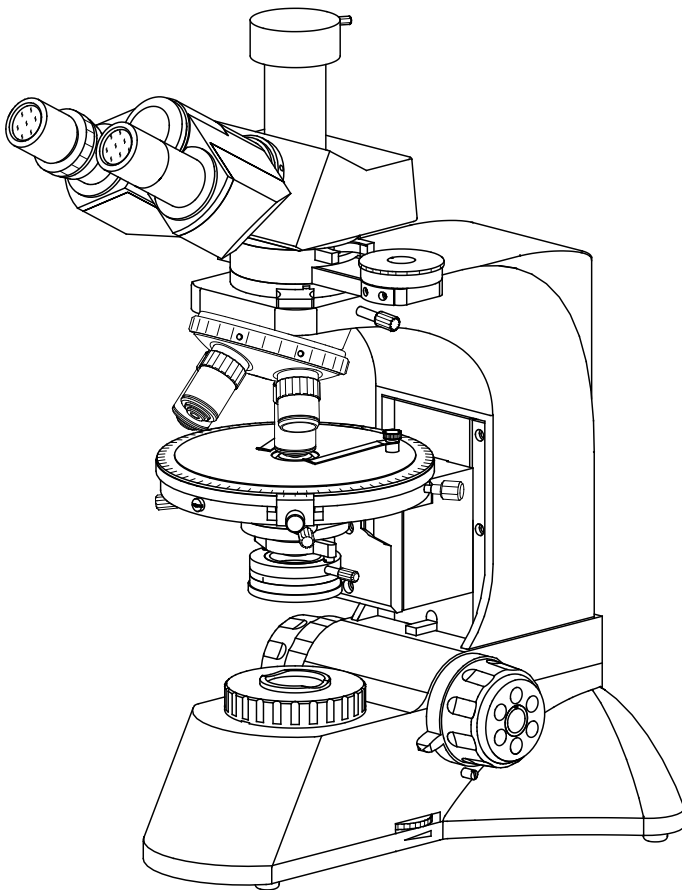




Polarization Microscope

# Omano OM349P Series

User Guide



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## Congratulations and Thank You for your purchase of Omano OM349 Polarizing Microscope

*This precision instrument has been designed to require a minimum of optical and mechanical maintenance. Its excellent design assures years of high quality, reliable service. We recommend you read this entire manual carefully before beginning to use the instrument.*

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### **WARNING**

PLEASE DISCONNECT PLUG FROM MAINS SOCKET BEFORE REMOVING THE BOTTOM PLATE, OPENING THE LAMP REPLACEMENT DOOR, OR REMOVING THE LAMP HOUSE

### **WARNING**

THE POWER CORD PROVIDED WITH THE EQUIPMENT HAS A GROUNDED PLUG. ALWAYS USE THE POWER CORD WITH A PROPERLY GROUNDED WALL OUTLET.

DO NOT EXPOSE THE INSTRUMENT TO HIGH TEMPERATURES OR HUMIDITY. AVOID USING THE INSTRUMENT IN EXTREMELY DUSTY LOCATIONS

OPERATING TEMPERATURE 41 DEGREE F. TO 95 DEGREE F.

OPERATING HUMIDITY 20% TO 80% @ 77 DEGREE F.

**CAUTION:** NEVER IMMERSE THE INSTRUMENT IN WATER OR SOLVENT

**CAUTION:** DO NOT PUT ANY FOREIGN OBJECTS IN THE FRAME OR INTO ANY MOVING MECHANICAL PARTS

## Getting Started

This reference guide is written base on a series of microscopes, it covers some optional attachments and functions that may not be included with this microscope.

### Components

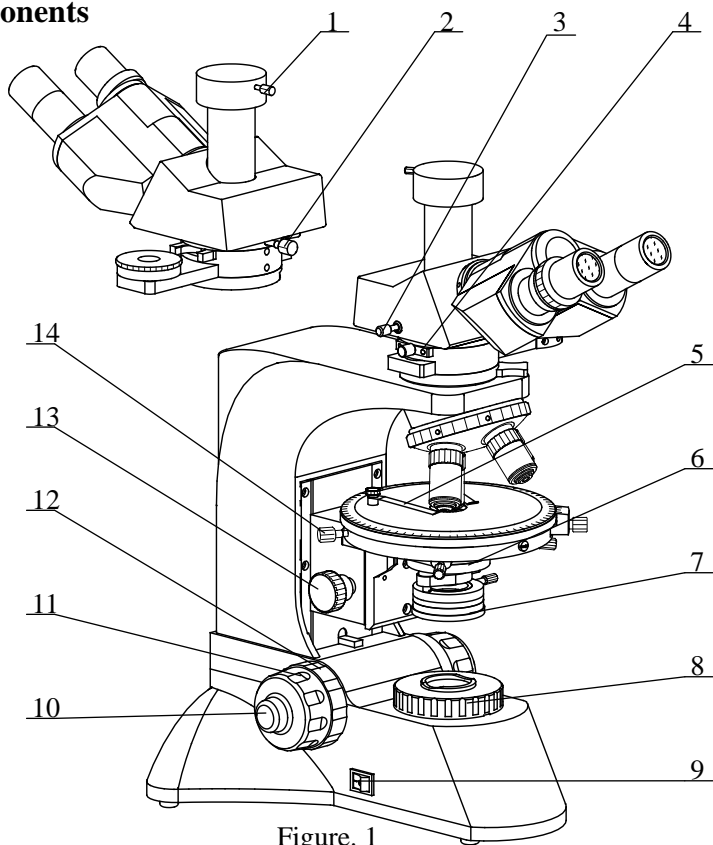


Figure. 1

1. Adapter Set Screw
2. Optical Body Set Screw
3. Beam Splitter Push Rod to Direct Image to Binocular Eyepieces or Trinocular Port
4. Bertrand Lens Centering Screw
5. Stage Clip
6. Condenser with Aperture Diaphragm
7. Polarizer
8. Kohler Condenser
9. Power Switch
10. Fine Focus Control Knob
11. Coarse Focus Control Knob
12. Focus Tensional Adjustment Knob
13. Sub-stage Adjustment Knob
14. Stage Centering Screw

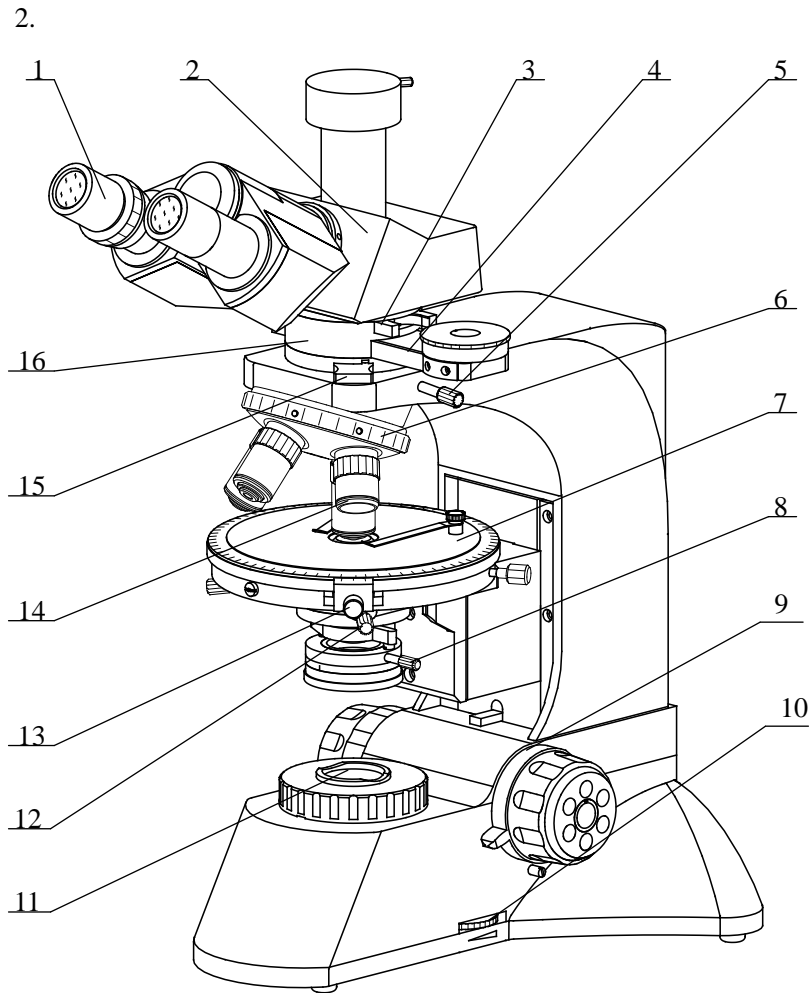


Figure. 2

1. Eyepiece 2. Trinocular Body 3. Bertrand Lens Unit 4. Analyzer 5. Thumbscrew 6. Nosepiece 7. Circular Rotating Stage 8. Polarizing Set Screw 9. Up Stop 10. Brightness Control Knob 11. Filter Seat 12. Condenser Set Screw 13. Stage Set Screw 14. Objective 15. Compensator 16. Intermediate Attachment

## Technical Specifications

**Trinocular:** Inclined 30°.

**Objectives:** Strain-free plan achromatic objectives (cover glass:0.17mm)

Magnification	N.A.	W.D. (mm)	Remark
4X	0.10	17.9	standard
10X	0.25	5.0	
40X	0.65(Spring)	0.56	
100X	1.25 (Spring ,Oil)	0.33	
5X	0.12	18.3	optional
20X	0.40	8.6	
60X	0.85(Spring)	0.25	

Strain-free plan achromatic objectives (no cover glass)

Magnification	N.A.	W.D. (mm)	Remark
5X	0.12	18.3	standard
10X	0.25	5.0	
40X	0.60(Spring)	3.73	
60X	0.75 (Spring )	1.34	
20X	0.40	8.6	optional
50X	0.70	2.02	
80X	0.80	0.96	
100X	0.85(Spring, Oil)	0.40	

**Nosepiece:** Quadruple/Quintuple nosepiece ball-bearing reversed nosepiece with positive click stops and smooth operation.

**Eyepieces:** 10X Wide field eyepiece and 10X plan division eyepiece (0.10mm/div), Focal Length 25mm, Field  $\Phi$ 18mm.

**Stage:** Circular rotating stage, Diameter  $\Phi 150\text{mm}$ ,  $360^\circ$  graduated in  $1^\circ$  increments, minimum retardation resolution  $6'$  center adjustable and locking clamp for stage rotation.

**Condenser:** Strain-free Abbe condenser N.A. 1.25 with polarizer and iris diaphragm, polarizer graduated every  $45^\circ$  and marked 0,90,180 and 270.

**Polarizing intermediate attachment:** Impellent style analyzer,  $360^\circ$  rotatable with scale and minimum vernier, Bertrand lens unit can be adjusted center with turret wrench. 1 and  $1/4$  wave length retardation plate and quartz wedge compensator are provided.

**Illumination:** Wide voltage range power supply (85-265V 47-60HZ), 6V/30W halogen lamp, adjustable brightness.

## Setup Instructions

1. Remove all parts from their packing materials and retain the packaging in the event you need to transport the product.
2. Connect the power cord to a suitable power supply.

## Basic Operation

1. Illumination controls, see figure 3
  - 1) The power switch to the illuminator is located on the base. The brightness control is located on the chassis. The electrical system is fuse protected and the fuse holder is located on the power Inlet.
  - 2) Press the power switch to the ON position. If the light does not appear to be ON, check the brightness control to see if it's on a low light setting. If so then adjust the brightness control until image can be observed comfortably.

***Note: Using the light at brightest setting reduces life span of bulb.***

2. Focusing Controls, see figure 3

- 1) **Focusing adjustment** is accomplished by using the large coarse adjustment knobs located on each side of the frame. Fine adjustment is accomplished using the smaller knobs located on the same focus shaft. This coaxial arrangement allows for easy, precise adjustment without drift or discomfort.
- 2) **Focus Control** Turning either of the coarse focus control knobs will raise or lower the stage. The smallest graduation on the fine adjust knob index scale is  $2\mu\text{m}$  of vertical.

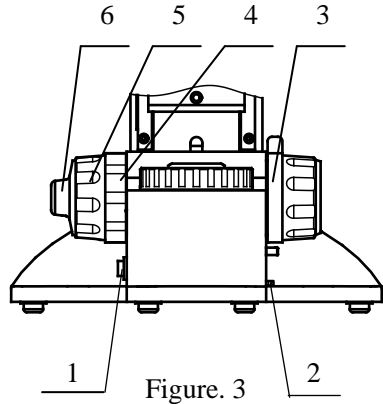


Figure. 3

1. Power Switch
2. Brightness Control
3. Up Stop Knob
4. Focus Tensional Adjustment
5. Coarse Focus Control Knob
6. Fine Focus Control Knob

- 3) **Focus Tension Adjustment** The tension of the coarse focus is adjustable and preset at the factory. If you wish to adjust the coarse focus tension, first locate the tension adjustment ring. Turn the ring toward the front of the microscope to increase the tension, and toward the rear of the microscope to loosen it. Tension is too high if you cannot turn the coarse adjustment knob comfortably.
- 4) **Pre-focusing or Focus Stop Control.** Use of this feature will insure that the short working distance objectives don't contact the stage or slide glass when using the microscope. Its use also simplifies focusing. After focusing on the glass slide with the coarse adjustment, rotation of the lever toward the rear of the microscope will set an upper limit on the coarse adjustment movement. After changing glass slides or objectives, focusing is easily accomplished by rotating the coarse adjustment knob to reach the pre-focused position, then making fine adjustments with the fine adjustment knob. Focusing movement with the fine adjustment isn't affected by using the pre-focusing lever.

3. Diopter and Interpupillary Adjustments

- 1) **Diopter Adjustment** Proper correction for individual vision is accomplished via the diopter adjustment located at the left eyepiece. Using the 40X objective, bring an image into focus with your right eye only. Once the image is well focused, observe with left eye, make fine adjustments with the diopter adjustment ring to correct for your vision.

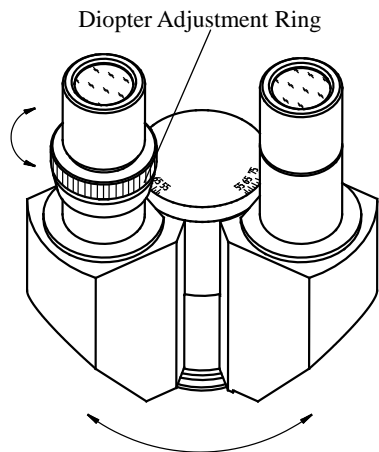


Figure 4



2) **Proper interpupillary distance**, or the distance between eyepieces, is crucial to the comfort of the user. Adjusting the interpupillary distance is accomplished through a “folding” action of the optical head, as in Figure 4.

4. Rotatable Stage Controls, see Figure 5

- 1) Put a specimen on the stage, observe it using the cross-lines eyepiece and 40X objective.
- 2) Focus on one target in the field of view, adjust it to the center of view, see Figure 6 A.
- 3) Rotate the stage. If the stage is off center, the target will encircle the center of the cross-lines, see Figure 6B.
- 4) To center the circle in the field of view, use the two stage centering screws, see Figure 6C.
- 5) If other objectives out of center, you may adjust it using the objective centering screws.
- 6) Tightening the stage setting screw will lock the rotatable stage into position.

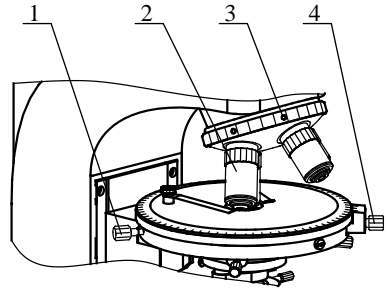


Figure 5

1. Stage Centering Screw
2. 40X Objective
3. Objective Centering Screw
4. Stage Set Screw

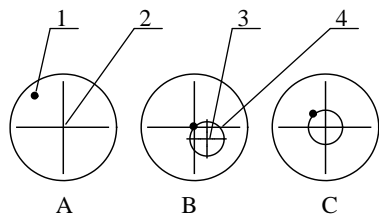


Figure 6

1. Target
2. Center of View
3. Center of Circle
4. Circle

5. Condenser Alignment Controls.

1) **Condenser Components** The condenser is located below the stage, see Figure 7. Abbe condenser; its mounting ring with lock screw and two large centering screws at either side of the adjustment knob for raising and lowering the condenser.

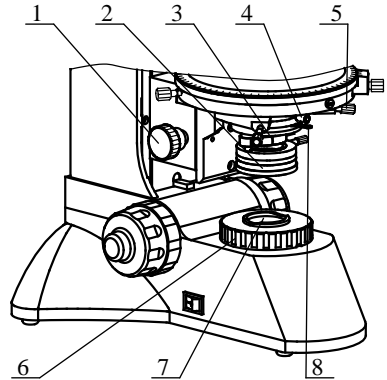


Figure 7

- |                              |                   |
|------------------------------|-------------------|
| 1. Sub-stage Adjustment Knob | 2.                |
| Polarizer                    | 3. Auxiliary Lens |
| Condenser Set Screw          | 4.                |
| Condenser Centering Screw    | 5.                |
| Field Diaphragm              | 6.                |
| Aperture Adjustment Lever    | 8.                |

2) **Condenser Alignment** – to center the Abbe condenser in the optical light path, see Figure 8.

3) Reduce the field diaphragm.

a. If the condenser out of center, you will see an image similar to Figure 8 A. The image may be out of focus and out of center.

b. Adjust the sub-stage adjustment knob until the side of image is clear. To center the iris opening in the field of view, use the two centering screws at each side of the abbe condenser mounting ring, see Figure 8B.

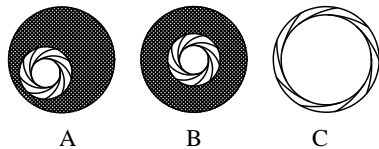


Figure 8

c. Once the image is in focus and centered in the field of view, open the field diaphragm until the image is almost as large as the field of view, see Figure 8C.

4) The lamp house has a field diaphragm to hold the filters. You may put colored glass filters over the diaphragm to enhance performance.

5) When using the auxiliary lenses or other objectives you may need to re-adjust the aperture diaphragm.

6. Polarization observation, see Figure 9
  - 1) The polarizing observation function is selected by pushing the analyzer and screwing the polarizer into light path (Figure 7).
  - 2) To make polarization path differences push the  $\lambda$  compensator,  $\lambda/4$  compensator or quartz wedge compensator into light path.
  - 3) The push rod on the upper left of the trinocular head will send 100% of the image light to the binocular eyepieces or split the image by 50% to the trinocular port, and 50% to the right eyepiece.

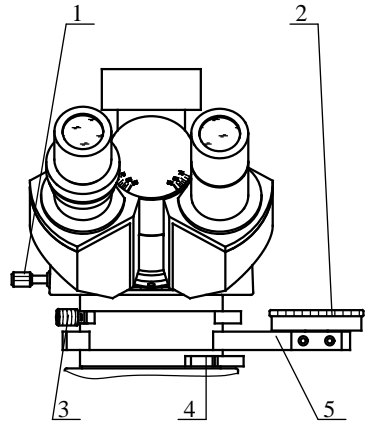


Figure 9

1. Push Rod To Direct Image to Binocular Eyepieces or Camera Port
2. Analyzer Adjustment Tray
3. Bertrand Lens Unit
4. Compensator
5. Analyzer

**NOTE:** If the condenser alignment is adjusted, you will also need to readjust the polarizer, see the Figure 7. Push the analyzer into light path and rotate analyzer knob to “0”. Rotate the polarizer adjustment to “0”. Loosen the condenser set-screw, and rotate the condenser iris until the field is very dark. Then tighten the set-screw again.

7. Conoscopic observation, see Figure 9
  - 1) The Conoscopic observation function is selected by pushing the Bertrand lens into light path. Observe the interference pattern using the eyepiece and 40X objective.

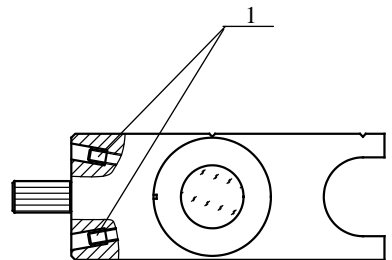


Figure 10

1. Bertrand Lens Centering Screw

- 2) If the Bertrand lens is off center, you will need to adjust the centering screw to adjust the Bertrand lens back into the center of view, see Figure 10.

## Changing the Light Bulb

1. Disconnect the power plug and **wait to be sure the bulb is cool**. Open the lamp door using the lamp door retaining screw as shown in Fig. 11.
2. Pull the old lamp straight out of the socket. Insert the new one into the same fixture. When installing the new bulb, be careful not to touch the glass with your fingers. The new bulb should be supplied in a plastic protective envelope. If not, use a tissue or other medium to grasp the bulb. This will prevent contamination from your hand from reducing the bulb's intensity and life. Reinsert the lamp socket into the lamp house and retighten the screw. If necessary, you may need to adjust the lamp centering screw to center the bulb.
3. Disconnect the power plug, take out the fuse holder. Changing the fuse. Install holder again, see figure 12.

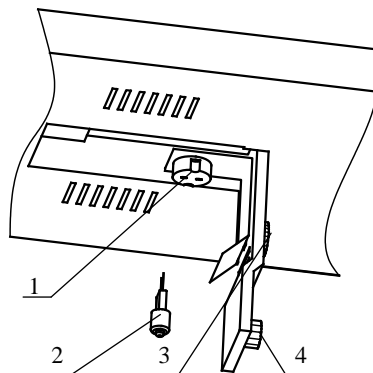


Figure 11

1. Lamp Socket
2. Bulb
3. Lamp Centering Screw
4. Lamp Door Retaining Screw

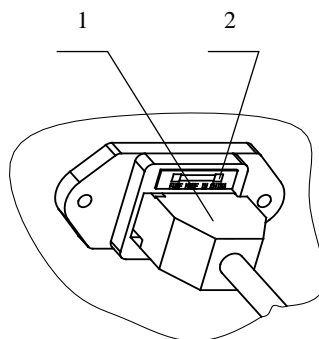


Figure 12

1. Power Plug
2. Fuse Holder

## **Preventative Maintenance**

1. Cleaning frame and stage

Disconnect the plug from mains socket before cleaning. Clean the frame and stage with a soft cloth moistened with a mild detergent solution. Be sure the instrument is dry before using.

2. Cleaning optical parts

Microscope eyepieces and objectives are coated. They should not be wiped while dry as dirt or dust may scratch the coating. It is best to remove parts from the frame prior to cleaning. Always blow loose dust away first. Use cotton swabs or lens tissue moistened with a lens cleaner or a small amount of alcohol, then wipe the surface clean with a good quality lens tissue. Solvents such as Xylene should NOT be used as cleaner.

3. Cleaning 100X oil immersion lens

The immersion oil should be removed from the lens at the end of each workday using cotton swabs or lens tissue moistened with a lens cleaner or a small amount of alcohol.



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