



MT-10 Series

Compound Microscope

INSTRUCTION MANUAL



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Introduction

With your purchase of an MT-10 series microscope you have chosen for a quality product. The MT-10 type microscopes are developed for use at schools and laboratories.

The maintenance requirement is limited when using the microscope in a decent manner.

This manual describes the construction of the microscope, how to use the microscope and maintenance of the microscope.

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Construction of the Microscope

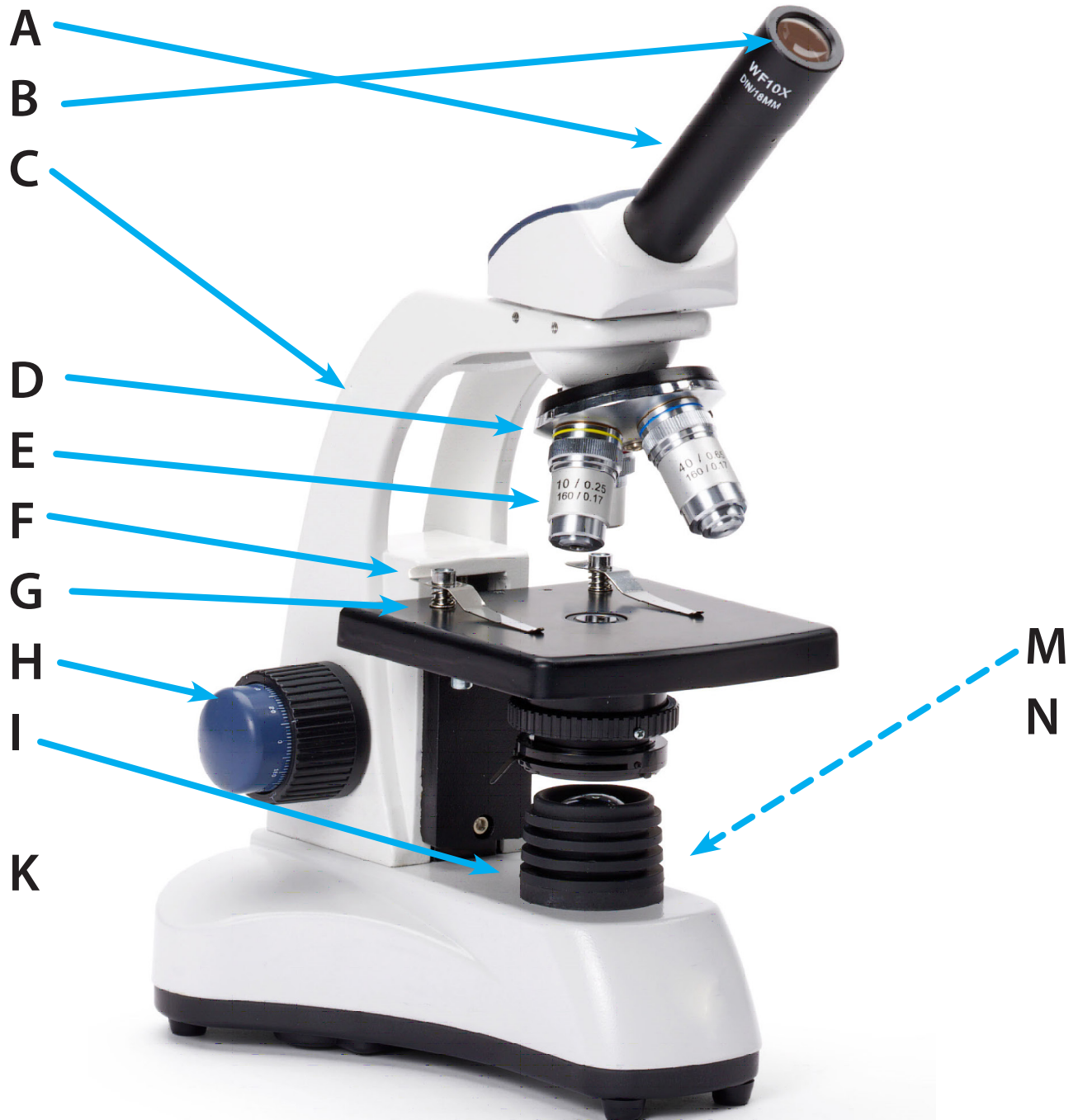
The names of the several parts are listed below and are indicated in the picture on the next page:

- A) Tube (mono 360°rotatable)**
- B) Eyepiece**
- C) Stand arm**
- D) Revolving nosepiece for 4 objectives**
- E) Objectives**
- F) Safety device**
- G) Object stage with clips**
- H) Coaxial coarse-and fine adjustment**
- I) Lamp housing**
- J) Light intensity adjustment**
- K) Polarizer 360°rotatable (POL version only)**
- L) Condenser with irisdiaphragm + filterholder (POL verison only)**
- M) On/Off switch (not visible)**
- N) Analyzer In/Out (POL version only)**

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Functions of the Microscope

The stand consists of a stand arm (C), stand base and an object stage (G).



Hold the microscope at the top of the stand arm when it should be moved.



Tube

The 360 rotatable monocular tube is equipped with WF10x eyepiece (B).

Revolving nosepiece

The revolving nosepiece (D) can be equipped with 4 objectives (E).

Optical specifications of the MT-30/MT-90 series range

The MT-10 series range microscopes are standard equipped with one wide field eyepiece WF10x (B) and achromatic objectives, as mentioned below in table 1

| Optical specifications and type |
|--|
| Achromatic 4x/10x/40x – LED illumination |
| Achromatic 4x/10x/S40x/S100x – LED illumination |
| Achromatic 4x/10x/S40x/S60x – LED illumination |
| Achromatic 4x/10x/S40x – LED illumination – Digital head 1.3 Mpix CMOS |
| Achromatic 4x/10x/S40x/S100x – LED illumination – Digital head 1.3 Mpix CMOS |
| Achromatic 4x/10x/S40x/S60x – LED illumination – Digital head 1.3 Mpix CMOS |
| Achromatic 4x/10x/40x – HALOGEN illumination – Polarization – Round stage |
| Achromatic 4x/10x/100x – HALOGEN illumination – Polarization – Round stage |
| Achromatic 4x/10x/600x – HALOGEN illumination – Polarization – Round stage |

Table 1

The S40x, S60x and S100x objectives are equipped with a spring mount, to prevent damage to the frontlens and the slide.

The Numeric Aperture - N.A. – of the objective is an indication for the resolving power of the objective.

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The total magnification can be calculated by multiplying the magnification of the eyepiece with the magnification of the objective. The magnifications are displayed in the table below:

| Eyepiece | Objective | Magnification |
|----------|-----------|---------------|
| 10x | 4x | 40x |
| 10x | 10x | 100x |
| 10x | 40x | 400x |
| 10x | 60x | 600x |
| 10x | 100x | 1000x |

Object stage

On the MT-10 series the slide is placed beneath the object clips. Focusing the specimen is done by using the coaxial coarse- and fine adjustment knobs (H).

Coarse- and fine adjustment

The coarse- and fine adjustment knobs (H) for the height adjustment of the object stage are mounted together on one axis (co-axial). On both fine adjustment knobs there is a graduation with intervals of 0.002 mm. This can be used to measure depths in a specimen.

Abbe condenser with iris diaphragm

Beneath the object stage an Abbe condenser (L) N.A. 12.5 is mounted. The condenser can be adjusted in height by means of turning or by a handle (polarization models). With this one can focus the light on the specimen to optimise contrast-resolution ratio. The condenser is factory pre-centered.

The iris diaphragm with filter holder is mounted beneath the condenser. The light intensity can be adjusted by changing the flexible opening.

Illumination MT-10 series

In order to have good color rendering against the Michel-Levy chart, the polarization versions are standard equipped with a halogen illumination.

All other models have a LED illumination

The cable goes to the mains socket at the backside of the microscope.

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Preparing the Microscope for Use

Remove the packing and put the microscope on a flat table. The objectives are pre mounted.

Put the plug into the mains supply and switch on the microscope . Sit comfortably down behind the microscope and take a relaxed position while viewing through the eyepiece (B).

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Working with the Microscope

Please read the following instructions to achieve the best microscope observing results.

Setting the illumination

For optimum effect in contrast and resolution one should follow the below procedure:

Place a specimen on the object stage and focus using the 4x objective, with a fully opened iris diaphragm.

- Turn the condenser in the highest position.
- Close the iris diaphragm, until it is just visible on the edge of the field of view.

The microscope is properly set for use with the 4x objective. For each other magnification this procedure should be repeated to ensure the best balance between contrast and resolution.

Caution:

The maximum light intensity when using the 4x and 10x can damage the eyes!

When changing slides always start with the 4x objective again.

Safety device

To prevent damage to the objective lens, or breaking the slide, all types are equipped with a pre-fixed safety device (F).

It is recommended to use slides of 1.0 – 1.2 mm thickness in combination with cover glasses of 0.13 mm or 0.17 mm thickness.

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Use of the S100x oil-immersion objective

The MT-10 series microscopes are equipped with a S100x N.A. 1.25 oil immersion objective. Please follow these instructions for using this objective:

- Focus the image with the S40x objective.
- Turn the revolving nosepiece so the S100x objective almost reaches the click-stop.
- Put a small drop of immersion oil on the centre of the slide.
- Now turn the S100x objective so that you feel the click stop.
- The front lens is in contact with the immersion oil.
- Look through the eyepiece (B) and focus the image with the fine adjustment knobs (I).
- The distance between the lens of the objective and the slide is only 0.14 mm!
- In case there are small bubbles visible turn the S100x objective a couple of times left/right so that the front of the objective moves in the oil and the bubbles will disappear.
- After using the S100x objective turn the fine adjustment knobs (I) up until the front lens doesn't touch the oil any longer.
- Always clean the front lens of the S100x objective with a piece of lens paper that is moistened with a drop of xylol or alcohol.
- Clean the slide after use as well.

Caution

- Never put a drop of xylol or alcohol directly on the lens of the objective. It could enter the objective and dissolve the glue that holds the lenses!
- Avoid oil contact with any of the other objectives!

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Maintenance and Cleaning

Always place the dustcover over the microscope after use. Keep the eyepiece and objectives always mounted on the microscope to avoid dust entering the instrument.

Cleaning the optics

When the eyepiece lens or front lens of the 10x or S40x objective are dirty they can be cleaned by wiping a piece of lens paper over the surface (circular movements). When this does not help put a drop of xylol or alcohol on the lens paper. Never put xylol or alcohol directly on the lens!

When dirt is clearly visible in the field of view it resides on the lowest lens of the eyepiece. By using the Allen-key the eyepiece can be removed from the tube. Clean the outside of the lens.

In case there is still dust visible please check if the dust is in the eyepiece by turning it. If this is the case remove the lowest lens carefully from the eyepiece and clean it.

It is not necessary – and not recommended – to clean the lens surfaces at the inner side of the objectives. Sometimes dust can be removed with high pressured air. There will never be dust in the objectives if the objectives are not removed from the revolving nosepiece.

Caution

- Cleaning cloths containing plastic fibers can damage the coating of the lenses!

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Maintenance of the stand

Dust can be removed with a brush. In case the stand or table is really dirty the surface can be cleaned with a non-aggressive cleaning product.

All moving parts like the height adjustment or the coaxial course and fine adjustment contain ball bearings that are not dust sensitive. With a drop of sewing-machine oil the bearing can be lubricated.

Changing the batteries of the MT-30/MT-90 series

Caution: Always remove the power cable from the main supply !



- Remove the small lid out of the bottom cover of the microscope.
- Place the batteries and put the lid back into its place.

Tension control setting

Between the right-handed coarse adjustment knob and the microscope stand there is a ring for the tension control setting. By means of turning it clock- or counter clockwise the tension of the coarse adjustment knobs can be adjusted.

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100 Lauman Lane, Suite A, Hicksville, NY 11801
Tel: (877) 877-7274 | Fax: (516) 801-2046
Email: Info@nyscopes.com
www.microscopeinternational.com