



Instruction Manual
ZEISS SteREO Discovery Series
Stereo Microscope



ZEISS SteREO Discovery Series

Original Manual

Document Title: Instruction Manual ZEISS SteREO Discovery Series

Order Number: 435001-7011-101

Revision: 2

Language: en-US

Effective from: 07/2026



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1 Contact and Addresses

ZEISS Contact Find your contact at ZEISS Microscopy at www.zeiss.com/microscopy/contact.



ZEISS Academy For information on microscopy courses, training, and education visit the ZEISS Academy Microscopy at www.zeiss.com/microscopy-training.



Legal Manufacturer



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Carl-Zeiss-Promenade 10
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Authorized Representatives, Importers, etc. This section informs about responsible entities for certain obligations in the identified country or jurisdiction.

EU



Carl Zeiss Microscopy GmbH
Carl-Zeiss-Promenade 10
07745 Jena
Germany

UK Importer

Carl Zeiss Ltd
1030 Cambourne Business Park, Cambourne
CB23 6DW Cambridge
United Kingdom

Report of Serious Incidents Any serious incident that has occurred in relation to the microscope and its components shall be reported to these institutions:

- the competent authority of the country in which the user is established
- Carl Zeiss Microscopy GmbH, Jena, Germany

2 About this Instruction Manual

This Instruction Manual (further called "document") is considered to be part of the SteREO Discovery.V8, SteREO Discovery.V12 and SteREO Discovery.V20, herein after referred to as "microscope".

This document contains basic steps and safety information that must be observed during operation and maintenance. Therefore, the document must be read by the operator prior to commissioning and must always be available at the place of use of the microscope.

This document is an essential part of the microscope and, if the microscope is resold, the document must remain with the microscope or be handed over to the new owner.

2.1 Text Conventions and Link Types

Explanation	Example
Hardware controls and elements.	Press the Standby button.
Link to further information within this document.	See: <i>Text Conventions and Link Types</i> [▶ 8].
Link to a website.	https://www.zeiss.com

2.2 Explanation of Warning Messages and Additional Information

DANGER, WARNING, CAUTION, and NOTICE are standard signal words used to determine the levels of hazards and risks of personal injury and property damage.

Always observe the safety and warning messages in **all** chapters of this document. Failure to comply with these instructions and warnings may result in personal injury, property damage, and the loss of any claims for damages.

The following warning messages indicating dangerous situations and hazards are used in this document.

DANGER

Type and source of danger

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Type and source of danger

WARNING indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

CAUTION

Type and source of danger

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE**Type and source of danger**

NOTICE indicates a potentially harmful situation which, if not avoided, may result in property damage.

Info

Provides additional information or explanations to help the user better understand the contents of this document.

2.3 Explanation of Symbols



CE marking (Conformité Européenne)



UKCA marking (UK conformity assessed)



Manufacturer



WEEE label: Do not discard as unsorted waste. Send to separate collection facilities for recovery and recycling

2.4 Further Applicable Documents

Brochures and Certificates For brochures, declarations of conformity, and other approval certificates ask your ZEISS Sales & Service Partner.

Local and National Health and Safety Regulations Observe local and national health and safety regulations for the location of installation and during the use of the microscope.

Consult with your ZEISS Sales & Service Partner if these regulations are in conflict with the installation requirements of the microscope.

Software For detailed information on how to use the software, refer to its manual (e.g. Online Help, Software Manual) or ask your ZEISS Sales & Service Partner.

System and Third-Party Components, Accessories Information about the individual components, enhancements, and accessories can be obtained from your ZEISS Sales & Service Partner. Also refer to the documentation of third-party manufacturers.

Instruction Manuals Also observe the following ZEISS instruction manuals:

- ZEISS Sycop 3 - System control Panel for Zoom and Stereo Microscopes
- ZEISS EMS 3 - Electronic Module for Stereo and Zoom Microscopes
- ZEISS Intermediate tubes, e.g: Intermediate LED tube S, Drawing tube S, Co-Observation Equipment S, Oblique-view module S 0,3x with LED ring light
- ZEISS Mechanical / Measuring stage S mot
- External light sources and LED illuminators, e.g: CL 6000 LED, CL 9000 LED CAN, CL 1500 HAL, Vertical Illuminator S, VisiLED Series, EasyLED Spotlight Plus, High Power Ringlight HPRL
- Fluorescence excitation light sources, e.g: HXP 200C, HXP 120 V, X-Cite XYLIS II®
- Alternative stands, e.g: Stand SDA, Floor Stand, Stand U, Stand B, Stand M LED
- ZEISS SVB 1 - Signal distribution box
- ZEISS Axiocam cameras
- ZEN Software Description (online version)

Many of these instruction manuals can be found in the [ZEISS Portal](#).



3 Safety

This chapter contains general requirements for safe working practices. Any person using the microscope or commissioned with installation or maintenance must read and observe these general safety instructions. Knowledge of basic safety instructions and requirements is a precondition for safe and fault-free operation. Operational safety of the supplied microscope is only ensured if it is operated according to its intended use.

If any work is associated with residual risks, this is mentioned in the relevant parts of this document in a specific note. When components must be handled with special caution, they are marked with a warning label. These warnings must always be observed.

Improper use of the microscope and its components can easily lead to impairment of their function or even damage them. Damage caused by incorrect operation, negligence, or unauthorized intervention, in particular by removing, modifying, or replacing parts of the microscope or its components, cannot be held liable by the device manufacturer. Third-party devices or components that are not expressly approved by ZEISS may not be used.

Any serious incident that has occurred in relation to the microscope and its components shall be reported to these institutions:

- the competent authority of the Member State in which the user is established
- Carl Zeiss Microscopy GmbH, Jena, Germany

3.1 Intended Purpose

The SteREO Discovery stereomicroscopes are instruments for the magnified, stereoscopic observation and 2D image documentation of small objects.

The microscopes are primarily used in biological laboratories, industrial manufacturing and quality assurance as well as forensics.

They are used for observing, testing, preparing, assembling, sorting and microsampling (dissection, stimulation, manipulation) of objects and specimens of various types and conditions.

SteREO Discovery is intended for use in research and routine applications.

It is not intended to directly or indirectly generate medical diagnostic results.

SteREO Discovery microscopes include:

- SteREO Discovery.V8
- SteREO Discovery.V12
- SteREO Discovery.V20

3.2 General Safety Information

This document must be read before commissioning in order to ensure safe and uninterrupted operation. Pay particular attention to all listed safety notes. Make sure, that

- the operating personnel has read and understood this manual, associated documents and particularly all safety regulations and instructions, and applies them.
- the local and national safety and accident prevention regulations must be observed, as well as the applicable laws and regulations in your country.
- this document is always available at the place of use of the microscope.
- the microscope is always in perfect condition.
- in case of defect or damage, the affected parts and the microscope are taken out of operation immediately and are secured against unintentional use.
- maintenance and repair work, retrofitting, removal or replacement of components, as well as any other intervention in the microscope not described in this document, may only be carried out by the manufacturer ZEISS or persons expressly authorized by ZEISS to do so.

3.2.1 Requirements for Operators

The microscope, components, and accessories may only be operated and maintained by authorized and trained personnel. The microscope may only be used in accordance with this document. If the microscope is not used as described, the safety of the user may be impaired and/or the microscope may be damaged.

Any unauthorized intervention or use other than within the scope of the intended use shall void all rights to warranty claims. The regional regulations on health protection and accident prevention must be observed at all times and during all work on and with the microscope.

3.2.2 Safe Operating Condition

If circumstances occur which impair safety and cause changes in operating behavior, the microscope and its components must be shut down immediately and a ZEISS service representative should be informed.

The microscope may only be operated if the operating conditions are adhered to.

- Do not operate the microscope and its components until you have completely read and understood the entire documentation.
- Make sure that all protective cover panels are installed and all warning labels are available and legible.
- Ensure conditions and take measures to prevent the build up of electrostatic charge on the workplace.

3.2.3 Order and Use of Spare Parts

Using spare parts that are not provided by ZEISS can be hazardous or can lead to property damage.

- Unless authorized by ZEISS, all spare parts should be installed by a ZEISS service representative.
- Contact your ZEISS service representative for information on spare parts order.
- Only genuine parts supplied by ZEISS are to be used in servicing the microscope and its components.

3.2.4 EMC Information

The microscope is intended to be used in a basic electromagnetic environment.

The microscope complies with the emission and immunity requirements as a CISPR 11 / EN 55011 / class A group 1 system according to IEC 61326-1. Emissions, which exceed the levels required by CISPR 11 / EN 55011, can occur when the microscope is connected to other devices.

External interferences such as electrostatic discharge can interrupt the function of the illumination unit X-Cite XYLIS II®. This is not a defect. Correct function can be restored by restarting the illumination unit. There is no damage to the illumination unit. In this case it may help to remove the source of interference from the vicinity of the illumination unit.

External interferences such as conducted disturbances induced by RF fields, surges, or electrical fast transients (bursts) can interrupt the function of the X-Cite XYLIS II® illumination unit. This is not a defect. Correct function can be restored by restarting the illumination unit. There is no damage to the illumination unit. In the case of conducted disturbances induced by RF fields, it may be helpful to remove the interference source from the immediate vicinity of the light source. In the case of conducted disturbances induced by surges or electrical fast transients (bursts), transient protection is a possible protective measure.

The following EMC user notice is for Korea only:

기종별	사용자안내문
A급기기(업무용방송통신기자재)	이기는업무용(A급) 전자파적합기기로서 판매자또는사용자는이점을주의하시기바라며, 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

3.2.5 Optical Risk Grouping

According to IEC 62471 sources of optical radiation are classified into risk groups subject to their potential photobiological hazard. Sources are classified into the following four groups according to hazard, based on the emission limit as well as permissible exposure time before hazard exceeded.

Risk group	Description
Exempt	No photobiological hazard.
1 (low risk)	No hazard due to normal behavioral limitations on exposure.
2 (moderate risk)	No hazard due to the aversion response to very bright light sources or thermal discomfort.
3 (high risk)	Hazardous even for momentary exposure.

The following table lists the risk grouping of the available light sources/illumination units according to the mentioned standard:

Fiberoptic light sources

Light source/Illumination unit	Risk group
CL 1500 HAL	2
CL 6000 LED	2
CL 9000 LED CAN	2
HXP 200C	2
HXP 120 V	2
X-Cite XYLIS II®	3

Direct LED illuminators

Light source/Illumination unit	Risk group
VisiLED ring light series (S80-55BF, S80-25BF, S40-10DF, slim ringlight)	1
VisiLED transmitted light BF	1
EasyLED Spotlight Plus	1
High Power ringlight HPRL	Exempt
High power LED double spot	Exempt

3.3 Prevention of Hazards

This section summarizes potential hazards and recommended safety precautions. Failure to follow the safety instructions and instructions may result in personal injury and property damage.

3.3.1 Mechanical Hazards

Crushing Hazards due to Motorized Components

The microscope contains motorized components. Fingers could be trapped. Do not reach into the working area of motorized components when they are in operation.

Automatic travel of the motor focus can be interrupted by pressing the **STOP** button on the motor focus or by moving the knurled wheel on the HIP up and down.

The lower limit switch of the motor focus must always be correctly adjusted to prevent the objective from colliding with the stage or the sample.

3.3.2 Electrical Hazards

Voltage Hazards

Risk of electric shock in case of contact with live parts.

- Detachable mains supply cords must not be replaced with inadequately rated cords.
- Disconnect all power cords before cleaning.
- Only connect electrical systems that are authorized by ZEISS to the supplied power supply cord.
- Set up and operate the microscope so that the connectors are easily accessible.
- Position the microscope in a way so that you can easily unplug the power cord at any time.
- The microscope must be plugged into a properly installed power socket with protective earth contact using the supplied mains cords. The protective earth connection must not be impaired by the use of extension cables.
- Always use the power cords supplied by ZEISS. When an unsuitable power cord is used, ZEISS can no longer guarantee the electrical safety and functionality of the microscope.
- Shut down the microscope when not using the microscope.
- Safe disconnection from the power supply is only ensured by pulling out the power cord. The switch on the microscope only switches to standby mode.

3.3.3 Thermal Hazards

Burning Hazards

Hot surfaces, radiation and/or aggressive chemicals can cause burns.

- Use suitable protective equipment / protective clothing if mandatory.
- Always observe the cooling time of the hot surfaces.

Adding more than one power supply might lead to heating up of the power supplies.

- Supply the CAN network of the microscope with one power supply only (one plug-in power supply or the integrated power supply of the EMS3 electronic module).

Heat Accumulation

Covering the ventilation openings can lead to heat accumulation that may damage the product and, in extreme cases, can cause a fire.

- Keep ventilation openings unobstructed at all times.
- Do not cover devices or openings emitting heat.
- Do not obstruct ventilation.
- Comply with minimum distance from walls. The distance of the system to the wall should be at least 15 cm, in order to ensure sufficient air circulation and accessibility of the cabling.

- Using Fiberoptic Light Sources** Covering the light guide outlet can lead to heat accumulation that can cause burns and fire.
- Never cover the light guide outlet when the light source is switched on.
 - Never close the light guide outlet with your hands or other parts of your body.
 - Keep all light guides in a safety distance of 10 cm from heat-sensitive or flammable light-absorbing objects or materials.
 - Reduce the brightness and duration of the lighting to the necessary minimum.

3.3.4 Hazards Generated by Radiation

- Optical Radiation Hazards** Gas discharge lights, LED lights and other sources of white light emit strong optical radiation (e.g. UV, VIS, IR). Optical radiation may cause damage to the skin and eyes. The extent of the damage depends on the parameters such as wavelength, exposure time, mode of operation (continuous or pulsed), etc.
- Avoid exposure of eyes and skin to radiation.
 - Do not introduce reflective objects into the beam path.
 - Never remove covers or cover panels during operation.
 - Do not disable any interlock system elements.
 - Use suitable protective equipment / protective clothing if required.
 - When working with fiber optic light sources, never look directly into the light guide output to avoid the risk of being dazzled or going blind.

3.3.5 Ergonomic Hazards

- Prevention of Musculoskeletal Disorders** Musculoskeletal disorders (MSDs) affect the muscles, nerves, blood vessels, ligaments and tendons. Workers in many different industries and occupations can be exposed to risk factors at work, such as lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures and performing the same or similar tasks repetitively. Employers are responsible for providing a safe and healthful workplace for their workers.

3.3.6 Hazards Generated with the Operating Environment

- Dirt, Dust, and Moisture** Dirt, dust, and moisture can impair the microscope's functionality.
- Shut down the microscope whenever it is not used and cover it with a dust protection cover (if available).
 - Always cover unused openings/ports with the corresponding system component or with blind caps.
 - Perform regular maintenance and cleaning according to the instructions in this manual.
 - Make sure that no cleaning liquid or moisture gets inside the microscope.
 - Make sure that the electrical parts never come into contact with moisture.
 - Never expose the microscope to inadmissible climate conditions (high humidity and temperature).
- Explosive Hazard** Fire hazard due to explosive or flammable environment.
- Do not operate the microscope and its components in a potentially explosive atmosphere, in the presence of volatile anesthetics or flammable solvents such as alcohol, petrol, or similar substances.

3.4 Labels and Lights

This chapter shows labels and, where applicable, indicator lights.

All parts that may pose specific hazards are marked with warning labels.

Always observe **all** warning labels!

- Check all warning labels for availability and legibility.
- Immediately replace damaged or illegible warning labels.

In case a label is missing, contact your ZEISS service representative for free of charge replacement.

3.4.1 Labels on the Microscope

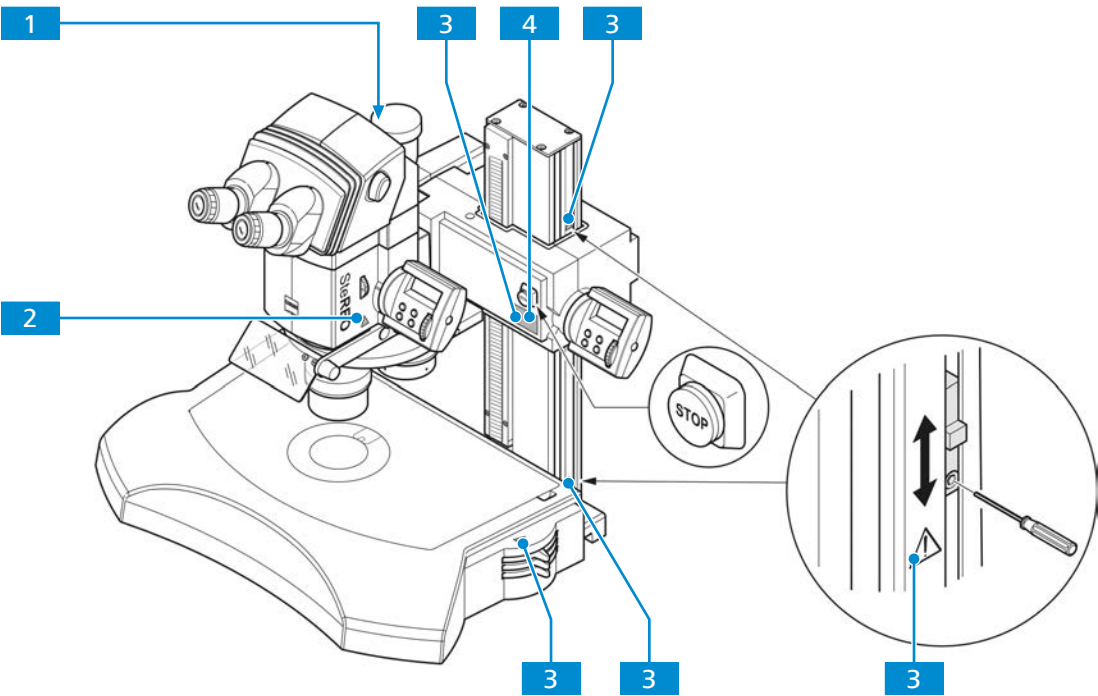


Fig. 1: Labels on the microscope

Pos.	Label or light	Explanation
1	Carl Zeiss Microscopy GmbH Carl-Zeiss-Promenade 10 07745 Jena, Germany 1418 - 0007000000 0007000000 1418 - 0007 / 000 - 000 0 - 00000000 CE	Type label
2		LED radiation! Avoid exposure to radiation.
3		Possible danger! Observe notes in the instruction manual and the supplied documents.

Pos.	Label or light	Explanation
4		Crushing hazard! Fingers may be pinched!

3.5 Safety Devices and Interlocks

In order to prevent injuries and/or property damage, the microscope and its components are equipped with several safety devices and interlocks. In case of defect or damage, the affected parts and the microscope must be taken out of operation immediately and must be secured against unintentional use.

To verify the safety of the microscope and its components, contact your ZEISS service representative and keep the service logs and logbooks.

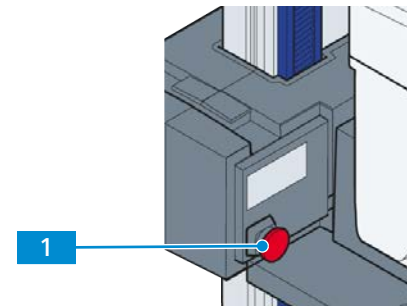
3.5.1 Stop Button on the Motor Focus

Purpose The **STOP** button is for instantaneous deactivation of the motor focus to prevent collision with the stage or a sample on the latter.

Position Depending on which motor focus is used, the **STOP** button is on the right- or left-hand side.

Procedure

1. Press the **STOP** button **1** to switch off the motor focus.



- The **STOP** button engages.
- The focusing movement is immediately interrupted.
- 2. Pull the **STOP** button out again to restart.
- ↳ The **STOP** button is unlocked.

4 Product and Functional Description

The SteREO Discovery stereo microscopes are instruments for the magnified, stereoscopic observation of small objects, typically in the size range from 10 centimeters to less than 50 micrometers.

The natural, spatial shape of the objects is retained - no sample preparation is required. When viewed through the eyepieces, the objects appear three-dimensional with excellent depth perception. This enables an intuitive understanding of the spatial object structures and precise sample handling.

SteREO Discovery is characterized by an impressive stereo impression, excellent optical quality, large free working distances and a generous sample space. The optical pancratic zoom system ensures high-contrast, sharp images across the entire field of view and the entire zoom range. Once the basic setting of the stereomicroscope has been made, the image remains exactly in focus when zooming.

In addition to visual stereoscopic observation, SteREO Discovery is designed for 2D documentation and imaging of microscopic objects and work results. The optional vertical view mode enables documentation without parallax errors.

The comprehensive motorization of SteREO Discovery (zoom, focus drive, mechanical stage and more) in combination with the ZEISS Imaging Software ZEN enables the integration of the microscopes into automated workflows, such as the Technical Cleanliness Analysis Workflow. Further examples are the automated generation of extended depth of field images or large-area images composed of many individual image tiles.

Thanks to its telescope or CMO design, in which two parallel beam paths share a "Common Main Objective", the SteREO Discovery is highly modular system so that the microscope configuration can be optimally adapted to a wide range of application requirements.

Typical tasks with SteREO Discovery are the observation, screening, sorting, preparation, and microsampling (dissection, stimulation, manipulation) of biological and geological objects, and materials of all kinds - as well as the inspection, testing, assembly, and repair of industrial workpieces, components, modules, and devices.

Typical applications

- Life science research facilities and routine bio laboratories
- Materials and geoscientific research facilities
- Industrial research, development, production and quality assurance departments
- Forensic investigation centers
- Museums

Typical branches of science and industry:

- Biology: botany, developmental biology, embryology, entomology, marine biology, microbiology, mycology, neuroscience, parasitology, zoology
- Plants and food: agronomy, forestry, fruit growing
- Medicines: pharmacology
- Materials: paleontology, gemmology, geology, materials testing
- Industries: Automotive and aviation industry, electrical industry, precision mechanics and optics, watch industry, medical technology, mineral oil industry, glass and plastics industry, pharmaceutical industry, food industry, paper and printing industry, telecommunications, semiconductor industry
- Forensics
- Restoration

4.1 Main Components of the SteREO Discovery.V8

SteREO Discovery is a highly modular system that can be flexibly adapted. A typical configuration of SteREO Discovery.V8 with manual focusing drive is shown.

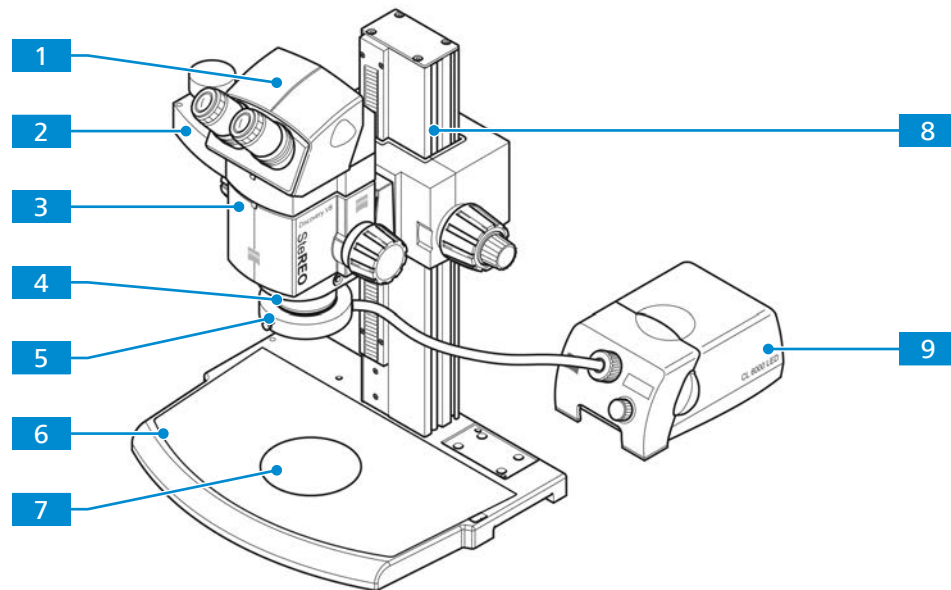


Fig. 2: Main components - SteREO Discovery.V8 (typical configuration)

- | | |
|--|--|
| 1 Binocular tube | 2 Intermediate tube, here: photo tube |
| 3 Microscope body | 4 Objective |
| 5 Fiberoptic illuminator, here: ringlight | 6 Stand base |
| 7 Object plate | 8 Profile column with manual coarse / fine focusing |
| 9 Cold-light source | |

4.1.1 Controls and Functional Elements of SteREO Discovery.V8 (Manual Stand)

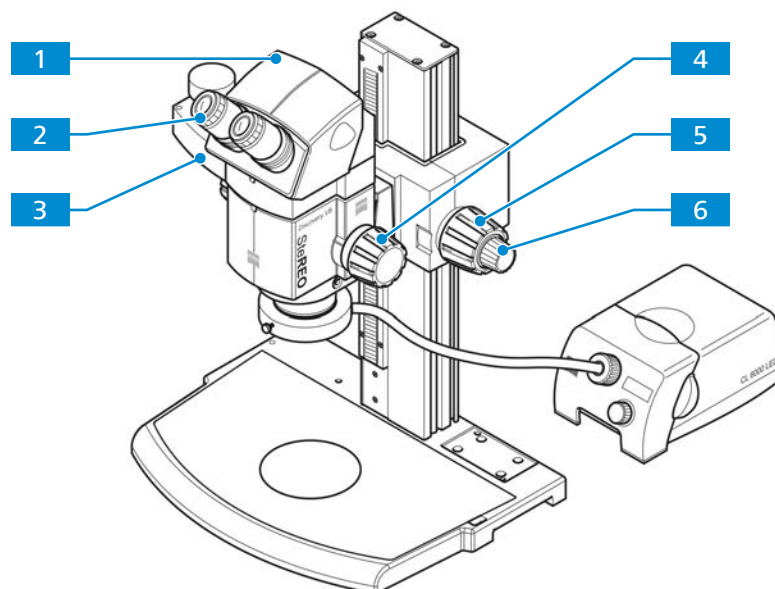


Fig. 3: Controls and Functional Elements of the SteREO Discovery.V8

- | | |
|---|--|
| 1 Binocular tube with adjustable eyepiece distance | 2 Eyepieces with diopter adjustment |
| 3 Switch between eyepiece and camera view | 4 Zoom knob with switchable clickstops (on/off) |
| 5 Coarse focusing knob and focus brake adjustment | 6 Fine focusing knob |

4.2 Main Components of the SteREO Discovery.V12/V20 (with Motorized Stand and CAN Network)

SteREO Discovery is a highly modular system that can be flexibly adapted. A typical configuration of SteREO Discovery.V12/V20 with motor focus is shown.

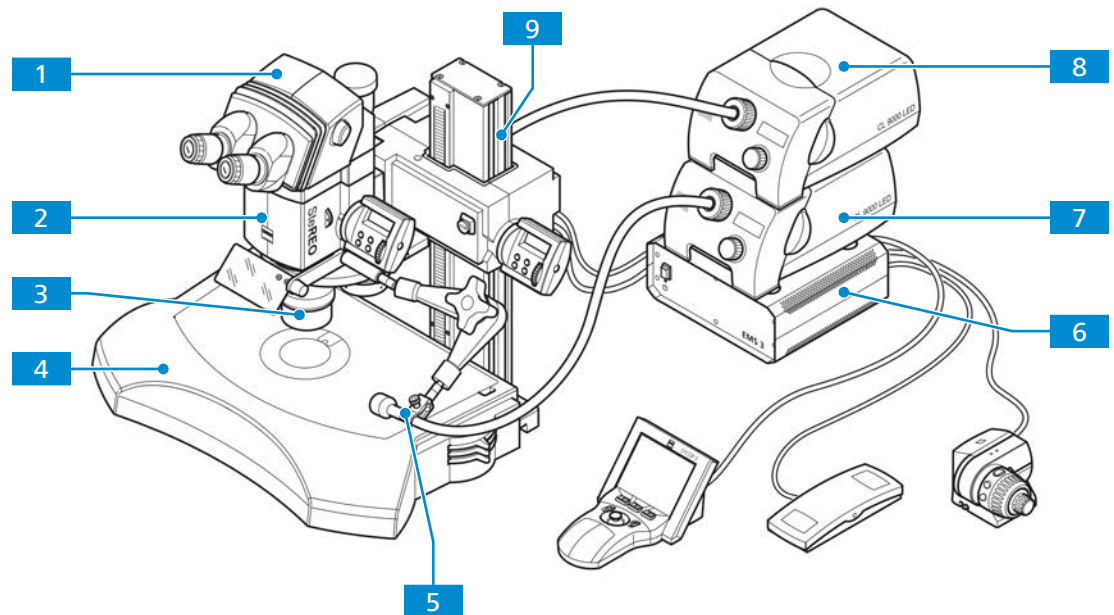


Fig. 4: Main components - SteREO Discovery.V12 and SteREO Discovery.V20 (typical configuration)

- | | |
|--|--|
| 1 Binocular tube, here: Ergo Phototube | 2 Microscope body |
| 3 Objective nosepiece with up to 3 objectives | 4 Stand base 450 with transillumination unit |
| 5 Fiberoptic illuminator, here: spot illuminator with holding arm | 6 Electronic module EMS 3 |
| 7 Cold light source CL 9000 LED CAN for reflected light | 8 Cold light source CL 9000 LED CAN for transmitted light |
| 9 Profile column 490 mm with motor focus | |

4.2.1 Controls and Functional Elements of SteREO Discovery.V12/V20 Stand

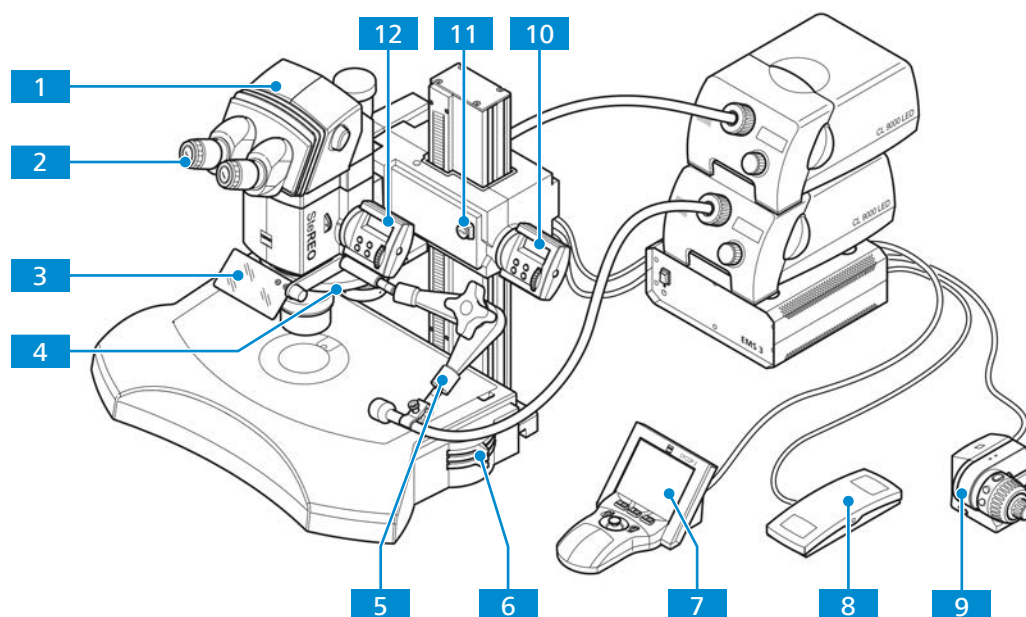


Fig. 5: Controls and Functional Elements of the SteREO Discovery.V12 and SteREO Discovery.V20

- | | |
|---|--|
| 1 Binocular ergo photo tube with adjustable angle of insight and eyepiece distance in two viewing heights | 2 Eyepieces with diopter adjustment |
| 3 Anti-glare shield, height adjustable and tiltable | 4 Objective nosepiece with 6 encoded positions (3x stereo and 3x vertical view) |
| 5 Reflected light spot illuminator with holding arm, precisely adjustable | 6 Operation controls for transmitted light contrasts |
| 7 Sycop 3 system control panel - with joy stick, fine-control wheels, 6 function keys and touch panel. For zoom, focus, stage and illumination control | 8 Foot pedal for handsfree focus or zoom control |
| 9 MaRC [▶ 30] unit with coarse / fine focusing knobs and buttons for fast focusing and zooming | 10 Focus control unit HIP [▶ 26] |
| 11 STOP button | 12 Zoom control unit HIP [▶ 26] |

4.3 Eyepieces

- Purpose** The eyepieces serve to observe the microscopic image in stereoscopic visual insight.
- Position** The eyepieces are inserted into the eyepiece sockets of the binocular tube.
- Function** All eyepieces are equipped with a focusing ring to compensate for defective vision. The imprinted diopter scale helps to find the correct setting. The 10x and 16x magnification eyepieces are suitable for spectacle wearers. They include a rubber ring to protect glasses from scratches. The protective rings can be replaced by fold-down eyecups if required. When using the microscope for fluorescence applications, special eyecups with light protection wings can be used.

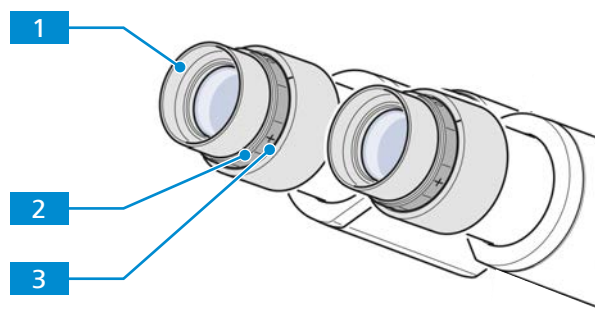


Fig. 6: Eyepiece

- | | |
|---|------------------------|
| 1 Eyecup (e.g. Foldover rubber eyecup) | 2 Focusing ring |
| 3 Diopter scale | |

4.3.1 Eyepieces with Eyepiece Reticles

- Purpose** The eyepieces with reticles are used to observe the microscopic image in special microscopy procedures, such as measuring, counting and comparing in the eyepiece view.
- Position** The eyepieces with reticles are inserted into the tube.
- The eyepiece reticles must be inserted under dust-free conditions. This should be carried out only by ZEISS Service.

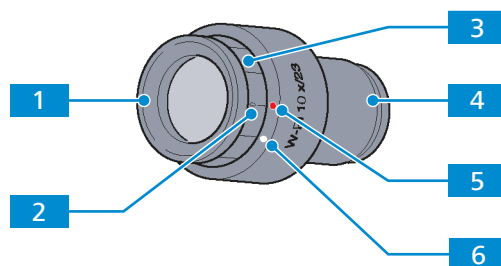


Fig. 7: Eyepiece with installed eyepiece reticle

- | | |
|--|---|
| 1 Eyecup, changeable | 2 Diopter scale with zero point to facilitate finding the correct setting |
| 3 Focusing ring for compensation of defective vision | 4 Mounting stop with interface for inserting an eyepiece reticle |
| 5 Red dot, corresponds to the zero diopter setting when a reticle is inserted | 6 White dot, corresponds to the zero diopter setting when no reticle is inserted |

4.4 Objective Nosepiece S/doc

Function The Objective nosepiece S/doc, 3x, 6x cod. is a central component of the SteREO Discovery stand system 450. It combines the support for the microscope body (mount S) with an objective nosepiece for three SteREO Discovery objectives.

Each objective can be positioned centrally under the microscope for stereoscopic viewing (stereo or "3D" position) or moved laterally under the right-hand microscope channel for vertical viewing (macroscope, documentation or "2D" position).

All six objective positions are provided with clickstops and coded so that the selected objective and its viewing position can be displayed on the Sycop 3 display and in the ZEN software.

In addition, special fiber optic illuminators, the Slit ring illuminators d=66mm without light guides, can be attached to each objective and to the nosepiece - for bright, shadow-free illumination and for easy objective changes without disturbing cables or light guides. Light guide rods of different lengths adapt the ring illuminators to the different objective heights.

Position The objective nosepiece may be attached to the Central profile column 490 mm with motor focus, and to the Profile column 490 mm with manual coarse/fine drive.

When the objective nosepiece is equipped with parfocalized objectives, there is virtually no refocusing needed after objective change. There are 2 groups of parfocalized objectives:

- Objectives with parfocal distance 137 mm: Achromat S 0.63x, Plan S 1.0x, PlanApo S 0.63x, PlanApo S 1.0x, PlanApo S 1.5x
- Objectives with parfocal distance 93 mm: Achromat S 1.0x, Achromat S 1.25x, Achromat S 1.5x, Plan Apo S 3.5x mono

When combining non-parfocal objectives, significant focusing might be required after switching the nosepiece. Automatic refocusing is possible by using the parfocality manager (requires Sycop 3 and the Central profile column 490 mm with motor focus).

4.5 Reflected Light Illumination System for Objective Nosepiece S/doc

Purpose To ensure bright, shadow-free illumination and easy objective changing without interfering cables or light guides, a special illumination system was developed for the objective nosepiece S/doc. It consists of two supply light guides and up to three slit-ring illuminators $d = 66 \text{ mm}$ without light guides.

Position The supply light guides are attached to two light guide mounts on top of the nosepiece - one for the stereo and one for the vertical viewing position.

The slit-ring illuminators without light guides are attached from below a) to the objectives and b) to corresponding light guide mounts in the rotating part of the nosepiece. Light-conducting rods of different lengths compensate for the height differences between the ring lights and the various objectives.

Function The supplied light is directed via the light-conducting rods to the slit-ring illuminator on the respective objective being used.

The light guide mounts serve as a transmission interface between the incoming light guides and the subsequent slit-ring illuminators.

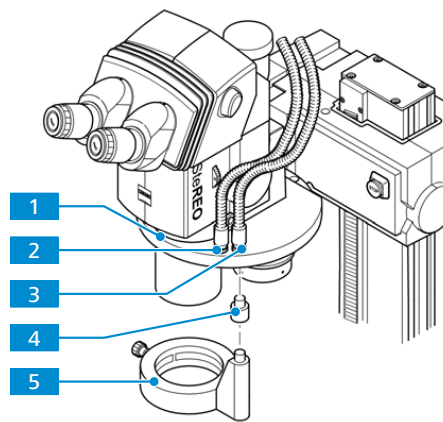


Fig. 8: Light guide mount

1 Objective nosepiece S/doc

2 Light guide mount for stereo position

3 Light guide mount for vertical view position

4 Light-conducting rod

5 Slit-ring illuminator

Info

Instead of the two-arm light guide shown, a single-arm supply light guide may also be used. The supply light guide must then be relocated when changing from the stereo position to the vertical view position.

4.6 Operating Control Units

The SteREO Discovery portfolio includes a wide range of motorized components for precise and repeatable control of the SteREO Discovery stereo microscopes, including remote control via PC and software for automated lifescience experiments or industrial workflows.

SteREO Discovery enables motorized zooming, focusing, and XY positioning, as well as automated operation of reflected and transmitted light illumination. A range of operation units enables precise and comprehensive control of the motorized systems:

- The Human Interface Panels (HIP) are the basic control units for controlling and configuring the SteREO Discovery microscope bodies (with motorized zoom system) and the central motor focus.
- The Manual Rotary Controller (MaRC) was specialized for particularly sensitive focusing and precise zooming. However, it is not suitable for adjusting system parameters.
- The central EMS 3 electronic module enables the establishment of a CAN network that allows full system control of the motorized microscope - either via a workstation with ZEISS ZEN software or via the Sycop 3 system control panel.
- The Sycop 3 system control panel with joystick, fine control wheels, multiple function keys, and a touch panel enables one-handed operation of the microscope from a central point - including zoom, focus, stage, illumination, and comprehensive system settings (see separate user manual).

4.6.1 Human Interface Panel Control Unit (HIP)

Purpose The HIP is a basic control unit for controlling and configuring the microscope.

Function Depending on the profile column, up to two HIPs can be installed. One HIP, mounted on the microscope body, controls zooming, displays optical parameters and allows the setting of zoom and magnification parameters. Another HIP, which is mounted on the central motor focus, controls focusing and allows the setting of focus parameters.

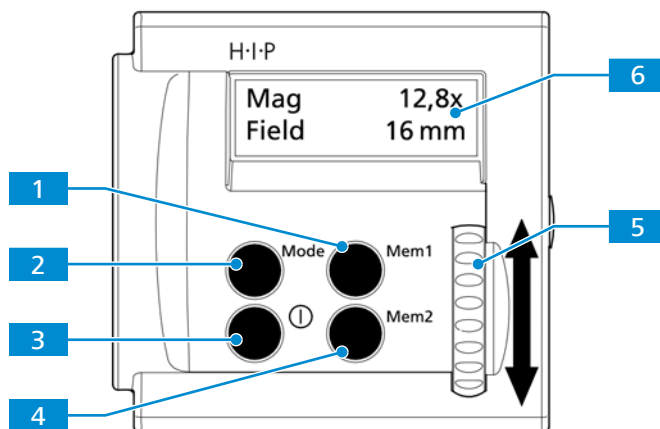


Fig. 9: Control and functional elements of the HIP

- | | |
|---|---------------------------|
| 1 Mem1 button | 2 Mode button |
| 3 button | 4 Mem2 button |
| 5 Knurled wheel (joystick functionality) | 6 Two-line display |

4.6.1.1 Functionality and Operation of the HIP Units

The HIP control units have two modes: the **Basic Mode** for microscope operation and the **Setting Mode** for configuring microscope parameters.

Element	Basic mode		Setting mode
	HIP Zoom control unit	HIP Focus control unit	
Two-line display	Top line displays the total magnification viewed in the eyepieces (Mag)*	Top line displays Focus	Top line displays the system parameter selected to be configured.
	Bottom line displays current optical parameters: ▪ Field: object field diameter [mm] ▪ Resol: Resolution [μm] ▪ Depth: Depth of field [mm or μm]	Bottom line displays the current focus position Z [mm]	Bottom line displays the available parameter values.
Mode button	Short press (several times): Show different optical parameters	Short press: Reset the focus value to zero	Short press (several times): Call up the desired system parameter to be configured.
	Long press (two seconds): ▪ Change to setting mode ▪ Acknowledgment signal sounds	Long press (two seconds): ▪ Change to setting mode ▪ Acknowledgment signal sounds	Long press (two seconds): ▪ Store the selected parameter values ▪ Switch back to basic mode ▪ Acknowledgment signal sounds
Knurled wheel	Move up/down to zoom: ▪ Deflect slightly for fine zooming ▪ Deflect more for faster zooming	Move up/down to focus: ▪ Deflect slightly for fine focusing ▪ Deflect more for faster focusing Short press on the wheel: ▪ Switch between coarse and fine focus. Focus or Fine Focus are displayed. Long press (two seconds): ▪ Call up the super fine focus mode. Super Fine is displayed. ▪ Leave the super fine mode by short pressing the focusing wheel.	Move up/down (several times): ▪ Select the desired parameter value

Element	Basic mode		Setting mode
	HIP Zoom control unit	HIP Focus control unit	
Mem1/Mem2 buttons	Short press: Recall the stored zoom value.	Short press: Recall the stored focus position.	-
	Long press (two seconds): - Store the current zoom value. - Acknowledgment signal sounds.	Long press (two seconds): - Store the current focus position. - Acknowledgment signal sounds.	-
Button 	Switch on/off (standby) for HIP and microscope body.	Switch on/off (standby) for HIP and motor focus.	-

*Total magnification = zoom magnification x objective magnification x eyepiece magnification x optional tube factor

When the operation unit Sycop 3 is present, it takes over the system control and the HIP functions change:

- The bottom line of the HIP displays show **SycopControl**.
- The HIP buttons **MODE** and **ON/OFF** are out of function.

The HIP Focus control unit indicates the active focus modes as follows:

- Coarse mode: the focus value is displayed with a 3-digit accuracy (without leading letter F).
- Fine mode: the letter **F** is displayed, followed by the focus value with a 3-digit accuracy.
- Super Fine mode: the letter **F** is displayed, followed by the focus value with a 4-digit accuracy.

4.6.1.2 Parameters for the Zoom Control (Setting Mode)

Parameters		Values	Remarks
Set Lens	Select currently installed objectives If using the objective nose-piece, swivel the objectives one after the other to the working position and select the lens magnification separately before saving the newly selected parameters.	Achro 1.5x Achro 1.25x Achro 1.0x Achro 0.63x Achro 0.5x Achro 0.3x PlanApo 3.5x PlanApo 2.3x PlanApo 1.5x PlanApo 1.0x PlanApo 0.63x Plan 1.0x	Required for correct display of all optical parameters - magnification - resolution - object field - depth of field
Conv. 1.5x	Select if the objective converter 1.5x is installed.	NO & YES	Required for correct display of all optical parameters
Tube 1.25x	Select if the Ergo tube 1.25x (with long eyepiece tubes) is installed.	NO & YES	Required for correct display of the parameters - magnification - object field

Parameters		Values	Remarks
Set Eyepiece	Select currently installed eyepiece	25x/10 foc 16x/16 Br foc 10x/23 Br foc 10x/20 Br foc	Required for correct display of the parameters ■ magnification ■ object field
Zoom speed	Set the zoom profile	1, 2, 3	"Slow, medium or fast" increase of the zoom speed (when the knurled wheel is deflected)
Backlight	Adjust display brightness	12-stage progress bar	Move the knurled wheel up/down for increasing and reducing background brightness
Beep Level	Switch acknowledgment signal on/off	ON & OFF	Activation recommended
Reset Param?	Reset to factory default	NO & YES	

4.6.1.3 Parameters for the Focus Control (Setting Mode)

Parameters		Values	Remarks
Focus Speed	Set the focus profile	1, 2, 3 slow & fast	Select "slow, medium or fast" increase of the focus speed (when the knurled wheel is deflected). Setting affects every focus mode.
Backlight	Adjust display brightness	12-stage progress bar	Move the knurled wheel up/down for increasing and reducing background brightness
Beep Level	Switch acknowledgment signal on/off	ON & OFF	Activation recommended
Reset Param?	Reset to factory default	NO & YES	

4.6.2 Manual Rotary Control (MaRC)

Function The MaRC is used to operate the motor focus and zoom functions of the microscope.

Position It can be mounted either directly on the motor focus, or the microscope body instead of the HIP, or as a desktop version with table-top base independently of the microscope. When the MaRC is replacing a HIP, the magnification (or the Z-position) can only be viewed in the Sycop 3 display or in the ZEISS imaging software ZEN.

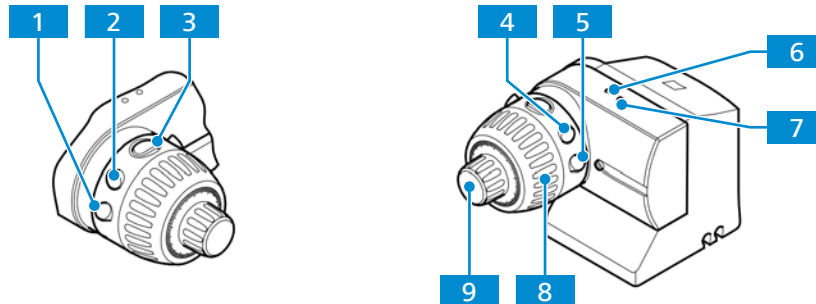


Fig. 10: Controls and functional elements of MaRC

- | | |
|---|---|
| <p>1 Key 1</p> <ul style="list-style-type: none"> ▪ Short press: Precise zooming out to the next zoom clickstop position ▪ Long press: Quick zooming out | <p>2 Key 2</p> <ul style="list-style-type: none"> ▪ Short press: Precise zooming in to the next zoom clickstop position ▪ Long press: Quick zooming in |
| <p>3 Key 3</p> <ul style="list-style-type: none"> ▪ Long press (2 s): Storing a focus position ▪ Short press: Travel to the stored position ▪ Long press (> 5 s, until beeping twice): Reversing the sense of rotation of the MaRC | <p>4 Key 4</p> <ul style="list-style-type: none"> ▪ Quick focusing downwards |
| <p>5 Key 5</p> <ul style="list-style-type: none"> ▪ Quick focusing upwards | <p>6 Green LED</p> |
| <p>7 Blue LED</p> | <p>8 Coarse adjustment knob</p> |
| <p>9 Fine adjustment knob</p> | |

4.6.3 Sycop 3

Info

For further information, refer to the instruction manual of Sycop 3.

5 Installation

Perform only the installation work described in this document. All other installation work not described may only be carried out by an authorized ZEISS service representative.

5.1 Unpacking and Setting up the Microscope

- Procedure**
1. Open the packaging.
 2. Take the microscope, all assemblies, and accessories out of the packaging.
 3. Check them for completeness as per delivery note.
 4. Check all parts for damaging.
 5. Provide a vibration-free, level, and non-inflammable surface to assemble the microscope.

It is recommended to keep the original packaging and store it away for later use, e.g. for stowing the microscope during periods of non-use or for returning the microscope to the manufacturer for repair.

5.2 Installing the Microscope Stand

The following microscope carriers can be installed using the procedure described below:

- microscope carrier for a single objective
- objective nosepiece S/doc for three objectives
- objective nosepiece S, coax (with integrated coaxial illuminator)

- Parts and Tools**
-  Hex key, 5.0 mm
 -  Hex key, 8.0 mm

NOTICE

Damage due to wrong handling

The profile column with motor focus (or with manual coarse/fine drive) can be damaged when handled incautiously.

- ▶ It is strongly recommended to store the profile column with motor focus (or with manual coarse/fine drive) in its original packaging until the microscope is installed.
- ▶ When the original packaging is not available, place the profile column on the rear, using sufficiently high support blocks. Do not use the housing of the focusing unit as a support.
- ▶ Do not lift or carry the profile column by the focusing unit.
- ▶ Avoid heavy shocks to the focusing unit.
- ▶ Lift and carry the installed microscope only at the stand base and the profile column.
- ▶ After installing and connecting the microscope, adjust the mechanical end stops of the motor focus - to avoid damage by unintentional actuation.

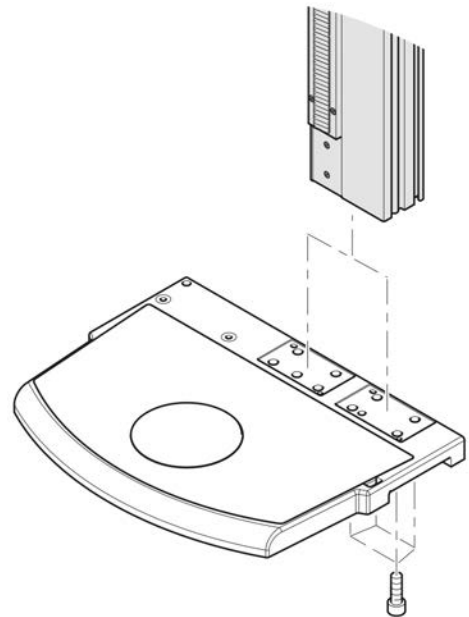
Info

The microscope carrier for a single objective can be mounted in L-position (as shown in the figure) or 180° tilted in F-position (not shown).

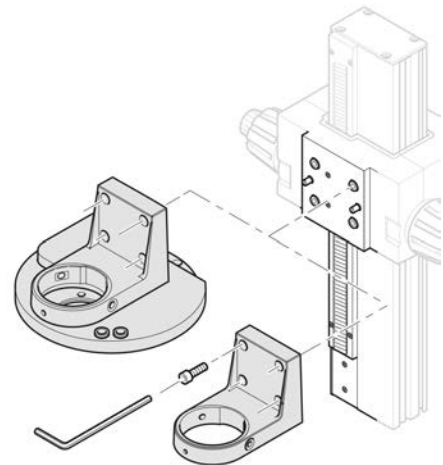
The F-position allows to focus 10 cm higher samples, but cannot be combined with objective slider S or the coaxial Epi-illuminator.

- Prerequisite** ✓ Sufficient table space is provided to set up the microscope and peripheral accessories (recommended 800 x 800 mm).
- ✓ On the objective nosepiece, *stoppers are inserted* [▶ 42].

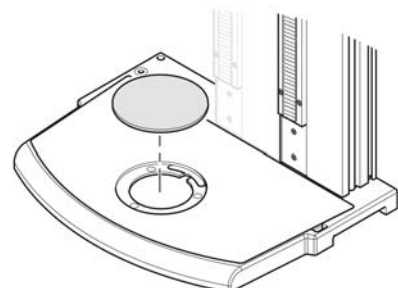
- Procedure**
1. Attach the profile column to the stand base.
 2. Let the two centering pins slide into place.



- a Use the left mounting surface for the manual coarse/fine drives with 350 mm and 490 mm profile columns, and for the motor focus with central profile column.
 - b Use the right mounting surface for mounting the co-observation equipment S.
3. Fix the profile column with four screws through the stand base.
 4. Put the carrier or the objective nosepiece onto the focusing drive and let the two centering pins slide into place.



5. Hold the component in place until the first screw is fixed.
6. Fix the component with four screws.
7. If required, *install the transillumination unit 450* [▶ 77].
8. If required, *install a stage* [▶ 33].
9. Insert the 120 mm object plate.



5.3 Installing a Stage with 84 mm Interface

The present section applies to the following components:

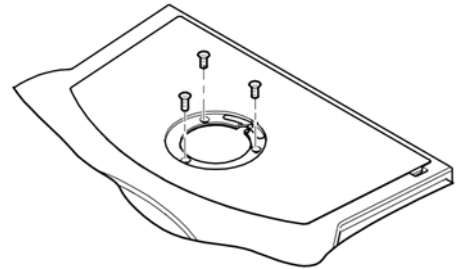
- Gliding stage +/- 20 mm (shown below)
- Ball-and-socket stage +/-30°
- Rotating Pol Stage

Parts and Tools

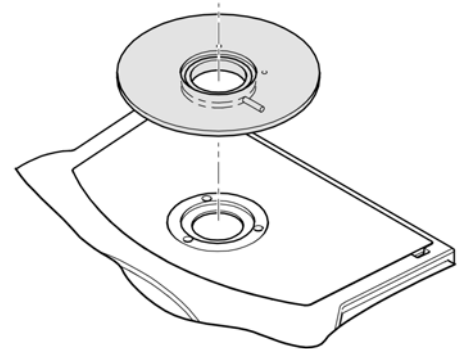
- 🔧 Hex key, 3.0 mm
- 🔧 84/120 mm stage adapter

Procedure

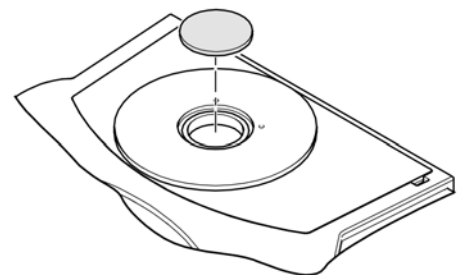
1. Unscrew three short Allen screws from the insert plate.



2. Fix the stage adapter 84/120 with three longer Allen screws through the insert plate.
3. Put the stage onto the stage adapter and align it.



4. Turn the eccentric clamping lever to clamp the stage in the stage adapter.
5. Put the round 84 mm plate into the stage interface.

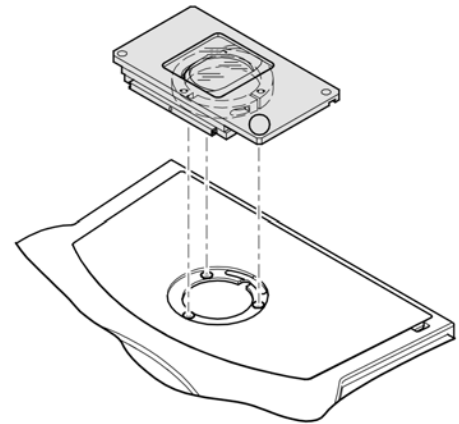


5.4 Installing the Gliding Stage 110 x 110

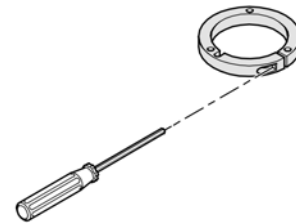
Parts and Tools 🔧 Hex key, 3.0 mm

Prerequisite ✓ The stage clamping ring is assembled to the stage.

Procedure 1. Put the stage with installed stage-clamping ring onto the insert plate.



2. Align the stage.
3. Clamp the stage-clamping ring in the insert plate by turning the Allen screw (SW 3) clockwise.



4. Install the insert frame or plate.

5.5 Installing the Microscope

This procedure consists of the following steps:

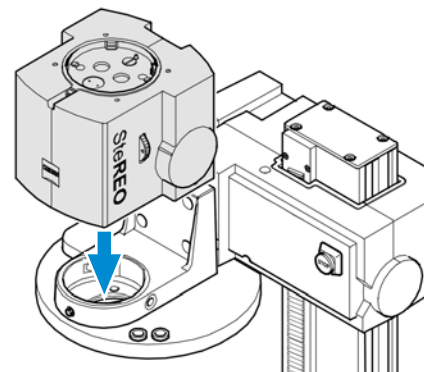
Procedure 1. *Installing the microscope body* [▶ 34].
 2. *Installing the objectives* [▶ 35].
 3. *Installing the binocular tube* [▶ 36].
 4. *Installing the anti-glare shield* [▶ 36].

5.5.1 Installing the Microscope Body

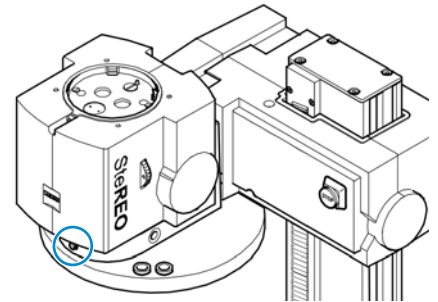
Parts and Tools 🔧 Hex key, 3.0 mm

Prerequisite ✓ The stand components are installed [▶ 31].

Procedure 1. Loosen but do not remove the clamping screw on the carrier or objective nosepiece.
 2. Insert the microscope body into the mount.



3. Align the housing joint of the microscope body with the screw of mount S.
4. Tighten the screw.



5. Install the objective [▶ 35].
6. Install the binocular tube [▶ 36].

5.5.2 Installing Objectives

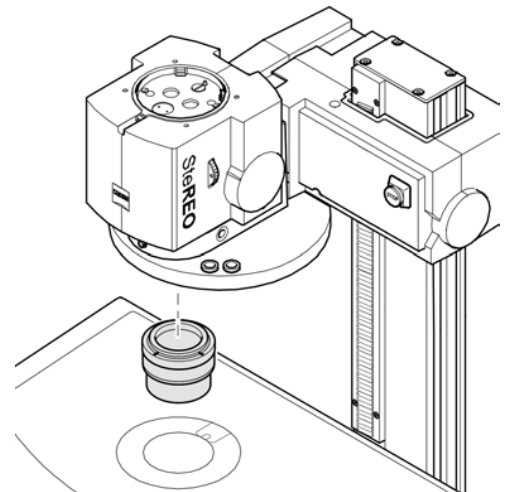
Parts and Tools 🔧 Hex key, 3.0 mm

Prerequisite ✓ The microscope body is installed [▶ 34].

- Procedure**
1. Install the shortest objective **1**, then the medium one **2**, and finally the longest one **3**.



2. Take up the objective with both hands and screw it counterclockwise into the microscope body (upside down right-hand thread).

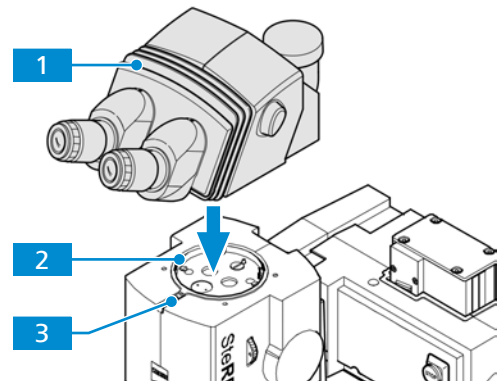


5.5.3 Installing the Binocular Tube

Parts and Tools 🔧 Screwdriver, 3.0 mm, ball head

Prerequisite ✓ *The microscope body is assembled [▶ 34].*

- Procedure**
1. Insert the binocular tube **1** with the dovetail ring into the tube mount **2**.



2. Tighten the screw **3**.

Proceed in the reverse order for removal.

Info

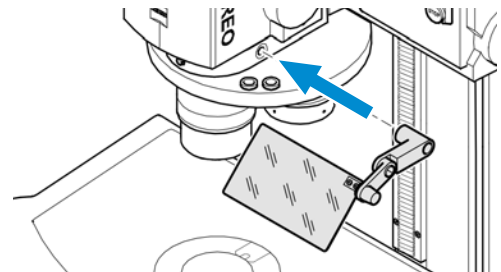
If *intermediate tubes* [▶ 85] are present, they must be installed between the microscope body and the binocular tube. Up to two intermediate tubes can be stacked.

5.5.4 Installing the Anti-Glare Shield

Parts and Tools 🔧 Screwdriver, 3.0 mm, ball head

Prerequisite ✓ *The stand components are installed [▶ 31].*

- Procedure**
1. Fix the anti-glare shield to the objective nose-piece turning the screwdriver clockwise.



2. Swing in the anti-glare shield to prevent dazzling during microscopic work.

5.6 Adjusting the Travel of the Motor Focus

⚠ CAUTION

Pinching hazard when the motor focus is lowered

Fingers can be trapped.

- ▶ Switch off the motor focus with the **STOP** button if necessary (depending on the motor focus version the **STOP** button is on the right- or left-hand side).
- ▶ Do not reach into the work area or beneath the motor focus during lowering.
- ▶ Adjust the upper and lower limit stops immediately to prevent damage to the microscope due to movement of the motor focus.

NOTICE

Property damage due to collision of sample and objective

The objective and the sample can collide when lowering the motor focus.

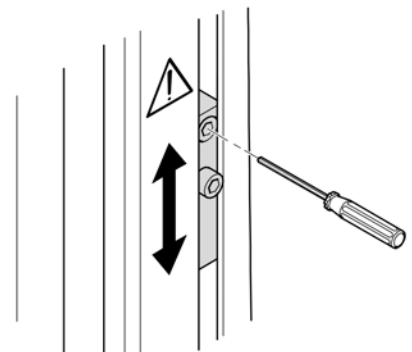
- ▶ Adjust the lower limit switch after the first installation.
- ▶ Lower the motor focus only carefully unless the lower limit switch is adjusted.

5.6.1 Adjusting the Lower Limit Switch

Parts and Tools 🔧 Screwdriver, 3.0 mm, ball head

Prerequisite ✓ The microscope is operational.
 ✓ A printed sheet of paper is positioned on the stage.
 When samples higher than 20 mm are to be examined, use the flattest sample instead.

- Procedure**
1. Release the lower limit switch and move it down as far as it will go.
 2. Tighten the screw again.
 3. When using the nosepiece, swing the longest objective into the beam path.
 4. **NOTICE** Keep all moving microscope parts under observation to ensure that there is no collision with the sample, the stage, or the base plate.
 5. Carefully move the motor focus downwards until the sample is in focus - at first under direct observation and then while looking through the eyepieces.
 6. Stop the motor focus.
 7. Using the ball-headed screwdriver, push the lower limit switch upwards against the motor focus until it engages.
 8. Secure the lower limit switch in this position.

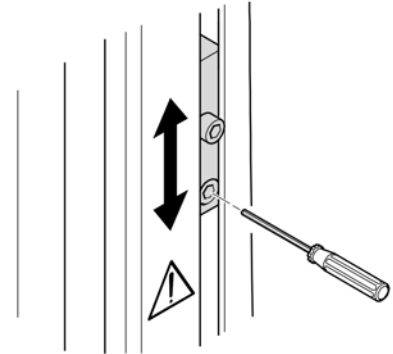


5.6.2 Adjusting the Upper Limit Switch

Parts and Tools 🔧 Hex key, 3.0 mm

- Prerequisite** ✓ The microscope is operational.
 ✓ A printed sheet of paper is positioned on the stage.
 When samples higher than 20 mm are to be examined, use the flattest sample instead.

- Procedure**
1. Move the upper limit switch to the topmost position and secure it.
 2. Move the motor focus carefully upwards to the highest focus position in which the microscope does not collide with objects in the proximity of the microscope.
 3. Release the upper limit switch and lower it down against the motor focus until it engages.
 4. Secure the upper limit switch in this position.



5.7 Adjusting the Torque of the Manual Focusing Drive

Info

If the torque is set too high, turning the focus knob requires too much force.

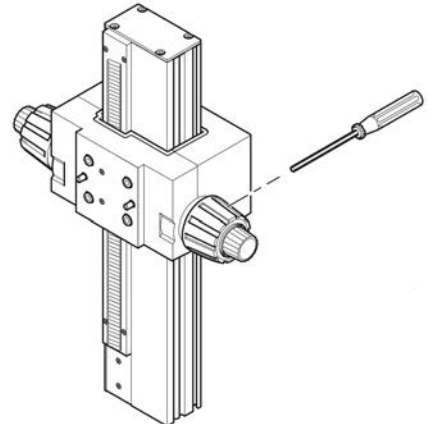
If the torque is set too low, the focus drive will lower on its own under the weight of the microscope.

Info

With a coarse/fine drive with column 490 mm the torque-adjusting ring is on the right-hand focusing knob, with a coarse/fine drive with column 350 mm it is on the left focusing knob.

Parts and Tools 🔧 Hex key, 3.0 mm

- Procedure**
1. Insert the hex key into one of the boreholes on the torque-adjusting ring.



2. Hold the coarse-focusing knob with one hand so that it cannot rotate while adjusting the torque.
3. Turn the torque-adjusting ring clockwise (increased torque) or counter-clockwise (decreased torque) until reaching the desired level. It is recommended to increase the torque until the focus drive keeps the focus position without lowering on its own under the weight of the microscope.
4. Remove the hex key.
5. Turn the focus knob. Check if the focus position is maintained after releasing the focus knob.

5.8 Installing the Reflected Light Illumination

Most common reflected light illuminators are:

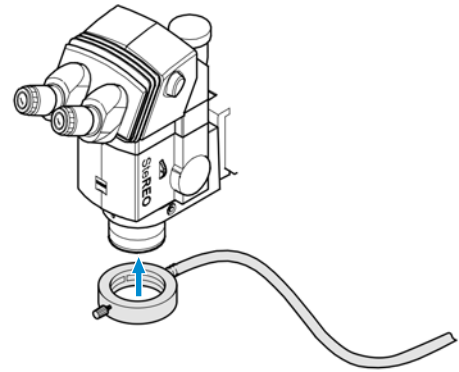
- *LED Ring Illuminators* [▶ 39]
- *Fiber optic slit-ring illuminators* [▶ 40]
- *Fiber optic spot, line and area illuminators with flexible light guides* [▶ 40]

5.8.1 Installing the LED Ring Illuminator

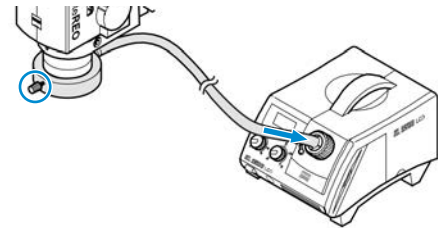
- Procedure**
1. If required, attach the ring light accessories (diffuser ring, polarizing filter set) to the ring illuminator.
 2. Slide the LED ring illuminator onto the objective. Make sure it is aligned horizontally.
 3. Tighten the knurled screw.

5.8.2 Installing the Fiberoptic Slit-Ring Illuminator

- Procedure**
1. If required, attach the polarizing filter set to the fiberoptic slit-ring illuminator.
 2. Slide the slit-ring illuminator onto the objective. Make sure, that the slit-ring is not obscured by the edge of the objective and that it is aligned horizontally.



3. Tighten the knurled screw.



4. Connect the light guide to the cold-light source. Observe the separate user manual of the light source.

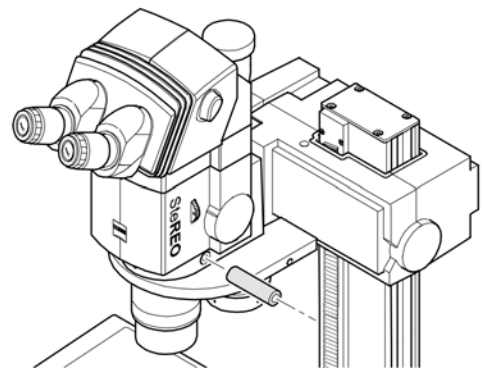
5.8.3 Installing Fiber Optic Spot Illuminators with Flexible Light Guides

The present section applies to the following fiberoptic illuminators:

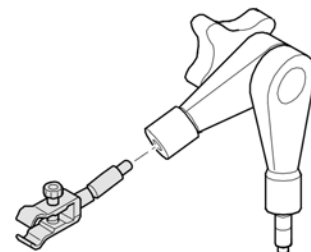
- Single arm spot illuminators with focusing attachments
- Double arm spot illuminators with focusing attachments

Parts and Tools 🔧 Hex key, 3.0 mm

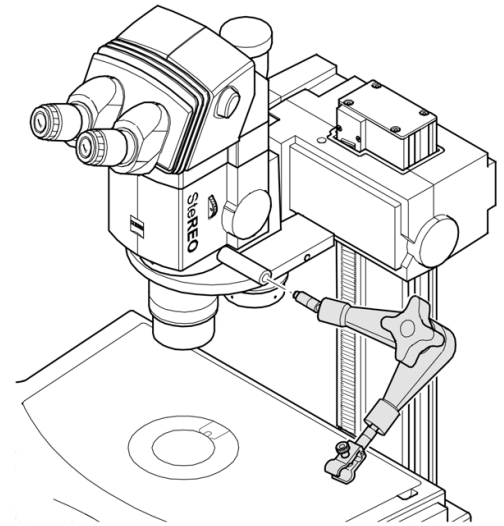
- Procedure**
1. If required, screw the spacing rod to the tapped hole at the left or right side of the microscope carrier. Fix it tight using the hex key.



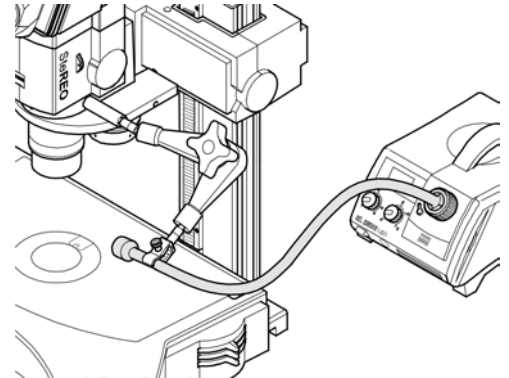
2. Hold the articulated arm in such a way that the label is correctly readable.
3. Fix the clamp for the light guide on the upper end of the articulated arm.



4. Screw the bottom end of the articulated arm into the spacing rod (or directly to the microscope carrier).



5. Connect the light guide to the clamp of the holding arm.
6. Mount the focusing attachment to the output end of the light guide.
7. Precisely adjust the light guide to the object: Loosen the tensioning screw of the articulated arm. Incrementally tighten the screw again while successively positioning the three joints of the articulating arm "from bottom to top".
8. Connect the light guide to the cold-light source.



Proceed analogously to mount the double arm flexible light guide. Use two rods (if required), two articulating arms, two clamps and two focusing attachments.

5.8.4 Installing Fiber Optic Line and Area Illuminators with Flexible Light Guides

The present section applies to the following fiberoptic illuminators:

- Line light S
- Diffuse area light S

Parts and Tools  Hex key, 3.0 mm

- Procedure**
1. Screw the M6/M8 adapter to the upper end of the articulating arm and tighten it using the hex key.
 2. Screw the fiberoptic line light/area light to the articulating arm.
 3. Adjust the illuminator to the object: Loosen the tensioning screw of the articulated arm. Incrementally tighten the screw again while successively positioning the three joints of the articulating arm "from bottom to top".
 4. Connect the light guide to the cold-light source.

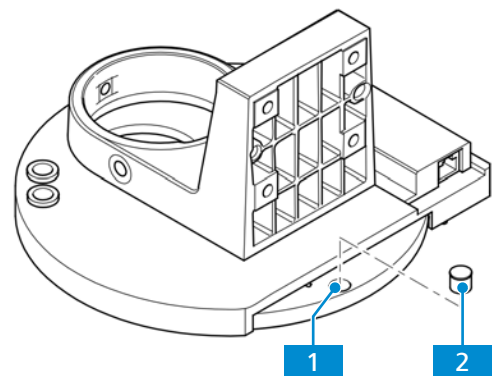
5.9 Installing Components onto the Objective Nosepiece S/doc

1. *Inserting the stoppers [▶ 42].*
2. *Installing the objective nosepiece to the stand [▶ 31].*
3. *Installing the microscope body [▶ 34].*
4. *Installing the supply light guides [▶ 43].*
5. *Installing the objectives [▶ 35].*
6. *Installing the slit-ring illuminator without lightguide [▶ 43].*

5.9.1 Inserting Stoppers into the Objective Nosepiece S/doc

The stoppers are required for closing light openings on objective positions which are not to be provided with a slit ring illuminator $d = 66$ mm without light guide. the openings must be closed prior to mounting the objective nosepiece to the stand.

- Procedure**
1. Rotate the nosepiece plate accordingly to make the light opening **1** of the corresponding nosepiece position accessible at the rear of the nosepiece.

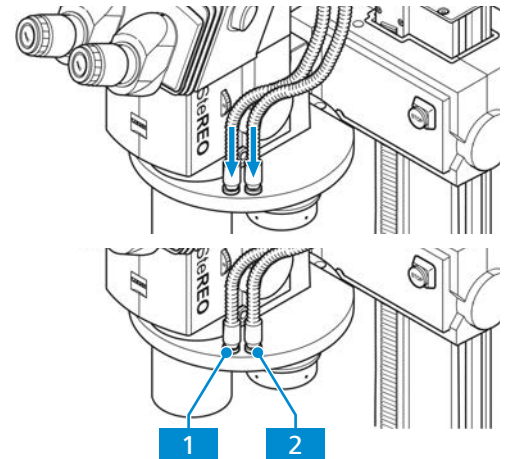


2. Put the stopper **2** from above into the light opening, with the taper hole of the stopper facing downwards.
3. *Install the objective nosepiece [▶ 31].*
4. **CAUTION** During operation, the stoppers may become hot. Let the stoppers cool down for at least 5 minutes before removing them from the objective nosepiece. To remove the stopper, lift it from below using a hex key 3 mm and remove it sideways. This is possible when the objective nosepiece is mounted on the stand.

5.9.2 Installing the Supply Light Guides

Prerequisite ✓ *The objective nosepiece is installed [► 31].*

Procedure 1. Insert the end-sleeve of the light guide into the corresponding light guide mount.



2. To avoid repositioning the light guide when changing between stereo and vertical positions, install a two-arm light guide 2x5.6mm/1000 or two single-arm light guides 1x8.0mm/1000 combined with two light sources.

a Insert one light guide for stereo position **1**.

b Insert one light guide for vertical view position **2**.

3. *Install the slit-ring illuminator without light guide [► 43].*

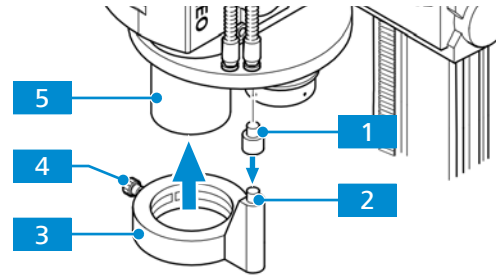
5.9.3 Installing the Slit-Ring Illuminator D = 66 mm without Light Guide

Special adapters are required to connect the slit-ring illuminator without light guide to different working heights caused by different objective lengths:

Objective	Light-conducting rod 13 mm	Light-conducting rod 51 mm	Spacing ring d = 66x16 mm for Achromat S
PlanApo S 0.63x	-	-	-
PlanApo S 1.0x	X	-	-
PlanApo S 1.5x	-	X	-
PlanApo S 3.5x mono	X	-	-
Plan S 1.0x	-	-	-
Achromat S 0.3x	-	-	X
Achromat S 0.5x	-	-	X
Achromat S 0.63x	-	-	X
Achromat S 1.0x	-	-	X
Achromat S 1.25x	-	-	-
Achromat S 1.5x	X	-	-

- Prerequisite** ✓ *The objectives are installed [▶ 35].*
 ✓ *The light guide is installed [▶ 43].*
 ✓ *The spacer ring is screwed to the Achromat objective, if required.*

- Procedure** 1. Put the appropriate light-conducting **1** rod onto the fiber input **2** of the slit-ring illuminator.



2. Put the slit-ring illuminator **3** from below onto the corresponding objective **5**.
 3. Push the slit-ring illuminator upwards until the light-conducting rod touches the mechanical stop in the corresponding hole at the underside of the objective nosepiece.
 4. Fix the slit-ring illuminator with the knurled knob **4** in this position.

Proceed in the reverse order for removal.

5.10 Installing the Camera Adapter

- Purpose** Use camera adapters with the "Interface 60N" connector to attach a microscope camera to the camera port on a phototube (or intermediate phototube) of the microscope. Adapters with the "Interface 60" connector can also be used.

Camera adapters are available for C-mount microscope cameras (e.g. Carl Zeiss Axiocam cameras), conventional SLR cameras, and compact digital cameras.

Info

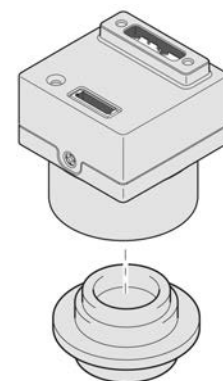
To avoid vignetting, use only camera/adapter combinations expressly recommended by ZEISS.

- Procedure** 1. Follow the corresponding individual camera operating instructions when working with micro-photographic equipment.

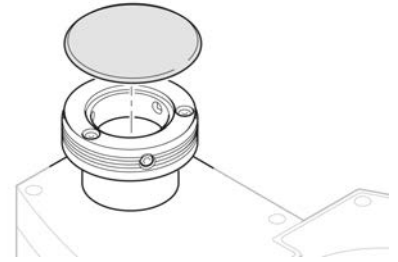
5.10.1 Installing the Camera Adapter for Interface 60 (Plug-in Diameter 30 mm)

- Parts and Tools** 🔧 Hex key, 3.0 mm

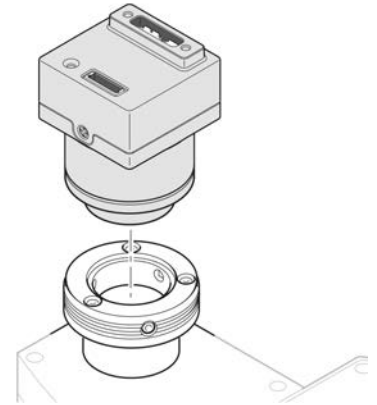
- Procedure** 1. Mount the camera adapter 60 to the camera.



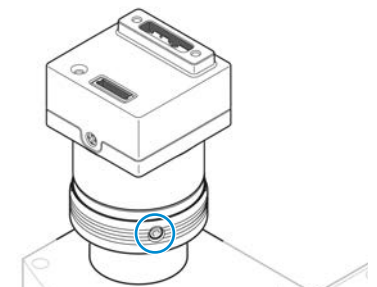
2. Remove the dust cap from the camera port.



3. Set the pre-assembled unit on the camera port.



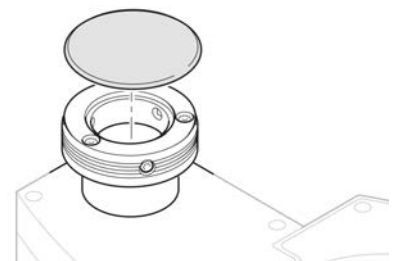
- a Ensure that the three screws do not project too far into the inner bore.
 - b Retract as necessary.
4. Fix the adapter with the screw.



5.10.2 Installing the Camera Adapter for Interface 60N (External Thread M52 x 1)

Parts and Tools  Hex key, 3.0 mm

- Procedure**
1. Mount the camera adapter 60N to the camera.
 2. Remove the dust cap from the camera port.



3. Observe that the setscrew on the camera port does not project into either the external thread or the inner bore.
4. Connect the pre-assembled unit to the camera port, align and tighten the union nut of the adapter.

5.11 Installing the Human Interface Panel (HIP)

⚠ DANGER

Electric injury due to live parts

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

- ▶ Switch off the microscope prior to installing and de-installing components.
- ▶ Disconnect live parts from the power supply.

NOTICE

NOTICE - Damage due to forcible twisting

The HIP can be swivelled by about 30° around its longitudinal axis to achieve a convenient viewing angle. Forcible twisting beyond the two end stops may result in damage to the microscope.

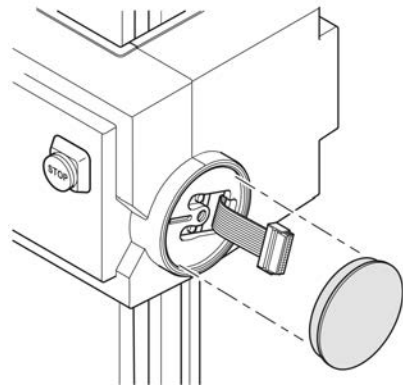
- ▶ Be sure not to exceed the stated swivel range.

Info

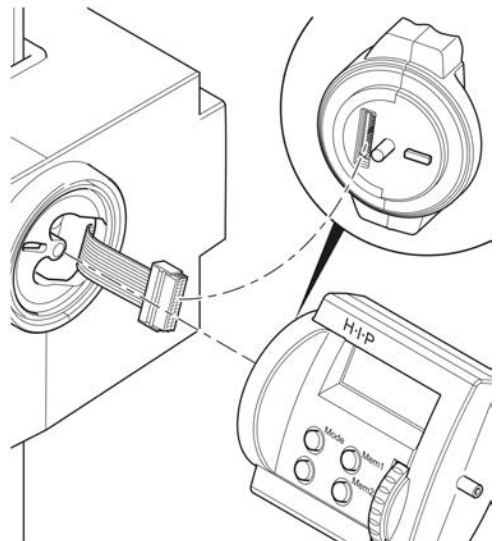
The HIP can be installed on the motor focus, and on the microscope body. In the following, the installation is explained using the motor focus as example. The procedure is the same for installing the HIP to the microscope body.

Parts and Tools  Hex key, 3.0 mm

- Procedure**
1. Remove the cover on the motor focus or the microscope body.

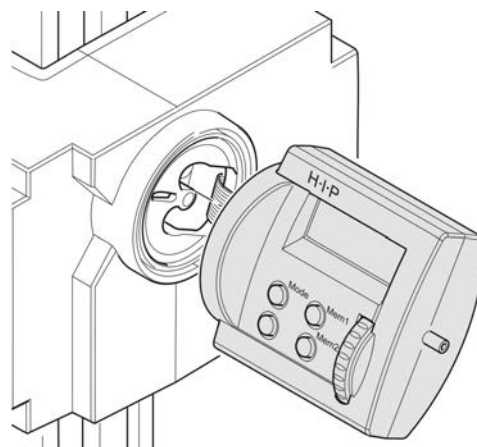


2. Pull out the connecting cable slightly without applying force.
3. Connect the cable carefully to the corresponding HIP connector socket.

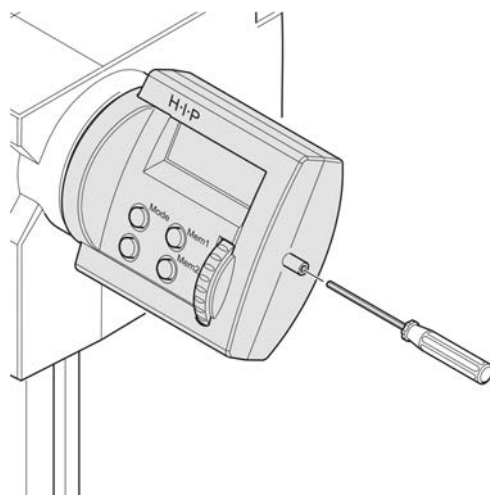


4. Push the cable fully back into the casing without bending it.

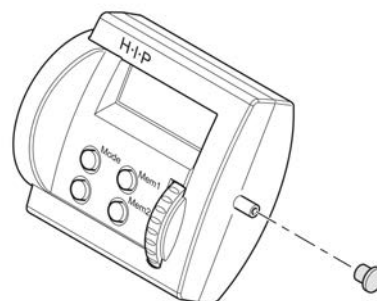
5. Carefully attach the HIP so that the nose on the HIP engages in the groove provided.



6. Screw in the socket head screw as far as it will go.



7. Push the cover cap onto the HIP.



5.12 Installing the MaRC

5.12.1 Installing the MaRC to the Motor Focus or to the Microscope Body

⚠ DANGER

Electric injury due to live parts

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

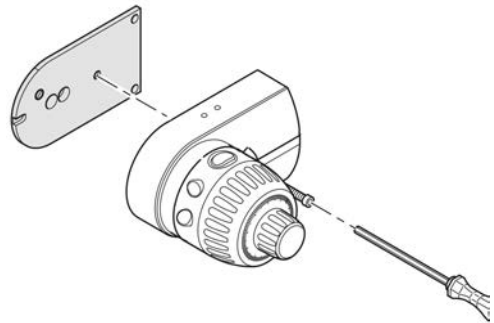
- ▶ Switch off the microscope prior to installing and de-installing components.
- ▶ Disconnect live parts from the power supply.

Info

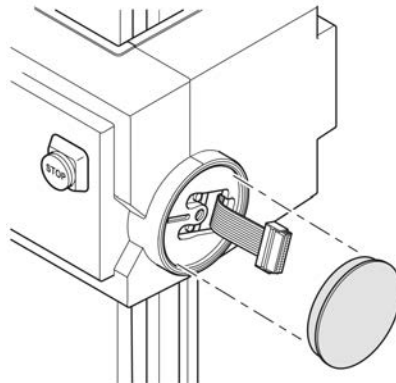
The MaRC can be installed on the motor focus, and on the microscope body. In the following, the installation is explained using the motor focus as example. The procedure is the same for installing the MaRC to the microscope body.

Parts and Tools 🔧 Hex key, 3.0 mm

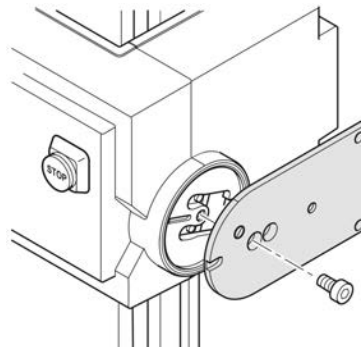
- Procedure**
1. Loosen the screw on the MaRC.
 2. Remove the mounting plate.



3. Remove the cover on the motor focus. Ensure that the connecting cable remains completely inside the housing.

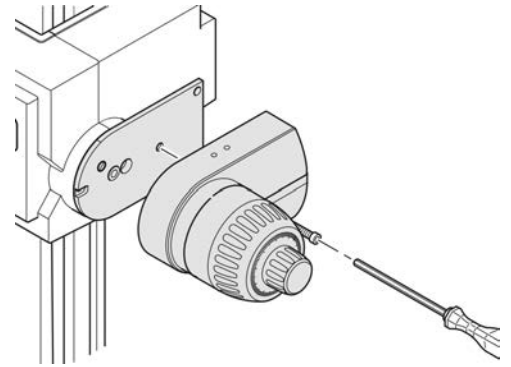


4. Attach the mounting plate with a screw securely to the flange of the motor focus.



- a Insert the screw into the left hole of the mounting plate.
- b Ensure that the orientation pin on the rear side of the mounting plate is seated in the groove provided.

5. Screw the MaRC to the attached mounting plate.

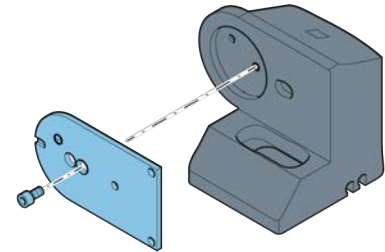


6. Plug the CAN cable RJ 45 into one of the two CAN bus ports on the MaRC (base).
7. Connect it to the motor focus.

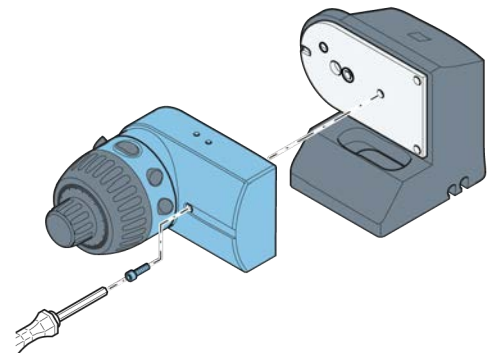
5.12.2 Installing the MaRC to the Table-Top Base

Parts and Tools  Screwdriver, 3.0 mm, ball head

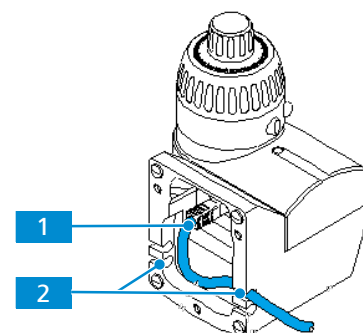
- Procedure**
1. Insert the screw into the right hole of the mounting plate.



2. Secure the mounting plate with screw on the table-top base.
3. Screw the MaRC to the attached mounting plate.



4. Plug the CAN cable RJ 45 **1** into one of the two CAN bus ports of the MaRC (through the underside of the table-top base, and connect to the motor focus).



5. Pull the CAN cable RJ 45 to the outside through one of the two cut-outs **2**.
6. Place the table-top base with MaRC beside the microscope to the right or left.

5.13 Cabling the Microscope

DANGER

Electric injury due to live parts

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

- ▶ Switch off the microscope prior to installing and de-installing components.
- ▶ Disconnect live parts from the power supply.

CAUTION

Risk of burns due to hot power supply unit

- ▶ Only use one power supply unit to connect the CAN bus system of the microscope to the mains. The connection of two or more plug-in power supply units to the CAN bus system is expressly prohibited.
- ▶ The EMS 3 electronic module has an integrated power supply unit. No additional plug-in power supply unit must be connected when using the EMS 3.

Info

For microscopes with EMS 3, connect the motor focus to the EMS 3 module to establish the supply of power. Observe the separate instruction manuals.

Info

Microscope components with RJ45 CAN interface can be connected to the motor focus **or** to the EMS 3, e.g.:

- SteREO Discovery.V12/V20 microscope body
- intermediate photo tube S, motorized
- intermediate Y-tube S, motorized
- LED intermediate tubes
- nosepiece 3x S/doc, coded
- MaRC operation controller
- the external cold light source CL 9000 LED CAN

CAN Components with HD15 CAN interface must be connected to the EMS 3:

- motorized stages S 150x100
- external fluorescence excitation light sources HXP 120 V, HXP 200C

5.13.1 Connecting the Microscope without EMS 3

NOTICE

LED intermediate tubes draw too much current to be powered together with the microscope via a shared plug-in power supply.

Therefore, each LED intermediate tube must be powered as standalone unit with its own plug-in power supply.

- ▶ Do not connect LED intermediate tubes to the microscope via CAN cables.
- ▶ Connect each LED intermediate tube to the mains with its own plug-in power supply unit.

Info

- ▶ Without motor focus: interconnect the CAN components with CAN cables and use one plug-in power supply to establish supply power.
- ▶ If the SteREO Discovery.V12/V20 microscope body is the only available CAN component, connect it directly to the mains via the plug-in power supply unit.
- ▶ Connecting the CL 9000 LED CAN cold light source to the CAN system is only useful, if the EMS 3 controller is present.

- Prerequisite**
- ✓ The HIPs are *installed* [▶ 46].
 - ✓ The microscope is switched off.

- Procedure**
1. Connect the microscope body to the motor focus via the 1 m long CAN cable (with RJ45 plugs).
 2. **NOTICE** Do not connect LED intermediate tubes via CAN cables.
 3. Connect additional CAN components via RJ45 cables to the motor focus, if applicable.
 4. Connect the motor focus to the mains via the provided plug-in power supply unit.
 - a Connect the cable of the power supply unit to a RJ45 socket on the back of the motor focus.
 - b Select the appropriate plug adapter (EURO, US, UK or AUS) and plug it into the power supply unit.
 - c Connect the power supply unit to the mains power.

Info

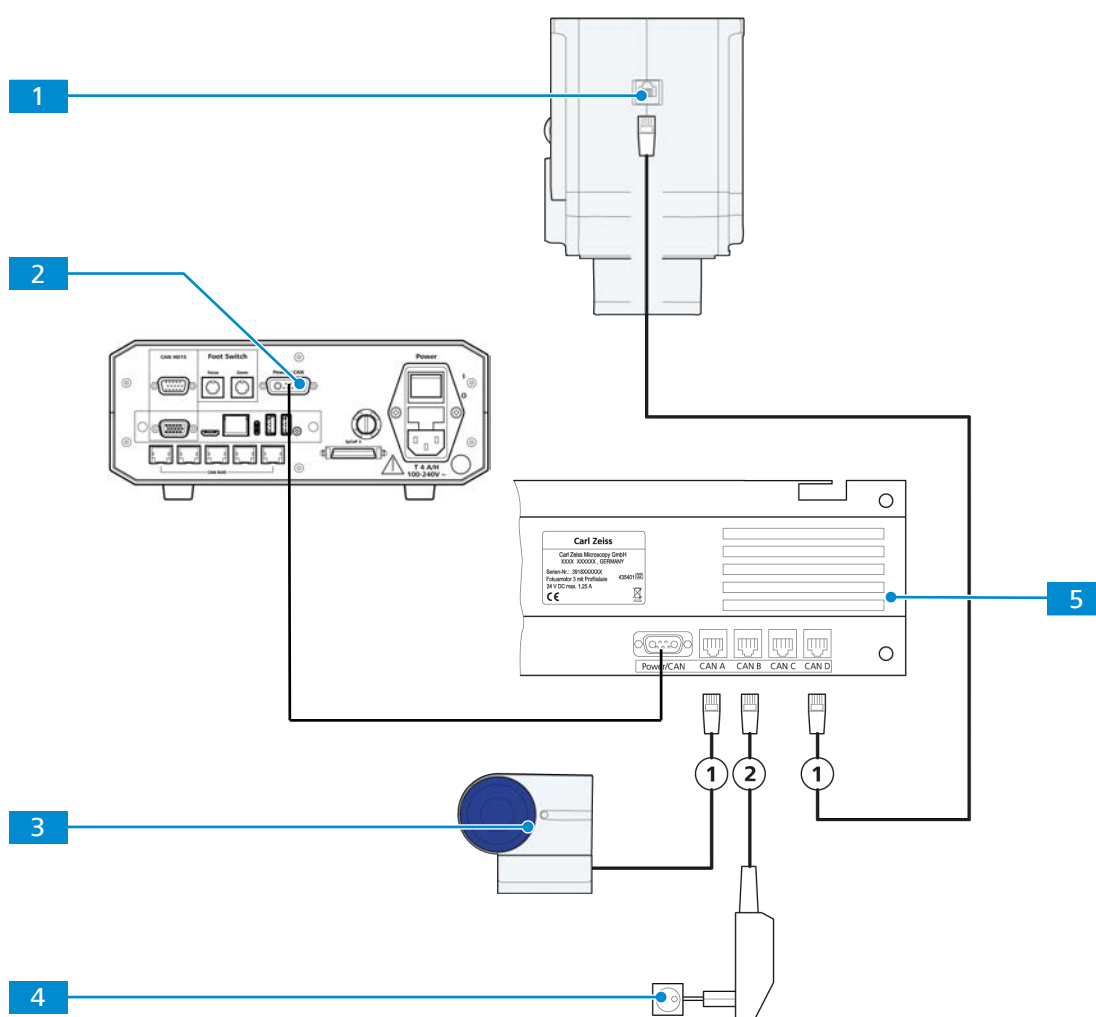
When an EMS 3 is present, it is possible and recommended to *connect the LED intermediate tubes to the CAN network of the microscope* [▶ 52].

5.13.2 Connecting the Microscope with EMS 3

Info

The EMS 3 provides two HD15 CAN ports. A third HD15 CAN component can be connected directly to the workstation via USB-CAN interface, if required.

Microscope components with USB interface must be connected directly to the workstation, e.g. the external fiber optic light sources CL 6000 LED or X-Cite XYLIS II®. Observe the separate instruction manuals.



Parts and Tools  2 x CAN cable RJ 45

Prerequisite  The microscope is installed.

- Procedure**
1. Connect the microscope body **1** (CAN cable) to the motor focus **5**.
 2. Connect the motor focus **5** (cable 435403-9030-000) to the **Power / CAN** **2** port on the EMS 3.
 3. Optional: connect additional CAN components via CAN cables to the motor focus or directly to the interfaces at the backside of the EMS 3 controller.
For example:
 - a MaRC **3** Focus control unit
 - b intermediate tubes via RJ45 CAN interface (including LED intermediate tubes)
 - c external light sources via RJ45 or HD15 CAN interfaces
 - d motorized stages 150x100 via HD15 CAN interface
 4. Optional: Connect additional components (e.g. Sycop 3 or foot pedal) to the EMS 3 and to the mains.
 5. If applicable, connect the EMS 3 to a workstation via USB cable.
 6. Connect the power cord to the EMS 3 and to the mains **4**.

5.13.3 Schematic Drawing of the Power Connections

The microscope must be properly installed with the power cords and supplied socket with protective ground contact securely connected.

The provided electrical connection must be in accordance with the applicable electrical codes for the country of installation. In order to avoid disturbance from other installed machines, you must use a separately fused power socket.

- Do not extend or modify the supplied power cords.
- Do not connect electrical systems that are not authorized by ZEISS on the supplied power supply cord.

NOTICE

Before connecting the main cables and switching on the microscope, check whether your mains voltage is suitable for this microscope.

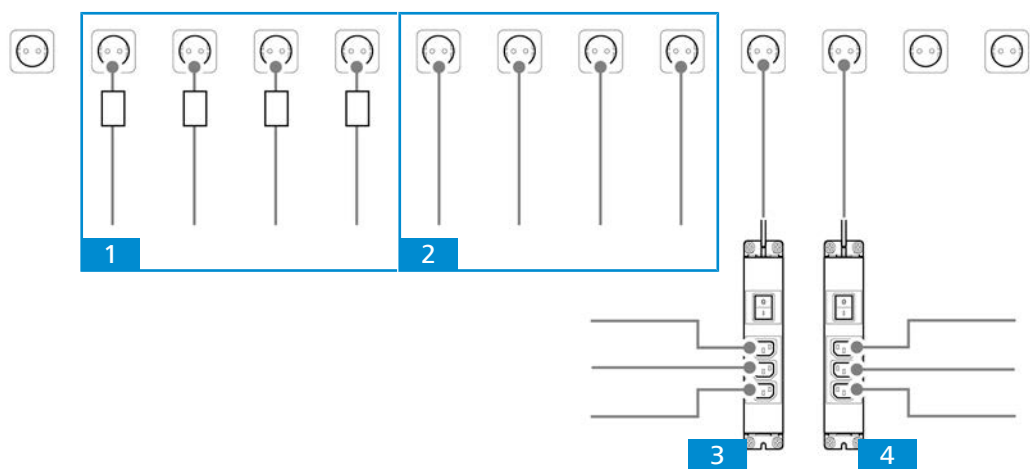


Fig. 11: Schematic drawing of the power connections

The following mains connections are to be made:

Pos.	Mains supply	Components to be connected
1	Direct connection to the mains for components with external power supply	- Microscope body Optional components, e.g.: - Transmitted light base 300 - USB/CAN converter - Multi-controller MC 1500 - Controller MC 1100
2	Direct connection to the mains for components with integrated power supply	Optional components, e.g.: - Thermo plate 3rd light source - CL 1500 HAL - CL 6000 LED - CL 9000 LED CAN - Fluorescence light source - HXP 120 V - HXP 200C - X-Cite XYLIS II®
3	3-point power strip (multipoint connector for PC)	- workstation 1st monitor 2nd monitor
4	3-point power strip (multipoint connector for Components)	- EMS 3 1st light source: - CL 1500 HAL - CL 6000 LED - CL 9000 LED CAN 2nd light source - CL 1500 HAL - CL 6000 LED - CL 9000 LED CAN

6 Operation

This chapter describes switching on/off the microscope as well as the first operating steps with the microscope.

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

Info

For further information on CAN networked systems with EMS 3 and Sycop 3 control see the separate operating instructions for Sycop 3.

6.1 Prerequisites for Commissioning and Operation

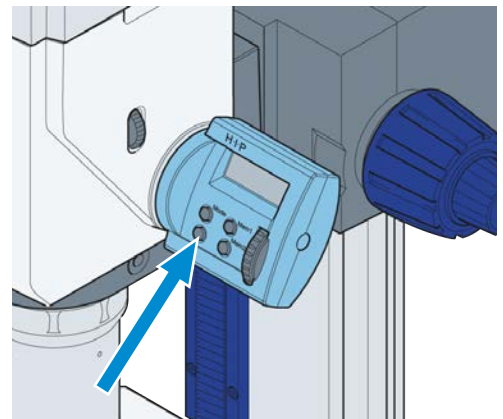
The following basic prerequisites are necessary for commissioning and operation:

- This document was read prior to commissioning or operation and kept for further use.
- The chapter **Safety** was read and understood.
- The operator is acquainted with the general Windows-based programs.
- If required: Basic training and safety briefing were successfully completed.

6.2 Switching On the Microscope without EMS 3

- Prerequisite**
- ✓ All components are connected and operational.
 - ✓ The **STOP** button on the motor focus is released.

- Procedure**
1. Switch on the supply power.
 2. Switch on external accessories, e.g. light sources. Refer to separate instruction manuals, if applicable.
 3. Press the button ① of the HIP (on the microscope body and/or the motor focus).



6.3 Switching On the Microscope with EMS 3

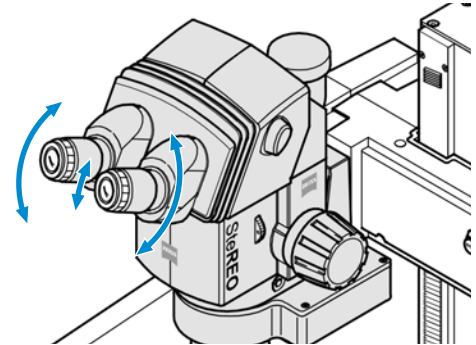
- Prerequisite**
- ✓ All components are connected and operational.
 - ✓ The **STOP** button on the motor focus is released.

- Procedure**
1. Switch on the supply power.
 2. Switch on external accessories, e.g. fiber optic light sources. Refer to separate instruction manuals, if applicable.
 3. Turn on the EMS 3 controller on the **Power** switch at the backside.
 4. Press the Standby button on the front side of the EMS 3 controller.
 - ➔ The microscope has booted, when the HIP displays wake up (~ 20 seconds).

6.4 Adjusting the Stereomicroscope

- Prerequisite**
- ✓ The microscope is switched on and ready for operation.
 - ✓ The lower limit switch is *adjusted* [► 37].

- Procedure**
1. Place a sample in the center of the object plate.
 2. Switch on the illumination.
 3. Fully open the aperture diaphragm in the microscope body by turning the knurled wheel all the way up.
 4. Recheck that the eyepieces are fully inserted into the tube - up to the stop.
 5. Adjust the diopter-setting ring on the eyepieces to "0".
For eyepieces without reticles set "0" to the white dot - with reticles set "0" to the red dot.
 6. Adjust the interpupillary distance by turning the eyepiece tubes while looking through both eyepieces. Only one common circle of light should be visible with both eyes.
In order to see only one circle of light when looking into the eyepieces, a distance of approx. 2 cm must be maintained between the eyes and the eyepiece.



7. Set the zoom to the smallest level of magnification.
8. Realign the illumination, if necessary.
9. Observe the sample through the eyepieces and focus on a prominent object detail in the center using the focusing drive.
10. Zoom in slowly while observing the sample. If the prominent detail gets off center or blurred, move it back to center and re-focus on it.
11. When the maximum zoom position is reached, precisely focus the prominent object detail again.
→ The correct focus plane is now determined. Do not move the focus knobs (or HIP focusing wheel) anymore in this procedure!
12. Set the minimum zoom again and observe the sample through both eyepieces.
13. Correct any image blurring in the left and in the right eye by turning the diopter adjustment ring of each eyepiece separately.
→ This establishes the parfocality of the Discovery Zoom and at the same time compensates for any defective vision.
14. To verify the parfocality, zoom up and down under visual observation through eyepieces. The object must remain in focus. Otherwise, repeat the basic setting procedure.
15. When using a microscope camera, the live image of the camera must also stay in focus. Otherwise, repeat the installation of the camera adapter and the camera.
16. If the user of the microscope changes (or puts on/off glasses), repeat the previous steps to restore the parfocality of the zoom and compensate for defective vision.

6.5 Adjusting the System Settings

Info

If the SteREO Discovery.V12/V20 with motorized zoom and the motor focus are used, the microscope is controlled and configured via the HIP control units.

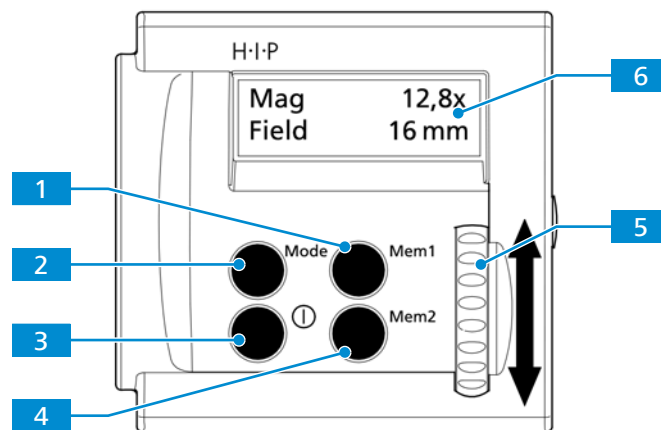
One HIP on the microscope body controls the zooming and displays current optical parameters, the other HIP on the motor focus controls the focusing.

In addition to the HIPs, a *MaRC* [▶ 30] control unit can be used for particularly sensitive focusing and precise zooming. However, it is not suited to set system parameters.

If the Sycop 3 is present, all parameters must be adjusted via the Sycop 3. The setting mode of the HIPs is not accessible in this case.

6.5.1 Adjusting the HIP Settings

To ensure that the HIP displays the correct magnification and optical parameters, the HIP settings must be adjusted before using the microscope for the first time.



Procedure

1. Enter the setting mode of the HIP by pressing the **MODE** button **2** for longer than two seconds.
→ A confirmation signal will sound.
2. Toggle through the system parameters by briefly pressing the **MODE** button **2** several times.
→ The required system parameter is active for setting when it is shown in the upper line of the display **6**.
3. Set the desired parameter values by moving the knurled wheel **5** up/down several times.
4. Proceed in the same way to set other system parameters.
5. Save the settings and exit the setting mode by pressing the **MODE** button **2** for longer than two seconds.
→ A confirmation signal will sound.

To ensure that the HIP displays correct values of the total magnification and the other optical parameters, set the following system parameters:

set lens - select the currently installed objective lens

set eyepiece - select the currently installed eyepiece type

Conv. 1.5x, Tube 1.25x - set the tube factor according to the microscope configuration

Set the other system parameters according to your personal preferences:

zoom speed, backlight, beep level

In the same way, set the system parameters of the HIP on the motor focus according to your personal preferences:

focus speed, backlight, beep level

6.6 Adjusting the Reflected Light Illumination

Prerequisite ✓ *The reflected light illumination is installed [▶ 39].*

- Procedure**
1. Switch on the LED illuminator or the fiber optic cold-light source for reflected light (RL). Refer to the separate user manuals.
 2. Adjust the light guide to the sample.
 3. Adjust the illumination intensity or illumination pattern as required. Refer to the separate user manuals

6.7 Acquiring an Image

- Prerequisite**
- ✓ The microscope is switched on and ready for operation.
 - ✓ The mechanical stops of the motor focus are *adjusted* [▶ 37].
 - ✓ The microscope is *adjusted* [▶ 56].
 - ✓ The illumination is switched on.

- Procedure**
1. Place the sample on the center of the round object plate, respectively on the stage plate.
 2. Sharply focus on the sample.
 3. Re-adjust the illumination, if necessary.
 4. Move the sample until the region of interest is visible through the eyepieces. Use the mechanical stage, the gliding stage, and/or the ball-and-socket stage for precise sample adjustment.
 5. Set the maximum zoom value.
 6. Re-focus on the sample.
 7. Re-adjust the illumination, if necessary.
 8. Zoom down to the desired magnification level.
 - The sample detail stays sharp in focus.

6.8 Controlling the Microscope Using the MaRC

6.8.1 Switching on the MaRC

- Procedure**
1. Connect the MaRC to the motor focus via CAN cable.
 - The MaRC is switched on as soon as the motor focus is connected to the mains power.
 - After power ON, the stored focus position will remain unchanged, provided a focus position was stored and MaRC was switched off properly the last time it was used. If it was not switched off properly, the switch-on focus position will be set as stored value.
 - If a motor focus ready for operation is connected, the blue LED will light up.
 - MaRC is immediately ready for operation.

With EMS 3

Prerequisite ✓ The EMS 3 is connected via CAN bus.

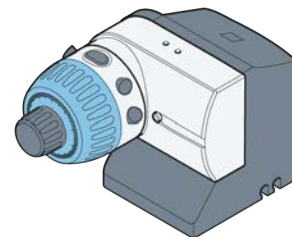
- Procedure**
1. Switch on the EMS 3.
 - The whole microscope including MaRC is switched on.

6.8.2 Controlling the Motor Focus

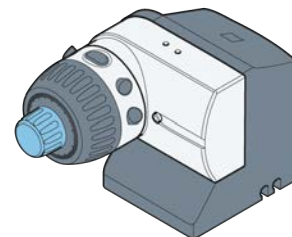
Info

If a motorized zoom body is used, the sensitivity of the coarse/fine drive depends on the set zoom magnification and configured objective.

- Procedure**
1. To control the motor focus quickly, turn the coarse adjustment knob clockwise or counterclockwise.

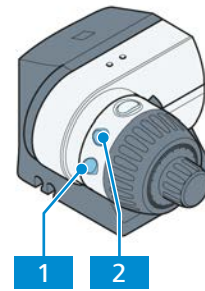


2. To control the motor focus slowly, turn the fine adjustment knob clockwise or counterclockwise.



6.8.3 Travelling to Zoom Click Stop Positions

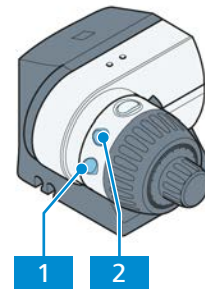
- Procedure** 1. Briefly (≤ 200 ms) press key **1** or **2** to travel the zoom body exactly to the next lower or higher displayable zoom value.



- A click stop counter will be incremented if key **2** is pressed briefly several times.
 - A click stop counter will be decremented if key **1** is pressed briefly several times.
 - The click stop travel of the zoom body starts 200 ms after the last keystroke.
- ↳ Travel will stop exactly at the magnification level indicated on the HIP panels according to the current objective/eyepiece combination.

6.8.4 Fast Zooming In or Out

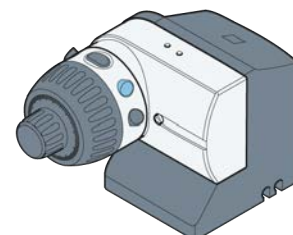
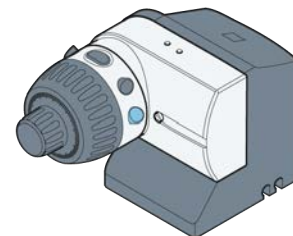
- Procedure** 1. Press key **1** or **2** for > 200 ms to start continuous zooming.



- **Info** The attainable maximum speed depends on the currently active speed profile set via HIP.
 - At first the speed will increase linearly with the duration of the keystroke until the maximum speed is reached.
- ↳ It will not stop until the respective key is released or the limit position is reached.

6.8.5 Fast Focusing Upwards or Downwards

- Procedure** 1. Press the lower key to move the motor control upwards.
2. Press the upper key to move the motor control downwards.



- **Info** The attainable maximum speed depends on the currently active speed profile set via HIP.
- At first the speed will increase linearly with the duration of the keystroke until the maximum speed is reached.
- ↳ It will not stop until the respective key is released or the limit position is reached.

6.8.6 Saving a Focus Position

- Procedure**
1. To store the current focus position press the key for 2 to 5 seconds.



- ↳ The green LED will briefly light up and one short beep tone on the motor focus issued to indicate completion of the storing process after 2 seconds.

6.8.7 Traveling to the Saved Focus Position

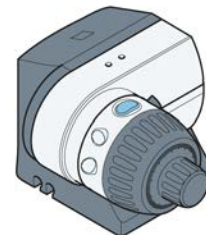
- Procedure**
1. To travel the motor to the stored focus position, press the key for < 2 seconds.



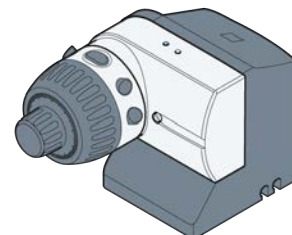
6.8.8 Reversing Rotation of MaRC

Reversal of the direction of rotation means that the MaRC control unit can be mounted and operated either to the right (for right-handed persons) or to the left of the microscope (left-handed persons).

- Procedure**
1. To reverse the direction of rotation, press the key for more than 5 seconds.



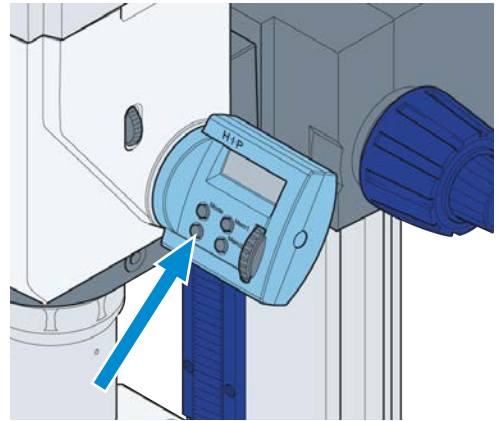
- First of all, a single beep tone will be issued.
- Then two tones will be issued and the green control lamp will flash once or twice.



- ↳ The reversal has been completed.

6.9 Switching Off the Microscope without EMS 3

- Procedure**
1. On the HIPs of zoom body and motor focus, briefly press the  button.



2. Switch off the external accessories with separate power supplies (e.g. LED illuminators, fiber optic light sources, heating plates). Refer to the separate instruction manuals, if applicable.
3. Disconnect the supply power (e.g. by pulling the power cable, or by switching off the external power strip).
4. Protect the microscope using a dust cover.

NOTICE

Communication errors due to insufficient switching off-procedure

Switching on/standby via the HIP units "only" is not sufficient.

If MaRC is used in systems without EMS 3, always disconnect the supply power after switching off the microscope. This ensures that the data connection between MaRC and the zoom body is updated when the microscope is restarted and avoids potential communication errors.

6.10 Switching Off the Microscope with EMS 3

- Procedure**
1. Press the Standby button on the front side of the EMS 3 controller.
 2. Wait until the displays of the HIP units are turned off.
 3. Turn off the EMS 3 controller on the **Power** switch at the backside.
 4. Switch off the external light sources. Refer to separate instruction manuals, if applicable.
 5. Protect the microscope using a dust cover.

7 Care and Maintenance

To ensure the best possible performance of the microscope and its components, maintenance must be performed on a regular basis. Keep the service logs of the microscope.

To maintain operational safety and reliability of the microscope, we recommend entering into a **ZEISS Protect Service Agreement**.

Info

Contact the ZEISS service representative to learn more about the **ZEISS Predictive Service**.

7.1 Maintenance Schedule

The recommended intervals for maintenance depend on the total uptime of the microscope.

Interval	Part/Component	Activity
If required	Motor focus	<i>Adjust the limit switches [▶ 37].</i>
If required	Manual focusing drive	<i>Adjust the torque [▶ 38].</i>

7.2 Care and Cleaning Work

To ensure the best possible performance of the microscope and its components, maintenance must be performed on a regular basis. Keep the service logs of the microscope.

To maintain operational safety and reliability of the microscope, we recommend entering into a **ZEISS Protect Service Agreement**.

Info

Contact the ZEISS service representative to learn more about the **ZEISS Predictive Service**.

DANGER

Electric injury due to live parts

When the microscope and its components are still switched on, coming in contact with live parts can lead to electric shock or burn.

- ▶ Switch off the microscope and its components prior to opening or cleaning.
- ▶ Disconnect the microscope and its components from the mains.

NOTICE

Functional impairment due to dirt, dust and moisture

Dirt, dust, and moisture can impair the microscope and its components functionality and can cause short-circuits. Blocking or covering ventilation slots can lead to a build-up of heat that can damage the device and, in extreme cases, cause a fire.

- ▶ Use the dust protection cover if the microscope is not used.
- ▶ The ventilation slots must be unobstructed at all times and the heat sink (if available) must be unobstructed.
- ▶ Do not insert any objects or allow them to fall into the ventilation slots.
- ▶ Perform regular maintenance and cleaning according to the instructions in this document and according to the instructions in the applicable documents.
- ▶ Make sure that no cleaning liquid or moisture gets inside the microscope and its components.
- ▶ In case of damage, the affected parts of the microscope must be taken out of operation.

7.2.1 Cleaning an Optical Surface

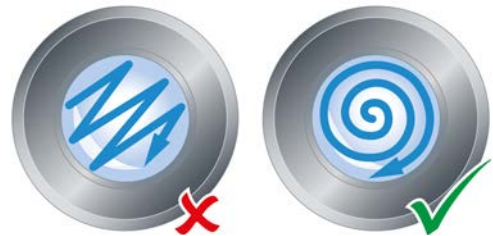
NOTICE

Damage of optical surfaces due to improper cleaning

- ▶ Remove dust from the optical surface slowly and carefully.
- ▶ Remove dust on optical surfaces with a natural-hair brush or blow it off with a dust blower.
- ▶ Avoid touching optical surfaces with fingers.
- ▶ Never use abrasive compounds or cleaners.

- Parts and Tools**
- 🔧 Clean cloth
 - 🔧 Cotton swab
 - 🔧 Distilled water
 - 🔧 Optical cleaning solution (70 % ethanol)
 - 🔧 Lint-free cloth

- Procedure**
1. Moisten a cotton swab or a clean cloth with distilled water or, if necessary, with an optical cleaning solution.
 2. Wipe optical surfaces in a circular motion towards the edge of the optics with slight pressure.



3. Dry with a lint-free cloth.

7.2.2 Removing Water-Soluble Contamination

- Parts and Tools**
- 🔧 Clean cloth
 - 🔧 Lint-free cloth

- Prerequisite** ✓ The microscope and its components are switched off and disconnected from the power supply.

- Procedure**
1. Remove dust and loose dirt particles with a soft brush or clean lint-free cloth.
 2. If necessary, moisten a clean cloth with water.

Info A mild detergent (no solvent!) may be added to the water for stubborn dirt.
 3. Wipe off the area with the moistened cloth.

Info Labels on the device may only be cleaned using a dry cloth.
 4. Dry with a lint-free cloth.

8 Troubleshooting

The following table provides information about solving common problems.

Info

If you cannot solve the problem or if you are unsure about a certain technical difficulty, contact your local ZEISS service representative.

Affected component	Symptom	Cause	Measure
Focus drive	The focus drive moves down by itself.	Focus drive is set too light / torque setting is too low to bear the load on the carrier or the nosepiece	<i>Increase the torque of the manual focus drive [▶ 38].</i>
	The coarse focusing knob of the focus drive can only be turned with great effort.	The focus drive is set too stiff / the torque setting is too high.	<i>Decrease the torque of the manual focus drive [▶ 38].</i>
	The coarse focusing knob can only be turned with great effort - but if the torque is reduced, the focus drive moves down by itself.	The total load on the carrier, or the nosepiece is more than 10 kg.	Use the motor focus.
	The visual image becomes blurred while zooming.	Focus plane not set correctly.	Set the focus plane correctly. <i>Adjust the microscope [▶ 56].</i>
		Defective vision not compensated properly.	<i>Adjust the microscope [▶ 56].</i>
HIP	The HIP cannot be switched on by pressing  button.	Mains supply interrupted.	Check and restore mains supply.
			Check, if the HIP is correct installed [▶ 46] and connected [▶ 50].
	The HIP cannot be switched on/off by pressing the  button. The setting mode cannot be accessed by a long press on the MODE button.	Sycop 3 is present and took over system control.	1. Switch on the microscope using the Sycop 3. 2. Change the system settings via Sycop 3.
	The microscope is switched on, but focusing with HIP is not possible.	The STOP button is pressed.	<i>Unlock the STOP button [▶ 17].</i>
	The HIP for zoom control does not show correct magnification or other optical values.		<i>Set the correct parameters [▶ 57].</i>

Affected component	Symptom	Cause	Measure
MaRC	The microscope is switched on, but focusing with MaRC is not possible.	The STOP button is pressed.	<i>Unlock the STOP button [► 17].</i>
	The zoom or focus buttons of the MaRC rotary control unit show unexpected behavior.	MaRC has lost data connection to the microscope body.	1. Switch off the microscope and disconnect it from the mains power (e.g., by switching off/on the power strip, if used). 2. Reconnect the microscope to the mains power. 3. Restart the microscope.
Camera	The camera live image becomes blurred while zooming.		Set the focus plane correctly. Focus a ROI in maximum zoom position. It must stay sharp when zooming down.
		The camera adapter is not correctly installed.	<i>Re-install the camera adapter [► 44].</i>
Sycop 3 or foot pedal	Unexpected focusing, zooming or stage movement (Sycop 3 or foot pedal present).	The foot pedal is pressed accidentally.	Release the foot pedal.
		The Sycop 3 joystick is pressed accidentally	Release the Sycop 3 joystick.

9 Decommissioning and Disposal

This chapter contains information on the decommissioning and disposal of the microscope, its accessories and expansions.

9.1 Decommissioning

If the microscope and its components are not used for an extended period of time such as several months, they should be shut down completely and secured against unauthorized access.

DANGER

Electric injury due to live parts

When the microscope and its components are still switched on, coming in contact with live parts can lead to electric shock or burn.

- ▶ Switch off the microscope and its components prior to opening or cleaning.
- ▶ Disconnect the microscope and its components from the mains.

- Procedure**
1. Switch off the *SteREO Discovery* [[▶ 62](#)].
 2. Unplug all separately controllable electronic components.
 3. Pull the mains plug.

9.2 Transport and Storage

The following regulations must be observed before and during transport:

- Use devices (e.g. handles, fork lifts or hand pallet trucks) to transport the microscope safely to the installation room. The microscope may only be transported in air-suspended vehicles. Devices for transporting the microscope must be rated to handle its full weight and dimensions.
 - Moving parts must be secured during transport to prevent them from slipping or tipping over.
 - Avoid rocking the transport boxes back and forth.
 - Note the weight information on the package and on the shipping document.
 - Where possible, the original packaging must be used for shipping or transport.
- Maximum shock resistance**
- Do not drop or bump the boxes during movement or storage. Acceleration must not exceed 10 g.
 - Evaluate packaging shock and tilting sensors on delivery and after internal transport.

- Allowable environmental conditions**
- Transport and storage in shipping packaging:
- Between -40 °C and +70 °C

Storage without packaging:

- Between +10 °C and +40 °C
- Relative humidity less than 75 % at +35 °C

Info

24 hours before installation of the microscope it is required that the transport boxes are at recommended room temperature to avoid ingress of humidity, which is harmful to optical parts, and to ensure effective stability of the microscope during installation and testing.

Info

Detailed information on transport and storage is available from your ZEISS Sales & Service Partner.

9.2.1 Weight and Sizes of the Transported Goods

For the weight and dimensions of the shipment crates or boxes for your specific microscope system configuration, contact your ZEISS Sales & Service Partner. Below is an example of the boxes that may be delivered.

Box	Box contents	Length x Width x Height	Weight
Large box for stand and accessories	SteREO Discovery Series microscope body and other accessories, which depends on the system configuration e.g.:	1200 mm x 800 mm x 960 mm	100 - 300 kg
Small box for stand and accessories		800 mm x 600 mm x 906 mm	≤ 100 kg
Small box for stand and accessories	▪ Sycop 3 ▪ EMS 3 ▪ Workstation ▪ Additional accessories e.g. light sources, or cameras	800 mm x 600 mm x 640 - 1180 mm	

9.2.2 Transporting over Short Distances

CAUTION

Muscle strains and back injuries due to heavy weight

The microscope is heavy. Wrong handling, e.g. lifting alone, might lead to injuries or damage the microscope.

- ▶ Organize an assistance for transportation.
- ▶ Only transport the microscope over short distances, i.e. within the same building.
- ▶ Use the supplied grip holders for lifting or transporting the microscope.
- ▶ Do not attempt to grab the microscope anywhere else for lifting or transporting the microscope.
- ▶ Transport of the microscope over long distances may only be performed by the ZEISS service representative.

For relocating the microscope within a laboratory, follow this procedure:

- Procedure**
1. Move the focusing drive down to its bottom mechanical stop.
 2. *Switch off the microscope* [▶ 62].
 3. Disconnect all cable connections.
 4. Pull the mains plug.
 5. *Remove the binocular tube* [▶ 36].
 6. Remove the intermediate tube.
 7. *Remove objectives* [▶ 35].
 8. *Remove the microscope body* [▶ 34].
 9. *Remove the transillumination unit 450* [▶ 77].
 10. Taking the microscope by the recessed grip wells at the stand base, lift it up and carry it.
 11. Reinstall the disassembled components.
 12. Establish all cable connections correctly.
 13. Switch on the microscope.

9.3 Disposal

The microscope and its components must not be disposed of as domestic waste or through municipal disposal companies. They must be disposed of in accordance with applicable regulations (WEEE Directive 2012/19/EU). ZEISS has implemented a system for the return and recycling of devices in member states of the European Union that ensures suitable reuse according to the EU Directives mentioned.

Info

Detailed information on disposal and recycling is available from your ZEISS Sales & Service Partner.

The customer is responsible for decontamination.

9.4 Decontamination

A decontamination statement must be submitted before returning any used objects to the ZEISS location.

If reliable decontamination cannot be guaranteed, the hazard must be marked according to applicable regulations. In general, a well-visible warning sign must be affixed to the article itself and to the outside of the packaging, together with detailed information on the type of contamination.

10 Technical Data and Conformity

This chapter contains important technical data as well as information on the conformity.

10.1 Performance Data and Specifications

Weight and Sizes The table below gives some indication on the approximate weight and sizes of the unpacked items.

Main Components	Width (mm)	Depth (mm)	Height (mm)	Weight (kg)
SteREO Discovery.V8	450	433	521	≥ 25 kg
SteREO Discovery.V12 SteREO Discovery.V20	594	457	520	≥ 30 kg

Location requirements The microscope may only be operated in closed rooms. The microscope should not be installed near radiators or windows with direct sunlight. The microscope must be placed securely on the table surface to prevent slipping and falling.

Compliance with the installation requirements of the microscope is the responsibility of the customer. The requested supplies must be readily available at the time of installation.

Installation site	Exclusively inside buildings
Altitude	Max. 2000 m above sea level
Atmospheric pressure	Min. 800 hPa

Air Conditioning and Quality

	Value
Temperature range for operation with indicated performance (24 h per day, regardless of whether the microscope is in operation or switched off)	+10 to +40 °C
Temperature range for operation with X-Cite XYLIS II®	+15 to +30 °C
Relative humidity	< 75 % at 30°C
Atmospheric pressure	800 to 1060 hPa
Pollution degree	2

Mains connection The microscope must be plugged into a properly installed power socket with protective earth contact using the supplied mains cable. The protective earth connection must not be impaired by the use of extension cables.

	Value
Nominal AC voltage	L+N+PE 100 to 240 VAC $\pm$ 10 %
Nominal frequency	50 - 60 Hz
Main Power Plug	Local mains plug will be supplied.
Power consumption	max. 700 mA
Protection class	IP40 (IEC 60529)
IEC earth class	Class 1 of IEC 61140 All chassis are connected to electrical earth by the earth cable in the mains cable.
Overvoltage Category	II
Output voltage	24 VDC stabilized: 1.25 A, 30 W

10.2 Applicable Standards and Regulations

The SteREO Discovery Series is a product for research purposes only. It conforms to current international standards (e.g. IEC 61010-1) as well as to harmonized standards of the applied EU directives.

The SteREO Discovery Series complies with the following EU directives:

2011/65/EU and delegated directive (EU) 2015/863	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), amended by Commission Delegated Directive (EU) 2015/863 of 31 March 2015
2012/19/EU	WEEE Directive
2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility
2014/35/EU	Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
(EC) No 1907/2006	Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Not for therapeutic use, treatment, or medical diagnostic evidence. Not all products are available in every country. Observe all general and country-specific safety regulations as well as applicable environmental protection laws and regulations.

ZEISS conforms to the following management system standards: ISO 9001, ISO 13485, ISO 14001, and ISO 50001.

10.3 Declaration of China RoHS

Information table of names and content of hazardous substances in the product:

Hazardous Substances										
Part Name	Pb	Hg	Cd	Cr6+	PBBs	PBDEs	DBP	DIBP	BBP	DEHP
Cables	x	o	o	o	o	o	o	o	o	o
Electronical Parts	x	o	x	o	o	o	o	o	o	o
Optical Parts	x	o	o	o	o	o	o	o	o	o
Mechanical Parts	x	o	x	o	o	o	o	o	o	o
Lamps	x	x	x	o	o	o	o	o	o	o

Note 1:

O: Indicates that the content of this hazardous substance in all homogeneous materials of this component does not exceed the requirements of the national standard for restriction of hazardous substances in electrical and electronic products.

X: Indicates that the content of this hazardous substance in at least one homogeneous material of this component exceeds the requirements of the national standard for restriction of hazardous substances in electrical and electronic products.

Note 2:

Components not listed above indicate that their hazardous substance content does not exceed the requirements of the national standard for restriction of hazardous substances in electrical and electronic products.

11 Accessories and System Expansions

Only the following accessories may be used with the microscope as their safe use has been confirmed by ZEISS. Only original parts from ZEISS may be used. Check in advance whether your microscope can be retrofitted with a system expansion or accessories.

After installation or conversion it must be carefully checked whether the microscope and its system expansions/accessories are in a safe operational state and whether unused ports are closed. For details and safety measures refer to the associated documents.

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

11.1 PentaFluar S Vertical Illuminator

Position The PentaFluar S vertical illuminator is mounted directly on the microscope body, below the binocular tube. If desired, a further intermediate tube can be mounted above the PentaFluar S vertical illuminator.

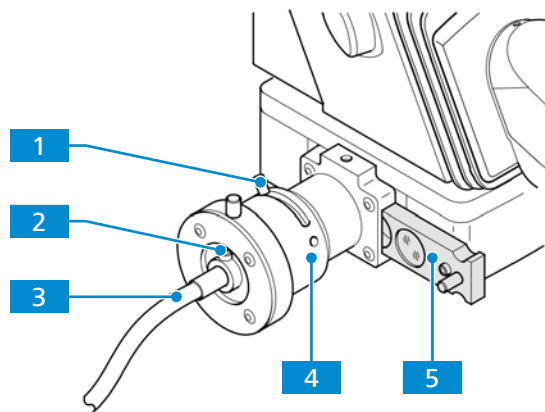


Fig. 12: Controls of the PentaFluar S vertical illuminator

- | | |
|--|------------------------|
| 1 Lever to open/close the diaphragm | 2 Clamp screw |
| 3 Optical fiber | 4 Mounting port |
| 5 Filter slider | |

Function The filter slider **5** has the following functions:

- Pulled out: blocking position
- Middle position: free aperture, working position
- Pulled in: additional filter BG38 for attenuation of a possible reddish background

The PentaFluar S vertical illuminator can be combined with the following fluorescence excitation illuminators:

- HXP 120 V
- HXP 200C
- X-Cite XYLIS II®

11.1.1 Labels on the PentaFluar S Vertical Illuminator

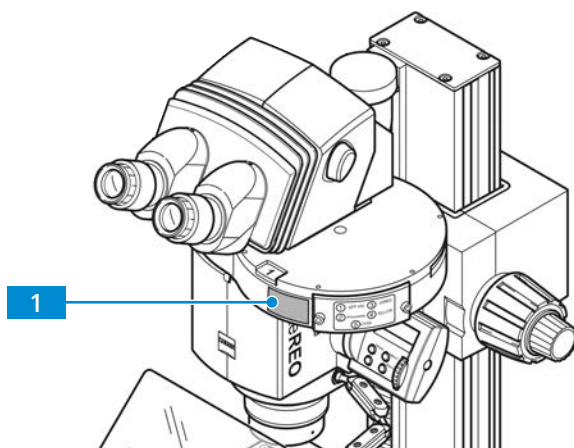


Fig. 13: Labels on the PentaFluar S vertical illuminator

Pos.	Label or light	Explanation
1		Warning: UV-radiation inside Switch off the light source before opening the cover.

11.1.2 Installing the PentaFluar S Vertical Illuminator

NOTICE

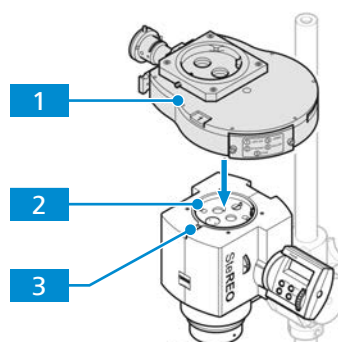
Install the PentaFluar S directly on top of the microscope body. If an additional intermediate tube is required, ensure that it is installed above the PentaFluar S vertical illuminator.

Parts and Tools

- 🔑 Hex key, 3.0 mm
- 🔑 Screwdriver, 3.0 mm, ball head

Prerequisite ✓ *The binocular tube is removed [▶ 36].*

- Procedure**
1. Hold the PentaFluar S vertical illuminator with the connector for the illumination equipment pointing to the left.
 2. Insert the PentaFluar S vertical illuminator with the dovetail ring into the tube mount **1** **2** on the microscope body.
 3. Tighten the screw **3**.
 4. *Install the anti-glare shield [▶ 36].*
 5. *If required, install an intermediate tube (intermediate phototube, drawing tube or Y-tube).*
 6. *Install the binocular tube [▶ 36].*



11.1.3 Installing the Liquid Light Guide

⚠ WARNING

Hazardous light emission

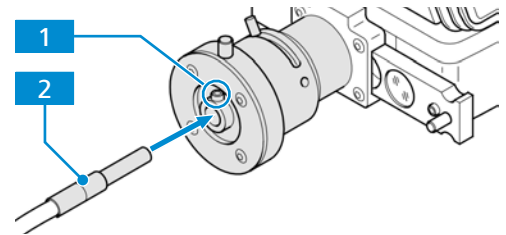
Accidentally or intentionally looking into emitted light of the light source can damage the eye.

- ▶ Never look directly into the light-emitting aperture of the light source.
- ▶ Before installing or removing the light source always make sure it is switched off.

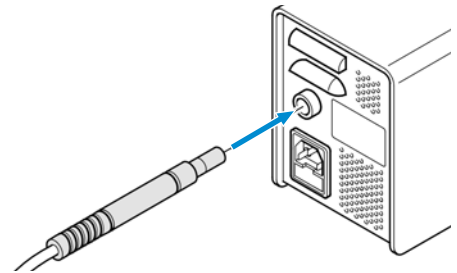
Parts and Tools 🔧 Hex key, 1.5 mm

Prerequisite ✓ The PentaFluar S vertical illuminator is installed [▶ 74].

Procedure 1. Loosen the screw **1** on the mounting port of the PentaFluar S vertical illuminator.



2. Push the thin end of the liquid light guide **2** into the mounting port as far as it will go .
3. Tighten the screw.
4. Push the larger end of the liquid light guide into the fluorescence excitation illuminator as far as it will go.



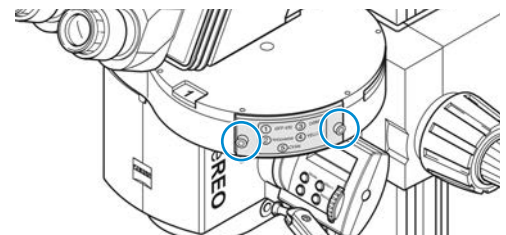
5. Connect the light source to the power supply.

11.1.4 Installing Filter Blocks into the PentaFluar S Vertical Illuminator

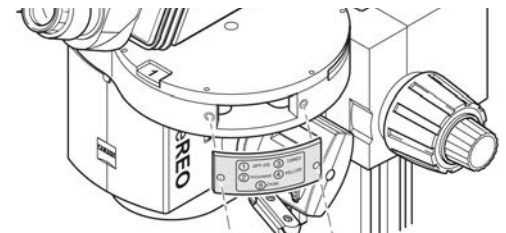
Parts and Tools 🔧 Hex key, 1.5 mm

Prerequisite ✓ The light source is switched off.

Procedure 1. Remove two screws from the mounting aperture of the PentaFluar S vertical illuminator.

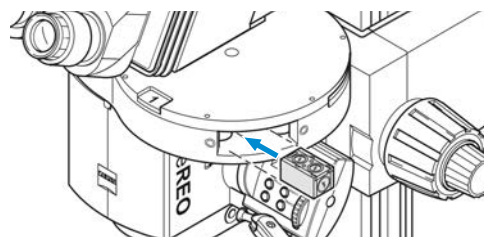


2. Remove the cover.

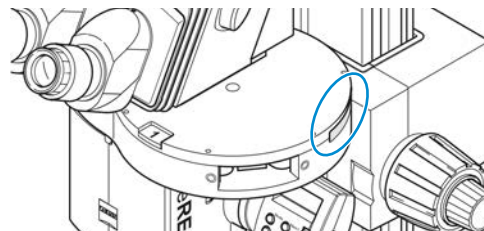


3. Hold the filter block with the barrier filters pointing up and the exciter filter pointing outward.

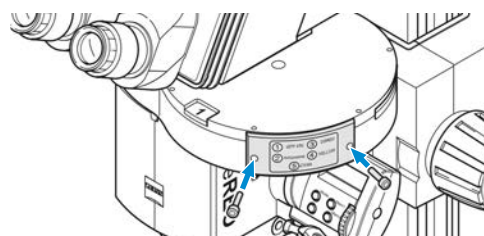
4. Push in the filter block through the installation aperture until the magnetic fixation device catches the filter block and positions it in the correct place.



5. Turn the filter wheel by one position.



6. Insert the next filter block.
7. Proceed in the same way for all other filter blocks.
8. Install the cover.
9. Tighten the two screws.



10. Affix the supplied self-adhesive labels for the filter combinations to the cover allocated to the corresponding position numbers.

Proceed in the reverse order for removal.

11.2 Transillumination Unit 450

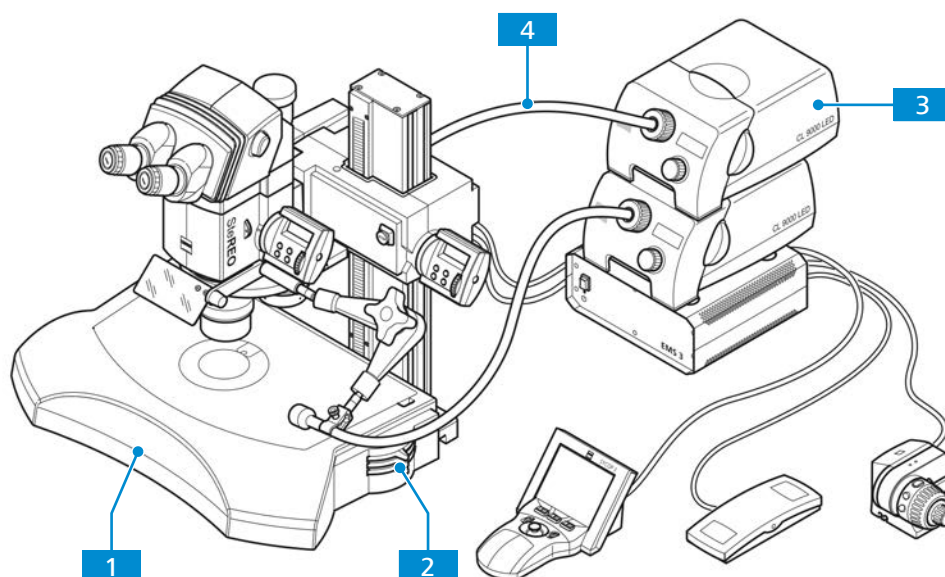


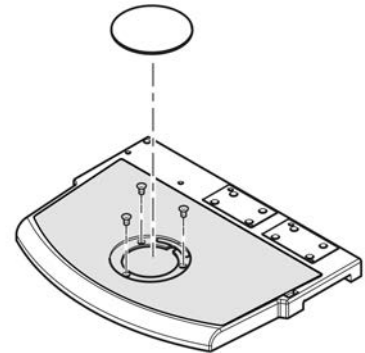
Fig. 14: Lighting control

- | | |
|---|-----------------------------|
| 1 Transillumination unit 450 | 2 Lighting controls |
| 3 Cold light source for transillumination unit 450 | 4 Supply light guide |

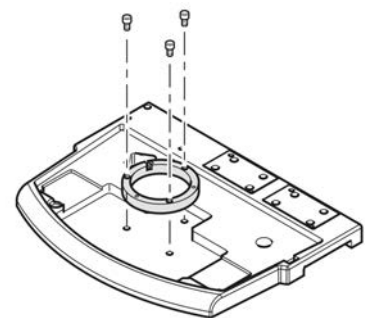
11.2.1 Installing the Transillumination Unit 450

Parts and Tools  Hex key, 3.0 mm

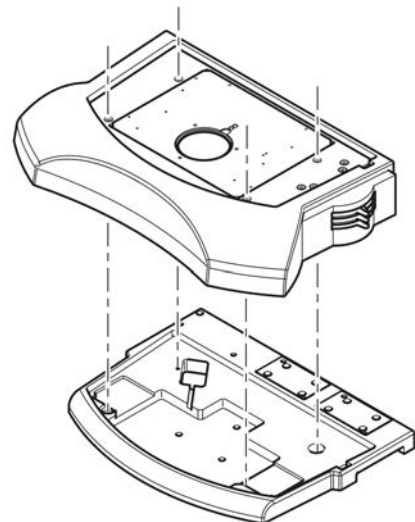
Procedure 1. Loosen the three short Allen screws.



2. Remove the insert plate.
3. Loosen the three Allen screws of the adapter ring.

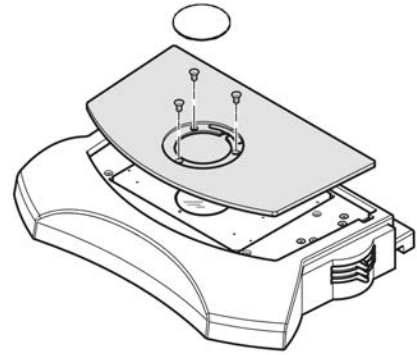


4. Remove the adapter ring.
5. Put the transillumination unit 450 laterally correct onto the stand base. Ensure that the two large plastic taper pins on the bottom of the transillumination unit 450 engage with the respective holes of the stand base.
6. Fix the transillumination unit 450 with four Allen screws.

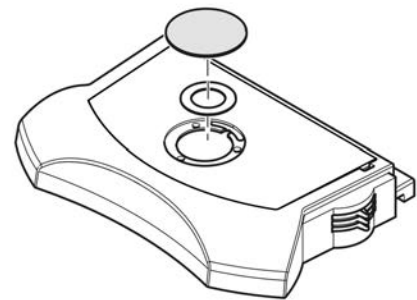


7. Put the insert plate onto the transillumination unit 450.

8. Insert the opal glass plate $D = 84 \text{ mm}$ to avoid that screws and other small parts get lost during the further installation work.



9. Fix the insert plate (without stage adapter) with three Allen screws to the transillumination unit 450.
10. Remove the opal glass plate.
11. Insert the insert 52/84 into the small opening of the insert plate.

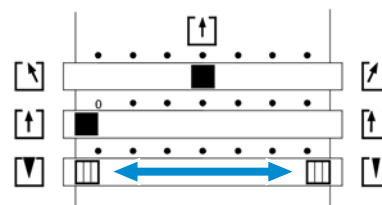


12. If required, install a stage.
13. If no stage is installed, insert the 120 mm glass plate into the large opening of the insert plate.

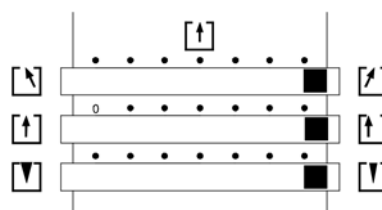
11.2.2 Adjusting the Transillumination Unit 450

- Prerequisite**
- ✓ The transillumination unit 450 is connected.
 - ✓ The cold light source of the transillumination unit 450 is switched on.

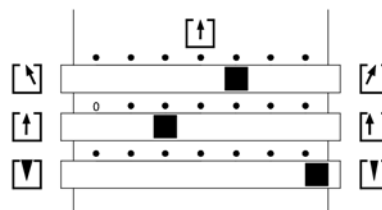
- Procedure**
1. For low levels of magnification, insert the Ø 84 mm opal glass plate.
 2. To avoid glare by transmitted light, swivel in the anti-glare shield.
 3. Adjust the illumination intensity of the cold light source.
 4. Set the desired transmitted light contrast using the lighting controls.
 - a Settings for transmitted light brightfield:



- b Settings for transmitted light darkfield:



- c Settings for transmitted light oblique illumination:



Several intermediate positions can be used to optimize the contrast:

Symbol	Technical description	Applicative description
	Light bundle emerges vertically (reflector inclined 45°)	Bright field
	Inclination of the light bundle to the observer (risk of glare!)	Oblique illumination
	Inclination of light bundle away from the observer	Oblique illumination
	Translation of the light bundle to the observer	Oblique illumination
	White reflector surface of the mirror	Diffuse light quality
	Mirroring reflector surface of the mirror	Directed light quality (more contrast)

11.3 Coaxial Epi-Illuminator S

Purpose The coaxial epi-illuminator S is intended for the illumination of flat, highly reflective objects (e.g. wafers, polished sections). Positioned horizontally, the surface appears bright, in high-contrast and free of hotspots.

The coaxial epi-illuminator S may also be used as a bright field illuminator of spatial objects with matt, diffusely reflecting surfaces. Diffuse surfaces also are illuminated, but appear in the eye-pieces with significantly lower brightness.

The Coaxial Epi-illuminator S is suitable for microscopes with a carrier for a single objective only. If the combination of a coaxial epi-illumination with a 3-position nosepiece is required, the "objective nosepiece, coax" must be used.

Info

The coaxial epi-illuminator S is not suitable for illuminating spatial, specularly reflective objects. Non-horizontal, mirror-like surfaces appear completely dark.

Info

Hints for application with specular (mirror-like) reflection

In case of specular reflection, i.e., with flat objects reflecting the light of the illumination source directly into the objective, vignetting of the field of view are possible when using low zoom magnifications.

Using SteREO Discovery.V12 or SteREO Discovery.V20 with eyepieces 10x/23, the Plan Apo S 1.0x objective works nearly without vignetting.

Using SteREO Discovery.V8 with eyepieces 10x/23, the Plan Apo S 1.0x, Plan S 1.0x, and Achromat S 1.5x objectives are nearly without vignetting. The documentation remains unimpaired in these cases.

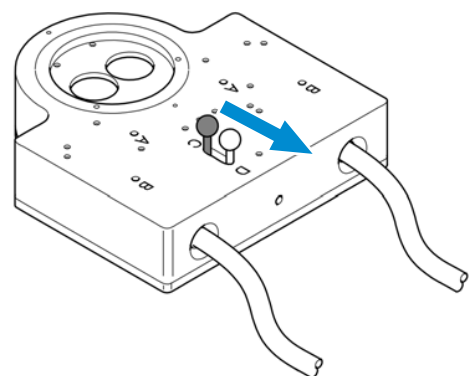
With objectives > 1.0x higher magnifications and a better resolution can be achieved. Vignetting, however, should be considered when choosing the eyepiece. The coaxial epi-illuminator S is not recommended for objectives with magnifications < 1.0x, because the vignetting-free illuminated object fields are smaller than with 1.0x objectives.

11.3.1 Installing the Coaxial Epi-Illumination S

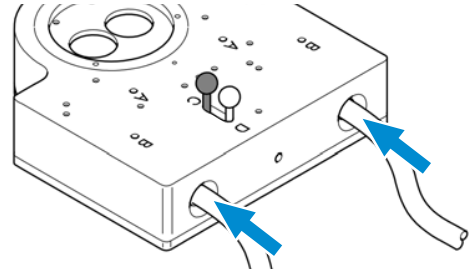
Parts and Tools  Hex key, 3.0 mm

- Prerequisite**
- ✓ The microscope is assembled [▶ 34].
 - ✓ The microscope carrier for a single objective is mounted in L-position.
 - ✓ The focusing drive is in the topmost position.

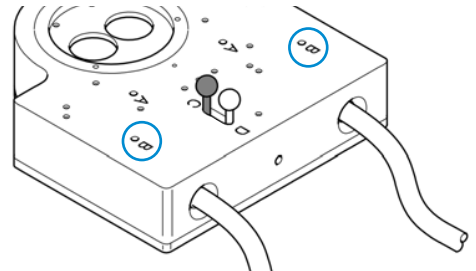
- Procedure**
1. On the bottom of the epi-illuminator S, move the switching lever backwards to position **D** and retain it.
- NOTICE** To use the coaxial EPI illumination S with objective slider S/doc, unscrew the switching lever for light guide positioning and screw it in at the hole at the back of the epi-illuminator S.



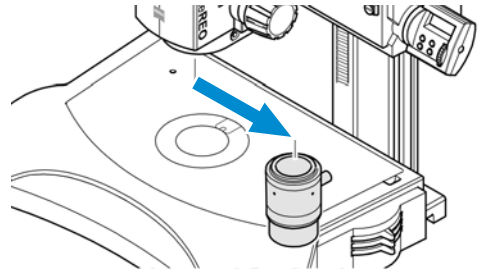
2. Insert both light guide arms carefully into the back holes of the epi-illuminator S.
 - a Make sure that the end sleeve of the light guide is pushed past the clamping screws at the drill holes **B**.
 - b If necessary, loosen the clamping screws slightly to let the light guide pass through.



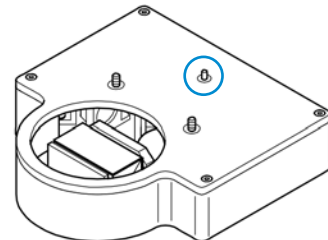
3. Thread the light guide arms into the light guide slot and push them to stop.
4. Tighten the clamping screws through the drill holes **B**.



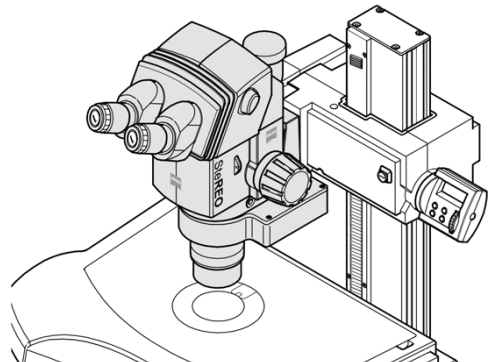
5. Unscrew the objective from the microscope body.



6. Turn the coaxial epi-illuminator S around.
 - ➔ The guide pin is facing upwards.



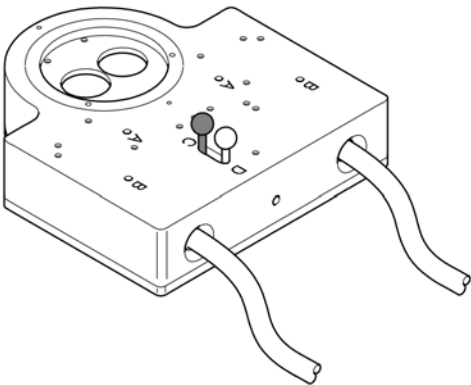
7. Insert the rear guide pin and the two clamping screws into the holes under the mount S and hold the coaxial epi-illuminator S in position.
8. Attach the coaxial epi-illuminator S by fastening the two screws through the holes **A** in the mount S.
9. Screw the objective [▶ 35] into the coaxial epi-illuminator S or install the objective slider S/doc [▶ 83].



11.3.2 Adjusting the Coaxial Epi-illuminator S

- Prerequisite**
- ✓ The microscope is operational.
 - ✓ The coaxial epi-illuminator S is *installed* [▶ 80].

- Procedure**
1. Set the lever to position **C** or **D** to optimize homogeneity and minimize vignetting (depending on objective and sample).



2. To use the coaxial epi-illuminator S in "Vertical View Mode" (objective slider S/doc is moved to the right-hand position), the lambda quarter cap must be attached to the objective. Turn it, until a high-contrast, homogeneous image quality is achieved.

11.4 Objective Slider S

Info

The objective slider S can only be used in conjunction with the mount S (with Ø 76 mm support) and, if desired, with the Coaxial epi-illuminator S. It is not functional and not useful in combination with the objective nosepiece S/doc, as this has an integrated slider function.

Position The objective slider is mounted on the underside of mount S, or of the coaxial epi-illuminator S, above the objective.

Function The objective slider S allows positioning the objective in three click-stop positions for stereoscopic and vertical observation..

Click-stop position	Function
Left	for vertical observation and documentation through the left optical Discovery channel, of a sample detail 12 mm to the left from the middle
Middle	for stereoscopic observation of the sample detail
Right	for vertical observation and documentation through the right optical Discovery channel, of a sample detail 12 mm to the right from the middle

To observe the same object detail in all three positions, the sample must be moved 12 mm to the left or right. This is facilitated by the use of gliding stages or mechanical stages - and can be automated using motorized stages.

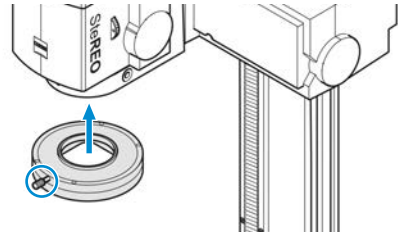
Adding an *Y intermediate tube* [▶ 87] enables binocular vertical observation (in 2D) when the objective is set to the righthand slider position.

11.4.1 Installing the Objective Slider S

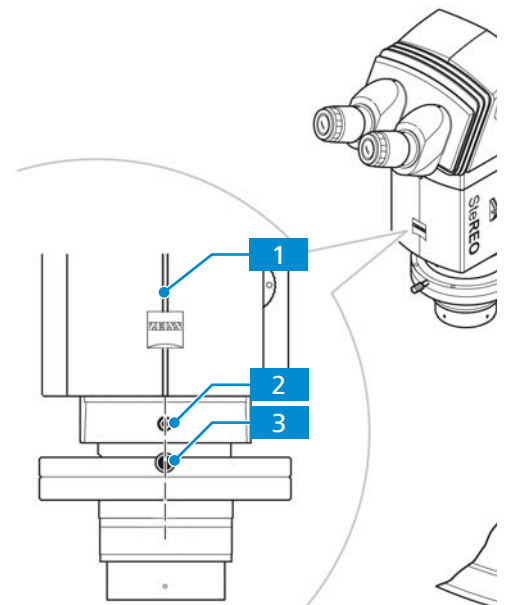
Parts and Tools  Hex key, 1.5 mm

- Prerequisite**
- ✓ The focusing drive is in the topmost position.
 - ✓ The objective is removed.

- Procedure**
1. Remove the screw from the objective slider and put it aside.
 2. Hold the objective slider with both hands and screw it into the microscope body as far as it will go.



3. Install the objective.
4. Reinstall the screw on the objective slider **3**, but do not tighten it
5. Loosen the screws on the mount S **2**.
6. Align the screws of the objective slider **3** and the mount S **2** with the joint of the microscope body **1**.



7. Hand-tighten the screws on the objective slider **3** and on the mount S **2**.
8. *Adjust the lower limit switch of the motor focus [▶ 37].*

11.4.2 Operating the Objective Slider S

Prerequisite ✓ The objective slider S is *installed* [▶ 83].

Procedure 1. For stereoscopic observation, slide the objective to the middle position.

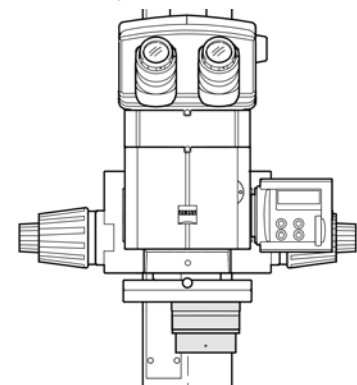
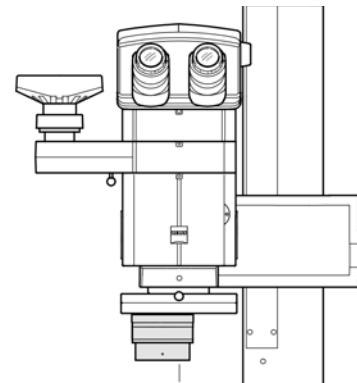
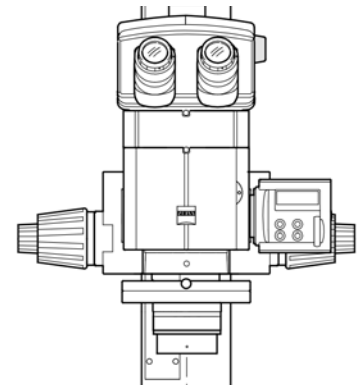
2. For vertical documentation using intermediate phototubes with camera port, slide the objective to the left position.

a Switch the photo tube to camera observation.
b Move the objective carefully to the left stop position of the objective slider.

3. For vertical documentation using binocular photo tubes or intermediate phototubes with camera port, slide the objective to the right position.

a Switch the photo tube to camera observation.
b Move the objective carefully to the right stop position of the objective slider.

4. For binocular eyepiece observation in the right vertical view position, install an *intermediate Y-tube* [▶ 87] and set it to 2D observation. Move the objective carefully to the right position of the objective slider.



11.5 Intermediate Tubes

If intermediate tubes are present, they must be installed between the microscope body and the binocular tube. They use the same dovetail interface.

Up to two intermediate tubes can be stacked.

11.5.1 Intermediate Phototube S Mot., Right 100/100

Purpose Using the intermediate phototube S mot., right 100/100, a camera can be connected on the right side of the microscope body.

Function The switching of the intermediate phototube S mot can be automated by using Sycop 3 or the ZEN software.

Position The intermediate phototube is mounted between the microscope body and the binocular tube. One additional intermediate tube can be mounted above or below the intermediate phototube.

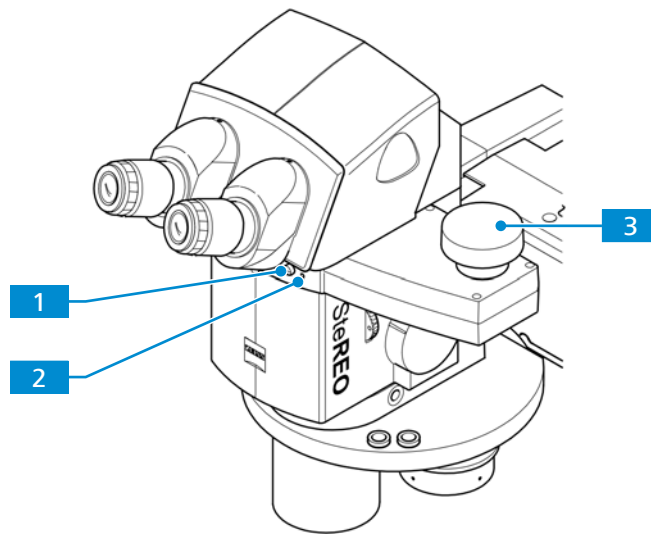


Fig. 15: Intermediate phototube S mot., right 100/100

1 Button

2 Blue LED

3 Camera port

11.5.1.1 Connecting the Intermediate Phototube Mot., Right 100/100 Via CAN

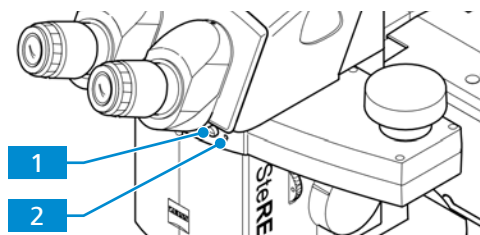
Prerequisite ✓ The intermediate phototube is mounted between the microscope body and the binocular tube.

- Procedure**
1. Connect the CAN bus port at the back of the intermediate tube with one of the following CAN bus ports:
 - a CAN bus port of the motor focus
 - b CAN bus port of the EMS 3 Electronic Module
 - c a free CAN bus port of another CAN bus accessory component
 - d plug-in power unit RJ45-CAN (direct power supply), only for standalone use without CAN network

11.5.1.2 Changing the Beam Path of the Intermediate Phototube S Mot., Right 100/100

- Prerequisite**
- ✓ The intermediate phototube is installed and *connected* [▶ 85].
 - ✓ The microscope is operational and switched on.

- Procedure**
1. Briefly press the button **1**.



- The microscopic beam path is switched between "visual observation" and "camera observation".
- If the camera port is active, the blue LED **2** is lighting.

11.5.2 Intermediate Phototube S, Right, 3 Pos.

Purpose Using the intermediate tube S, right, 3 pos., a camera can be connected on the right side of the microscope body. The light can be directed to the eyepieces, to the attached camera, or to both simultaneously. The intermediate tube S, right, 3 pos. is suited for documentation with the objective nosepiece S/doc in macroscope position.

Position The intermediate phototube is mounted between the microscope body and the binocular tube. One additional intermediate tube can be mounted above or below the intermediate phototube.

Function Slide rod with three positions:

- slide rod pushed in: Stereoscopic observation through eyepieces and camera documentation are possible in parallel. Each port receives 50% brightness.
- slide rod in middle position: The entire light of the right Discovery channel (100% intensity) is available for the camera. Visual observation is still possible through the left eyepiece - with 100 % intensity, but only in 2D.
- slide rod pulled out: The entire light of the two Discovery channels (100% intensity) is available for stereoscopic observation through the eyepieces. No light is sent to the camera.

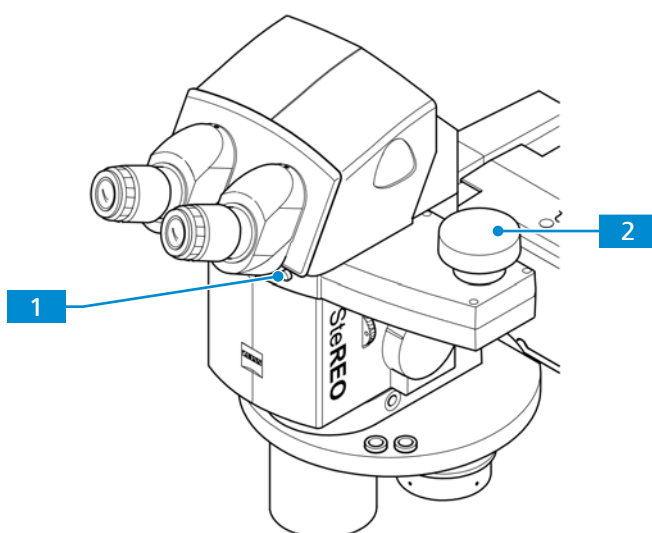


Fig. 16: Intermediate phototube S, right, 3 pos.

1 Slide rod

2 Camera port

11.5.3 Y Intermediate Tube S Mot

Purpose The Y-intermediate tube S mot enables automatic switching between “stereoscopic viewing” and “binocular vertical viewing” of the sample through the eyepieces. The SteREO Discovery stereomicroscope then automatically converts to a macroscope with a vertical 2D view of the sample.

Position The Y intermediate tube S mot is mounted between the microscope body and the binocular tube. It can be mounted on an intermediate phototube.

Function Manual switching by key press:

- **OFF:** Stereoscopic visual observation is enabled. The blue status LED is switched off.
- **ON :** Binocular visual observation (in 2D) through eyepieces enabled. 50% of the light of the right Discovery channel is directed to each eyepiece. The LED is lighting blue.

Automatic switching: The Y intermediate tube S mot is switched, whenever the coded objective nosepiece S/doc is manually moved between stereo position and vertical view position.

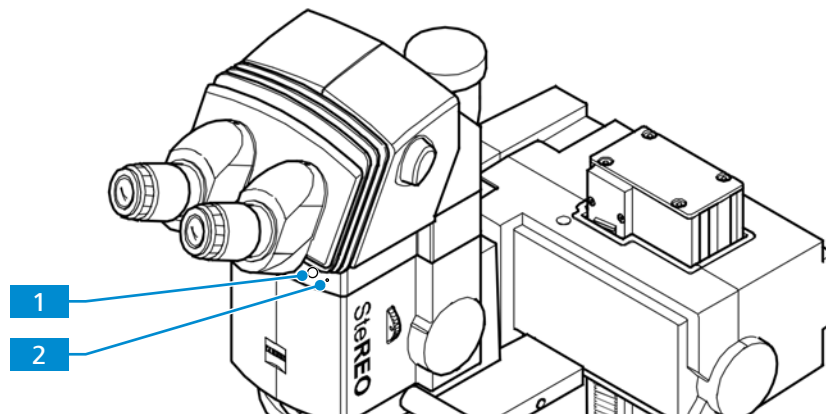


Fig. 17: Y intermediate tube S mot

1 Button

2 LED

11.5.3.1 Connecting the Y Intermediate Tube S Mot Via CAN

- In the case of a mainly manual microscope configuration without further motorized components, the Y intermediate tube S mot is connected directly to the nosepiece S/doc via a CAN cable and is supplied via its own separate power supply unit.
- In the case of a microscope with additional motorized components, all CAN components (including the Y intermediate tube S mot and the nosepiece) are connected to the motor focus or the EMS 3 Electronic Module via CAN cables. Power is supplied via a separate power supply unit on the motor focus or via the EMS 3.

Prerequisite ✓ The Y intermediate tube S mot is mounted between the microscope body and the binocular tube.
 ✓ The objective nosepiece S/doc is installed.

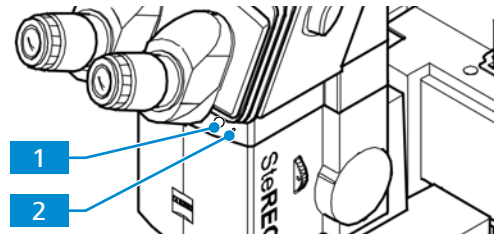
Procedure

1. Using the supplied 1 m long cable, connect one CAN bus port at the back of the Y intermediate tube to one of the following CAN distributors:
 - a CAN bus port of the motor focus.
 - b CAN bus port of the EMS 3.
2. Using the supplied 0.5 m long cable, connect the second CAN bus port of the Y intermediate tube to the CAN bus port of the objective nosepiece S/doc.

11.5.3.2 Changing the Beam Path of the Y Intermediate Tube S Mot

- Prerequisite**
- ✓ The Y intermediate tube is installed and *connected* [▶ 87].
 - ✓ The microscope is operational and switched on.

- Procedure**
1. Briefly press the button **1**.



- The Y intermediate tube is switched between stereoscopic observation and binocular 2D observation of the right Discovery channel.
- If the Y intermediate tube is in position **ON**, the blue LED **2** is lighting.

11.5.4 Analyzer Intermediate Tube S Mot Mono

Purpose The Analyzer intermediate tube S mot mono enables the automatic insertion and removal of a polarization filter in the right Discovery channel. Switching is performed via a CAN command or by pressing the button on the tube. The Analyzer intermediate tube S mot mono is a component of the Particle Analyzer System for automatic testing of technical cleanliness. The polarization direction of the analyzer in the intermediate tube goes from east to west. The polarization direction of the reflected or transmitted light illuminators used must be aligned with the Analyzer intermediate tube S mot mono.

Position The Analyzer intermediate tube S mot mono is mounted between the microscope body and the binocular tube.

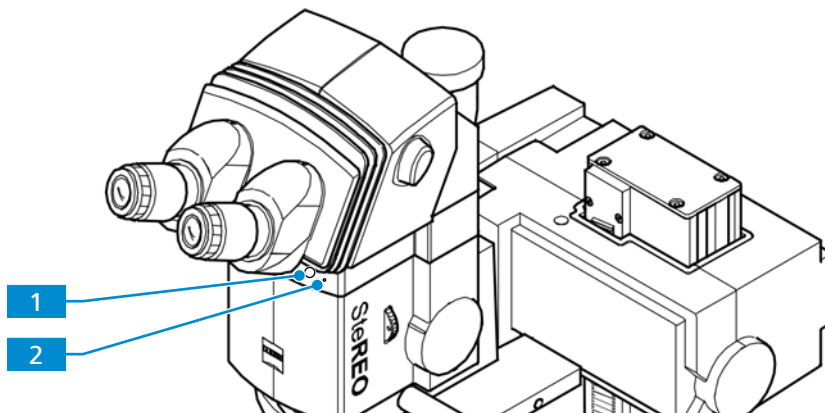


Fig. 18: Analyzer intermediate tube S mot mono

1 Button

2 LED

Function Automatic switching of the motorized analyzer corresponding to the workflow of the "technical cleanliness analysis" is realized by software (ZEN).

The POL extinction can only be observed through the right eyepiece or in the live image of a camera attached to the right stereo channel.

11.5.4.1 Connecting the Analyzer Intermediate Tube S Mot Mono Via CAN

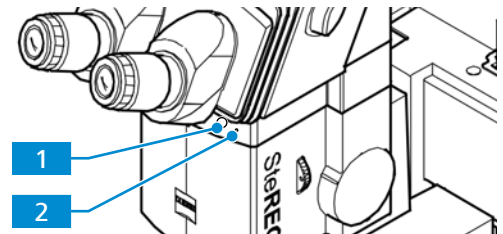
Prerequisite ✓ The analyzer intermediate tube S mot mono is mounted between the microscope body and the binocular tube.

- Procedure**
1. Connect one CAN bus port of the analyzer intermediate tube to one of the following CAN distributors:
 - a CAN bus port of the motor focus
 - a CAN bus port of the EMS 3
 - a free CAN bus port of another CAN bus accessory component
 - plug-in power unit RJ45-CAN (direct power supply), only for standalone use without CAN network

11.5.4.2 Operating the Pol Analyzer of the Intermediate Tube S Mot Mono

Prerequisite ✓ The analyzer intermediate tube is installed and *connected* [▶ 89].
✓ The microscope is operational and switched on.

- Procedure**
1. Briefly press the button **1**.



- The analyzer intermediate tube is switched between "analyzer filter in path" and "analyzer filter out of path".
- If the filter is in path, the blue LED **2** is lighting.

11.6 X-Cite XYLIS II®

NOTICE

In addition to the white light LED, the light source includes an internal laser source (class 1 laser) as part of the light generation inside the device. No laser radiation is emitted into the microscope via the light guide.

Purpose The X-Cite XYLIS II® liquid light guide coupled fluorescence excitation light source delivers a broad spectrum of excitation light for many fluorescence applications.

Position The X-Cite XYLIS II® light source is connected to the *Pentafluor S vertical illuminator* [► 73] of the SteREO Discovery microscope by its light guide.

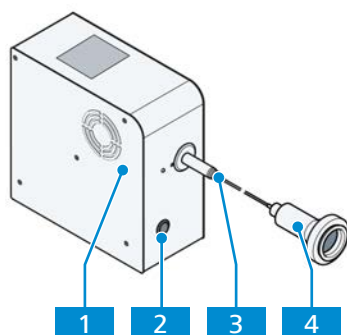


Fig. 19: X-Cite XYLIS II® light source

1 X-Cite XYLIS II® light source

3 Light guide

2 Power switch

4 Illumination adapter (not used for SteREO Discovery)

11.6.1 Labels on the X-Cite XYLIS II® Light Source

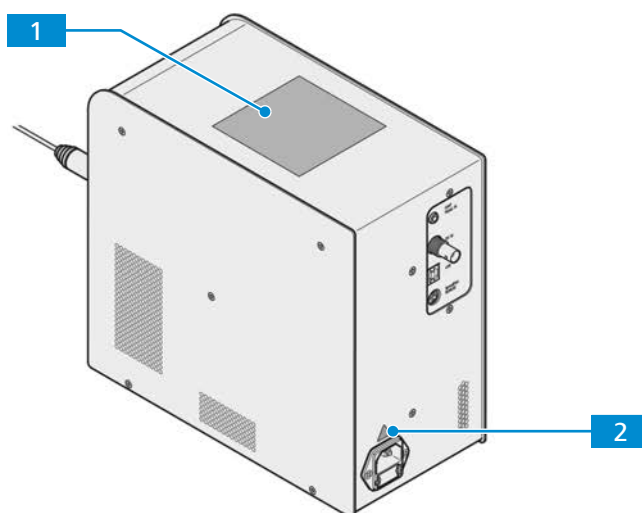


Fig. 20: Labels on the X-Cite XYLIS II® light source

Pos.	Label	Explanation
1		UV radiation and optical radiation warning label Risk group 3 according to IEC 62471 UV emitted from this product. Avoid eye and skin exposure to unshielded product. Possibly hazardous optical radiation emitted from this product. Do not look at operating lamp. Eye injury may result.
2		Observe notes in the instruction manual and the supplied documents.

Revision History

Revision	Date of Issue	Introduced Modifications
2	07/2026	▪ Editorial rework ▪ Correction of chapter(s): – <i>Declaration of China RoHS</i> [▶ 72]
1	05/2024	▪ New material number as successor of 435001-7944-001, revision 5. ▪ Editorial rework ▪ Adaptation to Directive 2014/35/EU (LVD)

Glossary

BF (Brightfield)

Illumination and imaging system where direct light passes through the objective aperture and provides a bright background against which the image is viewed.

CAN

Controller Area Network. An ISO specification that defines a generic physical layer and data link medium access procedure based on non-destructive bit-wise arbitration.

DF (Darkfield)

Illumination and imaging system that prevents direct light from entering the objective aperture.

FWD (Free Working Distance)

A distance in air, or in the specified immersion liquid, between the front of the objective and the surface of the cover glass, or of the object if uncovered, under normal operating conditions.

HIP

Human Interface Panel

IEC

The International Electrotechnical Commission (IEC) is an international standards organization that prepares and publishes international standards for all electrical, electronic and related technologies – collectively known as "electrotechnology".

IP

Ingress Protection, a standardized classification of protection against intrusion, dust, accidental contact and water

LED (Light emitting diode)

Solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current.

MaRC (Manual Rotary Control)**RL (Reflected Light)**

Designation for microscopy techniques to image light that was reflected by the object

TL (Transmitted Light)

Light used for illuminating a object, where the light is transmitted through the object.

UV (Ultraviolet)

Of, relating to, or consisting of radiation lying in the ultraviolet range.

ZEISS service representative

Specially trained service expert, either ZEISS staff or authorized service partner of ZEISS.

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