

Operating Manual
Transillumination top 450 mot.
for Axio Zoom.V16

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 transillumination top 450 mot. has been designed, manufactured and tested in compliance with DIN EN 61010-1 (IEC 61010-1) and IEC 61010-2-101 Safety requirements for electrical equipment for measurement, control and laboratory use.

The device conforms to Directives 2006/95/EC "Low Voltage Directive" and 2004/108/EC "Electromagnetic Compatibility". The device is disposed of in accordance with the WEEE Directive 2002/96/EC.

It carries the  mark.

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 2.3).*

**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 transillumination top 450 mot. is equipped with a power supply unit that enables the use of mains voltages in the 100 to 240 V $\pm 10\%$ 50/60 Hz range without additional voltage change.



The power supply unit with plastic housing is designed to conform with protective class I. The unit may not be used if the housing becomes damaged. The transillumination top 450 mot. may only be operated with the PSU supplied.



The table power supply should not be brought into contact with moisture. The power supply must be disconnected from the mains supply before cleaning.



The transillumination top 450 mot. 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.



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.



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 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 table. There is a risk of pinching or injury to the fingers when the table is positioned by the control unit.



The separate operating manuals for the Axio Zoom.V16, HXP 200 C and SYCOP 3 (if used) must be observed and the general safety requirements complied with.

- Operating Manual Axio Zoom.V16: Order No. 435080-9030-701, English edition
- Operating Manual SYCOP 3: Order No. 435611-9010-701, English edition



When operating the microscope always use the antiglare shield to avoid eye damage due to scattered light.



Use the UV/antiglare shield (Fig. 1/I). Avoid looking directly into the light beam. This can cause damage to the eyes and skin.

The transillumination top 450 mot. generates extremely high-energy light in the visible and invisible range. The related instructions for safety and use must be strictly adhered to.

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.

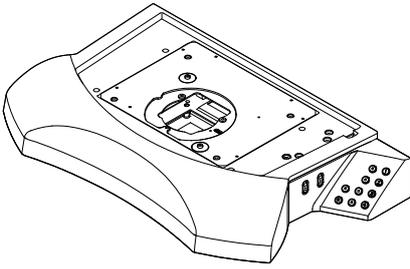
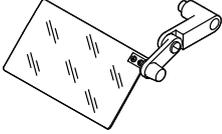
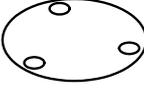
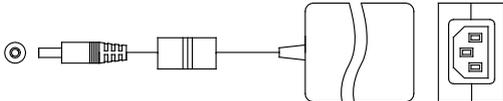
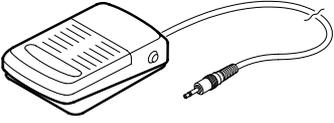
The instrument manufacturer shall not be liable for damage caused by faulty operation, negligence or any other tampering with the instrument, particularly the removal or replacement of instrument components, or the use of accessories from other manufacturers. Such actions will render any warranty claims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

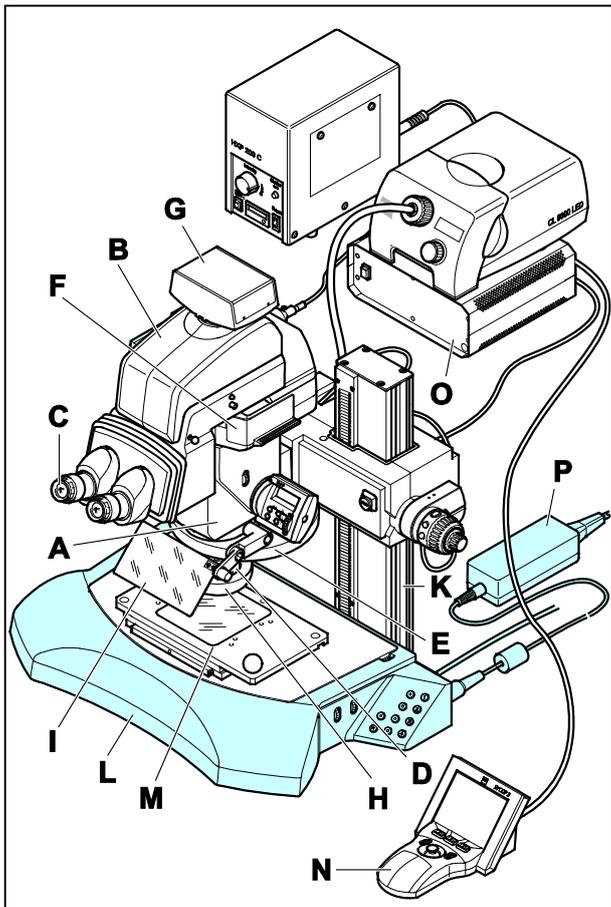
With the exception of the work described in this operating manual, no maintenance or repair work is to be carried out on these microscopes. Repairs may only be performed by Carl Zeiss service staff or personnel specifically authorized by Carl Zeiss. In the event of a problem with the instrument, please 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 transillumination top 450 mot. is for examining translucent preparations by the transmitted light process.

2.2 Package check list with accessories

Name/Order No.	Figure	Remarks
Transillumination top 450 mot. 435500-9000-000		
Antiglare shield contained in 435500-9000-000		Can be screwed onto the carrier/nosepiece from the left or right
Magnet coded receptacle d = 84 mm included in 435500-9000-000		For Ø 84 mm accessories
Clear glass plate d = 120 mm included in 435500-9000-000		Scratch-proof, with strongly reduced autofluorescence
Assembly aid d = 120 mm included in 435500-9000-000		For covering the transmitted light aperture during assembly
Power supply 24 V, 60 W included in 435500-9000-000		With country-specific power supply cable
CAN cable RJ 45 included in 435500-9000-000		L = 1000 mm
Foot button S 435602-9010-000		Optional accessories For connecting to transillumination top 450 mot.

2.3 Microscope system with transillumination top 450 mot.**Axio Zoom.V16 microscope system**

- 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 6000 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 (gliding stage)
- N** SYCOP 3 system control panel
- O** EMS 3 controller with optional foot pedal S
- P** Power supply

Fig. 1 Axio Zoom.V16 with transillumination top 450 mot.

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

2.4 Technical data**Dimensions**

Transillumination top 450 mot. (length x width x height) 595 mm x 342 mm x 86 mm

Weight (shipping contents without packaging)

Transillumination top 450 mot. 4.74 kg

Power supply

Separate power supply 24 V, 60 W

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 pollution 2

Optical risk group classification acc. to DIN EN 62471:2009

Axio Zoom.V16 microscope system with:

Transillumination top 450 mot. LED risk group 1 acc. to DIN EN 62471:2009

Radiation apertures

Axio Zoom.V16 microscope system with:

Transillumination top 450 mot. conically upwards from the opening

Table power supply

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 category II

RFI suppression conforming to EN 55011 Class A

Noise immunity conforming to DIN EN 61326-1

Rated voltage range 100 to 240 V AC \pm 10 %

Mains frequency 50 to 60 Hz

Output voltage 24 V DC, max. 2.5 A

Power consumption max. 1.4 A~

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 transillumination top 450 mot. 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 and delivery scope (see page 9) are present.
- Keep the original packaging for storage or for returning the instrument to the manufacturer, or dispose of it properly.
- The following system requirements must be observed:
 - Use of stand 450 (from 435430-9902-000 or later models)
 - Use of focus motor 2 or 3 as CAN distributor
 - Optional software:
 - EMS 3 (435610-9010-000 or later model)
 - ZEN 2011 (Blue Edition or later model)
 - Optional mechanical stages:
 - Mechanical stage S 150x100 R (435465-9010-000 or later models)
 - Mechanical stage S 150x100 mot. CAN (435465-9000-000 or later models)
 - Measuring stage S 150x100 mot. CAN (435465-9020-000 or later models)

3.2 Mounting the transillumination top 450 mot.

 In the event that an Axio Zoom.V16 microscope system is not yet available or assembled, the microscope must initially be installed and put into operation according to the separate operating manual.

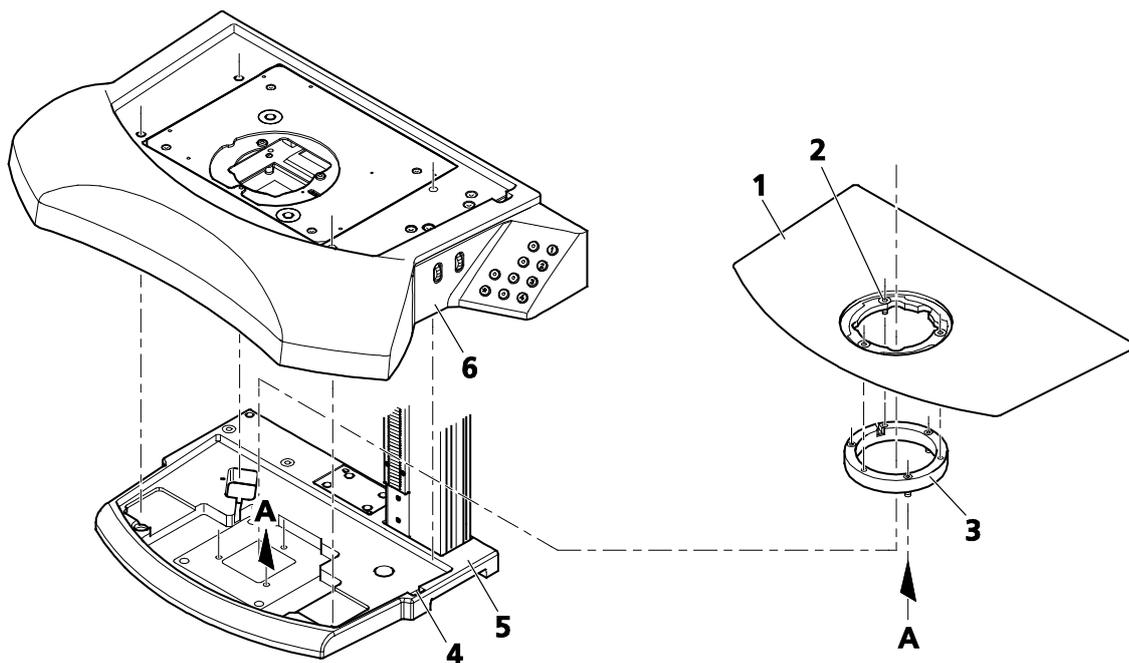


Fig. 2 Mounting transillumination top 450 mot.

- Switch off the Axio Zoom.V16 microscope and illumination.
- Remove the base insert plate (Fig. 2/1). To do this loosen the short socket head screws (Fig. 2/2), lift the insert plate (use recessed grip (Fig. 2/4) on the right edge of stand base for the purpose) and lift securely with both hands.
- Loosen the three socket head screws (SW 3) in the adapter ring (Fig. 2/3) using a ball-headed screwdriver and remove the adapter ring.
- Mount the transillumination top 450 mot. (Fig. 2/6) on the base plate (Fig. 2/5).

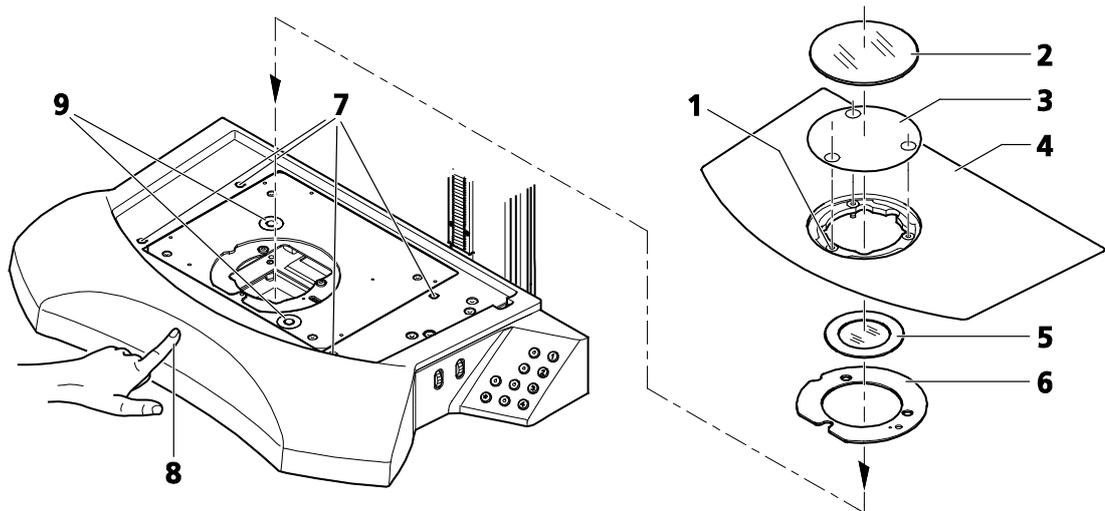


Fig. 3 Mounting the transillumination top 450 mot.

- For parallel alignment push the transillumination top slightly backwards with the finger (Fig. 3/8) and screw it hand-tight to the base plate using the four countersunk captive hexagon socket screws (SW 3) (Fig. 3/7).



The transillumination top may not be connected to the mains supply until the shipping screws (Fig. 3/9) have been removed; damage may otherwise be caused by the initialization runs thus triggered.

- The two shipping screws (Fig. 3/9) must be removed and kept in a safe place.
- Insert the magnet-coded receptacle $d = 84$ mm (Fig. 3/6) with polarizer (Fig. 3/5) only for polarization applications (pay attention to markings for north-south orientation). Attach the respective analyzer to the objective.



If the magnet-coded receptacle $d = 84$ mm (Fig. 3/6) is mounted or removed at a later time, the microscope system must be switched on again/restarted for the new status to be recognized.

- Place the insert plate (Fig. 3/4) on the transillumination top.
- Insert assembly aid $d = 120$ mm (Fig. 3/3) and align with the threaded holes. This will prevent the screws and small parts from falling into the transillumination top.
- Screw the insert plate onto the transillumination top using the three hexagon socket screws (Fig. 3/1).
- Remove assembly aid $d = 120$ mm. Insert the glass plate 120 mm (Fig. 3/2).



To prevent eye injury due to scattered light, attach and swing in the antiglare shield (Fig. 1/1) on the right or left of the mount or revolving nosepiece.

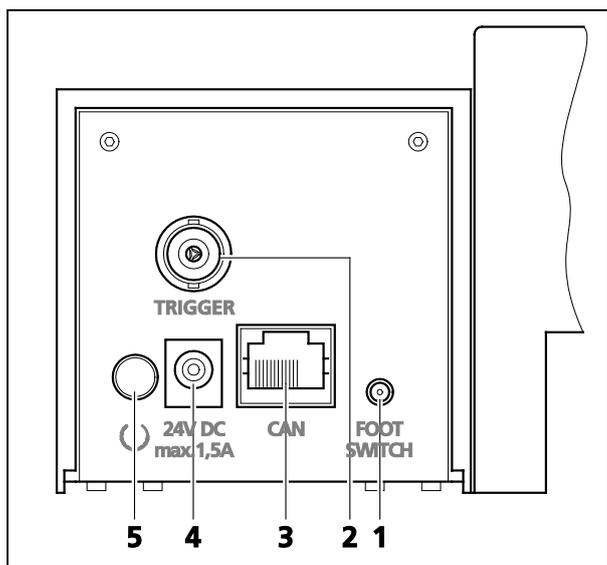


Fig. 4 On/off switch and ports on the transillumination top 450 mot.

3.3 Connecting the transillumination top 450 mot.

Connecting to the microscope system

- Use the CAN cable RJ 45 to connect the **CAN** (Fig. 4/3) socket of the transillumination top to one of the **CAN** sockets on the rear side of the focusing motor 3 (Fig. 1/K) or the EMS 3 (Fig. 1/O).
- A BNC cable can be connected to the **Trigger** (Fig. 4/2) plug-in point to transmit a trigger signal.
- Alternatively, the foot switch S can be used to switch the illumination of the transillumination top on/off via the **Foot switch** (Fig. 4/1) plug-in point.

Connecting to the mains supply

- Connect the power supply unit to the **24V DC** (Fig. 4/4) plug-in point.
- Plug the power cable of the PSU into a mains socket.

Upon connection to the mains supply the transillumination top will initialize itself automatically.

4 OPERATION

In addition to lighting control, the illumination method can also be selected, varies and saved at the touch of a button with the transillumination top 450 mot.

4.1 Control elements

LED SYCOP Control (Fig. 5/1):

- The blue LED lights up only when the SYCOP 3 system control panel is connected to the microscope system.

Mode keypad (Fig. 5/2):

-  Upon switching on the transillumination top the **Best Mode** function is always activated.
-  LED lights up when the respective function is activated by pressing a button.

BF button

- Brightfield illumination

BF+ button

- Brightfield illumination with additional contrast enhancement

RC button

- Relief contrast by oblique illumination

DF button

- One-sided darkfield



Limitations in image quality in the unilateral darkfield must be anticipated in extremely large object fields and high magnifications.

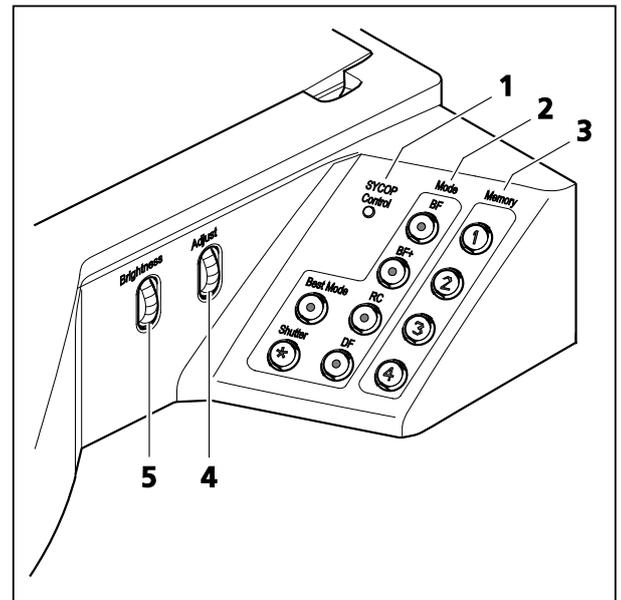


Fig. 5 Control elements on the transillumination top 450 mot.

Best Mode button

- Depending on the optical configuration of the microscope, in illumination methods **BF**, **BF+** and **RC** the method that delivers the best results in terms of contrast and homogeneity is automatically set. The corresponding button will be activated (lit up).

 A prerequisite for the **Best Mode** application is a correctly implemented microscope system setup:

- via HIP, see AxioZoom.V16 operating manual (Section **Menu guidance in Settings mode**)
- via SYCOP 3, see SYCOP 3 operating manual (Opening the menu: **Home\Setup\Components\Changing Optics**)

Shutter button

- Switches the transmitted light on/off. In the latter case the transmitted light optics are additionally protected by a cover.
- The integral LED lights up when the shutter is closed (transmitted light off).

Memory keypad (Fig. 5/3):

- When the respective button **1** to **4** is held down for 1 to 2 seconds, the parameters set for zoom position (magnification), illumination method (BF, BF+, RC, DF), brightness and respective adjustment function of the configured system are saved.
- Briefly pressing the respective button resets the saved parameters.

 Saved settings can no longer be retrieved after changing the objective. Pressing the **Memory** button has no effect; the button's LED flashes. If an objective for which the settings have been saved is reused, the buttons will become active again.

 The saved settings will be retained when the transillumination top is switched off.

Adjust scroll wheel (Fig. 5/4):

- Contrast (**Adjust 1**) and homogeneity in north-south direction (**Adjust 2**) in the relief contrast (RC) can be individually varied as required by turning the **Adjust** scroll wheel.
- Pressing the **Adjust** scroll wheel toggles between **Adjust 1** and **Adjust 2**.

 The **Adjust** scroll wheel can also be used for slight adjustments in the other illumination methods (**BF**, **BF+** and **DF**)

Brightness scroll wheel (Fig. 5/5):

- Increases or reduces brightness.
- The brightness gradients are linearly proportional to the zoom function and are also dependent on the illumination method used.

4.2 Switching on



Adjust the antiglare shield correctly to avoid eye injuries.



The position of the limit switch for the focusing drive must be checked prior to the first-time use of the transmitted illumination adapter and reset if necessary (see AxioZoom.V16 operating manual, Section **Adjusting the range of travel of the motorized focusing drive**) to avoid collisions during the focusing movement.

- Switch on the microscope system via HIP or on the SYCOP.
- Switch the transillumination top by pressing the on/off button  (Fig. 4/5) on the rear side.
- Select the desired magnification on the microscope and adjust the focus as necessary.
- Select the illumination method for transmitted light on the **Mode** keypad. Open **Shutter** as necessary.



If a Foot switch S is connected, it can be used to switch the illumination of the transillumination top alternately on/off.

4.3 Switching off

- Switch off the transillumination top by pressing the on/off button  (Fig. 4/5).
- Switch off the microscope system on the HIP or all units jointly with SYCOP.

4.4 Troubleshooting

Error description	Error cause	Remedy
No image visible.	Transillumination top not switched on.	Switch the transillumination top on by the on-/off switch (rear side).
	The shutter is closed.	Press the Shutter key. The shutter is closed when the integral LED is lit.
Restricted image quality	Adapter disk (Fig. 3/6) is still attached.	Remove the adapter disk.
	An unsuitable microscope stage is being used.	Use only the recommended microscope stage, see Section 3.1.
Memory button not available, button flashing	Active system state does not conform to saved state.	Check the objective, stage and adapter disk.
Transillumination top does not fit the base plate 450.	Use of a base plate that is not system-compatible.	Use only the recommended base plate, see Section 3.1.
	Adapter ring has not been removed.	Remove the adapter ring, see Section 3.2.
Microscope stage cannot be screwed onto the transillumination top	Insert plate missing.	Attach the insert plate, see Section 3.2.
Unusual noises during initialization of the transillumination top	Shipping braces have not been removed.	Disconnect the transillumination top from the mains and remove the shipping braces, see Section 3.2.
Collision noises of the apertures of the transillumination top	Use of an insert plate that is not system-compatible.	Replace the insert plate, see Section 3.2.

4.5 Functional limitations

Objective	BF	BF+	RC	DF
PA Z 0.5x	Slight vignetting in the lower zoom range (stage frame) when using stages	Slight vignetting in the lower zoom range (prism frame)	Slight vignetting in the lower zoom range (stage frame) when using stages	Restricted image quality in lower zoom range
PA Z 1.0x	none	none	none	none
PNF Z 1.0x	none	none	none	none
PNF Z 2.3x	Slight vignetting in the lower zoom range (stage frame) when using stages	Slight vignetting in the lower zoom range (stage frame) when using stages	Slight vignetting in the lower zoom range (stage frame) when using stages	Slight vignetting in the lower zoom range (stage frame) when using stages, an image quality in the upper zoom range



W-PI 16x16 Br. foc eyepieces are recommended for use with the Ergo phototube Z.