# SAL50F14

(1.4/50) (50mm F1.4)

# 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



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 *1**
47°

**Angle of view 2 *1**
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**
0.45 (1.5)
*3 Minimum focus is the shortest distance from the image sensor to the subject.

**Maximum magnification (×)**
0.15

**Minimum f-stop**
f/22

**Filter diameter (mm)**
55

**Dimensions (maximum diameter × height) (mm (in.))**
Approx. 65.5 × 43 (2 9/16 × 1 11/16)

**Mass (g (oz.))**
Approx. 220 (7 13/16)

**Included items**
Lens (1), Front lens cap (1), Rear lens cap (1), Lens hood (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.<br>Replace only with the same or equivalent type. |

**SAFETY-RELATED COMPONENT WARNING!!**

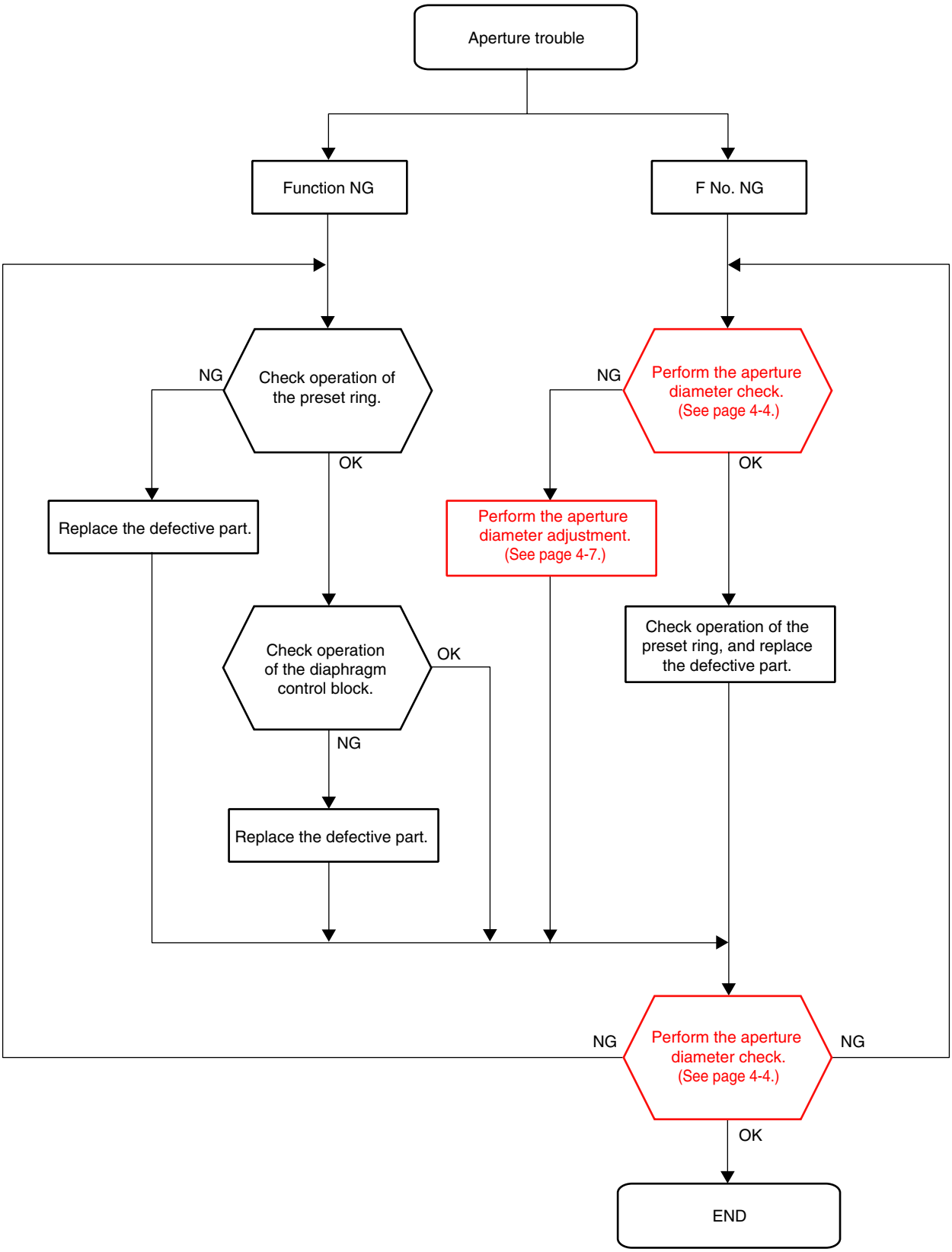
**COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.**

**ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!**

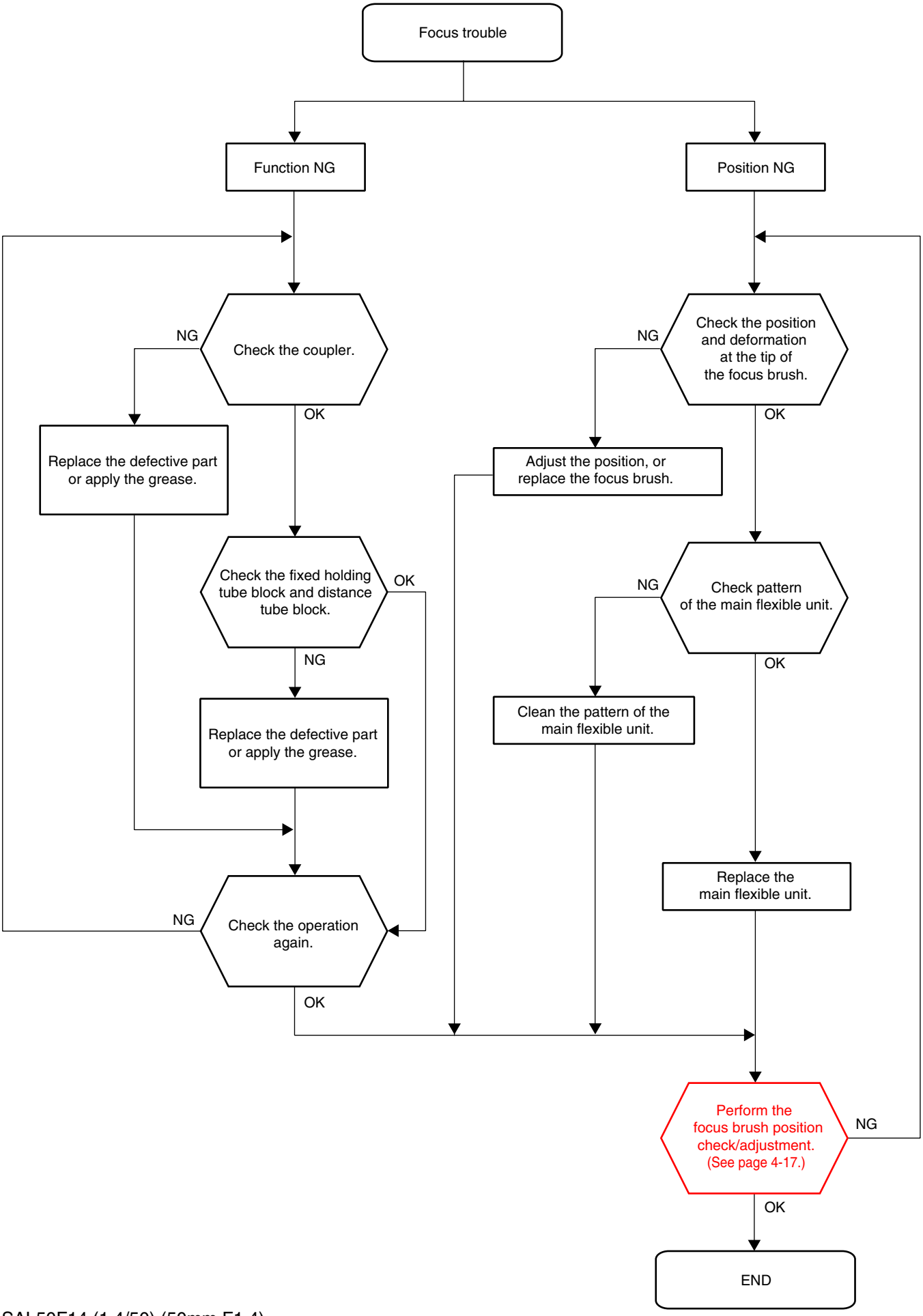
**LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈSES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPÉMENTS PUBLIÉS PAR SONY.**

## 1-5. TROUBLESHOOTING

### 1-5-1. Aperture Trouble



## 1-5-2. Focus Trouble

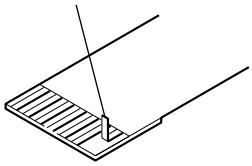


# 2. DISASSEMBLY

## 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.

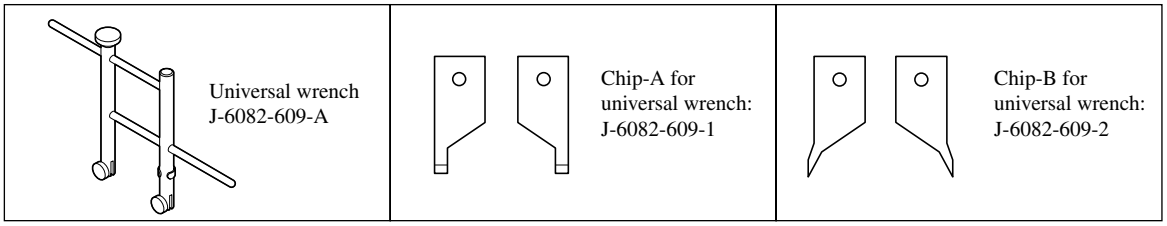
Cut and remove the part of gilt which comes off at the point. (Be careful or some pieces of gilt may be left inside)



## UNIVERSAL WRENCH

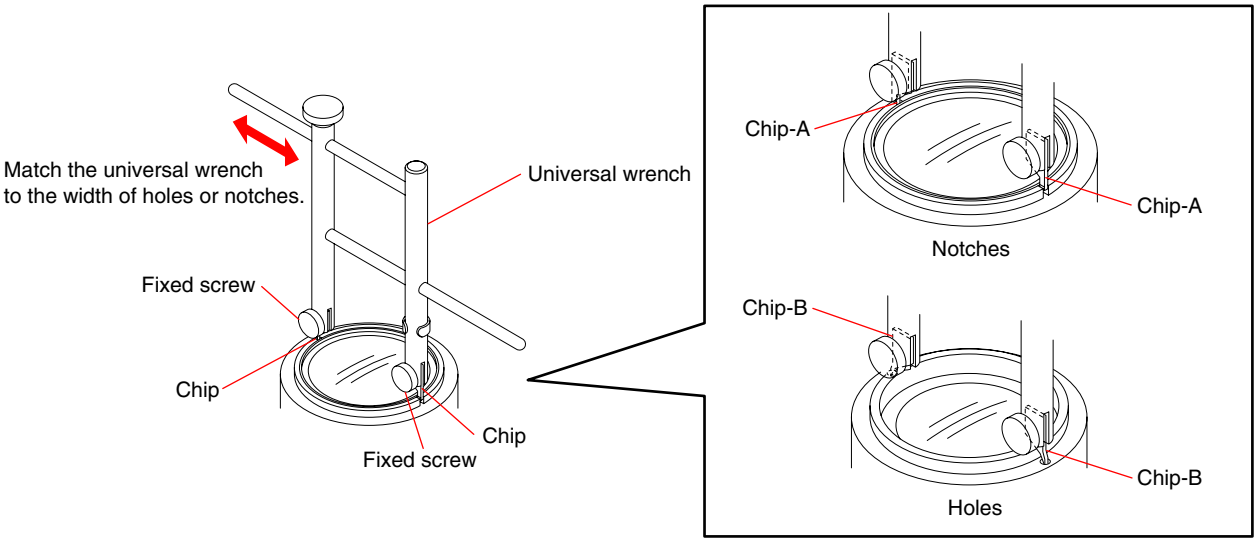
In case of the following notches or holes are located in the lens block, etc during disassembling/ assembling the lens, Use the universal wrench.


### How to Use




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

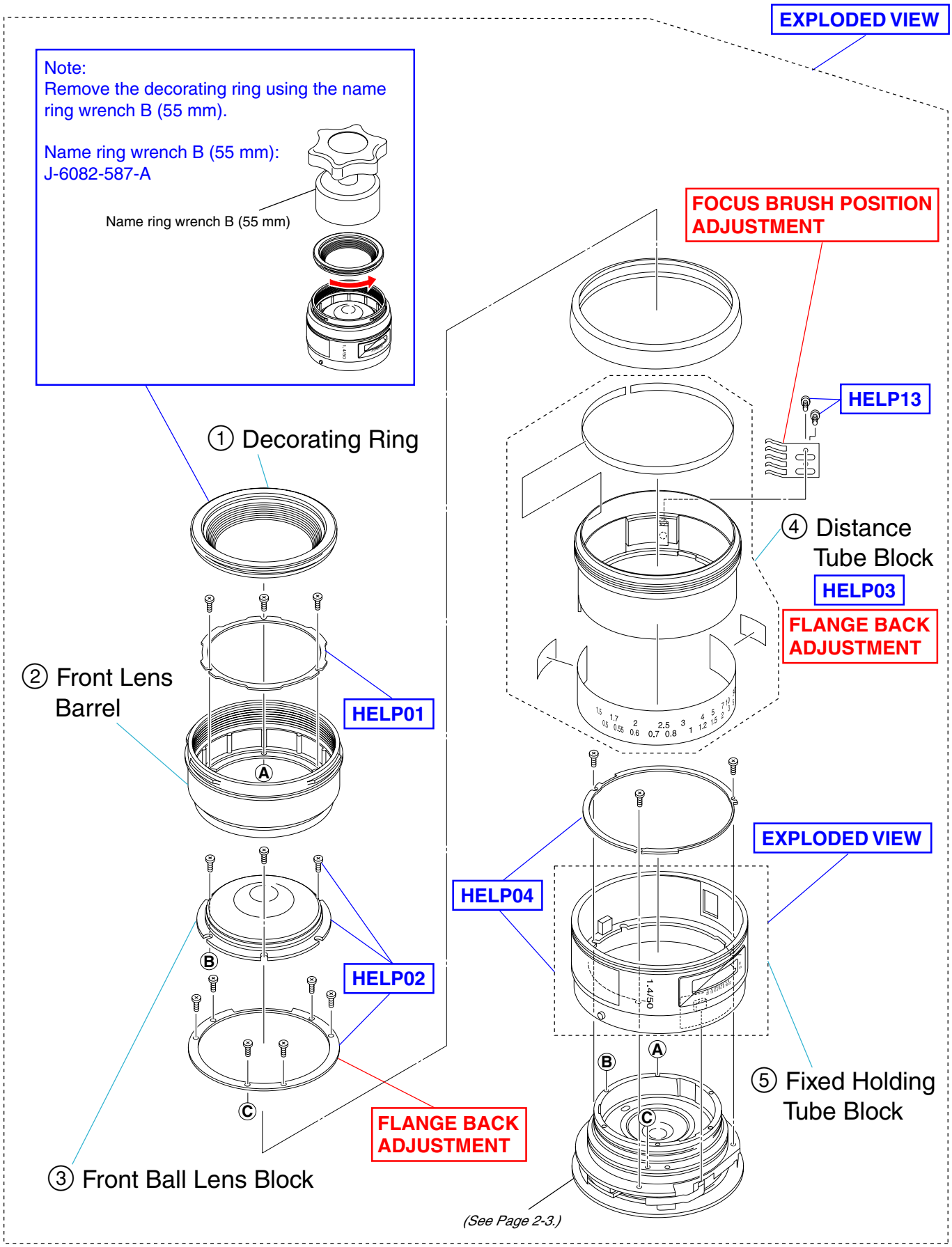
Match the universal wrench to the holes or notches of the lens block, etc.



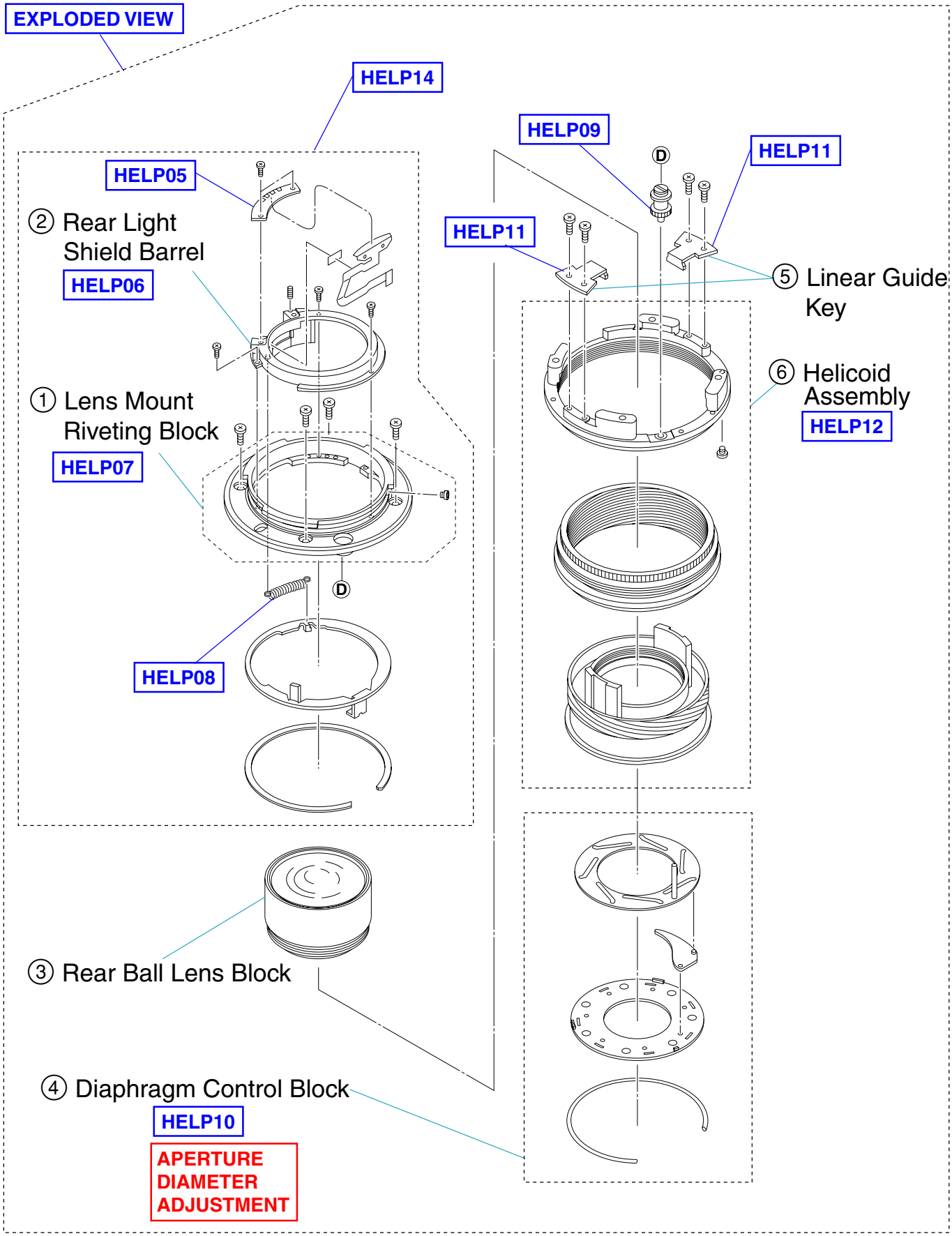

When top of tip does not reach holes or notches because the fixed screw becomes obstructive, replace the fixed screw to below.
+B 3X5 7-682-546-09

## 2-1. DISASSEMBLY

### 2-1-1. FRONT LENS BARREL, DISTANCE TUBE BLOCK AND FRONT BALL LENS BLOCK



## 2-1-2. REAR BALL LENS BLOCK, HELICOID ASSEMBLY AND DIAPHRAGM CONTROL BLOCK



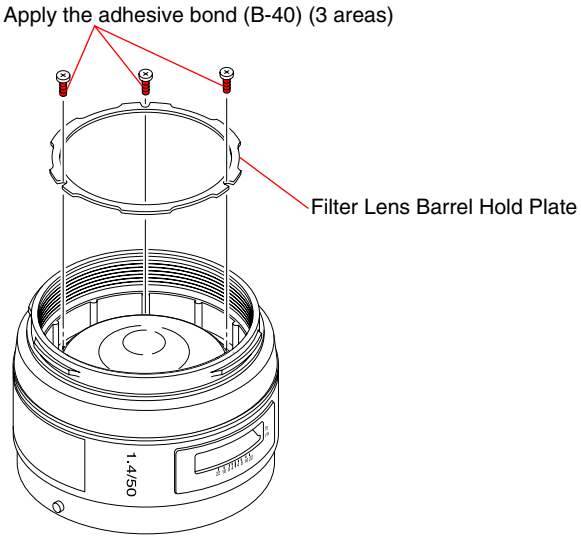
# HELP

Note for assembling and grease applying positions are shown.

## HELP01

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

1. Attach the filter lens barrel hold plate and fix it with the three screws tentatively as shown in the figure.
2. Perform the “4-2-1. Aperture Diameter Check”.
3. After the aperture diameter check is completed, apply the adhesive bond (B-40) to the three screws and tighten them as shown in the figure.

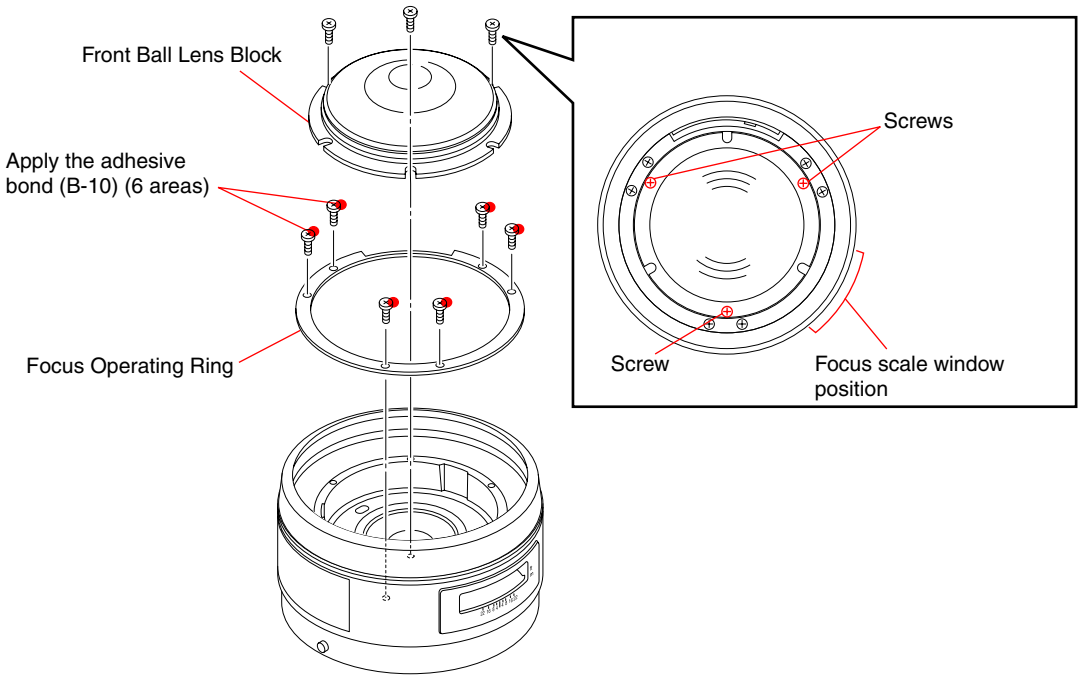


## HELP02

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

1. Perform the “4-2-2. Aperture Diameter Adjustment” before attaching the front ball lens block.
2. Attach the front ball lens block, and perform the “4-4-2. Flange Back (f’F) Adjustment”.
   **Note:** Attach the three screws fixing the front ball lens block as shown in the figure.

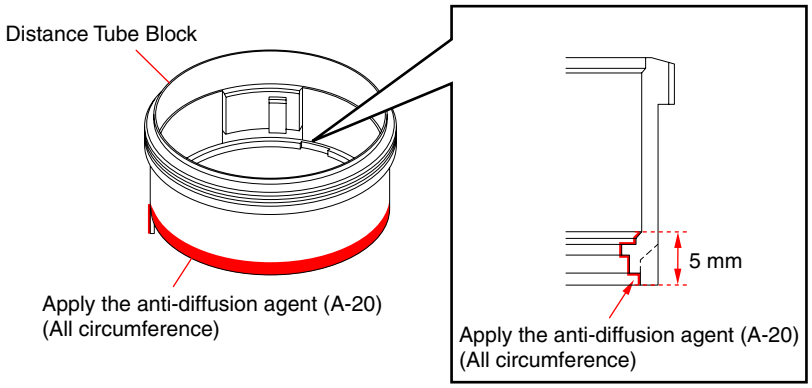
3. After the flange back (f’F) adjustment is completed, tighten the six screws and apply the adhesive bond (B-10) to them as shown in the figure.




## HELP03

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

Apply the anti-diffusion agent (A-20) to the instruction part of the distance tube block.
**Note:** When attaching the focusing ring, set the distance tube block to the infinity position.



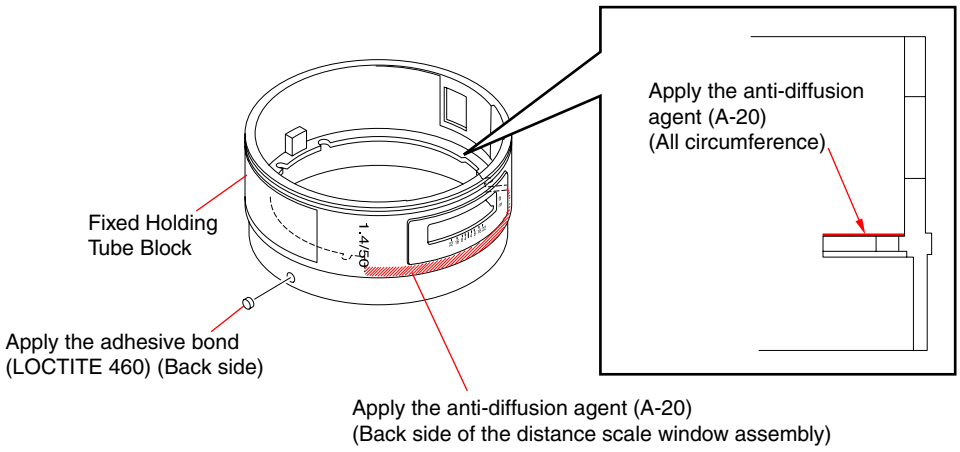
## HELP04

Adhesive bond (LOCTITE 460) (Note)

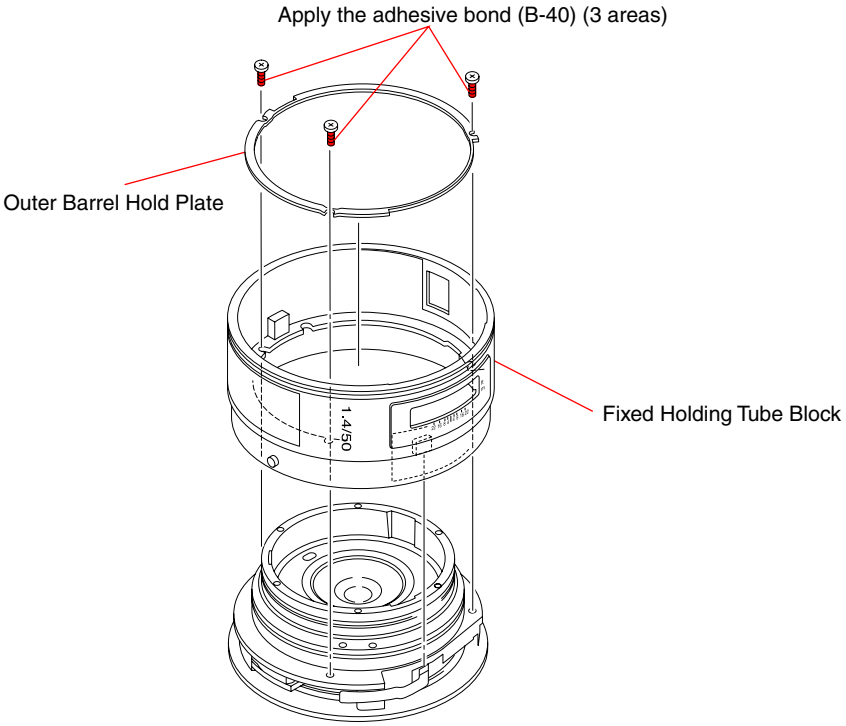
**Note:** Use adhesive bond (LOCTITE 460) or an equivalent article.
Don't use what becomes white after drying like a quick-drying glue.

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

1. Apply the adhesive bond (LOCTITE 460) to the back side of the mount index, and attach it to the fixed holding tube block.
2. Apply the anti-diffusion agent (A-20) to the instruction part of the fixed holding tube block.



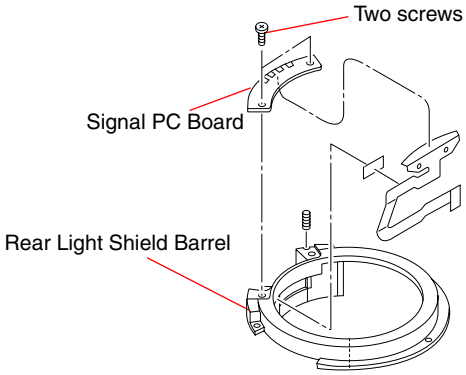

3. Attach the fixed holding tube block and the outer barrel hold plate.
4. Apply the adhesive bond (B-40) to the three screws and tighten them as shown in the figure.



## HELP05

Attach the signal PC board to the rear light shield barrel.

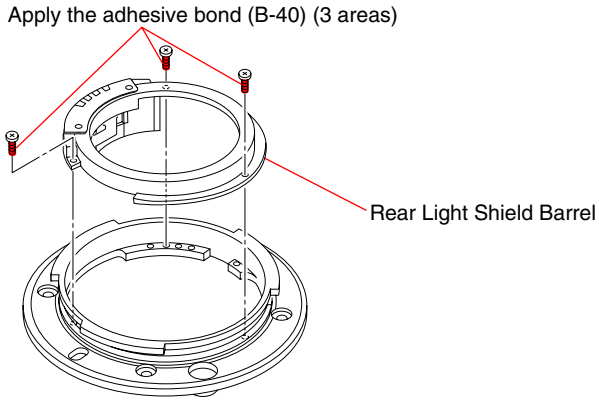
**Note:** Be careful not to tighten the two screws too much shown in the figure.




## HELP06

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

1. Attach the rear light shield barrel, and apply the adhesive bond (B-40) to the three screws and tighten them as shown in the figure.
2. Check that the preset ring moves smoothly.



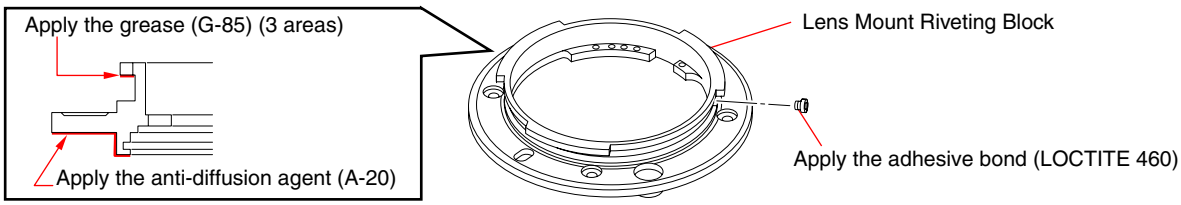

## HELP07

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.

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

1. Apply the adhesive bond (LOCTITE 460) to the stopper screw, and attach it to the lens mount riveting block.
2. Apply the grease (G-85) and anti-diffusion agent (A-20) to the instruction part of the lens mount riveting block.

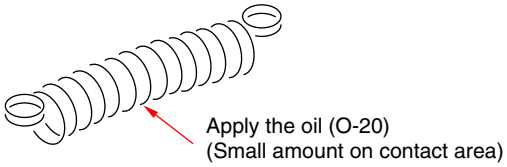



3. After attaching the lens mount riveting block, check the operation of the iris feather unit.
And check the operation of the coupler by turning the helicoid assembly.

## HELP08

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

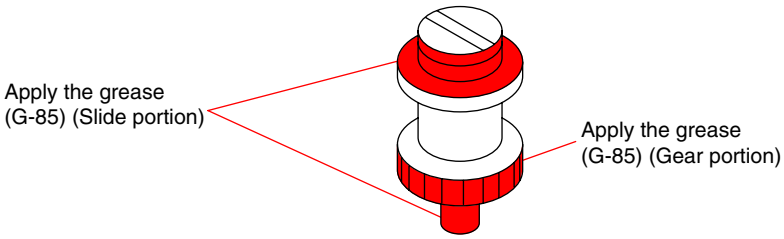
Apply the oil (O-20) to the instruction part of the main spring.




## HELP09

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

Apply the grease (G-85) to the instruction part of the coupler.



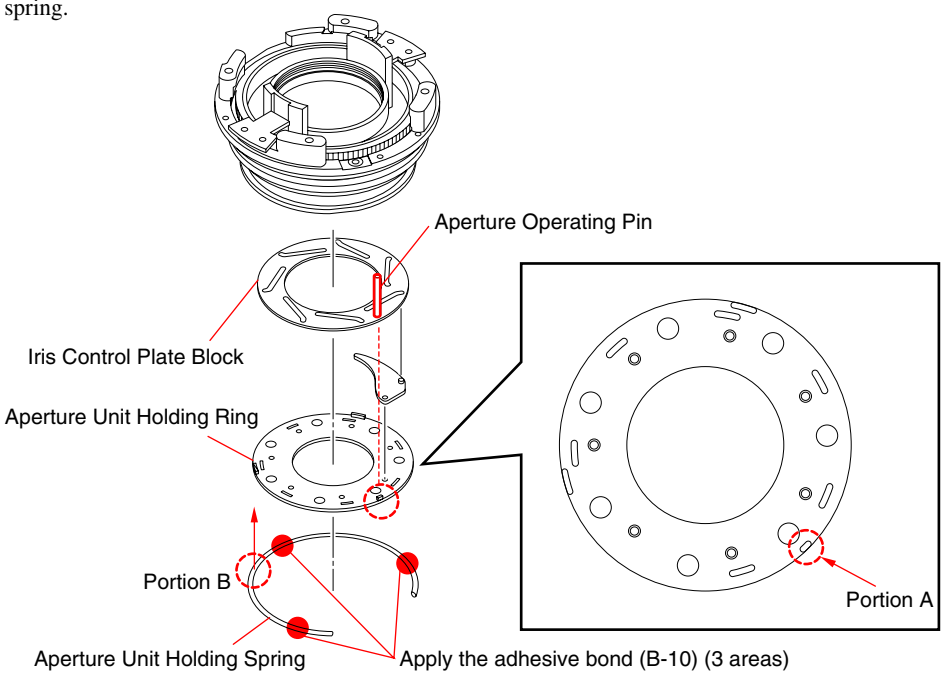

## HELP10

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

1. Attach the seven diaphragm blades to the iris control plate block.
   **Note:** Attach the iris feather unit in fully opening condition.

2. Fit the portion A of the aperture unit holding ring to the aperture operating pin, and attach the iris retainer tube.
3. Attach the aperture unit holding spring, and check the operation of the iris feather unit.
   **Note:** When attaching the aperture unit holding spring, insert the portion B first.

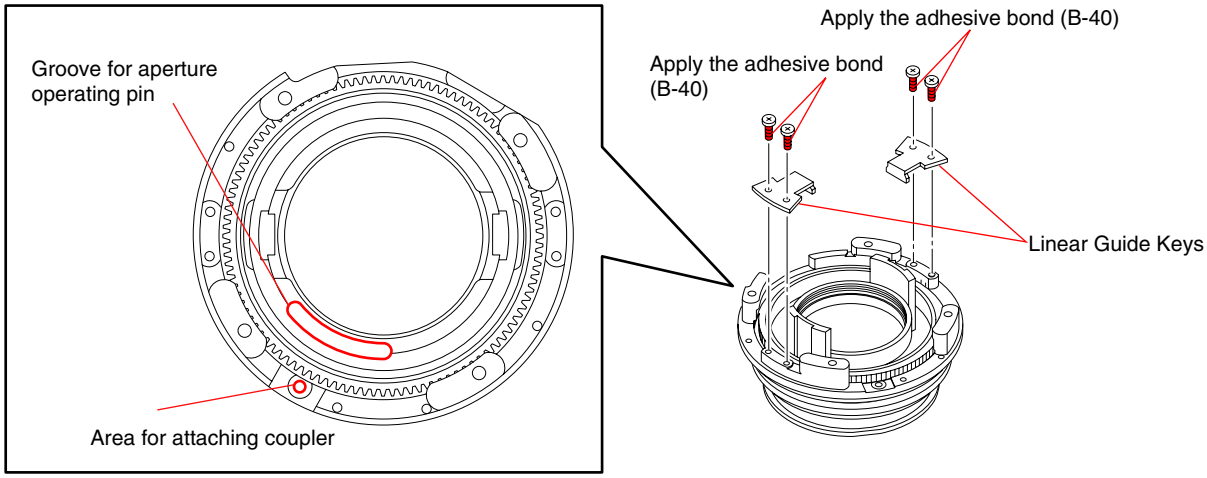
4. After the aperture diameter adjustment is completed, apply the adhesive bond (B-10) to the instruction part of the aperture unit holding spring.



## HELP11

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

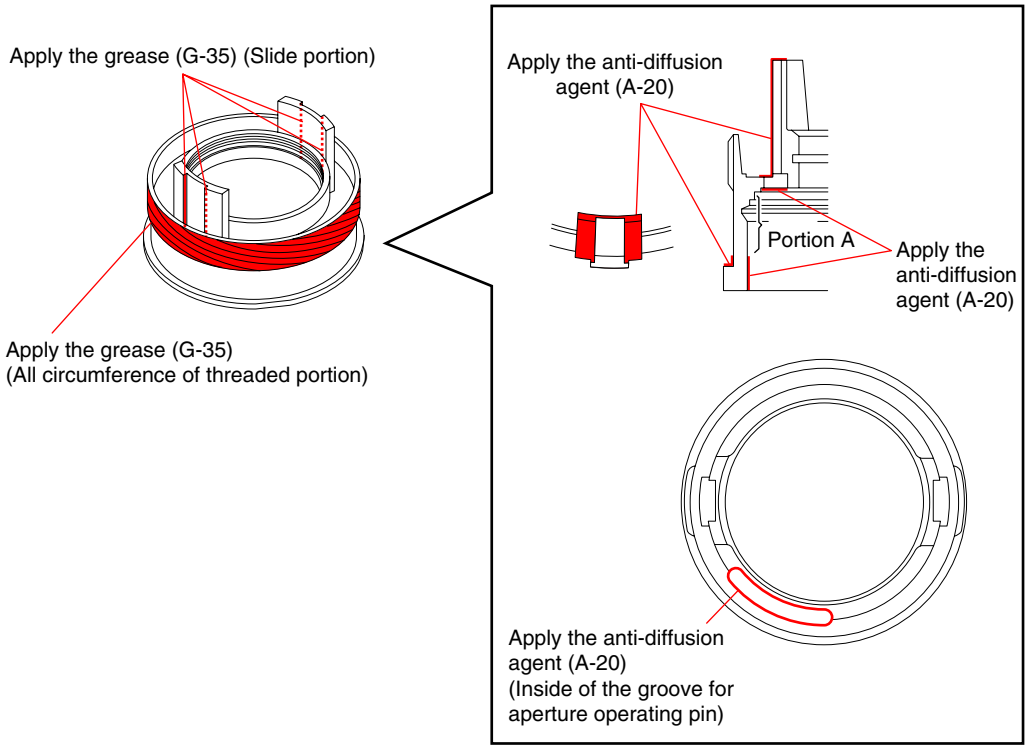
1. Match the position of the groove for aperture operating pin and the area for attaching coupler as shown in the figure.
2. Attach the linear guide keys, and apply the adhesive bond (B-40) to the four screws and tighten them as shown in the figure.



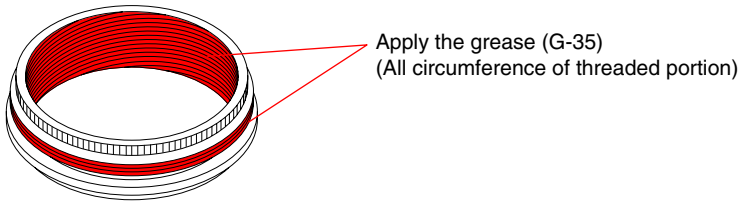

## HELP12

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

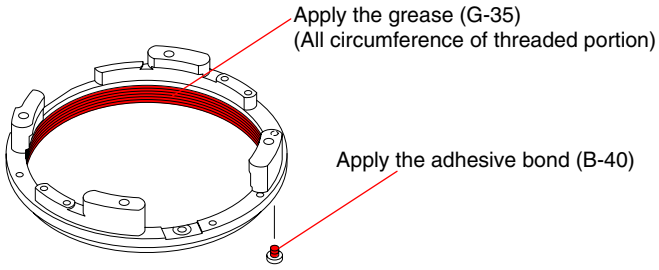
1. Apply the grease (G-35) and anti-diffusion agent (A-20) to the instruction part of the inside barrel.
   **Note:** Be careful not to get anti-diffusion agent (A-20) smeared to the portion A.



2. Apply the grease (G-35) to the instruction part of the inner helicoid barrel.

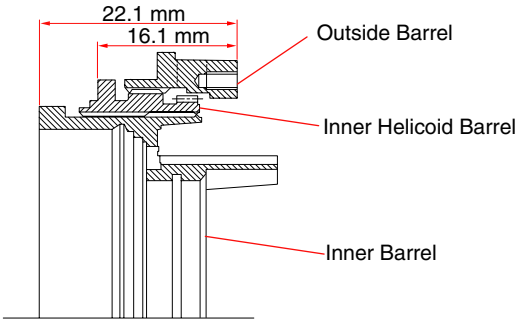



3. Apply the adhesive bond (B-40) to the hold screw, and tighten it to the outer tube.
4. Apply the grease (G-35) to the instruction part of the outside barrel.




5. Assemble the outside barrel, inner helicoid barrel, and inner barrel, and check the operation of the helicoid (stiffness, smoothness, catching).
6. Set the helicoid level as shown in the figure.

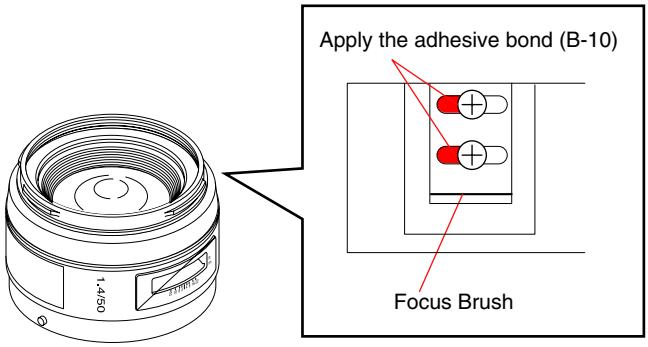
   **Note:** This level is infinity position.




## HELP13

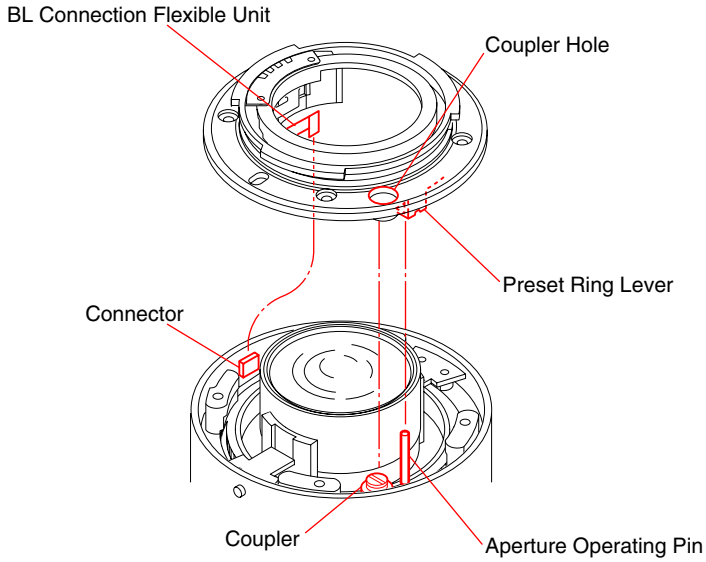
Adhesive bond (B-10): J-6082-612-A

After the focus brush position adjustment is completed, apply the adhesive bond (B-10) as shown in the figure.

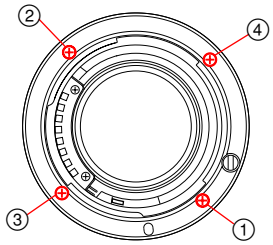


## HELP14

1. Close the aperture of the lens.
2. Connect the BL connection flexible unit to the connector as shown in the figure.
3. Align the preset ring lever to the aperture operating pin, coupler hole to the coupler, and attach the lens mount riveting block.




4. Tighten the four screws in the order as shown in the figure.



# 3. REPAIR PARTS LIST

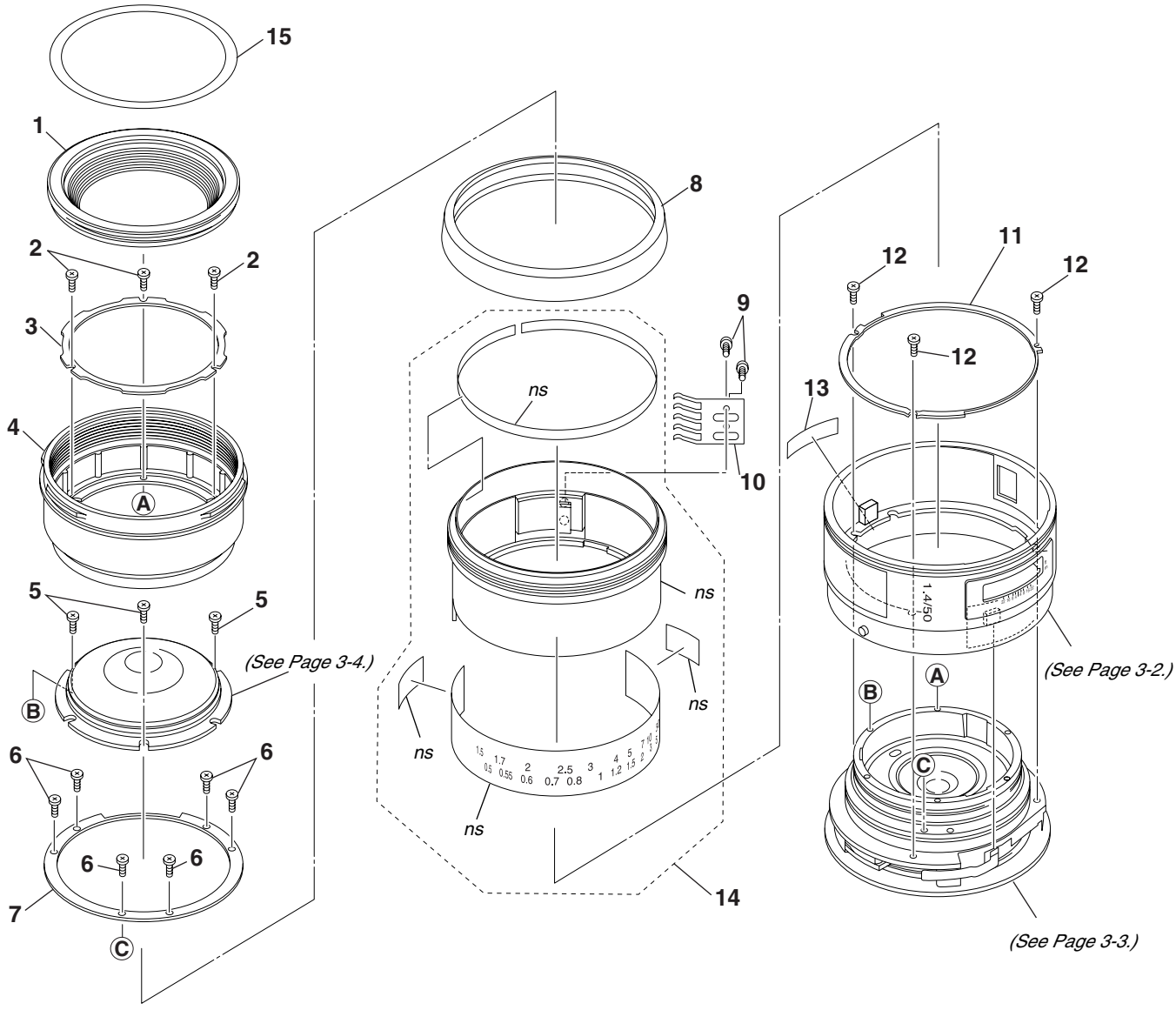
DISASSEMBLY

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 DISTANCE TUBE BLOCK

ns: not supplied

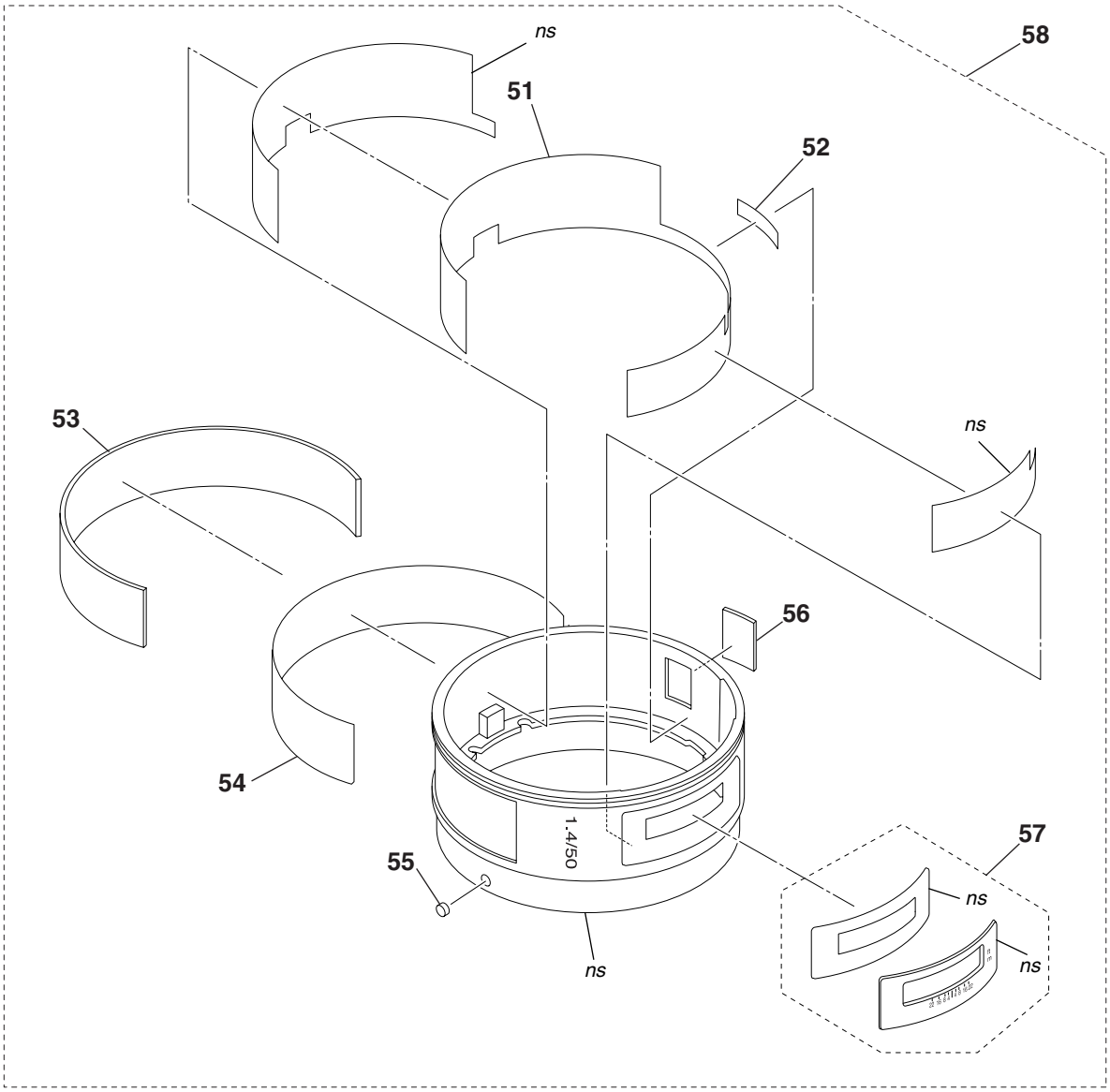



| Ref. No. | Part No. | Description |
|---|---|---|
| 1 | 2-685-010-01 | RING (DECORATION RING) |
| 2 | 2-687-283-01 | SCREW M1.6X5.5 |
| 3 | 2-687-282-01 | FRONT LENS BARREL HOLD PLATE |
| 4 | 2-685-008-01 | RING (FRONT LENS BARREL) |
| 5 | 2-684-105-01 | SCREW M1.6X3.5 |
| 6 | 2-685-020-01 | SCREW (SET SCREW A) |
| 7 | 2-685-019-01 | PLATE (FOCUS OPERATING RING) |
| 8 | 2-685-021-01 | RUBBER (FOCUS RUBBER RING) |

| Ref. No. | Part No. | Description |
|---|---|---|
| 9 | 2-685-023-01 | TAPPING SCREW 1.4X2.0 |
| 10 | 2-684-786-01 | CONTACT CHIP (FOCUS BRUSH) |
| 11 | 2-685-017-01 | PLATE(OUTER BARREL HOLD PLATE) |
| 12 | 2-684-120-01 | SCREW M1.6X4.0 |
| 13 | 2-689-542-01 | LENS NO. PLATE (C) |
| 14 | A-1191-672-A | BLOCK, DISTANCE TUBE |
| 15 | 2-887-479-01 | DECORATION RING LABEL |

## 3-1-2. FIXED HOLDING TUBE BLOCK

ns: not supplied

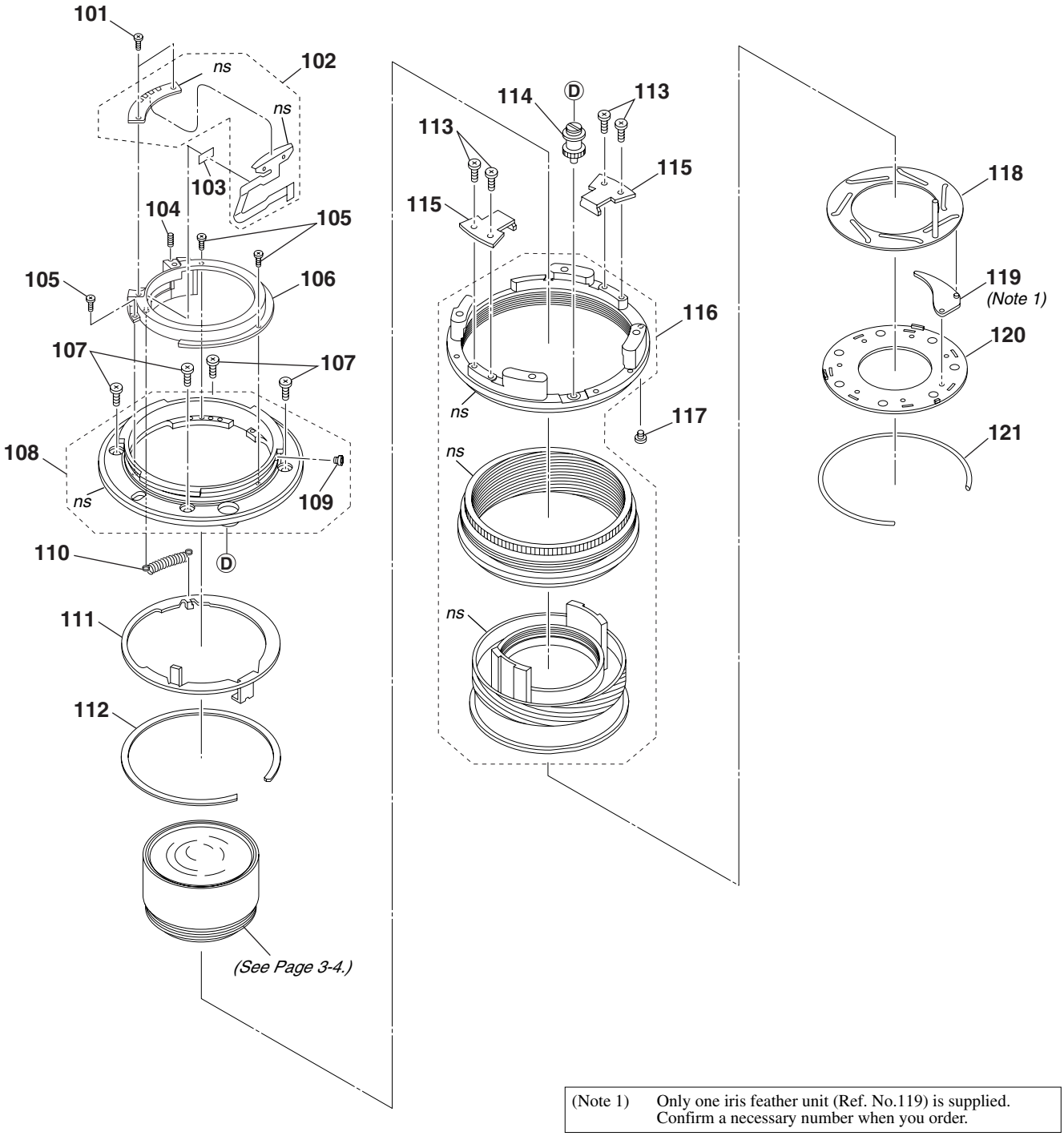



| Ref. No. | Part No. | Description |
|---|---|---|
| 51 | A-1191-674-A | FLEXIBLE UNIT, MAIN |
| 52 | 2-684-978-01 | TAPE C(FLEXIBLE SUBSTRATE) |
| 53 | 2-685-026-01 | SHEET (HOLD SHEET) |
| 54 | 2-685-025-01 | TAPE (HOLD SHEET TAPE) |

| Ref. No. | Part No. | Description |
|---|---|---|
| 55 | 2-683-692-01 | CHIP (MOUNT INDEX) |
| 56 | 2-685-024-01 | COVER (BRUSH HOLE COVER) |
| 57 | A-1191-671-A | UNIT (FOCUS SCALE WINDOW UNIT) |
| 58 | A-1191-669-A | BLOCK, FIXED HOLDING TUBE |

## 3-1-3. HELICOID ASSEMBLY AND IRIS CONTROL BLOCK

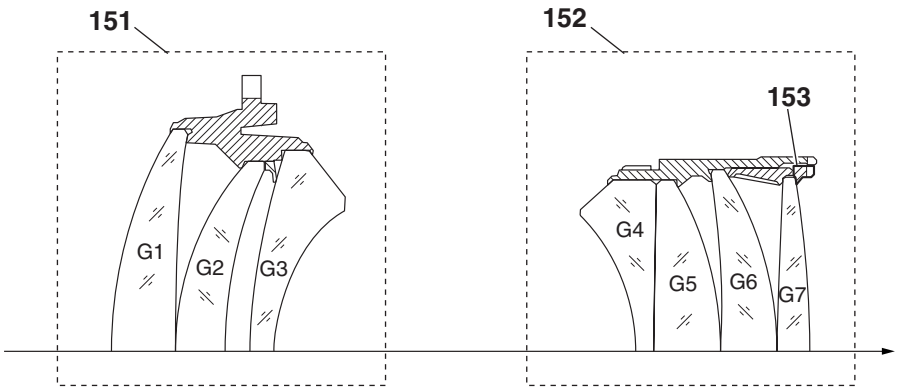
ns: not supplied




(Note 1) Only one iris feather unit (Ref. No.119) is supplied. Confirm a necessary number when you order.

| Ref. No. | Part No. | Description |
|---|---|---|
| 101 | 2-684-066-01 | TAPPING SCREW 1.7X4.0 |
| 102 | A-1191-670-A | FLEXIBLE UNIT, BL CONNECTION |
| 103 | 2-684-978-01 | TAPE C(FLEXIBLE SUBSTRATE) |
| 104 | 2-684-065-01 | GROUND SPRING |
| 105 | 2-684-064-01 | SCREW M1.4X2.2 |
| 106 | 2-684-995-01 | BARREL(REAR LIGHT SHIELD BARREL) |
| 107 | 2-687-685-01 | SCREW M2X4.0 |
| 108 | A-1194-208-A | BLOCK, LENS MOUNT RIVETING |
| 109 | 2-684-244-01 | STOPPER SCREW |
| 110 | 2-684-994-01 | MAIN SPRING |
| 111 | 2-684-993-01 | RING (PRESET RING) |
| 112 | 2-684-234-01 | PRESET RING HOLDING PLATE |
| 113 | 2-684-731-01 | SCREW M1.6 |
| 114 | 2-685-022-01 | COUPLER |
| 115 | 2-685-014-01 | LINEAR GUIDE KEY |
| 116 | A-1194-207-A | ASSY (HELICOID ASSY) |
| 117 | 2-685-018-01 | HOLD SCREW |
| 118 | A-1191-668-A | BLOCK, IRIS CONTROL PLATE |
| 119 | A-1191-667-A | FEATHER UNIT, IRIS (Note 1) |
| 120 | 2-685-015-01 | APERTURE UNIT HOLDING RING |
| 121 | 2-685-016-01 | APERTURE UNIT HOLDING SPRING |

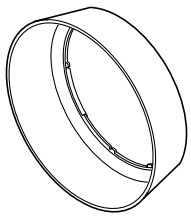
## 3-1-4. FRONT BALL LENS BLOCK AND REAR BALL LENS BLOCK



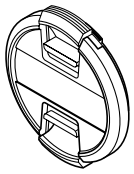

| Ref. No. | Part No. | Description |
|---|---|---|
| 151 | A-1191-676-A | BLOCK, FRONT BALL LENS |
| 152 | A-1191-675-A | BLOCK, REAR BALL LENS |
| 153 | 2-685-002-01 | G7 STOPPER |

## 3-2. SUPPLIED ACCESSORIES

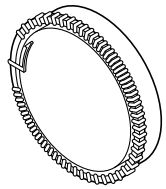
**Checking supplied accessories.**



Lens Hood (SH0011)
2-687-333-01



Front Lens Cap
2-683-616-01



Rear Lens Cap
2-683-615-01

**Other accessories**

2-686-120-01 MANUAL, INSTRUCTION
(JAPANESE, ENGLISH, FRENCH, SPANISH, SIMPLIFIED CHINESE)
2-686-120-11 MANUAL, INSTRUCTION
(GERMAN, DUTCH, SWEDISH, ITALIAN) (AEP)
2-686-120-21 MANUAL, INSTRUCTION (PORTUGUESE, RUSSIAN,
TRADITIONAL CHINESE, KOREAN, ARABIC) (AEP)

# 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.

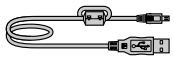
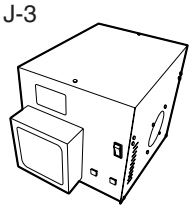
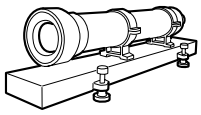
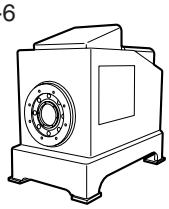
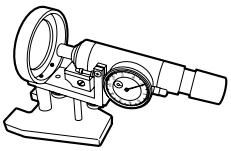
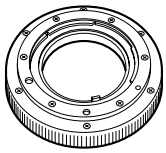
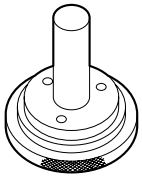
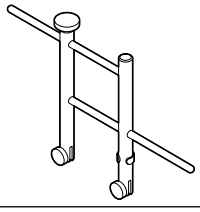
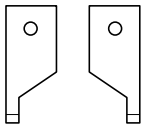
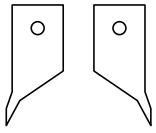
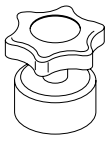
| | | |
|---|---|---|
| J-1  Personal computer (Note 1) | J-2  USB cord with connector 1-833-062-11 | J-3  Luminance box J-6082-581-A |
| J-4  AE master lens J-6082-597-A |  1000 mm Collimator 110V: J-6082-604-A 240V: J-6082-604-B (Note 2) | J-6  Lens test projector J-6082-605-A (Note 3) |
| J-7  Flange 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  Universal wrench J-6082-609-A | J-11  Chip-A for universal wrench J-6082-609-1 | J-12  Chip-B for universal wrench J-6082-609-2 |
| J-13  Name ring wrench (55mm) J-6082-587-A | | |

***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.

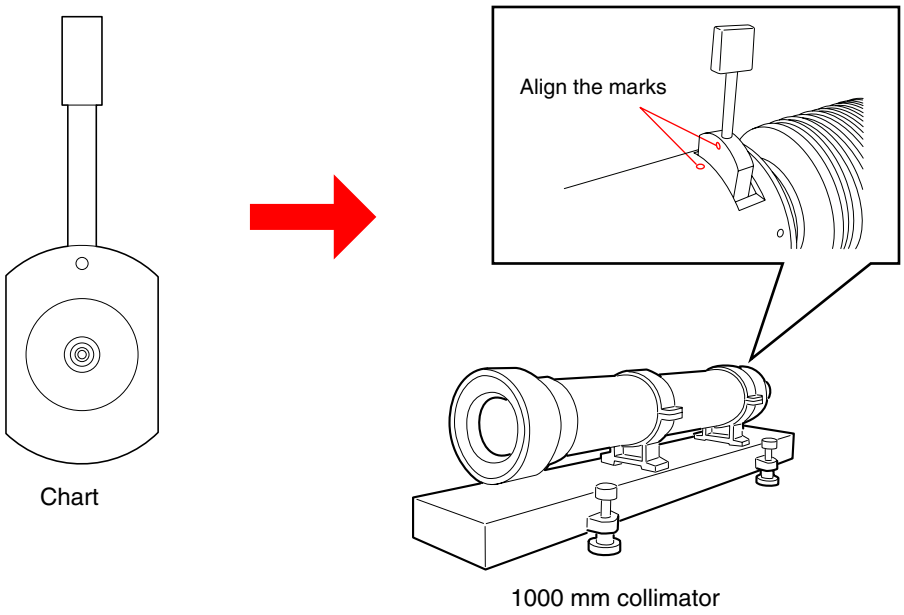



***Fig. 4-1-2***

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

## 4-1-2. Lens Adjustment Program

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

**Note:** Perform the aperture diameter check in the state of the Fig.4-2-1 (only the decoration ring was removed), or completion of assembling. When remove the decoration ring, use the name ring wrench (55mm).

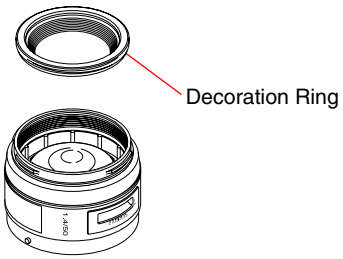



*Fig.4-2-1*

#### 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.4-2-2.

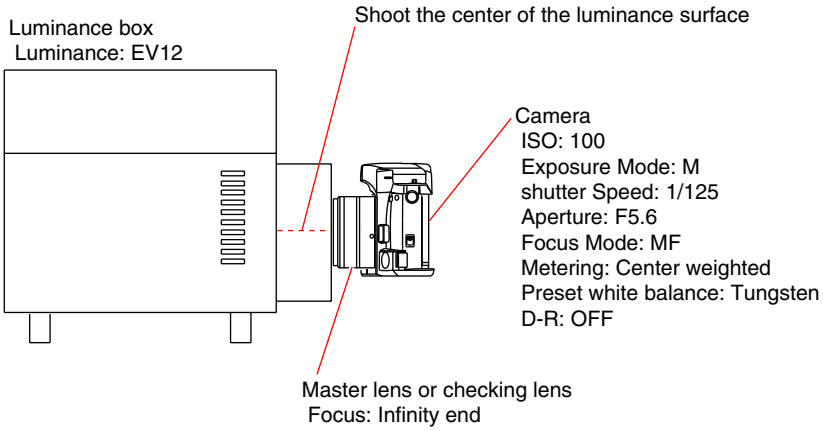



*Fig.4-2-2*

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.

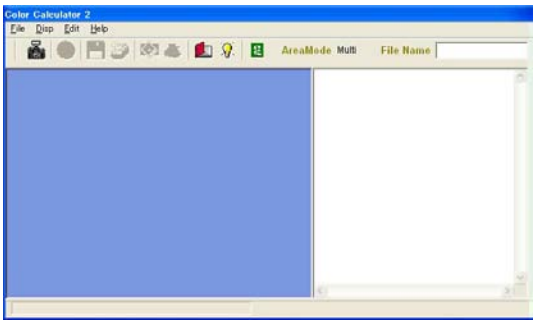



*Fig.4-2-3*

2) Read the image from the file menu.


*Fig.4-2-4*

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

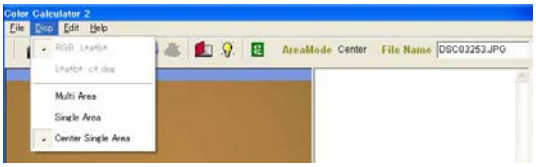



*Fig.4-2-5*

Color space (Edit menu): sRGB


*Fig.4-2-6*

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

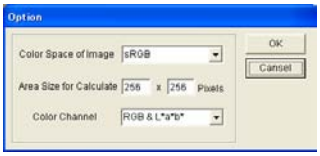



*Fig.4-2-7*

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)

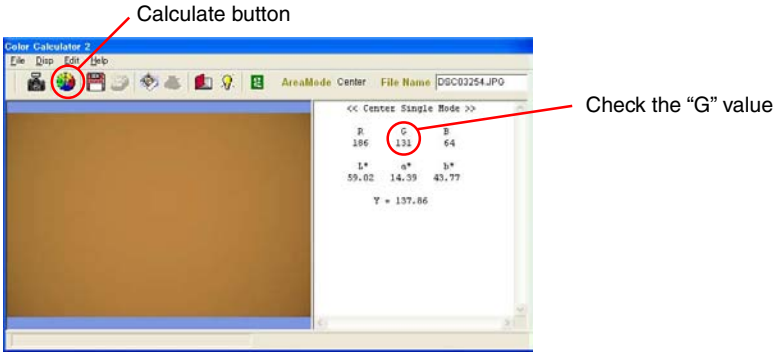



***Fig.4-2-8***

## 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

- 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)
- Name Ring Wrench (55mm)

### 1. Adjustment Method

1) Disassemble or assemble the checking lens into the state of Fig.4-2-9.

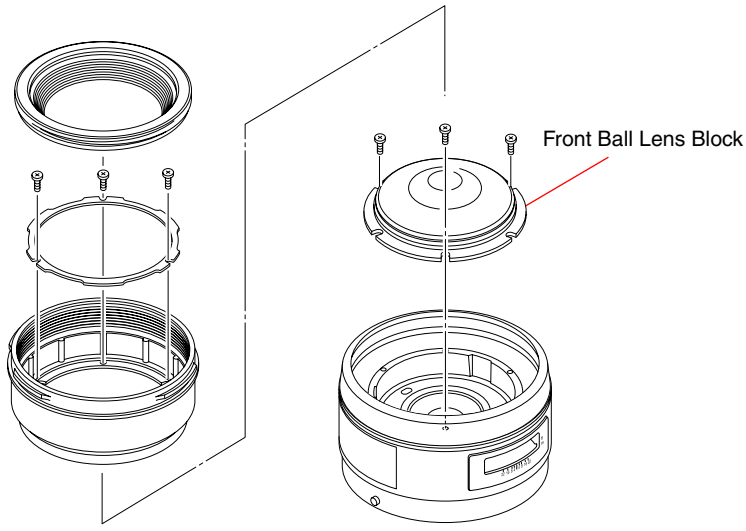



*Fig.4-2-9*

2) Remove the adhesive bond fixing the aperture unit holding spring.

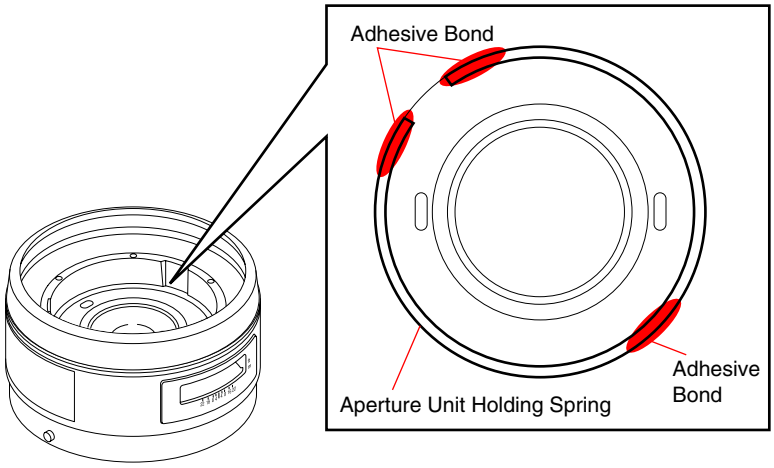



*Fig.4-2-10*

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

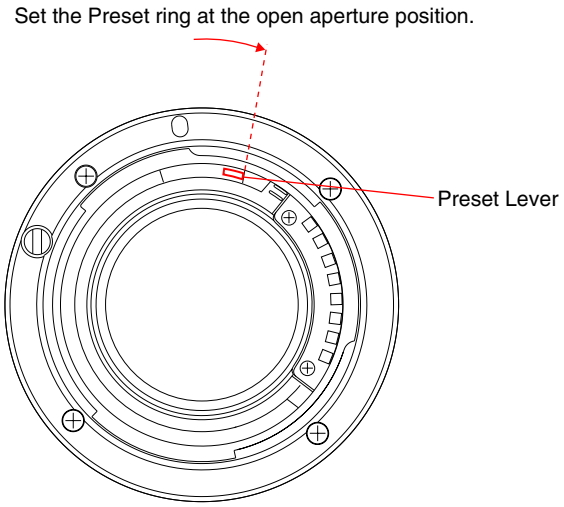



***Fig.4-2-11***

4) Turn the apreture unit holding ring to adjust the position that the diaphragm blades are hidden into the edge completely.

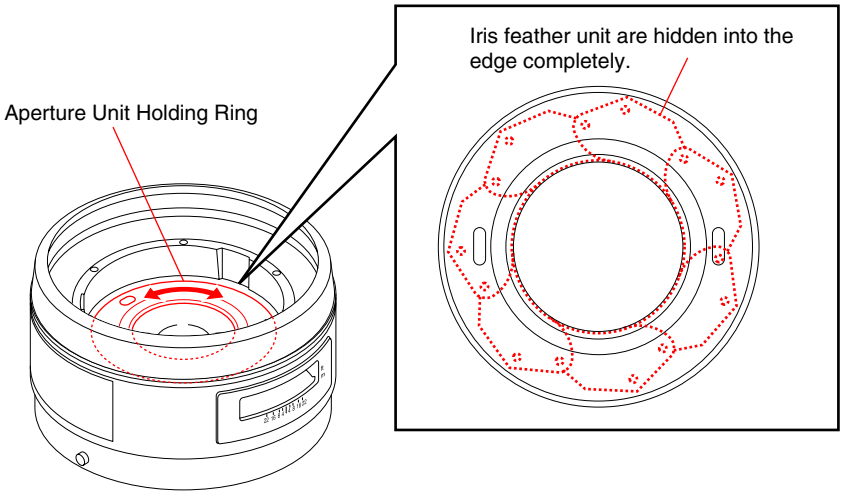



***Fig.4-2-12***

5) After the adjustment is completed, apply the adhesive bond (B-10) as shown in the Fig.4-2-13.

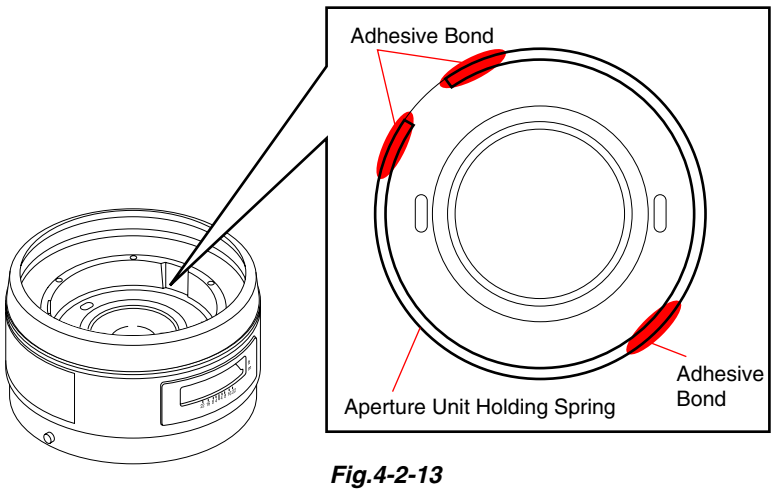



***Fig.4-2-13***

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)
- Name Ring Wrench (55mm)
- Universal Wrench
- Chip-A for Universal Wrench
- Chip-B for Universal Wrench

### 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 | 0.9 to 2.17 |

***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.

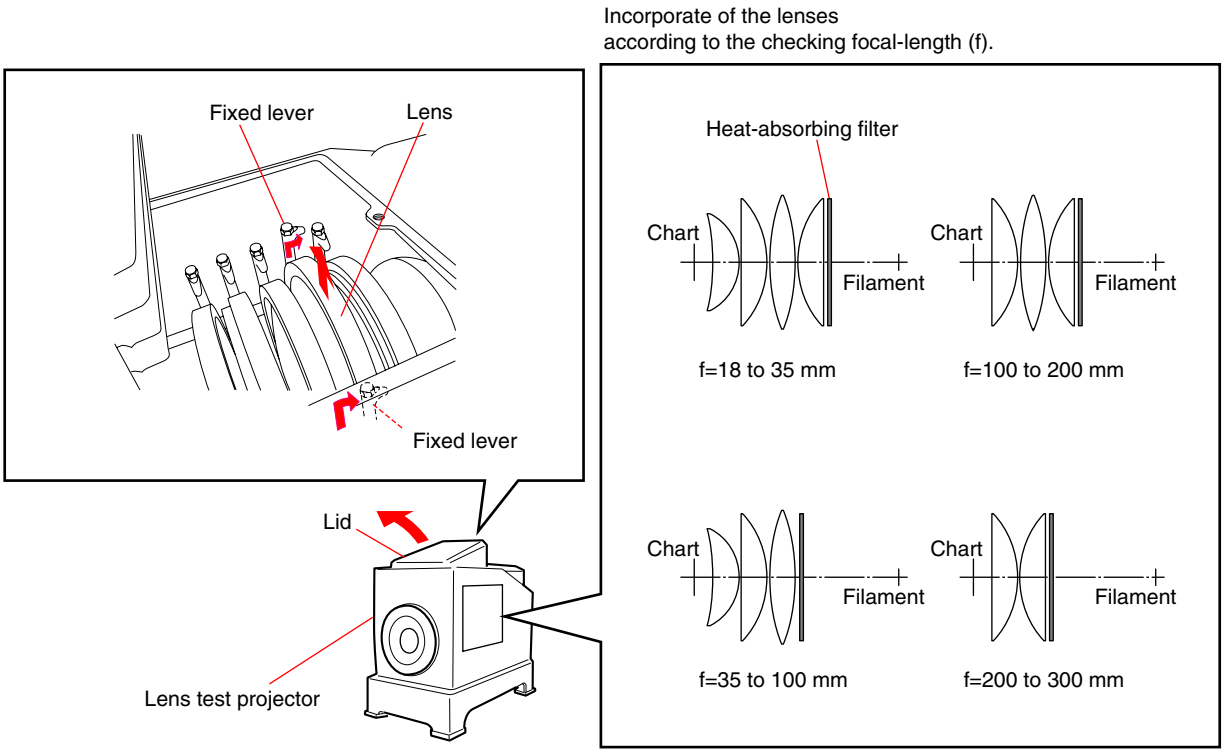



***Fig.4-3-1***

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.

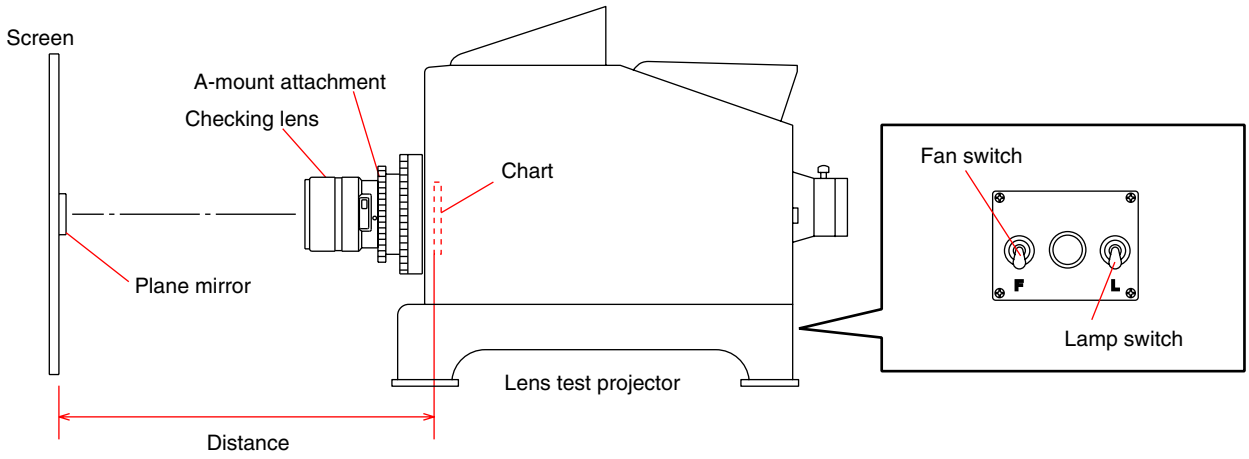



***Fig.4-3-2***

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).

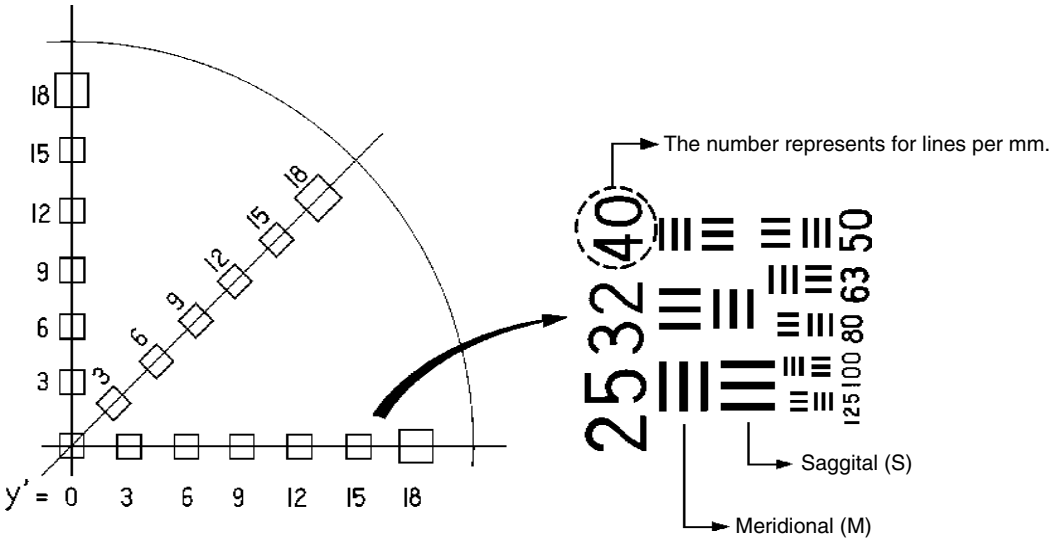



*Fig.4-3-3*

3) Turn the mount rotation ring of lens test projector until the projected image at a certain peripheral point (y'= 15) 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.

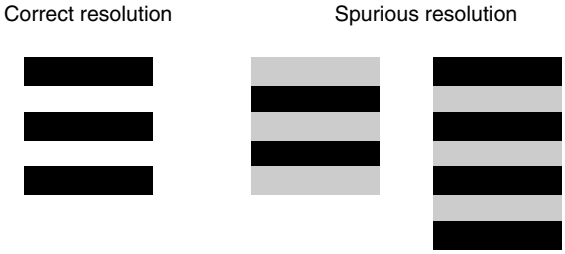



*Fig.4-3-4*

4) Check that the all readings (y'= 0, saggital (S) and meridional (M) at y'= 15) is within the specification of the Table 4-3-2.
When the specification is not satisfied, perform the following procedure.
- Remove the front ball lens block set and turn the block 120 degrees, then reattach the block.
- Replace the front ball lens block set or rear ball lens block.

### Specification

| Focal-length f (mm) | distance (m) | Number of the smallest pitched lines | | |
|---|---|---|---|---|
| | | Center (y'=0) (Lines per mm) | y'= 15 | |
| | | | S | M |
| 50 | 0.9 to 2.17 | 100 or greater | 32 or greater | 32 or greater |

*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.

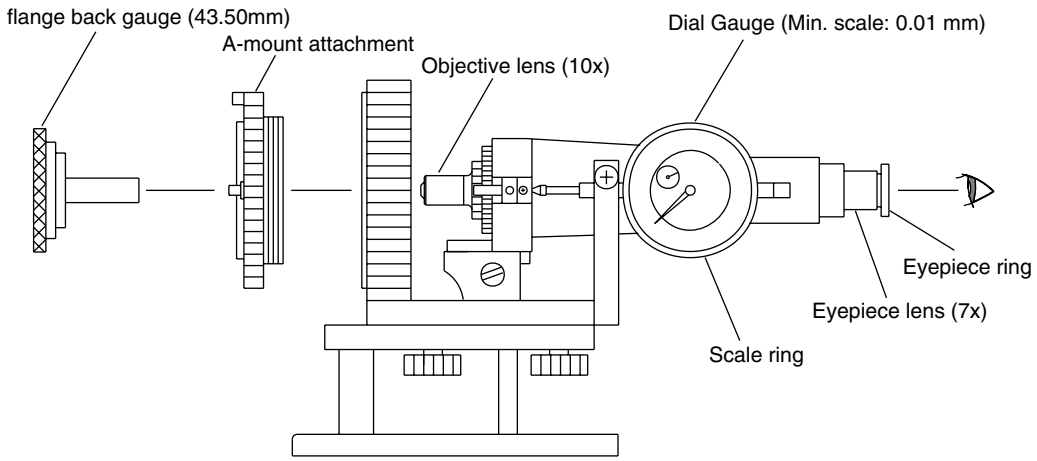



*Fig.4-4-1*

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.

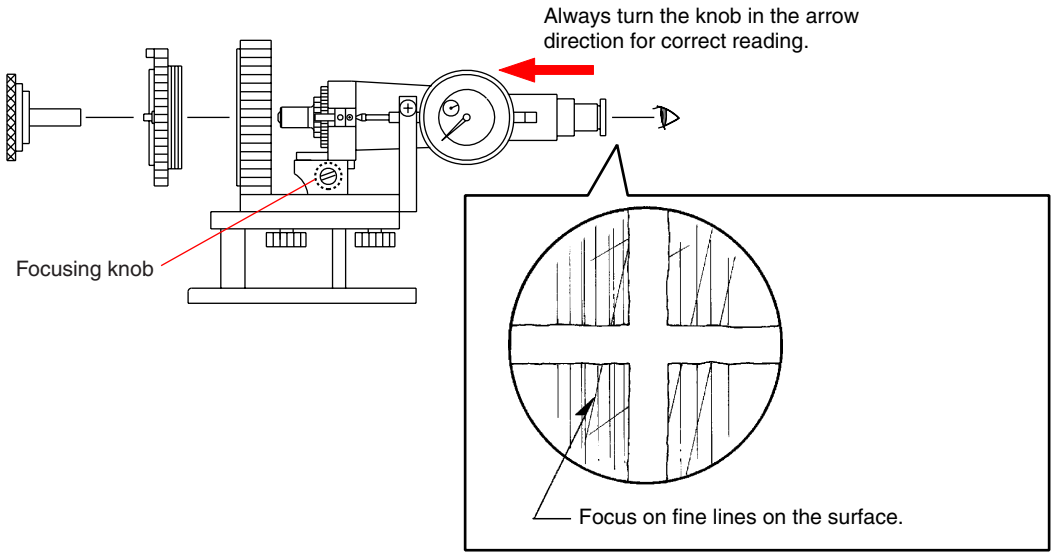



*Fig.4-4-2*

5) Turn the scale ring of the dial gauge until the long pointer indicates "0".
   **Note:** This position is the flange back (f'F) = 43.50 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.

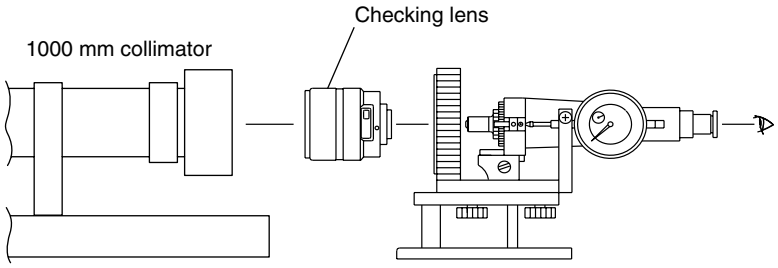



*Fig.4-4-3*

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 tester 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.

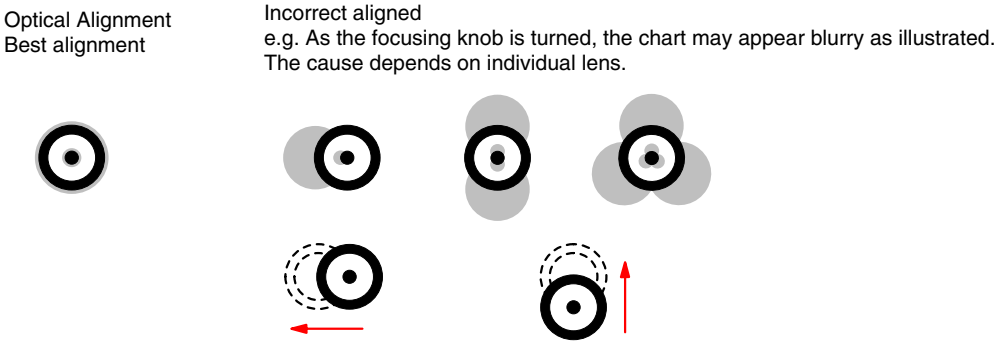



*Fig.4-4-4*

4) Calculate the flange back (f'F) of the checking lens using the following formula, and check that the specification of the Table 4-4-1 is satisfied.

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

### Specification

| Focal-length f (mm) | f'F (mm) (Infinity position) |
|---|---|
| 50 | 44.56 to 44.58 |

*Table 4-4-1*

5) When the flange back (f'F) of the checking lens is out of specification of the Table 4-4-1, perform "4-4-2. Flange Back (f'F) Adjustment".

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

### Equipment

- 1000 mm Collimator
- Flange Back Tester
- A-mount Attachment
- Flange Back Gauge (43.50mm)
- Adhesive bond (B-10)
- Name Ring Wrench (55mm)

### Adjusting Method

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

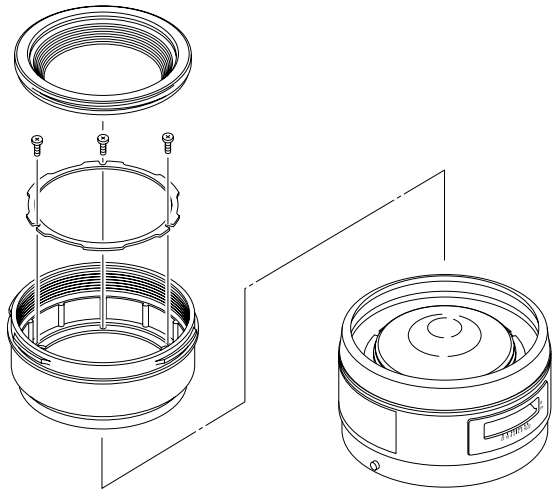


*Fig.4-4-5*

2) Perform "4-4-1. Flange Back (f'F) Check", and check that the flange Back (f'F) of the checking lens is out of specification of the Table 4-4-1.
3) Turn the focusing knob of the tester until the flange back (f'F) of the checking lens is "44.56 mm".

**Note:** When turning the focusing knob of the tester, chart image check is not required.

4) Turn the focusing ring of the checking lens until red and green color areas are equal on the chart while looking through the microscope.

**Note:** If in-focus point cannot be obtained even through the focusing ring is fully turned, perform the following steps (1) to (4) and shift the position of the focusing ring. (Refer to Fig.4-4-6.)

(1) Set the focusing ring to the infinity stop position, and hold the distance tube block.
(2) Loosen the six screws fixing the focus operating ring.
(3) Turn the helicoid in the direction of the arrow (screw in direction), and tighten the six screws loosened in step (2) temporarily.
(4) Perform the step 4) again.

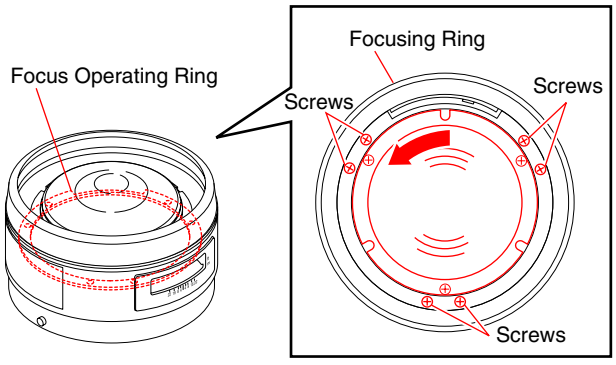



*Fig.4-4-6*

5) Loosen the six screws fixing the focusing ring set plate, and set the focusing ring to the infinity stop position without moving the helicoid. (Refer to Fig.4-4-7.)
6) Tighten the six screws loosened in step 5).

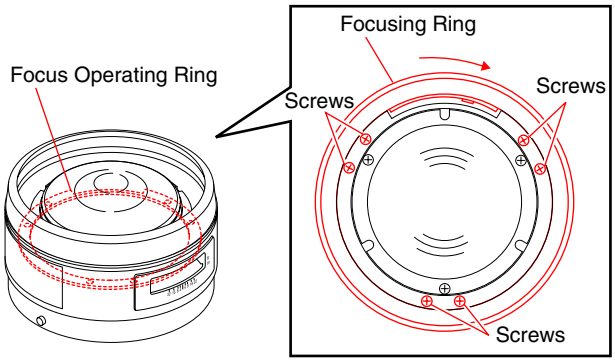



***Fig.4-4-7***

7) Check that the focusing ring moves smoothly from minimum distance to infinity, and perform "4-4-1. Flange Back (f'F) Check" again.
8) After the adjustment is completed, apply the adhesive bond (B-10) to the position shown in the Fig.4-4-8.

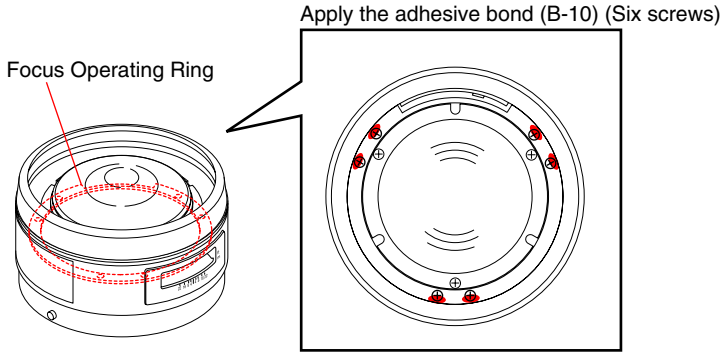



***Fig.4-4-8***

## 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”.

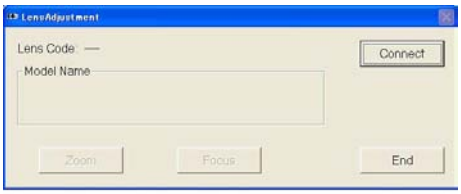



*Fig. 4-5-1*

### 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.

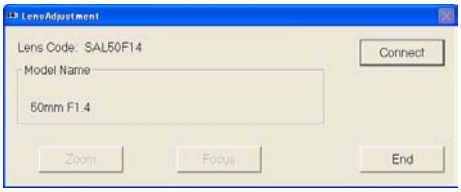



*Fig. 4-5-2*

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

# 4-6. FOCUS 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. Focus 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".

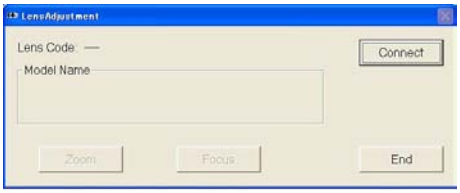



*Fig. 4-6-1*

### 2. Checking Method

1) 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.

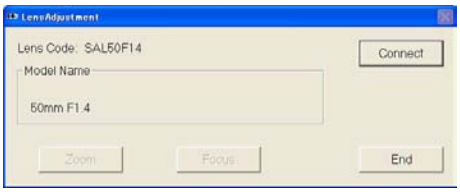



*Fig. 4-6-2*

2) 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.

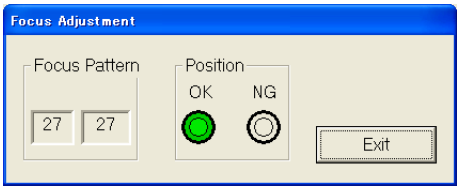



*Fig. 4-6-3*

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

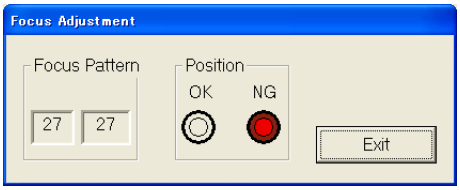



*Fig. 4-6-4*

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. Focus 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.

### 1. Focus Brush Position Adjustment

1) Remove the hold sheet, hold sheet tape and brush hole cover, and loosen the two screws fixing the focus brush.

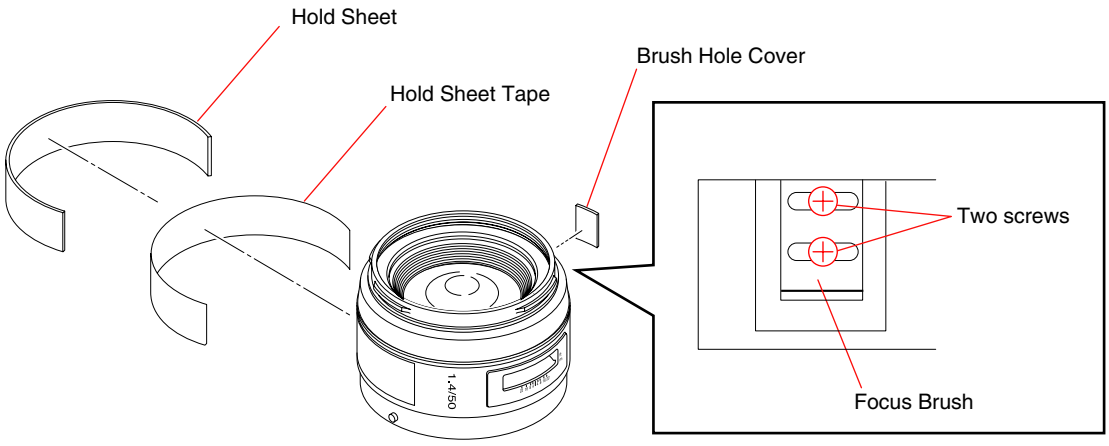



*Fig. 4-6-5*

2) Set the focus position to infinity end.

3) Perform the “4-6-1. Focus Brush Position Check”, and adjust the focus brush position until the OK (Green) indicator of “Position” lights.

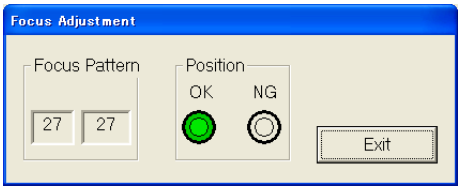



*Fig. 4-6-6*

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

## 2. 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 : 27" and check that the value of "Focus Pattern" change from 1 to 27 continuously.

2) Turn the focus ring slowly from the infinity end "Focus Pattern : 27" to the near end "Focus Pattern : 1" and check that the value of "Focus Pattern" change from 27 to 1 continuously.

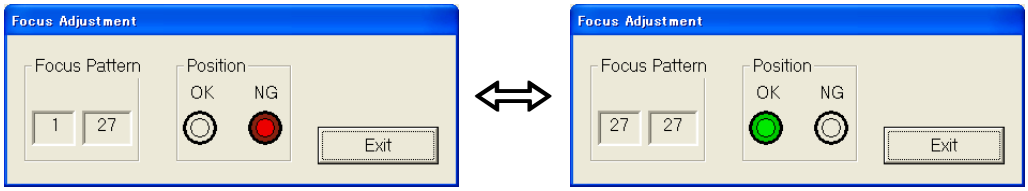



*Fig. 4-6-7*

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.

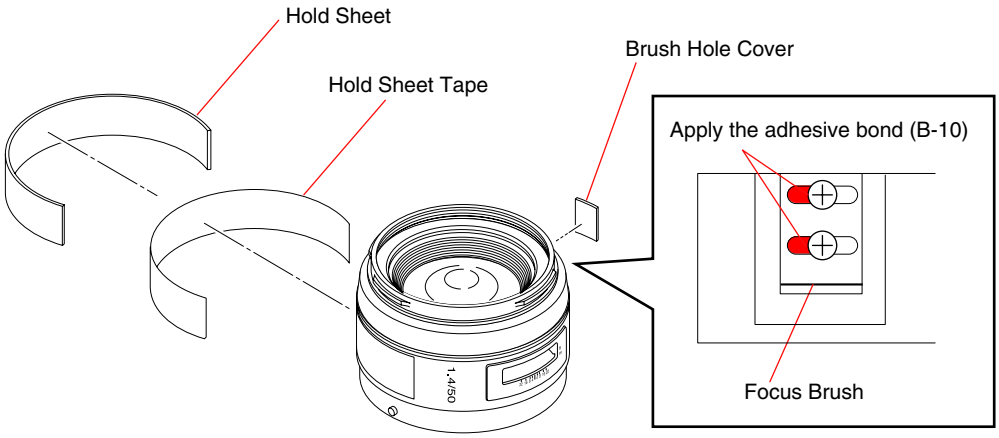
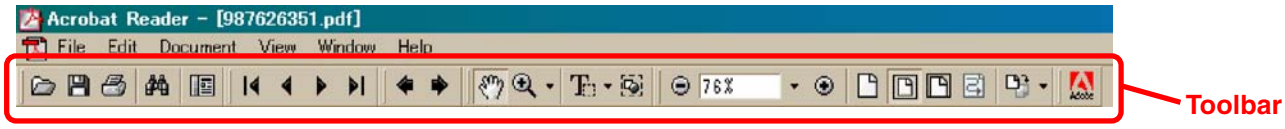



*Fig. 4-6-8*

## 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

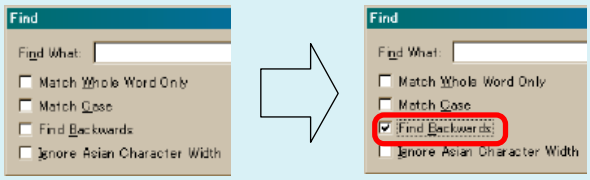
1. Click the Print button .
2. Specify a printer, print range, number of copies, and other options, and then click [OK].

**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

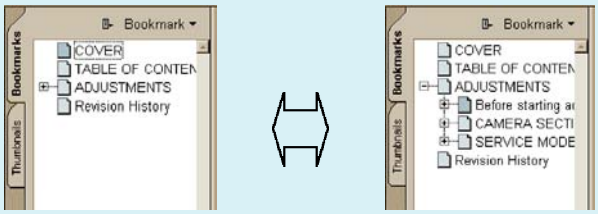
- To reverse the previous screens (operation) one by one, click the .
- To advance the reversed screens (operation) one by one, click the .

**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)<br>• Addition of guide of [About the Lens Test Projector] (Cover) | Yes |
| | | | | |