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General Instructions

Safety concept

Before using your stereomicroscope for the first time, please read the "Safety concept" brochure included with your instrument. It contains additional information about handling and care.



Use in clean rooms

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

About 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 specimens 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.

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.

Symbols Used

Warning of a danger



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.



Safety Instructions

Description

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

Intended use

- Refer to "Safety Concept" booklet

Non-intended use

- ~~Refer to "Safety Concept" booklet.~~

Never use S series microscopes or their components for surgical procedures (e.g. on the eye) unless they are specifically intended for that purpose.

The devices and accessories described in this User Manual have been tested with regard to 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

Safety Instructions (continued)

Repairs, service work

- Refer to "Safety Concept" booklet
- Only original Leica Microsystems spare parts may be used.
- Before opening the instruments, switch off the power and unplug the power cable.



Touching the live circuit can cause injury.

Transport

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

Integration in third-party products

- Refer to "Safety Concept" booklet

Disposal

- Refer to "Safety Concept" booklet

Legal regulations

- Refer to "Safety Concept" booklet

EC Declaration of Conformity

- Refer to "Safety Concept" booklet

Safety Instructions (continued)

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:

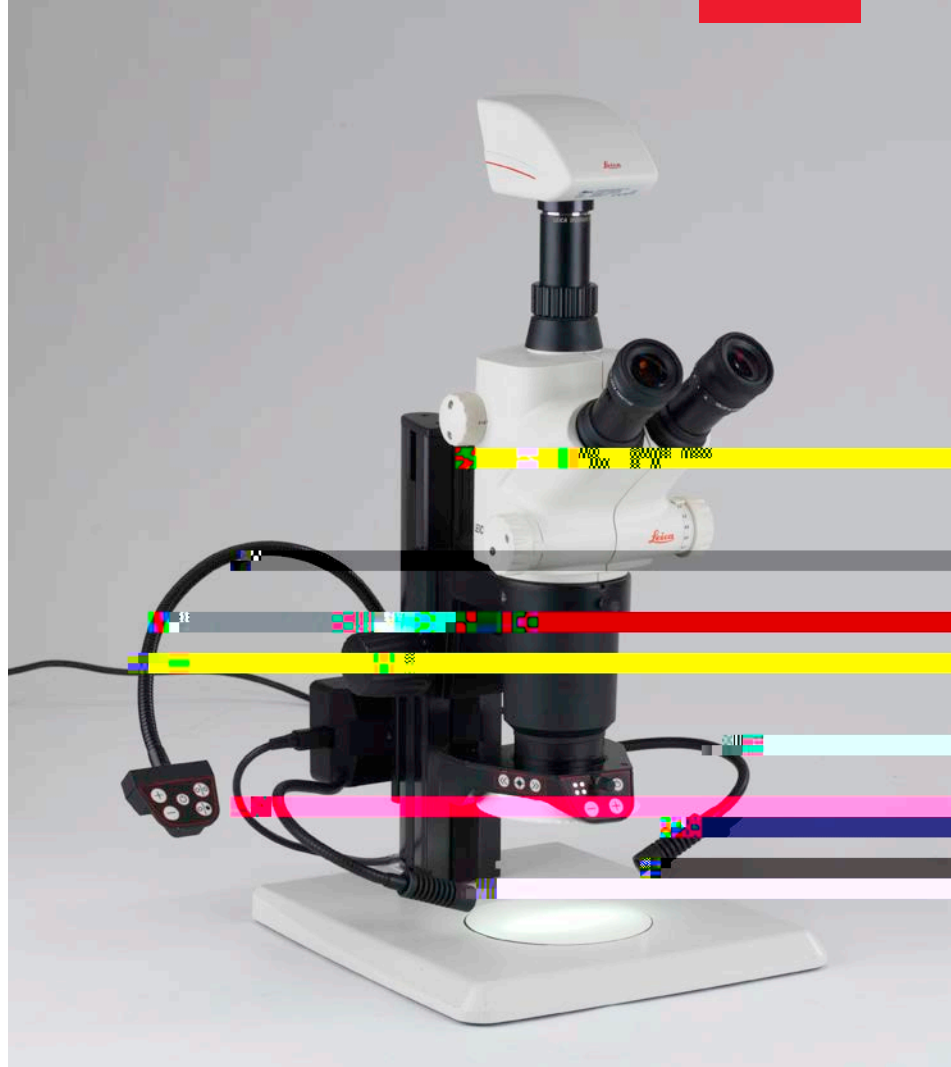
- Optimal arrangement of workplace, work assignments and work flow (changing tasks frequently).



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Leica S series



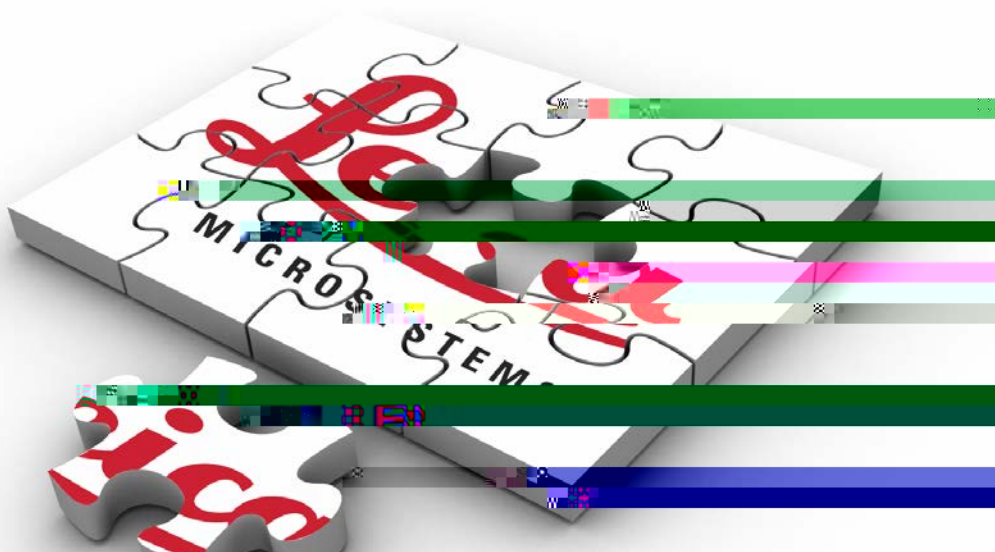
Congratulations!

Congratulations on obtaining your new Leica StereoZoom® line stereomicroscope (S series). We are convinced it will exceed your expectations, as this instrument embodies all the qualities you associate with the name

The Modular Design: Everything is possible

Have a special request? Let us know!

Leica Microsystems enjoys an exceptional reputation when it comes to devising customer-specific solutions. If you have a special request that cannot be met with standard parts, contact your Leica consultant. He or she has a solution for every application.



What your stereomicroscope has to offer 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 advantage: 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.

ESD protection

The Leica S4 E, S6 E, S6, S6 D and S8 APO, including its cold light source and stand, is made from highly conductive material with surface resistivity of $2 \cdot 10^{11}$ Ohm/square, with a discharge time of <2 seconds, 1000 V to 100 V.

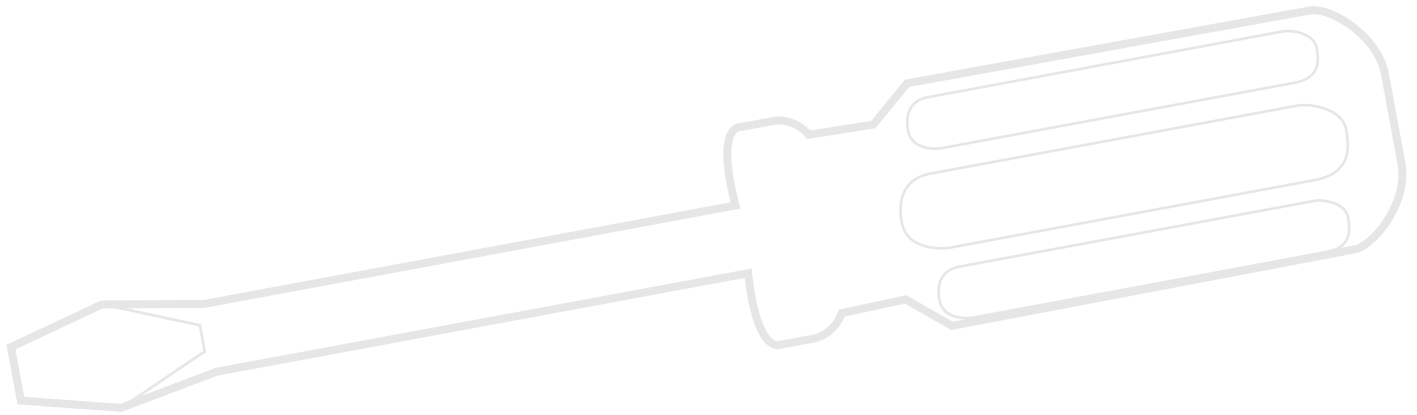
The Leica S6 T terminator version for highly complicated working ranges and the T incident light stand consist of a dissipative material with a surface resistivity of $10 \text{ de-D} \cdot 10^{-10} \text{ DE}$ with

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 Page](#)



Assembly



Focusing column



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



Focusing column on the incident light base


1. Remove the stage plate.



2. Route the 3 hollow screws from below through the base plate and screw these securely into the focusing column.



3. Insert the stage plate back into place.

- 
1. Remove the glass stage plate.
 2. Pull the locking mechanism forward.
 3. Set the incident-light stand to the sub-base for transmitted light and engage it with the connection screw.
 4. Press the locking mechanism backward. The incident light base and the sub-base for transmitted light are now connected.

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 objective 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"
- Crosshairs
- Stage micrometer 50 mm, 0.1/0.01/ mm graduation
- Stage micrometer 1", 0.001" graduation

Inserting graticules

 Graticules can be inserted in the adjustable eyepieces and the in the eyepieces for eyeglass wearers.

 The procedure for taking measurements is described in the "Measuring" user manual.

Inserting graticule(s)

1. Use the stereomicroscope to determine the side on which the scale is inscribed. 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

i You can use your Leica StereoZoom® together with a fixed or adjustable eyepiece. For models in which a graticule is included in an eyepiece for measurement or photography, two eyepieces are necessary. We recommend that you also equip the high-powered StereoZoom® Leica S8 APO with two adjustable eyepieces.

Inserting the eyepieces

1. Push 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

i 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.

Leica LED illumination

 The Leica KL300 LED cold light source with its fiber-optic light guides is ideally suited for the Leica S4 E, S6 E, S6 and S6 T stereomicroscopes. A number of matching adapters are available for connecting the Leica KL300 LED cold light source to various stereomicroscope stands and for stand-alone operation.

For detailed information about installation and use, please refer to the user manual for the Leica KL300 LED.

 Please note that the universal light guide on the Leica S8 APO can only be used with the light arm mounted on the side.

High-output illuminators



For higher demands, such as photography or in use combination with the Leica S8 APO, we offer different high-performance transmitted light stands and LED incident light illumination, as in the Leica LED3000 series, for example. Please ask your Leica consultant about the options.







Quick Start Guide

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.


Ergonomic objectives

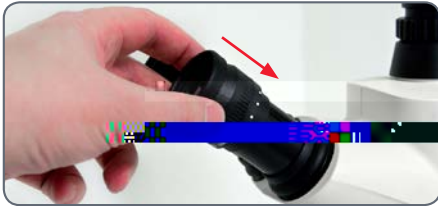
The ErgoObjective for the Leica S4 E and all S6 models provides for fatigue-free work. The ErgoObjective 0.6 – 0.75 \times with an adjustable working distance of 77 – 137 mm and the ErgoObjective 0.7 – 1.0 \times with an adjustable working distance of 48 – 98 mm allow the fine adjustment of the working distance, the magnification and the viewing level without time-consuming changing of lenses.

The Leica S6, with a 60° viewing angle, offers optimum viewing height on the inclined stereomicroscope.




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 one adjustable and one fixed eyepiece: from page [37](#).
- With two adjustable eyepieces: from page [40](#).

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

 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.



Limiting zoom range

With the S6 models and the S8 APO, the zoom range can be limited at the top and bottom. 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 hollow screw 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.

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.





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.





Diopter settings and parfocality: 1 adjustable & 1 fixed eyepiece (continued)

Checking parfocality

1. Select the highest magnification level.
2. Monitor 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.

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

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.

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Photography & Video

For most stereomicroscope users, digital documentation has become an invaluable part of their work. Research results can be presented in an appealing form, while measurements on the digital image provide clarity.

Adapters

If camera control using the Leica Application Suite is not required, conventional mirror reflex and rangefinder cameras from third-party manufacturers can be used. Leica Microsystems offers various adapters for these.

Leica DFC cameras

If you require absolute control over the camera and need the capability for measurement, evaluation and more in addition to photography, the digital Leica DFC cameras are exactly right for you. Together with the Leica Application Suite, they provide virtually limitless freedom of use. For additional information about Leica cameras, refer to the camera's documen



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

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



Dimensional drawings in mm

Leica S6



Leica S6 D with incident light and transmitted light illumination







Appendix

Calculating the total magnification/field of view diameter

Parameter

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×/23B, 16×14B, 25×/9.5B, 40×6B.

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

$$OF: \frac{N_{FOV}}{\quad} = \frac{12}{\quad}$$



Care, Maintenance, Contact Persons (continued)

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 or with a soft brush.
- Clean objectives and eyepieces with special optic cleaning cloths and with pure alcohol.

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