User Manual

Trinocular Infinity
Compound LED Microscope

Model M8333 series

OMAX

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i. Caution

1. Open the carton carefully with a knife or paper cutter. Find the “UP” sign and place the Styrofoam container on the side that makes the arrow upward. If the “UP” sign is missing, please open the Styrofoam container gently to prevent any accessory items (i.e. objectives or eyepieces) from dropping and being damaged.

2. Do not discard the molded Styrofoam container. The container should be retained should the microscope ever requires reshipment.

3. Keep the instrument out of direct sunlight, high temperature or humidity, and dusty environments. Ensure that 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. For safety when replacing the LED light and the fuse, be sure the main switch is off, unplug the power cord, and replace the LED light and the fuse.

ii. Care and Maintenance

1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.

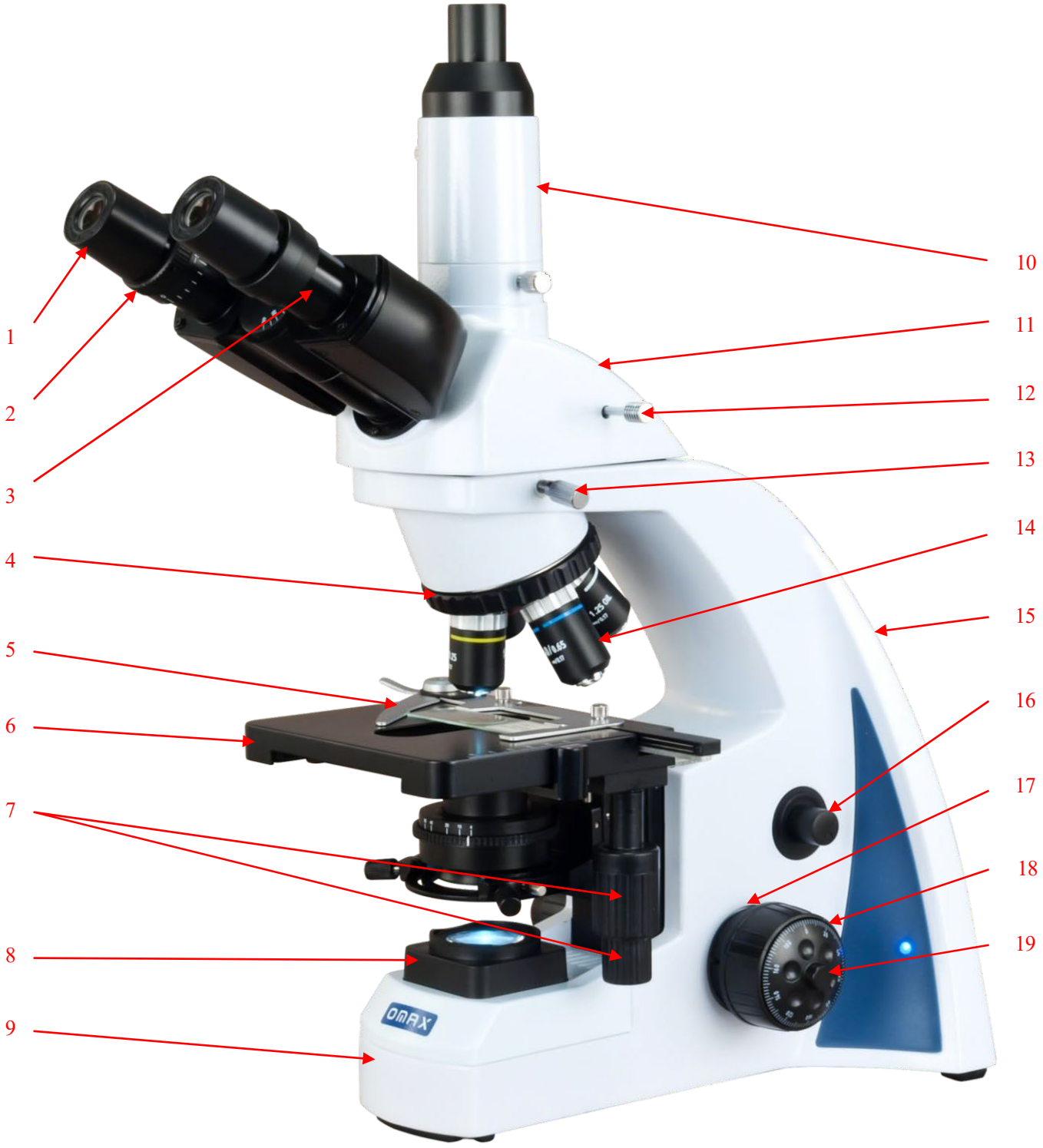
2. Keep the instrument clean; remove dirt and debris regularly. Accumulated dirt on metal surfaces should be cleaned with a damp cloth. More persistent dirt should be removed using a mild soap solution. **Do not use organic solvents for cleansing**.

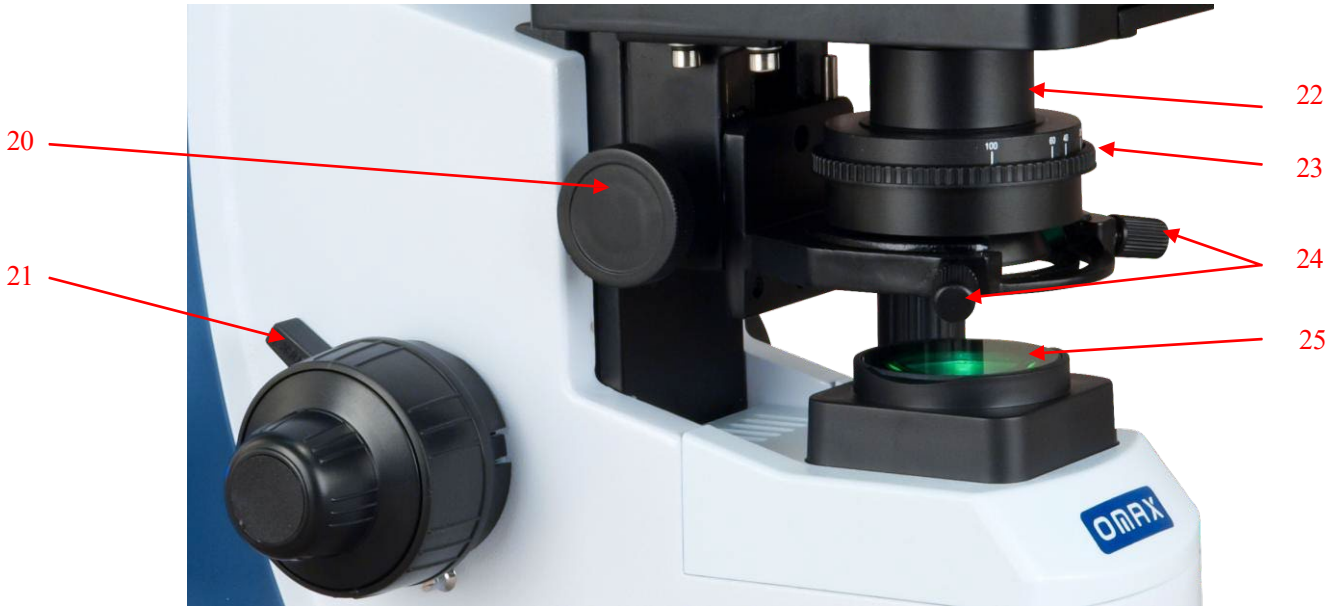
3. The outer surface of the optics should be inspected and cleaned periodically using an air stream from an air bulb. If dirt remains on the optical surface, use a soft cloth or cotton swab dampened with a lens cleaning solution (available at camera stores). All optical lenses should be swabbed using a circular motion. A small amount of absorbent cotton wound on the end of a tapered stick 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. Oil immersion objectives should be cleaned immediately after use by removing the oil with lens tissue or a clean, soft cloth.

4. Observe the specimen with the 4X, 10X and 40X objectives in order, then observe the specimen with the 100X objective. Apply the immersion oil on the slide cover with the 100X objective. Do not let the immersion oil to contact with the dry objectives lens (especially the 40X). Clean the dry objective lens using the lens cleaning paper if the immersion oil is on the dry objectives lens. Clean the 100X objective lens first using the lens cleaning paper after observing the specimen with the 100X objective, then clean the specimen. More persistent dirt should be removed using a little bit alcohol. **Do not use organic solvents for cleansing**.

5. Store the instrument in a cool, dry environment. Cover the microscope with the dust cover when not in use.

1. Components Illustration





1	Eyepiece	11	Trinocular Viewing Head	21	Stage Upward Stopper
2	Diopter Ring	12	Swapping Lever	22	Condenser
3	Eyepiece Tube	13	Head Lock Thumb Screw	23	Aperture Diaphragm Ring
4	Nosepiece	14	Objectives	24	Condenser Centering Screws
5	Slide Holder	15	Microscope Body	25	Filter
6	Mechanical Stage	16	Brightness Intensity Dial		
7	X-Y Stage Moving Knobs	17	Focus Tension Ring		
8	Light Collector	18	Coarse Focus Knob		
9	Microscope Base	19	Fine Focus Knob		
10	Photo Tube	20	Condenser Focus Knob		

2. Installation

2.1 Installation of the trinocular viewing head

1) Loosen the head lock thumb screw on the top of the microscope body and remove the plastic cover on the top.
2) Remove the cap on the dovetail of the trinocular viewing head.
3) Seat the dovetail of the viewing head ***(Fig. 1 (a))*** into the socket on the top of the microscope body ***(Fig. 1 (b))***.
4) Rotate the viewing head as shown in ***Fig. 1 (c)***.
5) Tighten the head lock thumb screw ***(Fig. 1(d))***.

Caution:

Do not release the viewing head until you are sure the viewing head is installed securely.

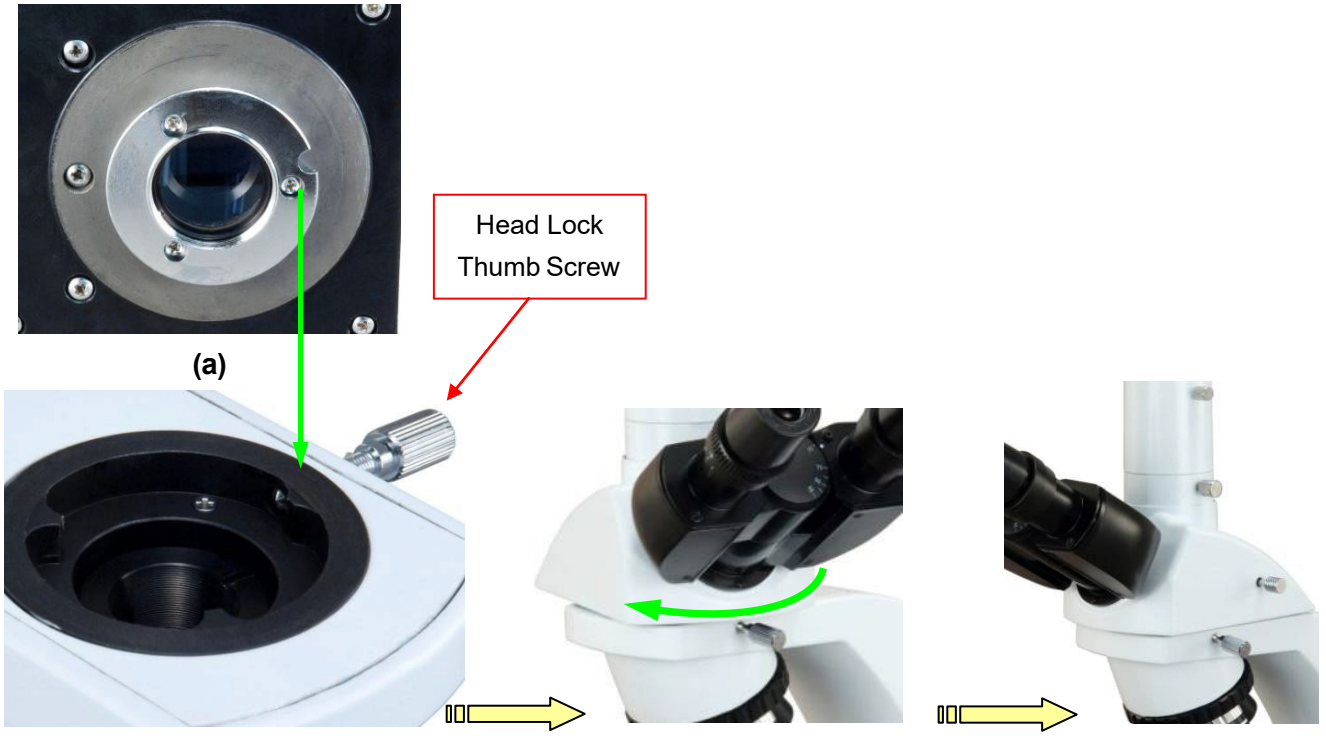


Fig.1

2.2 Installation of the photo tube

1) Remove the cap on the top of the viewing head.
2) Thread the photo tube into the top of the viewing head.

2.3 Installation of the eyepieces

3) Remove the protective caps from the eyepiece tubes.
4) Insert the eyepieces into the eyepiece tubes.

2.4 Installation of the objectives

1) Adjust the coarse focus knob until the mechanical stage is at its lowest position.
2) Turn the caps counter-clockwise to remove them from the nosepiece.
3) Take the objectives out from the plastic cases and turn each one clock-wise into the holes on the nosepiece. Install the 4X objective into the nosepiece first. Then in a

counter-clockwise direction, rotate the nosepiece and install each succeeding higher magnification objective as shown in ***Fig. 2***.

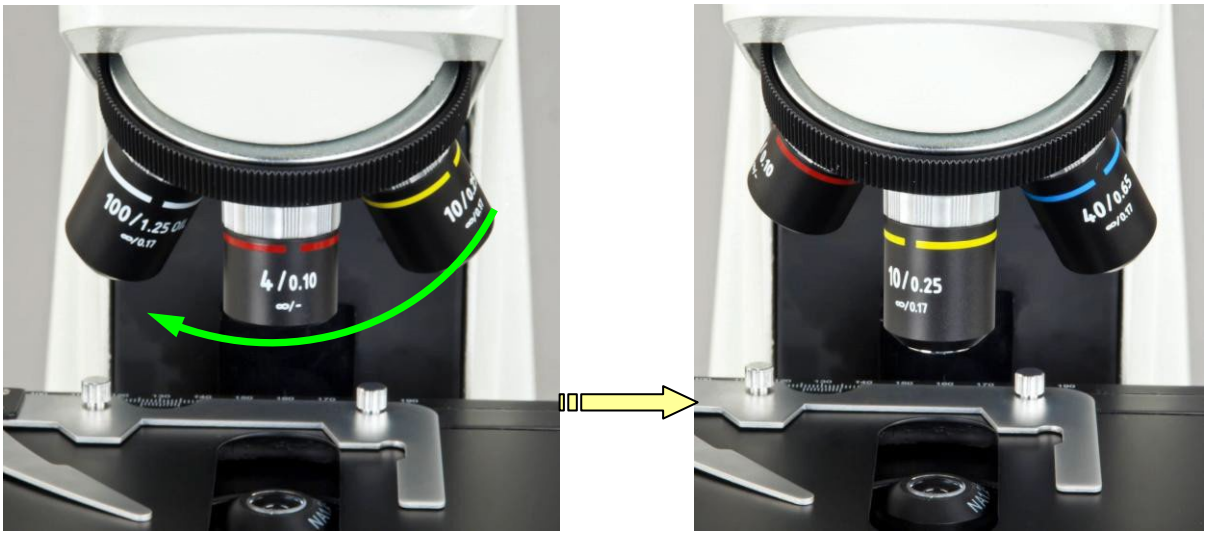


Fig.2

Note:

- Inspect the objectives frequently for dirt or oil; clean if necessary.
- Use the 10X objective to initially focus the image of your specimen.
- When changing the objective magnification, rotate the objective nosepiece until you hear a “click” sound or have a clear "in position" feeling. This ensures the objective is centered in the optical light path.

2.5 Installation of the color filters

The color filter is simply put into the filter holder

2.6 Connecting the power cord

1) Turn the power switch to the off position.
2) Connect the power cord to the socket at the back of microscope body and plug the other end into a wall outlet.

Caution:

Before connect the cord to the wall outlet; make sure the voltage switch is slide to the correct position for the right power source.

2.7 Replacing the fuse

1) Turn off the power switch and disconnect the power cord.
2) Find the fuse holder at the back of the microscope body.
3) With a flat-head screwdriver, press and turn the fuse holder counter clock wise to remove it.
4) Replace the old fuse with a new one,
5) Put the fuse holder back, press and turn it clock wise. See ***Fig. 3***.

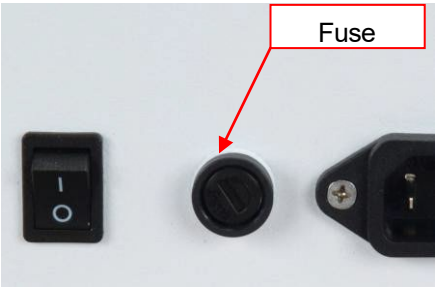


Fig.3

3. Operation

3.1 Adjusting illumination

1) Plug the power cord into the power socket on the microscope and connect it to the power outlet.
2) Turn on the power switch.
3) Rotate the brightness intensity dial to increase or decrease the brightness of the illuminator.

3.2 Placing specimen

1) Place the slide on the mechanical stage.
2) Use the slide holder to gently secure the slide.
3) Turn the X and Y stage moving knobs to position the specimen in the center of viewing field.

Caution:

Be sure not to allow an objective to touch a specimen slide when changing objectives.

3.3 Focusing

1) With the 10X objective in position, raise the mechanical stage using the coarse focus knob until the specimen is close to the objective.
2) Turn the coarse focus knob until the specimen is in focus.
3) Use the fine focus knob to obtain a sharp image.
4) Turn the condenser focus knob (***Fig. 4***) to raise or lower the condenser till the image of field is focused.

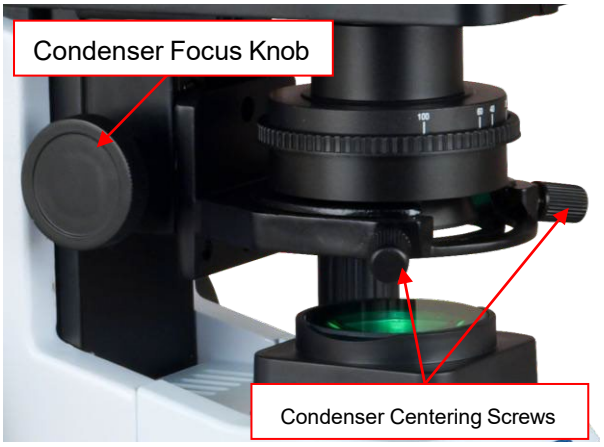


Fig.4

5) Turn the condenser centering screws (***Fig. 4***) to move the image of the field into the center of the viewing field.
6) To get a good focused image, you may need to combine the focus knob adjustment and interpupillary distance adjustment, along with eyepiece diopter adjustment stated in **3.4** and **3.5**.
7) You may now switch to another magnification objective.

Tips:

a) The condenser is raised when using high power objectives and lowered when using low power objectives.
b) To prevent your specimen slide from making contact with an objective, raise the stage to its highest position without contacting the 100X objective; then tighten the stage upward stopper (***Fig. 5***). Give the stage a tiny extra moving space to ensure the objective can be focused every time.

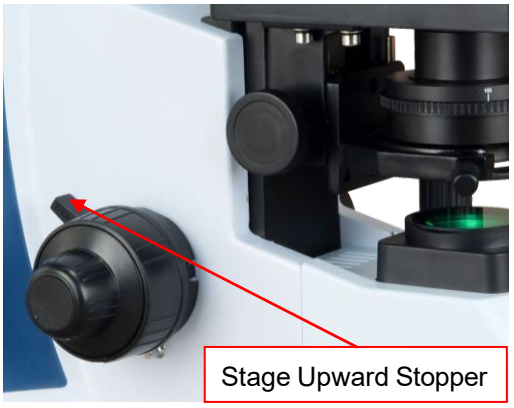


Fig.5

3.4 Adjusting interpupillary distance

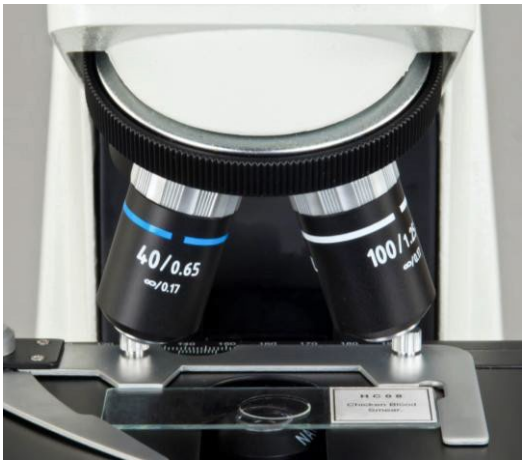
While observing with both eyes, hold the left and right eyepiece tubes then swing them around the center axis. The interpupillary distance is correct when the left and right fields of view converge completely into one image.

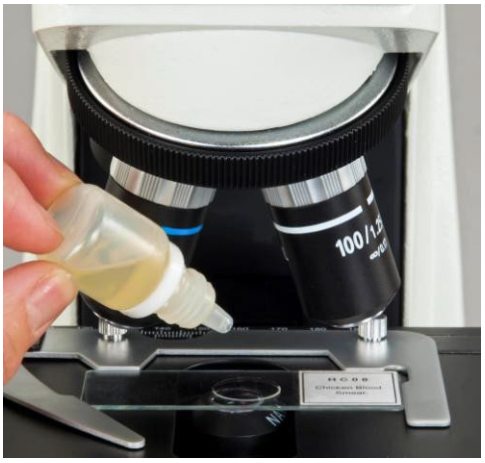
3.5 Adjusting eyepiece diopter

1) Using the 10X objective and your right eye only, observe your specimen through the eyepiece and bring it into focus by adjusting the focus knobs.
2) Then observe the specimen with your left eye only through the left eyepiece. If the specimen is not in focus, turn the diopter ring on the eyepiece tube until a sharp image is obtained.

3.6 Applying the immersion oil

1) Rotate the objective nosepiece to seat the observing position between the 40X and 100X objectives as shown in ***Fig. 6 (a)***.
2) Place a drop of immersion oil on the slide cover as shown in ***Fig. 6 (b)***.
3) Rotate the objective nosepiece to seat the 100X objective to the observing position until you hear a “click” sound.
4) After observing the specimen, use the lens cleaning paper to clean the 100X objective lens gently and the specimen in time.
5) If it is hard to clean, you need a little bit alcohol to clean the 100X objective lens and the specimen.





Caution (*importan* (a) **Fig.6** **(b)**

- When you use the 100X objective to observe the specimen, you have to finish observing the specimen with the 4X, 10X, 40X objectives.
- When you use the 100X objective to observe the specimen, you have to apply the immersion oil on the top of the slide cover.
- When you apply the immersion oil with the 100X objective, do not let the immersion oil to contact with the dry objective lenses (especially the 40X). If the immersion oil is on the dry objectives lens, please use the lens cleaning paper to clean the objectives lens in time. The oil will damage the dry objective lenses.
- After observing the specimen with the 100X objective, clean the 100X objective lens first.

3.7 Adjusting iris aperture diaphragm

Turn the aperture diaphragm ring to adjust the aperture size.

3.8 Adjusting focus knob tension

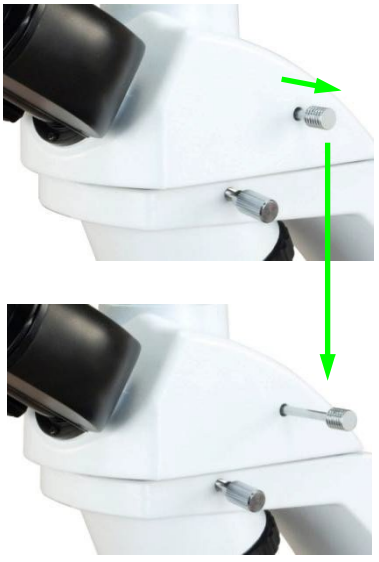
The tightness of the focus knob tension has been pre-set at the factory. If the mechanical stage drops by itself, rotate the focus tension ring (***Fig. 7***) with the tension wrench situated between the coarse focus knob and microscope body until the tension is in maintained.

Fig.7

Fig.8

3.9 Photo/video observing, capturing and recording

1) Insert camera into the photo tube (***Fig. 8***).
2) Bring the microscope into focus by following the procedures in **3.3**.
3) Pull the swapping lever out (***Fig. 9***)
4) Adjust the photo tube length until image on camera is in focus.



Note:

- The swapping lever to switch beam spilt for photo part and 100% to eyepieces when photo tube is not in use.

Fig.9

4. Specifications

Model	**M8333**
Total Magnification	40X, 100X, 400X, 1000X
Eyepieces	1 pair of WF10X/18
Objectives	Infinity objectives achromatic 4X/0.10 ∞/- 10X/0.25 ∞/0.17 40X/0.65 ∞/0.17 (spring) 100X/1.25 ∞/0.17 (spring, oil)
Viewing Head	30º inclined, 360º swiveling siedentopf trinocular viewing head Hinge interpupillary distance adjustment, 2-3/16" ~ 2-5/16" (55mm ~ 75mm) Diopter adjustment on left eyepiece tube A lever to switch between beam spilt for photo part and 100% to eyepieces when camera is not in use
Nosepiece	Reversed revolving quadruple nosepiece
Stage	Double layer mechanical stage Dimension: 5-1/2" x 4-1/4" (140mm x 110mm) Translation range: 3" x 1-13/16" (78mm x 46mm)
Condenser	NA=1.25, built-in aperture iris diaphragm Center adjustable, rack and pinion adjustment
Focus Mechanism	Coaxial coarse and fine focusing knobs on both sides with focus stop and tension control
Collector	With color filter holder
Color filter	45mm green filter in diameter
Illumination	Transmitted, LED, intensity adjustable
Power Supply	AC 100-240V (US and Canada plug)
Cameras (***optional***)	Refer to the cameras specifications
Darkfield Condensers (***optional***)	Refer to the darkfield condensers specifications
Phase Contrast Kit (***optional***)	Refer to the phase contrast kit specifications
Dimension	19-3/4" x 16" x 8" (50 cm x 41 cm x 20 cm)
Net weight	17 lbs (7.7 kg)

5. Optional Parts

(The optional parts may be included in some models or sold separately.)

1) Cameras

	Model	Sensor	Resolution	Operating System	Software
	A35100U	CMOS USB2.0	3584 x 2748 (10.MP)	MS Windows Mac OS 10.8 and up Linux (2.6 or above)	Included
	A35140U		4096 x 3288 (14.0MP)		
	A3550U3	CMOS USB3.0	2560 x 1922 (5.0MP)		
	A3580U3		3328 x 2548 (8.0MP)		
	A35100U3		3584 x 2746 (10.0MP)		
	A35140U3		4096 x 3286 (14.0MP)		
	A35180U3		4912 x 3684 (18.0MP)		
	CPZJ-150R	CMOS	2560 x 1920 (5.0MP)	N/A	N/A

2) Darkfield Condensers

	Model	Darkfield Condenser	Numerical Aperture	Objective	Mounting Size(diameter)
	A191-INF	Dry	0.7-0.9	-	37mm
	A191BD-INF	Oil	1.36-1.25	-	37mm

3) Phase Contrast Kits

	Model	Phase Contrast Objective	Condenser	Annular Ring Plates	Centering Telescope
	A1PHIP	Plan achromatic 10X with built-in phase plate Plan achromatic 20X with built-in phase plate Plan achromatic 40X with built-in phase plate, spring Plan achromatic 100X with built-in phase plate, spring, oil	NA 1.25	Five positions: 10 for 10X phase contrast objective 20 for 20X phase contrast objective 40 for 40X phase contrast objective 100 for 100X phase contrast objective B for bright field observation, with iris	Focusing adjustable

6. Troubleshooting Guide

Problem	Cause	Solution
Lamp does not light when switched on	No electrical power	Check power cord connection
	LED or power unit dead	Replace LED light
	Fuse blown out	Replace fuse
Darkness at the periphery or uneven brightness in the field of view	Revolving nosepiece not in click stop position	Revolve the nosepiece to click-stop position by swinging the objective correctly into the optical path
	The field iris diaphragm are not opened enough	Open field diaphragm
	The field diaphragm not in the center	Center the field iris diaphragm
Dirt or dust on the view	Dirt or dust on the eyepiece, condenser, objective, collector lens or specimen	Clean the lens with a lens cleaning paper
Poor image quality or not able to get focused image	No slide cover attached to the slide	Attach a 0.17mm slide cover
	Slide cover is too thick or thin	Use a slide cover of the appropriate thickness (0.17mm)
	Slide may be upside down (specimen at the bottom)	Turn slide over so the cover-glass faces up
	Diopter adjustment is not set properly	Readjust the diopter settings
	Immersion oil is on a dry objective (especially the 40X)	Check the objectives, clean if necessary
	No immersion oil used with 100X objective	Use immersion oil
	Air bubbles in immersion oil	Remove bubbles
	Aperture is closed or open too much	Open or close properly
	Condenser is not in the right position	Adjust the condenser
	The field diaphragm not in the center	Center the field iris diaphragm
	The aperture and field iris diaphragm are not opened enough	Open and adjust the aperture and field diaphragm

	Specimen rises from stage surface	Secure the specimen in the slide holder
	Revolving nosepiece is not in the click-stop position	Revolve the nosepiece to the click-stop position
	Lamp intensity is too high or low	Adjust the light intensity by rotating the intensity control dial
Slippage of focus when using the coarse focusing knob fine focus is ineffective	Tension adjustment is set too low	Increase the tension on the focusing knobs
	Tension adjustment is set too high	Loosen the tension on the focusing knobs

7. Darkfield Condenser Installation and Operation Instructions

7.1 Dry darkfield condenser of A191-INF

1) Mounting the dry darkfield condenser

- Rotate the nosepiece and set the 4X objective in position.
- Turn the coarse focus knob to raise the mechanical stage to the highest position without contacting the 4X objective.
- Turn the condenser control knob to lower the condenser to the lowest position.
- Loosen the condenser lock thumb screw on the condenser holder and remove the brightfield condenser as shown in ***Fig. 10 (a)***.
- Install the dry darkfield condenser and tighten the condenser lock thumb screw on the condenser holder as shown in ***Fig. 10 (c)***.
- Re-adjust the condenser height to its normal position.
- Re-adjust the mechanical stage height to its normal position.

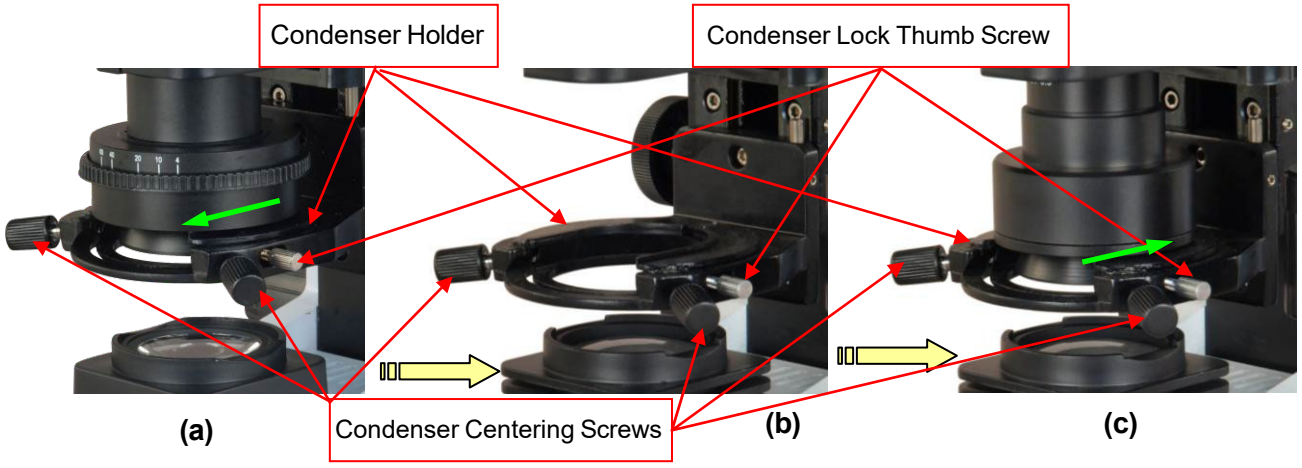


Fig.10

2) Centering the dry darkfield condenser

- Turn the 4X objective to the light path.
- Turn the condenser focus knob to lower the condenser till a dark spot showed in the viewing field as shown in ***Fig. 11 (a)***.
- Turn the condenser translational centering screws to move the dark spot to the center as shown in ***Fig. 11 (b)***.

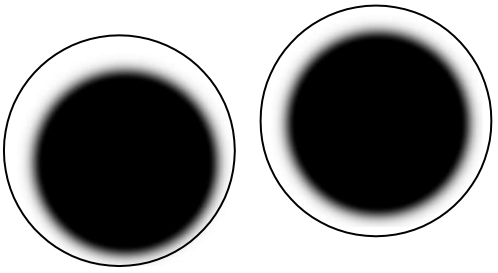


Fig.11

3) Place the slide on the stage.

4) Raise the condenser all the way to the top and lower it a little bit.

5) Following the procedures in this manual to focus and observe.

6) Move the condenser up or down slightly to get the best darkfield viewing.

Note :

- The dry darkfield condenser is used with the dry objectives only.
- The dry darkfield condenser works with the 4X, 10X, 40X objectives.
- The dry darkfield condenser won't work with the 100X oil immersion objective.

7.2 Oil darkfield condenser of A191BD-INF

1) Mounting the oil darkfield condenser
   - Rotate the nosepiece and set the 4X objective in position.
   - Turn the coarse focus knob to raise the mechanical stage to the highest position without contacting the 4X objective.
   - Turn the condenser control knob to lower the condenser to the lowest position.
   - Loosen the condenser lock thumb screw on the condenser holder and remove the brightfield condenser as shown in ***Fig. 12 (a)***.
   - Install the oil darkfield condenser and tighten the condenser lock thumb screw on the condenser holder as shown in ***Fig. 12 (c)***.
   - Re-adjust the condenser height to its normal position.
   - Re-adjust the mechanical stage height to its normal position.

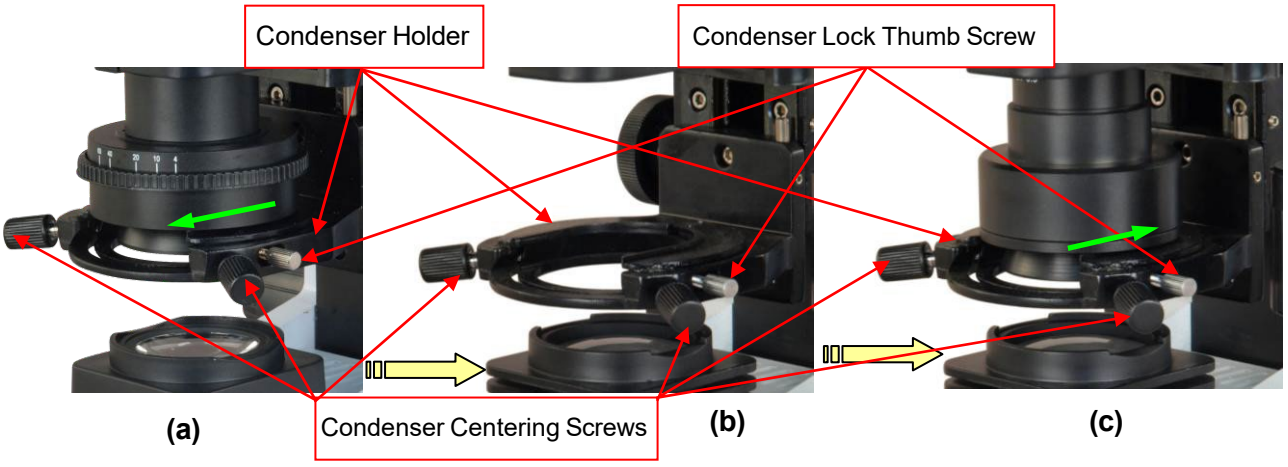


Fig.12

2) Centering the oil darkfield condenser
   - Turn the 40X objective to the light path.
   - Turn the condenser focus knob to slowly lower and raise the condenser till a dark spot showed in the viewing field as shown in ***Fig. 13 (a)***.
   - Turn the condenser translational centering screws to move the dark spot to the center as shown in ***Fig. 13 (b)***.

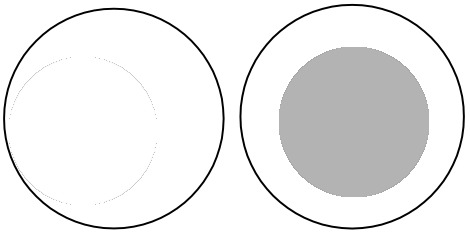


Fig.13

3) When using the 40X objective to observe the specimen.
   - Place the slide on the stage.
   - Lower the condenser until a sharp brightfield image showing in the viewing field.
   - Raise the condenser until the darkfield image showing in the viewing field.
4) When using the 100X objective to observe the specimen
   - Raise the condenser until the top is close to the opening of stage.
   - Place a drop of immersion oil on the top of condenser.
   - Place the slide on the stage.
5) Raise the condenser and let the oil drop contact the bottom of the slide. If air bubbles exist in the oil, clean the oil from the top of the condenser and bottom of slide with a lens cleaning paper and repeat the procedures.
6) Follow the procedures in this manual to bring the sample on slide in focus and

observe.

7) After observing the specimen with 100X objective, use the lens cleaning paper to

gently clean the 100X objective lens, oil darkfield condenser and the specimen in time.

8) If it is hard to clean, you need a little bit alcohol to clean the 100X objective lens, oil darkfield condenser and the specimen.

Note :

- When using the 40X objective, you won't need to apply oil drop on the oil condenser.
- When using the 100X objective, the condenser won't work well if no oil drop applied on the condenser.
- When you apply the immersion oil with the 100X objective, do not let the immersion oil to contact with the dry objective lenses (especially the 40X). If the immersion oil is on the dry objectives lens, please use the lens cleaning paper to clean the objectives lens in time. The oil will damage the dry objective lenses.
- After observing the specimen with the 100X objective, clean the 100X objective lens first.

8. Phase Contrast Kit Installation and Operation Instructions

8.1 Phase contrast kit of A1PHIP:

1) Mounting the phase contrast objectives
   a. Take off all the objectives from the nosepiece.
   b. Install the phase contrast objectives onto the nosepiece following the steps in ***2.4***.
2) Mounting the phase contrast condenser/annular ring disk
   a. Rotate the nosepiece and set the 10X objective in position.
   b. Turn the coarse focus knob to raise the mechanical stage to the highest position without contacting the 10X objective.
   c. Turn the condenser control knob to lower the condenser to the lowest position.
   d. Loosen the condenser lock thumb screw and remove the brightfield condenser as shown in ***Fig. 14 (a)***.
   e. Insert the condenser/annular ring disk into the condenser holder, and tighten the thumb screw as shown in ***Fig. 14 (c)***.
   f. Re-adjust the condenser height to its normal position.
   g. Re-adjust the mechanical stage height to its normal position.

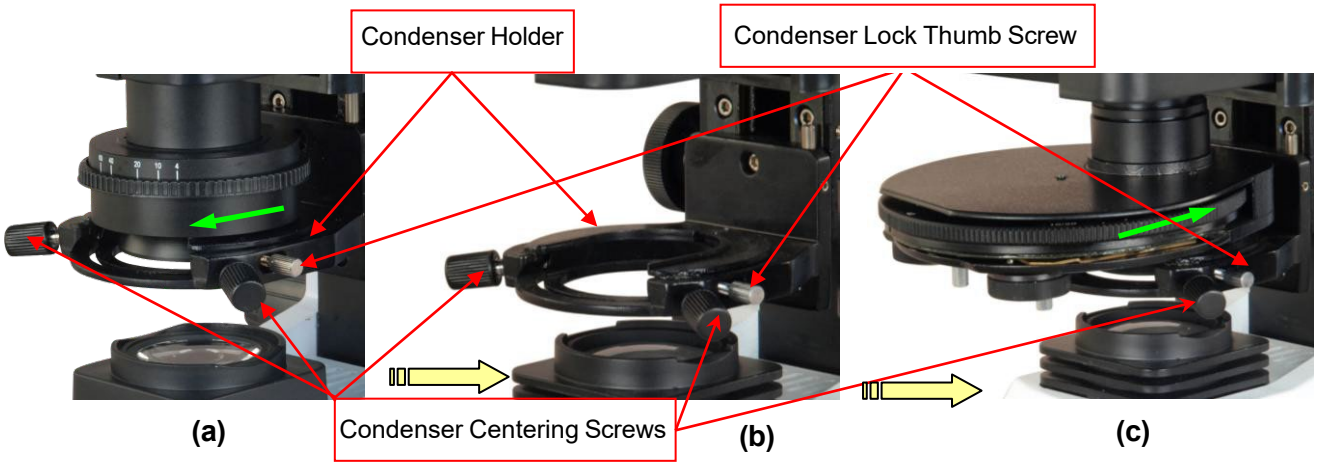


Fig.14

Note:

- When raising the mechanical stage, do not make contact with the objective.

3) Turn the desired objective into light path.
4) Turn the annular ring disk to put the corresponding ring into light path, i.e. if you are using the 4**0X** phase contrast objective, you should turn the disk at **40** as shown in ***Fig. 15***.

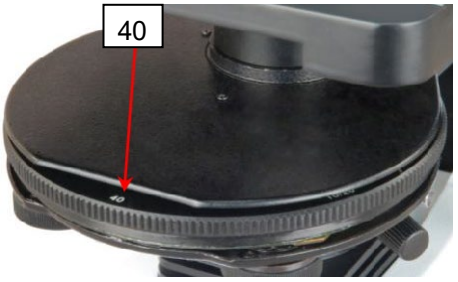


Fig.15

5) Centering the annular ring.
   a. Remove one eyepiece from the microscope eyepiece tube and insert the centering telescope as shown in ***Fig. 16***.
   b. Observe from the telescope. The bright ring and dark ring should be coincided with each other as shown in ***Fig.17 (d)***.
   c. If the ring images are not clear, turn the top of telescope until both ring images are in focus.
   d. If the bright ring is still obscure as in ***Fig.17 (b)***, adjust the condenser focus knob.

Fig.16

   e. If the two ring images are not coincided as shown in ***Fig.17 (c)***:
      - Turn the condenser centering screws ***(Fig. 18)*** to move the dark spot to the center until two ring images are coincided, or
      - Turn the adjustment knobs ***(Fig. 18)*** to move the dark spot to the center until two ring images are coincided.
   f. Remove the centering telescope and replace it with the eyepiece.
   g. Put the specimen on the stage and adjust the illumination, focusing, etc following the instructions in this manual.

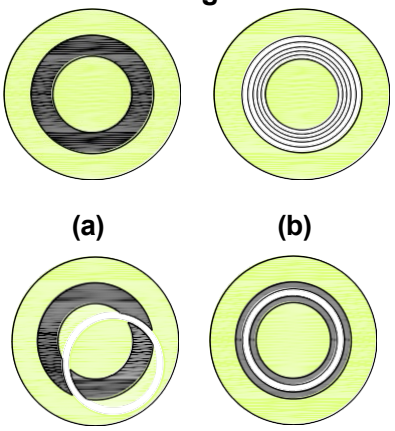


Fig.17

Note:

- The phase contrast condenser will be working as a conventional Abbe condenser if the annular ring disk being put at **BF** position.
- The phase contrast condenser will be working as a dry darkfield condenser if the annular ring disk being put at **DF** position.

6) Performing the phase contrast observation.
   After centering the condenser ring plate, perform the phase contrast observation the same way as a normal bright field microscope.

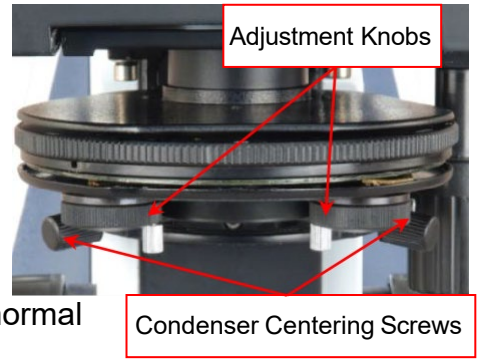


Fig.18

Note:

- When change to another phase contrast objective and corresponding condenser ring plate, the focusing and centering of bright ring and dark ring should be repeated following the procedures from **5)-b** to **5)-f**.