

PHYWE Systeme GmbH & Co. KG
Robert-Bosch-Breite 10
D-37079 Göttingen

Telefon +49 (0) 551 604-0
Fax +49 (0) 551 604-107
E-mail info@phywe.de
Internet www.phywe.com

Operating instructions



The unit complies with the corresponding EC guidelines.



Fig. 1: MIC-110A (left) und MIC-126A (right)

INHALTSVERZEICHNIS

- 1 INTRODUCTION
- 2 CONSTRUCTION OF THE MICROSCOPE
- 3 PREPARING THE MICROSCOPE
- 4 FUNCTIONS OF THE MICROSCOPE
- 5 WORKING WITH THE MICROSCOPE
- 6 MAINTENANCE AND CLEANING
- 7 TECHNICAL DATA
- 8 WASTE DISPOSAL

The MIC-100 microscopes differ as follows:

Model	Mono- / binocular	Table	Magnification
MIC-110A	Monocular	Clamps	400x
MIC-111A	Monocular	Mechanical stage	400x
MIC-116A	Monocular	Mechanical stage	600x
MIC-119A	Monocular	Mechanical stage	1000x
MIC-121A	Binocular	Mechanical stage	400x
MIC-126A	Binocular	Mechanical stage	600x
MIC-129A	Binocular	Mechanical stage	1000x

1 INTRODUCTION

By purchasing a microscope from the MIC-100 series, you have chosen a quality microscope. The MIC-100 series microscopes are designed for use in schools and laboratories. This instruction manual describes how to set up the microscope, how to use, clean and maintain it.

2 CONSTRUCTION OF THE MICROSCOPE

After completing the step "Preparing the microscope", first familiarize yourself with the mechanical, but also the optical and electrical components of your microscope. Operate each component carefully by hand (no tools are necessary) and get an impression of the functionality of each adjustment option.

The names of the components are listed here and are marked in the Fig. 2. Shown is the binocular version with mechanical stage:

- A1) Right tube with eyepiece (10x)
 - A2) Left tube with eyepiece (10x)
 - A3) Diopter adjustment ring on left eyepiece
 - A4) Adjusting the interpupillary distance
 - A5) Microscope head, rotatable
 - A6) Revolving nosepiece for 4 objectives
 - A7) Objectives (4x, 10x, 40x, possibly 60x or 100x depending on the model)
 - A8 with A9) Work table (shown here: mechanical stage with specimen holder, alternatively object stage with clamps)
 - A10 and A11) Coaxial coarse and fine focussing mechanism
 - A12 and A13) Only for models with mechanical stage: coaxial handwheels for X and Y movement of the sample holder
 - A14) Collective lens of the LED illumination
 - A15) Light intensity adjustment knob
- Below the object stage: Condenser with iris diaphragm and filter holder (not visible)
- On the back: On/Off switch (not visible)

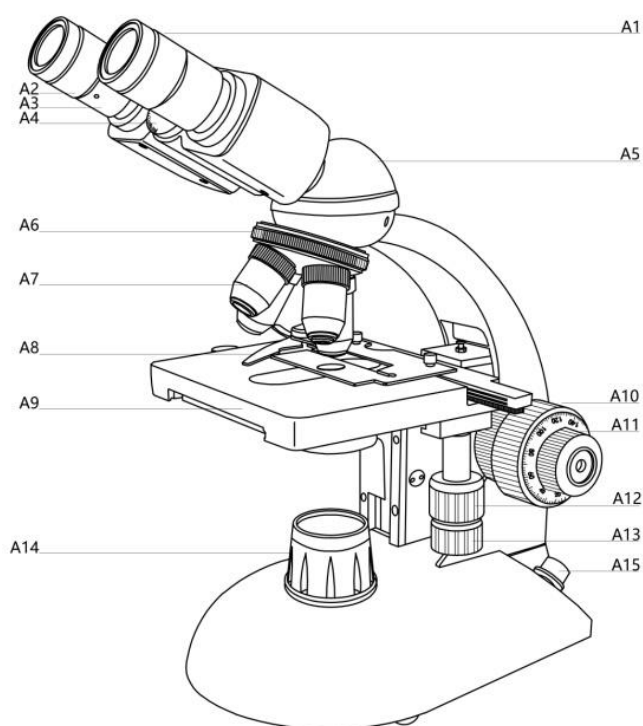


Fig. 2 Set up of the microscope

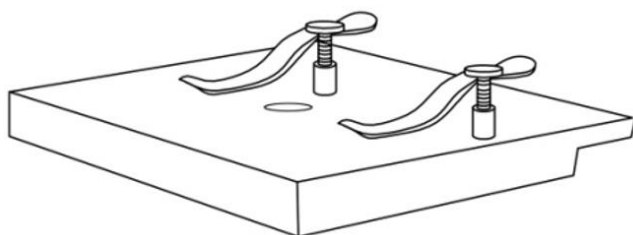


Fig. 3 Object stage with clamps

3 PREPARING THE MICROSCOPE

Unpack the microscope and place it on a table. The 4x, 10x and 40x objectives are pre-assembled with this microscope. Otherwise, proceed as described for the 60x and 100x objectives.

If you have a version with 600x or 1000x magnification, 60x and 100x objectives are supplied with the microscope outside the polystyrene package and must be locked in place:

Attach the lenses by removing the protective cap from the free space on the nosepiece and simply screw in the additional lens. However, do not tighten it with a tool.

Plug in the power plug and switch on the microscope. Now sit comfortably in front of the microscope to use it.

4 FUNCTIONS OF THE MICROSCOPE

The stand consists of tube arm (tube carrier), base and table. You can grip the microscope by the tube arm during transport.

Monocular or binocular tube(s)

The head with the tube(s) can be rotated through 360° and is equipped with two WF10x wide-field eyepieces. These are marked with a spectacle symbol, because they are eyepieces for spectacle wearers. This enables spectacle wearers with glasses to perform microscopy without removing the spectacles.

The eyepieces are secured against removal, but can be removed and replaced with a tool, e.g. for cleaning.

Revolving Nosepiece

The nosepiece is equipped with 3 or 4 achromatic objectives as follows:

- The microscopes with 400x magnification: 4x NA 0.10, 10x NA 0.25, S40x NA 0.65
- The microscopes with 600x magnification: 4x NA 0.10, 10x NA 0.25, S40x NA 0.65, S60x NA 0.85
- The microscopes with 1000x magnification: 4x NA 0.10, 10x NA 0.25, S40x NA 0.65, S100x NA 1.25

The objectives 40x, 60x and 100x are equipped with springs to prevent damage to the front lens and the microscope slide and cover glass).

The numerical aperture (N.A.) of the objective indicates the resolving power of the objective.



The total magnification can be easily calculated by multiplying the magnification of the eyepiece by that of the respective objective, as shown in the table:

Ocular	Objective	Magnification
10x	4x	40x
10x	10x	100x
10x	40x	400x
10x	60x	600x
10x	100x	1000x

In microscopes with 400x magnification, the objectives are already attached to the nosepiece.

For the microscopes with 600x and 1000x magnification, the 60x and 100x objectives are not yet attached to the revolving nosepiece, but are part of the scope of delivery.

Check that all the objectives are firmly attached. To do this, grasp the knurled rings of the objectives with your fingers and turn them to the right. Do not use a tool to tighten them. The entire nosepiece with the 3 or 4 objectives can be turned by hand. When you rotate the nosepiece, you will notice that the objectives click into place. They do so in the correct position relative to the optical axis of the microscope.

Object table with preparation clamps or mechanical stage

Object table/stage with preparation clamps: The micro slide is locked in place with the two clamps. It is then carefully positioned with the fingers.

Mechanical stage: The microscope slide is placed in the specimen holder of the mechanical stage and can be moved in X and Y direction. The stage has a working area of 140 x 130 mm, the travel range is 78 x 30 mm.

Coarse and fine adjustment

The focussing mechanisms for coarse and fine adjustment are located on one axis (coaxial). On the fine adjustment knobs there is a graduation. This can be used to measure the depth of a specimen.

When the stage automatically slides down after using the microscope for some time, turn the adjustment ring on the inside of the coarse and fine adjustment knobs slightly in the direction of the arrow. The coarse adjustment knob is tightened to prevent the stage from sliding down.

Abbe condenser with iris diaphragm

Below the object stage is an Abbe condenser N.A. 1.25. The condenser can be adjusted in height by turning. This allows light to be focused on the specimen for contrast enhancement. The condenser is already pre-centered.

The iris diaphragm with filter holder is located under the condenser. The light intensity can be adjusted by changing the movable opening.

Lighting

The power-saving illumination is the reason why the microscopes of the MIC-100 series do not need to be connected to the mains all the time for operation, but can also be operated independently of the mains, as they contain a rechargeable NiMH battery. The illumination is a modern LED lamp with the following specifications:

- LED: 3W, brightness adjustable
- Power supply: 100V-230V

5 WORKING WITH THE MICROSCOPE

Please follow the following instructions to achieve the best results:

Adjustment of interpupillary distance and diopter distance for a binocular model

First adjust the coarse and fine adjustment knobs so that you get a sharp microscope image with the right eyepiece (A1), and then adjust the diopter adjustment ring (A3) on the left eyepiece tube (A2) to get a sharp image with the left eyepiece as well. Finally, adjust the interpupillary distance (A4) so that it corresponds to the viewer's interpupillary distance. Sometimes the microscope head (A5) should be rotated to obtain a comfortable observation position instead of moving the microscope body.



This procedure must be carried out anew for each user.

Adjusting the lighting

For optimal contrast and resolution, please follow these steps:

- Place a micro slide on the stage and focus with the 4x lens. The iris diaphragm is open.
- Turn the condenser to the highest position.
- Close the iris diaphragm until it is just visible at the edge of the image field.
- The microscope is now optimized for use with the 4x objective. Repeat this procedure with each additional magnification to achieve the best balance between contrast and resolution.

Attention: the maximum light intensity of the microscope can damage your eyes if you use it with the 4x and 10x objectives!

If you swap microslides, start again with the 4x objective.

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

Battery

The microscope contains a 3.6V NiMH battery.

A charging indicator is located on the side of the microscope. It is red when connected to the power supply and green when the battery is full. If the red indicator flickers, the microscope is not properly connected to the power supply.

The microscope's illumination can be powered by a battery pack for 4 to 8 hours without an external power supply.

Using the S100x oil immersion objective

The MIC-119A and MIC-129A are equipped with an S100x N.A. 1.25 oil immersion lens. Please follow the following recommendations for using this lens:

- Focus the image with the S40x lens.
- Rotate the revolving nosepiece until the S100x objective almost (not quite) clicks into place.
- Drop a small drop of immersion oil (not part of the scope of delivery, please order separately) on the center of the specimen.
- Then let the S100x objective snap into place.
- The front lens is now in contact with the immersion oil.
- View the specimen through the eyepiece and focus the image with the fine adjustment knob.
- The distance between objective lens and specimen is only 0.14mm!
- If small bubbles are visible, turn the S100x objective a few times to the left and right so that the front lens of the objective moves in the oil. This will make the bubbles disappear.
- Then turn the stage with the fine adjustment knob downwards until the front lens does not touch the oil anymore.
- Always clean the front lens of the S100x lens with a piece of lens paper moistened with a drop of xylene or alcohol.
- Now also clean the microslide.
-

The S100x objective can also be used without immersion oil, i.e. dry. However, please note that in this case the resolution is much lower. Water may provide somewhat better resolution than using it dry.

Caution!

- **Never drop the xylene or alcohol directly onto the objective lens. This could cause xylene or alcohol to enter the lens and dissolve the lens fixation!**
- **Avoid oil contact with the other lenses!**

6 MAINTENANCE AND CLEANING

Always cover the microscope with a dust cover after use. Always leave the eyepieces and objective lenses mounted so that no dust can enter the inside parts of the microscope.

Cleaning the optical components

If the eyepiece lenses or the front lenses of the objectives are dirty, you can clean them by wiping a piece of lens paper over the lens surface in circular motions. If this does not help, use a drop of xylene or alcohol on the lens paper. Never put xylene or alcohol directly on the lens!

If dirt is clearly visible in the field of view, it is on the lowest lens of the eyepiece. Remove the eyepiece from the tube and clean the outside of the lens.

If dust is still visible, check whether the dust is in the eyepiece by rotating it. If so, gently remove the bottom lens from the eyepiece and clean it.

It is not necessary - and not recommended - to clean the lens surfaces inside the objectives. Sometimes the dust can be removed by high-pressure treatment with air. Otherwise, there will be no dust inside the objectives until the objectives are removed from the revolving nosepiece.

The most important step to a long lasting clean microscope optics is to use the dust cover when you are not using your microscope!

Caution! Cleaning cloths containing plastic fibres can damage the coating of the lenses!

Maintenance of the stand and mechanical components

Simply remove dust with a brush. If the stand is very dirty, the surface can be treated with a careful cleaning agent.

All moving parts such as the adjustment of the mechanical or the coarse and fine focussing mechanism contain ball bearings which are not sensitive to dust. The bearings can be lubricated with sewing machine oil if necessary.

Change the lamp and the fuse

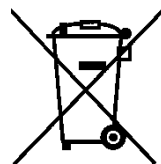
- Switch off the power and pull the mains plug.
- Now loosen the lower cover screw of the chassis and remove the cover to replace the bulb and fuse according to the requirements of the different models.
- After replacing the bulb and fuse, the cover should be replaced and the screws tightened.

7 TECHNICAL DATA

- Tube: 30° viewing angle (monocular/binocular)
- WF10x/18mm eyepieces for spectacle wearers
- Eyepieces of the monocular models secured against removal
- 4-position nosepiece with click-stop
- Achromatic objectives 4x NA 0.10, 10x NA 0.25, S40x NA 0.65, S60x NA 0.85 and S100x (oil) NA 1.25 (depending on model)
- Condenser: Abbe N.A. 1.25 with iris diaphragm
- Models with mechanical stage: area 140 x 130 mm, travel range 78 x 30 mm
- Coaxial coarse and fine focussing mechanism with graduations on the fine focussing mechanism
- Lighting: 3 W LED (colour temperature 5000 K), adjustable
- Integrated power supply unit 100...240 V, 50/60 Hz, 3W
- Fuse: F2A/250V
- Includes dust cover
- Dimensions (H x W x D): 35 cm x 21 cm x 23 cm
- Weight: 5.0 kg (monocular models); 5.5 kg (binocular models)

8 WASTE DISPOSAL

The packaging consists predominately of environmentally compatible materials because they can be recycled and should be passed on for disposal by the local recycling service.



Should you no longer require this product, do not dispose of it with the household refuse.

Please return it to the address below for proper waste disposal.

PHYWE Systeme GmbH & Co. KG
Service Department (Customer Service)
Robert-Bosch-Breite 10
37079 Göttingen / Germany

Phone +49 (0) 551 604-274
Fax +49 (0) 551 604-246
Mail info@phywe.de, hotline@phywe.de