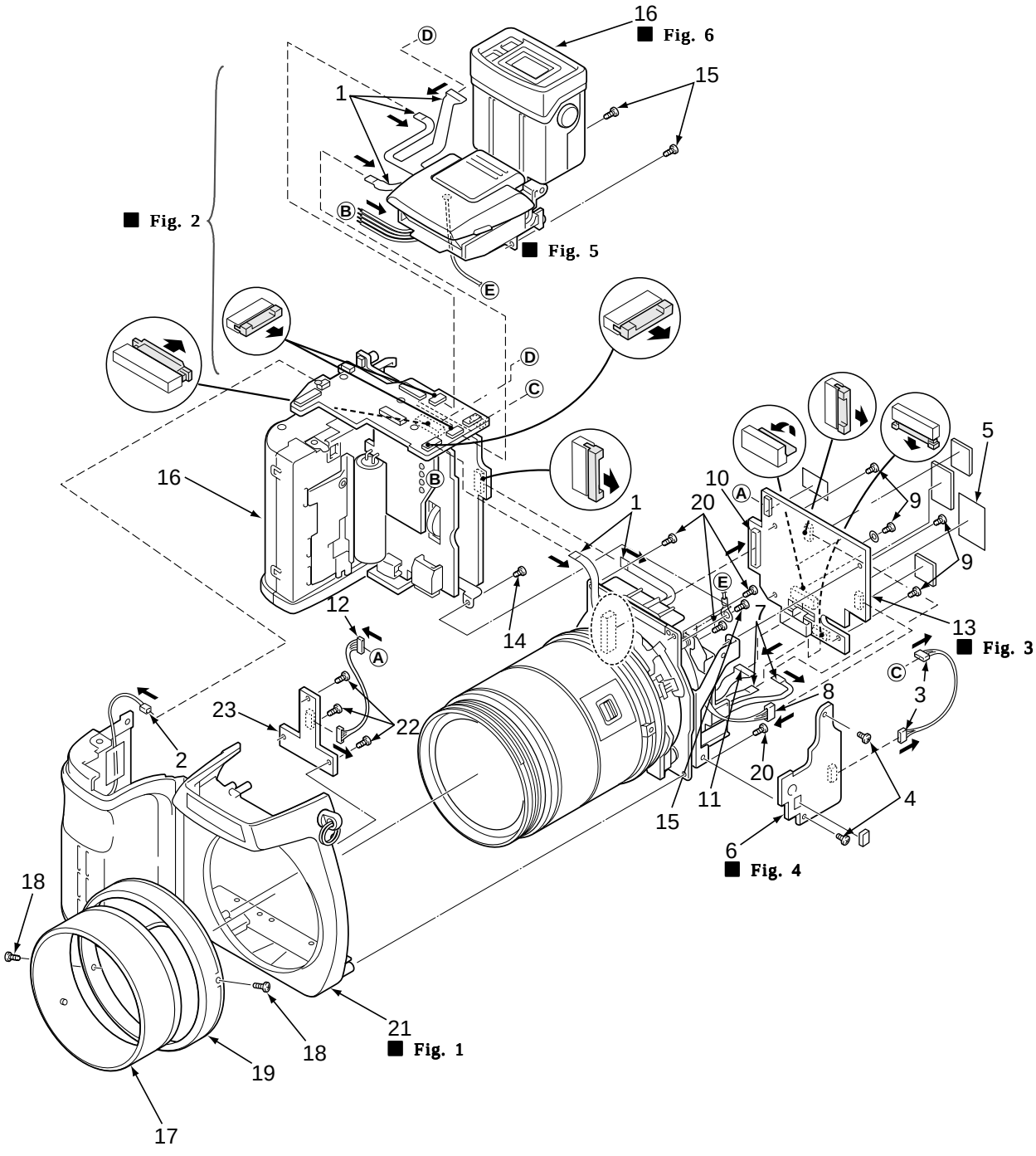


Fig.1 Installation of the assy cabi front.

1. Stick 2782-1215 onto 3256-2231 as shown on the figure.
2. Arrange the FPC of the zoom encoder FPC assy as shown on the figure.

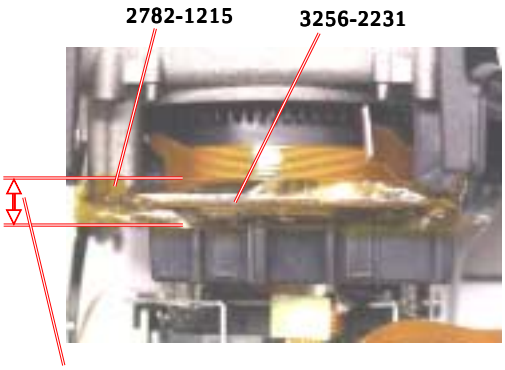
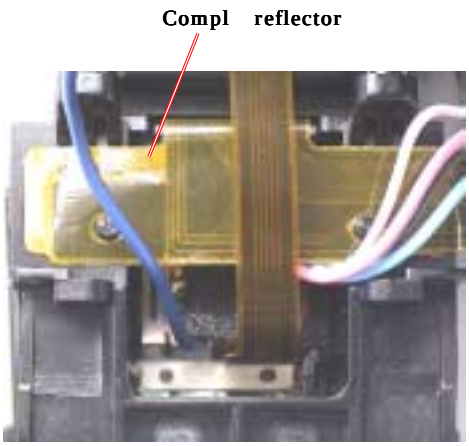
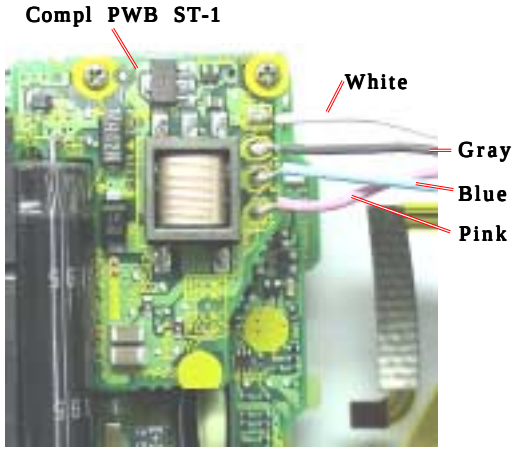




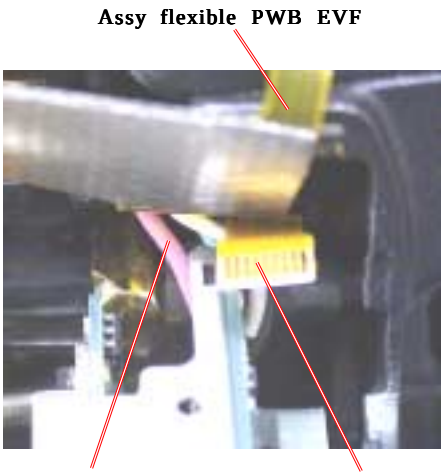
Fig.2 Installation of the EVF UNIT part, the strobo part and the holder battery part

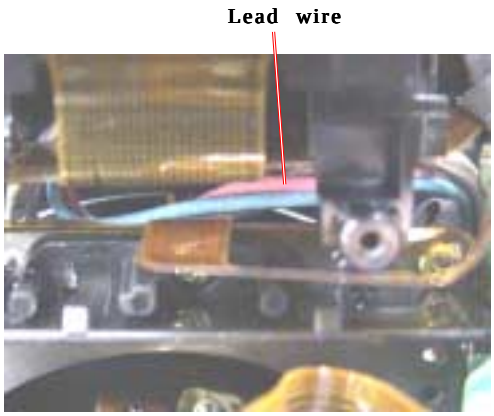
1. Arrange the lead wire of the compl reflector as shown on the figure, and solder it to the compl PWB ST-1.





2. Make a set of the lens block, the EVF UNIT and the strobo part to install onto the assy cabi front.
3. Install the lead wire and FPC as shown on the figure.





4. Harness from the strobo part as shown on the figure.
5. Arrange the harness of the compl PWB TC-1 as shown on the figure.

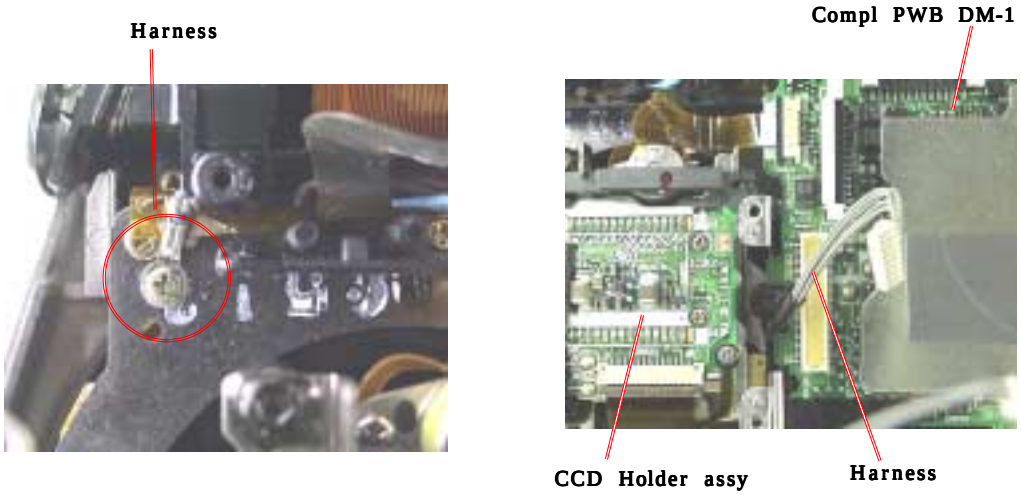
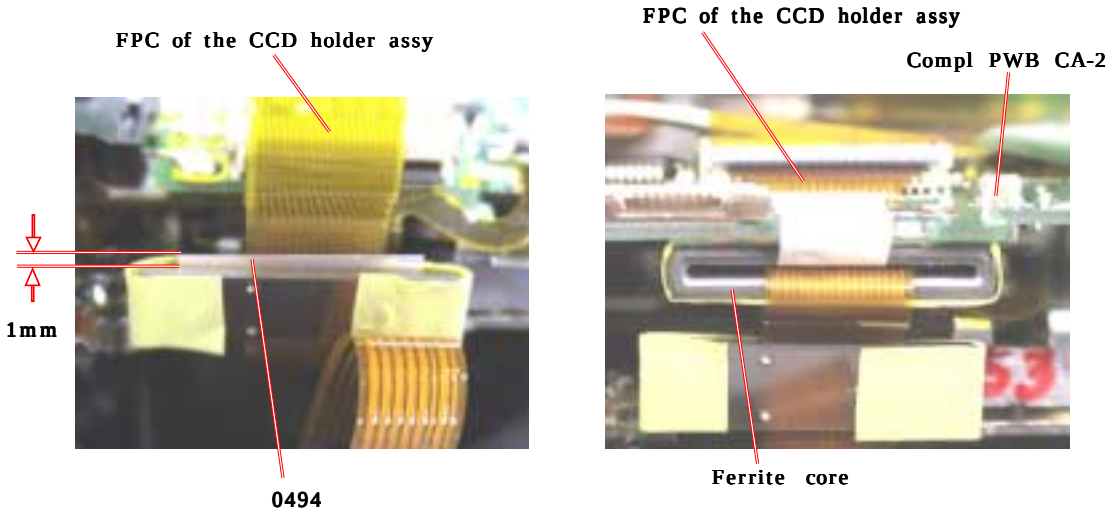
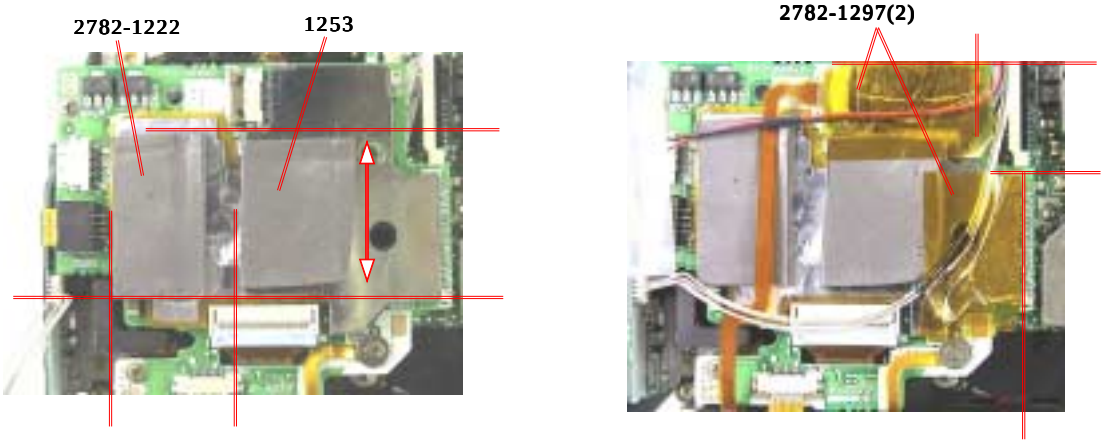


Fig.3 Installation of the compl PWB CA-2

1. Stick 0494 between the FPC of the CCD holder and the metallic plate.
2. Stick the ferrite core on the compl PWB CA-2 to arrange the FPC of the CCD holder assy as shown on the figure.



3. Assemble 2782-1222, 1253, 2782-1297 and arrange the FPC.



REPAIR GUIDE

Fig. 4 Stick 1210 and 2782-1163

Stick 1210 and 2782-1163 on the position shown on the figure.

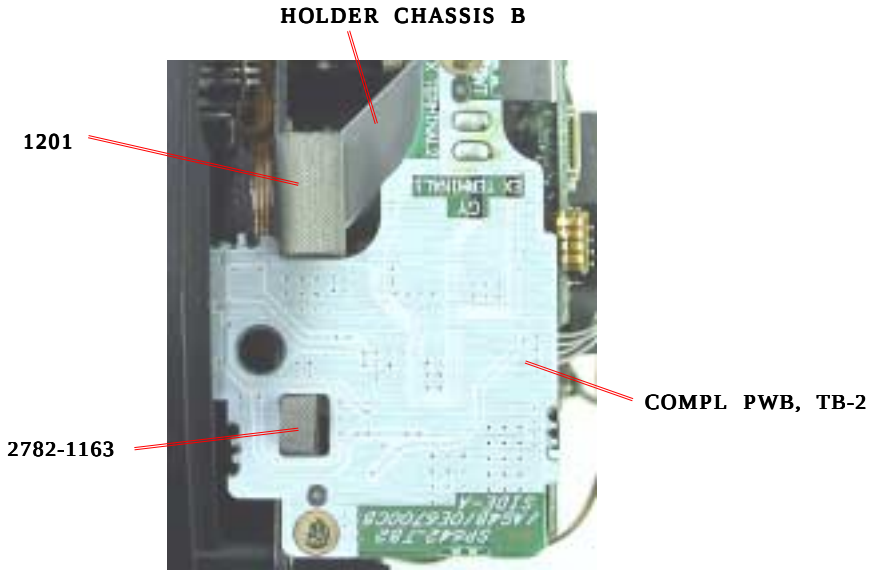


Fig.5 Assembly of the assy hood VF part

1. Apply G-85 to the click part on the figure.
2. Apply G-114 to the directed part (both sides) of the cabinet bottom VF.

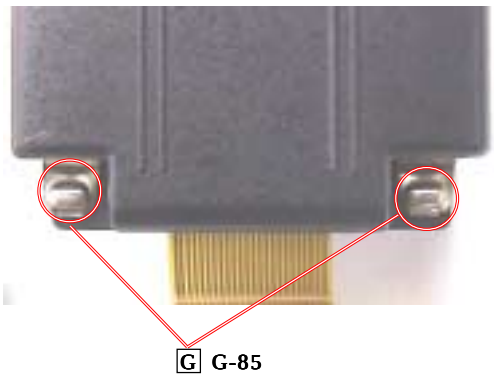
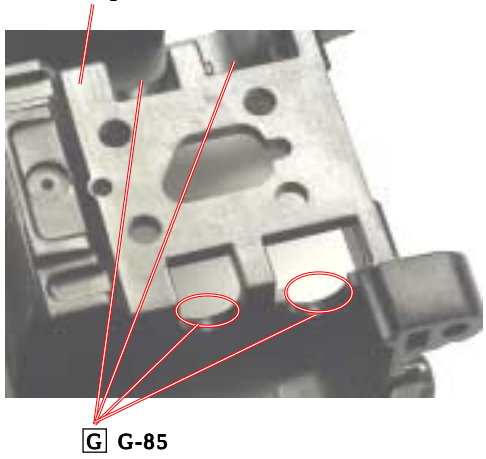
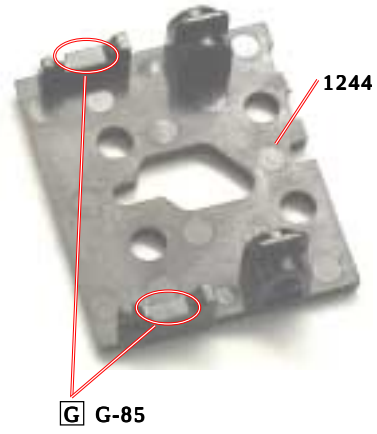




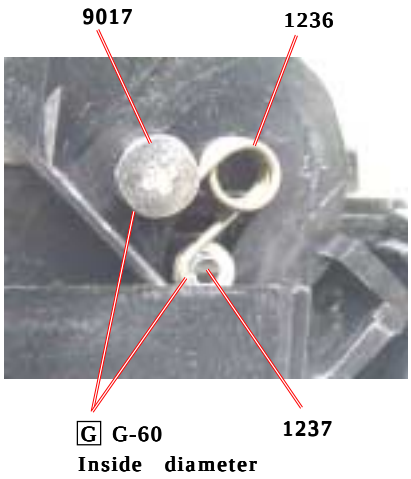
Fig.6 Assembly of the strobo

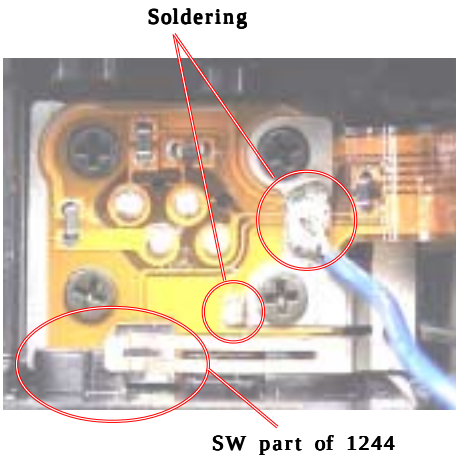
1. Apply G-85 to the directed part (sliding part) of the hinge EVF flash.
2. Apply G-85 to the directed part of 1244.



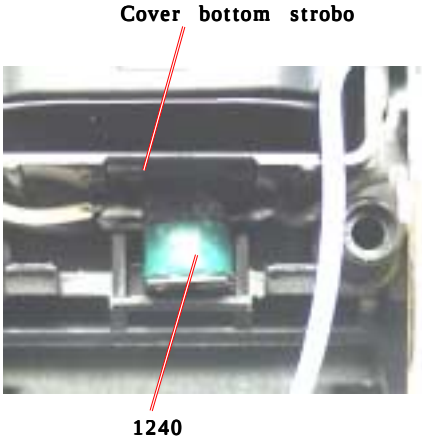


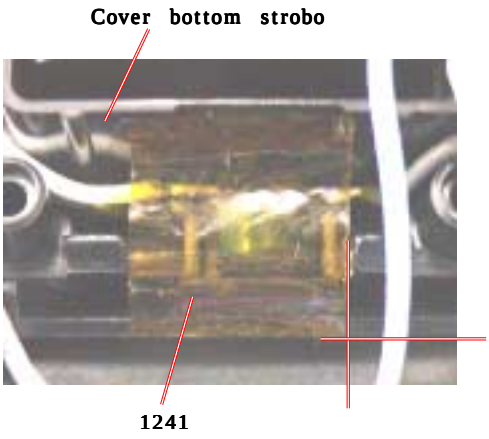
3. Apply G-60 to the directed part of 1236 to assemble it as shown on the figure.
4. Assemble it to position SW part of 1244 as the figure, and solder 1244 and the harness.





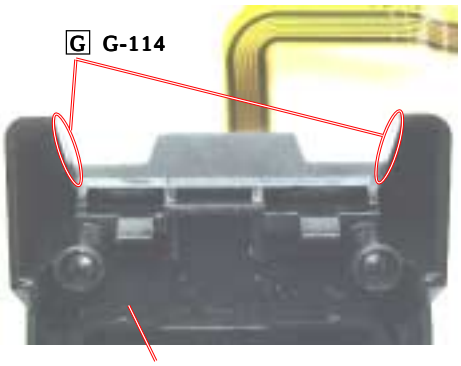
5. Assemble 1240 on the position of the figure.
6. Stick 1241 onto the position of the figure to fix it.

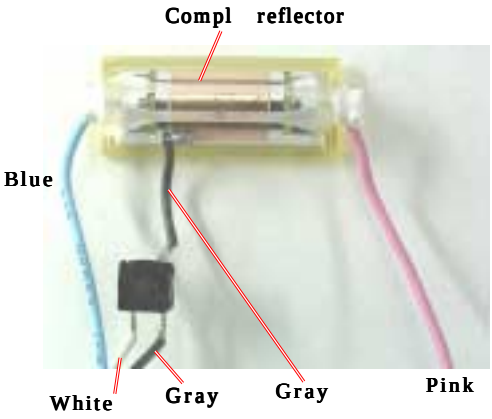




REPAIR GUIDE

7. Apply G-114 to the directed part of the cover bottom strobo.
8. Solder the lead wire to the compl reflector.



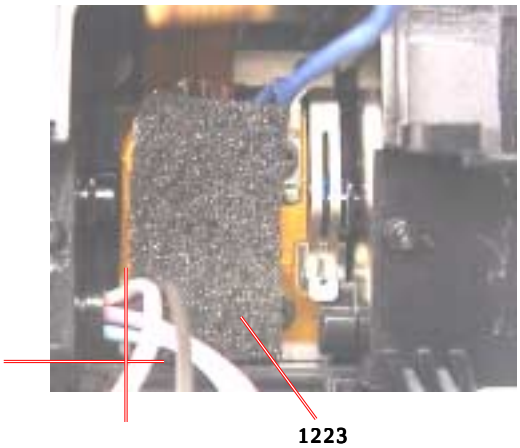


9. Assemble 2766-1604 in the direction of the figure.
10. Arrange the lead wire.





11. Stick 1223 onto the position of the figure.
12. Apply G-114 to the directed part of the cover top strobo.

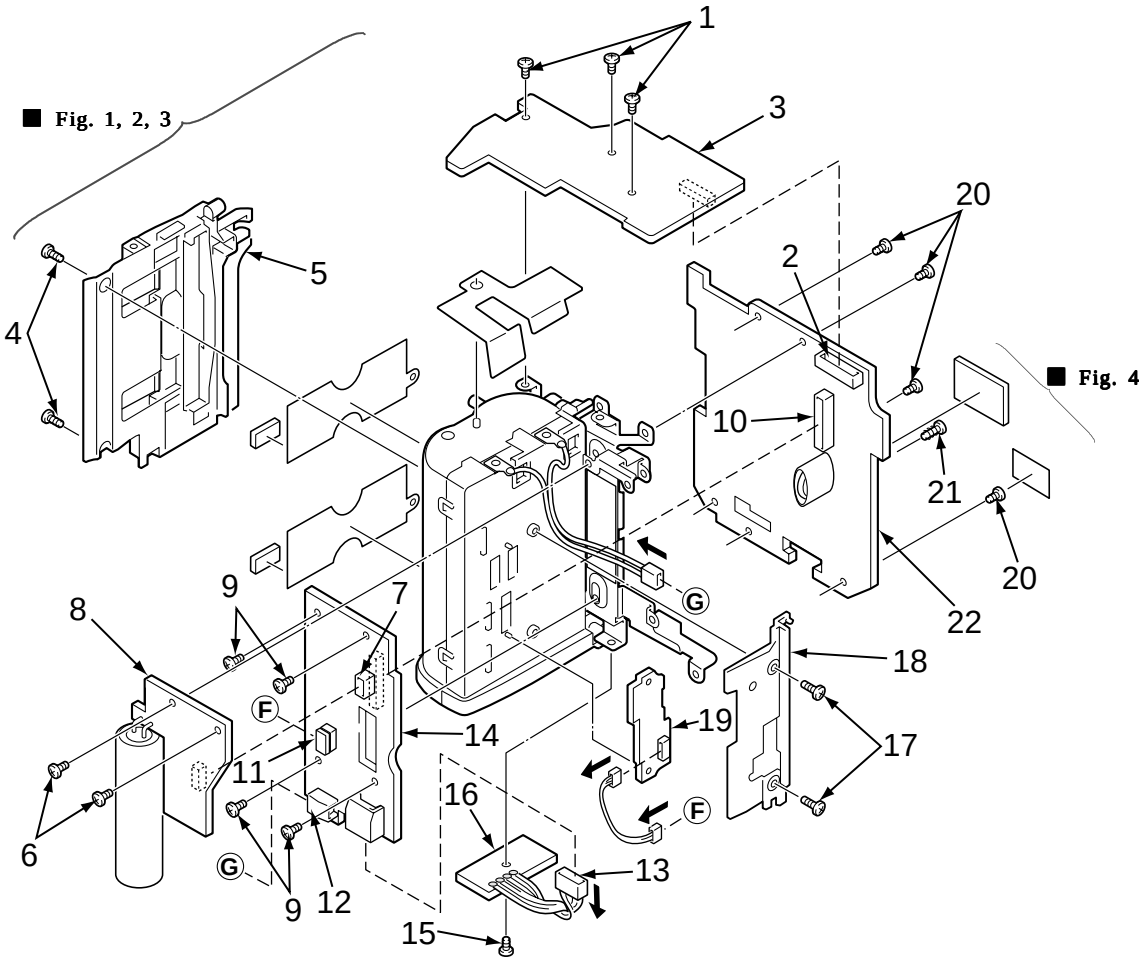




4. Disassembly of the compl PWB SY-1/ST-1/PW-1/TB-1/SY-2/DM-1

Disassemble it in order of step 1 to 22.

■ Fig. 1, 2, 3



■ Fig. 4

Fig.1 Assembly of the cover battery

1. Assemble 2782-1258 under 2782-1257.
2. Assemble 2782-1261 as shown on the figure, and insert 2782-1260.

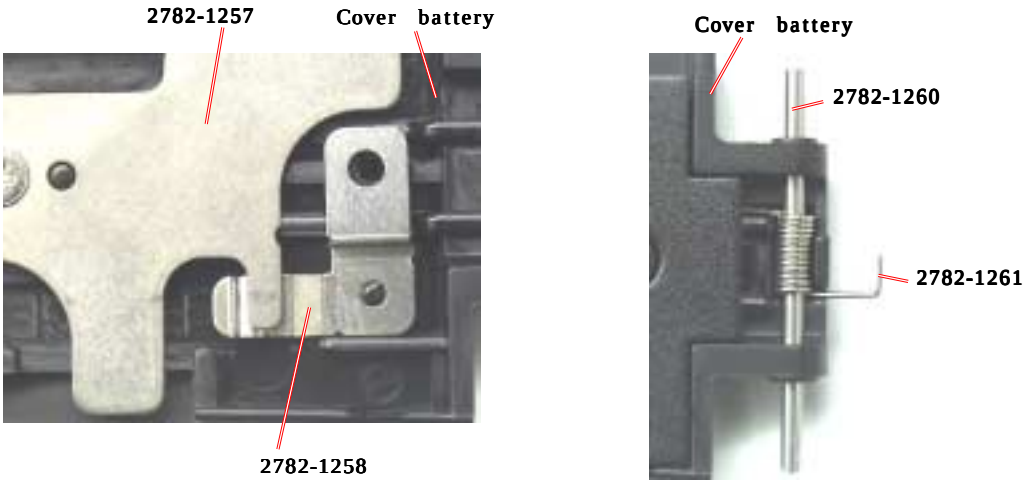
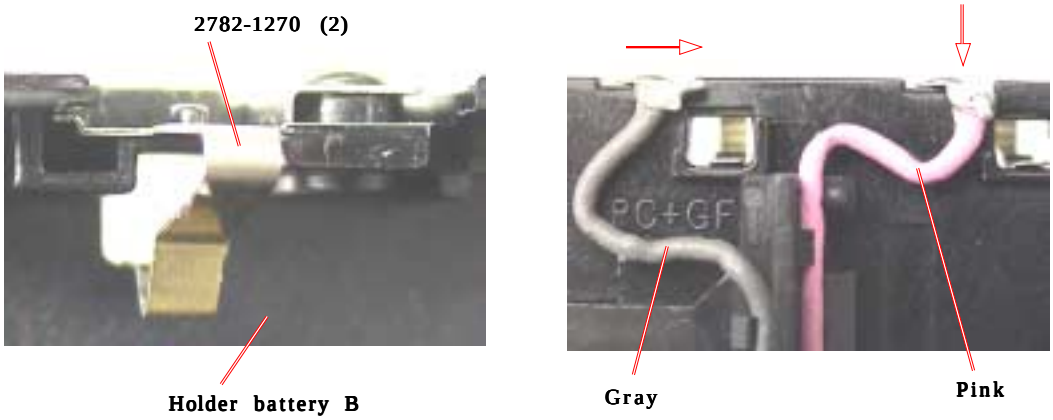
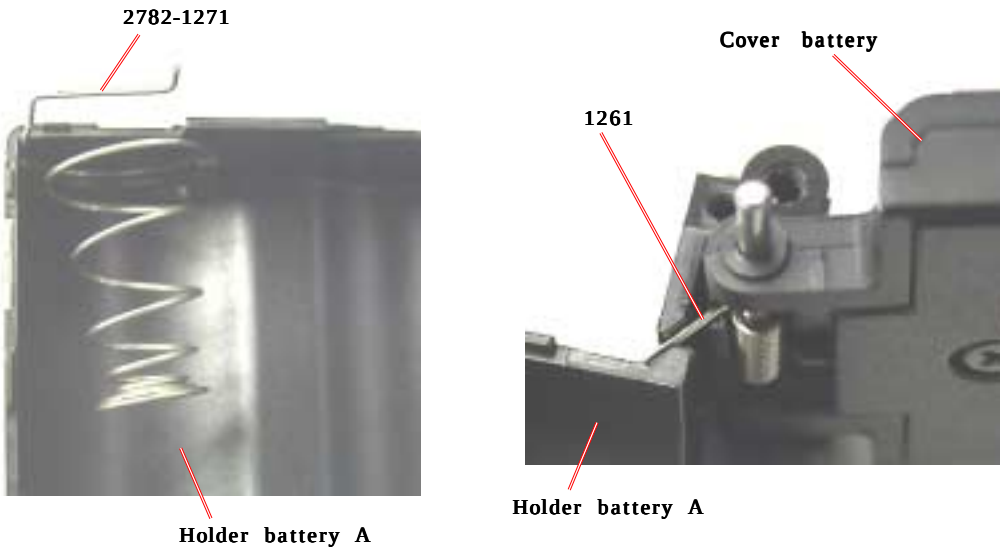


Fig.2 Assembly of the holder battery

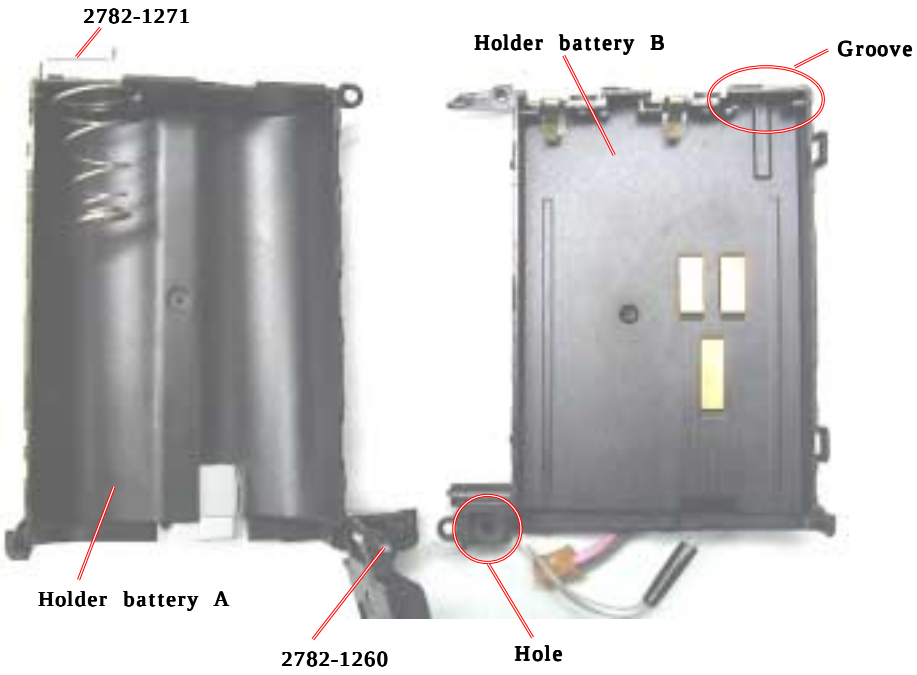
1. Assemble 2782-1270 as shown on the figure.
2. Solder the lead wire in the direction of the figure.



3. Assemble 2782-1271 on the holder battery A as shown on the figure.
4. Hook 2782-1261 on the holder battery A as shown on the figure, and assemble the cover battery.



5. Insert and install 2782-1271 and 2782-1260 respectively into the groove and the hole of the holder battery B.



6. Confirm 2782-1270 and 2782-1271 after assembling.

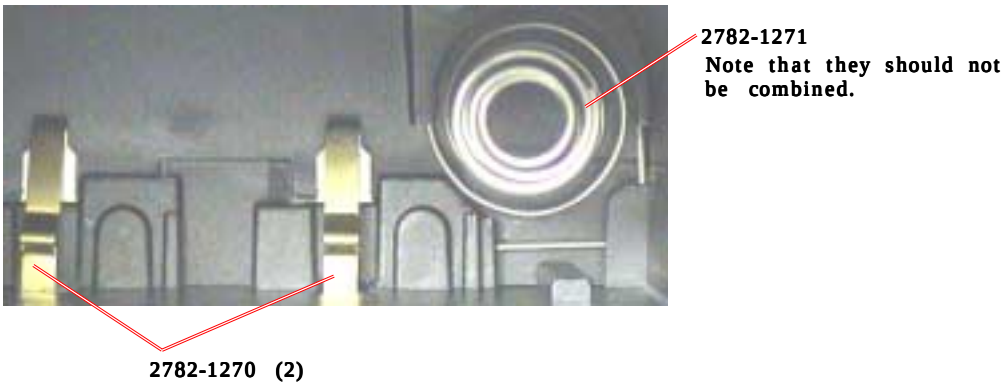
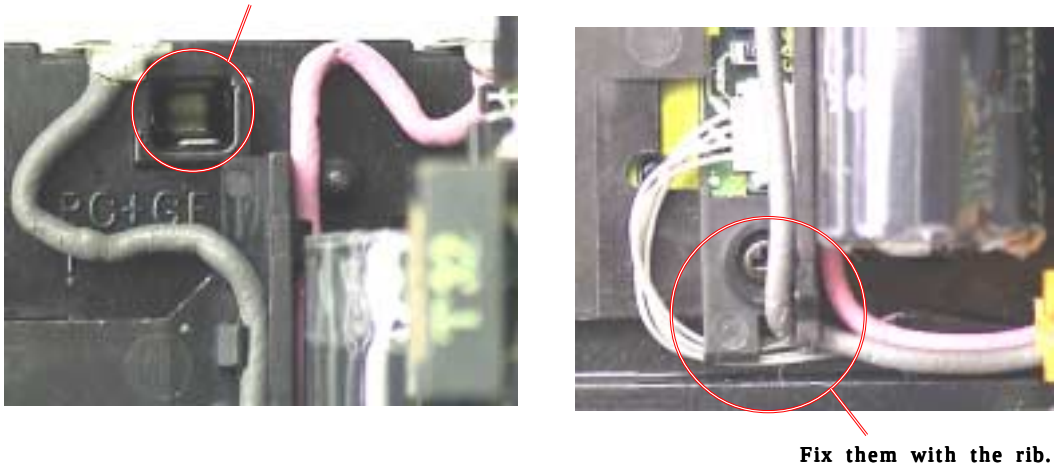
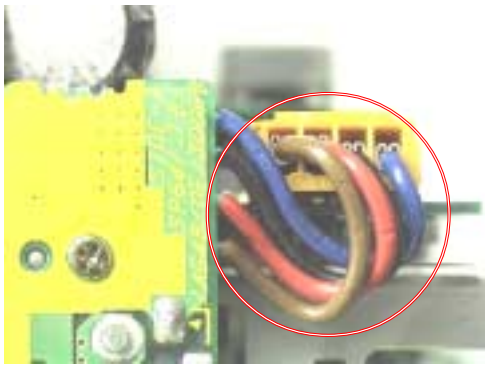


Fig.3 Assembly of the compl PWB ST-1, the compl PWB DM-1 and the cover card

1. Assemble each compl PWB and arrange the harness.

Note that they should not be hooked on the window.





2. Apply G-85 to the directed part of 2782-1280.
3. Apply G-114 to the directed part of the cover card.

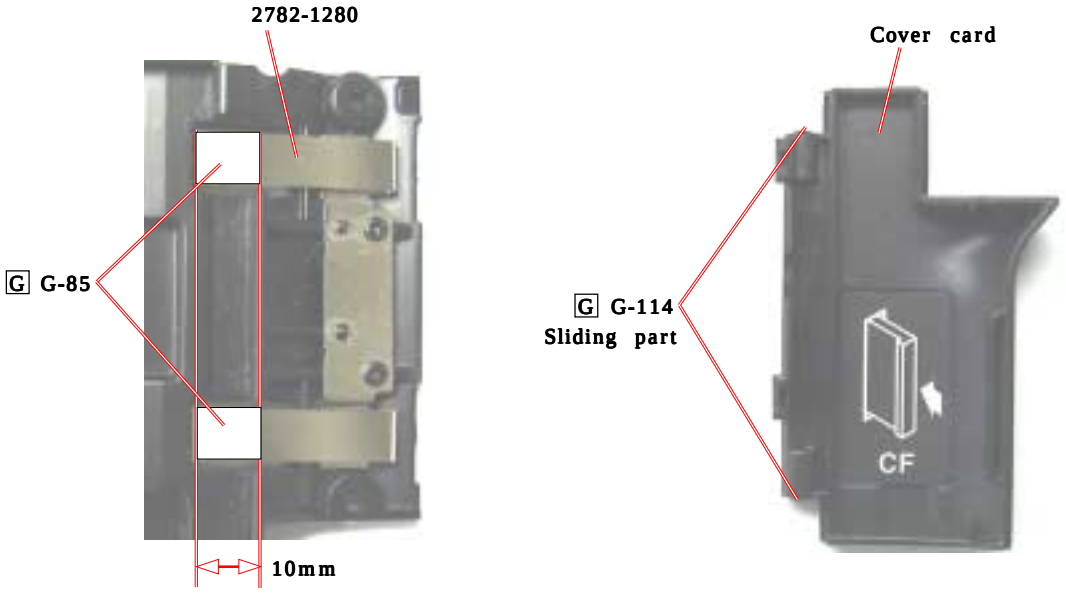
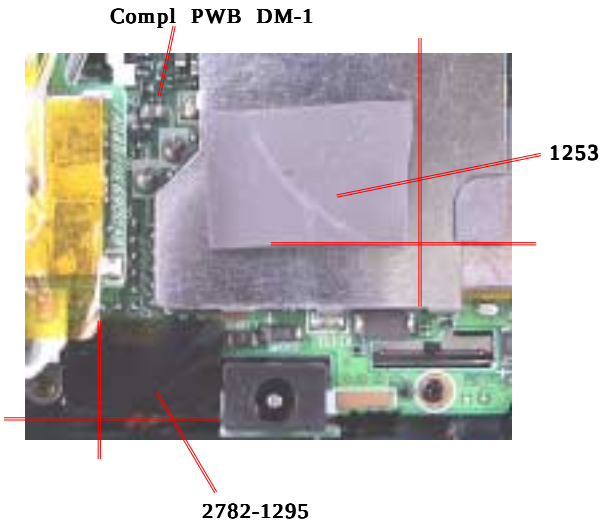


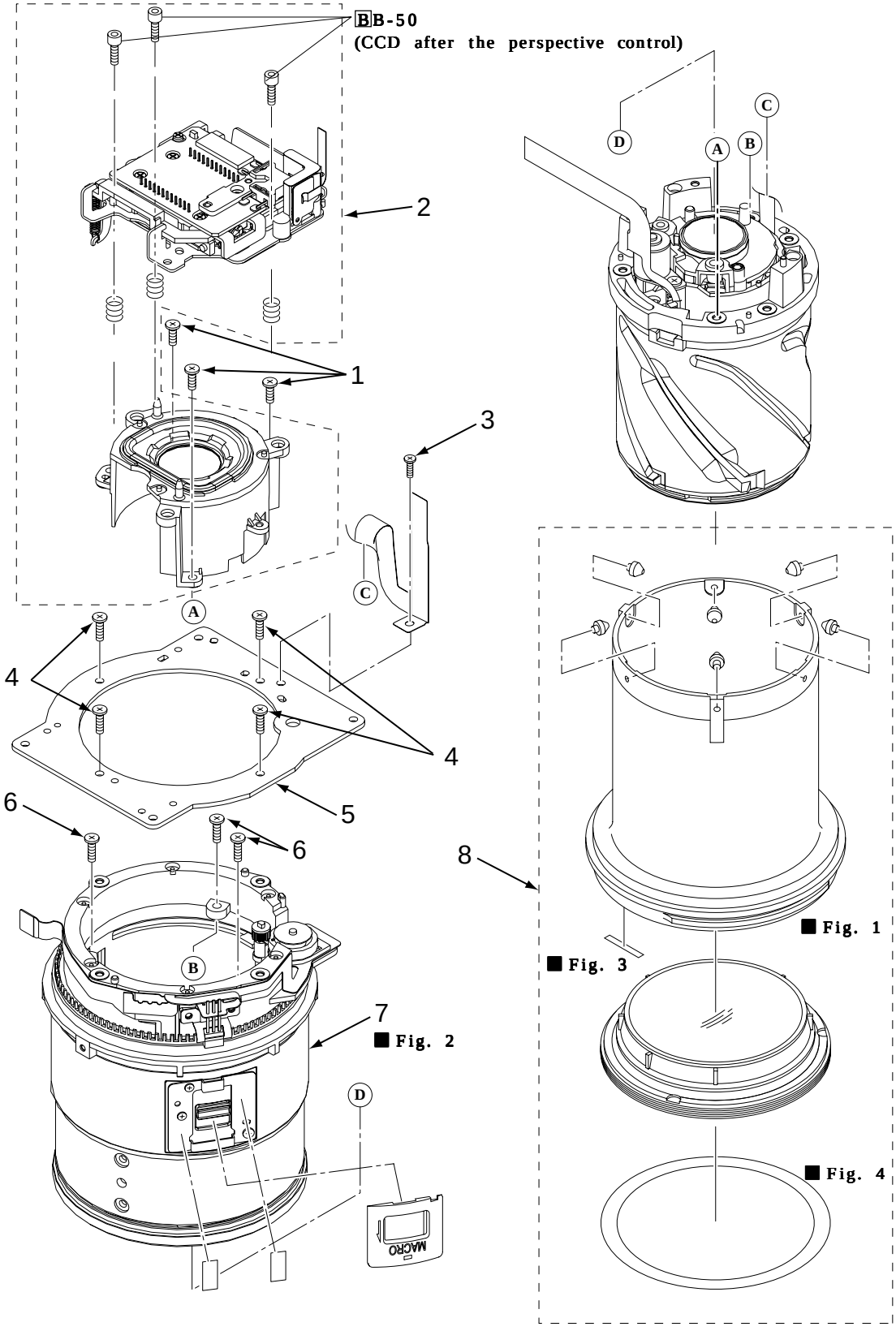
Fig. 4

Stick 1253 and 2782-1295 onto the position of the figure.



5. Disassembly of the CCD holder assy, the outer barrel assy and the 1st lens group moving barrel.

Disassemble them in order of step 1 to 8.



■ Fig. 1

■ Fig. 2

■ Fig. 3

■ Fig. 4

Fig.1 Installation of the 1st lens group moving barrel

The stopper of the hood valve on the 1st lens group moving barrel should be in the position shown on the figure. Insert it into the lead.

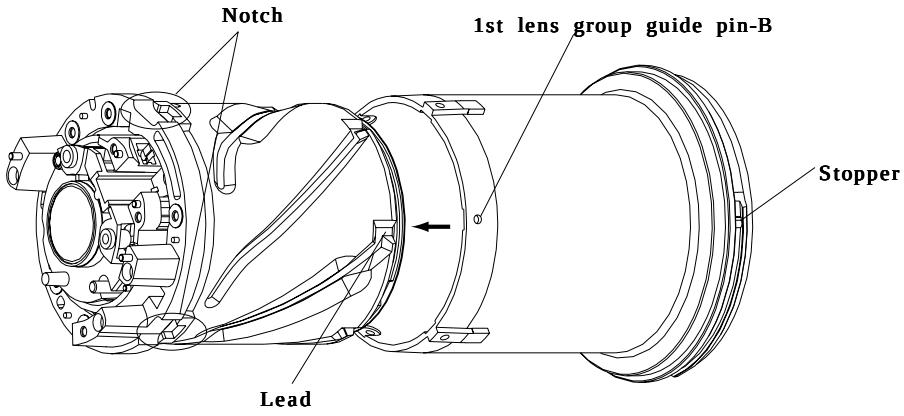
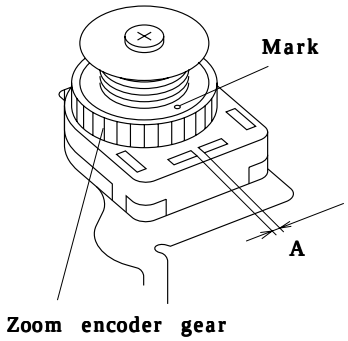
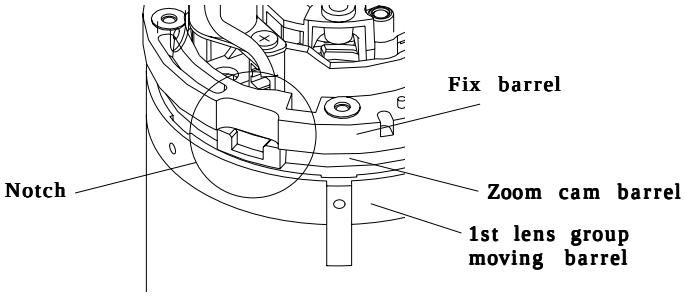


Fig.2 Installation of the outer barrel assy

1. **Set it to let the mark of the zoom encoder gear be in the range of A part.**



2. **Turn back the zoom cam barrel slightly from the end of "Wide" angle position to let it be in the position where the notch of the fix barrel and the zoom cam barrel are aligned.**
3. **Turn the 1st lens moving barrel down into it.**



4. **Install the outer barrel assy to insert the cam connection lever into the notch of the zoom cam barrel (two parts).**

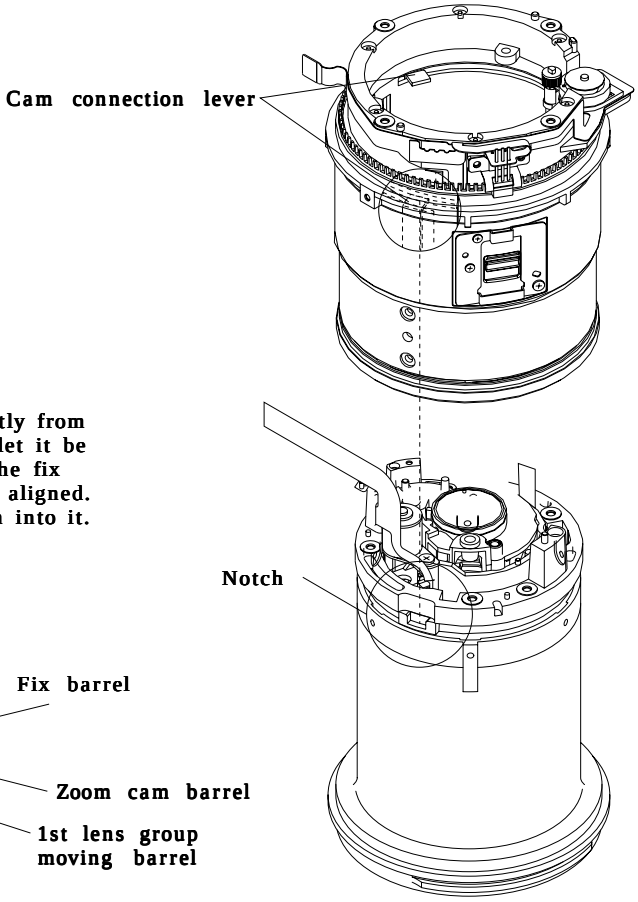


Fig.3 Sticking 9384-2290-90

Stick 9384-2290-90 (1.5x10mm) onto the hood index of the 1st lens group moving barrel and the projected surface on the reverse side.

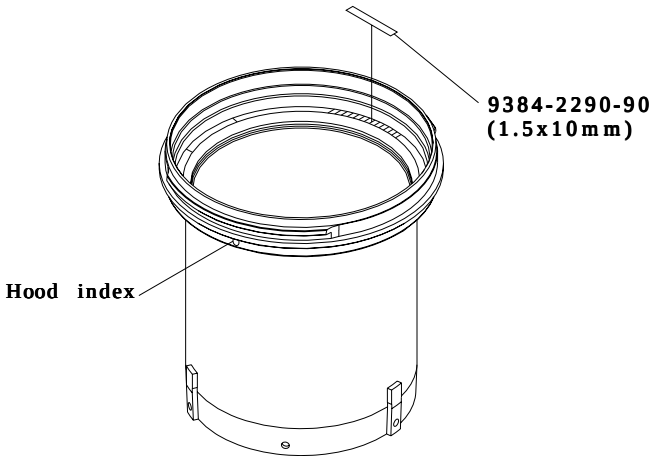
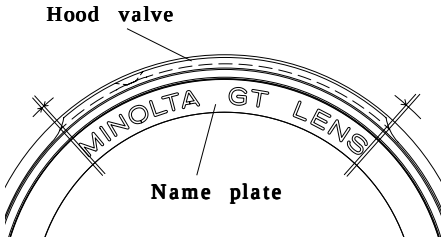


Fig.4 Sticking the name plate

Stick the name plate of to let it be in the position of the food valve of the 1st lens moving barrel on the figure.



6. Disassembly of the outer barrel assy

Disassemble it in order of step 1 to 12.

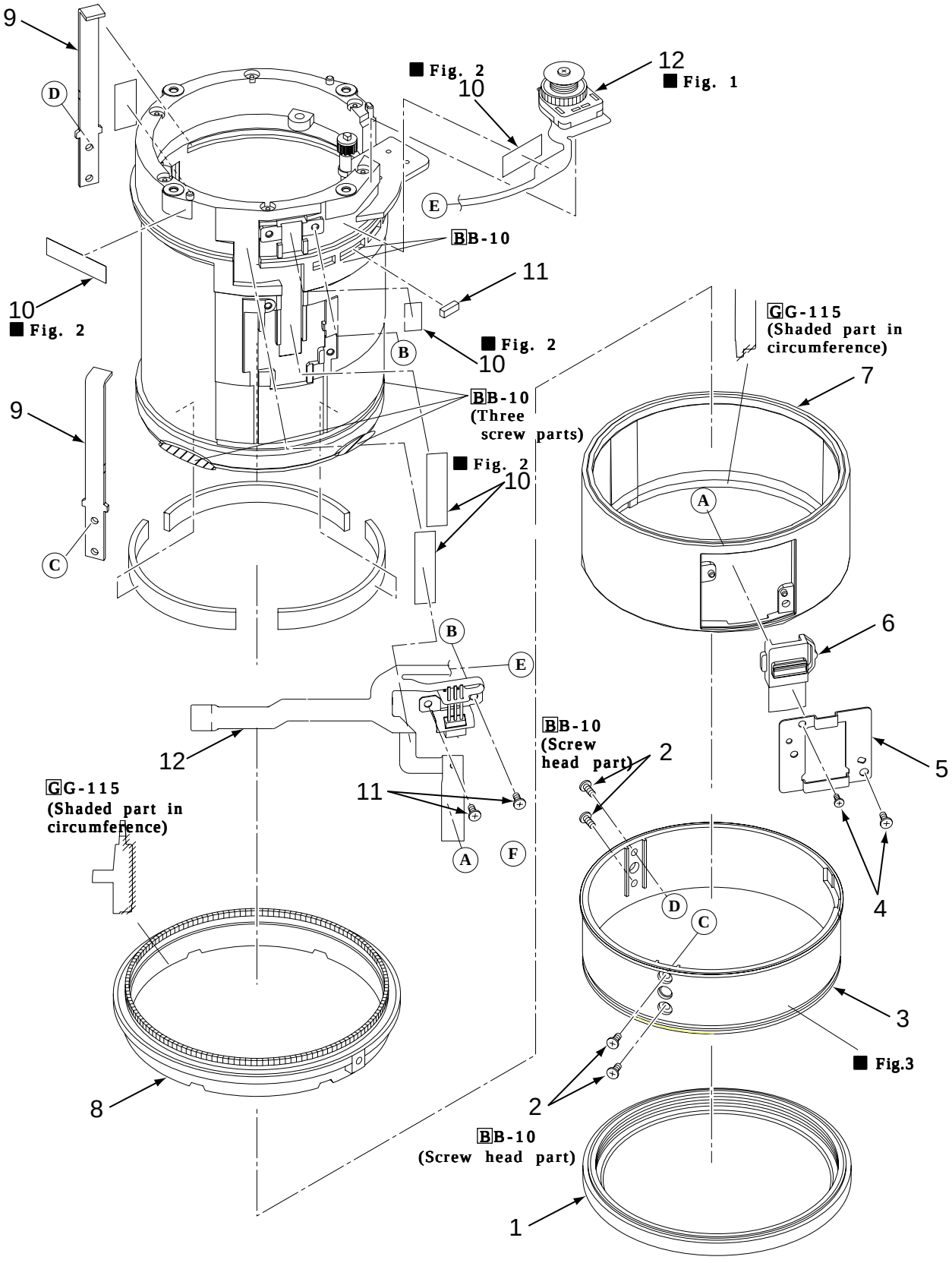
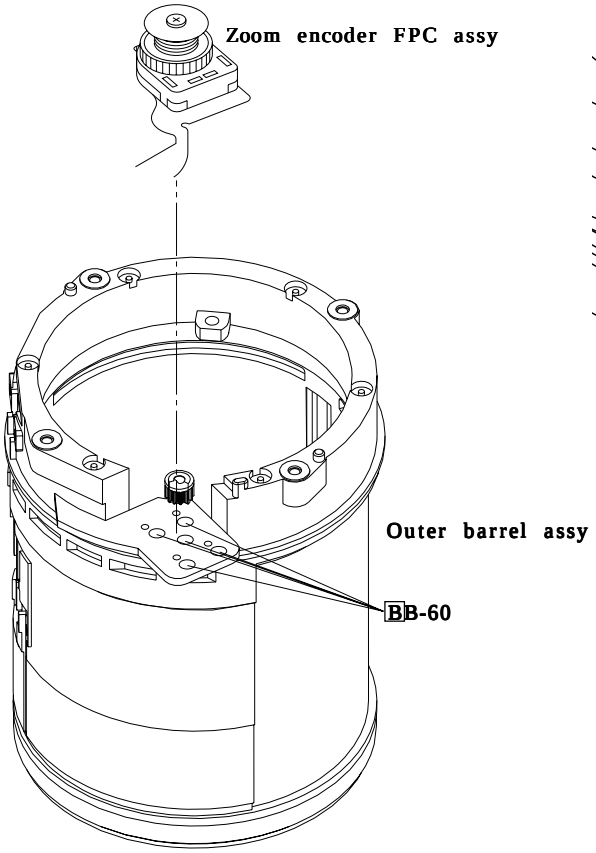
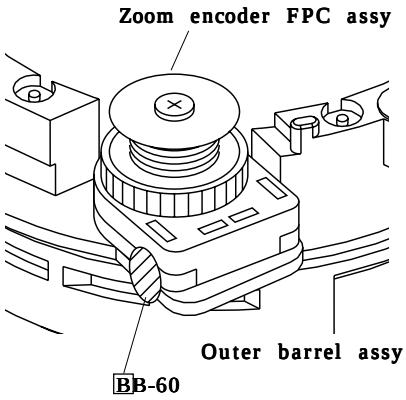


Fig.1 Sticking the zoom encoder FPC assy

Apply B-60 to the directed parts of the outer barrel assy and the zoom encoder FPC assy.





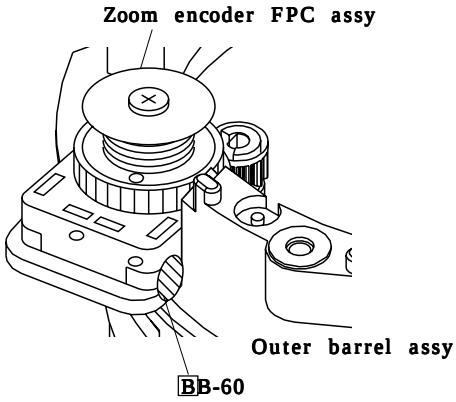


Fig.2 Sticking 3256-2259 and 9384-2190-50

Stick 3256-2259 and 9384-2190-50 onto the directed part of the outer barrel assy.

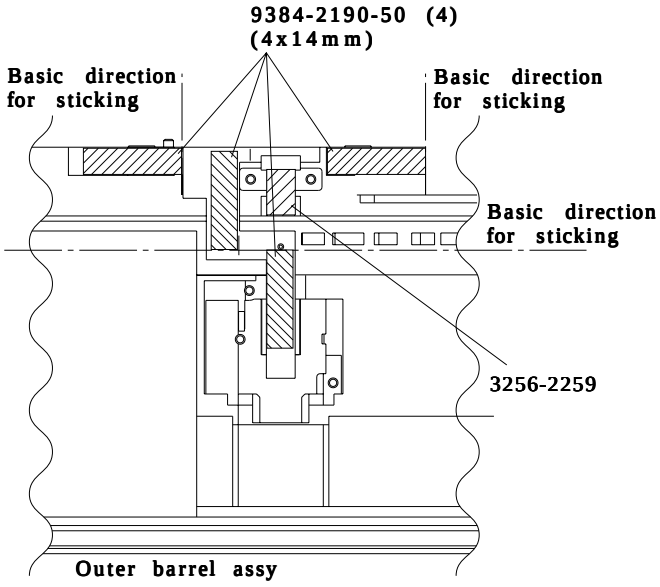
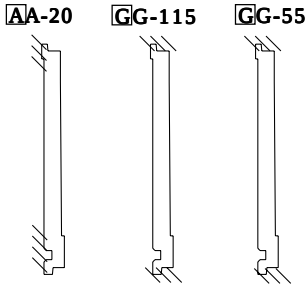


Fig. 3

Apply it to the shaded area of 2206.



REPAIR GUIDE

7. Disassembly of the 4th moving barrel assy, the 3rd moving barrel assy and the 2nd lens group assy.

Disassemble them in order of step 1 to 7.

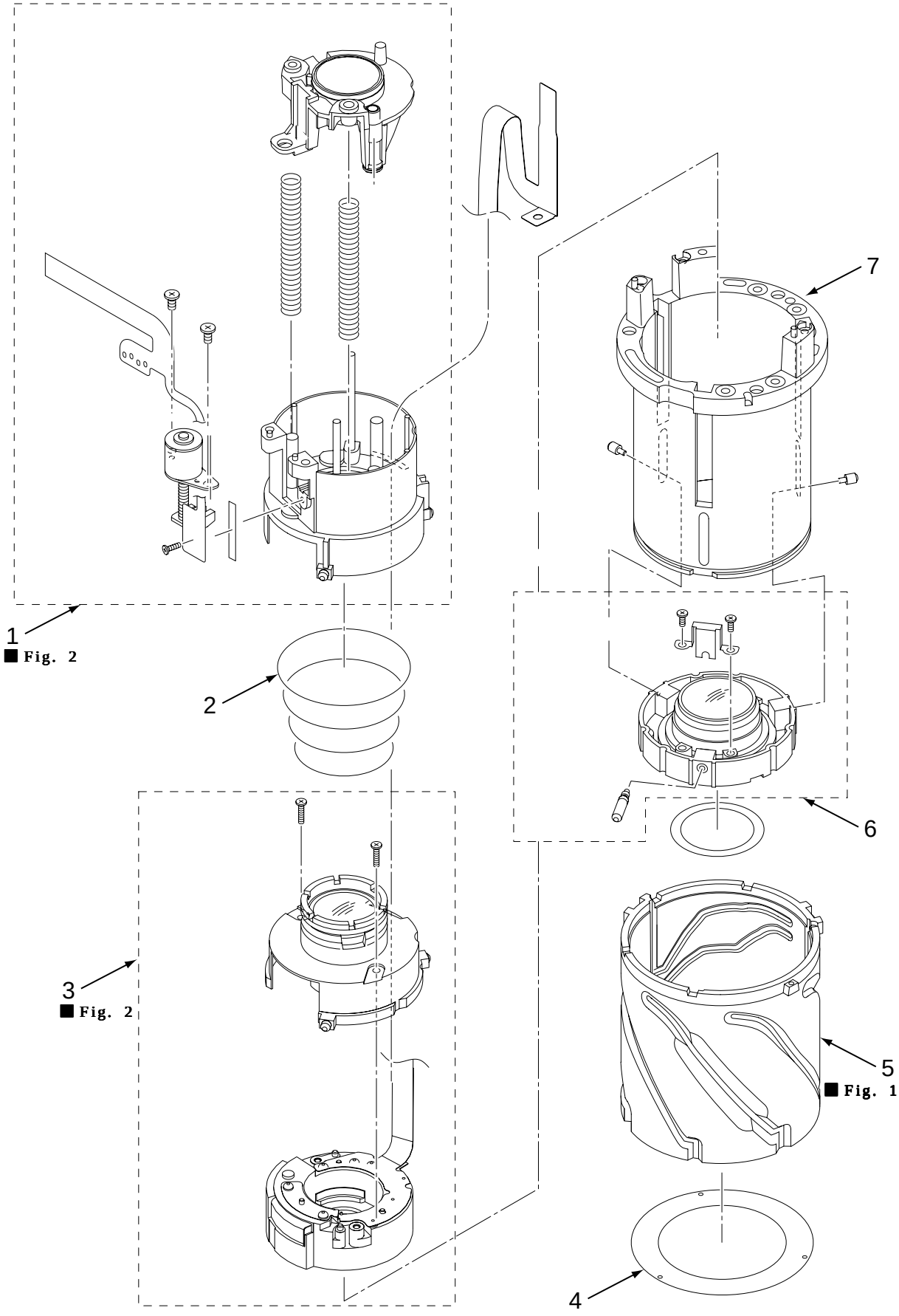


Fig. 1 Installation of the zoom cam barrel

Insert the zoom cam barrel at the point where the 2nd lens group guide pin on the cutout part on the figure of fix barrel and the lead in the figure of near the gear of the zoom cam barrel are aligned.

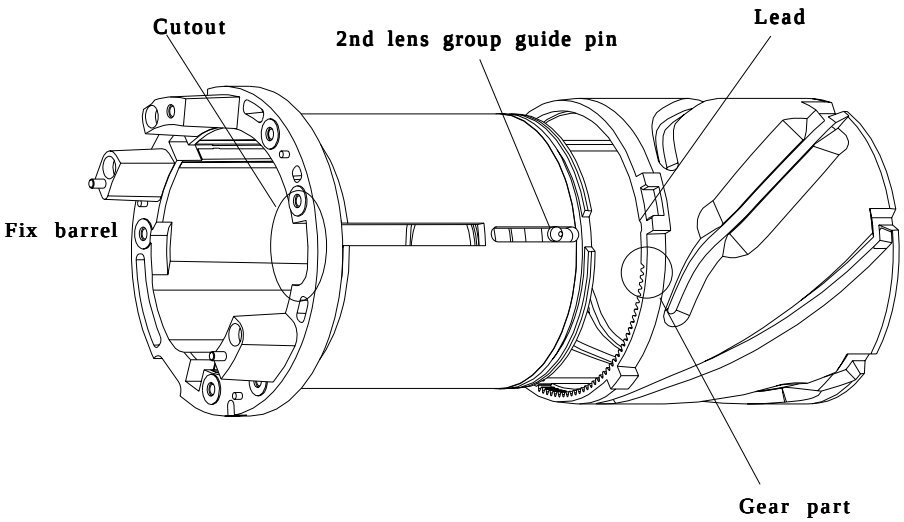
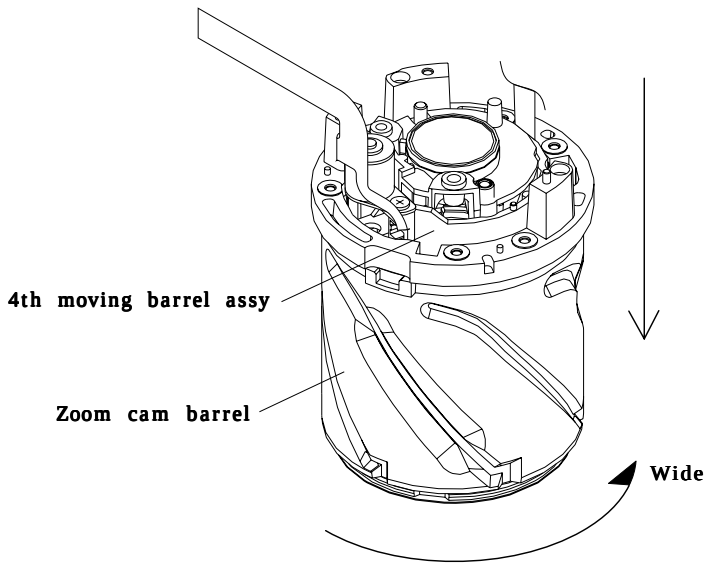
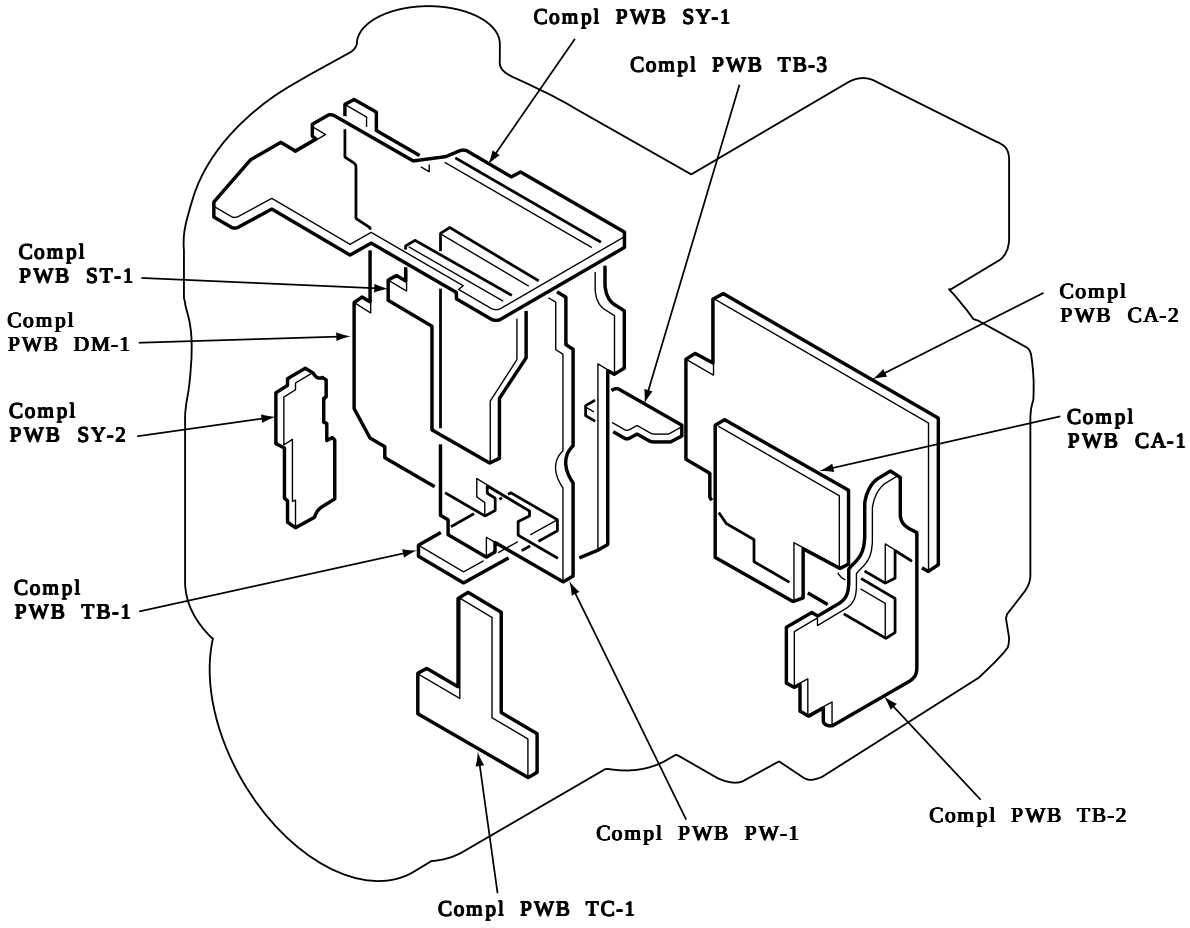


Fig.2 Installation of the 3rd and the 4th moving barrel assy

1. **Set the zoom cam barrel to the "Telephoto" end (reverse direction of the arrow), and insert the 3rd and the 4th moving barrel assy.**
2. **Turn the 4th moving barrel assy back to about 2 - 3mm (reverse direction of the arrow), and turn the zoom cam barrel in the direction of "Wide" (direction of the arrow) in the condition that the 2nd lens group assy, the 3rd land the 4th moving barrel assy are turned down into the arrowed direction.**



Arrangement plan of PCB



Required adjustment, setting and confirmation items after repairing (exchanging parts)

Adjust, set and confirm as the following table when the following parts are removed (exchanged).
Follow the steps from the upper line to adjust.

Parts / adjustment, setting and confirmation	COMPL, REFLECTOR (0239)		COMPL, PWB TC-1 (1208)		COMPL, PWB CA-2 (0420)	COMPL, PWB ST-1 (0485)		COMPL, PWB PW-1 (0487)
	Removal	Replacement	Removal	Replacement	Replacement	Removal	Replacement	Replacement
Firmware Installation								
Adj. For CCD perspective (CCD AORI)								
Adj. for sensitivity (GAIN)					○			○
Adj. for center part of CCD (CCD CENTER)					○			○
Frequency adj. for camera shaking (ACT DRV FREQ)			○	○	○			○
Servo adj. for camera shaking (SERVO GAIN)			○	○	○			○
Gyro adj. for camera shaking (GYRO OFFSET)			○	○	○			○
Shutter adj. (SHUTTER)					○			○
Defective pixel adj. (DEFECT PIXEL)					○			○
Flash GN adj. (FL GNo)	○	○			○		○	○
White balance adj. (WB)					○			○
Focus adj. (FCS INF POS)					○			○
Manual focus PI adj. (MF PI)								○
Adj. for camera shaking compensation (SHAKE OFFSET)			○	○	○			○
DESTINATION Setting (DESTINATION)								
Setting date and time (TOD)					○			○
Resolving Power Check								

Parts / adjustment, setting and confirmation	COMPL, PWB SY-1 (0491)	COMPL, PWB DM-1 (0492)	CCD HOLDER ASSY (3258-0270)		ZOOM ENCODER FPC ASSY (3256-0420)		FOCUS FPC ASSY (3256-0421)		Other optical	
	Replacement	Replacement	Removal	Replacement	Removal	Replacement	Removal	Replacement	Removal	Replacement
Firmware Installation		○								
Adj. For CCD perspective (CCD AORI)			○	○					○	○
Adj. for sensitivity (GAIN)		○		○						○
Adj. for center part of CCD (CCD CENTER)		○	○	○					○	○
Frequency adj. for camera shaking (ACT DRV FREQ)		○	○	○					○	○
Servo adj. for camera shaking (SERVO GAIN)		○	○	○					○	○
Gyro adj. for camera shaking (GYRO OFFSET)		○	○	○					○	○
Shutter adj. (SHUTTER)		○		○				○		○
Defective pixel adj. (DEFECT PIXEL)		○		○						○
Flash GN adj. (FL GNo)		○		○						○
White balance adj. (WB)		○		○						○
Focus adj. (FCS INF POS)		○		○	○	○	○	○		○
Manual focus PI adj. (MF PI)	○	○			○	○				
Adj. for camera shaking compensation (SHAKE OFFSET)		○	○	○					○	○
DESTINATION Setting (DESTINATION)		○								
Setting date and time (TOD)		○		○						○
Resolving Power Check			○	○	○	○	○	○	○	○

REPAIR GUIDE

Related adjustment and required setting items

When each adjustment or setting is operated, be sure to follow the related adjustment and setting items listed blow.

Number : Related adjustment items. Adjust and set in order of the number.
× : Related adjustment items. However, these items mean not to adjust the adjustment order is different (the adjustment should be completed).
None : Unrelated adjustment and setting items (possible to adjust and set solely).

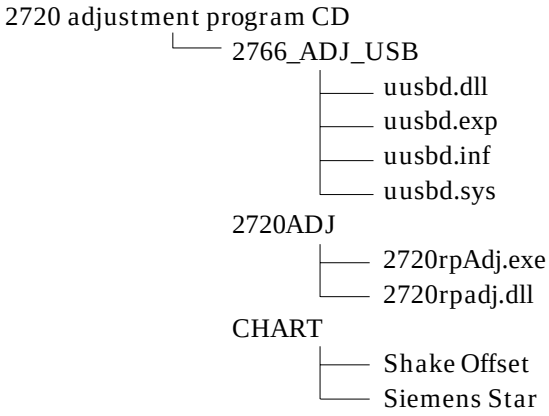
Related adjustment/ setup necesaary items / Adjustment/ Setup items	Adj. For CCD perspective (CCD AORI)	Adj. for sensitivity (GAIN)	Adj. for center part of CCD (CCD CENTER)	Frequency adj. for camera shaking (ACT DRV FREQ)	Servo adj. for camera shaking (ACT DRV FREQ)	Gyro adj. for camera shaking (GYRO OFFSET)	Shutter adj. (SHUTTER)	Defective pixel adj. (DEFECT PIXEL)	Flash GN adj. (FL GNo)	White balance adj. (WB)	Focus adj. (FCS INF POS)	Manual focus PI adj. (MF PI)	Adj. for camera shaking compensation (SHAKE OFFSET)	DESTINATION Setting (DESTINATION)	Setting date and time (TOD)
Adj. For CCD perspective (CCD AORI)		1	2	3	4	5	6	7	8	9	10		11		12
Adj. for sensitivity (GAIN)	×		1	2	3	4	5	6	7	8	9		10		11
Adj. for center part of CCD (CCD CENTER)	×			1	2	3	4	5	6	7	8		9		10
Frequency adj. for camera shaking (ACT DRV FREQ)	×		×		1	2	3	4	5	6	7		8		9
Servo adj. for camera shaking (SERVO GAIN)	×		×	×		1	2	3	4	5	6		7		8
Gyro adj. for camera shaking (GYRO OFFSET)	×		×	×	×		1	2	3	4	5		6		7
Shutter adj. (SHUTTER)	×		×	×	×	×		1	2	3	4		5		6
Defective pixel adj. (DEFECT PIXEL)	×		×	×	×	×			1	2	3		4		5
Flash GN adj. (FL GNo)	×		×	×	×	×		×		1	2		3		4
White balance adj. (WB)	×		×	×	×	×		×	×		1		2		3
Focus adj. (FCS INF POS)	×		×	×	×	×		×	×	×			1		2
Manual focus PI adj. (MF PI)															
Adj. for camera shaking compensation (SHAKE OFFSET)	×		×	×	×	×		×	×	×	×	×			1
DESTINATION Setting (DESTINATION)															
Setting date and time (TOD)	×		×	×	×	×		×	×	×	×	×	×		

Preparing the 2720 adjustment program

PC for use

The PC loaded on either Windows 98/98SE or 2000 Professional and USB terminal originally
40MB or more of available memory and 15MB or more of available hard-disk space
VGA or more monitor capable of displaying at least 32,000 colors

Details of the 2720 adjustment program CD



Installation of the 2720 adjustment program

1. Insert the 2720 adjustment program CD into the CD-ROM.
2. Copy the "2720 ADJ" folder from CD-ROM to the desktop.

Installation of the USB driver

* The following steps are not required if PC has been used for adjustment of 2766, 2773, 2778, 2779 and 2782.

1. Open "2766_ADJ_USB" folder in the 2720 adjustment program CD.
2. Copy the following files from "2766_ADJ_USB" folder to c:\Windows\system folder.
   uusbd.dll, uusbd.exp
   *Select "Display all" from the file option of Windows.
3. Start up the 2720 adjustment program, "#2720rpAdj.exe."
   Starting up the 2720 adjustment program (in the adjustment mode) (see P.33).
4. The new registration for USB is started on PC, and the dialog is opened for specifying USB driver soft.
5. Operate "Use Disk."
6. Select "uusbd.sys" in "2766_ADJ_USB" folder and click "OK."
7. Restart PC after the installation of USB driver soft.
   Remove the connection of the camera and PC when restarting.

Confirmation after installation

1. Start up the 2720 adjustment program, "#2720rpAdj.exe."
   Starting up the 2720 adjustment program (in the adjustment mode) (see P.33).
2. Open the device manager of PC after starting up the adjustment mode.
   * Please confirm that there is "USB device for UUSBD" in the device manager, and that "Universal USB Driver (Adjust)" is registered in the underlying layer.

Starting up the 2720 adjustment program (in the adjustment mode).

Outline

Connect the camera and PC with USB-500 and start up the camera in the "adjustment mode."
"Adjustment mode" means the condition of that the camera can contact with the 2720 adjustment program in the PC.

Required equipment

PC with preinstalled the 2720 adjustment program
AC-1L/AC-11
USB-500 (USB cable)
* Use the AC adapter (AC-1L/AC-11) not batteries when adjusting.

Starting up the 2720 adjustment program (in the adjustment mode).

1. Starting up the 2720 adjustment program, "#2720rpAdj.exe."
2. Turn the recording mode and the dial to the "M mode."
3. Press "Function button," "Digital effect button" and "AEL button" together and turn the main switch on.
   When the self-timer lamp turns on, the camera starts up in the "adjustment mode."
4. Follow the direction of the 2720 adjustment program, "Please connect a camera and click START!"
   Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.

* When adjusting CCD perspective (P.37) (when starting up without the assy cabi back)

1. Remove the cabinet top (1124) and the assy cabi back (0160).
2. Remove the control back unit (2782-0458) of the assy cabi back.
3. Connect the connector of the control back unit.
4. Connect the connector of the control top unit (0428) from the cabinet top (1124).
5. Start up in the way mentioned above of starting up the 2720 adjustment program (in the adjustment mode).

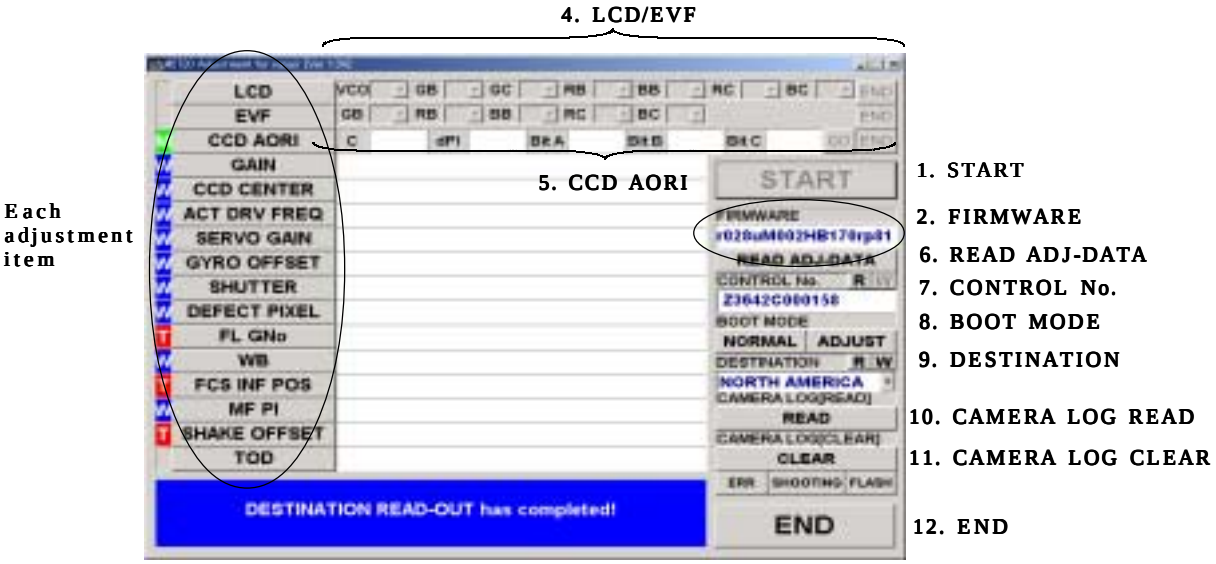
Quitting the 2720 adjusting program

1. Click "END" of the 2720 adjustment program.
2. Remove the AC adapter.

Contents of the adjustment program and CPU version readout

Contents of adjustment program

	Item	Sub item	Operation/Display
1.	START		Connecting 2720 adjustment program.
2.	FIRMWARE		Displaying CPU version when the adjustment program is launched.
3.	Each adjustment item		Starting of each adjustmnet. Supplied service parts "DM-1 Compl. PWB" (0492) will be shipped after being adjusted. So the LCD adjustment and EVF adjustment are not necessary.
4.		LCD/EVF	Optional adjustments of LCD by changing values.
5.		CCD AORI	Optional adjustments of CCD AORI. (C, dPI, Bit B, Bit C) (See pg. 38.)
6.	READ ADJ-DATA		The adjustment value of each adjustment item is displayed.
7.	CONTROL No.	R	Disabled
8.	BOOT MODE		Camera setting mode for the case when the connection between camera and 2782 adjustment program
		NORMAL	Normal mode
		ADJUST	Adjustment mode: In this case, it is not necessary to press function button, digital effect button, and AEL button at once. Be sure to return to normal mode after completing all the adjustments.
9.	DISTINATION	R	Distination check mode.
		W	Distination setting mode. Selectable destinations: JAPAN/NORTH AMERICA/EUROPE/CHINA
10.	CAMERA LOG READ	ALL	Read the log of the error code, number of release, and number of flash burst. (See pg.2 of Trouble-shooting chart)
11.	CAMERA LOG CLEAR	ALL	Clear the log of error code, number of release, and number of flash burst.
		ERR	Clear the error code log.
		SHOOTING	Clear the shutter-release log.
		FLASH	Clear the flash burst log.
12.	END		Break connection



CPU version readout

1. Start 2720 Adjustment program. (See pg.33)
   "FIRMWARE VERSION READ-OUThas completed!" is displayed.
2. Check the firmware in the adjustment program..

FIRMWARE	Item	Sample
1 - 5 th	Main CPU version	r028u
6 - 9 th	Camera CPU version	M002
10 - 14 th	Anti shake CPU version	HB170
15 - 18 th	Adjustment DLL	rp81

Setting the camera and the chart when adjusting the CCD perspective.

Set the camera and the chart (siemens star chart and LB adjustment chart II for 2766) in either way, 1 or 2 of the followings to adjust the CCD perspective.

1. In case of using the camera chart setting stand

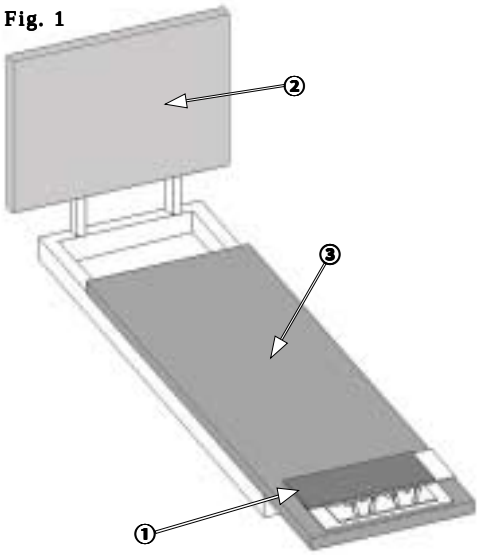
Required equipment

Camera chart setting stand
Stand for 2782
Chart stand backboard
Siemens star chart (see P.51 Measuring instrument)
LB adjustment chart II for 2766

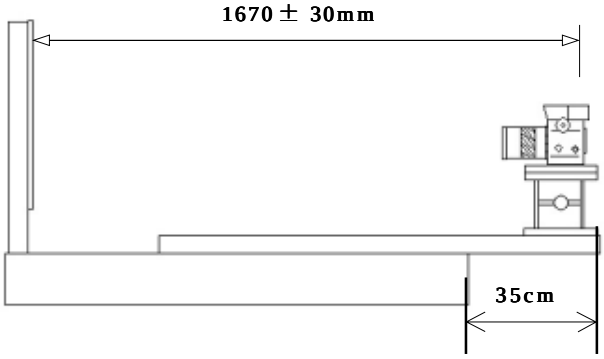
Remodelling the camera chart setting stand

1. Exchange the stand for 2766 (Fig. 1 -1-).
2. Exchange the chart stand backboard (Fig. 1 -2-).
3. Move the board (Fig. 1 -3-) to 35cm back (Fig. 2).

■ Fig. 1

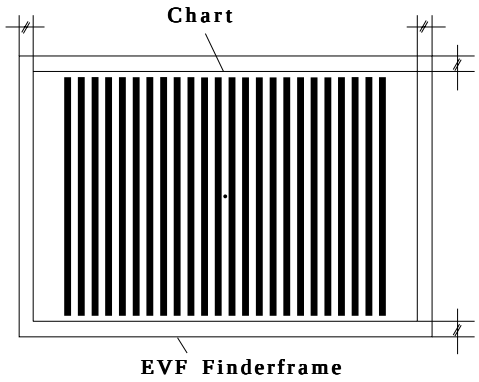


■ Fig. 2





■ Fig. 3



Setting the camera and the chart

1. Install 2720 on the stand for 2782.
2. Stick the chart onto the chart stand backboard (siemens star chart or LB adjustment chart II for 2766), and adjust the base stand to be " 1670±30mm" for the distance form the CCD surface of the camera to the chart.
3. Turn the power of the camera on.
4. Look into the EVF, and adjust the base stand to let the chart be in the center of the finer.
   Zoom roughly to let the vertical and horizontal spaces of the chart and the EVF finder be equal (Fig.3).
   However, three adjustment screws for the CCD holder must be tighten to the end.

In case of using the camera chart setting stand on 2757 and 2765

Use the stand for 2757 / 2765 (Fig.1 -1-).
Move the board (Fig.1 -3-) to 35cm front (Fig.2).

2. In case of using a tripod

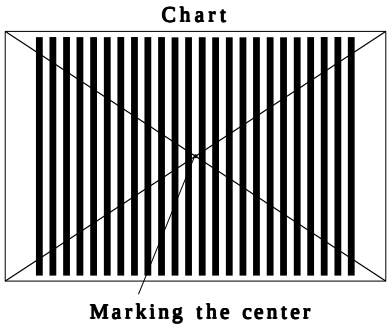
Required equipment

Tripod
Siemens star chart (see P.51 Measuring instrument)
LB adjustment chart II for 2766

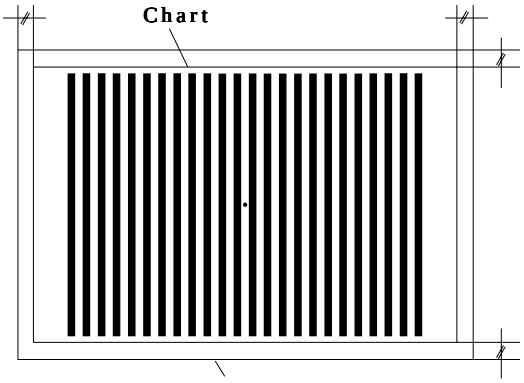
Setting the camera and the chart

1. Mark in the center of the chart (siemens star chart or LB adjustment chart II for 2766) (Fig.1).
2. Stick the chart onto the wall.
3. Check the point where the straight line from the center of the chart, "marking" meets the floor surface (Fig.2).
4. Stick the line or tape measure in the angle of "90 degrees" from the checked point on the floor to the chart (Fig.2).
5. Align the heights of the center of the chart and the camera lens (Fig.2).
6. Align the line of the floor and the center of the camera lens to set the distance, from the CCD surface of the camera to the chart, to "1670•} 30mm" (Fig.2).
7. Turn the power of the camera on.
8. Look into the EVF, and adjust the camera to let the 2 charts be in the center of the finder.
   Zoom roughly to let the vertical and horizontal spaces of the chart and the EVF finder be equal (Fig.3).
   However, three adjustment screws for the CCD holder must be tighten to the end.
9. When 5, 6 and 8 are aligned, the setting of the camera and the chart is completed.

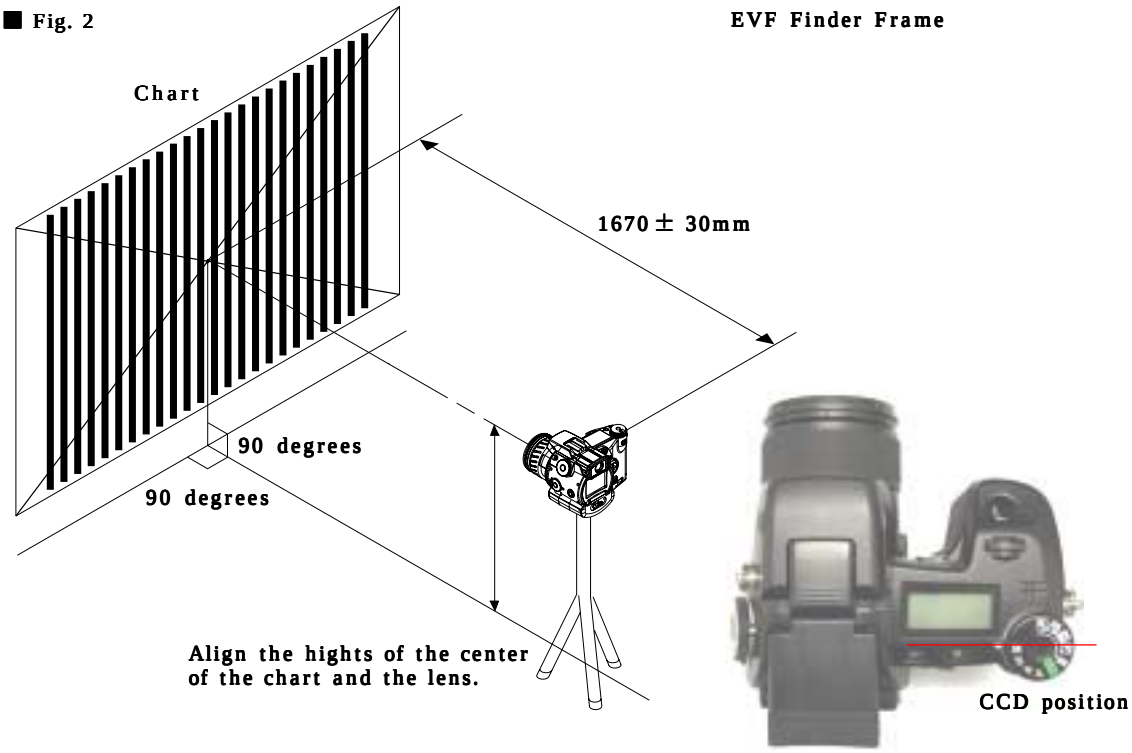
■ Fig. 1



■ Fig. 3



■ Fig. 2



Adjustment of CCD perspective

Outline

Adjust the position and inclination of the CCD.

*See Setting the camera and the chart when adjusting the CCD perspective (P.35, 36). Use -1- the camera chart setting stand or -2- the tripod to set the position of the camera and the chart and adjust the CCD position.

Required equipment

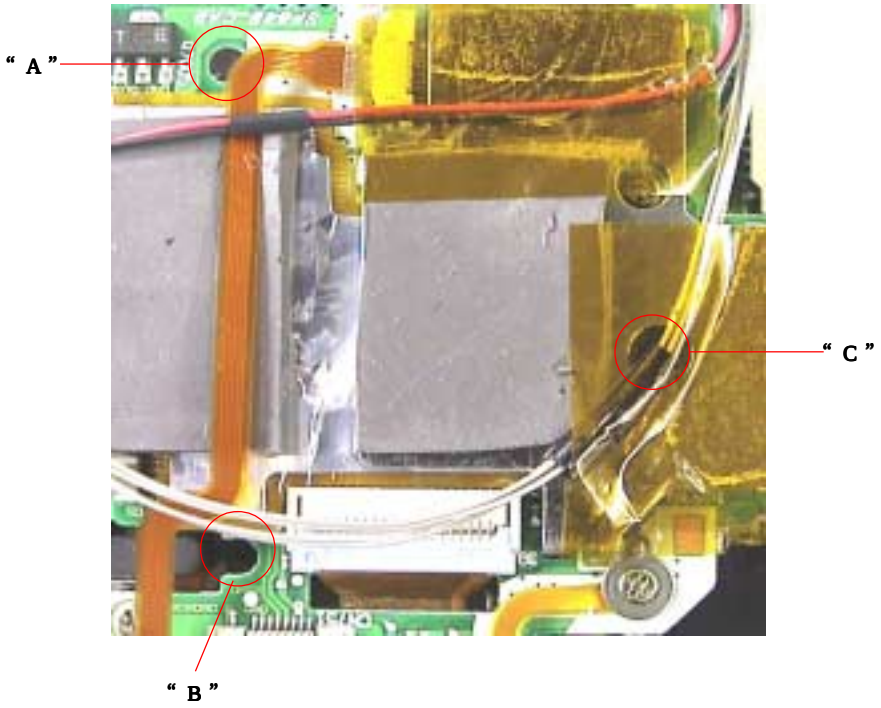
Fluorescent light stand SQ967W
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11
Hexangular wrench (1.5) or hexangular screwdriver

Preparation of the adjustment

1.Remove the cabinet top (1124) and the assy cabi back (0160).
2. Remove the control back unit (2782-0458) of the assy cabi back (0160).
3. Connect the connector of the control back unit (2782-0458).
4. Connect the connector of the control top unit (0428) from the cabinet top (1124).
5. Remove the glue when the CCD adjustment screw is fixed by the glue.
6. Tighten three CCD adjustment screws with the hexangular wrench (Fig.1).
7. See Setting the camera and the chart when adjusting the CCD perspective (P.35, 36) to set the positions of the camera and the siemens star chart.
8. Set the inverter fluorescent light to light the chart equally.
9. Loosen three CCD adjustment screws (fig.1) by 1 + 3/4 turns.
10. Start up the 2720 adjustment program.
11. Connect the camera and PC with USB-500, and click "START" after confirming the connection.

■ **Fig. 1**

CCD adjustment screw



Procedure of the adjustment

1. Set the position of the zoom ring "100."
2. Click "CCD AORI" of the adjustment menu.
3. Follow the message, "Please change a chart," set the LB adjustment chart II for 2766, and click "OK" (Fig.2).
   * When the Fig.3 is displayed, confirm whether three CCD adjustment screws (Fig.1) are loosened by 1 + 3/4 turns.
4. Click "GO" of "CCD AORI" adjustment menu (Fig.4).
   Measure the CCD perspective, and display "Condition of the CCD perspective" (Fig.4) on "CCD AORI" adjustment menu.
5. Confirm displayed values of "C" and "dPI" are within the following standard range (Fig.4).

   C = 142 ± 20 dPI = 0 ± 15

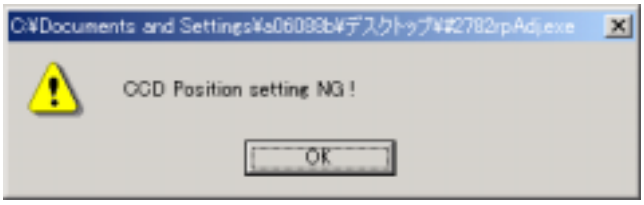
   1) Adjust in the following ways if they are not within the standard range.
      Confirm "Bit A, B, C" displayed on "CCD AORI" adjustment menu, and turn "A, B,C" (Fig.1) of the CCD adjustment screw to adjust.
      Displayed "Bit A" indicates the CCD adjustment screw "A."
      Displayed "Bit B" indicates the CCD adjustment screw "B."
      Displayed "Bit C" indicates the CCD adjustment screw "C."
      The value of "Bit A, B, C" indicates the degrees of turning the CCD adjustment screw.
      If the value is plus, turn it clockwise
      If the value is minus, turn it counter clockwise.
   2) Click "GO" of "CCD AORI" adjustment menu again (Fig.4).
      Measure the CCD perspective, and display "Condition of the CCD perspective" (fig.4) on "CCD AORI" adjustment menu.
   3) Repeat the above steps, 1) and 2) until the value meets the standard.
6. When the value meets the standard, click "END" of "CCD AORI" adjustment menu to finish the adjustment (Fig.4).

* When three CCD adjustment screws are not glued, glue them after the CCD perspective adjustment.
(See P.22 "Disassembly of the CCD holder assy, the outer barrel assy and the 1st lens group moving barrel")

■ **Fig. 2**



■ **Fig. 3**



■ **Fig. 4**



Sensitivity adjustment (GAIN)

Required equipment

Luminance box
L-2101/L-2111 or multi camera tester: EF-8301
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

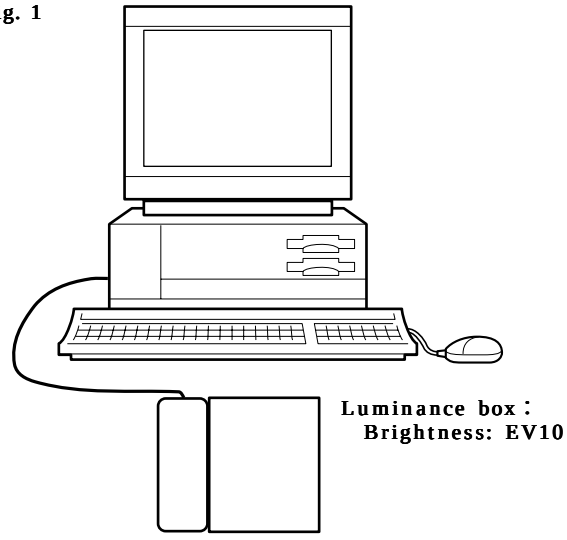
Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the camera and the measuring instrument as shown on the Fig. 1.
4. Set the luminance box to "EV10," and the lens block of the camera to "Wide position."

Procedure of the adjustment

1. Click "GAIN" of the adjustment menu.
   The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

■ **Fig. 1**



Adjusting the center part of CCD (CCD CENTER)

Required equipment

Luminance box
L-2101/L-2111 or multi camera tester: EF-8301
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

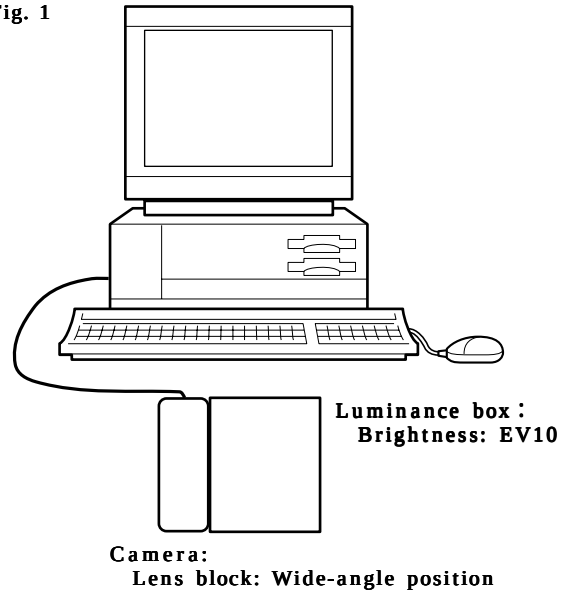
Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the camera and the measuring instrument as shown on the Fig. 1.
4. Set the luminance box to "EV10," and the lens block of the camera to "Wide position."

Procedure of the adjustment

1. Click "CCD CENTER" of the adjustment menu.
   The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

■ Fig. 1



Adjustment of the frequency for camera shaking (ACT DRV FREQ)

Required equipment

PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the lens block of the camera to "Wide-angle" position.

Procedure of the adjustment

1. Click "ACT DRV FREQ" of the adjustment menu.
   The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

Adjustment of the servo for camera shaking (SERVO GAIN)

Required equipment

PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the lens block of the camera to "Wide-angle" position.

Procedure of the adjustment

1. Click "SERVO GAIN" of the adjustment menu.
   The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

Adjustment of the gyro for camera shaking (GYRO OFFSET)

Required equipment

PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the lens block of the camera to "Wide-angle" position.

Procedure of the adjustment

1. Click "GYRO OFFSET" of the adjustment menu.
   The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

Adjustment of the shutter (SHUTTER)

Required equipment

Luminance box
  L-2101/L-2111 or multi camera tester: EF-8301
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

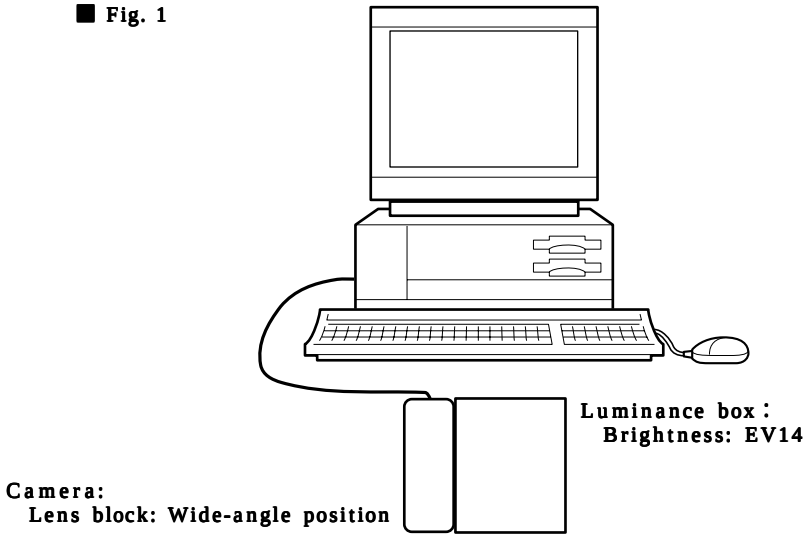
Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the camera and the measuring instrument as shown on the Fig.1.
4. Set the luminance box to "EV14," and the lens block of the camera to "Wide position."

Procedure of the adjustment

1. Click "SHUTTER" of the adjustment menu.
   The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

■ Fig. 1



Adjustment of the defective pixel (DEFECT PIXEL)

Required equipment

Luminance box
L-2101/L-2111 or multi camera tester: EF-8301
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

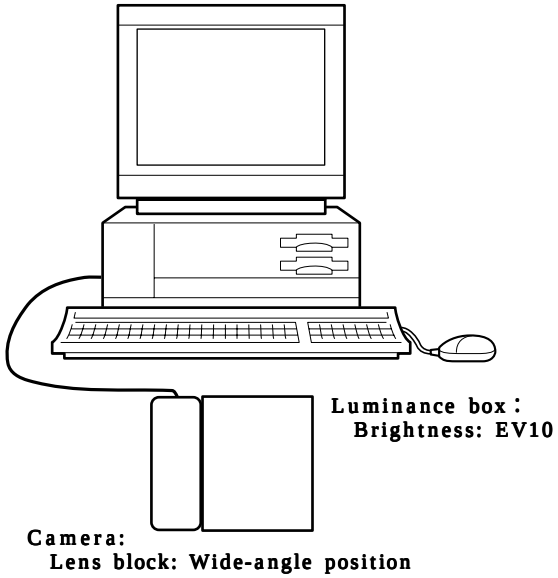
Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the camera and the measuring instrument as shown on the Fig.1.
4. Set the luminance box to "EV10," and the lens block of the camera to "Wide position."

Procedure of the adjustment

1. Click "DEFECT PIXEL" of the adjustment menu.
   The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

■ Fig. 1



Adjustment of the flash GN (FL GNo)

*Operate in the darkroom.

Required equipment

Tripod
Gray chart: Standard reflection paper II
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

Preparation of the adjustment

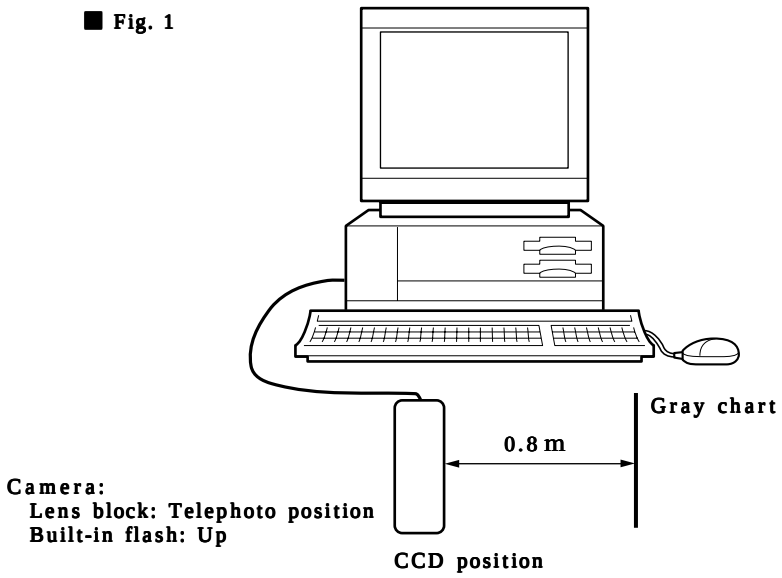
*Operate in the darkroom.

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the camera and the measuring instrument as shown on the Fig.1, and set the distance of the camera (see P.35, 36 CCD position Fig.2) and the gray chart to "0.8m."
4. Set the lens block of the camera to "Telephoto position," and pop up the built-in flash.

Procedure of the adjustment

1. Click "FL Gno" of the adjustment menu.
   The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

■ Fig. 1



Adjustment of white balance (WB)

Required equipment

Color Viewer LV-1450DC
Light balancing filter LB200
White chart
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

Preparation of the adjustment

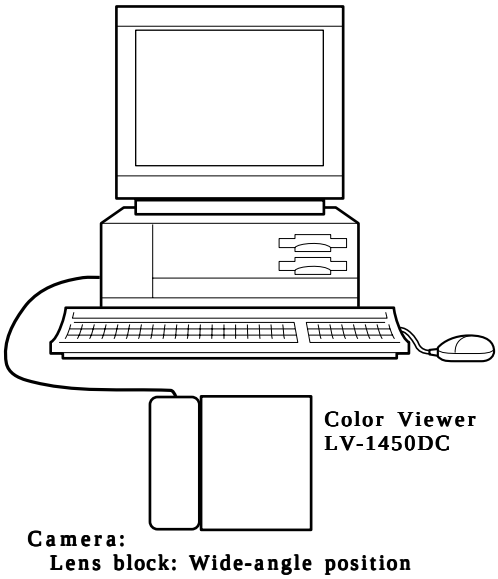
Perform the adjustment 30 minutes or longer after turning on the Color Viewer.
The Color Viewer should be checked and adjusted according to its maintenance instruction on page 23 in 2783 repair guide.

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the camera and the measuring instrument as shown on the Fig.1.
4. Set the lens block of the camera to "Wide position."

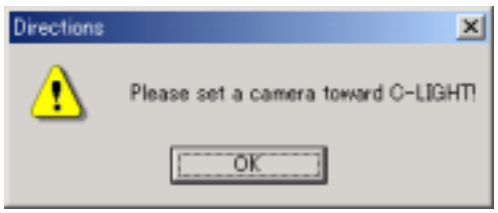
Procedure of the adjustment

1. Click "WB" of the adjustment menu.
   The adjustment is automatically started.
2. Follow the message, "Please set a camera toward C-LIGHT!" Set "Light source C," and click "OK." (Fig. 2)
   The adjustment is automatically started.
   Setting the Light Source-C
   Affix the Scotch tape (Sellotape) fitting the Light Balancing Filter LB200 securely to the zoom lens shown in Fig. 3, then set the Color Viewer apart from the front of camera.
3. The adjustment is completed when "OK" is displayed on the adjustment menu.

■ **Fig. 1**



■ **Fig. 2**



■ **Fig. 3**



Adjustment of the focus (FCS INF POS)

Required equipment

Fluorescent Lamp FPL 27EX-N/Fluorescent light stand SQ967WA
Siemens star chart (see P.51 Measuring instrument)
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

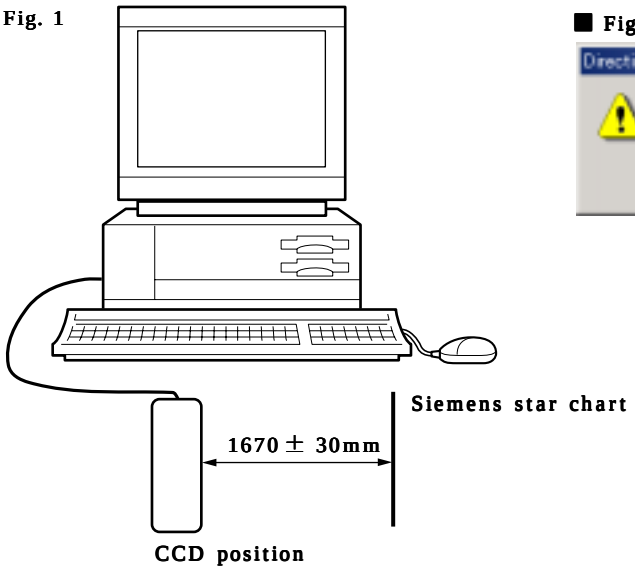
Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the camera and the measuring instrument as shown on the Fig.1, and set the distance of the camera (see P.35, 36 CCD position Fig.2) and the siemens star chart to "1670+/-30mm."
4. Set the lens block of the camera to "Telephoto position."

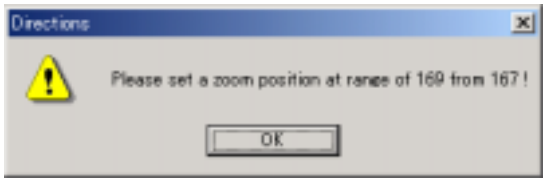
Procedure of the adjustment

1. Click "FCS INF POS" of the adjustment menu.
2. Follow the message, "Please set a zoom position on a wide edge !" Set the lens block to "Wide-angle" position, and click "OK."
3. Follow the message, "Please set a zoom position on a tele edge !" Set the lens block to "Telephoto" position, and click "OK."
4. Follow the message, " Please confirm a position of a chart !" Confirm the position of the chart, and click "OK."
5. Follow the message, "Please set a zoom position at range of 169 from 167 !" Set the lens block to "167 - 169" (displayed on the upper data panel), and click "OK" (Fig.2).
6. Repeat the step 5 in the zoom position, "167-169, 140-142, 113-115, 97-99, 54-56, Wide-angle."
7. The adjustment is completed when "OK" is displayed on the adjustment menu.

■ Fig. 1



■ Fig. 2



Adjustment of the manual focus PI (MF PI)

Required equipment

PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.

Procedure of the adjustment

1. Click "MF PI" of the adjustment menu.
2. Follow the message, "Please turn a focal ring with half-rotation/sec." and turn the focus ring by half. The adjustment is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

Adjustment of the camera shaking compensation (SHAKE OFFSET)

Required equipment

Vibration tester
Shake offset chart (see P.51 Measuring instrument)
PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

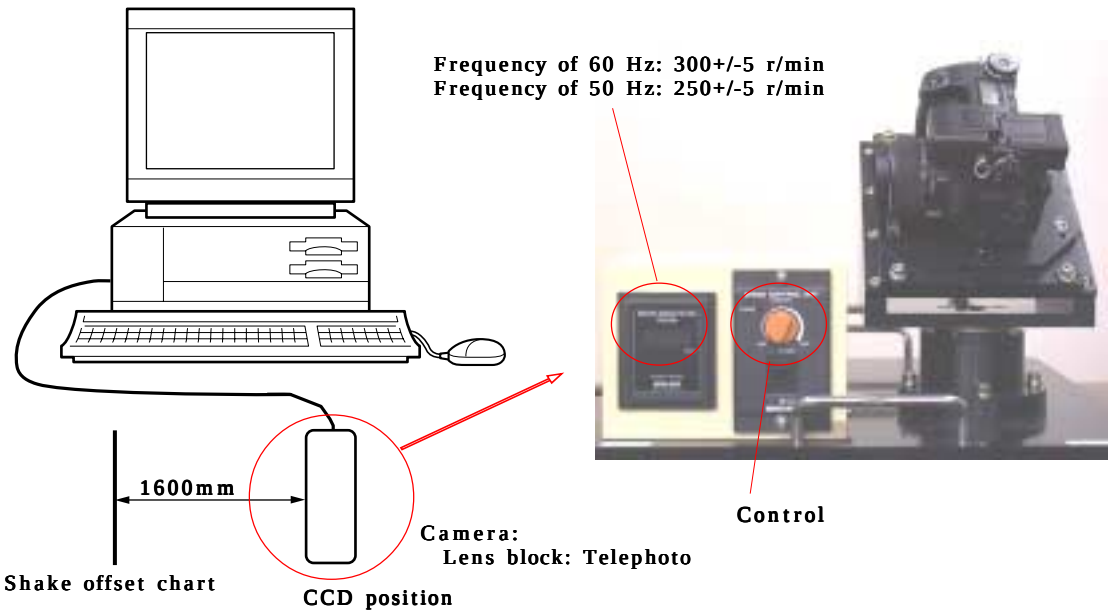
Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.
3. Set the camera and the measuring instrument as shown on the Fig.1., and set the distance of the camera (see P.35, 36 CCD position Fig.2) and the chart to "1600mm."
   Set the chart to let the vertical and horizontal spaces of the monitor LCD or the EVF frame be equal.
4. Set the lens block of the camera to "Telephoto position."

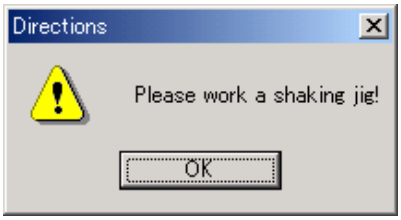
Procedure of the adjustment

1. Click "SHAKE OFFSET" of the adjustment menu.
   Take a picture in the automatic mode.
2. Follow the message, "Please work a shaking jig!" Turn the power of thevibration tester on, and click "OK" (Fig.2) after setting the rotation as follows (Fig.1).
   Take nine pictures in the automatic mode.
   Frequency of 60 Hz: 300+/-5 r/min
   Frequency of 50 Hz: 250+/-5 r/min
3. Follow the message, "Please stop a shaking jig!" Turn the power of the vibration tester off, and click "OK" (Fig.3).
4. The adjustment is completed when "OK" is displayed on the adjustment menu.

■ Fig. 1



■ Fig. 2



■ Fig. 3



DESTINATION Setting (DESTINATION)

Be sure to perform Destination setting including confirmation.

Required equipment

PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

Preparation of the adjustment

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.

Procedure of the adjustment

1. Click Down button placed at lower right of "DESTINATION" in the 2720 Adjustment Program, and select a destination.
   Selectable destinations: JAPAN/NORTH AMERICA/EUROPE/CHINA
2. Click after selecting the destination, and then click W button placed on the right of "DESTINATION". "DESTINATION WRITE-IN has completed!" will appear on completion of the setting.

Setting date and time (TOD)

*Setting the date and time also means to set the last flag on each adjustment. Therefore, do not set the date and time on the product but on the 2720 adjustment program after each adjustment is completed.

Required equipment

PC with preinstalled the 2720 adjustment program
USB-500 (USB cable)
AC-1L/AC-11

Preparation of the adjustment

*Set the date / time correctly on PC which is used for the adjustment.

1. Start up the 2720 adjustment program.
2. Connect the camera and PC with USB-500, and click "START" after confirming the USB connection.

Procedure of the adjustment

1. Click "TOD" of the adjustment menu.
   The setting is automatically started.
2. The adjustment is completed when "OK" is displayed on the adjustment menu.

Error code on adjustment program

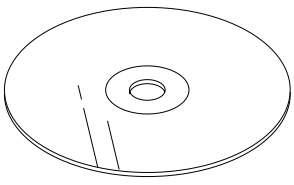
Error Code list

item	Error	Condition	item	Error	Condition
Common	F2	Aperture control error	Gyro	64	Gyro offset (Pitch)
	F3	Camera shake reset error		65	Gyro offset (Yaw)
	F4	Focus reset error		66	ICVref
	F5	Shutter control error		67	Dark current (Pitch)
	F7	Zoom data readout error		68	Dark current (Yaw)
	F8	Temperature data readout error	Missing pixel	80	Dead pixel
	FA	Adjustment sequence error		81	Defective pixel
	FD	Adjustment data error (below the standard)		82	Defective pixel at long exposure
	FE	Flash ROM access error	Shutter	70	Capture
	FF	Setting error		71	Invalid coarse adjustment value
Sensitivity	20	Black level		72	Varied coarse adjustment value
	21	Camera sensitivity		73	Adjustment trial period
	22	Adjustment setting		74	Invalid fine adjustment
	23	Adjustment trial period over		75	Varied fine adjustment value
	24	Camera sensitivity	Gno.	90	Flash check (small GNo)
	25	Camera sensitivity		91	Flash check (large GNo)
CCD centering	30	Shift data (Pitch)		9A	Flash check setting data
	31	Shift data (Yaw)	WB	A0	Light source-A
	32	Shadowing not detected (Pitch)		A1	Light source-C
	33	Shadowing not detected (Yaw)		A5	Varied adjustment value at TYPE3
	34	Adjustment value (Pitch)		A6	Invaid adjustment value at TYPE0
	35	Adjustment value (Yaw)		A7	Invaid adjustment value at TYPE1
	36	Shake		A8	Invaid adjustment value at TYPE2
Camera shake	40	Speed (Pitch)		A9	Invaid adjustment value at TYPE3
	41	Speed (Yaw)		AA - AF	Shading error
Servo gain	B0	Speed	Focus	50	Adjustment setting
	B1	S1 gain (Pitch)		51	Zoom setting
	B2	S1 gain (Yaw)		52	Peak detection
	B3	S2 gain (Pitch)		5A	Wideangle setting
	B4	S2 gain (Yaw)		5B	Telephoto setting
	B5	S2 gain margin (Pitch)		5C	Telephoto setting
	B6	S2 gain margin (Yaw)	Camera shake	D0	PtoP(Pitch)
	B7	Value in huge current (Pitch)		D1	PtoP(Yaw)
	B8	Value in huge current (Yaw)		D2	Anti shake (Pitch)
	B9	Speed in huge current (Pitch)		D3	Anti shake (Yaw)
	BA	Speed in huge current (Yaw)		D4	Adjustment value (Pitch)
	BB	Speed in little current (Pitch)		D5	Adjustment value (Yaw)
	BC	Speed in little current (Yaw)		D6	Anti shake (Pitch + Yaw)
	BD	Value in little current (Pitch)		D7	Anti shake (Pitch2)
	BE	Value in little current (Yaw)		D8	Anti shake (Yaw2)
Gyro	60	Detected while adjustment (vertical)	CCD Aori	E0	Peak is not detected.
	61	Detected while adjustment (horizontal)	MF PI	E1	CCD Aori is beyond the standard.
	62	DAC default (Pitch)	Date/time	EA	Incorrect setting
	63	DAC default (Yaw)			

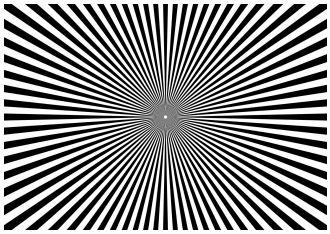
Measuring instrument

PC (AT convertible) with preinstalled Windows 98, 98SE or 2000. (USB port should be guaranteed its performance by the maker. Also, Adobe Photoshop 6.0 or later should be installed if Windows 2000 is installed on PC.)
* It is possible to confirm the performance on PC with Windows 95 (AT convertible).
(Card reader and PC card adapter are required.)
640 x 480 or more color display capable of displaying at least 32,000 colors
Adobe Photoshop
USB Cable For USB-500
Digital storage scope DS-8706
Luminance box L-2101
L-2111
Multi camera tester EF-8301
DC power supplies PR18-5A
Digital multi meter <FLUKE 83>
Camera leak tester <CL-1101, CL-1201>
Macbeth color checker <2755-0008-75>
Light balancing filter LB200 <2720-0002-75>
LB adjustment chart II for 2766 <2766-0003-75>
2766 resolving power chart (W) <2766-0005-75>
2766 resolving power chart (T) <2766-0005-76>
Color calculator II <2766-0008-75>
2720 adjustment program CD (Ver. 1.0) <2720-0001-75>
(including image files of the siemens star chart and the shake offset chart)
Siemens star chart: Make copies in A3 size to use.
Shake offset chart: Make copies in A4 size to use.
2760 B.C power supply adapter <2760-0013-76>
Power supply adapter for 2766 <7981-1018-82>
Standard reflection paper II <7981-3001-52>
Camera chart setting stand <7981-9012-01>
Stand for 2782 <7981-9012-15>
Back board for camera chart setting stand <7981-9012-51>
Fluorescent light stand SQ 967W <7981-9012-61>
Vibration tester <7981-9013-01>
Hexangular screwdriver <7983-1040-01>
Fuluorescent light FPL 27EX-N <7985-1020-01>
White chart
Light source A; Tungsten light (see P.52 Administrative points of the light source A).
Light source C; (Light source A + light balancing filter LB200 <2720-0002-75>)
CF card; For record of taken images: Prepare for 16MB or more CF card confirmed its performance
Blackout curtain
AC adapter AC-1L/AC-11
Tripod
Hexangular wrench (1.5)

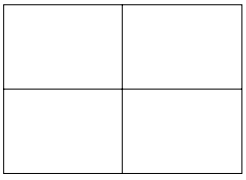
2720 adjustment program CD (Ver. 1.0) <2710-0001-75>
(including image files of the siemens star chart and the shake offset chart)



Siemens star chart



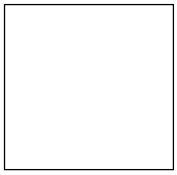
Shake offset chart



Vibration tester <7981-9013-01>



Color balancing Filter LB200 <2720-0002-75>



Subsidiary Materials

Grease

- G-55 <7984-1055-01>
- G-60 <7984-1060-02>
- G-85 <7984-1085-02>
- G-114 <7984-1114-03>
- G-115 <7984-1115-03>

Adhesive

- B-10 <7984-2010-01>
- B-60 <7984-2060-01>