

USER MANUAL

LMS-Z400 Series



Contents

Before use	3
System Diagram	4
Assembly	
Assembly Schematic	5
Assembly Steps	6-9
Operation	
Set Illumination	10
Adjusting the Reflector	10
Adjusting the Focusing Tension	11
Adjusting the Diopter and Focus	11
Adjusting the Interpupillary Distance	11
Adjusting the Elevation Angle of Observation Head	11
Magnification Click-Stop Function	12
Use of the Eye-cup	12
Adjusting the Aperture Diaphragm	13
Selecting the Light Path	13
Assembling and Use the C-Mount Adapter	13
Assembling and Use of Polarizer	13
Troubleshooting	14
Warranty	14
Specifications	15



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Before Use

Notice

1. Microscope should be placed in a dry and clean place. Do not expose the microscope in the sun directly. Avoid high temperature and vibration.
2. As microscope is a precision instrument, handle with care, avoiding impact or abrupt movement during transportation.
3. Environmental parameters: Indoor temperature: 5°C-40°C, Maximum relative humidity: 80%.
4. When moving the microscope, use both hands to hold at position (1) and (2) of the microscope. (See Fig. 1). Note: It will damage the microscope by holding the observation head, focusing knob, body or objectives when moving.
5. To keep the image clear, do not leave fingerprints or stains on the surfaces of the lens.
6. Never turn the left and right focusing knob in the adverse direction at the same time, otherwise the microscope will be damaged.

Maintenance

1. All lenses must be kept clean. Fine dust on the surface of the lens should be blown off with hand blower or wiped off gently with a soft lens tissue; Fingerprints or oil marked on it should be wiped off with a tissue moistened with a small amount of xylene or a 3:7 mixture of alcohol and ether.
2. Never use the organic solution to clean the other surface (especially the plastic surfaces). If necessary, please choose a neutral detergent.
3. Do not disassemble the microscope, potential damage may occur.
4. After using, cover the microscope with the dust-cover and store it in a dry, clean place free from moisture.

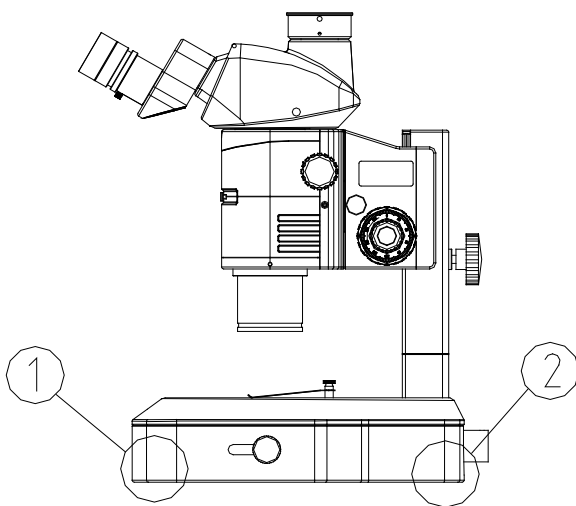
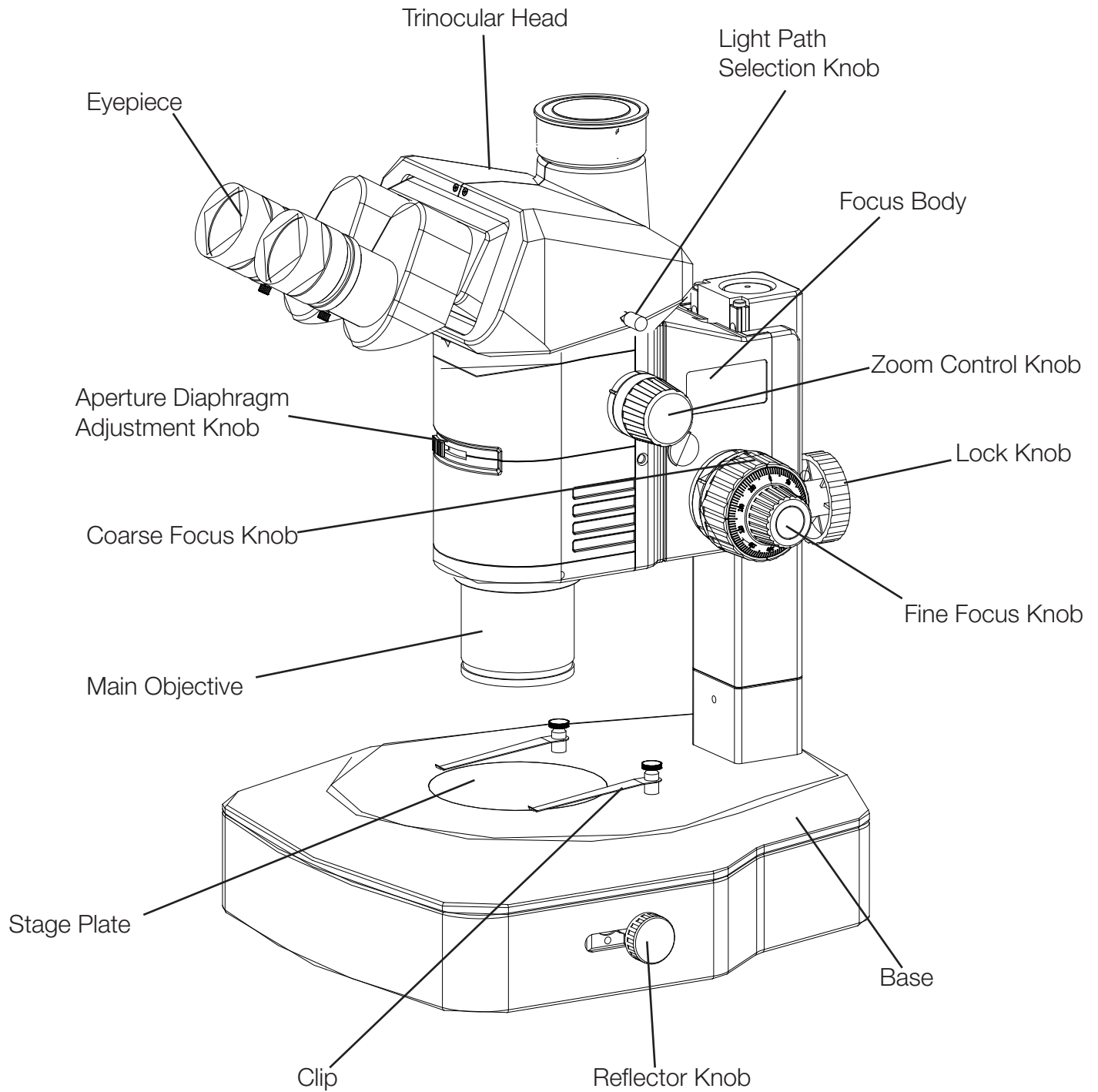


Fig.1

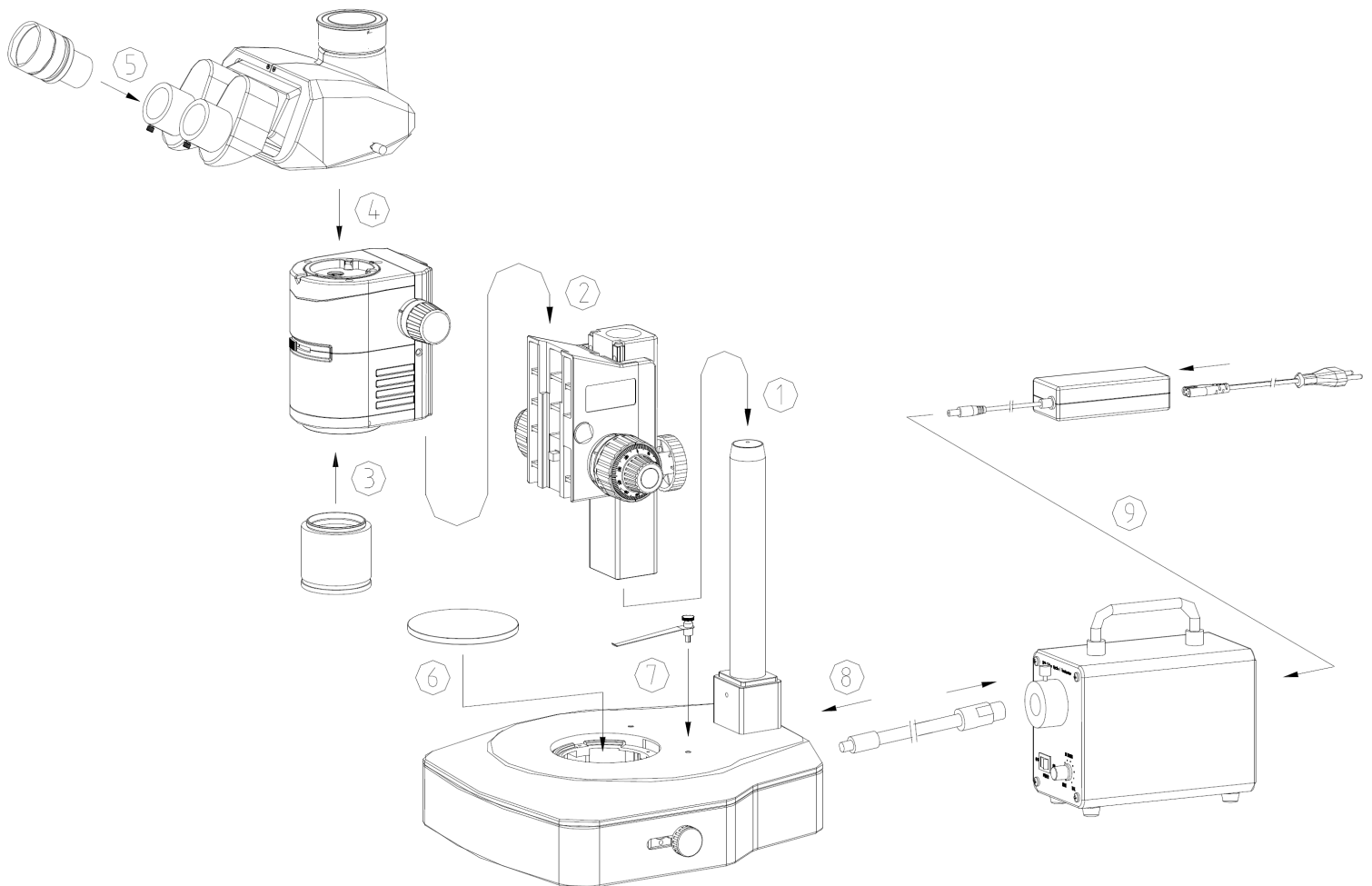
1. System Diagram



Assembly

Notice

1. The numbered steps below indicate the typical steps required to assemble the LMS-Z400 series stereo microscope systems.



Assembly

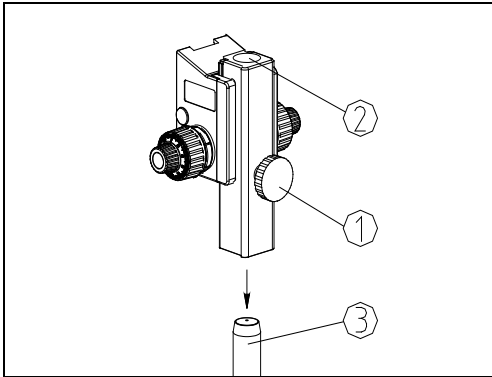


Fig.2

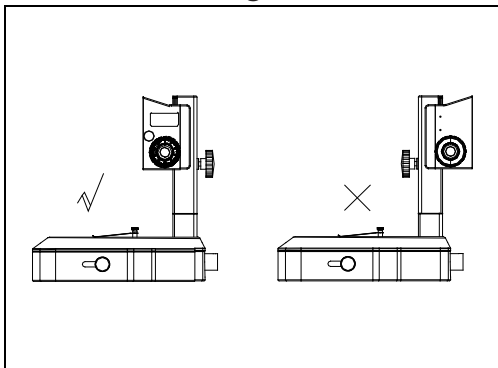


Fig.3

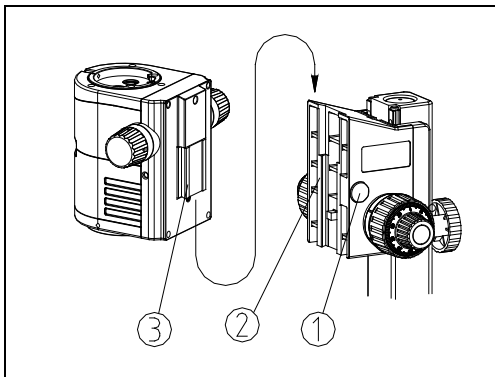


Fig.4

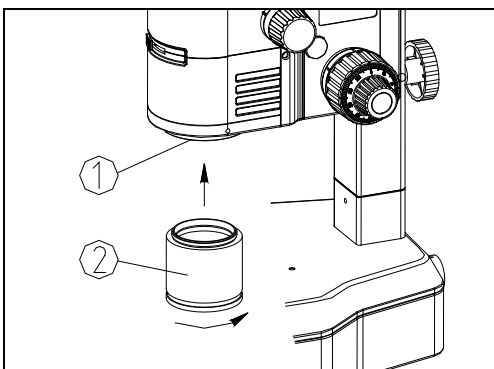


Fig.5

Focus Bracket Assembly

1. Loosen the lock knob (1) of the focusing bracket group, insert the hole (2) of focusing bracket group into the column (3), until the focusing bracket group to the lowest position. Then tighten the lock knob (1) to prevent the microscope from turning.

Note: Carefully insert the focus bracket, don't force it.

Note: To avoid the microscope from tipping over, the focusing bracket must be assembled on the same side as the stage surface as seen on the left of Fig. 3. If assembled on the wrong side, the microscope will tip over.

Microscope Body Assembly

1. Remove the cover (1) of the focus bracket and loosen the M4 hex screw (See Fig. 4)
2. Align the dovetail interface (3) of the microscope body with the dovetail groove (2) of the focus bracket and insert it from top to bottom as shown in the figure.
3. Tighten the M4 hex screw on the focus bracket with a M4 hexagon spanner, then replace the decorative cover (1).

Objective Assembly

1. Rotate the objective as the arrowhead direction shown in the figure, and screw the objective (2) into the objective nosepiece (1). (See Fig. 5)

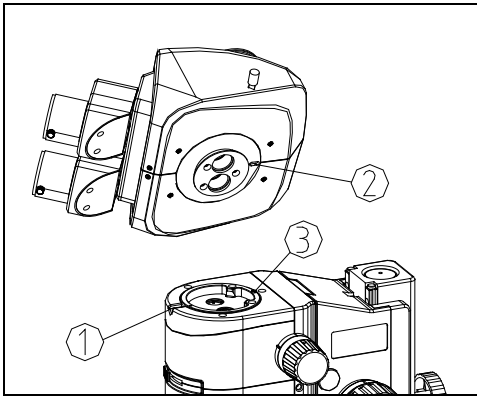


Fig.6

Head Assembly

1. Loosen the head lock-screw (1) completely with a M4 inner hex spanner.
2. Align the dovetails starting from rear and insert the dovetail on the microscope head into the zoom body. Align the orientation groove (2) of the head with the orientation pin (3) of the body and then tighten the lock screw (1). (See Fig. 6)

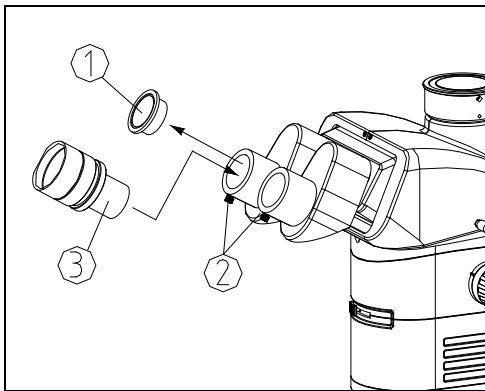


Fig.7

Eyepiece Assembly

1. Remove the eyepiece tube cover (1).
2. Insert the eyepiece (3) into the eyepiece tube, until it is fully inserted. Lock the eyepiece by tightening the lock-screw (2) (See Fig. 7)

Reticle Installation

1. Unscrew the pressure ring from eyepiece (see Fig. 8).
2. Clean the reticle, then install it into the pressure ring with the scaled surface upward (see Fig. 8).
3. Screw the pressure ring with reticle into the eyepiece until tight.
4. To remove the reticle, first unscrew the pressure ring from eyepiece, remove the reticle and store it for later use.

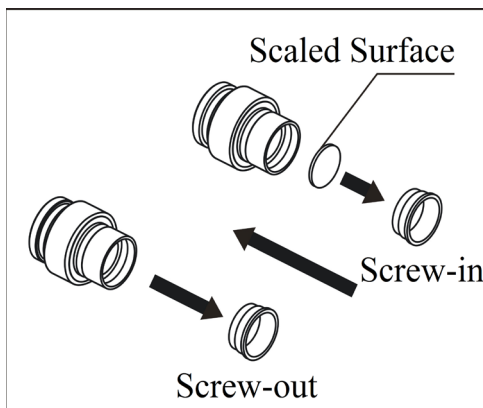


Fig.8

Stage Plate Assembly

1. Install the stage plate into the circular opening in the microscope base.
2. To remove the stage plate, use fingertip to press down on the stage plate near its edge (as the arrowhead direction shown in Fig. 9), this will cause other end of stage plate to lift up for removal. (See Fig. 9)

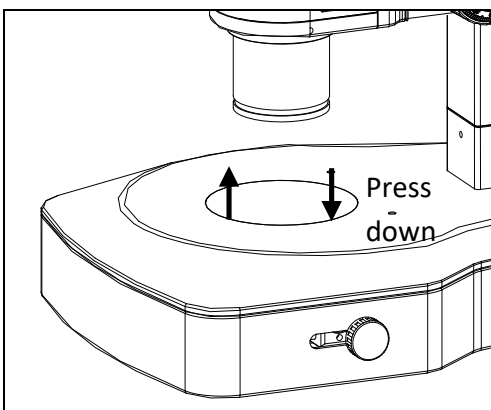


Fig.9

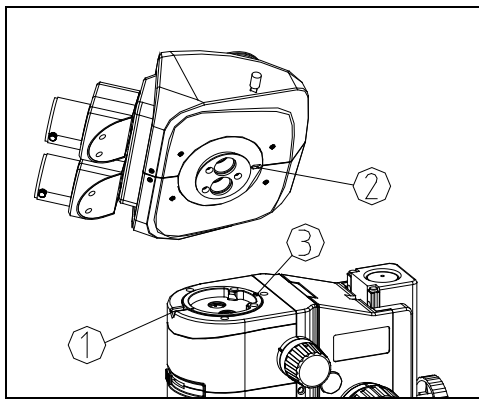


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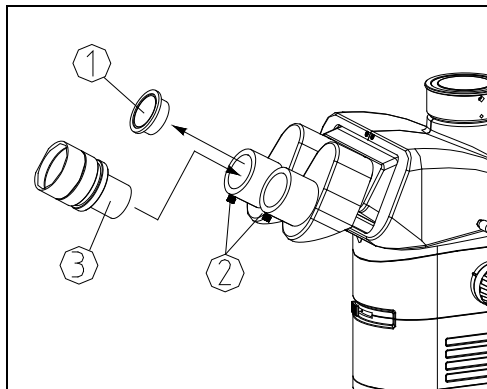


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Reticle Installation

1. Unscrew the pressure ring from eyepiece (see Fig. 8).
2. Clean the reticle, then install it into the pressure ring with the scaled surface upward (see Fig. 8).
3. Screw the pressure ring with reticle into the eyepiece until tight.
4. To remove the reticle, first unscrew the pressure ring from eyepiece, remove the reticle and store it for later use.

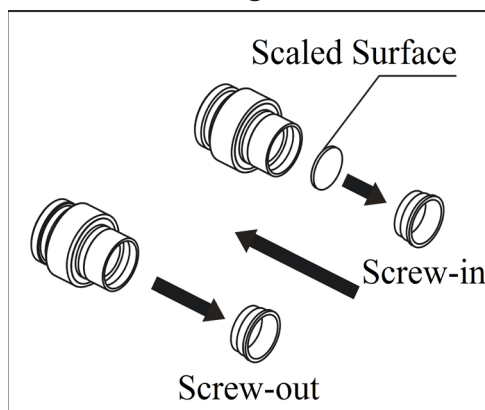


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Stage Plate Assembly

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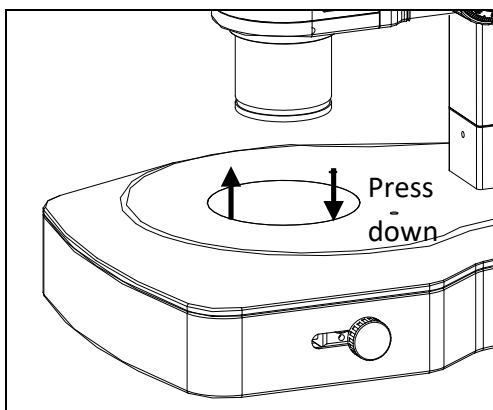


Fig.9

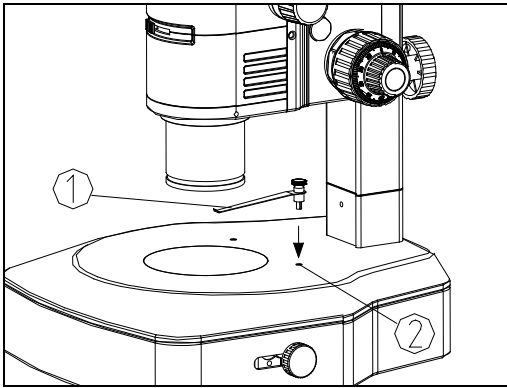


Fig.10

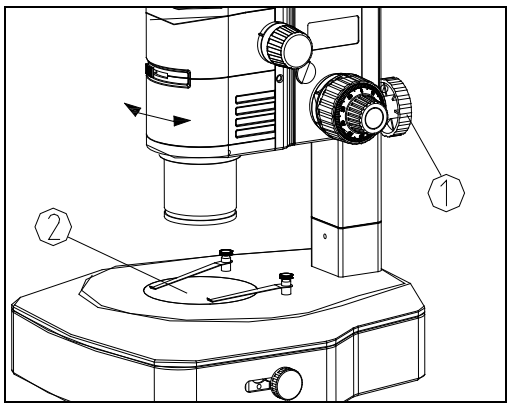


Fig.11

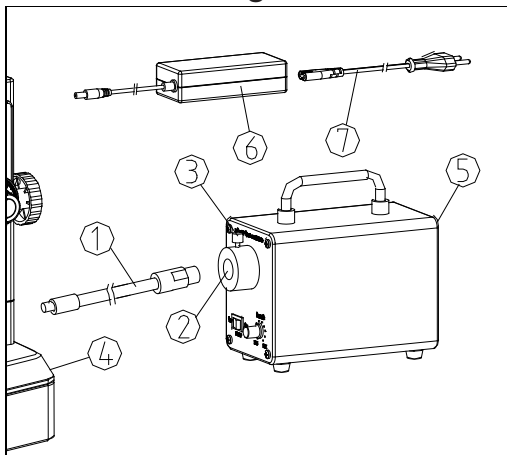


Fig.12

Stage Plate Assembly

1. Using the stage clip can help secure specimens to the stage plate.
2. Insert the clip (1) into the two holes of the base (2) as shown in Fig. 10.

Microscope Body Alignment

3. Loosen the lock knob (1), and rotate the microscope body and the focusing bracket left or right.
4. Align the center of zoom body with the center of stage plate, then tighten the lock knob (1). (See Fig. 11)

LED light source Installation (LMSP-Z400B2 stand)

1. Make sure the main switch is at "O" (OFF) position. (See Fig. 12)
2. Insert one end of the optical fiber (1) into the opening in illumination box (2). Align the flat surface with the lock screw (3), then secure with the lock screw (3).
3. Insert the other end of the optical fiber (1) into the opening in the base (4), then secure it with the lock screw.
4. Plug the power adapter (6) into the back of the power illumination box (5).
5. Insert the power cable (7) into the corresponding hole of the power adapter (6) and the other end into the power supply socket.

Notes:

- The power supply box supports wide voltage as 100-240V.
- Don't use strong force when the power cord is bent or twisted, this may cause be damaged.
- Connect the power cord appropriately and make sure power supply is grounded.

Operation (LMSP-Z400B2 Stand)

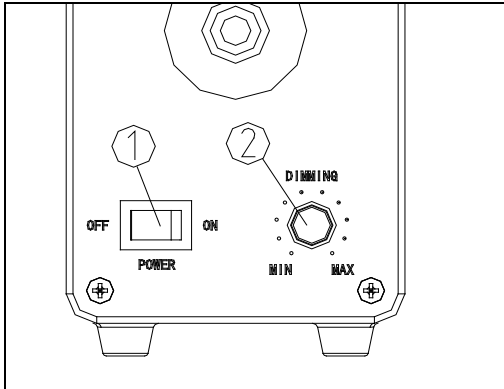


Fig.13

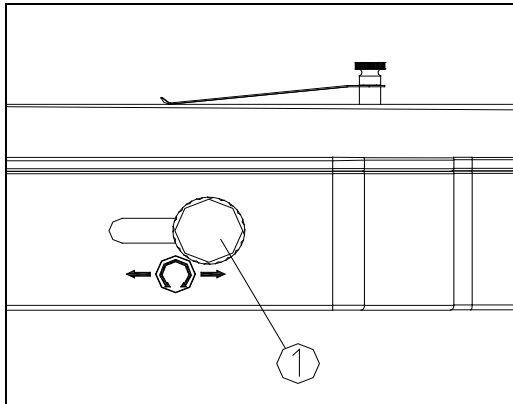


Fig.14

Set Illumination

1. Plug the microscope to a power outlet and turn the main power switch to "ON" (1).
2. Adjust the light adjustment knob (2) until the illumination is comfortable for observation. Rotate the light adjustment knob clockwise to raise the brightness. Rotate the light adjustment knob counterclockwise to lower the brightness (See Fig. 13).

Adjusting the Reflector

- The reflector has two surfaces, one is plane mirror, the other is sandblasted aluminum. Both surfaces can reflect the light, but the reflection of plane mirror is stronger.
3. Rotating the adjustment knob (1) of the reflector (See Fig. 14), can change the reflector surface and also the angle of reflection
 4. The adjustment knob (1) of the reflector can be moved forward and back according to the arrow direction, to achieve different lighting effects.

Operation (LMS-Z400 Head)

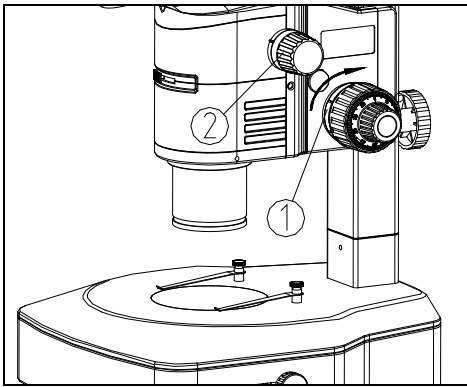


Fig.15

Adjusting the Focus Knob Tension

1. If the handle is very heavy when coarse focusing, or the specimen leaves the focus plane soon after focusing, or the stage declines itself, these problems can be solved by adjusting the tension adjustment ring. (See Fig.15)
2. Rotate the tension adjustment ring according to the arrow direction in the figure, to tighten the focusing system; rotate the tension adjustment ring in the opposite direction, to loosen the focusing system.

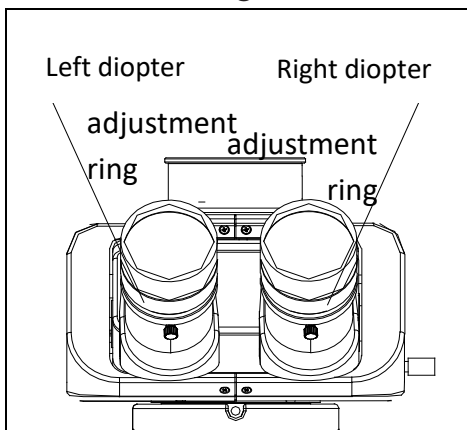


Fig.16

Adjusting the Diopter and Focus

- Before operating, make sure the eyepiece lock screw is tighten.
1. Rotate the zoom knob to the maximum magnification. (See Fig. 15)
 2. Rotate the focusing knob if the image is unclear when observed with the right eyepiece.
 3. Rotate the zoom knob to the minimum magnification.
 4. Rotate the diopter adjustment ring of right eyepiece if the image is unclear when observed with the right eyepiece. (See Fig. 16)
 5. Then rotate the zoom knob to the maximum magnification, if the image is not clear enough when observed with the right eyepiece, repeat Step (3)~(5) as above.
 6. Then rotate the zoom knob to the minimum magnification, turn the diopter adjustment ring of left eyepiece if the image is not clear enough when observed with the left eyepiece. (See Fig. 16)

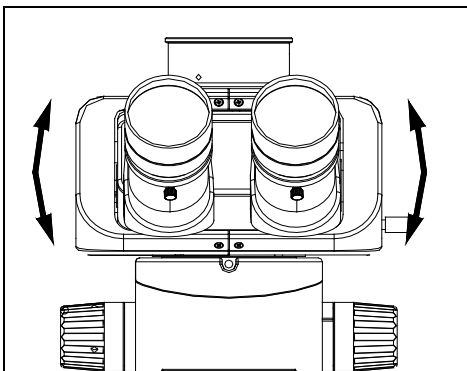


Fig.17

Adjusting the Interpupillary Distance

- Hold the left and right prism boxes and rotate them according to the arrowhead pointed in Fig. 17, until it's comfortable to view. Adjustment range: 50~76mm.

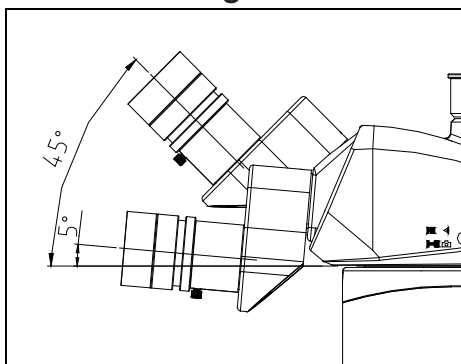


Fig.18

Adjusting Elevation Angle of Observation Head

1. Adjust the height and elevation of observation tube to the most comfortable position for observation.
2. Use both hands to hold the binocular components, to move it up or down to the position required. (Fig. 18)

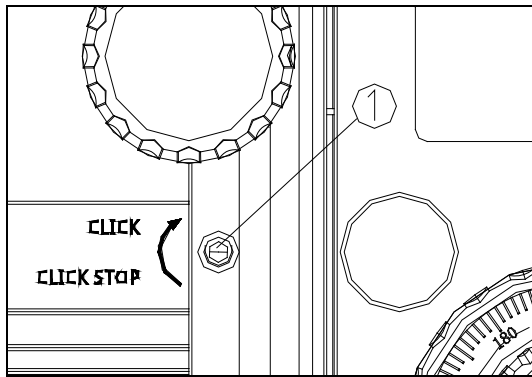


Fig.19

Magnification Click-Stop Function

- Magnification click-stop function provides a click stop position for every zoom magnification indicated on the zoom knob. When the click-stop function is turned to STOP, the zoom magnification can be finely adjusted around the zoom magnification indicated value.
 1. To turn on the click-stop function, rotate the screw (1) clockwise (as the arrow shows) until tight with an inner hexagon spanner. (See Fig. 19)
 2. Every magnification value on the zoom knob has a click-stop position.
 3. To turn off the click-stop function, rotate the screw (1) counter-clockwise (in the opposite direction of arrowhead) for two rotations. (See Fig. 19)
- Note: Do not over-rotate the screw (1), otherwise it will damage the housing and internal mechanisms of the microscope.

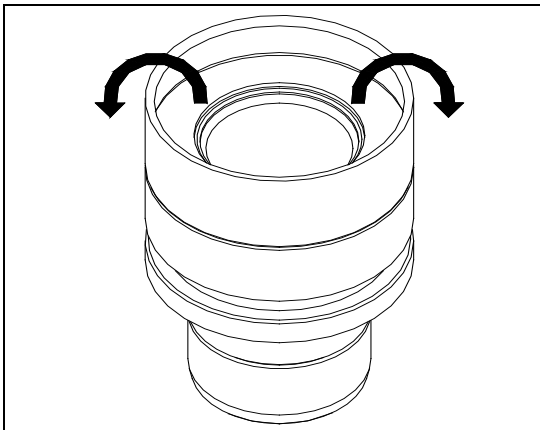


Fig.20

Use of Eye-Cup

- When wearing glasses, fold the eye cups inward to prevent damage to eyeglasses.
- When not wearing glasses, fold out the eye cups to prevent stray light. (See Fig.20)

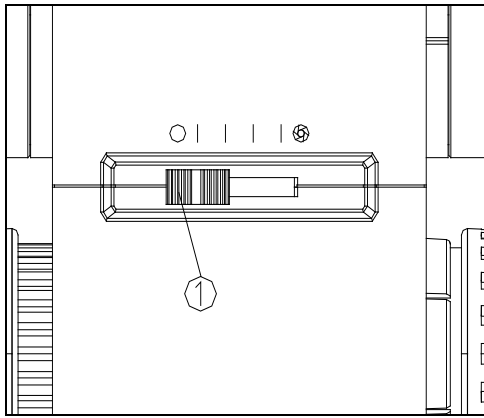


Fig.21

Adjusting the Aperture Diaphragm

1. Adjust the aperture diaphragm by the aperture diaphragm adjustment lever (1). Move it to the left to enlarge the aperture diaphragm and move it to the right to decrease the aperture diaphragm. (See Fig. 21)
2. In actual use, adjust the aperture diaphragm according to the size of the sample image contrast, until it's comfortable for observation and the contrast is good.

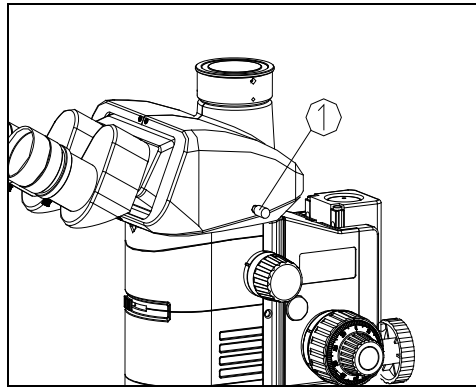


Fig.22

Selecting the Light Path (LMSP-SZX12TTR head)

3. When the light path selection lever (1) is pushed in, all the light will enter the binocular head, which can be used for binocular observation. (See Fig. 22)
4. When the light path selection lever is pulled out, all the light will be directed to the trinocular head, which can be used for digital imaging.

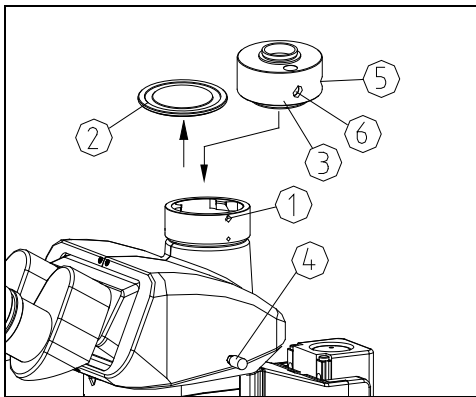


Fig.23

Assembly and Use of C-Mount Adapter

- Loosen the lock screw (1) of trinocular head, and remove the dust-cover (2) (See Fig. 23).
- Remove the dust-covers of the c-mount adapter (3). Insert the c-mount adapter into the trinocular head as shown in the figure and tighten the lock screw (1).
- Connect the CCD or camera to the adapter (3).
- For binocular observation, after the image is clear, pull the light path selection lever (4) out, to observe the image. If the image is not clear, loosen the lock screw (5), and adjust the focusing screw (6) until the image is clear, then tighten the lock screw (5).

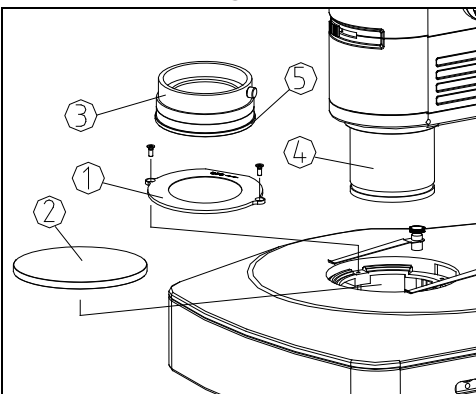


Fig.24

Assembly and Use of Polarizer/Analyzer

- Remove the stage plate (2) from the base, and install the polarizer (1) into the base with a M3 key (align the flat side of polarizer (1) close to the pillar), then reinstall the stage plate (2). (See Fig. 24)
- Install the analyzer (3) on the outside diameter of main objective (4), and lock it with the lock screw on analyzer.
- Rotate the adjustment ring (5) of analyzer (3) to adjust the direction of the analyzer, which is 360°rotatable.

Troubleshooting

Problem	Cause	Solution
1. Optical System		
(1) The image is too bright or too dark.	Inappropriate adjustment to brightness.	Readjust the brightness appropriately.
(2) Stain or dust is observed in the field of view.	Stains have accumulated on the specimen.	Clean the specimen.
	Stains have accumulated on the eyepiece.	Clean the eyepiece.
	Stains have accumulated on the objective.	Clean the objective.
	Stains have accumulated on the working plate.	Clean the working plate.
(3) The right field of view doesn't superpose with the left one.	Interpupillary distance is incorrect.	Adjust the interpupillary distance.
	Diopter adjustment is incorrect.	Adjust the diopter.
	The eyepiece for the right eye is different from the left one.	Use the same eyepieces.
(4) Unclear image	Stains have accumulated on the objective.	Clean the objective.
(5) Image is not clear when focusing.	Diopter adjustment is incorrect.	Adjust the diopter.
	Focus is incorrect.	Adjust the focus.
(6) The eyes feel tired easily.	Diopter adjustment is incorrect.	Adjust the diopter.
	The brightness is not right.	Adjust it.
2. Focus system		
(1) The focusing knob is not smooth.	The focusing knob is too tight.	Loosen it properly.
(2) The image is not clear due to the self-decline of the microscope body.	The focusing knob is too loose.	Tighten it properly.

Warranty

Statement of Limited Product Warranty: This model is warranted to be free of all defects in material and workmanship for a period of 24 months (2 years) from the date of delivery. The warranty does not apply to any instrument which has become worn, defective, damaged or broken due to abuse, misuse, tampering, or unauthorized repairs. Under this warranty, Laxco will repair or replace, without charge to the purchaser, any part which upon our examination, appears to be defective in materials or workmanship. Returned Goods Policy for Repair or Replacement Parts: To return goods for repair or replacement, please contact Laxco Customer Service.

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Optical Specifications

Eyepiece	1x Objective		2x Objective	
	Mag	FOV (mm)	Mag	FOV (mm)
10X/23mm	8X	28.75	16X	14.38
	100X	2.30	200X	1.15
15X/16mm	12X	20.00	24X	10.00
	150X	1.60	300X	0.80

Specifications

Viewing Head	Tilting trinocular viewing head, 5°-45° adjustable, fixed eyepiece tube, interpupillary range: 50mm - 76mm, light split: 100:0 or 0:100
	30° inclined trinocular head with fixed eyepiece tube, interpupillary range: 50mm - 76mm, light split: 50:50
Eyepiece	High eye-point wide field plan eyepiece PL10X/23mm, with adjustable diopter
	High eye-point wide field plan eyepiece PL15X/16mm, with adjustable diopter
	High eye-point wide field plan eyepiece PL20X/12.5mm, with adjustable diopter
Zoom Body	Zoom range: 0.8X~10X, zoom ratio: 12.5 : 1; built-in aperture diaphragm; click stop for 0.8X, 1X, 1.5X, 2X, 3X, 4X, 5X, 6X, 8X, 10X
Nosepiece	Single objective nosepiece
	Dual objective revolving nosepiece
Main Objective	1X APO objective, working distance 78mm
	2X APO objective, working distance 20mm
Focus Body	Coarse and fine coaxial focus system, integrated body with focus holder, coarse range: 50mm, fine precision 0.002mm
Base	B1: Plain base without illumination, black & white plate (dia.100mm)
	B2: Plain base with transmitted illumination (works with external 5W LED fiber); built-in 360 degree rotating mirror, adjustable
	BL10: Ultra-thin base, multi-LED (5W), with digital readout of light intensity and color temperature (3200~5600K)
Illumination	5W LED external illuminator (size: 270X100X130mm) with single fiber (500mm), color temperature 5000-5500K; operating voltage 100-240VAC/50-60Hz, output 12V
	LED ring lamp (200 LEDs)
Camera adapter	0.35X/0.5X/0.65X/1X C-mount adapter



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