

# AF Zoom-Nikkor ED 80-200mm f/2.8D

## REPAIR MANUAL

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Tokyo, Japan

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# INSPECTION OF ENCODER SIGNAL

※ Use an F90 (N90) camera body and checking & adjustment programs for F90/N90 to display encoder signal on the computer monitor when making an inspection.

## Inspection method

- Start the checking & adjustment programs for F90/N90 and select " E. Checking of AF lens communication ". Make inspection according to instructions as shown on the display.
- Encoder signals should be as described in the table below when the zoom and distance scale are set to specified positions.

\*No. 400001~

### ● MF mode

| Zoom ring<br>Distance<br>scale position | f = 8 0 mm     |       |   | f = 1 0 5 mm |       |   | f = 2 0 0 mm |       |   |
|-----------------------------------------|----------------|-------|---|--------------|-------|---|--------------|-------|---|
|                                         | Encoder signal |       |   |              |       |   |              |       |   |
|                                         | 1              | 2     | 3 | 1            | 2     | 3 | 1            | 2     | 3 |
| Most infinity position                  | 1 9 h          | C 2 h |   | 7 9 h        | C 2 h |   | C 9 h        | C 2 h |   |
| Infinity position                       |                |       |   |              |       |   | C 9 h        | C 3 h |   |
| 4 m                                     |                |       |   |              |       |   | C F h        | C 3 h |   |
| Most close distance position            |                |       |   |              |       |   | C C h        | C 2 h |   |

### ● AF mode

| <div>Zoom ring</div> <div>Distance<br/>scale position</div> | f = 8 0 mm     |      |   | f = 1 0 5 mm |      |   | f = 2 0 0 mm |      |   |
|-------------------------------------------------------------|----------------|------|---|--------------|------|---|--------------|------|---|
|                                                             | Encoder signal |      |   |              |      |   |              |      |   |
|                                                             | 1              | 2    | 3 | 1            | 2    | 3 | 1            | 2    | 3 |
| Most infinity position                                      | 1 9 h          | DE h |   | 7 9 h        | DE h |   | C 9 h        | DE h |   |

◎ If encoder signal values are different from those shown in the table, following causes must be considered.

Distance brush is mounted in the wrong position, distance brush or FPC is defective, encoder patterns on the FPC are contaminated, or the FPC is fixed in the wrong position.



# 記号説明 MARKS IN THE PARTS LIST

## (1) 機械標準品

下の表に示す機械標準品の部品番号は品名、種類、呼び径、長さを示しています。

例 ① A 2 - 1 4 0 2 5 F A → J C I S 十字穴付き  
品名 ↑ さら小ネジ 1 種  
表(1)の部品的小数点位置  $\phi 1.4 \times 2.5 \text{ mm}$

例 ② N 1 - 0 2 0 0 0 F A → 六角ナット 1 種  $\phi 2.0$   
品名 ↑ 表(2)の小数点位置で長さ表示はなし

## (1) Standard mechanical parts

Reference Number in the Parts List

### A. Screw · Pin

A 2 - 1 4 0 2 5 F A  
Item ↑ Type ↑ Diameter ↑ Length ↑

### B. Nut · Washer · Snap ring

N 1 - 0 2 0 0 0 F A  
Item ↑ Type ↑ Diameter ↑

表 1

| 品 名 Item                                                      | 種類 Type                                                       | 品 名 Item                                   | 種類 Type                                                         |
|---------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------|
| J C I S<br>十字穴付き小ねじ 1 種<br>Cross-point screw 1                | A<br>なべ Pan 1<br>さら Countersunk 2<br>丸さら Oval 3               | すりわり付き止めねじ<br>Splitted set screw           | K<br>丸先 Round point 1<br>とがり先 Cone point 2<br>くぼみ先 Half point 3 |
| J C I S<br>十字穴付き小ねじ 3 種<br>Cross-point screw 3                | B<br>なべ Pan 1<br>さら Countersunk 2<br>丸さら Oval 3               | 六角穴付き止めねじ<br>Hexagon socket head set screw | L<br>とがり先 Cone point 2<br>くぼみ先 Half point 3<br>平先 Normal 4      |
| 十字穴付き小ねじ<br>Cross-point screw                                 | C<br>なべ Pan 1<br>さら Countersunk 2<br>丸さら Oval 3<br>トラス Trus 4 | 六角穴付きボルト<br>Hexagon socket head bolt       | M<br>W2, W2.6 1<br>2                                            |
| 十字穴付きタップタイ<br>タイトねじ B 型<br>Cross-point tapped<br>screw B      | F<br>なべ Pan 1<br>さら Countersunk 2                             | 平行ピン<br>Straight pin                       | P<br>ステンレス<br>Stainless steel 1<br>5                            |
| 十字穴付きタップタイ<br>タイトねじ B 型 1 種<br>Cross-point tapped<br>screw B1 | G<br>なべ Pan 1<br>さら Countersunk 2<br>丸さら Oval 3               | テーパピン<br>Taper pin                         | 2                                                               |
| 十字穴付きタップタイ<br>タイトねじ B 型 3 種<br>Cross-point tapped<br>screw B3 | H<br>なべ Pan 1<br>さら Countersunk 2<br>丸さら Oval 3               | スプリングピン<br>Spring cotter                   | 一般用<br>Normal 3<br>軽荷重用<br>Light 4                              |
| 表 2                                                           |                                                               |                                            |                                                                 |
| 品 名 Item                                                      | 種類 Type                                                       | 品 名 Item                                   | 種類 Type                                                         |
| 六角ナット<br>Hexagon nut                                          | K<br>1 種 Type 1 1<br>1 種 Type 3 3                             | 平座金<br>Washer                              | R<br>小形丸 1<br>みがき丸 2                                            |
| ばね座金<br>Spring washer                                         |                                                               | E 型止め環<br>E-snap ring                      | S<br>E 型 Type E 1<br>G 型 Type G 2<br>GS 型 Type GS 3             |

## (2) 販売区分欄 The term of sale colum

| 記号 Mark | 説明 Explanation                                                                       |                                   |
|---------|--------------------------------------------------------------------------------------|-----------------------------------|
| ○       | Can be Supplied individually                                                         | 単独部品として販売するもの                     |
| △       | Not supplied individually but only as subassembly.                                   | 部組品でなければ販売しないもの                   |
| ○△      | Supplied either as part or subassembly                                               | 単独部品でも部組品でも販売するもの                 |
| ×       | Not considered as repair part                                                        | 修理部品と考えないもの                       |
| ※       | Should be sent to the factory if the repair needed.                                  | 単体では交換できないので、組む場合に工場での加工が必要なもの    |
| ☒       | Delivered as a product from the sales department (i.e., not supplied as repair part) | 商品として販売店で販売しているもの<br>(修理部品扱いはしない) |

## (3) 備考欄 The remarks colum

|                                          |                                                                                                                         |                                        |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| F-601M                                   | Part number used in common                                                                                              | 共通部品番号                                 |
| (Blue ×125mm)                            | Lead wire (color × length)                                                                                              | コードの色と長さ                               |
| 53F-2013<br>(FM-780028)                  | Technical information ref. number<br>(number in parenthesis; English edition)                                           | 製品技術資料No ( )内は英文                       |
| (2.1×3.8 ×0.07)                          | Washer (internal diameter × external diameter×thickness)                                                                | ワッシャー<br>(内径×外径×厚さ)                    |
| (Black)                                  | Black-finished parts                                                                                                    | 黒部品                                    |
| (d=0.2)                                  | Diameter of wire                                                                                                        | 線型=0.2                                 |
| (t= 1)                                   | Thickness                                                                                                               | 厚さ=1                                   |
| Rev.                                     | Revision                                                                                                                | 訂正                                     |
| Add.                                     | Addition                                                                                                                | 追加                                     |
| Dis.                                     | Discontinuation                                                                                                         | 廃止                                     |
| OLD                                      | Parts of the intial design                                                                                              | 旧部品                                    |
| ◆                                        | Limited part                                                                                                            | R P 限定出庫部品                             |
| RP-9001                                  | Repair part information No.                                                                                             | R P 情報 No.                             |
| R1... D1.... W1...<br>C1... Q1.... P1... | Abbreviation for electronic part                                                                                        | 電気部品記号                                 |
| TA-0003                                  | Number (TA-****) are order numbers of adhesive tape. (For the order of adhesive tape, the number 1K***-*** is not use). | 接着テープ要求部番<br>(1K***-*** では部品要求できません。)  |
| W-0056BE                                 | Number (W-0056BE) are order numbers of Lead wire. (For the order of Lead wire, the number 1K***-*** is not use).        | リードワイヤ要求部番<br>(1S***-*** では部品要求できません。) |

## \* VERSATILE PART

## \* 既出部品

Apart maked with this pentagonal symblo is used commonly in the arcitecture of other products. That is called "VERSATILE PART". Note that every part, bearing new part number of eleven places, will turn into a VERSATILE PART when it is used in the design of future product.

テープ類TA設定部品一覧表

TAPES AND FILMS WITH PREFIX ALPHABETS TA Dec. 17, 1991

| 部 品 No.<br>Part No. | 名 称<br>Name of part                    | 色<br>Color        | 厚さ<br>Thickness<br>(t=mm) | 幅<br>Widths<br>(mm) | 長さ<br>Length<br>(m) | 要求単位<br>Q'ty for<br>a unit for<br>crdring |
|---------------------|----------------------------------------|-------------------|---------------------------|---------------------|---------------------|-------------------------------------------|
| TA-0001             | ポリエステルフィルム<br>Tape                     | 透明<br>Transparent | 0.025                     | 10                  | 30                  | 1 巻<br>1 roll                             |
| TA-0002             | ポリエステルフィルム<br>Tape                     | 透明<br>Transparent | 0.025                     | 20                  | 30                  | 1 巻<br>1 roll                             |
| TA-0003             | 両面接着テープ<br>Both sided adhesive tape    | 白<br>White        | 0.16                      | 10                  | 2                   | 1 巻<br>1 roll                             |
| TA-0004             | 両面接着テープ<br>Both sided adhesive tape    | 黒<br>Black        | 0.14                      | 12                  | 50                  | 1 巻<br>1 roll                             |
| TA-0005             | ポリエステルフィルム<br>Tape                     | 黄<br>Yellow       | 0.06                      | 19                  | 66                  | 1 巻<br>1 roll                             |
| TA-0006S            | アセテートクロス (シート)<br>Tape (200x120/sheet) | 黒<br>Black        | 0.23                      | 6                   | 200<br>(mm)         | 1set<br>(20pcs)                           |
| TA-0007             | 銅箔導電性<br>Tape, copper foil             | 銅箔<br>Copper foil | 0.11                      | 4                   | 6                   | 1 巻<br>1 roll                             |
| TA-0008             | ポリエステルフィルム<br>Tape                     | 透明<br>Transparent | 0.055                     | 30                  | 30                  | 1 巻<br>1 roll                             |
| TA-0009             | カプトンフィルム<br>Tape                       | 琥珀<br>Amber       | 0.07                      | 6                   | 30                  | 1 巻<br>1 roll                             |
| TA-0010             | 両面接着テープ<br>Both sided adhesive tape    | 乳白色<br>Opal       | 0.16                      | 15                  | 36                  | 1 巻<br>1 roll                             |
| TA-0011             | ポリエステルフィルム<br>Tape                     | 黒<br>Black        | 0.06                      | 10                  | 30                  | 1 巻<br>1 roll                             |
| TA-0012             | ポリエステルフィルム<br>Tape                     | 透明<br>Transparent | 0.025                     | 6                   | 30                  | 1 巻<br>1 roll                             |
| TA-0013             | アセテートクロス (シート)<br>Tape (200x120/sheet) | 黒<br>Black        | 0.23                      | 20                  | 200<br>(mm)         | 1set<br>(20pcs)                           |
|                     |                                        |                   |                           |                     |                     |                                           |
|                     |                                        |                   |                           |                     |                     |                                           |
|                     |                                        |                   |                           |                     |                     |                                           |
|                     |                                        |                   |                           |                     |                     |                                           |

リードワイヤー一覧表

LEAD WIRE LIST

DEC. 17, 1991

| 部 品 No<br>Part No. | 色<br>Color    | 外 形<br>Diameter<br>(outer<br>tube) | 導体サイズ<br>Pcs. /<br>Diameter<br>(lead wire) | 部 品 No<br>Part No. | 色<br>Color | 外 形<br>Diameter<br>(outer<br>tube) | 導体サイズ<br>Pcs. /<br>Diameter<br>(lead wire) |
|--------------------|---------------|------------------------------------|--------------------------------------------|--------------------|------------|------------------------------------|--------------------------------------------|
| W-0045BN           | Brown         | 0.45mm                             | 7×0.05mm                                   | W-0108BK           | Black      | 1.08mm                             | 7×0.16mm                                   |
| W-0045RE           | Red           | -ditto-                            | -ditto-                                    | W-0108BN           | Brown      | -ditto-                            | -ditto-                                    |
| W-0045OR           | Orange        | -ditto-                            | -ditto-                                    | W-0108RE           | Red        | -ditto-                            | -ditto-                                    |
| W-0045GN           | Green         | -ditto-                            | -ditto-                                    | W-0108OR           | Orange     | -ditto-                            | -ditto-                                    |
| W-0045BE           | Blue          | -ditto-                            | -ditto-                                    | W-0108YE           | Yellow     | -ditto-                            | -ditto-                                    |
| W-0045PU           | Purple        | -ditto-                            | -ditto-                                    | W-0108GN           | Green      | -ditto-                            | -ditto-                                    |
|                    |               |                                    |                                            | W-0108BE           | Blue       | -ditto-                            | -ditto-                                    |
| W-0056BK           | Black         | 0.56mm                             | 7×0.08mm                                   | W-0108PU           | Purple     | -ditto-                            | -ditto-                                    |
| W-0056BN           | Brown         | -ditto-                            | -ditto-                                    | W-0108GY           | Gray       | -ditto-                            | -ditto-                                    |
| W-0056RE           | Red           | -ditto-                            | -ditto-                                    | W-0108WH           | White      | -ditto-                            | -ditto-                                    |
| W-0056OR           | Orange        | -ditto-                            | -ditto-                                    |                    |            |                                    |                                            |
| W-0056YE           | Yellow        | -ditto-                            | -ditto-                                    | W-0120BK           | Black      | 1.2 mm                             | 7×0.18mm                                   |
| W-0056GN           | Green         | -ditto-                            | -ditto-                                    | W-0120BN           | Brown      | -ditto-                            | -ditto-                                    |
| W-0056BE           | Blue          | -ditto-                            | -ditto-                                    | W-0120RE           | Red        | -ditto-                            | -ditto-                                    |
| W-0056PU           | Purple        | -ditto-                            | -ditto-                                    | W-0120OR           | Orange     | -ditto-                            | -ditto-                                    |
| W-0056GY           | Gray          | -ditto-                            | -ditto-                                    | W-0120YE           | Yellow     | -ditto-                            | -ditto-                                    |
| W-0056WH           | White         | -ditto-                            | -ditto-                                    | W-0120GN           | Green      | -ditto-                            | -ditto-                                    |
| W-0056PK           | Pink          | -ditto-                            | -ditto-                                    | W-0120BE           | Blue       | -ditto-                            | -ditto-                                    |
|                    |               |                                    |                                            | W-0120PU           | Purple     | -ditto-                            | -ditto-                                    |
|                    |               |                                    |                                            | W-0120GY           | Gray       | -ditto-                            | -ditto-                                    |
|                    |               |                                    |                                            | W-0120WH           | White      | -ditto-                            | -ditto-                                    |
| W-0080BK           | Black         | 0.80mm                             | 7×0.12mm                                   |                    |            |                                    |                                            |
| W-0080BN           | Brown         | -ditto-                            | -ditto-                                    | W-0150BK           | Black      | 1.5 mm                             | 40×0.08mm                                  |
| W-0080RE           | Red           | -ditto-                            | -ditto-                                    | W-0150BN           | Brown      | -ditto-                            | -ditto-                                    |
| W-0080OR           | Orange        | -ditto-                            | -ditto-                                    | W-0150RE           | Red        | -ditto-                            | -ditto-                                    |
| W-0080YE           | Yellow        | -ditto-                            | -ditto-                                    | W-0150OR           | Orange     | -ditto-                            | -ditto-                                    |
| W-0080GN           | Green         | -ditto-                            | -ditto-                                    | W-0150YE           | Yellow     | -ditto-                            | -ditto-                                    |
| W-0080BE           | Blue          | -ditto-                            | -ditto-                                    | W-0150GN           | Green      | -ditto-                            | -ditto-                                    |
| W-0080PU           | Purple        | -ditto-                            | -ditto-                                    | W-0150BE           | Blue       | -ditto-                            | -ditto-                                    |
| W-0080GY           | Gray          | -ditto-                            | -ditto-                                    | W-0150PU           | Purple     | -ditto-                            | -ditto-                                    |
| W-0080WH           | White         | -ditto-                            | -ditto-                                    | W-0150GY           | Gray       | -ditto-                            | -ditto-                                    |
| W-0080LB           | Light<br>blue | -ditto-                            | -ditto-                                    | W-0150WH           | White      | -ditto-                            | -ditto-                                    |
|                    |               |                                    |                                            |                    |            |                                    |                                            |
|                    |               |                                    |                                            |                    |            |                                    |                                            |
|                    |               |                                    |                                            |                    |            |                                    |                                            |
| 1 roll = 20m       |               |                                    |                                            |                    |            |                                    |                                            |

## 収縮チューブ一覧表

## Thermal construction tube list

Dec. 17, 1991

[illegible]



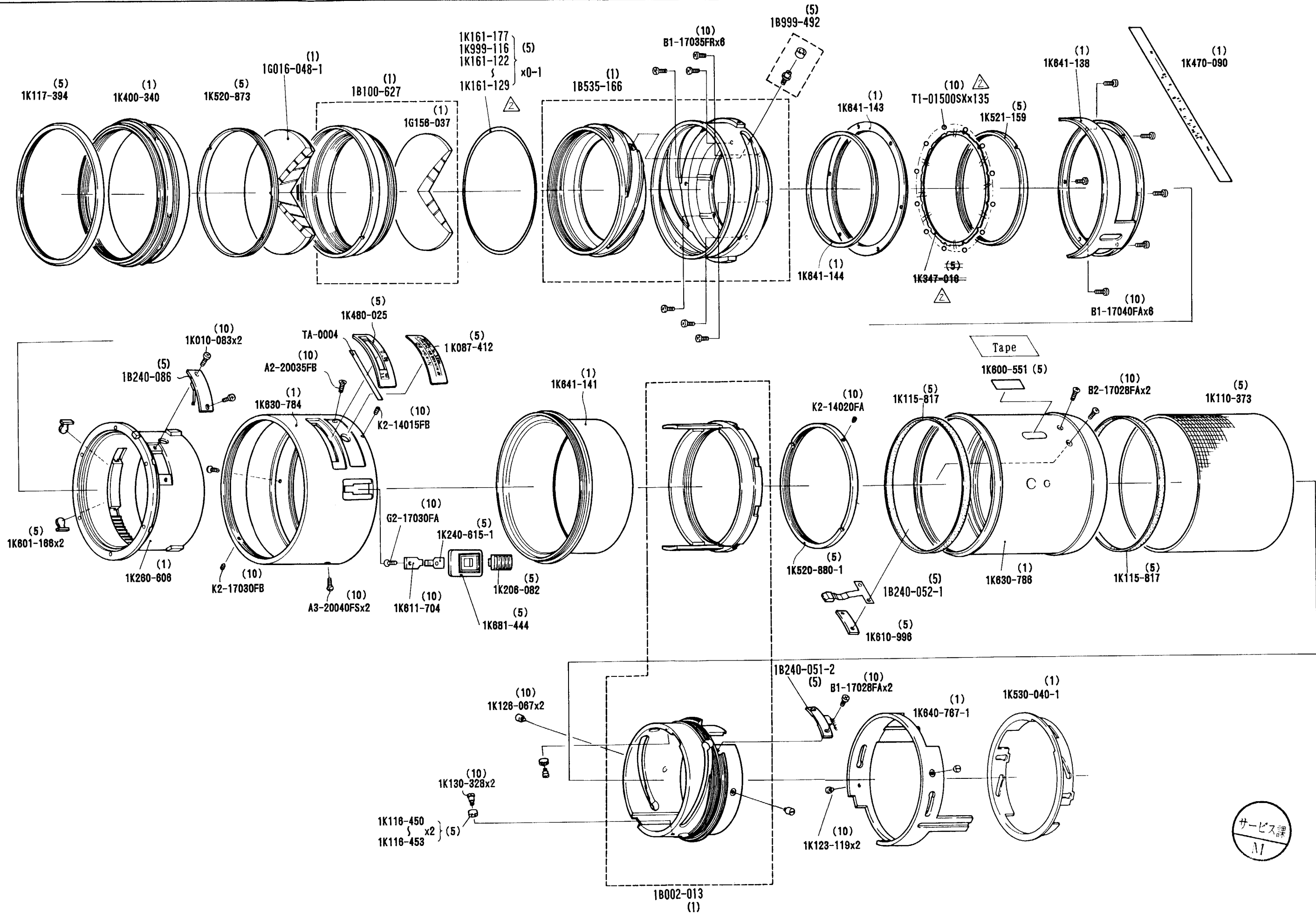


Fig. 1

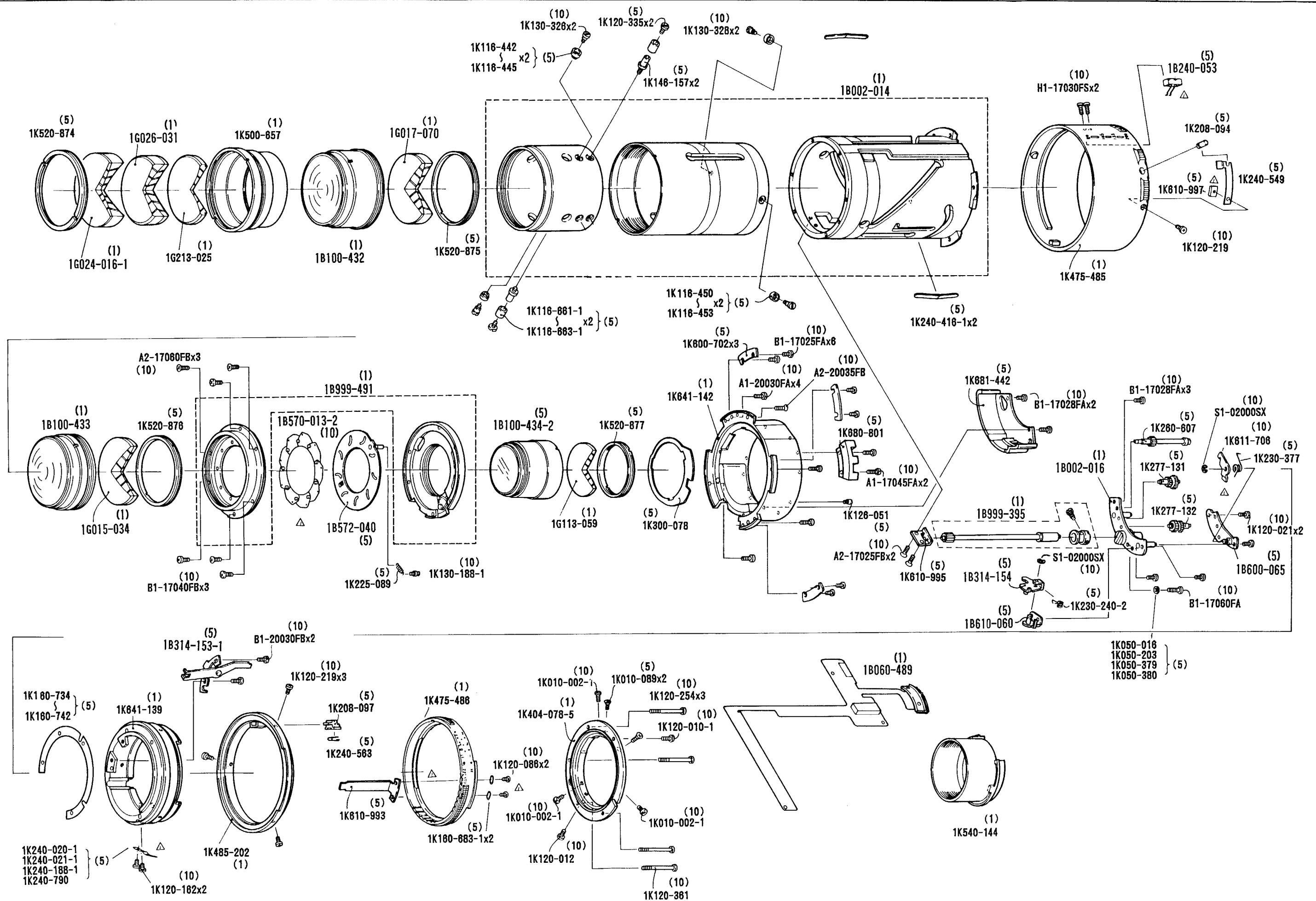


Fig. 2

## 〔 2 〕 部品表 Parts List

AF Zoom ED 80~200/2.8

J A A 7 4 2 5 1 - R . 3 2 9 9 . A

| 部品番号<br>Part No. | 補助番号<br>Ckt No. | 名 称<br>Name          | 1台分<br>個 数<br>Pcs. Per<br>Unit | 部組品番号<br>Assembly | 参照<br>図番<br>Fig.<br>No. | 販売区分<br>Term of<br>Delivery | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|------------------|-----------------|----------------------|--------------------------------|-------------------|-------------------------|-----------------------------|----------------|---------------------------|
| *1K010-002-1     | 121             | Screw                | 3                              |                   | 2 3                     | ○                           |                | 10                        |
| *1K010-083       | 157             | Screw                | 2                              |                   | 1 3                     | ○                           |                | 10                        |
| *1K010-089       | 118             | Screw                | 2                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K050-016       | 176             | Washer               | 0-1                            |                   | 2 3                     | ○                           |                | 10                        |
| *1K050-203       | 176             | Washer               | 0-1                            |                   | 2 3                     | ○                           |                | 10                        |
| *1K050-379       | 176             | Washer               | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K050-380       | 176             | Washer               | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| 1K087-412        | 98              | 銘板<br>Name plate     | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| 1K110-373        | 37              | ゴムリング<br>Rubber ring | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K115-817       | 101             | スエード<br>Flock paper  | 2                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K116-442       | 132             | ガイド環<br>Guide ring   | 0-2                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K116-443       | 132             | ガイド環<br>Guide ring   | 0-2                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K116-444       | 132             | ガイド環<br>Guide ring   | 0-2                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K116-445       | 132             | ガイド環<br>Guide ring   | 0-2                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K116-450       | 134             | ガイド環<br>Guide ring   | 0-4                            |                   | 1 2<br>3                | ○                           |                | 5                         |
| *1K116-451       | 134             | ガイド環<br>Guide ring   | 0-4                            |                   | 1 2<br>3                | ○                           |                | 5                         |
| 1K116-311        | 154             | テープ<br>Tape          | 1                              |                   | 1 3                     | ○                           | TA-0004        | 1 roll                    |
|                  |                 |                      |                                |                   |                         |                             |                |                           |

## 部品表 Parts List

AF Zoom ED 80~200/2.8

JAA74251-R. 3299. A

| 部品番号<br>Part No. | 補助番号<br>Ckt No. | 名 称<br>Name         | 1台分<br>個 数<br>Pcs. Per<br>Unit | 部組品番号<br>Assembly | 参照<br>図番<br>Fig.<br>No. | 販売区分<br>Term of<br>Delivery | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|------------------|-----------------|---------------------|--------------------------------|-------------------|-------------------------|-----------------------------|----------------|---------------------------|
| *1K116-452       | 134             | ガイド環<br>Guide ring  | 0-4                            |                   | 1. 2<br>3               | ○                           |                | 5                         |
| *1K116-453       | 134             | ガイド環<br>Guide ring  | 0-4                            |                   | 1. 2<br>3               | ○                           |                | 5                         |
| *1K116-661-1     | 133             | ガイド環<br>Guide ring  | 0-2                            |                   | 2. 3                    | ○                           |                | 5                         |
| *1K116-662-1     | 133             | ガイド環<br>Guide ring  | 0-2                            |                   | 2. 3                    | ○                           |                | 5                         |
| *1K116-663-1     | 133             | ガイド環<br>Guide ring  | 0-2                            |                   | 2. 3                    | ○                           |                | 5                         |
| 1K117-394        | 44              | 保護ゴム<br>Rubber ring | 1                              |                   | 1. 3                    | ○                           |                | 5                         |
| *1K120-010-1     | 123             | Screw               | 1                              |                   | 2. 3                    | ○                           |                | 10                        |
| *1K120-012       | 120             | Screw               | 1                              |                   | 2. 3                    | ○                           |                | 10                        |
| *1K120-021       | 109             | Screw               | 2                              |                   | 2. 4                    | ○                           |                | 10                        |
| *1K120-086       | 127             | Screw               | 2                              |                   | 2. 3                    | ○                           |                | 10                        |
| *1K120-162       | 124             | Screw               | 2                              |                   | 2. 3                    | ○                           |                | 10                        |
| *1K120-219       | 117             | Screw               | 4                              |                   | 2. 3                    | ○                           |                | 10                        |
| *1K120-254       | 122             | Screw               | 3                              |                   | 2. 3                    | ○                           |                | 10                        |
| *1K120-335       | 131             | Screw               | 2                              |                   | 2. 3                    | ○                           |                | 5                         |
| 1K120-361        | 119             | Screw               | 1                              |                   | 2. 3                    | ○                           |                | 10                        |
| *1K123-119       | 143             | Screw               | 2                              |                   | 1. 3                    | ○                           |                | 10                        |
|                  |                 |                     |                                |                   |                         |                             |                |                           |
|                  |                 |                     |                                |                   |                         |                             |                |                           |

## 部品表 Parts List

AF Zoom ED 80~200/2.8

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| 部品番号<br>Part No.            | 補助番号<br>Ckt No. | 名 称<br>Name   | 1台分<br>個 数<br>Pcs. Per<br>Unit | 部組品番号<br>Assembly | 参照<br>図番<br>Fig.<br>No. | 販売区分<br>Term of<br>Delivery | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|-----------------------------|-----------------|---------------|--------------------------------|-------------------|-------------------------|-----------------------------|----------------|---------------------------|
| *1K126-051                  | 126             | Screw         | 2                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K126-067                  | 142             | Screw         | 2                              |                   | 1 3                     | ○                           |                | 10                        |
| *1K130-188-1<br>(1K130-188) | 73              | Screw         | 1                              |                   | 2 3                     | ○                           |                | 10                        |
| *1K130-326                  | 128             | Screw         | 2                              |                   | 2 3                     | ○                           |                | 10                        |
| *1K130-328                  | 130             | Screw         | 4                              |                   | 1 2<br>3                | ○                           |                | 10                        |
| 1K146-157                   | 129             | 段付軸<br>Shaft  | 2                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-683-1                | 108             | Washer        | 2                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-734                  | 137             | Washer t=0.5  | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-735                  | 137             | Washer t=0.3  | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-736                  | 137             | Washer t=0.2  | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-737                  | 137             | Washer t=0.1  | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-738                  | 137             | Washer t=0.09 | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-739                  | 137             | Washer t=0.08 | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-740                  | 137             | Washer t=0.07 | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-741                  | 137             | Washer t=0.06 | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K160-742                  | 137             | Washer t=0.05 | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
|                             |                 |               |                                |                   |                         |                             |                |                           |
|                             |                 |               |                                |                   |                         |                             |                |                           |

## 部品表 Parts List

AF Zoom ED 80~200/2.8

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| 部品番号<br>Part No.            | 補助番号<br>Ckt No. | 名 称<br>Name                   | 1台分<br>個 数<br>Pcs. Per<br>Unit | 部組品番号<br>Assembly | 参照<br>図番<br>Fig.<br>No. | 販売区分<br>Term of<br>Delivery | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|-----------------------------|-----------------|-------------------------------|--------------------------------|-------------------|-------------------------|-----------------------------|----------------|---------------------------|
| 1K161-177                   | 190             | Washer                        | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K206-082                  | 95              | レバー<br>Lever                  | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K208-094                  | 147             | マクロボタン<br>Macro button        | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K208-097                  | 65              | ロック釦<br>Lock button           | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K225-089                  | 72              | 引張バネ<br>Spring                | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K230-240-2<br>(1K230-240) | 162             | バネ<br>Spring                  | 1                              |                   | 2 4                     | ○                           |                | 5                         |
| 1K230-377                   | 164             | バネ<br>Spring                  | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K240-020-1<br>(1K240-020) | 36              | クリックバネ t=0.2<br>Click spring  | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K240-021-1<br>(1K240-021) | 36              | クリックバネ t=0.18<br>Click spring | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K240-188-1<br>(1K240-188) | 36              | クリックバネ t=0.22<br>Click spring | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| *1K240-416-1<br>(1K240-416) | 188             | 板バネ<br>Leaf spring            | 2                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K240-549                  | 149             | 板バネ<br>Leaf spring            | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K240-563                  | 66              | EE ロックバネ<br>EE lock spring    | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K240-615-1<br>(1K240-615) | 99              | クリックバネ<br>Click spring        | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K240-790                  | 36              | クリックバネ t=0.15<br>Click spring | 0-1                            |                   | 2 3                     | ○                           |                | 5                         |
| 1K260-606                   | 58              | 丸環<br>Ring                    | 1                              |                   | 1 3                     | ○                           |                | 1                         |
|                             |                 |                               |                                |                   |                         |                             |                |                           |
|                             |                 |                               |                                |                   |                         |                             |                |                           |

## 部品表 Parts List

AF Zoom ED 80~200/2.8

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| 部品番号<br>Part No. | 補助番号<br>Ckt No. | 名 称<br>Name                              | 1台分<br>個 数<br>Pcs. Per<br>Unit | 部組品番号<br>Assembly | 参照<br>図番<br>Fig.<br>No. | 販売区分<br>Term of<br>Delivery | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|------------------|-----------------|------------------------------------------|--------------------------------|-------------------|-------------------------|-----------------------------|----------------|---------------------------|
| 1K260-607        | 83              | クラッチギア<br>Gear                           | 1                              |                   | 2.4                     | ○                           |                | 5                         |
| 1K277-131        | 84              | 平歯車<br>Gear                              | 1                              |                   | 2.4                     | ○                           |                | 5                         |
| 1K277-132        | 85              | 平歯車<br>Gear                              | 1                              |                   | 2.4                     | ○                           |                | 5                         |
| *1K300-078       | 21              | 絞りカム<br>Cam                              | 1                              |                   | 2.3                     | ○                           |                | 5                         |
| 1K347-016        | 106             | Washer                                   | 1                              |                   | 1.3                     | ○                           |                | 5                         |
| 1K400-340        | 38              | フィルター環<br>Filter ring                    | 1                              |                   | 1.3                     | ○                           |                | 1                         |
| *1K404-078-5     | 30              | バヨネット<br>Bayonet mount                   | 1                              |                   | 2.4                     | ○                           |                | 1                         |
| 1K470-090        | 27              | 距離環<br>Focus ring                        | 1                              |                   | 1.3                     | ○                           |                | 1                         |
| 1K475-485        | 26              | 深度環<br>Depth of field ring               | 1                              |                   | 2.3                     | ○                           |                | 1                         |
| *1K480-025       | 153             | アクリル板<br>Acryle plate                    | 1                              |                   | 1.3                     | ○                           |                | 5                         |
| 1K475-486        | 28              | 絞り環<br>Diaphragm ring                    | 1                              |                   | 2.3                     | ○                           |                | 1                         |
| 1K485-202        | 64              | 指標環<br>Index ring                        | 1                              |                   | 2.3                     | ○                           |                | 1                         |
| *1K500-657       | 42              | 2群レンズ室<br>2nd lens housing               | 1                              |                   | 2.3                     | ○                           |                | 1                         |
| *1K520-873       | 40              | G1 押さえ環<br>G1 retaining ring             | 1                              |                   | 1.3                     | ○                           |                | 5                         |
| *1K520-874       | 43              | G4-G8 押さえ環<br>G2-G8 retaining ring       | 1                              |                   | 2.3                     | ○                           |                | 5                         |
| *1K520-875       | 47              | G10, G11 押さえ環<br>G10, G11 retaining ring | 1                              |                   | 2.3                     | ○                           |                | 5                         |
|                  |                 |                                          |                                |                   |                         |                             |                |                           |
|                  |                 |                                          |                                |                   |                         |                             |                |                           |

## 部品表 Parts List

AF Zoom ED 80~200/2.8

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| 部品番号<br>Part No.            | 補助番号<br>Ckt No. | 名 称<br>Name                              | 1台分<br>個 数<br>Pcs. Per<br>Unit | 部組品番号<br>Assembly | 参照<br>図番<br>Fig.<br>No. | 販売区分<br>Term of<br>Delivery | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|-----------------------------|-----------------|------------------------------------------|--------------------------------|-------------------|-------------------------|-----------------------------|----------------|---------------------------|
| *1K520-876                  | 50              | G13, G14 押さえ環<br>G13, G14 retaining ring | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K520-877                  | 54              | G16 押さえ環<br>G16 retaining ring           | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K520-880-1                | 61              | 押さえ環<br>retaining ring                   | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| 1K521-159                   | 105             | 丸環<br>Ring                               | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K530-040-1<br>(1K530-040) | 140             | リード溝環<br>Inner tube                      | 1                              |                   | 1 3                     | ○                           |                | 1                         |
| *1K540-144                  | 39              | 鏡筒<br>Rear cover ring                    | 1                              |                   | 2 3                     | ○                           |                | 1                         |
| *1K600-551                  | 114             | 穴カバー<br>Plate                            | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K600-702                  | 146             | 平板<br>Plate                              | 3                              |                   | 2 3                     | ○                           |                | 5                         |
| 1K601-166                   | 187             | 平板<br>Plate                              | 2                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K610-993                  | 78              | 絞り連動カバー<br>Actuating plate               | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| *1K610-995                  | 92              | 軸受け<br>Shaft holder                      | 1                              |                   | 2 4                     | ○                           |                | 5                         |
| *1K610-996                  | 94              | 止め板<br>Snap plate                        | 1                              |                   | 1 3                     | ○                           |                | 5                         |
| *1K610-997                  | 93              | ナット<br>Nut                               | 1                              |                   | 2 3                     | ○                           |                | 5                         |
| 1K611-704                   | 96              | 曲げ板<br>Bent plate                        | 1                              |                   | 1 3                     | ○                           |                | 10                        |
| 1K611-706                   | 163             | 曲げ板<br>Bent plate                        | 1                              |                   | 2 3                     | ○                           |                | 10                        |
| 1K630-784                   | 51              | 丸筒<br>Tube                               | 1                              |                   | 1 3                     | ○                           |                | 1                         |
|                             |                 |                                          |                                |                   |                         |                             |                |                           |
|                             |                 |                                          |                                |                   |                         |                             |                |                           |



## 部品表 Parts List

AF Zoom ED 80~200/2.8

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| 部品番号<br>Part No.            | 補助番号<br>Ckt No. | 名 称<br>Name                 | 1台分<br>個 数<br>Pcs. Per<br>Unit | 部組品番号<br>Assembly | 参照<br>図番<br>Fig.<br>No. | 販売区分<br>Term of<br>Delivery | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|-----------------------------|-----------------|-----------------------------|--------------------------------|-------------------|-------------------------|-----------------------------|----------------|---------------------------|
| 1K630-786                   | 60              | 丸筒<br>Tube                  | 1                              |                   | 1. 3                    | ○                           |                | 1                         |
| *1K640-767-1<br>(1K640-767) | 141             | 丸環<br>Ring                  | 1                              |                   | 1. 3                    | ○                           |                | 1                         |
| 1K641-138                   | 22              | 丸筒<br>Tube                  | 1                              |                   | 1. 3                    | ○                           |                | 1                         |
| 1K641-139                   | 29              | 丸筒<br>Tube                  | 1                              |                   | 2. 3                    | ○                           |                | 1                         |
| 1K641-141                   | 59              | 丸筒<br>Tube                  | 1                              |                   | 1. 3                    | ○                           |                | 1                         |
| 1K641-142                   | 82              | 丸筒<br>Tube                  | 1                              |                   | 2. 4                    | ○                           |                | 1                         |
| 1K641-143                   | 100             | 丸環<br>Ring                  | 1                              |                   | 1. 3                    | ○                           |                | 1                         |
| 1K641-144                   | 104             | 丸環<br>Ring                  | 1                              |                   | 1. 3                    | ○                           |                | 1                         |
| *1K680-801                  | 148             | 連結コマ<br>Connecting plate    | 1                              |                   | 2. 3                    | ○                           |                | 5                         |
| 1K681-442                   | 77              | ブロック<br>Block               | 1                              |                   | 2. 4                    | ○                           |                | 5                         |
| 1K681-444                   | 91              | ブロック<br>Block               | 1                              |                   | 1. 3                    | ○                           |                | 5                         |
|                             |                 |                             |                                |                   |                         |                             |                |                           |
|                             |                 |                             |                                |                   |                         |                             |                |                           |
| *1G113-059                  | G16             | G16 レンズ<br>G16 lens element | 1                              |                   | 2. 3                    | ○                           |                | 1                         |
| △ *1G156-037                | G3              | G3 レンズ<br>G3 lens element   | 1                              | 1B100-627         | 1. 3                    | ○△<br>↓<br>△                | RP-9507        |                           |
| *1G213-025                  | G8              | G8 レンズ<br>G8 lens element   | 1                              |                   | 2. 3                    | ○                           |                | 1                         |
|                             |                 |                             |                                |                   |                         |                             |                |                           |
|                             |                 |                             |                                |                   |                         |                             |                |                           |

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## 部品表 Parts List

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| 部品番号<br>Part No. | 補助番号<br>Ckt No. | 名 称<br>Name | 1台分<br>個 数<br>Pcs. Per<br>Unit | 部組品番号<br>Assembly | 参照<br>図番<br>Fig.<br>No. | 販売区分<br>Term of<br>Delivery | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|------------------|-----------------|-------------|--------------------------------|-------------------|-------------------------|-----------------------------|----------------|---------------------------|
| *A1-17045FA      | 182             | Screw       | 2                              |                   | 2 3                     | ○                           |                | 10                        |
| *A1-20030FA      | 150             | Screw       | 4                              |                   | 2 3                     | ○                           |                | 10                        |
| *A2-17025FB      | 174             | Screw       | 2                              |                   | 2 4                     | ○                           |                | 10                        |
| *A2-17060FB      | 161             | Screw       | 3                              |                   | 2 3                     | ○                           |                | 10                        |
| *A2-20035FB      | 167             | Screw       | 2                              |                   | 1. 2<br>3               | ○                           |                | 10                        |
| *A3-20040FS      | 172             | Screw       | 2                              |                   | 1. 3                    | ○                           |                | 10                        |
| *B1-17025FA      | 115             | Screw       | 6                              |                   | 2 3                     | ○                           |                | 10                        |
| *B1-17028FA      | 111             | Screw       | 7                              |                   | 1. 2<br>4               | ○                           |                | 10                        |
| *B1-17035FR      | 103             | Screw       | 6                              |                   | 1. 3                    | ○                           |                | 10                        |
| *B1-17040FA      | 113             | Screw       | 6                              |                   | 1. 3                    | ○                           |                | 10                        |
| *B1-17040FB      | 110             | Screw       | 3                              |                   | 2 3                     | ○                           |                | 10                        |
| *B1-17060FA      | 181             | Screw       | 1                              |                   | 2 3                     | ○                           |                | 10                        |
| *B1-20030FB      | 125             | Screw       | 2                              |                   | 2 3                     | ○                           |                | 10                        |
| *B2-17028FA      | 173             | Screw       | 2                              |                   | 1. 3                    | ○                           |                | 10                        |
| *G2-17030FA      | 171             | Screw       | 1                              |                   | 1. 3                    | ○                           |                | 10                        |
| *H1-17030FS      | 175             | Screw       | 2                              |                   | 2 3                     | ○                           |                | 10                        |
|                  |                 |             |                                |                   |                         |                             |                |                           |
|                  |                 |             |                                |                   |                         |                             |                |                           |

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| 部組番号<br>Part No.            | 補助番号<br>Ckt No. | 名 称<br>Name                        | 1台分<br>個 数<br>Pcs. Per<br>Unit | 構成組品番号<br>Constituent Parts                                                                       | 参照<br>図番<br>Fig.<br>No. | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|-----------------------------|-----------------|------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-------------------------|----------------|---------------------------|
| 1B002-013                   | B56             | リード環 組<br>Inner tube               | 1                              | 1K530-062<br>1K630-785                                                                            | 1                       |                | 1                         |
| 1B002-014                   | B55             | ヘリコイド 組<br>Helicoid unit           | 1                              | 1K307-026<br>1K540-146-3<br>1K630-783                                                             | 2                       |                | 1                         |
| 1B002-016                   | B159            | レバー 組<br>Lever unit                | 1                              | 1K260-608<br>1K371-704 X 2<br>1K426-003<br>1K601-164                                              | 2                       |                | 1                         |
| △ 1B060-489                 | B81             | FPC 組<br>* FPC unit                | 1                              | 1K116-533<br>1K116-824<br>1K117-395<br>1K240-469-1 X 5<br>1K680-643-1<br>1K680-651-2<br>1S015-059 | 2                       | RP-9561        | 1                         |
| △ 1B060-489-2               |                 |                                    |                                |                                                                                                   |                         |                |                           |
| *1B100-432                  | Z46             | G9 レンズ室組<br>G9 Lens housing unit   | 1                              | 1G114-074<br>1K500-658                                                                            | 2                       |                | 1                         |
| *1B100-433                  | Z49             | G12 レンズ室組<br>G12 Lens housing unit | 1                              | 1G154-070<br>1K500-659                                                                            | 2                       |                | 1                         |
| *1B100-434-3<br>(1B100-434) | Z53             | G15 レンズ室組<br>G15 Lens housing unit | 1                              | 1G247-045<br>1K500-660                                                                            | 2                       |                | 5                         |
| 1B100-627                   | Z41             | G3 レンズ室組<br>G3 Lens housing unit   | 1                              | 1G156-037<br>1K500-830                                                                            | 1                       |                | 1                         |
| *1B240-051-2<br>(1B240-051) | B63             | ブラシ 組<br>Brush unit                | 1                              | 1K240-453-2<br>1K680-790-1                                                                        | 1                       |                | 5                         |
| *1B240-052-2<br>(1B240-052) | B97             | インサート スイッチ<br>Swicth               | 1                              | 1K240-547-1                                                                                       | 1                       |                | 5                         |
| *1B240-053                  | B151            | ブラシ 組<br>Brush unit                | 1                              | 1K240-550<br>1K680-802                                                                            | 2                       |                | 5                         |
| 1B240-086                   | B112            | ブラシ 組<br>Brush unit                | 1                              | 1K240-797<br>1K681-443                                                                            | 1                       |                | 5                         |
| *1B314-153-2<br>(1B314-153) | B23             | シーソーレバー 組<br>Lever unit            | 1                              | 1K314-311-1<br>1K340-143<br>1K371-098<br>1K610-992                                                | 2                       |                | 5                         |
|                             |                 |                                    |                                |                                                                                                   |                         |                |                           |
|                             |                 |                                    |                                |                                                                                                   |                         |                |                           |

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| 部組番号<br>Part No.            | 補助番号<br>Ckt No. | 名 称<br>Name                  | 1台分<br>個 数<br>Pcs. Per<br>Unit | 構成組品番号<br>Constituent Parts                      | 参照<br>図番<br>No. | 備 考<br>Remarks | 要求単位<br>Q'ty per<br>order |
|-----------------------------|-----------------|------------------------------|--------------------------------|--------------------------------------------------|-----------------|----------------|---------------------------|
| *1B314-154                  | B155            | スイッチレバー組<br>Lever unit       | 1                              | 1K314-312<br>1K370-117                           | 2               |                | 5                         |
| 1B535-166                   | B24             | ヘリコイド 組<br>Helicoid unit     | 1                              | 1K535-408<br>1K535-409                           | 1               |                | 1                         |
| *1B570-013-2<br>(1B570-013) | B32             | 絞り羽根<br>Diaphragm blade      | 9                              | 1K370-004-1 x 2<br>1K570-012                     | 2               |                | 10                        |
| *1B572-040                  | B71             | 矢車 組<br>Blade actuating ring | 1                              | 1K370-933<br>1K572-124                           | 2               |                | 5                         |
| 1B600-065                   | B90             | ギア軸受<br>Gear shaft holder    | 1                              | 1K371-705<br>1K601-165                           | 2               |                | 5                         |
| 1B610-060                   | B158            | クラッチ<br>Clutch               | 1                              | 1K371-108<br>1K611-012                           | 2               |                | 5                         |
| *1B999-395                  | B160            | クラッチギア 組<br>Clutch gear unit | 1                              | 1K136-067-1<br>1K260-349-3<br>1K426-002          | 2               |                | 1                         |
| 1B999-491                   | B75             | 羽根基板 組<br>Blade mount unit   | 1                              | 1K370-052<br>1K574-151<br>1K641-140<br>1K680-688 | 2               |                | 1                         |
|                             |                 |                              |                                |                                                  |                 |                |                           |
| 1B999-492                   | B139            | ガイド軸<br>Guide ring           | 0-1                            | 1K117-396<br>1K130-494                           | 1               |                | 5                         |
| 1B999-493                   | B139            | ガイド軸<br>Guide ring           | 0-1                            | 1K117-397<br>1K130-494                           | 1               |                | 5                         |
| 1B999-494                   | B139            | ガイド軸<br>Guide ring           | 0-1                            | 1K117-398<br>1K130-494                           | 1               |                | 5                         |
| 1B999-495                   | B139            | ガイド軸<br>Guide ring           | 0-1                            | 1K117-399<br>1K130-494                           | 1               |                | 5                         |
|                             |                 |                              |                                |                                                  |                 |                |                           |
|                             |                 |                              |                                |                                                  |                 |                |                           |
|                             |                 |                              |                                |                                                  |                 |                |                           |
|                             |                 |                              |                                |                                                  |                 |                |                           |

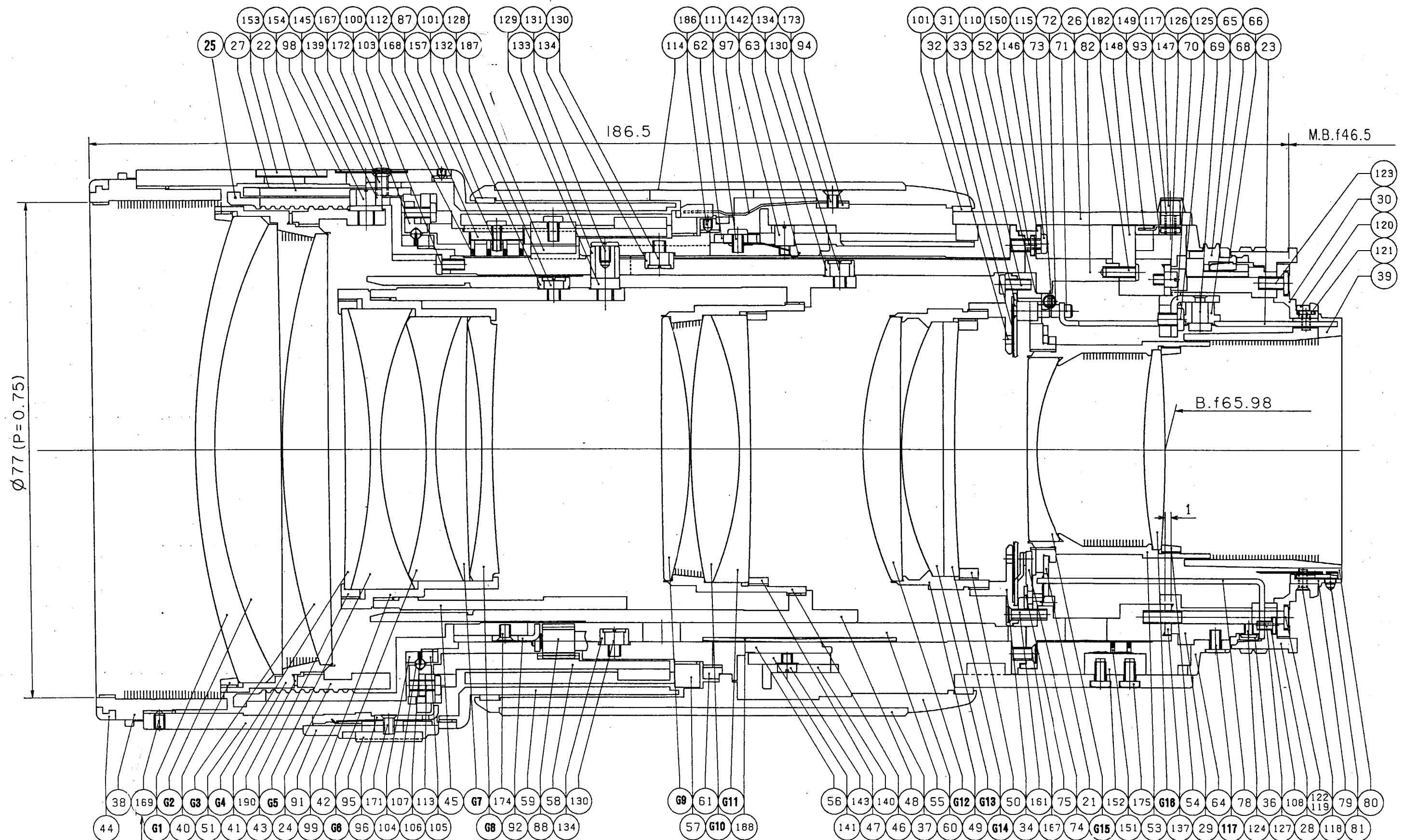


〔 3 〕 部品对照表 Parts Reference Table

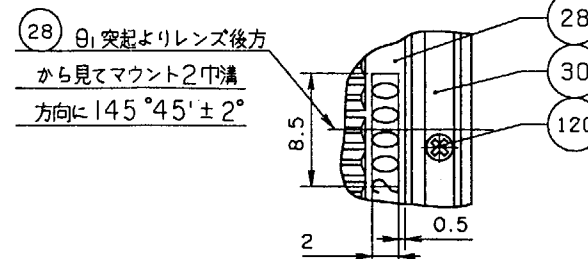
| 補助番号<br>Auxiliary<br>No. | 部品番号<br>Part Number | 補助番号<br>Auxiliary<br>No. | 部品番号<br>Part Number | 補助番号<br>Auxiliary<br>No. | 部品番号<br>Part Number |
|--------------------------|---------------------|--------------------------|---------------------|--------------------------|---------------------|
| 61                       | 16257-048           | 40                       | 1K520-873           | 79                       | 1K680-643-1         |
| 62                       | 16114-073-1         | 41                       | 1K500-830           | 80                       | 1K680-651-1         |
| 63                       | 16156-037           | 42                       | 1K500-657           | 81                       | 1K240-469-1         |
| 64                       | 16154-069           | 43                       | 1K520-874           | 82                       | 1K641-142           |
| 65                       | 16210-026-1         | 44                       | 1K117-394           | 83                       | 1K260-607           |
| 66                       | 16210-027           | 45                       | 1K630-783           | 84                       | 1K277-131           |
| 67                       | 16152-045           | 46                       | 1K500-658           | 85                       | 1K277-132           |
| 68                       | 16213-025           | 47                       | 1K520-875           | 86                       | 1K260-608           |
| 69                       | 16114-074           | 48                       | 1K540-146-3         | 87                       | 1K681-443           |
| 610                      | 16111-037           | 49                       | 1K500-659           | 88                       | 1K260-349-3         |
| 611                      | 16252-027           | 50                       | 1K520-876           | 89                       | 1K601-164           |
| 612                      | 16154-070           | 51                       | 1K630-784           | 90                       | 1K601-165           |
| 613                      | 16153-044           | 52                       | 1K641-140           | 91                       | 1K681-444           |
| 614                      | 16257-049           | 53                       | 1K500-660-1         | 92                       | 1K610-995           |
| 615                      | 16247-045           | 54                       | 1K520-877           | 93                       | 1K610-997           |
| 616                      | 16113-059           | 55                       | 1K307-026           | 94                       | 1K610-996           |
|                          |                     | 56                       | 1K530-062           | 95                       | 1K206-082           |
| 21                       | 1K300-078           | 57                       | 1K630-785           | 96                       | 1K611-704           |
| 22                       | 1K641-138           | 58                       | 1K260-606           | 97                       | 1K240-547-1         |
| 23                       | 1K314-311-1         | 59                       | 1K641-141           | 98                       | K087-412            |
| 24                       | 1K535-408           | 60                       | 1K630-786           | 99                       | 1K240-615-1         |
| 25                       | 1K535-409           | 61                       | 1K520-880-1         | 100                      | 1K641-143           |
| 26                       | 1K475-485           | 62                       | 1K680-790-1         | 101                      | 1K115-817           |
| 27                       | 1K470-090           | 63                       | 1K240-453-2         | 102                      | 1K117-395           |
| 28                       | 1K475-486           | 64                       | 1K485-202           | 103                      | B1-17035PR          |
| 29                       | 1K641-139           | 65                       | 1K208-097           | 104                      | 1K641-144           |
| 30                       | 1K404-078-5         | 66                       | 1K240-563           | 105                      | 1K521-159           |
| 31                       | 1K570-012           |                          |                     | 106                      | 1K347-016           |
| 32                       | 1K370-004-2         | 68                       | 1K340-143           | 107                      | T1-01500SX          |
| 33                       | 1K572-124           | 69                       | 1K371-098           | 108                      | 1K160-683-1         |
| 34                       | 1K574-151           | 70                       | 1K610-992           | 109                      | 1K120-021           |
|                          |                     | 71                       | 1K370-933           | 110                      | B1-17040PB          |
| 36                       | 1K240-020-1         | 72                       | 1K225-089           | 111                      | B1-17028PA          |
|                          | 1K240-021-1         | 73                       | 1K130-188-1         | 112                      | 1K240-797           |
|                          | 1K240-188-1         | 74                       | 1K680-688           | 113                      | B1-17040PA          |
|                          | 1K240-790           | 75                       | 1K370-052           | 114                      | 1K600-551           |
| 37                       | 1K110-373           | 76                       | 1K371-704           | 115                      | B1-17025PA          |
| 38                       | 1K400-340           | 77                       | 1K681-442           | 117                      | 1K120-219           |
| 39                       | 1K540-144           | 78                       | 1K610-993           | 118                      | 1K010-089           |

| 補助番号<br>Auxiliary<br>No. | 部品番号<br>Part Number | 補助番号<br>Auxiliary<br>No. | 部品番号号<br>Part Number | 補助番号<br>Auxiliary<br>No. | 部品番号<br>Part Number |
|--------------------------|---------------------|--------------------------|----------------------|--------------------------|---------------------|
| 119                      | 1K120-361           | 145                      | 1K130-494            | 185                      | 1K116-533           |
| 120                      | 1K120-012           | 146                      | 1K600-702            | 186                      | K2-14020FA          |
| 121                      | 1K010-002-1         | 147                      | 1K208-094            | 187                      | 1K601-166           |
| 122                      | 1K120-254           | 148                      | 1K680-801            | 188                      | 1K240-416-1         |
| 123                      | 1K120-010-1         | 149                      | 1K240-549            | 190                      | 1K161-177           |
| 124                      | 1K120-162           | 150                      | A1-20030FA           |                          |                     |
| 125                      | B1-20030FB          | 151                      | 1K240-550            | B23                      | 1B314-153-1         |
| 126                      | 1K126-051           | 152                      | 1K680-802            | B24                      | 1B535-166           |
| 127                      | 1K120-086           | 153                      | 1K480-025            | B32                      | 1B570-013-2         |
| 128                      | 1K130-326           | 154                      | 1K116-311            | B55                      | 1B002-014           |
| 129                      | 1K146-157           | 155                      | 1K314-312            | B56                      | 1B002-013           |
| 130                      | 1K130-328           | 156                      | 1K611-012            | B63                      | 1B240-051-2         |
| 131                      | 1K120-335           | 157                      | 1K010-083            | B71                      | 1B572-040           |
| 132                      | 1K116-442           | 158                      | 1K371-108            | B75                      | 1B999-491           |
|                          | 1K116-443           | 159                      | 1K426-003            | B81                      | 1B060-489           |
|                          | 1K116-444           | 160                      | 1K136-067-1          | B90                      | 1B600-065           |
|                          | 1K116-445           | 161                      | A2-17060FB           | B97                      | 1B240-052-1         |
| 133                      | 1K116-661-1         | 162                      | 1K230-240-2          | B112                     | 1B240-086           |
| 133                      | 1K116-662-1         | 163                      | 1K611-706            | B139                     | 1B999-492           |
| 133                      | 1K116-663-1         | 164                      | 1K230-377            | B151                     | 1B240-053           |
| 134                      | 1K116-450           | 165                      | 1K426-002            | B155                     | 1B314-154           |
| 134                      | 1K116-451           | 166                      | 1K371-705            | B158                     | 1B610-060           |
| 134                      | 1K116-452           | 167                      | A2-20035FB           | B159                     | 1B002-016           |
| 134                      | 1K116-453           | 168                      | K2-14015FB           | B160                     | 1B999-395           |
| 137                      | 1K160-734           | 169                      | K2-17030FB           |                          |                     |
| 137                      | 1K160-735           |                          |                      | Z41                      | 1B100-627           |
| 137                      | 1K160-736           | 171                      | G2-17030FA           | Z46                      | 1B100-432           |
| 137                      | 1K160-737           | 172                      | A3-20040FS           | Z49                      | 1B100-433           |
| 137                      | 1K160-738           | 173                      | B2-17028FA           | Z53                      | 1B100-434-2         |
| 137                      | 1K160-739           | 174                      | A2-17025FB           |                          |                     |
| 137                      | 1K160-740           | 175                      | H1-17030FS           | L1                       | 1G016-048-1         |
| 137                      | 1K160-741           | 176                      | 1K050-016            | L2                       | 1G024-016-1         |
| 137                      | 1K160-742           | 176                      | 1K050-203            | L3                       | 1G026-031           |
| 139                      | 1K117-396           | 176                      | 1K050-379            | L4                       | 1G017-070           |
| 139                      | 1K117-397           | 176                      | 1K050-380            | L5                       | 1G015-034           |
| 139                      | 1K117-398           | 179                      | S1-02000SX           |                          |                     |
| 139                      | 1K117-399           | 180                      | 1K370-117            |                          |                     |
| 140                      | 1K530-040-1         | 181                      | B1-17060FA           |                          |                     |
| 141                      | 1K640-767-1         | 182                      | A1-17045FA           |                          |                     |
| 142                      | 1K126-067           | 183                      | 1K116-824            |                          |                     |
| 143                      | 1K123-119           | 184                      | 1K116-533            |                          |                     |





**Note)** When ordering the repair parts, please use the parts numbers stated on the Repair Parts List. Please note that some of those numbers stated on the Parts Number Reference Table, the Exploded Drawings and the Lubricant and Binding Agent Chart are not included in the Repair Parts List since they are not available as the individual repair parts.



**注)** 部品対照表、組立図、接着給油図には部品要求出来る番号と要求出来ない番号と記載されています。部品要求の際は、部品表で確認の上、要求して下さい。部品表に記載されていない部番は部品要求出来ません。

Fig. 3

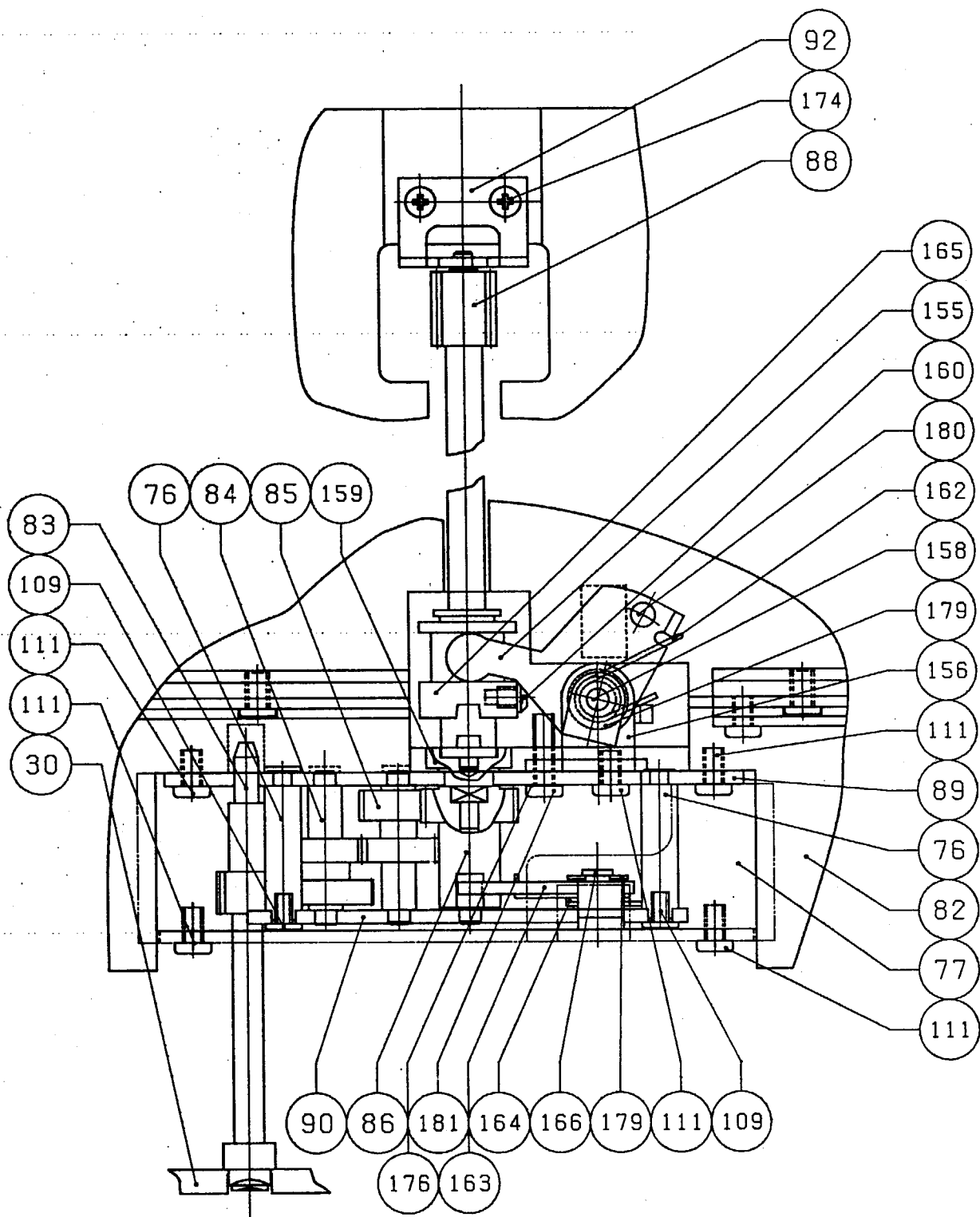
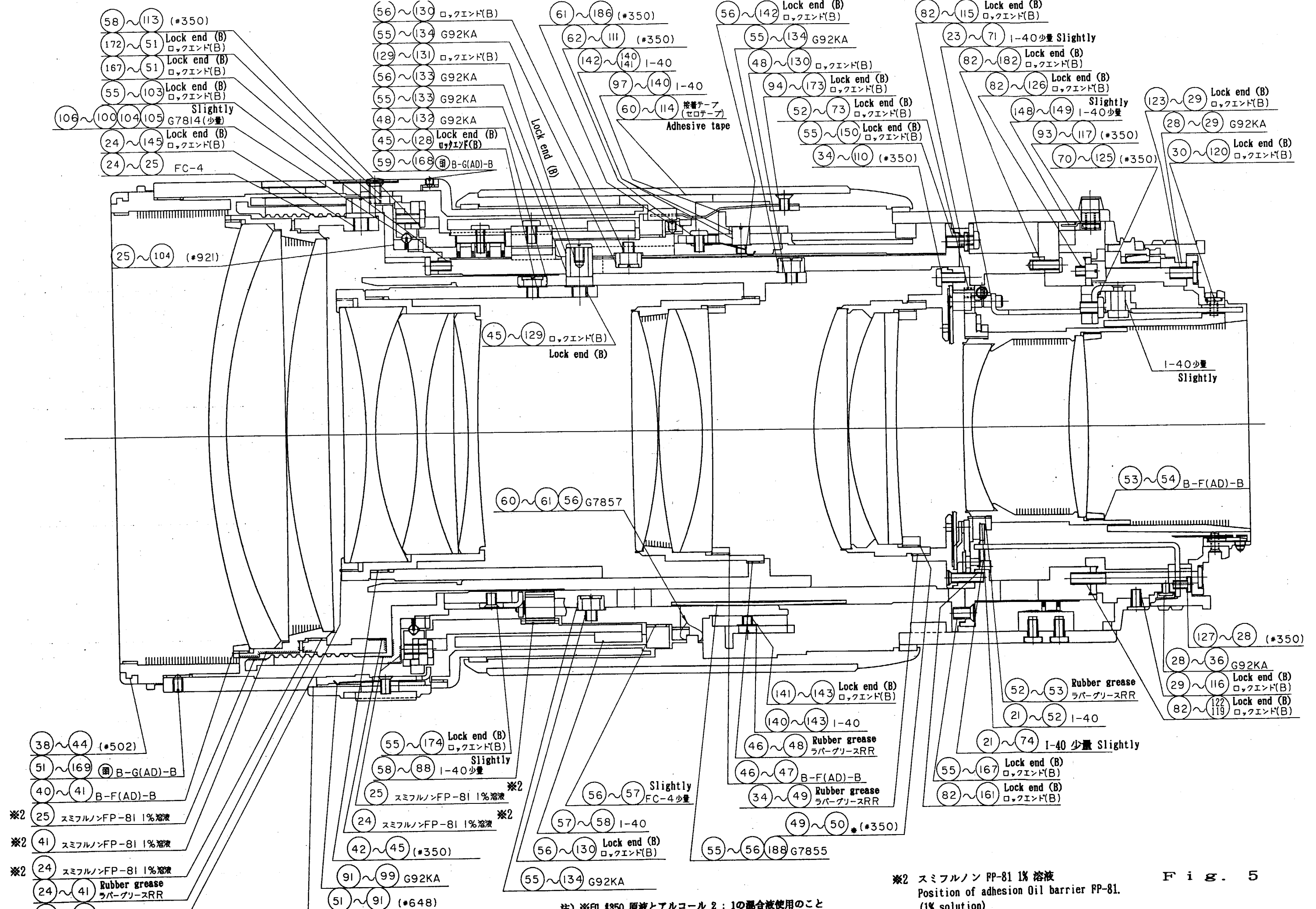
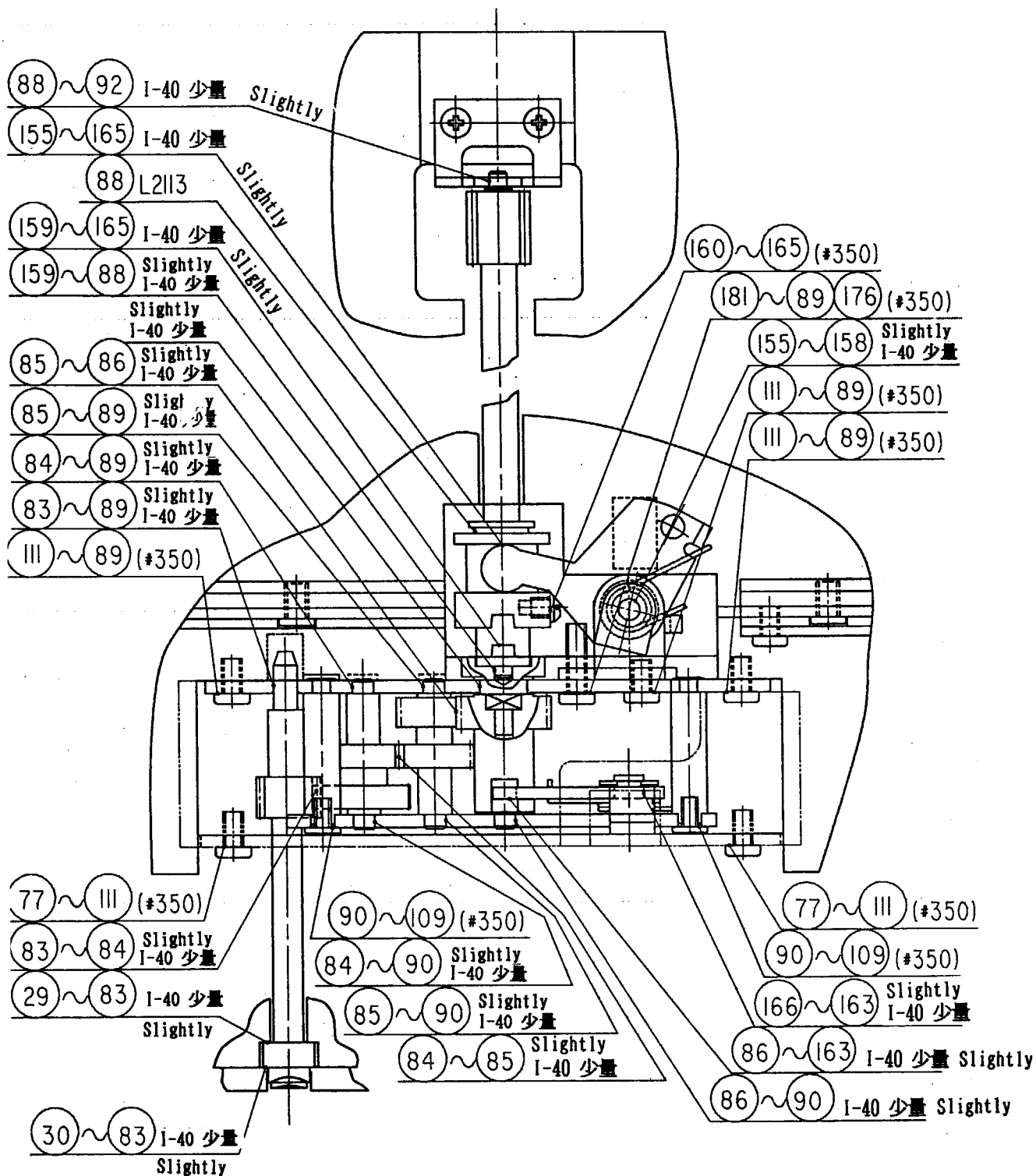


Fig. 4



※2 スミフルノン PP-81 1% 溶液  
Position of adhesion Oil barrier PP-81.  
(1% solution)

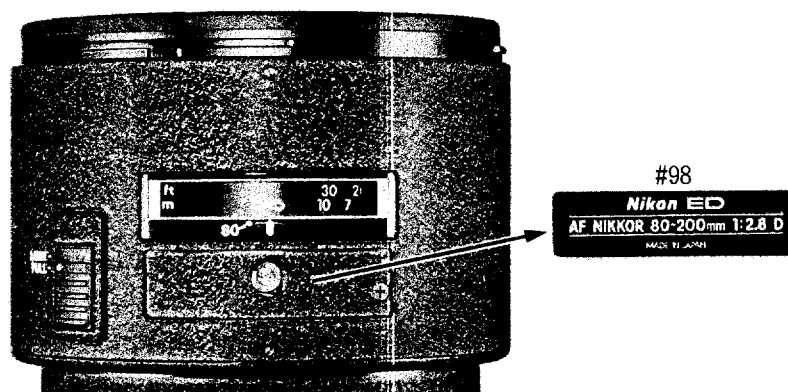


F i g . 6

# [6] DISASSEMBLING / ASSEMBLING *parts*

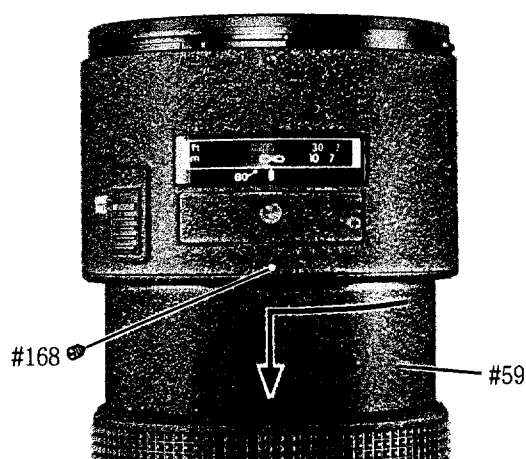
## 1. DISASSEMBLING

NAME PLATE #98

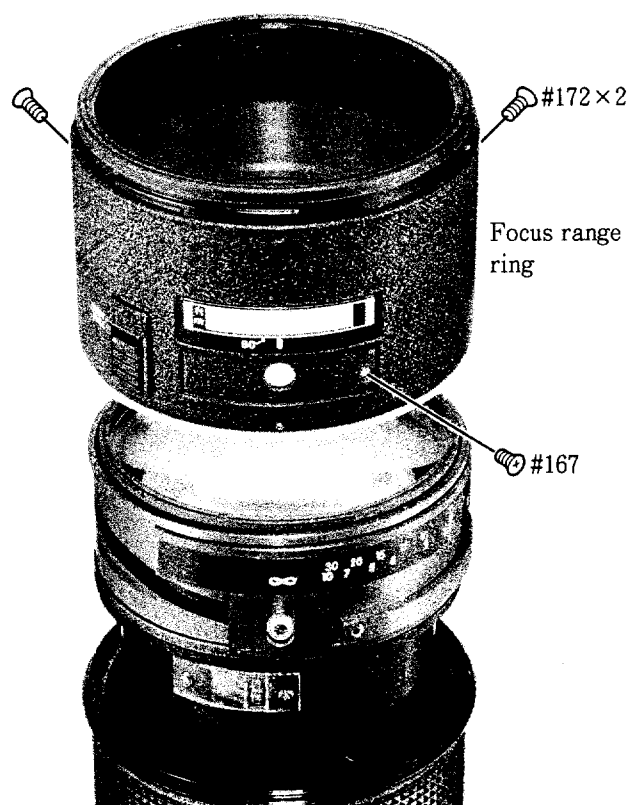


FOCUS RANGE RING

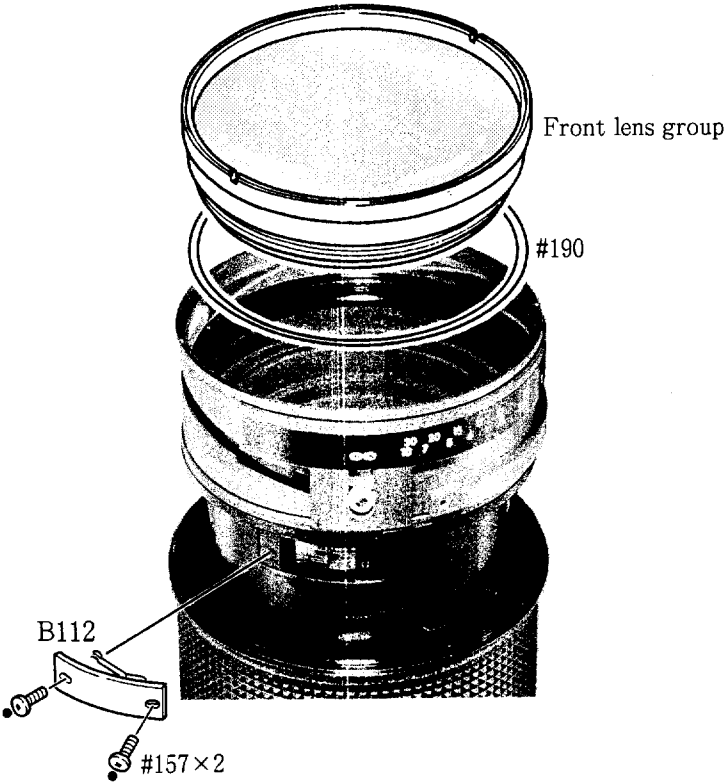
- Remove set screw #168 and remove external ring #59 from the focus range ring.



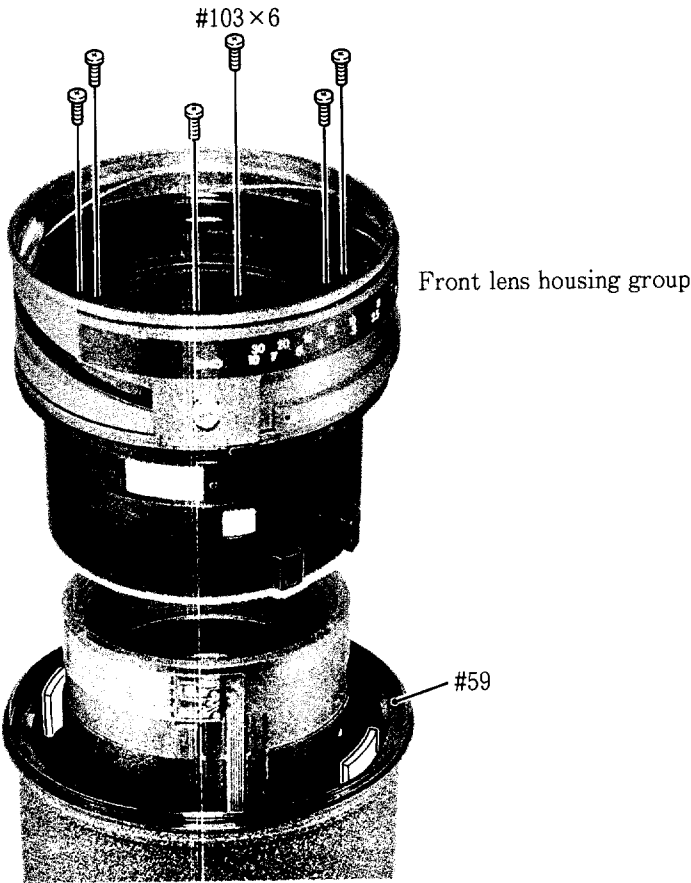
- Set the index to the  $\infty$  (infinity) mark and remove the focus range ring.



FRONT LENS GROUP, DISTANCE BRUSH



FRONT LENS HOUSING GROUP, EXTERNAL RING #59

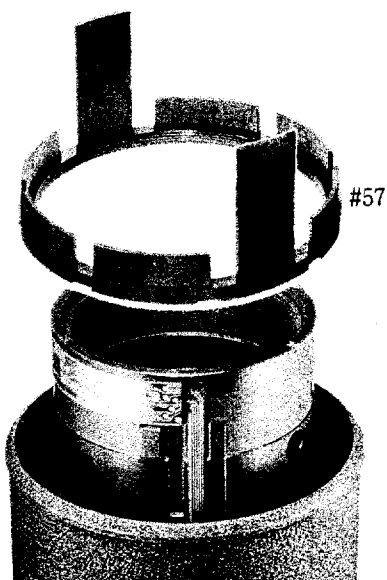


## 2nd LENS GROUP



2nd lens group

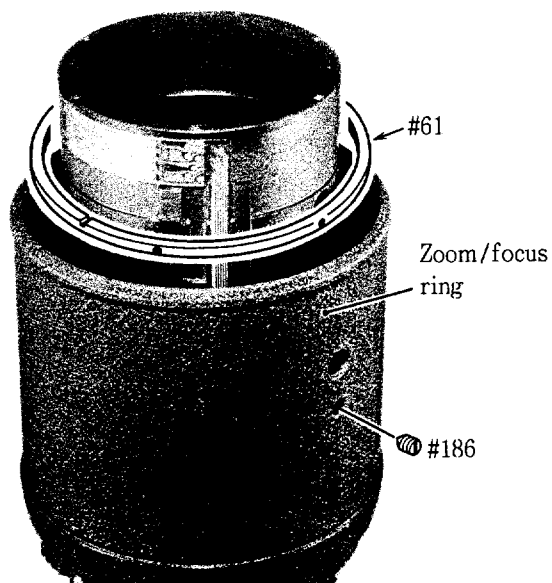
## MANUAL FOCUS DRIVING RING #57



#57

- Set the A-M ring to "A". Then remove the manual focus driving ring #57.

## ZOOM/FOCUS RING



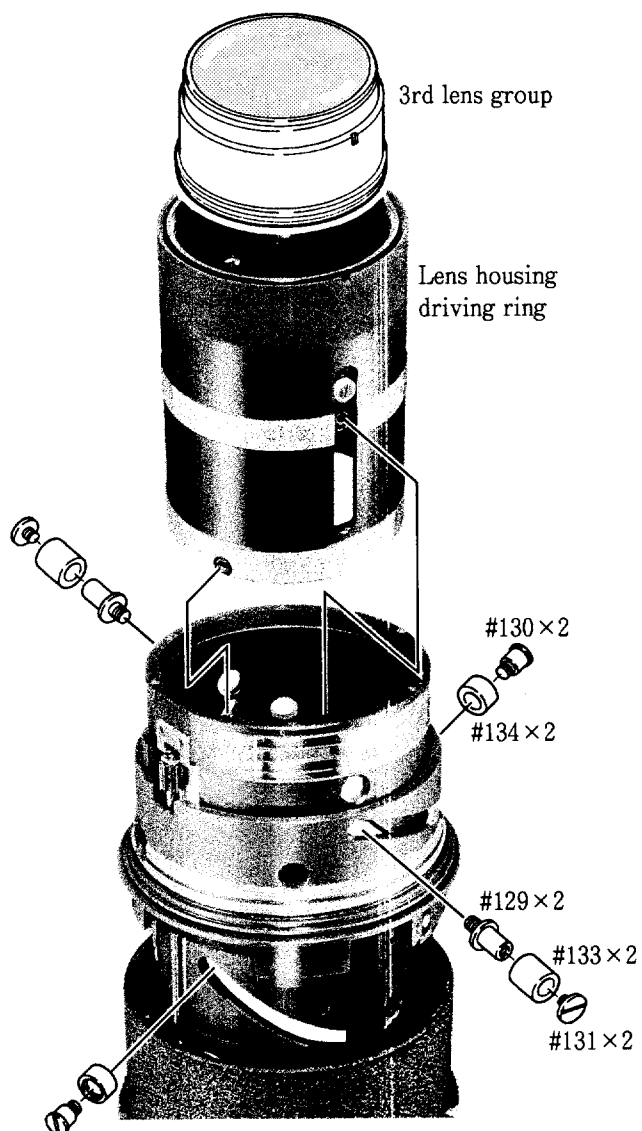
#61

Zoom/focus ring

#186

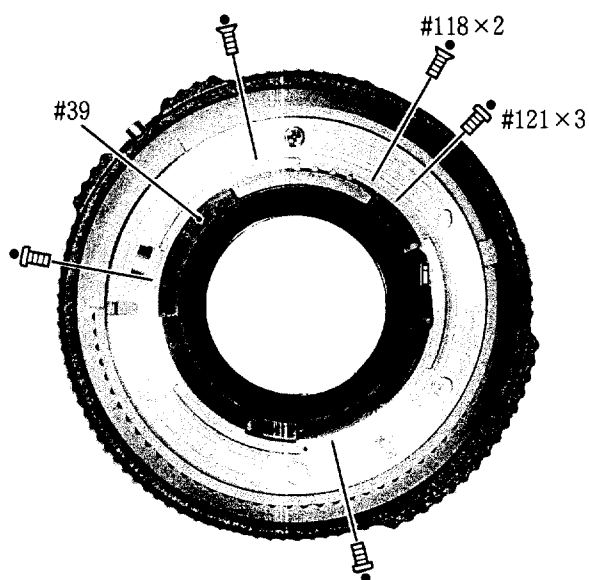
- ① Remove the rubber ring #37.
- ② Remove screw #186 from the hole in the zoom/focus ring.
- ③ Remove the retaining ring #61 using tool J11201.
- ④ Remove the zoom/focus ring.

## LENS HOUSING DRIVING RING, 3rd LENS GROUP



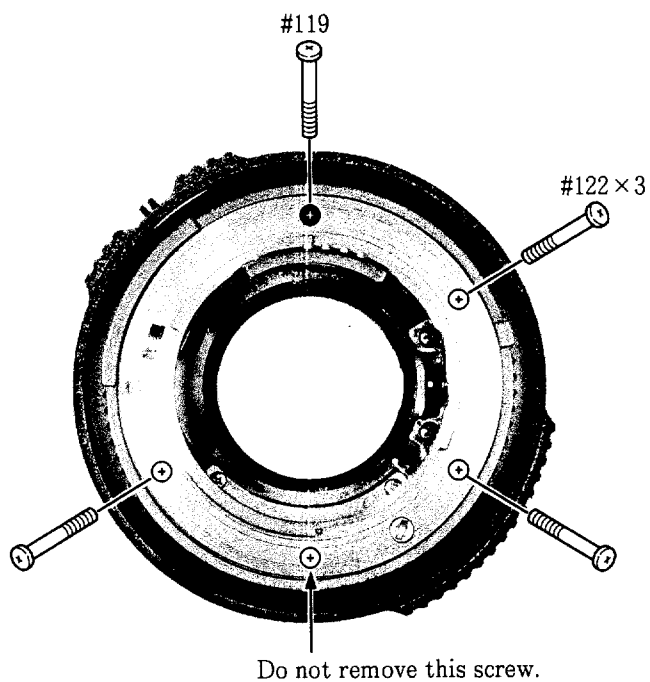
- Use tool J11195A to remove the 3rd lens group.

## REAR COVER RING #39

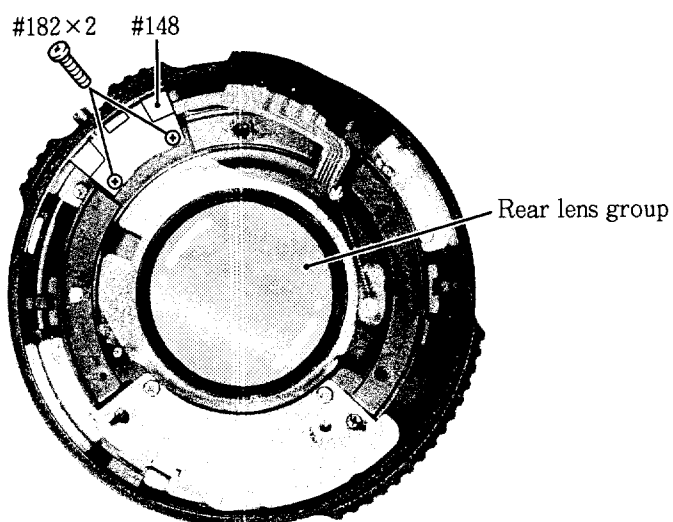




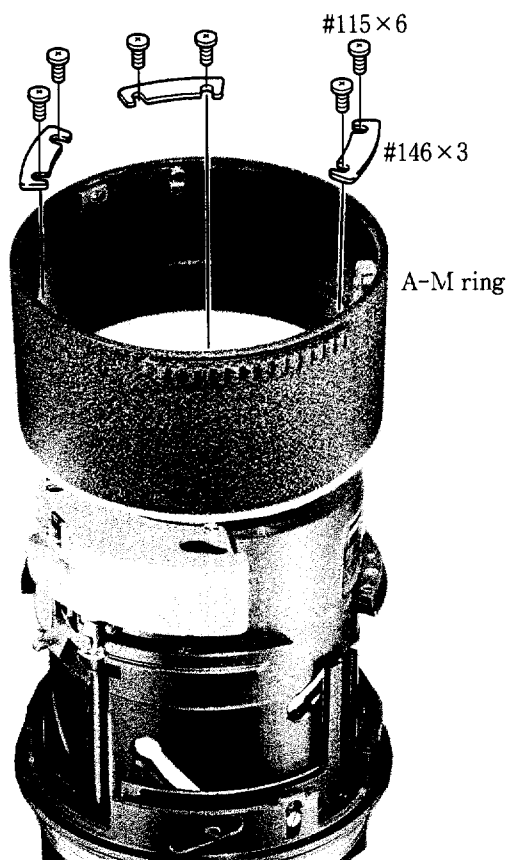
BAYONET MOUNT GROUP



REAR LENS GROUP, A-M BLOCK #148

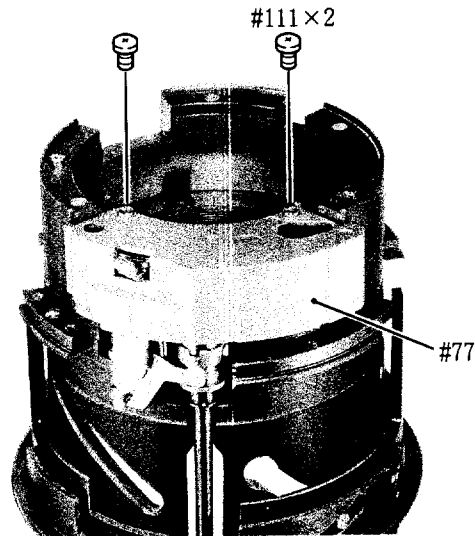


A-M RING

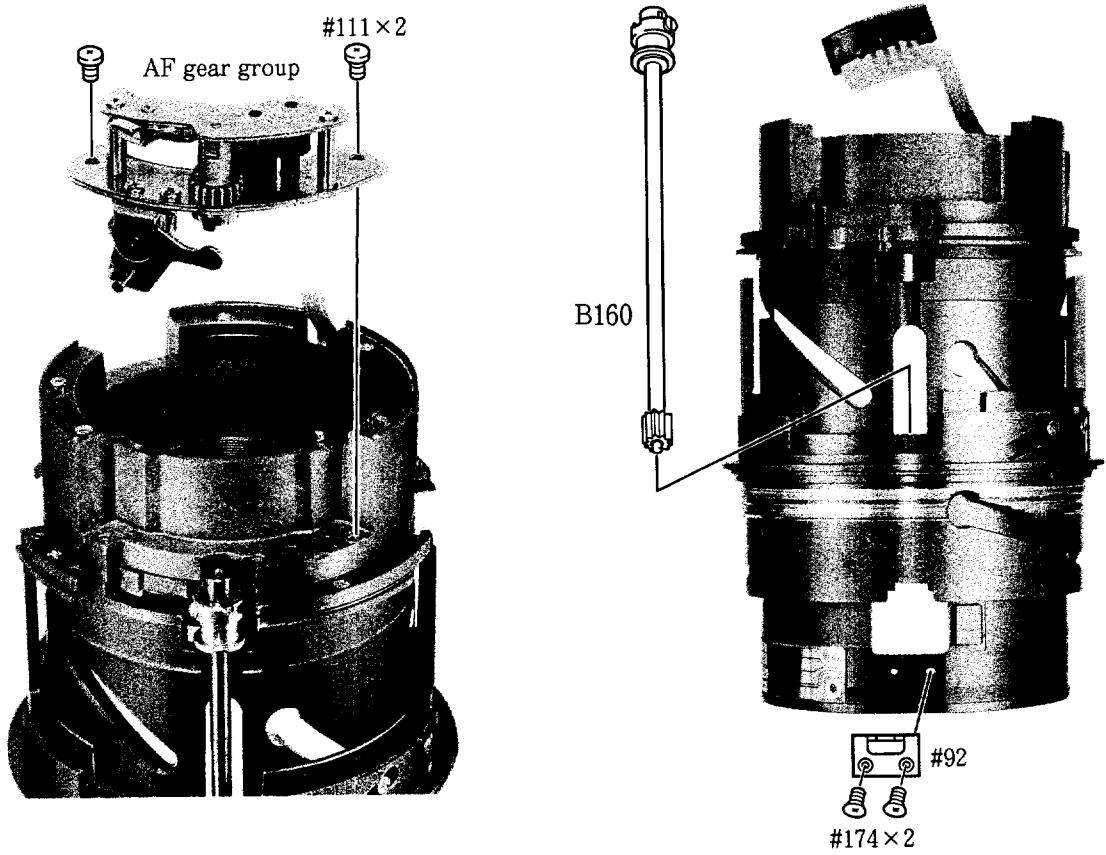


**Note:** Be sure not to bend the A-M brush.

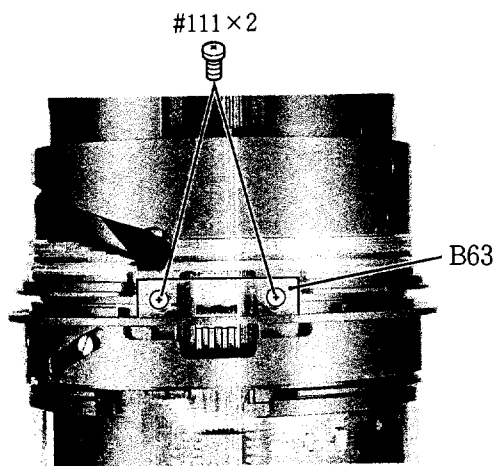
GEAR COVER #77



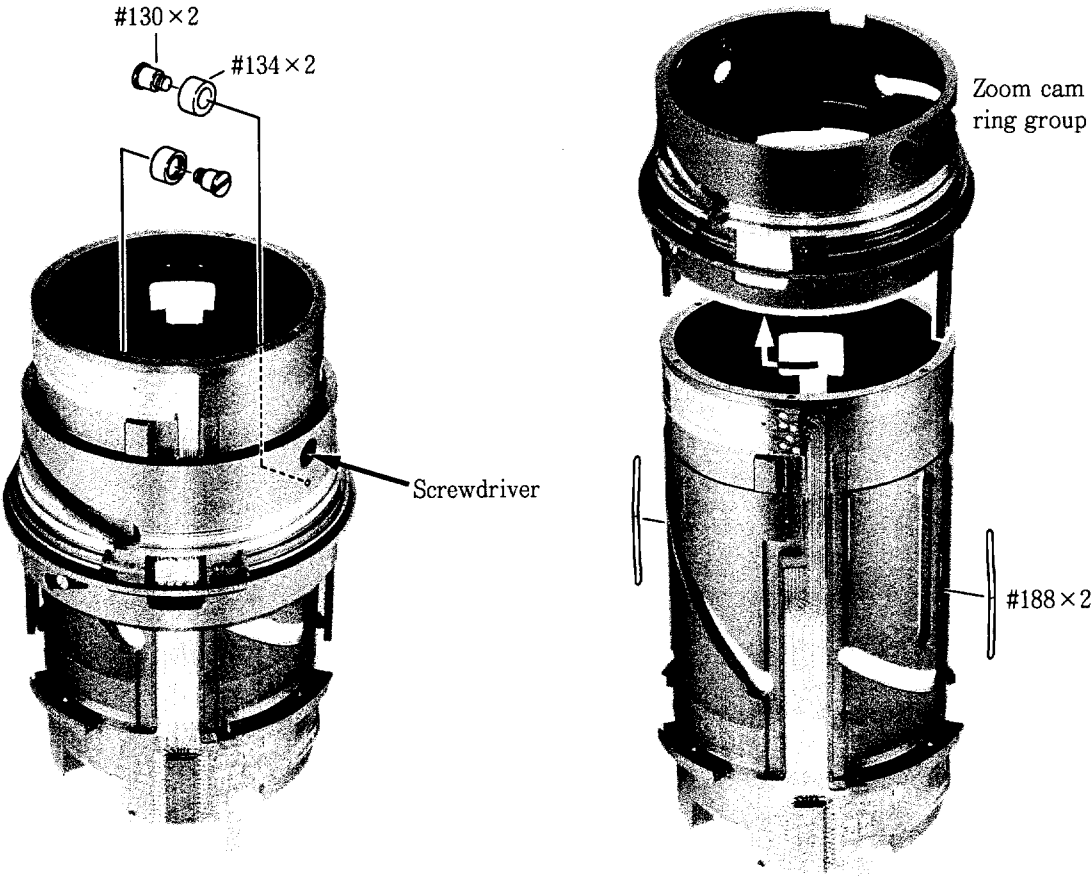
AF GEAR GROUP



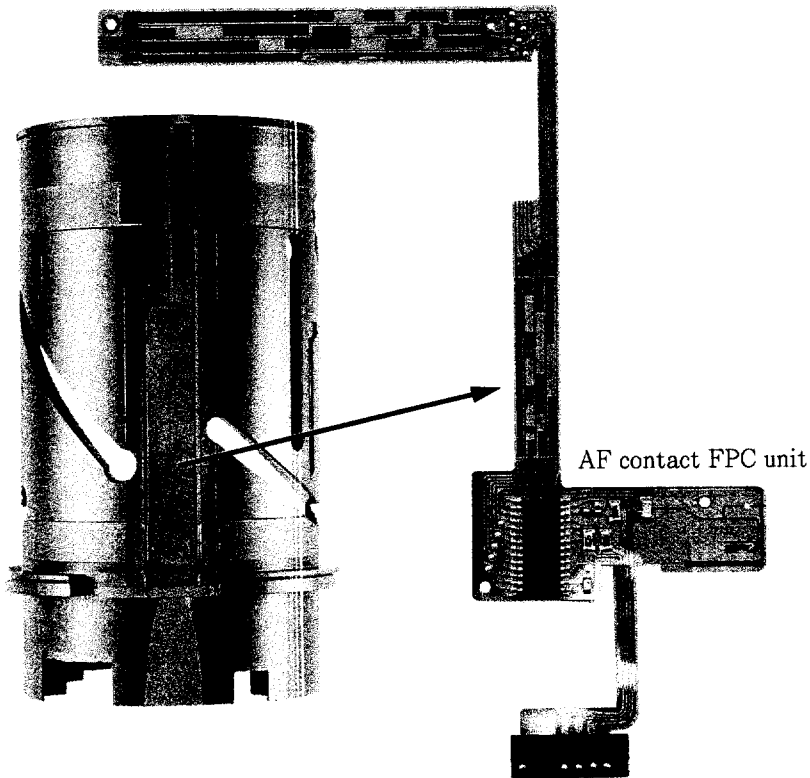
ZOOM BRUSH B63



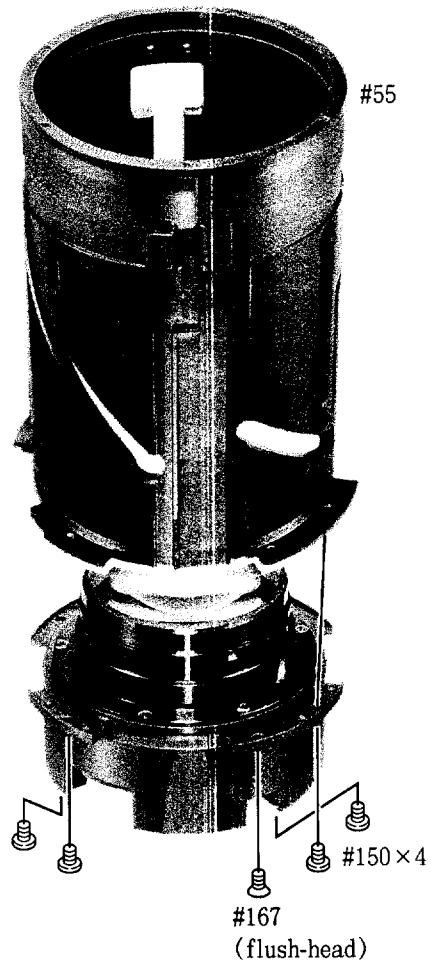
ZOOM CAM RING GROUP



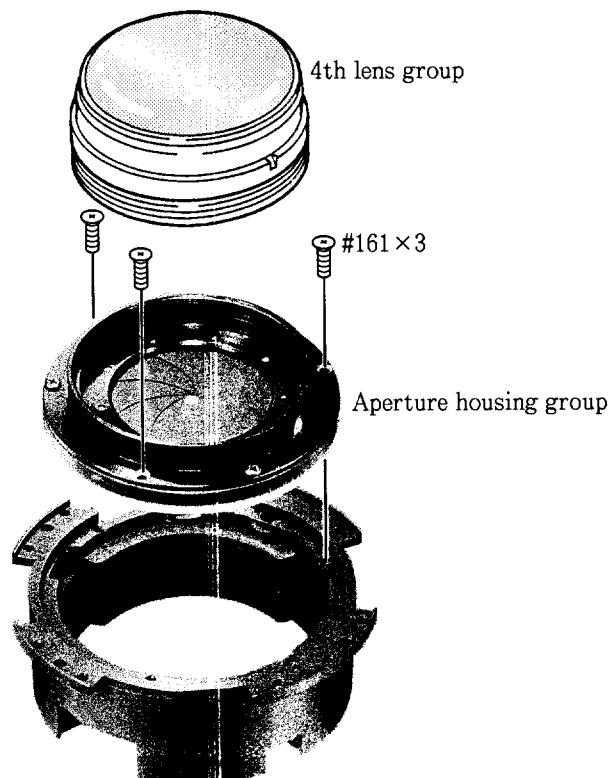
AF CONTACT FPC UNIT



LENS BARREL #55



4th LENS GROUP, APERTURE HOUSING GROUP

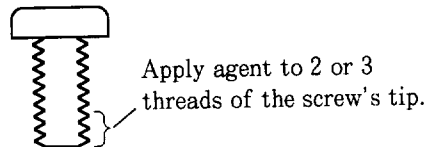


## 2. ASSEMBLING

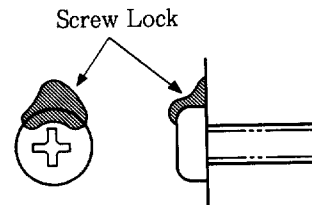
### ◆ Before assembling

- Refer to the following figures when applying Lock End B or Screw Lock #350 agent (used to prevent screws from working loose).

**Lock End B**

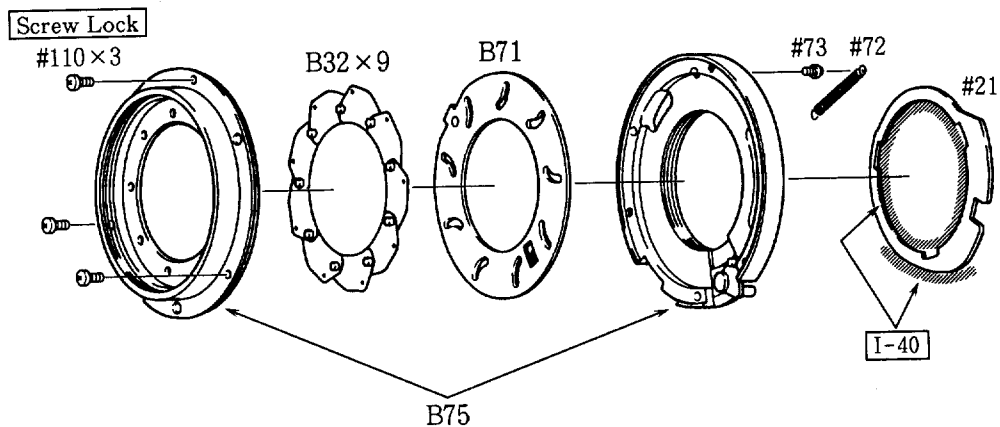


**Screw Lock**



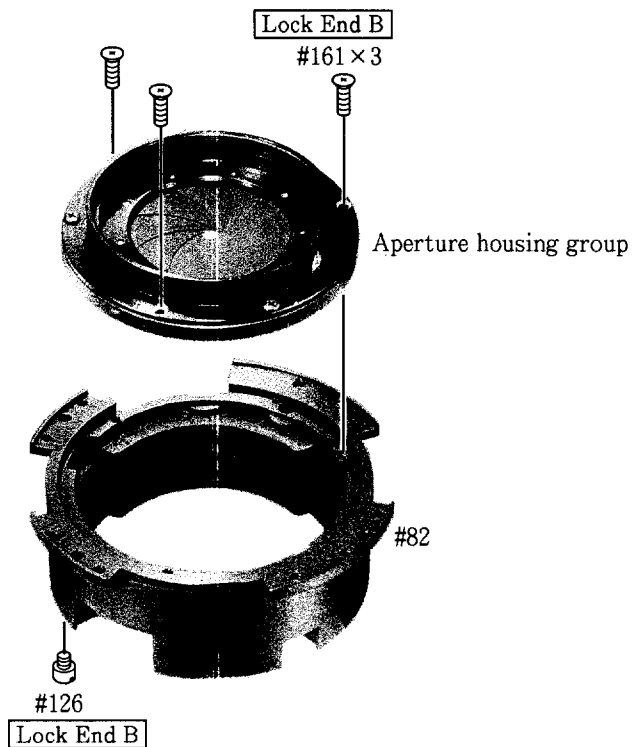
- If it is hard to obtain Lock End B locally, you can use Lock Tight (purple) instead. Make sure not to use the more powerful yellow, red or blue Lock Tight or you will not be able to remove the screw again easily.
- Remove all traces of old Lock End B or Screw Lock agent before reapplying.

### APERTURE HOUSING GROUP

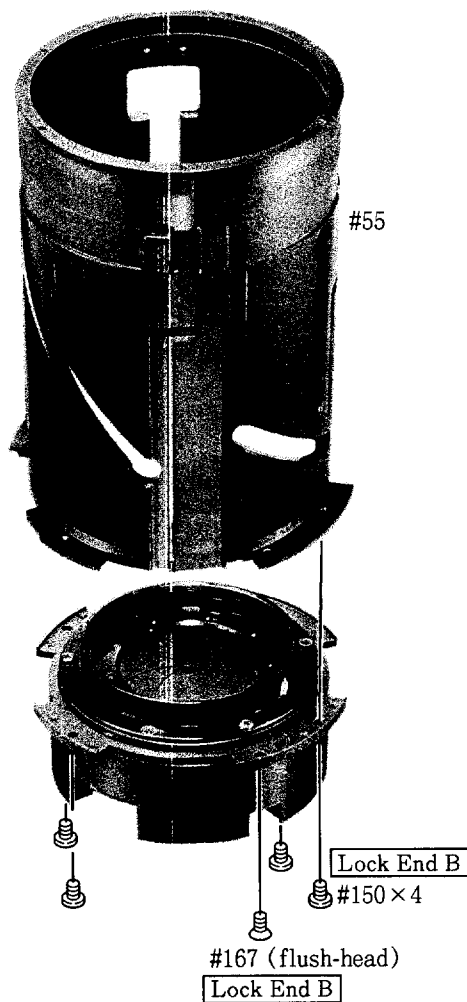


**Inspection:** Check aperture operation by moving the #21 and B71.

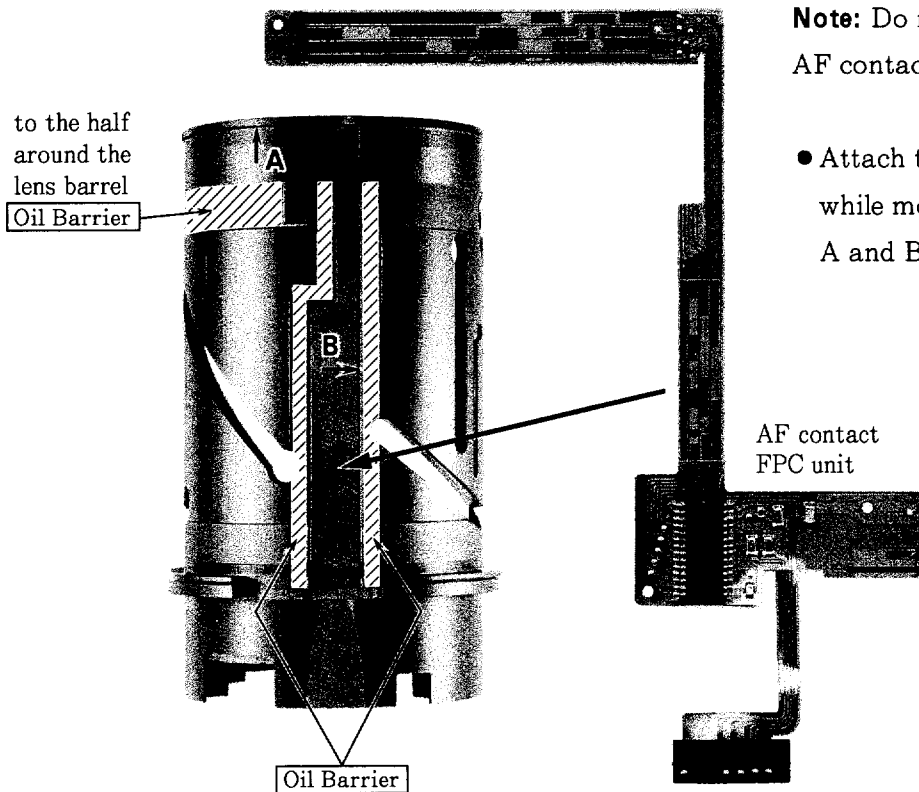
MOUNT THE APERTURE HOUSING GROUP



LENS BARREL #55



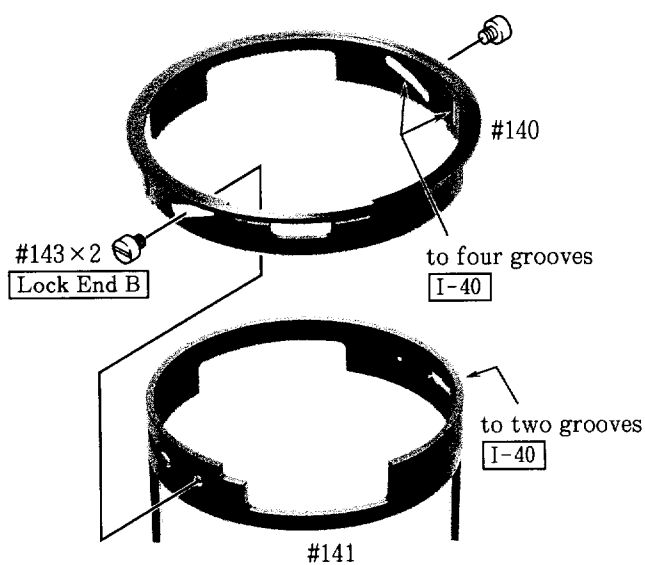
## AF CONTACT FPC UNIT



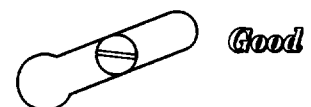
**Note:** Do not reuse the peeled-off AF contact FPC unit .

- Attach the AF contact FPC unit while moving it toward portions A and B.

## CAM RING #140 &amp; #141

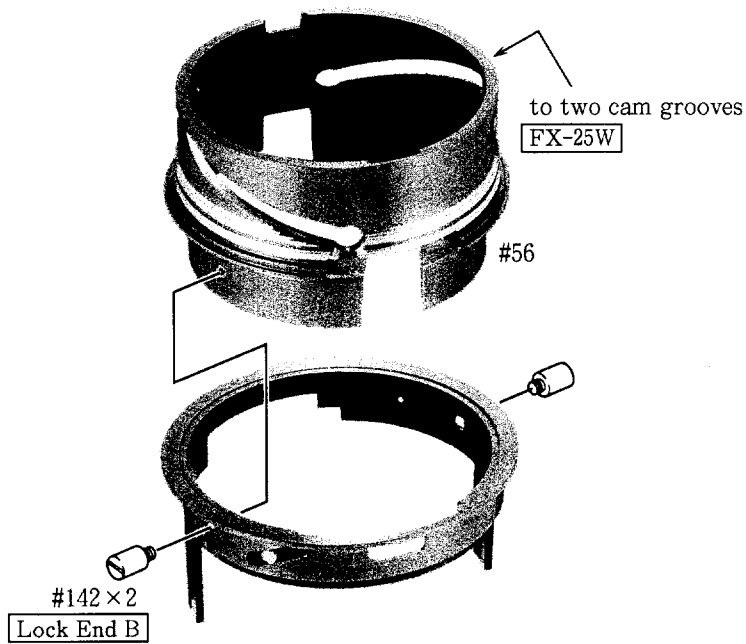


- The slot position of guide screw #143 for the groove should be as shown in the following figures.





## ZOOM CAM RING #56



- The slot position of guide screw #142 for the groove should be as shown in the following figures.



*Very  
good*

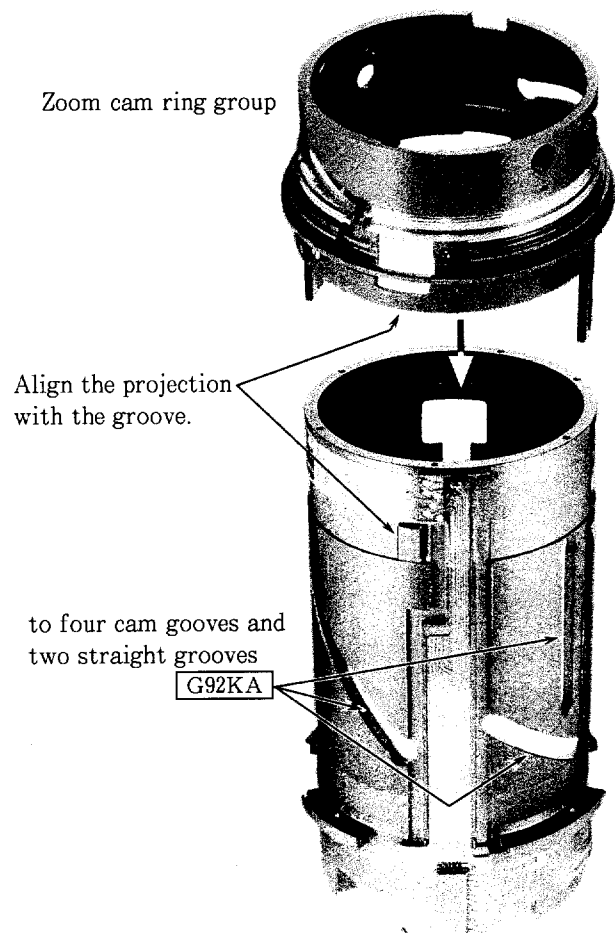


*Good*

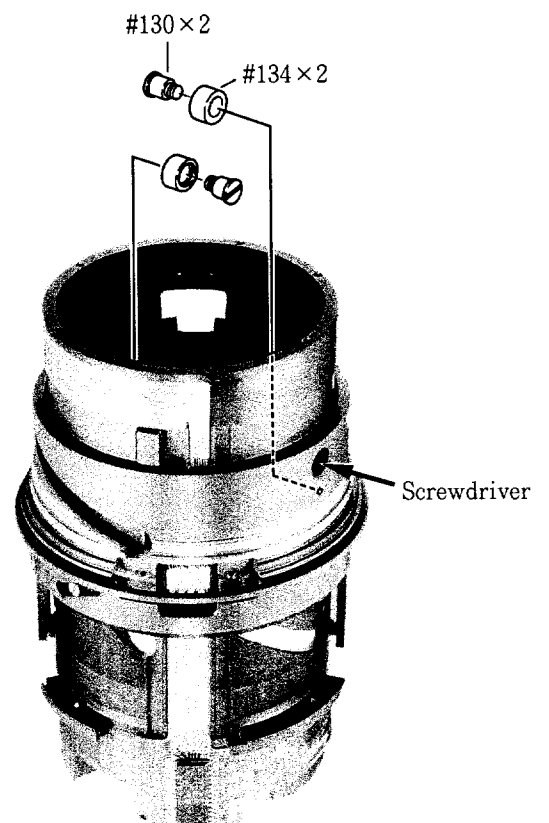


*No good*

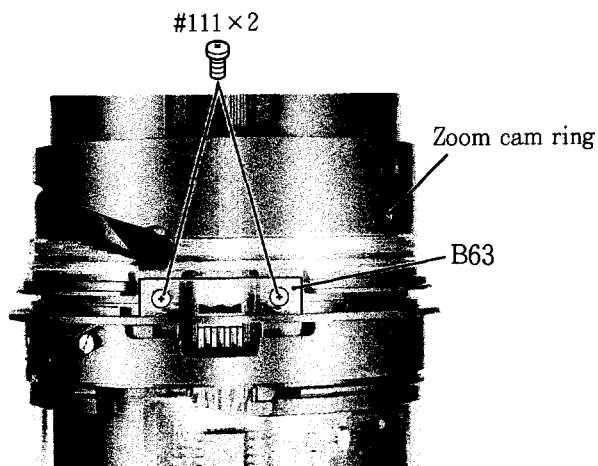
## ASSEMBLE THE ZOOM CAM RING GROUP



**Inspection:** Move the zoom cam ring group vertically to check operation.



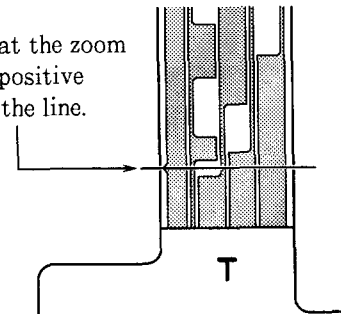
## ZOOM BRUSH B63



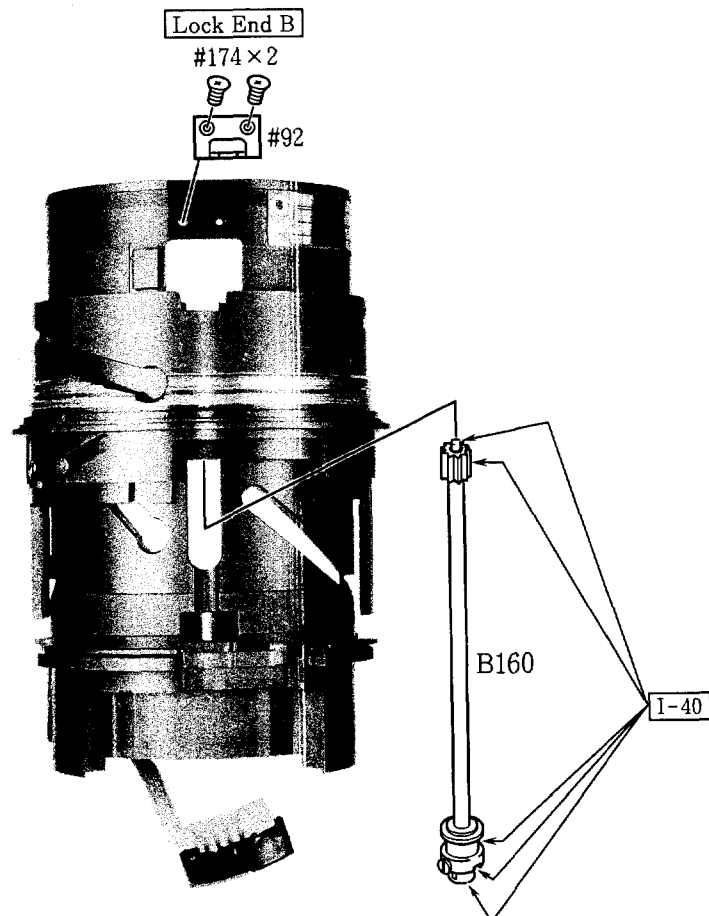
## ● Adjustment of zoom brush position

- ① Move the zoom cam ring until it comes to a stop at the stopper on the Tele (f=200) side.
- ② Adjust the position of the zoom brush B63 so that the zoom brush comes into contact with the line as shown in the figure below.
- ③ Move the zoom cam ring vertically several times to check that the brush is correctly positioned.
- ④ Secure screws #111 x 2 using Screw Lock.

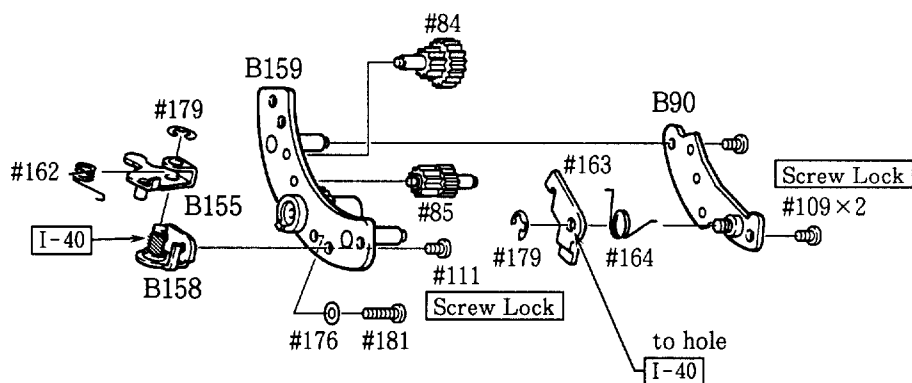
Make sure that the zoom brush makes positive contact with the line.



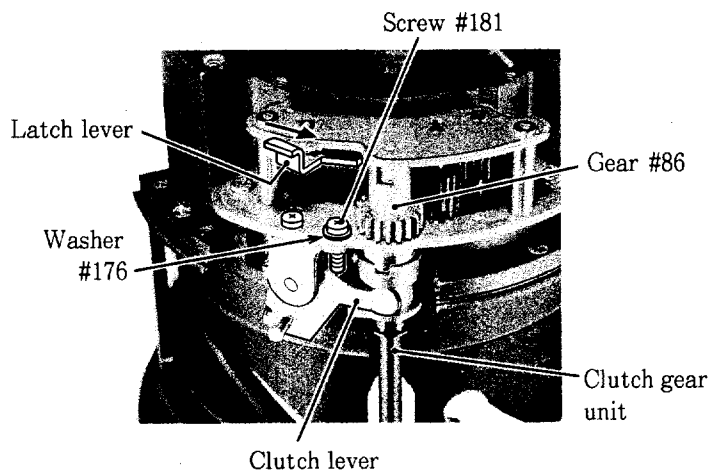
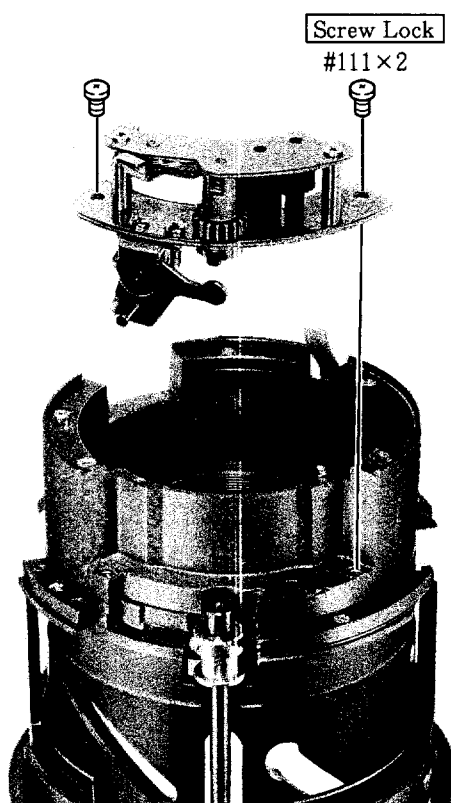
## CLUTCH GEAR UNIT B160



## AF GEAR GROUP

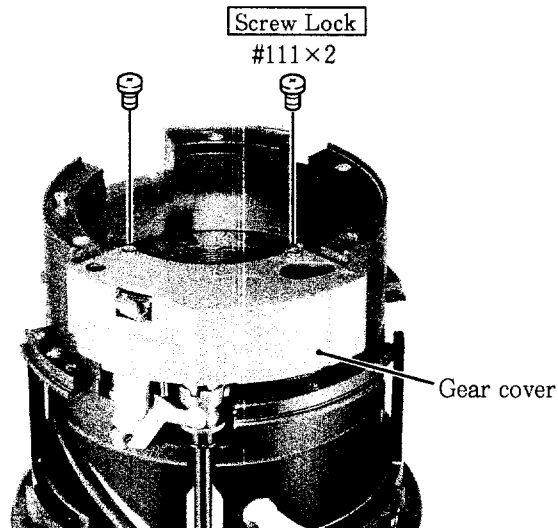


- Apply grease I-40 to each gear and gear shaft.

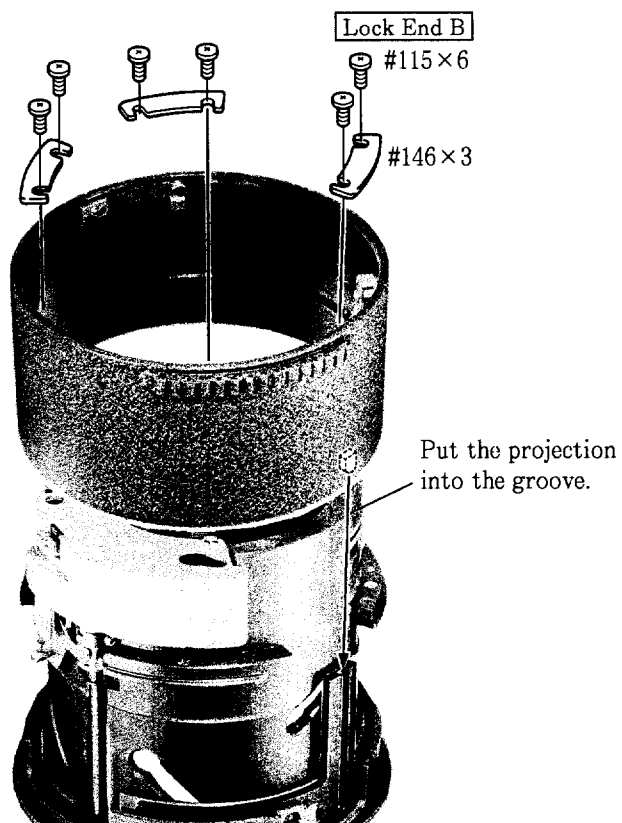
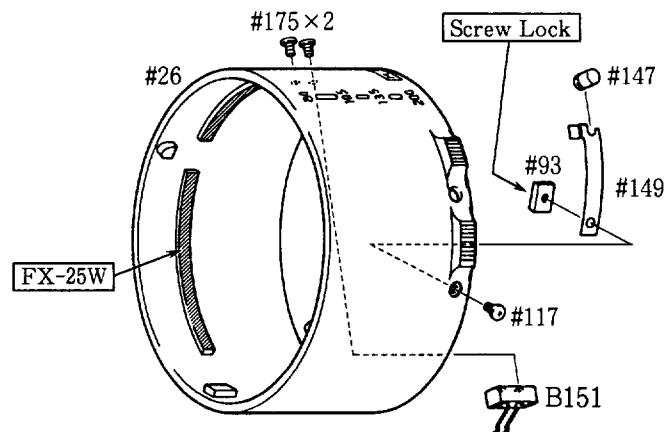


- Adjust the position of the clutch lever
  - ① Move the latch lever in the direction of the arrow. And rotate gear #86 or clutch gear unit to check operation.
  - ② If operation is abnormal, change the thickness of washer #176 to adjust the position of clutch lever.
- Note:** Make sure that gear #86 and clutch gear unit are positively interlocked.
- ③ Secure screw #181 using Screw Lock.

## GEAR COVER #77



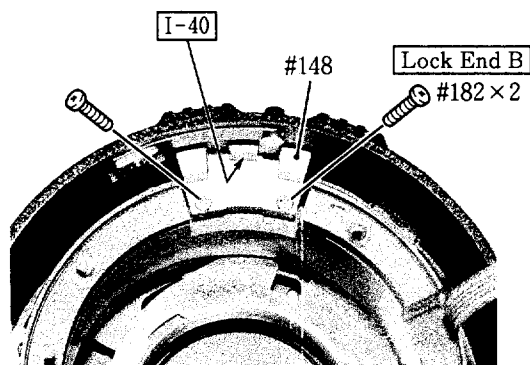
## A-M RING #26

**Note:**

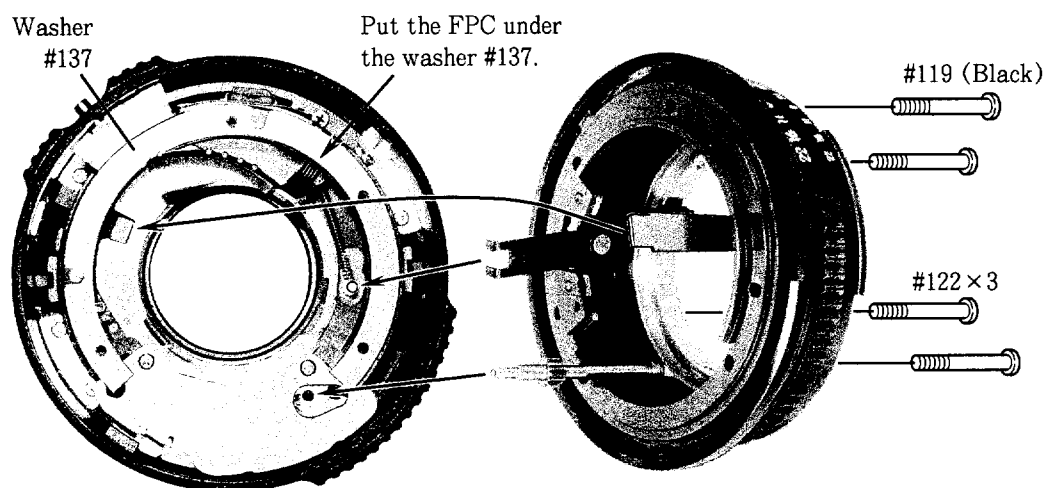
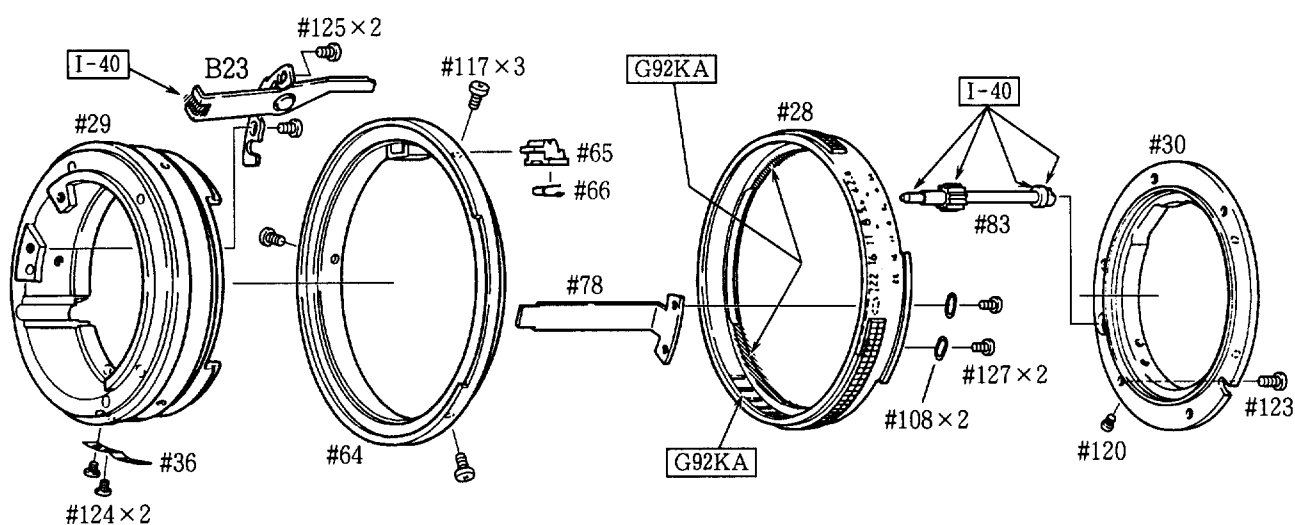
- ① Do not bend brush B151 when installing the A-M ring.
- ② Install retaining plates #146×3 with the flash surface facing upward.

**Inspection:** Rotate the A-M ring to check operation and A-M changeover operation.

## A-M BLOCK #148



## BAYONET MOUNT GROUP

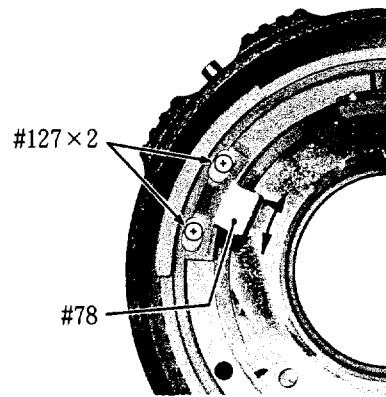


**Note:** If several #137 washers are to be used, insert thin washers between thick ones.

**Inspection:**

- ① Check operation of aperture by moving aperture lever and aperture ring.
- ② After setting the A-M ring to "A", rotate coupling gear #83 to check operation of AF gear section.

## ADJUSTMENT OF APERTURE OPENING



| Aperture setting | Inscribed circle diameter (mm) | Tolerance (mm) |
|------------------|--------------------------------|----------------|
| 2.8              | 28.98                          | 30.49 ~ 27.48  |
| 4                | 19.57                          | 21.14 ~ 18.12  |
| 5.6              | 13.62                          | 15.29 ~ 12.13  |
| 8                | 9.56                           | 10.73 ~ 8.52   |
| 11               | 6.74                           | 7.86 ~ 5.78    |
| 16               | 4.76                           | 5.55 ~ 4.08    |
| 22               | 3.36                           | 3.92 ~ 2.88    |

- ① Remove the bayonet mount #30 only.
- ② Unfasten the screws #127×2 and adjust the aperture diameter by moving the lever #78.

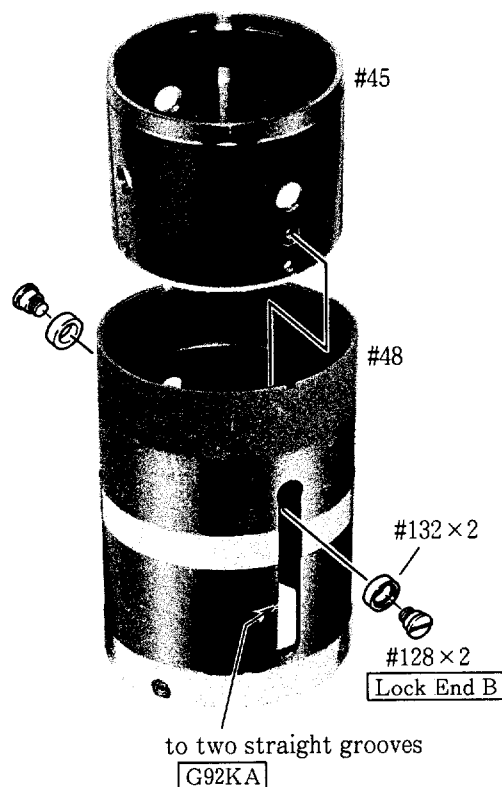
**Reference:**

- (a) In the full aperture (f/2.8), let the aperture diameter be slightly larger than the inside diameter of B71 (28.5mm).
- (b) In the minimum aperture (f/22), the 3mm-rod should pass through the aperture diameter and the 4mm-rod should not pass through it.

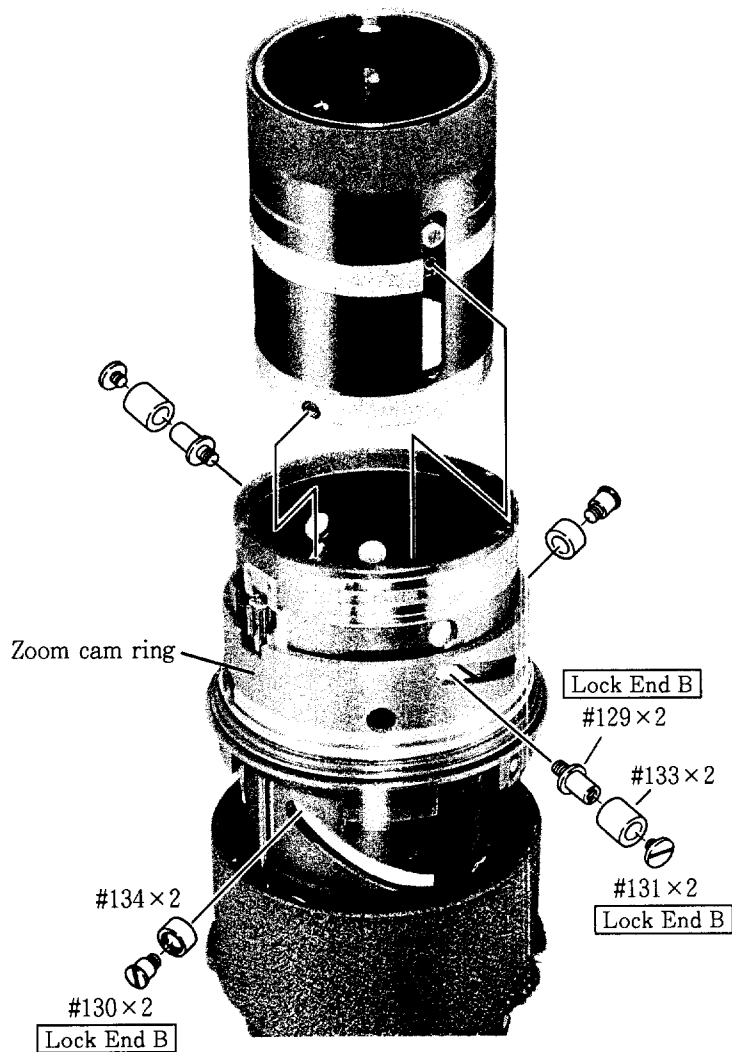
**Inspection:**

- (a) Check to see that the aperture diameter stays within allowable range when the aperture ring is moved forward and backward.
  - (b) Check to see that the aperture diameter stays within allowable range when the aperture lever is 'snapped', (using your finger), or when not 'snapped'.
- ③ After adjustment, secure screws #127×2 using Screw Lock.

## LENS HOUSING DRIVEN RING #45 &amp; #48

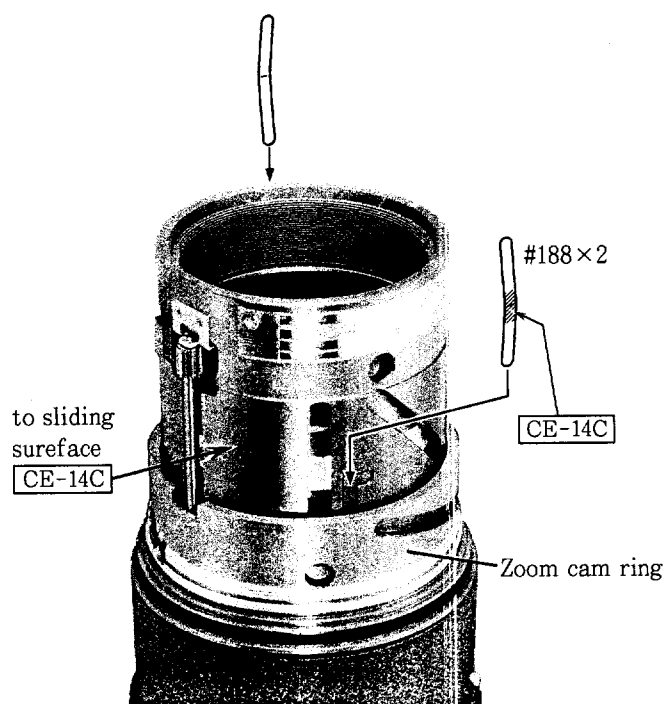


- Insert #45 into #48 and attach the guide rings at the optimum operating position.



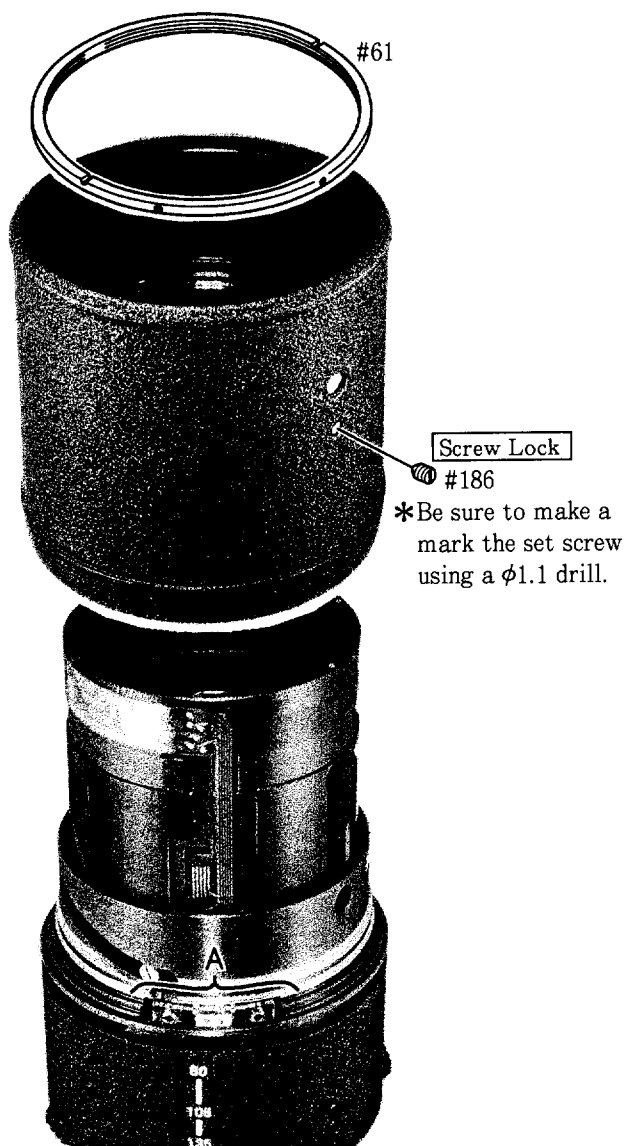
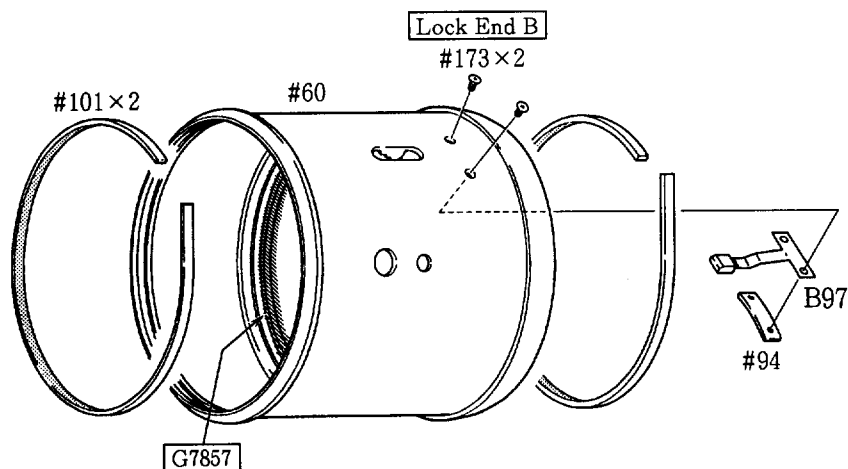
- Attach guide rings #130 and #134 in the first place. Then attach guide rings #129, #131, and #133 from the top of the zoom cam ring.

**Inspection:** Move the zoom cam ring vertically to check operation.



**Inspection:** Move the zoom cam ring vertically to check operation.

## ZOOM/FOCUS RING #60



- ①
- Use tool J11201 to mount retaining ring #61.

**Note:** There are two screw holes in the retaining ring #61. Insert one set screw into the screw hole in the ring in the portion other than "A".

**Inspection:** Move the zoom/focus ring to check operation.

① × 1

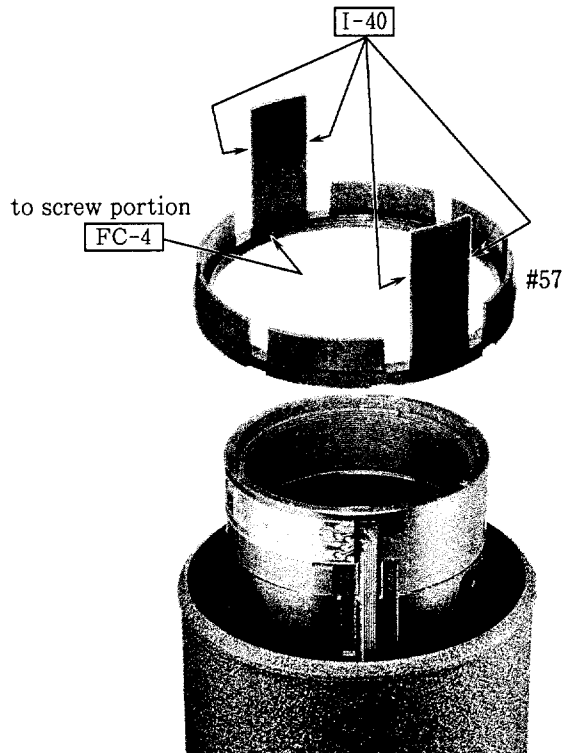
Change page (差し替え)



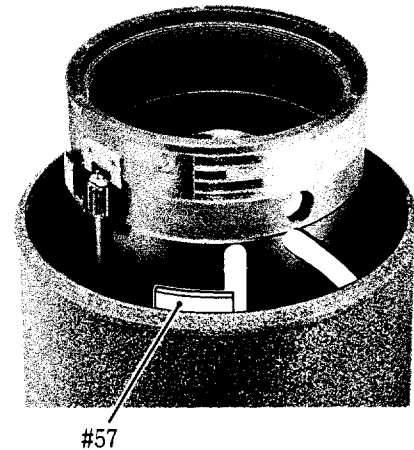
Feb. 28 1994



## MANUAL FOCUS DRIVING RING #57

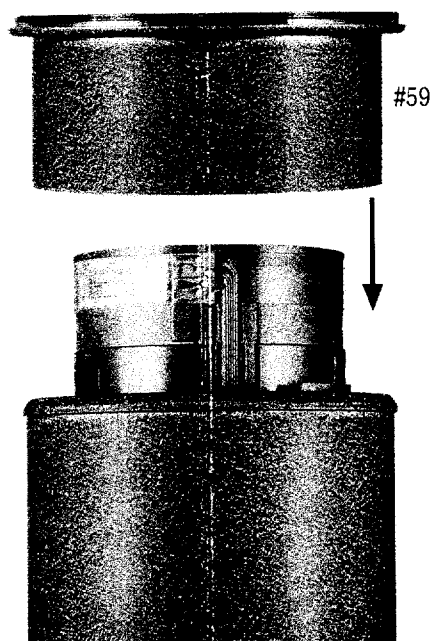


- ① Set the A-M ring to "A".
- ② Lightly screw in #57 as far as it will go. Rotate the ring by approximately 270° (3/4 turn) reversely so that #57 comes to the position as shown in the picture below.

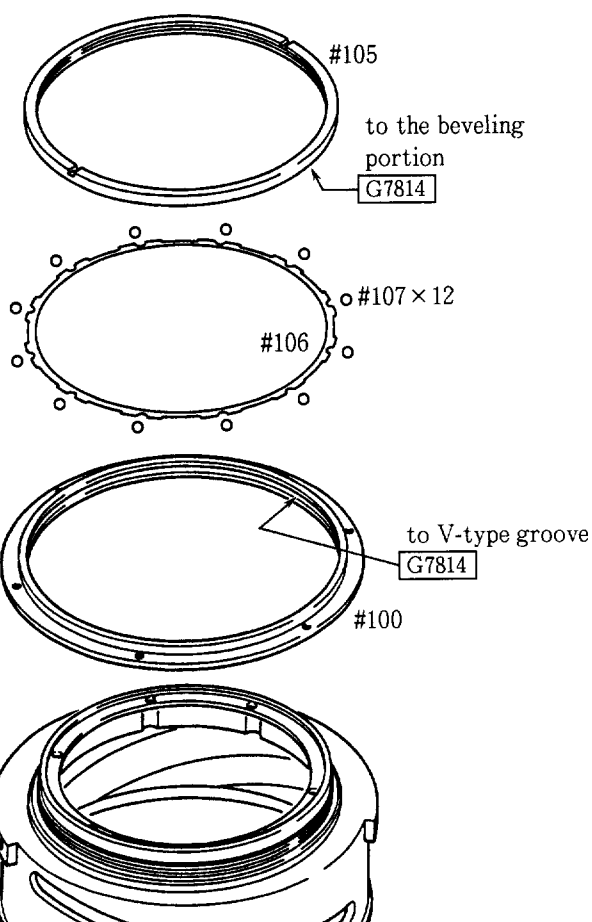
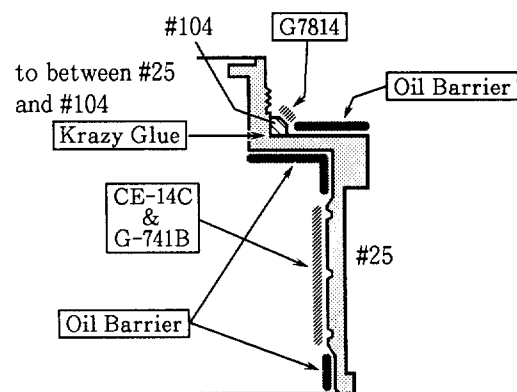
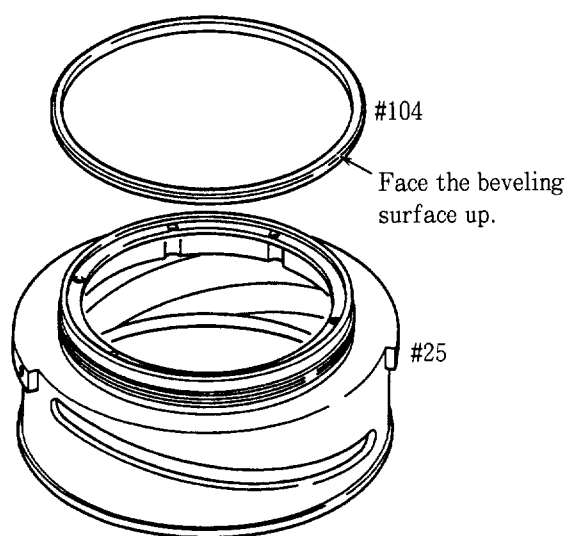


**Note:** Do not move #57 from the position as shown above until the front lens housing group has been mounted.

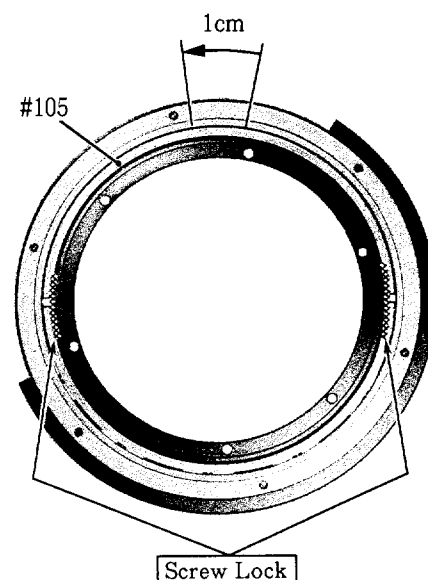
## EXTERNAL RING #59



## FRONT LENS HOUSING GROUP

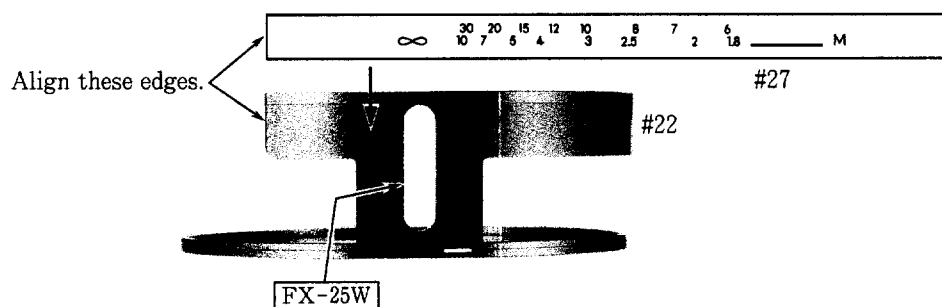
1. Mounting ball bearing

- Lightly screw in #105 as far as it will go. Rotate it by approximately 1cm (external circumference) reversely. (Refer to the picture below.)

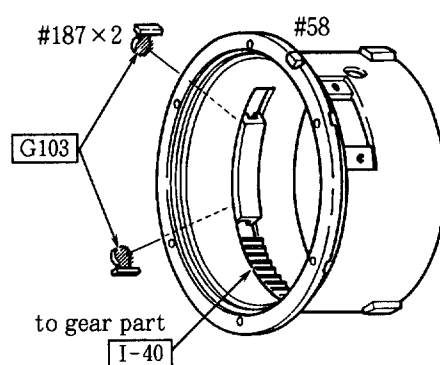


**Inspection:** Rotate #100 to check operation.

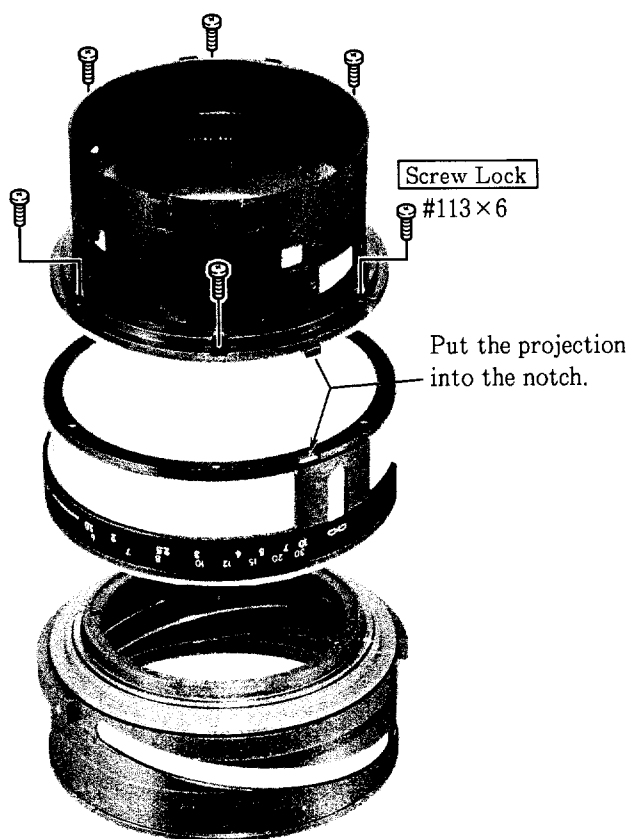
## 2. Attach the distance scale plate #27



## 3. Gear ring #58

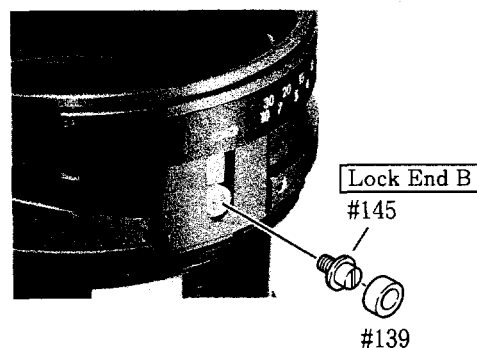
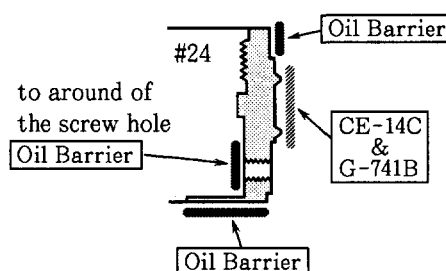
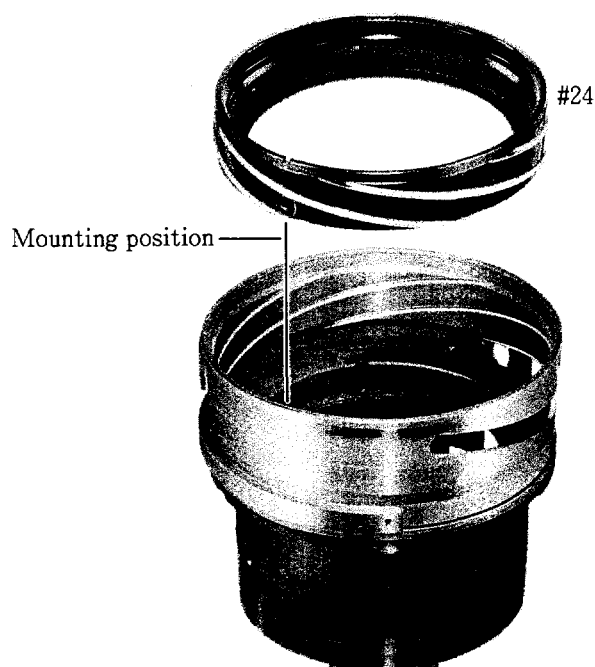


## 4. Assemble

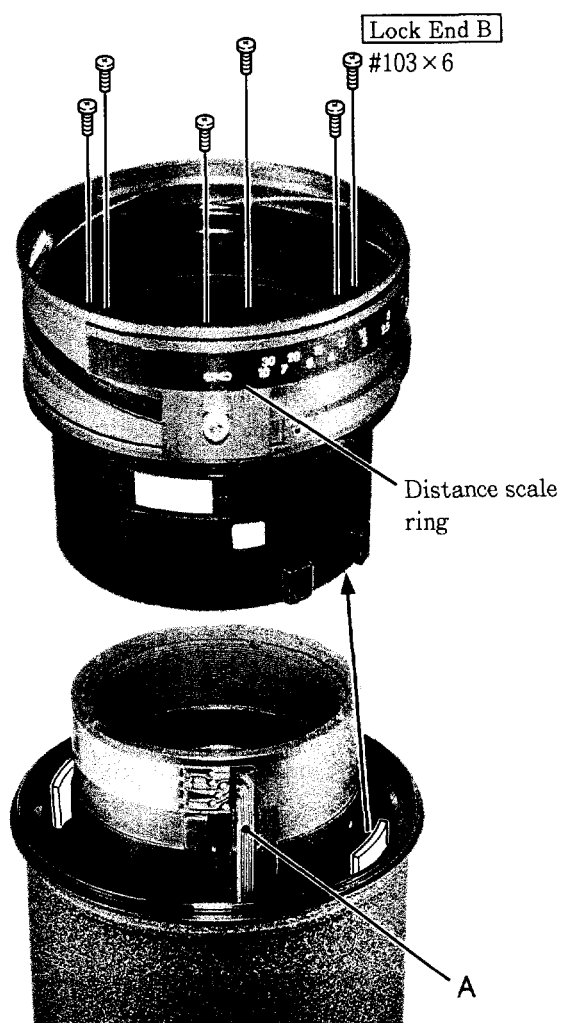


**Inspection:** Rotate the gear ring #58 to check operation.

### 5. Front lens driving ring #24



### 6. Mount the front lens housing group



- Set the distance scale ring to the position as shown in the picture. And mount the front lens housing group.

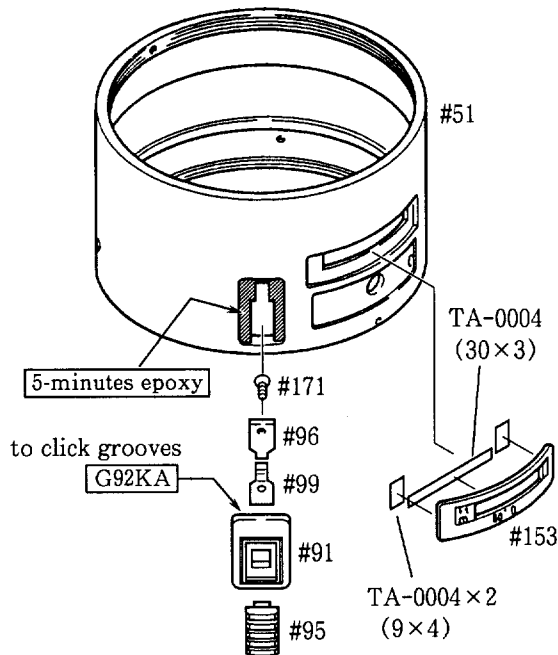
#### Note:

- ① Portion "A" on FPC should not lift off. If portion "A" lifts off, the front lens housing group might come into contact with the FPC with resulting damaging to the FPC.
- ② Do not apply grease to the FPC encoder when mounting the front lens housing group.

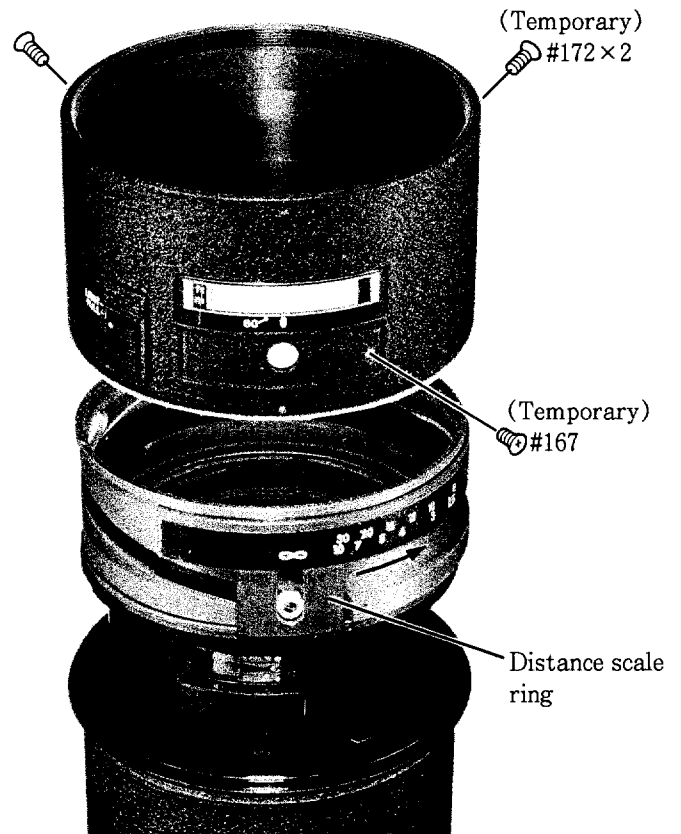
**Inspection:** Set the A-M ring to "M".

And rotate the zoom/focus ring to check operation.

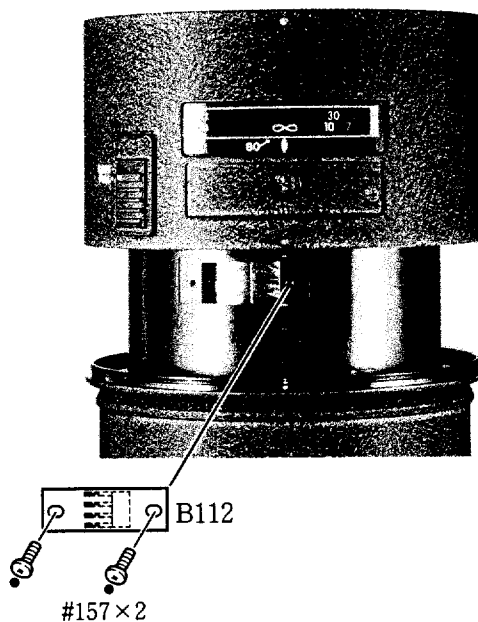
## FOCUS RANGE RING #51



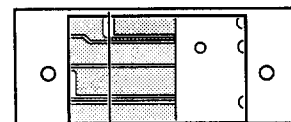
**Note:** Move the distance scale ring in the direction of the arrow since #96 might easily come into contact with the distance scale causing damage during mounting.



## DISTANCE BRUSH B112



- Adjusting distance brush position
  - ① Set the index to the  $\infty$  (infinity) mark.
  - ② Attach the distance brush B112 with screws #157 x 2 so that the distance brush comes into contact with the line, as shown in the figure below, when in the above state.



Make sure that the distance brush makes positive contact with the line.

- ③ Secure screws #157 x 2 using Screw Lock.

## INSPECTION OF LENS DATA AND ENCODER SIGNAL

\*Use an F90 camera body and checking & adjustment program for F90/N90 to display lens data and encoder signal on the computer monitor when making an inspection.

**Inspection method**

1. Screw external ring #59 (refer to page 41) into the focus range ring.
2. Start the checking & adjustment program for F90/N90 and select "E. Checking of AF lens communication". Make inspection according to instructions as shown on the display.
3. Lens data

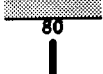
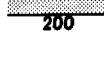
Lens data should be as described below even when the zoom and distance scale are at any positions.

- ID number of the lens : 2 4
- CPU version of the lens: 1 a

## 4. Encoder signal

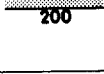
Encoder signal should be as described in the table below when the zoom and distance scale are set to specified positions. Encoder signal 3 and blanks are excluded for inspection.

(1) When A-M ring is set to "M":

| Zoom position<br>Distance scale position | f = 8 0 mm<br> |     | f = 1 0 5 mm<br> Center of the number "105". |     | f = 2 0 0 mm<br> |     |
|------------------------------------------|---------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------|-----|
|                                          | Encoder signal                                                                                    |     | Encoder signal                                                                                                                  |     | Encoder signal                                                                                        |     |
| Most infinity position                   | 1 9                                                                                               | c 2 | 7 9                                                                                                                             | c 2 | c 9                                                                                                   | c 2 |
| $\infty$                                 |                                                                                                   |     |                                                                                                                                 |     | c 9                                                                                                   | c 3 |
| 4 m                                      |                                                                                                   |     |                                                                                                                                 |     | c f                                                                                                   | c 3 |
| Most close distance position             |                                                                                                   |     |                                                                                                                                 |     | c c                                                                                                   | c 2 |

 : Adjusting position of zoom brush and distance brush.

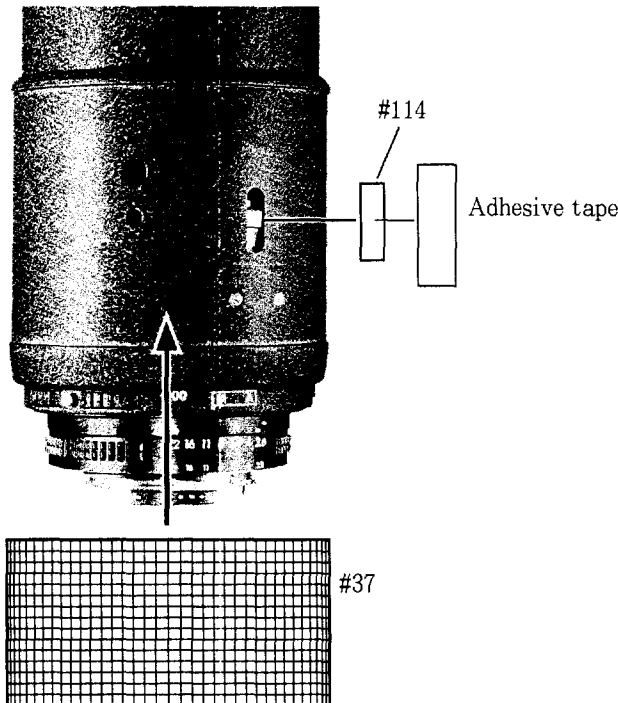
(2) When A-M ring is set to "A":

| Zoom position<br>Distance scale position | f = 8 0 mm<br> |     | f = 1 0 5 mm<br> Center of the number "105". |     | f = 2 0 0 mm<br> |     |
|------------------------------------------|---------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------|-----|
|                                          | Encoder signal                                                                                    |     | Encoder signal                                                                                                                  |     | Encoder signal                                                                                        |     |
| Most infinity position                   | 1 9                                                                                               | d e | 7 9                                                                                                                             | d e | c 9                                                                                                   | d e |

5. If lens data or encoder signal values are different from those shown in the table, following causes must be considered.

- (1) In case of lens data; Incorrect CPU is mounted on the FPC.
- (2) In case of encoder signal values; Encoder brush is mounted in the wrong position, brush or FPC is defective, encoder patterns on the FPC are contaminated, or the FPC is fixed in the wrong position.

RUBBER RING #37

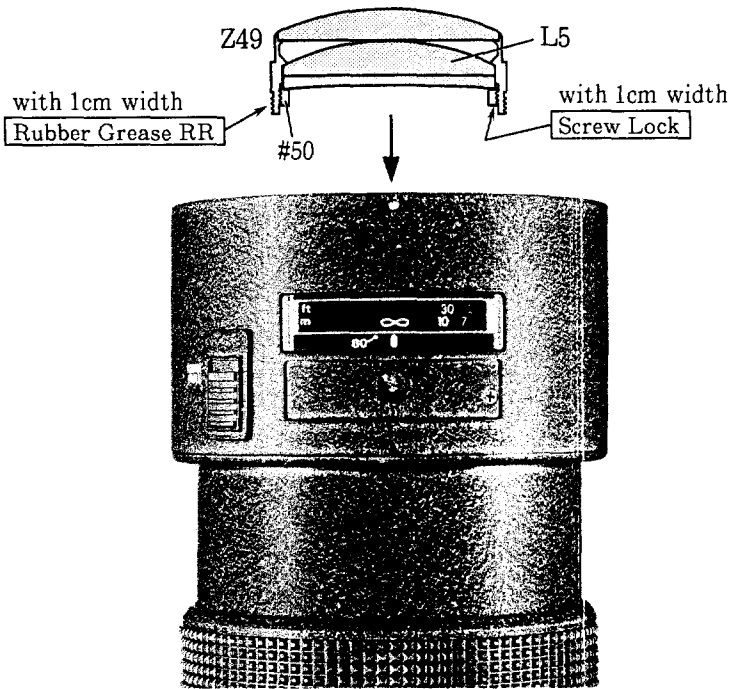


SPREAD CHINESE INK

- Spread chinese ink (black frosted ink) on the sides of L1, L2, L3, L4, G8 and G16 lenses.

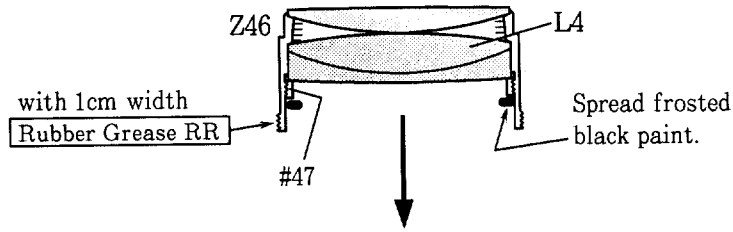


4th LENS GROUP

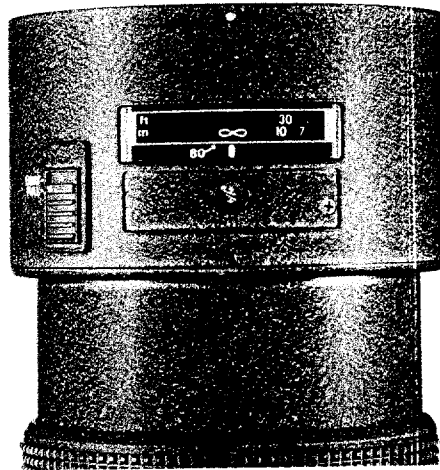


- Attach the 4th lens group using tool J11195B.

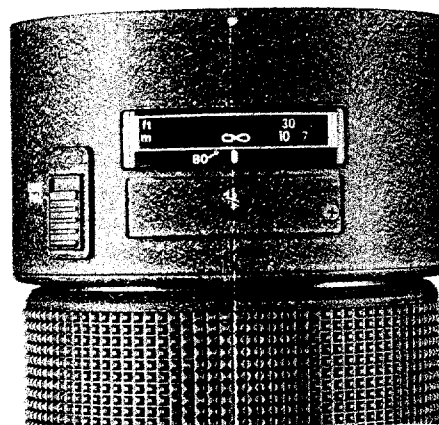
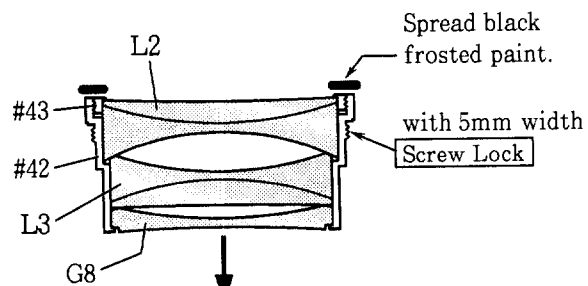
3rd LENS GROUP



- Attach the 3rd lens group using tool J11195A.

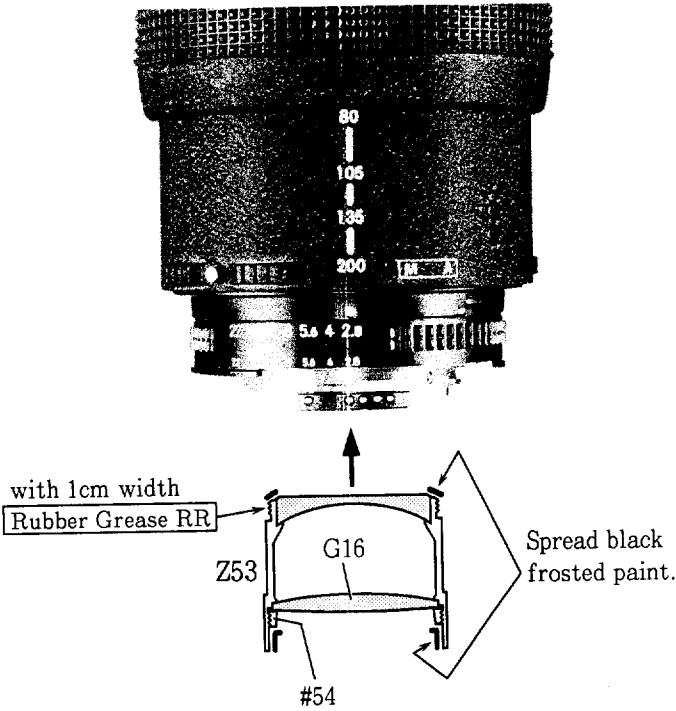


2nd LENS GROUP

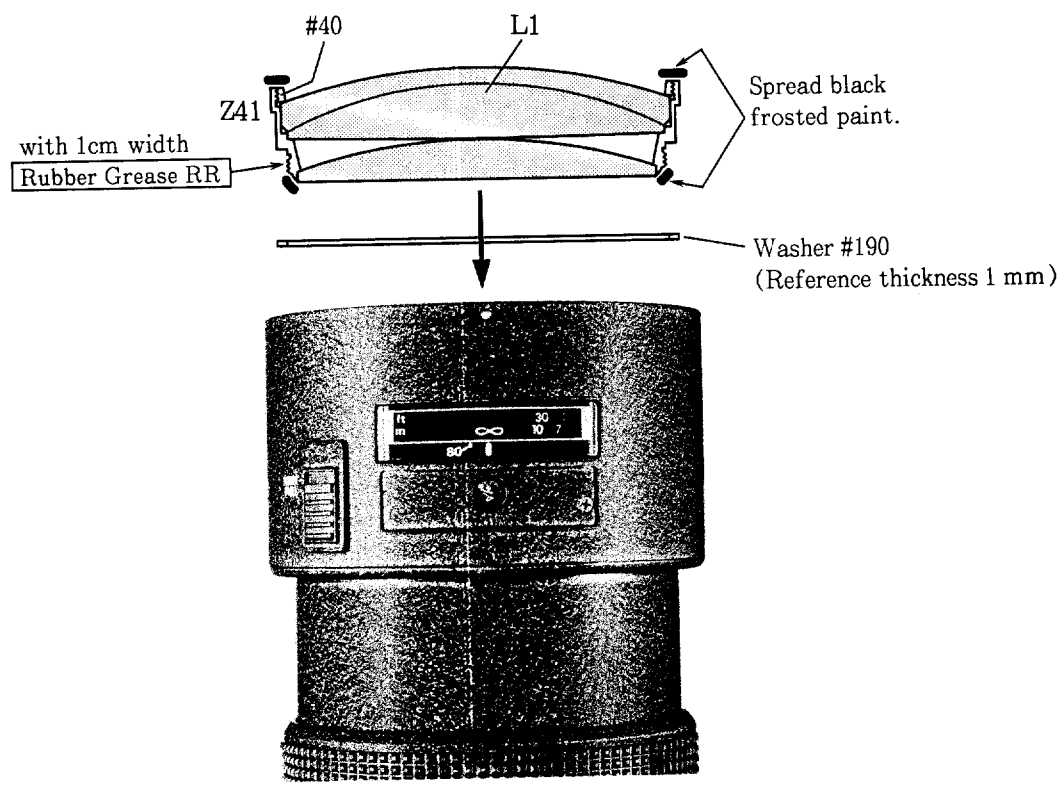




REAR LENS GROUP



FRONT LENS GROUP



# ADJUSTMENT AT BOTH ENDS OF FOCAL LENGHT

- ① Set the index to the  $\infty$  (infinity) mark. Set the aperture to f/2.8.
- ② Read out the values at both Wide (f=80mm) and Tele (f=200mm) sides.

**Note:** The index and the  $\infty$  (infinity) mark should align exactly.

- ③ Calculate the following equation.

$$\frac{T-W}{2.08} = A$$

where

T: Tele side value (mm)

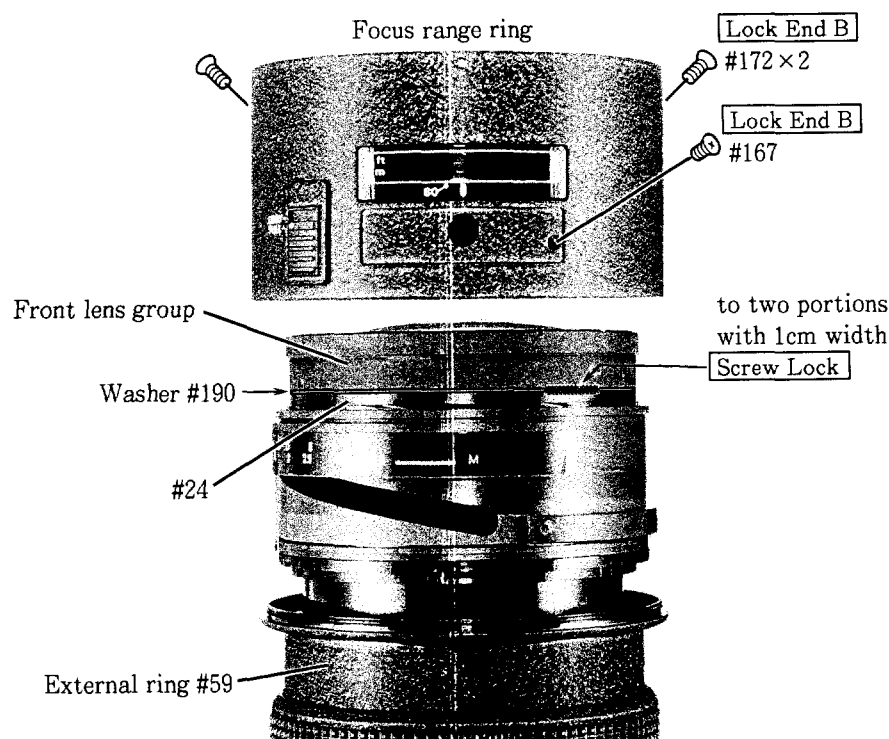
W: Wide side value (mm)

A: Adjusted amount of washer #190 (mm)

- ④ Adjust the thickness of washer #190 by the amount of value "A" obtained from the above equation. If the value is positive, decrease the thickness of the washer by that value and if it is negative, increase the thickness by that value.

**Note:** Insert a thin washer between thick washers.

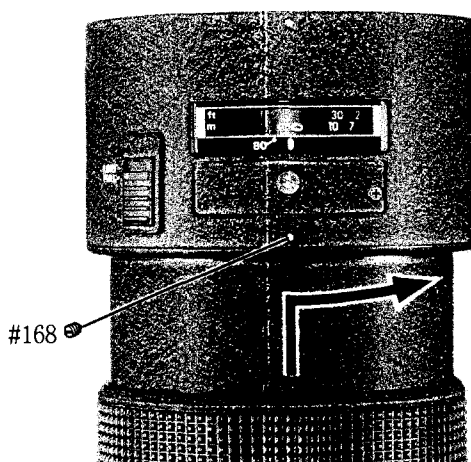
- ⑤ Mount the front lens group and washer #190. And confirm that the difference between Wide and Tele side values is within 0.15mm.
- ⑥ Remove external ring #59 from the focus range ring. Next remove the focus range ring. Check to see if washer #190 is securely inserted between the front lens group and #24. After confirmation, secure the front lens group and washer #190 using ScrewLock. (Refer to the picture below.)



- ⑦ Mount the focus range ring. Make sure to apply Lock End B to screws #167 and #172 x 2.

**Note:** Take care not to damage the distance scale.

- ⑧ Screw external ring #59 in to the focus range ring, and attach set screw #168.



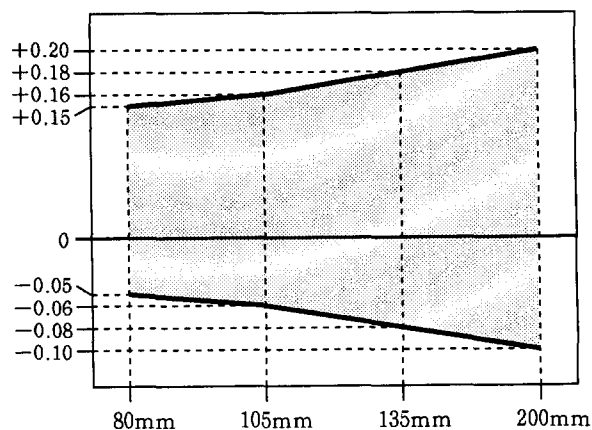
#### ADJUSTMENT OF SHIFT (BACK FOCUS)

- ① Set the zoom/focus ring to Wide ( $f=80\text{mm}$ ).
- ② Set the index to the  $\infty$  (infinity) mark and set the aperture to  $f/2.8$ , and read M.B.f value.
- ③ If the readout value is greater than the standard value, increase thickness of the washer #137 by the difference, decrease the thickness of the washer #137 by the difference if the readout value is smaller than the standard one.

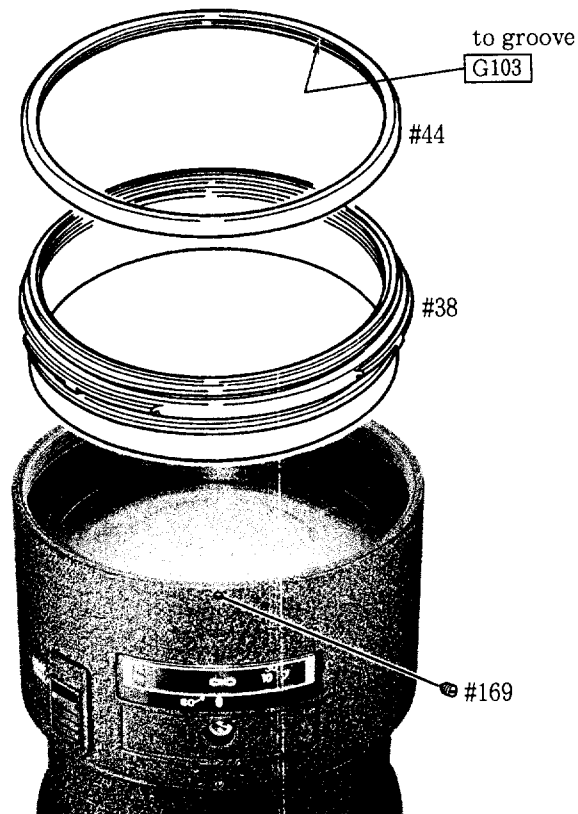
Remove bayonet mount group to adjust the thickness of the washer #137. (Refer to page 37.)

- ④ Check to see that the value is within the standard value range.

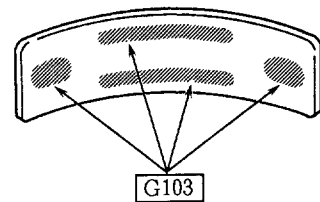
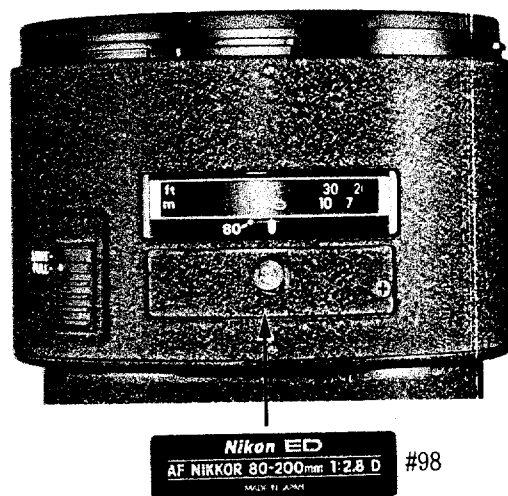
| Focal length | Standard (mm) |
|--------------|---------------|
| 80mm         | -0.05 ~ +0.15 |
| 105mm        | -0.06 ~ +0.16 |
| 135mm        | -0.08 ~ +0.18 |
| 200mm        | -0.10 ~ +0.20 |



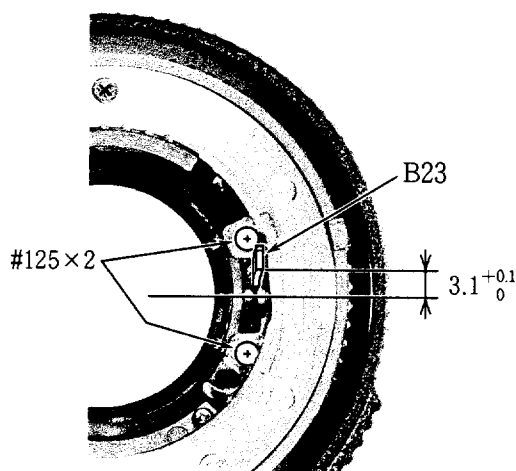
FILTER RING #38



NAME PLATE #98



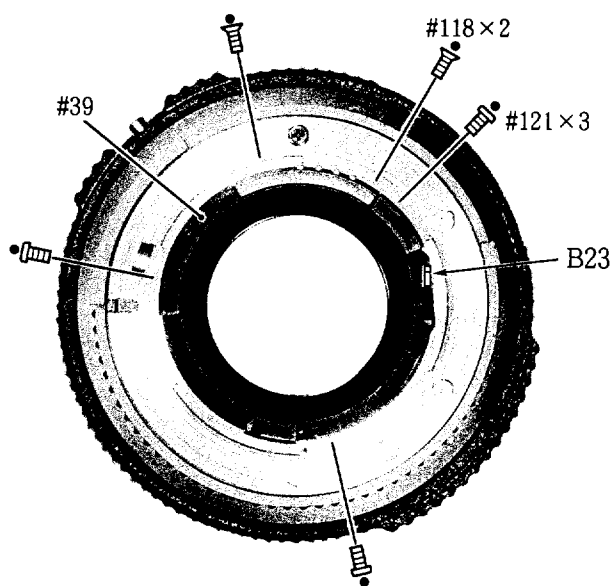
## ADJUSTMENT OF APERTURE LEVER B23 POSITION



- Unfasten screws #125×2 to adjust the position of the aperture lever B23 so that it comes into the rated value of  $3.1^{+0.1}_0$  to bring the aperture diameter within rated value at full aperture. Together with this, adjust the horizontal position so that it does not come in contact with the bayonet mount and rear cover ring. After adjustment, secure screws #125×2 using Screw Lock.

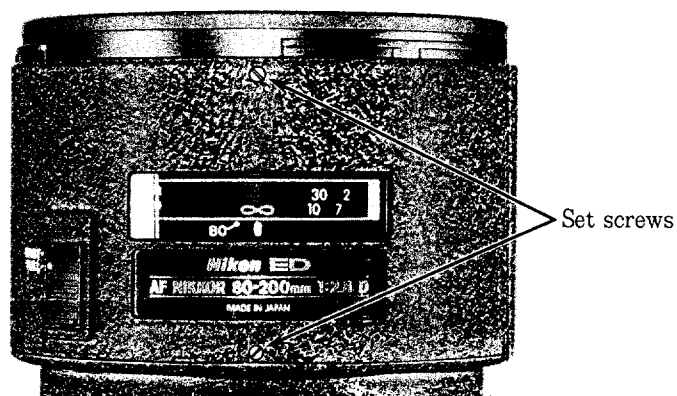
**Reference:** When adjusting the rated value of  $3.1^{+0.1}_0$ , set the aperture ring to f/2.8 and mount the tool J18004-1 on the bayonet mount. It becomes much easier to adjust if you mount the aperture lever B23 based on the groove of the tool as a reference.

## REAR COVER RING #39



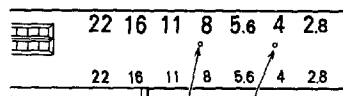
- Mount the rear cover ring #39 so that it becomes the full aperture stopper (the height of the aperture lever is  $3.1^{+0.1}_0$  mm) of the aperture lever B23.

## SPREAD BLACK PAINT



- Spread black gloss paint onto the heads of set screws #168 and #169.

# ATTACHING METER COUPLING SHOE



Make holes on these  
two concave portions.

- ① Remove the aperture ring #28.
- ② Make two holes  $\phi 1.1\text{mm}$  in the concave portions of the aperture ring #28.
- ③ Attach the meter coupling shoe.

|                     |             |     |
|---------------------|-------------|-----|
| Meter coupling shoe | 1K406-029   | × 1 |
| Screws              | 1K010-002-1 | × 2 |

- ④ Assembling.