A-lens mechanism description

1. A-lens

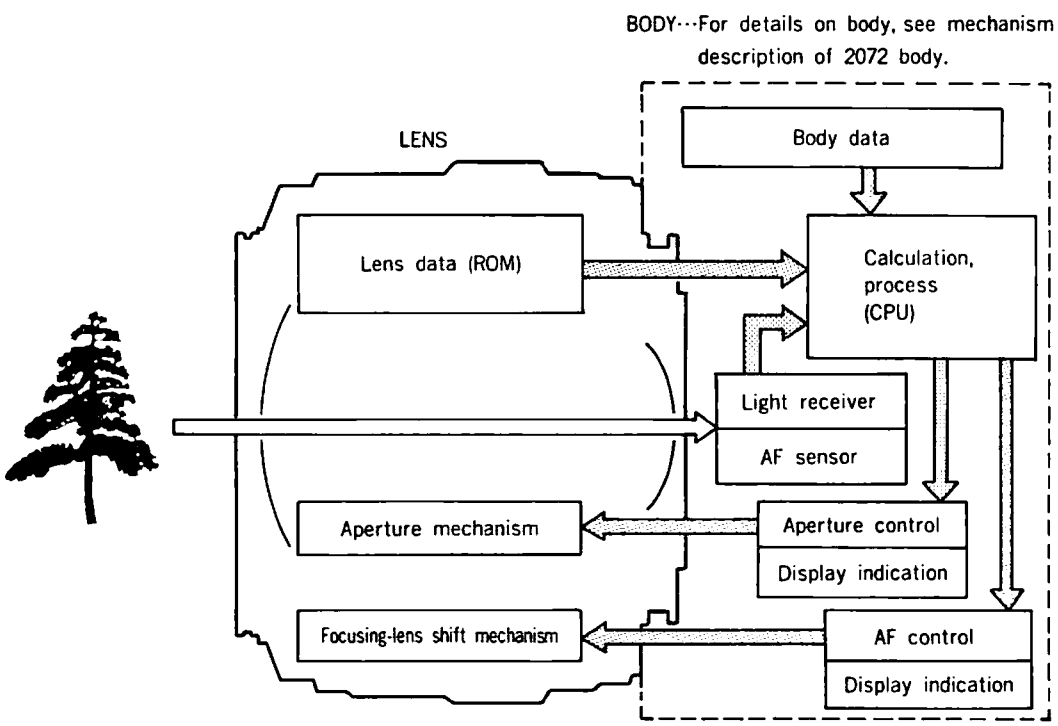
A-lens is specially designed for Minolta new SLR-camera system that is represented by 2072 body. Compared with conventional lens, A-lens has the following new features:

(1) New lens mount (Minolta A lens mount)
(2) Transmission of lens data and aperture mechanism corresponding to new exposure control system.
(3) Transmission of lens data and mechanism of lens corresponding to AF system.

With features above, external modification and use of electrical parts are also found in A-lens.

2. Summary description

(1) Summary description of lens and body



- With body-side power circuit ON, lens data needed for AF control, exposure control and display indication, is transmitted from lens to body electrically.
- In body, data (exposure mode, setting shutter speed, setting aperture, setting ISO etc), metering and AF data (measured by light receiver, AF sensor) and lens data is calculated and processed. According to the calculation data, body is controlled and the corresponding indication is displayed.
- In lens, aperture mechanism and focusing-lens shift mechanism are operated following AF and aperture data calculated by body.

(2) New lens mount (Minolta A mount)

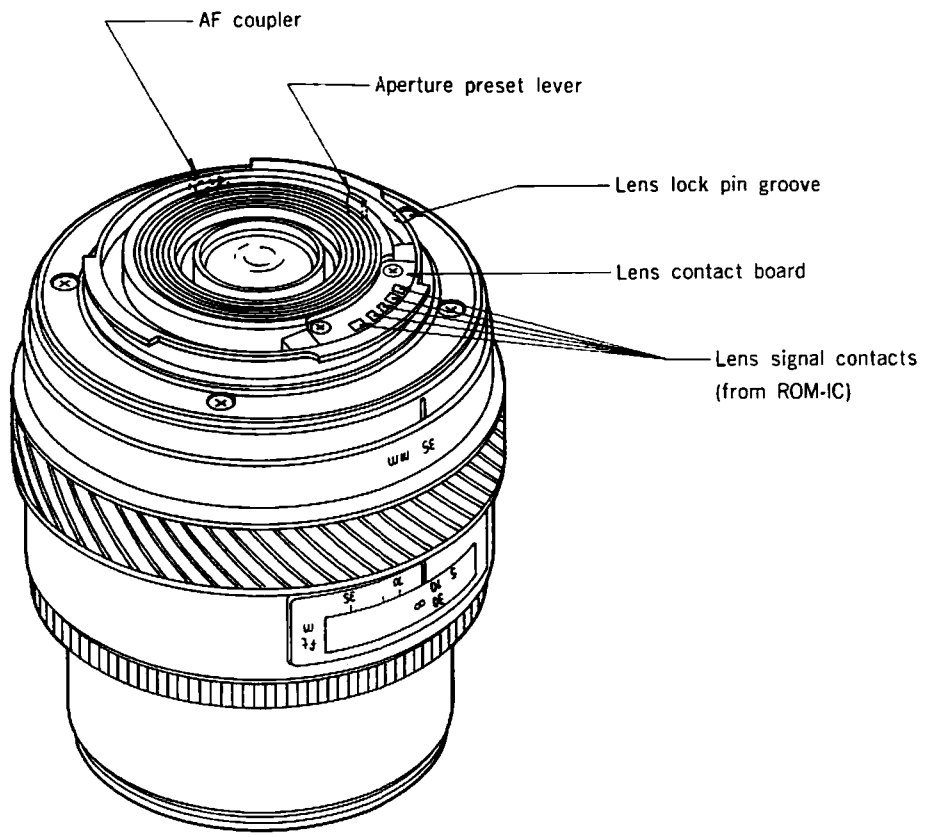
To correspond to AF system, and new exposure control system of Minolta new SLR-camera,Minolta A mount has the following features:

① AF coupler which transmits drive motion of body AF motor to focusing-lens shift mechanism.

② Five signal contacts which transmit lens data to body.

③ New aperture mechanism.

In addition to the features above, Minolta A mount has different flange-back distance and mount diameter from conventional lens.



(3) Transmission of lens data corresponding to new exposure control system.

Minolta A lens is provided with aperture mechanism and data corresponding to full-aperture metering memory system which enables body to set and control aperture.

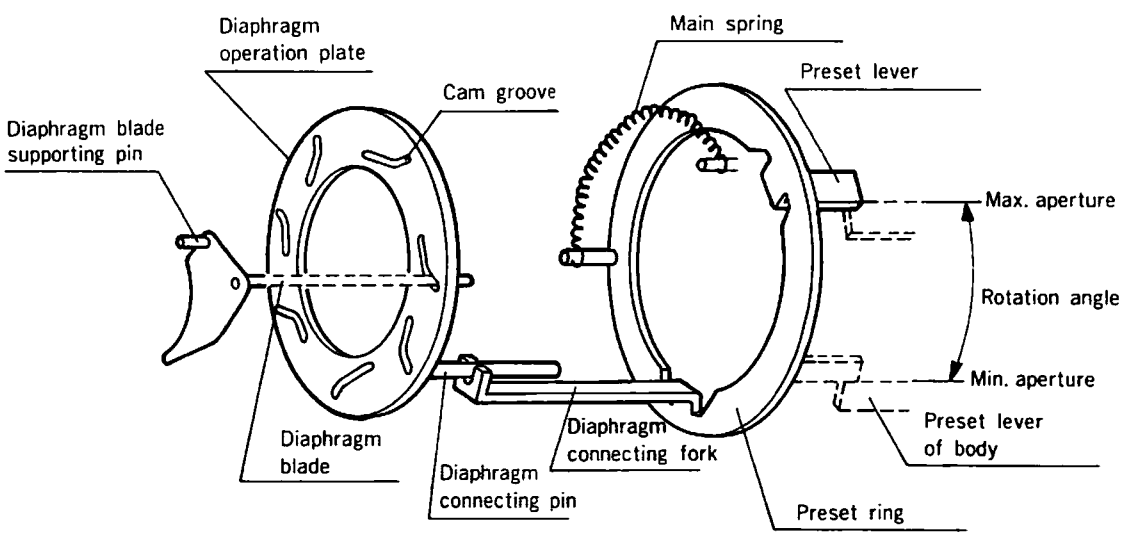
Each A-lens has preset lever which moves at equal intervals and with long stroke, and has ROM-IC which stores fixed data of lens own data (e. g. about aperture). Besides zoom lens has rotary encoder to transmit data about effective f-number which varies by zooming.

These lens signals (fixed and variable) are transmitted from ROM-IC. through lens signal contacts on rear-side of mount, to body.

Receiving these signals, body calculates and processes data metered by light receiver according to lens data and body data.
And the body displays corresponding indication and controls itself.

When shutter has released, preset lever of body rotates by amount of calculated and set stop-down, and then stops.
Preset lever of lens, interlocked with preset lever of body, rotates and stops to complete aperture setting. After exposure, preset lever of body returns to original position and aperture is reset to full-opening.

Aperture mechanism



Differences from MD lens

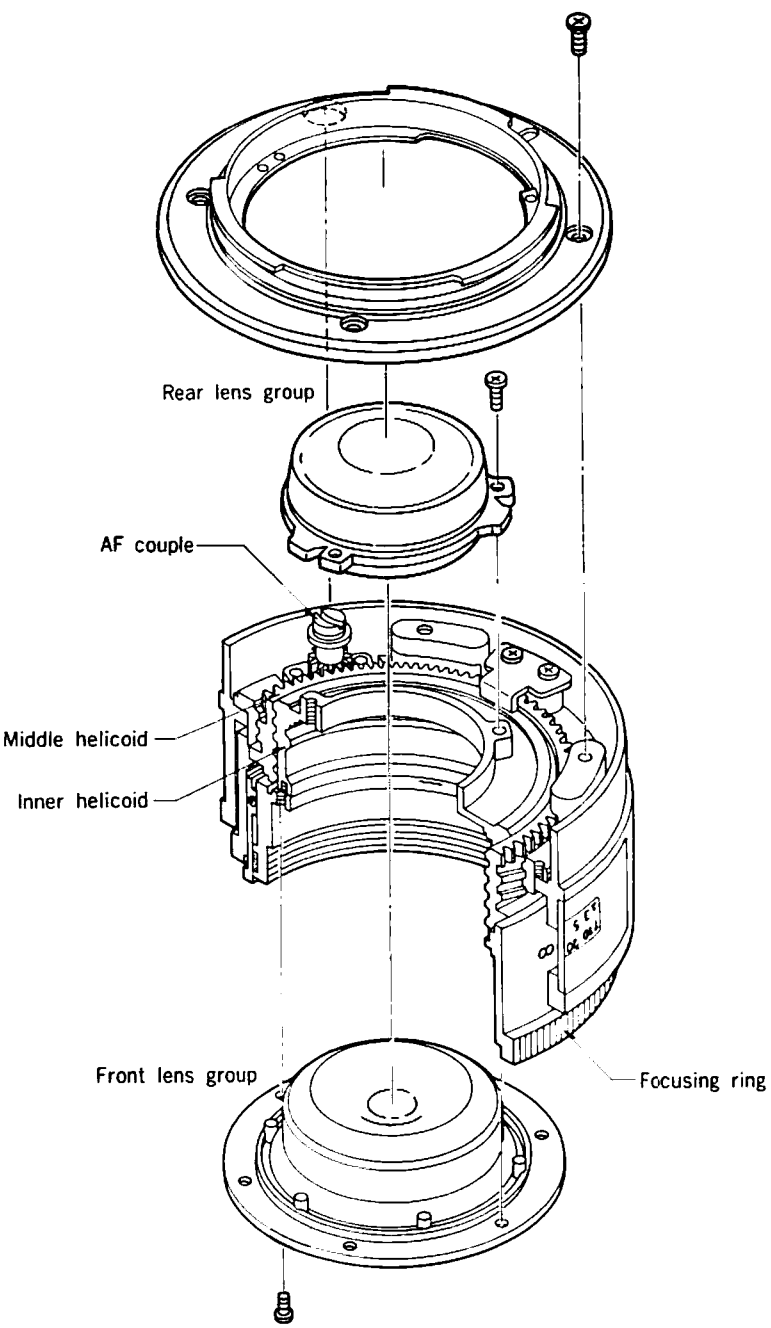
- Modification of position of parts related to body (e. g. preset lever).
- No aperture ring.
  Has cam on diaphragm operation plate.
- Rotation angle of preset lever is wider.
  Rotation angle per 1 EV has become equal (equal intervals) by cam groove on diaphragm operation plate.
- No overcharge of preset lever.
- Diaphragm blade consists of odd blades (7 or 9).

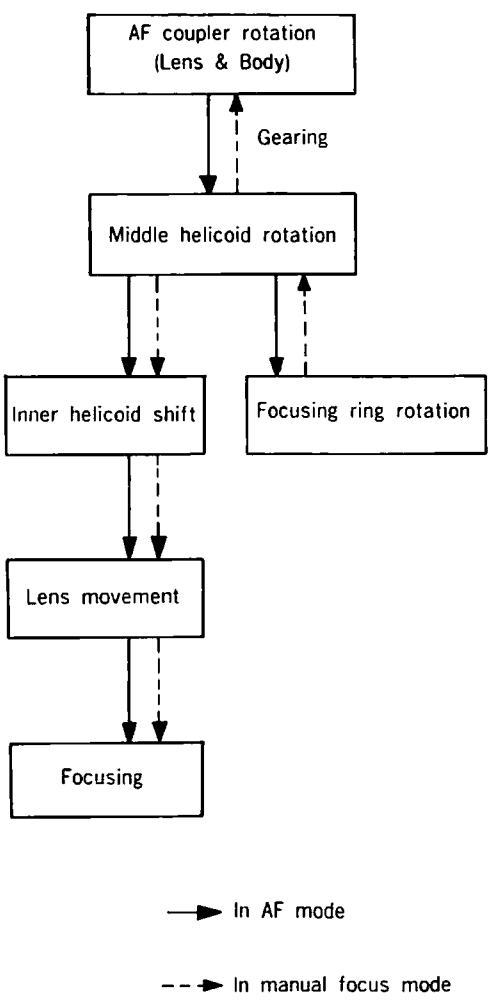
(4) Transmission of lens data and mechanism of lens.

Corresponding to AF system A-lens, provided with AF system, transmits lens data to body for AF operation, and has focusing-lens shift mechanism, corresponding to AF drive, control of body.

Each A-lens has its own peculiar ROM-IC which transmits rotation direction of focusing ring and conversion coefficient of focusing-lens shift amount as lens data needed for AF operation.

Besides zoom lens has rotary encoder which varies lens permanent data depending on lens setting (e. g. conversion coefficient of focusing-lens shift amount) and transmits the varied data through the five lens signal contacts to body. And some lenses transmit data on subject distance to body for aberration correction. Calculating and processing the lens data and the AF sensor data, body operates AF with focusing indication displayed.





3. Glossary of terms

(1) ROM-IC (Read-only-memory IC)

Only used to read out the memory stored in ROM. It is permament memory which has been stored when manufacturing and which cannot be modified any more.
Data stored in ROM remains there after power switch is turned OFF.
Minolta A lens uses ROM-IC which stores its own peculiar data and which supplies the data needed for exposure, AF control to CPU (see below) in body.

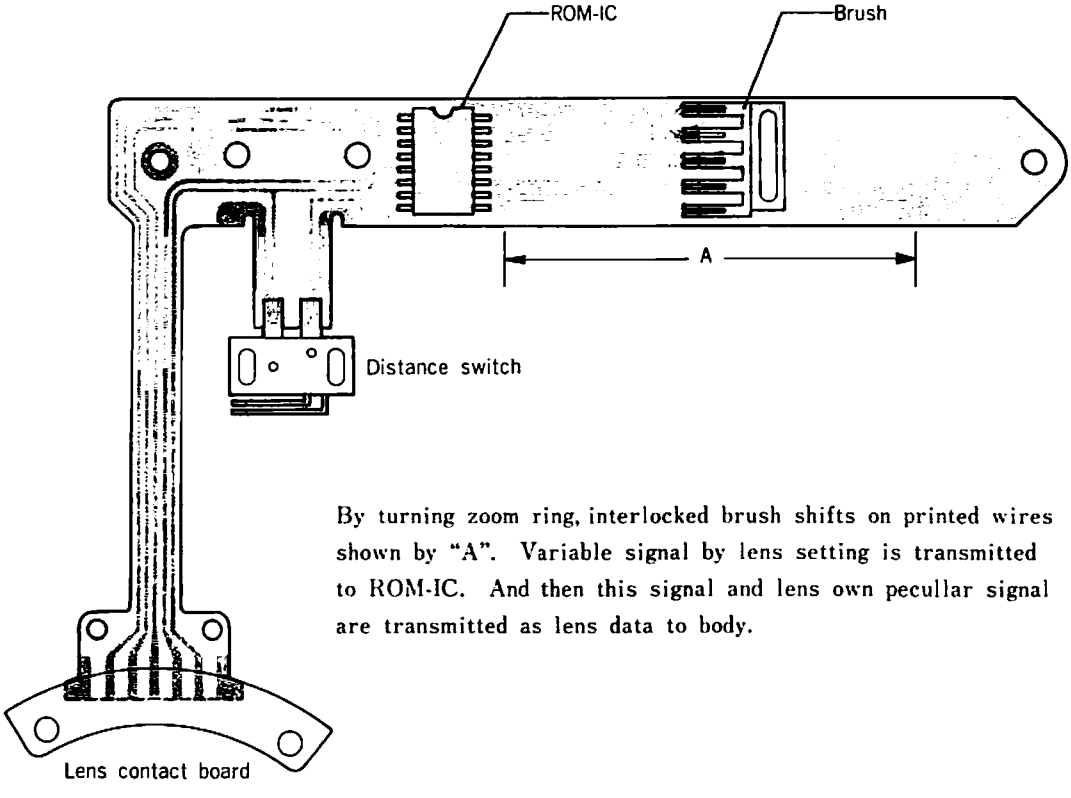
(2) CPU (Central processing unit)

Consists of the three units:

- Control unit which controls each unit following program decoded in this unit.
- Arithmetic unit which calculates data.
- Processor storage which stores program and data.
  (In some cases, processor unit is not included).

(3) Rotary encoder

Zoom lens has rotary encoder to vary lens own data corresponding to lens setting; e.g. focal length and in some cases effective f-number varied by zooming, macro capability.
Rotary encoder encodes automatically this variable data and transmits to ROM-IC.



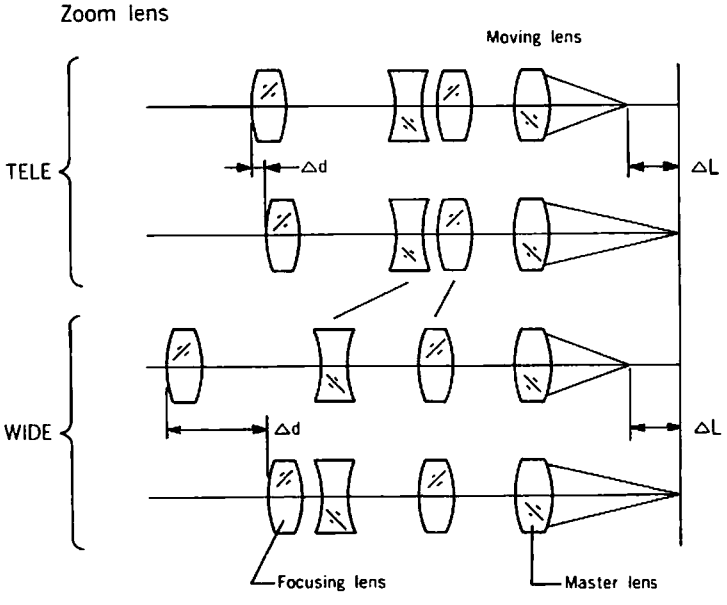
By turning zoom ring, interlocked brush shifts on printed wires shown by "A". Variable signal by lens setting is transmitted to ROM-IC. And then this signal and lens own peculiar signal are transmitted as lens data to body.

(4) Distance switch

Some A-lenses correct lens aberration corresponding to subject-to-camera distance. Such a lens has distance switch to transmit subject distance data to ROM-IC and to vary lens own peculiar data.

Some macro lenses use rotary encoder as distance switch.

(5) Conversion coefficient of focusing-lens shift amount (K_L)



Conversion coefficient of defocus amount ($\triangle L$) into focusing-lens shift amount ($\triangle d$)

$$K_L = \frac{\triangle d}{\triangle L}$$

Ratio of focusing-lens shift amount for focusing to defocus amount on film plane.

General checking/adjusting procedure

■ Precautions

- Since this lens many resin parts, keep the following in mind when assembling and adjusting.
  - ○ Use Flonsolve or alcohol when cleaning. Never use the thinner, ketone or ether.
- Since MOS-IC is used in this lens, it is necessary to take special precautions about static electricity. When performing repairs, use the conductive mat without fail, as shown.

INTRODUCTION

In this Service Manual, "General checking/adjusting procedure" for A-lens is described and is commonly used for every model.

Use this procedure with Repair Guide for your reference.

When you need the model's own procedure and/or allowable range, see Repair Guide of the model.

General checking/adjusting procedure

- ○Flange back (f' F) measuring, adjusting procedure (except zoom and special use lenses)
- ○Focus shift/flange back measuring, adjusting procedure, for zoom lens
- ○Projection resolving power checking procedure
- ○Aperture diameter adjusting procedure
- ○Aperture diameter checking (or pre-check) procedure
- ○Brush position checking/adjusting procedure
- ○General function checking procedure

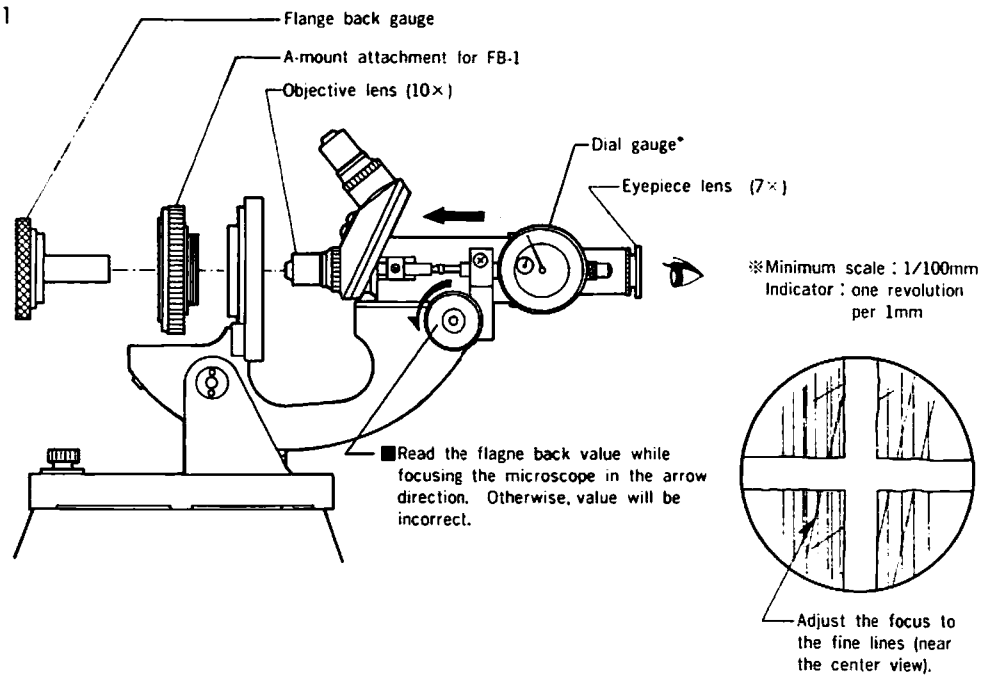
■ Flange back (f′F) measuring, adjusting procedure (except zoom and special use lenses)

■Measuring instruments : Collimator (Model RC-1000 Ⅰ*, Ⅱ*, Ⅲ) ※Discontinued model
For the lens whose focal length is 300mm or more, longer collimator (f= 1500mm or more) is needed.
: Flange back checking tester (FB-1)
: A-mount attachment for FB-1
: Flange back gauge (43.50mm)

■Preparation (refer to Fig. 1)

1. Rotate eyepiece helicoid to adjust dioptric power to scale, looking through eyepiece lens.
2. Set flange back checking tester to reference value (43.50mm).
   (1) Connect flange back gauge firmly on A-mount attachment for FB-1 (paying attention to diaphragm full opening lever), and look into eyepiece lens and shift microscope in the direction shown in Fig.1, the fine lines on flange back gauge are clearly visible.
   (2) Set scale "0" to dial gauge indicator, turning outer ring of dial gauge. Then write down short indicator value as flange back (43.50mm) for reference value of calculation.

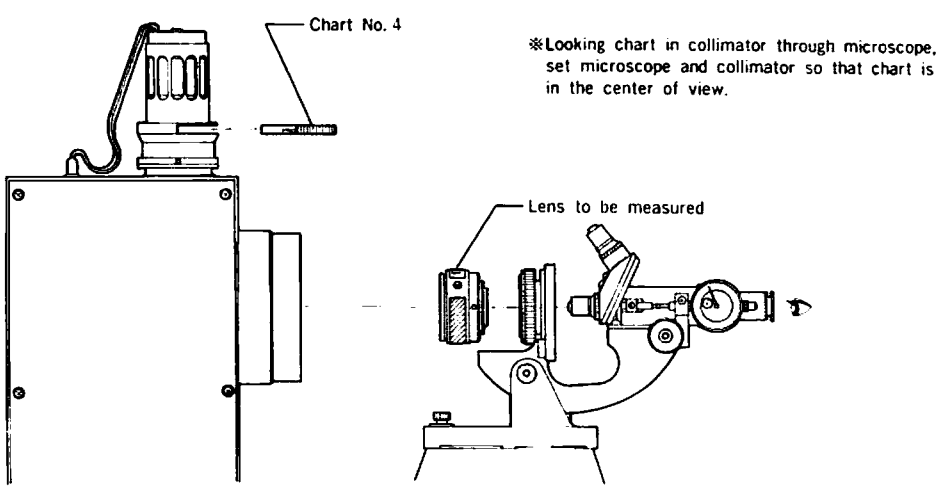
■Fig. 1



■Measuring procedure

1. Set lens and measuring instruments as shown in Fig. 2.

■Fig. 2



2. Turn focusing knob of microscope, stop turning at the in-focus point where green and red colors appear in equal quantity.

   Note : For RF lens or the like, with which color difference is not noticeable, regard the point where chart is most clearly visible as in-focus point.

3. Read flange back value

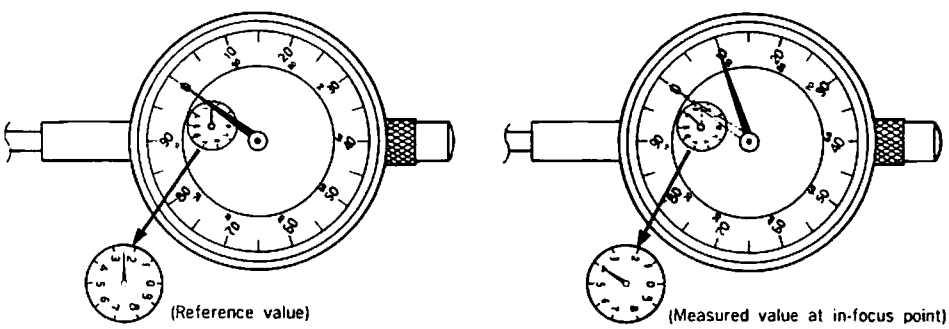
   Read value of dial gauge indicator, and obtain flange back value of lens calculating with reference value (43.50mm).

   Flange back (f′F) = Reference value + Number of short indicator + Value of long indicator revolution.

   "EXAMPLE : In case of Fig. 3.

   Flange back (f′F) = 43.50 + (4−3) + (10−0) × 1/100 = 44.60mm

■Fig. 3



4. Judgment

   Check if measured value meets allowable range of flange back, referring Service Manual Repair Guide of each model.

   If out of allowable range, adjust flange back following procedure below.

■Adjusting procedure

1. Disassemble the lens until distance ring can be adjusted easily.

   e.g. For 2550-100, -600 (f:1.7/50mm), remove name ring and hood set.

   (Refer to Repair Guide on p. 4.)

2. Attach lens to microscope (refer to p. 1).
3. Set dial gauge to specified value (center value of allowable range).
4. Turn distance ring, looking chart in collimator through microscope, stop turning at the in-focus point where green and red colors appear in equal quantity.

   Note : If in-focus point cannot be obtained even though distance ring is fully turned, shift the position of distance ring.

   (Turn distance ring to infininity (∞), loosen distance ring screws, turn helicoid itself slightly to infinity (∞). Then tighten the screws temporarily, and adjust focus following above procedure.)

5. Loosen distance ring screws slightly and turn distance ring itself to stop position. Then tighten screws.
6. Make sure distance ring smoothly operates from minimum distance to infinity (∞).
7. Re-turn distance ring to infinity (∞), and re-check if flange back value is within the allowable range.

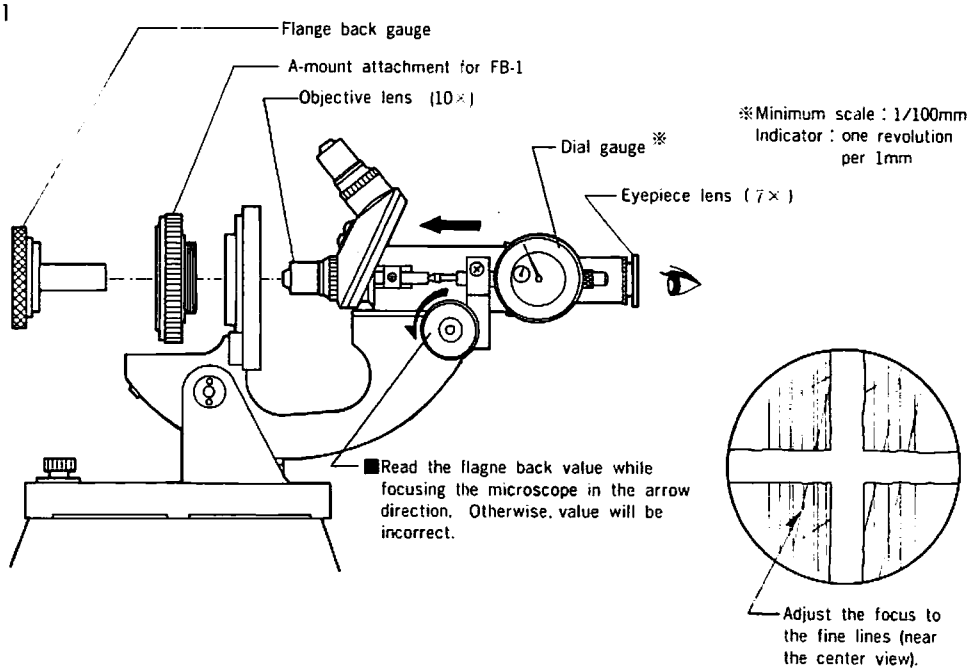
■ Focus shift/flange back measuring, adjusting procedure, for zoom lens

■Measuring instruments : Collimator (Model RC-1000 Ⅰ*, Ⅱ*, Ⅲ) ※Discontinued model
For the lens whose focal length is 300mm or more, longer collimator (f= 1500mm or more) is needed.
: Flange back checking tester (FB-1)
: A-mount attachment for FB-1
: Flange back gauge (43.50mm)

■Preparation (refer to Fig. 1)

1. Rotate eyepiece helicoid to adjust dioptric power to scale, looking through eyepiece lens.
2. Set flange back checking tester to reference value (43.50mm).
   (1) Connect flange back gauge firmly on A-mount attachment for FB-1 (paying attention to diaphragm full opening lever), and look into eyepiece lens and shift microscope in the direction shown in Fig. 1, the fine lines on flange back gauge are clearly visible.
   (2) Set scale "0" to dial gauge indicator, turning outer ring of dial gauge. Then write down short indicator value as flange back (43.50mm) for reference value of calculation.

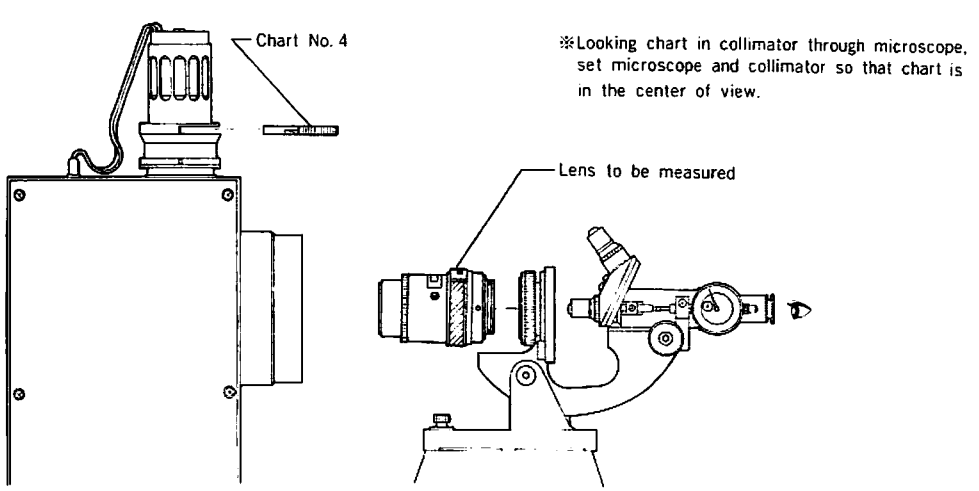
■Fig. 1



■Measuring procedure of focus shift (caused by zooming)

1. Set lens and measuring instruments as shown in Fig. 2.

■Fig. 2



2. Measure flange back at each focal length specified in Service Manual Repair Guide of each model

e.g. 2551-100 (f:4/35-70mm)

Measure flange back at focal length of 35mm, 50mm, 70mm.

Calculating procedure of focus shift

Focus shift = (Maximum flange back) − (Minimum flange back)

e.g. If measured flange back value is as below...

Focal length 35mm : 44.60mm

50mm : 44.63mm

70mm : 44.58mm

Focus shift = 44.63 − 44.58 = 0.05mm

(1) Turn focusing knob of microscope, stop turning at the in-focus point where green and red colors appear in equal quantity.

(2) Read flange back value

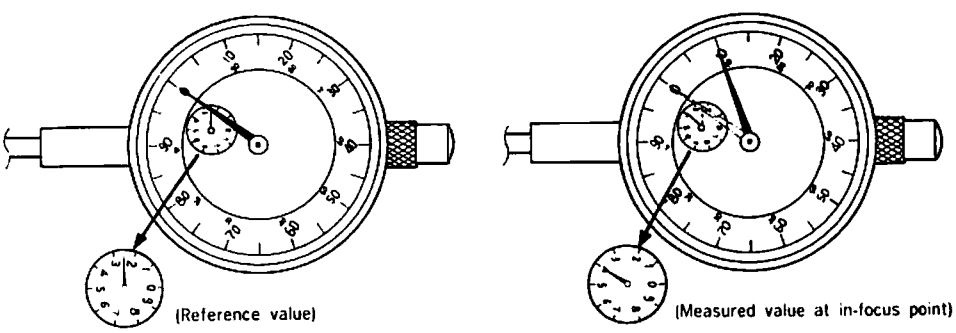
Read value of dial gauge indicator, and obtain flange back value of lens, calculating with reference value (43.50mm).

Flange back (f'F) = Reference value + Number of short indicator revolution + Value of long indicator

EXAMPLE : In case of Fig. 3.

Flange back (f'F) = 43.50 + (4−3) + (10−0) × 1/100 = 44.60mm

■Fig. 3



(3) Judgment

Check if measured value meets allowable range of flange back, referring Service Manual Repair Guide of each model.

If out of allowable range, adjust flange back following procedure below.

■Adjusting procedure of focus shift.

1. Disassemble the lens until focus shift can be adjusted easily.

Regularly, disassemble until installing position of focus lens group (front lens group) can be adjusted.

e.g. 2551-100 (f:4/35-70mm) : Remove name ring (2551-1241).

2555-100 (f:4/70-210mm) : Unnecessary to disassemble.

2. Set lens and measuring instruments as shown in Fig. 2 on p. 3.

Distance ring : Infinity

Aperture : Full opening

(Aperture fully opens automatically when setting lens to flange back checking tester.)

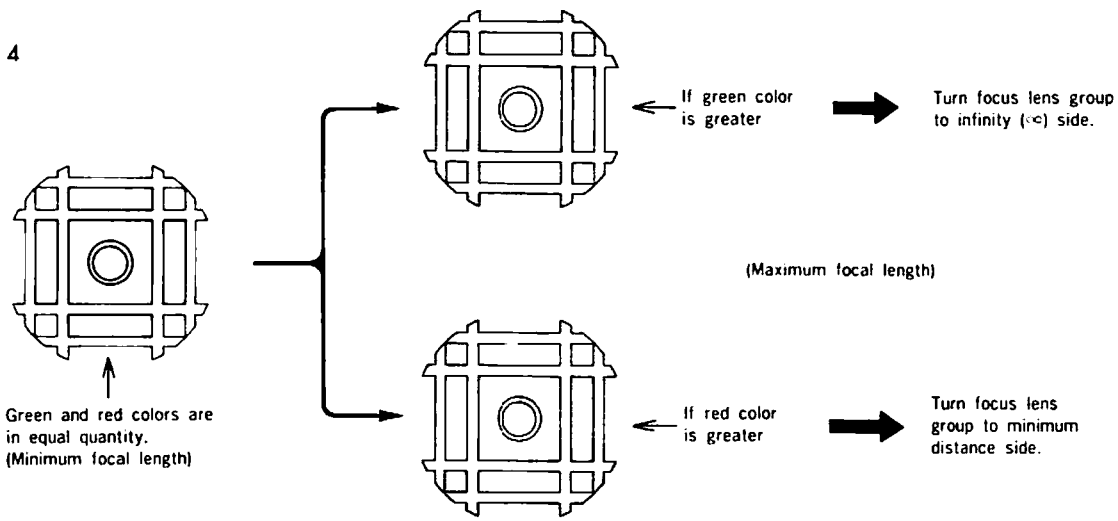
3 . Adjust focus shift at minimum and maximum focal lengths.

NOTE : When zooming, hold lens itself avoiding lens turning; otherwise aperture may be changed slightly.

(1) Set lens to minimum focal length, and adjust focus turning focusing knob of microscope so that red and green colors appear in equal quantity.

(2) Set lens to maximum focal length, and loosen focus lens group screws (three screws in general). Then adjust focus turning focus lens group, paying attention not to touch flange back checking tester.

■Fig. 4



(3) Re-set distance ring to infinity position keeping focus lens group in position, and tighten focus lens group screws.

(4) Repeat 3 or 4 times above (1)−(3) so that focus shift value meets allowable range.

■Adjusting procedure of flange back.

• Before flange back adjustment, adjust focus shift first.

1 . Measure flange back at each focal length (refer to p. 3), and check if flange back value meets allowable range (refer to Service Manual Repair Guide of each model). If out of allowable range, calculate correct value (refer to Fig. 5).

• Key point

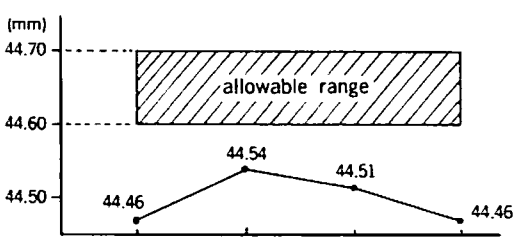
If shorter than allowable range.....
decrease back washer thickness.

If longer than allowable.....
increase back washer thickness.

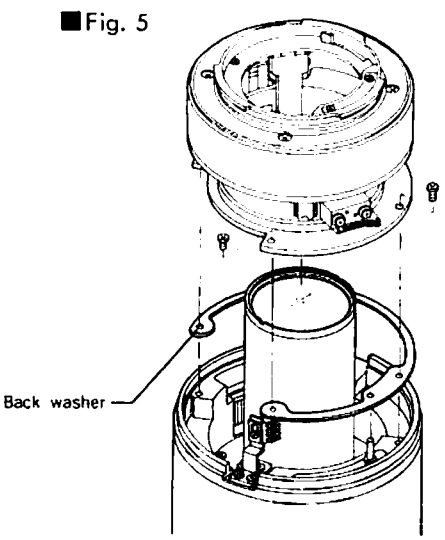
2 . Remove back washer from lens unit.

3 . Measure thickness of original back washer. Then select proper thickness of washer to correct total thickness of back washer. (Classified back washers are given in Service Manual Repair Guide of each model).

4 . After assembling, make sure flange back at each focal length meets allowable range.



■Fig. 5



■ Projection resolving power checking procedure

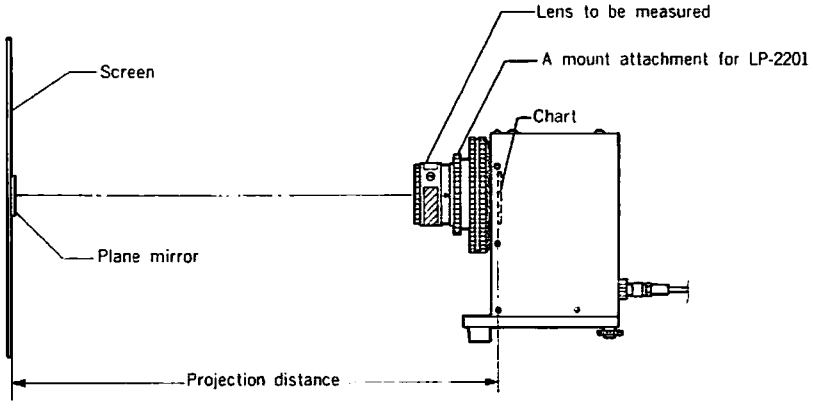
Reading correct projection resolving power in service facilities is very hard, since it depends on measuring circumstances such as instruments, inspectors, and so forth.
Accordingly, use the projection resolving power table in Service Manual as the allowable ranges for general purpose photography.

■Measuring instruments : Lens test projector (Model LP-2201)
: A-mount attachment for LP-2201
: Screen (art paper)
: Tape measure
: Plane mirror (Use SLR's mirror)

■Preparation

1 . Set lens and measuring instruments as shown below.

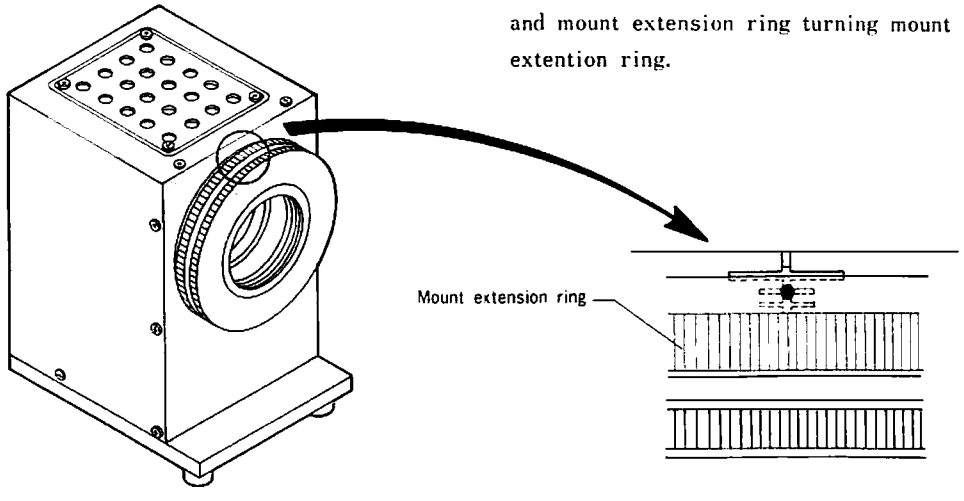
■Fig. 1



(1) Set the projection distance from chart to screen following Service Manual Repair Guide, since setting distance varies according to focal length of measured lens.
(2) Set screen and lens test projector (chart) in parallel.
Set the plane mirror to the center of projected image and position the projector so that light reflected from mirror is at the center of measured lens.
(3) Adjust the distance, from mount (flange) surface to chart, to 44.6mm referring to Fig. 2.

■Fig. 2

Fully turn mount extension ring clockwise, then match the indexes of lens test projector and mount extension ring turning mount extention ring.



■Measuring procedure

1 . Read the maximum projection resolving power of the center image.
Turn distance ring to adjust focus so that projected center image (y′ = 0 mm) on screen is the maximum resolution.

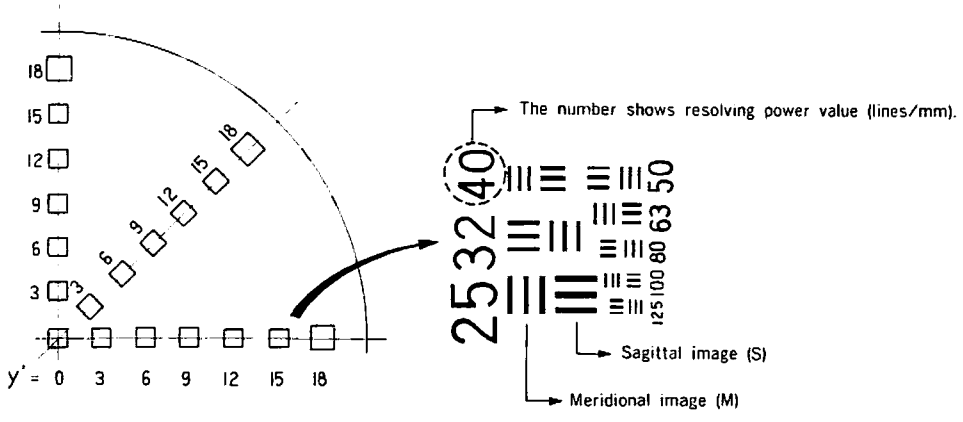
2 . Read the projection resolving power of the spherical image (y′ = 15mm) on screen, without distance scale ring turning.

(1) Observe the minimum resolving power of the spherical image (y′ = 15mm) turning mount rotation ring.

(2) At the minimum resolving power point, read the maximum resolving power* of sagittal and meridional images saparately.

※Maximum resolving power : The visually distinguishable closest lines.

■Fig. 3



3 . Check if projection resolving power meets allowable range in Service Manual Repair Guide.

NOTE : Pay attention not to read spurious resolution as measured value.
Spurious resolution : The reversed image (two or four lines) on screen as shown below, may be appeared at the point of more than the maximum resolving power of measured lens itself.

■Fig. 4

Correct image　　Spurious resolution

■ Aperture diameter adjusting

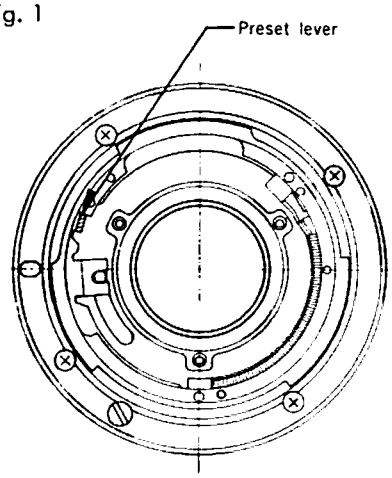
■Outline

This is adjusting procedure of aperture diameter for A-lens before aperture diameter pre-check (on next page).

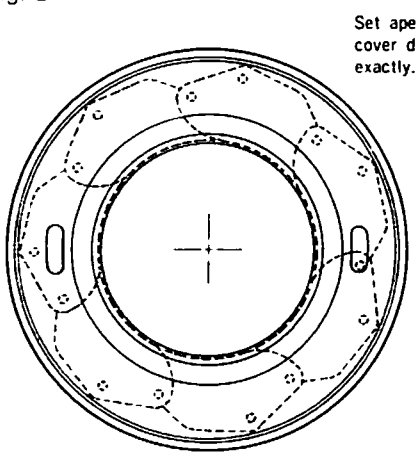
Generally, diaphragm blades of A lens open fully when preset lever (preset ring) touches bayonet mount. (See Fig. 1.)

In above condition, adjust aperture diameter. (See Fig. 2.)

■Fig. 1



■Fig. 2



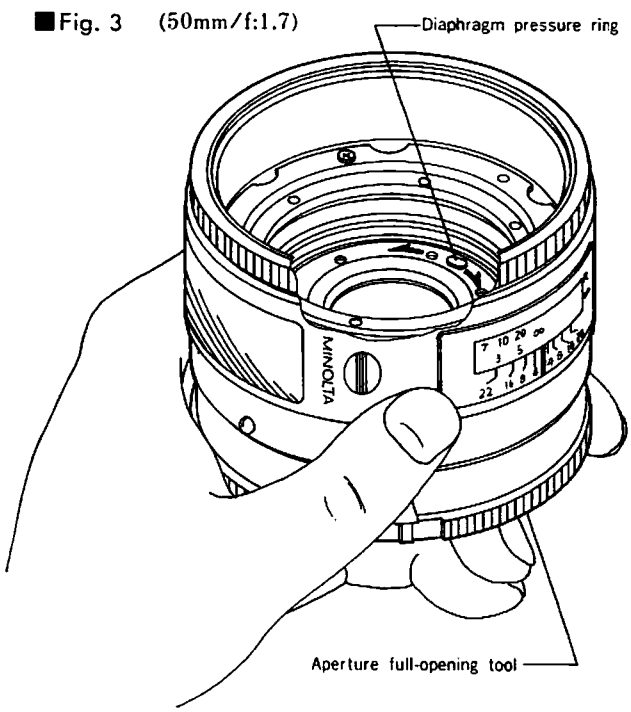
NOTE

Aperture diameter of some A lens does not open fully in the condition of Fig. 1. (Example: 35-70 mm/f:4, 28-135 mm/f:4-4.5)
Check/adjust referring Repair Guide of each model.

■Tool : Aperture full-opening tool (2550-0110-75)

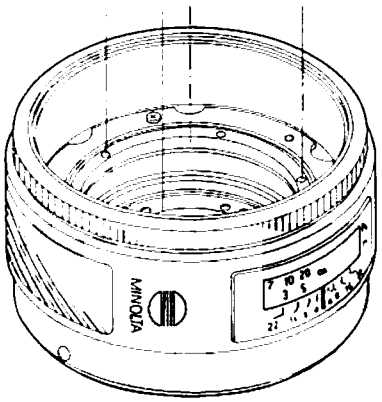
■Adjusting procedure

■Fig. 3 (50mm/f:1.7)



1. Disassemble (or assemble) lens for the adjustable condition.
   Generally, remove the lens elements which are installed front side of diaphragm blades. (See Repair Guide of each model.)
2. Loosen diaphragm pressure ring.
   Loosen screws (× 3) or remove adhesion of diaphragm pressure ring spring.
3. Set preset lever at full opening position with using tool. (See Fig. 3.)
4. Turn diaphragm pressure ring and set aperture diameter at full opening. (See Fig. 2.)
5. Install diaphragm pressure ring in position. Tighten screws. Or apply bond on diaphragm pressure ring spring after aperture diameter pre-check. (refer to p. 9) (If aperture diameter does not meet allowable range after pre-check, adjust again.)

■ Aperture diameter checking (or pre-check)



For pre-check, remove front lens group as Fig. 1.
Never fail to check aperture diameter at completion of assembling for final checking.

■Fig. 1 The condition for pre-check
(50mm/f:1.7)

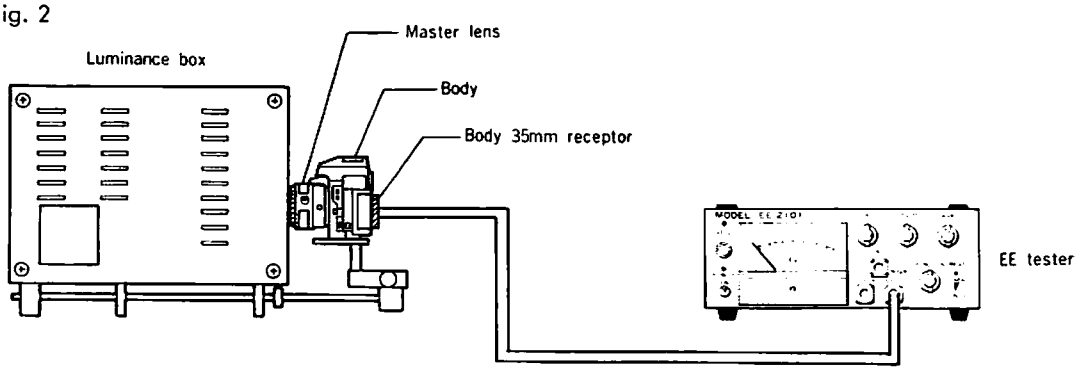
■Measuring instruments : Luminance box (Model L-2101, L-222*, L-223*) ※Discontinued model
: EE tester (Model EE-2101, EE-2111)
: Aperture error receptor for EE tester (Model 8034-760)
: Master lens
: Reference body (See Fig. below.)

■Selecting reference body

Select reference body as the followings.

1. Set measuring instruments and body as Fig. 2 below.

■Fig. 2



• Luminance box		• Body		• Master lens		• EE tester	
K value	: 1.2	Exposure mode	: M	Distance scale	: ∞ (infinity)	Function	: 35
Luminance	: EV 11	Shutter speed	: bulb			ASA	: F
		Aperture	: f/5.6			K value	: 1.2
		Focus mode	: M			MEAS-CALF	: CALF
						F	: 5.6

2. Release the shutter ten times at bulb setting.
If the indicated values and dispersion (difference between max. and min. value) meet Table 1, use the body as reference body.

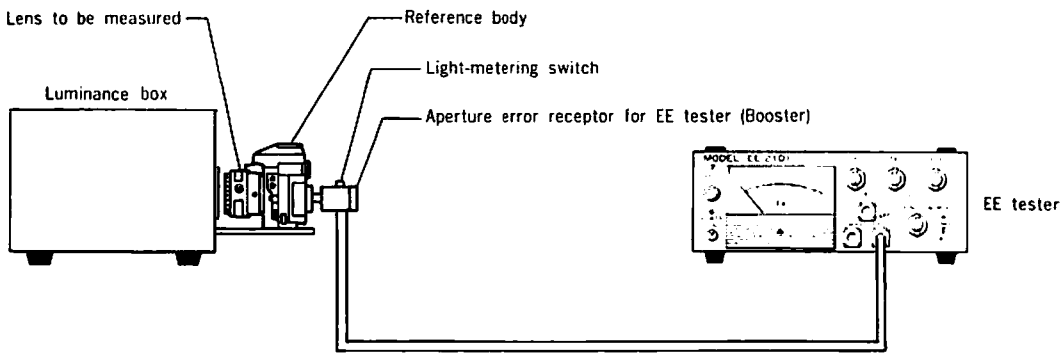
3. Record the average of indicated value. (Use as error of reference body when measuring lens.)

Table-1

Indicated value (Average)	Dispersion
within ±0.4EV	within 0.5EV

■Preparation

1. Set the measuring instruments as Fig. below.



- Luminance box
  - K value : 1.2
  - Luminance : EV 11
- Reference body
  - Mode : M
  - Shutter speed : bulb
  - Aperture : full opening
  - Focus mode : M
- Lens to be measured
  - Distance : ∞ (infinity)
  - Zoom operation ring : tele side (only for zoom lens)
- EE tester
  - FUNCTION : 35
  - ASA : F
  - K value : 1.2
  - MFAS-CALF : CAL F

NOTE

1. When installing the lens to reference body, check if diaphragm blades in optical path are not visible at full opening setting.
   ① For servicing checking procedure, aperture diameter at each setting is measured by film surface illuminance comparing value at full opening setting as the reference.
   ② This adjusting procedure is not usable for some models which have diaphragm blades visible in optical path at full opening setting. (Example:35-70 mm/f:4, 28-135 mm/f:4-4.5) See Repair Guide of each model.
2. When measuring built-in filter type lens, set filter at "NORMAL" or "1A". (Example:300mm/f:2.8)

2. Set the correcting value of EE tester.
   (1) Set the F dial of EE Tester to the f-number of the lens to be measured (full opening) according to the Table 2.
   (2) Release the shutter at bulb setting.
   (3) Pressing the light-metering switch of the receiver, adjust the sensitivity changeover scale so that the correcting value of EE tester is as shown in the Table 2.

NOTE

- Repeat above (2) and (3) several times to obtain correcting value (average), considering dispersion.

※Use relevant correcting value for pre-check of aperture also.

Table-2

F-number of lens to be measured (full opening)	F dial of EE tester	※ Correcting value of EE tester
F1.2	F1.4	+0.2 EV
F1.4	F1.4	−0.2 EV
F1.7	F 2	+0.3 EV
F1.8	F 2	+0.15EV
F 2	F 2	−0.1 EV
F2.5	F2.8	+0.25EV
F2.8	F2.8	−0.1 EV
F3.5	F 4	+0.3 EV
F 4	F 4	−0.1 EV
F4.5	F 4	−0.4 EV
F5.6	F5.6	−0.1 EV
F6.3	F5.6	−0.35EV

■Measuring procedure

1. Set f-number of lens to be measured and F dial of EE tester as Table 3.

Table 3

f-number of lens (full opening)	f/1.4-f/3.5	more than f/3.5
F dial of EE tester and aperture setting of lens	f/5.6	f/11

※Use smaller aperture for measuring varible-effective f-number zoom lens.

2. Release the shutter several times with holding light-metering switch of booster.

3. Read the average of measured value and calculate aperture error as below.

[Aperture error] = [Average of measured value] − [Error of reference body※]

※See "Selecting of reference body" on p. 9.

(Example) Average of measured value = −0.3EV
Error of reference body = −0.2EV
} −0.3−(−0.2)=−0.1
Aperture error=−0.1Ev

4. Make sure that aperture error meets the allowable range of Table 4.

Table 4

F dial of EE tester and aperture setting of lens	f/5.6	f/11
Allowable range	within ±0.3EV	within ±0.4EV

※If aperture diameter does not meet allowable range after pre-check, adjust again.

■ Lens brush position checking/adjusting procedure

Checking/adjusting of zoom lens for brush position of rotary encoder for variable information input/output.

Preparation

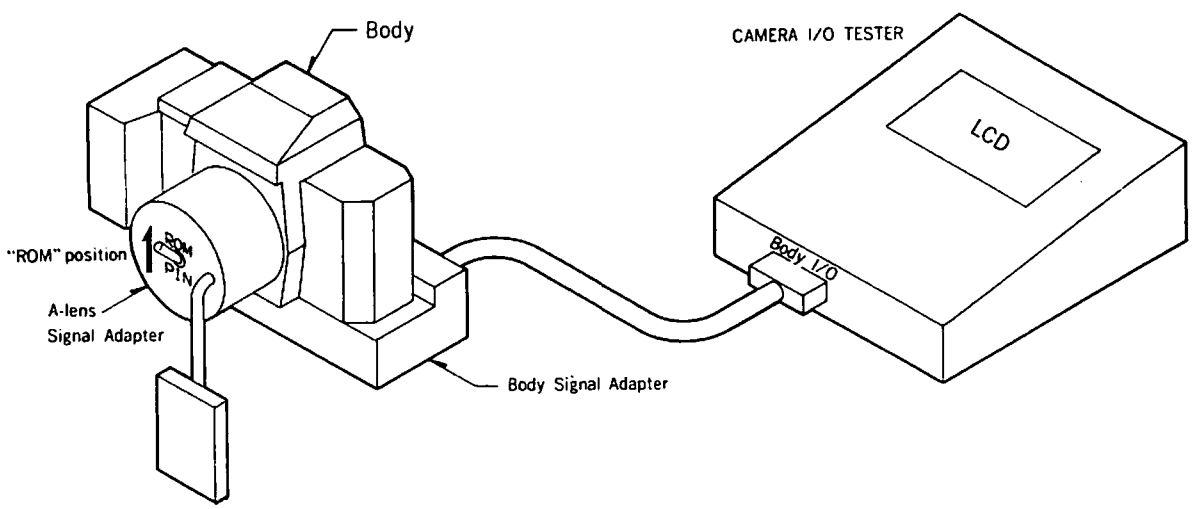
For this checking/adjusting, pre-check the measured lens for ROM-IC following p. 14 "General checking/adjusting procedure.

■ Measuring instruments : Camera I/O tester (Model IO-5101)
: Reference body (See p. 4 "Selecting reference body")

■ Selecting reference body

(1) Set the measuring instruments as Fig. 1.

■ Fig. 1



- A-lens Signal Adapter
  Switch : ROM
- Body
  Sw. M : ON or
  Focus mode Sw. : M
- CAMERA I/O TESTER
  Measuring item : Lens ROM signal checking

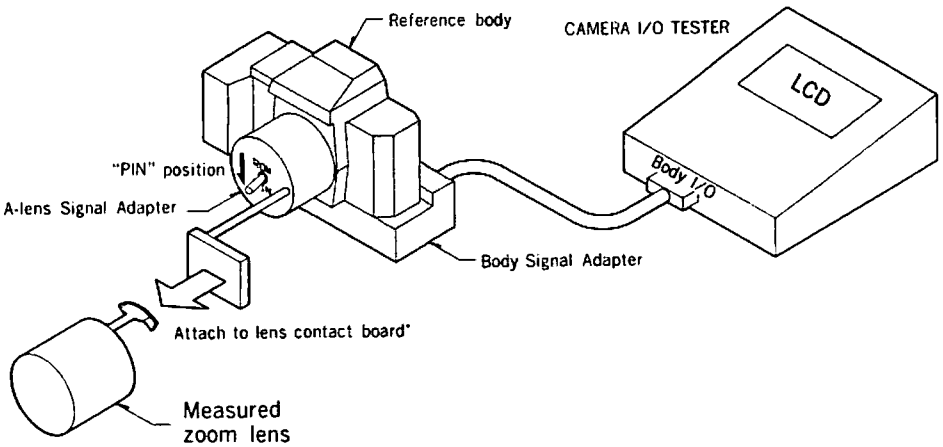
(2) Make sure code No.* of the lens appears on LCD of Camera I/O tester.
*e.g. "2550" for 50mm f/1.7

If "OUT" appears, exchange the body to re-check. Select the body which shows "OK" as measuring instrument.

■Checking/adjusting

1. Set the measuring instruments as Fig. 1.

■Fig. 1



- Measured zoom lens
  Zoom ring : Stop position in tele or wide side
  (For attaching, see Fig. 2 or Repair Guide.)
- A-lens Signal Adapter
  Switch : PIN
- Reference body
  Sw. M : ON or ■)))
  Focus mode Sw. : M
- CAMERA I/O TESTER
  Measuring item : Lens brush positioning

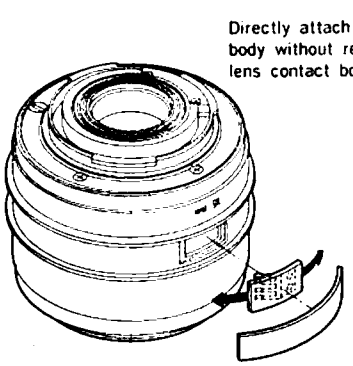
For checking of brush position, directly attach the lens, without disassemling, to the body.
(A-lens Signal Adapter not required)

2. Set zoom ring to tele or wide (depending on model. See Fig. 2) until it stops. Make sure "OK" appears on LCD of Camera I/O tester.
3. If "OUT" appears, adjust lens brush position so that "OK" appears. (For adjusting procedure, see Fig. 2 or Repair Guide.)
4. Give zoom ring one return and set it to tele or wide (depending on model) until it stops. Make sure "OK" appears on LCD. If "OUT" appears, repeat steps from "3" above.

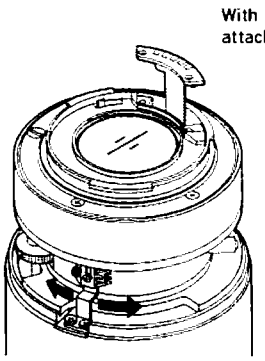
Attaching of A-lens Signal Adapter/Setting of zoom ring

(For other lenses, see Repair Guide of each model)

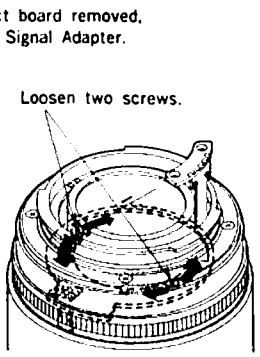
■Fig. 2



Ex. 35-70mm F4 (Set to tele)



Ex. 70-210mm F4 (Set to tele)
35-105mm F3.5-4.5 (Set to tele)
28-85mm F3.5-4.5 (Set to tele)



Ex. 28-135mm F3.5-4.5
(Set to wide)

■ General checking/adjusting procedure

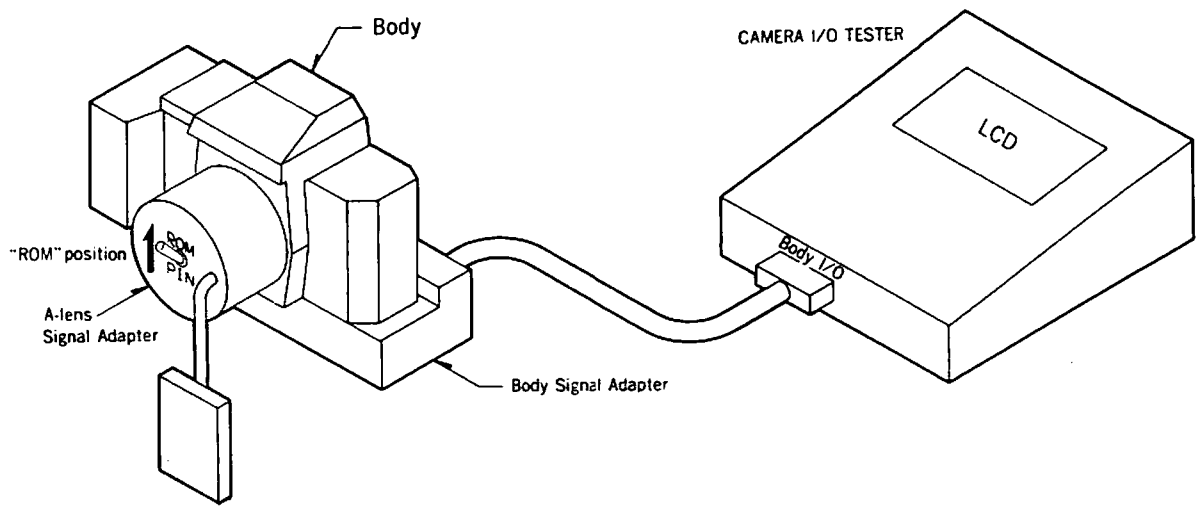
1. Lens ROM signal checking.

■Measuring instruments : Camera I/O tester (Model IO-5101)
: Reference body (See below)

■Selecting reference body

(1) Set the measuring instruments as Fig. 1.

■Fig. 1



- A-lens Signal Adapter
  Switch : ROM
- Body
  Sw. M : ON or
  Focus mode Sw. : M
- CAMERA I/O TESTER
  Measuring item : Lens ROM signal checking

(2) Make sure code No.* of the lens appears on LCD of Camera I/O tester.
*e.g. "2550" for 50mm f/1.7
If "OUT" appears, exchange the body to re-check. Select the body which shows "OK" as measuring instrument.

■Checking

For single focal-length lens…

(1) After checking the body, detach A-lens Signal Adapter from the body, and attach measured lens instead. (Refer to Fig. 1)

(2) Make sure code No. of measured lens appears on LCD of Camera I/O tester.
e.g. "2550" appears for 50mm f/1.7

(3) If "OUT" or other lens code No. appears, the lens is defective.
Repair following Trouble-Shooting Chart.

For zoom lens···

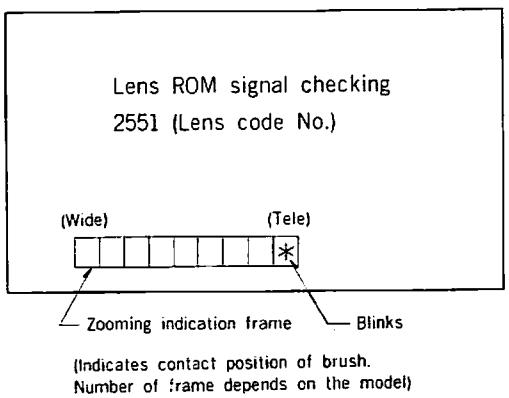
(1) After selecting body (p. 14 Fig. 1), detach A-lens Signal Adapter from the body.

(2) Attach the lens to the body with zoom ring set to tele until it stops.

(3) Make sure the lens code No. appears on LCD of Camera I/O tester, and that "*" blinks at right end (tele side) of zooming indication frame. (Refer to Fig. 2)

■Fig. 2

e.g. Camera I/O tester LCD display with 35-70mm f4



- No letters in ( ) appear.
- If lens code No. of the measured lens does not appear ("OUT" or other lens code No. disply), repair the lens following Trouble-Shooting Chart.
- If normal signal does not appear in the zooming indication frame, check and repair brush for position/contact.

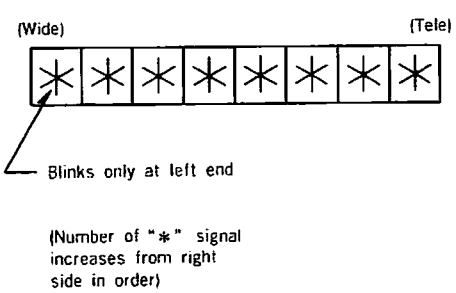
(4) Turn zoom ring SLOWLY to wide.

"*" should blink and increase in number from right side of zooming indication frame in order.

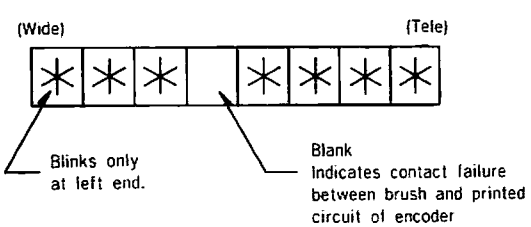
By turning zoom ring to wide until it stops, make sure "*" only at the left end should blink, and other "*" signals should glow. (Refer to Fig. 3)

■Fig. 3 (Display of zooming indication frame with 35-70mm f/4)

Example of normal lens



Example of defective lens



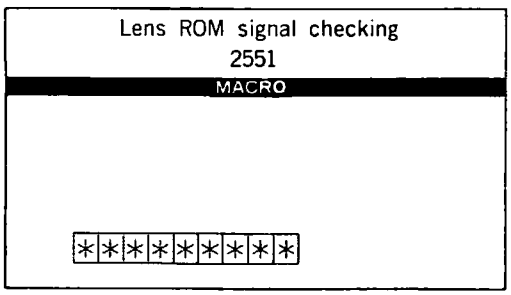
(5) Re-turn zoom ring SLOWLY to tele side.

Make sure position of "*" signal blinking moves from left (wide side) to right (tele) each after each.

(6) With zoom ring set at MACRO, turn zoom ring SLOWLY.
Make sure "MACRO" always appears on LCD as Fig. 5.

■Fig. 4

e.g. Camera I/O tester LCD display with 35-70mm f/4

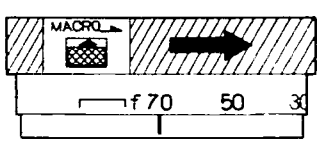


- "MACRO" always appears with zoom lens in macro range.
- "MACRO" appears only with zoom lens for which macro is set by zoom ring.
(e.g. No "MACRO" display with 70-210mm f/4)

(7) Turn and reset zoom ring to zoom range. Turn zoom ring until it stops (to tele or wide depending on model)
Make sure NO "MACRO" appears.

■Fig. 5

e.g. 35-70mm f/4



In zoom range, turn zoom ring in the direction of arrow (f=70mm side) until it stops.

- If "MACRO" appears, check/adjust lens brush position (p. 12).

■ Measuring instruments

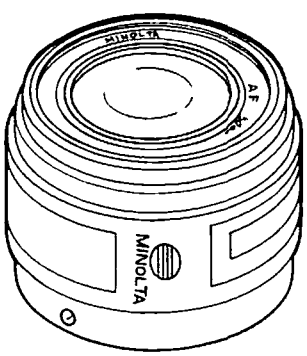
■Collimator 〈MODEL RC-1000Ⅲ,*Ⅱ,*Ⅰ〉
■Collimator (f=1500mm or more)
■Flange back checking tester 〈MODEL FB-1〉
NEW A-mount attachment for FB-1
■Flange back gauge (43.50mm)
■Lens test projector 〈MODEL LP-2201〉
NEW A-mount attachment for LP-2201
■Screen (art paper)
■Luminance box 〈MODEL L-2101,*L-222,*L-223〉
■EE tester 〈MODEL EE-2101, EE-2111〉
■Aperture error receptor for EE tester 〈MODEL 8034-760〉
■Body 35mm receptor
NEW Camera I/O tester 〈MODEL IO-5101〉

(※Discontinued model)

■ Exclusive tools

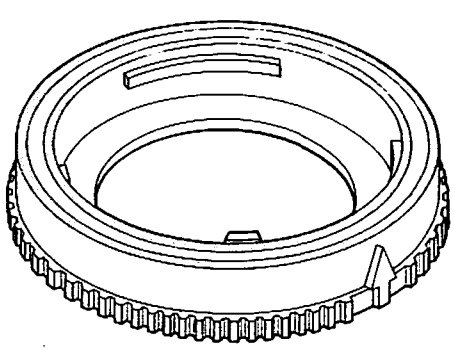
■ Tool No. 2072-0001-75

Master lens



■ Tool No. 2550-0110-75

Aperture full-opeing tool



■ Tools used in common

■ Tool No. 2507-0112-75
Diaphragm assembly tool

■ Tool No. 2514-1416-75
Spring washer tool

■ Tool No. 2514-1416-76
Spring washer push rod

■ Spring washer hook

■ Tool No. 2521-8241-75
Name ring wrench (φ49)

■ Tool No. 0515-8241-75
Name ring wrench (φ55)

■ Tool No. 0676-8241-75
Name ring wrench (φ72)

■ Subsidiary materials

■ Lubricant
- G-10
- G-20
- G-30
- G-40
- G-50
- G-60
- G-70
- G-80

■ Adhesive
- B-10
- B-20
- B-40
- B-50
- B-60

■ Anti-diffusion compound
- A-10
- A-20

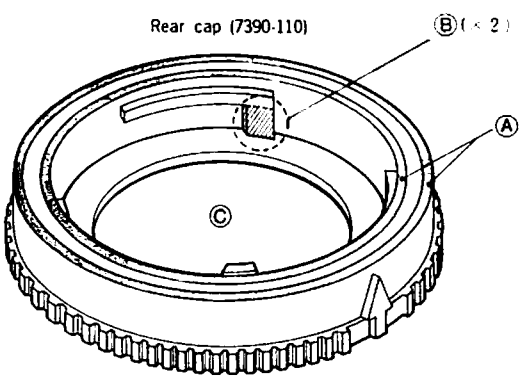
■ Cleaner
- Flonsolve

■ Solvent
- Thinner

■ Other
- Frosting lacquer

■ Aperture full-opening tool making procedure

Here is the procedure to make aperture full-opening tool (2550-0110-75); however, order the tool if necessary.



1. File surface Ⓐ about 0.2–0.3mm.
2. File Ⓑ portion (×2) off.
3. Make a hole (φ35mm) on Ⓒ portion to check aperture diameter.

(Checking)
- Attach tool you made to 2562-100 (50/f:1.4).
- Turn it in the direction for full-opening to stop position.
- Make sure that aperture diameter is full-opened with using tool.

Trouble-Shooting Chart

1. Use of Trouble-Shooting Chart

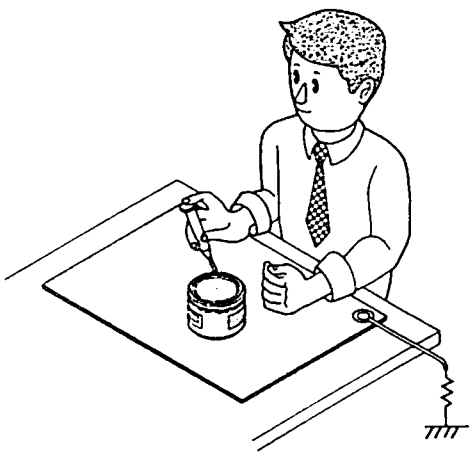
This chart describes symptoms and causes of troubles found on the lens side. (Most troubles are found on the camera side. Therefore, use this chart upon confirmation of trouble on the lens after checking combined performance with the camera according to trouble contents.)

2. Description

Trouble described here is due to a single case only. Trouble due to a plurality of causes should be checked collectively on the basis of the causes listed in this chart.

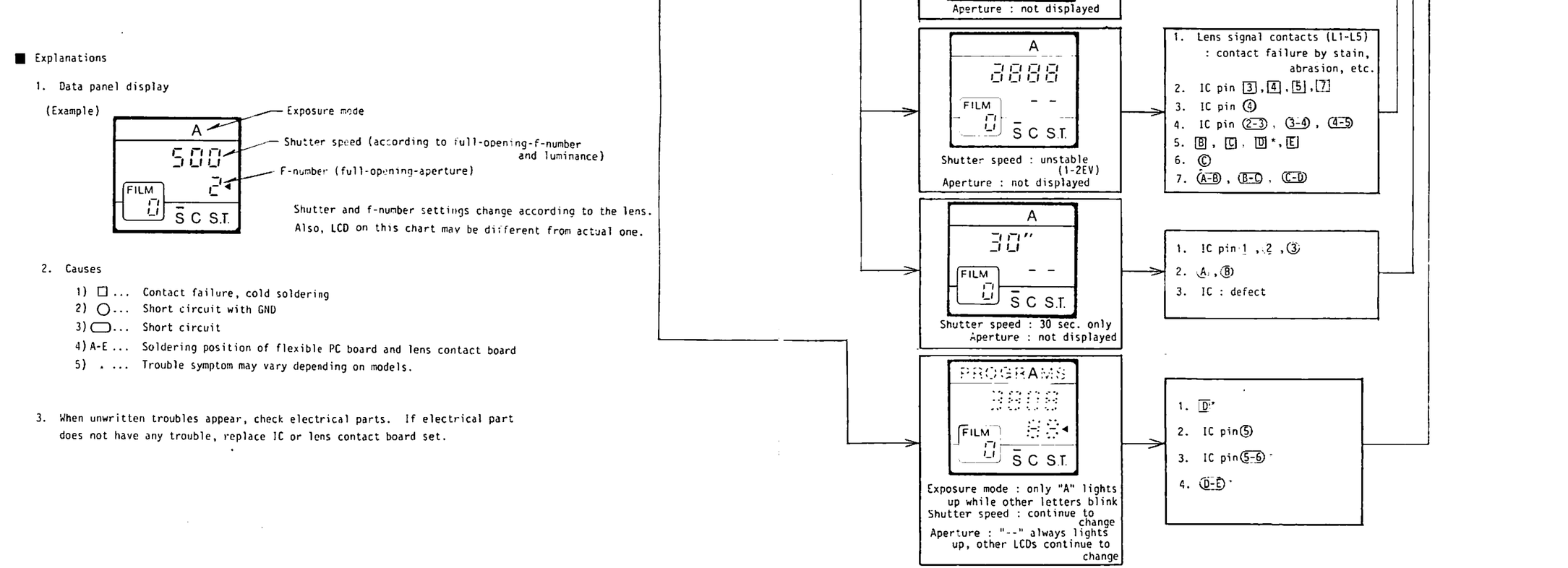
3. Precautions

1. When checking soldered or plated parts, avoid pressing the parts or pulling lead wires unnecessarily.
2. The ideal temperature range for the soldering iron tip is 290°C to 340°C (550°F to 640°F). If the temperature is higher, perform soldering quickly. Also, be sure to clean the tip when soldering.
3. Since MOS-IC is used in this lens, it is necessary to take special precautions about static electricity. When performing repairs, use the conductive mat without fail, as shown.



Set the lens to camera body (2072) with the following conditions.

Camera body --- Exposure mode : A
Focus mode : AF
ISO : 100
Main switch : ON
Power source : Four AAA-size batteries (5.5V or more)
Aperture : Full-opening
(Press aperture or shutter speed keys until full opening aperture is shown in data panel.)
Lens------- Focal length (only for zoom lens) : wide side
Luminance source --- EV11



■ Explanations

1. Data panel display

(Example)

Exposure mode
Shutter speed (according to full-opening-f-number and luminance)
F-number (full-opening-aperture)

Shutter and f-number settings change according to the lens.
Also, LCD on this chart may be different from actual one.

2. Causes

1) □ ... Contact failure, cold soldering
2) ○ ... Short circuit with GND
3) ▭ ... Short circuit
4) A-E ... Soldering position of flexible PC board and lens contact board
5) * ... Trouble symptom may vary depending on models.

3. When unwritten troubles appear, check electrical parts. If electrical part does not have any trouble, replace IC or lens contact board set.