LAXCO™

A Microscope for Everyone

LMC-2000

MICROSCOPE SERIES
USER MANUAL

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CONTENTS *LMC2000*

1. Precautions

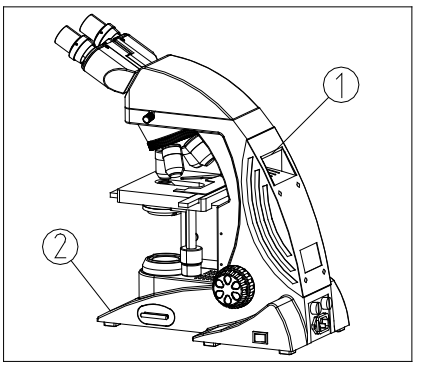


Figure1

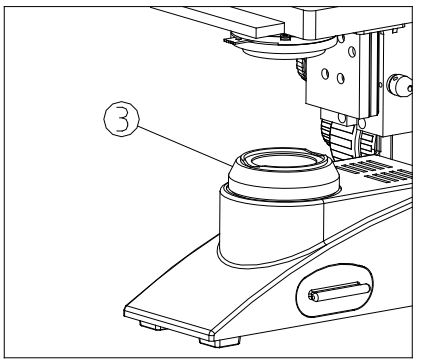
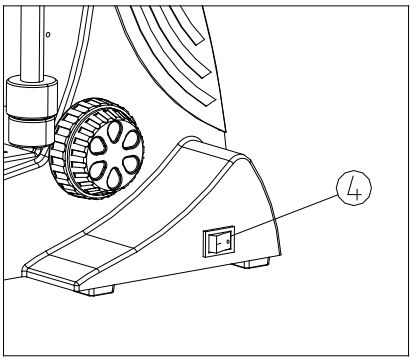


Figure2



1. The microscope is a precision instrument, please operate carefully, avoiding vibration during the operation.

2. Do not operate the microscope in the direct sunlight, high temperature, high humidity, dusty or around other equipment causing vibration. Ensure the work surface if flat.

3. When moving the microscope use one hand to carry the handle of microscope body(①) and another hand to carry front of microscope body(② (Figure 1).

   ★ **Microscope will be damaged by holding the stage, focusing knob or head when moving the microscope.**

4. The lamp will be very hot when on. Ensure field lens(③) has enough space to dissipate the heat. (Figure 2)

5. Ensure the microscope is grounded to avoid electric shock.

6. Ensure the power switch is in the “0” (off) position (④) before replacing the bulb or fuse and wait until the lamp cools completely.
   (Figure 3)

   ★ **Appointed Lamp： 6V/20W HAL bulb**

7. Wide voltage range (90 to 240V) without external transformer. Please ensure the input voltage is

stabilized.

Figure3

2. Maintenance

(1) Wipe the lens gently with a lens cloth . Carefully wipe off oil and fingerprints on the objective surfaces with a lens cloth moistened with a small amount of lens cleaning solution.

★ **As alcohol and ether is flammable, don't place these chemical near an open flame. For example, when turning on or turning off the electrical device, please use these chemical in a ventilated place.**

(2) Don't use organic solutions to wipe the surfaces of the other components. Please use the neutral detergent if necessary.

(3) If the microscope is exposed to liquid during operation, please power it off immediately and wipe it dry.

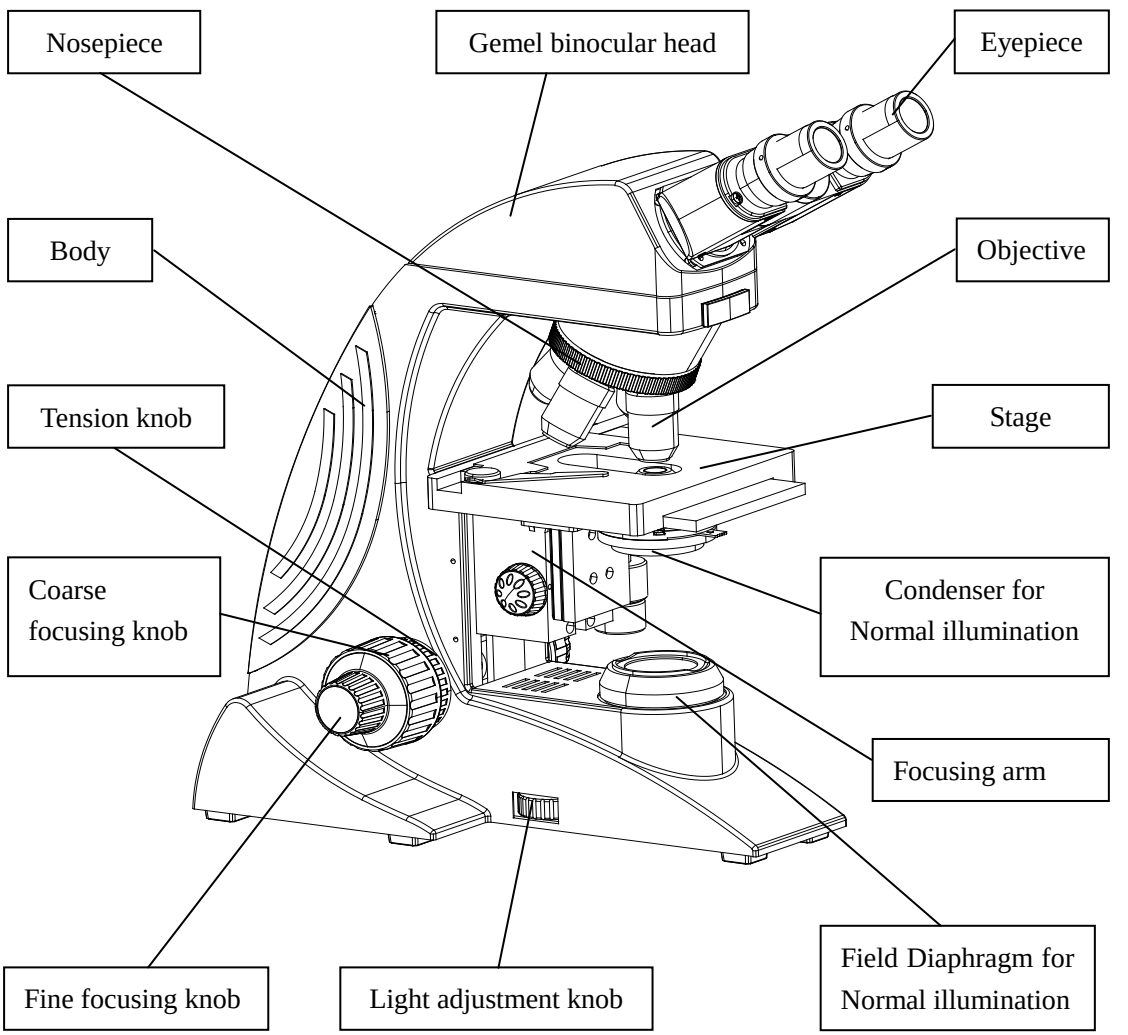
(4) Never disassemble the microscope, the performance will be affected or the instrument will be damaged.

(5)After using, cover the microscope with a dust cover.

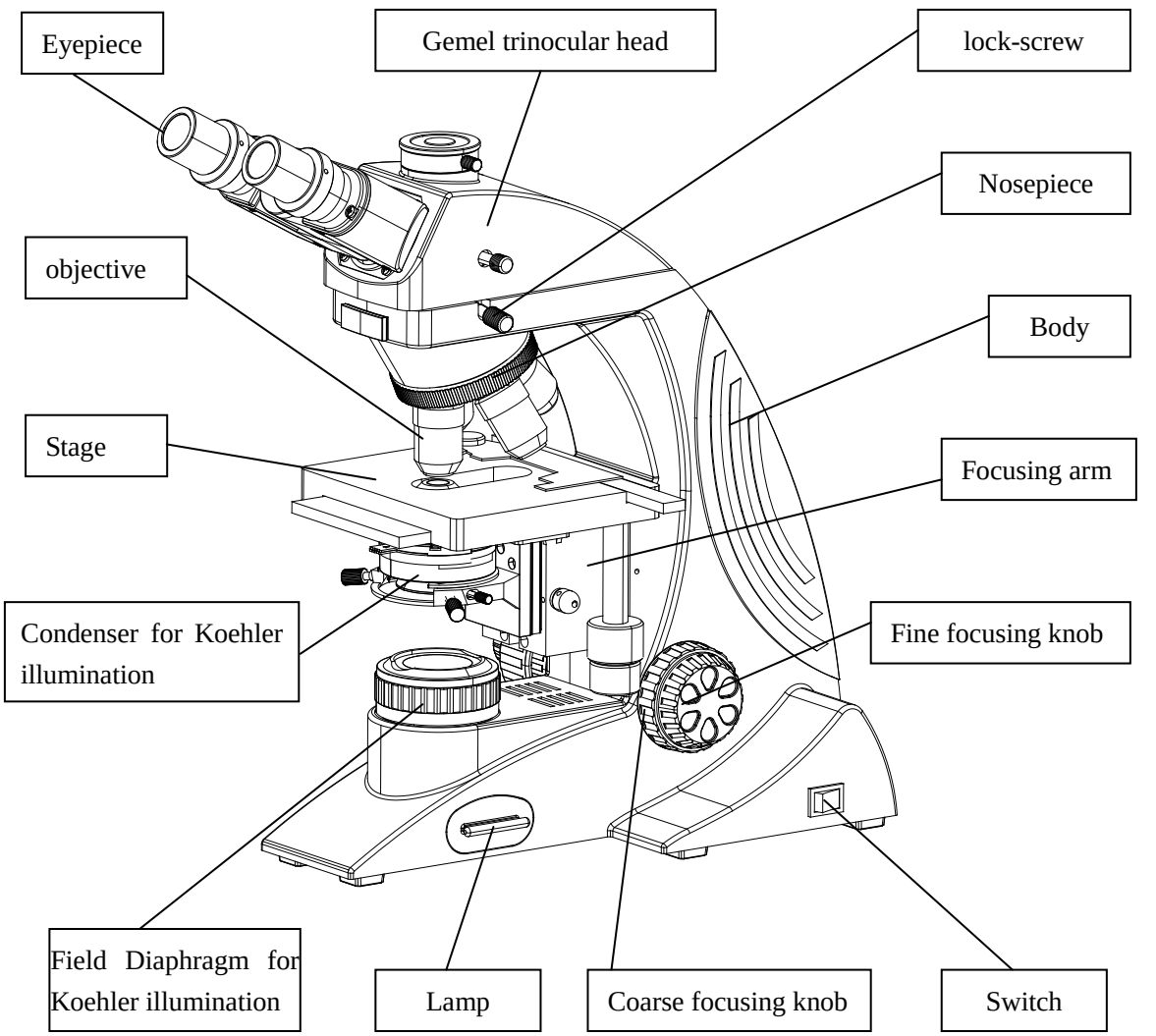
3. Safety mark

Mark	description
⚠	Read the manual before use. Unsuitable operation would lead to injury or instrument failure
|	Switch ON
O	Switch OFF

LMC2000


Nosepiece
Gemel binocular head
Eyepiece
Body
Objective
Tension knob
Stage
Coarse
focusing knob
Condenser for
Normal illumination
Focusing arm
Fine focusing knob
Light adjustment knob
Field Diaphragm for
Normal illumination

LMC2000

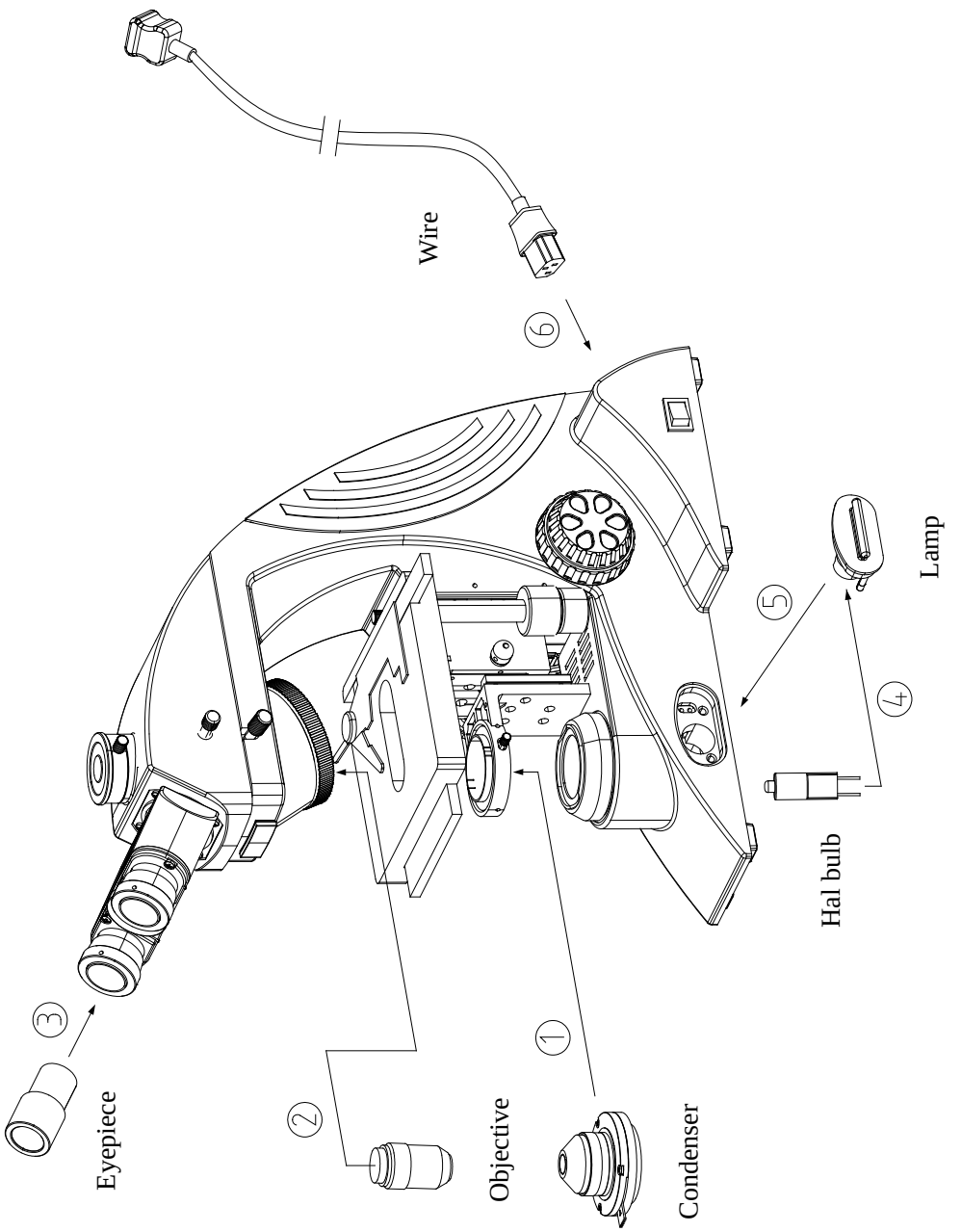

Eyepiece
Gemel trinocular head
lock-screw
Nosepiece
objective
Body
Stage
Focusing arm
Condenser for Koehler illumination
Fine focusing knob
Field Diaphragm for Koehler illumination
Lamp
Coarse focusing knob
Switch

2. Assembling *LMC2000*

2-1 *Assembly scheme*

No. shows installation sequence.

★ **Ensure there is no dust or dirt before installation.**



2-2 *Assemble Step*

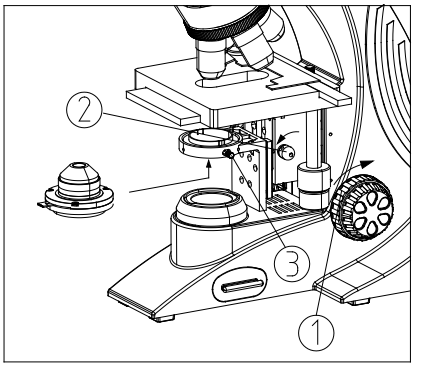


Figure 4

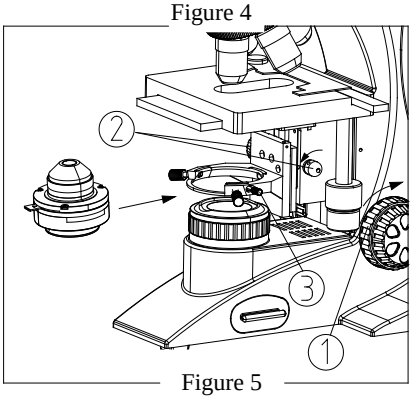


Figure 5

2-2-1 Set condenser

Set condenser for normal illumination

1. Adjust coarse focus knob①tomake the stage in highest location.(Figure 4)
2. Adjust the condenser adjustment knob ② toadjust the condenser to the appropriate location.
3. Loosen the lock-screw ③ of condenser.
4. Install condenser with NA indication facing forward.
5. Tighten the lock–screw ③, then adjust the condenser adjustment knob ②. to the highest position.

Set condenser for Koehler illumination

1. Adjust coarse focus knob①to raise the stage in highest location.(Figure 5)
2. Adjust the condenser adjustment knob ② tolower the condenser bracket down to the appropriate location.
3. Loosen the lock-screw ③ of condenser.
4. Install the condenser.
5. Tighten the lock–screw ③, then adjust the condenser ②. to the highest position .

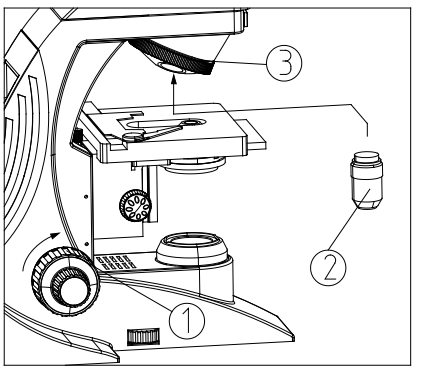


Figure 6

2-2-2 Assemble objectives

1. Adjust coarse focus knob①to lowest postion. (Figure 6)
2. Install objectives to the nosepiece from 4X to 100X clockwise**.** (Figure 6)

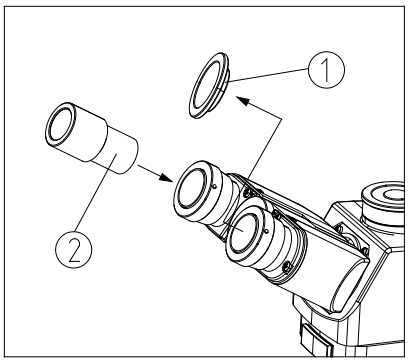


Figure 7

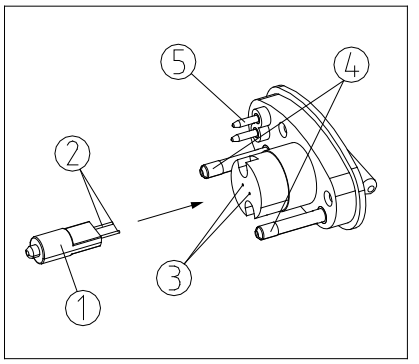


Figure 8

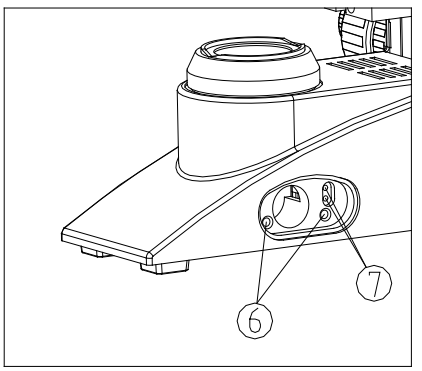


Figure 9

2-2-3 Install eyepiece

1. Remove eyepiece tube covers ①.
2. Install the eyepieces ②into the tubes. (Figure 7)

2-2-4 Set or replace bulb (halogen version only)

1. Hold the bulb① with clean gauze or other soft cloth and insert bulb pins ②into the jack③. Ensure the bulb is vertical. (Figure 8)

★Please install the bulb gently.

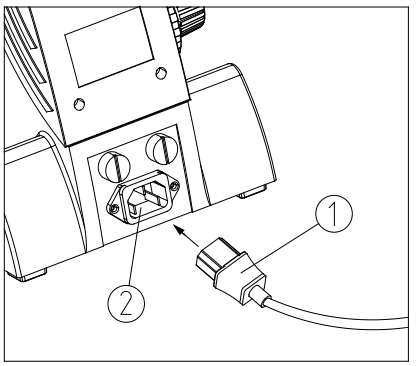
★ Don't touch the bulb with fingers directly. If you touch bulb, please clean it with lens cloth or similar soft cloth.

2-2-5 Install Bulb Assembly

1. Connect the pin ④ and plug ⑤ with the jack ⑥ and socket ⑦. Push the assembly into the stand fully.（Figure 8 & 9）

★ Whenever replacing the bulb, turn off the main power and wait until the lamp holder and bulb cool completely.

★ When replacing LED bulb, you must replace the entire LED assembly. The installation method is the same as halogen.



2-2-6 Connect the power cord

1. Ensure the power switch is in the "O" (OFF) position before connecting.
2. Insert the plug ①to power jack ②, and ensure it is fully inserted.（Figure 10）

★ **Don't put pressure on the power cord, it is easy to damage if bent.**

★**Microscope can accept variable voltage from 90V to 240V.**

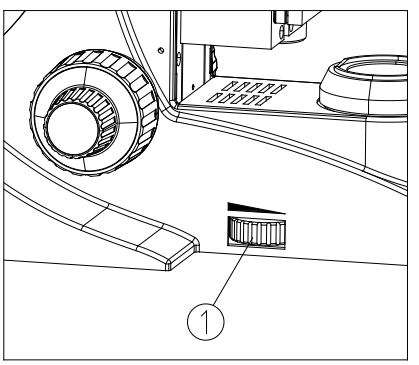


Figure 11

3-1 Illuminator

1.Turn switch on"—".

2. Adjust the light intensity knob① until you get thedesired brightness. (Figure 11)

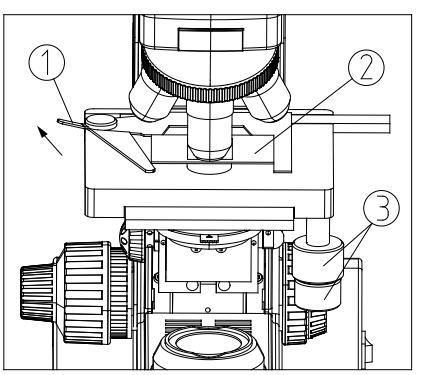


Figure 12

3-2 Place Slide

1. Open slide holder by pushing lever (1) towards the rear of the scope.
2. Insert slide ②into clips and slowly release lever (1) ①.(Figure 12)
3. Use the X and Y-axis knobs③to move the slide to the desired location.

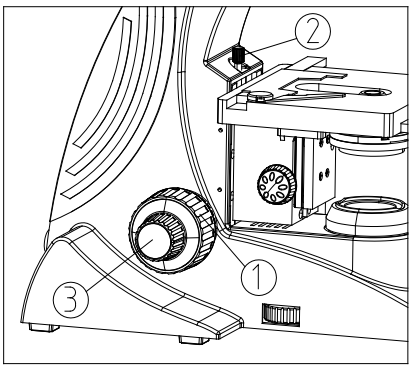


Figure 13

3-3 Focusing

1. Rotate the 4X objective to the light path.
2. Adjust the stage limit screw② to thehighest position, and rotate the coarse focusing knob ①until the image appears. (Figure 13)
3. Rotate the fine focusing knob ③until the image is in clear focus, Lock ②

★ **Limit screw can prevent the collision between objective and slide when focusing.**

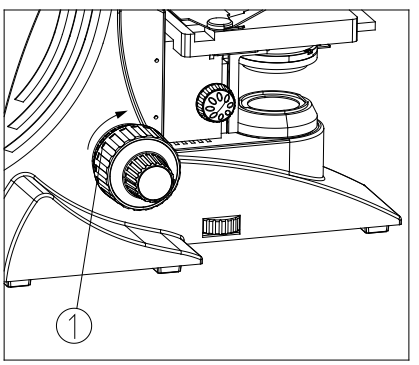


Figure 14

3-4 Adjust focusing tension

If the coarse focus knob's tension is greater than desired or the stage drifts under normal observation, you can resolve this issue by adjusting the tension adjustment ring①. (Figure 14)

Rotate toward arrow to increase tension (Figure 14), and away from arrow to decrease tension.

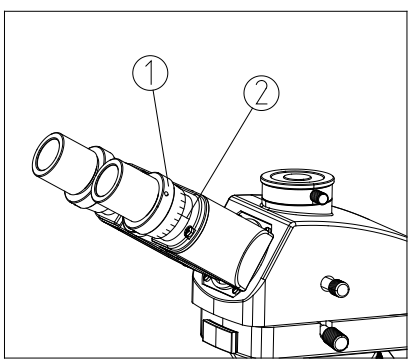


Figure 15

3-5 Adjust diopter

Rotate the diopter adjustment ring① so the "0" line is aligned with the scale on the eyetubes②. Focus on the specimen with your right eye until it is in clear focus, then use your left eye to observe the specimen. If it is not in clear focus, rotate the diopter adjustment ring①until it is clear. (Figure 15)

★ **There are ±5 diopters on the diopter adjustment ring①, and the value aligned with the scale② is your eye's diopter.**

★**Remember your eye's diopter for future use.**

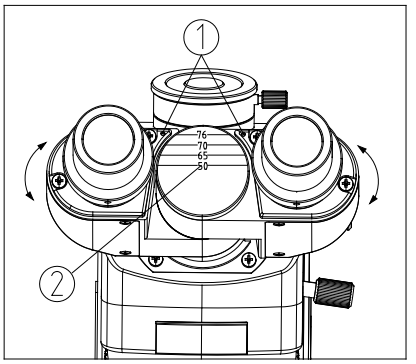


Figure 16

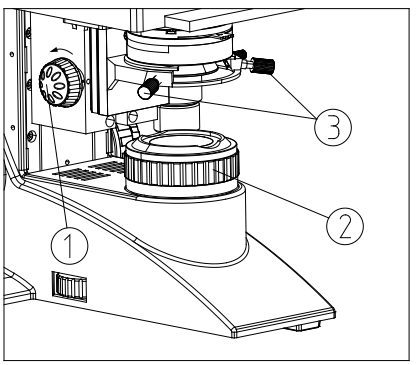
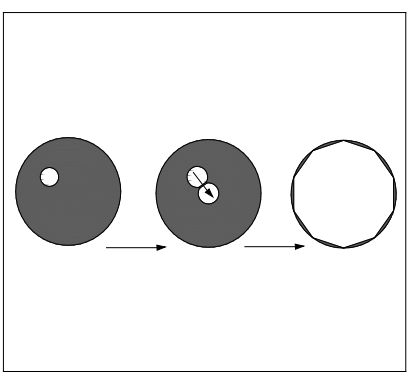


Figure 17



3-6 Adjust interpupillary distance

When using two eyes to observe, hold the base of the prism and rotate them around the axis until there is only one field of view.

"·"① on the left eyepiecebase points to one number②. This number is the interpupillary distance. (Figure 16)

Interpupillary distance range：50～76mm.

★ Remember your interpupillary distance for future use.

3-7 Centering condenser

1. Rotate the condenser adjustment knob①to raise it to the highest position. (Figure 17)
2. Rotate the objective 10X to the light path and focus the specimen.
3. Rotate the field diaphragm adjustment ring② toadjust the field diaphragm to the smallest position. The image of the diaphragm can be viewed in the eyepiece.
4. Rotate the condenser adjustment knob① until the image of the field diaphragm "leaves" are in focus.
5. Adjust the center adjustment screws③and adjust the field diaphragm to the center of the field of view. (Figure 18)
6. Open the field diaphragm gradually. If the image is in the center all the time and inscribed to the field of view, it shows condenser has been centered correctly**.**
7. In fact, you can enlarge the field diaphragm a bit and make the image tangent to the field of view.

3-8 Field diaphragm

By limiting the diameter of the beam entering the condenser, the field diaphragm can prevent stray light and improve the image. When the field diaphragm is adjusted to the edge of the field of view, you can obtain the clearest image.

Figure 18

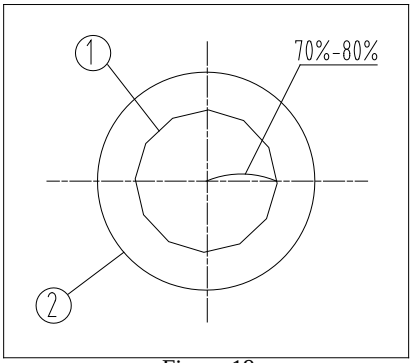


Figure 19

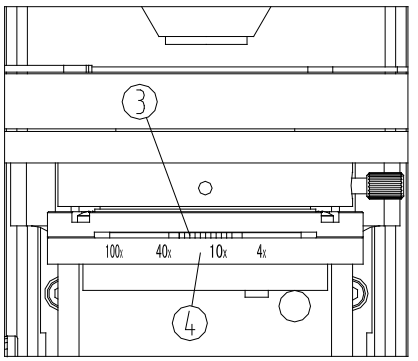


Figure 20

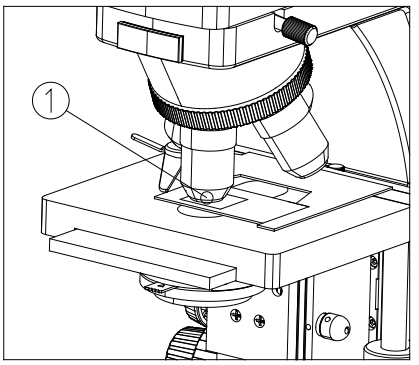


Figure 21

3-9 Aperture diaphragm

1. The aperture diaphragm determines the numerical aperture of the illumination. If the N.A. of illumination matches the N.A.of the objective, you can obtain optimal resolution and contrast and increase the depth of field.
2. If the contrast of your sample is low, you can adjust the condenser diaphragm③, towards the objective magnification indication on the condenser④, i.e., adjust the N.A. of the condenser 70%-80% of the objectives N.A. If necessary, you can remove the eyepiece to observe from the eyetube. Adjust the condenser diaphragm③ until you obtain an image similar to (Figure 19, Inner ring① is the image of the aperture diaphragm, ② is the outside edge of the objective.)

3-10 Using objective (100X) with oil

1. Use 4X objective to focus the specimen.
2. Put a drop of oil on the specimen. (Figure 21)
3. Rotate the nosepiece in a counter clockwise direction and rotate the objective (oil) 100X to the light path. Then use the fine focus knob to focus.

★Make sure there is not an air bubble in the oil.

A. Remove the eyepiece to examine the air bubble. Open the aperture diaphragm and field diaphragm fully and observe the edge of the objective from the tube (It looks round and light).

B. You can rotate nosepiece slightly and swing the oil objective a couple of times to remove the air bubble.

4. After use, wipe the objective lens with lens cloth and lens cleaning solution. Clean oil from the slide.

★ Don't rotate another objective into the light path before wiping oil from the slide to avoid getting oil on a dry objective.

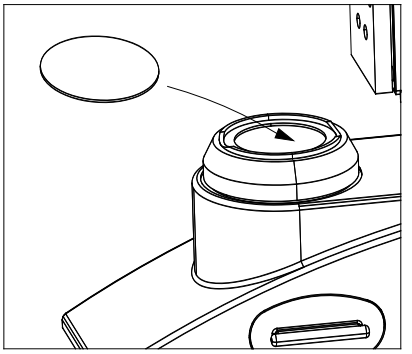


Figure 22

3-11 Filters

Filters can make improve image for certain applications. (Figure 22)

There are four kinds of filters available: blue, green, yellow and white.

★Place the filter's rough side face down in the light well.

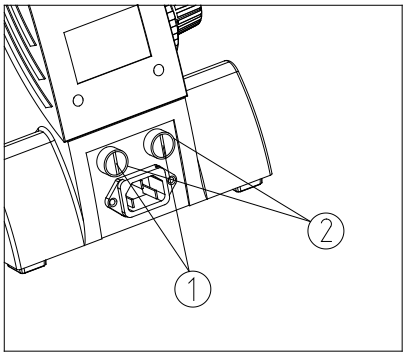


Figure 23

3-12 Replace fuse

Turn the power switch to the "O"(off) position before replacing the fuse.

Remove power cord from the rear of the microscope frame. Unscrew the fuse holder①from the fuse base② with a screwdriver. Install a new fuse and replace the fuse holder. (Figure 23)

★Specification: 250V，3.15A.

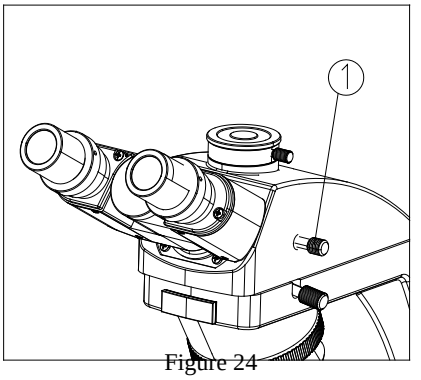


Figure 24

3-13 Select light path (trinocular models)

The light path selecting lever①controls the direction of the light path between the eyepieces and camera port. When lever① is inserted, 100% of the light is directed to the eyepieces binocular fully; when lever① is pulled out, the light is split between the eyepieces (80%) and camera port (20%). (Figure 24)

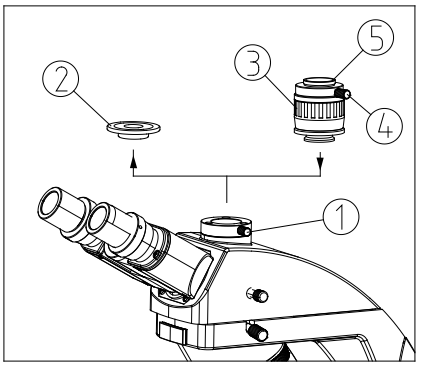


Figure 25

3-14 Installation of camera

1. Loosen the lock-screw①on the trinocular head and remove the dust-cap②from the photo port. (Figure 25)
2. Remove the dust-caps from the camera adapter③. Insert the camera adapter③into the trinocular port. Tighten thumbscrew①.
3. Attach camera to camera adapter.
4. Pull out the light path selecting lever to direct light path to the camera. If the image is not in focus, rotate the focus adjustment③ until it is in focus

4.General Specification *LMC2000*

LMC2000 Biological Microscope specifications

Optical system	UIS(universal infinity-corrected optical system)
Head	Binocular head, Gemel type, 30°inclined, 360°rotating. Trinocular head, Gemel type, 30°inclined, 360°rotating. Light split rate：binocular ：100%, binocular / trinocular： 80%/20%
Eyepiece	PL10X high eye-point plan eyepiece, field of view 18mm
Nosepiece	Reversed quadruple nosepiece
Objective	Plan achromatic objective （4X.10X.40X.100X）
Focus	Coaxial coarse & fine focusing system with limit-stop & tension adjustment. Travel range: 28mm. Fine focusing precision：0.002mm
Stage	Low position coaxial 150x140mm mechanical stage, 76x50mm moving range. Slide clips.
Condenser system	Koehler illuminator system
Illuminator	90～240V variable voltage. Built-in. 6V/20W halogen bulb. Pre-centered, with continuous intensity control.

5. Troubleshooting *LMC2000*

Symptom	Cause	Remedy
1.*Optics*		
(1)The lamp is bright, but the light in the field of view is not bright enough.	Field diaphragm is not large enough.	Increase the field diaphragm.
	Condenser is too low.	Adjust the condenser.
	Condenser is not centered.	Centre the condenser.
	Light path selecting lever is on the position of trinocular (outside).	Push the light path selecting lever to the position of binocular(inside).
(2)The side of the field of view is dark or not even.	The nosepiece is not in the right position.	Turn the nosepiece into the right position.
	Stain or dust has accumulated on the lens （condenser, objective, eyepieces）	Clean the lens.
(3)Stain or dust is observed in the field of view.	Stains have accumulated on the specimen.	Clean the specimen.
	Stains have accumulated on the lens.	Clean the lens.
(4)Unclear image	No cover glass on the specimen slide.	Add the cover glass.
	The cover glass is not standard.	Use a standard cover glass with thickness 0.17mm.
	The cover glass faces down.	Put the cover glass to face up.
	The immersion oil has accumulated on the dry objective.	Clean thoroughly.
	The immersion oil is not used for oil objective 100X.	Use immersion oil.
	Air bubble in the immersion.	Get rid of the air bubble.
	Using wrong immersion oil.	Use correct one.
	The aperture is not opened correctly.	Adjust the iris diaphragm.
	Stain or dust has accumulated on the lens in the inlet of the head.	Clean the lens.
	The condenser is not in the right position.	Adjust the condenser.
(5)One side of the field of view is dark or the image moves while	The specimen slide is not fixed.	Fix with clips.
	The nosepiece is not in the right position.	Turn the nosepiece into the right position.

focusing.	Condenser centered incorrectly.	Centre the condenser.

Symptom	Cause	Remedy
(6)The eyes tire easily. The right field of view doesn't superpose with the left.	Interpupillary distance is wrong.	Adjust the interpupillary distance.
	Diopter adjustment is wrong.	Adjust the diopter.
	The eyepieces for the right are different from the left.	Use the same eyepieces.
2.*Mechanics*		
(1)Can not get the objective focused.	The cover glass faces down.	Put the cover glass to face up.
	The cover glass is not standard.	Use a standard cover glass with thickness 0.17mm.
(2)The objective touches the cover glass while turning the nosepiece.	The cover glass faces down.	Put the cover glass to face up.
	The cover glass is not standard.	Use a standard cover glass with thickness 0.17mm.
(3)Coarse focusing knob is too tight.	Tension knob is too tight.	Loosen a little.
(4)Stage declines itself.	Tension knob is too loose.	Tighten a little.
(5)Coarse focusing knob can't raise.	The limit stop knob is locked.	Loosen the knob.
(6)Coarse focusing knob can't lower.	The base of the condenser is too low.	Raise the base.
(7)Cannot move the slide smoothly.	The slide is not fixed correctly.	Adjust it correctly.
	The movable specimen holder is not fixed properly.	Adjust it correctly.
3.*Electrics*		
(1)The bulb does not work.	No power supply.	Check the connection of the power cable.
	The bulb is not inserted correctly.	Insert it correctly.
	The bulb burned out.	Replace it.
(2)The bulb burned out immediately after replacement.	Using incorrect bulb.	Replace with a correct one.
(3)The field of view is not bright enough.	Not using correct bulb.	Replace with a correct one.
	Intensity adjustment knob is not properly adjusted.	Adjust correctly.
(4)The bulb flickers or the brightness is not stable.	The bulb will burn out soon.	Replace with a new one.
	The power cord is not inserted correctly.	Connect correctly.