SAL50M28

(MACRO 2.8/50) (50mm F2.8 Macro)

SERVICE MANUAL

Ver 1.1 2007.02
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 Lens Test Projector

LENS FOR DSLR CAMERA

SONY

SAL50M28 (MACRO 2.8/50) (50mm F2.8 Macro)
9-852-101-12

Sony EMCS Co.

2007B0800-1

Published by Kohda TEC

SPECIFICATIONS

- This lens is equipped with a distance encoder. The distance encoder allows more accurate measurement (ADI) by using a flash for ADI.
- 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)
75
*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
6-7

Angle of view 1 *2
47°

Angle of view 2 *2
32°
*2 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)) *3
0.2 (0.65)
*3 Minimum focus is the shortest distance from the image sensor to the subject.

Maximum magnification (×)
1

Minimum f-stop
f/32

Filter diameter (mm)
55

Dimensions (maximum diameter × height) (mm (in.))
Approx. 71.5 × 60 (2 13/16 × 2 3/8)

Mass (g (oz.))
Approx. 295 (10 3/8)

Included items
Lens (1), Front lens cap (1), Rear lens cap (1), Set of printed documentation

Designs and specifications are subject to change without notice.

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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!!

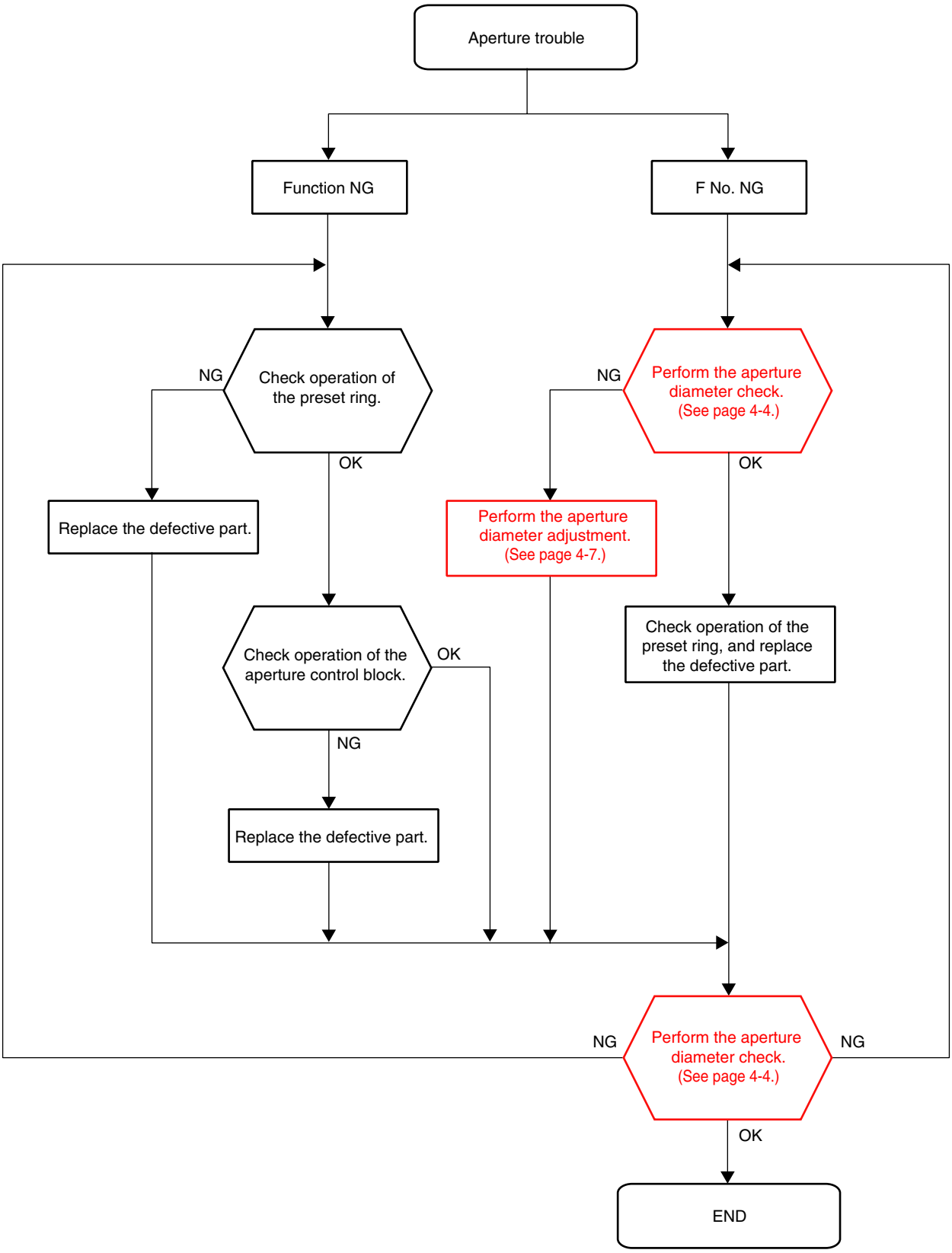
COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

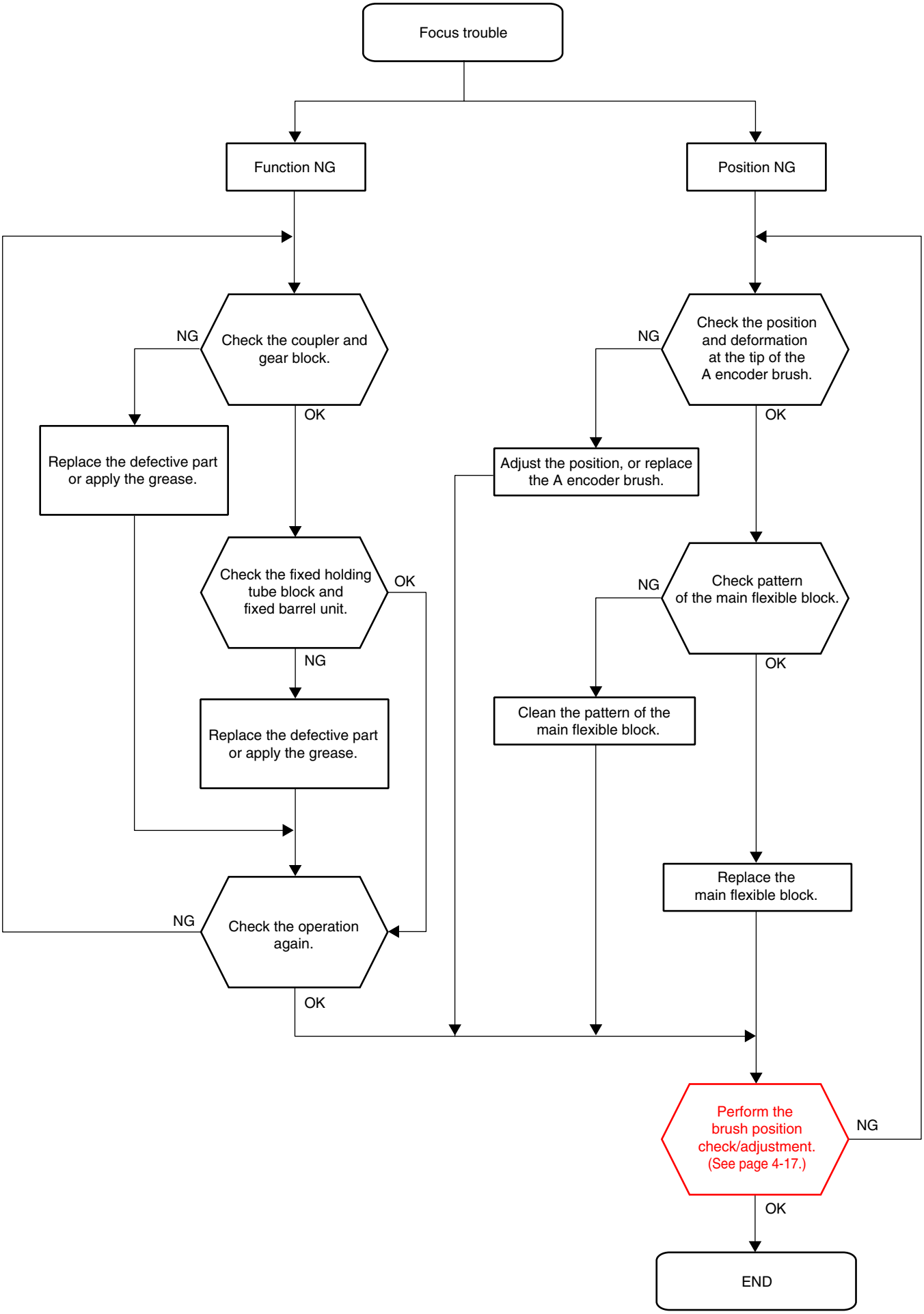
LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈSES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPÉMENTS PUBLIÉS PAR SONY.

1-5. TROUBLESHOOTING

1-5-1. Aperture Trouble



1-5-2. Foucus Trouble

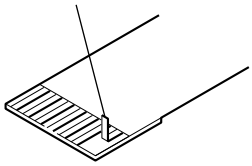


2. DISASSEMBLY

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.

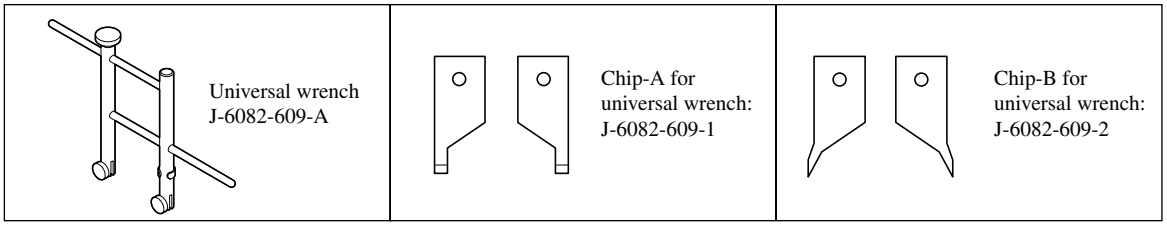
Cut and remove the part of gilt which comes off at the point. (Be careful or some pieces of gilt may be left inside)



UNIVERSAL WRENCH

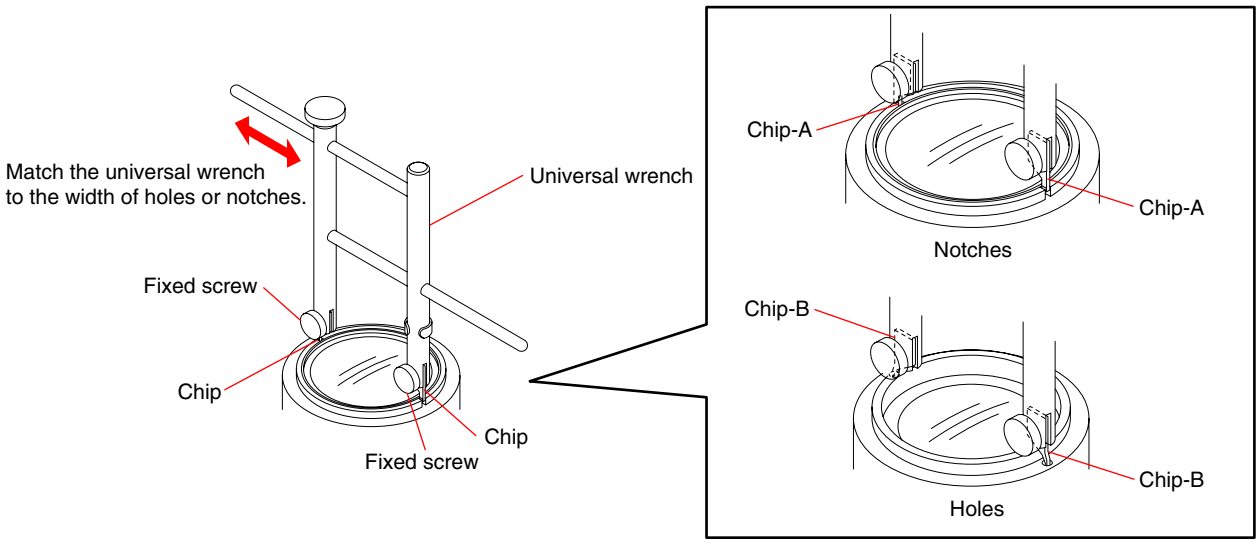
In case of the following notches or holes are located in the lens block, etc during disassembling/ assembling the lens, Use the universal wrench.

How to Use



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

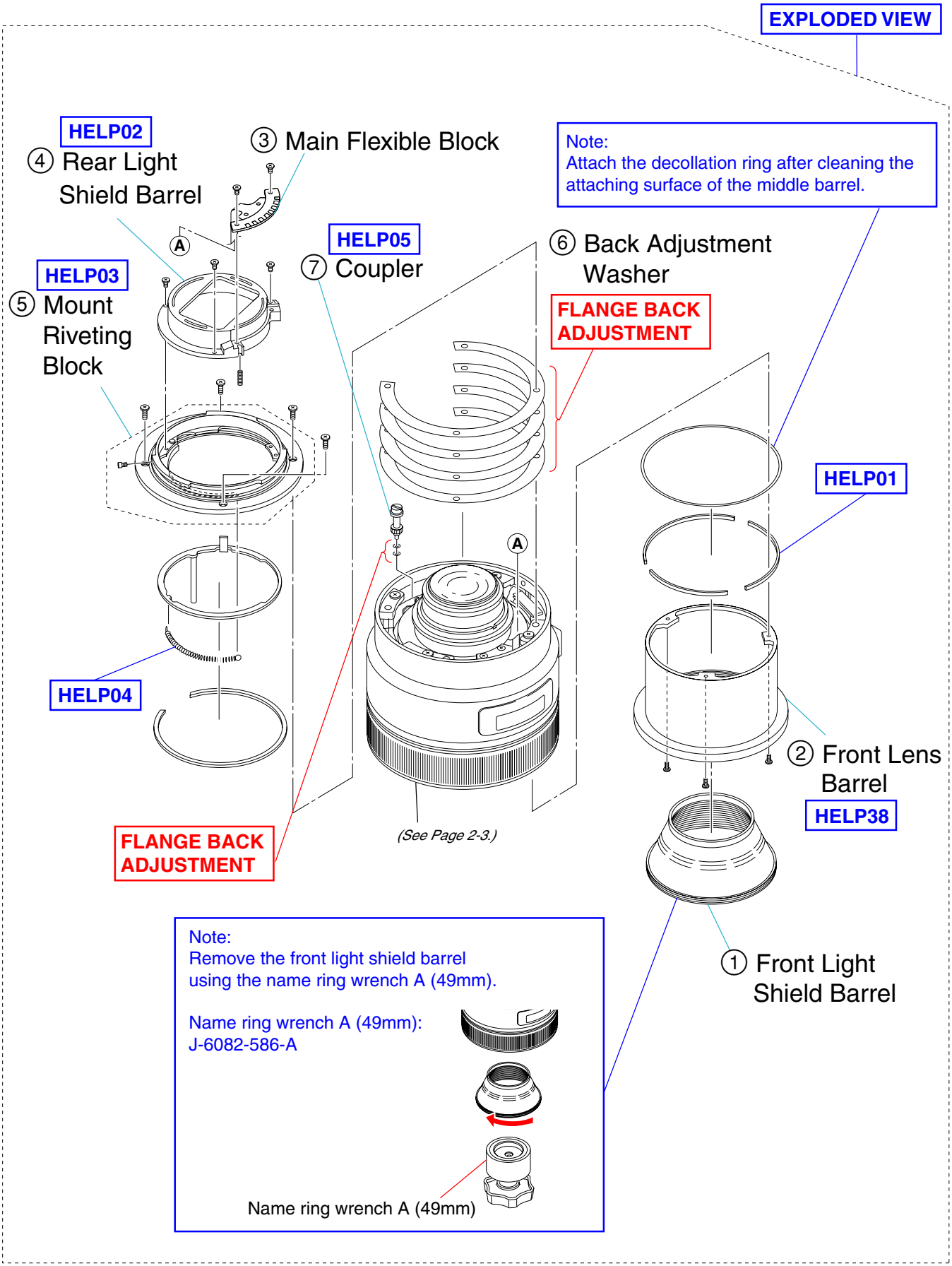
Match the universal wrench to the holes or notches of the lens block, etc.



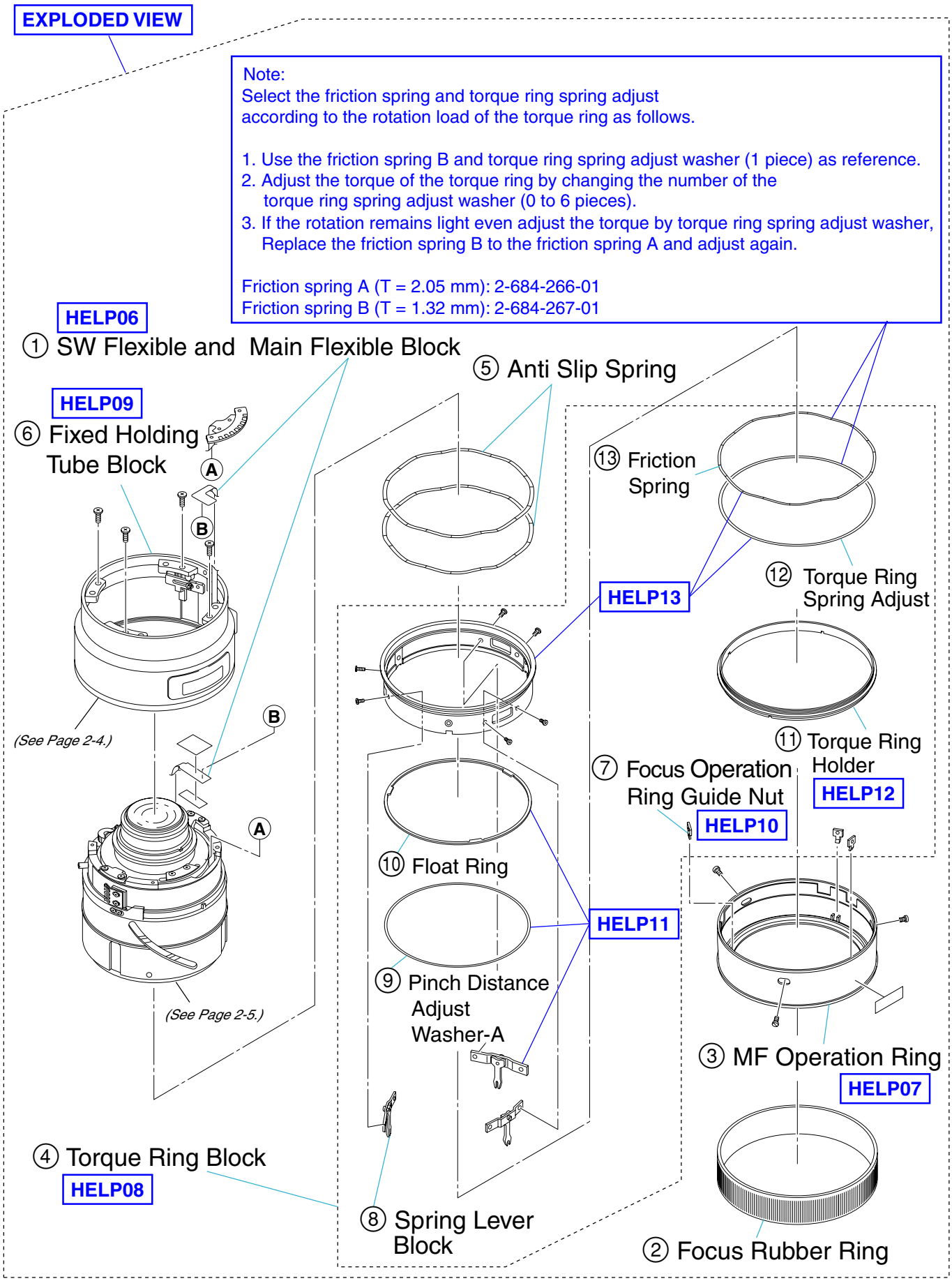
When top of tip does not reach holes or notches because the fixed screw becomes obstructive, replace the fixed screw to below.
+B 3X5 7-682-546-09

2-1. DISASSEMBLY

2-1-1. FRONT LENS BARREL AND MOUNT RIVETING BLOCK



2-1-2. MF OPERATION RING AND TORQUE RING BLOCK



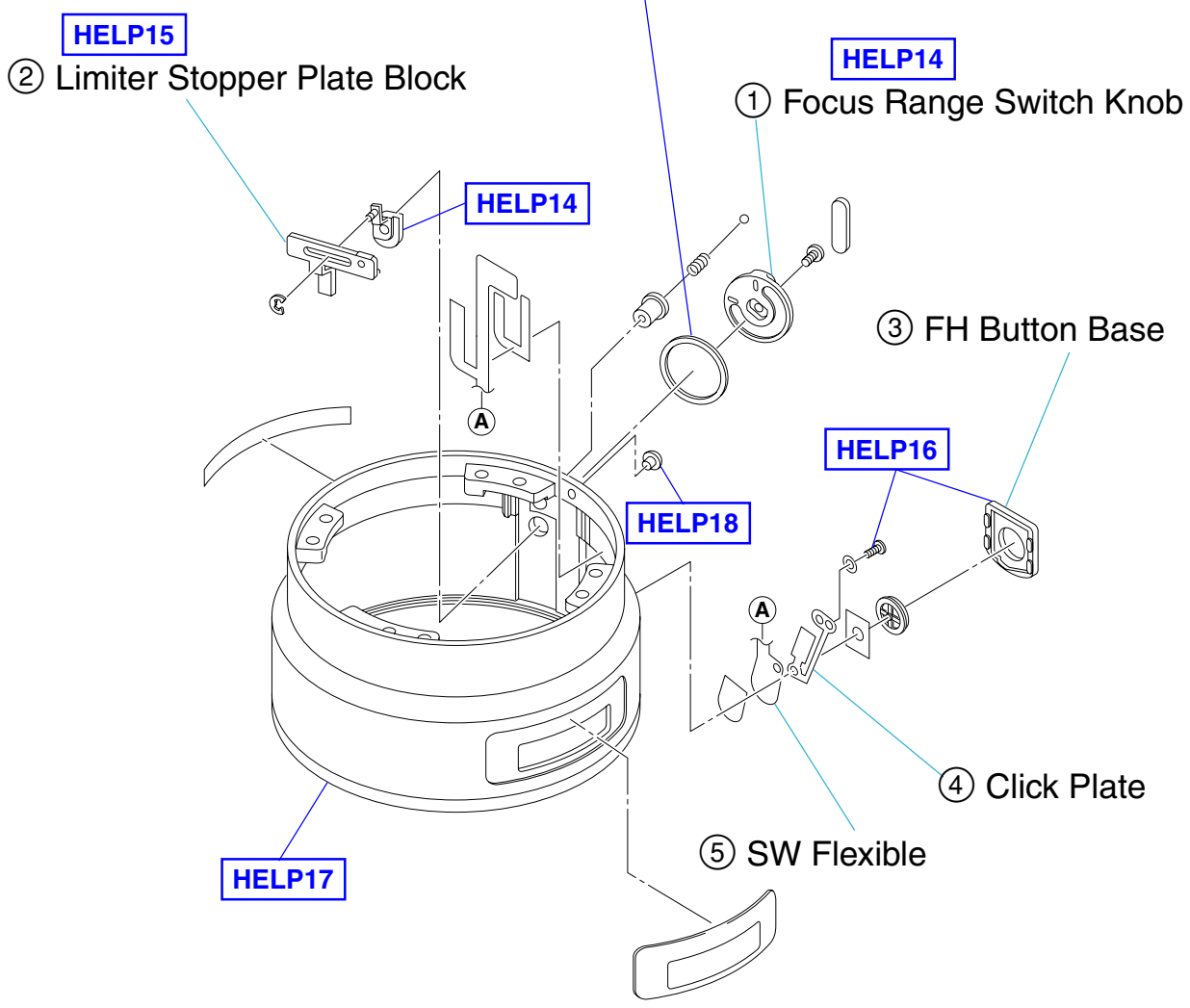
2-1-3. FIXED HOLDING TUBE BLOCK

EXPLODED VIEW

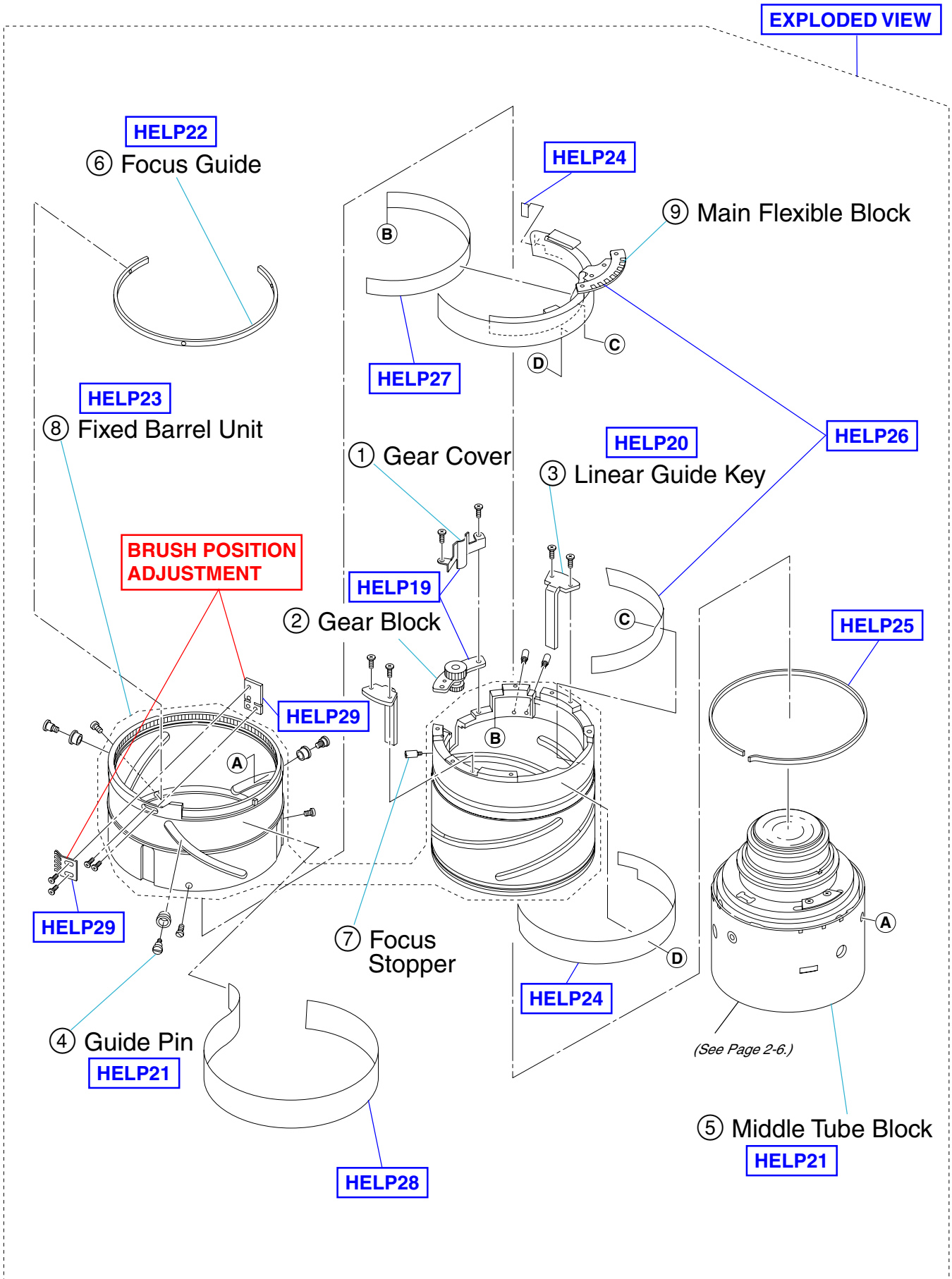
Note:
Select the gap adjust washer according to the rotation load of the focus range switch knob as follows.

1. Install the gap adjust washer-B and check the rotation.
2. If the rotation is heavy, replace with the gap adjust washer-A.
   If it is largely wobbly, replace with the gap adjust washer-C.
3. If the rotation remains heavy even with the gap adjust washer-A,
   remove the washer and attach the focus range switch knob.

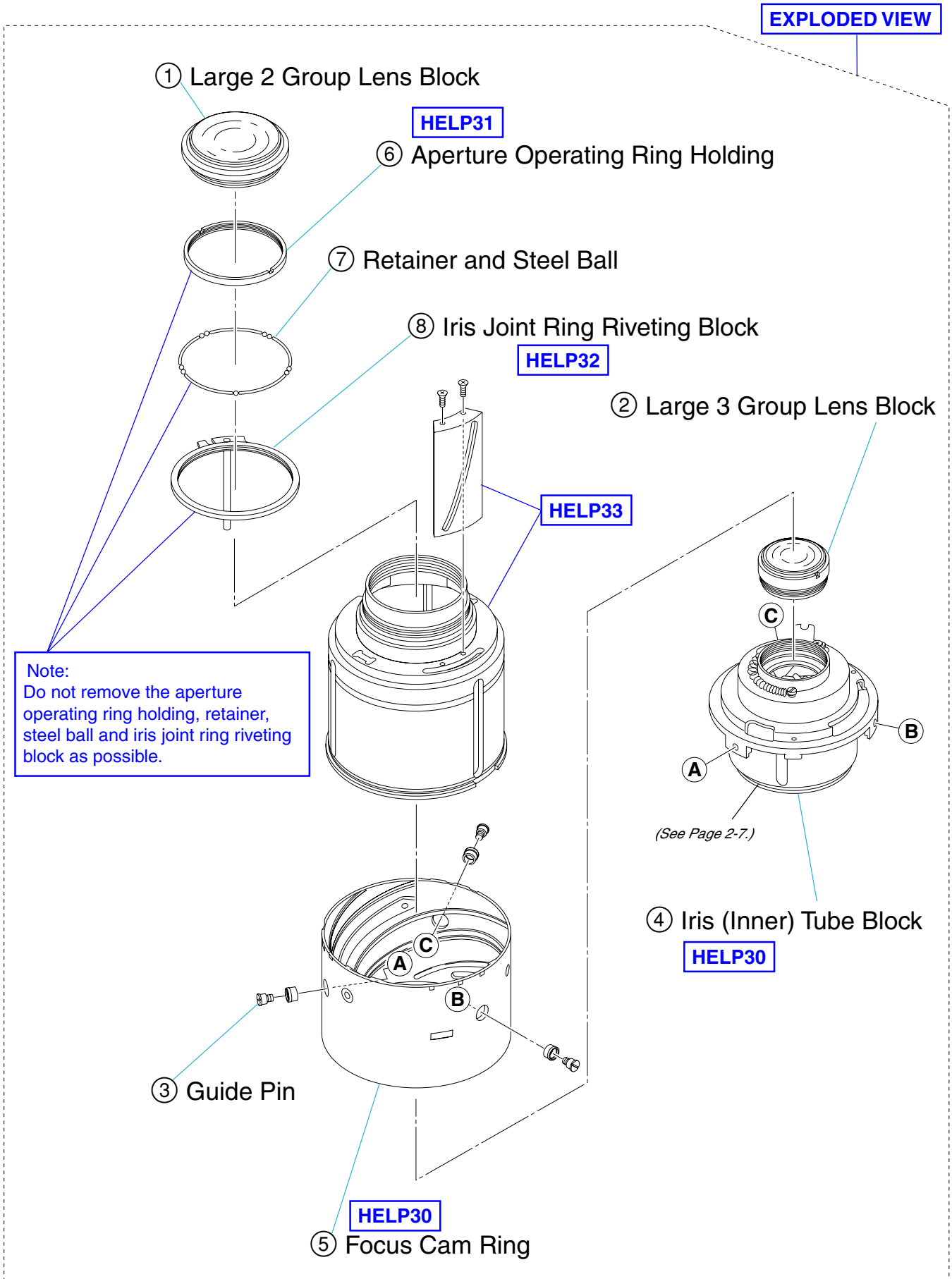
Washer-A (T = 0.05 mm): 2-684-218-01
Washer-B (T = 0.1 mm): 2-684-219-01
Washer-C (T = 0.2 mm): 2-684-220-01



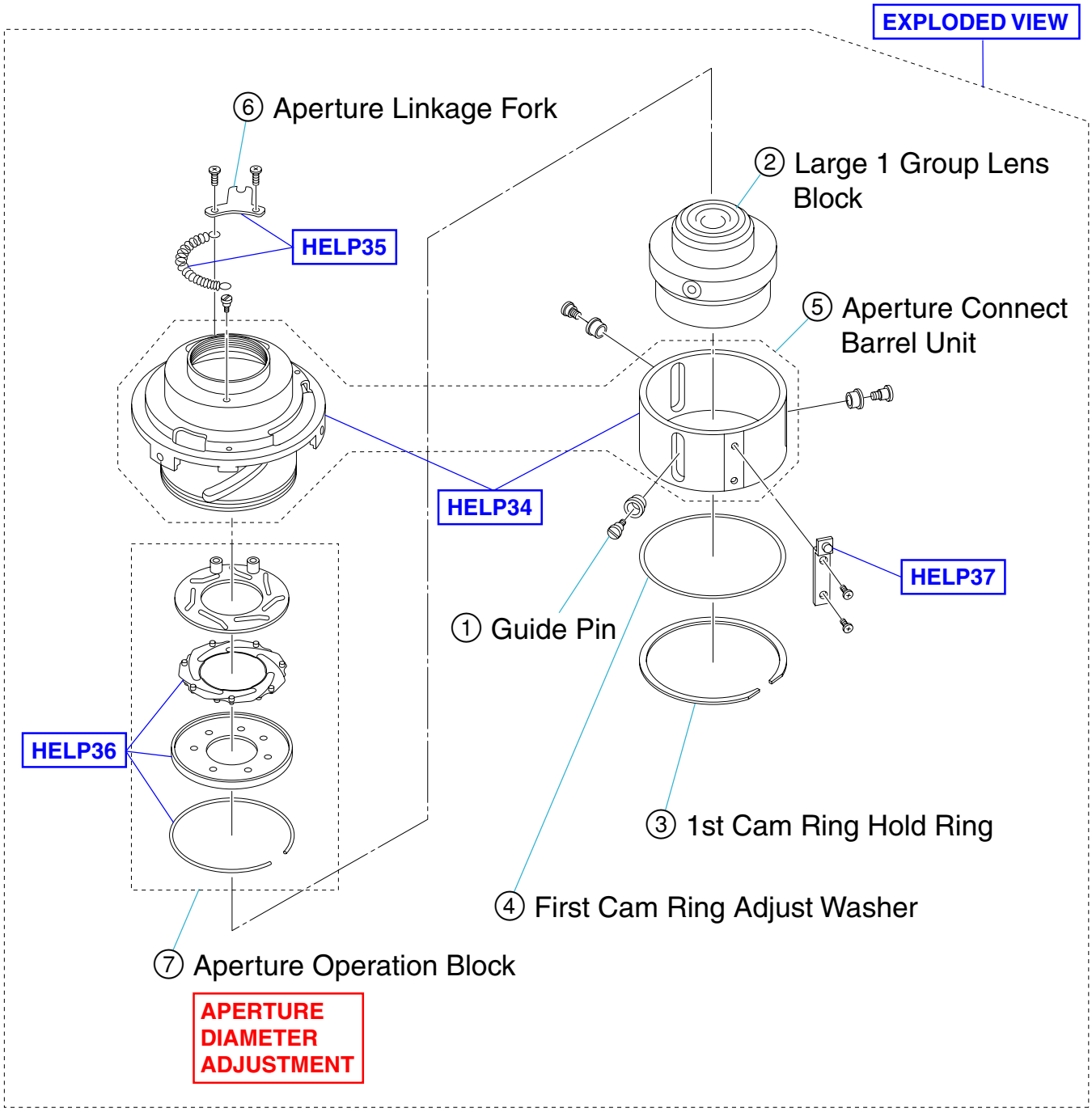
2-1-4. FIXED BARREL UNIT AND MAIN FLEXIBLE BLOCK



2-1-5. FOCUS CAM RING AND IRIS JOINT RING RIVETING BLOCK



2-1-6. IRIS (INNER) TUBE BLOCK

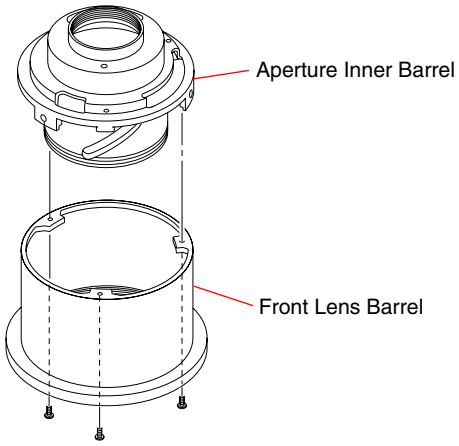


HELP

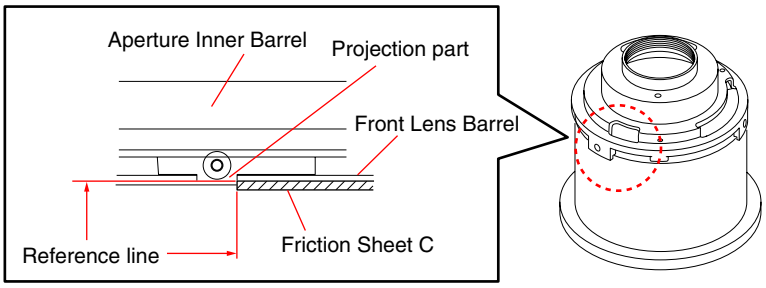
Note for assembling and grease applying positions are shown.

HELP01

1. Install the front lens barrel to the aperture inner barrel (Temporary installation).



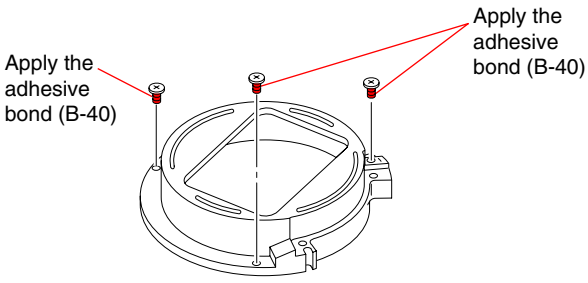
2. Attach the friction sheet C to the shaded area of the front lens barrel.



HELP02

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

Apply the adhesive bond (B-40) to the three screws and tighten them as shown in the figure.

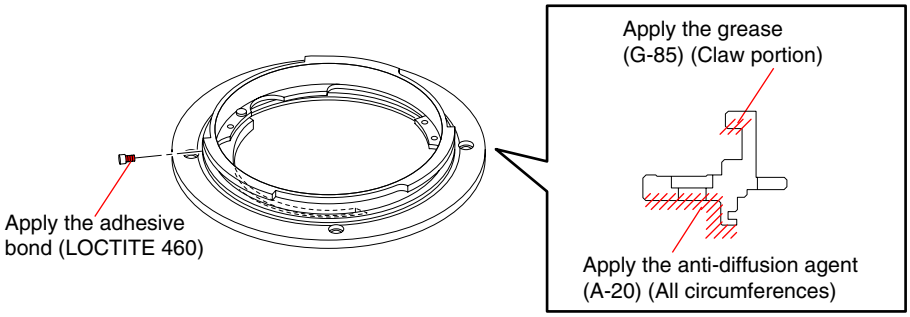


HELP03

Grease (G-85): J-6082-626-A
Anti-diffusion agent (A-20): J-6082-611-A
Adhesive bond (LOCTITE 460) (Note)

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

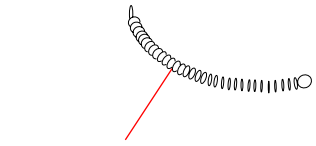
1. Apply the grease (G-85) and anti-diffusion agent (A-20) to the instruction part of the mount riveting block.
2. Apply the adhesive bond (LOCTITE 460) to the screw and tighten it as shown in the figure.



HELP04

Oil (O-20): J-6082-610-A

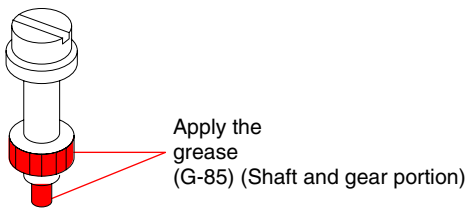
Apply the oil (O-20) to the instruction part of the main SP and attach it.



HELP05

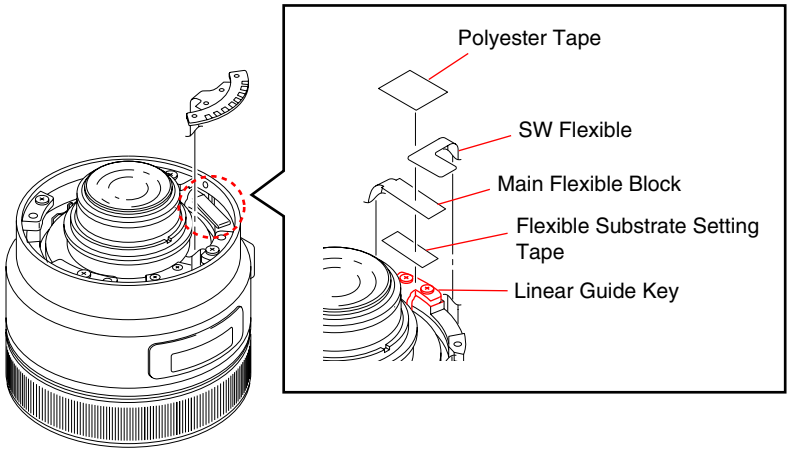
Grease (G-85): J-6082-626-A

Apply the grease (G-85) to the instruction part of the coupler as shown in the figure.



HELP06

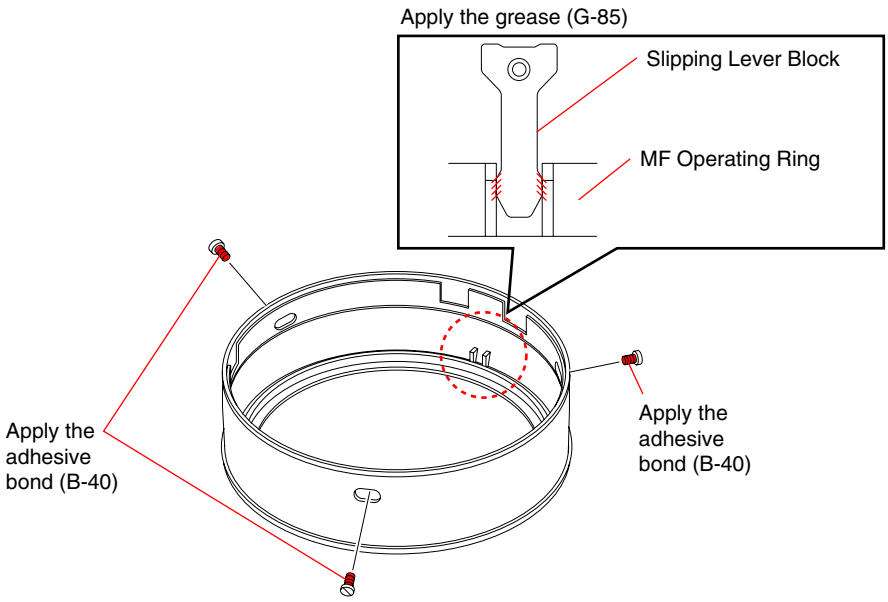
1. Attach the flexible substrate setting tape E onto the linear guide key.
2. Solder the SW flexible to the main flexible block as shown in the figure.
3. Cut the polyester tape for 6×12 mm, attach the polyester tape onto the solder parts to cover entirely.



HELP07

Grease (G-85): J-6082-626-A
Adhesive bond (B-40): J-6082-614-A

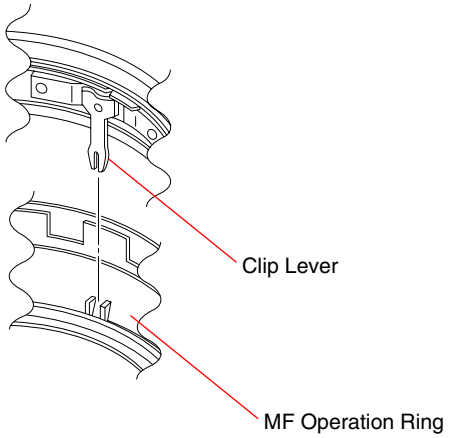
1. Apply the grease (G-85) to the instruction part of the slipping lever block.
2. Apply the adhesive bond (B-40) to the three screws.



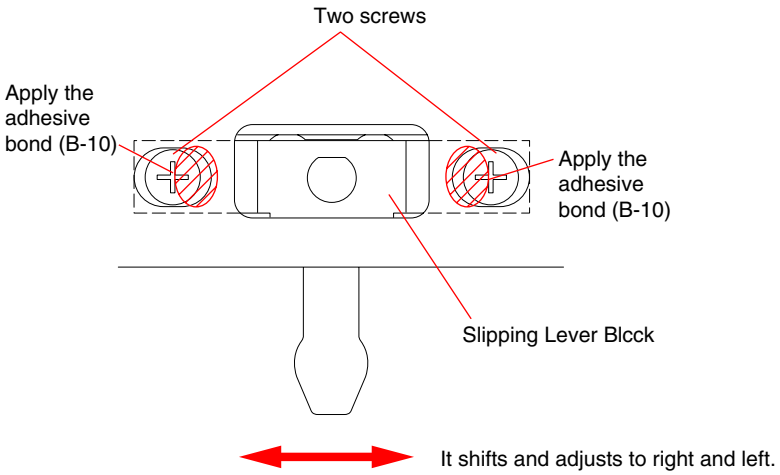
HELP08

Grease (G-15): J-6082-619-A
Adhesive bond (B-10): J-6082-612-A

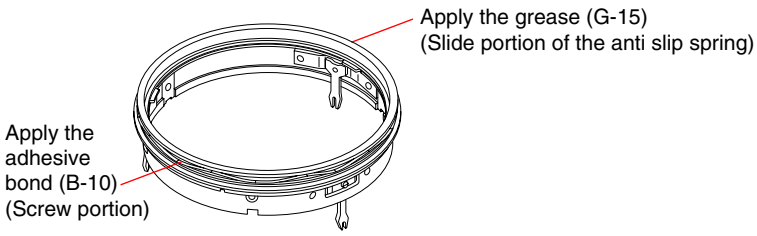
1. Install the MF operation ring so that the slipping lever block fit into the groove of the MF operation ring. After installation, ensure the three pinch lever assemblies are securely fit it.



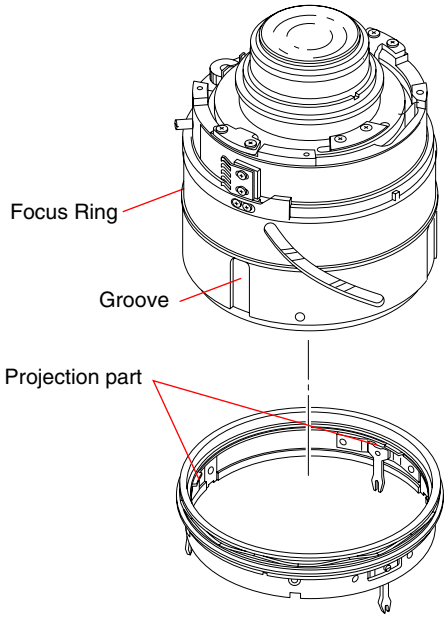
2. Loosen the two screws, then reposition the slipping lever block so that the MF operation ring can be installed smoothly.
3. After adjustment, apply the adhesive bond (B-10) to the two screws.



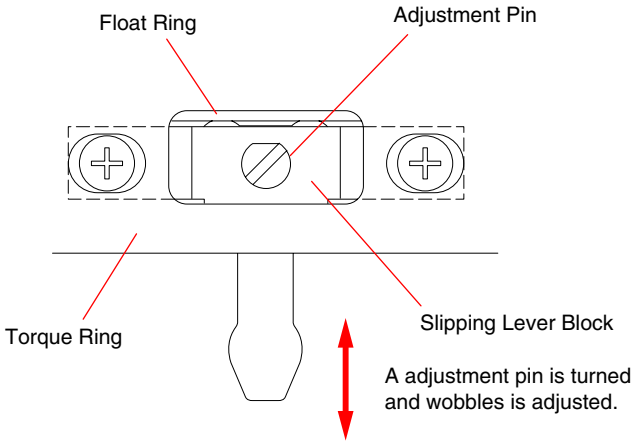
4. Apply the adhesive bond (B-10) and grease (G-15) to the instruction part of the anti slip spring as shown in the figure.



5. Align the projection of the torque ring block and the groove of the focus ring as shown in the figure, and attach it.



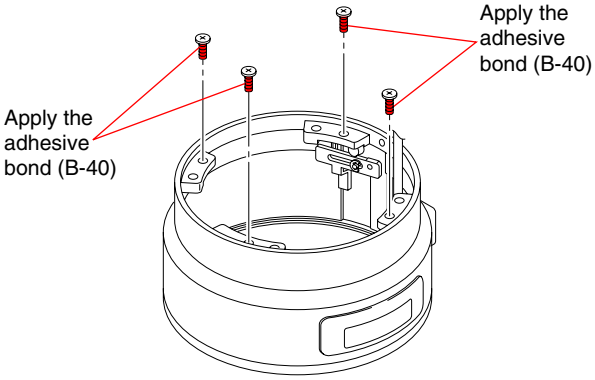
6. Check wobbles of the three pinch lever assemblies. Then use the adjustment screw for adjustment. (Make sure the float ring does not rotate accordingly when turning the torque ring by any slipping lever block.)



HELP09

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

Apply the adhesive bond (B-40) to the four screws.

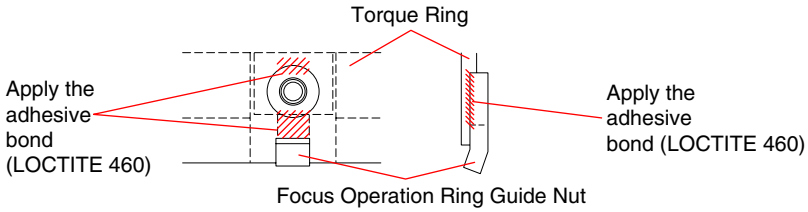


HELP10

Adhesive bond (LOCTITE 460) (Note)

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

1. Apply the adhesive bond (LOCTITE 460) to the instruction part of the torque ring.
2. Attach the focus operaion ring guide nut aligning the opening with the torque ring.

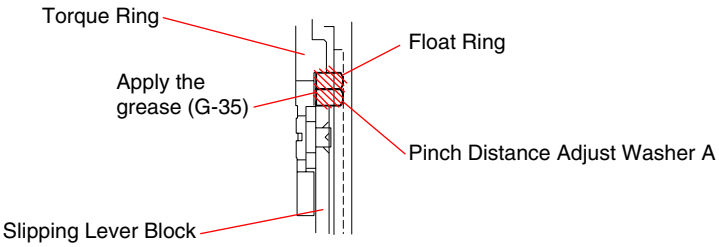


HELP11

Grease (G-35): J-6082-621-A

Apply the grease (G-35) to the instruction part as shown in the figure.

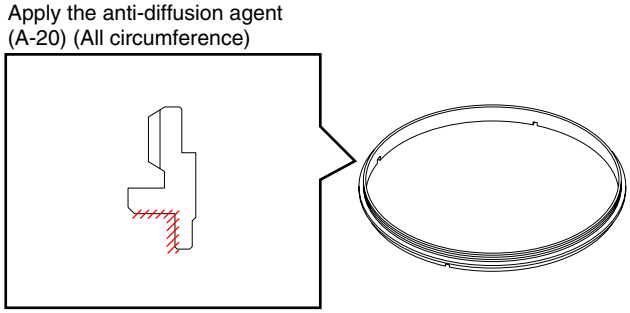
Note: If the rotation of MF operation ring is heavy, remove the pinch distance adjust washer A.



HELP12

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

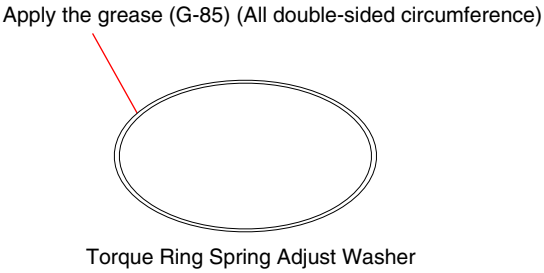
Apply the anti-diffusion agent (A-20) to the instruction part of the torque ring holder.



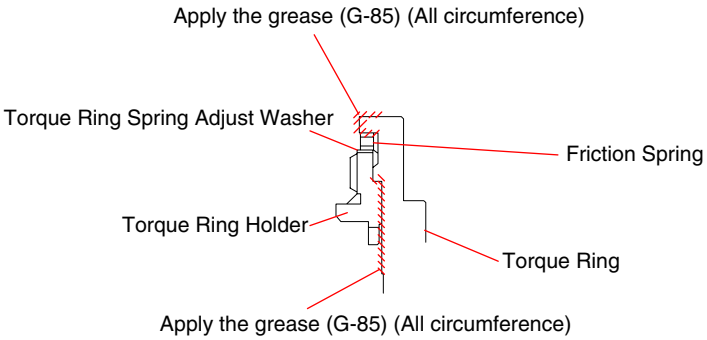
HELP13

Grease (G-85): J-6082-626-A

1. Apply the grease (G-85) to the torque ring spring adjust washer.



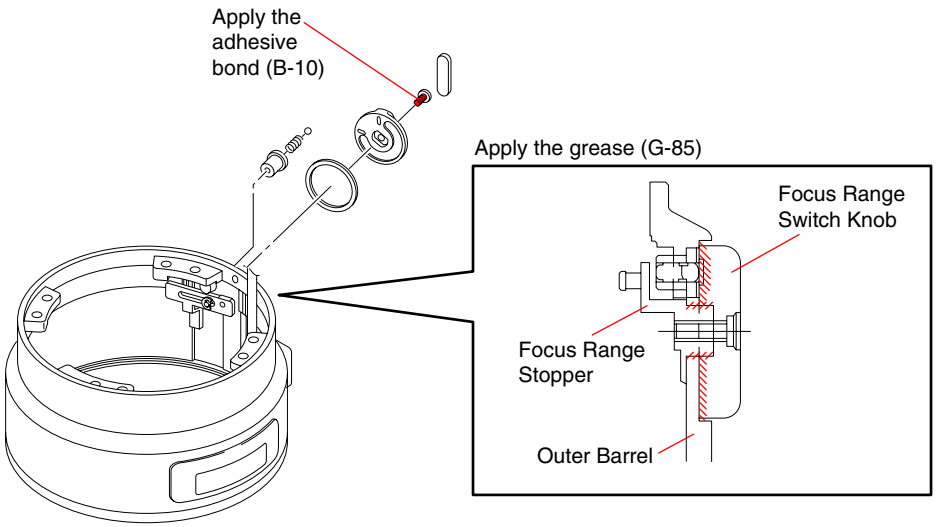
2. Apply the grease (G-85) to the instruction part as shown in the figure.



HELP14

Grease (G-85): J-6082-626-A
Adhesive bond (B-10): J-6082-612-A

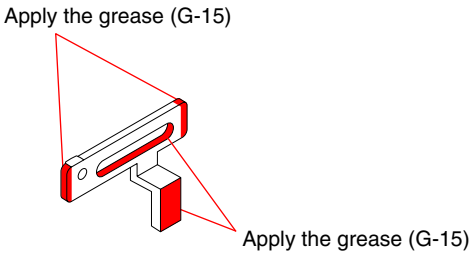
Apply the grease (G-85) to the instruction part as shown in the figure and apply the adhesive bond (B-10) to the screw.



HELP15

Grease (G-15): J-6082-619-A

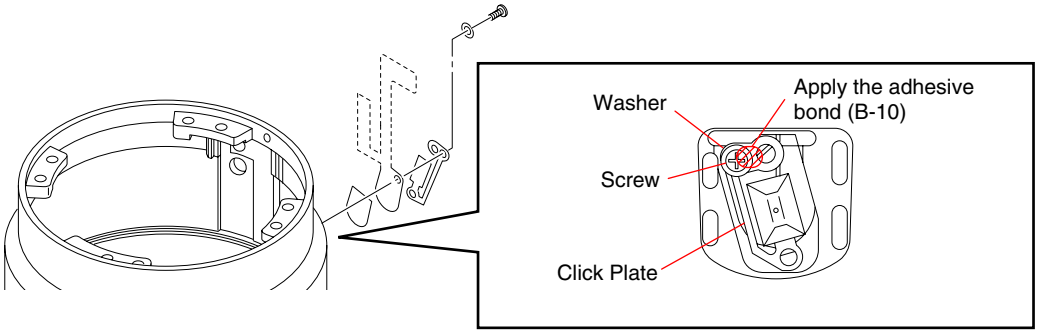
Apply the grease (G-15) to the instruction part as shown in the figure.



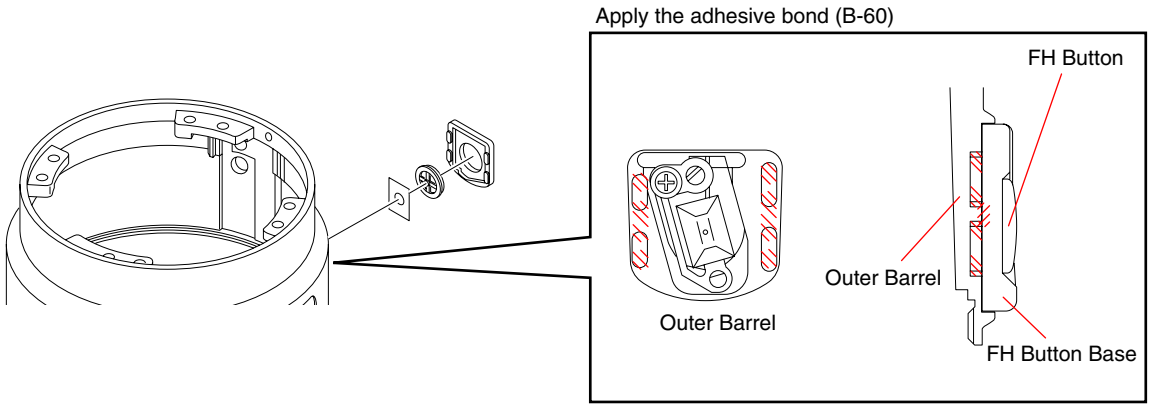
HELP16

Adhesive bond (B-10): J-6082-612-A
Adhesive bond (B-60): J-6082-616-A

1. Apply the adhesive bond (B-10) to the instruction part as shown in the figure.



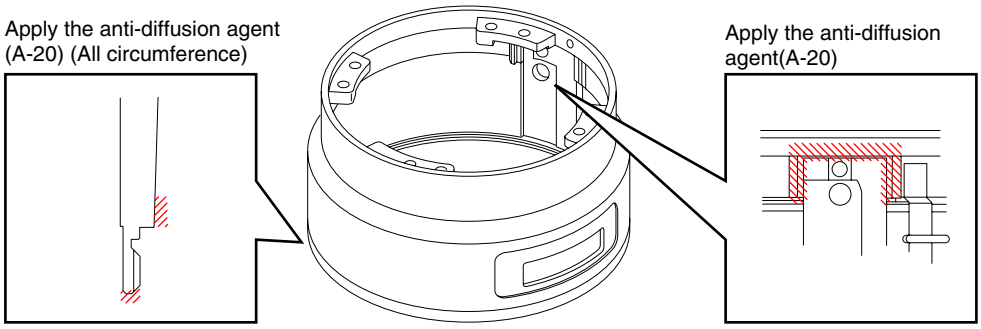
2. Apply the adhesive bond (B-60) to the instruction part of the outer barrel as shown in the figure.



HELP17

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

Apply the anti-diffusion agent (A-20) to the instruction part as shown in the figure.

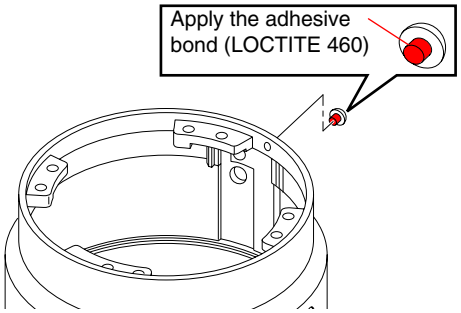


HELP18

Adhesive bond (LOCTITE 460) (Note)

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

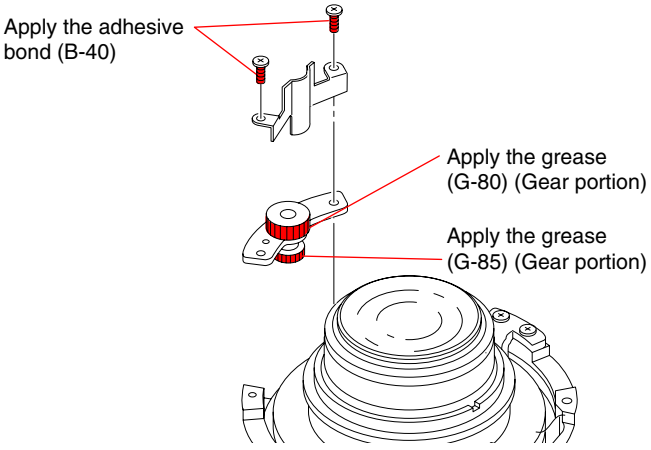
Apply the adhesive bond (LOCTITE 460) to the instruction part of the mount index.



HELP19

Grease (G-80): J-6082-625-A
Grease (G-85): J-6082-626-A
Adhesive bond (B-40): J-6082-614-A

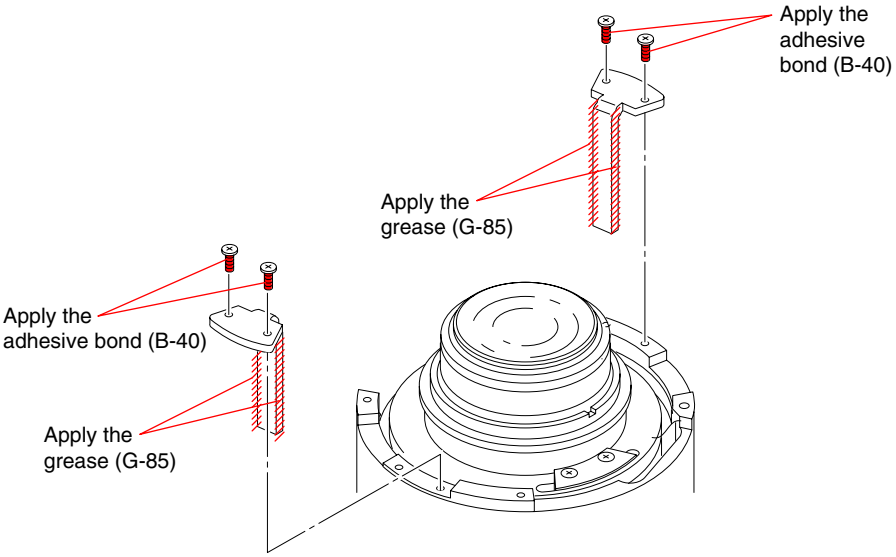
Apply the grease (G-80, G-85) to the instruction part of the gear block and apply the adhesive bond (B-40) to the two screws.



HELP20

Grease (G-85): J-6082-626-A
Adhesive bond (B-40): J-6082-614-A

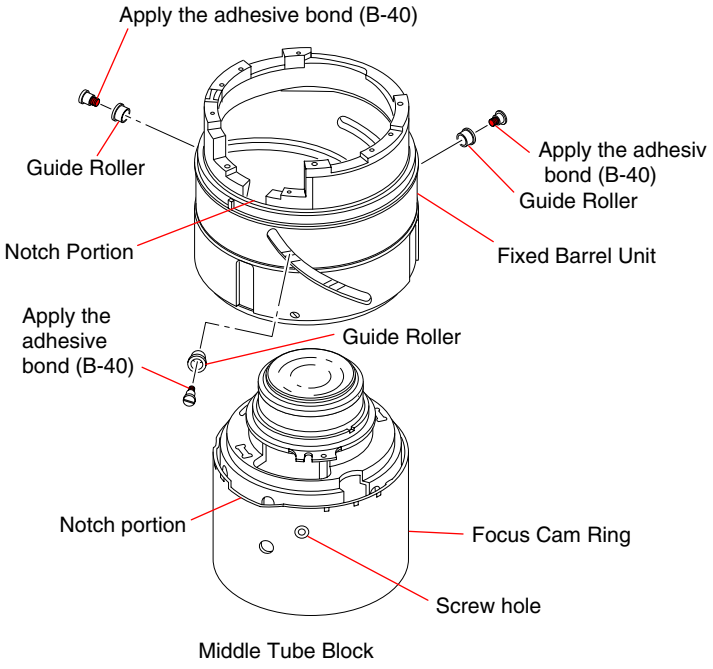
Apply the grease (G-85) to the instruction part of the linear guide key and apply the adhesive bond (B-40) to the four screws.



HELP21

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

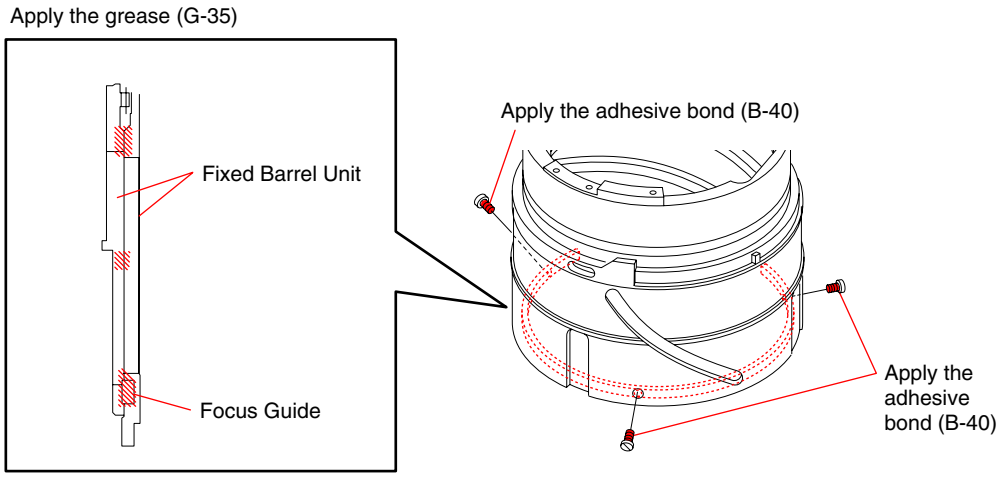
1. Set the fixed barrel unit to infinity.
2. Install the middle tube block so that the notch of the focus cam ring and one of the fixed barrel unit are aligned.
3. Align the cam groove of the focus ring, one of the fixed barrel unit and the screw hole of the focus cam ring. Then apply the adhesive bond (B-40) to the guide pin and install the guide roller.



HELP22

Grease (G-35): J-6082-621-A
Adhesive bond (B-40): J-6082-614-A

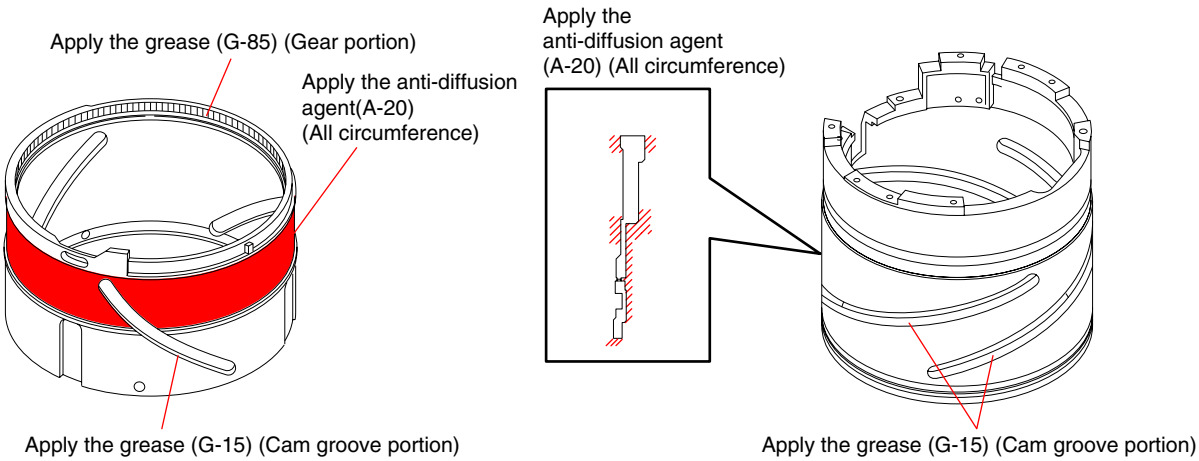
Apply the grease (G-35) to the instruction part as shown in the figure and apply the adhesive bond (B-40) to the three screws.



HELP23

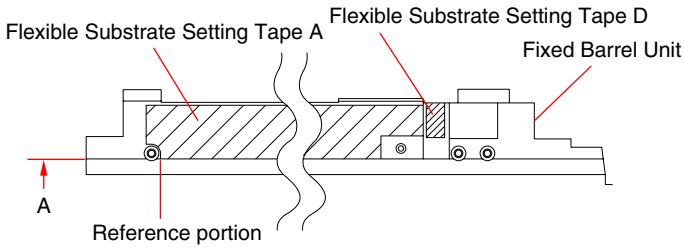
Grease (G-85): J-6082-626-A
Grease (G-15): J-6082-619-A
Anti-diffusion agent (A-20): J-6082-611-A

1. Apply the grease (G-85) to the gear teeth, grease (G-15) to the cam groove, and the anti-diffusion agent (A-20) to the instruction parts of the focus ring.
2. Apply the grease (G-15) to the cam groove and the anti-diffusion agent (A-20) all round to the shaded area of the fixed barrel as shown in the figure.



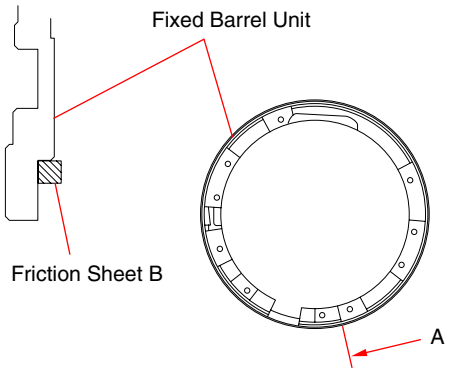
HELP24

1. Attach the flexible substrate setting tape A fitting the chipped corner to the screw hole and line-A.
2. Attach the flexible substrate setting tape D at the designated point.



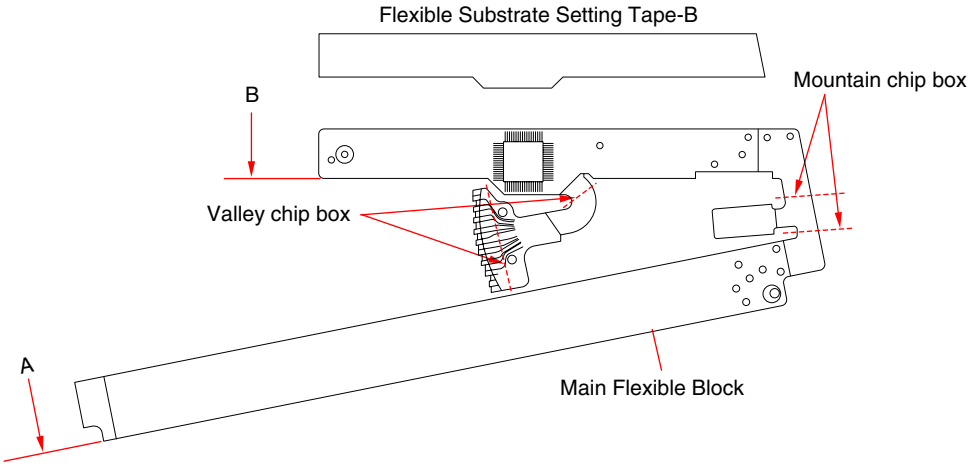
HELP25

Attach the friction sheet B (to the shaded area) from the position-A as shown in the figure (horizontal tolerance: ±10mm).

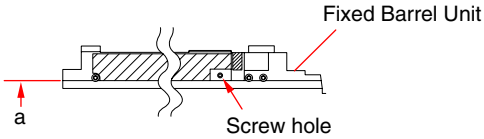


HELP26

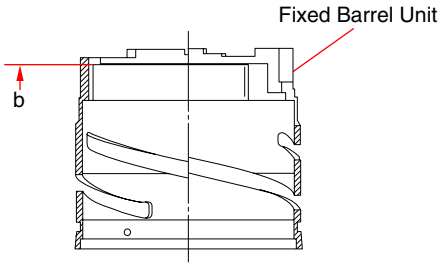
1. Attach the flexible substrate setting tape B to the backside of the main flexible block aligning the edge of the flexible substrate setting tape B to the line-B of the main flexible block.
2. Fold the main flexible block at the reference lines as shown in the figure.



3. Attach the main flexible block to the fixed barrel.
   Outside: Align the line-A of the main flexible block with the line-a of the fixed barrel.

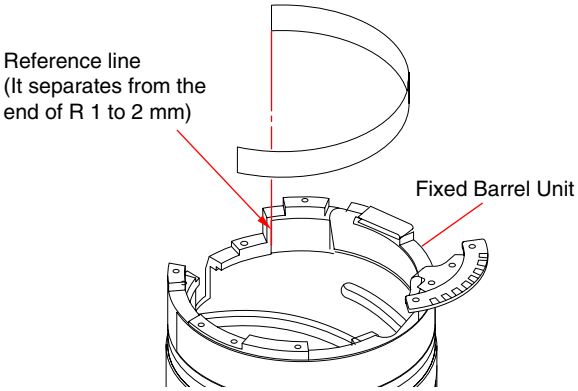


   Inside: Align the line-B of the main flexible block with the line-b of the fixed barrel.



HELP27

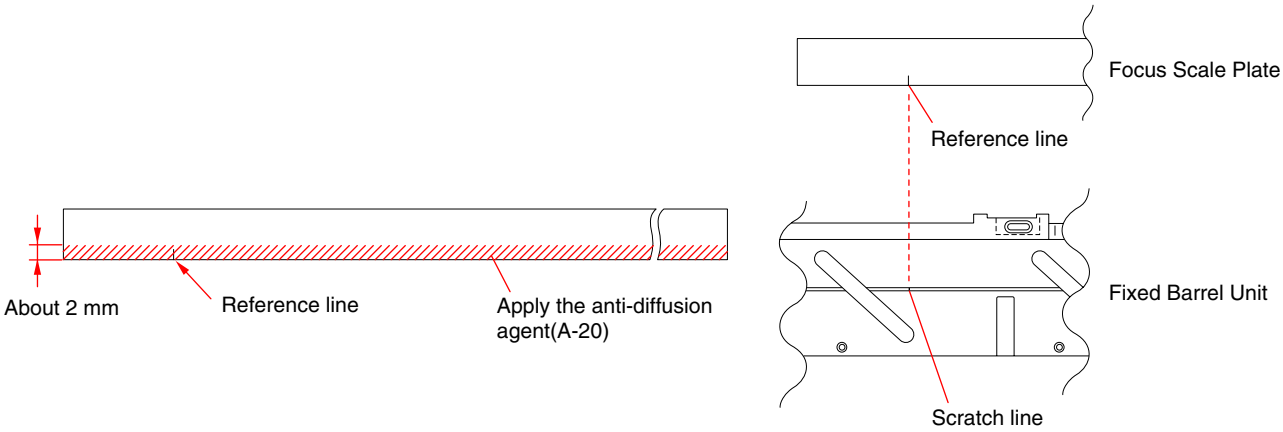
Cut the polyester tape (Black) 10 mm for 7×100 mm, attach the polyester tape (Black) 10 mm fitting its upper side to the edge of the fixed barrel on the mount side.



HELP28

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

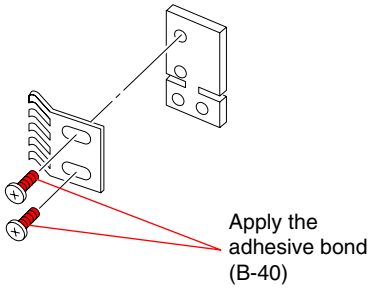
1. Apply the anti-diffusion agent (A-20) to the shaded area of the focus scale plate.
2. Attach so that the scratch line of the focus scale plate and reference line of the focus ring are aligned.



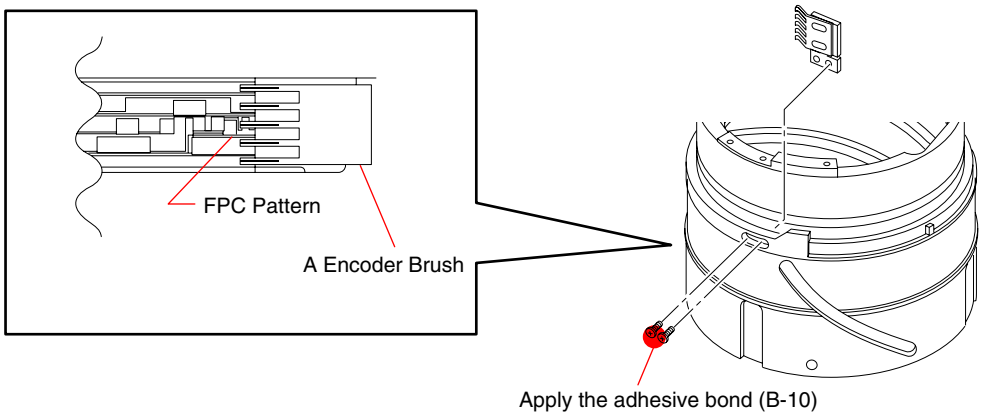
HELP29

Adhesive bond (B-40): J-6082-614-A
Adhesive bond (B-10): J-6082-612-A

1. Apply the adhesive bond (B-40) to the two screws and install the brush base to the A encoder brush.



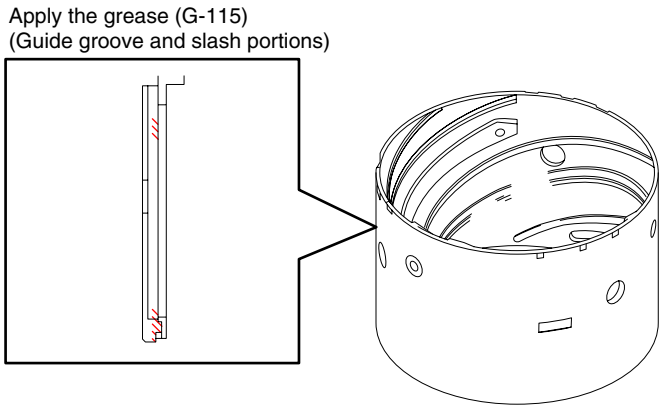
2. Install the A encoder brush to the designated position. Turn the barrel to infinity so that no flex pattern underlies. (Temporary installation: A encoder brush position adjustment is necessary before fixing.)
3. After the brush position adjustment is completed, apply the adhesive bond (B-10) to the two screws.



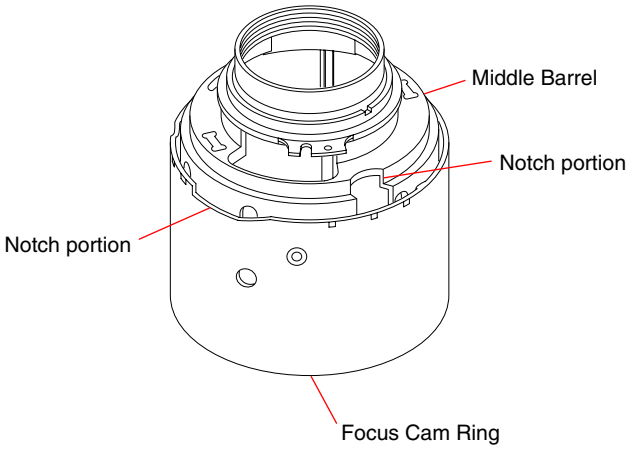
HELP30

Grease (G-115): J-6082-627-A
Adhesive bond (B-40): J-6082-614-A

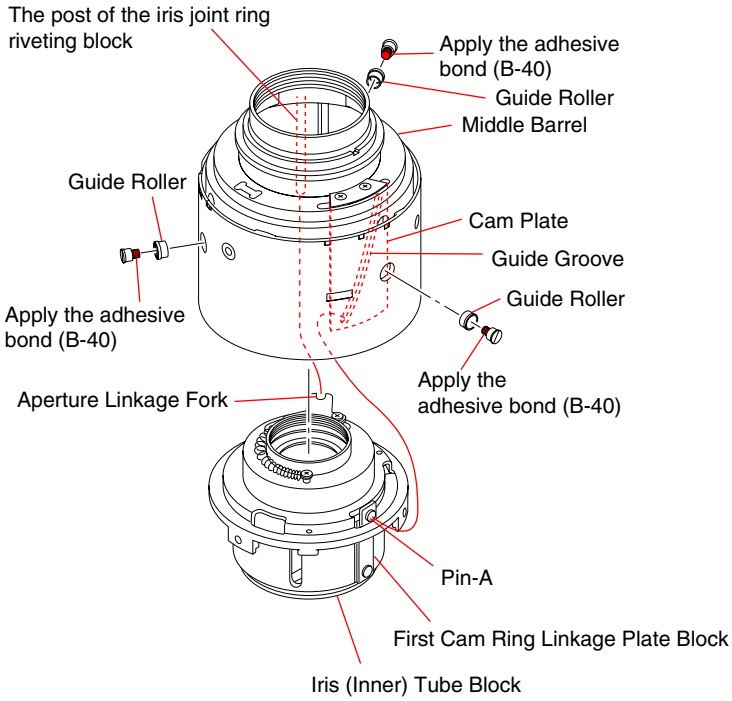
1. Apply the grease (G-115) to the instruction part as shown in the figure.



2. Turn the focus cam ring until the notches of the focus cam ring and the middle barrel are position as shown in the figure.



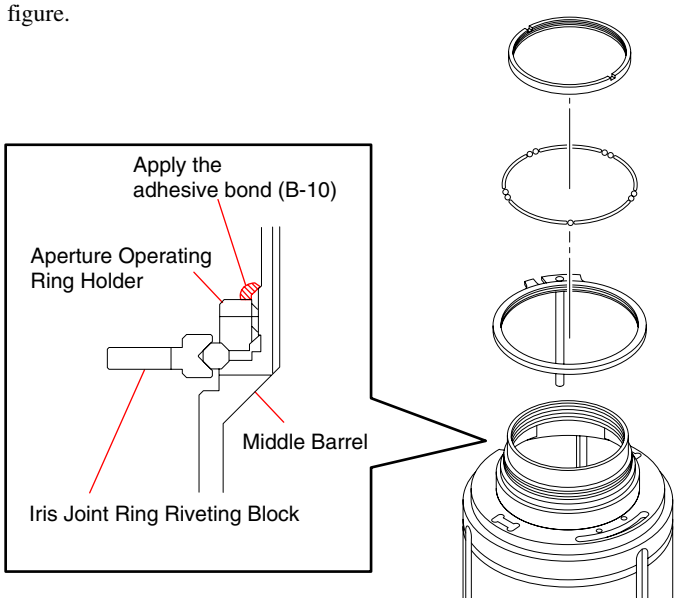
3. Install the inner barrel assembly so that the pin-A of the 1st cam barrel block fits into the guide groove of the cam plate, and the post of the diaphragm operation fits to the aperture linkage fork.
4. Align the holes of the focus cam ring, the cam groove of the middle barrel and the screw hole of the inner barrel assembly. Then apply the adhesive bond (B-40) to the guide pin and install the guide roller.



HELP31

Adhesive bond (B-10): J-6082-612-A
Universal wrench: J-6082-609-A
Chip-A for Universal Wrench: J-6082-609-1
Chip-B for Universal Wrench: J-6082-609-2

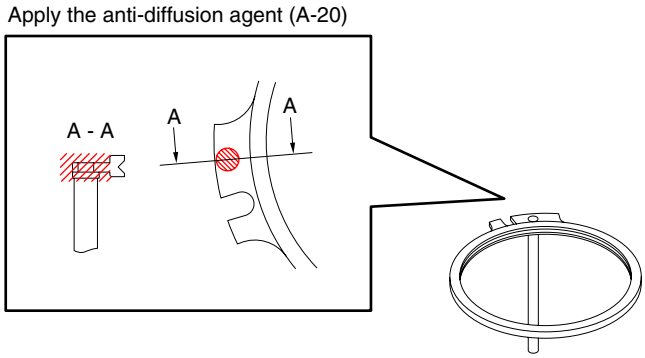
1. Install the iris joint ring riveting block into the middle barrel.
2. Hold up the iris joint ring block by 5mm above.
3. Install the steel ball and retainer between the middle barrel and the iris joint ring riveting block.
4. Use the universal wrench, tighten the aperture operating ring holder almost to the end, then loosen it back by 5 to 10mm.
5. After confirming operation of the iris joint ring riveting block, apply the Adhesive bond (B-10) to the instruction part as shown in the figure.



HELP32

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

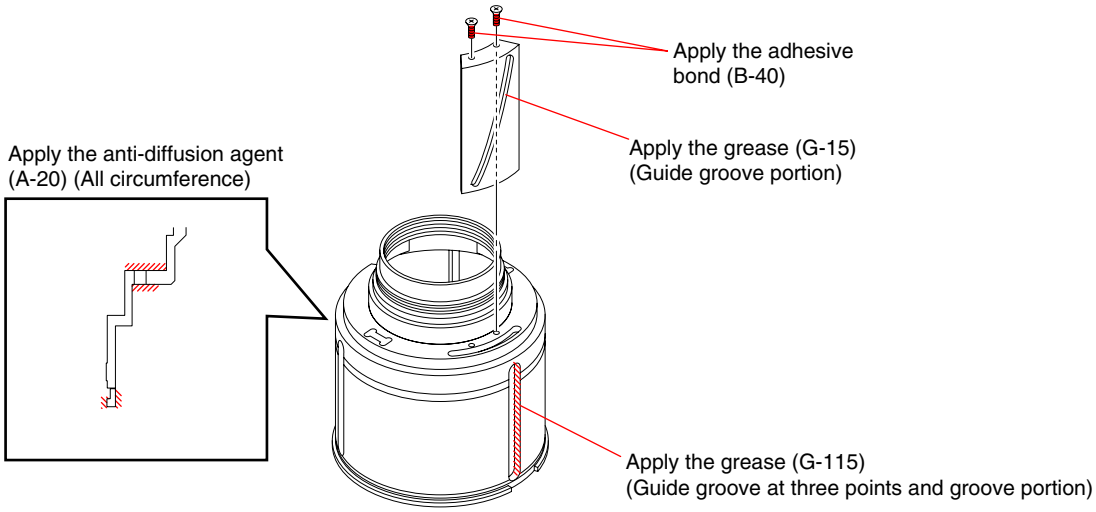
Apply the anti-diffusion agent (A-20) to the shaded area. Avoid applying anti-diffusion agent (A-20) to the inside wall of the barrel.



HELP33

Anti-diffusion agent (A-20):	J-6082-611-A
Grease (G-115):	J-6082-627-A
Grease (G-15):	J-6082-619-A
Adhesive bond (B-40):	J-6082-614-A

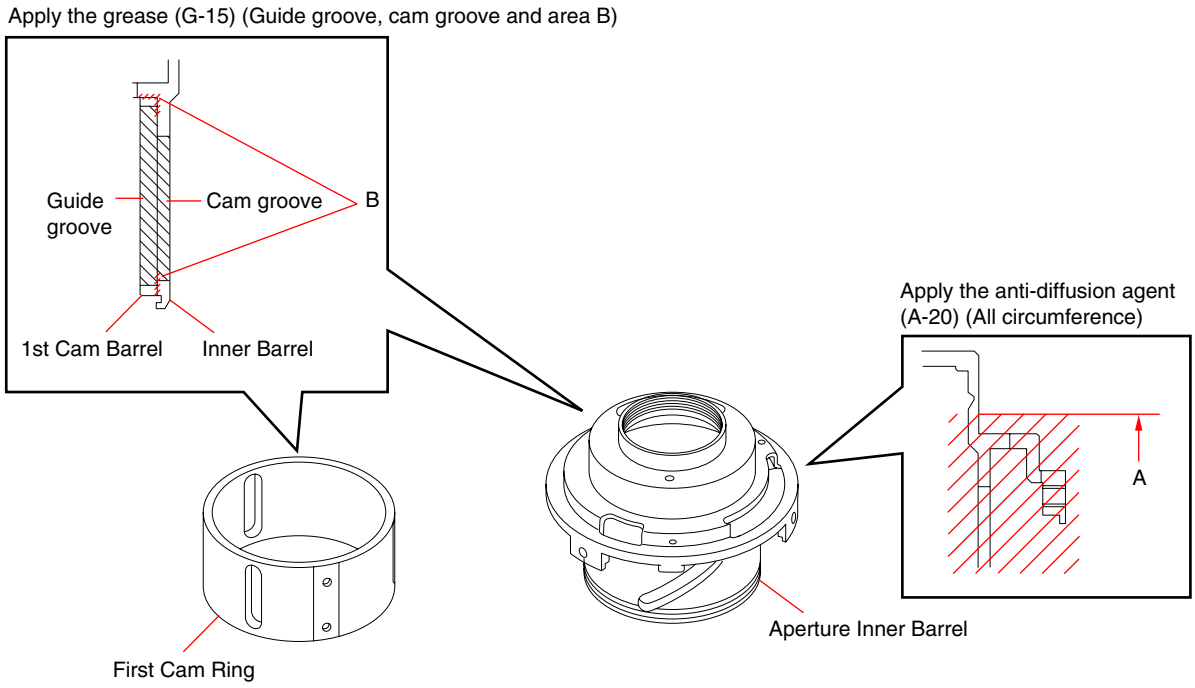
1. Apply the anti-diffusion agent (A-20) to the instruction part of the middle barrel as shown in the figure.
2. Apply the grease (G-115) to the guide groove of the middle barrel at three points.
3. Apply the grease (G-15) to the groove of the cam plate, apply the Adhesive bond (B-40) to the two screws and install the cam plate.



HELP34

Anti-diffusion agent (A-20): J-6082-611-A
Grease (G-15): J-6082-619-A

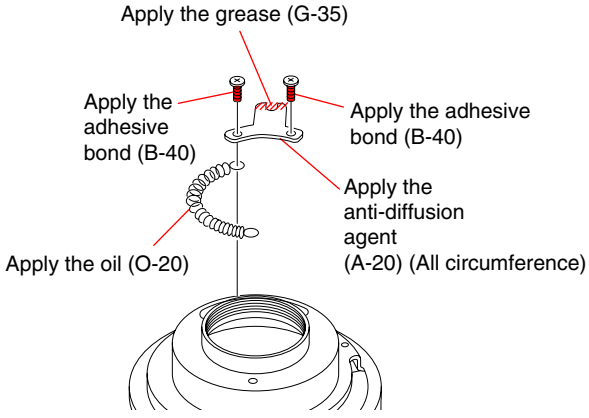
1. Apply the anti-diffusion agent (A-20) entirely to the shaded area of the inner barrel below the A line as shown in the figure.
2. Apply the grease (G-15) to the guide groove of the first cam ring barrel, the cam groove of the aperture inner barrel, and area B as shown in the figure.



HELP35

Oil (O-20): J-6082-610-A
Grease (G-35): J-6082-621-A
Anti-diffusion agent (A-20): J-6082-611-A
Adhesive bond (B-40): J-6082-614-A

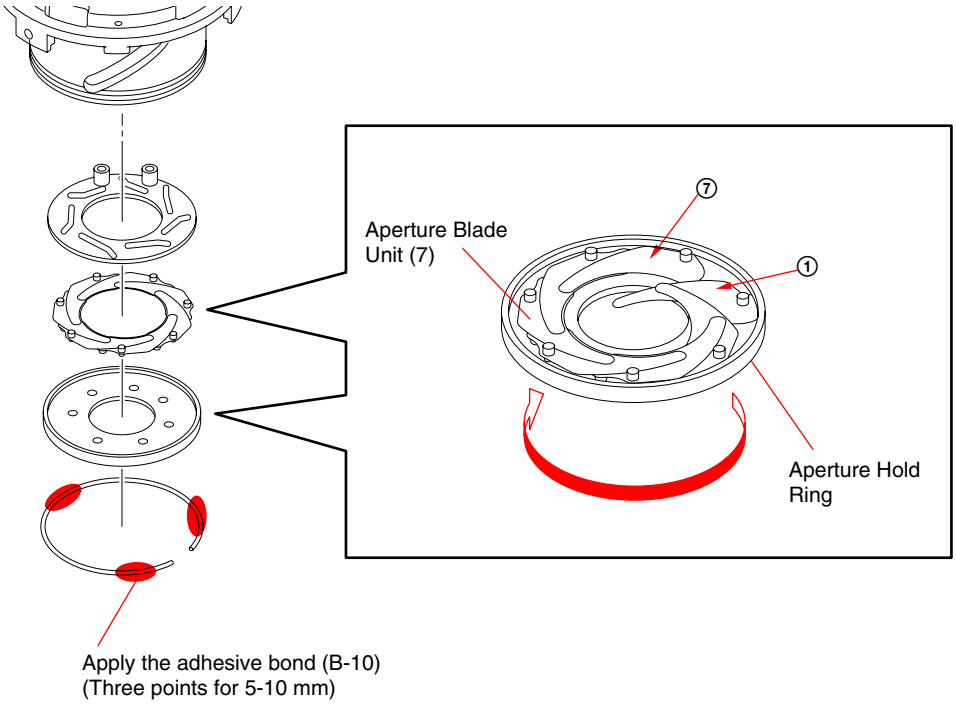
1. Apply the oil (O-20) to the sub spring.
2. Apply the grease (G-35) to the instruction part of the aperture linkage fork.
3. Apply the anti-diffusion agent (A-20) entirely to the aperture linkage fork.
4. Apply the adhesive bond (B-40) to the two screws and install the aperture linkage fork.



HELP36

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

1. Install the aperture blades one by one, and put the first blade on the 7th one finally.
2. Apply the adhesive bond (B-10) to three points for 5 to 10mm of width after completing aperture diameter adjustment.

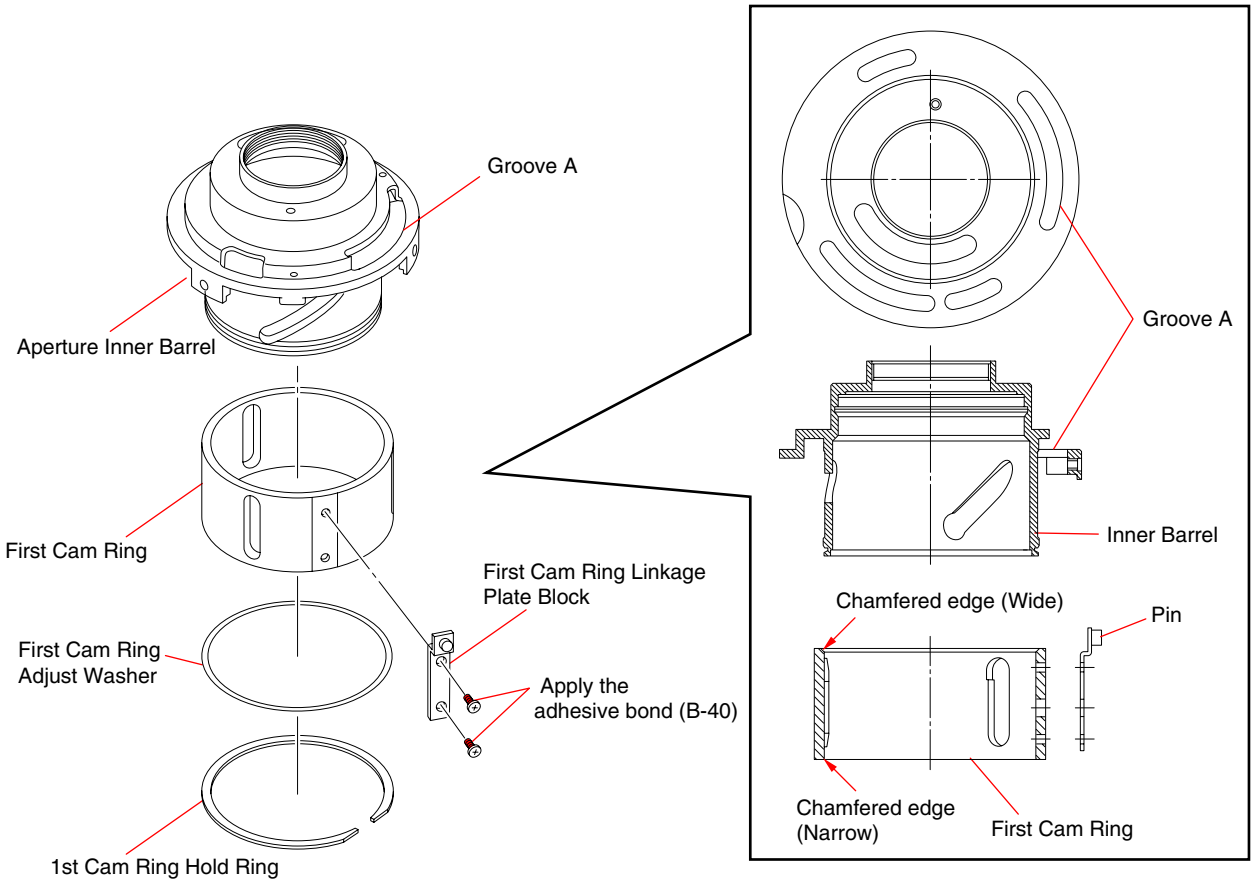


HELP37

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

1. Attach the first cam ring linkage plate block to the first cam ring, and apply the adhesive bond (B-40) to the two screws and tighten them as shown in the figure.
   Note: Attach the pin of the first cam ring linkage plate block to the wide chamfered edge side of the first cam ring.

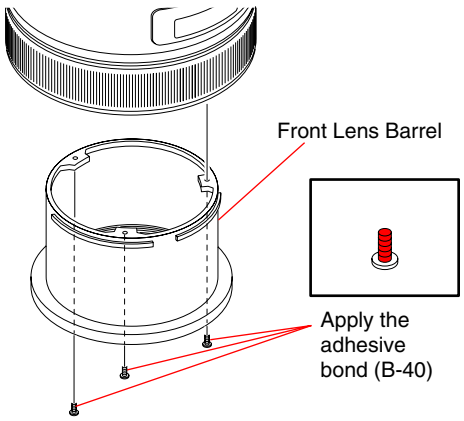
2. Install the first cam ring so that the post of the first cam ring linkage plate block fits into groove A of the inner barrel. Then install it with the first cam ring adjust washer.



HELP38

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

Attach the front lens barrel, and apply the adhesive bond (B-40) to the three screws and tighten them as shown in the figure.



3. REPAIR PARTS LIST

DISASSEMBLY

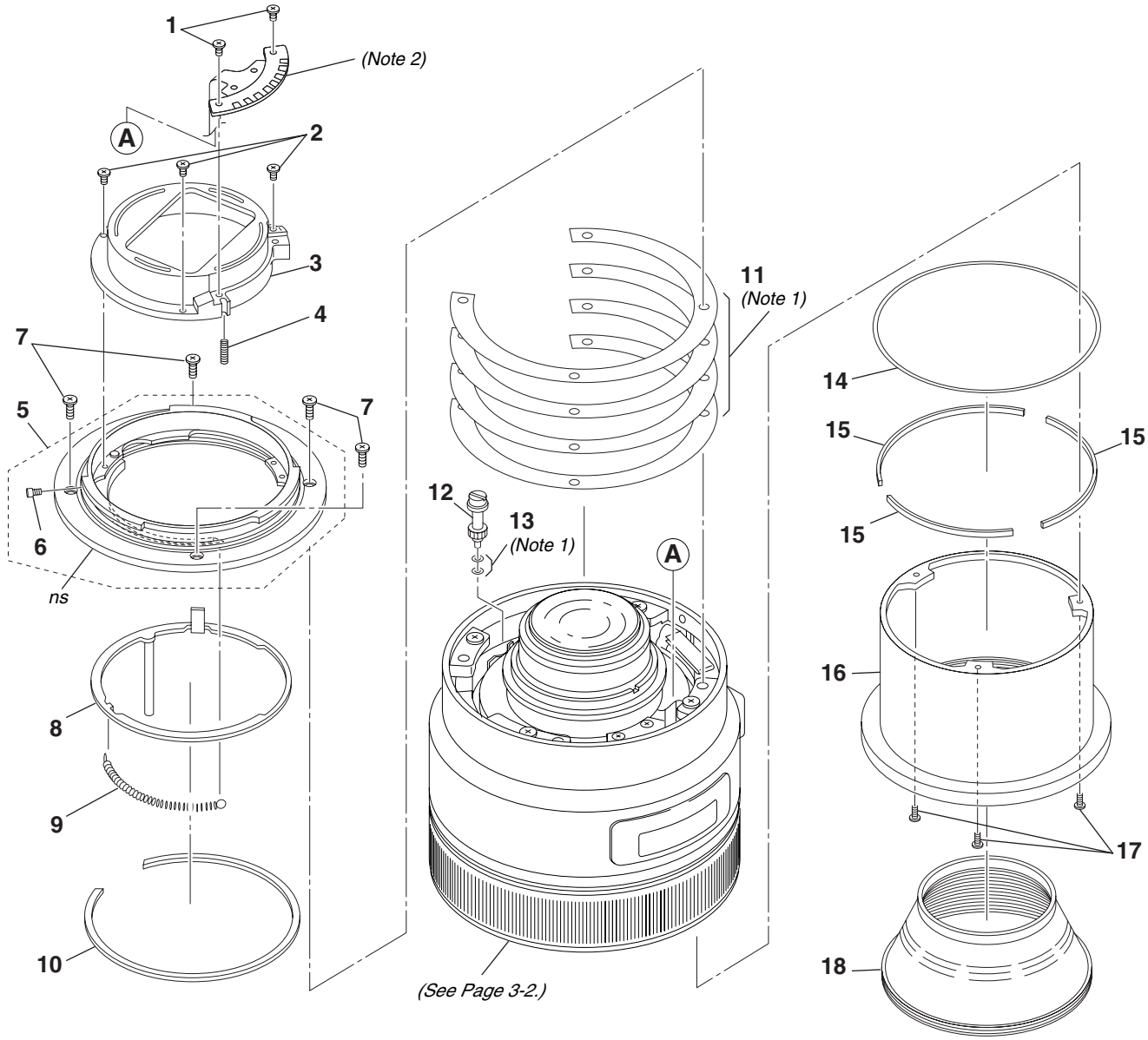
NOTE:

- -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. FRONT LENS BARREL AND MOUNT RIVETING BLOCK

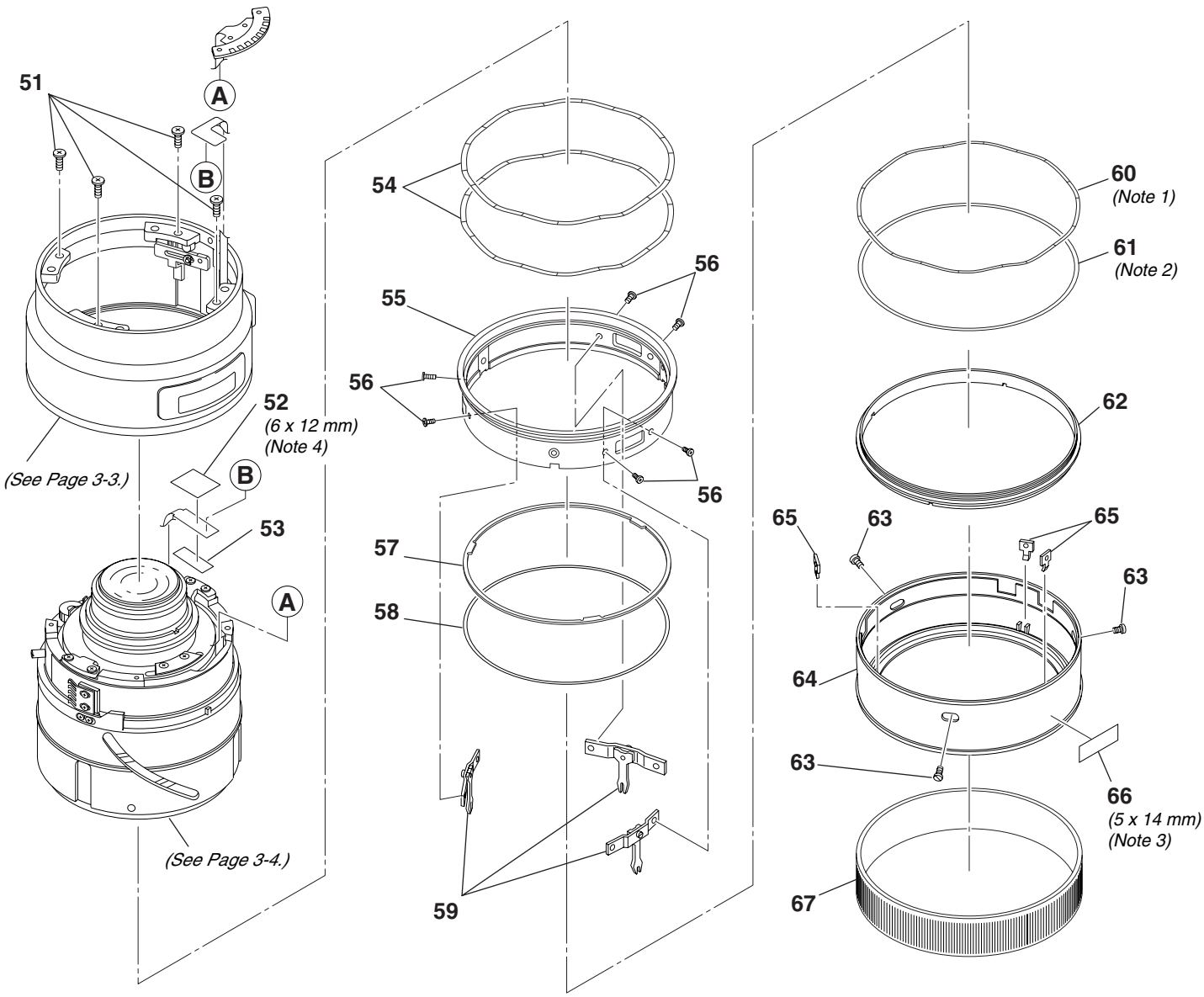
ns: not supplied



(Note 1) The number or type of these parts need to be selected according to adjustment etc..
Select the part referring to page 3-7.

Ref. No.	Part No.	Description
1	2-684-066-01	TAPPING SCREW 1.7X4.0
2	2-684-064-01	SCREW M1.4X2.2
3	2-684-063-01	REAR LIGHT SHIELD BARREL
4	2-684-065-01	GROUND SPRING
5	A-1191-138-A	BLOCK, MOUNT RIVETING
6	2-684-244-01	STOPPER SCREW
7	2-684-128-01	TAPPING SCREW PHI 2 M2.0X4.5
8	A-1191-017-A	PRESET RING BLOCK
9	2-684-233-01	MAIN SPRING
10	2-684-234-01	PRESET RING HOLDING PLATE
11	Selection part	BACK ADJUSTMENT WASHER A to E (Note 1)
12	2-684-056-01	COUPLER
13	Selection part	COUPLER ADJUSTMENT WASHER A A to E (Note 1)
14	2-684-130-01	DECOLLATION RING
15	2-684-264-01	FRICTION SHEET C
16	2-684-263-02	FRONT LENS BARREL
17	2-684-117-01	SCREW M1.6X4.0
18	2-696-835-01	FRONT LIGHT SHIELD BARREL

3-1-2. MF OPERATION RING AND TORQUE RING BLOCK



(Note 1) The number or type of these parts need to be selected according to adjustment etc..
Select the part referring to page 3-7.

(Note 2) See page 2-3.
Select the number of the torque ring spring adjuset washer (Ref. No. 61) according to the operation load of the associated parts.

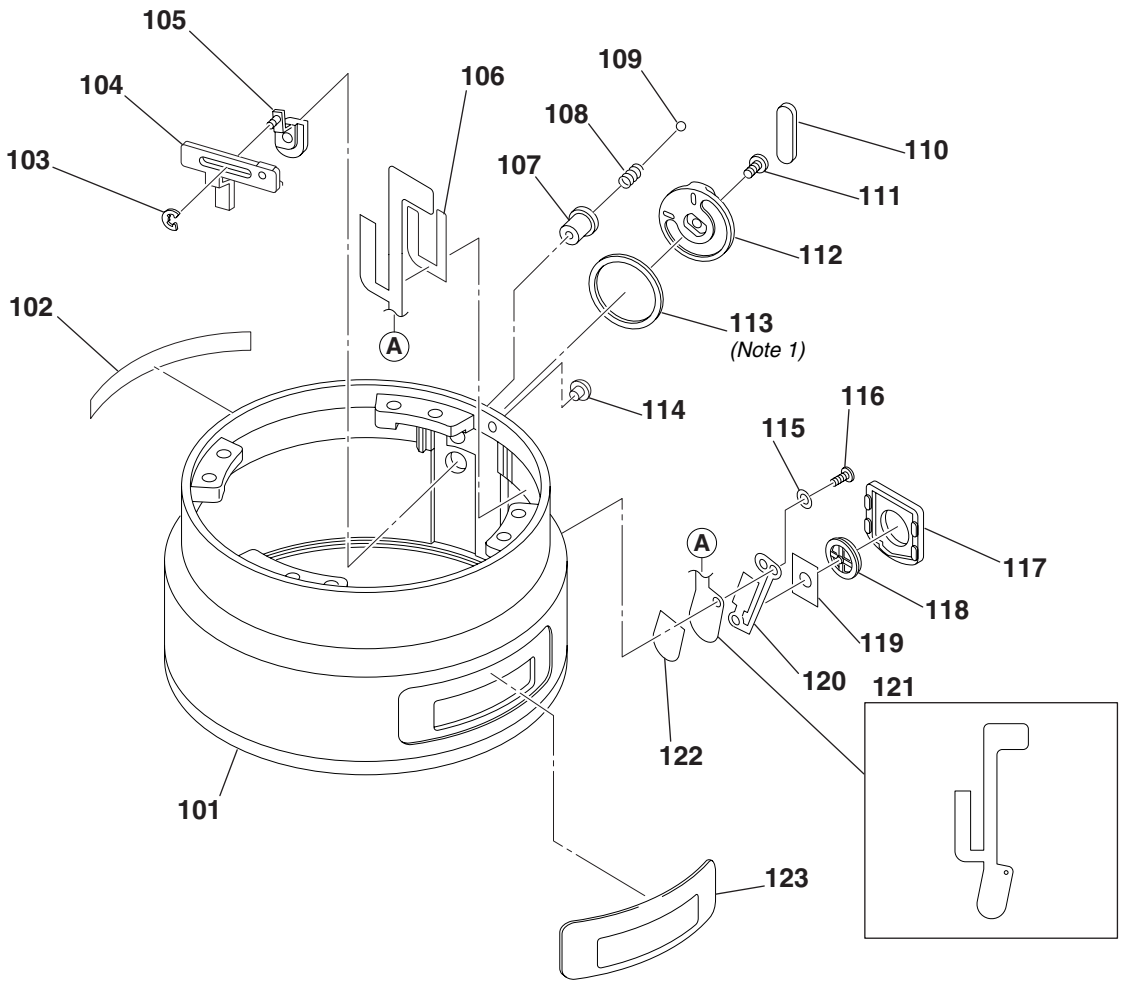
(Note 3) Cut the flexible substrate tape C (per roll) (Ref. No. 66) for 5×14 mm.

(Note 4) Cut the polyester tape (per roll) (Ref. No. 52) for 6×12 mm.

Ref. No.	Part No.	Description
51	2-684-120-01	SCREW M1.6X4.0
52	9-913-210-00	POLYESTER TAPE (Note 4)
53	2-684-121-01	FLEXIBLE SUBSTRATE SETTING TAPE E
54	2-684-068-01	ANTI SLIP SPRING
55	2-684-265-01	TORQUE RING
56	2-684-272-01	SCREW M1.6X1.8
57	2-684-270-01	FLOAT RING
58	2-684-271-01	PINCH DISTANCE ADJUST WASHER A
59	A-1216-911-A	BLOCK, SLIPPING LEVER

Ref. No.	Part No.	Description
60	Selection part	FRICTION SPRING A,B (Note 1)
61	2-684-268-01	TORQUE RING SPRING ADJUST WASHER (Note 2)
62	2-684-269-01	TORQUE RING HOLDER
63	2-684-070-01	MF OPERATION RING GUIDE PIN
64	2-684-069-01	MF OPERATION RING
65	2-684-273-01	FOCUS OPERATION RING GUIDE NUT
66	2-684-071-01	FLEXIBLE SUBSTRATE SETTING TAPE C (Note 3)
67	2-684-072-01	FOCUS RUBBER RING

3-1-3. FLEXIBLE HOLDING TUBE BLOCK



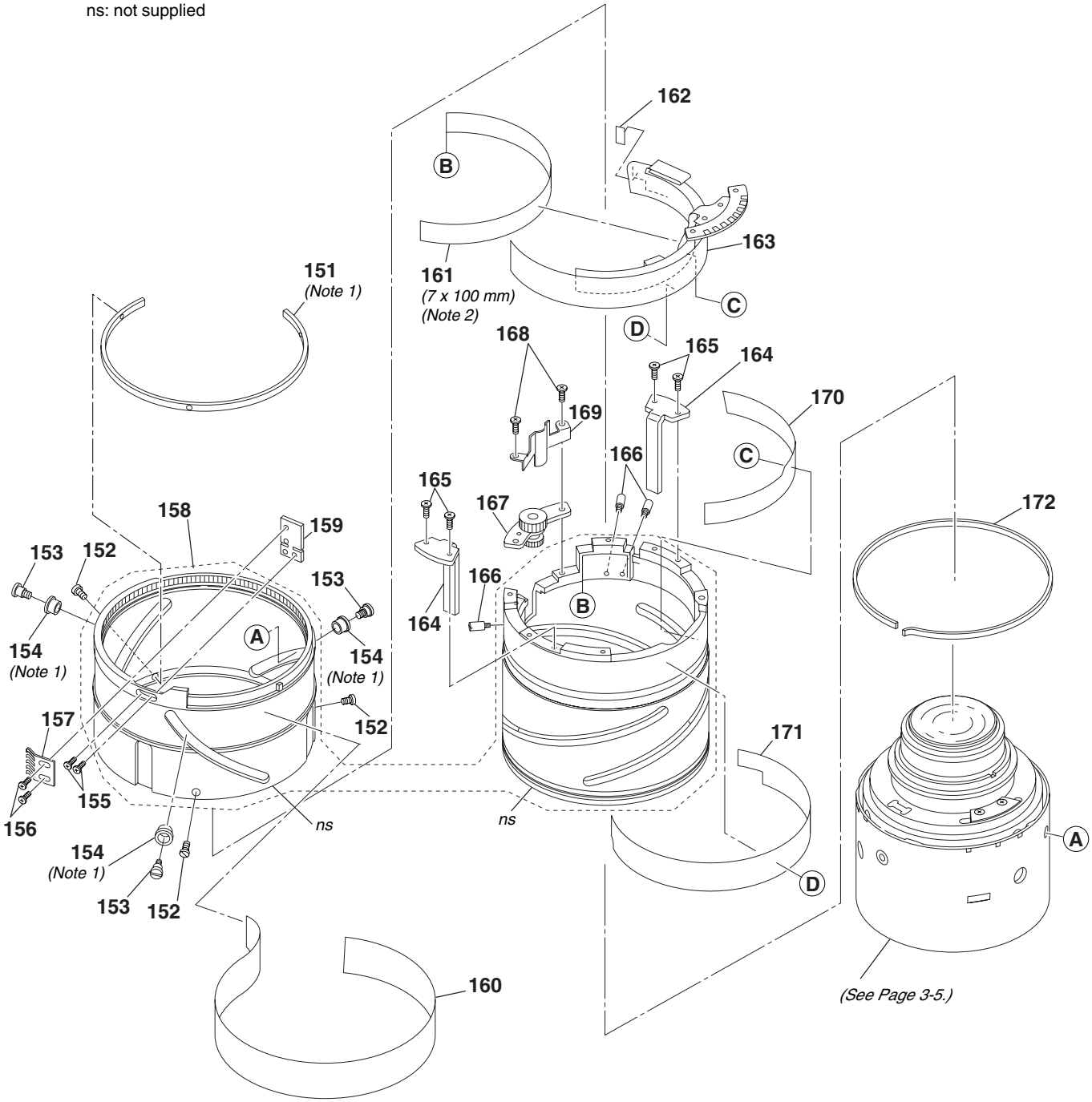
(Note 1) The number or type of these parts need to be selected according to adjustment etc..
Select the part referring to page 3-7.

Ref. No.	Part No.	Description
101	2-684-206-02	OUTER BARREL
102	2-684-073-01	LENS NO. PLATE
103	2-684-223-01	E RING
104	A-1189-978-A	BLOCK, LIMITTER STOPPER PLATE
105	2-684-214-01	FOCUS RANGE STOPPER
106	2-684-229-01	TAPE C(FLEXIBLE SUBSTRATE SET)
107	2-684-215-02	CLICK BASE
108	2-684-216-01	FOCUS CLICK SPRING
109	2-684-217-01	STEEL BALL
110	2-684-077-01	PLATE (DECORATION PLATE)
111	2-684-120-01	SCREW M1.6X4.0
112	2-684-221-02	FOCUS RANGE SWITCH KNOB

Ref. No.	Part No.	Description
113	Selection part	GAP ADJUST WASHER A to C (Note 1)
114	2-683-692-01	CHIP (MOUNT INDEX)
115	2-684-210-01	WASHER
116	2-684-209-01	SCREW M1.4X1.5
117	2-684-213-01	FH BUTTON BASE
118	2-684-212-01	FH BUTTON
119	2-684-211-01	DUST PROOFING TAPE
120	2-684-208-01	CLICK PLATE
121	2-684-228-01	SW FLEXIBLE
122	2-684-207-01	FHB ADHESIVE TAPE
123	A-1191-041-A	UNIT(FOCUS SCALE WINDOW UNIT)

3-1-4. FIXED BARREL UNIT AND MAIN FLEXIBLE BLOCK

ns: not supplied



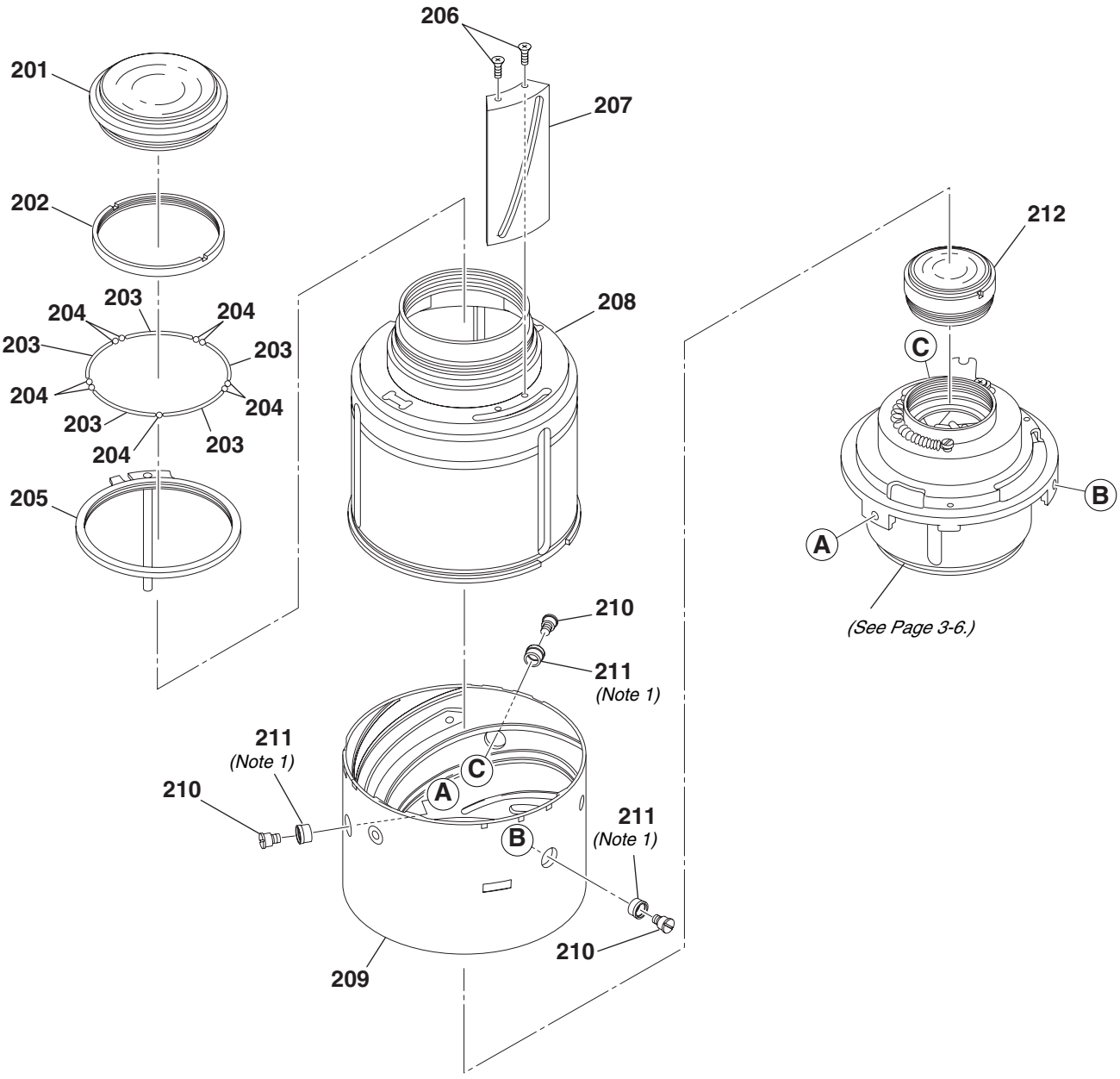
(Note 1) The number or type of these parts need to be selected according to adjustment etc..
Select the part referring to page 3-7.

(Note 2) Cut the polyester tape (black) 10mm (Ref. No. 161) for 7×100 mm.

Ref. No.	Part No.	Description
151	Selection part	FOCUS GUIDE A to C (Note 1)
152	2-684-092-01	SEMIOVAL SCREW M1.6X2.0
153	2-684-094-01	GUIDE PIN
154	Selection part	GUIDE ROLLER A to I (Note 1)
155	2-684-119-01	PHI3 HEAD SCREW M1.6X2.0
156	2-684-203-01	PHI 3 HEAD SCREW M1.6X1.6
157	2-684-202-01	A ENCODER BRUSH
158	A-1189-941-A	FIXED BARREL UNIT
159	2-684-201-01	BRUSH BASE
160	2-684-378-01	FOCUS SCALE PLATE
161	9-913-210-03	POLYESTER TAPE (BLACK) 10mm (Note 2)

Ref. No.	Part No.	Description
162	2-684-084-01	TAPE D(FLEXIBLE SUBSTRATE SETTING TAPE D)
163	A-1189-942-A	MAIN FLEXIBLE BLOCK
164	2-684-104-01	PLATE(LINEAR GUIDE KEY A)
165	2-684-105-01	SCREW M1.6X3.5
166	2-684-093-01	FOCUS STOPPER
167	A-1189-971-A	BLOCK, GEAR
168	2-684-117-01	SCREW M1.6X4.0
169	2-684-106-01	GEAR COVER
170	2-684-087-01	TAPE B(FLEXIBLE SUBSTRATE SETTING TAPE B)
171	2-684-083-01	TAPE(FLEXIBLE SUBSTRATE SETTING
172	2-684-085-01	FRICTION SHEET B

3-1-5. FOCUS CAM RING AND IRIS JOINT RING RIVETTING BLOCK



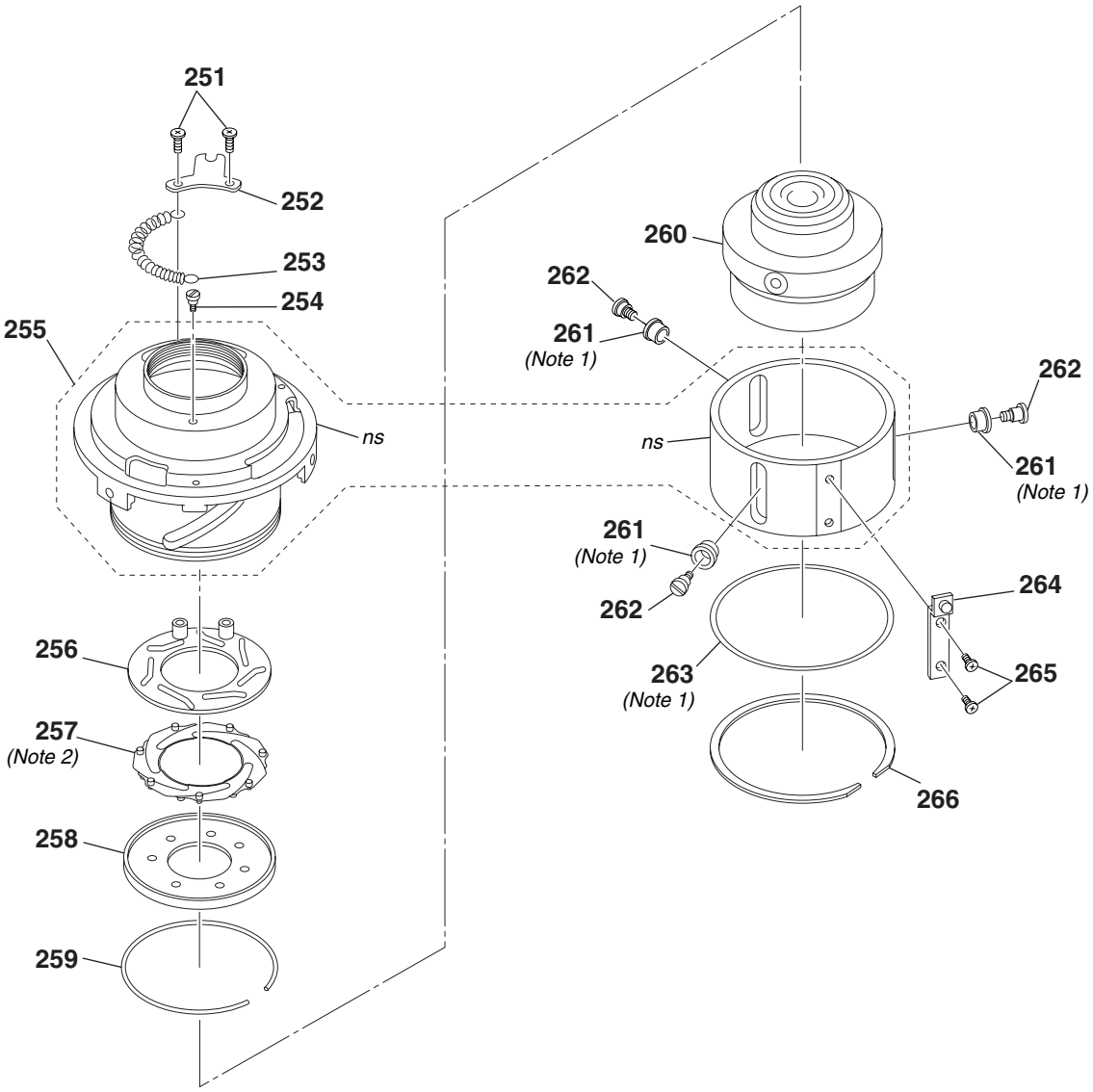
(Note 1) The number or type of these parts need to be selected according to adjustment etc..
Select the part referring to page 3-7.

Ref. No.	Part No.	Description
201	A-1191-029-A	BLOCK, LARGE 2 GROUP LENS
202	2-684-173-01	APERTURE OPERATING RING HOLDER
203	2-684-172-01	RETAINER
204	2-684-171-01	STEEL BALL
205	A-1189-957-A	BLOCK,IRIS JOINT RING RIVETING
206	2-684-170-01	SEMIOVAL SCREW M1.6X3.0

Ref. No.	Part No.	Description
207	2-684-169-01	CAM PLATE
208	2-684-168-01	MIDDLE BARREL
209	2-684-155-02	FOCUS CAM RING
210	2-684-129-01	PIN (GUIDE PIN)
211	Selection part	1ST-2ND LENS GUIDE ROLLER A to I (Note 1)
212	A-1191-030-A	BLOCK, LARGE 3 GROUP LENS

3-1-6. IRIS (INNER) TUBE BLOCK

ns: not supplied



(Note 1) The number or type of these parts need to be selected according to adjustment etc..
Select the part referring to page 3-7.

(Note 2) Only one aperture blade unit (Ref. No. 257) is supplied.
Confirm a necessary number when you order.

Ref. No.	Part No.	Description
251	2-684-181-01	SCREW M1.6X2.0
252	2-684-180-01	APERTURE LINKAGE FORK
253	2-684-179-01	SUB SPRING
254	2-684-176-01	PIN B
255	A-1189-966-A	APERTURE CONNECT BARREL UNIT
256	A-1189-968-A	APERTURE OPERATE PLATE UNIT
257	A-1189-967-A	APERTURE BLADE UNIT (Note 2)
258	2-684-177-01	APERTURE HOLD RING

Ref. No.	Part No.	Description
259	2-684-178-01	APERTURE UNIT HOLDING SPRING
260	A-1191-031-A	BLOCK, LARGE 1 GROUP LENS
261	Selection part	GUIDE ROLLER A to I (Note 1)
262	2-684-129-01	PIN (GUIDE PIN)
263	Selection part	FIRST CAM RING ADJUST WASHER A to I (Note 1)
264	A-1189-970-A	BLOCK
265	2-684-182-01	SCREW M1.6X1.8
266	2-684-183-01	1ST CAM RING HOLD RING

3-1-7. SELECTION PARTS

Ref. No.11

These washers are provided for flange back adjustment.
Change the thickness (t) according to result of adjustment.

Part No.	Description
2-684-123-01	BACK ADJUSTMENT WASHER A(T=0.05 mm)
2-684-124-01	BACK ADJUSTMENT WASHER B(T=0.07 mm)
2-684-125-01	BACK ADJUSTMENT WASHER C(T=0.1 mm)
2-684-126-01	BACK ADJUSTMENT WASHER D(T=0.2 mm)
2-684-127-01	BACK ADJUSTMENT WASHER E(T=0.5 mm)

Ref. No.13

These washers are provided for flange back adjustment.
Change the thickness (t) according to result of adjustment.

Part No.	Description
2-684-057-01	COUPLER ADJUSTMENT WASHER A (T=0.05 mm)
2-684-058-01	COUPLER ADJUSTMENT WASHER B (T=0.07 mm)
2-684-059-01	COUPLER ADJUSTMENT WASHER C (T=0.1 mm)
2-684-060-01	COUPLER ADJUSTMENT WASHER D (T=0.2 mm)
2-684-061-01	COUPLER ADJUSTMENT WASHER E (T=0.5 mm)

Ref. No.60

Select the type of part according to the operation load of the associated parts.

Note: For details, see page 2-3.

Part No.	Description
2-684-266-01	FRICTION SPRING A (T=2.05 mm)
2-684-267-01	FRICTION SPRING B (T=1.32 mm)

Ref. No.113

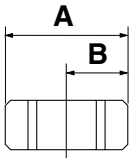
Select the type of part according to the operation load of the associated parts.

Note: For details, see page 2-4.

Part No.	Description
2-684-218-01	GAP ADJUSTMENT WASHER A (T=0.05 mm)
2-684-219-01	GAP ADJUSTMENT WASHER B (T=0.1 mm)
2-684-220-01	GAP ADJUSTMENT WASHER C (T=0.2 mm)

Ref. No.151

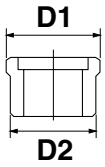
Select the type of part according to the operation load of the associated parts.



Part No.	Description
2-684-089-01	FOCUS GUIDE A (A=2.48 mm, B=1.24 mm)
2-684-090-01	FOCUS GUIDE B (A=2.45 mm, B=1.225 mm)
2-684-091-01	FOCUS GUIDE C (A=2.42 mm, B=1.21 mm)

Ref. No.154

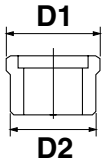
Select the type of part according to the operation load of the associated parts.



Part No.	Description
2-684-095-01	GUIDE ROLLER A (D1=4.53 mm, D2=4.03 mm)
2-684-096-01	GUIDE ROLLER B (D1=4.53 mm, D2=4.02 mm)
2-684-097-01	GUIDE ROLLER C (D1=4.53 mm, D2=4.01 mm)
2-684-098-01	GUIDE ROLLER D (D1=4.52 mm, D2=4.03 mm)
2-684-099-01	GUIDE ROLLER E (D1=4.52 mm, D2=4.02 mm)
2-684-100-01	GUIDE ROLLER F (D1=4.52 mm, D2=4.01 mm)
2-684-101-01	GUIDE ROLLER G (D1=4.51 mm, D2=4.03 mm)
2-684-102-01	GUIDE ROLLER H (D1=4.51 mm, D2=4.02 mm)
2-684-103-01	GUIDE ROLLER I (D1=4.51 mm, D2=4.01 mm)

Ref. No.211

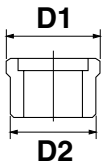
Select the type of part according to the operation load of the associated parts.



Part No.	Description
2-684-157-01	1ST-2ND GROUP GUIDE ROLLER A (D1=4.58 mm, D2=4.03 mm)
2-684-158-01	1ST-2ND GROUP GUIDE ROLLER B (D1=4.58 mm, D2=4.02 mm)
2-684-159-01	1ST-2ND GROUP GUIDE ROLLER C (D1=4.58 mm, D2=4.01 mm)
2-684-160-01	1ST-2ND GROUP GUIDE ROLLER D (D1=4.57 mm, D2=4.03 mm)
2-684-161-01	1ST-2ND GROUP GUIDE ROLLER E (D1=4.57 mm, D2=4.02 mm)
2-684-162-01	1ST-2ND GROUP GUIDE ROLLER F (D1=4.57 mm, D2=4.01 mm)
2-684-163-01	1ST-2ND GROUP GUIDE ROLLER G (D1=4.56 mm, D2=4.03 mm)
2-684-164-01	1ST-2ND GROUP GUIDE ROLLER H (D1=4.56 mm, D2=4.02 mm)
2-684-165-01	1ST-2ND GROUP GUIDE ROLLER I (D1=4.56 mm, D2=4.01 mm)

Ref. No.261

Select the type of part according to the operation load of the associated parts.



Part No.	Description
2-684-133-01	GUIDE ROLLER A (D1=4.53 mm, D2=4.03 mm)
2-684-134-01	GUIDE ROLLER B (D1=4.53 mm, D2=4.02 mm)
2-684-135-01	GUIDE ROLLER C (D1=4.53 mm, D2=4.01 mm)
2-684-136-01	GUIDE ROLLER D (D1=4.52 mm, D2=4.03 mm)
2-684-137-01	GUIDE ROLLER E (D1=4.52 mm, D2=4.02 mm)
2-684-138-01	GUIDE ROLLER F (D1=4.52 mm, D2=4.01 mm)
2-684-139-01	GUIDE ROLLER G (D1=4.51 mm, D2=4.03 mm)
2-684-140-01	GUIDE ROLLER H (D1=4.51 mm, D2=4.02 mm)
2-684-141-01	GUIDE ROLLER I (D1=4.51 mm, D2=4.01 mm)

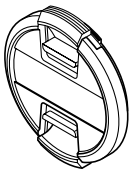
Ref. No.263

Select the type of part according to the operation load of the associated parts.

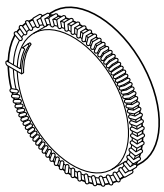
Part No.	Description
2-684-184-01	FIRST CAM RING ADJUST WASHER A (T=0.05 mm)
2-684-185-01	FIRST CAM RING ADJUST WASHER B (T=0.1 mm)
2-684-186-01	FIRST CAM RING ADJUST WASHER C (T=0.2 mm)

3-2. SUPPLIED ACCESSORIES

Checking supplied accessories.



Front Lens Cap
2-683-616-01



Rear Lens Cap
2-683-615-01

Other accessories

2-685-162-01 MANUAL, INSTRUCTION
(JAPANESE, ENGLISH, FRENCH, SPANISH)
2-685-162-11 MANUAL, INSTRUCTION
(GERMAN, DUTCH, SWEDISH, ITALIAN) (AEP)
2-685-162-21 MANUAL, INSTRUCTION (PORTUGUESE, RUSSIAN,
TRADITIONAL CHINESE, KOREAN) (AEP)
2-685-162-31 MANUAL, INSTRUCTION
(SIMPLIFIED CHINESE, ARABIC) (AEP, CH)

• Abbreviation

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

- Variable Transformer (Output voltage: AC 100 V) (Note 3)
- Camera DSLR-A100
- Compact Flash (CF) Card (For image saving)
- Screen (Art paper)
- Tape Measure
- Plane Mirror (For SLRs)
- Adhesive bond (B-10): J-6082-612-A
- Color Calculator 2

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

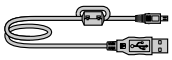
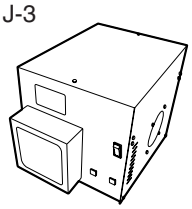
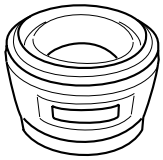
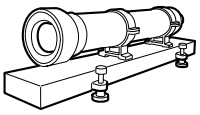
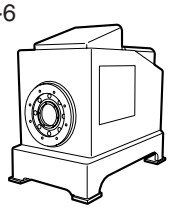
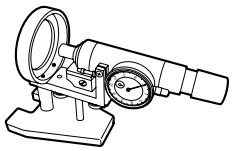
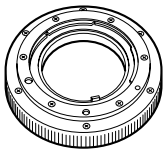
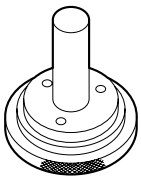
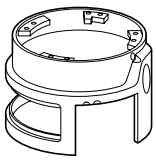
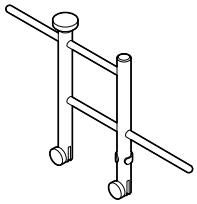
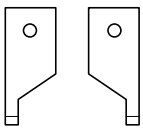
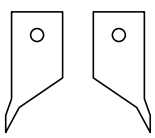
J-1  Personal computer (Note 1)	J-2  USB cord with connector 1-833-062-11	J-3  Luminance box J-6082-581-A
J-4  AE master lens J-6082-597-A	J-5  1000 mm Collimator 110V: J-6082-604-A 240V: J-6082-604-B (Note 2)	J-6  Lens test projector J-6082-605-A (Note 3)
J-7  Flange back tester J-6082-606-A	J-8  A-mount attachment J-6082-607-A	J-9  Flange back gauge (43.50mm) J-6082-608-A
J-10  Outer ring jig (Note 4)	J-11  Universal wrench J-6082-609-A	J-12  Chip-A for universal wrench J-6082-609-1
J-13  Chip-B for universal wrench J-6082-609-2		

Fig. 4-1-1

Note 1: Personal Computer (PC)
(Color Calculator 2 installed)
OS: Windows2000 Professional/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: Attach the chart to the 1000 mm collimator as shown in Fig. 4-1-2.

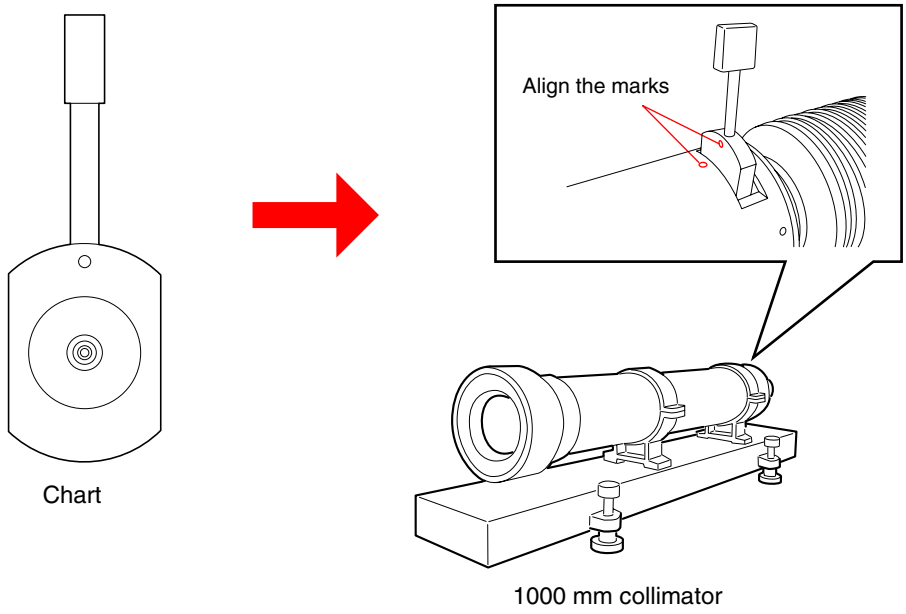


Fig. 4-1-2

Note 3: Connect the variable transformer (Output voltage: **AC 100 V**) to the lens test projector.

Note 4: Modify the outer barrel as follows to make the outer ring jig.

Required Part

Outer barrel: 2-684-206-01

Making Method

1) Chop off the outer barrel as shown in Fig. 4-1-3.

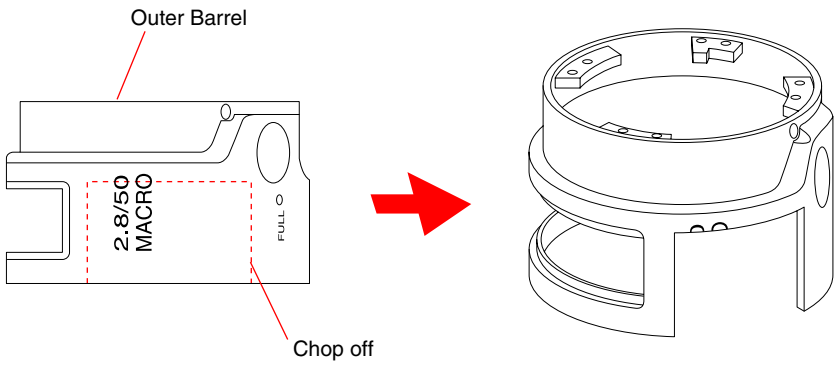


Fig. 4-1-3

4-1-2. Lens Adjustment Program

The lens adjustment program is required for the following check/adjustment.
4-5. LENS ROM CHECK
4-6. BRUSH POSITION CHECK/ADJUSTMENT AND PATTERN CHECK

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

Equipment

- Personal Computer (PC)
- Camera DSLR-A100
- USB Cord With Connector
- Lens Adjustment Program

Note: Lens Adjustment Program is downloadable from the ESI homepage.

1. Installation of the Lens Adjustment Program

For installation of the lens adjustment program, refer to the link "• Preparing the DSLR-A100 adjustment program" described on the top cover of the camera DSLR-A100 service manual "9-852-130-5□".

Note: Store the lens adjustment program "LensAdjustment.exe" and related file "AlphaLensAdjust.txt" in the folder that contains the DSLR-A100 adjustment program "DSLRadj_cs.exe".

2. Start the Lens Adjustment Program

1) Connect the camera and PC with the USB cord with connector.
2) Set the mode dial of camera to "M".
3) Turn the POWER switch of the camera to OFF, then turn the POWER switch to ON while pressing the shutter button halfway down with pressed the ▲ button of controller keys and MENU buttons.
4) Check that the remaining number of recordable images on the LCD monitor is "BBBB".

   Note: When "BBBB" is displayed, the camera activates in the adjustment mode.

5) Start the lens adjustment program "LensAdjustment.exe".

4-2. APERTURE DIAMETER CHECK/ADJUSTMENT

4-2-1. Aperture Diameter Check

Equipment

- Luminance Box
- Camera DSLR-A100
- AE Master Lens
- Compact Flash (CF) Card (For image saving)
- Personal Computer (PC)
  (Color Calculator 2 installed)

1. Preparations

1) Install the CF card to the camera.
2) Set the equipments, camera and master lens as shown in Fig.4-2-1.

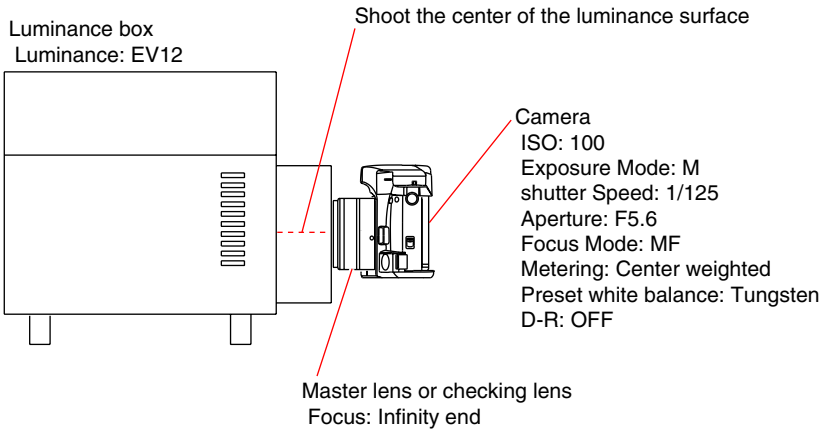


Fig.4-2-1

3) Shoot the images under the following conditions and save them.

Note: Shoot the center of the luminance surface three times with the master lens and checking lens.

Setting of Luminance box:

Luminance:	EV12

Setting of Lens:

Focus:	Infinity end

Setting of Camera:

ISO:	100
Exposure Mode:	M
shutter Speed:	1/125
Aperture:	F5.6
Focus Mode:	MF
Metering:	Center weighted
Preset white balance:	Tungsten
D-R:	OFF

2. Checking of Image

Note: Check the image of both master lens and checking lens.

1) Start the Color Calculator 2.

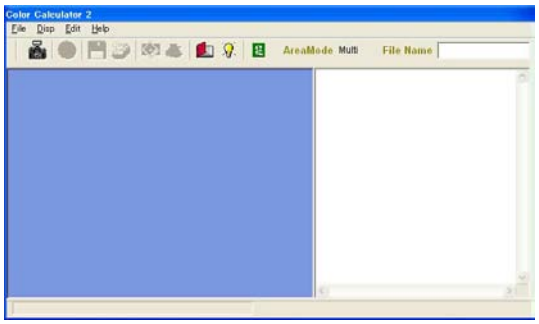


Fig.4-2-2

2) Read the image from the file menu.

Fig.4-2-3

3) Set the Color Calculator 2 as follows.
Measured value display (Display menu): RGB+L*a*b*
Measuring method (Display menu): Center Single Area

Fig.4-2-4

Color space (Edit menu): sRGB

Fig.4-2-5

Area size for calculate (Edit menu →Option): 256×256 Pixels

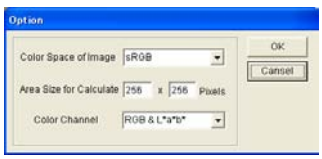


Fig.4-2-6

4) Click the calculate button to measure the image.

5) After measuring, check the “G” values.

Average “G” value of the three images shoot with master lens: (a)

Average “G” value of the three images shoot with checking lens: (b)

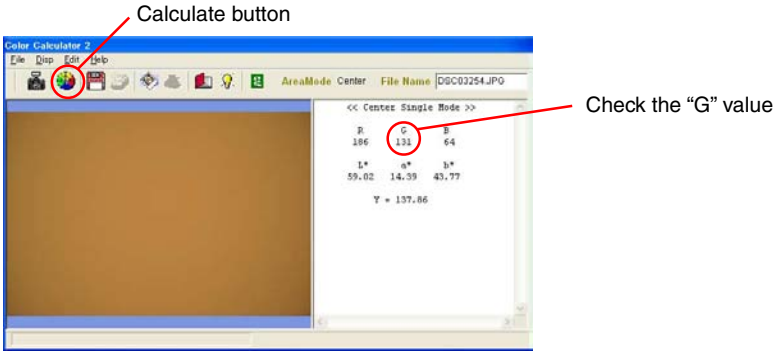


Fig.4-2-7

3. Checking Method

1) Calculate aperture error using the following formula, and check that the aperture error is within the specification.

Aperture error = Average “G” value of master lens (a) - Average “G” value of checking lens (b)

Specification

Aperture error = 0 ±12

2) When the aperture error is out of specification, perform “4-2-2. Aperture Diameter Adjustment”.

4-2-2. Aperture Diameter Adjustment

Equipment

Equipment

- Luminance Box
- Camera DSLR-A100
- AE Master Lens
- Compact Flash (CF) Card (For image saving)
- Personal Computer (PC)
  (Color Calculator 2 installed)
- Adhesive bond (B-10)

1. Adjusting Method

1) Separate all lens elements in front of the aperture blades.
2) Remove the adhesive bond fixing the aperture unit holding spring.

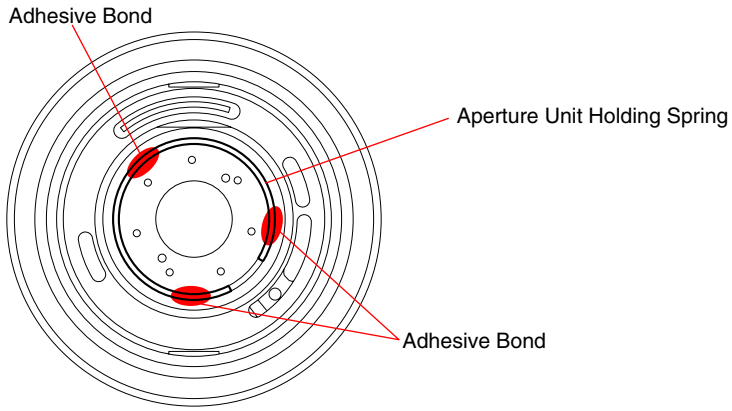


Fig.4-2-8

3) Move the preset lever to set the preset ring at the open aperture position.

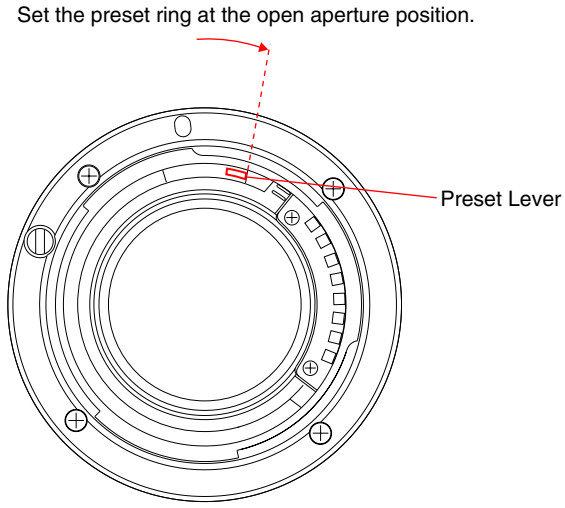


Fig.4-2-9

4) Turn the aperture hold ring to adjust the position that the aperture blades are hidden into the edge completely.

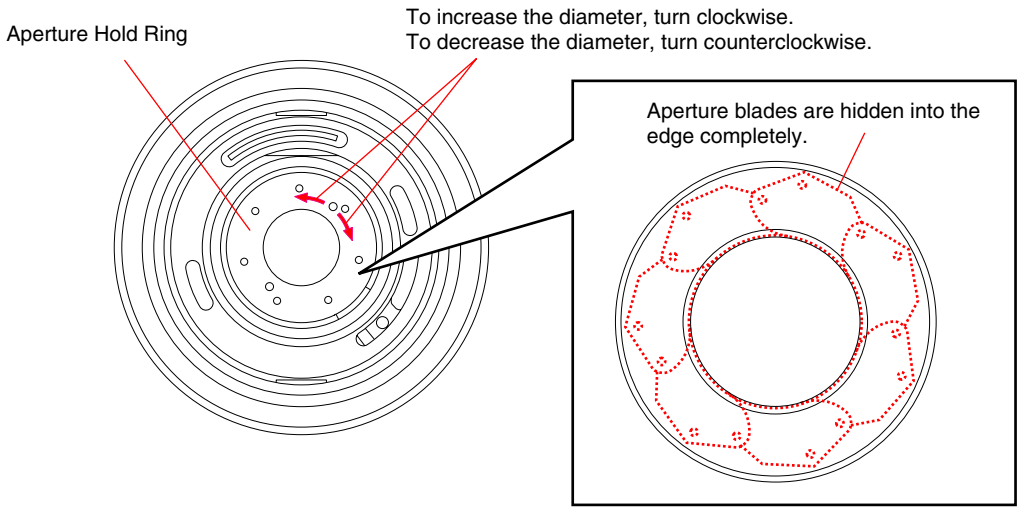


Fig.4-2-10

5) After the adjustment is completed, apply the adhesive bond (B-10) as shown in the Fig.4-2-11.

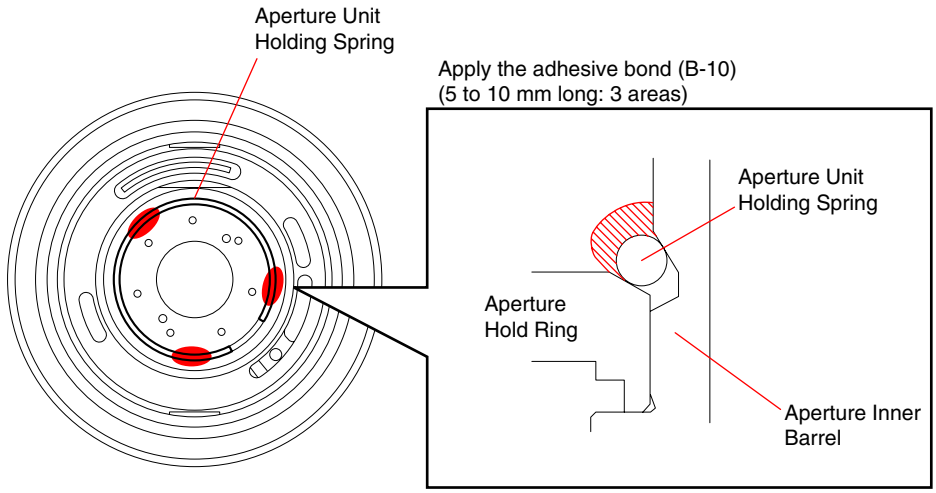


Fig.4-2-11

6) Assemble the lens completely.

7) Perform “4-2-1. Aperture Diameter Check”, and repeat “4-2-1. Aperture Diameter Check” and “4-2-2. Aperture Diameter Adjustment” until the aperture error is within the specification.

4-3. PROJECTIVE RESOLVING POWER CHECK

Equipment

- Lens Test Projector and Variable Transformer (Output voltage: AC 100 V)
  Note: Connect the variable transformer (Output voltage: AC 100 V) to the lens test projector.

- A-mount Attachment
- Screen (Art paper)
- Tape Measure
- Plane Mirror (For SLRs)

1. Preparations

Note: Check the projective resolving power of the checking lens at the following focal-length and distance.

Focal-length f (mm)	distance (m)
50	2.15

Table 4-3-1

1) Perform the following steps (1) to (3), and incorporate the internal lenses of the lens test projector according to the checking focal-length.
   (1) Open the lid of the lens test projector.
   (2) Pull up and turn the fixed levers on the right and left sides of the lens test projector.
   (3) Remove or insert the lens.
   Note: Be sure to have the right position and direction of the lens.

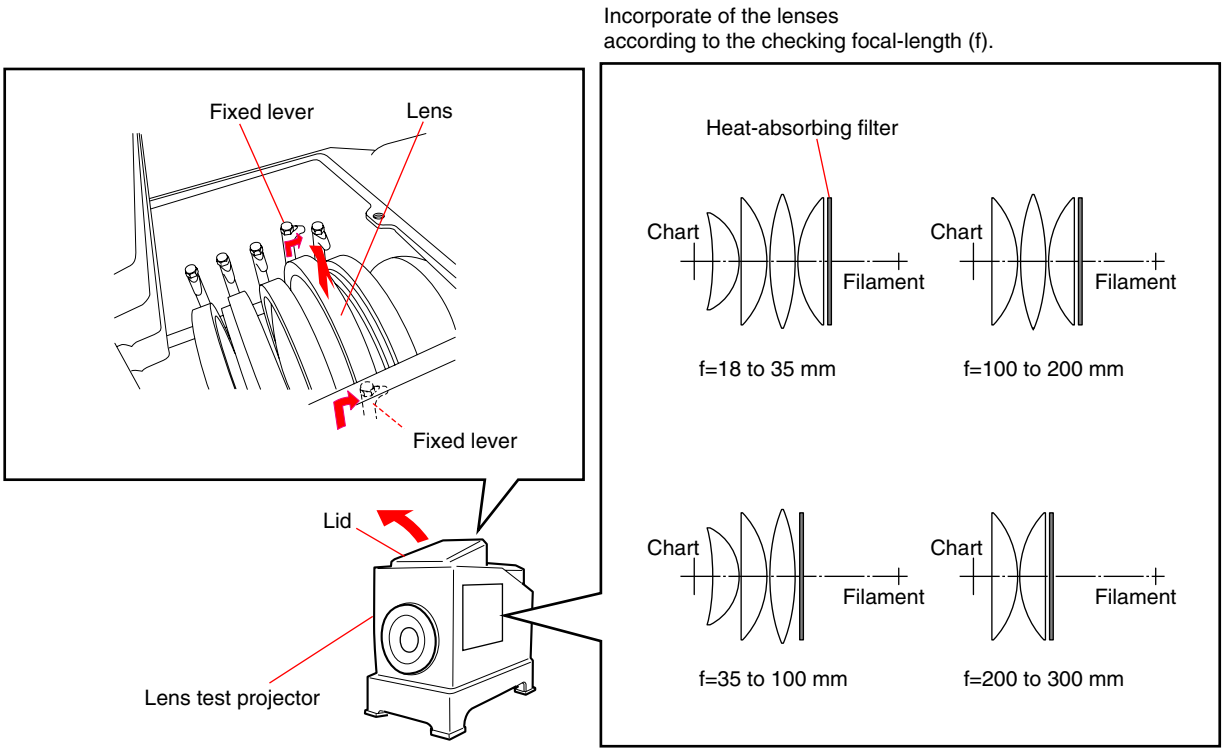


Fig.4-3-1

2) Attach the checking lens to the lens test projector, and set the equipments as shown in Fig.4-3-2.
3) Turn the fan switch of the lens test projector to ON, then turn the lamp switch to ON.

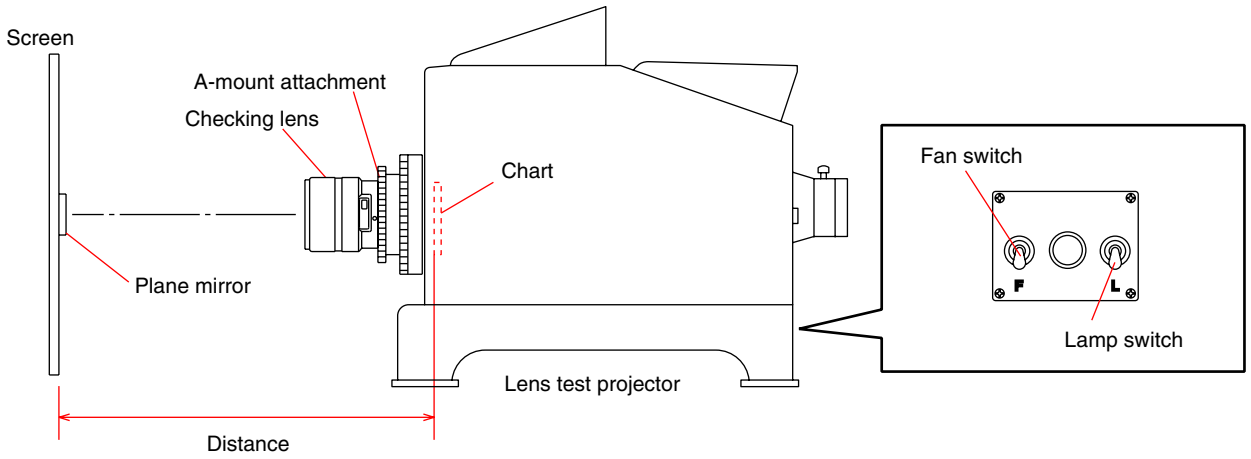


Fig.4-3-2

4) Turn the focus ring of the checking lens until the chart image projected on the screen is the sharpest at the center (y'=0).
5) Set the plane mirror to the center of the projected image (y'= 0), and adjust the projector position so that the mirror reflects the light to the center of the lens.

2. Checking Method

1) Turn the focus ring of the checking lens until the chart image projected on the screen is the sharpest at the center (y'=0).
2) Read the number of the smallest pitched lines at the center (y'= 0).

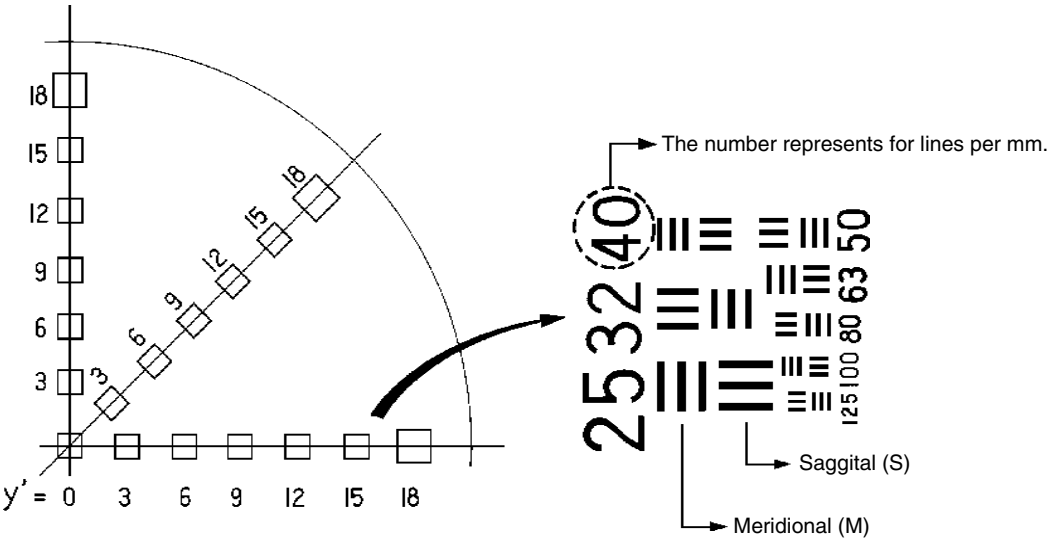


Fig.4-3-3

3) Turn the mount rotation ring of lens test projector until the projected image at a certain peripheral point (y'= 15 or 18) on the screen appears the most unsharp.
Read the number of the smallest pitched lines (both saggital and meridional: 3 lines) at the peripheral point.

Note: When reading the number of the smallest pitched lines, be careful of the spurious resolution.
Spurious resolution is the reversed image of 2 or 4 lines which appears on screen when focus is beyond maximum revolving power.
Do not confuse spurious resolution for the smallest pitched lines.

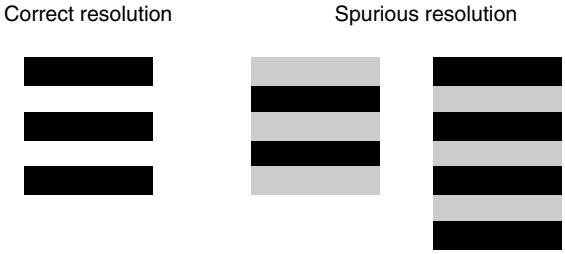


Fig.4-3-4

4) Check that the all readings (y'= 0, saggital (S) and meridional (M) at y'= 15 or 18) is within the specification of the Table 4-3-2.

Specification

Focal-length f (mm)	distance (m)	Number of the smallest pitched lines				
		Center (y'=0)	y'= 15		y'= 18	
		(Lines per mm)	S	M	S	M
50	2.15	125	50	32	50	40

Table 4-3-2

5) After the checking is completed, turn the lamp switch of the lens test projector to OFF and cool the inside of the lens test projector, then turn the fan switch to OFF.

4-4. FLANGE BACK (f'F) CHECK/ADJUSTMENT

4-4-1. Flange Back (f'F) Check

Equipment

- 1000 mm Collimator
- Flange Back Tester
- A-mount Attachment
- Flange Back Gauge (43.50mm)

1. Preparations

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

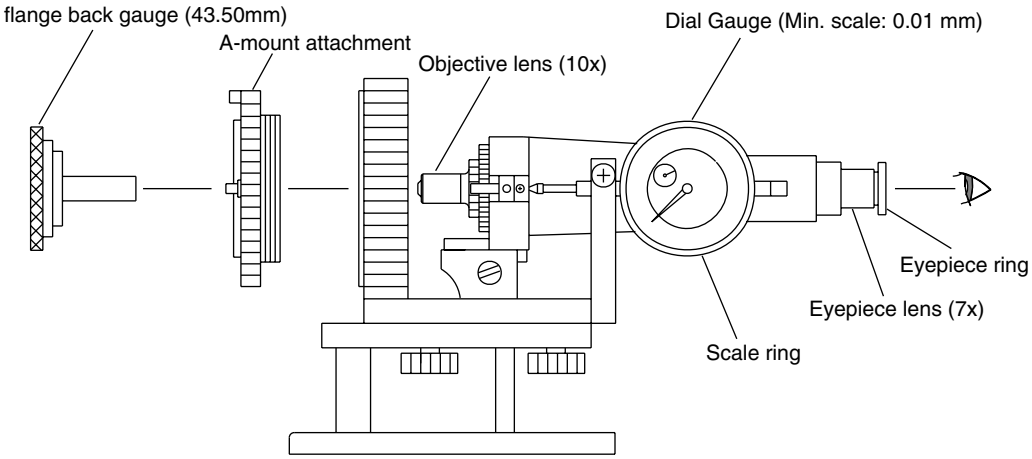


Fig.4-4-1

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.4-4-2 for correct reading.

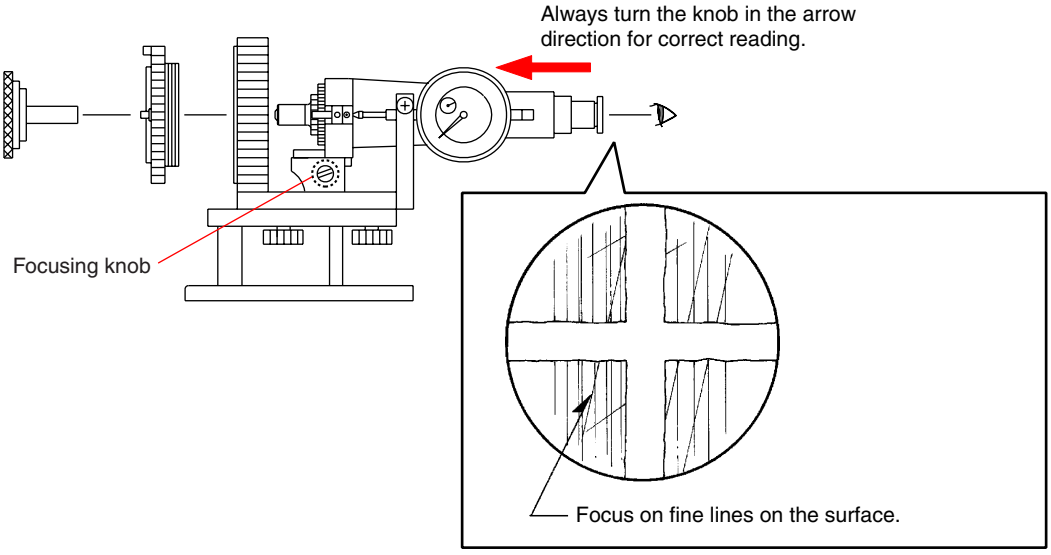


Fig.4-4-2

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 1000 mm collimator.

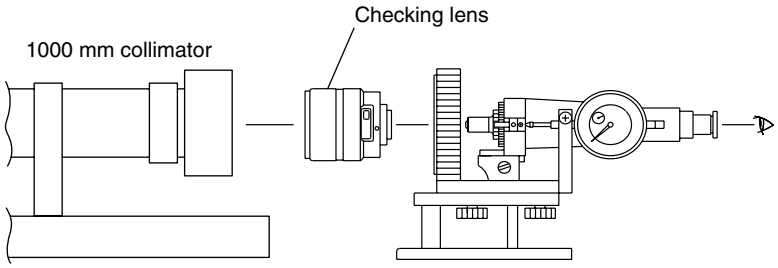


Fig.4-4-3

2) Set the focus ring of the checking lens to infinity end position while looking through the microscope, and align the optical axis to the center of the chart image accurately.
3) Turn the focusing knob of the flange back tester, and set the dial gauge value to "44.60 mm".
4) Turn the focus ring of the checking lens from near to infinity side until the chart image is the sharpest (red and green color areas are equal on the chart *).

   *: Position in which the color of collimator chart changes from green into red and come into focus.
   Also check the optical axis aligns with the chart center. (Refer to Fig.4-4-4.)

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

Optical Alignment
Best alignment

Incorrect aligned
e.g. As the focusing knob is turned, the chart may appear blurry as illustrated.
The cause depends on individual lens.

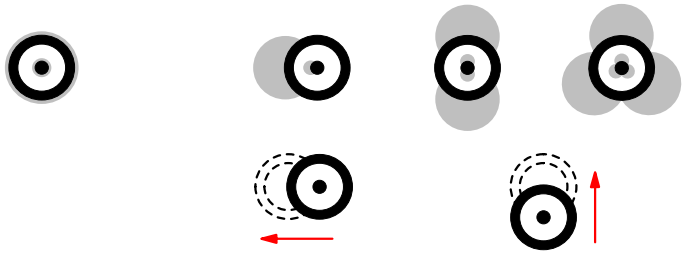


Fig.4-4-4

Appearance	Allowance
Off center	Within 0.05 mm
Astigmatism	Within 0.04 mm

5) Check that the infinity index of the focus scale plate is within the distance index width of the distance scale window as shown in the Fig. 4-4-5.
   If not, perform "4-4-2. Flange Back (f'F) Adjustment".

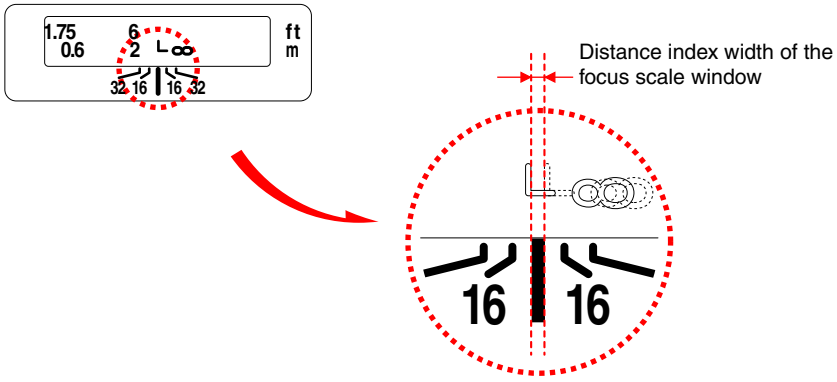


Fig. 4-4-5

4-4-2. Flange Back (f'F) Adjustment

Equipment

- 1000 mm Collimator
- Flange Back Tester
- A-mount Attachment
- Flange Back Gauge (43.50mm)

Adjusting Method

1) Perform "4-4-1. Flange Back (f'F) Check", and check that the checking lens is out of specification.
2) Turn the focus ring of the checking lens and align the infinity index of the focus scale plate to the distance index of the focus scale window as shown in the Fig. 4-4-6.

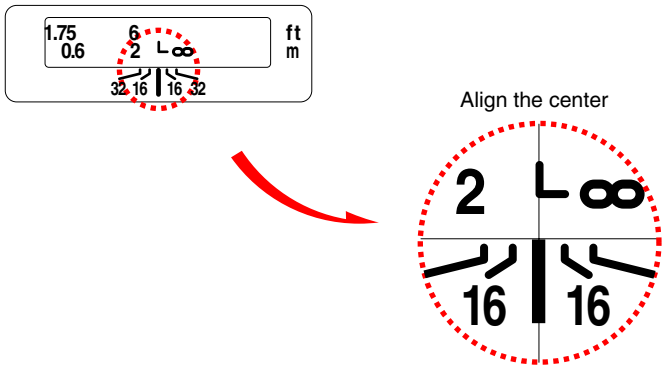


Fig. 4-4-6

3) Turn the focusing knob of the flange back tester until the chart image is the sharpest while looking through the microscope.
4) Calculate the flange back (f'F).

Flange back (f'F) of the checking lens = (Flange back gauge) + (Number of short-pointer revolution) + (Reading of long-pointer)

5) Calculate focus error amount using the following formula.

Focus error amount = Flange back (f'F) reading - 44.60 mm

Focus error amount: Amount that should be adjusted by the back adjustment washer thickness.
f'F: Flange back value (Reading value)

6) Adjust the back adjustment washer thickness according to the result of step 5). (Refer to Table 4-4-1 and Fig.4-4-7.)
Note: Use the micrometer gauge (or slide gauge) to measure the back adjustment washer thickness.

If focus error is a negative value: Decrease adjustment back washer thickness by error amount to increase flange back.
If focus error is a positive value: Increase adjustment back washer thickness by error amount to decrease flange back.

7) Calculate the coupler adjustment washer thickness using the following formula, and replace the adjustment washer. (Refer to Table 4-4-1 and Fig.4-4-7.)

Coupler djustment washer thickness = Back adjustment washer thickness - 0.05 mm

Back adjustment washer	Parts No.	t (mm)
A	2-684-123-01	0.05
B	2-684-124-01	0.07
C	2-684-125-01	0.1
D	2-684-126-01	0.2
E	2-683-127-01	0.5

Coupler adjustment washer	Parts No.	t (mm)
A	2-684-057-01	0.05
B	2-684-058-01	0.07
C	2-684-059-01	0.1
D	2-684-060-01	0.2
E	2-684-061-01	0.5

Table 4-4-1

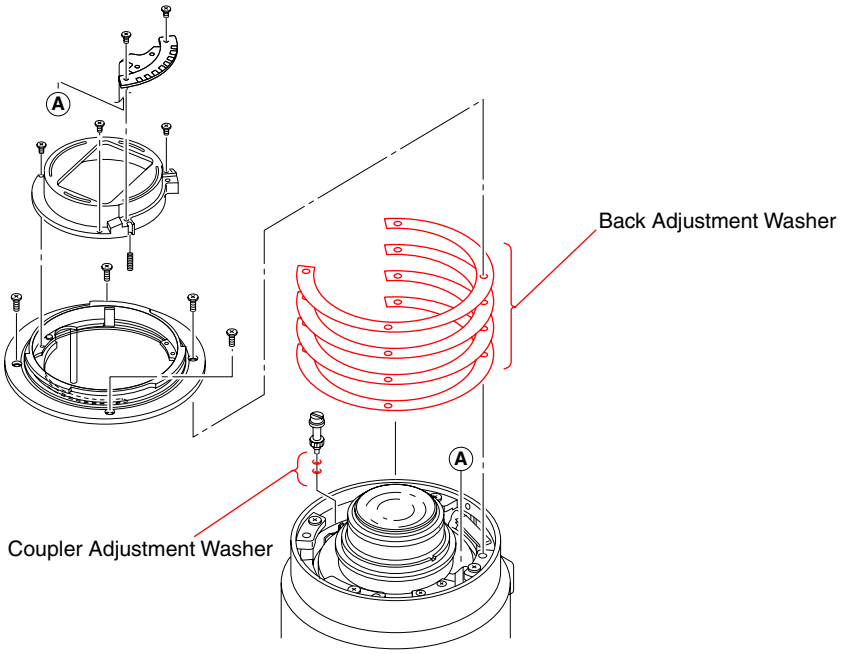


Fig.4-4-7

6) Install the back adjustment washer and coupler adjustment washer, and perform “4-4-1. Flange Back (f’F) Check” again.

4-5. LENS ROM CHECK

Note: If dialog box of error code appears during the checking, check the reason of error referring to page 4-20.

Equipment

- Personal Computer (PC)
- Camera DSLR-A100
- USB Cord With Connector
- Lens Adjustment Program

  Note: Lens Adjustment Program is downloadable from the ESI homepage.

1. Preparations

1) Connect the checking lens to the camera.
2) Start the lens adjustment program “LensAdjustment.exe” referring to “4-1-2. Lens Adjustment Program”.

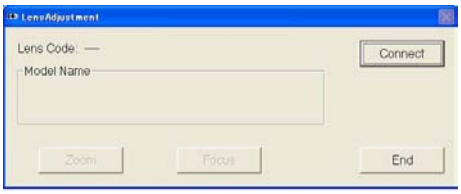


Fig. 4-5-1

2. Checking Method

1) Click the Connect button on the lens adjustment program.

   Note: Click the End button to disconnect the USB connection, then lens adjustment program will terminate.

2) Check that the display of “Lens Code” and “Model Name” is correct.

   Note: Focus position setting is not required.

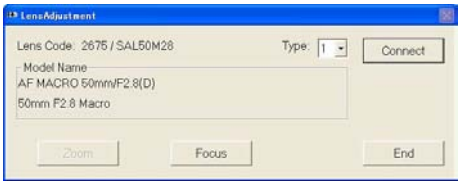


Fig. 4-5-2

3) Click the End button to terminate the lens adjustment program.
4) Turn the POWER switch of the camera to OFF.

4-6. BRUSH POSITION CHECK/ADJUSTMENT AND PATTERN CHECK

Note: If dialog box of error code appears during the checking or adjustment, check the reason of error referring to page 4-20.

4-6-1. Brush Position Check

Equipment

- Personal Computer (PC)
- Camera DSLR-A100
- USB Cord With Connector
- Lens Adjustment Program

  Note: Lens Adjustment Program is downloadable from the ESI homepage.

1. Preparations

1) Connect the checking lens to the camera.
2) Start the lens adjustment program "LensAdjustment.exe" referring to "4-1-2. Lens Adjustment Program".

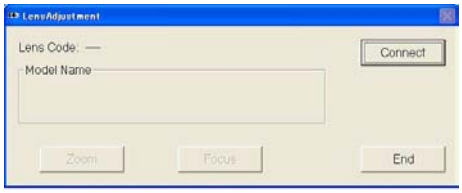


Fig. 4-6-1

2. Checking Method

1) Check that the "Type" is set to "1", and click the Connect button on the lens adjustment program.

   Note: Click the End button to disconnect the USB connection, then lens adjustment program will terminate.

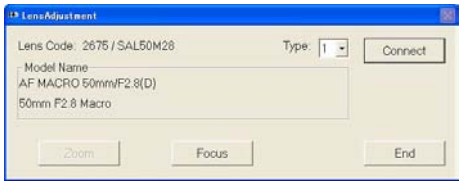


Fig. 4-6-2

2) Check that the "Type" is set to "1", and click the Focus button on the lens adjustment program.
3) Set the focus position to infinity end, then check that the OK (Green) indicator of "Position" lights as shown in Fig. 4-6-3.

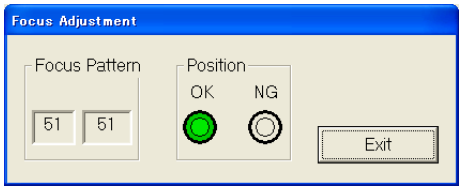


Fig. 4-6-3

If the NG (Red) indicator of "Position" lights, perform the "4-6-2. Brush Position Adjustment and Pattern Check".

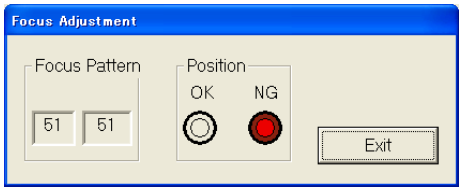


Fig. 4-6-4

4) Click the Exit button.
5) Click the End button to terminate the lens adjustment program.
6) Turn the POWER switch of the camera to OFF.

4-6-2. Brush Position Adjustment and Pattern Check

Equipment

- Personal Computer (PC)
- Camera DSLR-A100
- USB Cord With Connector
- Adhesive bond (B-10)
- Lens Adjustment Program

  Note: Lens Adjustment Program is downloadable from the ESI homepage.

- Outer Ring Jig

  Note: For details of the jig making method, refer to "4-1-1. List of Service Tools and Equipments".

1. Preparations

1) Remove the fixed holding tube from the checking lens.
2) Attach the outer ring jig to the checking lens and assemble the lens.
3) Set the focus position to infinity end.

2. Brush Position Adjustment

1) Loosen the two screws as shown in the Fig. 4-6-5.

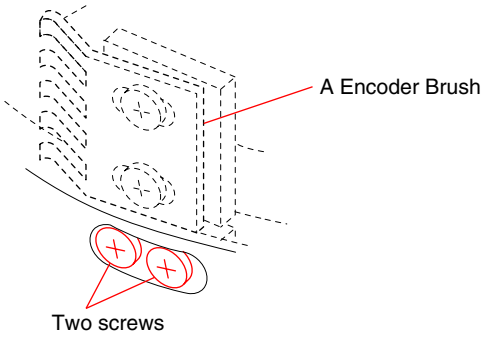


Fig. 4-6-5

2) Perform the "4-6-1. Brush Position Check", and adjust the A encoder brush position until the OK (Green) indicator of "Position" lights.

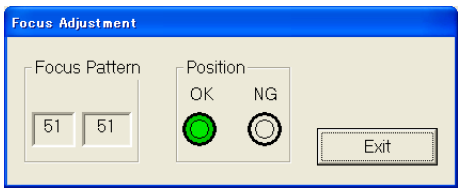


Fig. 4-6-6

3) Tighten the two screws loosened in step 1).

3. Pattern Check

Note: When the NG (Red) indicator of "Position" lights during checking, does not care about it (It is normal performance).

1) Turn the focus ring slowly from the near end "Focus Pattern : 1" to the infinity end "Focus Pattern : 51" and check that the value of "Focus Pattern" change from 1 to 51 continuously.

2) Turn the focus ring slowly from the infinity end "Focus Pattern : 51" to the near end "Focus Pattern : 1" and check that the value of "Focus Pattern" change from 51 to 1 continuously.

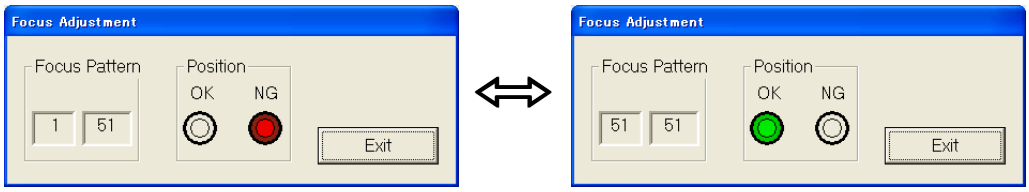


Fig. 4-6-7

3) Click the Exit button.
4) Click the End button to terminate the lens adjustment program.
5) Turn the POWER switch of the camera to OFF.
6) After the pattern check is completed, apply the adhesive bond (B-10) as shown in Fig. 4-6-8.

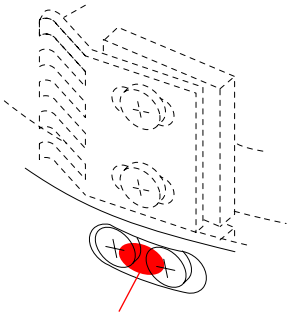
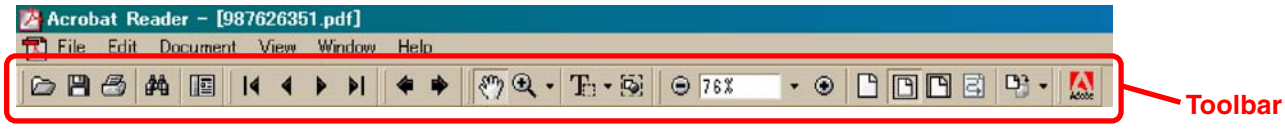


Fig. 4-6-8

4-7. ERROR CODE LIST

Error code		Description
Corrupt Data		Zoom/focus data of check pattern is out of sync with the number of check pattern.
Error, No Lens		Lens is not connected correctly.
Error, Unknown Lens		Unidentified lens is connected.
Communication Error,	Code#:E600	Communication error with the camera
	Code#:F000	Input data error to DLL file
	Code#:F100	Setting error of USB port
	Code#:2531	Communication error of main signal on the camera

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



Printing a text

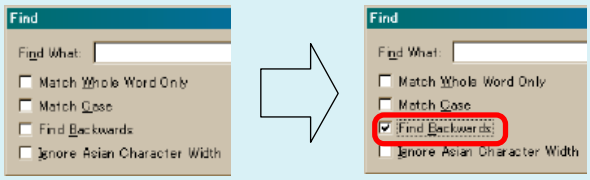
1. Click the Print button .
2. Specify a printer, print range, number of copies, and other options, and then click [OK].

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

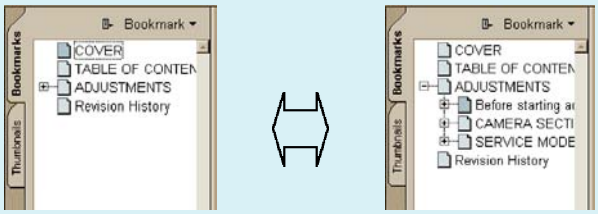
- To reverse the previous screens (operation) one by one, click the .
- To advance the reversed screens (operation) one by one, click the .

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	2006.06	Official Release	—	—
1.1	2007.02	Revised-1	• Change of Repair Parts (Section 1-5, Section 2, Section 3, Section 4) • Change of HELP15 • Addition of guide of [About the Lens Test Projector] (Cover)	Yes