

MP300 SERIES

Biological Microscopes

PRODUCT MANUAL

Models: MP302 | MP302SP | MP302PL | MP303 | MP303SP | MP303PL

Binocular and Trinocular Biological Microscopes

For Academic, Clinical, and Research Laboratory Applications



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1. Product Overview

This manual covers the MP300 Series biological microscopes — precision optical instruments designed for reliable, high-resolution imaging of biological specimens in academic, clinical, and research laboratory environments. The MP300 Series is offered in two head configurations: binocular (MP302 models) and trinocular (MP303 models), each available in three infinity optical options — Infinity Achromat, Infinity Semi-Plan, and Infinity Plan objectives.

Intended Use

MP300 Series microscopes are designed for brightfield observation of prepared and living specimens, including histological sections, cytological smears, microbiological cultures, and hematological samples. They are suitable for use in clinical laboratories, academic teaching environments, and general research settings.

Series Overview

The MP302 Series provides a standard binocular Siedentopf head configuration ideal for routine or advance laboratory use. The MP303 Series extends this platform with a trinocular head, enabling simultaneous visual observation and digital imaging via an attached camera. Within each configuration, three infinity objective grades are offered to match application requirements from routine teaching to advanced research imaging.

2. Model Comparison

The following table provides a side-by-side comparison of all models in the MP300 Series to assist in selecting the appropriate instrument for your application.

Specification	MP302	MP302SP	MP302PL	MP303	MP303SP	MP303PL
Head Type	Binocular	Binocular	Binocular	Trinocular	Trinocular	Trinocular
Infinity Objectives	Achromat	Semi-Plan	Plan	Achromat	Semi-Plan	Plan
Camera Port	No	No	No	Yes	Yes	Yes
Light Split	—	—	—	20:80	20:80	20:80
Weight (lbs/kg)	12.8 / 5.8	12.8 / 5.8	12.8 / 5.8	14.75 / 6.6	14.75 / 6.6	14.75 / 6.6

3. Technical Specifications

The following specifications apply across all MP300 Series models unless otherwise noted. Individual model variants differ in head type and objective optical grade as listed above.

Series	MP300 Series Microscope
Category	Biological
Head	Binocular (Siedentopf) Trinocular (Siedentopf)
Head Inclination	30°
Head Rotation	360°
IPD Range	48–75 mm
Light Split	— 20:80 (Trinocular)
Eyepiece	WF 10× / 20 mm (High Eyepoint)
Field of View (FOV)	20 mm
Objectives	Infinity Achromat Infinity Semi-Plan Infinity Plan Achromat
Objective Set	4×, 10×, 40×, 100×
Infinity Corrected	Yes
Nosepiece	4-Position
Magnification Range	40× – 1000×
Condenser	Abbe N.A. 1.25
Iris Diaphragm	Adjustable aperture diaphragm with lever control
Stage	Rackless (Integrated)
Stage Size	140 × 135 mm
Stage Travel	75 × 35 mm
Illumination	LED
Light Power	3 W
Coaxial Focus	Coarse focusing travel range: 25 mm Fine focusing: 2 µm/division
Dimensions (W×D×H)	13.5 × 10.2 × 17.9 in / 345 × 260 × 455 mm
Weight	14.75 lbs / 6.6 kg

Specifications subject to change without notice. © 2026 MPD Scientific. All rights reserved.

4. Safety Information

Read all safety instructions before operating any MP300 Series instrument. Failure to follow these instructions may result in instrument damage, specimen contamination, or personal injury.

General Safety Precautions

- This is a precision optical instrument. Always handle with care. Strong impact or vibration may cause irreparable damage to internal optical and mechanical components.
- Always turn off the power and disconnect the power adapter before moving the instrument.
- Position the instrument on a stable, level, vibration-free surface. Do not drag the instrument across work surfaces.
- Do not operate in environments with direct sunlight, excessive heat, high humidity, dust, acidic or alkaline vapors, or other corrosive atmospheres.
- Do not touch optical surfaces (objectives, eyepieces, condenser) with bare hands. Fingerprint contamination is difficult to remove and degrades image quality.
- If an unexpected situation occurs during operation, immediately disconnect the power adapter.
- Do not disassemble or modify the instrument. This microscope is fully adjusted and calibrated prior to shipment. Unauthorized disassembly may result in equipment damage and void the warranty. If service is required, contact MPD Scientific or your authorized distributor.

Power Supply

- The instrument is designed for a wide input voltage range: DC 5V–12V (via supplied power adapter). The power adapter accepts AC 100V–240V, 50/60Hz.
- Supplying voltage outside of this range may cause serious and irreparable damage to the instrument.
- Always verify the local supply voltage is compatible with the power adapter before connecting.

Fire and Burn Hazards

- Keep alcohol, ether, and all other flammable materials away from the lamp housing and power components.
- Alcohol and ether used for lens cleaning are flammable. Ensure adequate ventilation and keep away from open flames during use.

Environmental Requirements

- Operating temperature: 0°C to 40°C
- Maximum relative humidity: 85%, non-condensing
- High temperature or humidity may cause mold growth, condensation, or fogging of optical components, impairing performance.
- In persistently high-humidity environments, use a desiccant or dehumidifying unit to protect optical components.

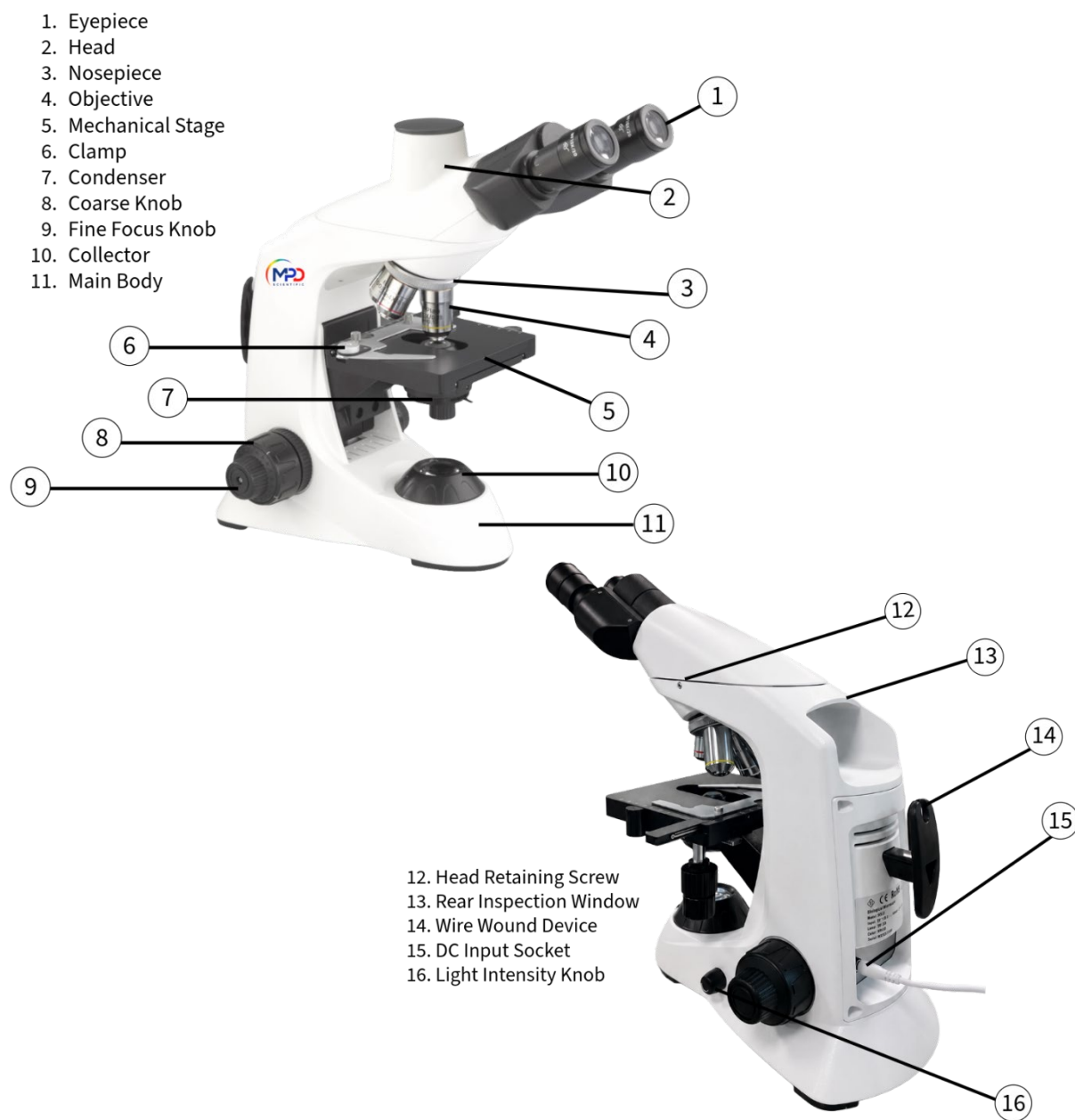
Environmental Disposal

To protect the environment, dispose of packaging materials (cardboard, foam inserts) responsibly through appropriate recycling or salvage facilities.

5. Installation and Setup

5.1 Unpacking

Carefully remove the instrument from its packaging. Inspect for any shipping damage before proceeding. Retain the original packaging materials for future transport or storage. Verify all components listed on the packing slip are present.



5.2 Environmental Requirements

- Operating temperature: 0°C to 40°C
- Maximum relative humidity: 85%, non-condensing
- Place on a stable, vibration-free, level surface away from direct sunlight, dust, and corrosive vapors
- Leave adequate clearance around the instrument for ventilation and ease of operation

5.3 Power Connection

Connect the DC input socket (A9) on the instrument base to the supplied power adapter (A10) using the power cable (A11). Plug the power adapter into a suitable AC outlet (100V–240V, 50/60Hz). Do not power on yet.

Never operate the instrument outside the specified voltage range. Verify local supply voltage before connecting.

5.4 Component Assembly

Follow these steps for initial assembly:

1. Clean the work surface before beginning.
2. Remove the cover from the head mounting port on the body: use the included Allen key to turn the head retaining screw counter-clockwise until it is backed out of the hole as far as possible, then lift the cover away. Leaving the screw fully backed out provides clearance for head installation.
3. Align the grooves on the observation head with the mounting port on the body and lower the head into place until you hear a click. While stabilizing the head with one hand, tighten the retaining screw clockwise until it stops.
4. Remove the dust covers from the eyepiece tubes.
5. Insert both WF10× eyepieces into the eyepiece tubes. Do not touch the eyepiece lens surfaces with your bare hands.
6. For trinocular models (MP303 series): attach the C-mount adapter and camera to the trinocular port. Install the camera acquisition software on your computer before connecting the camera.
7. Connect the power adapter to the instrument DC input socket and to a suitable AC outlet. The instrument is now ready for use.

6. Operation

6.1 Brightfield Standard Operating Procedure

Follow this sequence for routine brightfield microscopy:

8. Turn on the power switch and adjust the LED brightness to a comfortable level using the rotary potentiometer
9. Open the stage clamp, place the specimen slide on the mechanical stage, close the clamp, and use the stage moving knob to center the area of interest in the optical path.
10. Rotate the nosepiece to engage the 4× objective for initial orientation, then switch to the 10× objective for primary observation. Always rotate the nosepiece to click-stop — do not force objectives into position.
11. Use the course focusing knob to bring the specimen into approximate focus, then use the fine focusing knob for precise adjustment.
12. Adjust the interpupillary distance by moving the eyepiece tubes until the two fields merge into a single circular field of view.
13. Adjust the diopter to one eyepiece to equalize focus between both eyes.
14. Adjust the aperture diaphragm lever to optimize image contrast and brightness. The recommended setting is 70–80% of the objective's numerical aperture.

15. Rotate the nosepiece to the desired higher-power objective as needed. Adjust focus using the fine focusing knob.
16. For the 100× oil immersion objective: place a small drop of appropriate immersion oil on the glass slide before engaging the objective. After use, clean the front lens of the 100× objective immediately using lens paper and lens cleaning solution.

6.2 Illumination

The 3W LED illumination system provides stable, adjustable broadband white light (color temperature 4000K–5000K) with a rated working life exceeding 10,000 hours. Adjust brightness using the potentiometer. The LED operates via the supplied power adapter (DC 5V–12V output).

The LED module does not require routine replacement. If the LED fails, do not attempt self-repair — contact MPD Scientific or your authorized distributor.

6.3 Condenser and Aperture Diaphragm

The Abbe condenser (N.A. 1.25) collects and focuses the LED illumination onto the specimen plane. The aperture diaphragm lever controls the cone angle of illuminating light.

- Opening the aperture diaphragm increases brightness and resolution but reduces contrast and depth of field.
- Closing the aperture diaphragm increases contrast and depth of field but reduces brightness and resolution.
- If the aperture diaphragm is too small, double-image artifacts may appear in the field of view.
- For most specimens, set the aperture to 70–80% of the objective's numerical aperture for optimal resolution and contrast balance.
- To verify the aperture setting, remove one eyepiece and observe the back focal plane of the objective directly.

6.4 Focusing System

The coaxial coarse and fine focusing knobs are mounted separately on the instrument arm for smooth, precise specimen positioning.

- Coarse focusing knob: for rapid large-range focus adjustments. Maximum travel range is 25 mm.
- Fine focusing knob: for precision adjustment with a resolution of 2 µm per division.
- If the stage drifts downward during extended use, adjust the tension ring on the coarse focusing knob assembly: rotate clockwise to increase tension, counterclockwise to decrease tension.

6.5 Digital and SLR Camera Imaging (MP303 Series)

Trinocular models (MP303 series) include a dedicated trinocular port with a 20:80 light split (20% to camera port, 80% to eyepieces during simultaneous use). Connect the CCD/CMOS camera via C-mount adapter or connect an SLR camera using the appropriate adapter. Install the camera acquisition software on your workstation before connecting. First achieve a sharp image through the eyepieces, then capture images via the camera interface. If the digital image is not sharp, adjust the fine focusing knob while monitoring the live camera view.

7. Maintenance and Care

7.1 Optical Surface Cleaning

- Never touch optical surfaces (objectives, eyepieces, condenser) with bare hands. Fingerprint contamination degrades image quality and is difficult to remove fully.
- Remove loose dust using a clean, soft brush or bulb blower before any wet cleaning.

- For fingerprints or stubborn contamination, use lens paper or absorbent cotton lightly moistened with a 1:4 mixture of ethanol and diethyl ether.
- Ethanol and ether are flammable. Keep away from open flames and ensure adequate ventilation when using these solvents.
- After oil immersion observation, clean the 100× objective front lens immediately using lens paper and a small amount of the ether/ethanol mixture. Residual hardened oil permanently damages optical coatings.

7.2 Mechanical and Housing Surfaces

- Clean metal surfaces with a soft cloth lightly moistened with a mild organic solvent such as 70% alcohol. Do not use aggressive solvents or bleach.
- Clean plastic components with a soft cloth and clean water only. Do not use organic solvents on plastic parts.
- Do not allow any cleaning liquid to enter the lamp housing, electrical connectors, or focusing mechanism.

7.3 Decontamination

For decontamination of the stage, clamp, and other surfaces following biohazard exposure, apply an appropriate disinfectant per your facility's biosafety protocols. Allow adequate contact time and wipe clean. Ensure no residue remains on mechanical surfaces before resuming use.

7.4 Storage

When not in use, power off the instrument, cover with the supplied dust cover, and store in a clean, dry location within the specified temperature and humidity ranges. Eyepieces and objectives should be stored in a dedicated dry container with desiccant when removed from the instrument. Retain original packaging materials for transport.

7.5 Periodic Inspection and Service

Periodically inspect the instrument for signs of optical surface degradation, unusual vibration or noise during focusing, or stage mechanism irregularities. To maintain optimal performance, it is recommended that the instrument be inspected by qualified personnel on a regular basis. If any malfunction occurs that cannot be resolved by the troubleshooting guidance in Section 8, contact MPD Scientific or your authorized distributor for service.

8. Troubleshooting

Consult the following guide if an issue arises during operation of your MP300 Series microscope. If the issue cannot be resolved using the remedies listed, contact MPD Scientific technical support or your authorized distributor for assistance.

Symptom	Probable Cause	Corrective Action
Power on but no illumination	Power adapter not fully connected	Reseat power adapter at both the instrument and AC outlet
	LED module failed	Contact MPD Scientific or distributor for LED replacement
	Blown fuse	Replace fuse per instrument specification
Illumination flickering	Loose DC input connection	Reseat the DC input cable at socket A9
	LED module failure	Contact MPD Scientific technical support
Insufficient or uneven field brightness	Brightness control set too low	Increase potentiometer (B8) setting

Symptom	Probable Cause	Corrective Action
	Objective not fully engaged in nosepiece	Rotate nosepiece until objective clicks into position
	Aperture diaphragm too small	Open aperture diaphragm using lever (B3)
	Dust or contamination on optical surfaces	Clean objectives, eyepieces, condenser, and collector
	Condenser positioned too low	Raise condenser to upper position
Image not in focus or lacking contrast	Cover glass thickness incorrect	Use 0.17 mm (No. 1.5) cover glass
	Specimen inverted (cover glass down)	Flip slide so cover glass faces upward
	Objective front lens contaminated	Clean front lens with lens paper and ether/ethanol mixture
	Immersion oil not applied (100× objective)	Apply appropriate immersion oil to cover glass before use
	Immersion oil does not meet specification	Use only immersion oil supplied by MPD Scientific or manufacturer-recommended type
	Air bubbles in immersion oil	Remove objective, clean, reapply oil carefully to avoid bubbles
	Aperture diaphragm not properly set	Adjust aperture to 70–80% of objective N.A.
	Condenser positioned too low	Readjust condenser height
One side of image is dark, or image shifts while focusing	Objective not centered in optical path	Rotate nosepiece until objective fully engages click-stop
	Slide not flat on stage	Ensure slide is level and fully secured by stage clamp (B2)
Objective contacts specimen when switching to higher power	Cover glass facing down	Flip slide so cover glass faces upward
	Cover glass too thick	Use standard 0.17 mm cover glass
Binocular fields not superimposed	Interpupillary distance not set correctly	Adjust IPD by moving eyepiece tubes until fields merge into one
Eye strain after prolonged observation	Diopter not calibrated for user	Adjust diopter ring on dominant-eye eyepiece
Stage drifts downward during use	Coarse focus tension too low	Tighten tension adjustment ring (B4) clockwise