



G700 SERIES ADVANCED CLINICAL MICROSCOPE OPERATION MANUAL

For use with MFR# G704, G704T



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UNICO G700 SERIES MICROSCOPE

Thank you for selecting the UNICO G700 Series Advanced Clinical Microscope. This precisely built, durable microscope should give years of service to even the busiest office or laboratory. Please read this manual carefully before you operate the microscope. If ever you require an additional accessory or spare part, please contact your local distributor, or you can contact UNICO for the name of the nearest distributor.

INSTRUMENT SAFETY

The UNICO Advanced Clinical Microscope may be used only for the microscope techniques described in this manual. Improper usage or failure to follow the safety instructions provided in this manual may cause personal injury or property damage. Do not discard this manual and keep it accessible for easy reference. The following warnings should be observed without exception:

-  The power plug must be inserted in a socket featuring a grounding (earth) contact. The grounding effect must not be made ineffective by an extension cable which does not have a protective ground wire. If it is established that the protection measures are no longer effective, the instrument must be switched off and safeguarded against inadvertent operation. For service and repair contact technical support 800-588-9776.
-  Always disconnect the instrument from the line before opening the instrument and before changing the fuses. Make sure to use only fuses of the rated power required. The use of makeshift fuses and the short-circuiting of the fuse holders are not permitted.
-  Dust and dirt can harm the performance of the instrument. The microscope must be covered with the dust cover if it is not used for longer periods of time. Always check whether the instrument is switched off before you cover it.
-  Never allow water to come in contact with the instrument and avoid using it in situations where it may be splashed with water. Splashing water may cause short circuit, malfunction and over heating. If water is splashed on the microscope turn off the power switches immediately and disconnect the power cord from the outlet. Wipe the moisture with the dry cloth. Contact technical support if necessary at 800-588-9776.
-  The UNICO Advance Clinical Microscopes are optical-mechanical precision instruments which may only be operated by trained personnel. Performance and lifespan of the instrument may be diminished if the instrument is not handled properly.

UNPACKING AND INSTALLATION

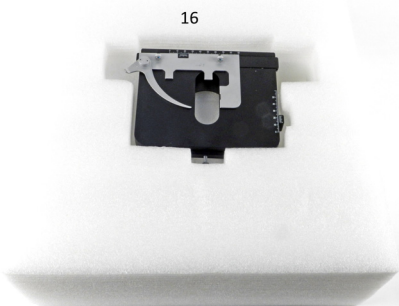
The microscope is packed in cushioning styrofoam in a box for maximum protection during shipping. Please examine the unit upon receiving and retain all packing until the unit has been tested. The warranty excludes any damage caused by shipping. Inspect for any possible shipping damage. If you note any damage, please contact your representative. Save the original packaging. If it becomes necessary to return the unit to us, we ask that it be returned in the original packaging. Do not unpack the microscope without reading the following instruction to insure proper assembly and prevent the loss of microscope components and accessories.

The G700 series packaging consists of 3 separate layers designed to hold individual components. After the shipping box is opened remove the top protective styrofoam cover and set it aside. Take out the first layer and place it on the flat dry sturdy surface. Do not remove individual components at this time. Please note your microscope configuration may be slightly different. Protective covers have been removed for illustration purpose.



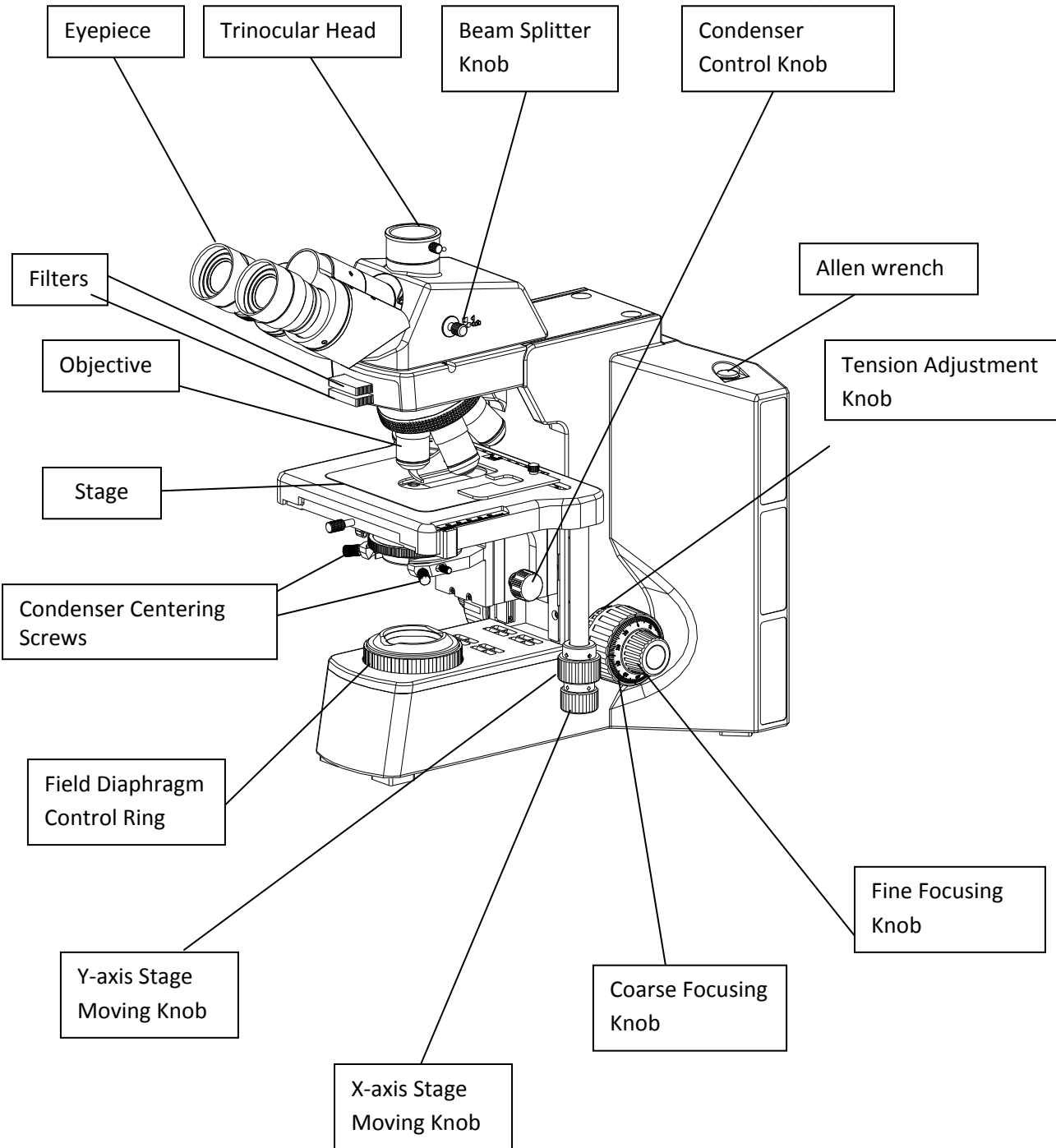
#	Description	Qty.	G704	G704T
1	Objectives	5	2x,4x,10x,40x,100x PL	
2	Eyepieces	2	WF 10x PL	
3	Immersion Oil	1	Included	
4	Microscope Head	1	Binocular	Trinocular
5	Condenser	1	Included	
6	C-mount Adapter	1	NA	Optional
7	LBD Filter	1	Optional	
8	Polarizer filter	1	Optional	
9	Analyzer filter	1	Optional	
10	Blank filter insert	1	Included	
11	Blank insert	1	Included	
12	Power Cord	1	Included	
13	Power Pack	1	Included	
14	Spare Bulb	1	Included	
15	Allen Key	1	Included	
16	Mechanical Stage	1	Included	
17	Microscope Body	1	Included	

Remove the second layer and set it aside. The second layer contains the mechanical stage of the microscope. Do not remove it at this time to avoid any damage. The third bottom layer contains the body of the microscope. Carefully remove the body and place it on the benchtop. Do not remove the last layer of the styrofoam from the box.

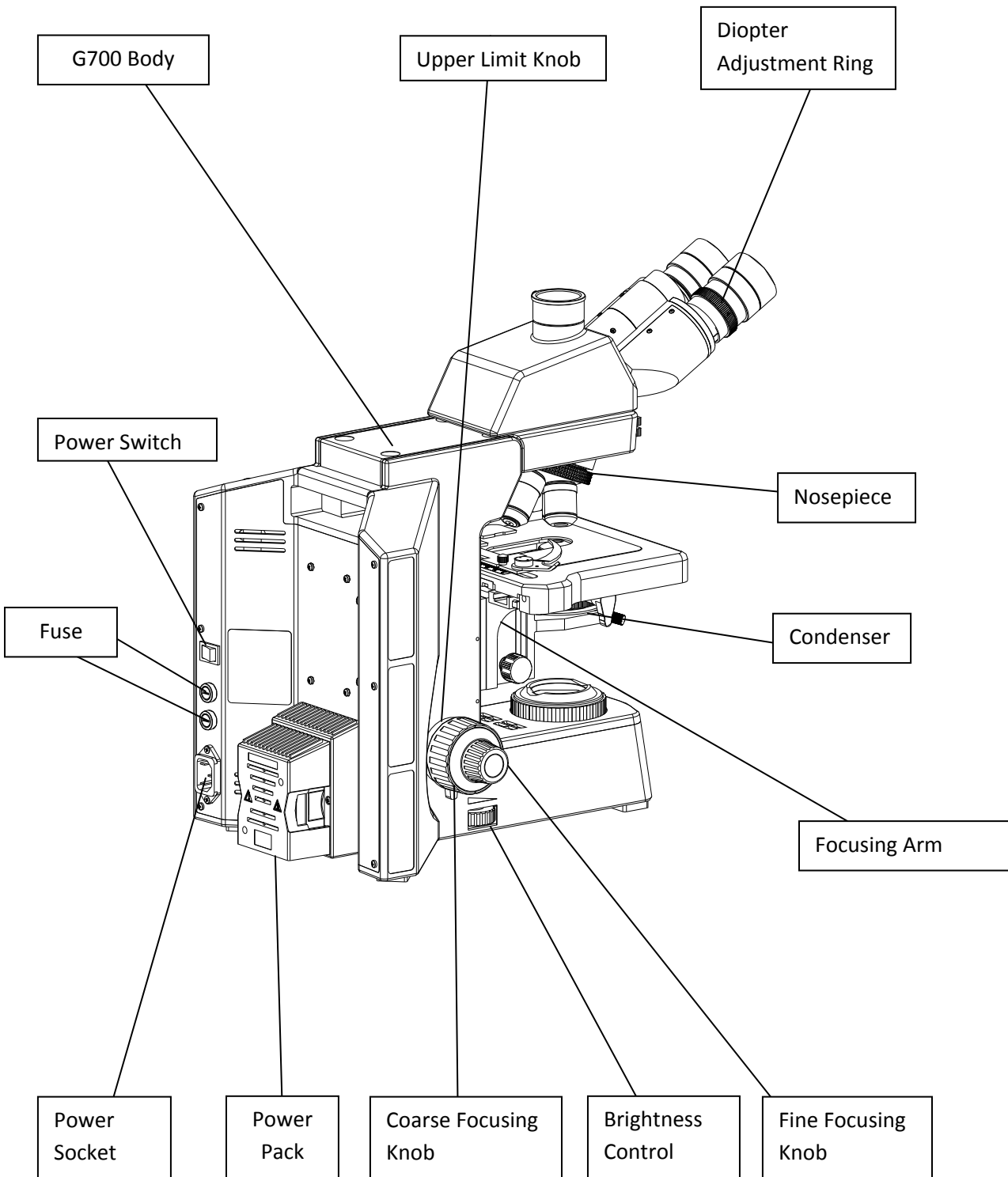


If any parts are missing, please contact your sales representative or call UNICO customer service at 732-274-1155 or e-mail us at info@unicosci.com. Please have the serial #, date of purchase and name of supplier available.

UNICO G700 ADVANCED CLINICAL MICROSCOPE DIAGRAM
FRONT VIEW

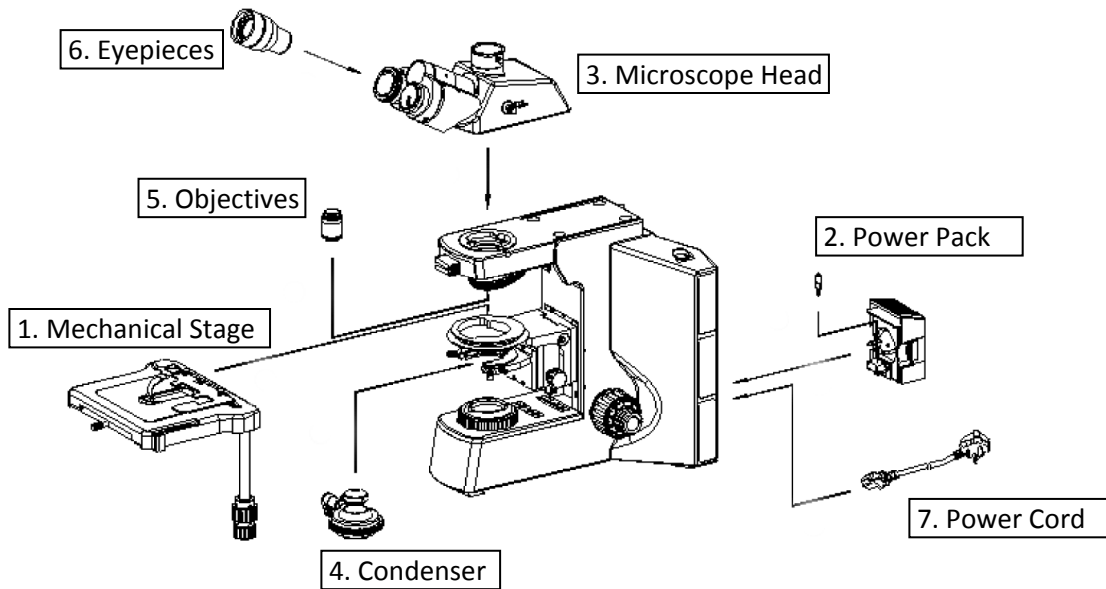


BACK VIEW

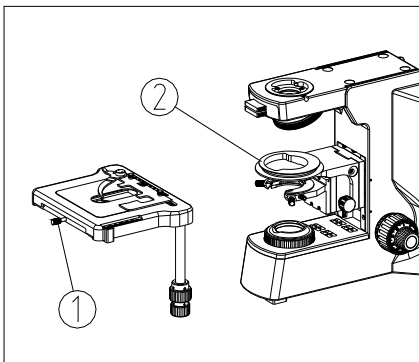


ASSEMBLING G700 SERIES ADVANCED CLINICAL MICROSCOPE

The schematic below outlines the microscope components to be installed and the recommended order of installation.



STEP 1. INSTALLING MECHANICAL STAGE



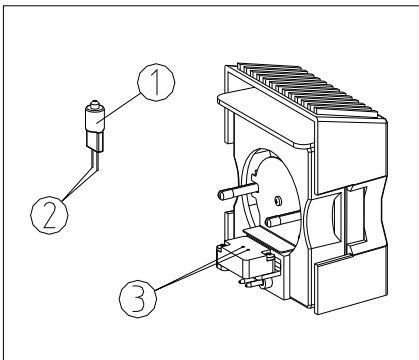
Release stage locking screw ①.

Insert the base of the stage into the opening on the holding arm ②.

Align the stage with the body of the microscope, making sure it is parallel to the vertical arm

Tighten up the locking screw.

STEP 2-A. INSTALLING HALOGEN BULB

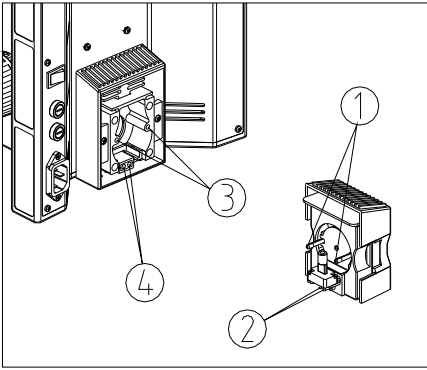


Skip this step if the bulb has been preinstalled.

Remove the bulb ① and the power pack block from the styrofoam.

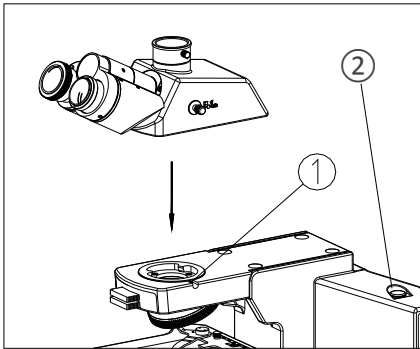
Do not touch the bulb with your fingers. Use gloves or tissue to insert the pins ② in to the receptacle ③. Make sure the bulb is fully inserted.

Step 2-B. INSTALLING THE POWER PACK



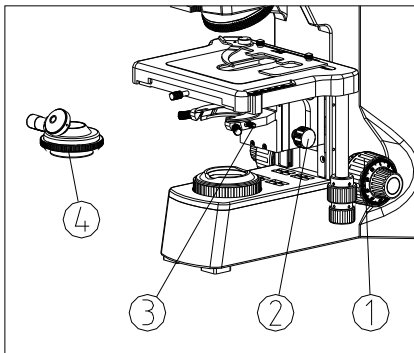
Turn the microscope body so its back is facing you.
Align the guiding pins ① of the power pack with the holders ③.
Insert the power pack making sure the power pin ② snaps into the power socket ④.

STEP 3. INSTALLING MICROSCOPE HEAD



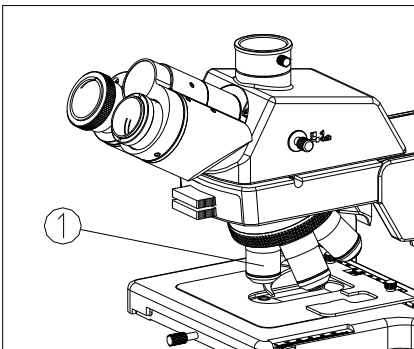
Using the Allen wrench ② release the head locking screw ①.
Insert the bottom of the head into the opening on the arm. Align the head parallel to the arm with the eyetubes facing forward. Tighten the head locking screw.

STEP 4. INSTALLING CONDENSER



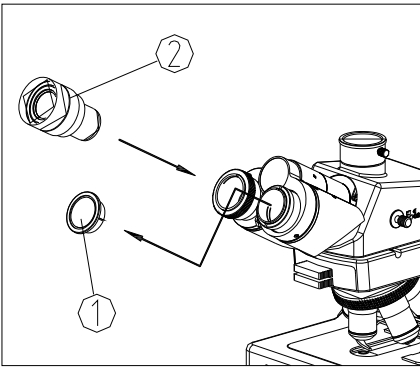
Rotate the coarse focusing knob ① to move the stage all the way up.
Rotate condenser positioning knob ② to move the holder all the way down. Completely loosen condenser locking screw ③.
Remove the condenser ④ from the styrofoam and flip the tilting lens forward as shown, holding it so the tilting handle is on the left side.
Insert the condenser into the arm making sure the guiding pin on the bottom is sliding in to the groove on the condenser arm all the way in.
Tighten the locking screw ③

STEP 5. INSTALLING OBJECTIVES



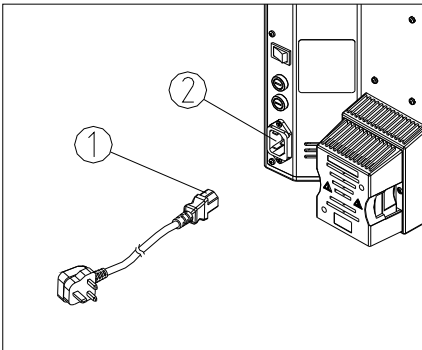
Rotate the coarse focusing knob to move the stage all the way down.
Remove objectives ① from the styrofoam and install them into the nosepieces from lowest magnification to the highest in the clockwise direction. Save the objective shipping containers in case they need to be sent for service or repair.

STEP 6. INSTALLING EYEPIECES



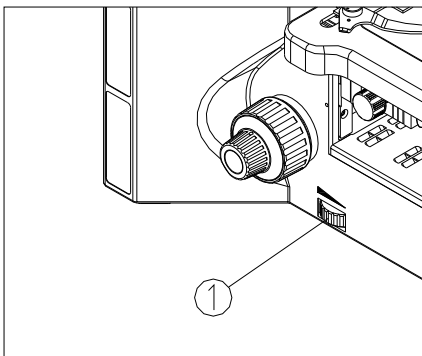
Remove the eyepiece from the styrofoam. Do not touch the glass with your fingers. Remove the protective caps ① from the head and slide the eyepieces ② into the eyetubes until they stop all the way in.

STEP 7. CONNECTING THE POWER CORD



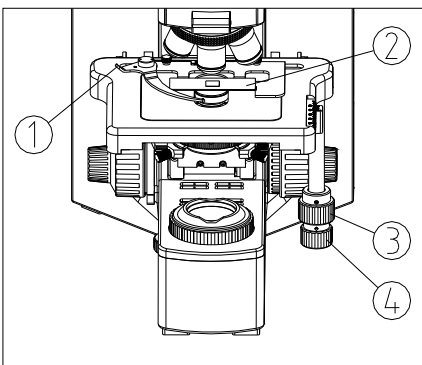
Make sure the power switch on the microscope is set to O (off). Plug in the power cord ① in to the power socket of the microscope ②. Connect the power cord to the power outlet. This is the last step of the installation. You may have additional accessories remaining in the styrofoam packaging. Please remove them and store in the safe place for later use. Place styrofoam back into the shipping box and save it in case you will need to send the microscope for service at a later date.

OPERATION



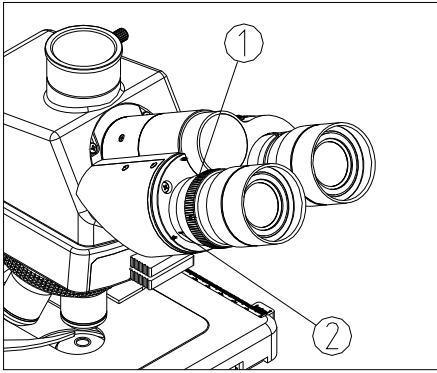
SETTING BRIGHTNESS LEVEL

Turn on the power switch on the back of the microscope. Use brightness adjustment rheostat wheel ① to set light intensity comfortable for observation.



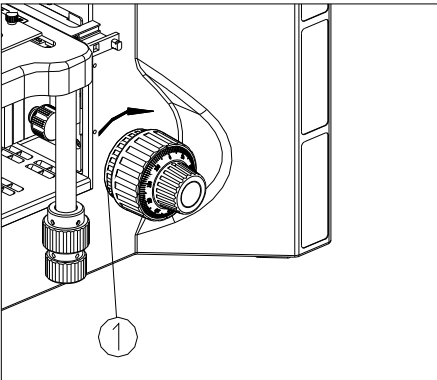
PLACING THE SLIDE.

Set 4X objective into the working position. Push back on the finger assembly ① and place the slide ② on the mechanical stage (Fig.8). Release finger assembly carefully not to damage the slide. Make sure the cover glass is on top of the slide. Use the mechanical stage controls ③ and ④ to center the slide under an objective.



DIOPTER ADJUSTMENT

Rotate the diopter ring ① on the left eyepiece tube so that the “0” on the diopter ring is set at the center line mark ②. Bring 4X objective into the working position. Using your right eye only turn the coarse focusing knob and then the fine focusing knob to bring the slide into sharp focus viewing through the right eyepiece only. Using your left eye only rotate the diopter ring until the image is sharp focus without touching focusing knobs. You should now be in sharp focus with both your right and left eyes. Note your personal diopter setting for future use.

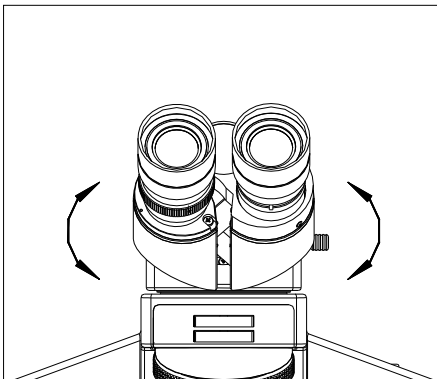


FOCUSING TENSION ADJUSTMENT

The focusing tension adjustment ring ① is located on the right side between the stand and the coarse focusing knob. Use the ring if one of the following conditions is true:

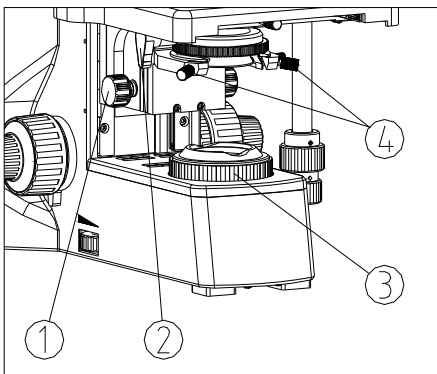
- The coarse adjustment is too tight or uncomfortable to use
- The image drops out of focal plane after focusing
- The stage sinks down on its own, without touching the focus controls

Turn the ring clockwise will increase the tension. Turn the ring counterclockwise to release the tension.



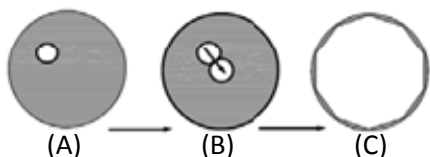
INTERPUPILLARY DISTANCE ADJUSTMENT

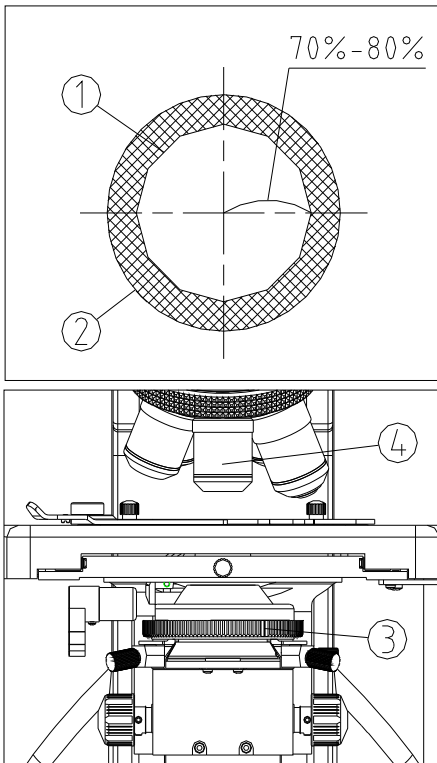
Look into the eyepieces and move the eyepiece tubes together or apart until you see only one complete circle of light. The interpupillary distance adjustable range is 50-76mm.



CENTERING THE CONDENSER AND USING FILED DIAPHRAGM

- Bring the 20X objective into working position Move condenser all the way up by turning the condenser control knob ①.
- Rotate flip-out lens ② into working position.
- Rotate the field diaphragm ring ③ counterclockwise to close the diaphragm. You should see the narrow light spot in the field of view (A). Slowly move the condenser down until the light spot is in sharp focus.
- Use the centering screws ④ to bring the light spot to the center of the field of view if necessary. (B)
- Slowly open the field diaphragm. The light spot should remain centered in the field of view (C).
- The field diaphragm (Koehler) restricts the light coming from the illuminator to the condenser, blocking the scattering of light and improving contrast. This technique is useful with unstained specimen or Phase Contrast microscopy. Rotate the ring ③ as necessary observing contrast change.





USING CONDENSER IRIS DIAPHRAGM

The Iris diaphragm in the condenser controls and determines aperture of the illumination to the objectives. Only when the aperture of the illumination is properly set for an objective, can you get the best resolution and contrast of the image; and the depth of field.

The diaphragm aperture ① of the condenser is set at 70-80% of objective aperture ② for best result. You can observe this by removing the eyepiece and viewing through eyepiece tube. Slide the Iris setting lever ③ to 80% of the objective's N.A. ④ in use.

Recommended settings for:

- 4X Objective, N.A = 0.1 set Iris Diaphragm to 0.1
- 10X Objective, N.A = 0.25 set Iris Diaphragm to 0.2
- 20X Objective, N.A = 0.40 set Iris Diaphragm to 0.32
- 40X Objective, N.A = 0.65 set Iris Diaphragm to 0.52
- 100X Objective, N.A = 1.25 set Iris Diaphragm to 1.0

USING 100X OIL IMMERSION OBJECTIVE

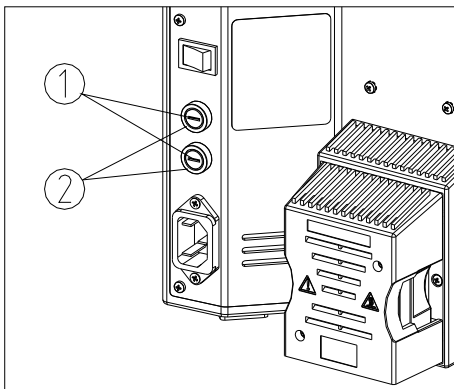
- Use the 4X or 10X objective to find and center the image. Place one drop of immersion oil on the slide.
- Turn the nosepiece COUNTER-CLOCKWISE to bring the objective 100X into light path. Make sure 40X objective is not passing through the oil. Oil will damage 40X objective.
- Use the fine focusing knob to bring the image into focus.
- Make sure there are no bubbles inside oil as they will affect image quality. Rotate the nosepiece back and forth softly to allow the 100X objective lens to swing through the oil to smooth out the bubbles.
- After each use clean the objective immediately to prevent damage to the objective.

FOCUSING PROCEDURE

- Bring the 4x objective into working position. Set Iris diaphragm to 4x position. As you bring the objective into place, you will feel a "stop" (click) when the objective is positioned properly. Use the coarse and fine adjustment knobs to locate the image and bring the 4x objective into focus.
- Move the 10x objective into place. Set Iris diaphragm to 10x position. Minor coarse adjustment may be needed yet the fine focusing knob is needed to bring the 10x objective into focus.
- Rotate to the 40x objective. Set Iris diaphragm to 40x position. Focus with fine focusing knob for the best image. Adjust field diaphragm for best contrast.

SERVICE AND MAINTENANCE

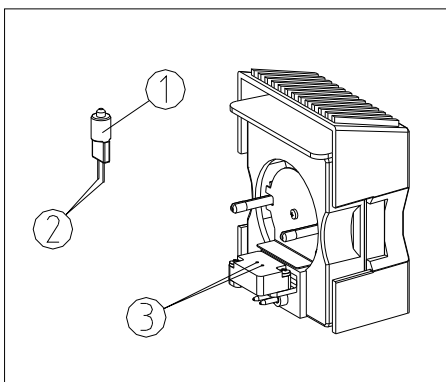
- Always cover your microscope with the dust cover when not in use.
- When cleaning the lenses, use lens paper or a Q-tip dipped in lens cleaning solution.
- Excess immersion oil should be cleaned of at once. An alcohol pad is best for removing oil from the stage and on the other metal parts, but is not recommended for use on the lenses.
- Dust in the nosepiece or eyepiece tubes should be blown out using only filtered air. Canned air work well for this job. Whenever you remove an objective, we recommend that you place the plastic cap over the slot and put the objective back into the original plastic shipping container until ready to be placed back on the microscope. This will keep the objective safe from dust and other foreign matter.
- To keep your microscope in top condition for years, we recommend that you have the microscope professionally serviced once a year.



FUSE REPLACEMENT

Turn the power switch off and disconnect the power cord from power outlet before replacing the fuse.

- Use a screw driver to remove the fuse cap (1) from the fuse base (2);
- Replace with new fuse(s) of the same type and rating: 250V, 3.15A.
- Screw the fuse cap back.



BULB REPLACEMENT

Turn the power switch off and disconnect the power cord from power outlet before replacing the fuse.

- Pull the power pack from the body of the microscope.
- Remove damaged bulb
- Do not touch the new bulb with your fingers. Use gloves or tissue to insert the pins (2) in to the receptacle (3). Make sure the bulb is fully inserted.
- Align the guiding pins of the power pack with the holders on the body.
- Insert the power pack making sure the power pin snaps into the power socket. See detailed schematics in the installation section Step2-B on page 6 of this manual.

UNICO G700 SERIES MICROSCOPE SPECIFICATIONS

Optical system Color corrected infinity optical system
 Head Binocular 30°inclined, 360°rotatable, Trinocular with 50/50 beam splitter
 Eyepieces High point plan eyepieces, FN 22mm, with eye-guards
 Nosepiece Reversed 5 place nosepiece
 Focusing Coaxial coarse and fine focusing with movement range up to 30mm and resolution at 0.002mm
 Stage Built-in Mechanical stage 140 x132mm; with movement range 76*50mm and low X-Y adjustment knobs
 Illumination 6V/30W Halogen with 90~240V wide range power supply.
 Environment Temp 5°C-35°C (41°F-95°F); Humidity: < 80%

Objectives Specifications

Magnification	Numerical Aperture (N.A.)	Cover Glass (mm)	Ring Color
Plan Achromatic 2X	0.06	0.17	White
Plan Achromatic 4X	0.10	0.17	Red
Plan Achromatic 10X	0.25	0.17	Yellow
Plan Achromatic 40X(S)	0.65	0.17	Blue
Plan Achromatic 100X(OIL)	1.25	0.17	White
Plan Phase 10X	0.25	0.17	Yellow
Plan Phase 20X	0.40	0.17	Green
Plan Phase 40X	0.65	0.17	Blue
Plan Phase 100X (Oil)	1.25	0.17	White

TROUBLESHOOTING

PROBLEM	REASON	SOLUTION
OPTICAL		
Not bright enough	Field diaphragm is not open enough	Open the field diaphragm more
	Condenser is too low	Adjust the condenser position
	Condenser is not centered	Center the condenser
	Beam splitter lever is pulled out	Push back the lever (trinocular only)
The edge of field of view is dark or not even	Nosepiece is not at the right position	Turn the nosepiece to click into position
	Dust on condenser, objective or eyepiece	Clean the lens
Stain on the field of view	Stain on the specimen	Prepare another specimen
	Stain on condenser, objective or eyepiece	Clean the lens
Blurry Image	No cover glass on the slide	Add cover glass (0.17mm)
	The cover glass is too thick	Use 0.17mm thickness cover glass
	Slide is upside down	Turn the slide, cover slip up
	Oil on dry objective (i.e. 40X)	Clean the lens of the objective
	No oil on the Oil objective (i.e. 100X)	Add immersion oil
	Iris diaphragm is not open properly	Adjust the Iris to get the best contrast
	Condenser is too low	Adjust the condenser position
One side of the image is dark or the image moves while focusing	Condenser is not centered	Center the condenser
Eyes get tired easily	The mechanical stage is not level	Check the stage, and table
	Interpupillary is not set properly	Adjust the interpupillary distance
	Diopter setting is not properly set	Set the diopter to fit your eyes
MECHANICAL		
Unable to focus on higher magnification objectives	Slide is upside down with cover glass at the bottom	Turn the slide with cover slip on top u
	Wrong cover glass is used	Use 0.17mm thickness cover glass
The objective touches slide while turning from lower to higher power objective	The slide is upside down	Turn the slide with the cover slip on top
	The cover glass is too thick	Use 0.17mm thickness cover glass
The coarse knob is too tight	The focusing tension setting is too tight	Readjust the tension setting
The stage drifting down	The focusing tension setting is too loose	Tight the focusing tension properly
The stage can't move high enough	The stage up-limit setting is low	Readjust the up-limit setting
The slide doesn't move smoothly	The slide is not held properly	Check and hold the slide properly
	The slide holder is loose or damaged	Check and/or repair the slide holder
ELECTRONICS		
The light is not on	No power	Check the power cable and supply
	Power is on, LED not lighting up	The LED power unit may be defective. Check the input and output and repair/replace it