



Axio Scan.Z1
Digitizer for slides (ZEN 2)
Operating Manual

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 Notes on instrument safety

Axio Scan.Z1 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 complying with relevant requirements according to Appendix 1 of the directive 98/79/EC.

The instrument meets the requirements of the European Directive 98/79/EC Appendix 1 for In Vitro Diagnostics products and the European Directive RoHS 2011/65/EC, and carries the **CE** marking.

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

The devices shall be disposed of in accordance with the WEEE Directive 2012/19/EC on waste electrical and electronic equipment.

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



WARNING

This symbol indicates a potential hazard to the user.



WARNING

Hot surface!



WARNING

UV radiation emitted!



WARNING

Disconnect the instrument from the power supply before opening!



WARNING

Risk of pinching!



WARNING

Combustible and easily flammable materials should be kept outside the range of the HXP 120 V lamp!



WARNING

Optical radiation is emitted. Do not look into the laser beam!
It may be injurious to the eyes.



CAUTION

This symbol indicates a potential hazard to the instrument.



NOTE

Observe the instructions in the operating manual (make sure you have read and understood the operating manual before working with the device).



NOTE

This symbol indicates an instruction which requires particular attention.

Axio Scan.Z1 and its original accessories may only be used for the applications described in this operating manual.

Special attention should be paid to the following instructions:



The manufacturer cannot assume any liability for other applications of the instrument, including those of individual modules or single parts. This also applies to any service or repair work that is not carried out by authorized service personnel. In case of non-compliance, all warranty claims shall be forfeited.



Operation of the instrument in explosive environments is not permissible.



The mains plug 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 the ZEISS customer service or the ZEISS Microscopy Service to repair the instrument.



Before switching on 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 fuses specified for the rated voltage may be used. The use of makeshift fuses and short-circuiting of the fuse holders are not permitted.



The instrument is 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.



Dust and dirt may impair the instrument's performance. The instrument must be effectively protected from such influences.



When the arched door of the Axio Scan.Z1 automatically closes it is possible for objects or body parts to be trapped between the door and the housing (LED status line). In this case, re-open the door, remove the objects or body parts and re-close the door.





Clogged or covered ventilation slits or openings may lead to heat build-up that will damage the instrument and, in extreme cases, cause a fire. Always keep the ventilation slits clear and ensure that no objects enter the instrument through the ventilation slits.



Do not replace detachable power cables with power cables that do not meet specifications. Only the specified power cables should be used.



Do not use the coupling points for the HXP 120 V and Colibri.2 for lifting, pulling or moving the device.



In the MicroToolBox (MTB) only the entries for filters may be changed by the user. Changing other entries may result in functional impairment or even damage to the device.



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



The device manufacturer is required by law to take back defective devices.



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 the application concerned. Axio Scan.Z1 is a high-precision instrument that can be impaired in its performance or destroyed when handled improperly.



Regulations for occupational health and safety must be observed when operating the Colibri.2 light source. The national legal requirements must also be observed.



- Follow the instructions in the operating manual for the Colibri.2 light source.
- The user should not expose him/herself to UV radiation from the Colibri.2 light source.



- Never look directly into the light beam when the illumination system is switched on.
Failure to observe this precaution may result in eye injuries!
- Never remove the Colibri.2 light source from the Axio Scan.Z1 during an active digitization process.
- Always separate the electronic/electric connection between the Axio Scan.Z1 and Colibri.2 before removing the Colibri.2.
- Never remove the housing from the Colibri.2 light source when the Axio Scan.Z1 is active, as the system will shut down and the digitization process will be aborted.



Suitable preventive measures must be taken if harmful gases, dust, vapors, secondary radiation or explosive substances occur due to UV radiation on the specimen.



Combustible and easily flammable materials should be kept outside the range of the HXP 120 V illuminator!



The Axio Scan.Z1 and HXP 120 V can be used for the voltage range 100 V to 240 V $\pm 10\%$, 50 Hz to 60 Hz without additional voltage change.



Regulations for occupational health and safety must be observed when operating the HXP 120 V source of UV radiation. The national legal requirements must also be observed.



- Follow the operating instructions for the HXP 120 V illuminator as supplied by the manufacturer.



- The lamp must be replaced according to the manufacturer's instructions. There is otherwise a risk of burning or explosion when the lamp is replaced.



- The user should not expose him/herself to UV radiation from the HXP 120 V illuminator.



- Never look directly into the optical waveguide when the HXP 120 V illuminator is switched on. **Failure to observe this precaution may result in eye injuries!**

- Never remove the optical waveguide from the Axio Scan.Z1 / Colibri.2 when the HXP 120 V illuminator is switched on.

- Never connect the optical waveguide to the Axio Scan.Z1 when the HXP 120 V illuminator is switched on.



The reflector turret or filter wheels may only be mounted or removed when the Axio Scan.Z1 has been switched to standby mode. Failure to observe this precaution can result in the fingers being cut or pinched when the motorized reflector turret moves (see Section 6.6).



The Axio Scan.Z1 may only be carried no more than a few meters by four people using the two grip handles (see Section 6.5).

ZEISS works with a certified environmental management system pursuant to ISO 14001. The product was developed, tested and manufactured in conformance with the applicable regulations and environmental directives of the European Union.

The product including accessories satisfies the requirements of EU Directives 2011/65/EC (RoHS) and 2012/19/EC (WEEE) insofar as these are applicable.

ZEISS introduced a procedure for the return and recycling of the instruments within the member states of the European Union which ensures suitable recycling procedures conforming to the EU directives.

For more information on disposal and recycling please consult your local ZEISS sales or customer service organization.

The product may not be disposed of in the household waste or through municipal waste disposal services. If the product is resold, the seller shall be obliged to inform the buyer that the product must be disposed of in accordance with the above regulations.

1.2 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 Axio Scan.Z1. Repairs may only be performed by ZEISS service staff or personnel specifically authorized by ZEISS. In the event of a problem with the instrument, please contact your local ZEISS representative.

Existing seals (Fig. 1-1) on the device may not be broken. All warranty claims will otherwise be rendered invalid. When handed over by the service technician to the user, this device is sealed.

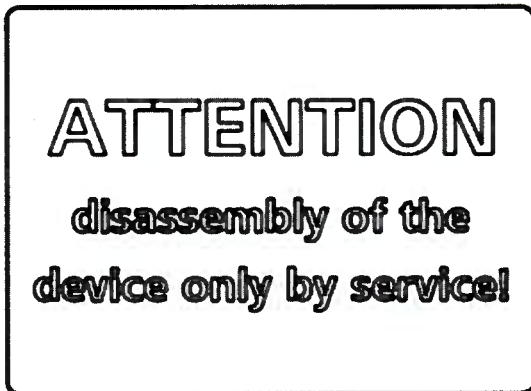


Fig. 1-1 Seal

2 INSTRUMENT DESCRIPTION

Axio Scan.Z1 is supplied in various different configurations. There are two main configurations:

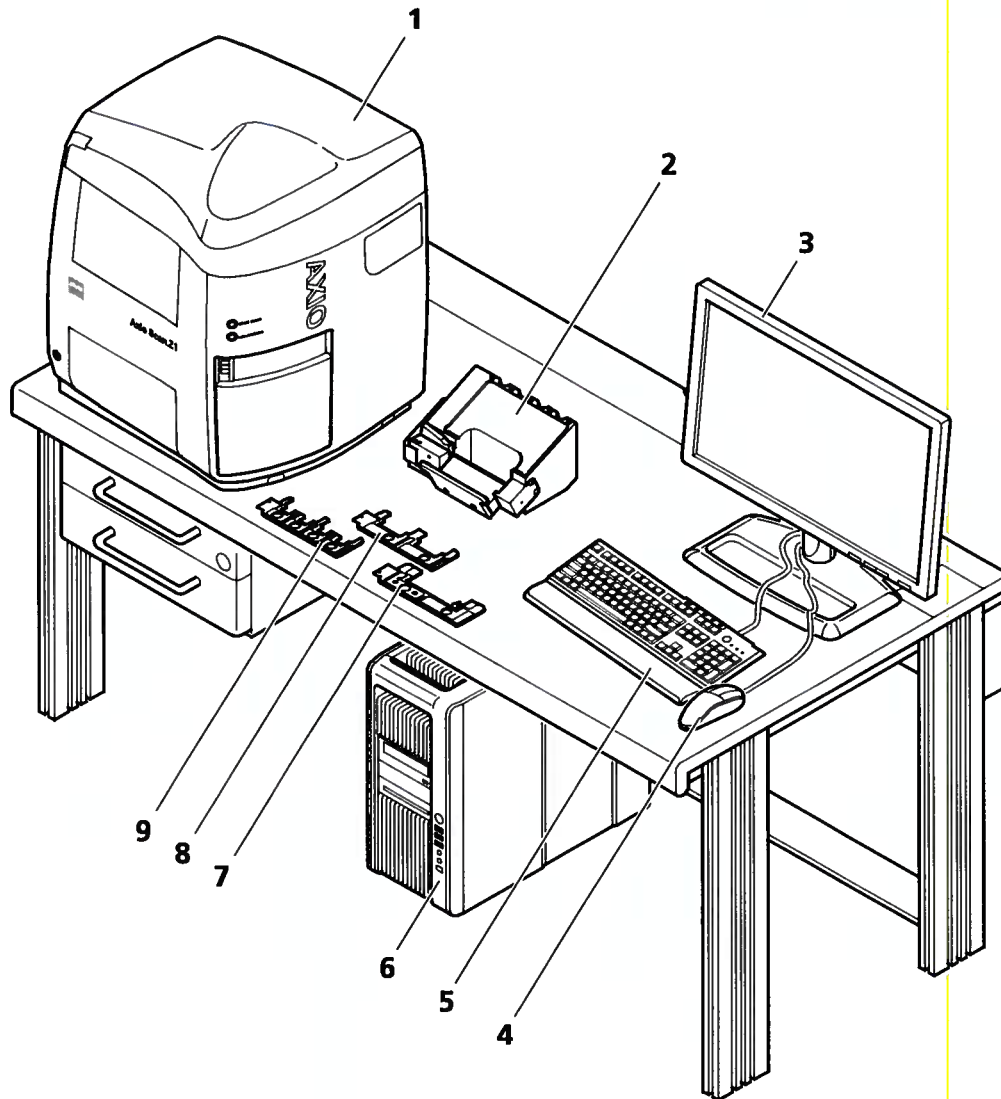
- Axio Scan.Z1 for brightfield applications (Fig. 2-1) and
- Axio Scan.Z1 for brightfield and fluorescence applications (Fig. 2-2)

Axio Scan.Z1 for brightfield (BF) and fluorescence (FL) is equipped either with a 10-position-reflector turret or a 6-position-high-speed filter wheel (emission)/6-high-speed beam splitter filter wheel or an external 6-high-speed filter wheel (excitation)

Each configuration can be equipped for a capacity of either 12 slides (26 mm x 76 mm) or 100 slides (26 mm x 76 mm).

Consult the system overview (Sections 2.6, 2.7, 2.8 and 2.9 from page 16) for further details.

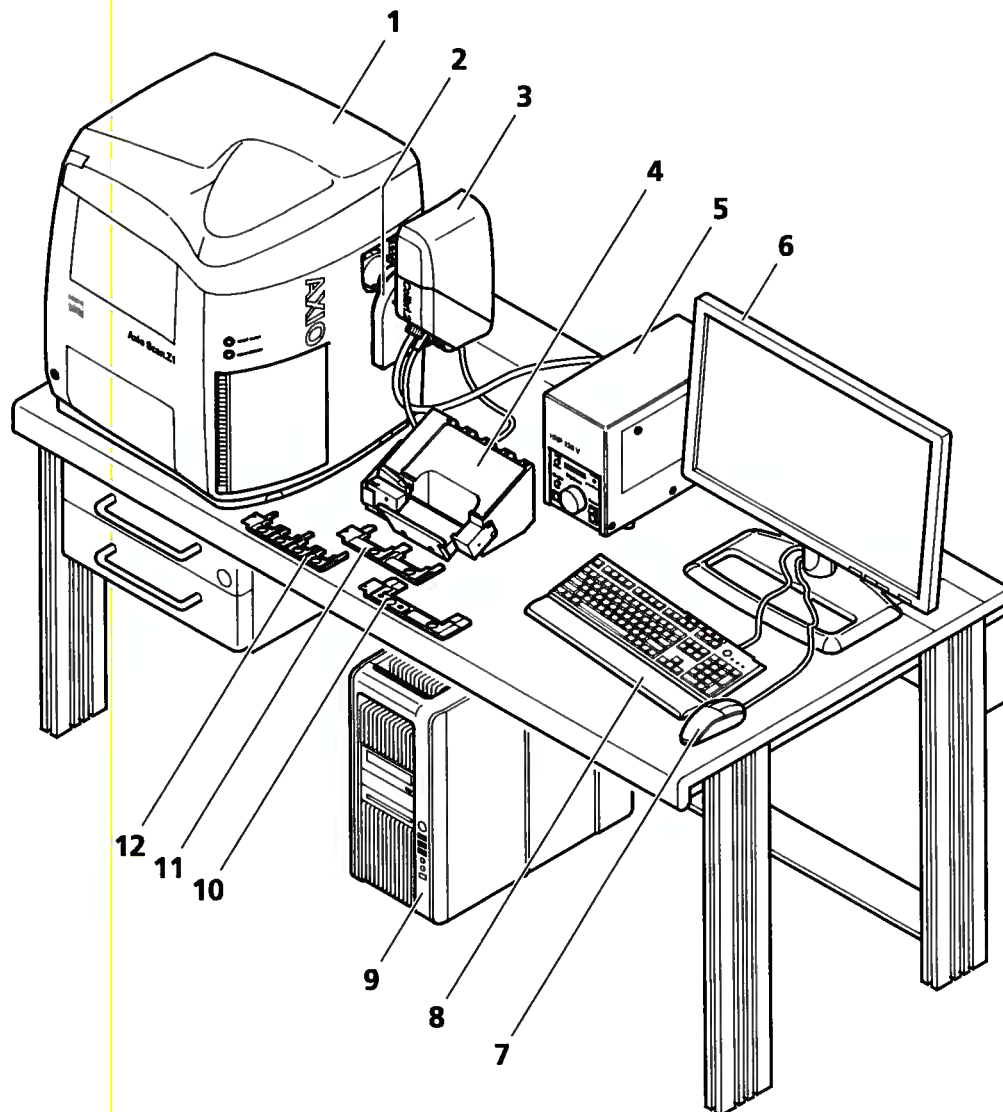
2.1 Axio Scan.Z1 BF (brightfield) system for 12 slides, overall view



- 1 Axio Scan.Z1 for brightfield for max. 12 slides
- 2 Loading aid for mounting frames 4x 26 mm x 76 mm
- 3 TFT monitor 24"
- 4 Mouse
- 5 Keyboard
- 6 High-end workstation
- 7 Mounting frame 1x 100 mm x 76 mm
- 8 Mounting frame 2x 52 mm x 76 mm
- 9 Mounting frame 4x 26 mm x 76 mm

Fig. 2-1 Axio Scan.Z1 brightfield for loading with max. 12 slides, overall view

2.2 Axio Scan.Z1 BF FL brightfield / reflected light fluorescence system for 100 slides, overall view



- 1 Axio Scan.Z1 for brightfield and reflected light fluorescence for max. 100 slides
- 2 External filter wheel 6 pos. excitation
- 3 Colibri.2 light source
- 4 Loading aid for mounting frames 4x 26 mm x 76 mm
- 5 HXP 120 V illuminator and HXP light guide with liquid filling
- 6 TFT monitor 24"
- 7 Mouse
- 8 Keyboard
- 9 High-end workstation
- 10 Mounting frame 1x 100 mm x 76 mm
- 11 Mounting frame 2x 52 mm x 76 mm
- 12 Mounting frame 4x 26 mm x 76 mm

Fig. 2-2 Axio Scan.Z1 brightfield / reflected light fluorescence system for loading with max. 100 slides, overall view

2.3 Designation and intended use

Manufacturer's designation: Axio Scan.Z1

The Axio Scan.Z1 is intended for the digitization of biological samples, preparations and specimens (primarily histological sections) from human and animal bodies on smooth slides in transmitted light and with reflected light fluorescence (option).

Typical fields of application for the device include:

- Universities
- Research facilities
- Central institutions
- Pharmaceutical industry
- Biotechnical companies
- Research departments at hospitals



Axio Scan.Z1 is a research only device.

It is not intended to be used, directly or indirectly, to generate diagnostic results.

2.4 Instrument description and main features

The main features of the device are:

- Robust and stable base unit
- Mounting frames for 4 slides (26 mm x 76 mm) or 2 slides (52 mm x 76 mm)
- Loading the Axio Scan.Z1 with 12 or 100 slides (depending on configuration)
- Automatic identification of mounting frame type in the device
- Automatic recognition of loading state of mounting frames in the device
- Use of up to five objectives with automatic switch-over possible
- Use of up to two cameras with automatic switch-over possible
- Special contrast for unstained samples (Ring Aperture Contrast – RAC)
- LED for transmitted light (flash illumination)
- Reflected light fluorescence possible (option) with LED illumination (Colibri.2)
- High-speed filter wheels (6 position; excitation, beam splitter, emission) or 10 position reflector turret
- High resolution imaging optics (max. 0.11 µm / pixel)
- Automatic feed and output of mounting frames within the device
- Automated identification of slides with barcode recognition
- Automated specimen recognition and digitization of recognized specimens on the slide
- Intuitive operation with keyboard and mouse

2.5 Warning and information labels

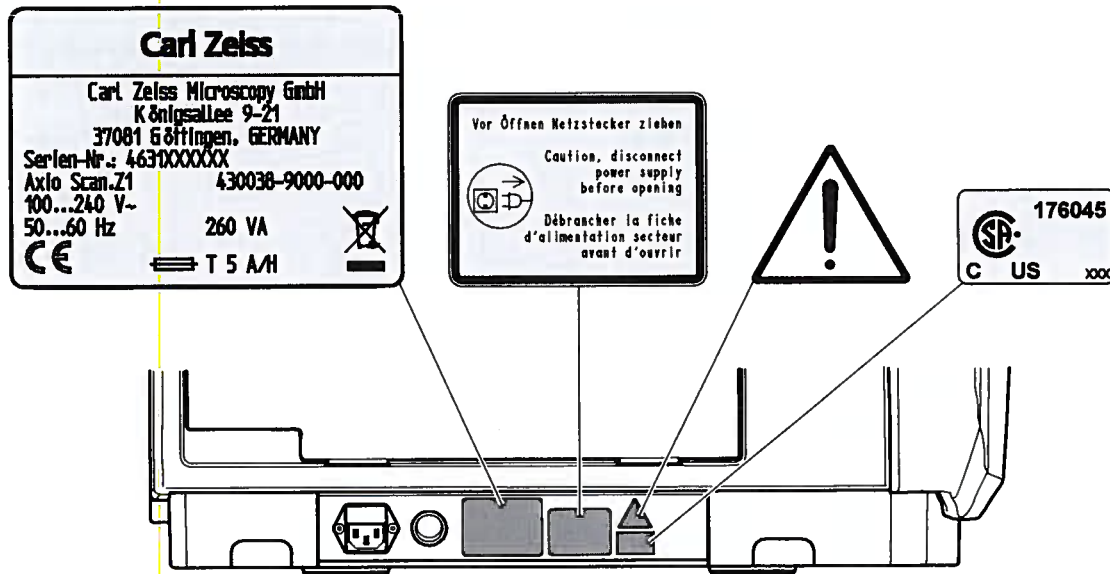


Fig. 2-3 Warning and information labels on the Axio Scan.Z1

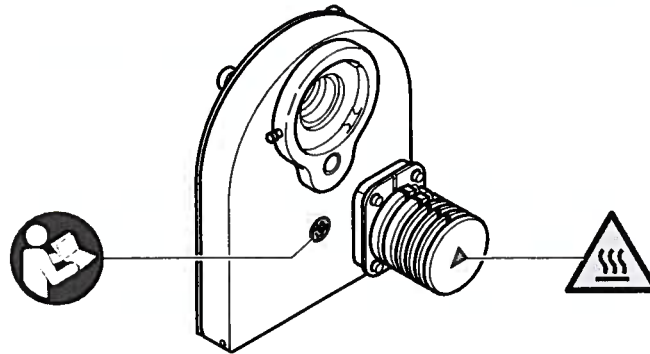


Fig. 2-4 Warning and information label on external filter wheel 6 pos. excitation

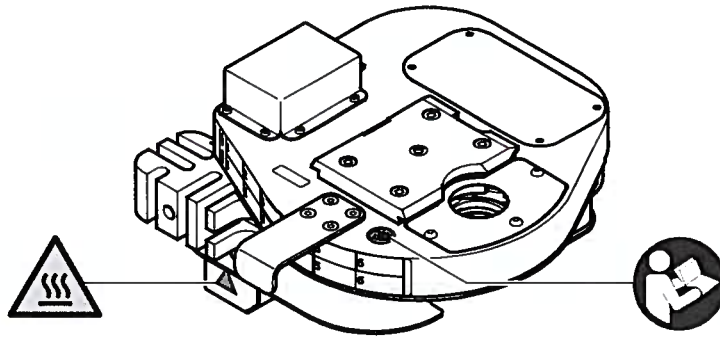


Fig. 2-5 Warning and information label on filter wheels 2x 6 pos. beam splitter and emission

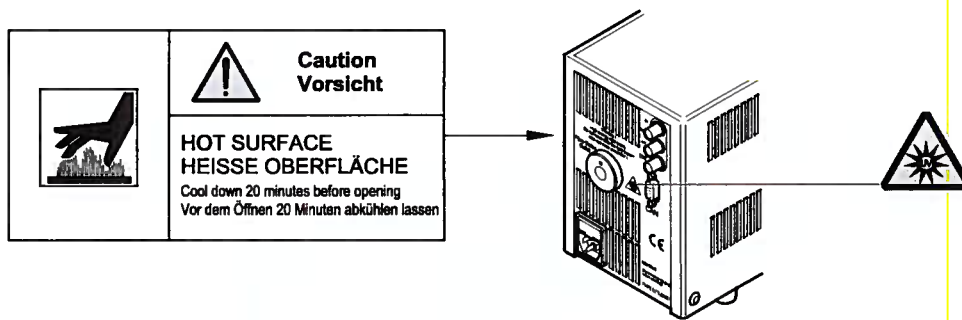


Fig. 2-6 Warning labels on the HXP 120 V illuminator

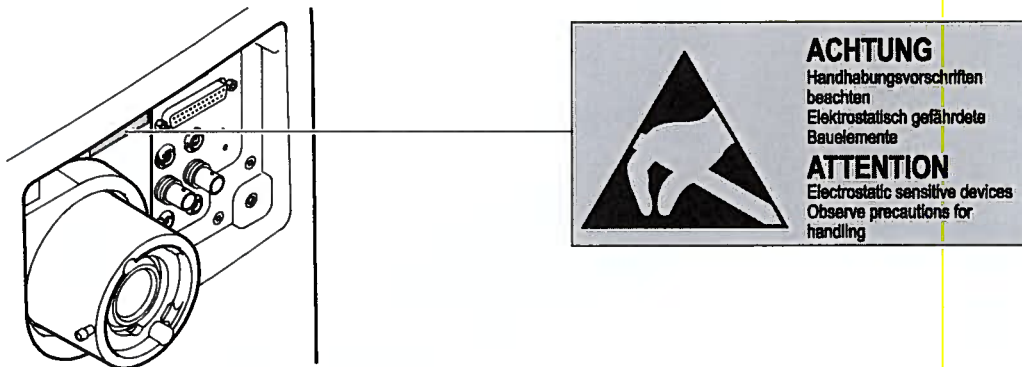
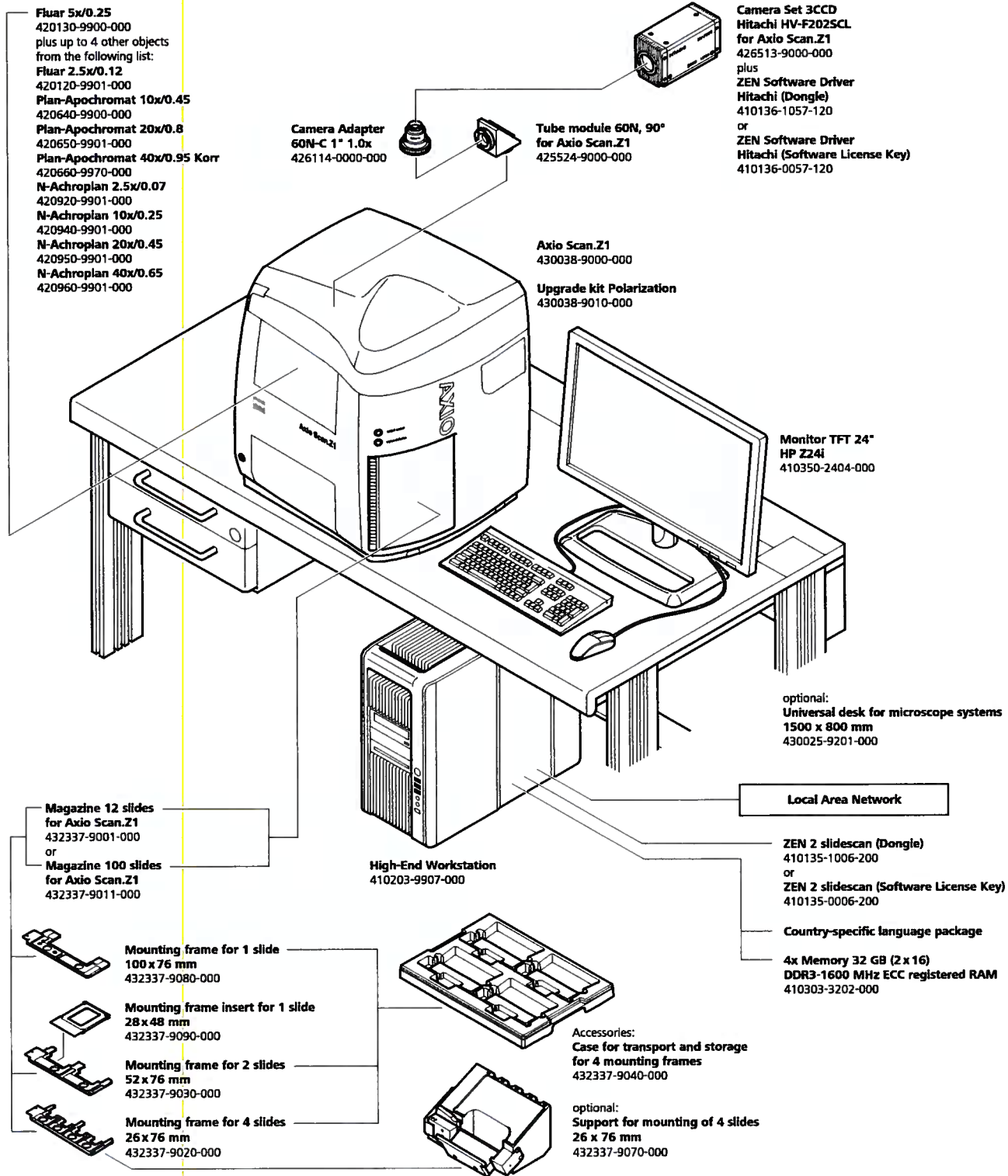


Fig. 2-7 Warning label at connector panel Axio Scan.Z1 BF FL

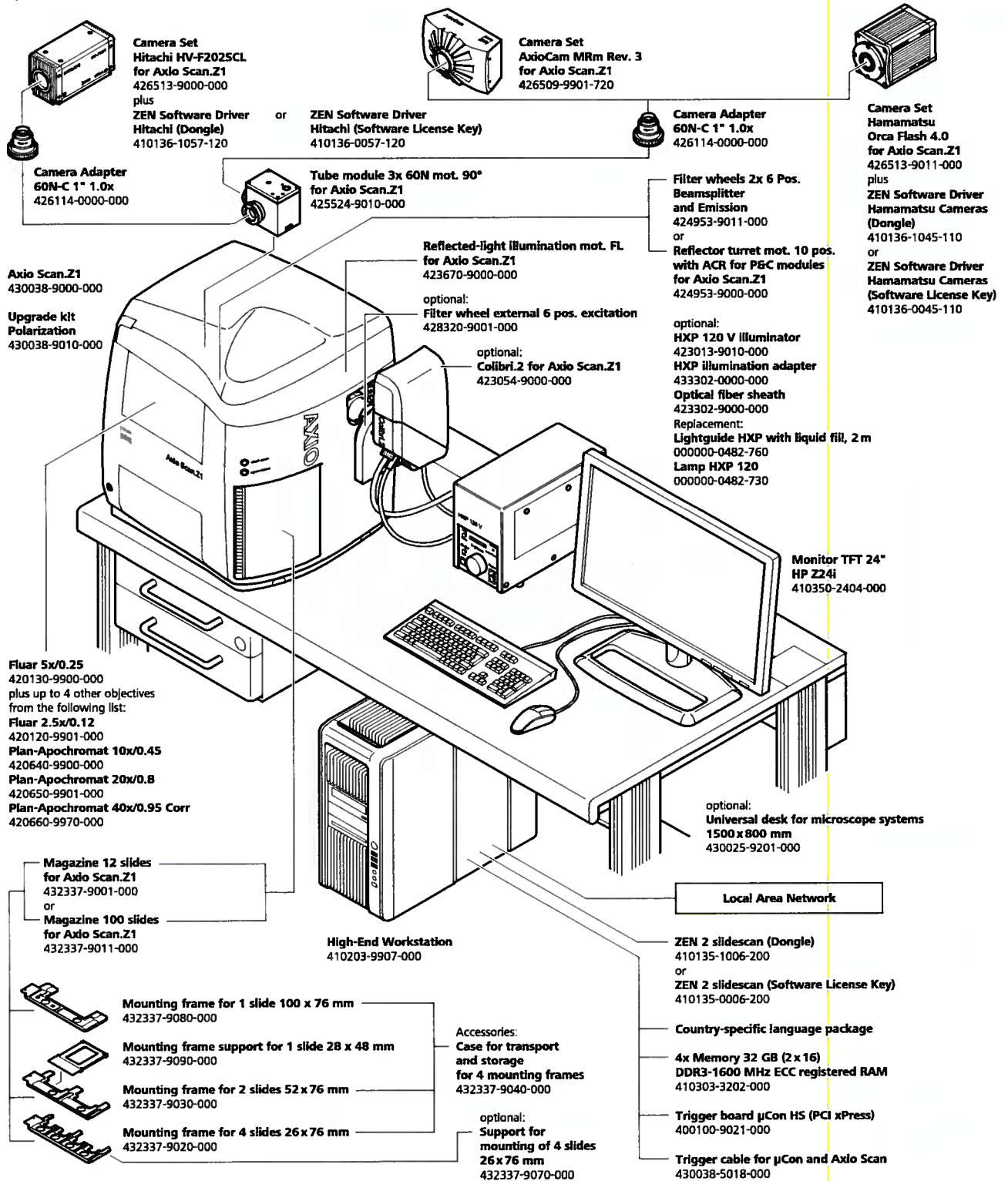
2.6 System overview of single workplace solution Axio Scan.Z1 BF

System Overview Axio Scan.Z1 for brightfield applications



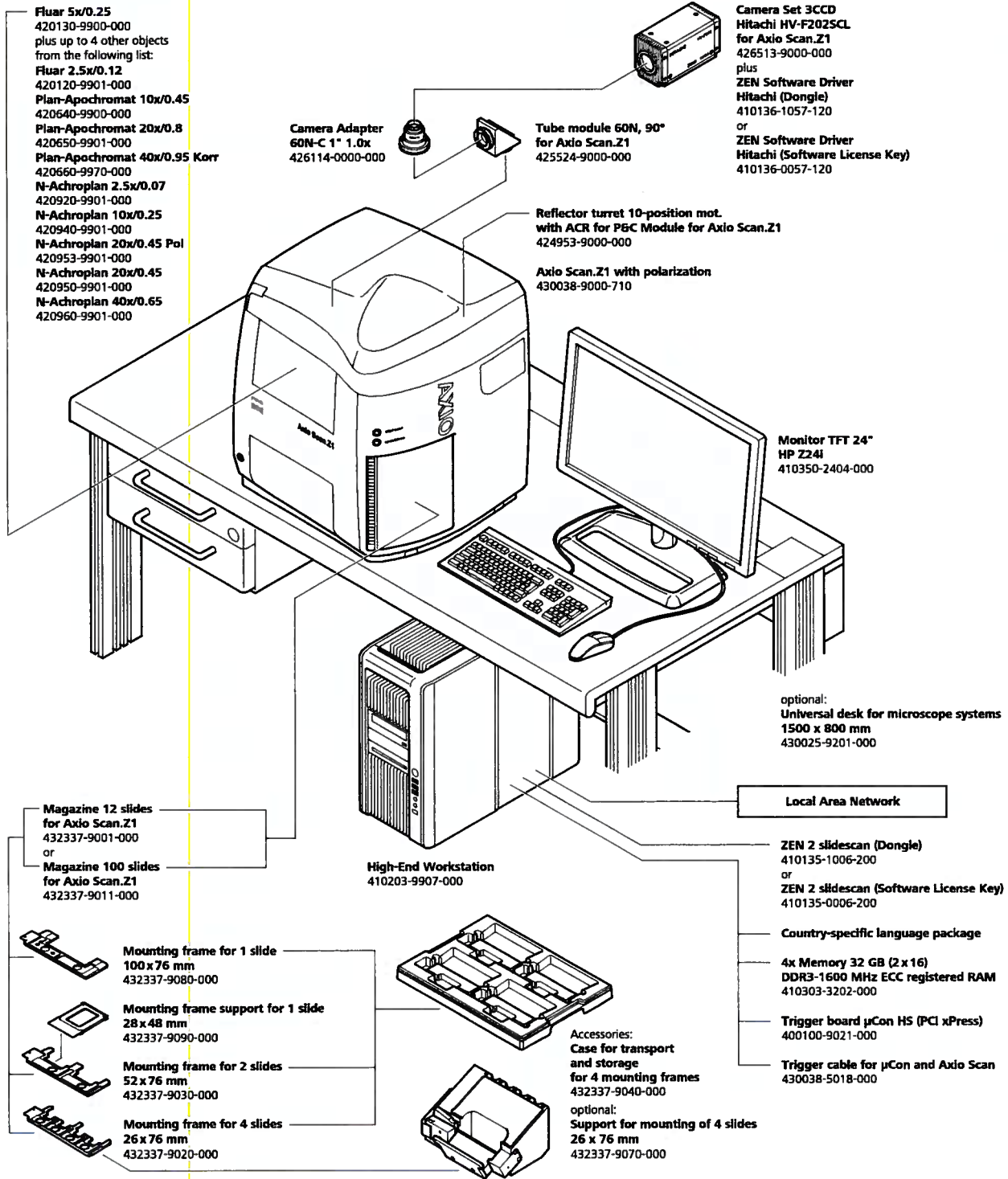
2.7 System overview of single workplace solution Axio Scan.Z1 BF FL

System Overview Axio Scan.Z1 for brightfield and fluorescence applications



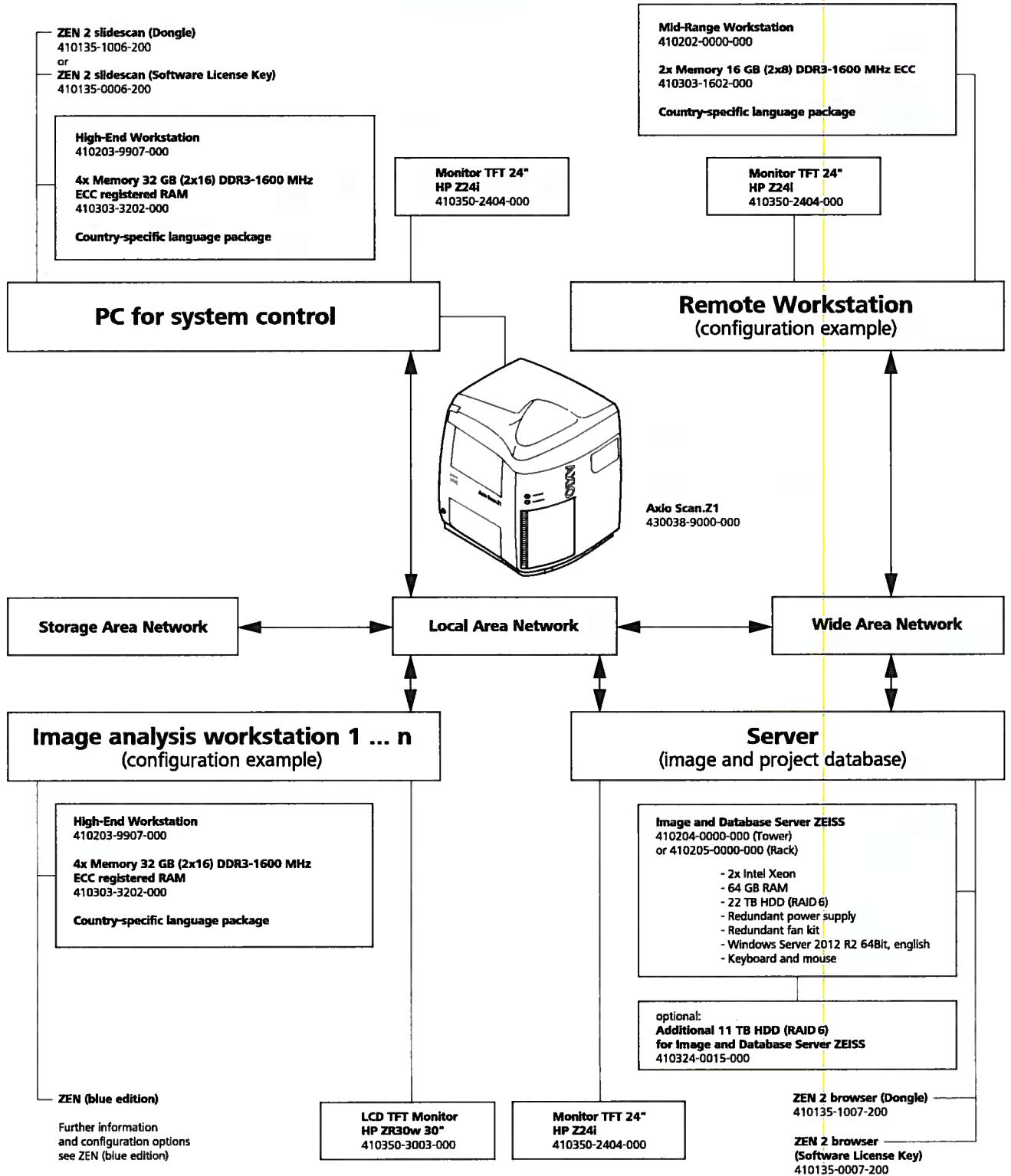
2.8 System overview of single workplace solution Axio Scan.Z1 BF with polarization

System Overview Axio Scan.Z1 for brightfield and polarization applications





2.9 System overview of network solution Axio Scan.Z1

System Overview of Axio Scan.Z1 network solution

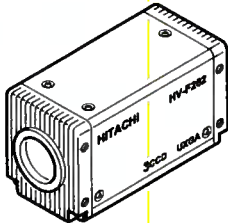


2.10 Objectives and cameras

Illustration	Description, technical specifications
<p>Example</p> 	<p>The following high-resolution objectives can be used with the Axio Scan.Z1:</p> <p>Fluar 2.5x / 0.12 (420120-9901-000)</p> <p>Fluar 5x / 0.25 (420130-9900-000) (this objective must be available in the configuration)</p> <p>Plan-Apochromat 10x / 0.45 (420640-9900-000)</p> <p>Plan-Apochromat 20x / 0.8 (420650-9901-000)</p> <p>Plan-Apochromat 40x / 0.95 (420660-9970-000)</p>
<p>Example</p> 	<p>The following entry-level objectives can be used with the Axio Scan.Z1:</p> <p>N-Achroplan 2.5x / 0.06 (420920-9901-000)</p> <p>N-Achroplan 10x / 0.25 (420940-9901-000)</p> <p>N-Achroplan 20x / 0.45 (420950-9901-000) or N-Achroplan 20x / 0.45 Pol (420953-9901-000) for polarization applications</p> <p>N-Achroplan 40x / 0.65 (420960-9901-000)</p>

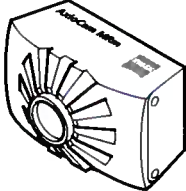
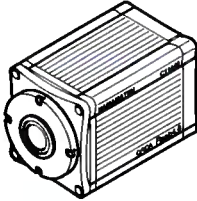


Objectives may only be replaced or installed by ZEISS Customer Service.

The following cameras (up to two in one device) may be part of the configuration:	
Brightfield applications:	
	<p>Hitachi HV-F202SCL</p>



Cameras may only be replaced or installed by ZEISS Customer Service.

Fluorescence applications:	
	AxioCam MRm Rev. 3
or	
	Hamamatsu Orca Flash 4.0 V2

2.11 Accessories and spare parts

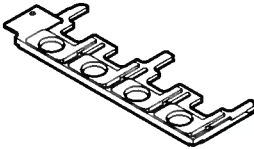
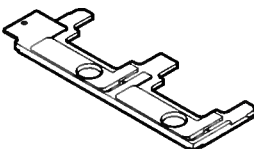
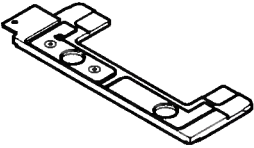

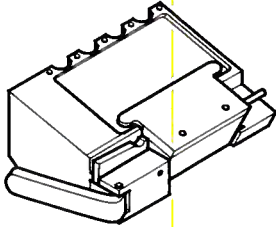
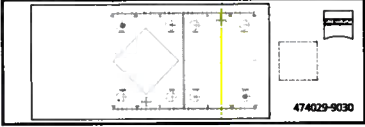
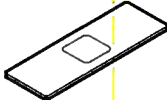
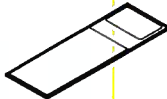

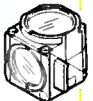
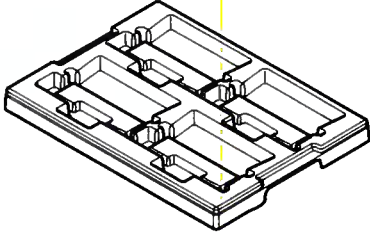

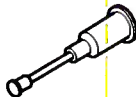

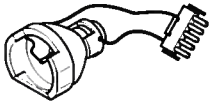
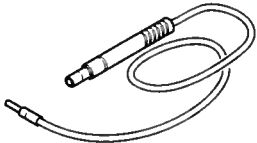
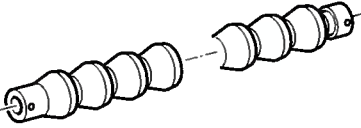
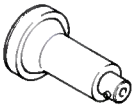
Illustration	Description, technical specifications	Catalogue No.
	Mounting frame for 4 slides (26 mm x 76 mm)	432337-9020-000
	Mounting frame for 2 slides (52 mm x 76 mm)	432337-9030-000
	Mounting frame for one slide (100 mm x 76 mm)	432337-9080-000
	Mounting frame support for one slide (26 mm x 48 mm)	432337-9090-000

Illustration	Description, technical specifications	Catalogue No.
	Loading aid (only for mounting frames for standard slides (26 mm x 76 mm))	432337-9070-000
	Calibration slide: Calibration slide p/n with coverslip	474029-9031-000
	Calibration slide fluorescence for thin specimens 26 x 76mm, D=0.17	474029-9080-000
	Color calibration slide 26 x 76 mm, D = 0.17	474029-9041-000
	Brightfield specimen set Fluorescence specimen set Polarization specimen set	474032-9010-000 474032-9000-000 474032-9020-000
	Reflector module FL EC P&C (without filter sets) or Reflector module FL EC ACR P&C (without filter sets)	424931-0000-000 424933-0000-000
	Transport and storage case for 4 mounting frames	432337-9040-000
	HANDI-VAC®	000000-0546-094 (Order from Service)
	Suction nozzle ESD-T1 S19	000000-0546-116 (Order from Service)



Axio Scan.Z1 may only be used with original accessories.

2.12 Illumination

Illustration	Description, technical specifications	Catalogue No.
	VIS-LED, replacement	Replacement only by ZEISS Customer Service
	HXP 120 lamp, replacement	000000-0482-730
	HXP light guide with liquid filling, 2 m, replacement	000000-0482-760
	Light guide sheath, 2 m	003302-9000-000
	Illumination adapter (operation without Colibri.2) for light sources with light guide	423302-0000-000

2.13 Technical data

Installation requirements

The total weight of the complete Axio Scan.Z1 equipment with accessories is approx. 125 kg.

An appropriately sturdy support/table is to be provided by the customer. ZEISS offers an adequate table (universal desk for microscope systems 1500 mm x 800 mm; 430025-9201-000).

It must also be ensured that the floor on which the support/table stands is subject to the least possible vibration; double and partially hollow floors are thus unsuitable.

Furthermore, the parameters for environmental conditions and operating data must be observed.



A fan is located on the rear side of the device. To ensure unobstructed ventilation, keep **at least 3 cm** distance between the rear side of the device and the adjacent wall or other objects.

Dimensions (width x depth x height)

Axio Scan.Z1 (brightfield)..... approx. 695 mm x 579 mm x 813 mm
Axio Scan.Z1 (brightfield and fluorescence with Colibri.2)..... approx. 912 mm x 579 mm x 813 mm

Weight

Axio Scan.Z1 (brightfield, 12 slides).....approx. 98 kg
Axio Scan.Z1 (brightfield and fluorescence with Colibri.2, 100 slides).....approx. 112 kg

Ambient conditions

Transport (in packaging):

Permissible ambient temperature-40 to +70 °C

Storage:

Permissible ambient temperature+10 to +40 °C
Permissible relative humidity (without condensation) max. 75 % at 35 °C

Operation

Permissible ambient temperature+10 to +30 °C
Permissible relative humidity max. 75 % at 30 °C
Highest permitted altitude of use.....max. 2000 m
Air pressure.....500 hPa to 1060 hPa
Degree of pollution2

Operating data

Operational area Closed rooms
Protection class I
Ingress protection rating..... IP 20

Electrical safety	conforms to DIN EN 61010-1 (IEC 61010-1) in CSA and UL regulations
Overvoltage category	II
RFI suppression	conforming to EN 55011 Class A
Noise immunity	conforming to DIN EN 61326-1
Input voltage base unit	100 V AC to 240 V AC ($\pm 10\%$) Mains voltage does not need to be converted!
Mains frequency	50 / 60 Hz
Power consumption	max. 260 VA
Fuses	2x T 5.0 A/H, 250 V, 5 x 20 mm

Light sources and light guides

LED (transmitted light):	VIS-LED
Typical service life of the LED (continuous operation)	10,000 h
LED (reflected light fluorescence).....	Colibri.2
Typical service life of the LED	10,000 h
Lamp module for HXP 120 V (reflected light fluorescence)	120 W
Mercury short arc reflector lamp:	
Average service life of service module (000000-1313-162).....	approx. 2000 h
HXP light guide with liquid filling, 2m (000000-0482-760) (reflected light fluorescence)	approx. 6000 h

Software

ZEN 2 slidescan (blue edition; dongle) device control for Axio Scan.Z1	410135-1006-200
ZEN 2 lite (blue edition), for viewing virtual slides	Freeware
ZEN 2 (blue edition) with various modules for viewing and analyzing images	

Axio Scan.Z1 BF, configurations

Mounting frames.....	4x 26 mm x 76 mm
Cameras.....	AxioCam MRm, Hitachi HV-F202SCL or Hamamatsu Orca-flash 4.0
Camera adapter	C-Mount Adapter 1x

Axio Scan.Z1, max. capacity

Magazine for 12 slides.....	12x 26 mm x 76 mm or 6x 52 mm x 76 mm
Magazine for 100 slides.....	100x 26 mm x 76 mm or 50x 52 mm x 76 mm



Because slide sizes 26 mm x 76 mm and 52 mm x 76 mm can be mixed in one loading, the effective capacity can also lie between the two capacity values.

Slide identification:

Slide identification by preview camera (AVT Guppy): Barcode area saved as an image and interpretation of barcode label as a character string.

The following 1D and 2D barcode types can be interpreted:

1D

- Code 11 (ASCII encoding)
- Code 39 (ASCII encoding)
- Code 39 Extended (ASCII encoding)
- Code 93 (ASCII encoding)
- Code128 (UCC/EAN128) (ASCII encoding)
- Codabar (ASCII encoding)
- Code Interleaved 2of5
- Path Code
- EAN-8 (Numeric encoding)
- EAN-13 (Numeric encoding)
- UPC-A (Numeric encoding)
- UPC-E (Numeric encoding)

2D

- DataMatrix (Numeric encoding, Alpha encoding, AlphaNumericPunc encoding, AlphaNumeric encoding, ASCII encoding, ISO8 encoding)
- PDF417 (Standard encoding type)
- QR Code (QR code Model 1, 2 encoding)
- Micro QR Code

Optical Character Recognition (OCR)**Image digitization**

Hitachi HV-F202SCL; 3-chip; 7.0 mm x 5.3 mm (corresponds to 1/1.8")

Type: Progressive scan interline CCD; camera link interface

Pixel size	4.4 µm x 4.4 µm
Pixel resolution with 20x objective	0.22 µm
Pixel resolution with 40x objective	0.11 µm

AxioCam MRm Rev. 3; monochrome; 8.9 mm x 6.7 mm (corresponds to 2/3")

Type: Progressive readout CCD; FireWire interface

Pixel size	6.45 µm x 6.45 µm
Pixel resolution with 20x objective	0.32 µm
Pixel resolution with 40x objective	0.16 µm
Cooling.....	Peltier element

Hamamatsu Orca-flash 4.0; monochrome; 13.3 mm x 13.3 mm

Type: Scientific CMOS Sensor; camera link interface

Pixel size.....	6.5 μm x 6.5 μm
Pixel resolution with 20x objective.....	0.32 μm
Pixel resolution with 40x objective.....	0.16 μm
Cooling (-10 °C)	active (air)

Max. scanning area (width x length)

26 mm x 76 mm slide	26 mm x 56 mm
52 mm x 76 mm slide	52 mm x 56 mm
28 mm x 48 mm slide	28 mm x 42 mm*
100 mm x 76 mm slide	90 mm x 70 mm

* with cutting on scan area corners

Max. preview area for the inscription field (width x length)

26 mm x 76 mm slide	32 mm x 32 mm
52 mm x 76 mm slide	52 mm x 32 mm
28 mm x 48 mm slide	32 mm x 10 mm
100 mm x 76 mm slide	104 mm x 32 mm

The preview area can be set to a larger area, however, this may result in a loss in lighting quality.

Control computer, system requirements (minimum)

CPU	Intel Xeon X5650 6-Core 2.66 GHz 12 MB / 1333 MHz
RAM	128 GB
Hard disk.....	4 TB
Connections*	up to 3x FireWire
.....	up to 4x Camera Link
.....	3x USB 2.0
.....	GB Ethernet
Input devices	keyboard, mouse

* Dependent on camera configuration

3 START-UP

3.1 First startup



WARNING

The total weight of the complete Axio Scan.Z1 equipment with accessories is approx. 125 kg.

An appropriately sturdy support/table is to be provided by the customer. ZEISS offers an adequate table (universal desk for microscope systems 1500 mm x 800 mm; 430025-9201-000).

It must also be ensured that the floor on which the support/table stands is subject to the least possible vibration; double and partially hollow floors are thus unsuitable.

Furthermore, the parameters for environmental conditions and operating data must be observed.

The Axio Scan.Z1 must be set up by ZEISS service technicians! Our service technicians will install the device, complete the initial start up and hand it over in a fully operational state.

Dispose of the original packaging in a proper manner or keep it for possible storage during extended periods of non-use or returning the device to the manufacturer.

When using the Axio Scan with Orca Flash 4.0 ensure the all-pole disconnection of the Orca Flash 4.0 power supply if the device is shut down or switched off. This can be provided by a switchable mains plug or power strip.

3.2 Device connections, control and status elements

3.2.1 Basic unit

3.2.1.1 Connections to the control computer

All external connections from the Axio Scan.Z1 (i.e. to the computer) are combined left, below, rear (Fig. 3-2/3) as a wiring harness.

The connections are marked accordingly on the cable.

The number and assembly of the cables/plugs depends on the device configuration.

All cable connections on the computer must be checked for tight fitting.

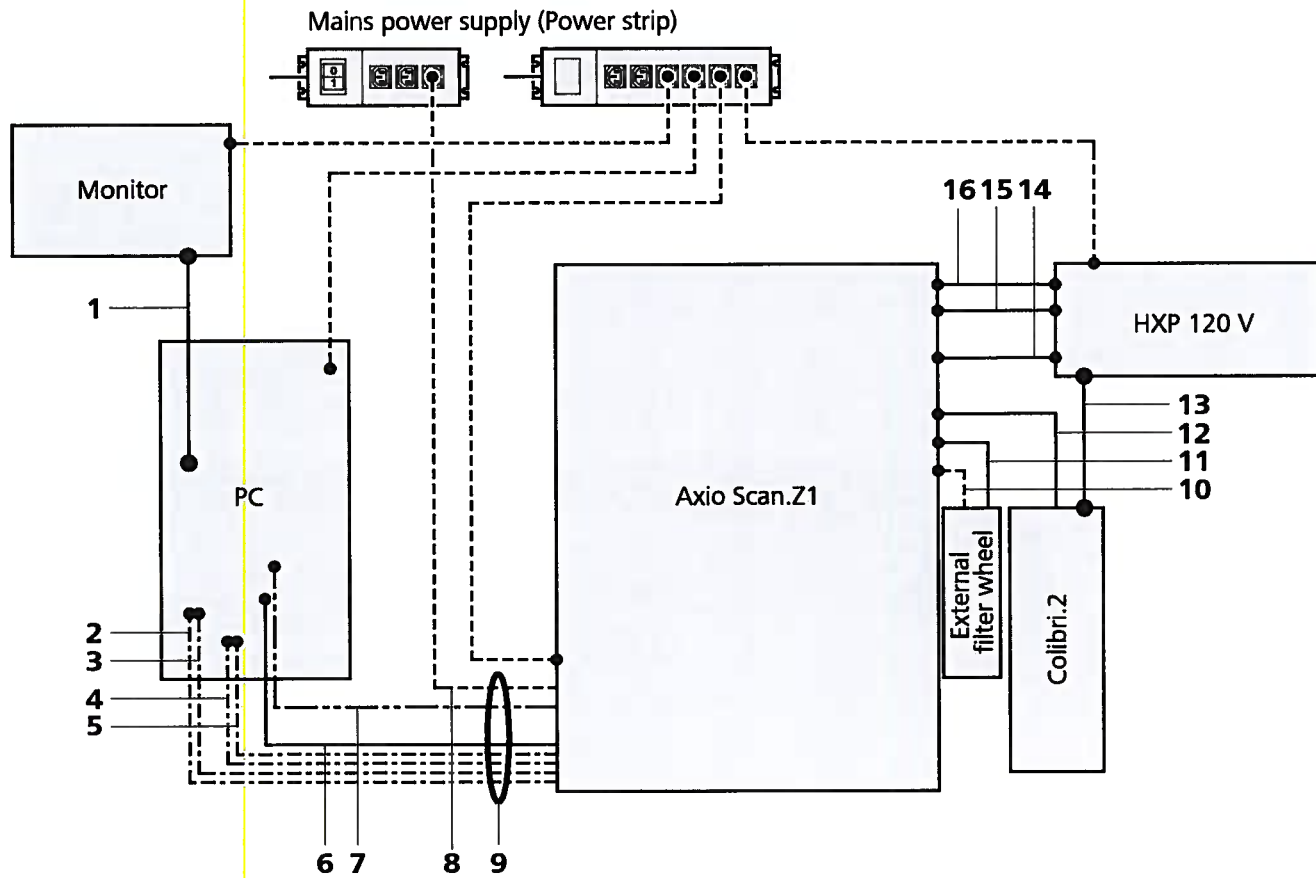
Defective cables should never be used, but replaced. In this case, contact ZEISS Customer Service.

Plug	Description
<i>For all configurations</i>	
PreScan	FireWire connection for AVT Guppy (preview camera)
USB	USB connection to device control (without marking)
<i>Dependent upon existing scan camera configuration</i>	
MRm	FireWire connection for AxioCam MRm (FL kit)
Orca Port 1	Camera link connection for Hamamatsu Orca Flash 4.0 (FL kit)
Orca Port 2	Camera link connection for Hamamatsu Orca Flash 4.0 (FL kit)
HV-F202 Port 0	Camera link connection for Hitachi HV-F202SCL (brightfield)
HV-F202 Port 1	Camera link connection for Hitachi HV-F202SCL (brightfield)
Trigger	Trigger cable for fluorescence kits

3.2.1.2 Cabling diagram

Sample configuration for Axio Scan.Z1 with

- Fluorescence option
- External filter wheel
- HXP 120 V
- Colibri.2
- Hamamatsu Orca Flash 4.0
- Hitachi HV-F202SCL



----- = Power supply cable
● = Plug connection

- | | | | |
|---|--|----|---------------------------------|
| 1 | Monitor cable | 9 | Wiring harness |
| 2 | Camera link cable 1 Hamamatsu Orca Flash 4.0 | 10 | Power supply |
| 3 | Camera link cable 2 Hamamatsu Orca Flash 4.0 | 11 | Control cable |
| 4 | Camera link cable 0 Hitachi HV-F202SCL | 12 | Control cable |
| 5 | Camera link cable 1 Hitachi HV-F202SCL | 13 | Light guide with liquid filling |
| 6 | Trigger cable | 14 | CAN cable |
| 7 | USB port Axio Scan.Z1 | 15 | Trigger cable in |
| 8 | Power supply for Hamamatsu Orca Flash 4.0 | 16 | Trigger cable out |

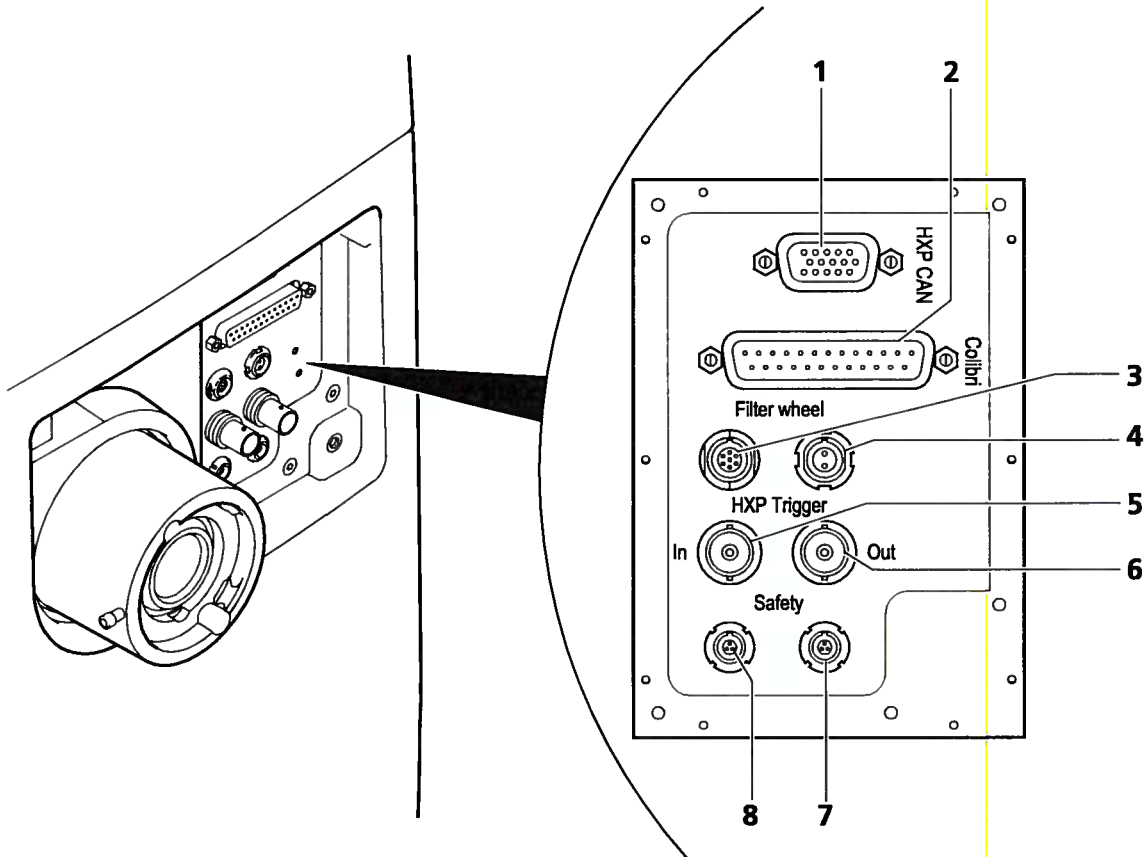
Connections to other external components (only for Axio Scan.Z1 with fluorescence kit)

The connections for the Colibri.2, HXP 120 V and external filter wheel are located on the connection panel (Fig. 3-1) on the right side of the device.

In the case of a device without fluorescence kit, this connection panel is provided with a cover.

All cable connections must be checked for a tight fitting.

Defective cables should never be used, but replaced. In this case, contact ZEISS Customer Service.



- 1 Terminal **HXP CAN** for HXP 120 V
- 2 Terminal **Colibri** for Colibri.2
- 3 Terminal 1 **Filter wheel** for external filter wheel
- 4 Terminal 2 **Filter wheel** for external filter wheel
- 5 Terminal **HXP Trigger In**
- 6 Terminal **HXP Trigger Out**
- 7 Terminal 1 **Safety** (not in use)
- 8 Terminal 2 **Safety** (not in use)

Fig. 3-1 Connector panel Axio Scan.Z1 BF FL

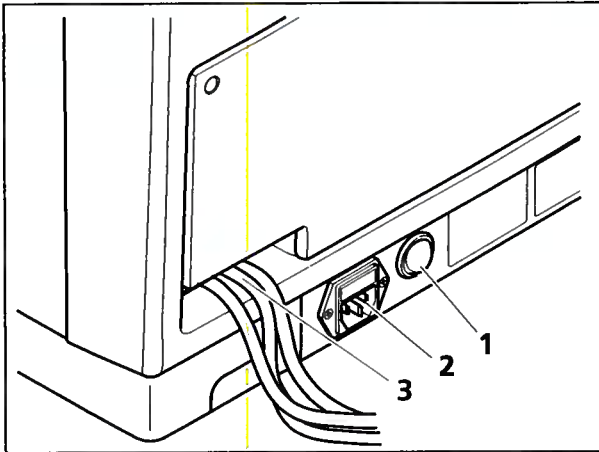


Fig. 3-2 On/off switch, mains input and wiring harness

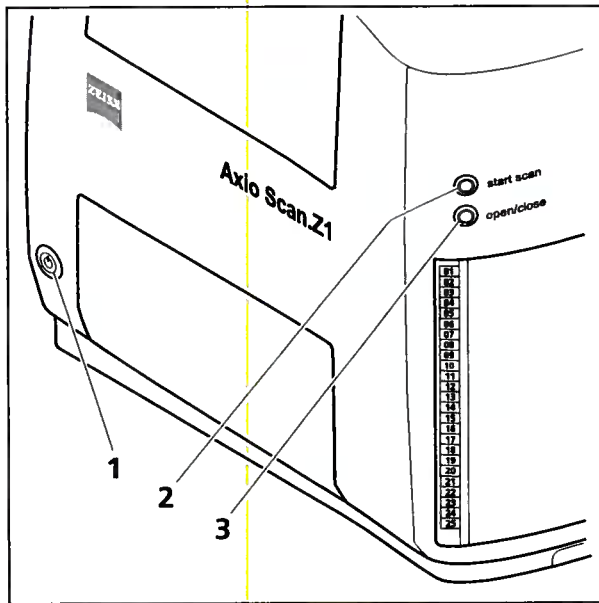


Fig. 3-3 Buttons on Axio Scan.Z1

3.2.1.3 Control and status elements


3.2.1.3.1 Control elements

The following control elements are located on the Axio Scan.Z1:

- On/off switch (Fig. 3-2/1):
The device is disconnected from or reconnected to the mains supply by means of this switch for the internal power supply unit.



The Axio Scan.Z1 must be set to **Standby** mode before the device is switched off (Fig. 3-3/1).

- Mains input (Fig. 3-2/2):
for connecting to the mains supply
- Wiring harness with camera ports, trigger cable, camera power supply and USB port (Fig. 3-2/3).
- **Standby** button  (Fig. 3-3/1):
The device is set to **Standby** mode when this button is pushed.
- **Start scan** button (Fig. 3-3/2):
Starts the digitization process for the slide-mounted samples
- **Open/close** button (Fig. 3-3/3):
Opens and closes the arched door for inserting and removing mounting frames

3.2.1.3.2 Status elements

The following status elements are located on the Axio Scan.Z1:

- Main status display (Fig. 3-4/1)
- Status display on each swivel compartment of the magazine (Fig. 3-4/2 and Fig. 3-5)

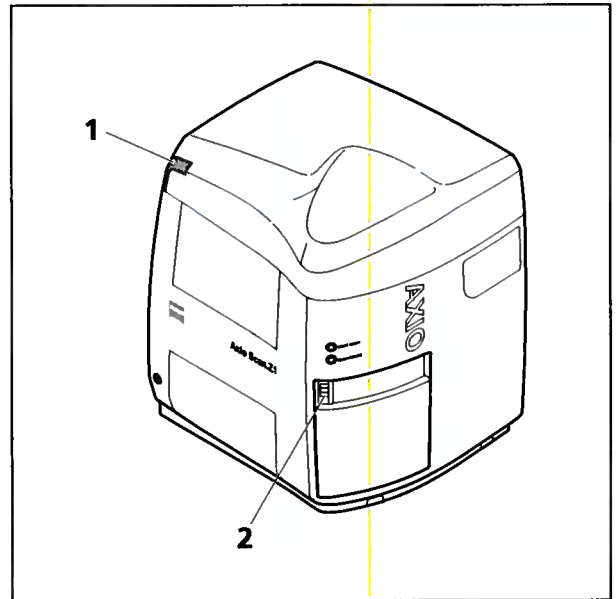
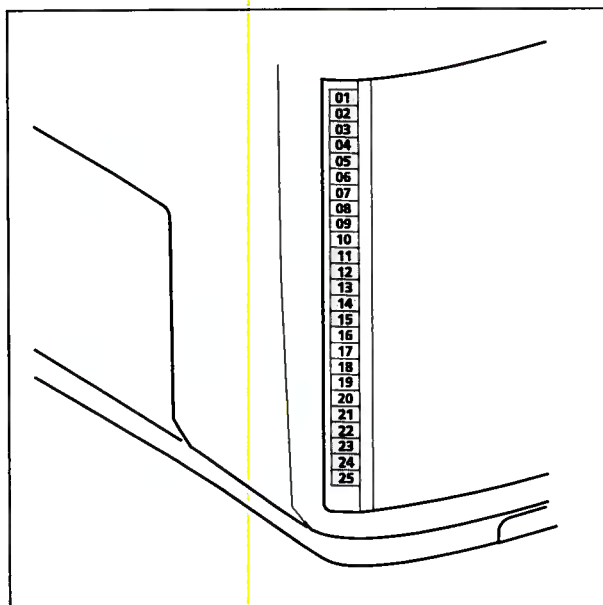


Fig. 3-4 Main status display of the Axio Scan.Z1

Main status display (Fig. 3-4)

For display of the current state of Axio Scan.Z1 with the following statuses:

Color	State	Status
blue	flashing	Device is being initialized or shut down
green	continuously lit	Axio Scan.Z1 is ready for operation.
green	pulsating	Axio Scan.Z1 is processing slides.
green	flashing	Axio Scan.Z1 is in Pause mode.
orange	pulsating	A warning status has occurred. The device is still processing slides; however, the user should check the display on the screen.
red	pulsating	An error has occurred. The device will not process any further slides until the user intervenes and remedies the error.
none	off	The device is de-energized or in Standby mode.



Status display on the swivel compartment of the magazine (Fig. 3-5)

The swivel compartments are consecutively numbered from **1** upwards; depending on the capacity of the Axio Scan.Z1 from **1** to **3** (for mounting max. 12 slides) and from **01** to **25** (for mounting max. 100 slides).

Each compartment of the magazine shows the current status separately on its status display, an LED with the compartment number.

Fig. 3-5 Status display on each swivel compartment of the Axio Scan.Z1

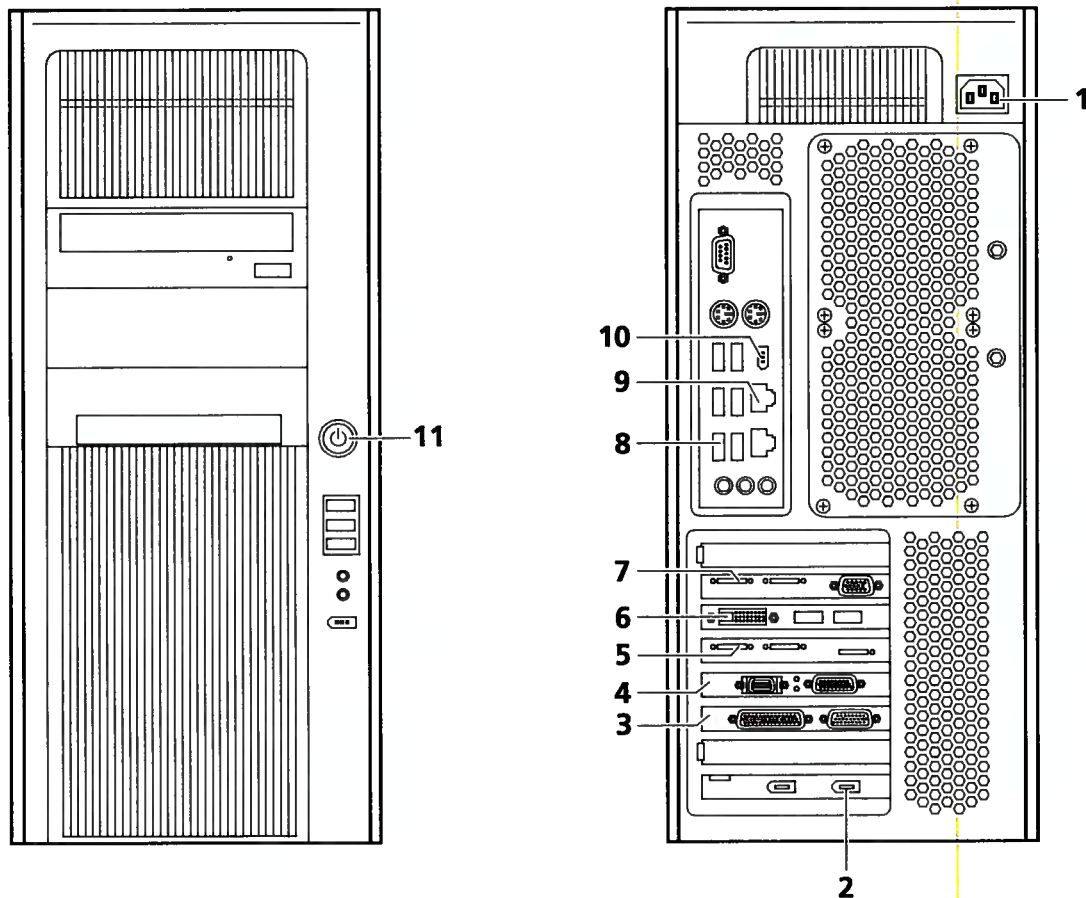
The following states can be displayed on the respective LED:

Color	State	Compartment swiveled out	Status
blue	continuously	no	A mounting frame has been inserted and the slides it contains have not been processed.
blue	flashing	no	The mounting frame is currently on the scanning stage and the slides are being processed.
blue	flashing	yes	Compartment swiveled out
green	continuously	no	A mounting frame has been inserted and the slides have been processed.
green	flashing	no	A preview has been prepared for the slides on this mounting frame.
orange	continuously	no	A Warning status has occurred for the mounting frame. The device is still processing slides; however, the user should check the display on the screen.
orange	flashing	no	The mounting frame type was not recognized.
orange	flashing	yes	The mounting frame is currently on the scanning stage.
red	flashing	no	The compartment to which the mounting frame on the scanning stage is assigned is open or closed and occupied by a mounting frame. Process cannot be continued.
red	continuously	no	An error has occurred. The device will not process any further slides until the user intervenes and remedies the error.
Backlight illuminator	continuously	no	No mounting frame has been inserted.
white	continuously	no	A mounting frame has been inserted but no slides were recognized inside it.
none	off	no	The device is now de-energized.

3.2.2 Monitor

Please consult the enclosed separate manual for connections and layout of the monitor status elements.

3.2.3 PC for system control



- 1 Power supply
- 2 Connection AxioCam MRm (FireWire)
- 3 ISG adapter for connecting trigger cable (Axio Scan.Z1 with reflected light fluorescence)
- 4 MiCo-IF card (Axio Scan.Z1 with reflected light fluorescence)
- 5 Board with 2x mini camera link cables (Silicon Fire Bird) for Hamamatsu camera
- 6 Video adapter
- 7 Board with 2x mini camera link cables (Matrox) for Hitachi camera
- 8 USB connecting terminal (6x)
- 9 Mains connection
- 10 AVT Guppy (FireWire) preview camera connection (example)
- 11 On/off switch

Fig. 3-6 Connections and control elements on front and rear sides of the control computer

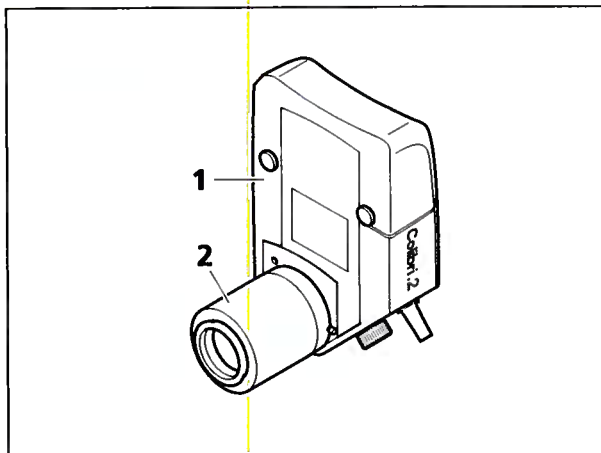


Fig. 3-7 Colibri.2 light source

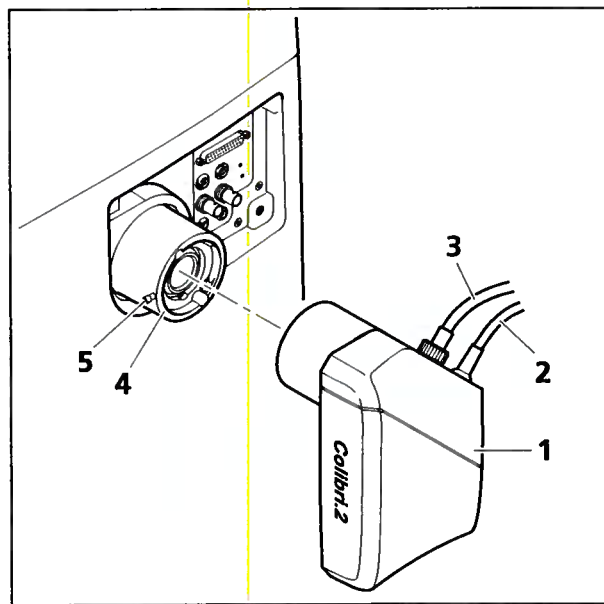


Fig. 3-8 Mounting the Colibri.2 light source

3.2.4 Connecting the Colibri.2 light source (devices with reflected light fluorescence option)

The Colibri.2 light source (Fig. 3-7/1) is supplied with an illumination adapter (Fig. 3-7/2).

- Attach the illuminator module (Fig. 3-8/1) with the dovetail mount of the illumination adapter to the reflected light port (Fig. 3-8/4) of the Axio Scan.Z1 and secure with the clamp screw (Fig. 3-8/5, Allen key 3 mm). The upward or downward orientation of the illuminator module is not relevant and can be set in any way.

No adjustment of the illuminator module is necessary.

- Connect the illuminator module by means of the connecting cable (Fig. 3-8/2) to the 25-pole subD connecting socket of the control unit (Fig. 3-1/2).

An external white light source (e.g. HXP 120 V) can be connected via the coupling point for liquid light guides.

- For this purpose plug one end of the light guide into the white light source (Fig. 3-10/3 and 4) and the other end into the port on the illuminator module (Fig. 3-8/3) and secure it with the union nut.
- Connect the white light source to a mains socket using power cable (Fig. 3-10/2).

If the external, fast **filter wheel 6 pos. excitation** is used, the illumination adapter (Fig. 3-7/2) is not necessary.

The illumination adapter is replaced by a short intermediate adapter and the external filter wheel. The intermediate adapter is supplied together with the external filter wheel.

- Attach the intermediate adapter (Fig. 3-9/5) with the dovetail mount to the connecting socket (Fig. 3-9/7) and secure with the clamp screw (Fig. 3-9/6, Allen key 3 mm).
- Attach the external filter wheel (Fig. 3-9/2) with the dovetail mount to the intermediate adapter (Fig. 3-9/5) and secure with the clamp screw (Fig. 3-9/4, Allen key 3 mm).
- Finally, set the illuminator module (Fig. 3-9/1) with the dovetail mount on the external filter wheel and secure with the clamp screw (Fig. 3-9/3, Allen key 3 mm). Care must be taken to ensure that the illuminator module points upwards, i.e. the control cable points downwards.

It is not necessary to adjust the illuminator module in this configuration.

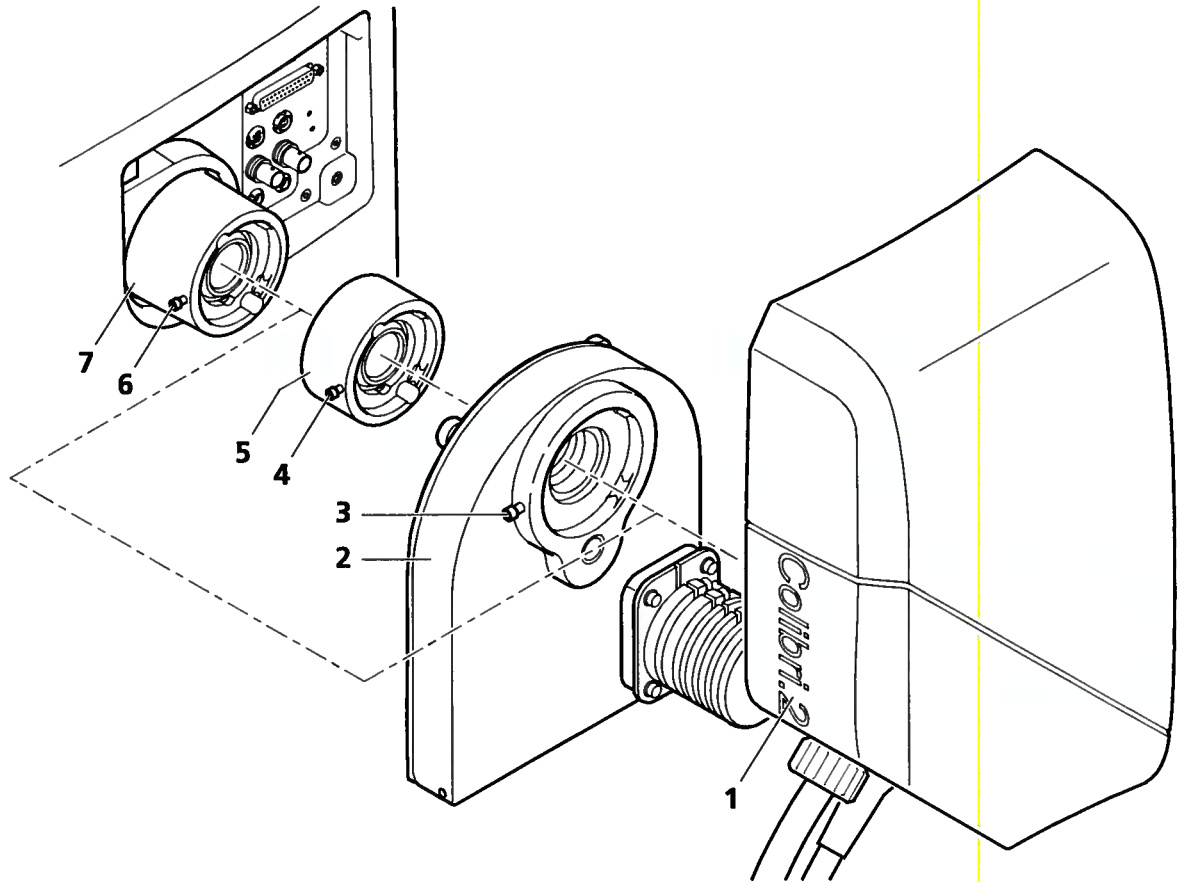


Fig. 3-9 Mounting the external filter wheel and the Colibri.2 light source

3.2.5 Connecting the HXP 120 V illuminator and external filter wheel (devices with fluorescence kit)



Regulations for occupational health and safety must be observed when operating the HXP 120 V source of UV radiation. The national legal requirements must also be observed.

- Follow the operating instructions for the HXP 120 V illuminator as supplied by the manufacturer.
- The user should not expose him/herself to UV radiation from the HXP 120 V illuminator.
- Never look directly into the optical waveguide when the HXP 120 V illuminator is switched on. **Failure to observe this precaution may result in eye injuries!**
- Never remove the optical waveguide from the Axio Scan.Z1 when the HXP 120 V illuminator is switched on.
- Never connect the optical waveguide to the Axio Scan.Z1 when the HXP 120 V illuminator is switched on.

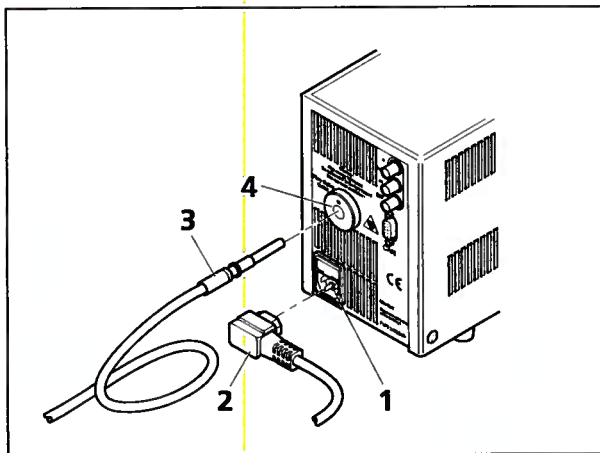


Fig. 3-10 Plug-in connections on the HXP 120 V illuminator

The HXP 120 V fiber-coupled illuminator delivers the required excitation light for fluorescence applications.

Its power input (Fig. 3-10/1) is located on the rear side of the illuminator.

The HXP 120 V is connected to the Axio Scan.Z1 by a light guide and an illumination adapter.

- Set the illumination adapter (Fig. 3-11/3) on the connecting socket (Fig. 3-11/7) of the Axio Scan.Z1 and secure with a clamp screw (Fig. 3-11/6).
- One end of the light guide (Fig. 3-10/3) is inserted into the rear side port (Fig. 3-10/4) of the illuminator, the other end (Fig. 3-11/1) into the illumination adapter (Fig. 3-11/3) and secured with the clamp screw wrench size 3 mm (Fig. 3-11/2).

If the **external filter wheel 6 pos. excitation** is used, this is mounted directly between the Axio Scan.Z1 and the illumination adapter.

- Remove the illumination adapter (Fig. 3-11/3) if necessary.
- Attach the short intermediate adapter (Fig. 3-11/7) with the dovetail mount to the connecting socket (Fig. 3-11/9) of the device and secure with the clamp screw (Fig. 3-11/8, Allen key 3 mm).
- Attach the filter wheel (Fig. 3-11/4) with the dovetail mount to the short intermediate adapter (Fig. 3-11/7) and secure with the clamp screw (Fig. 3-11/6, Allen key 3 mm).
- Set the illumination adapter (Fig. 3-11/3) on the filter wheel (Fig. 3-11/4) and secure with a clamp screw (Fig. 3-11/5).



Connection of the HXP 120 V when using the Colibri.2 illuminator module is described in Section 3.2.4.

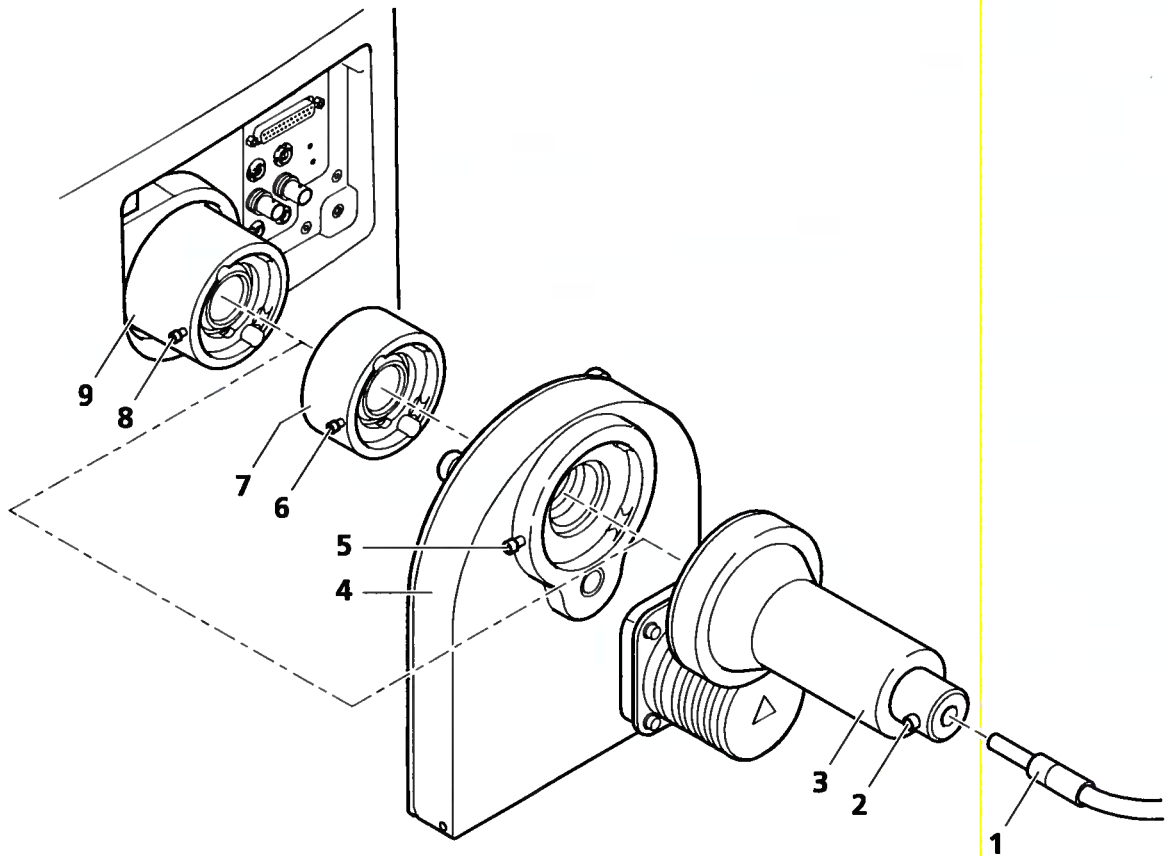


Fig. 3-11 Mounting the external filter wheel and connecting the HXP 120 V with illumination adapter

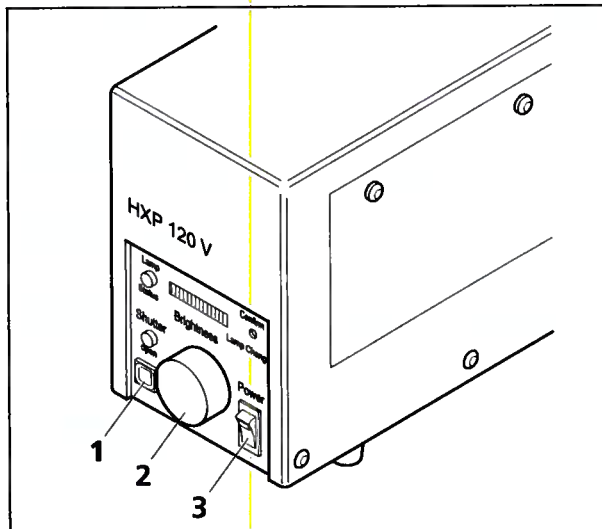


Fig. 3-12 Switching the HXP 120 V illuminator on/off

3.3 Switching on the instrument

Before switching on ensure that there is no visible damage to the outside of the Axio Scan.Z1.

- Connect Orca Flash 4.0 (if provided) to power (e.g. by switching on switchable mains plug or power strip).
- For Axio Scan.Z1 HF FL with HXP 120 V switch the HXP 120 V on at the mains switch (Fig. 3-12/3) and set to maximum intensity (Fig. 3-12/2).
- Wait for twenty minutes until the lamp has reached a nominal brightness!



Do not actuate the intensity control (Fig. 3-12/2) or shutter (Fig. 3-12/1) during scanning!

The Axio Scan.Z1, control computer and monitor must be switched on separately to supply power to further components.

- If the main status display (Fig. 3-4/1) does not light up, first of all switch on the Axio Scan.Z1 by the on/off switch (Fig. 3-2/1) on the left-hand side (rear).
- If the device is already in **Standby** mode (mains switch is on), only the **Standby** button ⏻ (Fig. 3-3/1) on the front of the device must be pressed.
- Switch the control computer on by pressing the on/off switch (Fig. 3-6/10). The operating system will be started.
- Switch on the monitor.

The main status display on the device (Fig. 3-4/1) must light up green before the control software can be started.

- Start the ZEN 2012 SP2 control software (blue edition) for Axio Scan.Z1 (ZEN slidescan) on the control computer.

The device and software are now ready for operation.

3.4 Switching off the instrument

- Switch the HXP 120 V off by the mains switch (3-12/3) (only for Axio Scan.Z1 with fluorescence kit and HXP 120 V). Wait approx. 20 minutes for the HXP 120 V to cool down before switching it on again.
- Exit the ZEN 2012 (blue edition) control software (ZEN slidescan) for Axio Scan.Z1.
- Shut down the control computer by the standard Windows routine.
- Switch off the monitor.
- Press the **Standby** ⏻ (Fig. 3-3/1) button on the front of the device.
- Disconnect all poles of Orca Flash 4.0 (if provided) from power supply (e.g. by switching off switchable mains plug or power strip).
- If the Axio Scan.Z1 is not used for an extended period, the device can be completely de-energized by the on/off switch (Fig. 3-2/1).

4 OPERATION

4.1 Preparing slides and mounting frames

All slides and coverslips with the following attributes may be used, depending on the mounting frames used:

4.1.1 Mounting frames 4x 26 mm x 76 mm (432337-9020-000)

Slide		Cover slip	
Capacity	1 ... 4		
Length	73.5 to 76.5 mm*	Length	max. 50 mm
Width	24.0 to 26.3 mm*	Width	max. 24 mm (recommended: 22 mm)
Thickness	0.8 to 1.3 mm*	Thickness	No. 1 or No. 1.5 (0.13 to 0.16 mm or 0.16 to 0.19 mm)

* this specification contains DIN ISO 8037/1



When using the Plan-Apochromat 40x / NA 0.95 (420660-997-0000) objective, coverslips with a close thickness tolerance (0.17 ± 0.005 mm) should be used, as the correction collar of the objective is set to 0.17 mm, e.g. 474030-9000-000 for 18 mm x 18 mm or 474030-9020-000 for 22 mm x 22 mm.

- 45° or 90° corners or cut edges
- Beveled or non-beveled edges

The following applies to all slides:

- The distance between the edges of the slide and the cover slip should be 0 to 1 mm. The edges of the slide should be aligned, as far as possible, with those of the coverslip.
- No stickers (or sticker combinations) thicker than 0.5 mm may be used.
- In preparing the cover slip it must be ensured that no part of the cover slip projects beyond the edge of the slide; however, a projection of up to 1 mm will be tolerated by the system. The coverslip may not project into the marking area of the slide, i.e. at least 15 mm should not be obscured by the coverslip.
- Specimens should be used in which the embedding medium has, as far as possible, fully hardened. If the embedding medium is not fully hardened, particular care is required when inserting the slide into the mounting frame to ensure that no embedding medium penetrates between the slide and mounting frame.
- Damaged slides may not be used.

- Care should be taken that the springs (which are visible if the mounting frame is viewed from below) are totally placed in the corresponding pockets and do not project beyond the supporting surfaces of the mounting frame.
- With archive material, i.e. older slides, it is possible that the smaller and longer side of the slide are not perpendicular to one other. The slides thus may be angled slightly in the horizontal plane with respect to the mounting frame. If these slides are inserted on position 1 or 4, the slide loading process may be interrupted, and a service call will be necessary. When processing such slides, they should be inserted at position 2 or 3 of the mounting frame.
- In the clamping area (marking area; Fig. 4-1/1) the maximum thickness of 1.3 mm should not be exceeded. Furthermore, no cover slips, labels or incompletely cured embedding mediums should be located in this area.
- Likewise, no cover slip or label, or any incompletely cured embedding medium should be projecting beyond the front edge of the slide (Fig. 4-1/2).
- Plastic slides are not suitable for this application (or only to a very limited degree), as the focus position can vary dramatically within very short time (in the second and minute range).

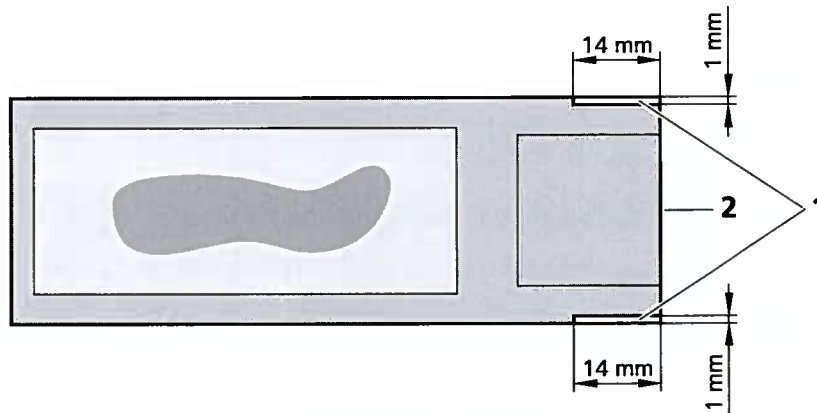


Fig. 4-1 Clamping zone of slide



The use of slides is described on in section 4.1.6 on page 49.

4.1.2 Mounting frames 2x 52 mm x 76 mm (432337-9030-000)

Slide		Cover slip	
Capacity	1 ... 2		
Length	73.5 to 76.5 mm	Length	max. 50 mm
Width	50.0 to 52.0 mm	Width	max. 50 mm (recommended: 48 mm)
Thickness	0.8 to 1.3 mm	Thickness	No. 1 or No. 1.5 (0.13 to 0.16 mm or 0.16 to 0.19 mm)



When using the Plan-Apochromat 40x / NA 0.95 (420660-997-0000) objective, coverslips with a narrow thickness tolerance (0.17 ± 0.005 mm) should be used, as the correction collar of the objective is set to 0.17 mm, e.g. 474030-9000-000 for 18 mm x 18 mm or 474030-9020-000 for 22 mm x 22 mm.

- 45° or 90° corners or cut edges
- Beveled or non-beveled edges

The following applies to all slides:

- The distance between the edges of the slide and the cover slip should be 0 to 1 mm. The edges of the slide should be aligned with those of the coverslip.
- No stickers (or sticker combinations) thicker than 0.5 mm may be used.
- In preparing the cover slip it must be ensured that no part of the cover slip projects beyond the edge of the slide; however, a projection of up to 1 mm will be tolerated by the system. The coverslip may not project into the marking area of the slide, i.e. at least 15 mm should not be obscured by the coverslip.
- Specimens should be used in which the embedding medium has, as far as possible, fully hardened. If the embedding medium is not fully hardened, particular care is required when inserting the slide into the mounting frame to ensure that no embedding medium penetrates between the slide and mounting frame.
- Damaged slides may not be used.
- With archive material, i.e. older slides, it is possible that the smaller and longer side of the slide are not perpendicular to one other.
The slides thus may be angled slightly in the vertical plane with respect to the mounting frame. If such slides are inserted, the charging process may be interrupted and eventually Customer Service must be called.
- In the clamping area (marking area; Fig. 4-1/1) the maximum thickness of 1.3 mm should not be exceeded. Furthermore, no cover slips, labels or incompletely cured embedding mediums should be located in this area.
- Likewise, no cover slip or label, or any incompletely cured embedding medium should be projecting beyond the front edge of the slide (Fig. 4-1/2).
- Care should be taken that the springs (which are visible if the mounting frame is viewed from below) are totally placed in the corresponding pockets and do not project beyond the supporting surfaces of the mounting frame.

- Plastic slides are not suitable for this application (or only to a very limited degree), as the focus position can vary dramatically within very short time (in the second and minute range).



The use of slides is described on in section 4.1.6 on page 49.

4.1.3 Mounting frames 1x 100 mm x 76 mm (432337-9080-000)

Slide		Cover slip	
Capacity	1		
Length	73.5 to 76.5 mm	Length	max. 70 mm
Width	99 to 106 mm	Width	max. 95 mm
Thickness	0.8 to 1.3 mm	Thickness	No. 1 or No. 1.5 (0.13 to 0.16 mm or 0.16 to 0.19 mm)



This mounting frame is not provided to be used with objectives with a magnification of more than 20x.

- 45° or 90° corners or cut edges
- Beveled or non-beveled edges

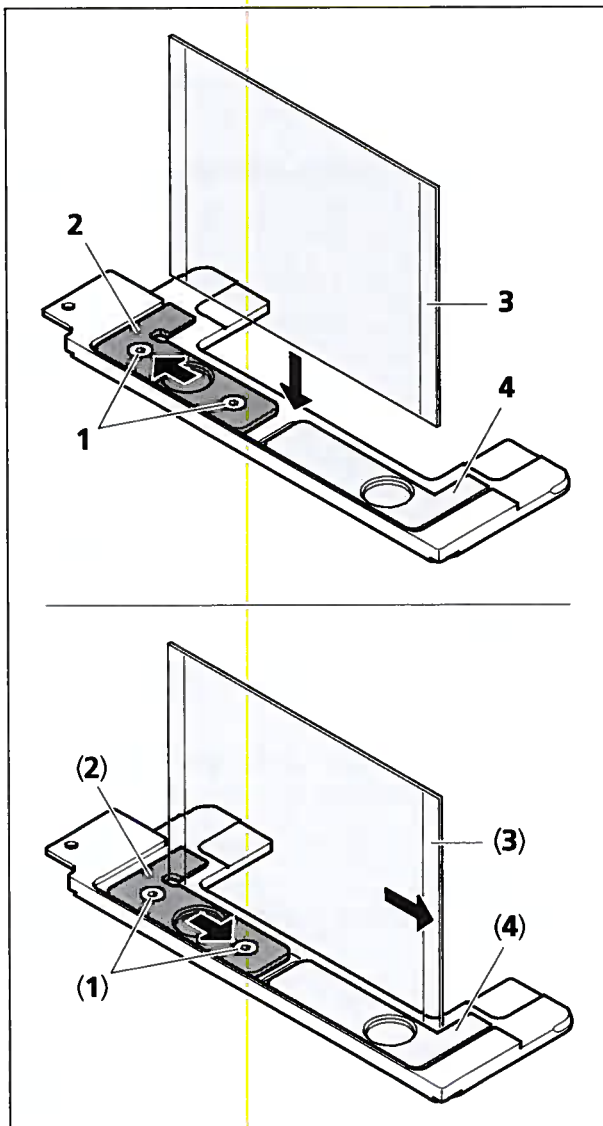
The following applies to all slides:

- The distance between the edges of the slide and the cover slip should be 0 to 1 mm. The edges of the slide should be aligned with those of the coverslip.
- No stickers (or sticker combinations) thicker than 0.5 mm may be used.
- No barcodes should be stuck in the center of the slide as the image for the marking area is composed of images and thus barcodes may not be readable.
- In preparing the cover slip it must be ensured that no part of the cover slip projects beyond the edge of the slide; however, a projection of up to 1 mm will be tolerated by the system.
- Specimens should be used in which the embedding medium has, as far as possible, fully cured. If the embedding medium is not fully cured, particular care is required when inserting the slide into the mounting frame to ensure that no embedding medium penetrates between the slide and mounting frame.
- Damaged slides may not be used
- In the clamping area (marking area; Fig. 4-1/1) the maximum thickness of 1.3 mm should not be exceeded. Furthermore, no cover slips, labels or incompletely cured embedding mediums should be located in this area.

- Likewise, no cover slip or label, or any incompletely cured embedding medium should be projecting beyond the front edge of the slide (Fig. 4-1/2).
- Care should be taken that the spring (which is visible if the mounting frame is viewed from below) is totally placed in the corresponding pocket and does not project beyond the supporting surfaces of the mounting frame.
- Plastic slides are not suitable for this application (or only to a very limited degree), as the focus position can vary dramatically within very short time (in the second and minute range).

Adjustment of the fixed stop:

As the width of this kind of slides can vary significantly, the fixed stop must be adjusted for each size:



- Loosen the screws (2x wrench size 2.0) (Fig. 4-1/1) and move the fixed stop (Fig. 4-1/2) to the left as far as it will go.
- Insert the slide (Fig. 4-1/3) upright so that its right side contacts the spring-loaded catch (Fig. 4-1/4).
- Move the fixed stop (Fig. 4-1/2) to the right until it stops at the slide (Fig. 4-1/3).
- Retighten the screws (2x wrench size 2.0) (Fig. 4-1/1).
- Insert the slide as described in Section 4.1.6 on page 49.



The use of slides is described on in section 4.1.6 on page 49.

Fig. 4-2 Adjusting the fixed stop

4.1.4 Mounting frame support for slides 28 mm x 48 mm (432337-9090-000)

Slide		Cover slip	
Capacity	1	Capacity	
Length	46.0 to 48.2 mm	Length	max. 44 mm
Width	26.0 to 28.2 mm	Width	max. 24 mm
Thickness	1.0 to 1.6 mm	Thickness	No. 1 or No. 1.5 (0.13 to 0.16 mm or 0.16 to 0.19 mm)*

* If no cover slip is used, the quality may be significantly impaired when using high aperture objectives. The Plan-Apochromat 40x / NA 0.95 objective (420660-9970-000) should not be used without cover slip.



When using the Plan-Apochromat 40x / NA 0.95 (420660-997-0000) objective, coverslips with a narrow thickness tolerance (0.17 ± 0.005 mm) should be used, as the correction collar of the objective is set to 0.17 mm, e.g. 474030-9000-000 for 18 mm x 18 mm or 474030-9020-000 for 22 mm x 22 mm.

- 45° or 90° corners or cut edges
- Beveled or non-beveled edges

The mounting frame support is used for mounting frames with 2 slides (52 mm x 76 mm) (432337-9030-000). The mounting frame support is to be used in the same manner as a slide.

The following applies to all slides:

- The distance between the edges of the slide and the cover slip should be 0 to 1 mm. The edges of the slide should be aligned with those of the coverslip.
- No stickers (or sticker combinations) thicker than 0.5 mm may be used.
- Take care that all four solenoids (Fig. 4-5/4) are present, otherwise the holding power will not be sufficient.
- Take care that the upper edges of the main body and the holding panel are parallel to each other.
- In preparing the cover slip it must be ensured that no part of the cover slip projects beyond the edge of the slide; however, a projection of up to 1 mm will be tolerated by the system. The coverslip may not project into the marking area of the slide, i.e. at least 15 mm should not be obscured by the coverslip.
- Specimens should be used in which the embedding medium has, as far as possible, fully hardened.
- Damaged slides may not be used.



The use of slides in the mounting frame support is described on in section 4.1.7 on page 50.

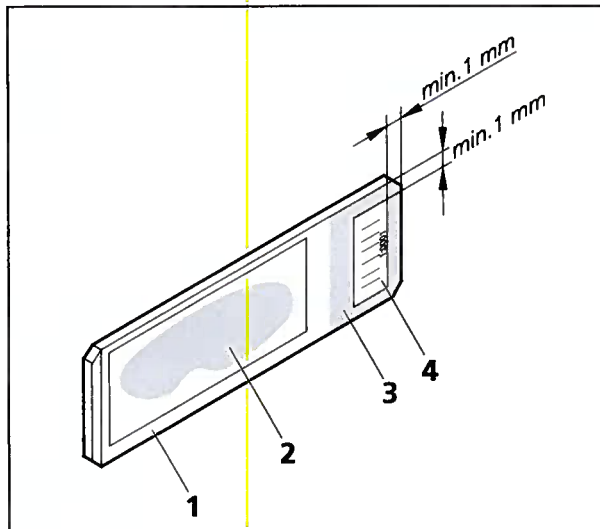


Fig. 4-3 Slide with barcode label

4.1.5 Affixing the barcode label to the slide

The barcode field (Fig. 4-3/3) is scanned by the preview camera and displayed in the software. When marking, ensure that at least 1 mm is kept free around the barcode field.

- Detach a barcode and affix as shown in Fig. 4-3 to the colored area (Fig. 4-3/3) without creases.
- The barcode (Fig. 4-3/4) must be affixed to the specimen side (with coverslip) (Fig. 4-3/2) of the slide (Fig. 4-3/1).
- The outside edges of the barcode label should be at least 1 mm from the edge of the barcode field so that it can be reliably scanned.

- The barcode label should not be applied over the cover slip and should not extend beyond the edges of the slide.
- Several labels may be stuck over one another, provided the total thickness does not exceed 0.5 mm.



Ensure that the labels do not exceed a total height of 1 mm, otherwise it is possible that the mounting frames will not be correctly conveyed within the device and a service call will be necessary.

4.1.6 Inserting slides into mounting frames (4x 26 mm x 76 mm)



The Axio Scan.Z1 may only be used with original ZEISS mounting frames!

When using the mounting frame for one slide (432337-9080-000) check that the adjusting of the mounting frame corresponds to the size of the slide to be used (see Section 4.1.3 on page 45).

Depending on the type, mounting frames can be loaded with up to 4 slides. The method of insertion does not vary between the different mounting frame types.

- Set the mounting frame (Fig. 4-4/1) upright as shown in Fig. 4-4 and hold with one hand.
- Push the spring-mounted silver catch (Fig. 4-4/3) at the corresponding position downwards with the thumb.



Due to the force needed, the mounting frame must be held securely. It is recommended that the mounting frame be set on a stable surface.

- Insert the slide (Fig. 4-4/2) into the mounting frame **until it engages** with the barcode side first and facing forwards.
- Release the catch (Fig. 4-4/3) so that the slide is firmly clamped.
- Several slides should be inserted into the mounting frame from bottom to top.

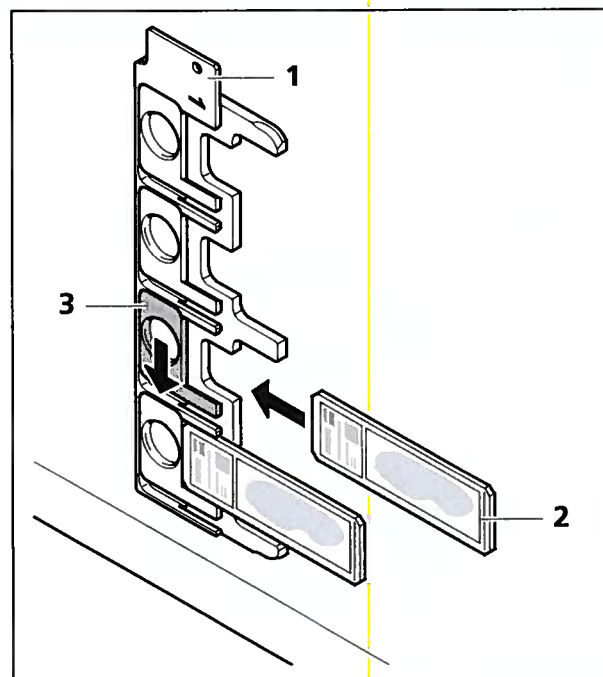


Fig. 4-4 Inserting slides into mounting frames 4x 26 mm x 76 mm



If a slide is loose, either a non-specified slide has been used or the spring has lost its nominal tension. In the former case, the slide should not be used; in the latter case the mounting frame should be replaced.



Care must be taken to ensure that the supporting surface on the mounting frame is clean, i.e. free of contamination (e.g. dust or embedding medium). The slides must be pushed into the mounting frame until they engage.

The mounting frame is a precision part and must be replaced if obvious damage is discovered.



The supplied transport and storage box is recommended for carrying a loaded mounting frame.



The mounting frame has an area containing the coding of the mounting frame (Fig. 4-4/1). Care must be taken to ensure that this area is not covered in any way (e.g. by labels)!



The slides must be pushed beneath the lateral bevels and securely held in a horizontal position.



The entire mounting frame must be clean and free of residue (i.e. embedding media and adhesives). This applies in particular to the underside.

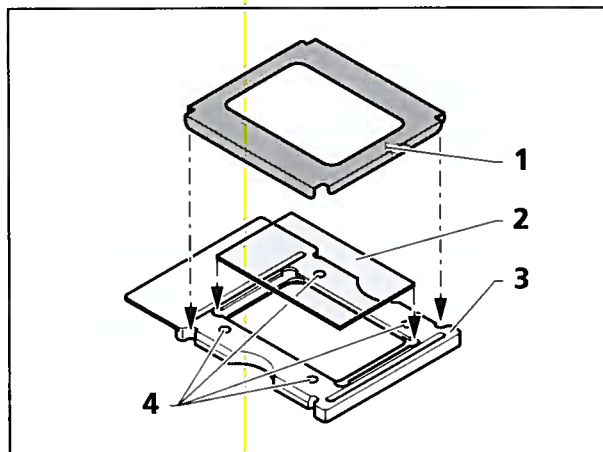


Fig. 4-5 Equipping the mounting frame support

4.1.7 Inserting slides into mounting frames (28 mm x 48 mm)

The mounting frame support consists of two parts, the main body (Fig. 4-5/3) and the holding panel (Fig. 4-5/1).

The four solenoids (Fig. 4-5/4) which are integrated in the main body hold the holding panel downwards so that the slide (Fig. 4-5/2) is firmly clamped.

A tab on each side of the holding panel fits into the recesses of the main body.

Once the holding panel is fixed, it should be parallel to the upper edge of the main body and rest on the slide.

- Place the mounting frame support on a stable surface so that the holding panel (Fig. 4-5/1) is facing upwards.
- Pull the holding panel gently, but firmly upwards. Do not twist or bend the holding panel.
- Insert the slide in the main body and center it on the long axis).
- Replace the holding panel. Make sure that the tabs are facing downwards and fit in the corresponding recesses of the main body.



Insert the mounting frame support(s) in the mounting frames for 2x slides (52 mm x 76 mm) (432337-9030-000) (see Section 4.1.8 on page 51).

4.1.8 Inserting the mounting frame support into the mounting frame (2x 52 mm x 76 mm)

- Push the spring-mounted catch (Fig. 4-6/1) to the right and hold.
- Insert the mounting frame support (Fig. 4-6/3) into the mounting frame (Fig. 4-6/2).
- Release the catch (Fig. 4-6/1) so that the mounting frame support is firmly clamped. Ensure the correct stop position.



When moving or tilting the mounting frame support, the inserted slide may not slip.



Alternatively it is possible to leave the main body in the mounting frame and to insert and remove the slides as described in section 4.1.7 on page 50.



If the mounting frame support is used, the software (ZEN slidescan) visualizes the detected slide even if only the support is inserted without a slide.

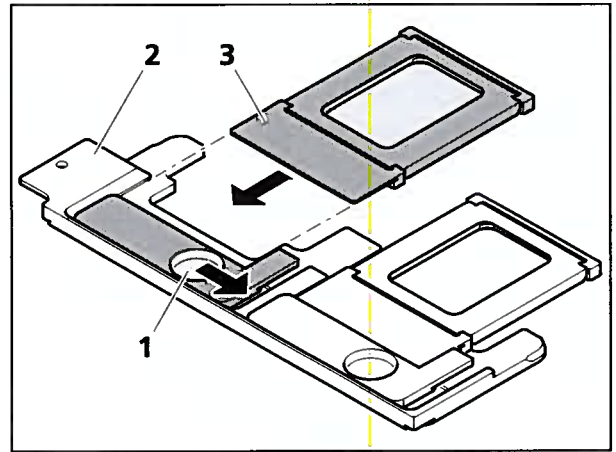


Fig. 4-6 Insert support in mounting frame

4.1.9 Loading aid (optional)

If there is a need to routinely load large quantities of mounting frames, a loading aid may be purchased as an option. This loading aid facilitates both loading and unloading of slides into/from the mounting frames.



The loading aid may only be used with mounting frames for 4 slides!

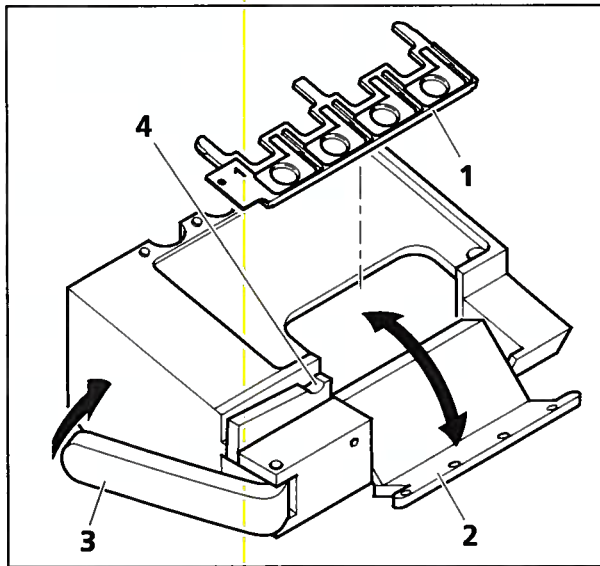


Fig. 4-7 Placing mounting frames into the loading aid

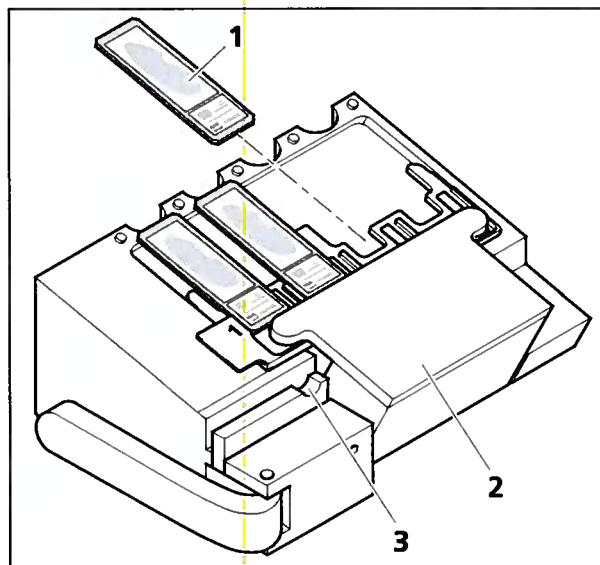



Fig. 4-8 Inserting slides into mounting frames

- Fold the fixing unit (Fig. 4-7/2) downwards. Unlock as necessary by pressing on the rocker (Fig. 4-7/4).
- Insert mounting frame (Fig. 4-7/1).
- Fold the fixing unit (Fig. 4-7/2) upwards until it lies on the mounting frame (Fig. 4-8/2).
- Push the lateral lever (Fig. 4-7/3) to the right so that the four positions of the mounting frame are open to receive the slides. The fixing unit is then locked.
- Remove the slides (Fig. 4-8/1) and/or insert new slides. When inserting make sure that the slides are pushed down completely to the stop in the mounting frame.
- Release the fixation by pressing the rocker (Fig. 4-8/3) (pushing against the lever on the side (Fig. 4-7/3) facilitates this); fixing unit (Fig. 4-8/2) will automatically fold downwards.
- Remove mounting frame.

4.1.10 Inserting and removing mounting frames

 The main status display will light up green when ready for operation.

- Open the arched door to the magazine by pressing the **open/close** button (Fig. 4-9/5).
- Depending on the version, three numbered swivel compartments (for three mounting frames with max. 12 slides, see Fig. 4-9) or 25 numbered swivel compartments (for 25 mounting frames with max. 100 slides) will be visible.
- Each compartment can be independently swiveled in or out by means of the respective lever (Fig. 4-9/1).

 With the trigger (Fig. 4-9/2) all compartments can be swiveled out simultaneously in a single operation and then loaded/unloaded successively from above.

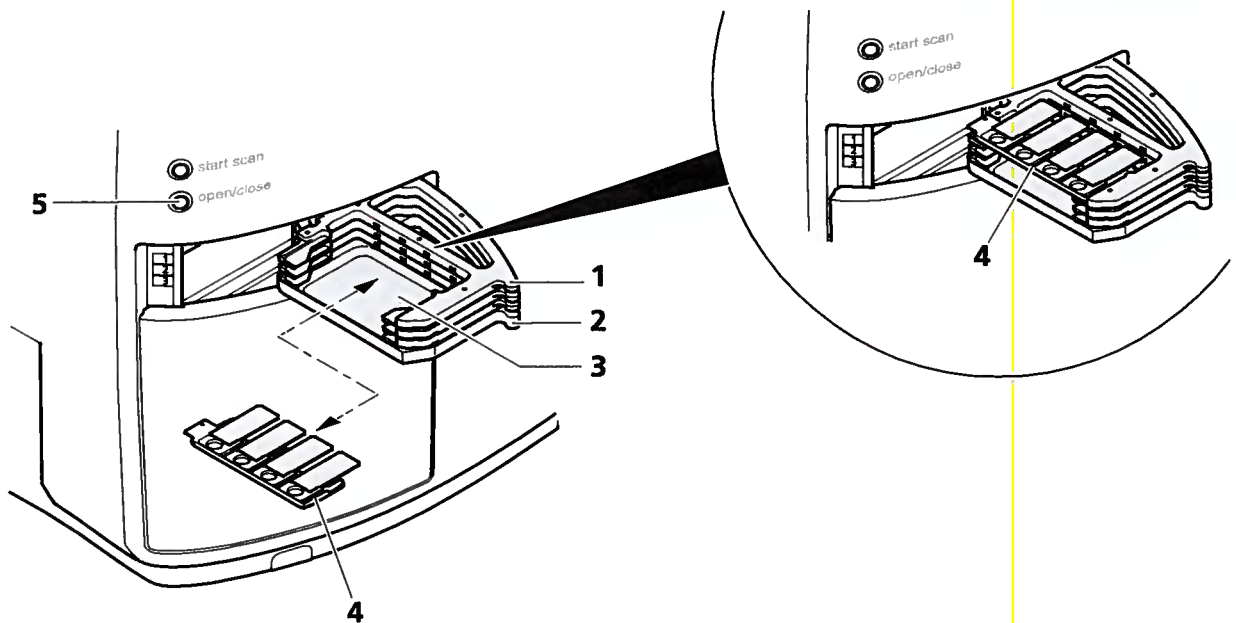


Fig. 4-9 Inserting and removing mounting frames

- Now insert the mounting frame (Fig. 4-9/4) which has been loaded for digitizing into the swivel compartment (Fig. 4-9/3). Care must be taken to ensure that the mounting frame and slides lie horizontally inside the compartment.
- Rotate the swivel compartment until it engages. It should be possible to close the compartment with minimum force, otherwise check to ensure that the mounting frame is correctly seated in the compartment. The compartment is properly engaged when the LED status display of the respective compartment no longer flashes.
- Repeat this procedure until all the required compartments are loaded.
- Unloaded compartments should also be closed.

- Close the arched door to the magazine by pressing the **open/close** button (Fig. 4-9/5).



When the arched door of the Axio Scan.Z1 automatically closes it is possible for objects or body parts to be trapped between the door and the housing (LED status line). In this case, re-open the door, remove the objects or body parts and re-close the door.



When a mounting frame is on the stage and the process is briefly interrupted, no further mounting frames may be inserted into the compartment from which the mounting frame came (assigned LED flashes orange). Should this nevertheless occur, the assigned LED will flash red and the process cannot be resumed.

- Upon completion of digitization of the slides, the mounting frames must be unloaded according to the following description.

5 DIGITIZATION

5.1 Software version

The software described in the following relates to the ZEN 2 version (blue edition). Due to further development the screenshots in this section may differ slightly from those of the version used.

This Section only describes basic principles for the different operation modes. A detailed description of the software can be found in the corresponding ZEN 2 online help.

5.2 Launching the software and login

Before launching the software, the Axio Scan.Z1 must be ready for operation, as signaled by the green indicator light on left upper side of the device (see Section 3.2.1.3.2 on page 33).

To launch the software click on the blue ZEN icon of the desktop.

Users of the Axio Scan.Z1 can be subdivided into various groups in which the possible uses of the software for the respective user group are defined. This is the case if **User Management** has been activated.

If **User Management** is activated, the user must log in with name and password prior to using the software. The respective data will be assigned by the administrator.



Fig. 5-1 User Login dialog



If no information is requested at the start of login, the user management is deactivated.

If after starting the software a selection dialog is displayed click on the **ZEN slidescan** entry in order to start the scanning application (Axio Scan.Z1 control software) (Fig. 5-2).

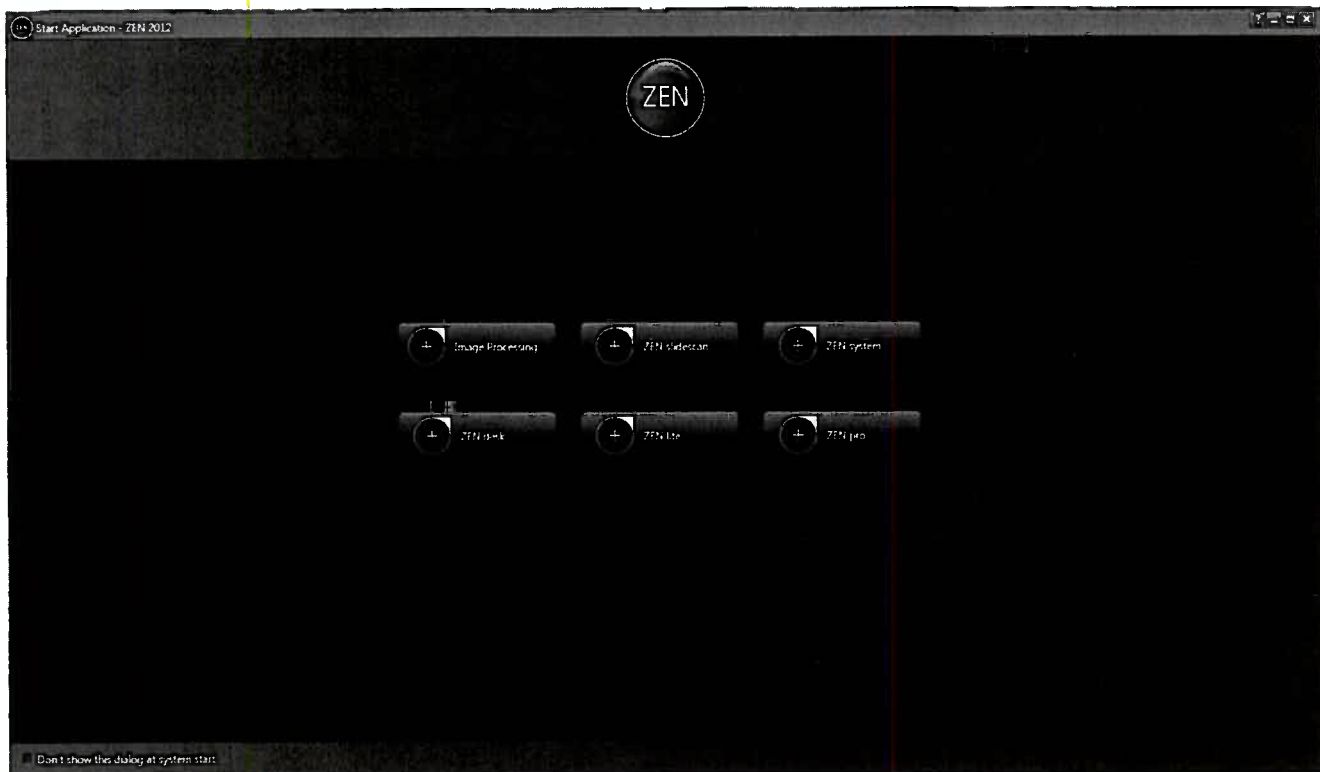


Fig. 5-2 Launch the scanning application

Enabling the **Don't show this dialog at system start** checkbox (bottom left) will automatically start the **Slide Scanning Application** without further query when the software is next launched.

5.3 Digitizing slides

After the system has been initiated (see Section 3.3), mounting frames inserted (see Section 4.1.10) and the ZEN blue software launched, the digitization process can be started.

In the simplest case the **start scan** button (see Section 3.2.1.3 on page 32) is pressed. Now all loaded slides with a predefined profile will be digitized. Due to intelligent detection of the mounting frame type and slides it contains, no further information is required.


Should the user deem it necessary to assign various profiles to the slide, this can be done directly in the ZEN 2 slidescan control software (blue edition). This can be found in the dropdown menu located beside each slide in the magazine area in the center of the ZEN window.

It is possible to import the names of the images, the profile designation and the scene names via the file (CSV) before starting the scan. This import should only be started when all mounting frames with the corresponding slides have been inserted.

5.4 System pause / continuous operation

To ensure a continuous digitization operation, the system can be paused to permit slides to be removed and new slides inserted.

- Press the **open/close** button (see Section 3.2.1.3 on page 32). The system is set to **Pause** mode. Once the **Pause** mode has been reached, the main status display will flash green and the arched door to the magazine will open. This may take several minutes, depending on the current status of the process and the digitization parameters. Please take care not to press the button a second time before the door opens.
- The mounting frames with the processed slides (LED lights up green on the status display for the magazine) may now be removed and the mounting frames with new slides inserted.

 If the compartment is opened and closed again, the mounting frame or inserted slides will be recognized as new and no preview will be shown!

- Press the **open/close** button (see Section 3.2.1.3 on page 32). The arched door closes and the system switches to the operating mode and the digitization process will continue. Once the operating mode has been reached, the main status display will flash green again.

The newly inserted slides will be placed in the process sequence after the existing slides and assigned the standard profile. The profile and sequence of mounting frames can always be modified until the digitization of the specific slide/mounting frame has commenced.

5.5 Priority slides

Should it be necessary to give priority to an urgently required slide in the digitization process, the procedure described in Section 5.4 must be followed.

Insert the mounting frames with the priority slides into the swivel compartments and close the arched door. The slides will now be displayed in the software and the mounting frames can be shifted by drag & drop. Priority samples should be moved to the top.

 For purposes of simplicity, only whole mounting frames (with slides) can be moved.

6 CARE, MAINTENANCE, TROUBLESHOOTING, SETTINGS AND SERVICE



Before cleaning, switch off the instrument and disconnect the power cable!



Ensure that no water or cleaning agent is allowed to penetrate the system.

6.1 Instrument care

6.1.1 Axio Scan.Z1

The only care required for the Axio Scan.Z1 is as follows:

- Switch the device off after longer periods of non-use and apply the protective cover (protects against dust and moisture).
- Do not set the instrument up in a moist environment, i.e. max. humidity < 75 %.
- The magazine should be checked at regular intervals for deposits. It is designed so that solid particles (e.g. dust or glass fragments) fall into a collection tray (independent on the magazine type). To access this tray all compartments must be swiveled out using the trigger (Fig. 4-9/2). When open, the tray of the trigger can be accessed for cleaning.
- The lower gap between the arched door and housing must likewise be checked for deposits at regular intervals. The use of a vacuum cleaner is recommended for removing heavy deposits.



If the above-described gap is not clean, the automatic arched door may not be closing properly.

- Cover all open tubes with dust caps.
- Remove water-soluble dirt (coffee, cola, etc.) by breathing on it and wiping with a dust-free cotton cloth or a moistened cloth. A mild cleaning agent may be added to the water.
- Remove stubborn, oily or greasy dirt (e.g. finger prints) using cotton wool buds or a dust-free cotton cloth and optical cleanser L.

This cleaning agent is manufactured from 90 vol% gasoline and 10 vol% isopropyl alcohol (IPA). The individual components are also known as:

Gasoline:	Rubbing alcohol, light petroleum
Isopropyl:	2-propyl alcohol, dimethylcarbinol, 2-hydroxypropane

When using Axio Scan.Z1 in warm and humid climatic zones, ensure that the device is installed in a light, dry and well-ventilated room; humidity < 75 %.

Precision-engineered optical instruments are always susceptible to mould in following conditions:

- Relative humidity > 75 % over periods exceeding three days at temperatures between +15 °C and +35 °C.
- Set up in dark rooms without sufficient ventilation.
- Dust and finger prints on optical surfaces.

6.1.2 Accessories

6.1.2.1 Mounting frames

Mounting frames made of aluminum are solvent-resistant and in addition to the above-named agents (see Section 6.1.1) they can be cleaned with xylene (synonyms: dimethyl benzene, ethyl benzene) or toluene (synonyms: methyl benzene, phenyl methane) if deposits of embedding medium are found on the mounting frame.

Mounting frames can also be autoclaved if necessary.

Mounting frames must be regularly checked for cleanliness (in particular the supporting surface for slides) and proper functioning (in particular spring tension and straightness).



Toluene is categorized as highly flammable and a health hazard.

Xylene is categorized as a health hazard.



6.1.2.2 Transport and storage box

The transport box is made of plastic. Water-soluble stains (coffee, Coke, etc.) can be removed with a moist, dust-free cotton cloth. A mild cleaning agent may be added to the water.

6.1.2.3 Loading aid

The loading aid is for the most part made of plastic. This material can be cleaned using the above-named agents (see Section 6.1.2.2 on page 59).

6.2 Troubleshooting

Problem	Cause	Troubleshooting
Equipment		
Axio Scan.Z1 not functioning.	Power supply interrupted, control computer is not switched on.	Axio Scan.Z1 is not switched on, switch on by the on/off button- or the standby button (see page 32). Switch on the control computer. Check the cable connections.
	Front cover (Fig. 6-8/2) is not mounted or does not sit properly.	Mount the cover or check for correct seating.
	Defective fuses.	Change fuses.
	When a Colibri.2 is used, the removable upper housing has not been (properly) mounted.	The removable upper housing of the Colibri.2 light source must be correctly mounted and secured with screws.
	Automatic arched door to magazine on the Axio Scan.Z1 does not close or requires two or more attempts.	Dirt has accumulated in the gap between the arched door and the housing. Compartments are not completely swiveled in (LEDs flashing).
Mounting frame type not recognized.	Coding is not legible, e.g. due to label; mounting frame recognition defective.	The coding area must be free of all labels and similar. Contact ZEISS Customer Service.
The process cannot be resumed after a pause. LED status display on the compartment is flashing red.	When a mounting frame is on the stage and the process is briefly interrupted, no further mounting frames may be inserted into the compartment from which the mounting frame came (assigned LED flashes orange). Should this nevertheless occur, the assigned LED will flash red and the process cannot be resumed.	Remove the mounting frame from the compartment.
The Axio Scan geometric calibration cannot be carried out. During the first steps an error message appears.	Calibration slide inserted incorrectly.	Remove the mounting frame from the device and check the position of the calibration slide. In most cases it is sufficient to turn the slide by 180° along its longer axis.

Problem	Cause	Troubleshooting
Image quality (general)		
Poor quality of focusing	Mounting frame is bent.	Replace mounting frame by a new one.
	Slide is damaged.	Only undamaged slides may be used. Damaged slides may not be used.
	Slide was inserted at a slant.	Remove deposits on the supporting surface for slides. Ensure proper clamping, i.e. position slide beneath lateral bevels.
Entire specimen is not properly focused.	Slide has been inserted incorrectly, i.e. coverslip pointing down.	Insert the slide as prescribed (see page 49). Check if the thickness of the slide is suitable for the mounting frame.
Color gradient in each tile	Slide was inserted at a slant (on the short side) into the mounting frame	Remove deposits on the supporting surface for slides. Ensure proper clamping, i.e. position slide beneath lateral bevels. Check if the thickness of the slide is suitable for the mounting frame.
	Mounting frame is bent.	Replace mounting frame by a new one.
Barcode cannot be read.	Barcode type is not supported.	Use a barcode type that is supported.
	Poor printing quality of the barcodes.	Check barcodes and reprint with lower resolution, i.e. larger.
	Slide inserted incorrectly.	Insert the slide as prescribed (see page 49).
Specimen area badly clipped, i.e. large part cannot be detected and digitized.	Slide inserted incorrectly.	Insert the slide as prescribed (see page 49).
Virtual slides have insufficient stitching.	Scanning cameras incorrectly adjusted (e.g. due to loosening of the bracket).	Perform calibration (see page 91) to determine whether this is the cause of the malfunction. Contact ZEISS Customer Service.
Digitization process is unusually slow.	Z-Stack function is activated.	The Z-Stack function should be deactivated if it is not required.
Brightfield		
Dark areas display a brightly colored fringe.	Imaging errors (e.g. chromatic deviations)	Contact ZEISS Customer Service.
All individual images display insufficient flattening.	Shading correction has not been activated.	Activate the shading correction under Scan Settings (Expander: Post Processing) in the Advanced Profile Wizard.
Virtual slide displays distinct color bias (on device with fluorescence option).	A filter is located in position 1 of the reflector turret.	Remove the filter.

Problem	Cause	Troubleshooting
Fluorescence applications (optional)		
Offset between the individual channels despite filter change in an image field.	6x beam splitter wheel is deformed.	Contact ZEISS Customer Service.
	When reflector modules (for the 10x reflector turret) are used, the beam splitters are not correctly adjusted to one another.	Contact ZEISS Customer Service.
All individual images display distinct shadowing (fluorescence).	No compensation image has been activated or the calibration process must be repeated.	Activate the compensation image for the fluorescence channels used. Re-calibrate the compensation image for the fluorescence channels used (see page 91).
All individual images display very distinct shadowing (fluorescence).	Shadowing of the optical path due to incorrect mounting of the 6x filter wheels.	Check the seating of the filters in the 6x filter wheels (see page 75 and following).
No suitable exposure time can be found. Signal is too weak.	HXP 120 V: shutter is closed.	Check that the connecting cables between the HXP 120 V and Axio Scan.Z1 are correctly seated.
	Intensity too low.	Increase the intensity.
	Maximum life of the light guide has been reached.	Replace the light guide. Check the light guide and coupling with the HXP 120 V and Colibri.2 or Axio Scan.Z1.
	HXP 120 V is switched off.	Switch on the light source.
Orca Flash 4.0 camera generates a whistling noise.	The camera is being used outside the specified operating temperature range.	When not using the Axio Scan, ensure the all-pole disconnection of the Orca Flash 4.0 power supply from the mains plug.
		Check that the fan on the rear side (left fan output when viewed from the front) is working. If not, switch off the device and Orca Flash 4.0 and contact ZEISS Customer Service. If the fan is working, check the ambient temperature and the ventilation channels (e.g. distances between wall and Axio Scan.Z1).
Orca Flash 4.0 power supply unit generates a whistling noise.	Power supply unit faulty.	Contact ZEISS Customer Service.

6.3 Changing the lamp module (HXP 120 V)

This section repeats excerpts from the manual for the HXP 120 V. The manual must be consulted for complete information, in particular safety instructions. The lamp module requires no adjustment and can thus be used immediately after lamp replacement.



Caution – Hot surface!

Wait for the lamp surface to cool down.

A cooling-down time of at least 20 minutes should be observed.

- Pull the mains plug (all-pole disconnection from the mains).
- Loosen the screw in the lateral cover plate of the lamp housing and remove the plate.
- Pull the plug on the lamp side.
- Withdraw the thrust bolt by the lever.
- Remove the lamp module.
- Carefully unwrap the new lamp module (000000-0482-730) from the shipping container. The lamp module should only be held by the ceramic part.
- Insert the new lamp module, making sure that the groove in the supporting surface of the lamp sits against the corresponding stud in the lamp holder.



The life of the lamp module can be considerably reduced by incorrect handling. Hold the lamp by the ceramic part and never touch the glass or inside of the reflector. Skin oil is harmful to these parts.

- Restore the plug connections.
- Retension the thrust bolt by the lever.
- Screw the lateral cover plate back onto the housing.
- Insert the mains plug.
- Reset the hour counter to zero.



The homogeneity of the image field must be re-calibrated each time the lamp or light guide is replaced.



The light guide of the HXP 120 V must be replaced at regular intervals. The service life of the light guide is approx. 8,000 hours.

6.4 Replacing the optical fiber



Take care that the light source HXP 120 V is switched off when replacing the optical fiber.

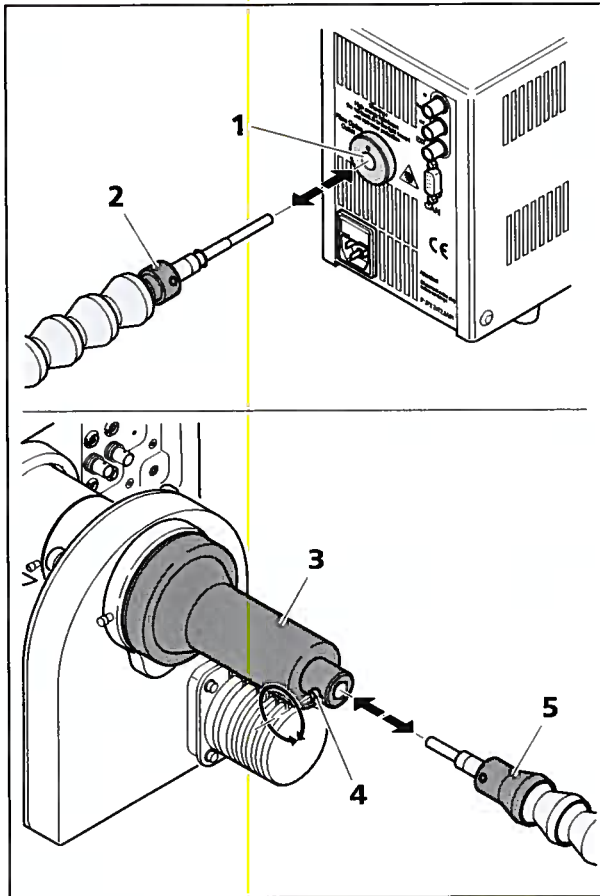


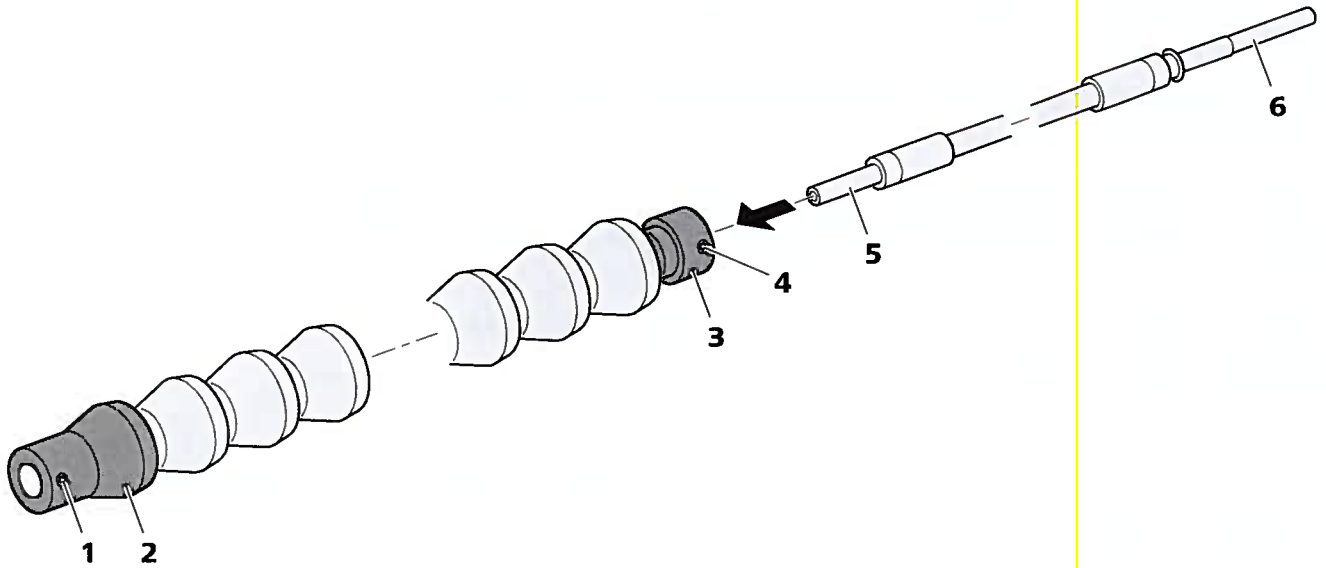
Fig. 6-1 Remove optical fiber (HXP 120 V)

6.4.1 Replacing the optical fiber with optical fiber sheath

6.4.1.1 Procedure for direct coupling

- Switch off the HXP 120.
- Pull the optical fiber end from HXP (Fig. 6-1/1) and loosen the stud screw (wrench size 2) from the endpiece (Fig. 6-1/2) of the sheath.
- Loosen the fixing screw (wrench size 3) (Fig. 6-1/4) at the illumination adapter (Fig. 6-1/3) and pull out the optical fiber.
- Loosen the studs screw (wrench size 2) at the conic endpiece (Fig. 6-1/5) of the sheath.
- Align the sheath with optical fiber **in a straight position**.

- Slowly pull out the optical fiber.



- 1 Stud screw
- 2 Conic sheath endpiece
- 3 Cylindric sheath endpiece
- 4 Stud screw
- 5 Small metal end of optical fiber
- 6 Long metal end of optical fiber

Fig. 6-2 Insert optical fiber into sheath



It is not possible to insert the optical fiber with its wrong end into the sheath as only one end of the optical fiber can be inserted.



Do not remove the red protective caps in order to protect the sensitive surfaces.

- Insert the short metal end of the new optical fiber (Fig. 6-2/5) into the cylindrical end of the sheath (Fig. 6-2/3) slowly rotating it.
- Push the optical fiber through and lead the end of the optical fiber through the conical end of the sheath (Fig. 6-2/2) to the outside.
- Remove the red protective cap. Take care that the stud screws (Fig. 6-2/1 and Fig. 6-2/4) have been loosened.
- Push the short end of the optical fiber into the illumination adapter (Fig. 6-1/3) as far as it will go.
- Fix the optical fiber by tightening the clamp screw (wrench size 3) (Fig. 6-1/4).
- Push the conic end of the sheath (Fig. 6-2/2) until it is directly adjacent to the illumination adapter (Fig. 6-1/3).
- Tighten the stud screw on the endpiece (Fig. 6-1/5).
- Loosen the stud screw (wrench size 2), then remove the protective cap on the other side of the optical fiber.

- Insert the end of the optical fiber (on the cylindrical end of the sheath (Fig. 6-1/2)) into the HXP 120 (Fig. 6-1/1) until you feel the end click into place.
- Move the cylindrical end of the sheath until the end is flush with the HXP 120.
- Tighten the stud screw on the cylindrical end of the sheath. Make sure that the optical fiber does not slide from its stop position.



In order to achieve a homogeneous illumination it is recommended to wind up the optical fiber if possible whereby the bending radius may not fall below the minimum level.



After replacing the optical fiber, the shading correction images for fluorescence scans must be newly created.

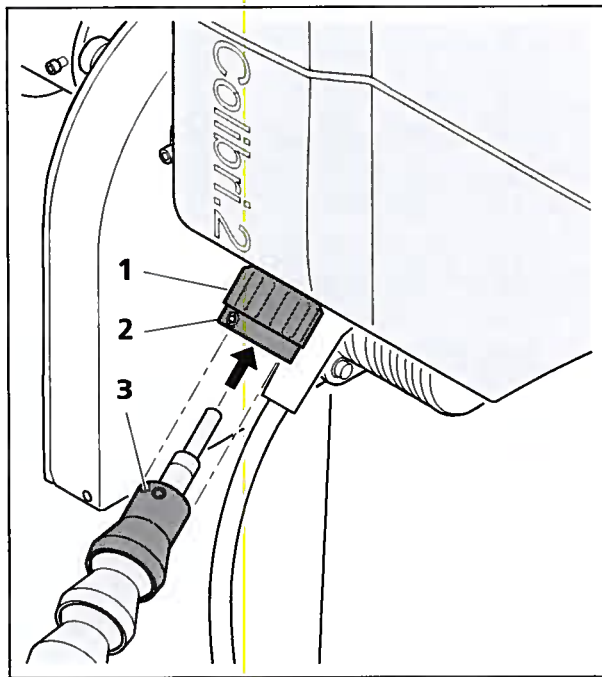


Fig. 6-3 Remove optical fiber (Colibri.2)



It is not possible to insert the optical fiber with its wrong end into the sheath as only one end of the optical fiber can be inserted.



Do not remove the red protective caps in order to protect the sensitive surfaces.

- Insert the short metal end of the optical fiber (Fig. 6-2/5) into the cylindrical end of the sheath (Fig. 6-2/3) slowly rotating it.
- Push the optical fiber through and lead the end of the optical fiber through the conical end of the sheath (Fig. 6-2/2) to the outside.
- Remove the red protective cap. Take care to loosen the cap nut (Fig. 6-3/1) and the stud screw (wrench size 2) (Fig. 6-3/2) (do not remove the cap nut completely).

6.4.1.2 Procedure for coupling via Colibri.2

- Switch off the HXP 120.
- Pull the optical fiber end from HXP (Fig. 6-1/1) and loosen the stud screw (wrench size 2) from the endpiece (Fig. 6-1/2) of the sheath.
- Loosen the stud screw (wrench size 2) (Fig. 6-3/2) of Colibri.2 which is inside the cap nut (Fig. 6-3/1).
- Loosen the cap nut and pull out the conical endpiece of the sheath (Fig. 6-3/3).
- Align the sheath with optical fiber **in a straight position**.
- Slowly pull out the optical fiber and gently insert the new optical fiber as shown in Fig. 6-2.

-
- Push in the shorter end of the optical fiber into the collet chuck on the Colibri.2 unit it stops. It may be necessary to slightly pull on the optical fiber so that more room is available to insert the optical fiber in to the collet chuck.
 - Hold the optical fiber in this position and hand-tighten the cap nut (Fig. 6-3/1) so that the optical fiber is firmly placed in the collet chuck.
 - Insert the conical part of the sheath (Fig. 6-3/3) into the cap nut (Fig. 6-3/1) until it stops.
 - Tighten the stud screw (wrench size 2) (Fig. 6-3/2) which is inside the cap nut (Fig. 6-3/1).
 - Loosen the stud screw (wrench size 2), then remove the protective cap on the other side of the optical fiber.
 - Insert the end of the optical fiber (on the cylindrical end of the sheath (Fig. 6-1/2)) into the HXP 120 (Fig. 6-1/1) until you feel the end click into place.
 - Move the cylindrical end of the sheath until the end is flush with the HXP 120.
 - Tighten the stud screw on the cylindrical end of the sheath. Make sure that the optical fiber does not slide from its stop position.



In order to achieve a homogeneous illumination it is recommended to wind up the optical fiber if possible whereby the bending radius may not fall below the minimum level.



After replacing the optical fiber, the shading correction images for fluorescence scans must be newly created.

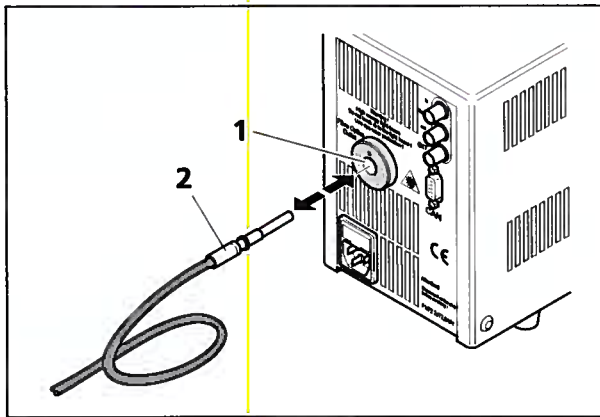


Fig. 6-4 Connect optical fiber (HXP 120 V)

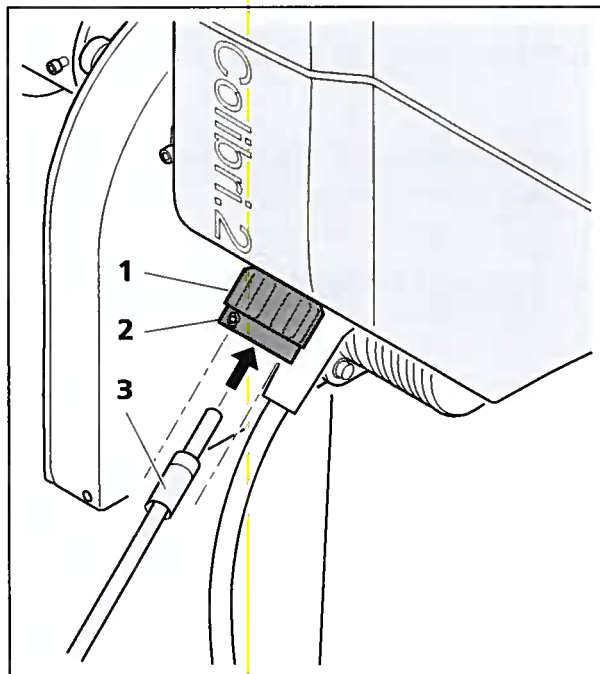


Fig. 6-5 Connect optical fiber to Colibri.2

6.4.2 Replacing the optical fiber without optical fiber sheath

- Insert the longer coupling piece (Fig. 6-4/2) into the HXP 120 V (Fig. 6-4/1), until you feel the metal end click into place.
- The shorter metal coupling will be coupled to the Colibri.2 or directly to the Axio Scan.Z1 in case of direct coupling via a coupling adapter.

Coupling to Colibri.2:

- Loosen the fixing screw (Fig. 6-5/2) and the cap nut (Fig. 6-5/1) and insert the metal end (Fig. 6-5/3) into the collet chuck until it stops.
- Then hand-tighten the cap nut (Fig. 6-5/1) and the fixing screw (Fig. 6-5/2) again.



In order to achieve a homogeneous illumination it is recommended to wind up the optical fiber if possible whereby the bending radius may not fall below the minimum level.



After replacing the optical fiber, the shading correction images for fluorescence scans must be newly created.

Direct coupling via illumination adapter

- Loosen the fixing screw (wrench size 3) (Fig. 6-6/2) on the illumination adapter (Fig. 6-6/1) and insert the metal end (Fig. 6-6/3) gently until it stops.
- Then retighten the fixing screw (Fig. 6-6/2).



In order to achieve a homogeneous illumination it is recommended to wind up the optical fiber if possible whereby the bending radius may not fall below the minimum level.



After replacing the optical fiber, the shading correction images for fluorescence photographs must be newly created.

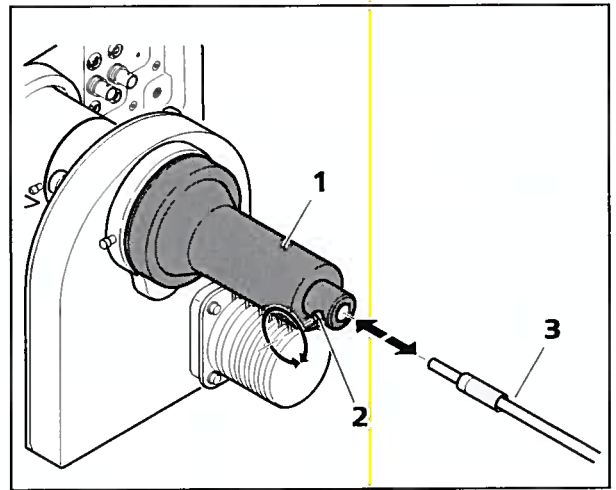


Fig. 6-6 Connect the optical fiber to the illumination adapter

6.5 Transporting the Axio Scan.Z1

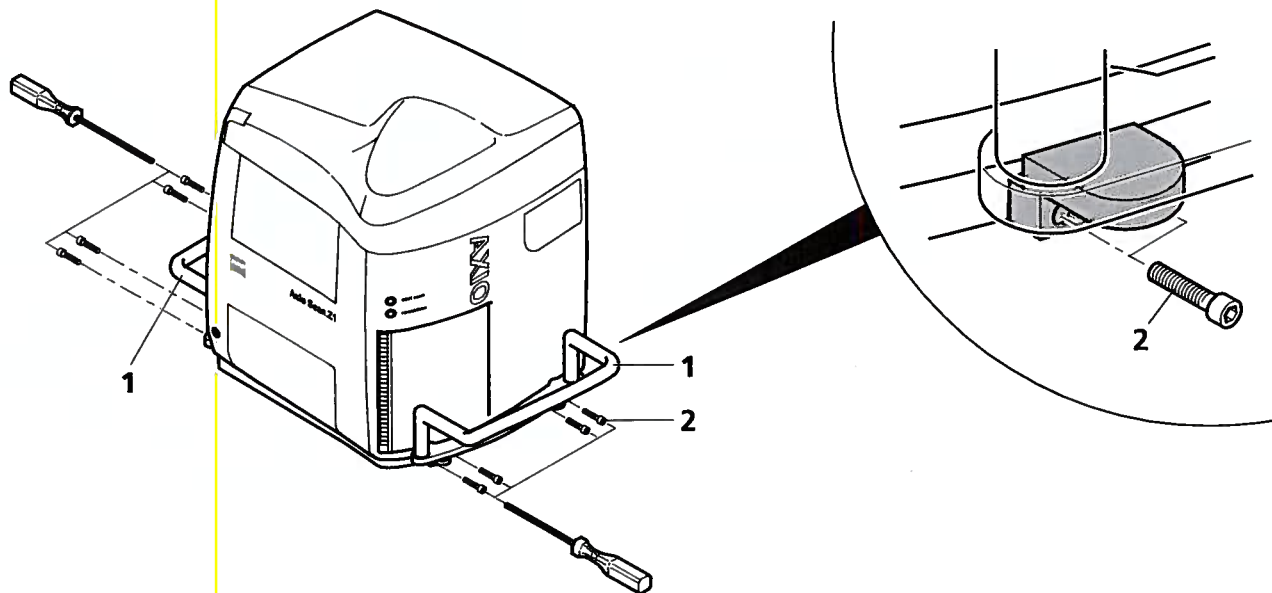


Fig. 6-7 Axio Scan.Z1 transport fixture



Mounted components (e.g. external filter wheel, Colibri.2) or recesses in the device (e.g. open arched door) may not be used to carry the device. Use only the grip handles provided.

The two grip handles (Fig. 6-7/1) must be mounted for transporting the device.

- Switch off the Axio Scan.Z1 and peripheral devices and separate all connections to other external devices (computer, mains power supply and HXP 120 V, if existing).
- Remove the cover caps (4x) from the screw holes.
- Mount a grip handle on the left and right sides of the base of the device using 4 screws (Fig. 6-7/2, Allen key 6 mm).



Risk of accidents! Ensure that the grip handles are properly seated; the screws must be tight.



The Axio Scan.Z1 may only be carried no more than a few meters by four people using the two grip handles.



The device may now be carried by the user for short distances, e.g. within a building (observe maximum legal weight per carrier). For conveying over longer distances contact ZEISS Customer Service.

After transporting the two grip handles must be detached, the cover caps inserted and the peripheral devices reconnected.

6.6 Change reflector modules or filter or beam splitter

If the Axio Scan.Z1 BF FL is equipped with the 10-position reflector turret, the installed reflector modules FL P&C can be changed by the customer. The reflector turret remains in the device.

Reflector modules FL P&C may be fitted with the filter combination by the customer and then inserted into the reflector turret.



The filter wheels may only be mounted or removed when the Axio Scan.Z1 has been switched to **Standby** mode. Failure to observe this precaution can result in the fingers being cut or pinched when the motorized filter wheels move. Electronic components may thereby be damaged.

6.6.1 Changing FL P&C reflector modules on the 10-position reflector turret of the Axio Scan.Z1 BF FL.

6.6.1.1 Remove the cover from the filter area



The cover (Fig. 6-8/2) has an interlock that immediately interrupts all movements as soon as it is removed, i.e. an ongoing digitization process will be aborted and subsequently cannot be resumed.

It should not be possible to start a digitization procedure on the Axio Scan.Z1, i.e. the main status display must be switched off or lit steadily in green.

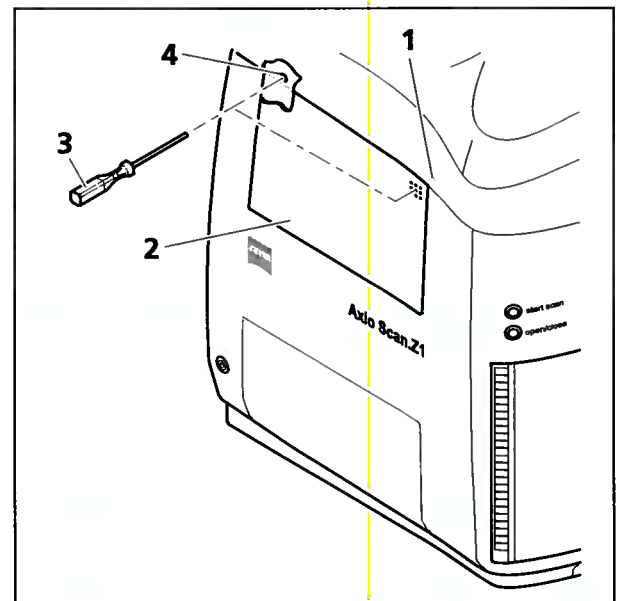


Fig. 6-8 Removing the cover

- Remove the cover from the front of the device (Fig. 6-8).
 - To do this, insert the supplied Allen screwdriver (wrench size 3 mm, Fig. 6-8/3) into the left-hand indentation (Fig. 6-8/4) of the joint between the cover and housing on the front of the device until the catch releases the left side and the cover (Fig. 6-8/2) pops out slightly.
 - Hold the cover with one hand to prevent it from tipping over and falling.
 - Then push the Allen screwdriver into the right indentation (Fig. 6-8/1) until the right side of the cover also pops out.
 - Pull the cover upwards out of the holding slots and remove it.

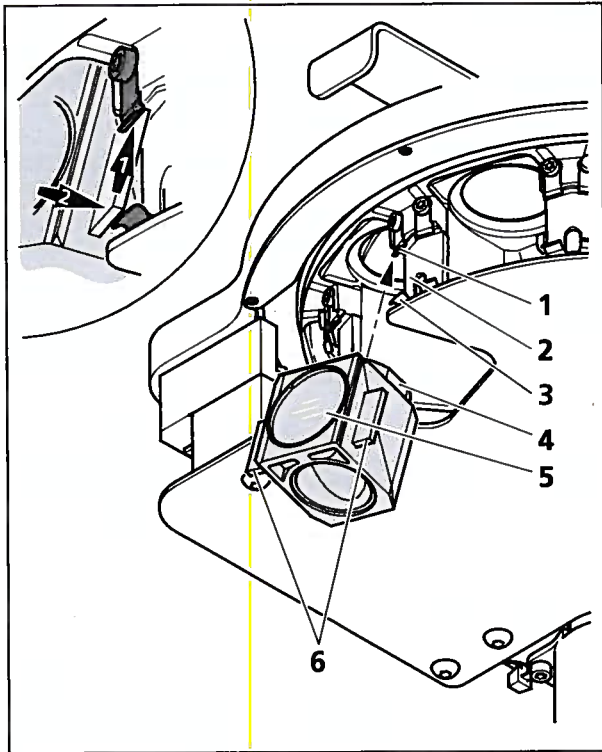


Fig. 6-9 Inserting and removing the FL P&C reflector module

6.6.1.2 Inserting and removing reflector module FL P&C



The use of FL P&C reflector modules with ACR coding is recommended. Position 1 must always remain free to enable brightfield applications to be carried out.

- Swing the reflector turret into the access opening by turning manually to the desired position
- To insert the FL P&C reflector module with the retaining elements mounted on the right and left of the FL P&C reflector module (Fig. 6-9/6) push it at an angle from below into the upper spring clips (Fig. 6-9/1) in the corresponding position (Fig. 6-9/2) of the reflector turret.
- Then press the FL P&C reflector module from below towards the front until it also engages securely in the lower spring clips (Fig. 6-9/3) of the reflector turret.



Filter mounting position: Excitation filter (Fig. 6-9/5); emission filter (Fig. 6-9/4).

- To remove a FL P&C reflector module tilt the module slightly forwards, pull it out of the lower retaining elements and then out of the upper retaining elements.

If the FL P&C reflector modules are equipped with an ACR coding, they will be automatically detected when the device is switched on again.

Reflector modules without ACR coding must be configured after mounting with MicoToolBox (MTB) in the device software.

A new compensation image for fluorescence must be generated, i.e. by calibration process, after each filter change or modification (see Section 6.9.2).

6.6.1.3 Configuring the FL P&C reflector module

The filter sets for the FL P&C reflector module can be individually combined and mounted by the customer. Only fluorescence filters with a free aperture of ≥ 22 mm may be used, as otherwise the image may be cropped. When using third-party filters, ensure that the free diameter is sufficient. Filter sets or fully assembled FL P&C reflector modules can be ordered from ZEISS.

- Remove the FL P&C reflector module (Fig. 6-10/3) from the reflector turret and put it aside.
- Unscrew the retaining ring (Fig. 6-10/1) with the mounting plate (Fig. 6-10/6) included in the tool kit.
- Turn the reflector module over and allow the filter (Fig. 6-10/2 or 5) to drop onto a soft surface.
- Insert the emission filter with Fig. 6-10/2 and excitation filter with Fig. 6-10/5 and secure with the retaining rings (Fig. 6-10/1).

Locking and excitation filters may have an inscription and arrow on the perimeter. The arrow indicates the direction the filter must be inserted into the reflector module; it must always point inwards (see arrows, Fig. 6-10).

To minimize image offset during multi-fluorescence procedures, the emission filter may have an additional marking to indicate the position of the wedge angle.

When inserting the emission filter into the reflector module, the marking must be aligned with the orientation groove (Fig. 6-10/4). This ensures that the wedge angle of the emission filter in the reflector modules used has the same defined position. This compensates for or minimizes the image offset – already small in Zeiss filter sets – between modules.

Should it be necessary to install filters without orientation markings (arrows), the following procedure is recommended:

- Filters with a reflective, dielectric coating must be mounted so that the reflective coating (Fig. 6-11/6) of the excitation filter (Fig. 6-11/5) points outwards (in relation to the reflector module). With the emission filter (Fig. 6-11/1) the reflective coating (Fig. 6-11/2) should point inwards.
- The reflective coating (Fig. 6-11/4) of the beam splitter (Fig. 6-11/3) points downwards when mounted.
- The arrows (Fig. 6-11/7) mark the path of the illumination or imaging beam.

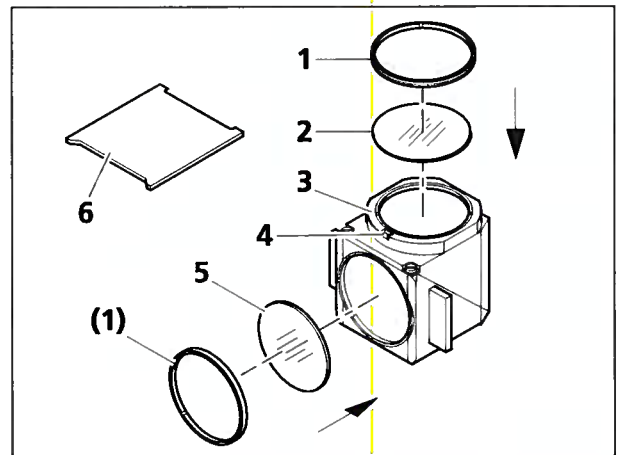


Fig. 6-10 Changing the filter set in the FL P&C reflector module.

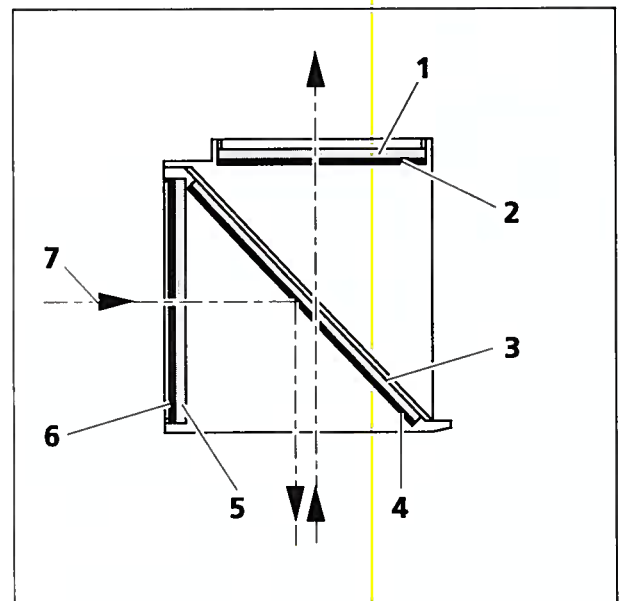


Fig. 6-11 Installing the filters and beam splitter

6.6.1.4 Changing the beam splitter in the FL P&C reflector module



Extreme care must be taken when mounting the filter and beam splitter to avoid damage and contamination of the optical components.

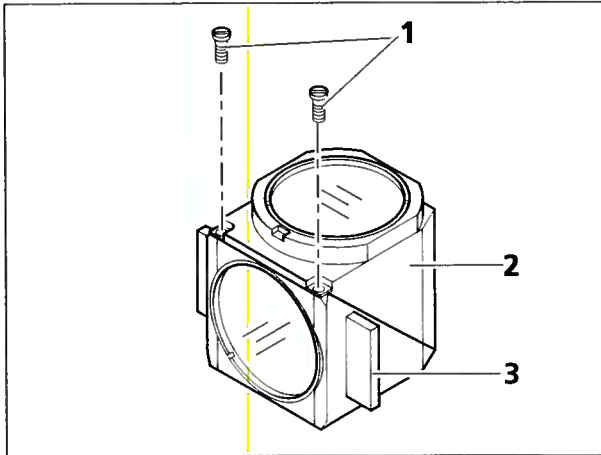


Fig. 6-12 Opening the module

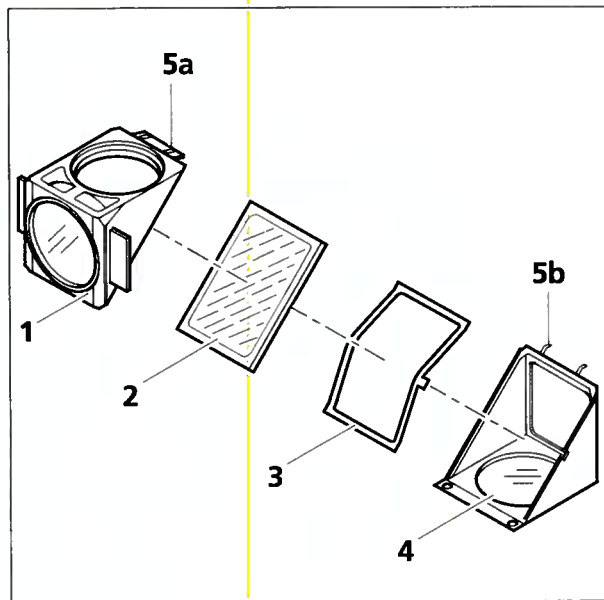



Fig. 6-13 Changing the beam splitter

We recommend ordering ready-equipped FL P&C reflector modules, as changing the beam splitter is a complex process.

Proceed as follows to change the beam splitter.

- Remove the FL P&C reflector module from the reflector turret (see Sections 6.6.1.1 and 6.6.1.2).
- Loosen the two slotted screws (Fig. 6-12/1) with a screwdriver.
- Hold both halves of the reflector module (**emission** half of the module (Fig. 6-12/2) and **excitation** half of the module (Fig. 6-12/3) together, turn against the mounting position and set aside.
- Tilt the upper **excitation** half of the module (Fig. 6-13/1) upwards and lift it out of the retaining elements (Fig. 6-13/5b) of the lower **emission** half of the module (Fig. 6-13/4).
- Remove the beam splitter (Fig. 6-13/2) and spring frame (Fig. 6-13/3) from the lower half of the module.
- Remove the old beam splitter and carefully place the new one on the spring frame (Fig. 6-13/3) with the reflective side pointing up. Place both parts together into the lower half of the module. Make sure that the side lug of the spring frame engages in the corresponding recess of the lower half of the module.

 The reflective (coated) side (Fig. 6-14/3) of the beam splitter has a beveled edge (Fig. 6-14/1) or corner (Fig. 6-14/2).

- Place the **excitation** half of the module (Fig. 6-13/1) onto the **emission** half of the module (Fig. 6-13/4) – retaining elements (Fig. 6-13/5b) and eyelets (Fig. 6-13/5a) interlock. Hold both halves together and turn into the mounting position.
- Replace the slotted screws and tighten.
- Finally, apply the label with the name of the filter combination to the side of the module.

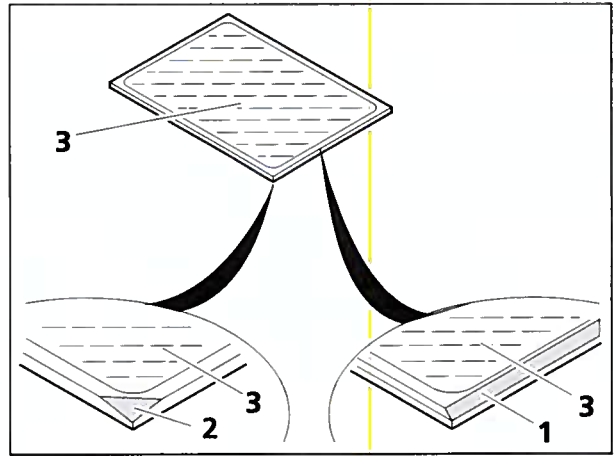


Fig. 6-14 Markings on the beam splitter

6.6.1.5 Attaching the cover to the filter area

- Insert the retaining tabs on the underside of the cover (Fig. 6-8/2) into the holding slots in the housing and press the upper side of the cover onto the housing until the catches on the left and right are securely engaged.
- Switch the HXP 120 V illuminator on again if necessary. In doing so, please note that the HXP 120 V must cool down completely before being switched on again. Its serviceable life may otherwise be compromised.


6.6.2 Changing the beam splitter and emission filter on the 6 pos. filter wheels of the Axio Scan.Z1 BF FL

The beam splitter and emission filter are mounted on two separate filter wheels located in a combined unit. In the mounting position of the combined unit the emission filter wheel is on top.

The filter wheels have 6 positions (position 1 must remain free for brightfield applications). The entire unit must be removed from the device to change the emission filter or beam splitter.

If an HXP 120 V is used an external filter wheel may be additionally installed for the excitation filter (see Sections 3.2.5 and 6.6.3).

 Position 1 must not be assigned to enable brightfield applications to be carried out.

 Note the assignment of the filter wheels (position, filter/beam splitter designation and spectral properties) so that this data can be entered in the software later.

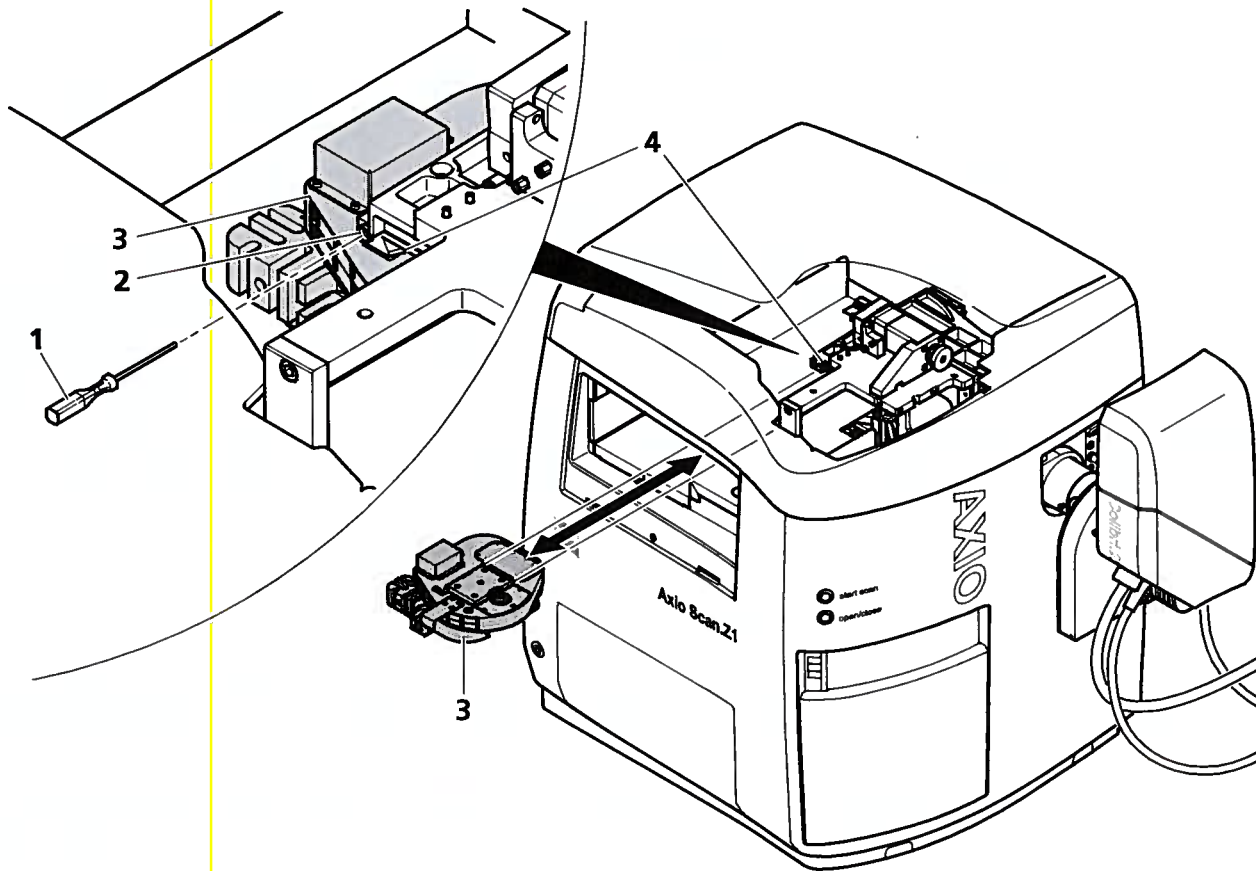


Fig. 6-15 Dismantling the combined unit with beam splitter and emission filter wheel

Proceed as follows when inserting or changing beam splitters or emission filters:



The reflector turret may only be mounted or removed when the Axio Scan.Z1 has been switched to **Standby** mode. Failure to observe this precaution can result in the fingers being cut or pinched when the motorized reflector turret moves.



- Switch the Axio Scan.Z1 to **Standby** mode by pressing the **Standby** ⏻ button and wait until the main status display goes out.
- First of all remove the cover of the filter area (see Section 6.6.1.1).
- Release the clamp screw (Fig. 6-15/2) using an Allen key 3 mm (Fig. 6-15/1) and carefully pull the combined unit (Fig. 6-15/3) out of the dovetail guides (Fig. 6-15/4) towards the front. Use one hand to support the unit from below.
- Deposit the unit on a suitable surface next to the device for mounting.

6.6.2.1 Changing emission filters



Only emission filters with a free aperture of ≥ 22 mm (diameter = 25 mm) may be used.

The emission filter wheel is located in a top mounting position. The 6 positions of the wheel bear the corresponding numbers.

- Remove the three screws (Fig. 6-16/1) from the housing.
- Remove the (Fig. 6-16/2) cover plate.
- Turn the emission filter wheel (Fig. 6-16/3) carefully until it is in the desired position below the installation opening (Fig. 6-16/7).
- Hold the wheel with a finger (Fig. 6-16/4) to stop it turning.
- Remove the retaining ring (Fig. 6-16/5) with mounting plate.
- Suction any existing filter (Fig. 6-16/6) with a filter lifter (Fig. 6-17/1) and remove it.
- Insert a new filter with filter lifter (Fig. 6-17/1) in the filter wheel position (Fig. 6-17/2). Ensure that the filter is seated precisely and not misaligned. The retaining ring cannot otherwise be screwed in completely.
- Screw the retaining ring with mounting plate until it is hand-tight.
- Note the assignment of the filter positions.
- Enter the data of the filters on the labels and affix to the surfaces provided on the respective position.
- Changing the beam splitter and inserting the unit will be explained in the following Section.

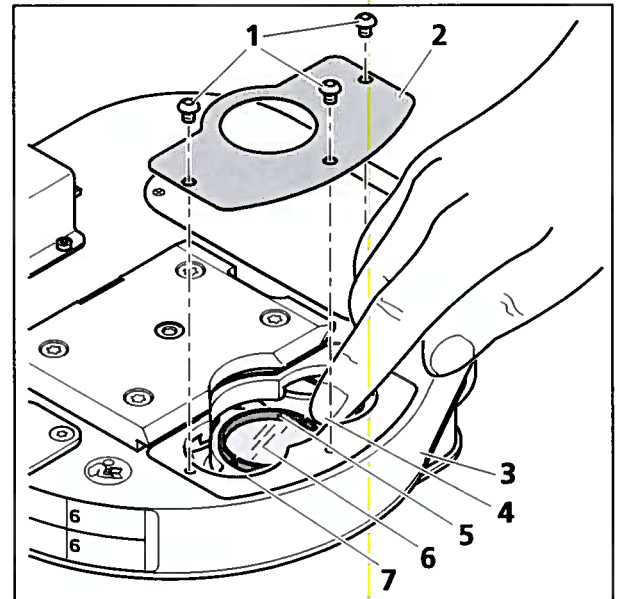


Fig. 6-16 Removing filters

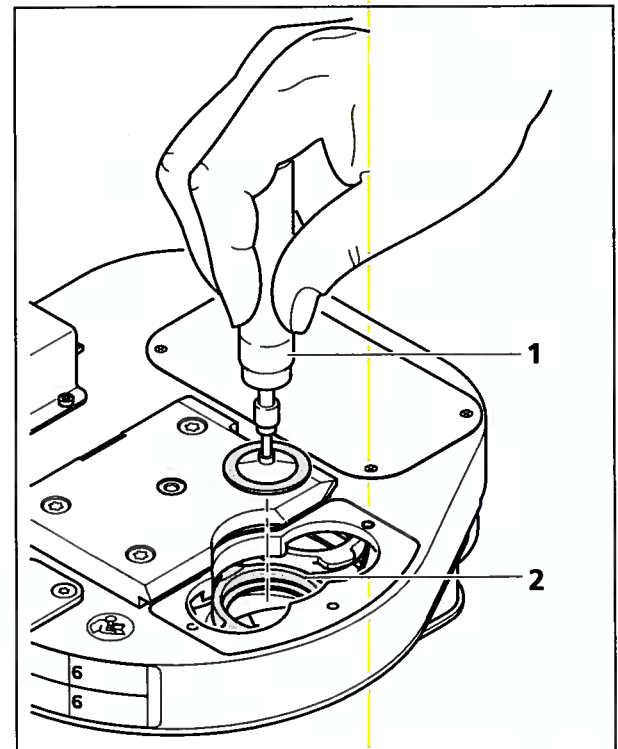


Fig. 6-17 Inserting filters

The emission filter may have an inscription and arrow on the perimeter. The arrow indicates the direction the filter must be inserted into the filter wheel. It must always point inwards. If it is necessary to mount filters that do not carry any directional mark (arrow), it is advisable to follow this procedure:

Filters with a reflective, dielectric coating must be mounted so that the reflective coating of the emission filter points inwards. For further information see Section 6.6.1.3.

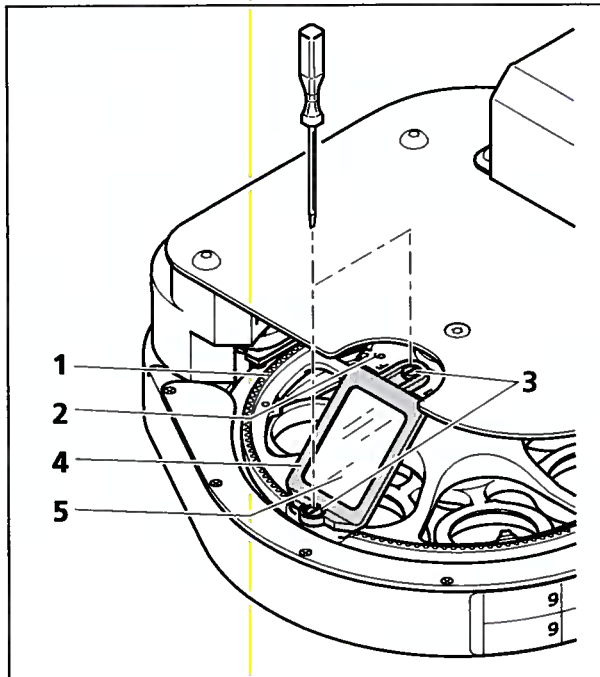


Fig. 6-18 Removing the beam splitter

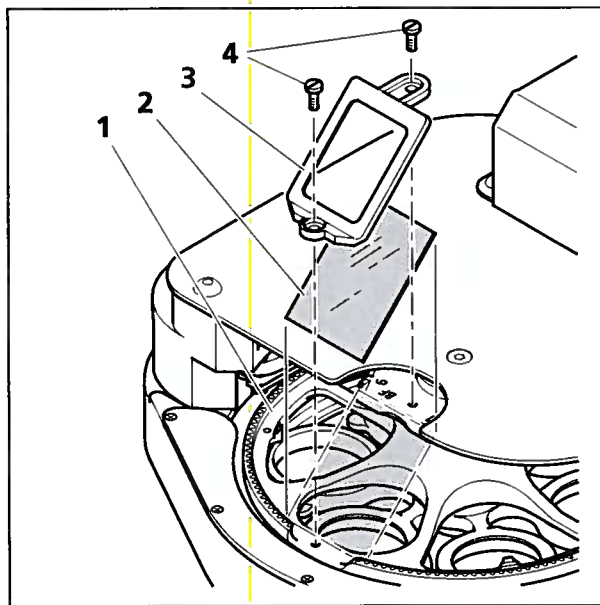


Fig. 6-19 Inserting the beam splitter

6.6.2.2 Changing the beam splitter



The beam splitter wheel is very liable to distortion and must therefore be treated with utmost care.



Only beam splitters sized 26 mm x 36 mm may be used.

The beam splitter wheel is located in a bottom mounting position. The 6 positions of the wheel bear the corresponding numbers.

- Turn the unit so that the beam splitter wheel (Fig. 6-18/1) is at the top.
- Turn the beam splitter wheel carefully until it is in the desired position below the installation opening (Fig. 6-18/2).
- Remove the two screws (Fig. 6-18/3) on the mounting frame (Fig. 6-18/4) using an Allen key 1.5 mm.
- Remove the mounting frame and carefully take out the existing beam splitter (Fig. 6-18/5) if applicable.
- Insert a new beam splitter (Fig. 6-19/2) into the position on the beam splitter wheel (Fig. 6-19/1). Take care not to contaminate the beam splitter. The mirrored side should face outwards (see also Section 6.6.1.4).
- Insert the mounting frame (Fig. 6-19/3) with the spring component.
- Insert the two screws (Fig. 6-19/4) on the mounting frame and tighten.

Enter the data of the beam splitters on the labels and affix to the surfaces provided on the respective beam splitter position.

The reflective layer of the beam splitter should point upward when in its mounting position, i.e. when the unit is turned as seen in Fig. 6-18. For further information see Section 6.6.1.3 and Section 6.6.1.4.

After changing beam splitters or emission filters, re-insert the combined unit into the device:


- Carefully insert the combined unit (Fig. 6-15/2) into the dovetail guides (Fig. 6-15/1) and push in until it engages.




If the combination is not fully pushed in to the back, shadows may be produced in individual images when scanning.

- Tighten the clamp screw (Fig. 6-15/2) with an Allen key 3 mm.
- Replace the cover of the filter area (see Section 6.6.1.5).
- Update the MicroToolBox with the data for the individual emission and beam splitter positions.

6.6.3 Changing excitation filter in the external filter wheel

 Only excitation filters with a free aperture of ≥ 22 mm (diameter = 25 mm) may be used. The filter wheel has position numbers.

 A new compensation image must be generated for fluorescence after each filter change or reconstruction.

Note the assignment of the filter wheel (position, filter/beam splitter designation and spectral properties) so that this data can be entered in the software later.




The external filter wheel has an interlock, i.e. if it is opened all moving parts will stop immediately. In other words, an ongoing digitization process will be aborted and subsequently cannot be resumed; it must be restarted.



The external filter wheel must not be dismantled for changing excitation filters. It is recommended that all mounted light sources be dismantled.

The filter wheel for holding the excitation filter is located on the right-hand side of the Axio Scan.Z1 between the housing and Colibri.2 or, if the latter is not mounted, between the housing and the illumination adapter for the HXP 120 V.

- Wait if necessary until the current digitization process has been completed.
- Switch the HXP 120 V illuminator (if mounted) off.
- Switch the Axio Scan.Z1 to Standby mode by pressing the **Standby**  button and wait until the main status display goes out.

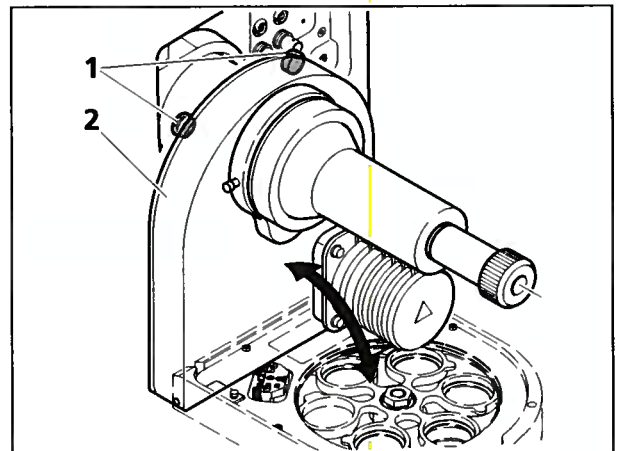


Fig. 6-20 Opening the filter wheel

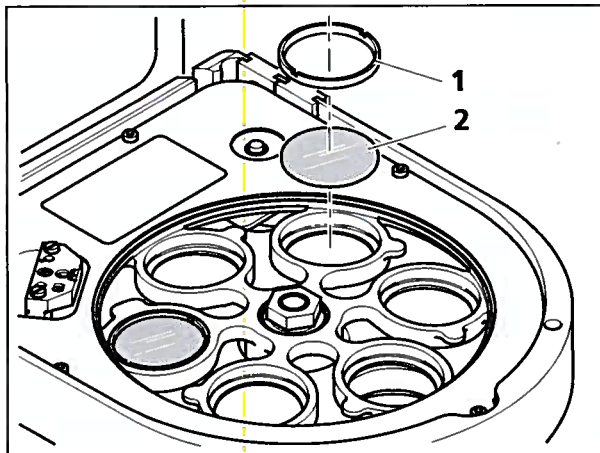


Fig. 6-21 Changing the excitation filter

- Colibri.2 should be dismantled if it is mounted. If HXP 120 V is connected directly, when folding down care should be taken to ensure that the bending radius of the light guide does not fall below the minimum level.
- Loosen the two knurled screws (Fig. 6-20/1) on the filter wheel and fold down the moving part (Fig. 6-20/2).
- Unscrew the retaining ring (Fig. 6-21/1) at the corresponding filter wheel position and remove any existing filter (Fig. 6-21/2) using the filter lifter.
- Insert a new filter and screw in the retaining ring hand-tight.
- Note the assignment of the filter positions.

Excitation filters may have an inscription and arrow on the perimeter. The arrow indicates the direction the filter must be inserted into the filter wheel. It must always point upwards when the filter wheel is folded out.

Should it be necessary to install filters without orientation markings (arrows), the following procedure is recommended. Filters with a reflective, dielectric coating must be mounted so that the reflective coating of the excitation filter points outwards (in relation to the filter wheel). For further information see Section 6.6.1.3.

- Fold up the moving part (Fig. 6-20/2) of the filter wheel again and secure it with the two knurled screws (Fig. 6-20/1).
- Update the MicroToolBox with the data for the individual filter positions.
- Switch the Axio Scan.Z1 to **Standby** ⏻ button and activate the HXP 120 V as necessary.

6.7 Removing and configuring the Colibri.2



The removable upper housing of the Colibri.2 light source has an interlock, i.e. if this cover is opened all moving parts will stop immediately. In other words, an ongoing scanning process will be aborted and subsequently cannot be resumed; it must be restarted.

If a Colibri.2 is mounted on the Axio Scan.Z1 it can be configured and equipped with LEDs according to the user's requirements.

- If a light guide is coupled with the Colibri.2 (when HXP 120 V is used), the former must be removed (see Section 3.2.4)
- In order to dismantle the Colibri.2 (light source) the electronic/electrical connection between the Colibri.2 and Axio Scan.Z1 must be released (see Section 3.2.1.2 on page 30).
- Then loosen the lateral screws on the coupling socket (see Section 3.2.4) while supporting the Colibri.2 with one hand. Now the Colibri.2 can be dismantled.

Consult the operating manual for the Colibri.2 (423052-7144-000) or the corresponding software documentation of ZEN 2012 for instructions on how to insert the LEDs and beam combiner or configuration of the Colibri.2 in the software.

- After configuring the Colibri.2, re-mount it on the Axio Scan.Z1 and connect it up (incl. the light guide).

6.8 Replacing the fuses

- Set the device to **Standby** and switch it off.



Make sure to pull out the mains plug before changing any fuse.

If the device fuses fail the cause must first of all be ascertained and technical problems properly remedied.

The fuse box is located on the rear side of the microscope stand. The fuse holder contains two Type **T 5.0 A/H 250 V, 5 x 20 mm** fuses.

- Remove the fuse holder (Fig. 6-22/2) by pulling it to the front. Use a small screwdriver for the purpose if necessary.
- Remove the fuses from the fuse holder (Fig. 6-22/2) and replace them with new ones.
- Reinsert the fuse carrier into the fuse compartment (Fig. 6-22/1) until it clicks into place.
- Insert the mains plug.

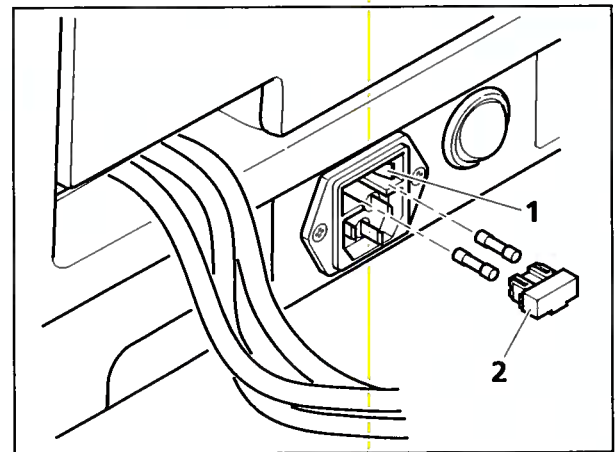


Fig. 6-22 Replacing the fuses

6.9 Settings

6.9.1 Configuration of the filter wheels or reflector turret

All FL P&C reflector modules and filters which can be purchased from ZEISS are normally available in the MicroToolBox.

If special filter sets are required other than those in this extensive list of FL P&C reflector modules and filters, they can be entered in the MicroToolBox (see Section 6.9.1.3) and will subsequently be available in the configuration of the filter wheels or reflector turret (see Sections 6.9.1.1 and 6.9.1.2).

Printed labels for the filter wheels or reflector turret are supplied.

6.9.1.1 Assignment of fluorescence filters to positions in the filter wheels.



In the MicroToolBox (MTB) only the entries for the filters may be changed.

Changing other entries may result in functional impairment or even damage to the device.



If filter wheels are part of the device configuration, the filters mounted in the filter wheels must be entered accordingly.

This can be performed using the MicroToolBox (MTB):

- Double-click the program symbol **MTB2011 Configuration** on the desktop.
- Alternatively, launch the program with: **Start / Programs / Carl Zeiss / MTB 2011 – 2.x.x.x / MTB2011 Configuration.**

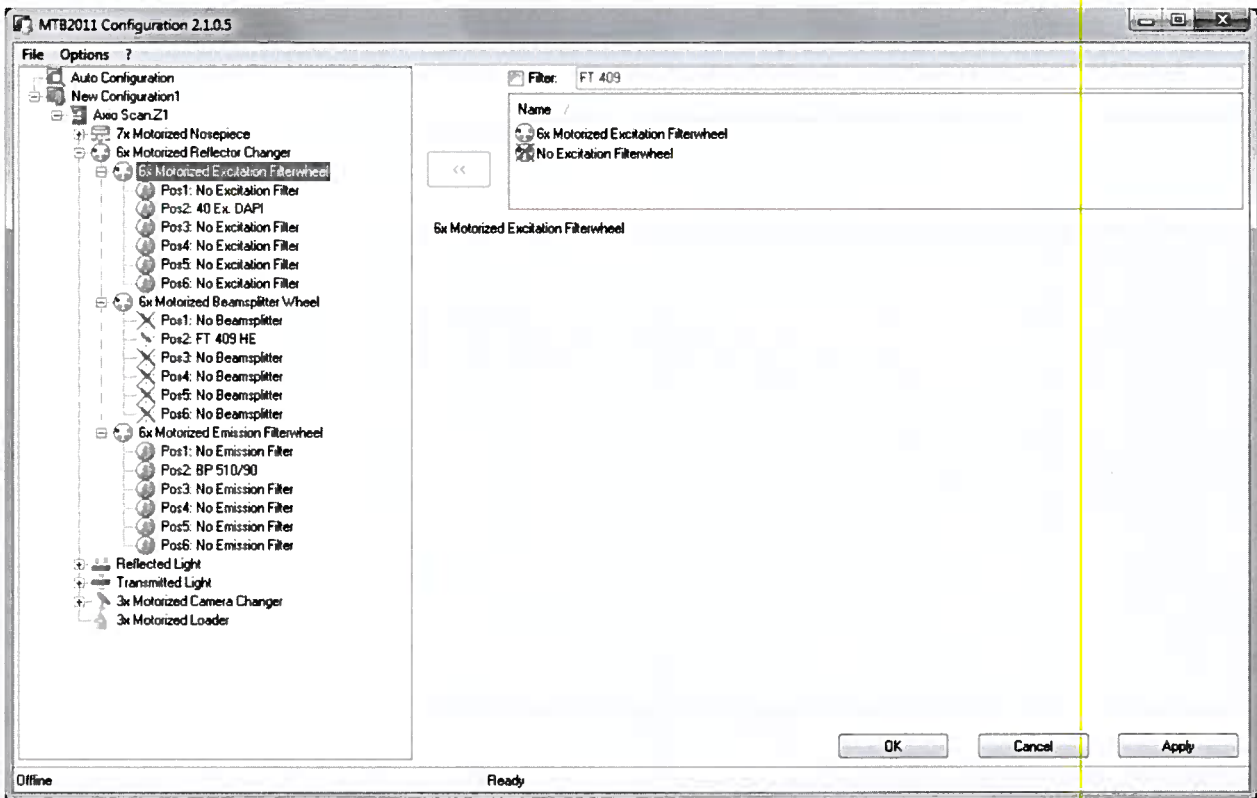


Fig.6-23 MicroToolBox - 6x motorized reflector changer

- In the window that now appears select the **6x motorized reflector changer** folder under **Axio Scan.Z1**.

Depending on the configuration either two elements (**6x motorized beam splitter wheel/6x motorized emission filter wheel**) or three elements (**6x motorized excitation filter wheel/6x motorized beam splitter wheel/6x motorized emission filter wheel**) will be displayed.

- The corresponding element must now be selected to display the 6 entries for filter position.

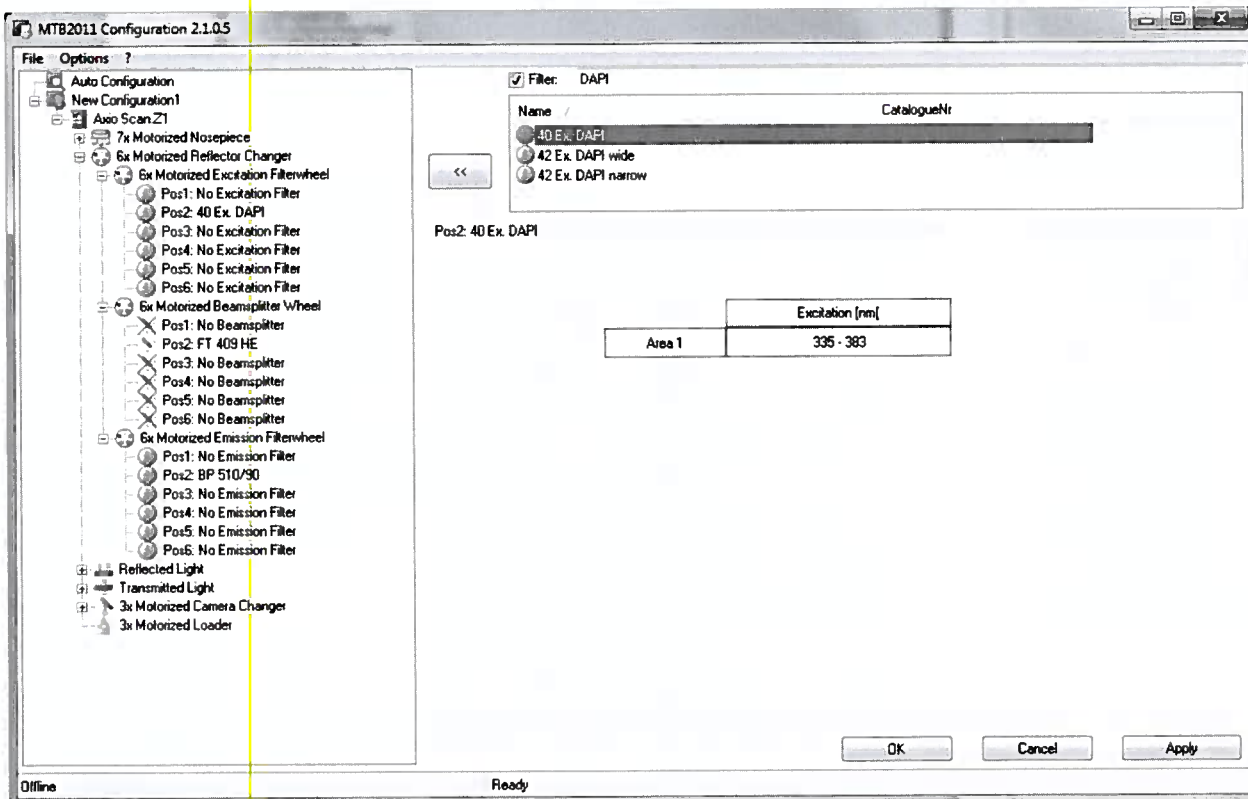


Fig. 6-24 MicroToolBox filter

- To do this, highlight the corresponding position (2 to 6) in the left section of the window.



Position 1 must always be set to the entered value (e.g. **Transm.**) to enable brightfield applications to be carried out. This is a factory setting which should not be changed.

- Under **Name** the filter or beam splitter can now be selected using a selection box, or alternatively a character string can be entered in the **Filter** field and only the filters or beam splitters containing this character string will be displayed. If this function of the filter is to be used, ensure that the **Filter** checkbox is activated, otherwise the complete list will be displayed.
- After selecting the correct filter or beam splitter, the selected filter or the selected beam splitter for the selected filter wheel position is saved with a mouse click on the << button.
- The spectral properties of this filter or beam splitter are then displayed in the lower right-hand section of the window.
- This procedure can be repeated for other filter wheels or beam splitters.
- The entries can be saved on the hard disk by clicking on the **Apply** button. To write any changes into the hardware, the master entry must be accessed (here: **New Configuration1**). Click on the **Write Configuration to Hardware** button, then the MTB can be closed.

6.9.1.2 Assignment of fluorescence filters to positions in the 10x reflector turret (FL P&C reflector modules without ACR)



In the MicroToolBox (MTB) only the entries for the filters may be changed.

Changing other entries may result in functional impairment or even damage to the device.

Insofar as the FL P&C reflector modules are equipped with automatic component recognition ACR (applies only to the 10x reflector turret), these do not need to be entered since they will be automatically inserted in the configuration.

If reflector modules without ACR are mounted in the reflector turret, these must be entered accordingly. This is done using the MicroToolBox (MTB):



- Double-click the program symbol **MTB2011 Configuration** on the desktop.
- Alternatively, launch the program with: **Start / Programs / Carl Zeiss / MTB 2011 – 2.x.x.x / MTB2011 Configuration**.

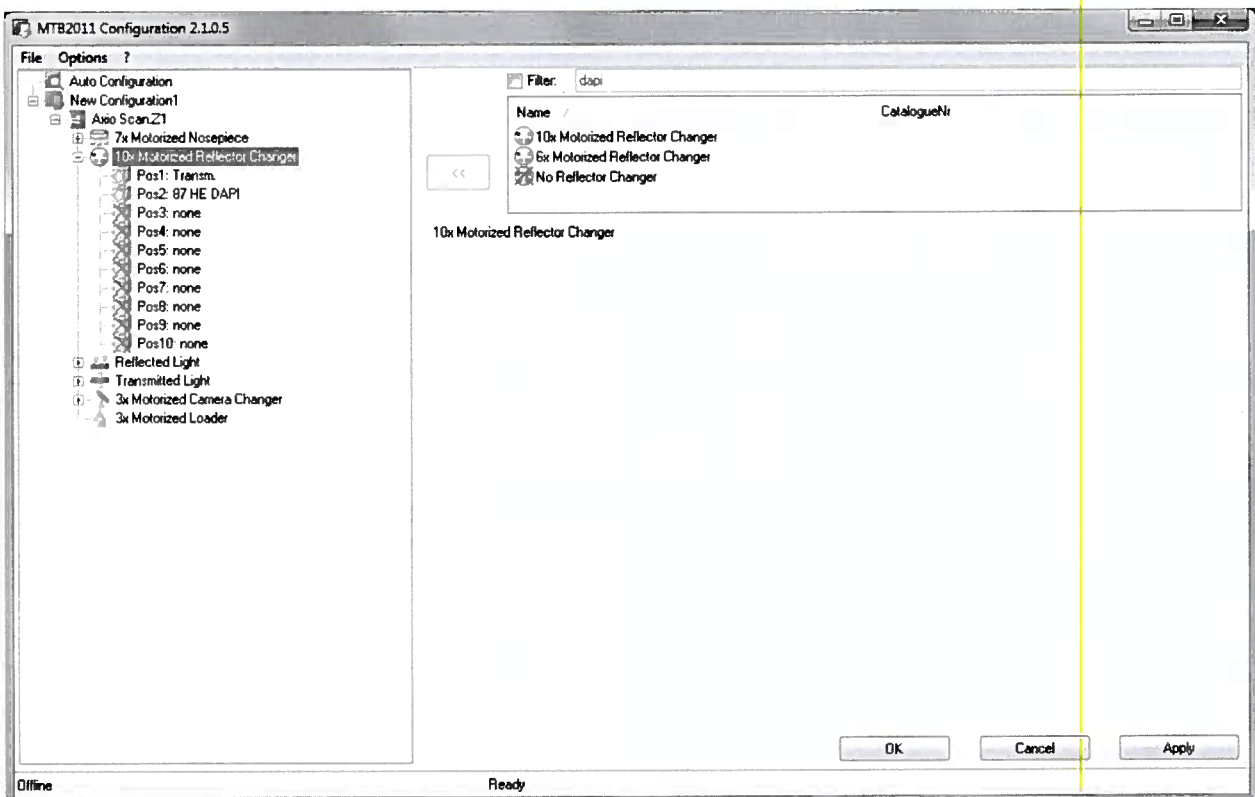



Fig.6-25 MicroToolBox - 10x motorized reflector changer

- In the window that now appears select the item **10x motorized reflector changer** under **Axio Scan.Z1**. Ten entries will be displayed.

-
- An FL P&C reflector module can be assigned to each of the positions 2 to 10.
 -  Position 1 must always be set to **Transm.** to enable brightfield applications to be carried out. This is a factory setting which should not be changed.
 - To do this, highlight the corresponding position in the left section of the window.
 - Under **Name** the filter configuration of the reflector module can now be selected using a selection box, or alternatively a character string can be entered in the **Filter** field and only the filters containing this character string will be displayed. If this function of the filter is to be used, ensure that the Filter checkbox is activated, otherwise the complete list will be displayed. This search applies to the actual name of the filter and its order number.
 - The selected reflector module filter configuration for the desired position in the reflector turret can be entered with a mouse click on the << button.
 - The spectral properties of this reflector module filter configuration are then displayed in the lower right-hand section of the window.
 - This procedure can be repeated for other filter positions.
 - Entries can be saved on the hard disk by clicking on the **Apply** button. To write any changes into the hardware, the master entry must be accessed (here: **New Configuration1**). Click on the **Write Configuration to Hardware** button, then the MTB can be closed.

6.9.1.3 Definition of fluorescence filters in the MicroToolBox



In the MicroToolBox (MTB) only the entries for the filters may be changed.

Changing other entries may result in functional impairment or even damage to the device.

6.9.1.3.1 Definition of FL P&C reflector modules (10x reflector revolver)

- Double-click the program symbol **MTB2011 Configuration** on the desktop.
- Alternatively, launch the program with: **Start / Programs / Carl Zeiss / MTB 2011 – 2.x.x.x / MTB2011 Configuration**.
- In the window under **Options** select **Custom Filter Set Specifications**.



	Excitation [nm]	Beamsplitter [nm]	Emission [nm]	Long Pass
Area 1	415 - 455	510	578 - 592	<input type="checkbox"/>
Area 2	-		-	<input type="checkbox"/>
Area 3	-		-	<input type="checkbox"/>
Area 4	-		-	<input type="checkbox"/>

Fig. 6-26 MicroToolBox - Options / Custom filter set specifications

- Click the mouse on the **New** button.
- Under **Name** enter a name for the FL P&C reflector module. The FL P&C reflector module will subsequently be displayed under this name in the ZEN slidescan software. In addition a **ShortName1** and **ShortName2** can be assigned.
- The spectral properties of the optical elements (excitation filter, beam splitter and emission filter) in the FL P&C reflector module are now displayed under **Area 1** (see above example for the QDot 585 filter set).

- If a filter set with double, triple or quadruple filters is being used, this spectral data will be entered under **Area2** to **Area4**.



Care must be taken to ensure that the spectral data is entered as accurately as possible, as it is evaluated by several functions of the ZEN slidescan control software (e.g. Smart Setup).



If a long pass filter is being used as an emission filter, the **Long Pass** selection box must be activated.



6.9.1.3.2 Definition of emission, excitation and beam splitters (6x filter wheels)

6.9.1.3.2.1 Definition of emission and excitation filters

- Double-click the program symbol **MTB2011 Configuration** on the desktop.
- Alternatively, launch the program with: **Start / Programs / Carl Zeiss / MTB 2011 – 2.x.x.x / MTB2011 Configuration**.
- Under **Options** now select **Custom excitation and emission filter specification**.
- Select the filter type (excitation or emission filter) under **Filter Type**.
- Click the mouse on the **New** button.

Custom Excitation and Emission Filter Specification

Filter Type:

Filter:

Filter Data


Name:

	Excitation [nm]		Long Pass
Area 1	415	- 455	<input type="checkbox"/>
Area 2		-	<input type="checkbox"/>
Area 3		-	<input type="checkbox"/>
Area 4		-	<input type="checkbox"/>

Fig.6-27 MicroToolBox - Options/Custom excitation and emission filter specification

- Under **Name** enter the name of the new filter.
- The spectral properties of the filter are entered under **Area 1** (see above example for a 435/40 filter for QDot 585). In case of a filter with multiple transmission maximums, these are specified in **Area 2** to **4**.

 Care must be taken to ensure that the spectral data is entered as accurately as possible, as it is evaluated by several functions of the control software.

 If a long pass filter is being used as an emission filter, the **Long Pass** selection box must be activated.

- The entry will be saved by clicking on **OK** and is now available for configuring the filter wheels.

6.9.1.3.2.2 Definition of beam splitters

- Double-click the program symbol **MTB2011 Configuration** on the desktop.
- Alternatively, launch the program with: **Start / Programs / Carl Zeiss / MTB 2011 – 2.x.x.x / MTB2011 Configuration**.
- In the window under **Options** select **Custom Beamsplitter Specification**.
- Click the mouse on the **New** button.

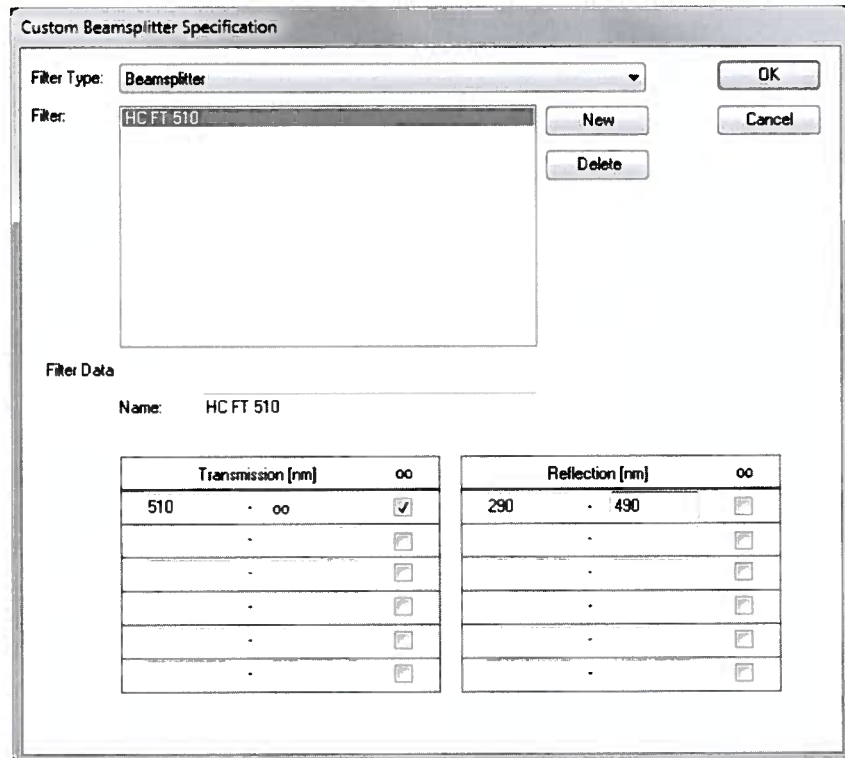


Fig. 6-28 MicroToolBox - Options / Custom Beamsplitter Specification

-
- Under **Name** enter the name of the new beam splitter.
 - The spectral properties of the beam splitter are now displayed in the first line of the lower table (see above example for the BS 510 beam splitter). In case of a beam splitter with multiple maximums, these are specified in the following lines.



Care must be taken to ensure that the spectral data is entered as accurately as possible, as it is evaluated by several functions of the control software.

- The entry will be saved by clicking on **OK** and is now available for configuring the filter wheels.

6.9.2 Calibration

6.9.2.1 Calibration and test specimens

6.9.2.1.1 Brightfield specimen set (474032-9010-000)

This specimen set consists of several slides. On one of the slides, a 5 µm thick tissue cross-section of rat kidney, stained with hemalaun-eosin. The purpose of this specimen is to monitor the calibration process. It serves as a comparison specimen over the life cycle of the device.



Even though the ageing of hemalaun-eosin specimens is minimal, care should be taken to ensure that these specimens are not exposed to intensive sunlight or high temperatures for extended periods.



The specimen should be clean, i.e. free of fingerprints, dust or other particles which could compromise the quality of the exposure. This should be checked prior to use. The specimen should be provided with a coverslip to enable it to be cleaned like a normal specimen.

6.9.2.1.2 Color calibration slide for (474029-9041-000)

The calibration slide for color is for calibrating color reproducibility over the life cycle of the device. This slide contains a matrix localized with various colors as well as patterns for different grey tones. These colors have been calibrated by the manufacturer and listed in a table. During calibration individual color zones are classified and the resulting values aligned to the measured values. These are used to create a correction matrix which is specific for each device. The calibration is performed automatically by a software-supported assistant which guides through the calibration routine (pay attention to instructions during the routine).

If increased demands are placed on color reproducibility, it is recommended that the calibration be repeated monthly.



Preservation of color fidelity is very important for this calibration slide. It should therefore not be exposed to constant strong sunlight and stored in a dry, dark place when not in use. (For storage instructions also see packaging)



The specimen should be clean, i.e. free of fingerprints, dust or other particles which could compromise the quality of the exposure. This should be checked prior to use. The specimen should be provided with a coverslip to enable it to be cleaned like a normal specimen.

6.9.2.1.3 Calibration slide for geometric calibration (474029-9030-000)

The geometric calibration of the Axio Scan.Z1 is carried out automatically with this slide. Calibration is performed by a software-supported assistant which guides through the calibration routine (pay attention to instructions during the routine). Geometric calibration includes scaling, parfocality, parcentricity, camera alignment (camera must be realigned if a pre-set angle is exceeded; contact ZEISS Customer Service).

It is recommended that the calibration be repeated monthly, or if image quality (e.g. focusing) is unsatisfactory.

In the event that the image quality is still not satisfactory after calibration, contact ZEISS Customer Service.



The specimen should be clean, i.e. free of fingerprints, dust or other particles which could compromise the quality of the exposure. This should be checked prior to use. The specimen should be provided with a coverslip to enable it to be cleaned like a normal specimen.

6.9.2.1.4 Calibration slide for fluorescence (474029-9080-000)

The calibration slide serves as a basis for determining the flattening of the illumination for fluorescence applications.

The specimen calibration slide fluorescence for thin specimens 26 x 76 mm, D = 0.17 (474029-9080-000) consists of a thin polymer layer in which different dyes have been embedded evenly.



This is the recommended specimen that should be used primarily for shading correction in fluorescence!

The following dyes are embedded in the polymer layer: Coumarin 2 (C 450), Coumarin 545, Rhodamin 6G Perchl., Rhodamin 101 (Rhod.640), Oxazin4 (LD 690 Perchl.), Nile blue Perchl. and Rhodamin 800 (LD 800).



The calibration slide fluorescence for thin specimens 26 x 76 mm D = 0.17 (474029-9060-000) with integrated specimen should not be exposed to strong sunlight.



The specimens should be clean, i.e. free of fingerprints, dust or other particles which could compromise the quality of the exposure. This should be checked prior to use.

The calibration slide fluorescence for thin specimens 26 x 76mm, D = 0.17 (474029-9080-000) is not provided with a cover slip and should be cleaned with extreme caution without scratching the sensitive polymer layer, i.e. clean it with a soft, lint-free cloth which is slightly moistened.

6.9.2.2 Calibration routines

The different calibration routines are software-supported. For this purpose the user must insert the calibration slides and start the software assistant for the calibration routines (Axio Scan Calibration under Tools in the main menu bar). He/she will then be guided through the calibration process. The instructions displayed during this process must be followed.



Incorrectly performed calibration processes may produce unsatisfactory digitization results. For this reason the calibration process or its routines must be used with great care.

Once calibration has been completed it is recommended that the test specimen H&E section (from set 474032-9010-000) be digitized and compared with previous scans of this specimen in order to conclusively verify the quality of the results of the calibration routines on the basis of the tissue cross-section.

6.9.3 In the event of power failure

In the event of a power failure cutting electricity to the system, control computer and monitor it is recommended that the Axio Scan.Z1 be disconnected from the circuit by the on/off switch (Fig. 3-2/1) and work be discontinued until the power supply has been restored.

When the power supply has been restored, the computer should be booted up and the Axio Scan.Z1 switched on again (Fig. 3-2/1).

If problems occur during initialization to the effect that the operating mode is not reached (i.e. main status display does not change to green), ZEISS Customer Service must be contacted.

Once the device has been initialized, the software must be relaunched. Any instructions pertaining to the software must be followed.



If the specimens are required elsewhere during a power failure (e.g. for manual assessment) the arched door can be opened by hand, applying only slight force. Once the arched door has been opened, the compartments can be swiveled out and the mounting frames removed.

In the event that the arched door cannot be opened without applying greater force, the magazine is not in the correct position. If it is nevertheless imperative that the specimens be reached, ZEISS Customer Service must be contacted.



Should frequent power failures be foreseeable and continuous operation is essential, the use of an uninterruptible power supply is recommended!

6.10 Requesting service

Repairs of mechanical, optical or electronic components inside the device and work on the device electronics, excepting tasks described in the operating manual, may only be performed by ZEISS service staff or specially **authorized** personnel.

To ensure optimum setting and trouble-free functioning of your Axio Scan.Z1 over a longer period of time, we recommend that you enter into a service/maintenance agreement with ZEISS.

For subsequent orders or when service is required, please get in touch with your local ZEISS representative.

Further information can be found in the Internet at:

www.zeiss.com/microscopy

7 ANNEX

7.1 List of abbreviations

AC	Alternating current
ACR	Automatic component recognition
B, BF	Brightfield
CSA	Canadian Standards Association
D	Coverslip thickness
d	Diameter (e.g. filter)
DIN	Deutsches Institut für Normung (German Standards Institute)
EC	European Community
EMC	Electromagnetic compatibility
EN	Euronorm (Euro standard)
FL	Fluorescence (here in the sense of reflected light fluorescence)
ICS	Infinity Color-Corrected System
IEC	International Electrotechnical Commission
IP	Internal protection (through housing)
ISO	International Organization for Standardization
IvD	In vitro diagnostics
LED	Light emitting diode
MTB	Micro Tool Box
PL	Plan
P&C	Push&Click
RL	Reflected light
RoHS	Restriction of hazardous substances
TL	Transmitted light
UL	Underwriter Laboratories
UV	Ultraviolet
VDE	Verband Deutscher Elektrotechniker (Association of German Electrical Engineers)
VIS	Visible
WEEE	Waste electrical and electronic equipment

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