



# **Multi-viewing Microscope**

## **Model Number**

**BS-2080MH10**

**Instruction Manual**

This instruction manual is for the microscope BS-2080MH10. To insure safety and obtain optimum performance and familiarize yourself fully with the use of this microscope. We recommend that you read the manual thoroughly before operating the microscope ,Attain this manual instruction in an easily accessible place near the microscope for the further reference.

Use Notices

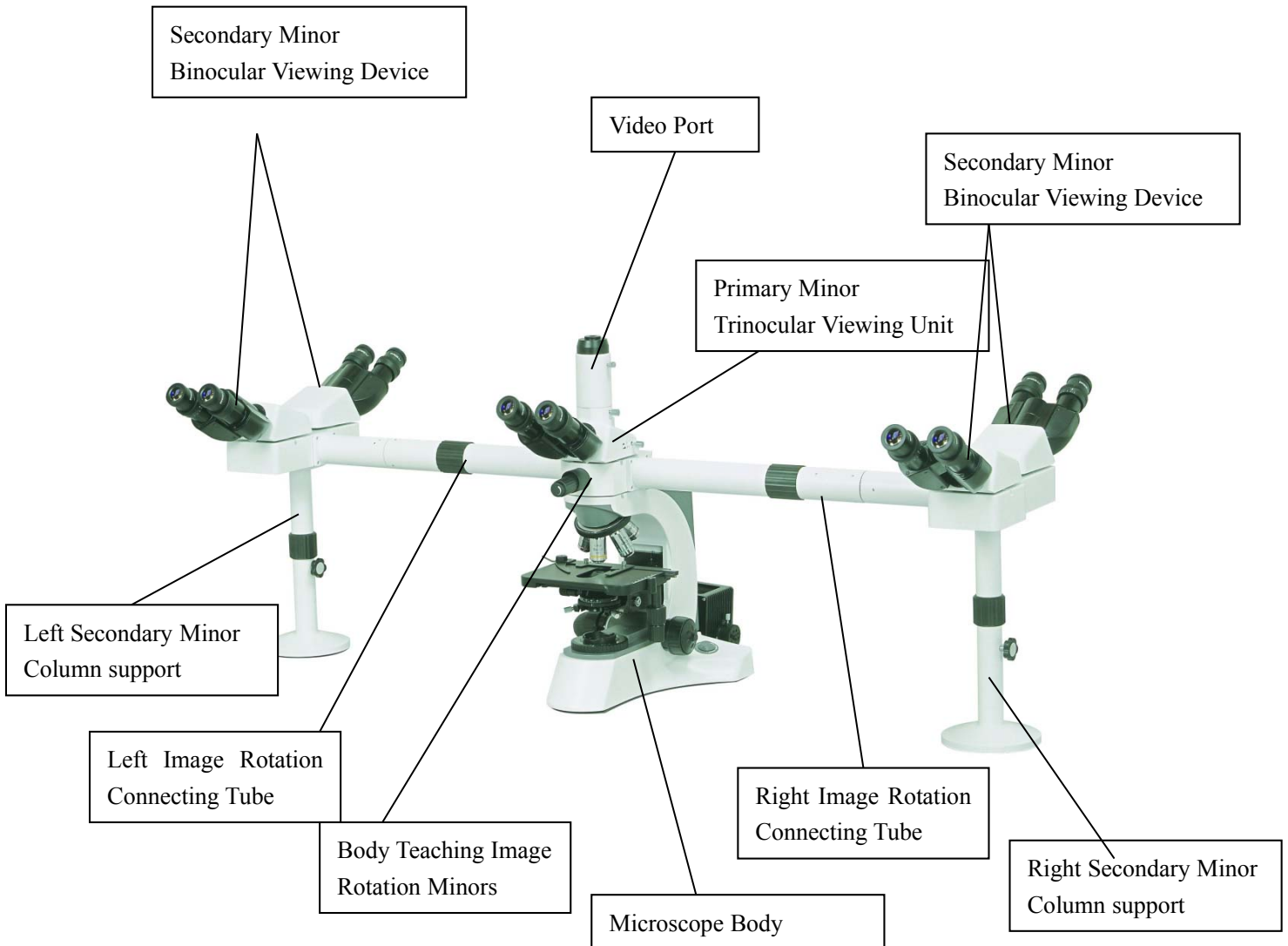
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**I. Safety note**

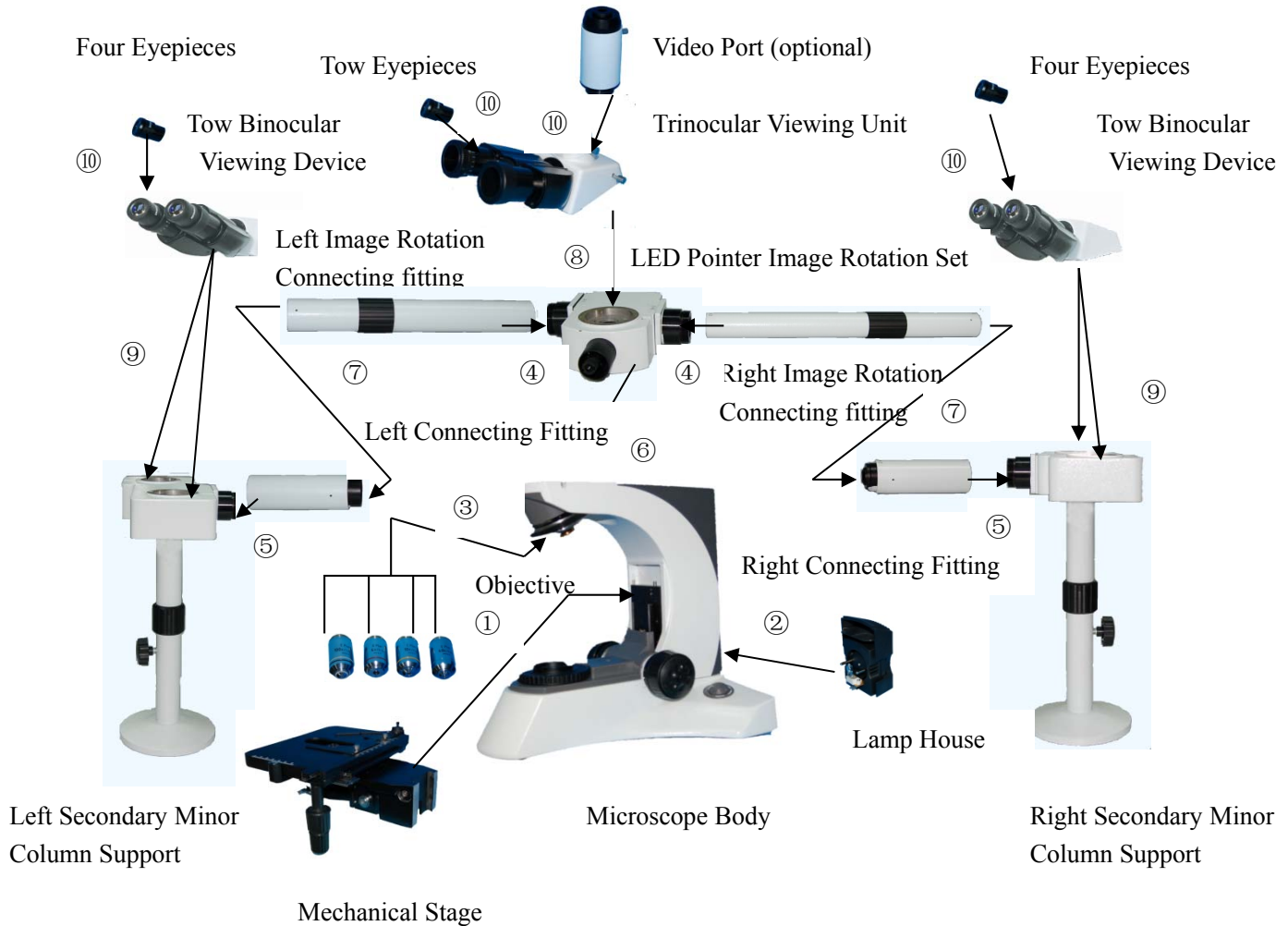
1. Carefully open the box, avoid the accessories, like lens, dropping to ground and being damaged.
2. Do keep the instrument out of direct sunlight, high temperature or humidity, dusty and easy shaking environment. Make sure the stage is smooth, horizontal and firm enough.
3. If the bacterium solution 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 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.
7. 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.
8. Use the factory supplied power cord, please.

**II. Maintenance**

1. All the lenses have been well checked and adjusted. It is forbidden to disassemble them yourself.
2. The nosepiece and coarse/fine focus unit have a compact and precise frame, please don't disassemble them as possible as you can.
3. Keep the instrument clean, wipe dust regularly, and be attention to avoid contaminating the optical elements especially.
4. The contaminations on the prism, as finger mark and oil, could be gently wiped with a piece of soft cloth or tissue paper, gauze which has been immersed in pure alcohol or xylene. (**note that the alcohol and the xylene are all burned easily, do not let them near the fire, and use them in a drafty room as possible as you can.**)
5. Don't use organic solvent to wipe the non-optical elements, when you need to clean, use the soft detergent, please.
6. When using, if the microscope is splash by liquid, cut off the power at once, and wipe up the moisture.
7. Do not disassemble any parts of the microscope. That will affect the function or decline the performance of the microscope.
8. Place the instrument in a cool, dry position. After using the microscope, remember to cover it with dust helmet. Do wait for the lamp house cooling completely before cover.



2-1 Order of Installation



- ① Installing the Mechanical Stage
- ② Installing the Lamp House
- ③ Installing the Objective
- ④ Connecting Teaching Image Rotation Set
- ⑤ Connecting Left\Right Secondary Minor Set
- ⑥ Stack Mounting Teaching Image Rotation Set
- ⑦ Stack Mounting Secondary Minor Set
- ⑧ Installing the Trinocular Viewing Unit
- ⑨ Installing Binocular Viewing Device
- ⑩ Installing Eyepiece and Video Port (optional)

## 2-2 Installing steps

### 2-2-1 Installation Body's chassis

#### 1. Installing the Mechanical Stage Support Device

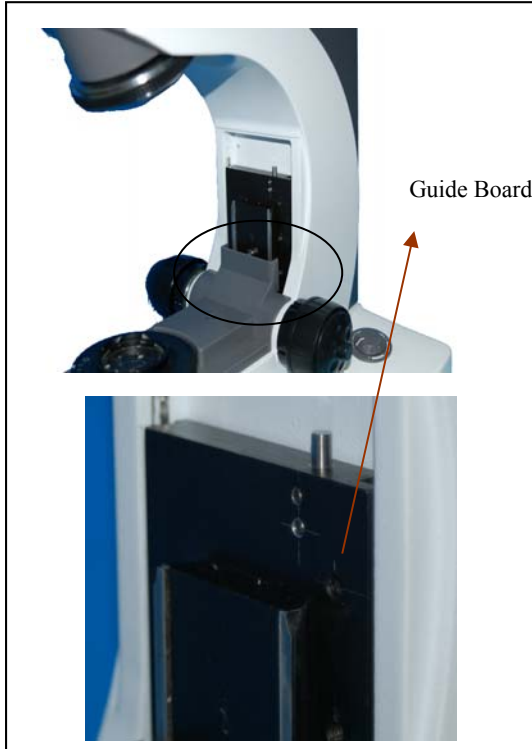


Figure 1

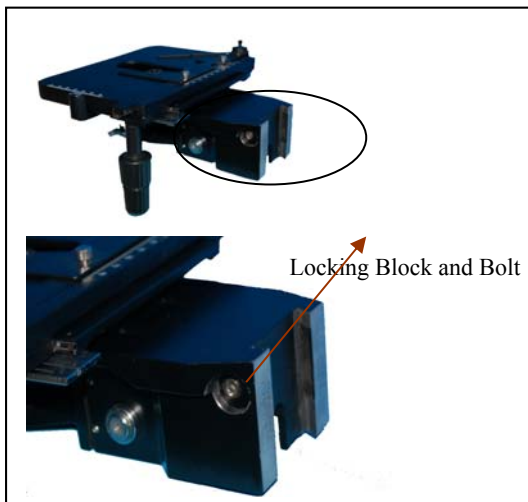


Figure 2

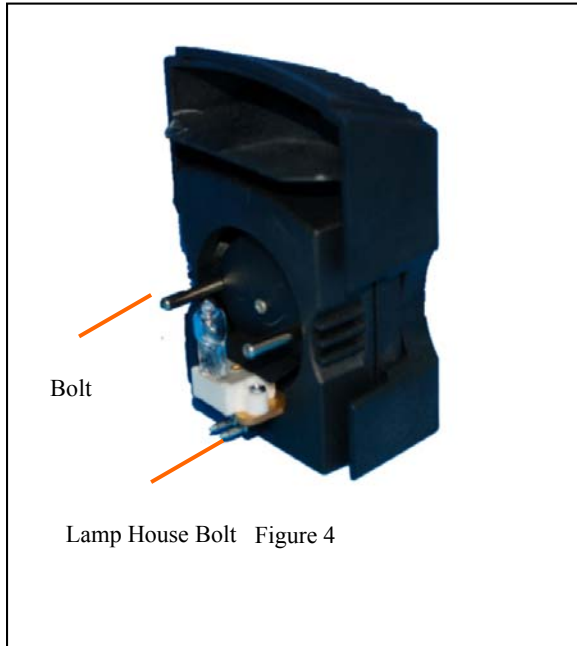


Figure 3

★ Before installing the device, be sure to adjust the coarse focus knob. Make the guide board (see figure 1) down to the lowest position, so you can install the mechanical stage support device easily.

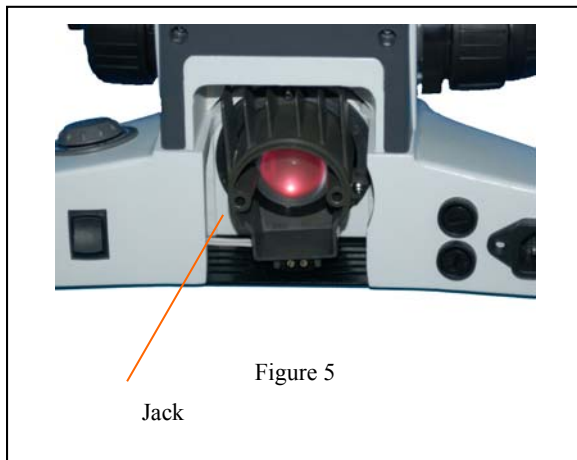
◇ Hold on the mechanical stage support device (figure 2), place it from the top of the guide board (figure 1), let the device (figure2) falling free until it reach the limit position. Use the hexagon wrench screw down the locking block, make the stage support device (figure1) and the guide board fixed together.

★ **The mechanical stage have been adjusted horizontally and fixed together before leaving factory. Do not disassemble unless necessary, that may affect the observation precision of the instrument.**



## 2 Installing the Lamp House

✧ Keep the bolt on the lamp house (figure 4) in line with the jack on the back of the microscope (like the show of figure 5), then pushing the lamp holder into the illumination kits gently until they are against each other (figure 6).



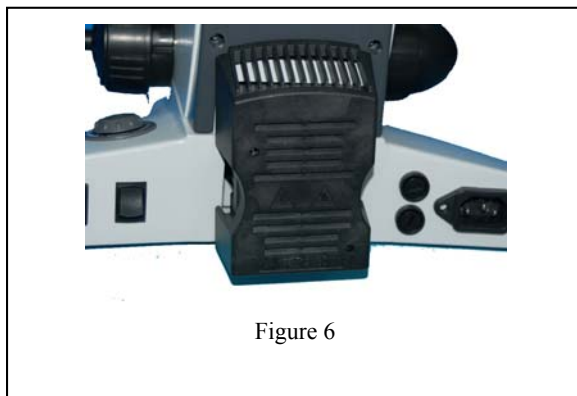
## 3 Installing and Replacing the Lamp (figure4)

✧ Please use the specified halogen Lamp 6V30W.

1. Hold to the bulb after you wrap it with gauze or other protection materials, and then deeply insert it into the lamp holder.

2. Replacing Lamp when using or soon after

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 out power plug, and make sure the bulb, the lamp room 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 bare hands. It will shorten the service life or cause it to burst. If you leave finger marks on the surface carelessly, clean it with a dry soft cloth.



Figure 7



Figure 8

#### 4 Installing the Objective

1. Adjusting the coarse focus knob until the support device of the mechanical stage reach its low limit position.
2. Wrestring the lowest magnification objective onto the nosepiece from the left or the right side (figure 9), then push the nosepiece clockwise, then place other objectives by the sequence of low to high magnification ( figure 10).

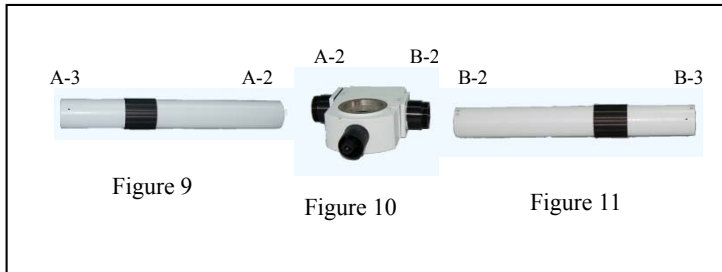
◇ Installing objective this way will make the change of magnification to be easier while in using.

★ Clean the objective regularly, the objective of the inversed microscope is very sensitive to dust.

★ **When operating, use 10 × magnification objective to search specimen and focus firstly, then replace with higher magnification objective if necessary.**

★ **When replacing the objective, slowly turning the nosepiece until you hear “clicked”, that means the objective enter the required position—the light path center.**



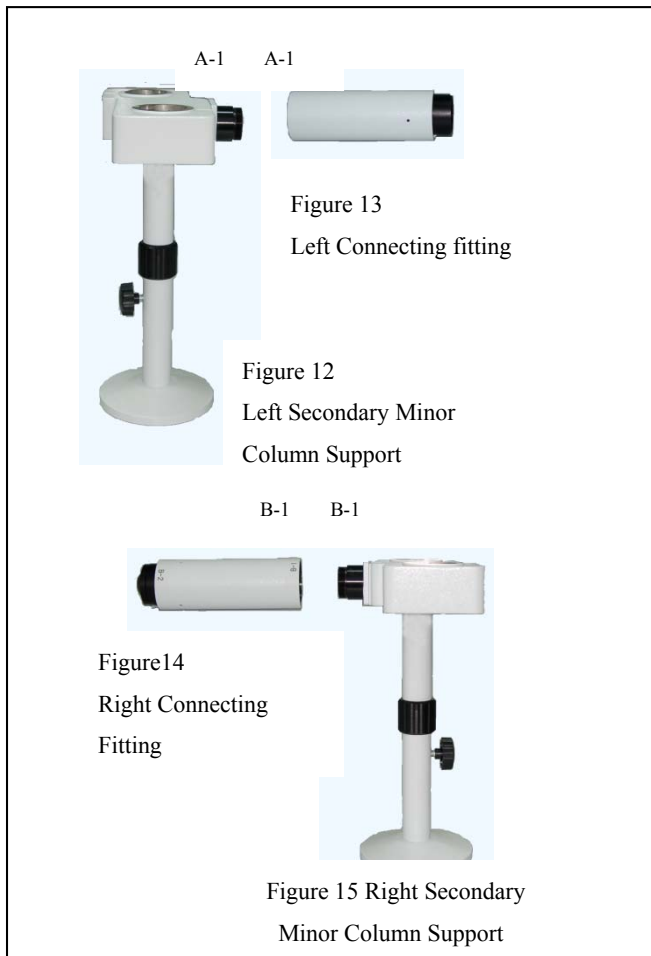


1

**2-2-2 Connecting Teaching Image Rotation Set**

☆ Spinning the left/right Image Rotation Connecting Fitting (figure9,figure11) into the corresponding port of LED pointer Image Rotation Set (figure10), and make sure the coincidence of label show in A-2,B-2. The result is showing in the figure 16.

★ When installing please make sure the coincidence of label in the left/right port of LED pointer Image Rotation Set with the left/right Connecting Fitting port



**2-2-3 Connecting left/right Secondary Minor Set**

1. Spinning the left Connecting Fitting (figure13) into left Secondary Minor Column Support (figure 12), and make sure the coincidence of the label show in A-1. The result is showing in the figure 16.

2. Spinning the right Connecting Fitting (figure14) into right Secondary Minor Column Support (figure 15), and make sure the coincidence of the label show in B-1. The result is showing in the figure 19.

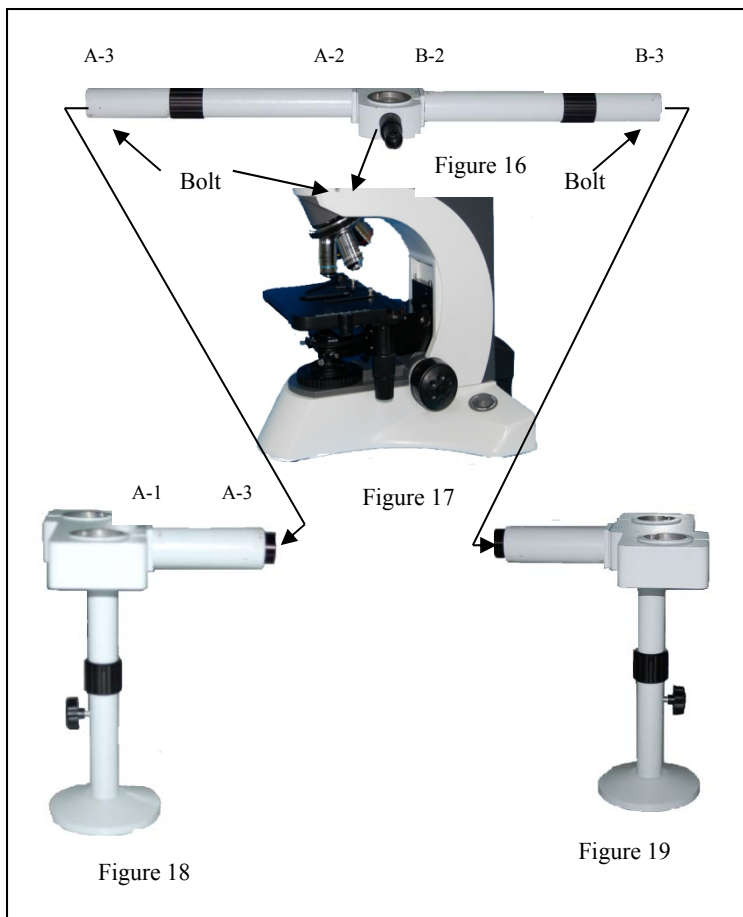
★ The height of left/right Secondary Column Support have been adjusted before leaving factory, Do not adjustability unless necessary.

### 2-2-4 Stack Mounting Teaching Set

#### 1. Stack Mounting Teaching Image

##### Rotation Set

Please loosen the bolt on microscope head and insert the Teaching Image Rotation Set (figure16) into Microscope head installed (figure17) , turn to a proper position, then use the hexagon wrench screw down the bolt to fix.

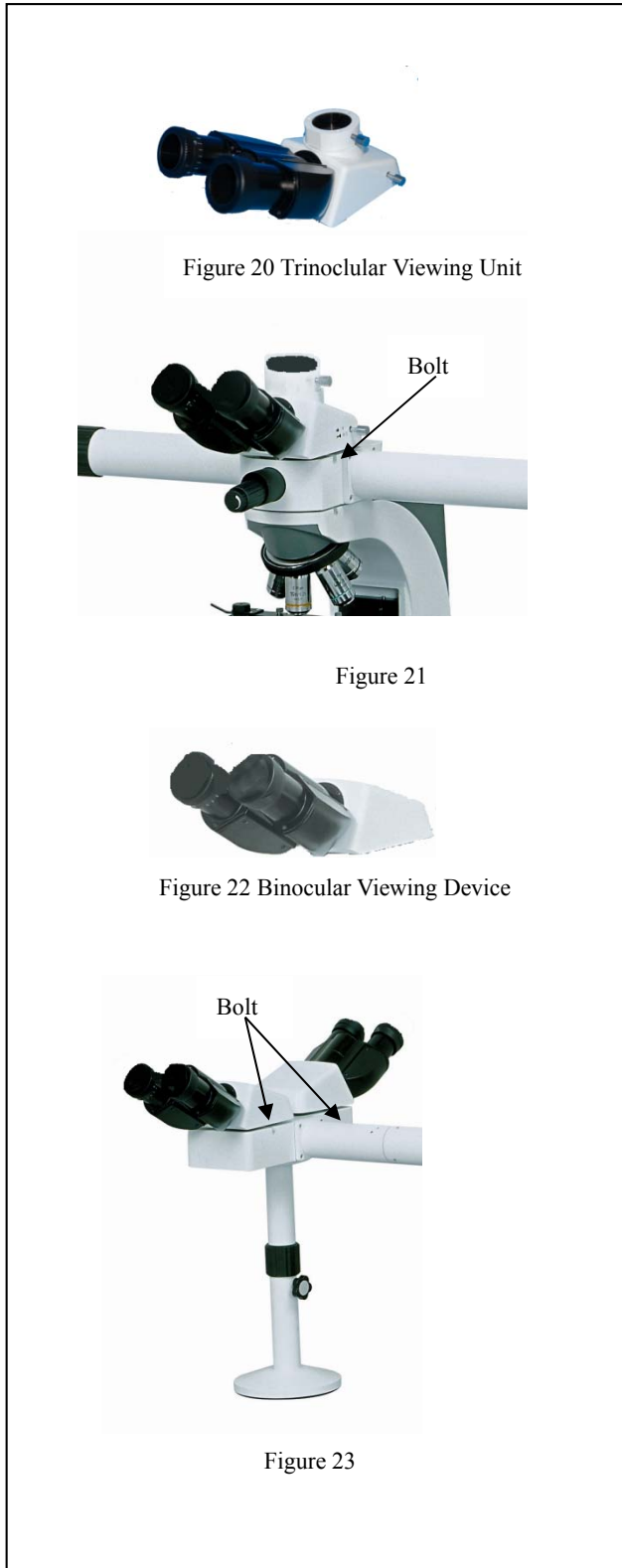


#### 2. Stack Mounting Secondary Minor Set

Easing bolts off on the left Secondary Minor A-3 port and the right Secondary

Minor (figure18) B-3 port, making them and left/right Teaching Image Rotation Set on the same level, adjusting their distance and direction, make sure their Connecting tube on a horizontal and connecting on the biggest port, then screwing down the bolt to fix.

★ Before installing, please make sure the coincidence of label in the left/right Secondary Minor A-3/B-3 port with the port of Teaching Image Rotation Set.



### 2-2-5 Installing Binocular/Trinocular viewing Device

1. Please ease the bolt on the head of the left/right Teaching Image Rotation Set (figure20) installed, insert Trinocular viewing unit into the head of the left/right Teaching Image Rotation Set (figure16), turn to a proper position, then use the hexagon wrench screw down the bolt to fix. The result is showing in the figure21.

2. Ease bolt off on the left/right Secondary Minor head, then insert four Binocular Viewing Devices into the left/right Secondary Minor head separately, turn to a proper position, use the hexagon wrench screw down the bolt to fix. The result is showing in the figure23.

★ When installing four Binocular Viewing Device, make sure the coincidence of their numbers with the numbers on the left Secondary Minor head(A1,A2) and the right Secondary Minor head (B1,B2),otherwise, will affect the image.

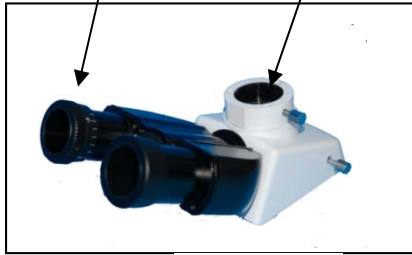
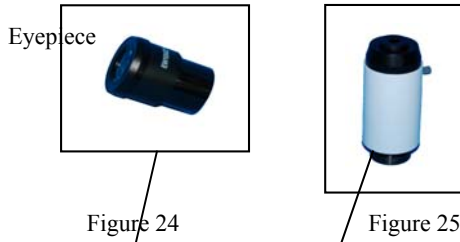


Figure 26



Figure 27

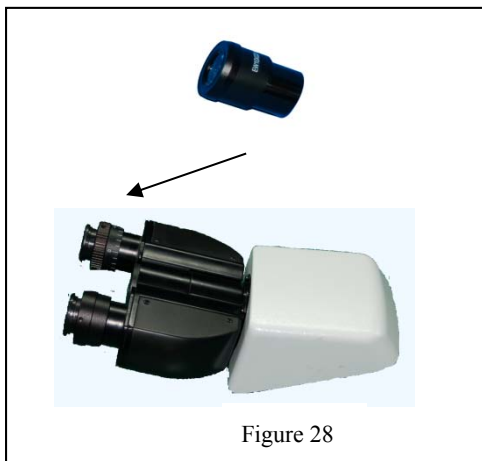
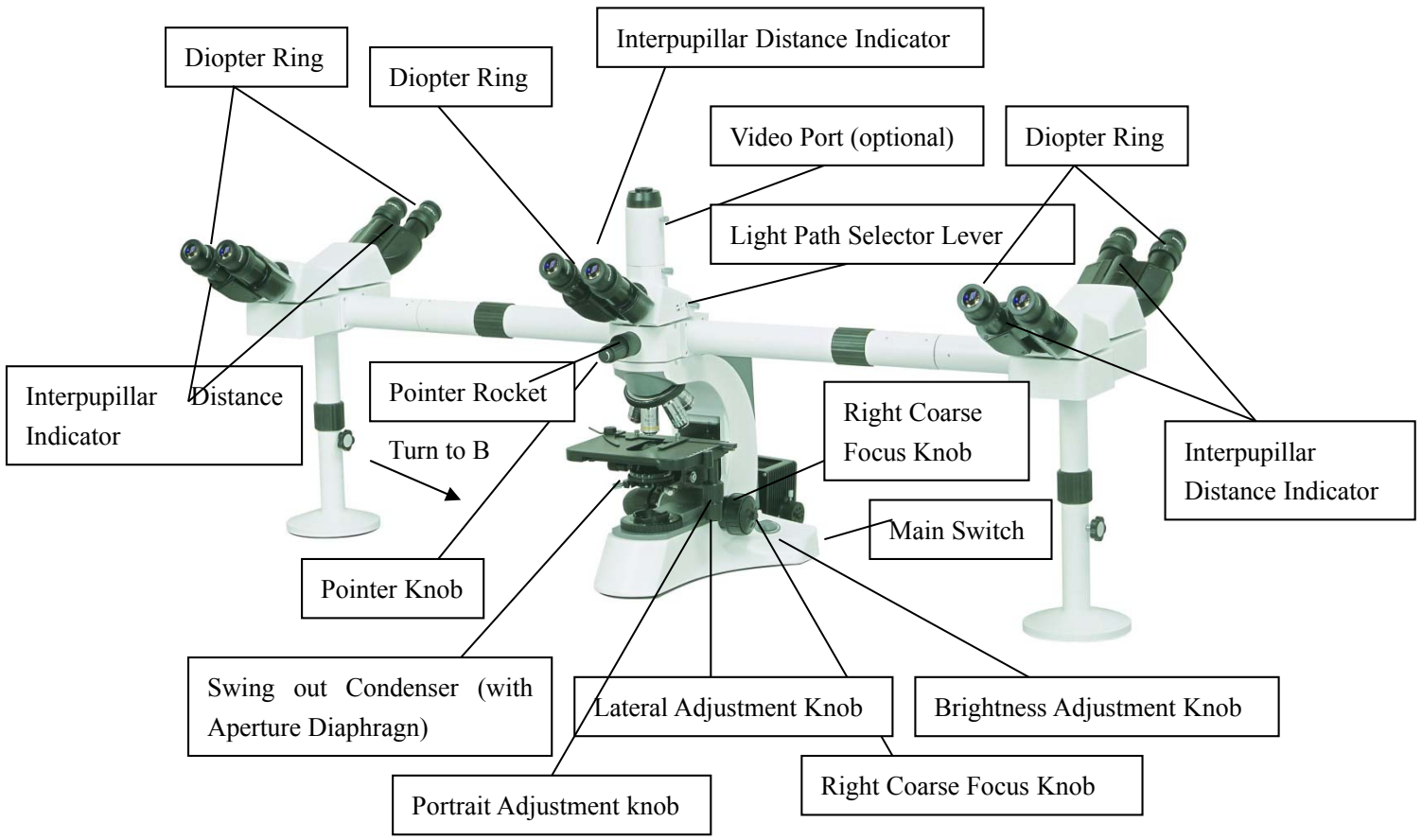


Figure 28

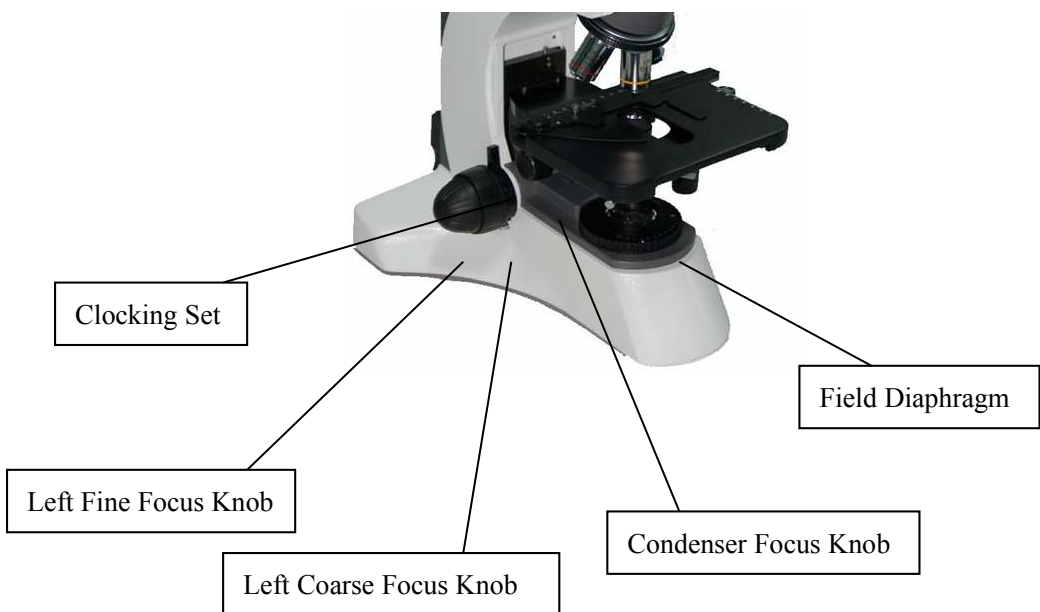


Figure 29

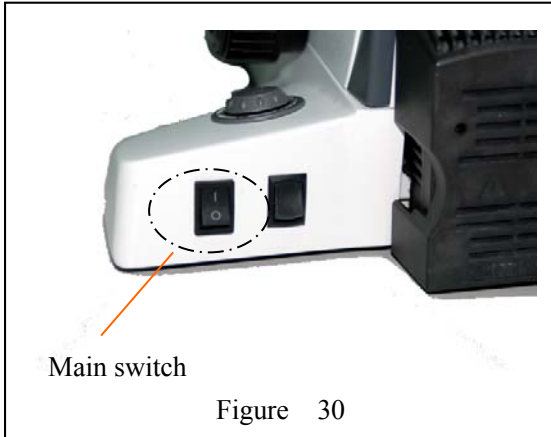
3. Pull out the lid of eyepiece on the eyepiece tube, insert eyepiece into eyepiece tube, until they are against each other. The result is showing in the figure 27, 29.
4. Insert the video port (figure 25) into the trinocular unit (figure 26), then screw down the bolt to fix it, the result is showing in figure 27.



Turn to B



4-1 Primary Minor operation



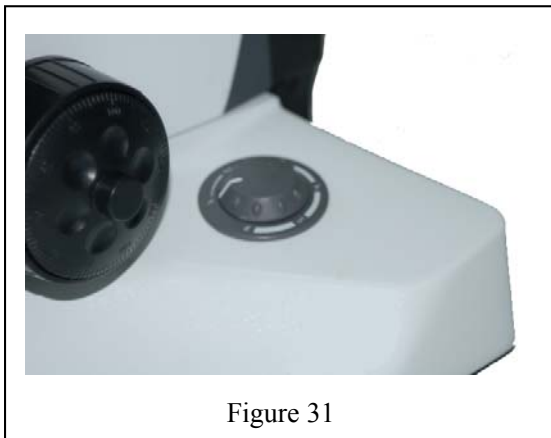
**4-1-1 Turning on the Lamp (Figure 30)**

Connect the power, turn on the main switch (figure 30) to “-”(on).

**4-1-2 Adjust Brightness (Figure 31)**

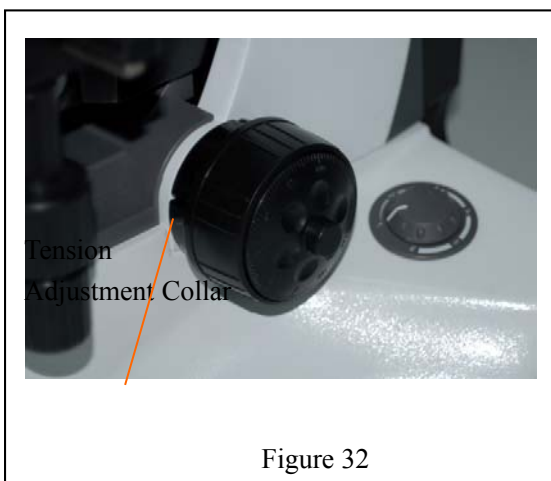
Turning the brightness adjustment knob clockwise, the voltage raise, and the brightness strengthen; turning with the anti-direction, the voltage decline, and the brightness weaken.

◇ Using the lamp in a low voltage condition, will prolong the use life.



**4-1-3 Adjust the Tension Adjustment Collar (figure 32)**

★ The tightness of the tension adjustment collar has adjusted before leaving factory, if finding it's loosing (the mechanical stage drop itself because of deadweight), please turning the tension adjustment collar until the tightness is in order.



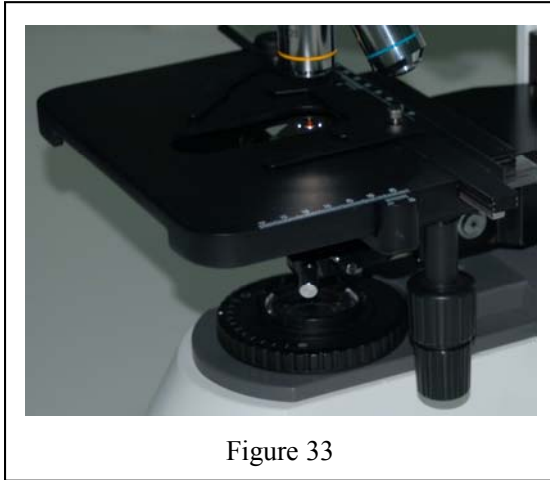


Figure 33

#### 4-1-4 Placing Specimen (figure 33)

Place the slide on the mechanical stage. Use the stage clips to clamp the slide gently.

Turn the portrait and lateral adjustment knob of the mechanical ruler, move the specimen onto the required position.

★ Be careful when changing the objective. If you finish the observation with the short working distance objective, and want to change another one, be careful of not letting the objective touch the specimen.

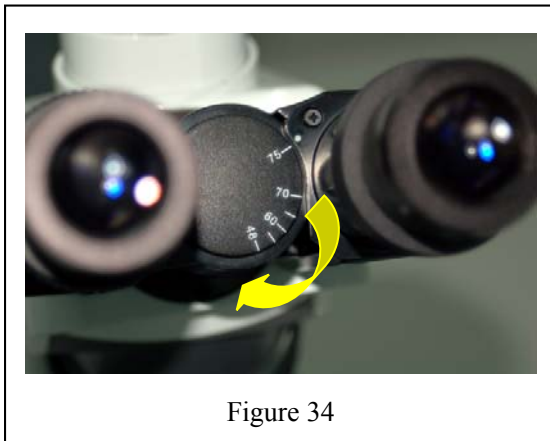


Figure 34

#### 4-1-5 Adjusting the Interpupillar Distance (Figure 34)

The interpupillar distance range: 48mm ~ 75mm. 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.

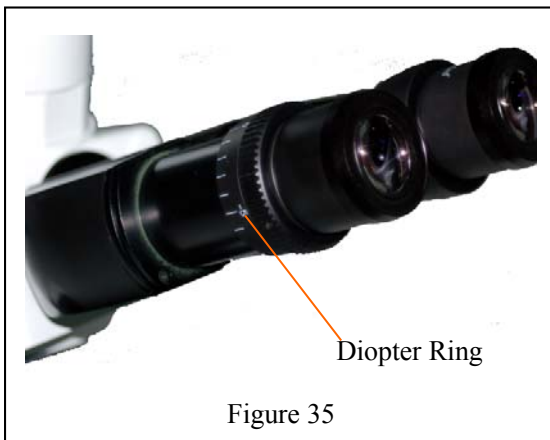


Figure 35

#### 4-1-6 Adjusting the Diopter (Figure 35)

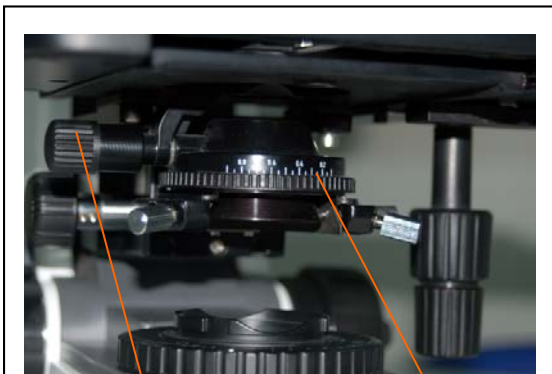
The right ocular tube is fixed. So by turning the left diopter ring after the right ocular focus on the specimen, the operator who's left and right eye has different eyesight can obtain a comfortable focus position with both eyes.



Figure 36



Figure 37



Swing out Condenser

Aperture  
Diaphragm

Figure 38

#### 4-1-7 Focus (figure21, figure22)

1. When not using the video set

Push in the light path selector lever (figure 25) completely, then observe with both eyes. Use the 10×objective focus, to avoid the objective touch with the specimen, you should raise the mechanical stage at first, let the specimen close to the objective, then slowly separating them to focus.

The operator can converse turn the coarse focus knob to get the specimen down ,and search images in the 10×ocular simultaneously, then use the fine knob to focus. At this moment, you can replace other magnification objectives safely, and focus without the risk of destroying the specimen.

2. When using the video set

Pull out the light path selector lever (see figure25), observe with both eyes, when the image is sharp, you can see the pictures directly on the video screen which connected by the micro photograph system through the video mount.

★ **If you need to fix the stage on a vertical position to make the observation become more convenience, take use of the locking set.**

#### 4-1-8 Adjusting the Swing out Condenser (Figure 23)

The center of the condenser and the light axes of the objective are coaxial. It has been adjusted before leaving factory, so the user needn't to adjust them by self.

The highest position of the condenser has been adjusted too. It also needn't any user's operation.

Turn the condenser focus knob to shift the condenser. It needs to raise the condenser when using the high magnification objective, and to decline when using the low magnification one.



1. Using the Swing out Condenser

When using the low magnification objective, turn out the condenser, and let it away from the light path.

While using the high magnification objective, turn it into the light path.

2. Adjusting the Aperture Diaphragm

The aperture diaphragm is designed for the adjustment of the numerical aperture, not for the brightness. Generally, reducing the diaphragm opening 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 aperture diaphragm, remove one eyepiece and look through the tube. You will see a dark circle encroaching on the bottom of the tube.



Figure 39

**4-1-9 Adjusting the Field Diaphragm (Figure 39)**

The control for the field diaphragm is a ring used for adjusting the area of field diaphragm. When using, turn the ring to reduce the field diaphragm, look into the field, if the diaphragm image is faintness, do the follow steps: first, turn the condenser focus knob, shift the condenser holder to the position where the observed image of the field of view is sharp; then open the field diaphragm, let the image full of the field of view, reduce the mixed light, improving the quality of the image.



Pointer knob                      Pointer rocker

Figure 40

**4-1-10 Adjusting Pointer (figure40)**

When the image is sharp by observe with both eyes, the image of pointer will on the field of view simultaneity. If not, you can turn the pointer rocker in four direction (up, down, left, right) gently, make the pointer on the field of view. If the image of pointer is unclear, you can turn the pointer knob to adjust the lightness until turn up a green sharp image.

- ★ Please gently when turn the pointer rocker or sipn the pointer konb, to protect inner circuit of the pointer konb.

**4-1-11 Switching the Light Path Selection (Figure 41)**

When the light path selector lever on the trinocular viewing set is pushed in, all the light enters the binocular tube, so you can do the binocular observation. While the lever pull out, some part of light enters the binocular tube, the left go up, enter the video tube, so you can observe through the video equipment.



Figure 41

## 4-2 Adjusting Secondary Minor



Interpupillar distance Indicator

Figure 42



Diopter Ring

Figure 43

### 4-2-1 Adjusting Interpupillar Distance

After adjusting the Primary Minor, observing the Secondary Minor Set, it will be a sharp image simultaneously. When observing with two eyes, hold on the left/right prism bolder, turn around the axis, adjusting the interpupillar distance until the left/right fields of view coincide completely.

### 4-2-2 Adjusting Diopter (figure43)

By turning the left diopter ring after the right ocular focus on the specimen, the operator whose left and right eye has different eyesight can obtain a comfortable focus.

### 4-2-3 Adjusting Pointer (figure40)

It will be a clear green pointer image after adjusting the Primary Minor, if the pointer not clear or invisible, you can turn the pointer knob moderately or turn the pointer rocker in four direction (up, down, left, right) gently to adjust lightness and height of the pointer, which will see the clear pointer image simultaneous on the field of view of Primary Minor and Secondary Minor.

**5. Technical Specifications**

**BS-2080MH10**

**1. Main specifications**

Optical System	Infinite Optical System
Viewing Head	Compensation Free Trinocular Head, Inclined at 30, Interpupillar distance: 48-75mm
	Compensation free binocular Head, Inclined at 30, Interpupillar distance:48-75mm
Eyepiece (Ocular)	Exceed wide field ocular EW10X/22, tubeΦ30 matched
Nosepiece	Backward Quintuple Nosepiece
Objective	Infinite plan Achromatic: 4×, 10×, 40×, 100×
Focus System	Coaxial Coarse and Fine Focusing System, Sensitivity and Graduation of Fine Focus: 0.001mm
Stage	Double layer mechanical stage, area: 185×142mm, movement range: 75×55mm
Koehler Illumination	Exposed illumination system, Aspheric collector, halogen lamp 6V30W
Condenser	Swing out condenser NA0.9/0.25

**2. Configuration Table**

Viewing Head	Compensation Free Trinocular Head	●
Eyepiece	Extra Wide Field Eyepiece	●
Objective	Infinite plan objective: 4×, 10×, 40×, 100×	●
	Infinite Plan Objective: 20×	○
Condenser	Swing out Condenser NA0.9/0.25	●
Video Accessories		○
Video Mount	C Mount 1×	○
	C Mount 0.5×	○
Polarization Device		○
Turret Phase Contrast Device		○
Dark Field Device		○
Fluorescent Attachment		○
Temperature Control Device		○

Note: ●Standard outfit, ○ Optional

**3. Objective Specifications**

Magnification	Numerical Value Aperture Diaphragm (N.A)	Working Distance (mm)	Thickness of Cover Slip (mm)	Conjugate Distance (mm)	Magnification Sign (Color loop)
4X	0.10	25.42	0.17	∞	Red
10X	0.25	11	0.17	∞	Yellow
40X	0.65	0.75	0.17	∞	Baby Blue
100X	1.25	0.21	0.17	∞	Black and White Circle

**6. Trouble shooting**

**BS-2080MH10**

Some problems will happen in the using of the microscope, you could solve them according the following list

<b>Problems</b>	<b>Reason for problem</b>	<b>Solution</b>
<b>I. Optical Part:</b>		
1. Illumination is opening, but the field of view is dark.	The poor contact exists in the lamp house and the illumination system.	Ensure the contact pin and the lamp holder pin work well
	The lamp bulb spoils	change a new bulb
	The brightness adjustment knob is set too dark	Adjust the knob in a proper position
	No use the appointed lamp bulb	use the specified halogen Lamp 6V30W
2. The edge of the field of view has shadow or the brightness is asymmetry	The nosepiece is not in the located position	Adjust it into the located position
	The surface of the lamp become black	Change a new lamp bulb
	The surface of the lens is moldy or has contaminant	Clean the lens
3. Find dust and stain in the field of view	There are stains on the specimen	Change the specimen
	There are stains on the eyepiece	Clean the eyepiece
4. The image is defocus\low-resolution	The objective damage	Mend and correct the objective (send to factory for overhauling)
	The lens of the objective and eyepiece is moldy or have contaminant	Do cleaning
	The opening of Aperture diaphragm and field diaphragm is not proper, and too much astigmatism.	Change the opening of the aperture diaphragm and field diaphragm
	Fine focus system is broken	Examine and repair the fine focus system(send to factory for overhauling)
	The objective is not in the center of the light path	Turn the nosepiece to the located position
5. The image focus surface incline (one side is clear and the other side is faint)	The illumination light incline serious	Adjust the filament position, let the light distributing of the field of view become symmetrical and bright
	The specimen don't correctly place	Put the specimen on the right position

	The nosepiece is not in the located position	Turn the nosepiece in the required position
6. The eyes are uncomfortable, the left and right fields of view is not coincided .	The interpupillar distance is not correct	Adjust the interpupillar distance correctly
	The diopter is not right	Adjust the diopter according your sight
	Can't adapt to binocular 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 the objective
7. The pointer is unclear or invisible in the field of view	The lightness of pointer is not enough or the pointer is not in the middle of the field of view	Turn the pointer knob to adjust the lightness or turn the rocker in four direction(up, down, left, right)softly which make the pointer in the middle of the field of view

<b>PROBLEM</b>	<b>REASON FOR PROBLEM</b>	<b>SOLUTION</b>
<b>II. Mechanical Part:</b>		
1. The coarse focus knob is hard to run	The tension adjustment collar is too tight	Loose properly
2. The image can't stay on the focal plane in the process of the observation	The tension adjustment collar is too loose	Tighten properly
<b>III. Electric Part:</b>		
1. 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
2. The bulb burn out in a high frequency	Not use the specified lamp	Use the required lamp
3. 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
4. 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