

Operating Manual
Mechanical / Measuring stage S mot.
for **Axio Zoom and SteREO Discovery**

You have purchased a high quality product from Zeiss. Before using the instrument the first time, please read this operating manual in order to maintain the high quality of the instrument and ensure reliable work with it for a long time.

Knowledge of this manual is required for the operation of the device. You should therefore familiarize yourself with the contents of this manual and pay special attention to instructions concerning the safe operation of the instrument.

We reserve the right to make changes in the interest of technological advancement; the operating manual is not subject to updating or revision.

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1 INTRODUCTION

1.1 General information

The mechanical / measuring stage S 150 x 100 mot. CAN and the appropriate controller EMS 3 have been designed, manufactured and tested in compliance with DIN EN 61010-1 (IEC 61010-1) Safety requirements for electrical equipment for measurement, control and laboratory use.

Mechanical / measuring stage S 150 x 100 mot. CAN satisfies the requirements of the European directives 2006/95/EC "Low Voltage Directive", 2004/108/EC "Electromagnetic Compatibility" and 2006/42/EC "Machinery Directive" with the appropriate controller EMS 3.

The operating manual contains all information and warnings the operator must comply with.

The following warning and information symbols are used in this operating manual:

**CAUTION**

This symbol indicates a potential hazard to the user.

**CAUTION**

*Optical radiation is emitted. Do not look into the laser beam!
This may be harmful to the eyes (see Section 2.4).*

**CAUTION**

Risk of pinching!

**CAUTION**

Hot surface!

**CAUTION: High-energy UV radiation!**

Risk of injury to eyes and skin!

**CAUTION**

Disconnect the instrument from the power supply before opening!

**ATTENTION**

This symbol indicates a potential hazard to the instrument or system.

**NOTE**

This symbol indicates an instruction which requires particular attention.

1.2 Notes on instrument safety



The mechanical stage / measuring stage S mot. CAN may only be used for the applications described in this operating manual. The manufacturer cannot assume any liability for other applications of the instrument, including those of individual modules or single parts.

Modifications and repairs to this instrument and any devices operated in combination with the microscope must be carried out by our service department or by authorized personnel only. The manufacturer accepts no liability for damage caused by unauthorized access to the interior of the instrument. Failure to comply with this shall also render any warranty claims invalid.



The device may only be operated by instructed personnel. The instruments may only be operated by trained personnel who are aware of the possible dangers involved with microscopy and the application concerned. The microscope is a high-precision instrument that can be impaired in its performance or destroyed when handled improperly.



The mains plug of instruments with a metal housing (e.g. EMS 3) may only be connected to a socket with earth contact. The protective capacity must not be rendered ineffective by using an extension cable without a ground wire.



If it is determined that protective measures are no longer effective, the instrument must be switched off and secured against inadvertent operation. Please contact a Zeiss service agency or the Carl Zeiss Microscopy Service to repair the instrument.



Dust and dirt may impair the instrument's performance. The instrument must be effectively protected from such influences and covered with the dust cover when not in use. Always check whether the instrument is switched off before you cover it. Broad temperature fluctuations, direct sunlight and vibrations should be avoided.



The instruments are not equipped with special devices to protect against corrosive, potentially infectious, toxic, radioactive or other substances that may be hazardous to health. All legal regulations must be observed when handling such substances, particularly the relevant national accident prevention regulations.



Defective instruments are not to be disposed of as ordinary domestic waste. They should be disposed of in accordance with the relevant regulations.



Samples should also be disposed of in compliance with the relevant legal requirements and internal operating procedures.



Before setting up the instrument, check whether it is suitable for the available line voltage.



Always disconnect the instrument from the power outlet before opening it and changing the fuses.

Only the specified fuses may be used.

The use of makeshift fuses and short-circuiting of the fuse holders are not permitted.



Controller EMS 3 supplies voltage to the mechanical / measuring stage S 150 x 100 mot. CAN. The EMS 3 permits mains voltages in the 100 to 240 V $\pm 10\%$ 50/60 Hz range without additional change in the voltage.



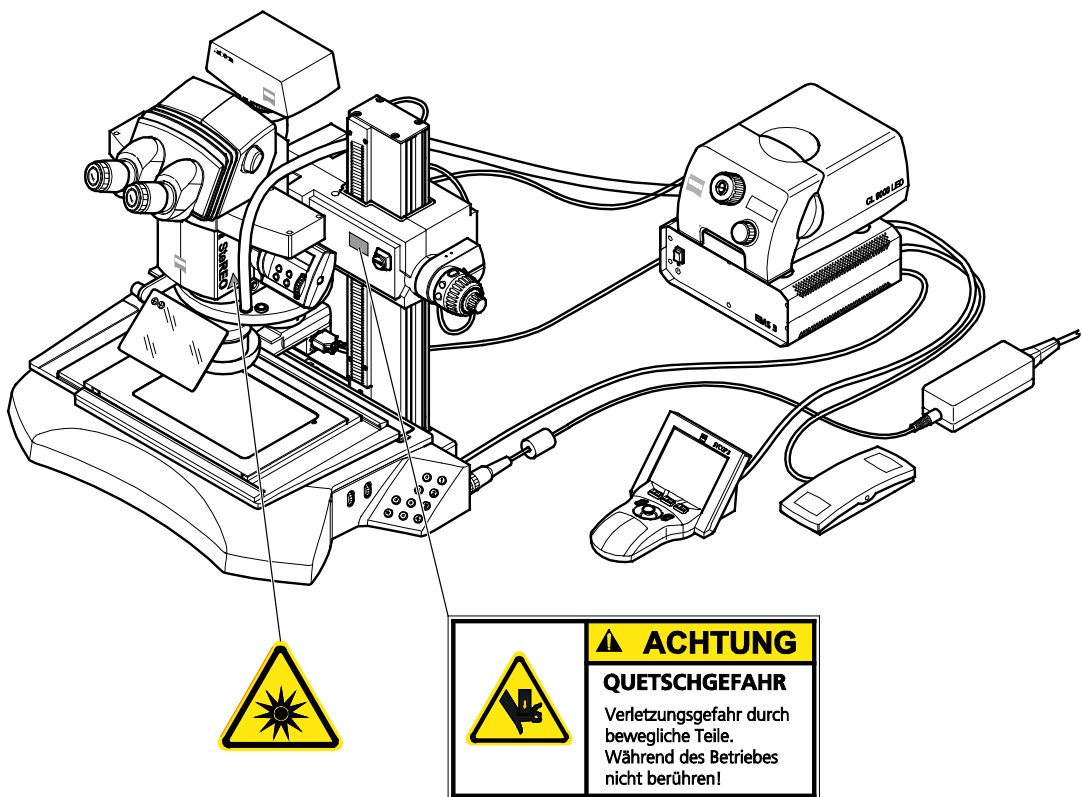
Operation of the instrument in explosive environments is not permissible.



On microscopes with motorized focusing drive there is a **risk of pinching fingers** in the work area when lowering the body of the microscope.



- Before switching on check that the joystick on the SYCOP 3 is at the zero position and not swiveled out, and that the foot pedal is clear.
- Automatic travel of the motorized tables can be interrupted by pressing the STOP button on the focusing drive or the STOP button on the SYCOP 3, moving the joystick on the SYCOP 3 up and down, turning the knurled wheel on the HIP or pressing the Memory 1 or 2 keys on the HIP.
- Do not reach into the possible travel path of the motorized stage. There is a risk of pinching or injury to the fingers when the stage is positioned by the control unit.



1.3 Notes on warranty

The manufacturer guarantees that the instrument is free of material or manufacturing defects when delivered. Possible defects must be notified to us immediately and steps taken to minimize damage. If notified of such a defect, the manufacturer is obligated to rectify it at his discretion, either by repairing the instrument or delivering an intact replacement. No guarantee is provided for defects caused by natural wear (wearing parts in particular) and improper use.

The instrument manufacturer shall not be liable for damage caused by faulty operation, negligence or any other tampering with the instrument, particularly the removal or replacement of instrument components, or the use of accessories from other manufacturers. Such actions will render any warranty claims invalid.

With the exception of the work described in this operating manual, no maintenance or repair work is to be carried out on these microscopes. Repairs may only be performed by Carl Zeiss service staff or personnel specifically authorized by Carl Zeiss. In the event of a problem with the instrument, please contact the Carl Zeiss microscopy service team or your local Carl Zeiss overseas representative.

2 DESCRIPTION

2.1 Indication for use

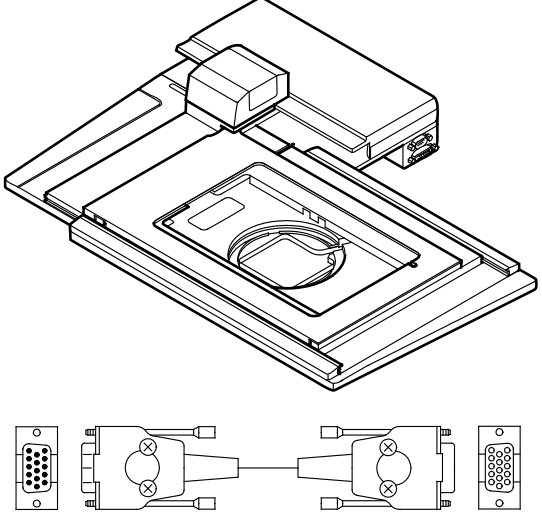
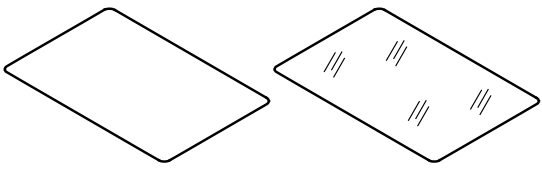
In conjunction with the selected microscope, the mechanical / measuring stage S mot. CAN is for motor-supported XY-positioning of specimens in the beam path.

The mechanical / measuring stage S mot. CAN is intended for operation only with Axio Zoom.V.16 microscopes and SteREO Discovery.V20 / V12 / V8 stereomicroscopes.

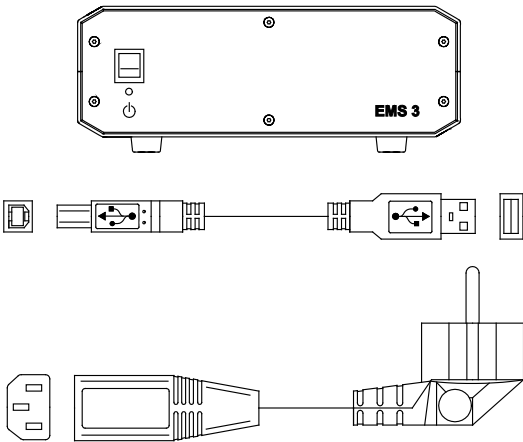
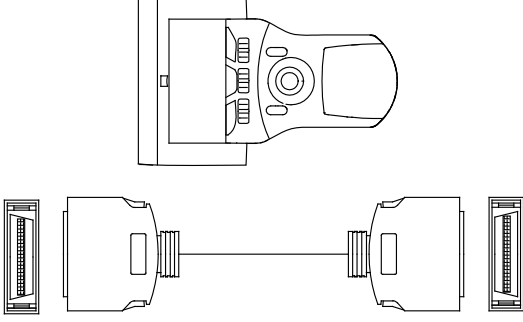
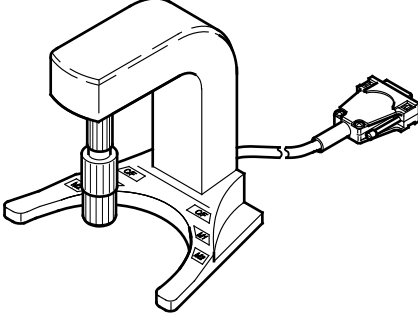
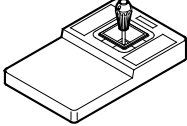

When using the mechanical / measuring stage S mot. CAN the separate operating manuals for the Axio Zoom.V16 or SteREO Discovery and, insofar as they are used, the

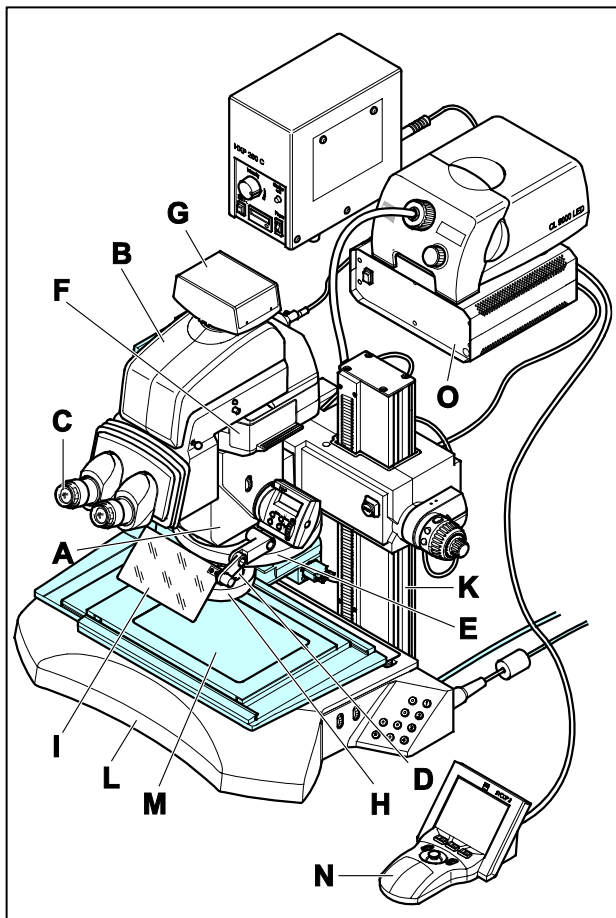
- Transillumination top 450 mot.
- SYCOP 3 system control panel
- and further components must be strictly observed.

2.2 Package check list

Name/Order No.	Figure	Remarks
Mechanical stage S 150x100 mot. CAN 435465-9000-000 or Measuring stage S 150x100 mot. CAN 435465-9020-000 (without illustration) CAN extension cable HD15000000-0500-647		Connection between EMS 3 and mechanical / measuring stage S 150x100 mot. CAN
Insert plate S. metal 237 x 157 mm 435465-9052-000 or Insert plate S, glass 237 x 157 mm 435465-9053-000		


2.3 Accessories and optional components

Name/Order No.	Figure	Remarks
EMS 3 controller 435610-9010-000		EMS 3 Required for operating the stage USB 2.0 cable to workstation with software Country-specific power cable
SYCOP 3 system control panel 435611-9010-000		SYCOP 3 for stage control Cable MDR 2x20 between SYCOP 3 and EMS 3
Mobile coaxial drive XY CAN 435606-9000-000		Optionally for manual control
Joystick XY; CAN (D) 432903-9010-000		Optionally for manual control
Trackball XY; CAN (D) 432903-9000-000		Optionally for manual control

2.4 Microscope system with mechanical stage S 150x100 mot. CAN**Axio Zoom.V16 microscope**

- A** Microscope body (Axio Zoom.V16) with control unit (HIP)
- B** Binocular photo tube
- C** Eyepiece
- D** Objective
- E** Nosepiece
- F** Intermediate tube (Fluar Illuminator Z mot.)
- G** Camera adapter with microscope camera (AxioCam)
- H** Reflected light illumination (slit-ring illuminator with cold light source CL 9000 LED)
- I** UV/visual glare shield
- K** Stand (focus motor with 490 mm profile column and MaRC control unit on base plate 450)
- L** Transmitted light illuminator (transillumination top 450 mot.)
- M** Specimen stage (Mechanical stage S mot. CAN)
- N** SYCOP 3 system control panel
- O** EMS 3 controller

Fig. 1 Axio Zoom.V16 with mechanical stage S 150x100 mot. CAN

 The items of microscope equipment shown here are examples and may differ from those actually provided!

2.5 Technical data

Dimensions

Mechanical stage / measuring stage S mot. CAN (length x width x height)..... 532 mm x 407 mm x 98 mm

Weight

Mechanical stage / measuring stage S mot. CAN..... 7.76 kg

Payload max. 3 kg

Power supply

Mechanical stage / measuring stage S mot. CAN..... viaCAN extension cable HD15
.....from Controller EMS 3 or focus motor

Travel speed

Via Joystick.....max. 17 mm/s

Memory travels max. 100 mm/s

Ambient conditions

Storage (in packaging)

Permissible ambient temperature+5 to +40 °C

Permissible relative humidity max. 75 % at +35 °C (non-condensing)

Transport (in packaging):

Permissible ambient temperature..... -40 to +70 °C

Operation

Permissible ambient temperature..... +10 to +40 °C

Permissible relative humidity max. 75%

Air pressure..... 800 hPa to 1060 hPa

Degree of pollution2

EMS 3 controller

Operational area.....Closed rooms

Protection class I

Ingress protection rating..... IP 20

Electrical safety conforms to DIN EN 61010-1 (IEC 61010-1)

and CSA and UL regulations

Overvoltage categoryII

RFI suppression conforming to EN 55011 Class A

Noise immunity..... conforming to DIN EN 61326-1

Mains voltage range..... 100 to 240 V AC \pm 10%


Mains frequency 50 to 60 Hz

Power consumptionmax. 180 VA

Fuses2xT 4 A/H 205 V

3 SET-UP

3.1 General information

 Read the **Notes on instrument safety** carefully prior to set-up and operation (see Section 1.2, page 7).

The mechanical stage / measuring stage S mot. CAN is normally delivered together with the required tools and optional accessories in several packages.

- Remove all components from the packaging and check that all components described on the delivery note are present.
- Remove all shipping braces (adhesive tape or similar).
- Keep the original packaging for storage or for returning the instrument to the manufacturer, or dispose of it properly.

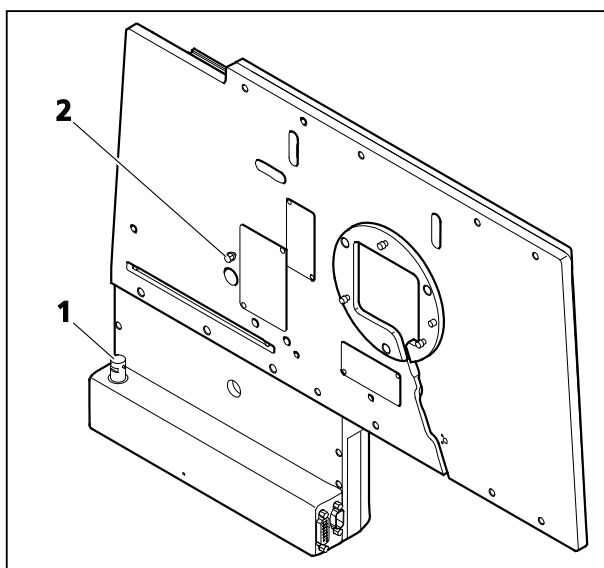




Fig. 2 Removing the transport locking screw

3.2 Mounting the mechanical / measuring stage S mot. CAN


 In the event that a microscope system is not yet available or assembled, the microscope must initially be installed and put into operation according to the separate operating manual. The transillumination top 450 mot. may already be mounted.

- Switch off the microscope and illumination.
- Remove the shipping screw (Fig. 2/2) on the underside of the respective stage and keep it for later use.

 Only the measuring stage S mot. CAN has a trigger socket (Fig. 2/1) on its underside.

3.2.1 Mounting the mechanical / measuring stage S mot. CAN on base 300 for epi-illumination

- If necessary, remove the metal plate (Fig. 3/1) from base 300 (Fig. 3/2) by pressing and tilting the rear edge.
- Set the mechanical / measuring stage (Fig. 3/4) on the base 300 (stage drive pointing to the left), align it to base 300 secure with the three captive screws (Fig. 3/3) of the stage.
- Insert the metal plate (Fig. 3/5) into the stage.
 - To do this, push the plate (Fig. 4/3) into the stage (Fig. 4/1) with the left front corner slightly inclined allow it to slide under slight pressure against the springs (Fig. 4/4) until it is completely inside the stage interface. The plate is held in the stage by spring pressure. Take care to ensure that the plate is correctly positioned on the stage.
 - To remove, insert a screwdriver into the recess (Fig. 4/2) and carefully prise the plate out.

 The red dots on the stage (Fig. 3/4) and metal plate (Fig. 3/5) are to ensure reproducibility of the alignment of the metal plate and stage if the former needs to be detached.

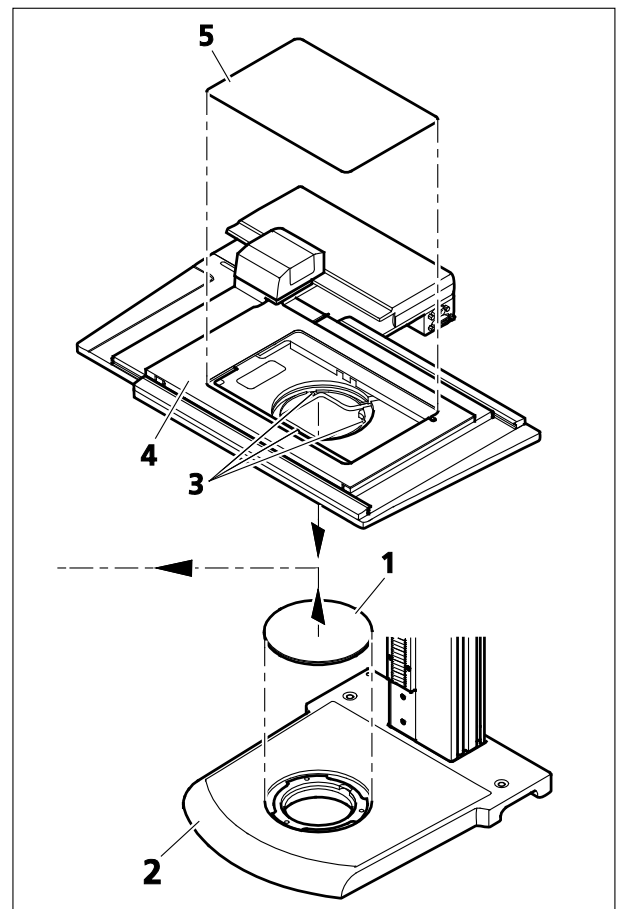


Fig. 3 Mounting the mechanical / measuring stage mot. on base 300

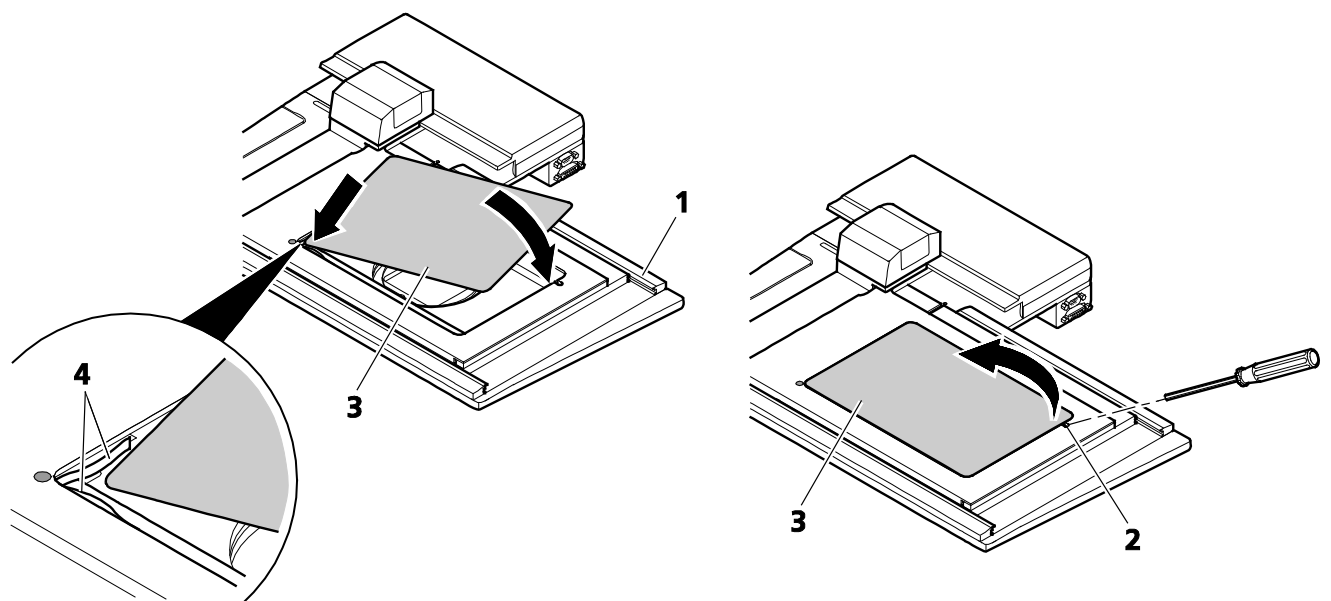


Fig. 4 Inserting the metal plate (glass plate) into or removing it from the stage

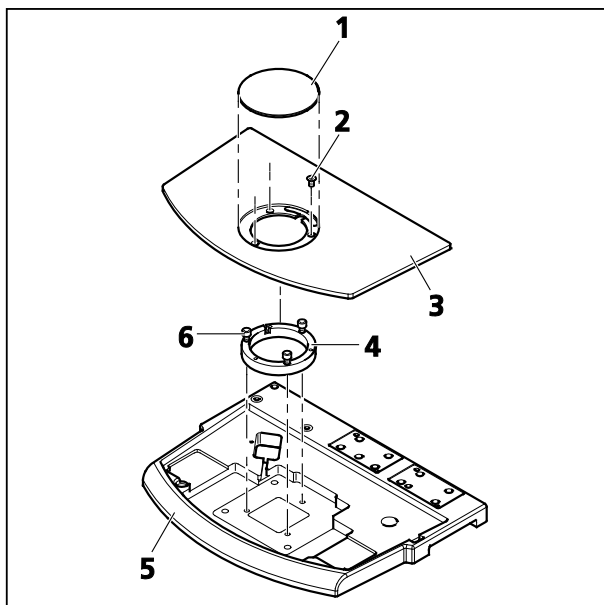


Fig. 5 Mounting the adapter ring

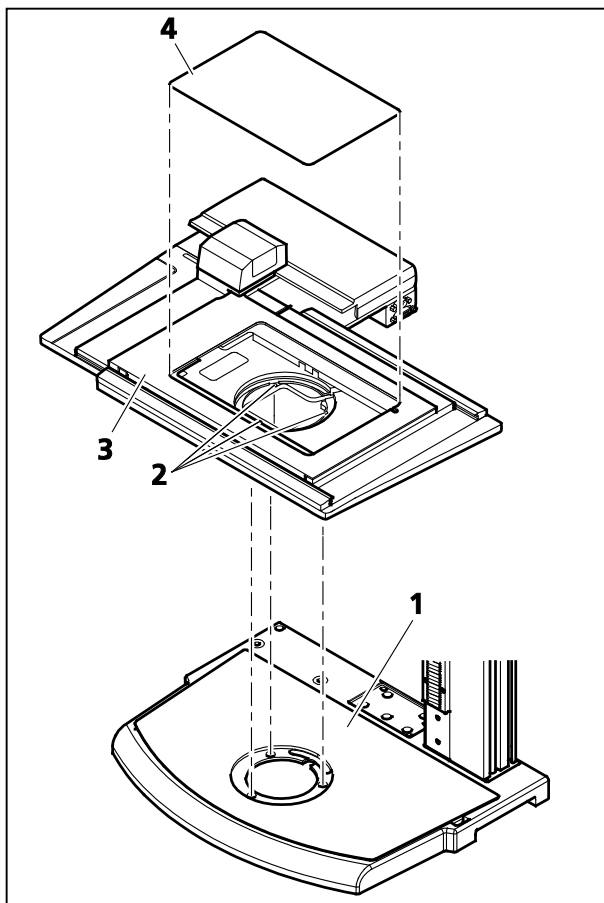


Fig. 6 Mounting the mechanical / measuring stage mot. on stand base 450

3.2.2 Mounting the mechanical / measuring stage S mot. CAN on stand base 450 for epi-illumination

- If necessary, remove the metal plate (Fig. 5/1) from insert plate (Fig. 5/3) by pressing and tilting the rear edge.

If stand base 450 (Fig. 5/5) is not provided with an adapter ring (Fig. 5/4) this must be mounted first:

- Remove the insert plate (Fig. 5/3). To do this, remove the three screws (Fig. 5/2) and keep them for possible later use.
- Insert the adapter ring (Fig. 5/4) into the stand base 450 and secure with the three captive screws (Fig. 5/6).
- Detach the insert plate (Fig. 5/3) from the stand base 450 (Fig. 5/5).

- Set the mechanical / measuring stage (Fig. 6/3) on the insert plate (Fig. 6/1) (stage drive pointing to the left), align to the rear edge and secure with the three captive screws (Fig. 6/2) of the stage on the transillumination top.

- Insert the metal plate (Fig. 6/4) into the stage.




The procedure for inserting the plate into and removing from the stage is described on page 15.




The red dots on the stage (Fig. 6/3) and metal plate (Fig. 6/4) are to ensure reproducibility of the alignment of the metal plate and stage if the former needs to be detached.

3.2.3 Mounting the mechanical stage / measuring stage S mot. CAN on the transillumination base 300

- If necessary, remove the glass plate (Fig. 7/1) from the transillumination base 300 (Fig. 7/2) by pressing on the rear edge to tilt it.
- Insert stage adapter 84+120 (Fig. 7/3) into the transillumination base 300 and screw it hand-tight with the 4 captive screws.
- Set the mechanical / measuring stage (Fig. 7/5) on the transillumination base 300 (stage drive pointing to the left), align to the rear edge and secure with the three captive screws (Fig. 7/4) of the stage.
- Insert the glass plate (Fig. 7/6) into the stage.

 The procedure for inserting the plate into and removing from the stage is described on page 15.

 The red dots on the table (Fig. 7/5) and metal plate (Fig. 7/6) are to ensure reproducibility of the alignment of the metal plate and stage if the former needs to be detached.

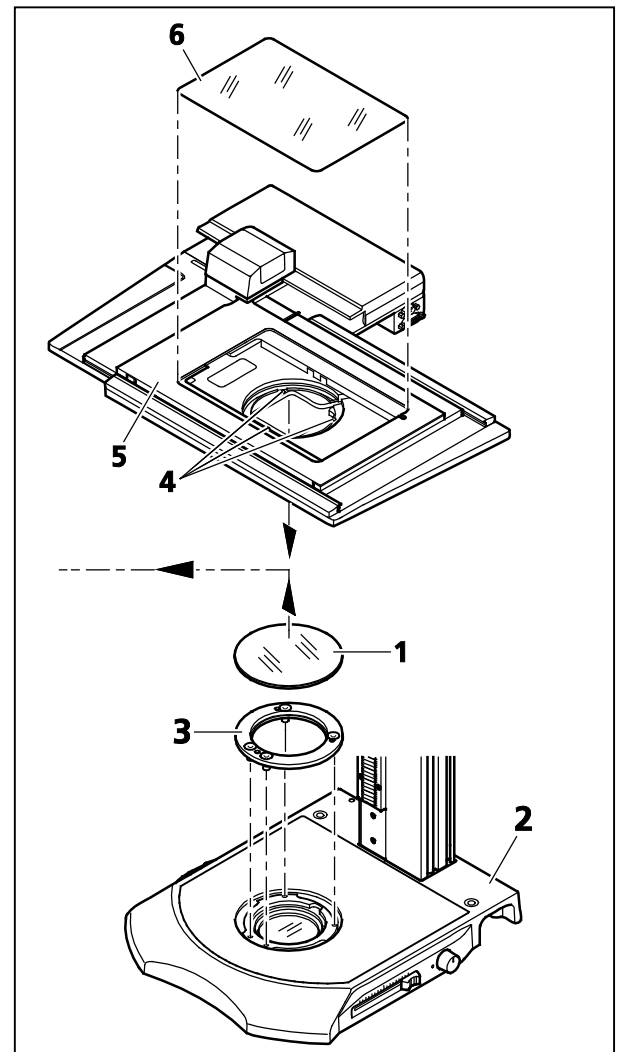


Fig. 7 Mounting the mechanical / measuring stage mot. on transillumination base 300

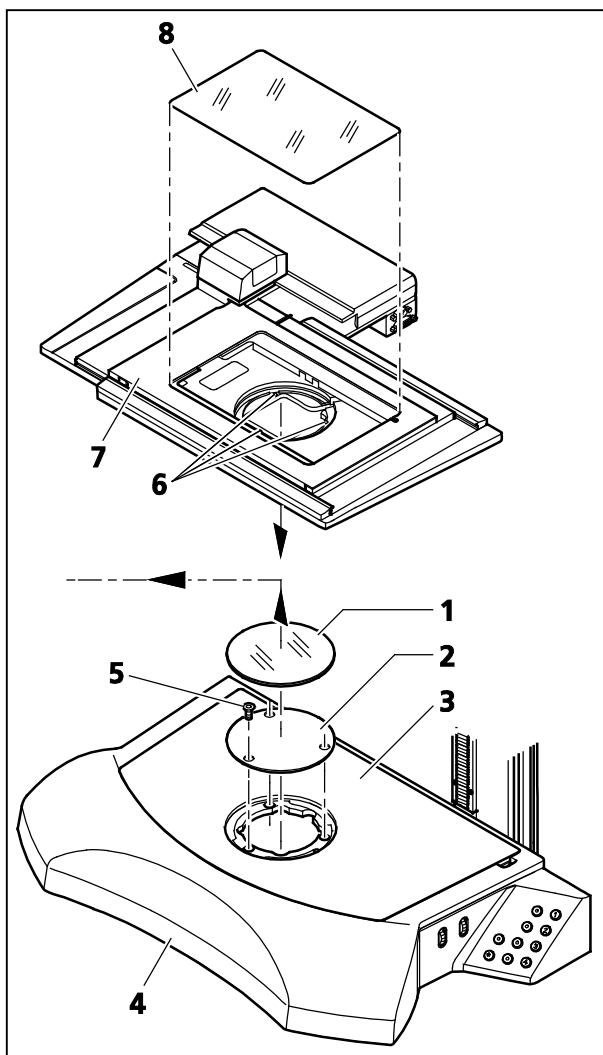


Fig. 8 Mounting the mechanical / measuring stage mot. on transillumination top DL 450 mot.

3.2.4 Mounting the mechanical / measuring stage S mot. CAN on the transillumination top DL 450 mot.



The procedure for mounting transillumination top DL 450 mot. on base plate 450 is described in the separate operating manual of the transillumination top.

- Remove the glass plate (Fig. 8/1) from insert plate (Fig. 8/3) by pressing and tilting the rear edge.
- Insert assembly aid $d = 120$ mm (Fig. 8/2) to prevent the screws and small parts from being lost in the transillumination top (Fig. 8/4).
- Remove the three short hexagon socket screws (Fig. 8/5) on the insert plate and keep for possible later use.
- Remove assembly aid $d = 120$ mm (Fig. 8/2) again.
- Set the mechanical / measuring stage (Fig. 8/7) on the insert plate (stage drive pointing to the left), align to the rear edge of the transillumination top (Fig. 8/4) and secure on the transillumination top with the three captive screws (Fig. 8/6) of the stage.
- Insert the glass plate (Fig. 8/8) into the stage.



The procedure for inserting the plate into and removing from the stage is described on page 15.




The red dots on the table (Fig. 8/7) and glass plate (Fig. 8/8) are to ensure reproducibility of the alignment of the metal plate and stage if the former needs to be detached.

3.3 Connecting the mechanical / measuring stage S mot. CAN

Connecting to the microscope system

- Connect the stage directly to the corresponding plug-in point **CAN HD15** of controller EMS 3 with the CAN extension cable HD15 (Fig. 9/3) via the upper connecting socket (Fig. 9/1).
- Connect SOCP 3 (Fig. 9/5) to EMS 3
- In addition to or as an alternative to SYCOP 3 the mobile coaxial drive XY CAN can be connected using the latter's connecting cable (Fig. 9/4) via the lower connecting socket (Fig. 9/2) of the stage.

 A device for transmitting a trigger signal can be connected to the trigger socket (Fig. 2/1) of measuring stage S mot. CAN.

- Connect EMS 3 to the mains supply using power cable (Fig. 9/6).

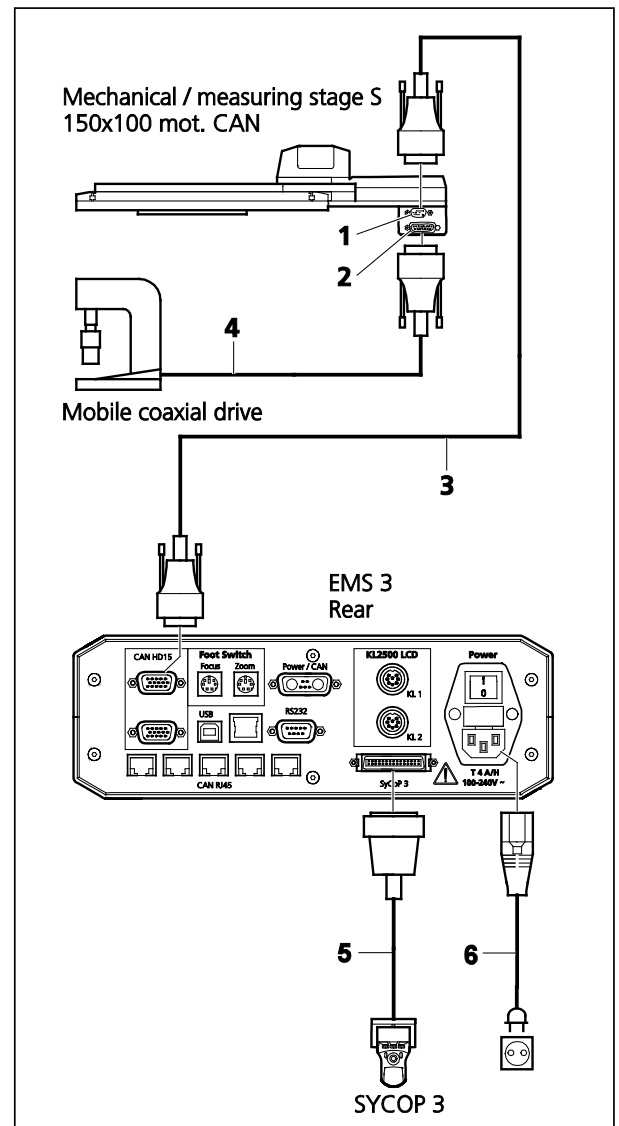


Fig. 9 Connections on the mechanical / measuring stage

4 OPERATION

Controller EMS 3 is indispensable for using the mechanical / measuring stage S mot. with SYCOP 3.


The stage function is controlled by the SYCOP 3 system control panel. See separate SYCOP 3 operating manual


– for operation under:


Home\Microscope\Function\XYZ Position or
Home\Microscope\Function\XYZ Distance

– for hardware settings under:

Home\Microscope\Memory\Hardware Setting

 The **Invert Direction** function can be used to reverse the direction of stage travel. See SYCOP 3 operating manual under:
Home\Setup\Mode\Stage.

 The **Fast XY** function can be used for rapid stage movements over longer distances. To do this, assign the **Fast XY** function to a button (see SYCOP 3 under: **Home\Setup\Key Settings\Buttons**) For quick positioning hold this button pressed while moving the joystick accordingly.

 If SYCOP 3 is not available on the microscope system, the mobile coaxial drive XY CAN can be optionally used for external control of the stage (see Section 4.2).

The **Parcentricity Manager** can be activated on the SYCOP 3 for SteREO Discovery.V20 / V12 microscope systems with nosepiece S, coax 3x2 cod.

The Parcentricity Manager ensures that when the nosepiece is switched between the **Stereo Mode (3D)** and **Axial Mode (2D)** positions the object detail being observed remains in the center of the image. The necessary compensatory movement of the object is performed automatically by the installed mechanical / measuring stage S mot. CAN.




Fig. 10 Activating/deactivating the Parcentricity Manager

Opening menus:

Home\Setup\Mode\Stage

- The function is activated / deactivated by pressing the **Compensate 2D/3D Changes** button.
- The LED lights up blue when the function is activated.

 The stage manager function is automatically activated when using the EMS 3. This ensures constant speed of movement of object details in the visual field.

4.1 Switching on and off



Before switching on the microscope system the movement range of the mechanical / measuring stage must be cleared and any objects removed from the stage to prevent collisions and damage during stage calibration.

- The mechanical / measuring stage S mot. is switched on and off with the microscope and initializes itself automatically when switched on.



After switching on the warning message **Stage Calibration** appears on the display of the SYCOP 3 with the request to remove objects from the stage. Calibration can be started immediately with **OK** or interrupted with **Cancel** and continued later as necessary. See separate SYCOP 3 operating manual under:

Home\Microscope\XYZ Position\Function\auto) or
Home\Setup\Mode\Stage\Calibrate).

Calibration is necessary for use of the SYCOP 3 memory function. It is recommended that this is carried out immediately upon prompting. The settings in the **Memory** menu are thus available again after switching the system off/on. Calibration of the measuring stage is a prerequisite for positional accuracy.

4.2 Control elements on the mobile coaxial drive

XY coaxial drive for stage control

- Upper drive knob: Y adjustment (Fig. 11/5)
- Lower drive knob: X adjustment (Fig. 11/4)
- The drive knobs are height adjustable. Simply push the drive knob up or down.
- If required, the friction of the drive knobs can also be adjusted:
To do this, hold the black sleeve and slide the silver sleeve in the corresponding direction to increase or decrease friction.
- The horizontal position of the drive axis (Fig. 11/6) can be individually selected: To do this, loosen the two screws on the left underside of the retaining bracket (Fig. 11/7) and push the drive forwards or backwards. Tighten the screws again.

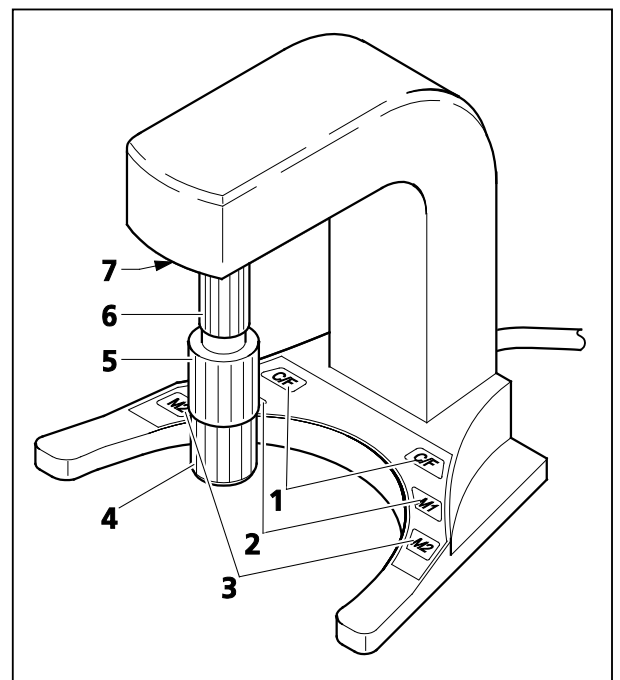



Fig. 11 Control elements on the mobile coaxial drive


Button C/F (positioned left and right, Fig. 11/1)

- Switching between coarse and fine adjustment of the stage.

Button M1 or M2 (positioned left and right, Fig. 11/2 or 3)

- Saving the current XY position by holding down the respective button.
- Going to the saved XY position by briefly pressing the respective button.

 The XY positions are only saved temporarily. They are deleted when the microscope system is switched off.

 If the coaxial drive and SYCOP 3 are operated parallel in the system, the memory positions saved with the coaxial drive are not identical to those saved in the SYCOP 3.