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A15.2601-RT

Polarizing Microscope, Transmit & Reflect

Instruction Manual

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

Contents

1.Purpose

BK-POL Series polarizing microscope is for the field of metallurgy, geology and minerals.

BK-POL Series polarizing microscope is with gypsum(λ), mica (λ /4) sample, quartz wedge and attachable mechanical stage. It is an ideal instrument that has perfect function and quality.
BK-POL/BK-POLR transmitting/reflecting polarizing microscope is perfect in optical and mechanical quality, and it can be used in observing even, non-even, transparent, non-transparent mineral sample.

2. Specification

2.1 Total Magnification

2.1.1 Transmitting

Objective / Eyepiece	4X	10X	20X	40X	60X	100X
10X	40X	100X	200X	400X	600X	1000X

2.1.2 Reflecting

Objective / Eyepiece	5X	10X	20X	50X	100X
10X	50X	100X	200X	500X	1000X

2.2 Objectives

Objective		N.A.	Working distance (mm)
Non-stress Infinity Plan Objective (Transmitting)	PLAN 4X	0.10	12.1
	PLAN 10X	0.25	4.64
	PLAN 20X(S)	0.40	2.41
	PLAN 40X(S)	0.66	0.65
	PLAN 60X(S)	0.80	0.33
	PLAN 100X(S,Oil)	1.25	0.19
Non-stress LWD Infinity Plan Objective (Reflecting)	LPL 5X	0.13	16.04
	LPL 10X	0.25	18.48
	LPL 20X	0.40	8.35
	LPL 50X(S)	0.70	1.95
	PLAN 100X(S,Dry)	0.90	1.10

2.3 Eyepiece

Magnification	Type	View Field Diameter(mm)
10X	High eye point	20/22
10X	Reticule (0.1mm)	20/22

2.4 Mechanical Tube Length: ∞

2.5 Head: Seidentopf binocular (trinocular) head 30° ,
Interpupillary adjustable distance is 48-76mm.
Diopter adjustable range ±5,
Anti-fungal systems.

2.6 Intermediate: 360°part division for analyzer, 2°30'per scale, lock system
Bertrand Lens (center adjusting)
Gypsum(λ), mica (λ /4)sample, quartz wedge

2.7 Nosepiece: Quadplex or quintuple nosepiece (center adjusting), nosepiece spanner.

2.8 Revolving Round Stage: Diameter Φ174mm, 360° part scale, 6'per scale.

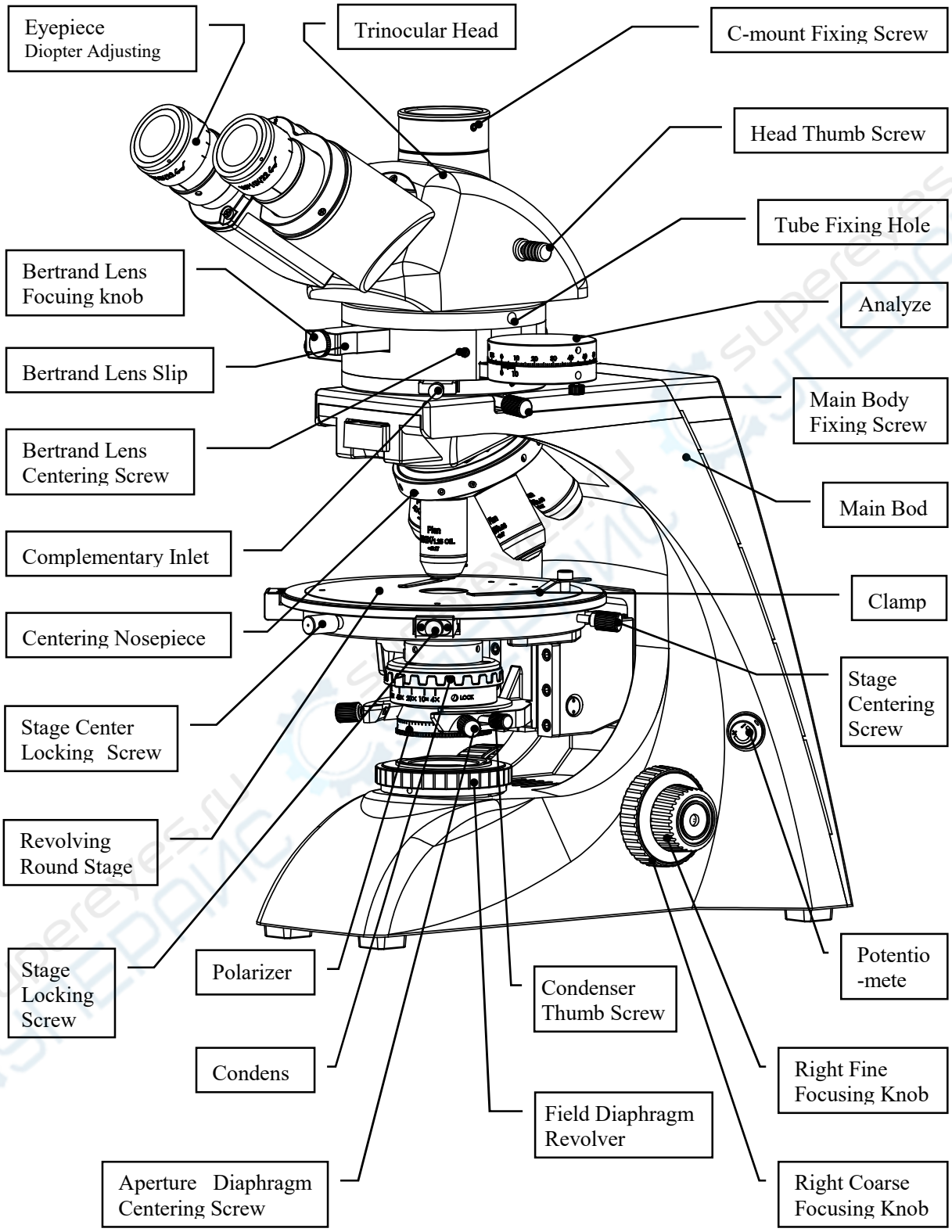
2.9 Focusing System: Coaxial coarse and fine focusing knobs, coarse stroke 22mm.
Fine division 2μm, condenser up-down range 22mm

2.10 Condenser: Abbe condenser, N.A. 1.25, adjustable aperture, aperture center can be adjustable.
360°part division for polarizer, 5° per scale, lock system

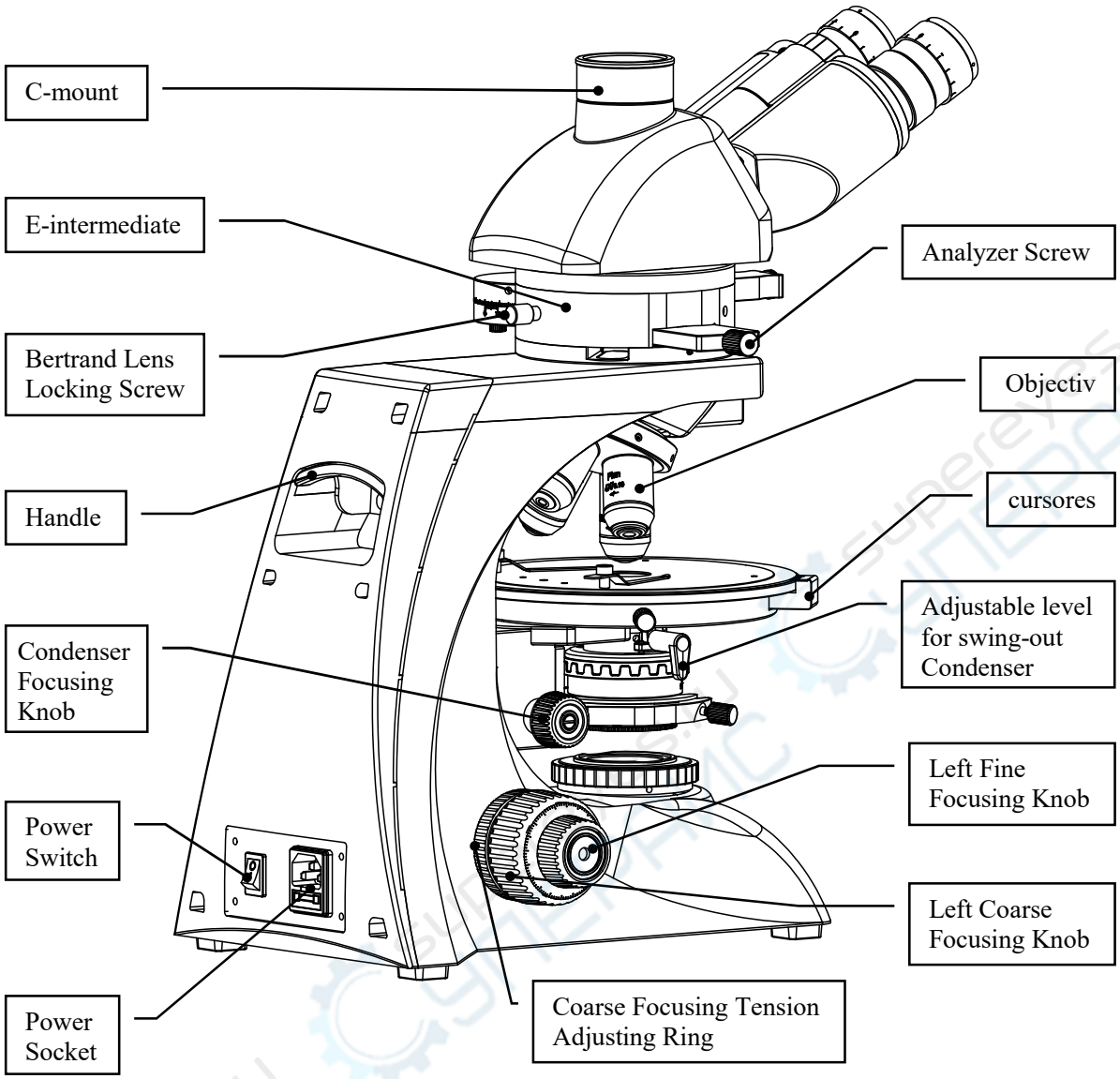
2.11 Electric components: Input voltage AC100-240V, 50/60Hz
Output voltage DC1.2-6V
12V/20W halogen lamp
Rotation potentiometer with power switch
Fuse 5A φ5×20

2.12 Filter: Blue (Amber, green, neutral filter optional)

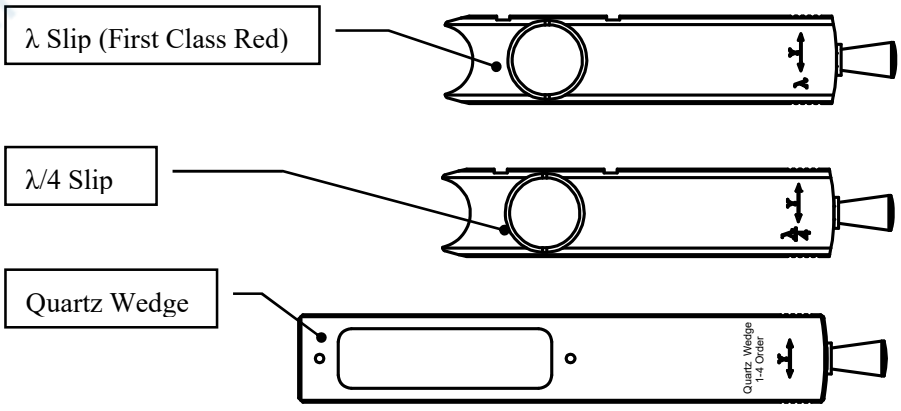
3. Parts Name

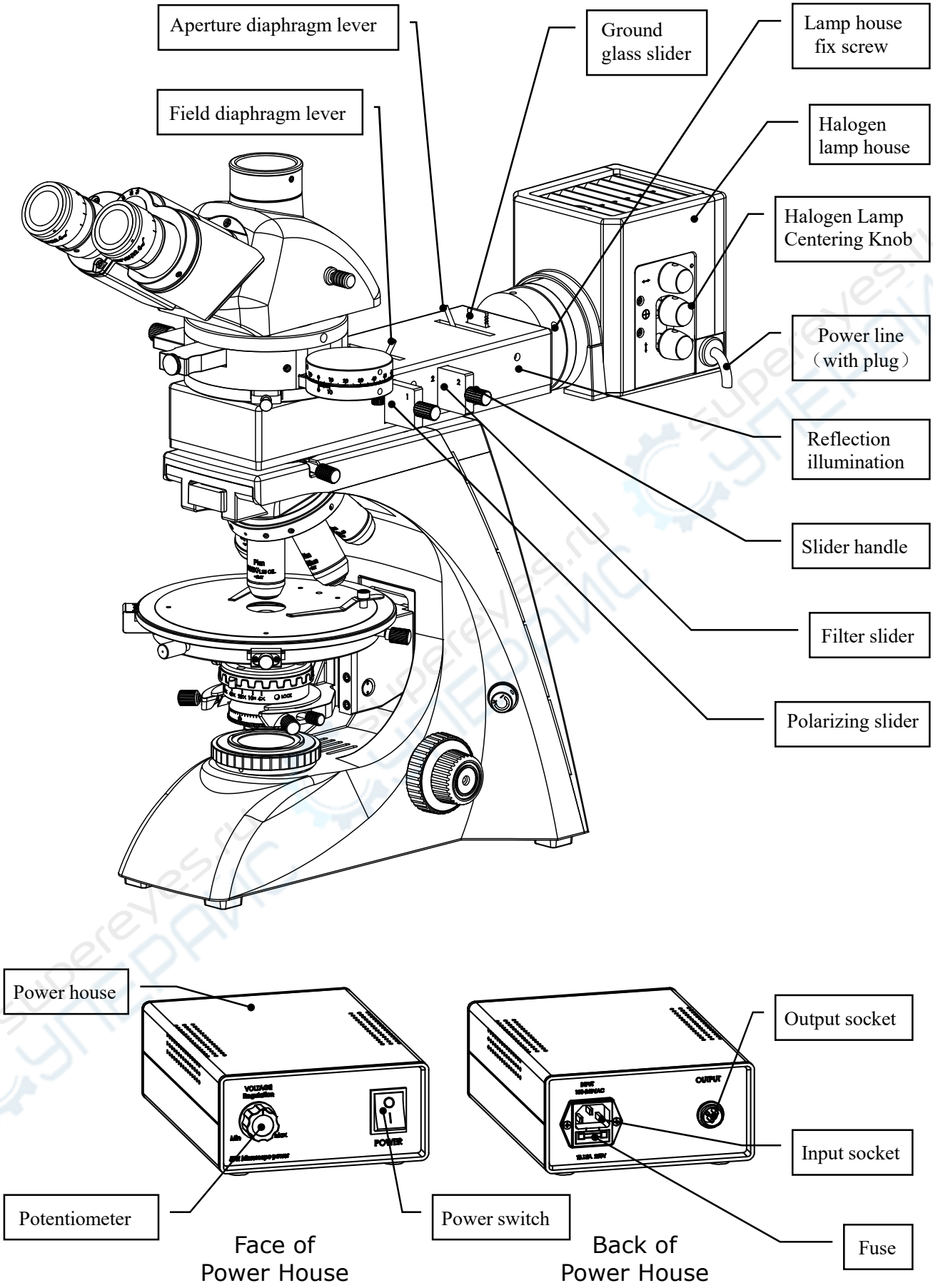


BK-POL Transmitting Polarizer Microscope (1)

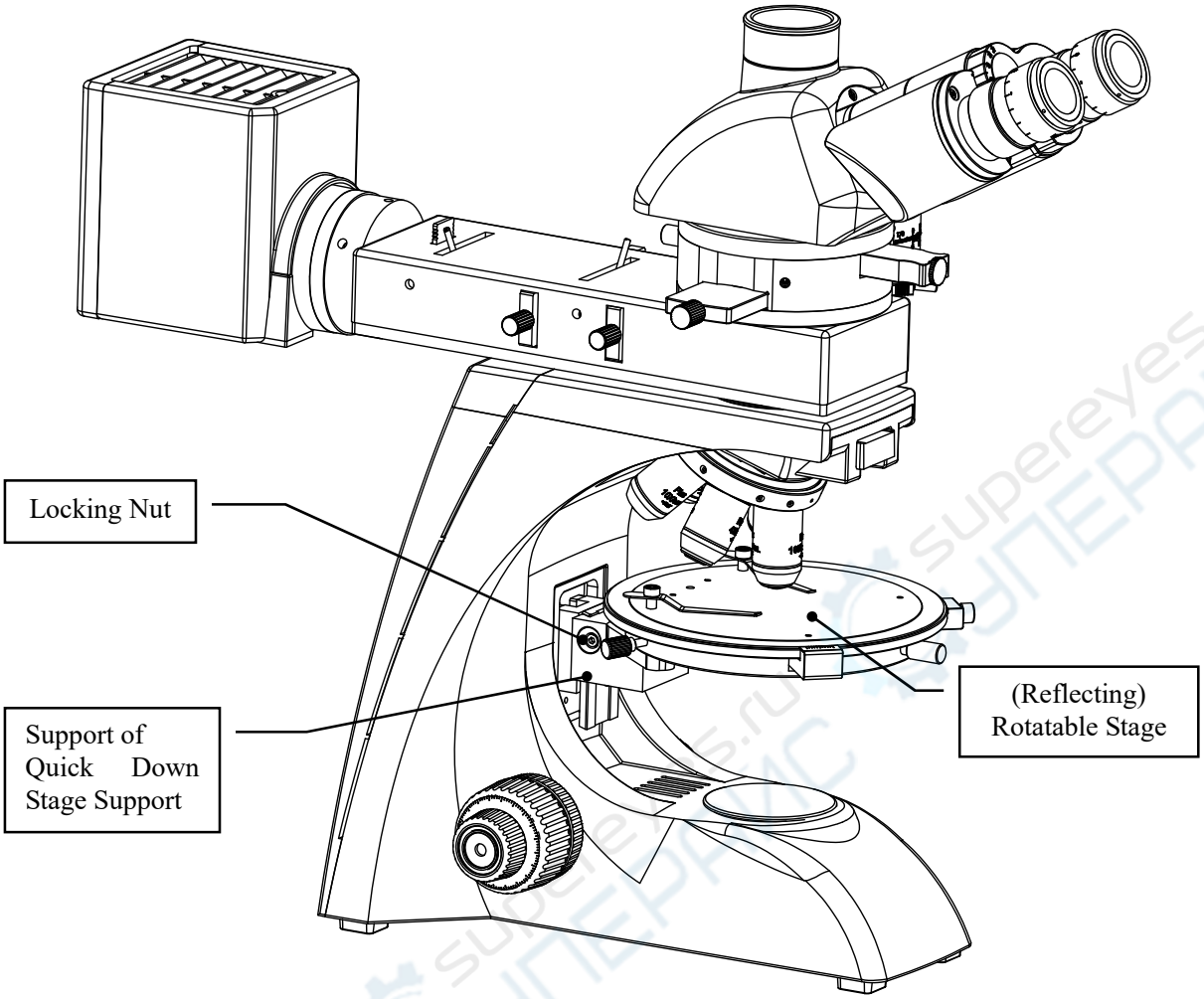


BK-POL Transmitting Polarizer Microscope (2)





BK-POLR Transmitting & Reflecting Polarizer Microscope



BK-POLF Reflecting Polarizing Microscope

4. Installation

4.1 Installation Condition

4.1.1 The required input voltage: 100V-240V, 50/60HZ

4.1.2 Alcohol, gasoline and paper all are burnt early, please take them away from the lamp.

4.1.3 The halogen lamp: 12V/20W, G4

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

4.1.5 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.

4.2 Installation

4.2.1 Please confirm the installation condition meets 4.1;

4.2.2 Put out the main body and place it in table, and loose the main body fixing screw, then put the cost cover out;

4.2.3 Put out the intermediate, fix it into the main body, then tighten the main body fixing screw; If it is Transmitting & Reflecting Polarizer Microscope, put out the reflecting illumination unit to fix it.

Installation of reflecting illumination unit: Put out the halogen lamp house, fix it onto the back of reflecting illumination unit by the fixed screw, connect the power wire of halogen lamp house into the power output socket of power house.

4.2.4 Fix the head into the intermediate;

4.2.5 Insert the eyepieces into the tubes;

4.2.6 Put out the dust cover of the nosepiece, and turn the coarse focusing knob to lower the stage, and find the objective hole with yellow mark in the nosepiece. Fix the 10X objective into the hole, and turn the nosepiece clockwise, fix the other objectives as per the power.

4.2.7 Loose the condenser lock thumb and fix the condenser.

5. Operation

5.1 Turn the power switch and the potentiometer to adjust light to be available;

5.2 Fix the sample on the stage, and move it into the path;

5.3 Turn the nosepiece to put 10X objective into light path, and turn the focus knobs to get clear image.

5.4 Confirm the polarizing vibrancy direction

The polarizing vibrancy direction has set to be at west-east in factory when the scale of the polarizing is 0°.

5.5 Check polarizing and analyzer

The field should be dark completely (when there is no sample) when the scale of polarizer and analyzer is 0°. Please check the position of the

polarizer and the analyzer if not so.

5.6 Choose the complementary slip as per the sample, then insert into the slip.

5.7 Put into the Bertrand Lens Slip in the condition of polarizing;
5.8 Adjust the center of the stage.

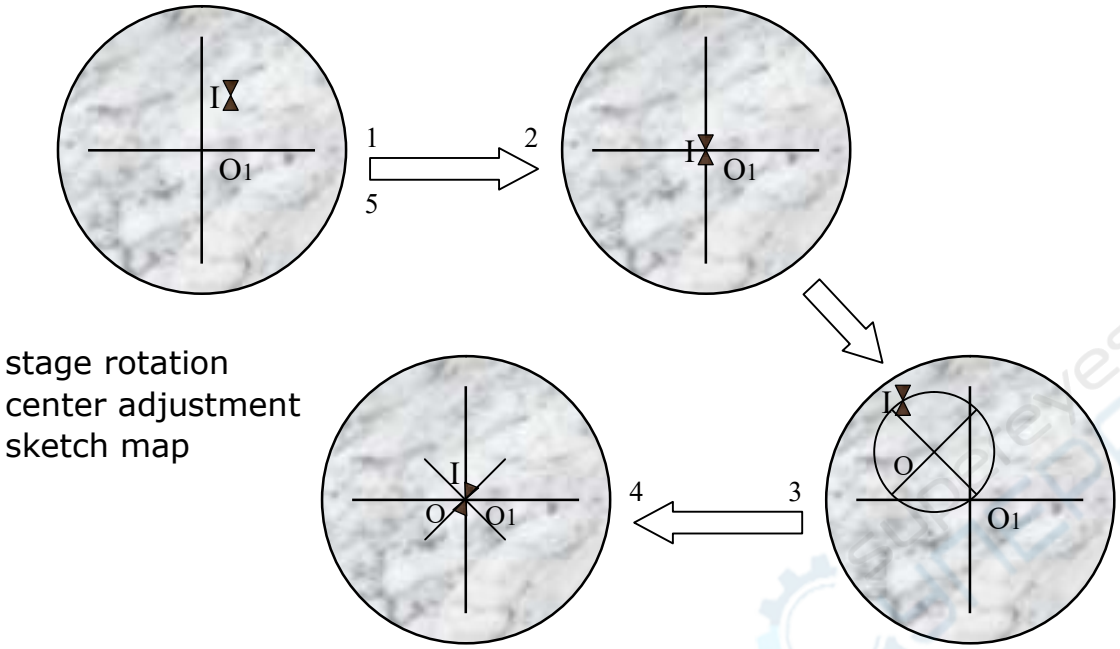
5.9 Adjustment for round stage rotating center
The rotating axis of the round stage should be in the same line with the axis of optical system. When rotating the stage, the sample's center would coincide with view field's cross division line intersection point, and image should move around cross division line intersection point in circular motion, image should always in the view field. If not, accurate data can't be got, and the operation can't be done correctly, especially for high power objective.
Adjusting Details:

5.9.1 After getting clear image, choose one image point (**I**) at the observational position, then moving mineral sample , making **I** in cross division line's point, and it is the center of field (mark: $\mathbf{O_1}$).

5.9.2 Stage must rotate at least one circle, if actual rotating center (mark: **O**) isn't coincided with field center $\mathbf{O_1}$, image point **I** will do circular motion around stage rotating center **O** .

5.9.3 The angle from rotating stage to initial position is 180°, point **I** will move from $\mathbf{O_1}$ to the full distance position , the symmetric point to point O. Adjusting the stage focusing screw, point **I** will move to point **O**, then move mineral sample gently, make point I coincided with field center $\mathbf{O_1}$.

5.9.4 Rotating stage one circle again, if image point **I** isn't off point $\mathbf{O_1}$, it means point **O** has coincided with point $\mathbf{O_1}$, then the center adjustment is finished. If not, please repeat step2 , 3, 4.



△ To confirm polarized light's vibration direction, choose a cleavage black mica, putting it in field center, then rotating the stage until the black mica color getting the darkest, the black mica cleavage direction is the polarized light's vibration direction.

6. Maintenance

6.1 Clean microscope

6.1.1 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).

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

6.1.3 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.

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

6.2 Environment of using and placing

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

6.2.2 Microscope should be used in environment of indoor temperature 0～40℃ and maximum relative humidity 85%.
6.2.3 Removing equipment is suggested to be installed when microscope used in heavy humidity area to avoid fungus and mist damage instrument.
6.2.4 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.

6.3 Replacement of bulb
6.3.1 Turn off power, and pull out plug.
6.3.2 Wait the bulb become cool.
▲ Please be sure that the bulb is cool, then follow by the nest operations.
6.3.3 Lay aside the microscope reliably, unscrew the knurled thumb screw of the lamp housing cover on the underside of base.
6.3.4 Pull over the lamp housing cover.
6.3.5 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.
6.3.6 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.

6.4 Replacement of fuse
6.4.1 Cut off power of microscope, and pull out the plug.
6.4.2 Unscrew fuse cap in the back of base, take out old fuse.
6.4.3 Replace a new fuse, then screw the fuse cap.

6.5 Stop to use microscope, please cut off power, cover the dust cover, and place it in a cool and dry environment.

7. Troubleshooting

In the period of using BK series 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 broken	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 isn't 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
Brightness of view field isn't enough or is Uneven	Lens (objective,eyepiece, condenser, light collector) has dust	Clean it
	Position of condenser is too low	Higher condenser
Image isn't clear (contrast or definition isn't enough)	Cover glass of specimen doesn't meet the requirement	Use required thickness cover glass (0.17mm)
	Cover glass of specimen isn't in up direction	Place specimen correctly
	Surface of objective lens isdirty (especially it is easy for the front lens of 40X objective to dip in immersion oil)	Clean it
	Immersion oil isn't used for 100X objective (oil)	Use immersion oil
	Immersion oil doesn't meet the requirement	Use immersion oil supplied by us
	There is bubble in immersion oil	Clear the bubble way
	Size of iris aperture isn't proper	Adjust the size of iris aperture
	Position of condenser is too low	Readjust the position of condenser
One side of image is dark or image is moving as focusing	Objective isn't in correct position	Make the objective in correct position
	Specimen isn't placed correctly	Place specimen levelly on stage and clip it with clamp
Objective touches specimen as changing low times objective to high times objective	Cover glass of specimen isn't in up direction	Place specimen correctly
	Cover glass doesn't meet the requirement	Use required thickness cover glass (0.17mm)
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