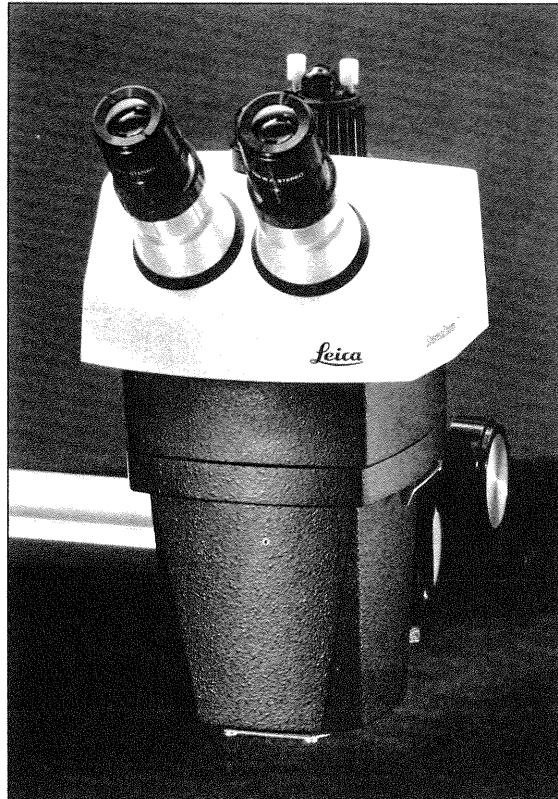


StereoZoom[®] 7 Stereomicroscope



SERVICE MANUAL

Leica

StereoZoom® 7 Stereomicroscope

Service Manual

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1.0 Introduction

This manual describes service procedures for Leica's StereoZoom® 7 stereomicroscope. It is designed to assist trained service technicians determine if the stereomicroscope has a mechanical or an optical alignment problem.

By following the service procedures properly, the problem can be quickly and accurately diagnosed.

This Manual Explains How To:

- disassemble the stereomicroscope
- examine the stereomicroscope for mechanical and optical problems by checking alignments
- clean the optics before assembly
- check focus, centration and magnification
- align the optics
- reassemble the instrument after it has been disassemble

All of the tools needed to repair the StereoZoom 7 stereomicroscope can be purchased through Leica. A complete list of repair tools appears on page 9.

If the instrument cannot be repaired on site, contact your nearest authorized Leica Service Center.

For more information contact Leica's Technical Services Department in Buffalo, NY USA at 716-686-3000.

NOTE: Before beginning the service procedures, it is important to read and follow the guidelines in Section 2.0, Safety Precautions. Remember that these safety guidelines will help to keep the StereoZoom 7 stereomicroscope in good operating condition.

2.0 Safety Precautions

1. Only use a non-flammable, non-toxic solvent for cleaning.
2. Do not touch the mirrors. They should be cleaned only with dry air (aerosol spray).
3. Apply new cement to surfaces where it was removed to make adjustments.
4. Do not smoke while servicing the instrument; smoke can cause film build-up on the mirrors and lenses.
5. Do not attempt to disassemble the instrument beyond the steps described in Section 4.0, Cleaning the Optics.

3.0 Disassembly Procedure

Determine why the instrument needs servicing before disassembling it.

For an optical problem refer to Section 6.0, Alignment Check Procedure. This procedure checks the resolution, focus, centration and magnification of the instrument. Refer to Section 5.0, Reassembly once the optical problem is resolved.

Tools Needed for Disassembly:

1. 0.050" Allen wrench
2. 0.109" Allen wrench (for units manufactured before 1983)
3. jewelers screwdriver
4. Philips screwdriver
5. regular bladed screwdriver
6. brush or lint-free cloth
7. KG-207 Grease
8. KG-207-44 Grease/Oil Mix

Refer to Section 9.0, Parts List/Descriptions to properly disassemble the instruments. Index numbers are listed in parentheses in the following text.

To Begin Disassembly:

Determine if the problem is mechanical or optical.

If the instrument has a mechanical problem disassemble the stereomicroscope using the following procedure.

Using a screwdriver, remove the eyepiece adapters (7) by unscrewing them in a counterclockwise motion.

Use a jewelers screwdriver to lift out the dust seals (6) and pull them free from the eyepiece adapters (7).

Remove the zoom magnification knob (55) by backing out (withdrawing) the screw (57) using a 0.050" Allen wrench.

Place the StereoZoom 7 stereomicroscope on its side. Using a screwdriver, remove the four screws (20) on the bottom of the instrument cover.

NOTE: Some of the instruments have Allen screws that can be removed using a 0.109" Allen wrench.

Remove the two screws (48) from the back cover plate (49) using a screwdriver.

Lift the back cover off (49).

Remove the foam dust ring (87) from the gear and shaft assembly (63).

Disassemble the lower housing (21) by removing the three screws (20) with a screwdriver.

Lift the inner frame assembly (18) from the lower housing (21).

Using a soft bristle brush or lint-free cloth, remove the grease from the guide rods (65).

NOTE: Do not touch the lens surface when lubricating.

Then, relubricate them using a soft bristle brush and KG-207 grease.

Visually check the cam (70), and if necessary, lubricate it with KG-207-44 mix.

4.0 Cleaning The Optics

Once the StereoZoom 7 stereomicroscope has been disassembled and the mechanical alignments have been checked, the optics must be cleaned.

Tools Needed to Clean the Optics:

- | | |
|------------------------------|----------------------------------|
| 1. ether | 6. work stand (312684-88) |
| 2. silver pick | 7. modified work housing (K4112) |
| 3. lens paper | 8. eyepiece adapters (K4107) |
| 4. cotton swabs (wood stick) | 9. air spray |
| 5. glass cleaner | 10. darkfield stop (K4118) |

Refer to Figure 1 to locate the optical components that must be cleaned.

To Begin Cleaning:

Insert the StereoZoom 7 stereomicroscope into the work housing (K4112) mounted into the work stand (312684-88).

Replace the zoom magnification knob (55) and screw in the two eyepiece adapters (K4107).

Look through one of the eyepiece adapters (K4107).

Use the zoom magnification knob (55) to focus on each surface of the lens assembly being viewed.

Use the aerosol spray to clean off each lens.

Wrap the wooden handle of the cotton swab with lens paper. Dip it in ether and clean the lens. If there is extra dirt or grit on the lens, apply glass cleaner to the cotton swab. Applying finger pressure to the cotton swab, clean the lens.

Use a darkfield stop (K4118) on the stage to detect any foreign particles in the optical system, if necessary.

NOTE: Do not disassemble the StereoZoom 7 stereomicroscope any further.

5.0 Reassembly

After disassembling the stereomicroscope, checking the mechanical alignments, and cleaning the lenses, the unit must be reassembled. Refer to Figure 1 to properly reassemble the StereoZoom 7 stereomicroscope. Index numbers are in parentheses.

P2-409 grease is needed to reassemble the unit.

To Begin Reassembling the StereoZoom 7 Stereomicroscope :

Turn the zoom magnification knob (55) to its lowest power position. This allows the knob to be easily repositioned later.

Remove the zoom magnification knob (55) and eyepiece adapters (7) from the instrument.

Remove the three screws (20) that secure the optical unit in the work housing (K4112) and carefully lift the unit free.

Place the gasket (19) in the lower housing.

Place the optical unit into the lower housing (21) and secure it with three screws (20).

Place the foam dust ring onto the gear and shaft assembly (70) and replace the upper housing (26).

Using six screws, secure the upper housing with four screws (20) on the bottom and two at the rear (48).

Place the dust seals (6) on the eyepiece adapters (7).

Replace the eyepiece adapters (7) and turn them in a clockwise direction. Be sure that the eyepiece adjusting rings (9) are not disturbed.

Apply P2-409 grease to the external thread of the left eyepiece adapter.

NOTE: The right eyepiece adapter is fixed. The left eyepiece adapter is adjustable.

Replace the zoom magnification knob (55). Set it at the 1X position against the stop and align it with the red dot that secures the set screw (57).

Install the eyepieces and check the full travel of the zoom magnification knob. If image jump occurs at the 1X or 7X end stops on the knob, loosen and back off the knob to realign the knob and the stop.

The StereoZoom 7 stereomicroscope is now ready to use.

6.0 Alignment Check Procedure

The Alignment Check Procedure helps to check the focus, centration and magnification of the StereoZoom 7 stereomicroscope.

If the focus, centration or magnification is not working properly, the optics must be aligned using the procedures described in Section 7.0, Optical Alignment Procedure.

For this procedure, the instrument must be assembled in one piece. (Refer to Section 4.0, Reassembly.)

Tools Needed for the Alignment Check Procedure:

1. work stand (312684-88)
2. fluorescent illuminator (313366)
3. centering eyepiece (K4100)
4. crossline centering slide (K4108)

Refer to Figure 1 to perform the Alignment Check Procedure properly. Index numbers are in parentheses.

To Begin the Alignment Check Procedure:

Place the StereoZoom 7 stereomicroscope in the work stand (312684-88) and turn on the fluorescent illuminator (313366).

By looking through the eyepiece tubes, determine if there are any scratches, digs, chips or dirt on the lenses. If the lenses are dirty, clean them using the procedure described in Section 4.0, Cleaning the Optics. If the lenses or eyepieces are damaged, remove and replace them. Extra lenses and eyepieces can be ordered from your local Leica representative.

To Check for Centration:

Insert the centering eyepiece (K4100) into the right eyepiece tube (3).

Place a crossline centering slide (K4108) on the stage of the work stand.

Turn the zoom magnification knob (55) to its highest magnification point (7X).

Adjust the crossline centering slide (K4108) so it coincides with the eyepiece reticle at high power in the center of the box.

Turn the zoom magnification knob (55) to its lowest power (1X) and check the focus, centration and smoothness of travel as the instrument zooms to low magnification.

The allowable tolerance of displacement between the reticle and the slide is 1/16" (1.59mm).

If the tolerance is not met, the focus is blurry. If the image jumps in and out of focus during zooming, then the optics need to be realigned. Refer to Section 7.0, Optical Alignment Procedure to realign the optics.

7.0 Optical Alignment Procedure

NOTE: To properly execute these procedures, the instrument has to be assembled. Refer to Section 5.0, Reassembly if the instrument has not already been reassembled.

There are four optical alignment procedures to perform to align the optics of the StereoZoom 7 stereomicroscope:

- resolution
- focus
- centration
- magnification

7.1 Resolution Procedure

Resolution can be judged when viewing the image on the slide. The lines seen through the eyepiece, depending on the magnification power, should be in the center of the field of view.

The following procedure enables the resolution of the stereomicroscope to be sharpened.

Tools Needed for the Resolution Procedure:

1. work housing (K4112)
2. 5° wedge resolution target slide (K4115)
3. resolution target (K4109)

Refer to Figure 1 to perform the Resolution Procedure. Index numbers are in parentheses.

To Begin the Resolution Procedure:

Secure the stereomicroscope in the work housing (K4112) with three screws (20).

Insert a 10X widefield stereo eyepiece into the right eyepiece adapter (7).

Place the 5° wedge resolution target slide (K4115) on the stage. The 5° wedge resolution target slide (K4115) should be slanted toward the side being checked.

The resolution on the left side should be the same as the right side.

Center the resolution target (K4109) in a plane perpendicular to its optical axis using the 5° wedge resolution target slide (K4115).

All parallel lines in the field of view must appear black and gray.

The horizontal and vertical resolutions while viewing should appear as follows:

- at 7X, using the 5° wedge resolution target slide (K4115) on axis –
 - B-6 300 horizontal lines/mm
 - B-5 270 vertical lines/mm
- at 1X, using the 5° wedge resolution target slide (K4115) on axis –
 - B-3 70 horizontal and vertical lines/mm
- at points 9.5mm of axis in the eyepiece focal plane –
 - A-3 35 horizontal and vertical lines/mm

7.2 Focusing Adjustment Procedure

The Focusing Adjustment Procedure adjusts and sharpens the focusing capability of the StereoZoom 7 stereomicroscope.

Tools Needed:

1. 10X widefield stereo eyepiece (311571)
2. resolution target slide (K4109)
3. work stand (312684-88)
4. two 0.050" Allen wrenches
5. Allen screwdriver
6. work housing (K4112)

Refer to Figure 1 to perform the Focusing Adjustment Procedure properly. Index numbers are in parentheses.

To Begin the Preliminary Setup for the Focusing Adjustment Procedure: check the eyepiece tubes to ensure that they are the same height. They should be about a one-half turn up from the shoulder of the instrument.

Place the 10X widefield stereo eyepiece (311571) in the right eyepiece tube.

Place the resolution target slide (K4109) on the stage of the work stand (312684-88) and center it.

7.3 Right-Side Focus Procedure

Turn the zoom magnification knob (55) to the highest power and focus on the resolution slide.

Next, turn the zoom magnification knob (55) to low power; the instrument should still be in focus.

If the instrument is out of focus, raise the eyepiece from the eyepiece tube while looking through it.

If the focus improves, move the relay lens (39) up. To do this, remove the cement from the relay lens with acetone first. Then, adjust the lens by unscrewing the adjustment screw (40), resetting the lens and tightening the screw down.

If the focus does not improve as the eyepiece is raised, loosen the lens assembly (60).

Then, screw the relay lens (39) down until a sharp image appears.

Using the zoom magnification knob (55), zoom to high

magnification and adjust the lower yoke (46) to bring it into sharp focus at high magnification. *Note: To adjust the lower yoke, adjust the lower yoke screws on the yoke.*

Repeat this procedure until both the high and low magnifications are in focus.

7.4 Right-Side Fade Out Procedure

To correct the fade out on the right side, use the zoom magnification knob (55) to zoom to the point of fade out. Then, sharpen the image with the coarse adjustment knob on the work stand.

Next, zoom to the high power and adjust the lower yoke (46) until the high power is in sharp focus.

NOTE: To adjust the lower yoke, adjust the lower yoke screws on the yoke.

Then, zoom to low power and adjust the relay lens (39) to bring the low power into sharp focus.

7.5 Left-Side Focus Procedure

To adjust the left side focus, repeat the right-side focus procedure.

Important: When adjusting the left-side focus, do not move or adjust the coarse adjustment knob on the work stand. When the coarse adjustment knob remains in place, optically match the right and left sides.

If both high power and low power are out of focus on the left side, thread the eyepiece tube (3) in and out to adjust the eyepiece tube (3) until the low power is in focus.

Using the zoom magnification knob (55), zoom to high power and adjust the lower yoke (46) until high power is in focus, then zoom back to low power.

NOTE: To adjust the lower yoke, adjust the lower yoke screws on the yoke.

If low power is still out of focus, readjust the eyepiece tube (3) so the low power is in sharp focus.

Zoom back to high power and adjust the lower yoke (46) for sharp focus.

7.6 Left-Side Fade Out Procedure

To correct fade out on the left side, turn the lower screw of the upper yoke (42) out two turns.

Tighten the top screw and repeat the above step to refocus from the start.

Using two 0.050" Allen wrenches, adjust the upper yoke (42) screws by simultaneously loosening one screw while tightening the other screw.

Place a ruler or straight object across the eyepieces to see if they are the same height. If they are not adjust them until they are the same height.

Using an Allen screwdriver, adjust the Allen set screw to adjust the relay lens (39) to a lower magnification.

Adjust the lower yoke (46) to bring it in at high magnification.

NOTE: To adjust the lower yoke, adjust the lower yoke screws on the yoke.

Using the zoom magnification knob (55), zoom to high power and sharpen the focus by adjusting the lower yoke (46).

Adjust the lower yoke (46) in the same way as the upper yoke (42).

Using the zoom magnification knob (55), zoom to low power and set the focus with the relay lens (39).

7.7 Centration Procedure

After performing the Centration Procedure both eyepieces can be centered and the image will be appear centered on the stage.

Tools needed for Centration Procedure:

1. work housing (K4112)
2. centering eyepiece (K4100)
3. crossline slide (K4108)
4. two 0.050 Allen wrenches

Refer to Figure 1 to perform the Centration Procedure properly. Index numbers are in parentheses.

7.8 General Adjustment Procedure for the Right Side

Place the instrument in the work housing (K4112).

Place the centering eyepiece (K4100) in the right eyepiece tube.

Center the crossline slide (K4108) on the stage of the work stand.

Adjust the crossline slide (K4108) so it matches the eyepiece reticle at its highest power.

NOTE: It should be centered in the box of the eyepiece reticle.

Using the zoom magnification knob (55), zoom to low magnification. Center at low magnification by adjusting the guide rods (65) using two 0.050" Allen wrenches.

Using two 0.050" Allen wrenches, adjust the outside rod (65) from the side and the inside rod (65) from the front.

NOTE: The rods are cemented into position. Remove the cement with acetone to adjust the rods.

Using the zoom magnification knob (55), zoom to high magnification and recenter the slide. Then, zoom to low magnification and recenter with the rods (65).

Repeat this procedure until the crossline slide (K4108) is centered in the box.

7.9 General Adjustment Procedure for the Left Side

Turn the zoom magnification knob (55) to high power.

If adjustment is necessary, use a 0.050 Allen wrench to move the #1 lens assembly in the carrier mount to center the image.

NOTE: The #1 lens assembly (80) in the carrier mount (83) should be moved only slightly.

Using the zoom magnification knob (55), zoom to low magnification.

Move the rods (65) to center at the low magnification. The image should be centered.

If the image is not centered, repeat this procedure until the image is centered.

Apply new cement to all spots that had cement removed for the adjustment procedures.

7.10 Curve Adjustment

If a curve exists when viewing the crossline slide, move the GH lens (60) in the upper yoke (42) off center approximately three times the distance of the curve at low magnification—in the opposite direction.

Repeat this procedure until the curve is removed from view.

7.11 Magnification Procedure

The Magnification Procedure adjusts and fine focuses the magnification power of the stereomicroscope.

Tools Needed for the Magnification Procedure:

1. work stand (312684-88)
2. centering eyepiece (K4100)
3. stage micrometer target slide (K4111)

Refer to Figure 1 to perform the Magnification Procedure properly. Index numbers are in parentheses.

To Adjust the Magnification:

Place the stage micrometer target slide (K4111) on the stage of the work stand.

Place the centering eyepiece (K4100) in the right eyepiece tube.

Using the zoom magnification knob (55), focus on the stage micrometer target slide (K4111) at high power, then zoom to low power.

Line up the zero line on the stage micrometer target slide (K4111) with the zero line in the centering eyepiece (K4100).

The zero line in the eyepiece should fall between 9.8 and 10.2 on the stage micrometer target slide.

Place the centering eyepiece (K4100) in the left eyepiece and check the magnification on the left side.

NOTE: Repeat the above steps to check the left side magnification.

The tolerance for the left side is the same as the right side — ± 2 divisions.

If the magnification is not within ± 2 divisions, the microscope is not balanced with the focal length of the objective lens.

If this is the case, contact your local Leica representative for further assistance.

8.0 Repair Tools

K4100 Centering Eyepiece
K4107 Eyepiece Adapters
K4108 Crossline Centering Slide
K4109 Resolution Target Slide
K4111 Stage Micrometer Target Slide
K4112 Modified Work Housing
K4115 5° Wedge Resolution Target Slide
K4118 Darkfield Stop

In addition the following catalog items are needed:

312684-88 Work Stand
313366 Fluorescent Illuminator

9.0 Part List/Descriptions

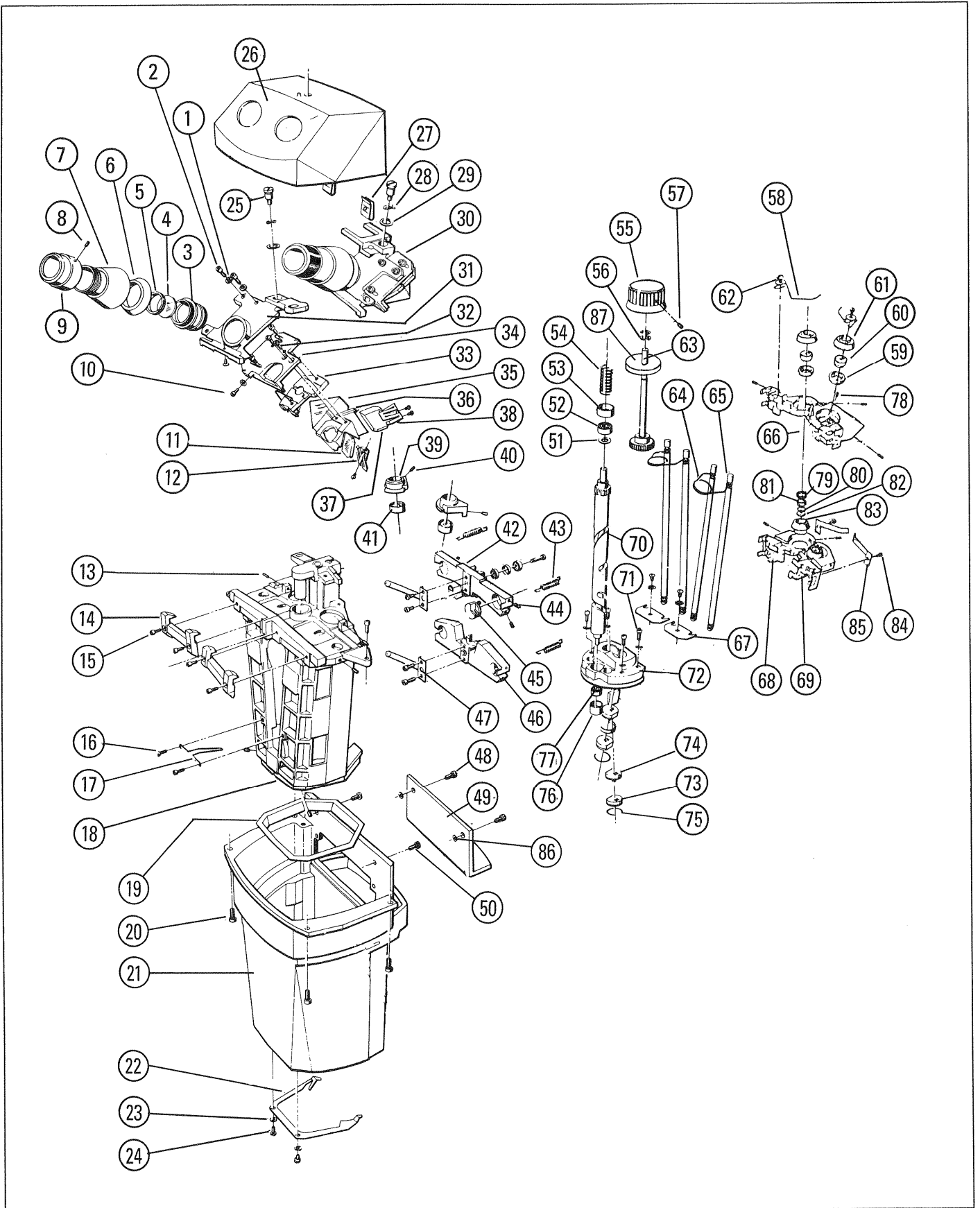


Figure 1

StereoZoom 7 Stereomicroscope Power Pod

Catalog No. 312701

Index No.	Part No.	Description	Qty. per Assembly	Index No.	Part No.	Description	Qty. per Assembly
1.	312701-396	Spring Washer.....	1	42.	312701-463	Upper Yoke.....	1
2.	313233-145	Screw 4-40 x 5/16.....	8	43.	312701-459	Spring.....	2
3.	312701-438	Tube.....	2	44.	313060-165	Screw 4440 x 3/8 LG.....	8
4.	312701-047	Dust Cover.....	2	45.	312701-477	Right Drive Pin Assembly &.....	2
5.	312701-437	Snap Ring.....	2		312701-474	Left Drive Pin Assembly.....	2
6.	312701-534	Dust Seal (Right).....	2	46.	312701-464	Lower Yoke.....	1
7.	312701-325	Right Eyepiece Adapter.....	1	47.	312701-460	Spring.....	2
	312701-234	Left Eyepiece Adapter (not shown).....	1	48.	312701-400	Screw 6 - 32 T x 1/2 LG.....	1
8.	312701-379	Screw -2-64 x 1/16 LG.....	1	49.	312701-393	Cover Plate.....	4
9.	312701-235	Eyepiece Ring.....	1	50.	312701-400	Screw 6/32 T x 1/2 LG.....	4
	312701-236	Eyepiece Adjusting Ring (not shown).....	1	51.	900083-68	F-115 Washer.....	1
10.	313233-145	Screw 4-40 x 5/16.....	1	52.	312701-298	New Departure Bearing #77R4U &.....	1
	312701-396	Spring Washer.....	1	53.	312701-160	Pressure Ring.....	1
11.	312701-042	Mirror "B".....	2	54.	312701-394	Cam Spring.....	1
12.	312701-340	Mirror Spring "B".....	2	55.	312701-507	Zoom Magnification Knob.....	1
13.	312701-514	Screw .112-64 x 3/8 LG.....	4	56.	900083-68	Washer F-303.....	3
14.	312701-338	Anti-Rock Block.....	2	57.	312701-485	Screw 4-40 x 1/4 LG &.....	1
15.	313233-145	Screw 4-40 x 5/16 LG.....	16		312701-361	Left Centering Spring.....	1
16.	312701-370	Screw.....	2	58.	312701-360	Right Centering Spring (not shown).....	1
17.	312701-405	Spring.....	1	59.	312701-120	#2 Lens Retainer.....	2
18.	312701-512	Frame & Hinge Assembly.....	1	60.	312701-032	Lens GH Assembly.....	2
19.	312701-356	Gasket.....	1	61.	312701-121	#2 Lens Mount.....	2
20.	312701-400	Screw 6-32 x 1/4 LG.....	4	62.	312701-378	Screw 256 x 3/16 LG & F-5.....	4
21.	312701-510	Lower Housing.....	1	63.	312701-408	Gear & Shaft Assembly.....	1
22.	312701-349	Mounting Spring.....	1	64.	312701-364	Retaining Spring.....	2
23.	312701-351	Washer Plain.....	2	65.	312701-202	Guide Rod.....	4
24.	312707-183	Phillips Screw 4-40 x 1/4.....	2	66.	312701-480	Right #2 Carrier.....	1
25.	312701-158	Hinge Pin.....	2		312701-479	Left # 2 Carrier (not shown).....	1
26.	312701-531	Upper Housing.....	1	67.	312701-206	Guide Rod Retainer.....	2
27.	312701-395	Clip.....	2	68.	312701-482	Left # 1 Carrier.....	1
28.	312701-506	Spring Washer.....	2	69.	312701-481	Right # 1 Carrier.....	1
29.	312701-397	Washer.....	2	70.	312701-347	Cam & Gear Assembly.....	1
30.	312701-327	Left Prism Assembly.....	1	71.	312701-500	Screw 4-40 x 1/4 LG.....	10
	312701-328	Right Prism Assembly.....	1	72.	312701-488	Objective Mount.....	1
		Right Interpupillary Shell.....	1	73.	312701-0110	Obj. Lens Assembly MN.....	2
31.	312701-472	Left Interpupillary Shell.....	1	74.	312701-0105	Obj. Lens Assembly.....	2
32.	313233-145	Screw 4-40 x 6/16 LG.....	6	75.	312701-411	Snap Ring.....	2
33.	312701-422	Left Prism Mount.....	1	76.	312701-407	Cam Bearing.....	1
	312701-423	Right Prism Mount (not shown).....	1	77.	312701-299	Bearing.....	1
34.	312701-152	Left Mirror.....	1	78.	312701-366	Screw 112-64 x 1/4 LG.....	10
35.	312701-0108	Prism.....	2	79.	312701-484	#1 Lens Retainer.....	2
36.	312701-515	Left Mirror Mount Assembly.....	1	80.	312701-028	Lens EF Assembly.....	2
	312701-516	Right Mirror Mount Assembly.....	1	81.	312701-495	Lens Spacer.....	2
37.	312701-041	Mirror A.....	2	82.	312701-025	Lens D.....	2
38.	312701-523	Spring "A".....	2	83.	312701-380	Lens Mount.....	2
39.	312701-486	Relay Lens Housing &.....	1	84.	312701-378	2-254 x 3/16 LG &.....	4
	312701-332	Lens Mount.....	2	85.	312701-456	Right Spring.....	1
40.	312701-514	Screw .112-64 x 3/8 LG.....	4		312701-455	Left Spring (not shown).....	1
41.	312701-035	Lens IJ Assembly.....	2	86.	900084-63	F-332 Washer.....	2
				87.	312701-409	Seal.....	1