LABDEX

Binocular Biological Microscope

LX1210BMC

Index

1. Introduction

Binocular Biological Microscope LX1210BMC is designed with siedentopf binocular head, reversed quadruple ball bearings revolving nosepiece and a pair of WF10X/18mm eyepiece. It has coarse and coaxial focus system with upper limited and tension adjustment helps in better observation of the specimen. This microscope comes with LED as external source of illumination. It is compact and light in weight, it is perfect for routine microscopic analysis and easy to operate system.

2. Features

- Easy to operate
- It has binocular head
- NA 1.25 Abbe Condenser with Iris Diaphragm
- LED as external source of illumination
- Double layer mechanical stage
- Compact and light in weight

3. Specifications

Model No.	LX1210BMC
Viewing head	Seidentopf binocular viewing head inclined at 30°,interpupillary 55-75mm, 360 ° rotation
Nosepiece	Reversed quadruple ball bearings revolving nosepiece
Eyepiece	A pair of WF10X/18mm eyepiece
Objectives	All with anti-fungus treatmentAchromatic objective 4x/0.10 Achromatic objective 10x/0.25 Achromatic objective 40x/0.65, spring loaded Achromatic objective 100x/1.25, spring loaded, oil
Stage	Double layer mechanical stage, with size: 125x125mm, 60x40mm X-Y movement range. Vernier scale on the two axes,accuracy: 0.1mm
Focusing	Integrated design, coaxial focus system with upper limited and tension adjustment, moving range: 14mm; fine precision: 0.002mm
Condenser	Abbe N.A. 1.25 condenser with iris diaphragm
Illumination	High brightness energy-saving LED illumination for long life, brightness adjustable
Power	100-220V, 50/60Hz

4. Applications

Biological microscope can be used for routine microscopic analysis of samples inresearch laboratories, schools, institutes and colleges.

5. Instrument Introduction

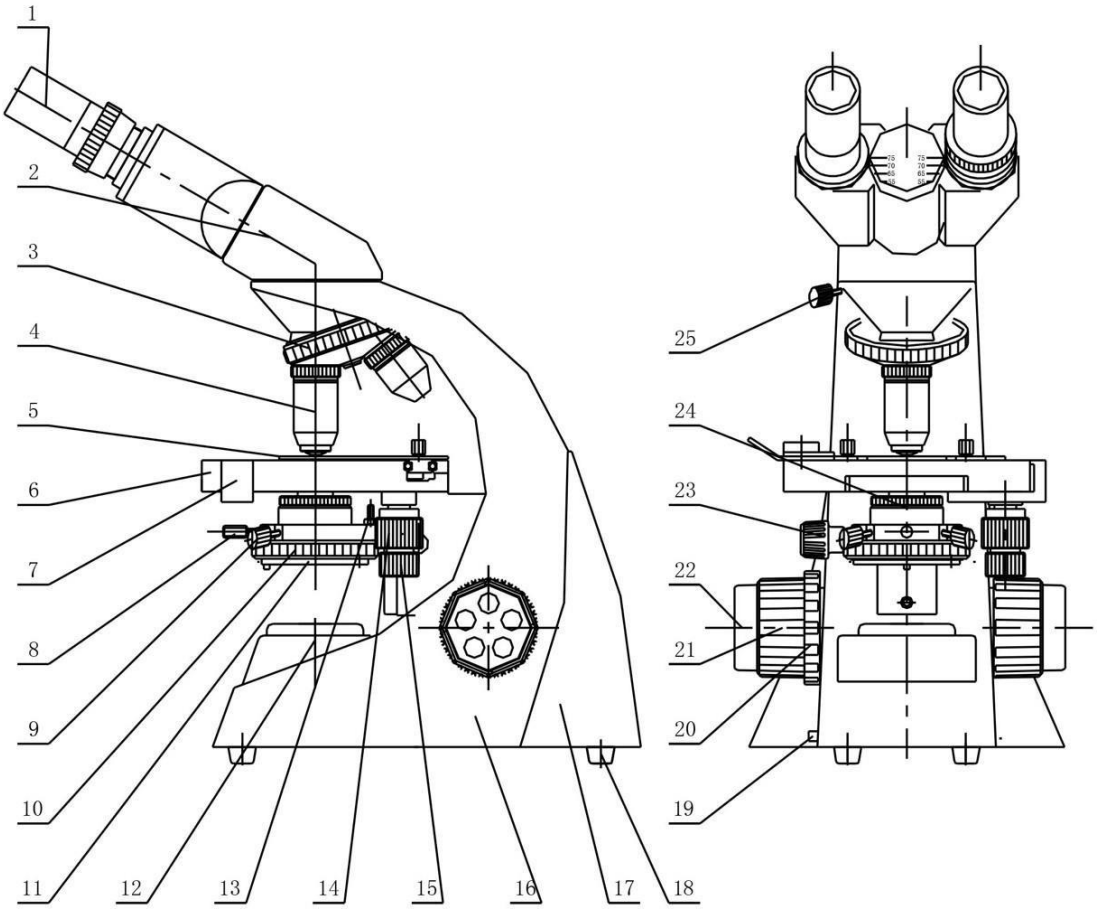

Figure-1

1. Eyepiece
2. Viewing head
3. Nosepiece
4. Objective
5. Specimen clamp
6. Mechanical stage
7. Vernier stage-lengthwise
8. Screw-fixing the condenser
9. Screw-centering the condenser
10. Iris diaphragm plate
11. Filter holder
12. Light collector
13. Screw-condenser height
14. Knob for moving stage lengthwise (Y)
15. Knob for moving stage crosswise (X)
16. Body
17. Plastic back
18. Rubber foot
19. Plate for adjusting brightness
20. Tensioner
21. Coarse focusing knob
22. Fine focusing knob
23. Knob-condenser up and down
24. ABBE condenser
25. Screw- fixing the viewing head

1) **Eyepiece (1)**
Usually, the microscope is only equipped with wide-field and plan-scope eyepiece WF10X. If users need, we will also provide users with wide-field eyepieces as WF5X,WF6X, WF12.5X, WF15X, WF16X, WF20X, or Huygens eyepieces as 5X, 6X, 10X, 12.5X, 15X, 16X. The specifications of WF10X are as follows:

Eyepiece	Magnification	Viewing Field	Working Distance	Remark
WF10X	10	18mm	24.95	Withpoint

2) **Objective (4)**
In this microscope, the standard outfit of the objective system is DIN achromatic objectives which are 4X, 10X, 40X (spring loaded), and 100X (spring loaded, oil immersion). The objective 100X is an immersion lens. When the 100X objective is used, between its top and the cover glass, drop some immersion oil and be sure to make the air bubble out. If there is some air bubble in the oil, users may rotate the nosepiece once more or add more oil again. After finishing observing, the top of the objective (100X and 40X) and the cover glass should be cleaned at once. Otherwise, the remaining dry oil will impair the imaging quality in the next observation. According to your requirement, we can also provide users with infinity system plane-scope achromatic objectives, infinity system achromatic objectives, plane-scope achromaticobjectives, and semi-plan achromatic objectives.

The specifications of the DIN achromatic objective system are shown as follows:

DIN Achromat Objective 10	Magnification	Numerical Aperture	Focal Distance	Working Distance	Cover Glass Thickness	Remark
4x	4	0.10mm	31.04mm	37.5mm	0.17mm	
10x	10	0.25mm	17.13mm	7.316mm	0.17mm	
40x	40	0.65mm	4.65mm	0.632mm	0.17mm	Spring
100x	100	1.25mm	2.906mm	0.198mm	0.17mm	Spring, oil

3) **Mechanical tube length:** 160mm
4) **Conjugated distance between object and image:** 195mm
5) **Viewing heads and microscope models:**
The viewing heads are used to change the direction of the ray transmitting. Equipped with different types of viewing heads, there are six model microscopes introduced to users for different effects.

6) **Nosepiece (3):**
The advanced and precise construction of the nosepiece guarantees smooth rotation, clear and positive location, and meets the requirement of par-focal and par-centered objectives.

7) **Mechanical stage (6):**
The stage of this microscope is the double layer's mechanical stage. Its size is 125(L)X125(W)mm. Push the rod of the clamp in the arrow direction and insert the specimen into the clamp carefully. Leave your finger away from the clamp, the clip will turn back slowly, and then the specimen will be held and moved with the clamp. Rotate the knob (14) to move the clamp lengthwise at 40mm. Rotate the knob (15) to move the clamp crosswise at 60mm. The moving precision is 0.1mm in both directions.

8) **ABBE condenser (24):**
The numerical aperture(N.A.) is 1.25.
The screw (8) is used to fix the condenser easily on the microscope without any tools. The center of the condenser in the microscope can beadjusted by rotating the black-head screws (9) without any tools as following steps:
- Turn the objective 4X or 10X in working.
- Turn the plate (10) to make the diaphragm diameter smaller.
- Lower the condenser to make the image of the diaphragm sharp byrotating the knob (23).
- Rotate the screws (9) to concenter the image of the diaphragm with the eyepiece viewing field. The condenser has been adjusted coaxial with the objective before the microscope is finished.
- If not, there will be large differences in the viewing field: one side may be dark and another side may be bright. Rotate the knob (23), built-in rack and pinion mechanical system control the condenser up or down.
- Usually, raise the condenser higher when 100X or 40X objective is used.
- Down the condenser lower when 10X or 4X objective is used. The highest position of the condenser rising is limited to lower than 0.2mm below the stage surface before the microscope is finished.

When it is necessary to readjust, do as following steps:
- Lose the nut on the screw (13).
- Put a slide on the stage.
- Raise the condenser to 0.2mm about lower below the slide.
- Rotate the screw (13) to touch the bottom of the stage.
- Fix the screw (13) with the nut. Turn the diaphragm plate (10) to adjust the diameter of the iris diaphragm from 2 to 30mm to match with the numerical apertureof the objective in use.
- When the diameter of the iris diaphragm is 70-80% of the objective's numerical aperture, the image observed is sharp in contrast. Look into the tube without an eyepiece, you can see the image of the iris diaphragm.
- The filter holder (11) can be turned out to insert the filter when you need it. The color of the filter may be blue, green, or yellow.

9) Focusing system:

It is a coaxial coarse and fine focusing system with a rack and pinion mechanism. It's focusing range is 14mm, and its precision of fine focusing is 0.01mm. Rotate the course focusing knob (21) to raise the stage up or down quickly. Rotate the fine-focusing knob (22) to raise the stage up or down slowly. The knob (20) is used to adjust the focusing moment. It will avoid the stage dropping automatically and provide comfortable operation.

10) Illumination system:

Usually, the illuminator of this series microscope is a 3.5V/1W LED lamp. Turn the plate (19) to adjust the brightness. So, the image backdrop will be not too bright under the lower-powered objectives, or too weak under the higher-powered objectives. The LED lampis soft in light to suit the operator for a long-time micro-observation. When the current and voltage don't overstep their limits, its average life can reach to 100000 hours. It is very secure because the bulb's temperature is lower than 30 degrees even after a long time using.

6. Installation

6.1 Unpacking

Unpack the microscope and its parts carefully. Check and sort out all parts accordingto the packing list. For the convenience of packaging and delivering the components and parts may be separated from the mainframe. Before using them, assemble them according to the Instrument structure draft.

6.2 Install the viewing head

Loose the screw (25) and take off the plastic plate cover on the body (16). Take theplastic plate cover on the viewing head. Finally, install the viewing head on the body (16) and fix it with the screw (25). Don't try to lose another two screws for centering the viewing head on the body (16).

6.3 Install the objectives (4)

Usually, the objectives are fixed stably on the nosepiece by us. Sometimes, they are separated from the mainframe. Screw the plastic dust cover off the nosepiece (3) and take the objects out of their plastic bottles. Screw them on the nosepiece (3) by their magnification order from low to high.

6.4 Install the eyepiece (1)

Take off the plastic dust cover from the eyepiece tube and insert the eyepiece needed.

Caution:

The power supply voltage must be fitted to the microscope; otherwise, it willdamage the circuit and bulb and even lead to insecurity.

- Rotate the knobs (12,13) to move the specimen so that it is centered over the in-stage condenser.
- Focus the objective on the specimen by turning the coarse focusing knob (21) until the image of your specimen is bright and clear. You can find the focal planeand focus upwards by using the lower-powered objective, and then you can bring the specimen into sharp focus by turning the fine focusing knob (22).
- The specimen now is in sharp focus. Rotate the nosepiece (3) to the other objectives and focus using only the fine focusing knob (22). Since the optics on the microscopes are Parfocal and Par-centered, only slightly turn the fine focusing knob (23) to make the image bright and clear.

Note:

It is important to note that the 4X and 10X objectives can never come into contact with your micro-slide specimen because of our built-in stop. The 40Xand 100X objectives may occasionally touch the micro-slide specimen. However because they have retractable mounts, the micro-slide specimen will not be damaged. To make the image clearer, you can adjust the diameters of the iris diaphragm to match the numerical aperture of the objective in use.

7. Working Principle

The principle of the microscope is shown in figure-1. The lamp(a) illuminates. Thelight from the lamp is introduced to the condenser (b) and then converged on the specimen (c) by the condenser. The image of the specimen(c) is first magnified by the objective(d) and then further magnified by the eyepiece(f). The prism(e) is used to change the direction of the light. Total magnification= (magnification of objective) × (magnification of the eyepiece).

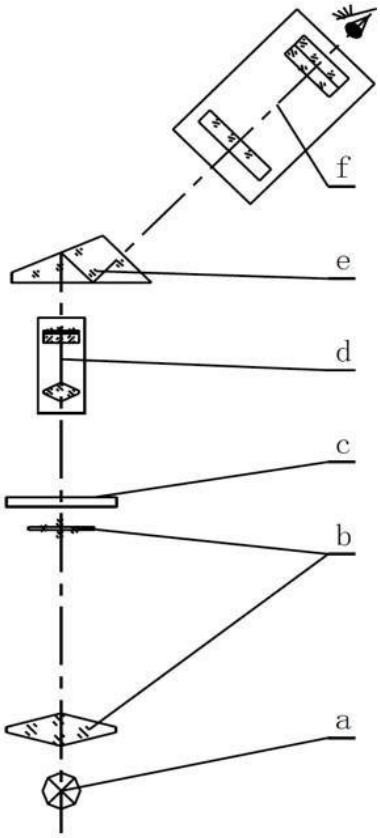

Figure-2

8. Operations

Select a position to work where little direct light falls on the instrument. Keep the microscope far away from a large window and not to face the window, because the direct light may adversely affect the contrast and resolution of the image. The following working surroundings are required:

1) **Room temperature:** 0-40 degrees, the high relative humidity:- 85%
2) High temperature and humidity can cause mildew and damage to the instrument
3) Keep the microscope away from dust. When it is not used, put the cover on it.
4) Keep the microscope away from vibration.
5) Insert the micro-slide specimen into the clamp (5).
6) Be sure that the cover glass is facing toward the objective. Otherwise, you will not be able to focus your specimen on using higher higher-powered objectives (40X, or 100X).
7) Place a lower-powered objective (4×, or 10×) into position and simply turn on the illuminator.

9. Troubleshooting

Troubles	Causes	Remedies
The specimen goes out offocus.	The stage is limited to low.	Adjust the upper focusing limit.
The slide is often broken by objective.	The stage is limited to high.	Adjust the upper focusing limit.
Users can't focus on using high-powered objectives.	The specimen is mounted on the stage upside down or the cover glass is too thick.	Reverse the specimen or choosethe standard cover glass (0.17mm).
The objective always touches with the slide when changing.	The cover glass is too thick.	Choose the standard cover glass (0.17mm).
Move the specimen no smoothly.	The clamp is not fixed stably.	Fix the clamp stably on the stage.
Incomplete binocular vision.	The interpupillarydistance is notadjusted correctly.	Correct the interpupillarydistance.
	Diopter adjusting isincomplete.	Complete the diopter adjusting.
	The brightnessis not suitable.	Check the illuminator and adjustits brightness.