User Manual

Digital Phase Contrast /Bright Field
Trinocular Compound Microscope

Model XM837PHB1C20C

OMAX

MicroscopeNet.com

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i. CAUTION

1. Find the “UP” sign and place the Styrofoam container on your table or bench so that the arrow is pointing upward. Open the shipping carton carefully to prevent any small 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. **Important**: 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.

6. All electrical connectors (power cord) should be inserted into an electrical surge suppressor to prevent damage due to voltage fluctuations.

7. For safety when replacing the halogen lamp or fuse, be sure the main switch is off, unplug the power cord, and only replace the halogen bulb after the bulb and the lamp house has completely cooled.

8. Confirm that the input voltage indicated on your microscope corresponds to your line voltage. The use of a different input voltage other than that as indicated will cause severe damage to the microscope.

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

1 Components Illustration

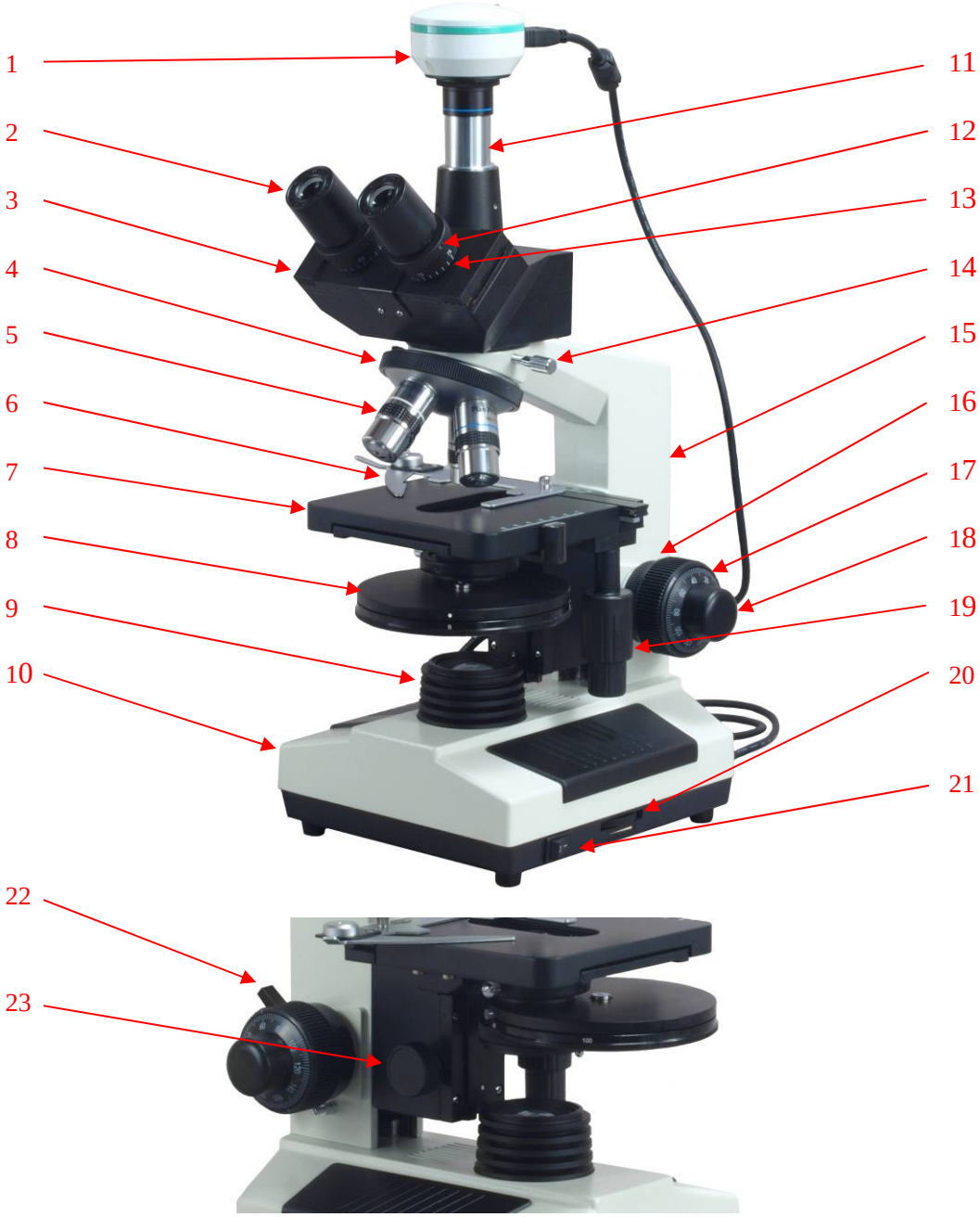


Figure 1

1. Digital Camera
2. Eyepiece
3. Viewing Head
4. Nosepiece
5. Objective
6. Slide Holder
7. Mechanical Stage
8. Condenser/Annular Ring Disk
9. Collector Lens
10. Base
11. Photo Tube
12. Diopter Ring
13. Eyepiece Tube
14. Thumb Screw
15. Body
16. Focus Tension Ring
17. Coarse Focus Knob
18. Fine Focus Knob
19. Stage Translational Control Knobs
20. Intensity Dial
21. Power Switch
22. Focusing Stop Lever
23. Condenser Focus Knob

2 Installation

2.1 Installation of the trinocular viewing head

1) Loosen the thumb screw (14) on the top of the body (15) and remove the plastic cover.
2) Remove the cap of the circular dovetail on the bottom of the trinocular viewing head (3).
3) Insert the dovetail into the socket on the top of the body; ensure that the dovetail is completely seated into the body.
4) Tighten the thumb screw (14).

Figure 2

Caution: Do not release the head from your hand grip until you are sure the head is installed securely.

2.2 Installation of the eyepieces

1) Remove the protective caps from the eyepiece tubes (13).
2) Insert the eyepieces (2) into the eyepiece tubes (13).

2.3 Installation of the objectives

1) Adjust the coarse focus knob (17) until the mechanical stage (7) is at its lowest position.
2) Install the 4x objective onto the nosepiece (4). Then in a clock-wise direction, rotate the nosepiece and install each succeeding higher magnification objective.

Note: When changing the objective magnification, rotate the objective nosepiece until you hear a “click” sound. This ensures the objective is centered in the optical light path.

2.4 Installation of the glass filter

1) Swing out the filter holder under the condenser.
2) Insert the filter into the holder.
3) Swing the holder back in.

Figure 3

2.5 Installing (or changing) the halogen bulb

1) Turn the power off and disconnect the power cord.
2) Allow some time to cool down the lamp.
3) Turn over the microscope on its side; find the bulb compartment at the bottom.
4) Open the cover of the bulb compartment by loosening the thumb screw.
5) Take out the dead bulb and insert the new bulb. Be sure the pins on the bulb are completely inserted into the lamp socket. You may also loosen the two screws on the cover to adjust the position of the bulb to get centered and even brightness.
6) Screw the cover on.

Figure 4

Caution: Before you turn over the microscope, be sure to take the eyepieces off and be certain that the head is securely locked by the thumb screw.

2.6 Replacing the fuse

1) Turn off the power and disconnect the power cord.
2) Turn over the microscope on its side; find the fuse at the bottom of the base.
3) Turn the fuse holder counter-clockwise to take it off, insert new fuse, and then turn it on clockwise.

Caution: Before you turn over the microscope, be sure to take the eyepieces off and be certain that the viewing head is securely locked by the thumb screw.

2.7 Installing the mirror (optional part, your model may not have one)

1) Unplug the power cord.
2) Screw off the collector lens (9) on the base.
3) Screw the black disc onto the base and then insert the mirror into the hole at the center of the black disc. You may try to get reflected ambient light on either side of the mirror with different angles for best result.

Figure 5

Note: The mirror is only used when there is a power failure or you are on the field and no power available.

2.8 Installing the phase contrast kit

1) Take off all the objectives (5) from the nosepiece (4).
2) Install the phase contrast objectives onto the nosepiece (4) following the steps in 2.3.
3) Loosen the thumb screw and take off the condenser from the holder.
4) Insert the condenser/annular ring disk (8) into the condenser holder, and tighten the thumb screw.

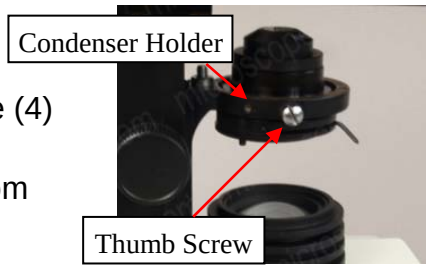


Figure 6

2.9 Installing the digital camera

1) Remove the plastic photo tube port cover on the top of the viewing head (3).
2) Thread the photo tube (11) on to the trinocular viewing head (3).
3) Thread the reduction lens on to the camera (1) as shown in Figure 7.
4) Insert the camera (1) into the photo tube (11).
5) Insert the USB cable into the camera and connect it to the computer.

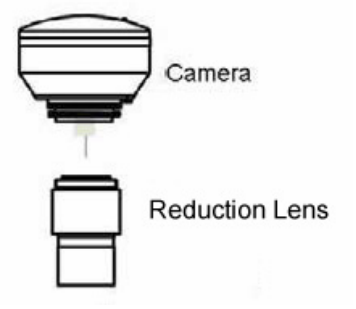


Figure 7

3 Operation

3.1 Adjusting illumination

1) Connect the power cord and turn on the main power switch (21).
2) Rotate the variable intensity dial (20) to increase or decrease the brightness.

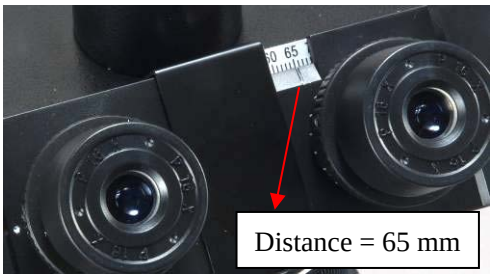
3.2 Placing specimen

1) Place the slide on the mechanical stage (7).
2) Use the slide holder (6) to gently secure the slide. Turn the stage X and Y translational control knobs (19) to position the specimen for viewing.

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

3.3 Adjusting interpupillary distance

While observing with both eyes, hold the left and right eyepiece tubes (13) then slowly slide them in and out. The interpupillary distance is correct when the left and right fields of view converge completely into one image.



3.4 Adjusting eyepiece diopter

1) Rotate the 10x objective into position.
2) Rotate the diopter ring on the right eyepiece tube until its numerical value is the same as your interpupillary distance, for example, 65 in Figure 8.
3) Close your left eye and bring the specimen into focus following the focusing procedures in 3.5.
4) Close your right eye and bring the same specimen into clear sharp focus by adjusting only the diopter ring (12) on left eyepiece tube (13). Don't use focus knobs at this step.
5) Since both sides are adjustable, you may also do the above in the opposite way, in other words, left eye first and right eye second.

Figure 8

3.5 Focusing

1) With the 10x objective in position, raise the mechanical stage (7) using the coarse focus knob (17) until the specimen is close to the objective
2) Turn the coarse focus knob (17) until the specimen is in focus.
3) Then use the fine focus knob (18) to obtain a clear sharp image. You may now switch to another magnification objective.

Tips: To prevent your specimen slide from making contact with an objective, raise the stage (7) to its highest position without contacting the 100x objective, then tighten the focusing stop lever (22).

3.6 Adjusting condenser

Turn the condenser focus knob (23) to raise or lower the condenser. The condenser

is raised when using high magnification objectives and lowered when using low magnification objectives.

Note:

- The centering of the condenser and the light axis of the objective are factory adjusted. Do not attempt re-adjustment.
- The highest position of the condenser has been factory adjusted. Do not attempt re-adjustment.

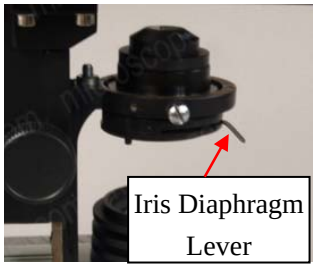


Figure 9

3.7 Adjusting aperture iris diaphragm

Move the iris diaphragm lever left or right to adjust the aperture size.

Note: The iris diaphragm is designed to adjust the aperture size, not to adjust brightness. Generally, opening the diaphragm to 70-80% of the N.A. value of the respective objective will provide an image of acceptable quality. If you want to observe the image of the iris diaphragm, remove one eyepiece and look through the tube. You will see a dark circle encroaching on the bottom of the tube.

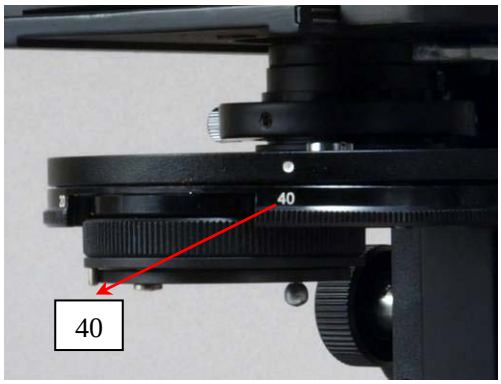


Fig. 10

3.8 Adjusting focus tension

The tightness of the focusing mechanism has been pre-set at the factory. If the mechanical stage drops by itself, rotate the tension adjustment ring (16) located beside the coarse focus knob (17) on the power switch side until the tension is in maintained.

3.9 Phase contrast observation

1) Install the phase contrast kit following the instructions in 2.8.
2) Turn the desired objective into light path.
3) Turn the annular ring disk to put the corresponding ring into light path, i.e. if you are using the 40x phase contrast objective, you should turn the disk at 40 as shown in Figure 10.
4) Centering the annular ring
   a) Remove one eyepiece from the microscope eyepiece tube and insert the centering telescope as shown in Figure 11.
   b) Observe from the telescope. The bright ring and dark ring should be coincided with each other as shown in Figure 12 (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 Figure 12 (b), adjust the condenser focus knob (23).
   e) If the two ring images are not coincided as shown in


Figure 11

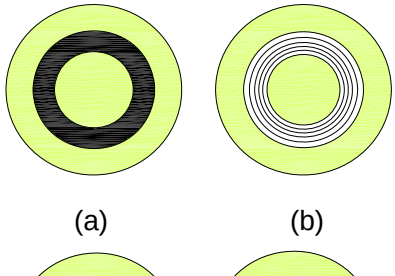


Figure 12

Figure 12 (c), hold the ring plate from the bottom of the annular ring disk (8) and adjust its position until two ring images are coincided.

f) Remove the centering telescope and replace the eyepiece.

5) Put the specimen on the stage (7) and adjust the illumination, focusing, etc following the instructions in this manual.

Note: The phase contrast condenser will be working as a conventional Abbe condenser if the annular ring disk being put at B position.

3.10 Photo/video observing, capturing and recording

1) Install the photo tube and camera following the steps in 2.9.
2) Turn on the computer, open the observing software to examine.
3) Adjust the height by loosening the 2 set screws on the photo tube (shown in Figure 13) and turn the upper part in order to make the camera parfocal with the eyepieces.
4) You also can capture images or record live videos through the software.

Figure 13

Note: For the details of installation and operation of the camera and its software, please refer to the manuals in the camera's CD.

4 Specifications

Total Magnification	Bright field: 40x, 64x, 100x, 160x, 400x, 640x, 1000x, 1600x Phase Contrast:100x,160x,200x,320x,400x,640x,1000x,1600x
Objective Tube Length	160mm
Viewing Head	Trinocular, inclined 45º, swiveling 360º, interpupillary distance 55-75mm, adjustable diopter on both eyepiece tubes
Eyepieces	WF10X, P16X
Nosepiece	Quadruple
Objectives	Achromatic 4X, 10X, 40X(spring), 100X (spring, oil) Plan phase contrast 10X, 20X, 40X, 100X (spring, oil)
Focus system	Coaxial coarse and fine focusing, minimum fine focusing adjustment at 0.002mm, range 28mm
Condenser	Abbe, NA=1.25, with iris diaphragm and filter holder
Phase Contrast Condenser	NA1.25 condenser, 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 diaphragm and filter holder
Centering Telescope	Focusing adjustable
Stage	Double layer mechanical stage, area 140mmx140mm, movement range 75mm X 50mm
Camera	USB 2.0 Mega Pixels Camera USB cable Driver and software in CD
Illumination	Halogen lamp 6V/20W

5 Troubleshooting Guide

OPTICAL PROBLEMS		
Problem	**Cause**	**Solution**
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 light source of the bulb is not at the center	Adjust the position of the bulb
Dirt or dust on the view	Dirt or dust on the lens eyepiece, condenser, objective, collector lens or specimen	Clean the lens with a camera cleaning kit
Poor image quality	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	Turn slide over so the cover-glass faces up
	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
	Condenser aperture is closed or open too much	Open or close properly
	Condenser is positioned too low	Position the condenser upward

ELECTRICAL PROBLEMS		
Problem	**Cause**	**Solution**
Lamp does not light when switched on	No electrical power	Check power cord connection
	Lamp bulb burnt out	Replace bulb
	Fuse blown out	Replace fuse

IMAGE PROBLEMS		
Problem	**Cause**	**Solution**
Image moves while focusing	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
Image tinged yellow	Blue filter not used	Use daylight blue filter
	Lamp intensity is too low	Adjust the light intensity by rotating the intensity control dial
Image is too bright	Lamp intensity is too high	Adjust the light intensity by rotating the intensity control dial
Insufficient brightness	Lamp intensity is too low	Adjust the light intensity by rotating the intensity control dial
	Aperture diaphragm closed too far	Open to the proper setting
	Condenser position too low	Position the condenser upward

MECHANICAL PROBLEMS		
Problem	**Cause**	**Solution**
Image will not focus with high power objectives	Slide upside down	Turn the slide over so the cover glass faces up
	Cover glass is too thick	Use a 0.17mm cover glass
High power objective contacts slide when changed from low power objective	Slide upside down	Turn the slide over so the cover glass faces up
	Cover glass is too thick	Use a 0.17mm cover glass
	Diopter adjustment is not set properly	Readjust the diopter settings
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