
UNITRON®

microMET

INVERTED METALLURGICAL MICROSCOPE

MANUAL



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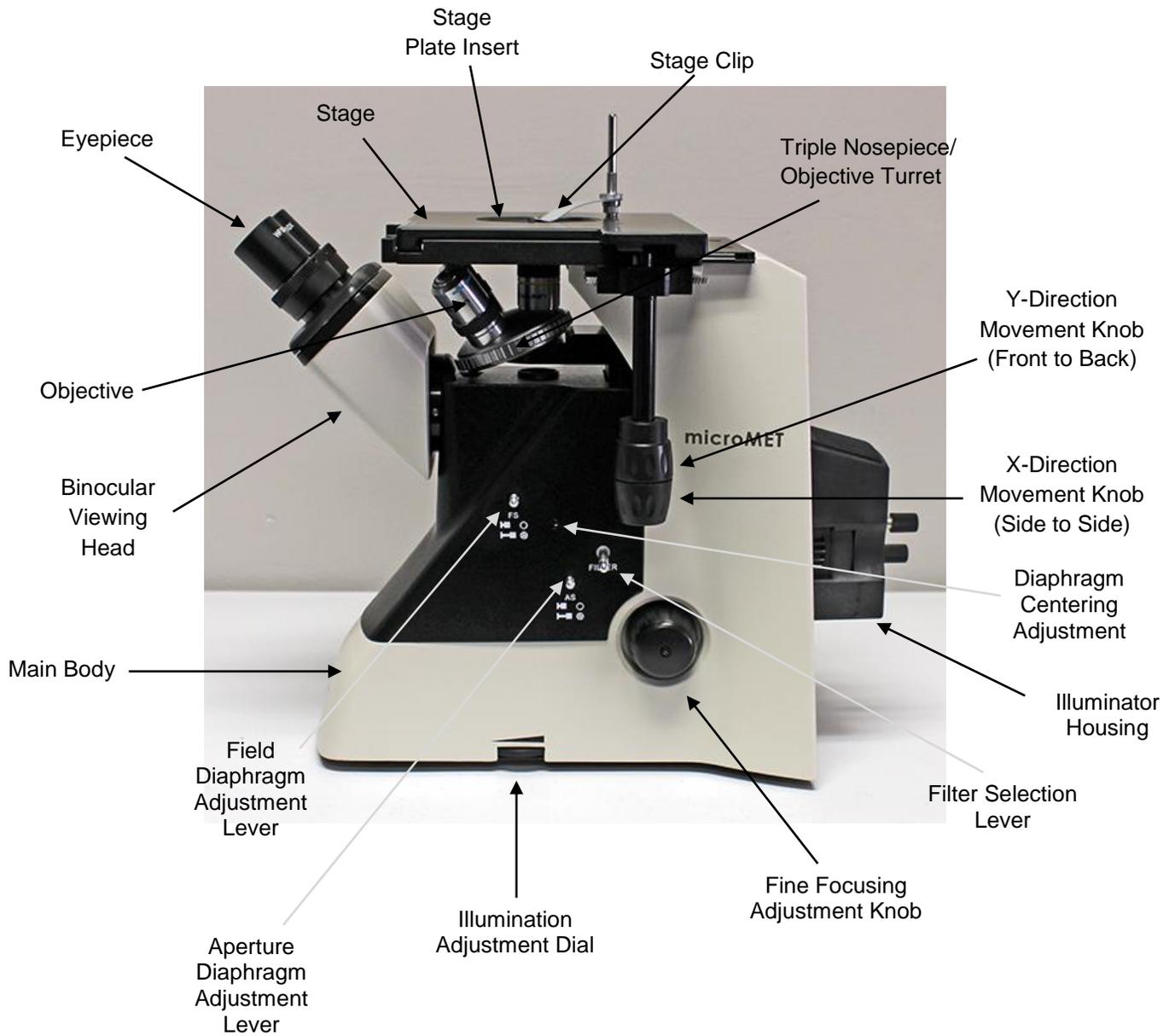
SAFETY NOTES

1. Open the shipping carton carefully to prevent any accessory, i.e. objectives or eyepieces, from dropping and being damaged.
2. Do not discard the molded shipping carton; the container should be retained should the microscope ever require reshipment.
3. Keep the instrument out of direct sunlight, high temperature or humidity, and dusty environments. Ensure the microscope is located on a smooth, level and firm surface.
4. If any specimen solutions or other liquids splash onto the stage, objective or any other component, disconnect the power cord immediately and wipe up the spillage. Otherwise, the instrument may be damaged.
5. All electrical connectors (power cord) should be inserted into an electrical surge suppressor to prevent damage due to voltage fluctuations.
6. **CAUTION:** the lamp, lamp housing and adjacent parts will become very hot. Do not touch these parts until they have completely cooled. Never attempt to handle a hot halogen bulb. For safety when replacing the lamp or fuse, be sure the main switch is off ("O"), remove the power cord, and replace the bulb after the bulb and the lamp house has completely cooled.
7. Confirm that the input voltage indicated on your microscope corresponds to your line voltage. The use of a different input voltage other than indicated will cause severe damage to the microscope.

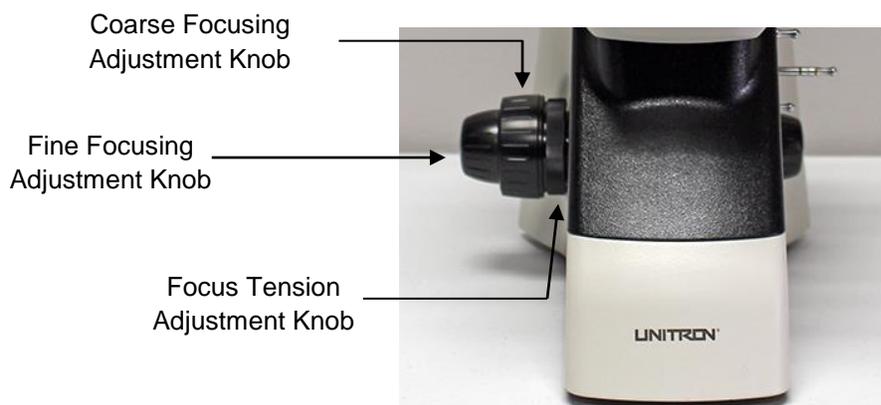
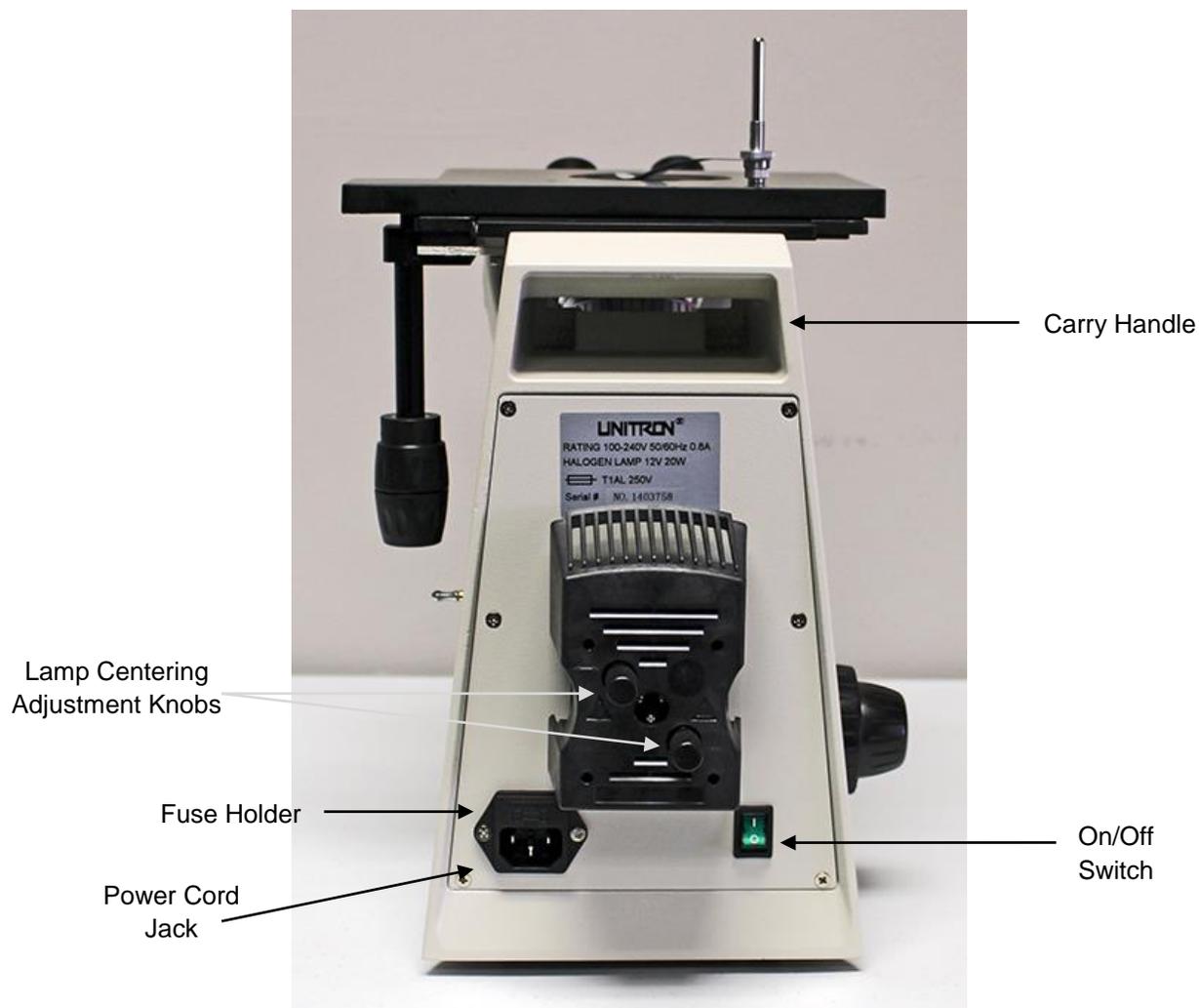
CARE AND MAINTENANCE

1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.
2. Keep the instrument clean; remove dirt and debris regularly. Accumulated dirt on metal surfaces should be cleaned with a damp cloth. More persistent dirt should be removed using a mild soap solution. Do not use organic solvents for cleansing.
3. The outer surface of the optics should be inspected and cleaned periodically using an air stream from an air bulb. If dirt remains on the optical surface, use a soft cloth or cotton swab dampened with a lens cleaning solution (available at camera stores). All optical lenses should be swabbed using a circular motion. A small amount of absorbent cotton wound on the end of a tapered stick such as cotton swabs or Q-tips, makes a useful tool for cleaning recessed optical surfaces. Avoid using an excessive amount of solvents as this may cause problems with optical coatings or cemented optics or the flowing solvent may pick up grease making cleaning more difficult.
4. Store the instrument in a cool, dry environment. Cover the microscope with the dust cover when not in use.
5. UNITRON® microscopes are precision instruments which require periodic preventative maintenance to maintain proper performance and to compensate for normal wear. An annual schedule of preventative maintenance by qualified personnel is highly recommended. Your authorized UNITRON® distributor can arrange for this service.

COMPONENTS DIAGRAM



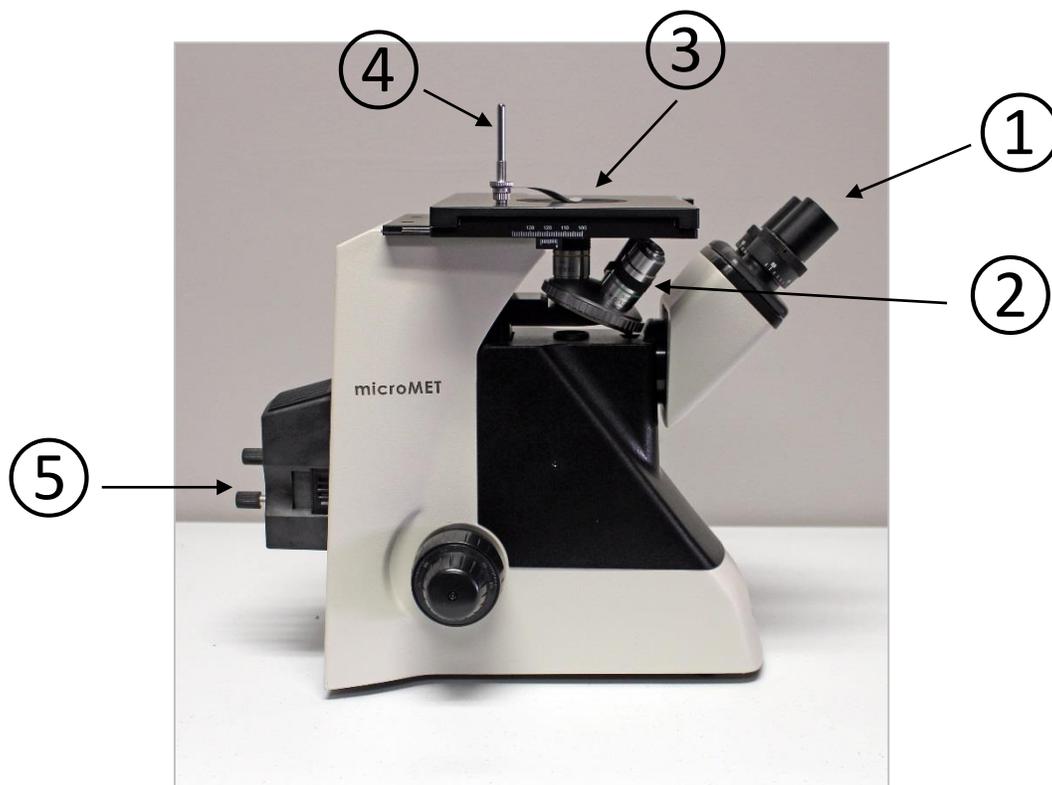
COMPONENTS DIAGRAM *(continued)*



ASSEMBLY DIAGRAM

The diagram below shows how to assemble the various components. The numbers indicate the order of assembly. Use the 2mm and 3mm hex wrenches that are supplied with your microscope when required. Be sure to keep these wrenches for changing out components or making adjustments.

When assembling the microscope, make sure that all parts are free of dust and dirt, and avoid scratching any parts or touching glass surfaces.



- ① Eyepieces
- ② Objectives
- ③ Stage Insert Plate
- ④ Stage Clip
- ⑤ Illuminator Housing
- ⑥ Power Cord (*not shown*)

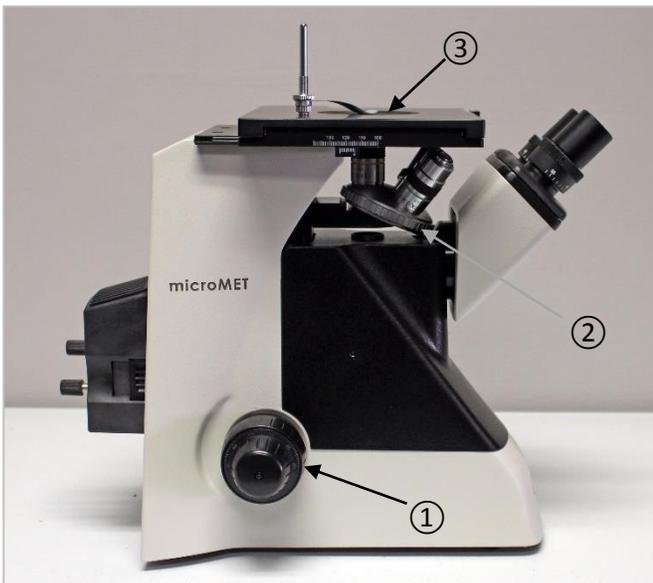
ASSEMBLY



Installing the Eyepieces

Using the hex wrench that came with your microscope, loosen the lock screw ① on the eyepiece tube and insert one of the eyepieces into the eyepiece tube ②. Tighten the lock screw ①.

Repeat above for the other eyepiece.

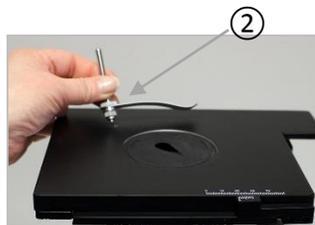


Installing the Objectives

Rotate the coarse focusing knob ① to raise the objective turret ② to its highest position.

Install the objectives into the objective nosepiece ② from the lowest magnification to the highest in a clockwise direction.

TIP: it's easier to install and remove the objectives from the hole in the stage ③ rather than from the side.



Installing the Stage Plate Insert & Stage Clip

Place the stage plate insert in the ① into the stage plate opening on the top of the stage.

Screw the stage clip in the ② into either hole on top of the stage.

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ASSEMBLY *(continued)*



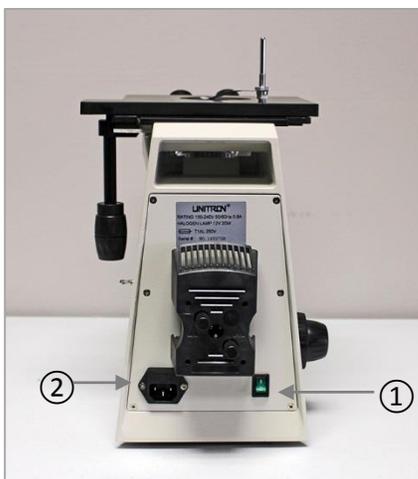
Installing the Illuminator Housing

NOTE: DO NOT TOUCH the halogen bulb with your fingers as oil from your fingers may damage it. To handle the halogen bulb when replacing, wear cotton gloves or use a soft cloth or tissue – see “Replacing the Halogen Bulb”.

Align and slide the two large upper pegs on the lamp housing into the two holes of the lamp housing receptacle on the back of the microscope as shown.



It is fully installed when you feel/hear it snap into place.



Installing the Power Cord

Make sure the On/Off switch ① is set to the Off (O) position. Plug the female (recessed) end of the power cord (not shown) into the power cord jack ② on the back of the microscope and the other end into an AC electrical outlet.

OPERATION

Plug the 3-prong line cord into the microscope and then into a grounded 120V or 220V A.C. electrical outlet. Usage of a surge suppressor outlet is highly recommended. Turn the On/Off switch to “|”. For longer bulb life always turn the illuminator variable intensity dial to the lowest illumination intensity setting possible before turning the power on or off.

Adjusting the Illumination

The light level may need adjustment depending upon the specimen density and objective magnification. Adjust the light intensity for comfortable viewing by turning the light intensity control dial ① to increase or decrease brightness.



Adjusting the Aperture Diaphragm

The aperture diaphragm determines the numerical aperture of the illumination system and effects the resolution of the optical image, the contrast, the brightness and depth of focus.

When the size of the aperture diaphragm is made smaller, the resolution and brightness of the image are reduced while the contrast and depth of focus are increased. If the aperture diaphragm is increased in size, the resolution and brightness will improve, however the contrast and depth of focus will be lowered.

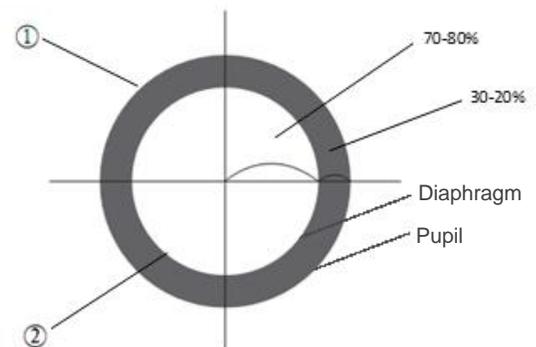
To adjust the aperture diaphragm use the aperture diaphragm control lever ①. To properly adjust the aperture diaphragm follow the following procedure:



1. Place a sample with a flat and plane surface onto the stage. A sample with a high reflectance (i.e. a mirror surface) is best.

2. Using the 10x objective in bright-field mode focus on the specimen.

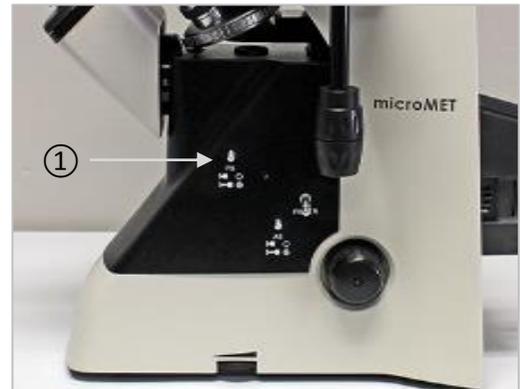
3. Remove one eyepiece and look through the eyepiece tube to determine that the aperture image is shown in the pupil of the objective. Adjust the aperture diaphragm (using the aperture diaphragm control knob) as necessary so that the aperture diaphragm image covers 70% to 80% of the pupil of the objective.



OPERATION *(continued)*

Adjusting the Field Diaphragm

By limiting the diameter of the light entering the condenser, the field diaphragm can prevent other light and strengthen the image contrast. When the image is just on the edge of the field of view, the objective can show the best performance and obtain the clearest image



Adjusting Interpupillary Distance

To adjust the interpupillary distance, hold the left and right eyetubes while observing a specimen. Pull the eyetubes out or push in until the fields of view of both eyepieces coincide completely. A complete circle should be seen in the viewing field when viewing the specimen slide. An improper adjustment will cause operator fatigue and will disrupt the objective parfocality.

The range is 54-75mm. Be sure to write down you interpupillary number for future operation.



Adjusting the Focus

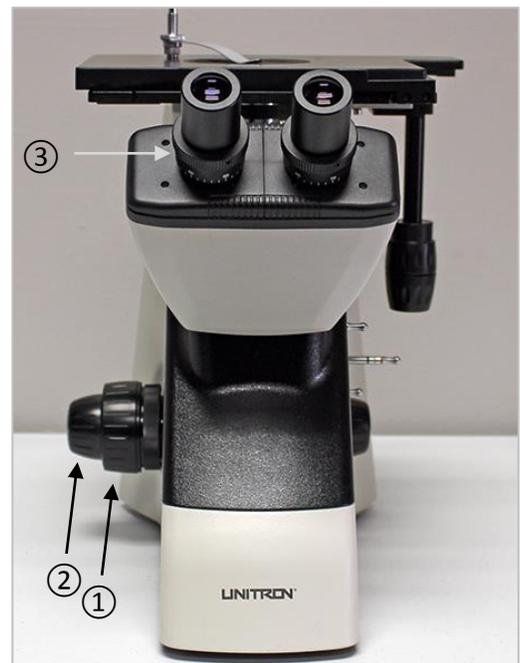
To ensure that you obtain sharp images with both eyes, (since eyes vary, especially for those wearing glasses) any eyesight variation can be corrected in the following manner.

Using your left eye only and the 10X objective, focus your specimen by adjusting the coarse focus adjustment knob ①. When the image is in view, refine the image to its sharpest focus by turning the fine focus adjustment knob ②.

Rotate the diopter collar to obtain the sharpest focus.

To obtain the same sharp image using your right eye, do not touch the coarse or fine adjustments. Instead, rotate the right diopter collar ③ until the sharpest image appears. Repeat several times to check.

IMPORTANT: do not counter rotate the focusing knobs as this will cause severe problems and damage to the focusing system.



OPERATION *(continued)*

Adjusting the Focusing Tension

If the feel is very heavy when focusing with the focusing knobs, or the specimen leaves the focus plane after focusing, or the stage lowers by itself, adjust the tension with the tension adjustment ring ①.

Turn the tension adjustment ring clockwise to loosen or counterclockwise to tighten according to user preference.



Placing & Moving Specimens

Place the polished surface of specimen face down on insert plate.

Rotate bottom knob ① for the X axis movement (side to side) of the stage, and upper knob ② for the Y axis movement (front to back) of the stage.

NOTE: The travel distance of the stage is 40mm X 30mm.

The scale value ③ indicates the distance with an accuracy of 0.1mm.



OPERATION *(continued)*

Using the Filters

Filters (green, yellow and neutral density) are pre-installed at the factory.

To change the filter, pull the filter selection lever to select the desired filter ①.



Replacing the Bulb

USE ONLY the specified halogen 12 volt 20 watt bulb (CAT #3253).

DO NOT TOUCH the halogen bulb with bare hands as it may shorten the lamp life. Wrap it with gauze, a soft piece of lint-free cloth, or handle with cotton gloves.

Ensure the power switch is off and the lamp is cooled before handling.

Pull out and remove the illuminator housing ①.

Using a lint-free cloth, pull the bulb out of the lamp socket in ceramic housing ②.

Replace the bulb by holding the bulb using a lint-free cloth and inserting the two pins ③ at the bottom of the bulb into the lamp socket in the ceramic housing.

Reinstall the illuminator housing, ensuring it clicks into place.



Operation *(continued)*

Replacing the Fuse

The fuse holder is located above the AC power cord receptacle on the back of the microscope.

To replace the fuse, turn the power off and unplug the microscope from the wall outlet and then from the power cord from the power cord receptacle on the back of the microscope.

Insert a small flat head (-) screwdriver into the top of the fuse holder ① and carefully pop it out.

Being careful not to break the glass of the fuse, gently grasp each end of the fuse to remove.

Replace the fuse with 250v 1A fuse, CAT# 149-30-37

Re-insert the fuse holder ensuring it snaps into place.

INPUT: AV 100 ~ 240v 50/60Hz

FUSE: 250v T1AL



TROUBLESHOOTING

Under certain conditions, performance of this unit may be adversely affected by factors other than defects. If a problem occurs, please review the following list and take remedial action as needed. If you cannot solve the problem after checking the entire list, please contact your local dealer for assistance.

OPTICAL

PROBLEM	CAUSE	SOLUTION
The illumination is on, but the field of view is dark.	The socket pin is not connected to the illumination column	Connect it securely
	The bulb is burnt out.	Replace it with a new one
	The brightness is set too low	Set it to the appropriate position
	Two many filters are stacked	Reduce them to the minimum required number
The edge of the field of view is obscured or not evenly illuminated.	The nosepiece is not in the located position	Turn the nosepiece into the position where you can hear it engaged
	the color filter is not inserted fully	Push it in all the way
Dirt or dust is visible in the field of view	Dirt/dust on the specimen Dirt/dust on the eyepiece	Replace with a clean specimen Clean the eyepieces
The image glares	The iris diaphragm is closed too much	Open up the iris diaphragm
Visibility is poor <ul style="list-style-type: none"> ● Image is not sharp ● Contrast is poor ● Details are indistinct 	The objective is not correctly engaged in the light path	Turn the nosepiece into the engaged position
	the aperture diaphragm is opened or stopped down too far in brightfield observation	adjust the aperture diaphragm properly
	The lens (condenser, objective, ocular or culture dish) become dirty	Clean it thoroughly
One side of the image is blurred	The objective is not in the center of the light path	Insure the nosepiece is in the "clicked" position
	The specimen is not correctly mounted on the stage.	Place the specimen on the stage correctly.
	The optical performance of the culture vessel bottom plate is poor (profile irregularity, etc.)	Use a vessel with a good profile irregularity characteristic.

TROUBLESHOOTING *(continued)*

MECHANICAL PART

PROBLEM	CAUSE	SOLUTION
The coarse adjustment knob is too difficult to rotate	The tension adjustment ring is tightened too much	Loosen it appropriately
The image goes out of focus during observation	The tension adjustment collar is too loose	Tighten it appropriately

ELECTRICAL SYSTEM

PROBLEM	CAUSE	SOLUTION
The lamp can't light	No power to the lamp	Check the power cord is connected correctly NOTE: Lamp Replacement The LED illuminator will provide approximately 20,000 hours of illumination under normal use. If you should need to replace the LED bulb, please contact an authorized UNITRON service center or call UNITRON at 1-888-289-2228 for an authorized service center near you.
The light intensity is not enough	Not use an designated lamp The brightness adjustment knob is used wrong	use an designated lamp Adjust the brightness adjustment knob in a correct way

MISCELLANEOUS

The field of view of one eye does not match that of the other	The interpupillary distance is not correct The diopter is not right Your view is not accustomed to the microscope observation and widefield eyepieces	Adjust the interpupillary distance Adjust the diopter Upon looking into eyepieces, try looking at the overall field before concentrating on the specimen range. You may also find it helpful to look up and into distance for a moment before looking into the microscope again.
The indoor window or the fluorescence lamp is photographed.	The stray light entered through the eyepieces or viewfinder is reflected	Cap both the eyepieces and photomicroscope system's viewfinder

MAINTENANCE

Please remember to **never** leave the microscope with eyepieces removed and always protect the microscope with the dust cover when not in use.

SERVICE

UNITRON® microscopes are precision instruments which require periodic servicing to keep them performing properly and to compensate for normal wear. A regular schedule of preventative maintenance by qualified service personnel is highly recommended. Your authorized UNITRON® distributor can arrange for this service. Should unexpected problems be experienced with your instrument, proceed as follows:

1. Contact the UNITRON® distributor from whom you purchased the microscope. Some problems can be resolved simply over the telephone.
2. If it is determined that the microscope should be returned to your UNITRON® distributor or to UNITRON® for warranty repair, pack the instrument in its original molded shipping carton. If you no longer have this carton, pack the microscope in a crush-resistant carton with a minimum of three inches of a shock absorbing material surrounding it to prevent in-transit damage. The microscope should be wrapped in a plastic bag to prevent dust from damaging the microscope. Always ship the microscope in an upright position; **NEVER SHIP A MICROSCOPE ON ITS SIDE**. The microscope or component should be shipped prepaid and insured.

LIMITED MICROSCOPE WARRANTY

This microscope is warranted to be free from defects in material and workmanship for a period of five (5) years for mechanical and optical components and one (1) year for electrical components from the date of invoice to the original (end user) purchaser. This warranty does not cover damage caused in-transit, misuse, neglect, abuse or damage resulting from improper servicing or modification by other than UNITRON® approved service personnel. This warranty does not cover any routine maintenance work or any other work, which is reasonably expected to be performed by the purchaser. Normal wear is excluded from this warranty. No responsibility is assumed for unsatisfactory operating performance due to environmental conditions such as humidity, dust, corrosive chemicals, deposition of oil or other foreign matter, spillage or other conditions beyond the control of Unitron Ltd. This warranty expressly excludes any liability by Unitron Ltd. for consequential loss or damage on any grounds, such as (but not limited to) the non-availability to the End User of the product(s) under warranty or the need to repair work processes. Should any defect in material, workmanship or electronic component occur under this warranty contact your UNITRON® distributor or UNITRON® at (631) 543-2000. This warranty is limited to the continental United States of America. All items returned for warranty repair must be sent freight prepaid and insured to Unitron Ltd., 73 Mall Drive, Commack, NY 11725 – USA. All warranty repairs will be returned freight prepaid to any destination within the continental United States of America. For all foreign warranty repairs, return freight charges are the responsibility of the individual/company who returned the merchandise for repair.