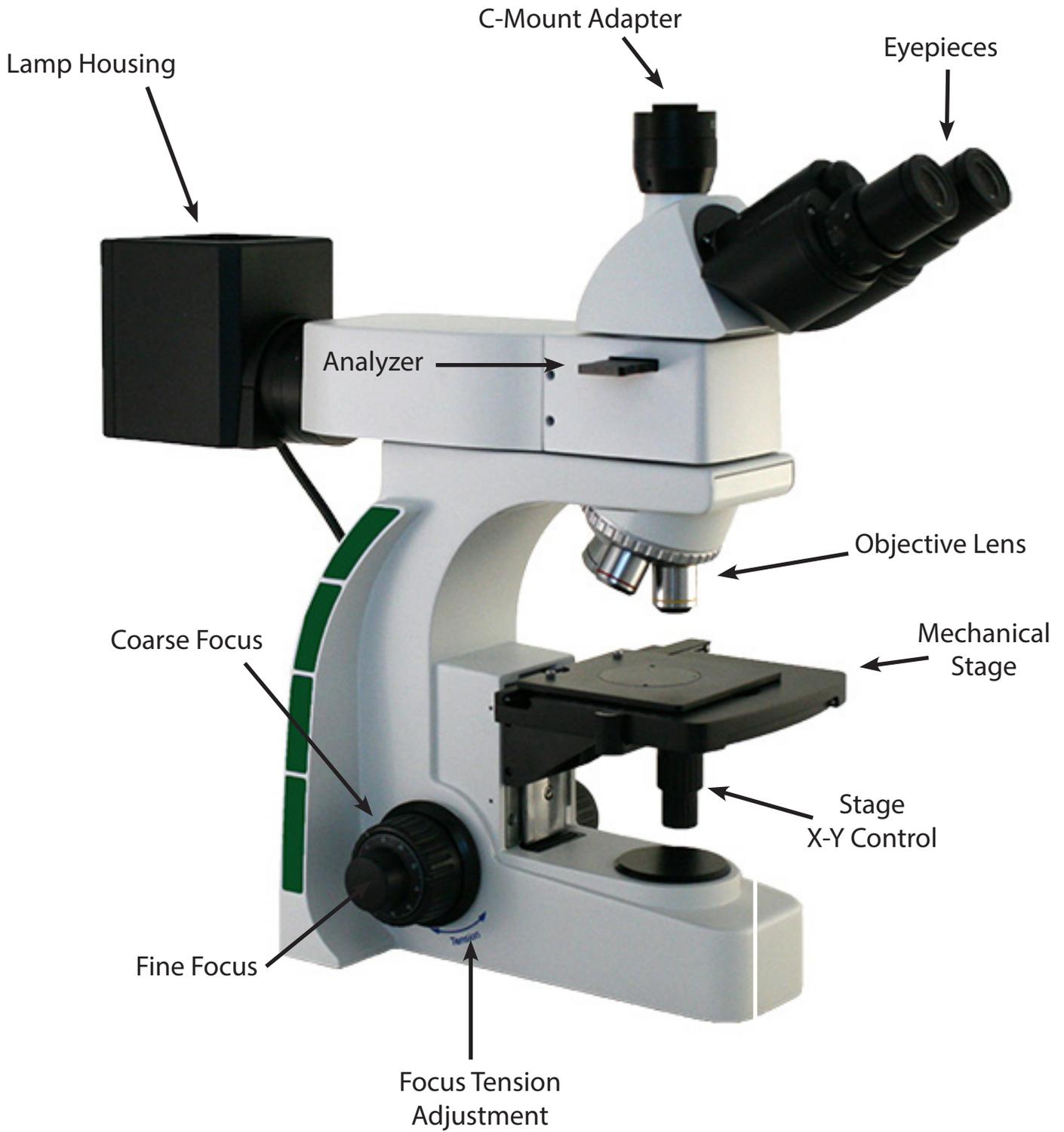


M20 Metallurgical Microscope User's Manual

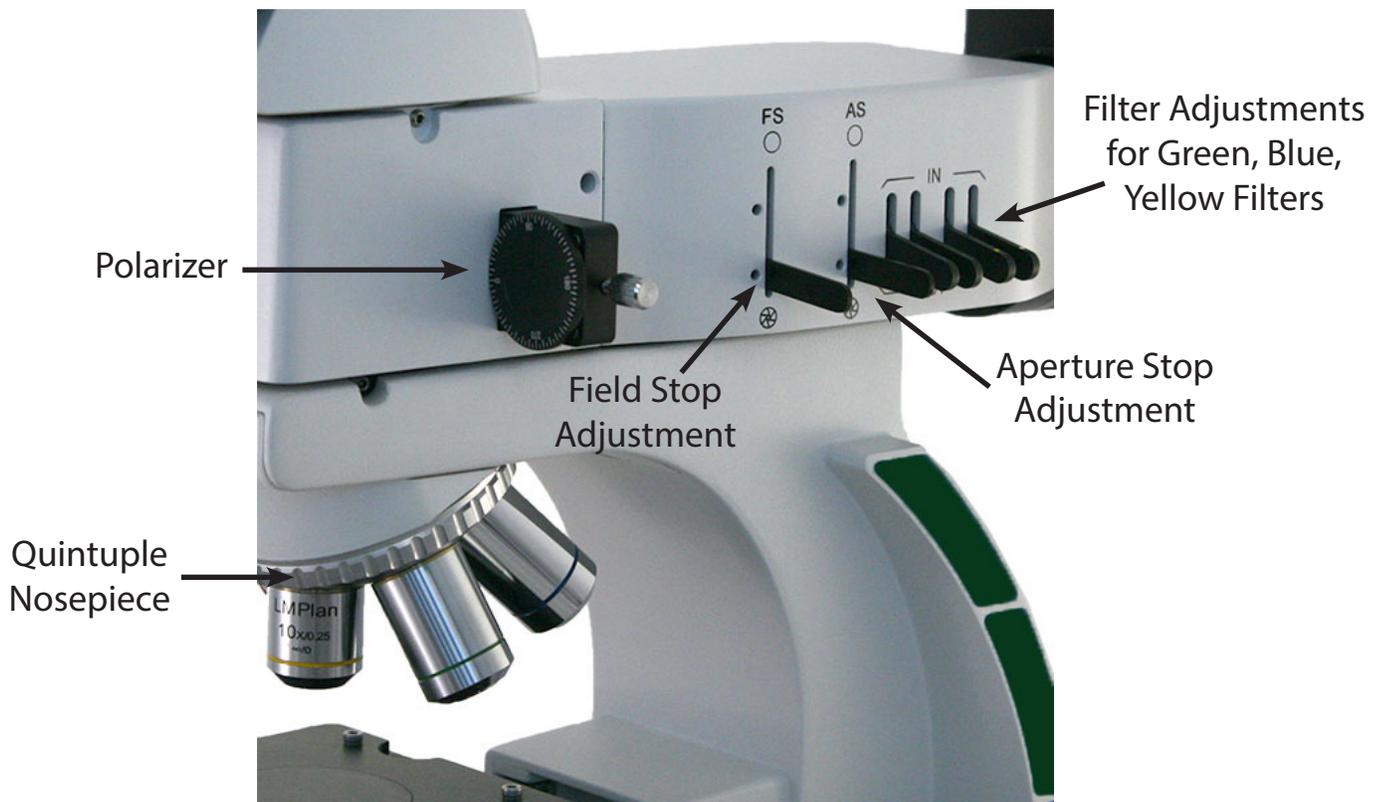


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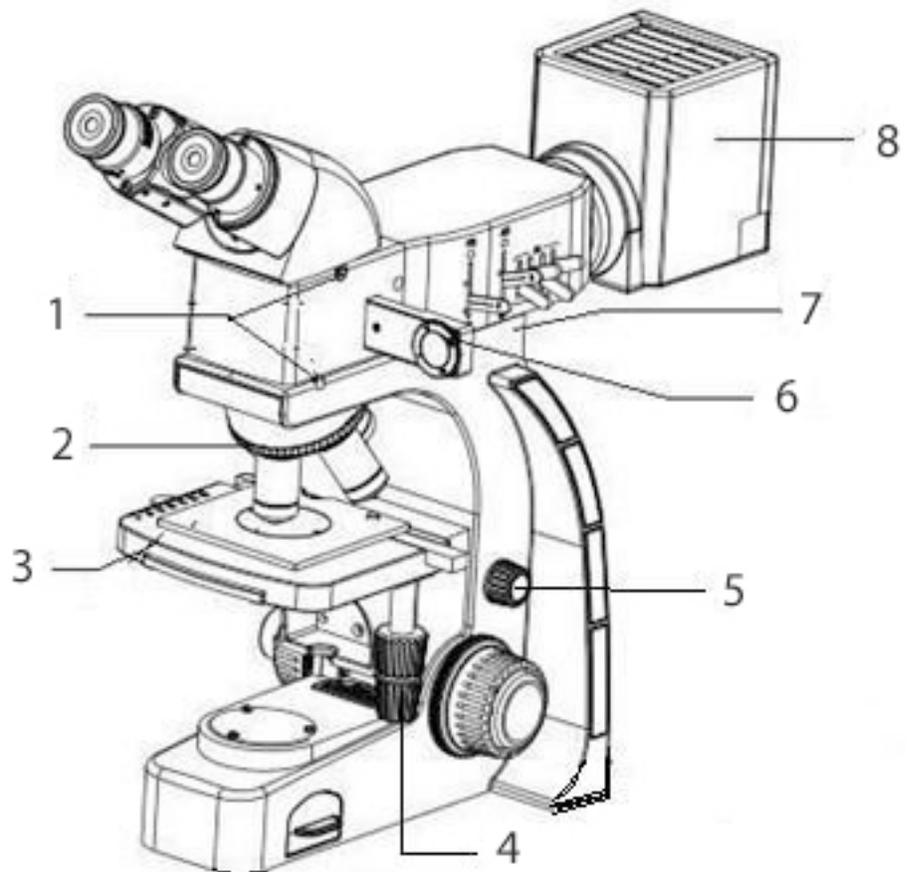
M20 Microscope Components



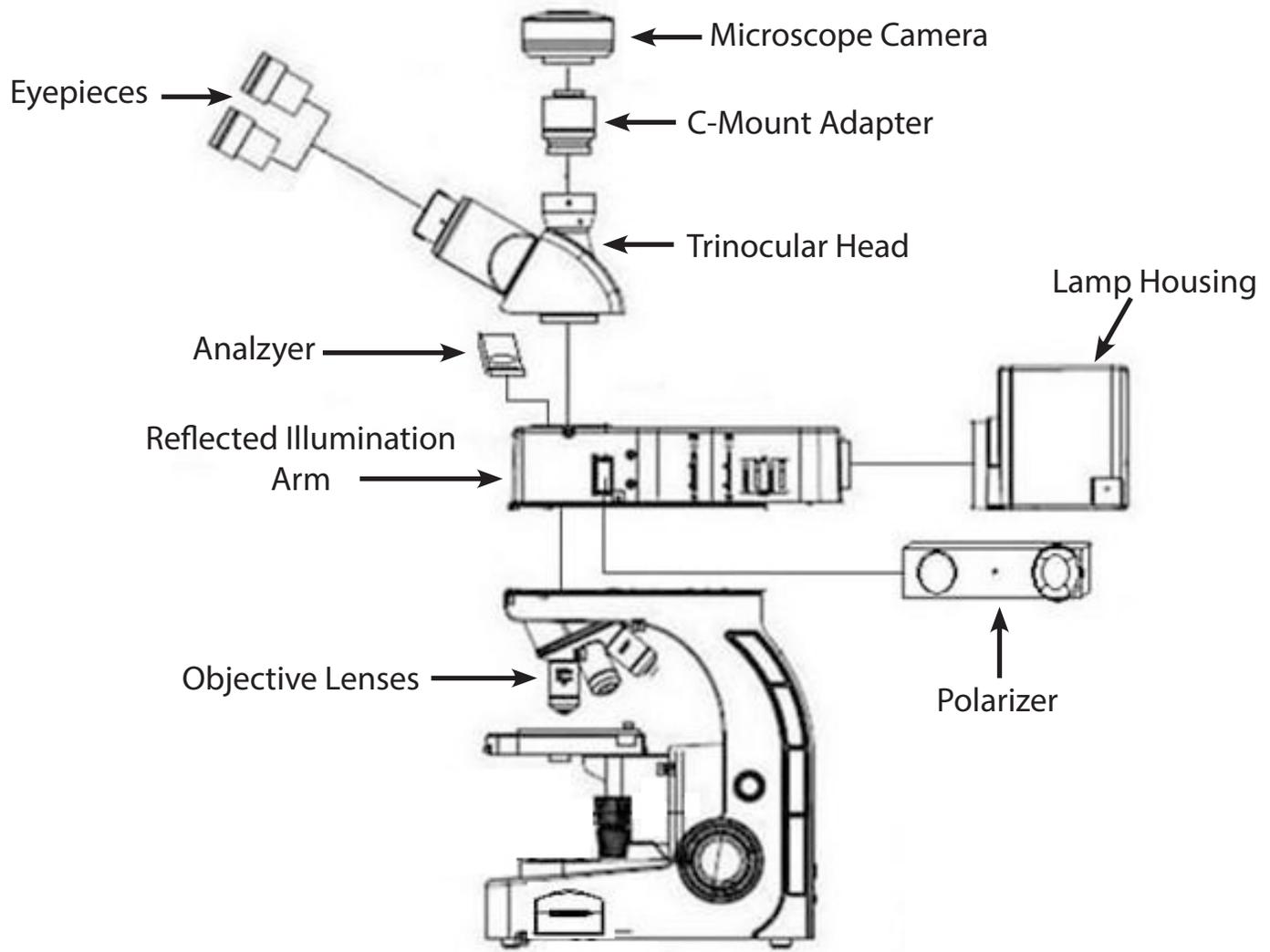
M20 Microscope Components



1. Allen Tightening Screws
2. Revolving Nosepiece
3. Mechanical Stage
4. X/Y Axis Knobs for Stage
5. Light Intensity Knob
6. Polarizer
7. M20 Frame
8. 12v / 50w Halogen Housing



M20 Metallurgical Microscope Assembly

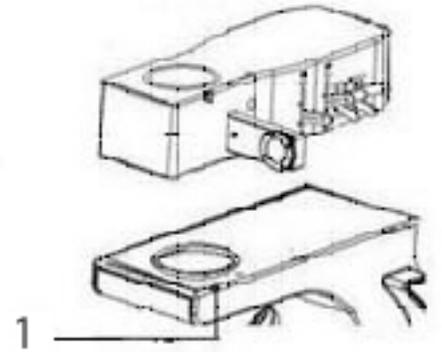


- Connect the reflected illumination arm to the microscope frame.
- Connect the lamp housing to the end of the reflected illumination arm.
- Connect the trinocular head to the top of the reflected illumination arm.
- Insert the eyepieces into the eyetubes.
- Insert the C-Mount adapter into the trinocular port.
- Thread the microscope camera onto the c-mount adapter.
- Insert the polarizer into the reflected illumination arm slot.
- Insert the analyzer on the opposite side of the reflected illumination arm.
- Screw the objective lenses into the nosepiece.
- Plug the microscope into the outlet.

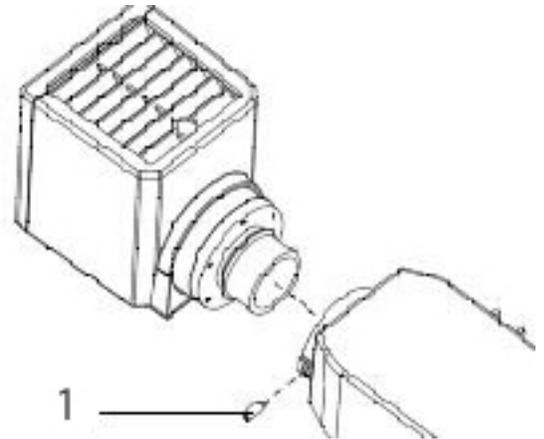
M20 Metallurgical Microscope Assembly



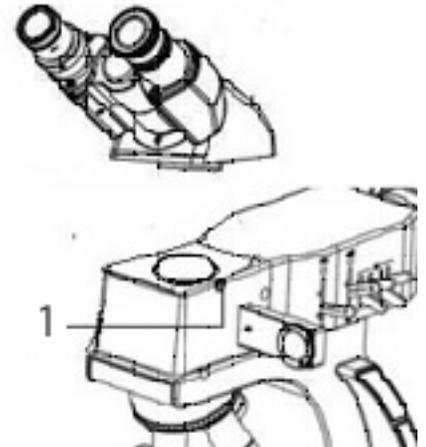
Use the allen key to loosen the screw (1) on the frame. Attach the reflected illumination arm and re-tighten the screw to secure.



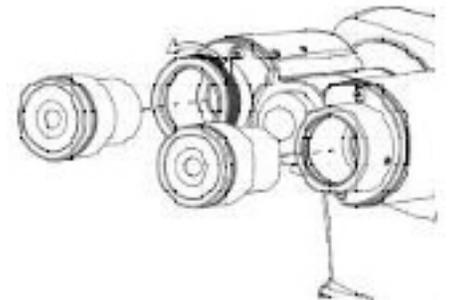
Use the allen key to loosen the screw on the back of the reflected illumination arm (1). Connect the dovetail mount of the lamp housing and insert into the illumination arm. Tighten the allen screw to secure in place.



Use the allen key to loosen the top of the reflected illumination arm clamping screw (1). Attach the trinocular head onto the reflected illumination arm. Tighten the screw to hold the head in place.

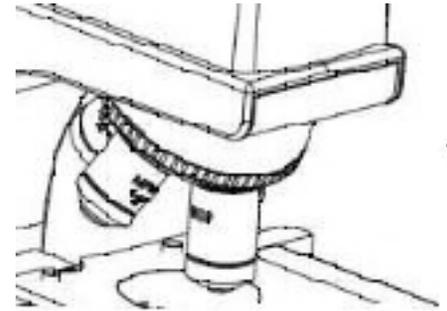


Remove the eyetube dust caps. Insert the eyepieces into the eyetubes.





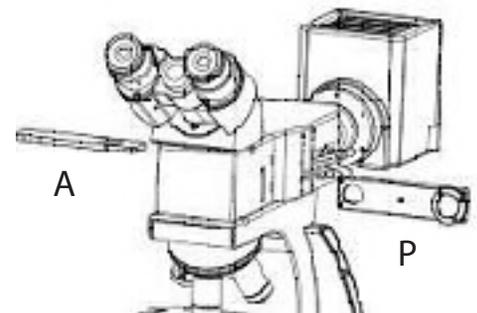
Lower the stage to its lowest position and screw the objectives into the nosepiece in ascending order.



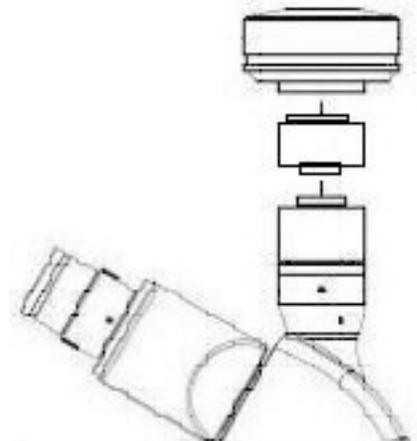
Make sure the main switch on the microscope is set to "O" off, and connect the power cord.



Insert the Polarizer (P) into the slot on the right side of the reflected illumination arm. Insert the analyzer (A) into the left side of the reflected illumination arm. Rotate the polarizer dial so the light is darkest.



Loosen the set screw and remove the dust cap from the trinocular port. Connect the c-mount adapter and tighten with the set screw. Screw the c-mount microscope camera onto the c-mount adapter. When not in use make sure to cover the c-mount or trinocular port to keep dust out of it.



M20 Microscope Operation Instructions



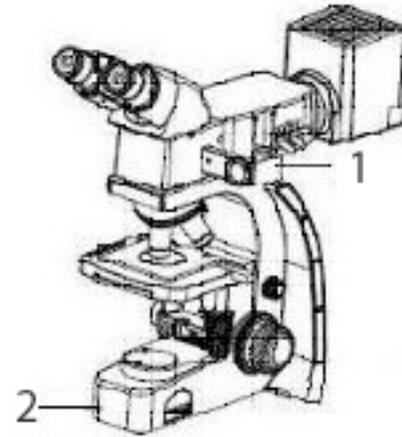
Do not shake or drop the microscope.



Do not expose the microscope to direct sun, high temperatures, high humidity, dust, or damp environments. Use a flat work surface.



When moving the microscope use both hands, holding the back of the frame (1) and the front of the base (2) as shown in the image at right.



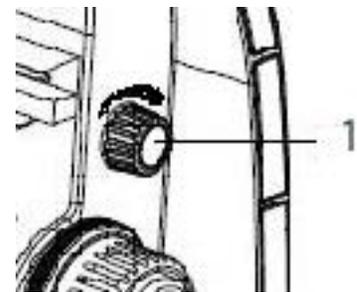
Set the power switch to off "O" before replacing a bulb or fuse, and wait until the lamp is cool. Microscope uses 12v, 50W halogen bulb. (Part # R40POL-001).



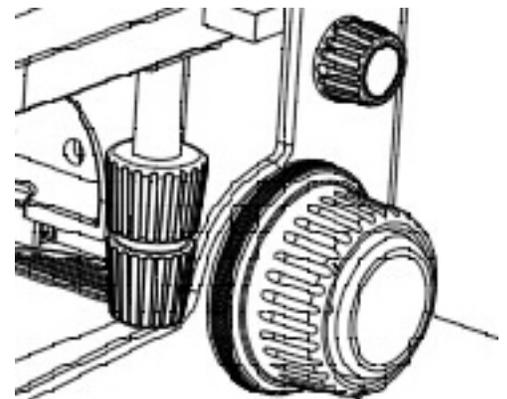
Voltage range of 100~240V (47-63Hz) is supported.



Turn the rheostat control knob (1) to the minimum and turn the power switch on the back of the microscope frame to the on "I" position. Rotate the rheostat knob to increase or decrease the brightness of the illumination. Push up the aperture diaphragm lever to open the aperture diaphragm and let more light in.



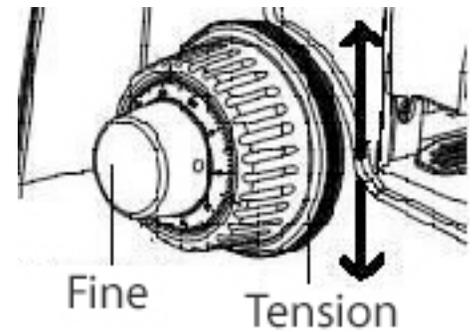
Place a sample on the stage and move the smallest magnification objective lens into the light path. Raise the stage up by rotating the coarse focus knob. Once the image is in focus, the fine focus knob can be used to finely adjust the focus.



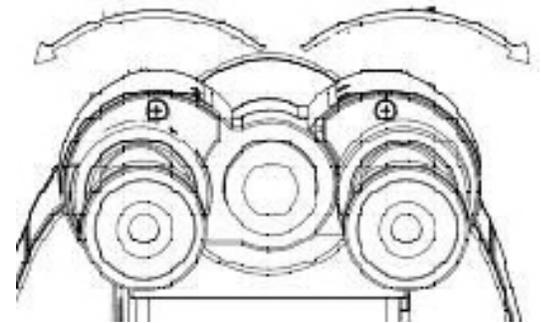
M20 Microscope Operation Instructions



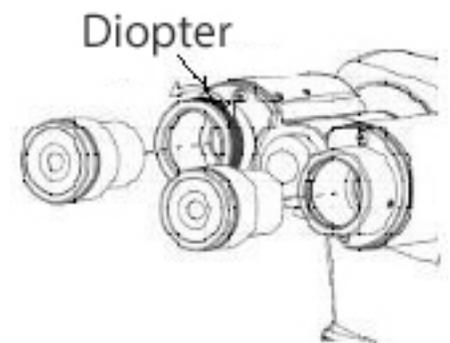
The tension of the coarse focus is set at the factory. Should the tension become loose or too tight, it can be adjusted with the tension adjustment ring. Turn the tension adjustment ring counter-clockwise to increase tension. Turn clockwise to decrease the tension.



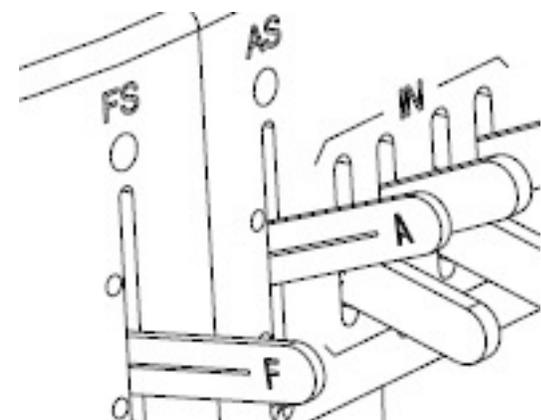
Adjust the interpupillary distance of the eyetubes so that when looking through the microscope, the vision of both the left and right eyes join completely. The interpupillary distance is adjustable from 50-75mm.



While looking through the right eyepiece, rotate the coarse / fine focus knobs to bring the specimen into focus. Now look through the left eyepiece only and rotate the diopter adjustment ring on the left eyepiece to bring the specimen into focus. When rotating the diopter adjustment ring, hold the lower part of the left eyetube steady while rotating the ring.



Adjust the field diaphragm (FS) until the size of the image becomes almost identical to that of the field of view.



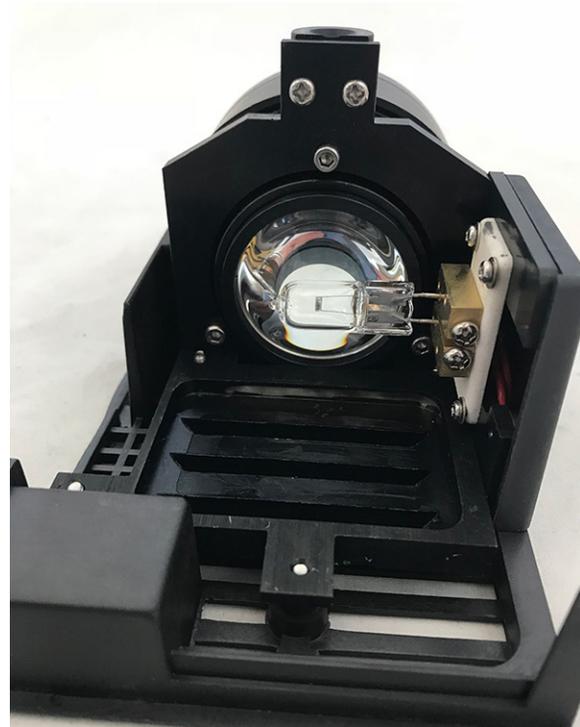
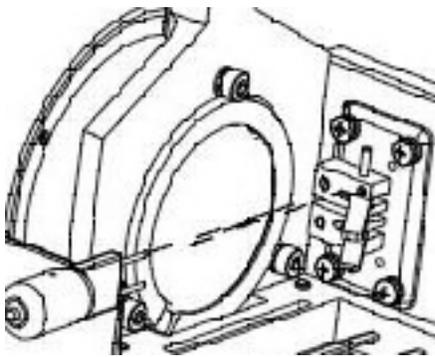
The filter sliders are labeled above with "IN". Green, blue and yellow filters are provided and each can be engaged by moving the slider up or down.

M20 Microscope Bulb Replacement



Turn off and unplug the microscope prior to changing the bulb.

1. Unscrew the top of the housing with the allen wrench.
2. Lift the illumination cover.
3. Do not touch the bulb with bare fingers.
4. Remove bulb from socket.
5. Replace bulb with 12v, 50w halogen (part #R40POL-001).



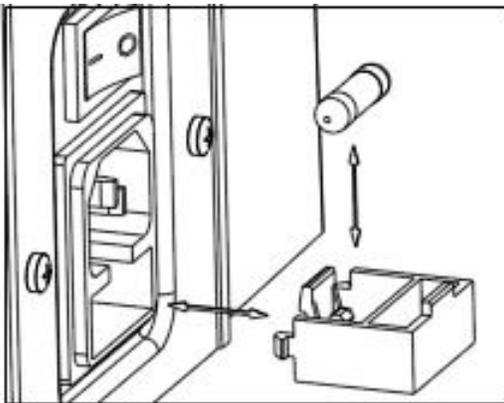
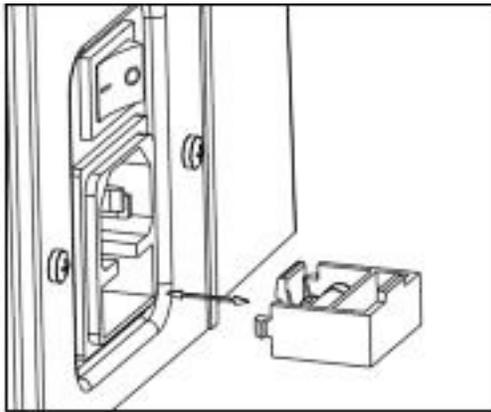
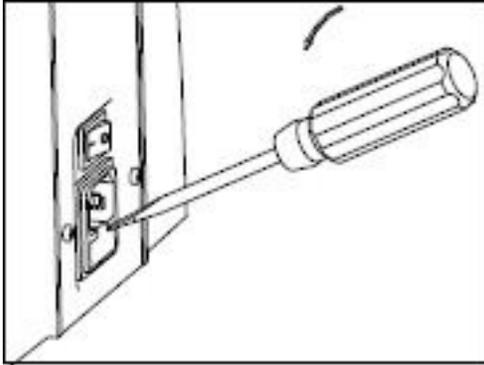
M20 Microscope Fuse Replacement



Turn off and unplug the microscope prior to fuse replacement.



The fuse box is installed below the power socket.
Fuse: 5x20mm, 3.15A.



M20 Metallurgical Microscope Trouble Shooting

TROUBLE	POSSIBLE CAUSE	SOLUTION
Bulb does not turn on.	Power cord is not plugged in.	Plug in power cord.
	Power switch is not turned on.	Turn on power switch.
	Bulb is burned out.	Replace bulb.
	Fuse is burned out.	Replace fuse.
Bulb turns on, but field of view is dark.	Rheostat is too low.	Increase light intensity by rotating rheostat control.
	Revolving nosepiece is not clicked into position.	Click nosepiece into place.
	Field iris diaphragm is not open enough.	Open field diaphragm.
	Too many filters are being used.	Reduce filters being used.
Field of view is obscured or not evenly illuminated.	Field iris diaphragm is not properly centered.	Center field iris diaphragm.
	Field iris diaphragm is closed down too much.	Open the field iris diaphragm.
	Revolving nosepiece is not clicked into position.	Make sure nosepiece is clicked into position.
	A filter is in an intermediate position.	Fully engage or disengage the filter.
Dust or dirt is visible in the field of view.	Dirt or dust is on the specimen.	Clean the sample.
	Dirt or dust on the eyepieces.	Clean the eyepieces.
	Dirt or dust on the objectives.	Clean the objectives.
Image has glare (hot spots).	Aperture diaphragm is closed down too much.	Open the aperture diaphragm more.
Image is not sharp, contrast is poor and details are poorly visible.	Improper objective lens is being used.	Use M20 metallurgical microscope objectives.
	Objective lens is dirty.	Clean objective lens.
	Dirt or dust on eyepieces.	Clean eyepieces.
Image is blurry	Objective is not fully in place in the light path.	Click nosepiece into place.
	Specimen is not flat on the stage.	Place the specimen flat on the stage, or make sure the sample is flat.
Field of view in one eye does not match that of the other.	Interpupillary distance has not been set.	Adjust interpupillary distance.
	Incorrect diopter adjustment setting.	Adjust the diopter.
Coarse / fine adjustment knobs will not rotate easily or at all.	Tension adjustment ring is set too tight.	Adjust tension adjustment.
Stage falls.	Tension adjustment ring is set too loose.	Tighten tension adjustment.

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