Living up to Life

Leica
MICROSYSTEMS

User Manual

Leica S8 APO B

CE

Copyright

The instructions contained in the following documentation reflect state-of-the-art technology. We have compiled the texts and illustrations as accurately as possible. Still, we are always grateful for comments and suggestions regarding potential mistakes within this documentation.

The information included in this manual may be changed without prior notice.

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Responsible for contents:
Marketing CMS

Function of the Microscopes

The Leica S8 APO B microscope, for which this User Manual has been written, is used for routine examinations of cell and tissue cultures, liquids and sediments. This includes examining specimens taken from the human body for the purpose of gaining information about physiological or pathological conditions or inborn anomalies, or testing for safety and compatibility for potential recipients, or for monitoring therapeutic measures.

IVD

The above-named microscopes comply with the Council Directive 98/79/EC concerning in vitro diagnostics.

The manufacturer assumes no liability for damage caused by, or any risks arising from, using the microscope for other purposes than those for which they are intended or not using them within the specifications of Leica Microsystems CMS GmbH. In such cases, the Declaration of Conformity shall be invalid.

Leica S8 APO B identification label

These (IVD) instruments are not intended for use in the patient environment defined by DIN VDE 0100-710. Nor are they designed to be combined with medical instruments in accordance with EN 60601-1. If a microscope is electrically connected to a medical instrument in accordance with EN 60601-1, the requirements listed in EN 60601-1-1 shall apply. Not suitable for examining potentially infectious specimens. This type of instrument may be operated by trained laboratory personnel only.

General Notes

Use in clean rooms
The Leica S series can be used in clean rooms without any problems.

Cleaning
- Do not use any unsuitable cleaning agents, chemicals or techniques for cleaning.
- Never use chemicals to clean colored surfaces or accessories with rubberized parts. This could damage the surfaces, and products could be contaminated by abraded particles.
- In most cases, we can provide special solutions on request. Some products can be modified, and we can offer other accessories for use in clean rooms.
- The cleaning of glass surfaces and objectives in particular should be carried out exclusively as outlined in the brochure "Cleaning of Microscope Optics". The information can be downloaded at:
http://www.leica-microsystems.com/products/
. Select your product and go to the "Download" page.
- For additional information, refer to page 51.

Servicing
- Repairs may only be carried out by Leica Microsystems-trained service technicians. Only original Leica Microsystems spare parts may be used.

Responsibilities of person in charge of instrument
- Ensure that the Leica stereomicroscope is operated, maintained and repaired by authorized and trained personnel only.

Important Safety Notes

User Manual

This User Manual describes the special functions of the Leica StereoZoom® stereomicroscopes (S series) and contains important instructions for their operational safety, maintenance, and accessories.

You can combine individual system articles with articles from external suppliers (e.g. cold light sources, etc.). Please read the User Manual and the safety instructions from the supplier.

Before installing, operating or using the instruments, read the user manuals listed above. In particular, please follow all safety instructions.

To maintain the unit in its original condition and to ensure safe operation, the user must follow the instructions and warnings contained in these user manuals.

We guarantee the quality of our products. Our guarantee covers all faults in materials and manufacture. It does not, however, cover damage resulting from careless or improper handling.

Symbols Used

Warning! Safety hazard!

This symbol indicates especially important information that is mandatory to read and observe.

Failure to comply can cause the following:

- Hazards to personnel
- Functional disturbances or damaged instruments

Warning of hazardous electrical voltage

This symbol indicates especially important information that is mandatory to read and observe.

Failure to comply can cause the following:

- Hazards to personnel
- Functional disturbances or damaged instruments

Danger due to hot surface.

This symbol warns against touching hot surfaces, e.g. those of light bulbs.

Important information

This symbol indicates additional information or explanations that are intended to provide clarity.

Explanatory notes

- This symbol within the text stands for additional information and explanations.

Figures

(1) Numbers in parentheses within the descriptions relate to the figures and the items within those figures.

Disposal.

Notes on how to dispose of the microscope, its components and consumables.

China RoHS 50 year EFUP (Environmentally friendly use period)

IVD labeling

IVD nstrument for in vitro diagnostics.

MM/YYYY IVD manufacturing date, for example 11 / 2011 for November 2011.

Safety Instructions

Description

- The individual modules fulfill the highest requirements for observation and documentation of Leica stereomicroscopes of the M series.

Intended use of instrument

- Leica Microsystems microscopes are optical instruments for improving the visibility of objects or specimens through magnification. Accessories such as optical accessories, stands, illumination, cameras etc. supplement the equipment configuration.

Non-intended use

- Using the instrument in any way contrary to the specifications in the User Manual can lead to bodily harm and damage to objects. Never use microscopes for in vivo examinations or eye surgery if they are not expressly intended for such use. Never install any other plug or unscrew optical systems and mechanical parts unless expressly instructed to do so in the instructions.

The instruments and accessories described in this User Manual have been tested for safety and potential hazards. The responsible Leica affiliate must be consulted whenever the instrument is altered, modified or used in conjunction with non-Leica components that are outside of the scope of this manual!

Unauthorized alterations to the instrument or noncompliant use shall void all rights to any warranty claims as well as product liability and the Declaration of Conformity.

Place of use

- Only use the instruments in enclosed, dust-free rooms and between +10 °C and +40 °C. Protect the devices from oil, chemicals and extreme humidity. If using the devices outdoors, protect them from dust and moisture. Never use electrical devices outdoors.

- Electrical components must be placed at least 10 cm away from the wall and away from flammable substances.

- Avoid large temperature fluctuations, direct sunlight and vibrations. These conditions can distort micrographic images, for example.

- In warm and warm-damp climatic zones, the individual components require special care in order to prevent the build-up of fungus.

Safety Instructions (continued)

Responsibilities of person in charge of instrument

- These Safety Instructions must be available at the workplace.

Ensure that:

- The M series stereomicroscopes and accessories are operated, maintained and repaired by authorized and trained personnel only.
- All operators have read, understood and observe this User Manual, and particularly the safety regulations.

Repairs, service work

- Repairs may only be carried out by Leica Microsystems-trained service technicians.
- Only original Leica Microsystems spare parts may be used.
- Before opening the instruments, switch off the power and unplug the power cable.
- Avoid contact with powered electrical circuits, which can lead to injury.

Transport

- Use the original packaging for shipping or transporting the individual modules of the Leica M stereomicroscopy series and the accessory components.
- In order to prevent damage from vibrations, disassemble all moving parts that (according to the user manual) can be assembled and disassembled by the customer and pack them separately.

Integration in third-party products

- When installing Leica products into third-party products, the manufacturer of the complete system or its dealer is responsible for following all applicable safety instructions, laws and guidelines.

Disposal

- Once the product has reached the end of its service life, please contact Leica Service or Sales about disposal.
- Please observe and comply with the national and federal laws and regulations that are equivalent to EC directives such as WEEE.

Like all electronic devices, the microscope, its accessory components and consumables must never be disposed of with general household waste.

Legal regulations

- Observe the generally applicable statutory and country-specific regulations for accident prevention and environmental protection.

EC Declaration of Conformity

- Electrically operated accessories are constructed based on the state of the art of technology and are provided with an EC Declaration of Conformity. See page 50.

Health risks

Workplaces with stereomicroscopes facilitate and improve the viewing task, but they also impose high demands on the eyes and holding muscles of the user. Depending on the duration of uninterrupted work, asthenopia and musculoskeletal problems may occur. For this reason, appropriate measures for reduction of the workload must be taken:

Optimal arrangement of workplace, work assignments and work flow (changing tasks frequently). Thorough training of the personnel, giving consideration to ergonomic and organizational aspects.

The ergonomic design and construction of the Leica M stereomicroscopy series are intended to reduce the exertion of the user to a minimum.

Direct contact with eyepieces can be a potential transmission path for bacterial and viral infections of the eye.

The risk can be kept to a minimum by using personal eyepieces for each individual or detachable eyecups.

Safety Instructions (continued)

Light sources: safety regulations

- Light sources pose a potential irradiation risk (glare, UV radiation, IR radiation). Therefore, lamps have to be operated in closed housings and in installed condition.
- Never look directly into the beam path (blinding hazard).
- Do not select a white, strongly reflective background for the specimen.

Careful handling

- Exercise particular care when setting up the instruments. If it is specified that two or more people are required for setup, compliance with this is mandatory.
- Never spill any liquids on electrical instruments. This could cause the stereomicroscope and other equipment to become electrically live and damage people and instruments.
- Never clean instruments using corrosive cleaning agents or those containing acetone. For detailed information about care, refer to the User Manual for the instrument.
- Check the power cables regularly. Defective power cables can cause injuries.
- Wait for bulbs to cool off before changing them. Touching hot bulbs can cause burns.

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Leica S8 APO B

Congratulations!

Congratulations on obtaining your new Leica StereoZoom® line stereomicroscope (S series). We are convinced that it will more than meet your expectations. This instrument embodies all the qualities you associate with the name Leica Microsystems: excellent objectives, high-quality engineering and reliability. Furthermore, the modular design ensures that the Leica stereomicroscope adapts perfectly to your needs – no matter which accessories you require for your tasks.

Thanks to the parfocal system, you can always obtain a precise, sharp display of your microscopic specimens at both large working distances and large fields of view – from the complete image down to the finest enlarged detail.

Though the reliability and robustness of Leica stereomicroscopes is world-renowned, like any high-tech product, the Leica S series requires a certain degree of care and attention. Therefore, we recommend that you read this manual. It contains all the information you need regarding operation, safety and maintenance. Simply observing a few guidelines will ensure that even after years of intensive use, your stereomicroscope will continue to work as smoothly and reliably as on the very first day.

We wish you the best of success in your work— after all, you are now equipped with the best tool!

What Your Stereomicroscope Offers You

The optical system of the Leica StereoZoom® line consists of two beam paths converging at 12°. The objective pairs of each optical path are positioned close together, so the stereomicroscopes can be of very "slender" design, especially towards the base of the instrument. The advantages of this design are that it has a small space requirement for use on bonders and in machine applications, unobstructed access to specimens, plenty of space for tools and a completely clear view of the object field.

The Greenough system enables cost-effective correction of aberrations such as chromasia, image field curvature, and distortion with minimal effort. In the new Leica StereoZoom® line, the optimum corrected center of the objective is used for the image. This provides superior optical performance with large, level and undistorted fields of view and chromatically optimized, high-contrast images.

Photography

The StereoZoom® Leica S8 APO B model is equipped with an integrated video/phototube, allowing for easy, quick digital camera assembly (Leica MC170 HD).

Apochromatic correction

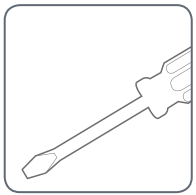
The Leica S8 APO B is a completely apochromatically corrected Greenough system. The apochromatic optics correct chromatic aberration perfectly, remove bothersome color seams and display pin-sharp images of even the finest enlarged detail. The contrast, brilliance, sharpness, resolution, color fidelity and image precision are unsurpassed. The benefit of apochromatic correction is best seen in specimens that have a fine, low-contrast structure such as large animal cells, cilia plants or metallic microelectronic structures.

The technical features are found on page 44.

On We Go

If your new Leica stereomicroscope has already been assembled and commissioned by your Leica consultant, click here to skip through the installation instructions and go directly to the Quick Start Guide on page 24.

If, on the other hand, you are assembling the stereomicroscope yourself, continue with the "Assembly" chapter, which begins on page 17.



Assembly

TL ST Transmitted Light Base

Unpacking the base

The base is delivered with the adapter plate installed. Make sure the instruments are unpacked on a flat, sufficiently dimensioned and non-slip surface.

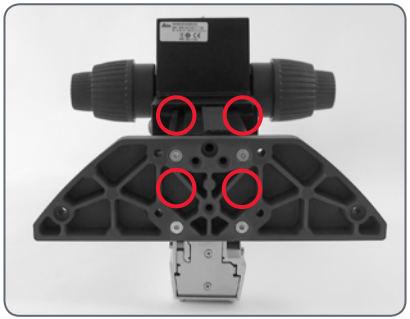
Refer also to the separately provided User Manual for the TL ST transmitted light base.

Focusing drive and column

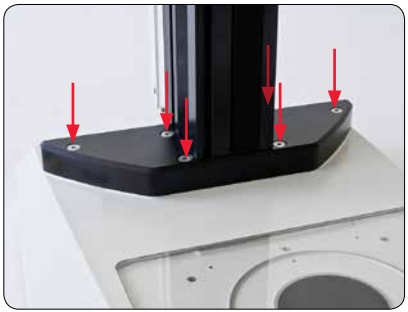
Never unscrew the 3 screws on the right side of the focusing column.

1. Unscrew the extension plate from the base using the Allen key provided.

2. Attach your focusing drive column to the bottom using the 4 Allen screws.



3. Reattach the adapter plate to its original position using the 6 Allen screws.



Optics Carrier and Additional Objective

Optics carrier

1. Insert the optics carrier carefully in the microscope carrier and fasten it in the desired position with the clamping screw.

Additional objective (optional)

1. Screw the desired objective counterclockwise into the optics carrier.

Protective objective glass (optional)

1. Screw the objective protective glass directly onto the StereoZoom® or on the additional objective.

Available Graticules

The optional graticules enable measurement and, in addition, provide valuable information when comparing and capturing still images of the specimens. Insert the graticule before you set the eyepiece in place.

Available graticules

The following graticules and stage micrometers for calibrating may be ordered:

- Graticule, 10 mm/0.1 mm
- Graticule, 5 mm/0.1 mm
- Graticule, 5 mm/0.05 mm
- Graticule, 100 div./0.002"
- Graticule, 100 div./0.001"
- Graticule, 150 div./0.0005"
- Crosshair
- Stage micrometer, 50 mm, 0.1/0.01 mm graduation
- Stage micrometer, 1", 0.001" graduation

Inserting the Graticules

The graticules can be inserted into the adjustable eyepieces and into the eyepieces for eyeglass wearers.

Fitting the graticule(s)

1. Using the stereomicroscope, determine on which side the scale is vacuum metallized. The scale must not appear reversed.

2. Remove the insert from the bottom of the eyepiece and place it on the bench with the knurled side down.

3. Hold the graticule by the edges to avoid leaving fingerprints, and push it into the holder from the side.

4. Replace the insert in the eyepiece and press it firmly into place.

5. Insert the eyepiece in the tube and turn the eyepiece in the tube to align the graticule correctly.

Eyepieces

You can combine your StereoZoom® with a fixed or an adjustable eyepiece. For equipment with a graticule for photography in one eyepiece, two adjustable eyepieces are needed. We recommend that you also equip the high-powered StereoZoom® Leica S8 APO B with two adjustable eyepieces.

Inserting the eyepieces

1. Push the eyepieces as far as they will go into the tubes.

2. Check that the eyepieces are seated firmly and precisely in place.

Risk of infection

Direct contact with eyepieces is a potential transmission method for bacterial and viral infections of the eye. The risk can be kept to a minimum by using personal eyepieces for each individual or detachable eyecups.

Mounting a Camera

The Leica S8 APO B is equipped with an integrated video/phototube, which allows the simple, fast mounting of digital cameras for photos and video. Ask your Leica sales representative for more details.

Installing the camera

1. Remove the protective dust cover from the video/projection lens (C-mount adapter) and the microscope camera.

2. Screw the camera into the video/projection lens (C-mount).

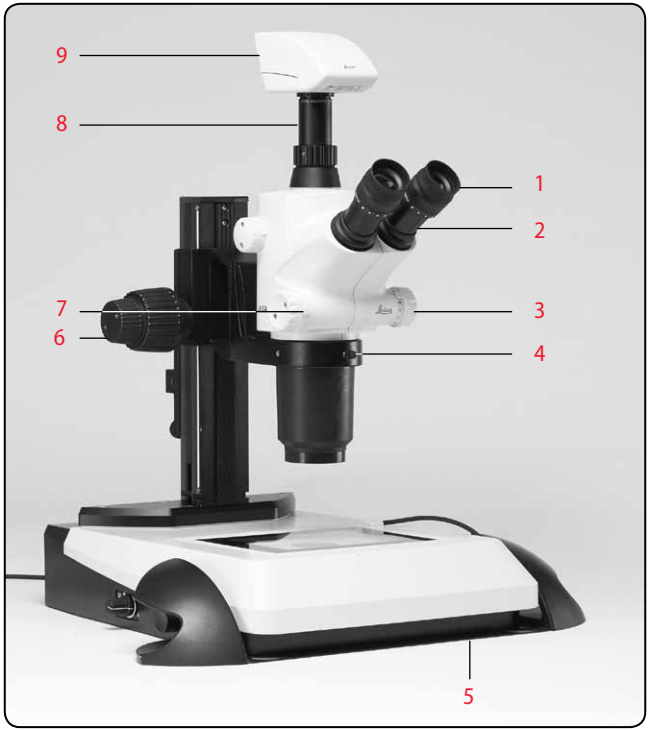
3. Insert the unit into the video/photo output of the stereomicroscope and screw it in.

Always close the video/photo output with the protective dust cover if no camera is installed.

Quick Start Guide

Overview of the Leica S8 APO B

1 *Eyepieces*
2 *Adjustable tubes: Interpupillary distance adjustable from 55 – 75 mm*
3 *Magnification changer, right drive knob with magnification scale*
4 *Fixing screw for optics carrier in the microscope carrier*
5 *TL3000 ST transmitted light base*
6 *Focusing drive*
7 *Stop for zoom limit*
8 *C-mount adapter and video/photo tube*
9 *Leica MC170 HD camera kit (optional)*



Tips for Working Ergonomically

Align your stereomicroscope optimally. You must configure the settings described here precisely in order to be able to take full advantage of its outstanding optical and ergonomic advantages.

- Align your workstation optimally. Consider the height of the bench and chair.
- Use the whole seat surface and the backrest.
- Ensure that your lower arms are supported.
- When carrying out other tasks, perform exercises to relax and relieve muscle tension.

Using the Eyepieces

The eyepieces form the connection between the tube and the eye of the observer. Simply push them into the tube and they are ready to use.

What does "parfocal" mean?

"Parfocal" means that a specimen continues to remain exactly in focus, even if the magnification on the stereomicroscope is modified. All stereomicroscopes from Leica Microsystems are parfocally matched. However, the parfocality requires a personal dioptric correction for the user.

Dioptric correction

In order to parfocally match the stereomicroscope, at least one eyepiece with dioptric correction is necessary. The setup is described on the following pages:

- With two adjustable eyepieces: from page 35.

If you do not wear glasses:

Depending on the preferences of the observer, eyecups can be used.

To avoid eye infections, we recommend that every user uses his or her own pair of eyecups.

If you wear glasses:

Eyeglass wearers must remove or fold back the eyecups (Fig. below left), as otherwise they cannot see the entire field of view.

The Correct Interpupillary Distance

The interpupillary distance is correctly set if you see a single circular image field when looking at a specimen.

If you are still a novice microscope user, you may need a short time to become accustomed to this. Not to worry—after a little while, it will become automatic.

Reference values

The interpupillary distance can be set between 55 and 75 mm.

An "exit pupil distance" is the distance between eye and eyepiece. With the 10×/23B wide-field eyepiece for eyeglass wearers, it is approx. 22 mm. For those who do not use the eyepiece for eyeglass wearers, it is 12 mm.

Adjusting the interpupillary distance

1. Bring the eyes slowly to the eyepieces.

2. Push the tubes together or apart with both hands until you see a single round, circular image field without shadows with both eyes.

Focusing

Focusing raises and lowers the stereomicroscope using the focusing drive. The specimen detail is brought into sharp focus as soon as it is in the focal point of the objective.

The focusing drive can be operated either left- or right-handed.

Focusing

1. Align the specimen under the objective.

2. Set the lowest magnification level.

At the lowest magnification, the desired specimen detail can be easier to localize due to the large field of view.

3. Look into the eyepieces and insert the desired specimen detail in the center.

4. Focus on the specimen with the drive knob.

Changing Magnification (Zooming)

All stereomicroscopes of the S series allow a continuous magnification change. The magnification changer can be operated with the left and the right hand. The image scale is shown on the right drive knob.

The basis for the calculation of the total magnification and the field of view can be found on page 48.

Changing magnification

1. Look into the eyepieces.
2. Focus on the object (see page 29).
3. Rotate the magnification changer until the desired magnification is configured.

Limiting Zoom Range

The zoom range can be limited above and below. In the same manner, a fixed magnification level can be set. The following example shows the limit to the range between 1 to 3.2.

Defining the lower limit

1. Loosen the Allen screws on the left drive knob with the Allen key provided.

2. Turn the right drive knob to position "1".

3. Set the stop on the left drive knob forward until it touches the built-in zoom stop.

4. Carefully tighten the Allen screw.

Continued on next page.

Limiting Zoom Range (continued)

Defining the upper limit stop

1. Loosen the Allen screws on the right drive knob with the Allen key provided.

2. Turn the right drive knob to position "3.2".

3. Set the stop backward on the right drive knob until it touches the built-in zoom stop.

4. Carefully tighten the Allen screw.

Regulating the resistance of the focusing drive

Adjusting the resistance

Is the focusing drive too loose or too tight? Does the equipment tend to slide downwards? The resistance can be adjusted individually depending on the equipment weight and personal preferences as follows:

1. Grip the outer drive knobs with both hands and turn them towards each other until the desired resistance is reached during focusing.

Changing the position of the optics carrier

The optics carrier can be turned sideways in the microscope carrier if the user wants to work from the side.

Changing position

1. Unscrew the clamping screw.

2. Turn the optics carrier laterally to the desired position.

3. Carefully tighten the clamping screw.

Dioptric Correction with Two Adjustable Eyepieces

If you set the diopters on the adjustable eyepiece exactly as described, the image will remain equally sharp and constant (parfocal) from the lowest to the highest magnification. This means you do not have to refocus when changing magnification. The focus needs to be readjusted only if you want to view a specimen detail that is located higher or lower. Use this advantage as often as possible, it is not available on all stereomicroscopes.

The diopters can be set between +5 and -5.

The following adjustments have to be carried out only once by each user. Using graticules leads to slightly deviated settings, which are described in the user manuals for the graticules.

Adjusting the diopter settings

1. Turn the rotary knob to the "Vis" position.

2. Turn the dioptric correction on both eyepieces to the center position.

Continued on next page

Dioptric correction with two adjustable eyepieces (continued)

3. Place a flat specimen under the objective.

4. Set the lowest magnification level.

5. Observe the specimen through the eyepieces and bring it into sharp focus with the focusing drive.

6. Set the highest magnification level.

7. Optimize the focusing with the focusing drive.

8. Set the lowest magnification level.

9. Turn the eyelens of the eyepiece as far as it will go in the "+" direction, without looking into the eyepieces while doing so.

10. Look through the eyepieces and close one eye.

11. With the other eye, monitor the specimen and turn the eyelens of the eyepiece slowly in the "–" direction, until this eye sees the specimen sharply.

12. Repeat steps 10 and 11 with the other eye.

Continued on next page

Dioptric correction with two adjustable eyepieces (continued)

Checking parfocality

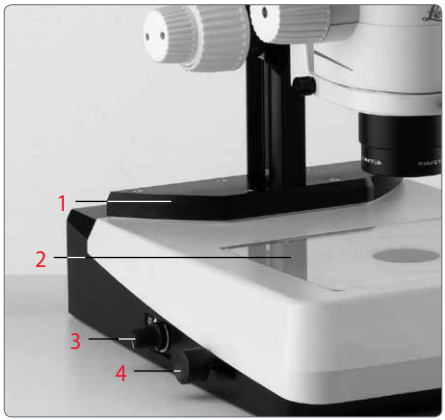
1. Select the highest magnification level.

2. Observe the specimen; if necessary, refocus it slightly.

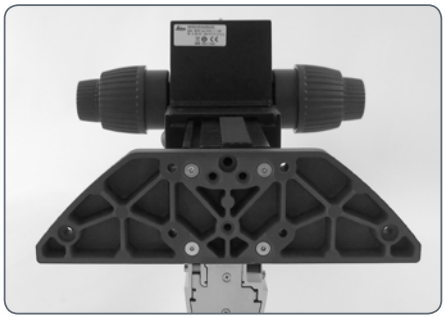
3. Change from the highest to the lowest magnification. The sharpness should be constant (parfocal). If this is not the case, repeat this procedure.

Leica TL ST Transmitted Light Base: Controls

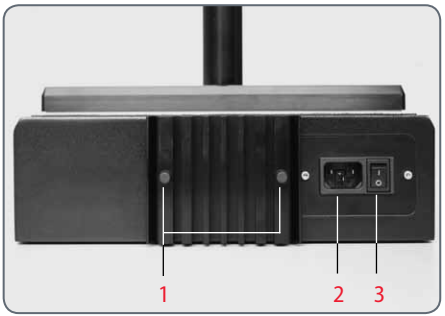
Refer also to the separately provided User Manual for the TL ST transmitted light base.



1 *Adapter plate for easy assembly of focusing drives*
2 *Removable glass plate*
3 *Controller for light intensity*
4 *Adjustment for path-folding mirror*



Extension plate of the transmitted light base TL ST



Rear side of the transmitted light base TL ST
1 *Screws for changing the halogen lamp*
2 *Power connection socket*
3 *Main power switch*

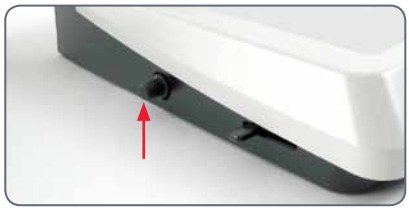
Leica TL ST Transmitted Light Base: Operation

Light intensity control
The left control adjusts the intensity of the 12 V/20 W halogen illumination.

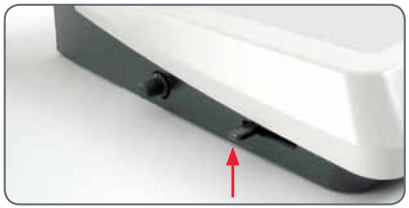
1. Switch on the illumination of the base at the power switch.

3. Focus on the specimen.

3. Set the illumination to the desired intensity using the left control.



Transmitted light control
The transmitted light base TL ST has a slider that automatically moves the path-folding mirror in the base when moved. The mirror is kept in the correct position at all times and permits smooth changeover between bright field and opaque transmitted light.



Bright field
Bright field is suitable for examining translucent objects featuring contrasting structures. The object is directly illuminated from below and is seen in its natural colors against a bright background.

- Move the slider backwards until the desired effect is achieved.

Inclined transmitted light
Transmitted light that traverses the object obliquely will provide additional resolution and information when observing semitransparent, opaque objects.

- Slowly pull the slider towards yourself until the desired effect is achieved.

Leica TL ST Transmitted Light Base: Lamp Replacement

Changing the halogen lamp

Before you change the lamp, it is absolutely necessary to unplug the power plug from the base to prevent the risk of electric shock!

The halogen lamp becomes very hot during operation. Therefore, to avoid being burned, let the base cool off for approx. 10 minutes after switching it off!

Do not touch new halogen lamps with your bare fingers – this drastically reduces the service life of the lamp!

Changing lamps

1. Unscrew the two screws on the cooling unit and pull the cooling unit out, along with the lamp.

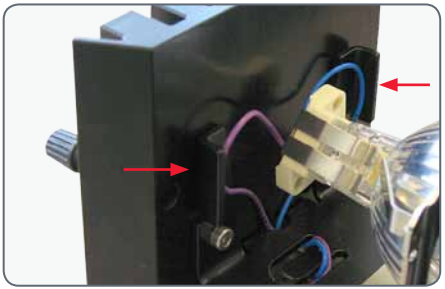
2. Carefully pull out the lamp and mount by pulling them upwards.

3. Disconnect the lamp from the mount.

4. Insert the new lamp into the mount and reinsert the lamp holder.

Safety precautions

When inserting the lamp, ensure that the cables are inside the two metal clamps. This prevents the cables from getting caught during insertion.



Photography with the Leica S8 APO B

The observation beam path and the photobeam path can be switched. For this, the light splitting is influenced as follows:

- "Vis" position: 100% light in both eyepieces, but no light in the video/photo beam path
- "Doc" position: 100% light in the right eyepiece, but no light in the left eyepiece. 100% of the light crosses the video/photo beam path

The focusing and the framing are done with the left eyepiece (video/photo beam path).

Flat specimens are sometimes blurry on the left and right edge of the image. This blurring is based on laws of optics and does not mean there is a malfunction of the camera or the microscope.

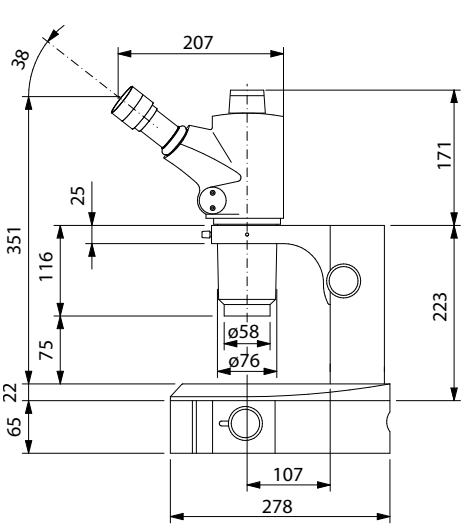
Capturing images and videos

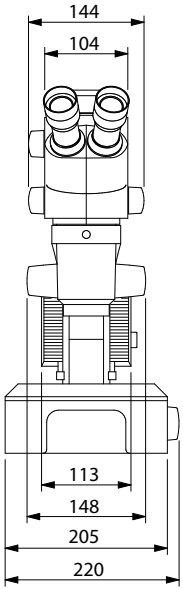
1. If the image detail and image sharpness are set to your satisfaction, switch on the "Doc" setting and capture your image.

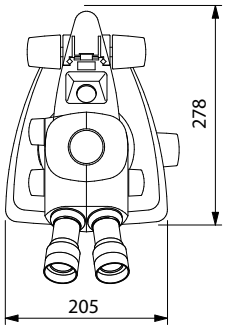
The images captured with the camera may not be used for diagnosis. In this case, an evaluation with the eyepieces is required.

Dimensional Drawings in mm

Leica S8 APO B with Transmitted Light Illumination







Technical Data

Technical Data

StereoZoom®	Leica S8 APO
Optical system, lead-free	12°-Greenough using best-corrected central part of the objective
Zoom	8:1, apochromatic
Viewing angle	38°
ESD protection	Antistatic
Specific surface resistivity	2×10^{11} Ω/square, discharge time <2 seconds from 1000 V to 100 V
Magnification (basic configuration)	10×– 80×
Maximum resolution	600 lp/mm
Maximum numerical aperture	0.2
Working distance (basic config.)	75 mm
Object field diameter	23 mm
Adjustable zoom limits	2
Video/photo outlet, switchable	100% visual or 100% video/photo and 100% visual in the left eyepiece
Image acquisition, coax lighting.	Yes
Standard objectives, lead-free	Apochromats 0.63×, 1.6×, 2.0× Achromat 0.32×
Ergonomic eyepieces, fixed and adjustable, with cups	10×/23, 16×/15, 25×/9.5, 40×/6
Interpupillary distance	55–75 mm

Leica TL ST Transmitted Light Base

Light source	Halogen lamp 12V/20W
Quick illuminant change	Yes
Illuminated area	50 mm
Power supply	Input voltage 100 – 240 V~, frequency 50/60 Hz Energy consumption 30 W max. Ambient temperature 10 – 40 °C
Connections	Power plug
Weight	7.4 kg

Illumination modes

Bright field	Yes
Dark field	Yes (single-sided)
Oblique light	No
Relief Contrast System (RC™)	No
CCIC (Constant Color Intensity Control)	No
Internal shutter/lamp control	No
Integrated filter holder	Yes
Coated optics for increasing the color temperature	Yes
Matching of high num. aperture	No
Remote control options	No
AntiShock™ Pads	Yes
Dimensions (W×H×D)	340×430×85 mm

Appendix

Calculating the Total Magnification/Field of View Diameter

Parameters

M_O	Magnification of the additional objective
M_E	Magnification of eyepiece
z	Magnification changer position
N_{FOV}	Field number of the eyepiece. Field numbers are printed on the eyepieces: 10×/**23**, 16×/**16**, 20×/**12**, 10×/**23**B, 16×**14**B, 25×/**9.5**B, 40×**6**B.

Example

M_O	Additional objective 1.6×
M_E	20×/12 eyepiece
z	Zoom position 4.0

Magnification in the binocular tube

$$M_{TOT\ VIS} = M_O \times M_E \times z$$

or

$$1.6 \times 20 \times 4 = 128$$

Calculation example: field of view diameter in the specimen

$$\varnothing\ OF: \frac{N_{FOV}}{M_O \times z} = \frac{12}{1.6 \times 4} = 1.9\ mm$$

Troubleshooting

The field of view is shadowed

- Adjusting the correct Interpupillary Distance (page 28).

The image goes out of focus.

- Inserting the eyepieces correctly (page 22).
- Perform diopter correction exactly according to the instructions (from page 35).

The focusing drive gradually sinks on its own or is difficult to turn.

- Regulate the ease of movement (page 33).

In the case of failures of electrically operated devices, always first check:

- Is the voltage selector set correctly?
- Is the main power switch switched on?
- Is the power cable connected correctly?
- Are all connecting cables attached correctly?
- Are the fuses intact?

Photos are blurry.

- Focus accurately (page 29).
- Bring the graticule into sharp focus and perform diopter correction exactly according to the instructions (page 35).
- Insert the eyepieces correctly up to the stop (page 22).
- Check that the graticules are securely in place in the eyepiece (page 21).

The image from the camera stays black

- Switch the beam splitter on the photo tube to the "Doc" setting (page 41).

Care, Maintenance, Contact Persons

We hope you enjoy using your stereomicroscope. Leica devices are renowned for their robustness and long service life. Observing the following care and cleaning tips will ensure that even after years and decades, your Leica stereomicroscope will continue to work as well as it did on the very first day.

Warranty benefits

The guarantee covers all faults in materials and manufacture. It does not, however, cover damage resulting from careless or improper handling.

EC Declaration of Conformity

To download the EC Declaration of Conformity, use this link

http://www.leica-microsystems.com/products/stereo-microscopes-macroscopes/research-manual/

Select the microscope type and go to the "Download" page.

Care

- Protect your stereomicroscope from moisture, fumes and acids and from alkaline, caustic and corrosive materials and keep chemicals away from the instruments.
- Plugs, optical systems and mechanical parts must not be disassembled or replaced, unless doing so is specifically permitted and described in this manual.
- Protect your stereomicroscope from oil and grease.
- Do not grease guide surfaces or mechanical parts.

Protection from dirt

Dust and dirt will affect the quality of your results.

- Put a dust cover over the stereomicroscope when it will not be used for a long time.
- Use dust caps to protect tube openings, tubes without eyepieces, and eyepieces.
- Keep accessories in a dust-free place when not in use.

Cleaning polymer components

Some components are made of polymer or are polymer-coated. They are, therefore, pleasant and convenient to handle. The use of unsuitable cleaning agents and techniques can damage polymers.

Permitted measures

- Clean the stereomicroscope (or parts of it) using warm soapy water, then wipe using distilled water.
- For stubborn dirt, you can also use ethanol (industrial alcohol) or isopropanol. When doing so, follow the corresponding safety regulations.
- Remove dust with a pneumatic rubber bulb and a soft brush.
- Clean eyepieces and objectives with special optics cleaning cloths and pure alcohol.

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