

**USERS MANUAL
NOVEX
MICROSCOPES
OF THE B-RANGE**



EUROMEX Microscopen B.V.
HOLLAND

www.euromex.com

1.0 Introduction

With your purchase of a NOVEX B-range microscope you have chosen for a quality product. The NOVEX B-range microscopes are developed for use at universities 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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3.0 Construction of the microscope

The names of the several parts are listed below and are indicated in fig. 1:

- | | |
|--|--|
| A) Photo tube (trinocular models) | L) Condenser with irisdiaphragm + filterholder |
| B) Diopter adjustment | M) Object stage |
| C) Tube (360° rotatable) | N) Slide clip |
| D) Stand arm | O) Objectives |
| E) Safety device | P) Revolving nosepiece for 4 objectives |
| F) Coaxial coarse- and fine adjustment | Q) Prism housings |
| G) Stand base | R) Eyepiece(s) |
| H) On/Off switch | S) Coaxial knobs mechanical stage |
| I) Light intensity adjustment | T) Tension control |
| J) Lamp housing | U) Set screw (trinocular models) |
| K) Height adjustment condenser | V) Photo/video switch (trinocular models) |

4.0 Functions of the microscope

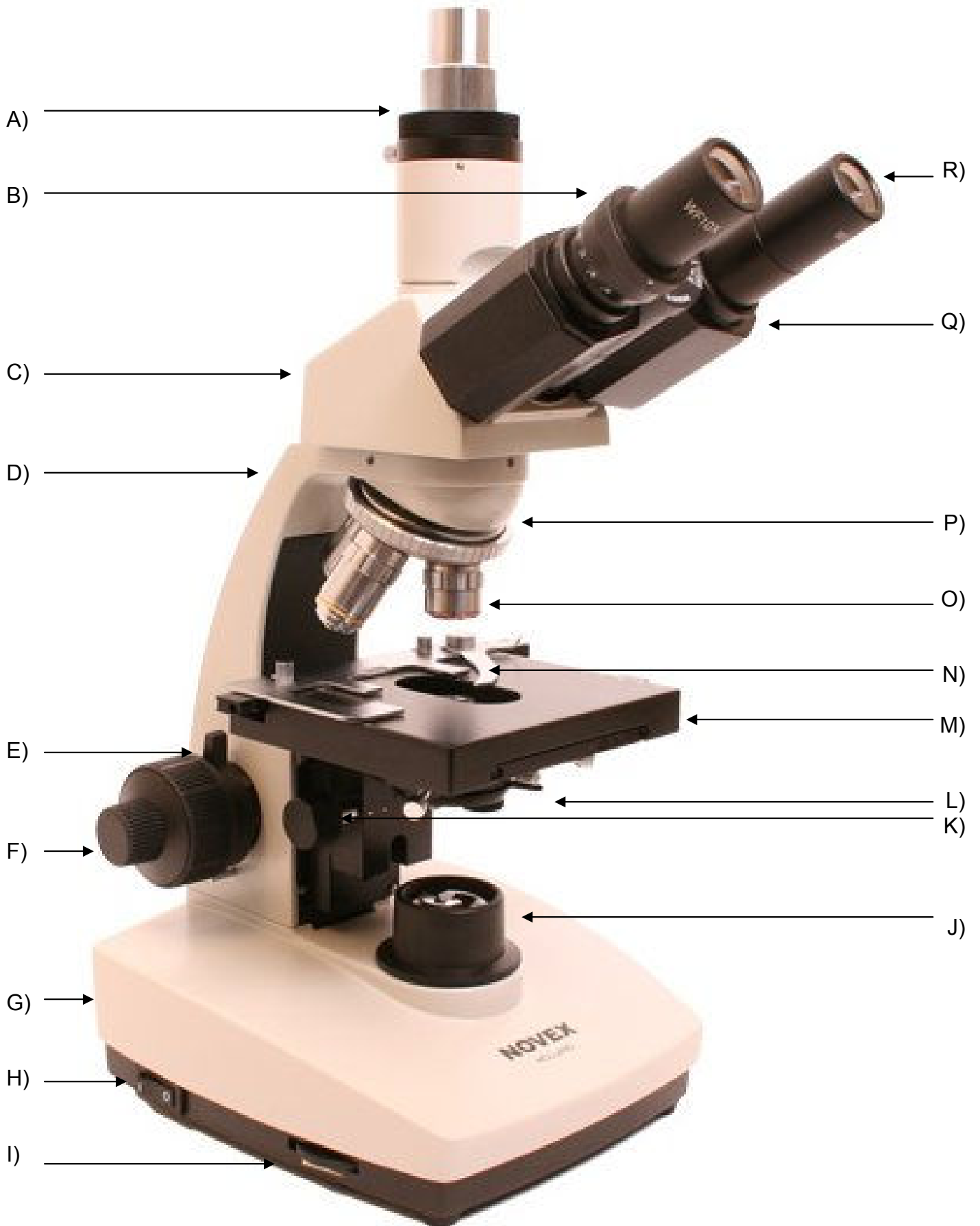
The stand consists of a stand arm (limb) (S), stand base (M) and an object stage (F). Hold the microscope at the top of the stand arm when it should be moved.

4.1 Tube

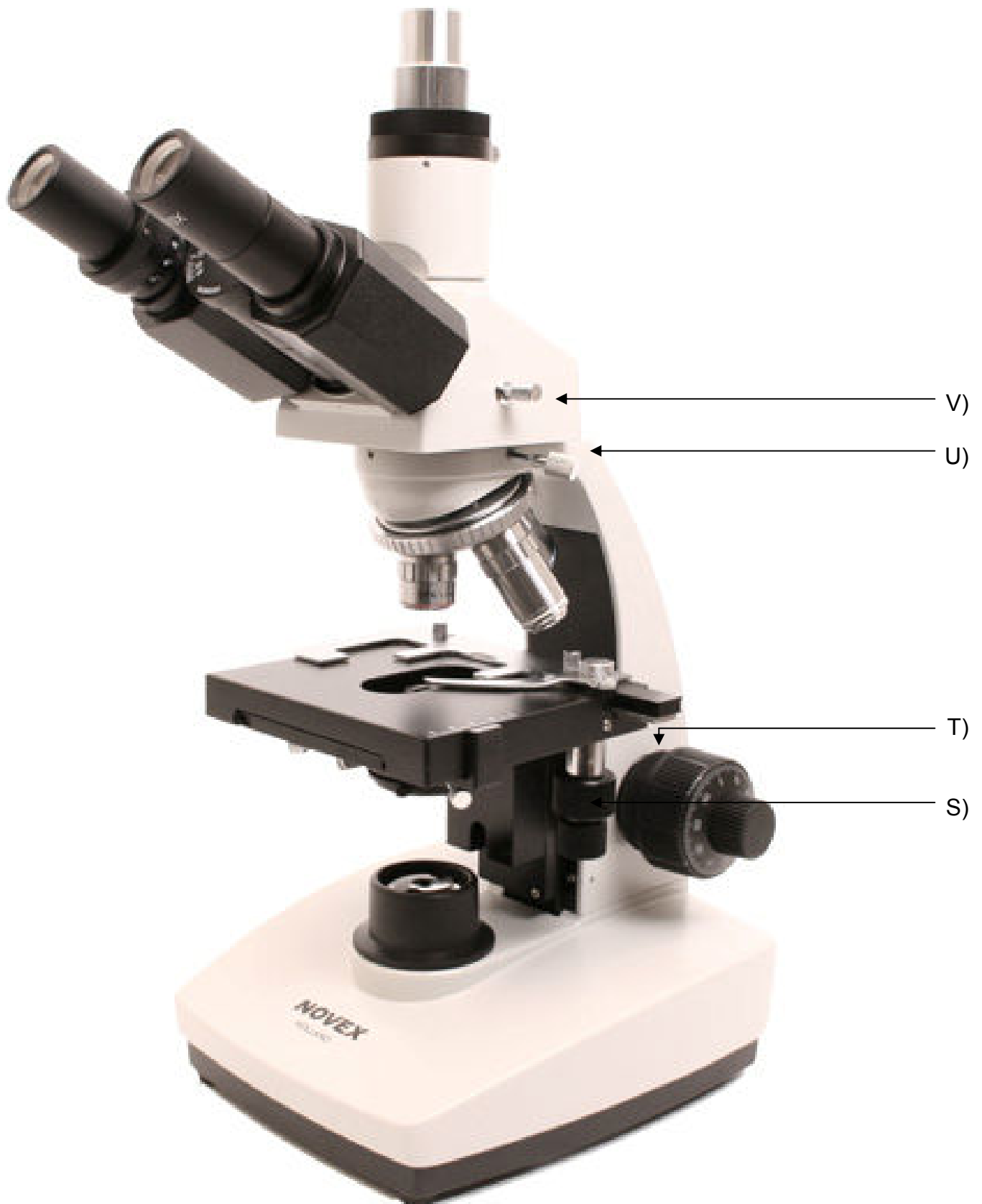
The 360° rotatable monocular tube is equipped with a WF10x eyepiece. The binocular and trinocular have 2 eyepieces WF10x. The tube of the trinocular model can be fixed in any position by using the set screw (T).

4.2 Revolving nosepiece for 4 objectives

The revolving “reversed” nosepiece (P) can contain 4 DIN objectives (O).



Set screw (U) in the picture below is for locking the position of the rotatable head. This system is only found on the models with infinity objectives. All other models have a non-detachable head.



4.3 Optical specifications

The NOVEX B range microscopes are equipped with one or two widefield eyepieces WF10x (R) and 4 semi-plan achromatic DIN objectives 4x N.A. 0.10, 10x N.A. 0.25, S40x N.A. 0.65 and S100x N.A. 1.25 oil-immersion (O).

The S40x 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.

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	100x	1000x

4.4 Object stage

The slide is placed into the clamp of the mechanical stage (N) and can be carefully moved into X- and Y- directions. Focusing the specimen is done by using the coaxial coarse- and fine adjustment knobs (F).

4.5 Coarse- and fine adjustment

The coarse- and fine adjustment knobs (F) for the height adjustment of the object stage are mounted together on one (1) axle (co-axial). On one of the coarse adjustment knobs there is a graduation with intervals of 0.002 mm. This can be used to measure depths in a specimen.

4.6 Abbe condenser with iris diaphragm

Beneath the object stage an Abbe condenser (M) N.A. 12.5 is mounted. The condenser can be adjusted in height by means of a rack and pinion movement and knob (K). With this one can focus the light on the specimen by which the contrast can be optimised. 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

4.7 Filter holder

To reach a natural colour image of the specimen one can put the blue filter in the filter holder (L). By doing this the light becomes whiter, even close to the normal daylight.

4.8a Halogen illumination NOVEX B-range

The halogen illumination of the B-range is adjustable (I)
The bulb is 6 Volt – 20 Watt. Art. nr. 86.889

4.8b LED illumination NOVEX B-range

The LED illumination of the B-range is adjustable (I) and has re-chargable batteries.
After charging the LED can be used for about 60 hours. Charging time is about 10 hours.

The LED illumination has the below specifications:

- LED : 20 mA, 3.5 Volt.
- Charger : Prim. AC 230 Volt-50Hz, sec. DC 5.5 Volt – 200 mA .
- Battery : 3 Nickel-Metal hydride batteries, AA type, 1.2 Volt 1800 mAh.

5.0 Preparing the microscope for use

Remove the packing and put the microscope on a flat table. The objectives are pre mounted.
Connect the power cable into the power connection at the rear side of the microscope and put the plug into the mains supply. Switch on the microscope (H). Sit comfortably down behind the microscope and take a relaxed position while viewing through the eyepiece (R).

6.0 Working with the microscope

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

6.1 Adjustment of the eyedistance (binocular and trinocular types)

Adjust the distance between the 2 tubes so it matches the distance between your eyes. The distance is adjustable from 55 – 75 mm.

6.2 Setting the diopter adjustment

Focus the slide by means of the coaxial coarse- and fine adjustment (F), using the tube without diopter adjustment ring only. Now look through the other eyepiece and focus the image with the diopter adjustment ring (B).

6.3 Setting the illumination

- Lower the stage (M) by means of the coaxial coarse- and fine adjustment knobs (F) to the maximum.
- Put a slide onto the stage in slide clip (N) with the thin cover glass pointing upwards.
- The part of the slide to be examined should be in the center of the opening of the stage.
- Turn a low power objective 4x, or 10x (O) to the slide.
- Lower the condenser (L) to the maximum.
- Fully open the iris diaphragm.

- Raise the stage (M) by means of the coaxial coarse- and fine adjustment knobs (F) until the image becomes visible.
- Focus the image by means of the coaxial coarse- and fine adjustment knobs (F).
- Now close the iris diaphragm until an equal light coverage is reached.
- Set the light intensity to at minimum position (I).

Caution: At maximum, the light intensity of the halogen bulb can be harmful to the eyes! For the 4x objective we therefore recommend the use of a neutral filter



- Focus the specimen.
- Turn up the light intensity to the required level.
- Now the microscope is set properly for the use with the 4x or 10x objective.
- For high magnifications always start with the 10x objective first.
- Critically focus with the fine adjustment knob (O).
- In general, the higher the magnification, the higher the condenser should be set. With a magnification of 400x, the top of the condenser will be about 2 mm. lower as the stage surface.
- When magnification is increased, the iris diaphragm should be opened wider to reach a good balance between contrast and resolving power.
- The light intensity can be adjusted with the knob (I)

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

6.4 Safety device

To prevent damage to the objective lens, or breaking the slide, all types are equipped with a safety device, which should be set as follows:

Move the safety device knob (E) to release the setting. Focus on the slide with the use of the 10x objective and push the knob to set the safety device. Now the object stage can not be moved upwards anymore by means of the coarse adjustment knobs.

It is recommended to use slides of 1.0 – 1.2 mm thickness (product numbers: PB.5150, PB.5155, PB.5160) in combination with cover glasses of 0.13 mm or 0.17 mm thickness (product numbers: PB.5165, PB.5168).

6.5 Use of the S100x oil-immersion objective

The B-range models 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 (R) and focus the image with the fine adjustment knobs (F).
- 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 table (M) with the fine adjustment knobs (F) downwards 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.

The S100x can also be used without immersion oil (dry). Please be aware of the fact that in such case the resolution will be much lower!

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!

6.6 Photo and video

The trinocular models are equipped with a vertical photo tube on which a photo or video CCD camera can be attached.

By pulling out the photo/video switch (V) on the right-handed side of the trinocular head, the light of one of the eyepieces is directed to the photo tube. The image remains visible through the other eyepiece.

For adapters see 8.0

7.0 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.

7.1 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. Remove the eyepiece 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 fibres can damage the coating of the lenses!

7.2 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.

7.3 Changing the bulb of the NOVEX B-range

Caution: Always remove the power cable from the mains supply before changing the bulb!



Replacing the halogen bulb is easily done by opening the lamp-cover on the bottom of the microscope. Please follow the below procedure:

- Remove the eyepiece to prevent them from falling out when the microscope is tipped over.
- Gently tip over the microscope until it is resting on its limb.
- Un screw the set screw of the lamp-cover and remove this cover.
- After having carefully checked that the bulb is cool to the touch, remove it from its holder. DO NOT TWIST, the pins can brake off and remain stuck into the holder.
- Take the fresh bulb with a tissue, and stick it into the holder.
- Do not touch new halogen bulbs with your fingers, this will shorten the life time of the bulb!

Catalogue number: 86.889 halogen bulb 6 Volt 20 Watt.

7.4 Charging the batteries of the LED types

The types BLMS, BLBS and BLTS are equipped with 3 rechargeable NI-MH batteries AA-format 1.2 volt - and can be used independently from the mains supply.

At first use the batteries should be charged. Set the On/off switch in the zero (0) position. Connect the cable from the plug transformer to the base of the microscope, and the plug transformer to the mains supply. Initial charging will take about 15 hours! During charging a red LED pilot lamp will light up on the backside of the microscope. As soon as this turns off, charging is ready.

These microscopes are not only equipped with LED illumination and a simple charger. The printed circuit board has an IC processor for maximum charging of the nickel-metalhydride batteries 1.2 volt 1800 mA/h. The first 5 hours the batteries are being charged quickly – uptil 80% - after that they will be charged and discharged a little until 100% capacity is reached. This will increase the lifetime of the batteries.

All next chargings will take 10 –12 hours. Upon full capacity the charger will turn itself off.

When batteries are down, one can charge them and work with the microscope simultaneously.

The LED types have a special condenser lens in the lamphousing, which concentrates the light beam for optimum light capacity. The field of view with the 4x and 10x objectives therefor has a light spot in the centre. With the supplied neutral filter the field of view can be equally illuminated again. This filter is placed into the filterholder (L).

7.5 Changing the batteries on the LED models



Caution: Always first pull out the plug-transformer from the mains supply!

- Remove the bottom cover by unscrewing the four bolts, located in the rubber feet.
- Now take of the cover of the battery compartment.
- Place the new batteries in the correct order, close the cover and replace the bottom cover again.

Caution: Batteries are **CHEMICAL WAIST** and should be disposed of as such!



7.6 Tension control setting

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

8.0 Microscope accessories

Eyepieces

80.873	Widefield yepiece WF 15x field number 12
85.882	Widefield yepiece WF 20x field number 10
85.574	Widefield micrometer eyepiece WF 10x fieldnumber 18, 10 mm in 100 parts, with adjustable eyelens

Objectives

86.891	Semiplan achromatic DIN objective SMP 4x / N.A. 0.10
86.893	Semiplan achromatic DIN objective SMP 10x / N.A. 0.25
86.894	Semiplan achromatic DIN objective SMP 20x / N.A. 0.45
86.897	Semiplan achromatic DIN objective SMP S40x / N.A. 0.65
86.900	Semiplan achromatic DIN objective SMP S100xx / N.A. 1.25 oil-immersion

Photo- and video adapters for the trinocular types:

86.817	C-mount adapter with built-in optics
86.127	Camera adapter
80.861	Photo eyepiece PH 2,5x – to be used with 86.127
86.820	Photo tube with built-in 2,5x and 4x photo eyepieces

T-2 rings on request

Other accessories

80.839	Eyeshade for 28 mm. eyepieces
80.810	Stage micrometer 1 mm. in 100 parts
86.960	Wooden cabinet with handle, lock and key

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