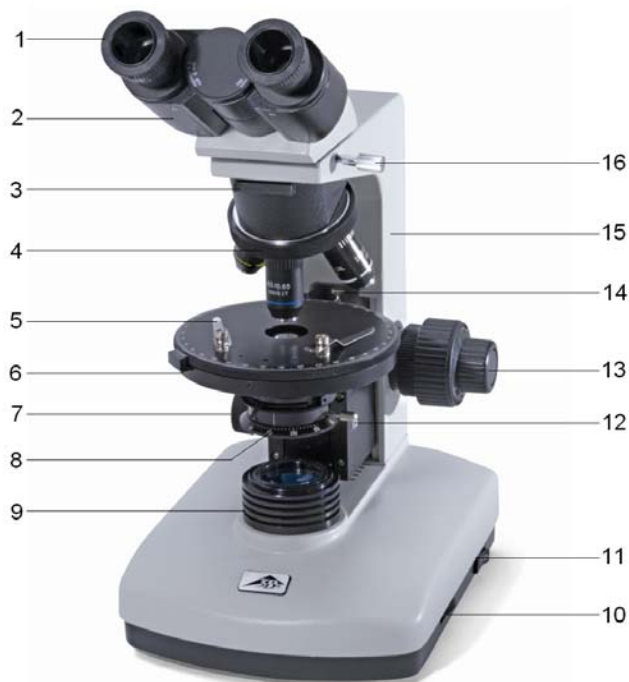


## Binocular Polarisation Microscope 1012404

### Instruction Manual

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- 8 Condensor with iris diaphragm, filter holder and polariser
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- 12 Lock screw for polariser
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- 14 Lock screw for object stage
- 15 Stand
- 16 Head lock screw

### 1. Safety notes

- For power supply use only electrical sockets with ground contact.

Caution! The Stirling engine becomes hot during use. Risk of burns!

- Do not touch the lamp during or immediately after use.

### 2. Description, technical data

The binocular polarisation microscope allows two-dimensional viewing of objects (thin sections of rock, plant or animal specimen) in 40x to 400x magnification in polarised light.

**Stand:** Robust, all metal stand with arm permanently connected to the base. Focussing by means of separate knobs for coarse and fine adjustment located on either side of the stand and operated by rack and pinion drive with ball

bearings and retaining lever, adjustable stopper for protecting the object slides and objective.

**Tube:** Binocular head, 30° viewing angle, 360° rotatable head, viewing distance adjustable between 54 and 75 mm, ±5 dioptic compensation for both eyepieces

**Polarisation equipment:** Polariser with scale and analyser, which can be inserted into the tube

**Eyepiece:** Pair of wide field eyepieces WF 10x 18 mm

**Objectives:** Inverted objective revolver with 3 achromatic objectives 4x / 0.10, 10x / 0.25, 40x / 0.65

**Magnification:** 40x, 100x, 400x

**Object stage:** Circular object stage 120 mm in diameter, which can be rotated 360°, scale with Vernier and 2 specimen clips

**Illumination:** Adjustable 6 V, 20 W halogen lamp incorporated into the base, universal 85 to 265 V, 50/60 Hz power supply

**Condenser:** Abbe condenser N.A.1.25 NA 0.65 with iris diaphragm , filter holder and blue filter, focussed via rack and pinion drive

**Dimensions:** 240 x 190 x 425 mm<sup>3</sup> approx.

**Weight:** 6 kg approx.

### 3. Unpacking and assembly

The microscope is packed in a molded styro-foam container.

- Take the container out of the carton remove the tape and carefully lift the top half off the container. Be careful not to let the optical items (objectives and eyepieces) drop down.
- To avoid condensation on the optical components, leave the microscope in the original packing to allow it to adjust to room temperature.
- Using both hands (one around the pillar and one around the base), lift the microscope from the container and put it on a stable desk.
- The objectives will be found within individual protective vials. Install the objectives into the microscope nosepiece from the lowest magnification to the highest, in a clockwise direction from the rear.
- Put the head onto the top of the stand and tighten the head-lock-screw. Insert the eyepieces into the tube.
- Insert the analyser into the slot on the revolving nosepiece.
- Insert the condensor with polariser and tighten the lock-screw.

### 4. Operation

#### 4.1 General information

- Set the microscope on a level table.
- Place the object to be observed in the centre of the specimen stage. Use the clips to fasten it into place.
- Connect the mains cable to the net and turn on the switch to get the object illuminated.
- Make certain that the specimen is centered over the opening in the stage.
- Adjust the interpupillary distance so that one circle of light can be seen.
- Make the necessary eyepiece dioptré adjustments to suit your eyes.
- To obtain a high contrast, adjust the background illumination by means of the iris diaphragm and the variable illumination control.
- Rotate the nosepiece until the objective with the lowest magnification is pointed at the

specimen. There is a definite “click” when each objective is lined up properly.

**NOTE:** It is best to begin with the lowest power objective. This is important to reveal general structural details with the largest field of view first. Then you may increase the magnification as needed to reveal small details.

To determine the magnification at which you are viewing a specimen, multiply the power of the eyepiece by the power of the objective.

- Adjust the holding brake to give a suitable degree of tightness in the focusing mechanism.
- Adjust the coarse-focusing-knob which moves the stage up until the specimen is focused. Be careful that the objective does not make contact with the slide at any time. This may cause damage to the objective and/or crack your slide.
- Adjust the fine-focusing-knob to get the image more sharp and more clear.
- Colour filters may be inserted into the filter holder for definition of specimen parts. Swing the filter holder out and insert colour filters.
- Always turn off the light immediately after use.
- Be careful not to spill any liquids on the microscope.
- Do not mishandle or impose unnecessary force on the microscope.
- Do not wipe the optics with your hands.
- Do not attempt to service the microscope yourself.

#### 4.2 Using the polarisation equipment

- Insert the analyser into the slot on the revolving nosepiece.
- Rotate the polariser until the planes of the polariser and the analyser are exactly crossed, so that one sees a black background.

Any object with a doubly-refracting (birefringent) structure should now appear brightly illuminated against the dark background. If that does not occur, it is possible that the direction of light vibration of the object coincides with the polarisation direction. Whether or not that is the case can be tested by rotating the polariser or the specimen itself.

A birefringent object, when rotated continuously, shows up brightly after each 90° rotation and is dark between these positions. In contrast, objects that are isotropic and not birefringent remain dark in all positions.

### 4.3 Changing the lamp and fuse

#### 4.3.1 Changing the lamp

- Turn off the power switch, unplug the mains plug and let the lamp cool down to avoid being burnt.
- For safety reasons, remove the eyepiece.
- To change the lamp lay the microscope on its back to reach the lid on the bottom side.
- Loosen screw C of the lamp socket and push it outwards so that it is in the position shown in Fig.1.
- Loosen screw A and open the cover.
- To remove the halogen lamp, use a cloth or similar material. Do not touch the bulb with the bare hand.
- Lift out the halogen lamp and replace it with a new one.
- Close the cover and secure it with the screw.
- Push the lamp socket back into the original position and tighten screw C.

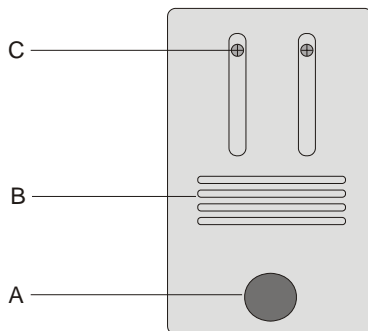


Fig. 1 Lamp socket cover: A - knurled screw, B - ventilation slots, C - securing screws of lamp-holder

#### 4.3.2 Changing the fuse

- Turn off the power switch and unplug the mains plug.
- Unscrew the fuse holder on the back of the stand base with a screwdriver.
- Replace the fuse and reinsert the holder in its socket.

### 5. Storage, cleaning and disposal

- Keep the microscope in a clean, dry and dust free place.
- When not in use always cover the microscope with the dust cover.
- Do not expose it to temperatures below 0°C and above 40°C and a max. relative humidity of over 85%.
- Always unplug the mains plug before cleaning or maintenance.
- Do not clean the unit with volatile solvents or abrasive cleaners.
- Do not disassemble objective or eyepieces to attempt to clean them.
- Use a soft linen cloth and some ethanol to clean the microscope.
- Use a soft lens tissue to clean the optics.
- The packaging should be disposed of at local recycling points.
- Should you need to dispose of the equipment itself, never throw it away in normal domestic waste. Local regulations for the disposal of electrical equipment will apply.

