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INSTRUCTIONS FOR

MODEL DC4-456H

STEREOSCOPIC MICROSCOPE
WITH DIGITAL CAMERA

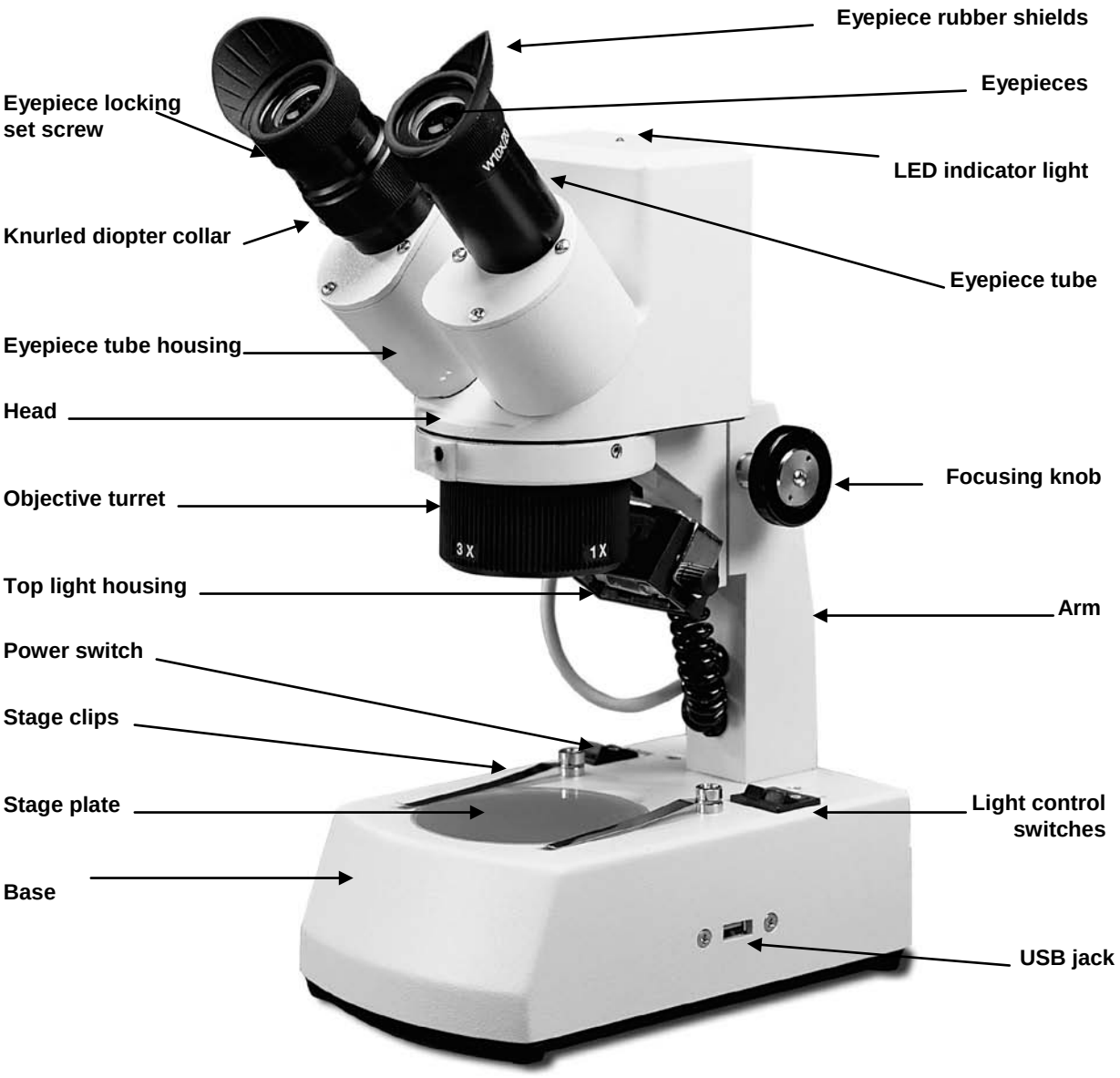
(For microscope operation only. Camera operation covered in PDF format on disc.)

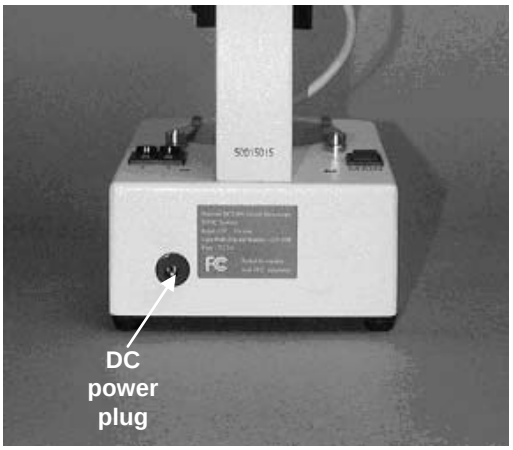
HOW TO USE YOUR MICROSCOPE SERIAL NUMBERS

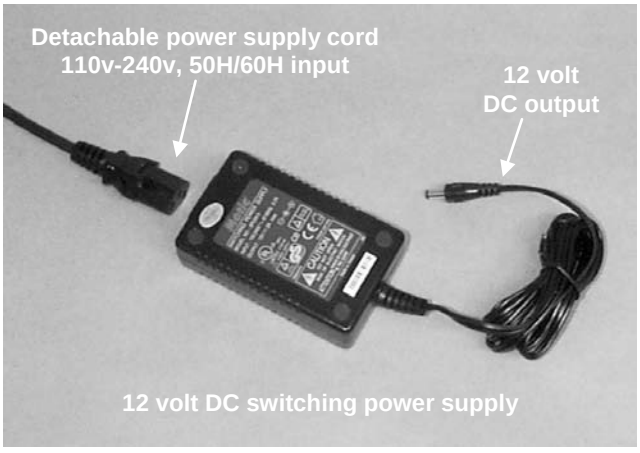
1. Microscope serial number: This number (etched on back of arm) is the number under which your warranty is registered.

2. Microscope & Motic CD DM number: This number (found on a white sticker on CD sleeve) is used for logging on to the Motic web site, which gives you the ability to download free software upgrades.

   *Please retain for your records


Eyepiece rubber shields
Eyepieces
Eyepiece locking set screw
LED indicator light
Knurled diopter collar
Eyepiece tube
Eyepiece tube housing
Head
Focusing knob
Objective turret
3X
1X
Top light housing
Arm
Power switch
Stage clips
Stage plate
Light control switches
Base
USB jack


DC power plug


Detachable power supply cord
110v-240v, 50H/60H input
12 volt DC output
12 volt DC switching power supply

About the Digital Microscope

Your new digital stereomicroscope incorporates a built in camera that utilizes ultra high-speed data transmission made possible through a simple plug and play USB 2.0 cable. Your stereoscopic microscope can be used independent of the camera so that you can view 3 dimensional objects, inspection or assembly of small pats, and for dissection of biological specimen. They provide upright, un-reversed image that permits easy manipulation of the object being viewed while looking through the microscope. They are designed for viewing solid objects at low magnification, but they will also permit viewing of some transparent specimen slides.

UNPACKING

1. Your microscope is packed with the following components, all of which have been checked at the factory. Do not touch any of the lens surfaces while handling the microscope. Dust, dirt, fingerprints can damage the delicate lens surfaces or adversely affect image quality. Carefully remove all components and check against this list.

   A. Microscope with WF10x eyepieces (pair) already installed

   B. Instruction manual

   C. CD Motic Images software

   D. Calibration slide

   E. 12VDC switching power supply, operates on 100v-240v, 50H/60H

   F. AC power cord

   G. USB 2.0 cable (for connecting to computer)

   H. Rubber eyecups (pair)

   I. Two 80mm stage plates: plastic white & frosted glass (one installed)

   J. 1.27mm “L” type hex wrench (for tightening stage plate locking screw)

   K. Pin spanner wrench (for turning tension adjustment collar)

   L. Dustcover

2. Examine packing material before you discard it. **Retain the Styrofoam container in case you need to transport, store or return the microscope for service.** If it becomes necessary to ship the microscope for any reason, repack it in the styrofoam container, and then pack the styrofoam in another corrugated shipping container for optimum protection. Use of the styrofoam alone will not provide adequate protection in transit, and will void your warranty.

DESCRIPTION OF COMPONENTS

1. LED INDICATOR LIGHT: Indicates if camera is on. The LED lamp is illuminated after microscope is connected to computer with USB 2.0 cable and camera is turned on by software commands.

2. WIDEFIELD 10X EYEPIECES: Lens closest to the eye, magnifies the primary image formed by the objective lens.

3. RUBBER EYEGUARDS: These help block out undesired light reflections, and to position your eyes at the proper point above the eyepieces.

4. EYEPIECE LOCKING SET SCREW: Prevents removal of eyepiece. In secure environment, locking screws are not required.

5. KNURLED DIOPTER COLLAR: On one eyepiece only, for adjusting microscope to each individual's vision. See operating instructions.

6. HEAD RETAINING SCREW: Locks head of microscope in a fixed position, to protect camera components,

7. OBJECTIVE TURRET: Turns 90° to change magnification of microscope. Number positioned at front of microscope indicates objective power in use.

8. FOCUSING KNOBS: For focusing image seen through microscope and camera. Tension adjustment collar is located between knob on one side and arm of microscope.

9. TOP LIGHT HOUSING: Covers incidental (top) light of microscope.

10. STAGE PLATE: 80mm stage plate secured by locking setscrew located on one side of base. Both white plastic and frosted glass plates are included.

11. MAIN POWER SWITCH: Turns power to microscope on and off.

12. LIGHT CONTROLS: "I" controls incidental (top) light and "T" controls transmitted (bottom) light. When "T" (bottom) light is in use, frosted glass plate MUST be in place.

13. 12VDC POWER CORD/CONVERTER: Accepts 100v-240v 50H/60H input and supplies 12VDC power to the microscope. Note that this converter accommodates either 120v or 240v and 50H or 60H power supply, eliminating the need for any other transformer.

14. USB JACK: USB 2.0 cable connection.

ASSEMBLY

Your microscope comes fully assembled, except minor parts.

1. Slip rubber eyeguards over top edge of eyepieces, with flared portion positioned at the outside edge of eyepieces. These help block out undesired light reflections, and to position your eyes at the proper point above the eyepieces.

2. Plug detachable power supply cord into the 12VDC switching power converter, then into power outlet. Note that the switching power converter will accept 120v or 240v current, 50H/60H, and no other transformer is required. Then plug jack on other end of power converter into port on back of microscope base.

3. Two 80mm stage plates are furnished. The frosted glass plate is used when viewing transparent specimen slides, or for viewing some specimen thin enough through which light can pass. The white plastic plate can be used when viewing opaque objects or for dissecting.

   NOTE: FROSTED GLASS PLATE MUST BE USED IF USING BOTTOM ILLUMINATION. HEAT GENERATED IN BASE FROM BOTTOM LIGHT WILL WARP OR DAMAGE WHITE PLASTIC PLATE. SUCH DAMAGE WILL NOT BE COVERED BY WARRANTY.

   It is acceptable to leave the glass plate in place for most viewing. To switch plates, use the "L" hex wrench to loosen setscrew at side of base, only enough to permit removal of stage plate. Replace stage plate and retighten setscrew.

OPERATION

1. There are three rocker type light controls located on top surface of microscope base:

   MAIN = Turns power to light selector switches on and off
   "I" = Turns incidental light on (top illumination)
   "T" = Turns transmitted light on (substage illumination)

2. Turn MAIN power switch to **ON** position and select appropriate illumination for your specimen.

3. Adjust the interpupillary distance between eyepieces to match that of your own eyes. Looking through microscope will both eyes, grasp both sides of microscope head and gently push eyepiece tube housings together or pull apart until the two images blend into one image.

4. Turn objective turret until small number (lowest magnification) is towards front of microscope (away from arm), making certain that turret "clicks" into indexed position.

5. Magnification is determined by multiplying the number on the eyepieces times the number on the objective turret. For example, your microscope is supplied with WF10x eyepieces, when the "3x" on the objective turret is facing to the front of the microscope, the magnification resulting will be 30 times.

   To change magnification, turn objective turret 90° until it clicks into indexed position with another number on turret facing to front of microscope. Your microscope is parfocalled, and only slight adjustment of the focusing knobs may be required after changing from one magnification to the other.

MICROSCOPE OPTICAL SPECIFICATIONS

Objective	Eyepiece					
	WF10X (Supplied)		WF15X (Optional)			
	Total Magnification	Field Size	Total Magnification	Field Size	Working Distance	Maximum Specimen Height
1X	10X	20mm	15X	13mm	76mm	34mm
3X	30X	6.6mm	45X	4.3mm	76mm	34mm

   Use of eyepieces other than WF10x will affect microscope magnification according to the chart above, only as viewed through the microscope. The digital camera has built in lenses and therefore, use of other eyepieces on the microscope will not affect image magnification as viewed on the computer monitor.

   Any reticle installed in eyepiece will be visible only when viewing through microscope, and will not be visible on computer or video monitor.

6. Place object to be viewed on center of stage surface.

7. Turn the focusing knobs until object being viewed is in focus.

8. Looking through right side of microscope with right eye, adjust image sharpness by turning the focusing knobs.

9. Looking through left side of microscope with left eye, turn diopter adjustment collar located on left eyepiece until left image is sharp. Note the scale on the diopter collar and its position in relationship to the index mark on the eyepiece tube.

   You have now adjusted the microscope for your personal vision. When viewing other objects of various sizes, you should not have to make further adjustment of the diopter, and will need only to adjust the focus knobs. If other users change the diopter setting for their vision, you need only to return the diopter scale to your setting in order for it to once again be adjusted for your vision.

10. For optimum sharpness of image in the entire field of view, it is important to position your eyes at the correct point above the eyepieces. Looking through both eyepieces, slowly move your eyes towards eyepieces to a level where clarity of the entire field of view is achieved. After a brief period of viewing, you will easily find the best point for your vision.

MAINTENANCE

WARNING: For your own safety, turn switch off and remove plug from power source before maintaining your microscope. If the power cord is worn, cut or damaged in any way, have it replaced immediately to avoid shock or fire hazard.

1. OPTICAL MAINTENANCE

   A. Do not attempt to disassemble any lens components. Consult a microscope service technician when any repairs not covered by instructions are needed.

   B. Prior to cleaning any lens surface, brush dust or lint off lens surface using a camel hair brush. You can also use an ear syringe or canned compressed air, such as that sold by most computer stores.

   C. To clean eyepiece lenses, do not remove from eyepiece tube. Clean only the outer lens surface. Breathe on lens to dampen surface, then wipe with lens paper or tissue or use a cotton swab moistened with distilled water. Wipe lenses with a circular motion, applying as little pressure as possible. Avoid wiping dry lens surface as lenses are scratched easily. If excessive dirt or grease gets on lens surfaces, a small amount of distilled water or Windex can be used on a cotton swab or lens tissue. To clean objective lenses, do not remove objectives from microscope. Clean front lens element only, following same procedure.

2. MECHANICAL MAINTENANCE

   The only mechanical adjustment you might ever require is the tension of the focusing mechanism. This has been adjusted at the factory, but over the course of time it may loosen and cause the head of the microscope to slip downward on the focusing block.

   To adjust, observe that stem of focus knob on one side of microscope has a tension adjustment collar with four small holes. Only one of these holes contains a small set screw. Using a small jewelers screwdriver, loosen this setscrew. Turn collar clockwise to tighten tension, counter-clockwise to loosen tension. Use of a large rubber band placed around the collar will permit you to grip the collar and turn it by hand in order to accomplish the adjustment. After adjusting, tighten the small setscrew to lock collar in place.

   NOTE: It is recommended that you leave the tension as loose as possible for ease of focusing, yet not so loose that it permits the head of microscope to drift downward from its own weight and cause the microscope to “drift” out of focus.

3. ELECTRICAL MAINTENANCE

   The extent of electrical maintenance, by other than a qualified technician, should be bulb replacement. BE CERTAIN TO TURN SWITCHES OFF AND REMOVE PLUG FROM POWER SOURCE OUTLET BEFORE CHANGING BULBS. After unplugging microscope, ALLOW SUFFICIENT TIME FOR LAMP HOUSING TO COOL COMPLETELY.

   A. To replace top lamp:

      The top lamp requires a 12 volt 10 watt halogen bulb, a common microscope bulb available from your dealer (National part #800-423)

      For easy access to the lamp housing, gently lay microscope on its side. Remove black lamp housing by rotating in a counter-clockwise direction. Using a tissue or cloth, gently grasp the halogen bulb and pull straight out from lamp socket.

      Make certain that new bulb is clean, as any oil or other contaminants can affect light transmission and shorten bulb life. Holding bulb with tissue or cloth, insert pins straight into lamp socket. Install black lamp housing by rotating in a clockwise direction.

   B. To replace bottom lamp:

      The bottom lamp requires a 12 volt 10 watt tubular type bulb available from your dealer (National part #800-400)

      Loosen setscrew at side of base in order to remove stage plate. This will expose bottom bulb. With tissue or cloth, gently grasp tubular bulb and pull from clips holding it in place. Make certain that new bulb is clean. Holding bulb with tissue or cloth, gently press into clips. Reinstall stage plate and tighten locking setscrew at side of base.

TROUBLESHOOTING

PROBLEM	REASON FOR PROBLEM	SOLUTION
A light fails to operate.	Outlet inoperative.	Have qualified service technician repair outlet.
	Main power switch not turned ON	Push main power switch to ON position
	AC power cord not connected.	Plug into outlet.
Incidental (top light) fails to operate	DC power input not connected.	Plug into adapter and microscope
	Incidental switch in OFF position.	Push incidental switch to ON.
	Lamp burned out.	Replace lamp.
Transmitted (bottom light) fails to operate	Transmitted switch in OFF position.	Push incidental switch to ON position.
	Lamp burned out.	Replace lamp.
No image	Objective turret improperly positioned.	Rotate objective turret until it clicks into position
Image does not remain in focus	Head of microscope drops from its own weight.	Adjust tension control collar
Poor resolution (Image not sharp)	Lens cover dirty	Clean glass surface of lens cover
Spots in field of view.	Eyepiece lens dirty.	Clean eyepiece lenses. ***
***Spots in field of view can also result from dirt on inside of eyepiece. It is recommended that you have service technician clean inside of lens.		

OPTIONAL ACCESSORIES AND PARTS:

#615-400	WF15X Eyepieces (pair) increases magnification 50% (when viewing through microscope only. Does not affect image magnification on computer monitor)
#800-423	12v 10w halogen, replacement bulb (top illuminator)
#800-400	12v 10w tungsten, replacement bulb (bottom illuminator)
#940-410	Frosted glass stage plate, 80mm
#941-460W	White plastic plate, 80mm
#965-400-05	Eyepiece reticle, 5mm/100 divisions, O.D. 22.9 mm for WF 10x eyepiece
#965-400-10	Eyepiece reticle, 10mm/100 divisions, O.D. 22.9 mm for WF 10x eyepiece
	Note: Any reticle installed in the 10x eyepiece will be visible only when viewing through microscope, and will not be visible on computer or video monitor

LIMITED LIFETIME WARRANTY

Please see our website, www.nationaloptical.com for complete warranty details and exclusions.

(Revised 5/9/13)