

**OLYMPUS NEOPAK
INCIDENT LIGHT
MICROSCOPE**

INSTRUCTION MANUAL

MODEL

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OLYMPUS

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I. STANDARD SET

Description	N-Mono	N-Bi	N-Tr
Main body of microscope (including the mirror)	1 set	1 set	1 set
Microscope head (including eyepiece tube cap)	Mono. 1	Bi. 1	Tri 1
Stage (with stage insert plate)	1	1	1
Illuminator	1	1	1
Objectives: Neo5×, Neo10×, Neo40×	1 each	1 each	1 each
Eyepiece: BiP7×, BiWF10×, BiWF15×	—	1 pair each	1 pair each
Straight tube for Photomicrography (including eyepiece tube cap)	—	1	—
Eyepiece for Photo: P7×, P10×, P15×	1 each	—	1 each
Spare bulb 6V2A	2	2	2
Metal slide	5	5	5
Sector diaphragm (180°, 270°)	1 each	1 each	1 each
Mount for sector diaphragm	1	1	1
Filters { 32.5 φ mm Y-48 32.5 φ mm C 32.5 φ mm G-533	1 each	1 each	1 each
Transformer	1	1	1
Dust plug for objective mounting socket on nosepiece	1	1	1
Vinyl cover	1	1	1
Case	1	1	1
Certificate of inspection	1	1	1

◆Special accessory :

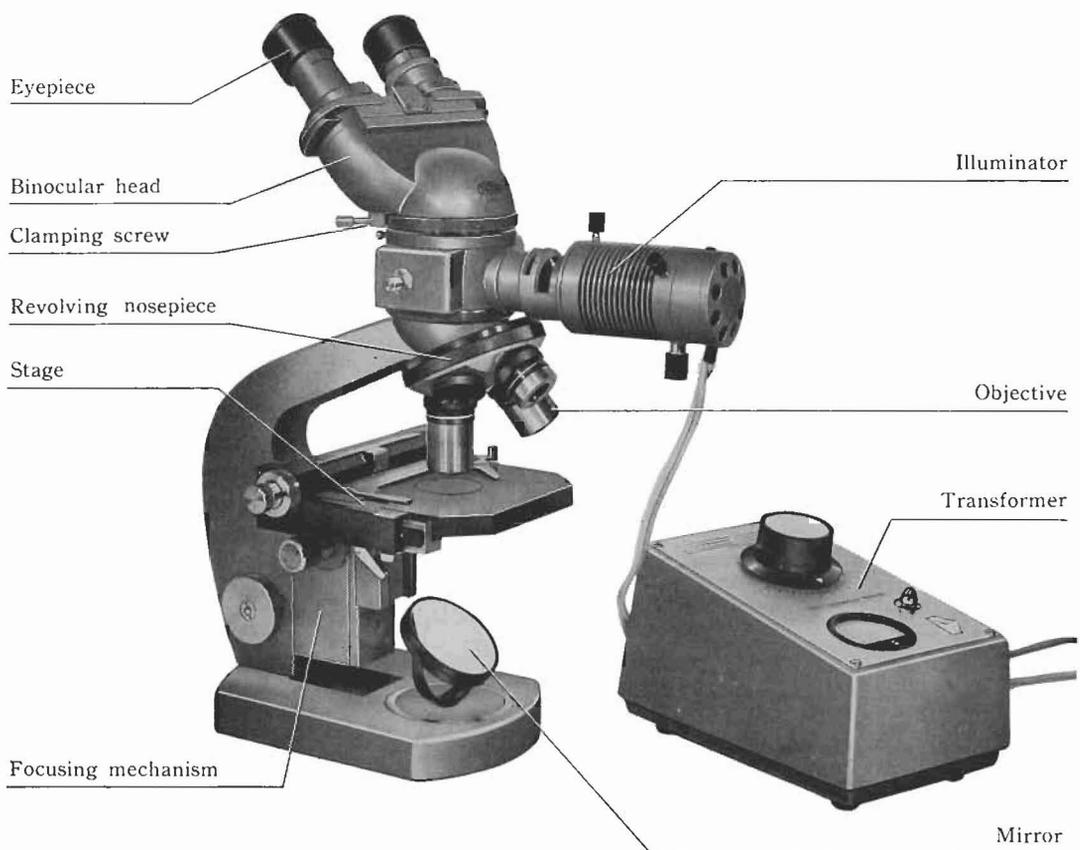
- Polarizing equipment (polarizer and analyser)

◆Olympus objective has its colour band

- **THE OLYMPUS OBJECTIVE**, you just purchased, has a **colour band** on it. This new step has been adopted for your convenience, that **you may understand the magnification, if you only see the colour**, without looking at the magnification number engraved on the tube.

Magnification	Neo 5×	Neo 10×	Neo 40×
Colour	Red	Orange	Brilliant green

II. PRINCIPAL PARTS



III. SPECIFICATIONS

Microscope head: Monocular and binocular; inclined 45° to the horizontal plane, rotates 360° .

Trinocular: The binocular head is inclined 45° to the horizontal plane, rotates 360° . A straight tube for photomicrography.

Revolving Nosepiece: Quadruple (ball bearing type) with the marks for mounting objectives

Mechanical tube length: 200mm

Total magnification: $35\times\sim 600\times$

Focusing: Raising and lowering of the stage by the coarse and fine adjustment knobs.

Coarse adjustment: Rack and pinion system, Range of vertical movement: 47.5mm

Fine adjustment: By lever, range of vertical movement: 2 mm

minimum graduation: 0.005 mm

Stage: Square, with a cross-movement mechanical stage, coaxial stage handle.

Transformer: Rated 6V5A, with a voltmeter.

Illuminator: Incident type illumination capable of bright field and dark field illuminations.

Oblique illumination is also possible.

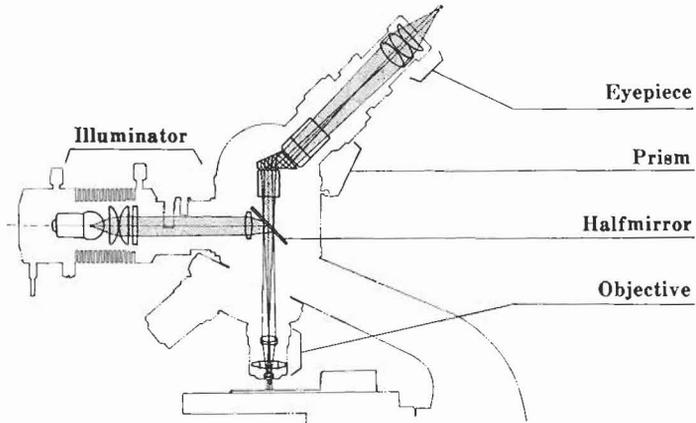
Weight: Aprox. 6kg (the main body only)

Height: Aprox. 370mm (N-Bi)

IV. OPTICAL PATH DIAGRAM

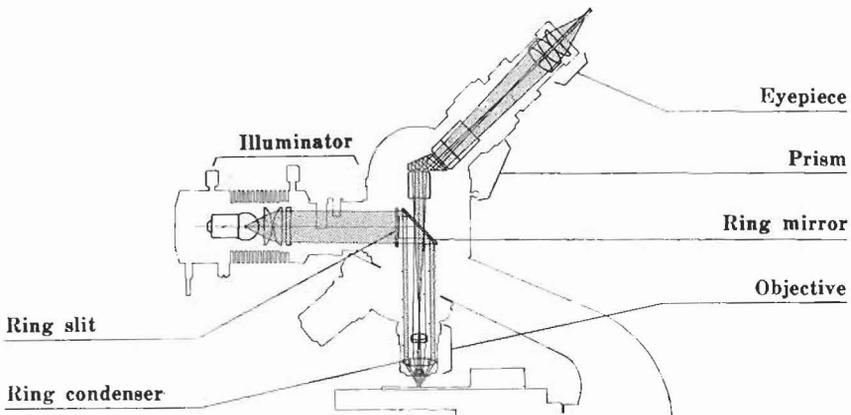
A. Incident light illumination for bright field

The light from the light source is reflected by the half mirror, passes through the objective and illuminates the specimen. The rays of illumination reflected from the specimen enter the objective, pass through the half mirror and the eyepieces and reach the observer's eyes.



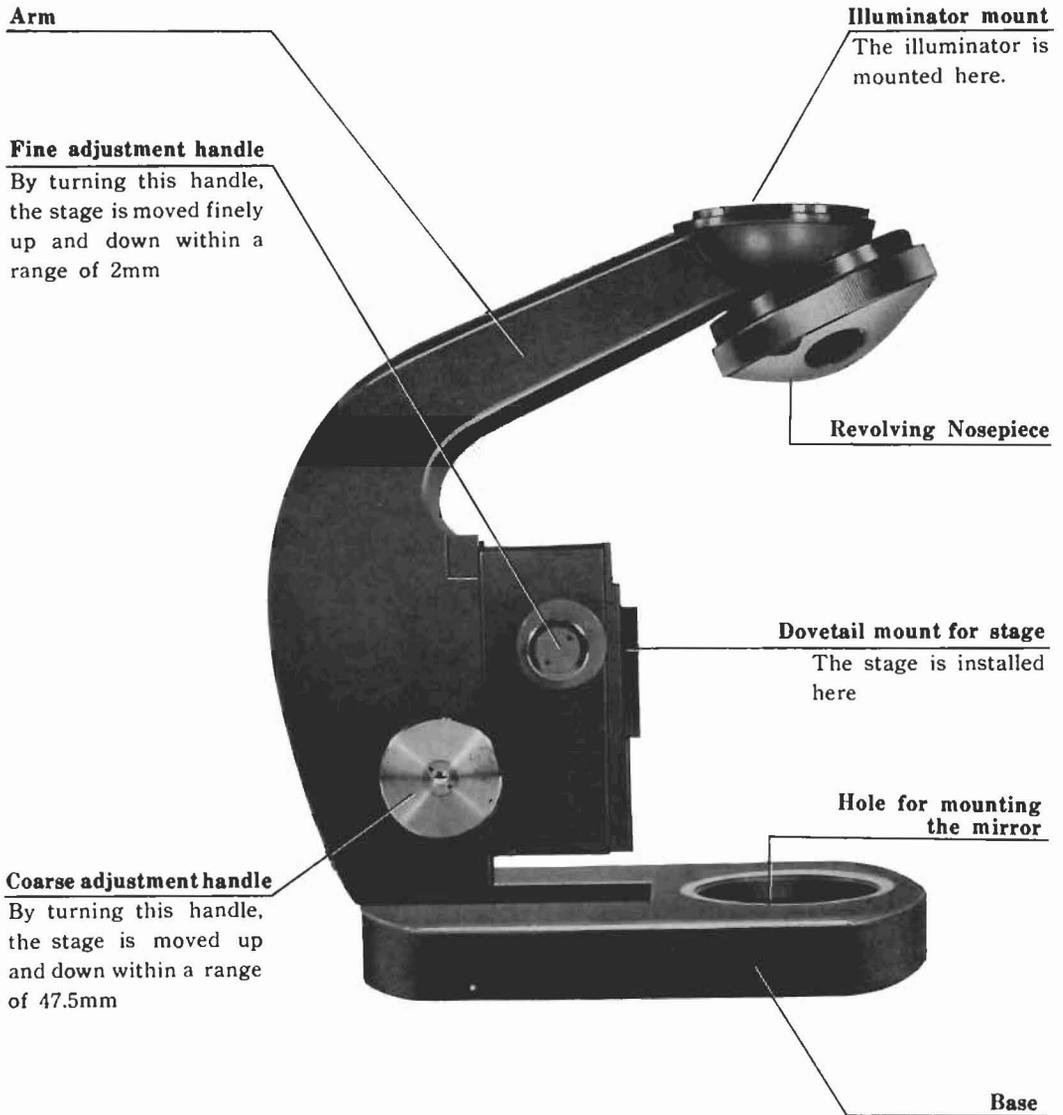
B. Incident light illumination for dark field

The light from the light source passes through the ring slit and is reflected by the ring mirror and illuminates the specimen after passing through the ring condenser located around the objective. Since the rays of light reflected from the specimen enter the objective, you can see the details of the specimen through eyepieces, which cannot be seen against the bright field.



V. STRUCTURE

A. Main Body



○ Revolving Nosepiece

The 4-hole revolving nosepiece operates very smoothly with a rotating steel ball on the axis of rotation and the knurled rim. The built-in click and ratchet mechanism correctly positions the objective set, maintaining proper optical alignment. Markings A, B, C and D are given on the nosepiece to indicate the positions of the objectives 5 \times , 10 \times , 40 \times , and the dust plug to be mounted in that order so that the magnification of the lens in use may be known at a glance.

B. Microscope Head

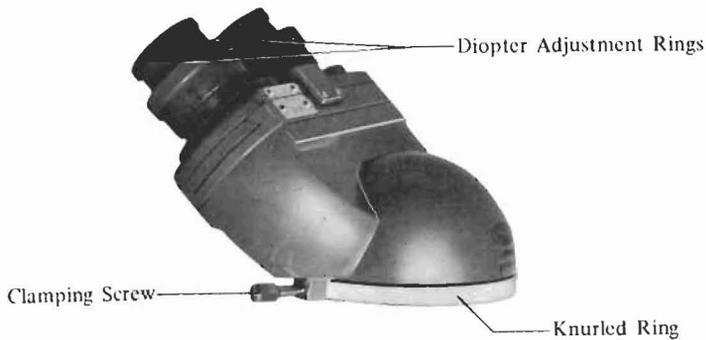
The following four types of microscope heads are available :

- * Monocular head
- * Binocular head
- * Trinocular head
- * Straight head for photomicrography

The head can be mounted on to the arm by means of the knurled fixing ring, firmly and in precise optical alignment. The monocular and binocular heads and the binocular part of the trinocular head are inclined 45 degrees from the horizontal plane.

The head can be revolved through 360 degrees, which permits observation from any desired direction. Two different types of optical tubes are available for binocular head and trinocular head, so that the user may choose the optical tube according to the physiology of his eyes.

① Binocular head



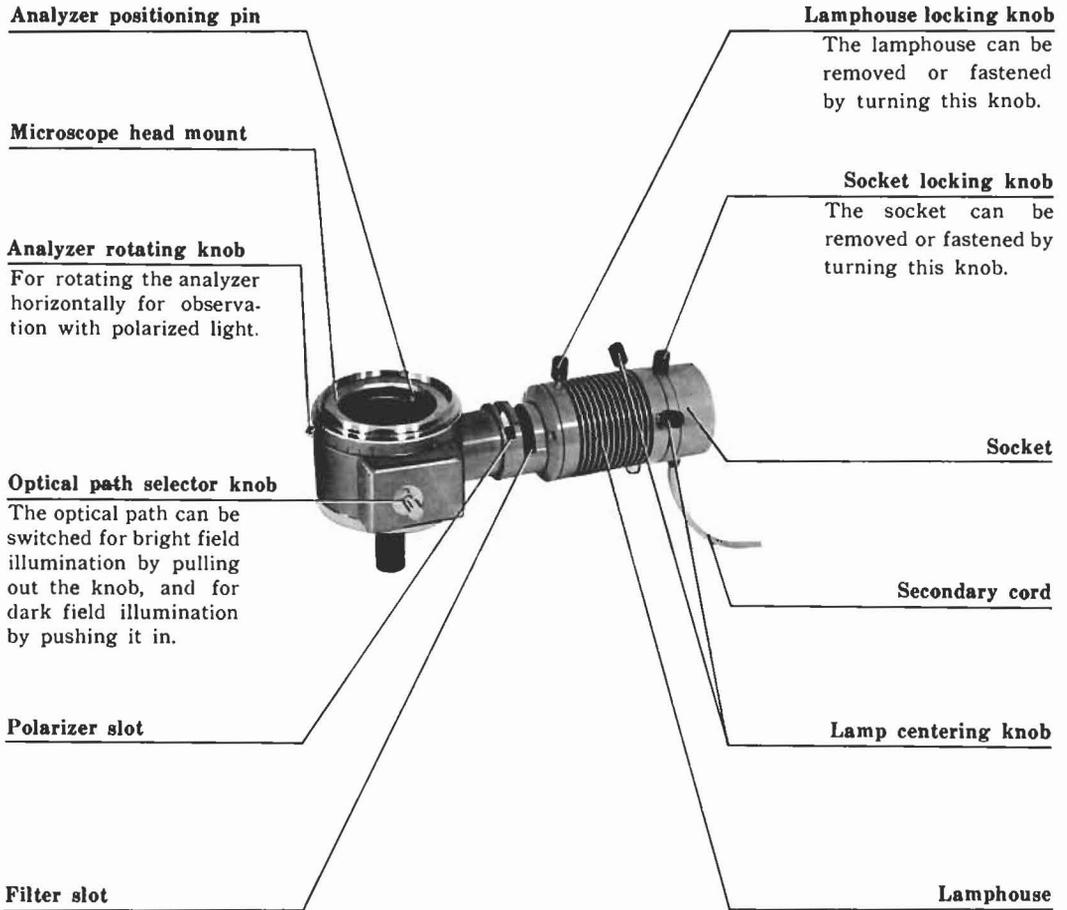
② Trinocular Head



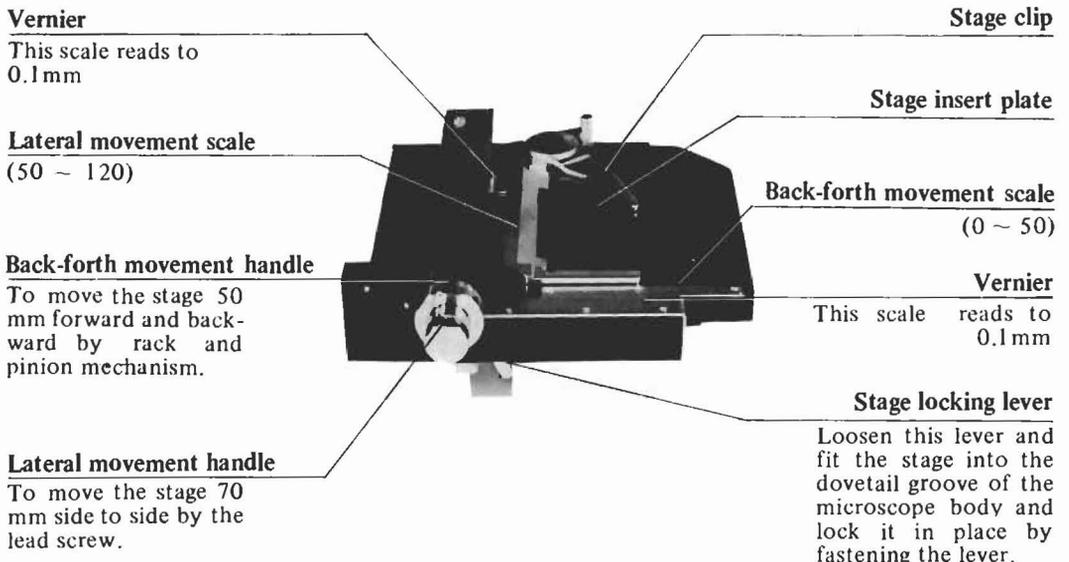
③ Straight head for photomicrography

When the monocular or binocular head is used, it must be replaced with the straight head for photographic work. The photomicrographic apparatus must be mounted on this straight head.

C. Illuminator



D. Stage



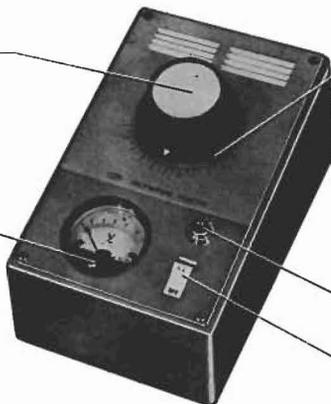
E. Transformer

Voltage control knob

Brightness of lamp can be adjusted by turning this knob.

0 adjustment screw

Turn this screw to make correct 0 adjustment



Stopper

Turn it while pushing it down.

When the ∇ mark is at the left extreme, the brightness has the highest intensity.

Pilot lamp

Main switch

F. Mirror

Generally the metallurgical microscope is used for observation of an opaque substance specimen with reflecting light, except when using the low power objective, in which case the observation is performed with transillumination.

Mirror

Plane surface and concave surface.

Fork

Mirror mount



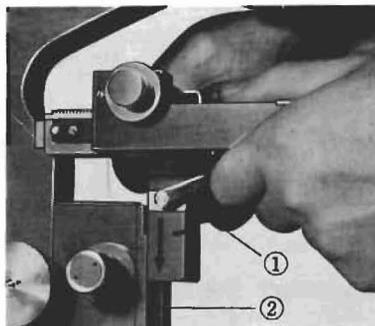
VI. HOW TO ASSEMBLE

A. Install the stage

1. Raise the focusing assembly fully by turning the coarse adjustment handle.
2. Turn up the stage locking lever ① and fit the guide on the stage into the guide ② on the microscope body and slowly lower the stage until it comes to a stop.

In installing the stage, make sure that the stage and the base of the microscope are parallel to each other.

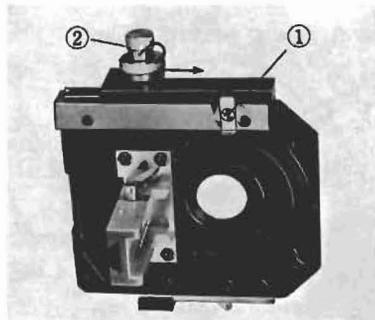
3. Lock the stage securely with the stage locking lever.



③ How to remove the cross-movement device

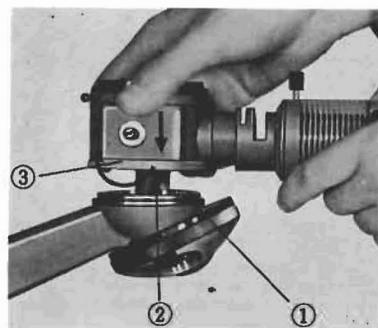
1. Turn the stopper ① on the back side of the stage through 90 degrees to disengage the back-forth movement stopper.
2. Turn the back-forth movement handle ② until it turn idle (the rack and pinion are disengaged), and then remove the cross-movement device by pulling it out.

Now the stage can be used as a plain stage.



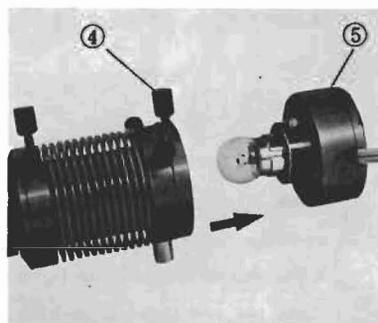
B. Attach the illuminator

Fit the illuminator assembly in the mount ① on the upper end of the microscope arm with the light projecting tube ②, and the light shielding tube facing downward. Lock the illuminator in place by turning the fastening ring ③.



Ⓞ Replacement of lamp

1. By loosening the socket locking knob ④, the socket ⑤ can be pulled out.
2. To removed the lamp, slightly press down the lamp and turn it to the left, and then it comes off easily.



C. Install the microscope head

Fit the microscope head in the microscope head mount on the illuminator body and lock it by turning the fixing ring.

D. Attach the objectives

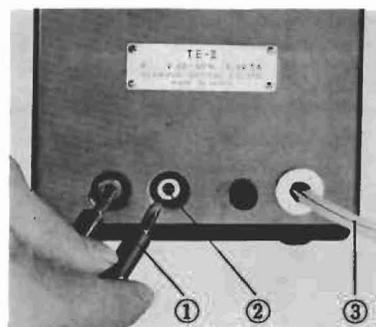
Screw the objectives into the respectively marked mounting holes; 5× lens into A hole, 10× lens into B hole and 40× lens into C hole.

★ It is suggested that the blind cover is put into D hole to prevent the entry of dust.

E. Insert the eyepiece(s)

F. Connect the cord

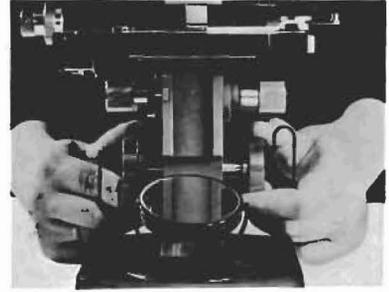
1. Plug the secondary cord ① into the socket ② on the transformer.
2. Make sure that the transformer's main switch is set at OFF and connect the power cord ③ to an electric outlet.



VII. HOW TO USE

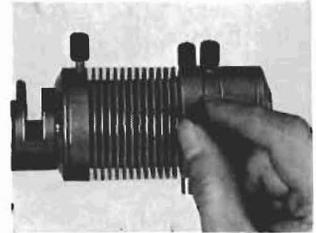
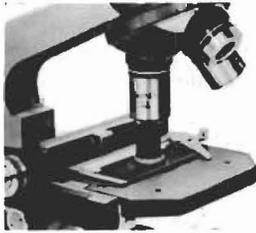
A. Adjustment of the movement of coarse adjustment handle

The coarse adjustment handle is usually heavy and tight. This can be adjusted to the user's preference. Hold right and left handles and turn them in reverse direction, the handles loosened so that they can be moved easily. The movement of the handles will become heavier when the handles are turned in the opposite direction.



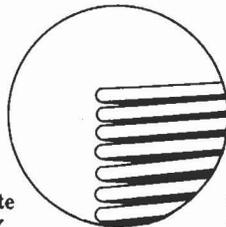
B. Place the specimen on the stage

Place some oil-clay on the metal slide and the specimen on top of it. Press them by the handpress, and place it on the stage in such manner that the specimen surface will be right-angled toward the optical axis. Secure the specimen on the stage firmly with the stage clip. Two slides may be placed on the stage. Cross movement of the specimen can be made with the cross-movement handle on the stage.

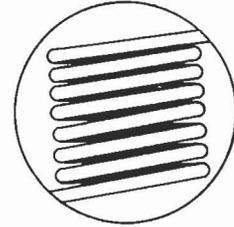


C. Centering of the light source lamp

1. Lower the output voltage of the transformer and set the switch to ON and adjust the brightness by using the voltage control knob. The pilot lamp will be lighted when the switch is turned to ON.
2. Set the Objective 10 \times in place.
3. Pull out all the way the optical path selector knob on the illuminator (to switch to bright field illumination).
4. Insert the eyepiece(s) and focus the specimen (For the focusing procedures, see per D.) Use your right eye to look through the right-hand eyepiece when binocular or trinocular type is used.
5. Remove the eyepiece and look through the eyepiece tube (the right-hand eyepiece when binocular or trinocular microscope tube is used) and you will see an image of the lamp filament.
6. Operate the two centering screws on the lamphouse until the image of filament is seen in the center of the field.



Incomplete centering



Complete centering

7. Replace the eyepiece.

Now the microscope is ready for use.

D. Focusing

1. Turn the fine adjustment handle so that the fine adjustment mark comes halfway between the fine adjustment range marking lines.
2. Use the Objective 10 \times .
3. Insert a desired eyepiece(s) into the eyepiece tube(s).
4. Looking at the specimen from the side, turn the coarse adjustment handle to raise the stage until the surface of specimen comes very close to the tip of objective.
5. Looking through the eyepiece(s), turn the coarse adjustment handle to slowly lower the stage for rough adjustment of focus.
6. Turn the nosepiece to set a desired objective in place.
7. Use the fine adjustment handle to make accurate adjustment of focus.

E. Interpupillary Distance and Diopter Adjustments

In order to obtain perfect binocular vision through the eyepieces, it is necessary to adjust interpupillary distance and diopter difference in eye acuity; otherwise, long time observation would put considerable strain on the observer's eyes.

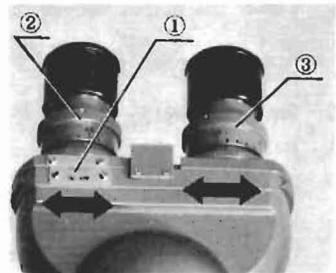
1. Interpupillary Distance Adjustment

- 1) Hold the right and left eyepiece tubes with both hands and push the tubes together, or pull them apart laterally, whichever is required, while looking through the eyepieces with both eyes, until perfect binocular vision is obtained.
- 2) Memorize your interpupillary distance setting. Scale ① is provided for this purpose, located between the eyepiece tubes.

* This interpupillary distance adjustment is necessary each time observers are changed.
Re-focusing is also necessary whenever the interpupillary distance is changed.

2. Diopter Adjustment

- 1) Rotate the diopter ring ② on the right eyepiece tube to match the scale on the ring to your interpupillary distance setting which you obtained from scale ① as described in the preceding paragraph 1-(2).
- 2) Look at the image through the right eyepiece with your right eye and focus on the specimen with the fine adjustment knobs.
- 3) Next, look at the image through the left eyepiece with your left eye and rotate the diopter ring ③ to focus on the specimen without using the coarse and fine adjustment knobs.



F. Bright field and dark field observation

Bright field and dark field can be readily selected by means of the optical path selector knob ①.

Dark field illumination: The knob is pressed in.

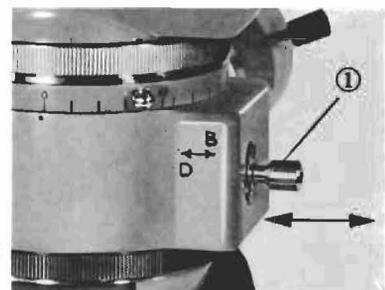
Bright field illumination: The knob is pulled out.

Etched marks are provided for the selector.

D stands for DARK (dark field illumination).

B stands for BRIGHT (bright field illumination).

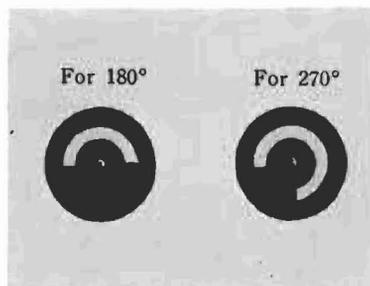
←→ shows the direction of the movement of the knob which is pulled out or pushed in.



G. Oblique illumination

Mount for sector diaphragm
slip the sector diaphragm into the Mount.

1. An oblique illumination can be obtained by the following manner. push in the optical path selector knob to get the dark field. Insert the mount for sector diaphragm (accessory) into the filter slot of the illumination tube.
2. The sector diaphragms are of two kinds. Each of them consists of two plates so that by rotating either of them the size of the diaphragm aperture can be changed to adjust the extent of the area to be illuminated.



H. Observation with polarized light

Observation with polarized light is possible by using the polarizing equipment (polarizer and analyzer), provided as a special accessory.

Adopt the following procedures for observation with polarized light.

- 1) Remove the microscope head (monocular, binocular and trinocular).
- 2) Slowly drop the analyzer in place with its positioning groove (1) matched with the positioning pin (2) on the illuminator.

The engraved mark A on the analyzer's frame stands for ANALYZER.

- 3) Replace the microscope head.
- 4) Insert the polarizer through the polarizer slot in the illumination tube. In inserting the polarizer, make sure that the engraved mark P faces the scale on the illumination tube.



The engraved mark P stands for POLARIZER.

- 5) Parallel and crossed positions can be obtained by rotating the analyzer by a rotating knob on the illuminator and the polarizer by the polarizer rotating knob.

		Polarizer setting (scale)	Analyzer setting (scale)
Crossed	1	0	0
	2	90°	90°
Parallel	1	45°	45°
	2	0	90°
	3	90°	0

- ★ Match the ● mark with the engraved on scale for the analyzer and match the polarizer knob with the scale for the polarizer.

I. Photography

1. When monocular or binocular head is used, replace the head with the straight tube for photomicrography.
2. When trinocular head is used, attach the photographic apparatus to the straight tube and use the optical path selector knob on the head for photographic work.

If the optical path selector knob is pulled out, the optical path is turned to the straight tube and it is switched to the binocular tube if the knob is pushed in.

VIII. CHARACTERISTICS OF LENSES

Objective				Eyepiece		Total magnification	Actual field of view	Depth of focus
Magnification	NA	WD	Focal length	Magnification	No. of view field			
Neo 5×	0.10	22.30	31.41	P7×	18	35×	3.6	124.6
				P10×	13	50×	2.6	95.5
				P15×	9.5	75×	1.9	72.8
				WF10×	18	50×	3.6	95.5
				WF15×	12	75×	2.4	72.8
Neo 10×	0.25	7.50	19.58	P7×	18	70×	1.8	23.8
				P10×	13	100×	1.3	18.0
				P15×	9.5	150×	0.95	13.5
				WF10×	18	100×	1.8	18.0
				WF15×	12	150×	1.2	13.5
Neo 40×	0.65	0.63	5.39	P7×	18	280×	0.45	2.5
				P10×	13	400×	0.33	2.0
				P15×	9.5	600×	0.24	1.5
				WF10×	18	400×	0.45	2.0
				WF15×	12	600×	0.3	1.5

No. of view field :

A number which represents in mm the size of the image of the field diaphragm that is formed by the lens in front of it. (JIS B7132)

Total magnification :

Magnification of objective X magnification of eyepiece.

Actual field of view :

$$\frac{\text{No. of view field of Eyepiece}}{\text{Magnification of objective}} \quad (\text{mm})$$

Depth of focus :

The extent of the depth of specimen in focus. (μ)

IX. IMPORTANT POINTS TO REMEMBER

Dampness and dust are the worst enemies of a microscope.

Special care must be taken to protect the instrument from the principal trouble makers.

It frequently happens that a research laboratory and other places where microscopes are used have such unfavorable conditions. So, it is advisable that when the instrument is not in use it is stored in the case. If working conditions at the laboratory do not allow the equipment to be stored away every time its job is finished, use the accessory vinyl cover to protect it from dust.

It is best to store eyepieces and objectives in the dessicator. It is advisable to place silicagel (dessicating agent) in the container. When the eyepiece is detached from the microscope, the eyepiece tube should be covered with its cap.

Strictly avoid disassembling and tinkering with the mechanical parts of the microscope. Leave such work to professional technicians. Great care must be exercised in cleaning the instrument.

For example, when you want to remove dust from inaccessible parts of the instrument, blow the dust with a rubber blower or carefully brush it away with a soft brush.

As we are continually improving and developing our products, the equipment supplied may not agree in all details with the descriptions and/or illustrations shown in this instructions.

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