# STEINDORFF®

### **Digital LCD Polarizing Microscope**

### NYMCS-1500 Instruction Manual

- Thanks for purchasing this digital LCD polarizing microscope. This user's manual is for item number NYMCS-1500. In order to operate the microscope properly and safely, and to know all the features which will help prolong the microscopes' service life, please read this manual thoroughly before using the microscope. Please keep this manual near the microscope for regular reference.
- 2. We suggest that before snapping important images, please make a few trial snaps, making sure you can operate the microscope properly.
- 3. LCD screen was made by precision technology, 99.99% of its pixels are up to specifications. 0.01% of the pixels may have problems, or become black, red or green dots. It will not affect the image's video quality, and it is not a performance defect.

### **Exemption Declaration**

- We tried our best to insure this manual's content correct and complete, but do not guarantee there is any mistake or omission. We reserve the rights to modify any of our products software or hardware without further notification.
- We are not responsible for any products defect caused by mishandling or by not using the original storage card.

### NEW YORK MICROSCOPE COMPANY INC. AKA MEL SOBEL MICROSCOPES



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### **USER NOTICES**

NYMCS-1500 transmitted & reflected digital LCD polarizing microscope utilizes polarizing light to observe and research the matter which have double refraction features, the user can make single polarizing observation, orthogonal observation, conoscope observation. It has renovated the traditional way of microscopic observation and adopted a modern way of electronic imaging. Our LCD Digital Microscope can be use both traditional eyepieces and an LCD Screen for easy and comfortable viewing for yourself and to share with others. This patented microscope makes the observation more comfortable and thoroughly resolves the fatigue caused by using a traditional microscope at work for a long time.

### **I. SAFETY NOTE**

- 1. Carefully open the box, avoid the accessories, like lens, dropping to ground and being damaged.
- 2. Do keep the instrument out of direct sunlight, high temperature or humidity, dusty and easy shaking environment. Make sure the table is smooth, horizontal and firm enough.
- 3. When moving the instrument, please use two hands to grip with the two sides of the microscope body.
- 4. If the bacterium solution or the water splash to the stage, objective or viewing tube, pull out the power cord at once, and wipe up the microscope. Otherwise, the instrument will be damaged. When running, the lamp house and nearby parts will be very hot. Please ensure there is enough cooling room for them.
- 5. Make sure the instrument is earthed, to avoid lighting strike.
- 6. For safety, be sure the main switch is in "O" (off) state before replace the halogen lamp or the fuse, then cut off the power, and do the operation after the lamp bulb and the lamp house completely cool.
- Check the input voltage: be sure the input voltage which signed in the back of the microscope is consistent with the power supply voltage, or it will bring a serious damage to the instrument. (Note; Use the factory supplied power cord 12v for binocular LCD display please.)
- 8. The mechanical stage may be distortion and damage when overweight object is placed on it.

### **1. NAME OF COMPONENTS**



- 1. Filter Wheel
- 2. Aperture Diaphragm Adjustment Knob
- 3. Push Rod To Direct Image to Binocular Eyepieces
- 4. Eyepiece
- 5. Compensator
- 6. Slide Holder
- 7. Condenser with Aperture Diaphragm
- 8. Polarizer
- 9. Collector

- 10. Power Switch
- 11. Transmitted / Reflection Illumination Toggle Switch
- 12. Fine Focus Control Knob
- 13. Coarse Focus Control
- 14. Focus Tension Adjustment Knob
- 15. Sub-stage Adjustment
- 16. Stage Centering Screw
- 17. Push Rod To Transmitted or Reflected
- 18. Adjustment Knob

### 2. TECHNICAL SPECIFICATIONS

Viewing head	9 Inches HD LCD Screen, 5 Mega Pixel built-in camera
Objectives	Strain-free plan achromatic objectives (no cover glass) 5x (0.12 N.A., 26.1 mm W.D.) 10x (0.25 N.A., 5 mm W.D.) 20x (0.40 N.A., 8.8 mm W.D.) 40x Spring Loaded (0.60 N.A., 3.98 mm W.D.)
Nosepiece	Quadruple/Quintuple nosepiece ball-bearing reversed nosepiece with positive click stops and smooth operation.
Eyepieces	10X Wide field eyepiece and 10X plan division eyepiece (0.10mm/div), Focal Length 25mm, Field $\Phi$ 18mm.
Stage	Circular rotating stage, Diameter $\Phi$ 150mm, 360° graduated in 1° increments, minimum retardation resolution 6' center adjustable and locking clamp for stage rotation.
Condenser	Strain-free Abbe condenser N.A. 1.25 with polarizer and iris diaphragm, polarizer graduated every 45° and marked 0, 90, 180 and 270.
Polarizing intermediate attachment	Impellent style analyzer, 360° rotatable with scale and minimum vernier, Built-in bertrand lens. 1 and 1/4 wave length retardation plate and quarts wedge compensator are provided.
Illumination	Wide voltage range power supply (85-265V 47-60HZ), 6V/30W halogen lamp, brightness adjustable

### **3. SETUP INSTRUCTIONS**

- 1. Remove all parts from their packing materials and retain the packaging in case you need to transport the product.
- 2. Connect the power cord to a suitable power supply.

### **3.1 Basic Operation**

### 1. Illumination controls, see figure 3

- 1.1. The power switch and transmitted / reflection illumination toggle switch are located on the base. The brightness control is located on the chassis. The electrical system is fuse protected and the fuse holder located on the power Inlet.
- 1.2. Press the power switch on the side of "I", which means the circuits is got through. If the light does not appear to be ON, check the brightness control to see if it's on a sufficiently low setting. Then adjust the brightness control until image can be observed comfortably.
- 1.3. Note: Using the light at brightest setting will reduce life span of bulb.



- 1. Transmitted / Reflection Illumination Toggle Switch.
- 2. Power Switch.
- 3. Brightness Control.
- 4. Up Stop Knob.
- 5. Focus Tension Adjustment.
- 6. Coarse Focus Knob
- 7. Fine Focus Control Knob

### 2. Focusing Controls, see figure 3

- 2.1. **Focusing adjustment:** Is accomplished by using the large coarse adjustment knobs located comfortably on each side of the frame. Fine adjustment is accomplished using the smaller knobs located on the same focus shaft. This coaxial arrangement allows for easy, precise adjustment without drift or discomfort.
- 2.2. Focus Control: Turning either of the coarse focus control knobs will raise or lower the stage. The smallest graduation on the fine adjust knob index scale is 2µm of vertical.
- 2.3. Focus Tension Adjustment: The tension of the coarse focus is adjustable and preset at the factory for ease of use. If you wish to adjust the coarse focus tension, first locate the tension adjustment ring. Turning the ring toward the front of the microscope increases the tension, and toward the rear of the microscope loosens it. Tension is too high if you experience physical discomfort.
- 2.4. **Pre-focusing or Focus Stop Control:** Use of this feature will insure that the short working distance objectives don't contact the stage or slide glass when using the microscope. Its use also simplifies focusing. After focusing on the slide glass with the coarse adjustment, rotation of the lever toward the rear of the microscope will set an upper limit on the coarse adjustment movement. After changing slide glass or objectives, focusing is easily accomplished by rotating the coarse adjustment knob to reach the pre-focused position, then making fine adjustments with the fine adjustment knob. Focusing movement with the fine adjustment isn't affected by using the pre-focusing lever.

### 3. Diopter and Interpupillary Adjustments

- 3.1. Diopter Adjustment Proper correction for individual vision is accomplished via the diopter adjustment located at the left eyepiece. Using the 10X objective, bring an image into focus with your right eye only. Once the image is well focused, observe with left eye, make fine adjustments with the diopter adjustment ring to correct for your vision.
- 3.2. Proper interpupillary distance, or the distance between eyepieces, is crucial to the comfort of the user. Adjusting the interpupillary distance is accomplished through a "folding" action of the optical head, at Figure 4, allowing for quick and easy adjustment.





Figure 4

### 4. Rotatable Stage Controls, see Figure 5

- 4.1. Put a specimen on the stage, observe it using dividing eyepiece and 10X objective.
- 4.2. Search one target in field of view, adjust it to the center of view. See Figure 6 A.
- 4.3. Rotate the stage. If the stage out of center, the target will encircle the center of circle. See Figure 6 B.
- 4.4. To center the center of circle in the field of view. Use the two centering screws, the stage centering adjustment can be finished. See Figure 6 C.
- 4.5. If other objectives out of center, you may adjust it using the objective centering screws.
- 4.6. Tightening the stage setting screw can fix the rotatable stage.

### 5. Condenser Alignment Controls.

- 5.1. Condenser Components: The condenser is located below the stage, see Figure 7. Abbe condenser; its mounting ring with lock screw and two large centering screws at either side. The adjustment knob for raising and lowering the condenser.
- 5.2. Condenser Alignment to center the abbe condenser in the optical light path. See Figure 8.
  - a. Turn the 10X objective to optics path, close iris diaphragm and lower the Abbe condenser until observe the image of iris diaphragm.
  - b. If the Abbe condenser optics axis offset optics system axis, the image of iris diaphragm is similar to figure 8A. The image may be out of focus and out of center.
  - c. Adjust the sub-stage adjustment knob until the side of image is clear. Adjust the Abbe condenser centering screw until the iris diaphragm locate in the center of field of view, see figure 8 B.
  - d. Open the iris diaphragm until the image is almost as large as the field of view, see figure 8 C. Raise Abbe condenser again for normal observe.



1. Stage Centering Screw

- **Objective Centering Screw** 2.
- 10X Objective 3.
- Stage Set Screw 4.



Figure 6

- Center of Circle 1. Target 3.
- 2. Center of View 4. Circle



Figure 7

- 1. Sub-stage Adjustment Knob
- 2. Polarizer
- 3. Auxiliary Lens
- 4. Condenser Set Screw
- 5. Condenser Centering Screw
- 6. Collector
- 7. Filter Seat
- 8. Aperture Adjustment Lever

- 5.3. You may put filter on the filter seat to enhance performance.
- 5.4. You may push the auxiliary lens and adjust the aperture diaphragm when use other objective.

### 6. Polarization observation, see Figure 9

- 6.1. The polarizing observation function selected by pushing the analyzer and screwing the polarizer to light path (Figure 7). Rotate both of them to "0" may let the polarizer and analyzer orthogonally namely polarizer with E-W direction of passage, analyzer with N-S direction of passage.
- 6.2. To make path differences, you may push the  $\lambda$  compensator,  $\lambda/4$  compensator or quarts wedge compensator to light path.
- 6.3. The push rod to the upper left of the trinocular head will send 100% of the image light to the binocular eyepieces or to the top port. It satisfy high-grape photography.
  NOTE: If the condenser adjusted, you will adjust the polarizer again, see the Figure 7. Set the analyzer to light path and rotate to "0". Rotate the polarizer to "0". Loosen the condenser set screw, rotate the condenser mark the field very dark. Then lock the screw again.

### 7. Conoscopic observation, see Figure 9

The conoscopic observation function selected by pushing the bertrand lens. Observe the interference pattern using eyepiece and 10X objective.



В

Figure 8

C

A

Figure 9

- Push Rod To Direct Image to Binocular Eyepieces
- 2. Analyzer Adjustment Tray
- 3. Bertrand Lens Unit
- 4. Compensator
- 5. Analyzer

### 8. Vertical Illumination Alignment



- 1. Field Diaphragm Adjustment Knob
- 2. Aperture Diaphragm Adjustment Knob
- 3. Filter Wheel
- 4. Condenser Adjustment Knob

- 5. Lamp Vertical Adjustment Knob
- 6. Lamp Transverse Adjustment Knob
- 7. Field Diaphragm Centering Screw
- 8. Polarizer
- 1. The aperture diaphragm near the lamp house may be adjusted slightly to change contrast.
- 2. To center the incident or vertical lamp:
  - a) Put a piece of paper and place it on the stage. Take out one objective form nosepiece and rotate the nosepiece until this objective opening hole is in position over the paper.
  - b) Turn the power on and adjust the brightness control to establish sufficient light.
  - c) This paper will allow for focusing of the lamp filament on it. If the filament image is not centered in the overpass hole, reduce the aperture



Overpass Hole

Figure 10

diaphragm, adjust the lamp transverse adjustment knob and vertical adjustment knob obtain a uniform image. Adjust the condenser adjustment knob until a sharp image of the lamp filament is attained. Refer to figure 10 for this step.

- 3. Reinstall the objective again.
- 4. Adjust the focusing control until the image clear. If brightness of field not equality, you may adjust the lamp vertical adjustment knob and condenser adjustment knob slightly to make the brightness of field equality.
- 5. Reduce the field diaphragm, If it is not centered, move it to the center using the tool. Adjustment can be done by opening the field diaphragm.
- 6. The filter seat contains a green, yellow, blue filter and ground glass, you may turn anyone to the light path to obtain an image of good quality.

### 3.2 Changing the Light Bulb and the Fuse

### 1. Changing the lamp of the vertical illuminator. See figure.

- a) Disconnect the power plug and wait to be sure the lamp is cool. Loosen the set screw, remove the lamp house from the body.
- b) Pull the old lamp straight out of the socket. Insert the new one into the same fixture. When installing the new lamp, be careful not to touch the glass with your fingers. The new lamp should be supplied in a plastic protective envelope. If not, use a tissue or other medium to grasp the lamp. This will prevent contamination from your hand from reducing the lamp's intensity and life. Reinsert the lamp house into the body and retighten the screw. If necessary, you may need to adjust the light bulb transverse and vertical adjustment to center the lamp.



- 1. Lamp Socket
- 2. Lamp

### 2. Changing the lamp of the transmitted illuminator.

- a) Disconnect the power plug and wait to be sure the lamp is cool. Open the lamp door using the lamp door retaining screw as shown in figure.
- b) Pull the old lamp straight out of the socket. Insert the new one into the same fixture. When installing the new lamp, be careful not to touch the glass with your fingers. The new lamp should be supplied in a plastic protective envelope. If not, use a tissue or other medium to grasp the lamp. This will prevent contamination from your hand from reducing the lamp's intensity and life. Reinsert the lamp socket into the lamp house and retighten the screw. If necessary, you may need to adjust the lamp centering screw to center the lamp.

### 3. Changing the fuse

Disconnect the power plug, take out the fuse holder. Change the fuse. Install holder again.



- 1. Lamp Socket
- 2. Bulb
- 3. Lamp Centering Screw
- 4. Lamp Door Retaining



- 1. Power Plug
- 2. Fuse Holder

### **3.3 Digital LCD Part Operation**



### 1. Operation buttons and functions

0k Crosshair & Coordinate 1. Confirm Button 6. 2. Color: White, Black, Red, Purple, Green Snapshot & Video Playback View 7. Direction key *i*odi 3. Start Videos 8. VIENI **Snapshot Pictures** Menu: Setting & Exit 9. 4. DISF Display button: Only display image and 5. remove kinds of characters, symbols

### 2. Power on

- A. Before power on, please take out the SD card from the card reader firstly. Insert SD card into SD slot in the right of the microscope head completely until it is locked. Push softly the inserted SD card, it will eject out, then take it out. (When the card is under reading or writing, do not pull it out. Better power off first before pulling out the SD card).
- B. Connect the DC plug of the power adapter to the "DC" jack on the microscope. Press the power switch O on microscope base, "WELCOME" should appear on the LCD screen. After 3 seconds, the microscope system will be in the preview in the real time automatically when you can snap.
- C. Adjust microscope's definition: according to its imaging focal length, make images sharp from LCD display screen, and then the adjustment is done.

### 3. Introduction of display on the LCD screen

Icons of upper left corner of Fig.23 and Fig.24 (

indicate snap (photo) mode and video mode.

### On the snap mode:

Shown on the below left corner is the number of photos that can be taken or the video recording time.

("766" means in the current setup mode, it still can shoot 766pcs photos). Fig. 23.



Figure 23

("00 : 00 : 00" means in current setup mode it still can record 00min 00sec) Fig.24.

When you insert SD card, the below right corner will show this mark \_\_\_\_\_.



Figure 24

### 4. Function menu control

With the help of the button, it is able to carry out the setting of the whole system. The direction key allows you to choose the following functions:

- A. Resolution
- B. Camera function setting
- C. Display setting

On the snap model, press menu button to enter menu interface. Use direction key to select a setting from the above 3 items.





1. Photo Resolution



Figure 26

### Select photo resolution

On snap model, press **MENU** button as shown the "Resolution:12M"(12M means the pixels has selected now), then press the **OK** (key to select the pixels for photo taken base on 2M/3M/5M/12M use by up & down keys (**Fig.26**). Press **OK** button to save your selection, the model comes back to **Fig.25**, then you press **MENU** button again, the model comes back to snap model.

### 2. Video Resolution



Figure 27

Figure 28

### Select video resolution

On video model, press **MENU** button as shown the "Resolution: 1080P30" (1080P30 means the pixels has selected now), then press the **OK** key to select the pixels for video taken base on 1080P30/1080P30-2/720P30/ WVGAP60/WVGA P30 use by up & down keys (**Fig.28**). Press **OK** button to save your selection, the model comes back to **Fig.27**, then you press **MENU** button again, the model comes back to video model.

### 3. Camera function setting



Figure 28

Figure 30

Figure 31

### Camera function setting: Setting up each item.

On snap model, press MENU button as show the "Resolution", then press the left & right key to enter the "Camera Function Setting" (Fig29). Then press up & down key to select as Scene/ WB/ DE/ Contrast/ Sharpness/ AE Meter/ AE ISO/ AE Bias. (Fig.29 & 30). For example: Fig.29 you can press the OK key to enter the Scene setting and choose by up & down keys (Fig.31). Press OK button again to save your selection or exit by MENU button. Once confirmed, the model comes back to Fig29, press MENU again, you can come back to snap model. Operation is the same on video model.



### Display Setting: Setting up each item.

On snap model, press MENU button as show the "Resolution", then press the left & right key to enter the "Display Setting" (Fig 33). Then press up & down key to select as Date/Time, Display, Format, Default settings, Auto power off, Language, Beep, USB, Version. (Fig. 33 & 34). For example: Fig. 33 You can press the OK key to enter the Date/Time setting and change by direction keys (Fig. 34). Press OK button again to save your selection or exit by MENU button. Once confirmed, the model comes back to Fig 32, press MENU again, you can come back to snap model. On video model, the operation is same.

### 5. Camera function setting details

### A. Scene

Scene	
Scene : Auto	
Scene : Sports	
Scene : Rough	
Scene : Reflector	
OK SET	MENUEXIT

You can choose different Scene by **MENU** button according to the objects observed so that help you to get perfect performance.

B. WB (White Balance)

₩	
WB : Auto	
WB : LED	
WB : D4000	
WB : D5000	
WB : Incandescent	
OK SET	MENU

WB will help you to obtain superb color when observing.

C. DE (Color effects)

@ DE	
DE : Off	
DE : Art	
DE : Sepia	
DE : Negative	
DE : Black / White	
OK SET	MENU EXIT

D. Sharpness

Sharpness	
Sharpness : Standard Sharpness : Hard Sharpness : Soft	
OK	<b>EXIT</b> EXIT

### E. AE Meter

O AE Meter	
AE Meter : Center AE Meter : Average AE Meter : Spot	
OK SET	MENU EXIT

F. AE ISO

AE ISO : Auto
AE ISO : 100
AE ISO : 200
AE ISO : 400
OK SET

G. AE Bias

AE ISO	⊲ <b>0.0EV</b> ⊳
OK SET	

### 6. Display setting details

A. Date/Time

Date/Time			
Year	4	2011	$\triangleright$
Month	$\triangleleft$	08	$\triangleright$
Day	$\triangleleft$	10	$\triangleright$
Hour	$\triangleleft$	12 AM	$\triangleright$
Minute	$\triangleleft$	09	$\triangleright$

You can use left and right keys of direction button to change the time. After fixed, you can save the time.

B. Display



Date and time information can be stored together with photo taken in SD card. File names also contain date and time information. Before using this camera, please set the date and time properly. You can choose what display you want. If you want to display "Date", you can choose the second option.

### C. Format



Select "Yes" can format all the SD card inserted; (Attention: Even the protected content will be deleted when formatting, cannot be resumed again.) Select "No" and press menu button, the model comes back to the snap mode.

D. Reset system settings to default values?



E. Auto power off

$\square$	Auto power off	
Auto po	ower off : Off	
Auto po	ower off : 30 min	
Auto po	ower off : 60 min	
Auto power off : 90 min		

### F. Language

(ABC) Lan	
Lan : English 사교환 : 사호 Langue: Français Language: Latin Idioma: Español Sprache: Deutsch 3blk : pycckNN 3PLK 言語: 日本語 언어 : 한국	
OK SET	MENU

We developed 9 languages according to your demand.

G. Beep

Beep	
Beep : Off Beep : On	
OK SET	MENU EXIT

H. USB Selection

Ditation USB Selection	
USB : Mass storage	
USB : USB camera	
OK SET	KENI EXIT

### 7. Snapshot & Record

- A. **Snapshot**: When you turn on the microscope, press button to snapshot pictures and meantime icon in upper left of LCD screen will show. The pictures automatically stored in SD card. When the card is full, the LCD screen will show "Card full".
- B. **Record**: When you turn on the microscope, you can press button to record. When the card is full, the LCD screen will show "Card full"
- C. **Playback**: Press 🕑 button to select playback model.

Press up & down keys to browse every photo and video which is taken and stored in the SD card. Press left key, the screen will display multi photos and videos. Index display helps to find target photo or video quickly in many pictures and videos.

### 4. MAINTENANCE

### 1. Sweep the lens

Sweep the lens by lens tissue or soft fabric immersed with mixed liquid of alcohol/ether or diethyl benzene. Cleaning the oil on the 100X objective whenever finish operating.

### 2. Clean the painted parts

The dust on the painted parts can be removed by gauze, for the grease spots, the gauze immersed slightly with aviation gasoline is recommended. Do not use organic solvents such as alcohol, ether or other thinner etc., for cleaning the pointed parts or plastic components.

### 3. Avoid disassembling the microscope

Being a precise instrument, do not disassemble the microscope casually that may cause serious damage to its performance.

### 4. Being not used

Cover the microscope with dust cover and put the microscope at places where there is dry and modules. Suggest that storage all objectives and eyepieces in closed container with drying agent.

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