INC

JAA80351-R.3739.A

| 作成承認印 | 配布許可印 |
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| ニコン映像カンパニー 品質保証部 GM | サービス 計画課 M |

# AF-S DX Nikkor 18-55mm/F3.5-5.6G VR

## JAA80351

## REPAIR MANUAL

Nikon | NIKON CORPORATION
Tokyo, Japan



Printed in Japan November 2007

# ※ Before Disassembly / Reassembly / Adjustment

This lens will require optical lens alignment after assembly, in case the 4th lens-group unit is removed. At repair service facilities, therefore, where this alignment work can not be performed, do NOT remove the 4th lens-group unit.

This lens also has the VR (vibration-reduction) unit mounted in order to correct camera shake. To keep the accuracy of this function for stabilizing the image, in case the gyro FPC, main PCB, or the fixed tube unit (VR unit) is replaced, be sure to make the VR adjustment by using the VR lens adjustment equipment (J15380). However, except for disassembling the above components, the VR adjustment is NOT necessary, so at repair service facilities where the "VR lens adjustment equipment" is not prepared, do NOT disassemble NOR repair the products of the above cases.

**Caution:**

- **When disassembling/(re)assembling, be sure to use the conductive mat (J5033) and wrist strap (J5033-5) for static protection of electrical parts.**
- **When disassembling, make sure to memorize the processing state of wires, screws to be fixed and their types, etc.**
- **Because prototypes are used for "1. Disassembly" and "2. Assembly/Adjustment", they may differ from the actual products in forms, etc.**
- **Because pictures are processed by a special method, they may differ from the actual ones in texture.**

| Points to notice for Lead-free solder products |
|---|
| ・Lead-free solder is used for this product.<br>・For soldering work, the special solder and soldering iron are required.<br>・Do NOT mix up lead-free solder with traditional solder.<br>・Use the special soldering iron respectively for lead-free solder and lead solder. They cannot be used in common. |

# 1.Disassembly

## Company name ring

・Remove the company name ring (#113).


## Name plate/VR name plate

・Remove the name plate (#68) and VR name plate (#69).

Caution: Removing the name plate (#68) and VR name plate (#69) are NOT necessary except when they are replaced.

Rubber ring

・Remove the rubber ring (#62) by pulling towards the 1st lens group side.


Rear cover ring

・Take out the three screws (#91) and remove the rear cover ring (#39).

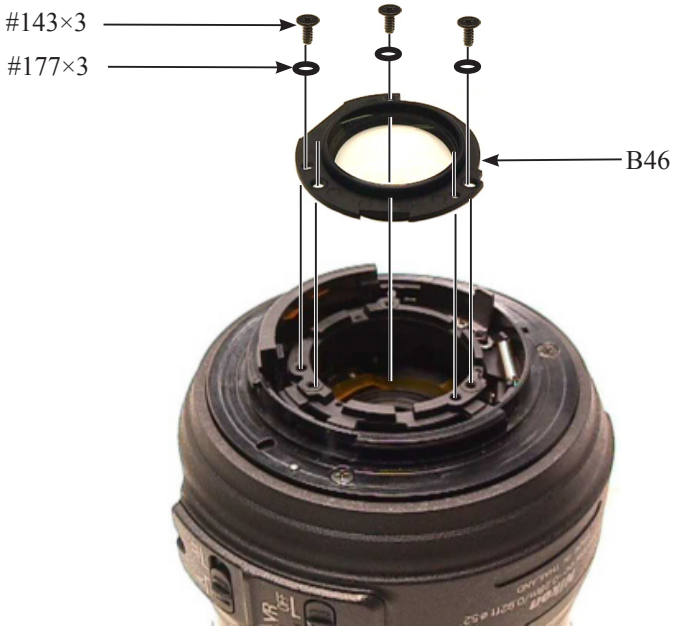
1st lens group unit

- Set the zoom to WIDE-end or TELE-end.
- Turn the 1st lens-G unit (B40) counterclockwise. Then remove the washer (#119: selected from A to I) and the 1st lens-G unit (B40).

## 4th lens group unit

Caution: The lens alignment work will be necessary after assembly, in case the 4th lens-G unit is removed. At repair service facilities, therefore, where such alignment work can not be performed, do NOT remove the 4th lens-G unit.

- Set the zoom to WIDE side.
- Take out the three screws (#143) and remove the three washers (#177). Then remove the 4th lens-G unit (B46).




## Zoom front ring unit

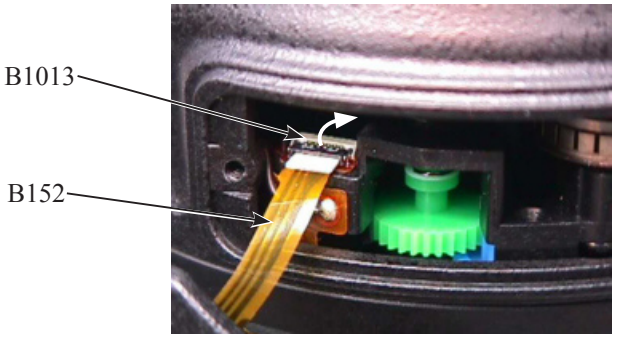
- Peel off the polyester tape (#77).

・Remove the zoom front ring (#54).


Change-SW unit

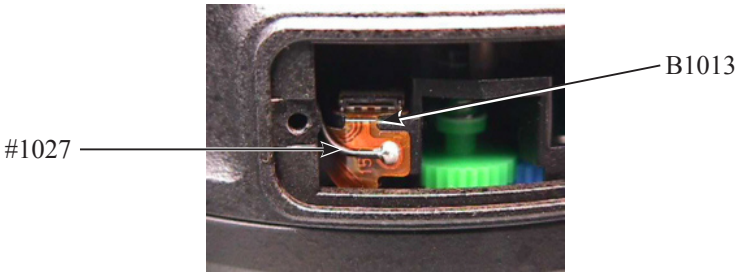
・Set the M/A switch to "A" side, and take out the screw (#155).


・Lift the black part of the connector of the PI-FPC (B1013), and remove the FPC of the change-SW unit (B152).



GND lead wire

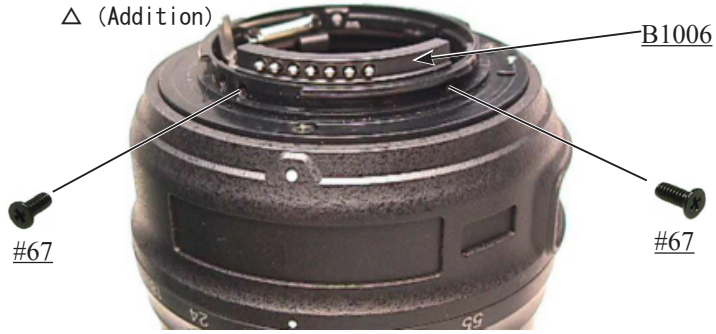
・Remove the GND lead wire (#1027) from the PI-FPC (B1013).




Bayonet mount unit

△ (Addition)

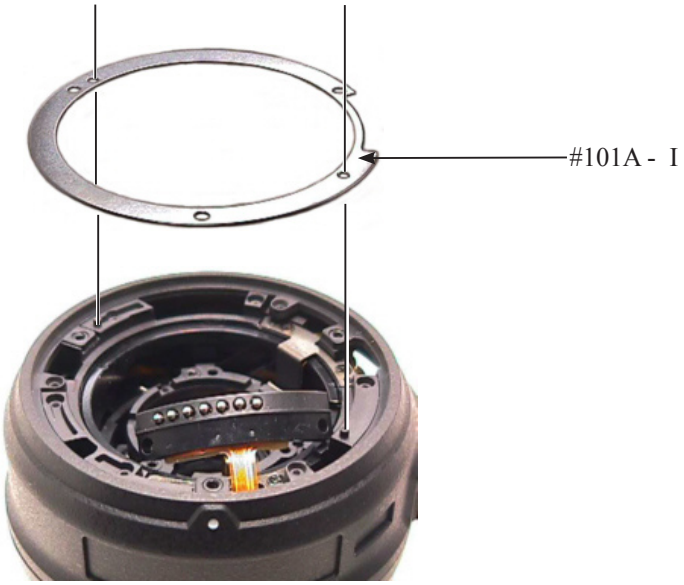
・Take out the two screws (#67).




・Take out the three screws (#78), and remove the bayonet mount unit (B30).


サービス計画課 M

・Remove the washer (#101: selected from A to I).

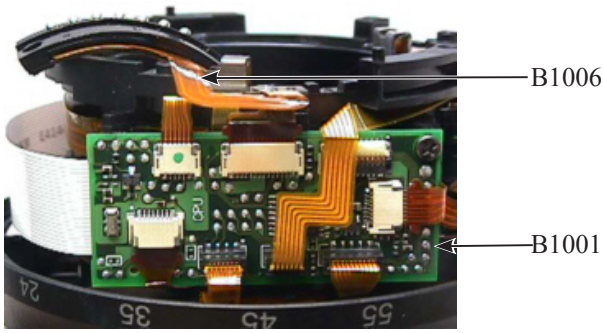



Rear fixed tube unit

・Remove the rear fixed tube unit (B57).

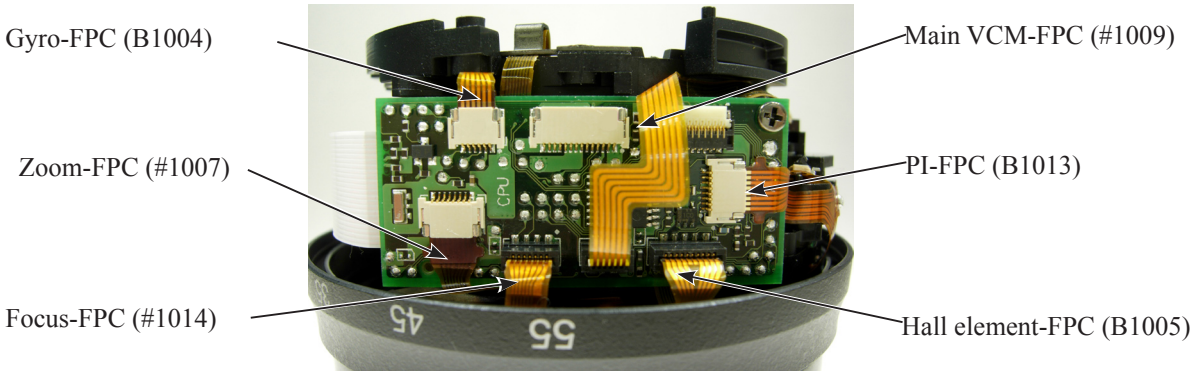
Contact pin unit

・Remove the FPC of the contact pin unit (B1006) from the main PCB (B1001).

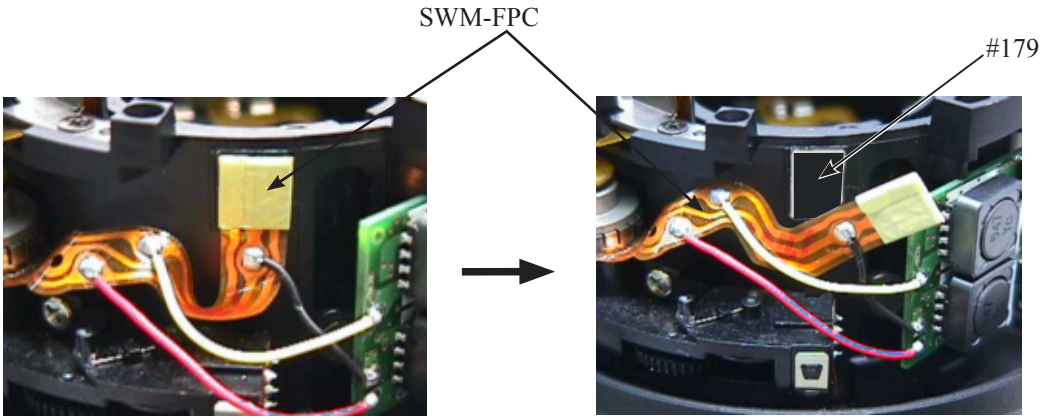



Main PCB unit

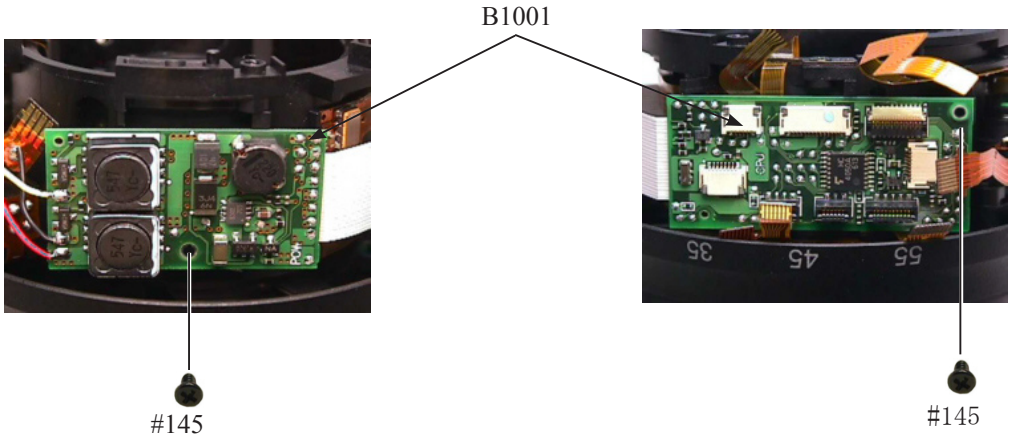
・Remove each FPC from the main PCB (B1001).




・Detach the SWM-FPC from the double-stick tape (#179) of the fixed tube 1 (#29).



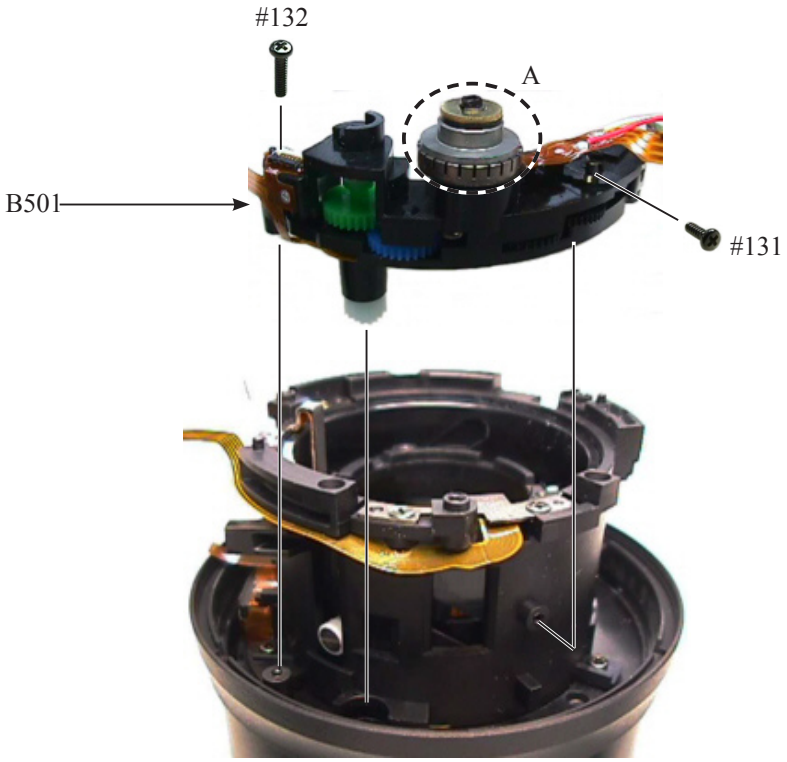
・Take out the two screws (#145), and remove the main PCB (B1001).




Gear unit

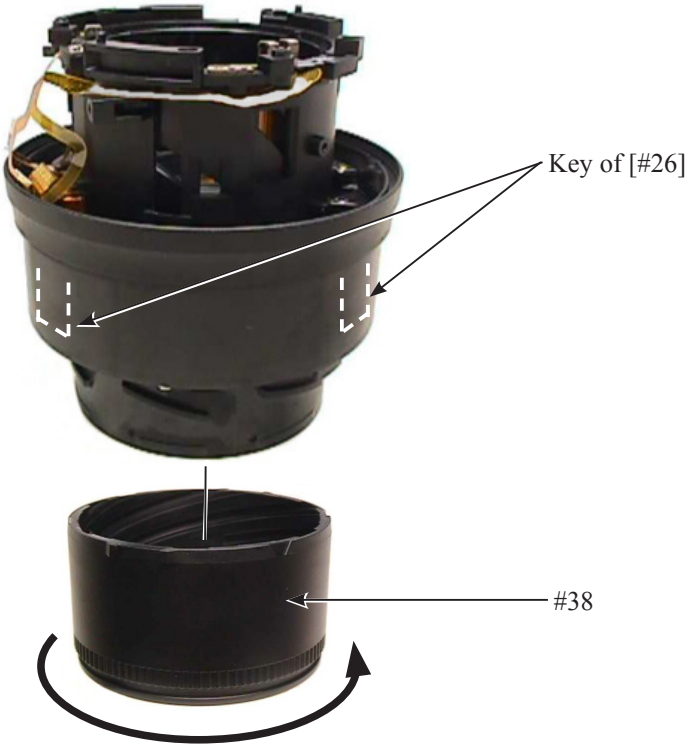
・Take out each screw (#131 and #132), and remove the gear unit (B501).

Caution: Do NOT touch "A" area.



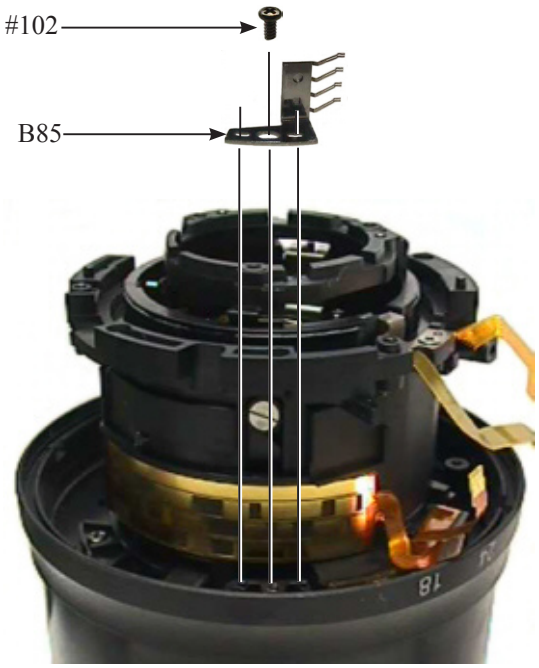
Filter ring

・Turn the filter ring (#38) clockwise. The keys of the segment gear tube (#26) will be extended outwards so release them from the key grooves of the filter ring (#38), and remove the filter ring (#38).



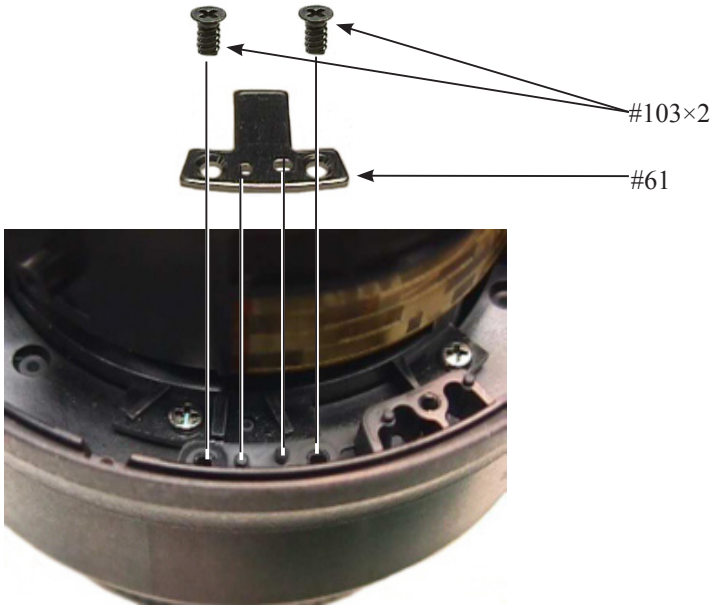

Zoom brush unit

・Take out the screw (#102), and remove the zoom brush unit (B85).



Zoom ring

・Take out the two screws (#103) and remove the zoom coupling key (#61).

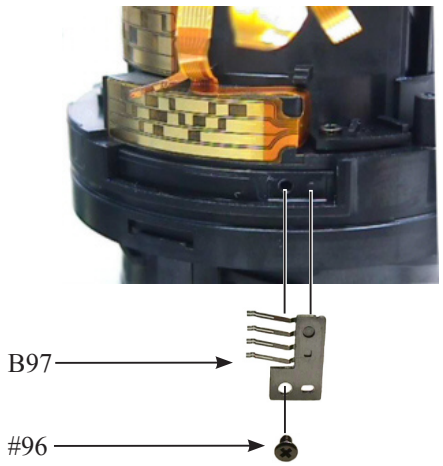



・Set the zoom ring (#52) to TELE-end.

・Lift and remove the zoom ring (#52).

Focus brush unit

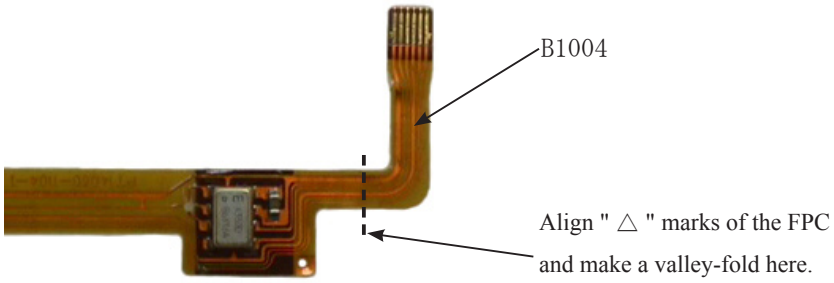
・Take out the screw (#96) and remove the focus brush unit (B97).



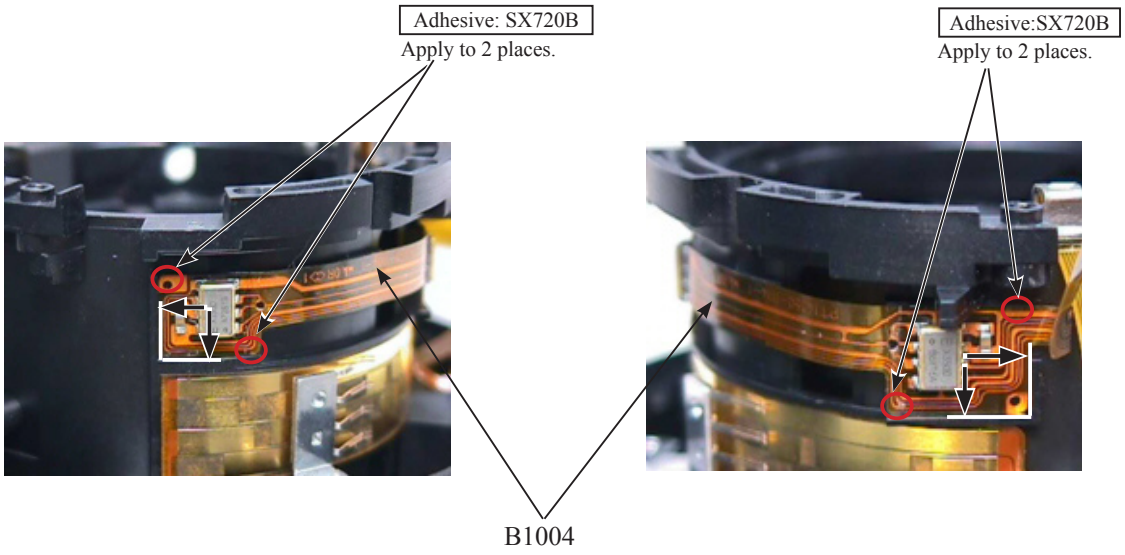
# 2. Assembly / Adjustment

Gyro-FPC

・Fold the gyro-FPC (B1004).




・Peel off the backing paper of the gyro-FPC (B1004), and adhere it by pressing in the directions of the arrows as below.

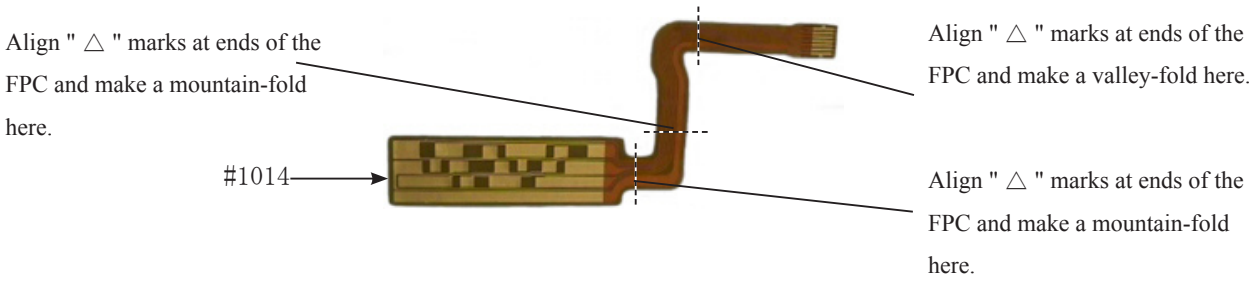



Zoom FPC

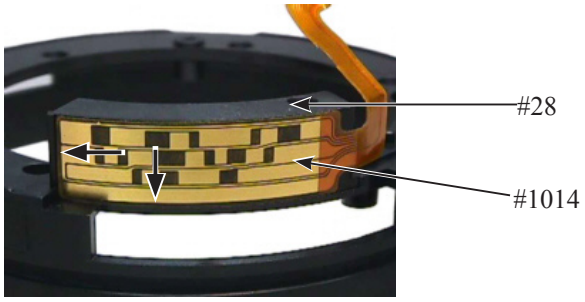
・Peel off the backing paper of the zoom-FPC (#1007), and adhere it to the fixed tube 2 (#28) by pressing in the directions of the arrows as below.

Focus-FPC

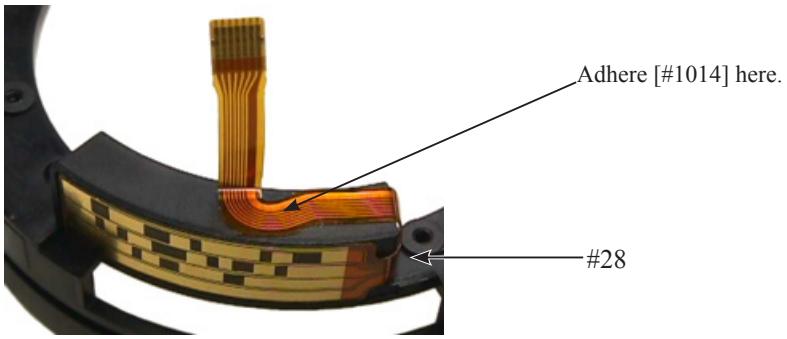
・Make a fold on the focus FPC (#1014).




・Peel off the backing paper of the focus-FPC (#1014), and adhere it to the fixed tube 2 (#28) by pressing in the directions of the arrows as below.



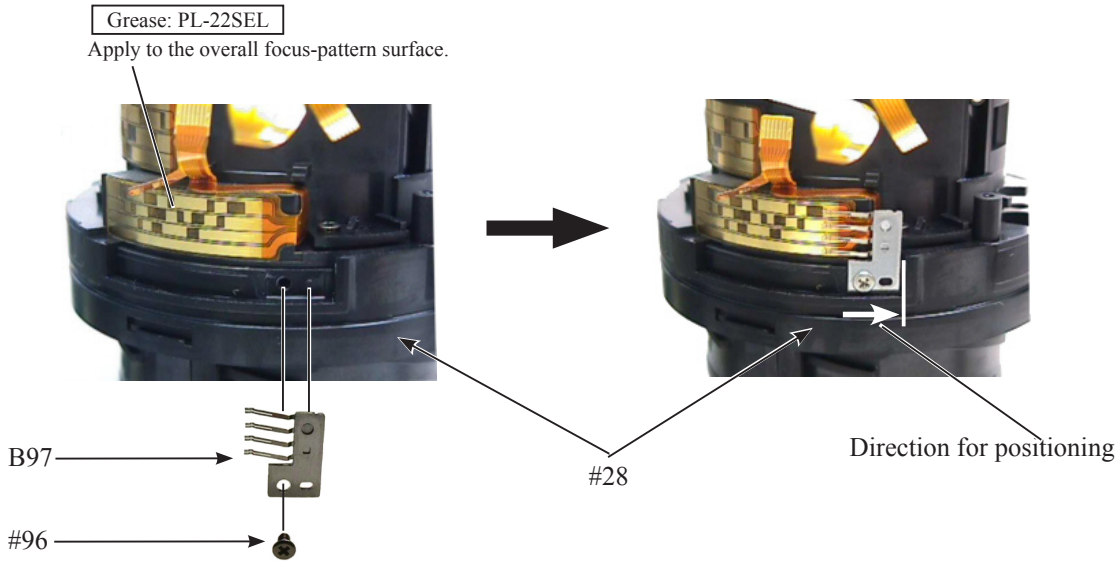

・Peel off the remaining backing paper of the zoom-FPC (#1014), and adhere it to the fixed tube 2 (#28) by pressing in the directions of the arrows as below.



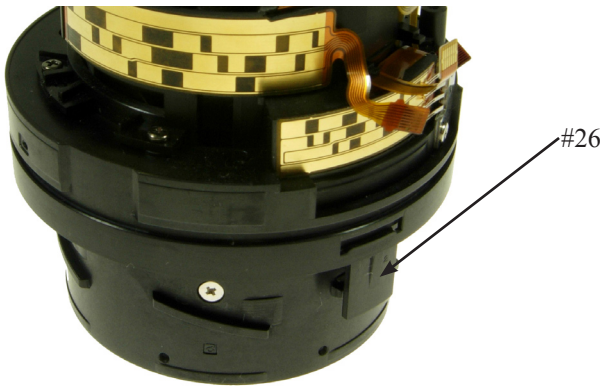
Focus brush unit

・Position the focus brush unit (B97) towards CLOSE side along the surface of the fixed tube 2 (#28), then attach it. Tighten the screw (#96).

Attach [B97] so that the tips of the brush (R/rounded parts) touches the overall pattern.

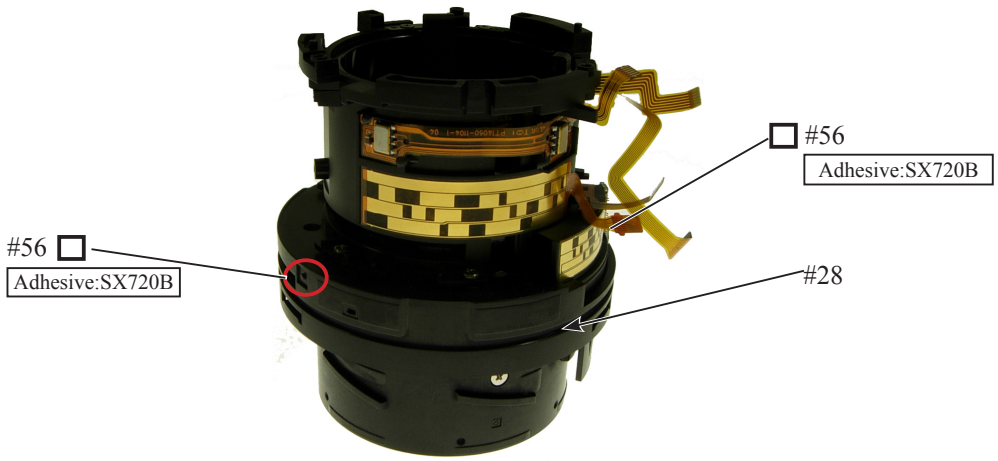



・Rotate the segment gear tube (#26) and check the operations.

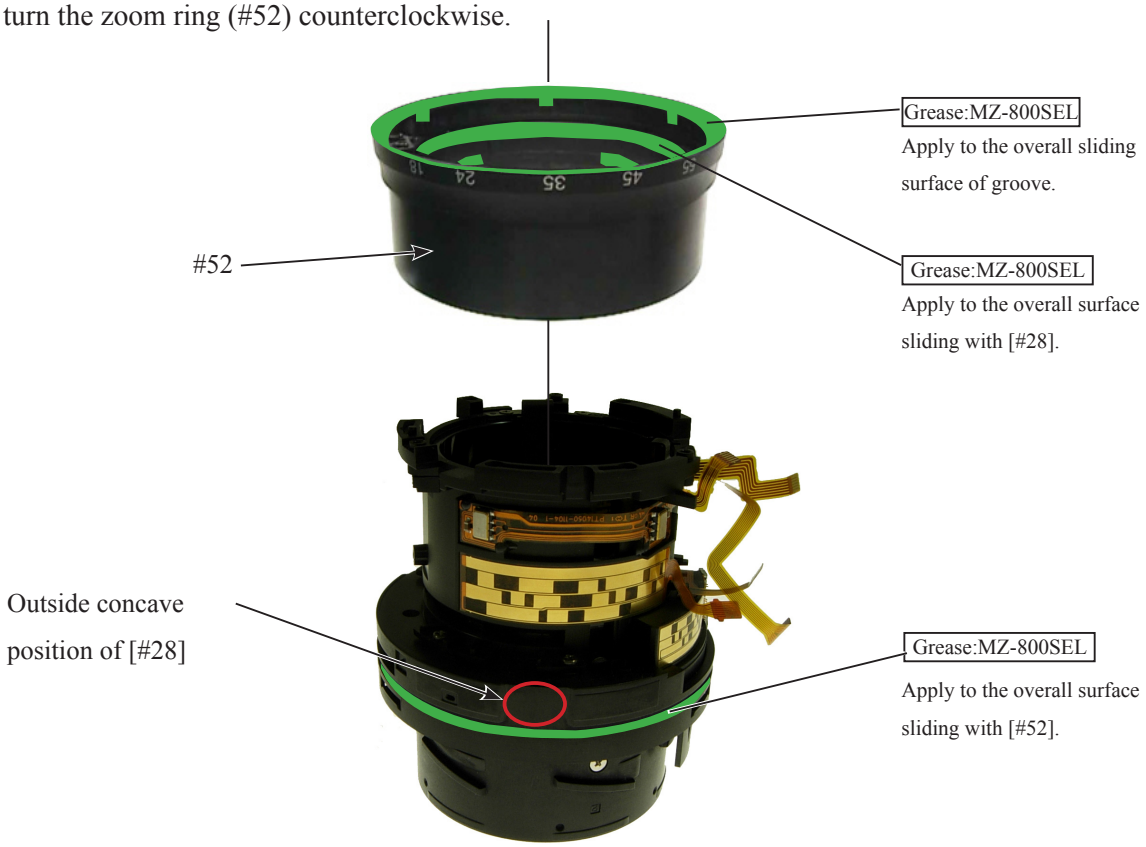


Zoom ring

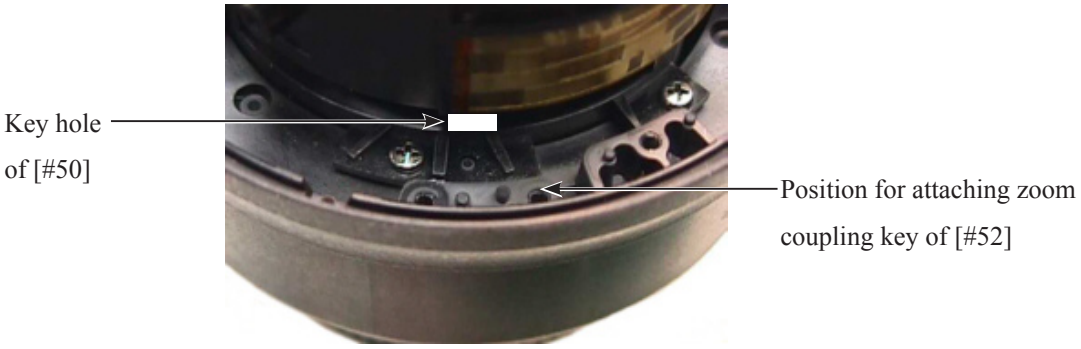
・Attach the two cushion rubbers (#56) to the fixed tube 2 (#28).




・Mount the zoom ring (#52) on the fixed tube ring 2 (#28) by fitting the convex portion which is inside and back of the index figure "35" of [#52] into the outside concave portion of [#28] that is near the zoom pattern. Then turn the zoom ring (#52) counterclockwise.

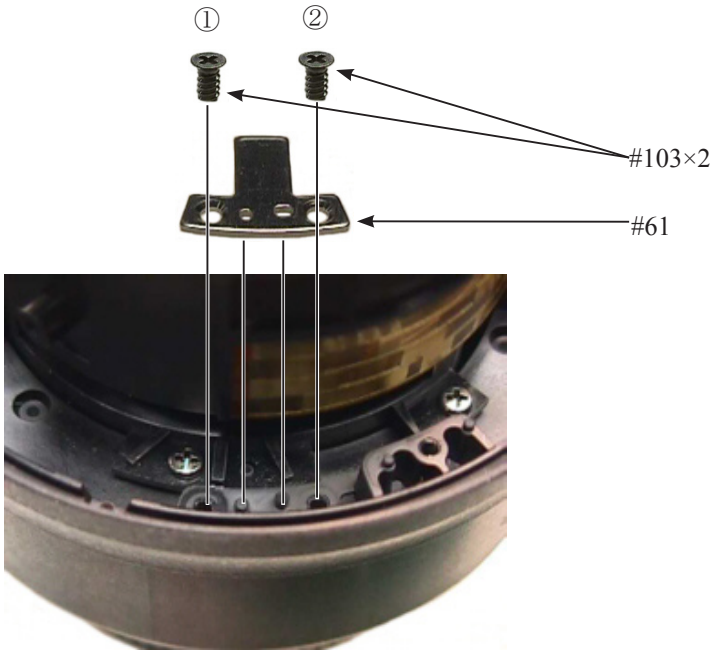


・Align the position for attaching the zoom coupling key of the zoom ring (#52) with the key hole of the cam tube (#50).




・Assemble the zoom coupling key (#61) by fitting the head of [#61] in the key hole of the cam tube (#50).

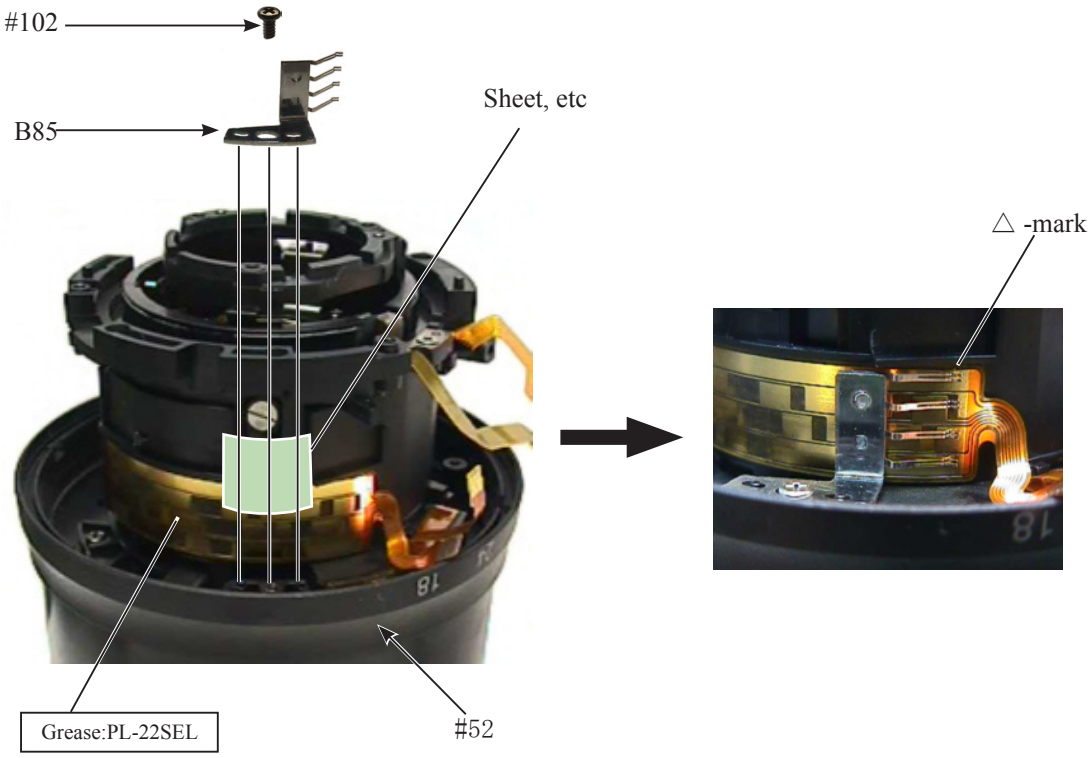
・Tighten the two screws (#103) in numeric order from ① to ② , and fixate the zoom coupling key (#61).



Zoom brush unit

・Set the zoom to WIDE-end.

・Position the zoom brush unit (B85) so that the tips of the brush (R/rounded parts) are lined up with " △ " mark, then attach it. Tighten the screw (#102).
When [B85] is attached, cover a sheet, etc (approx. 2×2cm) over the pattern so as not to bend the brush.



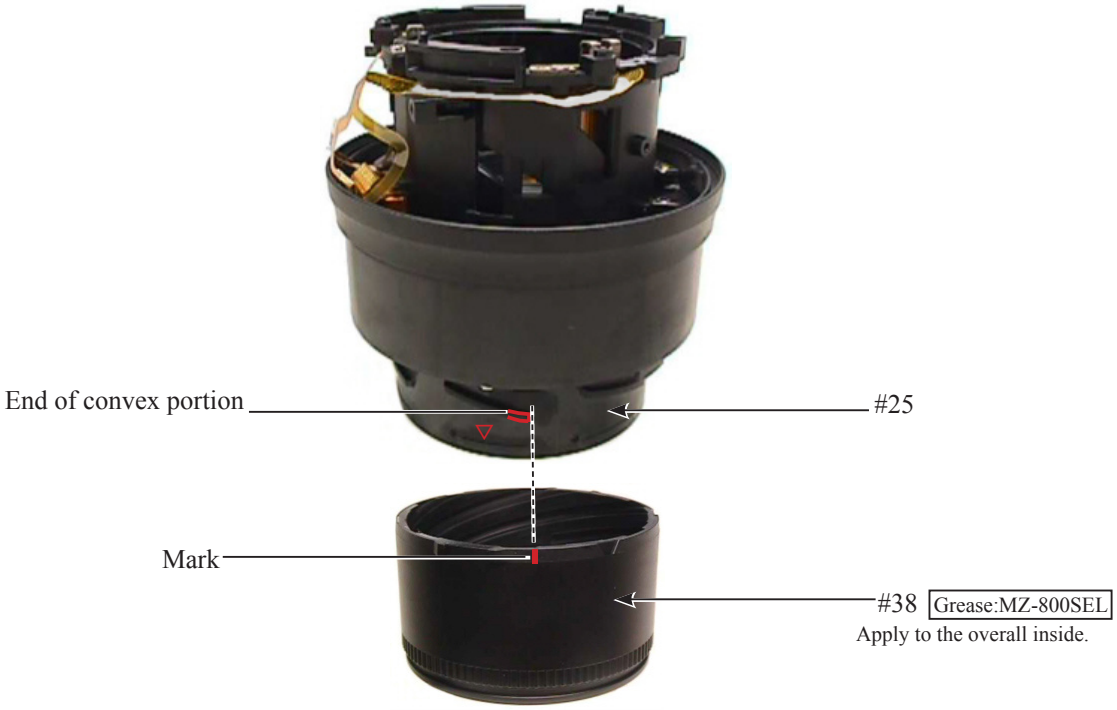

Apply to the overall surface of zoom pattern.

・Rotate the zoom ring (#52) and check the operations.

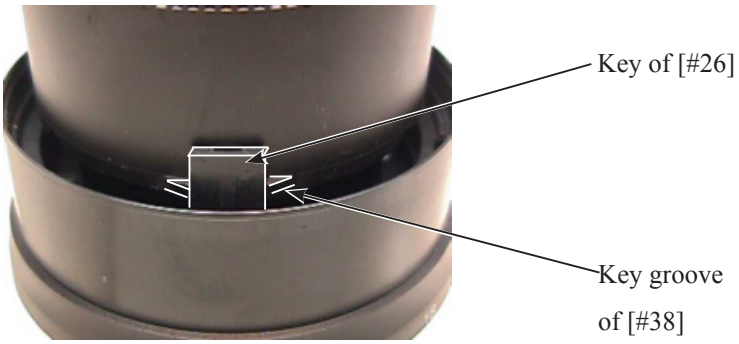
Filter ring

・Set the zoom to TELE-end, and the focus to INFINITY-end.

・Align the one end of the convex portion, which is above "▽"-mark of the helicoid ring (#25), with the mark of the filter ring (#38), and put the filter ring (#38) into [#25].

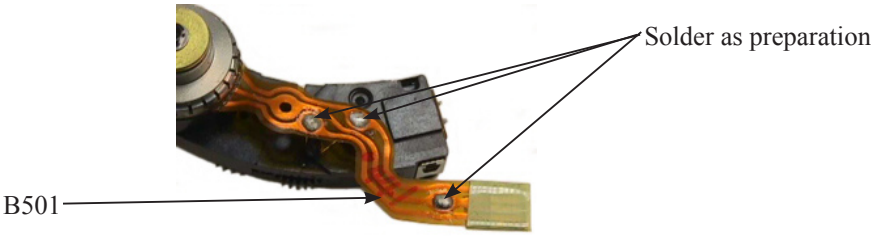



・While turning the filter ring (#38) clockwise, put the key of the segment gear tube (#26) into the key groove of the filter ring (#38).

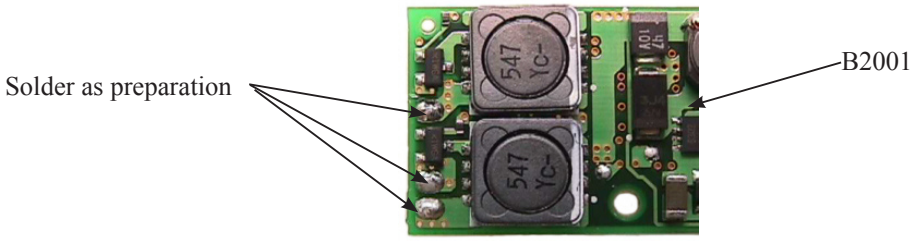


Gear unit

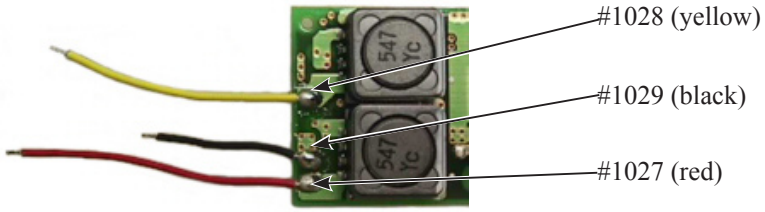
・As preparation, put the solders on the gear unit (B501).



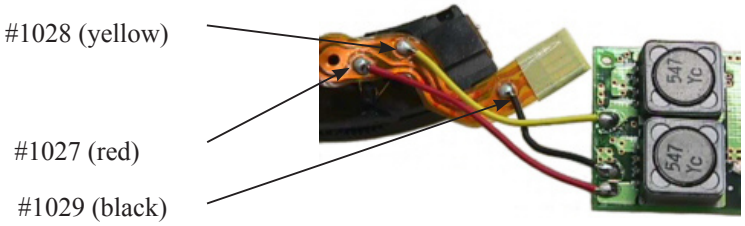

・As preparation, put the solders on the main PCB (B2001).




・Solder the three lead wires on the main PCB (B2001).

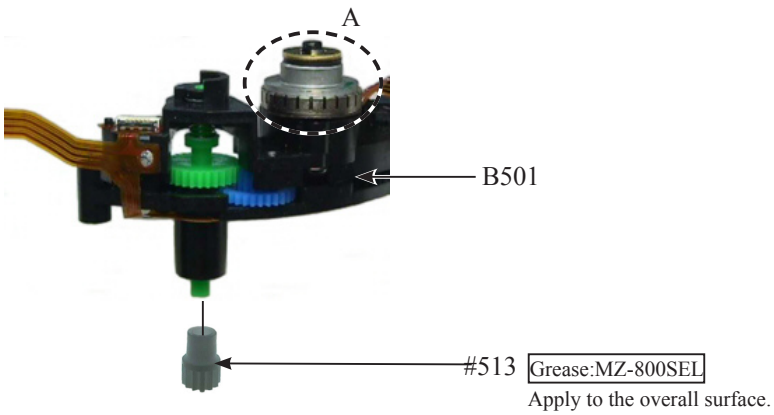



・Solder the three lead wires on the main PCB (B2001).

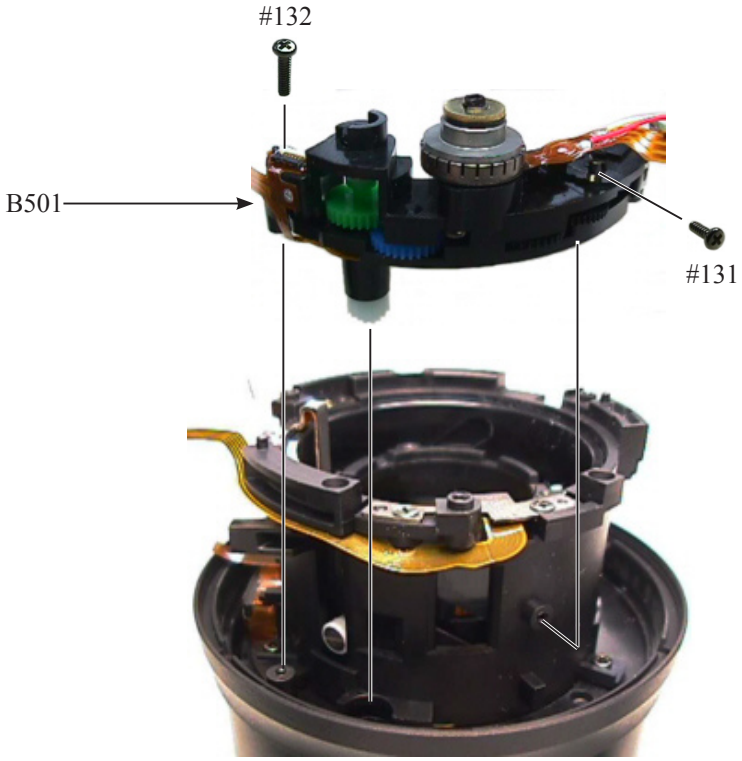


・Mount the pinion gear (#513) on the gear unit (B501).

Be careful NOT to touch "A" area.

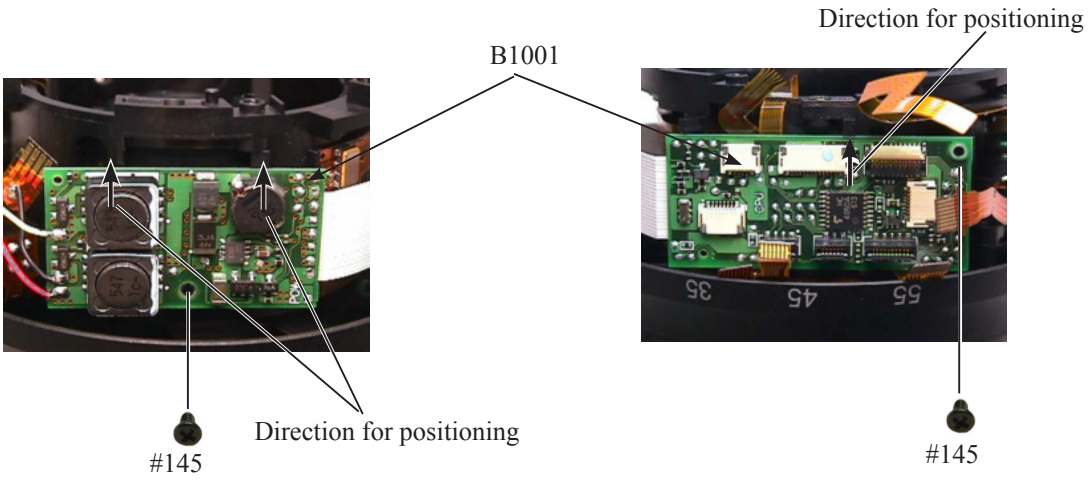



・Assemble the gear unit (B501). Tighten the screw (#131) first, and then the screw (#132) to fixate [B501]. Before the fixation, position the gear unit (B501) towards the left direction.

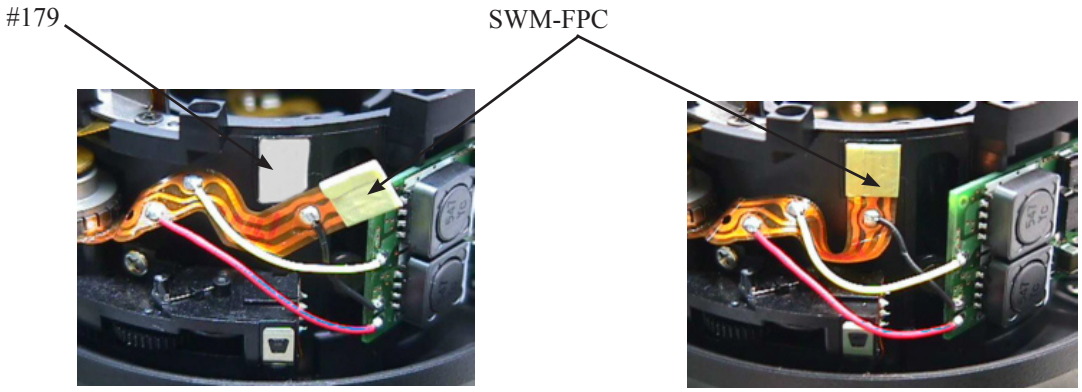


Main PCB unit

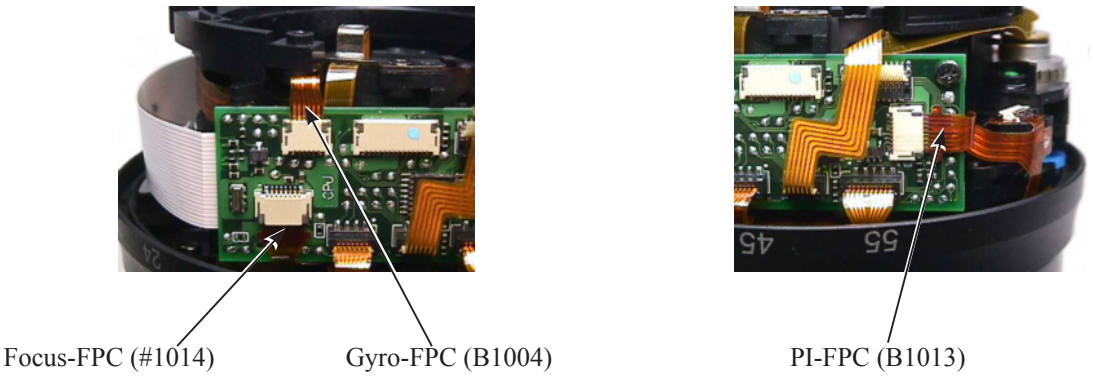
・Mount the main PCB (B1001) and tighten two screws (#145).



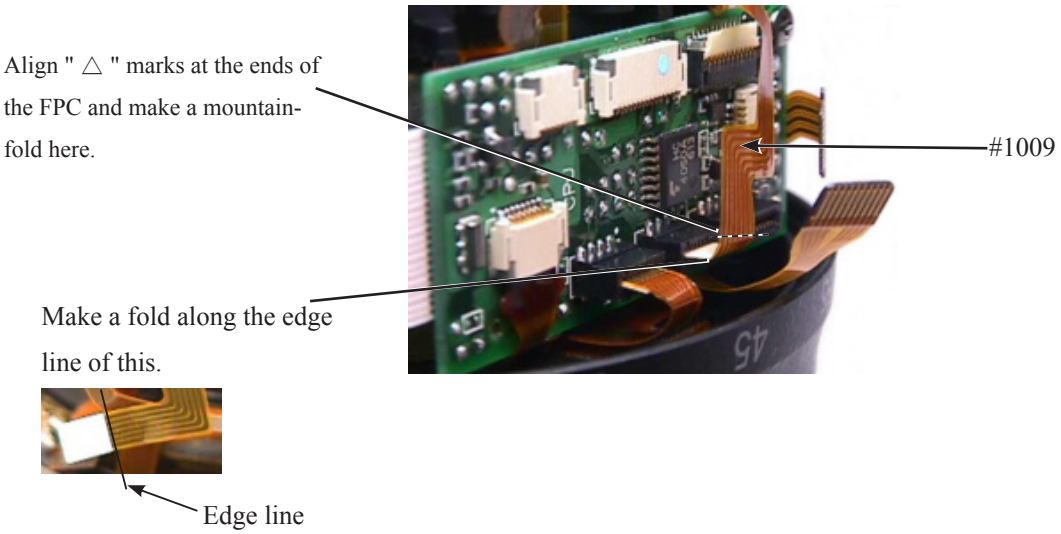

・Adhere the double-stick tape (#179) to the fixed tube 1 (#29) and peel off the backing paper. Then, attach the SWM-FPC.



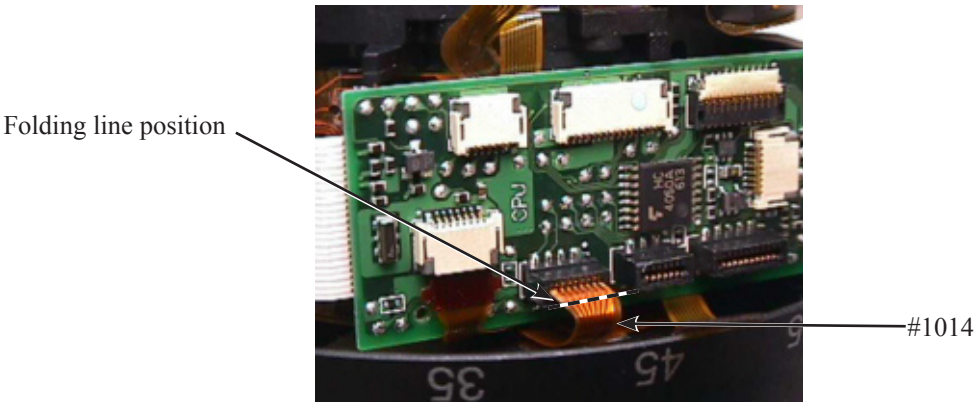

・Connect the gyro-FPC (B1004), zoom-FPC (#1007) and PI-FPC (#1009) to each connector of the main PCB (B1001).



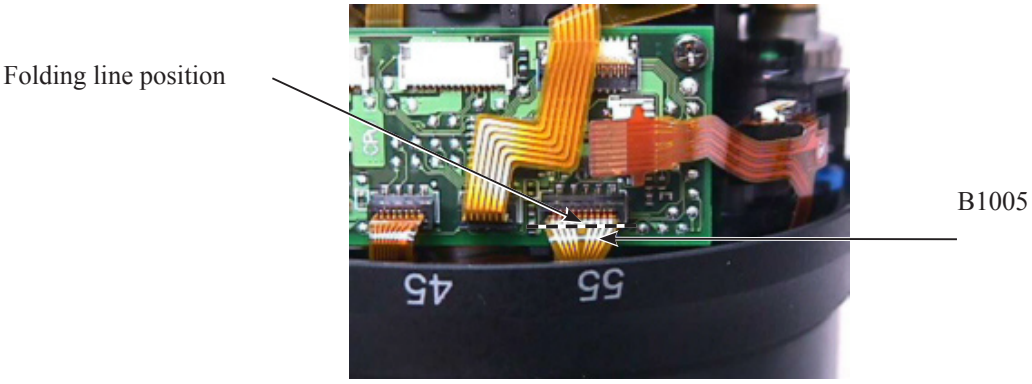
・Fold the main-VCM FPC (#1009) and connect it to the connector.




・Fold the focus FPC (#1014) and connect it to the connector.

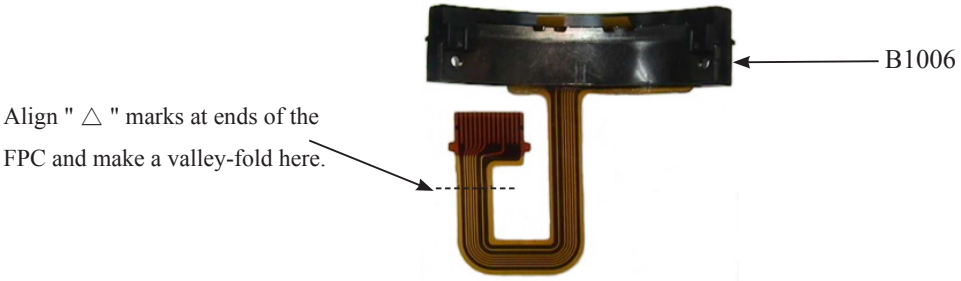



・Fold the hall element FPC (B1005) and connect it to the connector.

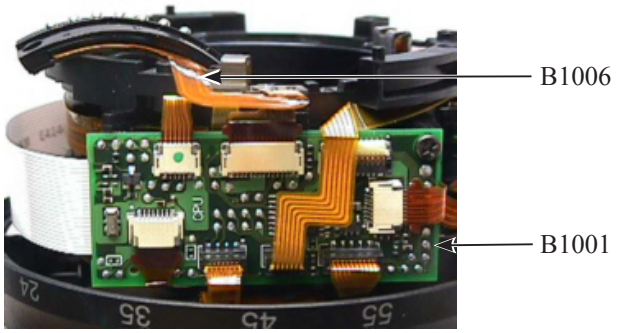


## Contact pin unit

・Fold the FPC of the contact pin unit (B1006).




・Connect the FPC of the contact pin unit (B1006) to the connector of the main PCB (B1001).

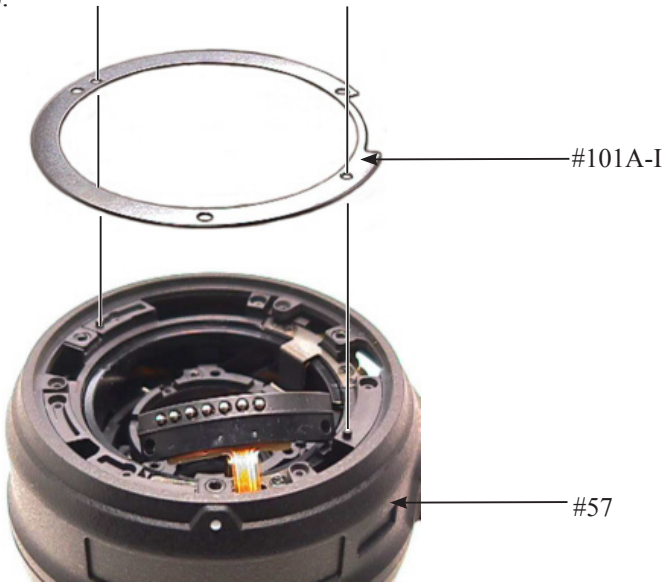



## Rear fixed tube unit

・Mount the rear fixed tube unit (B57).

Bayonet mount unit

・Put the washer (#101: from A to I).




・Mount the bayonet mount unit (B30) and position it by turning clockwise.

When [B30] is mounted, pass the GND lead wire (#1027) through the change-SW window.

・Tighten the three screws in numeric order from ① to ③ .

・Mount the contact pin unit (B1006) and position it by turning counterclockwise.

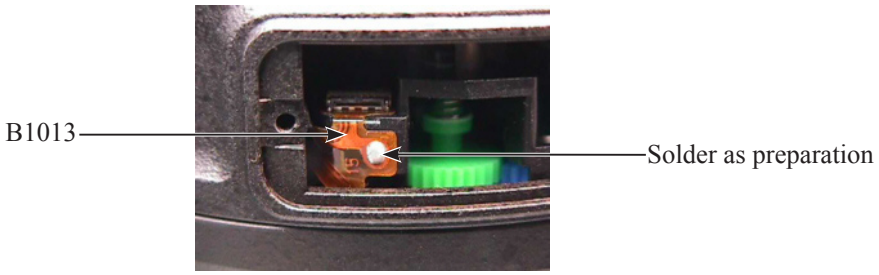
・Tighten the two screws (#67) in numeric order from ① to ② , and fixate the contact pin unit (B1006).

・Check the operations of the aperture lever (#23).

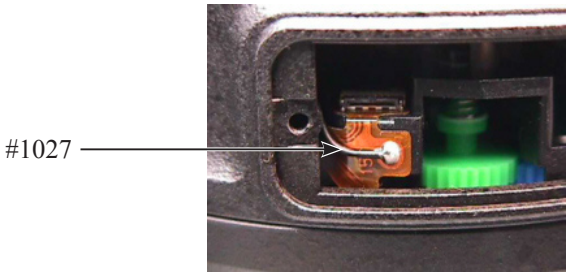
・Rotate the zoom ring (#52) and check the operations.

GND lead wire

・As preparation, put the solder on the PI-FPC (B1013).

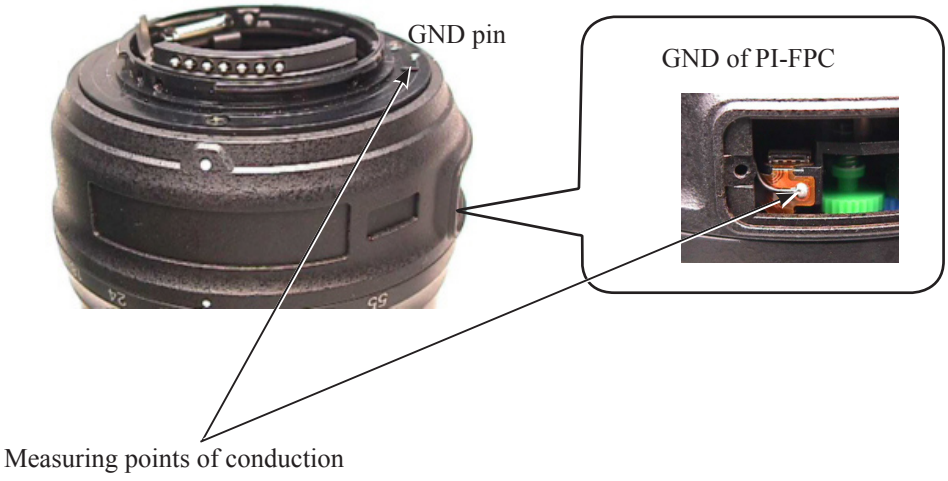



・Solder the GND lead wire (#1027) on the PI-FPC (B1013).




・Check the conduction between the GND pin of the bayonet mount and GND on the PI-FPC.

**Standard value: 0.3Ω or less**

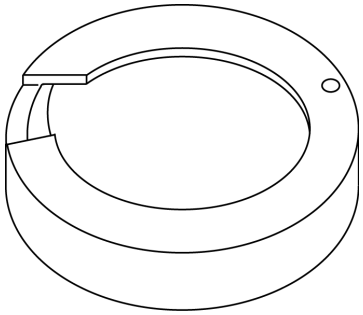


## Aperture lever adjustment

・Set the zoom to TELE-end.

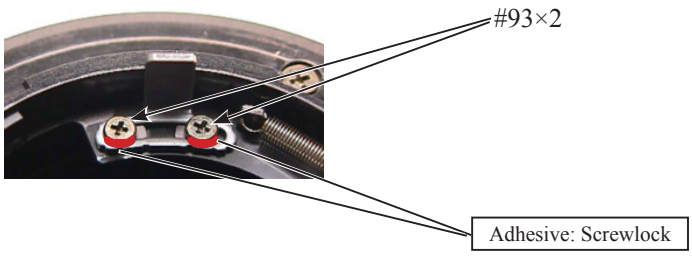
・When the lock pin of [J18004-1] is put into the lock hole of the bayonet, confirm that the aperture blades become fully open.

J18004-1



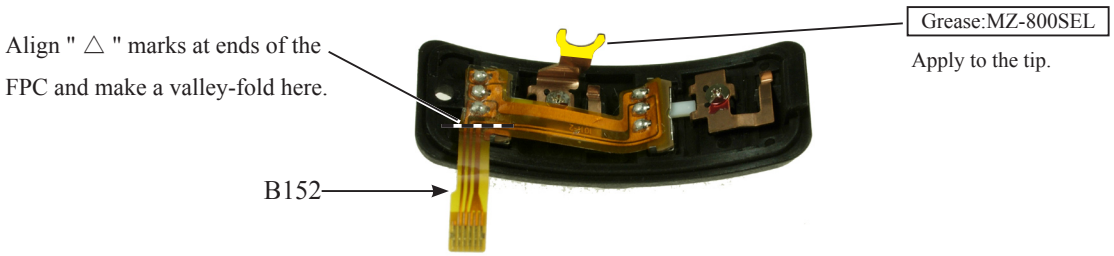
・If the aperture blades open quickly or slowly, adjust the position of the aperture lever (#23) with the two screws (#93).


・When the position of the aperture lever (#23) is adjusted, apply the screwlock to the two screws (#93).

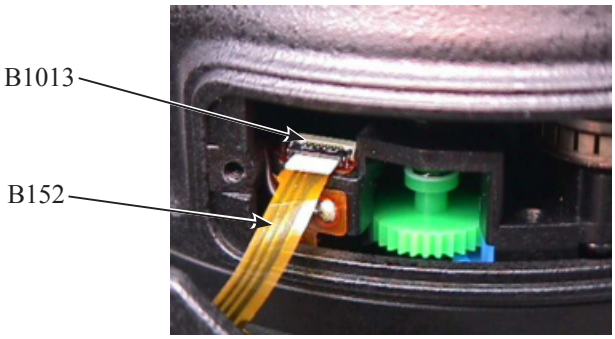


Change-SW unit

・Fold the FPC of the change-SW unit (B152).




・Connect the FPC of the change-SW unit (B152) to the connector of the PI-FPC (B1013).




・Set the M/A switch to "A" side, and mount the change-SW unit (B152).

・Fix the change-SW unit (B152) with the screw (#155).


・Switch over ON/OFF of the VR change-SW and M/A of the change-SW, and check the operation.

・When the M/A change-SW is set to "A" side, confirm that the focus ring does not operate, but when it is set to "M" side, it does operate.

・Check the operations of the autofocus.

Caution: After the inspection, set M/A change-SW to "A" side.

Zoom front ring unit

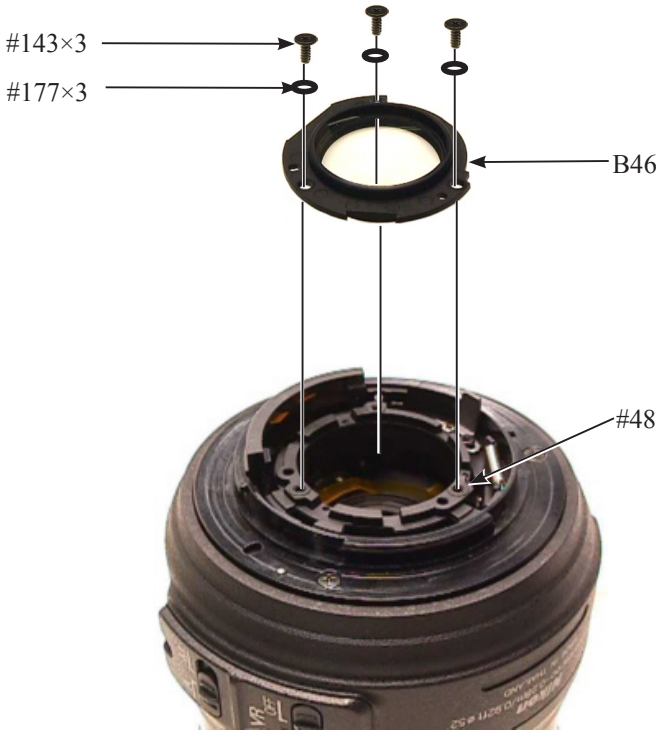
・Peel off the protection tape of the silver band tape (#114), which is attached to the zoom front ring unit (B54).

・Mount the zoom front ring unit (B54).


・While pushing the zoom front ring (#54) onto the zoom ring (#52), adhere the polyester tape (#77) along the stepped boundary line of the zoom front ring (#54).

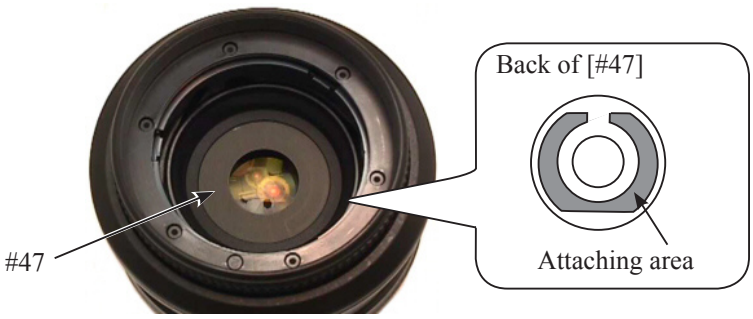
4th lens group unit

・Set the zoom to WIDE side.
・Mount the 4th lens-G unit (B46) on the 2nd-4th lens-G combined tube (#48).
・Tighten the three screws (#143) with the washers (#177), and fixate the 4th lens-G unit (B46).



Light-shield sheet

・Attach the light-shield sheet (#47) to the 2nd lens-G unit.
Attach it so as not to be slackened or bended.




1st lens group unit

・Set the zoom to WIDE-end or TELE-end.

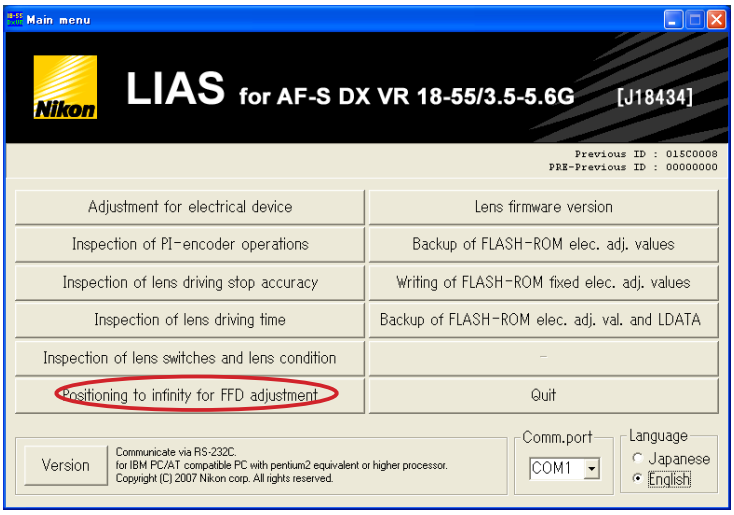
・By turning the washer (#119: selected from A to I) and the 1st lens-G unit (B40) clockwise, assemble them in the filter ring (#38).

## Adjustment of Focus movement (T, W)

★ : New tool

・Start up the adjustment software ( ★ J18434).

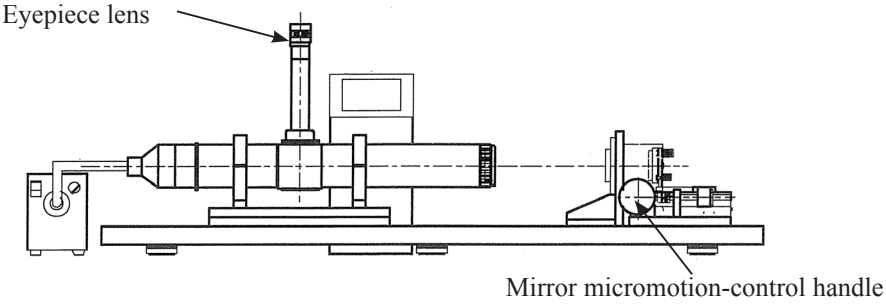
・Perform "Positioning to infinity for FFD adjustment" on the main menu for performing "∞" positioning.




・Being careful NOT to move the filter ring, mount the lens on the horizontal-type collimator.

・Looking through the eyepiece of the horizontal-type collimator, rotate the mirror micromotion-control handle to adjust focus, then measure focus position at WIDE or TELE side.
The focus position to be measured is the numeric number of the boundary line at the moment when the color of cross lines change from green to orange.

＜ Horizontal-type collimator ＞



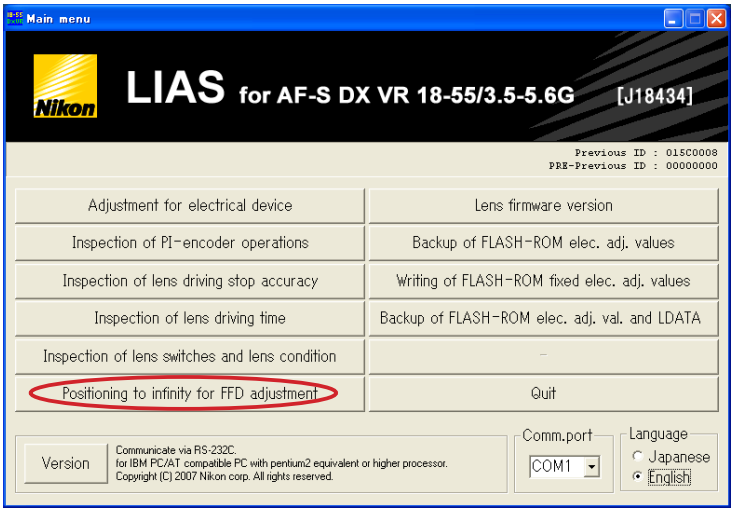

・Based on the following, calculate the adjustment amount "C" of the washer (#119):
C ＝ (A-B)/4.5
A = Value at TELE side; B = Value at WIDE side;
C = Adjustment amount (mm) of the washer (#119) which is under the 1st lens-G unit (B40)

・Adjust the washer (#119) by increasing/decreasing by the above value "C". If "C" is plus, increase the thickness of it, while it is minus, decrease the thickness of it. (ref. Page A20)
Note: When the washer (#119) is put, place a thin washer between thick washers.

## Adjustment of F.F.D (Back focus)

・Start up the adjustment software ( ★ J18434). ★ : New tool

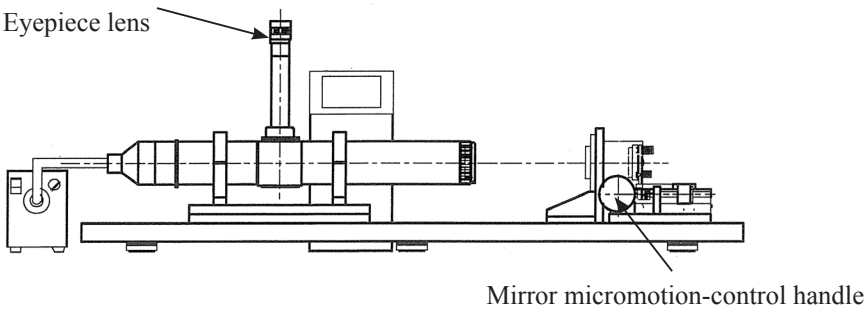
・Perform "Positioning to infinity for FFD adjustment" on the main menu for performing "∞" positioning.




・Being careful NOT to move the filter ring, mount the lens on the horizontal-type collimator.

・Looking through the eyepiece of the horizontal-type collimator, rotate the mirror micromotion-control handle to adjust focus, then measure focus position at WIDE or TELE side.
The focus position to be measured is the numeric number of the boundary line at the moment when the color of cross lines change from green to orange.
In case the measured value is out of standard, follow the below procedure.

＜ Horizontal-type collimator ＞




| Focal length (f) | Standard (mm) |
|---|---|
| 18 mm | -0.055 ～ +0.045 |
| 35 mm | -0.231 ～ +0.169 |
| 55 mm | -0.409 ～ +0.391 |

・Remove the bayonet mount unit.

・Adjust the washer (#101) by increasing/decreasing by the difference from the standard value. If the difference is ~~plus~~ minus, increase the thickness of it, while it is ~~minus~~ plus, decrease the thickness of it. (ref. Page A13).

△ (Revision) △ (Revision)

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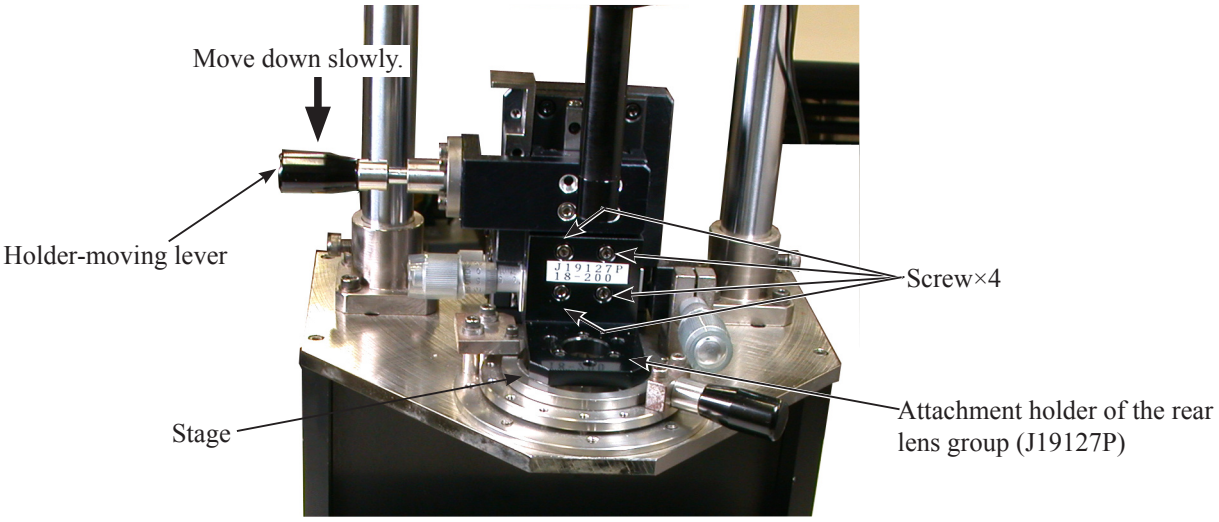
## Lens Alignment

**Caution: This adjustment is required when the 4th lens group is removed.**

(1) Preparation of Lens optical alignment equipment

・Fix the attachment holder of the rear lens group (J19127P) on the lens equipment.

How to Fix: Move down the holder-moving lever slowly so that the attachment holder of the rear lens group (J19127P) touches the stage.Then tighten four screws to fix it.



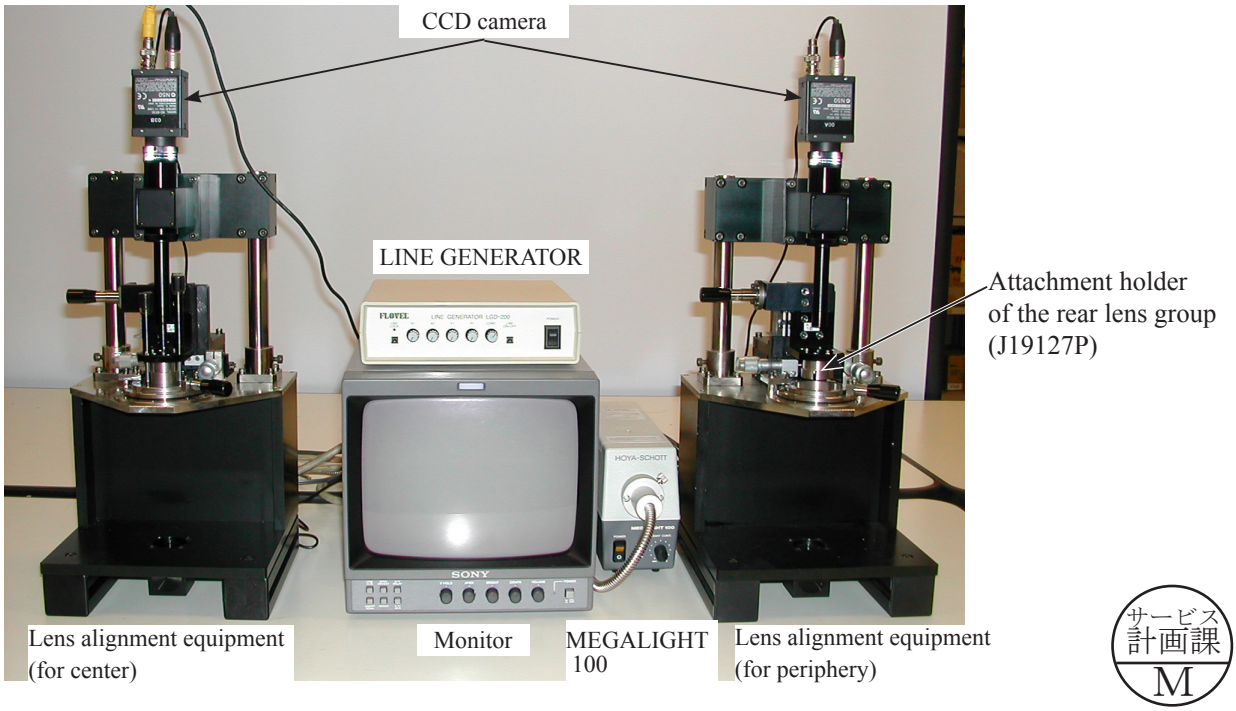

・Create the center positioning tool.

Refer to [Create positioning tool of Rear lens-group holder for lens alignment] (Page A22-15) for how to create.

・Create cardboards with which "Lens alignment chart" and "Viewers" are fit.

Refer to [Create Setting board of "Lens alignment chart" and "Viewer"] (Page A22-16) for how to create.

< Lens optical alignment equipment >

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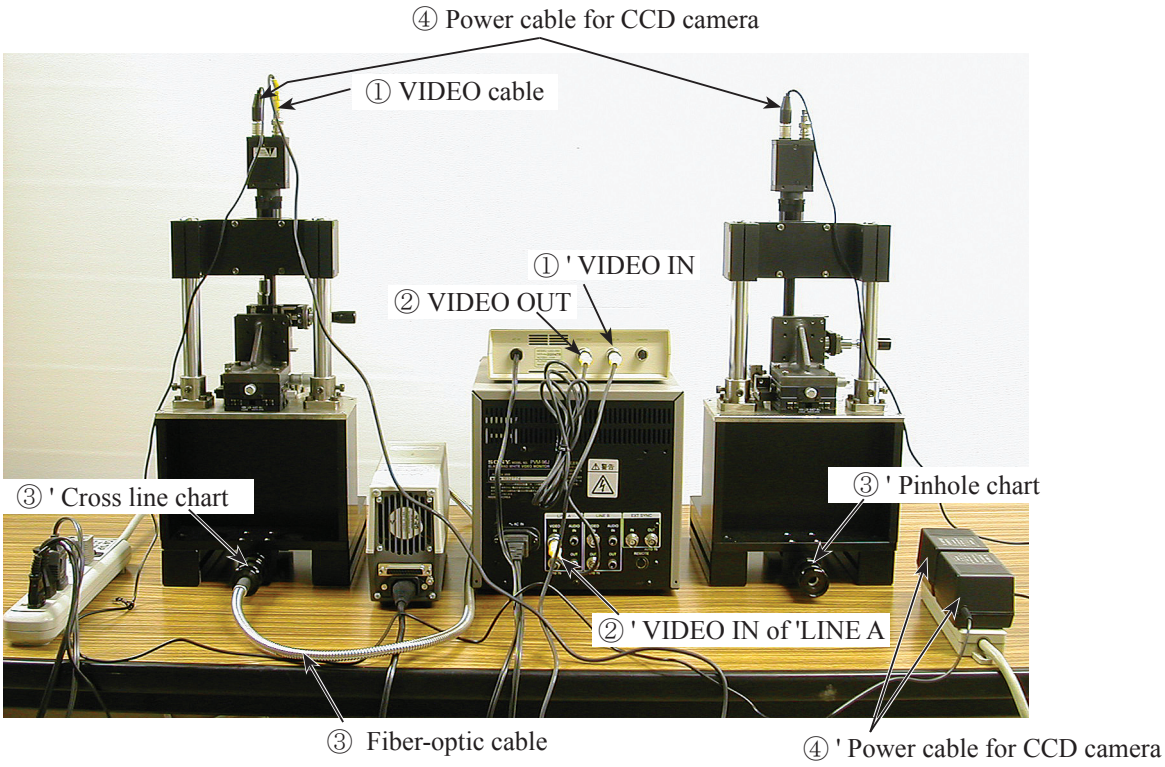
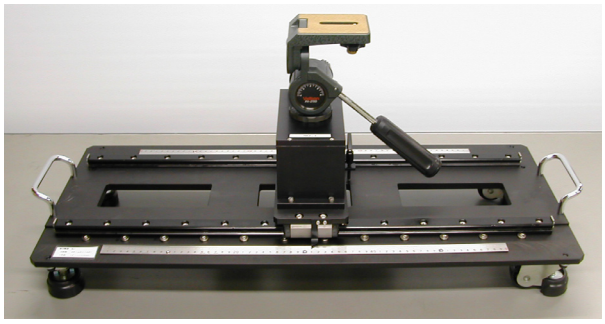
<Back view of Lens optical alignment equipment>

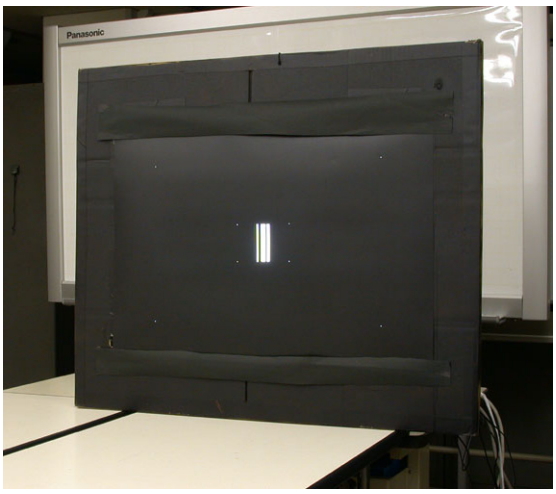
Connect each cable to the appropriate equipment with the same number. (e.g. Connect up ① to ①' )




< Chart shooting equipment for 4th lens-group alignment >



Slide rail for lens alignment equipment




The chart is embeddied in cardboards.

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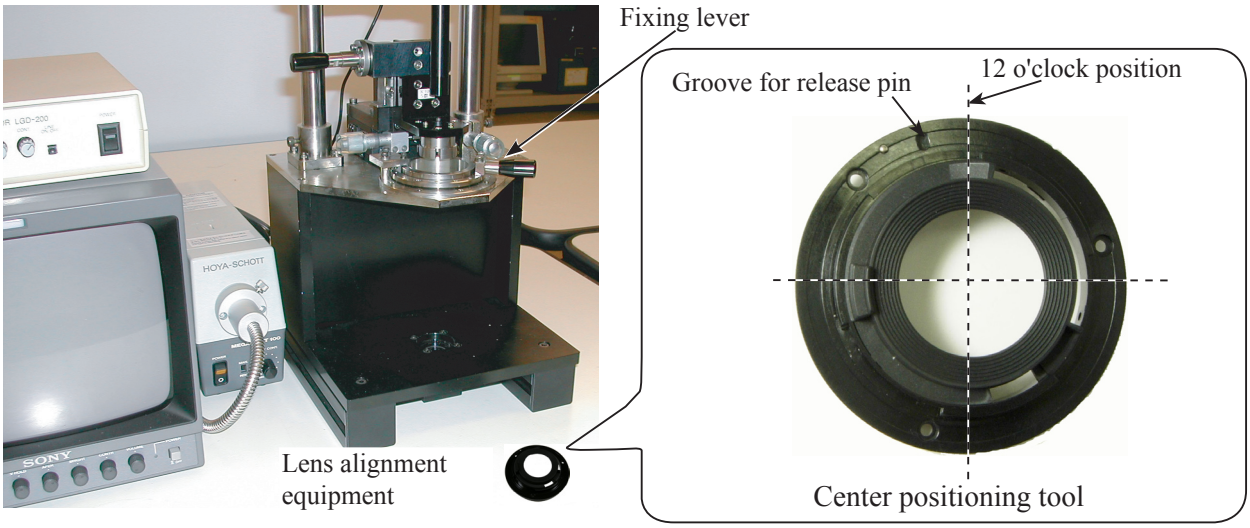
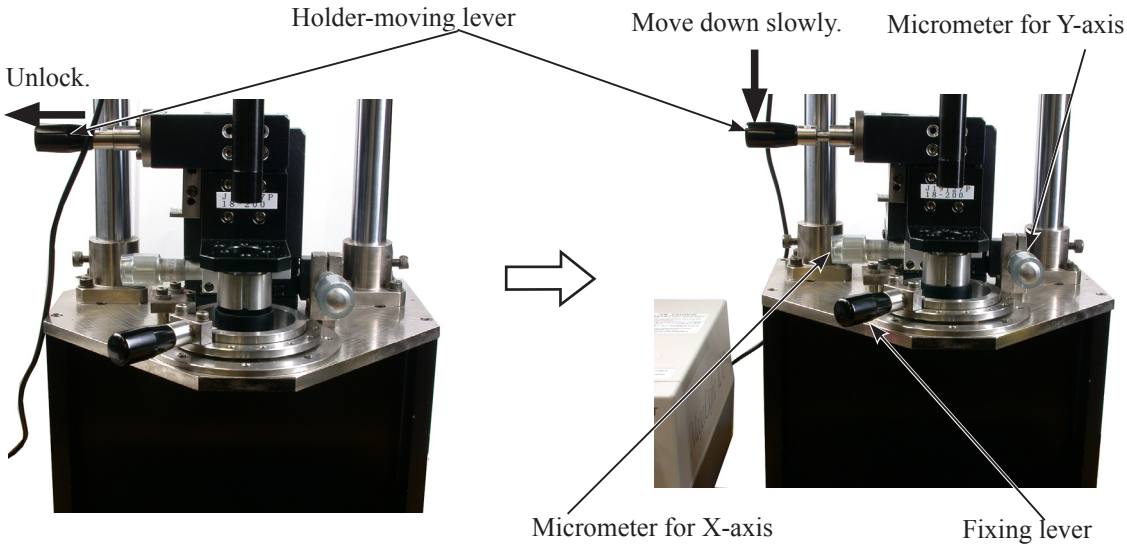
(2) Center positioning of rear lens-group holder

・Mount the (self-made) center positioning tool on the lens alignment equipment (for center) by setting the groove in place slightly to the left (in a counterclockwise direction) from the below 12 o'clock position. Then turn the tool clockwise all the way to the right, and move the lever to the left to fix it.




・Unlock the holder-moving lever, and move the holder down slowly by the lever.




・Adjust the attachment holder (J19127P) position by rotating the micrometers for X-axis or Y-axis so that the center of the attachment holder coincides with that of the rear cover ring of the (self-made) center positioning tool.

**Caution: Without this alignment, the 4th lens may be damaged by the attachment holder.**

・Move the holder-moving lever of the alignment equipment upwards, and remove the (self-made) center positioning tool from the equipment by moving the fixing lever rightwards.

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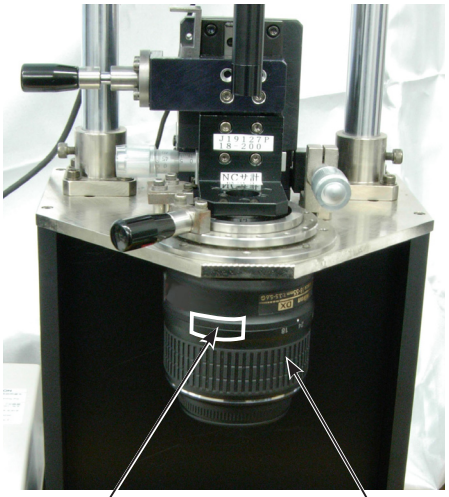
(3) Temporary positioning of the 4th lens group

・Mount the lens on the lens alignment equipment (for center). Set the focus ring to "infinity-end".
Refer to [(2) Center positioning of rear lens-group holder] (Page A22-3) for how to mount the lens.

・Set the Zoom ring to "24 mm".

**Caution: Do NOT set the zoom ring to TELE position longer than "24 mm". Otherwise, the lens will come off from the attachment holder (J19127P).**

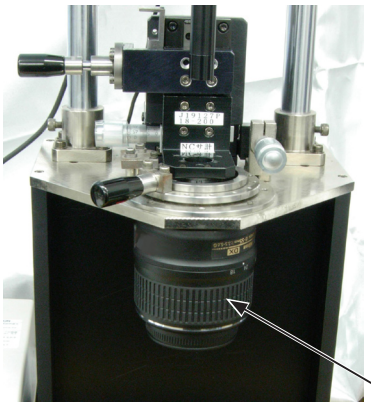
・Secure the zoom ring with tape, etc.




・Turn each power of the monitor, LINE GENERATOR, and MEGALIGHT 100 to ON.

・Rotate the "LIGHT CONT."knob of "MEGALIGHT 100" and adjust brightness.

・Rotate the focus ring. Adjust the shape of point image so that the point image on the monitor is like bellow.





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・Check the point image on the monitor.
In case the shape is like "Fig.1", remove the lens from the alignment equipment.
In case the point image is like "Fig.2" or "Fig.3", go to the next procedure, and perform "adjustment of 4th lens group point image".

< 4th lens group point image >

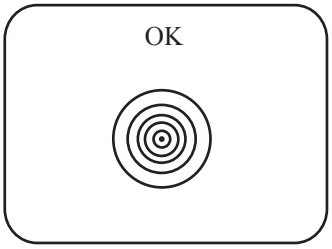


Fig.1

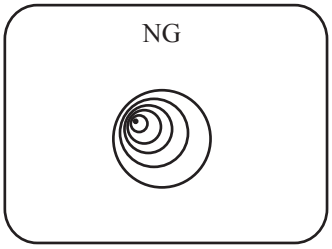


Fig.2

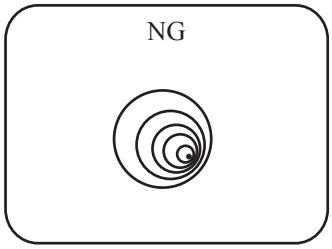
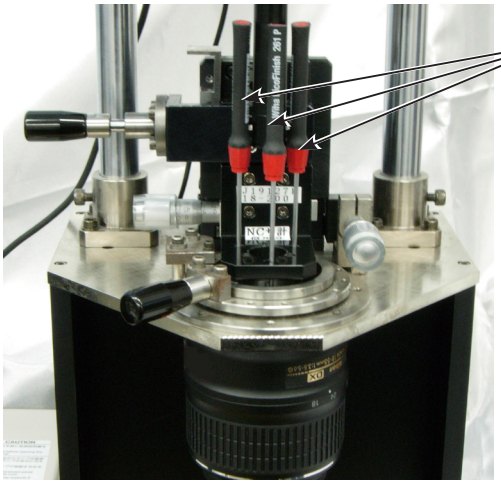


Fig.3

・Unlock the holder-moving lever, and move the holder down slowly by the lever.
**Caution: Be careful NOT to damage the 4th lens group by the attachment holder (J19127P).**

・Insert the three alignment screwdrivers in the screw holes of the 4th lens unit, and loosen the screws.
**Caution: When inserting the alignment screwdrivers, move the holder-moving lever up to lock the holder. Then put them straight down in the screw holes so that the screws can be easily found. After inserting the alignment screwdrivers, unlock the holder-moving lever and move the holder down slowly by the lever.**




・Rotate the micrometer (X-axis and Y-axis) so that the point image on the monitor is like "Fig.1".

・When the point image becomes like the above "Fig.1", tighten the three (loosened) screws of the 4th lens-G unit with the below three alignment screwdrivers.

・Remove the three alignment screwdrivers from the attachment holder (J19127P).

・Move the holder-moving lever up slowly to lock the holder, and remove the lens from the equipment (for center).

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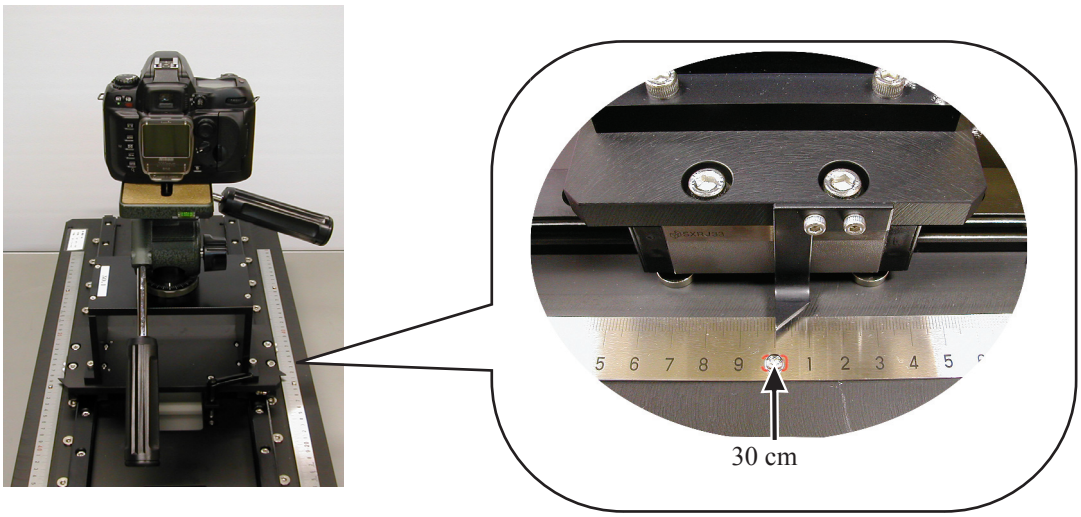
(4) Chart shooting for the rear lens group alignment

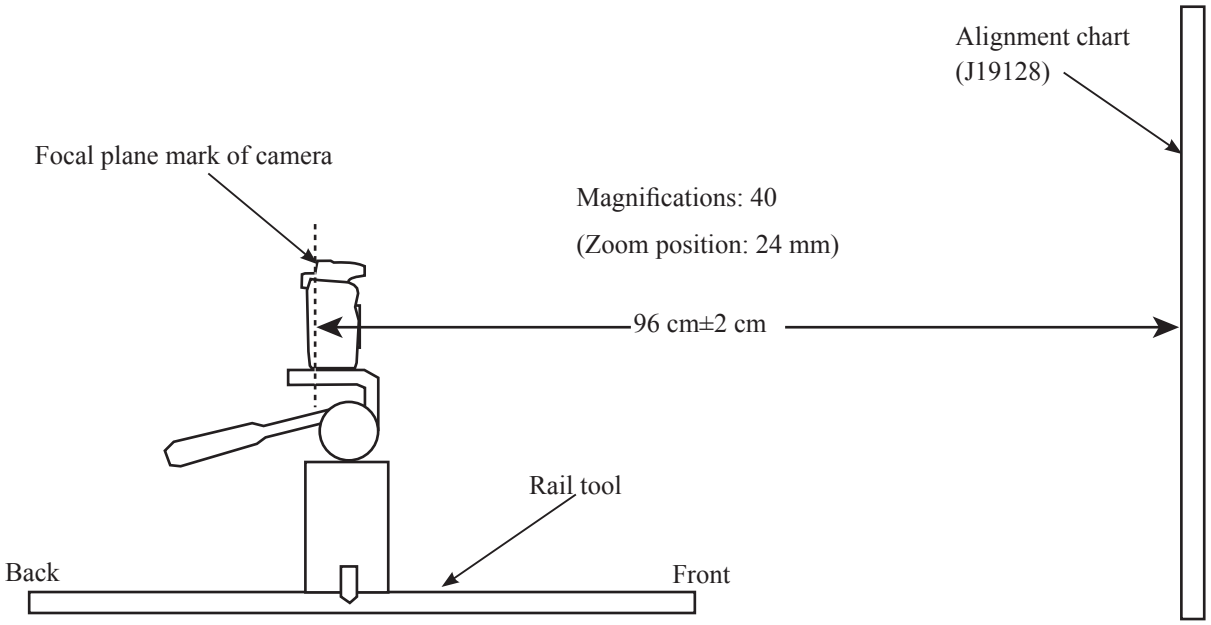
・Prepare a camera (D200). Set the shutter speed to "M1/60", aperture to "full open", and the focus mode to "S". On the shooting menu, set "Image Quality" mode to "RAW", "WB" to "Preset" and "ISO" to "200".

・Set the VR mode of the lens to "OFF".

・Set up the camera (D200) on a tripod on the slide rail. Set the indication pointer of the tripod to 30 cm.




・Set the alignment chart (J19128) as shown below.

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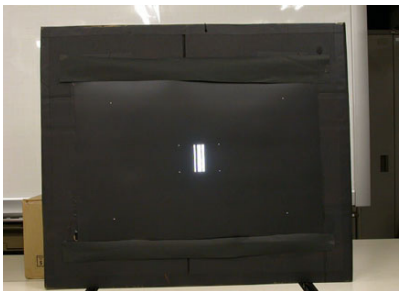
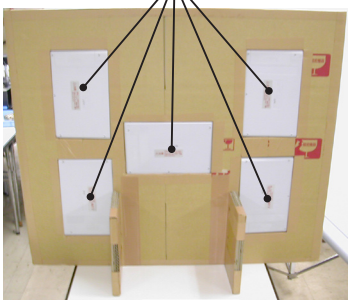
・Turn the power of viewers (5 pcs.) to ON.

**Caution: If the batteries of viewers are exhausted causing decreased brightness, the shooting data cannot be obtained correctly.**

Viewer× 5 pcs.



Front



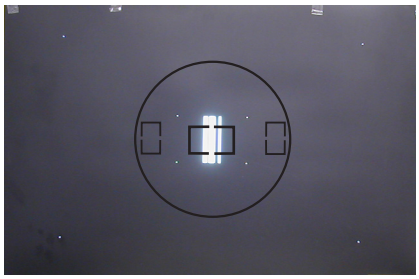
Back

・Attach the suspected lens to the camera (D200). Set the A/M change SW to "M", the zoom ring to "24 mm", and the focus ring to "infinity".

・Set the A/M change SW to "A".

・By looking through the viewfinder, adjust the height and tilt to make the chart fill the entire finder field frame.

・Adjust the tilt of the slide rail to make the three chart lines position in the center of the viewfinder, when the tripod is slid all the way to the front and back.

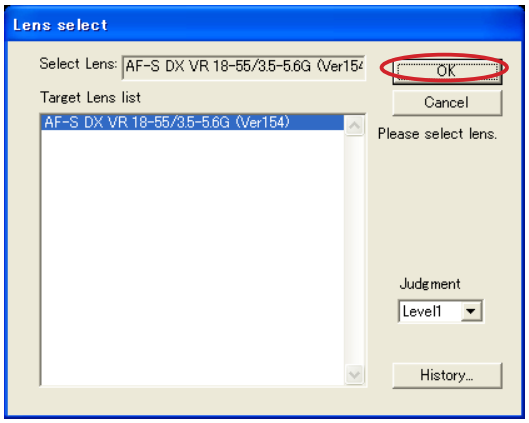


△ (Revision)

・Connect the PC and camera via USB cable (Camera setting: ~~Mass Storage~~ PTP ).

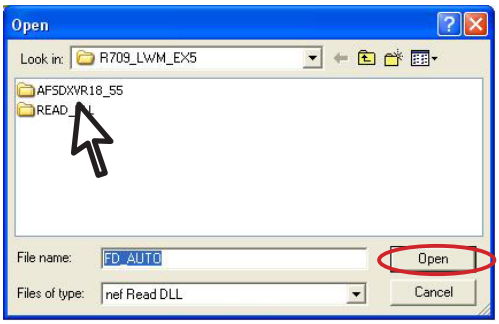
・Start the adjustment software (LWM_AFS18_55.exe).

・Click "OK".

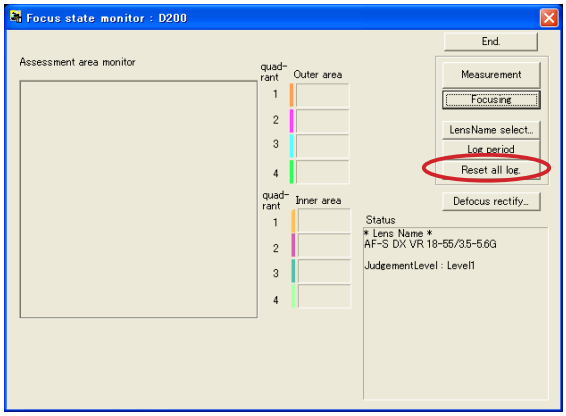



サービス計画課 M

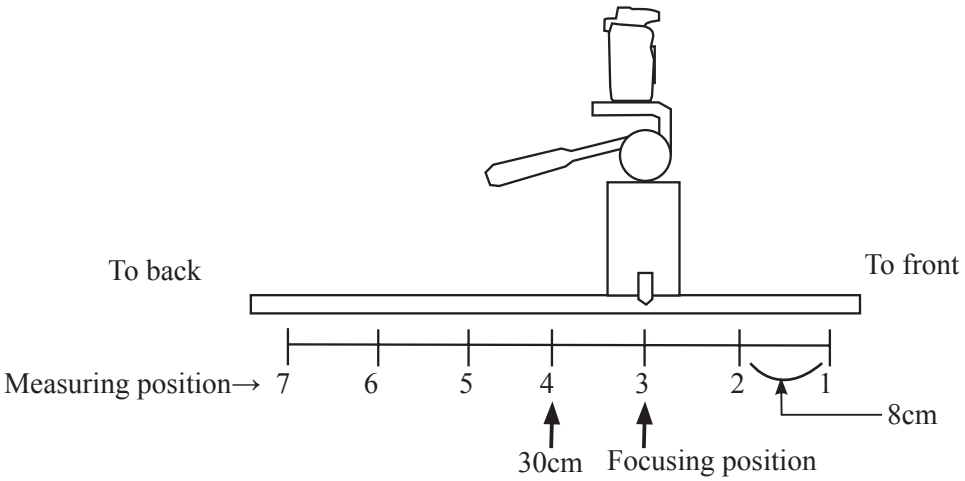
※ If this software is used for the first time, the selection screen of reading data will appear. This does not appear after the 2nd-time usage. Select "FD_AUTO.dll" and click "Open".



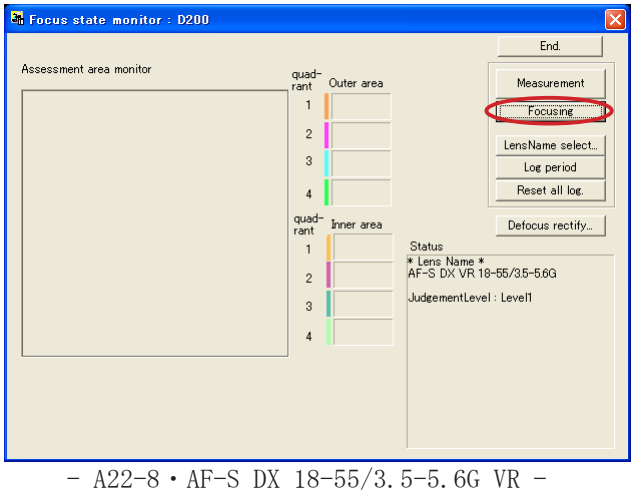

・Click "Reset all Log".




・Slide the tripod by 8 cm ± 0.1 cm to the front, then darken the room.

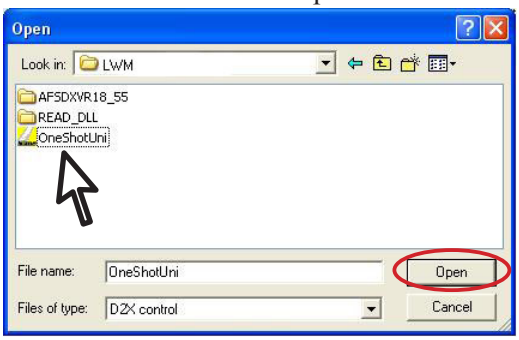



・Click "Focusing". AF is activated to focus and the shutter is released.



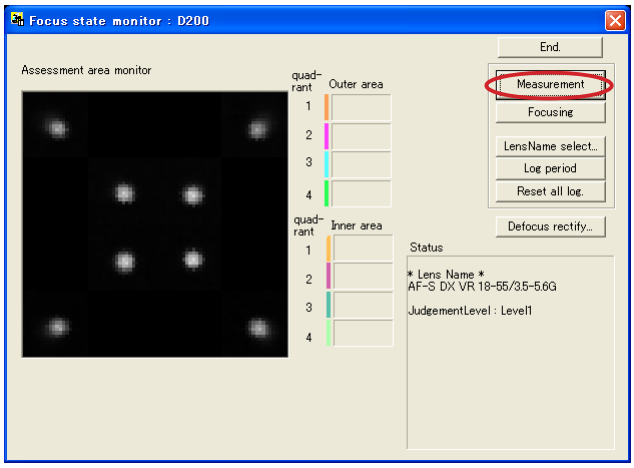

サービス計画課 M

※ If this software is used for the first time, the software selection screen will appear. This does not appear after the 2nd-time usage.Select "OneShotUni" and click "Open".




・Set the A/M change SW to "M".

・Slide the tripod to the front by 16±0.1 cm. Click "Measurement".




・When the shutter of the camera is released, slide the tripod to the back by 8±0.1 cm and click "Measurement" again.

・Repeat this procedure (of sliding the tripod in increments of 8±0.1 cm and clicking "Measurement" at 7 measuring positions). The total sliding distance is 48 cm. (ref. Illustration of previous page)

**Note 1: When the below warning is given, there may be some defects in the brightness of the viewers and/or parallelism of the chart and camera, etc. So correct the above and make a remeasurement.**


**Note 2: When the below warning is given, recheck that the Quality mode of the camera is set to RAW.**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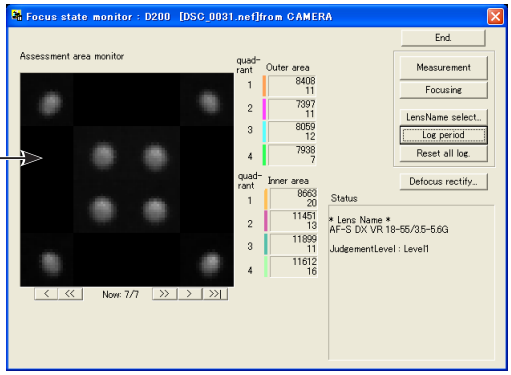
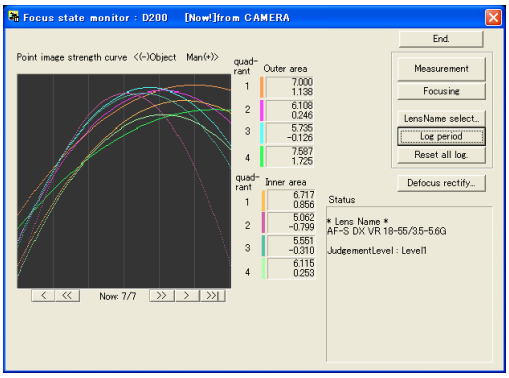
・After the seven measurements, point the cursor to the confirmation screen of the software. Click it three times.

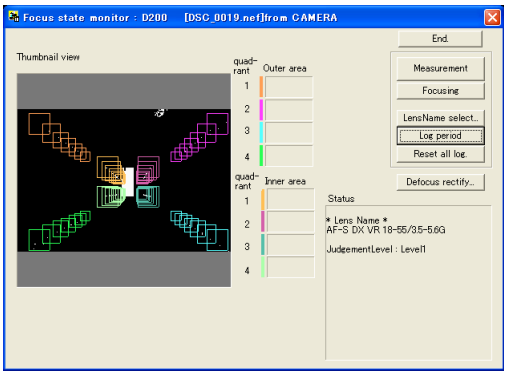
If "Information" displays "END", the lens optical alignment is completed.

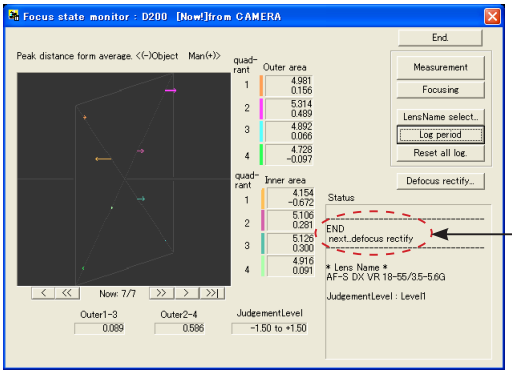
If "Information" displays other than "END", go to the next "(5) 4th lens group alignment" (Page A 22-11) to readjust.

Confirmation screen →




Information display →

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(5) 4th lens group alignment

・Mount the lens on the equipment (for periphery).

Refer to [(2) Center positioning of rear lens-group holder] (Page A22-3) for how to mount the lens.

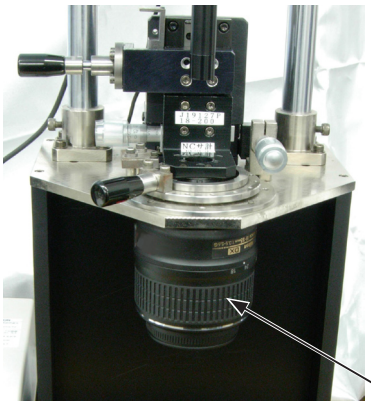
・Set the zoom ring to "24 mm".

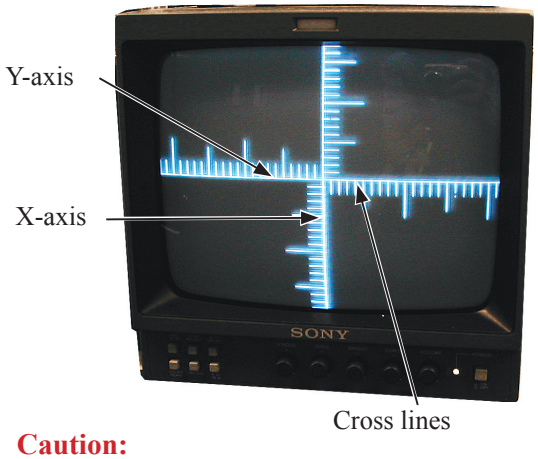
**Caution: Do NOT set the zoom ring to TELE position longer than "24 mm". Otherwise, the lens will come off from the attachment holder (J19127P).**

・Secure the zoom ring with tape, etc.


・Turn each power of the monitor, LINE GENERATOR, and MEGALIGHT 100 to ON.

Adjust the calibrated cross lines by rotating the "LIGHT CONT." knob of "MEGALIGHT 100" and rotating the focus ring from "infinity"-end so that the intersection of the cross lines can be seen clearly.




**Caution:**
**In case the cross lines are tilted, adjust them by turning the chart, which is screwed in the rear tube of the equipment.**

・Unlock the holder-moving lever, and move the holder down slowly by the lever.

**Caution: Be careful NOT to damage the 4th lens group by the attachment holder (J19127P).**

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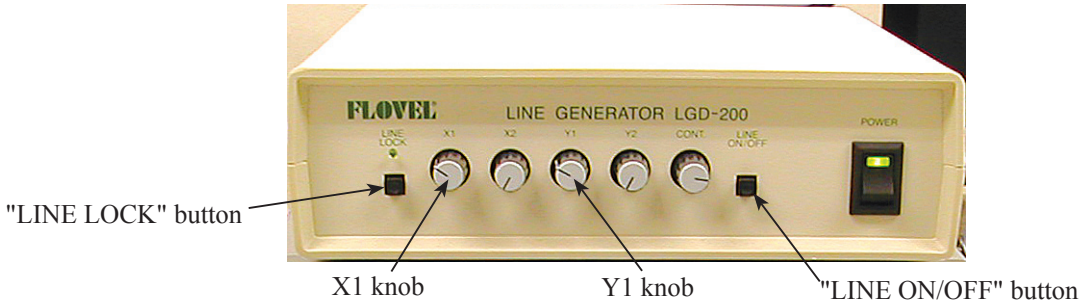
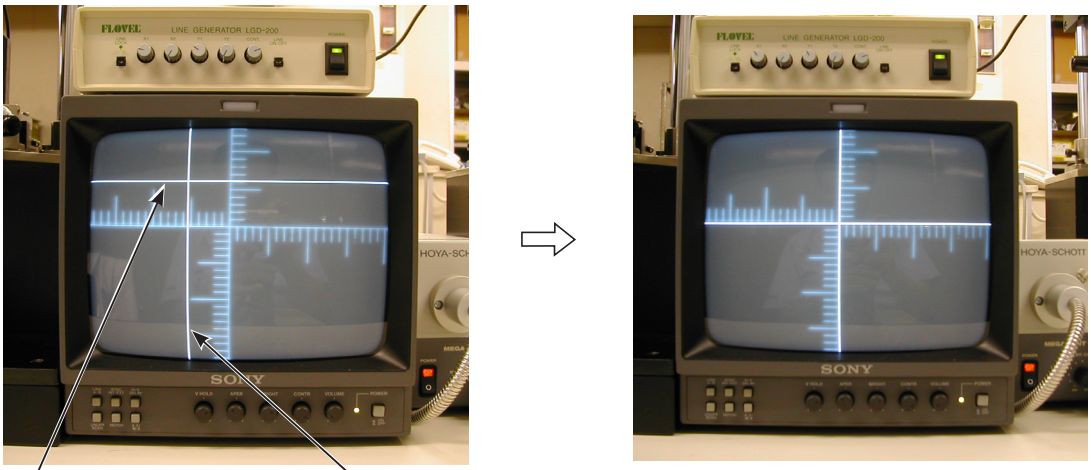
・Press the "LINE ON/OFF" button of LINE GENERATOR. Turn the knobs of "X1" and "Y1" until X- and Y-lines are displayed on the monitor.

Move these X- and Y-lines so that they coincide with the cross lines of the CCD camera.

Then press "LINE LOCK" button to fix these X- and Y-lines.

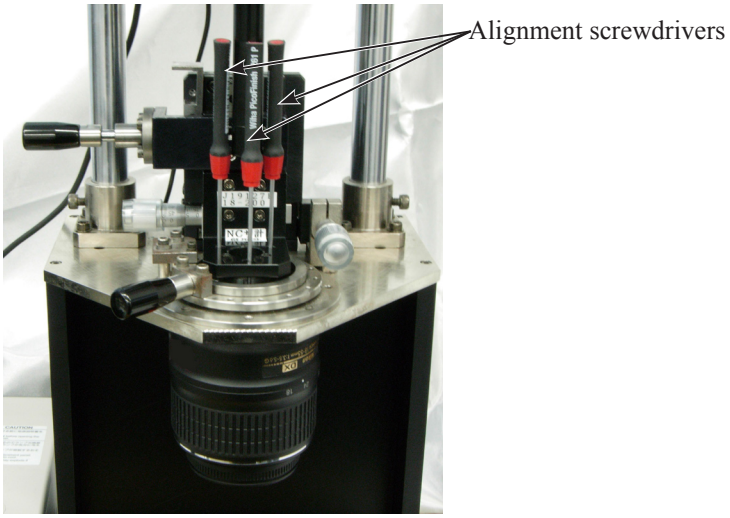



LINE GENERATOR




・Insert the three alignment screwdrivers in the screw holes of the 4th lens unit, and loosen the screws.

**Caution: When inserting the alignment screwdrivers, move the holder-moving lever up to lock the holder. Then put them straight down in the screw holes so that the screws can be easily found. After inserting the three alignment screwdrivers, unlock the holder-moving lever, and move the holder down slowly by the lever.**

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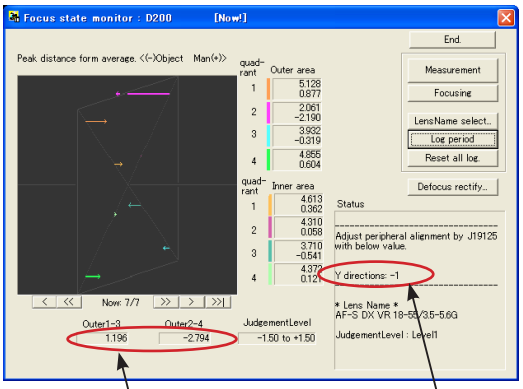
・Rotate the knobs of the micrometer (X and Y axes), and shift the calibrated cross lines based on the result (values) of the chart shooting of the rear lens group alignment.

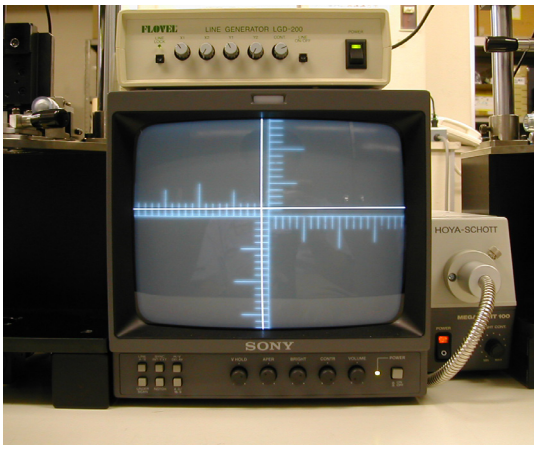
**Caution: When the knobs of the micrometer (X and Y axes) are rotated but the calibrated cross lines are unable to move, do not forcedly rotate them.**




Result (values)

If more accuracy is preferable even if "END" is displayed, adjust by using the value of "Outer 1-3" as the adjustment amount for "X-axis", while the value of "Outer 2-4" as the adjustment amount for "Y-axis".

< e.g. (X directions:+1, Y directions:-1) >




・After completing the above shift, tighten three screws of the 4th lens unit with the alignment screwdrivers.

・Remove the alignment screwdrivers from the attachment holder (J19127P).

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・Move the holder-moving lever up to lock the holder.

・Check that shift amounts (caused by differences between the calibrated cross lines and the X/Y lines) are equal to the result (values) (1= 1 scale amount of the calibrated cross lines) of "Chart shooting of the rear lens group alignment".

**Caution: After fixing the three screws of the 4th lens unit, if the shift amounts are different from the result of the chart shooting, repeat the rear lens group alignment until they become equal.**

・Turn each power of the monitor, LINE GENERATOR, and MEGALIGHT 100 to OFF.
Remove the lens from the equipment (for periphery).

・Go back to [(4) Chart shooting for the rear lens group alignment] (Page A22-6).
Repeat this procedure of [(4) Chart shooting for the rear lens group alignment] (Page A22-6) and [(5) 4th lens group alignment] (Page A22-11) until the result become "END".

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【Create positioning tool of Rear lens-group holder for lens alignment】

**1.Summery**

This is a positioning tool of the rear lens group holder for lens alignment, in order to secure the position for attaching the rear lens group temporarily.

**2.Preparation**

The following devices are used:

*Rear cover ring (JAA80351- Part no. :1K631-952) ×1

*Bayonet mount unit (JAA80351- Part no. :1C999-601) ×1

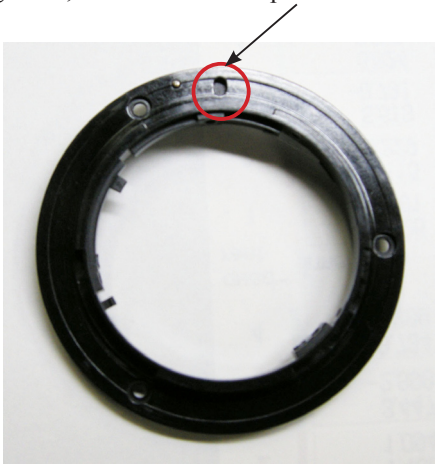
For use, remove the other components than the bayonet mount section from the bayonet mount unit of RP.

*Screw (JAA80351- Part no. :G1-14035FB) ×3

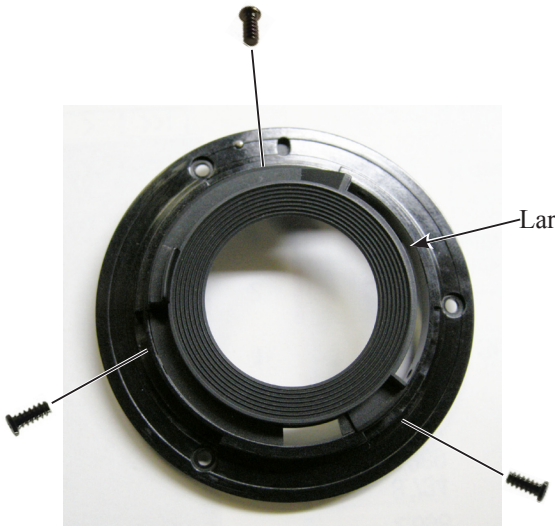
**3.Procedure**

・Put the bayonet mount as below.

Put with the groove, in which the lock pin of camera body enters, facing upwards.



・Mount the rear cover ring on the bayonet mount, and fix them with three screws.

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【Create Setting board of "Lens alignment chart" and "Viewer"】

**1.Summery**

In order to get necessary data for lens alignment, this board is created for setting a special chart and light viewers (for chart illumination), upon taking pictures of the special chart with a digital camera.

**2.Preparation**

Prepare a board (760 x 880 x 20 mm) or 2 cardboard boxes (size 2.33).

Note: Because you have to cut out the shape to embed light viewers, choose cardboard boxes (size 2.33) or material which can be easily cut. **- Ref. Fig.1**

**3.Procedure** (In this document, 2 cardboard boxes are used)

① As for the 1st flattened cardboard box (size 2.33), check the positions for embedding the light viewers, and cut out the shape at 5 locations (shaded parts/size 154 x 245 mm) as shown below. **- Ref. Fig.2**

Note: Cutting the shape slightly smaller than the actual size of viewers makes it easier to fit the positions of viewers tightly.

② Put the 2nd flattened cardboard box (size 2.33) on the above cut-out 1st cardboard together as one, and fix them by taping at 4 sides. **- Ref. Fig.3**

③ Then as for the 2nd flattened cardboard box, cut out the shape again by matching the cut-out size of ① for each viewer. **- Ref. Fig.4**

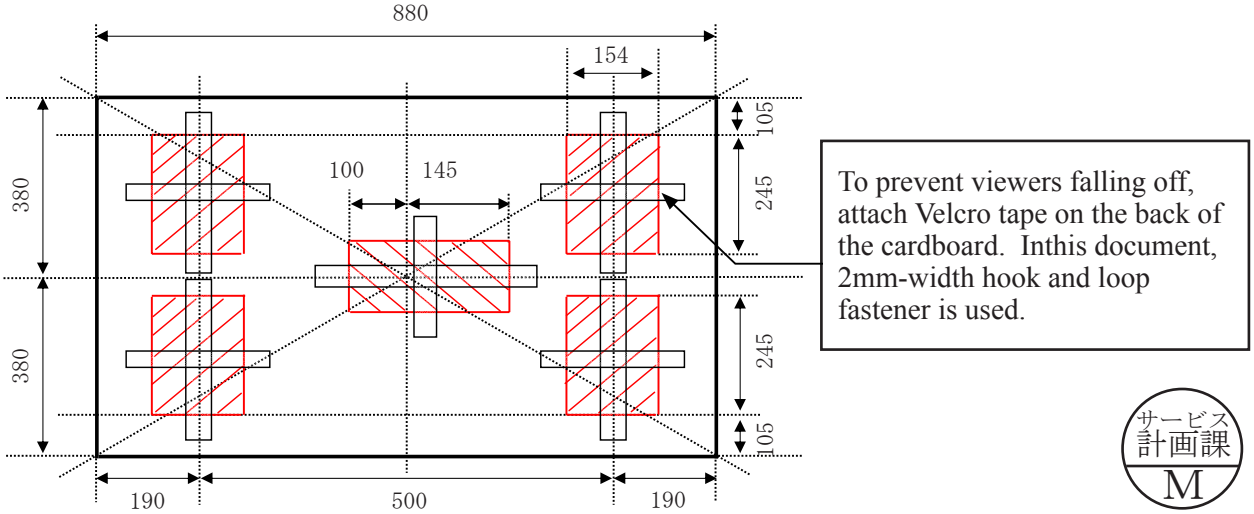
④ Reinforce the edges of cut-out parts with tape.

Note: To prevent viewers falling off, secure them with tape around the edges. **- Ref. Fig.5**

⑤ Blacken around the setting board (with black spray, etc).

**4.Prevent Viewers from falling off** (In this document, 2-mm width Velcro tape is used.)

As shown above, when viewers are embedded, secure them with square pieces of Velcro tape (hook and loop fastener) on the back of the cardboard to prevent viewers falling off.

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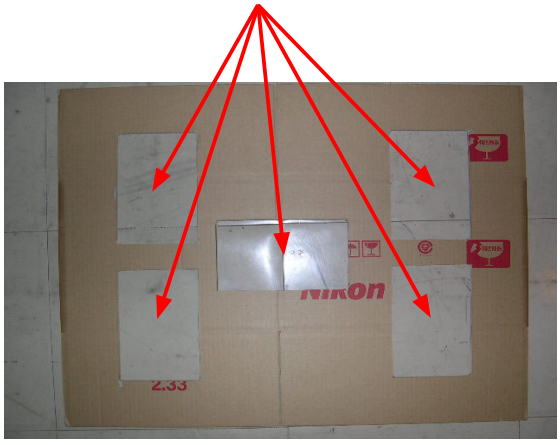
(**Fig.1** - Prepare two cardboard boxes, and flatten them as below.)

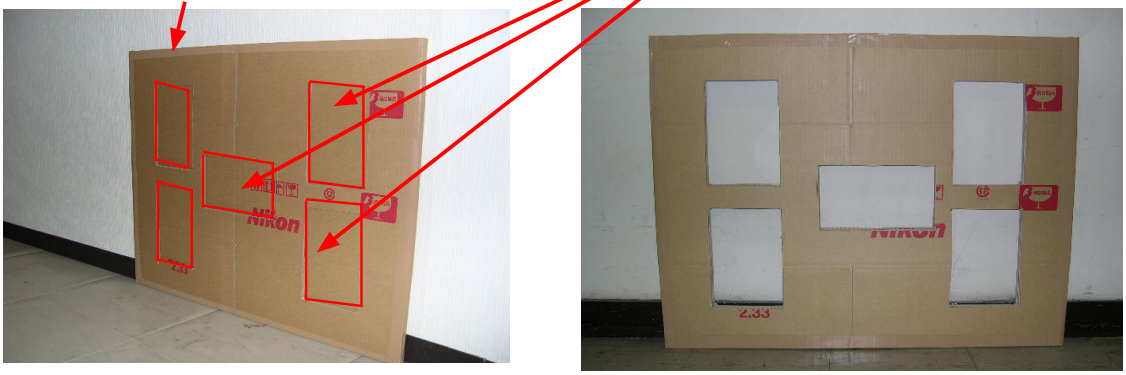

(**Fig.2** - As for the 1st flattened cardboard box, cut out the <154 x 245 mm sized> shape at 5 locations.)




(**Fig.3** - Cardboard boxes)
Put the 2nd flattened cardboard boxe on the1st cut-out cardboard together as one as shown below.

**Fig.4** - As for the 2nd flattened cardboard box, cut out the shape in the same way as Fig.2.
Cut out by matching the size of the 1st cutting.

Fix them by taping at 4 sides.




(**Fig.5** - Light viewers are embedded.)

To prevent viewers falling off, secure the viewers with tape around the edges.

(**Fig.6** - Setting board is blackened with the chart being attached.)

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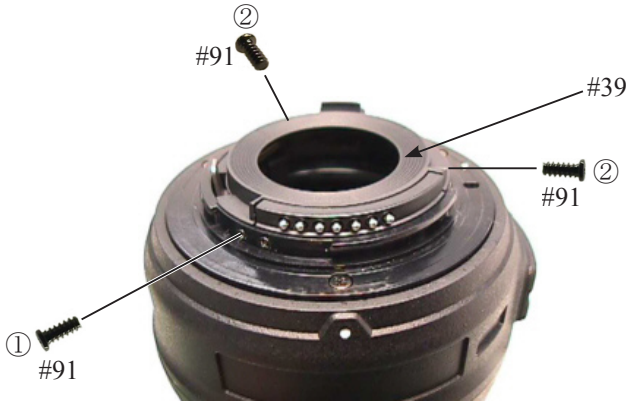
Rear cover ring

・Set the zoom to TELE side.
・Mount the rear cover ring (#39) and position it by turning counterclockwise.
・Tighten the screw (#91) (①) first, then the two screws (#91) (②) to fixate the rear cover ring (#39). There must not be NO gap between the rear cover ring (#39) and the bayonet mount（#30).




Rubber ring

・Mount the rubber ring (#62), from the 1st lens-group direction, with the thicker part facing upwards (1st lens group side).

Name plate/VR name plate

・Peel off the backing paper of the name plate (#68) and VR name plate (#69), then adhere them.


Company name plate

・Set the zoom to "35 mm".

・Peel off the backing paper of the company name plate (#113). Align the index of the zoom ring (#52) with the cutout of the company plate (#113), and mount [#113].

## Preparation for Inspection & Adjustment

★ : New tool

● In case of replacing the main PCB unit or SWM unit, etc, be sure to make the adjustments by using the adjustment software ( ★ J18434).

Required device:

・Single output rated voltage power supply: 1 unit (6.0V 3.0A)

・Oscilloscope: 1 unit For inspecting lens driving time

・AF-I communication box (J15306-1): 1 unit

・AF-I communication adapter (J15307): 1 unit

● When the main PCB is replaced, be sure to perform "Writing of FLASH-ROM fixed elec. adj. values".

### AF-S DX 18-55 VR Inspection and adjustment program ( ★ J18434)

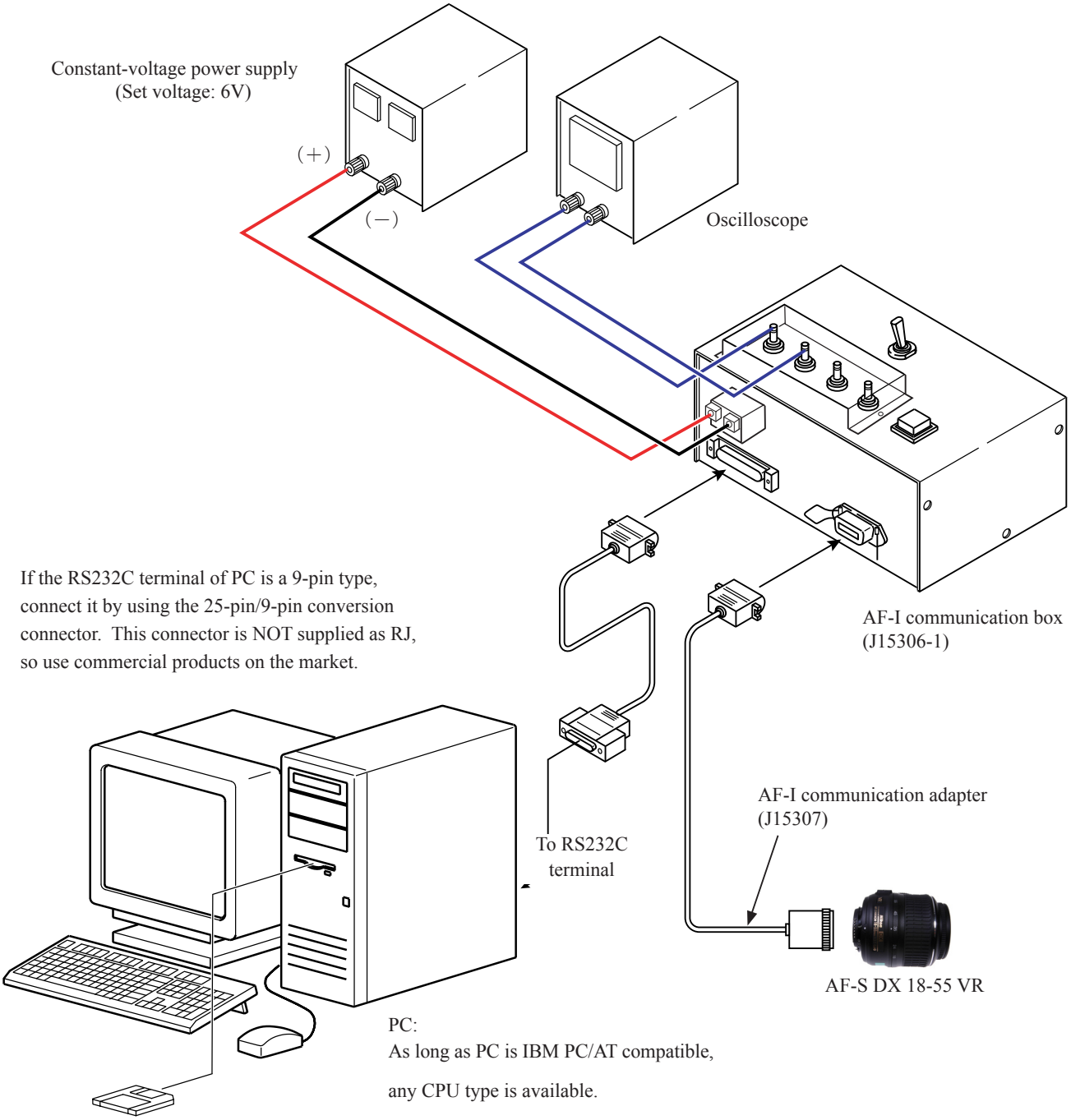
The below hardware requirements are necessary for installing the program on a computer.
Ensure them before installation.

| | |
|---|---|
| PC | IBM PC/AT compatible |
| OS | Windows XP Home Edition, Windows XP Professional, Windows 2000 |
| CPU | Pentium Ⅱ 266MHz ～ Pentium Ⅳ 2GHz |
| RAM (Memory) | 32MB or more |
| HD | 6 MB-or-more free space is necessary when installation |
| Monitor resolution | 800×600 or more pixels |
| Interface | Serial interface<br>※ USB interface cannot be used. |

As long as the above requirements are met, either desktop or notebook PC is available.

## 【System configuration】

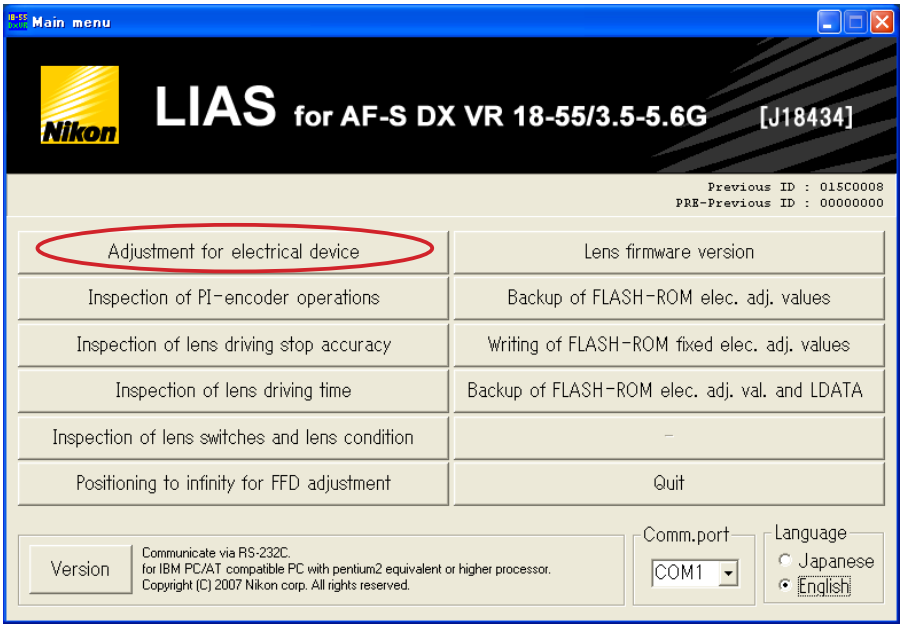
★ : New tool



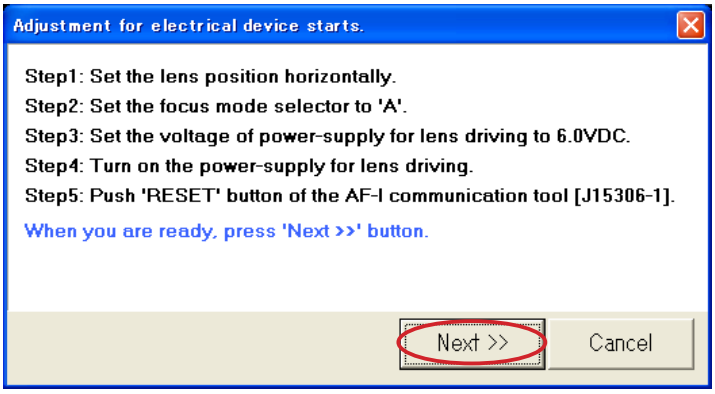
## Adjustment for electrical device

● When the main PCB unit or SWM unit is replaced, be sure to make this adjustment.

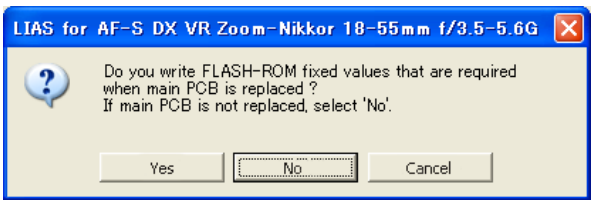
・Click "Adjustment for electrical device" on the main menu.




・Follow the instructions on the screen for preparation. Then click "Next".




・Click "Yes" if the main PCB is replaced, while click "No" if it is NOT replaced.
Clicking "Yes" goes on to ~~"Backup of FLASH-ROM elec.adj.values" (on Page A39)~~ △ (Revision) "Writing of FLASH-ROM fixed elec.adj.values" (on Page A45).

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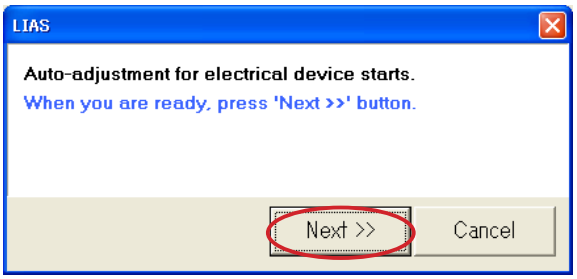
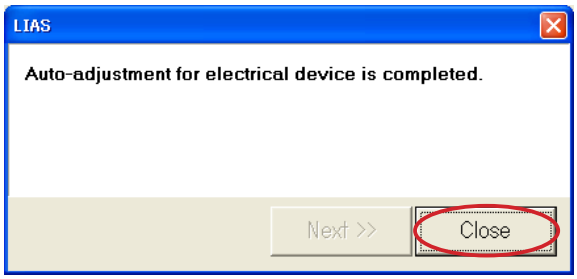
・Click "Next".

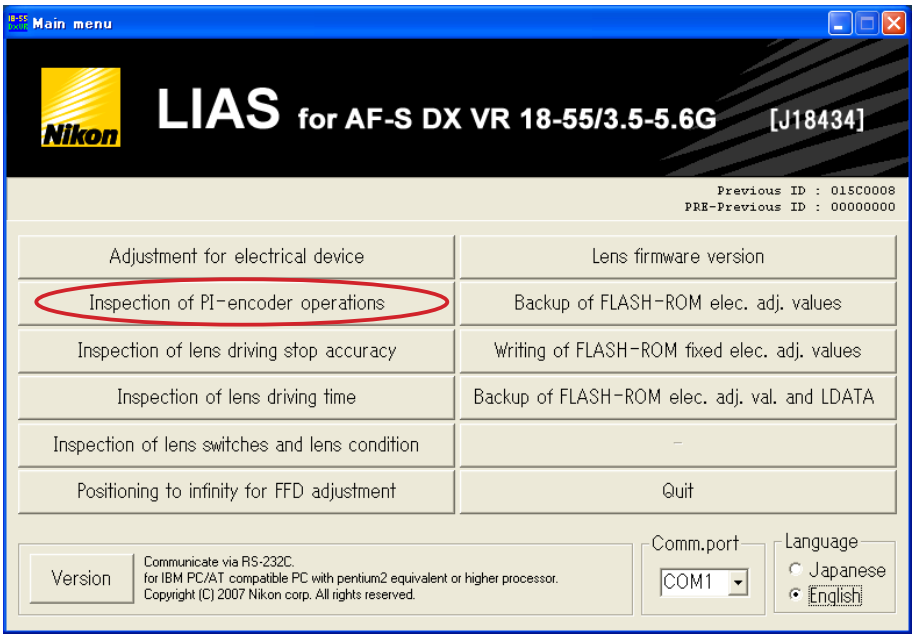



・When the adjustment is completed, click "Close" to end the procedure.

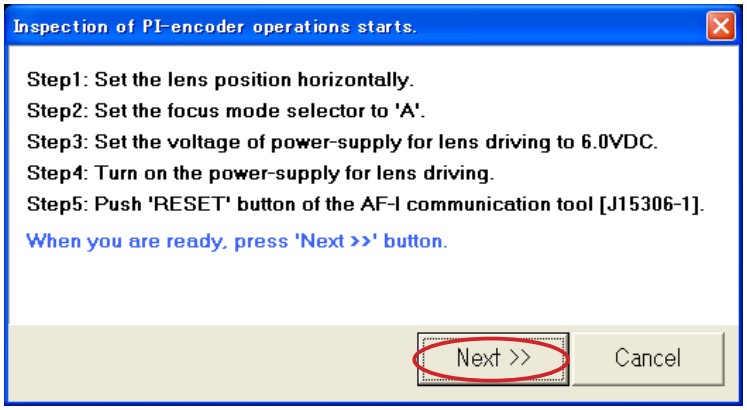


## Inspection of PI-encoder operations

・Click "Inspection of PI-encoder operations" on the main menu.

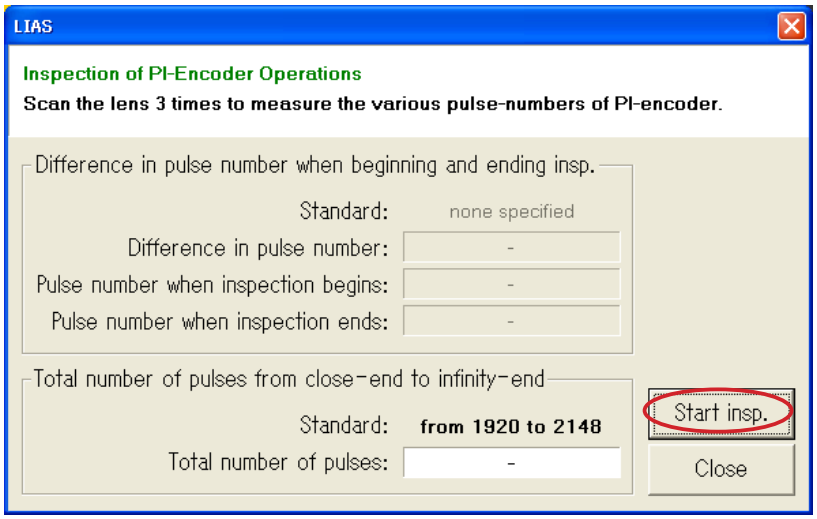



・Follow the instructions on the screen for preparation. Then click "Next".



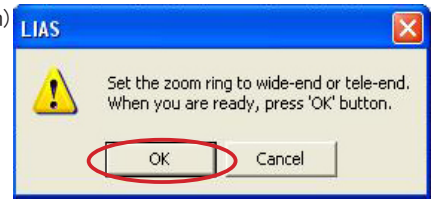
・Click "Start insp.".

Caution：If the zoom ring is rotated while the lens scanning is driven, the pulse shows an abnormal value.
Do NOT touch the zoom ring during operations.

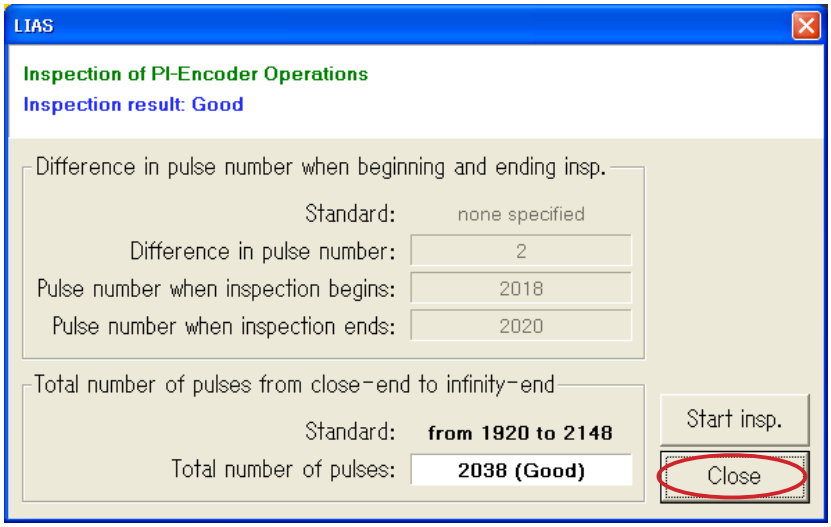



・Set the zoom ring to WIDE-end or TELE-end, and click "OK".

△ (Revision)




・If "Inspection result" shows "Good", click "Close".




**< Standard > Total pulses : 1920 - 2148 PULSE(S)**

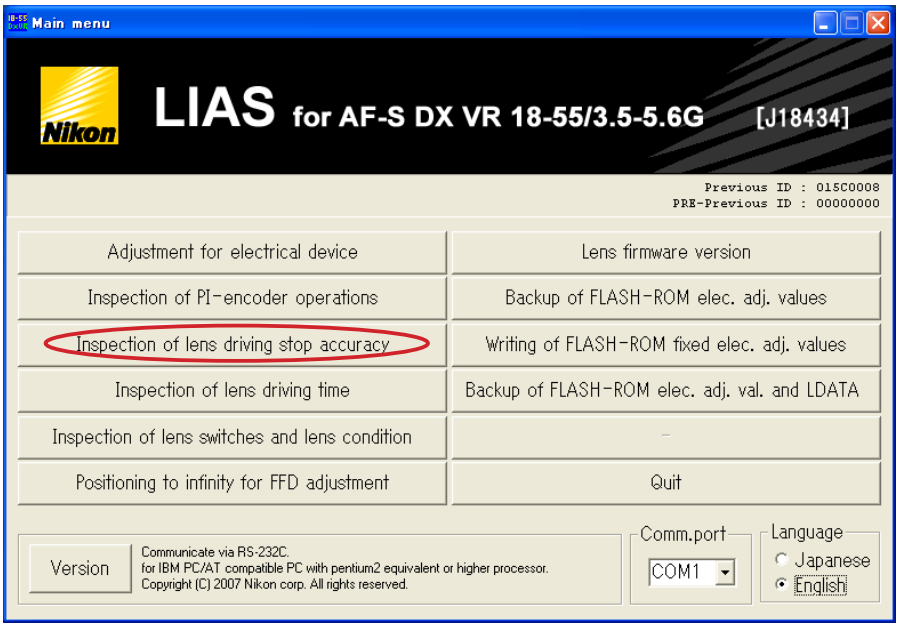
## Inspection of lens driving stop accuracy

● Make the inspections by focal length 18mm (W) or 55m (T) at the following five lens positions.

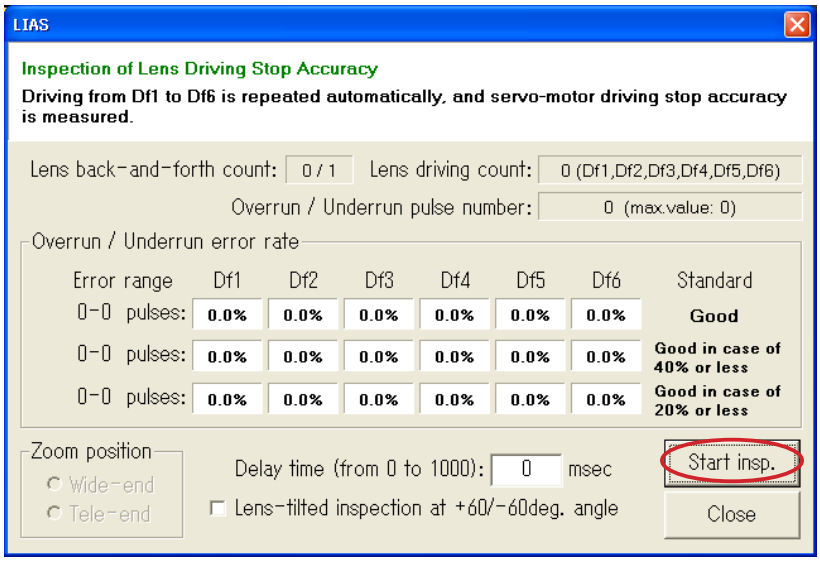
(Lens position in inspecting)

| Lens position | Index position |
|---|---|
| Horizontal lens position | Index facing (1) up / (2) right / (3) left |
| (4) Front lens group 60° angle upward | |
| (5) Front lens group 60° angle downward | |

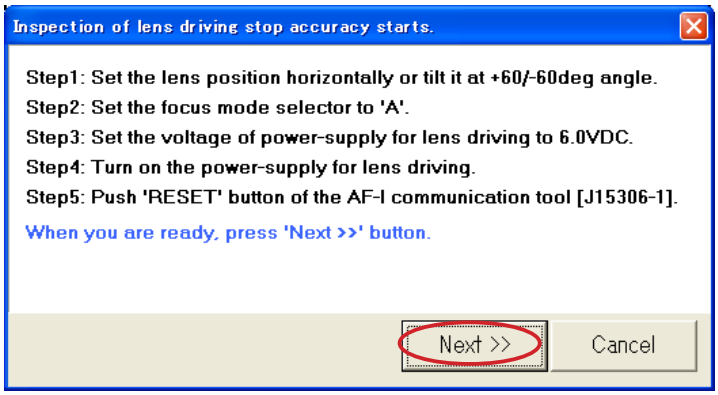
・Click "Inspection of lens driving stop accuracy" on the main menu.




・Click "Start insp.".

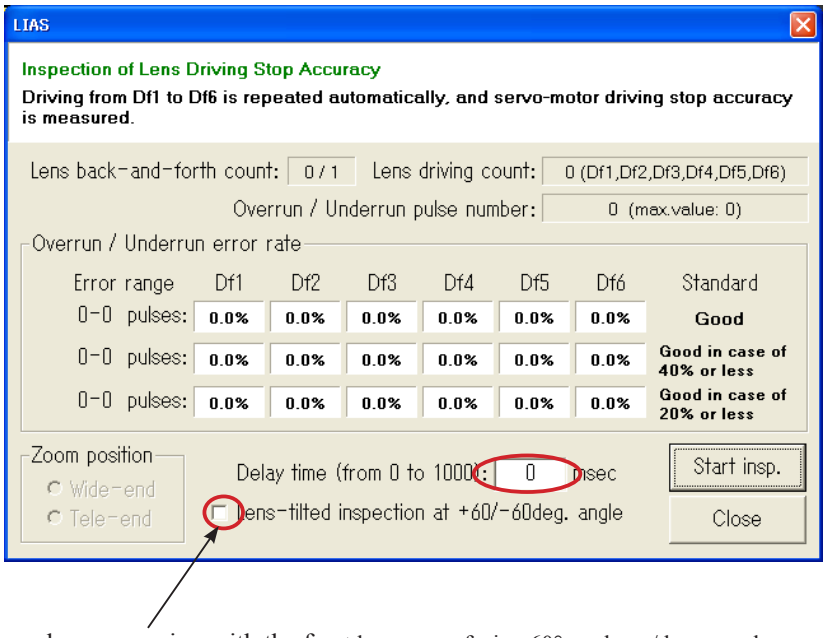


・Follow the instructions on the screen for preparation. Then click "Next".



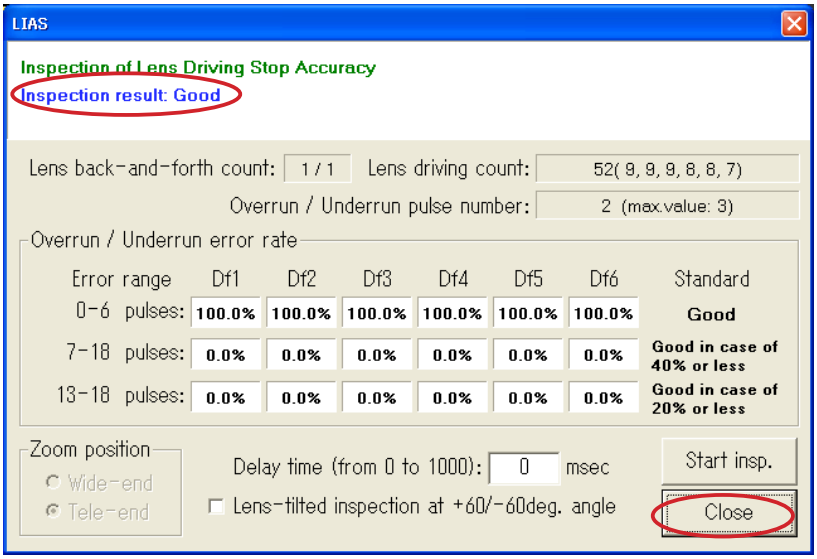

・If the lens stops, input a numeric number into "Delay time (from 0 to 1000 msec.) so that the lens does NOT stop.

Caution: The value of "Delay time" is set by the adjustment software. So, as far as the lens does not stop during the inspection of "Lens Driving Stop Accuracy", any value can be input without problem.
However, the larger the value of "Delay time" gets, the longer the inspection time becomes.




Tick here when measuring with the front lens group facing 60° angle up/downward.

・If "Inspection result" shows "Good", click "Close" to end the procedure.




The number of overrun/underrun pulses must be within the following standards after the lens back-and-forth driving 1-motion.

| Lens position | Error range of Df1 - Df6 (No. of occurrence) | Error pulse occurrence ratio: Judgment |
|---|---|---|
| Horizontal | 0 ～ 33 | GOOD |
| Horizontal | 34 ～ 97 | GOOD if 40% or less |
| Horizontal | 67 ～ 97 | GOOD if 20% or less |
| ±60° | 0 ～ 33 | GOOD |
| ±60° | 34 ～ 97 | GOOD if 40% or less |
| ±60° | 67 ～ 97 | GOOD if 20% or less |

※ "Df1~Df6" shows the lens driving amount.

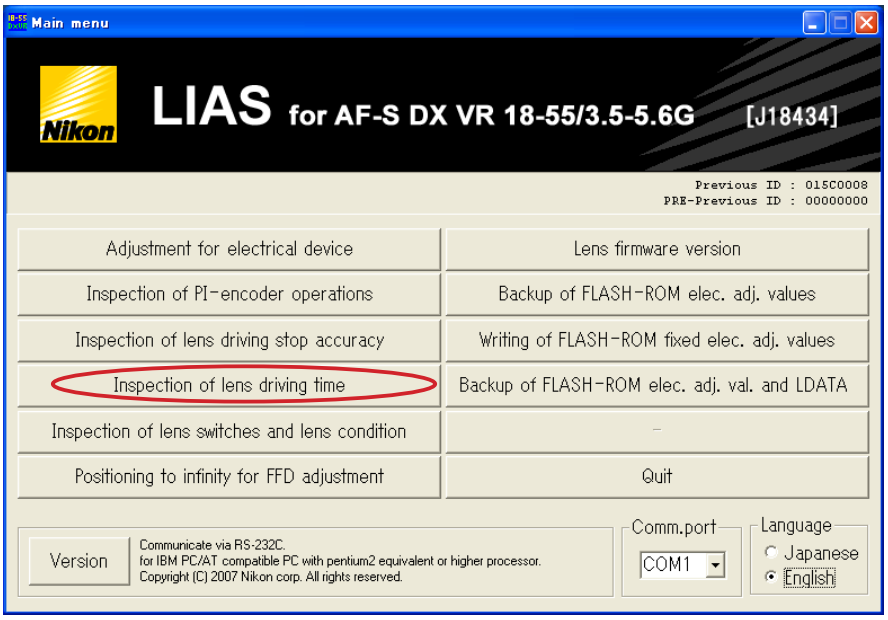
## Inspection of lens driving time

● Make inspections by focal length 18mm (W) or 55m (T) at the following five lens positions.

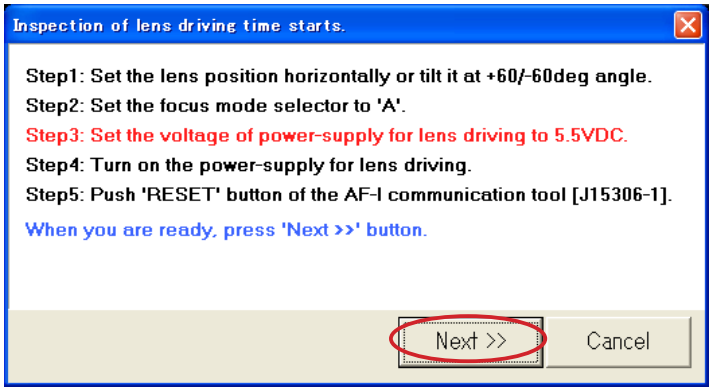
(Lens position in inspecting)

| Lens position | Index position |
|---|---|
| Horizontal lens position | Index facing (1) up / (2) right / (3) left |
| (4) Front lens group 60° angle upward | |
| (5) Front lens group 60° angle downward | |

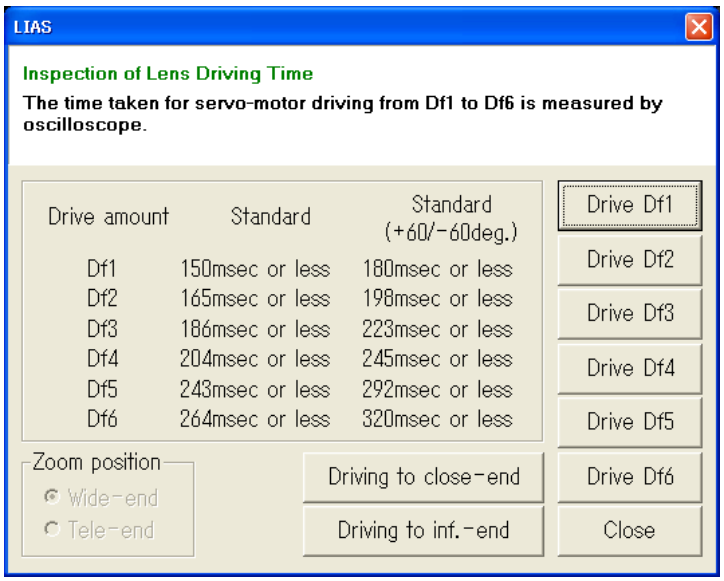
・Click "Inspection of lens driving time" on the main menu.

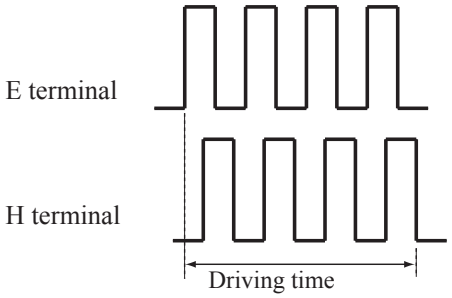



・Follow the instructions on the screen for preparation. Then click "Next".



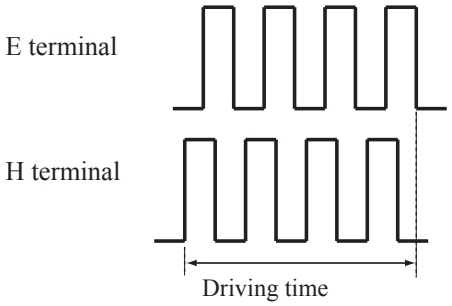
・ Select the driving amount respectively. Each lens driving time must be within the standard.




●Oscilloscope setting

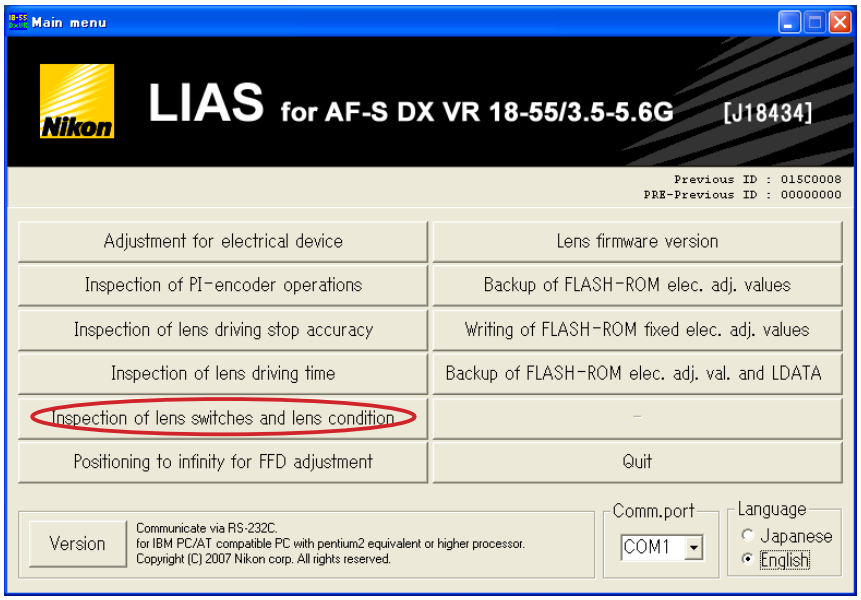
| | |
|---|---|
| V/Div | : 5V |
| Coupling | : DC |
| Time/Div | : 20m Sec |
| Trigger Mode | : SGL (S) |
| Trigger Coupling | : DC |
| Trigger Source | : CH1 |



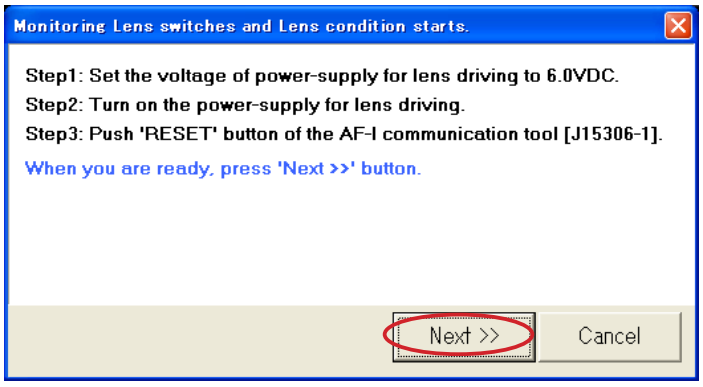

※ There are two types in shape of waveforms of E and H terminals:
Waveform (1) starts and goes up (2) starts and goes down.

## Inspection of Lens switches and Lens conditions

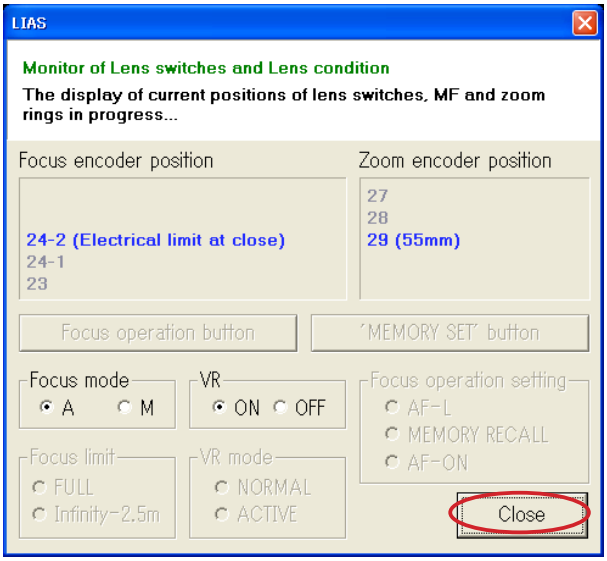
・Click "Inspection of lens switches and lens condition" on the main menu.




・Follow the instructions on the screen for preparation. Then click "Next".

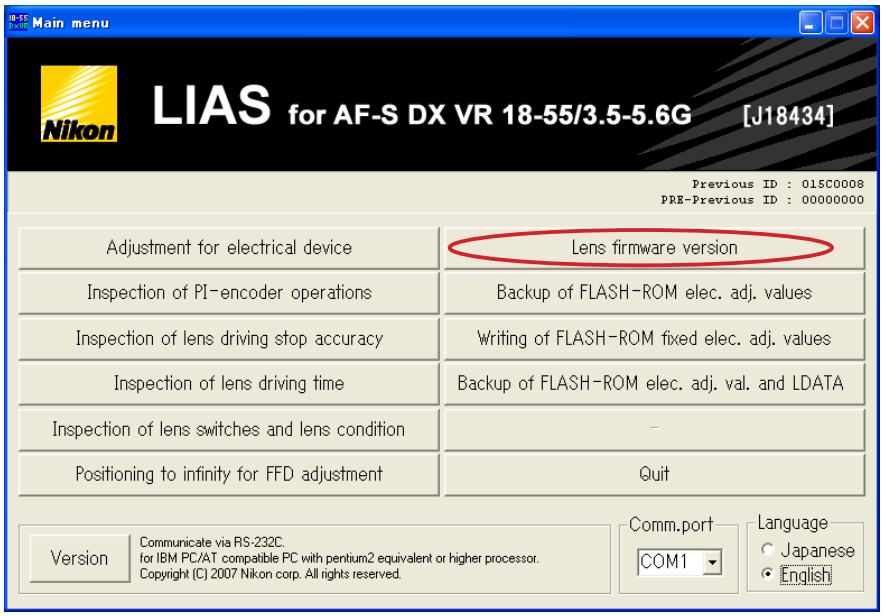



・If there is no problem with each check item, click "Close" to end the procedure.

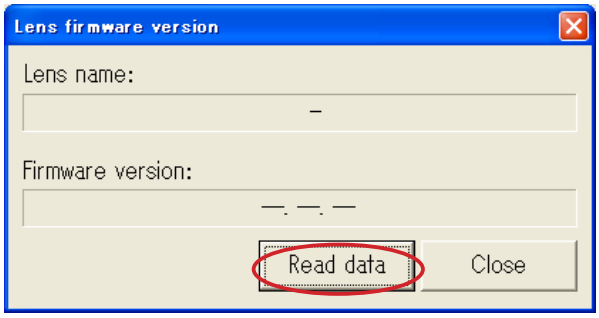


## Lens firmware version

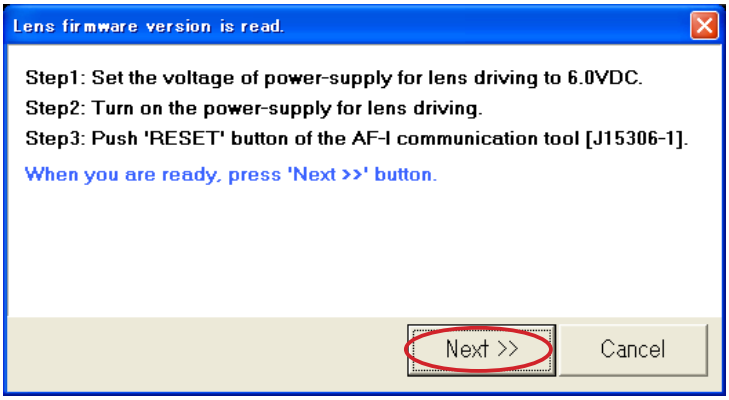
・Click "Lens firmware version" on the main menu.



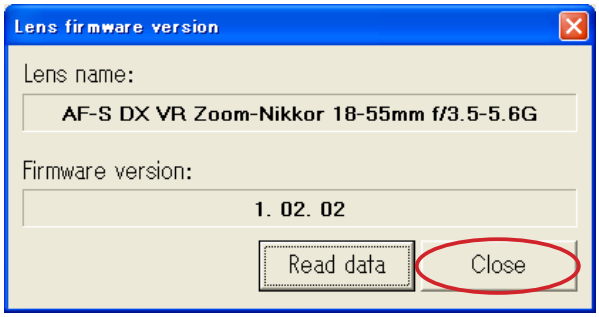

・Click "Read data".




・Follow the instructions on the screen for preparation. Then click "Next".



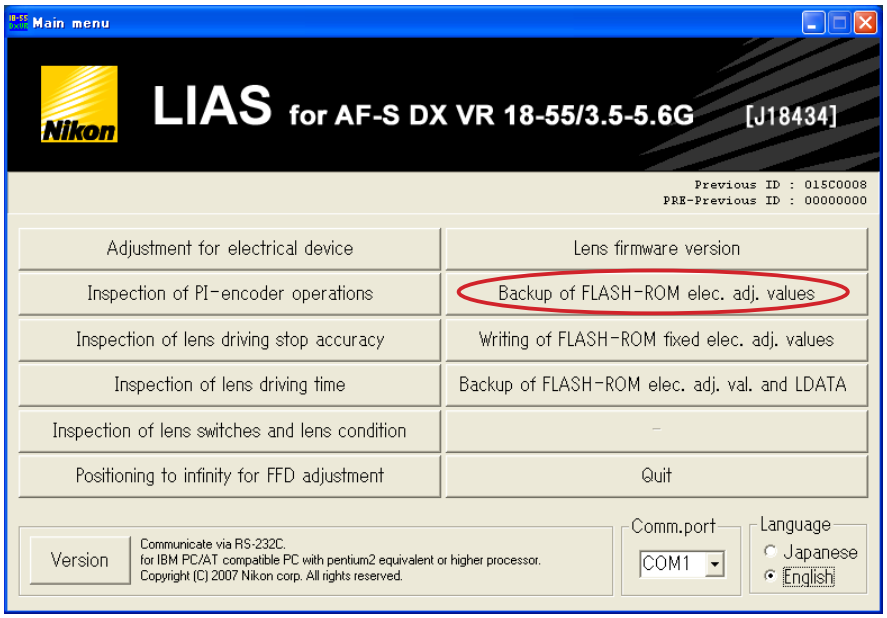
・Confirm that there is no mistake in the lens name and firmware version. Then click "Close" to end the procedure.



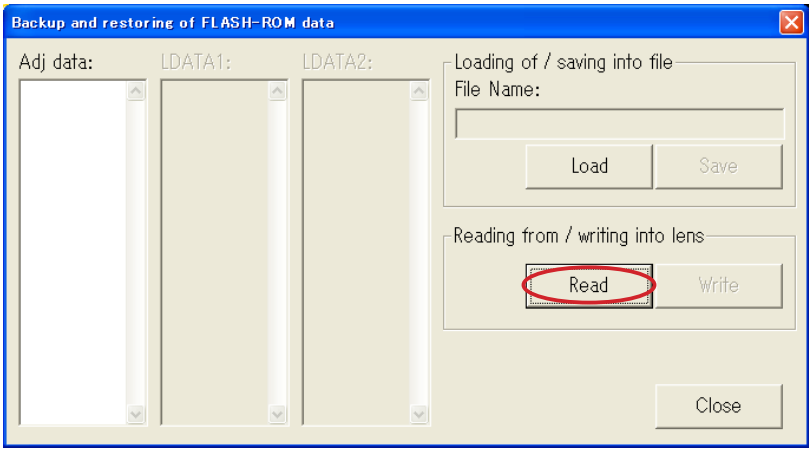
## Backup of FLASH-ROM electrical adjustment values

**How to back up:**

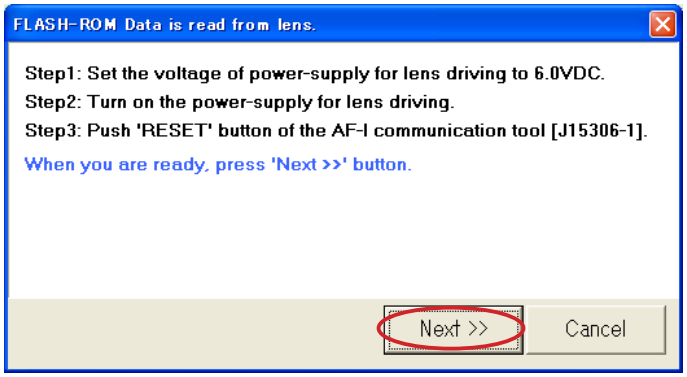
・Click "Backup of FLASH-ROM elec. adj. values" on the main menu.



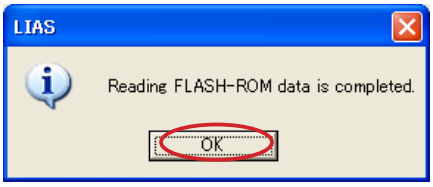

・Click "Read" of "Reading from/Writing into lens".



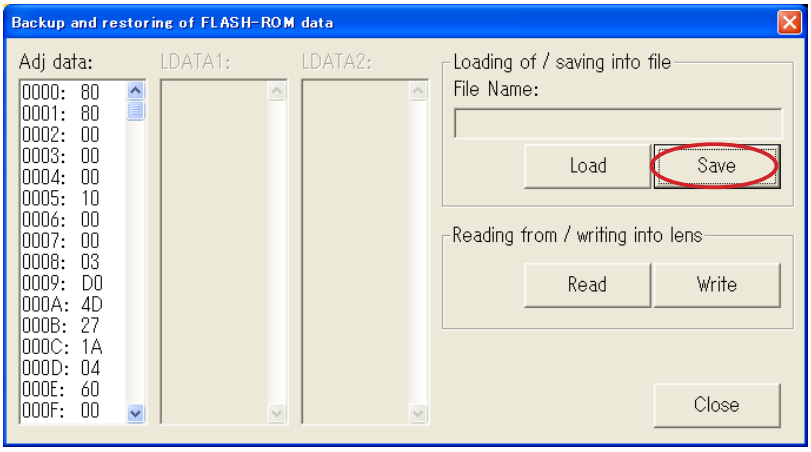

・Follow the instructions on the screen for preparation. Then click "Next".



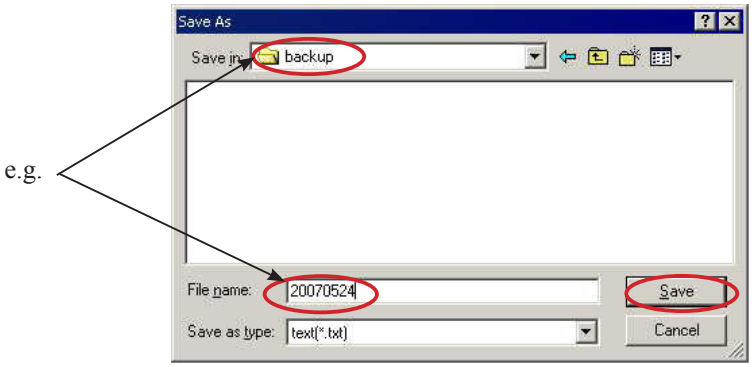
・When reading FLASH-ROM data is completed, click "OK".



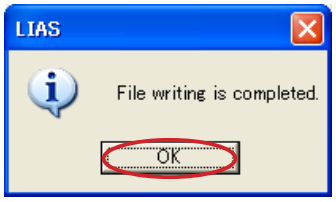

・Click "Save" of "Loading of/Saving into file".



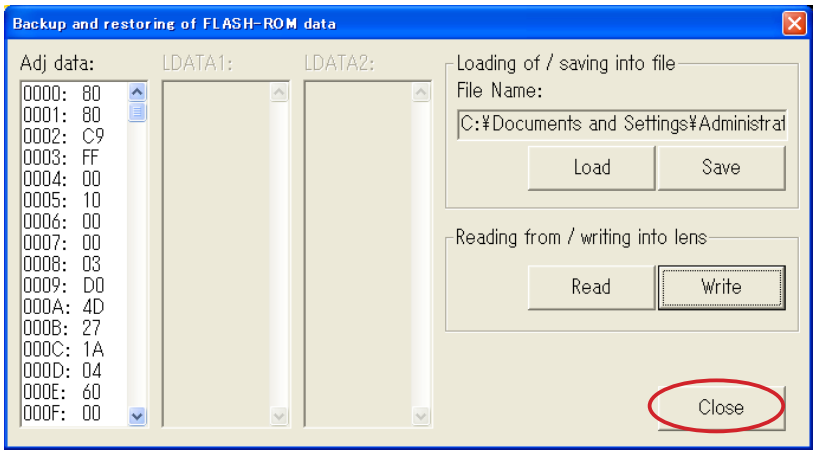

・Type the file name in any folder, and click "Save".




・Click "OK".

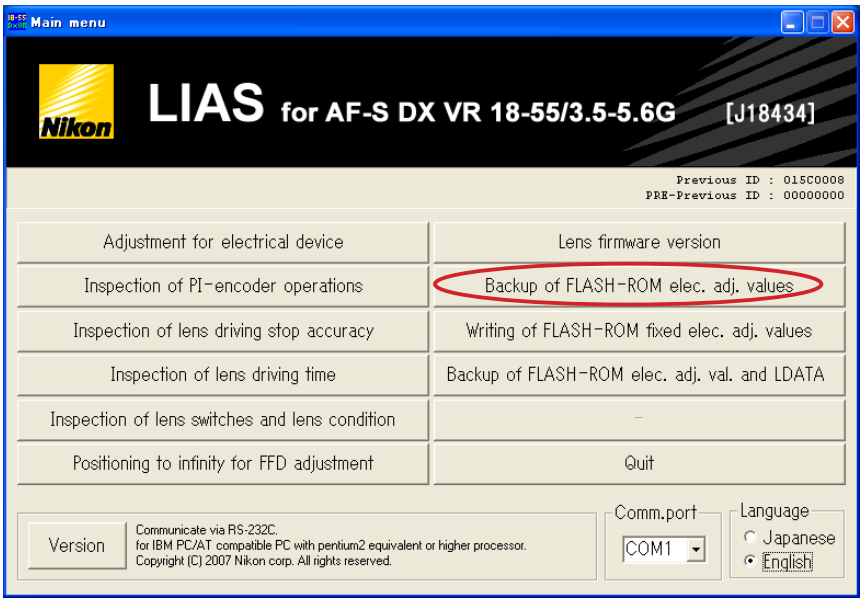


・ Click "Close" to end the procedure.

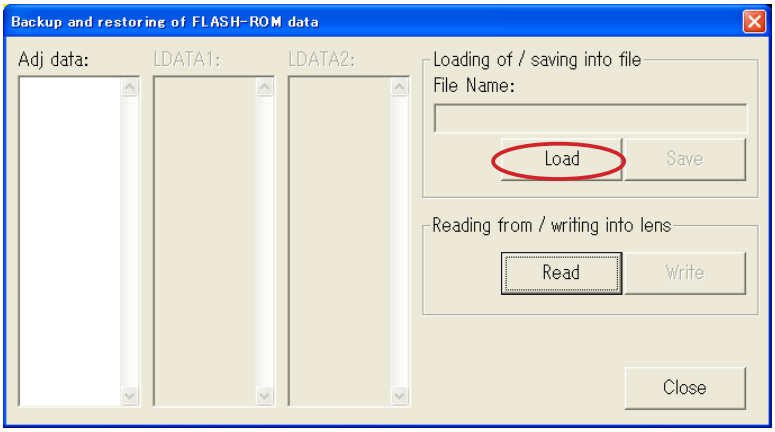


**How to restore:**

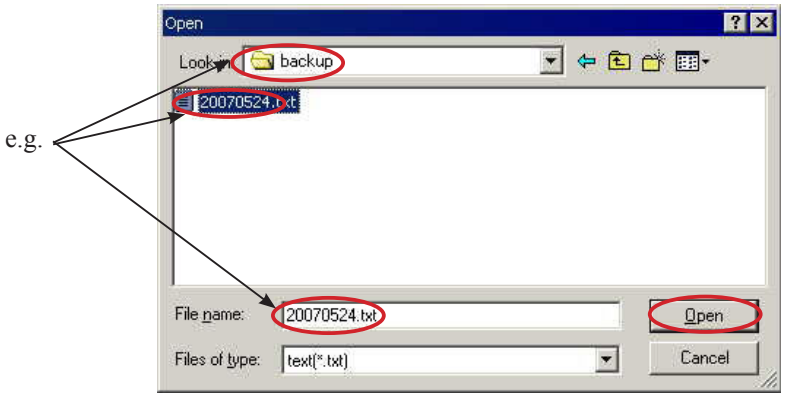
・Click "Backup of FLASH-ROM elec. adj. values" on the main menu.




・Click "Load" of "Loading of/Saving into file".

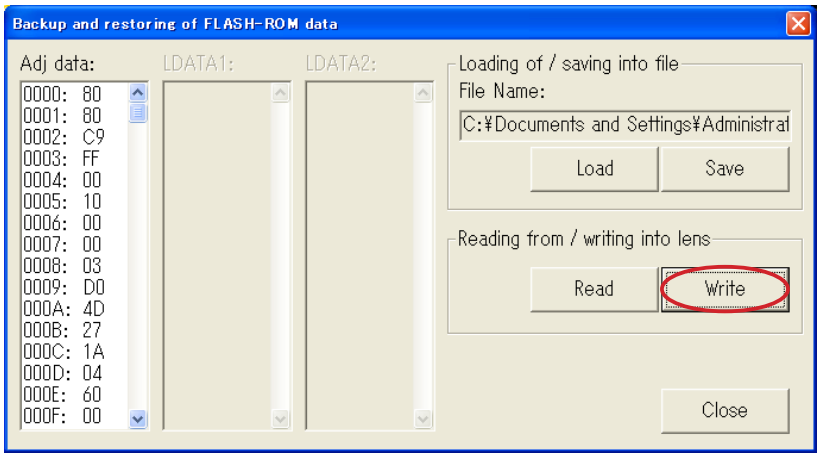



・Select the file name in the folder that was saved as backup, and click "Open" button.

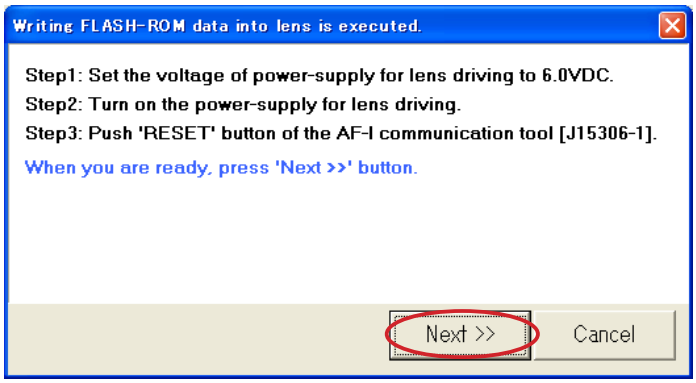


・When reading FLASH-ROM data is completed, click "OK" button.

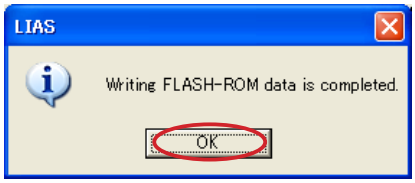

・Click "Write" of "Reading from/writing into lens".



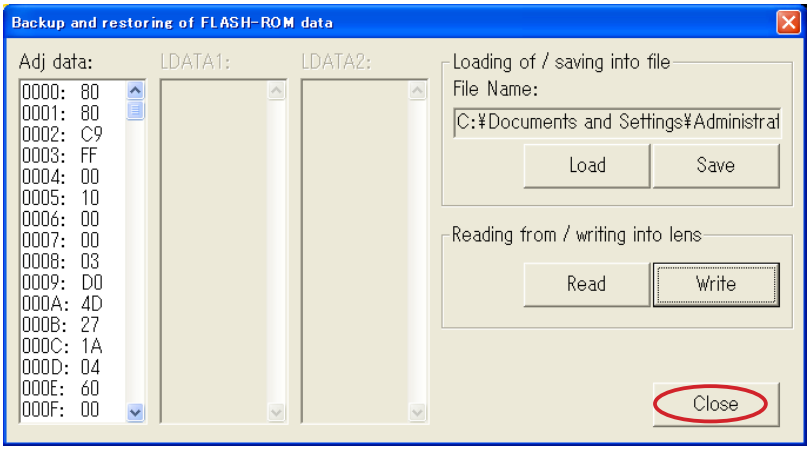

・Follow the instructions on the screen for preparation. Then click "Next".




・When writing FLASH-ROM data is completed, click "OK".

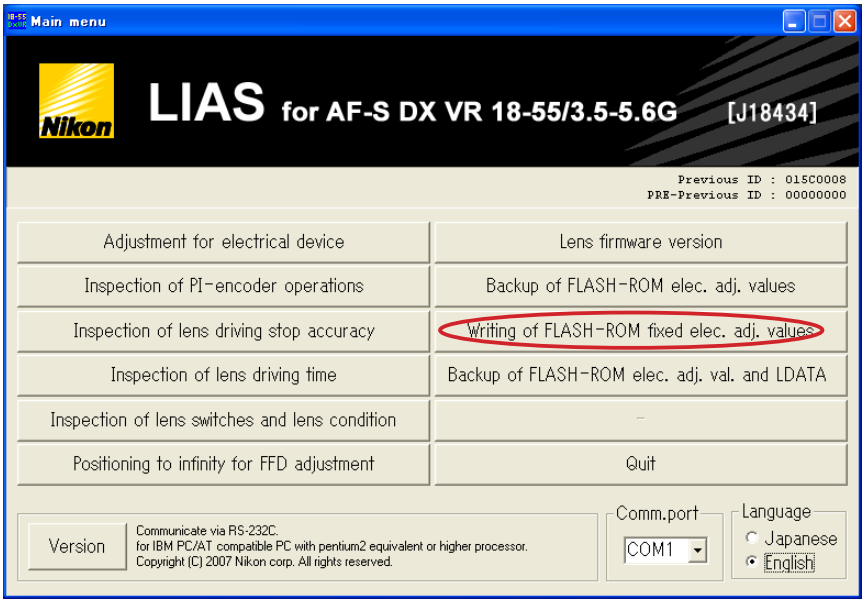


・Click "Close" to end the procedure.

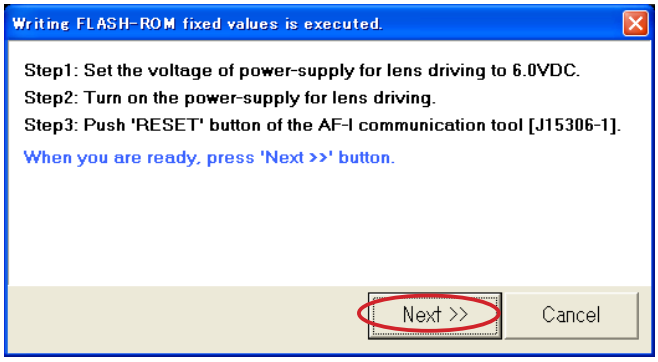


## Writing of FLASH-ROM fixed electrical adjustment values

・Click "Writing of FLASH-ROM fixed elec. adj. values" on the main menu.




・Follow the instructions on the screen for preparation. Then click "Next".

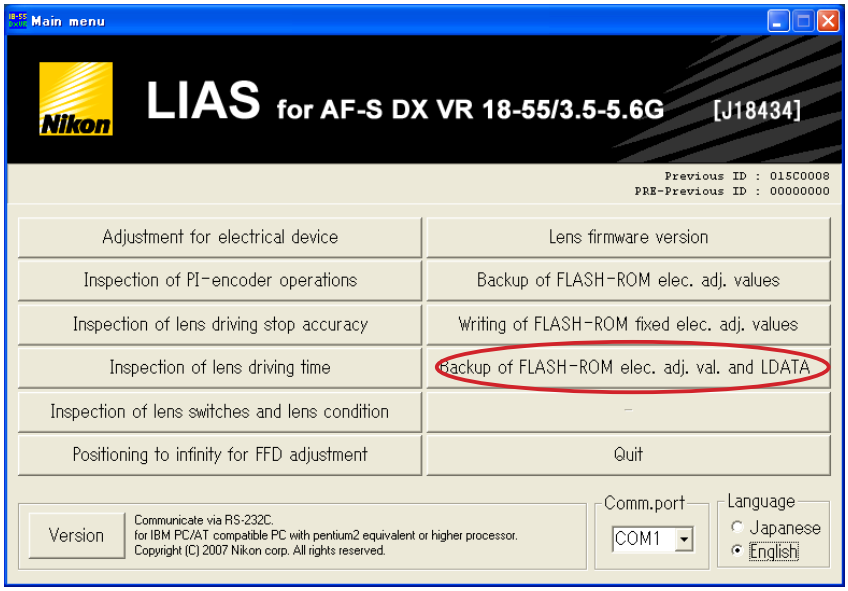



・When writing FLASH-ROM data is completed, click "OK" button.

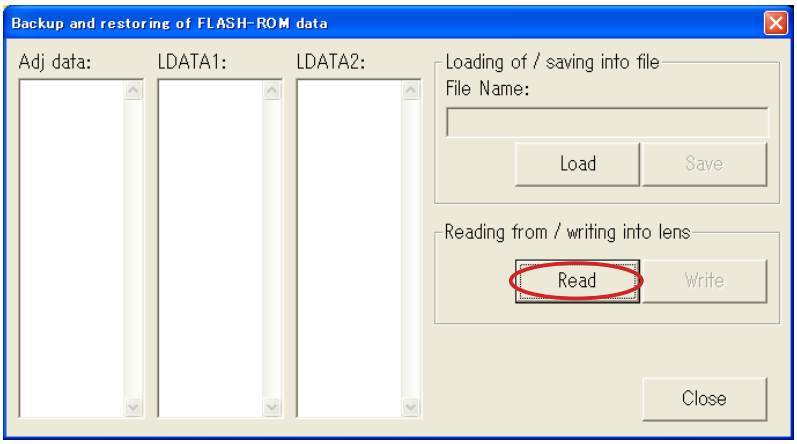
Backup of FLASH-ROM electrical adjustment value and LDATA

**How to back up:**

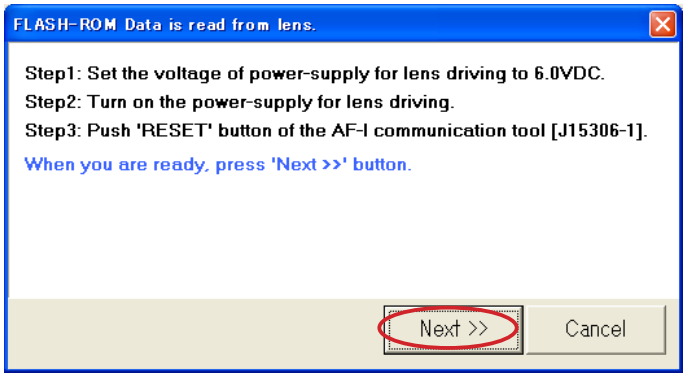
・Click "Backup of FLASH-ROM elec. adj. val. and LDATA" on the main menu.



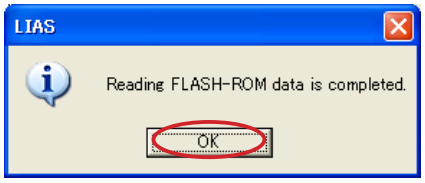

・Click "Read" of "Reading from/Writing into lens".



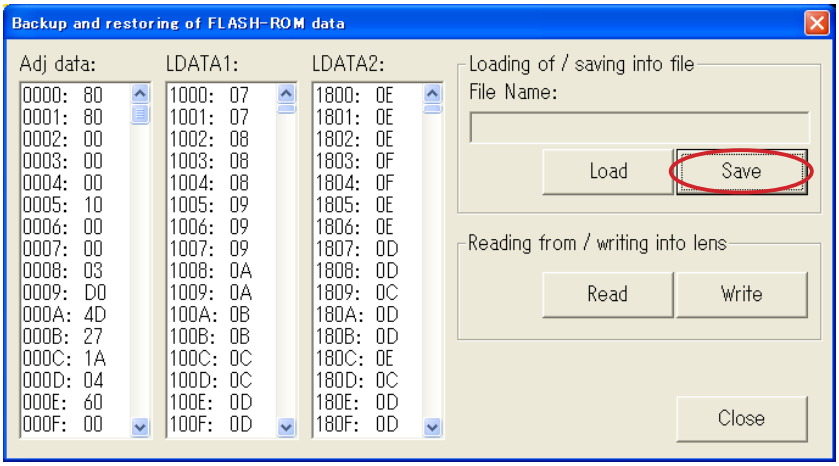

・Follow the instructions on the screen for preparation. Then click "Next".



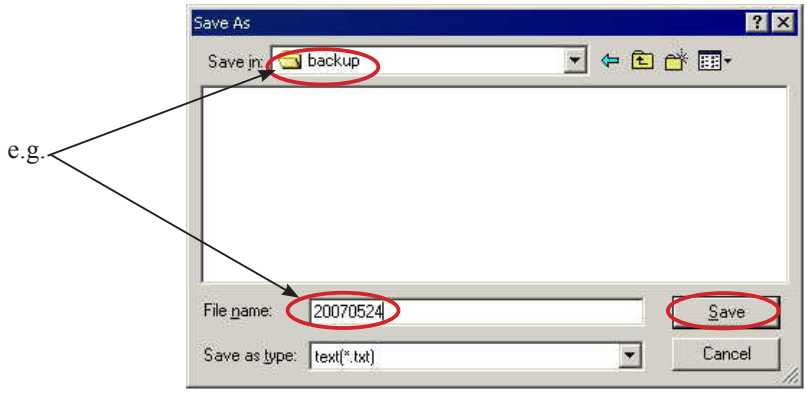
・When reading FLASH-ROM data is completed, click "OK".



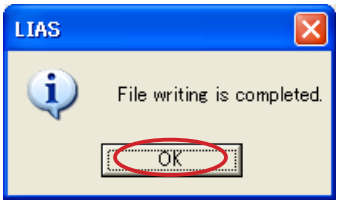

・Click "Save" of "Loading of/Saving into file".



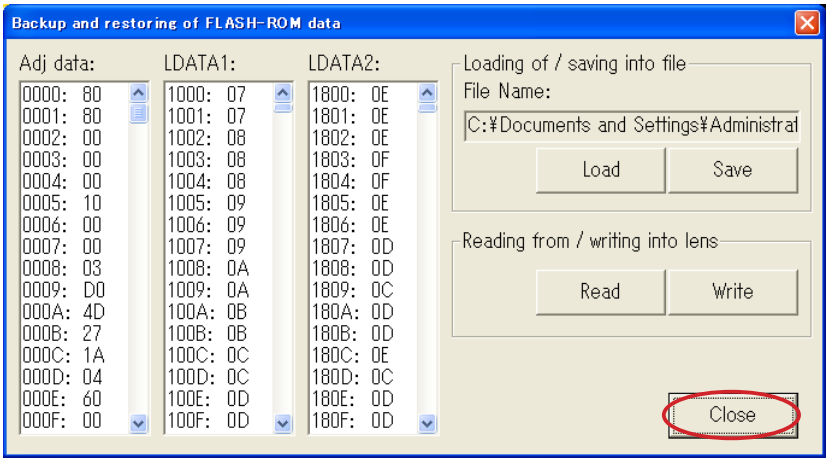

・Type the file name in any folder, and click "Save".




・Click "OK".

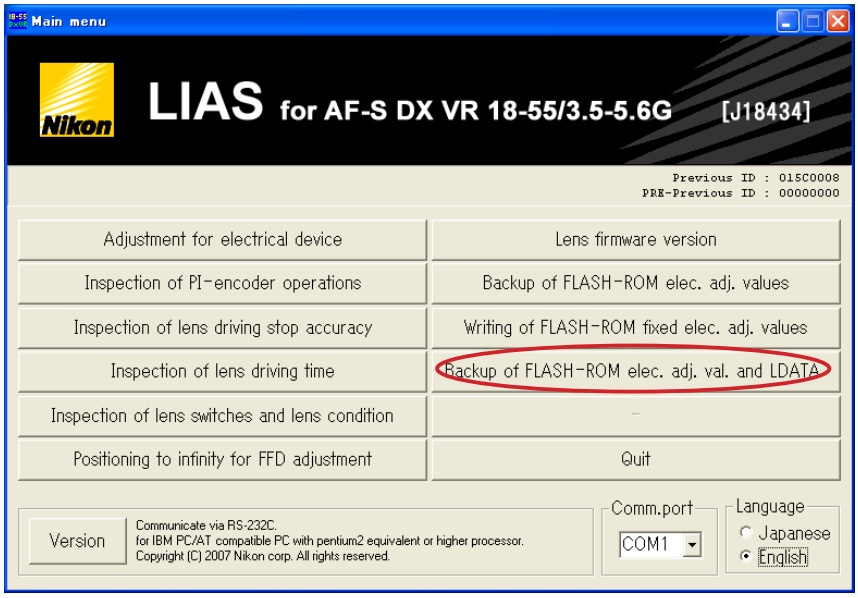


・Click "Close" to end the procedure.

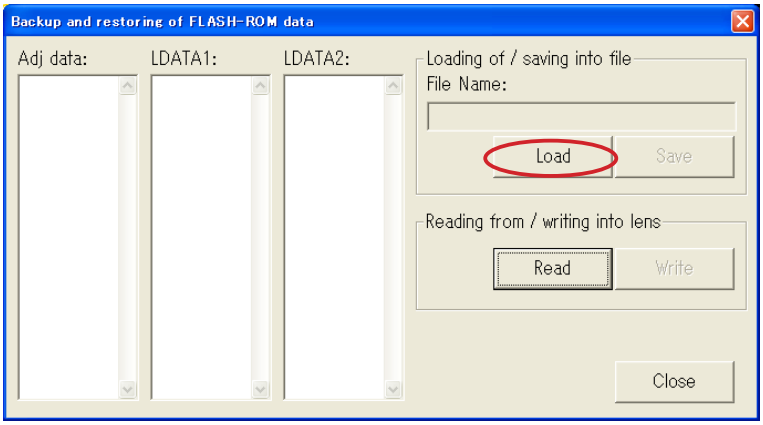


**How to restore:**

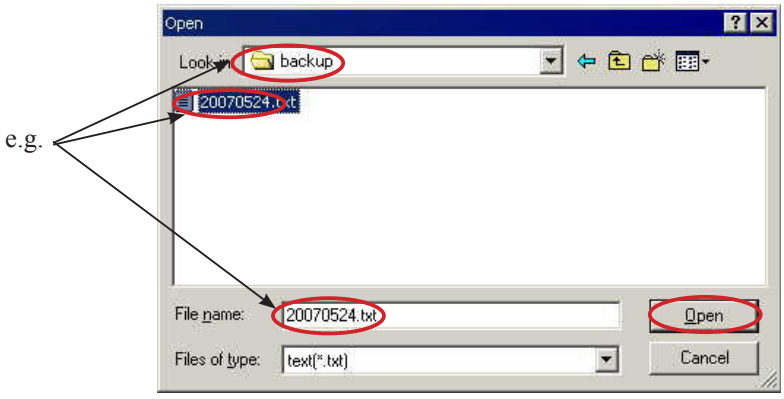
・Click "Backup of FLASH-ROM elec. adj. val. and LDATA" on the main menu.



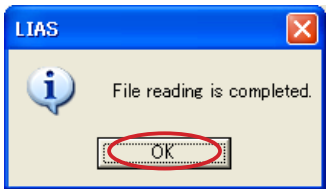

・Click "Load" of "Loading of/Saving into file".



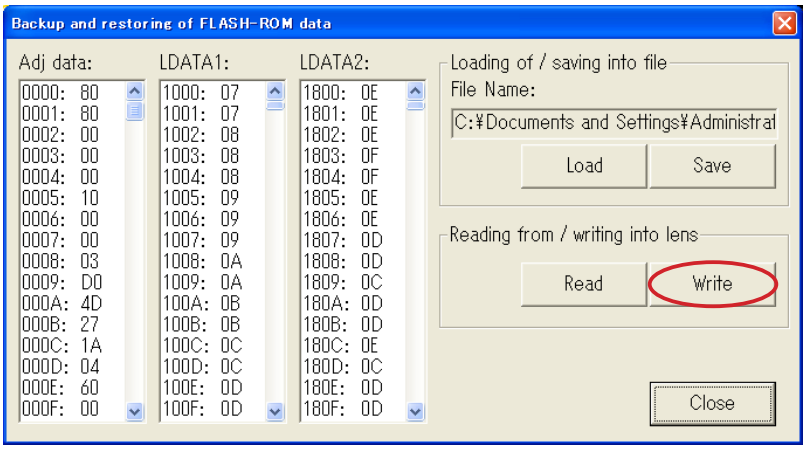

・Select the file name in the folder that was saved as backup, and click "Open".



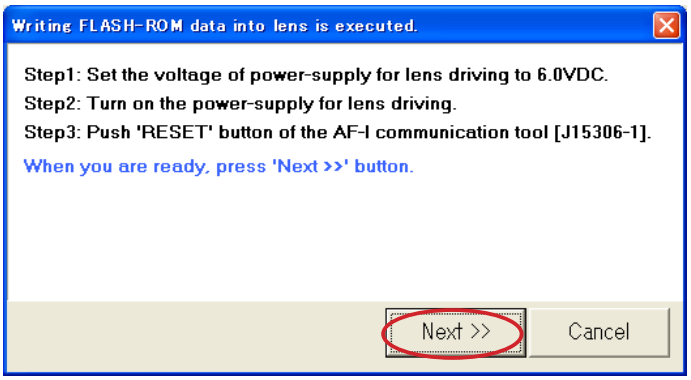
・When reading FLASH-ROM data is completed, click "OK".



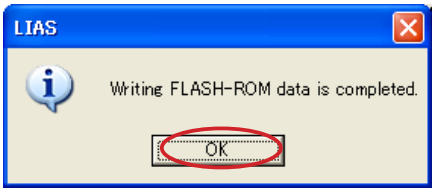

・Click "Write" of "Reading from/Writing into lens"



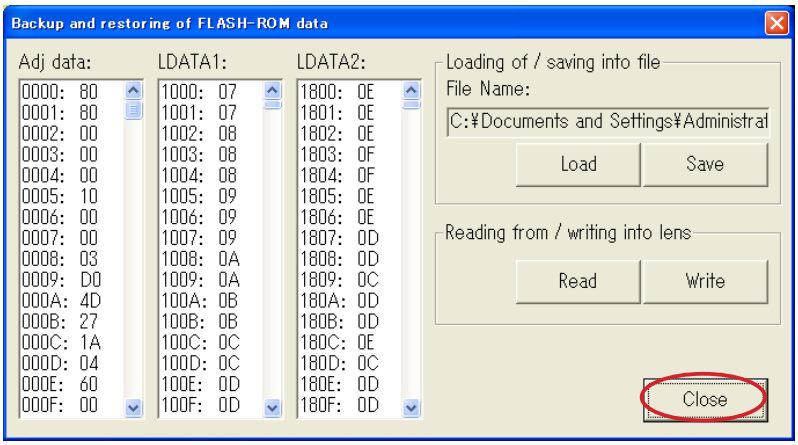

・Follow the instructions on the screen for preparation. Then click "Next".




・When writing FLASH-ROM data is completed, click "OK".



・Click "Close" to end the procedure.



## Necessary adjustment when replacing parts

| Adjustments / Parts to be replaced | Adjustment for electrical device | Lens alignment (incl. inspection of aberration compensation) | VR adjustment |
|---|---|---|---|
| Main PCB unit | ○ | Adjustment of aberration compensation | ○ |
| SWM unit | ○ | | |
| Fixed tube unit (VR unit) | | ○<br>△(Addition) | ○ |
| 4th lens group | | ○ | |
| Gyro FPC | | | ○ |

サービス計画課
M

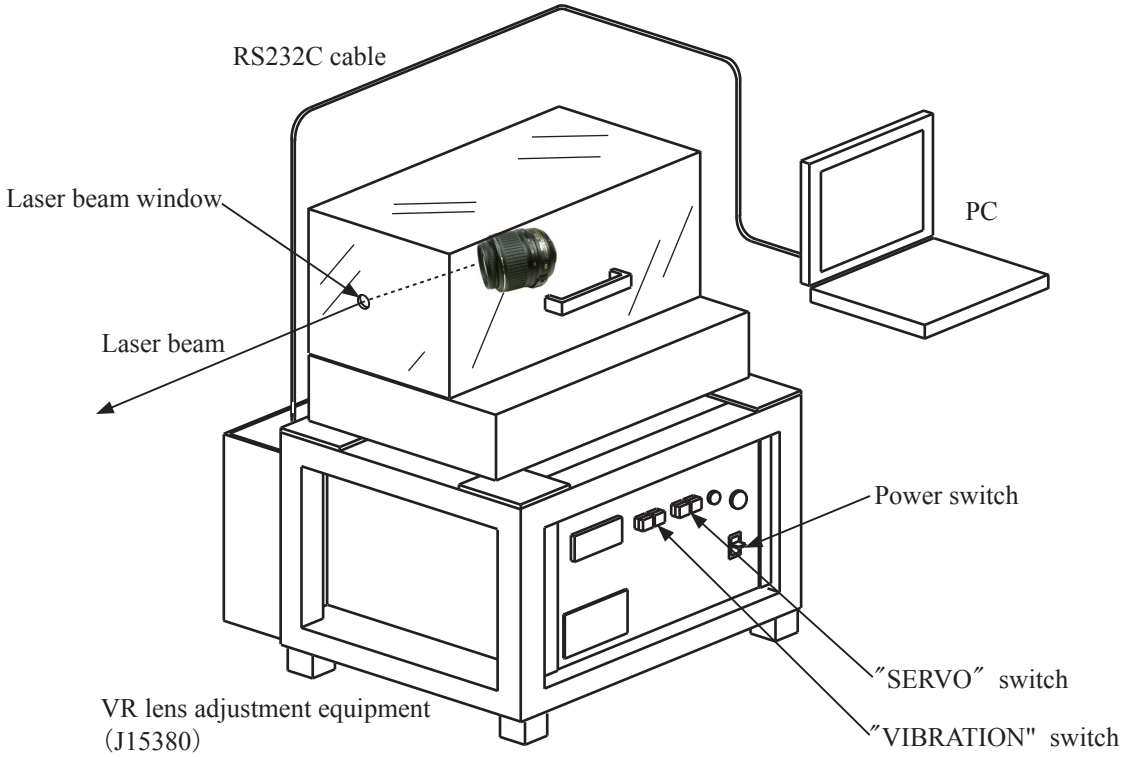
# VR adjustment

When making the VR adjustment, refer to the "Instruction Manual" that is attached to the VR lens adjustment equipment (J15380).

| ⚠ WARNING | |
|---|---|
|  | ●This equipment uses the laser beam.<br>Do not look at the laser beam directly or through the laser beam window. |

**● Setup of VR lens adjustment equipment (J15380)**

1. Set up the VR lens adjustment equipment (J15380) as shown below.




**Notes:** Keep the approx. 5-m distance from the laser beam window to the radiated surface.
Do not block the light path of the laser beam.

2. Connect the PC to the equipment (J15380) and start the PC.

3. Mount and fixed (△ (Revision)) the lens on the equipment (J15380). ~~Set the focus ring to infinity (∞) position~~.

Refer to "Procedure for ~~mounting~~ fixing (△ (Revision)) Lens" on Page A~~54~~ 55 (△ (Revision)) for details.

サービス計画課 M

● Startup of VR adjustment software

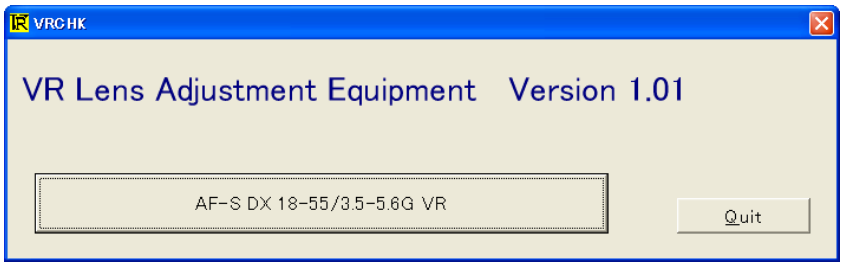
1. Turn the VR lens adjustment equipment (J15380) ON.

2. Mount the lens on the equipment (J15380).

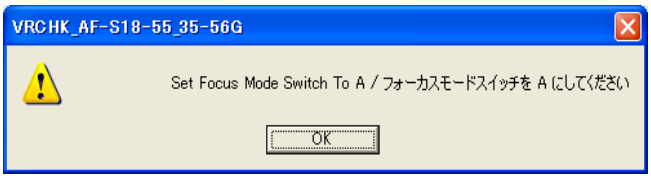
3. Set VR mode switch to "ON", A/M change switch to "A".

4. Start the VR adjustment software.

5. Click "AF-S DX 18-55/3.5-5.6G VR" on the Lens selection screen.




6. If the following messages appear, follow the instructions on the screen and click "OK".





Note: Do not change the lens settings until the adjustment is completed and the screen goes back to the Lens selection screen.
Otherwise, the correct adjustment value cannot be obtained, caused by a change of the setting position.

7 . Fix the lens with the lens retainer stand.
Refer to "Procedure for fixing Lens" on Page 55.

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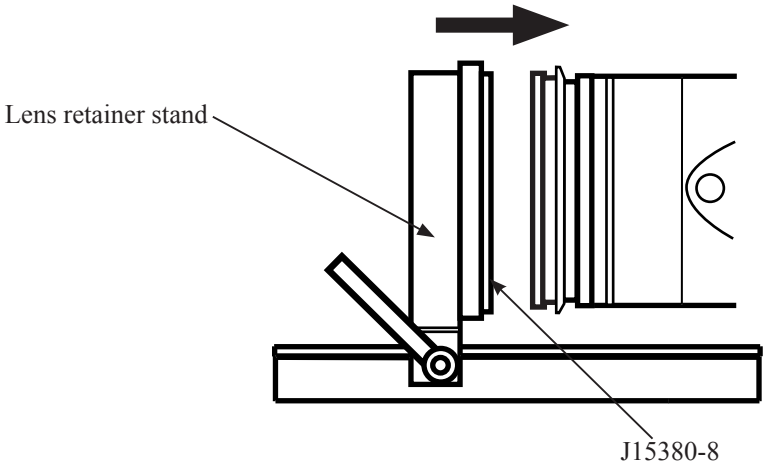
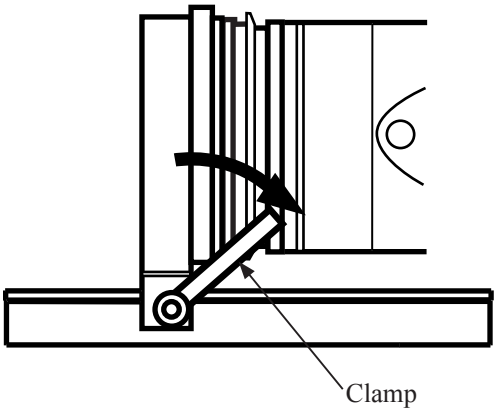
● **Procedure for fixing Lens**

1. Attach the adapter (J15380-8) to the lens retainer stand, and move the lens retainer stand in the direction of the arrow.




2. Move the lens retainer stand to the position as shown below and fix it by tightening the clamp.




サービス
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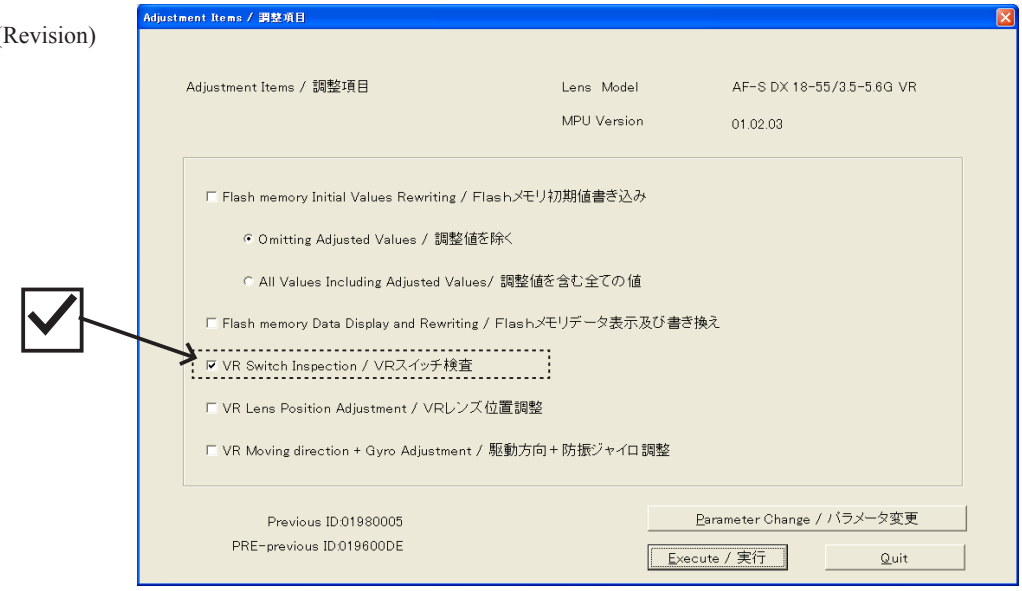
M

## VR mode switch inspection

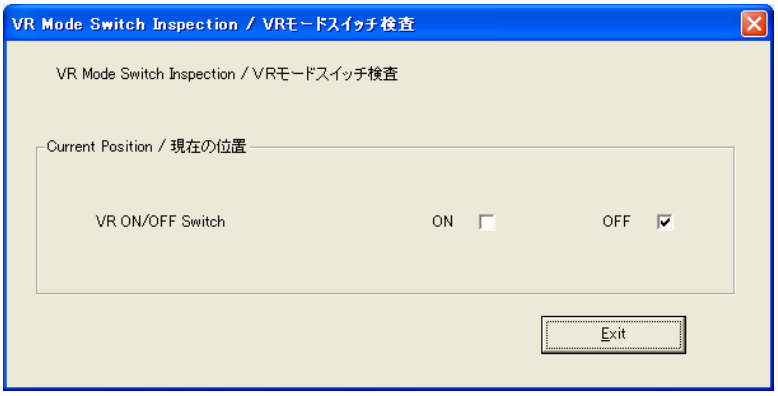
1. Tick "VR Switch Inspection" as below, and click "Execute".

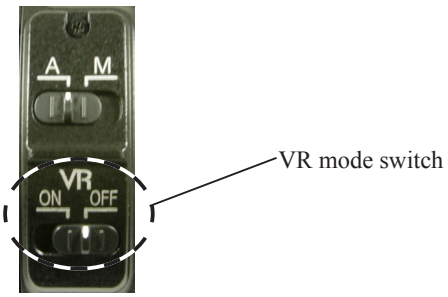
△ (Revision)




2. The position of the VR mode switch is indicated.

Selecting the VR mode switch indicates the current position.




3. When the VR mode switch inspection is completed, click "Exit" to end the procedure.

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## VR lens position adjustment

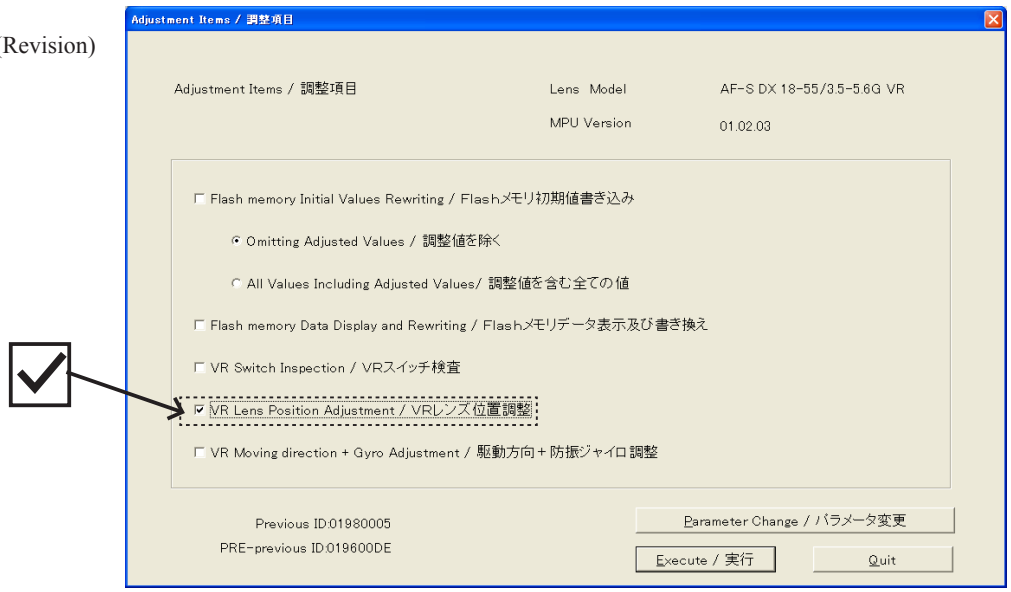
Caution:

If "NG" appears during each adjustment, click "Next" to exit from the inspection mode. After updating FLASH-ROM, go back to the Lens selection screen and make the adjustment again.

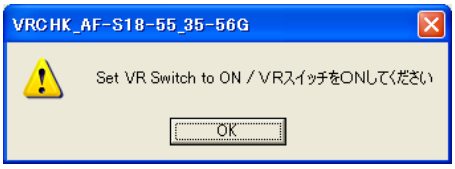
However, if "NG" appears even after adjusting a few times, the fixed tube unit (VR unit), Gyro FPC, main FPC, etc, may be defective.

1. Tick "VR Lens Position Adjustment" as below, and click "Execute".

△ (Revision)



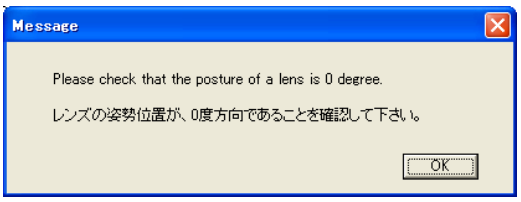

2. When the following message appears, set the VR switch to ON and click "OK".




3. When the message window appears, confirm that the angle of the lens position is "0° angle" and click "OK".

   Clicking "OK" starts "VCM polarity adjustment (auto control)".

   This "VCM polarity adjustment (auto control)" detects the polarity of the VCM (Voice Coil Motor) and writes it in FLASH-ROM as the compensation value.

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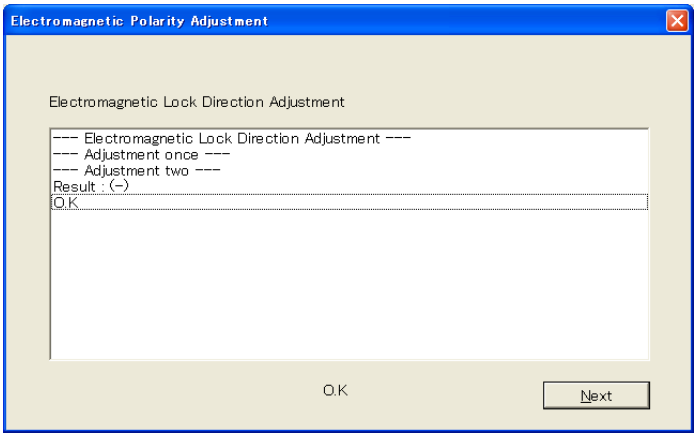
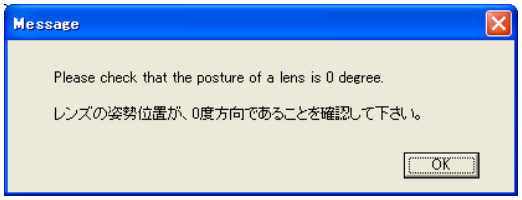
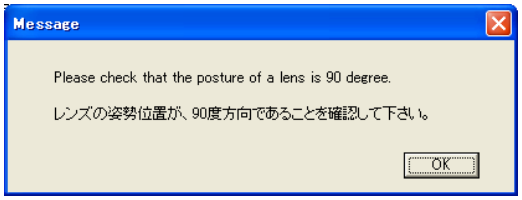
4. If the result is "OK", click "Next".



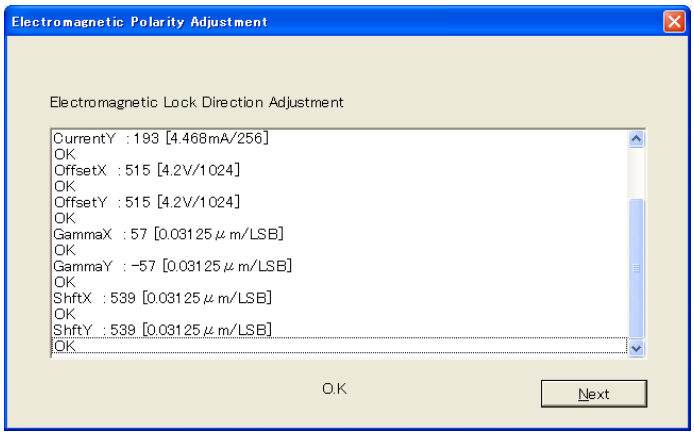

5. When the message window appears, confirm that the lens position is "0° angle" and click "OK".
   Clicking "OK" starts "Hall element-driven current adjustment".



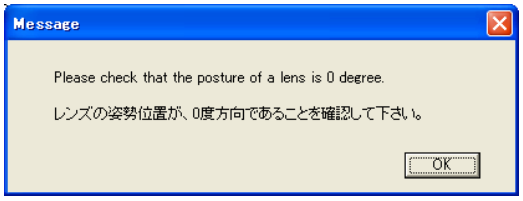

6. When the message window appears, confirm that the lens position is "90° angle" and click "OK".



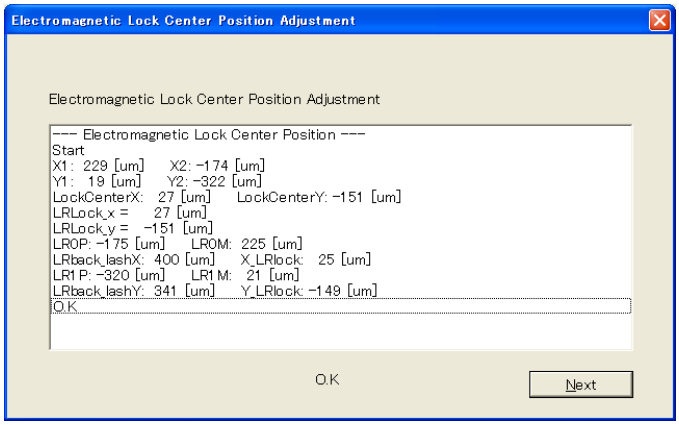
7. If the result is "OK", click "Next".



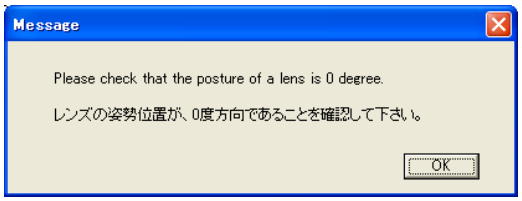

8. When the message window appears, confirm that the lens position is "0° angle" and click "OK". Clicking "OK" starts "Electromagnetic lock center position adjustment (Auto control)". This "electromagnetic lock center position adjustment" adjusts the center position in the time of electromagnetic lock.



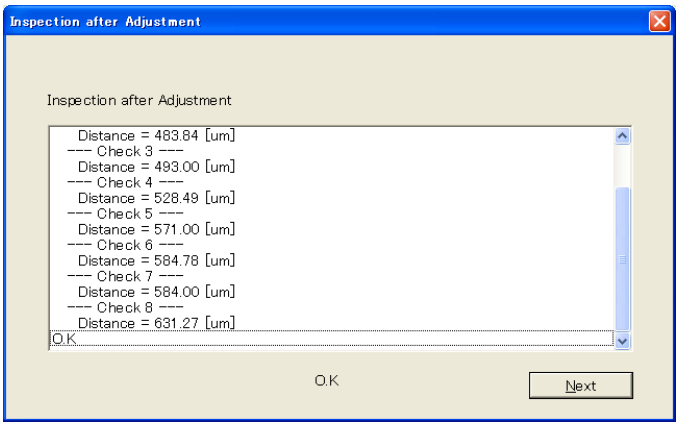

9. If the result is "OK", click "Next". Clicking "Next" starts the "after-adjustment inspection".



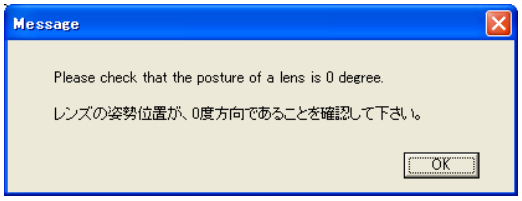

10. When the message window appears, confirm that the lens position is "0° angle" and click "OK". Clicking "OK" starts the "after-adjustment inspection".



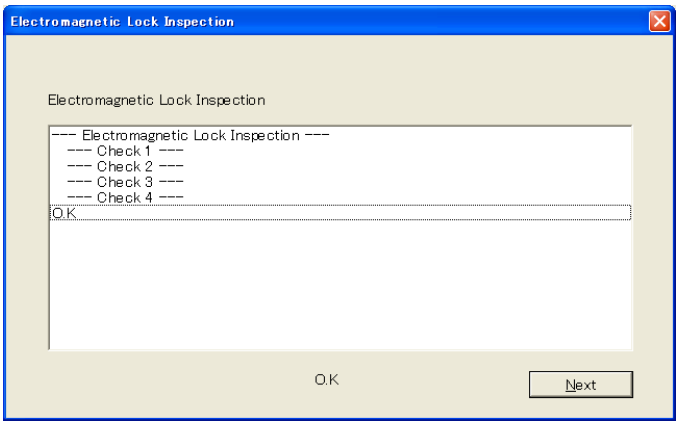
11. When the inspection result is "OK", click "Next".



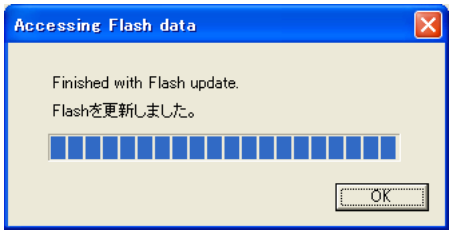

12. When the message window appears, confirm that the lens position is "0° angle" and click "OK". Clicking "OK" starts the "electromagnetic lock inspection".




13. When the inspection result is "OK", click "Next".



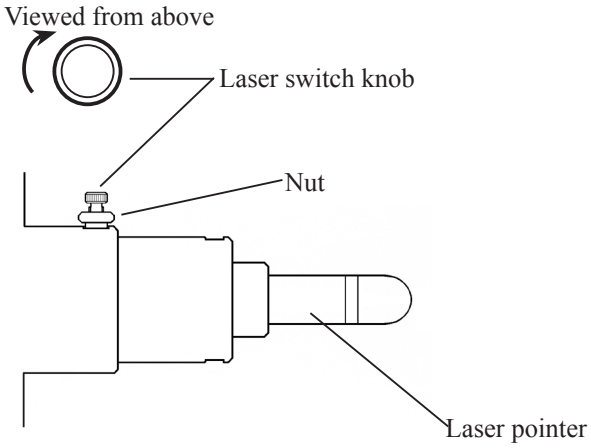
14. When the message that shows updating FLASH-ROM is finished" appears, click "OK".



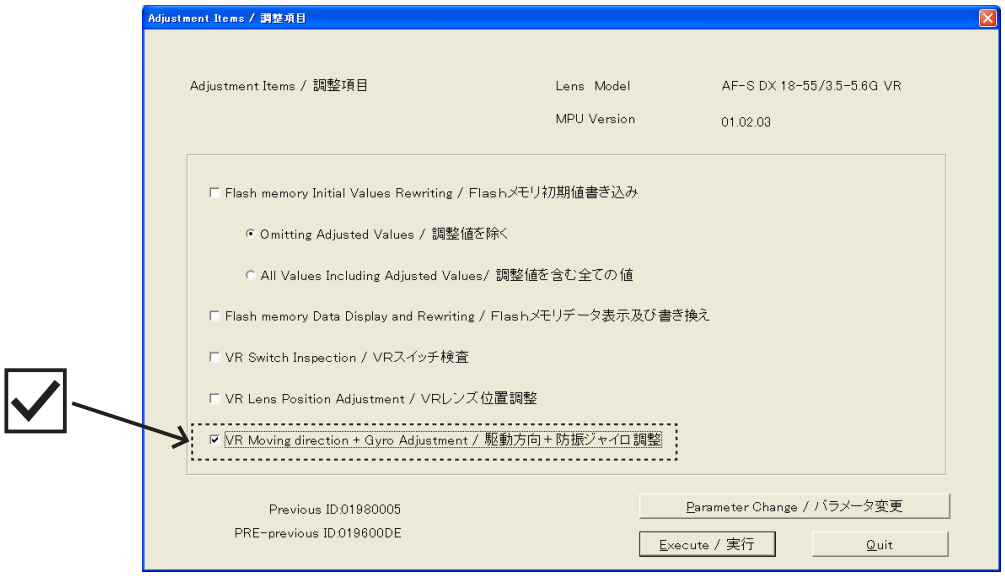

15. When the following message appears, turn the VR switch of the lens to OFF and click "OK".

## VR Moving Direction + Gyro Adjustment

1. Loosen the laser switch nut of the VR lens adjustment equipment (J15380), and rotate the knob in the direction of the arrow to radiate the laser beam.



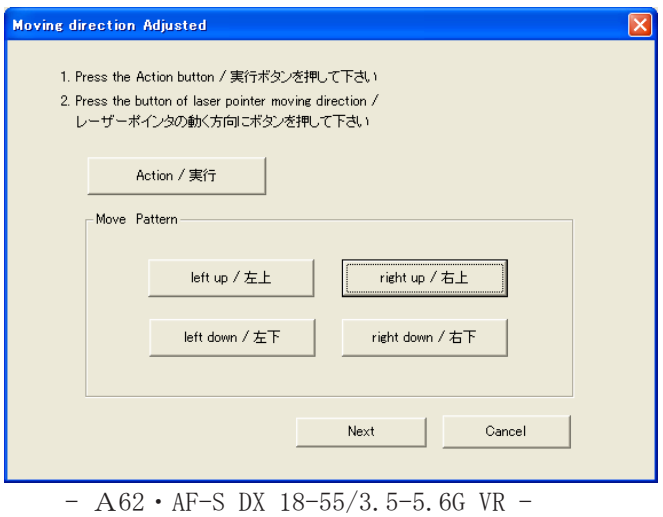

2. Tick "VR Moving Direction + Gyro Adjustment" as below and click "Execute".




3. Click "Action".

The laser pointer will move in any of the four directions. Confirm the moved direction.

△ (Addition)

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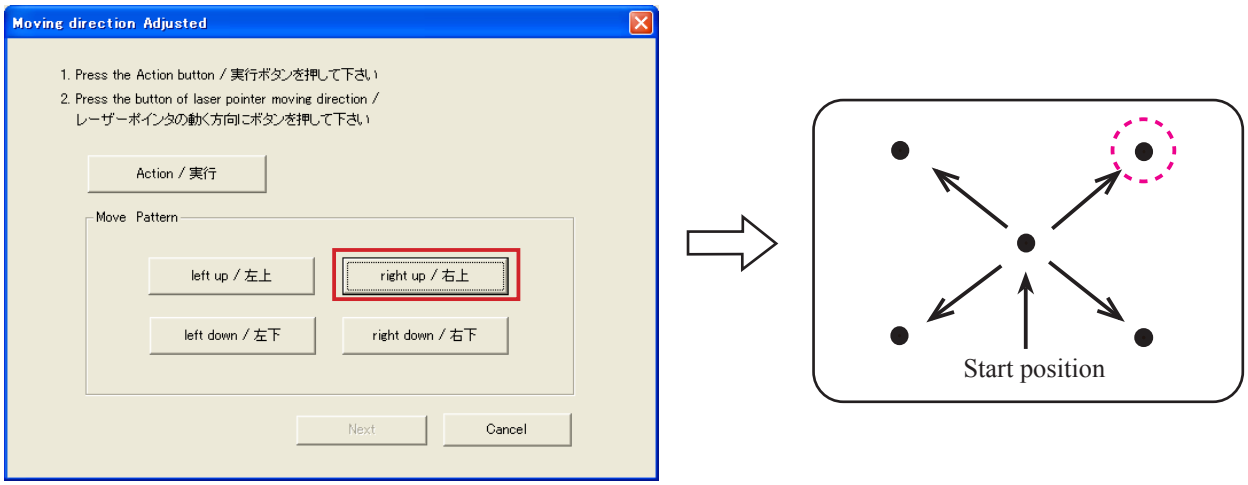
△ (Revision)

4. ~~The laser pointer will move in any of the four directions. Confirm the moved direction and click "OK".~~

   Click "OK".


5. Click the button that corresponds to the moved direction of "3.".




△ (Addition)

6. Click "OK", and confirm that the laser pointer moves towards the upper-right direction.


7. Click "OK". The laser pointer goes back to the start position.


△ (Addition)

8. If the laser pointer moves towards the upper-right direction in the procedure "6", click "Yes".

   If it does not move towards the direction, click "No" and repeat the procedures from "3." to "7.".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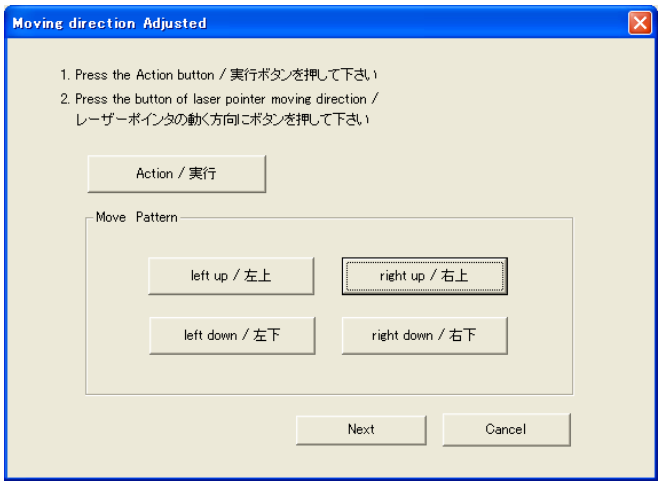
9.When the upper-right movement is confirmed, click "Next".




10. When the message window appears, set "Frequency" setting of the VR lens adjustment equipment (J15380) to "3.0 Hz", based on the instructions.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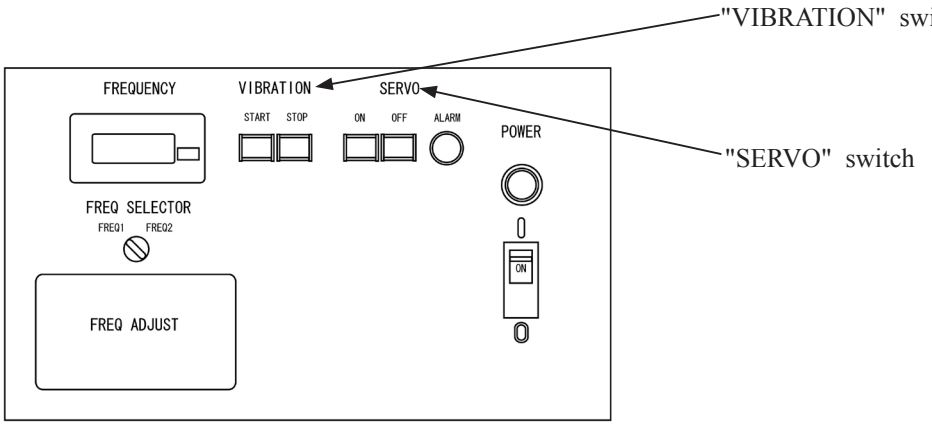
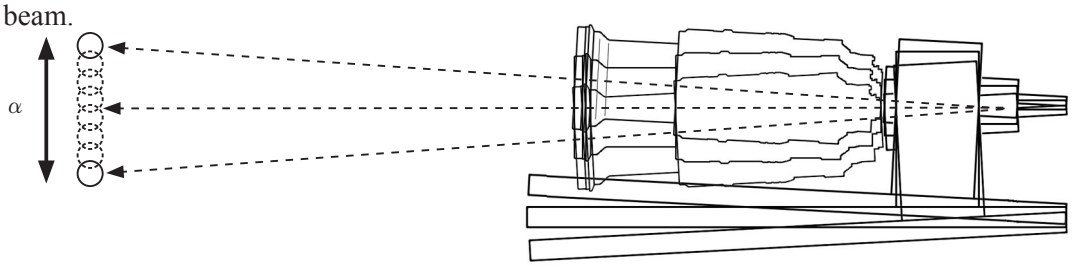
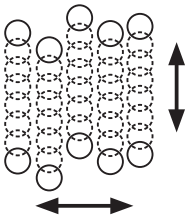
11. Press "ON" button for "SERVO" switch and press "START" for "VIBRATION" switch of the VR lens adjustment equipment (J15380).




12. When the VR lens adjustment equipment (J15380) starts to vibrate, measure the vibration width (α) of the laser beam.




**Notes**：During the above measurement, laser spot light swings from side to side and up and down. This phenomenon is caused by operations of the VR unit control so NOT defective.



13. Click "Next" on the message window.
The vibration reduction function starts and the vibration width of the laser beam becomes narrow.

△ (Revision)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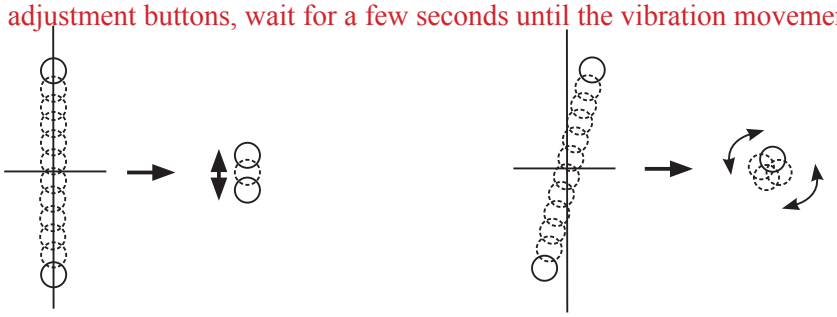
14. If the angle is deviated, the laser beam source looks like turning around even after making the Gyro-gain adjustment.

So if such deviation is detected, adjust and correct it by the adjustment buttons.
**Note**: After using the adjustment buttons, wait for a few seconds until the vibration movement stabilizes.



△ (Revision)

Buttons for adjusting "Angle deviation"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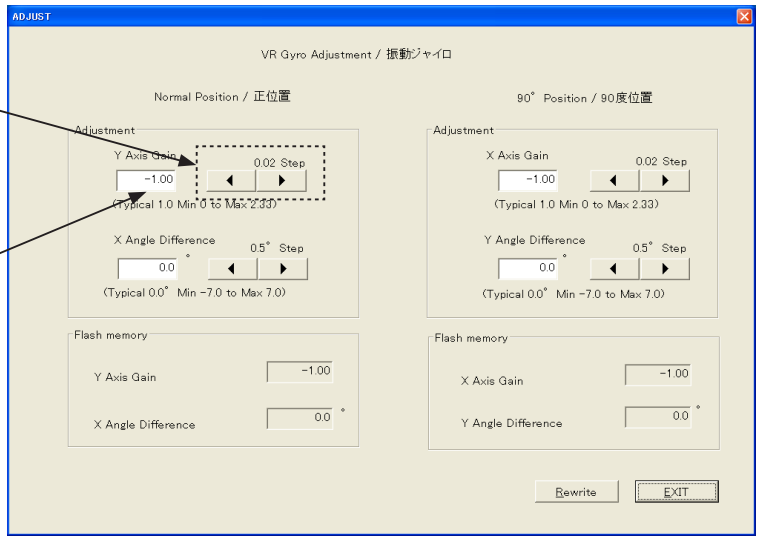
15. Adjust the vibration width by the buttons for Gyro-gain adjustment so that the measured vibration width at the center (α′) of the laser beam becomes ~~1/5~~ 1/8 or less of the maximum width. (△ Revision)

For how to calculate the center width (α′) and adjustment values, refer to the procedure from ① to ③ on the next page.

△ (Revision)

Buttons for adjusting "Gyrog-Gain"

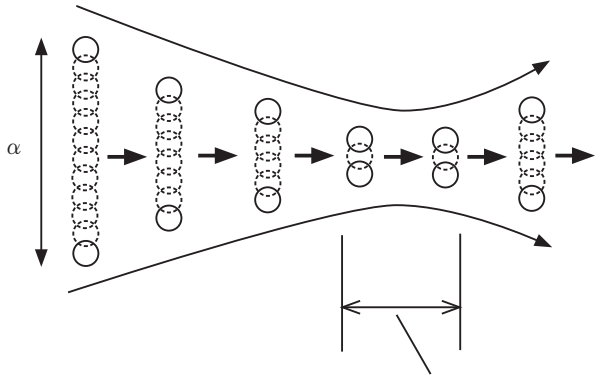
Adjustment value




**Standard:**

**Center vibration width (α′): One-fifth (~~1/5~~ 1/8) or less of the maximum vibration width** (△ Revision)

**Note**: The laser beam vibrates widely again after passing the peak section of the minimum value.




Peak zone of the minimum value of the vibration width

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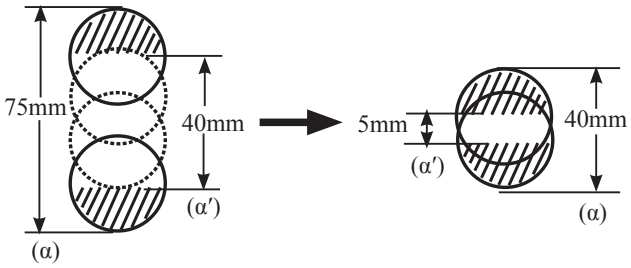
① For adjusting the center vibration width of the laser beam, calculate as follows:

Measure the whole vibration width (α) as in Procedure "12." (Page A65). Then, subtract the top and bottom radial parts (shaded areas) of the laser spots from it and work out the center vibration width (α′).

《Ref.》 The diameter of the laser spot beam radiated 5-m away is approx. 35 mm .

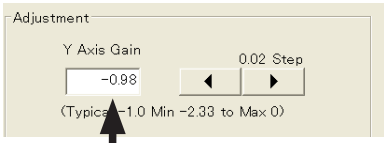

When the whole vibration width is "approx. 75 mm", the center vibration width is 75 - (17.5 + 17.5) = 40 mm. The standard value after the gyro-gain adjustment is 40×1/8 = 5 mm (center vibration width), so the whole vibration width is 5 + (17.5+17.5) = 40 mm.




② Measure the vibration width by changing the adjustment value in increments of 0.02-Step as below.

③ The peak zone of the minimum vibration width can be obtained by the actual measured value.

The middle of the peak zone is regarded as the adjustment value.




| Gyro Gain Adjustment Value | Vibration width Actual measured value |
|---|---|
| ・ | ・ |
| ・ | ・ |
| 0.90 | 43.5 mm |
| 0.92 | 42.5 mm |
| 0.94 | 41.0 mm |
| 0.96 | 40.5 mm |
| 0.98 | 40.0 mm |
| 1.00 | 40.0 mm |
| 1.02 | 40.0 mm |
| 1.04 | 40.5 mm |
| 1.06 | 41.0 mm |
| 1.08 | 41.5 mm |
| 1.10 | 42.0 mm |
| ・ | ・ |
| ・ | ・ |

**Note**: Measure the vibration width in increments of 0.5 mm.

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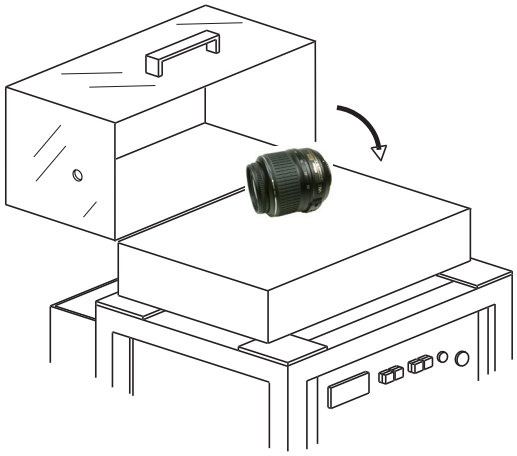
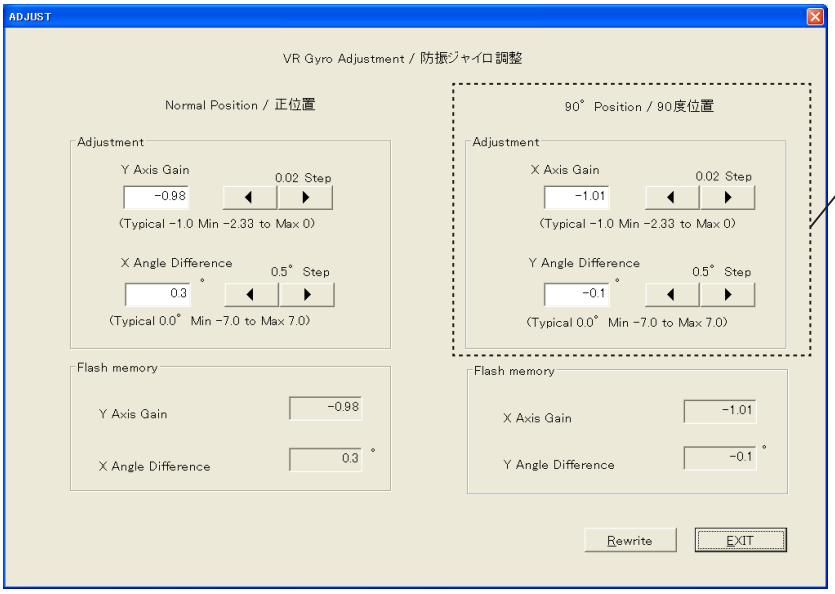
16. Press "STOP" button of VIBRATION switch of the VR adjustment equipment (J15380) to stop vibrations.
17. Rotate the lens through 90° in the direction indicated by the arrow, then press "START" button of VIBRATION switch of the VR adjustment equipment (J15380) to start vibrations.



18. At the 90° position, adjust the angle deviation and make gyro-gain adjustment.

**Note**: When adjusting the lens at the 90 ° angle position, use the buttons for the adjustment at 90 ° position as below.

△ (Revision)




Buttons for adjustment at 90 ° position

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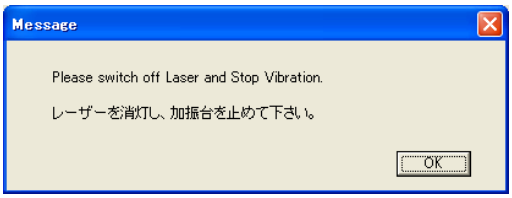
19. After the adjustment, click "Rewrite" button to write the adjustment value in FLASH-ROM of the lens.
20. When writing is completed, click "EXIT".

**Note**:

If clicking "EXIT" button without clicking "Rewrite" button, the adjustment value is not recorded and the adjustment details are not written.

21. When the message window appears, switch off the laser and stop the vibration. Then, click "OK".



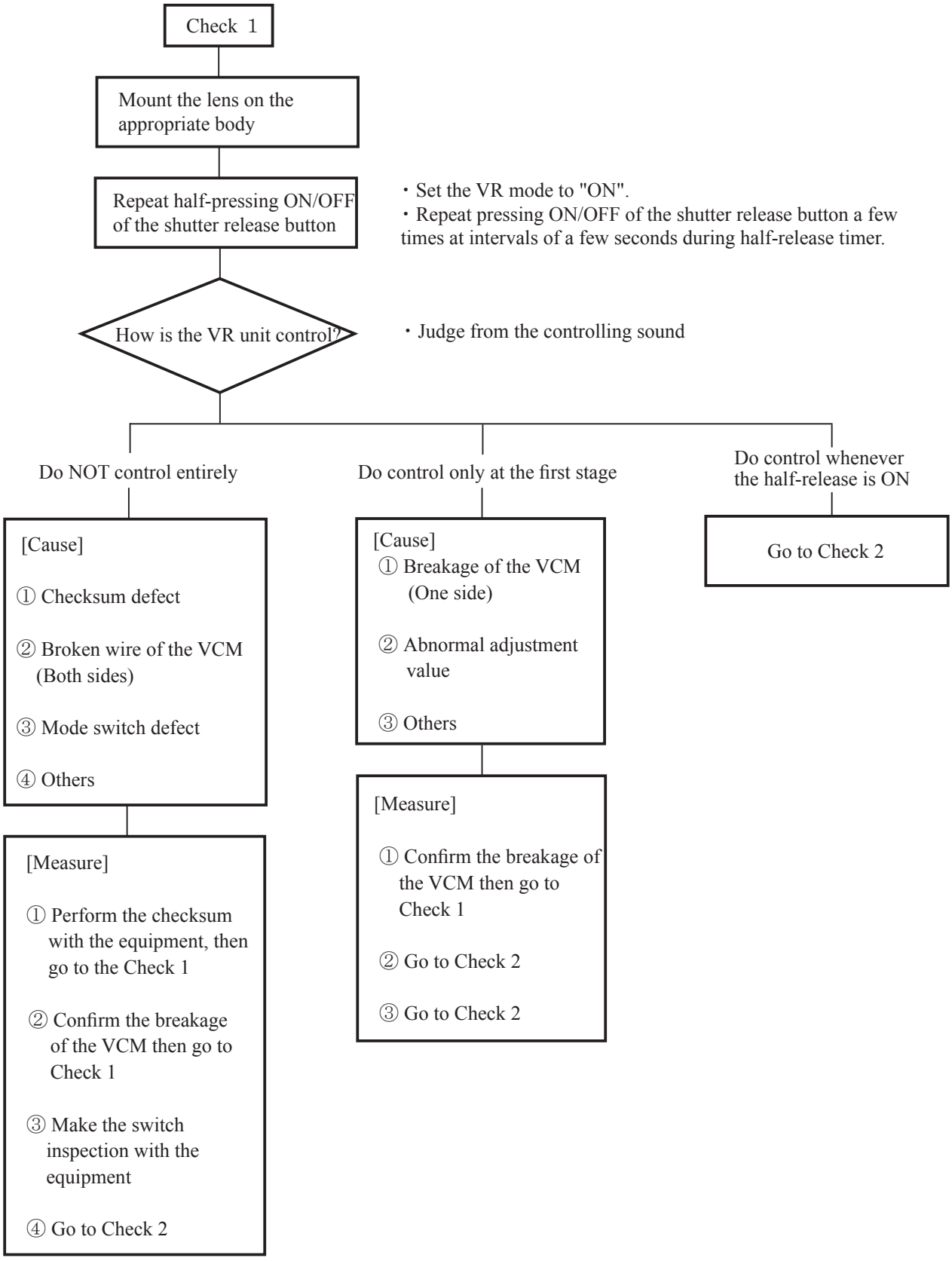

22. Click "Quit" on the adjustment-items screen to go back to the Lens selection screen.

**Note**:

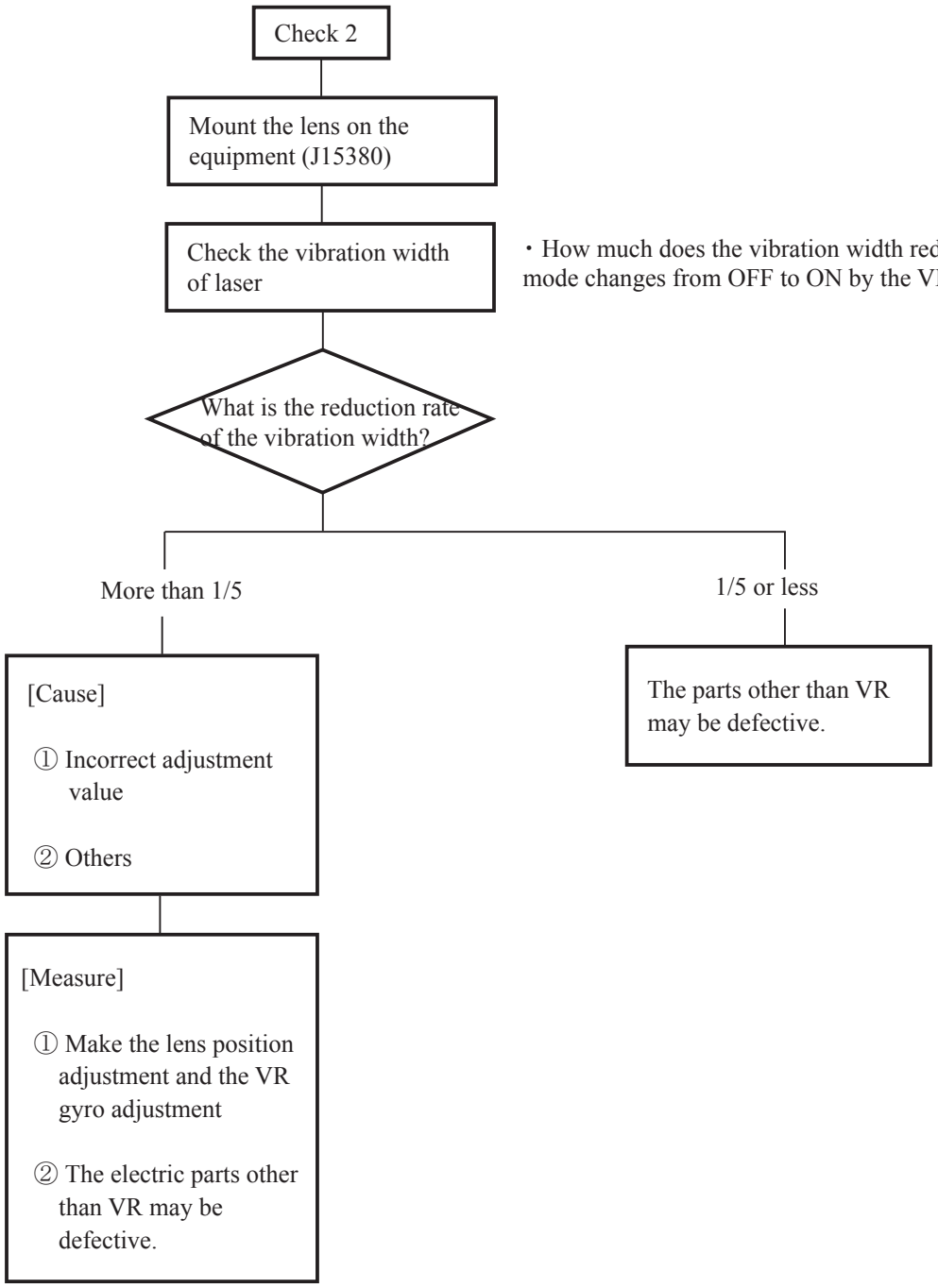
Do NOT remove the lens or turn OFF the VR lens adjustment equipment until going back to the Lens selection screen. Otherwise, troubles will occur such as incorrect recording of the adjustment value due to blocked communications, etc.

## Criteria for VR performance

Before making the VR adjustment for defective products by using the equipment, refer to the following.




**Go on to the next page "Check 2"**


Check 2
Mount the lens on the equipment (J15380)
Check the vibration width of laser
・How much does the vibration width reduce, when the VR mode changes from OFF to ON by the VR-gyro adjustment?
What is the reduction rate of the vibration width?
More than 1/5
1/5 or less
[Cause]
① Incorrect adjustment value
② Others
The parts other than VR may be defective.
[Measure]
① Make the lens position adjustment and the VR gyro adjustment
② The electric parts other than VR may be defective.

## Aberration compensation data-writing adjustment

★ : New tool

- This adjustment is made by the software which calculates the aberration compensation data according to the aberration feature of lens and writes in the Flash-ROM of the lens, in order to improve the accuracy of autofocus.

**Note: This adjustment is required when the main PCB and/or each lens part (glass, lens chamber) is replaced or when each lens part is disassembled. Be sure to make this adjustment after completing inspecting and adjusting the main PCB.**

(1) Preparation

- Test chart (Self-made tool: ref. Procedure for how to create it.)
- Tripod
- D200, D2X
- PC
- USB cable (UC-E4)
- Adjustment software (★ J18436 LWM_AFS18_55.exe : used for the lens optical alignment.)

(2) Procedure for how to create test chart

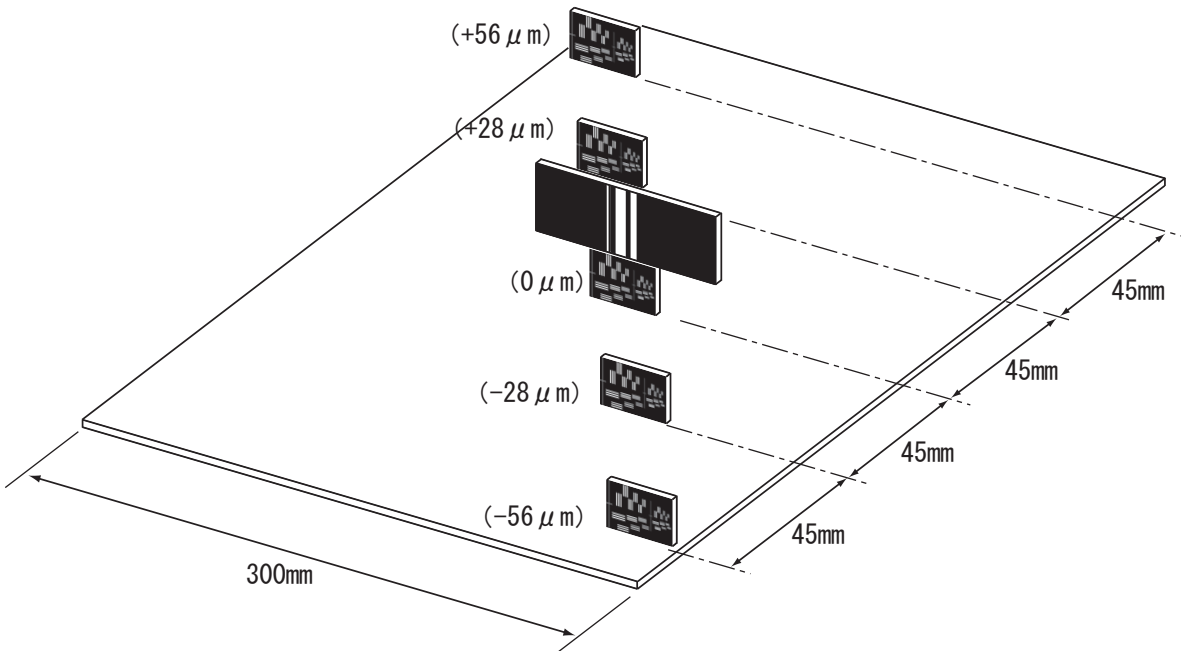
- Photocopy the next page and cut out one target chart and five resolution charts.

(Target chart)

(Resolution chart)

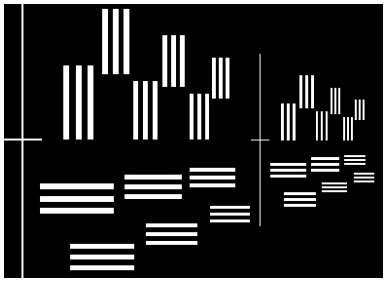
- As shown below, put each chart in position at the specified spacings.

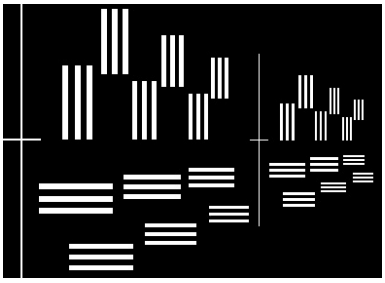
  **Caution: Only in the center, put the target chart on the central resolution chart.**

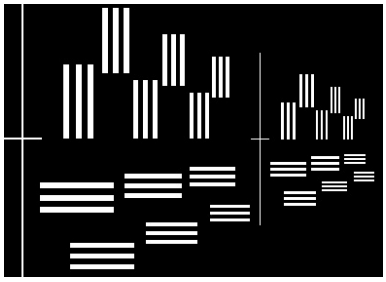


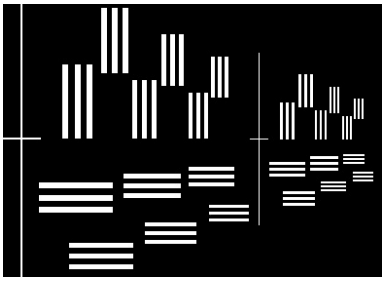
(Target chart)

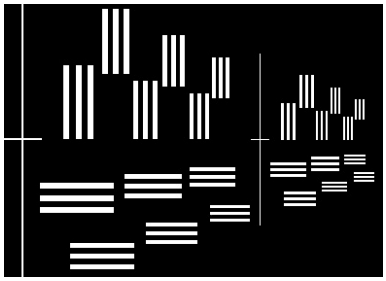
(Resolution chart)









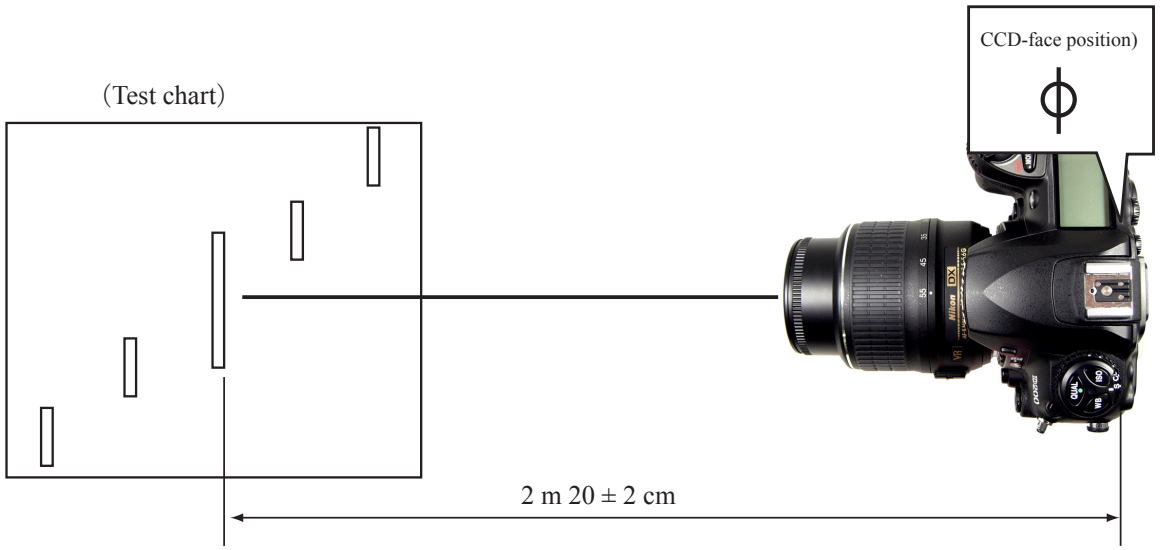


(3) Writing aberration compensation data

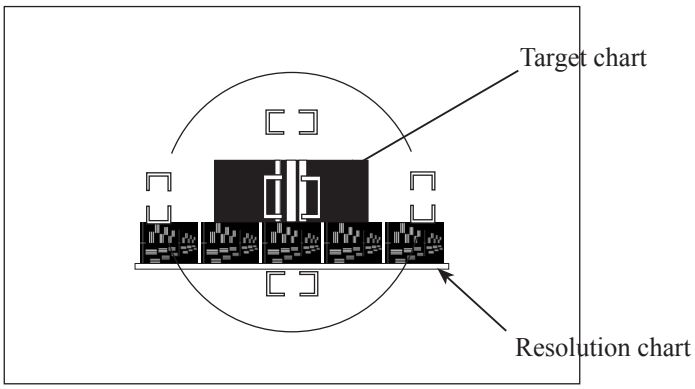
① Prepare a camera (D200 or D2X). Set the "Exposure mode" to "A", the aperture to full and "Focus mode" to "S".

On the shooting menu, set the "Image quality mode" to "FINE", "Image size" to"L", "WB" to "Preset", and "ISO" to "200".

② Set up the camera (D200 or D2X), to which the suspected lens is attached, on the tripod. Set the focal length to 55 mm, and the distance between the test chart and camera (CCD face) to 2 m 20 ±2 cm.




③ Set the center of the focus area coming in the target chart as below in viewfinder.



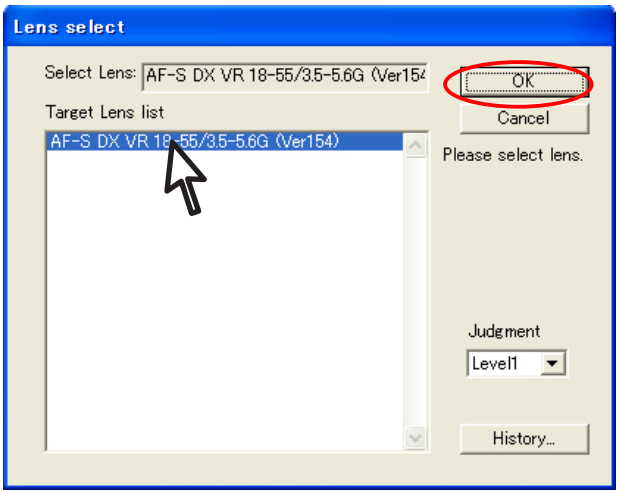

(In viewfinder)

④ Connect the PC and camera via USB cable. (Camera setting: Mass storage)

⑤ Start the adjustment software (LWM_AFS18_55.exe).

△ (Addition)

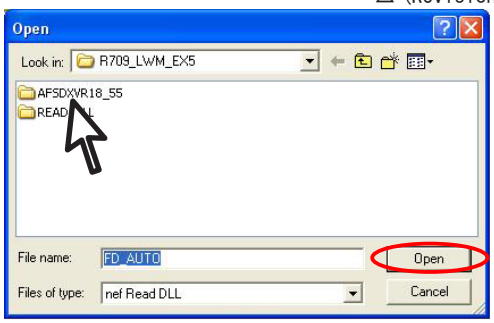
⑥ Select "AF-S DX VR 18-55/3.5-5.6G" on the "Lens select" screen. Click "OK".



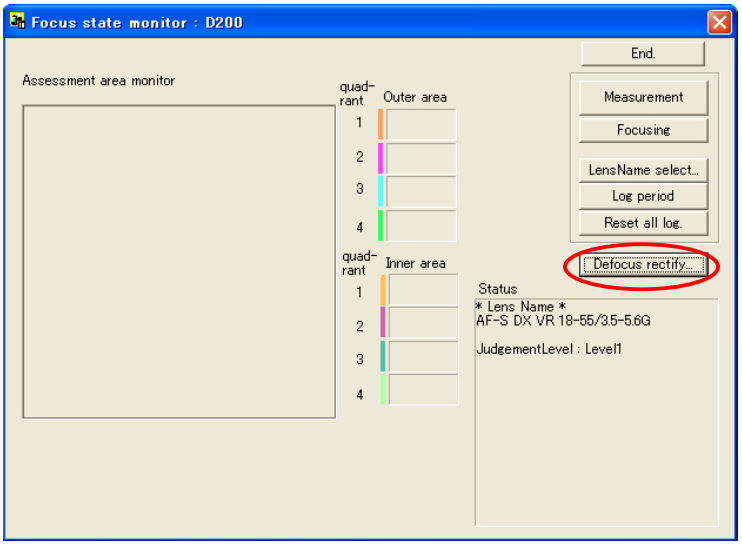

※ If this software is used for the first time, the selection screen of reading data will appear. This does not appear after the 2nd-time usage.)

Select "FD_AUTO.dll" and click "Open".

△ (Revision)




⑦ Click "Defocus rectify...".




**Caution:**

**Unless the focal length is set to 55 mm or 18 mm, the following window will appear and the procedure will be blocked.**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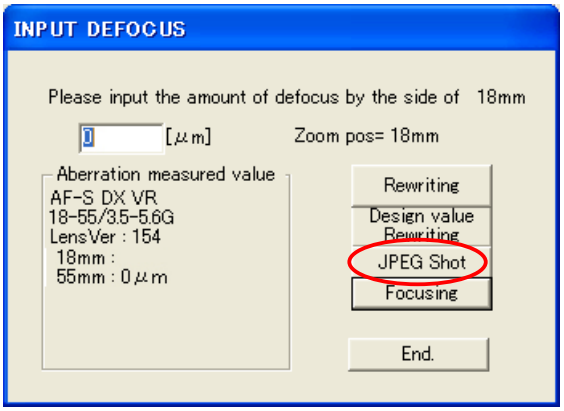
⑧ Click "JPEG Shot".

△ (Revision)

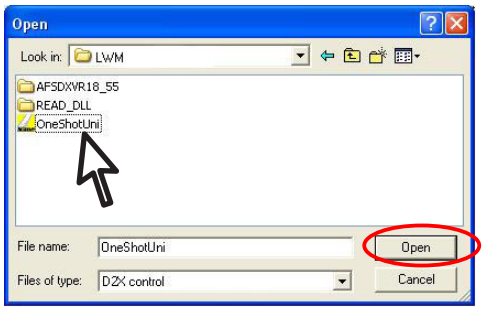



※ If this software is used for the first time, the software selection screen will appear. This does not appear after the 2nd-time usage.)

~~Select "OneShotoD200" and click "Open". (In case of D200)~~ Select "OneShotoUni" and click "Open".

△ (Revision)

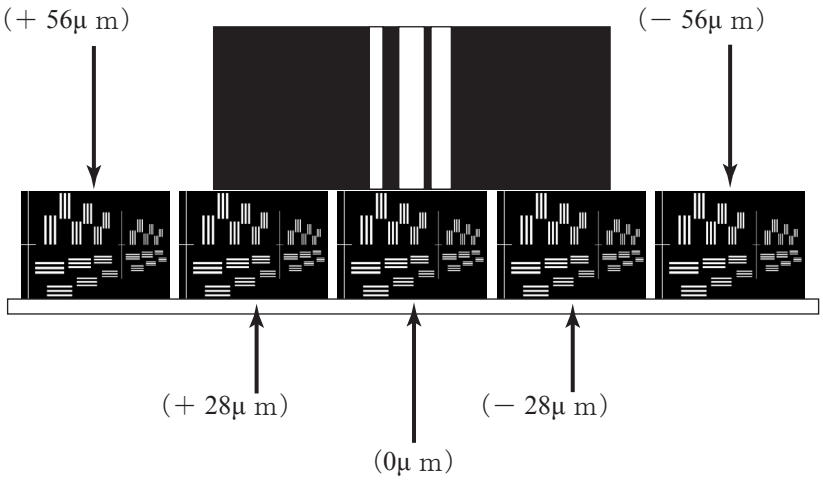
△ (Revision)




⑨ The shutter is released after the AF operation. The shot image is automatically displayed on the PC screen. Scale the image to 100% and check which chart is in focus of the five resolution charts.

**Caution:**

**Because this lens has a deep focal depth even if the aperture is fully open, when looking for the center of focus, compare two distant charts between which there are two or more charts.**

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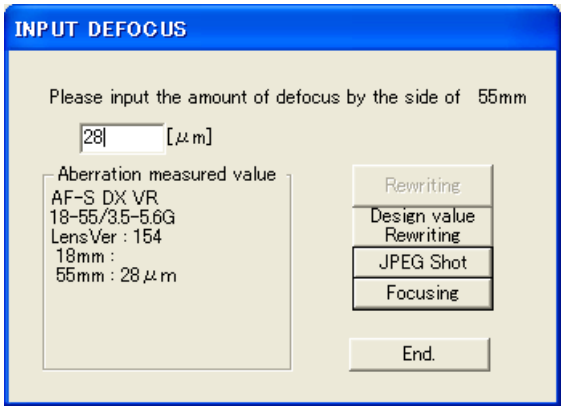
⑩ Input the value data of the focus position into the entry field.

e.g. The following means " ＋ 28μm (rear focus side)"-position is in focus.

△ (Revision)

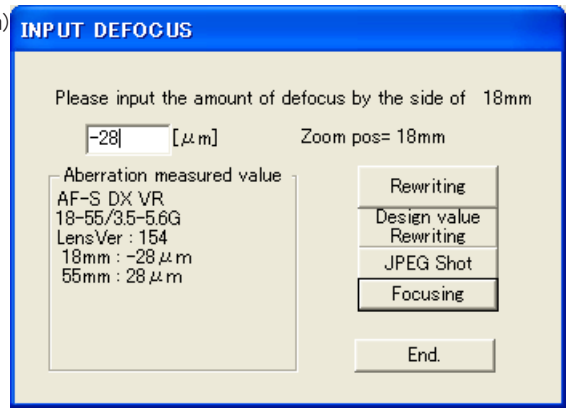



⑪ Set the focal length of the suspected lens to 18 mm, and the distance between the test chart and camera (CCD face) to 72 m ±2 cm.

⑫ Perform the procedure from ⑧ of the previous page to ⑩ . Input the value data of the focus position into the entry field.

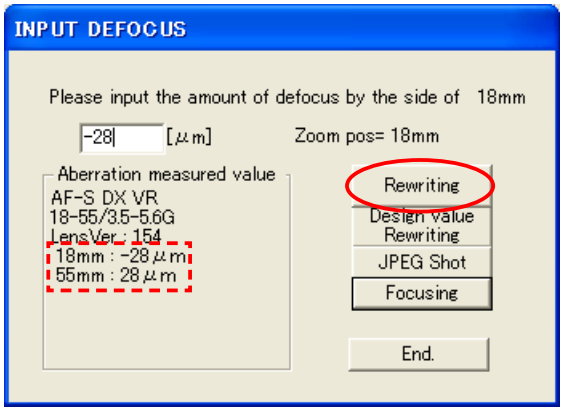
e.g. The following means " － 28μm (front focus side)"-position is in focus.

△ (Revision)




⑬ Check that the values of all the focal lengths are displayed within the dotted red circle. Then click "Rewriting".

△ (Revision)

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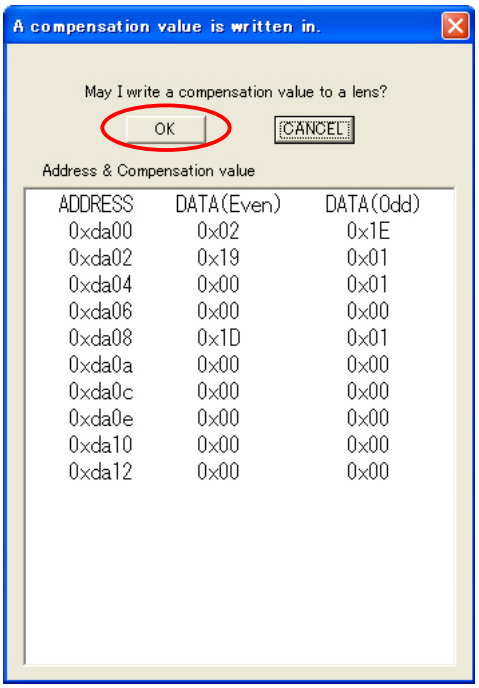
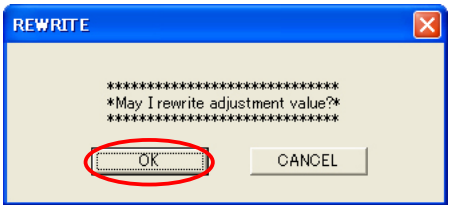
⑭ When the following screen appears, click "OK".




⑮ Click "OK".

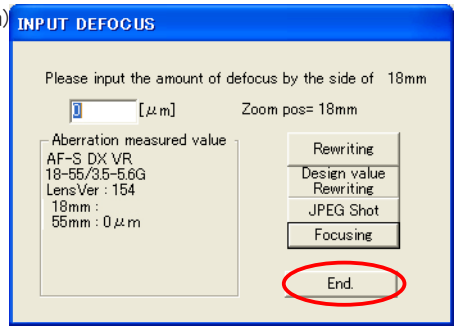


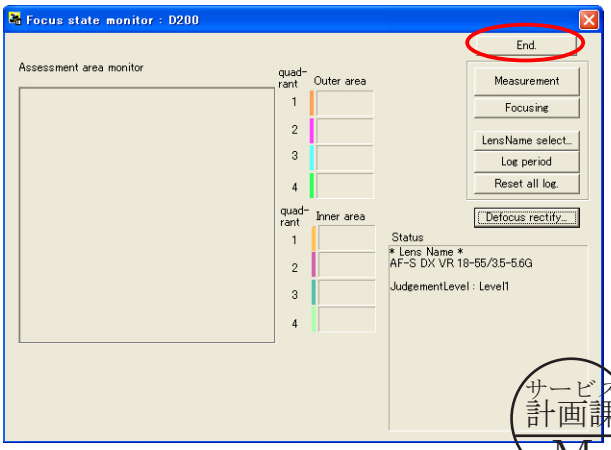

⑯ When the writing procedure starts and ends, the below screen will appear.

- Click "OK" to end the adjustment software.
- Turn the camera OFF and turn it ON again.
- Then reboot the adjustment software.

**Note: Unless the camera turns off once, the value that was written in Flash-ROM is not reflected.**


△ (Revision)

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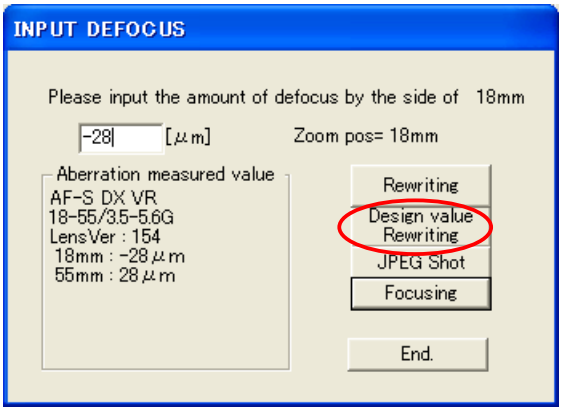
⑰ After rebooting the adjustment software, perform the procedure from ② to ⑫ again. Check that "0μm"-position is in focus by AF.

(It is also possible to take WIDE-side shooting at the procedure of ⑪ , and then to take TELE-side shooting at the procedure of ② .)

⑱ If "0μm"-position is not in focus, repeat the procedure from ② to ⑰ .

If it is not still in focus even after repetition, the written value in Flash-ROM may be abnormal. So click "Design value Rewriting" to write the initial value, then proceed with the procedure.

△ (Revision)

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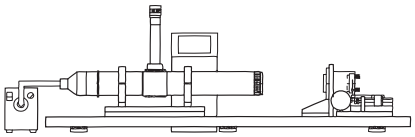
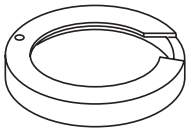
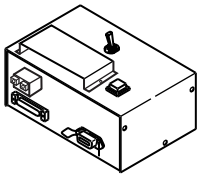
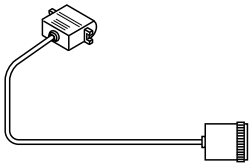
# 工具編 TOOLS

★：NEW TOOL

| | RJ 番号<br>RJ No. | 名称<br>NAME OF TOOL | 備考<br>OTHERS |
|---|---|---|---|
| ★ | J15430  | 横型焦点面検査器 AT-500H<br>BACK FOCUS COLLIMATER | |
| | J9001-5N-1  | 安定化電源５Ａ<br>DC REGULATED POWER SUPPLY 5A | |
| | J18028  | Ｆ用レンズ受け台<br>LENS ADADPTER FOR FOCUS TESTER | |
| | 工具設定なし<br>RJNo.is not available  | 鉛フリーはんだコテ<br>LEAD FREE SOLDERING IRON | |
| | J5400  | 鉛フリー糸はんだ RMA02(M705) 0.5MMX500G<br>ECO SOLDER RMA02(M705) 0.5MMX500G | |
| | 工具設定なし<br>RJNo.is not available | パーソナルコンピュータ<br>PERSONAL COMPUTER | |
| | 工具設定なし<br>RJNo.is not available  | オシロスコープ<br>OSCILLOSCOP | |
| ★ | J18434  | AF-S DX 18-55/3.5-5.6G VR 点検・調整ソフト<br>Adj.SOFT for AF-S DX 18-55/3.5-5.6G VR | |
| ★ | J18435  | ＶＲ調整ソフト<br>VR-Adj.SOFT for AF-S DX 18-55/3.5-5.6G VR | |
| ★ | J18436  | 調芯装置用調整ソフト（ＬＷＭ）<br>Adj.SOFT(LWM) for AF-S DX 18-55/3.5-5.6G VR | |
| | J18004-1  | Ｊ１８００４用基準ゲージ<br>STANDARD GAUGE FOR J18004 | |
| | J15306-1  | ＡＦ－Ｉ通信ボックス<br>AF-I LENS COMMUNICATION BOX(CE) | |
| | J15380 | ＶＲレンズ調整装置<br>INSPECTION TOOL FOR VR LENS | |
| | J15307  | ＡＦ－Ｉ通信アダプター<br>COMMUNICATION ADAPTER FOR AF-I | |

| | | | |
|---|---|---|---|
| J19127P |  | AF-S 18-200 用ホルダー<br>ATTACHMENT HOLDER FOR AF-S 18-200 | |
| J11326 |  | X タイプスリムピンセット<br>X-TYPE SLIM TWEEZERS | |
| OS-30MEL |  | ドライサーフ　OS-30MEL<br>DRY SERF OS-30MEL(OIL BARRIER) | |
| PL-22SEL | | ドライサーフ　PL-22SEL<br>DRY SERF PL-22SEL(OIL BARRIER) | |
| MZ-800SEL | | ドライサーフ　MZ-800SEL<br>DRY SERF MZ-800SEL(OIL BARRIER) | |
| I-40 | | ＡＦレンズ用グリース（Ｉ－４０）<br>GREASE FOR AF LENS | |
| EDB0011 |  | ネジロック（赤）1401C<br>SCREW LOCK 1401C | |
| L-241 | | ロックタイト＃２４１（青）<br>LOCTITE #241 (50ml) | |
| ★ SX720B | | セメダイン　SX720B（黒）<br>CEMEDINE SX720B(BLACK) | |
| TA-0012 |  | | ポリエステル<br>フィルム<br>Polyester Film |
| J5033 |  | 導電マット<br>CONDUCTIVE MAT | |
| J5033-5 |  | リストストラップ<br>WRIST STRAP | |