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A13.2602

Student Biological

Instruction Manual

To ensure the safety and obtain satisfactory performance, please study this instruction manual thoroughly bef ore start to use the instrument.

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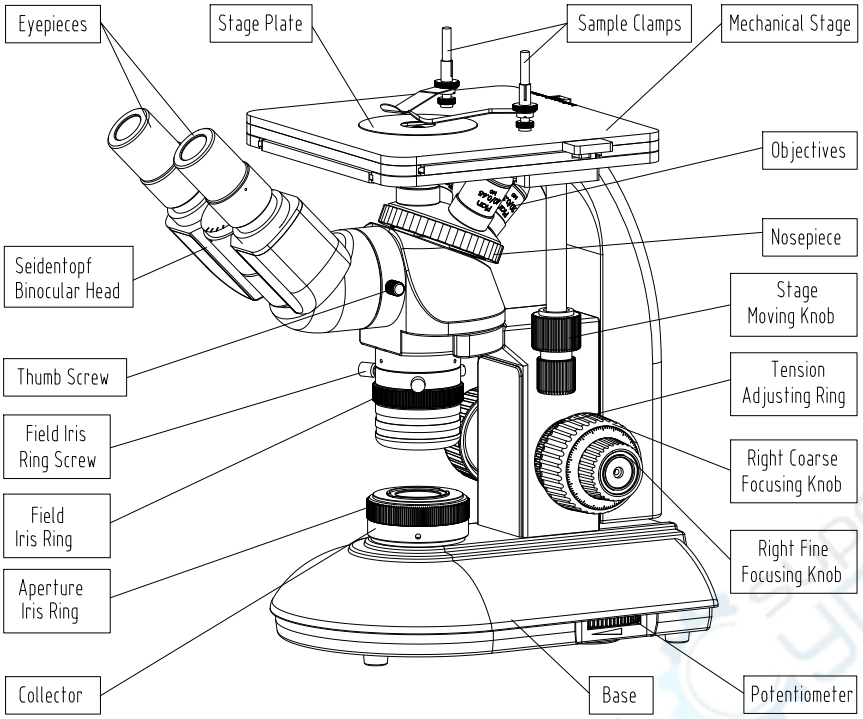

Fig.1 MDJ200 Metallurgical Microscope

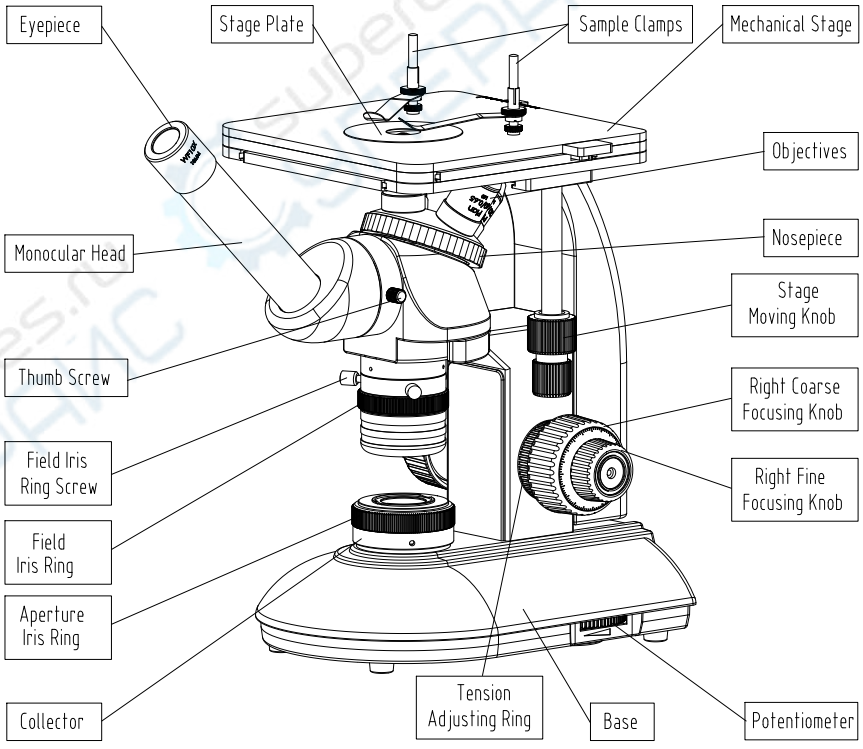

Fig.2 MDJ100 Metallurgical Microscope

1. Applications

The MDJ series Metallurgical Microscope is widely used for identifications and analysis of the structures of different metals and alloys in factories,colleges and scientific department.

2. Specification

2.1. Total Magnification

Objective / Eyepiece	5X	10X	20X	50X	80X
5X	25X	50X	100X	250X	400X
10X	40X	100X	200X	500X	800X
12.5X	50X	125X	250X	600X	1000X
16X	64X	160X	320X	800X	1280X

2.2. Objectives

Obj.Mark	Obj.Type	Magnification	Numerical Aperture (N.A.)	Working Distance（mm）	System	Colour Ring
LPL5X/0.13 ∞/0	LPL	5×	0.13	16.07	Dry	Red
LPL10X/0.25 ∞/0	LPL	10×	0.25	18.48	Dry	Yellow
LPL20/0.40 ∞/0	LPL	20×	0.40	8.35	Dry	Light Green
LPL50/0.70 ∞/0	LPL	50×	0.70	1.95	Dry	Light Blue
LPL80/0.80 ∞/0	LPL	50×	0.80	0.85	Dry	Dark Blue

Remark: 50×、80× are with spring

2.3. Eyepieces

Eyepiece Mark	Eyepiece Type	Magnification	Field Dia. （mm）	Focus （mm）
WF10×-20	Plan Wide Field	10×	φ20	25
WF10×-18	Reticle Eyepiece （0.1mm）	10×	φ18	25
WF16×	Plan Eyepiece	16×	φ13	15.6
WF12.5×	Plan Eyepiece	12.5×	φ14	20
5×	Huygenian Eyepiece	5×	φ20	50

2.4. Stage

Three layer mechanical stage size:180mm×180mm。
X-Y travel range：30mm×30mm；
Division ：0.1mm；
Stage plate size：φ110mm

2.5. Filter set:

Green, Blue, Grey and White grass can be supplied

2.6. Inllumination

12V/20W halogen bulb, adjustable brightness

2.7. Nosepiece

Quadruple nosepiece

2.8. Head

a. Monocular Head
b. Seidentopf Binocular Head

Inclined 45°, Interpupillary Adjustable Distance Is 48-75mm,
Diopter Adjustable Range ±5.

2.9. Coaxial Coarse & Fine Focusing System

Coaxial coarse & fine focusing knobs, coarse stroke 42.4mm/rotation, actual coarse stroke 12mm;
Fine stroke 0.2/rotation, fine division 0.002mm.

2.10. Anti-fungal systems

Eyepiece and objective is anti-fungal.

2.11. Power Supply

Input：100V～240V，47-63Hz；Fuse：5A 250V（φ5×20）.

3. Installation and Operation

3.1. Installation

3.1.1 Put the body upright on the table steadily.
3.1.2 Put the head into body.
3.1.3 Put out the dust cover from eyepiece tube,and insert available eyepiece into eyepiece tube.
3.1.4 Turn around the coarse focusing knob to araise the stage.Remove the dust covers of nosepiece and put the objectives into the holes in nosepiece as per the power of objectives.
3.1.5 Put the available stage plate into the hole of stage, and insert the clamps into the small holes of top face of stage.

3.2. Operation

Check the outside power voltage and make sure it is available then put the socket into pocket.
3.2.1 Turn around the potentiometer then adjust the light to an applicable position.
3.2.2 Select the suitable sample and place it on the stage plate,make sure the observed face down,and fix the sample with clips. Turn around the stage knob to make the sample into optical path.
3.2.3 Hold the rim of nosepiece and turn around to put a low power objective(usually 10×) into optical path then observe the specimen with left eyepiece by left eye and turn coarse focusing knob to find the image, then turn slowly fine focusing knob to make the image clear.

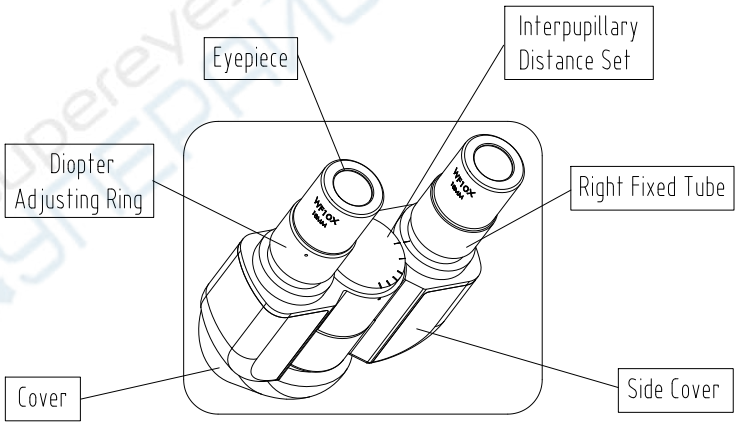

Fig.3

After that,put high power objective into the optical path.

3.2.4. Pupil Distance Adjustment and Diopter Adjustment
3.2.4.1 Interpupillary Distance Adjustment (As shown in Fig.3)
Interpupillary distance is different for everyone, so it is necessary to adjust interpupillary distance before using binocular microscope. Please take the two eyepiece tubes and turn until the rings observed by two eyes are in superposition entirely.
3.2.4.2 Diopter Adjustment (As shown in Fig.3)
As focusing for binocular, user should observe right eyepiece by right eye, and make the image clear by focusing adjustment, then observe the left eyepiece. At the same time, adjust the diopter ring of the left tube to make the image in left eyepiece clear as

same as the right eyepiece.

3.2.5 Field Iris Adjustment (As shown in Fig.1 and Fig.4)

Turn the field iris ring to make the image of field iris smaller than the eyepiece field, and you can see the image of the field iris. Make the field iris center nearly overlap the eyepiece view center by adjusting the iris center screw. Make the image of field iris smaller than eyepiece field and adjust again, make the field iris more overlaps the eyepiece field. Make the field iris bigger until the image of field iris disappears out of the eyepiece field .

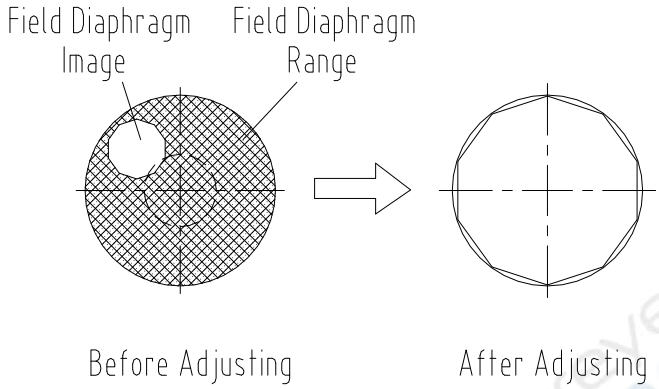

Fig.4

3.2.6 Aperture Iris Adjustment (As shown in Fig.1 and Fig.5)

Turn aperture iris ring and change the size of aperture iris to change the contrast of the sample.

Put out the eyepiece and observe through tube, and adjust the aperture iris to make the aperture iris image fills 70%-80%of the objective aperture.

After the above points, please choose available objective, eyepiece and filter as per the sample, and adjust aperture iris, bright, focusing knobs to get the clear image.

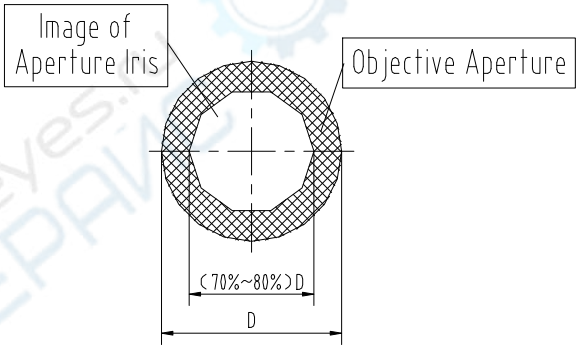

Fig.5

3.2.7 Usage of the tension adjustment ring (Shown in Fig.6)

The tension adjustment ring can adjust the tension of the coarse and fine focusing unit to prevent the stage from sliding down automatically and to improve the comfort of operation. Rotation clockwise makes tension decrease, and by contraries, rotation counterclockwise makes tension increase.

▲Don't turn lest and right coarse and fine focusing knobs with different direction with power at the same time, if so, the focusing system will be damaged.

▲Don't directly pull objective to turn nosepiece when user changes the different objectives, if so, optical quality of microscope possibly be affected. The right way is to take the tooth-like part of the nosepiece to turn it, and make the objective into correct position and into the bright path.

3.2.8 Usage of Digital Camera

3.2.8.1 Get the clear image, then put out the eyepiece.

3.2.8.2 Connect the camera adaptor with camera, then insert the adaptor into the tube, and fix it with screw.

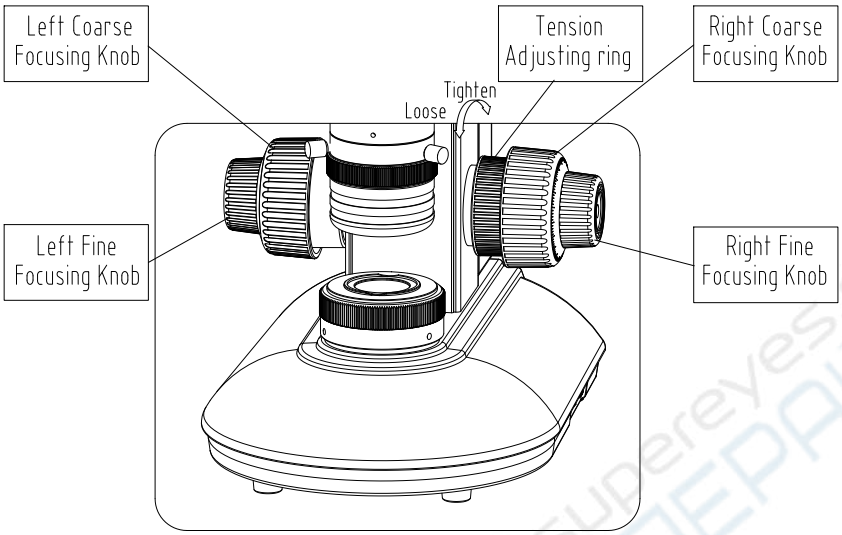

Fig.6

3.2.9 Usage of immersion oil objective

If you must to use oil objective, it is necessary that adding moderate immersion oil between the front lens of the oil objective and the sample. Please pay attention that air bubble and impurity can't be in the immersion oil, otherwise, the image would be affected.

▲After immersion oil used, the oil of specimen and the microscope surface should be soon cleaned by absorbent cotton, lens paper, gauze or soft cotton cloth with moderate mixture of pure industrial alcohol and ether (proportion 1:4) .

4.Maintenance

4.1 Clean microscope

4.1.1 Don't touch the lens with hand, Dust on lens should be cleaned by soft brush or absorbent cotton or cleaned by absorbent cotton, lens paper with the mixture of alcohol and ether (proportion 1:4).

4.1.2 Alcohol and ether all are burnt early, please take them away from fire. Be careful for turn on and off power.

4.1.3 Don't clean painted metal and galvanizing metal with organic solvent such as alcohol, ether or the mixture of the both. Silicon cloth or soft cleaning preparation is suggested to clean it.

4.1.4 Plastic should be cleaned by soft cloth with clear water.

4.2 Environment of using and placing

4.2.1 Microscope should be used and placed in a cool, dry, non-dust, non-shake and non-corrosive gases environment.

4.2.2 Microscope should be used in environment of indoor temperature 0° -40° C and maximum relative humidity 85%.

4.2.3 Removing equipment is suggested to be installed when microscope used in heavy humidity area to avoid fungus and mist damage instrument.

4.2.4 Please pay attention to prevent microscope from violent shake and vibration in application and in carrying. Don't drag it on the surface of worktable to avoid damage

to microscope and worktable.

4.3 Replacement of bulb

4.3.1 Turn off power, and pull out plug.

4.3.2 Wait the bulb become cool.

▲ **Please be sure that the bulb is cool, then follow by the nest operations.**

4.3.3 Lay aside the microscope reliably, unscrew the knurled thumb screw of the lamp housing cover on the underside of base.

4.3.4 Pull over the lamp housing cover.

4.3.5 Pull out the bulb should be replaced, hold a new bulb with silk cloth to avoid fingerprint and dust affect bulb brightness and service life, and insert fully the contact pins into the bulb socket.

4.3.6 Close the lamp housing cover, and screw the knurled thumb screw.

▲After working for above 10 hours continuously, better cut off the microscope about 30 minutes.

4.4 Replacement of fuse

4.4.1 Cut off power of microscope, and pull out the plug.

4.4.2 Unscrew fuse cap in the back of base, take out old fuse.

4.4.3 Replace a new fuse, then screw the fuse cap.

5. Troubleshooting

In the period of using MDJ microscope, if there is any trouble occurs, please referring to the following sheet listed some common troubleshooting resolve them.

Trouble	Causation	Remedy
Switch on but bulb dark	Plug is unreliable	Plug in again
	Bulb is bad	Change bulb
	Fuse is broken	Change fuse
Bulb is flickering or brightness is unsteady	Bulb is unstable	Insert it again
	Bulb is broken	Replacing bulb
Brightness of view field is not enough or is uneven	Bulb specification doesn't meet the requirement	Replacing bulb
	Brightness isn't adjusted correctly	Adjust Rotation potentiometer
	Objective isn't in correct position	Make the objective in correct position
	The size of iris aperture is too small	Adjust the size of iris aperture
	Lens (objective, eyepiece, Condenser, light collector) has dust	Clean it
Image isn't clear (contras or definition isn't enough)	Size of iris aperture isn't proper	Adjust the size of iris aperture
Image observed by two eyes aren't in superposition entirely.	Interpupilary distance isn't adjusted correctly	Adjust interpupilary distance according to two eyes
It is easy for eyes to be tired during observing	Diopter isn't adjusted correctly	Readjust diopter

MDJ Metallurgical Microscope

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