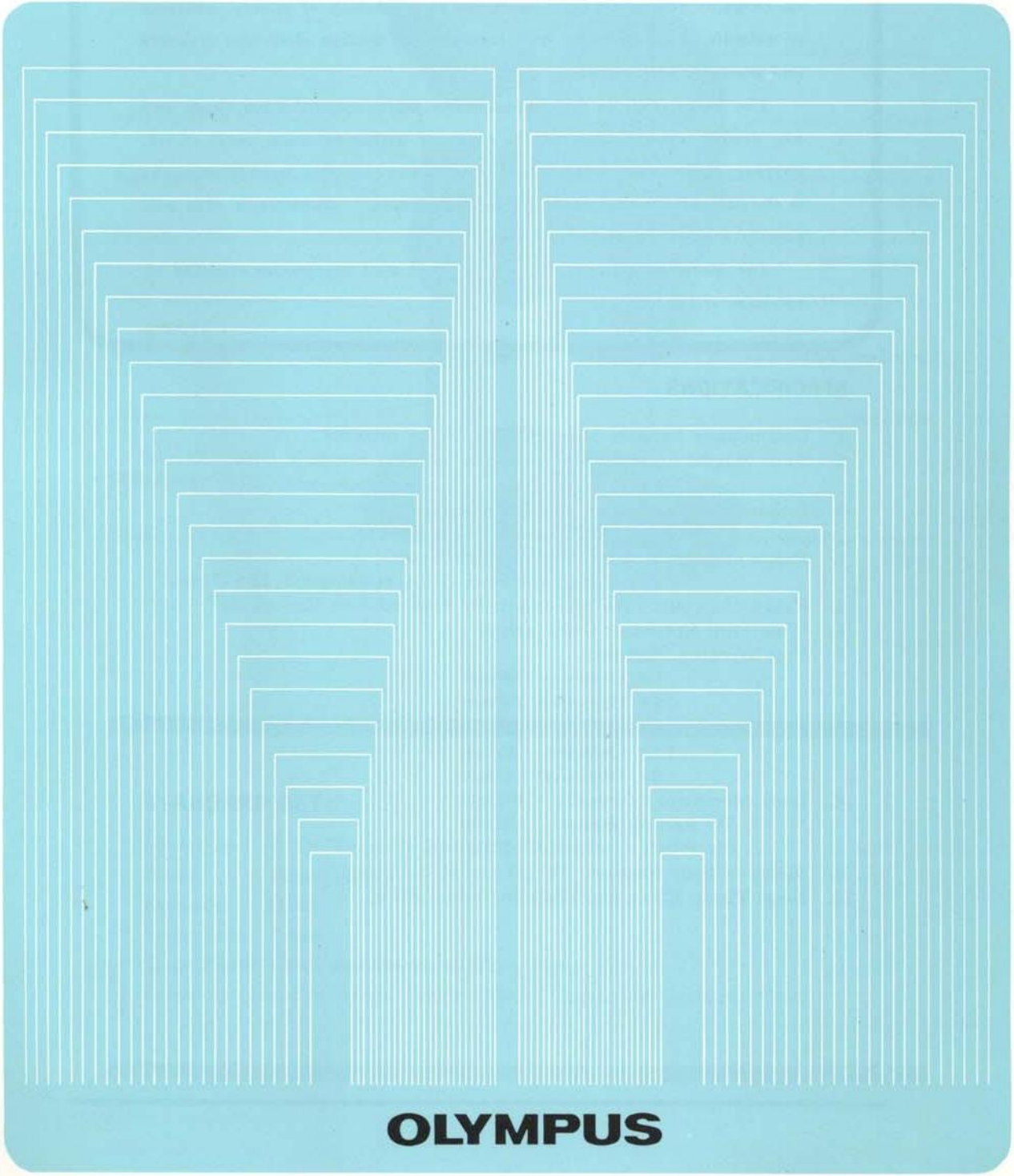
OLYMPUS ZOOM STEREO MICROSCOPE

INSTRUCTION MANUAL

MODEL **SZ-III**



OLYMPUS

OLYMPUS STEREOSCOPIC ZOOM MICROSCOPE
MODEL SZ-III

The Model SZ-III is an advanced version of the Model SZ, a revolutionary product which adopted the zoom magnification mechanism for the first time in the world in a stereoscopic microscope, thus rapidly expanding its range of utilization such as in the classification of plants, anatomy of animals, or in assembly and inspection of modern electronic products and precision instruments.

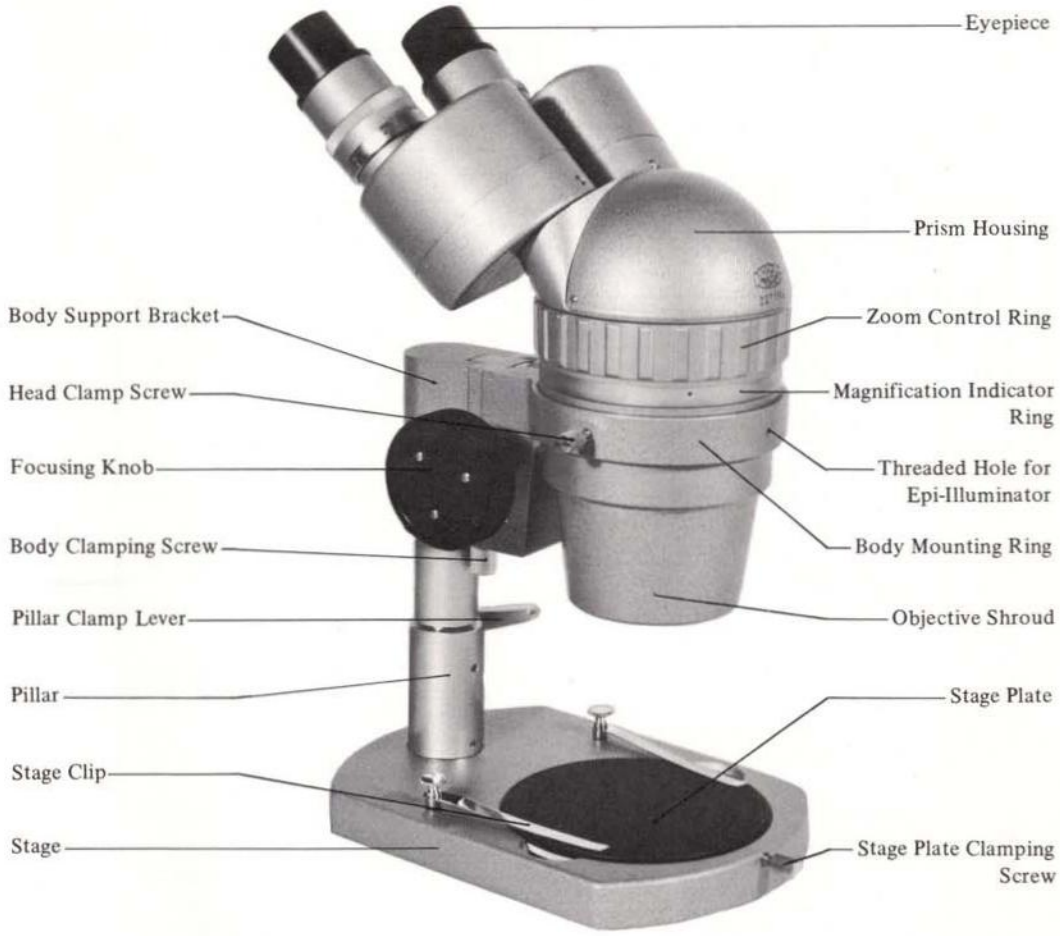
The image stays in focus through the entire magnification range and any desired magnification can be obtained within the zoom ratio of 5.7. Further, there is no "image fade away" when changing magnifications as is the case with conventional stereo microscopes. Doubtlessly this will greatly increase working efficiency.

The Model SZ-III is completely equipped with accessories assuring its optimum utilization.

SPECIFICATIONS :

1. Continuously Variable Magnifications: Zoom ratio 5.7
2. Total Magnifications: (with 1× objective) With eyepieces G10×: 7×~40×
   With eyepieces G20×: 14×~80×
3. Inclined Binocular Head: Inclination 45°
   Angle of visual axes 12°
4. Range of Interpupillary Distance Adjustment:
   With eyepieces G10× at exit-pupil: 53~79 mm.
5. Range of Ocular Tube Movement: By head rotation through 360°
6. Wide Field Eyepieces: G10× paired
7. Free Working Distance:
   - 1× Objective: 86 mm
   - 0.5× Objective: 159 mm
   - 0.75× Objective: 105 mm
   - 1.5× Objective: 45 mm
   - 2× Objective: 30 mm
8. Body Movement (Vertical): 102 mm
   - By Rack & Pinion: 55 mm
   - By Pillar: 47 mm
9. Range of Body Rotation: 75° pivoted at the pillar
10. Stage Plates: Clear, and Black-and-White Plates

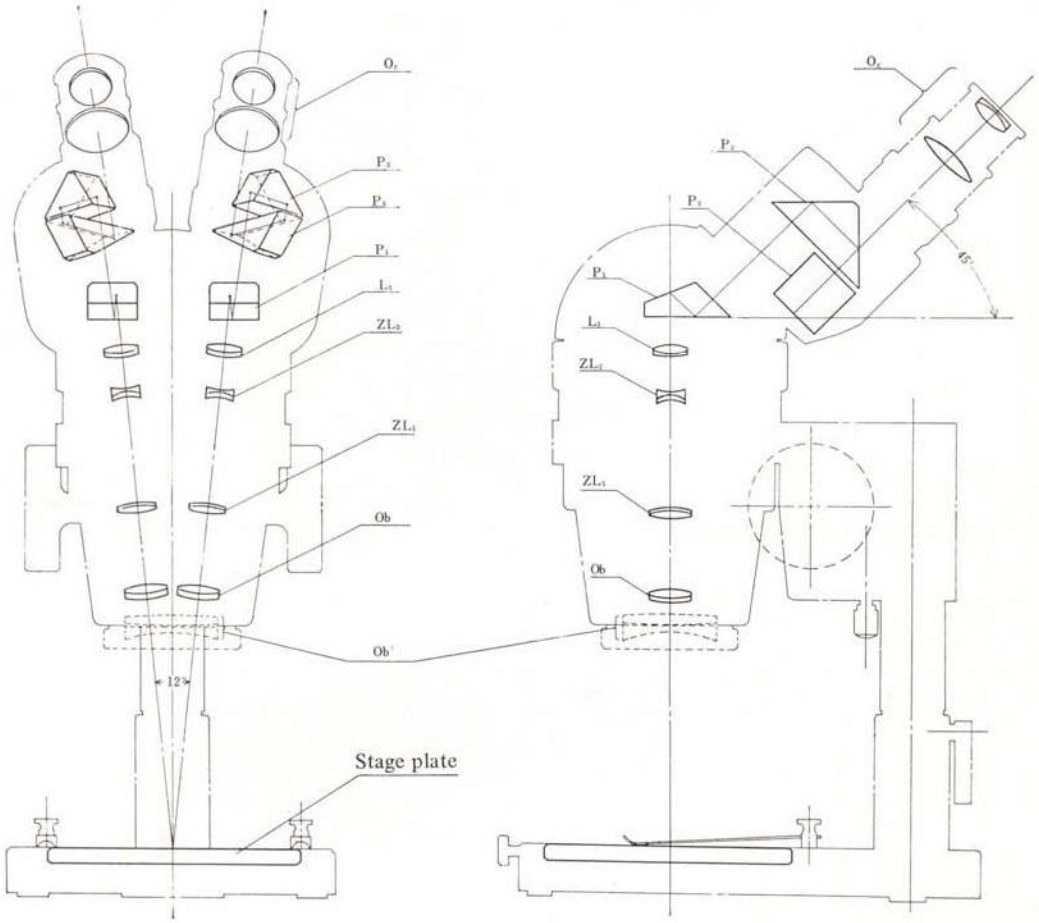
NAME OF PART:



STANDARD SET:

Microscope:	Body, Binocular Head, 1× Objective	1 set
Stand:	Stage, Pillar	1 set
Eyepieces:	G10×	1 pair
Stage Clips:	Large	1 pair
Stage Plates:	Clear, and Black-and-White Plates	1 each

Eyepieces caps, Eye-shades, Cabinet, Plastic Cover, and Guarantee Card.



OPTICAL SYSTEM:

The objective, ocular and varifocal lens systems are arranged as shown above. The beams from the specimen enter the Objective "Ob" at an angle of visual axes of 12°, wherein they are turned parallel to each other. They further proceed through the zoom system "ZL_1 and ZL_2" and the fixed lenses "L_1", reaching the Prism "P_1" where they again assume a 12° angle of visual axes and 45° inclination. Then the beams enter porro-prisms "P_2" and finally reach the eyepieces "Oc". Continuous zooming variation is performed by vertical displacement of the ZL lenses.

LENS CHARACTERISTICS :

The total magnification may be obtained by the following formula :

Total Mag. = (Eyepiece Mag.) × (Objective Mag.) × (Magnification Indicator Value)

Using Objective 1× : (Built-in)

	Mag. Indicator Value	Total Mag.	View Field (mm)	Working Distance (mm)
Eyepiece 10×	0.7	7×	31.4φ	86
	1	10×	22.0	〃
	1.5	15×	14.7	〃
	2	20×	11.0	〃
	2.5	25×	8.8	〃
	3	30×	7.3	〃
	3.5	35×	6.3	〃
	4	40×	5.5	〃
Eyepiece 20×	0.7	14×	14.3φ	86
	1	20×	10.0	〃
	1.5	30×	6.7	〃
	2	40×	5.0	〃
	2.5	50×	4.0	〃
	3	60×	3.3	〃
	3.5	70×	2.9	〃
	4	80×	2.5	〃

Using Objective 0.5× :

	Mag. Indicator Value	Total Mag.	View Field (mm)	Working Distance (mm)
Eyepiece 10×	0.7	3.5×	62.9φ	159
	1	5 ×	44.0	〃
	1.5	7.5×	29.3	〃
	2	10 ×	22.0	〃
	2.5	12.5×	17.6	〃
	3	15 ×	14.7	〃
	3.5	17.5×	12.6	〃
	4	20 ×	11.0	〃
Eyepiece 20×	0.7	7 ×	28.6φ	159
	1	10 ×	20.0	〃
	1.5	15 ×	13.3	〃
	2	20 ×	10.0	〃
	2.5	25 ×	8.0	〃
	3	30 ×	6.7	〃
	3.5	35 ×	5.7	〃
	4	40 ×	5.0	〃

Using Objective 0.75× :

	Mag. Indicator Value	Total Mag.	View Field (mm)	Working Distance (mm)
Eyepiece 10×	0.7	5.25×	41.9φ	105
	1	7.5 ×	29.3	〃
	1.5	11.25×	19.6	〃
	2	15 ×	14.7	〃
	2.5	18.75×	11.7	〃
	3	22.5 ×	9.8	〃
	3.5	26.25×	8.4	〃
	4	30 ×	7.3	〃
Eyepiece 20×	0.7	10.5 ×	19.0φ	105
	1	15 ×	13.3	〃
	1.5	22.5 ×	8.9	〃
	2	30 ×	6.7	〃
	2.5	37.5 ×	5.3	〃
	3	45 ×	4.4	〃
	3.5	52.5 ×	3.8	〃
	4	60 ×	3.3	〃

Using Objectve 1.5× :

	Mag. Indicator Value	Total Mag.	View Field (mm)	Working Distance (mm)
Eyepiece 10×	0.7	10.5×	20.95φ	45
	1	15 ×	14.7	〃
	1.5	22.5×	9.8	〃
	2	30 ×	7.3	〃
	2.5	37.5×	5.9	〃
	3	45 ×	4.9	〃
	3.5	52.5×	4.2	〃
	4	60 ×	3.7	〃
Eyepiece 20×	0.7	21 ×	9.5φ	45
	1	30 ×	6.7	〃
	1.5	45 ×	4.4	〃
	2	60 ×	3.3	〃
	2.5	75 ×	2.7	〃
	3	90 ×	2.2	〃
	3.5	105 ×	1.9	〃
	4	120 ×	1.7	〃

Using Objective 2× :

	Mag. Indicator Value	Total Mag.	View Field (mm)	Working Distance (mm)
Eyepiece 10×	0.7	14×	15.7φ	30
	1	20×	11.0	〃
	1.5	30×	7.3	〃
	2	40×	5.5	〃
	2.5	50×	4.4	〃
	3	60×	3.7	〃
	3.5	70×	3.1	〃
	4	80×	2.75	〃
Eyepiece 20×	0.7	28×	7.1φ	30
	1	40×	5.0	〃
	1.5	60×	3.3	〃
	2	80×	2.5	〃
	2.5	100×	2.0	〃
	3	120×	1.7	〃
	3.5	140×	1.4	〃
	4	160×	1.25	〃

ZOOM LENS SYSTEM:

This system is composed of 2 sets of lenses placed and operated parallel, each set consisting of 2 groups of varifocal lenses. The change of magnifications is performed by zooming these groups of lenses and changing the focal length of the objective. In case of magnification change from a low number to a higher one, the lower lens group (1st lens group) rises to the middle and then comes down. The upper lens group (2nd lens group) is lowered straight down. The magnification ratio for the zoom system is 5.7. With the use of an objective 1×, it varies from 0.7× to 4×.

EYEPIECES :

Eyepiece Characteristics :

Magnification	Focal Length	Field of View (Diameter of the View Field of an Eyepiece)
G 10 ×	25 mm	22 mm
G 20 ×	12.5 mm	12.2 mm

OBJECTIVES :

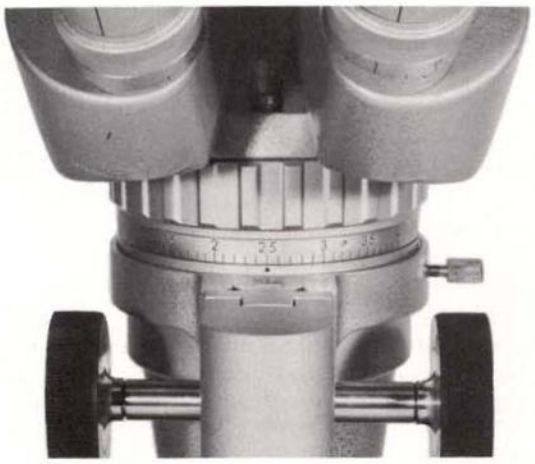
Special objectives have been designed for the exclusive use with the Model SZ-III. The standard set includes a 1× objective. This 1× objective is built in the microscope body and cannot be removed. 0.5×, 0.75×, 1.5× and 2× objectives are also available as special accessories. They are in threaded mounts and are screwed into a corresponding thread on the bottom of the objective shroud.

Objective Characteristics :

Magnification	Focal Length	Working Distance
1 ×	105 mm	86 mm
0.5 ×	210 mm	159 mm
0.75×	140 mm	105 mm
1.5 ×	70 mm	45 mm
2.0 ×	52 mm	30 mm

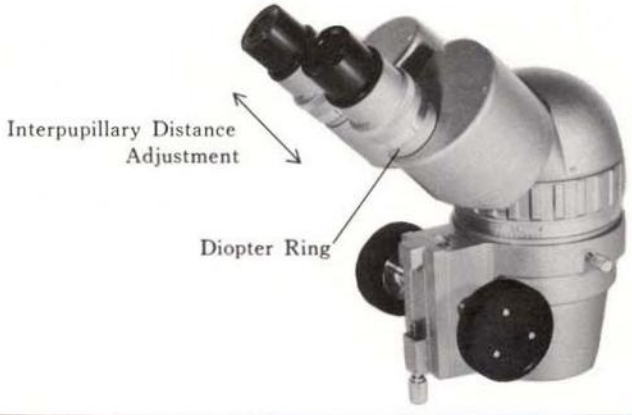
BODY :

This is the main part of the microscope including the built-in objective and the zoom variation mechanism, and is attached to the pillar with a mounting bracket. When the zoom control ring is turned, the zoom movement of vari-focal lenses provide a continuous change of magnification. The scale on the magnification indicator ring shows that its rotation by one graduation results in a change of total magnification by 0.1×. The body can be rotated through 360° within the body mounting ring, thus enabling the user to freely choose whatever position he desires.



HEAD :

The head is designed with an inclination of 45° to the horizontal and a 12° angle of visual axes to allow the user to maintain a comfortable posture and avoid fatigue during prolonged observation. This also facilitates smooth coincidence of the two images (right and left) into one. The range of interpupillary distance adjustment, using eyepieces G10×, is 53–79 mm. Therefore, you can adjust it to your own convenience by turning the eyepiece tubes. Eye-refraction difference will be adjusted by focusing correctly on the specimen through the right eyepiece and then turning the diopter ring to focus the left eyepiece.



FOCUSING MECHANISM:

Focusing is performed by: (1) Sliding the body on the pillar until rough focus is attained and (2) making fine adjustment with the focusing knob. The range of movement with the focusing knob is 55 mm.

STAND:

The stand is composed of a stage and a pillar. The stage is designed to assure complete stability of the body mounted at the top of the pillar in whatever position it may be. The stage plate is mounted in the circular receptacle of the stage. The stage plates are interchangeable according to the method of observation employed. Whichever plate (clear or black-and-white) may be used, it must be firmly clamped to the stage with the clamping screw. The pillar holds the microscope body and moves 47 mm vertically against the stage and rotates through 75°. The inner tube of the pillar, assisted by a built-in balancing spring, firmly holds the body and the body support bracket and slides up and down in the outer tube, and can be set at a desired position with the pillar clamping screw.

ASSEMBLY AND OBSERVATION:

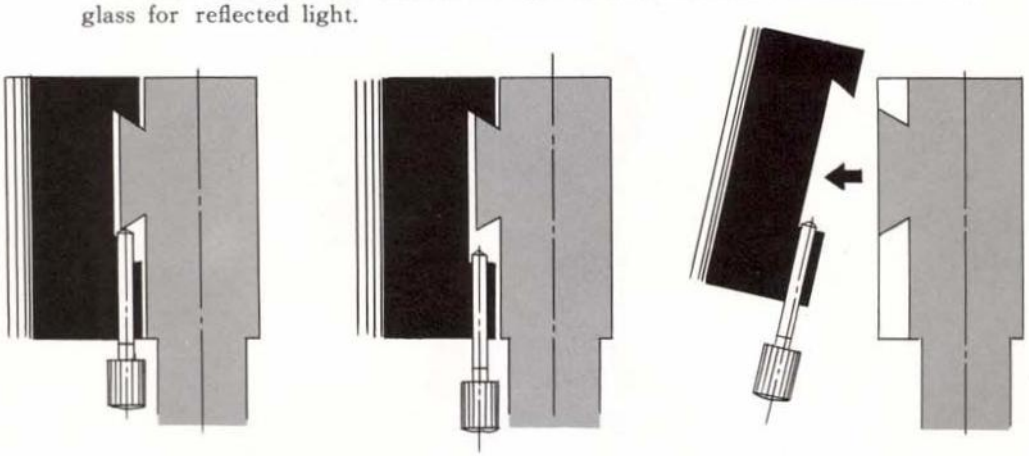
Remove the microscope components from the cabinet and assemble in the following order:

Order of Assembly:

1. Place the focusing portion onto the body support bracket and secure it tightly with the body clamping screw.
2. Insert the microscope portion into the head clamping ring from above, rotate the head to suit your preference and clamp it with the head clamping screw.
3. Place a stage plate into the receptacle and clamp it with the clamping screw.
4. Insert the stage clips.
5. Remove the eyepiece caps from the binocular tube and place eyepieces into appropriate position. There are two methods of observations—with reflected light and with transmitted light. In case of the latter, a special accessory (the base and the illuminating equipment) will be used.

Selection of Stage Plates

According to the type of the observation, the proper stage plate must be used—the clear glass for transmitted light observation and the black-and-white glass for reflected light.



PARFOCALITY ADJUSTMENTS:

The Olympus Model SZ-III is designed to be parfocal in both right and left eyepieces at all magnifications at the standard distance of vision (250 mm). However, each person has a different distance of vision from the other. To obtain satisfactory parfocality with the Model SZ-III, follow the procedures described below when focusing on the specimen.

(1) Set both (right and left) diopter rings at "O".
(2) Rotate the zoom control ring to position "4".
(3) Focus the image by means of the focusing knob.
(4) Rotate the zoom control ring to position "0.7".
(5) If the image is out of focus, perform focusing by adjusting the diopter ring(s) right or left, or both, as required.
DO NOT perform focus adjustment with the focusing knob.
(6) Once again rotate the zoom control ring to position "4".
If the image is still out of focus, adjust the focusing knob to bring the image in focus.
DO NOT perform focus adjustment with the diopter ring(s).
(7) Now your Model SZ-III has been adjusted to be parfocal at your own distance of vision. Hence, re-adjustment of focus when you switch from one magnification to the other is not necessary.

OPTIONAL ACCESSORIES

1. Auxiliary objectives 0.5×, 0.75×, 1.5×, and 2.0×
2. Eyepieces G20× paired
3. Epi-illuminator LSG-II with TF transformer
4. Illuminator LSD with TE transformer
5. Trans-illuminator base
6. Fluorescent illuminator VL-FL
7. Universal stand VS-IV
8. Pillar extension for conversion objective 0.5×
9. Iris diaphragm

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