



# **BS-3047, BS-3048 Series**

## **Zoom Stereo Microscope**

### **Instruction Manual**

This instruction manual is for the BS-3047, BS-3048 series stereo microscopes. 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.

## **Attentions ! !**

### **1) Purpose**

The series microscopes are used only for microscopic observation, not for other purpose, otherwise may cause damage.

### **2) Disassembled only by the professionals**

The microscopes have been adjusted before shipping, Unprofessional-person should not disassemble and remove any parts.

### **3) The proper usage**

Power supply voltage must be consistent with the input voltage marked in the microscope. If beyond this range, equipment will be seriously damaged. Microscope is a precision instrument and should be operated carefully, operators should comply with appropriate safety procedures and assume responsibility for the safe use of this instrument.

### **4) Use in safe way, prevent burns and fire**

When the illumination is on, temperature of bulb and collector will rise sharply, so pay attention to anti-hot logo, to prevent burns.



Do not use alcohol, gasoline, paper and other combustibles near the instrument, to prevent a fire! !

### **5) Notes on replacing the bulb**

The correct bulb must be used as the same specification of the bulb in the microscope. Use of other bulbs may damage the equipment. Before replacing the lamp, must turn off power switch, and unplug it in order to avoid electric shock and damage to equipment. When replacing the lamp, be careful not to pollution bulb. The bulb shouldn't have dust , fingerprints, oil, etc..

The power supply must be cut off before bulb replacement. The bulb must be cooled down completely before proceeding! !

### **6) Requirements for handling and using environment**

Power must be cut off before moving. Be careful not to crush your finger when placed.

This instrument is a precision instrument, and it should be handle with care, severe shock can cause serious damage to equipment-related parts.

The required available environment for using of the equipment:

Indoor temperature: 0 °C ~ 40 °C

Maximum relative humidity: 95%

High temperature or high humidity may cause mildew, fog or dew of the optical components.

7) For the protection of the environment, please properly handle the microscope packing waste (such as: cardboard, foam, etc.)

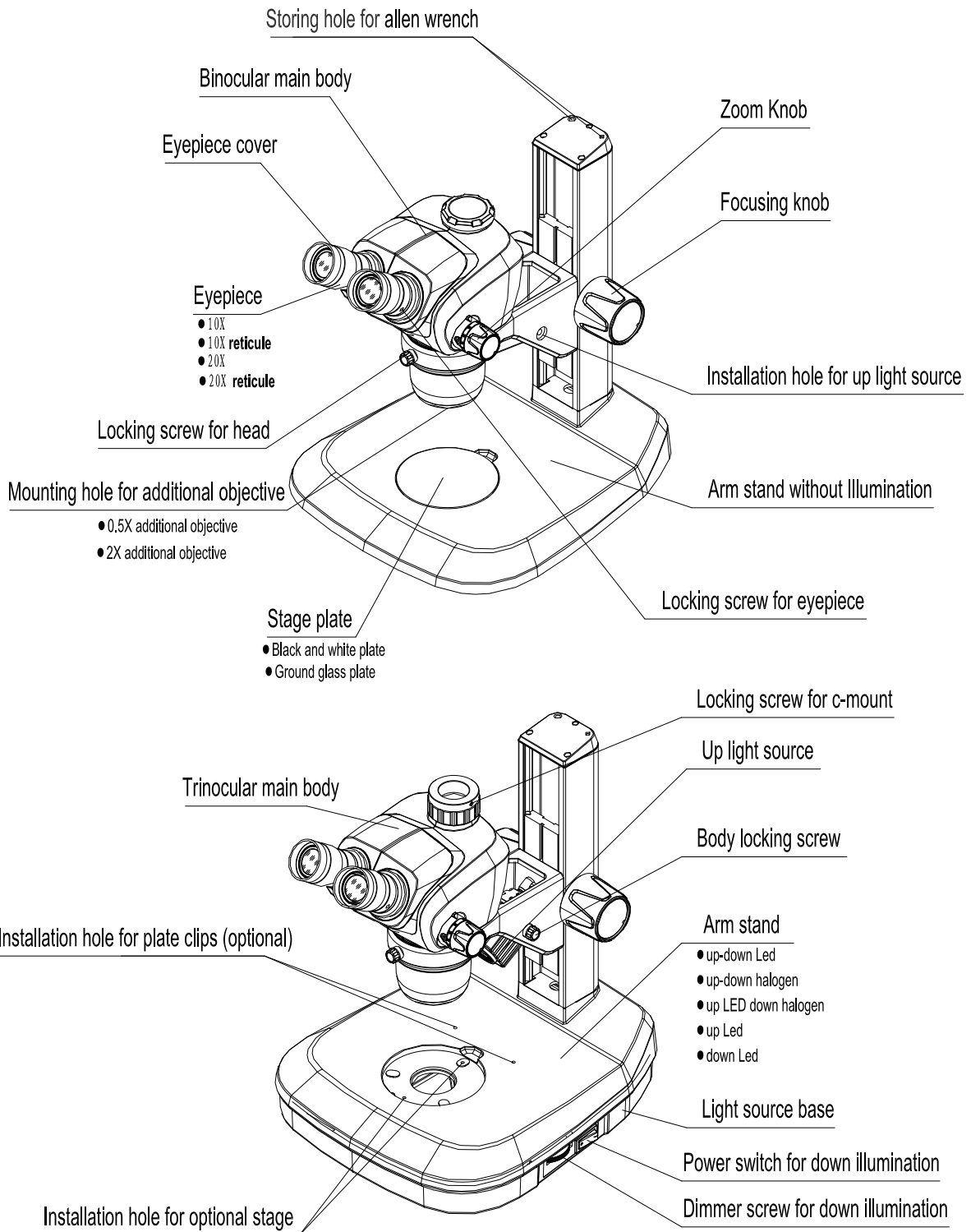
### **8) Statement**

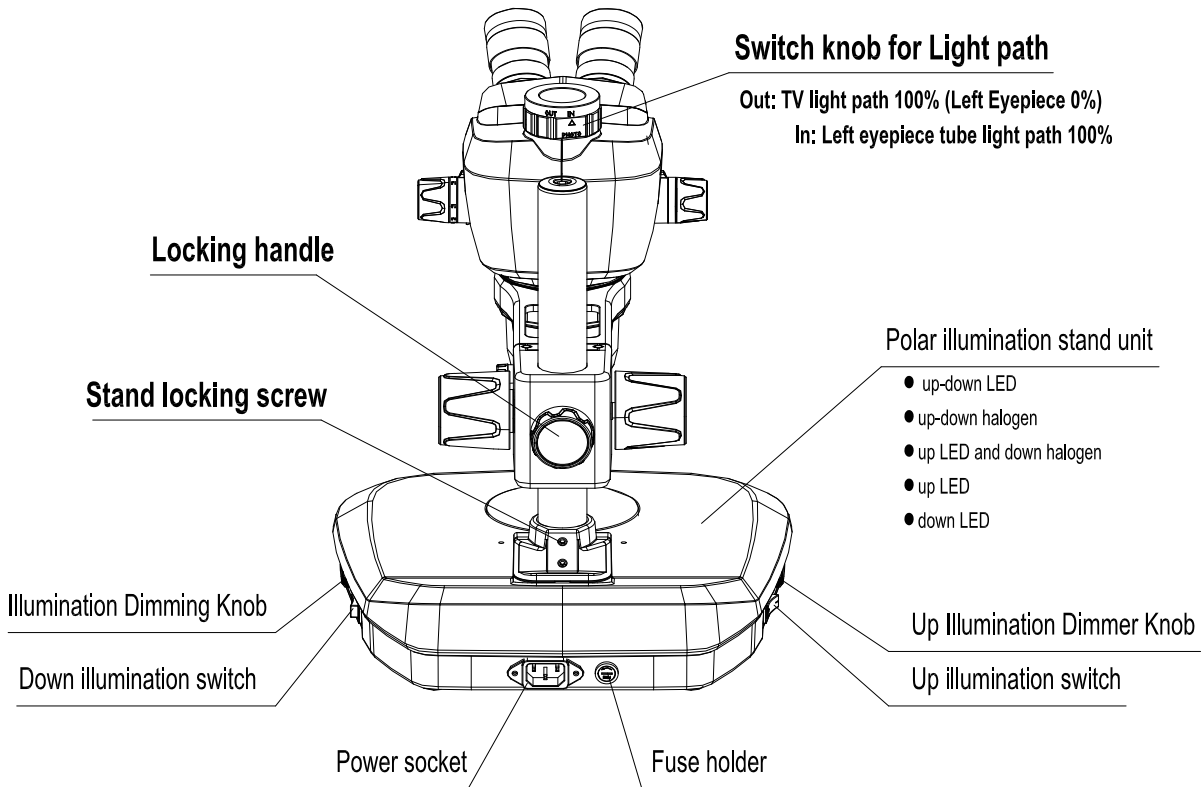
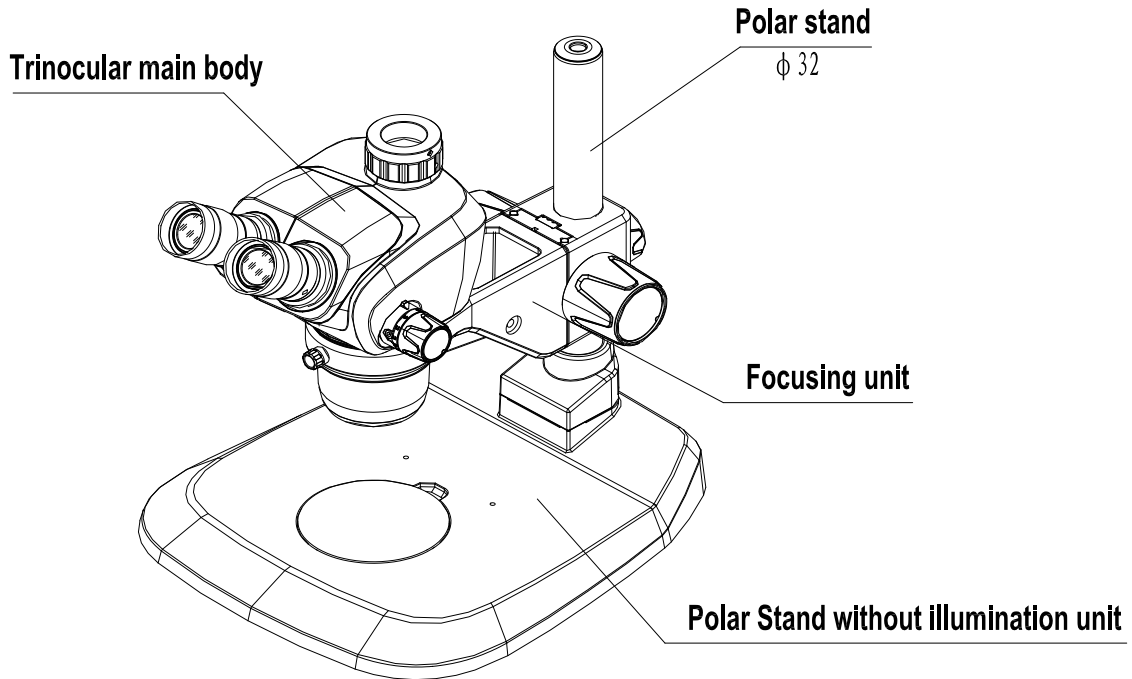
Our company reserves the right to improve product design and outfits.

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# 1. Parts Name



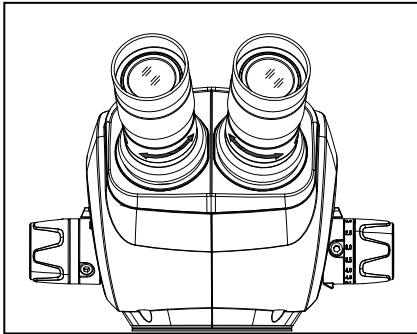


## 2. Observation procedure

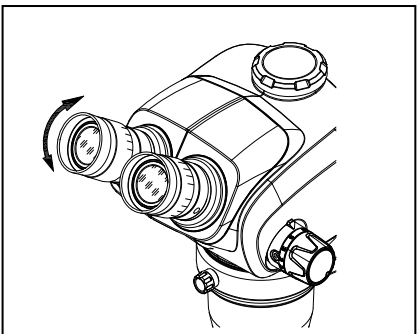
### 2.1 Preparation

1. Check parts
2. Check eyepiece if correctly inserted into tube
3. Prepare for light source

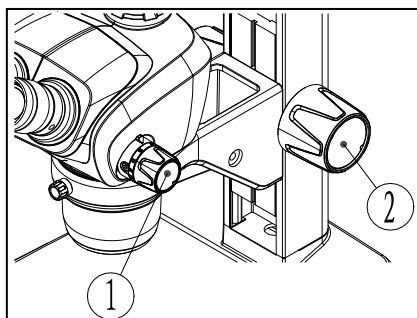
### 2.2 Procedure



1. Put sample on stage
2. Adjust interpupillary distance



3. Adjust diopter



4. Adjust Zoom knob ① to minimum level, rotate the focusing knob ② for coarse focus.
5. Rotate the zoom knob ① to the required magnification, then focus with focusing knob.

### 3. Operation

#### 3.1 Stand

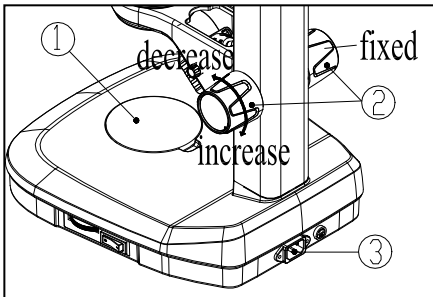


Fig 1

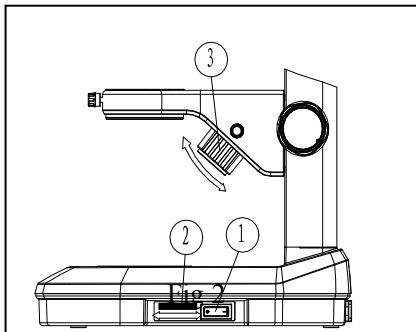


Fig 2

##### 3.1.1 Usage of stage round plate

In order to more easily observe samples in reflecting illumination, Stage plate ① can be changed from white side or black side.

- ◎ Ground glass plate can be used with transmitting illumination

##### 3.1.2 Focusing knob adjustment

Holding left& right focusing knob ② with both hands(Fig 1), then fixed left focusing knob, rotating clockwise the right focusing knob, Strain can increase otherwise decrease.

- ◎ Suggestion:

Set tension at higher position in case of automatic down.

##### 3.1.3 Usage of light source (Only for stand with illumination)

1. Plug in power cable in socket ③ (Fig 1), turn on the power.
2. Turn on power switch ①(Fig 2), transmitted light will be bright.
3. Rotate down illumination wheel ② (Fig 2) to adjust brightness.
4. Rotate the top illumination ③ for adjusting the light position.

#### 3.2 Main body

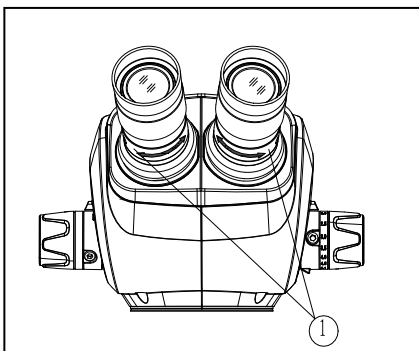


Fig 3

##### 3.2.1. Interpupillary Distance Adjustment (Fig.3)

Holding binocular eyepiece tube ①, adjusting eyepiece field until left &right field overlap totally.

- ◎ The noise is normal when rotating the eyepiece tube to adjusting field.

##### 3.2.2. Diopter adjustment (Fig 4-5)

◎ Different operation ways depend on whether use reticule eyepiece.

###### \* Not Use Reticule Eyepiece.

1. Make left & right eyepiece diopter adjustable ring ① to "0" position.
2. Put sample on the stage plate.
3. Rotate zoom knob ② to min. magnification power, then focus the sample with focusing knob ③.
4. Rotating zoom knob ② to max.zoom power, then focus the sample with focusing knob ③.
5. Rotating zoom knob ② to min. zoom power, to focus the sample with left & right eyepiece diopter adjustable ring ①.

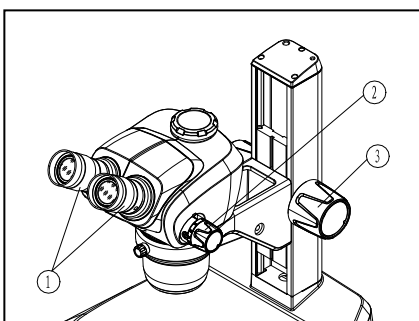


Fig 4

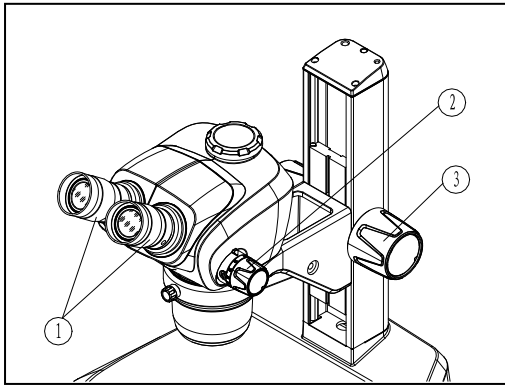


Fig 5

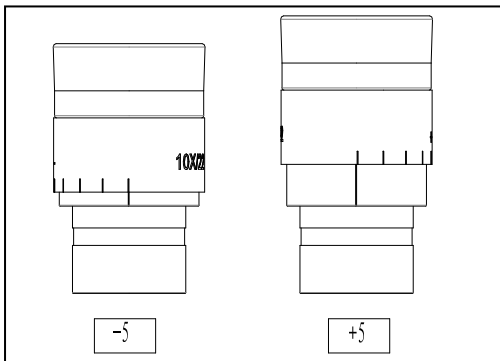


Fig6

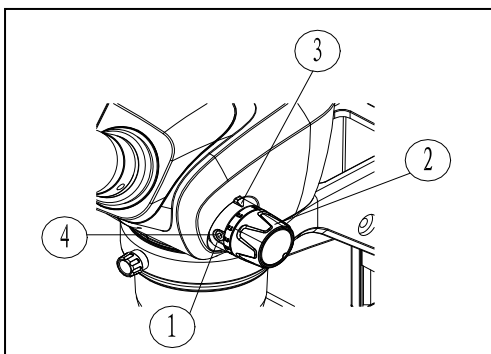


Fig 7

**\* Use Reticule Eyepiece.**

1. With micrometer eyepiece to observation, rotate diopter adjustable ring ① to focus the scale.
2. Put sample on the stage plate.
3. Rotate zoom knob ② to low magnification power, focus the sample with focusing knob ③ to observe the sample with micrometer eyepiece.
4. Rotate zoom knob ② to maximum power, then focus the sample with focusing knob ③.
5. Rotate zoom knob ② to minimum power, to focus the sample only with eyepiece diopter adjustable ring ① without reticule .

◎ Notice or Write down diopter number on the left& right eyepiece.

**10X Eyepiece diopter scale (Fig 6)**

◎ Useful range from -5 to +5 or over +5 to -5. Whether over -5 or below +5, both can confirm by eyepiece length.

**3.2.3 Usage of zoom magnification limiter(Fig 7)**

◎ By using limiter(indicate magnification value) and zoom knob spacing ring, Magnification can be limited in the required range. Right zoom knob is used to limit the high magnification, left zoom knob is used to limit the low magnification .

1. Use hexagon wrench to loosen right spacing ring's ①screw ④, it can rotate. (same way to loosen left ring)
2. Rotate right zoom knob ②, the maximum magnification can in alignment with indicator(limiter) ③.
3. Make spacing ring①close to limiter ③, Using hexagon wrench to fasten screw for fixed condition.
4. Rotating right zoom knob ②, the minimum magnification can in alignment with indicator(limiter) ③, in the same way to fix spacing ring.



### 3.2.4 Usage of eyecup (Fig 8)

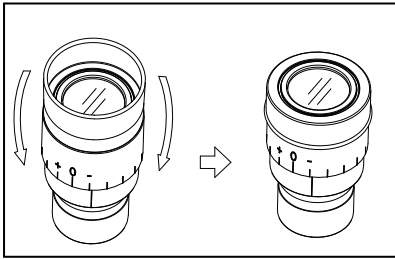


Fig 8

Using eyecup: First to open the folding cover by following direction of arrow in case of touching eye or scraping eyepiece.

Don't use eyecup: Put it in normal folding position in case of external light between eyepiece and eyes.

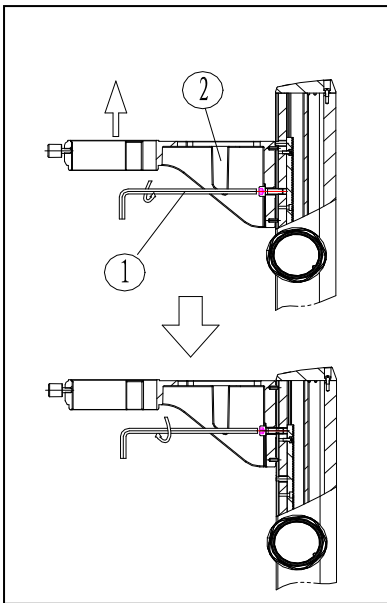


Fig9

### 3.2.5 With additional objective (Fig 9)

- ◎ Because 0.5X additional objective has long working distance, bracket② must adjust to higher position.
- 1. With 5mm allen wrench① to remove bracket② screw (up illumination lamp should be moved from the stand).
- 2. Moving the bracket② to higher position and fasten the screw.
- ◎ Screwing additional objective into the hole at the bottom of the microscope.

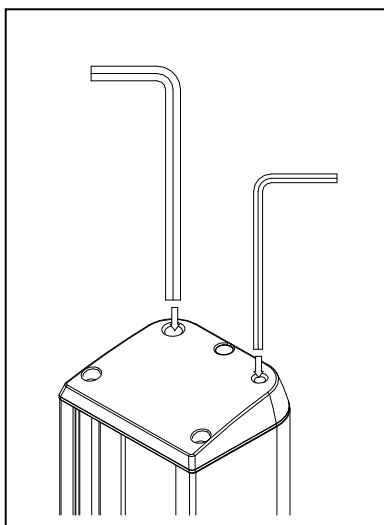


Fig 10

### 3.2.6 Storing for allen wrench (Fig 10)

Cover on arm stand can hold 5mm and 3mm allen wrench.  
Storing hole is convenient for next use.

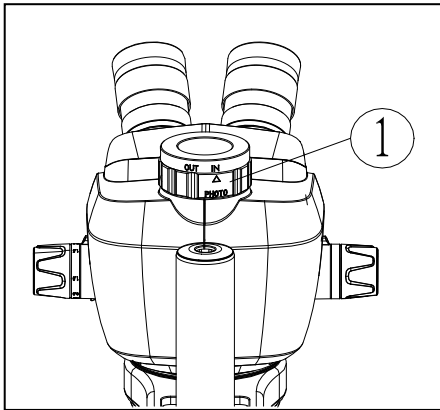


Fig 11

**3.2.7 Choose light path (Trinocular main body) (Fig11)**

1. Through binocular light path to observe sample, please turn the switching knob① to **IN**. (Fig 11)
2. Through camera light path, please turn the switching knob① to **OUT**. (Fig 11)

Because in this position ,mirror inserted into the light path , so 100% left eyepiece tube light distribution will pass video output.

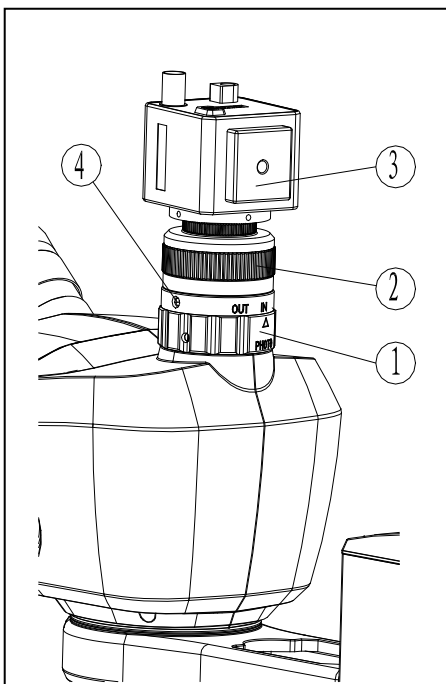


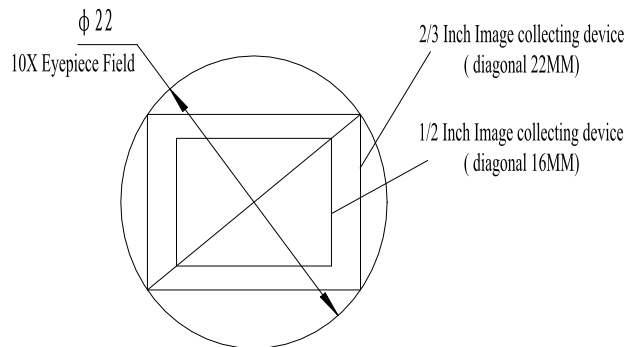
Fig 12

**3.2.8 Adjusting camera parfocality (trinocular main body) (Fig 12)**

◎Keep parfocality between image and video camera monitor for better image output after switching light path.

1. Adjust eyepiece diopter to focus ( Fig. 6-7).
2. Rotate the switching knob① to **OUT**, set minimum magnification .
3. Hold camera ③, rotate adjustable knob ②, adjust parfocality to focus for monitor image.

◎ Jointing one 0.5X C-mount with the bottom of the camera .



**Monitor image rotation.**

For TV light path, The monitor image will rotate slightly because Left eyepiece light path is in inclined way.

Rotating camera, monitor image will align at observation image. (loosening locking screw④and rotating camera, then monitor image is coincided with observation image, fasten the locking screw④).

## 4. Outfit

Items		BS-3047B1	BS-3047B3	BS-3047T3	BS-3048B1	BS-3048B3	BS-3048T3
Main Body (0.68X-4.7X)	Binocular	●	●				
	Trinocular			●			
Main Body (0.68X-4.7X)	Binocular				●	●	
	Trinocular						●
10XEyepiece/Φ23mm		●	●	●			
10XEyepiece/Φ24mm					●	●	●
20XEyepiece/Φ12mm		○	○	○	○	○	○
0.5X/2X Objective		○	○	○	○	○	○
Eyeguard		●	●	●	●	●	●
Focusing unit		●	●	●	●	●	●
No light		●			●		
Reflecting 3W LED			●	●		●	●
Reflecting 5W LED			○	○		○	○
Transmitting 3W LED			●	●		●	●
Black & white Plate		●	●	●	●	●	●
Glass Plate			●	●		●	●
Arm stand		●	●	●	●	●	●
Pillar stand		○	○	○	○	○	○
Base (330×300mm)		●	●	●	●	●	●
Polarizing Unit		○	○	○	○	○	○
Fine focusing unit		○	○	○	○	○	○
C-mount 0.5X				●			●
C-mount 1X				○			○
Adapter for digital photo camera				○			○
Two dimensional travelling table		○	○	○	○	○	○
Single pole Universal Stand		○	○	○	○	○	○

Note: "●" In Table Is Standard Outfits, "○" Is Optional Accessories.

## 5. Technical specification

### BS-3047 Series

Additional Objectives		0.5X	0.75X	1X(built-in)	1.5X	2X
Working distance (mm)		184mm		108mm		40mm
<b>10X Eyepiece</b> /φ23mm	magnification	3.4~23.5	5.1~35.3	6.8~47	10.2~70.5	13.6~94
	Field dia(mm)	67.65~9.75	45.1~6.52	33.82~4.89	25.55~3.26	16.91~2.45
<b>15X Eyepiece</b> /φ17mm	magnification	5.1~35.3	7.65~52.9	10.2~70.5	15.3~105.8	20.4~141
	Field dia(mm)	50.0~7.23	33.33~4.82	25.0~3.62	16.67~2.41	12.5~1.81
<b>20X Eyepiece</b> /φ13mm	magnification	6.8~47	10.2~70.5	13.6~94	20.4~141	27.2~188
	Field dia(mm)	38.24~5.53	25.49~3.69	19.12~2.77	12.75~1.84	9.56~1.38

### BS-3048 Series

Additional Objectives		0.5X	0.75X	1X(Built-in)	1.5X	2X
Working distance (mm)		184mm		108mm		40mm
<b>10X Eyepiece</b> /φ24mm	magnification	3.3~25.5	5.0~38.3	6.6~51	9.9~76.5	13.2~102
	Field dia(mm)	72.73~9.41	48.48~6.27	36.36~4.71	24.24~3.14	18.18~2.35
<b>15X Eyepiece</b> /φ17mm	magnification	5.0~38.3	7.4~57.4	9.9~76.5	14.9~114.8	19.8~153
	Field dia(mm)	51.52~6.67	34.34~4.44	25.76~3.33	17.17~2.22	12.88~1.67
<b>20X Eyepiece</b> /φ13mm	magnification	6.6~51	9.9~76.5	13.2~102	19.8~153	26.4~204
	Field dia(mm)	39.39~5.10	26.26~3.40	19.70~2.55	13.13~1.70	9.85~1.27

\* When use 0.5X auxiliary objective, the focus arm should be changed to upper position of the square rail pillar stand.

- © No matter the zoom magnification, the working distance of same objective will not change.
- © Use the following formula to calculate Total magnification and field of view

Total magnification = Zoom Magnification × Eyepiece Magnification × Auxiliary Objective Magnification

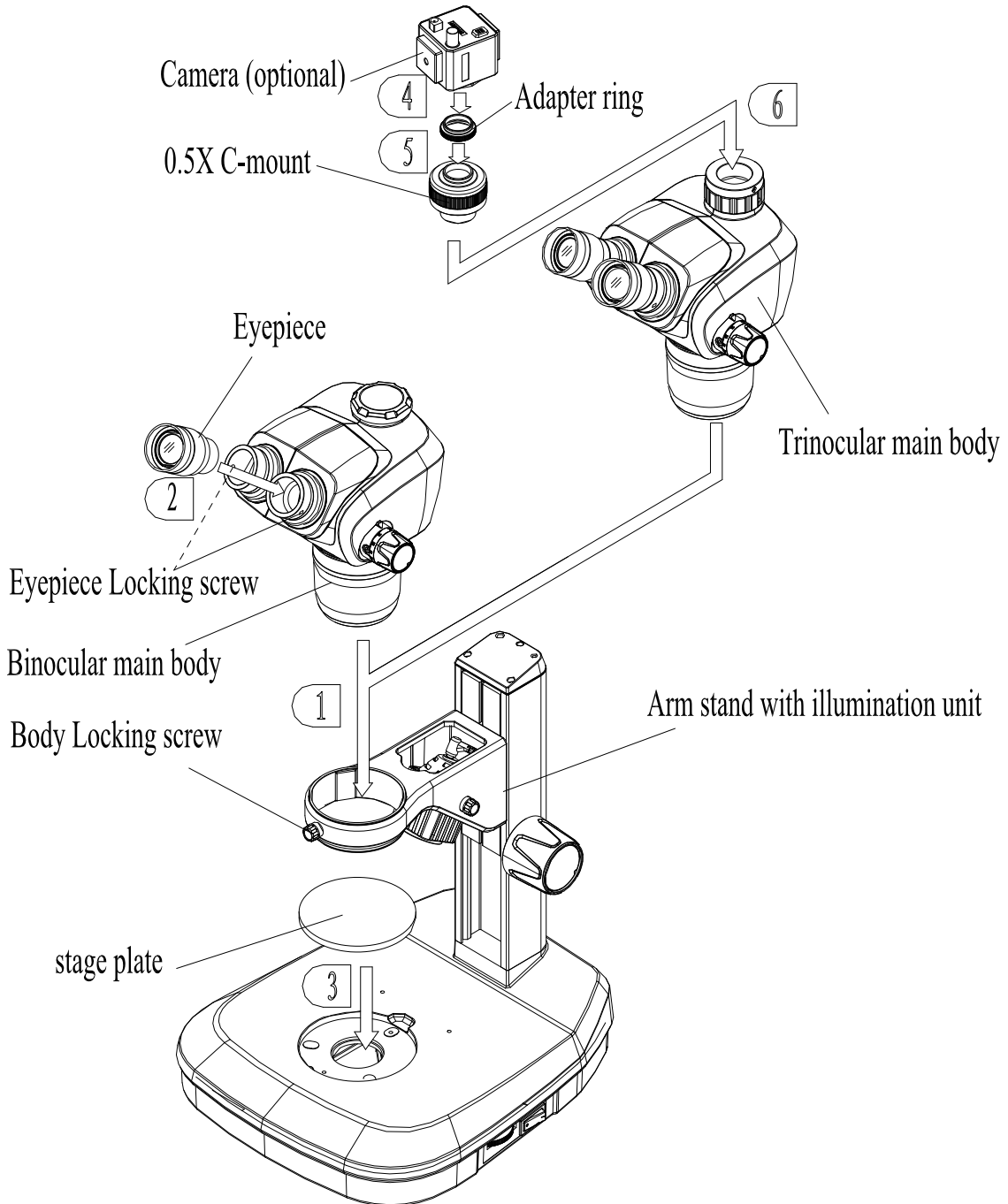
FOV=Eyepiece FOV / (Zoom Magnification× Auxiliary Objective Magnification\*)

\* Without Auxiliary Objective, this value is 1

## 6. Installation

### 6.1 Installation diagram (Note: Number is installation sequence)

★ To ensure that all parts has no dust and dirt. Note any part not scratch, rub or touch the glass surface.



## 6.2 Installation Details

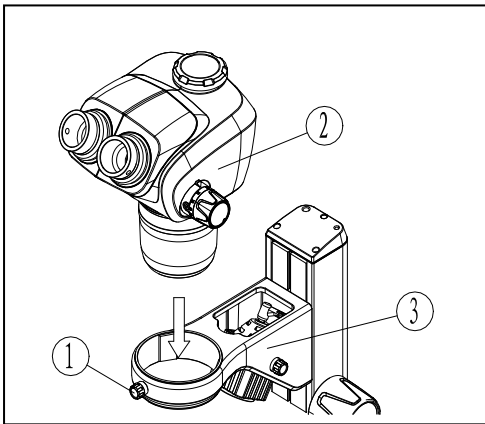


Fig 13

### 6.2.1 Main body Installation (Fig.13)

1. Unscrew body locking screw ①, insert main body ②.
  2. Fasten the Body Locking screw ①.
- ◎ You can rotate the main body if making observation from one side of focusing knob.

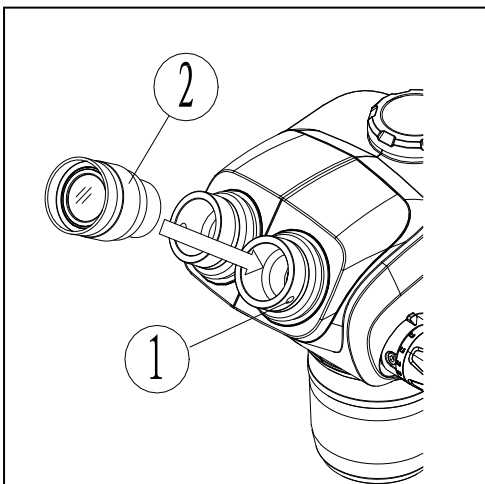


Fig 14

### 6.2.2 Eyepiece Installation (Fig.14)

1. Turn eyepiece ② to 0°, then insert into the eyepiece tube, line is up (if choose ordinary eyepiece, no such step).
2. Fasten the eyepiece locking screw ① with socket head wrench.

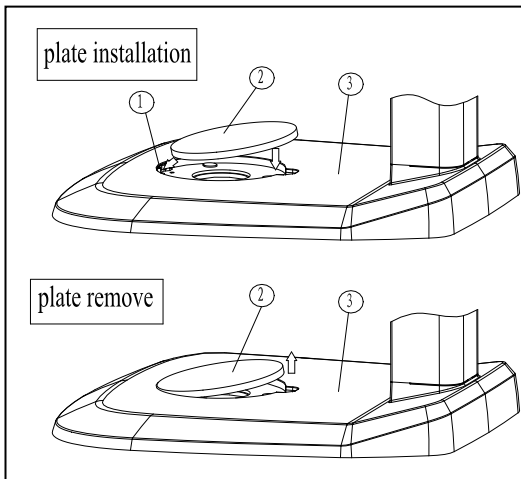


Fig 15

### 6.2.3 Stage plate installation (Fig 15)

1. Insert the stage plate (2) to slide on the spring of the bed plate①, then make the plate into the mounting hole and press from top to down to make it firmly installed.
- ◎ According to different sample to chose white plate cover or black plate cover.
2. Please remove the plate directly with finger following the diagram .

### 6.2.4 Camera installation (Only apply to trinocular body) (Fig 16)

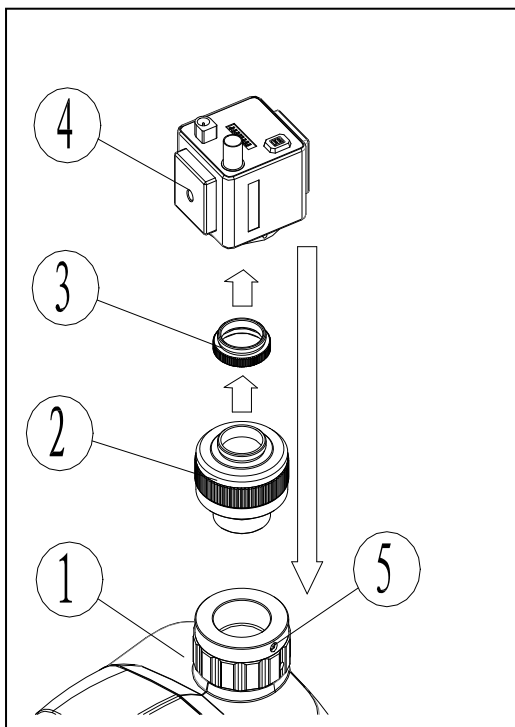


Fig 16

1. Connect C-mount ② and adapter ring ③ .
2. Screw in the combination adapter to the camera.
3. Loosen the locking screw ⑤, insert the camera and lock again.
4. Connect the data cable from monitor or computer to camera.

## 7. Optional accessory

### 7.1 LED Ring light or Cold light source with Ring Optical Fiber

#### 7.1.1 Installation (Fig 17)

1. Screwing the ring lamp jointing ring in main body.
2. Connecting the ring light source and fasten the locking screw.

#### 7.1.2 Usage

1. Switch on the power after installing the illumination.
2. Use light dimmer to change the illumination brightness.

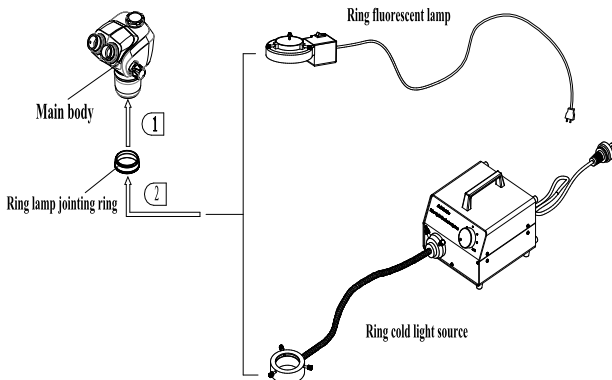


Fig 17

### 7.2 Polarizing unit

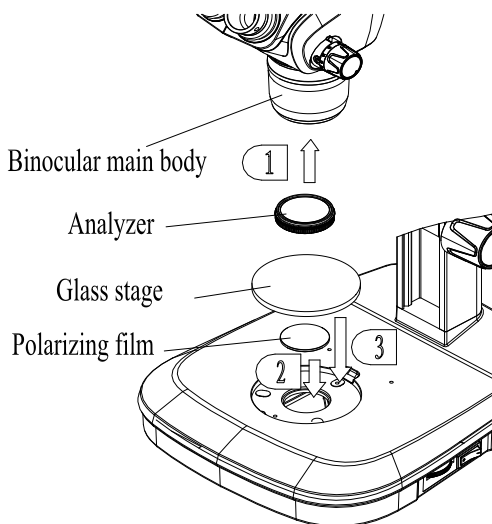
#### 7.2.1. Installation

1. Put the analyzer in the bottom of the microscope head.
2. Put the polarizing film in the stage hole.
3. Install the glass plate (Fig 15).

#### 7.2.2 Usage

The polarizing unit must be used with transmitting illumination unit.

Focusing for samples: rotate analyzer for best illumination effect, light intensity can be changed by using the down illumination dimmer Knob.





## 8. Troubleshooting

Trouble	Causation	Remedy	Page
Left & right field of view can't overlap.	Interpupillary distance adjustment isn't correct.	Readjust	6
	Optical parallax isn't correct.	Readjust	6-7
	Left & right Eyepiece is different.	Change eyepiece with same magnification.	3
Dust found in view image.	Dust on sample.	Wipe the dust	16
	Dust on eyepiece.		
Image isn't clear.	The dust on the top of the objective.	Wipe the dust	16
When changing focus and magnification power, sample image is out of focus.	Eyepiece diopter isn't accurate.	Re-adjust again.	6-7
	Focusing adjustment isn't correct.	Focusing again.	5
Image in Right field or image in monitor became two half.	Light path switch knob isn't at IN position.	Turn switch knob to IN.	9
Monitor image is out of focus .	Incorrect focusing adjustment for camera.	Focusing again.	9

## 9. Maintenance and clean

9.1 If the lens surface has dust, please clear with a blow ball. If the lens surface with fingerprints or oil stain, please clean gently with absorbent cotton or lens paper dipped in a little ethanol ether mixture (ratio 1:4) .

Absolute alcohol is an inflammable material, please turn off the power and don't close to cause fire, Please assure indoor ventilation.

9.2 Don't use solvent to wipe non-glass parts unless with soft hairless cotton in little neutral cleanser.

9.3 Don't disassemble microscope parts, otherwise result in damage for performance.

If you have any question, please contact us or our local distributor.

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