STEINDORFF®

Digital LCD Inverted Phase Contrast Microscope

NYMCS-1290

Operation Manual

This manual is written for Inverted Biological Microscope NYMC1290. For safety and for exerting the best performance, making you familiar with the instrument entirely, it is strongly recommended that you read this manual carefully before using the microscope.

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USER NOTICE

I. Safety Note

Figure 1

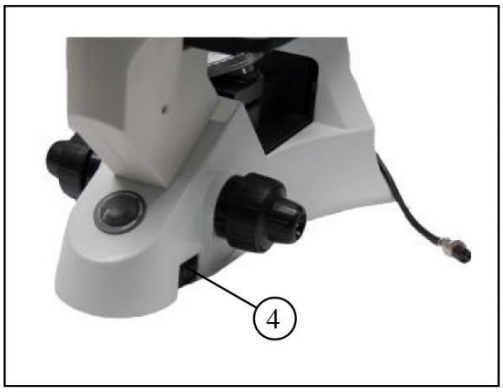

Figure 2

1. Do not keep the instrument in a direct sunlight, high temperature or humidity, dusty and easy shaking environment. Make sure the stage is plane, horizontal and stable enough.
2. When moving the microscope, please hold up the instrument with one hand on the lower side of the eyepiece tube ①, and the other hand on the illumination bracket ②. (Figure 1)
3. 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.
4. When working, the lamp house on the top of the arm ③ (Figure 1) will become very hot, be sure there have enough room around the lamp house (especially the top) for cool.
5. Before replacing the lamp bulb or fuse, turn the main switch on the "O" (off) position, then cut off the power. If the lamp is on, or soon after it has been turned off, it is hot and will cause serious burns, please do the replacement after it cool down completely.
   - ❖ **Specified: the halogen lamp 6V30W**
6. Earth this instrument to prevent the lightning strike.
7. Use the supplied power cord, please.

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II. Maintenance

1. Use the gauze to wipe the glass parts gently .If removing the fingerprints and oil stains , slightly dampen gauze with the xylene or the admixture liquid which comparison is 3:7 of the ethanol and the ether to wipe.
    - ❖ **Note: The ethanol and the ether are all very combustible, do not put these chemicals near fire or the possible electricity spark source such as the electronics equipment open and close operation. Use these chemicals in a well-ventilated room as far as possible.**
2. Don't use organic solvent to wipe the non-optical elements, If you need to clean, use the neutral detergent.
3. When using, if the microscope is splashed by liquid, cut off the power at once, and wipe up the moisture.
4. Do not disassemble any parts of the microscope. That will affect the function or decline the performance of the microscope.
5. If the objectives are not mounted, please cover with dust cap to prevent dust and splashed liquid of the tissue culture from entering the inside.
6. When not in use, remember to cover up the microscope with the dust casing. And make sure the lamp cools down enough before you do so.

III. Safety Symbol

Symbol	Meaning
	The surface is very hot, not touch by your hands
	Before using, please read the instruction carefully, improper operation will result in bodily injure or instruction malfunction.
	The main switch on
	The main switch off

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1. COMPONENTS

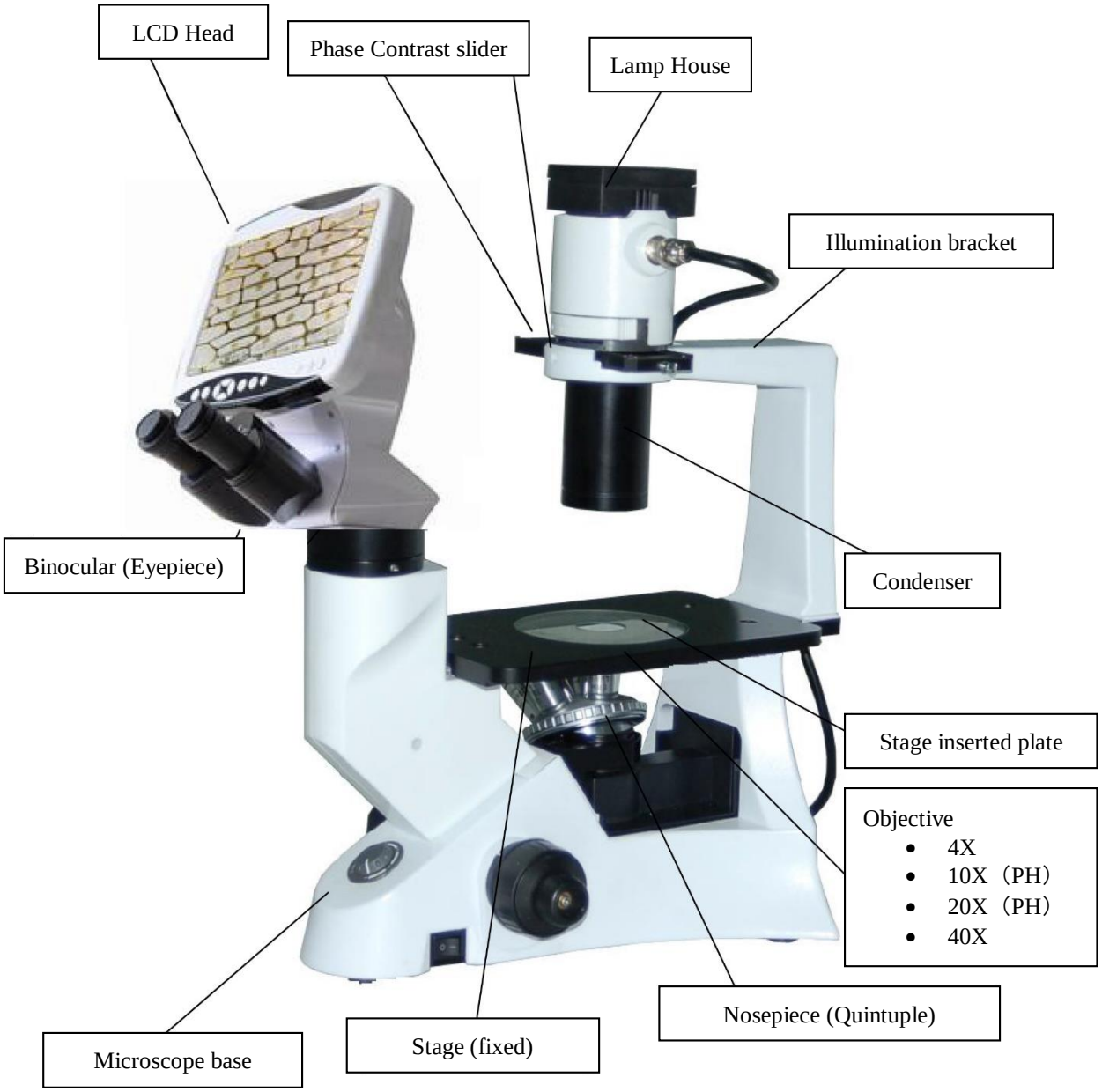

Figure 1

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2. INSTALLATION

2.1. Installing diagram

The following figure shows the installation sequence of the components. The number in the figure shows the installation steps.

- Before installing, be sure every components is clean, do not score any parts or glass surface.
- Keep well with the supplied hexagon wrench. When changing the components, you will need it again.

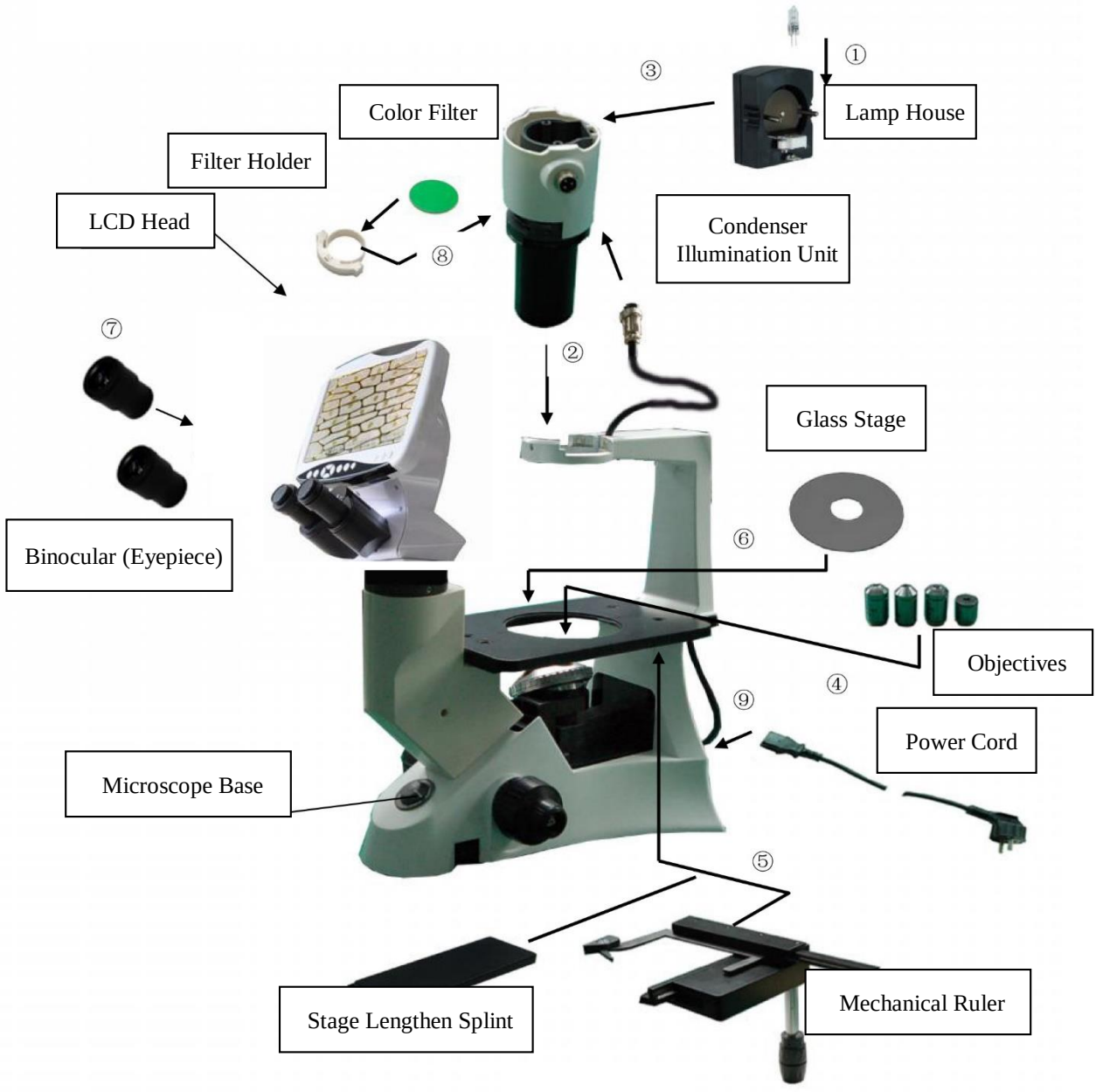

Figure 2

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2.2. Installing steps

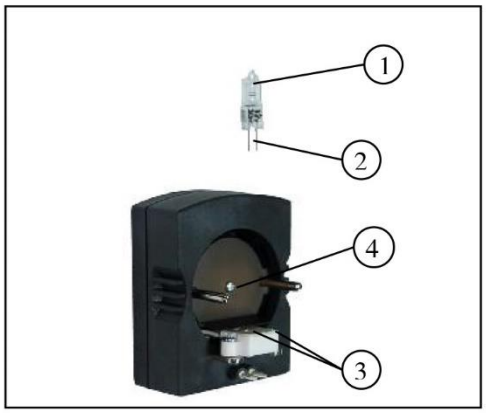

Figure 3

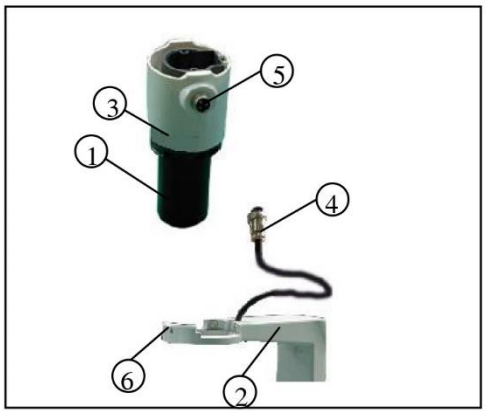

Figure 4

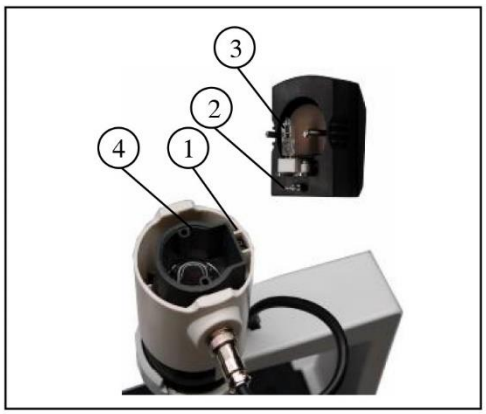

Figure 5

2.2.1. Installing and replacing the lamp (Figure3)

- Please use the specified halogen Lamp 6V 30W.

1. Hold to the bulb ① after you wrap it with gauze or other protection materials, then depress the plugs ② into the jack ③ on the lamp house, ensure the filament and the bolt ④ are in a same level.
2. Replacing the lamp when using or soon after it is turned off, the lamp, the lamp house and nearby parts will be very hot and will cause serious burns. Please turn the main switch on "O" (off), pull up power plug, and make sure the bulb, the lamp house and periphery are all cool. Then, you can do your replacing.

❖ Please insert the lamp gently, or it will be damaged by excessive extrusion.

❖ Do not touch the Halogen bulb with your hands. It will shorten the service life or cause it to burst. If you leave fingerprints on the surface carelessly, clean it with a dry soft cloth.

2.2.2. Installing the condenser illumination unit (Figure 4)

1. Insert the condenser illumination unit ① into the bracket ② gently, according the figure showed in the left.
2. Turn the condenser illumination unit at clockwise about 90°, let the "AS" mark of filter holder ③ facing forwards, and keep the screw of condenser illumination unit and the hole of the holder in line, then screw down the bolt in the hole with the supplied hexagon spanner.
3. Insert aviatic BNC connector plugs ④ into aviatic BNC connector jack ⑤.

2.2.3. Installing the lamp house (figure 5)

Keep the BNC connector plugs ① and the lamp house pin ② in line, and keep the bolt ③ and the condenser jack ④ in line, too. Then push the lamp house into the illumination unit gently until they are against.

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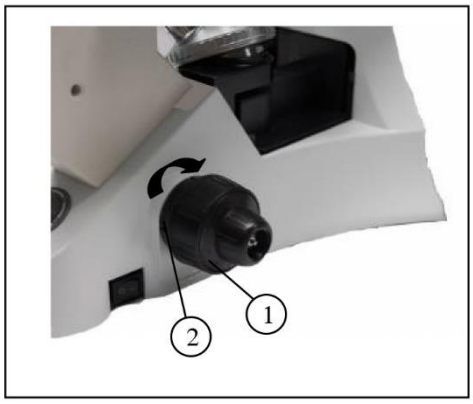

Figure 6

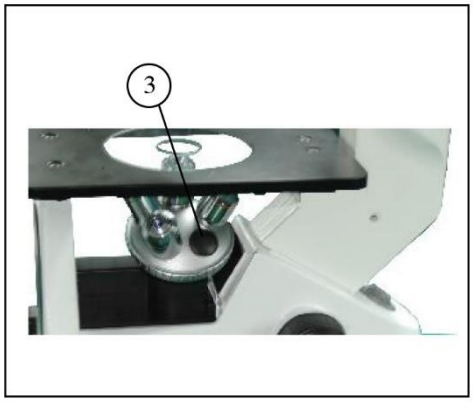

Figure 7

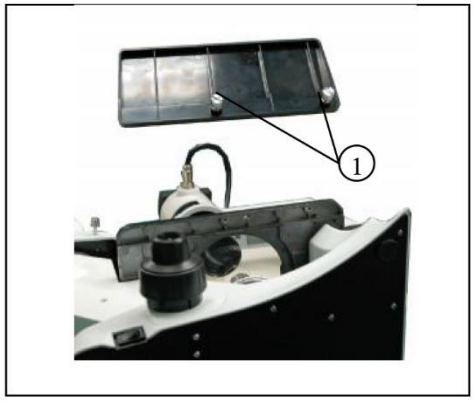

Figure 8

2.2.4. Installing the objective (Figure 6 and Figure 7)

1. Turning the coarse fusing knob ① like the figure shows till the nosepiece get to its lowest position.
   - ❖ **For ensuring the safety of the instruction on transportation, the nosepiece is located in the lowest position and the tension adjustment collar ② is adjusted in an appropriate tight tension while leaving the factory.**
2. Screw the lowest magnification objective on to the turret from the nearside, then turn the turret clockwise, mount other objectives according the magnification sequence of low to high.

❖ Mount objective like this way will make the change of magnification to be very easy in using.

❖ It also can install the objective through the stage opening.

2.2.5. Installing the stage lengthen splint and the mechanical ruler (Figure 8)

- Stage lengthen splint can be installed in either side of the stage to enlarge the work surface. But you can't install the mechanical ruler together.
- Generally, the mechanical ruler will be installed in the right side for comfortable adjustment.

1. **Installing the stage lengthen splint**

   First, Screw the fixed bolt ① on to the splint , then mount it on to the stage from right or left below, screwing down it until it stay hard.
2. **Installing the mechanical ruler**

   Please install the ruler like the way of the stage splint.

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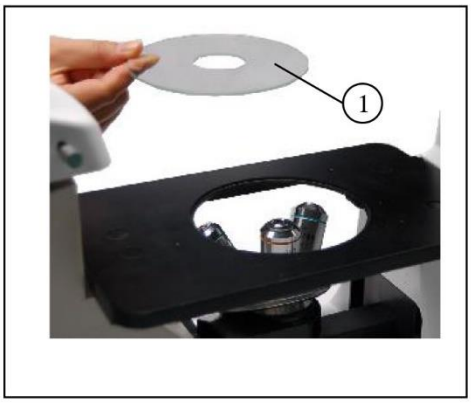

Figure 9

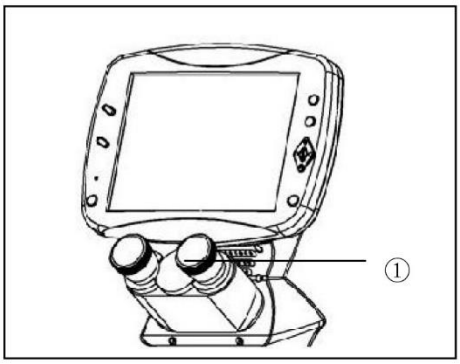

Figure 10

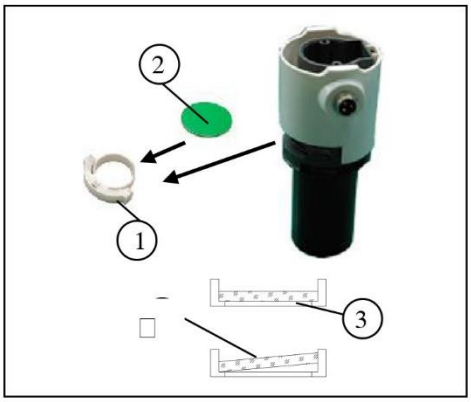

Figure 11

2.2.6. Installing the stage inserted plate (Figure 9)

1. When using the glass stage ①, there is no special requirement, you just need to place it in a plane.
2. Install the stage inserted plate on to the stage opening.

❖ Turn the disk, let the V nick to face user, so the recognition of the objective will become easier.

2.2.7. Installing the eyepiece (Figure 10)

1. Remove the cap of the eyepiece tube ①.
2. Insert the eyepiece into tube until they are against.

2.2.8. Installing the color filters (Figure 11)

❖ Be sure the color filter cools down completely before you change them. Take down the filter holder ①, then install the color filters ② you need.

❖ Mount the color filter downwards like ③ shown, keep it horizontal through the end, not allow inclined.

❖ If the color filter is inclined or not get to the end ④, it will drop possibly.

❖ The color filter could be piled on the holder, so you can install more than one filter according the needs if you can ensure the whole thickness is less than 11mm.

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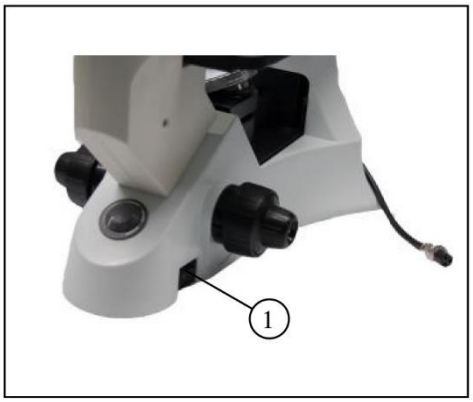

Figure 12

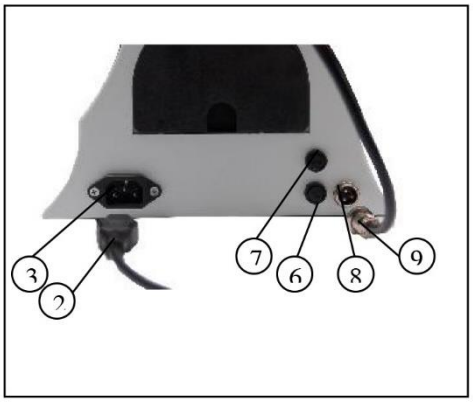

Figure 13

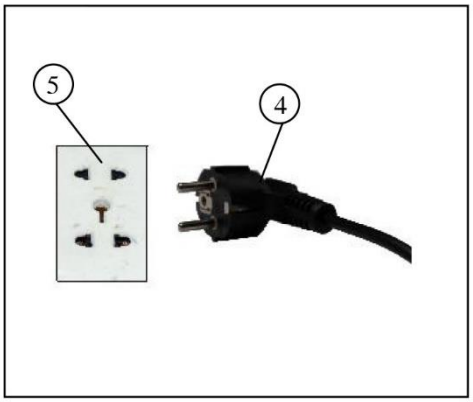

Figure 14

2.2.9. Connecting the power cord (Figure 12, 13 and 14)

- **Do not bring the power cord to bear a powerful stress. When being bent or wrapping, the cable and wires will be broken easily.**

1. Turn the main switch ① on "O" (off) state before connecting the power cord.
2. Insert the plugs ② into the power jack ③ of the microscope safely.
3. Plug the power cord ④ into the power supply receptacle. Make sure the connection is well.
4. Insert aviatic BNC connector plugs ⑨ into aviatic BNC connector jack ⑧.

- **Do use the supplied power cord all the time. If lost or damaged, select the same standard cord.**
- **Connect the power cord correctly, to ensure the instrument is earthing.**

2.2.10. Replacing the fuse (Figure 12and 13)

Do remember to turn the main switch ① on the state of "O" (off) before replacing the fuse, and unplug the power cord. Rotate the fuse ⑥ kits out of the holder ⑦ by the "--" type screwdriver, replace a new fuse, then rotate back to the holder again.

- Fuse rating: 250V, 500mA.

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3. OPERATING THE ADJUSTMENT

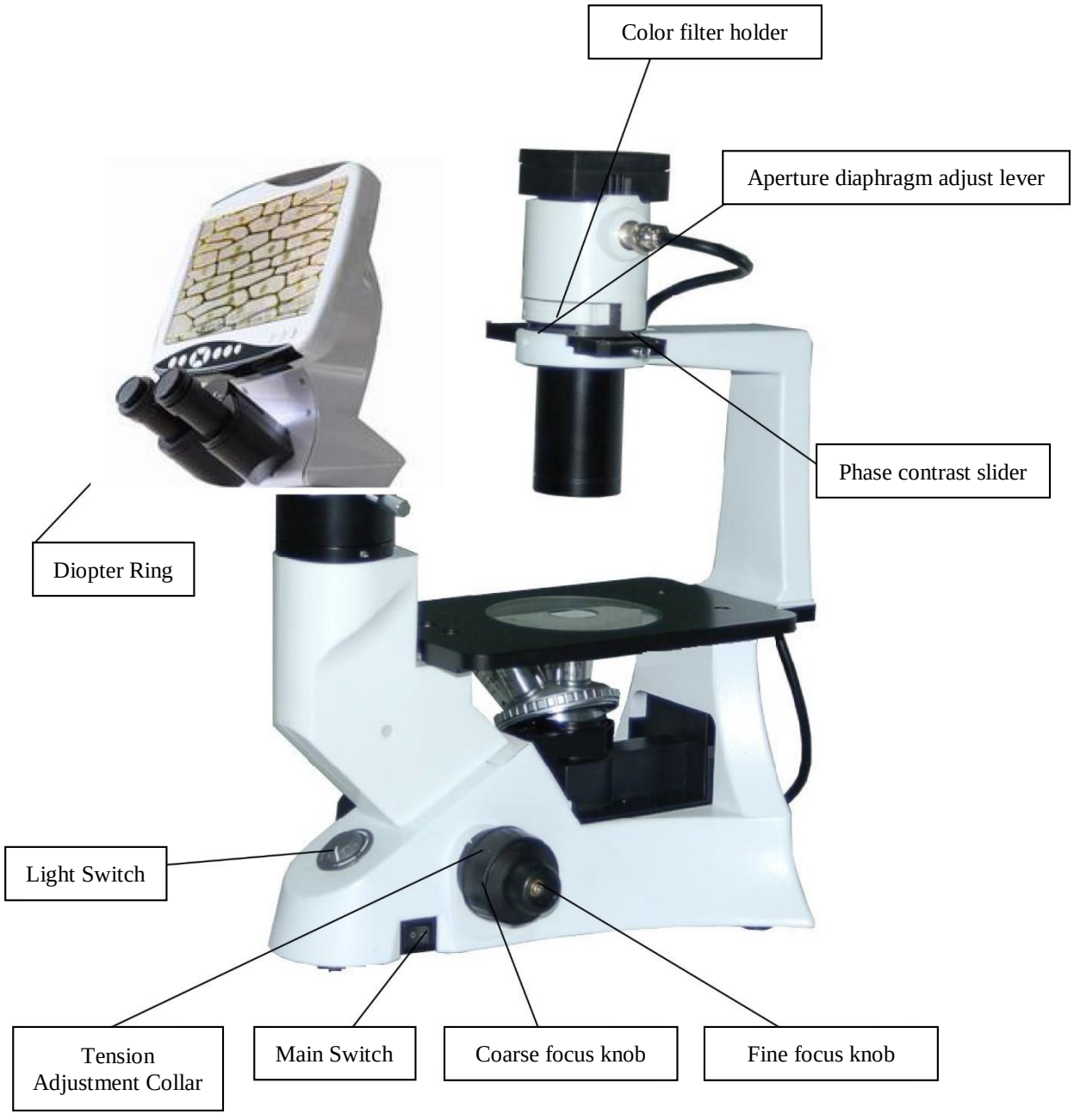

Figure 15

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3.1. Microscope base

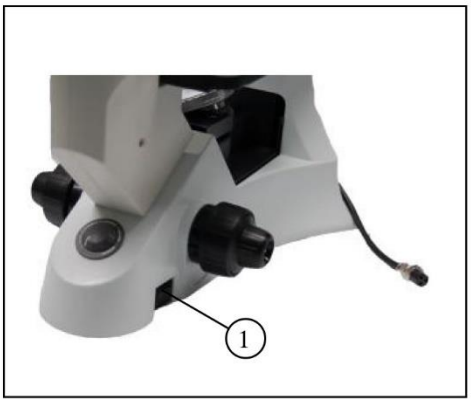

Figure 16

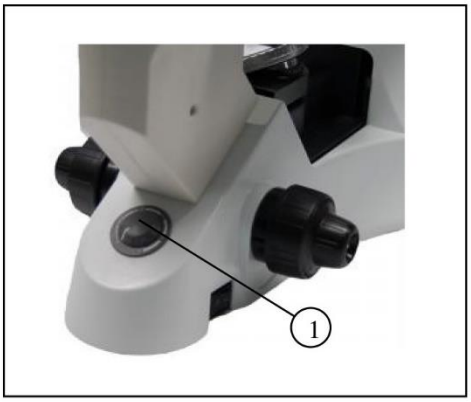

Figure 17

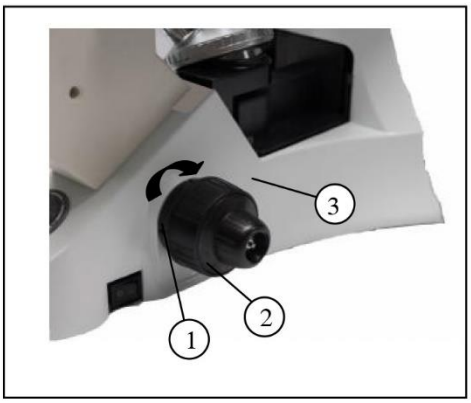

Figure 18

3.1.1. Turning on the lamp (Figure 16)

Connect the power, turn on the main switch ① (shown on figure 16) which on the bottom side of the base to "—" (on).

3.1.2. Adjusting the brightness (Figure 17)

Turning the brightness adjustment knob clockwise, the voltage raise, and the brightness strengthen; whereas turning at the contra direction, the voltage decline, and the brightness weaken.

- Using the lamp in a low voltage condition, will prolong the service life.

3.1.3. Adjusting the Tension Adjustment Collar (Figure 18)

❖ **The tight tension of the coarse focus knob ② had already adjusted before leaving factory.**

- How to adjust the tight tension
  Turning the tension adjustment collar ① while revolving in the direction which shown by the arrowhead on the figure, the tight tension of the coarse focus knob ② is increasing; and if at the contra direction, the tight tension will decline.

If the nosepiece dropped automatically, or the specimen defocused soon even you focus with the fine focus knob ③. It means the coarse focus knob is too loose, you should screw it down at the direction shown by the arrowhead in the figure 18.

3.2. Stage

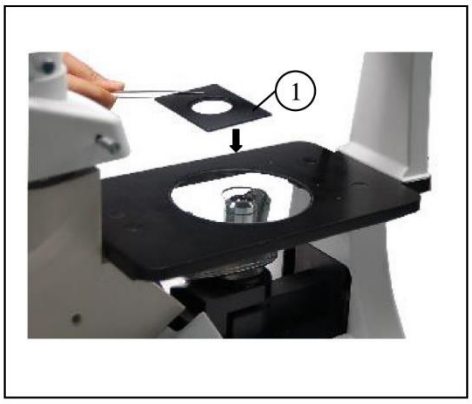

Figure 19

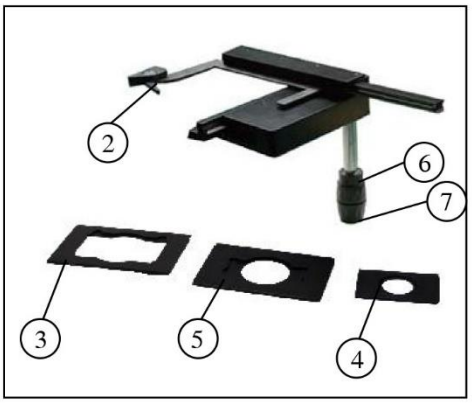

Figure 20

3.2.1. Setting the specimen (Figure 19 and Figure 20)

Set the specimen in the center of the stage.

- **To obtain the best observe effect, please select the containers, such as culture dish and culture bottle, with the bottom thickness is 1.2mm, and the same thickness is also required by the object slide when it is laid the specimen.**

- Using the Φ35mm culture dish:
  You can lay aΦ35mm culture dish on the stage directly by using the standard center board ① of the stage
- Using the mechanical ruler:
  1. When using the 96 bit or 24 bit micro-titration board, please fasten it tightly by the stage clips ②.
  2. When fastening other model boards, please use the following supplied brackets with mechanical ruler:
     - Teraski bracket ③ for Teraski board
     - Culture dish bracket ④ for Φ35mm culture dish
     - Object slide bracket ⑤ for object slide and Φ54mm culture dish
  3. Turning the transverse knob ⑥ and lengthways knob ⑦, move the specimen to the required position. Movement Range: 120mm (width) × 78mm (Length).

3.2.2. Moving the specimen

Turn the knob of the mechanical ruler or use your hands directly to move the specimen to the position you wanted.

- **Be careful when you replace the objective, please, especially after a short work distance observation. Not let the objective to touch the stage inserted plate or the culture dish bracket.**

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3.3. The viewing tube

Figure 21

Figure 22

3.3.1. Adjusting the diopter (Figure 21)

1. Look into the right binocular by your right eye, then revolving the coarse focus knob to focus on the specimen.
2. Then use your left eye to look into the left ocular. If the image is not sharp, just use the diopter adjustment ring ① to adjust.

❖ **There are ±5 diopter in the adjustment ring. The number which the reticle on the eyepiece holder pointed is your eye's diopter graduation.**

3.3.2. Adjusting the interpupillar distance (Figure 22)

When observing with two eyes, hold on the left and right prism holder, turn around the axis, adjusting the interpupillar distance until the left and right fields of view coincide completely.

❖ **The reticle on the interpupillar distance indicator, pointed by the spot "." on the eyepiece holder, shows the scale of the interpupillar distance. (Figure 21)**

The range of the interpupillar distance: 55～75mm.

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3.4. Illumination Unit

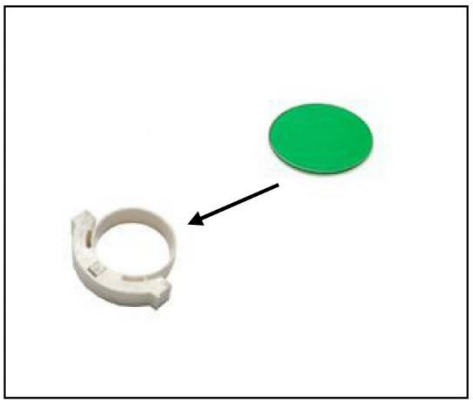

Figure 23

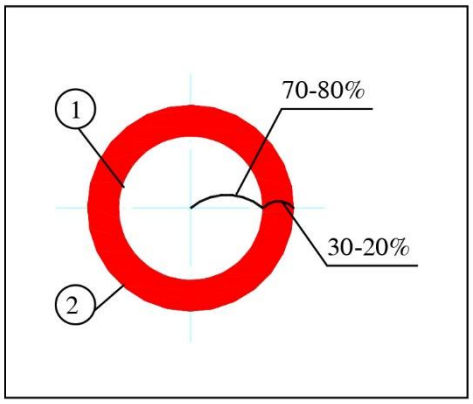

Figure 24

3.4.1. Using color filters (Figure 22)

- Selecting the appropriate color filters according your need, it became more effective to observe or photography the specimen. Especially, we suggest using the LBD color filter, which can compensate more neutral colors.
- You could pile up a group of color filters to the filter holder, if you ensure they are level and the whole thickness is less than 11mm.

Color filter	Meaning
IF550	Single contrast color filter (green) (Used for the phase contrast microscopy)
LBD	Color temperature transit color filter (blue) (Used for bright field observation and microphotography)

3.4.2. Using the aperture diaphragm (Figure 24)

- When in the bright field observation, the aperture diaphragm control the numerical aperture of the illumination system. Only when the numerical aperture of the objective and the illumination system being matching, you can obtain the higher image resolution and contrast, and the increased depth of field, too.
- To recognize the aperture diaphragm, you could remove the eyepiece if necessary. (You also could insert in the center telescope) then looked into the viewing tube, you might see a field of view like the figure shown. The proportion could be changed by dialing the aperture adjustment lever according your need. (①is the image of the aperture diaphragm, ② is the edge of the objective)
- Generally, when observing the chromatic specimen, you need to set the size of the condenser aperture diaphragm at 70%～80% of the numerical aperture which marked in the objective, but if observing the bacterium specimen which not colored, you could turn the aperture diaphragm lever at the direction of "㊣" (clockwise).

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4. PHASE CONTRAST VIEWING

4.1. The name of the components

Figure 25

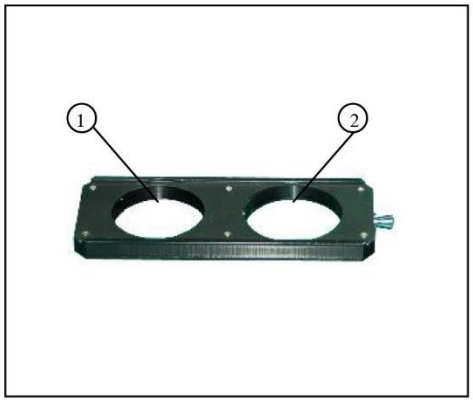

Figure 26

4.1.1. Phase contrast objective (Figure 25)

- The optional magnification of the phase contrast is: 10X, 20X.
- If you want to know how to mount the phase contrast objective, please see 2.2.4. You should mount it on the turret.

4.1.2. Phase contrast slider (Figure 26)

- Phase centering adjustable slider
- The light ring was centered beforehand, so it needn't to adjust in the use process. If the ring is not in the center, you could adjust by the centering bolt.
- The 10X/20X light ring ① is worked with the 10X, 20X phase contrast objective, while the opening ② is used for bright field.

4.2. The installation and use

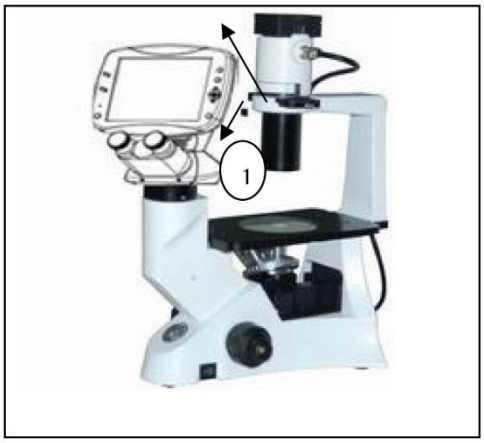

Figure 27

4.2.1. Installing the phase contrast slider (Figure 27)

1. Keep the slider ① face (The surface which had character) up towards, then inserted it into the illumination system from the right to the left like the figure showed.
2. Every light ring or opening has its own located position, so you need to move them until you heard the "clicked" to ensure the ring or the opening reach the center of the light path.
3. When in the phase contrast observation, do keep the aperture diaphragm adjustment lever ② on the position of "O" (wide opening).

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4.2.2. The centering ring (Figure 28 and Figure 29)

- **Usually you needn't the operation of centering. If necessary, please accord to the following steps:**

1. Place the specimen on the stage and focus it.
2. Take out the eyepiece, replace it with the CT (the centering telescope), and inserted it into the viewing tube without diopter adjustment.
3. Make sure the matched phase contrast objective and light ring (in the phase contrast slider) have been in the center of the light path.

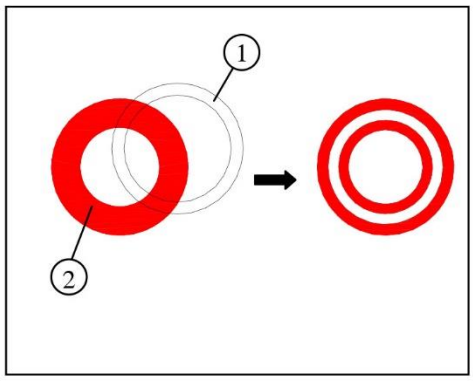

Figure 28

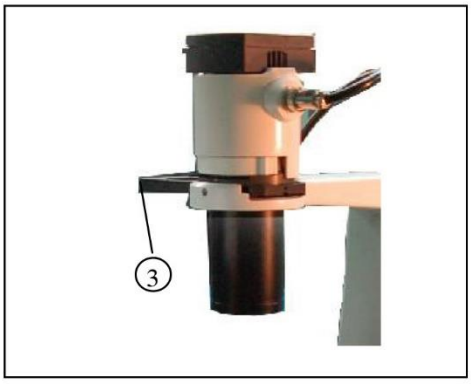

Figure 29

4. Using the CT to look the light ring's image ① and the phase contrast ring's image ②, if the light ring's image is not sharp, please shifting the CT's ocular until you can see a clear image of the light ring ②.
5. Adjusting the bolts of the two centering holes ③ in the phase contrast slider by the screwdriver ③ until the light ring center and the phase contrast center are coincided.
6. The 10X and the 20X phase contrast objective use the same light ring on the phase contrast slider. So you need to check the coincidence of the light ring center and the phase contrast center when changing the objective. If having departure, you ought to center again.

- If the light ring is centering incorrectly, you will fail to obtain the best viewing effect of the microscopy.
- After removing or replacing a thick specimen, the light ring and the phase contrast ring are likely to deviate each other, which will result in a decline of the image contrast. So if happened, please repeat the steps as above.
- If the container or the cover flip which used to place the specimen is not flat, it maybe need to repeat the centering steps for obtaining a more contrast effect. Please center the light ring by the phase contrast objective, according to the sequence of low to high magnification.

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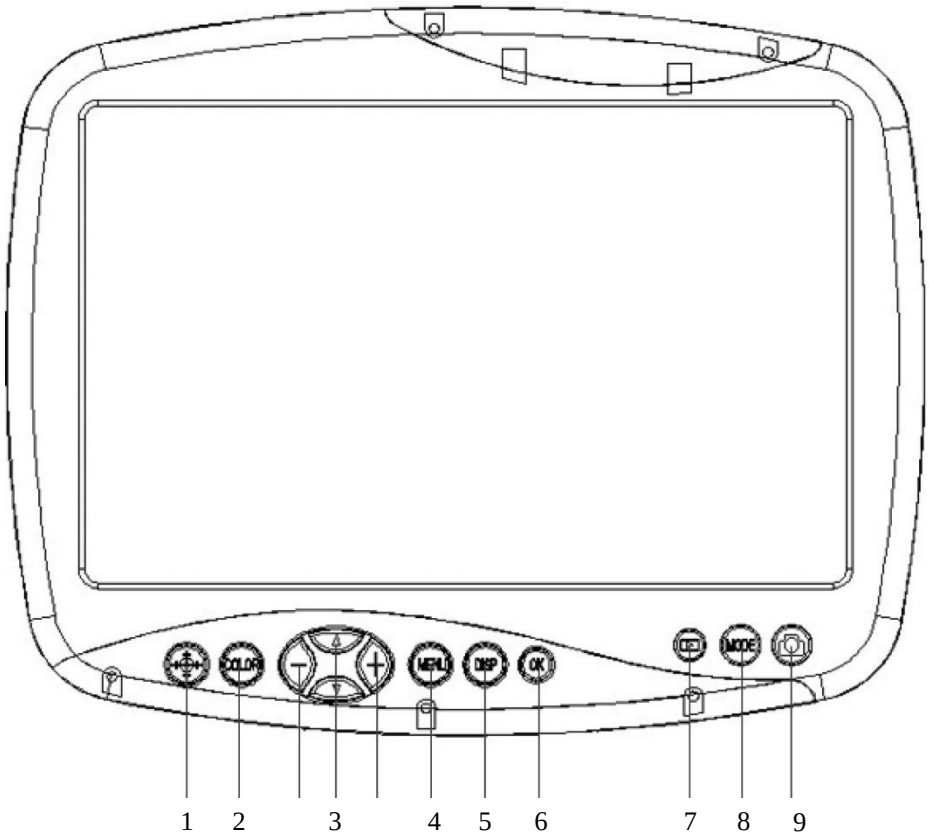
5. ADJUSTMENT & OPERATION FOR DIGITAL HEAD

5.1. Operation for digital parts



1. Operation buttons and functions

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

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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 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.30 and Fig.31 (&) 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. 30.

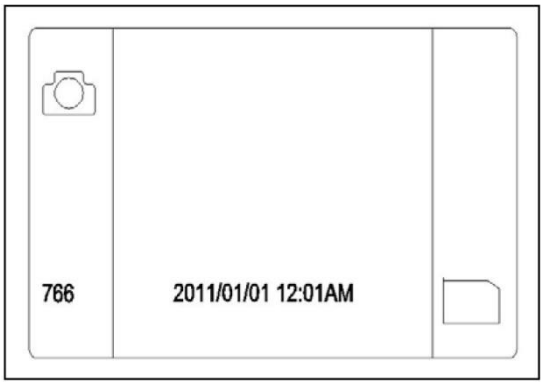

Figure 30

("00：00：00" means in current setup mode it still can record 00min 00sec) Fig.31.

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

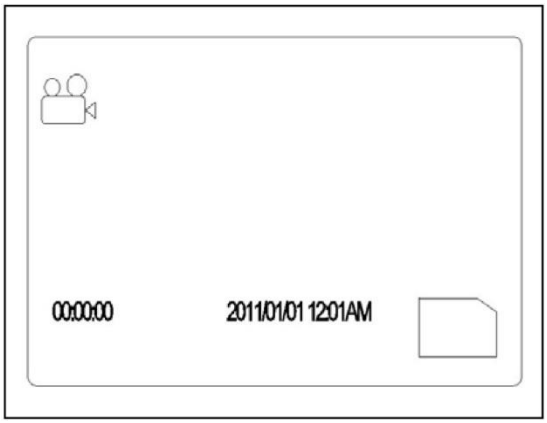

Figure 31

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4. Function menu control

With the help of the MENU 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 menu button to enter menu interface. Use direction key to select a setting from the above 3 items.

Resolution | Camera function setting | Display setting

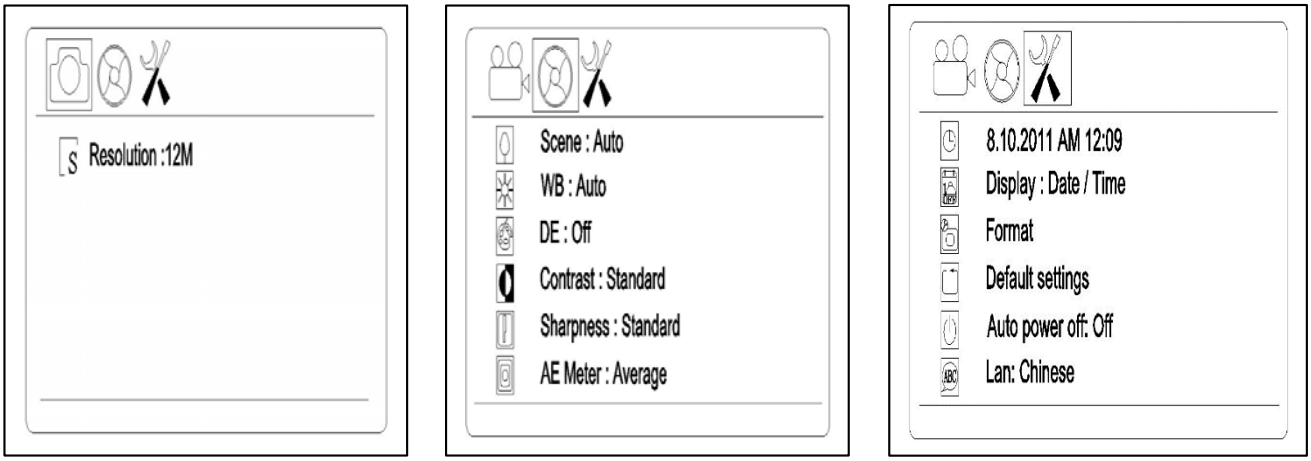

Figure 32

A. Photo Resolution

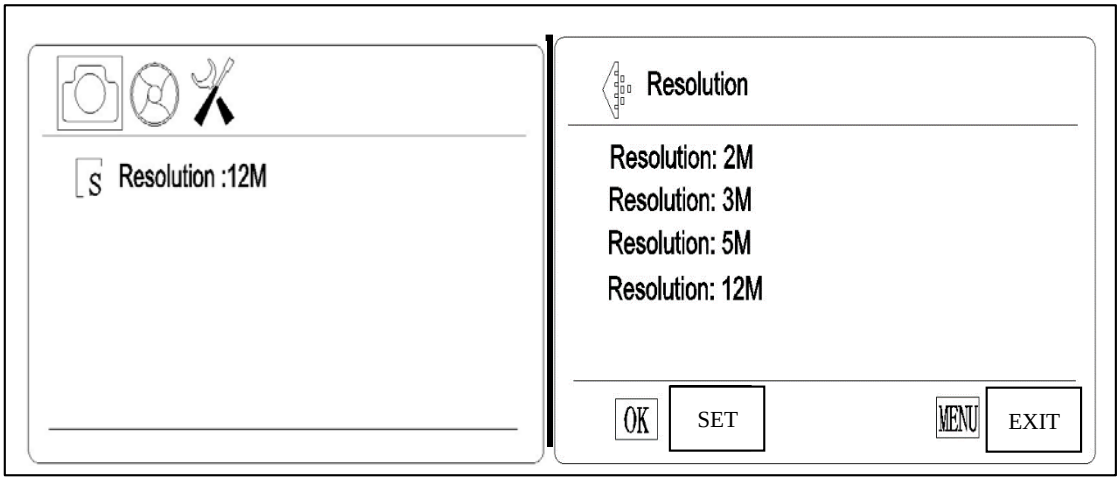

Figure 33

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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.33)**. Press **OK** button to save your selection, the model comes back to **Fig.32**, then you press **MENU** button again, the model comes back to snap model.

B. Video Resolution

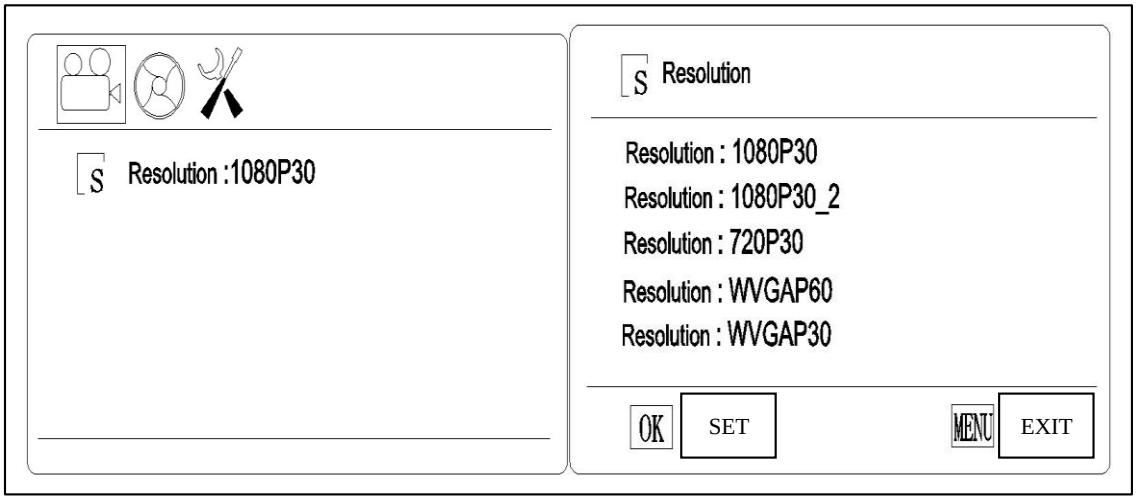

Figure 34 Figure 35

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.35)**. Press **OK** button to save your selection, the model comes back to **Fig.34**, then you press **MENU** button again, the model comes back to video model.

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C. Camera function setting

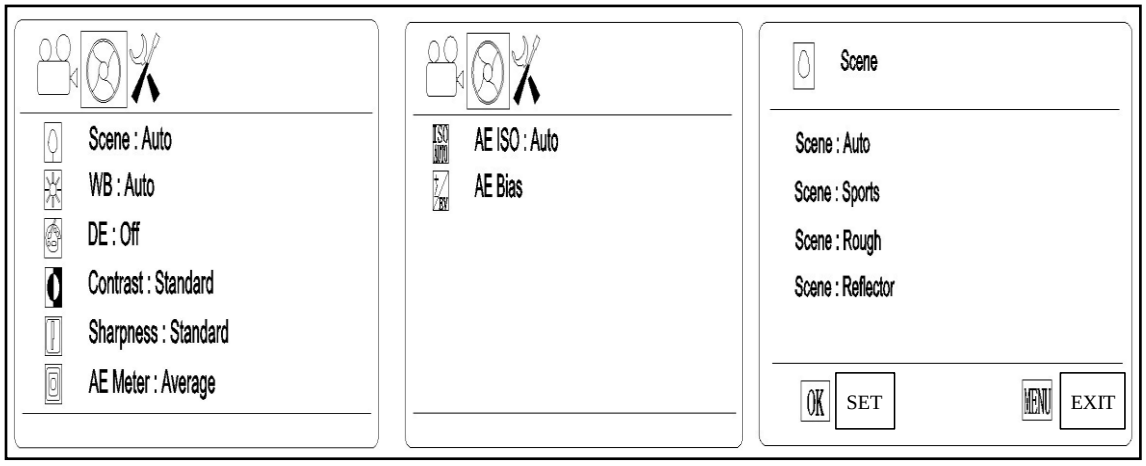

Figure 36 Figure 37 Figure 38

Camera function setting: Setting up each item.

On snap model, press MENU **MENU** button as show the "Resolution", then press the left & right key to enter the "Camera Function Setting" **(Fig. 36)**. Then press up & down key to select as Scene/ WB/ DE/ Contrast/ Sharpness/ AE Meter/ AE ISO/ AE Bias. **(Fig. 36 & 37)**. For example: **Fig. 36** you can press the **OK** OK key to enter the Scene setting and choose by up & down keys **(Fig. 38)**. Press **OK** button OK again to save your selection or exit by MENU **MENU** button. Once confirmed, the model comes back to **Fig. 36**, press MENU **MENU** again, you can come back to snap model. Operation is the same on video model.

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D. Display setting

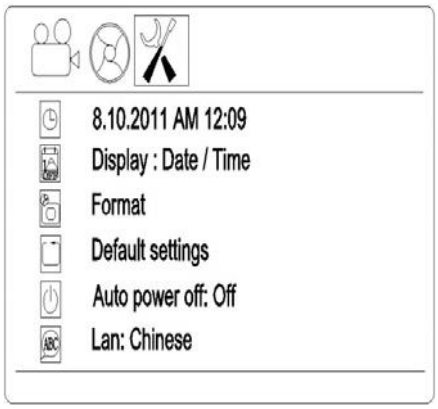


Figure 39

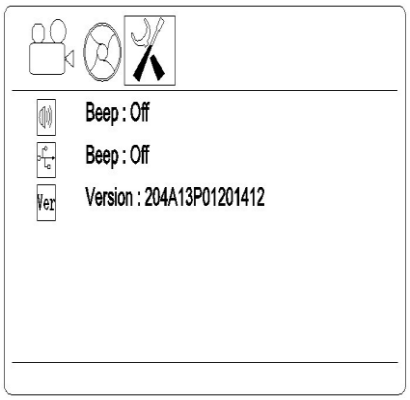


Figure 40

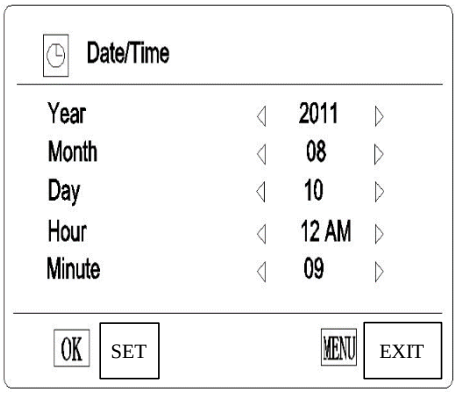


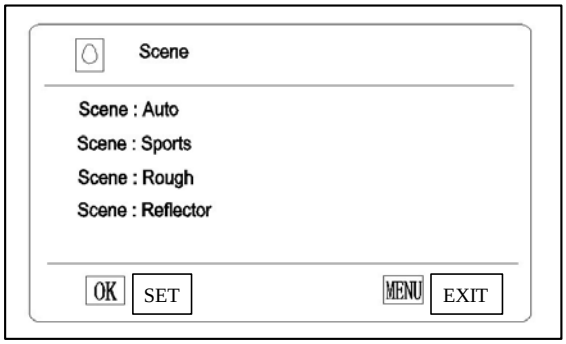
Figure 41

Display Setting: Setting up each item.

On snap model, press MENU **MENU** button as show the "Resolution", then press the left & right key to enter the "Display Setting" **(Fig 40)**.Then press up & down key to select as Date/Time, Display, Format, Default settings, Auto power off, Language, Beep, USB, Version. **(Fig. 40 & 41)**.For example: **Fig. 40** You can press the OK OK key to enter the Date/Time setting and change by direction keys **(Fig. 41)**. Press OK OK button again to save your selection or exit by MENU **MENU** button. Once confirmed, the model comes back to **Fig 39**, press MENU MENU again, you can come back to snap model. On video model, the operation is same.

5. Camera function setting details

A. Scene



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

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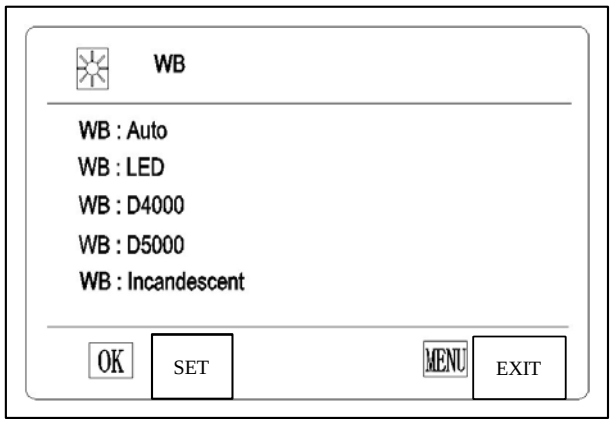
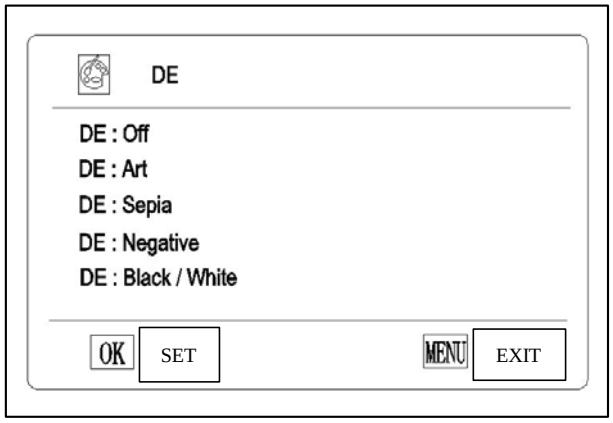
B. WB (White Balance)

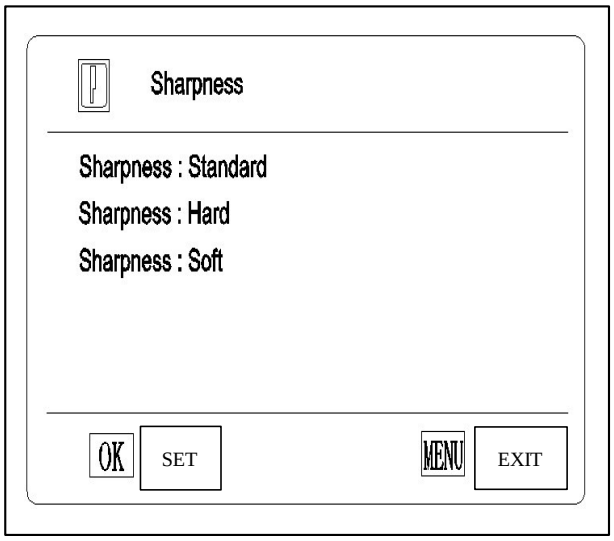


WB will help you to obtain superb color when observing.

C. DE (Color effects)



D. Sharpness



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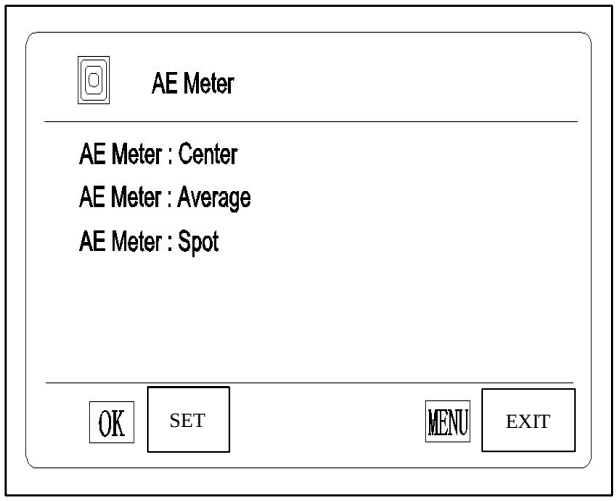
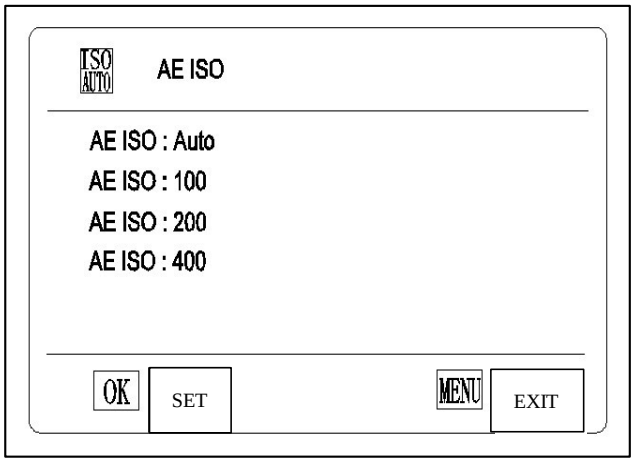
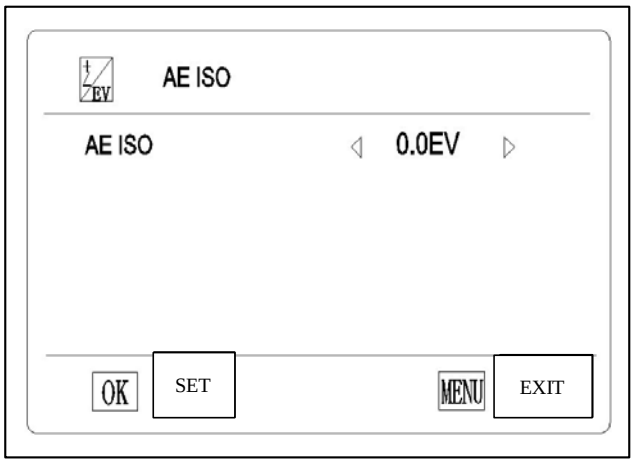
E. AE Meter



F. AE ISO



G. AE Bias



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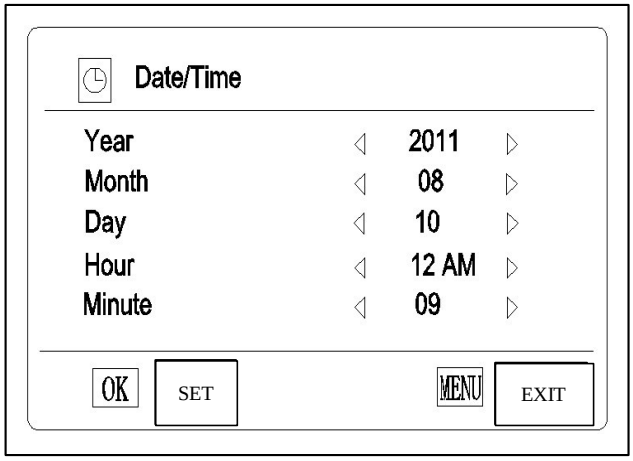
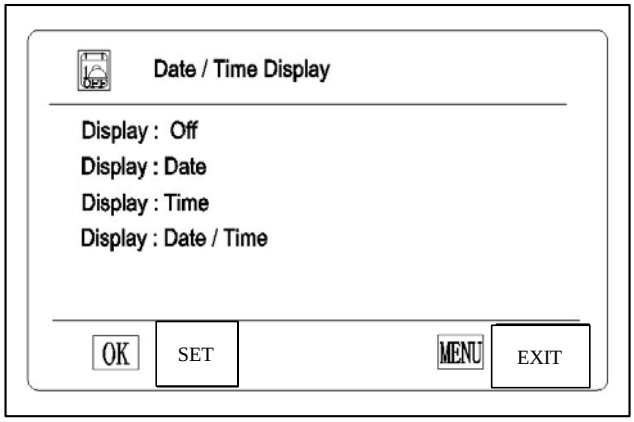
6. Display setting details

A. Date/Time



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.

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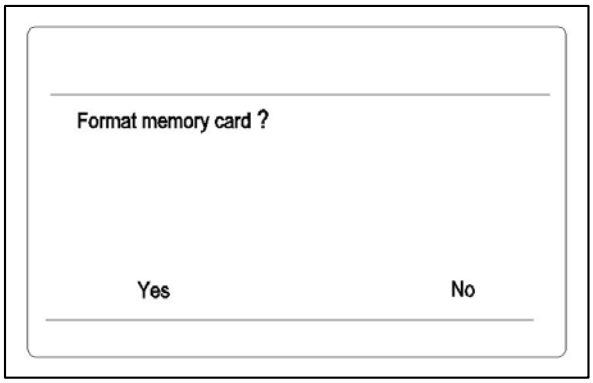
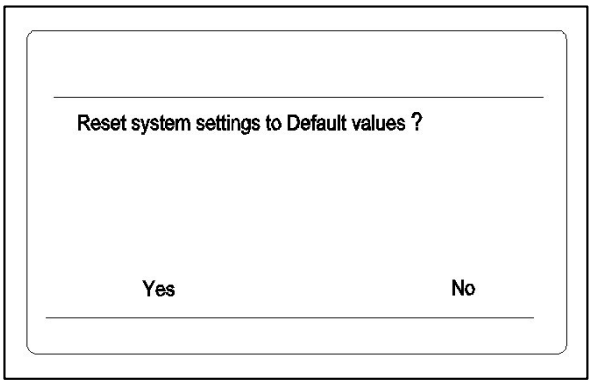
C. Format

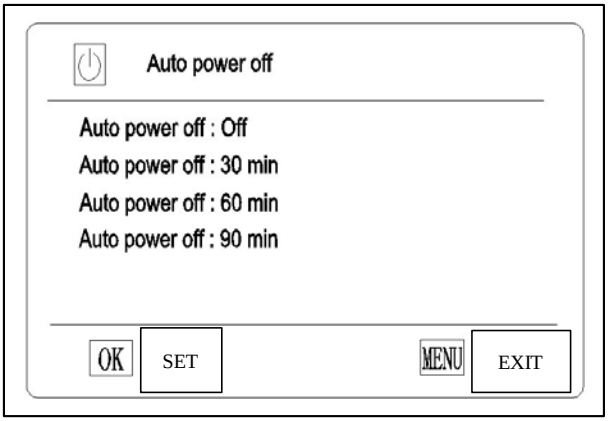


Select “Yes” can format all the SD card inserted；(Attention: Even the protected content will be deleted when formatting, cannot be resumed again.) Select “No” and press menu button, the model comes back to the snap mode.

D. Reset system settings to default values?



E. Auto power off



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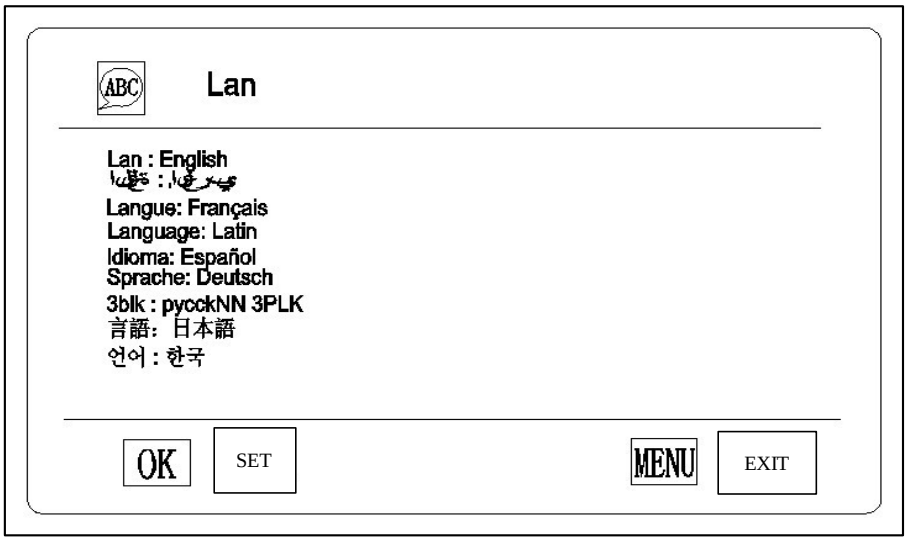
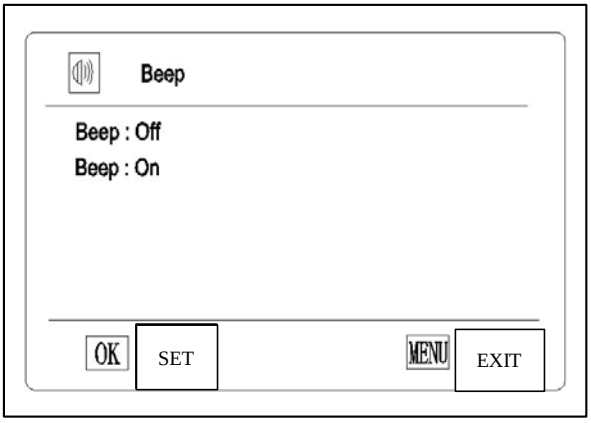
F. Language

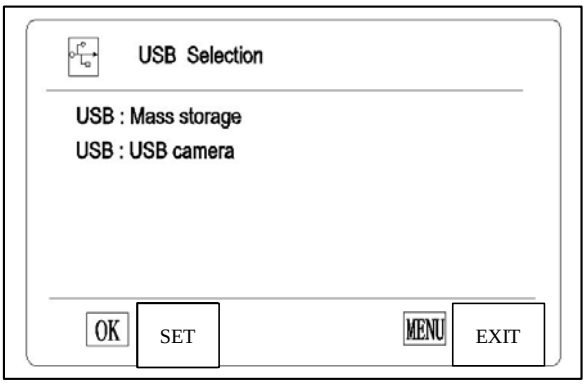


We developed 9 languages according to your demand.

G. Beep



H. USB Selection



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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.

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6. TECHNICAL SPECIFICATIONS

6.1. Main specifications

Optical System	Infinite Optical System
Viewing Tube	Compensation Free Binocular Tube Inclined at 30°
Eyepiece	Wide Field Eyepiece 10X, Linear Visual Field: 22 mm
Nosepiece	Backward Quintuple Nosepiece
Objective	Infinite Long Working Distance Plan Achromatic: 4X, 40X Infinite Long Working Distance Plan Phase Contrast: 10X, 20X
Focusing System	Coaxial Coarse and Fine Focusing System Sensitivity and Graduation of Fine Focus: 0.002mm Movement Range(from the surface focus of stage plate): up 8mm, down 3mm
Stage	Area: 160 mm (width) × 250 mm (Length)
Mechanical Ruler	Movement Range: 120 mm (width) × 78 mm (Length)
Illumination	Halogen Lamp 6V 30W, Preset Center, Intensity continued Adjustable
Condenser	Long working Distance Condenser, Numerical Aperture 0.3, Working Distance 72mm
Operation Environment	• Use indoor • Altitude: Maximum 2000 m • Temperature: 5℃~40℃ （41°F~109°F） • Maximum Relative Humidity: 80% at 31℃ （88°F）, then Fall Linear. • 70% at 34℃ （93°F）, 60% at 37℃ （104°F）, 50% at 40℃（104°F）. • Pollution Degree:2 (refer to IEC60664)

6.2. Objective Specifications

TYPE	Magnification	NUMERICAL APERTURE （N.A）	WORKING DISTANCE （mm）	CONJUGATE DISTANCE （mm）	FOCUS DISTANCE （mm）	COVER SLIP THICKNESS
Infinite Long Working Distance Plan Achromatic Objective	4X	0.1	25.2	∞	45	—
	40X	0.6	3.2	∞	45	1.2mm
Infinite Long Working Distance Plan Phase Contrast Objective	10X	0.25	11	∞	45	0.17
	20X	0.4	6	∞	45	0.17

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7. TROUBLESHOOTING

Under certain condition, some no-fault factors will bring a reversible influence to the instrument's performance. If the problem is happened, please take proper measures according to the follow table. If you can't solve the trouble by the supplied methods, please contact with the sales department of our company.

PROBLEM	REASON	SOLUTION
I. Optical Part:		
The illumination is opening, but the field of view is dark.	The plug of the lamp holder is not connected into the illumination set	Connect them well
	The bulb burnt out	Change a new lamp
	The brightness is too low	Adjust to a proper position
	The color filter is piled too much	Minimize the number of the filters
	No use the appointed lamp bulb	Use the specified halogen Lamp 6V 30W
The edge of the field of view has shadow or the brightness is asymmetry	The nosepiece is not in the located position	Turn the nosepiece into the position where you can hear "clicked"
	The color filter is stopped midway	Insert deeply
	The phase contrast slider is not located in the proper position	Turn the slider into the "clicked" position
Find dust and stain in the field of view	There are stains on the specimen	Change a clean specimen
	There are stains and dust on the eyepiece	Clean the eyepiece
Appear double image	The size of the aperture diaphragm is too small	Open up the aperture diaphragm
Resolution problems: Image is not sharp; The contrast is not high ; The detail is not clear ; Don't obtain the phase contrast effect	The nosepiece is not in the center of the light path	Ensure the nosepiece is turned into the "clicked"
	The aperture diaphragm in the view of field is opened	Too large or too small
	The lens (condenser, objective, ocular or culture dish) become dirty	Clean all
	In the phase contrast observation, the bottom thickness of the culture dish is more than 1.2mm.	Use a the culture dish whose bottom thickness is less than 1.2mm
	Use a bright field objective	Change to the phase contrast objective
	The condenser ring is not coincident with the objective phase ring	Adjust the condenser ring to match the objective phase ring

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	The light ring and the phase contrast kits is not centered	Adjust the bolts to center them
	The objective used is not fit to the phase contrast observation	Please use the compatible objective
	When looking at the edge of the culture dish, the phase contrast ring and the light ring is deviated each other	Moving the culture dish until you obtain the phase contrast effect. You also could demount the slider, and dial the field diaphragm with the direction of "⟲"
One side of the image is unfocused	The nosepiece is not in the center of the light path	Insure the nosepiece is in the "clicked" position
	The specimen don't place properly	Place the specimen on the stage correctly.
	The optical performance of the culture dish bottom is poor (such as erose figure and soon)	Please use a regular culture dish

PROBLEM	REASON	SOLUTION
II. Mechanical Part:		
The coarse focus knob is hard to run	The tension adjustment collar is too tight	Loose properly
The image can't stay on the focal plane in the process of the observation	The tension adjustment collar is too loose	Tighten properly

PROBLEM	REASON	SOLUTION
III. Electric Part:		
The lamp can't light	No power supply	Check the power cord, and connect them exactly
	The installation of the bulb is wrong	Install the bulb correctly
	The bulb burn out	Change a new bulb
The bulb burns out in a high frequency	Not use the specified lamp	Use the required lamp
The height of the brightness is not enough	Not use a appointed lamp	Use a appointed lamp
	The brightness adjustment knob is used wrong	Adjust the brightness adjustment knob in a correct way
The light glimpse	The bulb is going to spoil	Change the bulb
	The power cord have a poor contact	Check the power cord, and connect them exactly

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PROBLEM	REASON	SOLUTION
IV. Viewing tube:		
The two eyes' field of view is different	The interpupillar distance is not correct	Adjust the interpupillar distance
	The diopter is not right	Adjust the diopter
	Not adapt to the microscope observation	When look into the objective, do not stare at the specimen but at the whole field of view, or move the eyes away to see other things, then back into