



Instruction Manual

ZEISS Visioner 1

Digital Microscope with Integrated Micro-Mirror Array Lens System



ZEISS Visioner 1

Original Manual

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1 About this Instruction Manual

This Instruction Manual (further called "document") is considered to be part of the Visioner 1, 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.

1.1 Text Conventions and Link Types

Explanation	Example
Software controls and GUI elements.	Click Start .
Hardware controls and elements.	Press the Standby button.
Key on the keyboard.	Press Enter on the keyboard.
Press several keys on the keyboard simultaneously.	Press Ctrl + Alt + Del .
Follow a path in the software.	Select Tools > Goto Control Panel > Airlock .
Text to be entered by the user.	Enter <i>example.pdf</i> in this field.
Anything typed in literally during programming, for example macro codes and keywords.	Enter <code>Integer</code> in the console.
Link to further information within this document.	See: <i>Text Conventions and Link Types</i> [▶ 5].
Link to a website.	https://www.zeiss.com/corporate/int/home.html

1.2 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. Not only the safety and warning messages in the **Safety** chapter are to be considered also all safety and warning messages in other chapters. Failure to comply with these instructions and warnings can result in both personal injury and property damage and involve 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 operator better understand the contents of this document.

1.3 Explanation of Symbols



CE marking (Conformité Européene)



CSA label: product tested by CSA to meet U.S. and Canadian standards. CSA approval master number optionally given adjacent to this symbol



UKCA marking (UK conformity assessed)



Manufacturer



Country of manufacture. "CC" is the country code, e.g. "DE" for Germany, "CN" for China. Date of manufacture optionally given adjacent to this symbol



Importer



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

1.4 Further Applicable Documents

Also take note of the following documents:

Brochures and Certificates	For brochures, certificates (e.g. ISO, CSA, SEMI), and declarations of conformity (e.g. EU, UK) ask your ZEISS Sales & Service Partner.
Installation Requirements	For more details on technical data, refer to the corresponding Installation Requirements.
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.
Safety Data Sheets	Observe the enclosed safety data sheets. The instructions and guidelines given in the respective safety data sheets must be complied with.
Software	For detailed information on how to use ZEN, 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.

1.5 Contact

If you have any questions or problems, contact your local ZEISS Sales & Service Partner or one of the following addresses:

Headquarters

Phone:	+49 1803 33 63 34
Fax:	+49 3641 64 3439
Email:	info.microscopy.de@zeiss.com

Microscopy Courses, Training, and Education

For information on microscopy courses, training, and education contact us on our homepage (<https://www.zeiss.com/microscopy/int/service-support/training-and-education.html#contact>).

ZEISS Portal

The ZEISS Portal (<https://portal.zeiss.com/>) offers various services that simplify the daily work with your ZEISS systems (machines and software). It is constantly improved and extended to meet your needs and requirements better.

ZEISS Sales & Service Partner

You can find a ZEISS Sales & Service Partner in your area under <https://www.zeiss.com/microscopy/int/website/forms/sales-and-service-contacts.html>.

Service Germany

Phone:	+49 7364 20 3800
Fax:	+49 7364 20 3226
Email:	service.microscopy.de@zeiss.com

2 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.

2.1 Intended Use

The microscope is intended for industrial applications, e.g. quality control.

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.

2.2 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.
- the microscope is secured against access by unauthorized persons.
- 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.

2.2.1 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.

Training Authorized ZEISS personnel will provide basic training in operating the microscope, as well as information on equipment safety and maintenance work that can be conducted by the operator. The training will be documented by ZEISS and its completion is to be confirmed by the operator.

Special application training is offered for a fee. Current training dates, additional information and the registration form can be found at <https://www.zeiss.com/microscopy/int/service-support/training-and-education.html>.

2.2.2 Safe Operating Condition

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

The microscope may only be operated after correct installation by a ZEISS service representative and if the operating conditions are adhered to.

- Do not operate the microscope 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.

The microscope including its original accessories may only be used for the applications described in this document. The manufacturer cannot assume any liability for other applications, including those of individual modules or single components. Changes to and maintenance on this microscope and on devices which are operated together with the microscope may only be performed by ZEISS service representative or by ZEISS authorized persons.

If it becomes apparent that the safety measures are no longer effective, the microscope must be taken out of service and secured against being used again unintentionally. Please contact your ZEISS Sales & Service Partner to have the instrument repaired.

If the casing of the microscope is damaged, put the power unit out of operation. The microscope may only be operated with the desktop power unit supplied with the instrument.

2.3 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.

2.3.1 Mechanical Hazards

Property Damage due to Transport There is a risk of injury and property damage if the microscope is improperly handled and transported.

- Only use the handle, if applicable, for transport of the microscope. Otherwise hold the microscope with one hand and the base plate with the other hand.

2.3.2 Electrical Hazards

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

- 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.
- Detachable mains supply cords must not be replaced with inadequately rated cords.
- Disconnect all power supplies before cleaning.
- Shut down the microscope when not using the microscope.

The mains plug may only be inserted into a socket outlet with a protective contact. The protective effect must not be overridden by an extension cable without a protective conductor. Before commissioning the instrument, make sure that the existing power supply is suitable for the instrument.

Safe disconnection from the power supply is ensured exclusively by removing the mains plug. The standby button on the controller only switches into standby mode.

Only the LED illuminators pertaining to Visioner 1 may be connected to the sockets of Visioner 1.

Ensure that the device is not placed in such a way that it is difficult to disconnect the device from mains.

2.3.3 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.

The LED ring illuminators and the coaxial illuminator have been classified as belonging to LED risk group 1 according to DIN EN 62471:2009.

2.3.4 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.

Do not operate the devices included in the scope of supplies in a potentially explosive atmosphere, in the presence of volatile anaesthetics or flammable solvents such as alcohol, gasoline or similar substances.

Heat Accumulation Covering the ventilation openings can lead to heat accumulation that may damage the microscope 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.

2.3.5 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.
- Always cover unused openings/ports.
- 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).

2.4 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 please contact your ZEISS service representative for free of charge replacement.

2.4.1 Warning Labels on Visioner 1

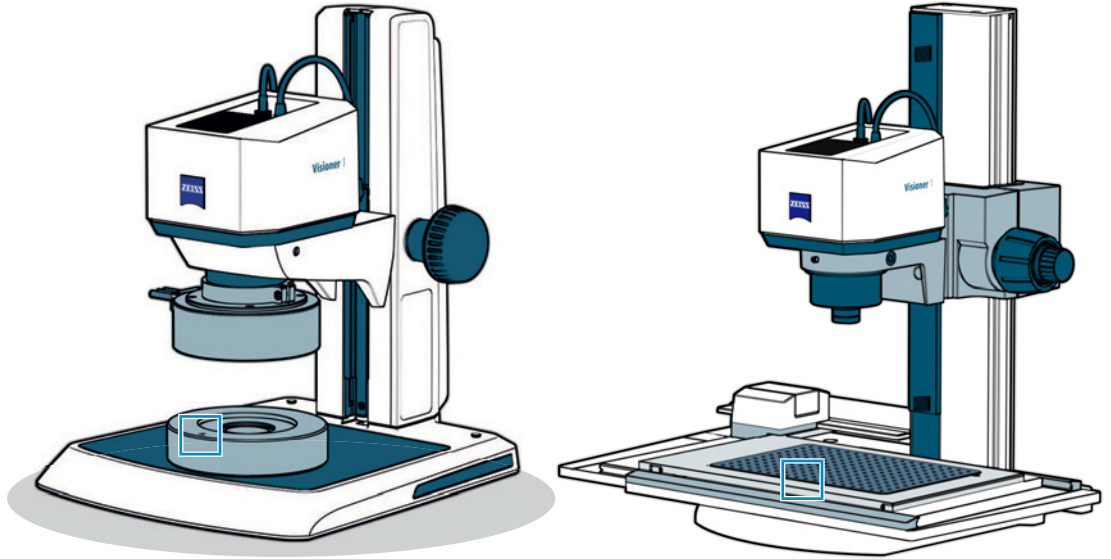


Fig. 1: Warning labels on Visioner 1

Position	Symbol	Description
Upper side of the optional spacer Upper side of the optional insert plate		Hot surface. Do not touch.

2.4.2 Type Plates

Position	Image
Back of the system unit	<div style="border: 1px solid black; padding: 5px;"> <p align="center">SD OPTICS SD Optics Inc. 06752, Seoul, Korea www.sdoptics.com</p> <hr/> <p>Serial-No.: 4708XXXXXX System unit Visioner 1 425525-9100-000 max. 12 VDC 1.0 A </p> <p>Made in Korea EU Importer Carl Zeiss Microscopy GmbH Carl-Zeiss-Promenade 10 07745 Jena, Germany</p> </div>
Back of the controller	<div style="border: 1px solid black; padding: 5px;"> <p align="center">SD OPTICS SD Optics Inc. 06752, Seoul, Korea www.sdoptics.com</p> <hr/> <p>Serial-No.: 5520XXXXXX Controller f/Visioner 1 432928-9010-000 max. 36 VDC 2.22A </p> <p>Made in Korea EU Importer Carl Zeiss Microscopy GmbH Carl-Zeiss-Promenade 10 07745 Jena, Germany</p> </div>

Manufacturer:

SD OPTICS, Inc. | 06752 4F, 1F Sooam B/D 9, Gangnam-daero 27-gil, Seocho-gu, Seoul, Korea

3 Product and Functional Description

The Visioner 1 enable real-time all-in-focus visualization. The Micro-mirror Array Lens System (MALST™) technology delivers the fastest and most comprehensive 3D visual inspection and documentation. Operator friendly, ergonomic and reproducible. It enables various shop floor quality control and quality assurance workflows. The system acquires Z-stacks of the sample and generates Enhanced Depth of Field (EDoF) images and 3D reconstructions in real-time.

Info

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

3.1 Main Components of the Microscope

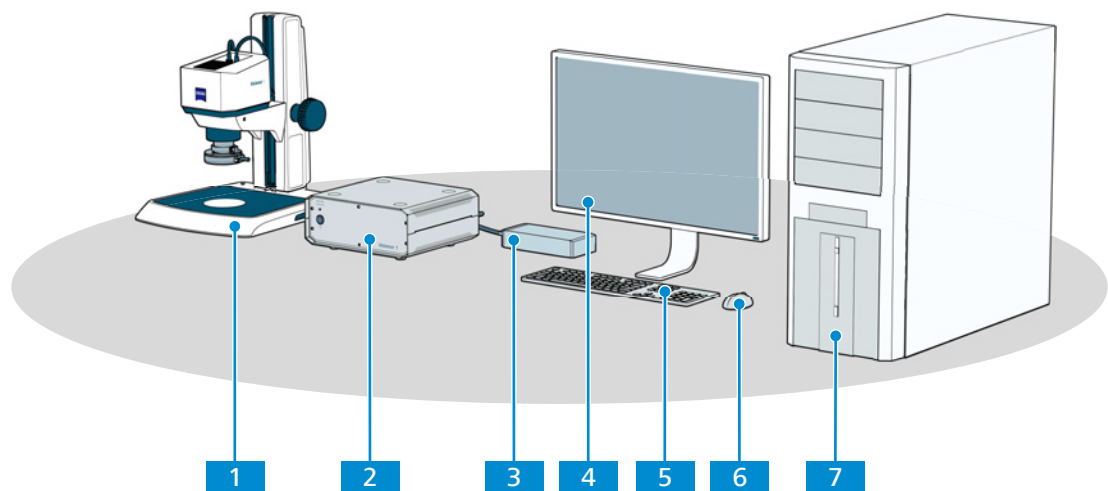


Fig. 2: Visioner 1 work station

- | | |
|--|--|
| 1 Stand | 2 Controller, refer to <i>Controller</i> [▶ 17] |
| 3 Power supply unit of the controller | 4 Monitor |
| 5 Keyboard | 6 Computer mouse |
| 7 User PC | Dust protection cover (not pictured) |

3.1.1 Control Elements and Indicators of the Stand

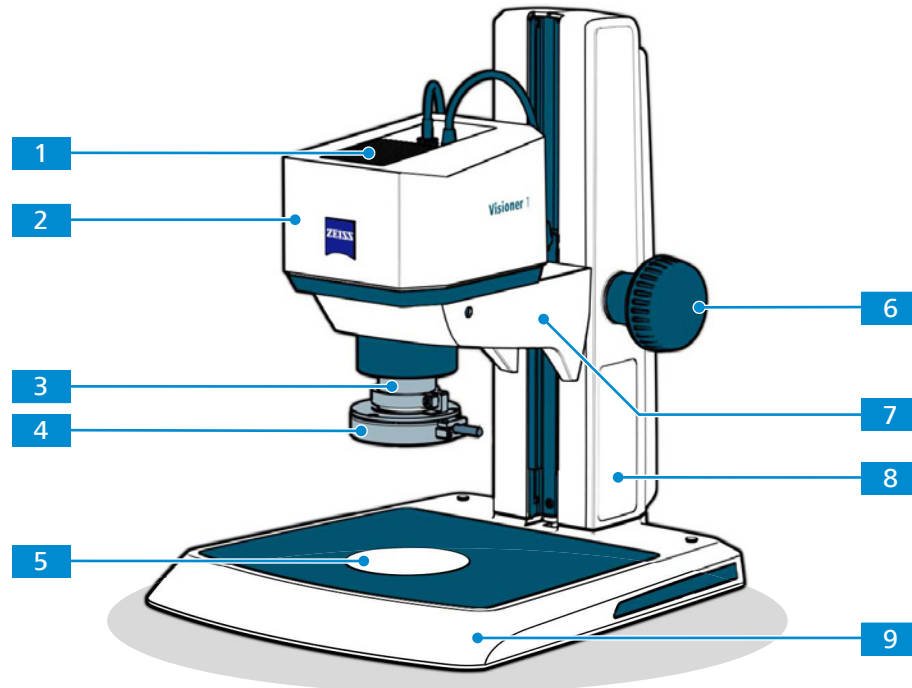


Fig. 3: Control Elements and Indicators of the Stand

- | | |
|---|--|
| 1 Heat sink | 2 System unit, refer to <i>System Unit</i> [▶ 14] |
| 3 Front optics (optional), refer to <i>Front Optics</i> [▶ 15] | 4 LED ring illuminator, refer to <i>LED Ring Illuminator</i> [▶ 15] |
| 5 Insertion plate | 6 Height adjustment knob |
| 7 Carrier | 8 Stand |
| 9 Base plate | |

3.1.1.1 System Unit

Purpose The system unit houses the camera which acquires the digital image.

Position The system unit is mounted on the carrier of the stand.

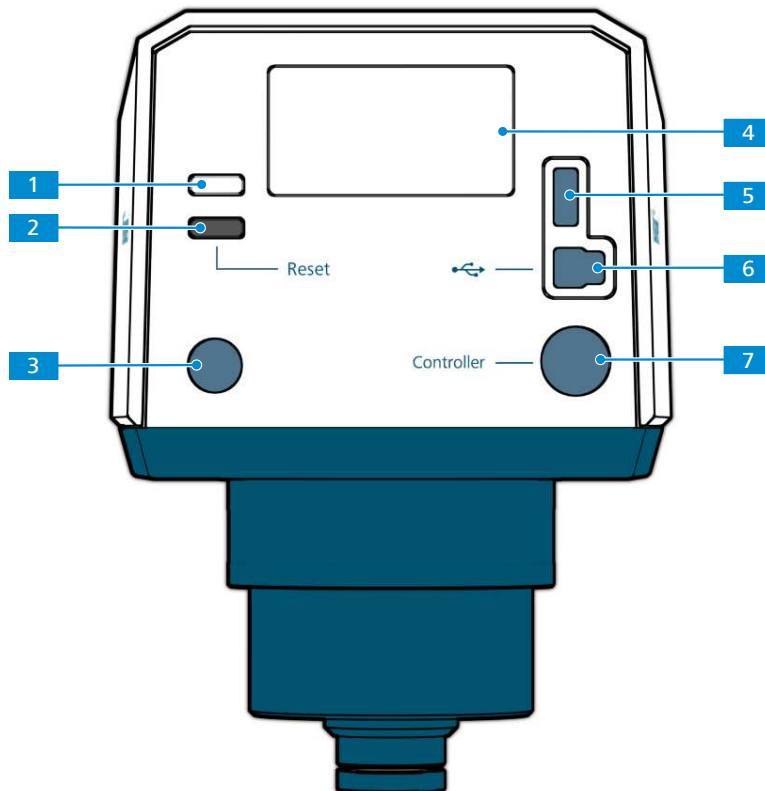


Fig. 4: Back of the system unit

- | | | | |
|----------|---|----------|---|
| 1 | Operation indicator (LED) | 2 | Reset button |
| 3 | Connection to top of the system unit (Hirose 6 pin right angle) | 4 | Type plate |
| 5 | Connection to top of the system unit (USB 3.0 Type A right angle) | 6 | Connection to PC (USB 3.0 Type B right angle) |
| 7 | Connection to controller (Hirose 12 pin right angle) | | |

3.1.1.2 LED Ring Illuminator

Purpose The LED ring illuminator illuminates the sample.

Position The LED ring illuminator is mounted at the bottom of the system unit and connected to the controller.

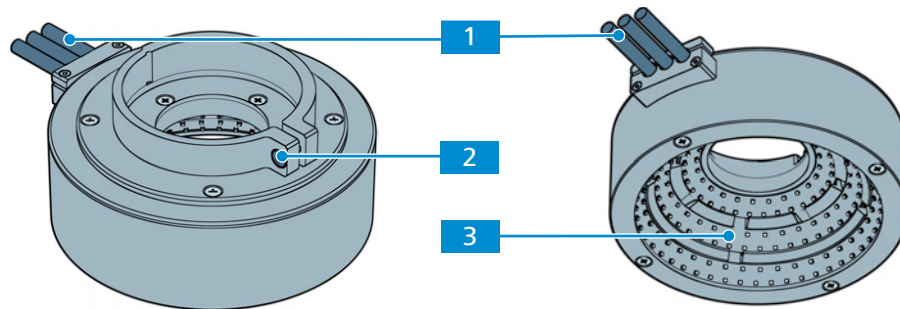


Fig. 5: LED ring illuminator 3x

1 Connection to controller

2 Clamping screw

3 LEDs

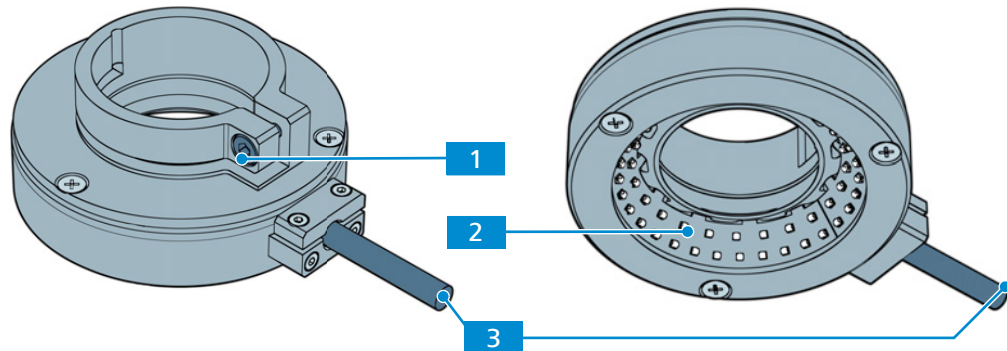


Fig. 6: LED ring illuminator 1x (optional)

1 Clamping screw

2 LEDs

3 Connection to controller

3.1.1.3 Front Optics

Purpose The optional front optics is used to change the magnification of Visioner 1.

Position The front optics is mounted at the bottom of the system unit.

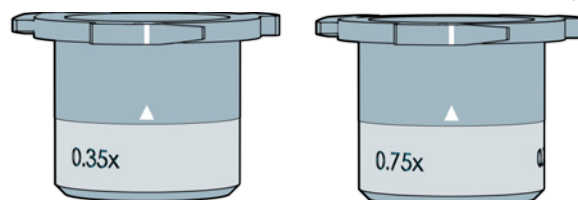


Fig. 7: Front optics 0.35x (left), front optics 0.75x (right)

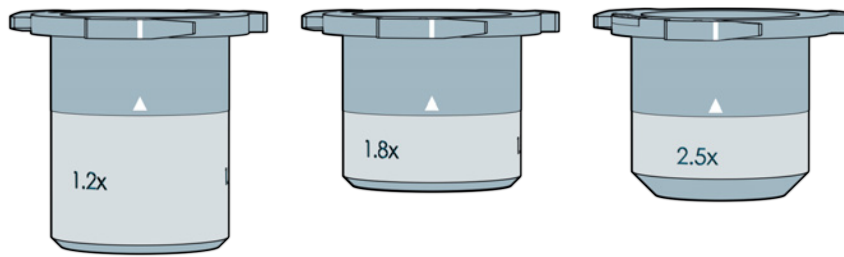


Fig. 8: Front optics 1.2x (left), front optics 1.8x (middle), front optics 2.5x (right)

3.1.1.4 Stages

Purpose The mechanical stage S 150x100 R is for manual xy-positioning of the sample in the beam path of the Visioner 1.

The mechanical stage S 150x100 mot. CAN and measuring stage S 150x100 mot. CAN is for motor-supported xy-positioning of the sample in the beam path of the Visioner 1. For detailed information on those stages, refer to Operating Manual Mechanical / Measuring stage S mot. 435465-9000-701.

Position The three stages can only be mounted on stand 300 for epi-illumination.

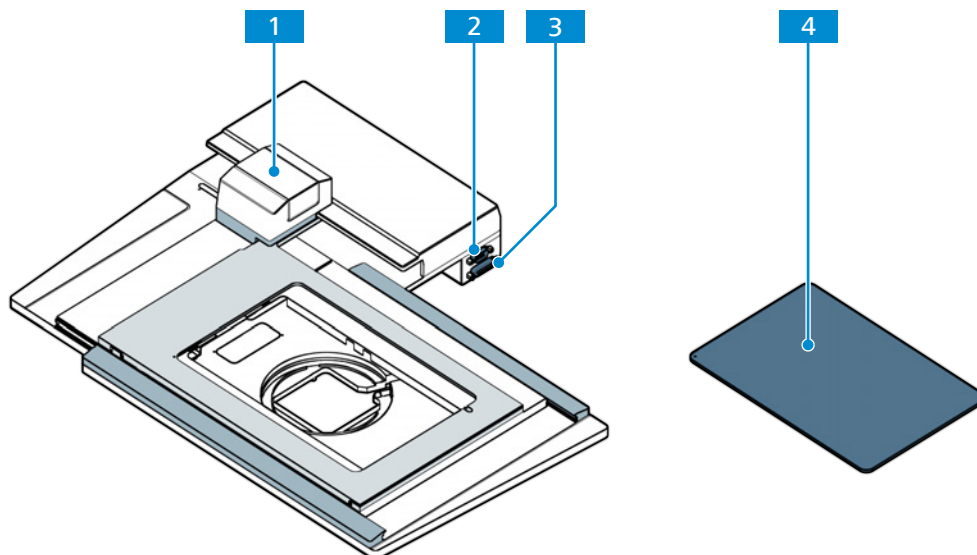


Fig. 9: Mechanical stage S 150x100 mot. CAN

- | | |
|---------------------------------|----------------------------------|
| 1 Stage drive | 2 Connection to converter |
| 3 Connection to joystick | 4 Insert plate |

The following insert plates are available:

- Insert plate S 237x157x3, metal (435465-9052-000)
- Insert plate S 237x157x3, with hole grid (435430-9120-000)
- Insert plate S 237x157x3, with mounting 84 for ball table (435430-9140-000)
- Insert plate S 237x157x3, for O-Select palette (435430-9130-000)

3.1.2 Controller

Purpose The controller controls the illumination of the LED ring illuminator.

Position The controller is placed on the table and connected to the LED ring illuminator and the system unit.

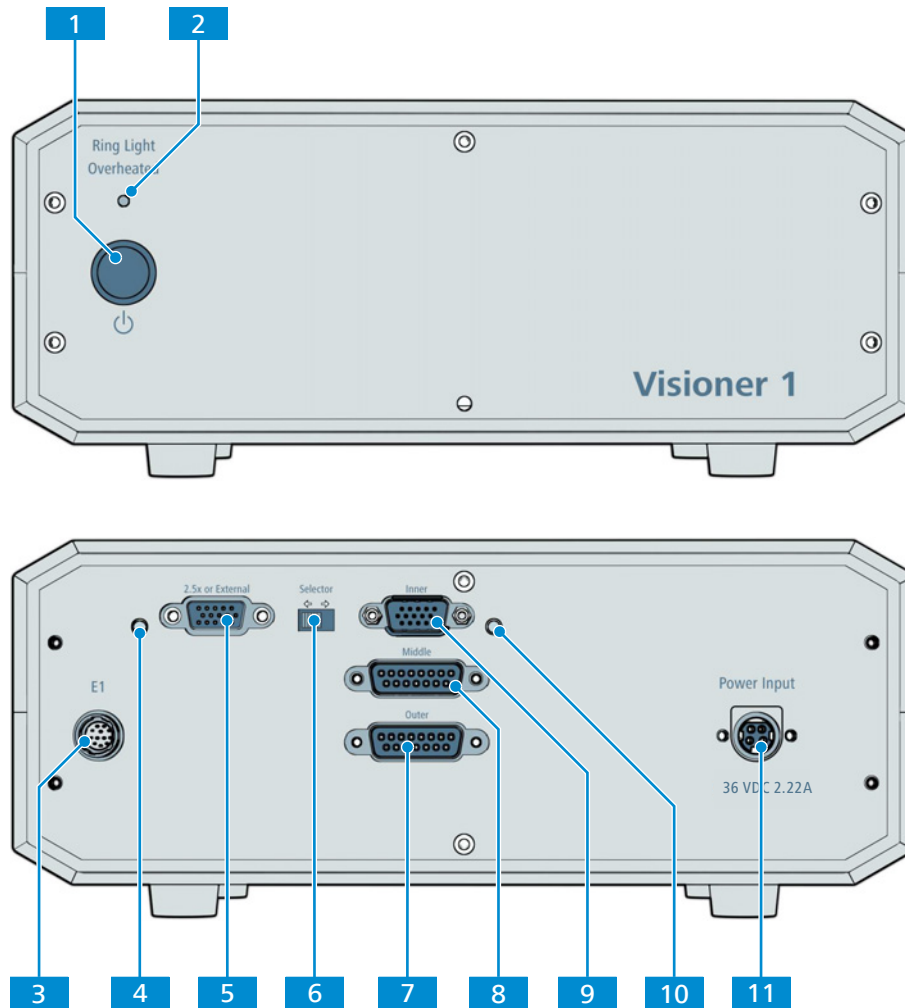


Fig. 10: Front and back of the controller

- | | | | |
|-----------|---|-----------|---|
| 1 | Standby button | 2 | Overheat indicator (LED) for LED ring illuminator |
| 3 | Connection to system unit (12 pin Hi-rose connector for power, illumination trigger, serial port) | 4 | LED showing that connection 5 is active |
| 5 | Connection to LED ring illuminator 1x and VisILED (15 pin HD D-sub female) | 6 | Selector
Left position: connection 5 is active
Right position: connections 7 , 8 , and 9 are active |
| 7 | Connection to LED ring illuminator 3x outer ring (15 pin D-sub male) | 8 | Connection to LED ring illuminator 3x middle ring (15 pin D-sub female) |
| 9 | Connection to LED ring illuminator 3x inner ring (15 pin HD D-sub male) | 10 | LED showing that connections 7 , 8 , and 9 are active |
| 11 | Connection to power supply unit | | |

3.2 Software Description

The ZEN software is released with a special version of Windows and a patch.

Info

Further information on the software and its operation is available in the software's online help.

4 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.

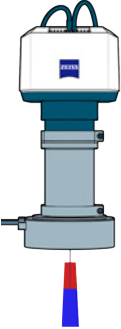
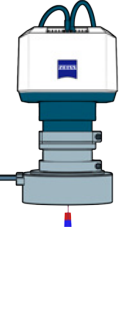
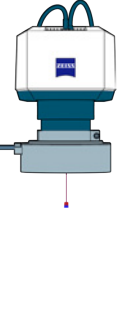
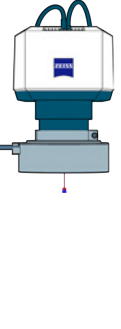
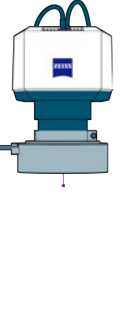
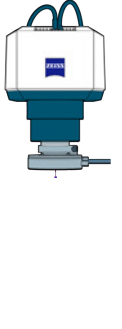
4.1 Assembling the Visioner 1

When you have received your Visioner 1, you have to perform the following steps to get the system started:

This procedure consists of the following steps:

1. Only Stand 300: *Assembling the Stand 300* [▶ 20]
2. Only Stand 300: Optional: *Assembling the Stage* [▶ 22]
3. *Installing the System Unit* [▶ 25]
4. *Assembling the LED Ring Illuminator* [▶ 28]
5. Optional: *Exchanging the Front Optics* [▶ 32]
6. *Wiring the Controller* [▶ 35]
7. To activate the license for the ZEN core software, refer to the document **ZEISS Software Licensing**.
8. Only LED Ring Illuminator 1x or VisiLED Illuminator: *Configuring the optional Illumination in the MTB* [▶ 32].
9. Only mechanical/measuring stage S mot. CAN: *Configuring the Stage in the MTB* [▶ 25].

The following table summarizes the configurations of Visioner 1:

Configuration (magnification)	0.35x	0.75x	1.2x telecentric	1.3x	1.8x telecentric	2.5x
Image of the hardware with scan range above (■) and below (■) the central slice						
Front optics	Front optics 0.35x	Front optics 0.75x	Front optics 1.2x	–	Front optics 1.8x	Front optics 2.5x
Optional extension tube	Extension tube (73 mm)	Extension tube short (37 mm)	–	–	–	–
Illumination*	LED ring illuminator 3x	LED ring illuminator 3x	LED ring illuminator 3x	LED ring illuminator 3x	LED ring illuminator 3x or 1x**	LED ring illuminator 1x
Spacers on Stand K/M without stage	–	One optional	One	One	Two	Two

Configuration (magnification)	0.35x	0.75x	1.2x telecentric	1.3x	1.8x telecentric	2.5x
with gliding stage	–	–	–	–	One	One

* VisiLED is an alternative illumination for all configurations

** for more working distance

4.2 Assembling the Stand 300

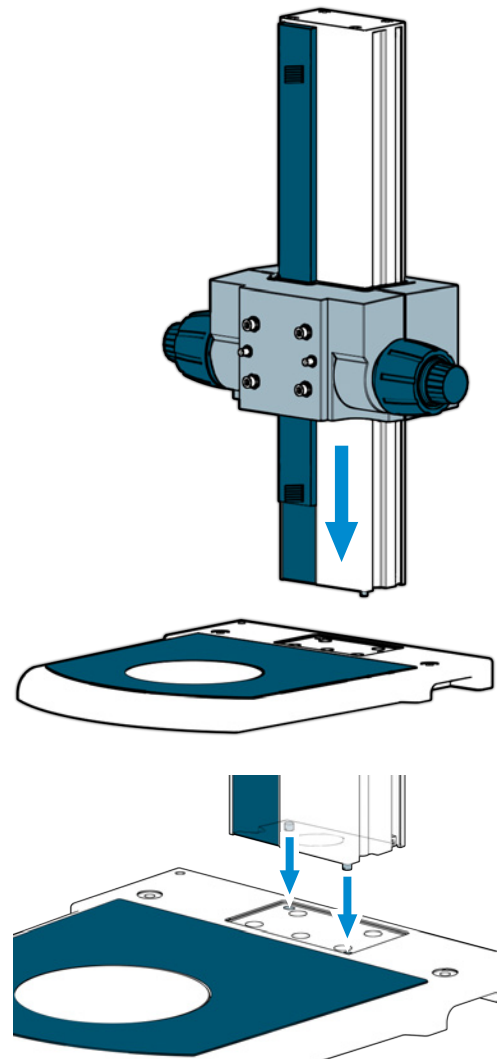
Stand 300 with column 490 is shown in this procedure. The procedure for stand 300 with T column 350 differs slightly.

Info

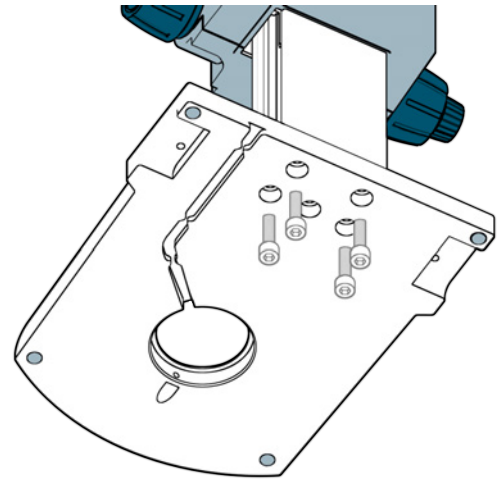
Stand 300 has to be assembled by the user. Stand M and stand K are supplied already assembled.

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

- Procedure**
1. Attach the column of the manual focus drive to the mounting surface of the base plate and let the two centering pins slide into place.

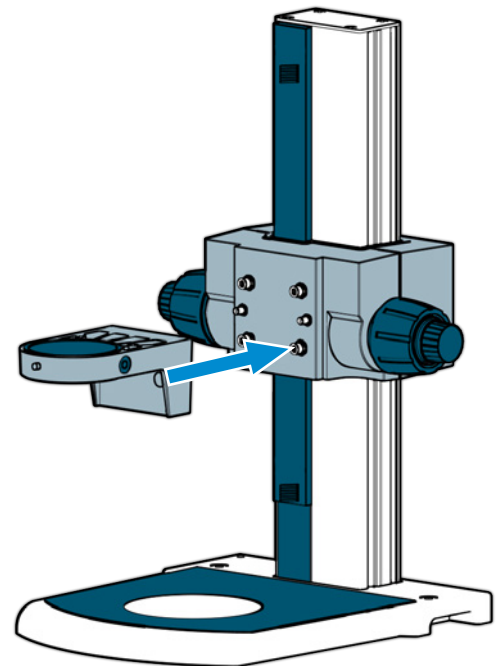


2. Use a hex key 8 mm to tighten the four screws.

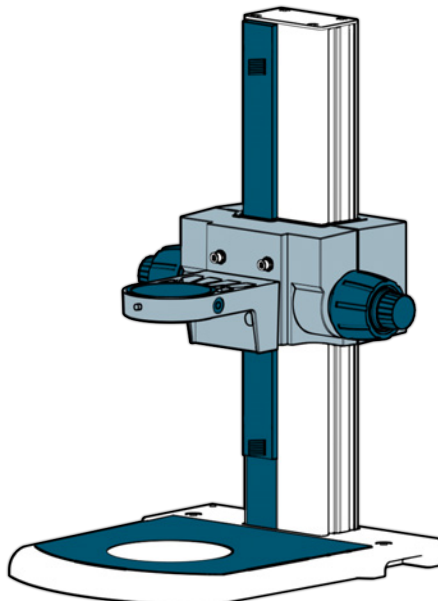


→ The column of the manual focus drive is fixed to the base plate.

3. To mount the carrier on the focus drive, use a hex key 5 mm to tighten the two screws. Use the two lower threads of the manual focus drive for regular use and the two upper threads for examination of higher samples.



↳ The stand is assembled.



4.3 Assembling the Stage

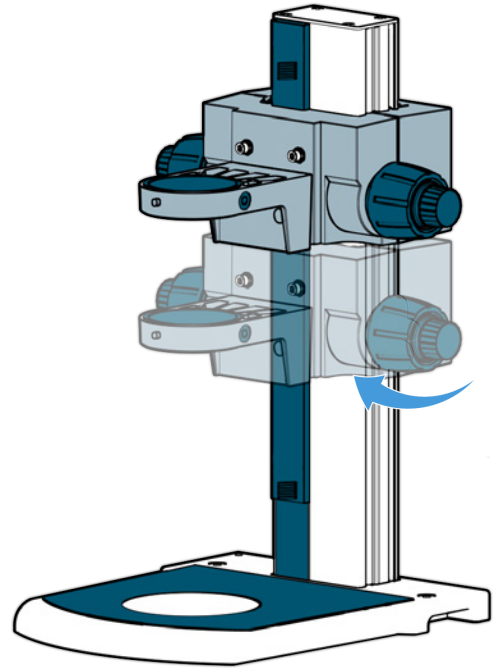
This procedure consists of the following steps:

1. *Assembling the Stage on the Stand 300* [▶ 22]
2. *Wiring the Stage* [▶ 24]
3. *Configuring the Stage in the MTB* [▶ 25]

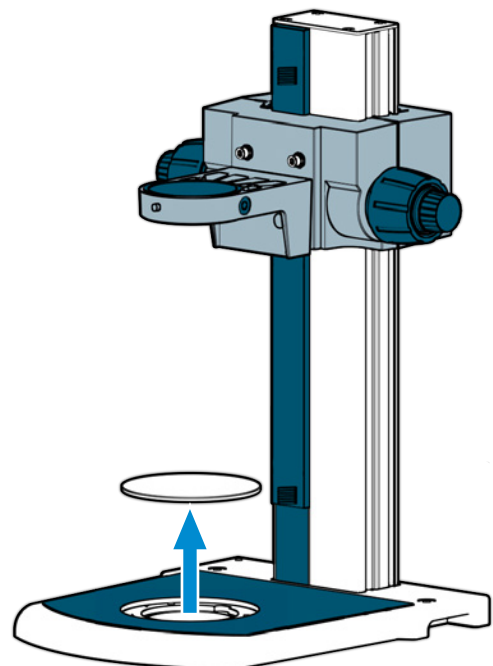
4.3.1 Assembling the Stage on the Stand 300

Prerequisite ✓ The microscope and the illumination are switched off.

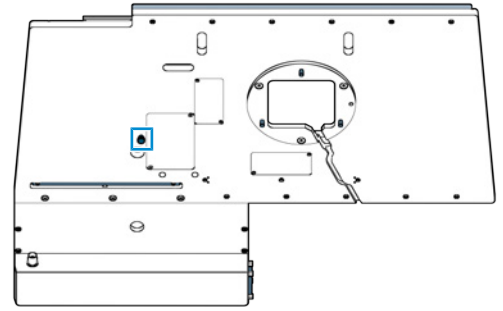
- Procedure**
1. Turn the height adjustment knob to move the carrier to the highest position.



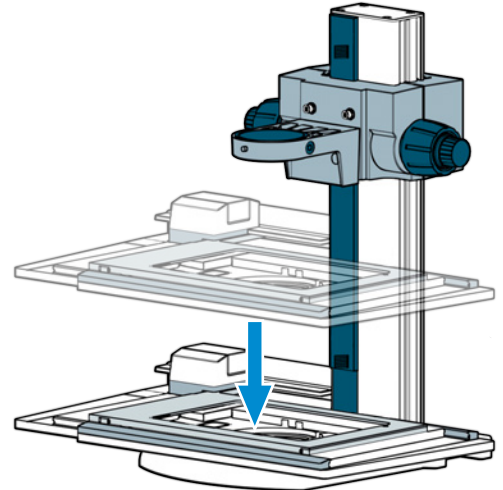
2. Press and tilt the rear edge of the insertion plate to remove the insertion plate from the base plate.



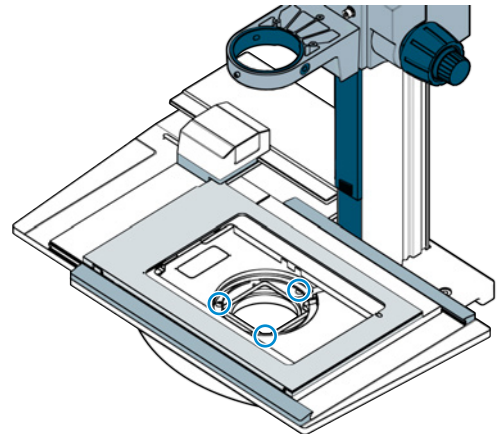
3. Remove the shipping screw on the underside of the stage. Store the shipping screw in a safe place.
INFO: Only the measuring stage S mot CAN has a trigger socket on its underside (bottom left in the image).



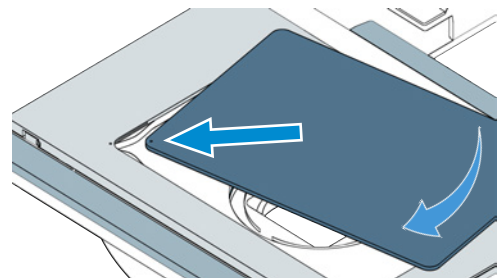
4. Set the stage on the base plate with the stage drive on the left. Align the stage to the base plate and let the three captive screws position into place.



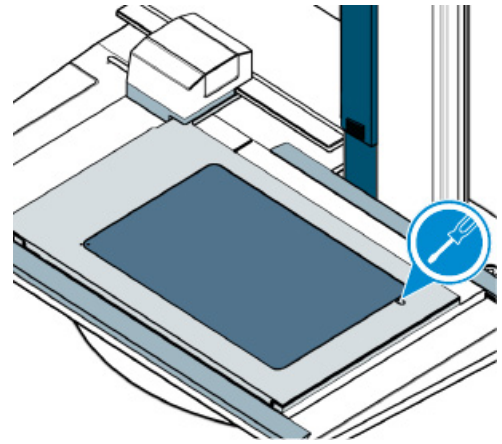
5. Secure the stage with the three captive screws on the stage.





6. Insert the insert plate into the stage: Push the plate into the stage with the left front corner slightly inclined and allow it to slide under slight pressure against the springs until the plate is completely inside the stage interfaces. The plate is held in the stage by spring pressure. Take care to ensure that the plate is correctly positioned on the stage.



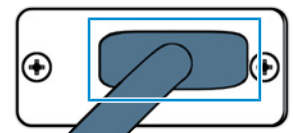
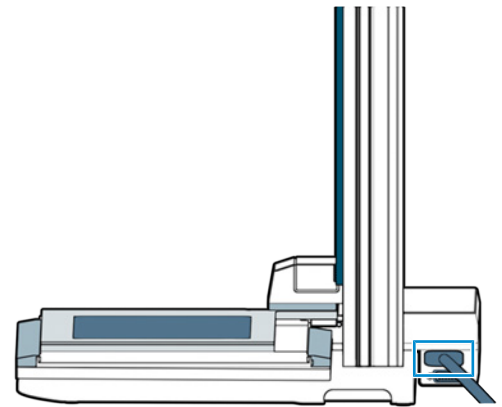
7. **INFO:** To remove the insert plate, insert a screwdriver into the recess and carefully prize the plate out.



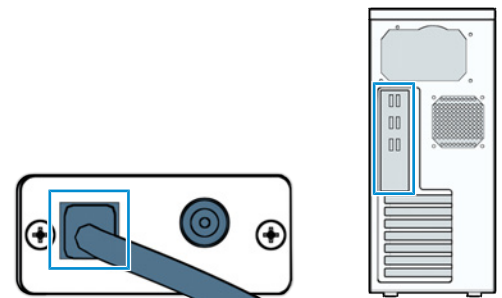
4.3.2 Wiring the Stage

- Parts and Tools**
-  CAN extension cable HD 15 (000000-0500-647)
 -  Converter CAN – USB Rev. 2 (432909-9901-000)

- Procedure**
1. With the CAN extension cable HD 15 connect the stage to the Converter CAN – USB Rev. 2.

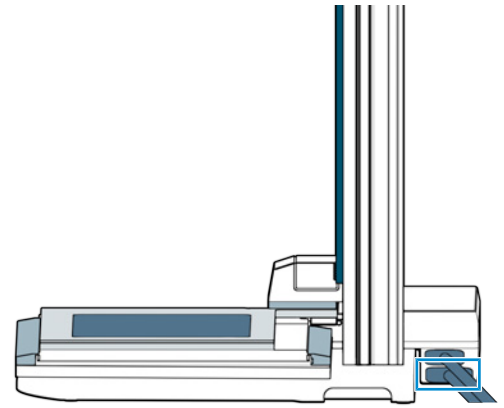


2. Connect the Converter CAN – USB Rev. 2 with an USB port of the PC.



3. Connect the Converter CAN – USB Rev. 2 to the according power supply and the power supply to the mains supply.

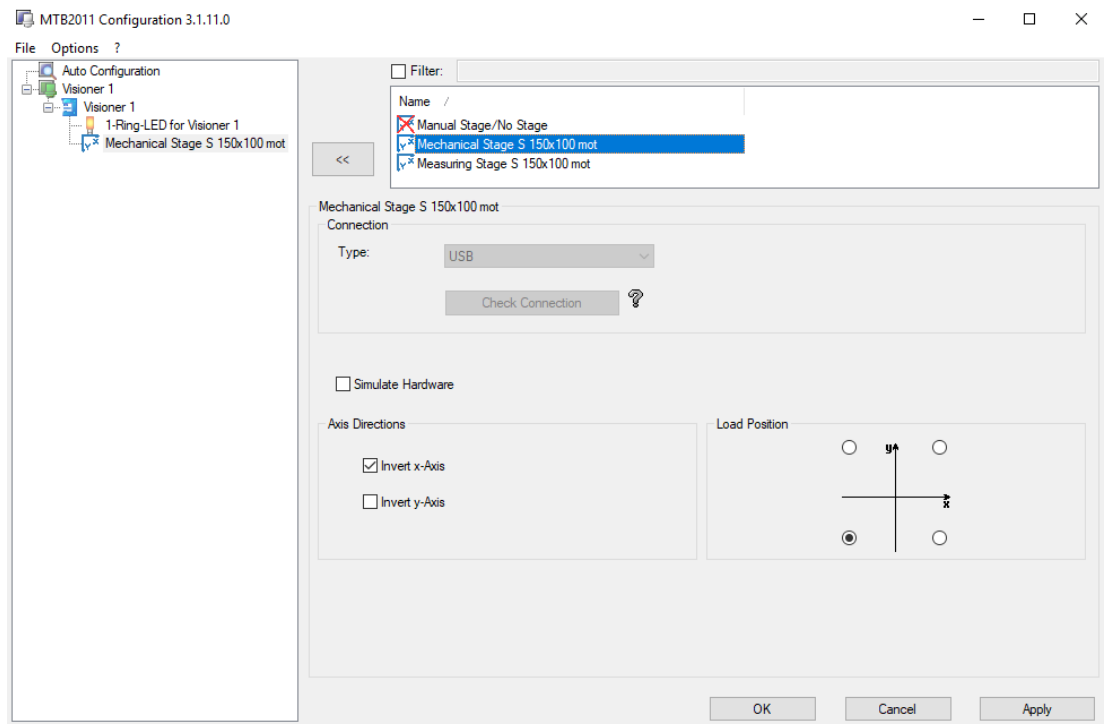
- Option: For manual control of the stage, connect the Joystick XY; CAN (432903-9010-000) to the stage.



4.3.3 Configuring the Stage in the MTB

In order to control the mechanical / measuring stage S 150x100 mot. CAN with the Software ZEN core Visioner, the stage has to be configured in the **MTB Config**.

- Procedure**
1. Open the **MTB Config**.
 2. Activate the stage in the MTB Config.
 3. Select the **Invert x-Axis**.
 4. Click **Apply**.



4.4 Installing the System Unit

This procedure consists of the following steps:

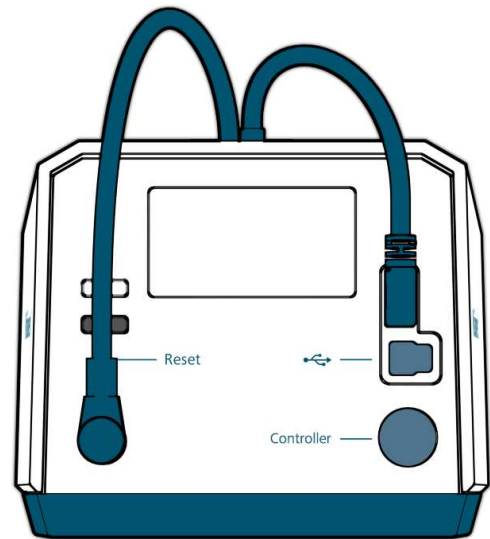
1. *Wiring the System Unit* [▶ 26]
2. *Installing the System Unit on the Stand* [▶ 27]
3. *Connecting the System Unit to the PC* [▶ 28]

4.4.1 Wiring the System Unit

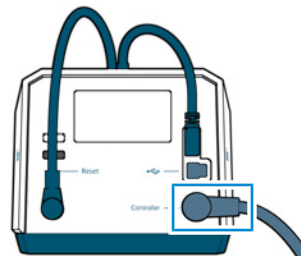
Info

All connectors are different to prevent faulty wiring.

- Procedure**
1. Connect the cables from the top of the system unit to the back of the system unit.

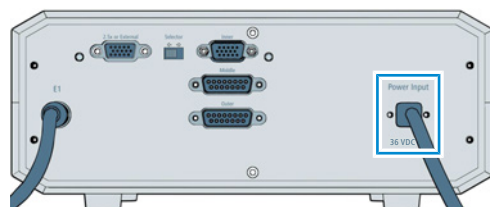
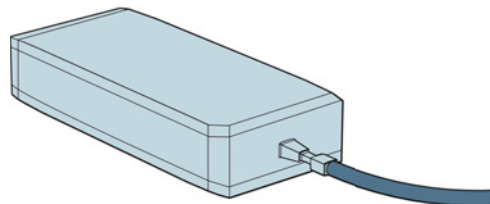
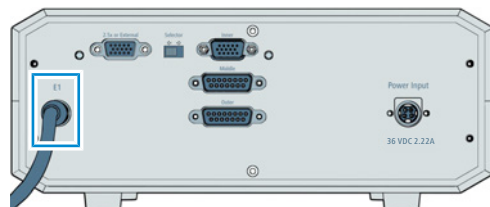


2. Connect the cable from the system unit to the back of the controller.



3. Connect the power supply unit to the back of the controller.

INFO: Due to the different designs of the power supply plugs for CAN - USB Rev.2 converter and controller, there is no danger of confusion.

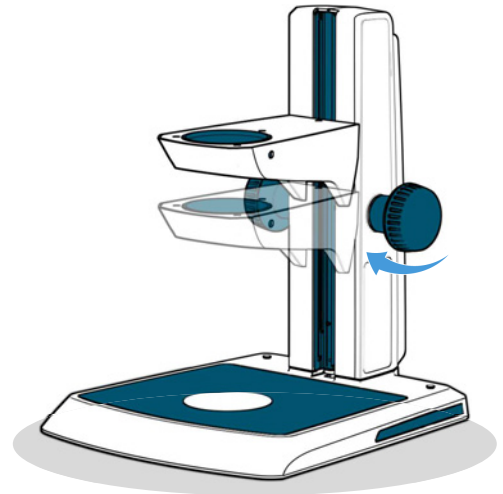


4. Connect the power supply unit to the mains supply.

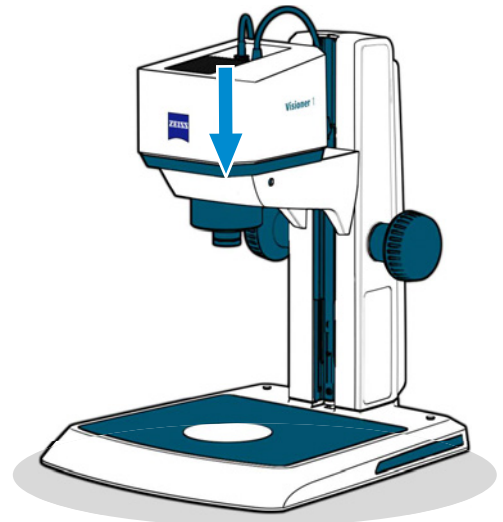
4.4.2 Installing the System Unit on the Stand

Parts and Tools  Hex Key, 3.0 mm

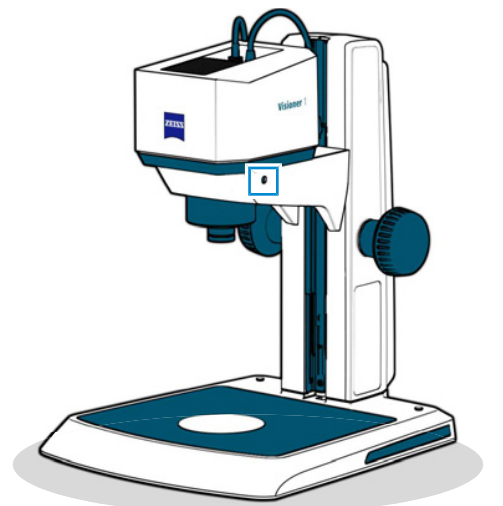
- Procedure**
1. Turn the height adjustment knob to move the carrier to the highest position.



2. Place the system unit on the carrier.

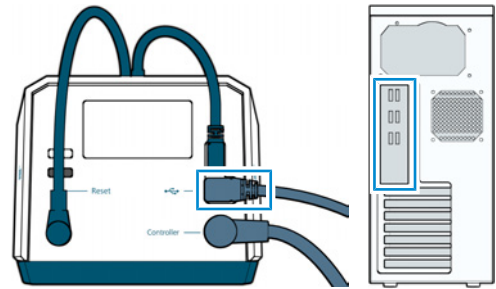


3. Use a hex key to tighten the grub screw.



4.4.3 Connecting the System Unit to the PC

Procedure 1. Connect the system unit to the PC (USB 3.0).



2. To activate the license for the ZEN core software, refer to the document **ZEISS Software Licensing**.

4.5 Assembling the LED Ring Illuminator

Depending on the mounted front optics, you have to mount corresponding LED ring illuminators:

- For the 0.35x or 0.75x configuration, refer to *Assembling the LED Ring Illuminator 3x for the 0.35x and 0.75x Configuration* [▶ 29].
- For the 1.2x, 1.3x, or 1.8x configuration, refer to *Assembling the LED Ring Illuminator 3x for the 1.2x, 1.3x, and 1.8x Configuration* [▶ 30].
- For the 1.8x or 2.5x configuration, refer to *Assembling the LED Ring Illuminator 1x for the 1.8x and 2.5x Configuration* [▶ 31].

Info

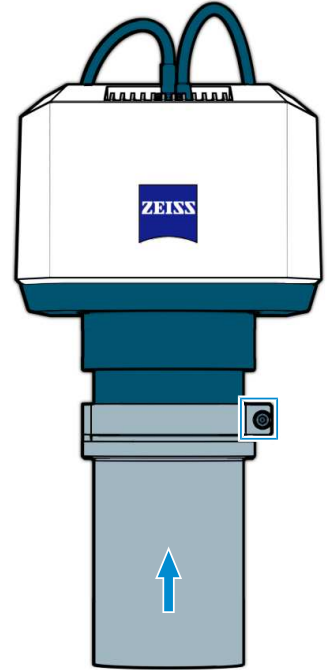
Instead of the LED ring illuminator 1x or the LED ring illuminator 3x you can alternatively mount the optional VisiLED. VisiLED is not optimized for a specific magnification and can be mounted on the front optics or directly on the system unit.

4.5.1 Assembling the LED Ring Illuminator 3x for the 0.35x and 0.75x Configuration

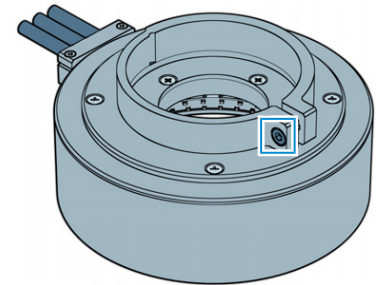
For the 0.35x configuration, you can mount the LED ring illuminator 3x directly on the system unit. Additionally you can use an extension tube to improve the illumination. Use the extension tube 73 mm for the 0.35x configuration and the extension tube 37 mm for the 0.75x configuration.

Parts and Tools  Hex Key, 3.0 mm

- Procedure**
1. If you want to use the extension tube, untighten the clamping screw of the extension tube.
 2. Mount the extension tube at the bottom of the front optics and tighten the clamping screw of the extension tube.

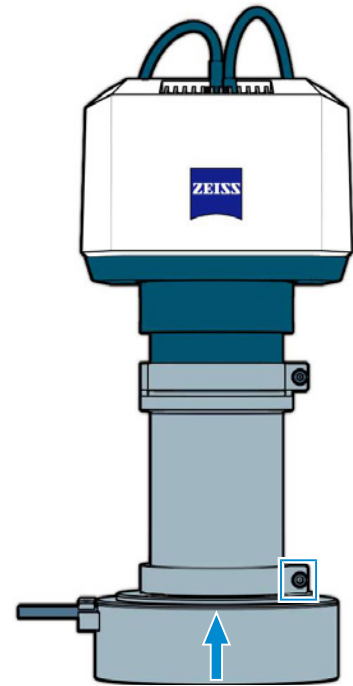


3. Untighten the clamping screw of the LED ring illuminator 3x.



4. Mount the LED ring illuminator 3x at the bottom of the system unit or – if mounted – at the bottom of the extension tube.

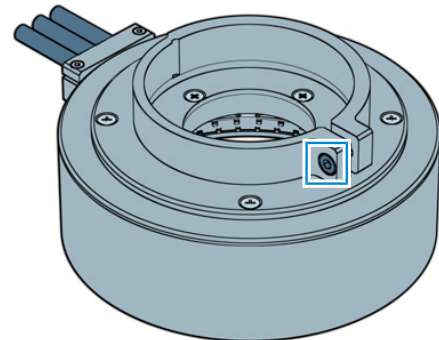
- Tighten the clamping screw of the LED ring illuminator 3x.



4.5.2 Assembling the LED Ring Illuminator 3x for the 1.2x, 1.3x, and 1.8x Configuration

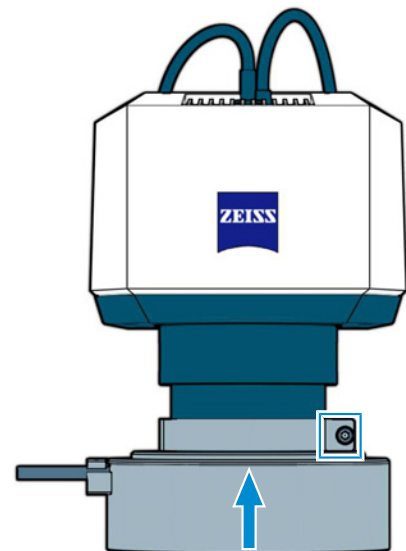
Parts and Tools  Hex Key, 3.0 mm

- Procedure**
- Untighten the clamping screw of the LED ring illuminator 3x.



- Mount the LED ring illuminator 3x at the bottom of the front optics – if installed – or at the bottom of the system unit.
- Tighten the clamping screw of the LED ring illuminator 3x.

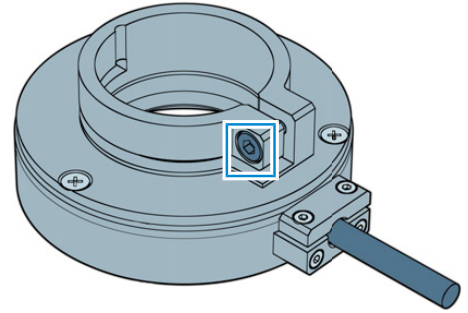
INFO: If a flat sample is not in focus even if the carrier is in the lowest position, then replace the insertion plate by an optional spacer.



4.5.3 Assembling the LED Ring Illuminator 1x for the 1.8x and 2.5x Configuration

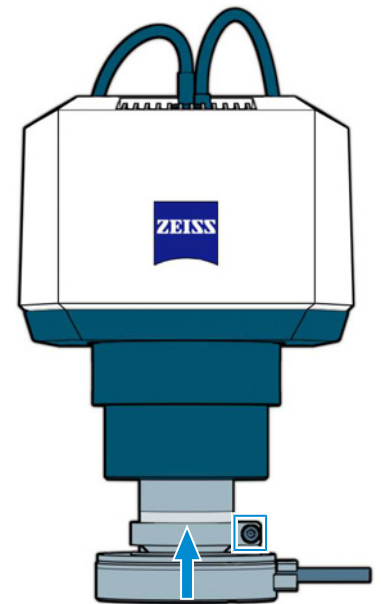
Parts and Tools  Hex Key, 3.0 mm

- Procedure**
1. Untighten the clamping screw of the LED ring illuminator 1x.

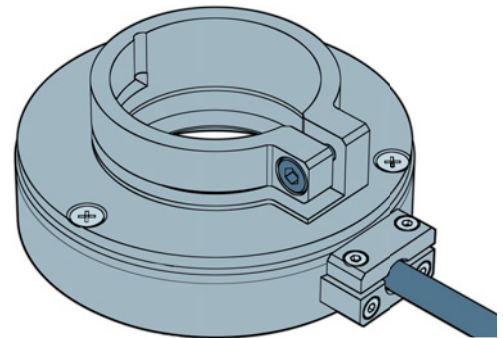


2. Mount the LED ring illuminator 1x at the bottom of the front optics.
3. Tighten the clamping screw of the LED ring illuminator 1x.

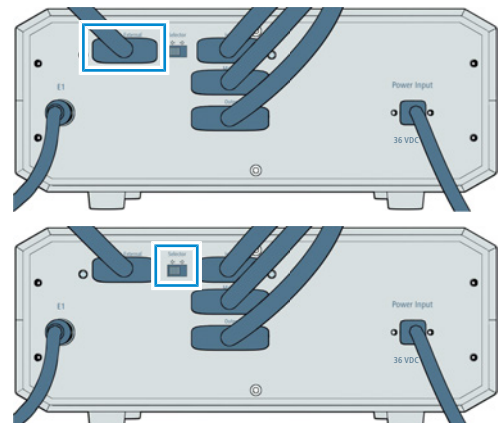
INFO: If a flat sample is not in focus even if the carrier is in the lowest position, then replace the insertion plate by two optional spacers.



4. Connect the cable from the LED ring illuminator 1x to the back of the controller.



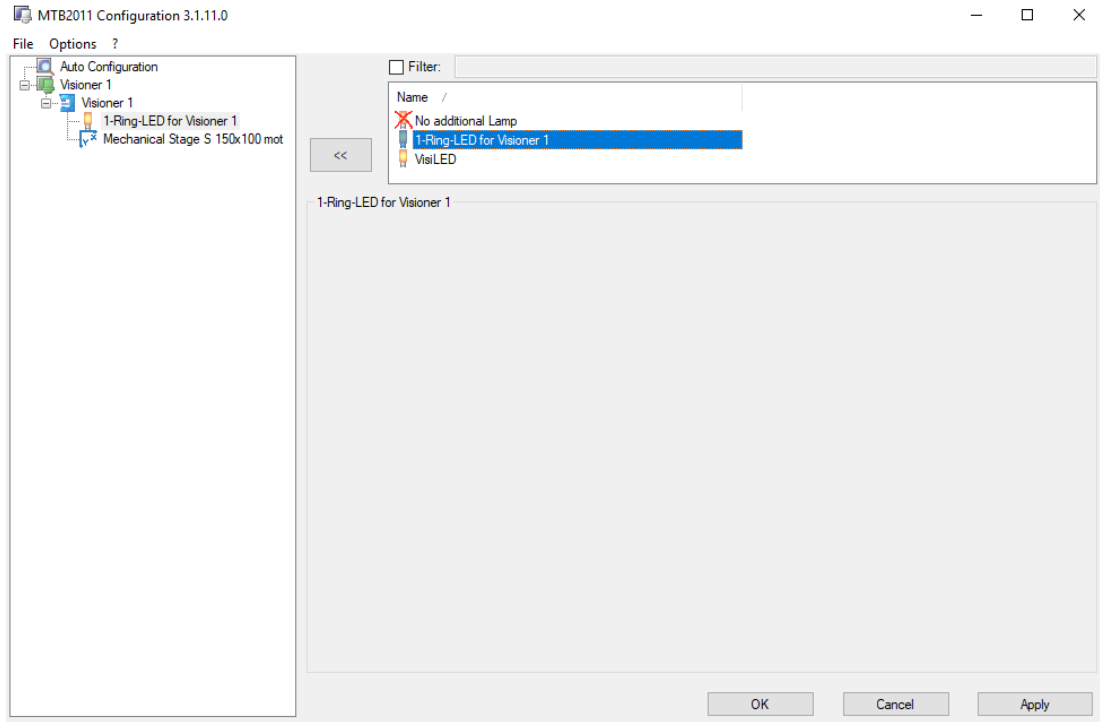
5. Move the selector at the back of the controller to the left position.



4.5.4 Configuring the optional Illumination in the MTB

If optional illumination (LED ring illuminator 1x or VisiLED) is installed, configure the optional illumination in **MTB Config**.

- Procedure**
1. Open the **MTB Config**.
 2. Select the installed illumination.
 3. Click **Apply**.



4.6 Exchanging the Front Optics

Without front optics Visioner 1 has a magnification of 1.3x. To use another magnification, mount the corresponding front optics, illumination, extension tube and spacer option.

Configuration (magnification)	Front optics	Illumination	Option
0.35x	Front optics 0.35x	LED ring illuminator 3x or VisiLED	Extension tube (73 mm)
0.75x	Front optics 0.75x	LED ring illuminator 3x or VisiLED	Extension tube short (37 mm), 0 or 1 spacer (with or without stage)
1.2x telecentric	Front optics 1.2x	LED ring illuminator 3x or VisiLED	0 or 1 spacer (with or without stage)
1.3x	–	LED ring illuminator 3x or VisiLED	0 or 1 spacer (with or without stage)
1.8x telecentric	Front optics 1.8x	LED ring illuminator 3x or LED ring illuminator 1x or VisiLED	1 or 2 spacers (with or without stage)

Configuration (magnification)	Front optics	Illumination	Option
2.5x	Front optics 2.5x	LED ring illuminator 1x or VisiLED	1 or 2 spacers (with or without stage)

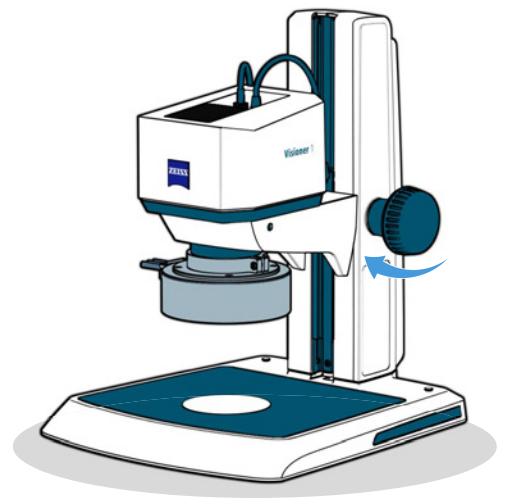
This procedure consists of the following steps:

1. *Unmounting the LED Ring Illuminator* [▶ 33]
2. *Assembling the Front Optics* [▶ 34]
3. *Assembling the LED Ring Illuminator* [▶ 28]

4.6.1 Unmounting the LED Ring Illuminator

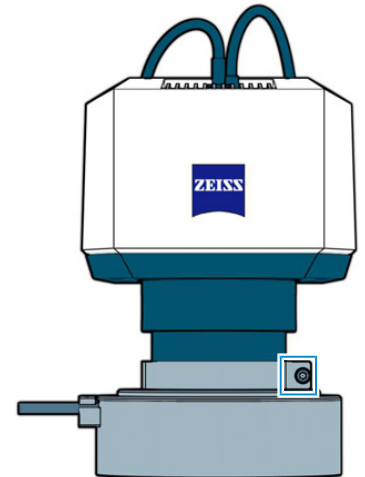
Parts and Tools 🔧 Hex Key, 3.0 mm

- Procedure**
1. Switch off the LED ring illuminator in the software ZEN core.
 2. Turn the height adjustment knob to move the carrier to the highest position.

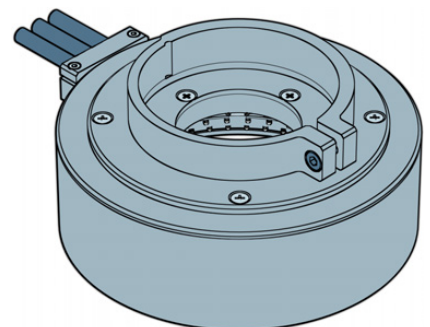


3. Hold the LED ring illuminator in one hand. With the other hand use a hex key to untighten the clamping screw.

CAUTION Risk of burned fingers: If the LED ring illuminator is hot, wait a few minutes to let the LED ring illuminator cool down.

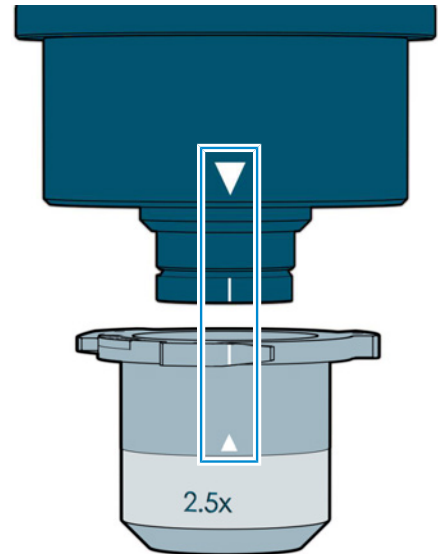


4. Place the LED ring illuminator on the table.

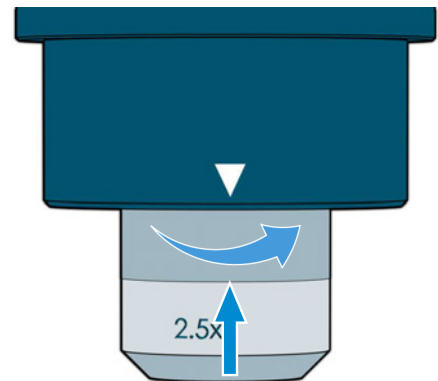


4.6.2 Assembling the Front Optics

- Procedure**
1. If another front optics is mounted, turn the front optics to the left, lower and remove the front optics.
 2. Store the front optics in a safe place.
 3. Align the mark on the front optics to the mark on the system unit.



4. Insert the front optics from below into the opening of the system unit.
5. Turn the front optics to the right until it locks in place.



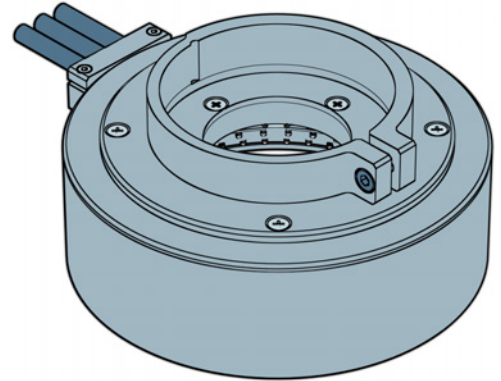
↳ Visioner 1 recognizes the mounted front optics automatically.

4.7 Wiring the Controller

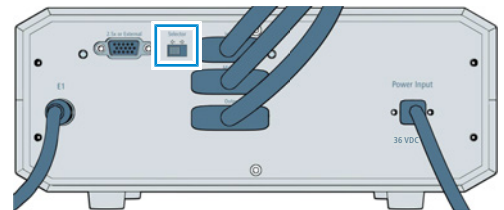
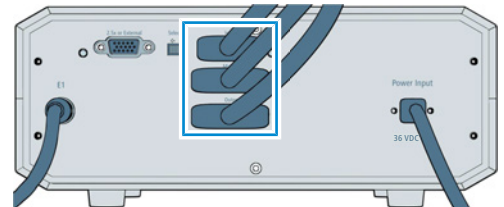
Info

All connectors are different to prevent faulty wiring.

- Procedure**
1. Connect the three cables from the LED ring illuminator 3x to the back of the controller.



2. Move the selector at the back of the controller to the right position.



5 Operation

This chapter describes switching on/off the microscope as well as the 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

Further information on the software and its operation is available in the software's online help.

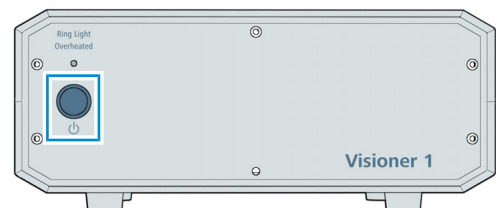
5.1 Prerequisites for Commissioning and Operation

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.

5.2 Switching On the Microscope

- Procedure**
1. Press the standby button at the front of the controller.



- The operation indicator at the back of the system unit lights up.


5.3 Starting Software

- Prerequisite** ✓ The software and all required licenses have been installed.

- Procedure**
1. Double-click the program icon on your desktop.
 - The software starts, and the login screen is displayed.
 2. Click on the application you want to work with, e.g. **ZEN core**.
 - The available applications depend on your licenses and system.
 - During the program start the hardware settings will be initialized.
 3. On the login screen, click on your name in the list of users, and enter your password. Click **Login**.
 - If you forgot your password or do not know your user name, contact the System Administrator or Supervisor.
- ↳ The **Home** Screen is displayed. You can start working with the software.

5.4 Acquiring an Image

You can acquire an image using your microscope's camera.


- Procedure**
1. Click the **Add workbench** button.
 2. In the left panel, click **Acquisition**.
 3. In the center panel select the desired acquisition workbench and click **Add**.
 - The selected workbench with its default tools is displayed in the **Workbench Area**. A live image of the sample is displayed in the image area.
 4. Focus the sample manually.
 5. If desired, add or remove tools from the workbench.
 6. Adjust the parameters in the tools until you are satisfied with the result in the live image.
 7. Click the **Snap** icon to acquire the image.
 - **Free Mode**: The image is added to the list of documents in the right panel. Note that an unsaved image is marked with a blue dot , which helps to remember that you must save the file.
 8. Switch between **EDF**, **Height Map** and **Topo** to visualize the information in an appropriate manner.

Info

Live Mode

You can switch back to a live image at any time by clicking the **Live** icon. Some Hardware settings require to stop **Live Mode** before changing them.

5.5 Closing Software

- Procedure**
1. Click **Home**.
 - The home screen is displayed.
 - If you have unsaved documents (e.g. templates, analysis results, or reports), choose whether to save or discard them.
 2. Click **Close**  in the upper right corner of the program window.
 - The software will close. Any unsaved data is discarded.
 3. If desired, turn off the microscope hardware.

5.6 Switching Off the Microscope

DANGER

Electric shock due to residual mains voltage

After shutdown the microscope, some external cables and devices can still carry residual mains voltage that can cause electric shock or burn.

- ▶ Safe disconnection from the power supply is ensured exclusively by removing the mains plug. The standby button on the front of the controller only switches into standby mode.
- ▶ Take care not to touch electrical contacts.

- Procedure**
1. Press the standby button at the front of the controller.



- The operation indicator at the back of the system unit turns off.

6 Care and Maintenance

To ensure the best possible performance of the microscope, maintenance must be performed on a regular basis. Please keep the service logs for your microscope.

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

Info

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

6.1 Safety During Cleaning and Maintenance

Only conduct preventive measures described here. All tasks of maintenance and cleaning not described may only be performed by an authorized ZEISS service representative.

Any unauthorized intervention or any operation outside the scope of the intended use can lead to injuries and property damage and voids all rights to warranty claims. Only original spare parts from ZEISS may be used.

DANGER

Electric shock 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 opening or cleaning.
- ▶ Disconnect live parts from the power supply.

NOTICE

Functional impairment due to dirt and moisture

Dirt, dust and moisture can impair the microscope functionality and can cause short-circuits.

- ▶ Use the dust protection cover if the microscope is not used.
- ▶ The ventilation slots must be unobstructed at all times.
- ▶ 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.
- ▶ In case of damage, the affected parts of the microscope must be taken out of operation.

6.2 Care and Cleaning Work

Foreign bodies and dust on microscope and on the lenses may result in incorrect measurements. Clean the lens regularly to ensure that the microscope continues to operate correctly.

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 rubber bellows.
- ▶ Avoid touching optical surfaces with fingers.

6.2.1 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 rubber bellows.
- ▶ Avoid touching optical surfaces with fingers.

- Parts and Tools**
- 🔧 Clean cloth
 - 🔧 Cotton swab
 - 🔧 Optical cleaning solution (85% n-hexan and 15 vol% isopropyl alcohol (IPA))
 - 🔧 Lint-free cloth

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



WRONG

CORRECT

3. Dry with a lint-free cloth.

6.2.2 Removing Water-Soluble Contamination

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

- Procedure**
1. Moisten a clean cloth with water.
 - A mild detergent may be added to the water (no solvent!).
 2. Wipe off the area with the cloth.
 3. Dry with a lint-free cloth.

7 Troubleshooting

The following table provides hints for solving common problems. If you cannot solve the problem or if you are unsure about a certain technical difficulty, contact your local ZEISS service representative.

Symptom	Cause	Measure
The microscope is not reacting.	Hardware is switched off.	Switch on the controller, refer to <i>Switching On the Microscope</i> [▶ 36].
	System unit is unresponsive.	Press the reset button on the back of the system unit.
Live image update is slow.	Acquisition parameters are not optimized.	Increase step size or reduce FoV or z-range, refer to Software Manual ZEISS ZEN core .
Image is too dark.	Illumination and camera parameters are not set appropriately.	Increase intensity, or gain, or exposure time, refer to Software Manual ZEISS ZEN core .
Illumination is not working.	Illumination is not connected.	Check wiring, refer to <i>Wiring the Controller</i> [▶ 35].
	Optional illumination is not registered in ZEN core.	Register optional illumination in ZEN core, refer to Software Manual ZEISS ZEN core .
	Selector at the back side of the controller is in the wrong position.	Move the selector to the left position for LED ring illuminator 1x or VisiLED. Move the selector to the right position for LED ring illuminator 3x.
Illumination changes between different pre-defined areas on LED ring illuminator.	Reflex mitigation is activated.	Switch off reflex mitigation, refer to Software Manual ZEISS ZEN core .
Overheat indicator (LED) on the front of the controller is switched on.	LED ring illuminator is too hot.	Let illumination cool down, e.g. by reducing intensity.
No live image.	Camera is too hot.	Let camera cool down.
	Software is unresponsive.	Restart User PC.

8 Decommissioning and Disposal

This chapter contains information on the decommissioning and disposal of the microscope and its expansions/components or accessories.

8.1 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.

Complete decommissioning of the microscope and its components should be executed by your ZEISS service representative.

DANGER

Electric shock 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 opening or cleaning.
- ▶ Disconnect live parts from the power supply.

- Procedure**
1. Switch off the microscope.
 2. Pull the mains plug.

8.2 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. In clean-room environments, this check is mandatory. 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.

Transport of the assembled Microscope The weight of microscope with stand 300 and one of the stages (mechanical stage S 150x100 R, mechanical stage S 150x100 mot. CAN, or measuring stage S 150x100 mot. CAN) is more than 20 kg. To transport the assembled microscope observe the following notes:

- Take the upper part of the column in one hand and tilt the microscope backwards until there is enough space to take the base plate. With the other hand take the base plate.
- Always use both hands to transport the assembled microscope.

Maximum shock resistance

- Do not drop or bump the boxes during movement or storage. Any acceleration shall be < 10 g.
- Evaluate packaging shock and tilting sensors on delivery and after internal transport.

Allowable temperature Allowable temperature during on-site storage:

- Between –10 °C and 55 °C
- Relative humidity less than 90 %

Allowable temperature during transport:

- Between –20 °C and 60 °C
- Relative humidity less than 90 %

Info

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

8.3 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. The customer is responsible for decontamination.

Info

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

8.4 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.

9 Technical Data and Conformity

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

9.1 Performance Data and Specifications

The microscope must only be operated in closed rooms. It is recommended to install the microscope in a dark room where artificial illumination, sunlight or other light sources cannot interfere with image acquisition. The microscope should not be installed near windows with direct sunlight or radiators. The microscope must be placed securely on the table surface to prevent slipping and falling.

Compliance with the installation requirements of the microscope and the availability of the requested supplies is the responsibility of the customer and has to be provided at the time of installation. Due to continuous development, we reserve the right to change specifications without notice.

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.

Info

Your ZEISS Sales & Service Partner will provide you with the detailed installation requirements.

Weight and Sizes

Main Components	Width (mm)	Depth (mm)	Height (mm)	Weight (kg)
System unit Visioner 1	134	140	105	1.8
Controller for Visioner 1	250	220	105	2.5
Power supply	165	75	45	0.66
Stand K	200	310	312	3.0
Stand M	300	340	392	4.1
Stand 300 with T column 350 and carrier S short	290	353	376	11.2
Stand 300 with column 490 and carrier S short	290	353	518	15.2

Air Conditioning and Quality

Parameter	Value
Heat Dissipation	Max. 230 W
Warm-up time	0.25 h
Temperature for operation	+10 to +35 °C
Relative humidity	< 75 % at 35 °C
Air pressure	800 hPa to 1060 hPa
Height above sea level	Max. 2000 m
Pollution degree	2

Mains connection	Parameter	Value
	Nominal AC voltage	100–240 VAC \pm 10 %
	Nominal frequency	50–60 Hz
	Power consumption	Max. 340 VA
	Max. current	2.22 A at 36 VDC (power supply of controller) 25 mA at 24 VDC (power supply of converter CAN - USB Rev. 2)
	Protection class	IP20 (IEC 60529)
	Overvoltage category	II

EMC Requirements	Parameter	Value
	Suppression of interference	In accordance with EN 55011 Class A
	Resistance to interference	In accordance with DIN EN 61326

9.2 Applicable Standards and Regulations

Observe all general and country-specific safety regulations as well as applicable environmental protection laws and regulations.

The microscope is in compliance with the requirements of the following regulations and directives:

2011/65/EU	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)
2015/863/EU	Commission Delegated Directive (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances (RoHS Directive III)
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

EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
EN 61010-1:2020	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
EN 62471:2009	Photobiological safety of lamps and lamp systems

According to directive 2011/65/EU (RoHS) the microscope and its accessories have been classified as instrument category 9 (Monitoring and control instruments including industrial monitoring and control instruments). They also fall under 2012/19/EU (WEEE).

The following EMC user notice is for Korea only:

기종별	사용자안내문
A급기기(업무용방송통신기자재)	이기는업무용(A급) 전자파적합기기로서 판매자또는사용자는이점을주의하시기바라며, 가정외의지역에서사용하는것을목적으로합니다.

European and International Directives / Standards: For more information on ISO and CSA certificates or CE Declarations of Conformity, contact your ZEISS Sales & Service Partner.

ZEISS works according to a certified Environment Management System according to ISO 14001. The microscope and its components were developed, tested, and produced in accordance with the valid regulations and guidelines for environmental law of the European Union.

10 Accessories and optional 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 please refer to the associated documents.

Info

Further information on the software and its operation is available in the software's online help.

Info

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

Name	Description/info
Front optics 0.35x with extension tube	Front optics for the 0.35x configuration. Extension tube (73 mm) is used to improve the illumination of the sample.
Front optics 0.75x with extension tube	Front optics for the 0.75x configuration. Extension tube (37 mm) is used to improve the illumination of the sample.
Front optics 1.2x	Telecentric front optics for the 1.2x configuration.
Front optics 1.8x	Telecentric front optics for the 1.8x configuration.
Front optics 2.5x	Front optics for the 2.5x configuration.
LED ring illuminator 1x	Replaces the LED ring illuminator 3x in the 2.5x configuration.
VisiLED	Replaces the LED ring illuminator 1x or the LED ring illuminator 3x. VisiLED is not optimized for a specific magnification and can be mounted on the front optics or directly on the system unit.
Spacer	Support block to bring flat samples into focus. The cylindrical spacer has a height of 3 cm.
Foot switch	For fast and hands-free image acquisition with ZEN core.
Mechanical stage S 150x100 R	For manual xy-positioning of sample in the beam path of the Visioner 1.
Mechanical stage S 150x100 mot. CAN	For motor-supported xy-positioning of sample in the beam path of the Visioner 1.
Measuring stage S 150x100 mot. CAN	For motor-supported xy-positioning of sample in the beam path of the Visioner 1 with higher accuracy and closed loop control.
Joystick XY; CAN	For manual control of mechanical stage S 150x100 mot. CAN or motorized stage S 150x100 mot. CAN.
Converter CAN - USB Rev. 2	For connection of mechanical stage S 150x100 mot. CAN or motorized stage S 150x100 mot. CAN to the PC.

Revision History

Revision	Date of Issue	Introduced Modifications
2	11/2022	<ul style="list-style-type: none">▪ Editorial rework▪ Implementation of UKCA marking▪ Implementation of revision history

Tab. 1: Revision History

Glossary

Contamination

The presence of an unwanted constituent, contaminant or impurity in a material, physical body, natural environment, workplace, etc.

Controller

Electronic device that interfaces with and controls a system, module or component; assembly that represents a closed-loop control system or an open-loop control system.

EDoF

Enhanced Depth of Field

Front Optics

Optical component that reduces or increases the magnification of a stereomicroscope, thereby changing the working distance.

MALS

Micro-mirror Array Lens System

Operator

A person who operates a machine or device.

Sample or Specimen

A representative part or a single item from a larger whole or group especially when presented for inspection or shown as evidence of quality.

ZEISS Sales & Service Partner

The Sales & Service Partner is generally in the field for customer support in a regional area and / or a clearly defined customer group.

ZEISS service representative

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

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