Motic®

MORE THAN MICROSCOPY

RED LINE Revolutionary Educational Design

RED100 SERIES

Instructions Manual

English

Motic Incorporation Ltd.

CE

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CONTENT

1. SAFETY INSTRUCTIONS

1.1 General safety instructions

- Please be sure to read these instructions before using the biological microscope.
- Additional information is available upon request from our maintenance department or authorized agency.
- To ensure safe operation and guarantee good performance of the microscope please pay attention to the precautions and warnings specified in the Operation Instructions.
- In this Operation Instructions manual, the following symbols indicate:

Caution! Electric shock hazard!

Caution! Danger!

1.2 Instrument safety

The **RED100 Series biological microscope** has been designed, manufactured and inspected according to the EN 61010-1:2001 **Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.**

1.3 Unpacking, transportation & storage

- The original shipping container, a foam box in a fiberboard carton, should be kept for use in long term storage or return shipment.
- When unpacking, please check the components according to the packing list.
- Please comply with the temperature requirements for transport and storage specified in the appendix of this manual.
- Set up, use and store the unpacked microscope on a firm and flat workbench.
- Please do not touch the optical lens surfaces.

1.4 Waste disposal

- Important: Any damaged biological microscope must not be treated as general waste; it should be disposed of according to relevant regulations.

1.5 Operation

When using the biological microscope, please pay attention to the following safety instructions:

- If it is used for any purpose other than the specified ones, including any individual component or part, the manufacturer will not take any responsibility.
- After-sales service or repair done by unauthorized personnel will void the warranty.
- Anyone who uses the instrument should receive instruction on the proper handling of the instrument and safety practices for microscopy. The biological microscope shall be placed only on a firm, flat workbench for operation.
- Since the biological microscope is a precision instrument, improper operation will impair or spoil its performance.
- The power unit is integrated in the main unit of the biological microscope: the grid supply voltage is within 100-240V~50Hz.

The biological microscope must be connected only to the normal power socket with a grounding terminal. Any extension cord without ground protection is not allowed to avoid failure of the protection function.

If there is any electrical failure (of the fuse system, ground protection or transformer), turn off and unplug the unit immediately. Make sure the microscope is set aside so it will not be used again and contact the Motic service department or a Motic microscope repair agency to have it repaired.

Please be sure to turn off the power before opening the instrument to replace LED illuminator or replace the fuse! Only use a fuse for the rated current.

Safety instructions for the use of immersion oil.

- Immersion oil is irritating to skin; avoid contact with skin, eyes and clothing.
- Skin contact: wash with soap and plenty of water until the immersion oil is completely removed.
- Eye contact: flush immediately with plenty of water for at least 5 minutes. If irritation persists, seek medical advice.
- Dispose of immersion oil properly. Do not discharge into surface water or sewage.

The biological microscope is not equipped with any special device to protect against corrosive, latent infective, toxic, radioactive or other hazardous samples. Therefore, when examining any such sample you must comply with the relevant laws and regulations, in particular the provisions related to accident prevention.

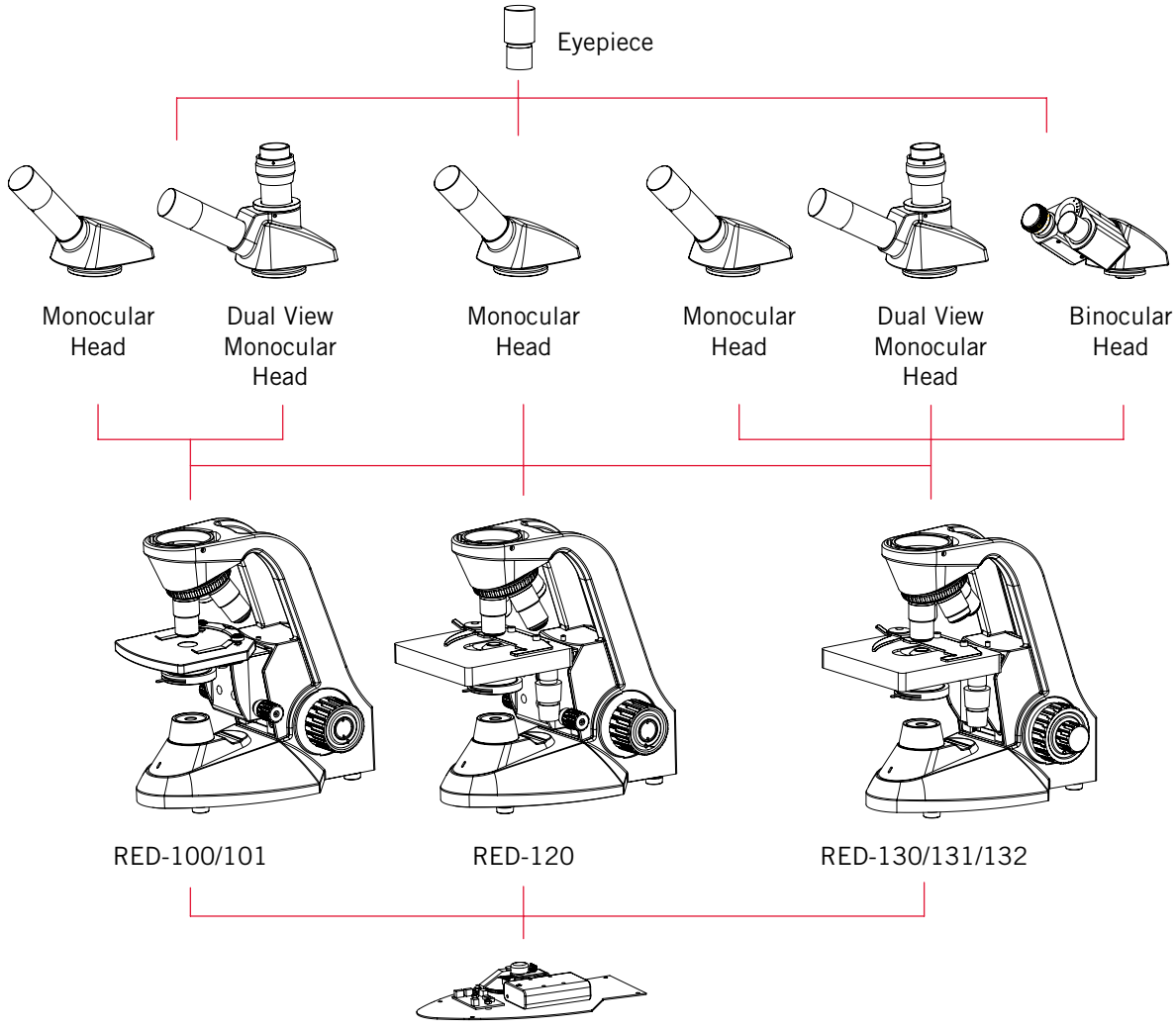
1.6 Quality Warranty

The **RED100 Series biological microscope** and the attached accessories are only allowed to be used for microscope examination as described in this manual. The manufacturer takes no responsibility for any other use.

- The manufacturer guarantees that the product is free from any defect in material or workmanship on the date of delivery.
- If any defect is found, notify the manufacturer immediately.
- Upon receipt of the Notification of Defect as described above, the manufacture is responsible to solve the problem either by repairing the defective instrument or replacing it with a new instrument of the same model.
- The manufacturer provides no warranty for any failure or defect due to normal wear and tear or improper use of the product.
- The manufacturer takes no responsibility for any damage caused by operation error, negligence or unauthorized dismantling of the instrument, or the use of spare parts from other manufacturers.

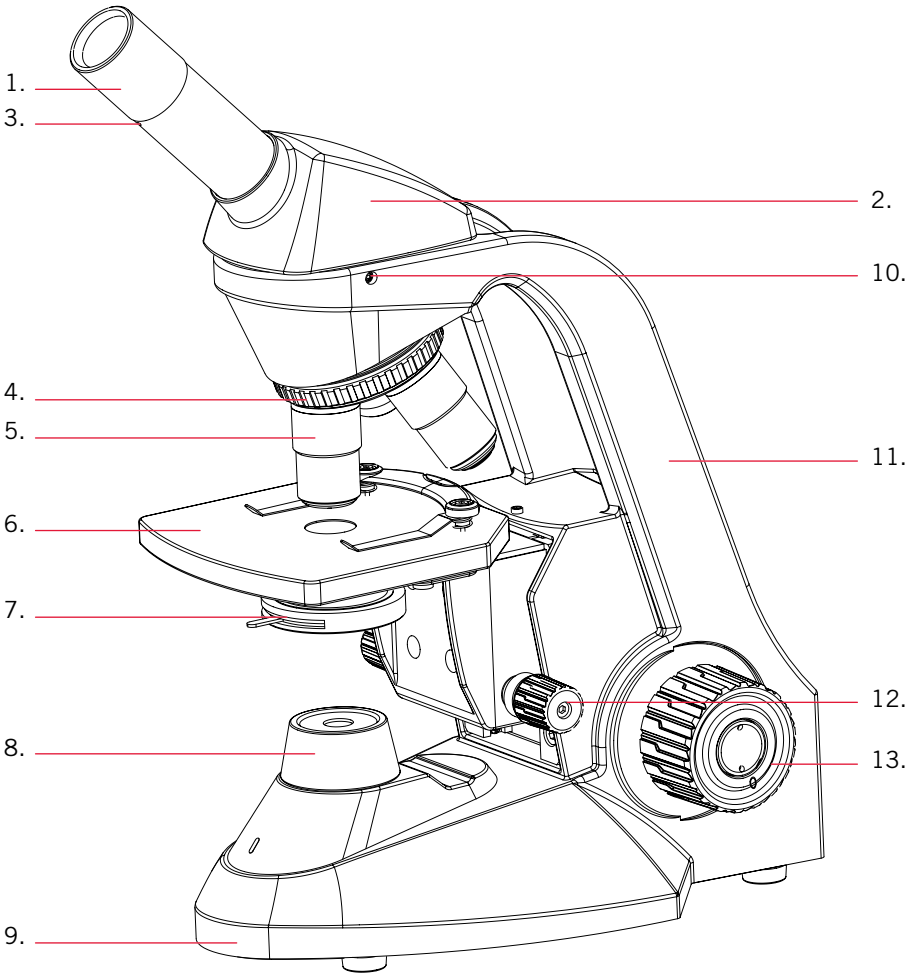
2. INSTRUMENT DESCRIPTION

2.1 General Views



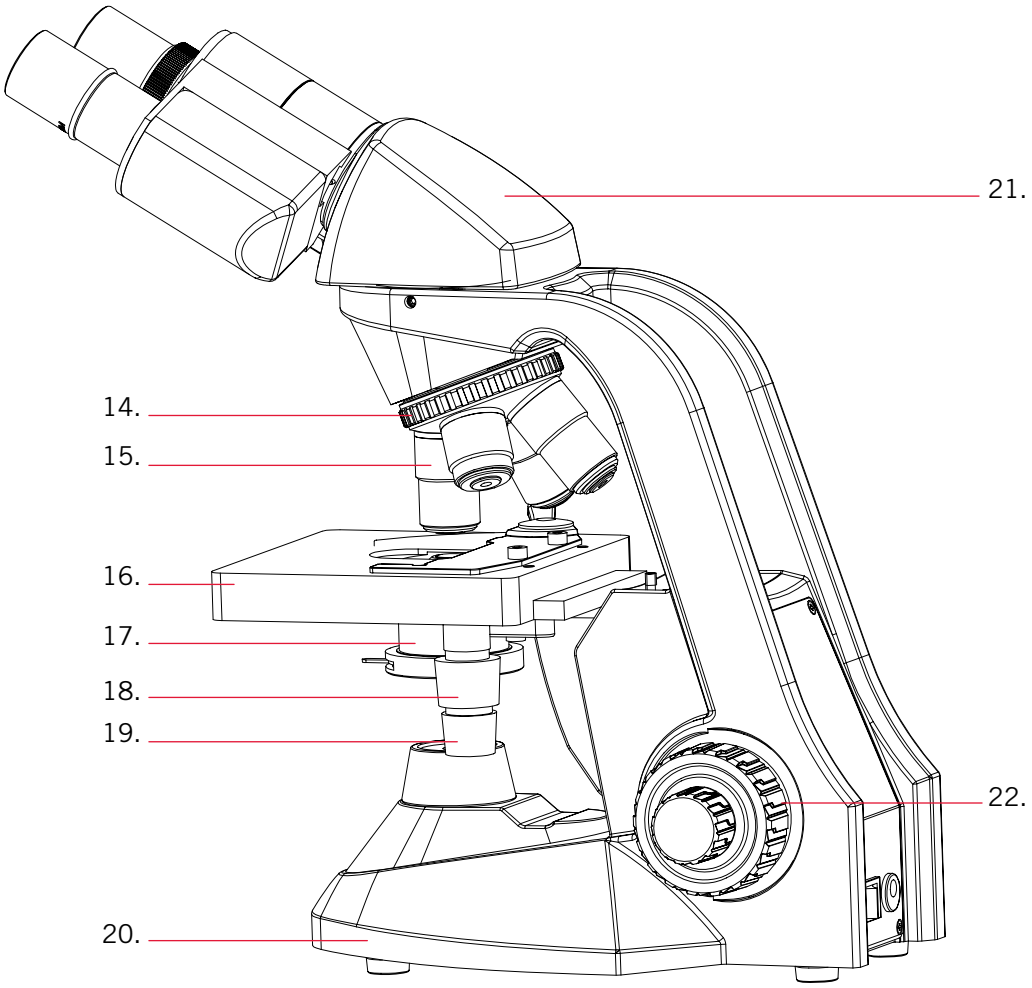
(Cordless model, with rechargeable batteries included)

2.2 Part names



RED100

1. Eyepiece
2. Monocular head
3. Lock screw of eyepiece
4. Triple nosepiece
5. 4X/10X/40X objectives
6. Movable stage
7. 0.65 condenser w/ iris diaphragm
8. Collector
9. Base (w/ rechargeable batteries and external charger)
10. Head lock screw
11. Arm
12. Fine focus knob
13. Coarse focus knob



RED132

14. Quadruple nosepiece
15. 4X/10X/40X/100X objectives
16. Mechanical stage
17. 1.25 condenser w/ iris diaphragm
18. Stage adjustment knob (X-axis)
19. Stage adjustment knob (Y-axis)
20. Base (w/ rechargeable batteries and external charger)
21. Binocular head
22. Coaxial coarse and fine focus knob

2.3 Application

The **RED100 Series biological microscope** is designed for microscopic observation of thin specimens with transmitted, visible light.

2.4 Instrument and its major features

Major features of the instrument include:

- Built-in LED illumination with brightness adjustment.
- Cord reel at the back to accommodate power cable; convenient and practical.
- Compact and easy to use.
- Separate coarse and fine focus adjustment *(Models RED-100 / 101 / 120).*
- Coaxial coarse and fine focus adjustment *(Models RED-130 / 131 / 132).*
- 110mm × 110mm gliding stage with linked slide clips, moving range: Ø 9mm. *(Models RED-100 and 101).*
- 120mm × 120mm mechanical stage with slide clips, stroke: 76mm × 26mm. *(Models RED-120 / 130 / 131 / 132).*
- Quadruple revolving nosepiece with ball bearing, thread pitch 0.8".
- Objective magnifications: 4X, 10X, 40X, 100X-Oil *(100X objective included with RED-120 / 130 / 131 / 132).*
- Field number of 10X eyepiece is 18; high point design for observers with glasses.

3. FIRST TIME USE & OPERATION

3.1 First time use

Before installing and using the biological microscope, make sure to read carefully the Safety Instructions (See Chapter 1). When unpacking and handling, please do not touch the optical surfaces.

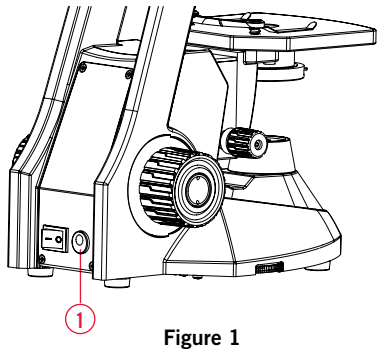


Figure 1

- After unpacking, place the biological microscope on a flat workbench and remove any foam padding or spacer used to prevent vibration during transportation.
- Connect the charger to the power supply. Before plugging in, keep in mind that the working voltage of the biological microscope shall be the same as the supply voltage. (Figure 1)

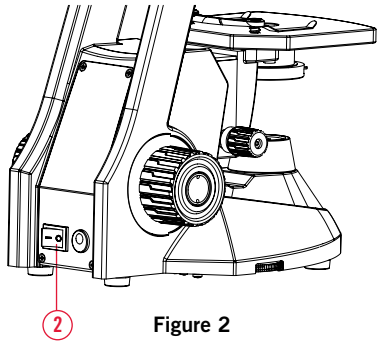


Figure 2

- Turn on the power switch at the back of the arm. (Figure 2)
  Note: Make sure that the brightness control is in the minimum position before turning on or off the power switch.

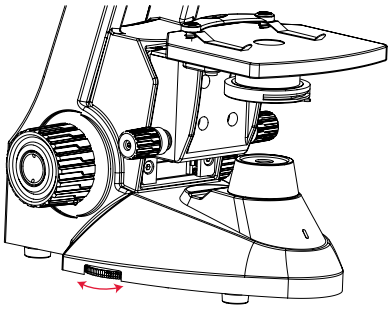


Figure 3

- Rotate the brightness control to the desired illumination. (Figure 3)
- After use, turn the brightness control to the minimum position, and then turn off the power and put on the dustproof cover.

3.2 Operation of the biological microscope

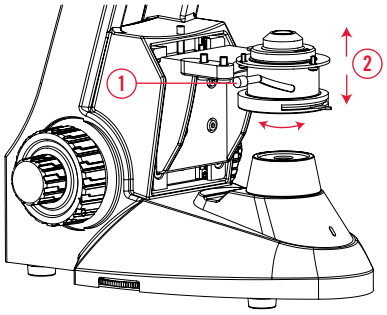


Figure 4a *(RED-120 / 130 / 131 / 132)*

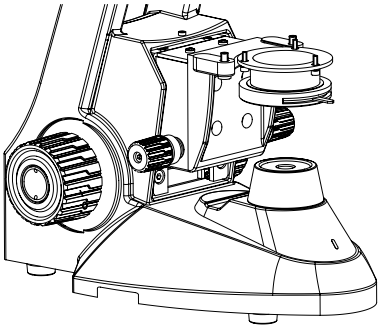


Figure 4b *(RED-100 / 101)*

- Put the specimen on the stage and fix it with the slide clips. Never examine a prepared specimen without a cover slip. Note: The thickness of the cover slip must be 0.17 mm.
- The aperture diaphragm of the condenser should be opened to the position matching the numerical aperture of the objective.
- For models with a movable condenser, lower or raise the condenser to locate the best illumination for the field. Start with the condenser all the way to the top of its range.
- Rotate the brightness control to the desired illumination.
- Always begin examination using the low power objective. Position the objective as close to the specimen as possible and focus by slowly increasing the distance between the specimen and the objective. Use the coarse focus adjustment, and then the fine adjustment.
- Once the specimen is in clear view under low power, switch to a higher power objective and refocus using the **FINE FOCUS KNOB ONLY.** The microscope has been set up at the factory so only a small adjustment is necessary when changing objective lenses.
- Always switch back to the low power objective to change the specimen on the stage.

3.3 Modification of biological microscope

Unplug the biological microscope before making any modifications.

3.3.1 Replace the head

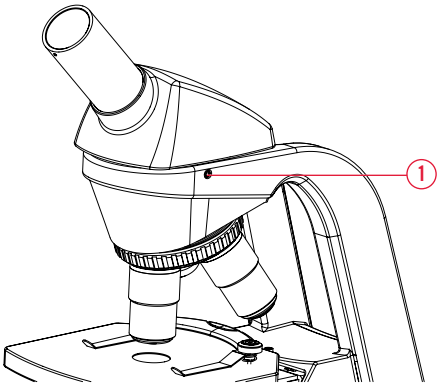


Figure 5a

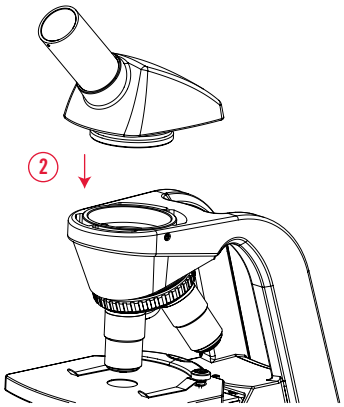


Figure 5b

- Unscrew the head lock screw and lift out the existing body tube. (Figure 5a)
- Insert the new body tube vertically into pilot hole of the main unit, resting it on the shoulder. (Figure 5b)
- Tighten the head lock screw.

3.3.2 Replace the objective

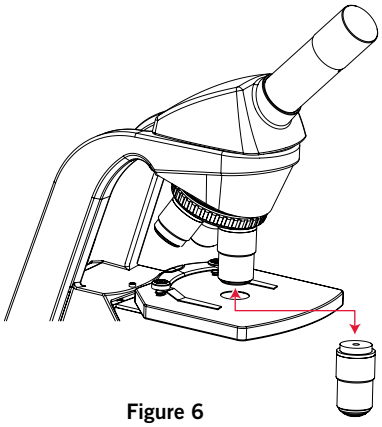


Figure 6

- Lower the stage completely with the coarse focus knob.
- Rotate the nosepiece to move the objective to be replaced to the side.
- Unscrew the objective and remove it downward.
- Fix the new objective into the hole on the nosepiece. Be very careful to match the threads correctly, the objective should screw in smoothly and easily. Make sure the objective is screwed in tightly.
- If one of the nosepiece holes is not used for an objective a dustproof cap should be screwed into the vacancy to prevent dust from entering. (Figure 6)

4. MAINTENANCE & TROUBLESHOOTING

4.1 Maintenance

The biological microscope is limited to the following maintenance only:

- Turn off the power switch after use, and put on the dustproof cover after the microscope has cooled down.
- Do not operate the microscope in a room with humidity higher than 75%.
- Remove dust or ordinary dirt on optical lens surfaces with a brush, rubber suction bulb and a moistened lens tissue.
- Use only optical lens tissues and optical lens cleaner (see below). Never clean a lens with a dry optical lens tissue. Be sure to remove any dust before using lens tissue and cleaner.
- To remove stubborn oily or lipoid dirt (such as immersion oil or fingerprints), dip the lens tissue into a 3 to 7 ethanol-ether mixture or a commercially available optical lens cleaning solution and then use it to wipe off the dirt.
- When cleaning an optical lens surface, wipe gently in a circle from the center to the edge.

4.2 Troubleshooting

Problem	Cause	Remedy
Can not see the whole field	Nosepiece is not locked into the slot	Rotate the nosepiece to lock into the slot
	Condenser is not set properly	Set the condenser properly
	Aperture (iris) diaphragm is not set accurately	Set the aperture (iris) diaphragm accurately
Low resolution Poor image contrast	Incorrect opening of aperture diaphragm	Set the opening of aperture diaphragm accurately
	Improper focusing of condenser	Focus the condenser properly
	Wrong thickness of cover slip for 0.17 transmitted-light objective	Use the standard 0.17 thick cover slip
	No immersion oil or non-specified immersion oil for 100X/(oil immersion) objective	Use immersion oil supplied with the instrument or go to buy cedar oil for microscope when supplied immersion oil used up
	Bubbles in the immersion oil	Add some immersion oil or rotate the nosepiece back and forth to remove bubbles
	Immersion oil or stain left on the front lens of dry objective Dirt or dust on the optical surface of objective, eyepiece, condenser or color filter	Clean the front lens of dry objective (see above) Clean the dirty optical component
Poor LED illumination	Power plug is not plugged into the socket properly	Insert the power plug into the socket and turn on the power
	LED illuminator damaged	Replace LED illuminator

5. APPENDIX

5.1 Technical Parameters

Dimension (W x L x H)

Biological microscope main unit w/ monocular head	≈ 269×150×353mm
Biological microscope main unit w/ dual viewing head	≈ 290×150×392mm

Weight

RED100 Series biological microscope	4.5 KG

Environmental Conditions

Transport (within package) :	
Permissible environment temperature	-40 ~ +70°C
Storage:	
Permissible environment temperature **Permissible relative humidity**	+10 ~ +40°C Below 31°C, max. humidity is 80%; at 40°C, linearly decreases to 50%
Operation:	
Permissible environment temperature **Permissible relative humidity**	+5 ~ +40 °C Below 31°C, max. humidity is 80%; at 40°C, linearly decreases to 50%

Operating Parameters

Protection grade	II
Ingress protection	IP20
Electrical safety	Conforms to GB 4793.1-2007/ IEC 61010-1:2001
Pollution index	2
Overvoltage category	II
Rated supply voltage	220V
Rated supply frequency	50Hz
Input power	6.5W

Light Sources

LED illumination:	
Color temperature **Even illumination of field** **Applicable objective**	6000K – 7000K Diameter 4.5mm 4X to 100X

Opto-mechanical parameters

Coaxial focus adjustment mechanism:	
Coarse focus adjustment	4.4mm/rotation
Fine focus adjustment	0.42mm/rotation
Stroke	9mm
Separate focus adjustment mechanism:	
Coarse focus adjustment	18.5mm/rotation
Fine focus adjustment	0.09mm/rotation
Stroke	11.5mm
Nosepiece:	Manual triple/quadruple nosepiece
Objective:	4X/10X/40X/100X
Eyepiece	Assembly diameter 23.2mm
Field number 18mm	WF 10X/18
Mechanical tube length	160mm
Mechanical stage: (RED-120, 130, 131, 132)	
Dimension (L x W)	120x120mm
Stroke (L x W)	76x26mm
Position of vernier	On the right
Slide clip	On the left of movable clip
1.25 condenser	Used for 4X ~ 100X objectives
Movable stage: (RED-100 and 101)	
Dimension (L x W)	110x110mm
Max. moving range	Ø9mm
Slide clip	Linked slide clips
0.65 condenser	Used for 4X ~ 40X objectives

In the registered product standard, the electrical safety features of the biological microscope are: overvoltage category II; pollution grade 2. The safety requirement test method and inspection rules for this standard product are based on EN 61010-1:2001.

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