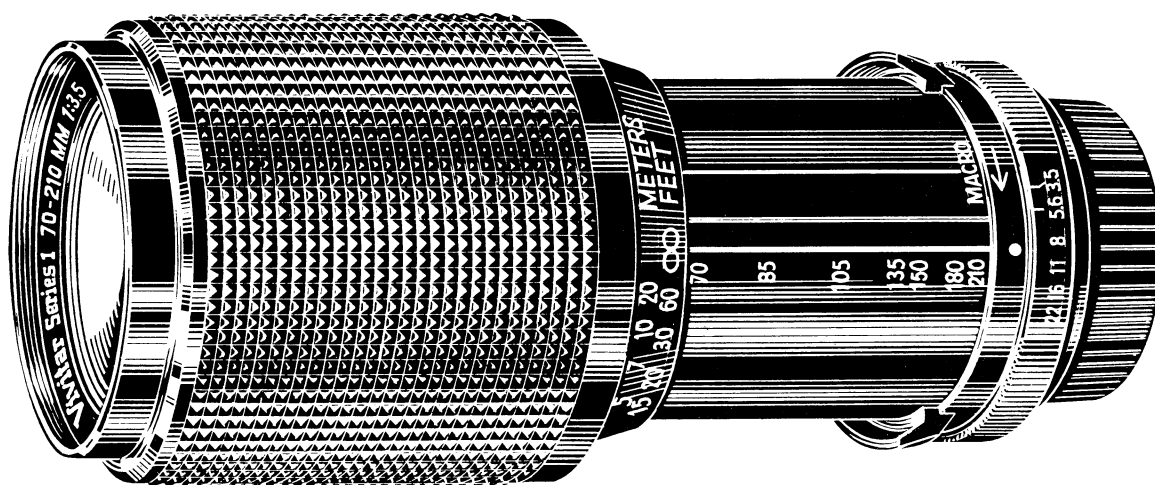


Vivitar®

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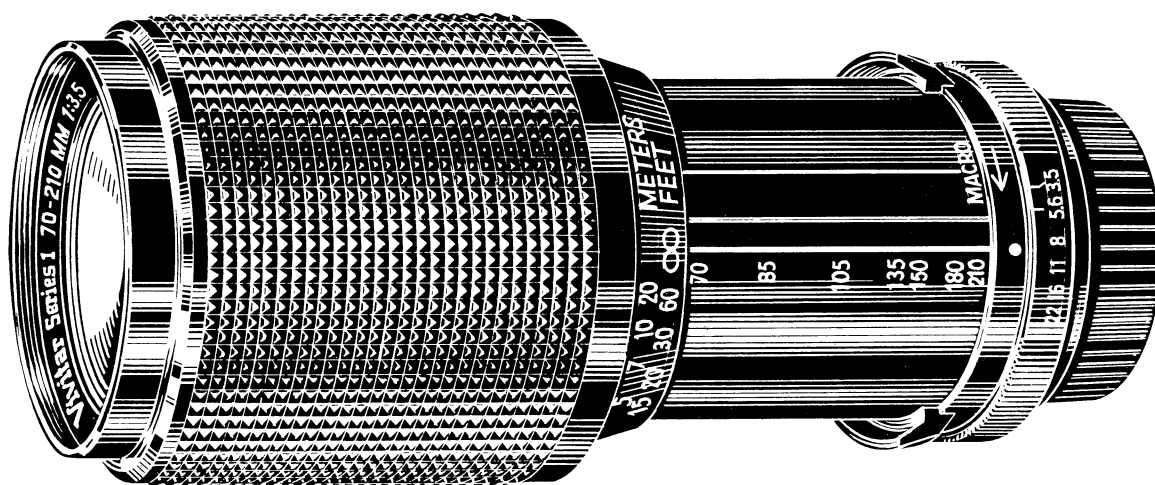


Series 1 Lens 70-210mm f/3.5 Macro Focusing Zoom

Publication No. 3746004C / June 1979
Revision D May 1980

Vivitar®

Service Manual



Series 1 Lens 70-210mm f/3.5 Macro Focusing Zoom

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HOW TO USE THIS PUBLICATION

HOW TO FIND PART ORDER NUMBERS

Parts are illustrated on exploded view drawings where each part is identified by a reference number or designator. These reference numbers appear in sequence in the parts lists where they are cross-referenced to the part numbers and descriptions.

When a part is not available separately it will be so indicated by a footnote and can be obtained by ordering the assembly containing it. The part number of the assembly may be shown immediately to the right on the same line in an "Included in Assembly" column or at the end of the parts list(s).

In parts lists for lens items, quantities of each item are listed as used in the different lens mounts. The mounts are referred to as:

| | | | | | |
|---|---|----------------------|---|---|---------------------------------|
| U | = | Vivitar Thread Mount | K | = | Konica Autoreflex Series Mounts |
| N | = | Nikon Mounts | O | = | Olympus OM Series Mount |
| M | = | Minolta Mounts | P | = | Pentax K Mounts |
| C | = | Canon Mounts | | | |

Note that many parts are common to more than one mount. This commonality is shown in the Complete Parts List at the end of the manual so that the service centers desiring to stock replacement parts can order economically.

CAUTION

This publication is intended for use by persons having skills and equipment needed to service the subject product(s) safely and correctly. Users are cautioned that special tools and/or test equipment may be required for proper disassembly, reassembly, alignment, or adjustment or damage to the product may result.

Notice: Information contained herein is subject to change without notice.

HOW TO ORDER PARTS OR SERVICE PUBLICATIONS

Please furnish the model number and serial number of the product for which parts are being ordered. For each part requested, please supply part number, description, and required quantity. Mail or phone parts orders to:

U.S.A.

Vivitar Corporation
Central Parts Service
2700 Pennsylvania Avenue
Santa Monica, CA 90406
Tele: (213) 829-3672
or (213) 870-0181

CANADA

Vivitar Canada Ltd/Ltee
5211 Creekbank Road
Mississauga, Ontario, L4W 1R3
Canada
Tele: (416) 624-1761

BELGIUM

Vivitar Belgium, S.A.
29, Passage International
Boite 35
1000 Brussels, Belgium
Tele: 2 2191277
or 2 2191383

FRANCE

Vivitar France, S.A.
5, Avenue de la Resistance
Parc Industriel de la Croix Blance
91703 Sainte Genevieve des Bois
B.P., 97
France
Tele: (6) 015-9383

WEST GERMANY

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6238 Hofheim/Ts
West Germany
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Shinjuku-Ku
Tokyo 160, Japan
Tele: 357-6021

This manual consists of the following pages:

| Page No.'s | Revision | Pub. Date |
|-------------|----------|-----------|
| Front Cover | D | 5/80 |
| i – iv | D | 5/80 |
| 1 – 2 | D | 5/80 |
| 3 – 10 | Orig. | 2/75 |
| 11 – 15 | B | 3/76 |
| 16 – 17 | Orig. | 2/75 |
| 18 – 19 | A | 9/75 |
| 20 – 35 | Orig. | 2/75 |
| 36 – 37 | A | 9/75 |
| 38 – 48 | Orig. | 2/75 |
| 49 – 58 | A | 9/75 |
| 59 | D | 5/80 |
| 60 – 65 | C | 6/79 |
| 66 – 67 | D | 5/80 |
| 68 – 77 | C | 6/79 |
| 78 | D | 5/80 |
| 79 – 83 | C | 6/79 |

For complete list of current manuals available, please request Vivitar Service Publications Index, Publication No. 3746068, from nearest Vivitar Service Center (See page i).

ERRATA SHEET

Insert this Errata Sheet between page ii and Page 1 of the manual and make the indicated corrections on the manual pages.

Page 65, Ref. 151: Change Description from SCREW, MOUNT
to SCREW, MOUNT STOP, CHR.

Ref. 527: Change Vivitar Part No. from 3103542 to 3514267
Change Description from LEVER, DIAPHRAGM ACTUATOR, N/F
to LEVER, AUTO DIAPHRAGM.

Page 67, Ref. 151: Change Description from SCREW, MOUNT
to SCREW, MOUNT STOP, CHR.

Complete Parts List: Enter changes listed above at the appropriate points in the Complete
Parts List.

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LIST OF ILLUSTRATIONS

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Illustrations in the Service section of the manual have no titles and are not listed here. This listing is limited to the exploded views in the Illustrated Parts List section.

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IDENTIFICATION AND MOUNT CONFIGURATION

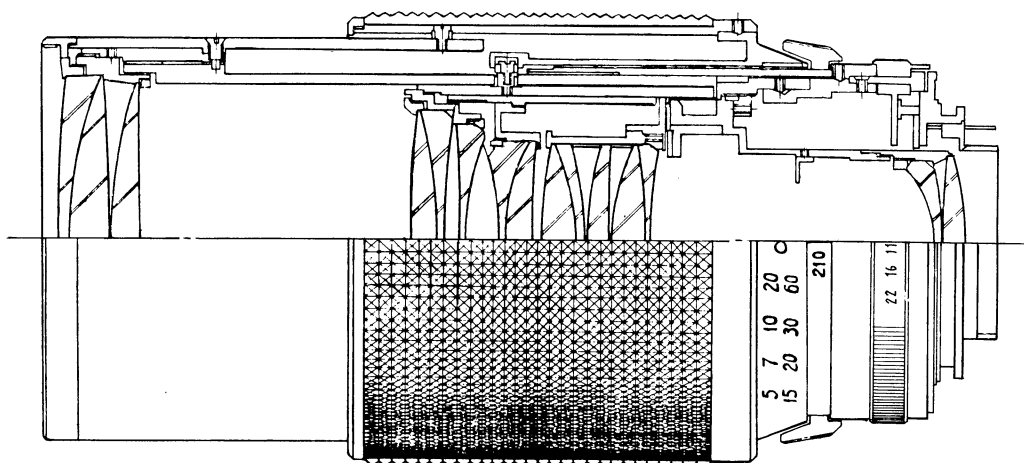
These lenses are furnished in seven mount configurations as follows:

| Mount | Vivitar Stock No. | Vivitar Part No. |
|---------------------------------------|-------------------|------------------|
| Universal Thread Mount | 0312257 | 3900089 |
| Minolta MD, SRT, SR Mounts | 0312350 | 3900090 |
| Canon FL, FD Mounts | 0312316 | 3900091 |
| Nikon/Nikkormat F, Nikon AI Mounts | 0312291 | 3900092 |
| Konica Autoreflex Mount | 0312372 | 3900093 |
| Olympus OM Mount | 0312408 | 3900094 |
| Pentax K, M Mounts | 0312420 | 3900095 |

CONFIGURATION CHANGES

Many changes have been made in this lens to improve its performance and reliability and not all of the changes have been fully documented. Many of the early parts are no longer stocked and are not listed. The newer parts can generally be made to fit in the older lenses although it may be necessary in some cases to replace assemblies and certain related parts rather than individual parts.

A major redesign occurred on lenses that began to appear late in 1978. this new configuration is documented in Supplement 1, Publication No. 3746142 (5/80) which should be used in conjunction with this manual for lenses that have the Z71 modification.



GENERAL INFORMATION

Design Features

1. Provides dual operating modes, "zoom" and "macro-focusing".
2. Both zooming and focusing are accomplished with a single control.
3. Large maximum aperture compared to other zooms.
4. Compact.
5. Light Weight.
6. 3 to 1 zoom ratio (70-210mm).
7. Excellent image contrast and resolution.

Optical Specifications

| | |
|--------------------------------|---|
| Construction: | 15 elements, 10 groups |
| Angle of View: | 11 degrees at 210mm, 32 degrees at 70mm |
| Minimum Focus Distance: | Normal: 6' 6 1/2" |
| (Measured from Focal Plane) | Macro : 11" |
| Maximum Magnification in Macro | 1:2.2 |

Mechanical Specifications

| | |
|------------------|--|
| Filter Size: | 67mm |
| Weight: | 31 oz. |
| Length | 6 1/8" |
| Maximum Diameter | 3 1/16" |
| f/Number Range | f/3.5 - f/22 (EE coupled Konica mount lens to f/16 only) |

Use of Parts List

Reference numbers used in the photographs in the service section are not the same parts reference numbers shown in the exploded view drawings in the illustrated parts list.

In the parts list, quantities of each item are listed as used in eight different mounts. The mounts are referred to as: "U" (Universal mount for cameras such as old Pentax, Vivitar, Mamiya, etc.), "N/F" (Nikon F mounts), "M" (Minolta mount), "C" (Canon mount), "K" (Konica mount), "O" (Olympus OM mounts), "P" (Pentax K and M mounts), and "N/AI" (Nikon AI mounts). Although Nikon mount lenses in current production fit both N/F and N/AI cameras, older N/F mount lenses have many parts that are different. Supplement 1, Publication No. 3746142 (5/80), is a complete Illustrated Parts List for the Z71 modification of this lens.

Repair Notes

The lens is composed of three main assemblies:

1. Zoom Lens Assembly
2. Prime Lens Assembly
3. Lens Mount Assembly

Most frequent repairs are to the Zoom Lens Assembly, followed by repairs to the various lens mounts. Repairs to the Prime Lens Assembly are relatively infrequent. Full disassembly and reassembly instructions for each of these assemblies are provided.

In most instances, repairs to the Prime Lens Assembly will not require disassembly beyond removal of lens groups. The Prime Lens Assembly is the most critical part of the lens, because it is precisely aligned to reduce aberrations to the minimum obtainable. Therefore it is recommended that it not be disassembled unless absolutely necessary.

This lens should never be disassembled further than necessary to correct malfunctions.

In the instructions, rotational directions (clockwise - counterclockwise) are as viewed from the FRONT of the lens when referring to the Zoom Lens Assembly, and from the REAR when referring to the Prime Lens and Lens Mount Assemblies.

Hints and Precautions

1. Before attempting to remove any screws, apply ketone solvent such as acetone, or methyl ethyl ketone (MEK) around the screw to soften the thread sealant. If the screw does not readily release, apply more solvent. All rings, screws and pins can be removed with normal pressures. In some cases the tip of a hot soldering iron will soften the thread sealant and allow a screw to be removed.
2. Before finally tightening any screw, apply sealant to the threads.
3. Before removing any retaining ring, flow sufficient solvent into the thread area and allow the sealing agent to soften.
4. Before fully tightening a retaining ring, flow sealant into its thread to lock it in place.
5. On all surfaces which require grease, use only a light film of lubricant. Too much grease has a way of creeping onto parts, such as diaphragm blades, which should be dry. (Refer to lubricant table)
6. Never tighten a set screw so tight as to split the head or distort the parts around it.
7. Pay particular attention to refocusing the lens. Assure that focus is exactly correct at 70mm position and within stated tolerance at 210mm and all intermediate positions.

8. Avoid excessive force, which can lead to expensive (and unnecessary) replacement of parts or assemblies.
9. Cleaning of lens surfaces can usually be accomplished by use of a mixture of 70% ether and 30% alcohol.
10. Before attempting any repair, read the manual thoroughly.

Lubrication Schedule:

| <u>General Area</u> | <u>Lubrication Point</u> | <u>Lubricant</u> |
|--|---|--|
| Outer Helicoid (Ref. No. 3) | Helicoid Threads | A-Losimol Losoid #33 |
| Lens Barrel (Ref. No. 4) | Helicoid Threads | A-Losimol Losoid #33 |
| Canon Mount (Ref. Nos. 122 & 124) | Mount Threads and Locking Ring Threads | A-Losimol Losoid #33 |
| Second Zoom Group Housing (Ref. No. 19) | Bearing Surfaces | Losimol Losoid #72125 B-GE G322L or equivalent* |
| Third Zoom Group Housing (Ref. No. 16) | Bearing Surfaces | Losimol Losoid #72125 B-GE G322L or equivalent* |
| Lens Barrel | Inside of Barrel for Zoom Group Housings | Losimol Losoid #72125 B-GE G322L or equivalent* |
| F/Stop Rings (Ref. Nos. 51, 75, 90, 103, 142) | Inside Surfaces | C-Photo Lub #22 |

*To minimize flare, mix with Molykote Powder, 1 part Moly to 10-15 parts grease.

SERVICE PROCEDURES

1.0 Separating Zoom Lens Assembly from Prime Lens Assembly.

1.1 Disassembly.

- 1.1.1 Set lens to "Macro" mode and 70mm focal length.
- 1.1.2 Flow ketone solvent (such as acetone or methyl ethyl ketone) into the crevice between Filter Holder Ring (1) and Inner Focus Ring (5), to soften the sealant on their threads. Allow about three minutes for solvent to work, and then unscrew Filter Holder Ring. (Fig. 1)
- 1.1.3 Remove screws (E) and Change Levers (24) and (26). Latch Button (25) will come away with Lever (26). (Fig. 1)
- 1.1.4 Remove limiting screw (A), situated under Change Lever (24). (Fig. 1)
- 1.1.5 Remove five (six, in some lenses) setscrews (F) from Shift Ring (27). (Fig. 1)
- 1.1.6 Slide Shift Ring under Zoom Ring (22) to expose four flathead screws (J), which secure Lens Barrel (4) to prime lens assembly. (Fig. 2)

NOTE: There is a detent ball (158) between Shift Ring and Prime Lens Assembly; remove and lay aside. (Fig. 2)

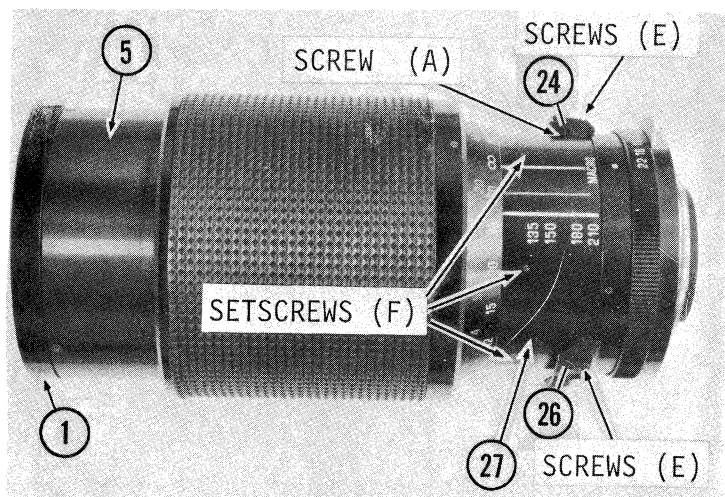


Fig. 1

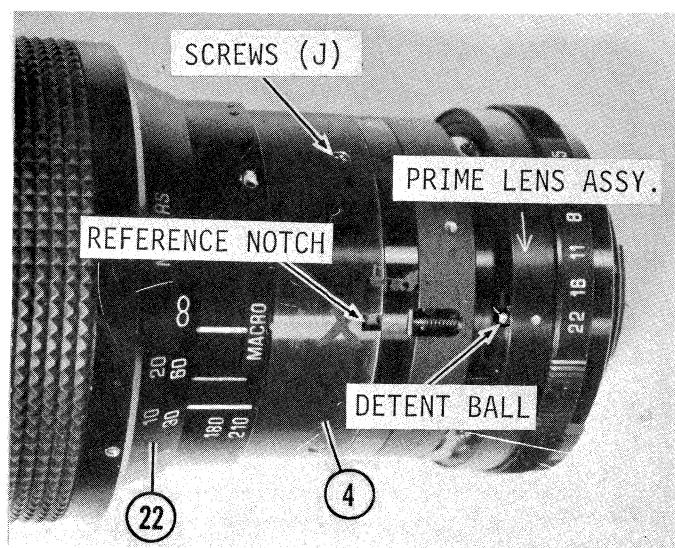
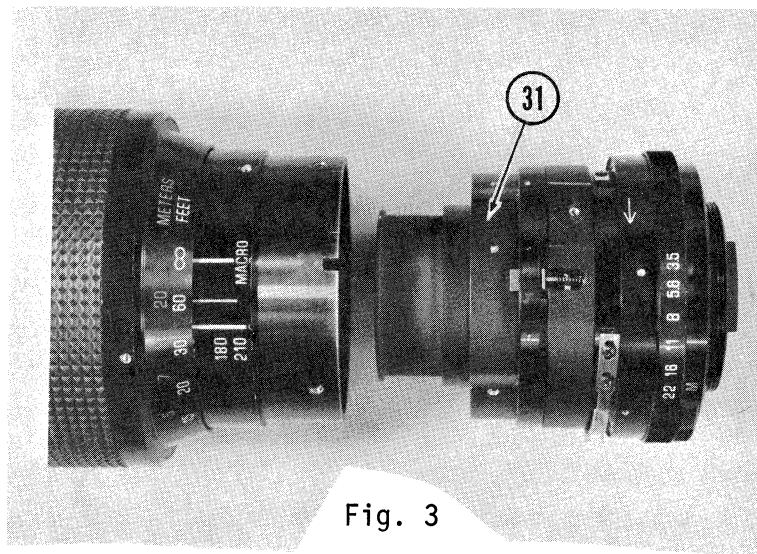


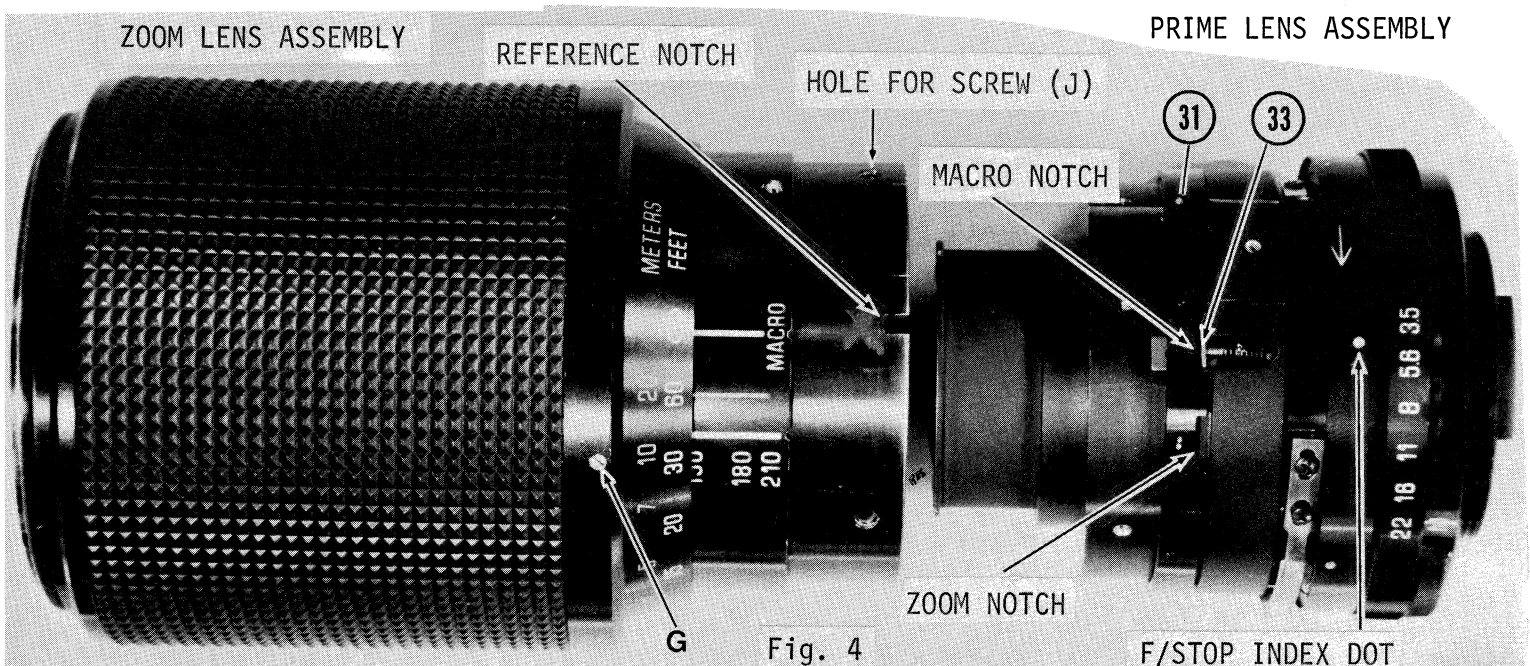
Fig. 2

1.1.7 Remove four screws (J) and remove Prime Lens Assembly. (Fig. 3)



1.2 Reassembly.

- 1.2.1 Position Prime Lens Assembly so that Latch Plate (33) adjacent to f/stop index dot (not the other Latch Plate) faces upward. (Fig. 4)
- 1.2.2 Align Latch Ring (31) on Prime Lens Assembly so that macro notch engages Latch Plate. (Fig. 4)
- 1.2.3 Position Zoom Lens Assembly so that reference notch in Lens Barrel aligns with Latch Plate. (Fig. 4)
- 1.2.4 Slide Prime Lens Assembly into Lens Barrel of Zoom Lens Assembly; rotate slightly if necessary to align screw holes; install four screws (J). (Fig. 4)



- 1.2.5 Apply a spot of grease to Detent Ball (158) and place it in hole shown in Fig. 5.
- 1.2.6 Assure that Latch Spring Booster Spring (63) is under Latch Spring (62). (Fig 6)
- 1.2.7 Depress Latch Spring; slide Change Ring (27) rearward to seat against F/Stop Index Ring, passing macro notch in Change Ring over vertical tabs on Latch Spring. (Fig. 6)
- 1.2.8 Holding Change Ring firmly in contact with F/Stop Index Ring, install setscrews (F). (Fig. 1)
- 1.2.9 Assure that Latch Button (25) is fitted into Change Lever (26). (Fig. 1)
- 1.2.10 Replace limiting screw (A). (Fig. 51)
- 1.2.11 Install Change Levers (24 and 26) and screws (E). (Fig. 1)
- 1.2.12 Loosen setscrews (G) (Fig. 4), in Zoom Collar Ring and rotate Zoom Ring (22) to align center of infinity symbol with yellow macro index line. Apply sealant to threads of setscrews and tighten firmly.
- 1.2.13 Check that lens changes over properly from macro to zoom modes, and that Zoom Collar slides forwards and backwards easily in either mode.

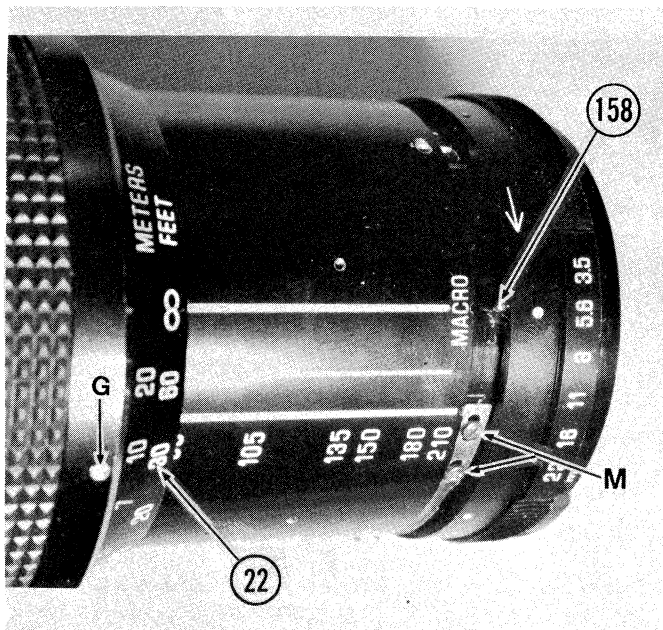


Fig. 5

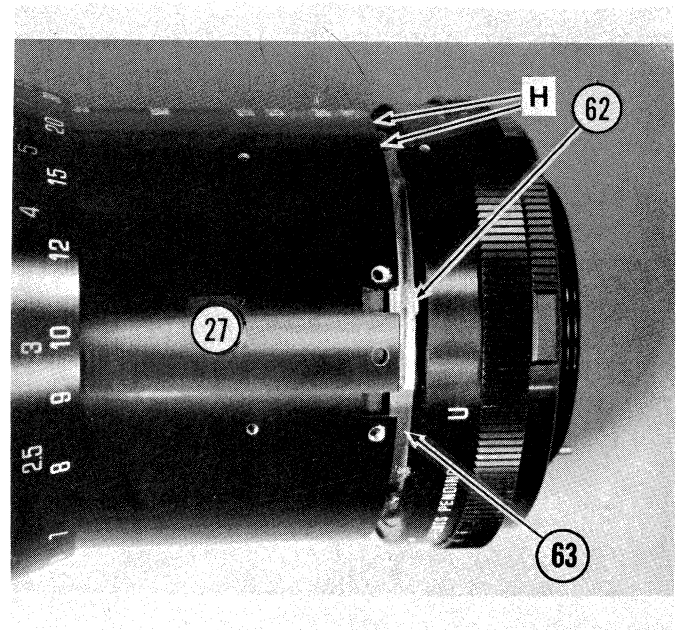


Fig. 6

2.0 Zoom Lens Assembly.

2.1 Disassembly.

- 2.1.1 Slide Shift Ring (27) off toward rear of lens. (Fig. 7)
- 2.1.2 Loosen three setscrews (G) near rear edge of Zoom Collar Ring (20), which secure it to Zoom Ring (22). (Fig. 7)
- 2.1.3 Slide Zoom Ring (22) from under Zoom Collar Ring (20) (which will move Zoom Rollers in zoom cam slots). Rotate Zoom Collar Ring counterclockwise to its stop. (Fig. 8)
- 2.1.4 Rotate Zoom Ring until Zoom Roller Shaft (29) appears in clearance hole nearest front edge of Ring. (Fig. 8)
- 2.1.5 Remove Shaft (29) and Zoom Ring (22). (Fig. 8)

NOTE: Unless lens has been dismantled previously, Shaft (17) and Rollers (18 and 30), situated under Shaft (29), will come away together with it. (See Fig. 16) for assembly sequence of Rollers and Shafts).

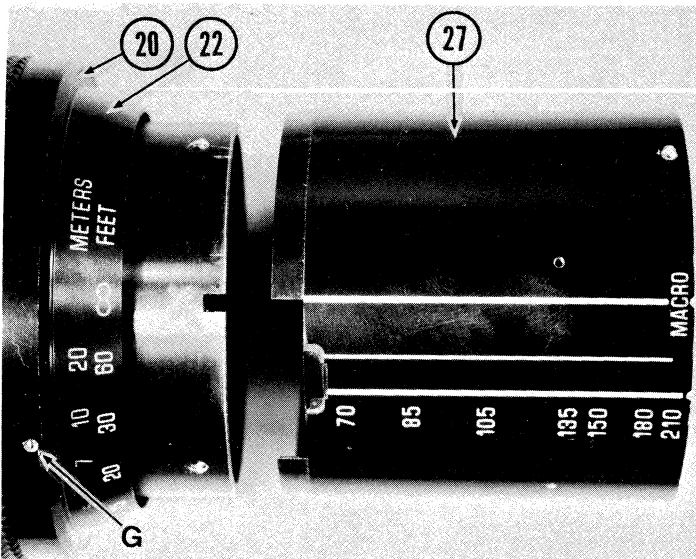


Fig. 7

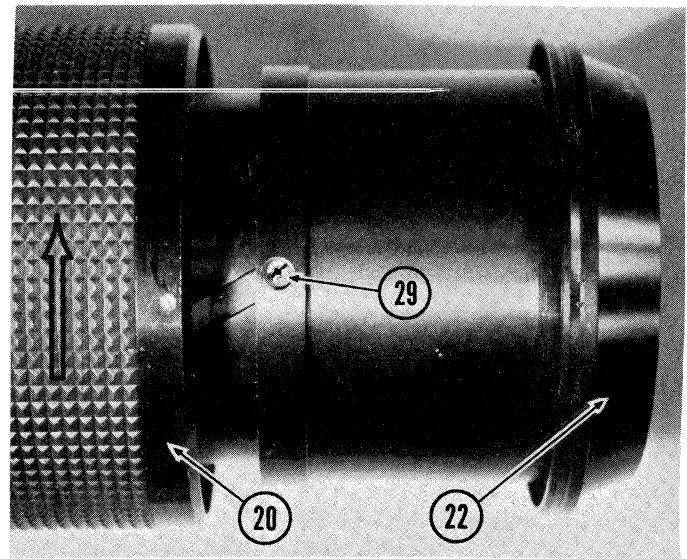


Fig. 8

- 2.1.6 Slide Zoom Collar Ring (20) to the rear to expose three screws (B), which attach Inner Focus Ring (5) to Outer Helicoid (3). Remove screws. (Fig. 9)
- 2.1.7 Slide Zoom Collar Assembly (Zoom Collar Ring 20 and attached parts) off the rear of the lens. (Fig. 9)
- 2.1.8 Remove Roller Shaft (13) and Rollers (14 and 15) through zoom slot in Lens Barrel (4). (Fig. 10)

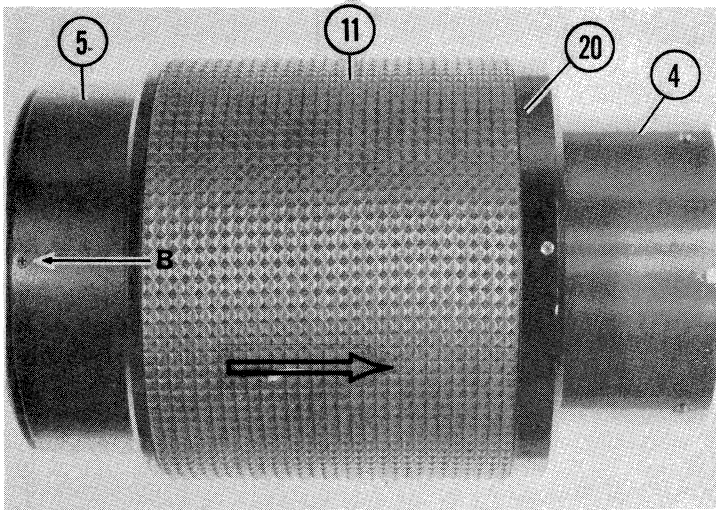


Fig. 9

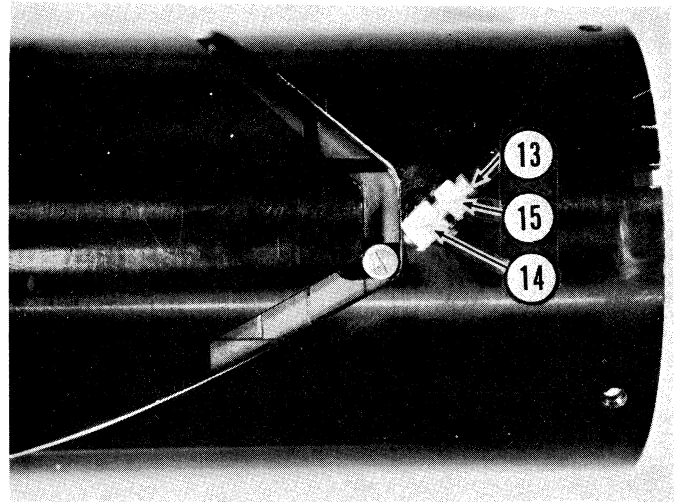


Fig. 10

- 2.1.9 Slide Third Zoom Group Housing (16) and then Second Zoom Group Housing (19) out rear of Lens Barrel. (Fig. 11)

NOTE: When reassembling these parts, they must be aligned as shown in Fig. 11; that is, slot in (19) must align with reference notch in (4) and with roller shaft hole in (16).

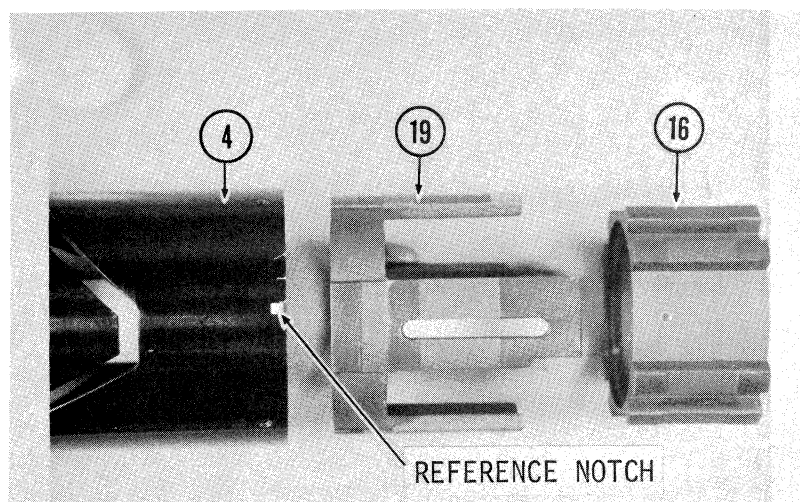


Fig. 11

- 2.1.10 Remove Vinyl Grip (11) from Zoom Collar Ring (20) by "rolling" it forward "like a stocking". (Fig. 12)
- 2.1.11 Remove acetate tape covering slots in Zoom Collar Ring, and remove Roller Shaft (7) and Roller (8) from each side of Ring. (Fig. 12)
- 2.1.12 Slide Zoom Collar Ring rearward off Inner Focus Ring (5). (Fig. 12)
- 2.1.13 Rotate Outer Helicoid (3) very slowly counterclockwise, carefully noting the exact point of separation of threads of Outer Helicoid and Lens Barrel. At this point, scribe a reference line on Lens Barrel, in line with lower edge of cutout in Outer Helicoid. (Fig. 13)
- 2.1.14 Loosen six setscrews (C), which attach Infinity Stop Ring to Outer Helicoid. (Fig. 13)
- 2.1.15 Remove Infinity Stop Ring (2) (together with First Lens Group, which is screwed into it). (Fig. 13)

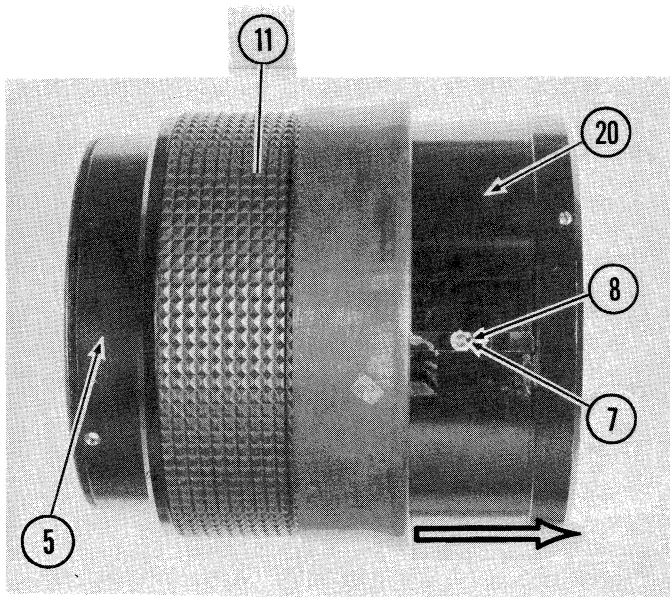


Fig. 12

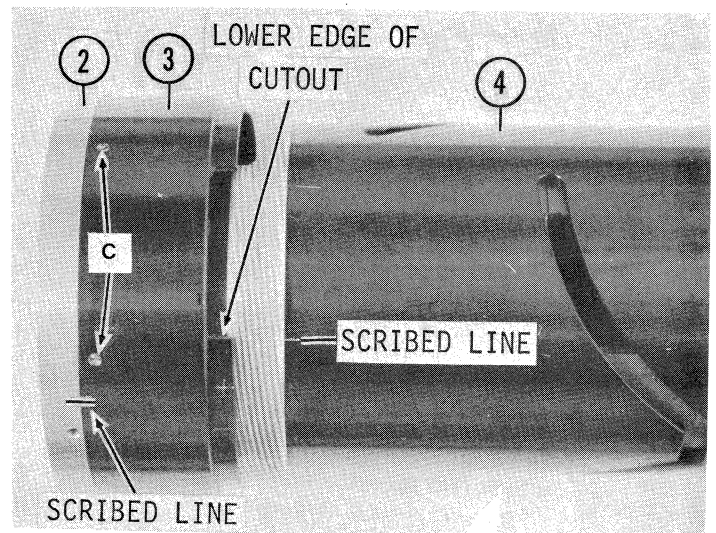


Fig. 13

IMPROVED HELICOID ASSEMBLY

An improved Helicoid Assembly has been introduced in Vivitar Series 1 70-210mm Zoom lenses beginning with Serial Number 22528001.

The improved Helicoid Assembly can be identified easily by three or four holes in the Outer Helicoid (Figure A). These two types (three- and four-hole Outer Helicoids) are fully interchangeable with each other.

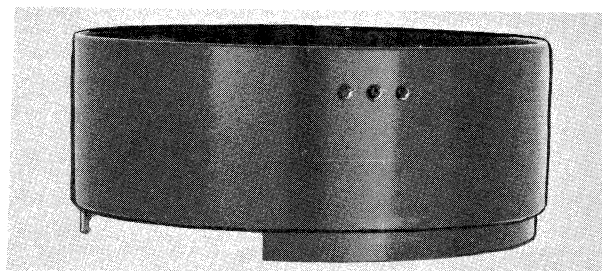
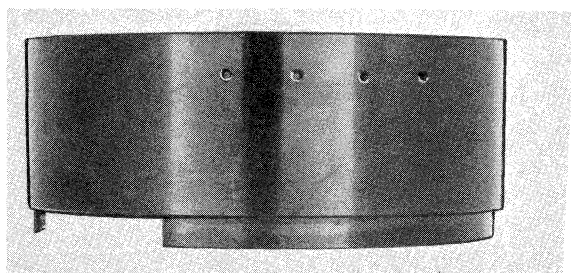


Fig. A

To verify whether a lens has an improved Helicoid Assembly, observe the location of the countersunk screw hole in the Inner Focus Ring. The distance shown in Figure B indicates a lens with a regular Helicoid Assembly, while that shown in Figure C indicates a lens with an Improved Helicoid Assembly.

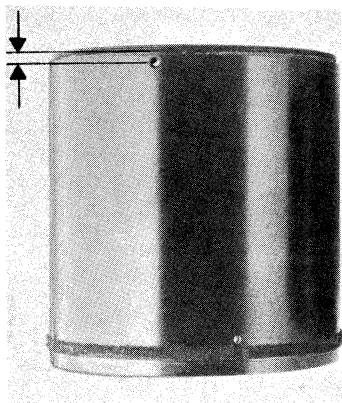


Fig. B

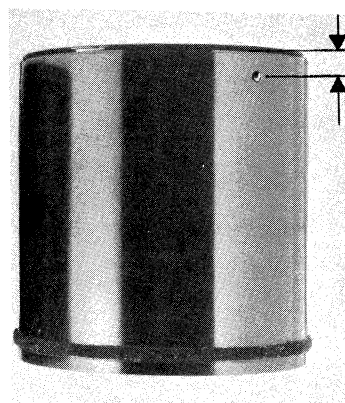


Fig. C

SERVICE PROCEDURE: Replace Lens Tube (Lenses with Serial Numbers prior to 22528001). EXAMINE LENS TUBE ASSEMBLY FOR PROPER AND ADEQUATE LUBRICATION. IF NECESSARY, FOLLOW LUBRICATION INSTRUCTIONS IN SECTION 2.2.

NOTE: A regular Helicoid Assembly is not directly interchangeable with the improved version. If it is necessary to install an improved Helicoid Assembly in a lens with a regular Helicoid Assembly, it is necessary to install the new type of Name Ring, Inner Focus Ring, and First Lens Group Housing. Similarly, the installation of a new type Inner Focus Ring or First Lens Group Housing will also require the installation of a complete, improved Helicoid Assembly. Parts are no longer available for the regular helicoid assembly and they are not shown in the Illustrated Parts List.

- STEP:
1. Separate Zoom Lens Assembly from Prime Lens Assembly. (Section 1.0)
 2. Disassemble Zoom Lens Assembly. (Section 2.1.1 through 2.1.7 and 2.1.10, through 2.1.12).
 3. Flow Acetone or other suitable solvent around Infinity Stop Screw (9, Fig. D). Remove and lay aside.

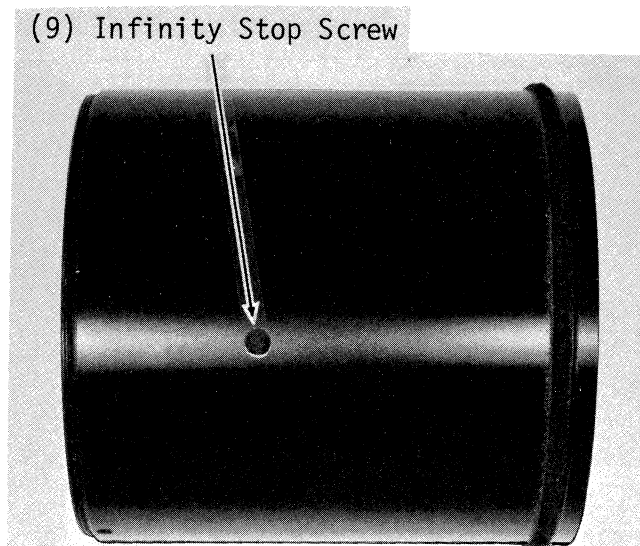
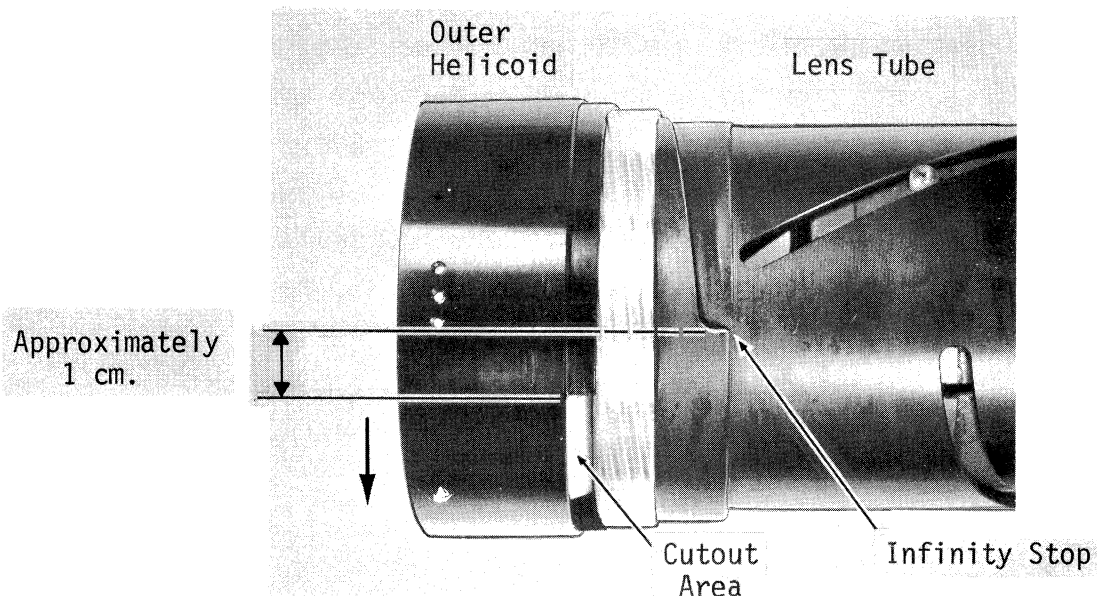
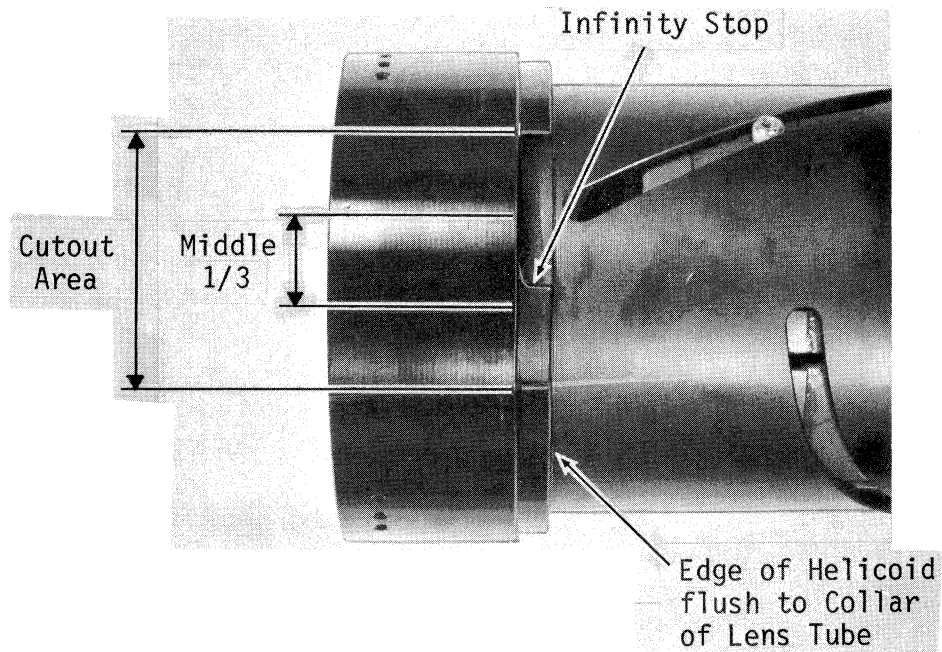


Fig. D

4. CHECK ASSEMBLY OF OUTER HELICOID TO LENS TUBE AS FOLLOWS: Rotate outer Helicoid until its rear edge is flush with the rear edge of the collar on the Lens Tube. The Infinity Stop should fall within the middle one-third of the cutout in the Outer Helicoid (Fig. E). If this condition is found, proceed to Service Procedure Instruction 6. If not, the Outer Helicoid may have become detached from the Lens Tube and it therefore will be necessary to properly mesh the Helicoids. Proceed as follows:
- Align the Infinity Stop of the Lens Tube with a point 1 cm. (0.4 in.) above the cutout in the Outer Helicoid. The NEAREST thread meshing point at this position is the CORRECT one (Fig. F).



STEP:

5. Assemble Infinity Stop Screw (9) to Inner Focusing Ring (5).
6. Assemble Inner Focus Ring to Outer Helicoid, taking care that Infinity Stop Screw aligns with cutout of the Outer Helicoid (Refer to p.14, Fig. 19). Secure Inner Focus Ring to Outer Helicoid with one screw (B), preferably the middle hole of the three-hole group in the Outer Helicoid or the second hole from the left, as viewed from the rear of the lens, in the case of the four-hole version
7. Rotate Inner Focusing Ring back and forth to check that Infinity Stop Screw engages both the Infinity Stop Position and the Near Focus Stop Position of the Lens Tube. If Outer Helicoid disengages from the Lens Tube, assembly was incorrect - repeat Step 4a.
8. Refer to and Follow Instruction in Service Manual Section 2.3.12 through 2.3.20.
9. Complete reassembly of Prime Lens Assembly. Service Manual Sections 2.3.12 through 2.3.20.
10. Transfer 2nd and 3rd lens groups from old lens tube to the new lens tube. Refer to Section 9.1.6 of the Service Manual. Check the optics for cleanliness when transferring.
11. Change 3rd Lens Element from old first lens group housing to new housing. Remove 3rd Lens Element Retaining Ring (205) from old lens group housing (203). Carefully change 3rd Lens Element to new housing, holding it in place with the retaining ring. Seal the threads with thread sealant.
12. Change 1st and 2nd Lens Elements from old First Lens Group Housing to new housing. Flow Acetone or other solvent into the threads between Name Ring and First Lens Group Housing. When thread sealant has softened sufficiently, unscrew Name Ring from housing. Remove the 1st and 2nd Lens Elements (doublet) from the old housing and after checking it for cleanliness install it in the new housing. Place thread sealant on the threads of the new Name Ring and screw it down into the lens group housing, snugging it down to prevent the optic from moving.
13. Install First Lens Group into the Outer Helicoid screwing it completely down to the bottomed position. Then unscrew it one and one-half turns. This will bring the 1st Lens Group approximately to the correct position for 210mm Infinity Setting, saving considerable time in refocusing the lens.

- STEP: 14. Refocus Lens - Follow Procedure in Section 10.0 of the Manual. If, in Section 10.6, 1st Lens Group is screwed to Bottom of Outer Helicoid and Infinity Focus cannot be reached, change position of screw (B) one hole to right of center hole in Outer Helicoid, as viewed from the rear of the Lens. If Infinity is reached but Filter Ring will not properly seat on the Lens, move location of screw (B) one hole to left of center hole, as viewed from rear of Lens (Fig. G). Repeat Refocusing Procedure as necessary to achieve Optimum Infinity Focus at 70mm and 210mm Focal Length Positions.

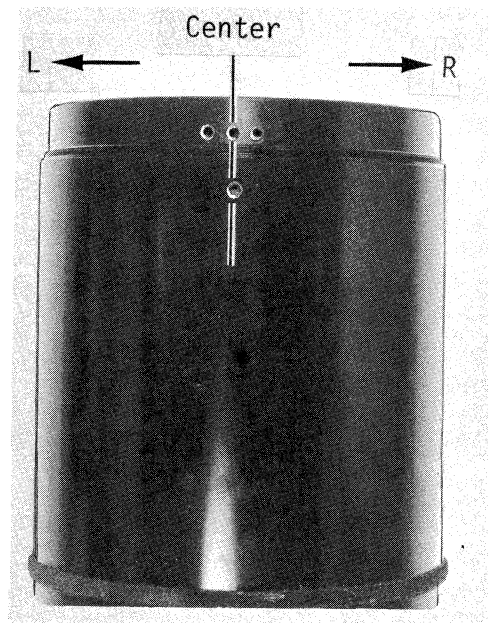


Fig. G

SERVICE PROCEDURE: Replace Lens Tube (Lenses with Serial Numbers Subsequent to 22528001).

- STEP:
1. Disassemble Lens following Steps 1, 2 and 3 above.
 2. Assemble Zoom Collar Ring to Lens Tube Assembly as in Steps 6, 7, 8, 9 and 10 above.
 3. Install First Lens Group into Outer Helicoid as instructed in Step 13 above.
 4. Refocus Lens following instruction 14 above.

2.2 Lubrication - Zoom Lens Assembly

NOTE: Do not over lubricate Lens Tube of Zoom Group Housing.

- 2.2.1 Remove optics from Housing before lubrication.
- 2.2.2 Apply a thin film of lubricant "A" to helicoid threads of Lens Barrel (4) (Fig. 14)
- 2.2.3 Apply a thin film of lubricant "A" on helicoid threads of Outer Helicoid (3) (Fig. 14)
- 2.2.4 Assemble Outer Helicoid to Lens Barrel as in 2.2.1. Rotate the two parts together to spread lubricant evenly.
- 2.2.5 Wipe off excess lubricant from Outer Helicoid and Lens Barrel as shown in Fig. 14.
- 2.2.6 Apply a thin film of Lubricant "B" to the inside of Lens Barrel. (Fig. 14)
- 2.2.7 Apply a thin film of lubricant "B" to the bearing surfaces of Zoom Group Housings (16 and 19). (Fig. 15)
- 2.2.8 Insert Zoom Group Housings into Lens Barrel.
- 2.2.9 Slide and rotate back and forth, to spread lubricant evenly over surfaces of Lens Barrel and Zoom Group Housings.
- 2.2.10 Remove Zoom Group Housings, wipe excess lubricant from edges. (Fig. 15)

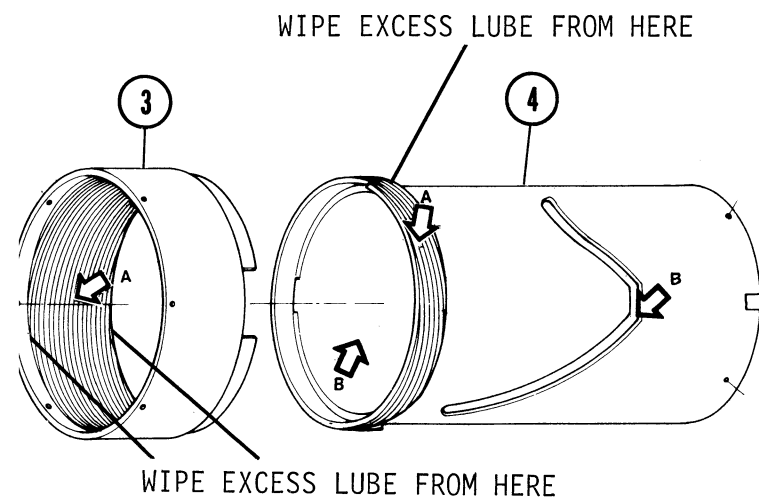


Fig. 14

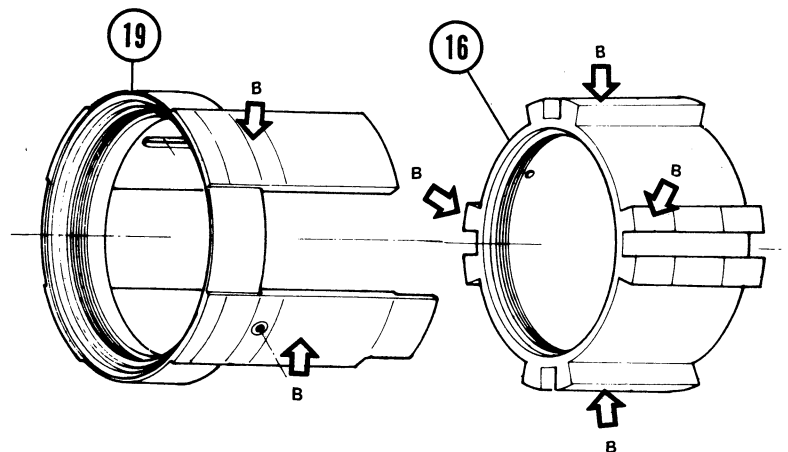
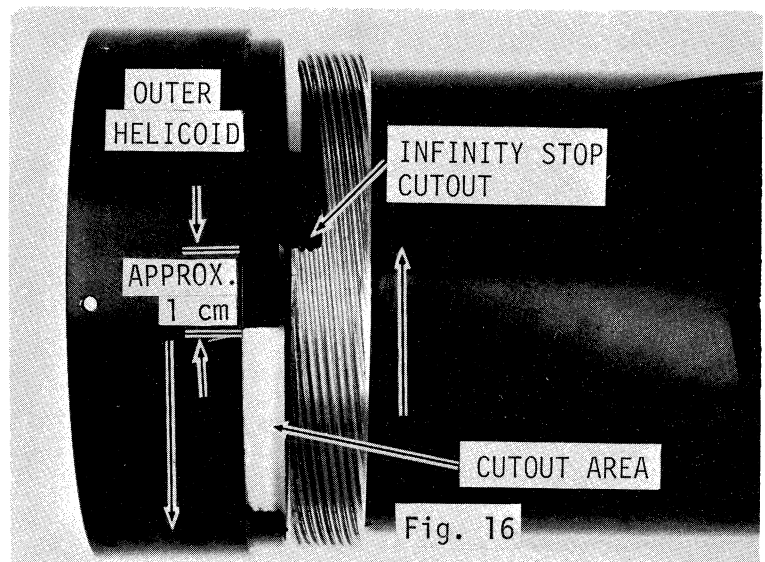
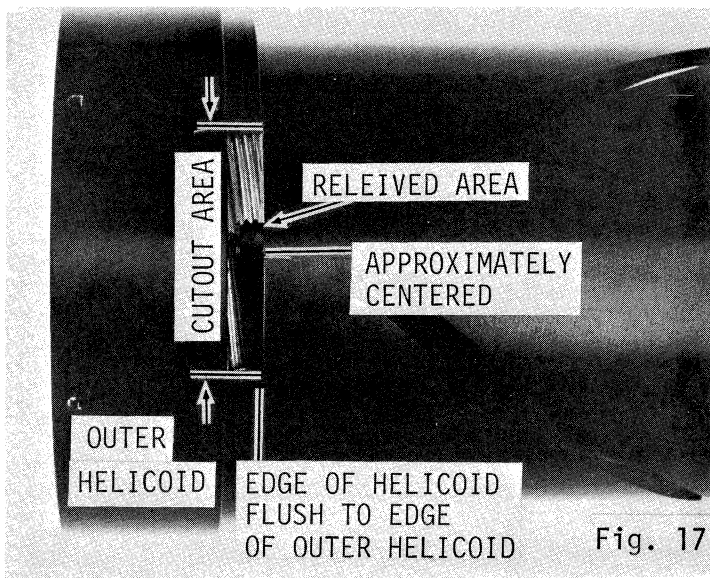


Fig. 15

2.3 Reassembly

In the event you are reassembling a lens dismantled by someone else, or have to replace any of the parts mentioned above, you of course will not have scribed reference lines to work with. Correct assembly still is easily accomplished as follows:

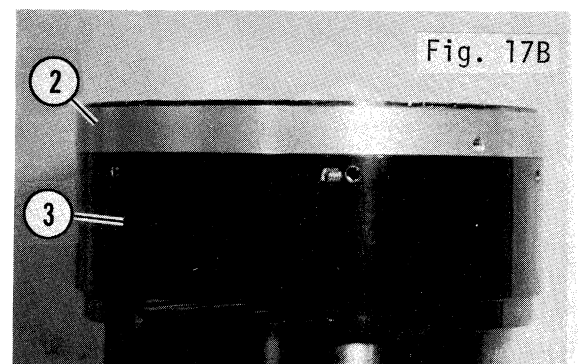
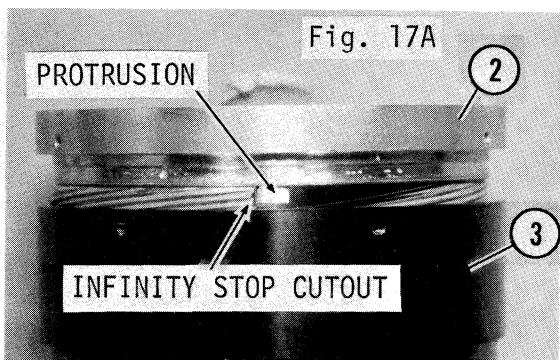
- 2.3.1 Align the infinity stop cutout of the Lens Barrel with a point about 1 cm (0.4 in) above the cutout in the Outer Helicoid. The nearest thread meshing point at this position is the correct one. (Fig. 16)
- 2.3.2 Check alignment by rotating Outer Helicoid until its rear edge is flush with the rear edge of the threaded shoulder on the Lens Barrel. (Fig. 17) The relieved area in the Lens Barrel's threads should then have its deepest point approximately centered in the cutout of the Outer Helicoid.
- 2.3.3 Continue rotating the Outer Helicoid until its six setscrews holes are bisected by the end of the Lens Barrel.



- 2.3.4 Insert the Infinity Stop Ring into the Outer Helicoid so that:

- a. Protrusion on Infinity Stop Ring is against the infinity stop cutout of the Lens Barrel (as in Fig. 17a), and
- b. Infinity Stop Ring is seated hard against the Lens Barrel (as in Fig. 17b).

- 2.3.5 Holding the Infinity Stop Ring and the Lens Barrel firmly in the above described position, rotate the Outer Helicoid slowly counterclockwise, until it just bottoms against the Infinity Stop Ring. (Fig. 17b)



- 2.3.7 Check alignment by rotating Lens Barrel back and forth against the stop. You should hear a loud "click" and feel a hard stop, as the stop tab on the Infinity Stop Ring contacts the infinity stop cutout in the Lens Barrel.

If the Barrel bottoms against the Infinity Stop Ring before the tab is engaged, the "click" will not occur. This will indicate that the Stop Ring has accidentally rotated counterclockwise before setscrews were tightened. Loosen screws and begin again at 2.3.4.

If, in 2.3.5, the Outer Helicoid was rotated too far, lifting the Stop Ring off the Lens Barrel, the "click" will still be heard and the hard stop felt, when the above-described check is made. However, the Lens Barrel will not be bottomed on the Infinity Stop Ring, thus positioning the First Lens Group too far forward. Later, when attempting to refocus the lens at 210mm infinity position, it may be found impossible to screw the First Lens Group in far enough. For this reason, 2.3.5 must be done very carefully.

- 2.3.8 If for any reason you have had to separate the 1st Lens Group from the Infinity Stop Ring, or if either part is replaced, assemble as follows (this procedure will bring the 1st Lens Group approximately to the correct 210mm infinity setting, saving considerable time in refocusing the lens):
 - a. Screw the 1st Lens Group completely down to the bottomed position.
 - b. Then unscrew it one full revolution. Leave in this position until ready to refocus the lens.
- 2.3.9 Procedure for reassembling Second and Third Zoom Group Housings.

Examine all rollers carefully before reinstallation, and replace any which are worn or damaged (better yet use all new rollers; worn rollers can cause focus problems).

Fig. 18 shows the correct sequence of assembling of the Rollers and Shafts which guide the Second and Third Zoom Group Housings.

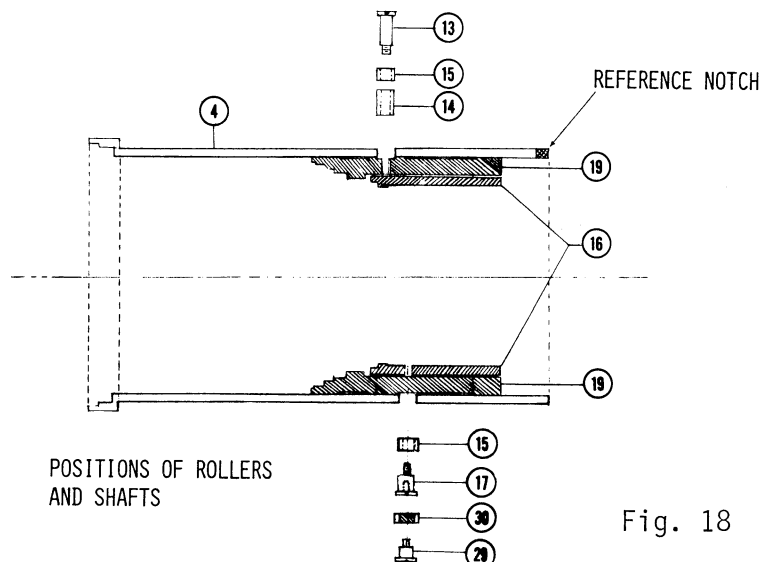


Fig. 18

- 2.3.10 Housings, Rollers, and Shafts must be installed in the following order:
- 2.3.10.1 Apply thread sealant to the threads of Roller Shaft mounting holes in the Second and Third Zoom Group Housings.
 - 2.3.10.2 Align Second and Third Housings as shown in Fig. 11; slide Third Housing into Second Housing and this in turn into the Lens Barrel.
 - 2.3.10.3 Position Zoom Group Housings within Lens Barrel as shown in Fig. 10 (hole in Third Housing near bottom of macro slot).
 - 2.3.10.4 Slide Rollers (15) and (14), in that order, onto Roller Shaft (13).
 - 2.3.10.5 Screw Roller Shaft (13) into hole in Third Zoom Group Housing.
 - 2.3.10.6 Slide Roller (18) onto Shaft (17).
 - 2.3.10.7 Screw Shaft (17) into Second Zoom Group Housing.
- 2.3.11 When reassembling Inner Focusing Ring (5) to Outer Helicoid (3), align Helicoid Stop Screw (9) with cutout in Outer Helicoid, as shown in Fig. 19. Align three holes in Inner Focusing Ring with mating holes in Outer Helicoid, and install three flathead screws (B).
- 2.3.12 Hold Roller (30) with tweezers as shown in Fig. 20 (that is, with flats of roller crosswise to lens axis), and push roller into clearance hole shown in Zoom Ring (22).

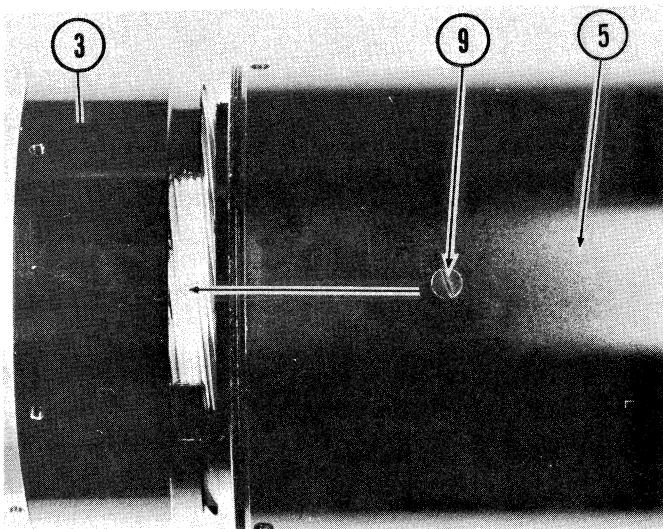


Fig. 19

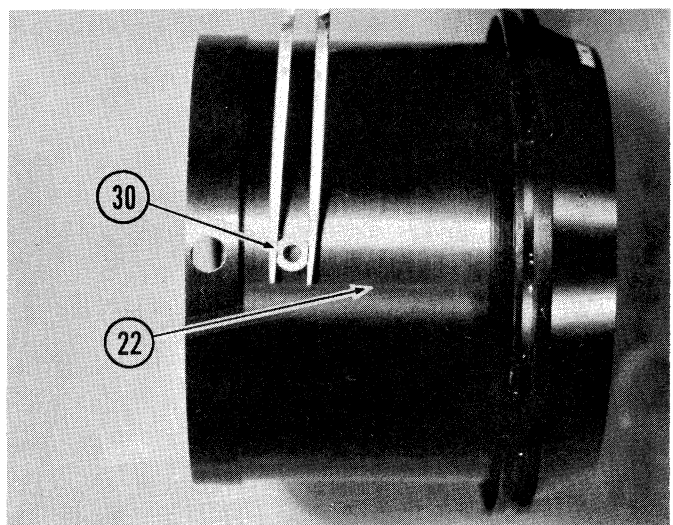


Fig. 20

- 2.3.13 Slide Zoom Collar Assembly fully forward and rotate it fully counter-clockwise to the near focus stop.
- 2.3.14 Place thread sealant in threads inside Shaft (17). Align Zoom Ring (22) so that previously installed Roller (30) is situated exactly over Shaft (17), as shown in Fig. 21. Install Shaft (29).
- 2.3.15 Slide Zoom Ring (22) fully forward [under Zoom Collar (20)]; this will force both Zoom Group Housings to the forward end of the macro slot.
- 2.3.16 Slide Zoom Collar (20) to the rear, bottoming it against Zoom Ring.
- 2.3.17 Rotate Zoom Collar clockwise to infinity stop.
- 2.3.18 Rotate Zoom Ring (22) counterclockwise to bring its infinity symbol opposite the reference notch at the rear edge of the Lens Barrel. (Fig. 22)
- 2.3.19 Lightly snug down three setscrews (G).
- 2.3.20 Slide Change Ring (27) onto Lens Barrel (4). Align yellow "macro" index line of Change Ring with infinity symbol of Zoom Ring. Then slide Change Ring forward to its stop. (Fig. 22)

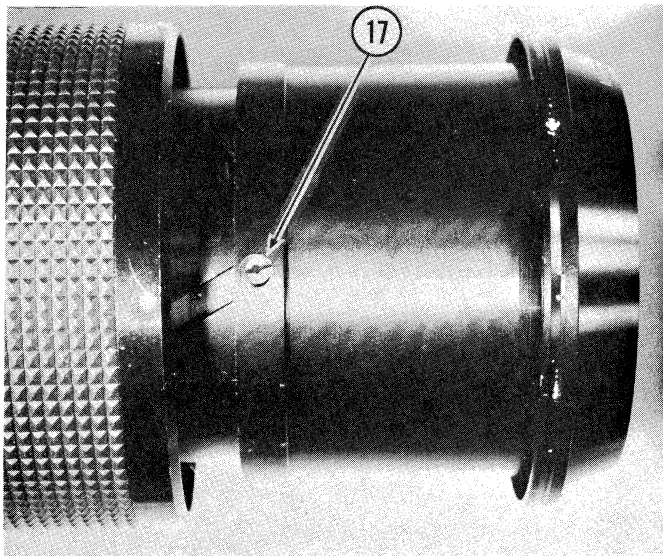


Fig. 21

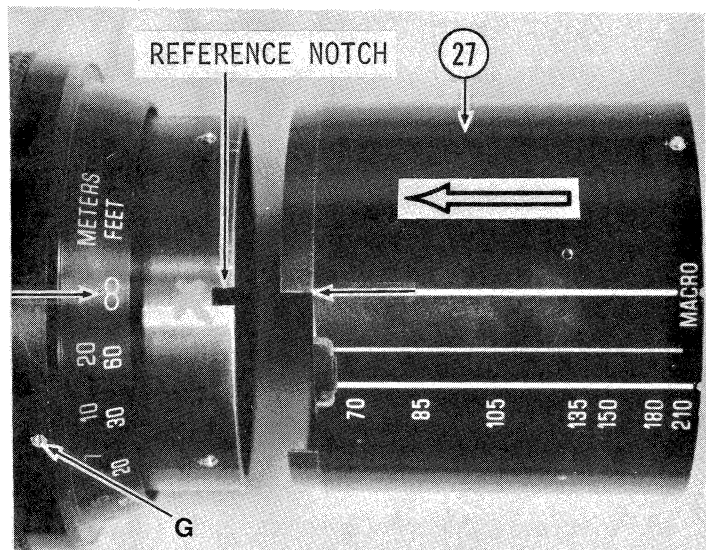


Fig. 22

3.0 Separation of Prime Lens and Lens Mount Assemblies.

NOTE: Latch Plates (32) are retracted by longer tips of Second Zoom Group Housing, when lens is set to 210mm focal length position. This allows the Change Ring [fastened to Latch Ring by setscrews (F)] to rotate the Latch Ring (31) between macro and zoom positions.

3.1 Disassembly.

- 3.1.1 Remove Latch Ring (31) and lay aside. (Fig. 23)
- 3.1.2 Scribe a reference line across the juncture of Prime Lens Barrel (35) and Lens Mount Ring (53). (Fig. 23)
- 3.1.3 Remove Three setscrews (H) from the Prime Lens Barrel, then separate the Prime Lens Assembly from the Lens Mount Assembly. (Fig. 23)
- 3.1.4 There are usually one or more Front Focus Spacers (49) installed between the Prime Lens and Lens Mount Assembly. These spacers (supplied in thicknesses of 0.1, 0.15, 0.2, 0.4 and 0.5mm) are used for focus adjustment as explained in Section 10. Remove Spacers and lay aside. (Fig. 23)

3.2 Reassembly.

Reassembly is simply reverse of disassembly described above.

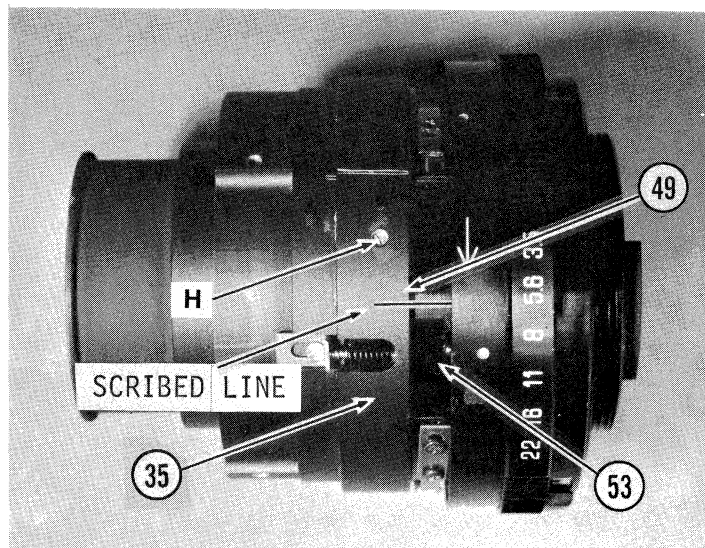


Fig. 23

4.0 Prime Lens Assembly.

Note: Most repairs to Prime Lens Assembly involve no more than cleaning sticky diaphragm blades or blade operating mechanisms. This may be accomplished by simply unscrewing and removing the 4th and 5th Lens Groups (234 and 235) and then cleaning barrel assembly as a unit. An ultrasonic cleaner is recommended. (Fig. 24)

4.1 Disassembly.

- 4.1.1 Disconnect Diaphragm Spring (43) from Post Screw (48) and from Diaphragm Lever (41). (Fig. 25)
- 4.1.2 Rotate Diaphragm Lever (41) clockwise, hard against the Diaphragm Limit Ring (46). Scribe a line across rim of Prime Lens Barrel (35), in line with right edge of Diaphragm Lever Fork, as shown in Fig. 25.
- 4.1.3 Remove 2 setscrews (N) in the Diaphragm Housing Retainer Ring (47). (Fig. 25)
- 4.1.4 Holding Diaphragm Housing (45) so that it cannot rotate within Prime Lens Barrel (35), remove Diaphragm Housing Retainer Ring (47) by unscrewing it counterclockwise. (Fig. 25)
- 4.1.5 Rest the assembly on bench with Diaphragm Housing down. Loosen two screws (32) (Fig. 24) two turns each. Lift Prime Lens Barrel upwards and off. This will expose Diaphragm Blades (ref. no. 36 or 37, depending on mount type). (Fig. 26)
- 4.1.6 Diaphragm Blades may now be lifted off. No further disassembly is advisable. Diaphragm Housing assembly may be cleaned as a unit.

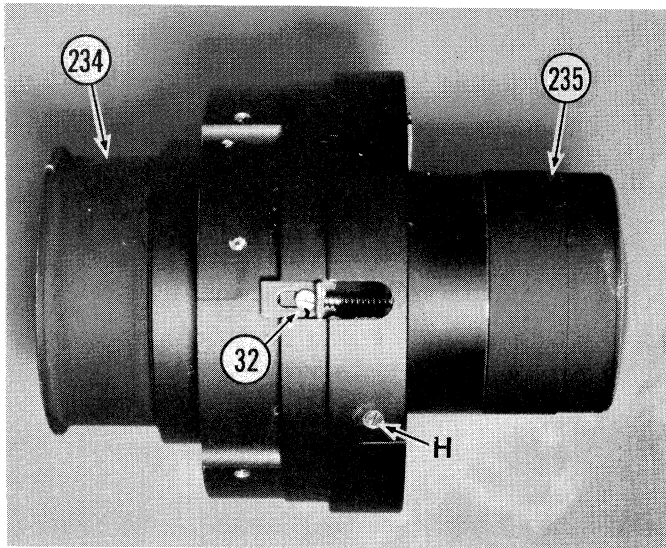


Fig. 24

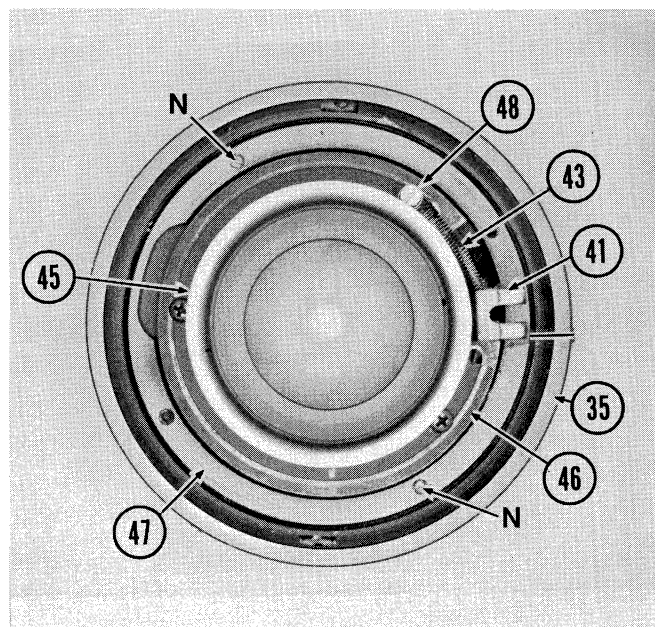


Fig. 25

4.2 Reassembly.

4.2.1 Install Diaphragm Blades in a counterclockwise sequence. (Fig. 26)

4.2.2 Rotate Diaphragm Lever (41) until all blades clear outer edge of Diaphragm Blade Ring (38), as shown in Fig. 27.

4.2.3 Install Prime Lens Barrel (35) over Diaphragm Housing (45), seating it fully down. Rotational position is unimportant. (Fig. 28)

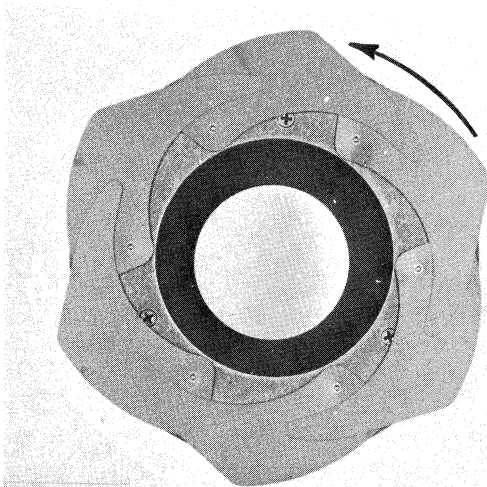


Fig. 26

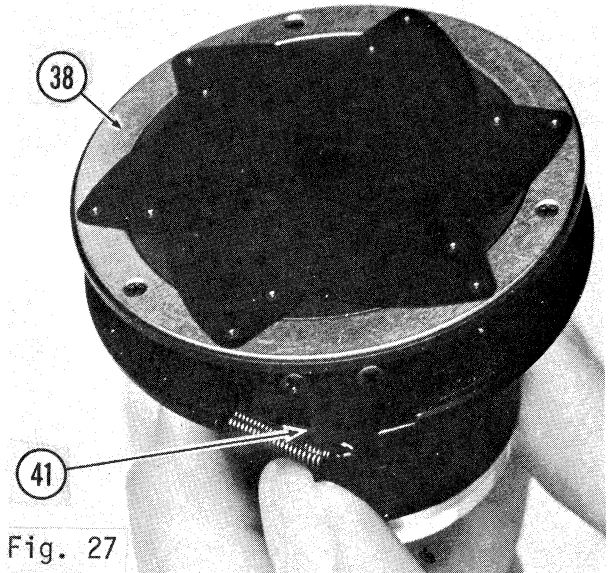


Fig. 27

4.2.4 Holding parts tightly together (as in Fig. 29), invert and place on workbench with Prime Lens Barrel down.

4.2.5 Install Diaphragm Housing Retainer Ring screwing it down until snug so that the Diaphragm Housing (45) will just turn. (Fig. 25)

4.2.6 Hold Diaphragm Lever clockwise against stop (which is Diaphragm Limit Ring 46), and measure the aperture size. A rod of $4.6 \pm 0.3\text{mm}$ should just pass through the hole (a $3/16$ " drill bit is nominally 4.76mm , which is within tolerance). (Figs. 30 and 31)

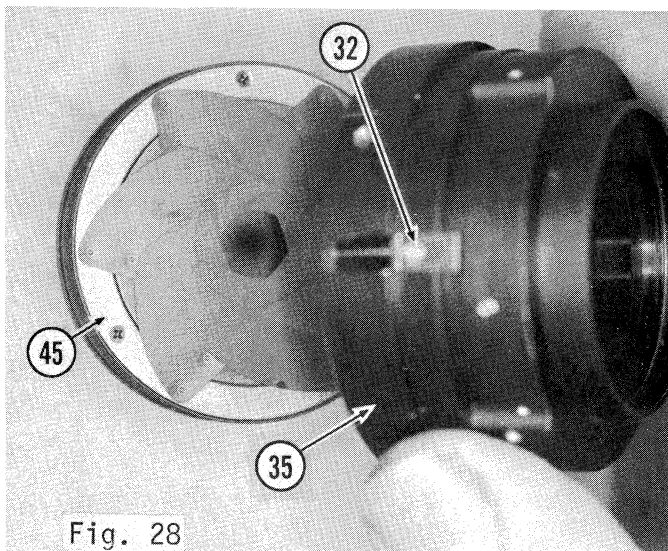


Fig. 28

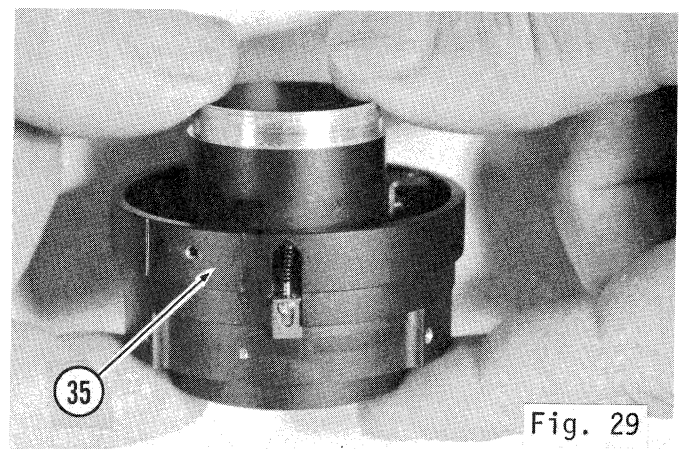


Fig. 29

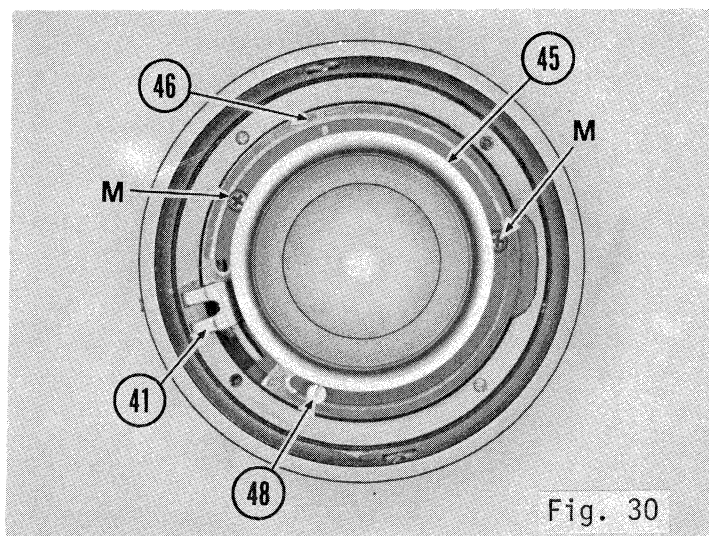


Fig. 30

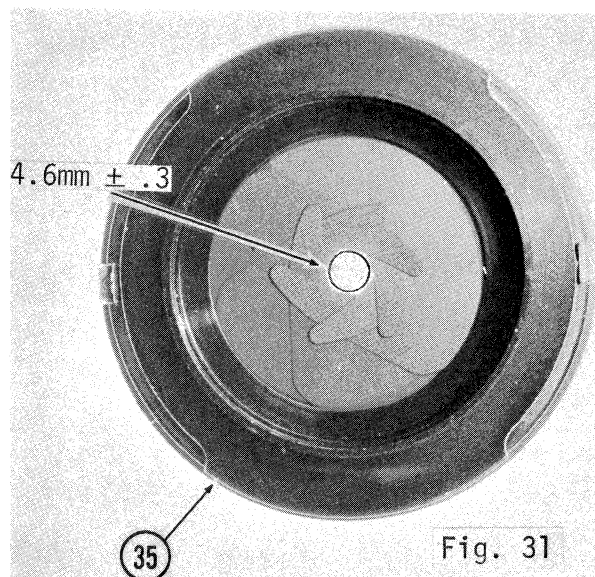


Fig. 31

- 4.2.7 If aperture size is incorrect loosen Post Screw (48) and two screws (M), which hold the Diaphragm Limit Ring (46) in position. Rotate limit ring clockwise or counterclockwise as required, to achieve correct aperture size. (Fig. 30)
- 4.2.8 Holding Diaphragm Lever clockwise against its stop, rotate Diaphragm Housing (45) to realign Diaphragm Lever and scribed line as shown in Fig. 25.
- 4.2.9 Tighten Diaphragm Housing Retainer Ring a little more to insure that Diaphragm Housing will not accidentally be rotated.
- 4.2.10 Replace Diaphragm Spring (43), attaching one end to stud on Diaphragm Lever (41) and one end to Post Screw (48). (Fig. 25)
- 4.2.11 Tighten two screws (32). (Fig. 28)
- 4.2.12 Assemble Lens Mount Assembly to Prime Lens Barrel, assuring that long pin on Diaphragm Actuating Lever passes through fork in Diaphragm Lever. Rotate either half of assembly to realign scribed lines. Tighten one setscrew (H), leaving two others loose. (Fig. 23)
- 4.2.13 At this point, the diaphragm must be checked for correct aperture size and operation. Proceed as follows:
 - 4.2.13.1 Set F/Stop Ring to f/22, then rotate it slowly toward f/16 position. The Diaphragm Blades should begin to open almost as soon as the Ring is moved, and there should be a significant change in aperture between the f/22 and f/16 settings.
 - 4.2.13.2 Set F/Stop Ring to f/22 and measure the size of the aperture, as described in Par. 4.2.6. Since the minimum aperture size has been adjusted in 4.2.6 the measurement at this point will not be undersize but may be oversize.

- 4.2.14 If both the tests described above are met, the aperture requires no further adjustment. You can proceed to Par. 4.2.16.
- 4.2.15 If either of the tests in Par. 4.2.13 are not met, proceed as follows:
 - 4.2.15.1 Loosen the setscrew (H) which was tightened in Par. 4.2.12 and separate the Prime Lens and Lens Mount assemblies.
 - 4.2.15.2 If the test in Par. 4.2.13.1 was negative (that is, if the diaphragm size did not change significantly between f/22 and f/16), loosen Diaphragm Housing Retainer Ring (47) and rotate Diaphragm Housing (45) very slightly clockwise.
 - 4.2.15.3 If the test in Par. 4.2.13.2 was negative (that is, if the aperture was too large at f/22 setting), rotate Diaphragm Housing very slightly counterclockwise.
 - 4.2.15.4 Rejoin Prime Lens and Lens Mount assemblies and repeat tests in Par. 4.2.13.
- 4.2.16 When aperture size is correctly adjusted, proceed as follows:
 - 4.2.16.1 Loosen the single setscrew (H), which was tightened in Par. 4.2.12.
 - 4.2.16.2 Separate Prime Lens and Rear Mount assemblies.
 - 4.2.16.3 Tighten two setscrews (N) in Diaphragm Housing Retainer Ring, locking them in place with thread sealant.
 - 4.2.16.4 Install any Focus Spacers (49) which have been removed, and rejoin Rear Mount and Prime Lens assemblies.
 - 4.2.16.5 Rotate either assembly to align scribed lines shown in Fig. 21.
 - 4.2.16.6 Tighten three setscrews (H), locking them in place with thread sealant. (Fig. 23)

5.0 Lens Mount Assemblies.

5.1 Konica Lens Mount Assembly.

5.1.1 Disassembly.

- 5.1.1.1 Remove Latch Spring (62) and Latch Spring Booster Spring (63). (Fig. 32)

- 5.1.1.2 Loosen three setscrews (X) in F/Stop Index Ring and remove it. Set F/Stop Ring at f/3.5. (Fig. 33)

NOTE: There is a Detent Ball (158) between F/Stop Index Ring and F/Stop Ring; remove and lay aside.

- 5.1.1.3 Remove Circlip ("E" Ring) (153) and Washer (154). Remove three screws (S) which attach Lens Mount Ring to Lens Mount Frame and separate them. (Fig. 33)

NOTE: Diaphragm Lever (143) remains attached to Lens Mount Ring (133) and does not require further disassembly except for replacement. (Fig. 33)

- 5.1.1.4 Remove Screw Cap (139) with smooth-jaw pliers. Lock Button Spring (140) and Lock Spring Pin (141) will then come away. (Fig. 33)

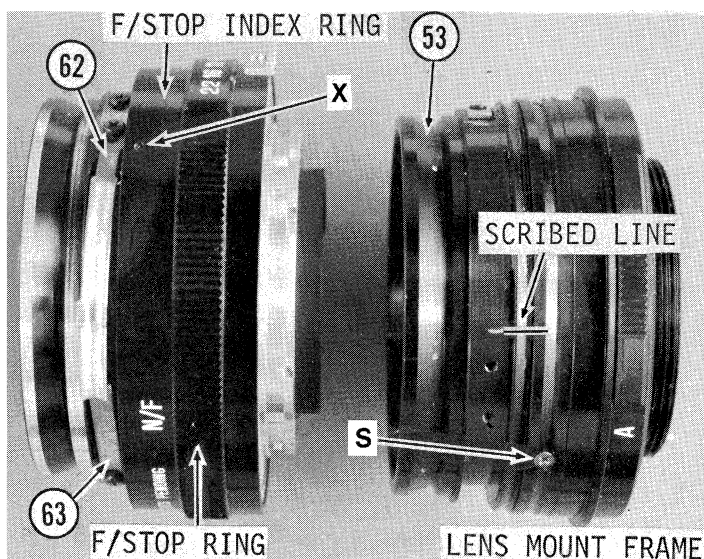


Fig. 32

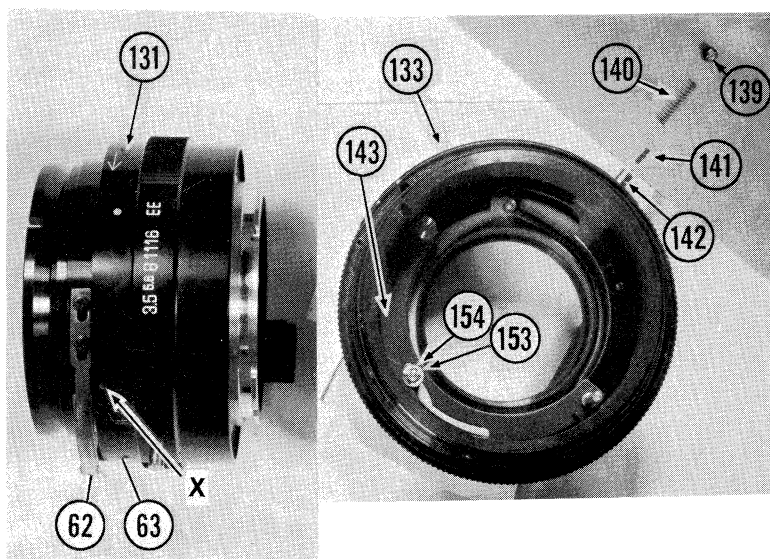
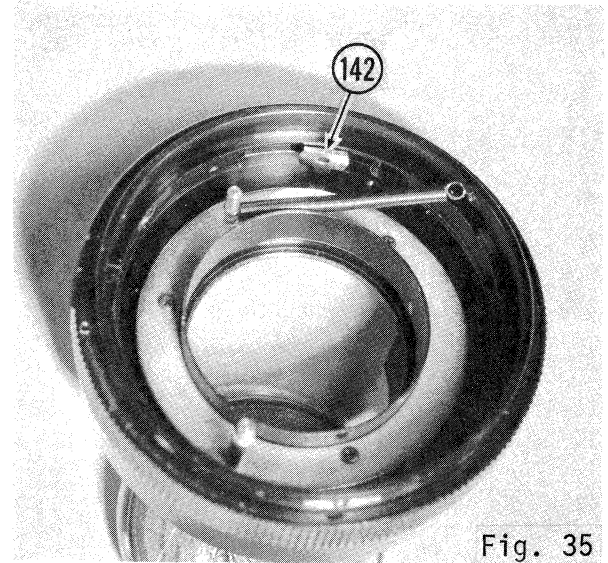
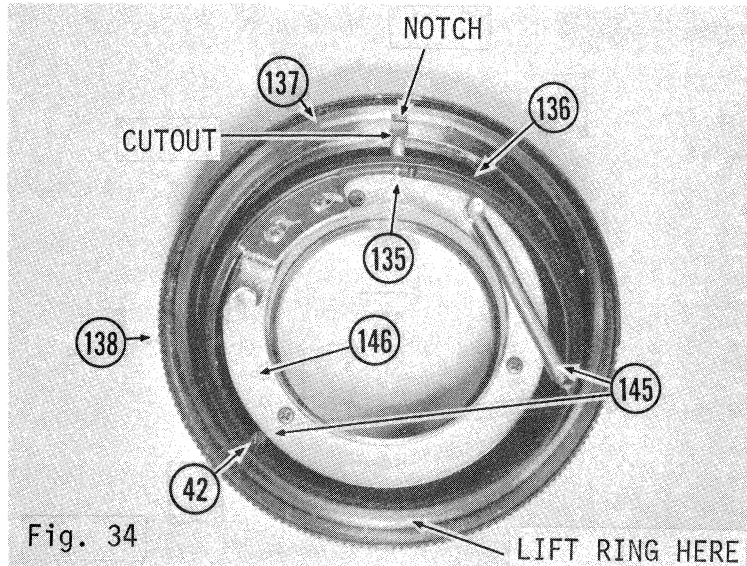


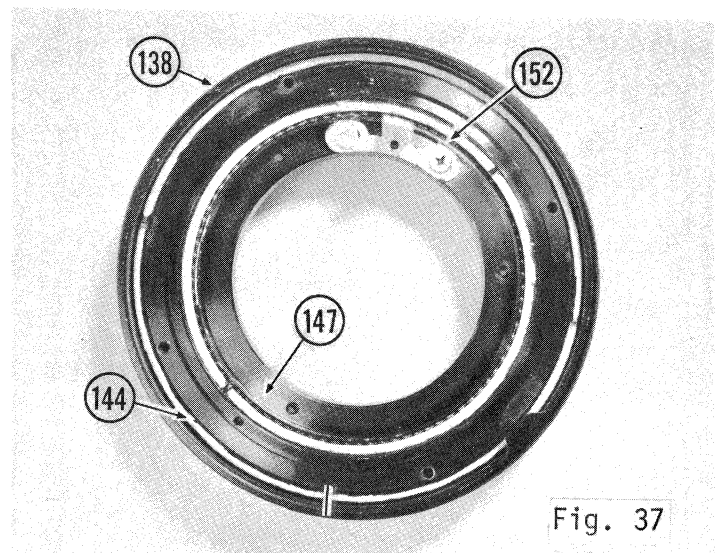
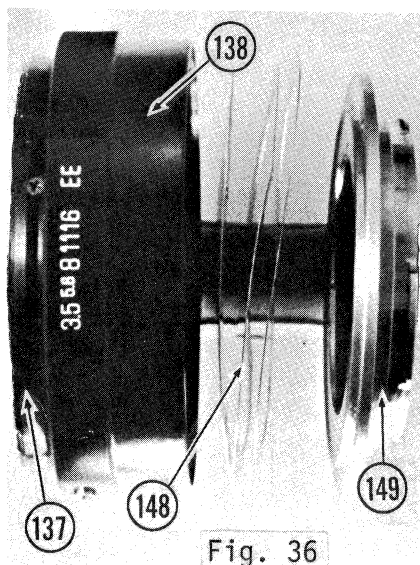
Fig. 33

- 5.1.1.5 Unhook Auto Lever Spring (145) from Screw Post (42). (Fig. 34)
- 5.1.1.6 Rotate Konica Mount Ring (137) to align notch and cutout as shown in Fig. 34, then lift Auto Diaphragm Ring (136) at point shown in Fig. 34 and remove.
- 5.1.1.7 Remove Lock Button (142). (Fig. 35)



- 5.1.1.8 Remove four screws (M) which attach Konica Mount (149) to Konica Mount Frame (137). There usually are one or more Rear Focus Spacers (148) between Mount and Frame. Remove and lay aside. (Fig. 36)
- 5.1.1.9 Unscrew F/Stop Ring Retainer (144); this is the very thin-walled ring between F/Stop Ring (138) and Mount Frame (137). (Fig. 37)
- 5.1.1.10 Remove F/Stop Ring (138). (Figs. 36 and 37)

NOTE: Further disassembly is not necessary and not recommended.



5.1.2 Reassembly.

- 5.1.2.1 Mount F/Stop Ring (138) on Konica Mount Frame (137). (Fig. 36)
- 5.1.2.2 Drop F/Stop Ring Retainer (144) into place and turn down snug. Then back off one-half turn. (Fig. 37)
- 5.1.2.3 Rotate Mount Frame (137) to align notch and cutout as shown in Fig. 34.
- 5.1.2.4 Insert Lock Button (142) and seat fully. (Fig. 35)
- 5.1.2.5 Rotate Diaphragm Operating Plate (146) to position shown in Fig. 34.
- 5.1.2.6 Insert Auto Diaphragm Ring (136). (Fig. 34)
- 5.1.2.7 Attach Auto Lever Spring to Screw Post (42). (Fig. 34 and 35)
- 5.1.2.8 Attach Konica Mount (149) to Mount Frame (137) and add four screws (M). (Fig. 36)
- 5.1.2.9 Install Lock Button Spring (140), Lock Spring Pin (141), and Screw Cap (139). (Fig. 36)
- 5.1.2.10 Join Lens Mount Ring to Lens Mount Assembly taking care that Diaphragm Actuating Post on Diaphragm Operating Plate (146) enters diaphragm cam slot in Diaphragm Operating Lever (143). (Fig. 33)
- 5.1.2.11 Replace Washer (154), Circlip ("E" Ring) (153). Replace three screws (S) to attach Lens Mount Ring to Lens Mount Assembly. (Figs. 32 and 33)
- 5.1.2.12 Rotate F/Stop Ring (138) to the "EE" latched position (Latch Button fully extended, F/Stop Ring locked). (Fig. 33)
- 5.1.2.13 Place a spot of grease on Detent Ball (158), then install over hole in F/Stop Ring.
- 5.1.2.14 Slide F/Stop Ring onto Lens Mount Assembly so that red indicator dot aligns with center of "EE" position. Hold the ring against the detent spring pressure, then tighten three setscrews (X) to secure the ring. Check operation of F/Stop Ring at all detent positions; adjust as necessary. (Fig. 31)
- 5.1.2.15 Replace Latch Spring Booster Spring (63) followed by Latch Spring (62). (Fig. 32)

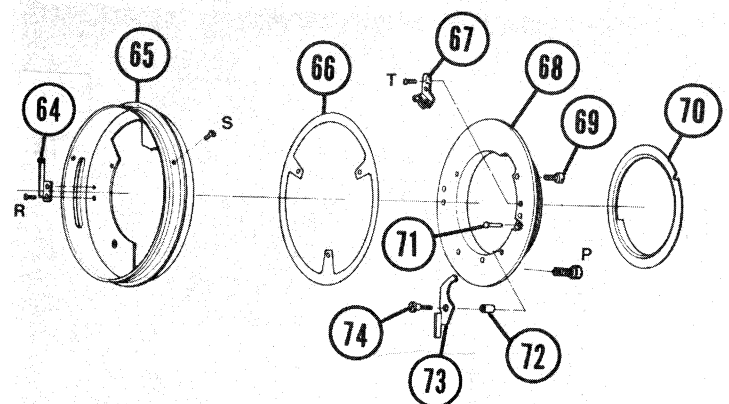
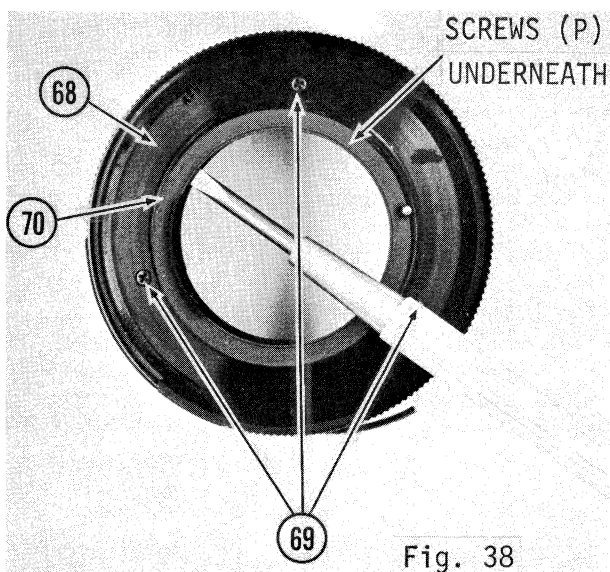
5.2 Universal Lens Mount Assembly.

5.2.1 Disassembly.

- 5.2.1.1 Remove Latch Spring (62) and Latch Spring Booster Spring (63). Loosen three setscrews (X) in F/Stop Index Ring and remove it. (Fig. 32)

NOTE: There is a Detent Ball (158) between the F/Stop Index Ring and the F/Stop Ring; remove and lay aside.

- 5.2.1.2 Remove F/Stop Ring. (Fig. 32)
- 5.2.1.3 Scribe a reference line across juncture of Lens Mount Ring (53) and Lens Mount Frame. (Fig. 32)
- 5.2.1.4 Remove six screws (S) which attach Lens Mount Ring to Lens Mount Frame. Separate Ring from Frame. (Fig. 32)
- 5.2.1.5 Flow a quantity of Ketone Solvent (such as Acetone or Methyl Ethyl Ketone) into the crevice between Cover Ring (70) and Universal Mount (68). Allow about one minute for the solvent to work, and then lift off Cover Ring with the tip of a screwdriver or flat blade. (Fig. 38)
- 5.2.1.6 Remove three screws (P), located under Cover Ring just removed, and three screws (69). (Fig. 38)
- 5.2.1.7 Lift off Universal Mount (68). (Figs. 38 and 39)
- 5.2.1.8 Remove Diaphragm Operating Pin (71) from under Diaphragm Actuating Lever (67). (Fig. 39)
- 5.2.1.9 Between Universal Mount (68) and Universal Mount Frame (65) will usually be found one or more Rear Focus Spacers (66). Remove and lay aside. (Fig. 39)



- 5.2.1.10 Remove Diaphragm Cam Ring (55) by lifting at point shown in Fig. 40A.
- 5.2.1.11 Unscrew Diaphragm Lever Screw (60) and remove Diaphragm Actuator Lever (56). (Fig. 40A) [Diaphragm Lever Spring (59) is situated around Pivot Collar of Diaphragm Actuator Lever as shown in Fig. 40B].
- 5.2.1.12 Remove two screws (D) from Auto-Manual Ring (57); then remove Auto-Manual Lever (58). (Fig. 40C)
- 5.2.1.13 Remove Auto-Manual Ring (57), being careful not to bend Detent Spring (64). (Fig. 40C)

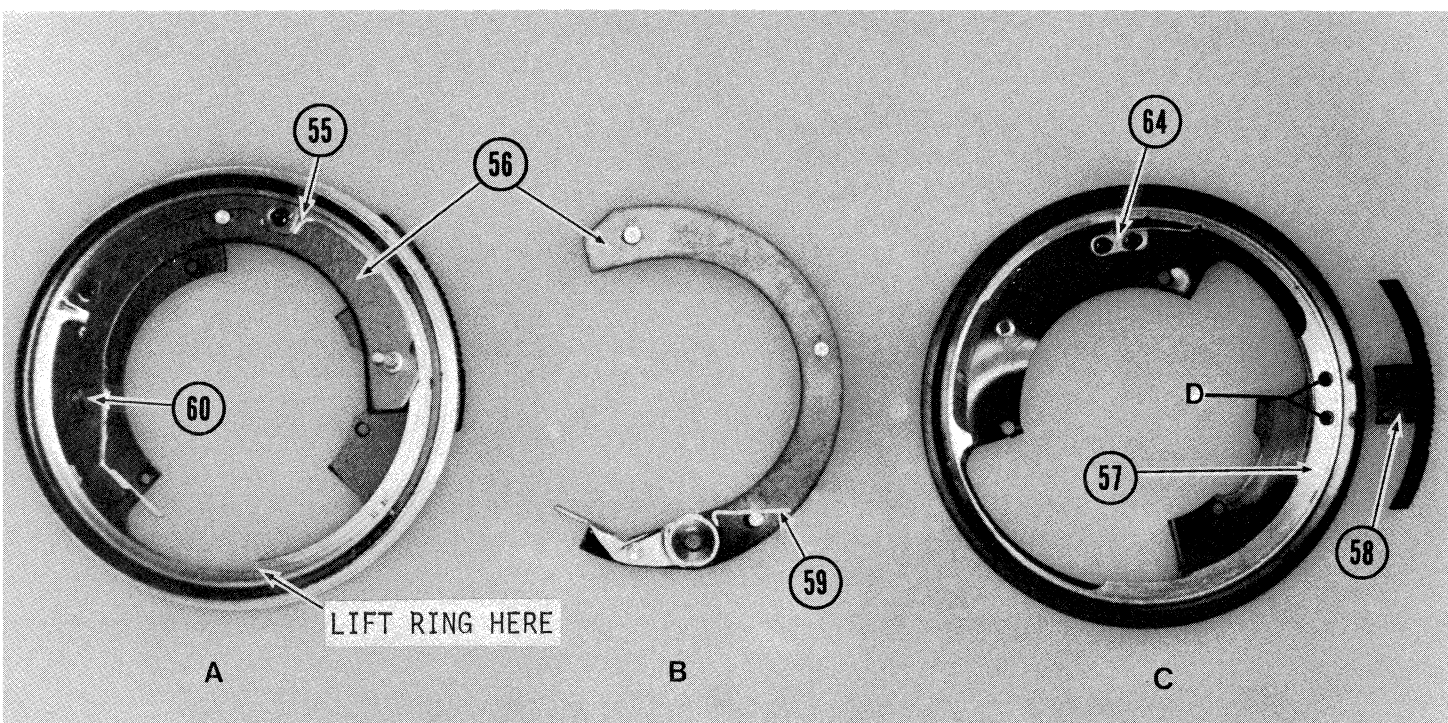


Fig. 40

5.2.2 Reassembly of Universal Mount.

Reassembly is reverse of Disassembly.

NOTE: When installing F/Stop Ring, rotate it fully in direction of yellow arrow on F/Stop Index Ring. Install F/Stop Index Ring with red dot aligned with f/3.5 on F/Stop Ring (except on Minolta Mount, in which red dot is aligned with f/22).

5.3 Nikon Lens Mount Assembly.

5.3.1 Disassembly.

- 5.3.1.1 Remove Latch Spring (62) and Latch Spring Booster Spring (63). Loosen Three setscrews (X) in F/Stop Index Ring and remove it. (Fig. 32)

NOTE: There is a Detent Ball (158) between the F/Stop Index Ring and the F/Stop Ring; remove and lay aside.

- 5.3.1.2 Remove F/Stop Ring. (Fig. 32)
- 5.3.1.3 Scribe a reference line across juncture of Lens Mount Ring (53) and Lens Mount Frame. (Fig. 32)
- 5.3.1.4 Remove six screws (S) which attach Lens Mount Ring to Lens Mount Frame. Separate Ring from Frame. (Fig. 32)
- 5.3.1.5 Remove Coupler Plate Screw (78) and Coupler Plate (77). (Fig. 41)
- 5.3.1.6 Remove F/Stop Ring and lay aside.
- 5.3.1.7 Remove five screws (P) which attach Nikon Mount (84) to Nikon Mount Frame (81). Lift off Nikon Mount. (Fig. 42) Between Nikon Mount and Nikon Mount Frame will usually be found one or more Rear Focus Spacers (82). Remove and lay aside.

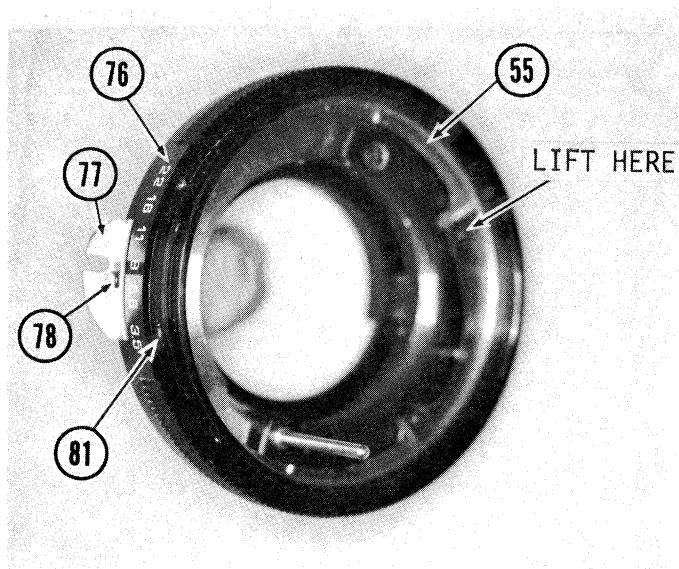


Fig. 41

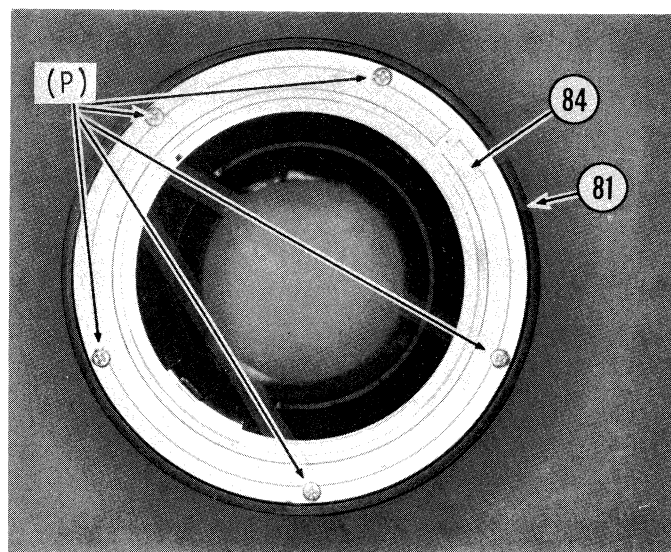


Fig. 42

- 5.3.1.8 Remove Auto Diaphragm Cam Ring (55) with Diaphragm Screw (61) by lifting Cam Ring at point shown in Fig. 43.
- 5.3.1.9 Unhook Diaphragm Lever Spring (87) from edge of hole in Nikon Mount (84). (Fig. 43)
- 5.3.1.10 Remove Diaphragm Lever Screw (88). Diaphragm Lever (83) and Diaphragm Lever Spring (87) will come away. (Fig. 43)

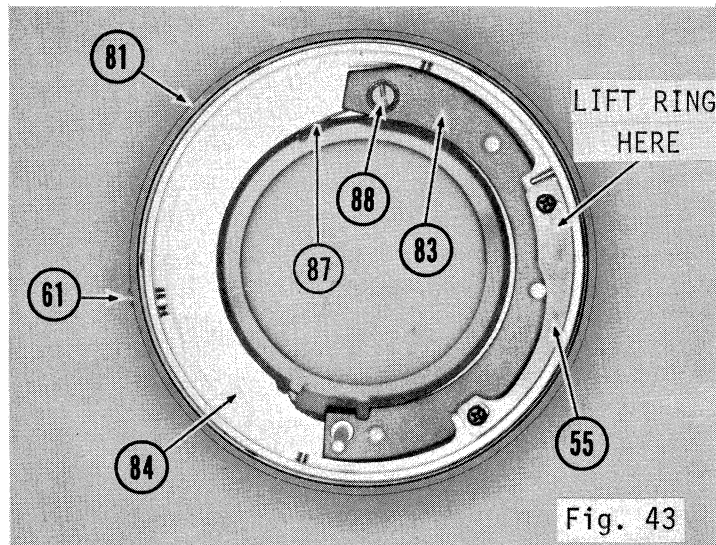


Fig. 43

5.3.2 Reassembly.

Reassembly is the reverse of disassembly.

NOTE: When installing F/Stop Ring, rotate it fully in direction of yellow arrow on F/Stop Ring. Install F/Stop Index Ring with red dot aligned with f/3.5 on F/Stop Ring (except on Minolta Mount, in which red dot is aligned with f/22).

5.4 Canon Lens Mount Assembly.

5.4.1 Disassembly.

- 5.4.1.1 Remove Latch Spring (62) and Latch Spring Booster Spring (63). Loosen three setscrews (X) in F/Stop Index Ring and remove it. (Fig. 32)

NOTE: There are two Detent Balls (158) between the F/Stop Index Ring and the F/Stop Ring; remove and lay aside.

- 5.4.1.2 Remove F/Stop Ring. (Fig. 32)
- 5.4.1.3 Scribe a reference line across juncture of Lens Mount Ring (53) and Lens Mount Frame. (Fig. 32)
- 5.4.1.4 Remove six screws (S) which attach Lens Mount Ring to Lens Mount Frame. Separate Ring from Frame. (Fig. 32)
- 5.4.1.5 Move Diaphragm screw (108) to bottom of slot, as shown in Fig. 42. Set Diaphragm Coupling Ring (119) to "Manual Position" (fully counterclockwise position). Remove two screws (Y). (Fig. 44)
- 5.4.1.6 Rotate Locking Ring (122) clockwise until it engages and begins to rotate Diaphragm Setting Ring (115); then rotate Locking Ring counterclockwise again, until Setting Ring just stops. Leave Locking Ring exactly in this position, and remove three screws (Y). (Fig. 45)

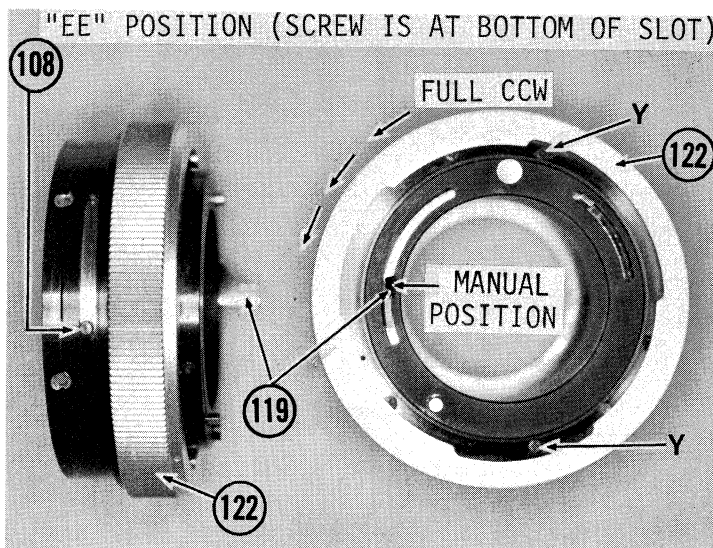


Fig. 44

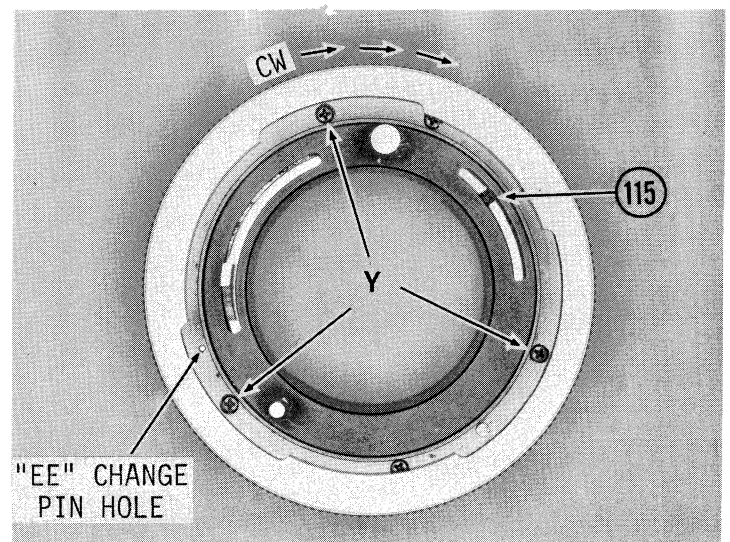


Fig. 45

- 5.4.1.7 Separate Canon Mount Assembly from Canon Mount Frame Assembly removing Change Pin (109) and Change Pin Spring (110) to prevent loss. (Fig. 46)
- 5.4.1.8 Between Canon Mount and Canon Mount Frame will usually be found one or more Rear Focus Spacers (111); remove and lay aside.

NOTE: If you have rotated Canon Mount Locking Ring (122) from the position set for separation, rotate it so that Signal Lever (123) is in position shown in Fig. 47). (Signal Lever in contact with pin on underside of Diaphragm Setting Ring (115)).
- 5.4.1.9 Turn Canon Mount Locking Ring fully counterclockwise (as viewed from rear of mount) until resistance is just met.
- 5.4.1.10 Remove two screws (D) (Fig. 46) and Signal Lever (123) (Fig. 47)
- 5.4.1.11 Remove Locking Ring by rotating clockwise (left hand thread), and remove Detent Ball (158) from hole in Canon Mount (125).

NOTE: Further disassembly is seldom required, but will be obvious if found necessary.

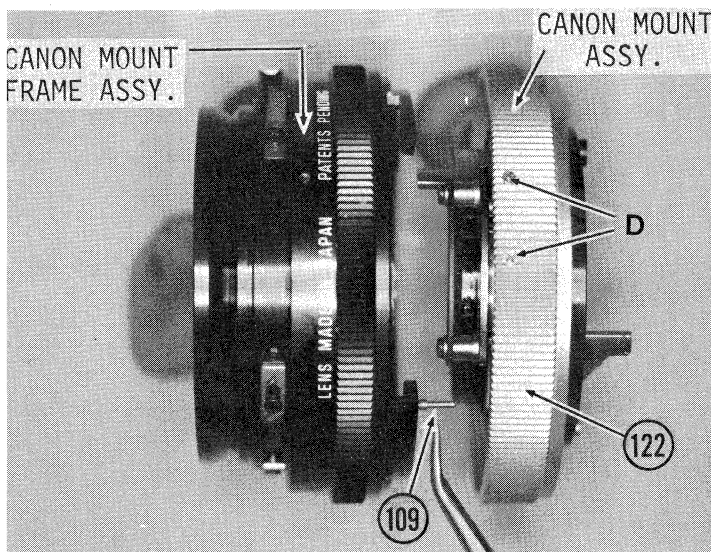


Fig. 46

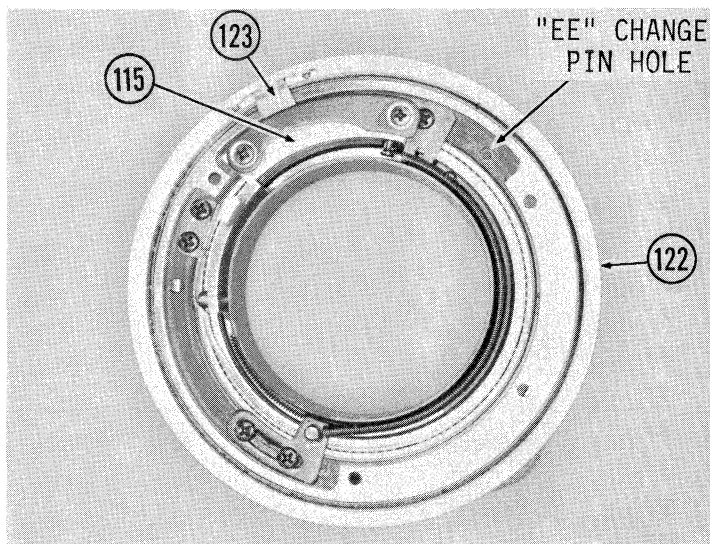


Fig. 47

5.4.2 Reassembly of Canon Mount.

Reassembly is reverse of disassembly.

NOTE: When installing F/Stop Ring, rotate it fully in direction of yellow arrow on F/Stop Index Ring. Install F/Stop Index Ring with red dot aligned with f/3.5 on F/Stop Ring (except on Minolta Mount, in which red dot is aligned with f/22).

5.5 Minolta Lens Mount Assembly.

5.5.1 Disassembly.

- 5.5.1.1 Remove Latch Spring (62) and Latch Spring Booster Spring (63). Loosen three setscrews (X) in F/Stop Index Ring and remove it. (Fig. 32)

NOTE: There is a Detent Ball (158) between the F/Stop Index Ring and the F/Stop Ring; remove and lay aside.

- 5.5.1.2 Remove F/Stop Ring. (Fig. 32)
- 5.5.1.3 Scribe a reference line across juncture of Lens Mount Ring (53) and Lens Mount Frame. (Fig. 32)
- 5.5.1.4 Remove six screws (S) which attach Lens Mount Ring to Lens Mount Frame. Separate Ring from Frame. (Fig. 32)
- 5.5.1.5 Remove four screws (P) and remove Minolta Mount (98) from Mount Frame (96). (Fig. 48)
- 5.5.1.6 Between Mount and Mount Frame there will usually be found one or more Rear Focus Spacers (97); remove and lay aside.
- 5.5.1.7 Lift Diaphragm Cam Ring (55) at point shown in Fig. 49 and remove.

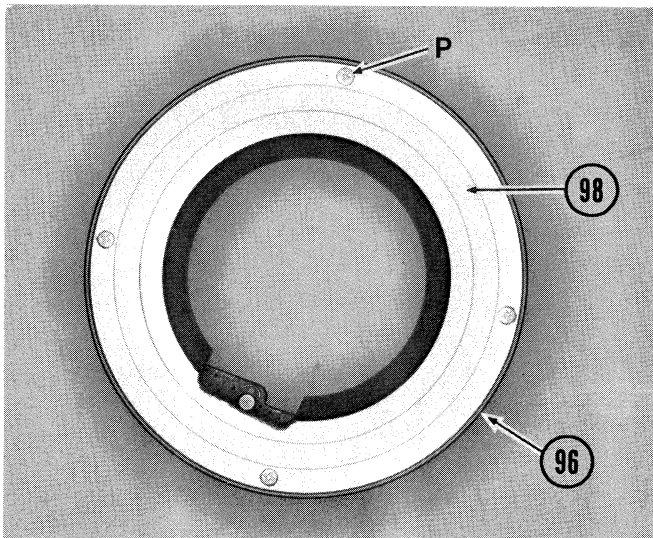


Fig. 48

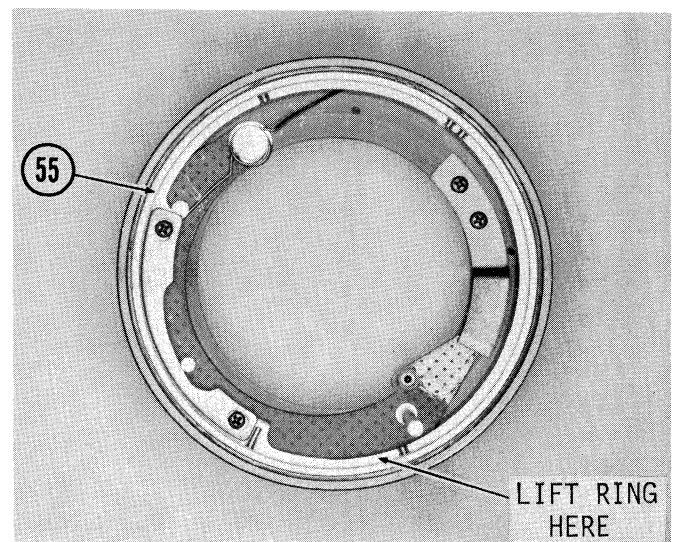


Fig. 49

5.5.2 Reassembly.

Reassembly is the reverse of disassembly.

NOTE: When installing F/Stop Ring, rotate it fully in direction of yellow arrow on F/Stop Index Ring. Install F/Stop Index Ring with red dot aligned with f/22 on F/Stop Ring.

5.6 Olympus Lens Mount Assembly

5.6.1 Disassembly.

- 5.6.1.1 Remove Latch Spring (62) and Latch Spring Booster Spring (63). Loosen three Setscrews (K) in F/Stop Index Ring and remove it. (Fig. 32)

NOTE: There is a Detent Ball (159) between the F/Stop Index Ring and the F/Stop Ring; remove and lay aside.

- 5.6.1.2 Remove F/Stop Ring. (Fig. 32)

- 5.6.1.3 Scribe a reference line across juncture of Lens Mount Ring (240) and Lens Mount Frame. (Fig. 32)

- 5.6.1.4 Remove six screws (S) which attach Lens Mount Ring to Lens Mount Frame. Separate Ring from Frame. (Fig. 32)

NOTE: Diaphragm Lever (239) remains attached to Lens Mount Ring (240) and does not require further disassembly except for replacement.

- 5.6.1.5 Remove four mount screws (268) and remove Olympus Mount from Mount Frame. (Fig. 50)

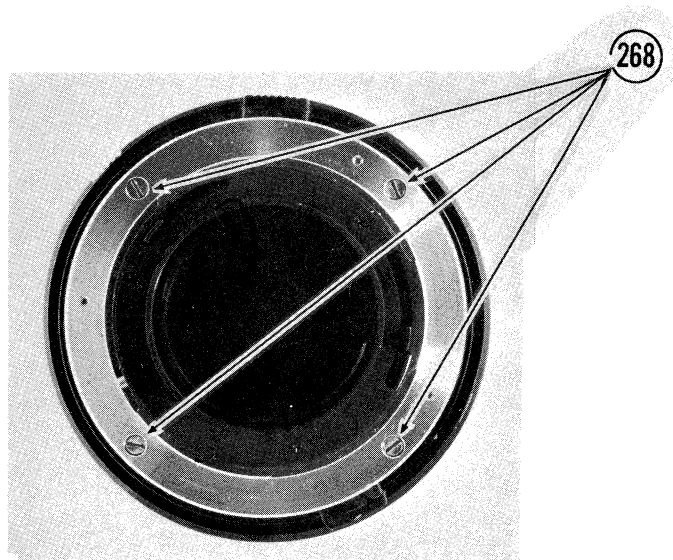


Fig. 50

- 5.6.1.6 Between Mount and Mount Frame there will usually be found one or more Rear Focus Spacers (247); remove and lay aside.

- 5.6.1.7 Remove Auto Diaphragm Cam Ring (242) with Diaphragm Screw (241) by lifting Cam Ring at point shown in Fig. 51.

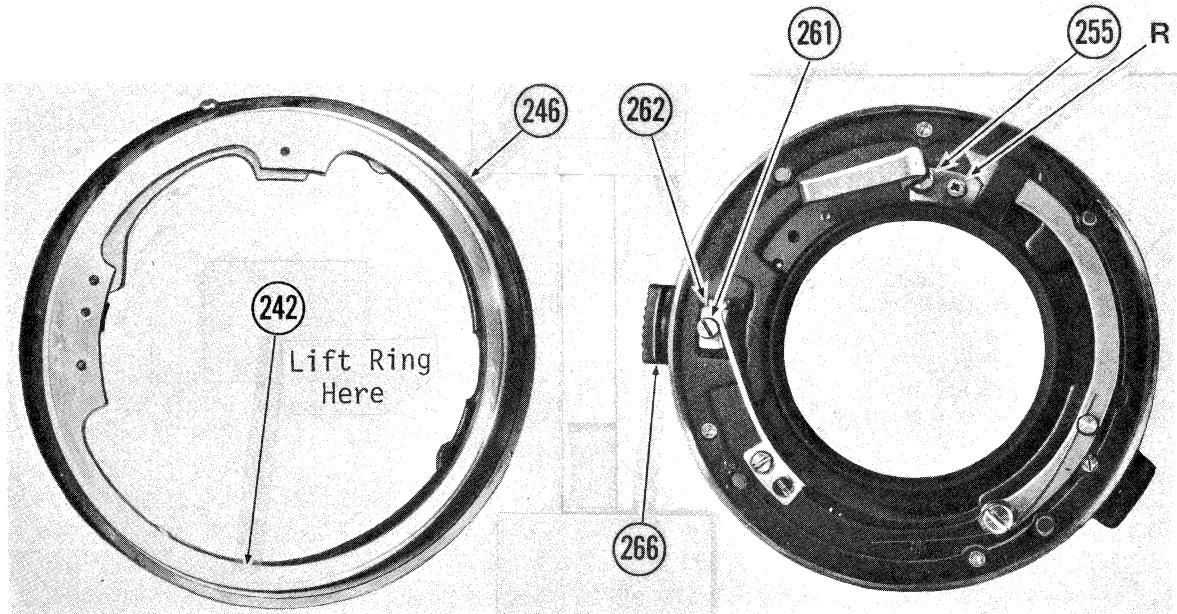


Fig. 51

Fig. 52

- 5.6.1.8 Lock Plate (262) can be removed by unscrewing screw (261) which attaches Lock Plate to Lock Button (266). Diaphragm Lever Spring can be removed by unscrewing Roller Shaft (255) and screw (R).

NOTE: Further disassembly is seldom required, but will be obvious if found necessary.

5.6.2 Reassembly.

Reassembly is the reverse of disassembly.

NOTE: When installing F/Stop Ring, rotate it fully in direction of yellow arrow on F/Stop Index Ring. Install F/Stop Index Ring with red dot aligned with f/3.5 on F/Stop Ring.

6.0 Installation of Lens Mount Assembly to Prime Lens Assembly.

- 6.1 Place Front Focus Spacers (49) on Lens Mount Ring. Replace same Spacers previously removed or, if installing a new Lens Mount, use a combination of Spacers 0.4mm thick. (Fig. 53)
- 6.2 Set F/Stop Ring to f/22 (f/16 for Konica).
- 6.3 Set Auto-Manual Lever to "M" (Universal Mount only).
- 6.4 Assemble Lens Mount Assembly to the Prime Lens Barrel (35) assuring that long pin on Diaphragm Actuating Lever passes through fork in Diaphragm Lever.
- 6.5 Rotate Lens Mount Assembly until red dot on F/Stop Index Ring aligns with brass pin in Change Plate (33). This will be approximately the correct position. (Fig. 53)
- 6.6 Rotate Lens Mount Assembly very slightly clockwise and counterclockwise while observing diaphragm blades. Stop rotation at a point where diaphragm blades just close to minimum aperture.

NOTE: In Konica and Canon Mounts there should be no change in diaphragm opening when changing from smallest f/stop position to the "EE" or Auto position.

- 6.7 Tighten one setscrew (H) lightly to hold Lens Mount Assembly in position. Check operation of diaphragm at all f/stops and half-stops. Note particularly the change in f/stop between f/22 and f/16. See Par. 4.2.13.1. (Fig. 53)
- 6.8 When Lens Mount position is correctly adjusted, tighten three setscrews (H), locking them in place with thread sealant. (Fig. 53)

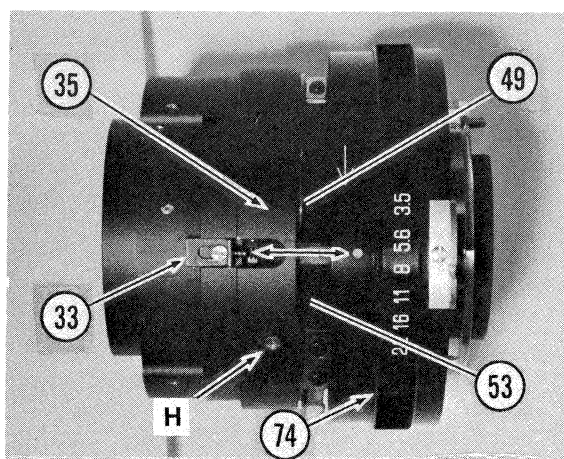


Fig. 53

7.0 Adjustment of Stop Plates.

- 7.1 Loosen two screws (P) just enough to allow Stop Plates (52) to move. Slide Stop Plates as close together as possible, as shown in Fig. 54)
- 7.2 Apply a spot of grease to Detent Ball (158) and place in hole in F/Stop Index Ring. (Fig. 55)
- 7.3 Slide Change Ring rearward to engage Detent Ball (158) in an area between Macro and Tele index lines. (Fig. 55)
- 7.4 Insert limiting screw (A) in Change Ring (27). Holding Change Ring against Detent Pressure, turn screw (A) fully down. (Fig. 54)
- 7.5 Rotate Change Ring (27) first to Macro Detent position, then to Tele Detent position, being careful not to overtravel either position.
- 7.6 Rotate Change Ring to a point between Macro and Tele position. Remove Limit Screw (A). Slide Change Ring forward. Seal and tighten two screws (P) securing Latch Plates.

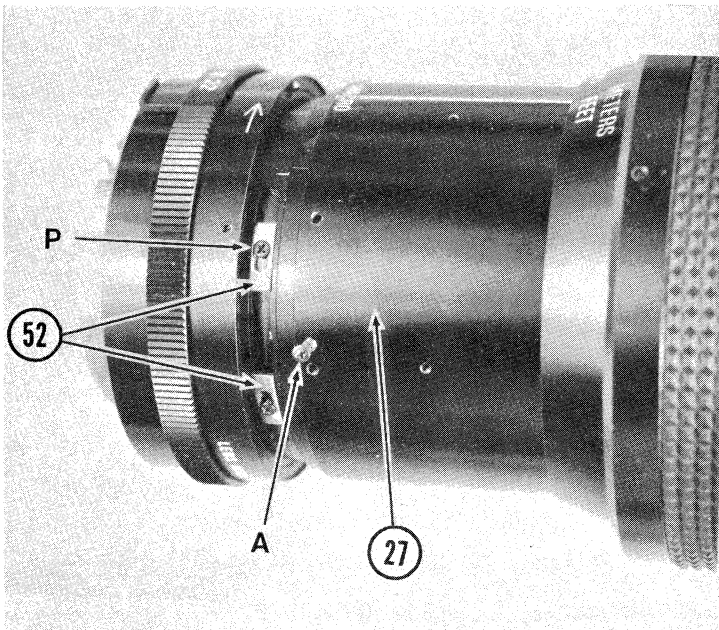


Fig. 54

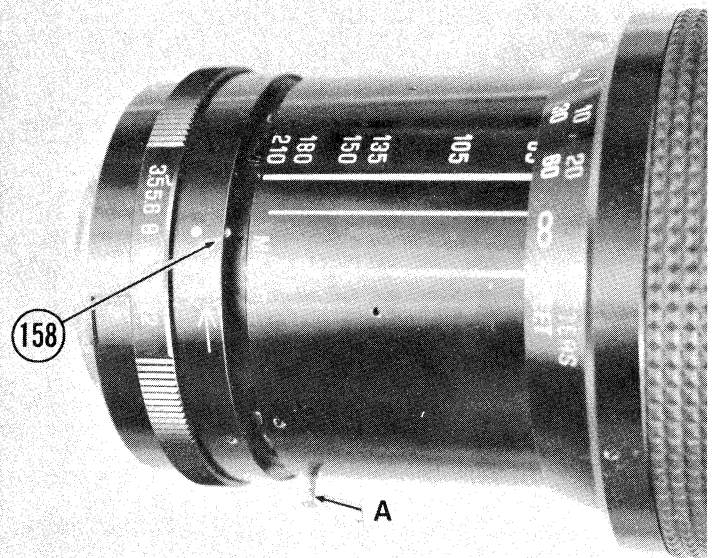


Fig. 55

8.0 Adjustment of Latch Spring and Latch Spring Booster Spring.

NOTE: These adjustments must be made either when joining Lens Mount Assembly to Prime Lens Assembly or when joining Prime Lens Assembly to Zoom Lens Assembly.

- 8.1 Loosen two screws (M) (Fig. 5) just enough to allow Latch Spring to move in slots.
- 8.2 Apply a spot of grease to Detent Ball (158) and place it in hole shown in Fig. 5.
- 8.3 Assure that Latch Spring Booster Spring (63) is under Latch Spring (62) and that Change Ring (27) is aligned with Latch Spring as shown in Fig. 6.
- 8.4 Depress Latch Spring, slide Change Ring (27) rearward to just engage the inner of the two vertical tabs on Latch Spring.
- 8.5 Rotate Change Ring to align detent notch at end of yellow Macro index line with Detent Ball (158) in F/Stop Index Ring of Lens Mount Assembly. This will move Latch Spring to correct position.
- 8.6 Tighten two screws (H) to lock Latch Spring in position. Apply sealant to threads. Readjust tip of Latch Spring Booster Spring (63) for an underlap of at least 2.0mm with Latch Spring (62).

9.0 Removal of Lens Groups

NOTE: Vivitar tools listed below simplify removal of optics from the lens. Other tools may be substituted for removal of all lens groups except the fifth.

9.1 Disassembly

9.1.1 Remove Filter Holder Ring (1.1.2)

9.1.2 Slide Zoom Collar to 210mm position (either zoom or macro mode).

9.1.3 Remove three screws (B). (Fig 9)

9.1.4 Slide Inner Focus Ring (5) to rear of lens to expose Outer Helicoid (3), Infinity Stop Ring (2), and 1st Lens Group. (Fig. 56)

9.1.5 Remove Outer Helicoid as in 2.1.13.

9.1.6 Use the following Vivitar tools as indicated to remove and replace Lens Groups. (Fig. 57)

| <u>TO REMOVE</u> | <u>USE VIVITAR TOOL NO.</u> |
|----------------------|-----------------------------|
| 2nd Lens Group (252) | 650502 |
| 3rd Lens Group (253) | 650503-A |
| 4th Lens Group (254) | 650503-B |
| 5th Lens Group (255) | 650505 |

NOTE: Tool No. 650505 clamps the outside of 5th Lens Group to remove.

9.2 Reassembly is reverse of disassembly . Refer to Par. 2.2.11 when reassembling Inner Focusing Ring to Outer Helicoid.

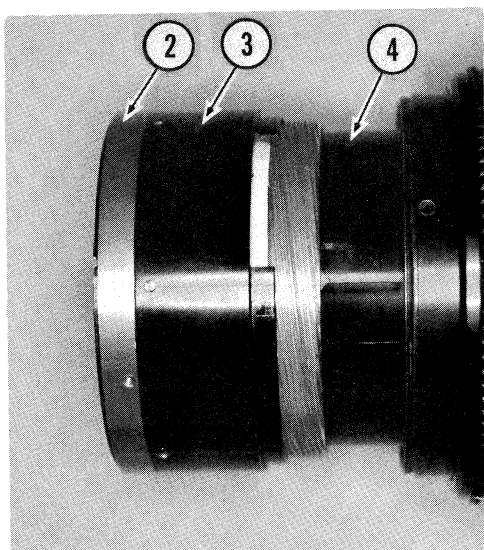


Fig. 56

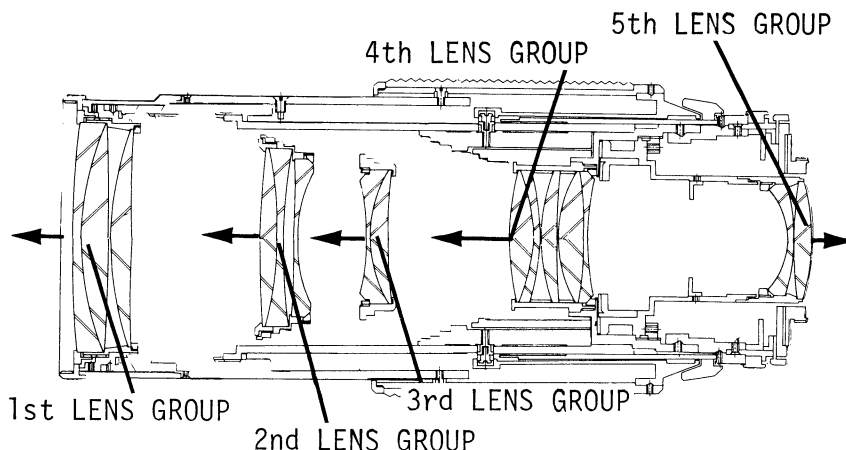


Fig. 57

10.0 Focus Adjustment

10.1 Test Equipment

10.1.1 Auto-Collimator - It is strongly recommended that an auto-collimator be used for focusing, either with a test fixture to simulate flange focus distance or with a properly adjusted camera body (on which lens flange-to-film rail distance is within manufacturer's tolerance).

10.1.2 Ground Glass - A ground glass should be used only if no auto-collimator is available, in which case the following points should be considered:

1. The camera flange focus distance must be correct.
2. The ground glass should be shimmed about 0.05mm from the guide rails.
3. A high-power magnifier (20-50X) should be used to examine the image.
4. An infinity collimator image is preferable to an infinity object viewed through the shop window.

10.2 Definitions

10.2.1 Focus Short - When rotating Zoom Collar to focus at infinity, focusing scale contacts infinity stop before infinity focus is reached. That is, infinity focus of the lens is beyond the infinity mark of the focus scale. (Fig. 58)

10.2.2 Focus Over - When rotating Zoom Collar to focus at infinity, infinity focus is reached before the focusing scale reaches the infinity mark of the lens. (Fig. 59)

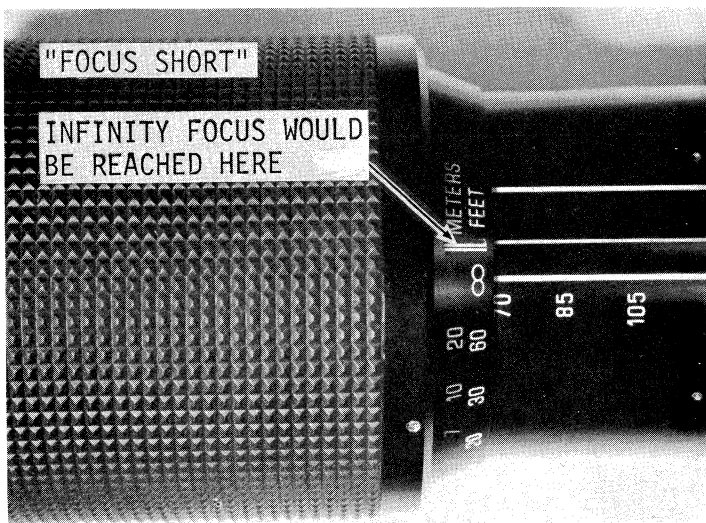


Fig. 58

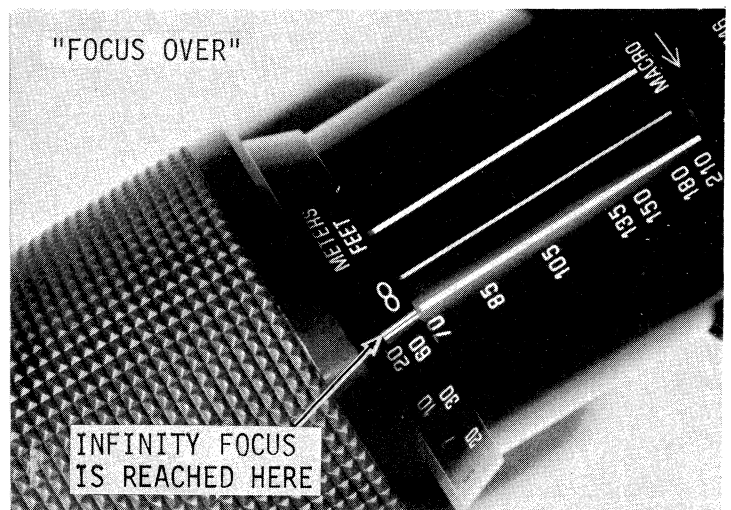


Fig. 59

10.3 Focus Spacers

10.3.1 Front Focus Spacers (49) are supplied in thicknesses of 0.1, 0.15, 0.2, 0.4 and 0.5mm.

10.3.2 Rear Focus Spacers are supplied in thicknesses of 0.1, 0.15, and 0.2mm (consult parts list and exploded drawings for part numbers).

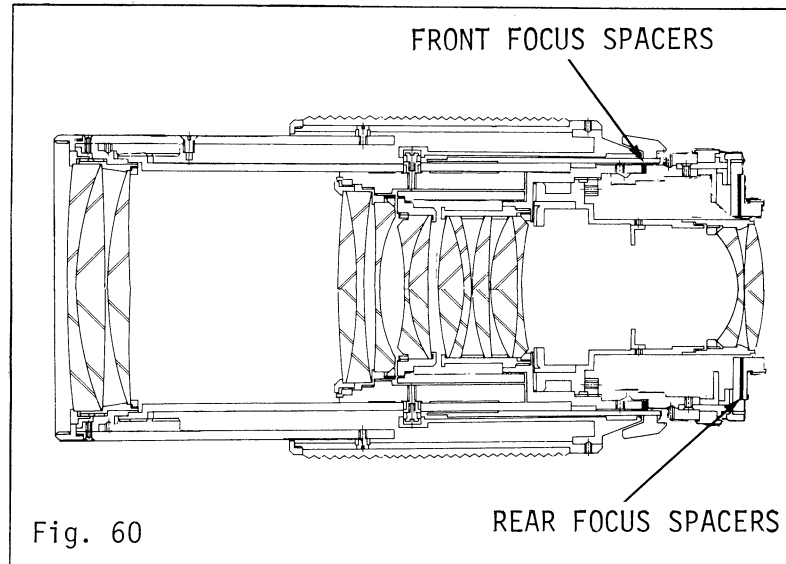
10.4 General Focusing Procedure

10.4.1 If 1st Lens Group was not disturbed in repair procedures - replace Front Focus Spacers (49) as disassembled.

10.4.2 If 1st Lens Group was removed from Infinity Stop Ring, reinstall Lens Group in accordance with 2.3.8.

10.4.3 If Lens Barrel was replaced in repair procedure, place Front Focus Spacers (49) between Prime Lens Barrel and Lens Mount Assembly with an initial thickness of 0.4mm. (Fig 60)

10.4.4 Place Rear Focus Spacers between Mount and Mount Frame with an initial thickness of 0.4mm. (Fig. 60)



NOTE: Do not use more than a thickness of 0.6mm Rear Focus Spacers. Use of thickness greater than 0.6mm may leave insufficient threads to prevent stripping. Add Front Focus Spacers so that Rear Focus Spacer thickness does not exceed 0.6mm. Front and Rear Focus Spacers adjust 70mm infinity position. Position of 1st Lens Group, inward or outward, adjusts 210mm infinity position.

10.5 70mm Infinity Focus

10.5.1 Set lens to 70mm focal length position, focus scale to infinity position.

10.5.2 Observe infinity focus of lens on infinity target.

10.5.3 If 70mm infinity focus is "OVER", increase thickness of Focus Spacers.

10.5.4 If 70mm infinity focus is "SHORT", reduce thickness of Focus Spacers.

10.6 210mm Infinity Focus

10.6.1 Set lens to 210mm, focus scale to infinity position.

10.6.2 Observe infinity focus of lens on infinity target.

10.6.3 If 210mm infinity focus is "OVER", screw 1st Lens Group outward.

10.6.4 If 210mm infinity focus is "SHORT", screw 1st Lens Group inward.

10.7 Focus Adjustment Check

Repeat steps in 10.5 and 10.6 as necessary to achieve optimum infinity focus at 70mm and 210mm focal length positions.

10.8 Infinity Focus Tolerance (On Focusing Scale)

10.8.1 At 70mm setting, the infinity index line must exactly bisect the infinity symbol, as shown in Fig. 61.

10.8.2 At 210mm setting, the index line must be no further from center of infinity symbol than shown in Fig. 62 (that is, no further than one-half the width of a loop of the symbol).



Fig. 61



Fig. 62

11.0 Zoom Collar Drag Adjustment

- 11.1 Roll Vinyl Grip (11) to position shown in Fig. 63.
- 11.2 Adjust Screws (12), (two on each side of straight slots in Zoom Collar (20) inward to increase drag, outward to decrease drag. (Fig. 63)
- 11.3 Adjust drag to be 700 - 900 grams (24 - 32 oz.) in either direction.
- 11.4 Roll Vinyl Grip back into position on Zoom Collar.

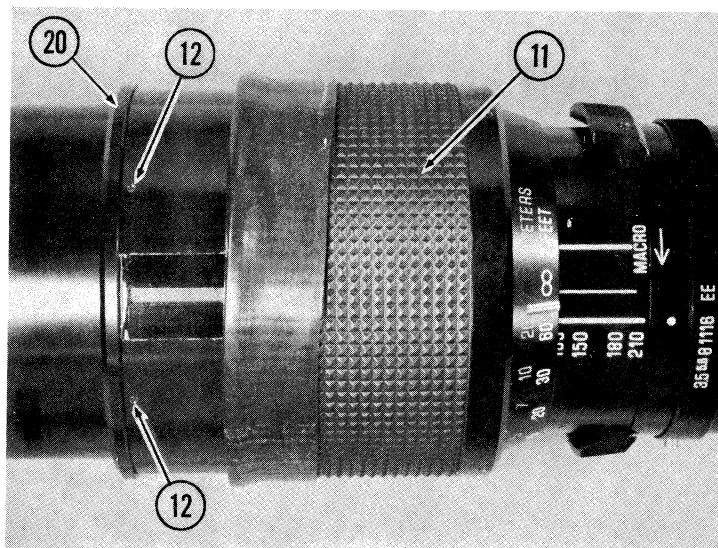


Fig. 63

12.0 Special Disassembly Procedures For Damaged Lenses

12.1 Rear Disassembly (unable to change to Macro position)

- 12.1.1 Work with Zoom Collar Assembly until it can be placed as far forward as possible.
- 12.1.2 Remove Change Levers (24) and (26). (Fig. 1)
- 12.1.3 Remove Limit Screw (A). (Fig. 1)
- 12.1.4 Remove Setscrews (F) from Shift Ring (27). (Fig.1)
- 12.1.5 Slide Shift Ring under Zoom Ring (22) as far forward as possible, to expose three setscrews (H) in Prime Lens Barrel. Remove and lay aside. (Fig. 23)
- 12.1.6 Place scribe line as in 3.1.2.
- 12.1.7 Separate Prime Lens Assembly from Lens Mount Assembly (see 3.1.3 and 3.1.4).
- 12.1.8 Slide Shift Ring (27) off toward rear of lens.
- 12.1.9 Remove four screws (J), as in Fig. 2.
- 12.1.10 Continue disassembly as in 1.0.

12.2 Front Disassembly

- 12.2.1 Remove Filter Holder Ring (1.1.2).
- 12.2.2 Remove three screws (B) which attach Inner Focus Ring (5) to Outer Helicoid (3), as shown in Fig. 9.
- 12.2.3 Slide Inner Focus Ring (5) to rear, exposing Outer Helicoid (3).
- 12.2.4 Remove Outer Helicoid as in 2.1.13.
- 12.2.5 Slide Inner Focus Ring (5) forward to expose Helicoid Stop Screw (9) and remove it. (Fig. 19)
- 12.2.6 Loosen three setscrews (G) as in 2.1.2. Slide Zoom Collar forward off lens.
- 12.2.7 Remove Zoom Ring, Roller Shafts and Rollers as in 2.1.4 and 2.1.5.
- 12.2.8 Remove Second and Third Zoom Group Housings out from front of lens. (It may be necessary to remove the optics in order to get a firm grip on the Housings).
- 12.2.9 Slide Zoom Ring (22) fully forward.
- 12.2.10 Follow instructions 1.1.3 through 1.1.7 for separation of Prime Lens Assembly from Lens Barrel.

13.0 Use of Special Tools

13.1 Vivitar Tool 650516 - Konica Mount.

Tool No. 650516 is used with a completely assembled lens, to set position of Diaphragm Coupling Plate (152) on Diaphragm Coupling Ring (147) for proper operation of diaphragm in the "EE" mode.

13.1.1 Prepare the Konica Mount for use with the Tool by removing three screws which attach the F/Stop Setting Ring (150) (not shown) to the Konica Mount (Fig. 64).

13.1.2 Prepare Tool for use by rotating Inner Ring so that Diaphragm Plate Positioning Arm is opposite Mount Locking Plate (Fig. 65).

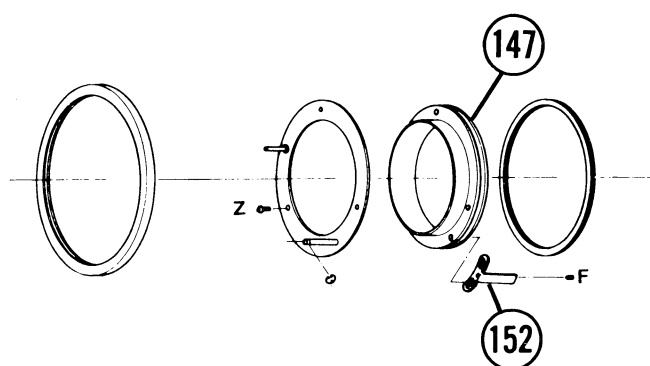


Fig. 64

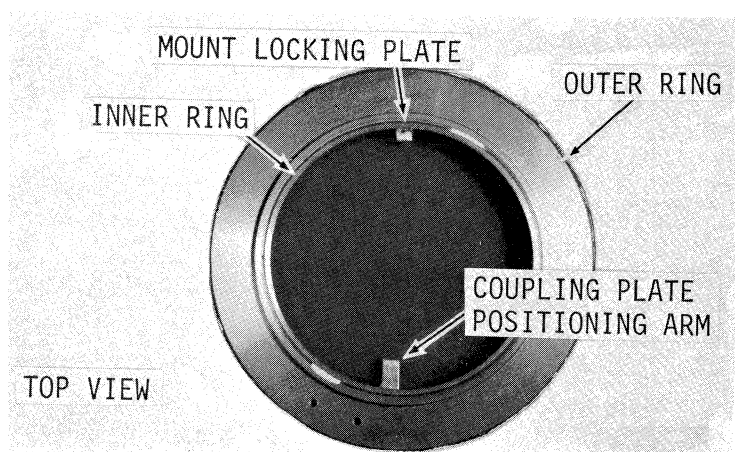


Fig. 65

13.1.3 Set diaphragm of lens to f/5.6 in "Manual" operation. Place Tool over Lens Mount as shown, then rotate it until Mount Locking Plate of Tool engages Locking Slot of Lens Mount (Fig. 66).

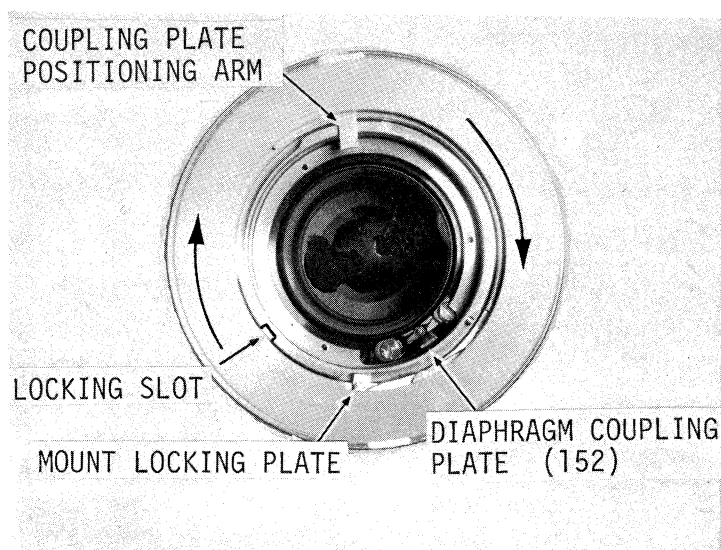


Fig. 66

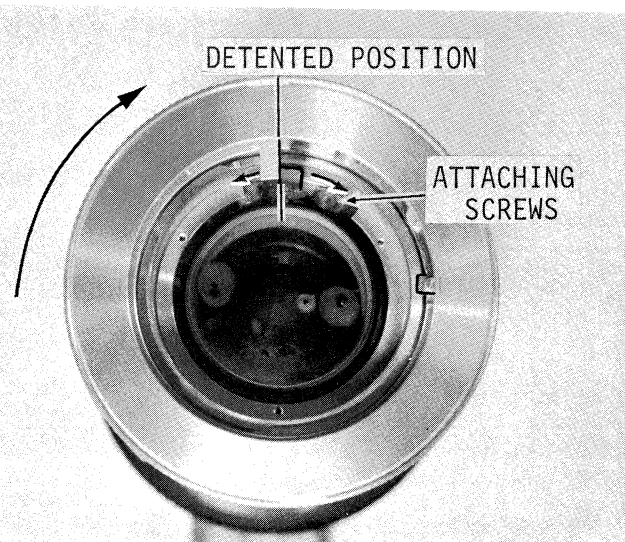


Fig. 67

13.1.4 Rotate outer knurled ring of Tool clockwise until Diaphragm Coupling Plate Positioning Arm enters the detented position. Observe any change in diaphragm opening when rotating knurled outer ring counterclockwise out of the detented position.

13.1.5 If there is a change in diaphragm opening in 13.1.4, Loosen the two screws and the setscrew attaching Diaphragm Coupling Plate (152) and move it until it just contacts the Coupling Plate Positioning Arm of the Tool. Tighten the attaching screws and the setscrews and replace the F/Stop Setting Ring (Fig. 67).

13.1.6 If no movement is observed, the Diaphragm Coupling Plate is properly positioned.

13.2 Vivitar Tool No. 650517 - Canon Mount

Tool No. 650517 is used to set the positions of Stop Plates (116) relation to Diaphragm Coupling Ring (119) and Diaphragm Setting Ring (115).

13.2.1 Place the Canon Mount on the Tool in the same manner as installing a lens on the camera.

13.2.2 The tip of the Diaphragm Coupling Ring (119) should rest against Stop "B". (Fig. 68)

13.2.3 The tip of Diaphragm Setting Ring (115) should rest against Stop "A". (Fig. 68)

13.2.4 Adjust positions of Stop Plates (116) so that they just make contact with Diaphragm Setting Ring (115) and Diaphragm Coupling Ring (119) as shown (Fig. 68). Parts of Canon Mount are cut away for illustration.

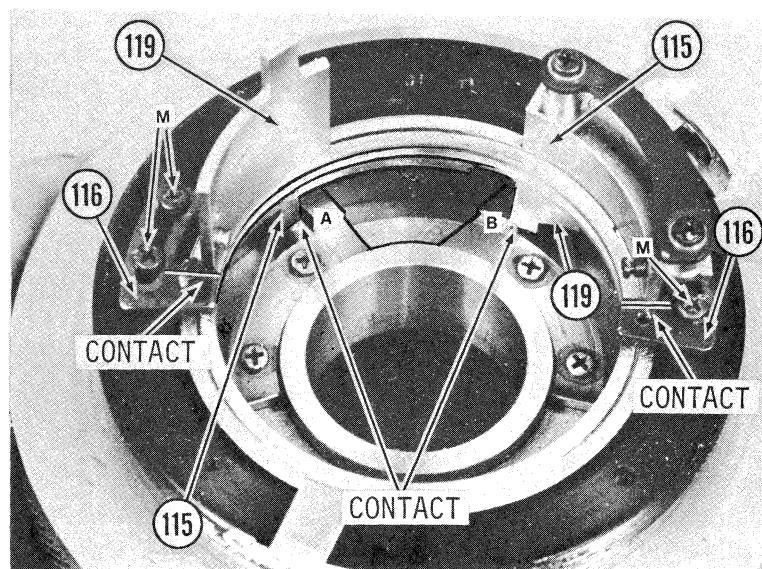


Fig. 68

13.3 Vivitar Tool No. 650515 - All Mounts

Tool No. 650515 is used to set, adjust and/or verify the position of Diaphragm Lever (41) to assure proper diaphragm operation of the lens.

Prepare the lens for use with the tool as follows:

- 13.3.1 If Prime Lens Assembly has been removed from Lens Tube as described in Section 1.0 of the Repair Manual, separate Prime Lens and Lens Mount Assembly as described in Section 3.0.
- 13.3.2 If lens has not been disassembled and repair procedure requires only removal of Lens Mount Assembly proceed as follows:
- 13.3.3 Set lens to "Macro" mode and 70mm focal length.
- 13.3.4 Remove Screws (E) and change Levers (24) and (26), Latch Button (25) will come away with Lever (26). (Fig. 1)
- 13.3.5 Remove Limiting Screw (A), situated under Change Lever (24). (Fig. 1)
- 13.3.6 Remove five (six in some lenses) Setscrews (F) from Shift Ring (27). (Fig. 1)
- 13.3.7 Slide Shift Ring under Zoom Ring (22) to expose three Setscrews (H). (Fig. 23)
NOTE: There is a Detent Ball (158) between Shift Ring and Prime Lens Assembly; remove and lay aside. (Fig. 2)
- 13.3.8 Loosen or remove three Setscrews (H) from the Prime Lens Barrel, then separate Lens Mount Assembly from Prime Lens Assembly. (Fig. 23) There are usually one or more Front Focus Spacers (49) installed between Prime Lens Assembly and Lens Mount Assembly as described in 3.1.4. Remove Fifth Lens Group from Prime Lens Assembly.
- 13.3.9 Hold Diaphragm Lever (41) hard against Diaphragm Limit Ring (46) so that Diaphragm Blades close to the smallest opening (f/22 U, N, M, C, and O) (f/16 Konica) and measure size of opening. A rod of $4.6 \pm 0.3\text{mm}$ should pass through the diaphragm opening. (A 3/16 inch drill bit is nominally 4.76mm which is within tolerance.) A rod of $6.47 \pm 0.3\text{mm}$ should pass through the diaphragm opening for f/16 on Konica Mount. (A 1/4 inch drill bit is nominally 6.35mm which is within tolerance. (Fig. 30)
- 13.3.10 If Aperture Size is incorrect, loosen Post Screw (48) and two Screws (M) which hold Diaphragm Limit Ring. [Three Screws (M) in Nikon Mount.] Rotate Limit Ring clockwise or counter-clockwise, as required, to obtain correct Aperture Size. (Fig. 31)
- 13.3.11 Loosen two Setscrews (N) in Diaphragm Housing Retainer Ring (47). (Fig. 25)

- 13.3.12 Holding Diaphragm Housing (45) so that it cannot rotate within Prime Lens Barrel (35), loosen Diaphragm Housing Retainer Ring (47) just enough to allow diaphragm to rotate. (Fig. 25)
- 13.3.13 Place Tool No. 650515 on Prime Lens Assembly with tip of knurled locating pin through fork in Diaphragm Lever. (Fig. 69)

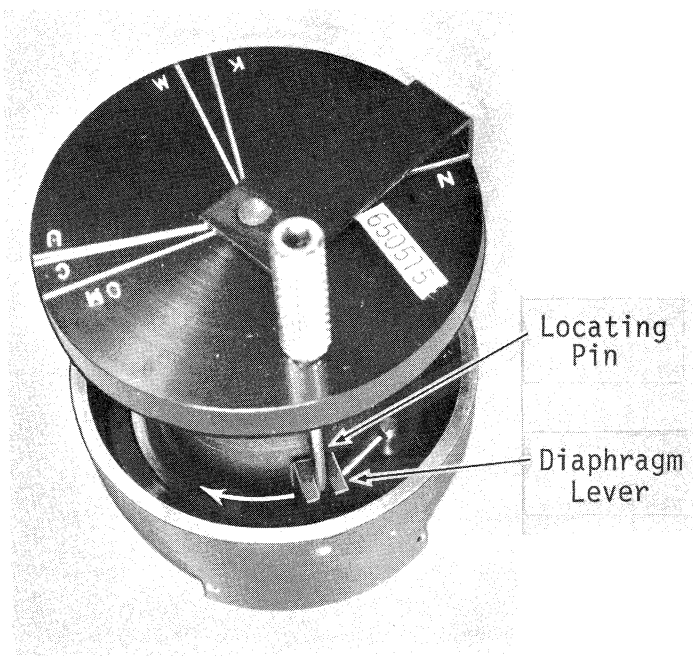


Fig. 69

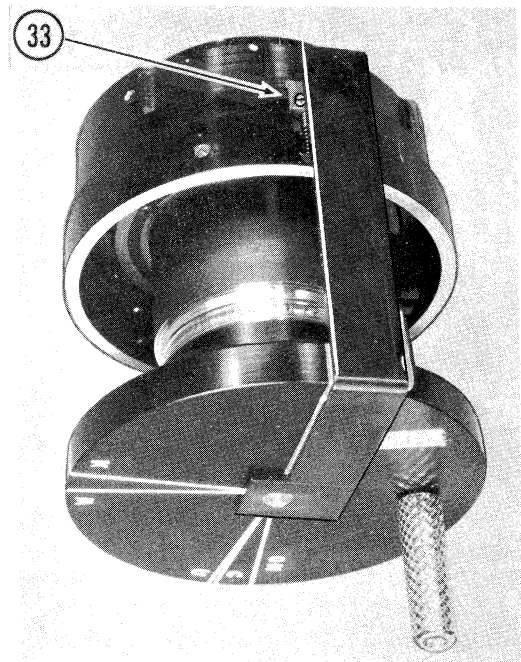


Fig. 70

- 13.3.14 Rotate Tool until diaphragm closes to smallest aperture (13.3.9) Align Angle Blade with desired angle setting for the lens mount. Edge of Angle Blade should fall along center line of Brass Pin of Change Plate (33). (Fig. 70) Adjust position of Diaphragm Housing within Prime Lens Housing so that:
 - 13.3.14.1 Diaphragm is at smallest aperture.
 - 13.3.14.2 Angle Blade aligns with Brass Pin in Change Plate.
- 13.3.15 Holding parts tightly together, tighten Diaphragm Housing Retainer Ring and one Setscrew to hold Diaphragm Housing in position.
- 13.3.16 Assemble Lens Mount Assembly to Prime Lens Barrel, assuring that long pin on Diaphragm Actuating Lever passes through fork in Diaphragm Lever. If Lens Mount Assembly is same assembly removed from lens, rotate either half of assembly to realign Scribed Lines made in 3.1.2. (Fig. 23)

- 13.3.17 At this point, the diaphragm must be checked for correct aperture size and operation. Proceed as follows:
- 13.3.17.1 Set F/Stop Ring to f/22, then rotate it slowly toward f/16 position. (Set F/Stop Ring at f/16, then rotate slowly toward f/11 - Konica Mount.) The Diaphragm Blades should begin to open almost as soon as the ring is moved, and there should be a significant change in aperture between the f/22 and f/16 settings. (f/16 and f/11 - Konica)
 - 13.3.17.2 Set F/Stop Ring to f/22 and measure the size of the aperture as described in 13.3.9 and 13.3.10. Since the minimum aperture size has been adjusted in 13.3.9 and 13.3.10 the measurement at this point will not be undersize but may be oversize.
- 13.3.18 If both tests described above are met, the aperture requires no further adjustment. Proceed to paragraph 13.3.19.4.
- 13.3.19 If either of the tests in paragraph 13.3.17 are not met, proceed as follows:
- 13.3.19.1 Separate Prime Lens and Lens Mount Assemblies.
 - 13.3.19.2 If test in 13.3.17.1 was negative, [(that is, if the diaphragm size did NOT change significantly between f/22 and f/16) (f/11 and f/16 - Konica)], loosen Diaphragm Housing Retainer Ring (47) and rotate Diaphragm Housing (45) very slightly clockwise.
 - 13.3.19.3 If the test in 13.3.17.1 was negative [(that is if the aperture was too large at f/22 setting) (f/16 - Konica)], rotate Diaphragm Housing very slightly counter-clockwise.
 - 13.3.19.4 Rejoin Prime Lens and Lens Mount Assemblies and repeat tests in paragraph 13.3.17.
- 13.3.20 When aperture size is correctly adjusted, proceed as follows:
- 13.3.20.1 Separate Prime Lens and Lens Mount Assemblies.
 - 13.3.20.2 Tighten two Setscrews (N) in Diaphragm Housing Retainer Ring, locking them in place with thread sealant.
 - 13.3.20.3 Install any Focus Spacers (49) which have been removed, and rejoin Rear Mount and Prime Lens Assemblies.

13.3.20.4 Align Scribe Lines as in 3.1.2.

13.3.20.5 Tighten three Setscrews (H), locking them in place with thread sealant. (Fig. 23)

13.3.21 If, in the repair procedure, it is found necessary to replace the Lens Mount Assembly as well as to adjust the angular position of the Diaphragm Lever, follow instructions given in paragraph 6.0 and 13.3.17.

13.4 Vivitar Tool No. 650518 - Canon Mount

Tool No. 650518 is used to confirm the f/stop positions of the Diaphragm Setting Ring of the Canon Mount in the "Auto" Mode of operation. Positions of the Diaphragm and Diaphragm Setting Ring are confirmed in the Manual Mode of operation so that when the lens is set in the "Auto" Mode, correct diaphragm operation is assured.

The tool consists of two principle parts: A Knurled Outer Ring with Position Tab and an Inner Ring with Notch to engage the Locating Pin on the Lens Mount. (Fig. 71) Looking at the face (bottom) of the tool, there are three Scribed Lines on the Inner Ring. One line is scribed for the f/3.5 position, one line for the f/5.6 position, and the third for the f/22 position. (Fig. 72)

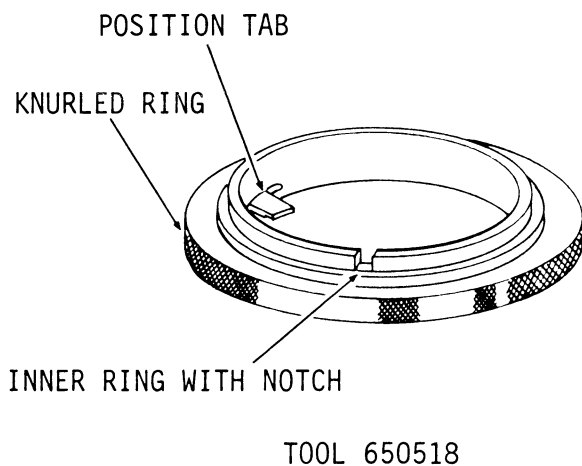


Fig. 71

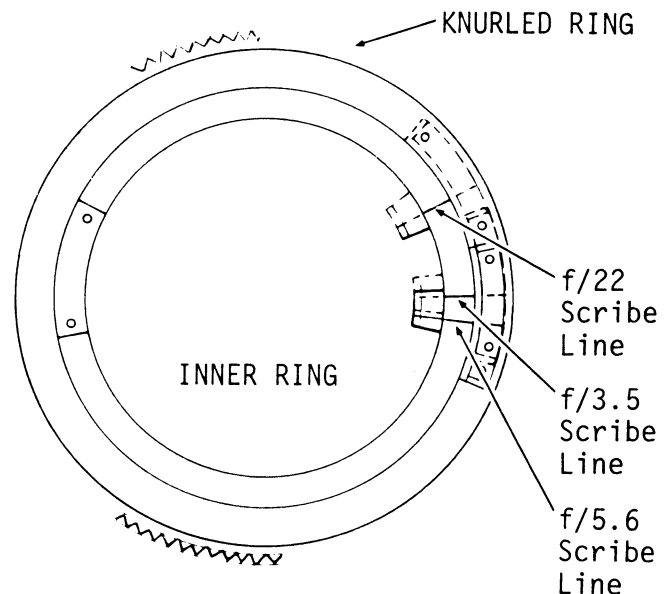


Fig. 72

13.4.1 Prepare the Canon Mount for use with the tool as follows:

13.4.1.1 Set Diaphragm Coupling Ring (119) to Manual Position.

13.4.1.2 Viewing Canon Mount from rear, rotate Locking Ring (122) fully counter-clockwise.

13.4.1.3 Set F/Stop Ring (102) to f/3.5. (Fig. 73)

13.4.2 Place Tool 650518 on Canon Mount so that Notch in tool sets down over Locating Pin of Mount. (Fig. 73)

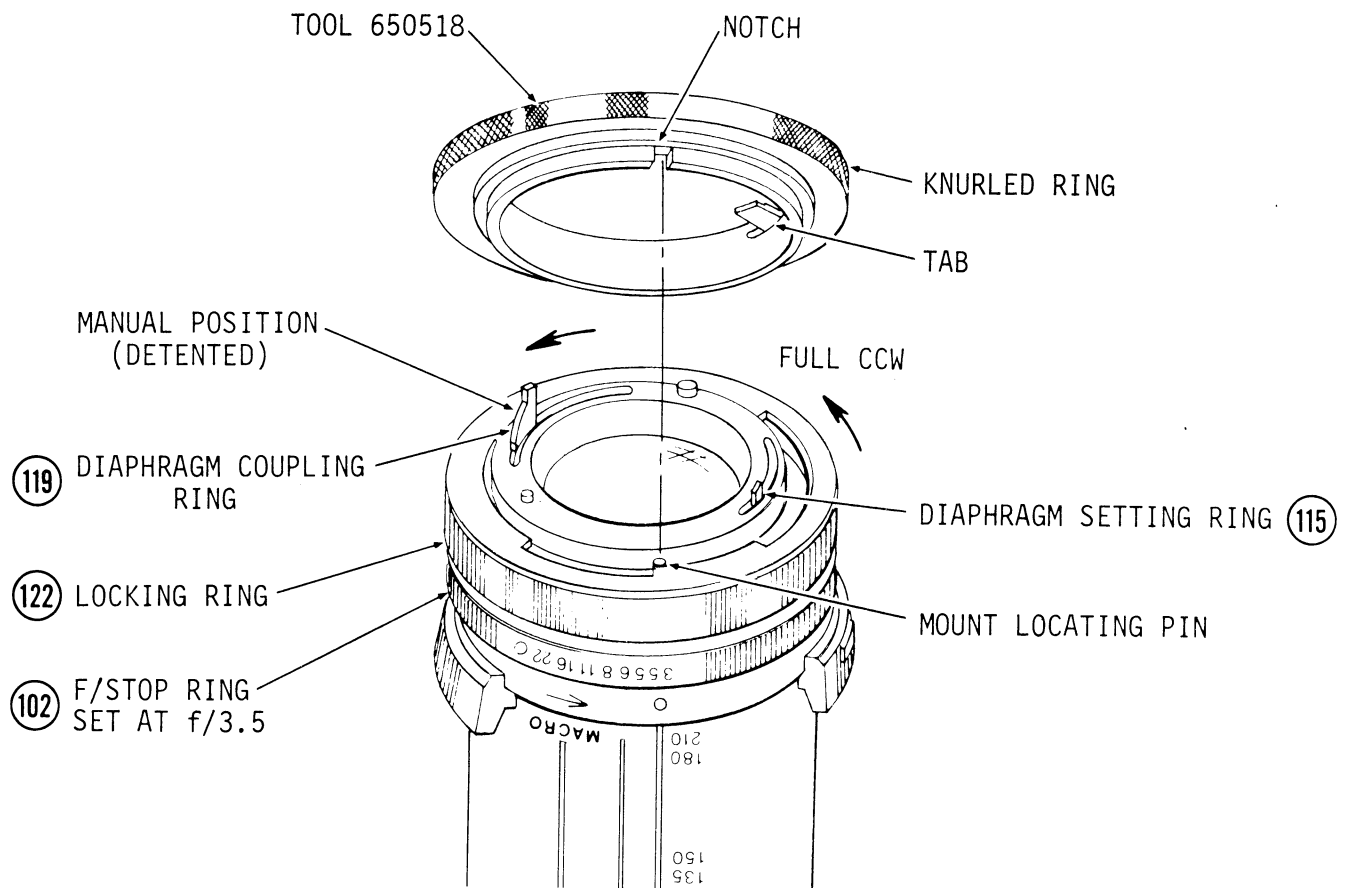


Fig. 73

- 13.4.3 With F/Stop of Lens set at $f/3.5$ and detented, rotate Knurled Ring of tool so that Scribe Lines for $f/3.5$ position align. Tab on Diaphragm Setting Ring (115) should just touch tab on tool. (Fig. 74A)
- 13.4.4 Rotate Ring of tool to $f/5.6$ position; align Scribe Marks. Rotate F/Stop Ring of Lens to $f/5.6$. Tab on Diaphragm Setting Ring should just touch tab to tool. (Fig. 74B)
- 13.4.5 Rotate Knurled Ring of tool to $f/22$ position; align Scribe Marks. Rotate F/Stop Ring of Lens to $f/22$. Tab on Diaphragm Setting Ring should just touch tab on tool. (Fig. 74C)

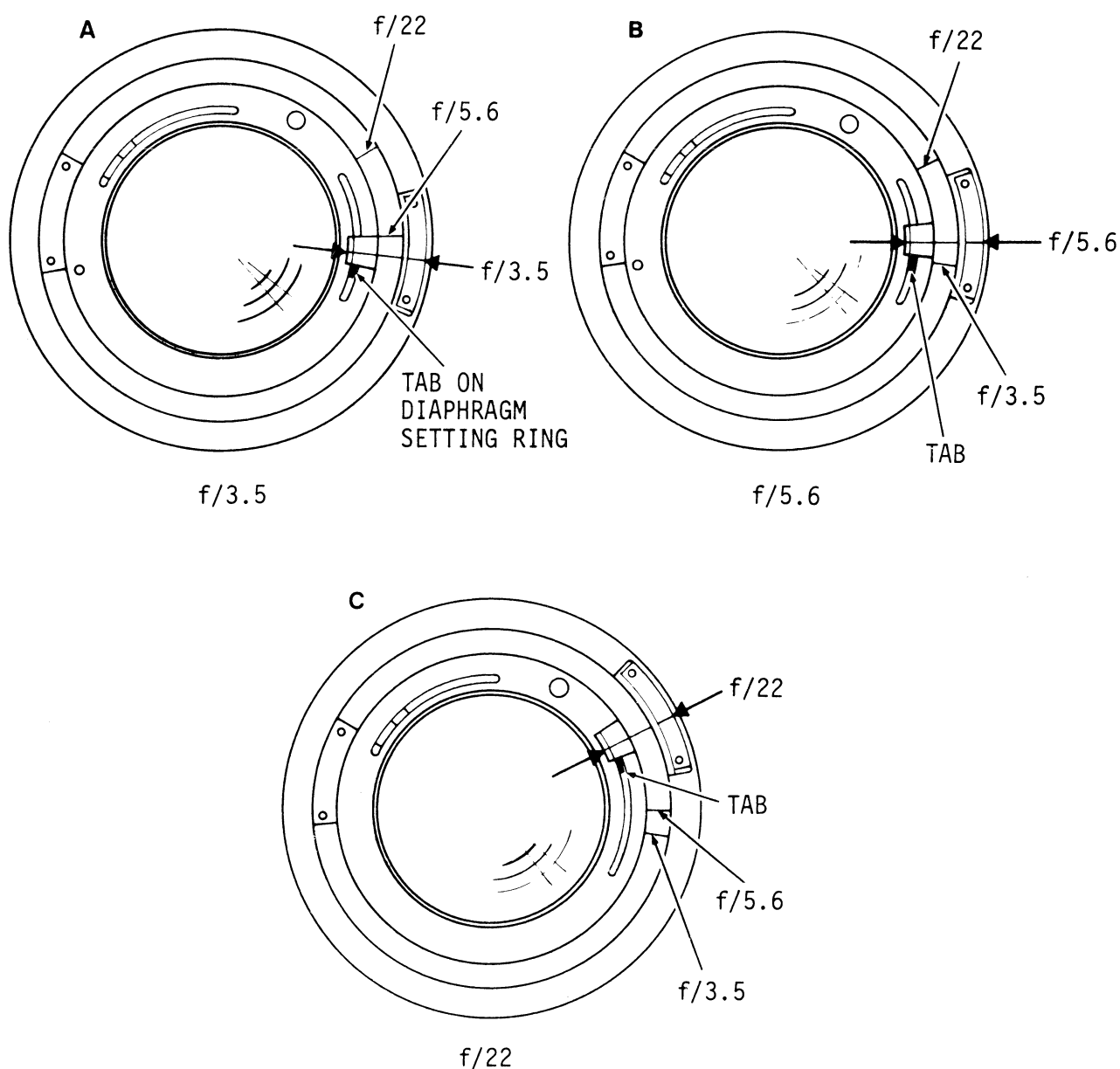


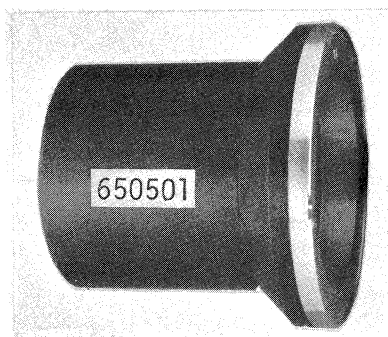
Fig. 74

13.4.6 If the F/Stop Positions and Diaphragm Openings do not confirm, (that is the F/Stop Ring stops in the detented position before the tab on the Diaphragm Setting Ring touches the position tab of the tool, or if the tab on the Diaphragm Setting Ring touches the position tab of the tool before the F/Stop Ring reaches the detented position) proceed as follows:

13.4.6.1 See Section 5.4 - Canon Mount Assembly, and NOTE after Section 5.4.2.

13.4.6.2 See Section 13.2 - P & B Tool No. 650517. If position of Stop Plates, Ref. 116, has changed - F/Stop Positions and Diaphragm Openings will not confirm. Follow instruction in above section to re-position Stop Plates, then recheck with Tool No. 650518.

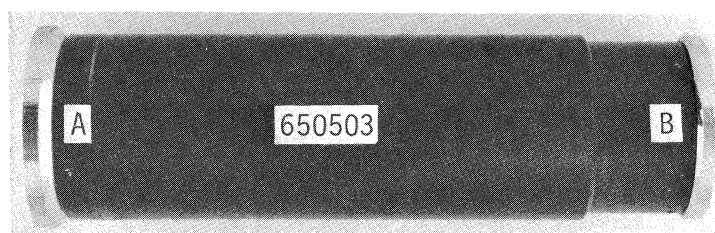
14.0 Vivitar Tools for Series 1 70-210mm Macro Zoom Lens



650501 - Use to remove/
replace and refocus
1st Lens Group (Ref.
231).

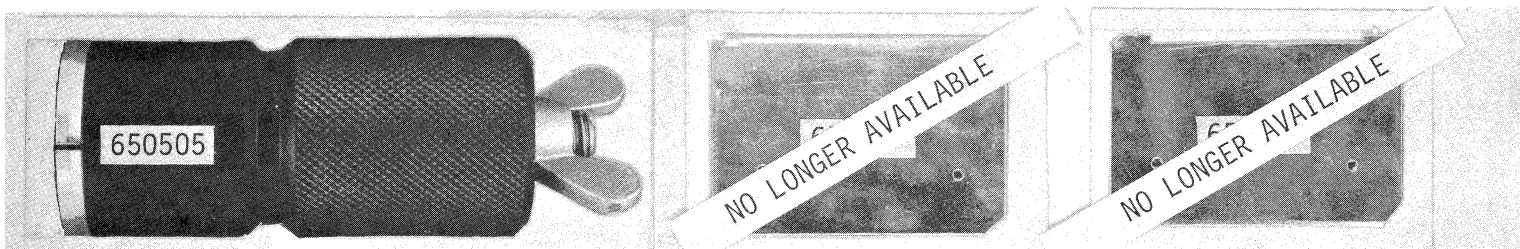


650502 - Use to remove/replace
2nd Lens Group (Ref. 232).



650503-A - Use to remove/
replace 3rd Lens Group
(Ref. 233).

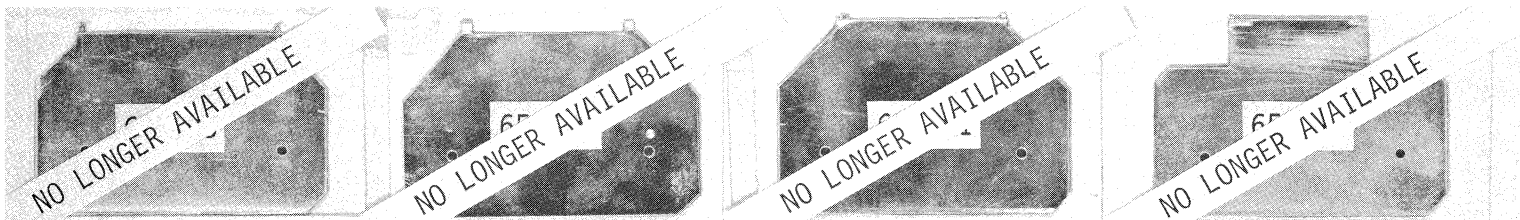
650503-B - Use to remove/replace
4th Lens Group (Ref. 234).



650505 - Use to remove/replace
5th Lens Group (Ref. 235).

650507 - Use to remove/
replace 3rd Lens Group
Retainer Ring (Ref. 205).

650508 - Use to remove/
replace 4th and 5th Lens
Retainer Ring (Ref. 206).



650509 - Use to
remove/replace 6th
Lens Retainer Ring
(Ref. 210).

650510 - Use to
remove/replace 3rd
Lens Group Retainer
Ring (Ref. 211)

650511 - Use to
remove/replace 12th
and 13th Lens Group
Retainer Ring.
(Ref. 220)

650512 - Use to
remove/replace 14th
Lens Element Retainer
Ring (Ref. 221).

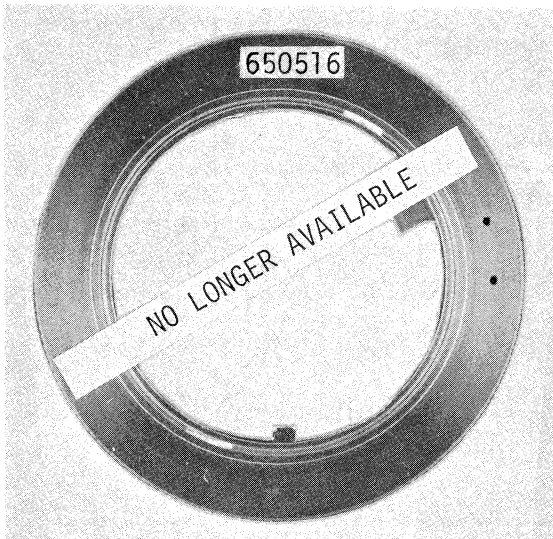
14.0 Vivitar Tools for Series 1 70-210mm Macro Zoom Lens (Continued)



650514 - Use to place scribe lines on lens assemblies.



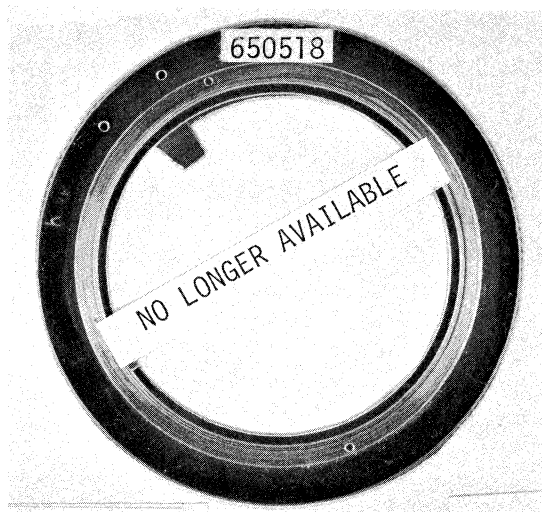
650515 - Use to set Diaphragm Lever (Ref. 41) to correct angle for Rear Mount Assembly. All mounts. (See Sec. 13.3)



650516 - Use to set position of Diaphragm Coupling Plate (Ref. 152) on Konica Mount. See special instructions. (See Sec. 13.1)



650517 - Use to set position of Stop Plate (Ref. 152) Canon Mount. (See Sec. 13.2)



650518 - Use to confirm F/Stop Settings Canon Mount. (See Sec. 13.4)

4.0 ILLUSTRATED PARTS LIST

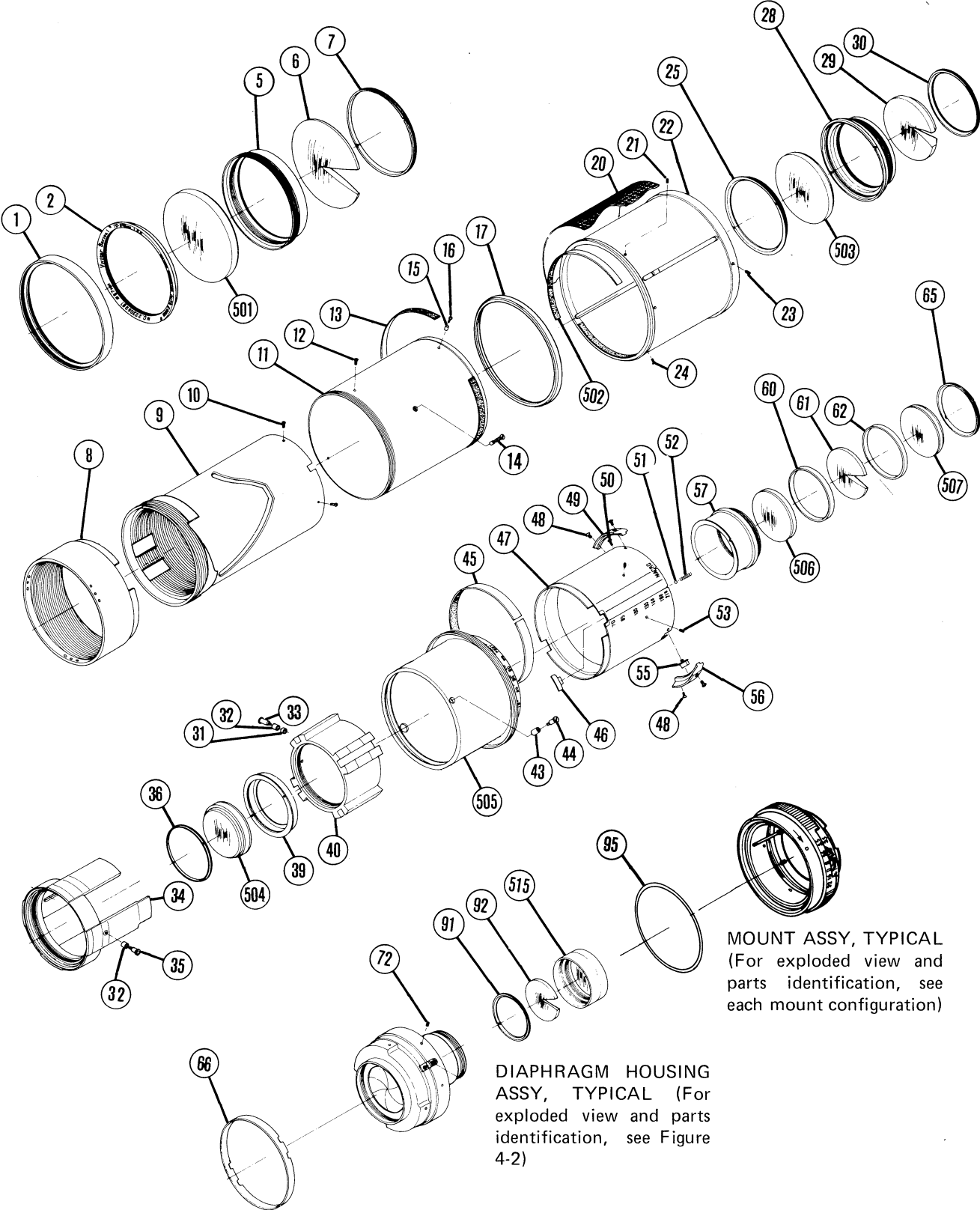


Figure 4-1. Parts Common To Most Mount Configurations

Parts List For Figure 4-1. Parts Common To Most Mount Configurations

| Ref. | Vivitar Part No. | Description | Part Code | Quantity |
|------|------------------|------------------------------------|-----------------|----------|
| 1 | 3512741 | RING, FILTER | Z70500 761030 | 1 |
| 2 | 3512781 | RING, NAME, UMC, NEW TYPE | Z70501 761030 | 1 |
| 5 | 3512943 | HOUSING, 1ST LENS GROUP | Z70502 761030 | 1 |
| 6 | 3512944 | LENS ELEMENT, 3RD | G00063 761030 | 1 |
| 7 | 3512945 | RING, RTNG, 3RD LENS ELEMENT | Z70503 761030 | 1 |
| 8 | 3512743 | HELICOID, OUTER | Z70504 761030 | 1 |
| 9 | 3512744 | BARREL, LENS | Z70505 761030 | 1 |
| 10 | 3512979 | SCREW, COUNTERSUNK 2030645 (BBR) | Z70922 B761030 | 4 |
| 11 | 3512745 | TUBE, INNER FOCUSING | Z70506 761030 | 1 |
| 12 | 3512972 | SCREW, FLTHD, 1.7x2.5 | Z70900 B761030 | 3 |
| 13 | 3512746 | RING, INNER FOCUSING, LIGHT SEAL | Z70901 761030 | 1 |
| 14 | 3512749 | SCREW, HELICOID STOPPER | Z75901 760520 | 1 |
| 15 | 3512748 | ROLLER, CAM SLOT | Z70902 761030 | 2 |
| 16 | 3512747 | SHAFT, CAM SLOT ROLLER | Z70903 761030 | 2 |
| 17 | 3103978 | RING, ZOOM COLLAR END | Z70507 761030 | 1 |
| 20 | 3512751 | GRIP, ZOOM COLLAR | Z70508 761030 | 1 |
| 21 | 3512752 | SCREW, DRAG ADJUSTMENT | Z70905 761030 | 4 |
| 22 | 3512760 | TUBE, ZOOM COLLAR, W/DRAG STRIP | Z70509 761030 | 1 |
| 23 | 3512977 | SETSCREW, 2.0x2.0 | Z75910 B760520 | 3 |
| 24 | 3512974 | SCREW, FLTHD, 1.4x2.5x2.0 | Z75912 B760520 | 5 |
| 25 | 3512946 | RING, RTNG, 2ND LENS GROUP | Z70510 761030 | 1 |
| 28 | 3512948 | HOUSING, 2ND LENS GROUP | Z70511 761030 | 1 |
| 29 | 3512949 | LENS ELEMENT, 6TH | G00066 761030 | 1 |
| 30 | 3512950 | RING, RTNG, 6TH LENS ELEMENT | Z70512 761030 | 1 |
| 31 | 3512955 | ROLLER, CAM SLOT | Z15901 760830 | 1 |
| 32 | 3512754 | ROLLER, CAM SLOT | Z70906 761030 | 2 |
| 33 | 3512753 | SHAFT, CAM SLOT ROLLER | Z70907 761030 | 1 |
| 34 | 3512759 | HOUSING, 2ND LENS GROUP | Z70513 761030 | 1 |
| 35 | 3512757 | SHAFT, CAM SLOT ROLLER | Z70908 761030 | 1 |
| 36 | 3512951 | RING, RTNG, 7TH & 8TH ELEMENT | Z70514 761030 | 1 |
| 39 | 3512953 | HOUSING, 3RD LENS GROUP | Z70513 761030 | 1 |
| 40 | 3512756 | HOUSING, ZOOM, 3RD LENS GROUP | Z70516 761030 | 1 |
| 43 | 3512770 | ROLLER, CAM SLOT | Z70909 761030 | 1 |
| 44 | 3512769 | SHAFT, CAM SLOT ROLLER | Z70910 761030 | 1 |
| 45 | 3512763 | SEAL, LIGHT, ZOOM RING | Z70911 761030 | 1 |
| 46 | 3512768 | PLATE, COVER | Z70701 761030 | 1 |
| 47 | 3512767 | TUBE, SHIFT | Z70519 761030 | 1 |
| 48 | 3512975 | SCREW, FLTHD, 3-17300850 | Z70912 B761030 | 4 |
| 49 | 3512764 | LEVER, CHANGE | Z70520 761030 | 1 |
| 50 | 3512971 | SCREW, PANHD, 1.7x4.0, BLACK | W25923 UB760817 | 1 |
| 51 | 3512898 | BALL, STEEL, 1.6 | Z75919 760520 | 80 |
| 52 | 3512857 | SPRING, DETENT, 1.5 | Z75920 760520 | 1 |
| 53 | 3512976 | SETSCREW, 1.4x1.5 | Z75905 B760520 | 9 |
| 55 | 3512765 | BUTTON, SHIFT LATCH RELEASE | Z70801 761030 | 1 |
| 56 | 3512766 | LEVER, CHANGE | Z70521 761030 | 1 |
| 57 | 3512954 | HOUSING, 4TH LENS GROUP | Z75521 760520 | 1 |
| 60 | 3512956 | RING, 10TH & 11TH LENS SPACER | Z75522 760520 | 1 |
| 61 | 3512957 | LENS ELEMENT, 11TH | G00071 761030 | 1 |
| 62 | 3512958 | RING, 11TH & 12TH LENS SPACER | Z75523 760520 | 1 |
| 65 | 3512960 | RING, 4TH LENS GROUP RTNG | Z75524 760520 | 1 |
| 66 | 3512771 | RING, LATCH | Z70522 761030 | 1 |
| 72 | 3512978 | SETSCREW, 2.0x2.5 | Z75911 W760520 | 3 |
| 91 | 3512961 | RING, RTNG, 14TH LENS ELEMENT | Z75530 760520 | 1 |
| 92 | 3512962 | LENS ELEMENT, 14TH | G00074 761030 | 1 |
| 95 | 3512789 | SHIM, ADJUSTMENT | Z70914 761030 | 1 |
| 501 | 3512942 | LENS DOUBLET, 1ST & 2ND ELEMENTS | Z70U99 N761030 | 1 |
| 502 | 3512750 | PLATE, DRAG ADJUSTMENT | Z70098 N761030 | 1 |
| 503 | 3512947 | LENS DOUBLET, 4TH & 5TH ELEMENTS | Z70U97 N761030 | 1 |
| 504 | 3512952 | LENS DOUBLET, 7TH & 8TH ELEMENTS | Z70U96 N761030 | 1 |
| 505 | 3512762 | TUBE, ZOOM | Z70U95 N761030 | 1 |
| 506 | 3512955 | LENS DOUBLET, 9TH & 10TH ELEMENTS | Z75U97 N760520 | 1 |
| 507 | 3512959 | LENS DOUBLET, 12TH & 13TH ELEMENTS | Z75U96 N760520 | 1 |
| 515 | 3103538 | LENS, ELEMENT, 15TH, IN HOUSING | Z75U94 N760520 | 1 |

**Series 1 Zoom Lens
70-210mm f/3.5 Macro**

Diaphragm Housing Assemblies and Mount Assemblies Referenced in Figure 4-1.

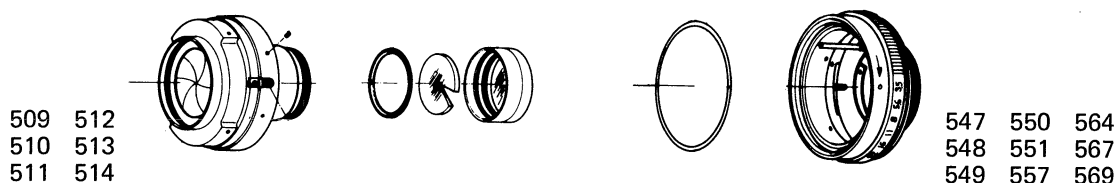


Figure 4-1A. Diaphragm Housing Assemblies and Mount Assemblies

Parts List for Figure 4-1A

| Ref. | Vivitar Part No. | Description | Part Code | Quantity |
|------|------------------|------------------------------------|----------------|----------|
| 509 | 3512996 | DIAPHRAGM HOUSING ASSY, UNIV | Z70U91 N761030 | 1 |
| 510 | 3512997 | DIAPHRAGM HOUSING ASSY, N/F & N/AI | Z70N91 N761030 | 1 |
| 511 | 3512998 | DIAPHRAGM HOUSING ASSY, M/MD, P/K | Z70M91 N761030 | 1 |
| 512 | 3512999 | DIAPHRAGM HOUSING ASSY, CANON | Z70C91 N761030 | 1 |
| 513 | 3513000 | DIAPHRAGM HOUSING ASSY, KONICA | Z70K91 N761030 | 1 |
| 514 | 3513001 | DIAPHRAGM HOUSING ASSY, O/OM | Z70O91 N761030 | 1 |
| 547 | 3512965 | MOUNT ASSY, COMPLETE, UNIV | Z70U55 N761030 | 1 |
| 548 | 3512966 | MOUNT ASSY, COMPLETE, N/F | Z70N55 N761030 | 1 |
| 549 | 3512967 | MOUNT ASSY, COMPLETE, MINOLTA | Z70M55 N761030 | 1 |
| 550 | 3512968 | MOUNT ASSY, COMPLETE, CANON | Z70C55 N761030 | 1 |
| 551 | 3512969 | MOUNT ASSY, COMPLETE, KONICA | Z70K55 N761030 | 1 |
| 557 | 3103557 | MOUNT ASSY, COMPLETE, O/OM | Z70O62 N761030 | 1 |
| 564 | 3103564 | MOUNT ASSY, COMPLETE, N/AI | Z70F55 N770525 | 1 |
| 567 | 3103567 | MOUNT ASSY, COMPLETE, P/K | Z70P55 N770228 | 1 |
| 569 | 3103568 | MOUNT ASSY, COMPLETE, M & MD | Z70M54 N771215 | 1 |

ADDITIONAL ASSEMBLIES

The following small assemblies are normally stocked. Parts that comprise these assemblies are illustrated and referenced in Figure 4-1 and its associated parts list. The assemblies as such are not separately illustrated.

| Vivitar Part No. | Description | Part Code | Ref. No.'s of Included Parts |
|------------------|----------------------|----------------|----------------------------------|
| 3512785 | HELICOID ASSY | Z70U80 N761030 | 8, 9, 10, 31, 32, 33, 34, 35, 40 |
| 3512786 | LENS TUBE KIT ASSY | Z70U82 N780210 | 8, 9, 10, 31, 32, 33, 34, 35, 40 |
| 3512991 | LENS GROUP ASSY, 1ST | Z70U85 N761030 | 1, 2, 5, 6, 7, 501 |
| 3512992 | LENS GROUP ASSY, 2ND | Z70U84 N761030 | 25, 28, 29, 30, 503 |
| 3512993 | LENS GROUP ASSY, 3RD | Z70U83 N761030 | 36, 39, 504 |
| 3512994 | LENS GROUP ASSY, 4TH | Z75U73 N760520 | 57, 60, 61, 62, 65, 506, 507 |
| 3512995 | LENS GROUP ASSY, 5TH | Z75U74 N760520 | 91, 92, 515 |

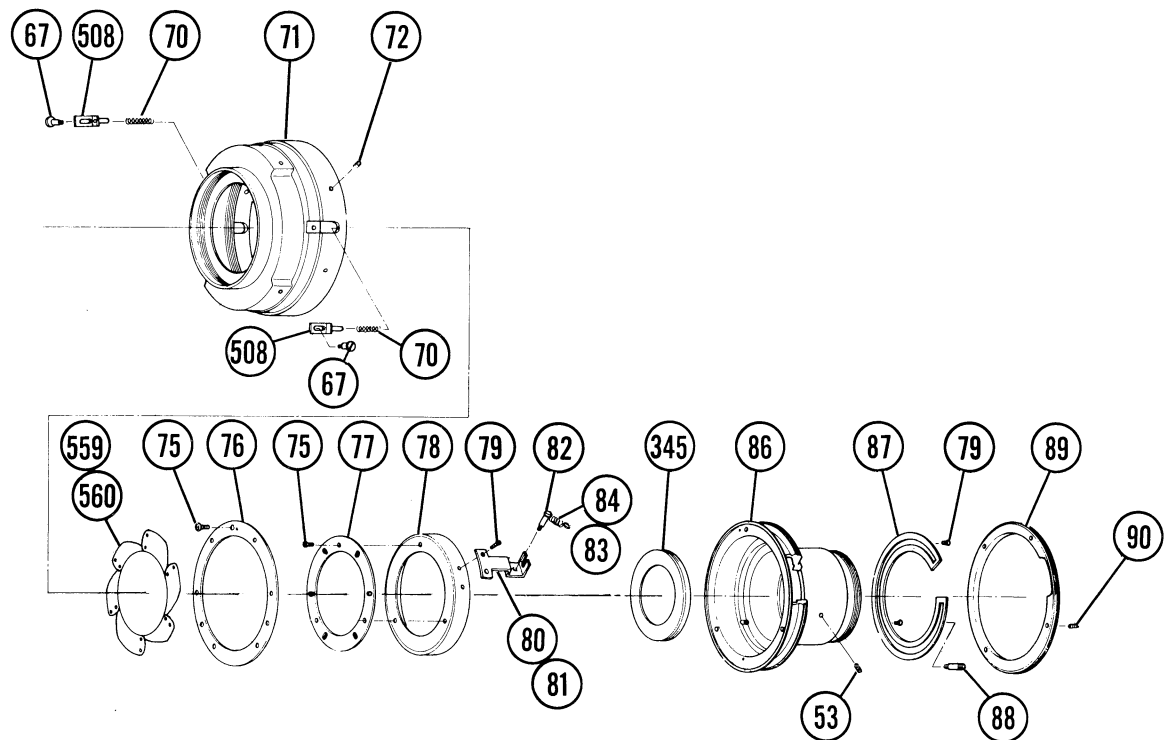


Figure 4-2. Diaphragm Housing Assembly, All Mounts (Ref. 509-514, Pg 58)

Parts List For Figure 4-2

| Ref. | Vivitar Part No. | Description | Part Code | Quantity |
|------|------------------|-------------------------------|----------------|----------|
| 53 | 3512976 | SETSCREW, 1.4x1.5 | Z75905 B760520 | 9 |
| 67 | 3512772 | SCREW, LATCH PLATE | Z70913 761030 | 2 |
| 70 | 3512774 | SPRING, CHANGE LATCH | W25926 760817 | 2 |
| 71 | 3512775 | HOUSING, DIAPHRAGM, FRONT | Z70523 761030 | 1 |
| 72 | 3512978 | SETSCREW, 2.0x2.5 | Z75911 W760520 | 3 |
| 75 | 3513859 | SCREW, FLTHD, 1.4x2.5 | Z75963 B760520 | 9 |
| 76 | 3517520 | RING, DIAPHRAGM BLADE | Z75704 760520 | 1 |
| 77 | 3512779 | RING, BLADE OPERATING | Z75705 760520 | 1 |
| 78 | 3512780 | MOUNT, BLADE OPERATING, RING | Z75526 760520 | 1 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0 | Z75913 B760520 | 13 |
| 80 | 3103493 | ARM, DIAPHRAGM OPERATING | Z75706 760520 | 1 |
| 81 | 3514269 | ARM, DIAPHRAGM OPERATING, OM | Z75707 760520 | 1 |
| 82 | 3512782 | SCREW, SPRING POST | Z75946 760520 | 2 |
| 83 | 3512783 | SPRING, DIAPHRAGM | Z75915 760520 | 1 |
| 84 | 3513932 | SPRING, DIAPHRAGM | Z75916 760520 | 1 |
| 86 | 3101443 | HOUSING, DIAPHRAGM, REAR | Z75528 780110 | 1 |
| 87 | 3103775 | STOPPER, DIAPHRAGM | Z75708 760520 | 1 |
| 88 | 3512788 | SCREW, SPRING POST | Z75917 760520 | 1 |
| 89 | 3512787 | RING, RTNG, DIAPHRAGM HOUSING | Z75529 760520 | 1 |
| 90 | 3512981 | SETSCREW, 1.7x3.0 | Z85907 B760615 | 1 |
| 345 | 3103869 | RING, LIGHT BAFFLE | Z75750 780110 | 1 |
| 508 | 3512773 | LATCH, CHANGE | Z70U92 N761030 | 2 |
| 559 | 3103559 | BLADE, DIAPHRAGM, U, N, O | Z75U67 N760520 | 6 |
| 560 | 3103560 | BLADE, DIAPHRAGM, M, C, K, P | Z75M68 N760520 | 6 |

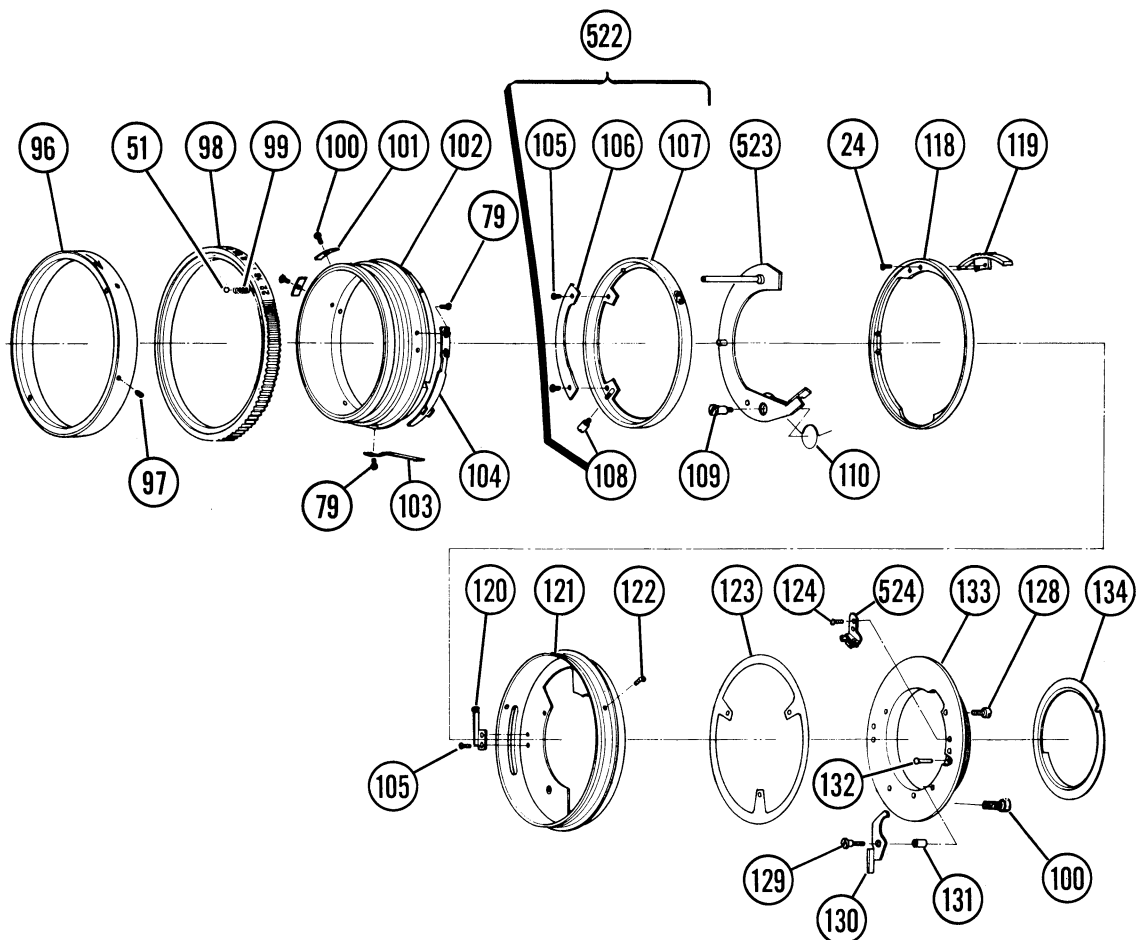


Figure 4-3. Mount Assembly, Universal (Ref. 547, Pg 58)

Parts List For Figure 4-3

| Ref. | Vivitar Part No. | Description | Part Code | Quantity |
|------|------------------|-----------------------------------|-----------------|----------|
| 24 | 3512974 | SCREW, FLTHD, 1.4x2.5x2.0 | Z75912 B760520 | 4 |
| 51 | 3512898 | BALL, STEEL, 1.6 | Z75919 760520 | 2 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0x3.0 | Z75913 B760520 | 13 |
| 96 | 3512790 | RING, APERTURE INDEX, UNIV | Z70525U B761030 | 1 |
| 97 | 3512988 | SETSCREW, 1.4x2.5 | W25903 B76017 | 3 |
| 98 | 3512791 | RING, APERTURE SETTING, UNIV | Z70526U B761030 | 1 |
| 99 | 3512857 | SPRING, DETENT, 1.5 | Z75920 760520 | 3 |
| 100 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 B760520 | 5 |
| 101 | 3512792 | PLATE, STOP | Z70703 761030 | 2 |
| 102 | 3512793 | FRAME, INTERMEDIATE | Z70527 761030 | 1 |
| 103 | 3512803 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 761030 | 1 |
| 104 | 3512802 | SPRING, ZOOM-MACRO DETENT | Z70705 761030 | 1 |
| 105 | 3512984 | SCREW, PANHD, 1.4x1.5x2.0 | Z75922 B760520 | 4 |
| 106 | 3512794 | CAM, APERTURE | Z75709 760520 | 1 |
| 107 | 3512795 | RING, APERTURE CAM | Z75535 760520 | 1 |
| 108 | 3512801 | SCREW, APERTURE CAM RING | Z75921 760520 | 1 |
| 109 | 3500002 | SCREW, PIVOT DIAPHRAGM LEVER | Z75923 760520 | 1 |
| 110 | 3512799 | SPRING, DIAPHRAGM LEVER ASSY | Z75924 760520 | 1 |
| 118 | 3512797 | RING, AUTO/MANUAL SELECT | Z75537 760520 | 1 |
| 119 | 3512798 | BUTTON, AUTO/MANUAL SELECT | Z75538 760520 | 1 |
| 120 | 3512804 | SPRING, LEAF, AUTO/MANUAL DETENT | Z75715 760520 | 1 |
| 121 | 3512805 | FRAME, MOUNT, UNIV | Z70528 761030 | 1 |
| 122 | 3512985 | SCREW, FLTHD, 1.7x2.5 | Z75927 B760520 | 6 |
| 123 | 3512806-1 | SHIM, FOCUS, 0.1, UNIV | Z70915 761030 | A/R |
| 123 | 3512806-2 | SHIM, FOCUS, 0.15, UNIV | Z70925 761030 | A/R |
| 123 | 3512806-3 | SHIM, FOCUS, 0.2, UNIV | Z70926 761030 | A/R |
| 124 | 3512986 | SCREW, PANHD, 1.4x2.0x1.8 | Z75926 B760520 | 2 |
| 128 | 3512809 | SCREW, MOUNT | Z70916 761030 | 3 |
| 129 | 3512814 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75925 760520 | 1 |
| 130 | 3518064 | LEVER, AUTO DIAPHRAGM TRANSFER | Z75712 760520 | 1 |
| 131 | 3518065 | BUSHING, PIVOT SCREW | Z75805 760520 | 1 |
| 132 | 3512811 | PIN, DIAPHRAGM CONTROL COUPLING | Z75806 760520 | 1 |
| 133 | 3512808 | MOUNT, UNIV | Z70529 761030 | 1 |
| 134 | 3512810 | PIPE, SHADE, UNIV | Z75539 760520 | 1 |
| 522 | 3514303 | APERTURE CAM RING ASSY, UNIV | Z75U61 N760520 | 1 |
| 523 | 3512796 | LEVER, AUTO DIAPHRAGM | Z75U80 N760520 | 1 |
| 524 | 3512807 | CRANK, DIAPHRAGM CONTROL TRANSFER | Z85U81 N760615 | 1 |

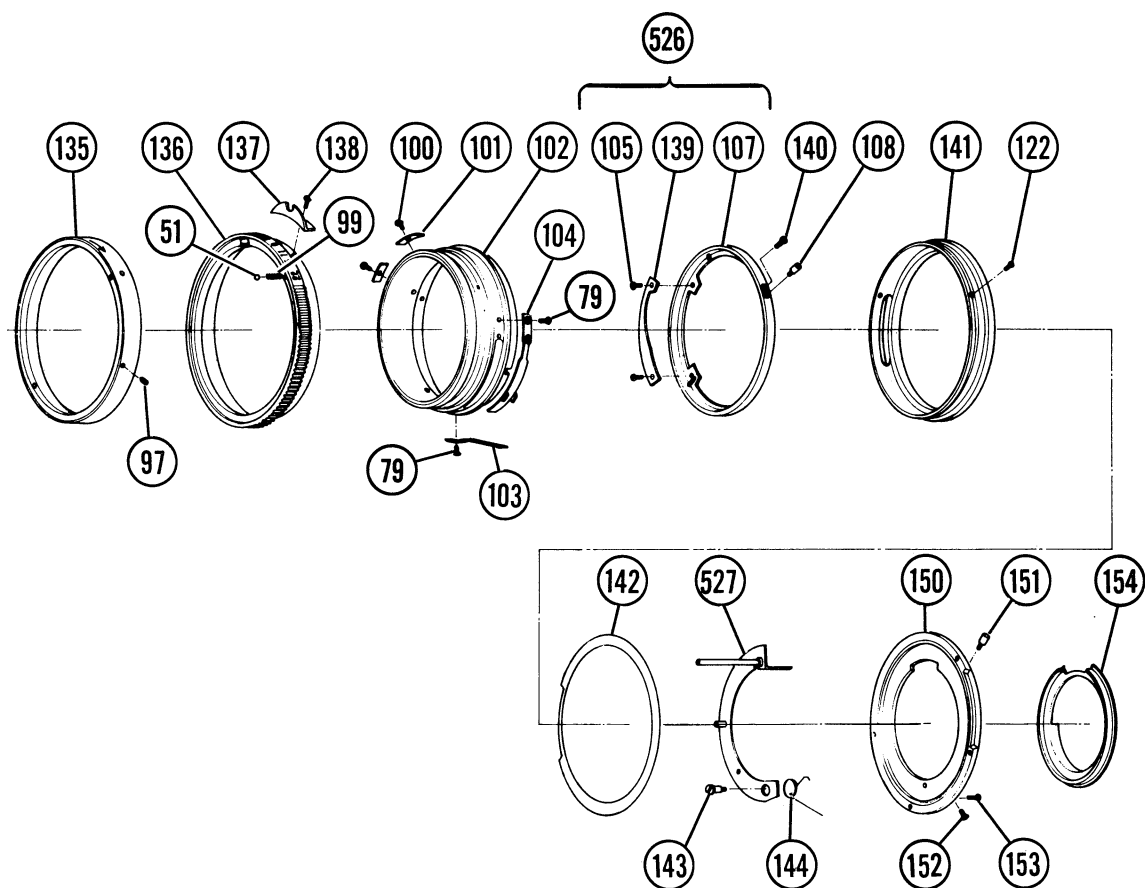


Figure 4-4. Mount Assembly, Nikon F And Nikkormat (Ref. 548, Pg 58)

Parts List For Figure 4-4

| Ref. | Vivitar Part No. | Description | Part Code | | Quantity |
|------|---------------------|-----------------------------------|-----------|----------|----------|
| 51 | 3512898 | BALL, STEEL, 1.6 | Z750520 | 760520 | 2 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0x3.0 | Z75913 | B760520 | 8 |
| 97 | 3512988 | SETSCREW, 1.4x2.5 | W25903 | B760817 | 3 |
| 99 | 3512857 | SPRING, DETENT, 1.5 | Z75920 | 760520 | 1 |
| 100 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 | B760520 | 2 |
| 101 | 3512792 | PLATE, STOP | Z70703 | 761030 | 2 |
| 102 | 3512793 | FRAME, INTERMEDIATE | Z70527 | 761030 | 1 |
| 103 | 3512803 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 | 761030 | 1 |
| 104 | 3512802 | SPRING, ZOOM-MACRO DETENT | Z70705 | 761030 | 1 |
| 105 | 3512984 | SCREW, PANHD, 1.4x1.5x2.0 | Z75922 | B760520 | 2 |
| 107 | 3512795 | RING, APERTURE CAM | Z75535 | 760520 | 1 |
| 108 | 3512801 | SCREW, APERTURE CAM RING | Z75921 | 760520 | 1 |
| 122 | 3512985 | SCREW, FLTHD, 1.7x2.5 | Z75927 | B760520 | 6 |
| 135 | 3512815 | RING, APERTURE INDEX, N/F | Z70525N | B761030 | 1 |
| 136 | 3512816 | RING, APERTURE SETTING | Z70530 | NB761030 | 1 |
| 137 | 3512817 | FORK, METER COUPLING | Z75716 | 760520 | 1 |
| 138 | 3512818 | SCREW, METER COUPLING FORK | Z75928 | 760520 | 1 |
| 139 | 3512819 | CAM, APERTURE | Z75717 | 760520 | 1 |
| 140 | 3512820 | SCREW, STOP | Z75929 | 760520 | 1 |
| 141 | 3512821 | FRAME, MOUNT | Z70531 | 761030 | 1 |
| 142 | 3512822-1 | SHIM, FOCUS, 0.1 N/F | Z70917 | 761030 | A/R |
| 142 | 3512822-2 | SHIM, FOCUS, 0.15, N/F | Z70927 | 761030 | A/R |
| 142 | 3512822-3 | SHIM, FOCUS, 0.2, N/F | Z70928 | 761030 | A/R |
| 143 | 3512828 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75930 | 760520 | 1 |
| 144 | 3513845 | SPRING, AUTO DIAPHRAGM LEVER | Z75931 | 760520 | 1 |
| 150 | 3512824 | MOUNT, N/F | Z75543 | 760520 | 1 |
| 151 | 3512825 | SCREW, MOUNT | Z75934 | B760520 | 1 |
| 152 | 3514089 | SCREW, FLTHD, 1.4x2.0, CHR | Z75912 | W760520 | 2 |
| 153 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 | B760520 | 2 |
| 154 | 3512826 | RING, SHADE | Z75544 | 760520 | 1 |
| 526 | 3514304 | APERTURE CAM RING ASSY, N/F | Z75N62 | N760520 | 1 |
| 527 | 3103542 | LEVER, DIAPHRAGM ACTUATOR, N/F | Z75N80 | N760520 | 1 |

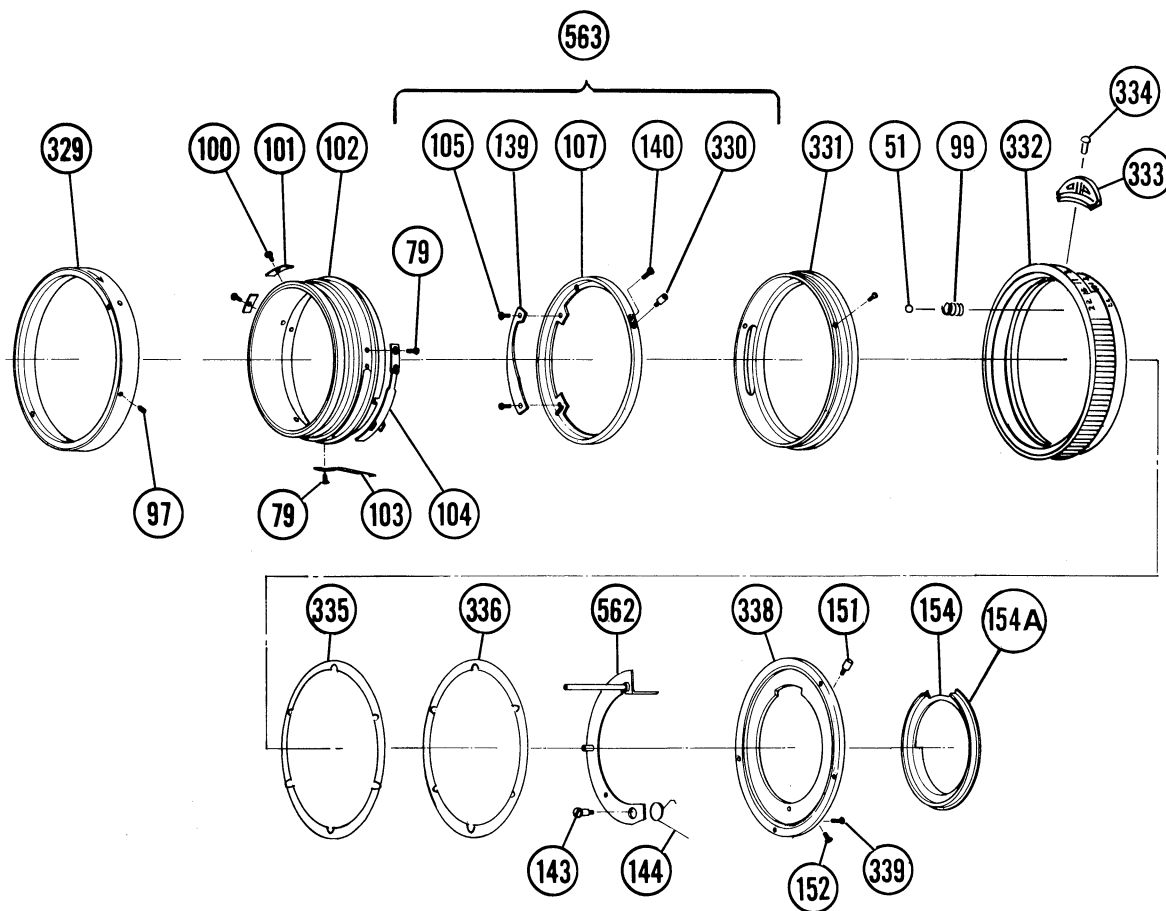


Figure 4-5. Mount Assembly, Nikon AI (Ref. 564, Pg 58)

1

Parts List For Figure 4-5

| Ref. | Vivitar Part No. | Description | Part Code | Quantity |
|------|---------------------|-----------------------------------|----------------|----------|
| 51 | 3512898 | BALL, STEEL, 1.6 | Z750520 760520 | 1 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0x3.0 | Z75913 B760520 | 8 |
| 97 | 3512988 | SETSCREW, 1.4x2.5 | W25903 B760817 | 3 |
| 99 | 3512857 | SPRING, DETENT, 1.5 | Z75920 760520 | 1 |
| 100 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 B760520 | 2 |
| 101 | 3512792 | PLATE, STOP | Z70703 761030 | 2 |
| 102 | 3512793 | FRAME, INTERMEDIATE | Z70527 761030 | 1 |
| 103 | 3512803 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 761030 | 1 |
| 104 | 3512802 | SPRING, ZOOM-MACRO DETENT | Z70705 761030 | 1 |
| 105 | 3512984 | SCREW, PANHD, 1.4x1.5x2.0 | Z75922 B760520 | 2 |
| 107 | 3512795 | RING, APERTURE CAM | Z75535 760520 | 1 |
| 139 | 3512819 | CAM, APERTURE | Z75717 760520 | 1 |
| 140 | 3512820 | SCREW, STOP | Z75929 760520 | 1 |
| 143 | 3512828 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75930 760520 | 1 |
| 144 | 3513845 | SPRING, AUTO DIAPHRAGM LEVER | Z75931 760520 | 1 |
| 151 | 3512825 | SCREW, MOUNT | Z75934 B760520 | 1 |
| 152 | 3514089 | SCREW, FLTHD, 1.4x2.0, CHR | Z75912 W760520 | 2 |
| 154 | 3512826 | RING, SHADE | Z75544 760520 | 1 |
| 154A | 3105744 | RING, SHADE (EM) | Z71032 790510 | 1 |
| 329 | 3103522 | RING, APERTURE INDEX, N/AI | Z70525FB770520 | 1 |
| 330 | 3518130 | SCREW, CAM RING | Z15919 770608 | 1 |
| 331 | 3518105 | FRAME, MOUNT, N/AI | Z70551 770520 | 1 |
| 332 | 3103525 | RING, APERTURE SETTING, N/AI | Z70552FB770520 | 1 |
| 333 | 3518107 | FORK, METER COUPLING | Z75747 770520 | 1 |
| 334 | 3518103 | SCREW, METER COUPLING FORK | Z75917 770520 | 1 |
| 335 | 3518109 | SHIM, FOCUS, 0.5, N/AI | Z70937 770520 | A/R |
| 336 | 3518110-1 | SHIM, FOCUS, 0.2, N/AI | Z70938 770520 | 2 |
| 336 | 3518110-3 | SHIM, FOCUS, 0.1, N/AI | Z70940 770520 | 1 |
| 338 | 3518112 | MOUNT, N/AI | Z75588 770520 | 1 |
| 339 | 3512971 | SCREW, PANHD, 1.7x2.5 | W25923 W760817 | 5 |
| 562 | 3518111 | ARM, DIAPHRAGM CONTROL TRANSFER | Z75F80 N770520 | 1 |
| 563 | 3103563 | APERTURE CAM RING ASSY, N/AI | Z75F62 N770525 | 1 |

Series 1 Zoom Lens
70-210mm f/3.5 Macro

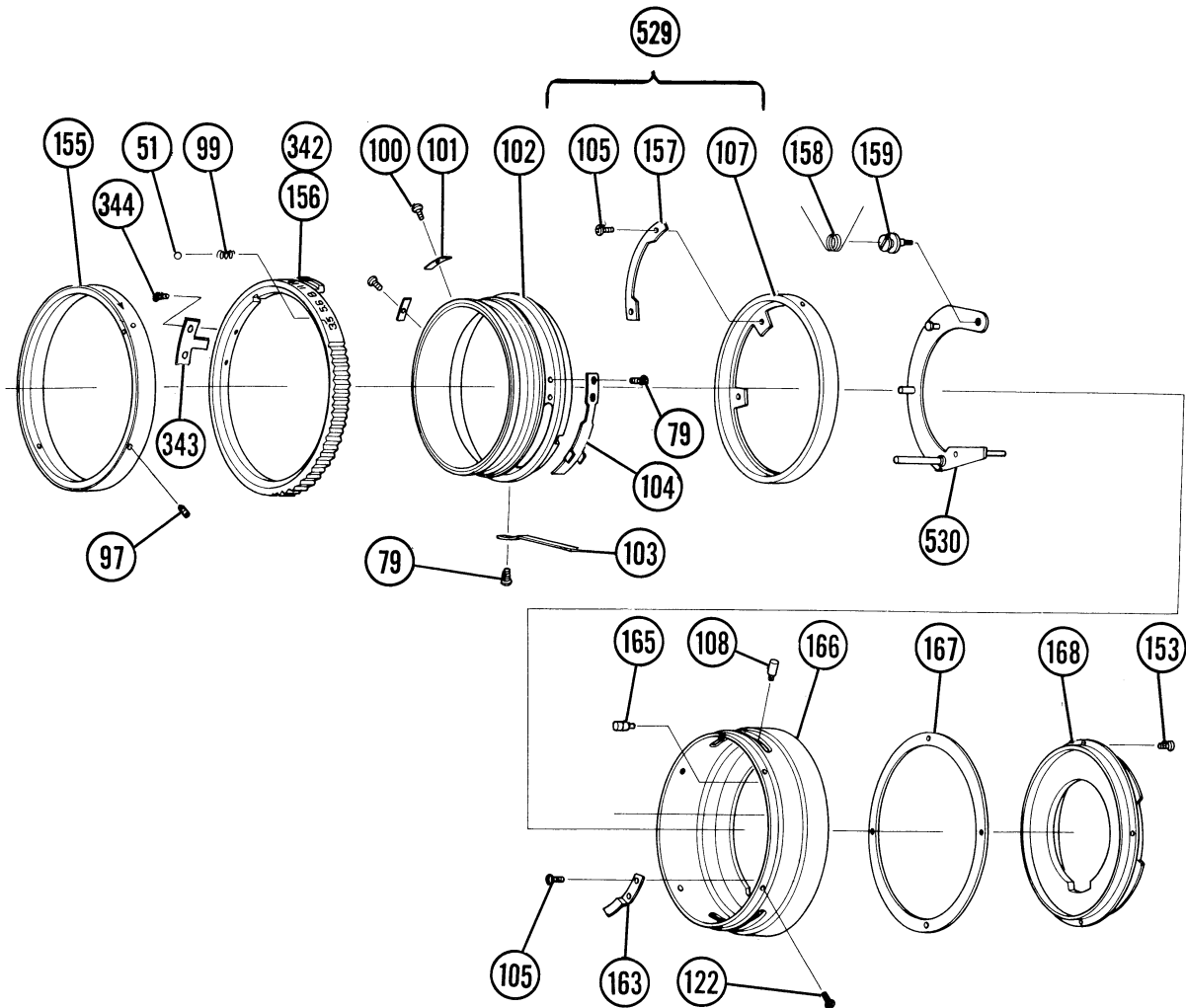


Figure 4-6. Mount Assembly, Minolta and Minolta MD (Ref. 569, Pg 58)

Parts List For Figure 4-6. Mount Assembly Minolta And Minolta MD

| Ref. | Vivitar Part No. | Description | Part Code | | Quantity |
|------|------------------|-----------------------------------|-----------|---------|----------|
| 51 | 3512898 | BALL, STEEL, 1.6 | Z750520 | 760520 | 2 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0x3.0 | Z75913 | B760520 | 8 |
| 97 | 3512988 | SETSCREW, 1.4x2.5 | W25903 | B760817 | 3 |
| 99 | 3512857 | SPRING, DETENT, 1.5 | Z75920 | 760520 | 1 |
| 100 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 | B760520 | 2 |
| 101 | 3512792 | PLATE, STOP | Z70703 | 761030 | 1 |
| 102 | 3512793 | FRAME, INTERMEDIATE | Z70527 | 761030 | 1 |
| 103 | 3512803 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 | 761030 | 1 |
| 104 | 3512802 | SPRING, ZOOM-MACRO DETENT | Z70705 | 761030 | 1 |
| 105 | 3512984 | SCREW, PANHD, 1.4x1.5x2.0 | Z75922 | B760520 | 2 |
| 107 | 3512795 | RING, APERTURE CAM | Z75535 | 760520 | 1 |
| 108 | 3512801 | SCREW, APERTURE CAM RING | Z75921 | 760520 | 1 |
| 122 | 3512985 | SCREW, FLTHD, 1.7x2.5 | Z75927 | B760520 | 6 |
| 153 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 | B760520 | 4 |
| 155 | 3512829 | RING, APERTURE INDEX, M/MD | Z70525M | B761030 | 1 |
| 156 | 3512830 | RING, APERTURE SETTING, M | Z70532M | B770514 | 1 |
| 157 | 3512831 | CAM, APERTURE | Z70706 | 761030 | 1 |
| 158 | 3512832 | SPRING, DIAPHRAGM LEVER | Z75935 | 550418 | 1 |
| 159 | 3512833 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75936 | 760520 | 1 |
| 163 | 3512839 | PLATE, GUIDE, DIAPHRAGM LEVER | Z75721 | 760520 | 1 |
| 165 | 3512835 | SCREW, SPRING POST | Z75914 | 760520 | 1 |
| 166 | 3512836 | FRAME, MOUNT, MINOLTA | Z85546 | 770514 | 1 |
| 167 | 3518075-1 | SHIM, FOCUS, 0.1, M/SR, M/MD | Z70918 | 761030 | A/R |
| 167 | 3518075-2 | SHIM, FOCUS, 0.15, M | Z70929 | 761030 | A/R |
| 167 | 3518075-3 | SHIM, FOCUS, 0.2, M | Z70930 | 761030 | A/R |
| 168 | 3512838 | MOUNT, MINOLTA | Z85547 | 770514 | 1 |
| 342 | (A) 3103534 | RING, APERTURE SETTING, M/MD | Z70553M | B771215 | 1 |
| 343 | (A) 3103535 | LUG, APERTURE COUPLING | Z75933 | 771215 | 1 |
| 344 | (A) 3103536 | SCREW, FLTHD | Z15921 | B771215 | 2 |
| 529 | 3103544 | APERTURE CAM RING ASSY, M & MD | Z70M75 | N761030 | 1 |
| 530 | 3103545 | LEVER, DIAPHRAGM ACTUATOR, M & MD | Z70M70 | N761030 | 1 |

(A) Minolta MD only

Series 1 Zoom Lens
70-210mm f/3.5 Macro

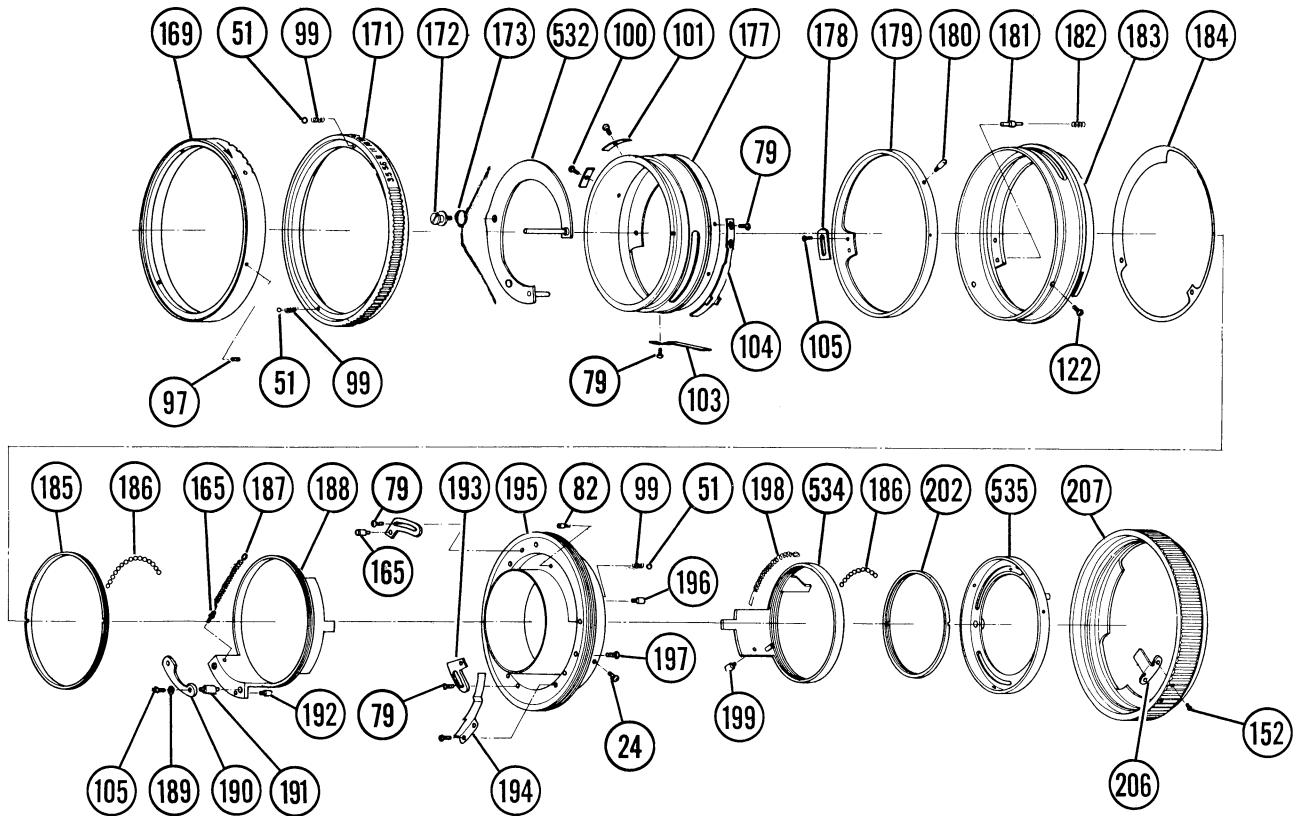


Figure 4-7. Mount Assembly, Canon (Ref. 550, Pg 58)

Parts List For Figure 4-7. Mount Assembly, Canon

| Ref. | Vivitar Part No. | Description | Part Code | Quantity |
|------|------------------|-----------------------------------|----------------|----------|
| 24 | 3512974 | SCREW, FLTHD, 1.4x2.5x2.0 | Z75912 B760520 | 5 |
| 51 | 3512898 | BALL, STEEL, 1.6 | Z750520 760520 | 4 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0x3.0 | Z75913 B760520 | 13 |
| 82 | 3512782 | SCREW, SPRING POST | Z75946 760520 | 2 |
| 97 | 3512988 | SETSCREW, 1.4x2.5 | W25903 B760817 | 3 |
| 99 | 3512857 | SPRING, DETENT, 1.5 | Z75920 760520 | 3 |
| 100 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 B760520 | 2 |
| 101 | 3512792 | PLATE, STOP | Z70703 761030 | 2 |
| 103 | 3512803 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 761030 | 1 |
| 104 | 3512802 | SPRING, ZOOM-MACRO DETENT | Z70705 761030 | 1 |
| 105 | 3512984 | SCREW, PANHD, 1.4x1.5x2.0 | Z75922 B760520 | 4 |
| 122 | 3512985 | SCREW, FLTHD, 1.7x2.5 | Z75927 B760520 | 6 |
| 165 | 3512835 | SCREW, SPRING POST | Z75914 760520 | 2 |
| 169 | 3512841 | RING, APERTURE INDEX, C | Z70525CB761030 | 1 |
| 171 | 3512842 | RING, APERTURE, SETTING | Z70533CB761030 | 1 |
| 172 | 3512843 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75937 760520 | 1 |
| 173 | 3512844 | SPRING, DIAPHRAGM LEVER | Z75938 760520 | 1 |
| 177 | 3512846 | FRAME, INTERMEDIATE | Z70534 761030 | 1 |
| 178 | 3512852 | PLATE, APERTURE RING STOP | Z75723 760520 | 1 |
| 179 | 3512936 | RING, APERTURE TRANSFER | Z75551 760520 | 1 |
| 180 | 3512848 | SCREW, APERTURE CAM RING | Z75939 760520 | 1 |
| 181 | 3512849 | PIN, EE SIGNAL | Z75817 760520 | 1 |
| 182 | 3512850 | SPRING, EE SIGNAL PIN | Z75940UU760520 | 1 |
| 183 | 3512903 | FRAME, MOUNT, C/FD | Z70535 761030 | 1 |
| 184 | 3513501-3 | SHIM, FOCUS, 0.2, C | Z85923 760615 | 1 |
| 184 | 3513501-2 | SHIM, FOCUS, 0.15, C | Z85922 760615 | 1 |
| 184 | 3512851-1 | SHIM, FOCUS, 0.1, C | Z85912 760615 | 1 |
| 185 | 3512853 | RING, BALL RTNG | Z75553 760520 | 1 |
| 186 | 3512899 | BALL, STEEL, 1.2 | Z75941 760520 | 120 |
| 187 | 3512854 | SPRING, APERTURE SIGNAL RING | Z75944 760520 | 1 |
| 188 | 3512855 | RING, APERTURE COUPLING | Z70536 761030 | 1 |
| 189 | 3512870 | WASHER, 1.7x3.5x0.4 | Z75942 760520 | 1 |
| 190 | 3512869 | CAM, APERTURE | Z70707 761030 | 1 |
| 191 | 3512868 | STANDOFF, APERTURE CAM | Z75943 760520 | 2 |
| 192 | 3512867 | SCREW, STOP | Z75945 760520 | 1 |
| 193 | 3512856 | PLATE, STOP | Z75725 760520 | 2 |
| 194 | 3512866 | SPRING, LEAF, DETENT | Z75726 760520 | 1 |
| 195 | 3512865 | MOUNT, CANON | Z75555 760520 | 1 |
| 196 | 3512825 | SCREW, MOUNT STOP | Z75934 B760520 | 1 |
| 197 | 3512989 | SCREW, PANHD, 1.7x5.5, BLK | Z75947UU760520 | 5 |
| 198 | 3103503 | SPRING, DIAPHRAGM CONTROL RING | Z85921 760615 | 1 |
| 199 | 3512864 | SCREW, DETENT | Z75950 760520 | 1 |
| 152 | 3514089 | SCREW, FLTHD, 1.4x2.0, CHR | Z75912 W760520 | 2 |
| 202 | 3512860 | RING, BALL RTNG | Z75557 760520 | 1 |
| 206 | 3512863 | ARM SIGNAL | Z75727 760520 | 1 |
| 207 | 3512862 | RING, BREECHLOCK | Z75559 760520 | 1 |
| 532 | 3514313 | LEVER, AUTO DIAPHRAGM, CANON | Z75C80 N760520 | 1 |
| 534 | 3512847 | RING, DIAPHRAGM CONTROL TRANSFER | Z75C81 N760520 | 1 |
| 535 | 3103549 | PIPE, SHADE | Z70C77 N761030 | 1 |

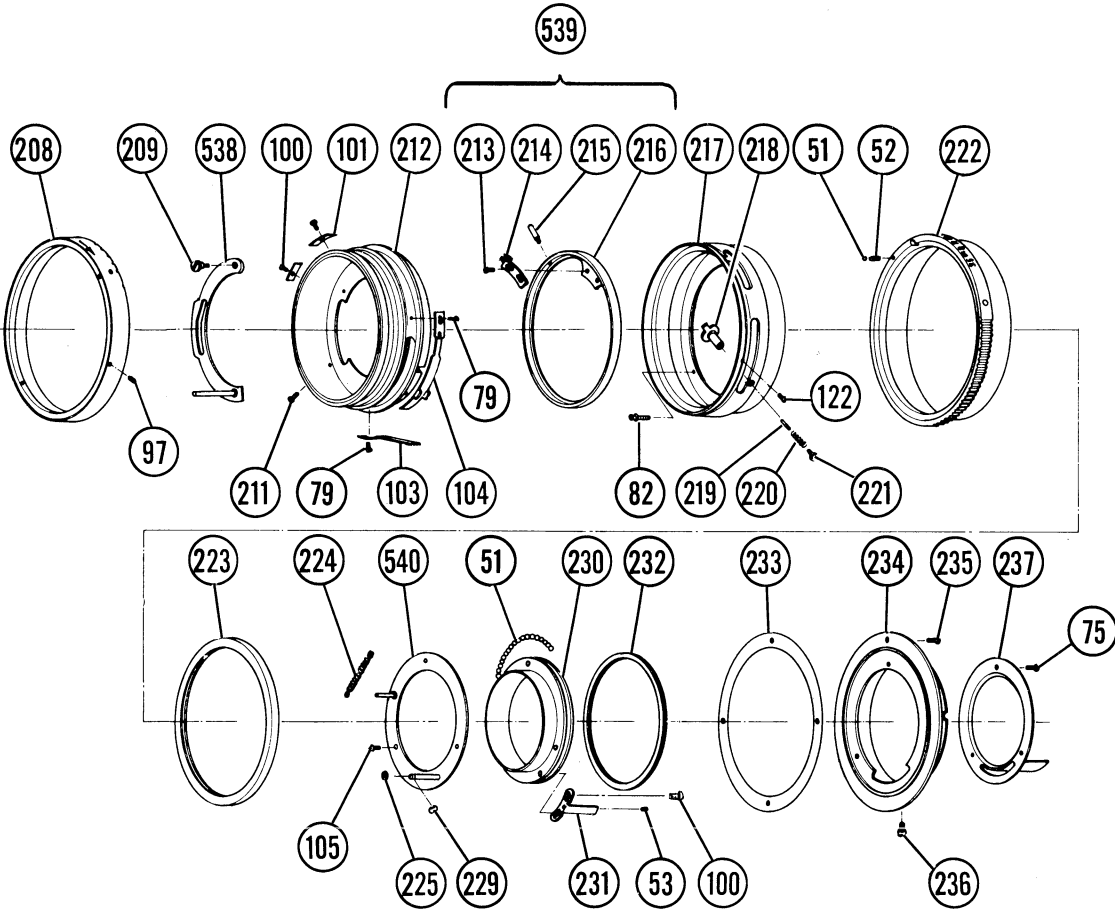


Figure 4-8. Mount Assembly, Konica (Ref. 551, Pg 58)

Parts List For Figure 4-8. Mount Assembly, Konica

| Ref. | Vivitar Part No. | Description | Part Code | | Quantity |
|------|------------------|-----------------------------------|-----------|---------|----------|
| 51 | 3512898 | BALL, STEEL, 1.6 | Z75919 | 760520 | 80 |
| 52 | 3512857 | SPRING, DETENT, 1.5 | Z75920 | 760520 | 2 |
| 53 | 3512976 | SETSCREW, 1.4x1.5 | Z75905 | B760520 | 9 |
| 75 | 3513859 | SCREW, FLTHD, 1.4x2.0 | Z75963 | B760520 | 9 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0x3.0, BK | Z75913 | B760520 | 7 |
| 82 | 3512782 | SCREW, SPRING POST | Z75946 | 760520 | 2 |
| 97 | 3512988 | SETSCREW, 1.4x2.5 | W25903 | B760817 | 3 |
| 100 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 | B760520 | 4 |
| 101 | 3512792 | PLATE, STOP | Z70703 | 761030 | 2 |
| 103 | 3512803 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 | 761030 | 1 |
| 104 | 3512802 | SPRING, ZOOM-MACRO DETENT | Z70705 | 761030 | 1 |
| 105 | 3512984 | SCREW, PANHD, 1.4x1.5x2.0 | Z75922 | B760520 | 3 |
| 122 | 3512985 | SCREW, PLTHD, 1.7x2.5 | Z75927 | B760520 | 6 |
| 208 | 3512871 | RING, APERTURE INDEX, K/AR | Z70525KB | 761030 | 1 |
| 209 | 3512872 | SCREW, PIVOT | Z75951 | 760520 | 1 |
| 211 | 3512983 | SCREW, PLTHD, 1-14200460 | Z70920 | B761030 | 1 |
| 212 | 3512873 | FRAME, INTERMEDIATE | Z70537 | 761030 | 1 |
| 213 | 3512990 | SCREW, PANHD, 1.4x1.5x2.0 | Z75952 | B760520 | 2 |
| 214 | 3512874 | PLATE, STOP | Z75729 | 760520 | 1 |
| 215 | 3512875 | SCREW, APERTURE SETTING RING | Z75953 | 760520 | 1 |
| 216 | 3512876 | RING, APERTURE SETTING TRANSFER | Z75562 | 760520 | 1 |
| 217 | 3512877 | FRAME, MOUNT, K/AR | Z70538 | 761030 | 1 |
| 218 | 3512882 | CATCH, EE LOCK | Z75821 | 760520 | 1 |
| 219 | 3513933 | SHAFT, EE RELEASE | Z75822 | 760520 | 1 |
| 220 | 3512880 | SPRING, EE LOCK | Z75954 | 760520 | 1 |
| 221 | 3512879 | SCREW, CAP, EE RELEASE | Z75955 | 760520 | 1 |
| 222 | 3512878 | RING, APERTURE SETTING, K/AR | Z70539KB | 761030 | 1 |
| 223 | 3512884 | RING, RTNG | Z75565 | 760520 | 1 |
| 224 | 3512885 | SPRING, COIL, TENSION, 2.5x27.0 | Z75957 | 760520 | 1 |
| 225 | 3512894 | WASHER, CAM OPERATION SHAFT | Z75958 | 760520 | 1 |
| 229 | 3512893 | E RING, 1.5 | Z75959 | 760520 | 1 |
| 230 | 3512887 | RING, DIAPHRAGM CONTROL COUPLING | Z75566 | 760520 | 1 |
| 231 | 3512892 | ARM, DIAPHRAGM COUPLING | Z75731 | 760520 | 1 |
| 232 | 3518118 | RING, BALL RTNG | Z75567 | 760520 | 1 |
| 233 | 3512888 | SHIM, FOCUS, 0.1, K/AR | Z70921 | 761030 | A/R |
| 233 | 3512888-2 | SHIM, FOCUS, 0.15, K/AR | Z70931 | 761030 | A/R |
| 233 | 3512888-3 | SHIM, FOCUS, 0.2, K/AR | Z70932 | 761030 | A/R |
| 234 | 3512889 | MOUNT, KONICA | Z75568 | 760520 | 1 |
| 235 | 3513947 | SCREW, PANHD, 1.7x3.0, CR | Z75913 | W760520 | 4 |
| 236 | 3512891 | SCREW, MOUNT STOP | Z75961 | 760520 | 1 |
| 237 | 3512890 | RING, MAX APERTURE COUPLING | Z70547 | 761030 | 1 |
| 538 | 3103552 | LEVER, DIAPHRAGM ACTUATOR, KONICA | Z70K70 | N761030 | 1 |
| 539 | 3518155 | APERTURE CAM RING ASSY, KONICA | Z70K75 | N761030 | 1 |
| 540 | 3518117 | RING, DIAPHRAGM CONTROL TRANSFER | Z75K84 | N760520 | 1 |

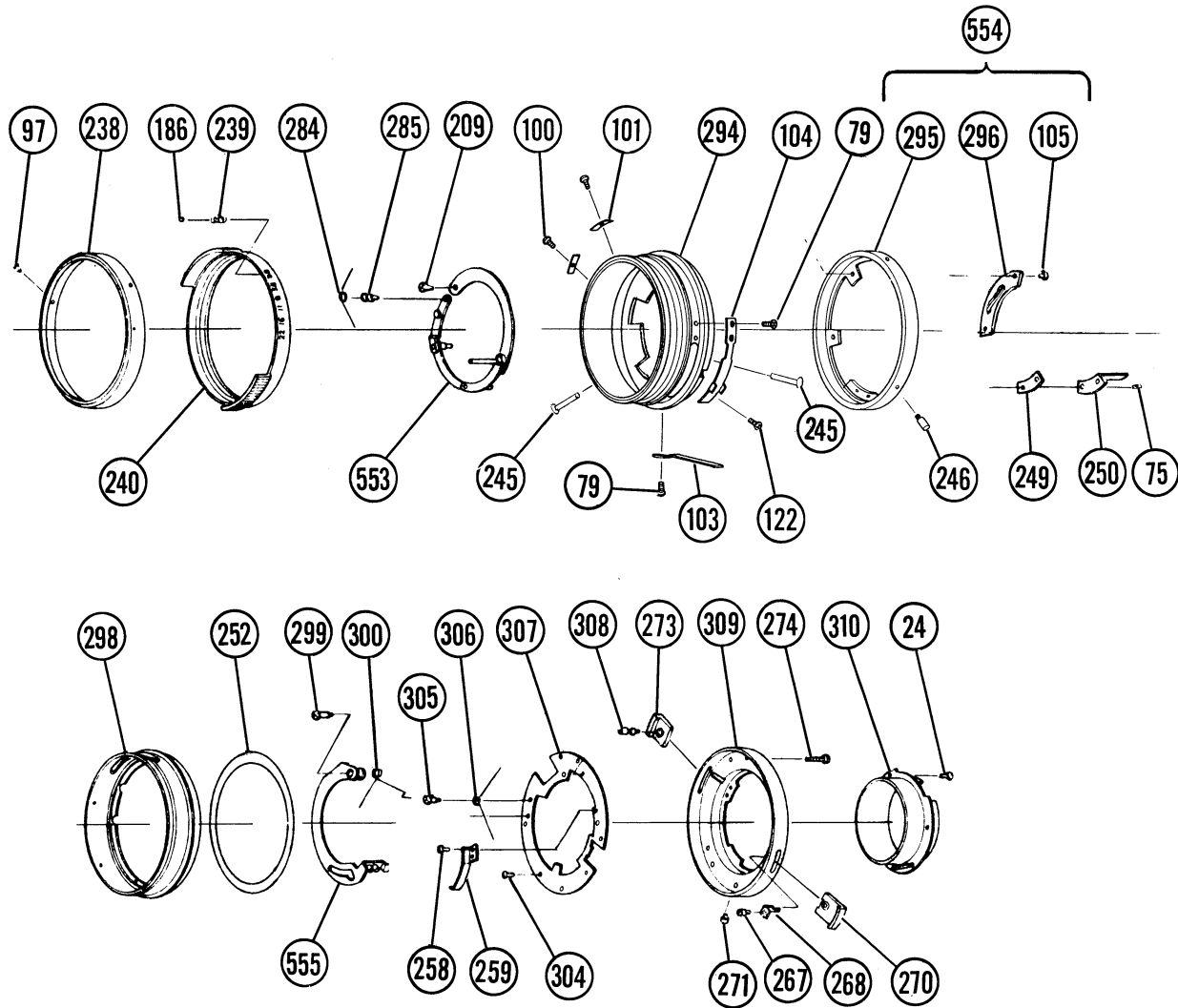


Figure 4-9. Mount Assembly, Olympus (Ref. 557, Pg 58)

Parts List For Figure 4-9. Mount Assembly, Olympus

| Ref. | Vivitar Part No. | Description | Part Code | | Quantity |
|------|---------------------|-----------------------------------|-----------|---------|----------|
| 24 | 3512974 | SCREW, FLTHD, 1.4x2.5x2.0 | Z75912 | B760520 | 5 |
| 75 | 3513859 | SCREW, FLTHD, 1.4x2.5 | Z75963 | B760520 | 8 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0x3.0 | Z75913 | B760520 | 7 |
| 97 | 3512988 | SETSCREW, 1.4x2.5 | W25903 | B760817 | 3 |
| 100 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 | B760520 | 2 |
| 101 | 3512792 | PLATE, STOP | Z70703 | 761030 | 2 |
| 103 | 3512803 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 | 761030 | 1 |
| 104 | 3512802 | SPRING, ZOOM-MACRO DETENT | Z70705 | 761030 | 1 |
| 122 | 3512985 | SCREW, FLTHD, 1.7x2.5 | Z75927 | B760520 | 6 |
| 186 | 3512899 | BALL, STEEL, 1.2 | Z75941 | 760520 | 1 |
| 209 | 3512872 | SCREW, PIVOT | Z75951 | 760520 | 1 |
| 238 | 3512904 | RING, APERTURE INDEX, O/OM | Z70525OB | 761030 | 1 |
| 239 | 3513713 | SPRING, DETENT, 1.2 | Z75964 | 760520 | 1 |
| 240 | 3512906 | RING, APERTURE SETTING, O/OM | Z70540OB | 761030 | 1 |
| 245 | 3500048 | SCREW, DIAPHRAGM LEVER RTNG | Z75966 | 750520 | 2 |
| 246 | 3512909 | SCREW, APERTURE CAM RING | Z75967 | 750520 | 1 |
| 249 | 3518127-1 | SHIM, APERTURE COUPLING ARM, 0.1 | Z85916 | 760615 | A/R |
| 249 | 3518127-2 | SHIM, APERTURE, COUPLING ARM, 0.2 | Z85925 | 760615 | A/R |
| 249 | 3518127-3 | SHIM, APERTURE, COUPLING ARM, 0.4 | Z85925 | 760615 | A/R |
| 250 | 3517527 | ARM, APERTURE COUPLING | Z15713 | 760830 | 1 |
| 252 | 3513774-1 | SHIM, FOCUS, 0.1, O/OM | Z70923 | 761030 | A/R |
| 252 | 3513774-2 | SHIM, FOCUS, 0.15, OM | Z70934 | 761030 | A/R |
| 252 | 3513774-3 | SHIM, FOCUS, 0.2, OM | Z70934 | 761030 | A/R |
| 258 | 3101536 | SCREW, LOCK RELEASE SPRING | Z15918 | B770606 | 1 |
| 259 | 3513783 | SPRING, LEAF, LOCK RELEASE | Z75737 | 760520 | 1 |
| 267 | 3512925 | SCREW, LOCK PLATE | Z75976 | 760520 | 1 |
| 268 | 3512931 | PLATE, MOUNT LOCKING | Z75741 | 760520 | 1 |
| 270 | 3512932 | BUTTON, MOUNT LOCK RELEASE | Z75827 | 760520 | 1 |
| 217 | 3512934 | SCREW, STOP | Z75975 | 760520 | 1 |
| 273 | 3512930 | BUTTON, MANUAL | Z75826 | 760520 | 1 |
| 274 | 3512933 | SCREW, PANHD, 1.7x5.5x2.9 | Z75986 | W760520 | 4 |
| 284 | 3518122 | SPRING, WIRE, DIAPHRAGM LEVER | Z15906 | 760830 | 1 |
| 285 | 3517521 | SCREW, SPRING RTNG | Z15907 | 760830 | 1 |
| 294 | 3101399 | FRAME, INTERMEDIATE | Z70544 | 761030 | 1 |
| 295 | 3518125 | RING, APERTURE CAM | Z70545 | 760614 | 1 |
| 296 | 3101397 | CAM, APERTURE | Z70710 | 761030 | 1 |
| 298 | 3518128 | FRAME, MOUNT, O/OM | Z70546 | 761030 | 1 |
| 299 | 3517530 | SCREW, PIVOT, COUPLING ARM | Z15909 | 760830 | 1 |
| 300 | 3518129 | SPRING, WIRE, COUPLING ARM | Z15908 | 760830 | 1 |
| 304 | 3513901 | SCREW, FLTHD, 1.4x2.5, CHR | Z75963 | W760520 | 3 |
| 305 | 3517532 | SCREW, SHOULDER | Z15910 | 760830 | 1 |
| 306 | 3517533 | SPRING, WIRE, MANUAL BUTTON | Z15911 | 760830 | 1 |
| 307 | 3517534 | PLATE, MOUNTING | Z15715 | 760830 | 1 |
| 308 | 3517535 | SCREW, MANUAL BUTTON | Z15912 | B771215 | 1 |
| 309 | 3517536 | MOUNT, OLYMPUS | Z15538 | 760830 | 1 |
| 310 | 3517537 | PIPE, SHADE | Z15539 | 760830 | 1 |
| 553 | 3517523 | DIAPHRAGM LEVER ASSY, FRONT | Z15080 | N760830 | 1 |
| 554 | 3103555 | APERTURE CAM RING ASSY, O/OM | Z70074 | N761030 | 1 |
| 555 | 3517531 | LEVER, DIAPHRAGM, REAR, O/OM | Z15083 | N760830 | 1 |

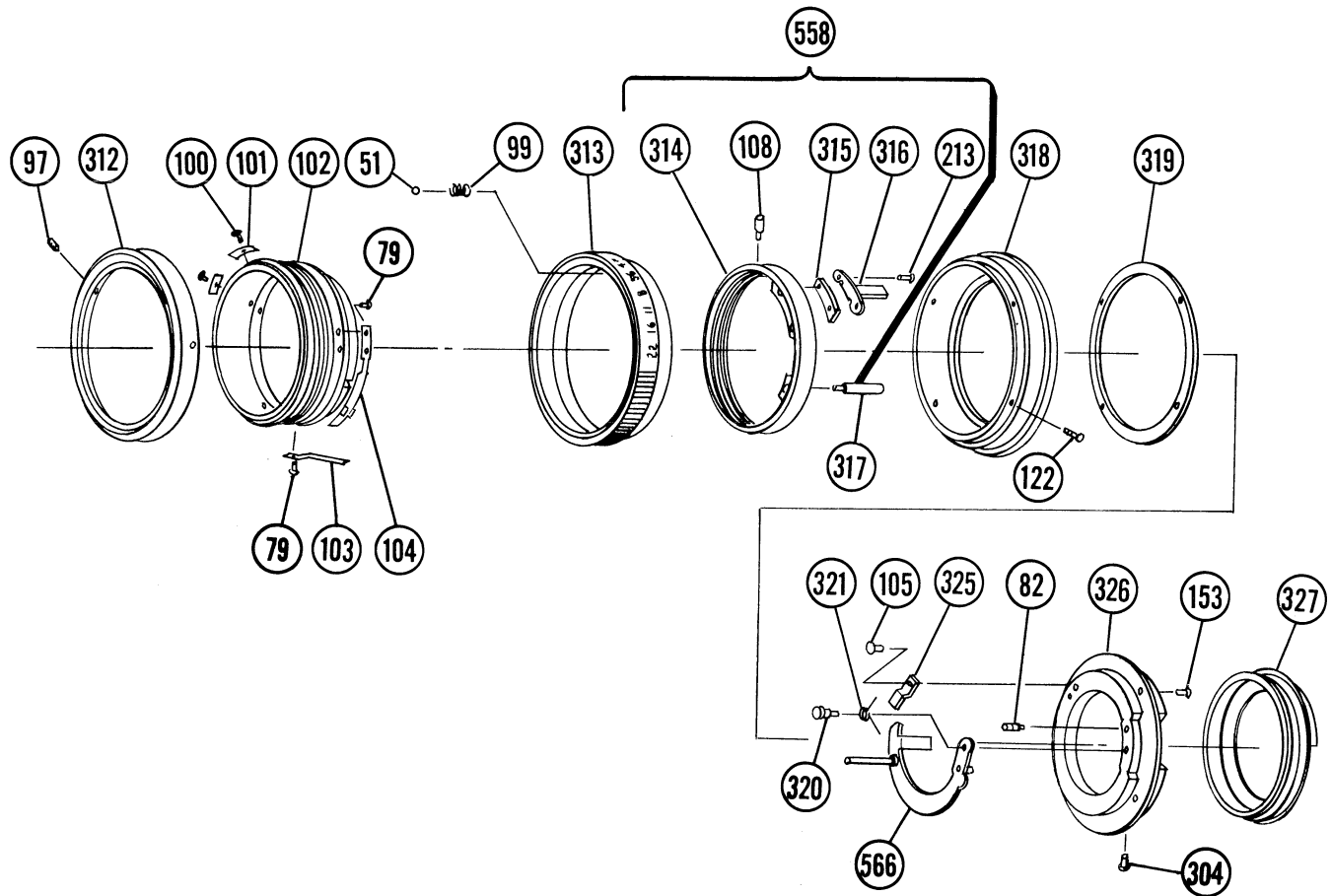


Figure 4-10. Mount Assembly, Pentax K (Ref. 567, Pg 58)

Parts List For Figure 4-10

| Ref. | Vivitar Part No. | Description | Part Code | Quantity |
|------|---------------------|-----------------------------------|----------------|----------|
| 51 | 3512898 | BALL, STEEL, 1.6 | Z75919 760520 | 2 |
| 79 | 3512980 | SCREW, PANHD, 1.7x3.0x3.0, | Z75913 B760520 | 8 |
| 82 | 3512782 | SCREW, SPRING POST | Z75946 760520 | 1 |
| 97 | 3512988 | SETSCREW, 1.4x2.5 | W25903 B760817 | 3 |
| 99 | 3512857 | SPRING, DETENT, 1.5 | Z75920 760520 | 1 |
| 100 | 3512982 | SCREW, PANHD, 1.7x2.5 | Z75933 B760520 | 2 |
| 101 | 3512792 | PLATE, STOP | Z70703 761030 | 2 |
| 102 | 3512793 | FRAME, INTERMEDIATE | Z70527 761030 | 1 |
| 103 | 3512803 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 761030 | 1 |
| 104 | 3512802 | SPRING, ZOOM-MACRO DETENT | Z70705 761030 | 1 |
| 105 | 3512984 | SCREW, PANHD, 1.4x1.5x2.0 | Z75922 B760520 | 2 |
| 108 | 3512801 | SCREW, APERTURE CAM RING | Z75921 760520 | 1 |
| 122 | 3512985 | SCREW, PLTHD, 1.7x2.5 | Z75927 B760520 | 6 |
| 153 | 3512982-1 | SCREW, PANHD, 1.7x2.5, CR | Z75933 W760520 | 5 |
| 304 | 3513901 | SCREW, FLTHD, 1.4x2.5, CR | Z75963 W760520 | 3 |
| 312 | 3103511 | RING, APERTURE INDEX, P/K | Z70525PB770228 | 1 |
| 313 | 3103512 | RING, APERTURE SETTING, P/K | Z70550PB770223 | 1 |
| 314 | 3518094 | RING, APERTURE CAM | Z75583 770228 | 1 |
| 315 | 3518095 | SHIM, APERTURE ARM | Z70941 770228 | 1 |
| 316 | 3518096 | ARM, APERTURE COUPLING | Z75744 770228 | 1 |
| 317 | 3513935 | SCREW, APERTURE TRANSFER | W25924 760817 | 1 |
| 318 | 3518097 | FRAME, MOUNT, P/K | Z70549 770223 | 1 |
| 319 | 3518098-1 | SHIM, FOCUS, 0.2, P/K | Z70924 770228 | A/R |
| 319 | 3518093-2 | SHIM, FOCUS, 0.15, P/K | Z70935 770228 | A/R |
| 319 | 3518093-3 | SHIM, FOCUS, 0.1, P/K | Z70936 770228 | A/R |
| 320 | 3518100 | SCREW, PIVOT, AUTO LEVER | K90916UU770606 | 1 |
| 321 | 3518131 | SPRING, WIRE, AUTO LEVER | K90917UU770606 | 1 |
| 325 | 3518101 | PLATE, HOLDDOWN | Z75743 770228 | 1 |
| 326 | 3518102 | MOUNT, P/K | Z70548 770228 | 1 |
| 327 | 3518103 | PIPE, SHADE, P/K | Z75582 770228 | 1 |
| 558 | 3518161 | APERTURE CAM RING ASSY, P/K | Z75P64 N770228 | 1 |
| 566 | 3103566 | LEVER, AUTO DIAPHRAGM, P/K | Z75P80 N770228 | 1 |

Series 1 Zoom Lens
70-210mm f/3.5 Macro

COMPLETE PARTS LIST

| Vivitar Part No. | Ref. | Description | Part Code | Quantity | | | | | | | | |
|---------------------|------|------------------------------------|----------------|----------|-----|---|-----|---|---|---|------|---|
| | | | | U | N/F | M | C | K | O | P | N/AI | |
| 3101397 | 296 | CAM, APERTURE | Z70710 761030 | | | | | | | 1 | | |
| 3101399 | 294 | FRAME, INTERMEDIATE | Z70544 761030 | | | | | | | 1 | | |
| 3101443 | 86 | HOUSING, DIAPHRAGM, REAR | Z75528 780110 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3101536 | 258 | SCREW, LOCK RELEASE SPRING | Z15918 B770606 | | | | | | | 2 | | |
| 3103493 | 80 | ARM, DIAPHRAGM OPERATING | Z75706 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3103501-2 | 184 | SHIM, FOCUS, 0.15, C | Z85922 760615 | | | | A/R | | | | | |
| 3103501-3 | 184 | SHIM, FOCUS, 0.2, C | Z85923 760615 | | | | A/R | | | | | |
| 3103503 | 198 | SPRING, DIAPHRAGM CONTROL RING | Z85921 760615 | | | | 1 | | | | | |
| 3103511 | 312 | RING, APERTURE INDEX, P/K | Z70525PB770228 | | | | | | | | 1 | |
| 3103512 | 313 | RING, APERTURE SETTING, P/K | Z70550PB770228 | | | | | | | | 1 | |
| 3103522 | 329 | RING, APERTURE INDEX, N/AI | Z70525FB770520 | | | | | | | | | 1 |
| 3103525 | 332 | RING, APERTURE SETTING, N/AI | Z70552FB770520 | | | | | | | | | 1 |
| 3103534 | 342 | RING, APERTURE SETTING, M/MD | Z70553MB771215 | | | 1 | | | | | | |
| 3103536 | 344 | SCREW, FLTHD | Z15921 B771215 | | | 2 | | | | | | |
| 3103538 | 515 | LENS ELEMENT, 15TH, IN HOUSING | Z75U94 N760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3103542 | 527 | LEVER, DIAPHRAGM ACTUATOR, N/F | Z75N80 N760520 | | 1 | | | | | | | |
| 3103544 | 529 | APERTURE CAM RING ASSY, M & M/D | Z70M75 N761030 | | | 1 | | | | | | |
| 3103545 | 530 | LEVER, DIAPHRAGM ACTUATOR, M & M/D | Z70M70 N761030 | | | 1 | | | | | | |
| 3103549 | 535 | MOUNT, CANON | Z70C77 N761030 | | | | 1 | | | | | |
| 3103552 | 538 | LEVER, DIAPHRAGM ACTUATOR, KONICA | Z70K70 N761030 | | | | | 1 | | | | |
| 3103555 | 554 | APERTURE CAM RING ASSY, O/OM | Z70074 N761030 | | | | | | | 1 | | |
| 3103557 | 557 | MOUNT ASSY, COMPLETE, O/OM | Z70062 N761030 | | | | | | | 1 | | |
| 3103559 | 559 | BLADE, DIAPHRAGM, U, N, O | Z75U67 N760520 | 6 | 6 | | | | | 6 | | 6 |
| 3103560 | 560 | BLADE, DIAPHRAGM, M, C, K, P | Z75M68 N760520 | | | 6 | 6 | 6 | | | 6 | |
| 3103563 | 563 | APERTURE CAM RING ASSY, N/AI | Z75F62 N770525 | | | | | | | | | 1 |
| 3103564 | 564 | MOUNT ASSY, COMPLETE, N/AI | Z70F55 N770525 | | | | | | | | | 1 |
| 3103566 | 566 | LEVER, AUTO DIAPHRAGM, P/K | Z75P80 N770228 | | | | | | | | 1 | |
| 3103567 | 567 | MOUNT ASSY, COMPLETE, P/K | Z70P55 N770228 | | | | | | | | 1 | |
| 3103568 | 569 | MOUNT ASSY, COMPLETE, M & MD | Z70M54 N771215 | | | 1 | | | | | | |
| 3103775 | 87 | STOPPER, DIAPHRAGM | Z75708 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3103869 | 345 | RING, LIGHT BAFFLE | Z75750 780110 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3103978 | 17 | RING, ZOOM COLLAR END | Z70507 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3103979 | 52 | SPRING, DETENT, 1.5 | Z75956 760520 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 |
| 3500048 | 245 | SCREW, DIAPHRAGM LEVER RTNG | Z75966 750520 | | | | | | | 2 | | |
| 3512741 | 1 | RING, FILTER | Z70500 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512743 | 8 | HELICOID, OUTER | Z70504 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512744 | 9 | BARREL, LENS | Z70505 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512745 | 11 | TUBE, INNER FOCUSING | Z70506 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512746 | 13 | RING, INNER FOCUSING, LIGHT SEAL | Z70901 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512747 | 16 | SHAFT, CAM SLOT ROLLER | Z70903 761030 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3512748 | 15 | ROLLER, CAM SLOT | Z70902 761030 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3512749 | 14 | SCREW, HELICOID STOPPER | Z75901 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512750 | 502 | PLATE, DRAG ADJUSTMENT | Z70098 N71030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512751 | 20 | GRIP, ZOOM COLLAR | Z70508 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512752 | 21 | SCREW, DRAG ADJUSTMENT | Z70905 761030 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 3512753 | 33 | SHAFT, CAM SLOT ROLLER | Z70907 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512754 | 32 | ROLLER, CAM SLOT | Z70906 761030 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3512755 | 31 | ROLLER, CAM SLOT | Z15901 760830 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512756 | 40 | HOUSING, ZOOM, 3RD LENS GROUP | Z70516 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512757 | 35 | SHAFT, CAM SLOT ROLLER | Z70908 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512759 | 34 | HOUSING, 2ND LENS GROUP | Z70513 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512760 | 22 | TUBE, ZOOM COLLER W/DRAG STRIP | Z70509 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512762 | 505 | TUBE, ZOOM | Z70U95 N761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512763 | 45 | SEAL, LIGHT, ZOOM RING | Z70911 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512764 | 49 | LEVER, CHANGE | Z70520 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512765 | 55 | BUTTON, SHIFT LATCH RELEASE | Z70801 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512766 | 56 | LEVER, CHANGE | Z70521 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512767 | 47 | TUBE, SHIFT | Z70519 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

COMPLETE PARTS LIST, Continued

| Vivitar Part No. | Ref. | Description | Part Code | Quantity | | | | | | | |
|---------------------|------|--------------------------------------|----------------|----------|-----|---|-------------------------|---|---|---|------|
| | | | | U | N/F | M | C | K | O | P | N/AI |
| 3512768 | 46 | PLATE, COVER | Z70701 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512769 | 44 | SHAFT, CAM SLOT ROLLER | Z70910 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512770 | 43 | ROLLER, CAM SLOT | Z70909 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512771 | 66 | RING, LATCH | Z70522 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512772 | 67 | SCREW, LATCH PLATE | Z70913 761030 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3512773 | 508 | LATCH, CHANGE | Z70U92 N761030 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3512774 | 70 | SPRING, CHANGE LATCH | W25926 760817 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3512775 | 71 | HOUSING, DIAPHRAGM, FRONT | Z70523 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512779 | 77 | RING, BLADE OPERATING | Z75705 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512780 | 78 | MOUNT, BLADE OPERATING, RING | Z75526 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512781 | 2 | RING, NAME, VMC, NEW TYPE | Z70501 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512782 | 82 | SCREW, SPRING POST | Z75946 760520 | 1 | | | 2 | 2 | 1 | | 1 |
| 3512783 | 83 | SPRING, DIAPHRAGM | Z75915 760520 | | | | 1 | | | | |
| 3512785 | | HELICOID ASSY | Z70U80 N761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512786 | 568 | LENS TUBE KIT ASSY | Z70U82 N780210 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512787 | 89 | RING, RTNG, DIAPHRAGM HOUSING | Z75529 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512788 | 88 | SCREW, SPRING POST | Z75917 760520 | 1 | | | 1 | 1 | 1 | | |
| 3512789 | 95 | SHIM, ADJUSTMENT | Z70914 761030 | | | | ----- As Required ----- | | | | |
| 3512790 | 96 | RING, APERTURE INDEX, UNIV | Z70525UB761030 | 1 | | | | | | | |
| 3512791 | 98 | RING, APERTURE SETTING, UNIV | Z70526UB761030 | 1 | | | | | | | |
| 3512792 | 101 | PLATE, STOP | Z70703 761030 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3512793 | 102 | FRAME, INTERMEDIATE | Z70527 761030 | 1 | 1 | 1 | | | | 1 | 1 |
| 3512794 | 106 | CAM, APERTURE | Z75709 760520 | 1 | | | | | | | |
| 3512795 | 107 | RING, APERTURE CAM | Z75535 760520 | 1 | 1 | 1 | | | | | 1 |
| 3512796 | 523 | LEVER, AUTO DIAPHRAGM | Z75U80 N760520 | 1 | | | | | | | |
| 3512797 | 118 | RING, AUTO/MANUAL SELECT | Z75537 760520 | 1 | | | | | | | |
| 3512798 | 119 | BUTTON, AUTO/MANUAL SELECT | Z75538 760520 | 1 | | | | | | | |
| 3512799 | 110 | SPRING, DIAPHRAGM LEVER ASSY | Z75924 760520 | 1 | | | | | | | |
| 3512801 | 108 | SCREW, APERTURE CAM RING | Z75921 760520 | 1 | 1 | 1 | | | | | |
| 3512802 | 104 | SPRING, ZOOM-MACRO DETENT | Z70705 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512803 | 103 | SPRING, ZOOM-MACRO DETENT BOOSTER | Z70704 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512804 | 120 | SPRING, LEAF, AUTO/MANUAL DETENT | Z75715 760520 | 1 | | | | | | | |
| 3512805 | 121 | FRAME, MOUNT, UNIV | Z70728 761030 | 1 | | | | | | | |
| 3512806-1 | 123 | SHIM, FOCUS, 0.1, UNIV | Z70915 761030 | A/R | | | | | | | |
| 3512806-2 | 123 | SHIM, FOCUS, 0.15, UNIV | Z70925 761030 | A/R | | | | | | | |
| 3512806-3 | 123 | SHIM, FOCUS, 0.2, UNIV | Z70926 761030 | A/R | | | | | | | |
| 3512807 | 524 | CRANK, DIAPHRAGM CONTROL TRANSFER | Z85U81 N760615 | 1 | | | | | | | |
| 3512808 | 133 | MOUNT, UNIV | Z70529 761030 | 1 | | | | | | | |
| 3512809 | 128 | SCREW, MOUNT | Z70916 761030 | 3 | | | | | | | |
| 3512810 | 134 | PIPE, SHADE, UNIV | Z75539 760520 | 1 | | | | | | | |
| 3512811 | 132 | PIN, DIAPHRAGM CONTROL COUPLING | Z75806 760520 | 1 | | | | | | | |
| 3512814 | 129 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75925 760520 | 1 | | | | | | | |
| 3512815 | 135 | RING, APERTURE INDEX, N/F | Z70525NB761030 | | 1 | | | | | | |
| 3512816 | 136 | RING, APERTURE SETTING | Z70530NB761030 | | 1 | | | | | | |
| 3512817 | 137 | FORK, METER COUPLING | Z75716 760520 | | 1 | | | | | | |
| 3512818 | 138 | SCREW, METER COUPLING FORK | Z75928 760520 | | 1 | | | | | | |
| 3512819 | 139 | CAM, APERTURE | Z75717 760520 | | 1 | | | | | | 1 |
| 3512820 | 140 | SCREW, STOP | Z75929 760520 | | 1 | | | | | | 1 |
| 3512821 | 141 | FRAME, MOUNT | Z70531 761030 | | 1 | | | | | | |
| 3512822-1 | 142 | SHIM, FOCUS, 0.1, N/F | Z70917 761030 | | A/R | | | | | | |
| 3512822-2 | 142 | SHIM, FOCUS, 0.15, N/F | Z70927 761030 | | A/R | | | | | | |
| 3512822-3 | 142 | SHIM, FOCUS, 0.2, N/F | Z70928 761030 | | A/R | | | | | | |
| 3512824 | 150 | MOUNT, N/F | Z75543 760520 | | 1 | | | | | | |
| 3512825 | 151 | SCREW, MOUNT | Z75934 B760520 | | 1 | | | | | | 1 |
| 3512825 | 196 | SCREW, MOUNT | Z75934 B760520 | | | | 1 | | | | |
| 3512826 | 154 | RING, SHADE | Z75544 760520 | | 1 | | | | | | 1 |
| 3512828 | 143 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75930 760520 | | 1 | | | | | | 1 |
| 3512829 | 155 | RING, APERTURE INDEX, M/MD | Z70525MB761030 | | | 1 | | | | | |
| 3512830 | 156 | RING, APERTURE SETTING, M | Z70532MB770514 | | | 1 | | | | | |
| 3512831 | 157 | CAM, APERTURE | Z70706 761030 | | | 1 | | | | | |

Series 1 Zoom Lens
70-210mm f/3.5 Macro

COMPLETE PARTS LIST, Continued

| Vivitar Part No. | Ref. | Description | Part Code | Quantity | | | | | | | | | |
|---------------------|------|-------------------------------------|----------------|----------|---|---|---|-----|-----|---|---|------|--|
| | | | | U | N | F | M | C | K | O | P | N/AI | |
| 3512832 | 158 | SPRING, DIAPHRAGM LEVER | Z75935 550418 | | | | 1 | | | | | | |
| 3512833 | 159 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75936 760520 | | | | 1 | | | | | | |
| 3512835 | 165 | SCREW, SPRING POST | Z75914 760520 | | | | 1 | 2 | | | | | |
| 3512836 | 166 | FRAME, MOUNT, MINOLTA | Z85546 770514 | | | | 1 | | | | | | |
| 3512838 | 168 | MOUNT, MINOLTA | Z85547 770514 | | | | 1 | | | | | | |
| 3512839 | 163 | PLATE, GUIDE, DIAPHRAGM LEVER | Z75721 760520 | | | | 1 | | | | | | |
| 3512841 | 169 | RING, APERTURE INDEX, C | Z70525CB761030 | | | | | 1 | | | | | |
| 3512842 | 171 | RING, APERTURE, SETTING | Z70533CB761030 | | | | | 1 | | | | | |
| 3512843 | 172 | SCREW, PIVOT, DIAPHRAGM LEVER | Z75937 760520 | | | | | 1 | | | | | |
| 3512844 | 173 | SPRING, DIAPHRAGM LEVER | Z75938 760520 | | | | | 1 | | | | | |
| 3512846 | 177 | FRAME, INTERMEDIATE | Z70534 761030 | | | | | 1 | | | | | |
| 3512847 | 534 | RING, DIAPHRAGM CONTROL TRANSFER | Z75C81 N760520 | | | | | 1 | | | | | |
| 3512848 | 180 | SCREW, APERTURE CAM RING | Z75939 760520 | | | | | 1 | | | | | |
| 3512849 | 181 | PIN, EE SIGNAL | Z75817 760520 | | | | | 1 | | | | | |
| 3512850 | 182 | SPRING, EE SIGNAL PIN | Z75940UU760520 | | | | | 1 | | | | | |
| 3512851-1 | 184 | SHIM, FOCUS, 0.1, C | Z85912 760615 | | | | | A/R | | | | | |
| 3512852 | 178 | PLATE, APERTURE RING STOP | Z75723 760520 | | | | | 1 | | | | | |
| 3512853 | 185 | RING, BALL RTNG | Z75553 760520 | | | | | 1 | | | | | |
| 3512854 | 187 | SPRING, APERTURE SIGNAL RING | Z75944 760520 | | | | | 1 | | | | | |
| 3512855 | 188 | RING, APERTURE COUPLING | Z70536 761030 | | | | | 1 | | | | | |
| 3512856 | 193 | PLATE, STOP | Z75725 760520 | | | | | 2 | | | | | |
| 3512857 | 99 | SPRING, DETENT, 1.5 | Z75920 760520 | 1 | 1 | 1 | | 3 | | | 1 | 1 | |
| 3512860 | 202 | RING, BALL RTNG | Z75557 760520 | | | | | 1 | | | | | |
| 3512862 | 207 | RING, BREECHLOCK | Z75559 760520 | | | | | 1 | | | | | |
| 3512863 | 206 | ARM SIGNAL | Z75727 760520 | | | | | 1 | | | | | |
| 3512864 | 199 | SCREW, DETENT | Z75950 760520 | | | | | 1 | | | | | |
| 3512865 | 195 | MOUNT, CANON | Z75555 760520 | | | | | 1 | | | | | |
| 3512866 | 194 | SPRING, LEAF, DETENT | Z75726 760520 | | | | | 1 | | | | | |
| 3512867 | 192 | SCREW, STOP | Z75945 760520 | | | | | 1 | | | | | |
| 3512868 | 191 | STANDOFF, APERTURE CAM | Z75943 760520 | | | | | 2 | | | | | |
| 3512869 | 190 | CAM, APERTURE | Z70707 761030 | | | | | 1 | | | | | |
| 3512870 | 189 | WASHER, 1.7x3.5x0.4 | Z75942 760520 | | | | | 2 | | | | | |
| 3512871 | 208 | RING, APERTURE INDEX, K/AR | Z70525KB761030 | | | | | | 1 | | | | |
| 3512872 | 209 | SCREW, PIVOT | Z75951 760520 | | | | | | 1 | 1 | | | |
| 3512873 | 212 | FRAME, INTERMEDIATE | Z70537 761030 | | | | | | 1 | | | | |
| 3512874 | 214 | PLATE, STOP | Z75729 760520 | | | | | | 1 | | | | |
| 3512875 | 215 | SCREW, APERTURE SETTING RING | Z75953 760520 | | | | | | 1 | | | | |
| 3512876 | 216 | RING, APERTURE SETTING TRANSFER | Z75562 760520 | | | | | | 1 | | | | |
| 3512877 | 217 | FRAME, MOUNT, K/AR | Z70538 761030 | | | | | | 1 | | | | |
| 3512878 | 222 | RING, APERTURE SETTING, K/AR | Z70539KB761030 | | | | | | 1 | | | | |
| 3512879 | 221 | SCREW, CAP, EE RELEASE | Z75955 760520 | | | | | | 1 | | | | |
| 3512880 | 220 | SPRING, EE LOCK | Z75954 760520 | | | | | | 1 | | | | |
| 3512882 | 218 | CATCH, EE LOCK | Z75821 760520 | | | | | | 1 | | | | |
| 3512884 | 223 | RING, RTNG | Z75565 760520 | | | | | | 1 | | | | |
| 3512885 | 224 | SPRING, COIL, TENSION, 2.5x27.0 | Z75957 760520 | | | | | | 1 | | | | |
| 3512887 | 230 | RING, DIAPHRAGM CONTROL COUPLING | Z75566 760520 | | | | | | 1 | | | | |
| 3512888 | 233 | SHIM, FOCUS, 0.1, K/AR | Z70921 761030 | | | | | | A/R | | | | |
| 3512888-2 | 233 | SHIM, FOCUS, 0.15, K/AR | Z70931 761030 | | | | | | A/R | | | | |
| 3512888-3 | 233 | SHIM, FOCUS, 0.2, K/AR | Z70932 761030 | | | | | | A/R | | | | |
| 3512889 | 234 | MOUNT, KONICA | Z75568 760520 | | | | | | 1 | | | | |
| 3512890 | 237 | RING, MAX APERTURE COUPLING | Z70547 761030 | | | | | | 1 | | | | |
| 3512891 | 236 | SCREW, MOUNT STOP | Z75961 760520 | | | | | | 1 | | | | |
| 3512892 | 231 | ARM, DIAPHRAGM COUPLING | Z75731 760520 | | | | | | 1 | | | | |
| 3512893 | 229 | E RING, 1.5 | Z75959 760520 | | | | | | 1 | | | | |
| 3512894 | 225 | WASHER, CAM OPERATING SHAFT | Z75958 760520 | | | | | | 1 | | | | |
| 3512898 | 51 | BALL, STEEL, 1.6 | Z75919 760520 | 2 | 2 | 2 | | 4 | 80 | 1 | 2 | 1 | |
| 3512899 | 186 | BALL, STEEL, 1.2 | Z75941 760520 | | | | | 120 | | 1 | | | |
| 3512903 | 183 | FRAME, MOUNT, C/FD | Z70535 761030 | | | | | 1 | | | | | |
| 3512904 | 238 | RING, APERTURE INDEX, O/OM | Z70525OB761030 | | | | | | | 1 | | | |

COMPLETE PARTS LIST, Continued

| Vivitar Part No. | Ref. | Description | Part Code | Quantity | | | | | | | |
|---------------------|------|------------------------------------|----------------|----------|-----|---|----|---|---|---|------|
| | | | | U | N/F | M | C | K | O | P | N/AI |
| 3512906 | 240 | RING, APERTURE SETTING, O/OM | Z70540OB761030 | | | | | | 1 | | |
| 3512909 | 246 | SCREW, APERTURE CAM RING | Z75967 760520 | | | | | | 1 | | |
| 3512925 | 267 | SCREW, LOCK PLATE | Z75976 760520 | | | | | | 1 | | |
| 3512930 | 273 | BUTTON, MANUAL | Z75826 760520 | | | | | | 1 | | |
| 3512931 | 268 | PLATE, MOUNT LOCKING | Z75741 760520 | | | | | | 1 | | |
| 3512932 | 270 | BUTTON, MOUNT LOCK RELEASE | Z75827 760520 | | | | | | 1 | | |
| 3512933 | 274 | SCREW, PANHD, 1.7x5.5x2.9 | Z75986 W760520 | | | | | | 4 | | |
| 3512934 | 271 | SCREW, STOP | Z75975 760520 | | | | | | 1 | | |
| 3512936 | 179 | RING, APERTURE TRANSFER | Z75551 760520 | | | | 1 | | | | |
| 3512942 | 501 | LENS DOUBLET, 1ST & 2ND ELEMENTS | Z70U99 N761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512943 | 5 | HOUSING, 1ST LENS GROUP | Z70502 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512944 | 6 | LENS ELEMENT, 3RD | G00063 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512945 | 7 | RING, RTNG, 3RD LENS ELEMENT | Z70503 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512946 | 25 | RING, RTNG, 2ND LENS GROUP | Z70510 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512947 | 503 | LENS DOUBLET, 4TH & 5TH ELEMENTS | Z70U97 N761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512948 | 28 | HOUSING, 2ND LENS GROUP | Z70511 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512949 | 29 | LENS ELEMENT, 6TH | G00066 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512950 | 30 | RING, RTNG, 6TH LENS ELEMENT | Z70512 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512951 | 36 | RING, RTNG, 7TH & 8TH ELEMENT | Z70514 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512952 | 504 | LENS DOUBLET, 7TH & 8TH ELEMENTS | Z70U96 N761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512953 | 39 | HOUSING, 3RD LENS GROUP | Z70515 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512954 | 57 | HOUSING, 4TH LENS GROUP | Z75521 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512955 | 506 | LENS DOUBLET, 9TH & 10TH ELEMENTS | Z75U97 N760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512956 | 60 | RING, 10TH & 11TH LENS SPACER | Z75522 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512957 | 61 | LENS ELEMENT, 11TH | G00071 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512958 | 62 | RING, 11TH & 12TH LENS SPACER | Z75523 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512959 | 507 | LENS DOUBLET, 12TH & 13TH ELEMENTS | Z75U96 N760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512960 | 65 | RING, 4TH LENS GROUP RTNG | Z75524 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512961 | 91 | RING, RTNG, 14TH LENS ELEMENT | Z75530 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512962 | 92 | LENS ELEMENT, 14TH | G00074 761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512965 | 547 | MOUNT ASSY, COMPLETE, UNIV | Z70U55 N761030 | 1 | | | | | | | |
| 3512966 | 548 | MOUNT ASSY, COMPLETE, N/F | Z70N55 N761030 | | 1 | | | | | | |
| 3512967 | 549 | MOUNT ASSY, COMPLETE, MINOLTA | Z70M55 N761030 | | | 1 | | | | | |
| 3512968 | 550 | MOUNT ASSY, COMPLETE, CANON | Z70C55 N761030 | | | | 1 | | | | |
| 3512969 | 551 | MOUNT ASSY, COMPLETE, KONICA | Z70K55 N761030 | | | | | 1 | | | |
| 3512971 | 50 | SCREW, PANHD, 1.7x4.0, BLACK | W25923UB760817 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512972 | 12 | SCREW, FLTHD, 1.7x2.5 | Z70900 B761030 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3512974 | 24 | SCREW, FLTHD, 1.4x2.5x2.0 | Z75912 B760520 | 4 | 2 | 2 | 5 | 2 | 5 | 2 | 2 |
| 3512975 | 48 | SCREW, FLTHD, 3-17300850 | Z70912 B761030 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 3512976 | 53 | SETSCREW, 1.4x1.5 | Z75905 B760520 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| 3512977 | 23 | SETSCREW, 2.0x2.0 | Z75910 B760520 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3512978 | 72 | SETSCREW, 2.0x2.5 | Z75911 W760520 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3512979 | 10 | SCREW, COUNTERSUNK 2030645 (BBR) | Z70922 B761030 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 3512980 | 79 | SCREW, PANHD, 1.7x3.0x3.0 | Z75913 B760520 | 7 | 8 | 8 | 13 | 7 | 7 | 8 | 8 |
| 3512981 | 90 | SETSCREW, 1.7x3.0 | Z85907 B760615 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512982 | 100 | SCREW, PANHD, 1.7x2.5 | Z75933 B760520 | 5 | 2 | 2 | 2 | 4 | 2 | 2 | 2 |
| 3512982-1 | 153 | SCREW, PANHD, 1.7x2.5, CR | Z75933 W760520 | | 5 | 4 | | | | 5 | |
| 3512983 | 211 | SCREW, FLTHD, 1-14200460 | Z70920 B761030 | | | | | 1 | | | |
| 3512984 | 105 | SCREW, PANHD, 1.4x1.5x2.0 | Z75922 B760520 | 4 | 2 | 2 | 4 | 3 | 2 | 2 | 2 |
| 3512985 | 122 | SCREW, FLTHD, 1.7x2.5 | Z75927 B760520 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 3512986 | 124 | SCREW, PANHD, 1.4x2.0x1.8 | Z75926 B760520 | 2 | | | | | | | |
| 3512988 | 97 | SETSCREW, 1.4x2.5 | W25903 B76017 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3512989 | 197 | SCREW, PANHD, 1.7x5.5, BLK | Z75947UU760520 | | | | 5 | | | | |
| 3512990 | 213 | SCREW, PANHD, 1.4x1.5x2.0 | Z75952 B760520 | | | | | 2 | | 2 | |
| 3512991 | | LENS GROUP ASSY, 1ST | Z70U85 N761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512992 | | LENS GROUP ASSY, 2ND | Z70U84 N761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512993 | | LENS GROUP ASSY, 3RD | Z70U83 N761030 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512994 | | LENS GROUP ASSY, 4TH | Z75U73 N760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3512995 | | LENS GROUP ASSY, 5TH | Z75U74 N760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Series 1 Zoom Lens
70-210mm f/3.5 Macro

COMPLETE PARTS LIST, Continued

| Vivitar Part No. | Ref. | Description | Part Code | Quantity | | | | | | | | | |
|---------------------|------|------------------------------------|----------------|----------|-----|-----|---|---|-----|-----|------|-----|--|
| | | | | U | N/F | M | C | K | O | P | N/AI | | |
| 3512996 | 509 | DIAPHRAGM HOUSING ASSY, UNIV | Z70U91 N761030 | 1 | | | | | | | | | |
| 3512997 | 510 | DIAPHRAGM HOUSING ASSY, N/F & N/AI | Z70N91 N761030 | | 1 | | | | | | | | |
| 3512998 | 511 | DIAPHRAGM HOUSING ASSY, M/MD, P/K | Z70M91 N761030 | | | 1 | | | | | 1 | | |
| 3512999 | 512 | DIAPHRAGM HOUSING ASSY, CANON | Z70C91 N761030 | | | | 1 | | | | | | |
| 3512971 | 339 | SCREW, PANHD, 1.7x2.5 | W25923 W760817 | | | | | | | | | 5 | |
| 3513000 | 513 | DIAPHRAGM HOUSING ASSY, KONICA | Z70K91 N76030 | | | | | 1 | | | | | |
| 3513001 | 514 | DIAPHRAGM HOUSING ASSY, O/OM | Z70O91 N761030 | | | | | | 1 | | | | |
| 3513713 | 239 | SPRING, DETENT, 1.2 | Z75964 760520 | | | | | | 1 | | | | |
| 3512774-1 | 252 | SHIM, FOCUS, 0.1, O/OM | Z70923 761030 | | | | | | A/R | | | | |
| 3512774-2 | 252 | SHIM, FOCUS, 0.15, O/OM | Z70934 761030 | | | | | | A/R | | | | |
| 3513774-3 | 252 | SHIM, FOCUS, 0.2, O/OM | Z70934 761030 | | | | | | A/R | | | | |
| 3513783 | 259 | SPRING, LEAF, LOCK RELEASE | Z75737 760520 | | | | | | 1 | | | | |
| 3513845 | 144 | SPRING, AUTO DIAPHRAGM LEVER | Z75931 760520 | | | | | | | | | 1 | |
| 3513859 | 75 | SCREW, FLTHD, 1.4x2.5 | Z75963 B760520 | 6 | 6 | 6 | 6 | 9 | 8 | 6 | | 6 | |
| 3513901 | 304 | SCREW, FLTHD, 1.4x2.5, CR | Z75963 W760520 | | | | | | 3 | 3 | | | |
| 3513932 | 84 | SPRING, DIAPHRAGM | Z75916 760520 | 1 | | | 1 | | 1 | | | | |
| 3513935 | 317 | SCREW, APERTURE TRANSFER | W25924 760817 | | | | | | | 1 | | | |
| 3513938 | 219 | SHAFT, EE RELEASE | Z75822 760520 | | | | | 1 | | | | | |
| 3513947 | 235 | SCREW, PANHD, 1.7x3.0, CR | Z75913 W760520 | | | | | 4 | | | | | |
| 3514089 | 152 | SCREW, FLTHD, 1.4x2.0, CHR | Z75912 W760520 | | 2 | | 2 | | | | | 2 | |
| 3514269 | 81 | ARM, DIAPHRAGM OPERATING, OM | Z75707 760520 | | | | | | 1 | | | | |
| 3514303 | 522 | APERTURE CAM RING ASSY, UNIV | Z75U61 N760520 | 1 | | | | | | | | | |
| 3514304 | 526 | APERTURE CAM RING ASSY, N/F | Z75N62 N760520 | | 1 | | | | | | | | |
| 3514313 | 532 | LEVER, AUTO DIAPHRAGM, CANON | Z75C80 N760520 | | | | 1 | | | | | | |
| 3517520 | 76 | RING, DIAPHRAGM BLADE | Z75704 760520 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| 3517521 | 285 | SCREW, SPRING RTNG | Z15907 760830 | | | | | | | 1 | | | |
| 3517523 | 553 | DIAPHRAGM LEVER ASSY, FRONT | Z15080 N760830 | | | | | | | 1 | | | |
| 3517527 | 250 | ARM, APERTURE COUPLING | Z15713 760520 | | | | | | | 1 | | | |
| 3517530 | 299 | SCREW, PIVOT, COUPLING ARM | Z15909 760830 | | | | | | | 1 | | | |
| 3517531 | 555 | LEVER, DIAPHRAGM, REAR, O/OM | Z15083 N76830 | | | | | | | 1 | | | |
| 3517532 | 305 | SCREW, SHOULDER | Z15910 760830 | | | | | | | 1 | | | |
| 3517533 | 306 | SPRING, WIRE, MANUAL BUTTON | Z15911 760830 | | | | | | | 1 | | | |
| 3517534 | 307 | PLATE, MOUNTING | Z15715 760830 | | | | | | | 1 | | | |
| 3517535 | 308 | SCREW, MANUAL BUTTON | Z15912 B771215 | | | | | | | 1 | | | |
| 3517536 | 309 | MOUNT, OLYMPUS | Z15538 760830 | | | | | | | 1 | | | |
| 3517537 | 310 | PIPE, SHADE | Z15539 760830 | | | | | | | 1 | | | |
| 3518064 | 130 | LEVER, AUTO DIAPHRAGM TRANSFER | Z75712 760520 | 1 | | | | | | | | | |
| 3518065 | 131 | BUSHING, PIVOT SCREW | Z75805 760520 | 1 | | | | | | | | | |
| 3518075-1 | 167 | SHIM, FOCUS, 0.1, M/SR, M/MD | Z70918 761030 | | | A/R | | | | | | | |
| 3518075-2 | 167 | SHIM, FOCUS, 0.15, M | Z70929 761030 | | | A/R | | | | | | | |
| 3518075-3 | 167 | SHIM, FOCUS, 0.2, M | Z70930 761030 | | | A/R | | | | | | | |
| 3518094 | 314 | RING, APERTURE CAM | Z75583 770228 | | | | | | | | 1 | | |
| 3518095 | 315 | SHIM, APERTURE ARM | Z70941 770228 | | | | | | | | 1 | | |
| 3518096 | 316 | ARM, APERTURE COUPLING | Z75744 770228 | | | | | | | | 1 | | |
| 3518097 | 318 | FRAME, MOUNT, P/K | Z70549 770228 | | | | | | | | 1 | | |
| 3518098-1 | 319 | SHIM, FOCUS, 0.2, P/K | Z70924 770228 | | | | | | | A/R | | | |
| 3518098-2 | 319 | SHIM, FOCUS, 0.15, P/K | Z70935 770228 | | | | | | | A/R | | | |
| 3518098-3 | 310 | SHIM, FOCUS, 0.1, P/K | Z70936 770228 | | | | | | | A/R | | | |
| 3518100 | 320 | SCREW, PIVOT, AUTO LEVER | K90916UU770606 | | | | | | | | 1 | | |
| 3518101 | 325 | PLATE, HOLDDOWN | Z75743 770228 | | | | | | | | 1 | | |
| 3518102 | 326 | MOUNT, P/K | Z70548 770228 | | | | | | | | 1 | | |
| 3518103 | 327 | PIPE, SHADE, P/K | Z75582 770228 | | | | | | | | 1 | | |
| 3518105 | 331 | FRAME, MOUNT, N/AI | Z70551 770520 | | | | | | | | | 1 | |
| 3518107 | 333 | FORK, METER COUPLING | Z75747 770520 | | | | | | | | | 1 | |
| 3518108 | 334 | SCREW, METER COUPLING FORK | Z15917 770520 | | | | | | | | | 1 | |
| 3518109 | 335 | SHIM, FOCUS, 0.5, N/AI | Z70937 770520 | | | | | | | | | A/R | |
| 3518110-1 | 336 | SHIM, FOCUS, 0.2, N/AI | Z70938 770520 | | | | | | | | | A/R | |
| 3518110-3 | 336 | SHIM, FOCUS, 0.1, N/AI | Z70940 770520 | | | | | | | | | A/R | |
| 3518111 | 562 | ARM, DIAPHRAGM CONTROL TRANSFER | Z75F80 N770520 | | | | | | | | | 1 | |
| 3518112 | 338 | MOUNT, N/AI | Z75588 770520 | | | | | | | | | 1 | |

COMPLETE PARTS LIST, Continued

| Vivitar Part No. | Ref. | Description | Part Code | U | N | M | Quantity | C | K | O | P | N/AI |
|---------------------|------|-------------------------------------|----------------|---|---|---|----------|---|---|-----|---|------|
| 3518117 | 540 | RING, DIAPHRAGM CONTROL TRANSFER | Z75K84 N760520 | | | | 1 | | | | | |
| 3518118 | 232 | RING, BALL RTNG | Z75567 760520 | | | | 1 | | | | | |
| 3518122 | 284 | SPRING, WIRE, DIAPHRAGM LEVER | Z15906 760830 | | | | | | | 1 | | |
| 3518125 | 295 | RING, APERTURE CAM | Z70545 760614 | | | | | | | 1 | | |
| 3518127-1 | 249 | SHIM, APERTURE COUPLING ARM, 0.1 | Z85916 760615 | | | | | | | A/R | | |
| 3518127-2 | 249 | SHIM, APERTURE COUPLING ARM, 0.2 | Z85925 760615 | | | | | | | A/R | | |
| 3518127-3 | 249 | SHIM, APERTURE COUPLING ARM, 0.4 | Z85925 760615 | | | | | | | A/R | | |
| 3518128 | 298 | FRAME, MOUNT, O/OM | Z70546 761030 | | | | | | | 1 | | |
| 3518129 | 300 | SPRING, WIRE, COUPLING ARM | Z15908 760830 | | | | | | | 1 | | |
| 3518130 | 330 | SCREW, CAM RING | Z15919 770608 | | | | | | | | | 1 |
| 3518131 | 321 | SPRING, WIRE, AUTO LEVER | K90917UU770606 | | | | | | | | 1 | |
| 3518155 | 539 | APERTURE CAM RING ASSY, K/AR | Z70K75 N761030 | | | | 1 | | | | | |
| 3518161 | 558 | APERTURE CAM RING ASSY, P/K | Z75P64 N770228 | | | | | | | | 1 | |

