BRESSER 5760100 Science TRM-301 Trinocular Transmitted Light Microscope Instruction Manual

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BRESSER 5760100 Science TRM-301 Trinocular Transmitted Light Microscope

Product Information

Specifications:

- **Model:** SCIENCE TRM-301
- **Type:** Trinocular transmitted light microscope
- **Article Number:** 5760100
- **Power Supply:** 12V, 4A
- **Input Voltage:** 110-240V
- **Light Source:** 12V/30W Halogen Lamp

Product Usage Instructions

1. **General Warnings:**
   Ensure safety precautions are followed to prevent risks of electric shock, suffocation, fire, explosions, and injuries.
2. **Components:**
   The package includes:
   - A. Microscope
   - B. Power Supply (12V, 4A)

1. **Setup and Location:**
   Choose a suitable location for the microscope and assemble it according to the provided instructions.
2. **Product Design:**
   Detailed view of the microscope components.

FAQ:

Q: How do I change the microscope lamp?
A: Follow these steps to change the lamp:

1. Switch off the main power switch and unplug the microscope.
2. Remove the blue filter from the field diaphragm.
3. Take out the old halogen lamp from the lamp holder.
4. Insert the replacement halogen lamp into the lamp holder.

Q: How do I clean and maintain the microscope?
A: Use caution when cleaning as alcohol is flammable. Refer to the manual for detailed cleaning and maintenance instructions.

Visit our website via the following QR Code or web link to find further information on this product or the available translations of these instructions.

WARRANTY

www.bresser.de/warranty_terms

IMPRINT
Bresser GmbH, Gutenbergstr. 2, 46414 Rhede, Germany www.bresser.de.

In the event of any warranty claims or service inquiries, please refer to the “Warranty” and “Service” sections of these operating instructions. We ask for your understanding that unsolicited returns cannot be processed. Errors and technical changes are reserved.

VALIDITY NOTE
These operating instructions are valid for products with the following article numbers: 5760100

- Manual version: 0324
- Manual name: Manual_5760100_Science-TRM-301_de-en_BRESSER_v032024a

If you have any queries, please quote this information.

ABOUT THESE OPERATING INSTRUCTIONS

NOTE
These operating instructions are to be regarded as part of the device.

Read the safety instructions and the operating instructions carefully before using this device. Keep this instruction manual in a safe place for future reference. If the device is sold or passed on, the operating instructions must be handed over to the new owner/user of the product.

GENERAL WARNINGS

DANGER OF AN ELECTRIC SHOCK!
This device contains electronic parts that are powered by a power source (mains connection). Never leave children unattended when handling the device! Only use the device as described in the instructions, otherwise, there is a RISK of an ELECTRIC SHOCK!

- Disconnect the power supply when you are not using the device, during long breaks, and before all maintenance and cleaning work (disconnect the mains plug).
- Place the device so that it can be disconnected from the power supply at any time. The power outlet should always be near the device and should be easily accessible, as the plug of the power cord serves as a part to disconnect the device from the main supply.
- To disconnect the device from the mains, always pull the mains plug and never the cable!
- Check the device, cables, and connections for damage before use.
- Do not use the device if is damaged or contains damaged live parts! Damaged parts must be replaced immediately by an authorized service center.
- Only operate the device in a completely dry environment and do not touch the device with wet body parts.

DANGER OF SUFFOCATION!
Improper use can lead to a RISK OF SUFFOCATION, especially for children! It is therefore imperative that you observe the following safety information.

- Keep packaging materials (plastic bags, rubber bands, etc.) away from children!
- This product contains small parts that can be swallowed by children!
- If small parts are swallowed, seek medical advice immediately!

FIRE/EXPLOSION HAZARD!
Improper use of this product poses a RISK OF FIRE/EXPLOSION! Always observe the following safety instructions to avoid fires and/or explosions.

- Do not expose the device to high temperatures. Only use the supplied mains adapter (12V, 4A). Do not short-

circuit the device and batteries or throw them into a fire! Excessive heat and improper handling can cause short circuits, fires, and even explosions!

- Never cover the ventilation slots or cooling fins of the device during operation or until it has cooled down completely!

RISK OF INJURY!
This device contains components/accessories that can cause minor or serious injuries if used incorrectly. It is therefore essential that you observe the following safety information in order to prevent body injuries.

- This device often requires the use of sharp-edged and pointed tools. For this reason, keep this device together with all accessories and tools in a place inaccessible to children!
- Keep chemicals and liquids out of reach of children! Don't drink! Clean hands thoroughly under running water after use.

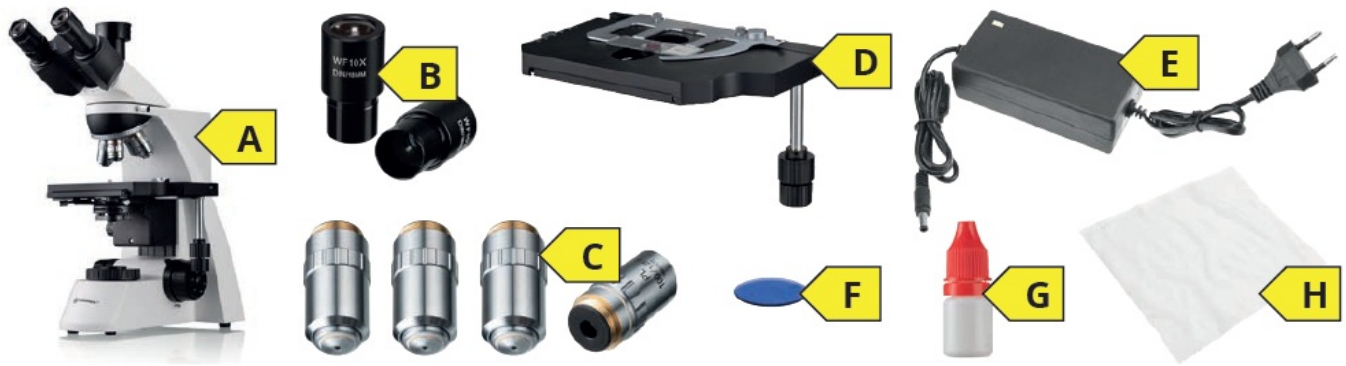
In case of accidental contact with eyes or mouth, rinse with water. In case of complaints, consult a doctor immediately and show the substances.

THIS DEVICE GENERATES HEAT!
This device contains a halogen light source (12V/30W). Halogen lamps emit a considerable amount of infrared light as heat. As a result, the surface of the lamp housing becomes very hot. Leave sufficient space around the microscope and DO NOT place it near flammable materials. Important: The heat generated can also cause the specimens to warm up! Adjust the brightness to your requirements: Set the Koehler illumination on the microscope by illuminating only the part of the sample that you want to inspect. Switch off the light when you are not using the microscope.

DANGER OF PROPERTY DAMAGE!
Improper handling can cause DAMAGE to the device and/or the accessories! Therefore, use the device only by the following safety information.

- Do not disassemble the device! In case of a defect, contact your dealer. The dealer will contact the service center and send the device for repair if necessary.
- Do not expose the device to high temperatures and protect it from water and high humidity!
- Do not subject the device to shocks!
- Only use accessories and spare parts that comply with the technical specifications!

SCOPE OF DELIVERY



- **A:** Transmitted light microscope

- **B:** 2 pcs. Eyepieces (WF 10x)
- **C:** 4 pcs. Lenses (4x, 10x, 40x, 100x oil / pre-assembled)
- **D:** Coaxial XY stage with vernier adjustment (pre-assembled)
- **E:** Power adapter (12V, 4A)
- **F:** Blue colour filter disc
- **G:** Immersion oil
- **H:** Dust cover

CHOICE OF LOCATION & SETUP

Before setting up your microscope, choose a suitable location.

Place the microscope on a surface that meets the following criteria:

- Flat/level
- Vibration-free/stable
- Hard, non-combustible surface
- Chemically and mechanically resistant

Set up the microscope so that …

- the ventilation slots on the back are not blocked.
- there is a distance of at least 10 cm around the device or to other appliances or the wall.
- you can disconnect it from the power supply at any time.

ATTENTION!
Always use the supplied power adapter (12V, 4A) for the halogen light (12V/30W) and dimmer. Using an unsuitable power supply unit can cause damage to the microscope!

PRODUCT DESIGN SCIENCE TRM 301

FRONT/SIDE VIEW

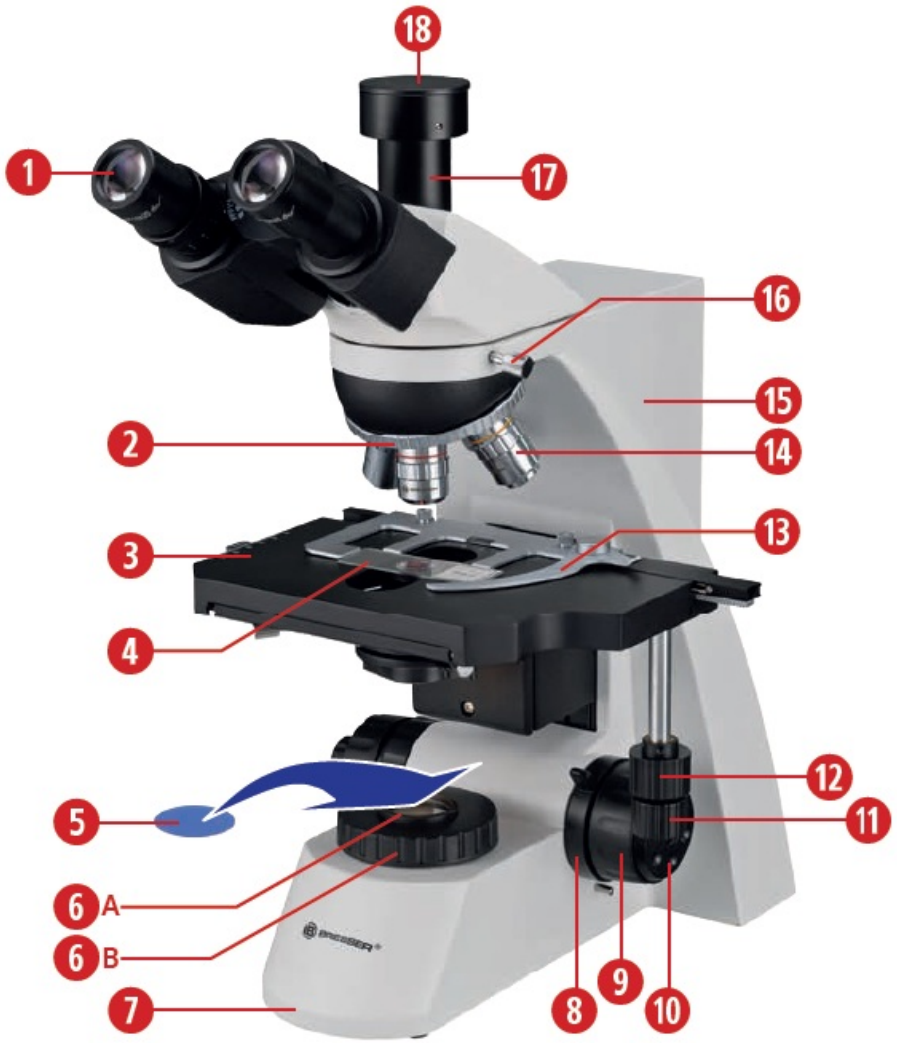


Fig. 1A: Components on TRM 301, front/side view.

EQUIPMENT

1. Eyepiece
2. Objective nosepiece
3. Specimen stage (XY stage) with vernier scales
4. Slide with sample
5. Blue filter (included with product)
6. **6A.** Field diaphragm with filter holder
   6B. Field diaphragm ring
7. Microscope base with lamp housing
8. Table height limit
9. Right-hand coarse focusing drive (coarse drive)
10. Right-hand fine focusing drive (fine drive)
11. Transverse XY stage
12. Longitudinal XY stage
13. Clamp mount
14. Objective
15. Microscope body
16. Microscope head retaining screw

17. Trino tube
18. Connection of an external camera is possible while using a suitable adapter (not included)

REAR/SIDE VIEW

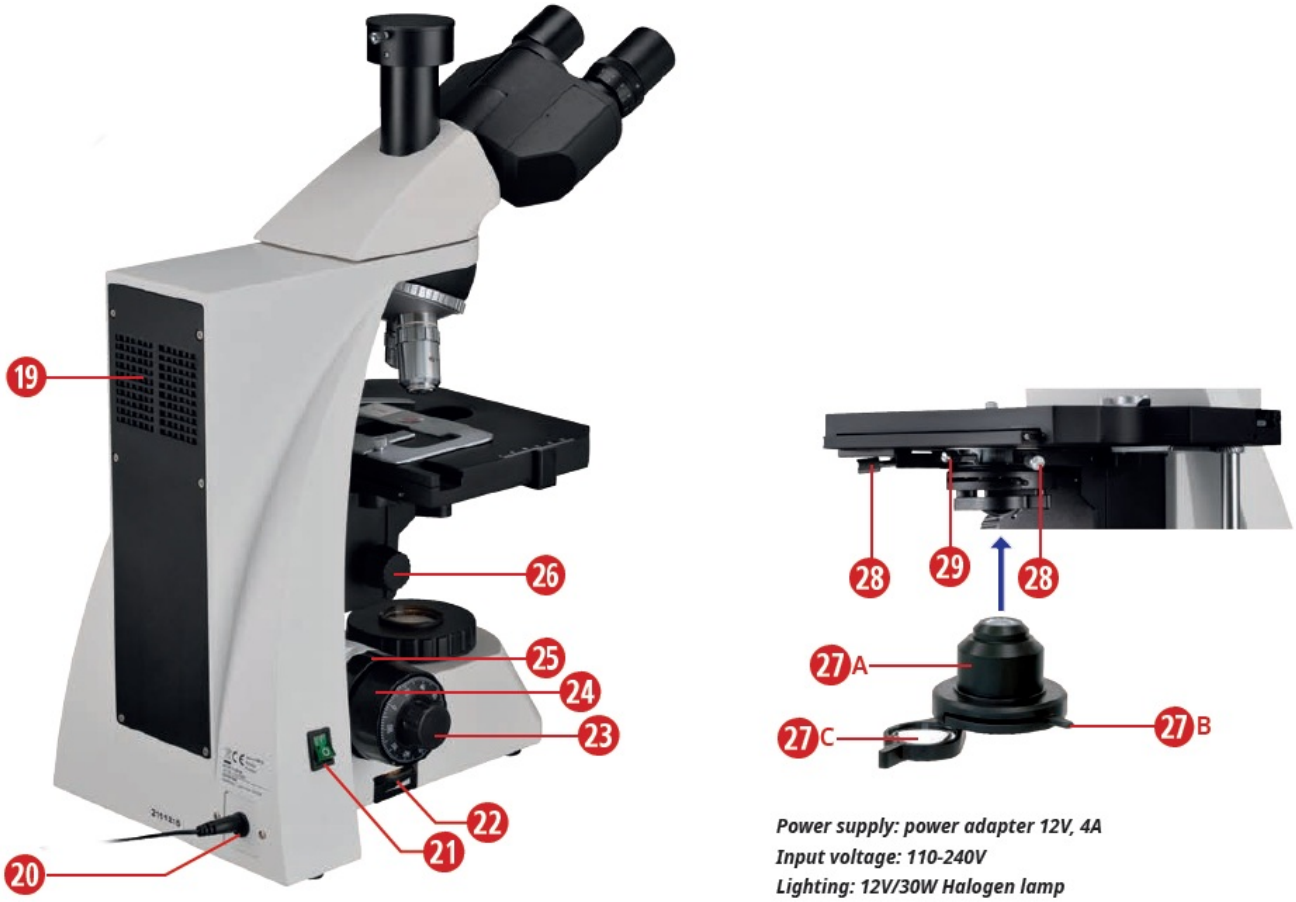


Fig. 1B: Components on TRM 301, rear/side view.

EQUIPMENT

19. Ventilation slots
20. Mains connection
21. On/off switch (main switch)
22. Dimmer
23. Left-hand fine focussing drive (fine drive)
24. Left-hand coarse focusing drive (coarse drive)
25. Friction drive
26. Condenser height drive
27. **27A.** Condenser

    27B. Aperture diaphragm lever

    27C. Auxiliary condenser lens
28. Condenser centering screws
29. Condenser retaining screw

MICROSCOPE SETTINGS

ESTABLISHING A MAIN CONNECTION

ATTENTION!
Before setting up the microscope, check that the on/off switch (main switch) (1) is in the O (OFF) position.

- To start up the microscope, first insert the hollow plug (2) on the supplied power adapter (12V, 4A) (3) into the power-in socket (4) on the back of the microscope. Then plug the mains plug (5) on the power adapter into a suitable socket (6) (max. 230V).
- To switch on the microscope, move the on/off switch (main switch) (1) to the 'I' position.

Fig. 2: Establishing a mains connection.

POSITIONING THE SPECIMEN

- The clamp holder (1) on the specimen stage is designed to hold a microscope slide (2). The longitudinal XY stage (3) (for movement in the longitudinal direction) and the transverse XY stage (4) (for movement in the transverse direction) are coaxial. The specimen stage can therefore be moved according to your requirements.
- Swivel the 4x objective (5) into the working position by turning the nosepiece (6).
- **NOTE:** The lenses engage with an audible "click" when they are positioned in the beam path.

Fig. 3: Positioning the speciment.

CONFIGURING THE LIGHT

- The lamp housing (1) is located in the microscope base.
- The light is supplied by a halogen bulb (12V/30W).
- You can adjust the brightness of the light source using the stepless dimmer (2).

WARNING:
Do not leave the dimmer at maximum brightness for long periods of time. This shortens the lifespan of the lamp.

Fig. 4: Configuring the light.

CONFIGURING THE OBSERVATION TUBE

- **Adjusting the interpupillary distance (A) (distance between the eyepieces)**
  Set the correct interpupillary distance for binocular observation by swiveling the eyepiece tubes (1) on the microscope head so that the right and left fields of view overlap completely or combine to form a circular image.
- **Setting the visual acuity correction (dioptre compensation)**
  Turn the 40x lens to the working position. First, look only through the right eyepiece with your right eye, and then use the coarse and fine focus knobs to focus the image. Next, look only through the left eyepiece with your left eye, and then use the dioptre adjustment ring (2) to focus the image.

Fig. 5:
Configuring the interpupillary distance and dioptre compensation.

FOCUSSING THE SPECIMEN

- Next, bring the specimen into focus and adjust the image sharpness (focus).
- The microscope has a coaxial coarse and fine focusing mechanism. Turn the coarse adjustment knob (1) to raise or lower the XY stage. To make precise adjustments to the image sharpness, use the fine adjustment knob (2). The friction drive (3) next to the coarse adjustment knob (1) is used to adjust the coarse drive's ease of movement so that the specimen does not slide down by itself. The stage height limiter (4) prevents

unintentional contact between the specimen and the objective when focusing. If you lock it at a specified height (by turning it upwards), you will not be able to use the coarse drive to bring the objective closer to the specimen, which is thus protected against damage.

- **NOTE:** The supplied blue filter (5) can be inserted into the filter holder of the field diaphragm. The blue filter makes the light color more neutral.
- **NOTE:** The condenser has an auxiliary lens (6). This lens is used to adjust the condenser aperture to the objective aperture. To observe with the 4x objective, swivel the auxiliary condenser lens into the beam path. This is used to illuminate the field of view. When observing with higher magnification objectives, swivel the auxiliary condenser lens out of the beam path.

NOTE:
Always start the observation with the lowest magnification: This makes it easier to center and adjust the specimen and also protects the microscope from damage.

WARNING:
The halogen lamp generates a significant amount of heat and will cause the specimens to heat up! Adjust the brightness to your requirements: Set the Koehler illumination on the microscope by illuminating only the part of the sample that you want to inspect. Switch off the light when you are not using the microscope.

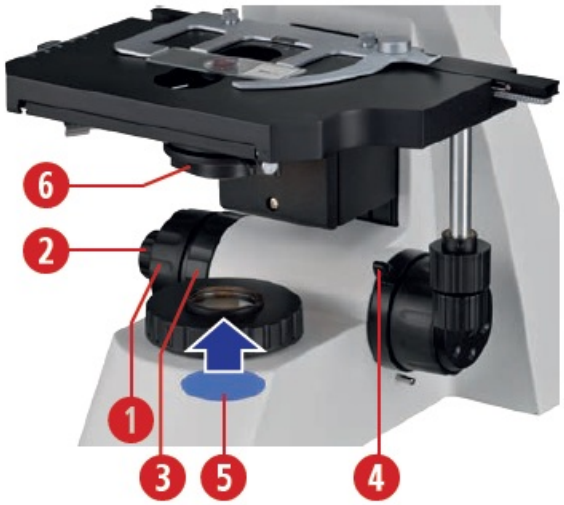


Fig. 6: Focussing the specimen.

TRINO TUBE FOR THE PHOTOGRAPHY

- The trino tube (1) offers the option of connecting a MicroCam or C-Mount camera. To connect them, a C-Mount MicroCam adapter is needed (item number: 5942101). An optional adapter (item number: 5942100) for SLR or system cameras is also available. In addition, a camera-specific T2 ring is required here.
- The adapter retaining screw (2) fixes the appropriate adapter/dust cap.

Fig. 7: Trino tube for the photography.

KOEHLER ILLUMINATION PRINCIPLE

This special technology ensures uniformly bright, high-contrast, and reflection-free illumination of the sample. In addition to making full use of the microscope optics, it also protects sensitive samples from excessive light irradiation. Koehler illumination is therefore the standard for scientific and photomicrography applications and can be adjusted with the built-in field diaphragm together with the height-adjustable and centerable Abbe condenser (numerical aperture 1.25; with iris diaphragm).

CENTRING THE CONDENSER

- **Height-adjustable and center able Abbe condenser**
  The condenser (1) can be moved up or down by turning the condenser height drive (2). Use the condenser centering screws (3) to center the condenser. After loosening the condenser retaining screw (4), the condenser can be easily removed from its holder. The field diaphragm and filter holder (5) have space for a filter disc (a blue filter is included with the product).
- The following section describes step-by-step how to set the Koehler illumination using the 10x objective as an example:
  - **a)** Use the condenser height drive (2) to bring the condenser (1) to the highest position directly under the stage.
  - **b)** Switch on the light with the on/off switch (6) and focus a high-contrast sample using the 10x objective. Make sure that the light is set correctly using the dimmer (7).
    NOTE: When centering with the 10x objective, swivel the auxiliary condenser lens (8) out of the beam path, otherwise you will not be able to center the condenser.
  - **c)** Turn the field diaphragm ring (9) in the direction of the arrow so that the field diaphragm (5) is completely closed. Look through the eyepieces. Adjust the condenser height drive (2) until the blurred image of the field diaphragm is in focus.
  - **d)** If the condenser is not centered, you will see an image of the field diaphragm similar to (10A).
  - **e)** To center the aperture in the field of view, use the two condenser centering screws (3) on each side of the condenser holder.
  - **f)** Once the image is in focus and centered in the field of view (10B), open the field diaphragm until its edge has just disappeared from the field of view and the field of view is completely illuminated (10C-10D). If needed, you may be able to re-center the condenser a little. You should also set the aperture diaphragm, which is explained in the next section.

NOTE:

- Bright-field microscopy is the most common of all light microscopy methods, as it allows high-contrast or colored specimens (e.g. blood smears) to be viewed quickly and easily. To fully utilize the optical capabilities of the microscope (especially the objective), the condenser, field diaphragm, and aperture diaphragm should be configured according to the Koehler illumination principle.
- The field diaphragm limits the diameter of the light beam entering
  the lens. This prevents stray light and increases the image contrast. To support the performance of the lens, the diameter of the field diaphragm must be adjusted so that its image and the field of view are the same size.

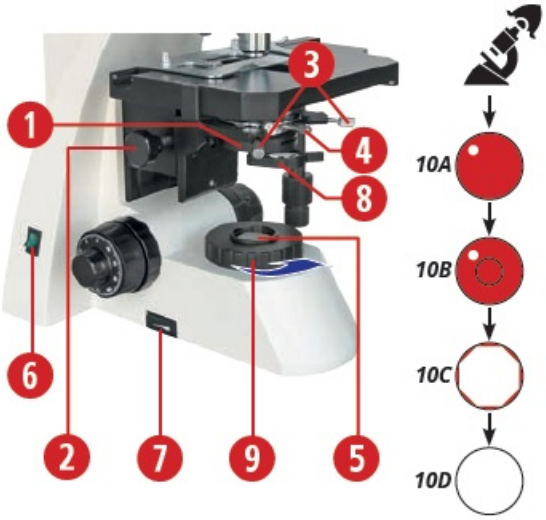


Fig. 8: Centering the Abbe condenser.

APERTURE DIAPHRAGM (CONDENSER DIAPHRAGM)
The aperture diaphragm (condenser diaphragm) determines the numerical aperture of the illumination system as well as the resolution of the microscope. It is used to set the contrast, image resolution and depth of field. Closing the aperture diaphragm increases the depth of field. The aperture diaphragm (condenser diaphragm) (1) can be opened or closed using the aperture diaphragm lever (2).

- **a)** Remove one eyepiece and look into the open eyepiece tube.
- **b)** Adjust the aperture diaphragm image (3) by adjusting the aperture diaphragm lever (2) to approx. 70-80% of the diameter of the lens pupil (4).
- **c)** Then insert the eyepiece back into the eyepiece socket.

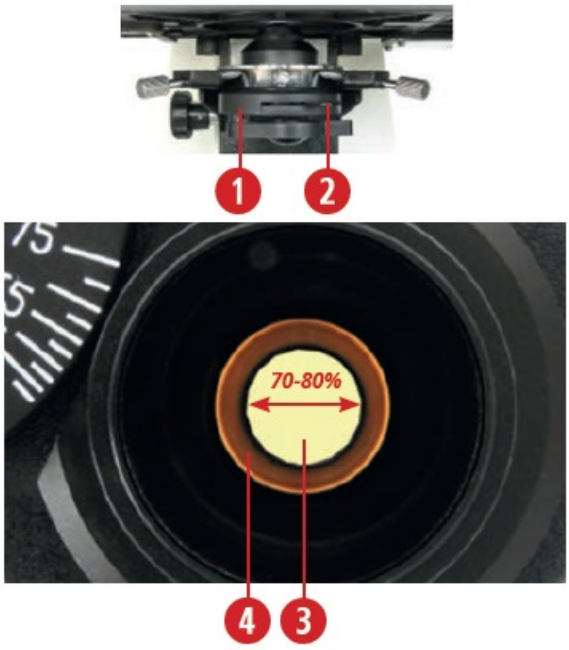


Fig. 9: Setting the aperture diaphragm (condenser diaphragm).

- **NOTE:** Each time the lens is changed, the object field size the lens aperture, and possibly the centering will change slightly, meaning that the light field and aperture diaphragm settings should be readjusted for optimum results.
- **WARNING:** The brightness can only be adjusted via the dimmer, and not via the aperture diaphragm.

USE OF OIL IMMERSION

- Focus the object with the 40x objective (1).
- Move the longitudinal XY stage (2) to expose the condenser lens (3). Turn the 40x lens (1) to the side.
- Apply a drop of immersion oil (4) to the lens of the condenser (3).
- Move the slide (5) back into the beam path using the longitudinal XY stage (2).
- Put another drop of immersion oil (4) on the cover glass of the slide (5) and screw in the 100x objective (6), immersing the front lens in the oil.
- Slowly refocus the image using the fine adjustment knob (7).

WARNING:
If the immersion oil comes into contact with the skin, rinse it off thoroughly with soap and water. In the event of eye contact, rinse the eyes under running water for at least 15 minutes.

Fig. 10: Using the 100x oil immersion objective.

- **NOTE:** Oil immersion can only be performed with a suitable 100x objective. The 100x oil immersion objective is included with the product.
- **NOTE:** We recommend immersion oil with a refractive index (RI) of nD=1.515 by ISO 8036.
- **NOTE:** As air bubbles in the oil impair the image quality, make sure that the oil drop is free of bubbles. To remove bubbles, defocus the oil immersion objective repeatedly and refocus it, or switch to another objective and allow the visible bubbles to burst before immersing the 100x objective again.
- **NOTE:** Clean the 100x lens by dabbing off the oil with a soft baby paper towel (lotion-free). If you use the immersion lens regularly, the lens should only be cleaned with a damp cloth once a week. Use a solution of 70% ethanol or isopropanol (to prepare such a solution, use p.A or pharmacy alcohol and double-distilled water).

LAMP REPLACEMENT

- Switch off the on/off switch (main switch) (1), disconnect the plug from the mains socket, and then disconnect the power adapter (2) from the mains connection (3) on the microscope. Remove the blue filter from the field diaphragm.
- Carefully tilt the microscope and loosen the fastening screw (4) on the bottom flap (5), which carries the lamp holder and is located in the middle of the underside of the microscope. Open the bottom flap (5).
- Pull the old halogen bulb (6) (12V/ 30W) out of the lamp holder (7).
  WARNING: Exercise caution, as the lamp may still be hot!
- Plug a suitable replacement halogen bulb (6) (12V/ 30W) into the lamp holder (7).
  NOTE: Take care not to touch the lamp directly with your fingers (to prevent soiling of the lamp, which reduces its lifespan and intensity). For example, grip the lamp using the lamp's protective cover or a handkerchief.
- Close the bottom flap (5) on the underside again with the fastening screw (4).
- After you have fitted the replacement lamp, reconnect the power supply and press the on/off switch (main switch) (1). Then swivel an objective into the beam path, adjust the condenser to the correct height using the condenser height drive (8), and illuminate the field of view. If the light spot shifts away from the center of the field of view, loosen the screw (9) slightly and move the lamp holder (7). Guide the light spot into the center, then immediately tighten the screw (9) again.

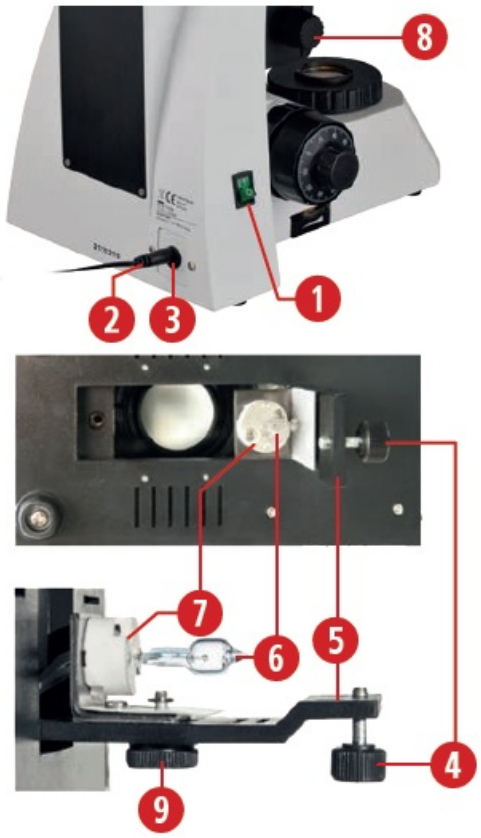


Fig. 11: Replace the lamp.

CLEANING/MAINTENANCE/TRANSPORT

- During long breaks, and before all maintenance and cleaning work, disconnect the power supply by unplugging the mains plug.
- Remove all interchangeable optical elements (e.g. objectives, eyepieces, etc.) before cleaning.
- The nosepiece, the coarse/fine focusing mechanism, and the condenser are precisely designed and calibrated to work together. Please avoid dismantling the components. This impairs the performance of the microscope.

CLEANING

Lens cleaning:
Wipe the lenses with a lens cleaning cloth or a soft cloth moistened with a small amount of alcohol or alcohol/ether mixture. Clean the immersion oil from the 100x immersion objective and the condenser lens after use.

Cleaning of microscope and optical elements:
Only clean the outside of the microscope with a dry cloth. First, blow loose dust off the lens surfaces. Use high-quality lens cleaning towels or soft cloth and moisten it with a little bit of pure alcohol (available in a drug store). Gently wipe the lens surface in a circular motion from the center to the edge of the lens, applying a small amount of pressure.

- **WARNING:** Do not use organic solvents (e.g. alcohol, ether, acetone, xylene or other thinners) to clean painted or plastic parts!
- **WARNING:** Alcohol is highly flammable.
- **WARNING:** To avoid damaging the electronics, do not use any cleaning fluid.

Cleaning the 100x oil objective/condenser lens

The immersion oil should be removed from the objective/condenser lens at the end of each working day. Clean the 100x objective (oil) and the condenser lens by dabbing off the oil with a soft baby paper towel (lotion-free). If you use the 100x objective with oil immersion regularly, it is sufficient to clean it once a week with a solution of 70 % ethanol or isopropanol (to prepare such a solution, use p.A or standard pharmacy alcohol and double-distilled water).

- **Dust protection:**
  When not in use, cover the microscope with the dust cover and place it in a dry and mold-free place. We recommend storing all objectives and eyepieces in a closed container with desiccant.
- **Transport:**
  Remove all loose components and the specimen from the XY stage. Only use the original packaging for transportation.

TECHNICAL DATA

- **Transmitted light microscope**
  Microscope head: Trinocular view, tilted by 30°, 360° rotatable
- 2x eyepieces: both wide-field eyepieces 10x (23 mm plug-in diameter) Field number (FN): 20 mm, (in 30° inclined eyepiece tube)
- 4x objectives: 4x, 10x, 40x, 100x oil spring-loaded (objective type: plan achromatic)
- Condenser: Abbe condenser, height-adjustable and center able (numerical aperture 1.25 with iris diaphragm)
- Specimen stage: The movement range of the XY stage is 50 mm longitudinal and 75 mm transverse; coaxial XY stage with vernier scales
- Fine drive: Smallest scale division: 0.002 mm
- Adjustment range for interpupillary distance: 53 mm – 75 mm
- Light source: Halogen lamp (12V/30W) with dimmer
- Replacement halogen lamp (12V/30W)

DISPOSAL

- Do not dispose of electrical appliances with household waste! By Directive 2002/96/EC of the European Parliament on waste electrical and electronic equipment and its transposition into German law, used electrical appliances must be collected separately and recycled in an environmentally friendly manner.
- Please observe the current legal regulations when disposing of the microscope and all accessories! Information on proper disposal can be obtained from municipal waste disposal service providers or the Environmental Agency.
- Dispose of the packaging materials according to type. Information on proper disposal can be obtained from municipal waste disposal service providers or the Environmental Agency.

WARRANTY

The regular guarantee period is 2 years and begins on the day of purchase. To benefit from an extended voluntary guarantee period as stated on the gift box, registration on our website is required.
You can consult the full guarantee terms as well as information on extending the guarantee period and details of our services at **www.bresser.de/warranty_terms**.

www.bresser.de/warranty_terms

EC DECLARATION OF CONFORMITY

Bresser GmbH has prepared a “CE Declaration of Conformity” per the applicable guidelines and corresponding standards. The full text of the CE declaration of conformity is available at the following website: www.bresser.de/download/5760100/CE/5760100_CE.pdf.

SERVICE

Please contact the service center first for any questions regarding the product or claims, preferably by e-mail.

- **E-Mail:** service@bresseruk.com
- **Telephone*:** +44 1342 837 098
- BRESSER UK Ltd. Suite 3G, Eden House Enterprise Way Edenbridge, Kent TN8 6HF Great Britain

Number charged at local rates in the UK (the amount you will be charged per phone call will depend on the tariff of your phone provider); calls from abroad will involve higher costs.

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Documents / Resources

	BRESSER 5760100 Science TRM-301 Trinocular Transmitted Light Microscope [pdf] Instruction Manual 5760100, 5760100 Science TRM-301 Trinocular Transmitted Light Microscope, 5760100, Science TRM-301 Trinocular Transmitted Light Microscope, TRM-301 Trinocular Transmitted Light Microscope, Trinocular Transmitted Light Microscope, Transmitted Light Microscope, Light Microscope, Microscope

References

- **User Manual**