SAL500F80

(REFLEX 8/500) (500mm F8 Reflex)

SERVICE MANUAL

Ver 1.1 2006.12

Revision History

How to use Acrobat Reader

US Model
Canadian Model
AEP Model
Chinese Model

Link

SPECIFICATIONS	DISASSEMBLY	ADJUSTMENTS
SERVICE NOTE	REPAIR PARTS LIST	

- About the Finished Inspection JIG

LENS FOR DSLR CAMERA

SONY

2006L0800-1

Published by Kohda TEC

SPECIFICATIONS

- Depending on the lens mechanism, the focal length may change with any change of the shooting distance. The focal length assumes the lens is focused at infinity.

Equivalent 35mm-format focal length *1 (mm)
750
*1 The value for equivalent 35mm-format focal length is based on Digital Single Lens Reflex Cameras equipped with an APS-C sized image sensor.

Lens groups elements *2
5-7 (with 1 filter)
*2 The values of lens group and elements include the normal filter and ND4X filter.

Angle of view 1 *3
5°

Angle of view 2 *3
3°10′
*3 The value of angle of view 1 is based on 35mm-format cameras, and that of angle of view 2 is based on Digital Single Lens Reflex Cameras equipped with an APS-C sized image sensor.

Minimum focus (m (feet)) *4
4 (1.3)
*4 Minimum focus is the shortest distance from the image sensor to the subject.

Maximum magnification (×)
0.13

F-stop
f/8

Filter diameter (mm)
42

Dimensions (maximum diameter × height) (mm (in.))
Approx. 89 × 118 (3 5/8 × 4 3/4)

Mass (g (oz.))
Approx. 665 (23 7/16)

Included items
Lens (1), Front lens cap (1), Rear lens cap (1), Lens hood (1), Normal filter (1), ND4X filter (1), Set of printed documentation

Designs and specifications are subject to change without notice.

TABLE OF CONTENTS

1. SERVICE NOTE

1-1. Chemicals

Some chemicals used for servicing are highly volatile.
Their evaporation caused by improper management affects your health and environment, and wastes resources.
Manage the chemicals carefully as follows.

- Store chemicals sealed in a specific place to prevent from exposure to high temperature or direct sunlight.
- Avoid dividing chemicals into excessive numbers of small containers to reduce natural evaporation.
- Keep containers sealed to avoid natural evaporation when chemicals are not in use.
- Avoid using chemicals as much as possible. When using chemicals, divide only required amount to a small plate from the container and use up it.

1-2. Exterior Parts

Be careful to the following points for exterior parts used in this unit.

- Use a piece of cleaning paper or cleaning cloth for cleaning exterior parts. Avoid using chemicals.
  Even if you have to use chemicals to clean heavy dirt, don't use paint thinner, ketone, nor alcohol.
- Insert the specific screws vertically to the part when installing a exterior part.
  Be careful not to tighten screws too much.

1-3. Unleaded Solder

This unit uses unleaded solder.
Boards requiring use of unleaded solder are printed with the lead free mark (LF) indicating the solder contains no lead.
(**Caution:** Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

 : LEAD FREE MARK
Be careful to the following points to solder or unsolder.

- Set the soldering iron tip temperature to 350 °C approximately.
  If cannot control temperature, solder/unsolder at high temperature for a short time.
  Caution: The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful!
  Unleaded solder is more viscous (sticky, less prone to flow) than ordinary solder so use caution not to let solder bridges occur such as on IC pins, etc.

- Be sure to control soldering iron tips used for unleaded solder and those for leaded solder so they are managed separately. Mixing unleaded solder and leaded solder will cause detachment phenomenon.

1-4. SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are “pinched” or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit Board Repairing
   - Keep the temperature of the soldering iron around 270 °C during repairing.
   - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

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

SAFETY-RELATED COMPONENT WARNING!!

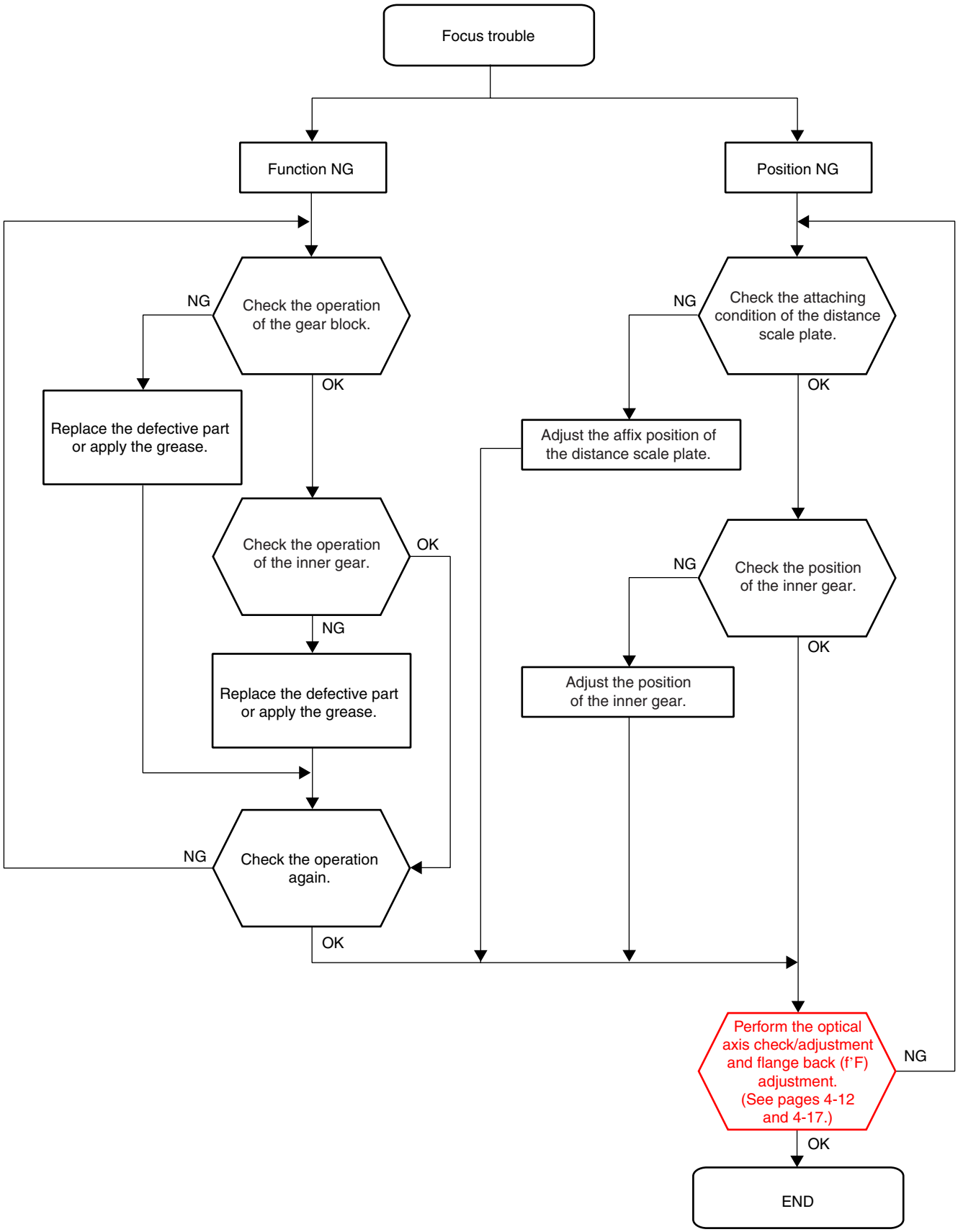
COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈSES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPÉMENTS PUBLIÉS PAR SONY.

1-5. TROUBLESHOOTING

1-5-1. Focus Trouble

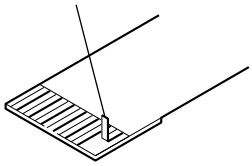


2. DISASSEMBLY

NOTE FOR REPAIR

- Make sure that the flat cable and flexible board are not cracked of bent at the terminal. Do not insert the cable insufficiently nor crookedly.
- When remove a connector, dont' pull at wire of connector. It is possible that a wire is snapped.
- When installing a connector, dont' press down at wire of connector. It is possible that a wire is snapped.
- Do not apply excessive load to the gilded flexible board.

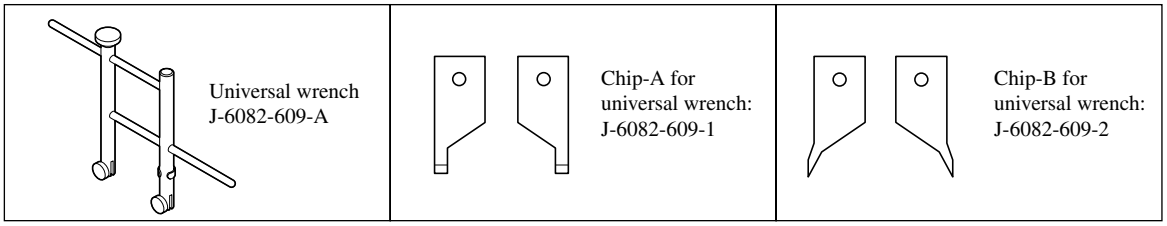
Cut and remove the part of gilt which comes off at the point. (Be careful or some pieces of gilt may be left inside)



UNIVERSAL WRENCH

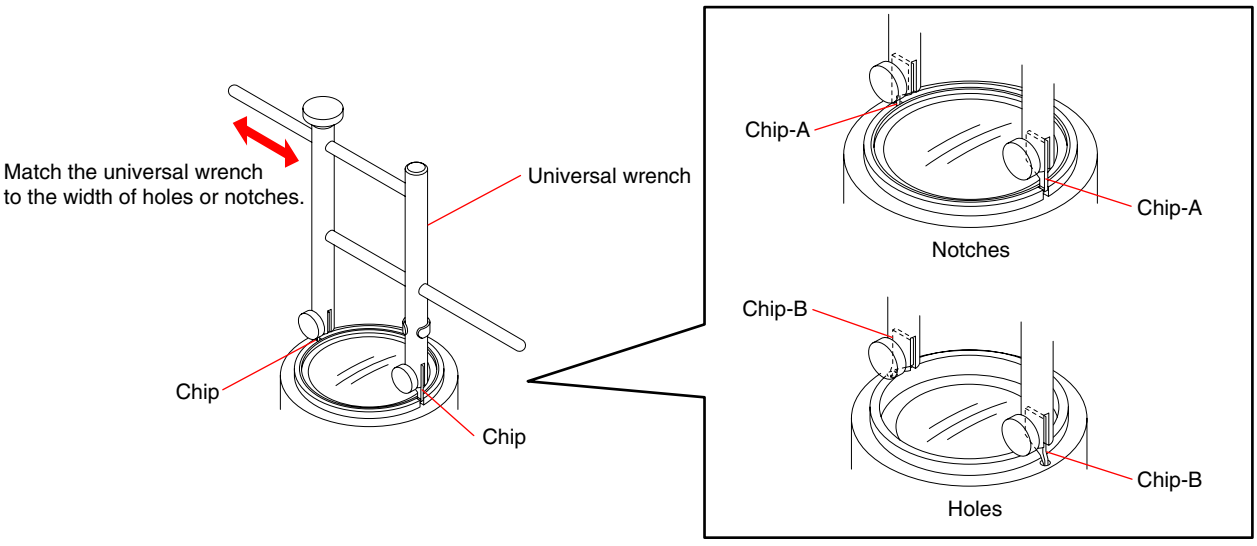
In case of the following notches or holes are located in the lens block, etc during disassembling/ assembling the lens, Use the universal wrench.

How to Use



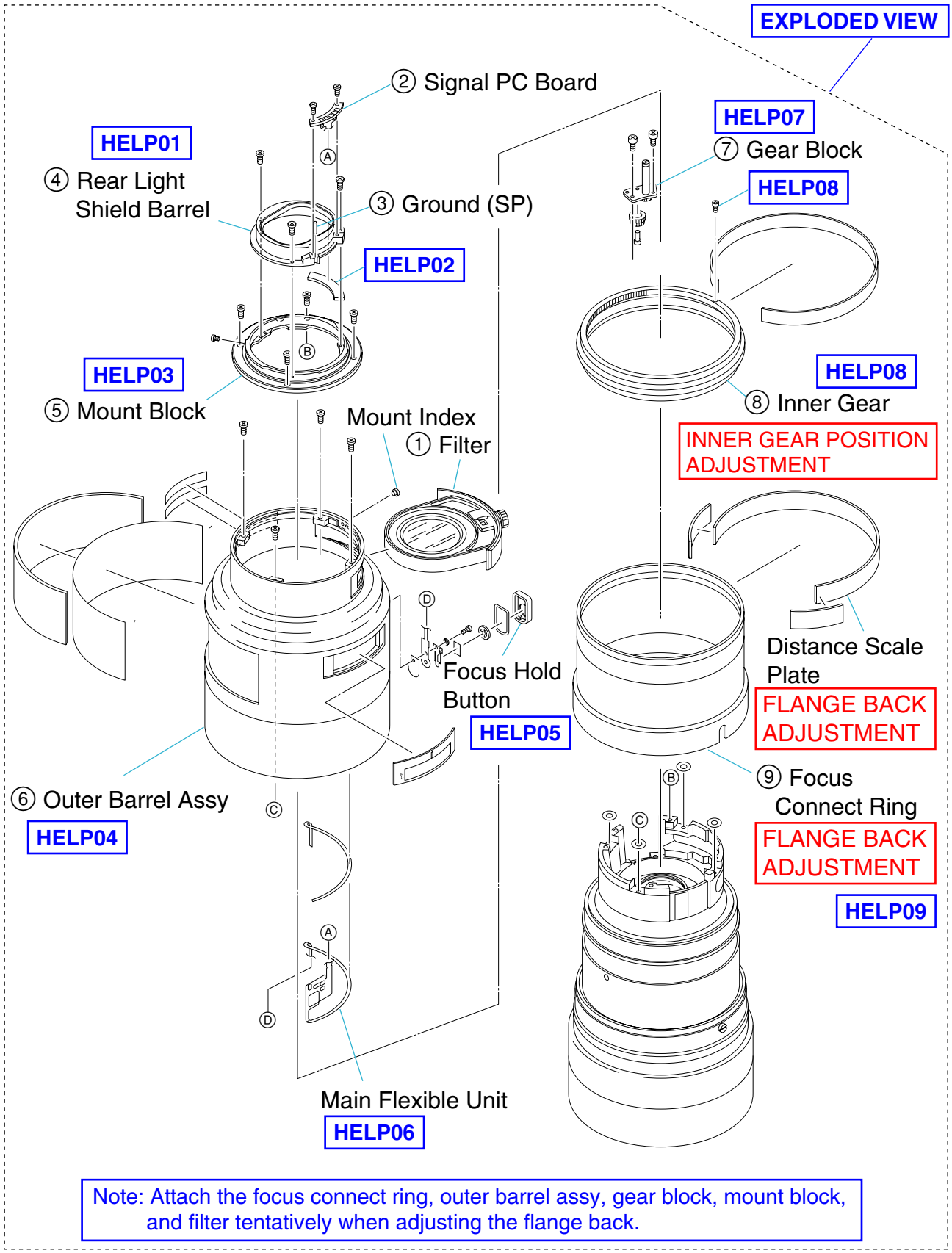
Attach the chip-A or chip-B to the universal wrench.
For the notches: chip-A
For the holes: chip-B

Match the universal wrench to the holes or notches of the lens block, etc.

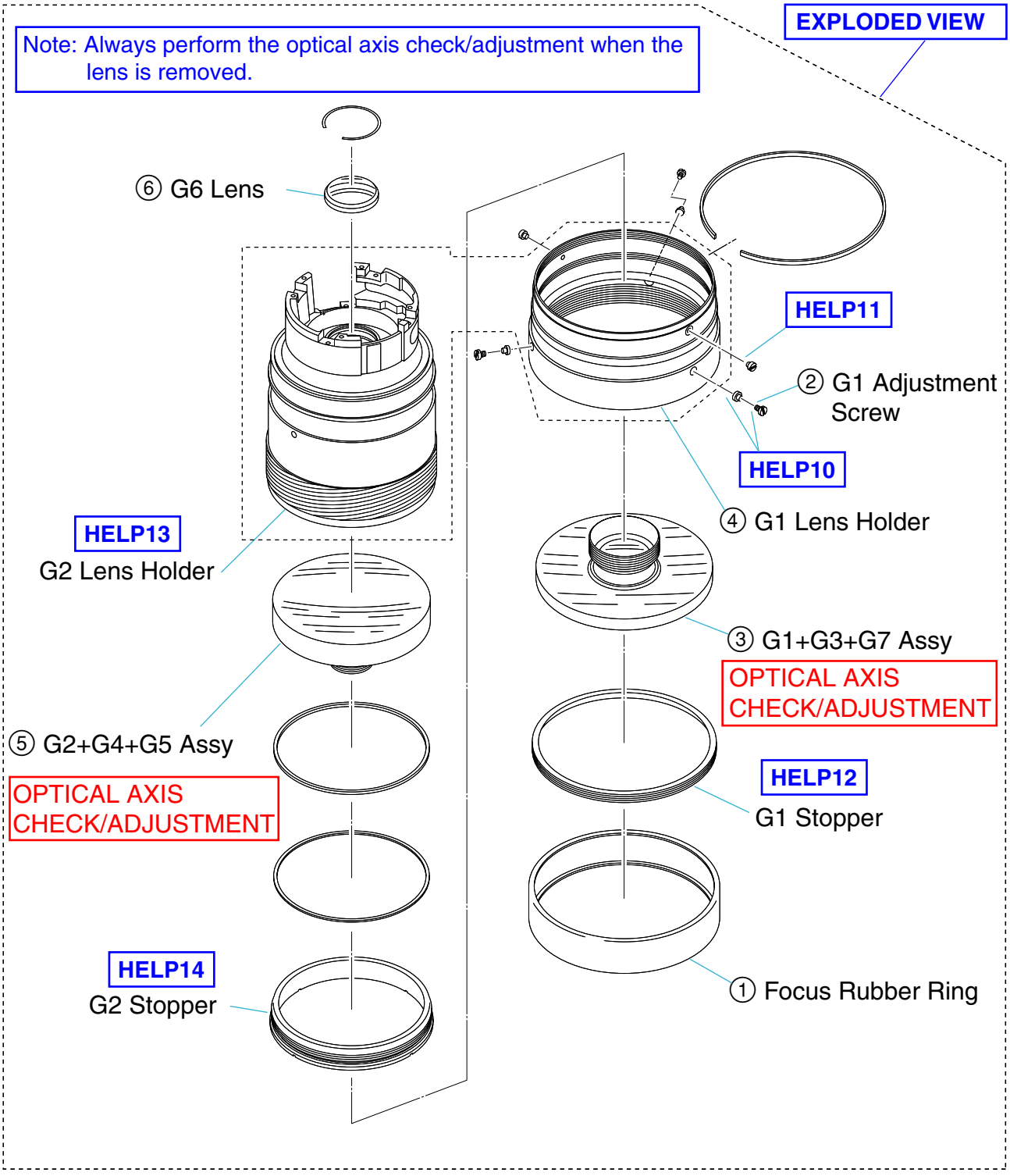


2-1. DISASSEMBLY

2-1-1. FOCUS CONNECT RING, OUTER BARREL ASSY AND MOUNT BLOCK



2-1-2. HELICOID UNIT



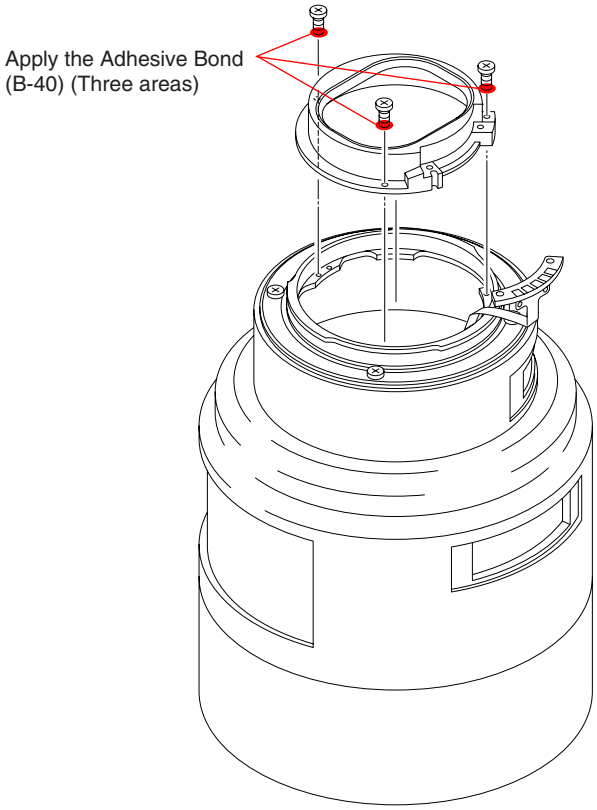
HELP

Note for assembling and grease applying positions are shown.

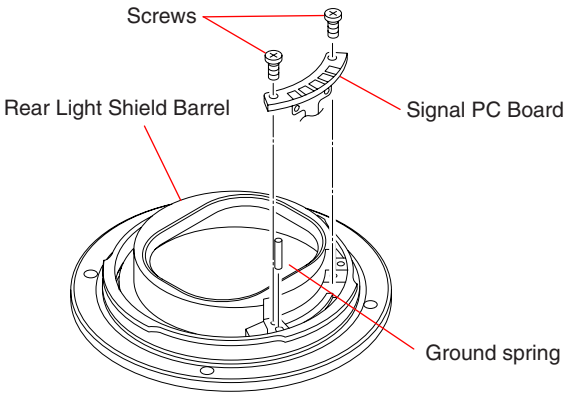
HELP01

Adhesive bond (B-40): J-6082-614-A

1. Attach the rear light shield barrel. Apply the adhesive bond (B-40) to the three screws, and then fix the rear light shield barrel with these screws as shown in the figure.



2. Attach the ground spring to the rear light shield barrel.
3. Attach the signal PC board, and fix it with the two screws as shown in the figure.
   Note: Be careful not to tighten the two screws too much.

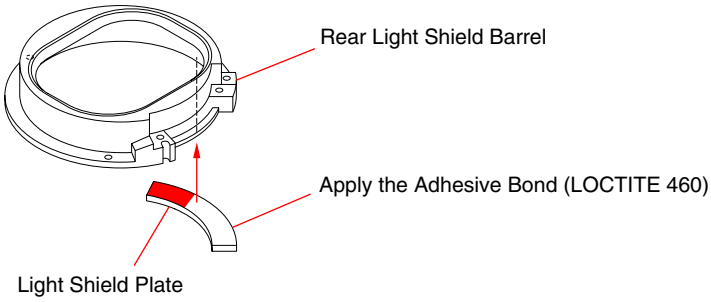


HELP02

Adhesive bond (LOCTITE 460)(Note)

Note: Use the adhesive bond (LOCTITE 460) or an equivalent article.
Do not use what becomes white after drying like quick-drying glue.

Apply the adhesive bond (LOCTITE 460) to the instruction portion of the light shield plate as shown in the figure, and affix it to the rear light shield barrel.



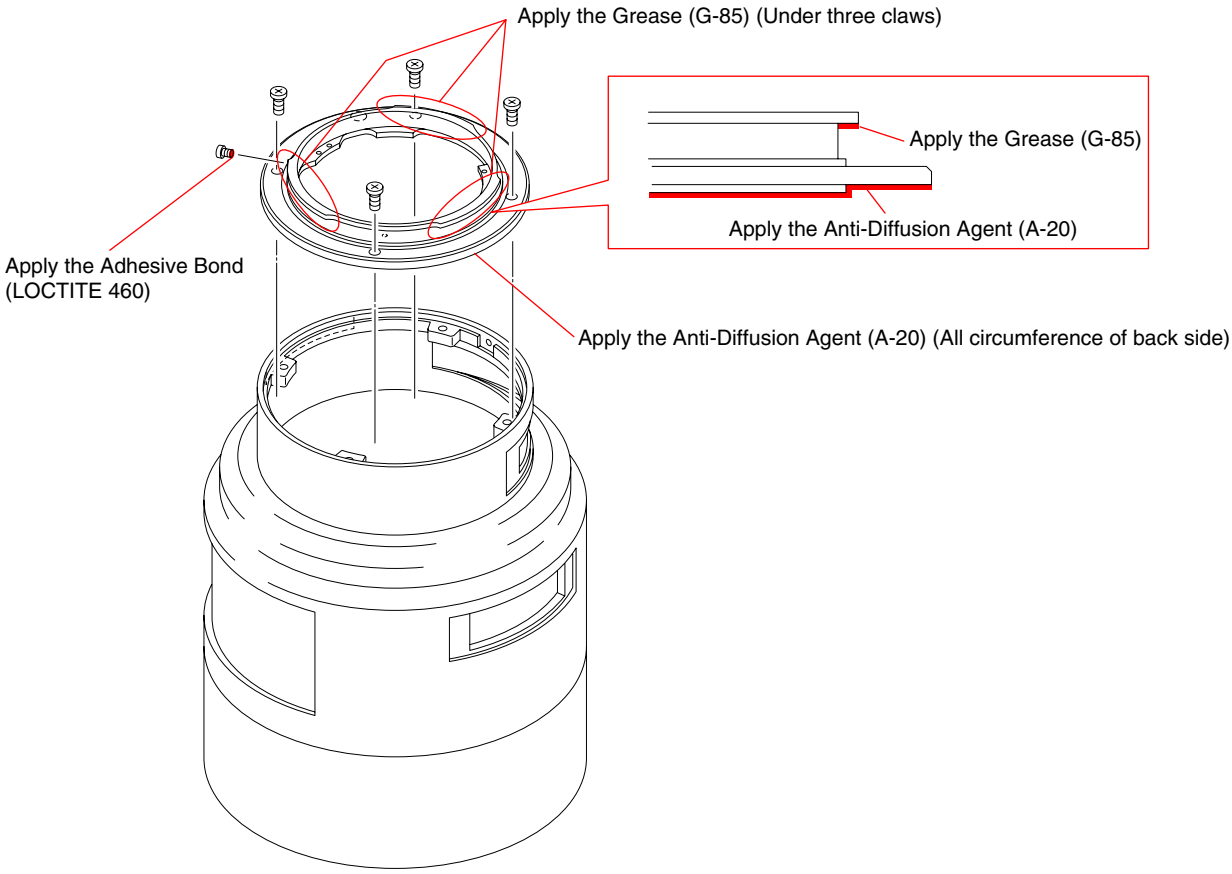
HELP03

Anti-diffusion agent (A-20): J-6082-611-A
Grease (G-85): J-6082-626-A

Adhesive bond (LOCTITE 460)(Note)

Note: Use the adhesive bond (LOCTITE 460) or an equivalent article.
Do not use what becomes white after drying like quick-drying glue.

1. Apply the adhesive bond (LOCTITE 460) to the instruction portion of the stopper screw as shown in the figure
2. Apply the anti-diffusion agent (A-20) to the instruction portion of the mount block as shown in the figure.
3. Apply the grease (G-85) under the three claws of the mount block as shown in the figure.
4. Attach the mount block with the four screws as shown in the figure.



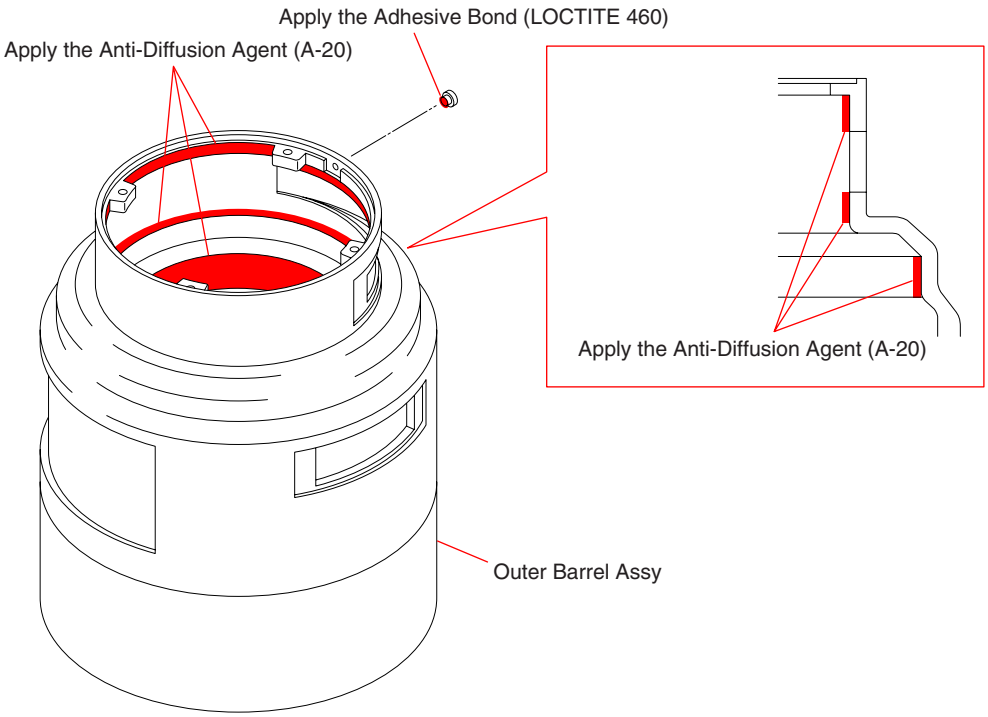
HELP04

Adhesive bond (LOCTITE 460) (Note)

Note: Use adhesive bond (LOCTITE 460) or an equivalent article.
Do not use what becomes white after drying like quick-drying glue.

Anti-diffusion agent (A-20): J-6082-611-A

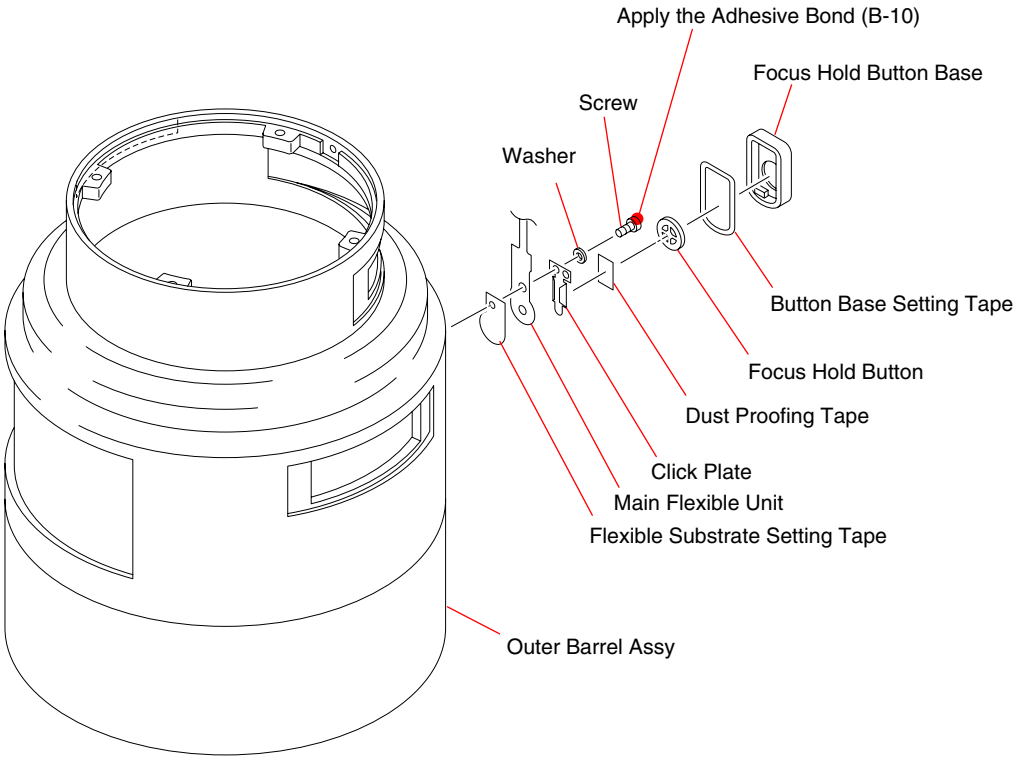
1. Apply the adhesive bond (LOCTITE 460) to the back side of the mount index, and attach it to the outer barrel assy set.
2. Apply the anti-diffusion agent (A-20) to the instruction portions of the outer barrel assy set as shown in the figure.



HELP05

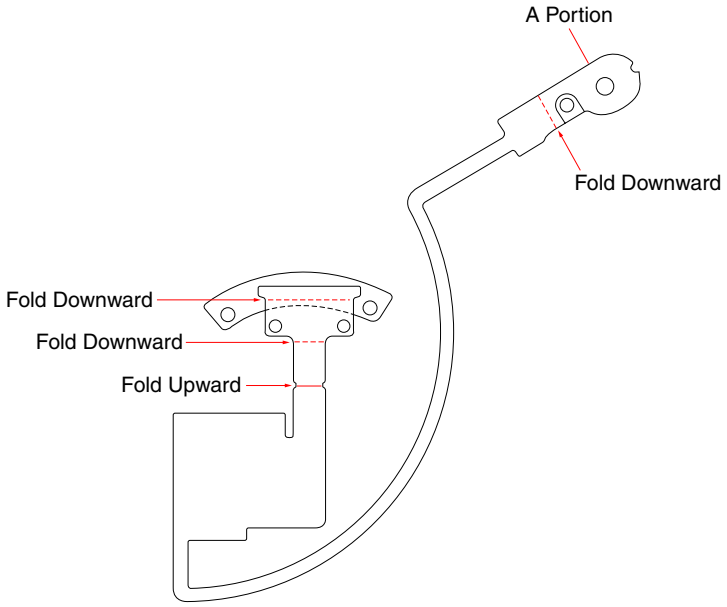
Adhesive bond (B-10): J-6082-612-A

1. Affix the flexible substrate setting tape to the main flexible unit. Then, affix the focus hold block of main flexible unit to the outer barrrel assy.
2. Attach the click plate and washer to the fixed holding tube set with the screw.
3. Apply the adhesive bond (B-10) to the head of screw.
4. Affix the button base set tape to the focus hold button base. Then, affix the focus hold button base to the outer barrrel assy.



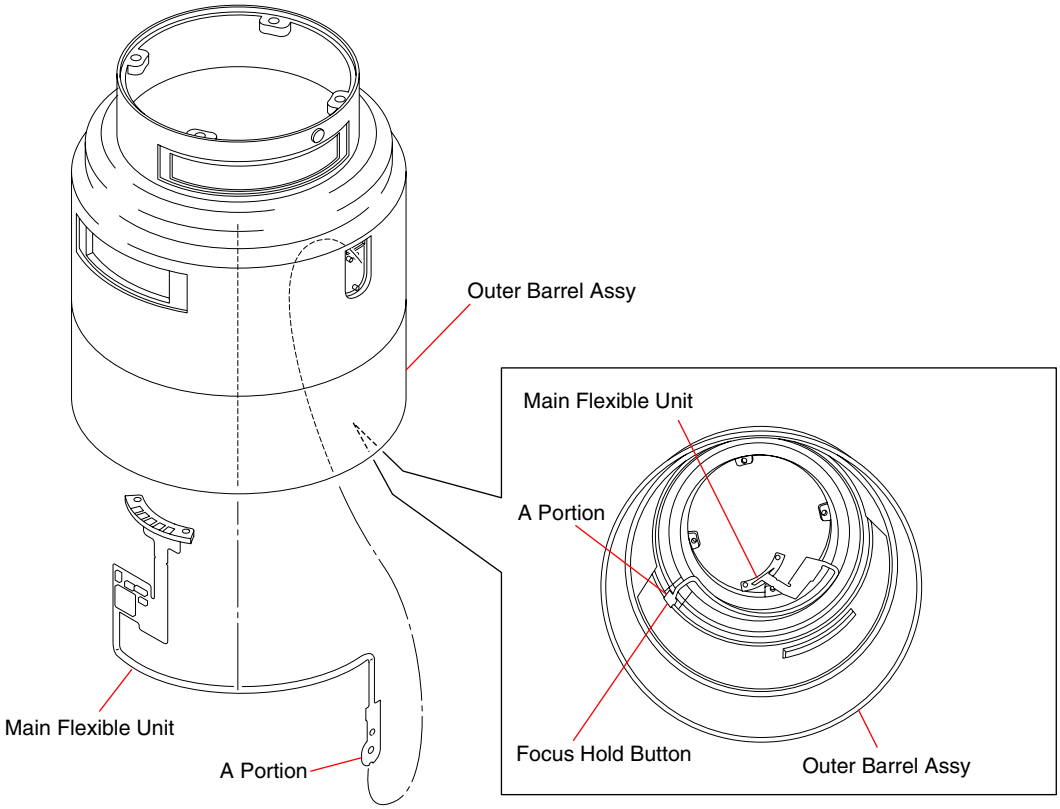
HELP06

1. Make folds by folding the main flexible unit in the order of numbers shown in the figure.



2. Aligning the portion A of main flexible unit with the position of focus hold button block of outer barrrel assy, affix the main flexible unit to the inner wall of fixed holding tube set.

   Note: Fix firmly the main flexible unit to the inner wall of fixed holding tube set so as not to protrude inward.

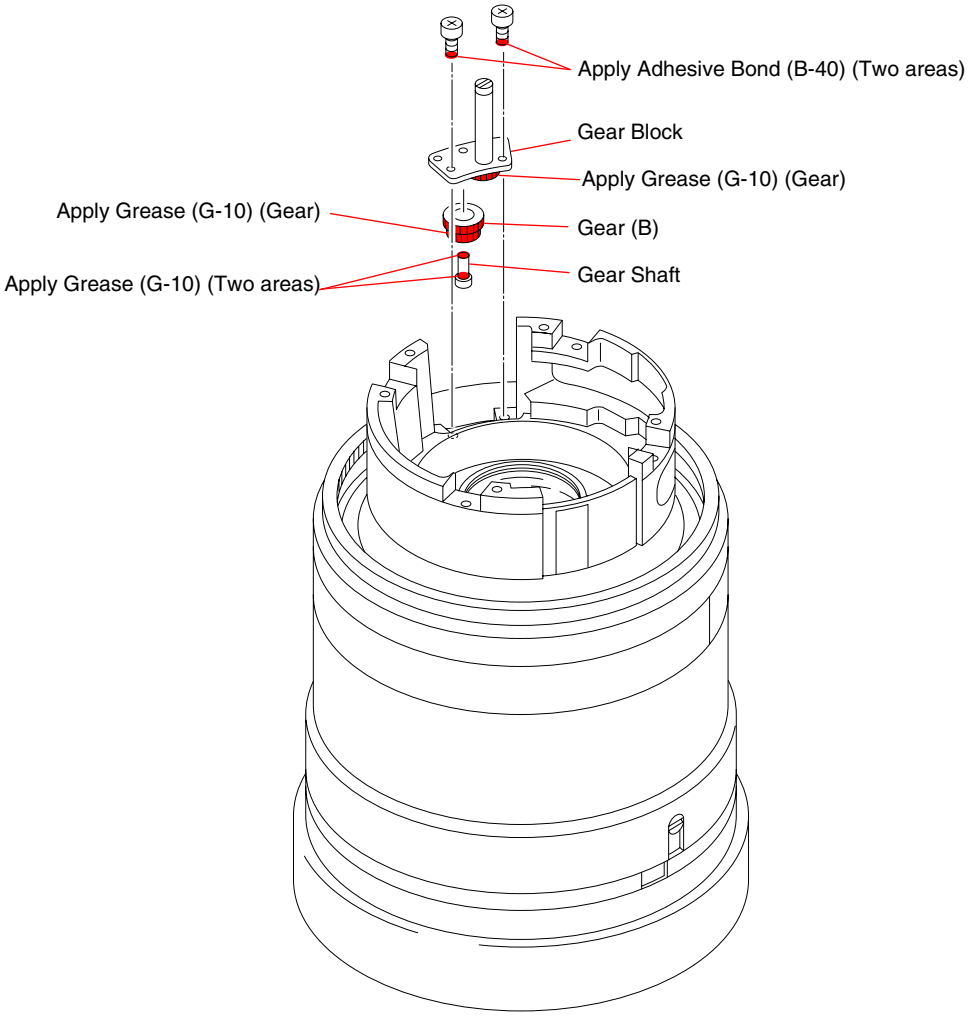


HELP07

Adhesive bond (B-40): J-6082-614-A
Grease (G-10): J-6082-618-A

1. Apply the grease (G-10) to the gear on the gear block and gear portion of the gear (B) as shown in the figure.
2. Apply the grease (G-10) to the two instruction portions of the gear shaft as shown in the figure, and attach it to the gear block.
3. Attach the gear block. Apply the adhesive bond (B-40) to the two screws, and then fix the gear block with these screws as shown in the figure.

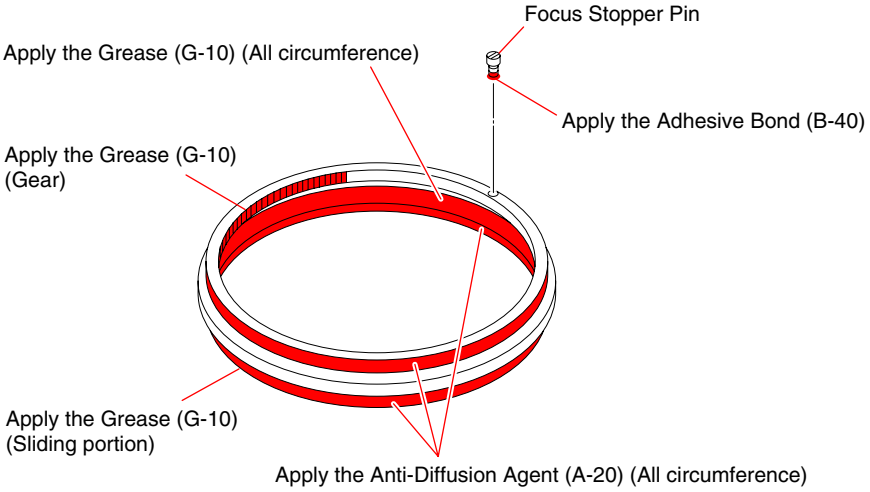
   Note: Rotate the helicoid unit by about 1/2 turn to protrude.



HELP08

Adhesive bond (B-40): J-6082-614-A
Grease (G-10): J-6082-618-A
Anti-diffusion agent (A-20): J-6082-611-A

1. Apply the adhesive bond (B-40) to the tip of focus stopper pin and attach the stopper pin as shown in the figure.
2. Apply the grease (G-10) and anti-diffusion agent (A-20) to the indicated portions of inner gear.

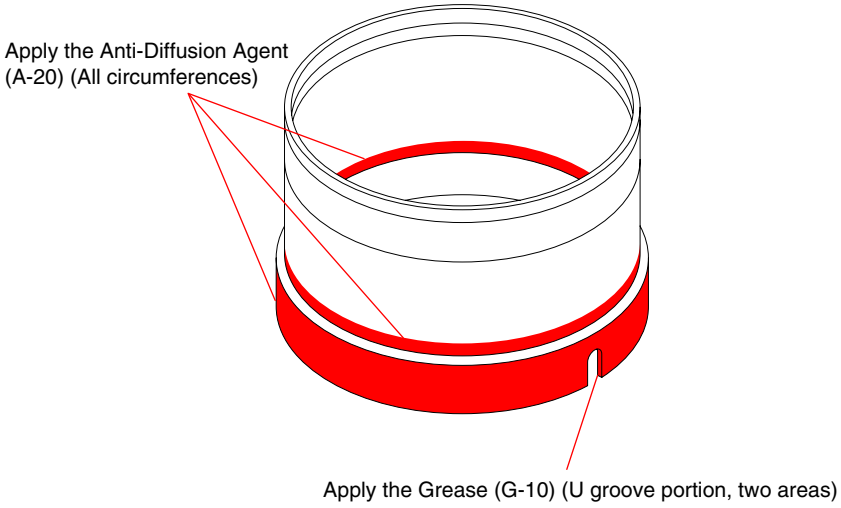


3. Install the gear. Then, perform the “4-2-2. Optical Axis Adjustment”, “4-3. Flange back (f’F) Adjustment” and “4-4. Inner Gear Position Adjustment” in order.

HELP09

Anti-diffusion agent (A-20): J-6082-611-A
Grease (G-10): J-6082-618-A

Apply the anti-diffusion agent (A-20) and the grease (G-10) to the instruction portions of the focus connect ring as shown in the figure.

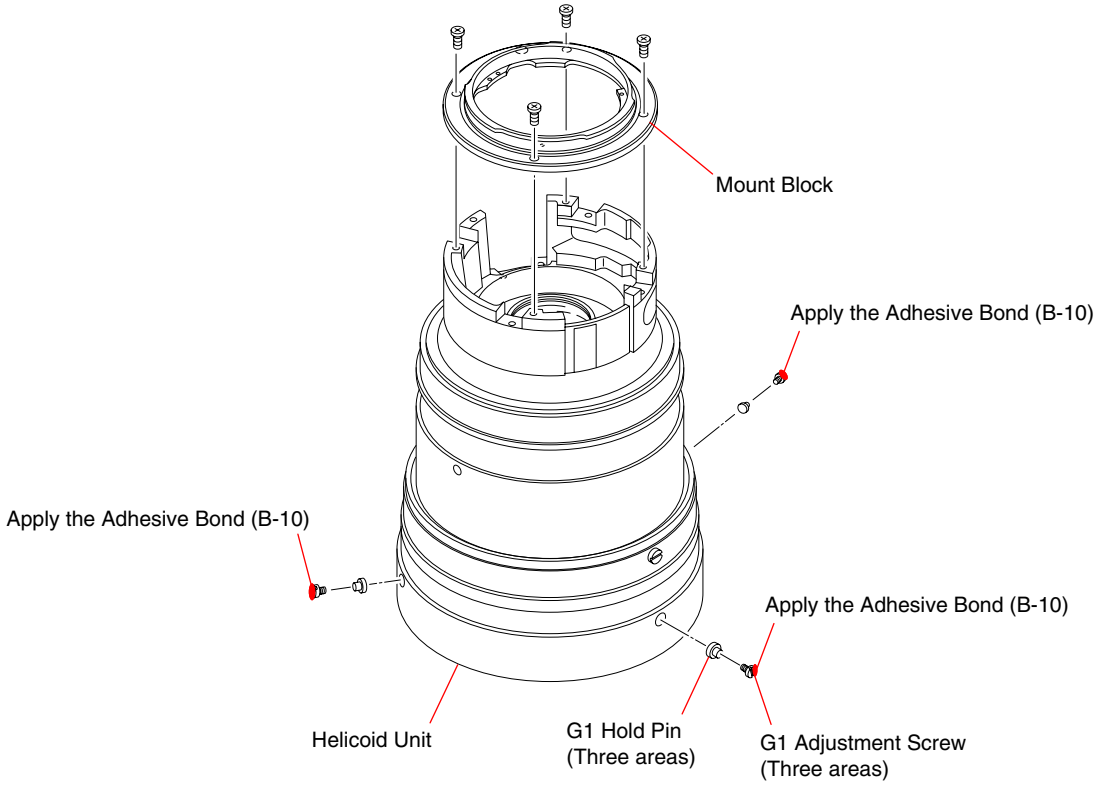


HELP10

Adhesive bond (B-10): J-6082-612-A

1. Install the G1+G3+G7 assy to the helicoid unit, and fix it with the three G1 hold pin and G1 adjustment screws.
   Note: Stop the tightening of the G1 adjustment screw when the tip of the G1 adjustment screw comes in contact with the G1+G3+G7 assy.

2. After attaching the mount block tentatively.
3. Perform the “4-2. Optical Axis Check/Adjustment”, apply the adhesive bond (B-10) to the three G1 adjustment screws.



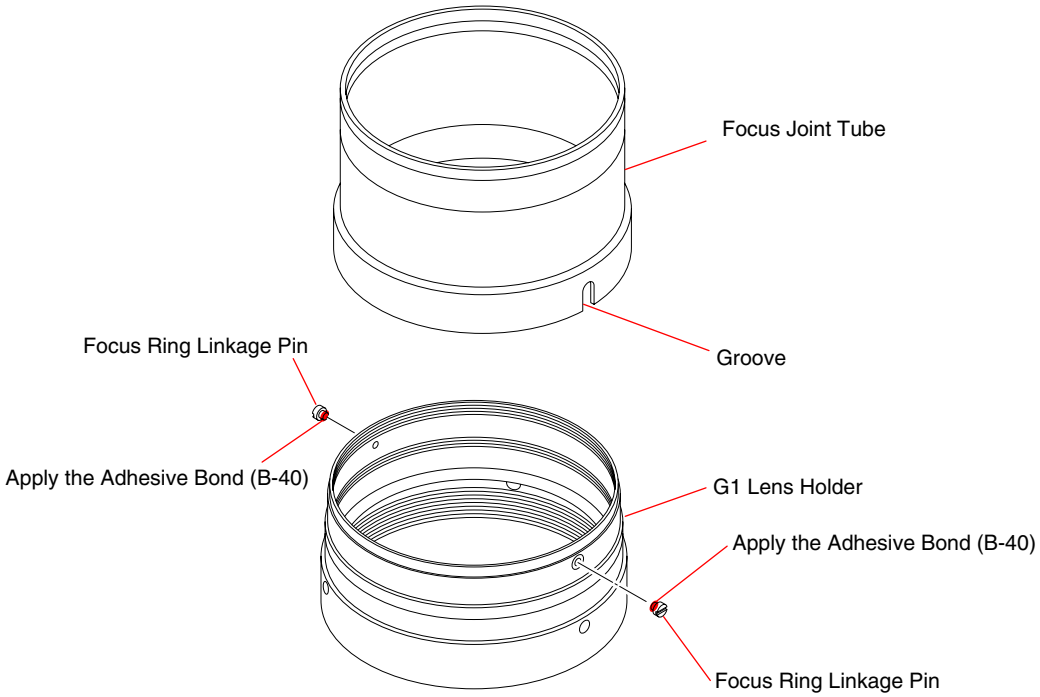
HELP11

Adhesive bond (B-40): J-6082-614-A

1. Select the focus ring linkage pin of a proper diameter against the groove of the focus connect ring from the following table.
2. Apply the adhesive bond (B-40) to the screw portion of the two focus ring linkage pins, and tighten them to the G1 lens holder.

Distance tube joint pin

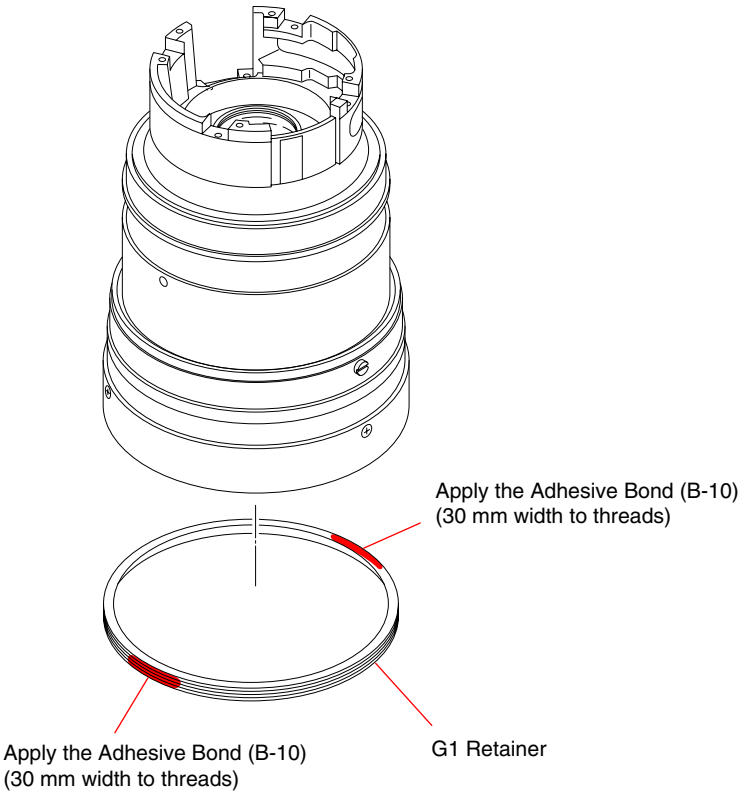
Part No.	Description
2-689-211-01	Focus Ring Linkage Pin A (ø4.00)
2-689-212-01	Focus Ring Linkage Pin B (ø4.01)
2-689-213-01	Focus Ring Linkage Pin C (ø4.02)



HELP12

Adhesive bond (B-10): J-6082-612-A

1. Apply the adhesive bond (B-10) in the width of 30 mm to the two instruction portions of the G1 stopper.



2. Screw the G1 stopper into the helicoid unit, and tighten it 5 to 10 mm more from the place where the G1 retainer comes in contact with the inside parts (G1+G3+G7 assy).

   Note:
   - After tightening, check that the helicoid unit does not clatter when the helicoid unit is shaken.
   - Be sure not to tighten the G1 retainer too much.

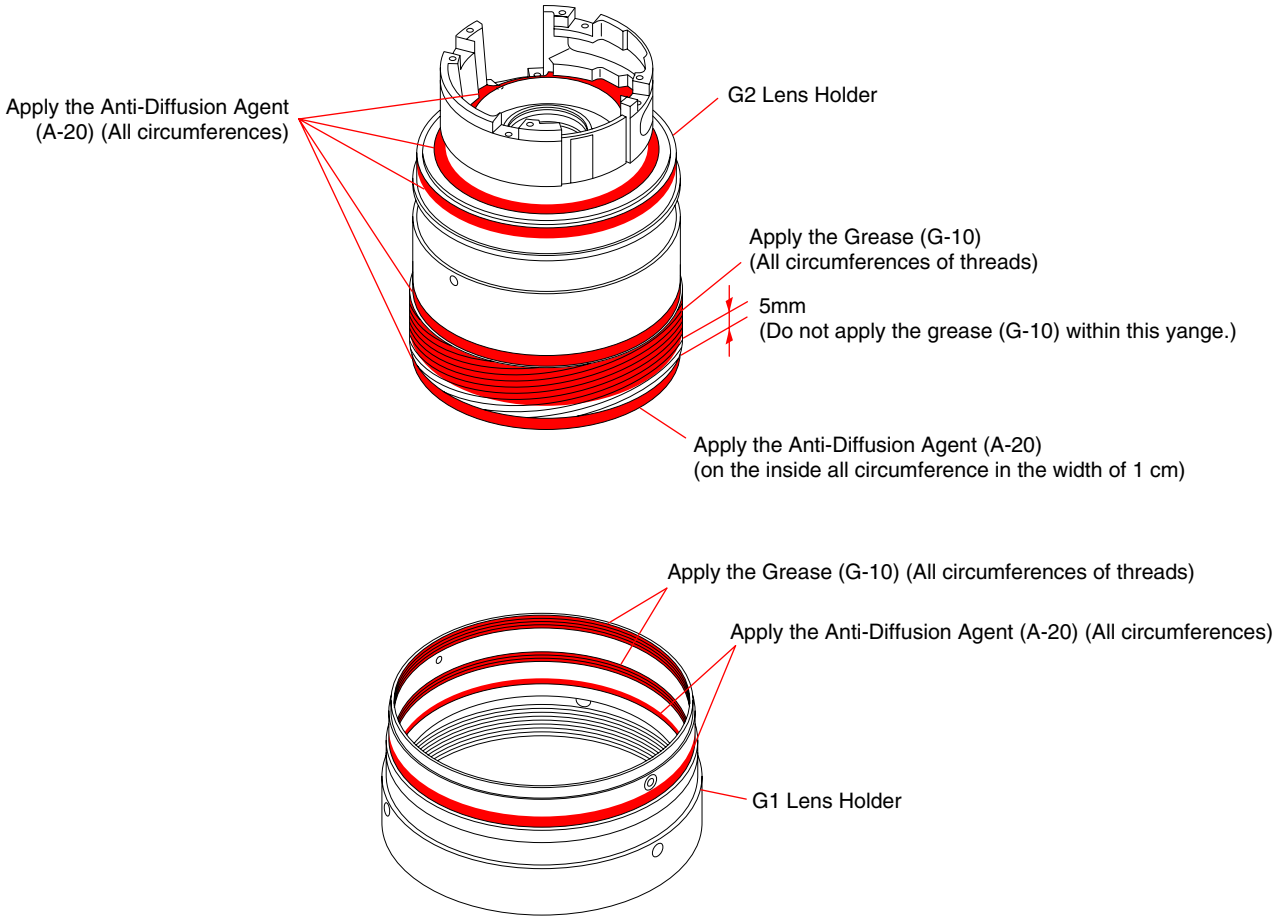
3. Perform the “4-2. Optical Axis Check/Adjustment”.

HELP13

Anti-diffusion agent (A-20): J-6082-611-A
Grease (G-10): J-6082-618-A

Apply the anti-diffusion agent (A-20) and the grease (G-10) to the instruction portions of the G1 lens folder and the G2 lens folder.

Note: After assembling, wipe off extra grease.



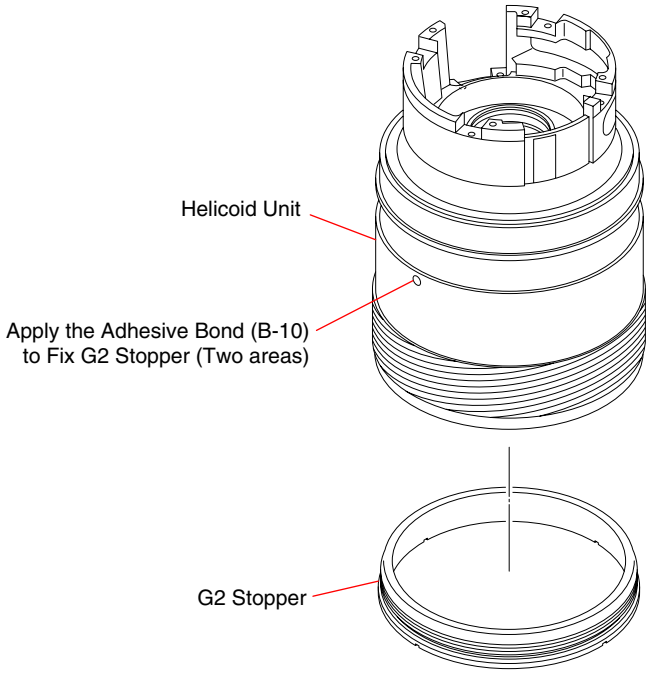
HELP14

Adhesive bond (B-10): J-6082-612-A

1. Screw the G2 stopper into the helicoid unit, and tighten it 5 to 10 mm more from the place where the G2 stopper comes in contact with the inside parts (G2 hold plate).

   Note:
   - After tightening, check that the helicoid unit does not clatter when the helicoid unit is shaken.
   - Be sure not to tighten the G2 stopper too much.

2. After performing erform the “4-2. Optical Axis Check/Adjustment”, apply the adhesive bond (B-10) to the two instruction portions of the G2 stopper to fix it to the helicoid unit.



3. REPAIR PARTS LIST

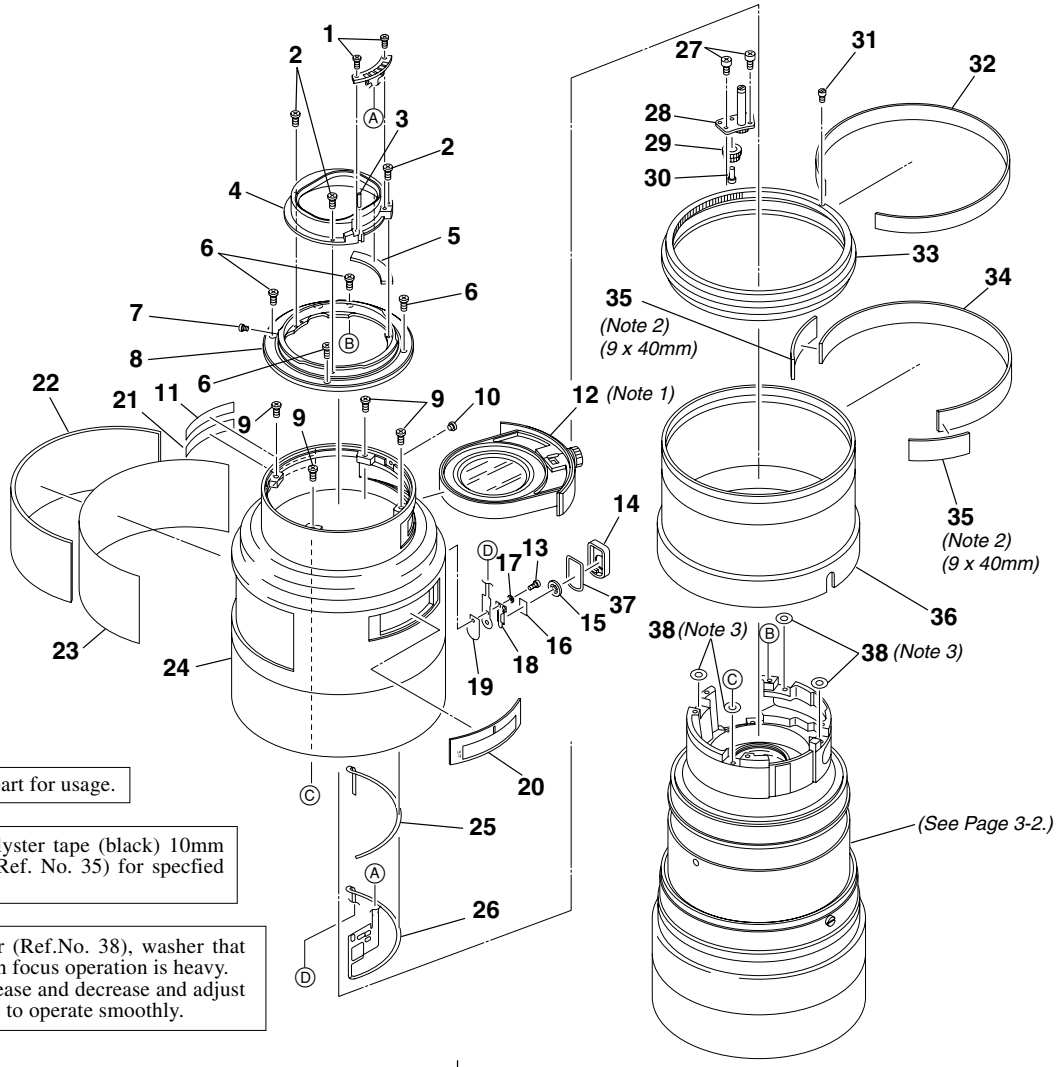
DISASSEMBLY

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

3-1. EXPLODED VIEWS

3-1-1. FOCUS CONNECT RING, OUTER BARREL ASSY AND MOUNT BLOCK



(Note 1) Select the part for usage.

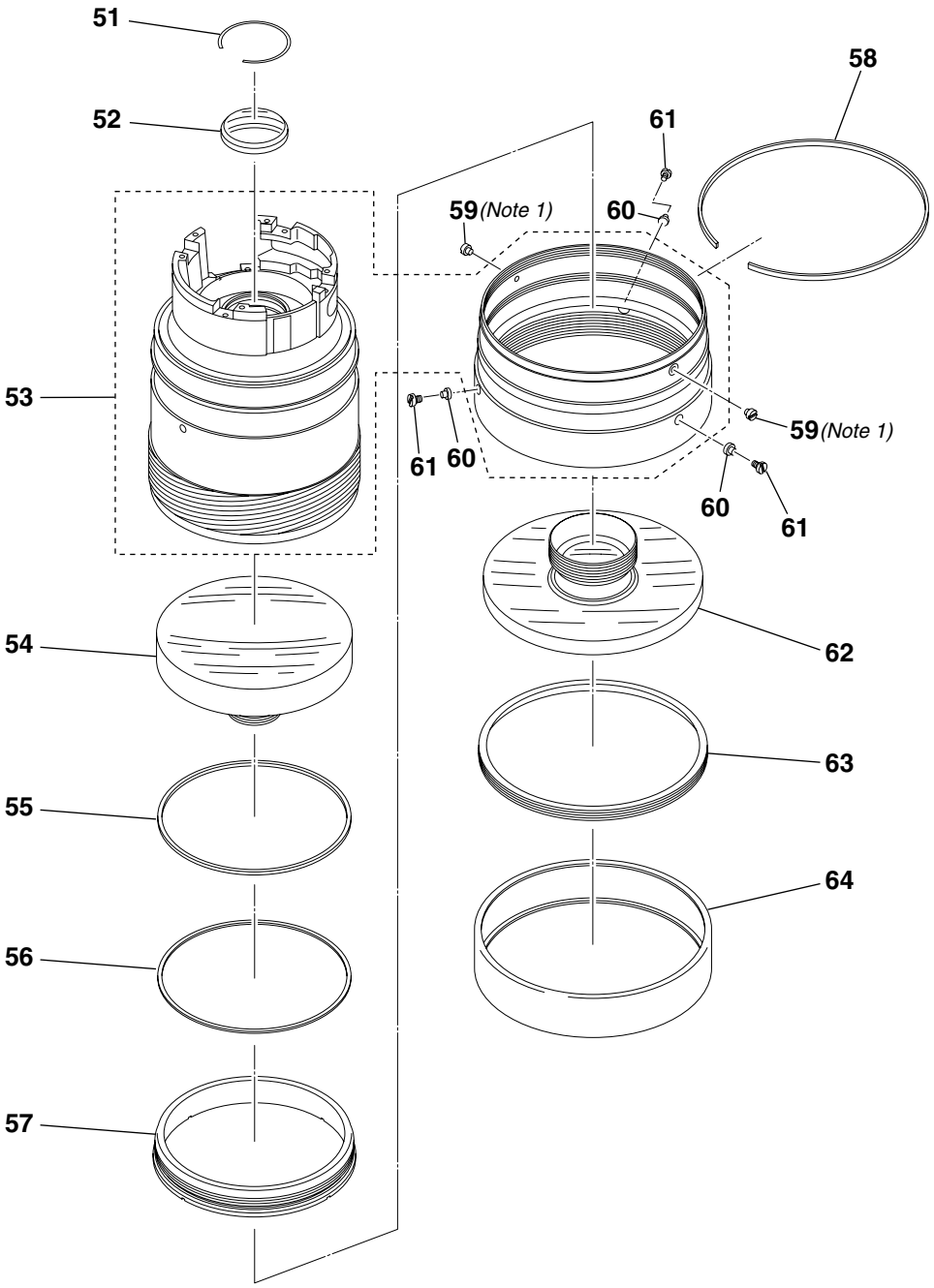
(Note 2) Cut the polyster tape (black) 10mm (per roll) (Ref. No. 35) for specfied size.

(Note 3) The washer (Ref.No. 38), washer that uses it when focus operation is heavy. Please increase and decrease and adjust the washers to operate smoothly.

Ref. No.	Part No.	Description
1	2-684-066-01	SCREW, TAPPING P1 M1.7X4.0
2	2-684-064-01	SCREW P1 M1.4X4.0
3	2-684-065-01	GROUND SPRING
4	2-689-268-01	REAR LIGHT SHIELD BARREL
5	2-689-207-01	LIGHT SHIELD PLATE
6	2-693-403-01	SCREW, P1 M2
7	2-684-244-01	STOPPER SCREW
8	A-1211-786-A	BLOCK, MOUNT
9	2-688-980-01	SCREW, P1M2X5.0
10	2-683-692-01	CHIP (MOUNT INDEX)
11	2-684-073-01	LENS NO. PLATE
12	Selection Parts	BLOCK, NORMAL FILTER LENS (Note 1)
12	Selection Parts	BLOCK, ND4X FILTER LENS (Note 1)
13	2-888-094-01	SCREW, TAPPING P1 M1.7X2.0
14	2-689-269-01	FOCUS HOLD BUTTON BASE
15	2-689-270-01	FOCUS HOLD BUTTON
16	2-689-275-01	DUST PROOFING TAPE
17	2-888-093-01	WASHER (Ø43.7 t=0.8)
18	2-684-208-01	CLICK PLATE

Ref. No.	Part No.	Description
19	2-689-274-01	FLEXIBLE SUBSTRATE SETTING TAPE
20	A-1211-785-A	UNIT(FOCUS SCALE WINDOW UNIT)
21	2-695-854-01	LABEL, MODEL NAME
22	2-689-266-01	SHEET (HOLD SHEET)
23	2-684-248-01	TAPE(HOLD SHEET TAPE)
24	A-1211-784-A	OUTER BARREL ASSY
25	2-689-247-01	FLEXIBLE SUBSTRATE SETTING TAPE C
26	A-1196-676-A	FLEXIBLE UNIT, MAIN
27	2-684-117-01	SCREW, P3 M1.6X4.0
28	A-1211-782-A	BLOCK, GEAR
29	2-696-819-01	GEAR B
30	2-689-237-01	GEAR SHAFT
31	2-689-214-01	FOCUS STOPPER PIN
32	2-689-245-01	BACK ADJUSTMENT TAPE
33	2-689-206-01	INNER GEAR
34	2-689-264-01	PLATE (FOCUS SCALE PLATE)
35	9-913-210-03	POLYSTER TAPE (BLACK) 10mm (Note 2)
36	2-689-205-01	FOCUS CONNECT RING
37	2-689-271-01	BUTTON BASE SETTING TAPE
38	2-888-347-01	WASHER (Ø4.2 t=0.05) (Note 3)

3-1-2. HELICOID UNIT



(Note 1) The number or type of these parts need to be selected according to adjustment etc..
Select the part referring to page 3-3.

Ref. No.	Part No.	Description
51	2-689-240-01	SPRING WASHER
52	2-689-259-01	LENS (G6)
53	A-1202-189-A	HELICOID UNIT
54	A-1196-678-A	G2+G4+G5 ASSY
55	2-689-244-01	G2 O-RING
56	2-689-208-01	G2 HOLD PLATE
57	2-689-203-01	G2 STOPPER

Ref. No.	Part No.	Description
58	2-689-243-01	FRICTION SHEET
59	Selection Parts	FOCUS RING LINKAGE PIN A-C (Note 1)
60	2-689-239-01	G1 HOLD PIN
61	2-689-238-01	SCREW (G1 ADJUSTMENT SCREW)
62	A-1196-677-A	G1+G3+G7 ASSY
63	2-689-200-01	G1 STOPPER
64	2-689-246-01	FOCUS RUBBER RING

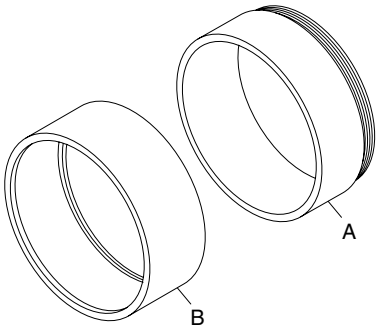
3-1-3. SELECTION PARTS

Ref. No. 59

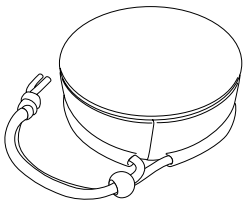
Part No.	Description
2-689-211-01	FOCUS RING LINKAGE PIN A (ø4.00)
2-689-212-01	FOCUS RING LINKAGE PIN B (ø4.01)
2-689-213-01	FOCUS RING LINKAGE PIN C (ø4.02)

3-2. SUPPLIED ACCESSORIES

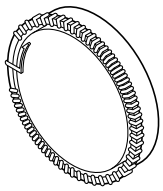
Checking supplied accessories.



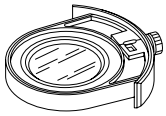
Lens Hood
A : 2-889-267-01(Hood(Main))
B : 2-889-268-01
(Hood Shock Absorbing Ring)



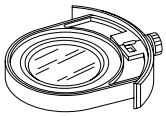
Front Lens Cap
2-687-238-01



Rear Lens Cap
2-683-615-01



Normal Filter
A-1211-996-A



ND4X Filter
A-1211-998-A

Other accessories

2-685-148-11	MANUAL, INSTRUCTION (ENGLISH) (US, CND, AEP)
2-685-148-21	MANUAL, INSTRUCTION (FRENCH) (US, CND, AEP)
2-685-148-31	MANUAL, INSTRUCTION (GERMAN) (AEP)
2-685-148-41	MANUAL, INSTRUCTION (SPANISH) (AEP)
2-685-148-51	MANUAL, INSTRUCTION (DUTCH) (AEP)
2-685-148-61	MANUAL, INSTRUCTION (SWEDISH) (AEP)
2-685-148-71	MANUAL, INSTRUCTION (ITALIAN) (AEP)
2-685-148-81	MANUAL, INSTRUCTION (PORTUGUESE) (AEP)
2-685-148-91	MANUAL, INSTRUCTION (RUSSIAN) (AEP)
2-685-149-11	MANUAL, INSTRUCTION (ARABIC) (AEP)
2-685-149-21	MANUAL, INSTRUCTION (TRADITIONAL CHINESE) (AEP)
2-685-149-31	MANUAL, INSTRUCTION (SIMPLIFIED CHINESE) (AEP, CH)
2-685-149-41	MANUAL, INSTRUCTION (KOREAN) (AEP)

- Abbreviation
  CND : Canadian model
  CH : Chinese model

4. ADJUSTMENTS

Note: After the service repair, perform the adjustments referring to this section.

4-1. PREPARATIONS

4-1-1. List of Service Tools and Equipments

- Lens Adjustment Program (ActuatorChecker VerX.X.X.X.zip)
- PC Card Setup File (InstaCal.zip)
- Adhesive bond (B-10): J-6082-612-A
- Color Calculator 2

  Note: Color Calculator 2 is downloadable from the ESI homepage.

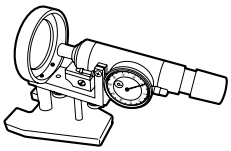
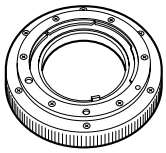
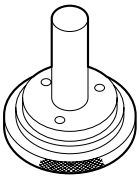
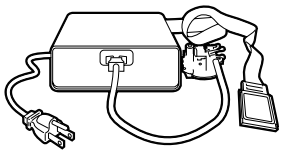
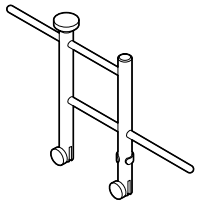
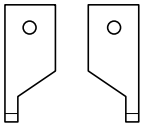
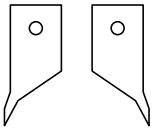
J-1  Personal computer (Note 1)	J-2  Flange back tester J-6082-606-A	J-3  A-mount attachment J-6082-607-A
J-4  Flange back gauge (43.50mm) J-6082-608-A	J-5  Finished Inspection JIG J-6082-645-A (Note 2)	J-6  Universal wrench J-6082-609-A
J-7  Chip-A for universal wrench J-6082-609-1	J-8  Chip-B for universal wrench J-6082-609-2	

Fig. 4-1-1

Note 1: Personal Computer (PC)
(Color Calculator 2 installed)

OS:	Windows XP
MEMORY:	40 M Byte or more recommended
Hard disk free area:	15 M Byte or more recommended
USB terminal:	Standard equipment
Graphics:	32,000 colors or more recommended VGA monitor

Note 2: Finished Inspection JIG is **AC 100 V** only.

4-1-2. Lens Adjustment Program (ActuatorChecker)

The lens adjustment program is required for the following check/adjustment.
4-5. LENS ROM CHECK
4-6. FOCUS HOLD BUTTON CHECK

Prepare/start the lens adjustment program with the following steps.

Equipment used

- Personal Computer
- Lens Adjustment Program (ActuatorChecker.zip)
- PC Card Setup File (InstaCal.zip)

Note 1: Lap top PC with PC card slot on which Windows XP runs
Note 2: Obtain the PC card setup file (InstaCal.exe) from the ESI homepage.
Note 3: Obtain the lens adjustment program (ActuatorChecker Ver. x.x.x.x.zip) from the ESI homepage.

1. Download of PC card setup file (InstaCal.zip)

1) Create the “MCC”folder in the C drive.

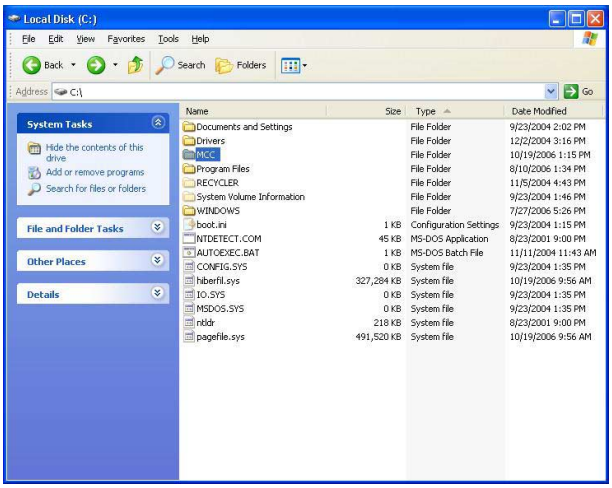


Fig.4-1-2

2) Download the file from Service Fixture and Software of ESI homepage, and save it in “C:\MCC”.
3) Double-click the downloaded file “InstaCal.exe”to extract it.
4) The window to specify the extract destination folder appears. Click [Browse...].

Fig.4-1-3

5) Specify “C:\MCC” for the extract destination folder.

Fig.4-1-4

6) The window returns to the menu to specify the extract destination folder. Click Unzip.

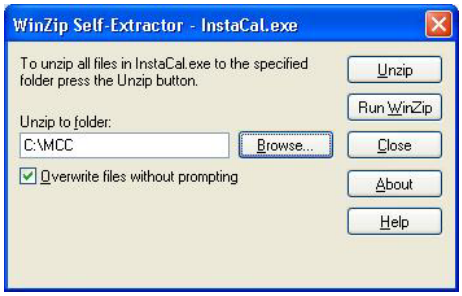


Fig.4-1-5

7) When the window below appears, click OK.

Fig.4-1-6

8) Return to the menu to specify the extract destination folder. Then, click Close to close the window.

2. Setup of PC Card

1) Double-click “InstaCal.exe” in “C:\MCC” folder to begin the installation.

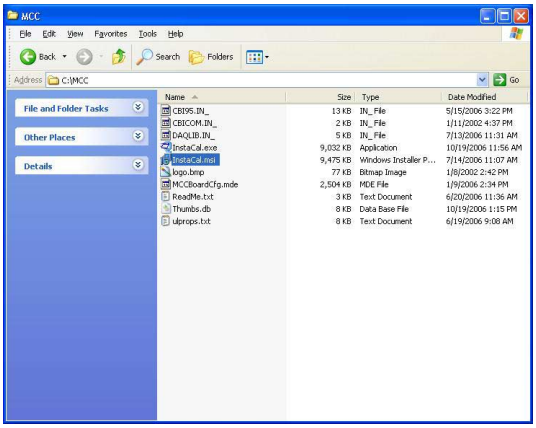


Fig.4-1-7

2) The menu to begin the installation appears. Click Next>.

Fig.4-1-8

3) Specify the install destination folder. As the default is used for it, click Next>.

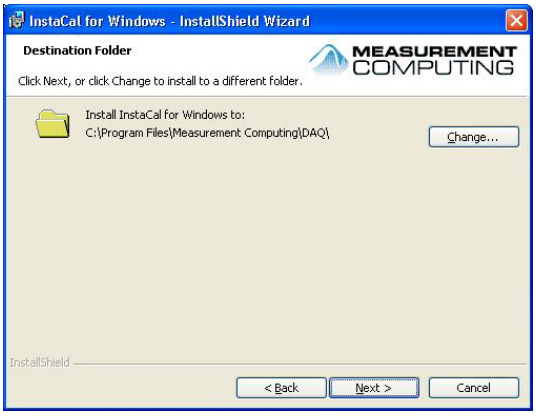


Fig.4-1-9

4) The menu to tell that the wizard is ready to install appears. Click Install.

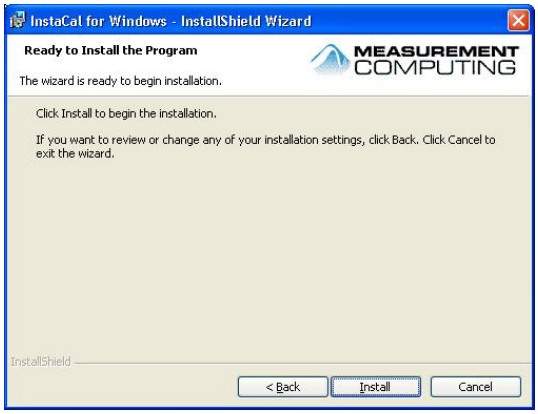


Fig.4-1-10

5) The installation is completed. Click Finish.

Note: ITo refer to the "readme" file, check the "Show the readme file" and click Finish.

Fig.4-1-11

6) To make the configuration installed effective, the window to prompt the restart appears. Click "Yes" to restart the PC.

Note: If a device is connected without restarting, the program may not work properly.

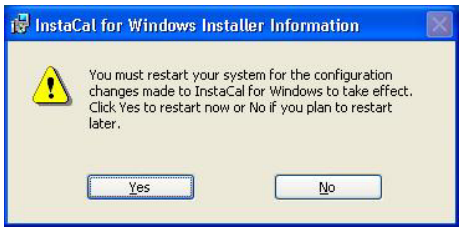


Fig.4-1-12

7) After restarting the PC, insert the PC-CARD-DIO48 in the PC card slot.

8) The software installation window appears.
Click “Install the software automatically. (Recommended)”.

Fig.4-1-13

9) The software is detected and installed. When the window below appears, click Finish to terminate the installation.

Fig.4-1-14

3. Confirmation of PC card setting

1) Select “All programs” - “MeasumentComputing” - “InstaCal” from the startup menu, and start up the software.

Note: Depending on the Windows setting, the window below may differ.

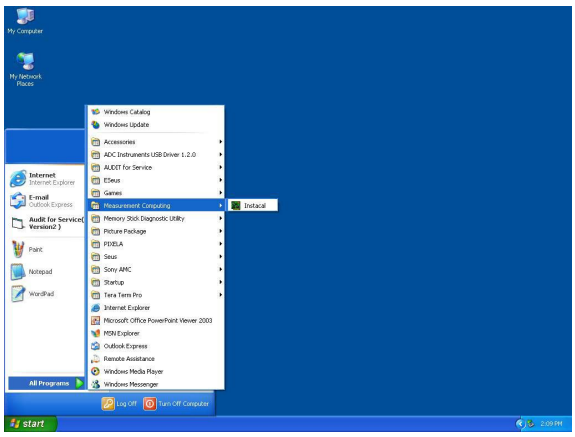


Fig.4-1-15

2) When “PC-CARD-DIO48” is detected, the window below appears. Confirm that the PC-CARD-DIO48” is checked.

Note: Depending on the slot inserted, the slot No. differs.

Fig.4-1-16

3) Confirm that “PC-CARD-DIO48” is recognized as “Board#0”.

Note: If not recognized as “Board#0”, the program does not work properly.

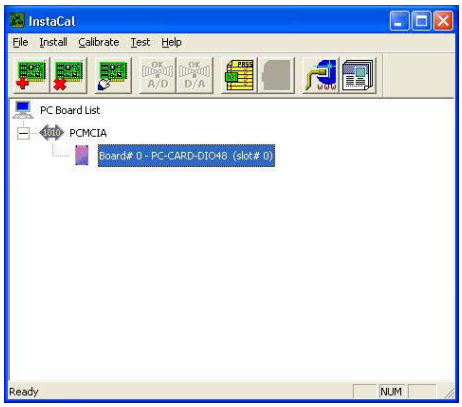


Fig.4-1-17

4) Click “File” - “Exit” to terminate “InstaCal”.

4. Startup of Lens Adjustment Program (ActuatorChecker.exe)

1) Download the file “ActuatorChecker VerX.X.X.X.zip” from Service Fixture and Software of ESI homepage, save and extract it.
2) Start up “ActuatorChecker.exe” from an arbitrary folder.
3) If “PC-CARD-DIO48” is properly installed, the window below appears.

Note: The version of “ActuatorCheker” might be updated.

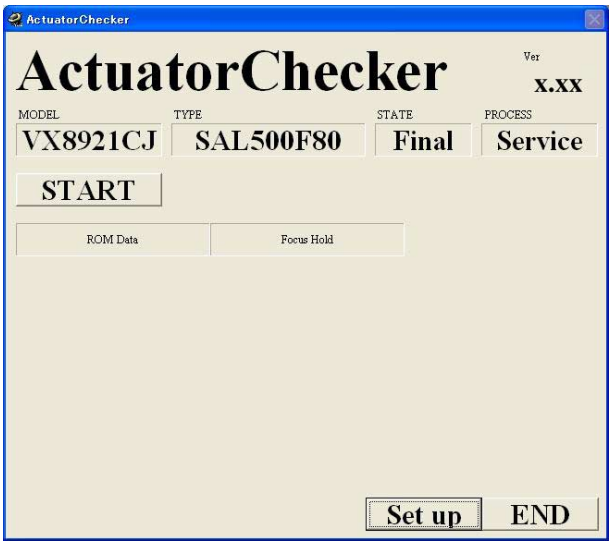


Fig.4-1-18

4-1-3. Connection of Finished Inspection JIG and Lens Adjustment Program (ActuatorChecker.exe)

Note: Confirm “4-1-2. Lens Adjustment Program (ActuatorChecker)” has been completed before this procedure is executed.

Equipment

- Personal Computer
- USB cord with connector
- Finished Inspection JIG (AC 100 V only)
- Lens Adjustment Program (ActuatorChecker.exe)

1. Connect equipment and checking lens as shown Fig.4-1-19.

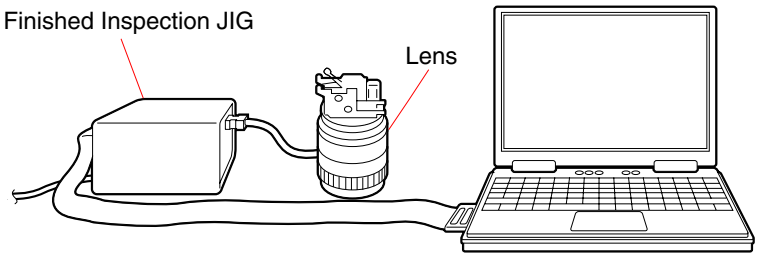


Fig.4-1-19

2. Turn on the finished inspection JIG.
3. Turn on the personal computer.
4. Start up “ActuatorChecker.exe” from an arbitrary folder, conform that start up program normally.
   Note: Turn off the finished inspection jig after use.

4-1-4. Initial Setting of “ActuatorChecker”

1. Start up “ActuatorChecker.exe”.

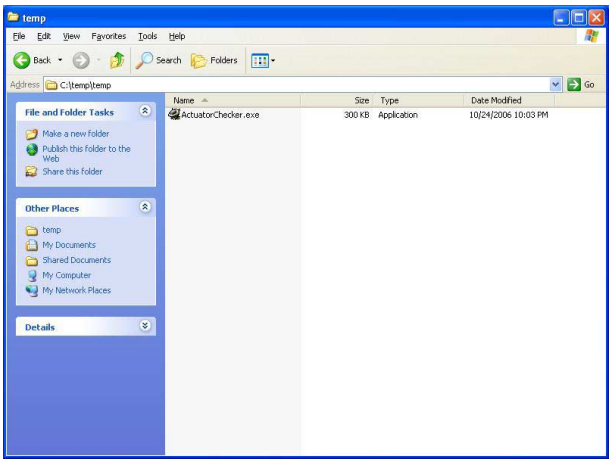


Fig.4-1-20

2. Depending on the initial startup or setting made at the previous startup, the window differs.When the English window appears, click the Set up button.

   Note: When any button is clicked, the Serial window appears. The window to enter the lens serial number appears.

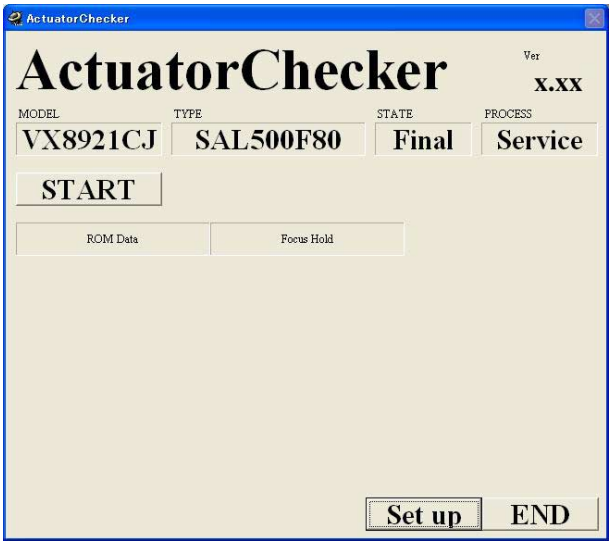


Fig.4-1-21

3. Set the following contents in the SETUP window.
   - MODEL Model to be adjustment this time
   - Language English
   - State FINAL
   - PROCESS SERVICE
4. Confirm that all of the items are set, and click [OK].

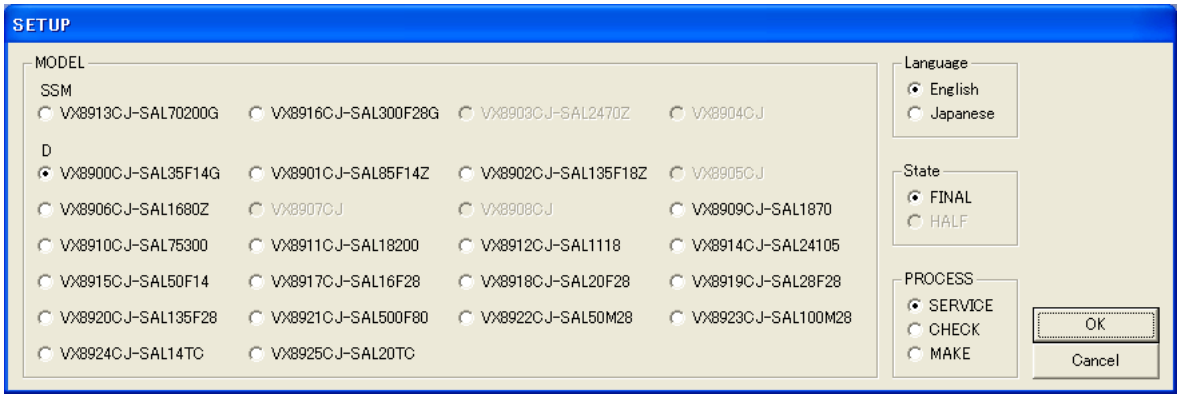


Fig.4-1-22

4-1-5. About Inspection Procedure of Lens Adjustment Program (ActuatorChecker)

The inspection method has the method of executing the method of inspecting the corresponding model as everything continues and the inspection of each item one by one.
Click [START] from the start up window when you inspect the corresponding model as everything continues.
The procedure for executing the inspection of each item one by one has been described in this manual.

4-2. OPTICAL AXIS CHECK/ADJUSTMENT

4-2-1. Optical Axis Check

Equipment

- Flange Back Tester
- A-mount Attachment
- Flange Back Gauge (43.50mm)

Note: Use the collimator (1500 mm or longer)

1. Preparations

1) Set the equipments as shown in the Fig.4-2-1.

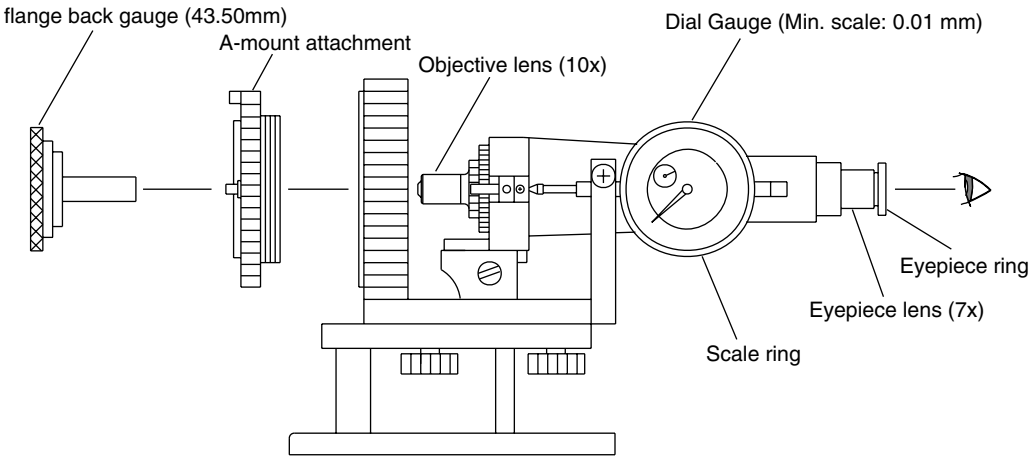


Fig.4-2-1

2) Looking through the eyepiece lens, turn the eyepiece ring of the flange back tester so that cross line or scale in the view is the sharpest.
3) Attach the flange back gauge (43.50mm) securely to the A-mount attachment and hold them together.
4) Turn the focusing knob of the flange back tester so that fine scratches on the flange back gauge (43.50mm) is the sharpest.

Note: Turn the knob in the direction of the arrow of Fig.4-2-2 for correct reading.

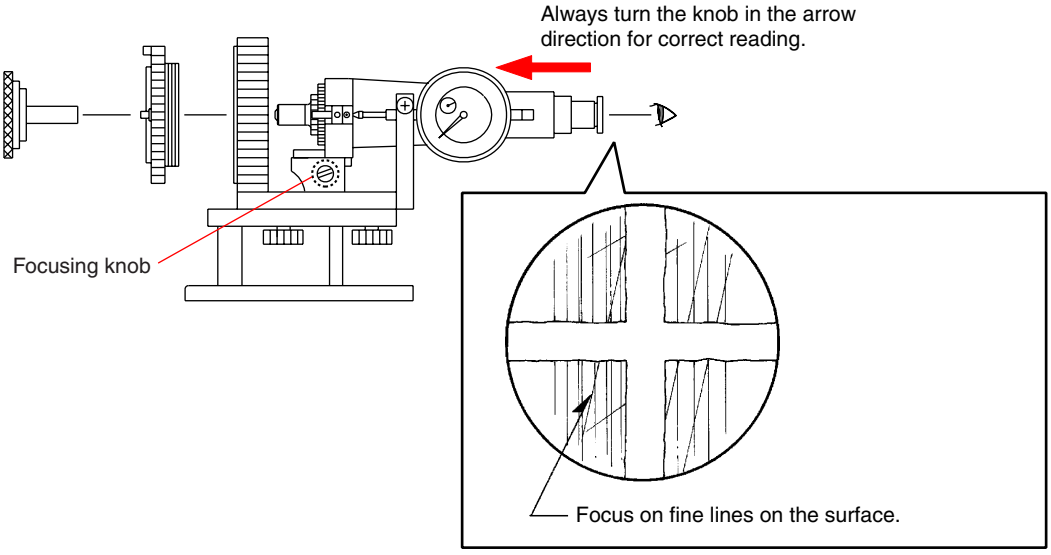


Fig.4-2-2

5) Turn the scale ring of the dial gauge until the long pointer indicates “0”.

Note: This position is the flange back (f’F) = 43.5 mm.
Memorize the position of short-pointer.

2. Checking Method

1) Attach the checking lens to the flange back tester, and set the collimator (1500 mm or longer).

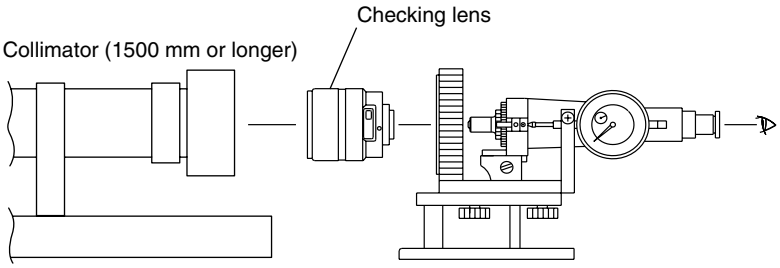


Fig.4-2-3

2) Turn the focusing knob of the flange back tester so that the dial gauge indicates "44.58 mm".
When turning the focusing knob of the tester, chart image check is not required.

3) Turn the helicoid unit of the checking lens until the image is the sharpest (red and green areas are equal on the chart*).
*: Position in which the color of the collimator chart changes from green into red and come into focus.

Note: Figure shows an example. The cause depends on individual lens.

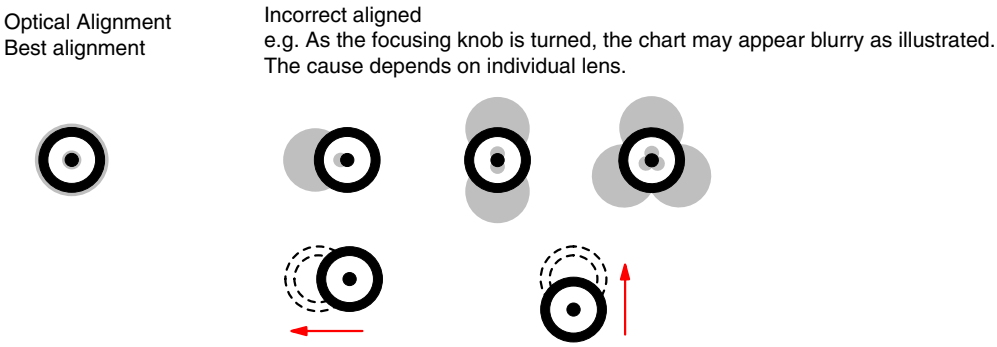


Fig.4-2-4

4) Turn the focusing knob of the flange back tester, and check that the difference of the dial gauge value from the start of color change (green to red, or red to green) at a point on the chart, to entire color change (red or green) of its periphery meets the following specification.

Off center: 0.3 mm or less

5) Check the difference of the dial gauge value from the start of color change (green to red, or red to green) at symmetrical two points on the chart to entire color change (red or green) of those peripheries meets the following specification.

Astigmatism: 0.3 mm or less

6) When the optical axis of the checking lens is out of the specifications, perform the "4-2-2. Optical Axis Adjustment".

4-2-2. Optical Axis Adjustment

Equipment

- Flange Back Tester
- A-mount Attachment
- Flange Back Gauge (43.50mm)
- Adhesive bond (B-10)

Note: Use the collimator (1500 mm or longer)

Adjusting Method

1) Disassemble or assemble the checking lens into the state of Fig.4-2-5.

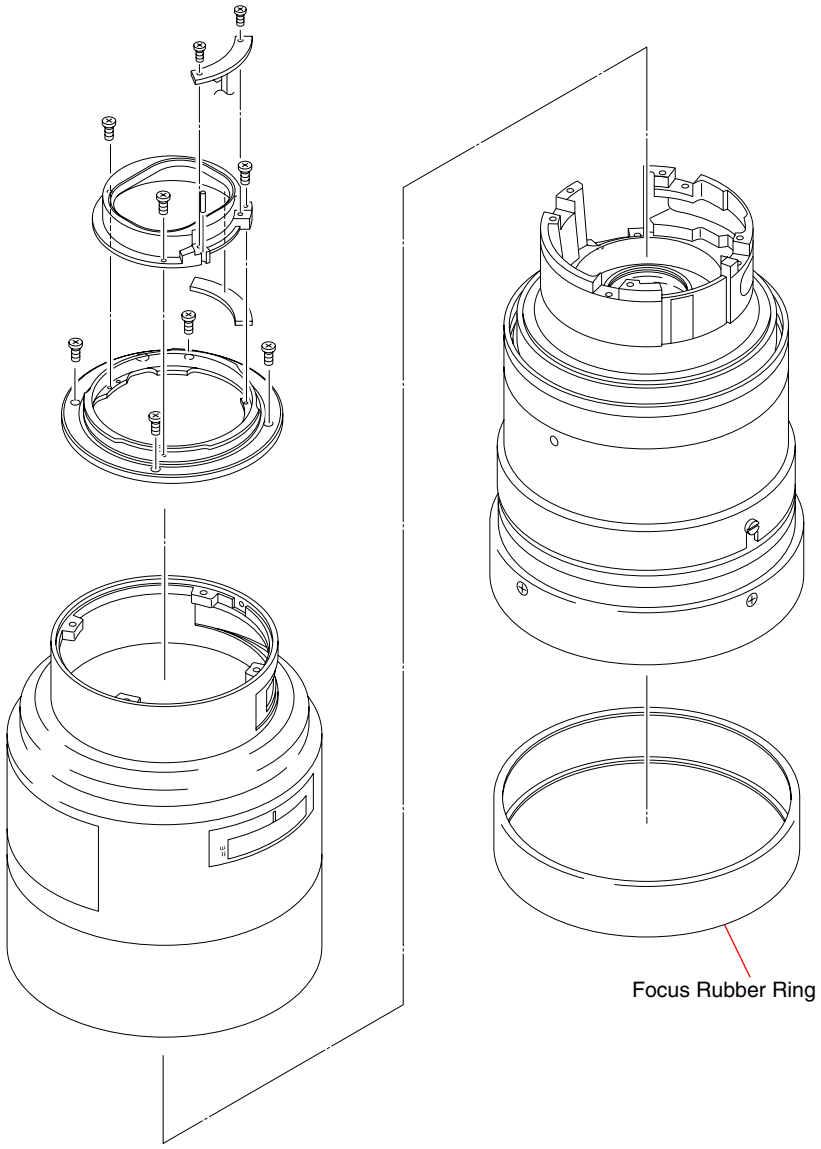
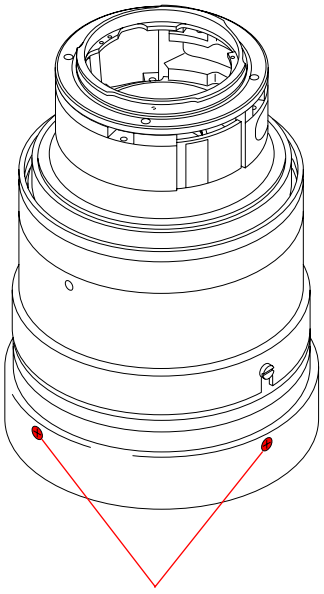


Fig.4-2-5

2) Perform “4-2-1. Optical Axis Check/Adjustment”, and check that the optical axis of the checking lens is out of specification.
3) Turn the knob of flange back tester so that the dial gauge indicates “44.57mm”. Then, adjust the focus by rotating the G1 lens holder.
4) Loosen the G1 stopper so that it lightly touches the G1+G3+G7 assy.

Note: When performing the following adjustments, if the G1 stopper is tightened too much, the G1+G3+G7 assy may be damaged. If loosened too much, the G1+G3+G7 assy may tilt, resulting in improper adjustment.

5) Turn three G1 adjustment screws to move the position of the G1+G3+G7 assy so that the red and green color shifts at the peripheral of chart image are equal.



G1 Adjustment Screws (Three areas)

Fig.4-2-7

6) If not adjusted in step 5), rotate the G1+G3+G7 assy so that either red or green area is minimized, and perform step 5).
7) If the adjustment is not completed in step 6), perform as follows.
   1. Remove the helicoid (G1 lens holder) having the G1+G3+G7 assy from the helicoid unit.
   2. Loosen the G2 retainer until it touches lightly the G2+G4+G5 assy.
   3. Rotate the G2.G4.G5 joint ball as is done in step 6).
   4. Install the helicoid (G1 lens holder) having the G1+G3+G7 assy to the helicoid (G2 lens holder) having the G2+G4+G5 assy.
   5. Repeat steps 3 and 4) so that so that either red or green shift at the peripheral of chart image is minimized.
   6. Tighten further the G2 stopper 5 to 10mm from the position where the G2 stopper touches the part (G2 hold plate) inside.
8) If step 6) or 7) are performed, perform step 5) again.

9) Turn the helicoids unit to the closest distance side (fully to the measurable range flange back tester).
Check that the red and green color shifts at right and left are even.

10) Apply the adhesive bond (B-10) in the width of 30mm to two indicated locations of G1 stopper (Refer to HELP 12)

11) Screw the G1 stopper into the helicoid unit until its tip touches the inner part (G1+G3+G7 assy).
And then tighten further the G1 stopper about 5 to 10mm.

Note: After tightening, confirm that the lens inside the helicoid unit does not rattle when the helicoid unit is shaken.
Do not tighten the G1 stopper too strongly.

12) After adjustment, apply the adhesive bond (B-10) to two indicated holes of G2 stopper and attach it to the helicoids unit.

13) After adjustment, apply the adhesive bond (B-10) to the tip of the G1 adjustment screws (three areas).

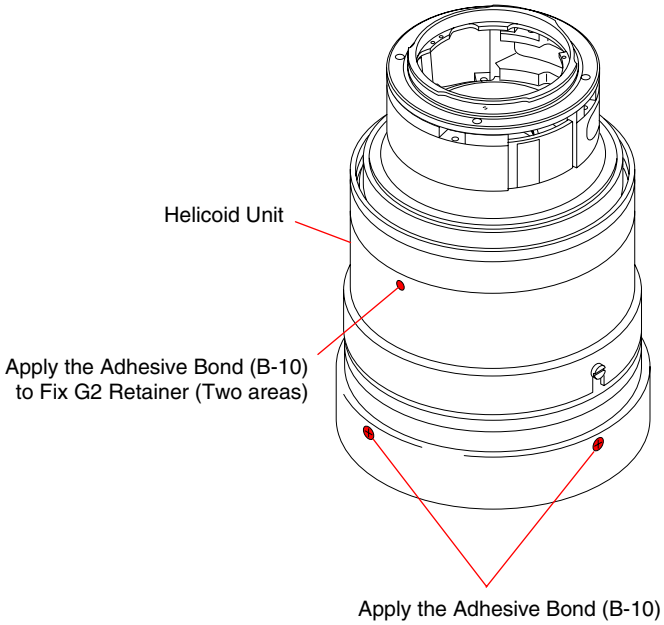


Fig.4-2-7

4-3. FLANGE BACK (f'F) ADJUSTMENT

Perform this adjustment after completing the "4-2. Optical Axis Check/Adjustment".

Equipment

- Flange Back Tester
- A-mount Attachment
- Flange Back Gauge (43.50mm)

  Note: Use the collimator (1500 mm or longer)

1. Preparations

1) Set the equipment according to "1. Preparations" of "4-2. Optical Axis Check/Adjustment'".
2) Remove the focus scale window unit of the outer barrel assy.

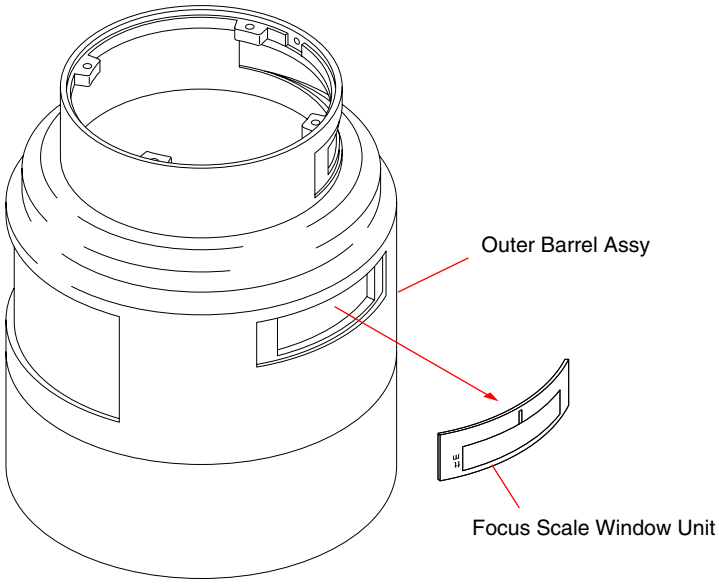


Fig.4-3-1

3) Mark the scrape line to the outer barrel assy that corresponds to the index line of the detached focus scale window unit as shown in the figure.

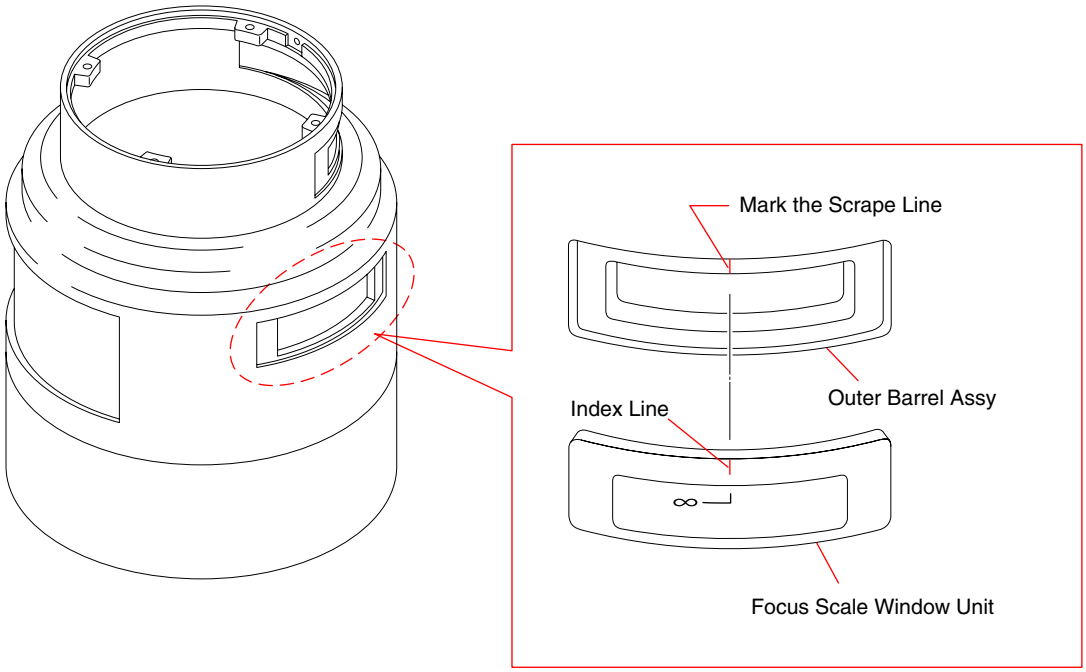


Fig.4-3-2

4) Attach the outer barrel assy, focus connect ring, gear block, filter and mount block tentatively to the helicoid unit.

2. Adjusting Method

1) Attach the checking lens to the flange back tester, and set the collimator (1500 mm or longer).

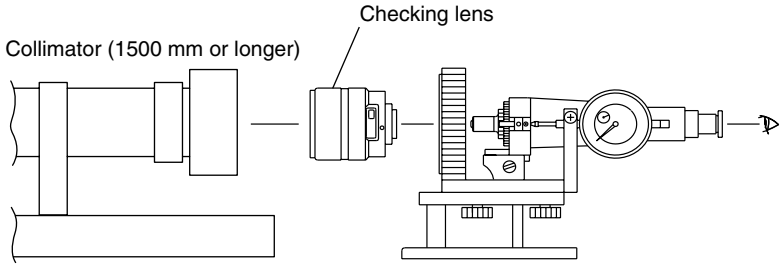


Fig.4-3-3

2) Turn the focusing knob of the flange back tester so that the dial gauge indicates “44.57 mm”.
3) Turn the helicoid unit of the checking lens until the image is the sharpest.
4) Mark the scrape line to the focus connect ring at the same position (infinity position) as the index line on the fixed holding tube marked in step 3) of the preparation.

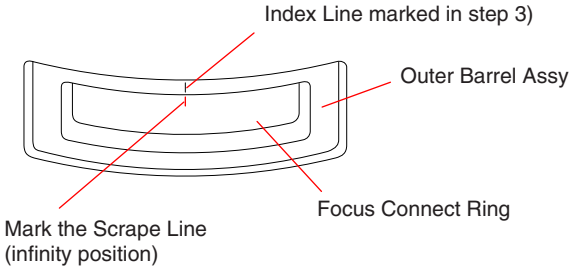


Fig.4-3-4

5) Remove the outer barrel assy, gear block, filter and mount block.
6) Align the infinity position of the focus scale plate with the index line marked in step 4), and affix it to the focus connect ring.

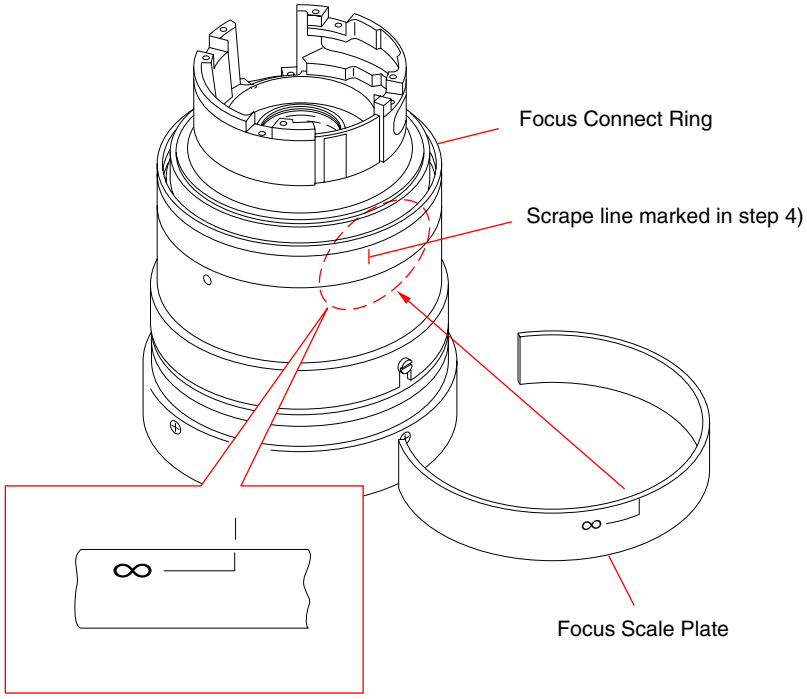


Fig.4-3-5

7) Affix the two focus scale plate set tapes to both ends of the focus scale plate.

4-4. INNER GEAR POSITION ADJUSTMENT

Perform this adjustment after completing the “4-2. Optical Axis Check/Adjustment” and “4-3. Flange Back (f’F) Adjustment”.

1. Adjusting Method

1) Attach the outer barrel assy tentatively.
2) Turn the G1 lens holder to align the index line on the focus scale window unit with the infinity index line of the focus scale plate.

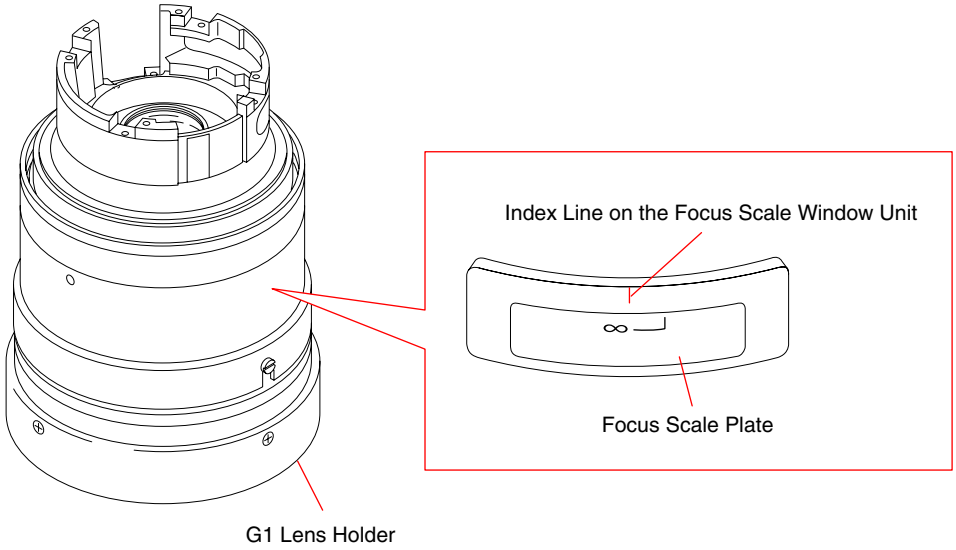


Fig.4-4-1

3) Rotate the coupler of the gear block clockwise until it stops.

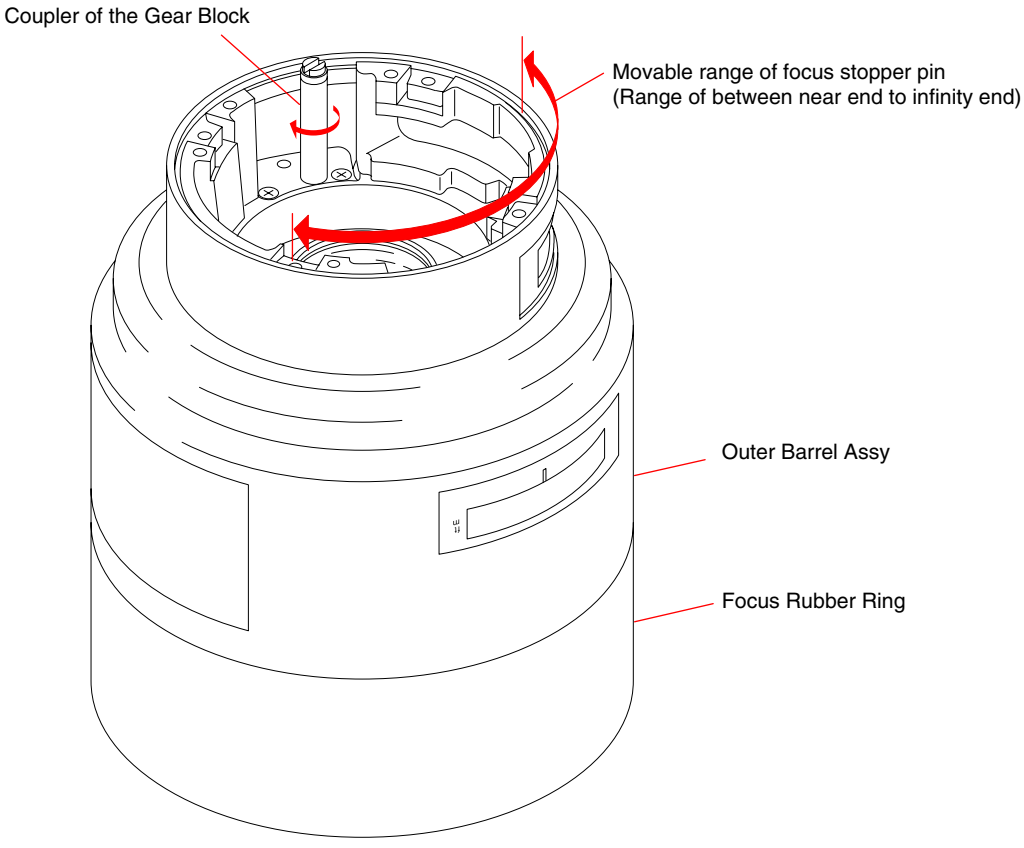


Fig.4-4-2

4) Detach the outer barrel assy in the state of above step 3), and lift the focus connect ring up. Then, fix the inner gear with back adjustment tape.

Note: At this time, hold it not to shift the focus rubber ring.

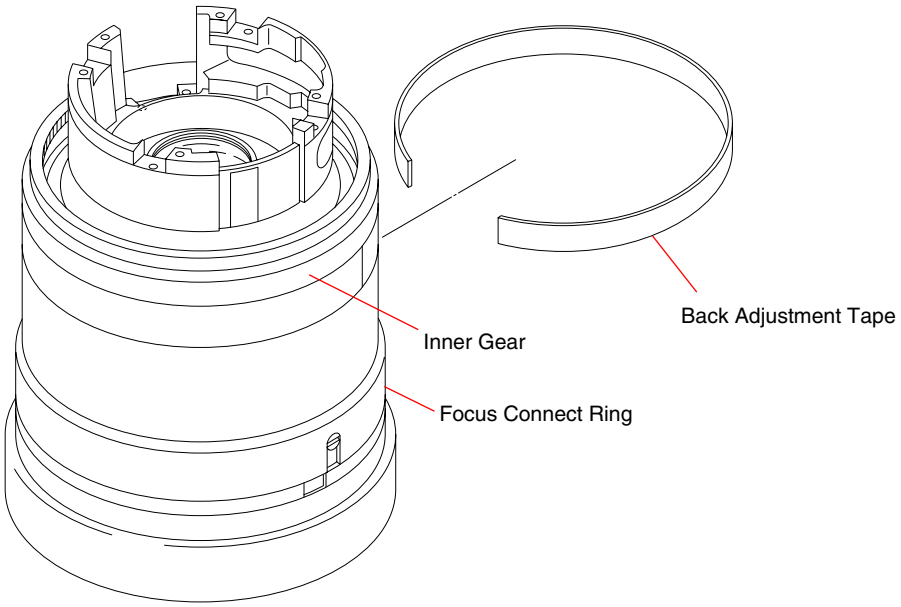


Fig.4-4-3

5) Rotate the helicoid unit, and check that it rotates smoothly without catching between near distance end and infinity position.

6) After assembling, mount the lens to the camera and focus it on an infinite object. Check that the infinity position of the focus scale plate and the index of the focus scale window unit are the same position as shown in the figure.

4-5. LENS ROM CHECK

Equipment

- Personal Computer
- Finished Inspection JIG (AC 100 V only)
- Lens Adjustment Program (ActuatorChecker.exe)

1. Preparations

1) Connected to equipment with checking lens. (Refer to Section 4-1-3.)
2) Start up of “ActuatorChecker.exe”.
3) Click [Set up], and perform the initial setting. (Refer to Section 4-1-4.)

2. Checking Method

1) Click [ROM Data].

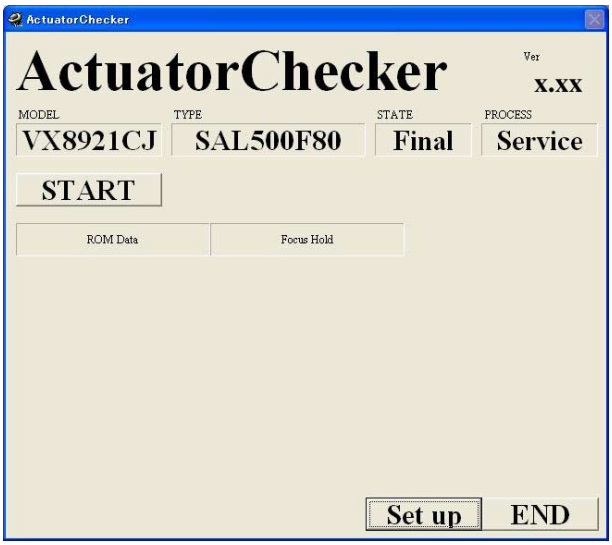


Fig.4-5-1

2) The Serial window appears. Input the lens serial number.

Note: When [OK] is clicked without inputting the serial number, the date executed is displayed on the completion window of each item.

Fig.4-5-2

3) When “OK” is displayed on the pop-up window, press the ENTER key to return to the initial window.

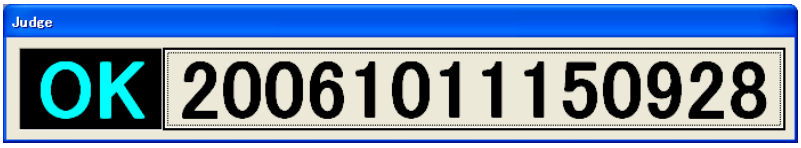


Fig.4-5-3

3. In case of error display in the ROM Data

1) When the error display and the NG display appear to the pop up window, press the ENTER key to return to the initial window, and perform “2. Checking Method” again.

Fig.4-5-4

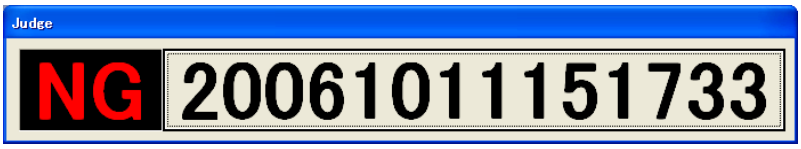


Fig.4-5-5

2) If the “NG” appears, confirm or perform the following.
   - Cleaning of the signal PC board of main flexible unit or perform the solder.
   - Perform or replace the solder of main flexible unit.

3) Perform “2. Checking Method” again, repeat the inspection until “OK” appears on the pop-up window.

4-6. FOCUS HOLD BUTTON CHECK (FOCUS HOLD BUTTON INSPECTION)

Equipment

- Personal Computer
- Finished Inspection JIG (AC 100 V only)
- Lens Adjustment Program (ActuatorChecker.exe)

1. Preparations

1) Connected to equipment with checking lens. (Refer to Section 4-1-3.)
2) Start up of "ActuatorChecker.exe".
3) Click [Set up], and perform the initial setting. (Refer to Section 4-1-4.)

2. Checking Method

1) Click the [Focus Hold].

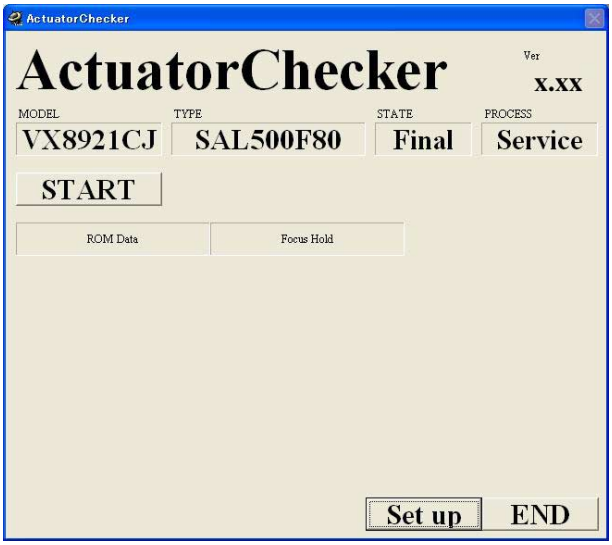


Fig.4-6-1

2) The Serial window appears. Input the lens serial number.

Note: When [OK] is clicked without inputting the serial number, the date executed is displayed on the completion window of each item.

Fig.4-6-2

3) The message "Push [FOCUS HOLD] button once softly." is displayed on the pop-up window.
Press the focus hold button.

Fig.4-6-3

4) When the focus hold button check finishes normally, "OK" is displayed on the pop-up window.

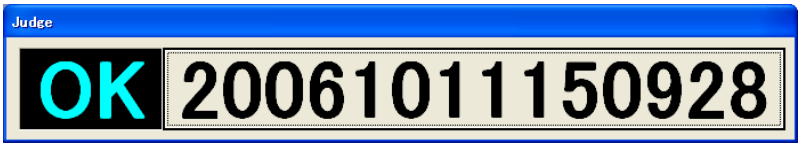


Fig.4-6-4

3. In case of error display in the Focus Hold Button

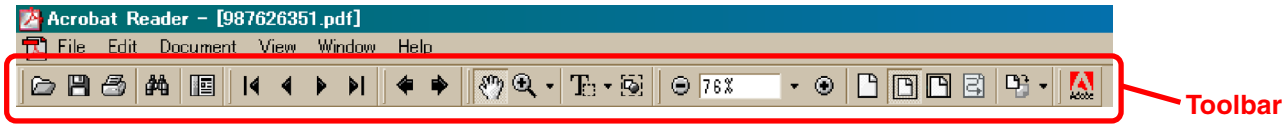
1) When the Focus Hold Button cannot be pressed within a certain period of time or the button is defective, the window below appears.

Fig.4-6-5

2) In case of error caused by time-out of key pressing, perform the work with caution so as to press the focus hold button within a certain period of time.
3) If the “NG” appears, confirm or perform the following.
   - Cleaning of the signal PC board of main flexible unit or perform the solder.
   - Perform the click plate, and perform or cleaning of the FH pattern of main flexible unit.
   - Perform or replace the solder of main flexible unit.

4) Perform “2. Checking Method”again, repeat the inspection until “OK” appears on the pop-up window.

[Description of main button functions on toolbar of the Adobe Acrobat Reader Ver5.0 (for Windows)]



Printing a text

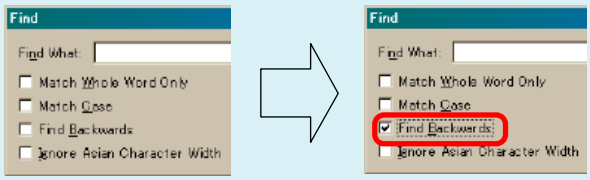
1. Click the Print button .
2. Specify a printer, print range, number of copies, and other options, and then click [OK].

Application of printing:
To set a range to be printed within a page, select the graphic selection tool and drag on the page to enclose a range to be printed, and then click the Print button.

Finding a text

1. Click the Find button .
2. Enter a character string to be found into a text box, and click the [Find]. (Specify the find options as necessary)

Application to the Service Manual:
To execute "find" from current page toward the previous pages, select the check box "Find Backward" and then click the "Find".



3. Open the find dialog box again, and click the [Find Again] and you can find the matched character strings displayed next. (Character strings entered previously are displayed as they are in the text box.)

Application to the Service Manual:
The parts on the drawing pages (block diagrams, circuit diagrams, printed circuit boards) and parts list pages in a text can be found using this find function. For example, find a Ref. No. of IC on the block diagram, and click the [Find Again] continuously, so that you can move to the Ref. No. of IC on the circuit diagram or printed circuit board diagram successively.
Note: The find function may not be applied to the Service Manual depending on the date of issue.

Switching a page

- To move to the first page, click the .
- To move to the last page, click the .
- To move to the previous page, click the .
- To move to the next page, click the .

Reversing the screens displayed once

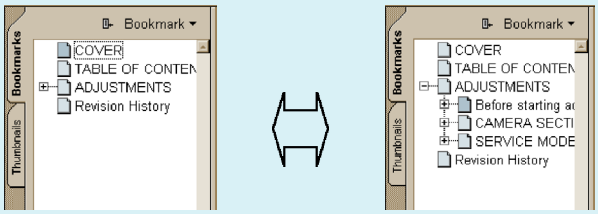
- To reverse the previous screens (operation) one by one, click the .
- To advance the reversed screens (operation) one by one, click the .

Application to the Service Manual:
This function allows you to go and back between circuit diagram and printed circuit board diagram, and accordingly it will be convenient for the voltage check.

Moving with link

1. Select either palm tool , zoom tool , text selection tool , or graphic selection tool .
2. Place the pointer in the position in a text where the link exists (such as a button on cover and the table of contents page, or blue characters on the removal flowchart page or drawing page), and the pointer will change to the forefinger form .
3. Then, click the link. (You will go to the link destination.)

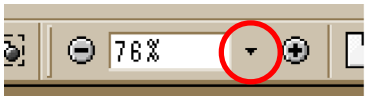
Moving with bookmark:
Click an item (text) on the bookmark pallet. and you can move to the link destination. Also, clicking can display the hidden items.
(To go back to original state, click)



Zooming or rotating the screen display

"Zoom in/out"

- Click the triangle button in the zoom control box to select the display magnification. Or, you may click or for zooming in or out.



"Rotate"

- Click rotate tool , and the page then rotates 90 degrees each.

Application to the Service Manual:
The printed circuit board diagram you see now can be changed to the same direction as the set.

Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2006.10	Official Release	—	—
1.1	2006.12	Revised-1	• Change of Repair Parts (Section 2, Section 3) • Change of List of Service Tools and Equlipments (Section 4)	Yes