

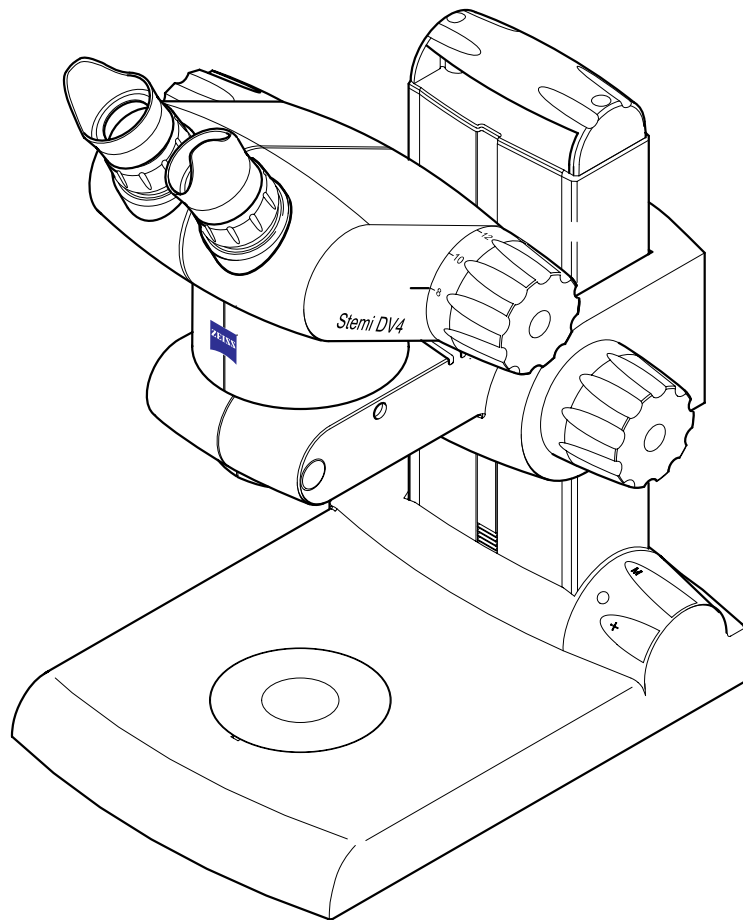
# Stereomicroscopes

**Stemi DV4**

**Stemi DV4 SPOT**

**Stemi DR 1040**

**Stemi DR 1663**



Operating Instructions



Knowledge of this manual is required for the operation of the instrument. Would you please therefore make yourself familiar with the contents of this manual and pay special attention to hints concerning the safe operation of the instrument.

The specifications are subject to change; the operating manual is not covered by an update service.

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Carl Zeiss

Stemi DV4 / DR

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EC Declaration of Conformity

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## 1 INTRODUCTION

### 1.1 General notes

**NOTE:** In this manual, Stemi DV4 / DR always stands for Stemi DV4, Stemi DV4 SPOT, Stemi DR 1040 and Stemi DR 1663.

The stereomicroscopes Stemi DV4 / DR were designed, produced and tested in compliance with DIN 61010-1 (IEC 1010-1), Safety requirements for electrical measuring, control and laboratory instruments, and meet the requirements of appendix I of directive 73/23/EC.

The instruments meet the requirements of the EC directive 89/336/EC and the EMC legislation of November 9th 1992. This operation manual includes information and warnings which must be observed by the user.

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

**NOTE**

*This symbol is a warning which you must observe under all circumstances.*

**CAUTION**

*This symbol is a warning which indicates a hazard to the instrument or instrument system.*

**CAUTION**

*This symbol is a warning which indicates a hazard to the user of the instrument.*

**CAUTION**

*Disconnect the instrument from the line before opening it!*

## 1.2 Notes on instrument safety



The Stereomicroscopes Stemi DV4 / DR, including original accessories, may only be used for the applications described in this manual. The manufacturer cannot assume any liability for any other applications, possibly also involving individual modules or single parts. This also applies to all service or repair work which is not carried out by authorized service personnel. Furthermore, this forfeits all the claims against warranty



Always disconnect the power unit from the line before exchanging lamps!



Turning the two zoom/focusing knobs in opposite directions by applying force will result in the stereomicroscope being damaged.



Dust and dirt can impair the performance of the instrument. Therefore, the instrument must be protected against these influences as far as possible, and covered with the dust cover if it is not used for longer periods of time.

## 1.3 Notes on warranty

The manufacturer guarantees that the instrument has no material and production defects when delivered. You must inform us of any defects immediately and we must do anything to minimize the damage. If the manufacturer is informed of such a defect, he is obliged to remove it; it is his decision whether he does this by repairing the instrument or by delivering an instrument free of any defect. No guarantee is provided for defects caused by natural wear (this concerns wearing parts in particular) and improper use.

The instrument manufacturer is not liable for damage caused by faulty operation, negligence or any other meddling with the instrument, particularly the removal or replacement of instrument components, or the use of accessories from other manufacturers. This forfeits all the claims against warranty.

With the exception of the work specified in this manual, no maintenance or repair of the microscopes may be performed. Repairs may only be performed by Carl Zeiss service staff or specially authorized personnel. Should any defect occur with the instrument, please get in touch with the Carl Zeiss microscopy service in Germany or your local Zeiss agency.



## 1.4 General use of stereomicroscopes

The stereomicroscopes Stemi DV4 / DR are Greenough-type microscopes mainly designed for versatile hobby and training applications and for routine work in biology, medicine and industry.

The name DV4 stands for Double Lens Vario with the zoom factor 4. The zoom range of 4:1 corresponds to the overall magnification range of 8x to 32x (basic version).

The zoom magnification changer guarantees high-contrast, sharp images over the entire zoom range. After the basic setting of the stereomicroscope, the image remains exactly in focus.

The name DR stands for Double Lens Revolver and means that these stereomicroscopes use two fixed magnifications which can be switched discretely. Stemi DR 1040 with overall magnifications 10x and 40x, Stemi DR 1663 with 16x and 63x (basic configuration).

Their compact design makes the stereomicroscopes Stemi DV4 / DR ready for immediate use and very easy to operate. Depending on requirements, these microscopes can be converted and upgraded in accordance with the modular system of Zeiss stereomicroscopes.

Interchangeable optics components permit the magnification range to be varied as required.

Modern illumination equipment for reflected and transmitted light is integrated in stand C. As a standard feature, the press of a key is sufficient for the selection of:

- brightfield illumination in reflected light
- brightfield illumination in transmitted light
- brightfield illumination in mixed light

And optional:

- darkfield illumination in transmitted light

The illumination intensity can be set continuously and electronically at the press of a button for each illumination type and can therefore be matched to most different objects.

Suitable eyepiece adapters are available for image documentation using:

- the SONY cameras "Digital Handycam DCR-PC100", "Digital Still Camera Cybershot DSC-F505" and "Digital Still Camera Cybershot DSC- S70"
- 35 mm SLR cameras
- still/video and video cameras with C-mount connector
- video cameras for insertion in the eyepiece, e.g. from L.O.T.-Oriel GmbH; SCI-EYE, Inc.
- microhead video cameras (head diameter: 17 mm) in the JAI-M2200 series



The adaptation of other digital cameras with M37 or M52 objective / filter thread must be tested, as described in section 3.2.3.2, page 3-12!



## 2 DESCRIPTION:

### 2.1 Stemi DV4 / DR product family

The product family of Stemi DV4 / DR stereomicroscopes includes the following four microscope bodies:

- Stemi DV4
- Stemi DV4 SPOT
- Stemi DR1040
- Stemi DR1663

The Stemis DV4, DR 1040 and DR 1063 are mainly intended for use with stand C and its accessories (compact version). Of course, use within the Zeiss Stemi modular system is also possible.

The Stemi DV4 SPOT has mainly been designed for use in the Zeiss Stemi modular system. It has therefore been equipped with a direct connection facility for the Schott KL 200 cold-light source via light guides. Of course, the Stemi DV4 SPOT can also be used with stand C. However, this is barely useful, since stand C is already equipped with reflected-light illumination.

The four microscope bodies differ in the following features:

#### Stemi DV4

- Continuous magnification settings from 8x for an overall view to 32x for object details via change knob (without interchangeable optical components)

#### Stemi DV4 SPOT

- Continuous magnification settings from 8x for an overall view to 32x for object details via change knob (without interchangeable optical components)
- Integrated SPOT illuminator for coaxial reflected light with connector for Schott KL 200 cold-light source.

#### Stemi DR 1040

- Magnification setting to 10x for an overall view or 40x for details via change knob (without interchangeable optical components).

#### Stemi DR 1663

- Magnification setting to 16x for an overall view or 63x for details via change knob (without interchangeable optical components).

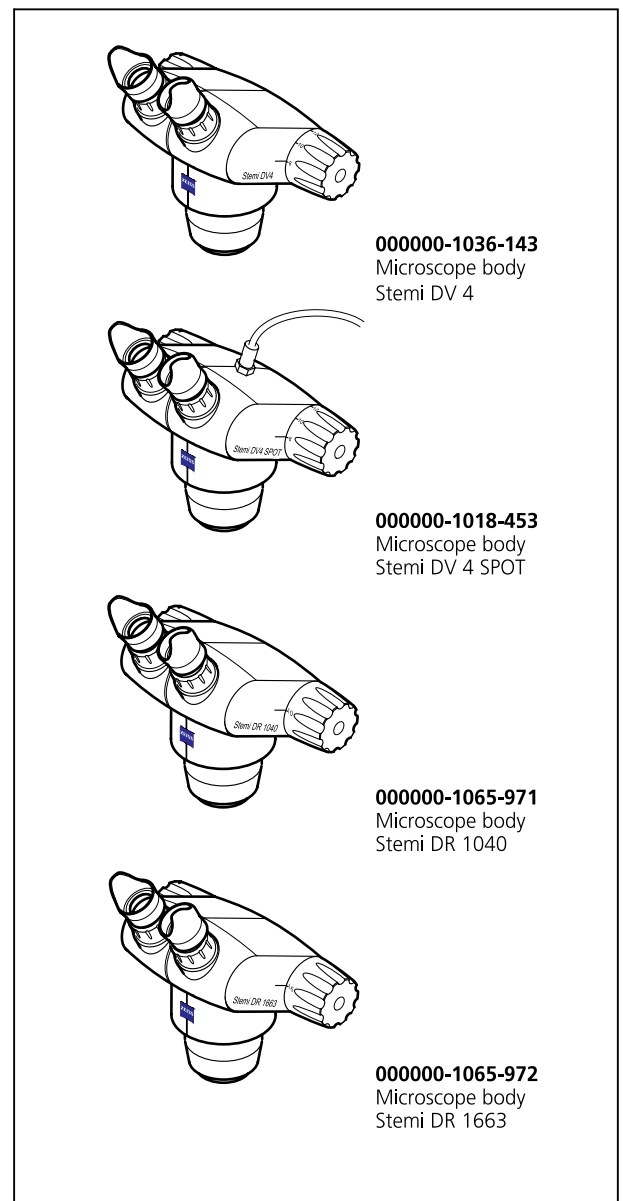


Fig. 2-1 Stemi DV4 / DR microscope body

2.2 Compact version with stand C

2.2.1 System diagram

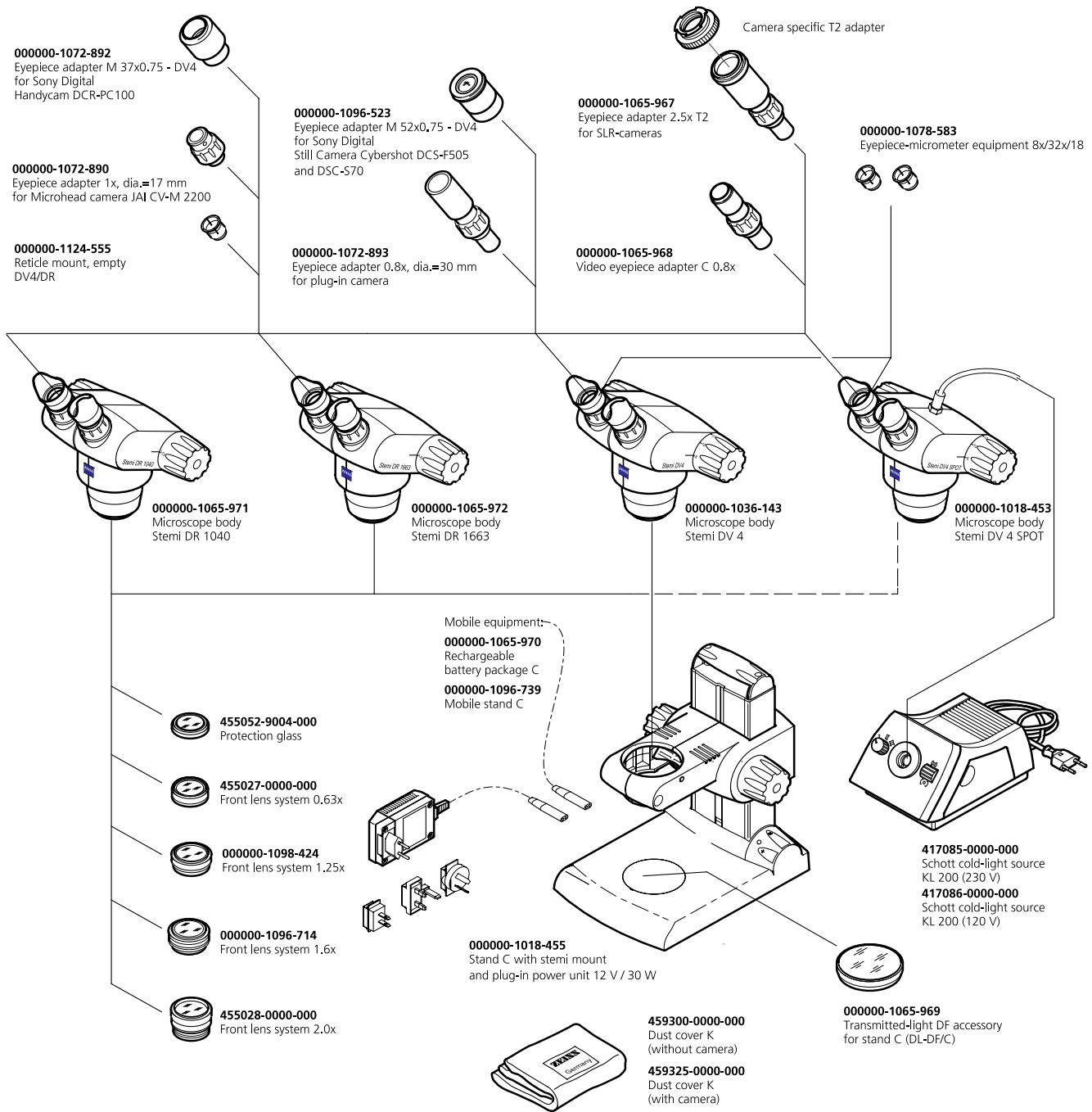
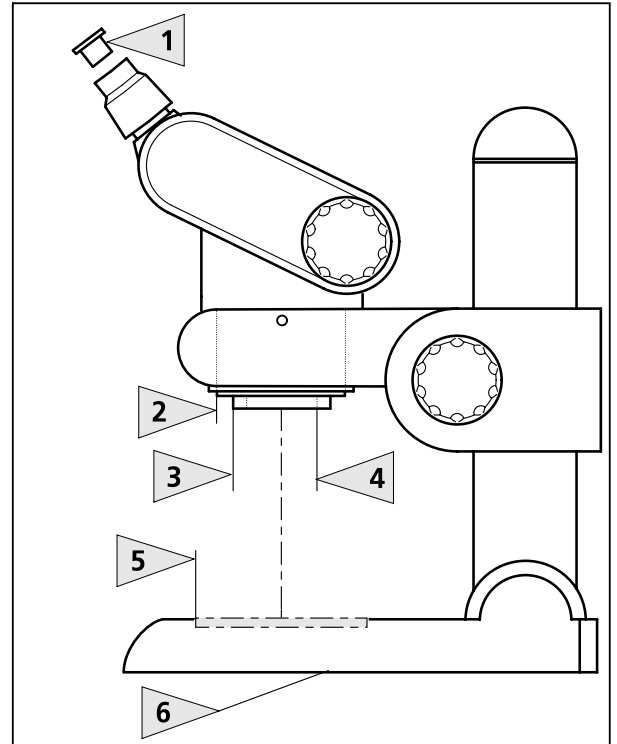


Fig. 2-2 System diagram of compact version with stand C

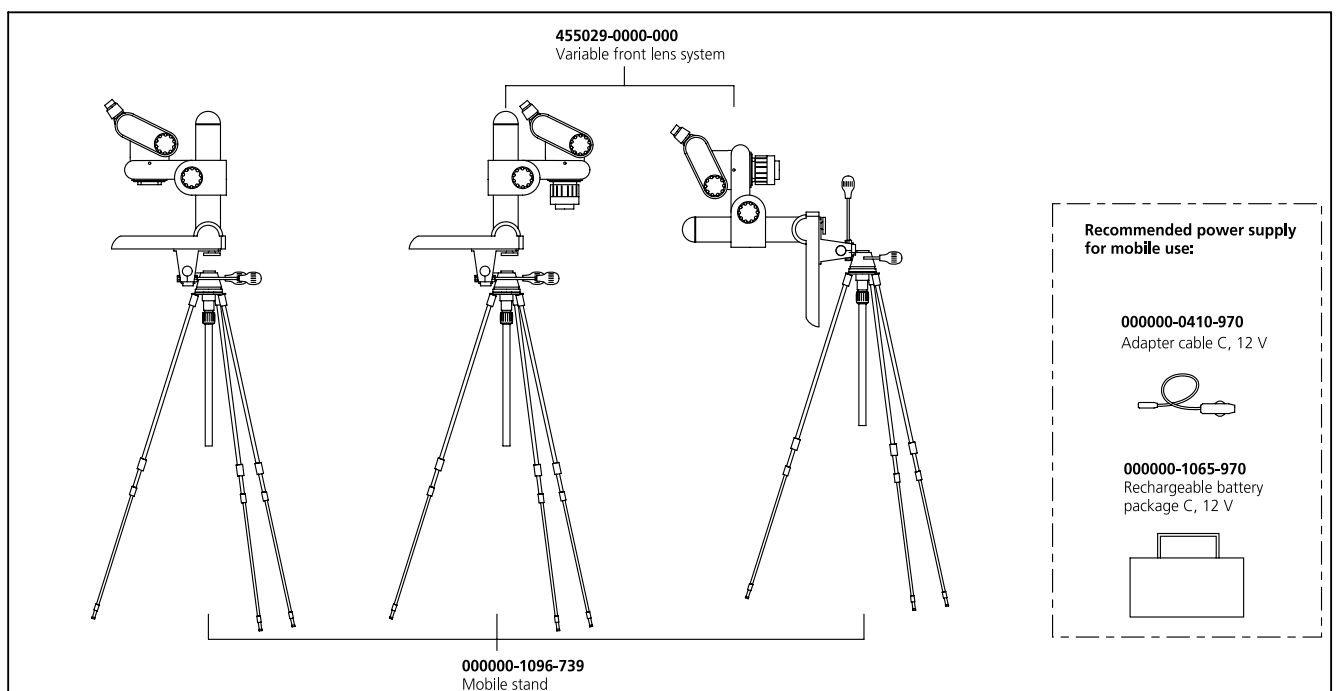
**2.2.2 Interfaces of the compact version  
Interfaces of the Stemi DV4 / DR with stand C**

- 1** Mount for reticles dia. 19 mm
- 2** Mount dia. 76 mm for microscope body
- 3** Mount dia. 53 mm for accessories
- 4** Internal thread M50x0.75 for mount for attachment systems, dust cover, or annular light adapter
- 5** Mount dia. 84 mm for stages, insert plate
- 6** Camera tripod connector 3/8", e.g. for mobile tripod



**Fig. 2-3 Interfaces of Stemi DV4 / DR with stand C (schematic)**

**2.2.3 Mobile equipment C for Stemi DV4, Stemi DR**



**2.2.4 Technical Data****Dimensions (width x depth x height)**

Stemi DV4 / DR..... 230 mm x 300 mm x 350 mm

**Weight**

Stemi DV4 (microscope body) ..... 1.5 kg

Stemi DV4 SPOT (microscope body) ..... 1.5 kg

Stemi DR 1040 (microscope body)..... 1.5 kg

Stemi DR 1663 (microscope body)..... 1.5 kg

Stand C..... 3.5 kg

**Ambient conditions****Storage and transport (in packaging):**

Permissible ambient temperature ..... -10 to +60 °C

Permissible relative humidity ..... 20 % to 85 % at +35 °C

Atmospheric pressure ..... 800 hPa to 1060 hPa

**Operation**

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

Permissible relative humidity ..... maximal 85 %

Atmospheric pressure ..... 800 hPa to 1060 hPa

Pollution degree ..... 2

**Operating data**

Protection class..... II

Protection type..... IP 30

Electrical safety..... in compliance with DIN EN 61010 (IEC 1010-1)  
including CSA, UL, ENEC, Q and MITI regulations

Excess voltage category ..... II

Radio interference suppression..... in accordance with EN 55011, Class B

Insensitivity to noise..... in accordance with EN 50082-2

Line voltage..... 100 to 240 V  $\pm$ 10 %  
Change of line voltage is not required!

Line frequency..... 50 to 60 Hz

Power consumption..... 30 VA

**Optical Data****Stemi DV4 and Stemi DV 4 SPOT**

Eyepiece	W 10x/20 Br. foc.							
Attachment systems	0.3x	0.4x	0.3x...0.5x	0.63x	without	1.25x	1.6x	2x
FWD in mm	285	210	245...85	130	92	60	48	29
Magnification	2.4x...9.6x	3.2x...12.8x	2.4x...16.0x	5.0x...20.2x	8.0x...32.0x	10.0x...40.0x	12.8x...51.2x	16.0x...64.0x
Object field in mm	83.3...20.8	62.5...15.6	83.3...12.5	40.0...9.9	25.0...6.3	20.0...5.0	15.6...3.9	12.5...3.1

**Stemi DR 1040**

Eyepiece	W 10x/20 Br. foc.							
Attachment systems	0.3x	0.4x	0.3x...0.5x	0.63x	without	1.25x	1.6x	2x
FWD in mm	285	210	245...85	130	92	60	48	29
Magnification	3.0x/12.0x	4.0x/16.0x	3.0x...5.0x / 12.0x...20.0x	6.3x/25.2x	10.0x/40.0x	12.5x/50.0x	16.0x/64.0x	20.0x/80.0x
Object field in mm	66.7/16.7	50.0/12.5	66.7...40.0 / 16.7...10.0	31.8/7.9	20.0/5.0	16.0/4.0	12.5/3.1	10.0/2.5

**Stemi DR 1663**

Eyepiece	W 10x/20 Br. foc.							
Attachment systems	0.3x	0.4x	0.3x...0.5x	0.63x	without	1.25x	1.6x	2x
FWD in mm	285	210	245...85	130	92	60	48	29
Magnification	4.8x/18.9x	6.4x/25.2x	4.8x...8.0x / 18.9x...31.5x	10.1x/39.7x	16.0x/63.0x	20.0x/78.8x	25.6x/100.8x	32.0x/126.0x
Object field in mm	41.7/10.6	31.3/7.9	41.7...25.0 / 10.6...6.3	19.8/5.0	12.5/3.2	10.0/2.5	7.8/2.0	6.3/1.6

**Illumination**

Stemi DV4 / DR

Halogen – integrated reflected-light illuminator ..... 12 V, 20 W

Halogen – integrated transmitted-light illuminator ..... 12 V, 10 W

Stemi DV4 SPOT

Near-axis, inclined reflected-light illumination ..... via light guide and Schott KL200 cold-light source  
..... (5.5° illumination)**Plug-in power unit**

Protection class ..... II

2.3 Modular Zeiss Stemi system

2.3.1 System diagram (extract)

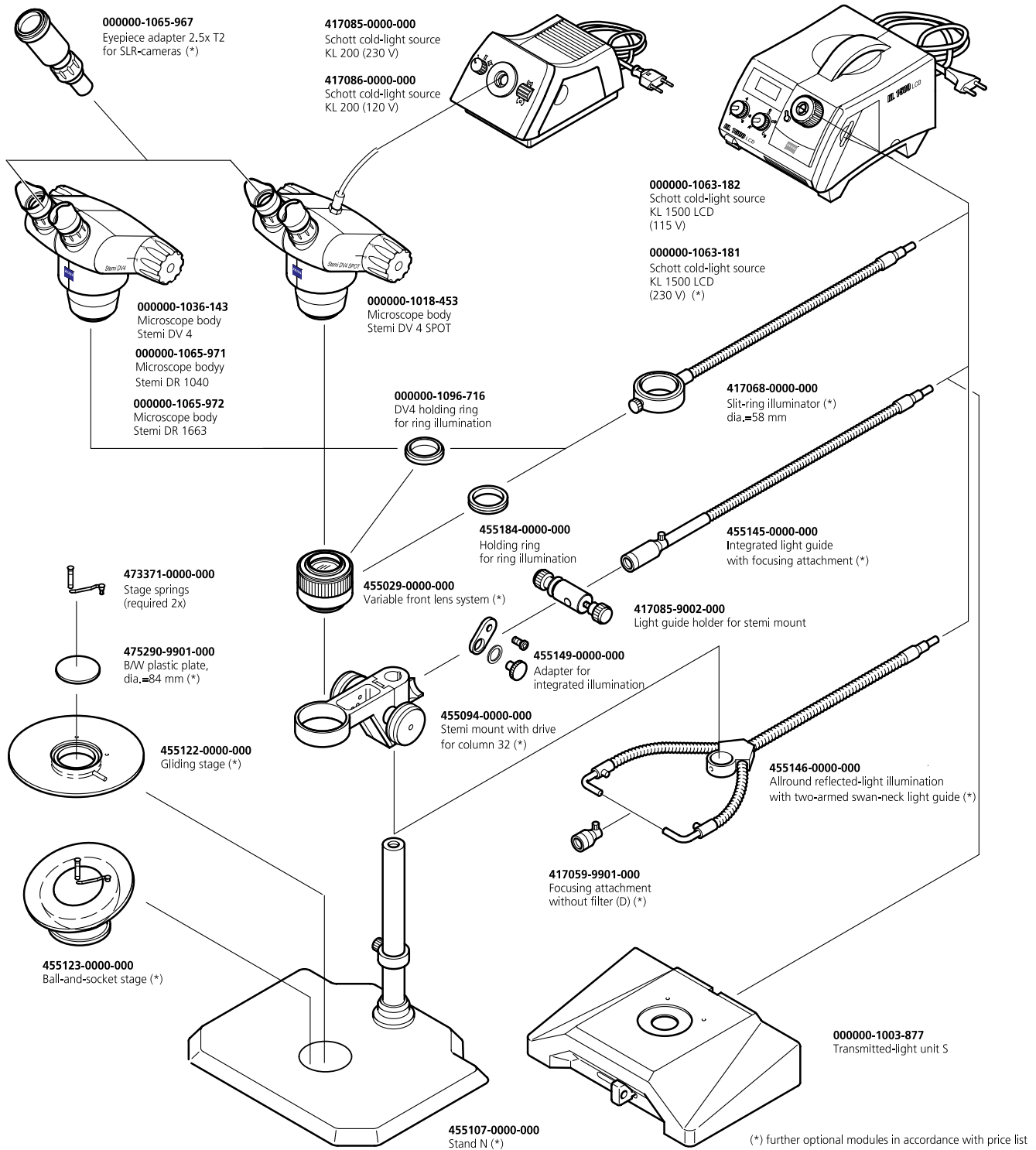


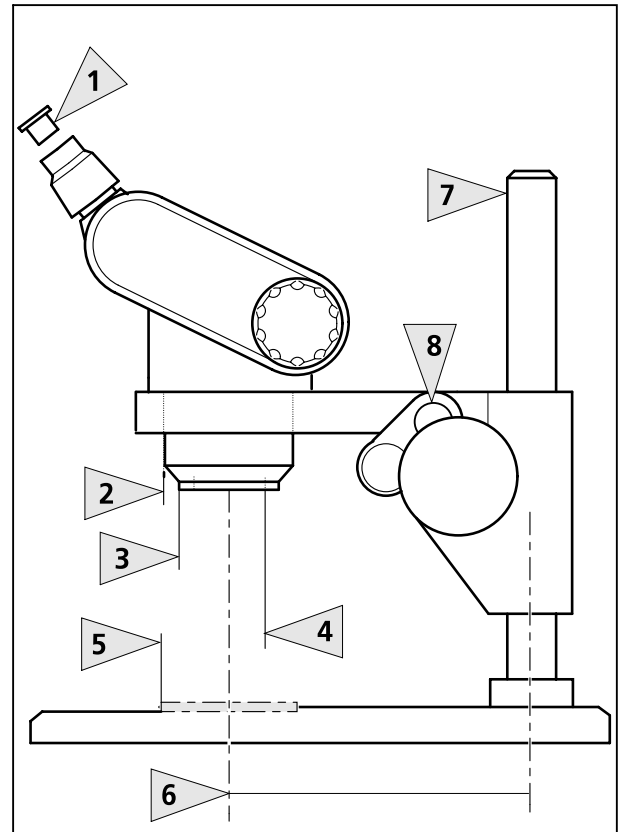
Fig. 2-4 Stemi DV4 / DR system diagram within the Zeiss Stemi modular system



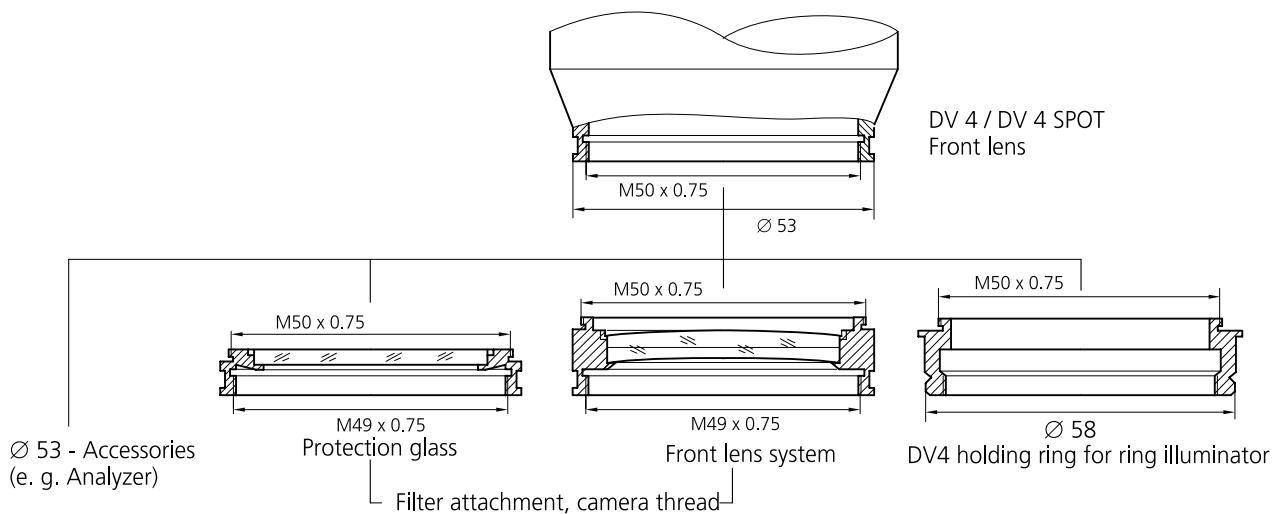
**2.3.2 Interfaces in the modular system**

**Interfaces of the Stemi DV4 / DR with column-type stand**

- 1** Mount for dia. 19 mm reticles
- 2** Mount dia. 76 mm for microscope body
- 3** Mount dia. 53 mm for accessories
- 4** Internal thread M50x0.75 for mount for attachment systems, dust cover or annular light adapter
- 5** Mount dia. 84 mm for stages, insert plates
- 6** Distance column – optical axis: 155 mm
- 7** Column dia. 32 mm
- 8** Mount for integrated illuminator



**Fig. 2-5 Interfaces of the Stemi DV4 / DR with column-type stand (schematic)**



**Fig. 2-6 Front lenses of Stemi DV4 / DR**

DESCRIPTION

Carl Zeiss

Stemi DV4 / DR


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### 3 OPERATION

#### 3.1 Basic instrument as compact version with stand C

##### 3.1.1 Start-up

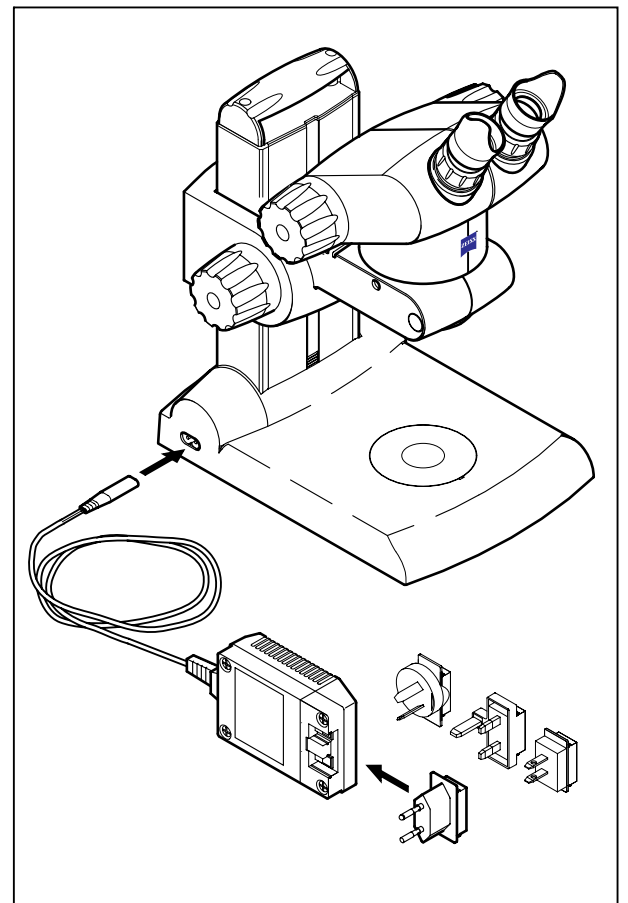
- Open the packaging on the top.
- Pull the Stemi DV4 / DR and the expanded plastic inset out of the packaging in upward direction and place it on the table.
- Remove the semi-shell which is pointing upwards.
- Check whether all the components listed in the delivery note are included in the package.
- Properly dispose of the packaging or keep it for later reuse.
- Place stand base plate of the stereomicroscope on a flat, stable support.
- Remove small cardboard box containing the power supply unit and unpack it.
- Insert primary adapter (corresponding to the local line voltage) into the appropriate opening of the power unit until stop.

 Voltage change on the power unit is not required. It is automatically matched to the available line voltage.

- Insert connector of the power unit into the 12 V socket in the rear left of the stand base plate.
- Connect power unit directly to the line.

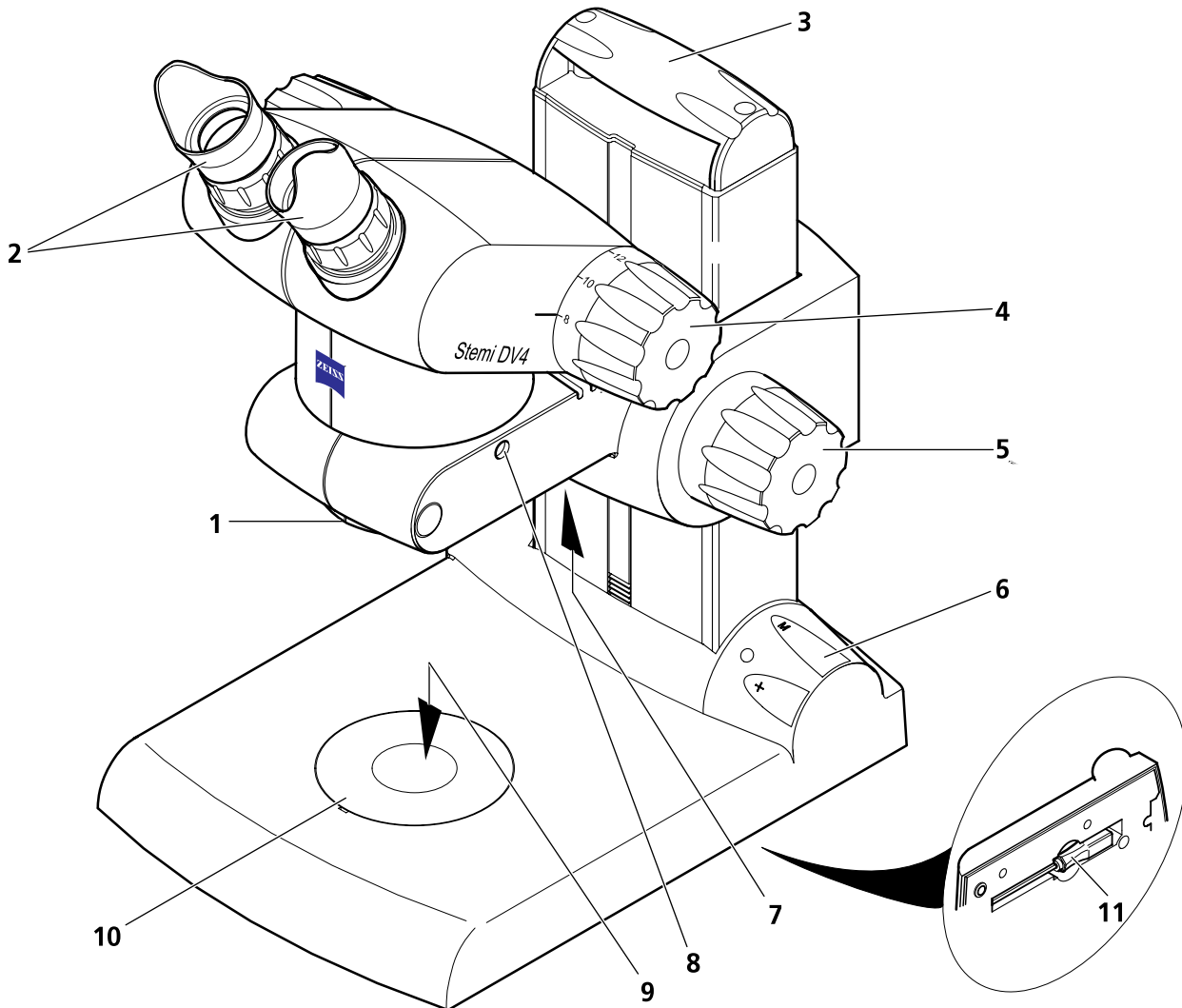
The blue power pilot lamp (LED) of the illumination control on the right of the stand base plate lights up. The instrument is in the standby mode.

 The packaging cover can be used as dust cover.



**Fig. 3-1** Installation and mains connection of the Stemi DV4 / DR

## 3.1.2 Operation and function controls



- 1 Connector for changeable optical components and accessories (outer mount dia.: 53 mm, internal thread M50x0.75)
- 2 Eyepieces W-PL 10x/20 Br. foc., screwed-in, with folding eyecups
- 3 Carrier handle
- 4 Magnification changing knob with engraved numbers indicating the set overall magnification (basic configuration without changeable optical components)
- 5 Focusing knob to enable focusing of the object
- 6 Illumination control (see detailed description on page 3-3)
- 7 Integrated reflected-light illuminator, 12 V / 20 W
- 8 Clamping screw (socket head SW 3 mm) to fix the microscope body in stand C
- 9 Integrated transmitted-light illuminator, 12 V / 10 W
- 10 Insert plate (dia. 84 mm) for object mounting
- 11 Ball-headed screwdriver (SW 3 mm) in the stand base

Fig. 3-2 Operation and function controls on the Stemi DV4 / DR

### 3.1.3 Illumination

The three membrane keys of the illumination control permit both selection of the illumination mode (reflected, transmitted and mixed light) and the control of the illumination intensity for the selected illumination mode.

The pressure points of the membrane keys feature three nubs which can be easily made out by touching during microscopy.

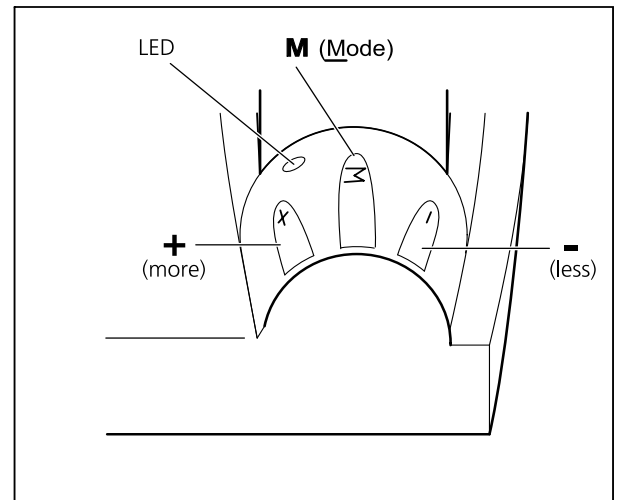


Fig. 3-3 Illumination control

#### 3.1.3.1 Selection of the illumination mode

The illumination mode is selected via key **M** on the illumination control panel. This key has been designed as a series switch with 4 switching statuses. Each switching procedure between these statuses is performed via a single press of key **M**. The following sequence of switching statuses is always observed:

- |                               |   |
|-------------------------------|---|
| – basic status after start-up | illumination off (standby), blue LED lights up      |
| – pressing key <b>M</b>       | reflected light on (transmitted light off)          |
| – pressing key <b>M</b> again | transmitted light on (reflected light off)          |
| – pressing key <b>M</b> again | mixed light on (reflected and transmitted light on) |
| – pressing key <b>M</b> again | basic status (standby)                              |



In each case, switching is performed not before key **M** has been released!

### 3.1.3.2 Varying the illumination intensity

The intensity is set continuously between the minimum and maximum values via the keys + and -.

- To increase the illumination intensity: press key + several times or keep it pressed
- To reduce the illumination intensity: press key - several times or keep it pressed

In mixed light, the intensities can be set separately for reflected and transmitted light.

- Incident light: press key + / - several times or keep it pressed
- Transmitted light: press keys **M** and key +/ - several times or keep it pressed

### 3.1.3.3 Specimen protection in transmitted-light applications

In the Stemi DV4 / DR, thermally sensitive specimens are automatically protected from excessive heat from the transmitted-light illuminator.

The automatic system arranges for the transmitted light intensity to be reduced after expiry of 3 minutes to a level which is uncritical for constant operation (60%), provided that maximum illumination intensity has been set for the transmitted-light mode.

If the illumination intensity for transmitted light has been set to 100 %, the blue LED lights up.

Of course, the transmitted-light illumination intensity can be reset to full lamp performance any time.

### 3.1.4 Basic setting of the stereomicroscope

The stereomicroscope has been connected to the line and is in standby mode.

- Place object (3-4/5) centrally on the insert plate.
- Switch on reflected-light illumination by a single press of key M (3-4/4).
- Screw eyepieces into the eyepiece tube until stop.
- Then unscrew both eyepieces again by a defined amount (approx. one rotation is sufficient) to allow for compensation of any available ametropia in both directions. The eyepieces should have approximately identical positions in the tube.
- Set the individual, trim-free interpupillary distance of the eyepieces (3-4/1) by pressing the eyepiece tubes together or pulling them apart so that only one light circle is visible on viewing through the eyepieces.
- To search the object, set the magnification changing knob (3-4/2) to the lowest magnification first and use the focusing knob (3-4/3) for approximate focusing.
- Set maximum magnification and precisely focus the image detail.
- Then set minimum magnification again and compensate any available blurs separately for each eye using the focusing eyepieces (3-4/1) and not the focusing knob (possibility for ametropia compensation).

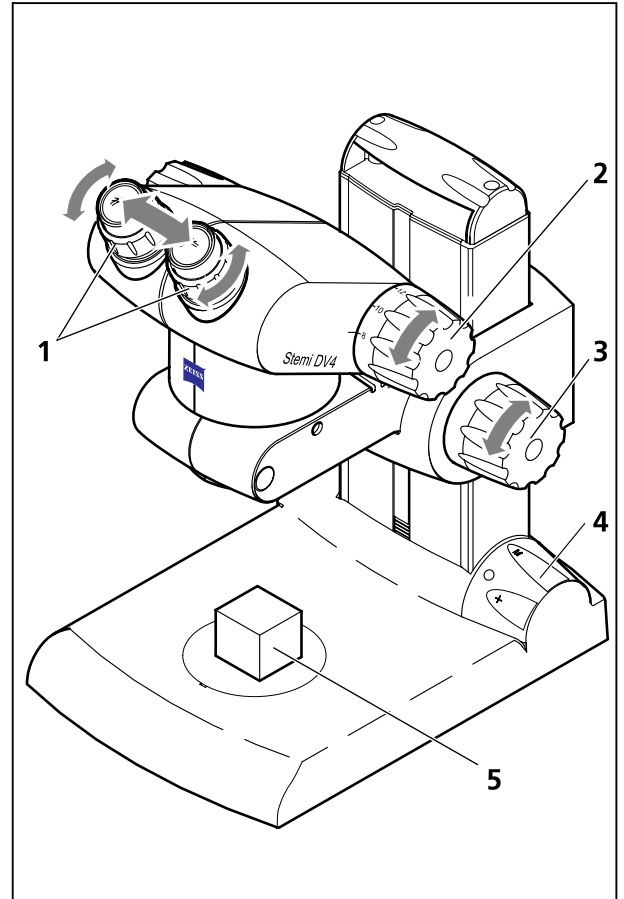


Fig. 3-4 Basic settings (Stemi DV4)

If the microscope has been aligned in this way, the image sharpness will be retained over the entire zoom range.



The values on the magnification changing knob are identical to the set overall magnification of the basic instrument (without changeable optical components) with eyepieces 10x/20.



Turning the two magnification changer/focusing knobs in opposite directions by applying force will result in the stereomicroscope being damaged.



The lower end position of the focusing drive is limited by the stand base. In the range of the lower end position, the focusing drive should therefore only be adjusted slowly in order to avoid damage to the stand.

The upper end position of the focusing drive is determined by the end of the toothed rack. If the upper end position is reached, the drive will no longer lock in position. It is not possible to turn the Stemi carrier out of the stand: a cracking noise can be heard if turning is continued. Turning back will automatically lock the drive in position again.



If the eyepiece is turned out too far (approx. 4 rotations), it will loosen from the eyepiece tube and can then be removed.

- The required illumination mode (reflected, transmitted or mixed light), depending on the object to be examined, can be easily set and the illumination intensity matched to the requirements.



**3.1.5 Lamp change****3.1.5.1 Change of reflected-light lamp**

Disconnect the power unit from the line before the lamp change and allow the lamp to be changed to cool down for at least 15 minutes.

- Loosen clamping screw (using SW 3 mm ball-headed screwdriver) and remove microscope body from the Stemi carrier in upward direction.



The ball-headed screwdriver is contained in the stand base.

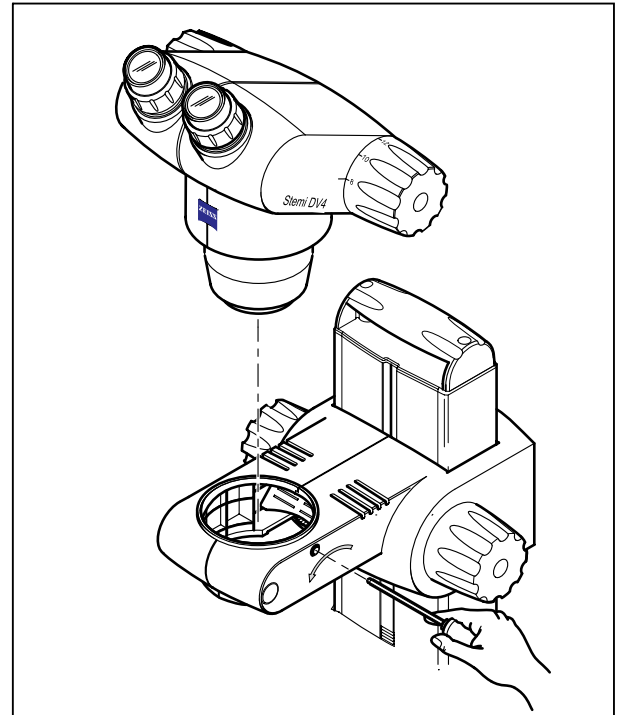


Fig. 3-5 Changing the lamp (reflected light)

- Pull defective lamp out of the lamp base in axial direction.
- Insert the new lamp into the lamp base with its two pins and press it into the base until stop. Make sure not to touch the lamp front with your bare fingers. The lamp is aligned automatically.
- Insert microscope body again, align it and tighten the clamping screw.

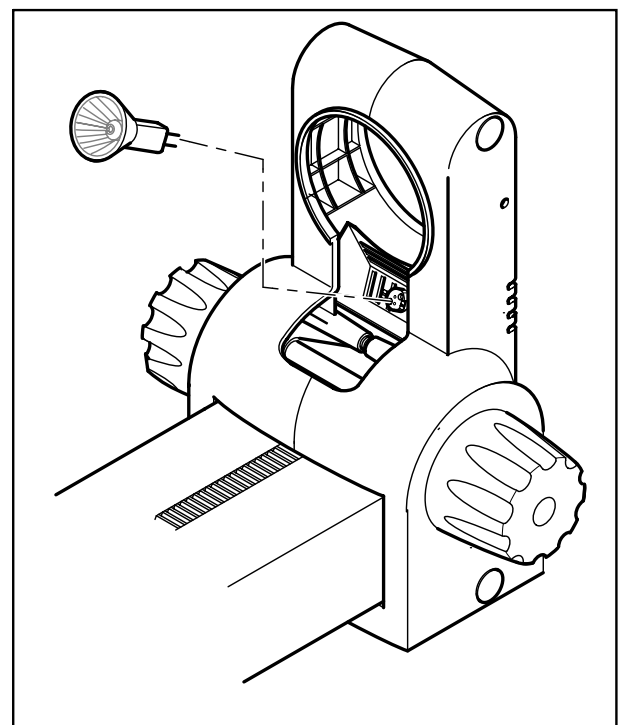


Fig. 3-6 Changing the lamp (reflected light)

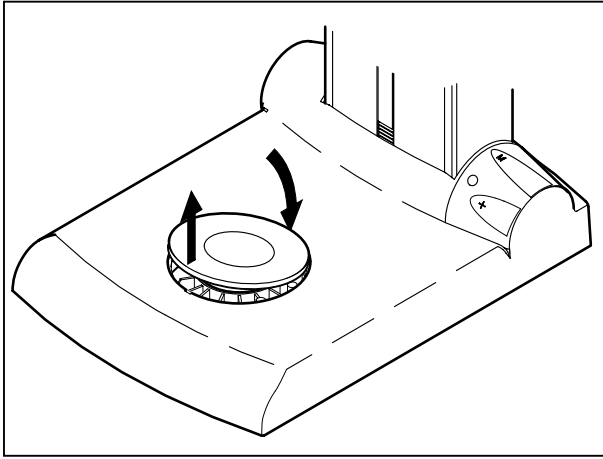


Fig. 3-7 Removing the glass plate

### 3.1.5.2 Change of transmitted-light lamp



Disconnect the power unit from the line before the lamp change and allow the lamp to be changed to cool down for at least 15 minutes.



- Tilt glass plate by pressing on its rear edge (North) and remove it from the stand base.

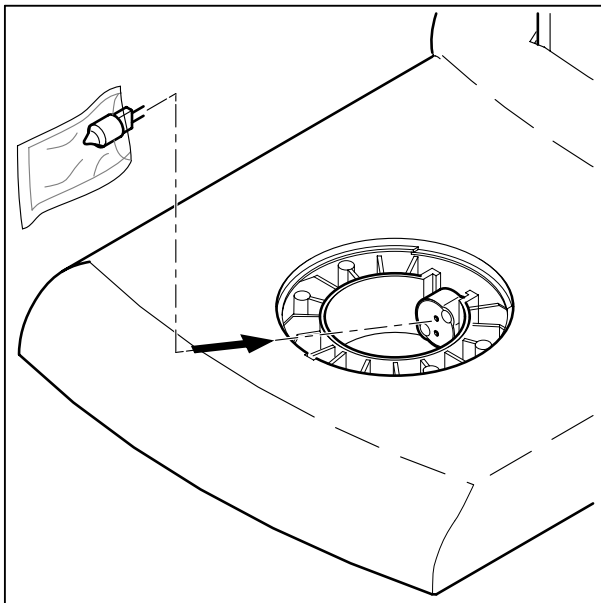


Fig. 3-8 Changing the lamp (transmitted light)

- Pull defective lamp out of the lamp base in forward direction.



Make sure not to touch new lamps with your bare hands.

- Cut open the plastic cover of the new lamp on the edge where the pins are positioned and pull back the cover until the pins protrude.
- Hold new lamp on the plastic cover and insert both pins into the lamp base.
- Press lamp into the base until stop and remove the plastic cover.

- Insert the glass plate again by pressing it against the spring in the stand base at the front (South) and lowering it at the back until stop.

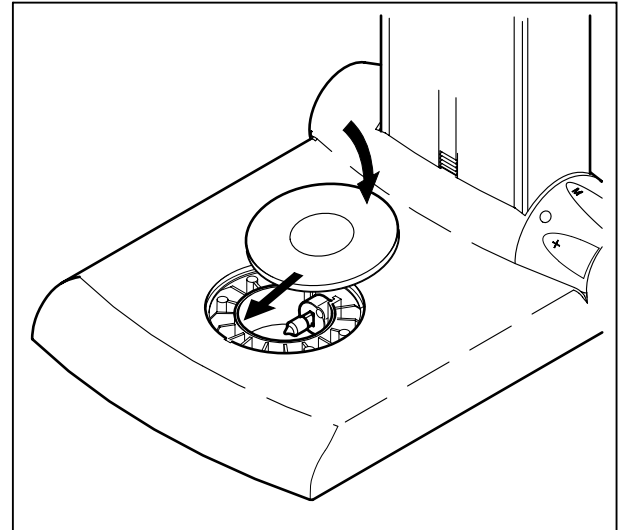



Fig. 3-9 Inserting the glass plate

### 3.1.6 Setting the smoothness of the focusing drive

- Hold left focusing knob in position and use ball-headed screwdriver (SW 3) to loosen its socket head screw by at least two rotations.

 The ball-headed screwdriver is contained in the stand base.

- Hold right focusing knob in position and turn left knob to the right (tight movement) or to the left (smooth movement).
- When the required smoothness is achieved, hold left focusing knob in position and tighten socket head screw.
- Check smoothness and repeat the procedure, if required.

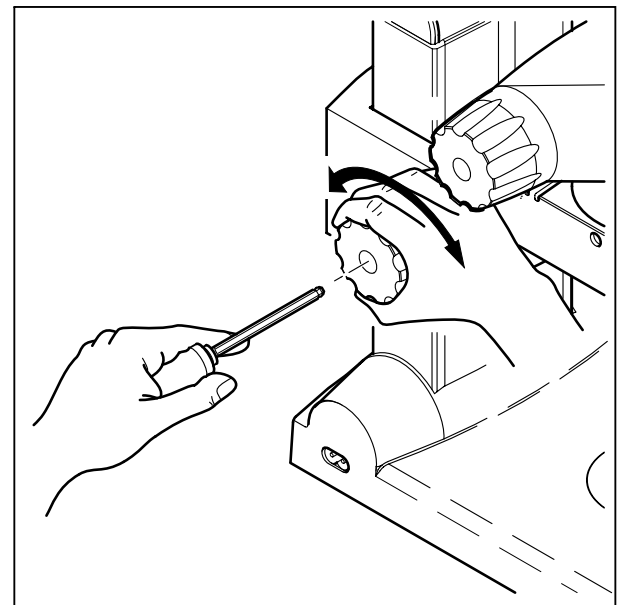


Fig. 3-10 Setting the smoothness of the focusing drive

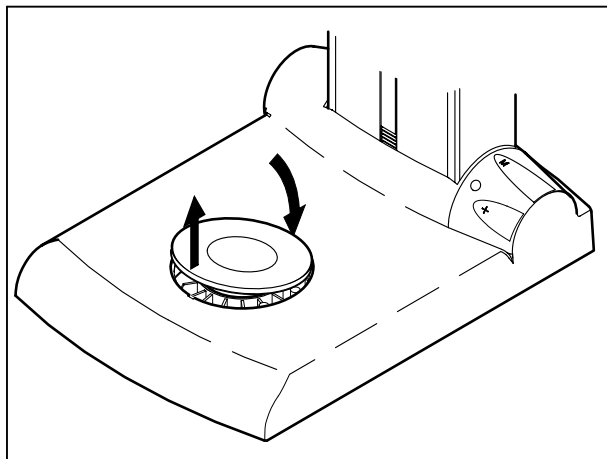


Fig. 3-11 Removing the glass plate

### 3.2 Core accessories

#### 3.2.1 Attachment for transmitted-light darkfield

Microscopy in transmitted-light darkfield requires the glass plate in the stand base to be exchanged for the attachment for transmitted-light darkfield for stand C (DL-DF/C attachment).

- Tilt glass plate by pressing on its rear edge (North) and remove it from the stand base.
- Press the DL-DF/C attachment against the spring in the stand base at the front (South) and lower it at the back until stop. Make sure that the DL-DF/C attachment is seated horizontally. **Caution:** the glass plate in the DL-DF/C attachment has only been loosely inserted.
- Switch on the transmitted light and set maximum intensity.



If maximum illumination intensity is set in transmitted light, the intensity is automatically reduced after 3 minutes to protect the specimens from excess heat. If required, the intensity must be set to maximum again.

Proceed as follows to remove the transmitted-light darkfield attachment:

- Hold the DL-DF/C at the rear (North) below the step, press it out of the stand base in upward direction and remove it in forward direction.

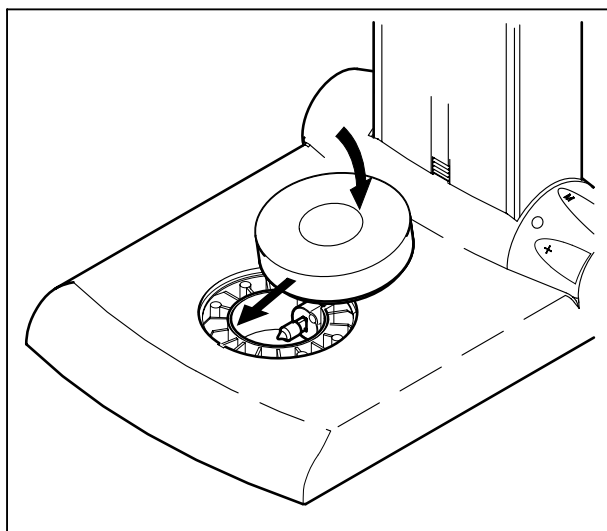



Fig. 3-12 Insertion of transmitted-light darkfield attachment


 To avoid background brightening, the removable glass plate of the DL-DF/C attachment must be carefully cleaned.

When the 0.63x attachment lens is used, slight image trimming can occur in the magnification range < 10x caused by the diaphragm of the attachment.

### 3.2.2 Direct measurement using the eyepiece measuring device 8x/32x/18 on the Stemi DV4

Integration of the eyepiece measuring device 8x/32x/18 into the eyepiece tubes of the Stemi DV4 permits measurements in the magnification steps 8x (overview) and 32x (object detail).

The graduation of the reticle scale indicates the dimensions of the objects in the magnification steps 8x and 32x; the values can be read off directly.

 Integration of the eyepiece measuring device requires the components to be meticulously clean. Should the reticle be dirty, it must be carefully cleaned first.

- Unscrew both eyepieces (3-13/1) from the eyepiece tubes (3-13/4).
- Insert reticle (3-13/3) and field diaphragm (3-13/2) into the eyepiece tube. Align reticle scale in North-South direction.
- Screw on eyepieces (3-13/1) again.
- Set magnification step 8x or 32x.
- Place object detail to be measured near the relevant measuring scale.
- Read measured value off the scale.

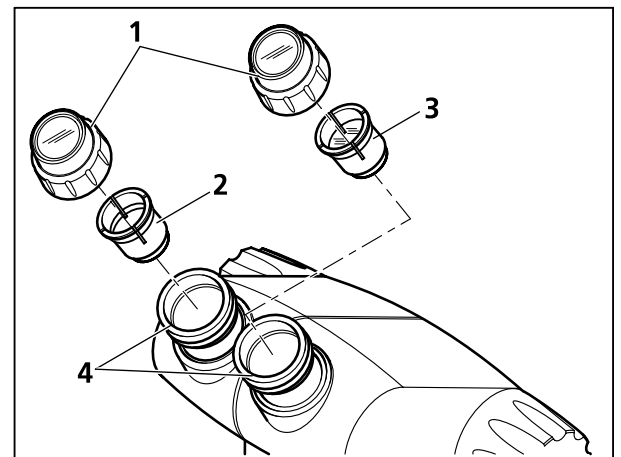


Fig. 3-13 Insertion of eyepiece measurement device

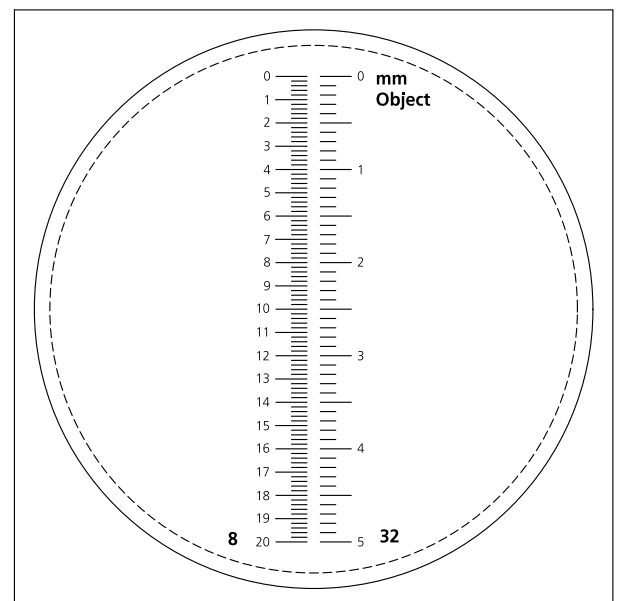



Fig. 3-14 Eyepiece micrometer 8x/32x/18

 The use of a suitable object micrometer also permits measurements in any other magnification. For this purpose, the eyepiece measuring scale must be calibrated for the set magnification factor.

### 3.2.3 Documentation of microscopic images

- ☞ The various eyepiece adapters are inserted into an eyepiece tube instead of the eyepiece!  
Adaptation must be made to the eyepiece tube which is not covered by the camera.

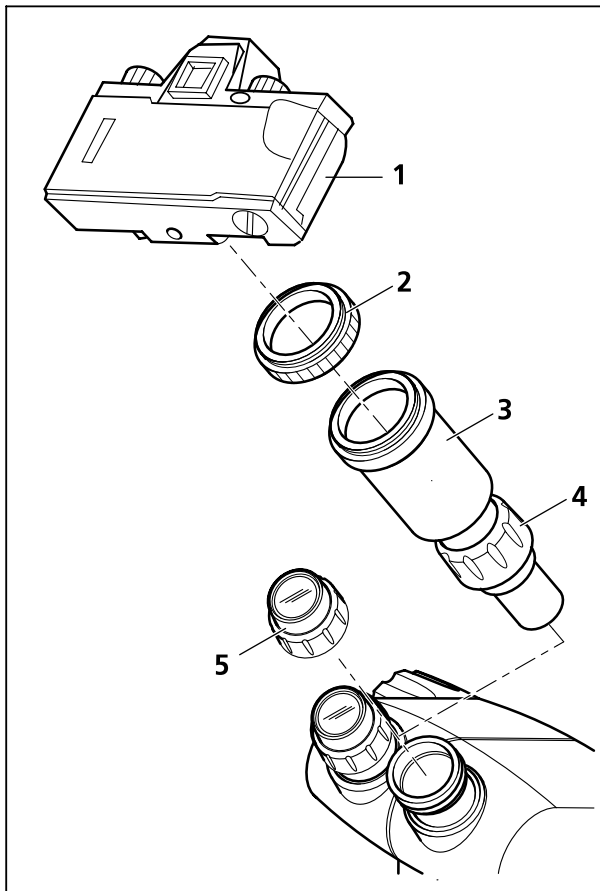


Fig. 3-15 Attachment of SLR camera

#### 3.2.3.1 SLR camera

- Unscrew eyepiece (3-15/5) from one of the eyepiece tubes.
- Attach suitable T2 adapter (3-15/2) to the SLR camera (3-15/1).
- Screw eyepiece adapter 2.5x T2 (3-15/3) into the T2 adapter.
- Insert complete unit consisting of SLR camera, T2 adapter and eyepiece adapter into the eyepiece tube until stop and slightly tighten the retainer ring (3-15/4) of the eyepiece adapter.
- Align the camera and tighten the retainer ring.
- Connect the cable release (if required) to the SLR camera.

### 3.2.3.2 SONY camera "Digital Handycam DCR-PC100"

- Use the angled screwdriver to loosen the set screw (3-16/3) on the eyepiece adapter.
- Pull out the lens mount (3-16/4).
- Unscrew eyepiece (3-16/5) from one of the eyepiece tubes.
- Screw lens mount (3-16/4, optical surface pointing to the observer) onto the thread of the eyepiece tube and tighten the screw until stop. Caution! Do not touch the optics!
- Screw sliding mount with thread M37 (3-16/2) into the M37 objective/filter thread of the DCR-PC100 camera (3-16/1) until stop.
- Attach sliding mount with camera (3-16/1, 2) to the lens mount (3-16/4), orient it and use angled screwdriver to tighten the set screw (3-16/3).

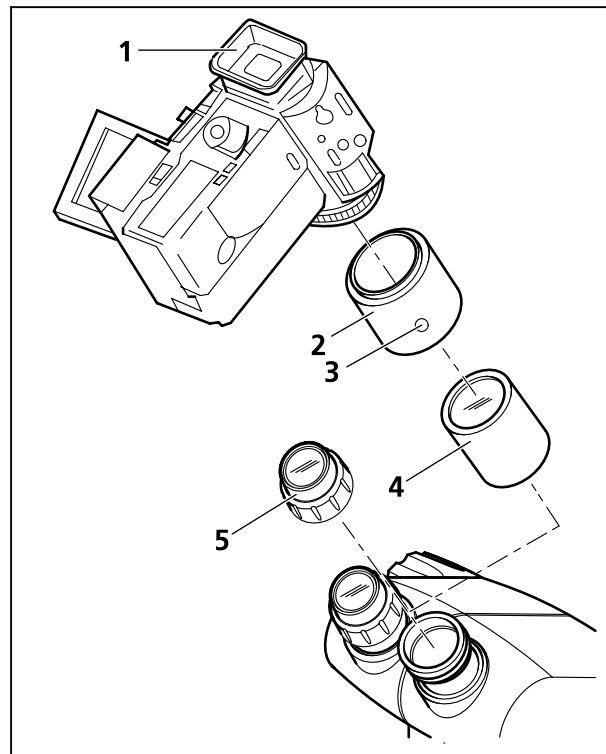





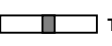


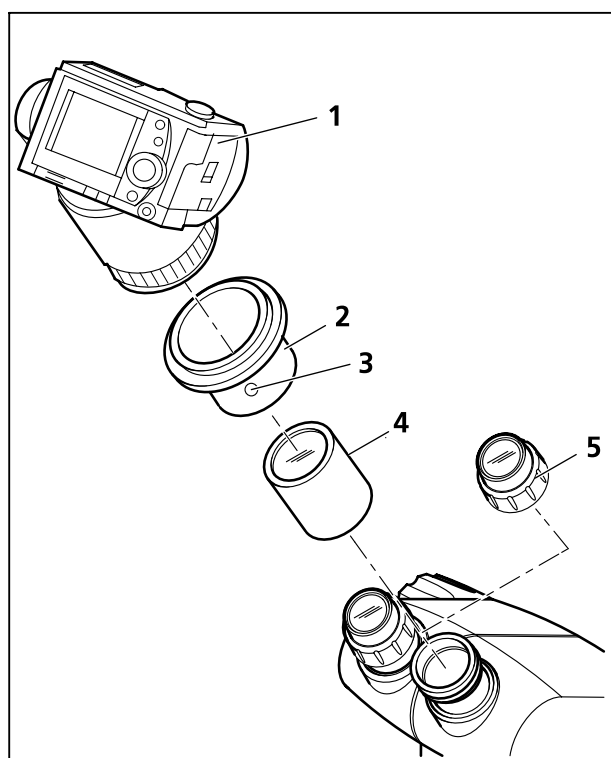
Fig. 3-16 Attachment of SONY camera "Digital Handycam DCR-PC100"

 The distance between the lower edge of the lens mount and the lower edge of the sliding mount should measure 12 mm, i.e. the sliding mount should be attached to the lens mount only until the marking ring.

- Connect supply and signal cables, if required. If the camera will be used for a long period of time, it is recommended to use the line adapter which is enclosed with the camera!
- Switch on the camera.
- Switch Autofocus to manual focusing (the symbols ,  or  are displayed).
- Set camera lens manually to  $\infty$  via the focusing ring: the symbol  must be displayed. **Caution!** It is possible that the " $\infty$ " setting is slightly moved when the adapter is manipulated or the camera zoom operated. Therefore: always check the " $\infty$ " setting before taking exposures!
- Move zoom camera lens into the center zoom position (display:   $\tau$ ).
- Move camera lens into the "W" or "T" direction until the image is untrimmed and homogeneously illuminated and until the required magnification has been reached.
- The camera is ready for operation.






☞ When taking photos in transmitted light with a lamp voltage close to  $U_{\max}$  (blue LED of the illumination control is blinking!), remember that the lamp voltage is reduced to constant voltage after three minutes!

- For the operation of the camera, see the operating manual "SONY Digital Handycam DCR-PC100"!




**Fig. 3-17** Attachment of SONY camera "Digital Still Camera Cybershot DSC-F505"

### 3.2.3.3 SONY camera "Digital Still Camera Cybershot DSC-F505"

- Use the angled screwdriver to loosen the set screw (3-17/3) on the eyepiece adapter.
- Pull out the lens mount (3-17/4).
- Unscrew eyepiece (3-17/5) from one of the eyepiece tubes.
- Screw lens mount (3-17/4, optical surface pointing to the observer) onto the thread of the eyepiece tube and tighten the screw until stop. Caution! Do not touch the optics!
- Screw sliding mount with thread M52 (3-17/2) into the M52 objective/filter thread of the DSC-F505 camera (3-17/1) until stop.
- Attach sliding mount (3-17/2) with camera (3-17/1) to the lens mount (3-17/4), orient it and use angled screwdriver to tighten the set screw (3-17/3).
- Connect supply and signal cables, if required. If the camera will be used for a long period of time, it is recommended to use the line adapter which is enclosed with the camera!
- Switch on the camera.
- Switch Autofocus to manual focusing (the symbols ,  or  are displayed).
- Set camera lens manually to  $\infty$  via the focusing ring: the symbol  must be displayed. **Caution!** It is possible that the " $\infty$ " setting is slightly moved when the adapter is manipulated or the camera zoom operated. Therefore: always check the " $\infty$ " setting before taking exposures!
- Move zoom camera lens into the center zoom position (display: ).
- Move camera lens into the "W" or "T" direction until the image is untrimmed and homogeneously illuminated and until the required magnification has been reached.



- The camera is ready for operation.

 When taking photos in transmitted light with a lamp voltage close to  $U_{\max}$  (blue LED of the illumination control is blinking!), remember that the lamp voltage is reduced to constant voltage after three minutes!

- For the operation of the camera, see the operating manual "SONY Digital Still Camera Cybershot DSC-F505"!

### 3.2.3.4 SONY camera "Digital Still Camera Cybershot DSC-S70"

- Screw adapter ring VAD-S70 (3-18/2, SONY) into the objective/filter thread of the DSC-S70 camera (3-18/1) until stop.
- Use the angled screwdriver to loosen the set screw (3-18/4) on the eyepiece adapter.
- Pull out the lens mount (3-18/5).
- Unscrew eyepiece (3-18/6) from one of the eyepiece tubes.
- Screw lens mount (3-18/5, optical surface pointing to the observer) onto the thread of the eyepiece tube and tighten the screw until stop. Caution! Do not touch the optics!
- Screw sliding mount with thread M52 (3-18/3) into adapter ring VAD-S70 (3-18/2) until stop.
- Attach sliding mount (3-18/3) with adapter ring (3-18/2) and camera (3-18/1) to the lens mount (3-18/5) until the distance between the lower edge of the lens mount and the lower edge of the sliding mount measures approx. 18 to 20 mm. Then orient the components and tighten the set screw (3-18/4) using the angled screwdriver.

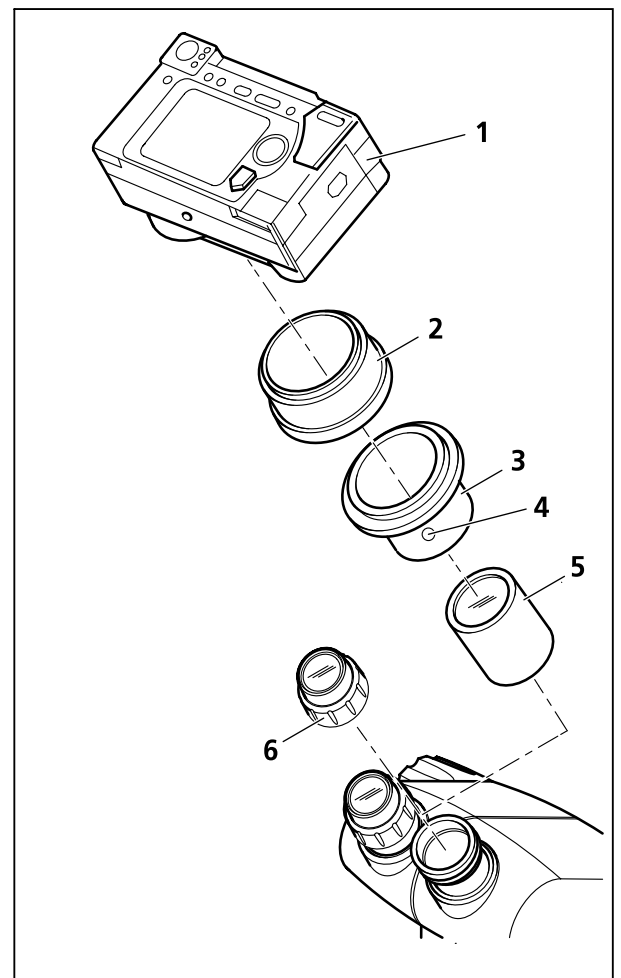




Fig. 3-18 Attachment of SONY camera "Digital Still Camera Cybershot DSC-S70"


- Connect supply and signal cables, if required. If the camera will be used for a long period of time, it is recommended to use the line adapter which is enclosed with the camera!
- Switch on the camera.
- Set the camera lens to  $\infty$  via the distance setting control. Always check the " $\infty$ " setting before taking exposures!
- Zoom the camera lens from "W" to "T" until the maximum telelens focal length of 21 mm is achieved. The image is trimless in this position.

 When the camera is switched off and the instrument is in the "PLAY" mode, the camera lens moves back into the camera. After switching on STILL and MOVIE again, the lens is in the wide-angle range. Therefore, the maximum telelens focal length must then be set again.

- The camera is ready for operation.

 When taking photos in transmitted light with a lamp voltage close to  $U_{\max}$  (blue LED of the illumination control is blinking!), remember that the lamp voltage is reduced to constant voltage after three minutes!

- For the operation of the camera, see the operating manual "SONY Digital Still Camera Cybershot DSC-S70"!

 If other cameras with objective/filter thread M37 or M52 shall be attached via the eyepiece adapter M37 / M52, you must check whether the images are format-filling without trimming or vignetting, i.e. whether position and size of the exit pupil of the eyepiece adapters match the focal length-dependent entry pupil!

This is checked as follows:

- Vary the distance between the camera lens and the lens mount in steps, i.e. move the sliding mount with camera on the lens mount in the eyepiece adapter by defined steps.
- Zoom camera lens from wide-angle position (W) through to tele position (T).
- Perform test until image is format-filling without trimming or vignetting.

If no format-filling image without trimming or vignetting is obtained, adaptation of the other camera is not possible!

### 3.2.3.5 Video camera with C-Mount connector

- Unscrew eyepiece (3-19/4) from one of the eyepiece tubes.
- Screw eyepiece adapter C-0.8x (3-19/2) into the video camera (3-19/1).
- Insert complete unit into the eyepiece tube until stop and slightly tighten the retainer ring (3-19/3) of the eyepiece adapter.
- Align the camera and tighten the retainer ring.

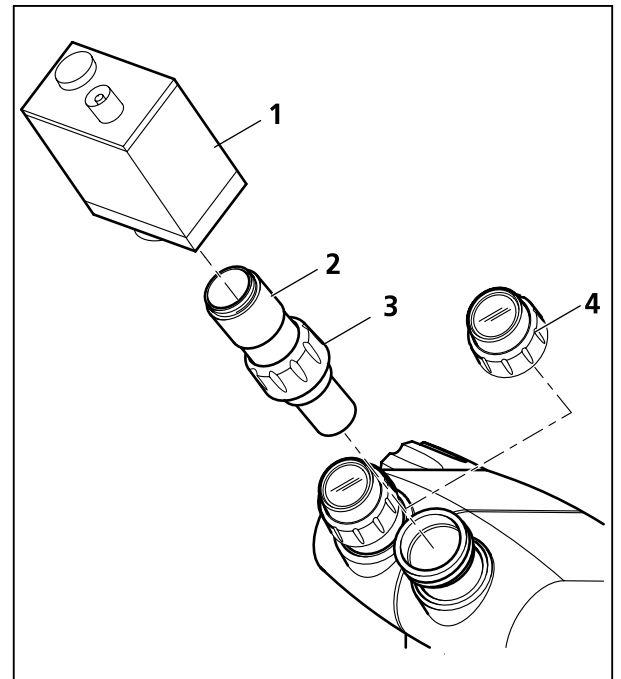


Fig. 3-19 Attachment of video camera with C-Mount connector

### 3.2.3.6 Microhead camera

- Unscrew eyepiece (3-20/4) from one of the eyepiece tubes.
- Insert microhead camera (JAI CV-M2200 PAL, 3-20/1) into the eyepiece adapter for the microhead camera and use angled screwdriver to slightly tighten the clamping screw (3-20/2).
- Insert eyepiece adapter into the eyepiece tube until stop and slightly tighten the retainer ring (3-20/3).
- Connect the microhead camera to the Control Unit and the monitor.
- Switch on the microscope illuminator and the video system.
- Place an object on the stage. Make the basic settings on the Stemi DV4 / DR (see page 3-5). After this, the focusing knob must no longer be adjusted.
- Set minimum magnification.

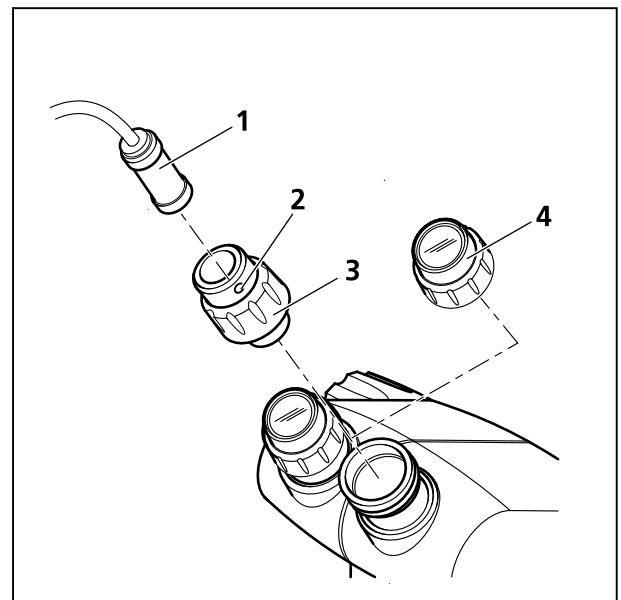


Fig. 3-20 Attachment of microhead camera

- Move the microhead camera in the eyepiece adapter axially to focus the image on the connected monitor.
- Tighten clamping screw (SW 1.5 mm) on the eyepiece adapter and check the focus. If required, repeat the procedure.
- Turn the eyepiece adapter in the eyepiece tube to align the camera image until the image on the monitor is upright and unreversed.
- Tighten retainer ring of the eyepiece adapter and check the setting; if required, repeat the procedure.

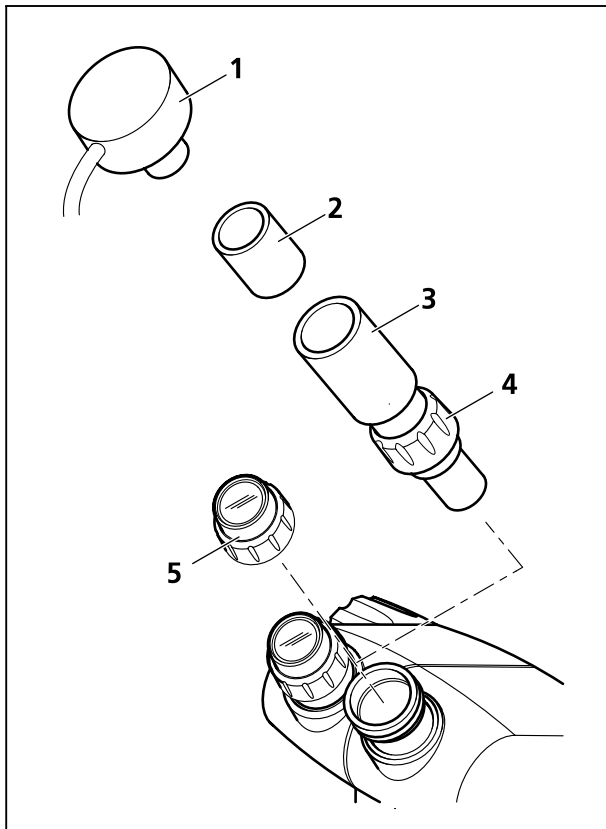


Fig. 3-21 Attachment of insertion camera

### 3.2.3.7 Eyepiece insertion camera

- Unscrew eyepiece (3-21/5) from one of the eyepiece tubes.
- Insert eyepiece adapter 0.8x (3-21/3) into the eyepiece tube and tighten the retainer ring (3-21/4).
- Insert dia. 30 mm or dia. 23.2 mm eyepiece insertion camera (3-21/1) into the mounting tube of the eyepiece adapter via the adapter for dia. 30 mm eyepieces (3-21/2) and align the image position.

## 4 MAINTENANCE AND SERVICE

### 4.1 Maintenance

Maintenance of the instruments is limited to the following operations:

- Disconnect the power unit of the Stemi DV4 / DR from the line after use. Use a suitable cover to protect the instruments from dust and humidity.
- Never expose the instruments to inadmissible climatic conditions (high humidity and temperature).

The best way to remove stubborn dirt on glass surfaces, e.g. finger prints or traces of grease, is the use of a piece of cotton wrapped around a wooden stick and a small amount of distilled water or a non-aggressive solution:

- distilled water: clean glass surface using a slightly moistened wad of cotton by moving in circles starting in the middle.
- optics cleaning solution, consisting of 15% isopropanol and 85 % medical alcohol (benzoline): clean glass surface using a slightly moistened wad of cotton by moving in circles starting in the middle.
- remove dust from optical surfaces using a natural hair brush or an air blower.
- plastic components must be cleaned with commercially available cleaning agents (no solutions!). Stubborn dirt can be carefully treated with pure benzene or petroleum ether.

### 4.2 Consumables

The following consumables can be ordered directly from Carl Zeiss:

Description	Cat. No.	Comments
Halostar frosted halogen lamp, 12 V, 10 W G4	000000-0407-307	For stand C
Decostar halogen reflector lamp 12 V, 20 W GU 4	000000-0407-308	For stand C
Opal glass plate d = 84 mm with stop 40 mm	000000-1055-602	For stand C
Ball-headed screwdriver 3 mm	000000-0069-551	For stand C
Clear glass plate	475265-0001-000	For the attachment for transmitted-light darkfield

### 4.3 Service

All repairs of mechanical, optical or electronic components inside the Stemi DV4 /DR may only be performed by Carl Zeiss service staff or specially **authorized** personnel.

To ensure the optimum setting and trouble-free function of your microscope even for a longer period of time, we would recommend you to conclude a service/maintenance contract with Carl Zeiss.

In the case of subsequent orders or when service is required, please get in touch with your local Zeiss agency.

Further information is also available in the Internet under:

[mikro@zeiss.de](mailto:mikro@zeiss.de)

<http://www.zeiss.de>