FISON

Digital Microscope

FM-DM-A100

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1. Safety measures

- Carefully open the box and avoid accessories, like a lens, dropping to the ground and being damaged.
- Do keep the instrument out of direct sunlight, high temperature or humidity, dusty and easy shaking environment.
- When moving the instrument use both hands to grip the two sides of the microscope body.
- If the bacterium solution or the water splashes into the stage objective or viewing tube pull out the power at once and wipe up the microscope otherwise the instrument will be damaged.
- When running the lamp house and nearby parts will be very hot ensure there is enough cooling for them
- There should be a proper earthing connection to avoid light strikes.
- Make sure the switch is in an "**O**" (**OFF**) state before replacing the halogen lamp or fuse then cut off the power and do the operation after the lamp bulb and the lamp hues completely cool.
- Check the input voltage: Be sure the input voltage signed in the back of the microscope is consistent with the power supply voltage or it will bring serious damage to the instrument.

2. Introduction

Digital Microscope FM-DM-A100 is equipped with 8 inch TFT touch LCD screen and easy to use software to view and study the specimen without straining the eyes. Illumination is provided by S-LED system with adjustable brightness. Sharp and clear images of the specimen are obtained using coarse and fine focusing adjustment.

3. Features

- ✓ Infinite optical system
- ✓ 8 Inch TFT Touch LCD screen, 5.0 MP, CMOS chip
- ✓ Infinitive Semi-Plan Achromatic Objectives
- ✓ Wide field eyepiece WF 10X/ 18 mm
- ✓ S-LED as illumination source
- ✓ User friendly operation

4. Specifications

Model No.	FM-DM-A100
Optical system	Infinite optical system
Viewing head	Seidentopf Binocular head, 30° inclined, Interpupillary 48 to 75 mm
LCD Touch pad Screen	8 Inch TFT Touching screen, 5.0 Mega Pixel CMOS Chip
Digital system software	Supports Wi-Fi and Bluetooth, USB 2.0, Mini US, HDMI, SD Card Operation System Android 4.2.2, Touch Scope Software
Eyepiece	Wide field eyepiece WF 10X/ 18 mm
Objective	Infinitive Semi-plan Achromatic Objectives 4×, 10×, 40×, 100×
Nosepiece	Quadruple nosepiece
Stage	Double layer mechanical stage: 140 × 140 mm, Travel stage: 75 × 75 mm
Condenser	Sliding-in centerable condenser N.A. 1.25
Focusing system	Coaxial Coarse and Fine focusing Adjustment, Fine Division 0.002 mm, Coarse Stroke 37.7 mm per Rotation, Fine Stroke 0.2 mm per Rotation, Moving Range 20 mm
Illumination	S-LED Illumination, brightness adjustable
Dimension without LCD Pad	360 × 230 × 196 mm
Dimension with LCD Pad	480 × 230 × 196 mm
Weight	11 kg
Power supply	220 V, 50 Hz

LCD Tablet

Hardware	CPU	RK3288 Quad-core 1.8 Hz
	Display	High resolution (2048 × 1536) color LCD with touch screen
	Storage	RAM 2 GB DDR3, ROM 8 GB, 32 GB extension storage
	Camera	5 MP color cameras
	Network	W i-Fi, Bluetooth
	Interface	USB 2.0 (OTG) ×2, Support USB keyboard mouse
		TF card
		DC 12 V power input
		Audio
		Mini HDMI output
Software	Operating system	Android 5.1
	Software	Built-in camera software, support take photos, videos and measurement.

Built-in camera derails

Sensor size	1/ 2.5 inch (4:3)
Effective imaging size	5.70 (H) × 4.28 (Y)
	7.13 mm (diagonal)
Effective pixel	2592 (H) × 1944 (V)
Pixel size	2.2 um × 2.2 um
Dynamic range	66.5 dB
SNR (maximum)	40.5 dB
A/D conversion resolution	12-bit, on-chip
Sensitivity	0.53 V/ Lux-sec (550 nm)
Frame rate	2048 × 1536 @15 fps, 1024 × 768@30 fps
Exposure range and manner	Electronic rolling shutter (ERS) , automatic
White balance	Manual/ Automatic

5. Applications

Used in the field of bacteriology, cytology, botany, medical science, tissue culture and others to study details, even quantitative analysis of the specimen on large LCD screen.

6. Instrument Introduction

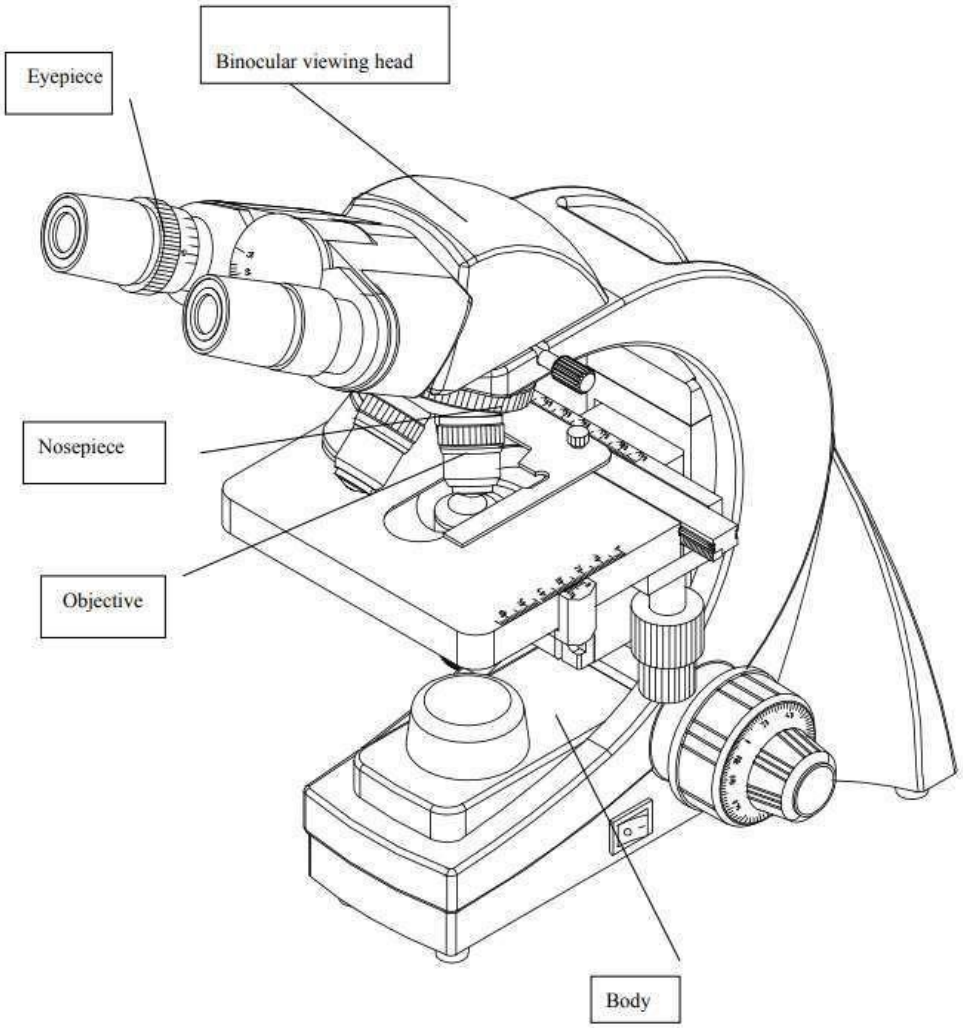


Figure.1

7. Installation

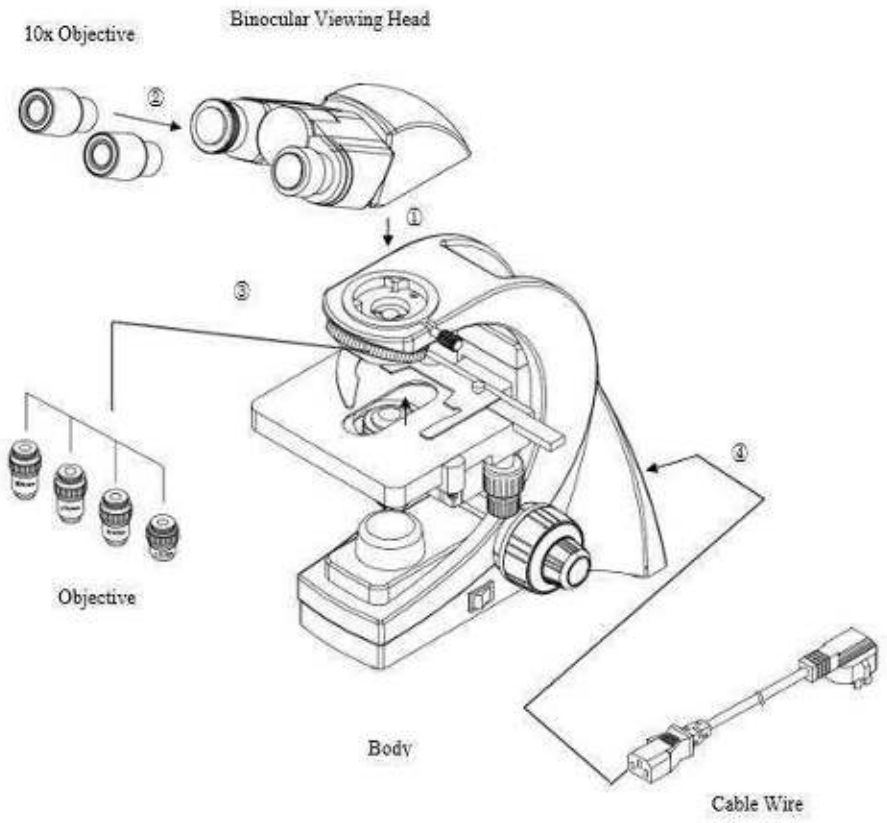


Figure.2

7.1 **Installation steps:**

1. Install the binocular viewing head

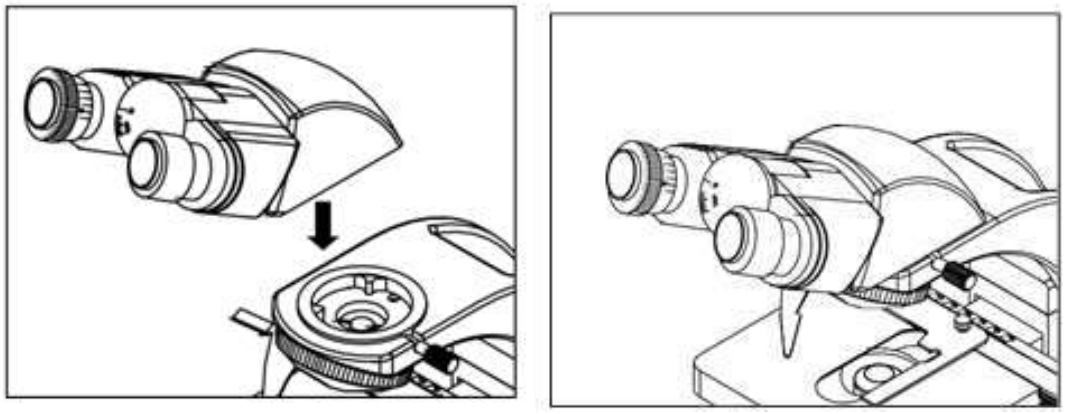


Figure.3

- Insert the binocular viewing heading into the head of the body and turn it in the right place then fix it up by bolts.

2. Install the eyepiece

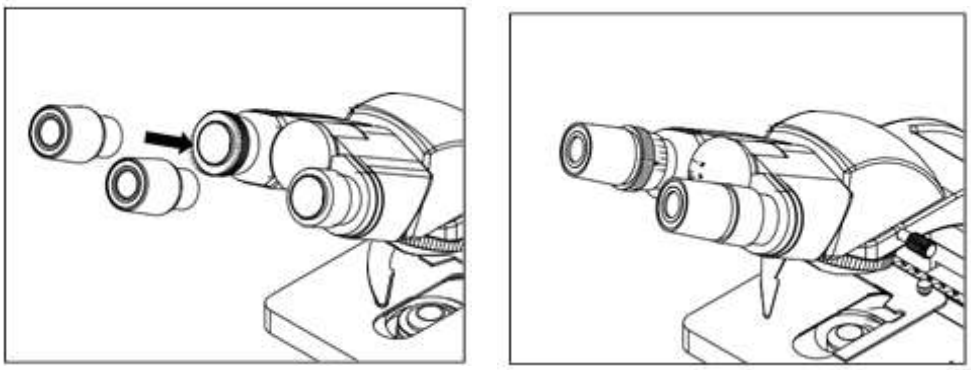


Figure.4

- Insert the eyepiece in the eyepiece tube till the end figure shows the station after installation.

3. Install the objective

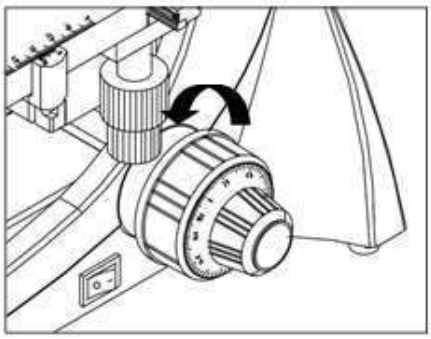


Figure.5

- Adjust the coarse and fine focus knob till the mechanical stage to the low limited place.
- Screw down the objective to the nosepiece one by one.

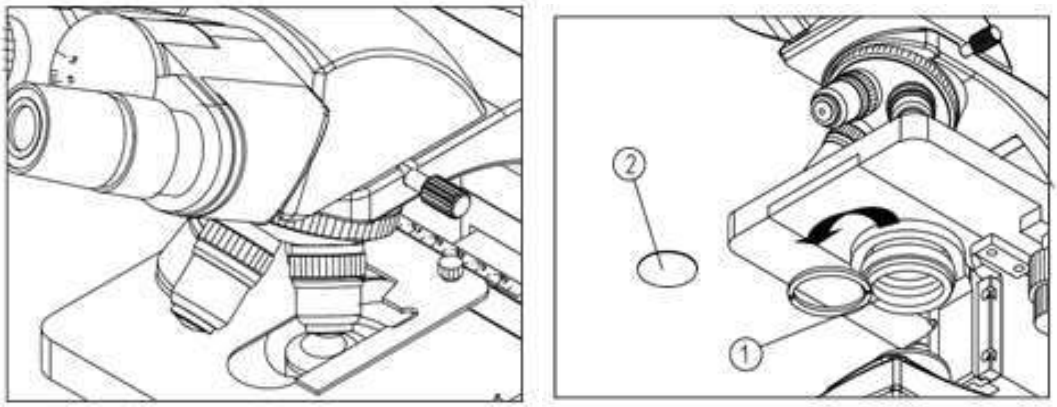


Figure.6

4. Install the filter

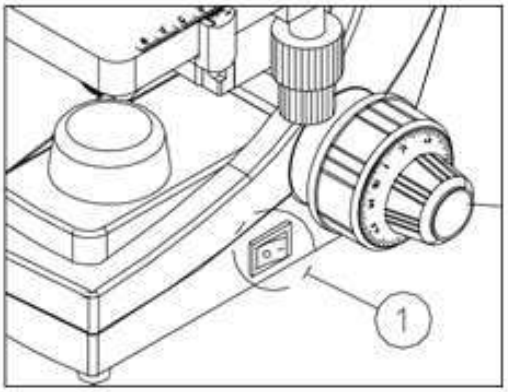


Figure.7

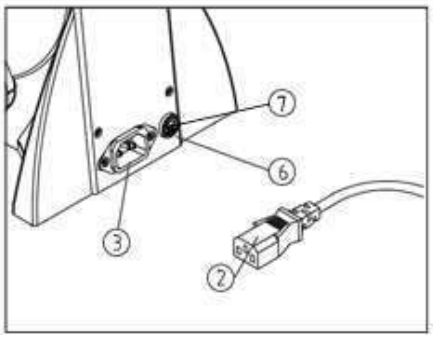


Figure.8

- Swing out the condenser holder
- Put the filter in the holder then swing the holder in
- Before linking the cable make sure the switch is cut **OFF**.
- Insert the electronic plug in the socket safety
- Insert 4 to 5.

5. Change the fuse

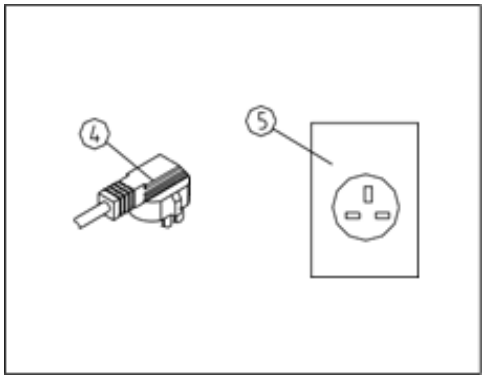


Figure.9

- Before changing the fuse make sure that the switch ① is cut off, swing out the ⑥, change a new fuse, then swing back into the ⑦.

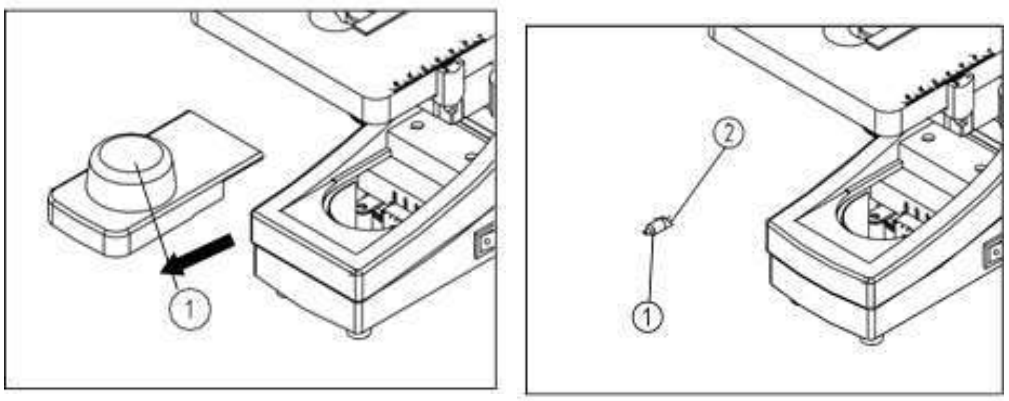


Figure.10

- Install and change the lamp.

6. Pull out the condenser

- Use the pledge wrap the lamp ①, put the lamp pin into the socket ③
- Change the lamp during usage: Make sure the switch is cut off & all parts around the lamp are cooled down.

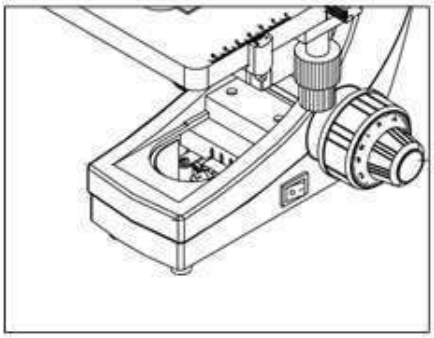


Figure.11

7. Adjustment of system installing

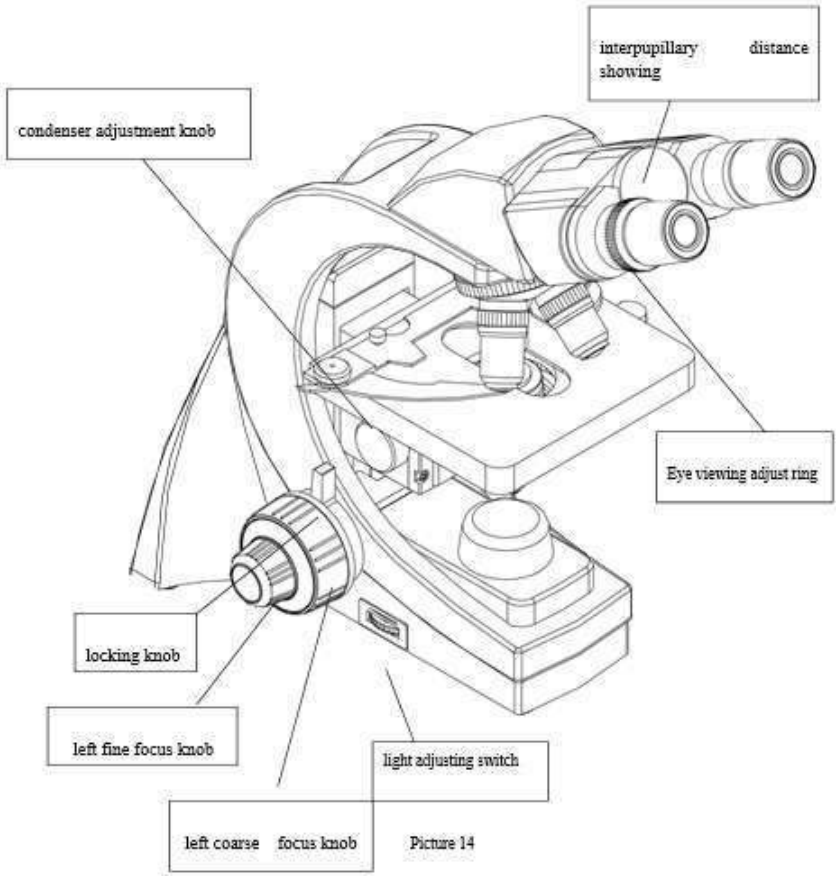


Figure.12

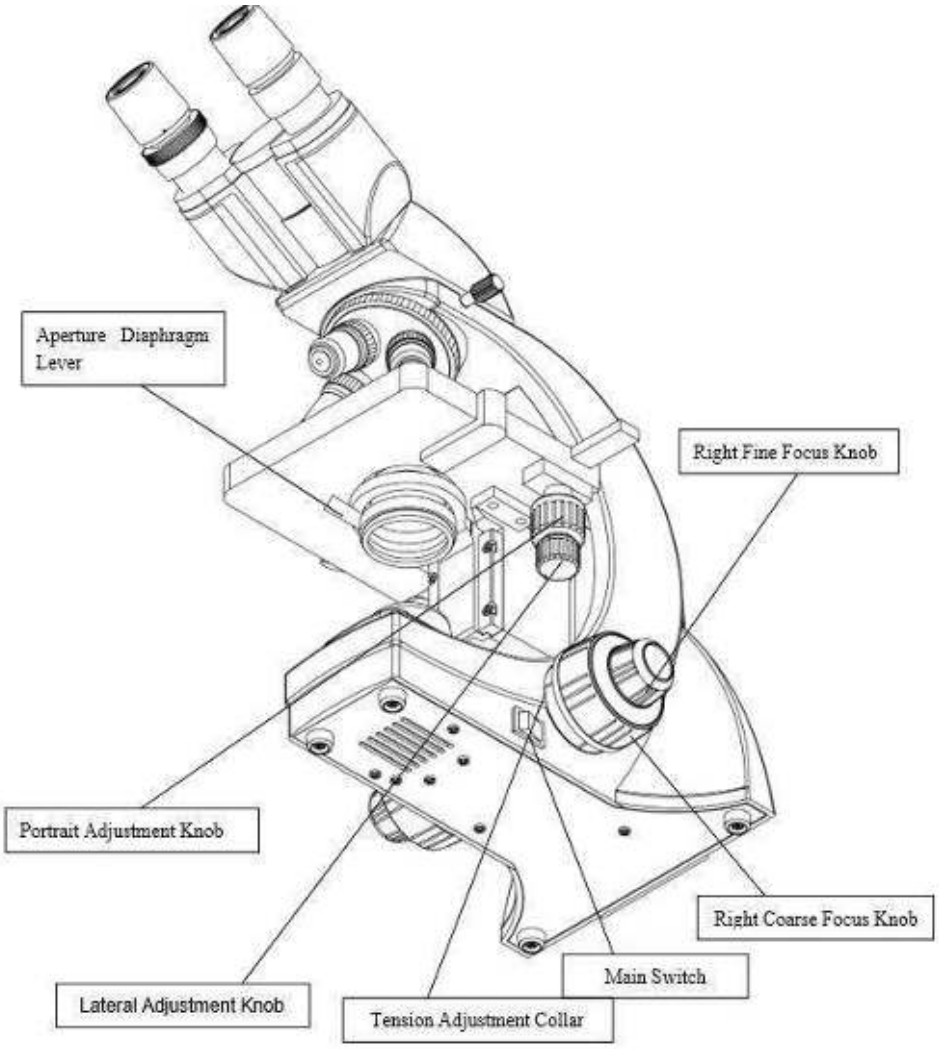

Aperture Diaphragm Lever
Right Fine Focus Knob
Portrait Adjustment Knob
Right Coarse Focus Knob
Main Switch
Lateral Adjustment Knob
Tension Adjustment Collar

Figure.13

8. Operations

1. Adjusting the illumination

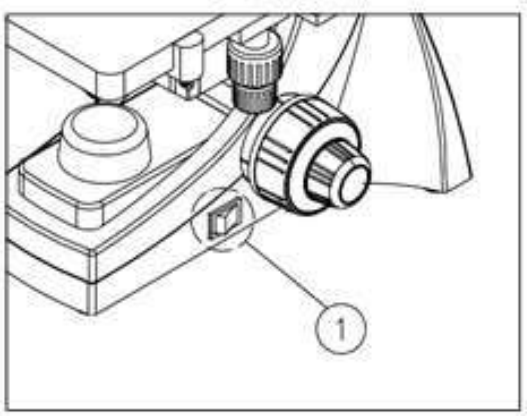


Figure.14

- Connect the power and turn **ON** the main switch to "**O**".
- Turning the brightness adjustment knob anticlockwise the voltage raises and the brightness strengthens turning it clockwise the voltage declines and the brightness weakens.

2. Placing specimen

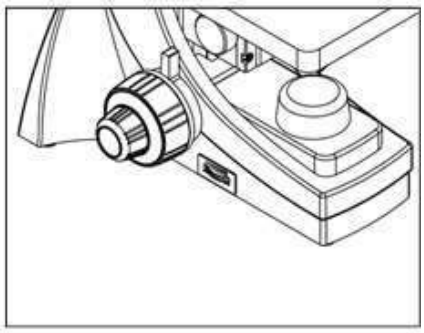


Figure.15

- Place the slide on the mechanical stage and use the stage clips to clamp the slide gently.
- Turn the portrait and lateral adjustment knob of the mechanical ruler and move the specimen to the required position.4.

3. Focusing

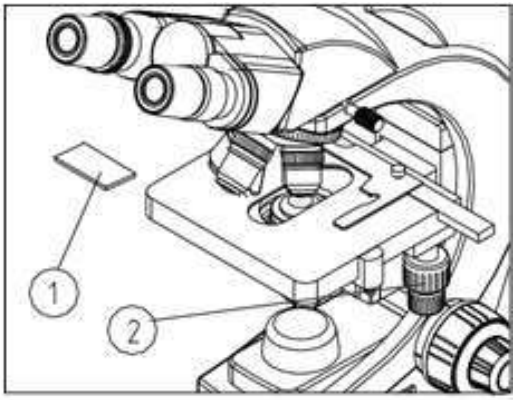


Figure.16

- 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 separate them to focus.
- The operator can converse turn the coarse focus knob① to get the specimen down, and search images in the 10×ocular simultaneously, then use the fine knob② to focus. At this moment, you can replace other magnification objectives safely and focus without the risk of destroying the specimen

4. Adjusting the condenser

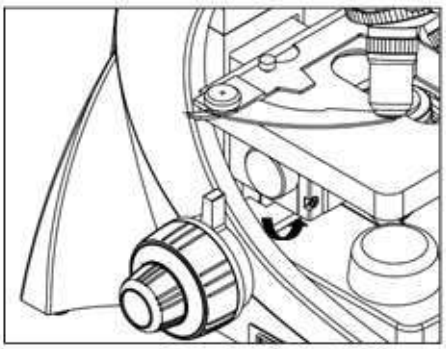


Figure.17

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

5. Adjusting the aperture diaphragm

- Turn the aperture diaphragm lever to adjust the aperture size.

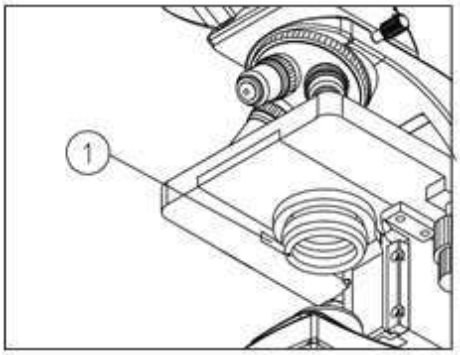


Figure.18

6. Adjusting the interpupillary distance

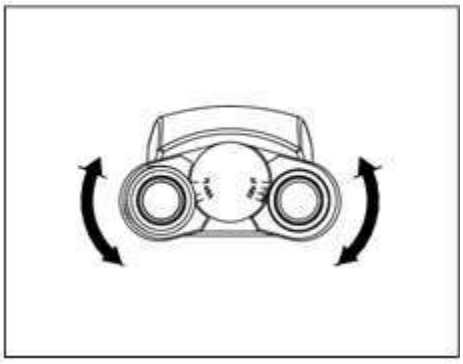


Figure.19

- The interpupillary distance range:55mm～75mm.
- When observing with two eyes, hold on the left and right prism holder, turn around the axis and adjust the interpupillary distance until the left and right fields of view coincide completely.

7. Adjusting the diopter

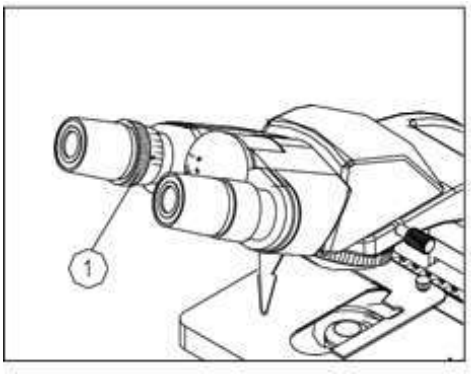


Figure.20

- Observe the right ocular tube with your right eye. Turn the Coarse & Fine Focus Knob to focus the specimen. Observe the left ocular tube with your left eye. If not in focus just adjust the Diopter Ring ① to make it in focus.

8. Adjusting the tension adjustment collar

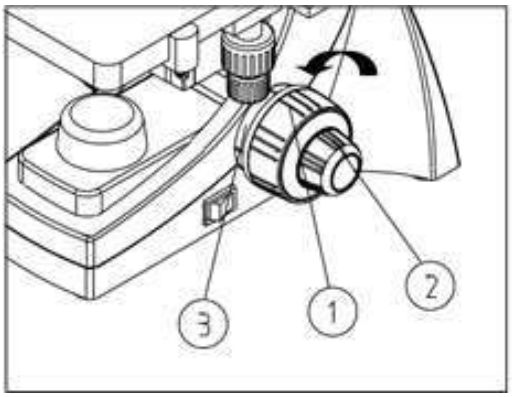


Figure.21

- The tightness of the tension adjustment collar has been adjusted before leaving the factory if you find it loose turn the tension adjustment collar until it is tightened. Turn it along the direction shown in the figure the coarse focus knob will become lighter and turning it anti-direction will get loose.

Software introduction

1. First, the product will be connected to the DC-12V power.
2. After connecting the power press the power **ON** button the blue light stays on.
3. After powering **ON** the system enters the interface.
4. You can connect the large screen through the HDMI interface according to the actual needs.
5. You can make the corresponding image measurement and parameter adjustment in the software interface as required.

- **-Eye software introduction**

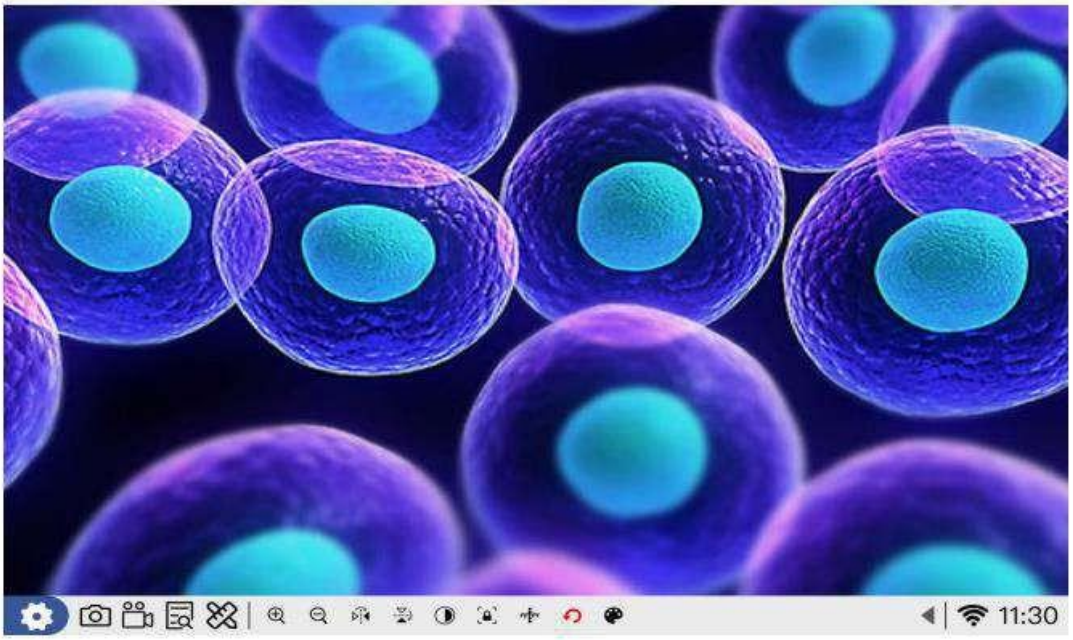
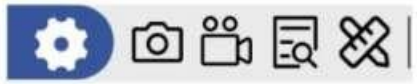


Figure.22

1. The camera & tablet will enter the main interface directly after power on, and you can click the shortcut buttons on the bottom of the screen to set, take photos, record video, review, measure, zoom in/out, mirror image, flip image, etc. as needed.
2.  the icons are for Setting, Photo capture, video recording, preview and measurement.
3.  : this icon is for Digital Zoom In/Out, Minor image, Flip image.

4.  : Black/White mode, Image Freeze, Scale switch, Parameter Reset, Color and size adjust.
5.  : The icon will set the time, Wi-Fi and other parameters
6.  Click the arrow to show more settings. Sound, Brightness, IE Brower, Explorer (USB Disk), Lan, WIFI, Time set.

- **Setting mode**

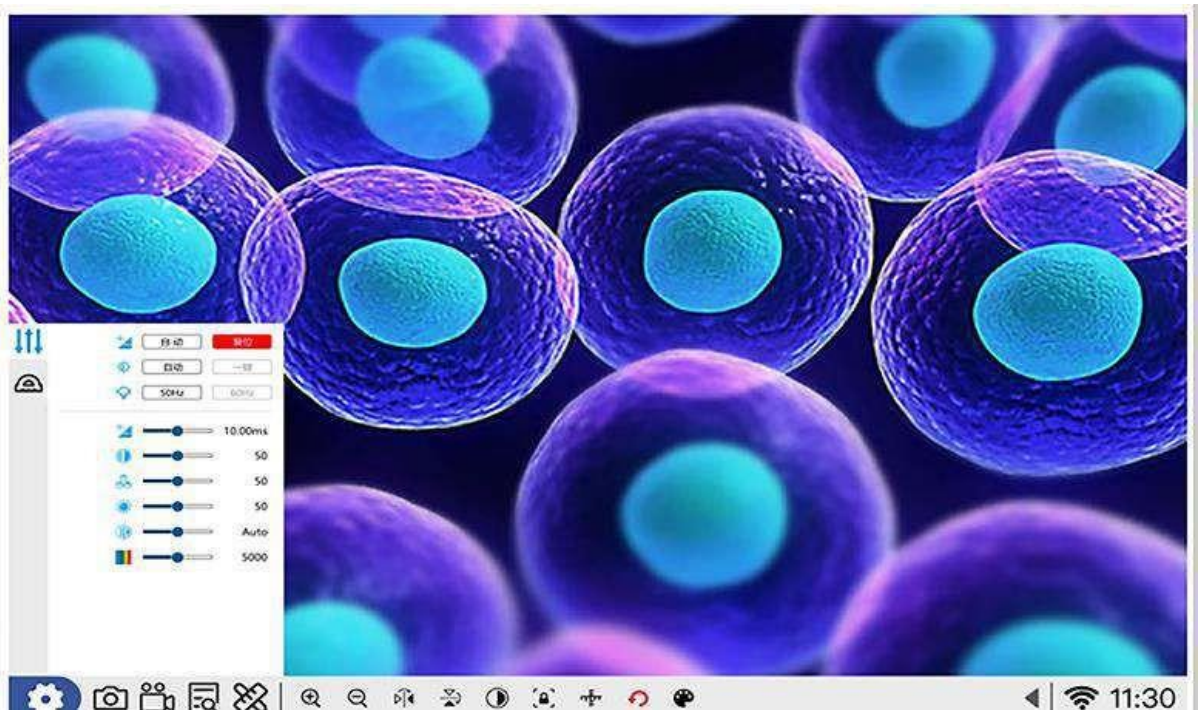


Figure.23

1. After the camera is turned **ON** directly into the screen as shown.
2. Click the button  to pop up the settings menu as above image.
3. Set the image parameters according to demand.

    1) Auto Exposure: Manual Setting and Auto Setting (Default).
    2) White Balance: Automatic (Default) and One-touch Set. Under the standard color temperature, click a one-touch button when the lens is facing standard light or white paper, and the camera will automatically load parameters according to the current condition, to achieve the correct white balance
    3) Anti-Flicker: The system provides 50HZ and 60HZ optional
    4) Exposure: Adjust the exposure time of the camera as needed

5) Contrast: Adjust the image contrast as needed
6) Saturation: Adjust the image saturation as needed
7) Brightness: Adjust the image brightness as needed
8) Sharpness: Adjust the image sharpness as needed
9) Color Temperature: adjust the image color temperature as needed

- **Calibration setting**

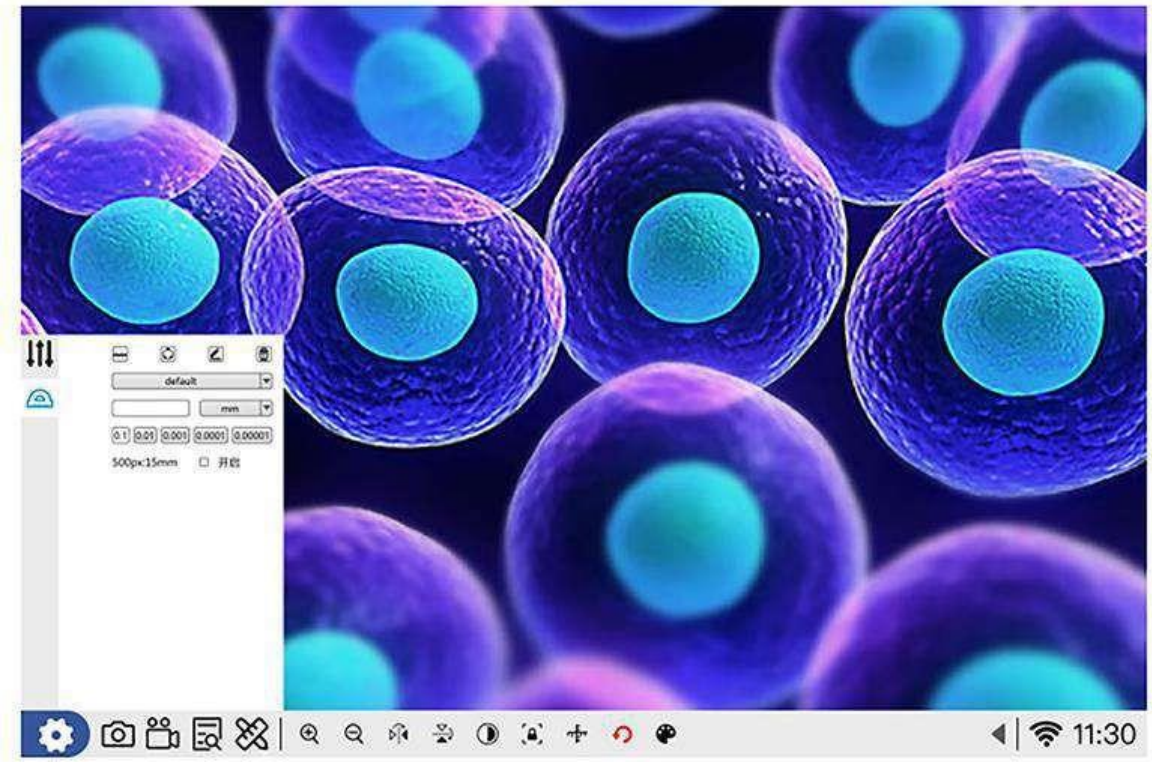


Figure.24

1. Click to choose the button to enter measure calibration mode
2. mode: providing calibration mode, line calibration and circle calibration are available to be selected After clicking the line calibration icon, the preview interface will directly display the line segment, according to the location and length of the calibration scale, the mouse will move the line segment to the top of the calibration scale to overlap with the corresponding scale. Kindly set the name, unit, and accuracy, and finally click the save icon to complete the calibration.
3. Click to delete unwanted calibration information after clicking the delete icon.
4. Name: after drawing the line segment cursor, directly defaults in this position. Enter the corresponding name and then select the unit after confirming, the cursor jumps to the next window.
5. Accuracy: After setting the name and unit, you need to set the corresponding number of decimals to ensure measurement accuracy.
6. Scale: provides the option to turn the scale **ON** or **OFF**.

- **Measurement mode**

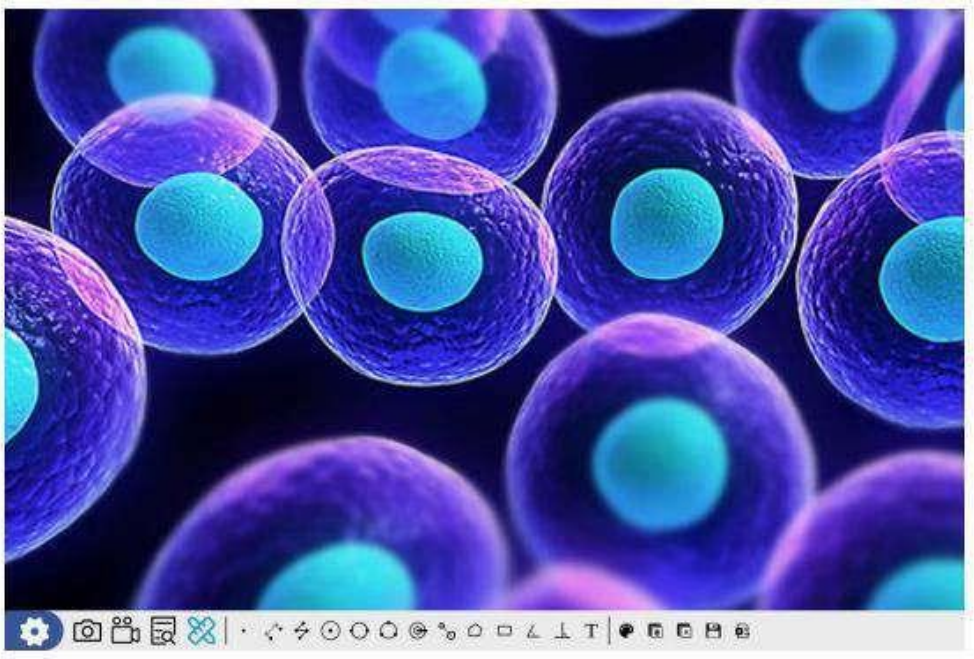
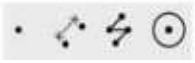
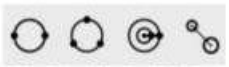


Figure.25

7. Click  to enter measure mode, you can measure the objects, and capture screenshots for the report.
8.  Point coordinates, straight lines, dashes (end of the right mouse button), drawing circles, etc.
9.  2 Points Circle, 3 Points Circle, Concentric Circles, Circle Center Distance.
10.  Polygon, Rectangle, Angle, Point-Line Distance, Text Mark
11.  Set Graph Color & Thickness, Delete One, Delete All, Save Screenshot, Export Measure Result

9. 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, kindly don't disassemble them as possible as you can.
3. Keep the instrument clean, wipe dust regularly, and be attentive to avoid contaminating the optical elements especially.
4. The contaminations on the prism, such as finger marks and oil, could be gently wiped with a piece of soft cloth tissue paper or gauze which has been immersed in pure alcohol or xylene.
5. Don't use organic solvent to wipe the non-optical elements, when you need to clean, use the soft detergent.
6. When using, if the microscope is splashed by liquid, cut off the power at once, and wipe up the mixture.
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 a dust helmet. Do wait for the lamp house to cool completely before the cover.

10. Troubleshooting

- **Optical part**

PROBLEMS	REASON FOR PROBLEMS	SOLUTION
1. The edge of the field of view has a shadow or the brightness is asymmetry.	The nosepiece is not in the located position.	Adjust it into the located position
	The filament Imaging is not in the center.	Adjusting it to center
	Stains on the lens (Condenser, Objective, Eyepiece).	Wipe up
2. Stains in View Field	Stains on the lens (Condenser, Objective, Eyepiece）	Wipe up
	Stains on the specimen	Wipe up
	The Condenser position is too low.	Lose the condenser locking bolt. Adjust the position of the condenser. Screw down the locking bolt.
3. Low image quality (Low resolution, low contrast)	No cover slip on the specimen.	Cover the slip
	The cover slip is too thick or too thin.	Use standard cover slip. Thickness:0.17mm
	The specimen is reversed.	Reverse back.
	The dry objective is stained with oil (Especially 40X).	Wipe up
	Stains on the lens (Condenser, Objective, Eyepiece).	Wipe up
	The oil objective is not in oil.	Use oil
	There is an air bubble in the oil.	Remove oil
	Do not use the appointed oil.	Use the appointed oil
	The opening of the Aperture diaphragm is too large.	Properly make it smaller.
	Stains on the incidence lens in the binocular drawtube.	Wipe up

	The opening of the Aperture diaphragm is too small.	Properly make it larger.
	The condenser position is too low.	Adjust the position
4. One side of the image is dark.	The condenser is not in the center of the view field, or the condenser is inclined.	Reinstall the condenser and adjust the center carefully by using the condenser adjusting bolt.
	The nosepiece is not in the located position.	Turn it into the required position.
	The specimen is floating on the stage.	Reinforce it reliably.
5. The image moved when focusing	The specimen is floating on the stage.	Reinforce it reliably.
	The nosepiece is not in the located position	Turn it into the required position
6. The image takes the yellow slightly.	Do not use the color filter.	Use the blue filter.
7. The bright degree is not enough	The opening of the Aperture diaphragm is too small.	Properly make it larger
	The condenser position is too low.	Adjust the position.
	Stains on the lens (Condenser, Objective, Eyepiece)	Wipe up.

- **Mechanical part**

PROBLEM	REASON FOR PROBLEM	SOLUTION
1. Can't focus when using high magnification objective.	Slice put reversed. The cover slice is too thick.	Reverse back Using standard cover slice. Thickness: 0.17 mm
2. Touch the slice when switching the objective from low magnification to high one.	Slice put reversed. The cover slice is too thick.	Reverse back Using standard cover slice. Thickness: 0.17mm.
3. The specimen moves not flowing.	The slice holder does not nip the slice firmly.	Make it firmly.
4. Two eyes image not in superposition.	The interpupillary distance is not correct.	Adjust the interpupillary distance correctly.
5. The eyes area uncomfortable	The diopter is not right.	Adjust the diopter according to your sight.

- **Electric part**

PROBLEM	REASON FOR PROBLEM	SOLUTION
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 burns out.	Change a new bulb

2. The bulb burns out in a high frequency	Do not use an appointed lamp with High voltage.	Use a pointed lamp. If the circumstances still have not changed contact the maintenance part.
3. The rightness	Do not use an appointed lamp Low voltage	use an appointed lamp to turn up.
4. The light glimpse	The bulb is going to spoil	Change the bulb.
	The power cord has poor contact.	Check the power cord and connect it exactly.

11. Accessories

Accessories No.	Name
1	Eyepiece WF 10X with pointer
2	Eyepiece WF 10X with micrometer
3	Infinite Plan Achromatic Objective 20X
4	Infinite Plan Achromatic Objective 60X
5	Dark Field Condenser NA 0.7 to 0.9 (Dry)
6	Dark Field Condenser NA 1.25 to 1.36 (Oil)
7	Sliding Phase Contrast Kit
8	Simple Polarization Set: Polarizer and Analyzer
9	LED Epi-Fluorescent attachment FL-LED
10	Epi-Fluorescent attachment X Y-2
11	1X C-Mount
12	0.5X C-Mount