Motic®

AE30/31

Inverted Microscope
Instruction Manual

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MOTIC INCORPORATION LTD.

We are constantly endeavouring to improve our instruments and to adapt them to the requirements of modern research techniques and testing methods. This involves modification to the mechanical structure and optical design of our instruments.

Therefore, all descriptions and illustrations in this instruction manual, including all specifications are subject to change without notice.

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SECTION

I Nomenclature

1. Lamp Socket Clamp Screw Knob
2. Lamp House Cover Clamp Screw
3. Annular Diaphragm
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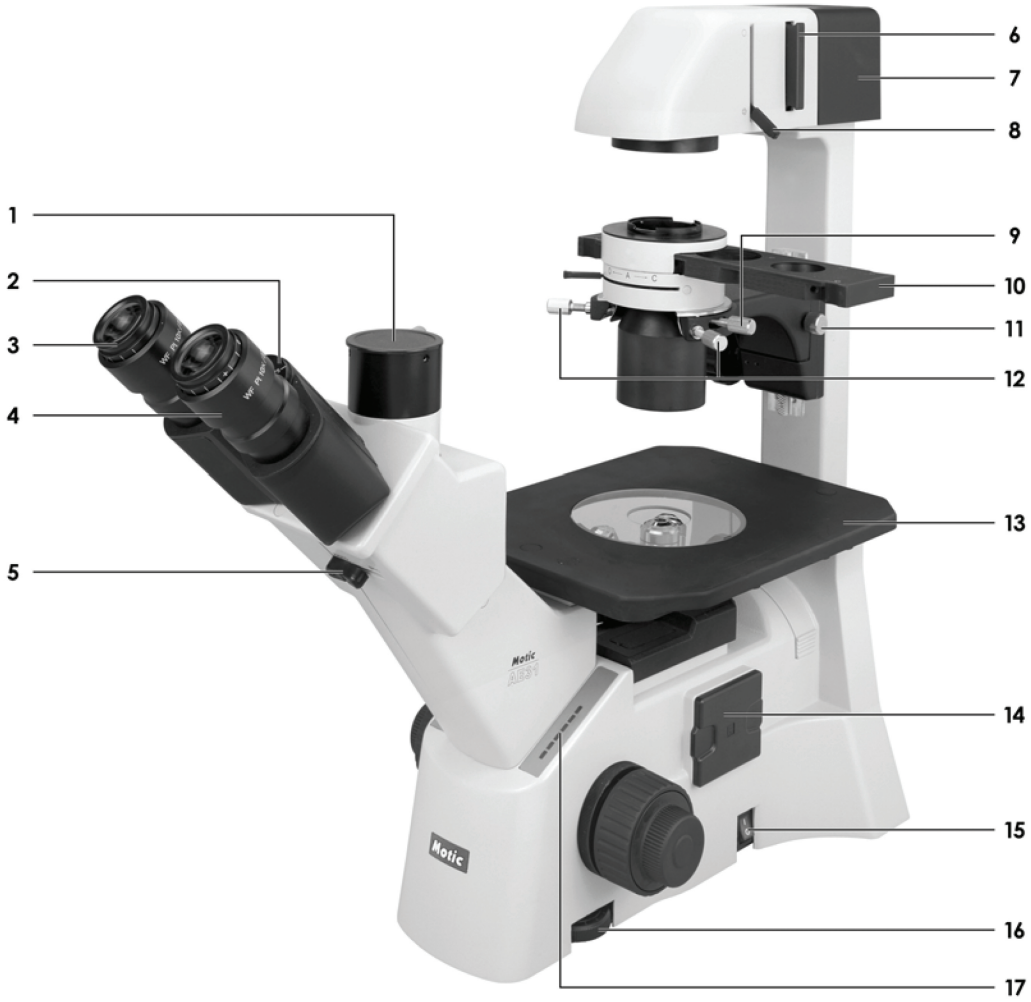
5. Condenser Focus Knob
6. Condenser Lens
7. Stage Plate Insert
8. Objectives
9. Revolving Nosepiece
10. Coaxial Coarse/Fine Focus Knob
11. Torque Adjusting Ring
12. Filter Retaining Ring
13. Hexagonal Centering Screwdrivers (x2)



1. Vertical Photo Port
2. Interpupillary Distance Scale
3. Diopter Adjustment Ring
4. Eyepiece
5. Optical Path Selector Lever
6. Filter Slider
7. Lamp House
8. Field Diaphragm Lever
9. Condenser Clamp Screw
10. Phase Slider
11. Condenser Clamp Holder Screw
12. Condenser Centering Screws
13. Stage Plate
14. Fluorescence Filter cassette Mount
15. Power Switch
16. Light Intensity Control Dial
17. Brightness Indicator
    (LED Segmented Display)

II Specifications

- Magnification Ratio : 40X-600X
- Eyepiece : Objective field ϕ22
- Objectives :

Maganification	N.A.	W.D.
4X	0.1	23.5
10X	0.25	7.5
20X	0.4	7
40X	0.6	2.8
60X (Optional)	0.7	1.4

- Condenser : 1. N.A. 0.3 / W.D. 72mm
  2. N.A. 0.5 / W.D. 28mm (Optional)
- LED : 6V / 30W Halogen Illumination Adjustable
- Electrical Specifications:

  Input : 90-240VAC, 35W, 50-60HZ

  Output : 12V, 30W

  Fuse : T2.5AL250V (If the orginal fuese is damaged, please replace a new one with same specification.

III Setting-up the Instrument

Working environment

- The location should be free from dust, moisture, chemical vapours and mechanical vibrations.
- Do not situate the instrument in a warm and/or humid environment.
- Locate the instrument where the operator's line of vision is not directed towards a window, a lamp or a well-lit.
  bright wall. The quality of the viewed image from the microscope will deteriorate where there is significant ambient light.

Operating environment

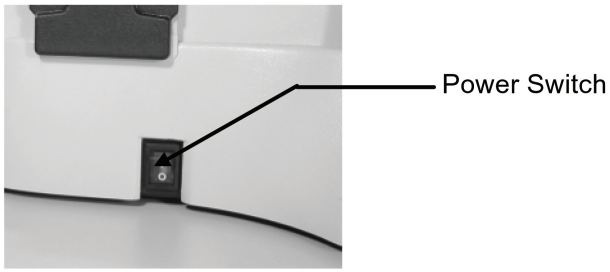
- Indoor use.
- Altitude:Max 2000 meters
- Ambient temperature: 15℃ to 35℃
- Maximum relative humidity: Relative Humidity of not more than 75%
- Supply voltage fluctuations: Not to exceed ± 10% of the normal voltage.
- Pollution degree: 2(in according with IEC60664)
- Installation/Overvoltage category:• (in according with IEC60664)
- Air Pressure of 75kPa to 106 kPa
- No hoar frost, dew, percolating water, rain

IV Assembling the microscope Input voltage

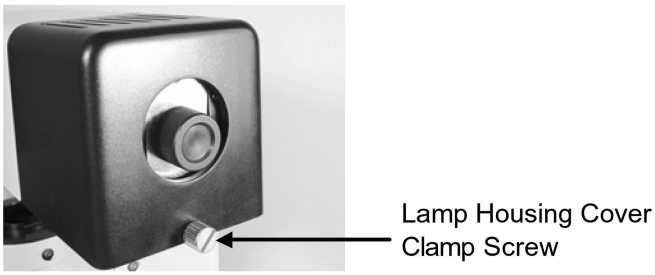
- Automatic voltage selection works with electrical outlets worldwide. However, always use a power cord that is rated for the voltage used in your area and that has been approved to meet local safety standards. Using the wrong power cord could cause fire or equipment damage.
- In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.
- In order to prevent electric shock, always turn the power switch on the power supply off before connecting the power cord.

1 Installing the lamp

- In order to prevent electric shock always turn the power switch off and unplug the power cord before replacing the lamp.



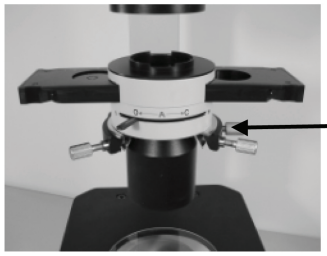
- Release lamp housing cover clamp screw using a coin to remove the cover.



- Firmly insert the lamp into the socket pinholes until it reaches the limit, be careful not to tilt the lamp when mounting.
- When installing the lamp, do not touch the glass surface of the lamp with bare fingers. Doing so will cause fingerprints , grease, etc., to burn onto the lamp surface, reducing the illumination provided by the lamp. If surface is contaminated, wipe it clean using lens tissue.
- Close the cover and fasten with it with lamp housing cover clamp screw.
- Insert the filter slider with mat surface of the diffuser turned towards the user.

2 Mounting the condenser

- and index marks facing the front and secure it with the clamp screw.Mount the ELWD condenser on the circular dovetail mount of the condenser holder with the aperture diaphragm lever



- Insert the Ph annular diaphragm slider with centering hexagonal socket head screws facing the front.
- The centerable condenser mount is height adjustable with rack and pinion and is dovetail mounted on the illuminating pillar with a clamp screw.

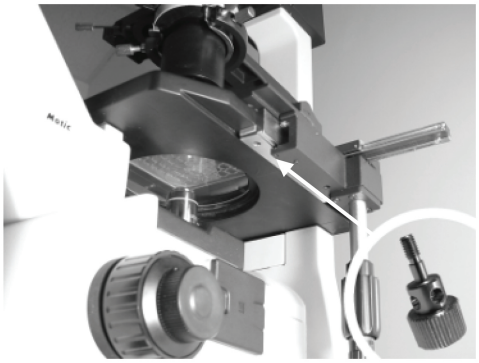
3 Installing the Objectives

- Remove the stage plate insert from the stage.
- Install the objectives into the nosepiece so that the magnification increases with clockwise rotation of the revolving nosepiece.

- Replace the stage plate insert.

4 Mechanical Stage

- Secure the mechanical stage to the AE30/31 plain stage using the two mounting screws located beneath the stage on the right side

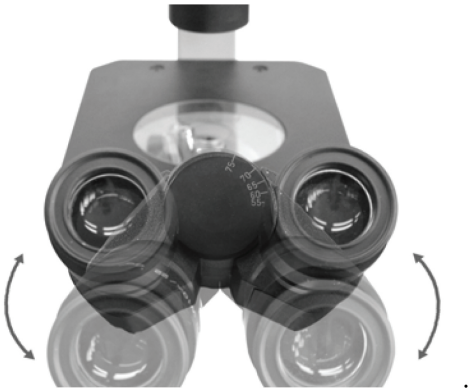


5 Mounting the eyepieces

- Remove the dust caps from the eyepiece tubes.
- Insert the eyepieces into the eyepiece tubes.
- If the rubber eye guards are to be used, fit them in the groove around the eyepiece.

V Microscopic procedure Interpupillary distance adjustment

- Before adjusting the interpupillary distance, bring a specimen into focus using the 10x objective.
- Adjust the interpupillary distance so that both the right and left field of view become one.
- This adjustment will enable the user to observe the specimen with both eyes



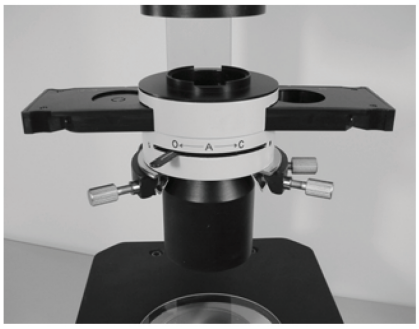
1 Diopter adjustment

- Diopter adjustment compensates for differences in vision between the left and right eyes. In addition to making observation through both eyes easier, this adjustment also reduces the extent to which focusing is lost when the objective magnification is changed. In particular, this occurs when a low power objective is used.
- Before adjusting the diopter, bring a specimen into focus using the 10x objective.
- Turn the diopter compensation ring on each eyepiece until the adjustment ring is adjusted to “0” position.

- Position 40x objective into the optical path and bring the specimen image into focus by turning the coarse and fine focus knobs.
- Position either 4x or 10x objective into optical path. Without adjusting the fine and coarse focus knobs, turn the diopter rings on the eyepieces so that the specimen images in the left and right eyepieces are focused individually.
- Repeat the above step twice.

2 Centering the condenser

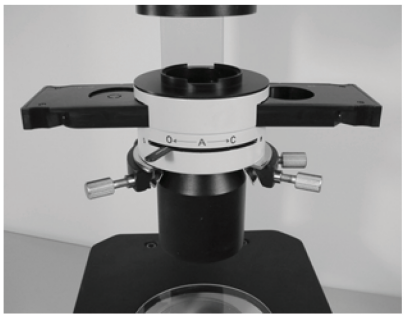
- Set the Phase annular diaphragm slider in centre position (O).
- Fully open the field of view diaphragm.
- Move the aperture diaphragm lever in open “O” position.
- Bring the specimen image into focus, using the 10x objective.
- Close the field of view diaphragm to its minimum setting.
- Turn the condenser focus knob so that the image of the field diaphragm forms on the specimen surface.



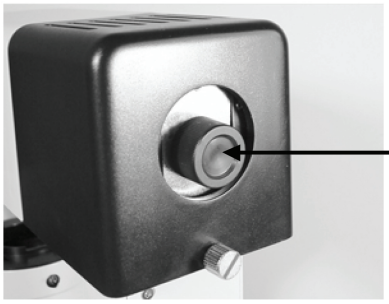
- Adjust the condenser centering screws so that the centre of the field diaphragm image matches the centre of the field of view. This adjustment is easier to make if the field diaphragm size is stopped down to slightly smaller than the eyepiece field of view.
- For normal observation, the size of the diaphragm should be just outside the edge of the field of view.

3 Cetering the lamp

- Set the Phase annular diaphragm slider in the centre position (O).



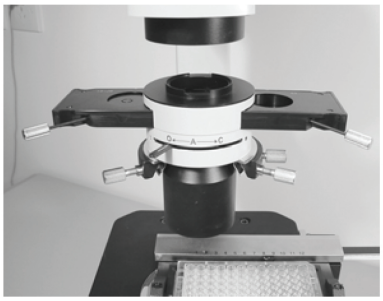
- Fully open the field of view diaphragm.
- Move the aperture diaphragm lever to the open “O” position.
- Using the 10x Phase contrast objective, bring the specimen image into focus.
- Remove the diffuser filter slider from the light path.
- Remove an eyepiece and insert the phase centering telescope in its place.
- Holding the knurled part of the centering telescope, rotate its eyepiece to focus on the phase plate image of the objective.
- Release the lamp socket clamp screw using the knob.



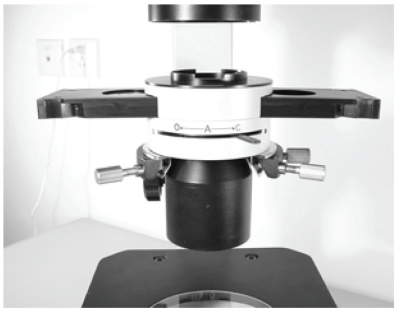
- Move the lamp socket with the knurled knob to bring the lamp filament image to the centre of the phase plate image of the objective.
- After finishing the above lamp centering procedure, insert the filter slider with mat surface of the diffuser turned towards the user.

4 Brightfield microscopy

- Set the Phase annular diaphragm slider in the centre position (O).
- Bring the specimen image into focus.
- Adjust the opening of the field of view diaphragm, for normal observation the size of the diaphragm should be just outside the edge of the field of view.
- The condenser aperture diaphragm is provided for adjusting the numerical aperture (N.A.) of the illuminating system of the microscope. It is important because it determines the resolution of the image, contrast, depth of focus and brightness.



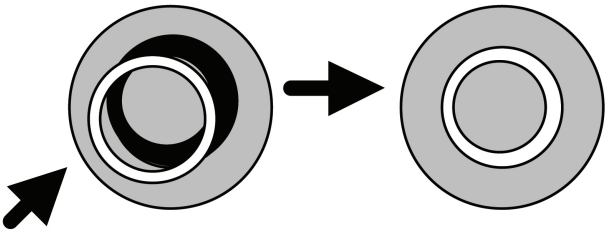
- Stopping down the aperture diaphragm will lower the resolution and brightness but increase the contrast and depth of focus. By stopping down the N.A. of the condenser to 2/3 of the N.A. of the objective, a good image of suitable contrast will be obtained.



5 Phase-contrast microscopy

- Phase contrast objectives are labelled “Ph”: Ph1; Ph2; Ph3 and Ph4.
- For phase contrast microscopy, be sure to use the annular diaphragm that has the same symbol as the objective, despite of the magnification of the objective.
- Fully open the aperture diaphragm.
- Bring the 10x (Ph1) objective into optical path.

- Position the Phase annular diaphragm slider to 10 -20. Set slider to 40 when using a 40x (Ph3) objective.
- Remove either eyepiece from the eyepiece tube and insert the phase centering telescope in its place.
- Rotate the eyepiece of the centering telescope to focus on both the phase plate image of the objective and the annular diaphragm image of the phase slider.
- If the objective phase plate and the annular of the slider do not coincide, use the two hexagonal screwdrivers supplied with the microscope to bring the slider annular ring to the centre of the phase plate, so that the image of the annular diaphragm is concentric with the phase plate image.



- If the slider annular ring image is moved from the phase plate image in the objective, a low phase contrast image will result.
- For phase contrast microscopy at the maximum contrast, use GIF (Green interference filter) in the optical path.
- Place the filter in the designated retaining ring above the phase annular diaphragm slider.

VI Photomicrographic procedure

- The optical path selector lever can be used to set the optical path to either the Binocular tube 100:0 or Binocular tube/vertical tube 20:80 (observation: photo).

- Before starting photomicrography, check the following:
  - The condenser is centered.
  - The condenser annular diaphragm is centred.
  - The field of view diaphragm is stopped down to slightly just outside the edge of the field of view.
- For photomicrographic procedures, refer to the manual of the specific camera being used.

Filter selection

Filter type	Procedure
GIF (Green interference) 546nm	For phase contrast and contrast adjustment with black and white film
NCB (Neutral Colour Balance) Blue	For general microscopy and colour photomicrography

Never attempt either of the following actions, since doing so will damage the focusing mechanism:

- Rotate the left and right knob while holding the other.
- Turning the coarse and fine focus knobs further than their limit.

VII Troubleshooting Table

As you use your microscope, you may occasionally experience problems. The troubleshooting table below contains the most frequently encountered problems and their possible causes.

Optical and Operating Problems

Problem	Possible Cause
Vignetting or uneven brightness in the field of view or field of view only partially visible	Lamp not installed properly
	Filter slider in intermediate position
	Phase slider not in click-stop position
	Incorrect condenser mounting
	Condenser is set too low
	Condenser is not centered
	Field diaphragm closed too far
	Aperture diaphragm closed too far
	Revolving nosepiece not clicked into position
	Optical path selector lever in intermediate position
Dust or dirt in field of view	Aperture diaphragm closed too far
	Field of view diaphragm image not focused on specimen surface
	Dust or dirt on specimen's surface
Image quality: No image under phase contrast or details cannot be viewed	Brightfield objective being used
	Phase annular diaphragm not in optical path
	Phase annular diaphragm and objective phase symbol do not match
	Slider annular ring image has moved away from the objective phase plate image
	Field of view diaphragm image not focused on specimen surface
	Thickness of specimen holder is outside the compensating range of objective
Eye strain or fatigue	Interpupillary distance not adjusted
	Diopter adjustment not made
	Inadequate illumination
	Field of view of left and right eyepiece differ

Electrical

Lamp does not light	Power supply not plugged in
	Lamp not installed
	Lamp burnt out
Inadequate brightness	Specified lamp not being used
Lamp blows out immediately	Specified lamp not being used
Lamp flickers	Connectors are not securely connected
	Lamp near end of service life
	Lamp not securely plugged into socket

VIII Care and maintenance

1 Lenses and filters

- To clean lens surfaces or filters, first remove dust using an air blower. If dust still persists, use a soft/clean brush or gauze.
- A soft gauze or lens tissue lightly moistened with pure alcohol should only be used to remove grease or fingerprints.
- Use petroleum benzine to clean immersion oil.
- Use petroleum benzine only to remove immersion oil from objective lenses.
- Because petroleum benzine and absolute alcohol are both highly flammable, be careful handling around open flame.
- Do not use same area of gauze or tissue, to wipe more than once.

2 Cleaning of painted or plastic components

- Do not use organic solvents (thinners, alcohol, ether, etc.). Doing so could result in discolouration or in the peeling of paint.
- For stubborn dirt, moisten a piece of gauze with diluted detergent and wipe clean.

3 When not in use

- When not in use, cover the instrument with vinyl dust cover and store in a place low in humidity where mould is not likely to form.
- Store the objectives, eyepieces and filters in a container or desiccator with drying agent.

Note:

If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

IX Warning lable

The following warning labels (or symbols) are found on the microscope, Study the meaning of the warning labels (or symbols) and always use the equipment in the safest possible manner.•

Warning Label / Symbol	Explanation
	Indicates that the surface becomes hot, and should not be touched with bare hands.
	Indicates that the main switch is ON.
	Indicates that the main switch is OFF.

Proper handling of the microscope will ensure years of trouble free service.

If repair become necessary, please contact your Motic agency or our Technical Service directly.

Motic®

NO.: SP010768B

Motic Incorporation Ltd. (Hong Kong)
Rm 2907-8, Windsor House, 311 Gloucester Road, Causeway Bay, Hong Kong Tel: 852-2837 0888 Fax: 852-2882 2792

Motic Instruments Inc. (Canada)
180-4320 Viking Way Richmond, B.C. V6V 2L4 Canada Tel: 1-877-977 4717 Fax: 1-604-303 9043

For inquiries in UK (UK)
Saracens House, 25 St. Margarets Green, Ipswich, IP4 2BN, Suffolk, UK Tel: 44-14732 81909 Fax: 44-(0)-14732 11508

Motic Deutschland GmbH (Germany)
Gewerbepark Spilburg, Spilburgstrasse 1 D-35578 Wetzlar Germany Tel: 49-6441-210 010 Fax: 49-6441-210 0122

Motic Spain, S.L. (Spain)
Polígon Industrial Les Corts, Camí del Mig, 112 08349 Cabrera de Mar, Barcelona Spain Tel: 34-93-756 6286 Fax: 34-93-756 6287

Website: http://www.motic.com
E-mail: info@speedfair.com

Motic China Group., Ltd. (China)
Motic Building, Torch Hi-Tech Industrial, Development Zone, Xiamen P.R.C. Tel: 86-0592-562 7866 Fax: 86-0592-562 7855