# OPMI® VARIO 700
## on the floor stand
### Software Release 1.1

## User Manual

G-30-1716-en

Version 4.1

2011-09-14

*About This Manual*

The user manual is part of the delivery package.

- Please read the user manual carefully before using the device.
- Keep it at the place of use.
- Keep the user manual over the entire service life of the device.
- Pass it on to any subsequent owners or users of the device.
- Also observe the user manuals for accessories and other system components.

*Orientation aids*

– The chapter overview at the beginning of the user manual provides a summary of all subjects.

– The contents of each chapter are specified in detail at the beginning of each chapter.

– A list of abbreviations, key words and technical terms in the annex facilitates the search for specific terms.

*Scope*

The present manual applies to the OPMI® VARIO 700 with the following identification:

– Reference number: 6636

– Software release 1.1

*Trademark*

– OPMI® is a registered trademark of Carl Zeiss.

Information on the manufacturer:

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# Chapter Overview

# Safety Measures

# Key to symbols

We would like to inform you about safety aspects which must be observed when handling this device. This chapter contains a summary of the most important information concerning matters relevant to instrument safety.

## Hazard symbols

The following safety information has been incorporated into the user manual. Please note this information and be particularly careful in these cases.

| | |
|---|---|
| ⚠ **WARNING** | Warning label, which may refer to **fatal injuries** or **severe injuries** if precautions are not followed. |
| ⚠ **CAUTION** | Indicating a hazard, which may lead to **moderately severe injuries** if risks are not avoided. |
| ***NOTE*** | Warning label, which may refer to **minor injuries** and **property damages** if precautions are not followed. |

## Information symbols

The following information symbols are used in this user manual:

– Listing

✓ Prerequisite for an action

• Prompt for action

→ Result of an action

ⓘ Additional information and tips

# Target audience

**CAUTION**

**Operation by trained personnel only**

This user manual is intended for physicians, nurses and other medical staff who prepare, operate or maintain the system after appropriate training. It is the duty of the institution operating the system to train and instruct all staff using the system.

Installation and service work that is not described may only be performed by Carl Zeiss Service or specialists authorized by CZS.

# Field of use

## Intended use

The OPMI VARIO 700 is a surgical microscope intended for the lighting and magnification of the surgical area and for the support of visualization in surgical procedures.
Only use the device in accordance with the intended use.

**CAUTION**

**Injury to the patient's eye!**

The xenon illumination must not be used for ophthalmic procedures.
Make sure that no xenon light enters the patient's eyes or the eyes of those persons in the vicinity of the surgical field. Make sure that no xenon light enters the patient's eyes during paranasal sinus surgery. Cover the eyes of the patient.

**CAUTION**

**Not for diagnosis purposes**

The live image, video sequences and individual images may not be used for diagnostics purposes. Visualized images may contain variations in shape, contrast and color.

***NOTE***

**Have a suitable replacement system ready at hand!**

Like any technical device used in the OR, this system may fail. We would therefore recommend having a suitable surgical microscope at hand as a replacement during surgery.

## Normal use

The OPMI VARIO 700 is a surgical microscope intended for surgical operations and enables the user to visually magnify and illuminate the surgical area.

The system is intended for use in clinics and other human medicine institutions.

## Warranty and liability

Warranty and liability depend on the applicable contractual stipulations.

***NOTE***

**Loss of warranty**

No modifications may be made to this system without the manufacturer's approval. If the system is modified, suitable inspection and testing must be completed to ensure that it can still be used safely.

The manufacturer accepts no liability for damage caused to the device as a result of unauthorized modifications. The warranty also becomes null and void.

# Notes for the operator

- Observe the legal provisions for accident prevention and occupational health and safety applicable in the relevant country.
- Modifications and repairs of this device or any equipment operated together with this device may only be performed by Carl Zeiss service staff or other persons authorized by Carl Zeiss.
- If required by the regulations and directives applicable in the country of use, connect the system to a special emergency backup power supply.
- Ensure that the installation conditions and the use of the device meet surgical requirements: See ambient conditions page 223.
- Never cover any ventilation openings on the light source and carrier arm as the system switches off in the event of overheating.
- Never attempt to forcefully attach any electrical connections (plugs, bushings). If a plug cannot be connected easily, check again whether the plug and socket are made to fit. If the plug connection is damaged, please call our service department. They will be happy to assist you.
- Do not use multiple sockets!
- Never open the device! The device contains freely accessible live components. If you remove the housing, you run the risk of electric shock.
- Do not touch the system if your body is electrostatically charged and the system is not grounded.
- Please note the information on EMC (electromagnetic compatibility) in the chapter "System data" on page 209.
- To prevent malfunctions, signal lines may not run parallel to power supply lines.
- Switch off the unit at the power switch if you notice any smoke, sparks or unusual noise. Do not use the unit until it has been repaired by our service team.
- Never leave a device unattended with the light source still switched on.
- In order to prevent any impairment of the device's safety due to age, wear, etc., the user must ensure that the device is subjected to the necessary safety checks (see section "Care and maintenance").
- Go through the checklist in the chapter "Operation".
- Never operate the system unattended.

- Always switch off the system
  - before disconnecting it from / connecting it to line power
  - if it will not be used for a prolonged period of time
  - or for cleaning purposes.
- Always use the master switch to turn off the device if it is not in use.
- Insufficient, faulty or wrong methods of cleaning or not disinfecting the device according to this instruction manual may severely increase the risk of infecting the patient and/or medical personnel.

# Requirements for operation

## Prior to the very first use

Our service representative or an expert authorized by us will install the system. Please make sure that the following requirements continue to be met for further operation:

- ✓ The connecting components have been properly connected. The screw connections have been firmly tightened.
- ✓ All cables and plugs are in perfect condition.
- ✓ The voltage set on the system corresponds to the rated line voltage on the site of installation.
- ✓ The power cord is plugged into a power outlet which has a properly connected protective ground contact.
- ✓ The device is connected with the power cord supplied.

# Risk of burn injuries caused by high illumination intensity

⚠ **CAUTION**

**If the xenon light is not used as intended, excessive illumination intensity may result in third-degree burns.**

### General

This system features a powerful xenon light.

- A device with light source switched on may never be left unattended.

The risk of burns is influenced by several different factors.

**System-related factors:**

– The wavelength range is limited by filters to the visible range between 400 nm and 700 nm. These filters remain stable over a very long period of time and cannot be exchanged by the user.

– With increased aging of the light source, the illumination intensity delivered for a particular setting decreases. When the lamp is replaced, the illumination intensity increases again to the high, original value.

– There are certain accessories (e.g., folding tube f = 170/260 mm, or eyepieces with increased magnification) which, when used, may reduce the image brightness at the user's eye. In this case, check whether the user settings are the proper ones for the particular accessories and reduce the light intensity to the minimum required for the application.

**Surgery-related factors:**

– The selected intensity of the light source is a major factor for the risk of injury. It should always be set to the minimum required for the surgical procedure to be performed.

– The size of the luminous field influences the injury risk in two respects:

  – If the diameter of the luminous field is large, areas of the skin are illuminated which are not monitored as strictly by the surgeon and which are not moistened sufficiently. These areas represent a particular injury risk. Such injuries can be prevented by adjusting the luminous field diameter to the smallest size required for that particular operation.

  – If the luminous field is reduced in size, the intensity increases because the light focus becomes stronger. If the luminous field is reduced in size, the intensity should therefore also be reduced, if possible.

- A long surgical procedure increases the risk of injury, in particular if a standard procedure takes considerably longer than usual.
- Injuries in the peripheral area can be prevented by covering this area with moist, sterile gauze.
  The gauze must be moistened at regular intervals to avoid that the area dries out or heats up. The risk is increased if dry drapes are used to cover such areas.
- You should also take into account that some areas of the body may be more sensitive than others.
- Certain preparations of the surgical field, local vasoconstrictive medications and incision drapes may also result in a higher risk of injury (drapes may heat up to varying degrees depending on their color and moisture content).

**Patient-related factors:**

- The general condition of a patient's health may contribute to the risk of injury.
- The skin type may also play a major role in this respect.
- Certain medications affect the sensitivity to light.
- The interaction of heat and antimicrobial substances in incision foils may increase the patient's reaction to these substances.

**Recommendations**

Due to the large number of different factors involved and the lack of scientific publications on this topic, Carl Zeiss cannot provide guidance on acceptable intensities and exposure durations. However, this system has several features that can help the user to reduce the risk of burns.

- The initial light intensity can be preset to a low value.
- The automatic Iris Control Function keeps the light intensity in the illuminated area virtually constant, irrespective of the size of the luminous field.
- The Spot function allows reducing the size of the illuminated area to the area of observation during surgery.
- Using the buttons on the hand grip or foot control panel, the surgeon can then set the illumination intensity to the value required for the procedure. Please note that the intensity increases with decreasing luminous field size if the Spot function is used. For this reason, the intensity should only be set after the size of the luminous field has been changed.

– Usually, the magnification factor is increased during surgery. This darkens the image so that the illumination intensity must be increased. This loss in image brightness is automatically compensated if the zoom-dependent brightness control is activated.

– A device with light source switched on may never be left unattended.

– The risk of burns can be reduced by constantly irrigating the illuminated surgical field and by keeping it moist.

– If used, drapes should also be re-moistened at regular intervals in order to prevent heat from accumulating underneath the drape.

• Switch off the light when the microscope is not in use, and ensure it is not directed at unprotected bare skin.

Final remark
Carl Zeiss recommends:

– Reduce the lighting of the surgical field - as far as is possible for the safety of the patient and for a good microscopic image.
The setting of the illumination intensity has been preconfigured at the factory such that an audible signal alerts the user to potential tissue damage caused by excessive light intensity, once the light threshold is exceeded.

– Adjust the light threshold (page 138).

## Explanation of the visual and acoustic signals

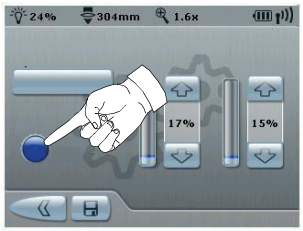
| Device function | Visual signal |
|---|---|
| Device ready<br>(brakes ready) | Power switch lights permanently green and main menu is shown on the display |
| "Light only" mode | "Light only" switch lights continually orange |
| Device off | Power switch does not light up |
| Indicates that a message is being shown on the display | Warning triangle is shown on the additional display |

| Situation | Acoustic signal* |
|---|---|
| For all messages displayed | Sound (ca. 250 ms) |
| On exceeding the light threshold | Sound (ca. 500 ms) |
| Speedfocus has focused. | 1 sound (ca. 50 ms) |
| Speedfocus has not focused<br>Focusing not possible. | 3 sounds (ca. 3 x 50 ms) |

* ) the duration of the sound varies but the frequency does not.

# Safety devices

## Automatic Iris Control




**Problem**

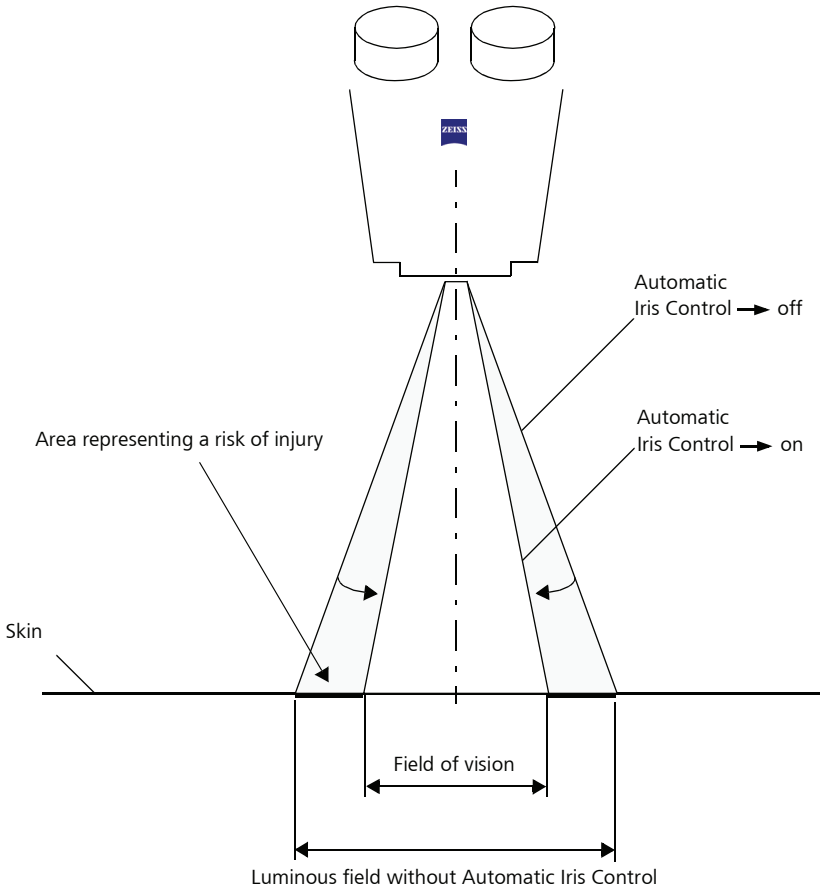
For a large luminous field diameter, areas of the skin are illuminated which are not monitored as strictly by the surgeon and which are not moistened sufficiently. These areas represent a particular injury risk. These kinds of injuries can be prevented by adjusting the luminous field size of the field of vision (see diagram on the following page).

If the luminous field is reduced in size, the intensity increases because the light is focused more. So, if possible, the intensity should be lowered as soon as the size of the luminous field is reduced.
A long surgical procedure increases the risk of injury, especially if a standard procedure takes considerably longer than usual.

Remedy: Automatic Iris Control

The effect of Automatic Iris Control is that the luminous field size automatically adjusts to the size of the field of vision irrespective of zoom and focus.

Also, the light intensity adjusts to this change, meaning the image of the surgical field the user sees in the eyepiece is more or less uniformly bright (see page 138).
Every user profile has a setting for whether Automatic Iris Control is enabled or disabled.


Automatic
Iris Control → off
Automatic
Iris Control → on
Area representing a risk of injury
Skin
Field of vision
Luminous field without Automatic Iris Control

## Focus-light control

The focus-light control is a safety feature intended to prevent possible tissue damage due to excessive illumination intensity.

**CAUTION**

**If xenon illumination is used improperly, excessive illumination intensities may lead to third-degree burns!**

The focus-light control regulates the illumination intensity as a function of the working distance. With increasing working distance, the user has accordingly more light available.

The set maximum illumination intensity is shown by a blue bar (1) in the light controller (e.g., max. 24%).
The illumination intensity is reduced to the set limit value (1). It can be set within the range below the blue bar, but not above it.

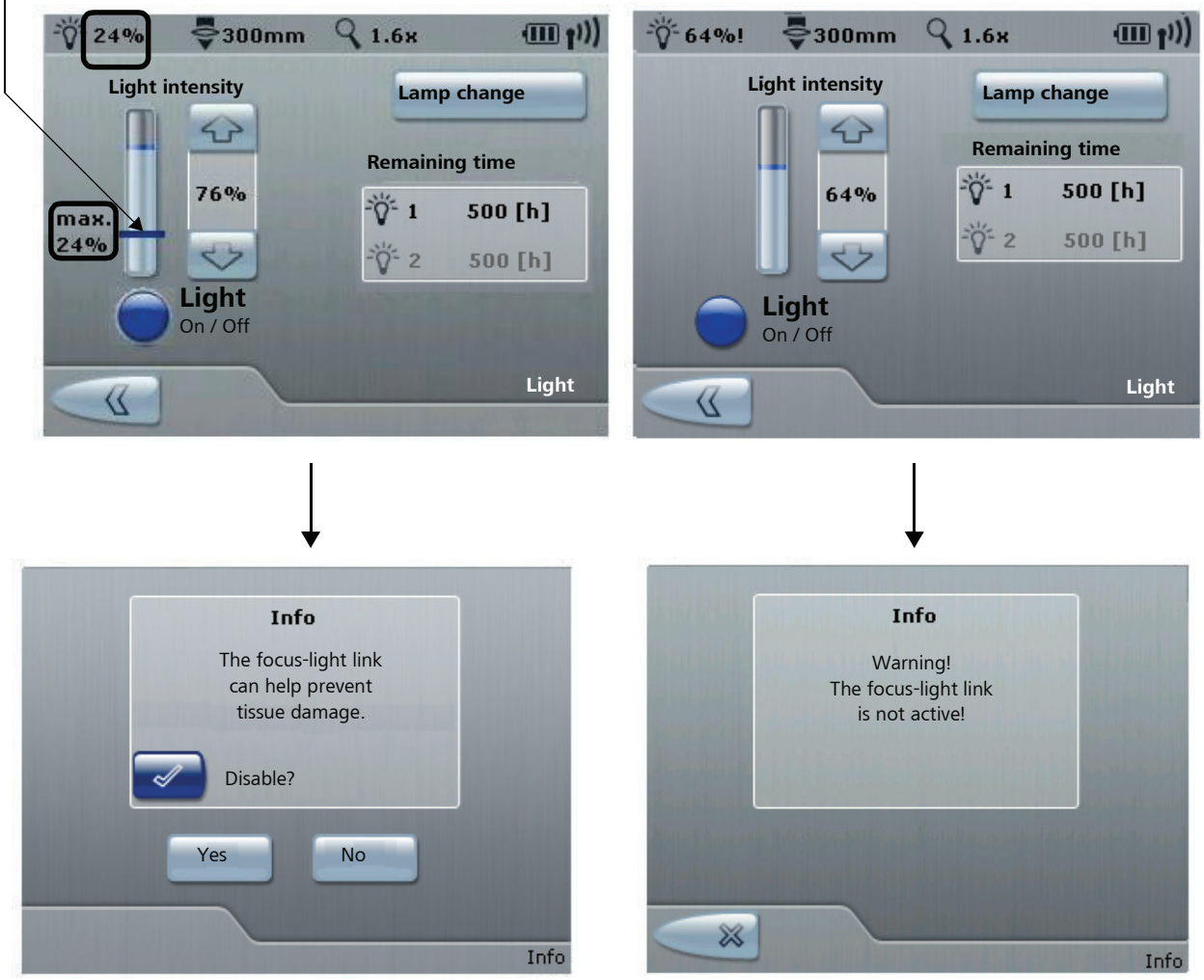
The focus-light control function can be enabled or disabled by the user as required. It is enabled by default. The factory setting is 25%.

The service technician can set the focus-light control to a value between 5% and 100% in the Service menu.

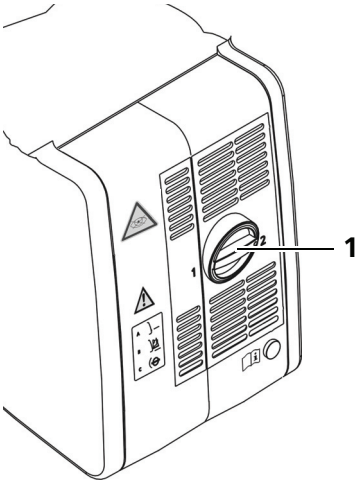
The service technician can configure the focus-light control in the Service menu such that it cannot be disabled.

For focus-light control, please refer to: Light - Adjusting the light, page 140.

**1** *Focus-light control enabled* *Focus-light control disabled*



## 180W xenon lighting




- The xenon lighting unit has a built-in UV/IR heat protection filter.
- Display of the light intensity (as a percentage) on the display and additional display.
  If the light intensity is greater than or equal to the threshold set, an exclamation mark is displayed after the light intensity display and a warning is sounded on exceeding the threshold.
- Note on exchanging the lamp
  The lamp has a maximum service life of 500 hours.
  Once the lamp being used has reached 450 operational hours, the display informs the user on restarting the system that the maximum service life is soon to be reached.
- Temperature monitoring
  The device monitors the temperature. The light source is switched off if too high a temperature is reached.
- Second lamp
  The 180W xenon light source has a lamp module that contains two xenon lamps. The second lamp can be swung into position manually should the first lamp fail.

**1** "Position second lamp" button
See page 172

Information on the 180W and 300W xenon lighting units (option):

**CAUTION**

**Lamp failure**

- The service life of the xenon lamp is limited to 500 hours. If the service life of the lamp is exceeded, the xenon lamp may suddenly fail.
- With increased aging of the light source, the actual illumination intensity at a particular setting decreases.

• Please replace the xenon lamp in good time.
  Note the remaining hours display on the screen.

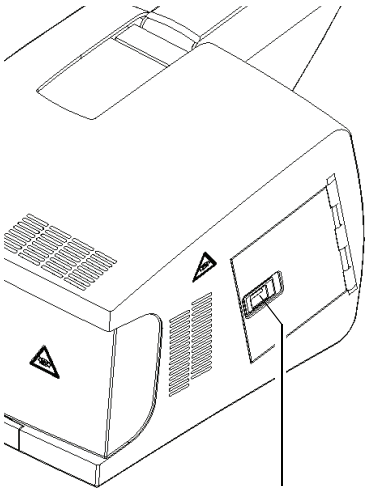
***NOTE***

Light failure

Never cover any ventilation openings as the light source of the system switches off in the event of overheating.

## 300-W xenon lighting (optional)

- The 300-W xenon lighting unit has a built-in UV/IR heat protection filter.
- Display of the light intensity (in percent) on the display and additional display.
  If the light intensity is greater than or equal to the threshold set, an exclamation mark is displayed after the light intensity display and an audible signal is issued (see page 16).
- Note on lamp change
  The lamp has a maximum service life of 500 hours.
  Once the lamp in operation has reached 450 operating hours, the display informs the user on restarting the system that the maximum service life will soon be reached.
- Temperature monitoring
  The device monitors the temperature. If the temperature is too high, a message is shown on the display and an audible signal is issued. The light source is switched off if the temperature becomes too high.
- Lamp 2 (automatic lamp change, see page 174)
  The 300-W xenon lighting unit features two lamps. If the active lamp fails, it is automatically replaced by the other lamp.
  However, lamp change can also be triggered via the control panel.
  If automatic lamp change fails, the lamp must be replaced manually (see page 176).
  A lamp can only be replaced manually (see page 190).



**1**

**1** Fastener for opening the lamp housing
Opening the lamp housing isolates all accessible parts from the power supply.

# "Light only" mode

**1** Button for "Light only" mode
If one of the main functions fails (focus, zoom, light control, magnetic brakes) and other functions are affected, press the orange-colored button for "Light only" mode.

The system reacts as follows:

– All electrical components (except the light source) are isolated from the power supply.

– The light source adjusts to a brightness of maximum 75% to permit you to complete the application.

– The magnetic brakes remain engaged and cannot be released.

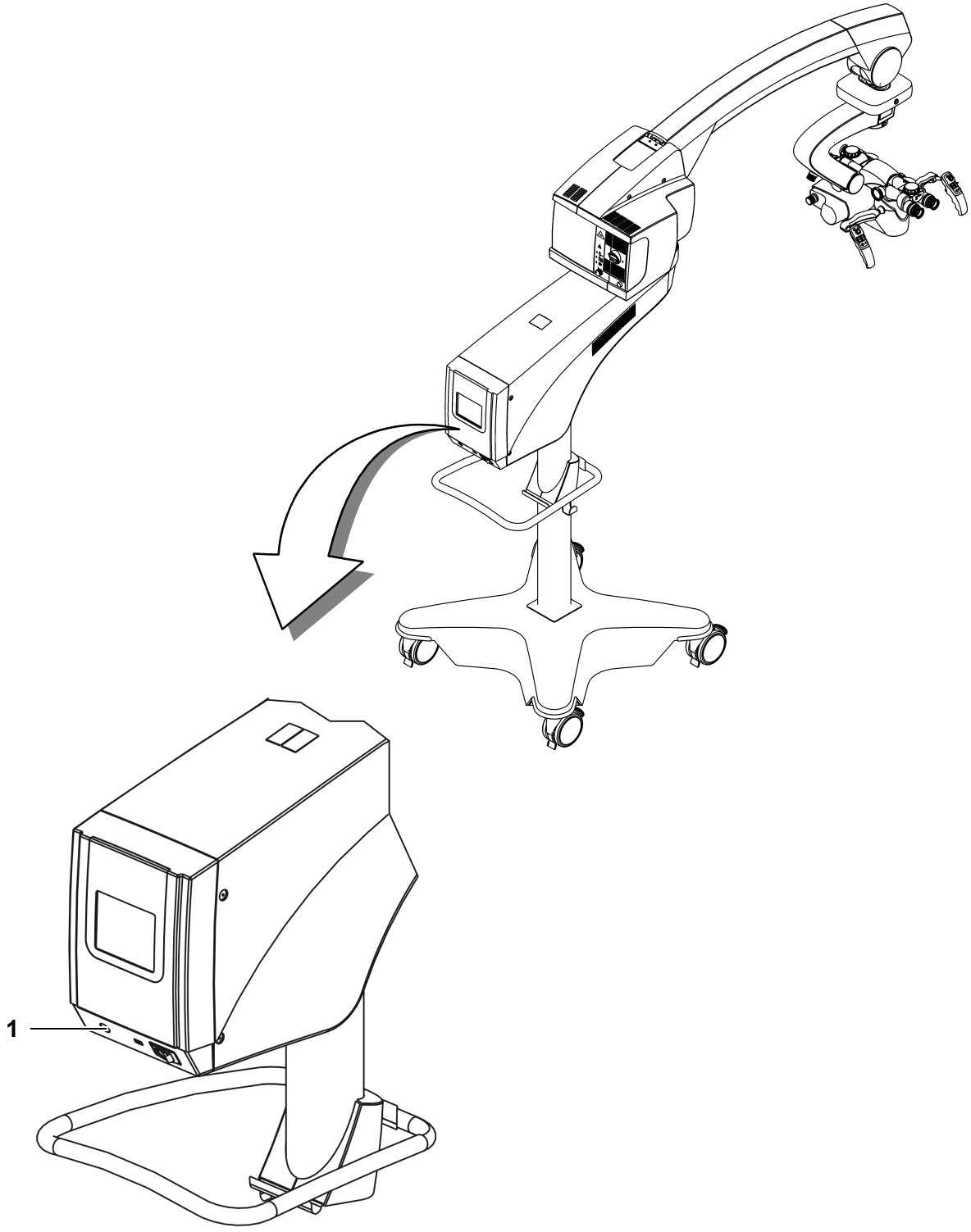
– Display, additional display and optional TFT screen are switched off.

To be able to continue working:

- manually adjust the magnification on the zoom adjustment knob of the microscope
- manually adjust the working distance on the focus adjustment knob of the microscope
- manually adjust the luminous field diameter
- manually position the stand for focusing and for moving the system in the X-Y directions

Press button (1) once more. The button disengages and the device starts. If you experience problems in rectifying a fault or if faults keep recurring, stop using the system, label it as non-operational and contact Carl Zeiss Service.

To guarantee smooth operation of "Light only" mode, check its function at regular intervals by enabling the mode (without patient).


1

# Symbols and labels on the device

**CAUTION**

**Observe all warnings and information labels!**

- If you notice that any label is missing on your device or has become illegible, please contact the Carl Zeiss service department.

## Labels on the microscope

F

**1** Labeling of the focus button

Z

**2** Labeling of the zoom button

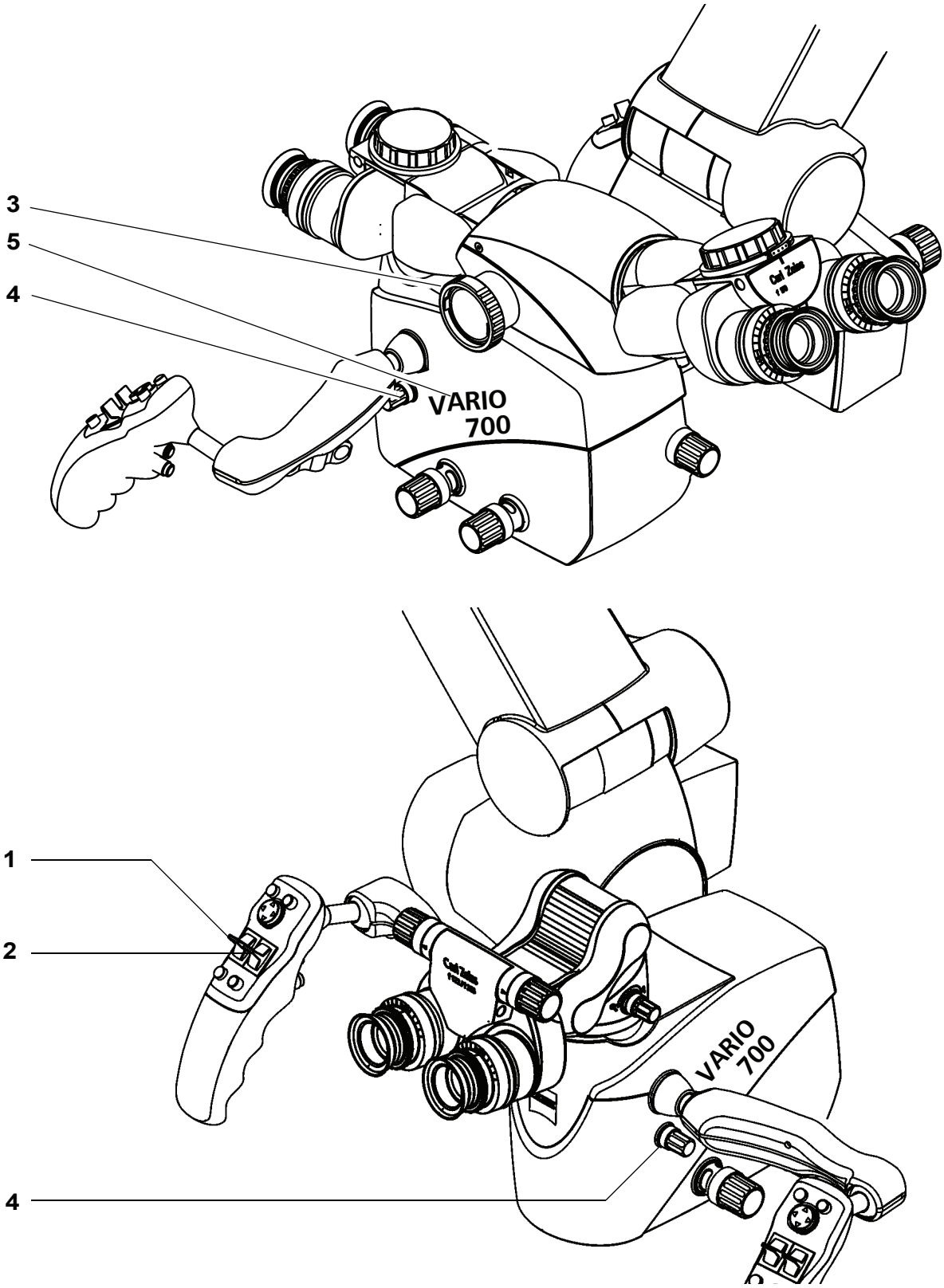
Open

**3** Note "Open in direction of the arrow"
on the knurled rings of the left and right image output ports.

**4** Symbol for the zoom adjustment knob for manual operation
Identifies the two directions of rotation to increase or reduce the zoom.

VARIO
700

**5** Labeling of the microscope


3
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VARIO
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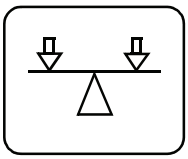
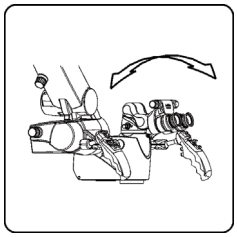
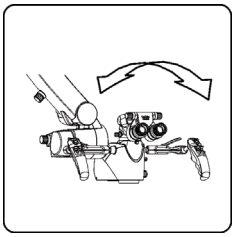
VARIO
700



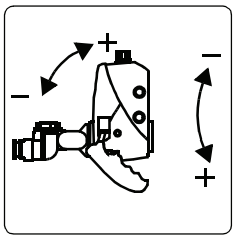
**6** Autobalance label (option)



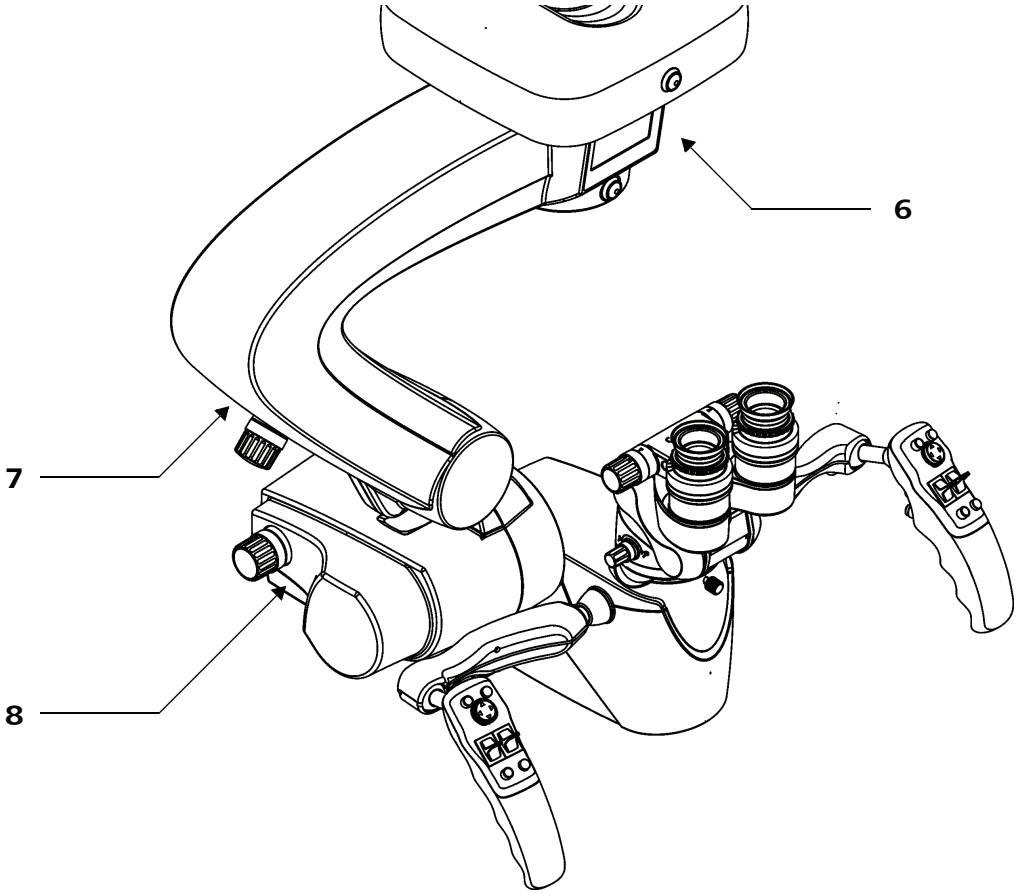
**7** Manual balancing label: front to back tilt



**8** Manual balancing label: lateral tilt




**9** Fine adjustment label
Fine adjustment of the microscope's tilt motion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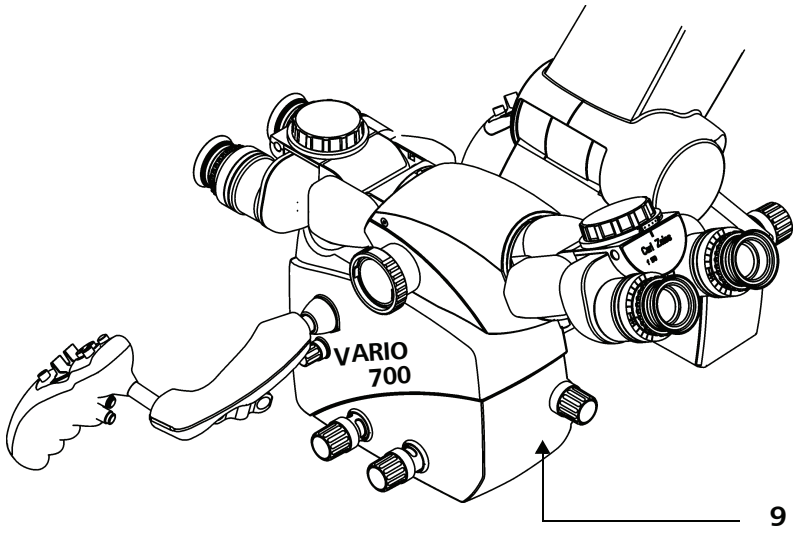

VARIO
700
9

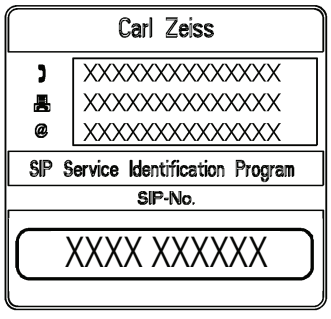
## Labels on the suspension system


**10** Rating label

The rating label contains the following information:

| | |
|---|---|
| – Manufacturing symbol | |
| – Manufacturer (company name) | Carl Zeiss Meditec AG |
| – Manufacturer's address | Goeschwitzer Strasse 51-52<br>07745 Jena, Germany |
| – Serial number | SN xxxxxxxxxx |
| – System name | OPMI VARIO 700 |
| – Reference number | REF 6636 |
| – Rated voltage | (115 V): 100 V-125 V<br>(230 V): 230 V-240 V |
| – Current consumption | max. 1200 VA |
| – Line frequency range | 50 Hz-60 Hz |
| – Protection type | IP20 |
| – CE mark | |


**11** NRTL approval




**12** SIP label

The SIP label contains the following information:

– Manufacturer (company name)

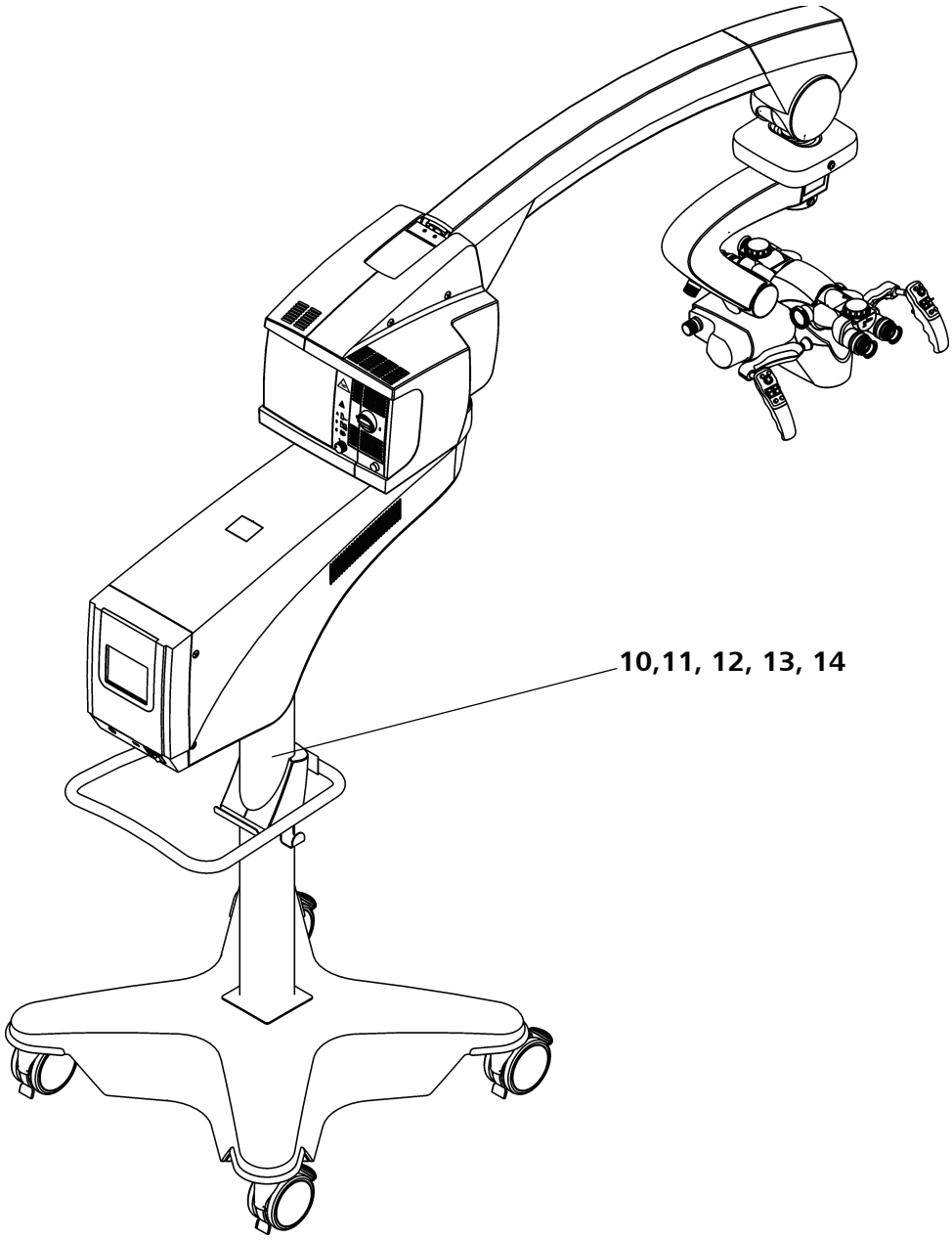
– Manufacturer's contact data,

– i.e., phone number, fax number and email address of the local contact of the national Carl Zeiss sales organization.

– SIP number
A unique identification number assigned to your system. A product file is maintained by Carl Zeiss for this SIP number.


**13** "Year of manufacture" label
This label indicates the year the system was manufactured.

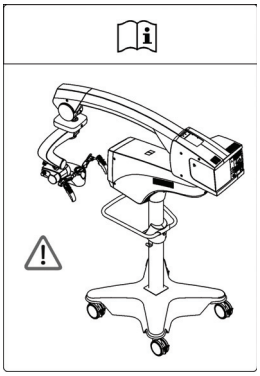
**14** "Observe disposal regulations" label
Electrical or electronic devices must not be disposed of as normal domestic waste. For more information on the disposal of electrical and electronic devices, please see the chapter "Maintenance and care".



**15** "Observe instructions for use!"
Observe the user manual or accompanying documents.

**16** "Risk of crushing" label
Fingers may be crushed. Do not touch this area while moving the surgical microscope or parts of it.


**17** "Maximum load" label on the microscope body
The maximum load (accessory equipment) on the microscope body may not exceed 7 kg!

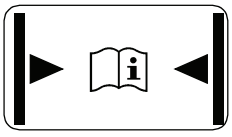


**18** "Moving position" warning label
Indicates the transport position of the system. Before transporting the system, make sure that it is in this position in order to avoid any damage.

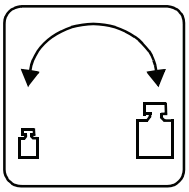
**19** Light Only mode
The OPMI and suspension system functions are deactivated. Illumination continues to operate at a constant intensity.

USB

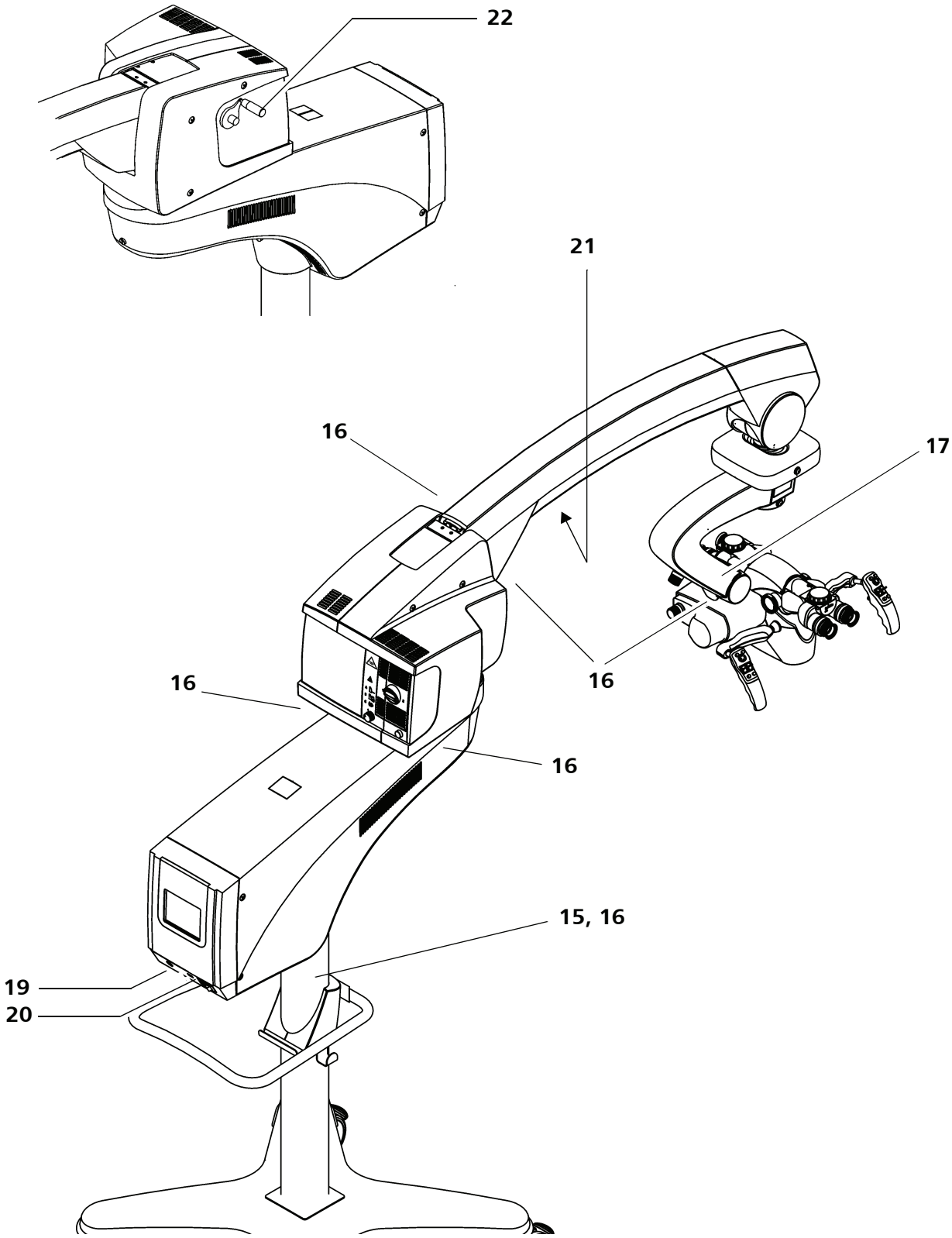
**20** USB port (video recording option)
Identifies the connector e.g. for USB sticks or external HDDs.



**21** "DRAPE" label
The drape is secured here with straps so that it is nearly airtight.



**22** Label for manual balancing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16
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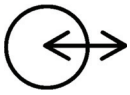
**23** "FCP Gateway WL" label (optional)
This device complies with Part 15 of the FCC Rules and with RSS 210 standard (Canada). Operation is subject to the following conditions:

- The device does not cause harmful interference.
- The device must remain operative even under the influence of unwanted frequencies.

**24** Potential equalization
for connection of the system to the potential equalization system.

**25** "Connector for foot control panel" label



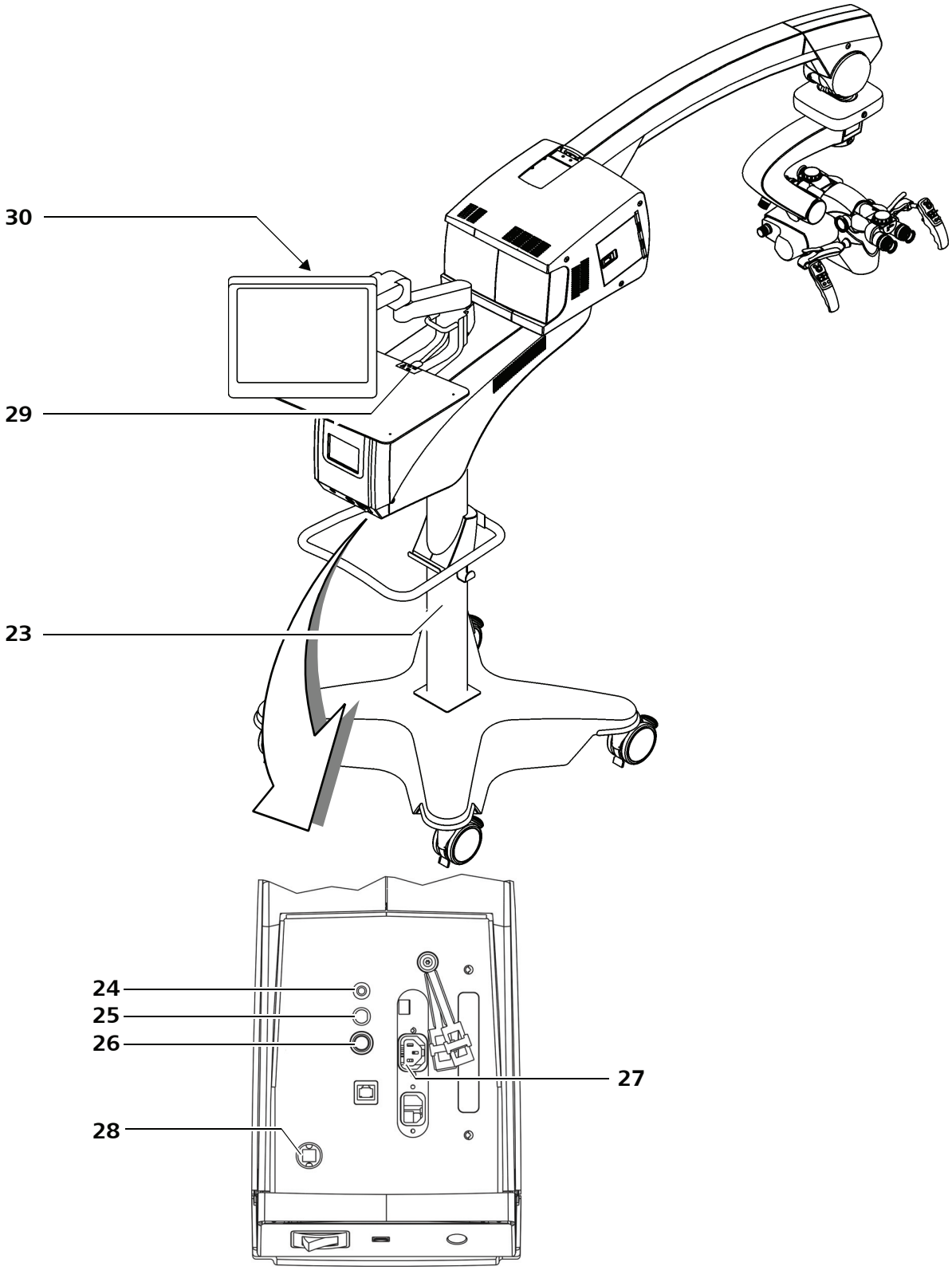
**26** Remote connector
This label identifies a connection on the device with max. 24V/0.5A


**27** Power outlet socket warning label
Only connect devices with the correct electrical ratings.

**28** Defined user group
Identifies the service interface.


**29** "Maximum load on instrument tray" warning label
Indicates that the maximum load capacity of the instrument tray for accessory equipment is 13 kg.


**30** "Videomonitor" label
Identifies the mounted video monitor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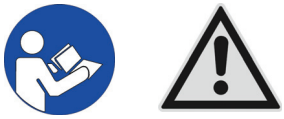
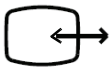
**31** Connector for cable
for a microscope navigation system (option).



**32** "Ethernet connector (LAN)" warning label
Prerequisite: video option

**SD connector panel (option)**



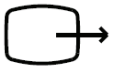
**33** Video signal output/input port (orange)
(e.g. for an SD endoscope camera)

**34** Video signal output port: Y/C or S-Video
(e.g. Y/C: video signal output port for an external monitor

**35** Video signal output port: VBS

**HD connector panel (option)**

**36** Video signal output port: YPbPr

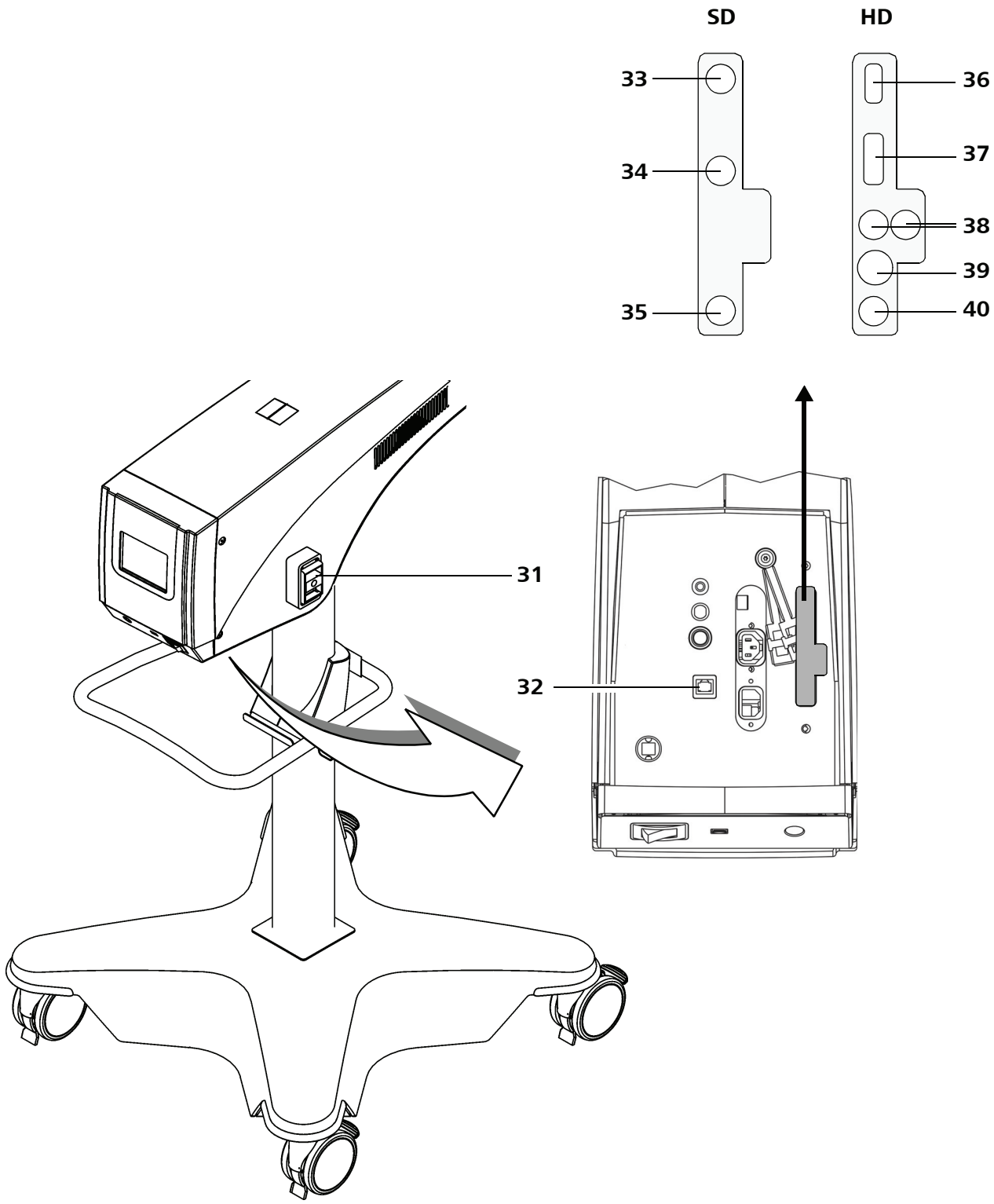


**37** Video signal output port: DVI-D


**38** Video signal output port: HD-SDI

**39** Video signal output port: Y/C or S-Video

**40** Video signal output port: VBS


SD
HD
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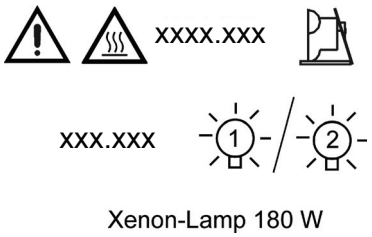
## Labels on the 180W illuminator

**41** Warning label Injury to the patient's eye!
Xenon illumination must not be used for ophthalmic procedures.

Make sure that no xenon light enters the patient's eyes.

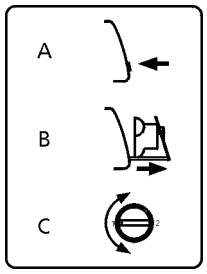
**42** Warning label "CAUTION "
Observe the user manual or accompanying documents.

**43** Labels on the inside of the 180W xenon lamp




- CAUTION label, "Hot surfaces" warning label
  Order no. of the lamp module and symbol for the lamp module
- Order no. of the individual lamps
  Lamp symbol: lamp 1 and lamp 2

**44** Pointing arrow for lamp module change



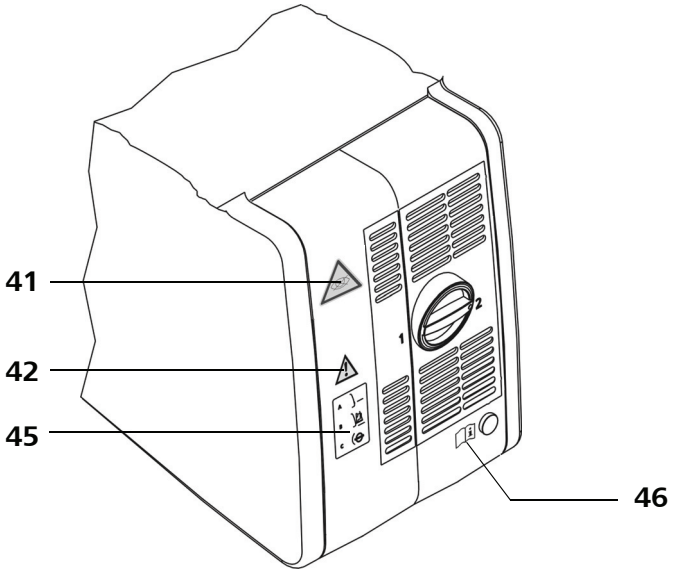

**45** Changing the lamps
The label shows the three steps for the replacement of a lamp.

A - push button

B - pull out lamp module

C - replace lamps

**46** "Observe the user manual" label
Observe the user manual or accompanying documents.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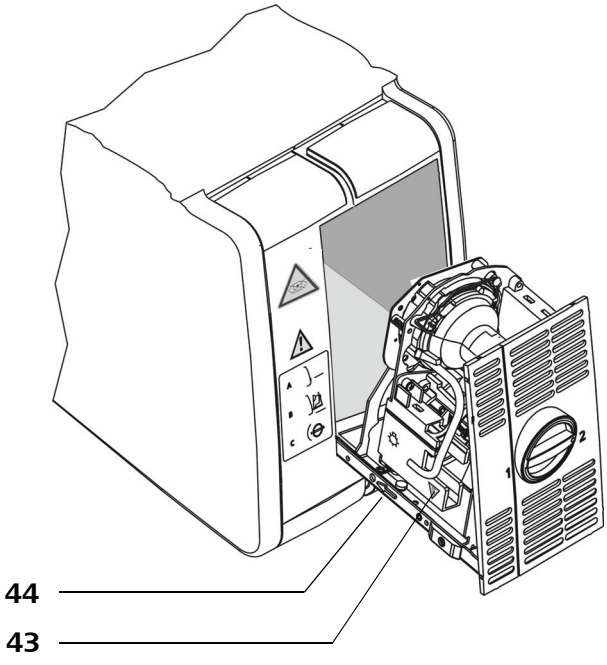
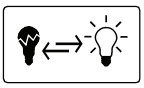

44
43

## Labels on the 300-W xenon illumination system (optional)

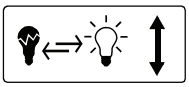
**47** Warning label: Injury to the patient's eye!
Xenon illumination may not be used for ophthalmic procedures.
Make sure that no xenon light enters the patient's eyes.

**48** "CAUTION" label
Observe the user manual or accompanying documents.

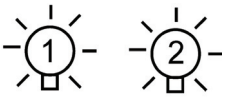


**49** "Lamp change" label
This label marks the cover to be opened for changing the lamp.

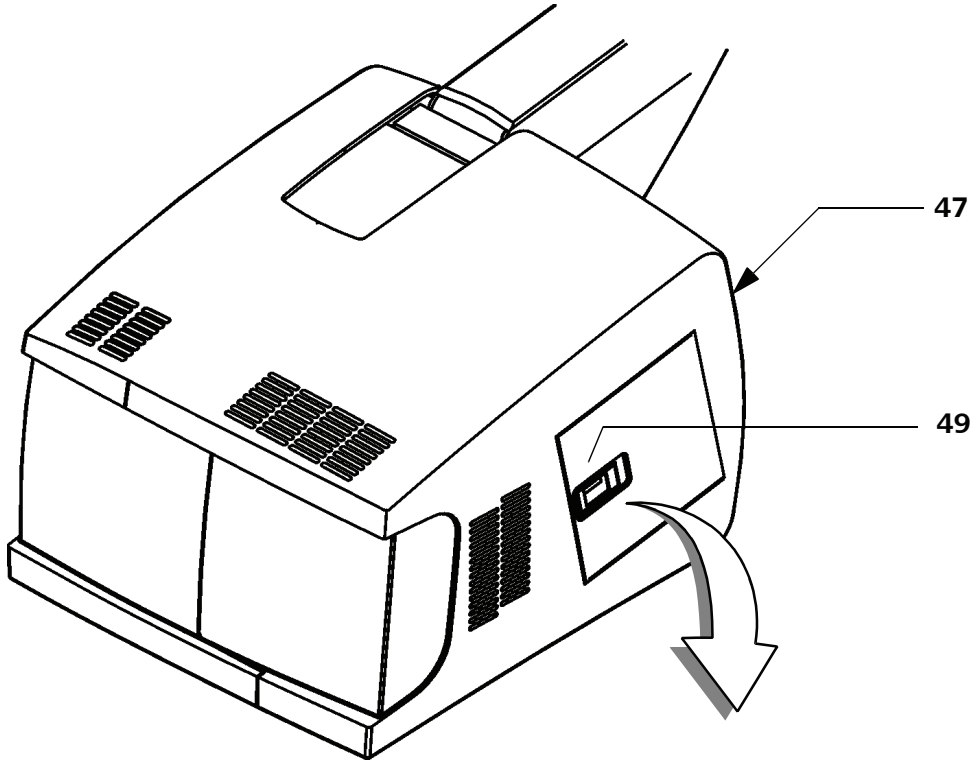
**50** "Hot surfaces" warning label
Caution, risk of burns!
Only change the lamp module after it has cooled down.



**51** "Lamp change" label
This label marks the cover to be opened for changing the lamp.




**52** Lamp 1 / Lamp 2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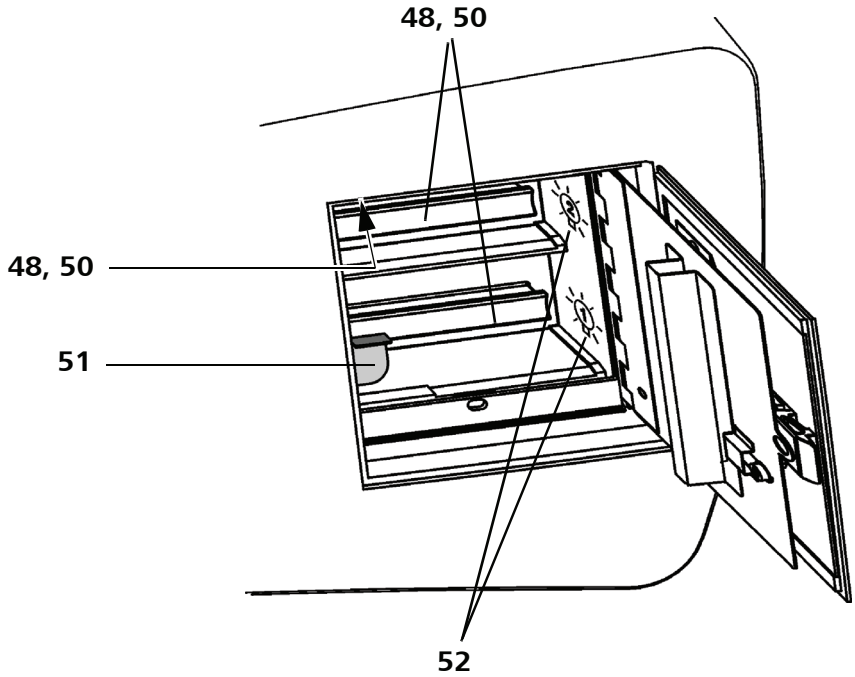
48, 50
48, 50
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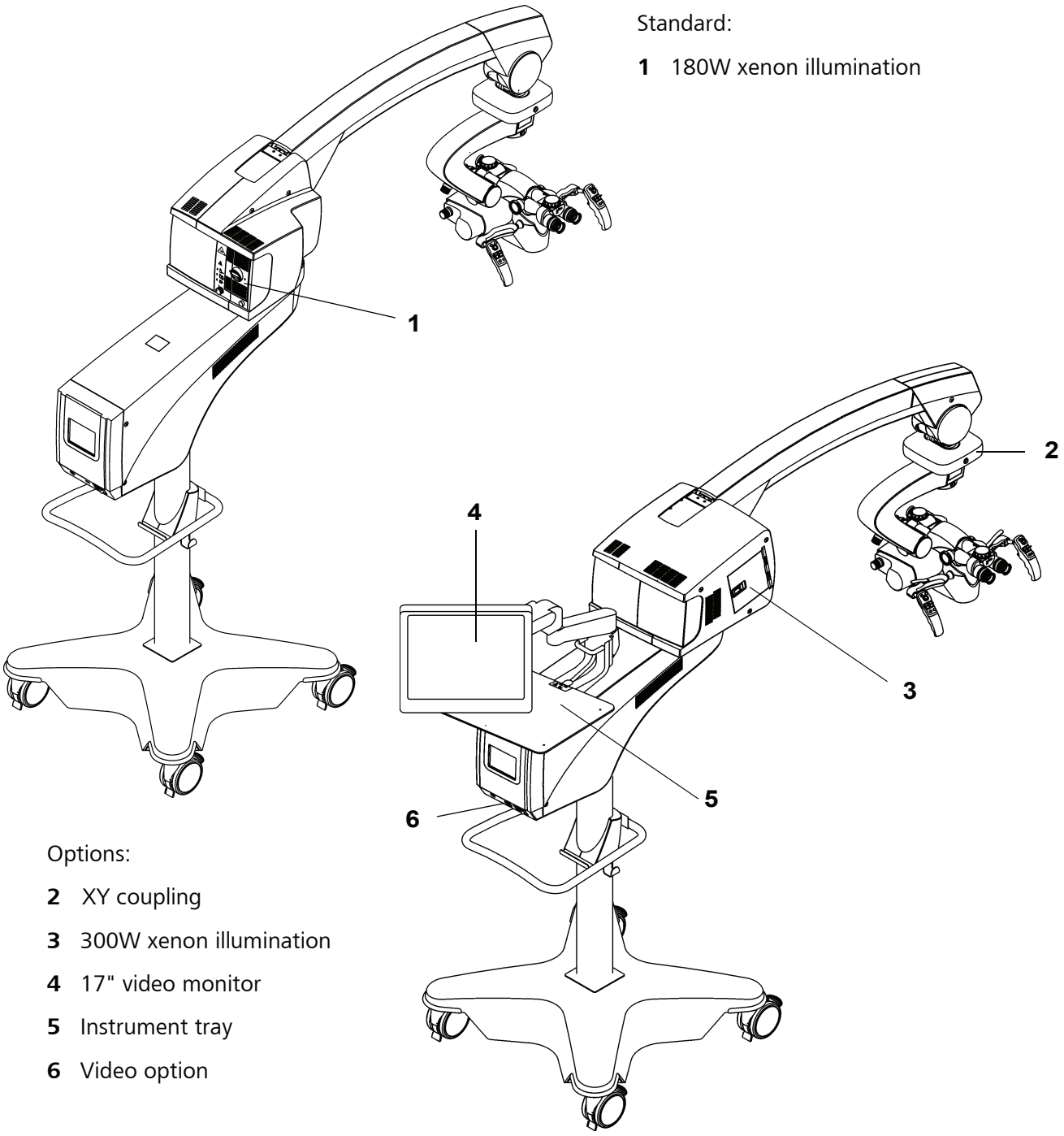
52

# System Overview

# Configuration options




Standard:

**1** 180W xenon illumination

Options:

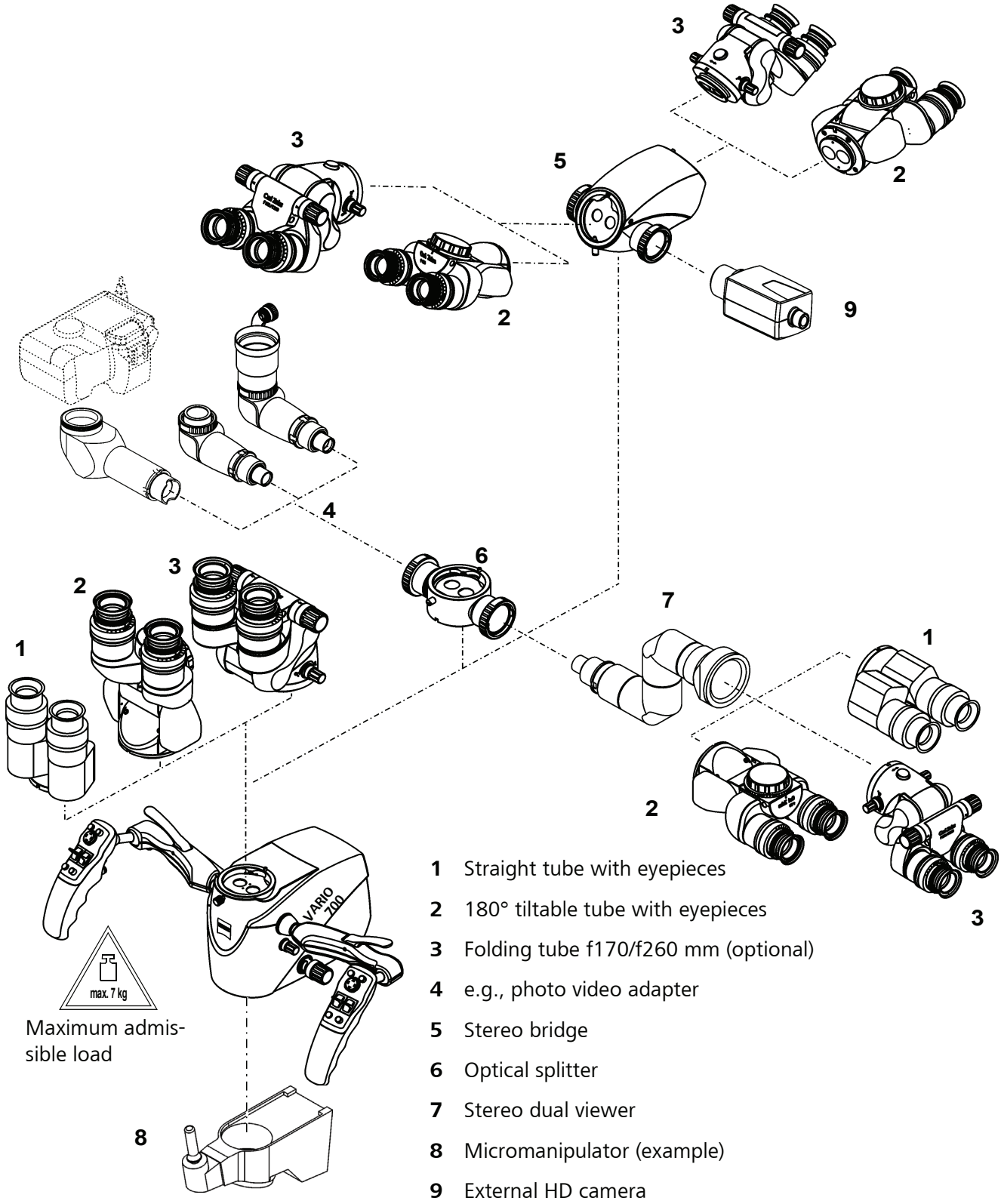
**2** XY coupling

**3** 300W xenon illumination

**4** 17" video monitor

**5** Instrument tray

**6** Video option




Maximum admissible load

**1** Straight tube with eyepieces

**2** 180° tiltable tube with eyepieces

**3** Folding tube f170/f260 mm (optional)

**4** e.g., photo video adapter

**5** Stereo bridge

**6** Optical splitter

**7** Stereo dual viewer

**8** Micromanipulator (example)

**9** External HD camera

# Overview

*Surgical microscope*

The surgical microscope enables the illumination and visual magnification of the surgical field. For visual observation, the surgical microscope can be equipped with different tubes, eyepieces and coobservation tubes.

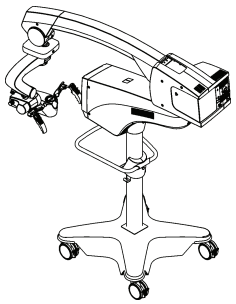
*XY coupling (option)*

The optional XY coupling is located on the suspension system of the stand and can be moved horizontally by +- 30 mm in the X and Y directions using the joystick button of the handgrips or the joystick on the foot control panel.

*Floor stand*

The floor stand is used to power and control the microscope functions. It comprises the stand column, stand base, carrier arm, lamp housing, suspension arm and suspension system. All movement axes are provided with electromagnetic spring brakes which can be unlocked and locked by the user via a button on the handgrip.
The system can be equipped with various options (see the following page).

*Standby position*



The six axes enable rough positioning of the surgical microscope and moving it into its standby position. In the horizontal position, the suspension arm provides a working range of approx. 1600 mm between the column and the optical axis. The maximum height of the suspension system has been designed in such a way that a user with an eye height of approx. 200 cm can look straight into the eyepiece in an upright, standing position.

The light source in the lamp housing supplies light to the surgical microscope. Depending on the ordered configuration, the system is equipped with a 180 W or 300 W xenon light source.

A handle mounted on the stand column facilitates moving the system. There are two cable brackets on the left and right side of the column that can be used to wind up the cables and to attach the foot control panel. The stand base has four steerable casters, each with a brake tab. The casters must be locked to ensure that the stand is securely positioned. The casters are provided with cable deflectors.

*Instrument tray and 17" video monitor*

The system can optionally be equipped with an instrument tray for Zeiss equipment and a 17" video monitor.

*Video*

The surgical microscope can optionally be equipped with internal or external SD or HD camera systems.

# Options

(for ordering data, see page 217)

- AutoBalance
- AutoDrape
- Navigation interface
- XY coupling
- SpeedFocus (requires video option)
- Video focus and Video SpeedFocus
- 300-W Superlux xenon illumination system with automatic lamp change
- Video in (requires 3CCD video standard definition option)
- FCP foot control panel (14 functions), wired
- FCP WL foot control panel (14 functions), wireless via Bluetooth
- 3 CCD HD video (high definition)
- 3 CCD video (standard definition)
- Integrated USB recording
- Ethernet interface
- Instrument support
- Integrated 17" TFT video monitor with carrier arm and tray
- Integrated 17" TFT video monitor with carrier arm

# Surgical microscope

**1** Securing screw
For attaching tubes and accessories (e.g. stereo bridge)

**2** Handgrip clamp

**3** Handgrips

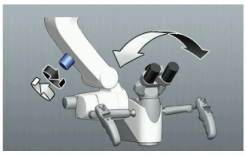
**4** Adjustment knob, zoom
For manual setting of the zoom system

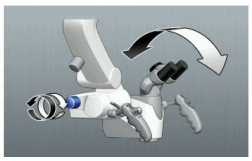
**5** Adjustment knob, focus
For manual setting of the working distance. The working distance set can be read from the control knob.

**6** Adjustment knob for luminous field diameter
For manual setting of the luminous field diameter.

**7** Additional display

**8** Knob for AutoBalance (option, see page 100 and page 55)
To activate AutoBalance
Manual adjustment not applicable for AutoBalance (9 ,10 and 11).

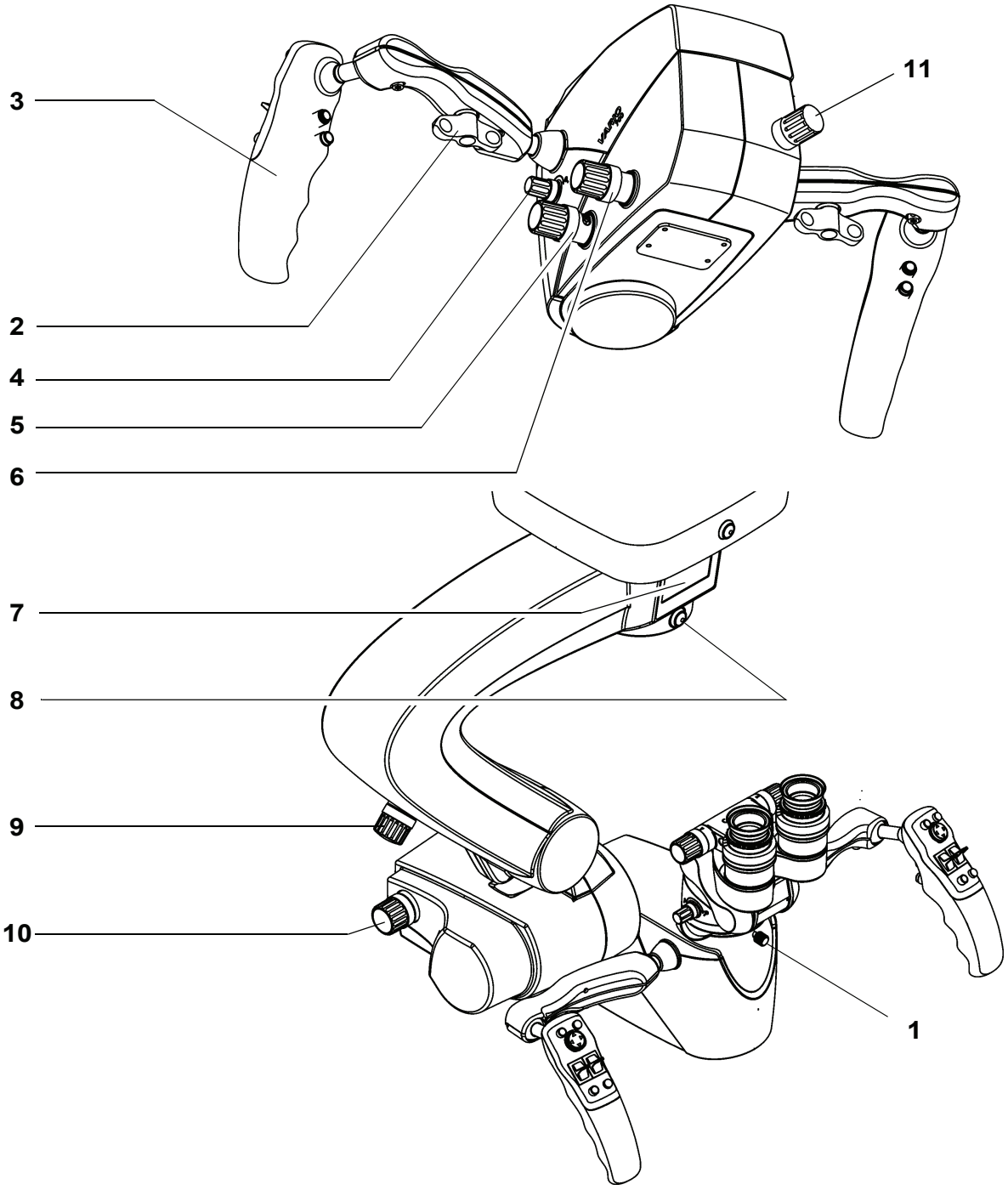




**9** Balance setting, microscope tilt axis (manual)
For manually setting the balance of the microscope's swivel motion.

**10** Balance setting, microscope swivel motion (manual)
For manually setting the balance of the microscope's tilt motion.

**11** Fine balancing, microscope (manual)
For fine adjustment of the microscope's balance.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## Handgrips

**1** Programmable button **A** (see page 152)

**2** Programmable button **B** (see page 152)

**3** Joystick
The joysticks on the left and right handgrips are used in the basic settings for motorized fine adjustment in the XY direction (optional).
If the navigation system is connected, the joystick on the right handgrip is used to control a mouse pointer for the functions of the navigation system connected (dependent on system).

**4** Rocker switch Focus + / Focus - (factory setting)
For continuously variable focusing within the working distance. The current value is shown on the display or additional display.

**5** Rocker switch Zoom + / Zoom - (factory setting)
To adjust the magnification. The current value is shown on the display or additional display.

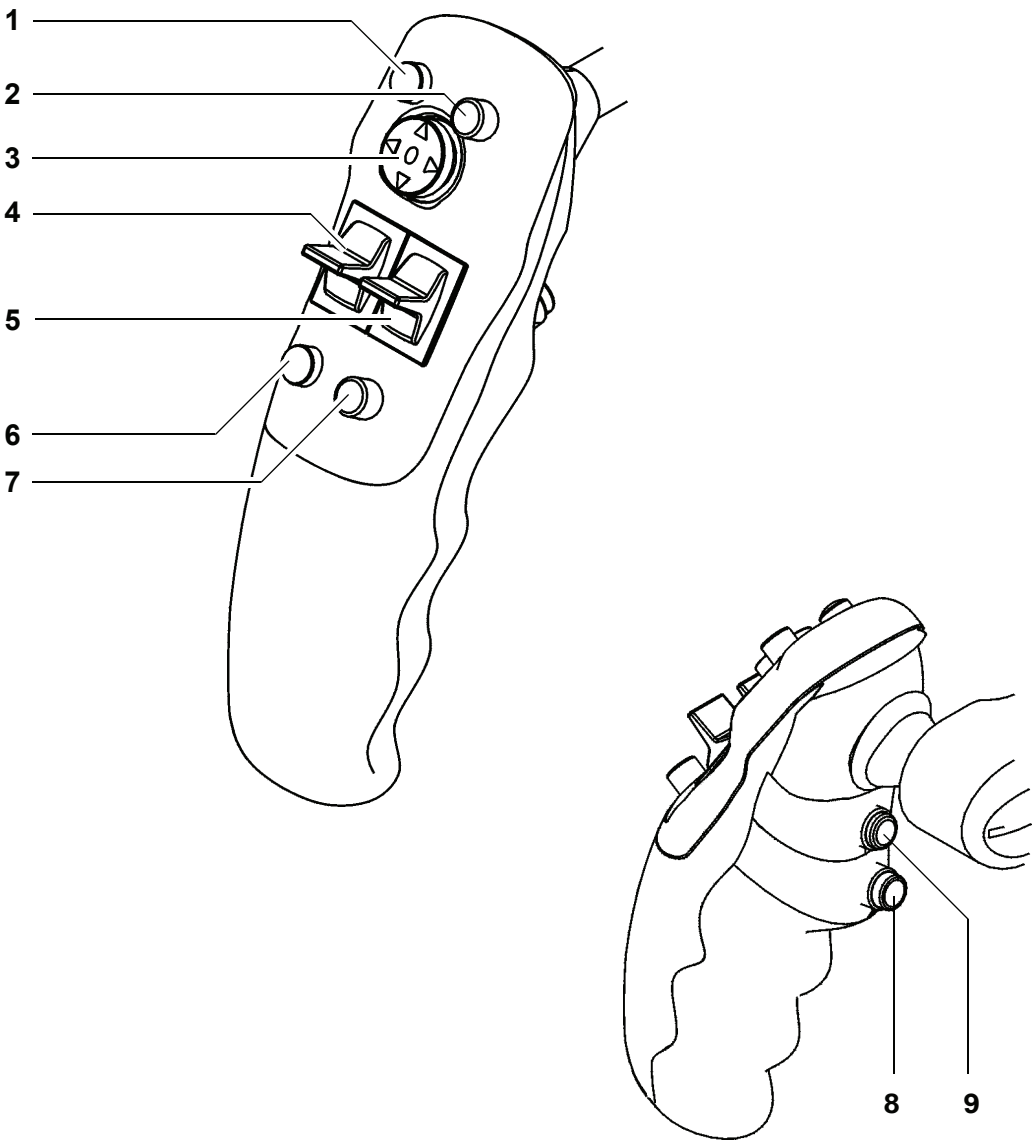
**6** Programmable button C (see page 152)

**7** Programmable button **D** (see page 152)

**8** **Brake release button (AB)**
Brake release button for all stand and microscope axes. Whilst this button remains pressed, all magnetic brakes ("All Brakes") are released and the system can move freely in all directions. On releasing the button, the magnetic brakes lock all axes simultaneously.

**9** **Brake release button (SB)**
Brake release button for the microscope axes or stand axes (factory setting). Whilst this button remains pressed, only the magnetic brakes of the stand axes or microscope axes are released ("Selected Brakes") and the stand or microscope can move freely. On releasing the button, the magnetic brakes lock the axes simultaneously.

Configuring the handgrip is explained on page 152.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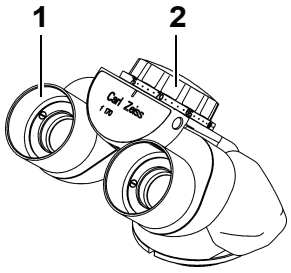
# Controls for the tubes

### 180° tiltable tube

**1** Eyepiece mount

**2** Adjustment wheel for pupillary distance
The correct position has been reached when the two eyepiece images merge into one. The interpupillary distance set can be read off the adjustment wheel.




### Folding tube f170/f260 mm (optional)

**3** Eyepiece mount

**4** Pupillary distance (PD) adjustment knob

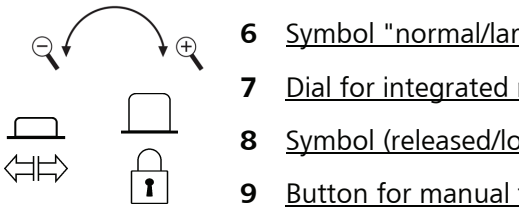
**5** Scale for pupillary distance

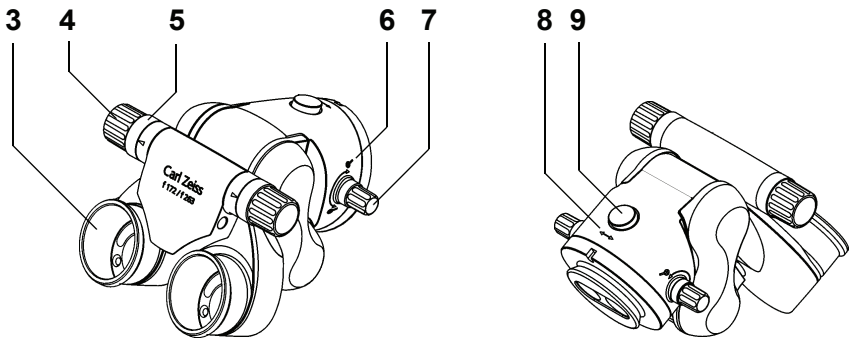
**6** Symbol "normal/larger" for magnification changer

**7** Dial for integrated magnification changer

**8** Symbol (released/locked) for manual tube rotation

**9** Button for manual tube rotation





# Controls for the widefield eyepieces

**CAUTION**

**Wide-angled eyepieces with magnetic coupling**

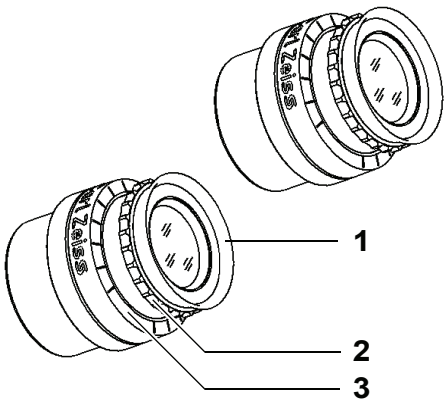
Note that the standard rules for handling magnets must be followed for eyepieces removed from the tube:

- Do not place the eyepiece near instruments which may be magnetizable.
- Do not place the eyepiece on sensitive electronic instruments such as infusion pumps, heart pacemakers, measuring instruments or magnetic data carriers such as disks, audio/video tapes and credit cards.
- Always store the eyepiece in its original packaging when not in use.
- Never look at the sun or a light source through the eyepieces or the binocular tube.

**1** Eyecup
for adjusting the distance between the eyepiece and the eye.

**2** Diopter setting ring
adjustable from -5 D to +5 D

**3** Diopter scale
for reading off the prescription set

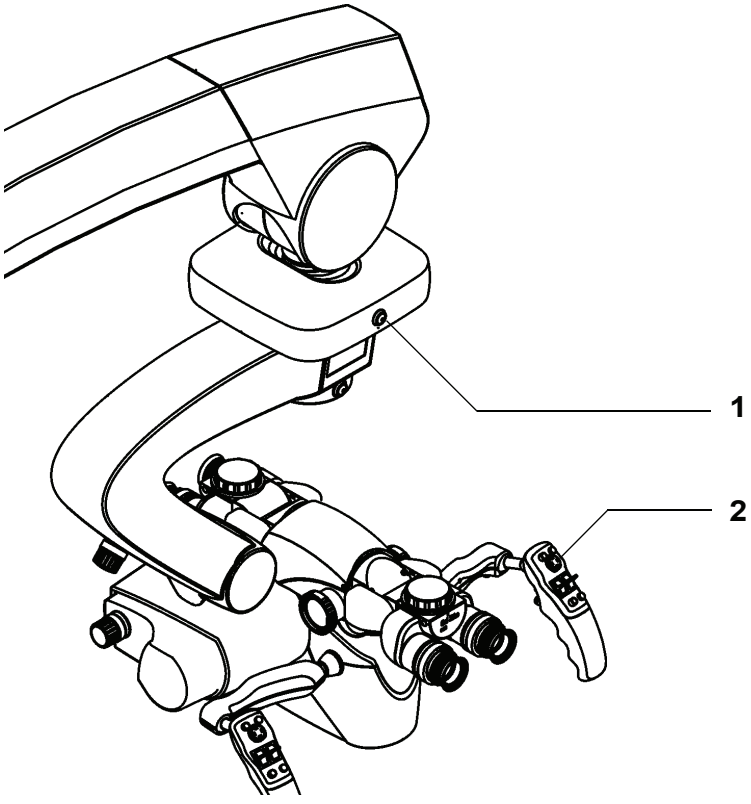


# XY coupling (option)

The X-Y coupling allows motorized positioning of the surgical microscope in a horizontal plane. The range of travel is 30 mm x 30 mm. Use the joystick button (2) on the handgrip or the joystick of the optional foot control panel for positioning. The speed of travel can be set at the display (see page 159). The XY coupling is provided with a reset button. If you press the XY reset button (1), the XY coupling moves to the center position.

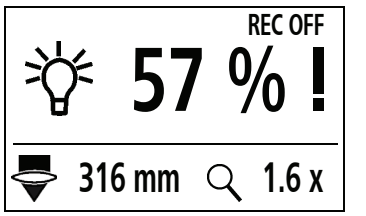
**1** XY reset button with LED indicator

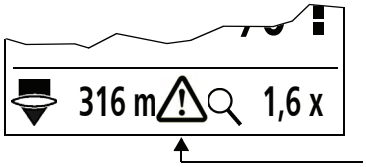
- The LED is lit as long as you can move the XY coupling in all directions.
- The LED is off when the XY coupling has reached an end stop in one direction.

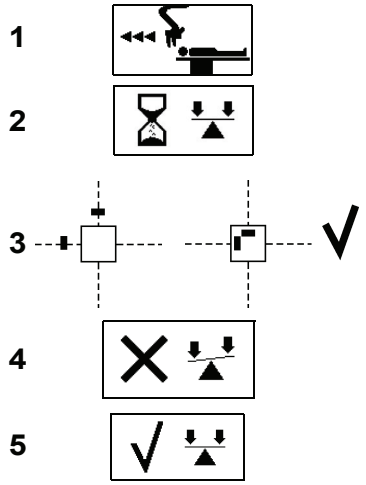


# Additional display

*Data in the additional display*




You can set the brightness of the additional display to meet your specific needs.
The following current information is displayed to the user on the additional display (see illustration below):

- Light intensity in percent ( ☼ )
  If the light intensity is equal to or higher than the warning threshold, an exclamation mark is displayed after the value.
  If the illumination system is switched off, the bulb is shown unlit ( ● )
- Current focus value ( ▼ ) (working distance in mm)
- Current magnification factor ( 🔍 ) (zoom)
- "REC ON" when video recording is in progress, "REC OFF" when no video is being recorded. "REC ON/REC OFF" is not displayed when the recording option is not available.
- Symbol ⚠ indicates that a message is shown on the display. If you acknowledge the message on the display, the note on the display and symbol ⚠ on the additional display also disappear. The symbol may appear in all menus, with the exception of the standard user menu.
- Autobalance status (Autobalance option, see page 100)

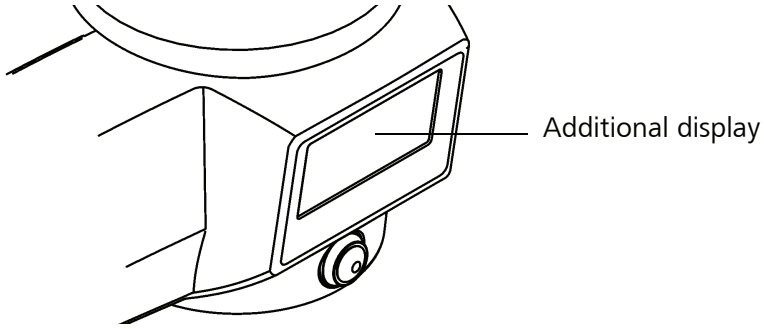
  1 Preparation: Do not balance the microscope above the patient
  Balancing can be started

  2 Autobalance is active

  3 Microscope is outside / within the balancing range, see page 102.

  4 Balancing procedure cancelled
  Repeat the balancing procedure!

  5 Autobalance successfully completed



# Components of the floor stand

**1** Extension arm

**2** Support arm with display
The support arm includes the display for controlling the surgical microscope.

**3** Stand column
A handle mounted on the stand column facilitates moving the system.
There are two cable brackets on the left and right side of the column that can be used to wind up the cables and to attach the foot control panel.

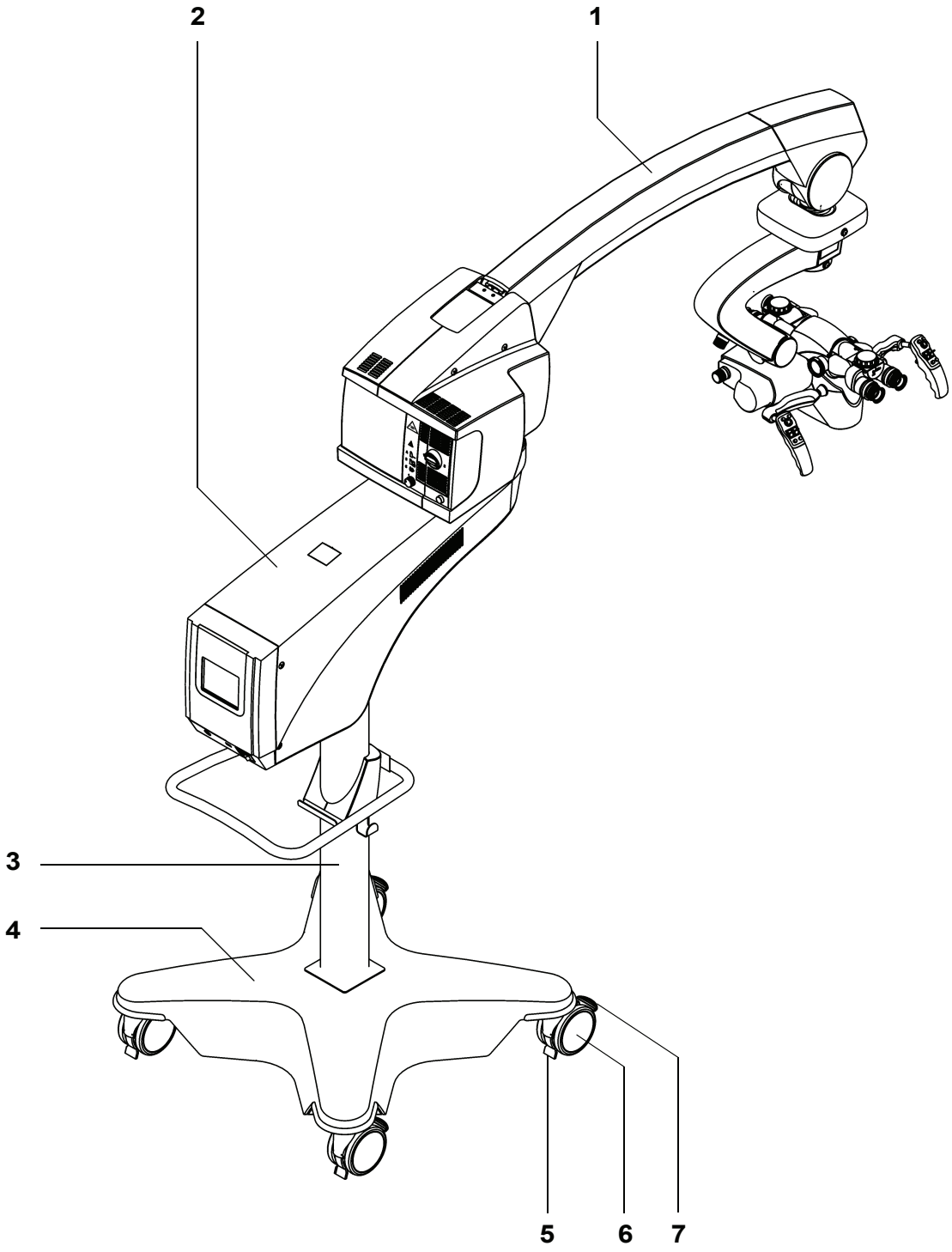
**4** Stand base
The stand base has four steerable casters (6) enabling positioning of the stand in the operating room.
To prevent the stand from moving or rolling away unintentionally, press down all four locking tabs (7).
Pull up all four locking tabs (7) to release them.
The cable deflectors (5) protect cables lying on the floor from damage after being rolled over.

**5** Cable deflector

**6** Steerable casters

**7** Locking tab

To change the location of the device, see page 95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**8** Instrument tray (option)
The instrument tray is designed for holding Zeiss equipment.

**CAUTION**

**Maximum capacity of instrument tray!**

If the instrument tray is overloaded or accessory tools are insufficiently secured, the risk of injury to the patient is increased.

- Do not exceed the instrument tray's load capacity of 13 kg.
- Ensure all accessory tools are securely placed on the instrument tray. Use tightening belts (incl. in delivery) to securely fix additional accessory tools.

**9** 17" TFT monitor (option)
The video monitor has a TFT display and is used for duel viewing of the operation for the sterile nurses and other operating room personnel. The flexible support arm can be used to accurately position the video monitor for best viewing.

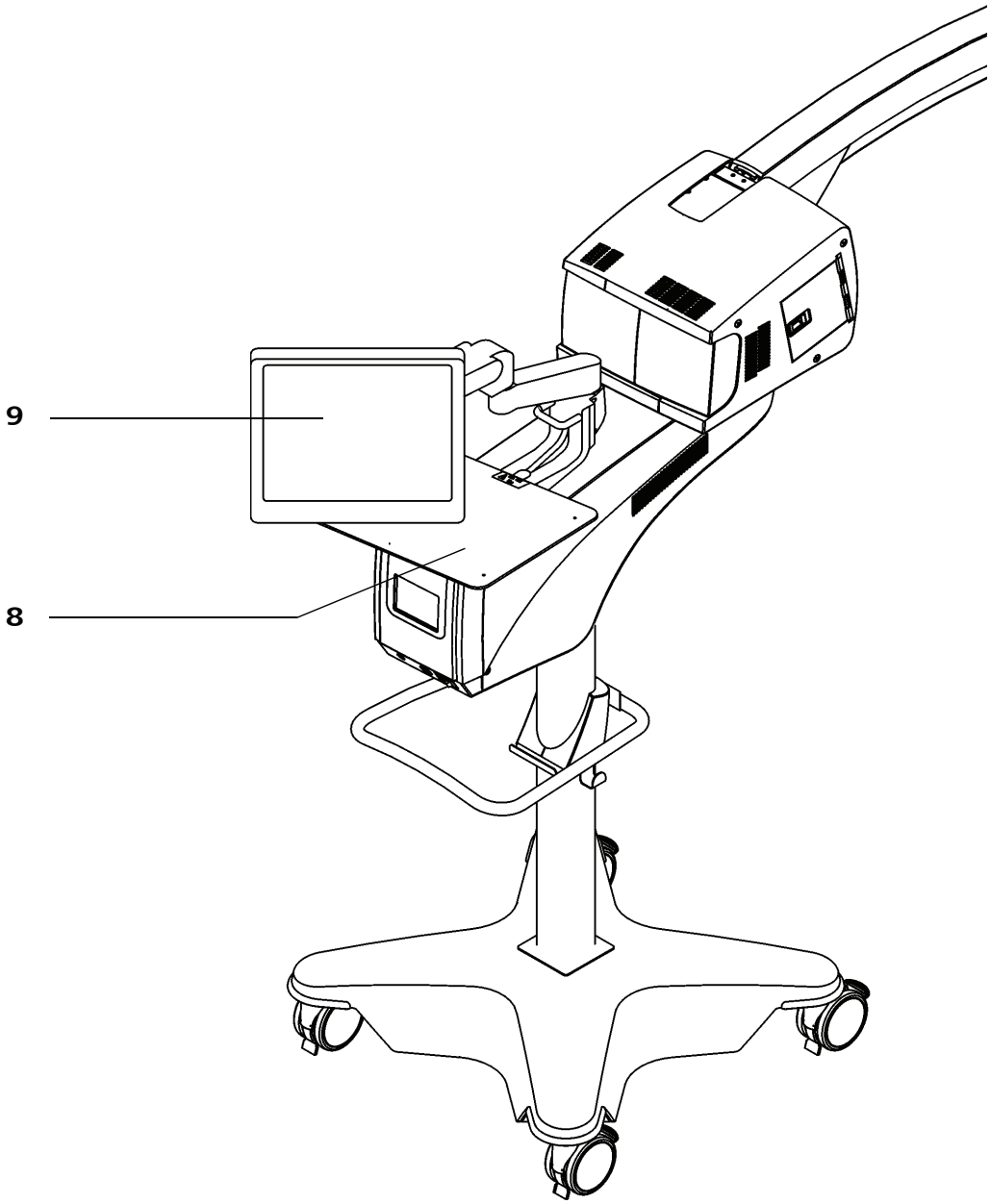
The video monitor is enabled automatically on switching the system on. During the switch-on process, the video monitor runs through a switch-on sequence in which the signals on the connectors (DVI, VGA, S-Video, Composite and Component) are tested. After detection of the signal present, the correct screen resolution and refresh rate are automatically set.

**CAUTION**

Incorrect diagnosis as a result of video images

The video monitor is not calibrated and not designed for diagnostics purposes. Visualized images may include deviations in scale, shape and color.

- The live image, video sequences and individual images may not be used for diagnostics purposes or treatment.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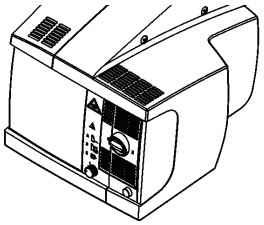
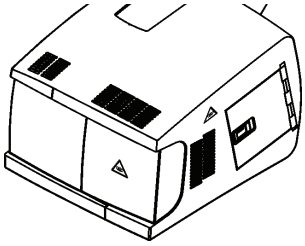
The xenon lamps generate light whose spectrum resembles that of natural daylight. The color temperature of the light always remains the same regardless of brightness setting. This enables photographic documentation under conditions resembling natural light.

*180W xenon lighting (standard)*

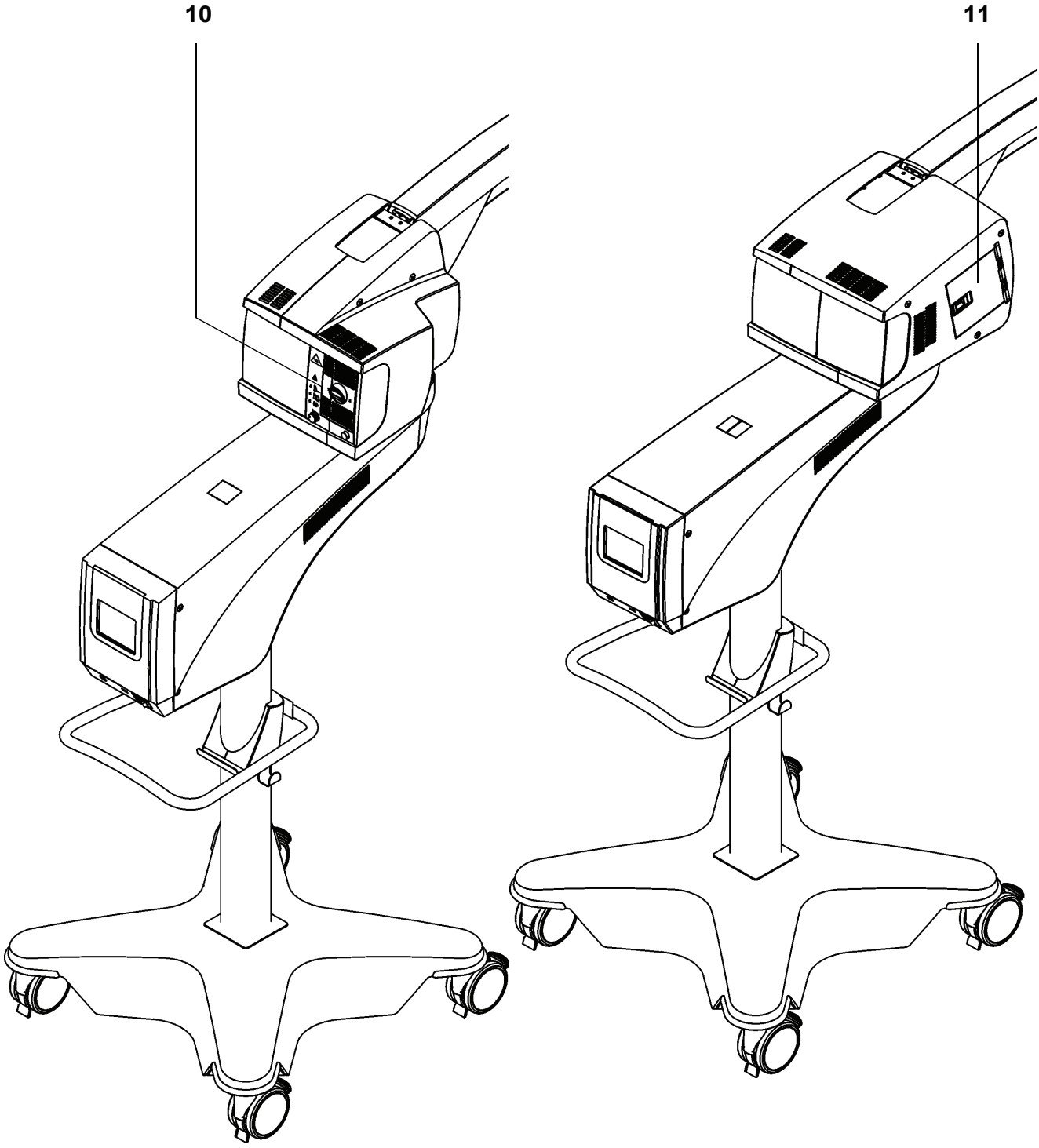


**10** 180W xenon lamp housing
The lamp housing with the 180W light source has fiber illumination, a filter wheel (optional) and two xenon lamps.

*300W xenon lighting (optional)*



**11** 300W xenon lamp housing
The lamp housing with the 300W light source has fiber illumination, an aperture plate, a filter wheel (optional) and two xenon lamps.


10
11

# Controls of the xenon lamp housings

**180W xenon lamp housing (standard)**

**1** Switch for manual replacement of xenon lamp

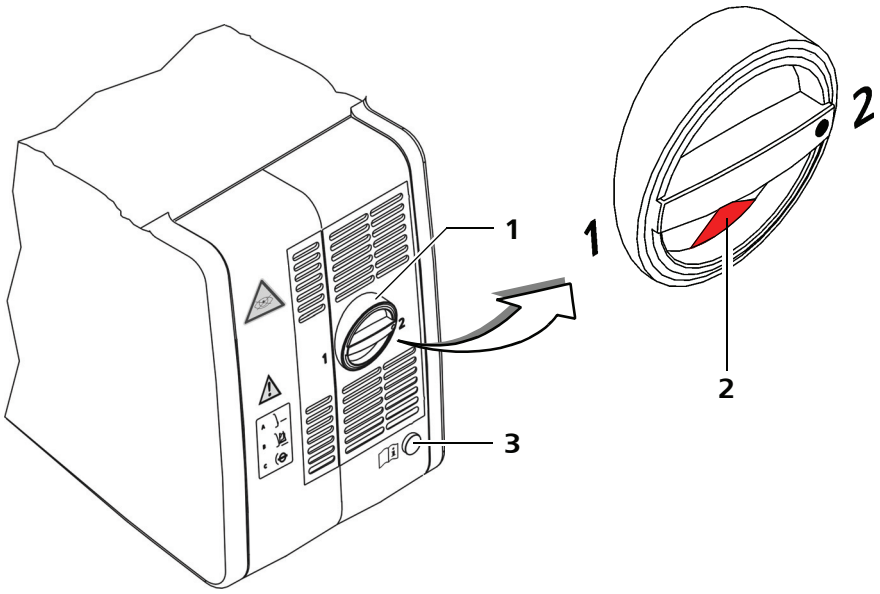
**2** Display: Lamp 2 in use
Lamp 2 is in use if the red segment in the switch (1) is ON.

**3** Button for opening the xenon lamp module
When this button is pressed, the lamp module is ejected slightly.

For manual lamp replacement, see page 172

For replacing the xenon lamp module, see page 188

Xenon lamp housing 180W



### 300-W xenon lamp housing (optional)

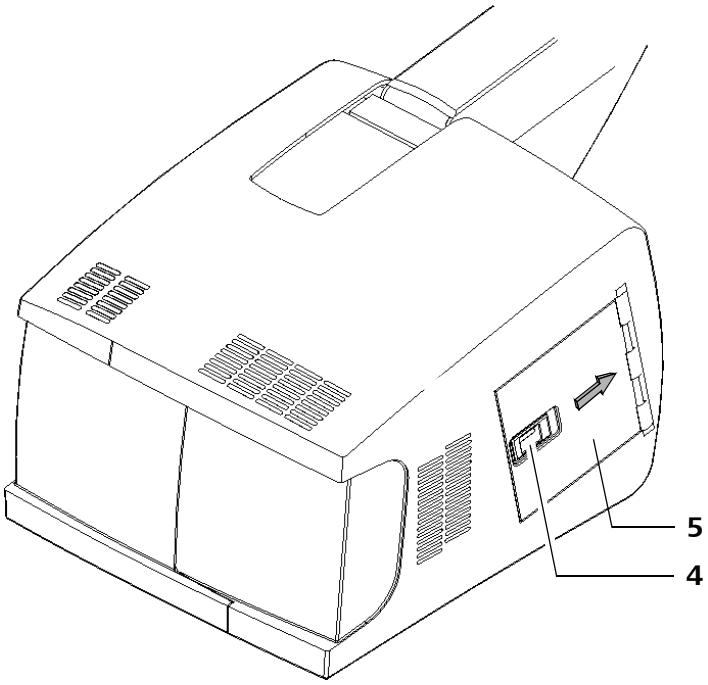
**4** Fastener for opening the lamp housing

**5** Housing door
The housing door opens when the fastener (4) is moved in the direction of the arrow.

For automatic lamp change, see page 174

For manual lamp change, see page 176

Xenon lamp housing 300W



## Controls for manual balancing

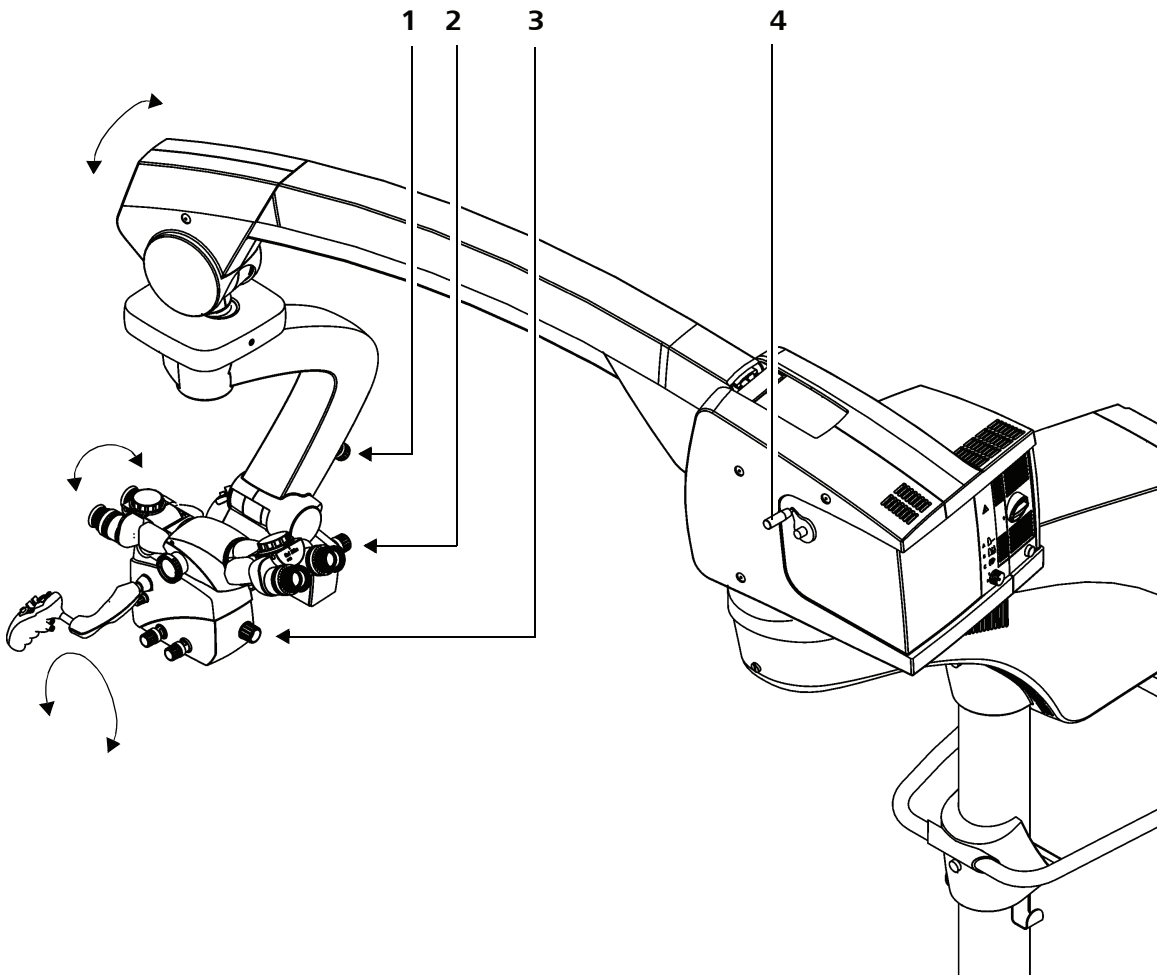
**1** Balancing of the microscope's lateral tilt movement (manual)
for manual balance setting of the microscope's lateral tilt axis.

**2** Balance setting knob
for balancing the front to back tilt movement of the surgical microscope

**3** Fine balancing of the microscope (manual)
for fine balance setting of the microscope

**4** Crank for weight balancing of the suspension system

For manual balancing, see page 97



## Controls on the control and display panel

**1** Display with touchscreen function, see page 124
The display is the system's central communication interface. It enables the user to access the settings of the microscope, stand, lighting system, camera (if integrated) and the programmable components of the handgrips and foot control panel. It is possible to store the selected settings individually for 20 users.

The display is covered by a thin, pressure-sensitive plastic screen so only tip the display with your fingers and not with pointed, hard objects which could damage the screen.

**2** Switch for "Light only" mode (see page 24 and page 178)

- All electrical components (except the light source) are isolated from the power supply.
- The light source adjusts to a maximum brightness of 75% to allow you to complete the current operation.

**3** USB socket (option)
The USB socket only exists if the "Recording" option has been installed.

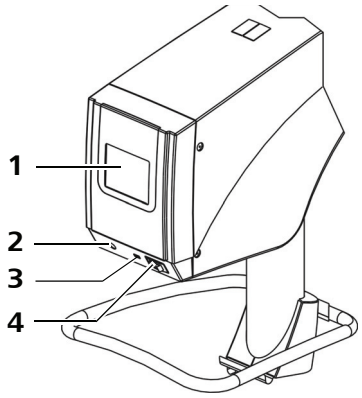
***NOTE***

**System malfunctions!**

Computer viruses may cause system malfunctions.

- Ensure the USB stick used for the exchange of data is always virus-free.

**4** Power switch
for switching the system on and off. The power switch also has an automatic circuit breaker that switches off the device in the event of a short circuit.



## Connector panel on the floor stand

**1** Strain relief device
for securing the power cord and video connection cable

**2** Potential equalization connector

**3** Cable connection for the foot control panel

**4** Remote connector (AUX)
for controlling external devices with a maximum breaking capacity of 24V/ 0.5A.

**5** USB connector (for servicing purposes only)

**6** Ethernet interface (optional)
for networking with OP management systems.
The network connection's cable and connector must comply with Cat-5e EIA/TIA-568A-5 as a minimum, i.e. the Class D values of ISO/IEC 11801:2002 or EN 50173-I:2002.

**CAUTION**

**Risk of patient injury caused by electrical voltage!**

- Do not touch the signal interfaces while in contact with the patient.

**7** Sliding switch for rated voltage
The voltage shown here must correspond to the rated line voltage provided on the site of installation. You can adjust the sliding switch using a suitable tool.

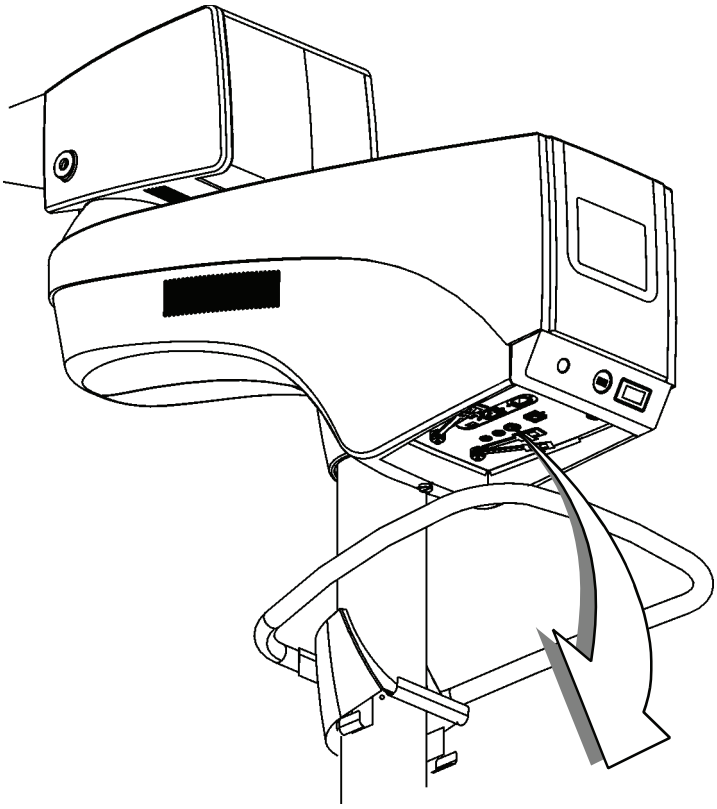
**8** Power inlet socket
The system must be operated only with 120 V in the USA!

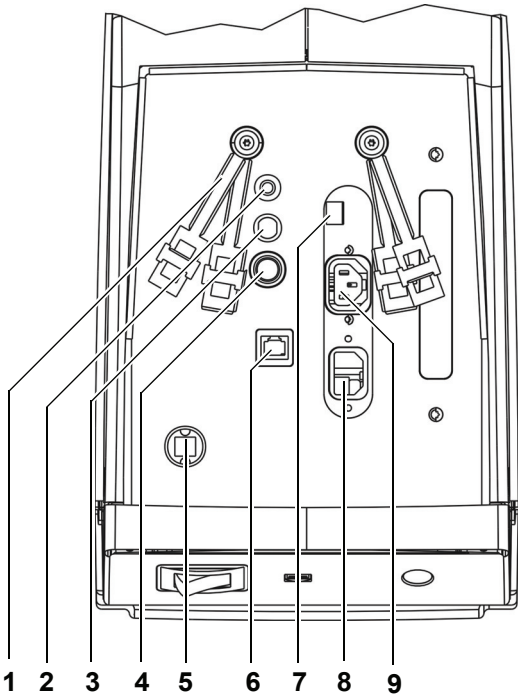
**9** Power outlet socket
for medical devices of max. 500 VA

**CAUTION**

**Hazard caused by electrical voltage!**

Only connect accessories and medical devices intended by Carl Zeiss for use with this system to the power outlet socket (see page 216). When connecting other devices, make sure that safety is guaranteed regarding admissible touch currents and ground leakage currents as per IEC 60601-1:2005.

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9

### Video ports with installed 3CCD SD (standard definition) camera (option)

**CAUTION**

**Increased leakage current!**

Connecting unapproved or defective accessories may lead to increased leakage current.

- Do not connect any defective or unapproved accessories to the video interfaces.
- Never contact video interfaces while in contact with the patient.

**10** Video output "Composite Video" (CVBS)
Analog connector for video components such as recorder, beamer and Zeiss accessories (e.g. MediLive Mindstream).
The video signal is output in accordance with the CVBS standard (shared line for brightness/ color signals). This kind of transmission is suitable when the video signal is to be sent over large distances (e.g. for BNC lines already laid on site).

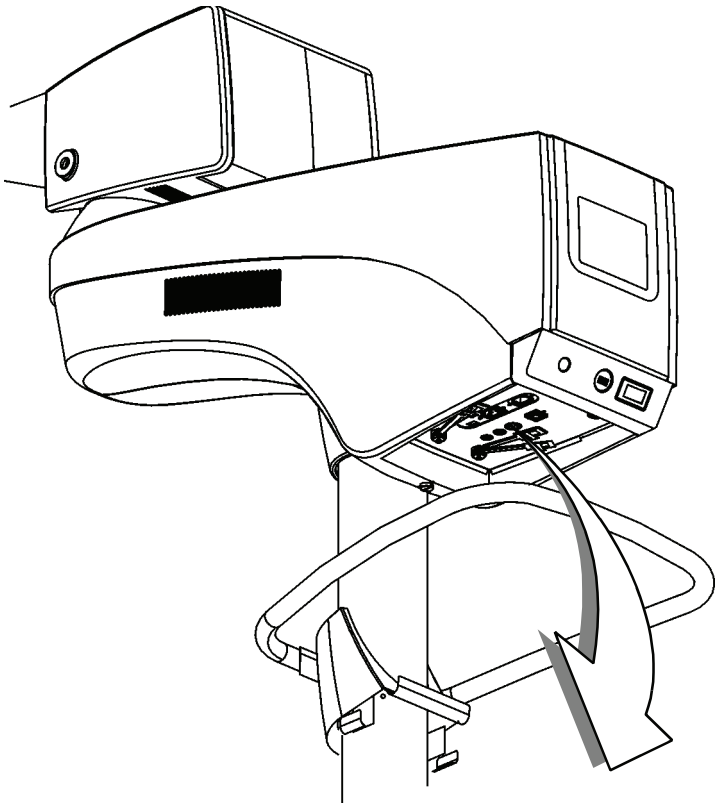
**11** Video output port: Y/C or S-Video (green)
Anlog connection for video components, e.g. recorder, projector or Zeiss accessories such as MediLive Mindstream.
Here, the video signal is transmitted according to the S Video or Y/C standard (separate lines for brightness and color signals). This standard provides higher video image quality than VBS.

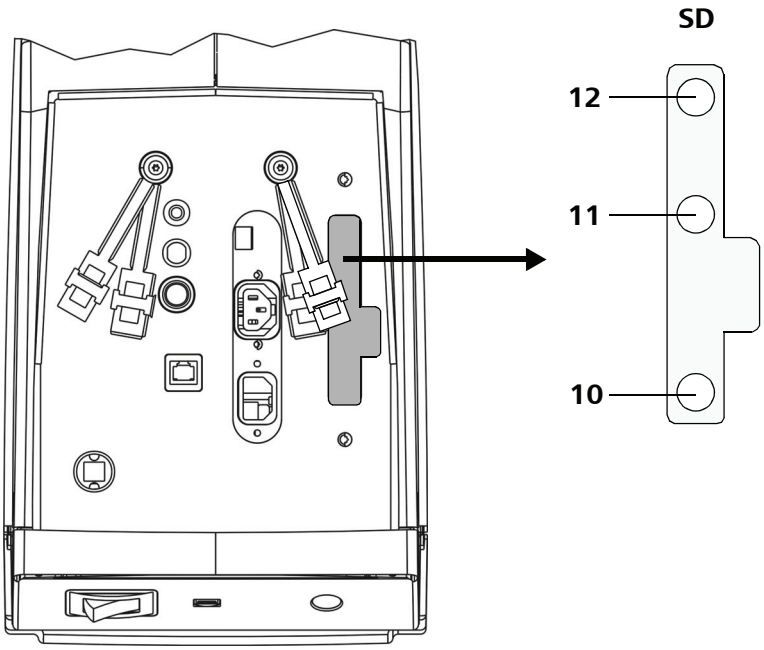
**12** Video input and video output (orange)
Analog connector for video devices such as endoscope camera.
A special cable is required here (10m video in/out connector cable)

**CAUTION**

**Use a galvanic isolation amplifier!**

Use video connection cables to other rooms only in combination with a "galvanic isolation amplifier for medical electrical equipment" in accordance with EN 60601-1.




SD
12
11
10

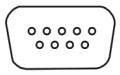
**Video ports with installed HD (high definition) camera (option)**

**CAUTION**

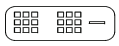
**Increased leakage current!**

Connecting unidentifiable or defective accessories may lead to increased leakage current.

- Do not connect defective or unidentifiable accessories to the video interfaces.
- Never contact video interfaces while touching the patient.

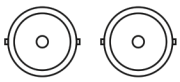


**13** Video output port: YPbPr
Analog port for high-resolution monitors or TV.



**14** Video output port: DVI-D
Digital port for LC monitors. DVI (Digital Video Interface) is a technology for the transmission of digital data between the graphics card and the monitor.

When connecting an external HD monitor via the DVI cable 302681-8767-000, make sure to plug the connector with the ferrite core into the stand in order to avoid EMC interference.



**15** Video output "HD-SDI" (2x)
Digital connector for professional, high-resolution HD monitors. The HD-SDI (High Definition Serial Digital Interface) transfers uncompressed and high-resolution image data in real time. The two connectors are independent of each other and can be configured as required.
Standard BNC cables are not suitable. Only use connector cable "HD-SDI video cable, 75 Ohm, 2 x BNC connector" for these interfaces. Order no.:

| | |
|---|---|
| 305989-8763-000 - | 5m long |
| 305989-8764-000 - | 10m long |
| 305989-8766-000 - | 15m long |

**16** Video output port: Y/C or S-Video (green)
Anlog connection for video components, e.g. recorder, projector or Zeiss accessories such as MediLive Mindstream.
Here, the video signal is transmitted according to the S Video or Y/C standard (separate lines for brightness and color signals). This standard provides higher video image quality than VBS.

**17** Video output "Composite Video" (CVBS)
Analog connector for video components such as recorder, beamer and Zeiss accessories (e.g. MediLive Mindstream).

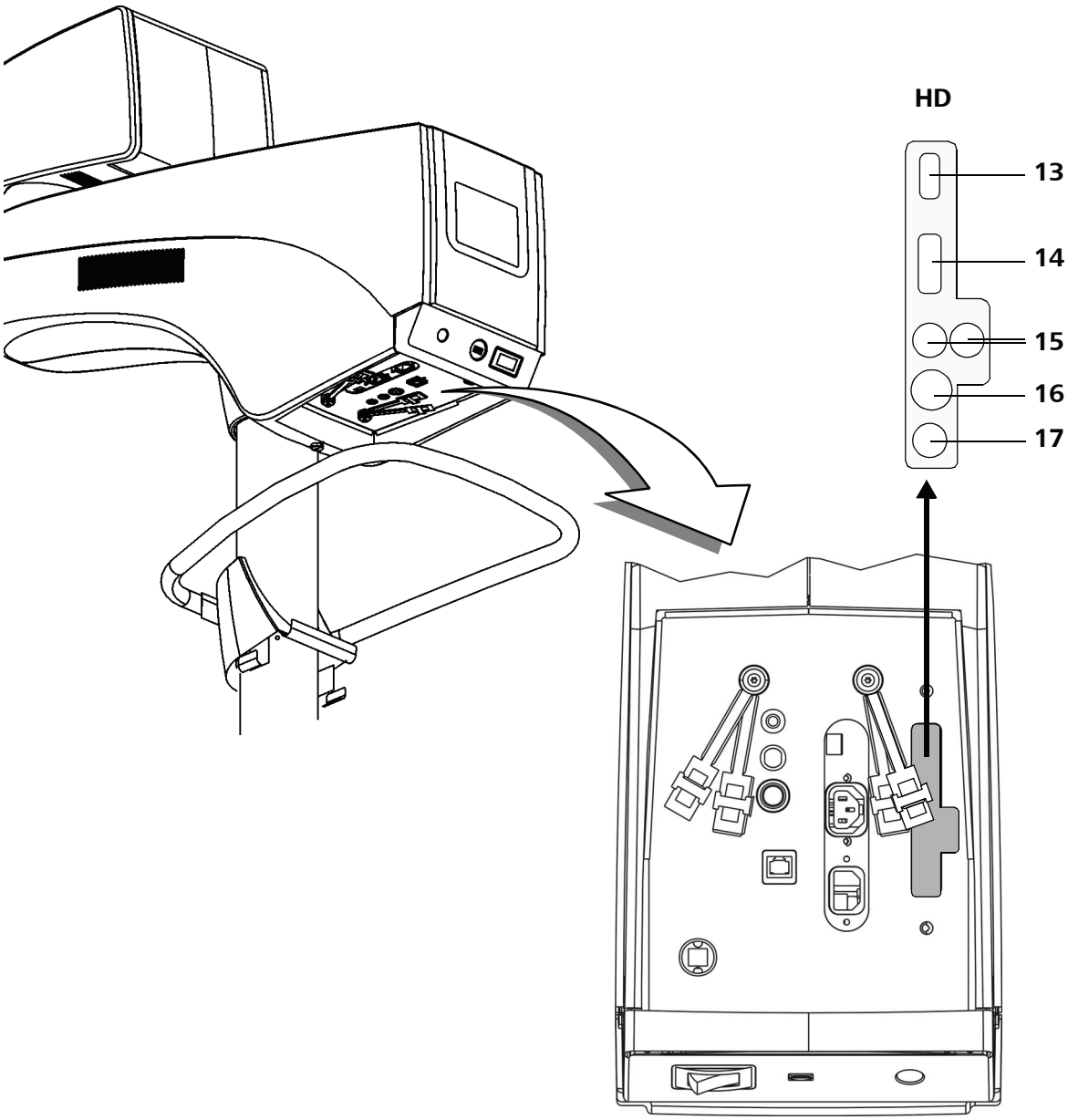
The video signal is output in accordance with the CVBS standard (shared line for brightness/ color signals). This kind of transmission is suitable when the

video signal is to be sent over large distances (e.g. for BNC lines already laid on site).

**CAUTION**

**Use galvanic isolating amplifier**

Only use video connection lines to other rooms in conjunction with a "galvanic isolating amplifier for medical electrical equipment and systems" in accordance with EN 60601-1:2005.

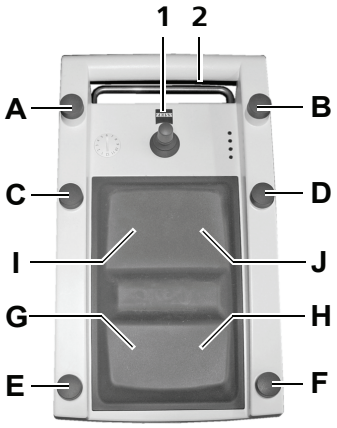


# Foot control panel (optional)

The foot control panel enables you to control various functions of the surgical microscope. See page 86 and page 154.

You are only able to activate functions that are configured in the respective system (stand, surgical microscope). Only use the foot control panels mentioned here and in the ordering data:
Follow the correct user manual for the relevant foot control panel.

- Foot control panel with 14 functions (FCP WL), wireless (optional)
- Foot control panel with 14 functions, wired (FCP), 3m (optional)
- Foot control panel with 14 functions, wired (FCP), 6m (optional)




### Structure

**1** Connector
for connecting the foot control panel with the connector panel of the stand

**2** Bracket
for attaching the foot control panel to the stand.

**3** Controls

- Buttons A, B, C, D, E, F (freely configurable)
- Joystick (1)
  The joystick permits motorized fine movement of the XY coupling.
- Rocker switches G, H, I, J
  The rocker switches are used to operate the ”Zoom” and ”Focus” functions. You can configure the buttons for these functions either horizontally or vertically.

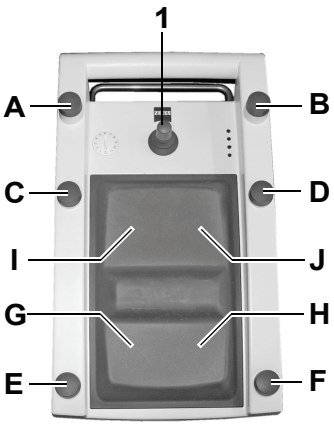
### Storage

The bracket on the foot control panel is used to hang it on the column of the floor stand when not in use.

## Preconfigured button assignment

*Buttons*

The functions of buttons A, B, C, D, E and F are preconfigured, but they can be re-assigned to meet the user's specific requirements. The factory settings are:




- Button A: DOF aperture -> depth of field low/high
- Button B: light on/off
- Button C: light -
- Button D: light +
- Button E: without function
- Button F: without function

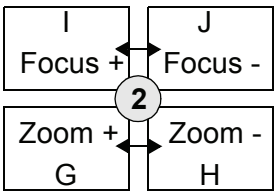
*Joystick*

Joystick (1) is used to control the XY coupling (option).

*Rocker switches*

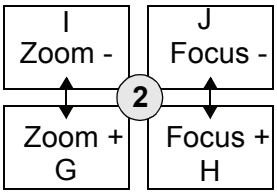
The focus/zoom rocker switches are preconfigured to the horizontal setting. However, they can be changed to the vertical setting at any time. User-specific settings (see page 154) can be made by yourself at any time. Press button (2) on the display for this purpose.

The horizontal factory settings are:




- Button I: focus rocker switch +
- Button J: focus rocker switch -
- Button G: zoom rocker switch +
- Button H: zoom rocker switch -

The vertical settings are:




- Button I: zoom rocker switch -
- Button J: focus rocker switch -
- Button G: zoom rocker switch +
- Button H: focus rocker switch +

# Surgical microscope and laser micromanipulator

A micromanipulator can be attached to the system via the dovetail mount on the bottom of the surgical microscope to permit the use of a laser. Manipulators from other manufacturers can also be attached.

### Adjusting the surgical microscope and laser micromanipulator to the same focal plane

The OPMI Vario 700 features a motorized varioscope which is operated via the focus rocker switches of the hand grips, the focus buttons of the foot control panel or an optional autofocus system.

The varioscope is used for motorized adjustment of the working distance and motorized adjustment of the image definition. The focus rocker switches allow you to continuously adjust the working distance between 200 mm and 500 mm.

- Set the working distance to the focus value of the laser micromanipulator. The display and the additional display show the focus value currently set.
- Use the previously described, recommended procedure to check that the focal planes coincide.
- If necessary, correct the focus by appropriate minor adjustment.

The <Fokus Lock> function permits you to deactivate the electrical drive of the focusing system. The focus rocker switches are disabled. This prevents the focal plane setting from being inadvertently changed by motorized movement. If Focus Lock has been activated, no autofocus setting is performed when the brakes are operated, even if the autofocus (optional) has been switched on.

**NOTE**

**If a micromanipulator from another manufacturer is used:**

- Check the correct installation and function of the micromanipulator! When using an approved micromanipulator from another manufacturer, activate the <Focus Lock> function (see page 142).

# Preparations for use

# Mounting the microscope components

**CAUTION**

**Risk of injury to the patient caused by lowering of the surgical microscope or by falling parts!**

- Never change modules and accessories during a surgical procedure or above the patient!
- After every change in configuration and before every use, make sure that the modules and accessories are securely locked in position. Make sure that all securing screws and locking screws are firmly tightened!

Mounting and removing modules and accessories may lead to unintended tilting of the surgical microscope.

- Always make sure that the maximum permissible load is not exceeded.
- After every change in configuration and before every use, rebalance the completely equipped surgical microscope without the patient and at a safe distance from other persons and equipment.

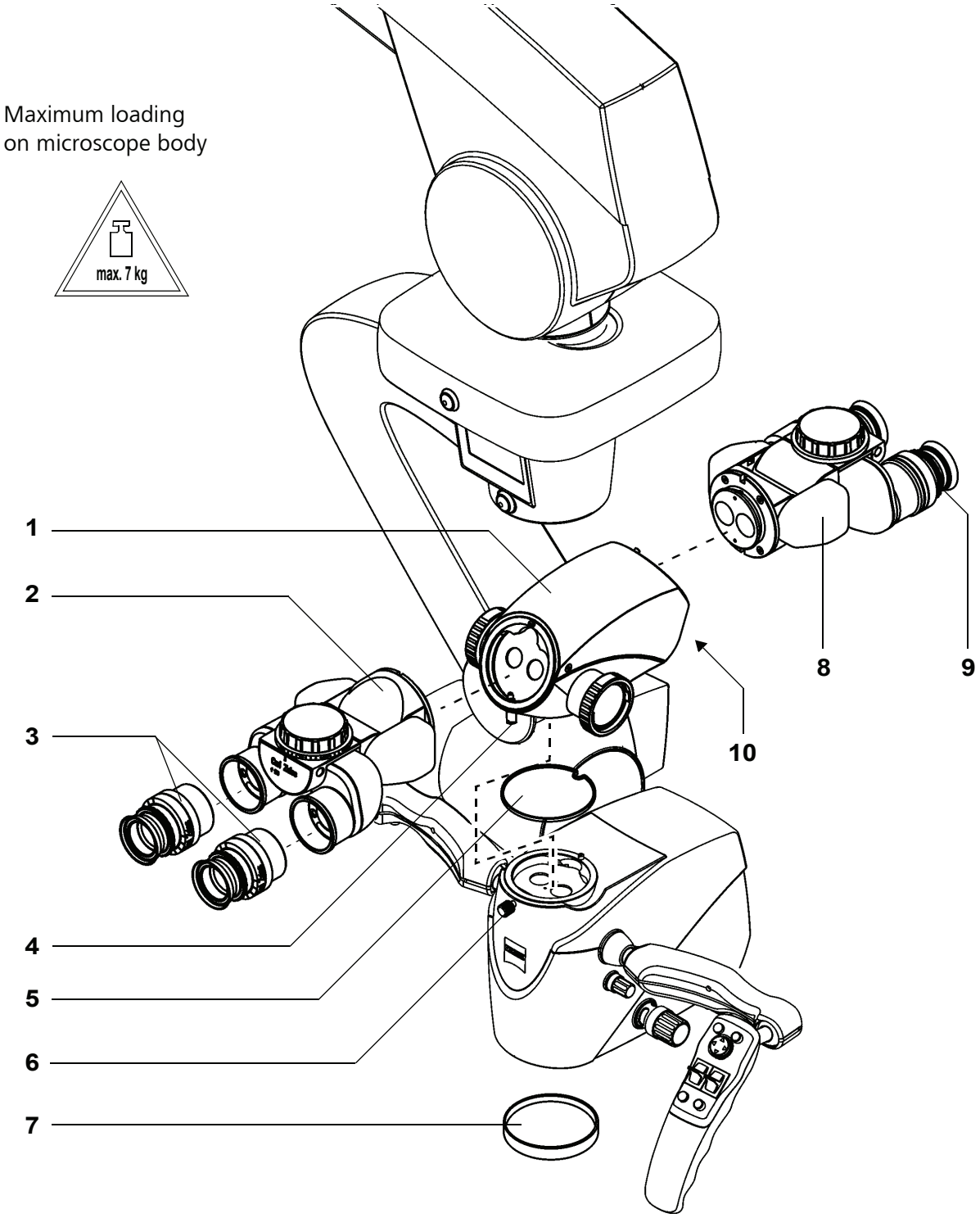
## Mounting the tube and the eyepieces

- Give securing screw(6) a few turns to loosen it.
- Remove cover (5) and keep it in a safe place.

You can attach different tubes (e.g the tiltable tube (2)) directly to the microscope body. First attaching the stereo bridge (1) to the microscope body and then the tubes (2 and 8) is recommended for many applications.

- Place the stereo bridge (1) onto the microscope body and tighten the screw (6) .
- Place the tubes (2 and 8) onto the stereo bridge (1) and tighten the screws (4 and 10) .
- Fully insert the wide-angled eyepieces(3 and 9) into the mounts provided on the binocular tube. The magnetic coupling reliably secures them in position (refer to page 53).

Remove the transportation protective cover (7) from the lens.
If the lighting is switched on, the cover can melt under the heat and cause irreparable damage to optical components.


Maximum loading
on microscope body
max. 7 kg
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## Mounting documentation / coobservation equipment

The camera adapter and coobservation module shown in the illustration are examples of further accessories that can be mounted on the lateral image exit ports. The method described below can also be used for other accessories. The operating principle of the accessories is described in the relevant user manuals.

- Loosen the respective knurled ring (e.g., 4).

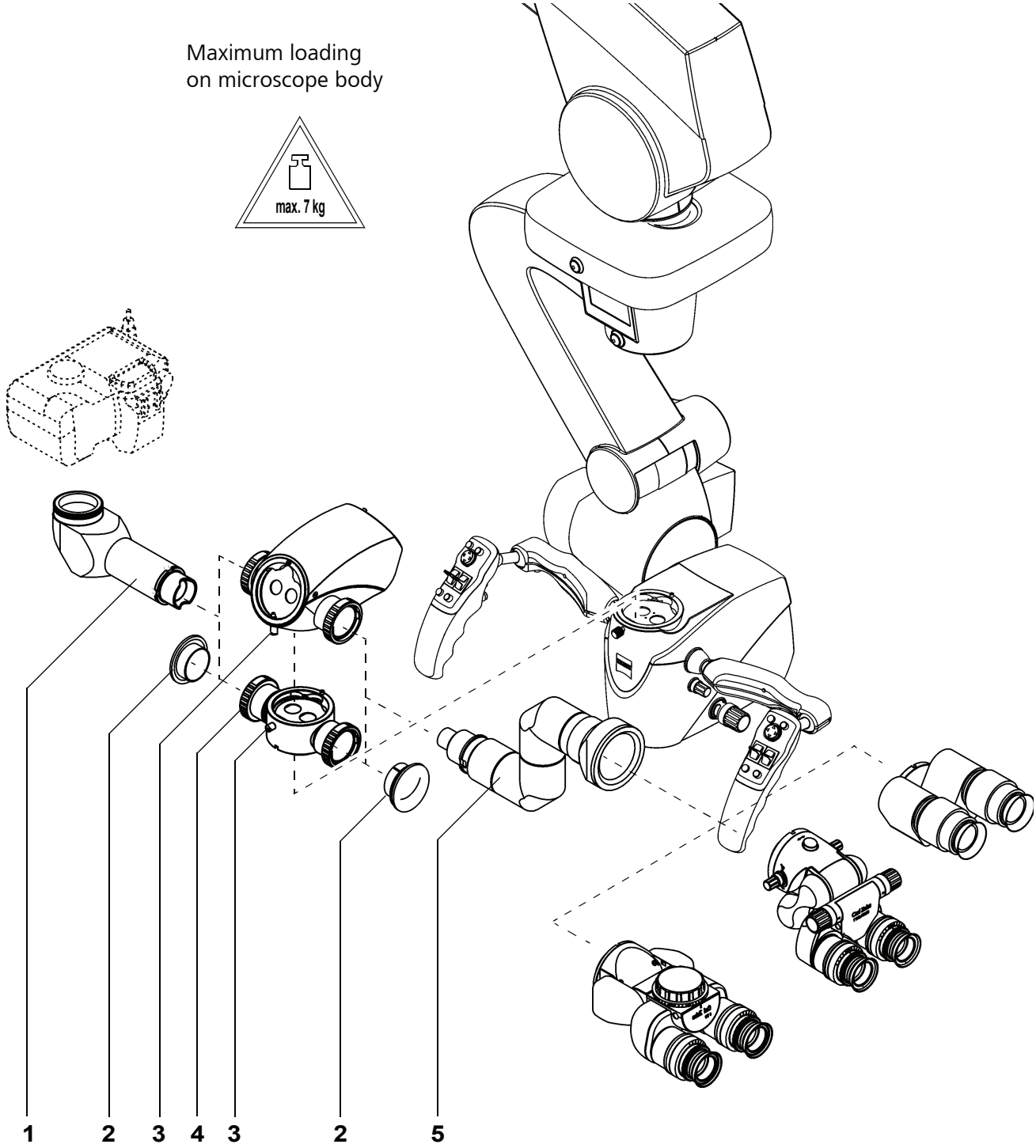
An arrow indicating the "open" direction is located on the shaft next to the knurled ring (e.g., 4).

- Remove dust cover (2) and store it in a safe place.
- Insert the accessory module (1 or 5) into the respective opening of the left or right image exit port.
  The mount of the image exit port is fitted with guide projections. The accessory module (1 or 5) has the corresponding grooves. Carefully turn the accessory module until the guide projections fit into the grooves, and slide the accessory module into the opening as far as it will go.
- Screw the corresponding knurled ring (e.g., 4) onto the accessory module.
- Firmly tighten the knurled ring.

Please note that the accessory attached to the documentation port on the left-hand side of the microscope can collide with the microscope attachment for swivel angles greater than -45°.

- If possible, and if an extended swivel range is an absolute requirement, attach the accessory to the right-hand side of the microscope.

If you wish to use documentation equipment, we can supply an eyepiece with a reticle to aid focusing. The retrofitting of a reticle to an eyepiece can only be performed in the factory or by our service staff. Always install the eyepiece with the reticle on that side of the binocular tube where the documentation equipment is located.


Maximum loading
on microscope body
max. 7 kg
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4
3
2
5

# Connecting navigation systems (option)

OPMI VARIO 700 is prepared for the connection of navigation systems.

For the use of a navigation system, the option must be ordered ex factory or installed and activated by Carl Zeiss service staff.

**NOTE**

The link-up using the navigation interface creates a medical system for which the system supplier (manufacturer of the navigation system) must meet the stipulated requirements (approval, qualifications, etc.). All accompanying papers required will be supplied by the manufacturer of the navigation system.

The navigation interface for OPMI VARIO 700 was developed in cooperation with Carl Zeiss in compliance with the requirements of the communication protocol of the OPMI VARIO 700 navigation interface.

The use of the OPMI VARIO 700 with a connected navigation system requires calibration of the microscope using a technique to be made available by the manufacturer of the connected navigation system. This allows OPMI VARIO 700 in combination with the navigation system to be used like an optical pointer with a variable length (corresponds to the working distance).

- OPMI VARIO 700 can manage various connected navigation systems.
- For safety reasons, the OPMI VARIO 700 navigation interface is not enabled unless a connected system authenticates itself.
- Before every surgery using a connected and authenticated navigation system, the function and accuracy of the navigation system must be verified (e.g., by focusing on a measuring point or comparing the focus with the instrument to be navigated). Please also observe the information contained in the respective user manual for the navigation system used.

**CAUTION**

**The use of third party drapes may affect navigation systems**

Certain third party drapes (e.g. drapes with curved protective lens covers) may influence the accuracy of navigation systems due to an optical distortion caused by the convex shaped protective lens cover.

Although there may be no perceptible impairment to the visual image quality observed through the microscope eyepieces (oculars), there is an imaging effect which displaces the microscope's focal point displayed by the navigation software. Due to this effect the focal point displayed by the navigation software may not be correctly aligned to the patient's image information from the navigation system (i.e. the patient data set).

Consequently the microscope-related reconstruction of the patient data set by the navigation system could display a wrong focal plane that does not comply with the real focal plane of your surgical microscope.

In systems with such features, depending on the distortion caused by the lens, the object contours of a pre-planned anatomical structure displayed in the microscope video of the navigation software, or in the heads-up-display, may show an incorrect size and/or incorrect position in relation to the actual image in your surgical microscope.

If not noticed by the user, incorrectly displayed information could influence clinical decisions during a navigated surgery. Those clinical decisions could be incorrect and potentially result in ineffective treatment or in serious injury to the patient.

- Always follow the instructions for use of the navigation system manufacturer for calibration, calibration verification and operation.

### Connecting and operating navigation systems

The navigation interface of the OPMI VARIO 700 only allows connection and use of systems from authorized manufacturers. Authorized manufacturers are companies or institutions having concluded an appropriate open-interface agreement with Carl Zeiss and having obtained a license for using the integrated navigation interface.
Please see the user's manual provided by the manufacturer of the connected system.

### Navigation interface (option)

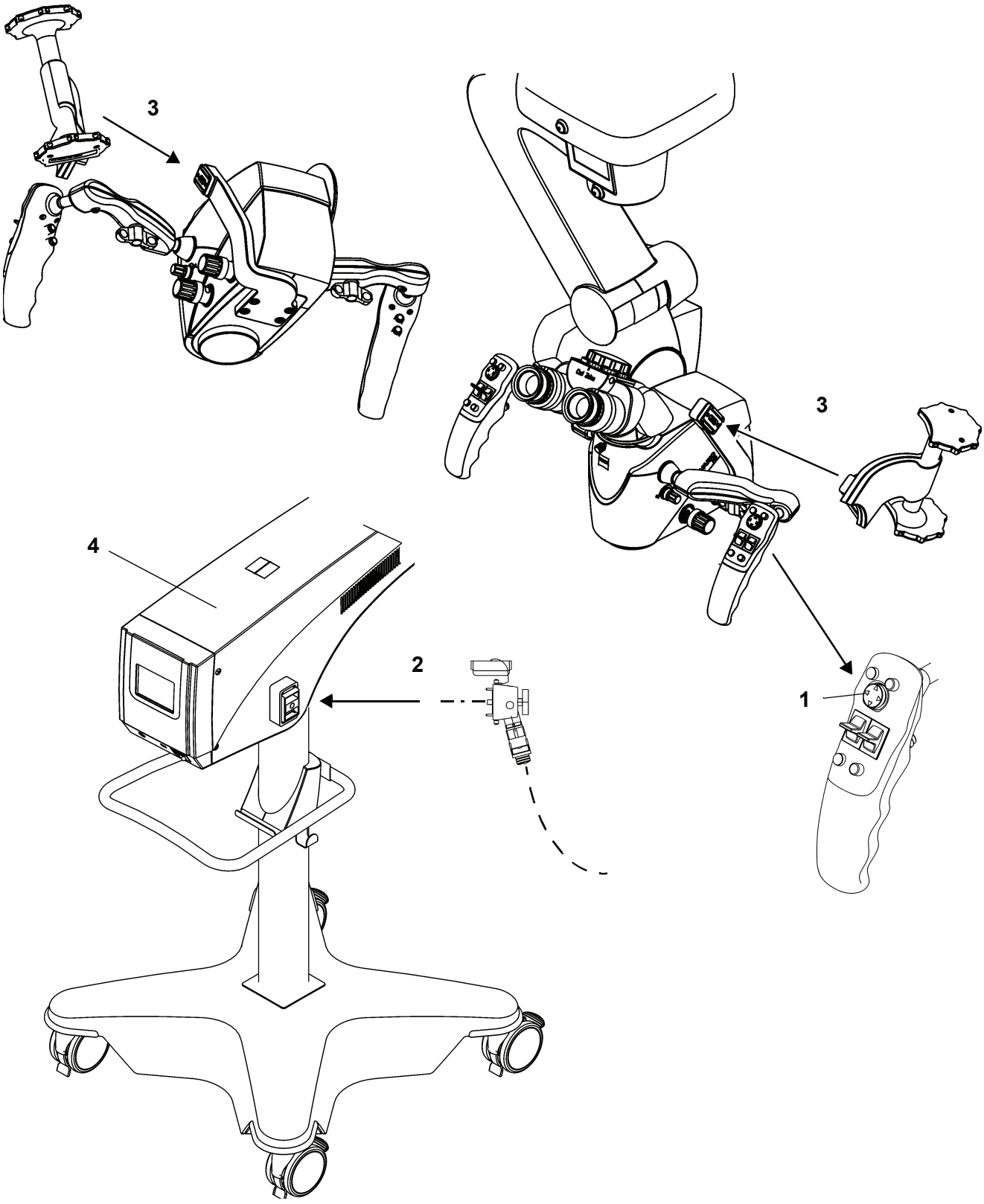
This navigation interface of the OPMI VARIO 700 comprises the following system components:

**1** Joystick (right handgrip)
The joystick button on the right handgrip can be used to control software functions of the connected navigation system if this button is supported by the navigation system.

**2** Connector (example)
for an external microscope navigation system.

**3** Interface on the surgical microscope
for connecting an antenna module (example)

**4** Software
for controlling data exchange


3
3
4
2
1

# Connecting the system and accessories

## Connecting the system to line power

In the United States, the device may only be operated at max. 120 V!

**CAUTION**

- According to EN 60601-1:2005, Section 16.2, the power outlet socket of this system must be a multiple connector that is intended for an ME system. When setting up your ME system (use of the power outlet socket), ensure to comply with the requirements of IEC 60601-1-1:1990 or IEC 60601-1:2005, Section 16. Please also observe the following:
- Never place multiple connectors on the floor.
- Never connect any additional multiple connectors.
- Only connect compatible components to the system.
- Ensure that you do not exceed the max. permissible load capacity of the multiple connectors.
- Only use multiple connectors for components which are part of the system.

**CAUTION**

**Risk of tripping over!**

Inappropriately laid cables represent an increased risk of tripping over.

- Always lay cables such that procedures are not hindered.

***NOTE***

**Risk of damage caused by incorrect setting of the line voltage**

The line voltage indicated at the window must correspond to the rated voltage available on the site of installation; otherwise, the suspension system will be damaged.
If the line voltage has not been correctly set, adjust the sliding switch in the indicator window using a suitable tool.

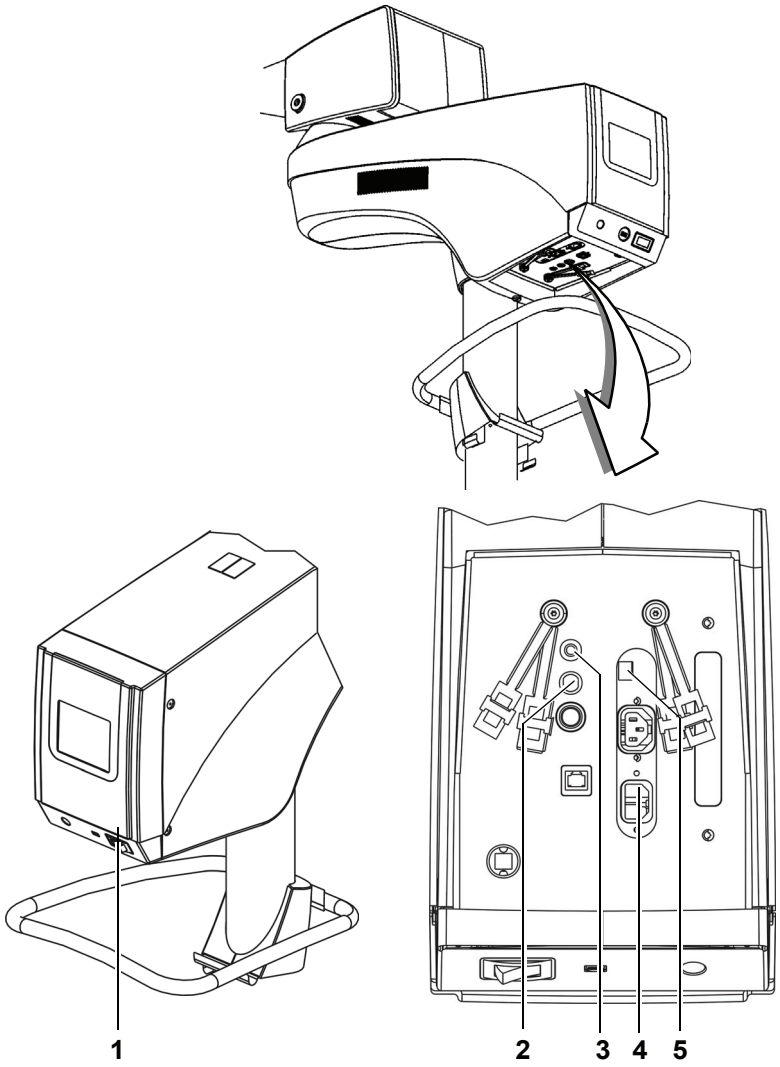
- Ensure the power switch (1) is OFF.
- Insert the power cord supplied into power inlet socket (4) on the stand.
- Only connect the power cord to wall outlets having a properly connected protective earth conductor.
- Secure the power cord using the strain relief device (see page 89).

- If required, connect the stand to the potential equalization rail in the operating room. Use the potential equalization bolt (3) for this.
  This connector can be used for placing other active devices at the same ground potential or for redundant grounding to protective earth.

**CAUTION**

**Risk of patient injury caused by electrical voltage!**

Defective or unidentified accessories or Ethernet cables may lead to increased leakage currents and injure the patient. Do not connect defective or unidentified accessories or Ethernet cables and never touch the power outlet socket or other signal interfaces whilst the patient is being treated.



## Connecting wired foot control panel (FCP) to the stand (optional)

- Ensure the power switch (1) is OFF.
- Secure the FCP cable with the strain relief device (see page 89).
- Connect the FCP cable to the connector (2) on the stand.

## Pair with wireless foot control panel (FCP WL) - optional

Pairing means the fixed relative assignment of the suspension system and foot control panel.
It is required for wireless operation. When pairing the system for the first time, a 20 sec. delay until a signal link between suspension system and foot operator panel has been established may be possible.


Proceed as follows for pairing:

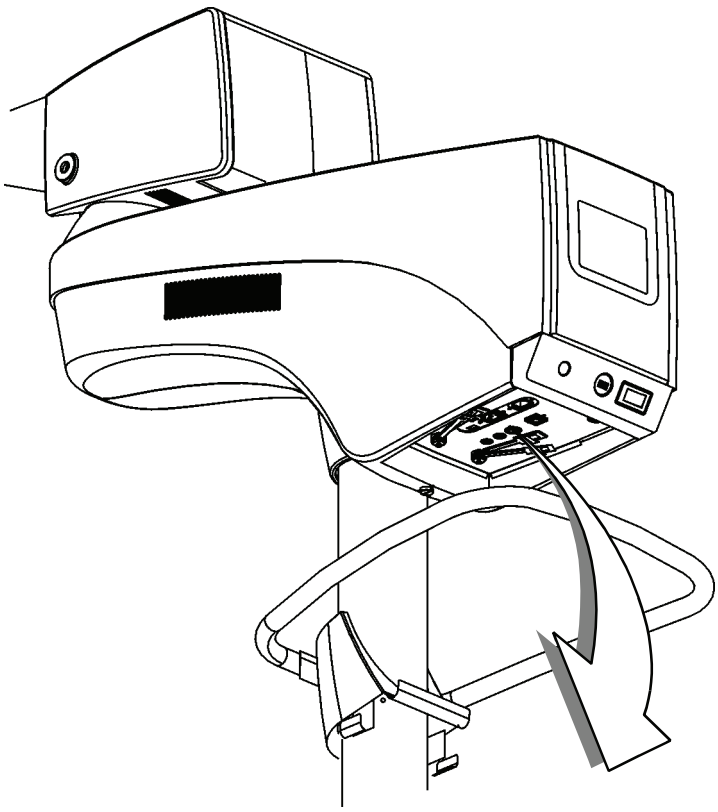
- Turn on the suspension system at power switch (1).
- Put the foot control panel in a vertical position (A) in the immediate vicinity of the suspension system (distance less than 2 m).
- Start the pairing process on the suspension system as described on page 88.

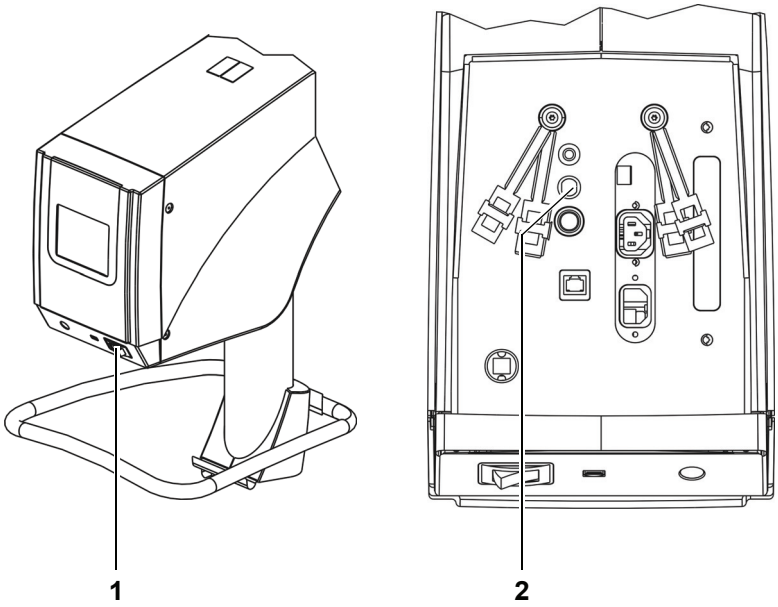
***NOTE***

**Foot control panel non-operational!**

If pairing is performed incorrectly or not at all, the foot control panel may be disabled, or activation of a control may trigger functions on a different suspension system not assigned to the foot control panel.

- Perform pairing.
- If the foot control panel continues to be non-operational after pairing, connect it to the system via a 3 m or 6 m cable.



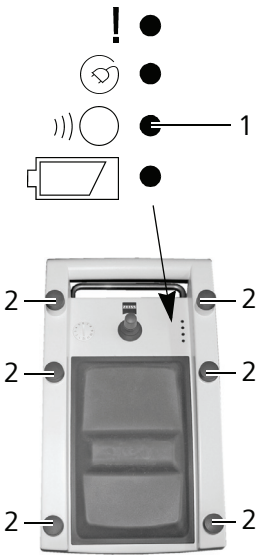

1
2

# Performing foot control pairing (optional)


Push the <System Config> button in the main menu and press the <Foot control pairing> button to open the "Pairing" submenu. In this submenu, you can assign a wireless foot control panel which is required for wireless operation to the system.

Before pairing, go through the following steps:

- Unless already done, place the foot control panel in its vertical position in the immediate vicinity of the system (max. distance of 1 m) and keep it in this position until pairing is completed.




### Performing pairing

- Start the "Pairing" process by pressing the <Start Pairing> button on the touch screen.

  → A message appears: "Activate one of the foot control panel's buttons until the third LED from the top blinks orange. Maintain the vertical position of the foot control panel."

### Successful pairing

If pairing was successful, the "Radio link intensity" indicator (1) flashes green for approx. 1 sec and the following message appears:

  – "Pairing successfully completed. Put the foot control panel in the horizontal position (working position) and perform a function test. Set the number specified on the suspension system via the wheel on the foot control panel."

- Check whether pairing was successful by simultaneously pressing any two control buttons (2) on the foot control panel. The "Radio link intensity" status indicator will be lit.

### Pairing failed

→ If pairing failed, the "Radio link intensity" indicator (1) flashes red for approx. 1 s and one of the following message appears:

  – "Pairing failed. No foot control panel was detected."

  – "Pairing failed. Several foot control panels were detected.

- Repeat the pairing process as described above.

## Fixing cable with strain relief device

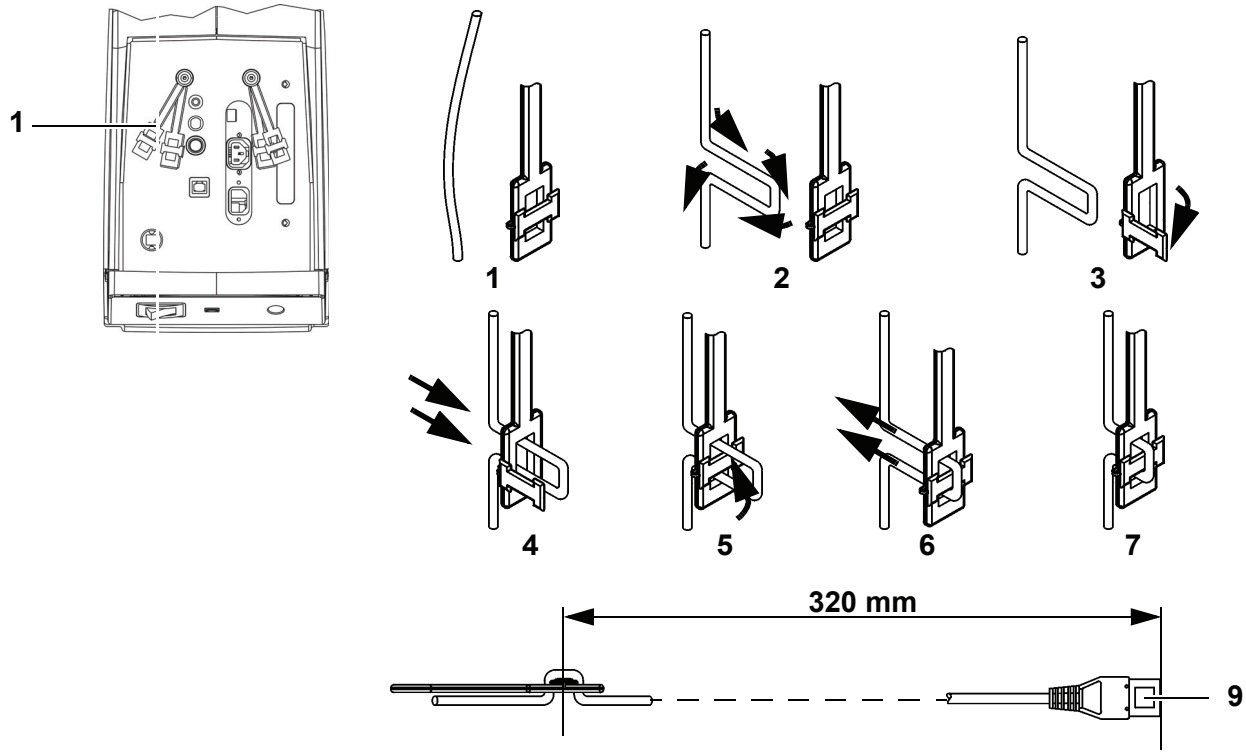
Use the strain relief device to prevent the connected cables from inadvertently being pulled out.

Make sure that the remaining cable length between the strain relief device and the connector (on the connector panel) is approx. 320 mm.

Secure the cable in the strain relief device as follows:

- Form a loop with the cable (2). Do not kink the cable.
- Open the flap (3).
- Feed the cable through the opening (4).
- Close the flap (5).
- Pull the cable until it encloses the flap (6).
  Do not kink the cable.

Check the cable length.



# Connecting external video devices to an SD video camera (optional)

The OPMI VARIO 700 with integrated SD video camera allows you to connect additional SD video monitors to the system. Parallel SD data recording is possible by connecting the optionally available external record option: MEDIALINK 100 or with the optional record function via the USB port.

**CAUTION**

**Hazard caused by live cables and connectors!**

The connection of accessories that have not been approved by Carl Zeiss may lead to injury of the patient.

- When setting up your system, make sure to comply with the requirements of EN 60601-1:2006 Chapter 15 or the requirements of EN 60601-1-1:1990.

### Connecting an endoscope camera

- Connect the analog video output port (Video in/out) on the OPMI VARIO 700 and the video input port of your endoscope camera using the following special cable:
  - 10 m Video in/out connecting cable

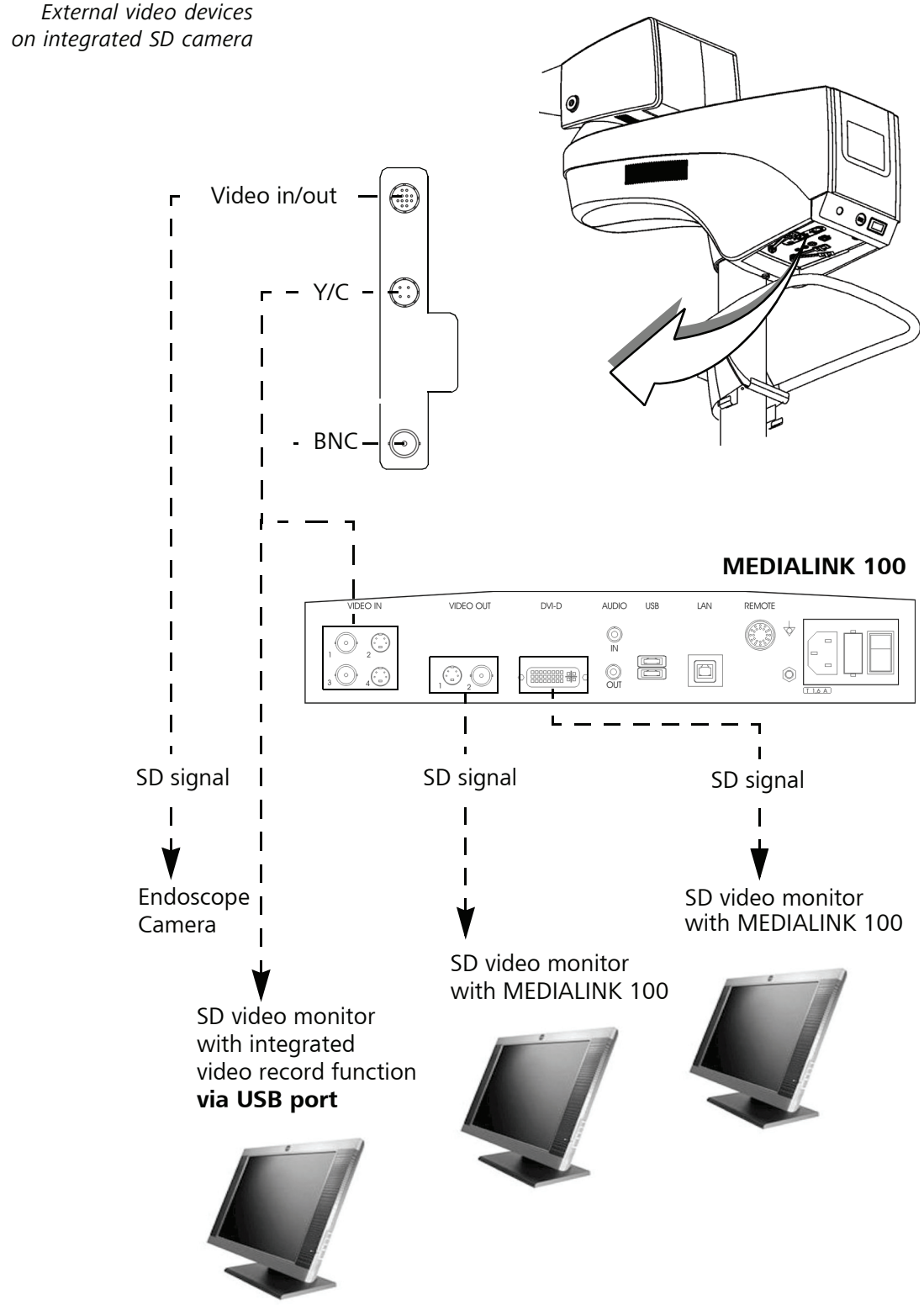
### Connecting the SD video monitor (integrated video recording function via USB port)

- Connect the analog video input port (Y/C) on the OPMI VARIO 700 to the video output port (e.g. Y/C) of your SD video monitor using the following video cable:
  - 10 m S-Video connecting cable

### Connecting the SD video monitor (external MEDIALINK 100)

- Connect the analog video output port (Y/C) on the OPMI VARIO 700 to the video input port (e.g. Y/C) of your MEDIALINK 100 using the following video cable:
  - 10 m S-Video connecting cable
- Connect the analog (DVI-D) or digital video output port (Y/C or BNC) of your MEDIALINK 100 and the video input port of your SD video monitor using one of the following video cables (depending on the connector type):
  - 10 m S-Video connecting cable
  - 2 m BNC cable set
  - 5 m DVI-D system cable

*External video devices on integrated SD camera*



# Connecting external video devices to an HD video camera (optional)

The OPMI VARIO 700 system with integrated HD video camera allows you to connect HD video monitors or external recording systems to view high-resolution images.
Parallel SD data recording is possible by connecting the optional MEDIALINK 100 recorder.

**CAUTION**

**Hazard caused by live cables and connectors!**

The connection of accessories that have not been approved by Carl Zeiss may lead
to injury of the patient.

- When setting up your system, make sure to comply with the requirements of EN 60601-1:2005 Chapter 15 or the requirements of EN 60601-1-1:1990.

### Connecting an HD video monitor

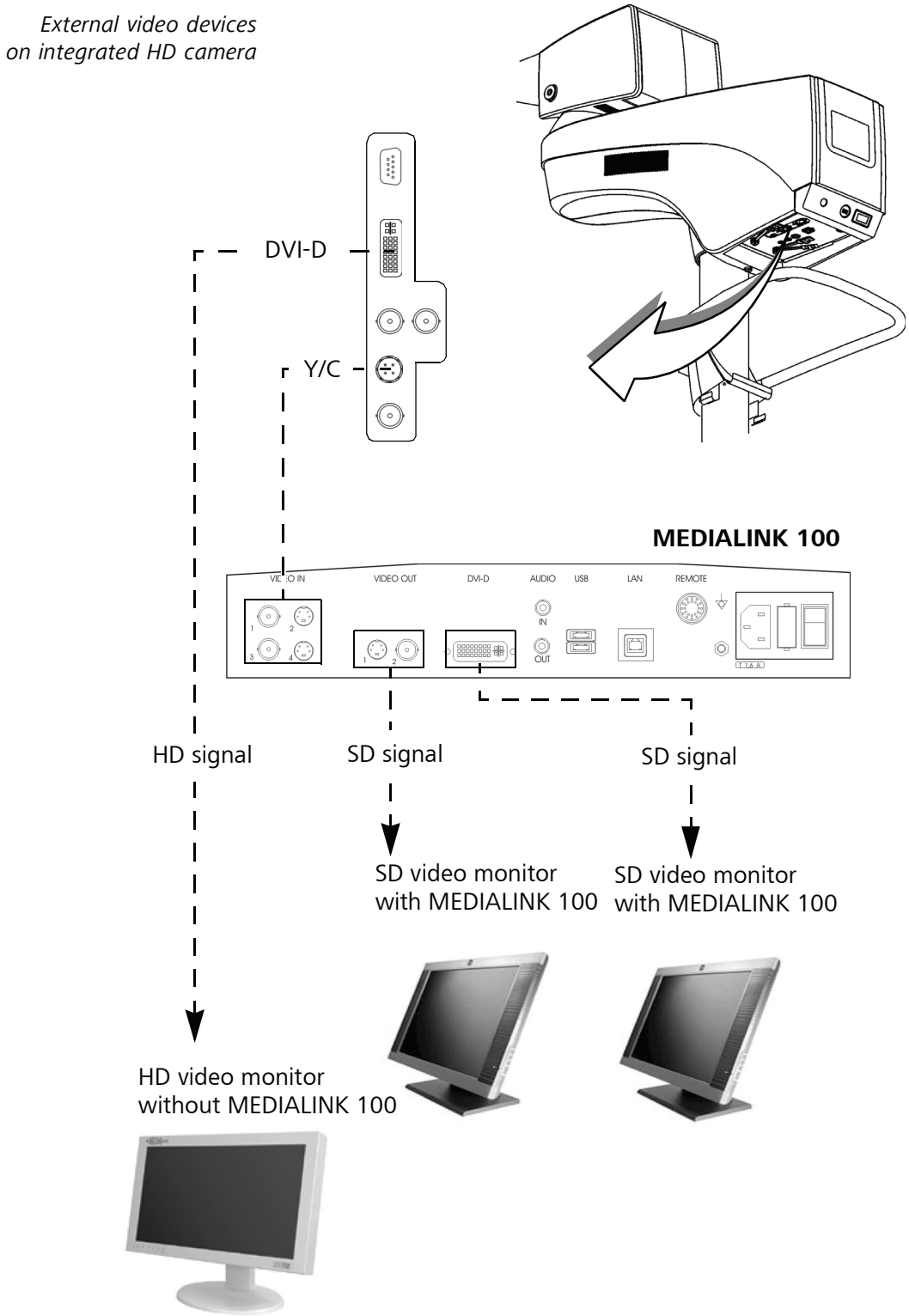
When connecting an external HD video monitor with the 5m DVI-D system cable (302681-8767-000), ensure to plug the connector with the ferrite core into the stand to prevent EMC interference.

- Connect the digital video output (DVI-D) on the OPMI VARIO 700 to the video input (e.g. DVI-D or BNC) of your HD video monitor using one of the following video cables (dependent on connector type):
  - HD-SDI connector cable, 75 Ohm, 2x BNC pin
  - 5 m DVI system cable

### Connecting an SD video monitor (including MEDIALINK 100)

- Connect the analog video output (Y/C) on the OPMI VARIO 700 to the video input (e.g. Y/C) on your MEDIALINK 100 using the
  - 10 m S-Video connector cable
- Connect the video output (Y/C, BNC or DVI) of your MEDIALINK 100 to the video input on your SD video monitor using one of the following video cables (dependent on connector type):
  - 10 m S-Video connector cable
  - 2 m BNC cable set
  - 5 m DVI system cable

*External video devices on integrated HD camera*



# Setting up the system

## Relocating the system

**CAUTION**

**Risk of tipping!**

Be careful when moving the device across sills; it may easily tip and/or injure a person next to it.

- When lifting or pulling the system across a doorsill request the help of a second person.

**CAUTION**

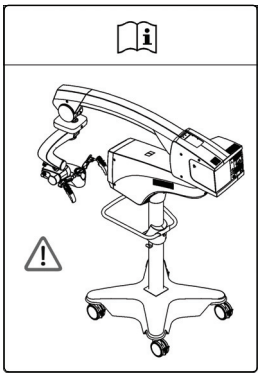
**Risk of crushing!**

Fingers can become trapped between support arm and extension arm.

- Never touch the area between support arm and extension arm while turning the support arm.

***NOTE***

**Transporting the device**



- Turn on the system from the power switch.
- Move the spring arm into the transport position (see figure on left).
- Turn on the system from the power switch.
- Disconnect the power cord from the power socket.
- Wrap the foot control panel and mains cables onto the cable holders.
- Hang the foot control panel on the bracket.
- Release the locking tabs of the casters.
- Hold the device by the bracket and push it carefully. Ensure the device is standing on even ground.
- Be careful of heights when passing through doorways.
- Avoid collisions of any kind.
- Do not go over steps and edges (the stand may topple!)
- Be extremely careful when moving over slopes.
- To lock the device into position, press the locking tabs of all four casters and ensure that the stand cannot be moved unintentionally.

***NOTE***

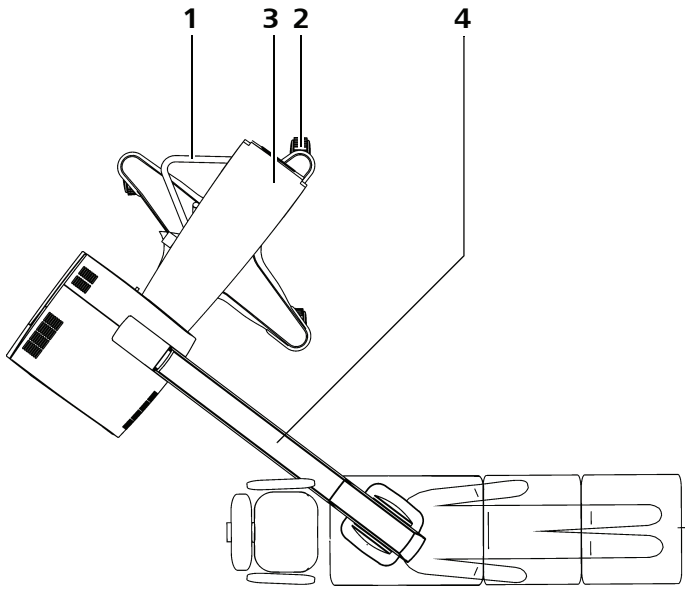
**Transporting the device over long distances**

- Only transport the device over long distances (e.g. relocation, return for repair) in its original packaging or special return packaging. Please contact your dealer or Carl Zeiss Service.

## Positioning the device in the OR

Position the device as follows:

- Release the locking tabs of all casters (2).
- Hold the device by the transport handle (1) and move it carefully into a position convenient for you (such as that shown below).
  - Ensure that the support arm (3) and the extension arm (4) are not fully extended but are at an angle of ca. 90° to each. This provides a greater degree of maneuverability and also a perfect working position.
  - Ensure the device is standing on even ground and is not tilting or wobbling.
- Press the locking tabs of all four casters (2) and ensure that the stand cannot be moved unintentionally.



# Aligning the video monitor (optional)

**CAUTION**

**Risk of crushing!**

Hands and/or fingers may be crushed between monitor and carrier arm.

- Stay clear of the area between monitor and carrier arm, while moving the monitor.

***NOTE***

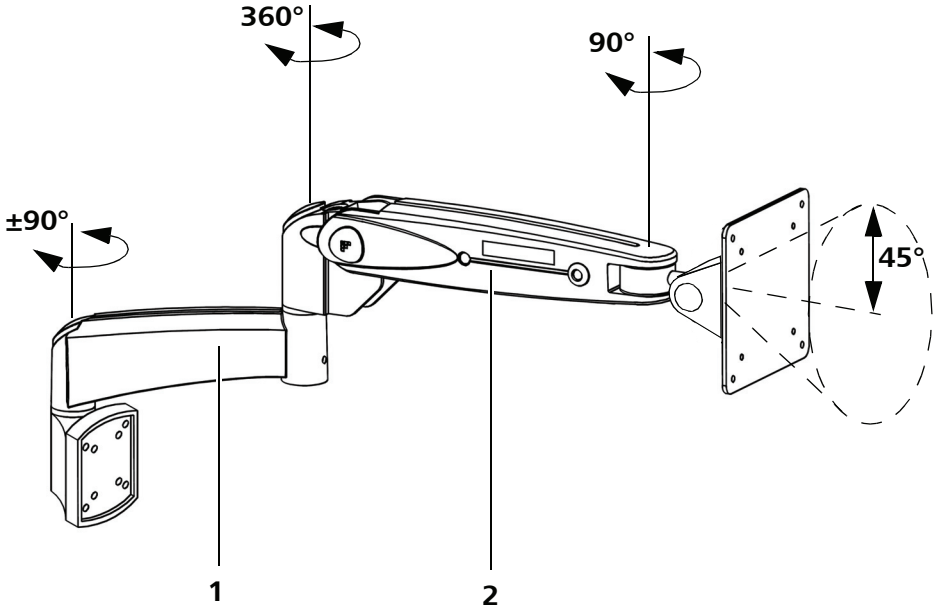
**The video monitor can drop downwards**

Aging processes can lead to a loss of gas in the gas pressure spring of the spring arm. The video monitor can drop down as a result.

- Compensate for the loss of gas by readjusting the gas pressure spring (see page 192).
- If the video monitor continues to drop downwards, the gas pressure spring is defective.
  Please inform the Carl Zeiss service department.

How to align the video monitor:

- Pivot the carrier arm (1) and the suspension arm (2) in the desired horizontal position.
- Tilt the suspension arm (2) upward or downward until the proper height is reached.
- Hold on to the upper corner of the video monitor and adjust the proper viewing angle.



# Manually balancing the surgical microscope

**CAUTION**

**Risk of injury caused by uncontrolled movement of the system!**

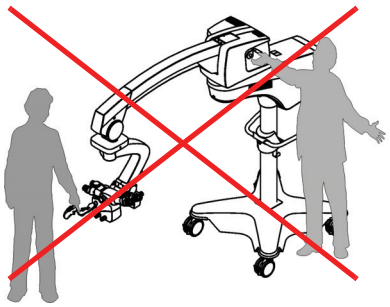
It may happen in exceptional cases that the surgical microscope is not correctly balanced although the balancing procedure has been completed. With an incorrectly balanced system, brake release may lead to uncontrolled movements of the suspension system.

- Only use the system after it has been properly balanced!
- To check correct balancing of the system, unlock the brakes. Hold the microscope tightly at both handgrips. If the system has been correctly balanced, the surgical microscope can be moved almost effortlessly. Repeat the balancing procedure, if required.

  The balancing procedure and the subsequent test must not be performed above the patient and only at a safe distance from other persons and devices.

### Move the stand into position for manual balancing

Turn the surgical microscope in the direction of the stand base and move the stand into a position (see diagram) so that the magnetic brakes and the crank of the balance adjustment can be operated.



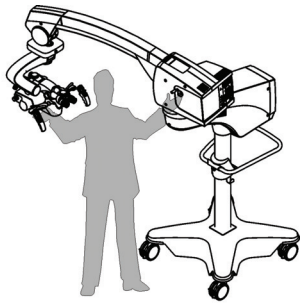




*Image 1*

## Manual balancing through user guidance on the display

Press the <Balance> button ( ) on the display in the main menu; images are used to explain the manual balancing procedure.

Press the < or > button to access the previous or next image.
Press the <Stop> button to return to the main menu.

In general, the following applies:
If the microscope moves in the direction of the white or black arrow when the brakes are unlocked, the respective knob must be turned in the direction of the white or black arrow.

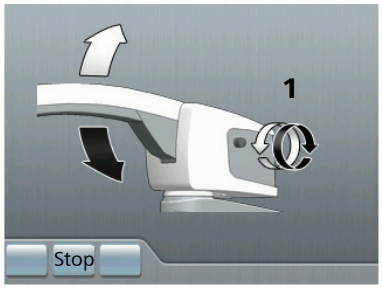



*Image 2*

**1** Adjusting the balance of the suspension arm

- Unlock the stand brakes by pressing the respective handgrip button and turn crank (1) to adjust the balance in such a way that the suspension arm with the microscope remains stationary in any required position.

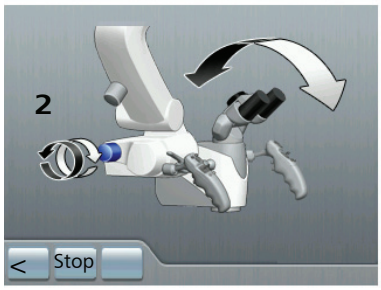
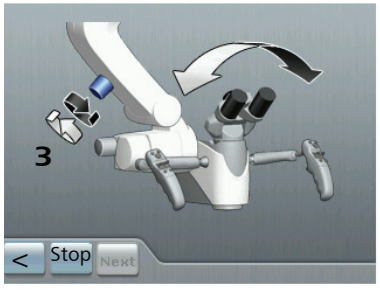



*Image 3*

**2** Adjusting the microscope's front-to-back tilt motion

- Unlock the microscope brakes and put the microscope in the position shown in image 2.
- Adjust the balance by turning knob (2) in such a way that the surgical microscope can be moved almost effortlessly through the front-to-back tilt axis.

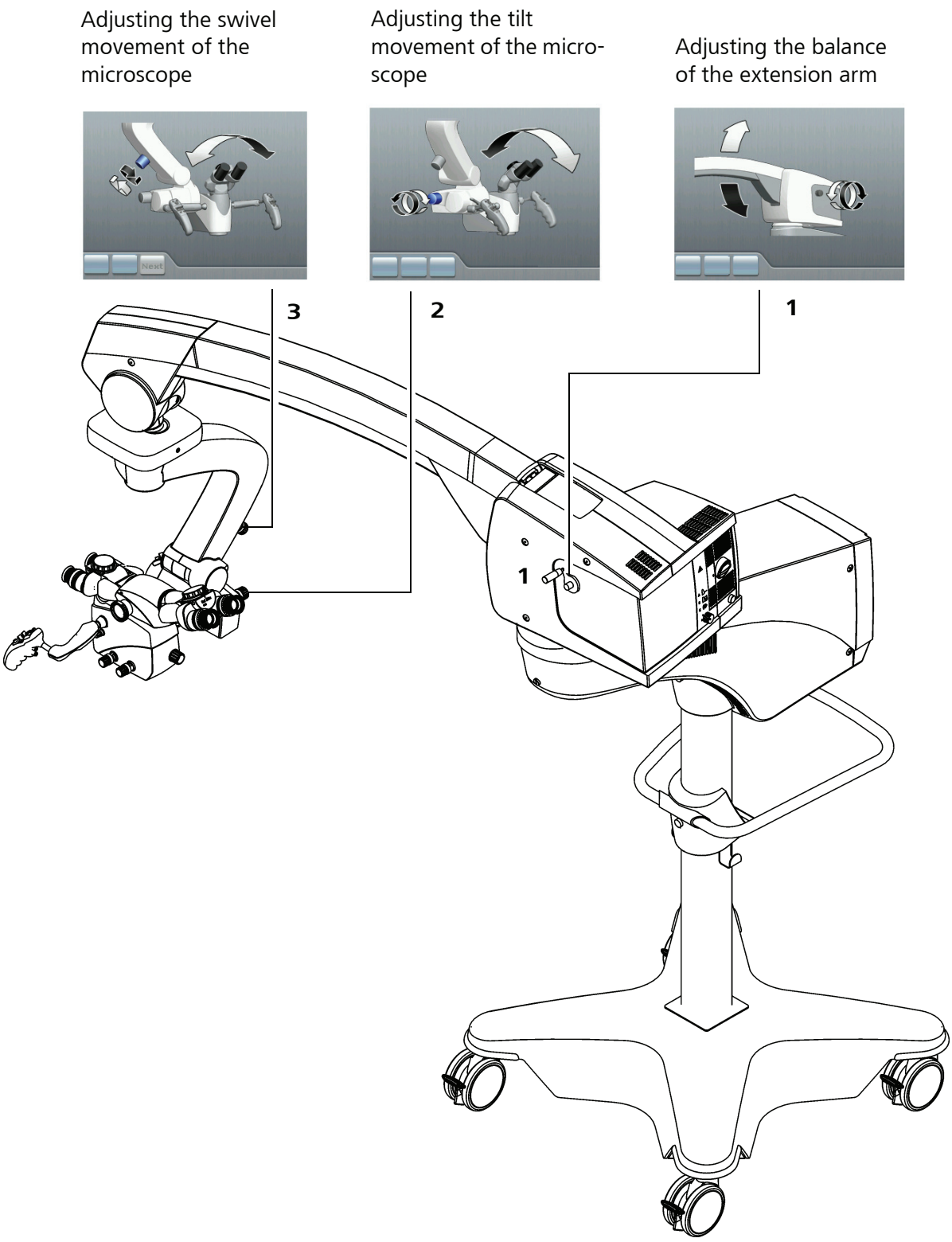



**3** Adjusting the microscope's lateral tilt motion

- Unlock the microscope brakes and put the microscope in the position shown in image 3.
- Adjust the balance by turning knob (3) in such a way that the surgical microscope can be moved almost effortlessly through the lateral tilt axis.

Procedures 2 and 3 may influence each other.
Therefore, adjust the front-to-back and lateral tilt ranges in such a way that optimum balance is obtained and you can move the surgical microscope almost effortlessly.

The balancing procedure is completed when the microscope has been balanced to your satisfaction. Perform fine adjustment (see page 104) if the balance is not satisfactory, e.g. when the microscope is used in horizontal viewing direction.


Adjusting the swivel movement of the microscope
Adjusting the tilt movement of the micro-scope
Adjusting the balance of the extension arm
3
2
1
1

# Automatically balancing the surgical microscope (optional)

The device can be fitted with the AutoBalance option.

**CAUTION**

**Risk of injury caused by uncontrolled movement of the system!**

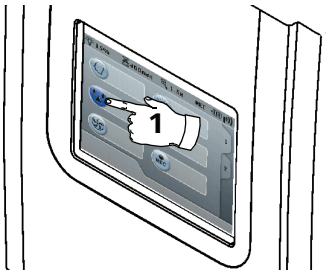
It may happen in exceptional cases that the surgical microscope is not correctly balanced although the balancing procedure has been completed. With an incorrectly balanced system, brake release may lead to uncontrolled movements of the suspension system.

- Only use the system after it has been properly balanced!
- To check correct balancing of the system, unlock the brakes. Hold the microscope tightly at both handgrips. If the system has been correctly balanced, the surgical microscope can be moved almost effortlessly. Repeat the balancing procedure, if required.

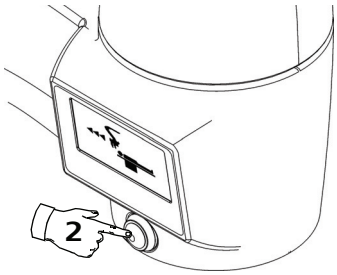
  The balancing procedure and the subsequent test must not be performed above the patient and only at a safe distance from other persons and devices.

Ensure that any accessories mounted (such as stereo dual viewer) do not collide with the stand during the balancing process.

The balancing process can be started by pressing the <AutoBalance> button (1) on the display or by pressing the balance button (2) on the additional display.
The AutoBalance process can be aborted at any time by pressing the <AutoBalance> button (1) on the display or by pressing the balance button (2) on the additional display. Releasing the magnetic brakes also stops the balancing process.




**1** Press the <Balance> button on the display → AutoBalance starts
The user is kept up-to-date on the process with messages on the display and symbols on the additional display (see following pages).

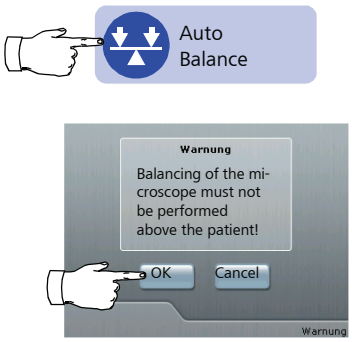



**2** Balancing process by pressing the Balance button → AutoBalance starts
Access to other functions of the device is temporarily disabled during the balancing process.
The user is kept up-to-date on the process with messages on the display and symbols on the additional display (see following pages).

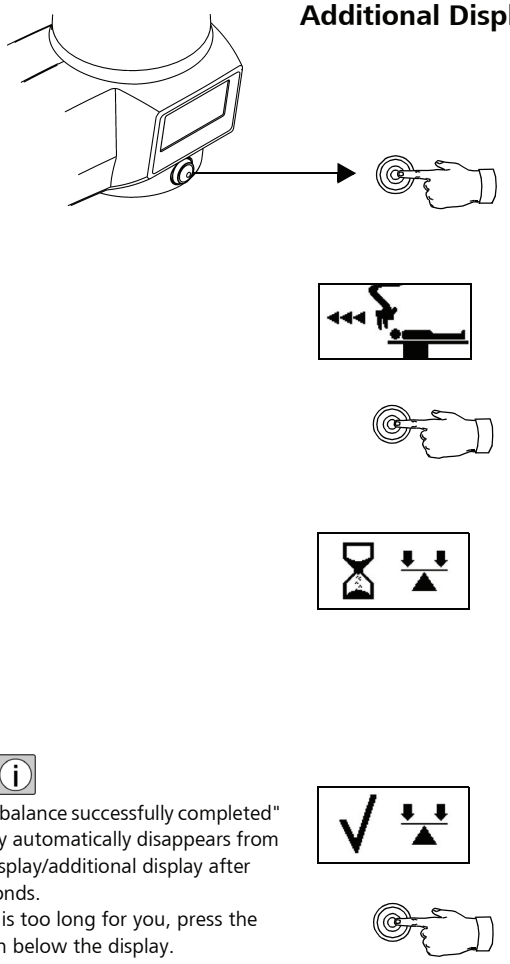
### Surgery microscope is within balancing range

The following balancing process applies if the surgical microscope is already in the balancing range (center position):

**Display**




**Additional Display**



"Autobalance successfully completed" display automatically disappears from the display/additional display after 3 seconds.
If this is too long for you, press the button below the display.

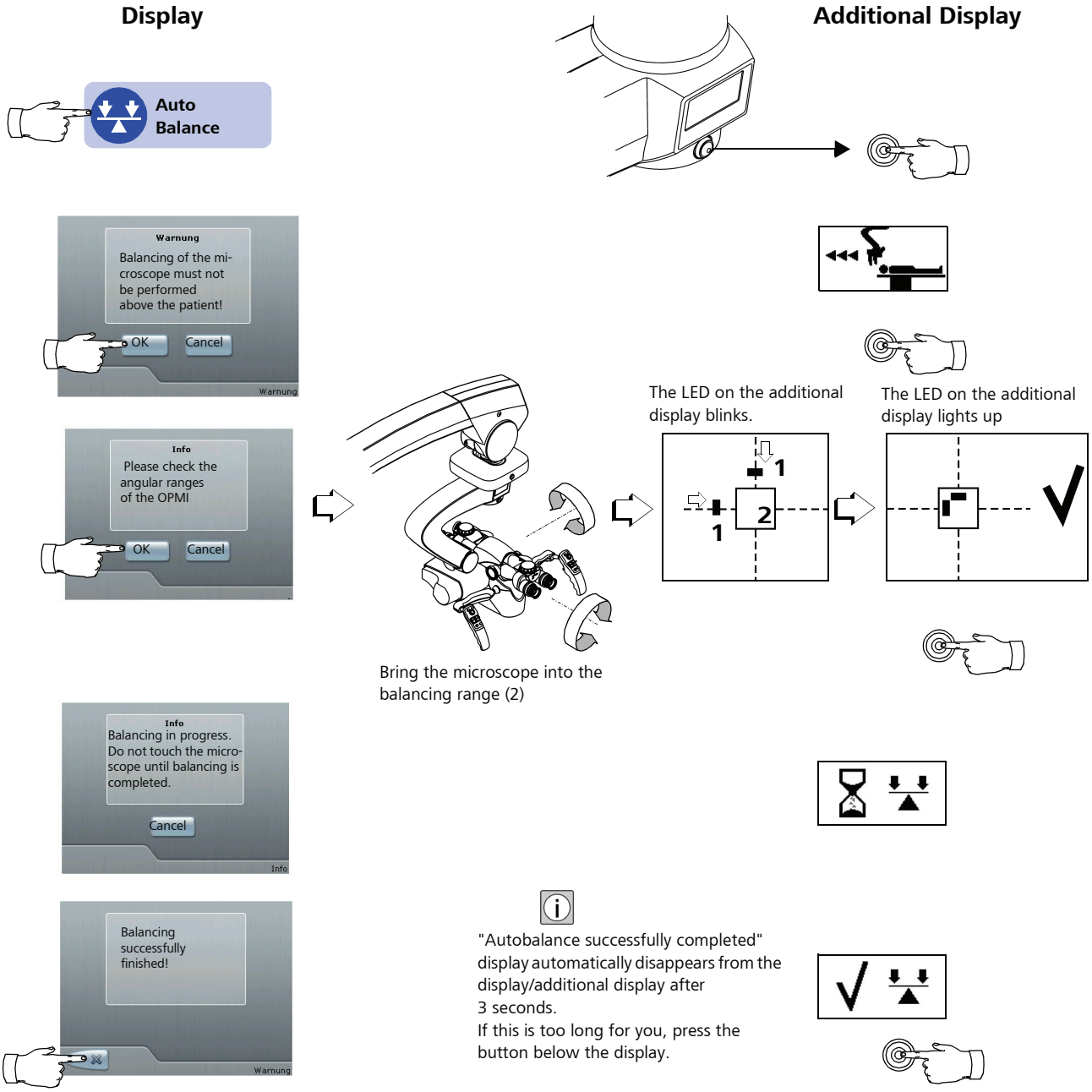
---

Error message during AutoBalance

Balancing procedure cancelled - Repeat the balancing procedure!
Pay attention to the error messages on the display. The additional display shows a warning triangle in this case, and a beep is heard.

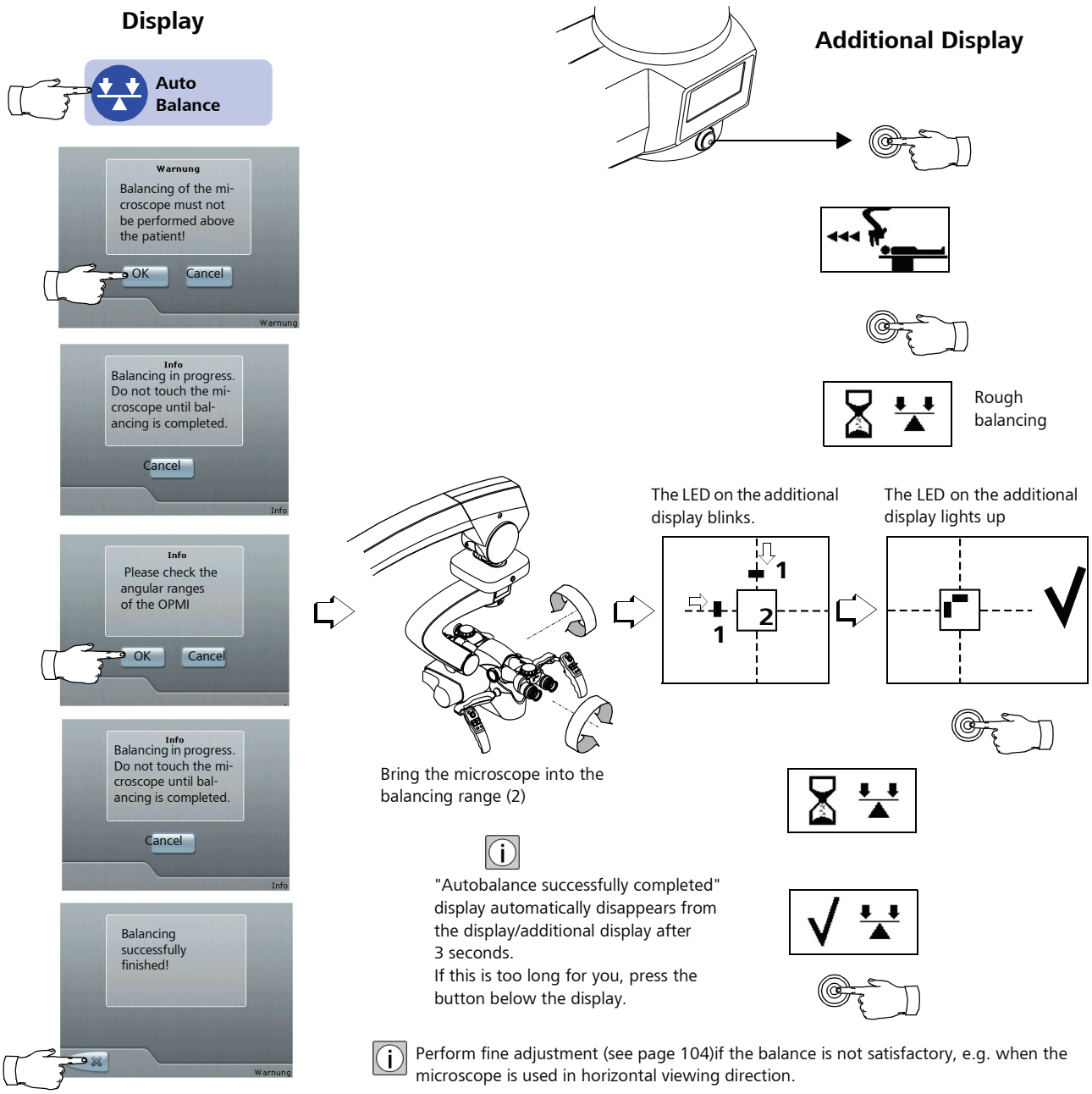
### Surgical microscope is outside the balancing range

Surgical microscope is outside the balancing range. Swivel the microscope (with brake released) in the microscope axes until the two marks (1) of the axes are in the balancing range (2). The following balancing process applies:



### Surgical microscope is not configured perfectly

The weight distribution of the accessory on the surgical microscope is not perfect. AutoBalance must first perform an approximate balance.
This is followed by a fine balance. Swivel the microscope (with brake released) in the microscope axes until the two marks (1) of the axes are in the balancing range (2). The following balancing process applies:



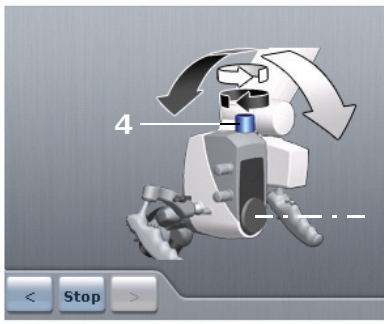

Perform fine adjustment (see page 104)if the balance is not satisfactory, e.g. when the microscope is used in horizontal viewing direction.

## Fine adjustment of microscope

Ideally, adjustment is sensitive and often only half a turn of the knob is sufficient (4).
For large loading or unsymmetrical configuration, greater corrections are necessary with the knob (4).

ⓘ Generally,
if the microscope body moves in the direction of the black/white arrows after disengaging the brake, the appropriate knob must be turned in the direction of the black/white arrows.

*Picture 1*

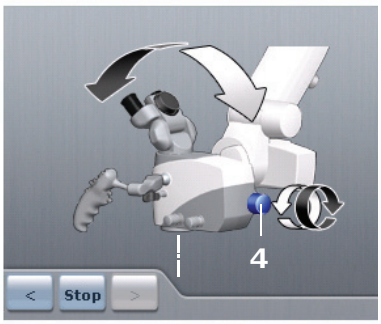



- Release the microscope brakes and position the microscope as shown in Figure 1.
- Adjust the balance by turning the knob(4) so that the surgical microscope can be tilted backwards and forwards with very little force in this position.
  - If the microscope swivels forwards when the brake is released (black arrow), turn the knob (4) in the direction of rotation of the black arrow.
  - If the microscope swivels backwards when the brake is released (white arrow), turn the knob (4) in the direction of rotation of the white arrow.

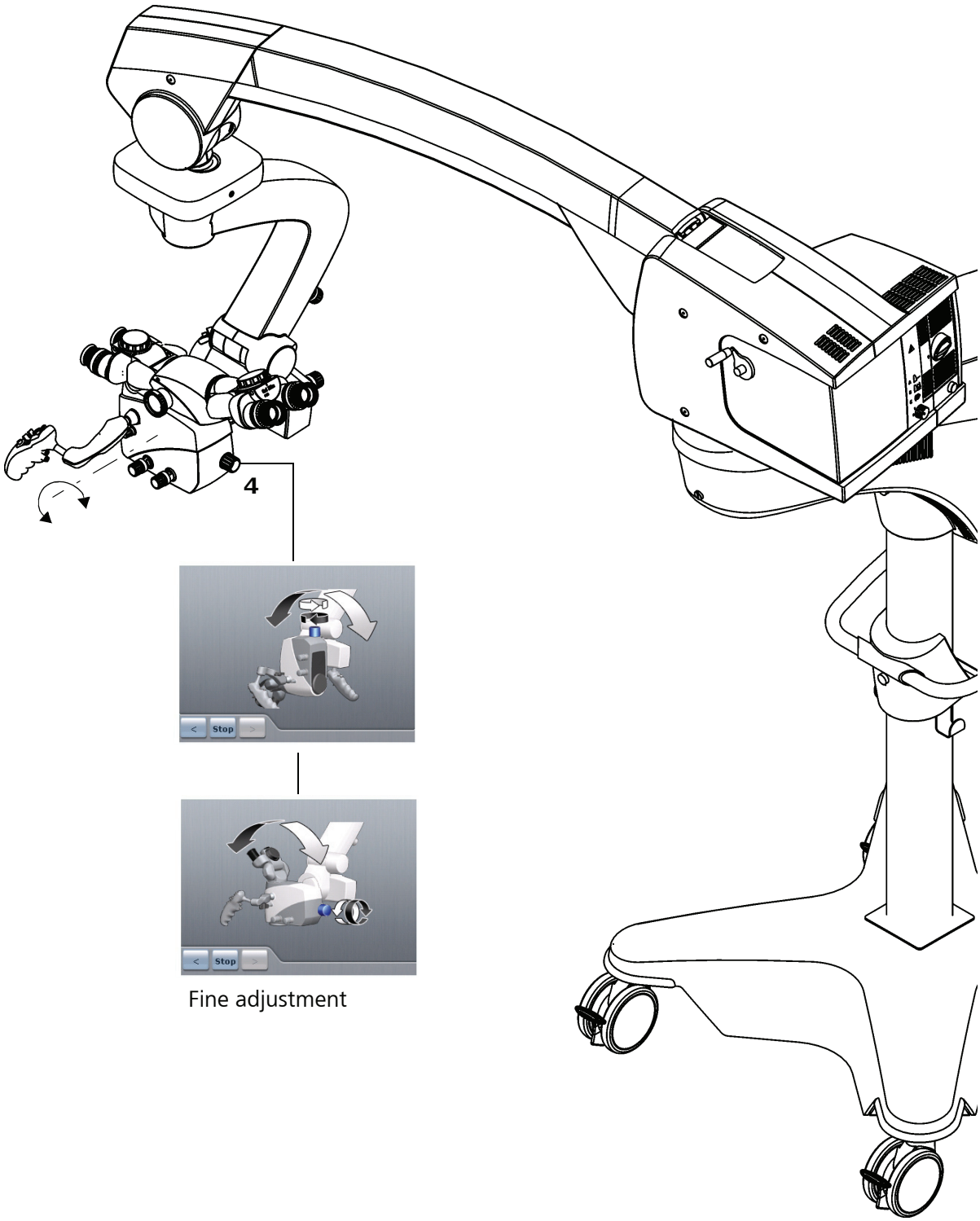
For the AutoBalance option:

- Re-run an Autobalance in this position.

*Picture 2*




- Release the microscope brakes and re-position the microscope as shown in Figure 2.
- Correct the balance again by turning the knob (4).




Fine adjustment

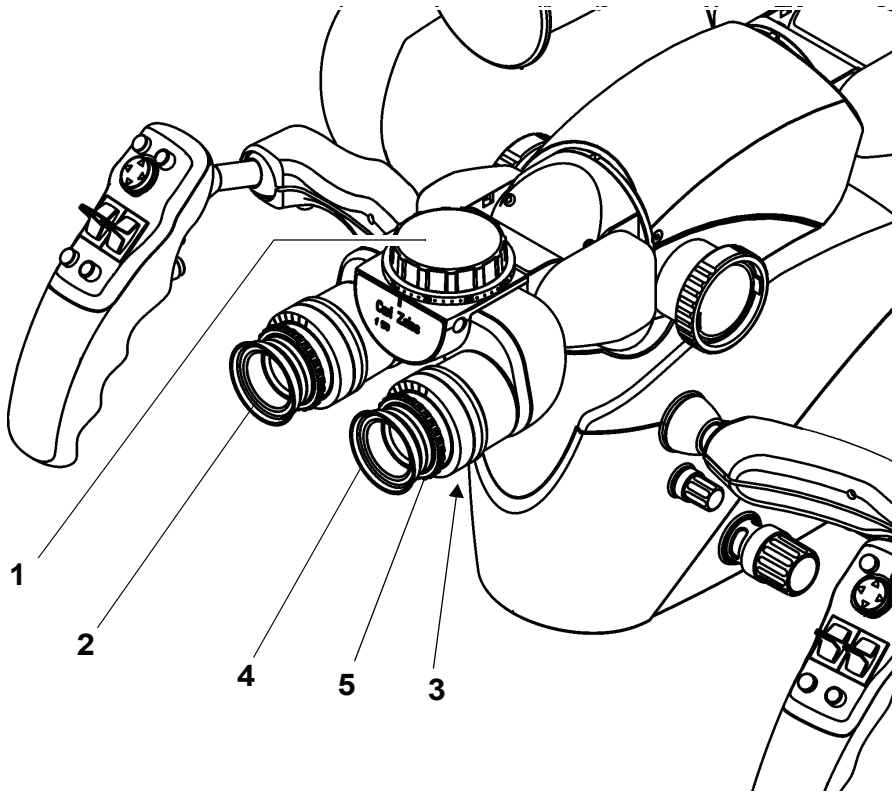
## Adjusting the surgical microscope

– Only a correctly adjusted working distance will provide an optimum image at all selectable magnifications.

– For quick setup of the surgical microscope, it is advisable to note the pupillary distance and prescriptions of the different users so that they can be easily preset during system preparation.

*Adjusting the interpupillary distance*

- Use knob (1) to adjust the distance of eyepieces (2) on the binocular tube in such a way that the two eyepiece images merge into one.
- Set the minimum magnification on the microscope via the handgrips or foot control panel.
- Position the microscope above the surgical field.



*Adjusting the eyepieces*

– Emmetropes:
  • Set diopter setting ring (5) to 0 diopters (D).
– Eyeglass wearers who perform surgery wearing their eyeglasses:
  • Set diopter setting ring (5) to 0 D.
– Eyeglass wearers who perform surgery without their eyeglasses (known prescription):
  • Set diopter setting ring (5) to the respective value.
– Eyeglass wearers who perform surgery without their eyeglasses (unknown prescription):
  • Set diopter setting ring (5) on the eyepiece to + 5 D.

| Eyepieces without reticle | Eyepieces with reticle |
|---|---|
| • Remove tube with eyepieces from the microscope body and point it at a distance object<br>• Slowly turn diopter setting ring (5) of one eyepiece clockwise until the object is in focus.<br>• Mount the tube with eyepieces on the microscope body and tighten the screw (3). | • Slowly turn the diopter setting ring (5) on the eyepieces clockwise until the reticle is in focus.<br>• Focus the main microscope on the object. The reticle and the object must be in focus at the same time. |

  • Adjust eyecups (4) in such a way that the entire field of view can be seen.

– Viewing with eyeglasses: Screw in eyecups (4) all the way.
– Viewing without eyeglasses: Screw out eyecups (4) and adjust them for your field of view.

# Focusing

### Manual focusing

- Move the surgical microscope over the surgical field (1) into an ergonomic position within the working distance.
- Set the minimum magnification (zoom) via the handgrips or foot control panel.
- For coarse focusing, look through the eyepieces and lower the surgical microscope until the surgical field comes into focus.
- Select the highest magnification (zoom).
- Look through the eyepieces and activate the focusing function until the image of the surgical field appears sharply focused.
- Select the magnification required (zoom). Look through the eyepieces of the binocular tube. Adjust the eyepieces in such a way that you can see both the edge of the field of view and the microscope image sharply.

### Using the SpeedFocus (autofocus) option for focusing.

The SpeedFocus autofocus function is based on the evaluation of the video image contrast: during focusing of the microscope's Varioskop optics, SpeedFocus continuously determines the video image contrast in the selected ROI. In this way, SpeedFocus controls the microscope's Varioskop optics and adjusts it to the point of maximum contrast.

- Move the surgical microscope over the surgical field into an ergonomic position within the working distance.
- Press the configured <SpeedFocus> button on the handgrip or the foot control panel.

  → SpeedFocus has focused .....1 beep

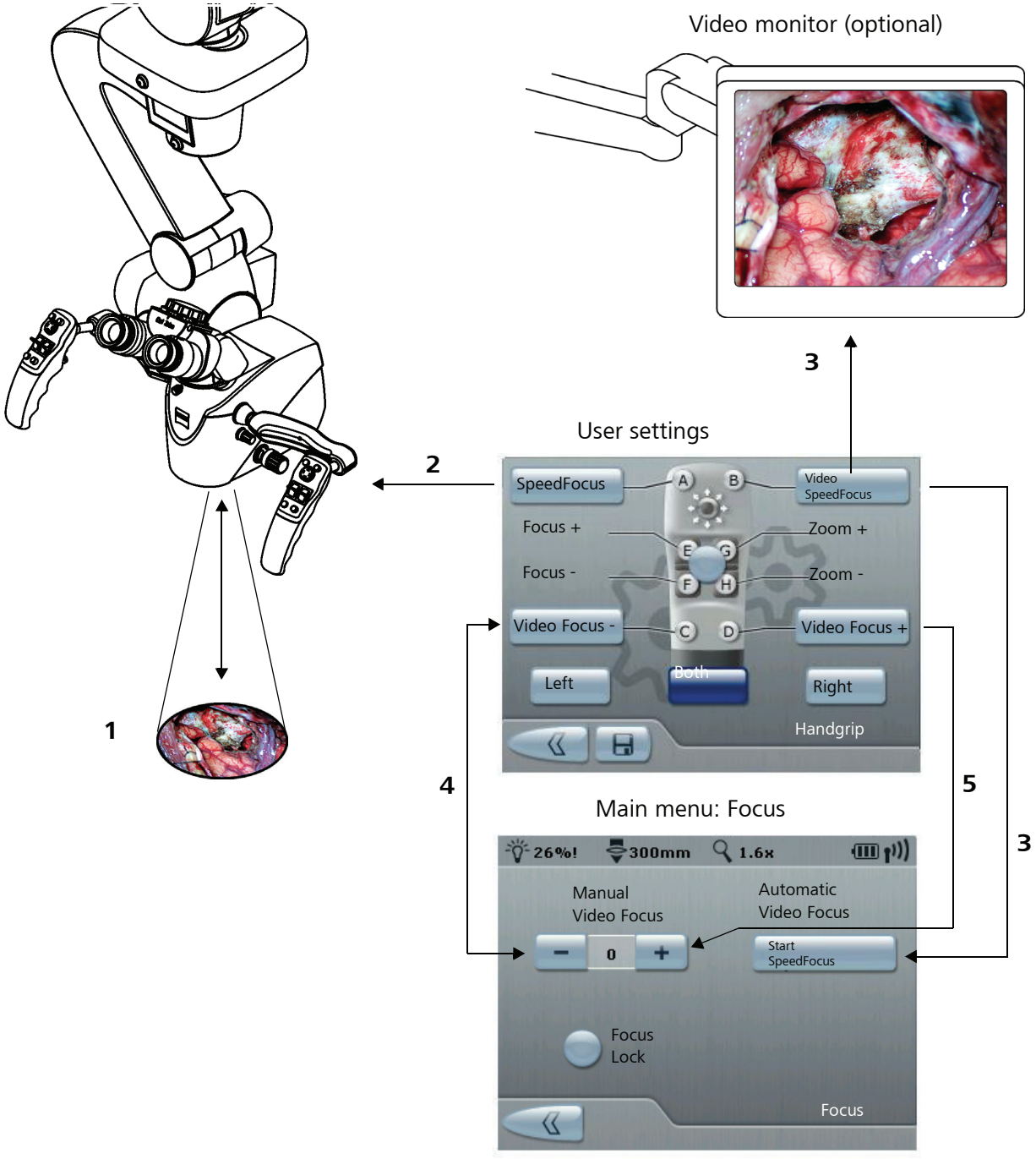
  → Focusing could not be performed ..... 3 beeps

### Focusing the video image manually on the optional video monitor

- Press the configured <Video focus +/ -> buttons on the handgrip or the foot control panel. Or: set the focus using the <+ (4) / - (5) buttons in the <Focus> menu.

**Focusing the video image automatically on the optional video monitor (2)**

- Press the configured <Video SpeedFocus> button on the handgrip or the foot control panel.
  The video image is automatically in focus, regardless of the microscope image actually seen by the surgeon.



## Attaching sterile drapes

**CAUTION**

**The use of third party drapes may affect navigation systems**

Certain third party drapes (e.g. drapes with curved protective lens covers) may influence the accuracy of navigation systems due to an optical distortion caused by the convex shaped protective lens cover.

Although there may be no perceptible impairment to the visual image quality observed through the microscope eyepieces (oculars), there is an imaging effect which displaces the microscope's focal point displayed by the navigation software. Due to this effect the focal point displayed by the navigation software may not be correctly aligned to the patient's image information from the navigation system (i.e. the patient data set).

Consequently the microscope-related reconstruction of the patient data set by the navigation system could display a wrong focal plane that does not comply with the real focal plane of your surgical microscope.

In systems with such features, depending on the distortion caused by the lens, the object contours of a pre-planned anatomical structure displayed in the microscope video of the navigation software, or in the heads-up-display, may show an incorrect size and/or incorrect position in relation to the actual image in your surgical microscope.

If not noticed by the user, incorrectly displayed information could influence clinical decisions during a navigated surgery. Those clinical decisions could be incorrect and potentially result in ineffective treatment or in serious injury to the patient.

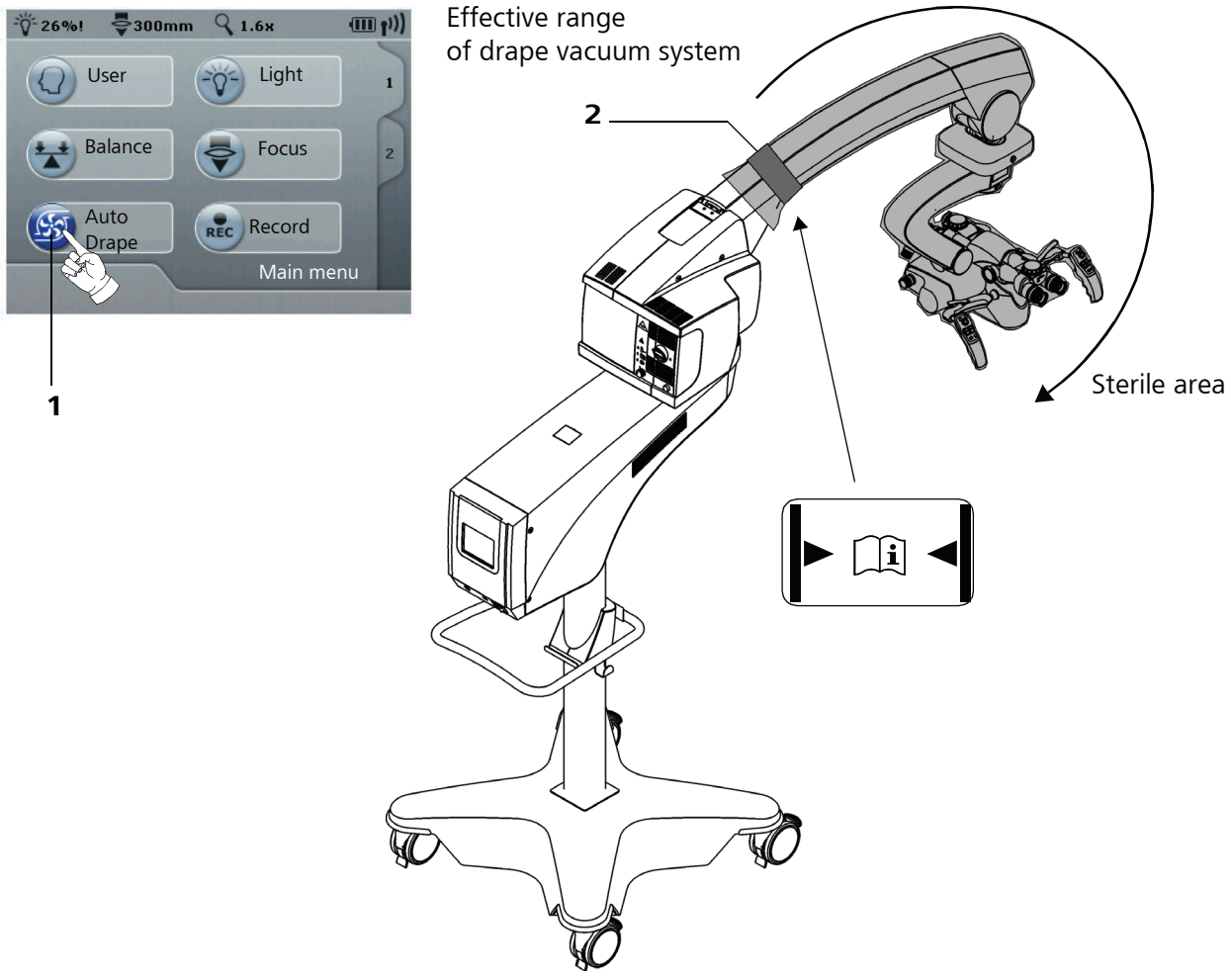
- Always follow the instructions for use of the navigation system manufacturer for calibration, calibration verification and operation.

Pull the drape until the marked position is reached .
Do not cover the ventilation openings of the light source or carrier arm.

**System without Autodrape function**

- Unpack the drape and pull it over the surgical microscope and the suspension arm.
  Refer to the instructions for use of the sterile drapes!
- Pull the drape over marked position (2) of the suspension arm.
  When attaching the drape, please ensure that there is sufficient space for the tilt and rotation movements of the surgical microscope.
- Make the drape airtight at the marked position (2) using one of the straps.

If the AutoDrape option has not been installed, <AutoDrape> button (1) is disabled.



### System with AutoDrape function (optional)

The system features an integrated AutoDrape function
which extracts the air from the drape at the suspension arm and surgical microscope.

- Press <AutoDrape> button (1) in the main menu to activate the drape vacuum pump.

  The vacuum system operates at maximum power during the first 3 minutes approximately. Then it automatically switches to a defined maintaining power to keep up the vacuum.

- The drape vacuum pump is switched off by pressing <AutoDrape> button (1) in the main menu once again.

  We recommend not to switch off the AutoDrape function during surgery.

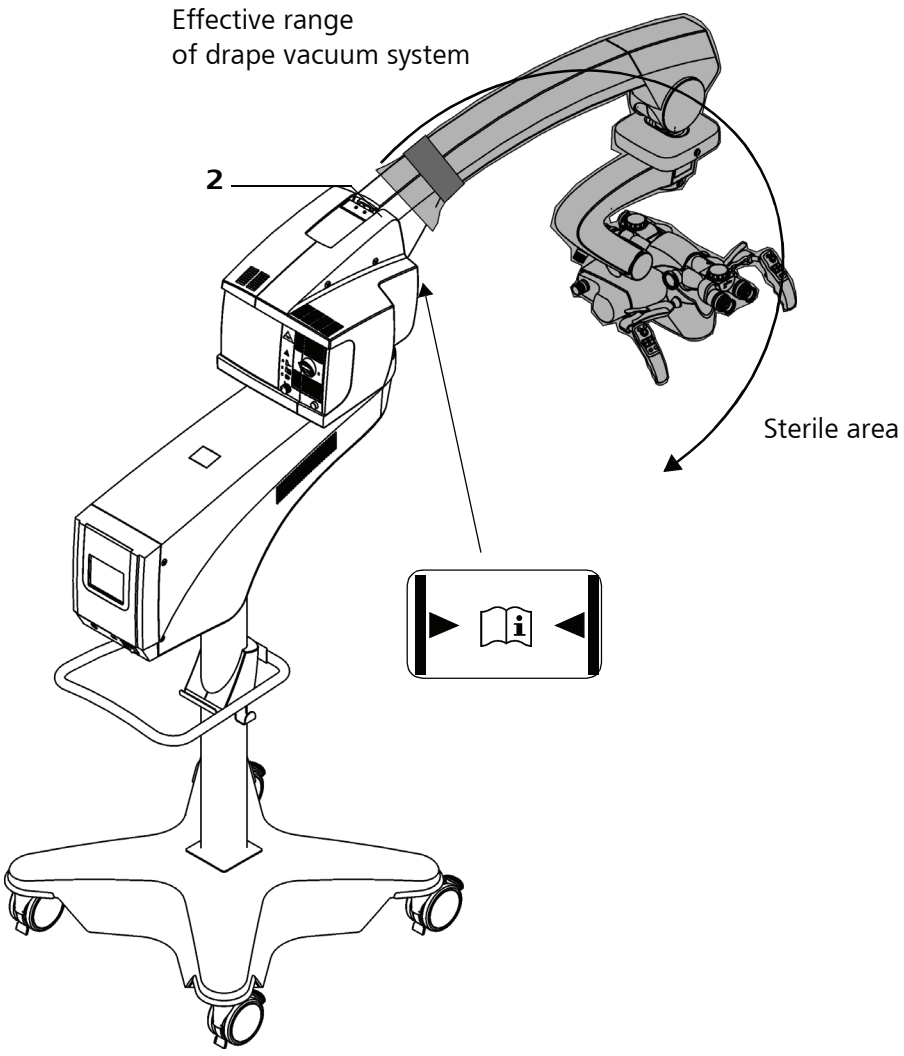
**CAUTION**

**Contamination with pathogenic germs!**

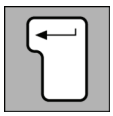
- Observe the instructions for use of the sterile drape and make sure that the drape is attached in such a way that sterility is not impaired (see sterile area in the illustration on the next page and page 200).


26%!
300mm
1.6x
User
Light
Balance
Focus
Auto Drape
Record
REC
Main menu
1
2

1


Effective range
of drape vacuum system
2
Sterile area

# Operation



# Powering the system up and down

*Prerequisites*

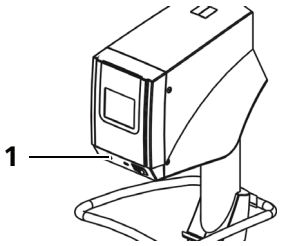
✓ The correct rated voltage for the stand has been set (see page 66).

✓ The power cable is connected (see page 84).

**CAUTION**

**Risk of injury!**

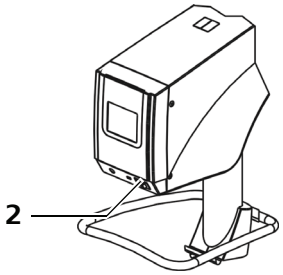
- Do not switch the device on above the patient.
- The device can perform uncontrollable movements or functions (focus, zoom, light control, XY movement(optional)) if the electronics system experiences malfunctions.
- In this case, switch to Light-only mode by pressing the orange-colored Light-only button (1) on the control and display panel.




**CAUTION**

**Malfunction**

- After powering on the device, check the system starts correctly.
  The device is ready for use after the signal tone and display of the start screen:


Proceed as follows to power the system up and down:

- Press the power switch (2) on the stand.
  → The power switch lights up green when the device is switched on.
  → The system performs a self-test after power-up during which a start screen with the Zeiss logo is shown on the display.
  → The power switch does not light up when the device is switched off.

Switching on the surgical microscope for the fist time displays the default user profile "Default User". For subsequence log-ins, the system sets the user profile of the user last selected.

The "Default User" profile cannot be edited or changed.
It cannot be deleted either.

A functional test (checklist) must be performed before starting to work with the system (see next page). Check the device configuration and the user-specific settings and re-set them if necessary.

# Functional test prior to use (checklist)

***NOTE***

**Functional test**

- Use the following list to check the function of the device before every operation (with no patient).

⚠ **CAUTION**

**Risk of injury!**

Incorrect user settings may lead to unexpected behavior of the system and may cause injuries to the patient.

- Always check the settings of the selected user profile before using the system.

⚠ **CAUTION**

**The values displayed (SI units) are not calibrated**

The values displayed (SI units) are rounded. They are intended to improve the display and do not represent a measurement function.

***NOTE***

**Software faults!**

Software faults can impact the behavior of the device.

- In the event of a software fault, switch to Light-only mode and inform our service department.

**Microscope**

- Check the zoom
  - ✓ The buttons on the handgrips and foot control panel work as per the configuration (see page 152).
  - ✓ The zoom speed has been set on the display and works.
- Check the focus
  - ✓ The buttons on the handgrips and foot control panel work as per the configuration (see page 152).
  - ✓ The focus speed has been set on the display and works.
  - ✓ SpeedFocus (option) has been set on the display and works (see page 108 and page 144).
  - ✓ Video focus (option) has been set on the display and works (see page 108).
- Check the unobstructed movement of the surgical microscope

✓ The balance has been set and the microscope is balanced.

✓ All accessory parts have been fitted such that the surgical microscope can be positioned safely and without causing damage.

- Check the eyepieces/binocular tube/stereo bridge

  ✓ The surgical microscope and the tube are in a position convenient for you.

  ✓ The interpupillary distance has been adjusted (see page 106).

  ✓ The eyecups have been adjusted such that you can see the full field of view (see page 106).

  ✓ Check that the correct prescription has been set on the diopter scale (see page 106).

  ✓ The image quality is correct throughout the entire magnification range.

  ✓ The lens and eyepieces are clean.

- Check accessories (also third-party accessories)

  ✓ Other equipment (lighting, video system and third-party accessories such as micromanipulator (see page 74)) has been checked for proper function using the user manuals.

⚠ **CAUTION**

**Loss of light for HDTV components**

Using HDTV components causes a minor loss of light.

- Check and correct the lighting of the surgical field - as far as is possible for the safety of the patient and for a good microscopic image.
- Adjust the luminous field diameter and the lighting intensity to the procedure size required.
- Do not correct the brightness of the camera image by increasing the light intensity of the microscope lighting, instead use the settings on the controller of the HDTV camera.

**Suspension system**

- Check the balancing

  ✓ When properly balanced, the surgical microscope must remain stationary in any position of the working range and move neither upward nor downward when the magnetic brakes are unlocked.

- Check the lamp brightness

Please note that, when using the Superlux 180 W light source, the system cannot automatically detect a defective or missing lamp.

- Please ensure that 2 working lamps are always in the system and that defective lamps are replaced immediately.

***NOTE***

**Function test!**

✓ Perform a function test and, if required, replace the bulbs prior to using the system.
Operate the system only with two functional lamps.
Keep a replacement lamp ready at hand.

✓ With increasing age of the light source, the actual illumination intensity delivered at the respective setting decreases. Please replace the xenon lamp in due time. Note the remaining service hours display.

✓ The ventilation openings are not covered because the light source of the system switches off in the event of overheating.

  ✓ The lamp brightness can be varied (see page 138). Brightness variation has an effect on the surgical field illumination.

- Check the XY coupling (optional)

  ✓ The XY coupling can be positioned over the entire adjustment range. Press the reset button to move the XY coupling to the center position.

- Check the stand for secure positioning

  ✓ All four brake tabs of the casters have been pressed down and the stand cannot roll away by itself (see page 95).

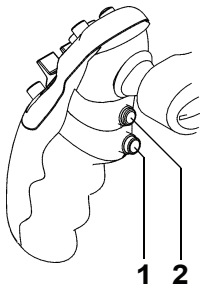
  ✓ The stand is in a stable and safe position.

- Check the user settings on the display

  ✓ The correct user profile has been selected and the settings have been checked.

- Check whether the stand is unobstructed in its movement

  ✓ The system has been positioned in such a way that it can be moved away from the patient at any time.




### Magnetic brakes

- Check proper functioning

  On the rear of the hand grips are brake release buttons (1) ("All Brakes") and (2) ("Selected Brakes").

  ✓ The brake release buttons for all stand **and/or** microscope axes work as per the configuration (see ).

  ✓ The magnetic brakes are locked when you release the button.

Please note that the magnetic brakes can engage briefly during system start - even when the button is pressed.

- Do not keep the button releasing the magnet brakes pressed for the whole time of the system start.
  If the brakes engage nevertheless, please release the button for a few seconds and then press it again.

### Foot control panel (optional)

- Check settings

  ✓ The buttons on the foot control panel work as per the configuration (see page 154).

***NOTE***

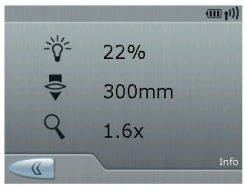
### Check batteries

- Prior to using the FCP WL wireless foot control panel, ensure its batteries are charged sufficiently. The system may malfunction if the FCP WL is not provided an adequate level of power.

# Display

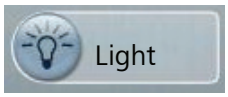
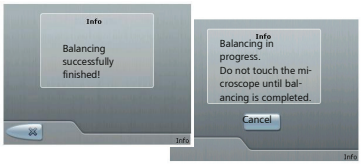
## Symbols on the display

| Symbol or abbreviation | Definition |
|---|---|
|  | **User** menu, see page 130 |
|  | **Light** menu, see page 136 |
|  | **Focus** menu, see page 142 |
|  | **Balance** menu, see page 97 (option: AutoBalance, see page 100) |
|  | **AutoDrape** (option), see page 112 |
|   | Integrated **Record** function via USB port / network, see page 225 |
|  | **User settings**, see page 150 and page 159<br>Light, zoom, handgrip, focus, brakes, foot control panel (option) camera (option), XY coupling (option, video source (option) |
|  | **System settings**, see page 164 and page 169<br>optics, foot control panel pairing (option), camera, additional display service PIN, export of service files, configuration |
|  | **Navigation** menu (option) |
|   | **White balance** menu (option), see page 148 |

| Symbol or abbreviation | Definition |
|---|---|
| 21% | Shows the light intensity as a % (e.g. 21%)<br>The lamp is shown gray if the lighting is switched off |
| 316 mm | Shows the working distance in mm (focus), e.g. 316 mm |
| 1.6 x | Shows the overall magnification of the system (e.g. 1.6x) |
| | Displays the charge state of the battery in the wireless foot control panel (option). The number of bars in the symbol gives the charge state. |
| | Shows that a radio link to the foot control panel (option) is active. The number of bars in the symbol gives the signal strength. |
| REC | Displays a running video recording if option "Record" is installed. |
|  | The light intensity, focus and zoom values displayed in the header are shown larger if the user touches the header. |
| | Notifies the user that a message is being shown on the display. This disappears on acknowledging the message. |

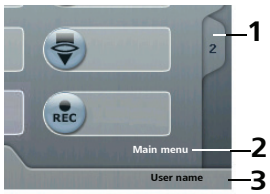
## Controls on the display

OPMI VARIO 700 provides the following controls:

| Control element | Definition |
|---|---|
|  | Press the button in the main menu to access a submenu (e.g. Light). |
|  | If the menu comprises two pages, press the tabs on the right-hand side to open the page required. |
|  | An info display appears to inform the user about the current or completed procedure. |
|  | Press this button to close the info display. |
|  | Press the <Previous> button to return to the previous menu, to cancel changes or to retain changes until the user is changed or the system is re-started.<br>Press this button for more than two seconds to access main menu 1. |
|  | On the lower bar in the submenus, you find the <Save> button. Press this button to save the current settings. |
|  | Press the arrow buttons to increase or reduce the numeric values of functions (e.g. light intensity). The current value is displayed in the middle. When the highest or lowest value has been reached, the respective arrow button will be grayed out. The bar on the left graphically indicates the set value. |
|  | Press the - / + buttons to increase or reduce the numeric values of functions. The current value is displayed in the middle. When the highest or lowest value has been reached, the respective arrow button will be grayed out. |
|  | Use the buttons to activate and deactivate functions.<br>– Light blue button => function is deactivated<br>– Dark blue button => function is activated<br>– Gray button => function is not available |

| Control element | Definition |
|---|---|
|  | If text entries need to be made, a virtual keyboard is shown on the display and the following input options are offered:<br>**1** Text field<br>The entered text is displayed here (max. 20 characters).<br>**2** ABC keypad<br>Use this keypad to enter letters.<br>**3** Numeric keypad<br>Use this keypad to enter figures and characters.<br>**4** <Shift key<br>Use this key to switch between upper case and lower case letters.<br>**5** <Space key<br>Use this key to enter spaces between numbers and characters.<br>**6** <<Delete> button<br>Use this key to delete characters on the left of the cursor. |

## Menu structure




The control panel consists of a display with a touchscreen function. All functions can be interactively controlled via menus. The menu comprises a main menu and two configuration menus. The name of the current user (3) is shown in the lower toolbar, the name of the menu (2) above it. If the menu comprises two pages, press the tabs on the right-hand side (1) to open the page required.

The functions available depend on the configuration of your system. Functions which are not available are displayed as disabled.

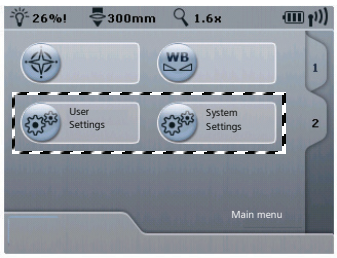

Start Screen


Main menu
The main menu permits you to set the major functions:

| | | | |
|---|---|---|---|
| 4 | - User | 7 | - Balance / AutoBalance (option) |
| 5 | - Light | 8 | - AutoDrape (option) |
| 6 | - Focus | 9 | - Record - USB / network (option) |

– All settings made by you in the main menu are not saved. The <Settings> menu on page 2 of the main menu enables you to save all settings on a user-specific or system-specific basis only by pressing the button.

– Changes to the user-specific camera settings are immediately active, but they are reset to the default values unless they are saved ( ).

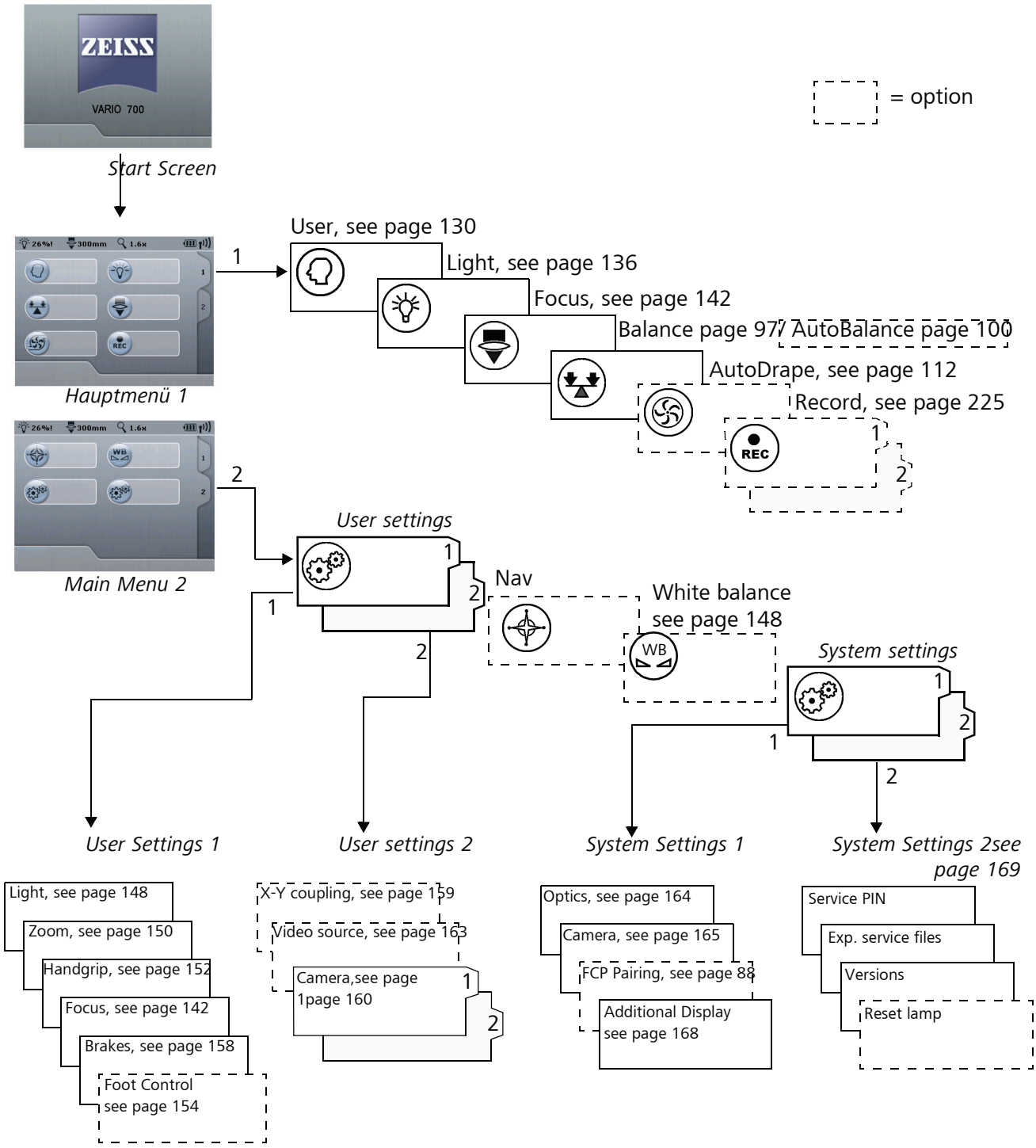



User Settings menu
This submenu displays all functions* that can be stored in the system on a user-specific basis.

System Settings menu
This submenu displays all functions* that can be stored in the system on a system-specific basis.

*The functions available depend on the configuration of your system. Functions which are not available are displayed as disabled.

# Overview


ZEISS
VARIO 700
Start Screen
= option
Hauptmenü 1
1
User, see page 130
Light, see page 136
Focus, see page 142
Balance page 97 / AutoBalance page 100
AutoDrape, see page 112
Record, see page 225
REC
Main Menu 2
2
User settings
Nav
White balance
see page 148
WB
System settings
User Settings 1
User settings 2
System Settings 1
System Settings 2see page 169
Light, see page 148
Zoom, see page 150
Handgrip, see page 152
Focus, see page 142
Brakes, see page 158
Foot Control
see page 154
X-Y coupling, see page 159
Video source, see page 163
Camera,see page 160page 160
Optics, see page 164
Camera, see page 165
FCP Pairing, see page 88
Additional Display
see page 168
Service PIN
Exp. service files
Versions
Reset lamp

# User


Press button (1) <User > to access the user submenu (2). The following can be set from there:

- User profile selection
- Assign the language of the user interface to the user profile
- Edit user profile
- Delete user profile
- Add user profile

## Selecting user and language

Menu "User" enables you to select a default user profile (default user) and 20 freely-configurable user profiles.

- Press the <User> button (1) in the main menu.

  → The "User" menu (2) is displayed.

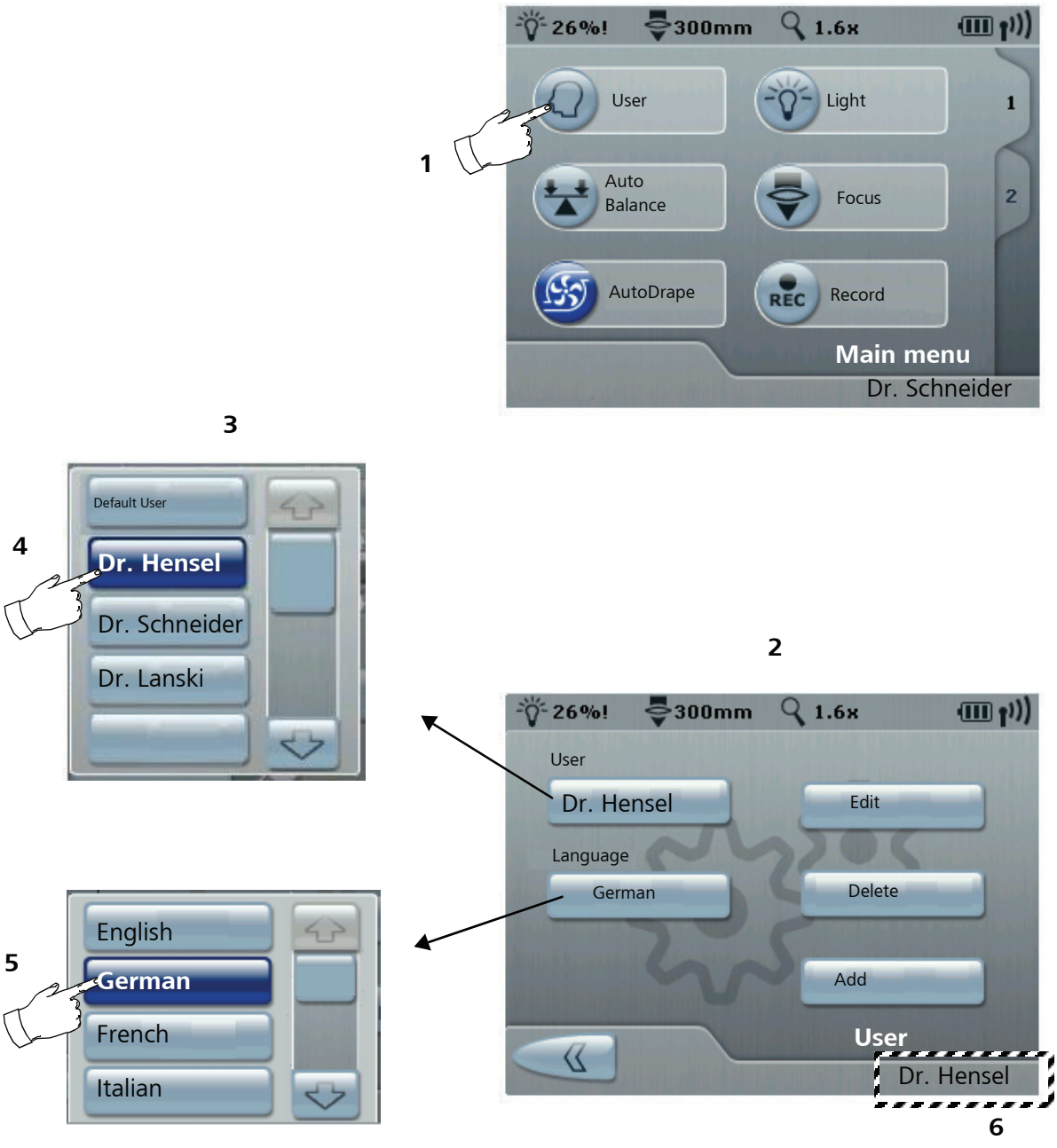
  → For multi-user configuration, a list (3) is displayed with a scroll bar.
- Click the arrows to scroll up and down.
- Select the required user (4) from the user list.
- Press the <Language> button and select the language (5) you wish to assign to the current user profile.

You must switch to the main menu to enable the user selected.

- Press the  button to return to the main menu.

  → A message is displayed: The current user is being changed.

  → The main menu with the new user profile (6) is displayed.


26%!
300mm
1.6x
User
Light
1
Auto Balance
Focus
2
AutoDrape
REC
Record
Main menu
Dr. Schneider
1
3
Default User
4
Dr. Hensel
Dr. Schneider
Dr. Lanski
2
26%!
300mm
1.6x
User
Dr. Hensel
Edit
Language
German
Delete
Add
User
Dr. Hensel
6
English
5
German
French
Italian

# Adding, deleting, editing a user

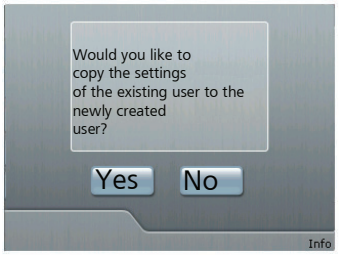
## Adding a user

Proceed as follows to add a new user profile:

- Press the <User> button in the main menu.

  → The "User" menu (2) is displayed.

- Press the <Add> button in the "User" menu; a virtual keyboard is shown on the display.
- Enter a user name. The maximum text length is 20 characters.
- Press the  button to save the user.
- Answer the prompt with <Yes> if you want to save the new user.




  → This saves the user.

  - Answer the prompt with <Yes> if you want to apply the settings of the existing user.

  → The "User" menu is displayed again.

- If necessary, select a language for the new user in the "Language" selection box.
- Press the  button to return to the main menu.

  → The main menu is displayed again. The new user profile is displayed on the bottom right.


26%!
300mm
1.6x
User
Dr. Hensel
Edit
Language
German
Delete
Add
User

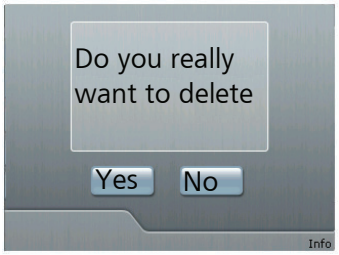

Dr. Schneider
Add


26%!
300mm
1.6x
User
Light
1
Auto Balance
Focus
2
AutoDrape
REC
Record
Main menu
Dr. Schneider

### Deleting a user

- The active user cannot be deleted.

- Select a user other than the one you want to delete from the "User" menu.
- The logged-on user can only be activated after the "User" menu has been exited.
- Re-select the "User" menu.
- Select the user to be deleted.
  - The "Default User" cannot be deleted.




- Press the <Delete> button.
- Answer the prompt with <Yes> if you want to delete the user.

  → The "User" menu is displayed again.
- Press the « button to return to the main menu.

### Editing the user profile

**CAUTION**

**Risk of injury!**

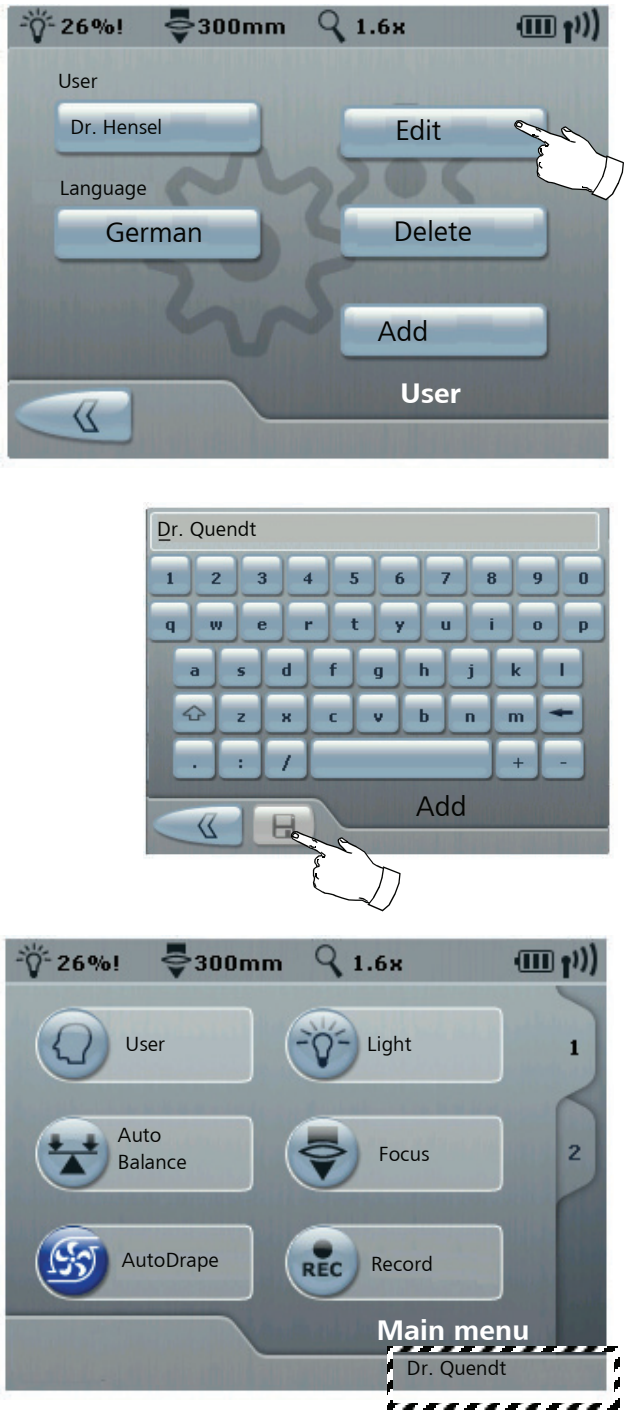
A wrong configuration of the user profile may lead to unexpected behavior of the equipment.

- Always check the user profile before using the equipment.
- Only make changes to your own profile name.

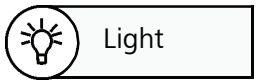
Press the <Edit> button in menu "User" to display a virtual keyboard with the current user name. Proceed as follows to change the user name:

- Delete the existing name with button ← .
- Enter a new user name (maximum length 20 characters).
- Press the 💾 button to save the changes.

  → The changed user profile is saved. The "User" menu is displayed again.
- Press the « button to return to the main menu.


26%!
300mm
1.6x
User
Dr. Hensel
Edit
Language
German
Delete
Add
User
Dr. Quendt
Add
26%!
300mm
1.6x
User
Light
1
Auto Balance
Focus
2
AutoDrape
REC
Record
Main menu
Dr. Quendt

# Light - Adjusting the light




Setting the light intensity

- Switch the light on (1) → .
- Adjust the light intensity (2).
  The light intensity can be adjusted using the configurable hand grip buttons (see page 152).

  → The light intensity is displayed as a percentage in a window with a scroll bar (2).
- Click on the arrows to increase or reduce the light intensity.

For focus-light control, please refer to page 140.

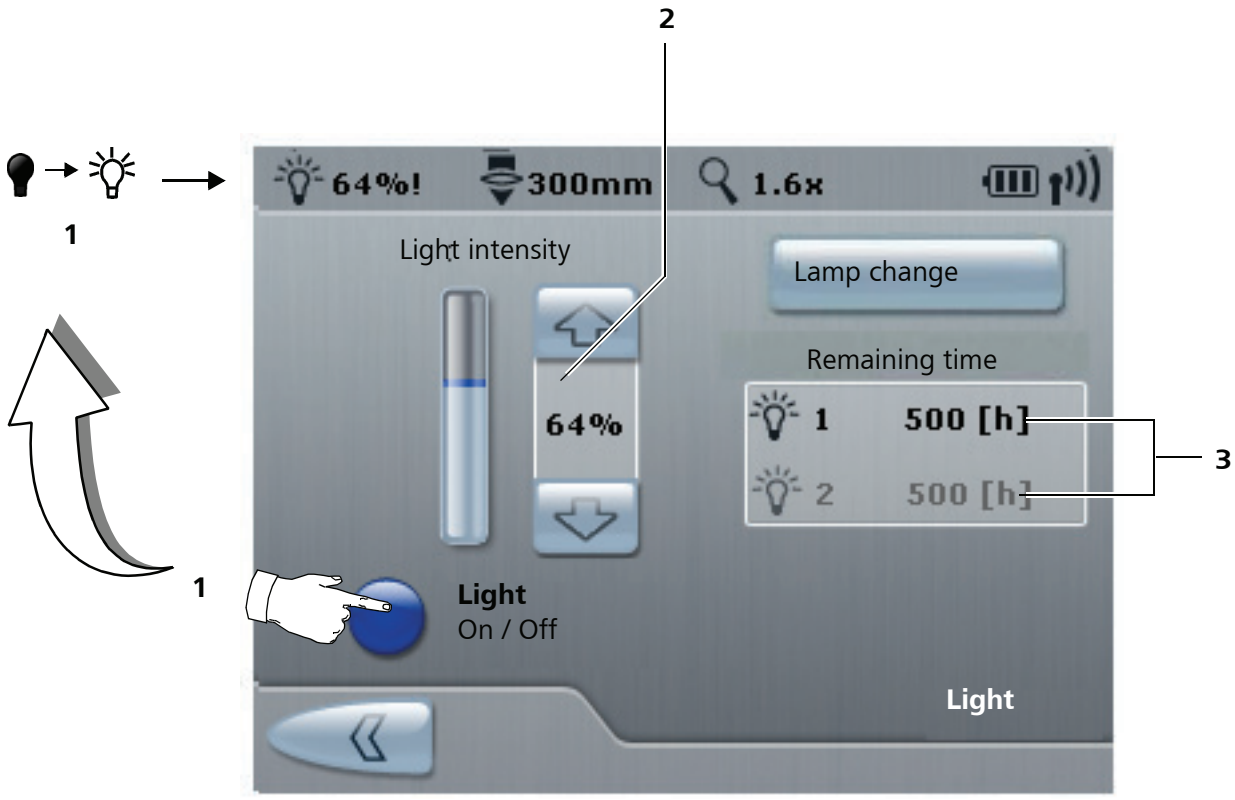
Remaining time (3)

The maximum service life of the lamp is 500 hours. The remaining operating hours of the two lamps is displayed in the <Light> menu.

- Change the lamp in good time.

Lamp change

– The manual lamp change in the 180W xenon light source is described on page 172.
– Automatic lamp change is only possible in the optional 300W light source and is described on page 174.


2
1
64%!
300mm
1.6x
Light intensity
Lamp change
Remaining time
64%
1 500 [h]
2 500 [h]
3
1
Light
On / Off
Light

## How to adjust illumination settings

The software automatically recognizes the light source (Superlux 180 W or Superlux 300 W) installed in your system and displays the appropriate menu.

Press the <User Settings> button in main menu 2 to access the "Light" submenu in which you can make the following settings on a user-specific basis:

**1** Speed of light intensity control
The different speeds can be set in several steps.

**2** Warning threshold for light intensity
The warning threshold for light intensity can be adjusted in a range from 5 to 100 percent.
An acoustic signal is emitted and an exclamation mark shown on the display behind the light intensity value to indicate that the threshold value has been exceeded.
The exclamation mark remains as long as the light intensity value is higher or equal to the threshold value.

Factory setting: 25 percent

**3** Light intensity start value
The light intensity start value can be adjusted in a range from 5 to 99 percent.

Factory setting: 24 percent

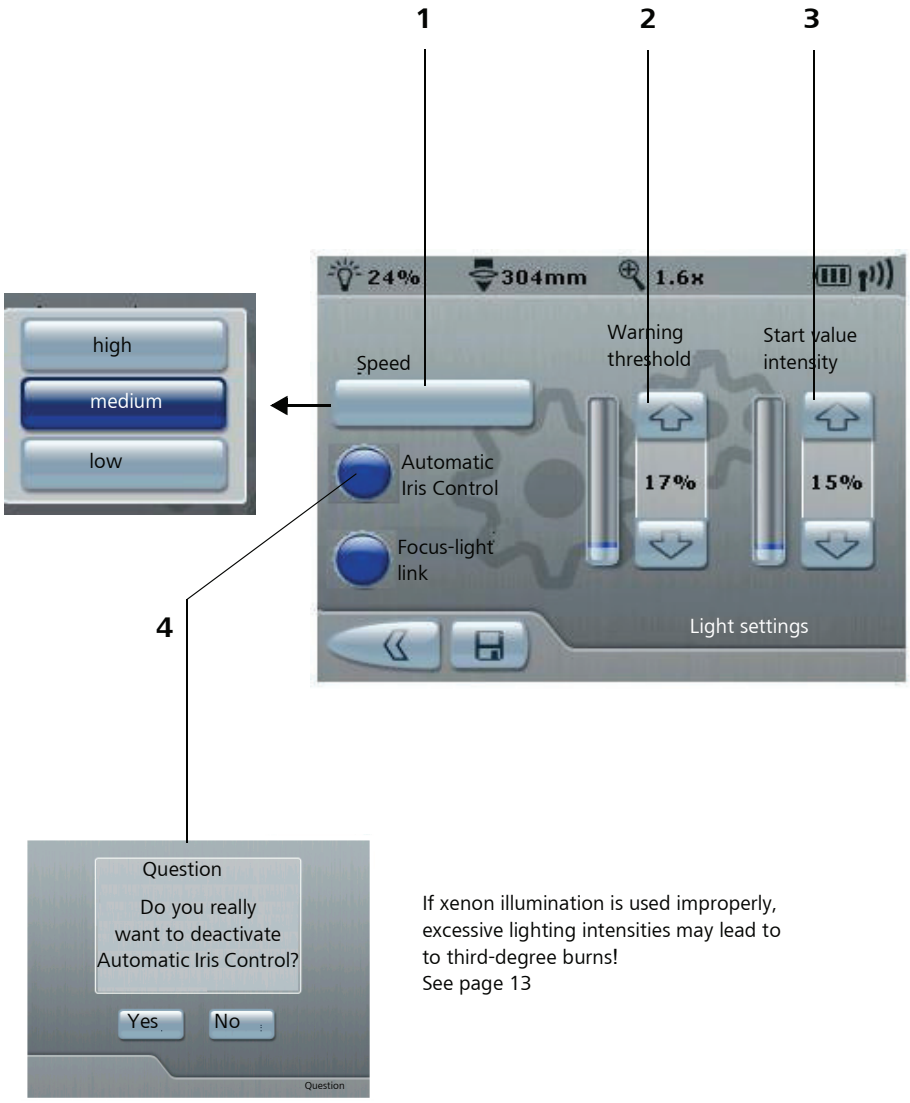
The light intensity start value can only be adjusted up to a level 1% lower than the setting for the light warning threshold value. If the light warning threshold value is reduced, the intensity start value is automatically set to 1% below the light warning threshold value.

**4** Activating and deactivating Automatic Iris Control
If Automatic Iris Control has been activated, the illumination intensity is automatically adapted to the size of the field of view. This means less exposure of the tissue as a result of too much light (see page 18).

A message draws the user's attention to the consequences of working without Automatic Iris Control if the function is deactivated. The message must be acknowledged with YES or NO.

Factory setting: On

- Press the  button to save the changes.
- Press the  button twice to return to the main menu.




If xenon illumination is used improperly, excessive lighting intensities may lead to to third-degree burns!
See page 13

Focus-light control

The focus-light control is a safety feature intended to prevent possible tissue damage due to excessive illumination intensity.

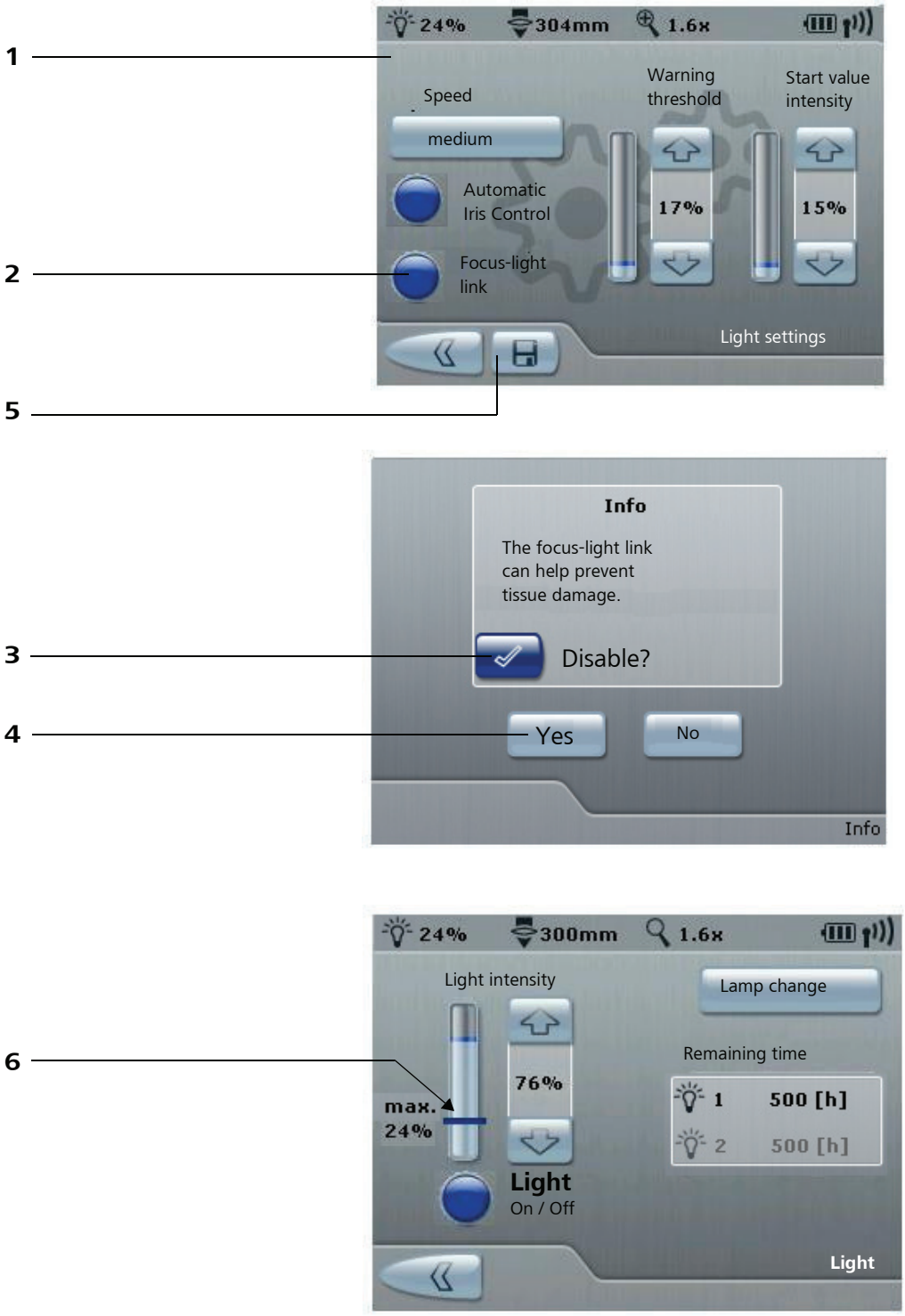
The focus-light control regulates the illumination intensity as a function of the working distance. With increasing working distance, the user has accordingly more light available.
The service technician can set the focus-light control to a value between 5% and 100% in the Service menu.
The focus-light control function can be enabled or disabled by the user as required. It is enabled by default. The factory setting is 25%.

Press the <User Settings> button in main menu 2 to access the "Light" submenu (1). In this menu, the focus-light control can be enabled or disabled by the user as required.
Press the Focus-light link button (2) to disable the function.

- Press button ☑ Disable? in the Info window (3) and confirm with <YES> (4).
- Press button  (5) in the "Light" submenu to save your settings.
- Press the  button twice to return to the main menu.

The set maximum illumination intensity is shown by a blue bar (6) in the light controller (e.g., max. 24%).
The illumination intensity is reduced to the set limit value (6). It can be set within the range below the blue bar, but not above it.

The service technician can configure the focus-light control in the Service menu such that it cannot be disabled.


1
2
5
3
4
6
24%
304mm
1.6x
Speed
medium
Warning threshold
Start value intensity
Automatic Iris Control
17%
15%
Focus-light link
Light settings
Info
The focus-light link can help prevent tissue damage.
Disable?
Yes
No
Info
24%
300mm
1.6x
Light intensity
Lamp change
76%
max. 24%
Remaining time
1 500 [h]
2 500 [h]
Light
On / Off
Light

# Configuring the video focus function (Options: SpeedFocus, video focus)


**1** Automatic video focus (optional)
The "automatic video focus" function ("autofocus") enables you to automatically focus the video image on the monitor.

**2** Manual video focus (optional)
This setting permits you to adjust the focus of the image generated by the camera on the monitor (optional).
This focus function on the monitor is independent of the focus of the surgical field actually seen by the surgeon through the microscope.
<Video Focus Adjustment> is only possible if a camera option has been enabled.

**3** Focus Lock
The <Focus Lock> function permits you to deactivate the electrical drive of the focusing system. This ensures that the set focal planes are not inadvertently changed when a connected laser micromanipulator is used. The focus rocker switches on the hand grips and the focusing buttons on the foot control panel (optional) are disabled. If Focus Lock has been activated, no autofocus setting is performed when the brakes are operated, even if SpeedFocus (optional) has been switched on.


22%
300mm
1.6x
Manual
Video Focus
Auto
Video Focus
0
Start
SpeedFocus
Focus
Lock
Focus
1
2
3

## Configuring the focusing function

Press the <User Settings> button in main menu 2 to access the "Focus" submenu. In this submenu, you can make the following settings on a user specific basis:

**1** Setting the focus start value
Enter the working distance at which the focusing mechanism starts after the system is powered on.
The working distance can be adjusted and saved in a range from 200 mm to 500 mm.

Factory setting: 300 mm

**2** Setting the focusing speed
The focusing speed can be set from minimum to maximum in a range from 5% to 100%.

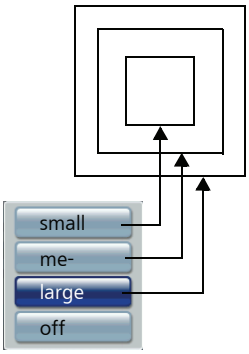
Factory setting: 50%

Please note that the setting of the focusing speed does not change linearly between 30% and 100%. The consequence is that focusing can still be deemed too quick at 30% of the maximum speed.
In this case, please use speeds slower than 30% or perform fine focusing using the knob on the microscope body.

**3** Starting autofocus automatically
(only possible with SpeedFocus option, otherwise the function is disabled)
If autofocus is "On", it automatically focuses on the object (within the working distance) when the brakes are applied.

Factory setting: Off

SpeedFocus (autofocus) option
The SpeedFocus (autofocus) option permits you to select and automatically focus on a feature in the ROI (region of interest, detailed view) in the image of the surgical field.
SpeedFocus (autofocus) is based on the analysis of the video image contrast: Whilst the varioscope lens of the surgery microscope is focusing, the SpeedFocus continually determines the contrast of the video image in the detailed view (ROI) selected. In this way, SpeedFocus (autofocus) controls the varioscope lens of the microscope and adjusts it to the point of maximum contrast which is also the point of maximum image definition.




**4** Selecting depth of field

The depth of field type can be set as follows: small / large

- Large depth of field → small aperture → less light
- Small depth of field → large aperture → more light

Factory setting: Small depth of field

**5** SpeedFocus ROI (region of interest, detailed view)

(only possible with SpeedFocus (autofocus) option, otherwise the function is disabled)

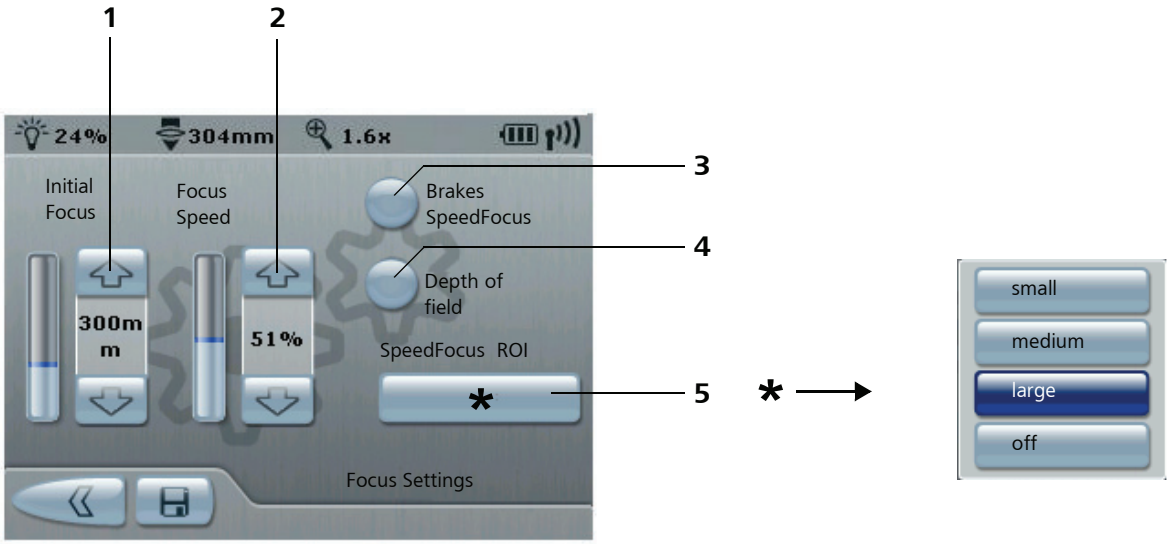
Set the size of the detailed view to be displayed after focusing.

Settings: small/medium/large/off

Factory setting: large

- Press the button to save the changes.

  → The setting is saved for the current user.
- Press the button twice to return to the main menu.



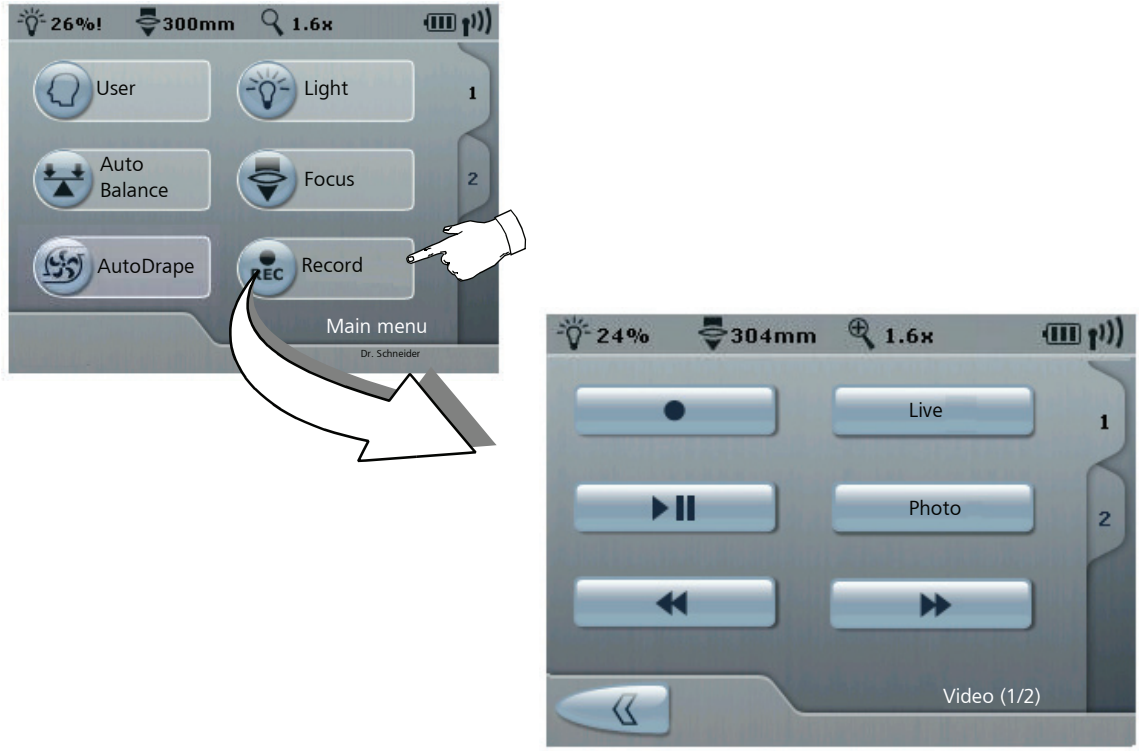
# Setup of record function

## (Integrated video record function over USB port - option)


The "Record" submenu enables you to record video sequences and single images using the optional "video recording function over USB port".

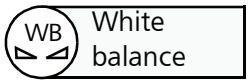
The recorded video and image data can be stored on an external USB storage medium or in a shared directory within a network. The unambiguous and automatic storage of images and videos ensures reliable assignment to the relevant patient.

For a detailed description of the video record function, please refer to Options annex "Integrated Video Record Function over USB Port" (see page 225).



# Perform white balance (option)

(Only if the video camera is installed (optional))



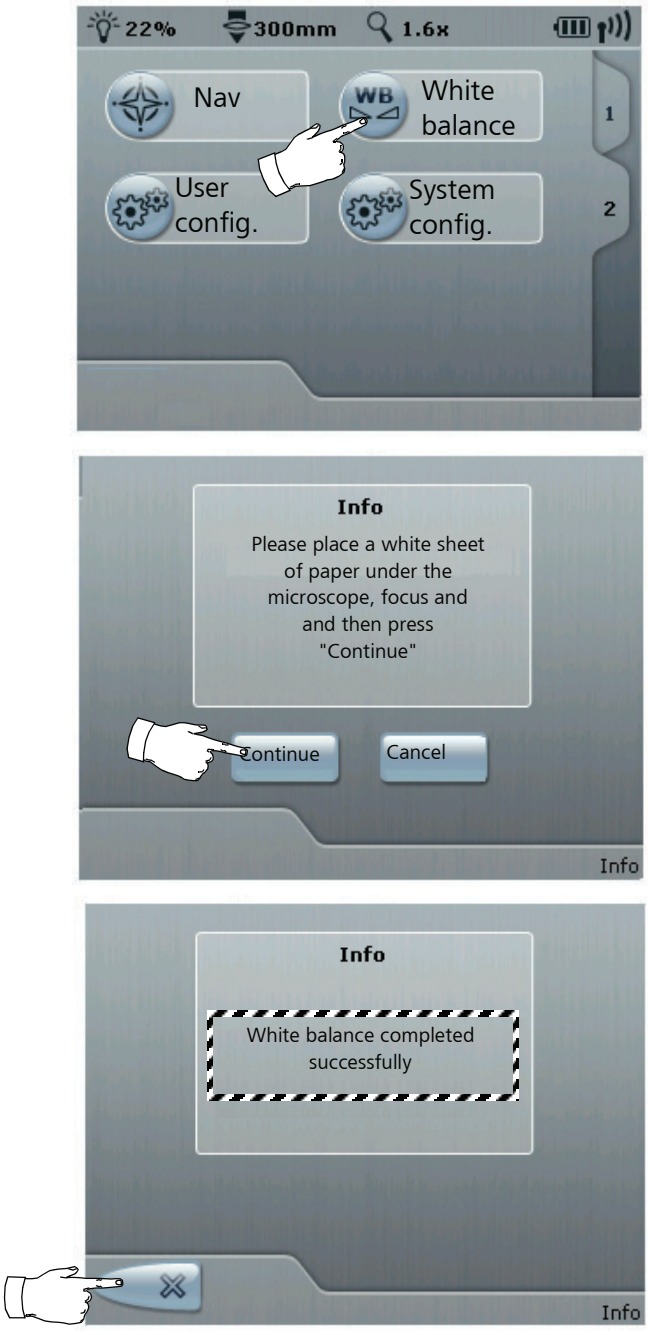

The <White balance> button on page two of the main menu allows you to perform a white balance. The system will adjust the video signal in such a way that white areas in the surgical field are also white on the monitor. In order to proceed with a white balance, follow these steps:

- Press the <White balance> button.
  → The following message will be displayed: Please place a white sheet of paper under the microscope, focus and then press "Continue".
- Align the surgical microscope towards a white object (e.g., a sheet of white paper with a matte surface).
- Focus on the object.
- Press the <Continue> button.
  → The following message is displayed: "Please wait - white balancing in progress!"
  → If the white balancing was successful, the following message will be displayed: "White balancing was successful". If the process was unsuccessful, the following message will be displayed: "White balancing failed".
- If white balancing failed, verify the settings described above and repeat the white balancing procedure.

Please note that a white balance can result in an error when the maximum light intensity is used.

- Please reduce the light intensity or increase the working distance and re-start the white balance.

- Press the  button to return to the previous menu.


22%
300mm
1.6x
Nav
WB
White balance
User config.
System config.
1
2
Info
Please place a white sheet of paper under the microscope, focus and and then press "Continue"
Continue
Cancel
Info
Info
White balance completed successfully
Info

# User settings menu 1

## Configuring zoom

Pressing the <User settings> button and then the <Zoom> button accesses submenu "Zoom", from where you are able to configure the following "user-specific" settings:

**1** Set initial zoom value
Enter the zoom factor (0.4x... 2.4x) the magnification mechanism starts with when the machine is powered on.

Factory setting: 0.4x

**2** Zoom speed
Set the speed for moving the zoom
Setting of the zoom speed from a minimum to a maximum speed (5% to 100%).

Factory setting: 50%

**3** Focus zoom link
The higher the magnification (zoom), the lower the focus speed.
If the focus zoom link function is enabled, the move speed of the optional XY coupling is controlled dependent on zoom.

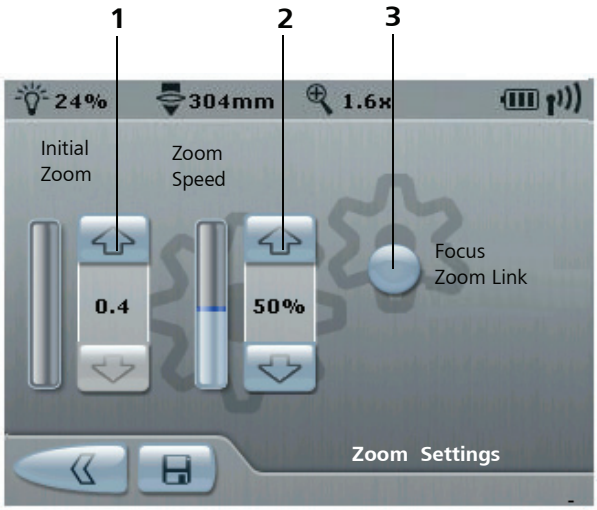
This zoom-dependent speed adjustment can be enabled/disabled.

Factory setting: Off

- Press the button to save changes.

  → The user-specific setting is saved.

- Press the button twice to return to the main menu.


1
2
3
24%
304mm
1.6x
Initial
Zoom
Zoom
Speed
0.4
50%
Focus
Zoom Link
Zoom Settings

## Configuring the handgrips

Select <User Settings> and press the <Handgrips> button to access the "Handgrips" submenu. This menu permits you to assign different functions to the handgrips on a user-specific basis.
You can configure both handgrips with the same functions by pressing button (2), or you can configure different functions in the right and left handgrip (3, 1).

Differences between the right and left handgrip buttons:

– Light- and video focus- are only available on the left handgrip button
– Light+ and video focus+ are only available on the right handgrip button
– Light+/- and video focus+/- can only be assigned in pairs (A-B or C-D)
– If light+/- or video focus+/- are not assigned in pairs, the second assignment will have no function.

**Changing the button assignment**

- Press the button whose function you want to change:

  → A list of the selectable functions is displayed. If several selectable functions are available, a scroll bar is displayed. Use the arrow buttons to scroll up and down.

- Tap on the function to be assigned to the button.
- Repeat these two steps until you have assigned the required functions to all configurable handgrip buttons.
- Press button (2) if you want to assign the same functions to both handgrips.
  Please note: if you press button (2), the left handgrip automatically adopts the configuration of the right handgrip.
- Successively press buttons (1 and 3) if you want to assign different functions to the right and left handgrips.
- Press the  button to save the changes.

  → The setting is saved for the current user.

- Press the  button twice to return to the main menu.

*Joystick* The joystick is used to control the XY coupling (option).

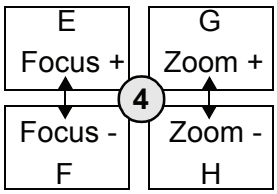
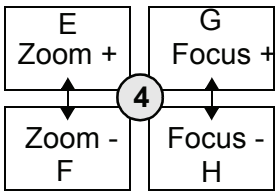
*Rocker switches* The focus/zoom setting of the rocker switches is preconfigured but it can be

changed at any time. User-specific settings can be made by yourself at any time. Press button (4) for this purpose.

Factory settings of buttons A, B, C and D:
A: DOF aperture (depth of field) low/high

B: light on/off

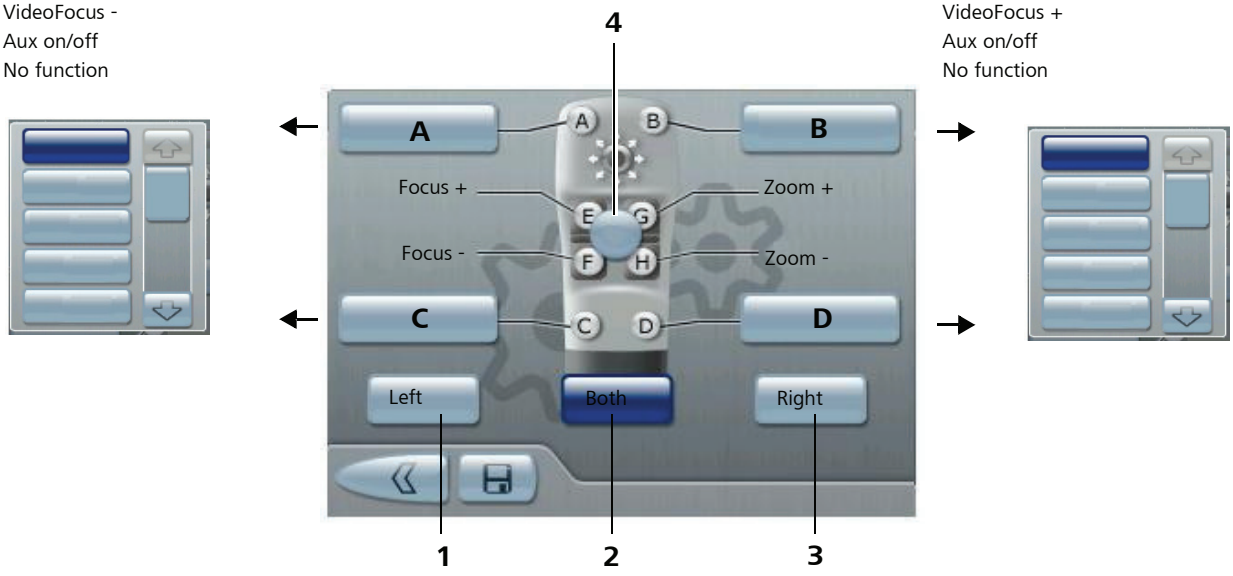
C/D: light -/+

| Factory settings of buttons E, F, G and H: | | User-specific setting options: | |
|---|---|---|---|
|  | Button E: focus rocker switch +<br>Button G: zoom rocker switch +<br>Button F: focus rocker switch -<br>Button H: zoom rocker switch - |  | Button I: zoom rocker switch +<br>Button G: zoom rocker switch -<br>Button J: focus rocker switch +<br>Button H: focus rocker switch - |

Functions of configurable hand grip buttons

Left side (buttons A and C):
D.o.F small/large
Light on/off
SpeedFocus
Video SpeedFocus
Video rec. on/off
Photo (image acquisition with integrated video camera)
Light -
VideoFocus -
Aux on/off
No function

Right side (buttons B and D):
D.o.F small/large
Light on/off
SpeedFocus
Video SpeedFocus
Video rec. on/off
Photo (image acquisition with integrated video camera)
Light +
VideoFocus +
Aux on/off
No function



# Configuring the foot control panel

Press button <User Settings> and then button <Fußschaltpult> to access the "Foot Control Panel" submenu. This menu allows you to assign different functions to the connected foot control panel on a user-specific basis.

Differences between the right and left buttons:

- Light - and video focus - are only available on the left button
- Light + and video focus + are only available on the right button
- Light +/- and video focus +/- can only be assigned in pairs (A-B, C-D or E-F)
- If light +/- or video focus +/- are not assigned in pairs, the second assignment will have no function.

### Changing the button assignment

- Press the button whose function you want to change:

  → A list of the selectable functions is displayed. If several selectable functions are available, a scroll bar is displayed. Use the arrow buttons to scroll up and down.
- Tap on the function to be assigned to the button.
- Repeat the two steps above until you have assigned the desired function to all of the buttons.
- Press the  button to save the changes.

  → The setting is saved for the current user.
- Press the  button twice to return to the main menu.

Please note that the E and F buttons are subject to some limitations if an earlier-generation foot switch is used. This means that functions requiring continuous adjustment can be adjusted in incremental steps only.

- Preferably assign functions which feature only 2 states to these buttons, such as "aperture for depth of field - large or small".

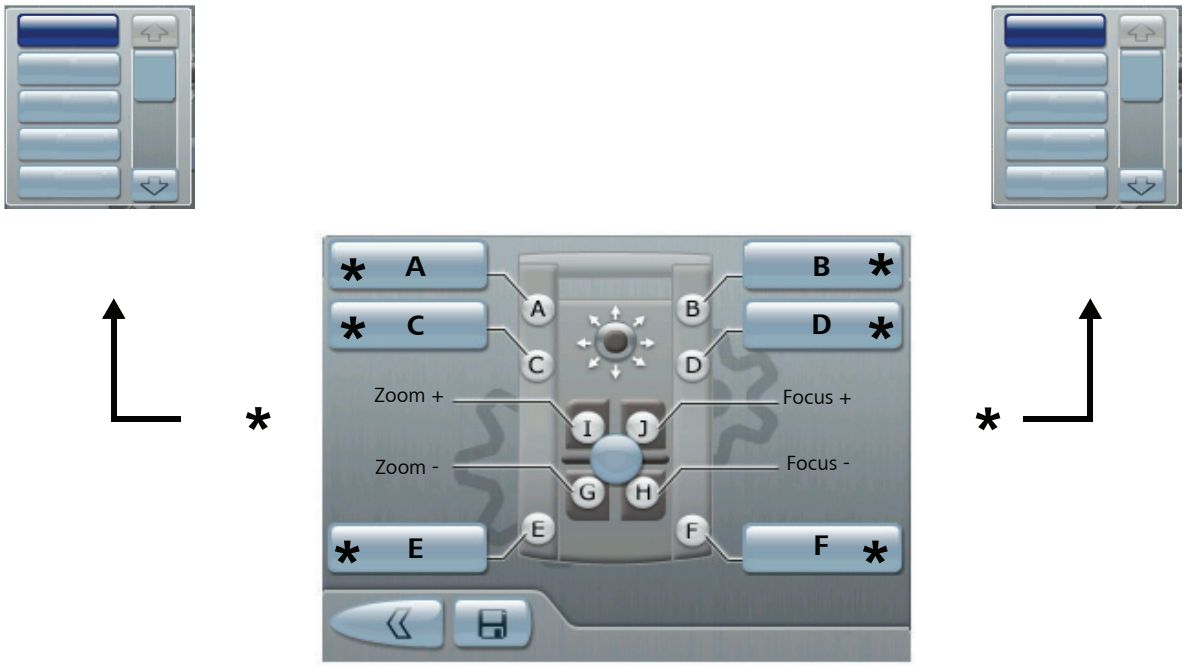
## Functions of the configurable foot control panel buttons

Left side (buttons A, C and E):

D.o.F small/large
Light on/off
SpeedFocus
Video SpeedFocus
Video rec. on/off
Photo (image acquisition with integrated video camera)
Light -
VideoFocus -
Aux on/off
No function

Right side (buttons B, D and F):

D.o.F small/large
Light on/off
SpeedFocus
Video SpeedFocus
Video rec. on/off
Photo (image acquisition with integrated video camera)
Light +
VideoFocus +
Aux on/off
No function

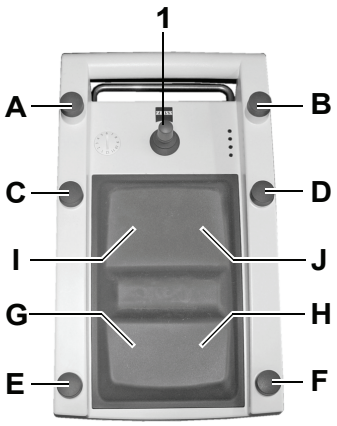


### Preconfigured button assignment

Before using the wireless foot -operated control panel FCP WL ensure its batteries are fully charged.

*Buttons*

The functions of buttons A, B, C, D, E and F are preconfigured, but they can be re-assigned to meet the user's specific requirements. The factory settings are:




- Button A: DOF aperture -> depth of field low/high
- Button B: light on/off
- Button C: light -
- Button D: light +
- Button E: without function
- Button F: without function

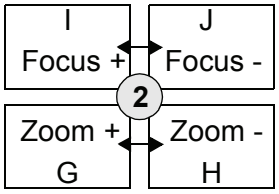
*Joystick*

Joystick (1) is used to control the XY coupling (option).

*Rocker switches*

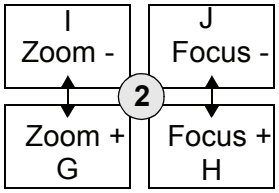
The focus/zoom rocker switches are preconfigured to the horizontal setting. However, they can be changed to the vertical setting at any time. User-specific settings (see page 154) can be made by yourself at any time. Press button (2) on the display for this purpose.

The horizontal factory settings are:




- Button I: focus rocker switch +
- Button J: focus rocker switch -
- Button G: zoom rocker switch +
- Button H: zoom rocker switch -

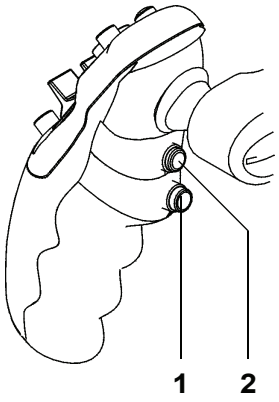
The vertical settings are:




- Button I: zoom rocker switch -
- Button J: focus rocker switch -
- Button G: zoom rocker switch +
- Button H: focus rocker switch +

Always check the assignment of functions and the functions of the foot control panel before every use.

# Configuring the brakes




The brake release buttons are located on the back of the handgrips.

**1** AB brake release button (All Brakes)
Brake release button for all stand **and** microscope axes. For as long as you press this button, **all** magnetic brakes are released and the system can be moved in all directions. The magnetic brakes are locked when you release the button.

**2** SB brake release button (Selected Brakes)
Brake release button for the microscope axes **or** stand axes. For as long as you press this button, only the magnetic brakes of the stand **or** surgical microscope are released. The magnetic brakes are locked when you release the button.

Select the <User Settings> button and press the <Brakes> button to access the "Brakes" submenu in which you can make the following settings on a user-specific basis:
You can select whether the SB button should release the microscope or the stand axes.

- Select the axes which you want to be released when you press SB button (2) on the handgrip.
  - Stand axes (factory setting
  - Microscope axes
- Press the button to save the changes.
- Press the button twice to return to the main menu.

# User settings menu 2

## Configuring the XY coupling (optional)

Pressing the <User settings, page 2> button and then <XY Coupling> accesses submenu "XY coupling", from where you are able to set the "user-specific" speed of the XY coupling.

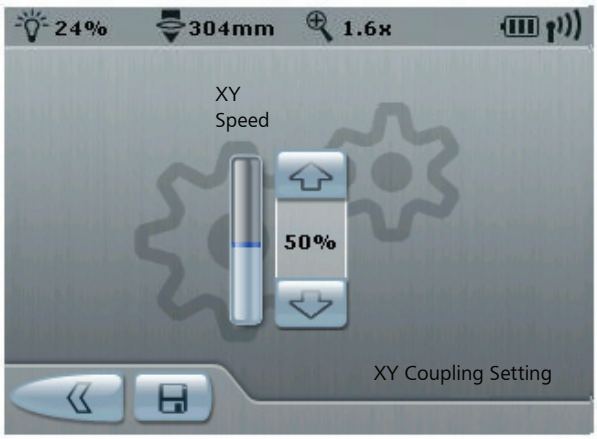
The speed can be set in range 5 to 100%.

Factory setting: 50%

- Press the button to save changes.

  → The user-specific setting is saved.

- Press the button twice to return to the main menu.



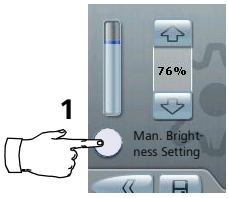
# Camera setting 1/2 (option)

Press button <User Settings, page 2> and then button <Camera> to access the "Camera" submenu. This menu allows you to set the camera parameters on a user-specific basis.

### Setting the exposure mode

Select between manual exposure control (button for manual brightness adjustment is activated) and automatic exposure control (button for manual brightness adjustment is deactivated).

*Automatic exposure*

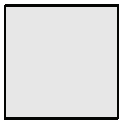



Automatic exposure control is the preferred method in most applications. In this mode, the camera automatically adjusts the brightness of the video image to the specified value. Exposure control affects the exposure time of the camera. If automatic exposure control is selected, the nominal brightness is set and the camera controls the exposure time according to this nominal value. The nominal brightness can be varied in the range between 0% and 100%.

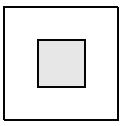
- Deactivate the <Manual Brightness Setting> button (1).

  → The display of the brightness setting range changes from exposure time (seconds) to percent (%).

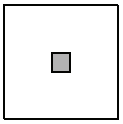
Select the metering method to be used in the "Spot Size" field (2).



– Full Field (default)
  The exposure is measured and averaged across the full video image. This metering pattern is recommended for surgical fields that are fully and evenly illuminated.



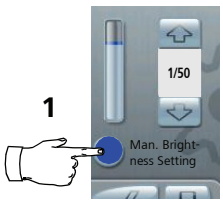
– Large Spot
  The exposure is measured in an area in the image center. This metering pattern is ideal for working with an eclipsed surgical field edge (resulting from a reduced illuminated field diameter).



– Small Spot
  The exposure is measured in a very small area in the image center. This metering pattern is suitable for working with an extremely small illuminated field diameter.

- However, if the object of interest is not located at the image center, the "Small Spot" setting usually does not provide the desired exposure result. In this case, select either a larger area (Full Field or Large Spot) or use the manual exposure mode.

*Manual exposure*




Manual exposure control is suitable for difficult light conditions. In this mode, a fixed exposure time is set.

- Activate the <Manual Brightness Setting> button (1).
  → Manual exposure control is active when the "Man. Brightness Setting" button emits dark blue light.
  → The display of the brightness setting range changes from percent (%) to exposure time (seconds).
  → The button under the "Spot Size" field is disabled.

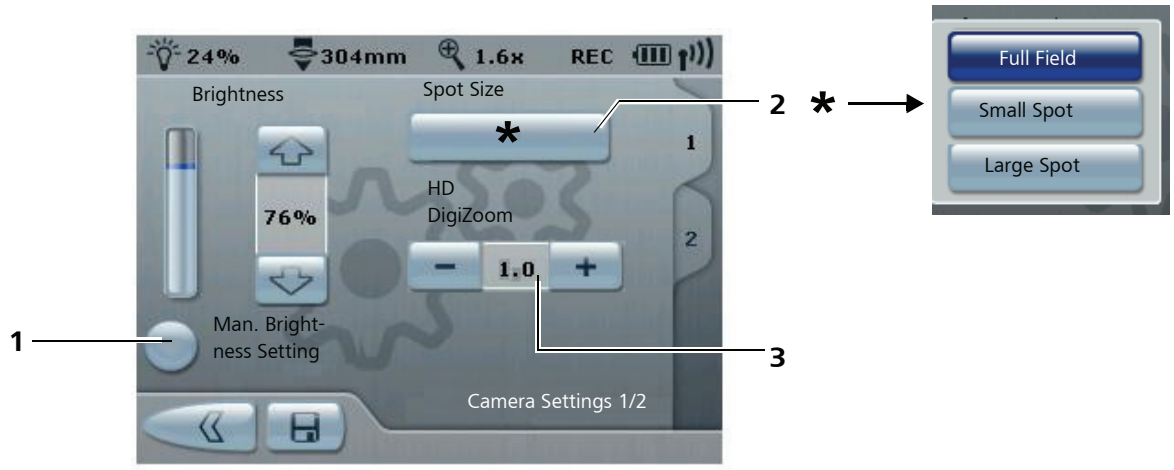
Move the slider to the required exposure value. You can adjust the exposure time between 1/10000 s und 1/8 s.

- Press the button to save the changes.
  → The setting is saved for the current user.
- Press the button twice to return to the main menu.

### Setting the HD DigiZoom (3)

The HD DigiZoom function allows digital enlargement, but only if an integrated HD camera is installed.

- Press the - / + buttons to zoom out and in, respectively. The current value is displayed in the middle. When the highest or lowest value has been reached, the respective arrow button will be grayed out.



## Camera settings 2/2 - Color setting (option)

You are able to configure the following user-specific camera settings on page 2 of submenu "Camera":

**1** Chroma (color saturation) of a 3CCD camera or HD camera
Setting range: -10 to +10

Factory setting: 0

**2** Hue setting of a 3CCD camera or HD camera
Setting range: -10 to +10

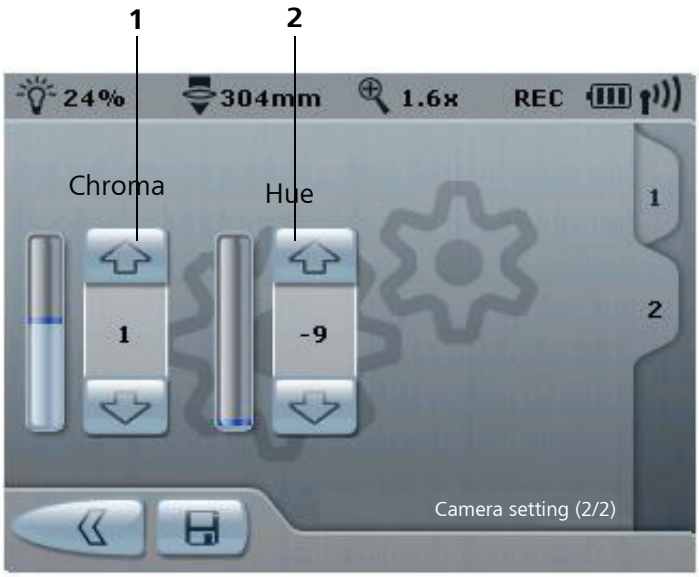
Factory setting: 0

Only the integrated 3 CCD cameras and HD cameras supplied by Carl Zeiss can be adjusted.

- Press the button to save changes.

  → The user-specific setting is saved.

- Press the button twice to return to the main menu.



## Configuring video source (camera) - only for SD camera option

Select <User Settings, page 2> and press the <Video source> button to access the "Video source" submenu.
This configuration menu permits you to select the video source.
It is possible to show the video image of the internal or external video camera (e.g. an endoscope camera) on the (optional) 17" video monitor and record it with the (optional) video recorder. The video signal of the external video camera is sent to the system via the optional ENDO connecting cable (video input and output port, orange).

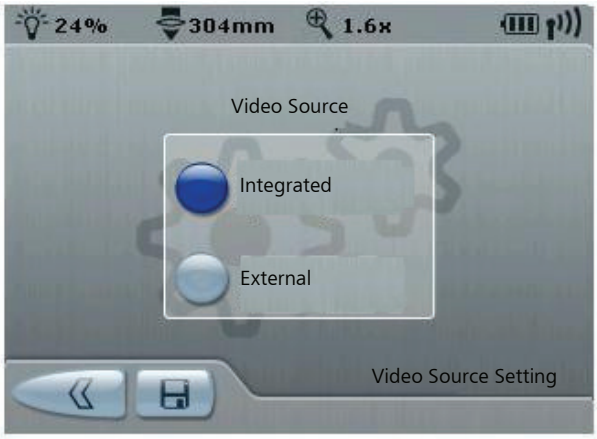
Settings: integrated / external

Factory setting: integrated

- Press the button to save the changes.

  → The setting is saved for the current user.

- Press the button twice to return to the main menu.



# System settings menu 1

## Optics

Press the <System Settings> button in the main menu to access the "System Settings" submenu. In the "Optics" submenu, the following settings can be assigned to the system:

To ensure correct display of the total magnification, the parameters of the objective lens, tube and eyepieces used must be set here. The settings are applied for all users.

- Select the system components used by pressing the relevant buttons in the "Eyepiece" (2) and "Tube" (1) fields.

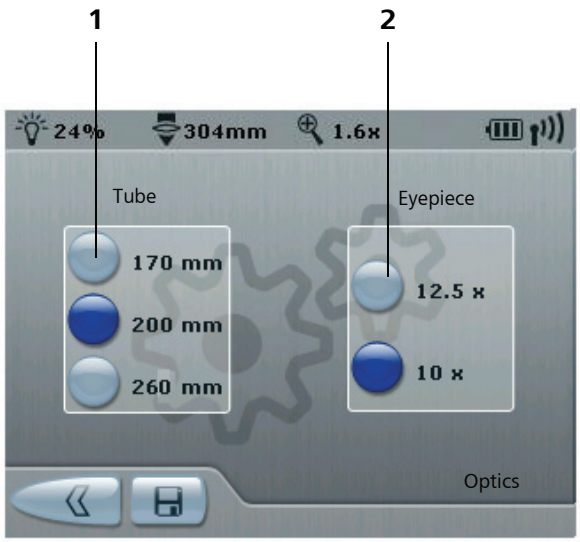
  → The parameter is activated when the button is dark blue.

- Press the button to save the changes.

  → The setting is saved for the current user.

- Press the button twice to return to the main menu.

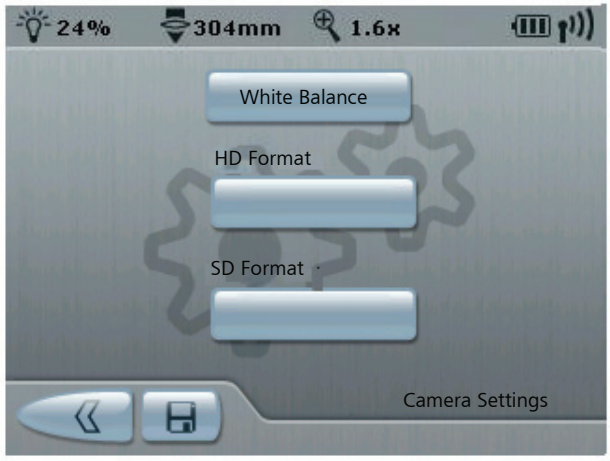
When using the folding tube f170/f260 with integrated, manual magnification changer, the overall magnification is not automatically updated for switchover on the folding tube.



## Configuring the video settings (optional)

Press the <System Settings> button in the main menu to access the "System Settings" submenu. The "Camera" submenu permits you to make the following camera settings:

- Performing the white balance procedure (see page 148)
- Setting the HD format (only active if a HD video camera is connected)
- Setting the SDTV format (only active if a SD video camera is connected)



### Setting the HD format

If a high-resolution display device (e.g. HDTV monitor) is connected, the "HD Format" field permits you to choose between the "720p" and "1080p" resolution.
The maximum resolution of the HD-SDI interface is 1080p. The 1080p signal is only available on the DVI-D port.

– Select the 720p format if your display device is 720p compatible. This mode is similar to the 1080p format but its maximum resolution is only 1280 x 720 pixels.

– Select the 1080p format if your display device is 1080p compatible. The image is set up using real full frames. This prevents any interline flicker, and the image is sharply defined and stable. The maximum resolution is 1920 x 1080 pixels.

Proceed as follows to select a format and to load the respective configuration:

- Press the <1080p> or <720p> button to set the video resolution.

  → The video resolution will be adjusted.
  As this process takes some time, the change is not enabled until you press the Save button.

- Press the  button to save the changes.

  → The settings are saved on a system-specific basis.

- Press the  button twice to return to the main menu.

- The main menu is displayed again.

### How to set the SDTV format

If a conventional display device (monitor, projector, etc.) with the 4:3 format is connected, the "SDTV Format" field enables you to choose between "Letterbox" and "Sidecut" visualization.

– Use the "Letterbox" format for display devices that are not compatible with the 16:9 widescreen format. A black bar appears at the top and bottom of the screen and the image is displayed in the 16:9 format.

– In the "Sidecut" format, the sides of the image are truncated, leaving the center of the image displayed with a 4:3 aspect ratio.

Proceed as follows to select a format and to load the right configuration:

- Press the currently selected format in the "SDTV Format" field.

  → This shows a list of available formats.

- Select the format to be loaded.

  → Press the  button to save changes.
  Because this switchover process takes some time, the setting does not become active until the Save button is pressed.

  → The system-specific settings are saved.

- Press the  button twice to return to the main menu.

The main menu is displayed again.

## Adjusting the brightness of the additional display

Select <System Settings> in the main menu and press the <Add. Display> button to access the "Add. Display" submenu in which you can adjust the brightness of the additional display.

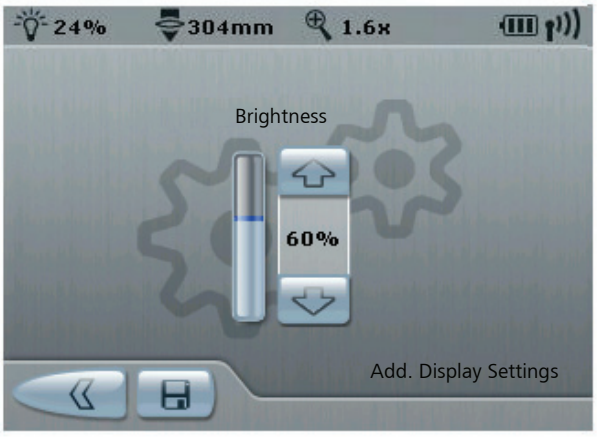
The brightness can be adjusted in a range from 5 to 100 percent.

Factory setting: 50%

- Press the button to save the changes.

  → The setting is saved on a system-specific basis.

- Press the button twice to return to the main menu.



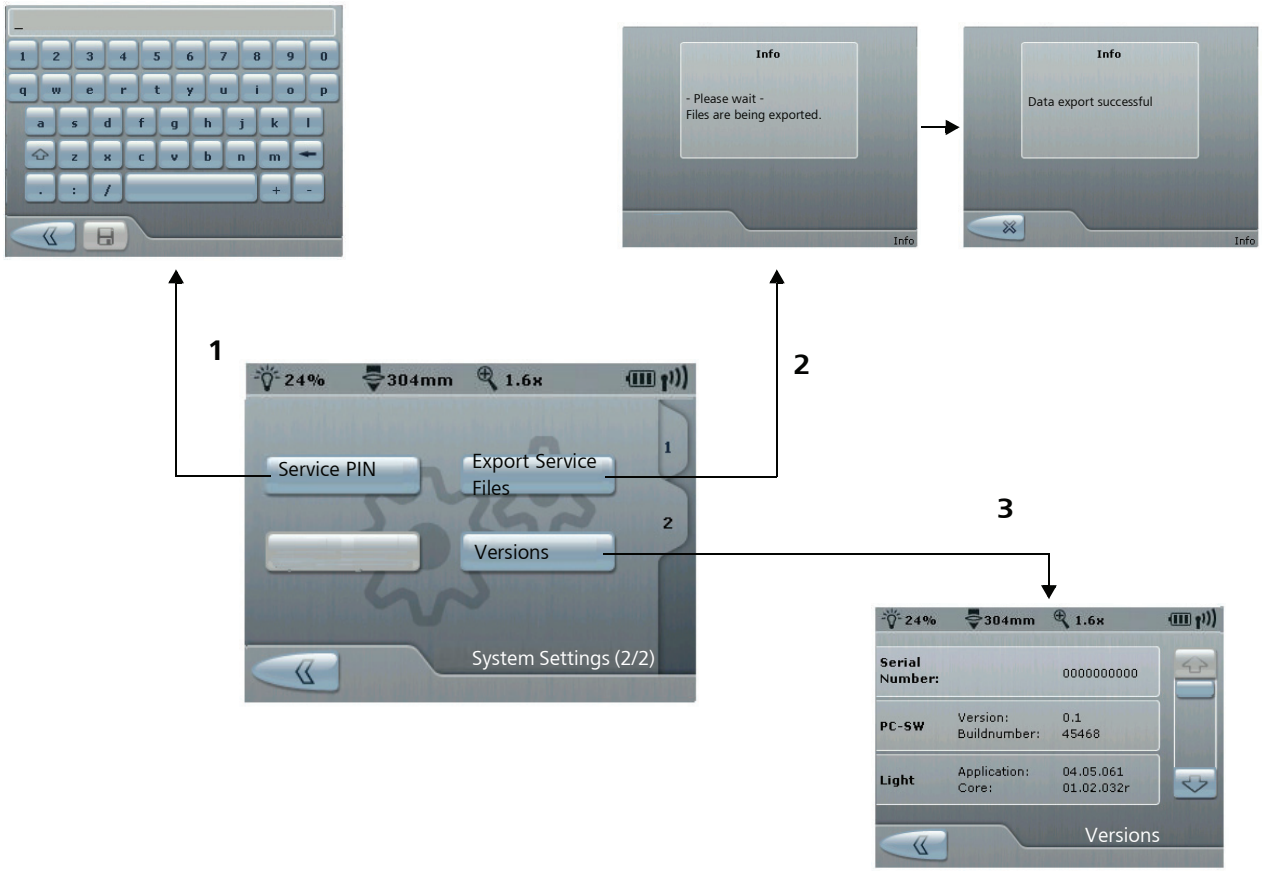
# System settings menu 2

Pressing the <System settings> button in main menu 2 accesses 2-page submenu "System settings". Page 2 of this submenu offers the following:

**1** Service PIN (password protected)
This PIN is only available for persons who have been trained by Carl Zeiss Surgical.

**2** Export of service files
Send Carl Zeiss Service these files in the event of a fault. The files enable faster troubleshooting.

**3** Configuration
Menu for displaying the configuration of the device



# Procedure in the event of faults

**NOTE**

Malfunction

If a failure occurs which you cannot rectify using Section "Procedure in the event of faults", label the system as non-functional and inform the Carl Zeiss service department.

⚠ **CAUTION**

**Error messages on the display**

Watch out for error messages on the display.
If faults occur during operation, an error message is shown on the display and a warning signal is sounded. In this case a warning triangle is also shown on the additional display.

# Manual lamp change in the 180W xenon light source

**CAUTION**

**Lamp failure**

– The service life of the xenon lamp is limited to 500 hours. If the service life of the lamp is exceeded, the xenon lamp may suddenly fail.

– With increased aging of the light source, the actual illumination intensity at a particular setting decreases.

• Please replace the xenon lamp in good time.
Note the remaining hours display on the screen.

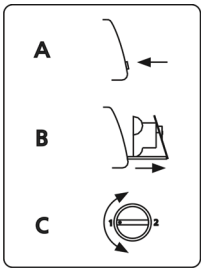
***NOTE***

**Lamp replacement**

• A lamp can be replaced within one minute.

### Switching to the second lamp

The lamp module contains two xenon lamps. The second lamp can be swung into position manually should the first lamp fail. The lamp module can be opened up if the first xenon lamp fails.




• Before replacing the lamp, switch off the stand from the power switch.

• Press button (2) to open the lamp module.

→ The lamp module is ejected slightly.

• Pull out the lamp module as far as it will go.

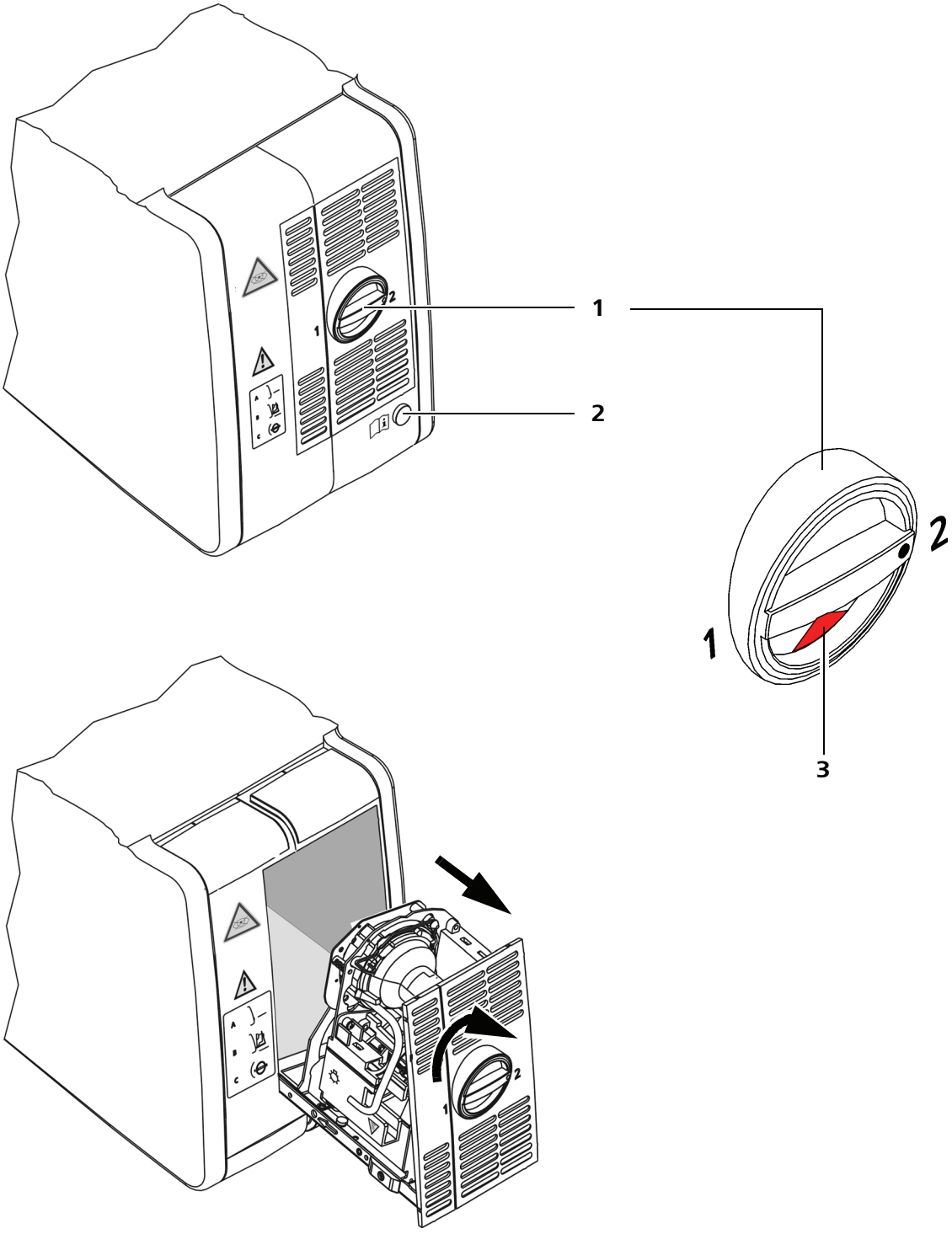
• Swing the second xenon lamp by turning knob (1) through 180° until it locks into place.

→ The segment (3) in the knob (1) lights red.

• Push the lamp module all the way back into the lamp housing.

• Switch the stand back on from the power switch.

If the first lamp failed and the second lamp is in use, a warning message is shown on the display on every restart of the device reminding you to keep a new lamp module ready.


1
2
1
2
3

# Automatic lamp change 300-W xenon light (optional)

**CAUTION**

**Lamp failure**

– The service life of the xenon lamp is limited to 500 hours. If the service life of the lamp is exceeded, the xenon lamp may suddenly fail.

– With increased aging of the light source, the actual illumination intensity at a particular setting decreases.

• Please replace the xenon lamp in good time.
Note the remaining hours display on the screen.

***NOTE***

**Lamp replacement**

• A lamp can be replaced within one minute.

### Switching to the second lamp

The lamp module contains two xenon lamps. In the event of a failure of the active lamp, the system automatically changes to the other lamp.

However, lamp change can also be triggered via the control panel.

• Press button <Light> (1) in the main menu to display submenu "Light".

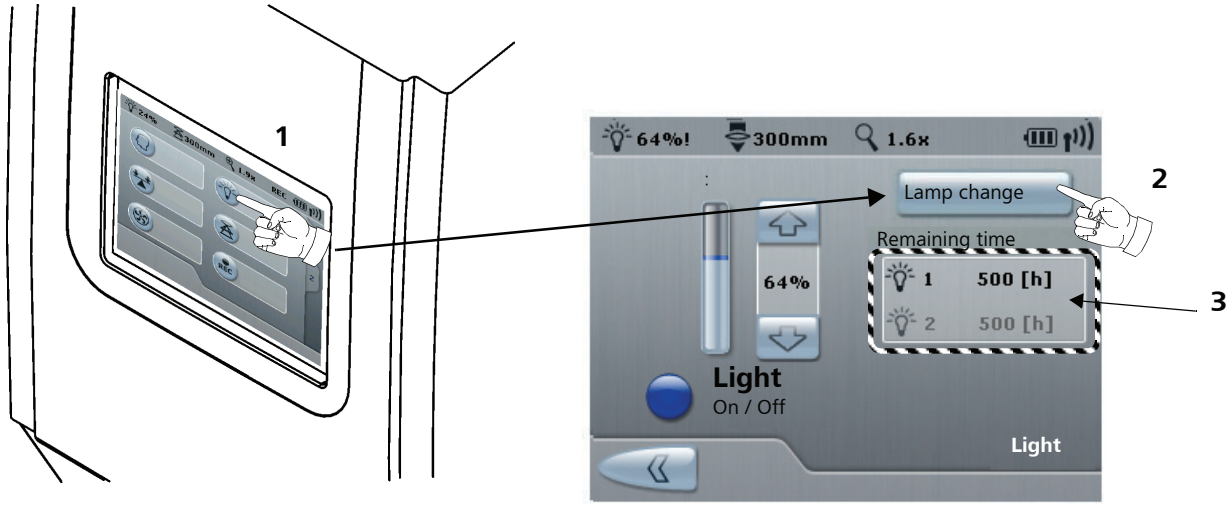
• Press the <Lamp replacement> (2) button.

• Press the  button twice to return to the main menu.

This should be done if the maximum number of operating hours of the active lamp has been reached and the operator wants to change to the other lamp as a precaution.

– If the first lamp failed and the second lamp is in use, a warning message is displayed reminding the user to keep a lamp module ready as a replacement.

– The operating hours are stored separately in every lamp. The operating hours remaining (3) are displayed when using a used lamp.


1
64%!
300mm
1.6x
Lamp change
2
Remaining time
64%
1 500 [h]
2 500 [h]
3
Light
On / Off
Light

# Manual lamp change 300-W xenon light (optional)

If automatic lamp change fails, the lamp must be changed manually.

The lamp housing contains two xenon lamps. The slider (2) for manually changing the lamp is always in front of the lamp just having been used. Proceed as follows in the event of a lamp failure and failure of the automatic lamp change function:

- Turn off the suspension system at the power switch.
- Move the fastener in the direction of the arrow to open the housing door (1).
- Push or press the slider (2) all the way in the direction of the second lamp (no longer in use).
- Re-close the housing door (1).
- Switch the suspension system back on again at the power switch.

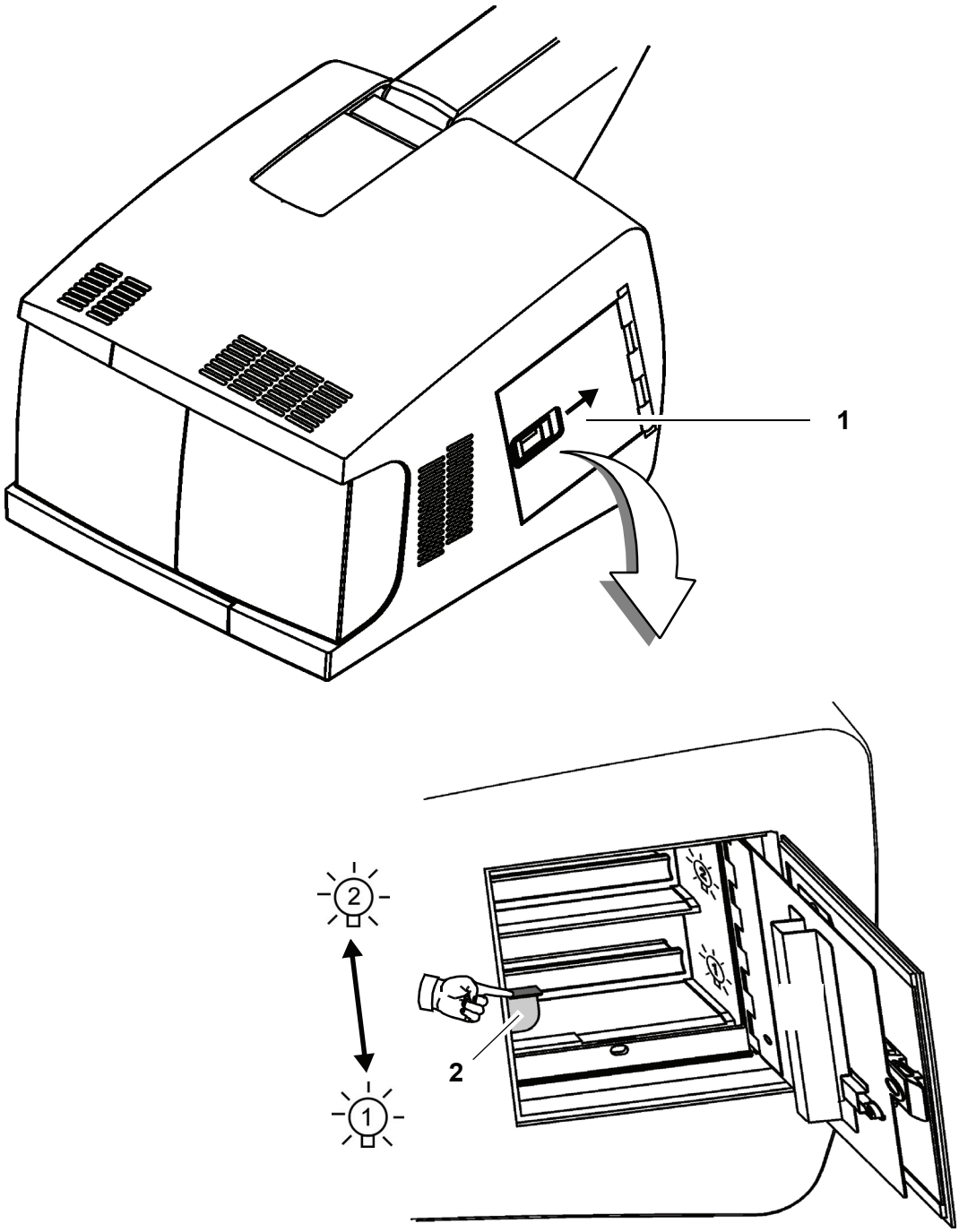
Be sure to replace the used lamp by a new one after an operation.

- Dispose of the used lamp in line with local guidelines and laws.

***NOTE***

**Lamp replacement**

- A lamp can be replaced within one minute.


1
2
2
1

# Electrical malfunction (focus, zoom, lighting)

**NOTE**

**Failure of major functions!**

A failure of the electronics may affect the focus, zoom and lighting functions. Press the orange-colored button (1) to activate Light-only mode and, e. g., finish an operation that has already been started. Light-only mode ensures continuing illumination at constant and sufficient light intensity.

### Working in Light-only mode

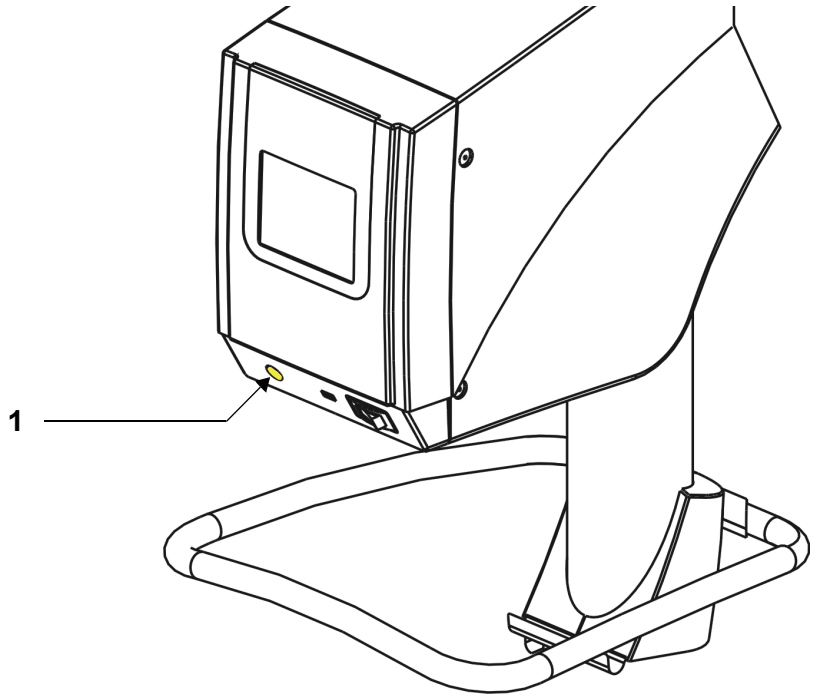
In Light-only mode, the lighting is set to an intensity of ca 70% and the power to all motorized functions is switched off (including magnetic brakes).

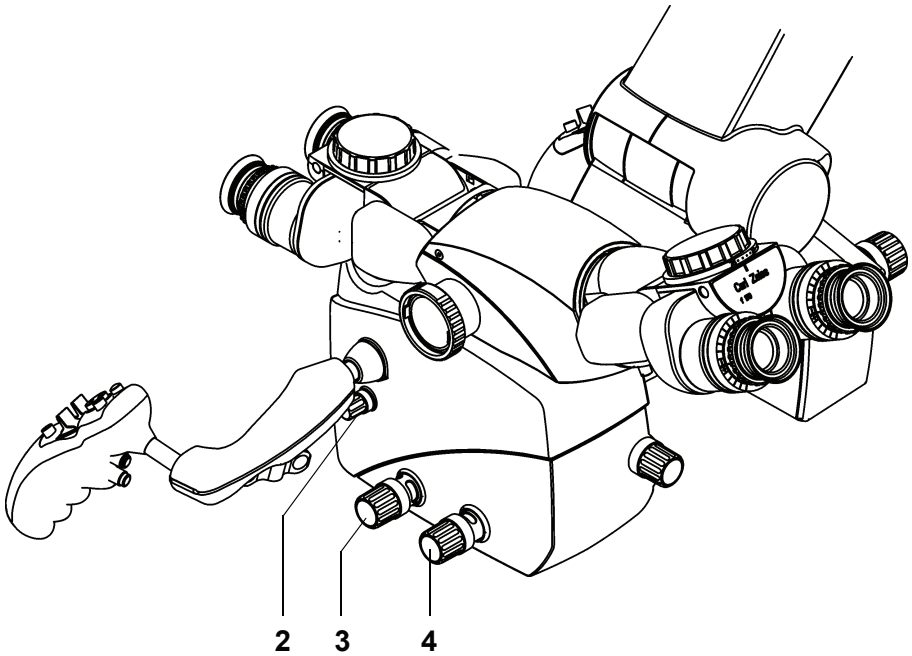
- Manually move the microscope in the X and Y directions to position it over the surgical field.
- Manually move the microscope up and down to focus the image of the surgical field.
- Use knob (2) to adjust the zoom value (magnification).
- Use knob (3) to adjust the focus (working distance).
- Use knob (4) to adjust the luminous field diameter.

**NOTE**

**Failure of the electronics (magnetic brakes)**

If the magnetic brakes fail (magnetic brakes are closed), you can manually move the axes of the stand by overcoming the locking effect of the brakes.


1


2
3
4

# Failure of the display

**CAUTION**

**Do not touch the display if it has failed**

- On no account touch the display surface if the display has failed.

Only the lighting of the display may have failed. If so, you might access unwanted menus, trigger functions or unintentionally change values.

If the display no longer responds to input, it is still possible to work with the device with the existing settings.

Proceed as follows to restore the function of the display:

- Switch the stand off and then (after ca. 2 minutes) on again.

  After being switched on again, the system automatically enters normal operating mode after the self-test.

- Check all the functions of the surgical microscope and the stand.

You can continue to perform operations in normal mode.

- Please notify your Carl Zeiss Service department should you experience any faults.

# Troubleshooting

## For your safety

**CAUTION**

**Error messages on the display!**

Pay attention to the error messages on the display.
In the event of malfunctions occurring during operation, error messages are shown on the display. The additional display shows a warning triangle in this case.

- Check and eliminate the malfunction.
- Acknowledge the message by pressing the relevant button on the display.

***Note***

**Problems in troubleshooting!**

If you have problems eliminating the malfunction or if errors keep recurring, do not continue using the system, attach a sign to the system stating that it is out of order, and contact your Carl Zeiss service partner.

Export of service files
In the event of malfunctions, send these files to your service technician. The files enable faster troubleshooting.

You will find the contact responsible for your country on the following web-site: www.meditec.zeiss.com

## Malfunctions of the system

| Problem | Possible cause | Remedy | See |
|---|---|---|---|
| No function at all. | Power plug of suspension system not inserted. | Plug in the power cord. | page 84 |
| | Power switch of suspension system not switched on. | Press the power switch. Green indicator light in the power switch must be lit. | page 118 |
| | Automatic circuit breaker in power switch of suspension system has been activated. | Press power switch again. | page 118 |
| | Power failure. | Contact in-house electrician. | - |
| Surgical field illumination on microscope not working. | | | - |
| | Failure of lamp 1 and lamp 2. | Replace both lamps. | - |
| | Failure of suspension system electronics. | Illuminate surgical field using an OR illuminator. Contact service dept. | - |
| | Lamp module in suspension system has no contact. | Insert lamp module as far as it will go. | - |
| | Light source has not been switched on. | Press light source on/off button on the handgrip / foot control panel. | - |
| Error message on the display: Lamp overheated - device switches off | Ventilation slots of light source are covered. | Uncover ventilation slots of light source. | - |
| Insufficient surgical field illumination. | Brightness level set too low. | Adjust brightness on suspension system or handgrip / foot control panel. | - |
| | Lamp ageing may lead to reduced light intensity. | Replace lamp. | - |
| | Defective light guide (illumination not uniform). | Replace light guide. Contact service dept. | - |

| Problem | Possible cause | Remedy | See |
|---|---|---|---|
| Surgical field illumination too bright. | Brightness level set too high. | Adjust brightness on suspension system or handgrip / foot control panel. | - |
| | | Switch off light source on suspension system. Illuminate surgical field using an OR illuminator.<br>Contact service dept. | - |
| | Defective light control. | Change to the Light Only mode. | - |
| Image on video monitor too dark, or high level of noise. | Use a camera adapter. | Remove fixed stop from camera adapter. | User manual for camera |
| | | Increase the brightness level of illumination. | - |
| Motorized focusing and /or zoom function of surgical microscope is inoperative. | Failure of suspension system electronics. | Manually adjust focusing and / or zoom on surgical microscope. | - |
| No video image. | Connection cable not properly connected. | Check all connections. | - |
| Stand wobbles. | Floor not level. Stand base not appropriately positioned. | Slightly change the stand base position. | - |

## Malfunctions of the wireless foot control panel

| Problem | Possible cause | Remedy | See |
|---|---|---|---|
| Intermittent malfunction | Batteries are flat | Replace batteries for new ones | User manual for the foot control panel |
| | Use of rechargeable batteries (accumulators) | Replace batteries for new ones | User manual for the foot control panel |
| | Failure of individual button functions | Configure button function differently - only possible if functions on the stand are configurable | page 154 |
| | Failure/fault of the radio link for the wireless foot control panel | Establish cable connection (if connector cable present). | User manual for the foot control panel |
| | Position switch always detects rest position | Establish cable connection (if connector cable present). | User manual for the foot control panel |
| | Radio link faulty | Establish cable connection (if connector cable present). | User manual for the foot control panel |
| | Weak radio signal | Establish cable connection (if connector cable present). | User manual for the foot control panel |
| | No pairing with stand | Perform pairing with the stand | page 88 |

| Problem | Possible cause | Remedy | See |
|---|---|---|---|
| Unintentional triggering of function | Control jams mechanically after being pressed | Move foot switch panel to the rest position<br>Configure button function differently - only possible if functions on the stand are configurable. | User manual for the foot control panel |
| | Foot switch panel sends erroneous activation signal | Move foot switch panel to the rest position<br>Configure button function differently - only possible if functions on the stand are configurable | User manual for the foot control panel |
| | Swap foot control panels | Check that the label on the stand and on the indicator of the foot control panel match | User manual for the foot control panel |
| | | Perform pairing with the stand | page 88 |

## Malfunctions of the cable-based foot control panel

| Malfunction | Possible cause | Remedy | Refer to |
|---|---|---|---|
| Foot control panel without any functions. | Suspension system or foot control panel not plugged in. | Establish connection. | page 86 |
| Sporadic loss of functions. | Loss of individual key functions. | Reconfigure key functions - only possible if functions on suspension system can be configured. | page 154 |

# Care and Maintenance

# System maintenance

## Changing the Superlux 180W xenon lamp module

**CAUTION**

**Risk of injury caused by improper handling of the xenon lamp!**

Improper handling of the xenon lamp may lead to damage or injury.

- The lamp module must only be changed by appropriately trained personnel.

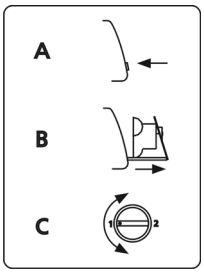
**CAUTION**

**Hazard caused by hot lamps!**

In the event of malfunction, there is the risk that the lamp may burst due to the high pressure inside the hot lamp. The hot surface of the xenon lamp may also cause burns.

- Only change the lamp module after it has cooled down (this takes approx. 10 min)!

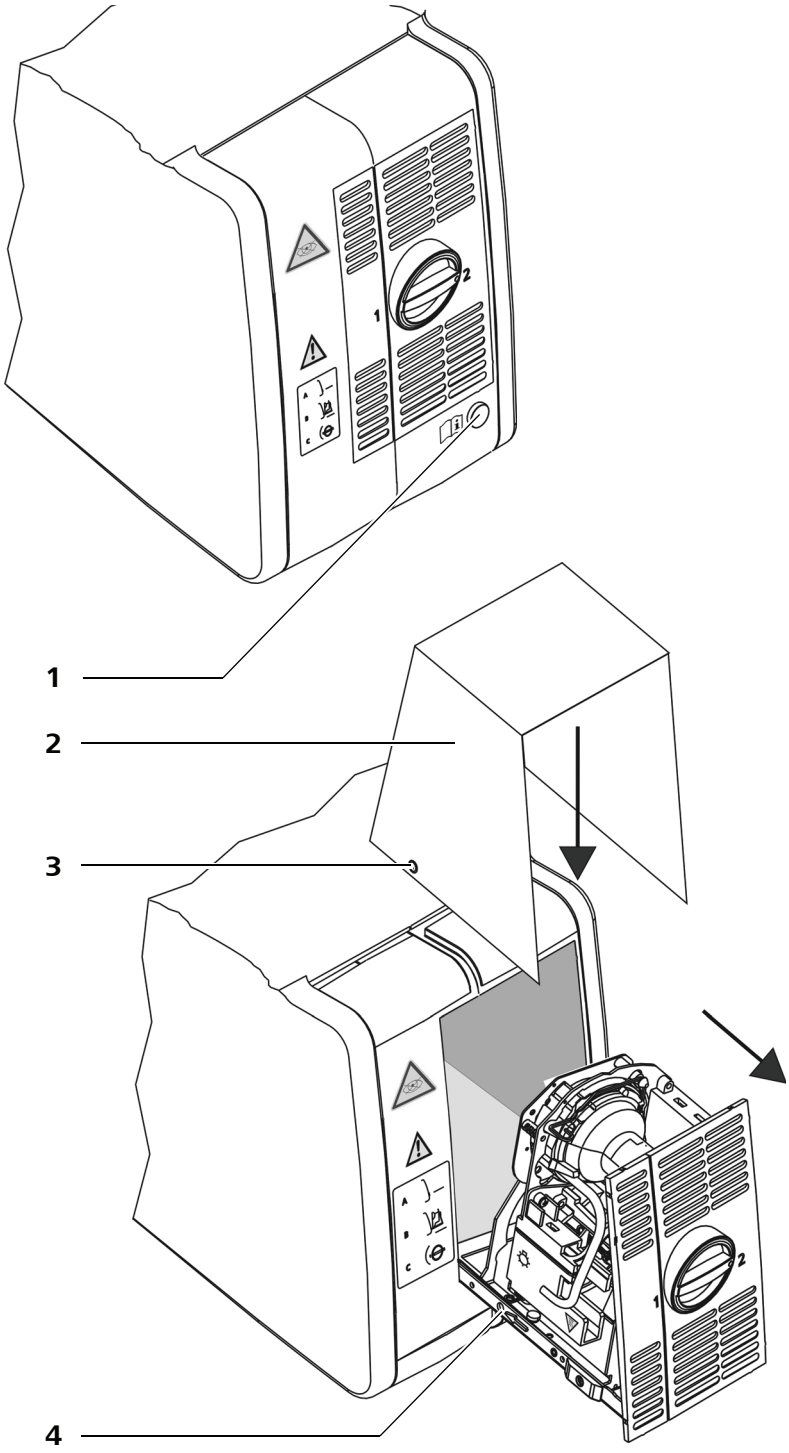
### Replacing the lamp module




- Before replacing the lamp, turn off the device at the power switch.
- Press button (1) to open the lamp module.

  → The lamp module is slightly ejected.
- Pull out the lamp module as far as it will go.
- Slide the original transport case (2) over the module, making sure that bolt (3) engages in bore (4). This unlocks the stop.
- Remove the old lamp module and insert the new module by proceeding in the reverse order.
- Turn on the system at its power switch.
- Check the function of the two xenon lamps.
- Pack the old lamp module (5) in the transport package of the new lamp module.
- Fill in the enclosed return card and send the old lamp module to the nearest Zeiss service representative.

Only use the original transport case (2) as it also provides explosion protection should xenon lamps be defective.


1
2
3
4

# Exchanging xenon lamp for 300W Superlux (option)

**CAUTION**

**Risk of injury caused by improper handling of the xenon lamp!**

Improper handling of the xenon lamp may lead to damage or injury.

- The lamp module must only be changed by appropriately trained personnel.

**CAUTION**

**Hazard caused by hot lamps!**

In the event of malfunction, there is the risk that the lamp may burst due to the high pressure inside the hot lamp. The hot surface of the xenon lamp may also cause burns.

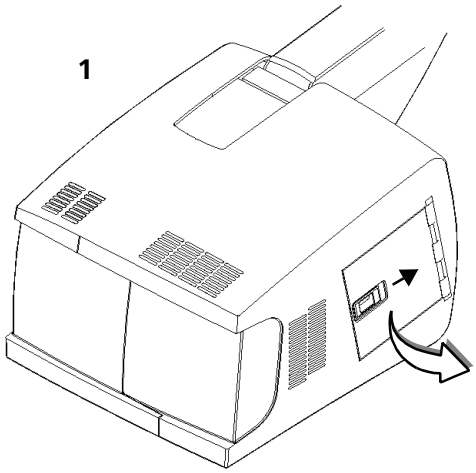
- Only change the lamp module after it has cooled down (this takes approx. 10 min)!

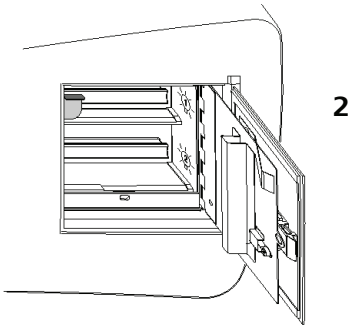
## Replacing the 300W lamp

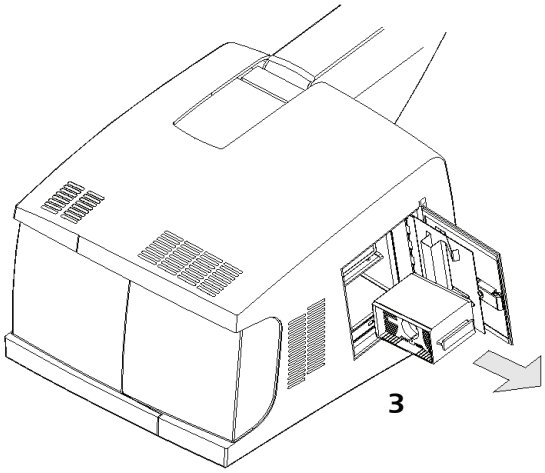
The lamp housing contains two xenon lamps. If a lamp fails, you can open the lamp module to replace the lamp.

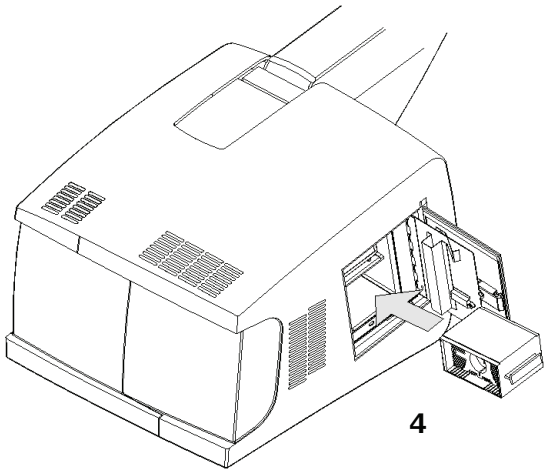
- Before replacing the lamp, switch off the suspension system at the power switch.
- Push the lock in the direction of the arrow (1) and open the door (2).
- Pull out the defective lamp (3).
- Push a new lamp all the way into the lamp housing (4).
- Close the door again (5).
- Switch the suspension system back on again at the power switch.

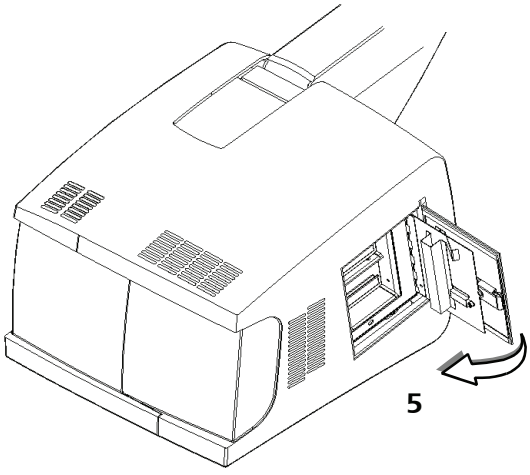
If the first lamp failed and the second lamp is in use, a warning message is shown on the display, reminding you to keep a backup lamp module ready at hand.


1


2


3


4


5

# Counterbalancing the monitor support arm

If the video monitor does not remain in place in the position required, the following readjustments can be performed.

**Increasing the friction of left/right movement of the carrier arm.**

- Slightly tighten screw (1) of the carrier arm by turning it clockwise using an M5 hex key.

**Increasing the friction of left/right movement of the spring arm.**

- Remove the plastic cover (2) on the spring arm joint.
- Loosen securing screw (4) on the support arm by turning it counterclockwise using an M2.5 hex key.
- Tighten the adjustment screw (3) of the spring arm by turning it clockwise until the required friction is attained.
- Firmly retighten the securing screw (4) on the support arm by turning it clockwise using an M2.5 hex key.
- Reattach the plastic cover (2).

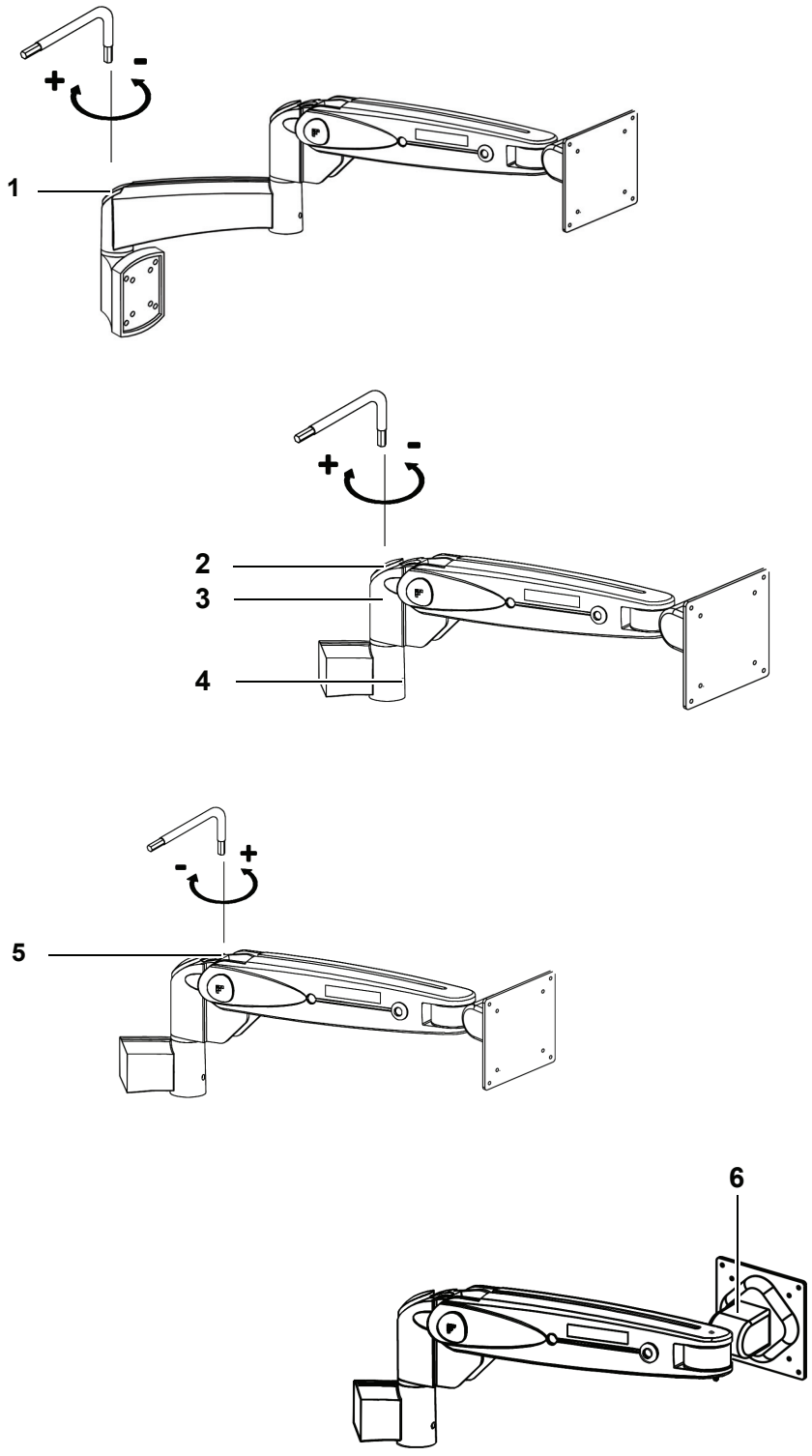
**Readjusting the gas pressure spring**

- For correct adjustment of the gas pressure spring, align the spring and support arms in a horizontal position.
- Tighten setting screw (5) of the gas pressure spring by turning it **counterclockwise** with an M5 hex key until the spring arm with the video monitor no longer moves downwards.

- If the spring arm with video monitor continues to move downward, the gas pressure spring is defective.
- Please inform the Carl Zeiss service department in this case.

**Adjusting the movement of the video monitor**

- Tighten the securing screw (6) of the monitor bracket by turning it clockwise until the video monitor remains in the required position.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# Maintenance intervals

Regular preventive maintenance is required to ensure safe and correct operation and a long service life of the system on an ongoing basis.

The following table lists the relevant maintenance activities and shows at which maximum intervals they must be performed.

For maintenance activities that can be performed by yourself, the relevant procedure is described in the following sections.

All maintenance work not detailed here requires system-specific expert know-how. It is frequently necessary to open the system for this work.
Please contact your local Carl Zeiss service representative in due time for the performance of these maintenance activities.

| Component | Inspection features and acceptance criteria | Comments |
|---|---|---|
| **According to country-specific interval requirements** | | |
| Safety check | | |
| **Before each use** | | |
| Brakes | Electrical and mechanical function test:<br>unlock brakes completely; braking force holds microscope securely in balanced state without any change of position. | |
| Lamps | Checking:<br>– Operating hours within permissible range<br>– Replacement available and ready for use | |
| **When specified operating hours have been reached** | | |
| Lamps | We recommend replacing the light source when the specified operating hours have been reached. | |
| **Every 12 months** | | |
| Documentation and identification labels | Visual inspection:<br>Manuals and identification labels available, undamaged, complete and legible | |

| Component | Inspection features and acceptance criteria | Comments |
|---|---|---|
| Controls such as handgrips and<br>XY coupling (option) | Visual inspection and function test:<br>– Optical and acoustic signals functional and react to prompt<br>– Light Only mode is operational<br>– Probes move easily without play | |
| Carrier system including microscope mount | Function test:<br>– play-free movement of the bearings, stops and suspensions<br>– brakes operational at maximum permissible OPMI configuration<br>Maximum admissible load on the microscope body   | |
| Stand column | Function test:<br>Secure without mechanical play in the column connection | |
| Casters | Visual inspection and function test:<br>– play-free attachment, lock-up free turning and rolling, locking tabs and brakes securely positioned<br>– Cable deflectors available | |
| Illumination:<br>Fan | Function test:<br>– Fan and vacuum capacity noticeable | |
| Microscope | Function test:<br>Checking optical imaging and illumination of the field of view | |
| Zoom, focus and illuminated field diaphragm | Function test:<br>– Jolt-free operation of the zoom system<br>– Play-free adjustability of focus, zoom and illuminated field diaphragm when adjusted manually | |
| Objective lens, tube and other accessories mounted to the microscope (camera, etc.): | Function test:<br>Attached parts without mechanical play, knurled screws tightened and other removable microscope components securely mounted | |
| Foot control panel (option) | Visual inspection and function test:<br>– Complete, undamaged dust and spray water protection<br>– Replace FCP WL battery | |

| Component | Inspection features and acceptance criteria | Comments |
|---|---|---|
| Monitor (option) | Visual inspection and function test:<br>– No noticeable damage to housing<br>– Checking the image quality<br>– Checking the gas pressure spring of the lift arm | |
| Video (option) | Function test: SpeedFocus | |
| **Every 2 years** | | |
| Illumination:<br>Light guide | Function test:<br>– Checking the light guide<br>– Checking the illuminated field | |
| Illumination:<br>Optical filters | – Heat-absorbing filter and UV filter:<br>– checking the light source filters | |
| AutoDrape (option) | Function test: drape pump function | |
| **Every 4 years** | | |
| Carrier system including microscope mount | Visual inspection:<br>– no signs of wear on the supporting structure<br>– No signs of wear or damage on the interfaces and couplings<br>– No visible damage or wear on the connection and mount of the spring packs | |
| Cables, plugs and switches | Visual inspection:<br>– Undamaged insulation and connectors on system/cable<br>– Checking the cable guide including fasteners | |
| Elektronik | We recommend replacing the internal batteries | |
| Casters | We recommend replacing the casters | |
| Light guide | We recommend replacing the light guide | |

| Component | Inspection features and acceptance criteria | Comments |
|---|---|---|
| **Every 6 years** | | |
| Monitor | Checking the gas pressure spring of the lift arm<br>We recommend replacing the monitor carrier arm including the gas pressure spring. | |
| Navigation | Function test of the interface | By manufacturer of the navigation system |
| | | |
| **Every 8 years** | | |
| AutoBalance (option) | Replacement of wearing parts in the balancing drive | |

# Technical safety check

**CAUTION**

**Risk of injury!**

- Make sure that the regular technical safety checks required for this system in accordance with the applicable national regulations are performed on schedule and to the stipulated extent.

To prevent any impairment of the system's safety as a result of ageing, wear, etc., the organization operating the system must ensure, in accordance with the applicable national regulations, that the regular technical safety checks defined for this system are performed on schedule and to the stipulated extent.

The safety checks must only be performed by the manufacturer or qualified personnel.
At a minimum, the scope of the safety checks of the system should comprise the following points:

– Availability of the user manual

– Visual inspection of the system and accessories for damage and legibility of the symbols and labels

– Leakage current test (measuring point: potential equalization bolt)

– Test of the protective ground conductor (measuring point: potential equalization bolt)

– Function and wear test of the steerable casters and locking tabs

– Function test of all switches, buttons, sockets and indicator lamps of the system

– Function test of the Light Only mode without a patient.

– The drive unit of the AutoBalance function (option) is subject to natural wear.
Check the age of the drive unit and replace it if it is older than 8 years.

# Care of the device

## Cleaning

***NOTE***

**Proper cleaning of the device**

- Follow the cleaning methods below:

### Cleaning optical surfaces

The multi-layer T* coating of the optical components (e.g. eyepieces, objective lenses) ensures optimum image quality.
Image quality is impaired by even slight contamination of the optics or by a fingerprint. To protect the internal optics from dust, the system should never be left without the objective lens, binocular tube and eyepieces. After use, cover the system to protect it from dust. Always store objective lenses, eyepieces and accessories in dust-free cases when they are not being used.

Clean the exterior surfaces of the optical components (eyepieces, objective lenses) only when necessary:

- Do not use any chemical cleaning agents.
- Remove dust from the optical surfaces using a squeeze blower or a clean, grease-free brush.

For the regular cleaning of objective lenses and eyepieces of the surgical microscope, we recommend the optics cleaning set available from ZEISS. For the catalog number, please see the section "System data - Ordering data".

### Prevention of fogging

To protect the eyepiece optics from fogging, we recommend using an anti-fogging agent. Anti-fogging agents provided by eyecare professionals for use with eyeglass lenses are also suitable for Zeiss eyepieces.

- Please observe the instructions for use supplied with each anti-fogging agent.

Anti-fogging agents do not only ensure fog-free eyepiece optics. They also clean the eyepiece optics and protect them from dirt, grease, dust, fluff and fingerprints.

### Cleaning mechanical surfaces

All mechanical surfaces of the system can be cleaned by wiping them with a

damp cloth. Do not use any aggressive or abrasive cleaning agents.

Remove any residue using a mixture of 50% ethyl alcohol and 50% distilled water plus a dash of household dish-washing liquid.

- Apply the cleaning agent on a soft, clean cloth (do not spray or apply it directly on the device) and wipe the device with the damp cloth.
- Do not allow any cleaning agent to seep into the device.

# Sterile use (drapes)

### Asepsis sets

The asepsis sets supplied by Carl Zeiss contain rubber caps and handgrips that you can sterilize in the autoclave. More detailed information on sterilization is available in the "Preparation of Resterilizable Products" user manual for the particular aspesis sets.

### Drapes

Sterile single-use drapes are also available for sterile covering of the system, see page 112.

We recommend the following drape types:

– Model 70, no. **306070**
– Model 25, no. **306025** (recommended with AutoDrape option)
– Model 71, no. **306071** (recommended with AutoDrape option)
– Model 26, no. **306026** (recommended with AutoDrape option)

- When fitting the sterile drape, ensure there is sufficient slack to allow for movement of the microscope carrier and surgical microscope.
- Do not cover the ventilation opens - this ensures the lamps are cooled adequately and no lamp fails.

# Disinfection

It may be a requirement to disinfect surfaces.

**CAUTION**

**Surface damage on device**

- Use a disinfectant based on aldehyde and/or alcohol. The addition of quaternary compounds is acceptable. To prevent damaging surfaces, disinfecting components other than those listed below must not be used.

The maximum concentrations are:

– For alcohol (tested with 2 propanol): 60%

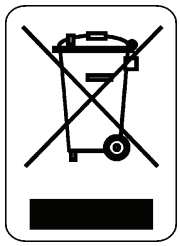
– For aldehyde (tested with glutaraldehyde): 2%

– For quaternary compounds (tested with DDAC): 0,2%

# Environmental protection measures

## Note on disposal

**User information**
**on the disposal of electrical and electronic devices**



This symbol means that the product must not be disposed of as normal domestic waste.
The correct disposal of electrical or electronic devices helps to protect the environment and to prevent potential hazards to the environment and/or human health which may occur as a result of improper handling of the devices concerned.
For detailed information on the disposal of the product, please contact your local dealer or the device manufacturer or its legal successor. Please also note the manufacturer's current information on the Internet. In the event of resale of the product or its components, the seller is required to inform the buyer that the product must be disposed of in accordance with the applicable national regulations currently in force.

### For customers in the European Union

Please contact your dealer or supplier if you wish to dispose of electrical or electronic devices.

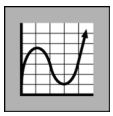
### Information on disposal in countries outside the European Union

This symbol is only applicable in the European Union. For the disposal of electrical and electronic devices, please observe the relevant national legislation and other regulations applicable in your country.

### Disposal of outer packaging material

- In order to dispose of outer packaging materials please refer to the local guidelines and bylaws.

# System Data



# Technical data

## Microscope

| Component | Property |
|---|---|
| Magnification | Magnification factor γ = 0.4x - 2.4x |
| Varioscope objective lens | Working distance: ≥ 200 ... ≤ 500 mm<br>Motorized, adjustable speed.<br>Possibility of manual adjustment (Light Only mode). |
| Tube / Eyepieces | – Tiltable tube,<br>tilt range 180°, focal length f = 170 mm<br>– (Optional) tube f= 170/260 mm<br>– 10x (12.5x) magnetic widefield eyepieces with integrated eyecups. |
| XY coupling (optional) | Motorized XY adjustment in the entire microscope tilt and swivel range, adjustment range 30 mm x 30 mm, movement speed can be controlled. |
| Max. additional load on the microscope | The maximum admissible load (accessory equipment) on the microscope may not exceed 7 kg! |

## Microscope magnifications

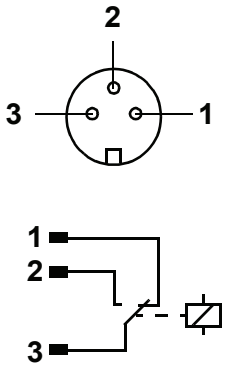
| | | 10x eyepiece | | | | 12.5x eyepiece | | | |
|---|---|---|---|---|---|---|---|---|---|
| WD in mm | Tube f in mm | Zoom | FOV Ø in mm | Magn. | FOV area in mm | Zoom | FOV Ø in mm | Magn. | FOV area in mm |
| 200 | 170 | 0.4 | 97.0 | 2.2 | 73.8 | 0.4 | 83.1 | 2.7 | 54.2 |
| | | 2.4 | 16.2 | 13.0 | 2.1 | 2.4 | 13.9 | 16.2 | 1.5 |
| | 200 | 0.4 | 83.4 | 2.5 | 54.6 | 0.4 | 71.5 | 3.1 | 40.1 |
| | | 2.4 | 13.9 | 15.1 | 1.5 | 2.4 | 11.9 | 18.8 | 1.1 |
| 350 | 170 | 0.4 | 146.1 | 1.4 | 167.5 | 0.4 | 125.2 | 1.8 | 123.0 |
| | | 2.4 | 24.3 | 8.6 | 4.7 | 2.4 | 20.9 | 10.8 | 3.4 |
| | 200 | 0.4 | 125.6 | 1.7 | 123.8 | 0.4 | 107.7 | 2.1 | 91.0 |
| | | 2.4 | 20.9 | 10.0 | 3.4 | 2.4 | 17.9 | 12.5 | 2.5 |
| 500 | 170 | 0.4 | 192.8 | 1.1 | 291.8 | 0.4 | 165.2 | 1.4 | 214.3 |
| | | 2.4 | 32.1 | 6.5 | 8.1 | 2.4 | 27.5 | 8.2 | 6.0 |
| | 200 | 0.4 | 165.8 | 1.3 | 215.8 | 0.4 | 142.1 | 1.6 | 158.5 |
| | | 2.4 | 27.6 | 7.6 | 6.0 | 2.4 | 23.7 | 9.5 | 4.4 |

WD = working distance; FOV = field of view; Magn. = magnification; 0.4 = min. / 2.4 = max.

# Electrical data

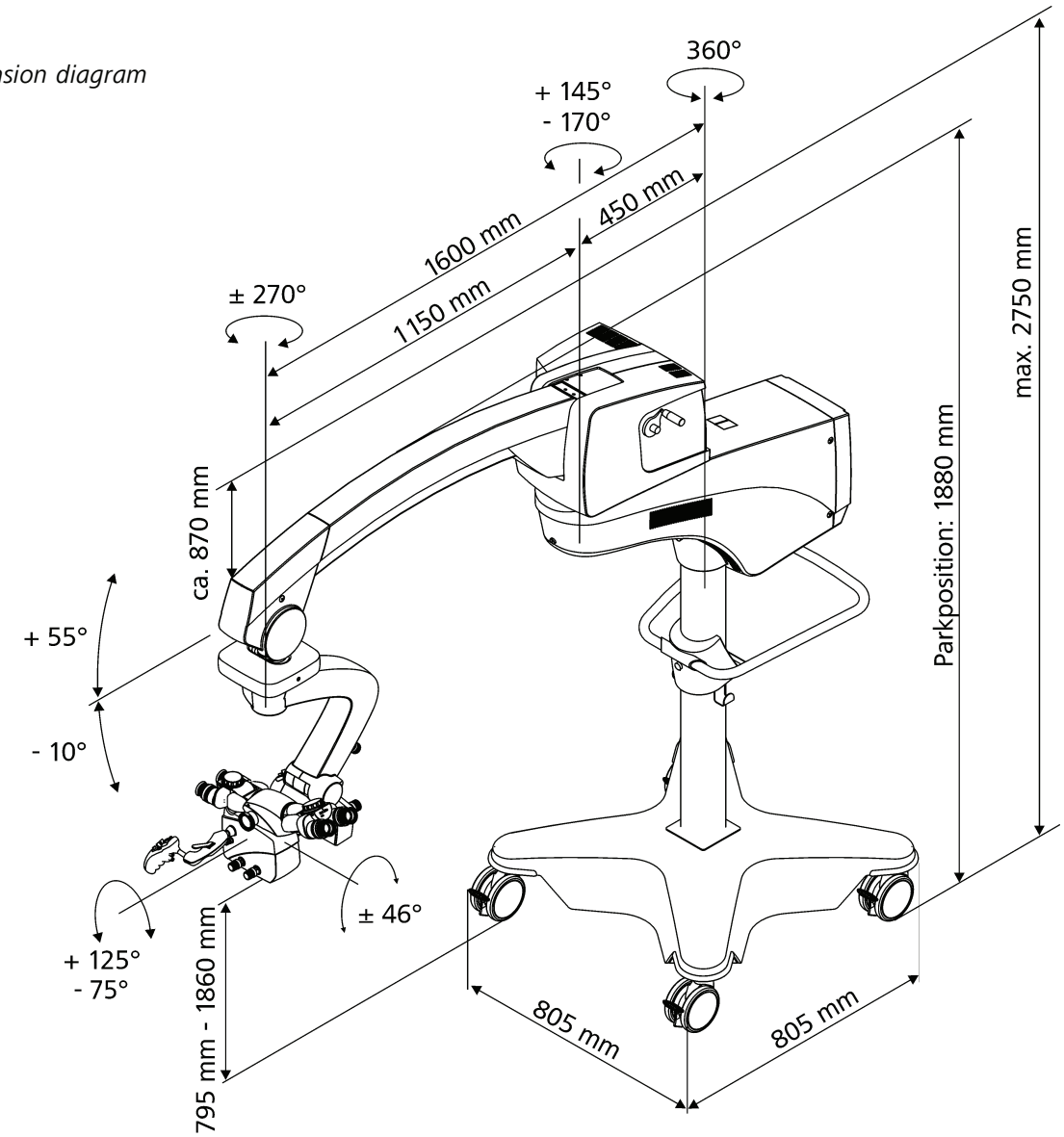
| Component | Property |
|---|---|
| Line connection | Only connect the system to wall outlets which are provided with a properly connected protective ground conductor.<br>To prevent malfunctions, signal lines may not run parallel to power supply lines.<br>In the United States, the device may only be operated at max. 120 V! |
| Rated voltage | 115 VAC (100 - 125 VAC) |
| | 230 VAC (230 - 240 VAC) |
| Current consumption | Max. 1200 VA |
| Rated frequency | 50 - 60 Hz |
| Fuses | Automatic circuit breaker |
| Electrical outlets | Power socket 100-240 VAC, max. 500 VA |
| | Video output YPrPb (only for HD camera)<br>Video output DVI-D (only for HD camera)<br>Video outputs HD-SDI (only for HD camera) |
| | Video output Y/C |
| | Video output FBAS |
| | Remote socket for an external signal with max. 24 V / 0.5 A. |
| | Ethernet connector (option) |
| Xenon light source *<br>Superlux 180<br>*) The maximum brightness of the lamp(s) can drop over time (normal device property). | Xenon short-arc reflector lamp,<br>color temperature: approx. 6000 K |
| | Rated power: approx. 180 W |
| | – UV/IR heat protection filter<br>– Pinhole stop controlling the light intensity |
| | Second lamp in lamp housing, swung in manually |

Remote socket
View of connector side



| Component | Property |
|---|---|
| Xenon light source * Superlux 300 (option) *) The maximum brightness of the lamp(s) can drop over time (normal device property). | Xenon short-arc reflector lamp, color temperature: approx. 5600 K |
| | Rated power: approx. 300 W |
| | – UV/IR heat protection filter<br>– Pinhole stop controlling the light intensity |
| | Second lamp in lamp housing, swung in manually |

*Dimension diagram*



# Weights

## Accessories

Accessories

**CAUTION**

**Do not exceed the maximum weight load.**

The maximum load on the microscope body may not exceed 7 kg.

| Description | Cat. No. | Weight |
|---|---|---|
| Straight tube | 303765-0000-000 | 0.75 kg |
| 180° tiltable tube, f = 170 mm | 303791-0000-000 | 1.11 kg |
| 180° tiltable tube, f = 200 mm | 303792-0000-000 | 1.1 kg |
| Folding tube f170/f260 | 303771-9020-000 | 1.0 kg |
| 10x widefield eyepieces (2 units) | 305542-0000-000 | 0.26 kg |
| 12.5x widefield eyepieces (2 units) | 305543-9901-000 | 0.26 kg |
| 10x widefield eyepieces with reticle (2 units) | 000000-1023-184 | 0.26 kg |
| 12.5x widefield eyepieces with reticle (2 units) | 000000-1023-188 | 0.26 kg |
| Stereo bridge | 1040-085 | 1.34 kg |
| Beam splitter 50/50 | 301513-9902-000 | 0.4 kg |
| Beam splitter 20/80 | 301503-9901-000 | 0.4 kg |
| Stereo coobservation tube | 1063-869 | 1.09 kg |
| Camera adapter f = 340 mm T2 | 1022-973 | 0.42 kg |
| External micromanipulator (for weight data, refer to the user manual of the external micromanipulator) | - | - |
| Video objective lens f = 85 mm | 301677-9085-000 | 0.4 kg |

## OPMI VARIO 700

| | |
|---|---|
| Weight of OPMI VARIO 700 with floor stand (without accessories) | approx. 275 kg |
| Transport case | approx. 220 kg |
| Weight of OPMI VARIO 700 with floor stand transportable in the transport case | approx. 495 kg |

# EMC (electromagnetic compatibility)

The device complies with the EMC requirements of EN 60601-1-2:2007. While operating the device, observe the EMC precautions specified below.

- Only use spare parts approved by Carl Zeiss for this device.
- Do not use any portable or mobile RF communication equipment in the vicinity of the device as this may impair the device's function.
- Do not use a mobile phone in the vicinity of the equipment because the radio interference can cause the equipment to malfunction. The effects of radio interference on medical equipment depend on a number of various factors and are therefore entirely unforeseeable.
- Please note the EMC guidelines on the following pages.

## Electromagnetic interference

The OPMI® VARIO 700 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the device OPMI® VARIO 700 is responsible for ensuring that the device is operated in such an environment.

| Interference measurements | Compliance | Electromagnetic environment - guidelines |
|---|---|---|
| RF emissions as per CISPR11 | Group 1 | The OPMI® VARIO 700 uses RF energy only for its internal functions. As a result, RF emissions are very low and unlikely to cause any interference in nearby electronic devices. |
| RF emissions as per CISPR11 | Class A | The device OPMI® VARIO 700 is suitable for use in various facilities including locations in residential environments and those directly connected to the public power supply network which also supplies buildings used for residential purposes. |
| Harmonic emissions as per IEC 61000-3-2 | not applicable | |
| Emission of voltage fluctuations/flicker as per IEC 61000-3-3 | not applicable | |

## Electromagnetic immunity for ME equipment and ME systems

The OPMI® VARIO 700 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the OPMI® VARIO 700 is responsible for ensuring that the device is operated in such an environment.

| Immunity tests | IEC 60601 - test level | Compliance level | Electromagnetic environment - guidelines |
|---|---|---|---|
| Electrostatic discharge (ESD) as per IEC 61000-4-2 | ±6 kV contact discharge<br>±8 kV air discharge | ±6 kV contact discharge<br>±8 kV air discharge | Floors should be made of wood or concrete or be covered with ceramic tiles. If the flooring contains synthetic materials, the relative humidity must be at least 30%. |
| Fast transient/burst immunity as per IEC 61000-4-4 | ±2 kV for power supply lines<br>±1 kV for input/output lines | ±2 kV for power supply lines<br>±1 kV for input/output lines | The quality of the supply voltage should be that of a typical business or hospital environment. |
| Surges as per IEC 61000-4-5 | ± 1 kV phase-to-neutral voltage<br>± 2 kV phase/neutral to ground voltage | ± 1 kV phase-to-neutral voltage<br>± 2 kV phase/neutral to ground voltage | The quality of the supply voltage should be that of a typical business or hospital environment. |
| Voltage dips, short interruptions and voltage variations as per IEC 61000-4-11 | < 5 % $U_T$ (> 95 % dip of $U_T$) for 0.5 cycle<br>40 % $U_T$ (60 % dip of $U_T$) for 5 cycles<br>70 % $U_T$ (30 % dip of $U_T$) for 25 cycles<br>< 5 % $U_T$ (95 % dip of $U_T$) for 5s | < 5 % $U_T$ (> 95 % dip of $U_T$) for 0.5 cycle<br>40 % $U_T$ (60 % dip of $U_T$) for 5 cycles<br>70 % $U_T$ (30 % dip of $U_T$) for 25 cycles<br>< 5 % $U_T$ (95 % dip of $U_T$) for 5s | The quality of the supply voltage should be that of a typical business or hospital environment. If the user of OPMI® VARIO 700 requires continued function even in the event of interruptions in the power supply, we recommend to power the device from OPMI® VARIO 700 an uninterruptible power supply or a battery. |

| Immunity tests | IEC 60601 - test level | Compliance level | Electromagnetic environment - guidelines |
|---|---|---|---|
| Power frequency (50/60Hz) magnetic field as per IEC 61000-4-8 | 3 A/m | 3 A/m | Power frequency magnetic fields should be at levels typical of business and hospital environments. |

NOTE: $U_T$ is the AC supply voltage prior to application of the test level.

## Electromagnetic immunity for non-life-supporting ME equipment and ME systems

The OPMI® VARIO 700 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the OPMI® VARIO 700 is responsible for ensuring that the device is operated in such an environment.

| Immunity tests | IEC 60601 - test level | Compliance level | Electromagnetic environment - guidelines |
|---|---|---|---|
| | | | Portable and mobile radio communication equipment should not be used closer to the OPMI® VARIO 700, including cables, than the recommended safety distance that is calculated using the equation applicable to the transmission frequency involved.<br><br>Recommended safety distance: |
| Conducted RF disturbances as per EN 61000-4-6 | 3 $V_{effective\ value}$<br>150 kHz to 80 MHz | 3V | $d = 1,17\sqrt{P}$ |
| Radiated RF disturbances as per EN 61000-4-3 | 3 $V_{effective\ value}$<br>80 MHz to 2.5 GHz | 3 V/m | $d = 1,17\sqrt{P}$ for 80 MHz to 800 MHz<br>$d = 2,33\sqrt{P}$ for 800 MHz to 2.5 GHz<br><br>where P is the output power rating of the transmitter in watts (W) according to the transmitter manufacturer's specifications and d is the recommended safety distance in meters (m).<br><br>Field strengths from stationary RF transmitters, as determined by a site survey[a], should be less than the compliance level in all frequency ranges.[b]<br><br>Interference may occur in the vicinity of equipment marked with the following symbol:<br>  |
| Note 1 | At 80 MHz and 800 MHz, the higher frequency range applies. | | |

| Immunity tests | IEC 60601 - test level | Compliance level | Electromagnetic environment - guidelines |
|---|---|---|---|
| Note 2 | These guidelines may not apply in all situations. Electromagnetic propagation is influenced by absorption and reflection by structures, objects and persons. | | |

[a] Field strengths of stationary transmitters such as base stations for mobile telephones and mobile land radio equipment, amateur radio stations, AM and FM radio broadcast and TV broadcast transmitters cannot be theoretically predicted accurately. To assess the electromagnetic environment with respect to stationary RF transmitters, a site study of the electromagnetic phenomena should be considered. If the measured field strength in the location where the device is used exceeds the compliance levels indicated above, the device should be monitored to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the ME equipment or ME system.

[b] Field strengths should be less than 3 V/m over the frequency range from 150 kHz to 80 MHz.

# Recommended safety distances between portable and mobile RF communication equipment and the OPMI® VARIO 700

The OPMI® VARIO 700 is intended for use in an electromagnetic environment in which RF disturbances are controlled. The customer or the user of OPMI® VARIO 700 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communication equipment (transmitters) and the OPMI® VARIO 700, depending on the output power of the communication equipment as specified below.

| Rated output power of transmitter [W] | Separation distance depending on transmission frequency [m] | | |
|---|---|---|---|
| | **150 KHz to 80 MHz** | **80 MHz to 800 MHz** | **800 MHz to 2.5 GHz** |
| | $d = 1,17\sqrt{P}$ | $d = 1,17\sqrt{P}$ | $d = 2,33\sqrt{P}$ |
| 0.01 | 0.12 | 0.12 | 0.23 |
| 0.1 | 0.37 | 0.37 | 0.74 |
| 1 | 1.17 | 1.17 | 2.33 |
| 10 | 3.69 | 3.69 | 7.38 |
| 100 | 11.67 | 11.67 | 23.33 |

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be determined using the equation indicated for each column, with P being the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer's specifications.

| | |
|---|---|
| NOTE 1 | At 80 MHz and 800 MHz, the higher frequency range applies. |
| NOTE 2 | These guidelines may not apply in all situations. Electromagnetic propagation is influenced by absorption and reflection by structures, objects and persons. |

# System combinations

This device can be extended to a tested system with various devices (see accessory equipment in the user manual).

This system combination has been approved by Carl Zeiss.

**CAUTION**

- When setting up an ME system, please make sure to comply with the requirements of EN 60601-1-1: 1990 or EN 60601-1: 2005, Chapter 16, and follow the measures below:
  - Never place multiple connectors on the floor.
  - Never connect any additional multiple connectors.
  - Only connect compatible components to the system.
  - Ensure that you do not exceed the max. permissible load capacity of the multiple connectors.
  - Use multiple connectors only for components which are part of the system.

- Any additional equipment connected to medical electrical devices must demonstrably comply with the applicable IEC or ISO standards (e.g. IEC 60950 for data processing equipment). In addition, all configurations must meet the normative requirements for medical systems (see IEC 60601-1-1 or Clause 16 of the 3rd edition of IEC 60601-1). Anyone connecting additional equipment to medical electrical devices is a system configurer and as such responsible for compliance of the system with the normative requirements for systems.

# Ordering data

Only operate the system with the accessories included in the delivery package and approved by Carl Zeiss. You will find the contact responsible for orders in your country on this website:

www.meditec.zeiss.com

### Eyepieces

| Description | Cat. No. |
|---|---|
| 10x widefield eyepieces | 305542-0000-000 |
| 12.5x widefield eyepieces | 305543-9901-000 |
| 10x widefield eyepieces with reticle | 000000-1023-184 |
| 12.5x widefield eyepieces with reticle | 000000-1023-188 |

### Tubes

| Description | Cat. No. |
|---|---|
| Straight tube f = 170 mm | 303765-0000-000 |
| 2 sleeves for tubes with screw thread | 305542-0107-000 |
| 180° tiltable tube, f = 170 mm | 303791-0000-000 |
| 180° tiltable tube, f = 200 mm | 303792-0000-000 |
| Folding tube f170/f260 (standard) (optional) | 303771-9020-000 |
| Rotary dovetail for binocular tubes | 301007-0000-000 |

### Components for documentation and coobservation

| Description | Cat. No. |
|---|---|
| Stereo coobservation module with two pivot joints | 1063-869 |
| Stereo bridge | 1040-085 |
| Camera adapter f=340 mm T2 | 1022-973 |
| FlexioStill Adapter | 301604-9010-000 |
| Still interface | 301604-9100-000 |
| FlexioMotion adapter | 301604-9050-000 |

| Description | Cat. No. |
|---|---|
| Motion interface | 301604-9500-000 |
| Beam splitter 50/50 (option) | 301513-9902-000 |
| Beam splitter 20/80 (option) | 301503-9901-000 |

### Video / audio cables

The listed S-VHS cables cannot be connected to the integrated OPMI VARIO 700 cameras because no suitable socket is available.

### Video/audio cables (standard definition)

| Description | Cat. No. |
|---|---|
| 1 m BNC-BNC connecting cable (option) | 301687-9100-000 |
| 10 m BNC-BNC connecting cable (option) | 301687-9101-000 |
| 5 m S-VHS mini-DIN connecting cable, 2x 4 pins (option) | 308203-3040-000 |
| 10 m RGB cable (option) for YPrPb | 302681-8740-000 |
| 1.5 m audio cable, CINCH-CINCH (option) | 301687-9103-000 |
| Cable tie set (20 pcs.) (option) | 301687-9106-000 |
| 10 m Video Out Lemo, S-Video connecting cable | 302681-8756-000 |
| 10 m Video In/Out Lemo, connecting cable(option) (only for 3CCD) | 302681-8757-000 |
| BNC cable for HD-SDI | |
| 10 m Component HD YPbPr connecting cable (option) | 308203-3080-000 |
| 2 m S-VHS mini-DIN connecting cable, 2x 4 pins for external SD monitor (option) | 301687-9102-000 |
| 10 m S-VHS mini-DIN connecting cable, 2x 4 pins for recording (option) | 308203-3070-000 |
| 2 m BNC cable set (option) | 301687-9109-000 |

### Video/audio cables (high definition)

| Description | Cat. No. |
|---|---|
| 1 m HD-SDI connecting cable, 75 Ohm, 2x BNC pin (option) | 305989-8762-000 |
| 5 m HD-SDI connecting cable, 75 Ohm, 2x BNC pin (option) | 305989-8763-000 |
| 10 m HD-SDI connecting cable, 75 Ohm, 2x BNC pin (option) | 305989-8764-000 |
| 15 m HD-SDI connecting cable, 75 Ohm, 2x BNC pin (option) | 305989-8766-000 |
| 4 m TRIO 610 extension cable | 308203-2400-000 |
| 2 m DVI monitor cable | 308203-3020-000 |

### Other cables and cable components

| Description | Cat. No. |
|---|---|
| 10 m Ethernet cable, 2x RJ45 | 305946-8660-000 |
| Cable clip | 302581-8675-000 |
| Cable tie set (20 pcs.) (option) | 301687-9106-000 |

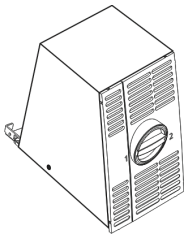
# Further accessories

| Description | Order number |
|---|---|
| MEDIALINK 100 | 308203-2200-000 |
| User manual G-30-1716:<br>"OPMI VARIO 700 on the floor stand" | 000000-1586-434 |

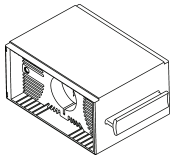
### Foot control panels and connecting cables

| Description | Order number |
|---|---|
| Wired 14 function foot control panel (FCP) | 304970-9015-000 |
| Foot control panel with 14 functions, wireless (FCP WL) | 304970-9020-000 |
| Foot control panel 2, with 14 functions, 6m cable length (optional) | 304979-9020-000 |
| Adapter for FSP II (foot control panel 2) | 305946-8181-000 |
| 3 m cable for 14 function foot control panel (FCP & FCP WL) | 304970-8730-000 |
| 6 m cable for 14 function foot control panel (FCP & FCP WL) | 304970-8760-000 |

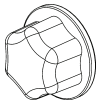
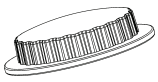
## Consumables



1



2

| Description | Cat. No. |
|---|---|
| Replacement lamp module complete with 2 xenon lamps in transport case and with return card (1) | 304977-9036-000 |
| 300-W xenon lamp (2) | 304949-9001-000 |
| Optics cleaning set | 000000-1216-071 |
| Sterile drapes type 70 | 306070-0000-000 |
| Sterile drapes type 71<br>(only use when AutoDrape option available) | 306071-0000-000 |
| Sterile drapes type 25<br>(only use when AutoDrape option available) | 306025-0000-000 |
| Zeiss sterile drapes, type 26, packet with 5 pcs VisionGuard Drape for OPMI(r) with 2 observation tubes and camera. Extra-long and -wide version. Dimensions: 132 cm x 391 cm<br>(only use when AutoDrape option available) | 306026-0000-000 |
| VisionGuard replacement lenses (sterile, 20/box) | 306001-0000-000 |
|  <br>Asepsis set - sterilizable caps<br>– Internal diameter 12 mm<br>– (pack of 6) | 305810-9002-000 |
|  <br>Asepsis set - sterilizable caps for controls on microscope and for PD adjustment knob on 45° inclined tube<br>– Internal diameter 22 mm<br>– (pack of 6) | 305810-9001-000 |
|  <br>Asepsis set - sterilizable caps<br>– Internal diameter 27 mm<br>– (pack of 6) | 305810-9008-000 |
|  <br>Asepsis set - sterilizable caps for PD adjustment knob on 180° tiltable tube<br>– Internal diameter 51 mm<br>– (pack of 6) | 305810-9003-000 |

# Approval data

### Approvals and requirements

| Description | Labeling |
|---|---|
| Electrical standard | EN 60601-1:2005 |
| | CAN/CSA-C22.2 No. 601.1 |
| | Protection class I, degree of protection IP 20 |
| EMC requirements | The system meets the EMC requirements of EN 60601-1-2:2007, Class A |
| CE mark | The device meets the essential requirements stipulated in Annex I to the Medical Device Directive 93/42/EEC.<br>The system is labeled with CE |

### Approvals and requirements for the optional FCP-WL foot control panel

| Description | Labeling |
|---|---|
| FCC | If a radio module for the optional FCP WL foot control panel is integrated in the device, the device meets the requirements of Part 15 of FCC (Federal Communications Commission, USA) |
| CE mark | If a radio module for the optional FCP WL foot control panel is integrated in the device, the FCP also meets the requirements of EU Directive 1999/5/EC.<br>The device is labeled with: CE 0682 |

# Environmental conditions

**CAUTION** **Observe the storage, transportation and operation conditions.**

**For operation**

| Property | Admissible range |
|---|---|
| Temperature | + 10°C ... + 35°C |
| Rel. humidity | 30 % ... 75 % |

- Do not use power-operated devices included in the delivery package
  - in explosion-risk areas,
  - at a distance of less than 25 cm from inflammable anesthetics or volatile solvents such as alcohol, benzene or similar chemicals.
- Ensure that the installation conditions and the use of the device meet surgical requirements:
  - Low vibration
  - Clean environment
  - Avoidance of extreme mechanical loading
  - The device is not intended for use in environments concentrated with oxygen.
- Do not use or store the system in damp rooms.
  Do not expose the system to water splashes, dripping water or sprayed water.

### For transportation and storage

| Property | Admissible range |
|---|---|
| Temperature | - 20°C ... + 60°C |
| Rel. humidity (without condensation) | 10 % ... 92 % |
| Air pressure | 500 hPa ... 1060 hPa |
| The device is not intended for use in environments concentrated with oxygen. | |

# Annex - (Options)

## Record (integrated video record function over USB port - optional)

# Description

## Normal use

The recording option is used for easy recording of video sequences and single images in clinical applications.

The recorded video and image data can be stored on an external USB storage medium or in a shared directory within a network. The unambiguous, automatic storage of images and videos ensures reliable assignment to the relevant patient.

The recording option is recommended only in combination with a connected video monitor because all control functions (menus) and image details are shown only on the video monitor.

***NOTE***

- The user (IT officer) is responsible for data protection and ensuring that no viruses are transferred to the system via the network connection.
- The user is responsible that the USB stick, which is used for the data exchange, is free of any viruses.

The company Carl Zeiss accepts no liability for any loss of patient, image and video data as well as system or user-specific configuration data. If required, arrange for patient, image and video data as well as all system settings to be backed up by your IT administrator on a regular basis.

## Storage options

– USB storage medium*

– Network PC**

* Only one USB storage medium at a time is supported.

** Archiving in the network must be configured: Menu / Config / Media / Storage Device : LAN configuration.

**Note**

**USB data security!**

USB storage media are not suitable for the permanent storage of patient data. Arrange for data to be backed up on a regular basis by your IT administrator.

– Check the function of USB storage media before use.

– Remove USB storage media only while the live image is displayed (no menu opened, no action, no recording).

– Do not remove USB storage media during Record/Play/Photo/Display/Index/Import.

– Check USB storage media for correct function at regular intervals using a PC.

### Password protection

The use of password protection is the responsibility of the customer or institution operating the device.

– Configurable password protection on system startup. Password protection can only be deactivated after entry of the password.

– User and administrator passwords comprise 4 figures and can be changed.
The factory setting for the user and administrator passwords is "0000" in both cases.

– User password protection can be activated and deactivated.
Factory setting: user password protection is deactivated.

– If password protection is active, the user or administrator password must be entered after startup to permit any functions to be executed.
Various functions (all network settings and the system settings) are only accessible via admin login.

# Video 1/2 button functions

<Record> button

- If you press the button once, video recording is started and the video is saved in accordance with the configuration.
  REC is displayed at the bottom left in the OSD (on-screen display) and the top right of the display; REC ON or REC OFF is shown on the additional display.
- If you press the button again, the current video recording is stopped.
  REC disappears from the display (REC OFF is shown on the additional display).


<Live> button

Closes all open dialogs and aborts all actions except <record>.

- Press the button once to return to the live mode.


<Photo> button

Still images can be created both in the live mode and during video recording or playback.

- Pressing the button once triggers the photo function (display at the top left: Photo) and saves the image in accordance with the configuration.
  Then the live image is displayed again.

<Play> button

- Press the <Play> button or select <Play> in the context menu.
- If you press the button once: "Pause", the current display is shown as a freeze image.
- If you press the button again, the video continues.

<Forward> button (fast forward)

- Press the button once to fast forward the selected video sequence to search it for scenes of interest to you. The sequence is played at a higher speed.
- Press the <Play> button to stop fast forward.

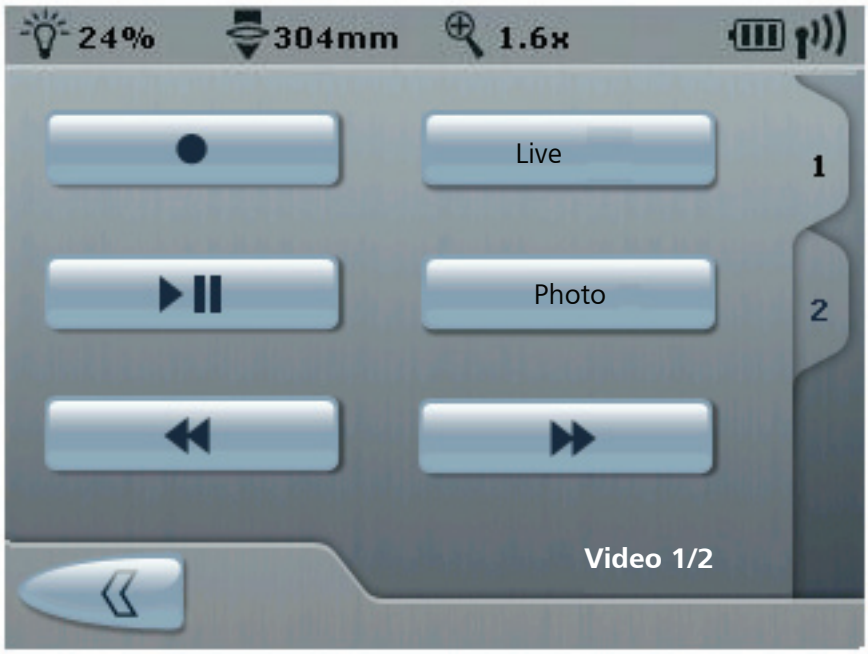
<Reverse> button (fast rewind)

- Press the button once to rewind the selected video sequence to search it for scenes which are of particular importance or interest to you. The sequence is played backward at a higher speed.
- Press the <Play> button to stop fast rewind.

During video recording, the photo function can be used to create additional single images.

These images can also serve as markers. During playback of the video, you can use these marker images to find scenes which are of particular interest to you (see page 254).

You can create further images during playback of the video using the photo function.



# Video 2/2 button functions

<Index> button
Press the button once to display the thumbnail index of the current patient.
Use the control buttons to select a video or image. A blue frame marks the selected file.

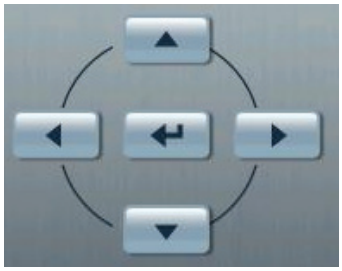
– Press the <Index> button or <menu> button to end the index display.

<N.Pat.> button
Creates a new patient directory on the external storage medium (patient name: Unknown) and uses it as the **current** patient.

<Menu> button
Opens context menus or closes context menus or dialogs.

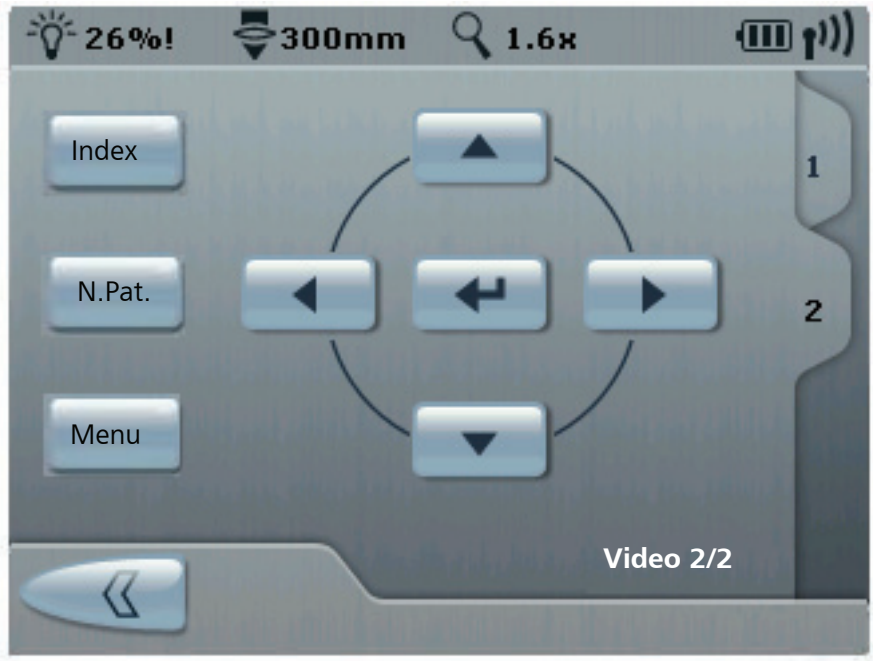
– Press the button once to display the menu in the OSD.

– Press the button again or press the <live> button to hide the menu.



<select> control buttons (cursor buttons)
The < > / ⇕ control buttons permit you to navigate in the menus displayed in the OSD.

<enter> key (<U346> )
Press this button to confirm your selection or to trigger a function.


26%!
300mm
1.6x
Index
N.Pat.
Menu
1
2
Video 2/2

# Menu functions on the video monitor

You can enter all system-relevant data in a configuration menu where they can be saved.

You have the possibility of writing your saved system settings to a USB medium or to load them from this medium to the system. (This provides an easy method of identically configuring several devices in a hospital).

**Config menu**

- Use the < >control keys to navigate between the submenus: (Media < > User < > Network < > System).
- Use the ⇕ control buttons to navigate within the submenus.

<Media>

**1** Selection of the supported video and image formats

**2** Freeze image function

**3** Selecting the storage device

**4** <Auto Delete Mode>
This mode is enabled, data cannot be assigned to a patient, but are saved to a neutral folder. Files older than 3 days are automatically deleted.
To change to a patient, must be disabled.

**5** Audio - Recorder - Player
Setting the microphone sensitivity and playback volume. The audio signal is automatically output when the MPEG video is played back via a player.

Videos recorded without sound can only be played back without sound.


4 - Live
Unknown
11:24
Config
Media
User
OSD
Network
System
Image format:
JPEG
TIFF
Storage Device
USB
LAN
Freeze
Auto Delete Mode
Sound
Recorder:
Player:
Sound
Sound
Volume:
-
50%
+
Volume:
-
50%
+
USB
17:35:50
1
2
3
4
5

<User>

**6** Language selection for OSD text
OSD is always in English, only the language of menus and dialogs is selectable.

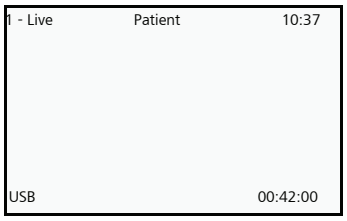
**7** Sounds
Activating/deactivating the notification sound, confirmation sound

**8** Passwords (password protection see page 229)
A password prompt can be activated to restrict system access to authorized persons.

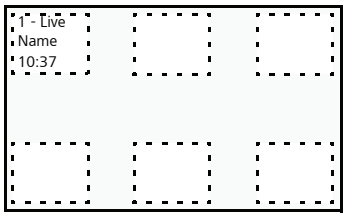
<OSD>

**9** OSD position
Selecting the text box position on the optional 17" video monitor:

17" video monitor



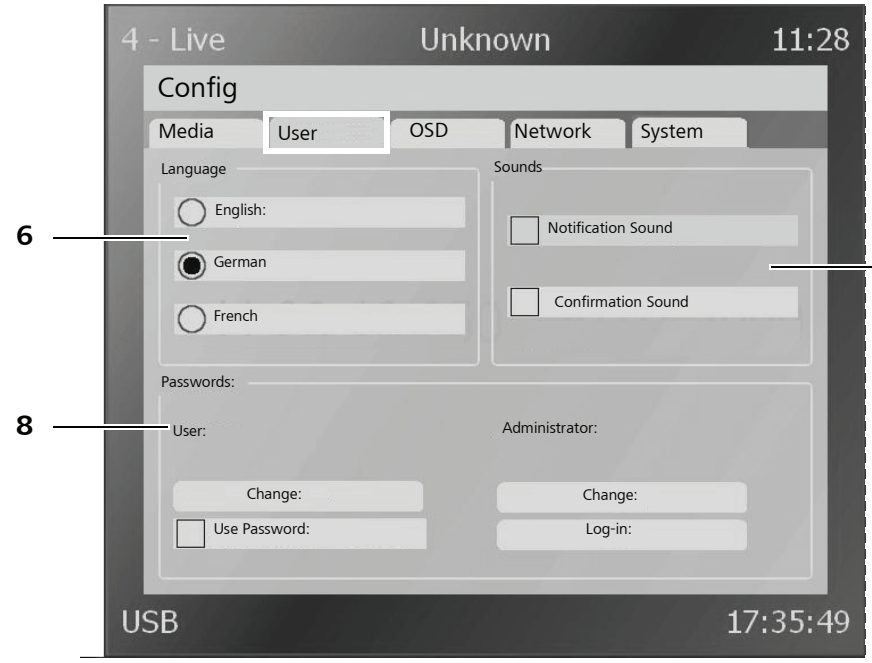

– Standard display

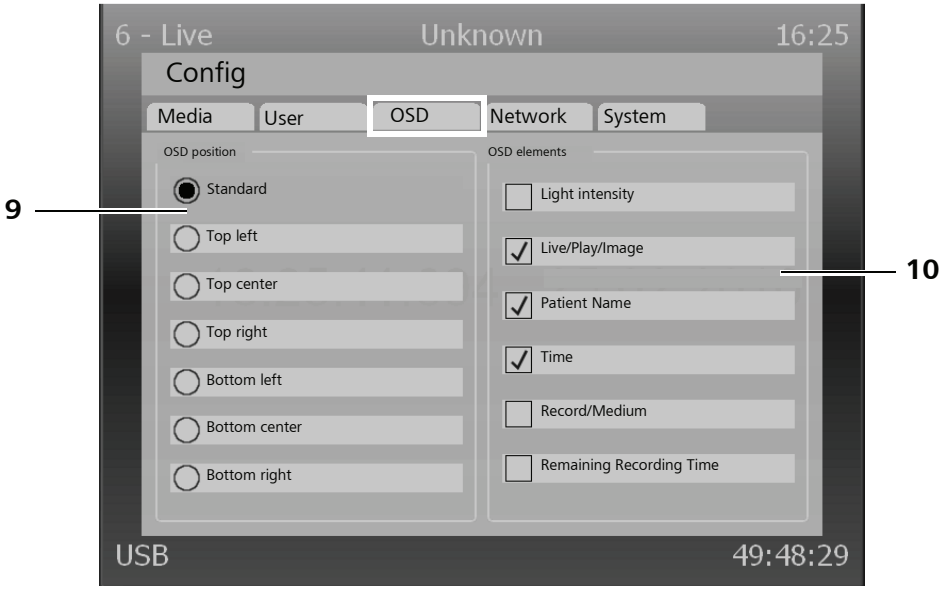



– Position selection:
Three OSD elements can be displayed in three lines at six different positions:
Top left - center - right; bottom left - center - right

**10** OSD elements
You can select three OSD elements which can be displayed in three lines, one below the other, at six different positions.

The light value is automatically updated on the display when changes are made on the microscope.


4 - Live
Unknown
11:28
Config
Media
User
OSD
Network
System
Language
English:
German
French
Sounds
Notification Sound
Confirmation Sound
Passwords:
User:
Administrator:
Change:
Use Password:
Change:
Log-in:
USB
17:35:49
6
7
8


6 - Live
Unknown
16:25
Config
Media
User
OSD
Network
System
OSD position
Standard
Top left
Top center
Top right
Bottom left
Bottom center
Bottom right
OSD elements
Light intensity
Live/Play/Image
Patient Name
Time
Record/Medium
Remaining Recording Time
USB
49:48:29
9
10

<Network>

To configure the network settings, you must log in as "Administrator": (Config/User/Passwords/Login). (Config/User/Passwords/Login).

**11** IP settings

MAC address

The MAC address (Media Access Control address) is the hardware address of each individual network adapter that is used for the unambiguous identification of the device in a computer network, if required.

DHCP

DHCP enables the automatic network integration of a new computer into an existing network without the need for its manual configuration. All that normally needs to be done on the client is setting the automatic reference of the IP address. Confirm the IP settings by clicking on "Apply" to make them effective.

When "Apply" is activated under IP Settings, Share is automatically disabled.

- Check the share parameters, as they may need to be adapted. Click on "Apply" again to activate them.

**12** Share

The video and image data recorded can be stored in a shared directory on a PC connected to the network.

Requirements for the connection of the archiving PC (client-server)

– You need Admin rights.

– **You need the Ethernet data** of the archiving PC (Run \cmd\ipconfig) to configure the record option.

– Create a new user (name/password) in user accounts under which you want to save the recording data.

- Enter the necessary PC attributes in the Share dialog and click "Apply" to enable the connection.


4 - Live
Unknown
11:35
Config
Media
User
OSD
Network
System
IP Settings
MAC: 00:20:0d:fc:20:08
Dhcp
IP Address
Subnet Mask
Standard Gateway
Apply
Share
Host IP
Ping
Networkshare Name
Workgroup
User Name
Password
Apply
USB
17:35:49
11
12

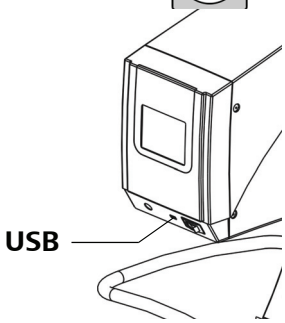
<System>

To perform the system settings, you have to log in as administrator: (Config/User/Passwords/Login).

**13** Export/Import

You have the possibility of exporting your saved system settings to a USB medium ("Export Config") and importing these system settings to a different system ("Import Config").
This provides an easy method of identically configuring several devices in a hospital.
All passwords including the administrator password are also overwritten by the new values. Make sure to use current (known) data.

Exporting logfiles (no administration rights required)
Automatically generated logfiles can be saved on a USB stick/HDD as a password-protected ZIP archive and sent to Carl Zeiss Service for evaluation.




**14** Special

The installed software version is displayed.

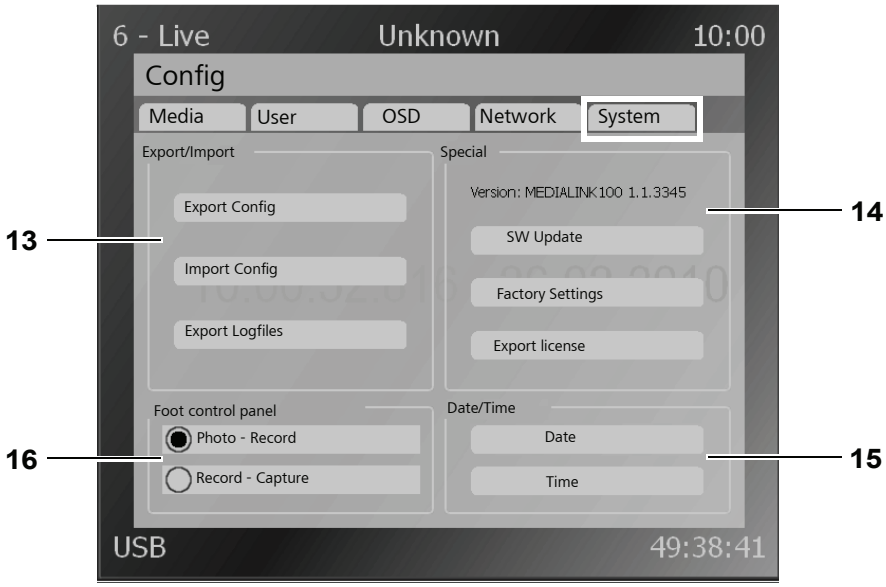
- Software update
  A software update can be performed via a USB data medium.
  Old system configurations are retained in this process.
- Factory settings
  The configuration is reset to the factory settings.
  The passwords are also reset.
- Export license
  creates a license file on the USB stick/HDD.
  A ZIP archive providing information on the licenses is stored on the USB stick/HDD (without password protection).

**15** Setting the date and time

- Set the date → yyyy/mm/dd
- Set the time → hh:mm

**16** Foot control panel

- Photo - Record
- Record - Capture


6 - Live
Unknown
10:00
Config
Media
User
OSD
Network
System
Export/Import
Export Config
Import Config
Export Logfiles
Special
Version: MEDIALINK100 1.1.3345
SW Update
Factory Settings
Export license
Foot control panel
Photo - Record
Record - Capture
Date/Time
Date
Time
USB
49:38:41
13
14
15
16

# Network interface - overview for networking

- Data can be stored in a shared directory on a host computer.
- It is possible to store image and video data in a network and to access this data.
- Patient data can be imported from a shared directory on a host computer.
  - Software programs from other manufacturers can create and read patient-related folders.
- The option can be automatically or manually configured for IP networking.
- The parameters for network access are factory-set.
- The host computer and the shared directory must be manually configured.

**Host computer**

- Fixed identification is required.
  - The IP address of the host must be known to enable its configuration.
  - The host computer must have a fixed IP address.
- A shared directory is created.
  - The directory must be approved and enabled for shared use.
  - This is done via Microsoft Windows file and printer sharing and the TCP/IP protocol.
- The access parameters used for the shared directory must be the same as those configured in the option.
  - Administrator rights are required for the correct setting of the shared directory.
  - User, password and the full access authorizations for the shared directory must be set.
  - The default parameters of the option can be used.

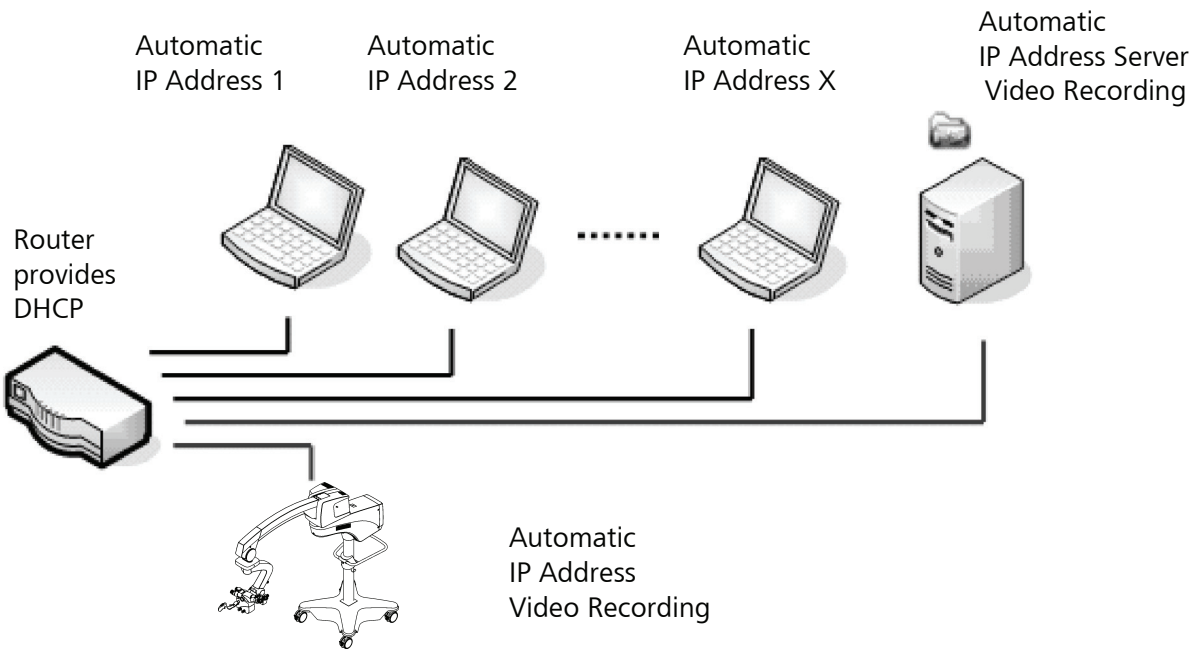
**Network**

- Ethernet LAN with 100 Mbit/s must be available.
  - OPMI VARIO 700 is optionally equipped with a RJ45 Ethernet connector.
- A DHCP service can be available.

  - The network parameters need not be manually configured.
- Some networks are subject to increased security.
  - The MAC address of a connected device may have to be entered manually.
  - Users may be automatically blocked after incorrect authorization.

**USB interface**

The read and write speeds of the USB 2.0 storage medium must be higher than 5 MBytes/s.



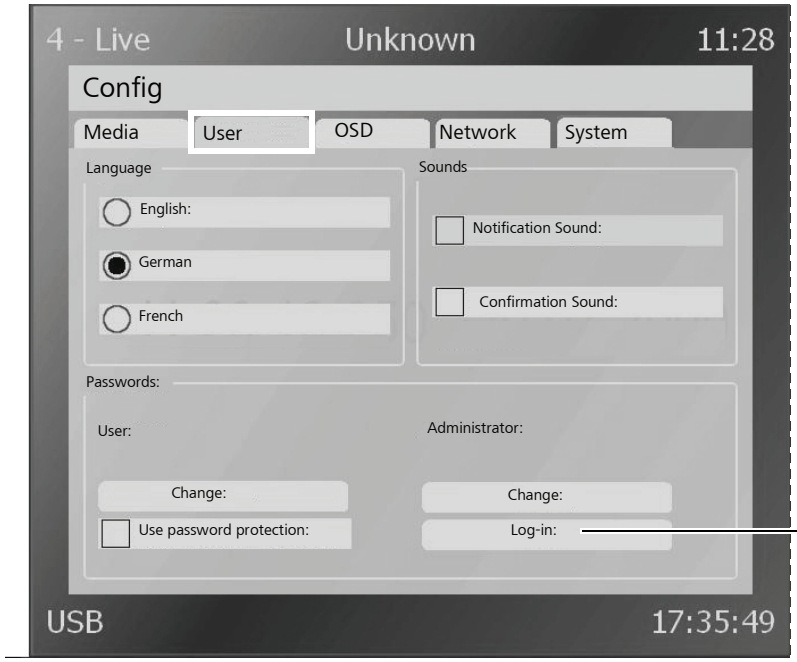
## Configuring the device

For the connection of your recording option to your network, admin rights may be required to be able to create the shared directory and the user account. Make sure that you have admin rights for the computer that you want to configure for networking with the recording option. Otherwise, please contact your system administrator before proceeding.

If your network connection with the host computer is protected by a firewall or another safety feature, please contact your system administrator. If you do not wish to use the factory-configured network settings of the recording option, you have to log in as administrator in the recording configuration mask before proceeding. The preset admin password is “0000” (4x zero, no quotation marks).

*Logging in as administrator*

- Press the MENU button.
- Select the menu item CONFIG.
- Navigate to the User tab.
- Select Login (1) to log in as administrator and to be able to access the network and system settings.


4 - Live
Unknown
11:28
Config
Media
User
OSD
Network
System
Language
English:
German
French
Sounds
Notification Sound:
Confirmation Sound:
Passwords:
User:
Administrator:
Change:
Use password protection:
Change:
Log-in:
USB
17:35:49
1

## Configuring your computer for networking

*Creating a directory*

The record function writes video and image data to a directory specified by you on your computer.

- Create a directory in your computer to which the videos and images should be written.
  Make sure that the user account has both read and write access to the shared directory on your computer.
- Grant network access rights for the newly created directory so that the record function in the network has access to it.

The record function has been factory-set such that it looks for a shared directory named “medialink” (no quotation marks). If your shared directory has a different name, this name must be changed in the configuration menu for the record function on the display.

*Creating a user account*

To enable the record function to access the shared directory created by you, it must be able to log in to your computer. At the factory, user name “MEDIALINK” and password “MEDIALINK” have been preset for the record function (both in uppercase letters without quotation marks).

- Create a user account on your computer using this name and password, or use a different account. If you use a different user account or password, you must change the default settings in the configuration screen accordingly.
- Always press the “Apply” button to save changes.


4 - Live
Unknown
11:35
Config
Media
User
OSD
Network
System
IP Settings
MAC: 00:20:0d:fc:20:08
Dhcp
IP Address
Subnet Mask
Standard Gateway
Apply
Share
Host IP
Ping
Networkshare Name
Workgroup
User Name
Password
Apply
USB
17:35:49

### Connecting the record function to your network

The recording option has been preset in such a way that DHCP is enabled for networking. As a result, the connection to most networks accepting this configuration type is possible without any problems.

- Connect the device to your network via the LAN connector on the connector panel.

  → If your network has been configured to accept DHCP and if no limitations exist, it should assign a unique IP address to the device.

- If there are any limitations in your network so that only specific MAC addresses are accepted, you have to configure your switch or router in such a way that it accepts the MAC address of the device. The illustration "IP settings" shows where you can find this information. The MAC address of the device (recording option) is indicated at the top left of this mask.
- If your network does not support DHCP or if you want to assign a fixed IP address to the device, remove the checkmark for DHCP and enter the IP address data as shown in the illustration "IP settings". Make sure that the IP address, subnet mask and default gateway are correctly set in accordance with your network requirements.
- Press the “Apply” button in the recording menu on the disüplay for your changes to become effective!

### Configuring the connection to your computer

After connecting the OPMI Vario 700 to the network and successfully setting all network parameters, you need to configure the record function so that it knows which computer has been set up for file sharing.

- Enter the IP address of the computer in the Host IP box on the configuration screen for the record function (Fig. "IP setting"). The preset host IP address is 192.168.0.1.
- Test the connection by pressing the Ping button.

  → If the IP address is correct and the computer replies to Ping queries, you will receive a positive confirmation.


4 - Live
Unknown
11:35
Config
Media
User
OSD
Network
System
IP Settings
MAC: 00:20:0d:fc:20:08
Dhcp
IP Address
Subnet Mask
Standard Gateway
Apply
Share
Host IP
Ping
Networkshare Name
Workgroup
User Name
Password
Apply
USB
17:35:49

### Presetting the storage device: USB or LAN

If you want the recording function to store images and videos by default in the network configured by you, you have to set the appropriate configuration in the configuration menu. The USB medium is the default (factory-set) storage device (see illustration "Selecting the storage device").

- Select the USB storage option if the data should be saved to a USB storage medium.

### When the device is ready for operation ...

When all changes have been saved and LAN has been preset as your storage device, the recording device tries to log in to the computer which you configured with the user account and password as described above. If the login is successful, a folder for the current patient is generated in the shared directory which you created. All recorded images and videos are saved here at the moment when they are captured.

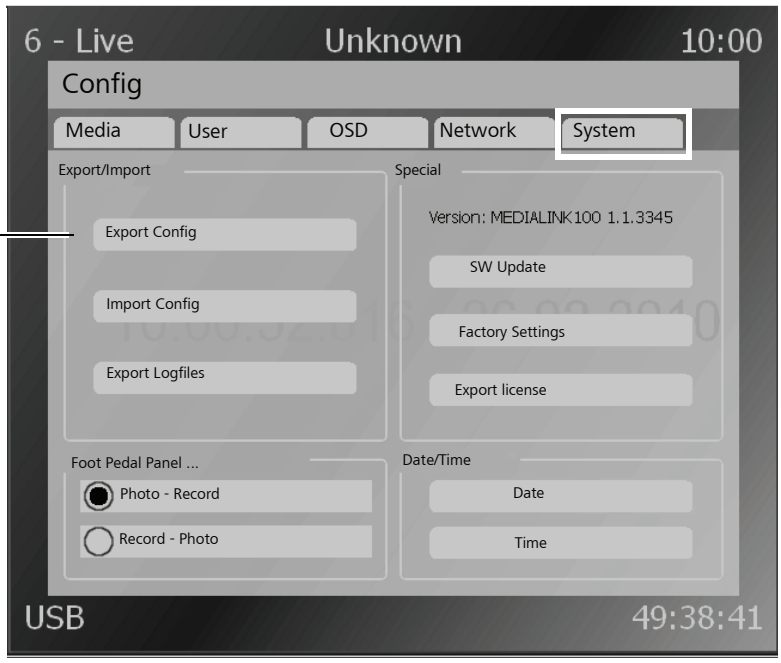
*Saving the configuration*

If the transfer of images and videos works perfectly, we recommend saving your configuration to a USB medium. In the unlikely event of a malfunction, you can use this configuration data to restore the system and your settings (including the network configuration) after repair or replacement of the device.

- To save your configuration, simply insert the USB medium and select the "Export Config" option (2).


4 - Live
Unknown
11:24
Config
Media
User
OSD
Network
System
Image format:
JPEG
TIFF
Storage Device
USB
LAN
Freeze
Auto Delete Mode
Sound
Recorder:
Player:
Sound
Sound
Volume:
-
50%
+
Volume:
-
50%
+
USB
17:35:50

1


6 - Live
Unknown
10:00
Config
Media
User
OSD
Network
System
Export/Import
Special
Export Config
Version: MEDIALINK100 1.1.3345
SW Update
Import Config
Factory Settings
Export Logfiles
Export license
Foot Pedal Panel ...
Date/Time
Photo - Record
Record - Photo
Date
Time
USB
49:38:41

2

## Video option checklist

- Always check the following points (without the patient) before using the device:
  - The OSD (on-screen display) on the monitor functions correctly.
  - A USB storage medium has been connected and detected, or the network connection has been set up.

# Recording photos or videos

## Recording photos

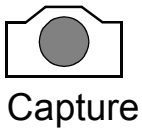
**1** Live image

**2** Photo function: (<Photo> button)

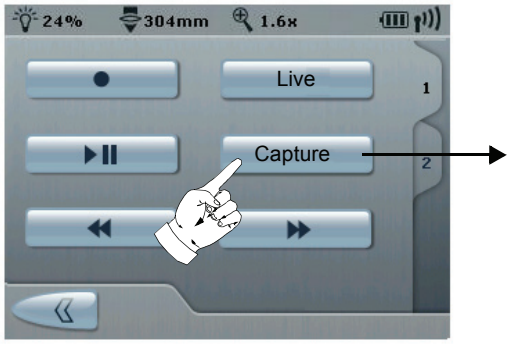
- Press the <Photo> button once; the image is displayed for approx. 2 seconds and saved in the graphic index of the current patient (3). Then the live image is displayed again.
- Active freeze image:
  Press the <Photo> button once, the live image is frozen.
  Press the <Photo> button once again; the displayed image is saved (3), then the live image appears again.
- No saving: press the <Live> button, the live image is displayed again.

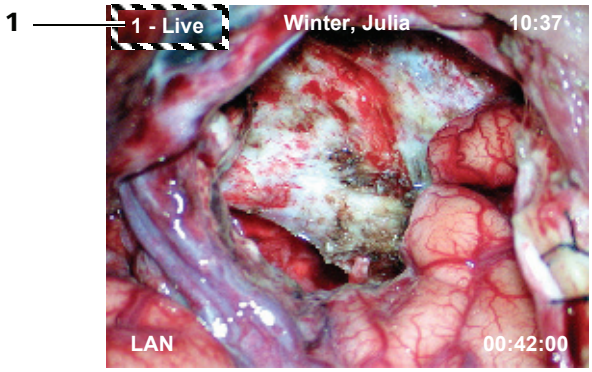
**3** <Index>
Graphic index of the current patient.

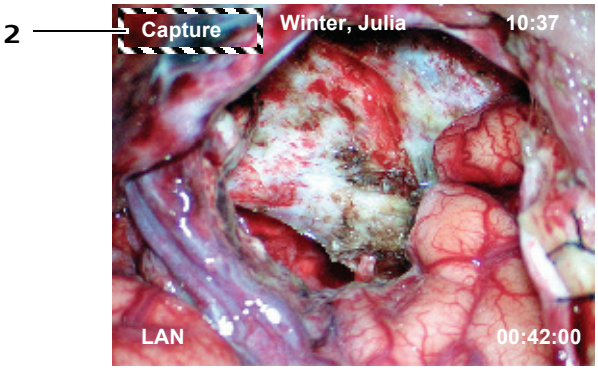
## Recording images

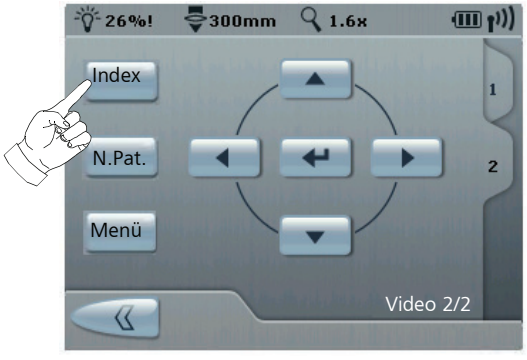


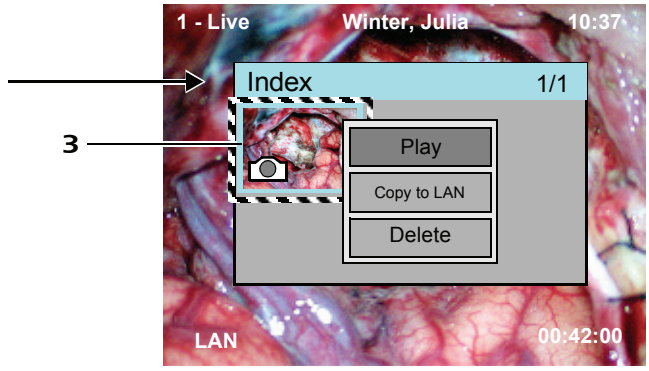
Capture



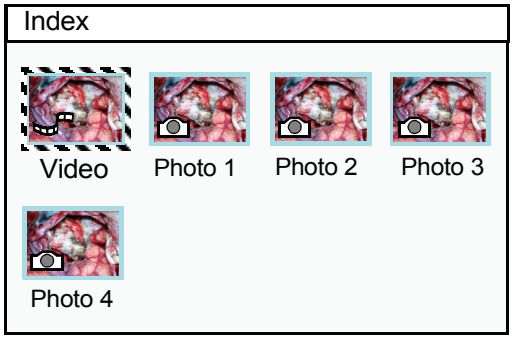
# Recording videos

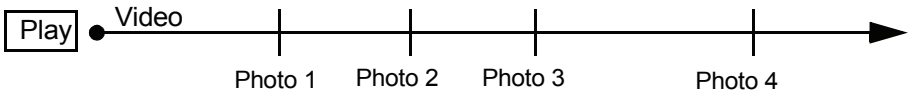
Video function: (<Record> button)

- Press <Record> once to start the video (rec),
  the video is saved in the graphic index of the current patient (1).
- Press <Record> again to stop the video.

**1** <Index>
Graphic index of the current patient.

During video recording, the photo function can be used to create additional single images (e.g. Photo 1 - Photo 4). These images can also serve as markers.

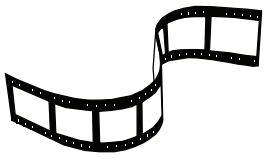


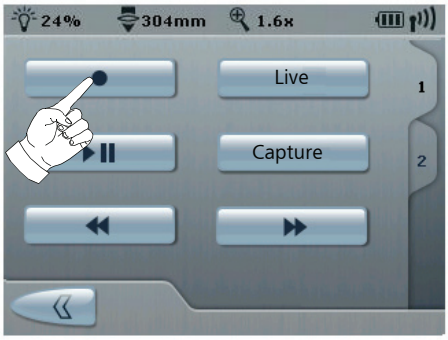



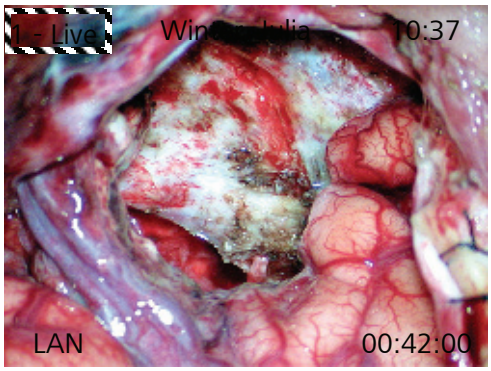

During video playback, the marked positions (e.g. Photo 1 - Photo 4) can successively be accessed using the cursor buttons ( ⇕ ) on the control panel or the remote control ( ⇕ ).

## Recording videos

Record

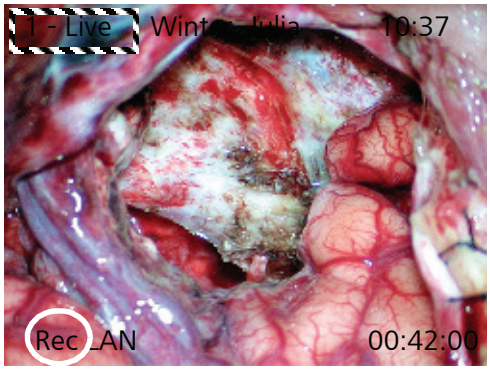


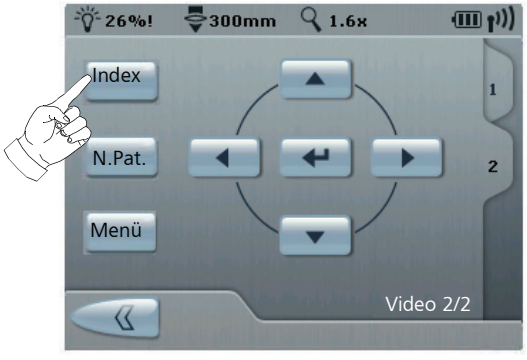


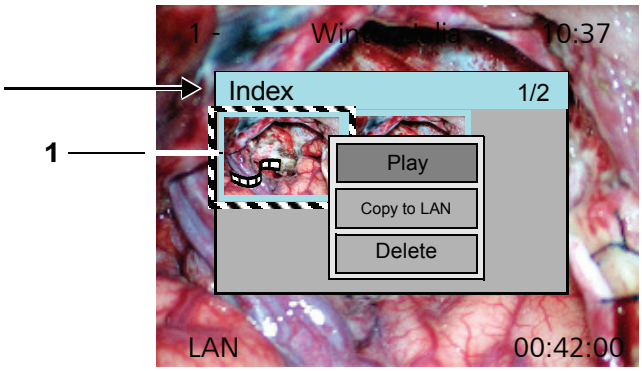




Press 1x → recording (>Rec<) is started

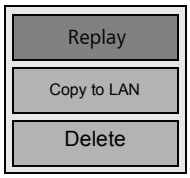
**Press again → recording is stopped**



# Viewing images/ videos



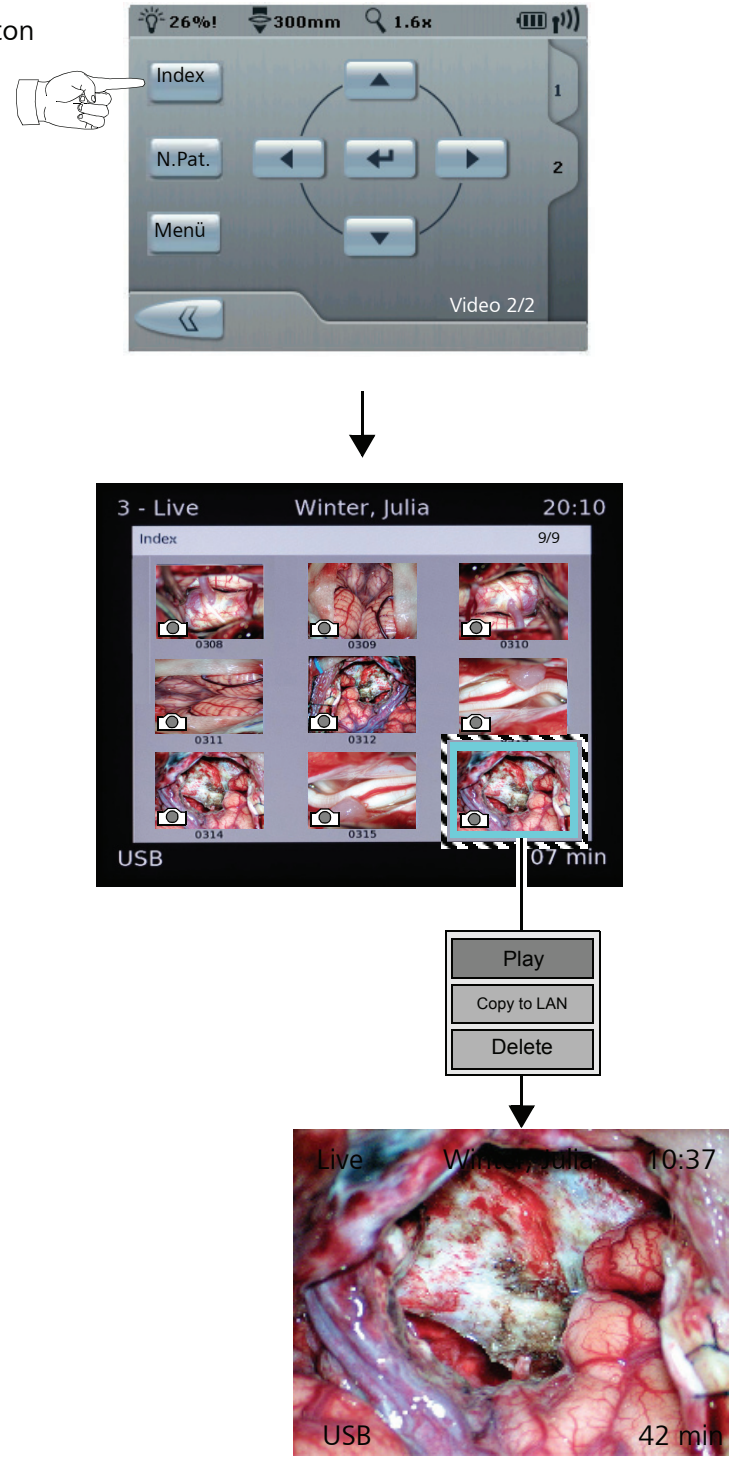

<Index> Graphical index of the current patient

- Press once for the graphical index of the current patient.
  A video or image is selected with cursor buttons < > . The blue frame denotes the object selected.
- Clicking the object opens a context menu to display, copy or delete the object.

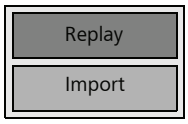
  USB or LAN must be configured beforehand as the storage location: Menu / Config / Medium / Storage location : USB or LAN.

## Viewing images / videos

Press the Index button



# Importing images/ videos

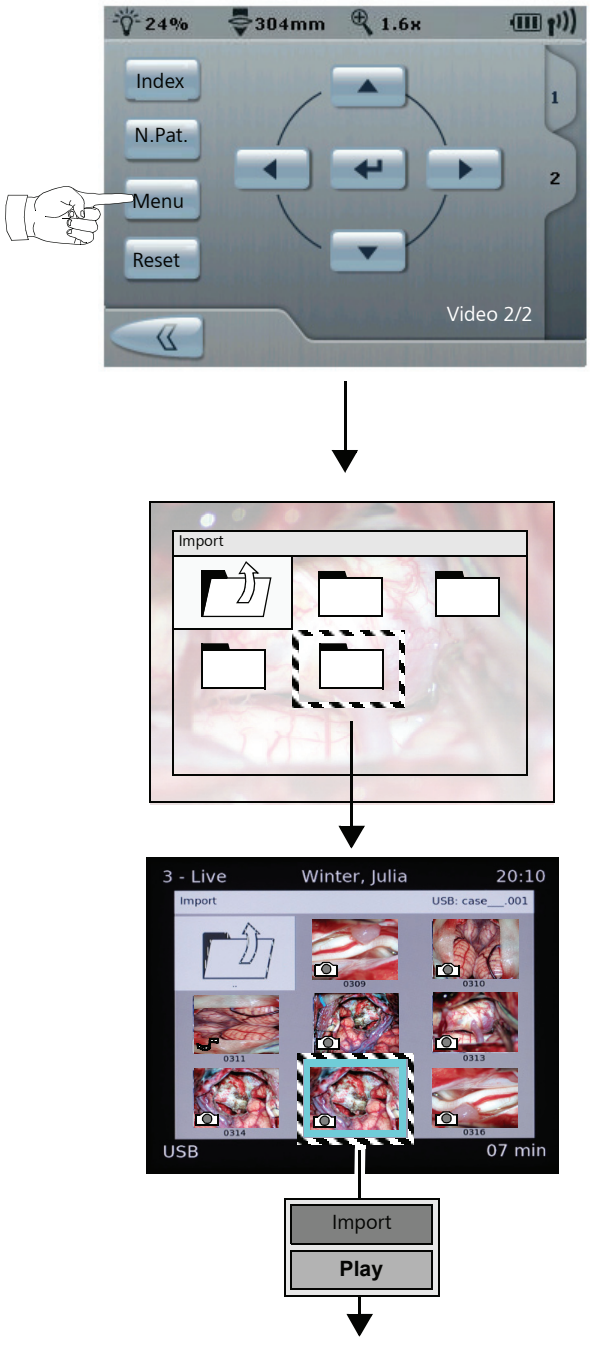



Import (<menu> button)
displays all the files of the non-active storage location (USB or LAN)

- Press the <Menu> button, open <Menu>, open <Import>
- Select the folder with <Enter> to access the graphical index of the current folder.
  A video or image is selected with cursor buttons < > . The blue frame denotes the object selected.
- Pressing <Enter> above the object opens a context menu for displaying or importing the object.

# Importing images/videos

Press Menu button

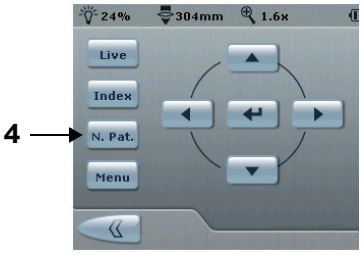


# Managing patient data

– Use the < >control buttons to navigate between the following actions: (Select, New, Filter, Rename, Delete).

– Use the ⇕ control buttons to navigate within the submenus.

### Creating a new patient




Using the <New Patient> key on the front panel

- Press <New Patient> key (4).
  A new patient directory "Unknown" is created on the external storage medium and used as the **current** patient.
  You can change the patient name (see Renaming the patient).

Using the patient menu

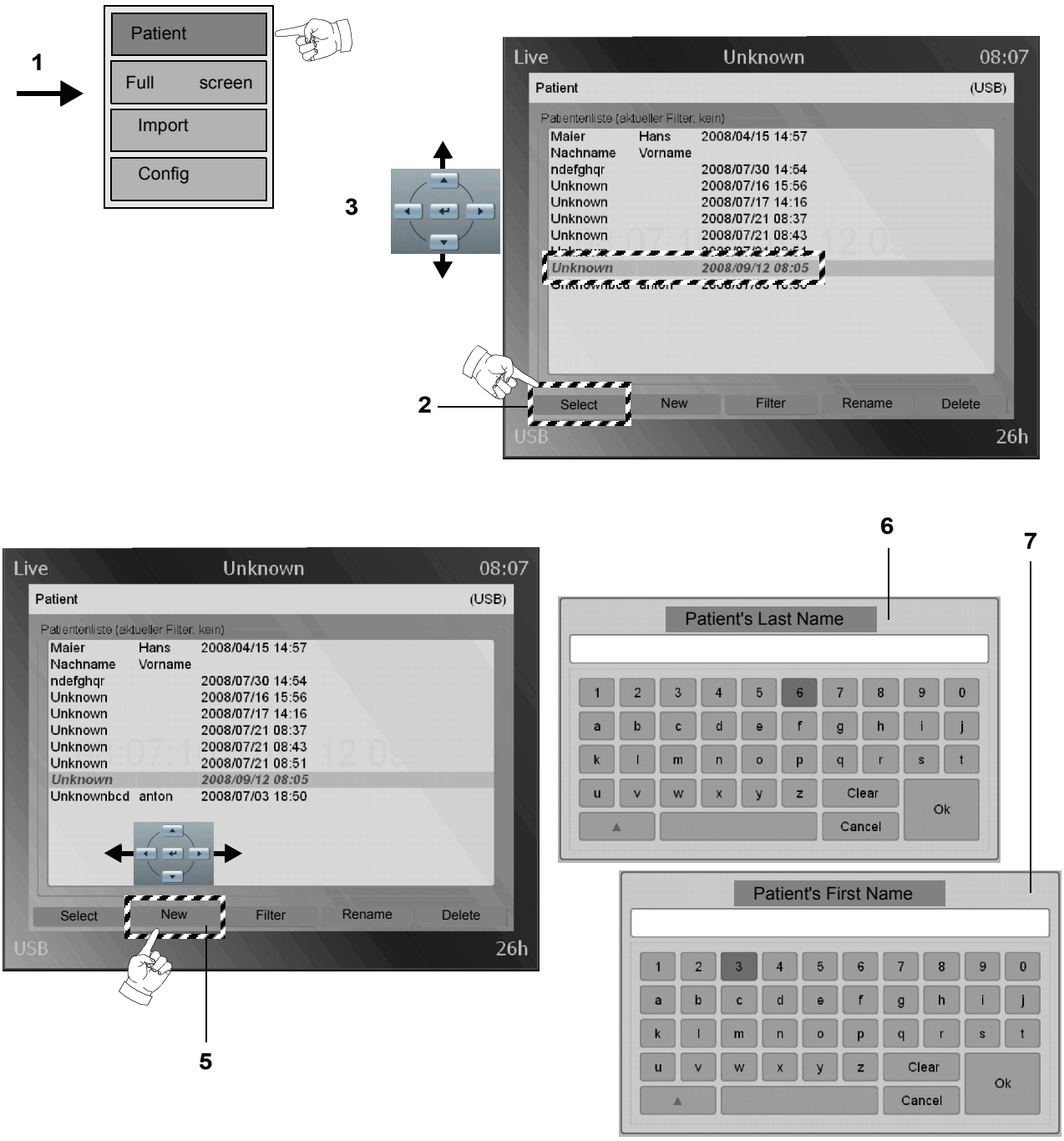
- Open <Menu> (1).
- Open <Patient> menu (2) using the ↵ button or the <Enter> button.
- Select the <New> submenu (5) using the < > control keys and confirm your selection with the ↵ key or <enter> key.
- Enter the patient's last name (6) and first name (7) via the keyboard displayed on the screen using the cursor buttons ( < > or ⇕ ).

### Selecting a patient

- Open <Menu> (1).
- Open <Patient> menu (2) using the ↵ button or the <Enter> button.
- Select <Patient> using the ⇕ control buttons (3).
- Confirm your selection by pressing the ↵ button or <enter> button.

Opening the <Patient> menu via the keyboard (option)

- Open <Menu> by pressing the enter key.
- Open the <Patient> menu using the enter key.
  – Use the < > keys of the keyboard for your selection in the submenu and confirm using the enter key.
  – Or: select <Patient> using the ⇕ keys of the keyboard.


1
Patient
Full screen
Import
Config
3
Live
Unknown
08:07
Patient
(USB)
Patientenliste (aktueller Filter: kein)
Maier Hans 2008/04/15 14:57
Nachname Vorname
ndefghqr 2008/07/30 14:54
Unknown 2008/07/16 15:56
Unknown 2008/07/17 14:16
Unknown 2008/07/21 08:37
Unknown 2008/07/21 08:43
Unknown 2008/09/12 08:05
2
Select
New
Filter
Rename
Delete
USB
26h
Live
Unknown
08:07
Patient
(USB)
Patientenliste (aktueller Filter: kein)
Maier Hans 2008/04/15 14:57
Nachname Vorname
ndefghqr 2008/07/30 14:54
Unknown 2008/07/16 15:56
Unknown 2008/07/17 14:16
Unknown 2008/07/21 08:37
Unknown 2008/07/21 08:43
Unknown 2008/07/21 08:51
Unknown 2008/09/12 08:05
Unknownbcd anton 2008/07/03 18:50
Select
New
Filter
Rename
Delete
USB
26h
5
6
Patient's Last Name
1 2 3 4 5 6 7 8 9 0
a b c d e f g h i j
k l m n o p q r s t
u v w x y z Clear
Cancel
Ok
7
Patient's First Name
1 2 3 4 5 6 7 8 9 0
a b c d e f g h i j
k l m n o p q r s t
u v w x y z Clear
Cancel
Ok

**Searching for a patient (filter function)**

- Press the <Menu> button, open <Menu> (1).
- Open the <Patient> menu using the ↵ button or the <Enter> button.
- Select <Filter> submenu (8) using the < > control keys.
- Confirm your selection by pressing the ↵ button or <Enter> button.
- Select the filter setting using the ⇕ control buttons (9).
  - If you select <No Filter>, all patients are displayed.
  - Depending on the selected range, the relevant patients are displayed.

**Renaming a patient**

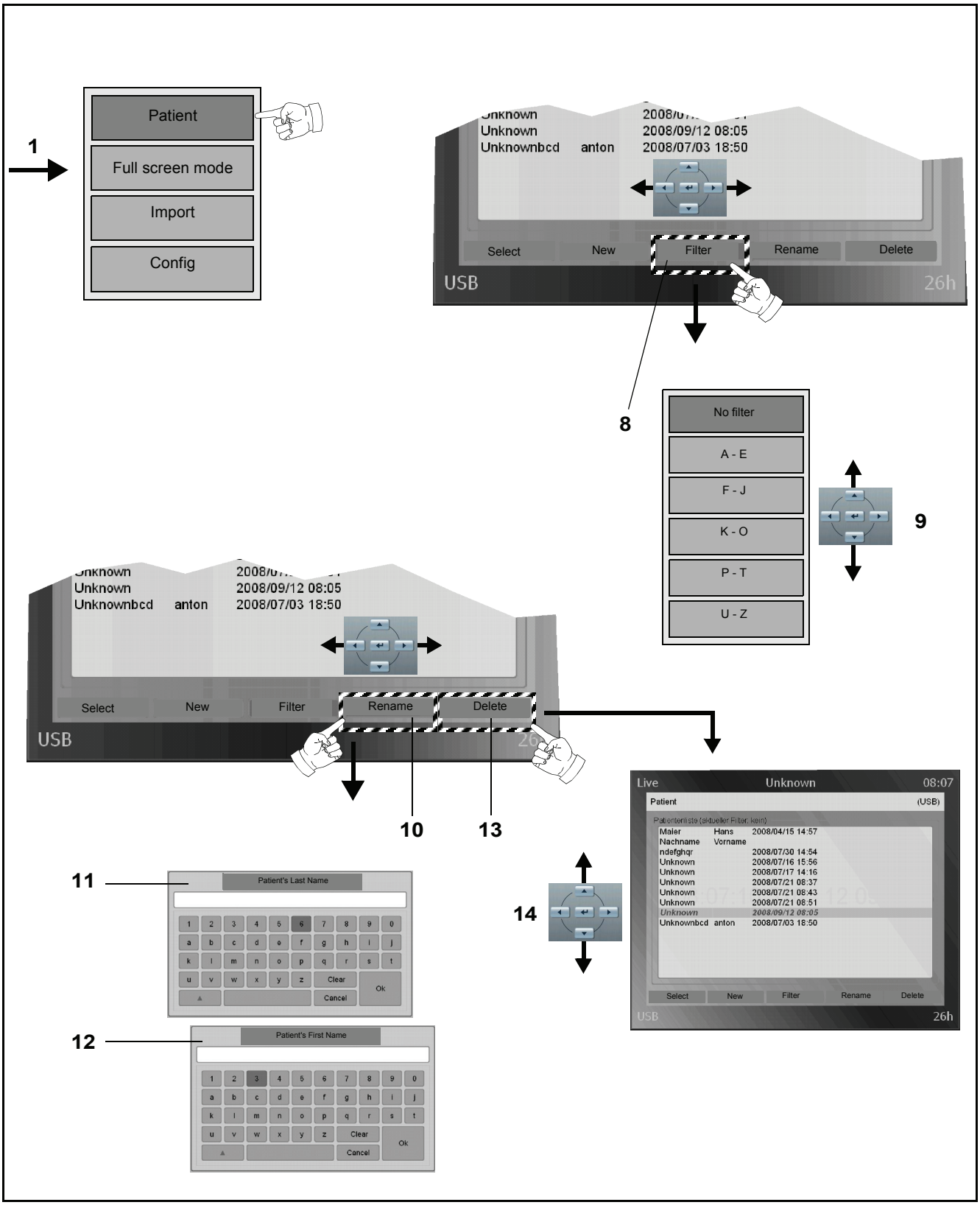
- Open <Menu> (1).
- Open the <Patient> menu using the ↵ button or the <Enter> button.
- Select <Rename> submenu (10) using the < > control keys.
- Confirm your selection by pressing the ↵ button or <Enter> button.
- Edit the last name (11) and first name (12) via the respective keyboard in the OSD.

**Deleting a patient**

- Open <Menu> (1).
- Open the <Patient> menu using the ↵ button or the <Enter> button.
- Select <Delete> (13) using the < > control buttons.
- Confirm your selection by pressing the ↵ button or <Enter> button.
- Select the patient to be deleted using the ⇕ control buttons and delete the patient (14).

  An inquiry is displayed, asking whether you really want to delete the patient.

The current patient cannot be deleted.
If you try to delete the current patient, the following message appears:
The current patient cannot be deleted!


1
Patient
Full screen mode
Import
Config
Unknown
Unknown 2008/09/12 08:05
Unknownbcd anton 2008/07/03 18:50
Select
New
Filter
Rename
Delete
USB
26h
8
No filter
A - E
F - J
K - O
P - T
U - Z
9
10
13
11
Patient's Last Name
12
Patient's First Name
14
Live
Unknown
08:07
Patient
(USB)
Maier Hans 2008/04/15 14:57
Nachname Vorname
ndefghqr 2008/07/30 14:54
Unknown 2008/07/16 15:56
Unknown 2008/07/17 14:16
Unknown 2008/07/21 08:37
Unknown 2008/07/21 08:43
Unknown 2008/07/21 08:51
Unknown 2008/09/12 08:05
Unknownbcd anton 2008/07/03 18:50

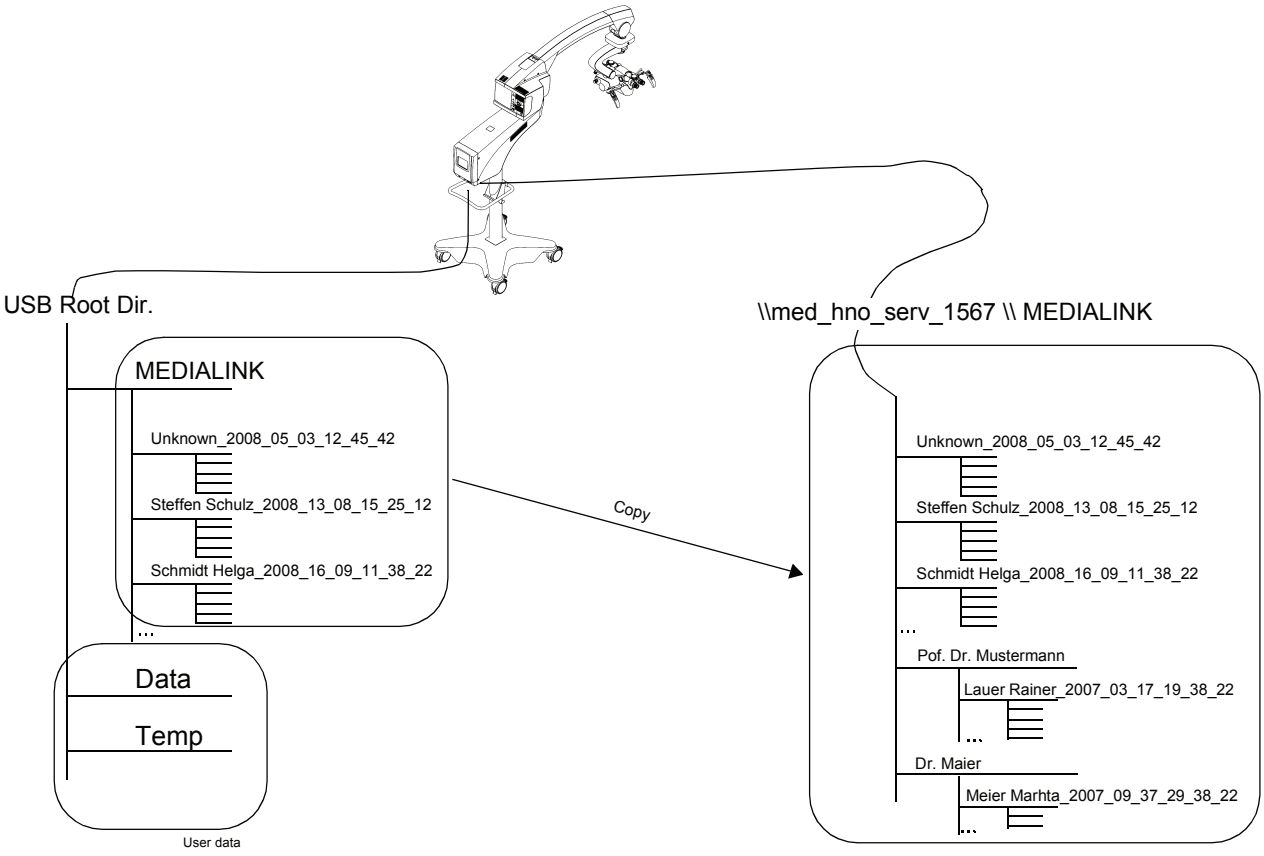
The image and video files are stored on the USB storage medium according to the following folder structure.

– Under the root directory, a directory named "MEDIALINK“ is created.

– Under the "MEDIALINK“ directory, the patient directories are created.

– All data collected during the session is filed in a patient directory (structured according to family name/first name) until a new patient is created or the device is switched off and back on again.

  The network drive is a shared directory whose name is assigned by the IT administrator of the hospital or office. This directory name is used in the same way as the "MEDIALINK“ directory of the USB storage medium.



# Importing patient data

The user can import videos and images with the supported formats (MPEG2 Standard, JPG, TIF;no MPEG4, H264, AVI, ... ) to an active patient folder. An Explorer is displayed for this purpose, permitting the import of individual files from a USB storage medium.
This data can be copied to a patient folder in the network (LAN).

The contents of the non-active storage medium (if connected) is displayed. Image and video files can be copied from there.

Simultaneous import is possible only from one storage device.The FAT32 and NTFS formats are supported as file systems.

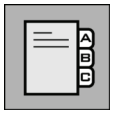
JPG files with up to 8 Mpixels and TIF images with up to 2 Mpixels can be displayed as thumbnail or image. For larger images, a fallback image is displayed.

# Exporting patient data

Images and videos can be copied to a connected USB stick using “Copy to USB” (e.g. for patients to take with them).


- Insert a USB stick in one of the USB ports.
- Use the < > control keys to select the required files in the <Index> menu. A blue frame marks the selected file.
- When you click on the file, a context menu is opened.
- Select "Copy to USB“, to copy the selected data to the USB stick.

# Indexes



## List of technical terms

| Term | Explanation |
|---|---|
| Apochromatic optics | Optical system with maximum correction of chromatic aberration |
| Drapes | Sterile covers for surgical microscopes |
| Depth of field | Range of depth that appears sharply defined through the microscope |
| Radiation intensity | Radiation incident or emitted at right angles per unit time and unit area. |

## List of abbreviations

| Term | Explanation |
|---|---|
| BEV | German acronym for "**special emergency backup power supply**" |
| BNC | **B**ayonet **N**eill **C**oncelmann<br>(Coaxial bayonet-locking connector for high frequencies, named after its inventor) |
| CCD | **C**harge **C**oupled **D**evice Technology<br>(optical sensor) |
| CE | **C**ommunauté **E**uropéenne (European Community) - The manufacturer declares that the device complies with the directives of the European Union. |

| Term | Explanation |
|---|---|
| CSA | **C**anadian **S**tandards **A**ssociation - non-governmental organization that tests and certifies product safety |
| D.o.F. | **D**epth **o**f **F**ield - depth of field management system |
| DPT | Diopters (refraction power of optical system) |
| DVI | **D**igital **V**ideo **I**nterface<br>(digital interface for video data) |
| EMC | **E**lectro**m**agnetic **C**ompatibility - defines non-interference of electrical and electronic devices with their environment |
| EN | **E**uropean **N**orm (European Standard) |
| CVBS | **C**olor **V**ideo **B**aseband Signal<br>(television signal for color picture transmission) |
| FDA | **F**ood and **D**rug **A**dministration - US agency responsible for the safety regulation of foods, drugs and medical products |
| FCP | Wired 14-function foot control panel |
| FCP WL | Wired 14-function foot control panel |
| HD-SDI | **H**igh **D**efinition **S**erial **D**igital **I**nterface<br>(digital interface for video and audio data) |
| HDTV / HD | **H**igh **D**efinition **T**ele**V**ision |
| ICC | **I**nformation and **C**ontrol **C**enter |
| IEC | **I**nternational **E**lectrotechnical **C**ommission |
| RF | **R**adio **f**requency |
| LED | **L**ight **E**mitting **D**iode |
| NTSC | **N**ational **T**elevision **S**ystems **C**ommittee<br>(US institution defining the first color television standard) |
| OP | Operation |
| OPMI | Surgical microscope |
| OSD | On Screen Display |
| PAL | **P**hase **A**lternating **L**ine<br>(color encoding system in analog TV systems) |

| Term | Explanation |
|---|---|
| PD | Interpupillary distance |
| ROI | Region of interest |
| SCI | **S**tereo **C**oaxial **I**llumination |
| SDTV / SD | **S**tandard **D**efinition **T**ele**V**ision<br>(television standard with resolution lower than HDTV, e.g. PAL or NTSC) |
| UV | **U**ltra **V**iolet |
| Y/C | Analog interface that transmits separate color (luminance Y) and brightness signals (chrominance C). |
| YPbPr | Color model that transmits brightness information Y and color difference information Pb and Pr separately. |

# Keyword index

## Numerics



## A



## B



## C

## D



## E

## F



## G



## H



## I



## K

## L



## M



## N



## O



## P

## R



## S

## T



## U



## V



## W

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