OPMI LUMERA® 700

User manual

ZEISS

About this manual   The instruction for use is part of the delivery package.

- Carefully read it before using the device.

- Keep it at the site of use of the device.

- Store it for the entire service life of the device.

- Pass it on to every subsequent owner or user of the device.

Orientation aids   − The chapter overview at the beginning of these instructions for use 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 of application   The present operating manual applies to the OPMI LUMERA 700 with software release 2.0 and the following identification:

− Reference number 6634 (floor stand)

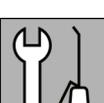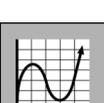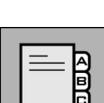− Reference number 6726 (ceiling mount)

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− SCI™ (Stereo Coaxial Illumination) and MEDIALINK™ 100 are trademarks of Carl Zeiss.

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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 instructions for use. 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 these instructions for use:

– Listing

✓ Requirements for an action

• Prompt for action

→ Result of an action

ⓘ Additional information and hints

Target group

These instructions for use are intended for physicians, nurses and other medical staff who prepare, operate or maintain the system after the appropriate training and in accordance with the instructions given in these instructions for use. It is the duty of the customer or institution operating the system to train and instruct all staff using the system.

Installation and service work not described in these instructions for use must only be performed by specialists from Carl Zeiss.

Field of application

Intended use

1. OPMI LUMERA 700 is a surgical microscope intended for the illumination and magnification of the surgical area and for the support of visualization in surgical procedures in the field of ophthalmology.

Normal use

In line with the intended use of the system, you can use it for surgical procedures on both the anterior segment of the eye (e.g. cataract, cornea, glaucoma) and the posterior segment of the eye (retina, vitreous).

28. The system-integrated SCI illumination provides an optimum red reflex and delivers a sharply defined, high-contrast image of the patient's eye. The freely programmable foot control panel or, alternatively, the handgrips ensure maximum operating comfort for the surgeon who can configure all settings required to meet his/her specific needs. In addition, the OR staff can configure the microscope, the integrated SD 3CCD/HD 3CCD camera or change the SD/HD video and image acquisition system using the adjustable 5.7" control panel. The fast focus allows rapid movement over a defined travel range and

enables the surgeon to move the focus very easily over long distances (e.g. for folding lenses) and back to its initial position. Assistant functions such as the keratoscope, the data injection system or the integrated slit illuminator expand the surgeon's scope of work. After completion of the surgical procedure, the system can be reset to the selected, freely programmable starting values via the standby position or reset function to ensure an optimum starting position for the next surgery.

35.1. - 4.

The system is available as a mobile and as a ceiling-mounted surgical microscope. It can be supplemented by various accessories and can be prepared for sterile use by attaching resterilizable caps, handgrips and sterile drapes. For attachment and alignment of a 22" TFT monitor, CALLISTO eye or an operating light, the ceiling.mounted surgical microscope can be fitted with an additional carrier arm system.

The system is intended for use in offices, hospitals or other human medicine institutions. For disposal, please observe these instructions of use as well as the applicable legal regulations in your country.

Notes for the operator

- Prior to using the device for the first time, please read the instructions for use thoroughly. Also ensure to read the instructions of accessory tools.

- Only personnel who have undergone training and instruction are allowed to use this instrument. It is the responsibility of the customer or institution operating the equipment to train and instruct all staff using the equipment.

- Only operate the device within the scope of its intended use.

- Please keep these instructions for use where there are easily accessible at all times for the persons operating the system.

- Only personnel who have been appropriately briefed are allowed to control the surgical microscope via CALLISTO eye (option). Any change in the focus and zoom setting via CALLISTO eye may lead to unwanted movement at the surgical microscope during application (e.g. in the OP mode).

- Please observe all symbols and labels attached to the device! (see page 30)

- Observe the legal regulations for accident prevention and occupational health and safety applicable in the country concerned.

- This system must not be modified without the manufacturer's approval. If the system is modified, suitable inspections and testing must be completed to ensure that it can still be used safely.
  The manufacturer is not liable for damage caused by unauthorized persons tampering with the system. Furthermore, this will forfeit any rights to claim under warranty.

- 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.

- Connect the system to a special emergency backup power supply in accordance with the regulations and directives applicable in the country of use.

- Ensure that the installation requirements and the operation of the device concur with the surgical conditions:

  - minimum vibration

  - clean environment

  - do not use the device under extreme mechanical stresses

- Do not use any power-operated device that is part of the delivery scope

–   in explosion-hazardous areas,

–   do not operate the device close to flammable anesthetics or volatile solvents, such as alcohol, ether/benzene or similar. Stay away at least 25 cm.

- Do not station or use the instrument in damp rooms. Do not expose the instrument to water splashes, dripping water or sprayed water.

- Do not place any fluid-filled containers on top of the instrument. Make sure that no fluids can seep into the instrument.

- Never look at the sun through the binocular tube, the objective lens or an eyepiece.

- The control unit features a potential equalization connector. This connector can be used for placing other active devices at the same ground potential or for redundant grounding to protective earth.

- 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.

- Before connecting the system to line power, make sure that the power network is free from defects that may lead to dangerous voltage on the power plug.

- Please note the information on EMC (electromagnetic compatibility) in the chapter "System data" on page 285.

- With increasing age of the light source, the actual illumination intensity delivered at the respective setting decreases (this is a normal property of the system).

- The user (IT officer) is responsible for ensuring that no viruses are transferred to the system via the network connection.

- It is the user's responsibility to ensure that the USB storage media used for data communication are free from viruses.

- Should the device be transported over longer distances (e.g., moving, return for repairs etc.), only use the original packaging or special return packages. Please contact your dealer or the Carl Zeiss Service department.

- In order to prevent a decrease in the device's safety due to age, wear and tear, etc., the user must have the device checked for its safe operation (refer to Safety Checks in Chapter "Care and maintenance").

More specific information about the floor stand:

- Condensation of humid air may occur if you move the system from a cold place (<10°C) to a warm place. Before switching on the system, allow it to adapt to room temperature for at least 1 hour.

- Always turn off the device before connecting to or removing from the power supply, if the device is not being used for a long time or if the device is being cleaned.

More specific information about the ceiling mount:

- Turn the device off whenever you will not use it for a prolonged period of time or intend to clean its surface.

Requirements for operation

Prior to the very first use

Carl Zeiss Service or a person authorized by Carl Zeiss will install the device. 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 connectors are in a perfect condition, i.e. they do not display any worn areas, kinks or other defects.

✓ Determine the supply voltage at the place of installation and set the voltage of the device accordingly.

✓ The power cord being used is the one designed for use with this system.

✓ When connecting the device to any network, please ensure the network is free of dangerous voltages.

More specific information about the floor stand:

✓ Insert the power plug only into a socket that is fitted with a flawless protective earth conductor.

More specific information about the ceiling mount:

✓ The device may only be connected to a power supply network which has a faultless protective ground conductor.

Before every use

• When adding accessories and/or components please ensure the permissible total weight of the device is not exceeded. (see label "Maximum load" or Section "Technical Data").

• Before every use, make certain to compensate for any added weight; this will enable the surgical microscope to maintain its balance in all positions of the working range.

• Before every use, limit the stroke of the suspension arm to prevent any contact with the patient if the surgical microscope is lowered accidentally.

- Check the surgical microscope for sufficient freedom of movement. The device itself or accessories may be damaged if conflicting with each other.

- When mounting accessories (e.g. fundus viewing systems) on the system, make sure that sufficient free space is available for focus positioning and that the surgical microscope cannot touch the patient.

- Before using a fundus viewing system, make sure that the room for movement is larger than the downward travel path of the microscope.

- In order to prevent an unexpected response by the device, check the user settings of the software before every use.

- The assistant's microscope may swing out of position if you tilt the surgical microscope to the horizontal viewing direction and the assistant's microscope has not been locked. Adjust the assistant's microscope before use and make sure it is properly locked in position.

- Always run cables in a manner that will not impede the user's movements.

- Before every use, switch off the light source for light guides that are not being used and properly attach them on the designated bracket.

- Before every use, check the light source for damages in order to prevent phototoxic injuries to the patient's eye.

- Before every use, check the filter settings in order to prevent phototoxic injury to the patient's eye.

- Use the system in the sterile area. Make sure to use the appropriate sterile accessories for this system.

- Never cover any ventilation openings, as this may e.g. cause the light source of the system to overheat and fail.

- Never attempt to forcefully connect any electrical connectors (plugs, sockets). If connection is not readily possible, check whether the plug fits the socket. If any of the connectors are damaged, have Carl Zeiss Service repair them.

- Before using the **wireless**, foot control panel FCP WL ensure its batteries are fully charged. Inadequate power supply of the **wireless** foot control panel may lead to malfunctions of the device.

- Go through the checklist in chapter "Operation" (see page 164).

More specific information about the floor stand:

- In order to avoid the device from rolling off inadvertently, use the locking mechanism on the base of the suspension system and secure the device.

During use

- In order to prevent phototoxic damages to the patient's eye, reduce the brightness and the light exposure of the surgical area to an amount that is absolutely necessary for the surgery.

31.
- In order to prevent phototoxic damages to the patient's eye during surgery, use a retina protection filter (blue barrier filter) and/or a retina protection device that are integrated into the light source.

- In order to prevent phototoxic damages to the patient's eye, adjust the irradiation intensity and the associated irradiation time by selecting the appropriate illumination setting. The values recommended by Carl Zeiss can be found in table "Maximum radiation exposure times" on page 22. Any deviation from these values is only permissible when medically justified.

- In order to prevent phototoxic damages, never look directly into the light source, e.g. on the microscope or the light guide.

- Never leave a device unattended with the light source still switched on, as excessive radiation exposure times may lead to retinal injury in the patient's eye.

- When operating the handgrips or the zoom knob on the assistant's microscope, do not touch the non-sterile connecting cable to avoid infecting the patient.

- If you have mounted the RESIGHT fundus viewing system on the underside of the microscope and steeply tilt the microscope, the RESIGHT fundus viewing system may unintentionally move in and injure the patient. Remove the RESIGHT fundus viewing system before steeply tilting the microscope.

- Defective or unidentified accessories may lead to increased leakage current on the system and injure the patient. Never connect any defective or unidentified accessories and never touch the power outlet or video interfaces while in contact with the patient.

- If the xenon lamp is used beyond its maximum service life of 500 hours, sudden failure may occur and interrupt operation. Once the xenon lamp's maximum service life reaches 5 hours, a warning is displayed, asking you to replace the relevant xenon lamp. Swing in the backup xenon lamp now at the latest. If the maximum service life of the backup xenon lamp has also been reached, replace the xenon lamp module of the Superlux Eye light source and reset the remaining service hours counter to its original value.

- If you change the lamp shortly after it has failed, the lamp will still be very hot. Use heat-resistant protective gloves when replacing the lamp to prevent burns.

6.
- <mark>Malfunctions in the motor's electronic system may cause the main functions to fail (XY movement, focus, zoom, light control system) and affect other functions. Change to manual mode.</mark>

- If a failure occurs which you cannot correct with the aid of the chapter "What to do in the event of malfunctions", attach a sign to the device stating it is out of order and contact our service representative.

- Do not pull at the light guide, power cord or any other connecting cables.

After every use

- Always use the master switch to turn off the device if it is not in use.

- Insufficient, incorrect or wrong cleaning or disinfection not complying with this user manual can expose the patient or medical staff to a considerable risk of infection.

Liability and warranty

Warranty and liability depend on the applicable contractual stipulations.

NOTE	**Loss of warranty**
	Modifications to this system are not permissible. The manufacturer is not liable for damage caused by unauthorized persons tampering with the system. Furthermore, this will forfeit any rights to claim under warranty.

Measures to prevent phototoxic injury

Several papers[1)-5)] dealing with the problem of phototoxicity in ophthalmic surgery have been published. A comprehensive review of these publications reveals five aspects of particular concern:

– Illumination characteristics (spectral composition)

– Illumination intensity

– Angle of illumination

– Focus of the light source

– Exposure time to light

In the following, comments on these aspects are given and a description of how Carl Zeiss, as a manufacturer, makes allowance for them in its systems.

Illumination characteristics (spectral composition)

Studies on the exposure of the eye to light of varying spectral composition date back to the early 1950s. These studies suggest that the potential hazard of phototoxic injury to the patient's retina can be reduced by blocking out the blue and ultraviolet light below a wavelength of 475 nm.

Integrated protection filters

30. - 2.

For protection of the retina, Carl Zeiss offers the swing-in retina protection filter (blue barrier filter) and the stationary UV blocking filter as standard features of the surgical microscope. This reduces not only the exposure of the patient's eye to light, but also that of the surgeon's.

An important point to note here, however, is that the orange color of the retina protection filter will inevitably change the perceived color of the light. For this reason, the surgeon may initially have to get used to the changed appearance of the anatomical structures.

Illumination intensity

The majority of researchers suggest that the surgeon should use the lowest light intensity required at the patient's eye to guarantee good viewing during

surgery.

Brightness control   For this reason, the brightness of the light source in Carl Zeiss systems is continuously variable. This permits the surgeon to optimally adapt the light intensity at the patient's eye to the conditions existing in each case.

Angle of illumination

A number of publications[1)-4)] suggest that the microscope should be tilted to reduce the exposure of the macula to direct illumination.

Tilting mechanism   The surgical microscope features a tilting mechanism for the main microscope to enable indirect illumination.

Focus of the light source

Studies show that injuries are likely to occur if the filament of the light source is imaged on the patient's retina. The peak intensity of a filament is considerably higher than that of an even and extended light source such as a light guide.

29.   *Fiber optic illumination*   This is the reason why Carl Zeiss uses fiber optic illumination in its surgical microscope systems.

Exposure time to light

According to some publications, the eye should not be exposed to the light source longer than a few minutes. In all surgical cases, the retinal exposure time to light depends on the type and duration of the procedure and possible case complications. It is therefore recommended in ophthalmic surgery to keep the light intensity as low as possible, or to use a device which prevents the light from entering through the patient's pupil. It is also recommended to make sure that the patient's eye is not additionally exposed to the light of surrounding light sources.

This problem has been solved by Carl Zeiss by the use of a retina protection device that can be swung into the microscope's illumination beam path and a swing-in retina protection filter (blue barrier filter).

Brightness adjustment

The brightness of this device can be adjusted on a scale from 5% to 100%. Based on standard DIN EN ISO 15004-2:2007 there are maximum illumination times for various illumination configurations. These values can be found on table "Maximum radiation exposure time" (see page 22).

With increasing age of the light source, the actual illumination intensity delivered at the respective setting decreases (this is a normal property of the system).

Phototoxic risk factors

The microscope light source - like any bright light source - may present a potential hazard to the patient's eye both in the form of immediately visible thermal damage to the retina as well as phototoxic chemical reactions which may lead to photoretinitis. The factors which play an important role in determining the phototoxic risk are:

– Lamp brightness

– Spectral distribution of the light (UV and blue light is more dangerous than longer wavelengths)

– Duration of direct exposure

– Pupil size

– Clarity of ocular media (infants and young children, for example, may be at a higher risk)

– Condition of the eye: aphakic and pseudo-aphakic eyes with IOLs are at a higher risk.

– Previous exposure to bright light such as retinal photography, especially within the last 24 hours

During cataract procedures, factors such as lenticular material, instruments

such as the phaco handpiece, and movement of the eye provide interruption of the exposure and would be expected to significantly lengthen the time before photoretinitis might be expected to occur.

Effects of microscope illumination

A prospective study [7] of the effects of microscope illumination during surgery did not reveal any phototoxic retinal injuries for procedure times of up to 30 minutes if the calculated maximum recommended exposure time was 150 seconds. However, it was also found that at the same brightness setting, phototoxic retinal injury could be expected after approximately 100 min.

28.   *Stereo Coaxial Illumination*

The Stereo Coaxial Illumination (SCI) of this system has been designed to provide a bright red reflex using only very small quantities of light in the center of the surgical field. The peripheral illumination causes higher exposure of the retina, but usually not directly on the macula, depending on the position of the eye. For cataract procedures, we recommend adjusting the surrounding field illumination to be somewhat darker than the central red reflex spot. This not only minimizes the phototoxic risk, but it also reduces the diffuse light that is reflected by the patient's sclera.

Other recommendations for minimizing the phototoxic risk include:

- Always use the lowest brightness setting possible.

- Use the retina protective filter (blue barrier filter) to block the blue spectrum of light. The retina protection filter increases the recommended exposure times by a factor of 5 (page 191).

- When working on the exterior eye, use the retinal protection device to prevent light from entering the pupil, especially when the pupil is dilated (see page 191).

- Always switch off the microscope illumination during pauses in surgery. Either move the surgical microscope to the standby position for this purpose, or cover the patient's eyes, or switch off the illumination system via the foot control panel.

Maximum radiation exposure times

The following tables are intended to provide the surgeon with a guideline in determining the potential hazard. The data has been calculated for the worst case:

– direct radiation exposure,

– uninterrupted radiation exposure, e.g., no surgical instruments in the eye,

– aphakic eye,

– totally immobile eye, which means that only one area is subject to exposure,

– pupil dilated to 8 mm.

The calculations are based on the recommended occupational health daily exposure limits as defined in [6]. A safety factor of 10 has been used in determining these limits.

Using the retina protection filter (blue barrier filter) increases the maximum radiation exposure time with the light sources specified below (see the following table) by a factor of 5.

Maximum radiation exposure times with red reflex illumination in minutes

Brightness level	Halogen	Xenon	LED	Xenon with HaMode filter	LED with HaMode filter
25%	47.0	7.6	19.7	26.6	69.7
50%	21.3	3.7	9.9	12.9	34.8
75%	12.9	2.8	6.6	9.8	23.2
100%	9.2	2.0	5.0	2.0	17.4

Maximum radiation exposure times with surrounding field illumination in minutes

Brightness level	Halogen	Xenon	LED	Xenon with HaMode filter	LED with HaMode filter
25%	13.7	2.3	6.0	8.0	20.7
50%	6.2	1.1	3.0	3.8	10.3
75%	3.8	0.8	2.0	2.8	6.9
100%	2.7	0.6	1.5	2.1	5.1

Maximum radiation exposure times with integrated slit illuminator in minutes

Brightness level	Halogen	Xenon	LED	Xenon with HaMode filter	LED with HaMode filter
25%	18.4	3.3	8.6	11.5	31.0
50%	8.2	1.6	4.3	5.6	15.5
75%	5.1	1.2	2.9	4.2	10.3
100%	3.6	0.9	2.1	3.1	7.7

Sources

[1] H. Stiller, and B. Rassow, "Light hazards to the patient's retina from ophthalmic instruments," Applied Optics-OT 30, 2187-2196 (1991).

[2] American Conference of Governmental Industrial Hygienists, "Documentation of the Threshold Limit Values for physical agents. 7th Edition," (American Conference of Governmental Industrial Hygienists, Cincinnati, 2001).

[3] S. G. Khwarg, F. A. Linstone, S. A. Daniels, S. J. Isenberg, T. A. Hanscom, M. Geoghegan, and B. R. Straatsma, "Incidence, risk factors, and morphology in operating microscope light retinopathy," Am. J. Ophthalmol. 103, 255-263 (1987).

[4] G. Kleinmann, P. Hoffman, E. Schechtman, and A. Pollack, "Microscope-induced retinal phototoxicity in cataract surgery of short duration," Ophthalmology 109, 334-338 (2002).

[5] DIN EN ISO 15004-2:2007 Optical instruments -- Fundamental requirements and test methods -- Part 2: Light hazard protection

[6] David Sliney, Danielle Aron-Rosa, Francois DeLori, Franz Fankhauser, Robert Landry, Martin Mainster, John Marshall, Bernard Rassow, Bruce Stuck, Stephen Trokel, Teresa Motz West, and Michael Wolffe, Adjustment of guidelines for exposure of the eye to optical radiation from ocular instruments: statement from a task group of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) APPLIED OPTICS Vol. 44, No. 11, p 2162 (10 April 2005)

[7] Byrnes, G.A., Antoszyk, A.N., Mazur, D.O., Kao, T.C., Miller, S.A., Photic maculopathy after extracapsular cataract surgery. A prospective study, 1992/05/01 Ophthalmology, VL - 99, IS - 5, SP - 731, EP - 737, PB - Elsevier

Safety devices

2. - 3.   **1**   Release bar for magnetic brake
                    Enables the person who is unsterile to activate the magnetic brake of the
                    suspension system.

2   Adjustment screw for limiting downward movement
         Is used to set the minimum working distance of the surgical microscope
         to the operating area in the vertical direction. This setting must be
         checked prior to any surgery.

3   Zoom adjustment knob (for manual operation)
         For manual adjustment of the main surgeon's magnification.

4   Adjustment screw of the suspension arm
         Enables fixing the suspension arm in the horizontal position

5   Rotary knob for beam splitter
         Enables the manual switching of the coobservation port from left to right

6   Knob for the integrated slit illuminator (in manual mode only)
         Enables manual positioning of the slit illuminator. The knob provides the
         following setting options:

–   left position = slit illuminator from the left

–   center position = normal OPMI illumination

–   right position = slit illuminator from the right

7   Knob for SCI illumination (in manual mode only)
         Enables manual switching between red reflex illumination (left position)
         and surrounding field illumination (right position).

8   Locking of the assistant's microscope

Fig. 1: Safety Equipment
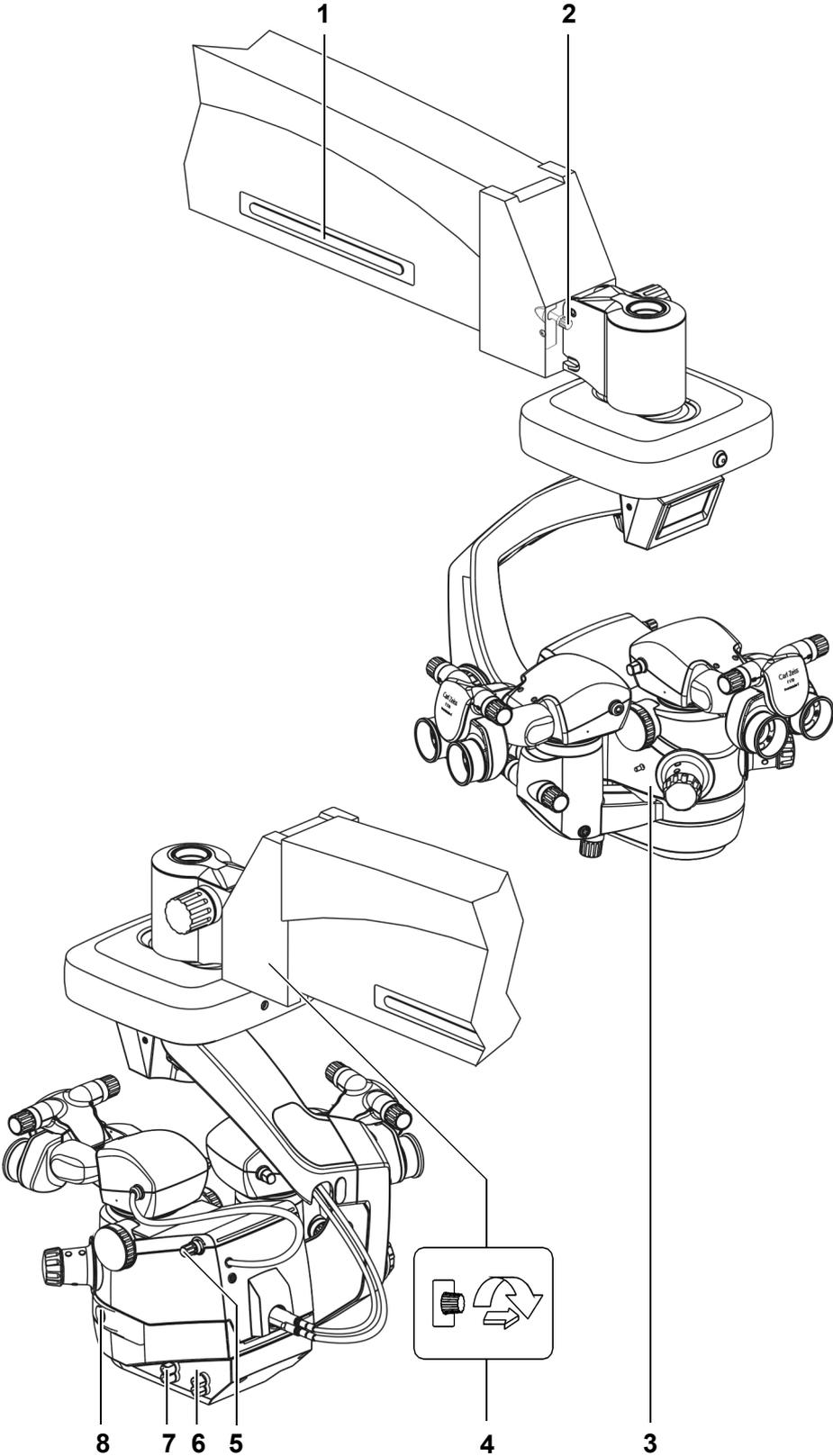
6.

9 <mark>Switch for manual operation</mark>

In the event that one of the major functions fails (XY movement, focus, zoom, light control), leading to the impairment of further functions, you can press this switch to change to manual mode.

The system reacts as follows:

– All electrical components except the light source and the lift function of the ceiling mount are separated from the power supply.

– The light source(s) adjust(s) to a medium brightness level to permit you to complete the application.

– The 5.7" control panel turns dark.

To be able to continue surgery:

• Manually set the enlargement on the zoom adjustment knob (9.1) of the microscope.

• Manually position the suspension system for focusing and for moving the system in the XY direction.

Press switch (9) again to return to normal operation. The switch unlocks and the system is restarted.

To ensure proper functioning manual mode when required, check its function at regular intervals (at least every six months) by activating the mode (without a patient).

Fig. 2: Switch for manual mode

Ceiling mount

9

Floor stand

9

9.1
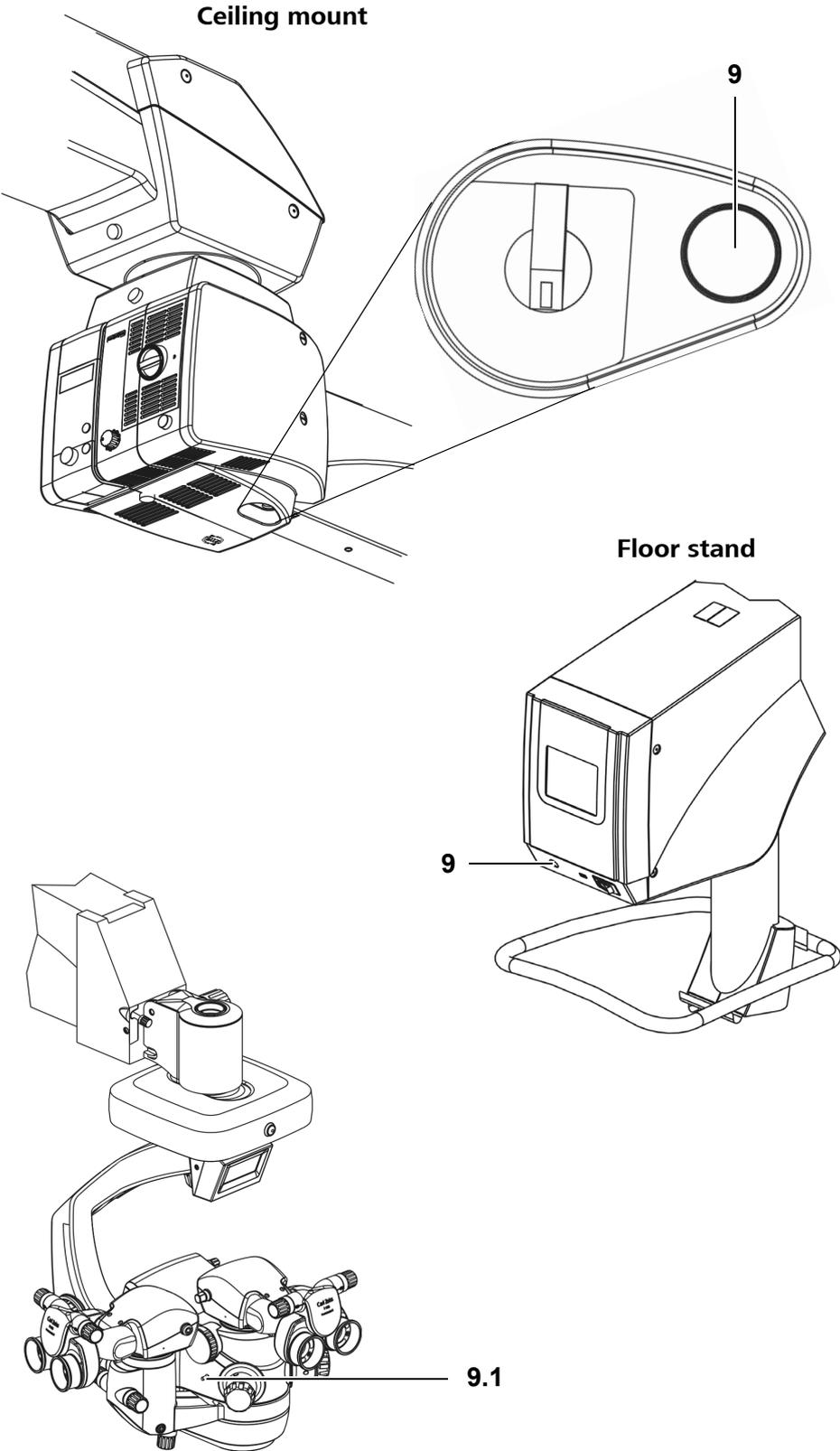
10 Indicator for the operating status of the LED light source
If the LED lights up amber, the LED light source is defective. In this case, the light intensity is reduced to 50% and an error message is displayed on the 5.7" control panel.

- Please contact Carl Zeiss Service.

11 Flap indicating the operating status of the halogen lamps

- When the flap is closed, the main lamp is operative.

- When the flap is open (yellow mark on the side), the main lamp has failed and the backup lamp is in use.

12 "Manually turn on the backup halogen lamp" button
The halogen light source is equipped with an automatic lamp backup. If the backup fails, pressing this button will enable you to switch on the backup lamp manually.

13 "Pivot in xenon backup lamp" button
The Superlux Eye light source is equipped with a lamp module that contains two xenon lamps. The second lamp is used as a backup lamp which can be pivoted in manually if the first lamp malfunctions. (see page 244)

⚠ **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 increasing age of the light source, the actual illumination intensity delivered at the respective setting decreases.

- Please replace the xenon lamp in due time.

- Reset the residual service hour display on the 5.7" control panel to "0".

Fig. 3: Lamp housings

LED

Halogen

10

11

12

Xenon

13

Xenon + Halogen

11

12

13
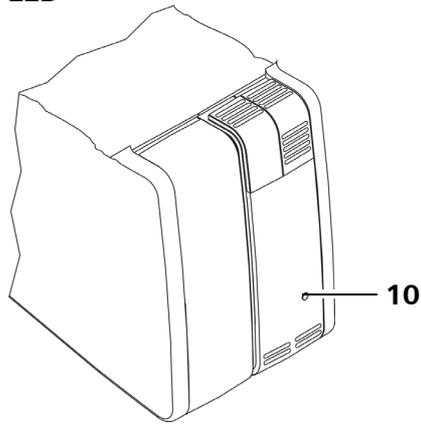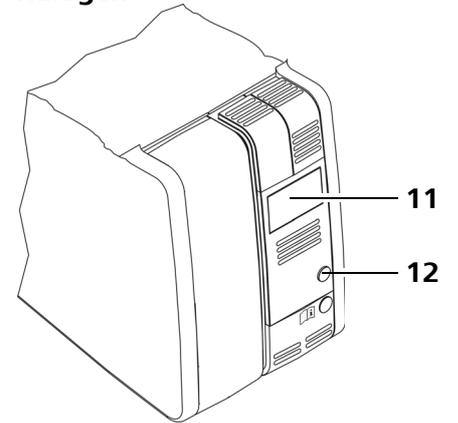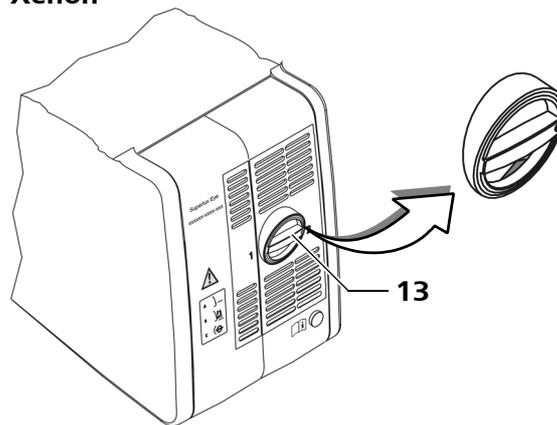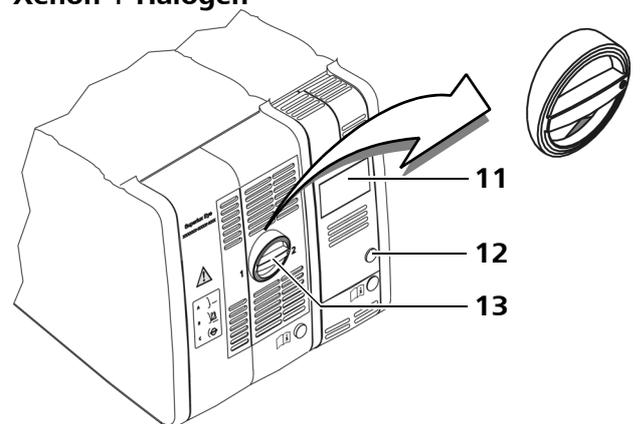
Symbols and labels on the device

⚠ | CAUTION | **Risk of injury!**

Observe all warnings and information labels!

- When discovering that one of the following labels is missing on the equipment or a label has become illegible, please contact us or one of our authorized dealers. We will provide you with a replacement.

Microscope labels

1 Zoom for assistant's microscope
Indicates the direction of rotation in order to zoom in or out.

2 Zoom adjustment knob for manual operation
Identifies the two directions of rotation to increase or reduce the zoom.

3 Front-to-back tilt axis
Indicates whether the surgical microscope is in a vertical position.

4 Displays the range of focus
If the dot is located between the two arrow tips, the focusing system of the surgical microscope is in its starting position.

LUMERA 700 **5** System name

6 Rotary knob for integrated slit lamp during equipment failure
left position = slit lamp from the left
center position = normal OPMI illumination
right position = slit lamp from the right

7 Rotary knob for SCI illumination during equipment failure
Left position = red reflex illumination is switched on
Right position = surrounding field illumination is switched on

8 Switch over to coobserver port
Identifies the rotary knob to manually switch the coobserver port from left to right and vica versa.

Fig. 4: Labels on the
microscope
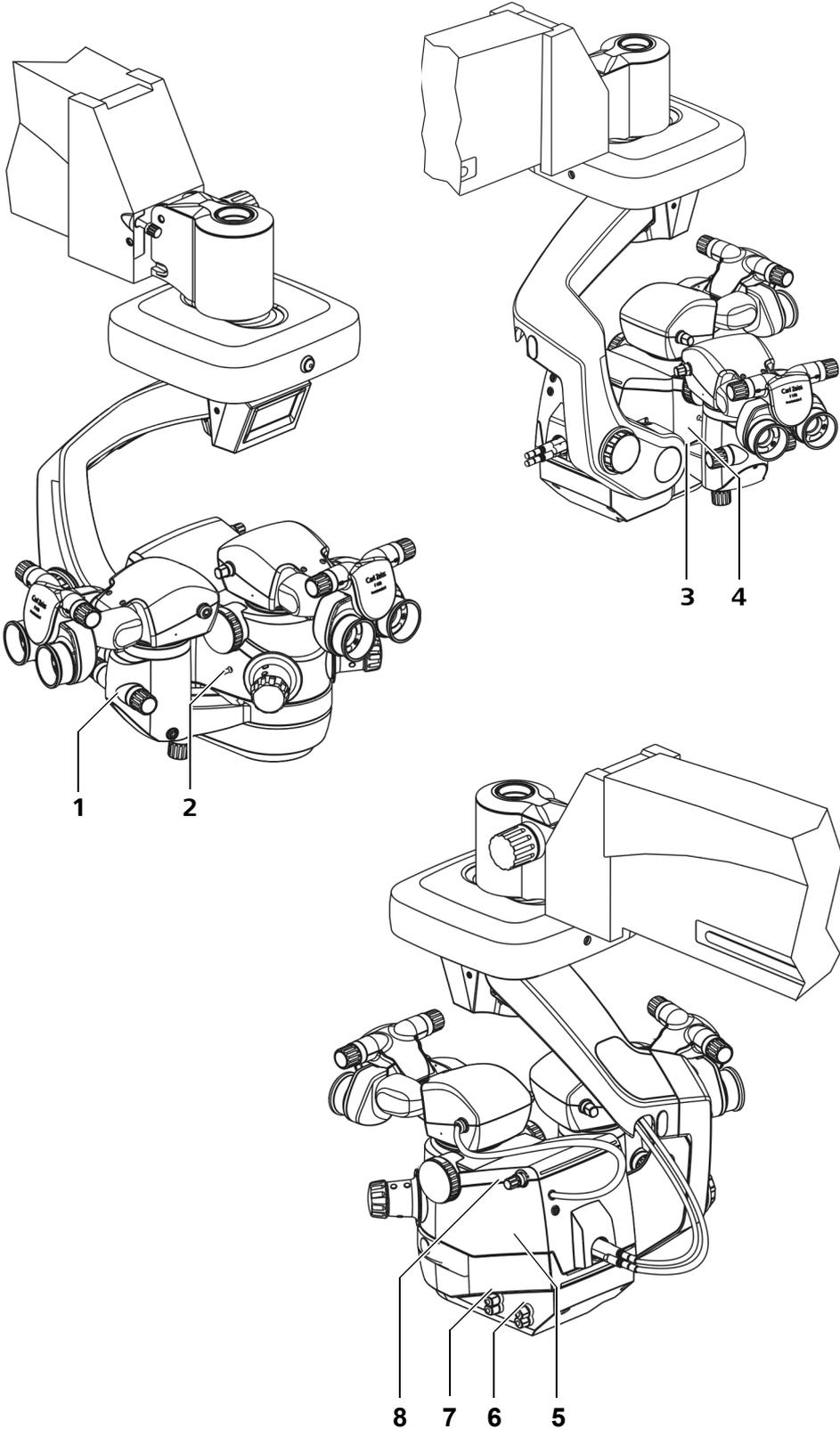
Labels on the suspension system

1 Friction information
Explanation of brake effect, which can be achieved by actuating the friction adjustment knob.

2 Warning label "Maximum load capacity"
The maximum weight of the add-ons (accessory equipment) to the microscope must not exceed 9 kg!

3 "User manual" label
Observe the user manual or accompanying documents.

4 "Risk of crushing" warning label
Fingers may be crushed. Do not touch this area while moving the surgical microscope or parts of it.
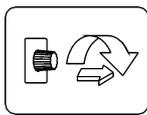
5 Locking the movement of the suspension arm.
This symbol indicates that the suspension arm can be secured to prevent an abrupt upward movement.

6 Releasing the magnetic brake
This symbol identifies the bar that must be pressed in order to release the magnetic brake on the suspension arm.
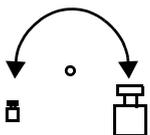
7 Weight compensation of suspension arm
After all accessory tools have been attached to the surgery microscope, this adjustment screw can be used to balance the weight of the suspension arm.
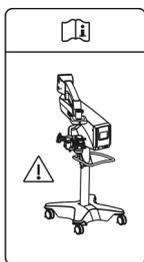
8 "Moving position" label
Indicates the transport position of the system. Before transporting the system, make sure that it is in this position in order to avoid any damage.

*Fig. 5: Labels on the suspen-*
sion system
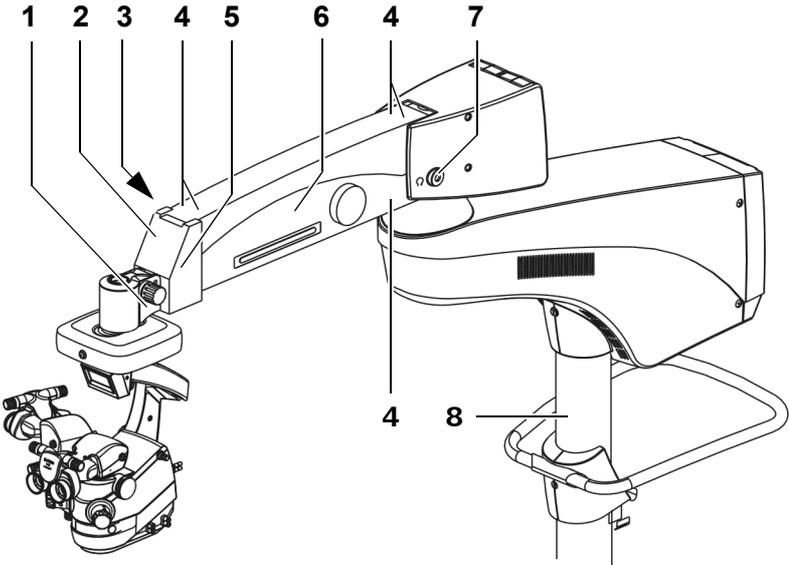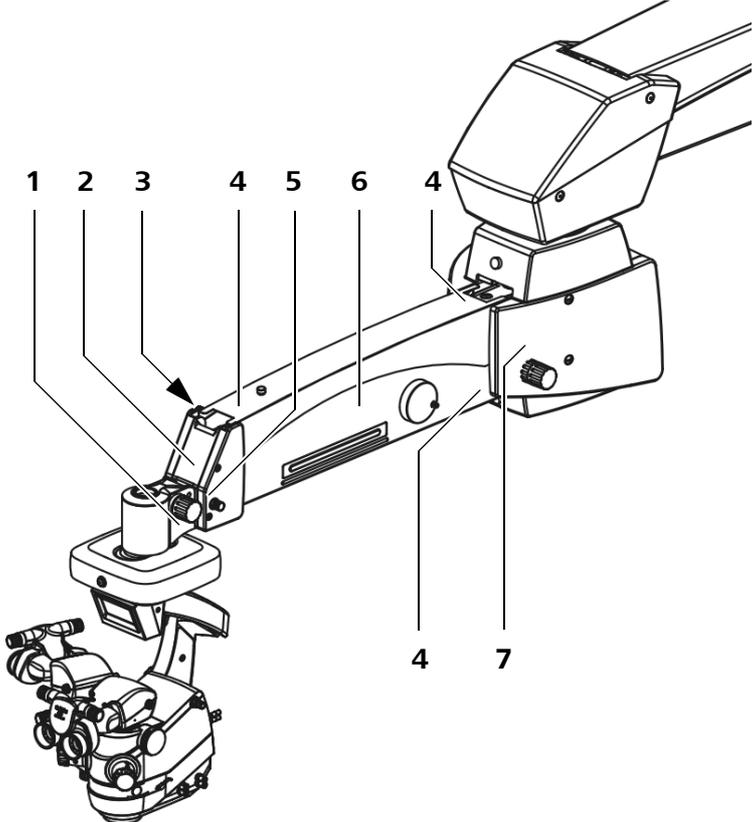
9   Rating label on ceiling mount
The rating label contains the following information:
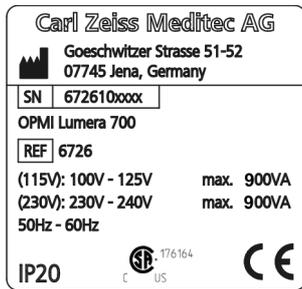
– Manufacturer's mark

– Manufacturer (company name)   Carl Zeiss Meditec AG

– Manufacturer's address   Goeschwitzer Strasse 51-52
                                                              07745 Jena/Germany

– Serial number   SN

– Device name   OPMI Lumera 700

– Reference number   REF

– Rated voltage   (115V): 100V - 125V

                                                              (230V): 230V - 240V

– Connected load: max. 900 VA

– Line frequency range: 50Hz - 60Hz

– Protection class   IP20

– CSA label

– CE mark

*Fig. 6:   Labels on the
suspension system*

9
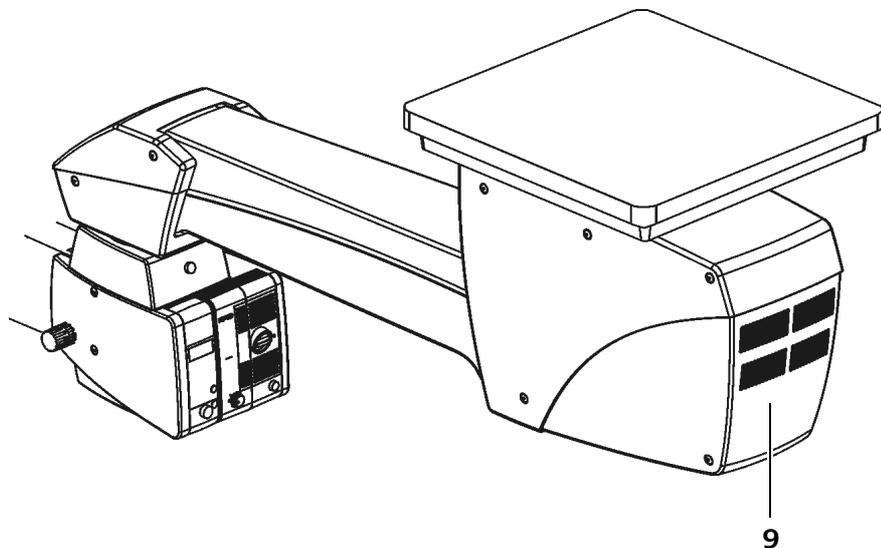
10 Rating label on the floor stand
The rating label contains the following information:
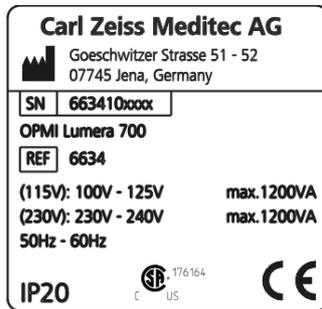
– Manufacturing symbol

– Manufacturer (company name)

Carl Zeiss Meditec AG

– Manufacturer's address

Goeschwitzer Strasse 51-52
07745 Jena, Germany

– Serial number

[SN]

– Device name

OPMI Lumera 700

– Reference number

[REF]

– Rated voltage

(115V): 100V - 125V

(230V): 230V - 240V

– Connected load

max. 1200 VA

– Line frequency range

50Hz - 60Hz

– Protection type

IP20

– CSA label

– CE label

Fig. 7: Labels on the suspension system

10
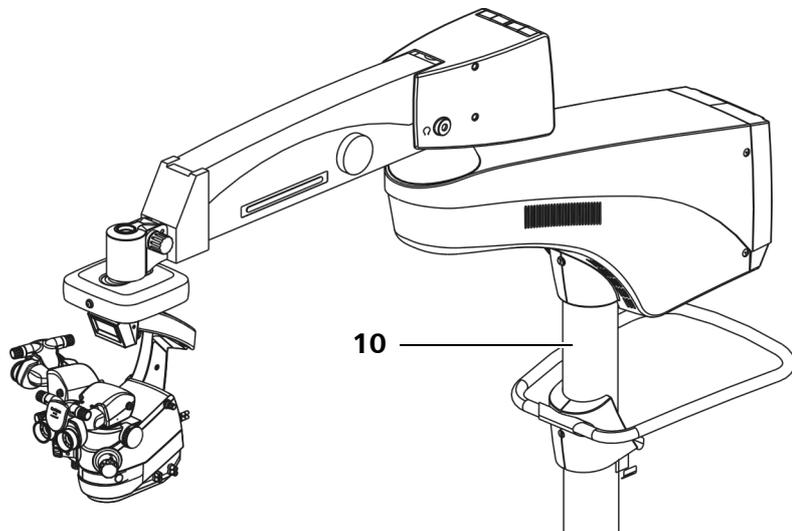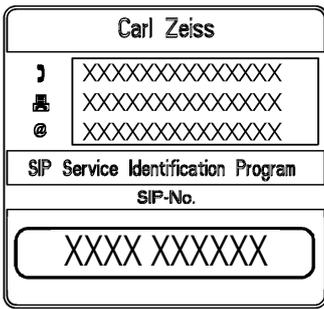
11 SIP label
The SIP label contains the following information:

– 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.

12 Please follow disposal regulations
Do not dispose of electrical and electronic waste with domestic waste. Additional information pertaining to the disposal of electrical and electronic
waste can be found in Chapter "Maintenance and care"

13 Year of manufacture
This label identifies the year when the device was manufactured.

14 "Observe the instructions for use" symbol
This graphical symbol means: Observe the instructions for use.

15 "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.

16 Pairing
Label on the suspension system indicating the foot control panel paired
with the suspension system in the wireless mode.

17 Laser warning sign LED light source (optional)
The LED light source is an LED device of class 2 according to IEC 60825-1:2001. According to EN 62471:2008 this light source is to be classified
as belonging to the free group.

*Fig. 8: Labels on the suspen-
sion system*
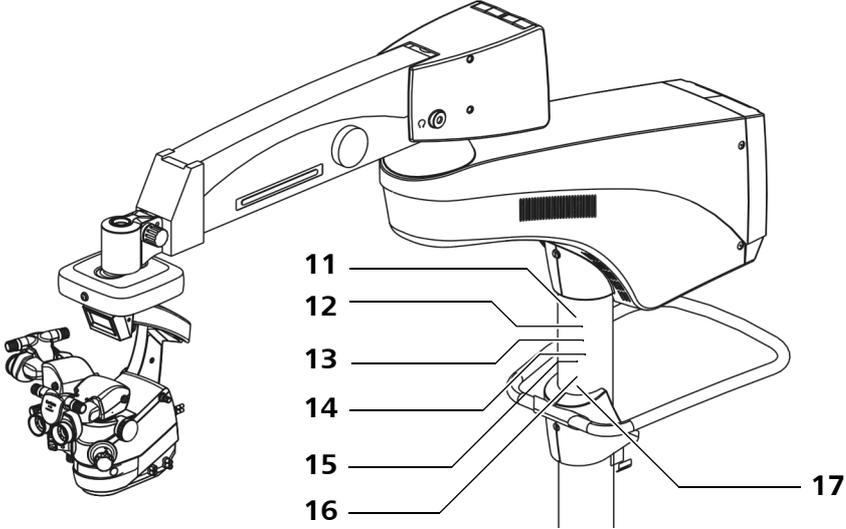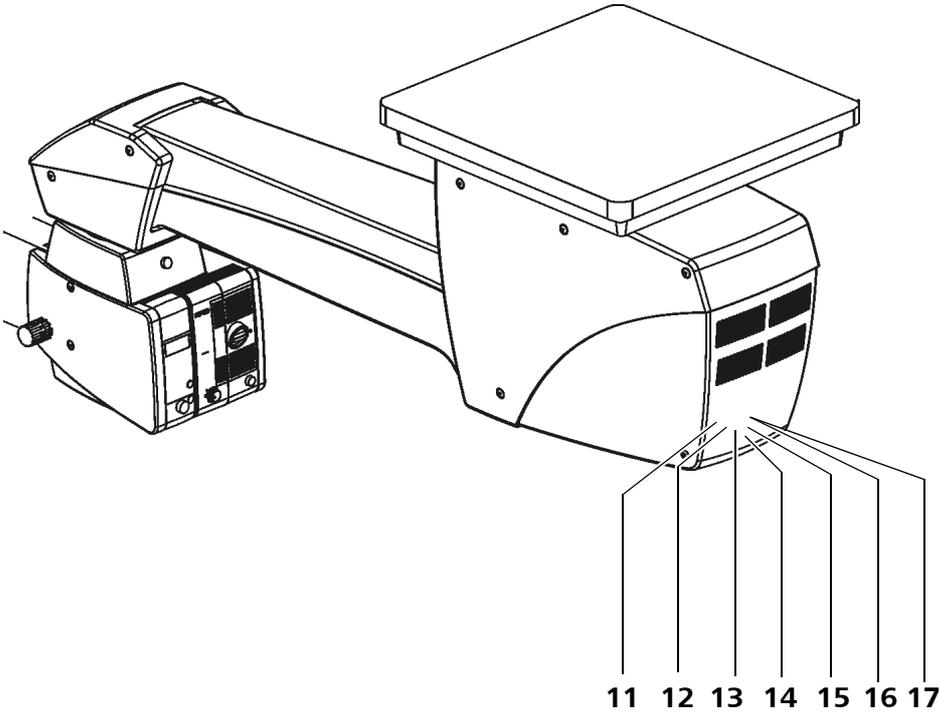
18 "Maximum load on instrument tray" warning label
Indicates that the maximum load capacity of the instrument tray for accessory equipment is 13 kg.
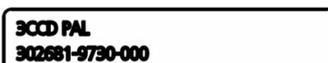
19 "Instructions for use" label
Observe the instructions for use or accompanying documents.

20 USB port
Identifies the connector e.g. for USB sticks or external HDDs.

21 HD camera (optional)
Indicates that the system is equipped with an integrated HD 3CCD camera.

22 3CCD PAL / 3CCD Camera NTSC (optional)
Indicates that the system is equipped with an integrated SD 3CCD camera (PAL or NTSC.

23 Integrated SD video and image acquisition system (optional)
Indicates that the system is equipped with an integrated SD video and image acquisition function via USB port.
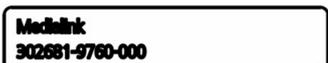
24 IDIS - Integrated Data Injection System (optional)
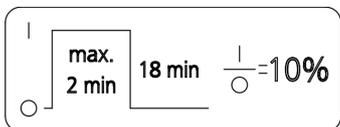Indicates that the system is equipped with a data injection system.

Fig. 9: Labels on the suspen-
sion system
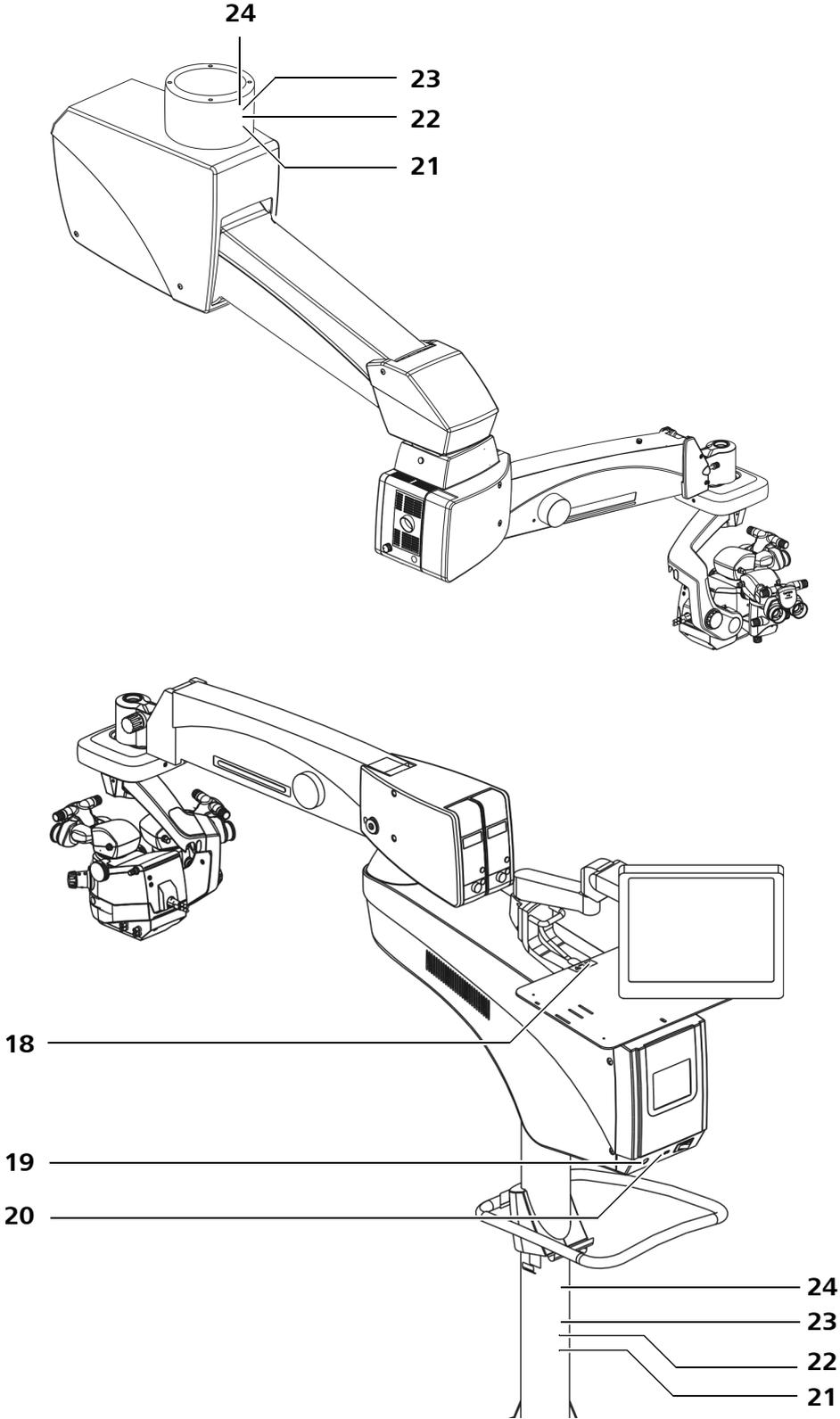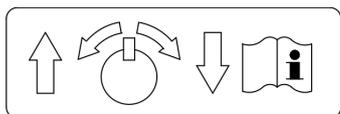
25 <u>Lift switch label (optional)</u>
Indicates the lift switch on the ceiling mount.

- Left position = lift arm moves up

- Right position = lift arm moves down

26 <u>"Work cycle for ceiling mount with lift arm" label (optional)</u>
This label represents the ratio (1:9) of the maximum allowed operating time to the idle phase of the lift arm that has to be maintained thereafter. Example: If the maximum actuation time if 2 minutes, the lift arm must be turned off for at least 18 minutes because, otherwise, the motor of the lift arm might overheat.

27 <u>"Instructions for use" label</u>
Observe the instructions for use or accompanying documents.

USB

28 <u>USB port</u>
Identifies the connector e.g. for USB sticks

29 <u>"Maximum load on monitor carrier" warning label</u>
Indicates that the maximum load capacity of the monitor carrier (optional) for accessory equipment is 20 kg.

30 <u>"Risk of crushing" warning label</u>
Fingers may be crushed. Do not touch this area while moving the surgical microscope or parts of it.
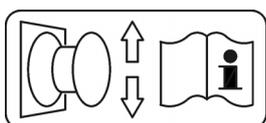
**31** <u>"3-joint carrier arm lock" information label</u>
The 3-joint carrier arm features a lock and three snap-in positions for height adjustment and in order to prevent the carrier arm from descending inadvertently. See user manual.

32 <u>"Maximum load on extension arm" warning labels</u>
Indicates that the maximum load capacity of the extension arm (optional) for accessory equipment is 40 kg. The accessory equipment may apply a maximum torque of 400 Nm on the interface.
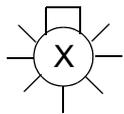
Fig. 10: Special labels
on the ceiling mount
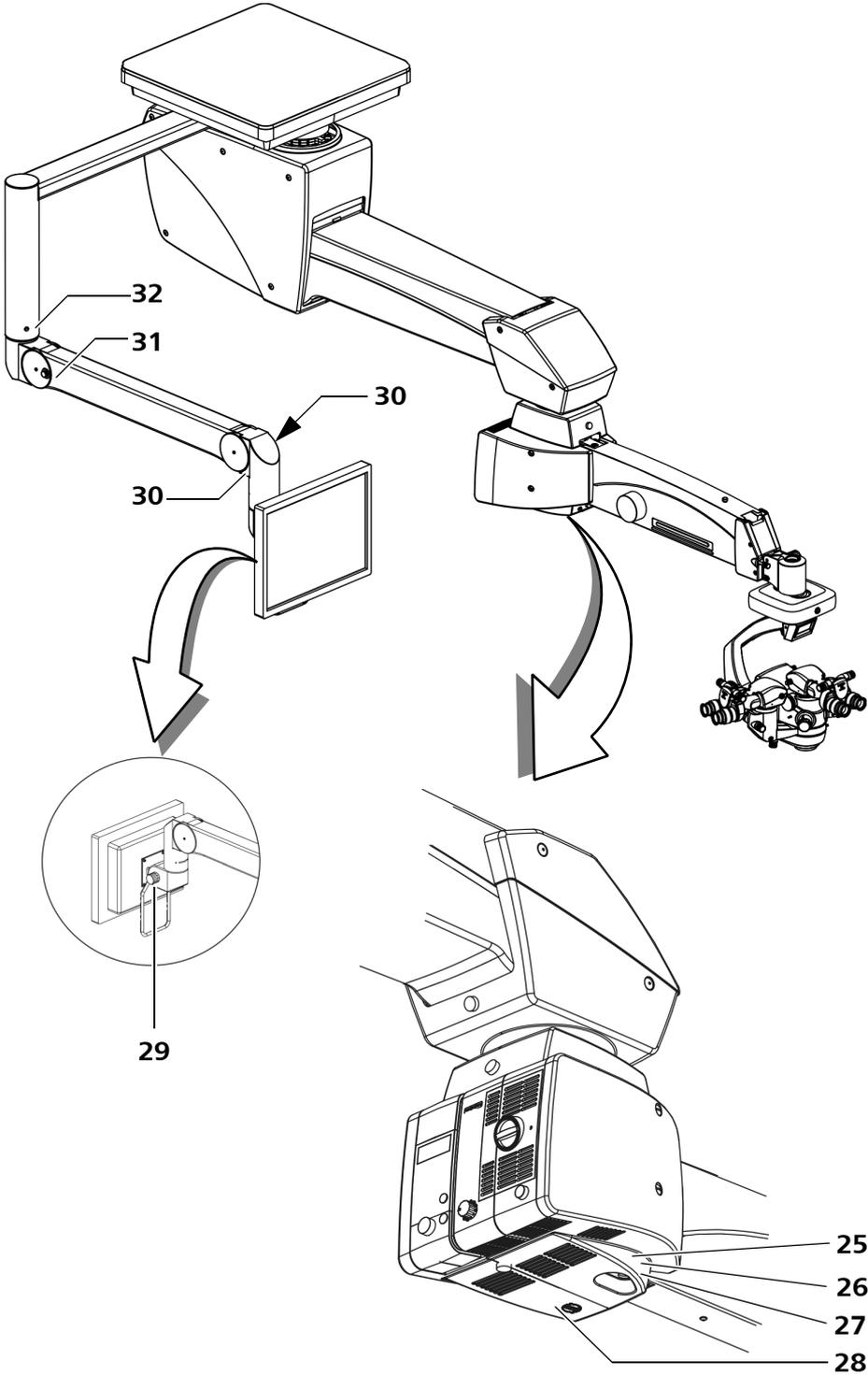
Labels on the lamp housing

1 <u>"User manual" label</u>
Observe the user manual or accompanying documents.

**2** <u>"Hot surfaces" warning label</u>
Hot surfaces may cause burns.

3 <u>Lamp identification</u>
All lamps of a light source are identified with a lamp symbol.

Superlux Eye   **4** <u>Lamp housing label</u>

     –   Superlux Eye with lamp module and integrated filters

5 <u>"CAUTION" label</u>
The Superlux Eye light source is a xenon light source that must only be operated with special xenon lamps approved by Carl Zeiss for ophthalmic surgery.
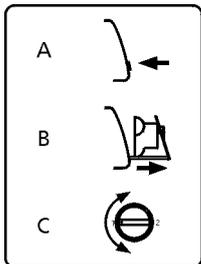
6 <u>Changing the lamps</u>
The label shows the three steps for the replacement of a lamp.

A - push button

B - pull out lamp module

C - replace lamps
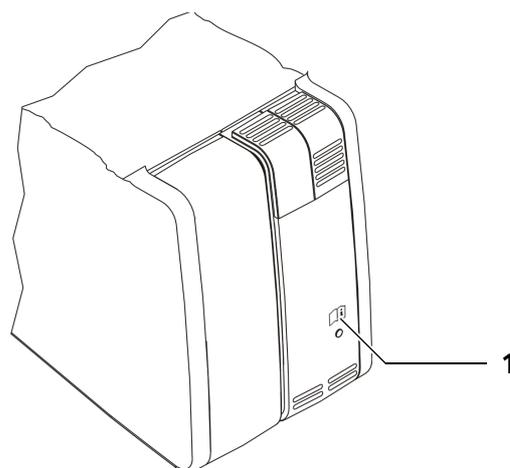
Fig. 11: Labels on the LED lamp housing

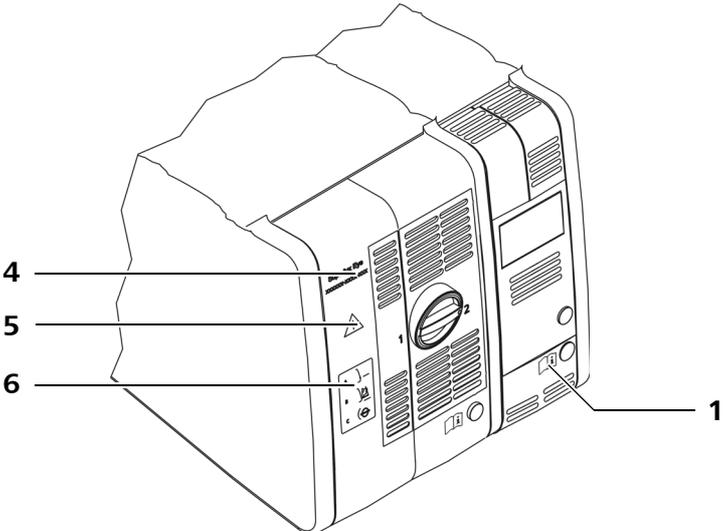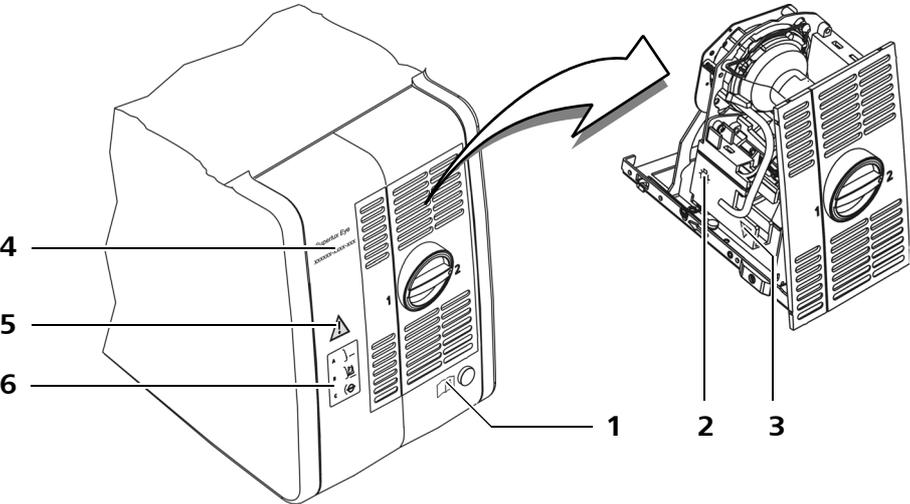*Fig. 12: Labels on halogen and
Superlux Eye lamp housing*

*Fig. 13: Labels on Superlux Eye
lamp housing*

Device connector signs

**1** Potential equalization
For connection of the system to the potential equalization system.

2 "Connector for foot control panel" label

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

4 "CAUTION" label
Warning of a potential hazard

5 Defined user group
Identifies the service interface.

100V - 240V AC max. 500VA

6 Power outlet socket
Only connect devices with the correct electrical ratings.
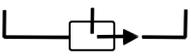
7 Video component connector
This label identifies the connections for additional video components

8 Video signal output port
(e.g., for video components, such as monitors or recording devices)
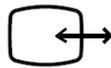
9 Video signal output/input port
(with SD video camera only)

USB

10 USB port
Identifies the connector e.g. for USB sticks

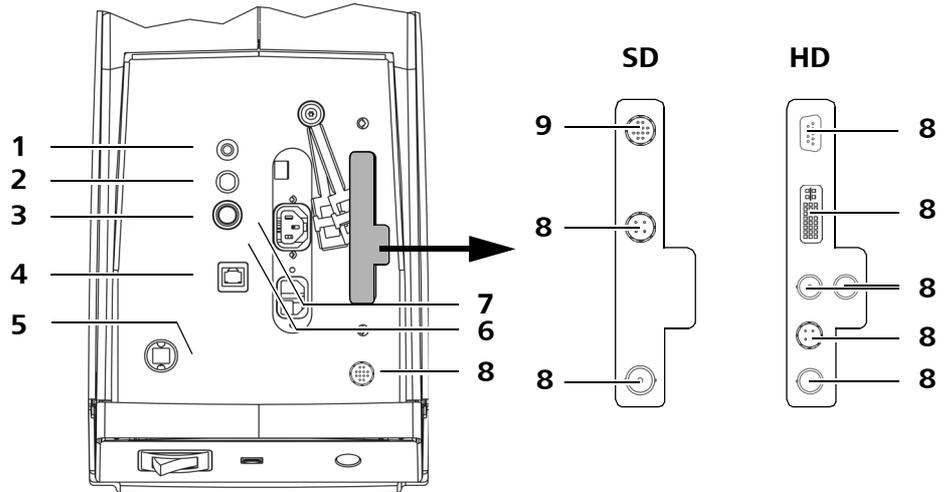*Fig. 14: Labels on the floor mount connectors*

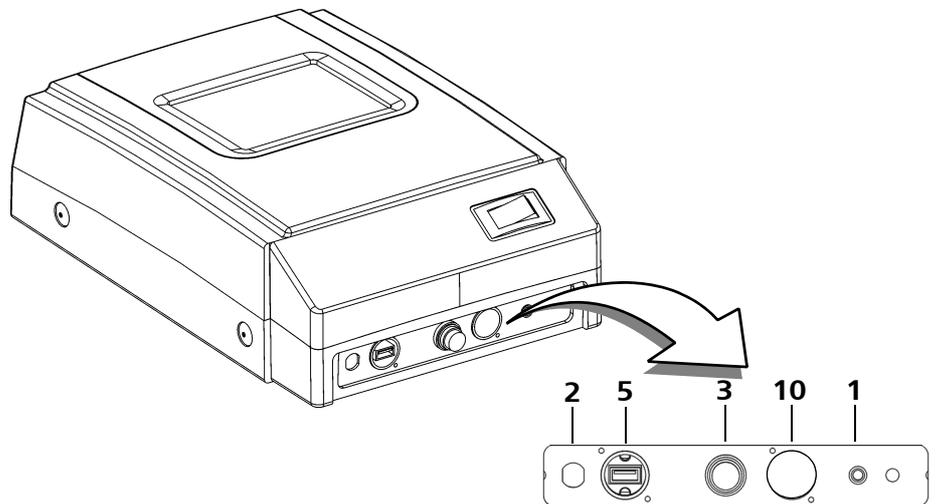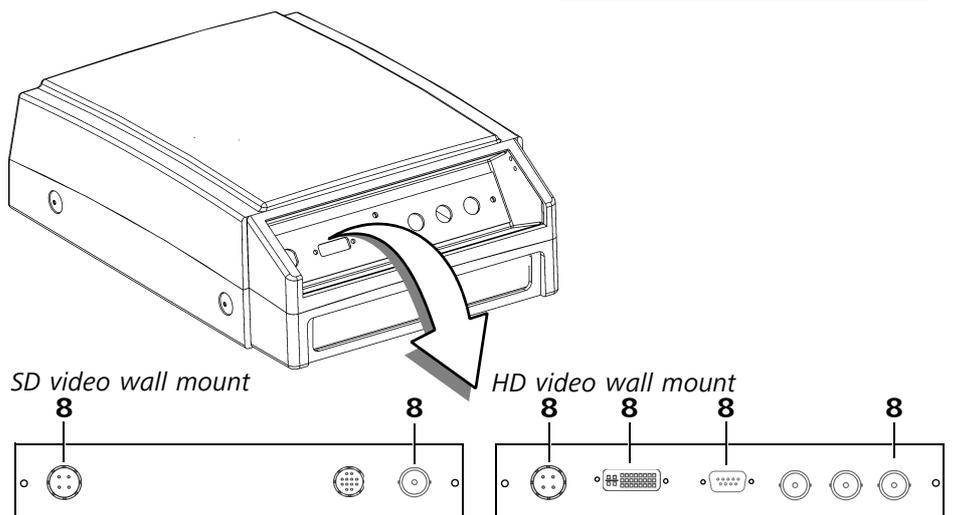*Fig. 15: Connector signs on the standard wall mount*

Fig. 16: Labels for connectors on video wall mount

SD video wall mount

HD video wall mount

System Overview

System overview

OPMI LUMERA 700 (floor stand version)

No image:

39. – Hard-wired or wireless foot control panel with 14 functions, page 104

    Belaidė kojinė panelė su 14 funkcijų

Optional accessories

– Integrated keratoscope

– Integrated slit illuminator

– IDIS (Integrated Data Injection System)

– Integrated SD 3CCD camera (standard definition)

– Integrated HD 3CCD camera (high definition)

– Integrated 22" TFT with carrier arm

– Integrated 22" TFT with carrier arm and device carrier for Zeiss devices such as, e.g., MEDIALINK 100, TRIO 610 or MediLive Trio Eye

– CALLISTO eye

– VISULUX - Motor-driven fiber slit illuminator

– RESIGHT 500 - manual fundus viewing system

– RESIGHT 700 - motor-driven fundus viewing system

Fig. 17: System overview
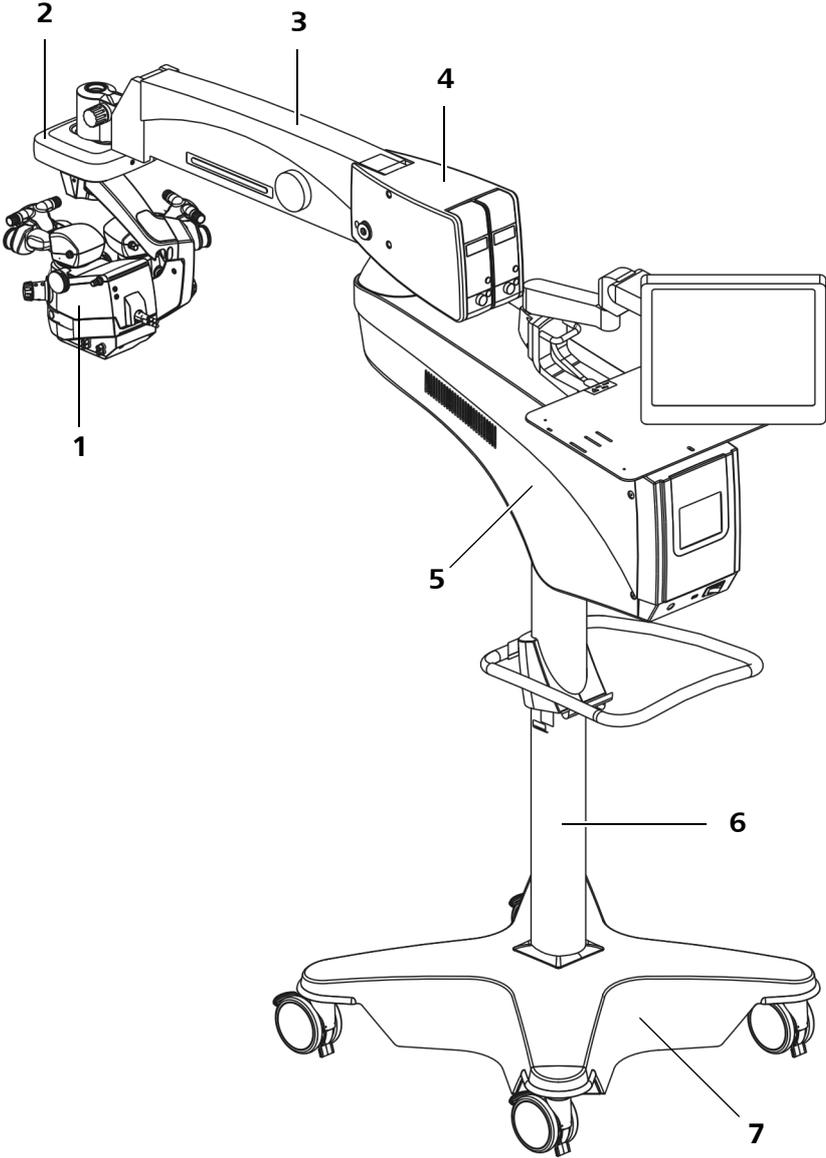
OPMI LUMERA 700 (ceiling mount version)

1 Surgical microscope - page 52

2 XY coupling -

3 Suspension arm - page 72

4 Lamp housing with light sources - page 78

5 Lift arm or rigid arm - page 72

6 Electronics box

7 Ceiling panel
(lining for the per-installation set and the ceiling mount flange)

8 Standard wall panel - page 88

9 Video wall panel - page 96 (optional)

No image:

– Hard-wired or wireless foot control panel with 14 functions, page 104

Optional accessories

– Integrated keratoscope

– Integrated slit illuminator

– IDIS (Integrated Data Injection System)

– Integrated SD 3CCD camera (standard definition)

– Integrated HD 3CCD camera (high definition)

– Integrated 22" TFT with height-adjustable 3-joint carrier arm

– CALLISTO eye with height-adjustable 3-joint carrier arm

– Carrier arm for operating light

– VISULUX - Motor-driven fiber slit illuminator

– RESIGHT 500 - manual fundus viewing system

– RESIGHT 700 - motor-driven fundus viewing system

Fig. 18: System overview
(ceiling mount version)
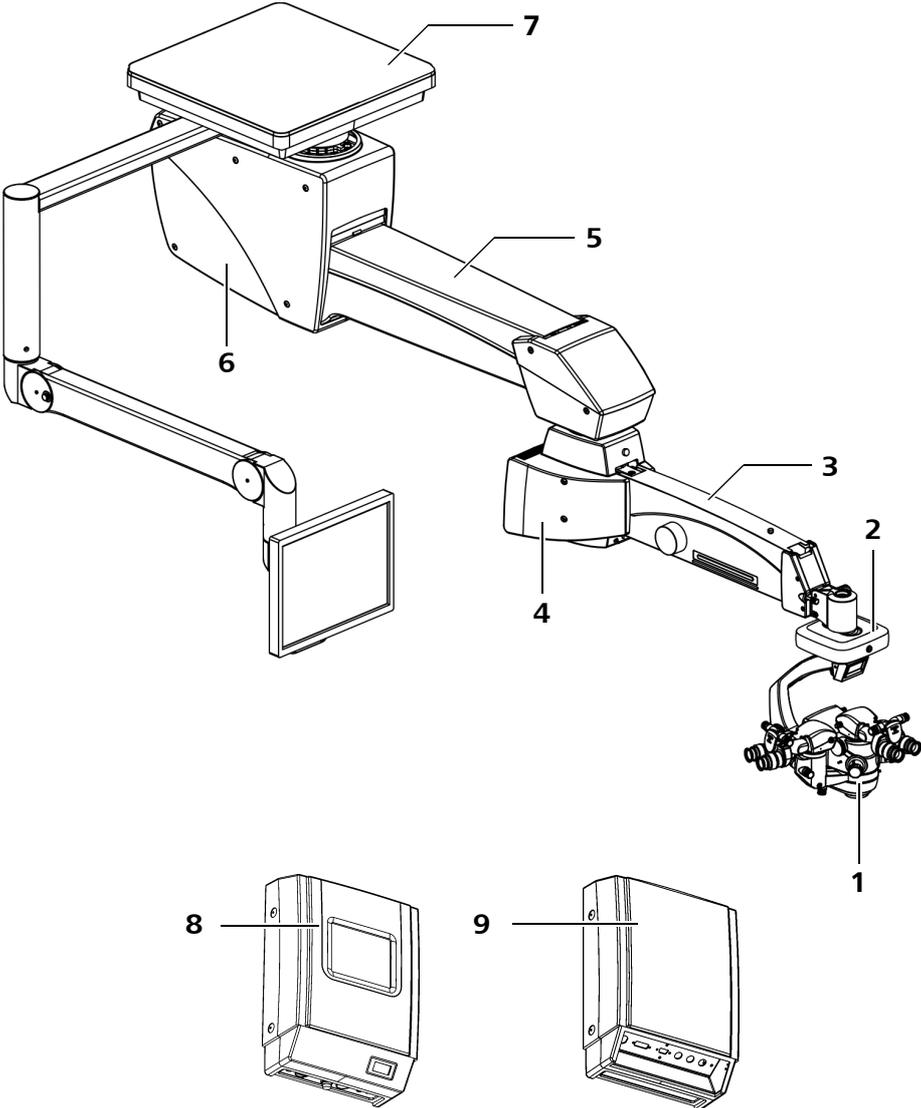
Components of the surgical microscope

1 <u>Tube for main and assistant's microscope</u>
The following tubes can be attached:
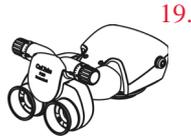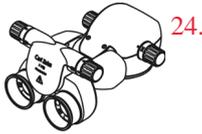
- Invertertube - manually adjustable (optional)
  The tube can be tilted by 110°. It is particularly suitable for use in combination with a fundus viewing system, as it erects an inverted image.

- Invertertube E - electrically adjustable (standard)
  The tube can be tilted by 110°. It is particularly suitable for use in combination with a fundus viewing system, as it erects an inverted image.

- 180° tiltable tube (optional)
  This tube can be turned by 180° and permits surgeons to sit upright even if the microscope is tilted.

- Inclined tube with a 45° viewing angle (optional)
  The tube cannot be tilted and is therefore mainly suitable for tasks performed with the microscope in a vertical position.

2 <u>Integrated SCI (Stereo Coaxial Illumination)</u>
The SCI illumination has been specially designed for use in ophthalmology and is integrated as a standard feature in the surgical microscope. It is used to illuminate the surgical field and can be controlled via the 5.7" control panel (see page 224), the foot control panel or handgrips.

There are three fixed SCI settings that can be activated directly or between which continuously variable adjustment is possible.

<u>Red reflex illumination</u>
Light emitted by the surgical microscope is limited to a diameter of approx. 20 mm and generates a red reflex which optimally visualizes the structure of the patient's eye.

<u>Red reflex / surrounding field illumination</u>
The light emitted by the surgical microscope generates a red reflex and simultaneously illuminates the surrounding area of the patient's eye. The ratio is freely configurable (seepage 192)

<u>Surrounding field illumination</u>
The red reflex is deactivated. The entire field of view is illuminated by surrounding field illumination.

*Fig. 19: Components of the
surgical microscope*
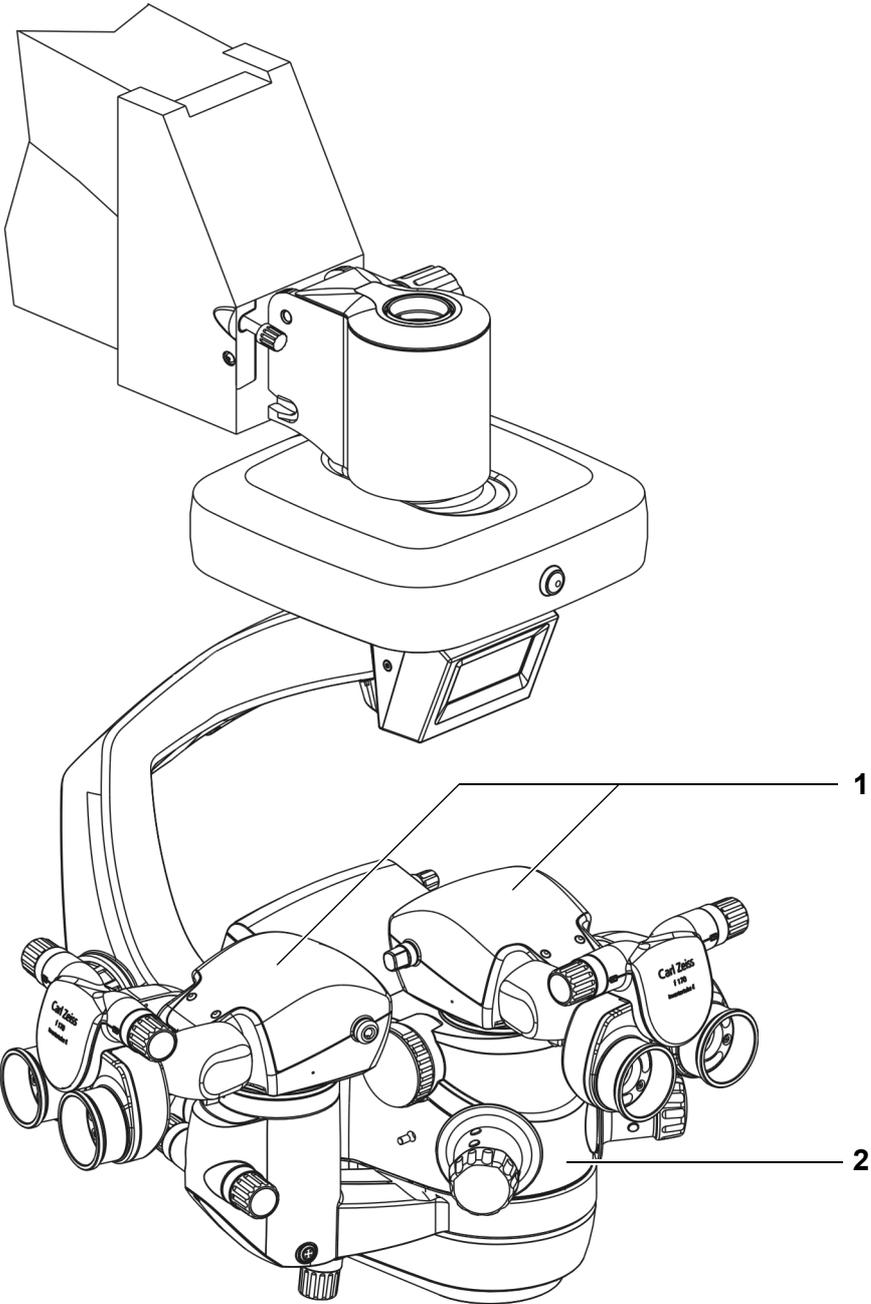
3 Slit illuminator (optional)

The slit illuminator is an integratedadditional light source for OPMI LUMERA 700. It creates a bright, clearly delineated slit image for high-contrast viewing of the front and back eye section.

The slit position (right, left) and the size of the slit apertures (slit width 0.2 mm, 2 mm, 3 mm and 4 mm) are set using the 5.7" control panel or the buttons of the foot control panel or hand grips, depending on the configuration.

The slit height in combination with an f = 200 mm objective lens is 12 mm.

When using the LED light source the slit illuminator is an LED device of laser class 2 according to IEC 60825-1:2001. According to EN 62471:2008 this light source is to be classified as belonging to the free group.

LED Class 2

4 Objective lens

Depending on the scope of delivery the following objective lenses are available for the different working distances of the surgical microscope:

– Objective lens f = 175 mm (available with and without support ring*)

– Objective lens f = 200 mm (available with and without support ring*)

– Objective lens f = 225 mm (available only with support ring*)

* The support ring is used for mounting the optionally available assistant's microscope 0°.

When using the LED light source the objective lens is an LED device of laser class 2 according to IEC 60825-1:2001. According to EN 62471:2008 this light source is to be classified as belonging to the free group.

LED Class 2

*Fig. 20: Components of the
surgical microscope*

3   **4**
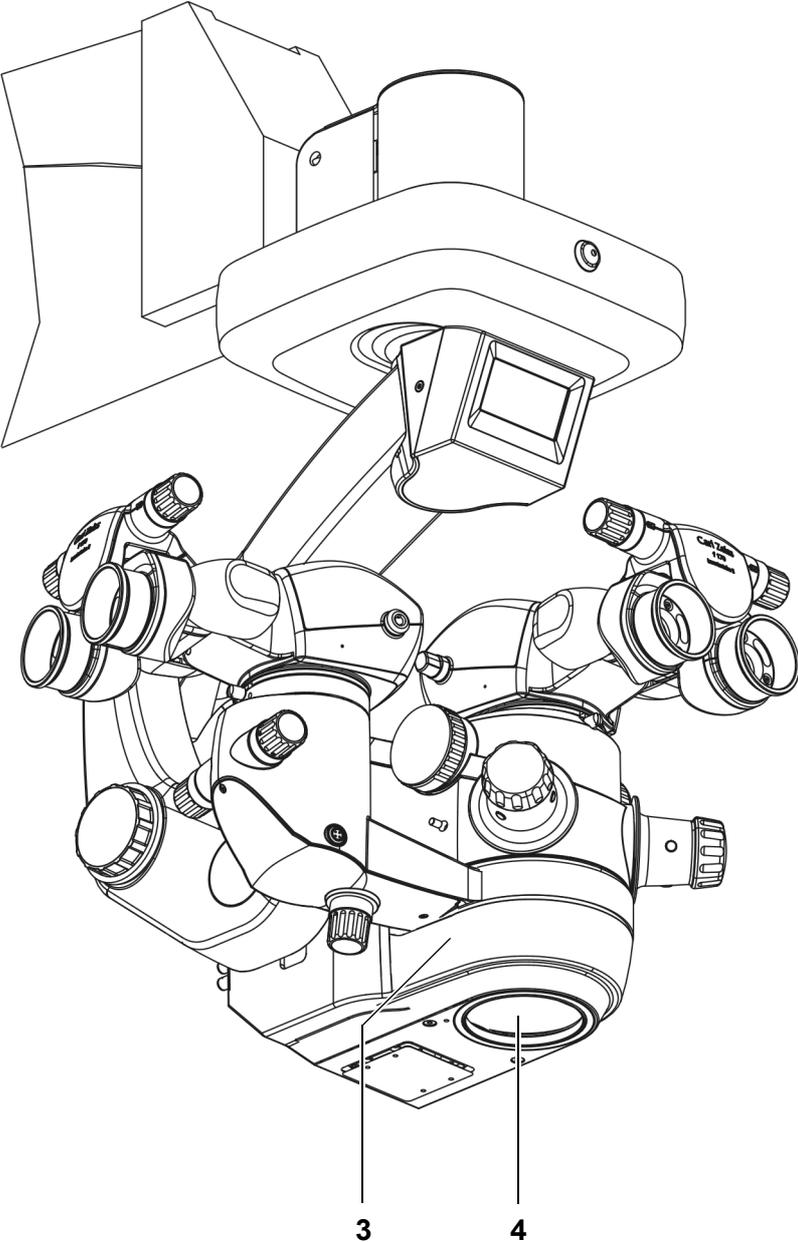
37. - 3. **5** Keratoscope (optional)

The keratoscope consists of a red LED illumination system that surrounds the objective lens as a ring. The feature is used to assess the shape of the cornea surface by observing and subjectively evaluating the pattern imaged on the cornea.

The following controls can be used to activate and deactivate the keratoscope, depending on the configuration:

- 5.7" control panel

- Hand grips

- Foot control panel

The brightness is adjustable using the 5.7" control panel (see page 227). You can also activate the Light Link function (see page 213). which ensures that the light intensity of the keratoscope is always matched automatically to the light intensity of the main light source.

LED Class 1

The keratoscope is an LED device of laser class 1 according to DIN EN 60825-1:2003. According to EN 62471:2008 this light source is to be classified as belonging to the free group.

Fig. 21: Components of the
surgical microscope

5
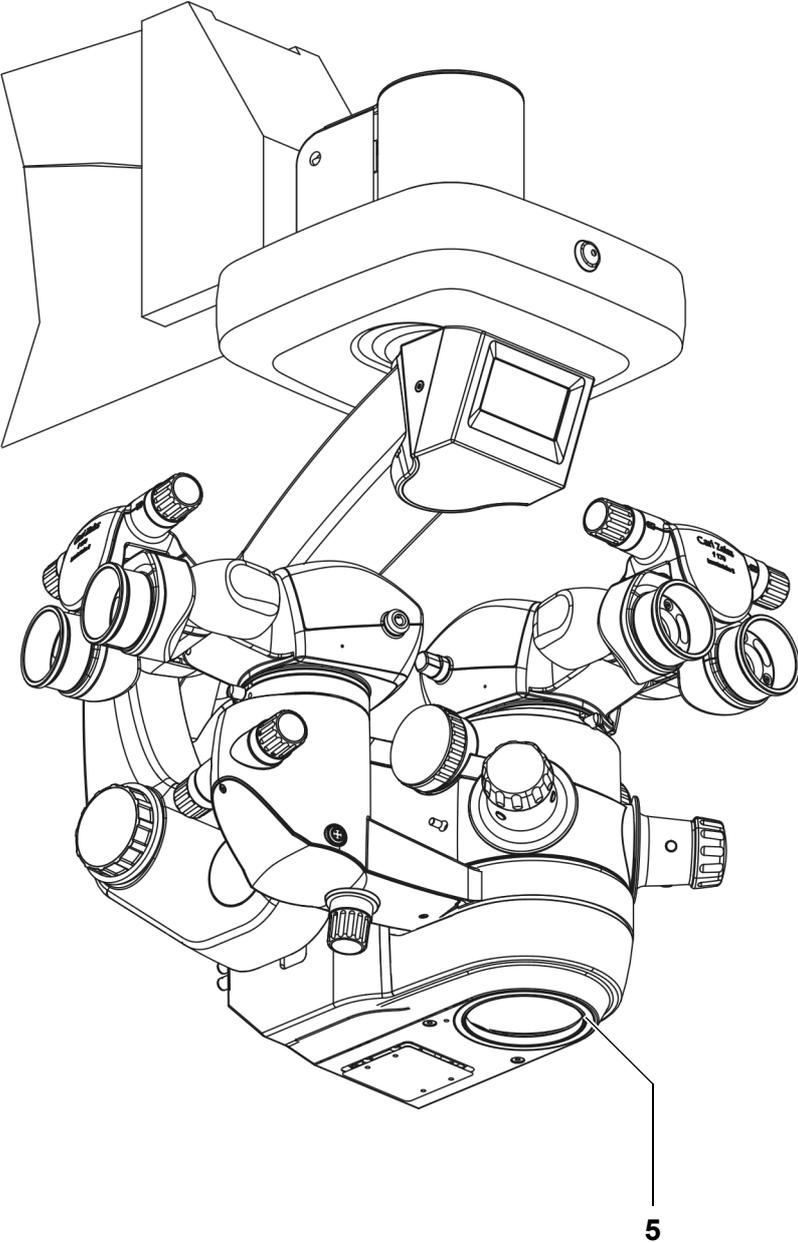
The two optical output ports of the beam splitter cannot be used simultaneously due to design reasons.

- Connect components such as video cameras or stereo coobservation modules either to the left or right optical output port.

- Use the beam splitter knob (see page 66) to switch between the left and right optical output ports.
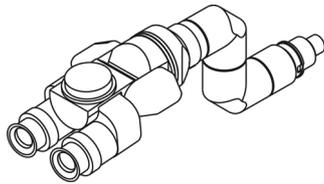
6 Left optical output port of the beam splitter
For connection of e.g. a stereo coobserver module with tube (see illustration on the left).
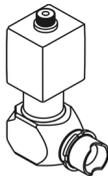
7 Right optical output port of the beam splitter
For connection of e.g. an external video camera with a C-mount adapter (see illustration on the left).

8 Optical fibre entrance
of the integrated S optical fiber of the coaxial fiber optic illumination system.

9 Connector for RESIGHT 700 fundus viewing system
This connector permits you to control the motorized focusing function of RESIGHT 700 via OPMI LUMERA 700.

10 Connector for Invertertube E
This connector permits you to control the motorized image inversion of Invertertube E via OPMI LUMERA 700. If RESIGHT 700 is also connected, the two devices can be synchronized so that the field of view is always displayed in the correct orientation.

Fig. 22: Components of the
surgical microscope
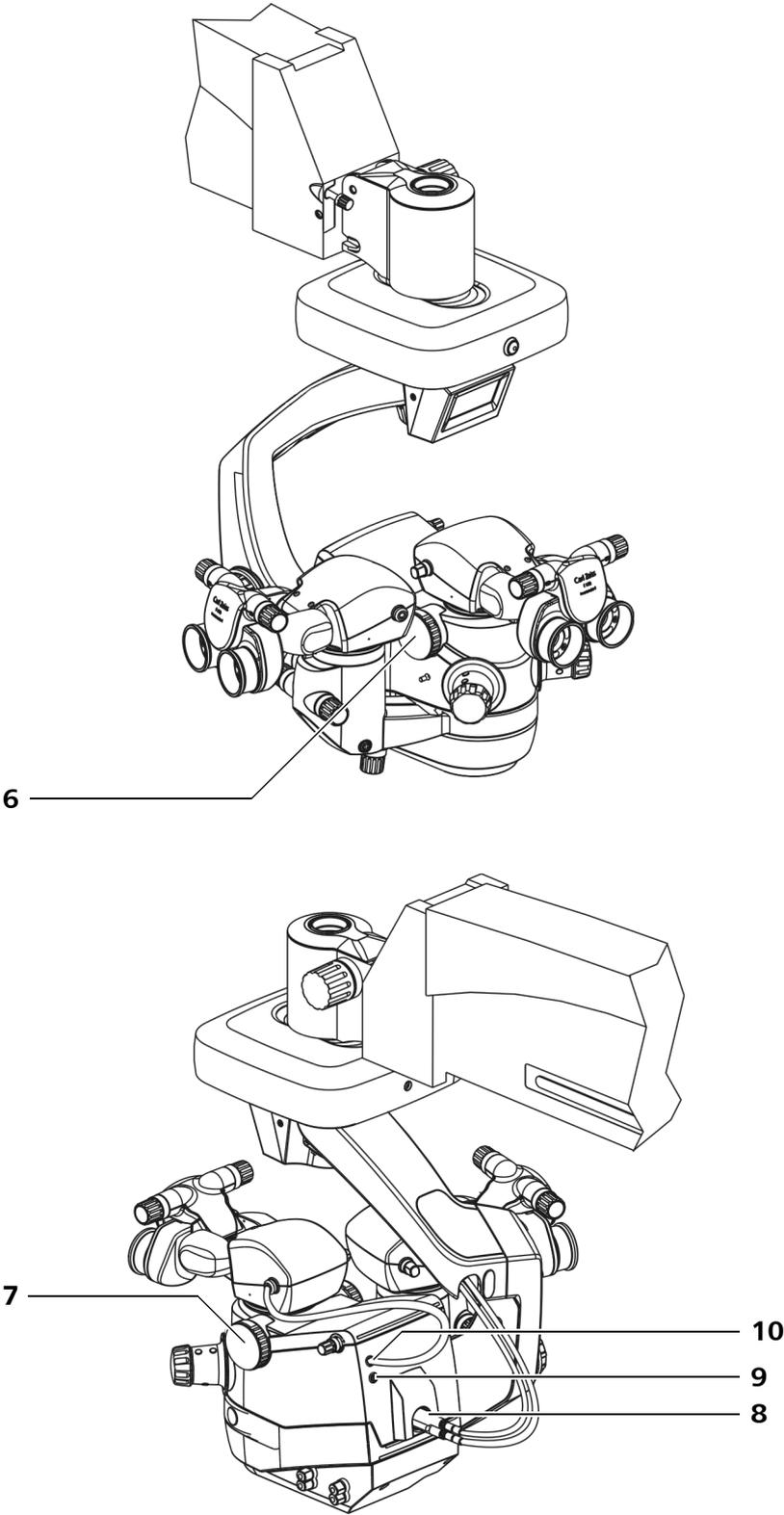
*Data on the
overhead display*
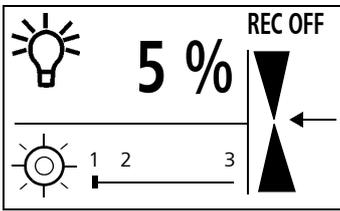
11 Overhead display (optional)

The following current information is displayed on the
overhead display (see image on left) for the user and his/her user profile:

− Light intensity in percent (☀)
  If the light source is switched off, the bulb is shown unlit (💡)

− Current focus position (↵)

− Set SCI position

  − Position 1 - red reflex illumination (⊙).
    Light emitted by the surgical microscope is limited to a diameter of
    approx. 20 mm and generates a red reflex which optimally visual-
    izes the structure of the patient's eye.

  − Position 2 - red reflex with surrounding field (◑).
    The light emitted by the surgical microscope generates a red reflex
    and simultaneously illuminates the surrounding area of the pa-
    tientÅ's eye. You can configure the start value for the combination
    ratio of this mode (see page 192).

  − Position 3 - surrounding field illumination (●).
    The red reflex illumination is deactivated. The entire field of view
    is illuminated by surrounding field illumination.

− "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
  integrated video recording option is not available.

− the warning sign, "CAUTION" (⚠) indicates that a message is dis-
  played on the 5.7" control panel. If the user acknowledges the mes-
  sage, the message on the 5.7" control panel and the overhead display
  disappears.

The user can set the status (activated/deactivated) and the brightness of
the overhead display on the 5.7" control panel (see page 214).

Fig. 23: Overhead display

11
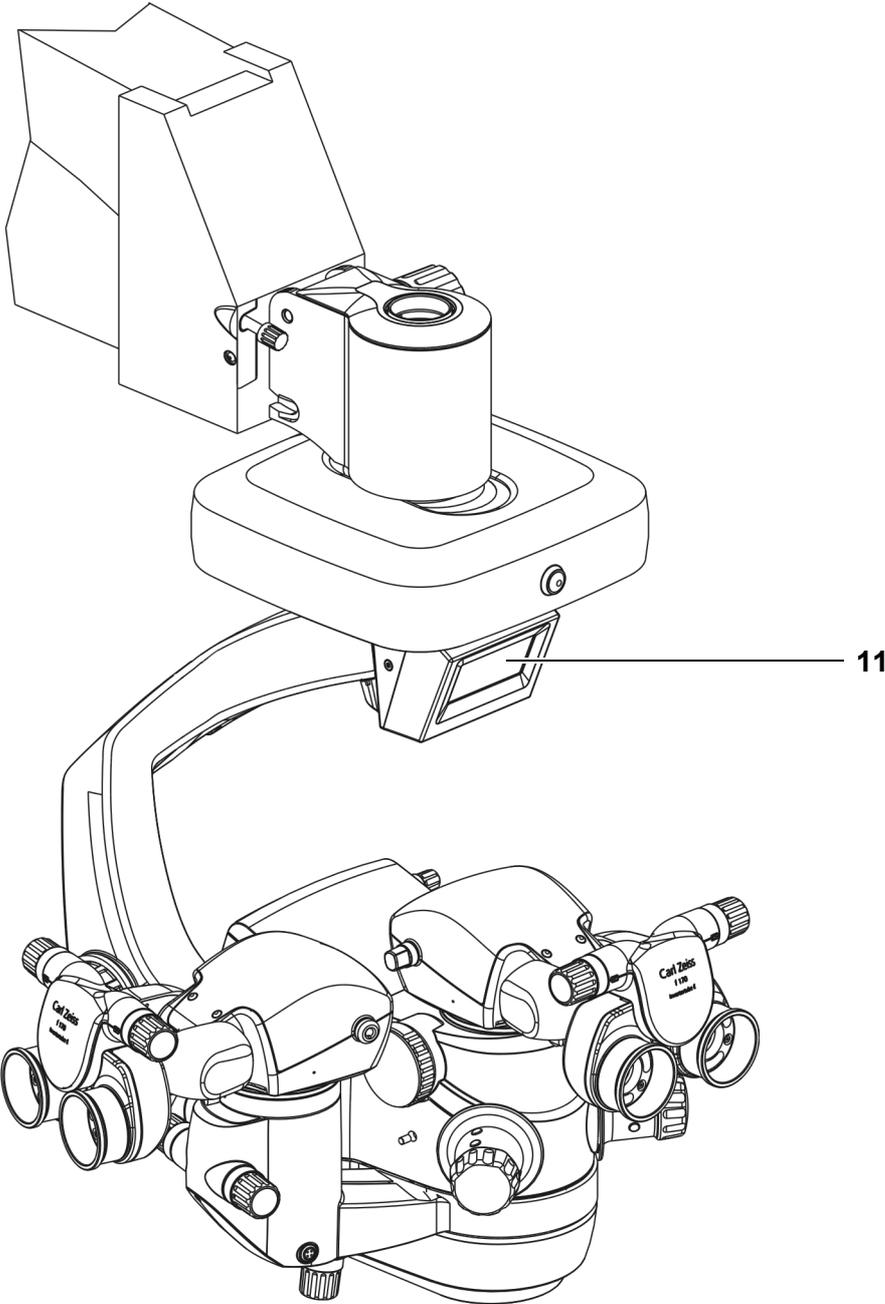
12 <u>IDIS – Integrated Data Injection System (optional)</u>
IDIS has been optimized for applications where CALLISTO eye and OPMI LUMERA 700 are used simultaneously. IDIS enables you to have the following information displayed in the right eyepiece and superimposed on the current microscope image.

– Status information about OPMI LUMERA 700

  – OPMI light (set brightness)

  – Additional light (set brightness)

  – Zoom (set magnification)

  – Battery charging state of the foot control panel

  – Signal strength of the radio connection of the foot control panel

– CALLISTO eye assistance functions for surgery support

35.4. - 4.   – K TRACK assistance function
Visualization of the shape of the cornea in combination with the keratoscope.

35.4. - 3.   – Z ALIGN assistance function
Assistance for alignment of toric intraocular lenses.

35.4. - 1.   – RHEXIS assistance function
Assistance when reaching the desired size and shape of the capsulorhexis.

35.4. - 2.   – Incision / LRI assistance function
Assistance function for easy positioning of incisions and LRIs.

Only one of the four assistance functions can be displayed at a time. For a detailed description of the functions, please refer to the CALLISTO eye user manual (G-30-1708).

LED Class 1

IDIS is an LED device of laser class 1 according to EN 60825-1:2003. According to EN 62471:2008 this light source is to be classified as belonging to the free group.

Retrofitting with IDIS is only possible for devices from serial number SN6634101596 onwards; devices up to serial number SN6634101595 cannot be retrofitted.

IDIS configuration and operation

The following prerequisites must be met in order to use the assistance functions of
CALLISTO eye:

✓ To enable use of the K TRACK, Z ALIGN and RHEXIS assistance functions, OPMI LUMERA 700 must be connected to CALLISTO eye via a network (seepage 124).

✓ To enable use of the K TRACK assistance function, OPMI LUMERA 700 must feature an integrated keratoscope.

NOTE

Poor surgical outcome!

If data errors occur or wrong optics parameters are input, the capsulorhexis ring is injected in the eyepiece with an offset and the surgical outcome deteriorates.

• Check the entered optics parameters before surgery.

• Check whether the injected ring data is plausible with regard to position and diameter.

NOTE

Defective IDIS!

When the IDIS is defective, assistance functions may fail and image errors such as offset image data may occur.

• To prevent poor surgical results such as incompletely corrected astigmatism, disable IDIS and align the toric lens using the CALLISTO eye screen.

The configuration and operation of IDIS and its assistance functions are described in the CALLISTO eye operating manual (G-30-1708).

Fig. 24: Integrated Data Injection System

12
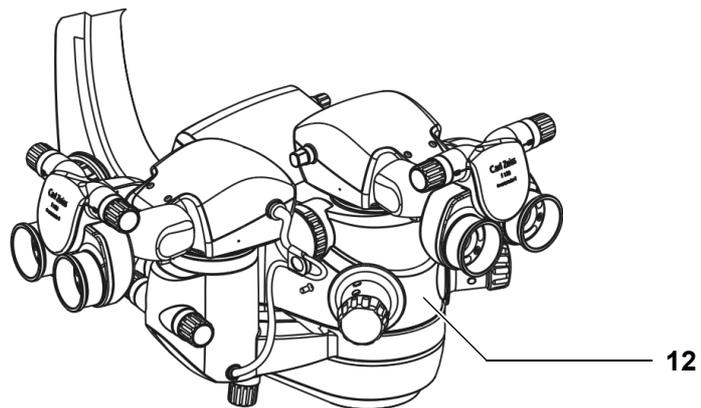
13 Assistant's microscope

22.1.

The integrated assistant's microscope in its standard version comes as an integral part of OPMI LUMERA 700. The assistant sees the same image as the main surgeon in the same image quality and without any loss of light.

Working position

22.2

The assistant's microscope is rotatable and has two working positions. These positions are to the left and right of the main surgeon and at a 90° angle (when looking in the viewing direction of the main surgeon). The locking mechanism ensures that the assistant's microscope does not swing out of position when you tilt the surgical microscope to the horizontal viewing direction. Since no clickstop mechanism is provided, the assistant can move the assistant's microscope by a certain amount out of the 90° position, if necessary.

Focusing system

23.

The assistant's microscope features a focusing system and is equipped with a motorized zoom system (standard) or a manual 5x magnification changer (optional). If the motorized zoom system is used, the main surgeon's magnification can be coupled with that of the assistant so that both of them always have the same magnification, or they can select their own separate magnification respectively. This can be configured in the Config menu. If the manual magnification changer is used, the main surgeon's and assistant's magnification can be adjusted separately.

The standard equipment includes eyepieces with a magnification factor of 10 x, providing a low initial magnification. The advantage lies in the larger field of vision and a better overall view of the surgical area.

*Fig. 25: Components of the
surgical microscope*

13
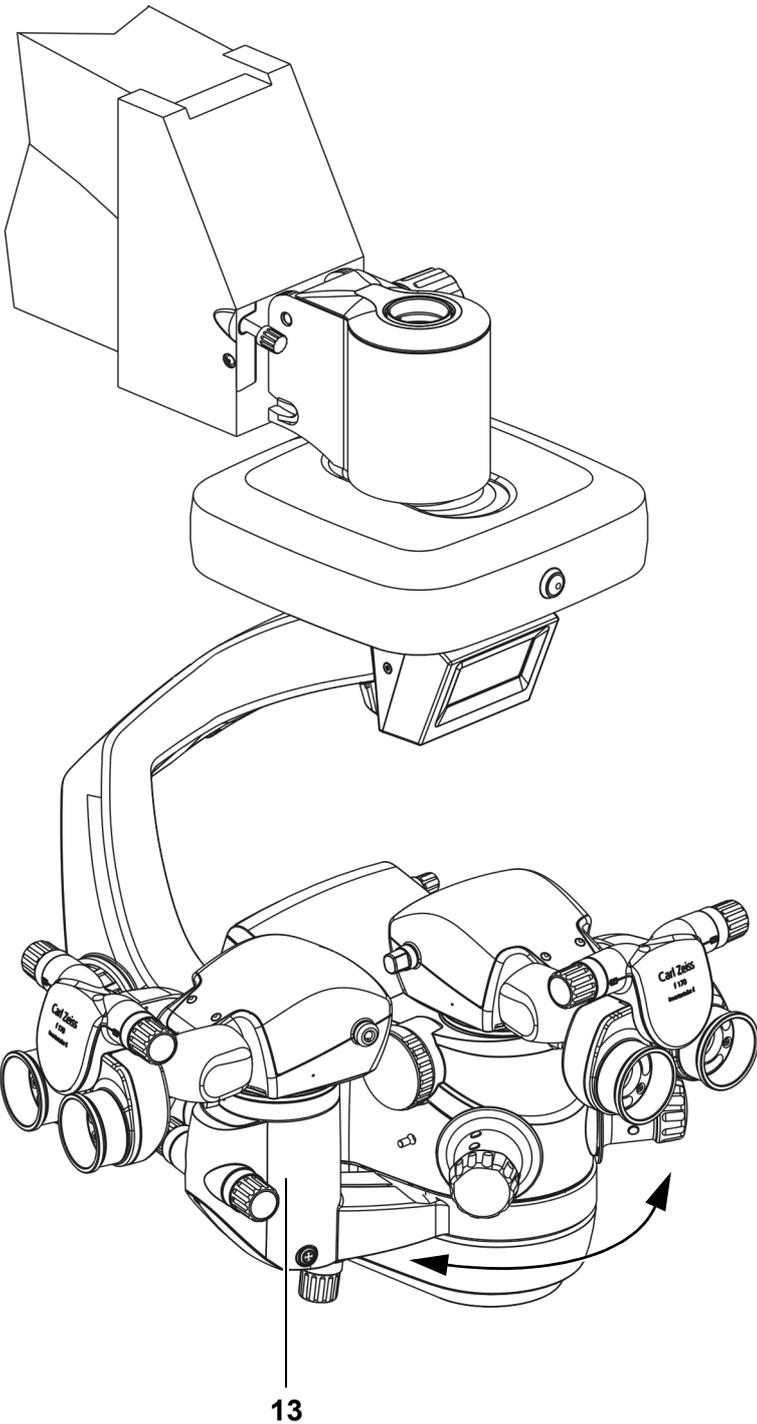
Controls of the main microscope and assistant's microscope

24. - 4.

1 Clamping screw of the assistant's tube
Locks the assistant's tube in place after it has been adjusted within its 12° rotational range

2 Rotary knob for zoom drive of assistant's microscope
As an option, the assistant's microscope can also be fitted with a manually adjustable 5x magnification changer.

3 Thumb wheel for the tilt device
for tilting the surgical microscope into a position convenient for the operator (e.g. vertical initial position).

4 Focus knob of the assistant's microscope
to set the focus of the assistant's microscope. Focusing is independent of the main microscope.

5 Beamsplitter knob
Enables manual switching of the coobserver port from left to right and vice versa.

2. - 2. **6** Handgrips with operating buttons
To release the magnetic brake and to operate and position the surgical microscope. The buttons of the handgrip can be freely configured (see page 202) and can be covered with asepsis caps to ensure sterile operation.

7 Locking knob of the assistant's microscope
Used to release the locking device of the assistant's microscope. The knob is always located on the opposite side of the assistant's microscope.

8 Knob for SCI illumination (in manual mode only)
Enables manual switching between red reflex illumination (left position) and surrounding field illumination (right position).

9 Knob for the integrated slit illuminator (in manual mode only)
Enables manual positioning of the slit illuminator. The knob provides the following setting options:

– left position = slit illuminator from the left

– center position = normal OPMI illumination

– right position = slit illuminator from the right

10 Zoom adjustment knob (for manual operation)
For manual adjustment of the main surgeon's magnification.

11 Retainer screw for tubes or accessories

*Fig. 26: Controls on the main
                         and
           assistant's microscope*
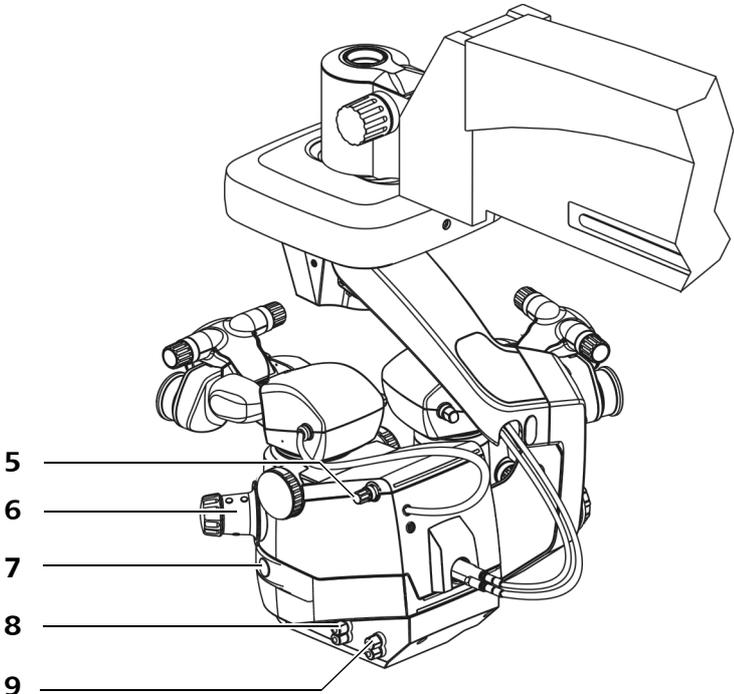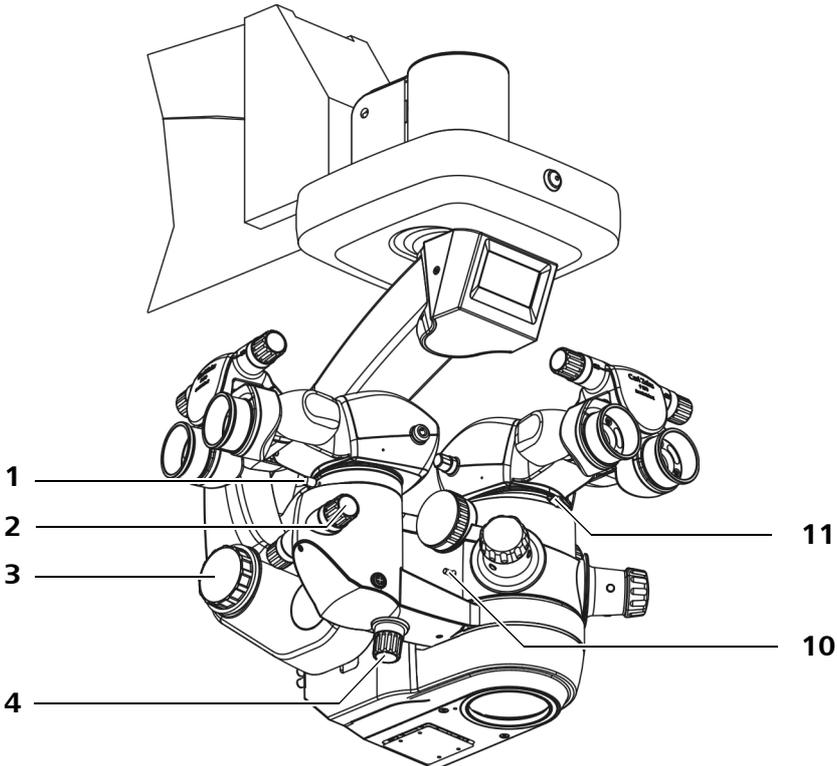
Controls for the tubes

180° tiltable tube and inclined tube

1 Eyepiece mount

2 Pupillary distance (PD) adjustment knob
    The correct position has been reached when the two eyepiece images
    merge into one. You can read off the PD setting on the adjustment knob.

Inverter tube and inverter tube E

3 Eyepiece mount

4 Knob for eye distance (interpupillary distance)

5 Warning label - use inverter tube only for main microscope

6 Knob for inverter

7 Symbol for switched off inverter

8 Symbol for switched on inverter

9 Control knob for manual invertion

*Fig. 27: Controls
        of tubes*
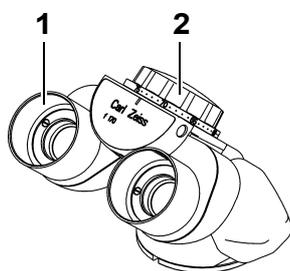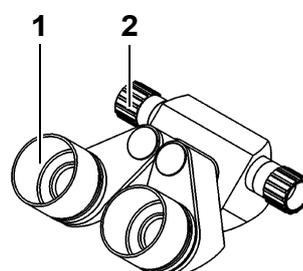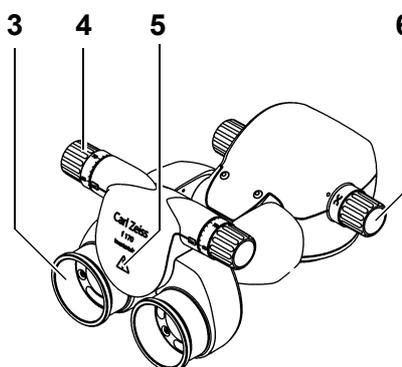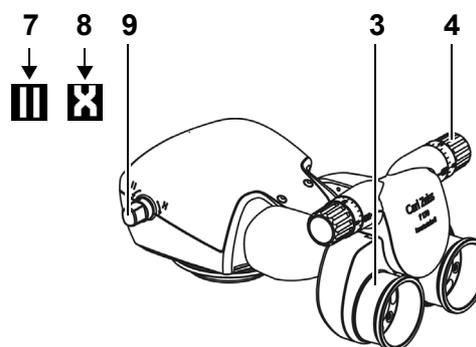
Controls for the widefield eyepieces

NOTE	**Widefield eyepieces with magnetic coupling**

Please note that the usual rules for the handling of magnets must be observed 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 or credit cards.

- Always store the eyepiece in its original packaging, when not using it.

1 <u>Eyecup</u>
for adjusting the distance between the eyepiece and the eye.

2 <u>Diopter setting ring</u>
adjustable from -8 D to +5 D

3 <u>Diopter scale</u>
for reading off the prescription set

Fig. 28: Controls for the eyepieces
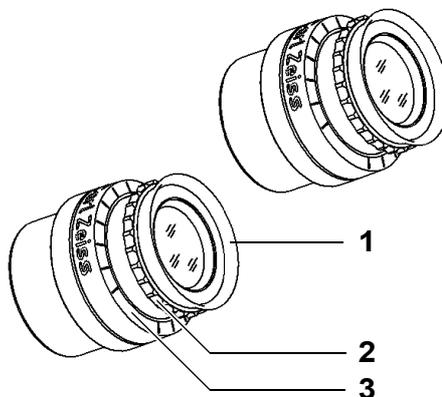
Components of the XY coupling

Controls of the XY coupling

⚠	**CAUTION**	**Risk of injury!**

When pressing the XY reset button, the device may be put in focus and can be lowered.

- Ensure the working distance between microscope and the patient is always larger than the moving range of the microscope.

27.   **1** <mark>XY reset button with LED indicator</mark>
You can have the functions listed below reset to their initial value when you press the XY reset button or move the suspension arm upward into the standby position. The XY reset button can be configured via the 5.7" control panel to meet your specific needs (see)page 186).

– XY coupling reset
When you press the XY reset button, the XY coupling moves to its center position.

– OPMI focus reset (always active)

– RESIGHT 700 focus reset (always active)
When you press the XY button, the focus of a connected fundus viewing system RESIGHT 700 moves to its center position.

– Zoom reset
The initial magnification level can be defined via the 5.7" control panel (see page 222).

– SCI reset
The initial value for light intensity and the position of the SCI illumination can be defined via the 5.7" control panel (see page 189).

Status of the reset button

– LED off: the button has been pressed and the system has been reset to the preselected initial status.

– LED on: a function has been activated and the system is no longer in the initial status.

Fig. 29: Controls of
XY coupling

1
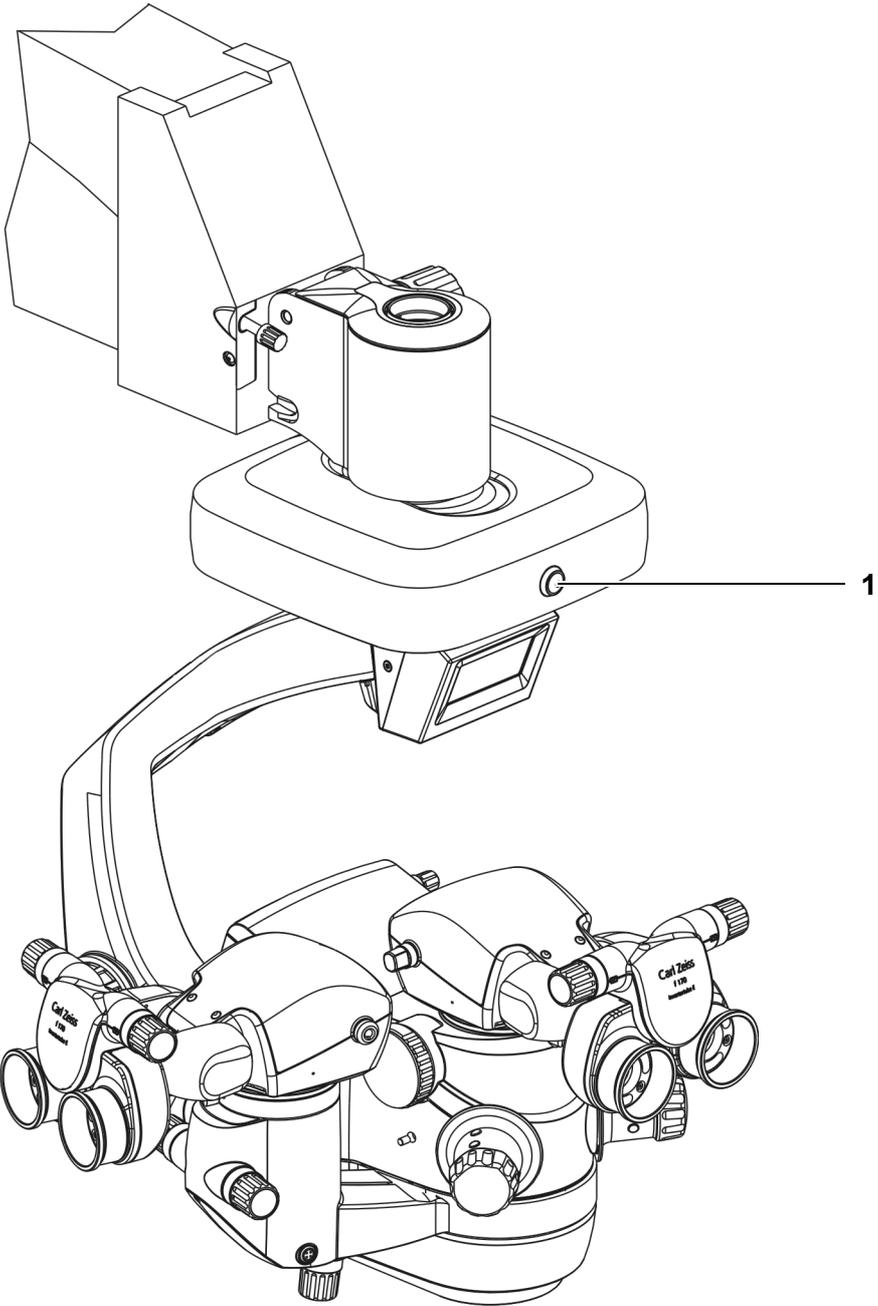
Floor stand and ceiling mount components

⚠️ **CAUTION**

Risk of injury caused by collisions!

The ceiling mount may collide with other moving parts of the ceiling mount system (e.g., carrier arm with 22" video monitor).

- Always ensure that you position moving parts slowly to avoid potential collisions.

- Avoid movements that could lead to collisions!
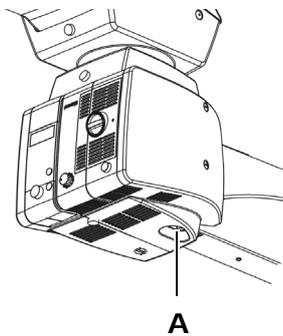
1 Lift arm or rigid arm (optional)

- Lift arm
  The moving lift arm can be used to adjust the height of the ceiling mount (motor-driven). The height is adjusted via the lift switch (A) on the bottom side of the lamp housing (see figure to the left).

- Rigid arm (optional)
  The rigid arm is adjusted to an invariable height during installation of the ceiling mount. With this type of ceiling mount, the height of the surgical microscope can only be adjusted via the suspension arm (2).

A

2 Suspension arm
The suspension arm enables precise positioning of the surgical microscope and moving it to its standby position. The standby position is reached as soon as the suspension arm has been completely moved up. At the same time, the light is switched off automatically and certain functions are reset to their stored starting values. The downward movement of the suspension arm can be limited as required.

Fig. 30: Components of ceiling mount and floor stand
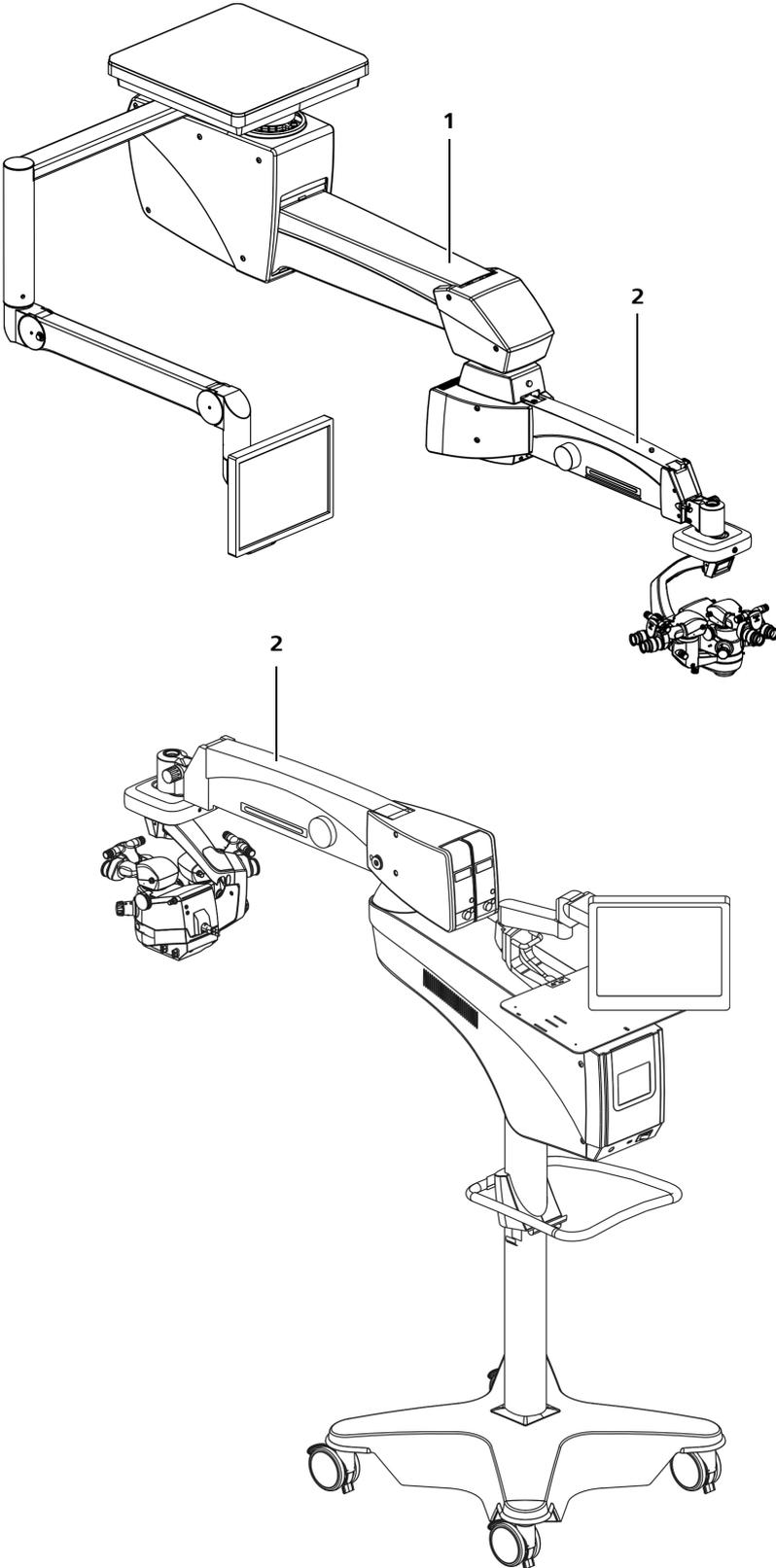
3 Carrier arm system for video monitors on the ceiling mount (optional)
The height-adjustable carrier arm system consists of a suspension arm (3a), height-adjustable 3-joint carrier arm (3b), and monitor holder (3c) with VESA-100 interface. The VESA-100 interface serves for attachment and alignment of the following accessories:

⚠ **CAUTION**

Incorrect diagnosis from video images!

The video monitors are not calibrated and not designed for diagnostics purposes. The visualized images may include deviations in scale, shape and color.

- Do not use the video sequences, video clips (cut sequences) and single images for diagnostic or treatment purposes.

  - The integrated 22" TFT (optional) can be used for dual observation of the surgical procedure by the sterile OR staff. The 22" TFT is automatically activated when the system is switched on and checks the signals at the connectors. Once the signal available has been detected, the 22" TFT automatically sets the correct screen resolution and frame rate.

35.1. - 5.
  - CALLISTO eye (optional) serves to assist and document eye surgery. It provides the OR team with relevant information and features an interface for controlling a surgical microscope. Patient and surgery data can be saved and exported to external systems. CALLISTO eye also provides a video-based functionality which supports the surgeon in the alignment of the axes of toric intraocular lenses.

4 Carrier arm for an operating light on the ceiling mount (optional)

NOTE

Carrier arm overload for operating lights (extension arm)

The maximum load capacity of the carrier arm for operating lights (extension arm) is 40 kg. The accessory equipment may apply a maximum torque of 400 Nm on the interface.

The carrier arm for operating lights consists of an extension arm (4) featuring an interface that can accommodate a lamp carrier arm including an operating light. The mechanical and electrical interface is designed for attachment of the following operating lights:

- Ondal Acrobat 2000 incl. rotary connector T19694

- Ondal Acrobat 3000 incl. rotary connector T19694

ⓘ The operating lights and rotary connectors and power supply are not included in the scope of delivery of the extension arm, but rather need to be supplied, installed, and connected by the manufacturer of the operating lights.

Fig. 31: Components of ceiling mount and floor stand
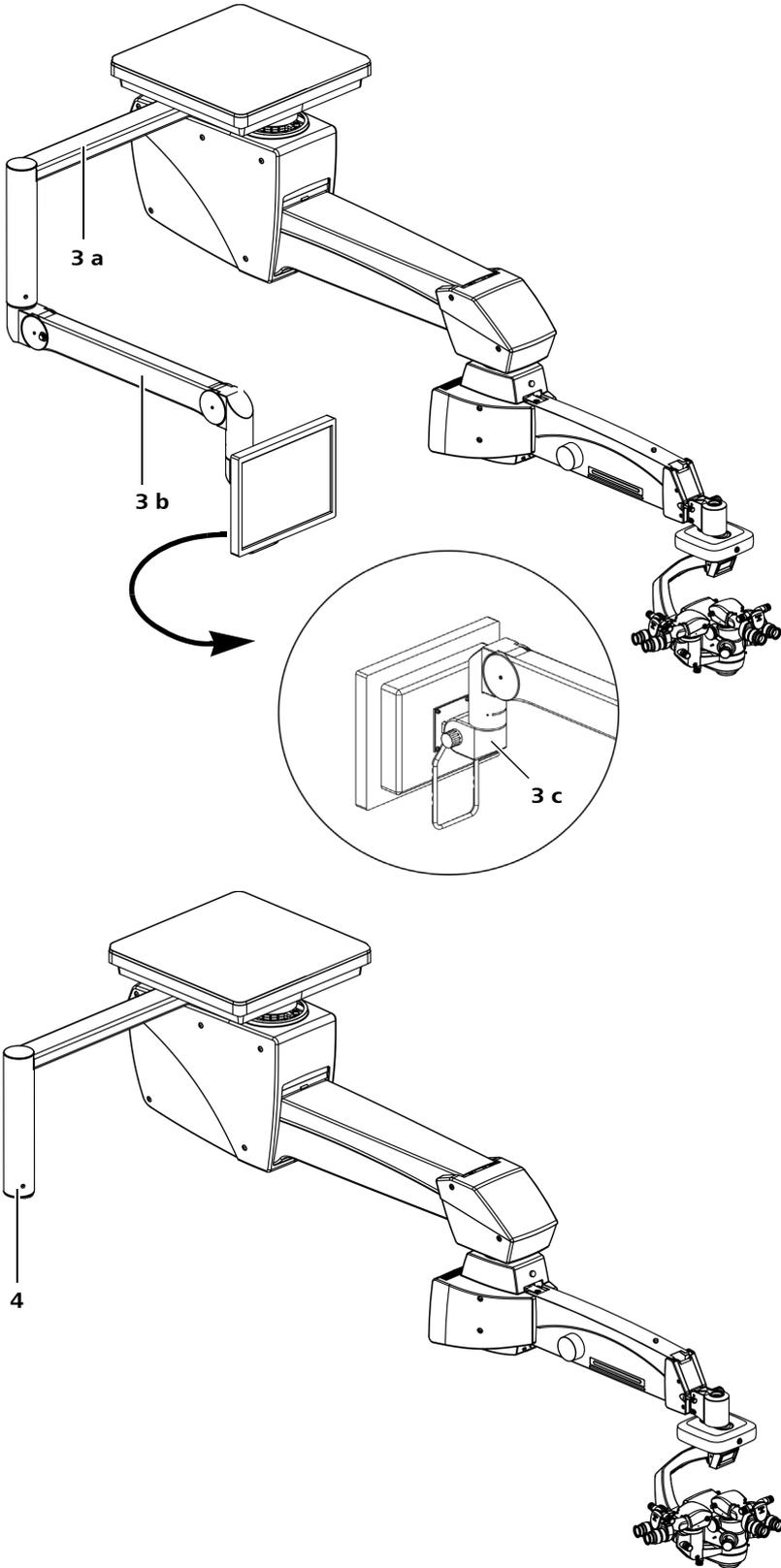
⚠ **CAUTION**

Maximum load capacity of the instrument tray!

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

- Do not exceed the instrument tray's load capacity of 13 kg.

- Make sure that all accessories are securely positioned on the instrument tray. Use the straps included in the delivery package to secure further accessories.

5 Instrument tray (optional)
The instrument tray is designed for holding the Zeiss units, MEDIALINK 100, VISULAS 532s or MediLive Trio.

35.3 **6** Carrier arm for monitors on the floor stand (optional)
The carrier arm serves for attachment and alignment of the integrated 22" TFT. It can be used for dual observation of the surgical procedure by the sterile nurses and other OR staff.

Fig. 32: Components
of ceiling mount and floor
stand
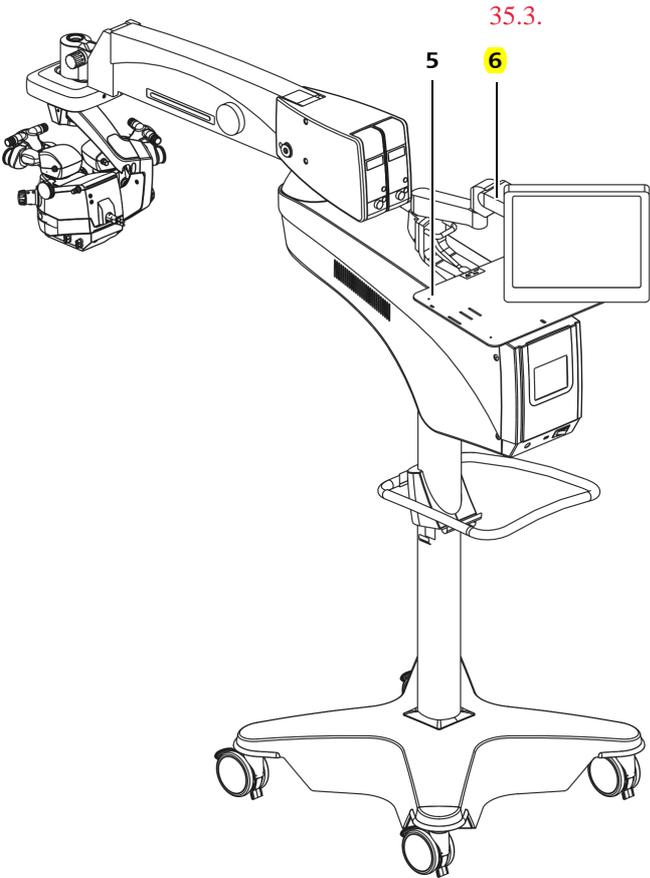
7 Lamp housing

The light source(s) in the lamp housing supplies/supply light to the SCI illumination system and the additional illuminator (e.g. VISULUX fiber slit illuminator). The device can be equipped with one of the following light source combinations:

	Main light source	**Additional light source**
Easy	Xenon (Superlux Eye)	-
	Halogen (optional)	-
	LED (optional)	-
Dual (optional)	Xenon (Superlux Eye)	Halogen
	Halogen	Xenon (Superlux Eye)
	Halogen	LED
	LED	LED
	LED	Halogen
	LED	Xenon (Superlux Eye)

Superlux Eye (standard)
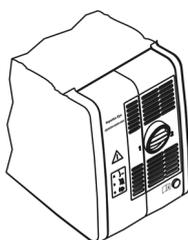
The system comes with an integrated lamp housing containing the Superlux Eye light source. The lamp housing features fiber optic illumination, a motorized filter wheel and two xenon lamps. The second xenon lamp is used as a backup lamp which can be manually swung into the illumination beam path if the first xenon lamp fails.

The xenon lamps generate light whose spectrum resembles that of natural daylight. Regardless of the brightness setting, the color temperature of the light always remains the same. This permits normal daylight film without any additional conversion filters to be used for photographic documentation. The following filters can be swung into the beam path via the 5.7" control panel, the foot control panel or the handgrips:

– Retina protection filter (blue barrier filter). The filter is integrated as a standard feature. It protects the patient's eye against unnecessary radiation and permits the radiation exposure time to be increased by factor 5.

– HaMode filter. The filter is integrated as a standard feature and generates a light spectrum similar to that of a halogen light source.

– Fluorescence filter, 485 nm. This filter makes fluorescent areas visible and is available as an option.

If the SuperLux Eye light source is equipped with a 485 nm fluorescence filter, the front panel is marked by the number 304977-9116-500.

Fig. 33: Components of ceiling mount and floor stand
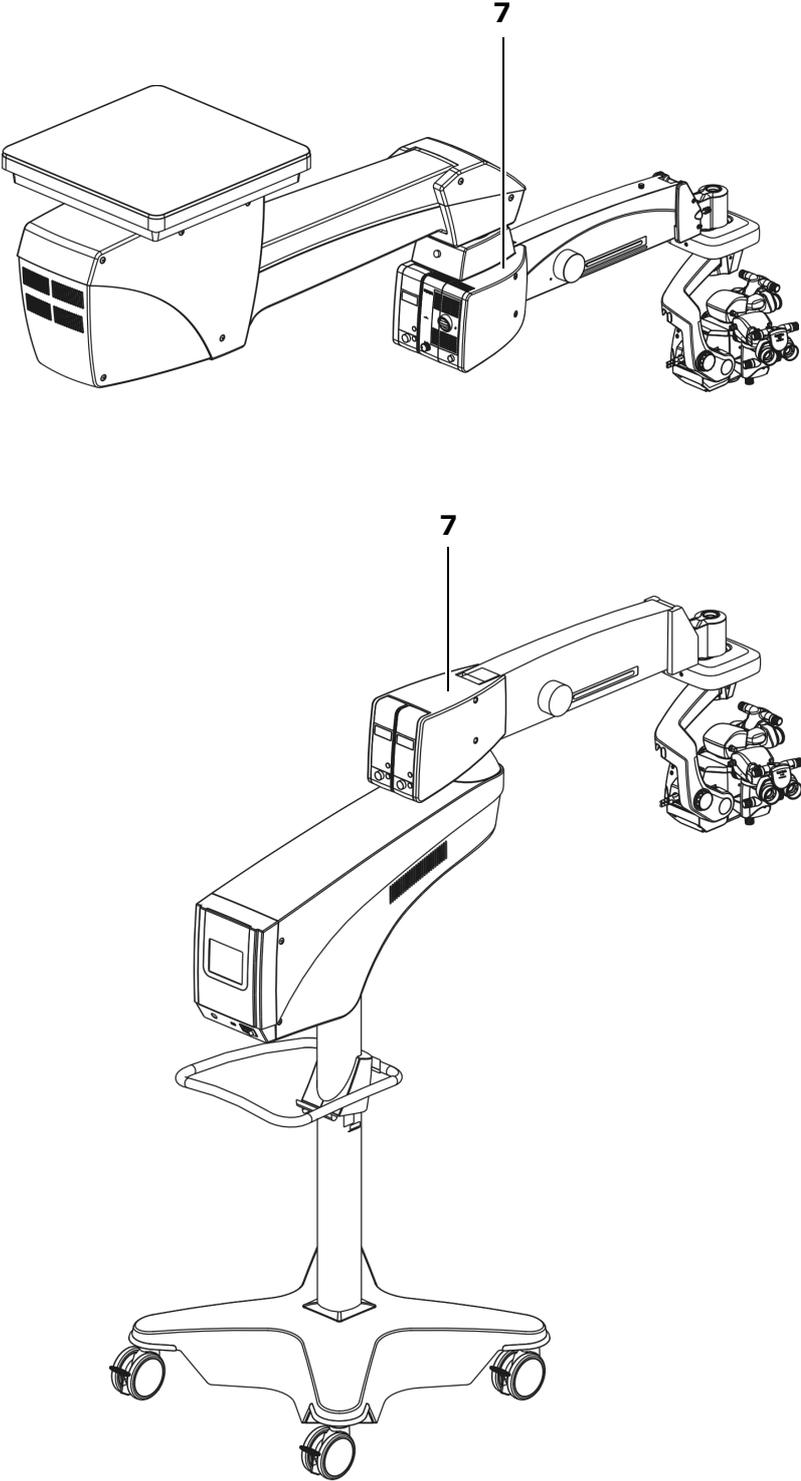
Halogen (optional)
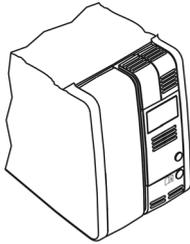
The lamp housing (7) with the halogen light source features a fiber optic illuminator and a motor-driven filter wheel. The integrated automatic lamp changer ensures that a backup lamp is automatically swung into the illumination beam path if the first lamp fails.

The following filters can be swung into the beam path via the 5.7" control panel, the foot control panel or the handgrips:

– Retina protection filter (blue barrier filter)

– Fluorescence filter 485 nm (optional)

LED (optional)

The lamp housing (7) with the LED light source features a fiber optic illuminator and a motorized filter wheel. If the light source is defective, the light intensity is reduced to 50 % and an error message is displayed on the 5.7" control panel.

The following filters can be swiveled into the beam path via the 5.7" control panel, the foot control panel or the hand grips:

30. - 3. – Retina protection filter (blue barrier filter). The filter is integrated as a standard feature. It protects the patient's eye against unnecessary radiation and allows the radiation exposure time to be increased by factor 5.

– 25 % gray filter (optional). It reduces the set light intensity to 25 % and allows the radiation exposure time to be increased by factor 4.

30. - 1. – HaMode filter (The filter is integrated as a standard feature and generates a light spectrum similar to that of a halogen light source.

30. - 4. – Fluorescence filter, 485 nm (option)

Combination (optional) 33. This lamp housing (7) comprises the light sources described above. The light sources are factory-configured according to your order and can be used as follows:
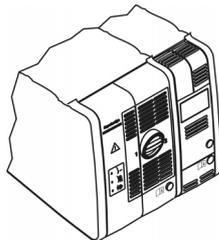
– One of the two light sources is used as the main light source of the surgical microscope.

– The second light source is intended, e.g., for the use of an additional light source, such as a fiber slit illuminator or oblique illumination.

Fig. 34: Components
of ceiling mount and floor
stand
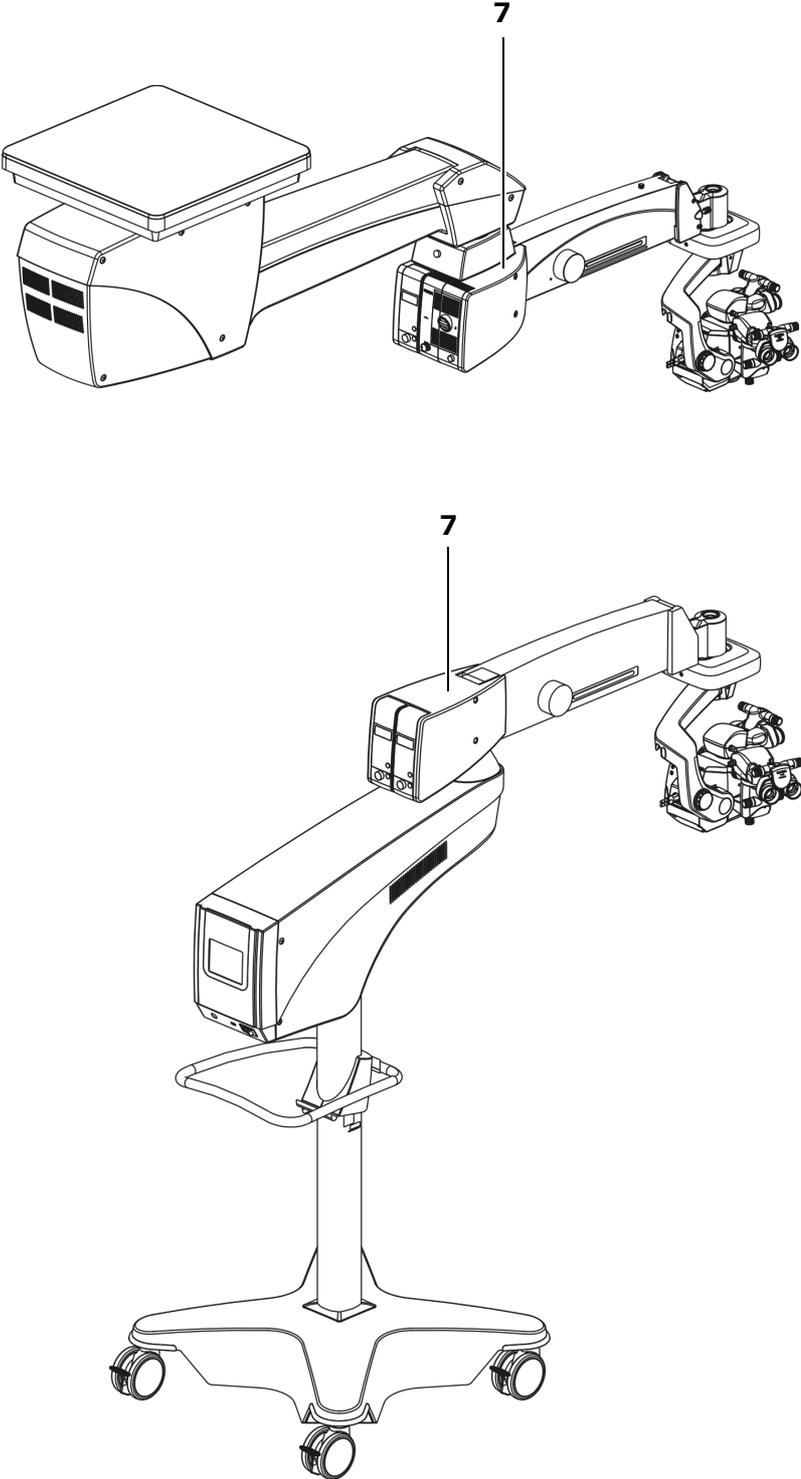
8   Electronics box mit 5.7" operating panel
The electronics box contains the 5.7" operating panel for controlling the surgical microscope.

⚠ **CAUTION**

Risk of injury!

Wrong operation of the equipment may increase the light's intensity and may lead to retina damages of the patient's eye.

•   Adjust the intensity of the irradiation and the resulting irradiation time by selecting the appropriate illumination setting. The values recommended by Carl Zeiss can be found in table "Maximum radiation exposure times" in Chapter "Safety measures".

9   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; there is also a holder for hanging up the foot control panel.

10 Stand base
The stand base is equipped with four steerable castors (12) which make it easier for you to position the system in the OR. The locking tabs (13) of the castors can be used to prevent the system from moving or rolling away inadvertently. At least two locking tabs must be pressed down to position the stand.

•   Press locking tab (13) down to lock the castor.

•   Press locking tab (13) up to release the castor.

The cable deflectors (11) protect cables lying on the floor from damage after being rolled over.

Fig. 35: Components of the floor stand

2. - 1.
Mobilus - sumontuotas at stovo su ratukais

13   12   11   10   9   8
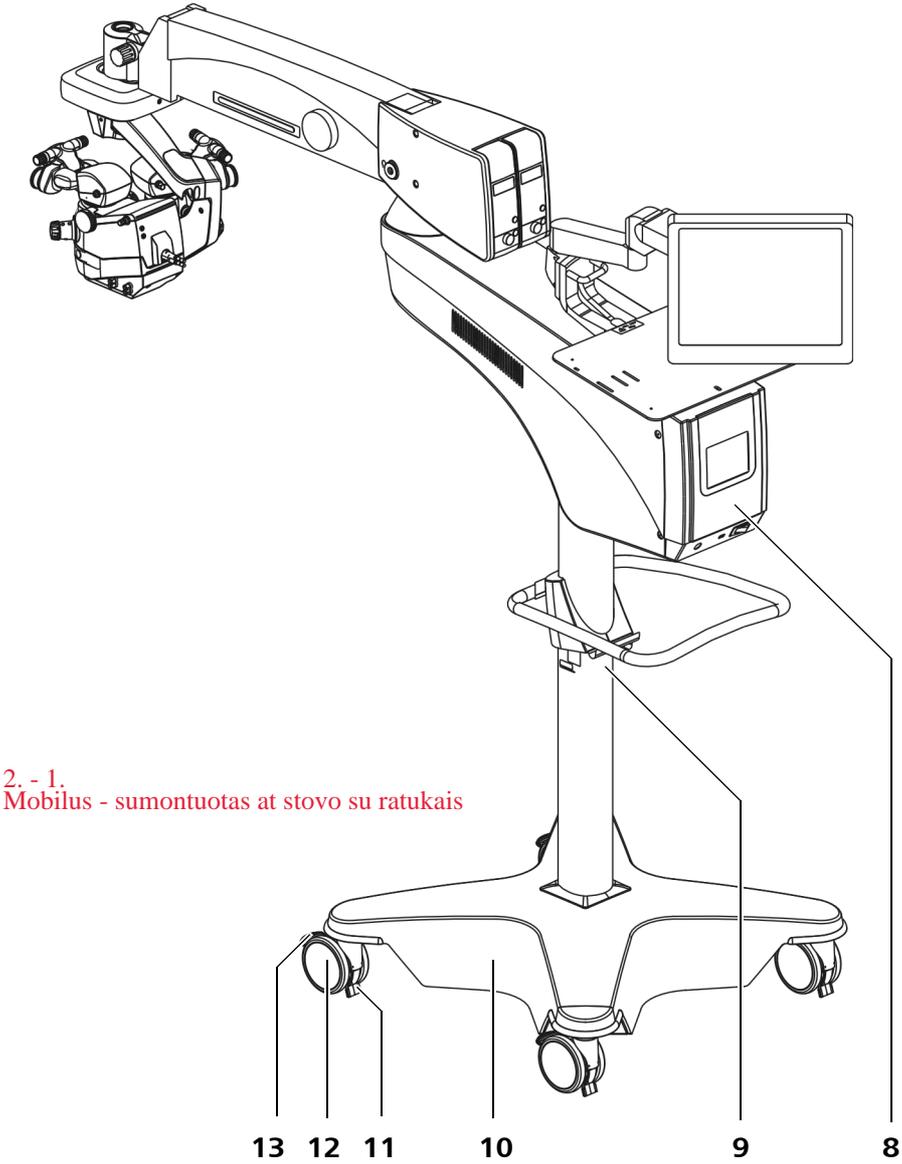
Controls of the lamp housing

| ⚠ **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 increasing age of the light source, the actual illumination intensity delivered at the respective setting decreases.

- Please replace the xenon lamp in due time.

- Reset the residual service hour display on the 5.7" control panel to "0".

LED light source **1** Display: LED light source defective

| **NOTE** | **LED light source defect!** |

If the LED is shining amber, the LED light source is defective. In this case, the light intensity reduces to 50% and an error message is displayed on the 5.7" control panel.

- Please contact Carl Zeiss Service.

Halogen light source **2** Flap indicating the operating status of the halogen lamps

- When the flap is closed, the main lamp is operative.

- When the flap is open (yellow mark on the side), the main lamp has failed and the backup lamp is in use.

3 Button for manual activation of the backup halogen lamp

4 Button for opening the halogen lamp module

Xenon light source **5** Switch for manually swinging the xenon backup lamp into the beam path

6 Display: Xenon backup lamp working
If the red segment in switch (5) is lit, the backup lamp is in use.

7 Button for opening the xenon lamp module
When you press this button, the lamp module is slightly ejected.

Fig. 36: Lamp housings

LED
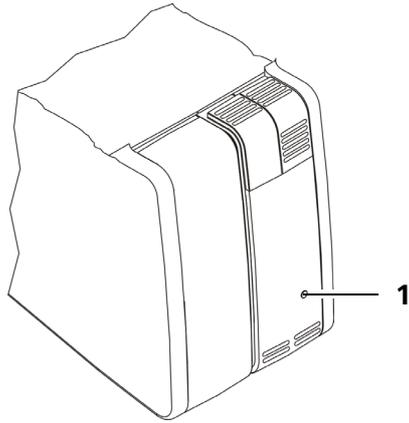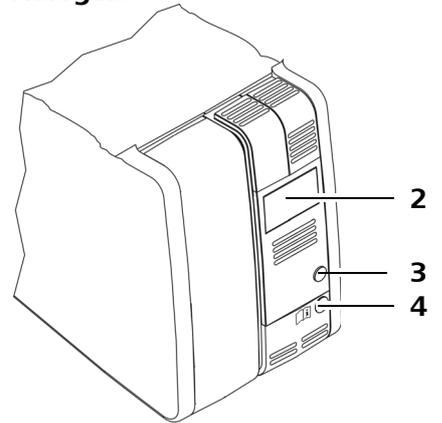
Halogen

Xenon
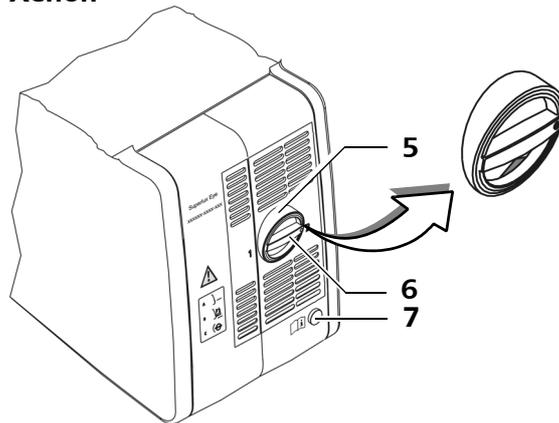
Xenon + Halogen
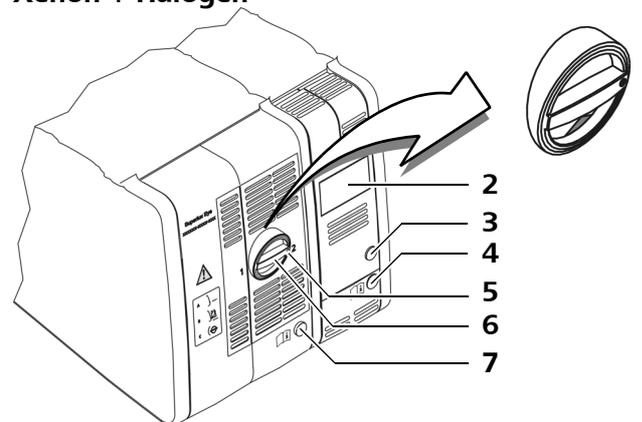
Controls on the suspension arm

1 Rotary knob for limiting downward movement
Serves to set the minimum working distance from the surgical field in vertical direction. See page 150.

2 Locating device of suspension arm
Serves to prevent the suspension arm from shooting up or falling down when accessories are attached to or removed from the microscope.

3 Locking screw of cable duct

4 Switching strip for magnetic brakes
Enables an unsterile person to release the magnetic brakes.

– Balance +

5 Rotary knob for weight balancing
Serves to balance the surgical microscope.

6 Lift switch on ceiling mount (optional)
The lift switch can be used to set the ceiling mount to the desired working position by moving the lift arm down or up.

7 Manual mode switch on ceiling mount
Permits manual control of the major functions in the event of system failure (see page 240).

Fig. 37: Controls on the spring arm
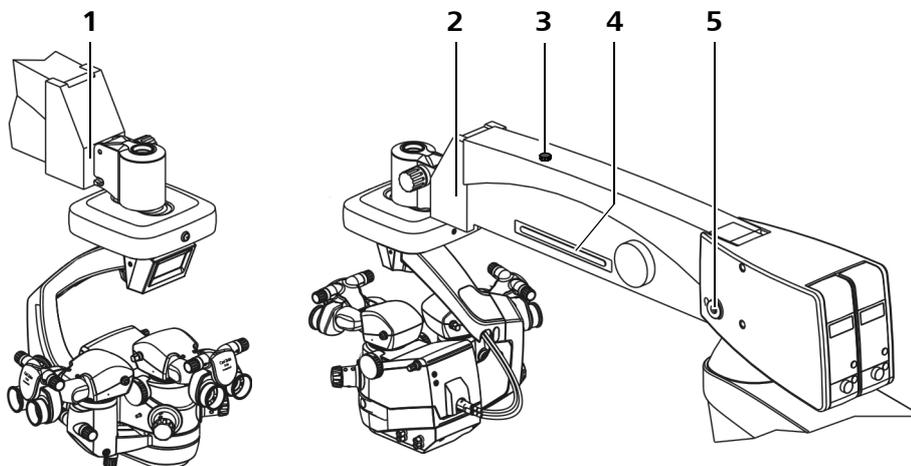
*Fig. 38: Controls
on the suspension arm
of the ceiling mount*
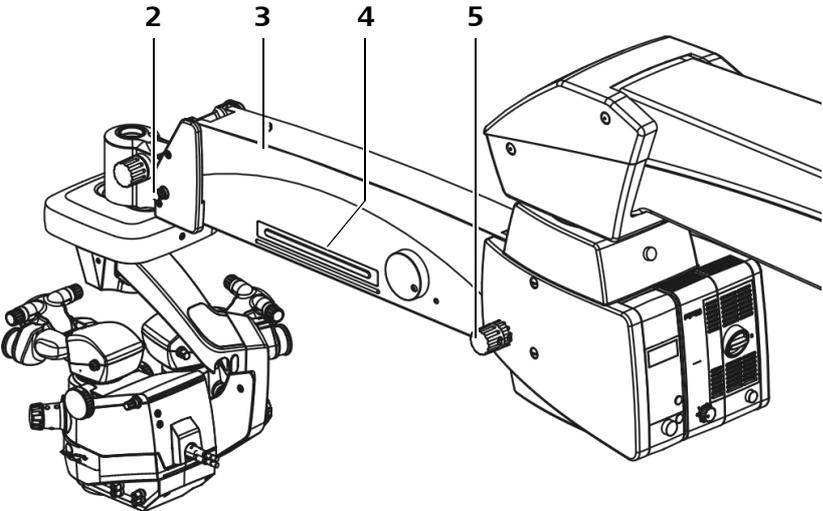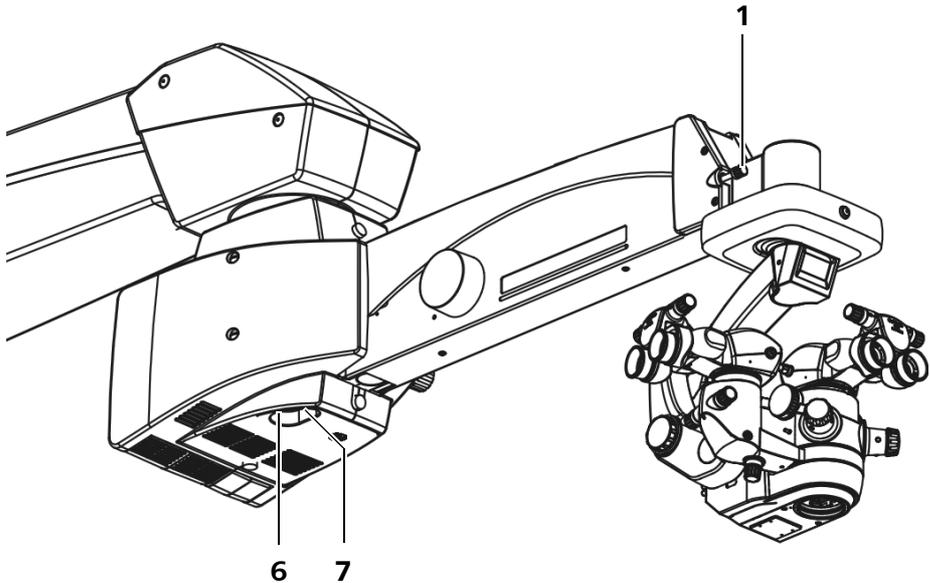
Controls on the standard wall panel of the ceiling mounts and on the control and display panel of the floor stand

4. **1** 5.7" control panel with touchscreen functionality
The 5.7" control panel is the central communication interface of the system. It enables the user to access the settings of the microscope, suspension system, illumination system, camera (if applicable) and the programmable components of the handgrips and foot control panel. It is possible to store settings specific to each user or system.

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

2 Master switch
to turn the device off and on. The master switch is fitted with an additional electric cutout, which shuts down the device in case of a short circuit.

3 Switch for manual operation
For the manual operation of important functions during equipment failure, (see page 240).

*Fig. 39: Display and
control panel*
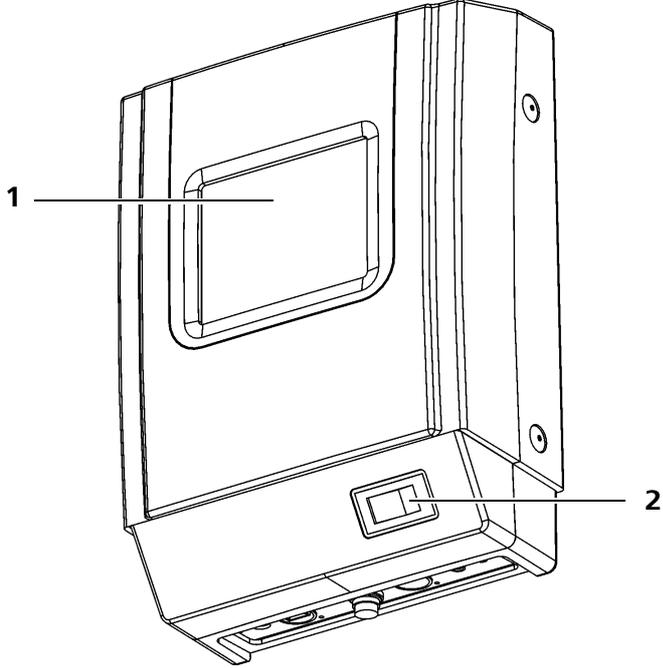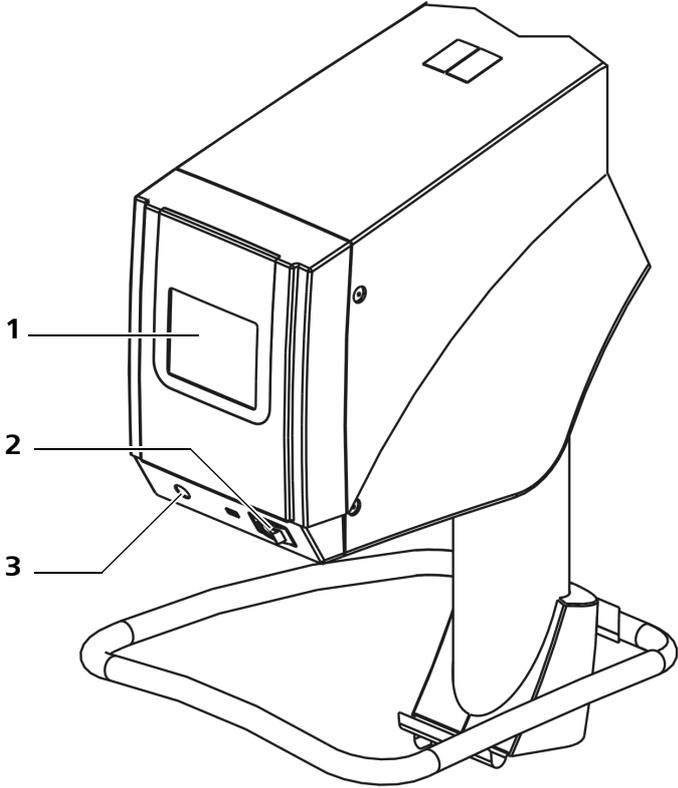
Connector panel on the floor stand

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
for controlling external devices with a maximum breaking capacity of 24V/0.5A.

NOTE	**Device fault!**

- No USB hub with a power supply may be plugged into the service interface.

5 Service interface
for exporting error messages for Carl Zeiss Service.

⚠ CAUTION	**Connection to data networks!**

Use the LAN port only in combination with "galvanic network isolation for medical electrical equipment" in accordance with DIN EN 60601-1.
The data network connector must have adequate protection against contact at the end of cable to the separator (network side), e.g., made of plastic material.
The cable and connector of the network connection must at least comply with Cat-5e EIA/TIA-568A-5, i.e., the more recent Class D values from ISO 11801:2002 or EN 50173-1:2002.

6 RJ45 Ethernet connector (option)
For networking OPMI LUMERA 700 and the CALLISTO eye OR management system.

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

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

ⓘ With the direct network connection between OPMI LUMERA 700 and CALLISTO eye (optional, the two devices must first be interconnected using a LAN cable. Afterwards, OPMI LUMERA 700 must be switched on and then CALLISTO eye.

⚠ | **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 292). When connecting other devices, make sure that safety is guaranteed regarding admissible touch currents and ground leakage currents as per IEC 60601-1:2006.

Fig. 40: Connectors on the floor stand

1 2   3   4   5   6   7   8   9
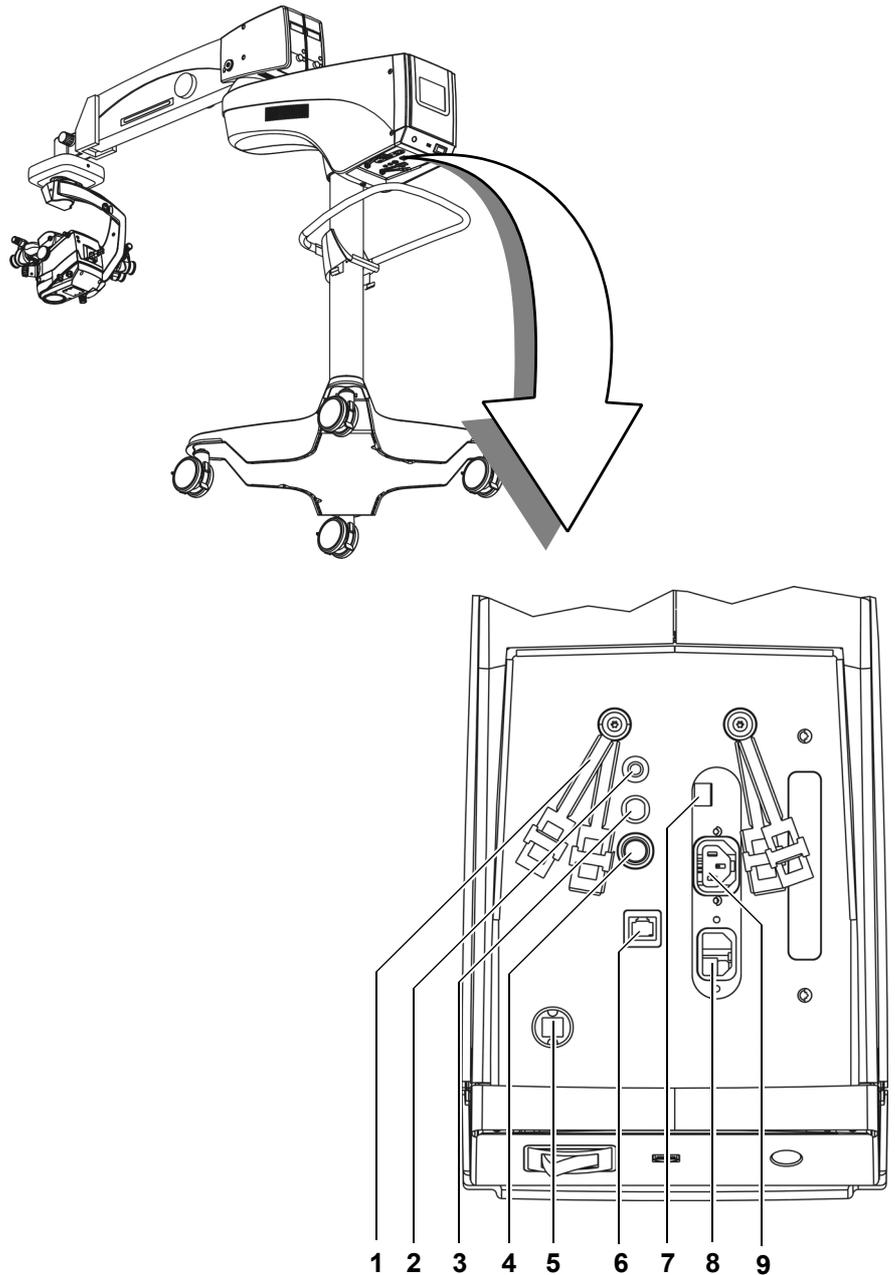
10 USB socket (optional)
The USB socket is only active if the "video recording function via USB port" option has been installed.

Video connection for IDIS (optional)

11 Video input port "Lemo socket"
Digital connection for image transmission from CALLISTO eye to IDIS in the surgical microscope.

Video ports for integrated SD 3CCD camera (optional)

⚠ **CAUTION**

Increased leakage current!

There is a risk that the user and patient may suffer an electrical shock.

- Never touch the plug connector contacts while in contact with the patient.

- Do not connect any defective or unapproved accessories to the plug connector contacts.

12 Video output port: Composite (VBS)
Analog connection for video components, e.g. recorder, projector or Zeiss accessories such as MediLive Mindstream.
Here, the video signal is transmitted according to the Composite VBS standard (shared line for brightness and color signal). This transfer mode is suitable if video signals have to be transmitted over relatively long distances (e.g. BNC lines already installed on site).

13 Video output "Y/C" or S-Video (green)
Analog port for video components, such as recorder, beamer and Zeiss accessories.
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 CVBS.

14 Video input and video output port (orange)
Analog connector for video devices such as an endoscope camera.
A special cable (10 m video in/out connecting cable) is required for operation.

Fig. 41: Video ports with integrated SD 3CCD camera
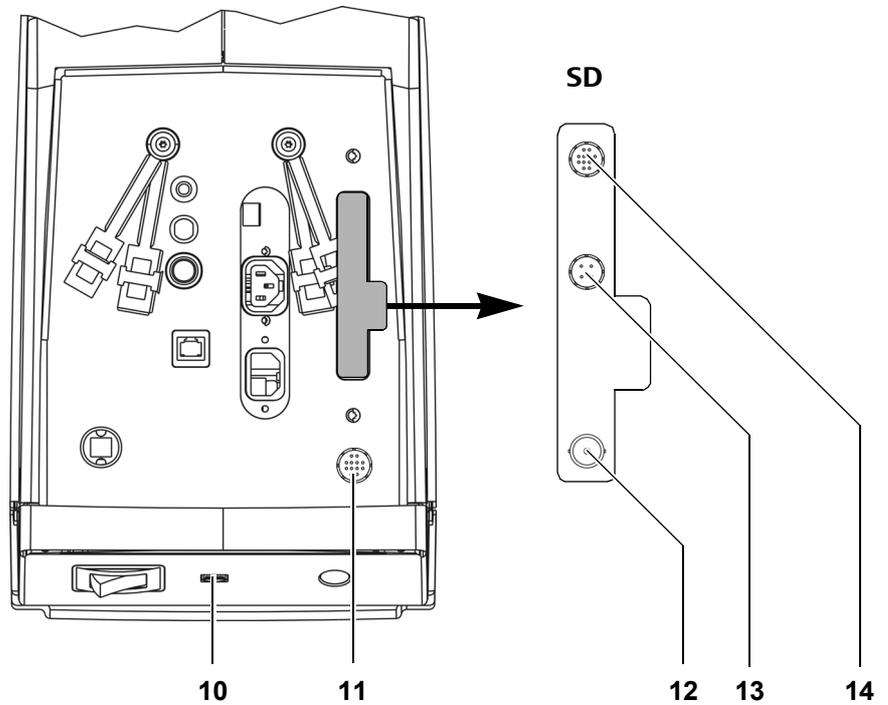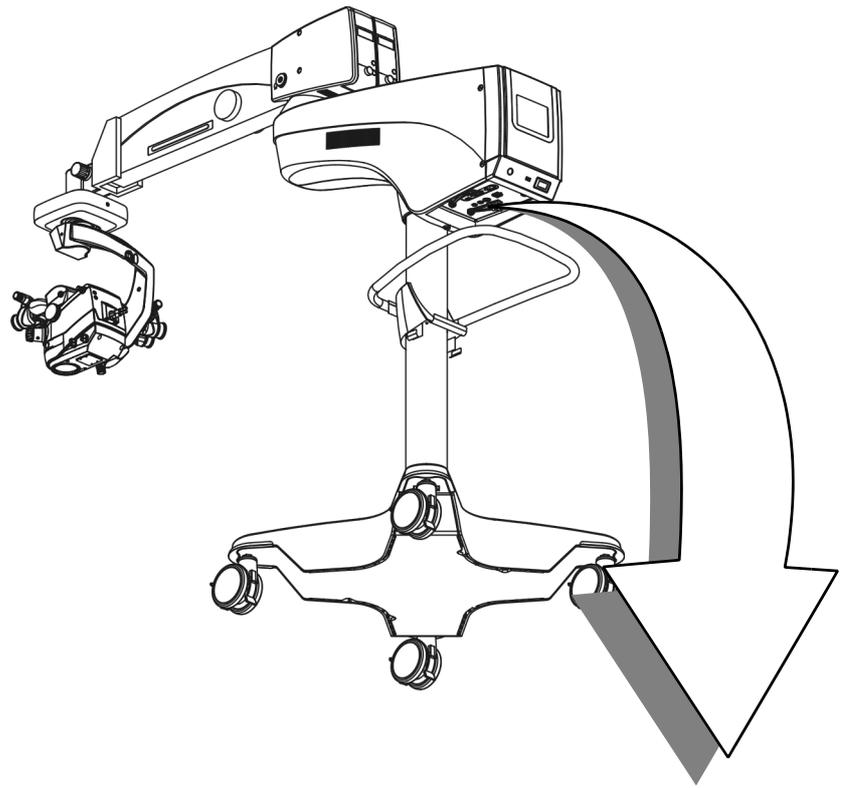
Video ports for integrated HD 3CCD camera (optional)

⚠ CAUTION	**Increased leakage current!**

There is a risk that the user and patient may suffer an electrical shock.

- Never touch the plug connector contacts while in contact with the patient.

- Do not connect any defective or unapproved accessories to the plug connector contacts.

15 Video output "Composite" (CVBS)
Analog connector for video components such as recorder, beamer and Zeiss accessories.
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).

16 Video output "Y/C" or S-Video (green)
Analog port for video components, such as recorder, beamer and Zeiss accessories.
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 CVBS.
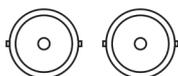
17 Video output port: HD-SDI (2 x)
Digital port for high-resolution, professional HD monitors. HD-SDI (High Definition Serial Digital Interface) transmits uncompressed hight-resolution image data in real time. The two ports are independent of each other and can be used as required.

18 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 video monitor via the 5 m DVI-D system cable 302681-8767-000, make sure to plug the connector with the ferrite core into the suspension system in order to avoid EMC interference.
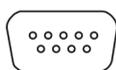
19 Video output port: YPbPr
Analog port for high-resolution monitors or TV.

Fig. 42: Video ports with integrated HD 3CCD camera

HD

15 16 17 18 19
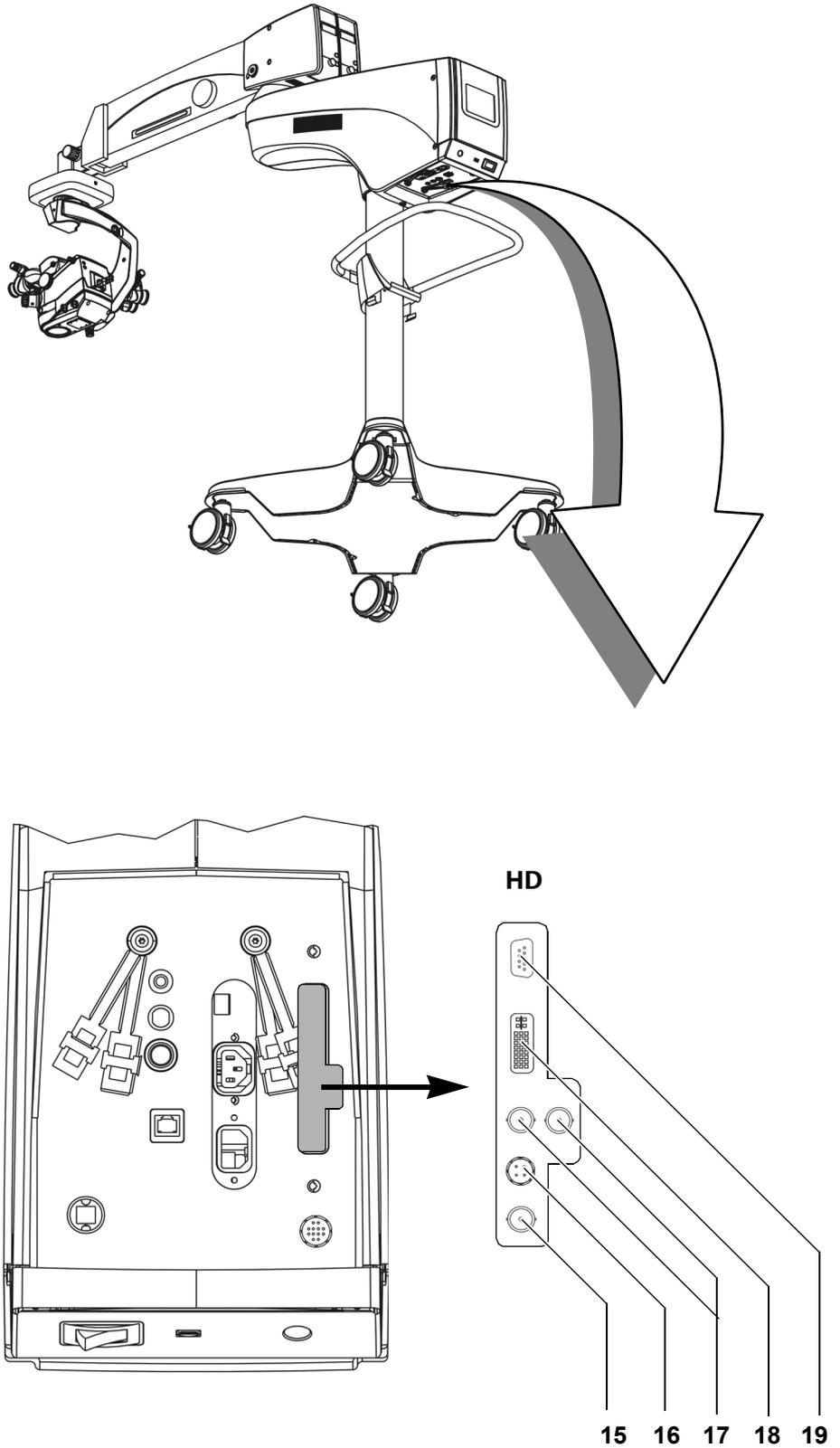
Ceiling mount terminal panels

The ceiling mount connectors are on the underside of the lamp housing, in the standard wall mount or in the optionally available video wall mount.

The standard wall mount contains the power switch and the 5.7" control panel, all connectors for operating the supplied or optionally available accessories.

The optional video wall mount contains the video ports of the SD or HD 3CCD camera integrated in the ceiling mount.

Connectors on the lamp housing of the ceiling mounts

1 Integrated video recording function via USB port (optional)
The USB socket is only active if the "integrated SD / HD video and image acquisition" option has been installed.

Ports on the standard wall panel

2 Connector for wired foot control panel

3 Service interface
for exporting error messages for Carl Zeiss Service.

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

5 Potential equalization connector

Fig. 43: Connectors on the ceiling mount on the standard wall mount
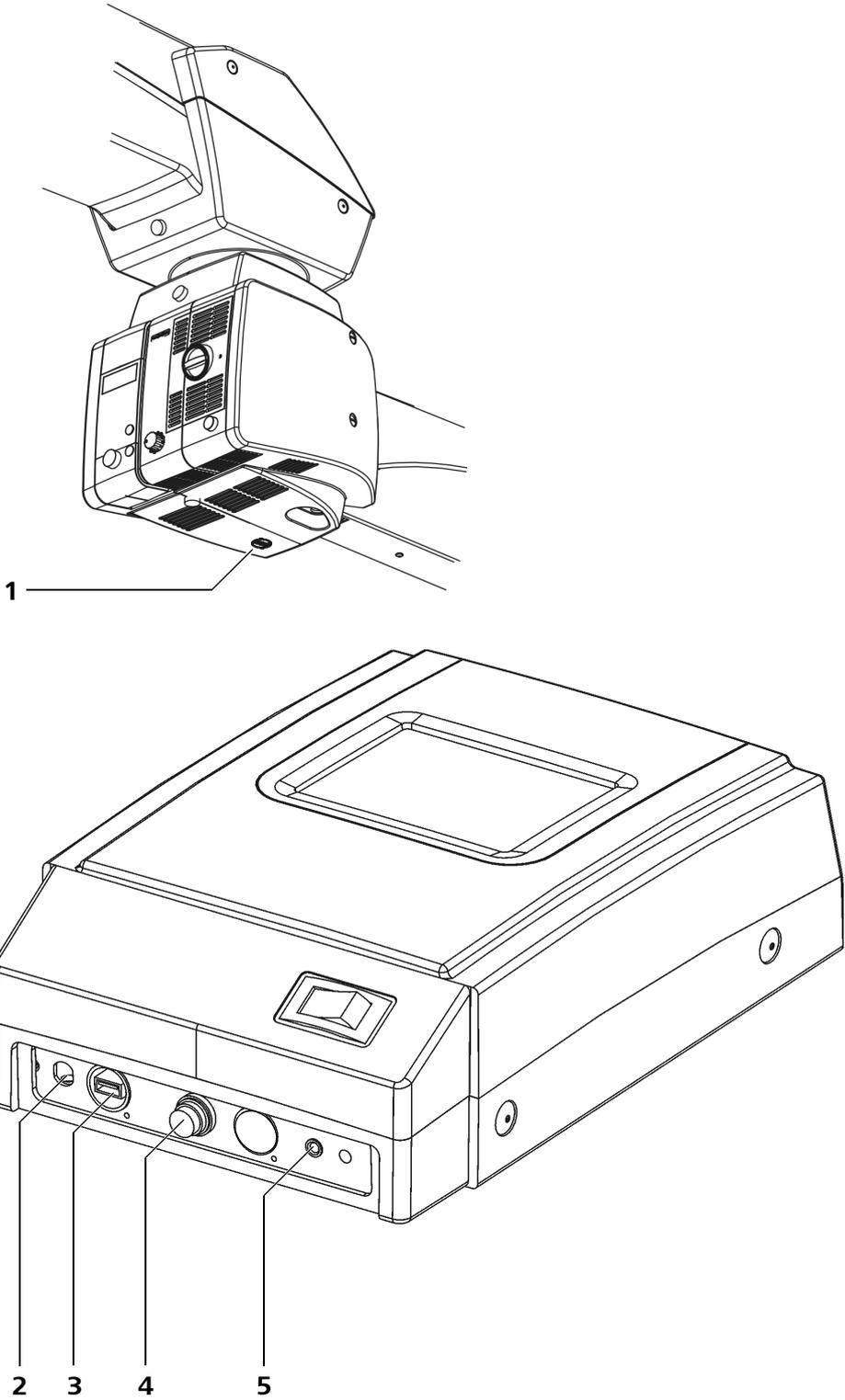
**Ports on the SD video wall mount
for integrated SD 3CCD camera (optional)**

The SD video wall mount (optional) contains the video ports for the
SD 3CCD camera (optional) integrated in the ceiling mount.

⚠ **CAUTION**   **Increased leakage current!**

There is a risk that the user and patient may suffer an electrical shock.

• Never touch the plug connector contacts while in contact with the pa-
tient.

• Do not connect any defective or unapproved accessories to the plug con-
nector contacts.

6 Video output "Y/C" or S-Video (green)
Analog port for video components, such as recorder, beamer and Zeiss ac-
cessories.
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 CVBS.

7 Video input and video output port (orange)
Analog connector for video devices such as an endoscope camera.
A special cable (10 m video in/out connecting cable) is required for oper-
ation.

8 Video output "Composite" (CVBS)
Analog connector for video components such as recorder, video projector
and Zeiss accessories.
The video signal is output in accordance with the CVBS standard (shared
line for brightness/ color signals). This video signal transmission is suitable
when the video signal is to be sent over large distances (e.g., if BNC lines
are previously on site).

Fig. 44: Ports for the integrated SD 3CCD camera

6   **7**   **8**
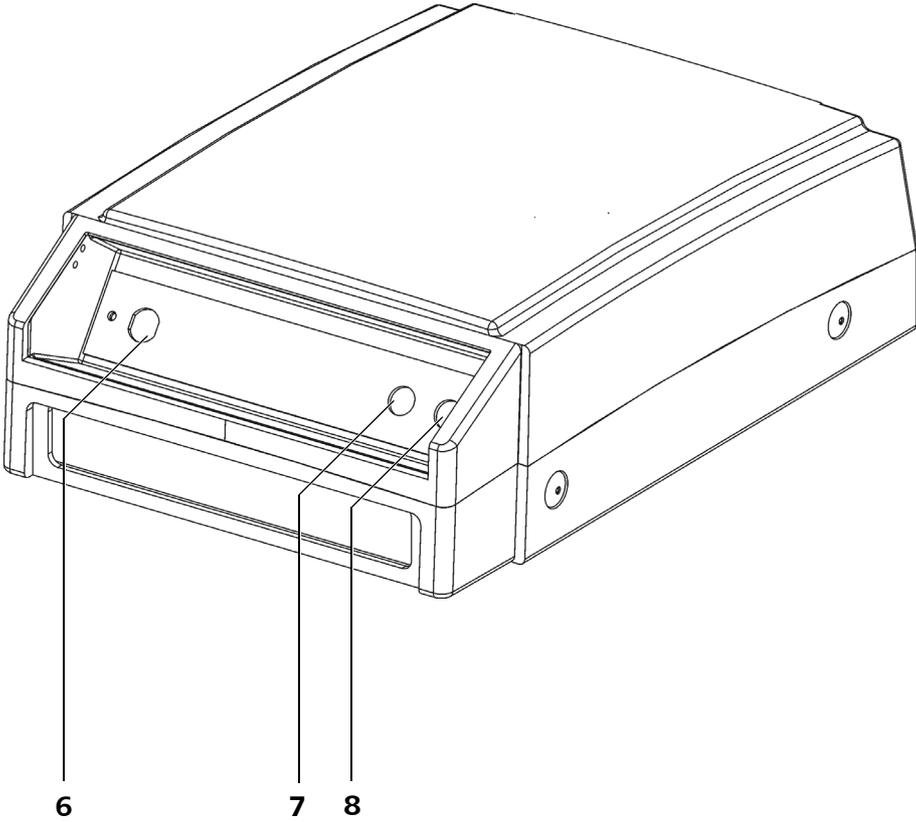
**Ports on the HD video wall mount
for integrated HD 3CCD camera (optional)**

The HD video wall mount (optional) contains the video ports for the HD 3CCD camera (optional) integrated in the ceiling mount.

| ⚠ | CAUTION | **Increased leakage current!** |

There is a risk that the user and patient may suffer an electrical shock.

- Never touch the plug connector contacts while in contact with the patient.

- Do not connect any defective or unapproved accessories to the plug connector contacts.

9 <u>Video output "Y/C" or S-Video (green)</u>
Analog port for video components, such as recorder, beamer and Zeiss accessories.
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 CVBS.
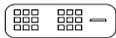
10 <u>Video output port: DVI-D</u>
Digital port for LC monitors. DVI (Digital Video Interface) is a technology for the transmission of digital data between the graphics card and the monitor.

When connecting an external HD video monitor via the 5 m DVI-D system cable 302681-8767-000, make sure to plug the connector with the ferrite core into the suspension system in order to avoid EMC interference.
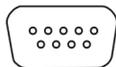
11 <u>Video output port: YPbPr</u>
Analog port for high-resolution monitors or TV.
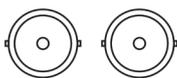
12 <u>Video output port: HD-SDI (2 x)</u>
Digital port for high-resolution, professional HD monitors. HD-SDI (High Definition Serial Digital Interface) transmits uncompressed hight-resolution image data in real time. The two ports are independent of each other and can be used as required.

13 Video output "Composite" (CVBS)
Analog port for video components, e.g., recorder, projector or Zeiss accessories such as 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., if BNC lines are already laid on site).

Fig. 45: Ports for integrated HD 3CCD camera
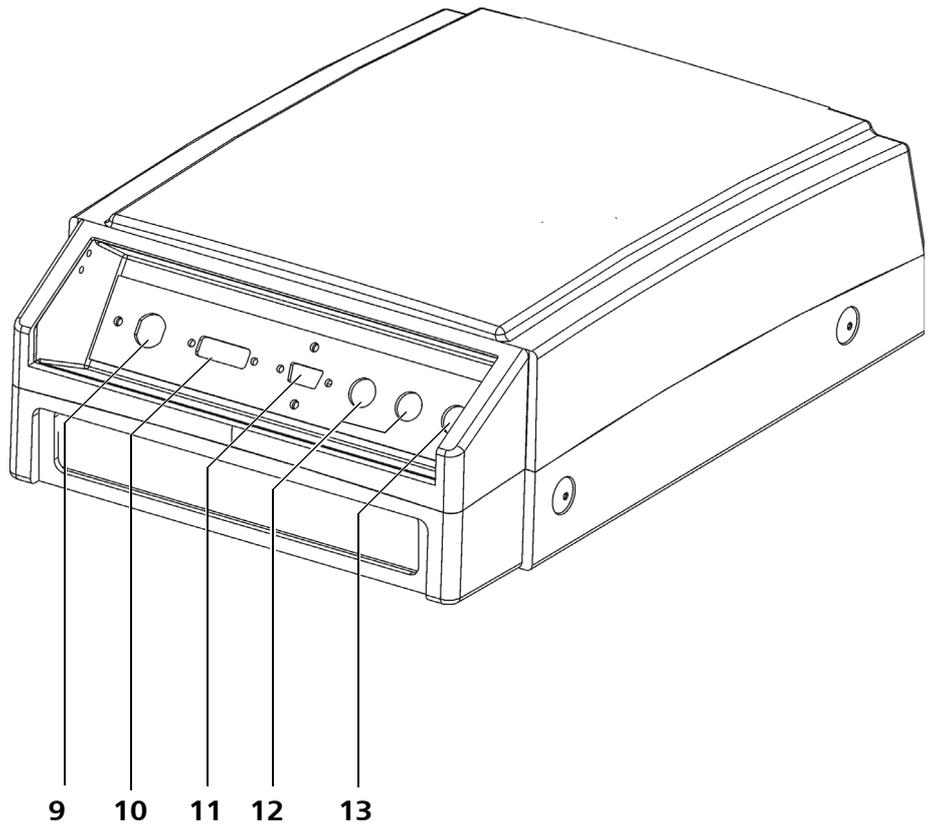
Connector panel on the 22" TFT

1 DC voltage connection
is used to supply the device with electrical energy
12 V DC +/-10%
< 5 A DC

2 RS232 port
Serial interface

3 Video port "Composite" (CVBS)
Analog port.
Here, the video signal is transferred according to the Composite CVBS standard (shared line for brightness and color signal). This video signal transfer is suitable if video signals are to be transmitted over longer distances (e.g., for BNC lines already installed on-site).

4 Y/C connector (S video)
Y/C, also known as S video is an analog interface for the separate transmission of brightness and color information. This standard allows for a better video quality than composite video. The cable length for this type of connection must not exceed 10 m. For longer lines a composite video connection is recommended.

5 DVI connection
DVI (Digital Video Interface) is a technology used to transmit digital data. The cable length for this connection must not exceed 4.5 m.

We recommend a DVI connection for the camera as it delivers the best picture quality. The DVI cable is part of the delivery package.

6 VGA connector
VGA (Video Graphics Array) is an analog interface for the transmission of video data between graphic cards and display devices.

Fig. 46: Ports on the 22" TFT
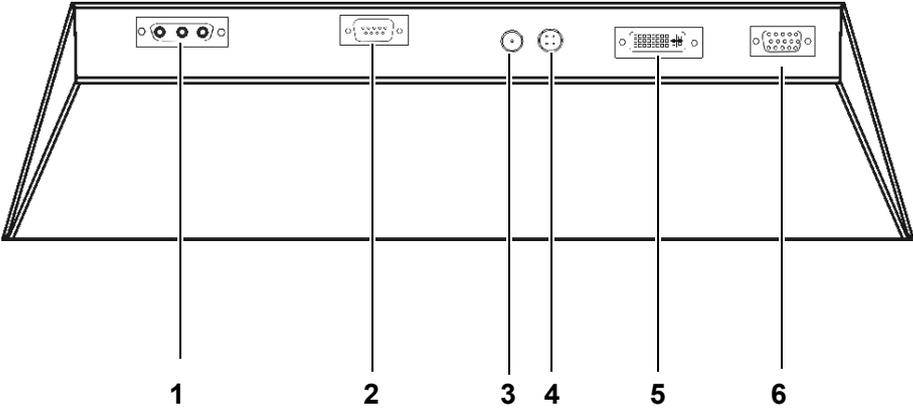
Components of the foot control panel

The foot control panel permits you to control various functions of OPMI LUMERA 700. The assignment of the functions to the buttons on the foot control panel is shown on the following page.

ⓘ You can only activate functions that are implemented in the respective system configuration (suspension system, surgical microscope). Only use the foot control panels listed here and in the ordering data.

39.
- Foot control panel with 14 functions, wireless (FCP WL)

- Foot control panel with 14 functions, wired (FCP), 3m (option)

- Foot control panel with 14 functions, wired (FCP), 6m (option)

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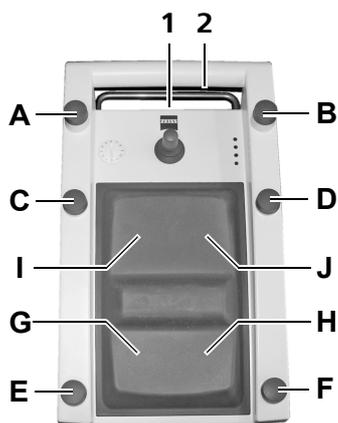
1 Connector
for the cable connecting the foot control panel with the connector panel of the stand

2 Silver-colored bracket
for attaching the foot control panel to the stand.

3 Controls

- Buttons A, B, C, D, E, F (freely configurable)

- Joystick
The joystick located between buttons C and D is used for motorized fine adjustment of the X-Y 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

When not using the foot control panel, you can attach it to the column of the floor stand using the silver-colored bracket.

Preconfigured button assignment

Buttons

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

– Key A: Light intensity ▼

– Key B: Light intensity ▲

32.   – Key C: Switching SCI illumination (Pos 1, Pos 2 and Pos 3)

– Key D: Activating quick focus

– Key E: Turning light source on/off

– Key F:
  - Activating/deactivating the keratoscope (if a keratoscope is integrated)
  - Swinging filter wheel in (if no keratoscope is integrated)
  - 2. Activating/deactivating the light source (if a second light source is integrated)

Joystick

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

Rocker switches

The default settings (focus/zoom) of the rocker switches are preconfigured horizontally or vertically for each country. However, a Carl Zeiss service technician can change the settings at any time. You can, however, customize the settings yourself at any time (see page 199).

The horizontal factory settings are:

– Button I: Focus ▼

– Button G: Zoom ▼

– Button J: Focus ▲

– Button H: Zoom ▲

The vertical factory settings are:

– Button I: Zoom ▲

– Button G: Zoom ▼

– Button J: Focus ▲

– Button H: Focus ▼

Preparations for use

Positioning and connecting the floor mount

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 may be crushed between the carrier arm and stand column.

- Never touch the area between carrier arm and stand column while turning the support arm.
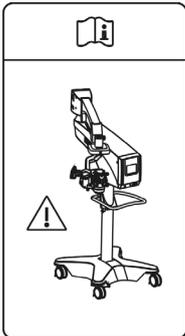
Proceed as follows when relocating the system over short distances:

- Turn off the device at the power switch.

- Remove the power plug from the wall socket.

- Set the suspension arm (1) of the floor mount into the transport position.

- Set the 22" TFT (if available) into the transport position.

- Thread the Velcro tape provided on bracket (4) and wrap it around the suspension arm (2) and carrier arm (3) of the 22" TFT so that it locks into place and does not unintentionally swing out.

- Wrap the foot control panel and power cables onto the cable holders.

- Attach the foot control panel to the maneuvering handle.

- Release the brake tabs on the casters.

- Hold the system by its maneuvering handle and carefully steer it to the side. Make sure that the system is positioned on level ground.

- When you have reached the required position, press down the locking tabs of all four casters and make sure that the stand is no longer able to roll away by itself.

As the stand is very easy to maneuver, there is a tendency to underestimate its weight. Therefore, move the stand slowly and carefully!

Fig. 47: Transport position of the 22″ TFT
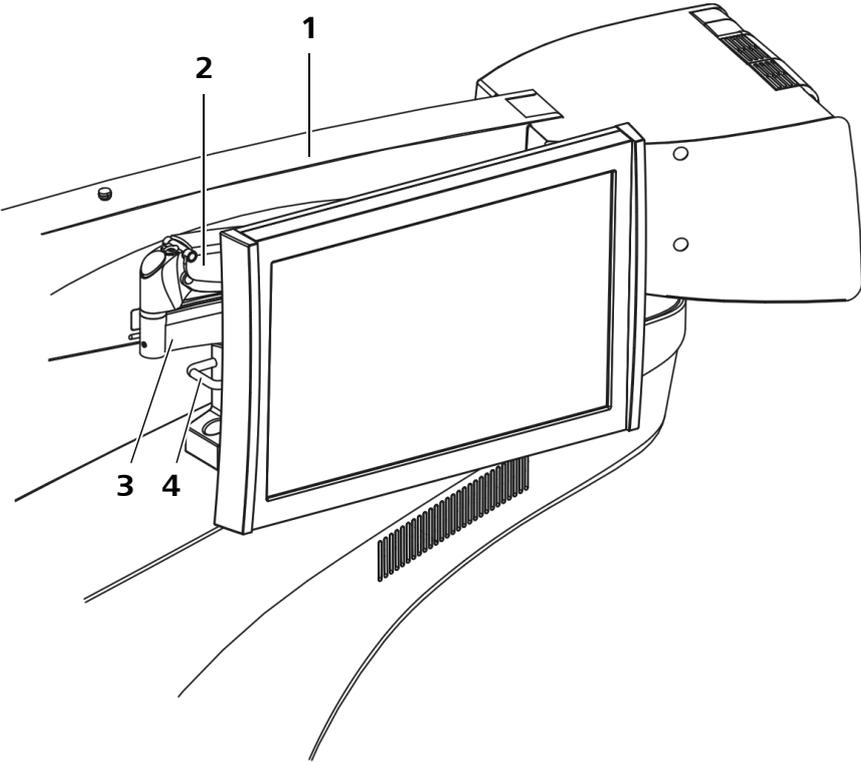
Positioning the device in the OR

Position the device as follows:

* Unlock all locking tabs.

* 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 carrier and suspension arms are not fully extended but are positioned at an angle. This provides a greater degree of maneuverability and also a perfect working position.

  – Ensure the device is standing on even ground.

* Press at least two of the locking tabs of the castors (2) and make sure that the stand is no longer able to roll away by itself.

Fig. 48: OR scene
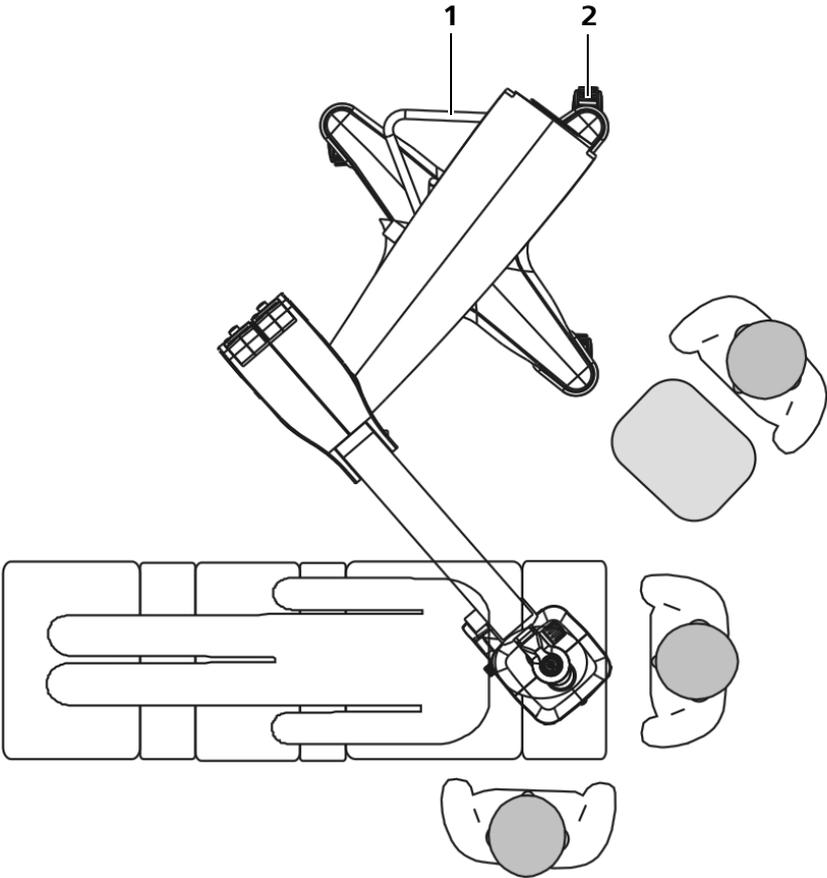
Connecting the system to the power supply

NOTE	**Tripping hazard!**

Cables inappropriately routed on the floor may constitute a tripping hazard.

• Always route cables in a manner that will not obstruct the workflow.

NOTE	**Risk of damaging the device!**

Prior to leaving the factory, the device is adjusted to the rated voltage of the respective export country. The rated voltage displayed on the sliding switch (5), must correspond with the rated voltage of the place of installation.

• If the rated voltage is not correctly displayed, use an appropriate tool to set the sliding switch (5) accordingly.

• Make sure that power switch (1) is OFF.

• Insert the supplied power cord in power inlet socket (4) on the suspension system.

• Only connect the power cord to wall outlets which are provided with a properly connected protective ground conductor.

• Secure the power cord using the strain relief device (see page 118).

• If required, connect the suspension system to the potential equalization contact in the OR using potential equalization pin (3).

Fig. 49: Connecting the system
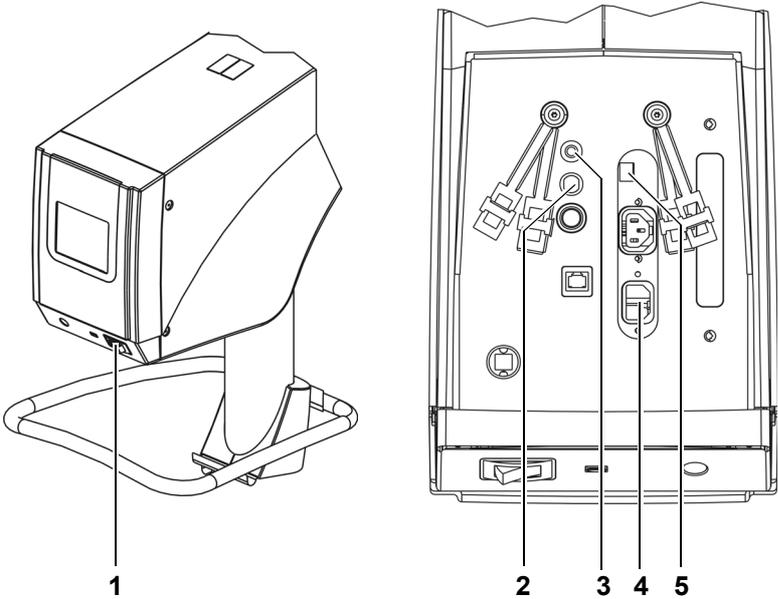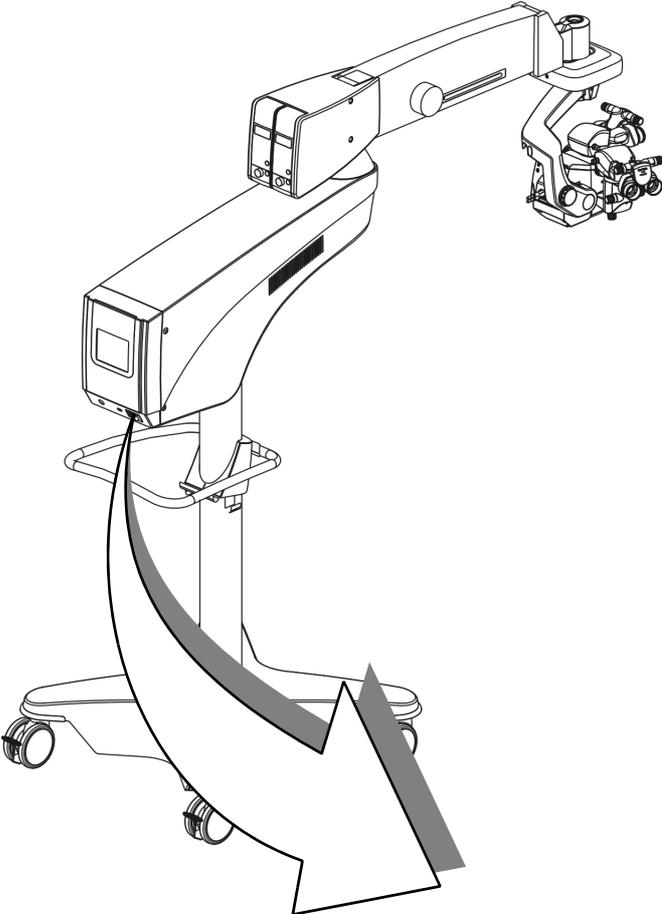
Pairing with the wireless foot control panel (FCP-WL)

Pairing means the fixed relative assignment of the suspension system and foot control panel.
It is required for wireless operation. On first-time pairing, it may take up to 20 s until the radio link between the suspension system and the foot control panel has been established.

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.

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 ceiling mount (distance approx. 1 m).

- Start the pairing process on the suspension system as described on page 175.

Connecting the wired foot control panel (FCP) (option)

- Make sure that power switch (1) is OFF.

- Secure the cable of the foot control panel using the strain relief device (see page 118).

- Connect the cable of the foot control panel to connector (2) on the suspension system.

*Fig. 50: Connecting the wired
         foot control panel*

1

2
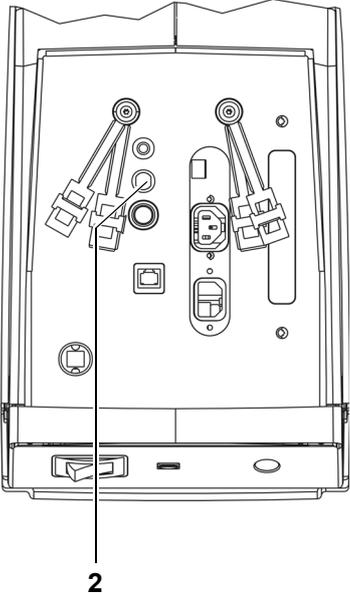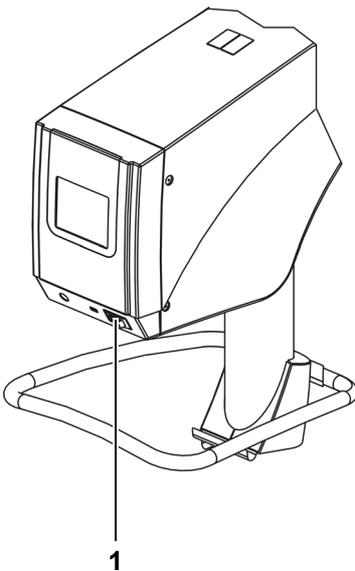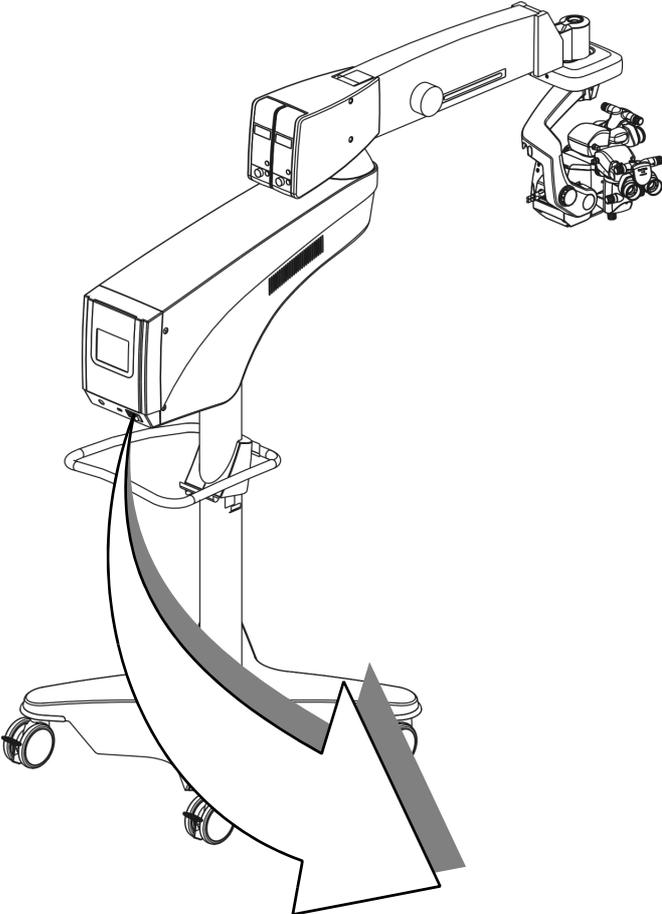
Connecting the strain relief device

Use the strain relief device (1) to prevent that the connected cables are inadvertently pulled out. Make sure that the remaining cable length between the strain relief device (7) and the connector (8) is approx. 320 mm.

Secure the cable in the strain relief device as follows:

- Form the cable into a loop (2).

- Open flap (3).

- Feed the cable through the opening (4).

- Close the flap (5).

- Tighten the cable until it encloses the flap (6).

- Check the remaining cable length between the strain relief device (7) and the connector (8).

Fig. 51: Connecting the strain relief device
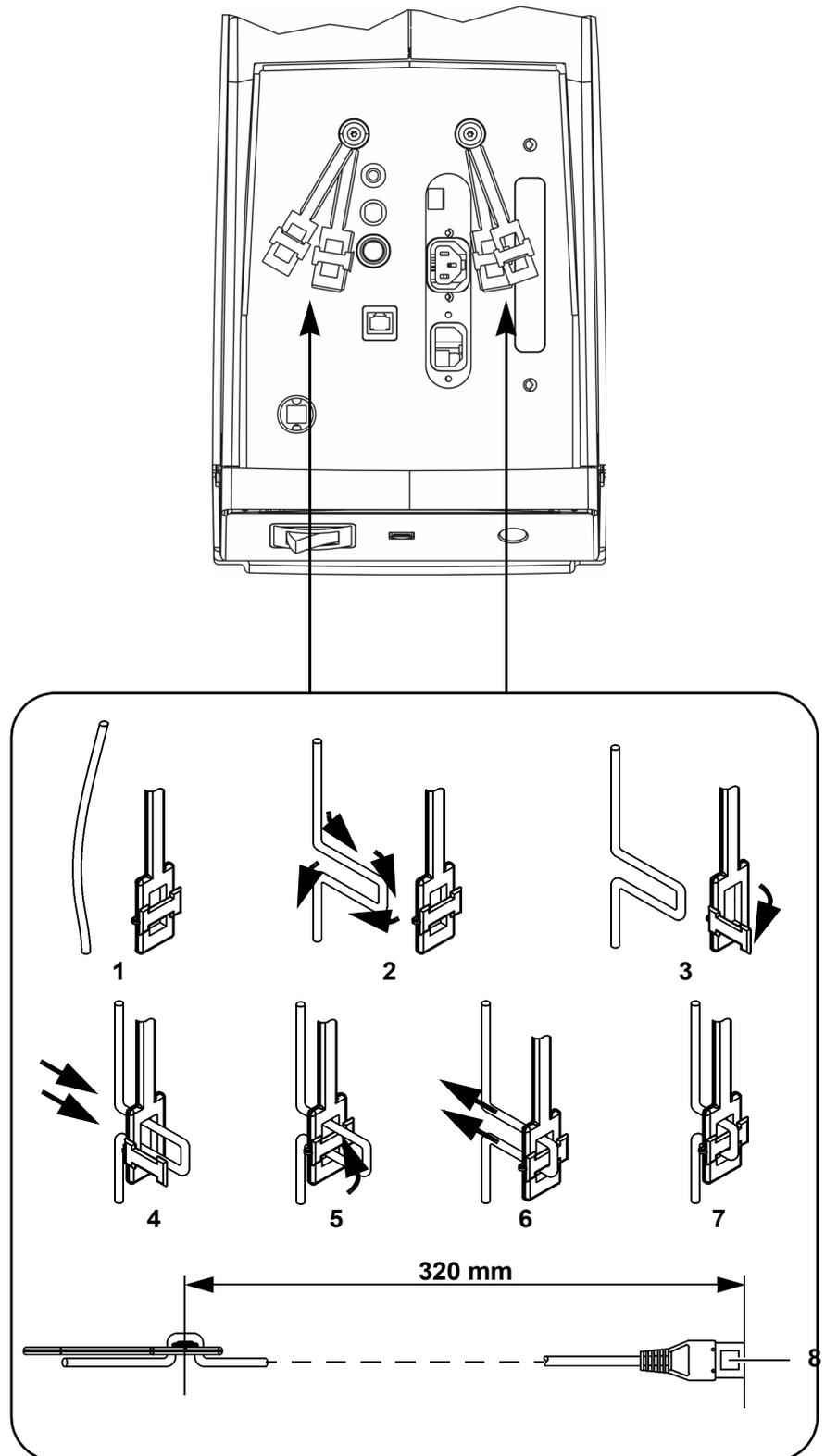
Connecting external video equipment to integrated SD 3CCD camera to the floor stand (optional)

You can connect external video equipment, such as endoscope cameras, SD video monitors or the optionally available SD video recording tool MEDIALINK 100 to the OPMI LUMERA 700 with integrated SD 3CCD camera.

⚠ **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 16 or the requirements of EN 60601-1-1:1990.

Connecting an endoscope camera

• Connect the analog video input (Video in/out) of the OPMI LUMERA 700 to the video output port of your endoscope camera, using the following special cable:

   – 10 m video in/out connecting cable

Connecting the SD video monitor

• Connect the analog Y/C video output port of the OPMI LUMERA 700 to the Y/C video input port of your SD video monitor, using the following video cable:

   – 10 m S-Video connecting cable

Connecting the MEDIALINK 100 and SD video monitor

• Connect the analog Y/C video output port of the OPMI LUMERA 700 to the Y/C video input port of your MEDIALINK 100, using the following video cable:

   – 10 m S-Video connecting cable

• Connect the analog Y/C, BNC or DVI-D video output port of your MEDIALINK 100 to 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

Fig. 52: External video
equipment on integrated
SD 3CCD camera

Connecting external video equipment on integrated HD 3CCD camera to the floor stand (optional)

You can connect external video equipment, such as HD video monitors, to the OPMI LUMERA 700 with integrated HD 3CCD camera. If your system is not equipped with the integrated HD video and image acquisition system (optional), you can also connect the optionally available SD video recording tool MEDIALINK 100.

⚠ **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 16 or the requirements of EN 60601-1-1:1990.

Connecting the HD video monitor

ⓘ When connecting an external HD video monitor via the 5 m DVI-D system cable 302681-8767-000, make sure to plug the connector with the ferrite core into the suspension system in order to avoid EMC interference.

- Connect the digital DVD D video output port of the OPMI LUMERA 700 to the DVI-D or BNC video input port of your HD video monitor, using one of the following video cables (depending on the connector type):

    – HD-SDI connecting cable, 75 Ohm, 2x BNC pin

    – 5 m DVI-D system cable

Connecting the MEDIALINK 100 and SD video monitor

- Connect the analog Y/C video output port of the OPMI LUMERA 700 to the Y/C video input port of your MEDIALINK 100, using the following video cable:

    – 10 m S-Video connecting cable

- Connect the analog Y/C, BNC or DVI-D video output port of your MEDIALINK 100 to 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 system cable

Fig. 53: External video equipment on integrated HD 3CCD camera

DVI-D

Y/C

MEDIALINK 100

VIDEO IN   VIDEO OUT   DVI-D   AUDIO   USB   LAN   REMOTE

IN

OUT

T 1.6 A

HD signal   SD signal   SD signal

SD video monitor   SD video monitor

HD video monitor
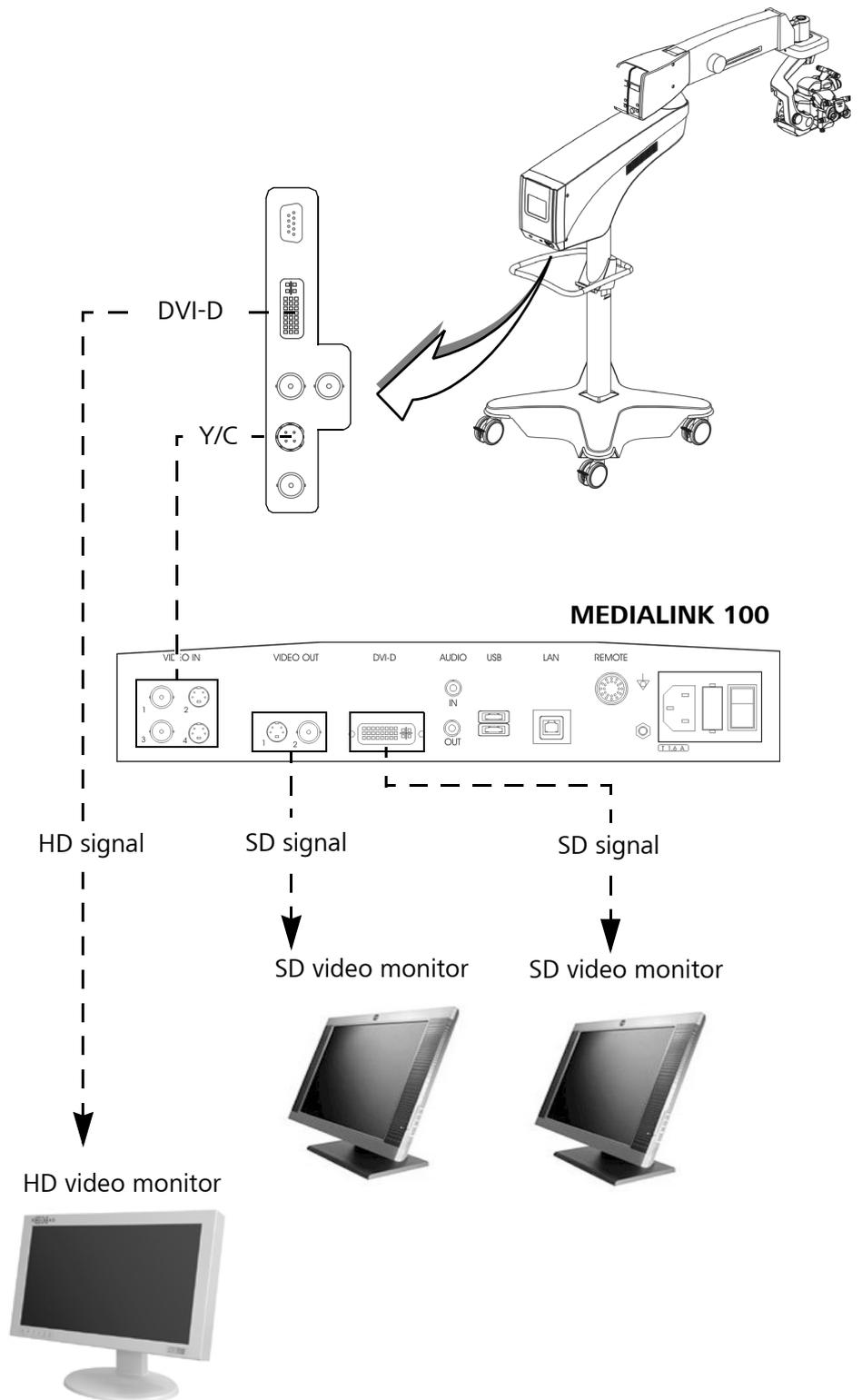
OPMI LUMERA 700 with integrated data injection system IDIS (optional)

To use IDIS, you must connect OPMI LUMERA 700 to the operation terminal of CALLISTO eye as follows:

✓ A video signal of the <u>integrated</u> OPMI LUMERA 700 HD 3CCD or SD 3CCD camera must be available on the CALLISTO eye for the injection system of the assistance functions. Video signals of external video cameras are not supported by CALLISTO eye!

IDIS connection to CALLISTO eye

- Connect the HDMI video output port (1) of CALLISTO eye to the HDMI video input port (2) of OPMI LUMERA 700, using the following cable: System cable, Lemo 2B - HDMI, 10 m

HD 3CCD or SD 3CCD camera connection to CALLISTO eye

- HD 3CCD camera: connect the HD SDI video output port (3) of OPMI LUMERA 700 to the HD SDI video input port (4) on CALLISTO eye, using the following cable: HD SDI video cable, 5 m or HD SDI video cable, 10 m

- SD 3CCD camera: connect the Y/C video output port (5) of OPMI LUMERA 700 to the Y/C video input port (6) on CALLISTO eye, using the following cable: Y/C cable, 5 m or Y/C cable, 10 m

Network connection to Callisto eye

- Connect the network connection (7) between the OPMI LUMERA 700 and the CALLISTO eye (see page 126), using the following cable: LAN cable, 5 m or LAN cable, 10 m

- Connect the network to CALLISTO eye (see page 318).

  → After successful connection, you can configure the IDIS in CALLISTO eye and use it on the surgical microscope.

| ⚠ | **CAUTION** | **Possible damage to user's retina** |

Excessive IDIS light intensity in the eyepiece causes glare and may damage the user's retina.

- Reduce the IDIS light intensity using CALLISTO eye until you have optimum view of the surgical field.

- If the IDIS light intensity cannot be reduced, switch off the IDIS using CALLISTO eye. You can also switch off the IDIS using the foot control panel or the handgrips if they are configured.

*Fig. 54: OPMI LUMERA 700
with IDIS*

*Underside
OPMI LUMERA 700*

Underside of CALLISTO eye
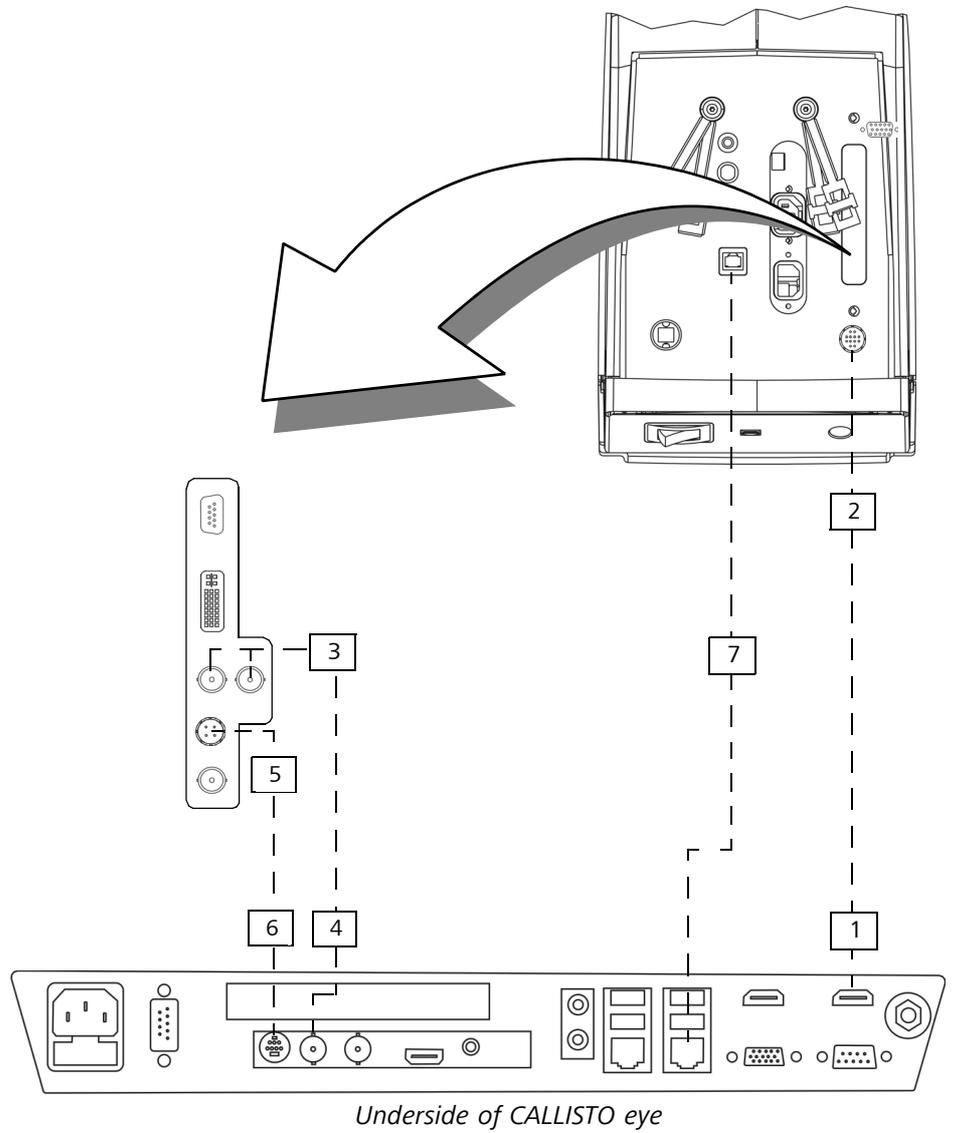
Network connection OPMI LUMERA 700 (floor mount) with CALLISTO eye

CALLISTO eye can be connected directly (point to point) to OPMI LUMERA 700 or indirectly using a network distributor (switch).

Direct network connection

With OPMI LUMERA 700 and CALLISTO eye the network is detected during the starting process. This is why you must observe the following procedure.

- Switch off OPMI LUMERA 700 and CALLISTO eye.

- Disconnect CALLISTO eye from the power supply.

- Connect the network connection of OPMI LUMERA 700 (1) to the network connection (2) of CALLISTO eye.

- Reconnect CALLISTO eye to the power cable.

  → The network adapter of CALLISTO eye is now activated and visible to OPMI LUMERA 700.

- Switch on OPMI LUMERA 700.

- Switch on CALLISTO eye.

After unplugging the network connections and plugging them back in, OPMI LUMERA 700 and CALLISTO eye must be restarted to adjust to the changes made to the network.

Indirect network connection using a network distributor (switch)

The following procedure must be observed for the indirect network connection of OPMI LUMERA 700 and CALLISTO eye.

- Connect the network.

- Switch on the network distributor (switch).

- Switch on OPMI LUMERA 700 and CALLISTO eye.

We recommend connecting the network between CALLISTO eye and OPMI LUMERA 700 using a standard network distributor (switch). You can switch on the devices in any order using this configuration. It is not necessary to follow the procedure described above for establishing the direct network connection.

Fig. 55: Direct network connection

OPMI LUMERA 700

CALLISTO eye
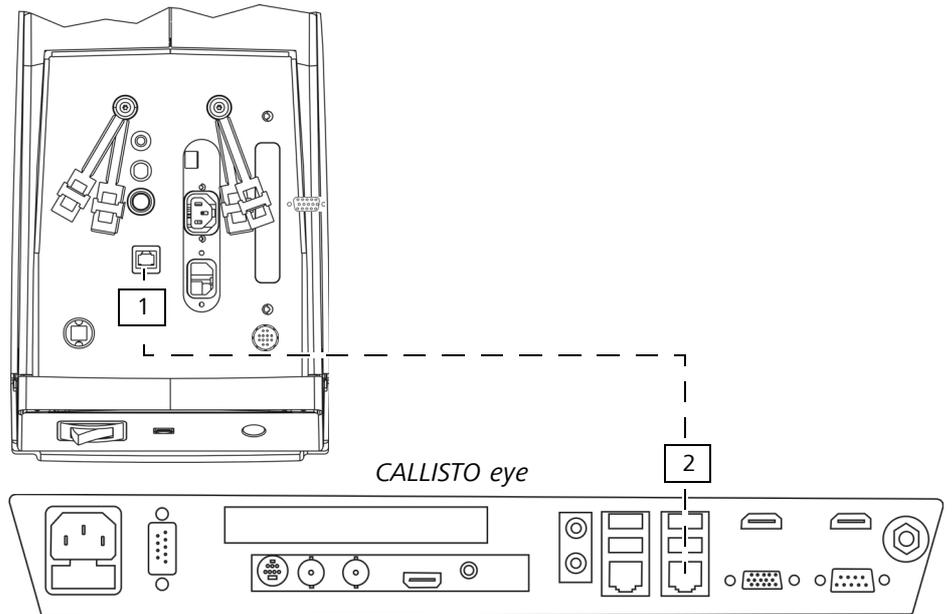
Fig. 56: Indirect network connection using a network distributor (switch)

OPMI LUMERA 700

Network distributor

CALLISTO eye
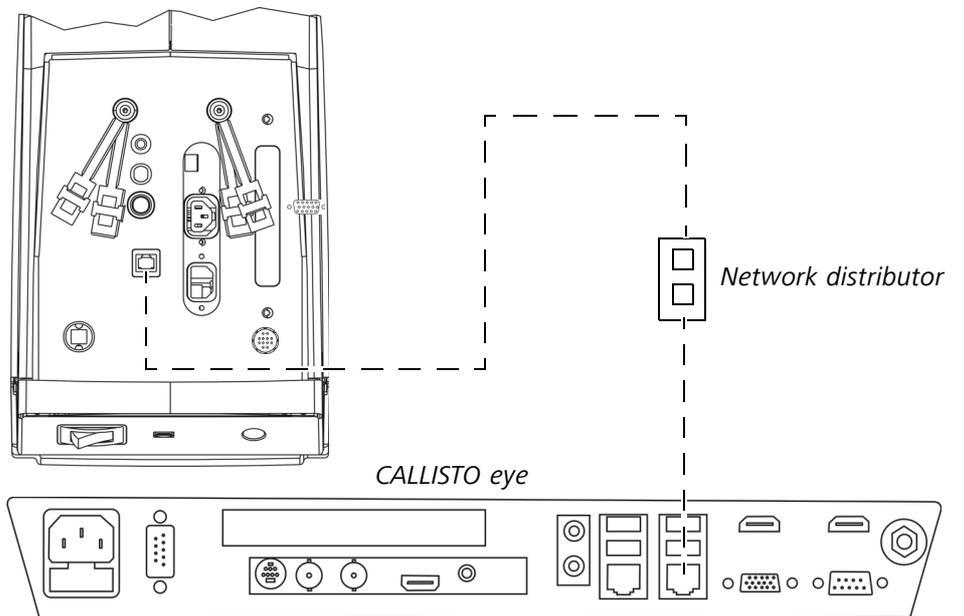
Positioning and connecting the floor mount

Positioning the device in the OR

Positioning the ceiling mount with lift arm

1   Standby position

2   Working position

⚠ **CAUTION**

Risk of injury to the patient!

Making a motor-driven lift arm readjustment during the operation might injure the patient.

- Always adjust the lift arm without patient before starting the operation.

- Do not readjust the lift arm as long as the surgical microscope is positioned above the patient.

- Do not use the motor-driven lift arm for focusing.

⚠ **CAUTION**

Injury to the patient!

If the lift arm is moved with locked suspension arm, the device may be damaged and the patient may be injured by dropping parts of the cover.

- Never lock the suspension arm with the locking screw (5) while your are moving the lift arm.

Proceed as follows to position the ceiling mount with lift arm:

Set working position
- To lower the lift arm, turn the lift switch (4) to the right and hold it in that position until the lift arm has reached the desired working height.

- After releasing the lift switch (4), the lift arm is locked at its working height.

- While pressing and holding the brake release button, use the hand grips (3) to move the surgical microscope to the desired working position (2).

Setting the standby position
- For mounted carrier arm systems please additionally note page 132.

- While pressing and holding the brake release button, use the hand grips (3) to move the surgical microscope to the topmost position.
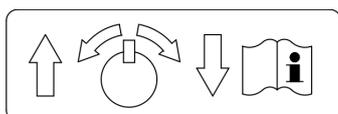
• To raise the lift arm, turn the lift switch (4) to the left and hold it in that position until the lift arm has reached the topmost position.

• After releasing the lift switch (4), the lift arm is locked in standby position (1).

Fig. 57: Positioning the ceiling mount with lift arm
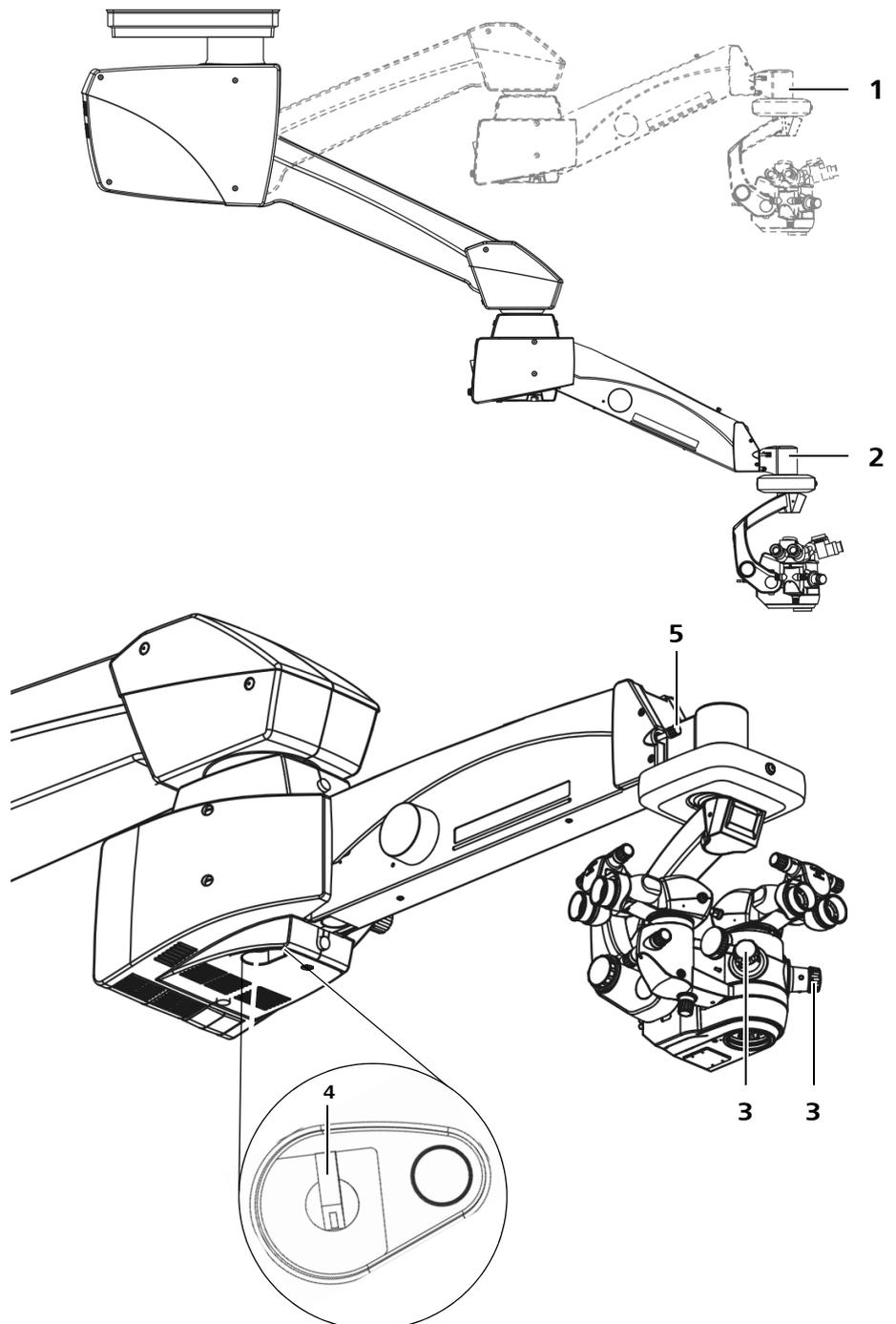
Ceiling mount with rigid arm

1 Standby position

2 Working position

Proceed as follows to position the ceiling mount with rigid arm:

Setting the working position
- While pressing and holding the brake release button (4), use the handgrips (3) to move the surgical microscope to the desired working position (2).

Setting the standby position
- While pressing and holding the brake release button (4), use the handgrips (3) to move the surgical microscope to the desired standby position (1).

*Fig. 58: Positioning the ceiling
           mount with rigid arm*
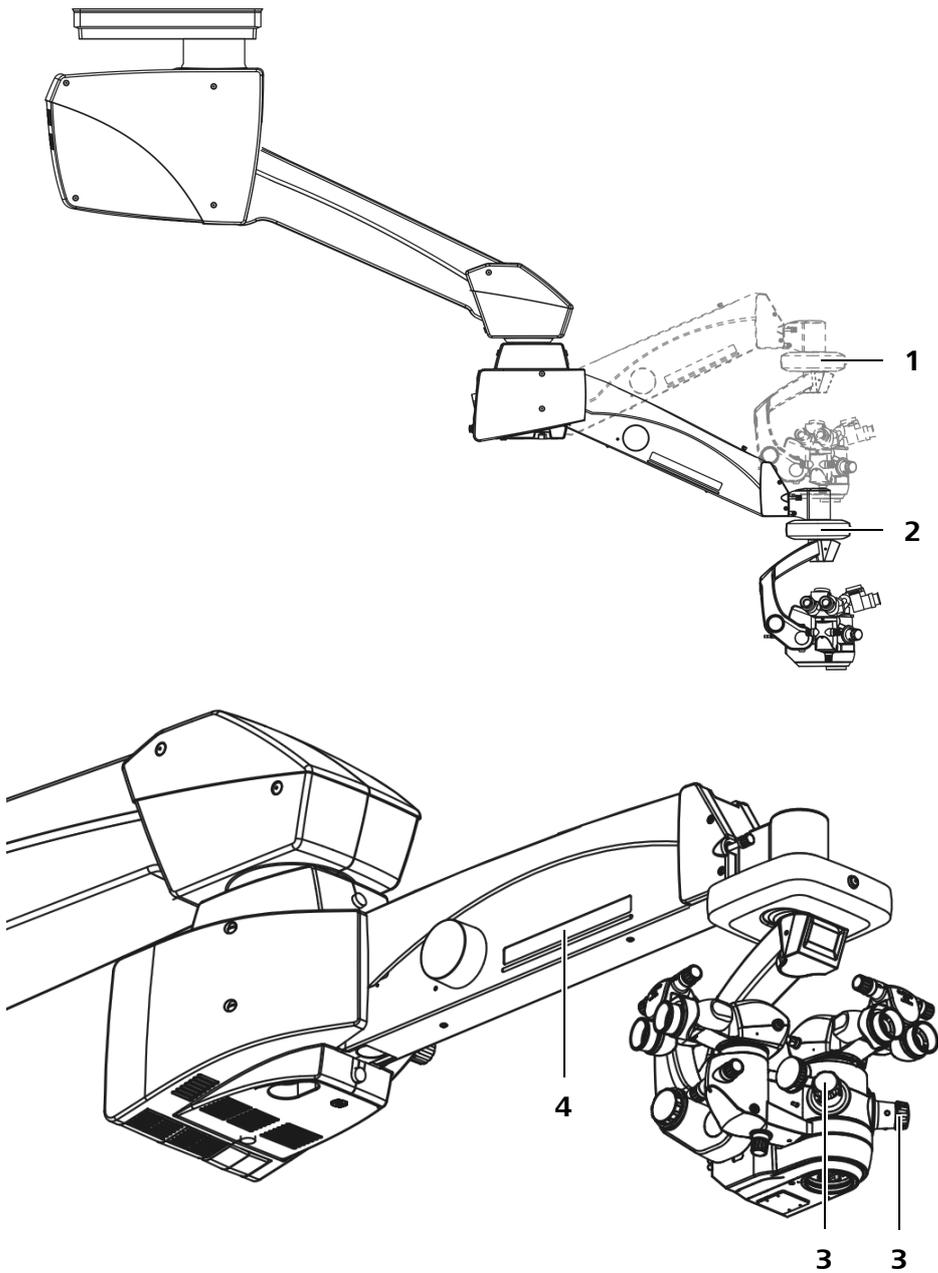
Standby position of ceiling mount

1 Swivel axis of ceiling mount

2 Swivel axis of carrier arm system for video monitors

⚠ **CAUTION**   **Risk of injury caused by collisions!**

The ceiling mount may collide with other moving parts of the ceiling mount system (e.g., carrier arm with 22" video monitor).

• Always ensure that you position moving parts slowly to avoid potential collisions.

• Avoid movements that could lead to collisions!

Fig. 59: Examples of correct standby positions
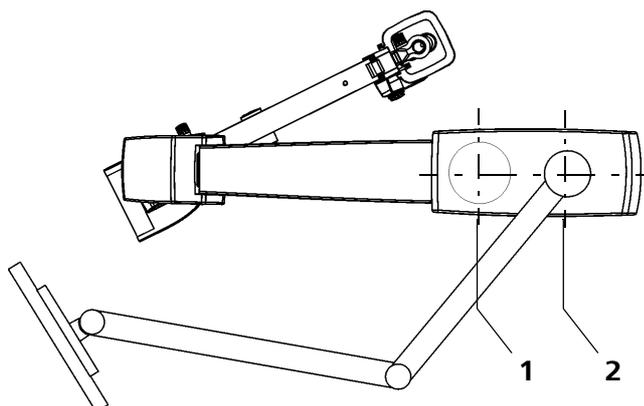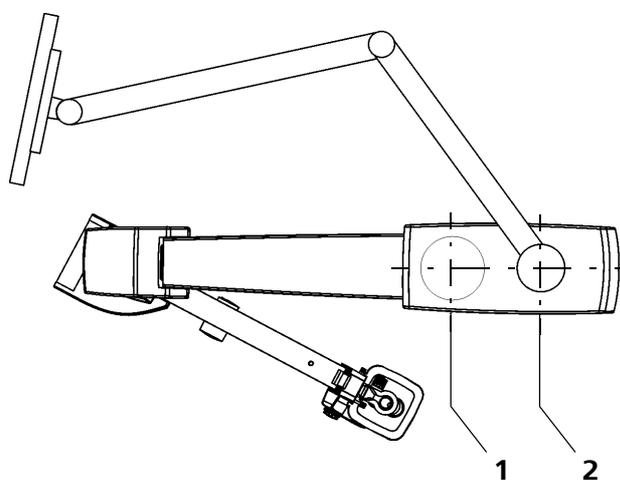
Fig. 60: Examples of incorrect standby positions
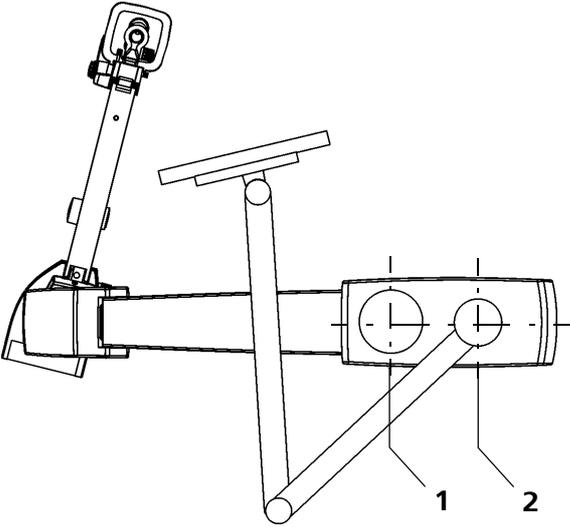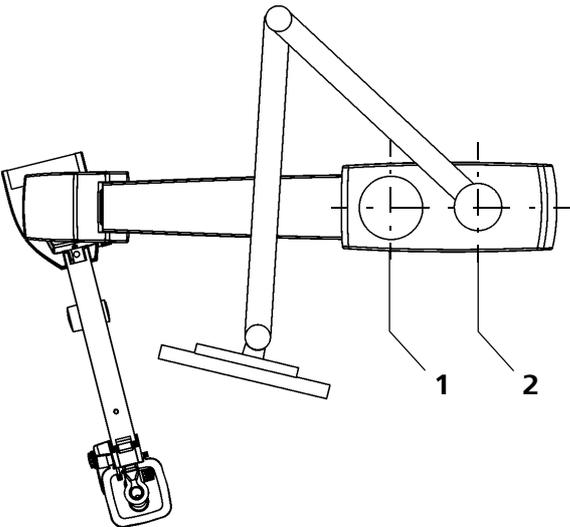
Example OR situations

1 <u>Surgeon</u>

2 <u>Assistant</u>

3 <u>Sterile nurse</u>

4 <u>OPMI LUMERA 700</u>

Example OR situation 1 for ophthalmic surgery with an assistant on the right side.

Fig. 61: Example OR situation 1
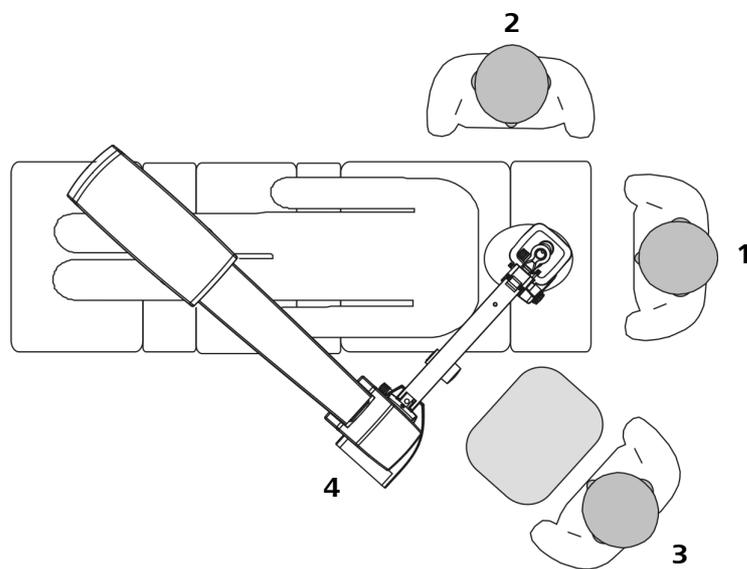
Example OR situation 2 for ophthalmic surgery with an assistant on the right side.

Fig. 62: Example OR situation 2
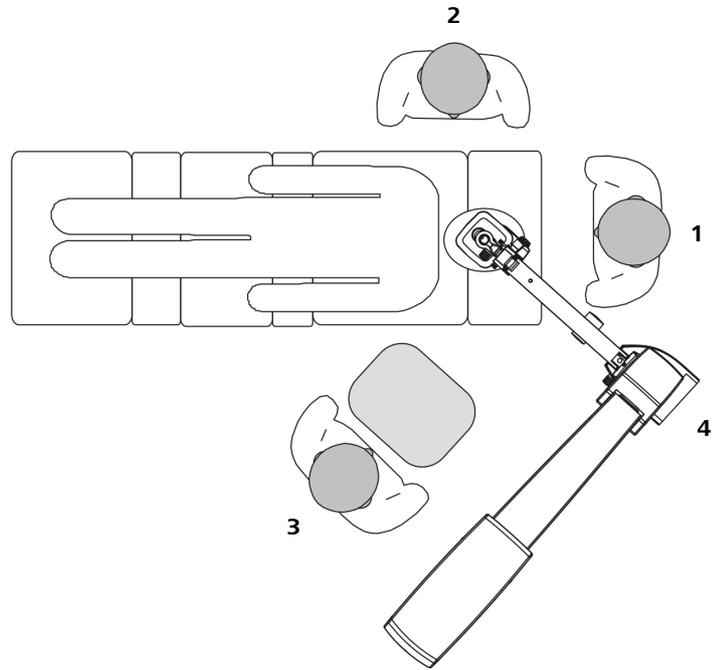
Example OR situation 3 for ophthalmic surgery with an assistant on the left side.

Fig. 63: Example OR situation
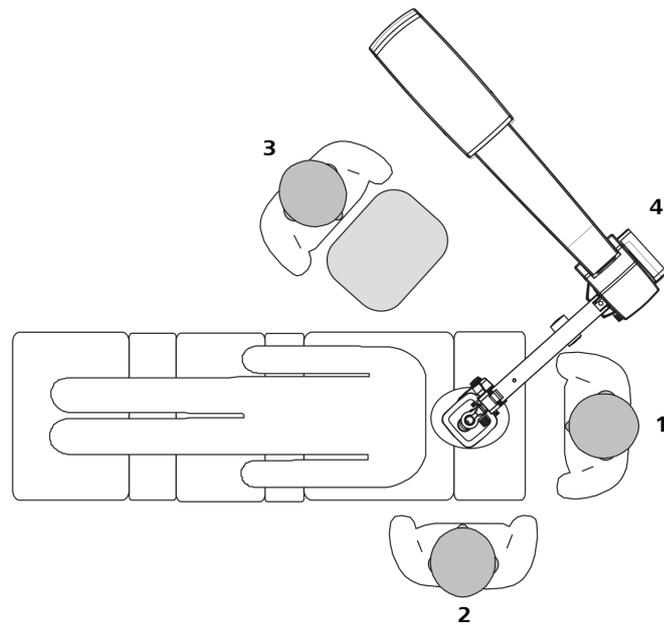
Pairing with wireless foot control panel (FCP-WL)

Pairing means the fixed relative assignment of the suspension system and foot control panel.

It is required for wireless operation. On first-time pairing, it may take up to 20 s until the radio link between the suspension system and the foot control panel has been established.

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.

Proceed as follows for pairing:

- Turn on the ceiling mount at power switch (1).

- Put the foot control panel in a vertical position (A) in the immediate vicinity of the antenna (2) of the ceiling mount (distance no more than 1 m).

- Start the pairing process on the ceiling mount as described on page 175.

When pairing on the ceiling mount, it may be useful if a second person reads out the information displayed on the standard wall panel to you.

Connecting the wired foot control panel (FCP) (option)

- Make sure that power switch (1) is OFF.

- Connect the cable of the foot control panel to the connector (3) on the standard wall mount.

Fig. 64: Connecting the foot control panel

Connecting external video equipment on integrated SD 3CCD camera to the floor stand (optional)

You can connect external video equipment, such as endoscope cameras, SD video monitors or the optionally available SD video recording tool MEDIALINK 100 to the OPMI LUMERA 700 with integrated SD 3CCD camera.

⚠ **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 16 or the requirements of EN 60601-1-1:1990.

Connecting an endoscope camera

- Connect the analog video input port (Video in/out) of the video wall mount on OPMI LUMERA 700 to the video output port of your endoscope camera, using the following special cable:

  - 10 m video in/out connecting cable

Connecting the SD video monitor

- Connect the analog Y/C video output port of the video wall mount on OPMI LUMERA 700 to the Y/C video input port of your SD video monitor, using the following video cable:

  - 10 m S-Video connecting cable

Connecting the MEDIALINK 100 and SD video monitor

- Connect the analog Y/C video output port of the video foot control on OPMI LUMERA 700 to the Y/C video input port of your MEDIALINK 100, using the following video cable:

  - 10 m S-Video connecting cable

- Connect the analog Y/C, BNC or DVI-D video output port of your MEDIALINK 100 to 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

*Fig. 65: External video devices
on integrated
SD 3CCD camera*

Connecting external video equipment on integrated HD 3CCD camera to the floor stand (optional)

You can connect external video equipment, such as HD video monitors, to the OPMI LUMERA 700 with integrated HD 3CCD camera. If your system is not equipped with the integrated HD video and image acquisition system (optional), you can also connect the optionally available SD video recording tool MEDIALINK 100.

| ⚠ | **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 16 or the requirements of EN 60601-1-1:1990.

Connecting the HD video monitor

ⓘ When connecting an external HD video monitor via the 5 m DVI-D system cable (302681-8767-000), make sure to plug the connector with the ferrite core into the suspension system in order to avoid EMC interference.

- Connect the digital DVI-D video output port on the OPMI LUMERA 700 to the video input port (e.g., DVI-D or BNC) of your HD video monitor, using one of the following video cables (depending on the connector type):

    – HD-SDI connecting cable, 75 Ohm, 2x BNC pin

    – 5 m DVI system cable

Connecting the MEDIALINK 100 and SD video monitor

- Connect the analog Y/C video output port of the video foot control on OPMI LUMERA 700 to the Y/C video input port of your MEDIALINK 100, using the following video cable:

    – 10 m S-Video connecting cable

- Connect the analog Y/C, BNC or DVI video output port of your MEDIALINK 100 to 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 system cable

Fig. 66: External video equipment on integrated HD 3CCD camera

DVI-D   HD-SDI

MEDIALINK 100

VIDEO IN   VIDEO OUT   DVI-D   AUDIO   USB   LAN   REMOTE

IN

OUT

T 1.6 A

HD signal   SD signal   SD signal

SD video monitor   SD video monitor

HD video monitor
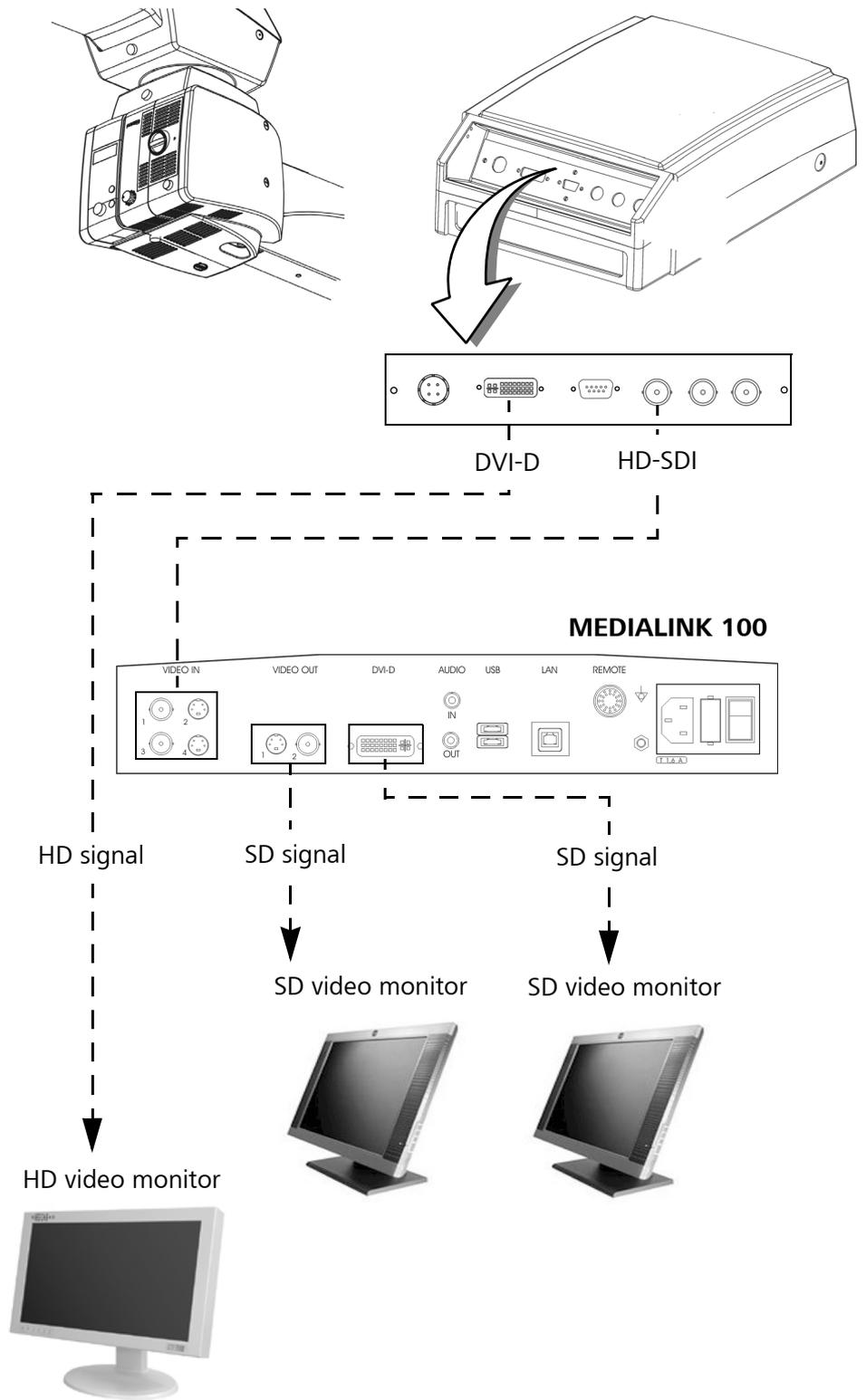
Mounting accessories on the surgical microscope

Replacing components and accessories

⚠ CAUTION	**Risk of injury!**

The swivel arm may move downward when accessories are changed.

- Never exceed the maximum permissible weight capacity of the suspension arm (see page 272).

- Re-adjust the balance of the suspension arm after every change of accessories (see page 149).

- Adjust the limit of downward travel of the suspension arm in such a way that the surgical microscope cannot come in contact with the patient (see page 150). This is particularly important if accessories such as the slit illuminator VISULUX (9), a fundus viewing system e.g. RESIGHT 700 (8) or the oblique illumination system are mounted to the bottom of the microscope.

⚠ CAUTION	**Risk of injury!**

Incorrectly mounted accessories can fall down.

- Do not replace accessories over the patient.

- Before every use and after re-equipping the system, make sure that the accessories are securely locked in position. Make sure that securing screws (6) and (10) have been firmly tightened!

- Mount accessories such as the slit illuminator VISULUX (10) or RESIGHT (8) only in accordance with the instructions of use.

Replace components as follow:

- Put the suspension arm in horizontal position, pull out the safety button (1) and turn it 180° to the right or left.
  Move the suspension arm slightly upward and downward until the lock snaps in. Now the suspension cannot swing upward due to missing mass.

- Loosen securing screw (6) by a few turns.

- Remove dust cover (2) and store it in a safe place.

Fig. 67: Components change
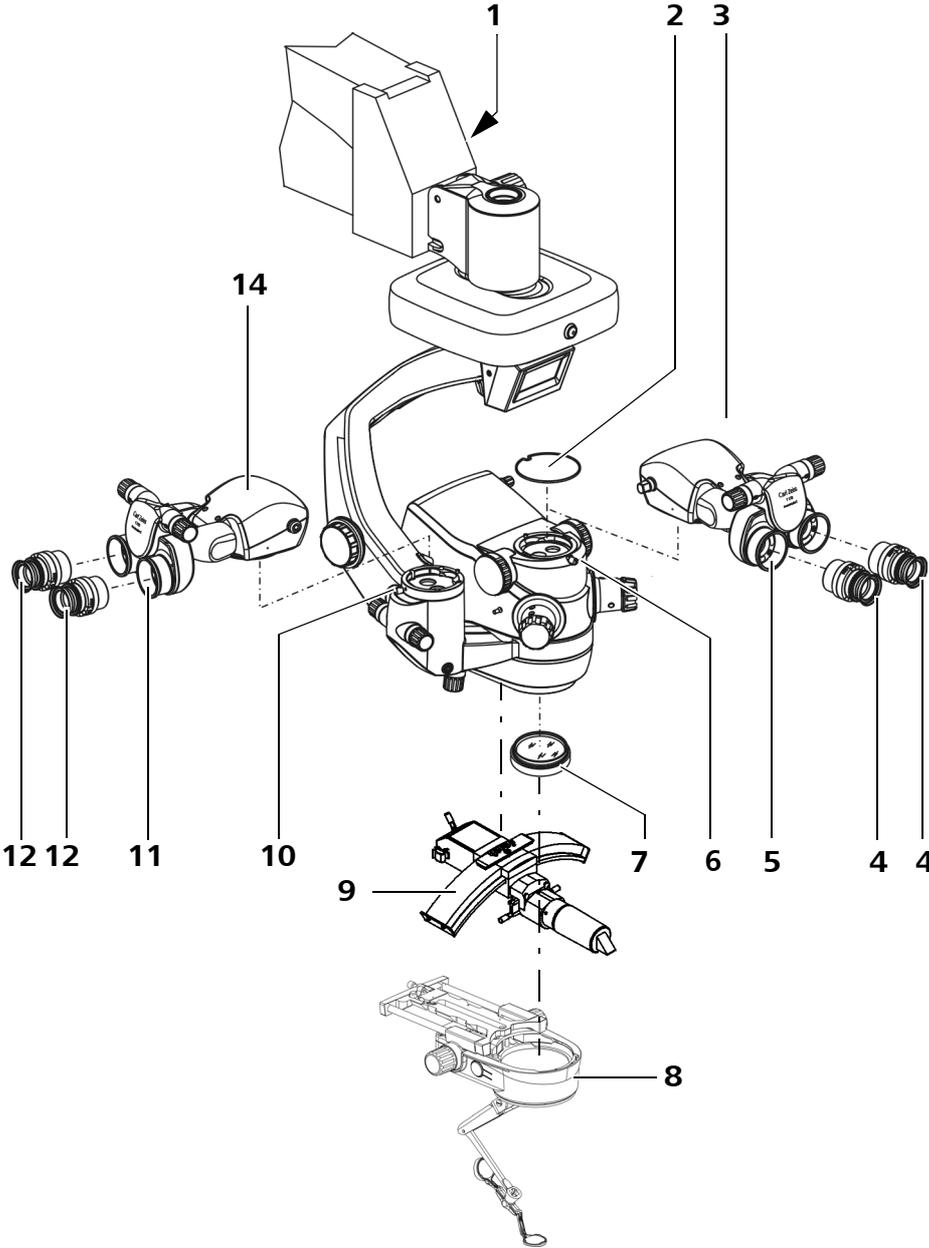
- Attach one of the tubes (3) described on page 52 to the microscope body and <u>firmly</u> tighten the securing screws (6).

- Attach one of the tubes (14) described onpage 52 to the integrated assistant's microscope and <u>firmly</u> tighten the securing screw (10).

  You can install further accessories between the new tubes and the microscope body. Lock these modules in position in the same way using securing screws (6) and (10).

- Insert the 10x or 12.5x widefield eyepieces (4 / 12) as far as they will go in the designated mounts (5 /11).
  The magnetic coupling reliably secures them in position.

  If you wish to use documentation equipment, we can supply an eyepiece with a reticle to aid focusing. Always install the eyepiece with the reticle on the same side of the tube where the documentation equipment is located.

- Screw objective lens (7) into the microscope body and tighten it <u>firmly</u>.

After changing tubes, objective lenses or eyepieces, you have to adjust the relevant parameters on the 5.7" control panel to ensure that the total magnification of the system is correctly displayed (see page 174).

Fig. 68: Components
change
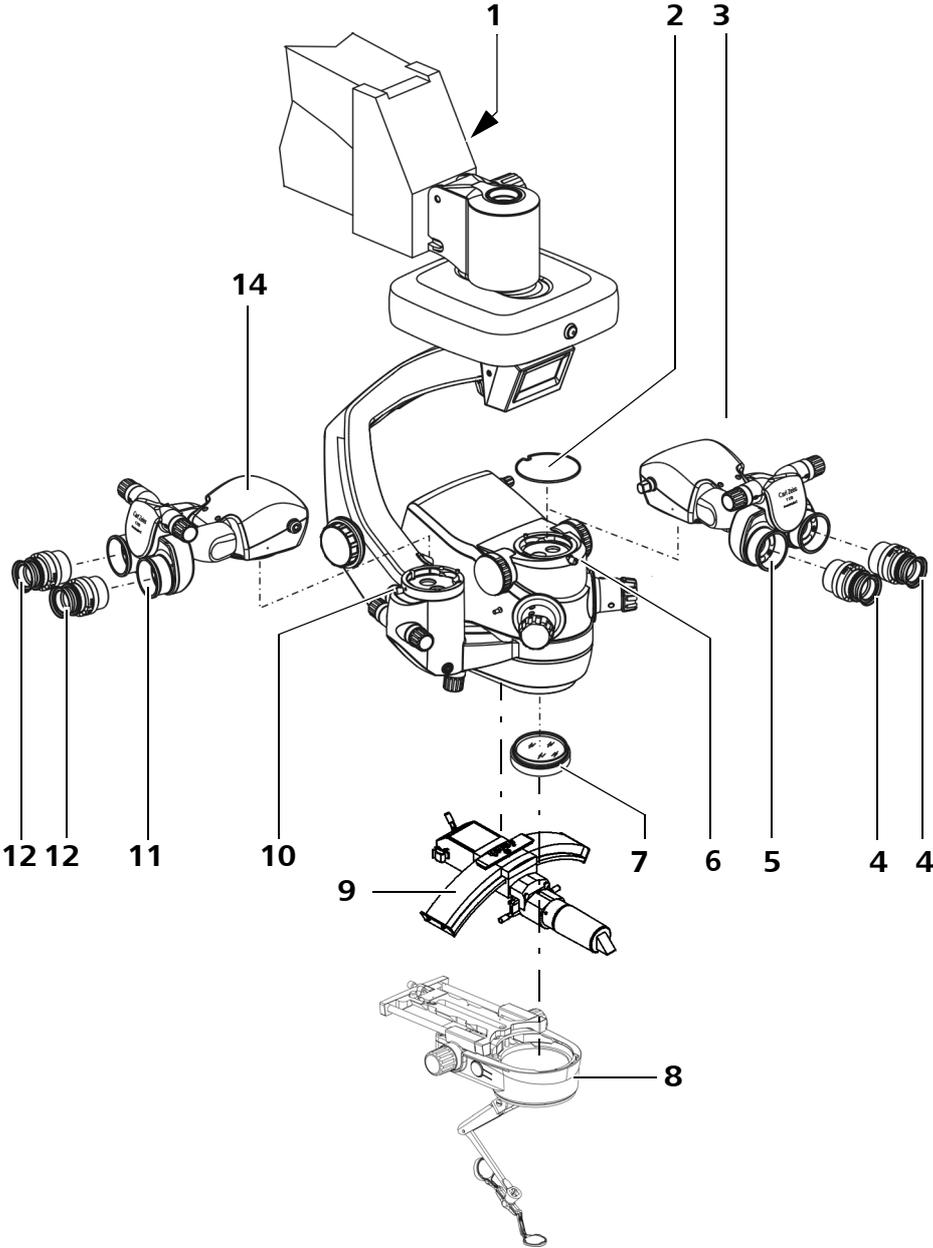
Connecting Invertertube E and RESIGHT 700 (optional) to the surgical microscope

✓ The two Invertertube E units are mounted (see page 142).

• Plug the connecting cable on Invertertube E into the Invertertube connection (2) on the surgical microscope.

• Plug the connecting cable on Invertertube E into the Invertertube connection (1) on the assistant's microscope.

→ The motorized image inversion function of of the two Invertertube E units can now be controlled via the system.

• Plug the RESIGHT 700 connecting cable (above figure) into the RESIGHT 700 connection (3) of the surgical microscope.

→ The internal focus of the RESIGHT 700 fundus viewing system can now be controlled via the system. The internal focus ensures that the surgical microscope no longer needs to be vertically moved. When working on the anterior segment of the eye, you can therefore move the fundus viewing system out of the beam path without causing blurring in the surgical microscope.

If both devices are connected simultaneously, they are synchronized so that the field of view is always displayed in the correct orientation. This also includes the image inversion function of an integrated SD 3CCD or HD 3CCD camera.

Please note that the button assignment on the foot control panel depends on your system configuration (see page 200).

Fixing the connecting cable with a cable clip

To make sure that the connecting cable of the Invertertube E on the assistant's microscope does not make contact with the sterile operating caps on the surgical microscope, you can fix the connecting cable using a cable clip:

• Push the dark gray cap out of the cable clip (Fig. B).

• Form the connecting cable of the Invertertube E into a loop (Fig. C).

• Pass this cable loop through the cable clip (Fig. D).

• Pull the cable loop out of the cable clip until the connecting cable runs straight up and no longer hinders you (Fig. D).

• Push the dark gray cap back into the cable clip to fix the loop (Fig. E and F).

*Fig. 69: Fixing the connecting
           cable with a cable clip*
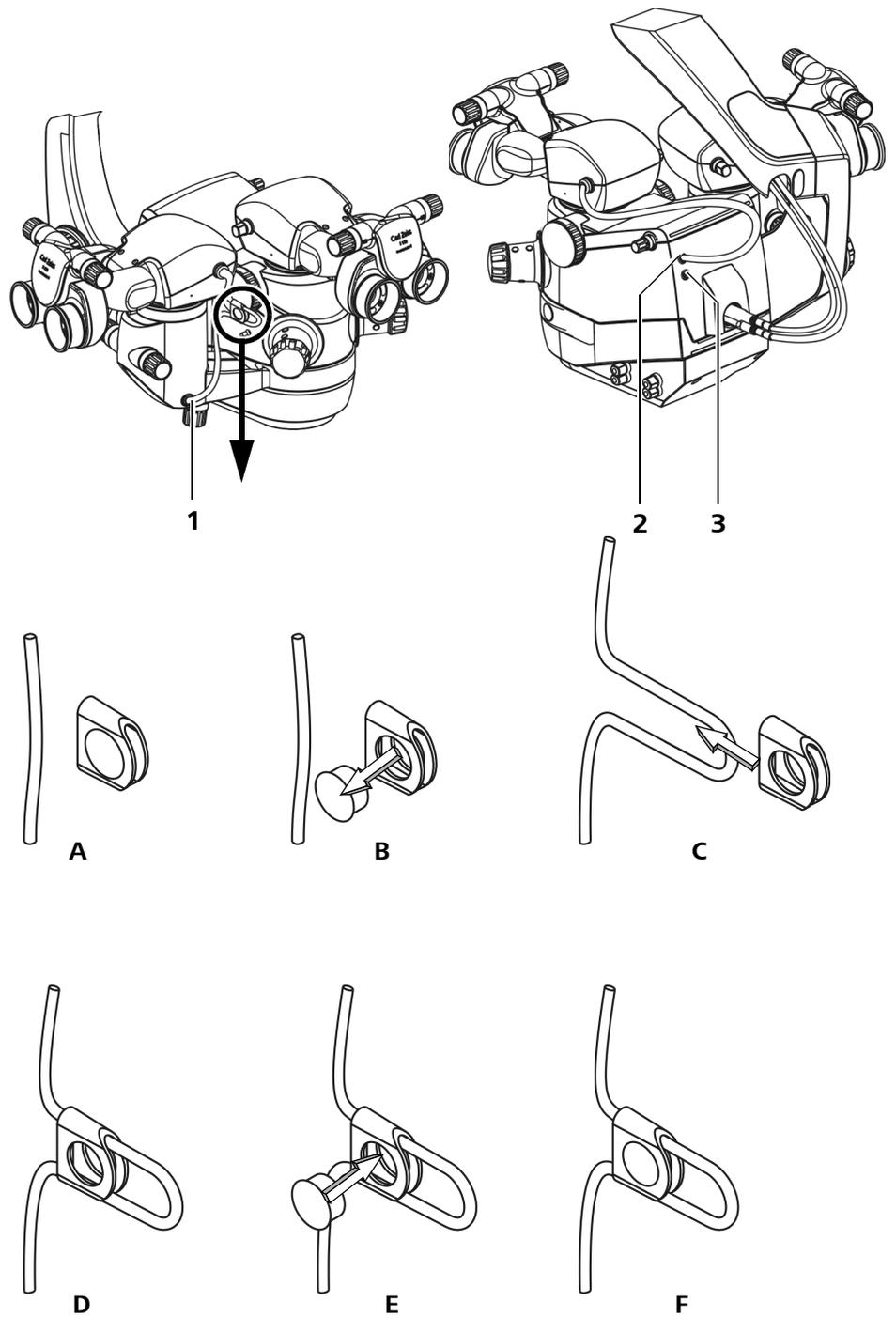
Connecting the second light guide to the accessories

⚠ **CAUTION**

Risk of injury!

A second light guide, which freely hangs from the surgical microscope, may cause retinal damage or slight burns to the patient.

- Always turn off the light source for the light guide that is not in use.

- Press the unused light guide into an open position of the cable holder (1) in such a way that it points away from the patient.

- Remove the protective cap of the unused light guide. This will prevent melting of the protective cap if the light source is accidentally turned on.

Before using the system, check whether the second light guide is connected to the accessory equipment. If this is not the case, proceed as follows to connect the second light guide:

- Switch off the light source.

- Insert the appropriate end of the light guide into the light guide socket of the accessory equipment as far as it will go.

Fig. 70: Connecting the light guide
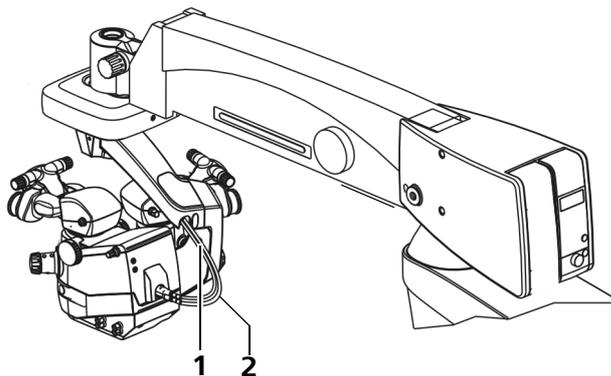
Balancing the system

Rebalance the system after every change of accessories. Do not perform the balancing procedure until all accessories have been mounted and there is no patient under the surgical microscope!

CAUTION

Risk of crushing!

Risk of crushing hands or fingers between suspension arm and XY coupling.

• Stay clear of the area between suspension arm and XY coupling while the suspension arm is in motion.

We recommend that you perform coarse balancing of the suspension arm before starting with precise balance setting of the suspension arm. To do this, the suspension arm must be locked in the horizontal position.
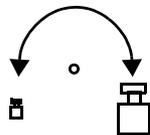
• To roughly balance the suspension arm, slightly move the arm up and down while tightening the adjustment screw (2). Continue tightening the screw until sufficient spring force is obtained to compensate for the weight of the surgical microscope and the accessories. Turning the screw clockwise increases the spring force, turning the screw counter-clockwise reduces the spring force.

• Hold the suspension arm in place and pull out the locking knob (1) without applying force. If this is not possible, readjust the spring force using the adjustment screw (2).

• During the balancing procedure, press one of the magnetic brake release buttons on the surgical microscope. Move the suspension arm up and down alternately by approx. 20 cm. Use the adjustment screw (2) to set a spring force that is equal in either direction, upward or downward. The system must not move downward when the brakes are unlocked.

Fig. 71: Perform balance

1   **2**
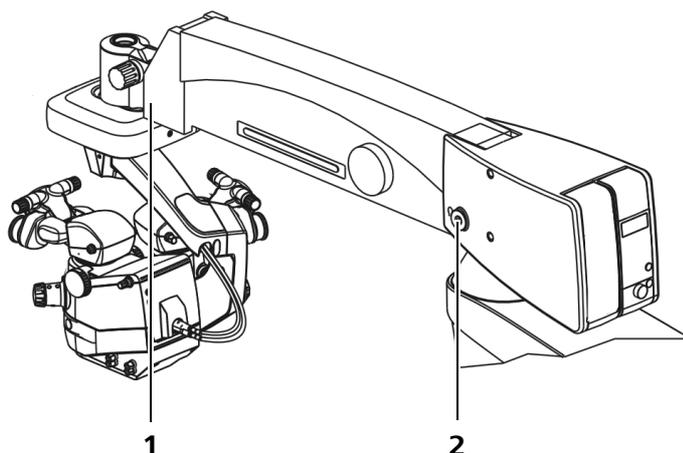
Adjusting the surgical microscope

Adjusting the downward travel limit

⚠	**CAUTION**

Risk of injury!

An improperly balanced systems will move upward or downward.

- Limit the stroke of the suspension arm to prevent any contact with the patient if the surgical microscope is lowered accidentally.

When setting the stroke limits, proceed as follows:

- Loosen the adjustment screw (1) by a few counterclockwise turns.

- Press one of the release buttons for the magnetic brake on the surgical microscope and lower the surgical microscope to a point where focusing in the operating field is still possible (depending on the focal distance of the objective lens). Ensure that there is still sufficient safety distance to the operating field.

- Turn the adjustment screw (1) clockwise as far as it will go.

- Lower the surgical microscope again to the lowest limit stop and check the safety distance.

Fig. 72: Setting downward travel
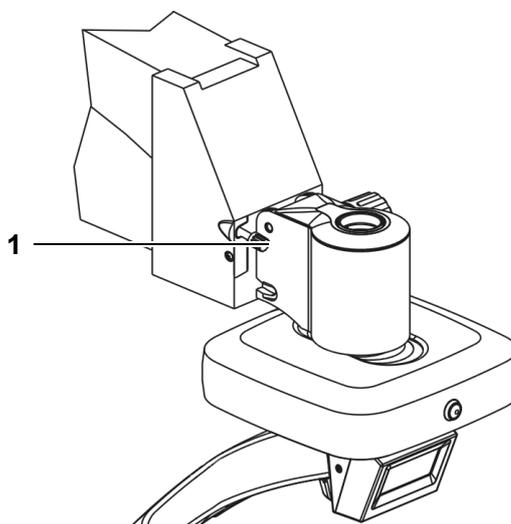
Positioning the assistant's microscope

Position the assistant's microscope as follows:

• Press the locking knob (1) and slightly swing the assistant's microscope in the desired direction until the locking point has been overridden.

The locking knob is located on the side opposite the assistant's microscope.

• Release the locking knob (1) and swing the assistant's microscope further until it automatically locks into place.

The assistant's microscope is not stationary after locking, but can still be slightly moved backward if required.

Fig. 73: Positioning the assistant's microscope

1
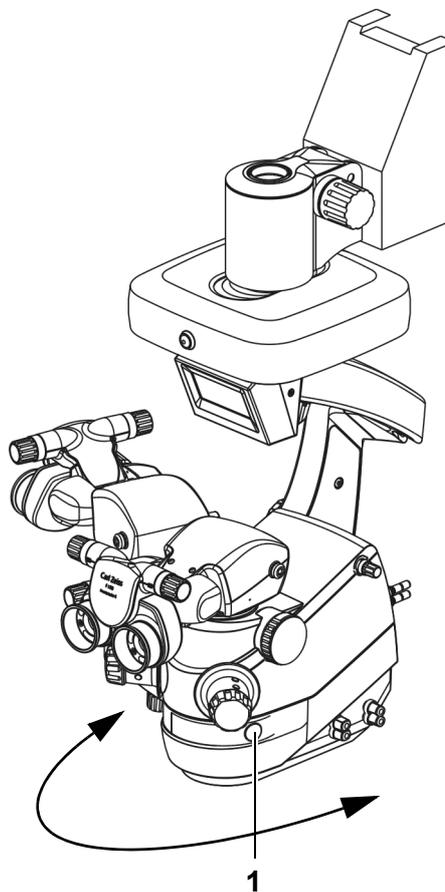
Adjusting the surgical microscope

Notes on adjustment

- To quickly set the surgical microscope, the interpupillary distance and the refractive values for the various users must be saved so that they can be preconfigured during the preparation step.

- Do not wear any bifocal or progressive lenses for the adjustment procedure and subsequent work with the microscope.
  Using such lenses makes it impossible to correctly set the diopter setting ring and leads to an unsatisfactory imaging results.

- Optimum image clarity in the eyepieces and optical output port for documentation equipment (camera, video) can only be achieved through careful focusing and a precisely adjusted binocular tube.

Adjusting the binocular tube

Setting Interpupillary distance

- Move the microscope to a vertical position above a flat object, e. g., a sheet of paper with writing.

- Move the eyepieces on the binocular tube to an interpupillary distance so that the two eyepiece images (object and the edge of the field of view) merge into one image.

Adjusting the eyepieces

The following procedure must be performed separately for each eyepiece in the order described.

- Set the microscope to minimum magnification.

- Set the diopter setting ring on the eyepiece to 0 D. (Diopters).

- Look through the eyepiece and move the microscope body to focus the image.

- Set the microscope to maximum magnification and adjust the fine focusing system until the image is sharply defined.

- Then reset the microscope to minimum magnification without changing the working distance.

- Set the diopter setting ring on the eyepiece to maximum positive diopter value (e.g., +5 dpt.).

- Look through the eyepiece and slowly rotate the diopter setting ring in the negative diopter direction until the image is sharply defined.

- Repeat the entire procedure for the second eyepiece.

→ The microscope has now been set in such a way that a continuously sharply defined image is produced throughout the magnification range without any need to refocus after a change of magnification.
If this is not the case, repeat the procedure.

Adjusting the eyecups   • Adjust the eyecups on the eyepieces in such a way that the entire field of view can be seen.

– Viewing with eyeglasses: Rotate eyecups in.

– Viewing without eyeglasses: Rotate eyecups out.

Setting the working distance and magnification

• Position the microscope above the surgical field so as to ensure convenient work.

• Roughly focus on the object by moving the microscope.

• Set the microscope to maximum magnification and adjust the fine focusing system until the image is sharply defined.

• Set the microscope to the required magnification. The focal plane is retained.

Fig. 74: Adjusting the
surgical microscope

1. Knob for adjusting
the pupillary distance
2. Eyepieces
3. Eyecup
4. Diopter setting ring
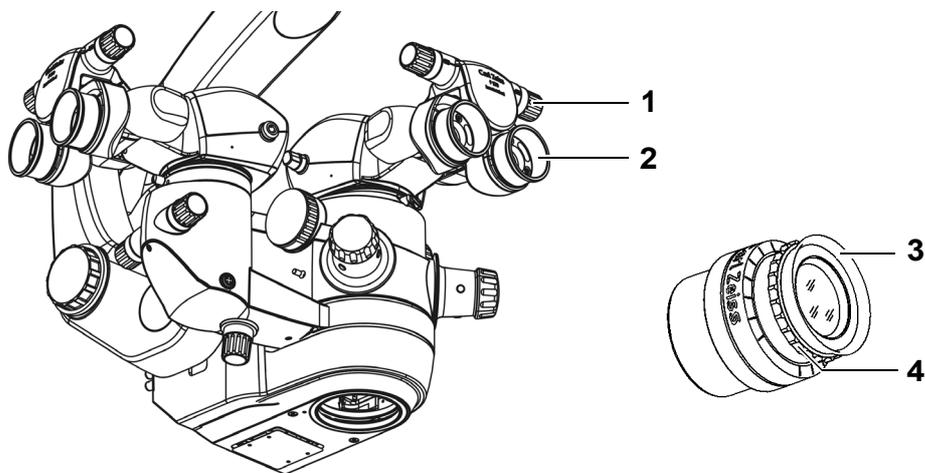
Setting the tilt position

⚠	**CAUTION**

Risk of injury!

The assistant's microscope is not locked in place, it may swing out if the surgical microscope is tipped in the horizontal viewing direction.

- Ensure to adjust and lock the assistant's microscope before starting the surgery.

- Ensure the locking mechanism of the assistant's microscope (2) is latched before the surgical microscope is tilted.

⚠	**CAUTION**

Risk of injury when tilting the surgical microscope!

If you have mounted the RESIGHT fundus viewing system on the underside of the microscope and steeply tilt the microscope, the RESIGHT fundus viewing system may unintentionally move in and injure the patient.

- Remove the RESIGHT fundus viewing system before steeply tilting the microscope.

Proceed as follows to tilt the surgical microscope:

- Tilt the surgical microscope towards you by turning the knob for the tilt device (1) clockwise.

- Tilt the surgical microscope away from you by turning the knob for the tilt device (1) counter-clockwise.

The optical axis of the surgical microscope should generally be vertical to the patient's eye. You will recognize the vertical position of the surgical microscope when the bar on the surgical microscope and the bar of the carrier arm are perpendicular to each other.

Fig. 75: Adjusting the tilt motion
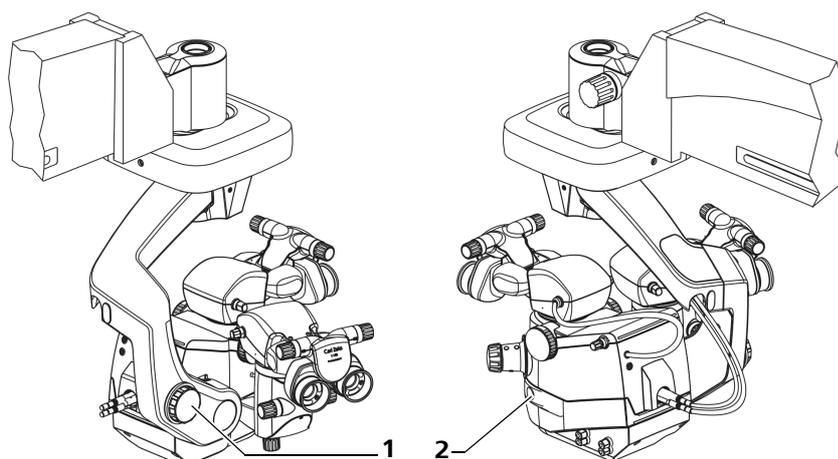
Aligning the video monitor on the floor stand (optional)

⚠️ | **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 | **Downward movement of the video monitor!**

Ageing processes may lead to the loss of gas in the gas pressure spring of the monitor's suspension arm, causing the video monitor to move downward of its own accord.

- Compensate for the loss of pressure by readjusting the gas spring (see page 260). If the video monitor continues to move downward, the gas spring is defective!

- Please contact 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.

Fig. 76: Aligning video monitor
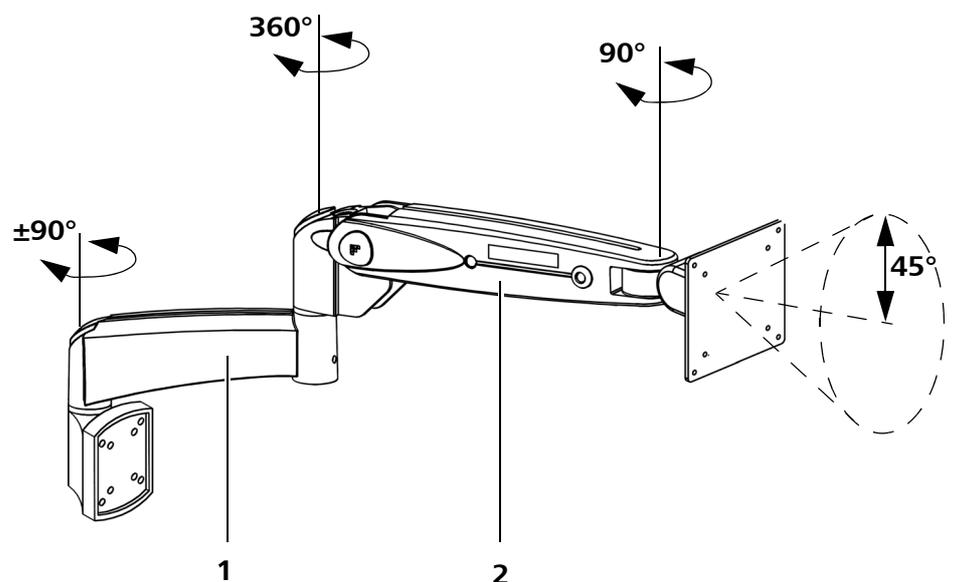
Aligning the carrier arm system on the ceiling mount (optional)

⚠	**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.

Proceed as follows to align the carrier arm system:

- Swing the extension arm (1) to the desired position.

- Swing the 3-joint carrier arm (2) horizontally to the desired position.

ⓘ The 3-joint carrier arm features a lock and three snap-in positions for height adjustment and in order to prevent the carrier arm from descending inadvertently. Please proceed as follows if you wish to tilt the 3-joint carrier arm down or up:

- Holding the 3-joint carrier arm with one hand, use the other hand to pull the locking knob (3) from the snap-in position.

- Tilt the 3-joint carrier arm upward or downward until the desired height is reached.

  → The 3-joint carrier arm is locked once the locking knob is snapped into one of the three snap-in positions.

To set the desired viewing angle for the installed monitor, please proceed as follows:

- Loosen the rotary knob (5) of the tilt device.

  → Now, the monitor holder (4) can be tilted up or down.

- Hold onto the handle (6) of the monitor holder and adjust the proper viewing angle.

- To lock the set viewing angle into place, tighten the rotary knob (5) of the tilt device.

Fig. 77: Carrier arm system alignment on the ceiling mount
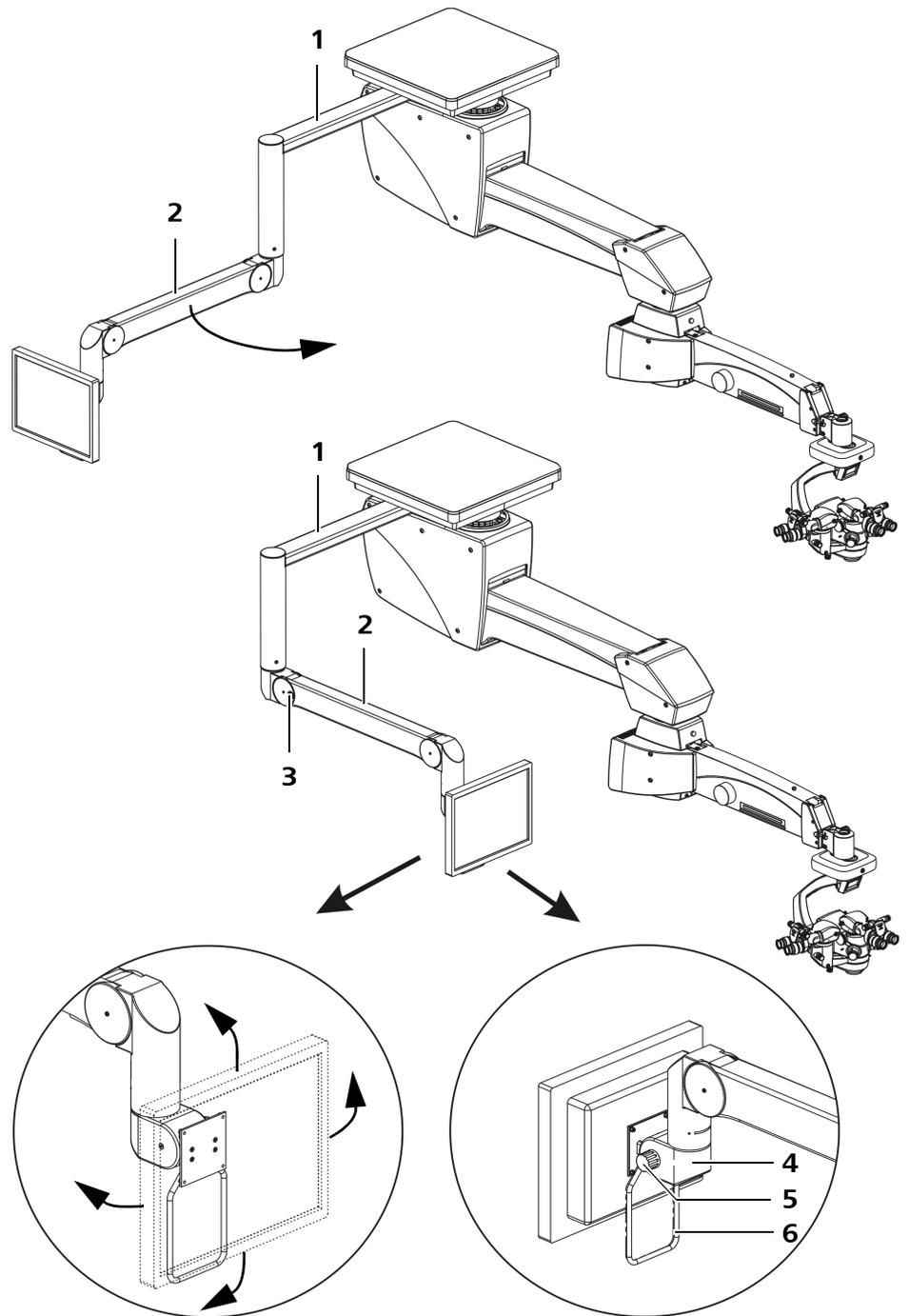
Preparing the system for sterile operation

Attaching asepsis caps

For sterile use, the system can be equipped with resterilizable products. The asepsis sets available from Carl Zeiss contain caps and hand grips which can be sterilized in autoclaves. For detailed information on sterilization please see the enclosed instructions "Preparation of resterilizable products" for the respective asepsis sets.

| ⚠ CAUTION | **Risk of infection!** |

The patient or user can become contaminated if sterile accessories are not used.

- Disinfect, clean and sterilize the products of the sterile accessories before each use. This also applies to the first use after delivery. The procedures must only be performed by properly trained personnel

- Only use the system with suitable, sterile accessories.

The following asepsis caps can be attached:
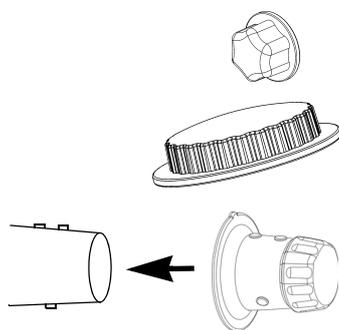
1 <u>22 mm asepsis cap</u>
For sterile operation of the interpupillary distance adjustment knobs on the tube.

2 <u>51 mm asepsis cap</u>
For sterile operation of the OPMI tilt device. When using the 180° tiltable tube, the asepsis cap is used for the sterile operation of the interpupillary distance adjustment knob.

3 <u>Asepsis caps</u>
For sterile operation of the handgrips on the surgical microscope.

- Turn these caps in such a way that the elevations for the buttons precisely fit on the handgrip buttons. The projection on the outer edge must point at the corresponding mark on the handgrip.

- Slide the cap all the way over the handgrip.

Fig. 78: *Attaching*
          asepsis caps
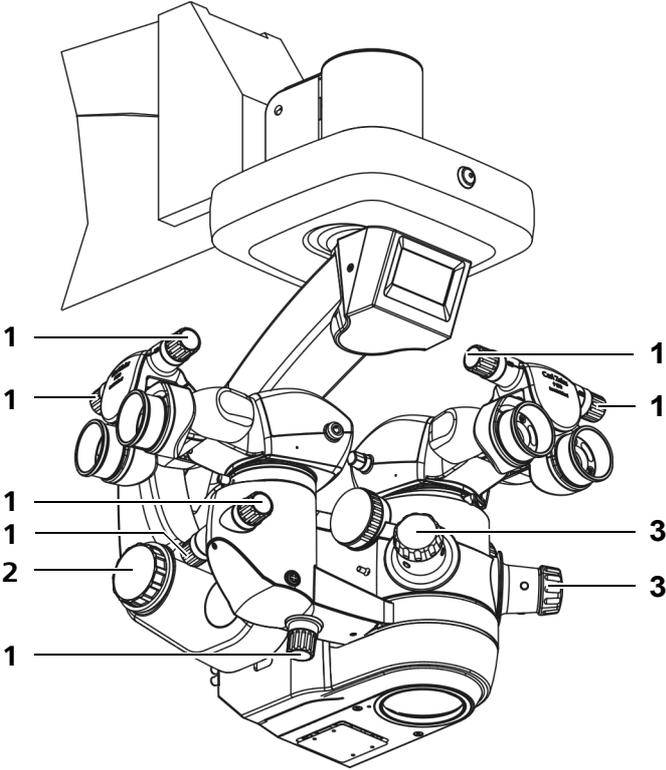
Attaching the drapes

To ensure sterile covering of the system, it is also possible to use the single-use drapes. When draping the system, make sure there is enough slack in the drapes to allow for movement of the microscope carrier and surgical microscope. Fasten the drapes with the supplied adhesive tape to prevent them from slipping.

NOTE	**Reduced image quality!**

Drapes with drape lens (VisionGuard®) may reduce the image quality of the optics.

• Remove the protective film from the drape lens (VisionGuard®)
  If necessary, replace the soiled drape lens.

Operation

Powering the system up and down

Requirements ✓ The correct rated voltage has been set on the suspension system (see page 90).

✓ The line cable has been connected (see page 114).

✓ The foot control panel has been connected (see page 114).

✓ There may be no patient underneath the surgical microscope before the device is turned on.

✓ For the direct network connection between OPMI LUMERA 700 and CALLISTO eye (optional), the two devices must be interconnected using the LAN cable. Afterwards, OPMI LUMERA 700 must be switched on and then CALLISTO eye.

⚠ **CAUTION**

Risk of injury!

Malfunctions of the motor electronic system may lead to uncontrollable movements or impact main functions (XY movement, focus, zoom, light guides)

• Switch to manual mode by pressing the "Manual" button (1) on the operating and control panel.
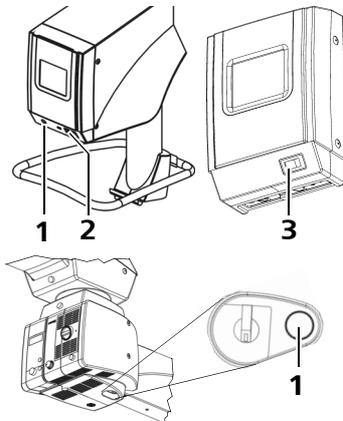
Proceed as follows to power the system up and down:

• Push the power button (2) to turn on the floor stand and the power switch (3) to turn on the ceiling mount.

→ The system has been switched on if the green lamp in the power switch is lit.

After power-up, the system performs a self-test. During this time (approx. 90 seconds), the Zeiss logo is displayed on the 5.7" control panel.

When the surgical microscope is switched on for the first time, the system displays the "Default User". During other logins, the system sets the most recently selected user.

ⓘ The "Default User" cannot be edited or changed. You can use this user at any time to work with standard settings.

Before starting to work with the system, you have to perform a function test (see next page). This permits you to check the system configuration and user-specific settings and to reconfigure them, if necessary.

Function test before use

Checklist   Always check the function of the system before surgery (without patient!) using the following checklist:

| ⚠ **CAUTION** | **Risk of injury!** |

Incorrect software settings may lead to unexpected **behavior** of the device and may cause injuries to the patient.

• Always check the selected user profile settings of the device prior to its use.

| **NOTE** | **Software malfunctions!** |

Malfunctions of the software may impair your work.

• In the event of software malfunctions, switch to the manual mode and contact Carl Zeiss Service.

Checking the function of the surgical microscope

• Check the zoom

  ✓ The buttons of the foot control panel have been configured (see page 199).

  ✓ The zoom speed has been set on the 5.7" control panel (see page 194).

• Check the focus

  ✓ The buttons of the foot control panel have been configured (see page 199).

  ✓ The focus speed has been set on the 5.7" control panel (see page 197).

• Check the XY coupling

  ✓ The speed has been set on the 5.7" control panel (see page 198).

• Check the unobstructed movement of the surgical microscope

  ✓ The ease of movement has been adjusted using the friction adjustment knob on the suspension system (see page 86).

  ✓ All cables and accessory parts have been fitted so that the surgical microscope can be safely positioned and without causing any damages.

- Check the eyepieces / binocular tube / objective lens

  ✓ The surgical microscope and the tube are in an ergonomic position for you (see page 112).

  ✓ The interpupillary distance has been correctly set (see page 152).

  ✓ The eyecups have been adjusted in such a way that you can see the full field of view (see page 152).

  ✓ Check that the correct prescription has been set on the diopter scale (see page 152).

  ✓ Image quality is correct throughout the entire magnification range.

  ✓ The objective lens and eyepieces are clean.

- Check the integrated data injection system (IDIS) (if available)

  ✓ The light intensity of the data injection system should be adjusted in such a way that glare is avoided and an optimum view of the surgical field is provided.

  ✓ The IDIS system magnification is displayed correctly. Check the set optics parameters (tube, eyepieces, objective lenses) on the 5.7" control panel against the instrument configuration on the surgical microscope before each use.

⚠ | **CAUTION** | **Risk of injury!**

Imported OPMI LUMERA 700 users can contain unfamiliar configuration settings.

- Check the imported configuration data before starting surgery.

NOTE | **Poor surgical outcome!**

If data errors occur or wrong optics parameters are input, the capsulorhexis ring is injected in the eyepiece with an offset and the surgical outcome deteriorates.

- Check the entered optics parameters before surgery.

- Check whether the injected ring data is plausible with regard to position and diameter.

Checking the function of the suspension system

- Check balance

    ✓ If the surgical microscope is properly balanced, it must stop in any position of the working range while the magnetic brakes are released. Upward or downward movement must not occur (see page 149).

- Check stroke limits

    ✓ The minimum working distance (height) to the operating area was set (see page 150).

- Check lamp brightness

    ✓ The lamp brightness can be varied (see page 189). Brightness variation has an effect on the surgical field illumination.

- Check user settings

    ✓ The correct user was selected and the settings checked (see page 215).

- Check the unobstructed movement of the system

    ✓ The system has been positioned in such a way that it can be moved (floor stand) or swung (ceiling mount) away from the patient at any time.

- Check the stand for secure positioning (floor stand only).

    ✓ All four brake tabs of the castors have been pressed down and the floor stand cannot roll away by itself (see page 112).

- Check the lift arm (only ceiling mount with lift arm).

    ✓ Motor-driven up and down movements of the lift arm can be initiated.

Checking the function of the accessory equipment

- Check foot control panel

    ✓ Suspension system and surgical microscope must perform the specified functions (see page 199).

- Check the fundus imaging system (if provided)

⚠ **WARNING**

Risk of injury!

Incorrect handling of a fundus viewing system mounted on the underside of the microscope or activation of the fast focus may cause injury to the patient's eye.

- Before using a fundus viewing system, make sure that the room for movement is larger than the downward travel path of the microscope.

- Perform the following focus reset:

A   B

  - With the fundus viewing system moved out of the beam path, position the microscope body in such a way that index dot (A) of the microscope's focal point is in the middle of the upper triangle (B).

  - Select a medium magnification (e.g. 1.0).

  - Lower the surgical microscope to the surgical field until the cornea of the patient's eye is in focus.

  - Tighten the locking screw for limiting the downward movement (turn clockwise) and check without the patient that the suspension arm cannot be lowered any further.

  - The use of the RESIGHT 500 / RESIGHT 700 fundus viewing systems from Carl Zeiss featuring a flexible lens support mechanism minimizes the risk of injury.
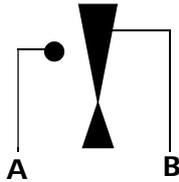
- Check the accessories

  ✓ The additional equipment (illumination system such as VISULUX, video system, etc.) has been checked for proper function using the respective user manuals.

⚠ **CAUTION**

Risk of injury!

If the working distance of accessories mounted on the underside of the microscope (e.g., VISULUX, RESIGHT 500 / 700) is insufficient, the patient's eye may be injured e.g. by unintentional movement of the focus.

- Make sure that the range of movement is sufficient for the external focus position when accessory equipment is attached.

- When using fundus viewing systems (e.g. RESIGHT 500 / 700 from Carl Zeiss) which are usually installed between the surgical microscope and the patient, make sure that the patient is neither put at risk nor injured by motorized focusing or the movement of the suspension arm.

Overview of the 5.7" operating panel

The 5.7" operating panel consists of a touchscreen with the following features:

1 Program selection

2 Status bar

3 Tab indicator

4 Program indicator

5 User indicator

6 Function indicator (optional)

Fig. 79: 5.7" operating panel
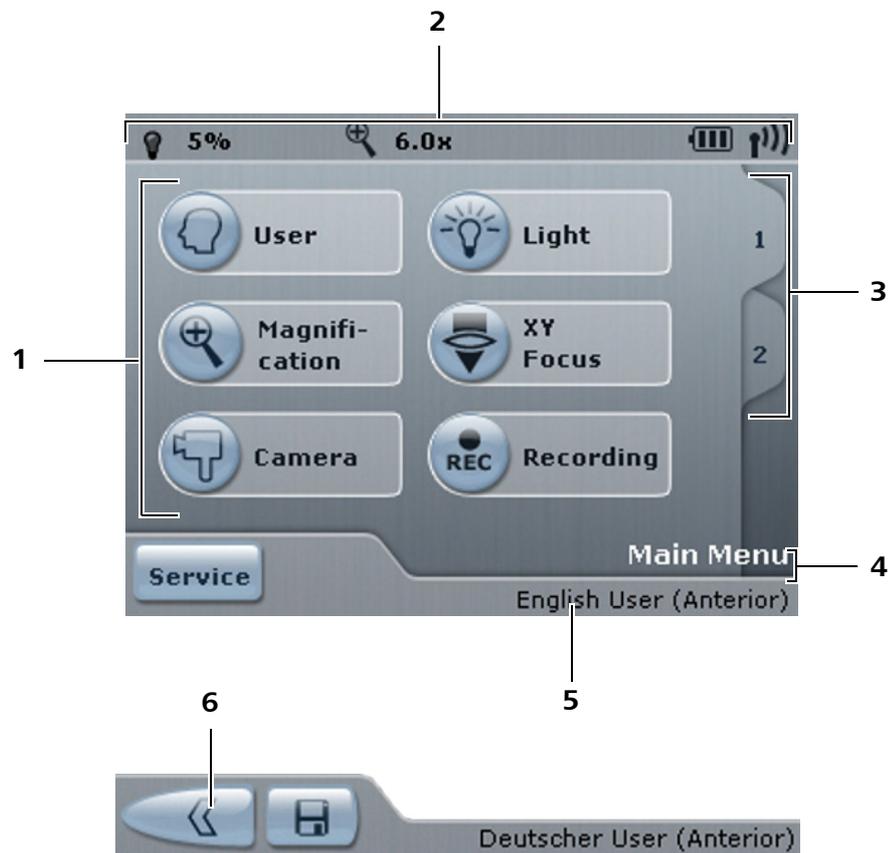
OPMI LUMERA 700 programs

Press one of the programs to launch it:

Program	Definition
	User Create, delete or edit users and their user profiles. Create a separate workflow step for each user. It consists of several user profiles and the can be customized by the user.
	Light Switch on or off the xenon, halogen or LED light source. Increase the light intensity of the light sources and swing its filter in. Find out how many service hours the xenon light source has left.
	Magnification Display the total magnification of the surgical microscope and adjust its magnification.
	XY focus Adjust the focus of the surgical microscope or position the XY coupling. Activate or deactivate the fast focus.
	Camera Adjust the settings of the integrated SD 3CCD or HD 3CCD camera or perform a white balancing procedure.
	Recording Using the integrated SD 3CCD or HD 3CCD camera, record images or videos in SD or HD quality and display them on the 22" TFT. Delete the saved recordings or save them to an external data carrier or in the network.
	User Config Configure and load the user profiles. Assign them settings, such as illumination (light source/illumination mode), zoom, focus (fast focus/deep view), XY coupling, foot control panel, handgrips, main observation tube (image inversion), RESIGHT, camera, video, links, overhead display and reset settings.
	System Config Configure all system-specific settings, such as optical settings (eyepieces/ tubes/ objective lenses), foot control panel, pairing, video recording, CALLISTO eye, camera (SDTV/HDTV), version, date & time, log file export, service PIN and lamp service hours.

Status bar icons

The OPMI LUMERA 700 has the following icons in the status bar (1).

Status bar icon	Definition
☀ 5%	**Light** Displays the light status (on/off) and the light intensity in %.
🔍 1.6 x ...	**Magnification** Displays the magnification of the overall system.
(III)	**Battery** Displays the charge state of the battery in the wireless foot control panel. The number of bars in the icon shows the charging status.
▪))	**WLAN** Displays that a radio link to the foot control panel is active. The number of bars in the icon shows the signal strength.
REC	**Recording** Displays a running video recording if the integrated video recording (optional) is enabled.

Enlarge status bar

By tapping the status bar, you can zoom in (2) and display detailed information about light intensity, total magnification and currently used filters. Tapping the 5.7" operating panel again hides the enlarged status bar and shows the previous menu again.

Fig. 80: Enlarge status bar
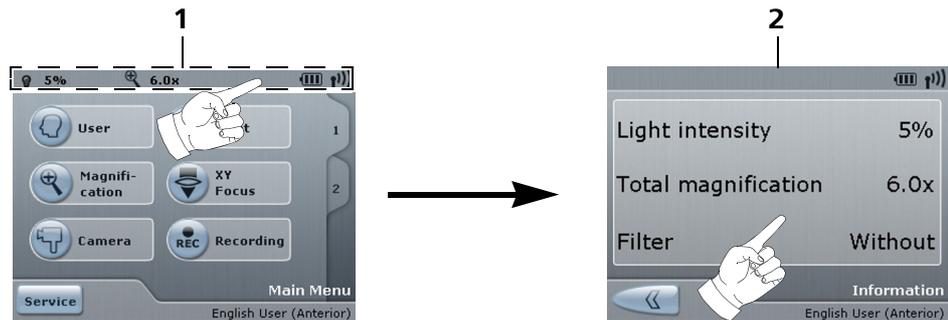
Controls on the 5.7" control panel

OPMI LUMERA 700 provides the following controls:

Operating element	Definition
	Back Press the <Back> button to return to the previous menu, to abort changes or to retain changes until a user change or system start occurs.
	Save Press the <Save> button to save new settings.
	Tab In two- or three-page menus, press the tab at the right of the screen to display the desired screen.
	Arrow keys 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 is grayed out. The bar on the left graphically indicates the set value.
	Buttons Click on buttons to activate functions or to open submenus.
	Option – Blue option => Function is activated – Light blue option => Function is deactivated – Gray option => Function is not available
	List – Blue list entry => Function is activated – Light blue list entry => Function is deactivated
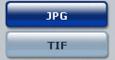
Screen keyboard

If text entries need to be made, a virtual keyboard is displayed on the 5.7" control panel and the following input options are offered:

Operating element	Definition
1 **2** **3** **4** **5** **6**	**1** <u>Text field</u> The entered text is displayed here (max. 20 characters). **2** <u>Numeric keypad</u> Use this keypad to enter figures and characters. **3** <u>ABC keypad</u> Use this keypad to enter letters. **4** <u><Shift key></u> Use this key to switch between upper case and lower case letters. **5** <u><Space key></u> Use this key to enter spaces between numbers and characters. **6** <u><Backspace key></u> Use this key to delete characters on the left of the cursor.

System-specific configuration (System Config)

 This section describes how you can configure all user-dependent system settings for OPMI LUMERA 700.

Tab 1

Control	Definition
Optical settings	**Optical settings** page 174
Recording	**Recording (optional)** page 312
Video signal	**Video signal** page 177
Foot control pairing	**Foot control pairing** page 175
CALLISTO eye	**CALLISTO eye (optional)** page 386

Tab 2

Control	Definition
Versions	**Versions** page 181
Export logfiles	**Export log files** page 183
Lamp service hours	**Lamp service hours** page 180
Date & Time	**Date & Time:** page 182
Service PIN	**Service PIN** page 182

Configuring the optical settings (System Config)
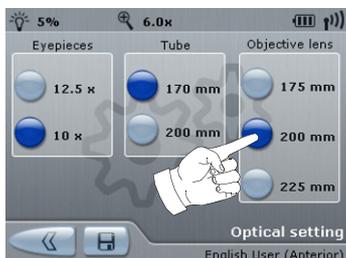
In the "Optical Settings" submenu (Main Menu > Tab 2 > System Config > Tab 1 > Optical Settings) you must set the parameters for the following system components so that the total magnification will be correctly displayed:

– Eyepieces

– Tube

– Lens

To set the system components, proceed as follows:

• Press tab [2] in the main menu.

• Press the "System Config" button.

• Press tab [1] in the "System Settings" menu.

• Press the <Optical Settings> button.

→ The "Optical Settings" menu is displayed.

• In the fields "Eyepieces", "Tube" and "Lens", select the system components to be used by pressing the corresponding option.

→ The parameter is activated when the button lights up in blue.

→ The parameter is deactivated when the button lights up in light blue.

• To save the changes, press the 🖫 button.

→ The settings are adopted for all users.

• To return to the main menu, press the ◁《 button twice.

Performing pairing procedure with the foot control panel (System Config)
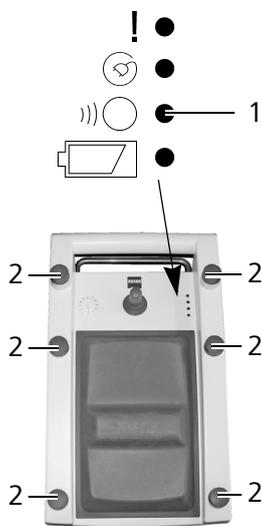
In the "Pairing" submenu (Main Menu > Tab 2 > System Config > Tab 1 > Foot Control Panel Pairing), you can assign a wireless foot control panel to the system, which is necessary for wireless opration.

Proceed as follows for pairing:

*   Unless already done, put the foot control panel in its vertical position in the immediate vicinity of the system (no more than 1 meter away) and keep it in this position until pairing is finished.

*   Press tab [2] in the main menu.

*   Press the "System Config" button.

*   Press tab [1] in the "System Settings" menu.

*   Press the <Fußschaltpult Pairing> button.

    → The "Pairing" submenu is displayed.

*   Start the pairing by pressing the <Start Pairing> button.

    → The following message appears: "System and foot control panel are being paired".
       Press a button on the foot control panel until the third LED from the top flashes orange and keep the foot control panel in the vertical position."

*   Press any button of the foot control panel until the third LED from the top flashes orange, and keep the foot control panel in the vertical position during the pairing process.

Successful pairing

When the pairing is successful, the status lamp "Radio Link Intensity" (1) flashes green for approximately 1 second 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 wheel on the foot control panel to the number specified on the suspension system."

*   Check whether pairing was successful by simultaneously pressing any two buttons (2) on the foot control panel. The "Radio Link Intensity" status indicator (1) will then 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."

• Start the pairing once more as described above.

In the event of malfunction, you can always use the wireless foot control panel with a cable. Keep the cable in the vicinity of the suspension system for this case!

Configuring the video settings (System Config)

The "Video Setting" (Main menu > Tab 2 > System Config > Tab 1 > Camera) permits you to set the video signal of an integrated HD 3CCD camera. The following formats are available:

– HDTV format (for high-definition display devices)

– SDTV format (for standard-definition display devices)

Setting the HDTV format

If a high-definition display device (e.g., HDTV monitor) is connected, the "HDTV Format" field permits you to choose between "720 P" and "1080 P" resolution.

– 1080 P - Select this 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.

– 720 P - Select this 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.

Proceed as follows to select a HDTV format:

• Press tab [2] in the main menu.

• Press the <System Config> button.

• Press the <Video signal> button.

→ The "Video Setting" submenu is displayed.

• Press the video resolution currently selected.

→ A pop-up menu offers "1080 P" or "720 P" for selection.

• Select the video resolution <1080 P> or <720 P>.

• If you would not like to make a change, press the ⟨⟨ button and the system displays the "Video Setting" menu.

• Press the 🖫 button to save the changes.

→ The following appears "Info - changing the HDTV formats requires a manual restart. Would you like to perform this now?

• If you do not wish to accept the changes made to the HDTV format, press "No" and the system displays the "Video Setting" menu.

- If you would like to accept the changes made to HDTV format, press "yes". Then the following message is displayed: "Info - Please restart the system manually".

- You must restart the system.

  → The settings are saved for the current user.

Setting the SDTV format

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

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

– Sidecut
In the "Sidecut" format, the sides of the image will be cut, leaving the center of the image to be displayed with a 4:3 aspect ratio.
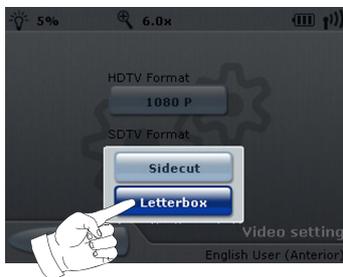
To select an SDTV format.

• Press tab [2] in the main menu.

• Press the "System Config" button.

• Press tab [1] in the "System Settings" menu.

• Press the <Camera> button.

→ The "Video Setting" submenu is displayed.

• Tap on the currently selected format in the "SDTV Format" field.

→ A pop-up menu offers "Letterbox" and "Sidecut" for selection.

• Select the <Letterbox> or <Sidecut> format.

The loaded format will be activated only when the "Save" button is pressed.

• To save the changes, press the 🖫 button.

→ The settings are saved user-specifically.

• To return to the main menu, press the ⟨⟨ button twice.

Resetting the Xenon lamp service hours (System Config)
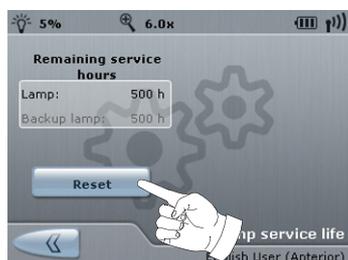
In the "Lamp Service Life" submenu (Main menu > Tab 2 > System Config > Tab 2 > Lamp Operating Hours), the available operating hours (max. 500 hours) of the xenon lamp and the backup xenon lamp are displayed.

When only 50 service hours remain, the 5.7" control panel displays the first warning message and indicates the residual service hours. If only five hours remain, a warning is displayed, asking you to replace the relevant xenon lamp. Swing in the backup xenon lamp now at the latest. If the maximum service life of the backup xenon lamp has also been reached, replace the xenon lamp module of the Superlux Eye light source and reset the remaining hours counter to its original value.

For information on how to replace the lamp module, see page 258.

Proceed as follows to reset the service hour counter display:

•   Press tab [2] in the main menu.

•   Press the "System Config" button.

•   Press tab [2] in the "System Settings" menu.

•   Press the <Lamp Service Hours> button.

    →   The "Remaining Service Hours" submenu is displayed.

•   To reset the remaining service hours, press the <Reset> button.

    →   An inquiry is displayed.

•   Select <Yes> to reset the lamp service hours or select <No> to cancel the process.

    →   After successful reset, the remaining lamp service life will again be 500h.

•   To return to the main menu, press the ⬅« button twice.

Accessing system information (System Config)

The "Versions" submenu (Main menu > Tab 2 > System Config > Tab 2 > Versions) displays current information on your system.

– Serial number	– Foot Panel
– PC-SW (PC software)	– RESIGHT
– LED1 light	– Invertertube
– Halogen Light	– Assistant's Invertertube
– Xenon Light	– Assistant
– OPMI	– Brake Axis 1,2
– XY	– Brake Axis 3
– Camera	– Recording
– Gateway	– Overhead display
	– IDIS

The system information may vary according to the configuration of your system.

Proceed as follows to display the system information:

• Press tab [2] in the main menu.

• Press the <System Config> button.

• Press tab [2] in the "System Settings" menu.

• Press the <Version> button.

→ The "Versions" submenu is displayed.

• Press the arrow buttons 🔽 or 🔼 to access the various system information.

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

Accessing the system menu (System Config)

The "Service PIN" submenu (Main Menu > Tab 2 > System Config > Tab 2 > Service PIN) is used to call up the service menu. The Service PIN is only available to those trained by Carl Zeiss Meditec.
Unauthorized persons may not use this PIN.

Setting the date and time (System Config)

The "Date & Time" submenu (Main menu > Tab 2 > System Config > Tab 2 > Date & Time) enables you to manually set the system data and time. Configure these settings when using the system for the first time, changing time zones and switching from summer to winter time or vice versa.

The data and time are not displayed during a HD video recoding, but they are automatically recorded so that they are displayed during playback.

Proceed as follows to set the date and time:

- Press tab [2] in the main menu.

- Press the <System Config> button.

- Press tab [2] in the "System Settings" menu.

- Press the <Date & Time> button.

   → The relevant submenu is displayed.

- Using the ➖ / ➕ buttons, set the date (day, month, year) and the time (hours/minutes).

- Make sure that the date and time are set correctly and press the 💾 button to save them.

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

Exporting log files (System Config)

The <Export Logfiles> submenu (Main menu > Tab 2 > System Config > Tab 2 > Export logfiles) permits you to copy encrypted log files to a USB storage medium in the event of errors. You can then send these files to your Carl Zeiss service technician who will be able to perform faster troubleshooting on this basis.

Proceed as follows to export the log files:

- Connect a USB storage medium to the USB port on the underside of the system (see page 90).

- Press tab [2] in the main menu.

- Press the <System Config> button.

- Press tab [2] in the "System Settings" menu.

- Press the <Export Logfiles> button.

  → The data is copied to the USB storage medium.

  → If no USB stick has been connected, the following error message appears: "USB storage medium not found."

User-specific configuration (User Config)

The "User Settings" submenu (Main menu >Tab 2 > User Config) enables you to make the following settings.

– In the "Change profile" field, you can configure and load profiles set at the factory and by yourself.

– The "Reset" button permits you to select which functions are to be reset to their start value when you press the XY reset button (1) or when the standby position is reached.

Control	Definition
Reset	**Reset** page 186
Anterior	**Profile (Anterior)** page 185
Activate	**Activate** For activating a selecting profile
Configuration	**Configuration** page 188

Loading and configuring a user profile (User Config)
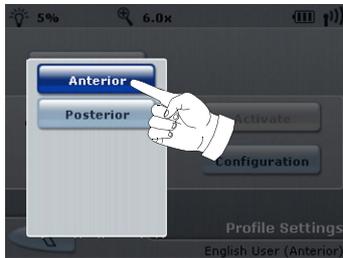
The factory-set DEFAULT "Anterior" and "Posterior" user profile is preconfigured for the immediate use of the surgical microscope.

The "Anterior" DEFAULT user profile is for applications in the anterior segment and the "Posterior" DEFAULT user profile is for applications in the posterior segment of the eye. Information on creating a new user profile is located in page 219.

The user can customizes the following device settings:

5.

- Light (see page 189)   - Zoom (see page 194)

- Focus (see page 195)   - XY (see page 198)

- Foot control panel (see page 199) - Handgrip (see page 202)

- Inversion (see page 205)   - RESIGHT (see page 206)

- Camera (see page 207)   - White balance (see page 211)

- Links (see page 213)   - Overhead display (see page 214)

All changes made to the device settings are always assigned to the that is profile currently loaded. Before you make any changes, you should consider whether you would like to assign the changes to the loaded or another saved profile.

Proceed as follows to load and configure a new profile.

✓ You are now in the "User settings" submenu" (Main menu > Tab 2 > User Config)

• Press the profile that is currently loaded.

→ A list of the profile available is displayed.

• Select a profile.

→ The profile name is displayed and the "Activate" button is activated.

• Press <Activate> button to load the profile.

→ The following message is displayed: "Info - The current profile settings are being changed. Please wait!"

→ The <Activate> button is disabled again.

• Press <Configuration> button to load the new profile.

• Adjust the desired parameters for each function.

Configuring the reset settings (User Config)

The "Reset Options" submenu (Main menu > Tab 2 > User Config > Reset) permits you to set which the functions are to be reset to their start value of the loaded user profile when you press the XY reset button (1) or when the standby position is reached.

You can select the following reset settings:

– "Center system in XY direction"
The XY coupling moves at maximum speed to its center position. You can also trigger this function by pressing a suitably configured foot control panel button (see page 199).

– "Move focus back to initial position" (cannot be deactivated)
The focus of the surgical microscope and the focus of the connected RESIGHT 700 are moved back to the initial position.

– "Move zoom back to initial position"

– "Reset illumination to start values"
Resets the SCI illumination and light source(s) to their start values.

Parallel to the functions that can be selected above, a reset of the RESIGHT 700 is performed when the XY reset button (1) is pressed or when the standby position is reached. This moves the focus of a connected RESIGHT 700 to its center position.

CAUTION
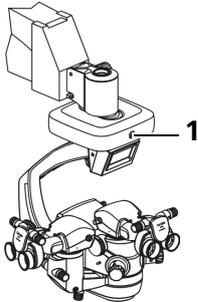
Risk of collision!

Pressing the reset button (1) moves the XY coupling into its configured starting position and/or moves the focus into the center position. This can injure the patient or damage any accessories installed.

• Keep sufficient distance between device and patient (minimum 40mm) when pressing the XY reset button (1).

• Ensure that any accessories installed do not come into contact with other objects.
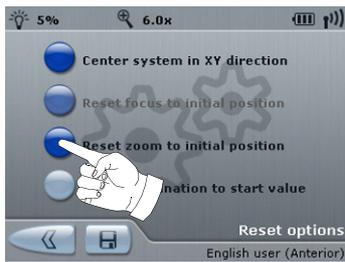
Proceed as follows to set the reset functions:

• Press tab [2] in the main menu.

• Press the <User Config> button.

→ The "User Settings" submenu is displayed.

• Press the <Reset> button.

→ The "Reset Options" submenu is displayed.

• Press the respective button to activate or deactivate the reset functions.

→ A function is active when the button lights up in blue color.

→ A function is inactive when the button lights up in light blue color.

• Press the 🖫 button to save the changes.

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

Configuring the user profile

Configuration

This section describes how you can configure all user-dependent profiles for OPMI LUMERA 700.

Tab 1

Control	Definition
Light	**Light** page 189
Focus	**Focus** page 195
Foot control panel	**Foot control panel** page 199
Zoom	**Zoom** page 194
XY	**XY** page 198
Handgrip	**Handgrip** page 202

Tab 2

Control	Definition
Inversion	**Inversion** page 205
Camera	**Camera** page 207
Links	**Links** page 213
RESIGHT	**RESIGHT** page 206
White balance	**White balance** page 211
Overhead display	**Overhead display** page 214

Configuring light sources and illuminations (User Config)

In the "Light Config" submenu (Main Menu > Tab2 > User Config > Configuration > Light) you can configure the initial values for the main light source and the second light source for the currently loaded user profile. The software automatically recognizes the light source installed in your system and displays the relevant menu.

Main light source

You can configure the following initial values for the main light source (e.g. LED, if this was selected as the main light source):

– initial value for the light source (light status [on/off], light intensity, filter status [swung in/swung out])

– Initial values of the SCI illumination (light intensity, combination ratio)

– Initial values for the slit lamp (light intensity, slit status [on/off], Slit width [0.2 mm, 2 mm, 3 mm, 4 mm] and slit position [right, left])

Second light source

You can configure the following initial values for the second light source (e.g. xenon, if this was selected as the second light source):

– initial values of the light source (light status [on/off], light intensity, filter status [swung in/swung out])

Actions triggering the initial values

The initial values for the light intensities of the light sources and for the combination ratio of the SCI illumination are set automatically after the following actions:

– Reaching of the standby position (with appropriate configuration)

– Power-up of the system

– Change of user

– Activation of the XY reset button (with appropriate configuration)

The initial values for the filter status of the light sources and for the slit illuminator (slit status, slit width and slit position) are set automatically after each system start.

Setting the start value of the light sources

⚠	**CAUTION**	**Risk of injury!**

Excessive light intensity or excessive radiation exposure times may lead to retinal injury in the patient's eye.

- Adjust the illumination intensity and the resulting radiation exposure time by selecting the appropriate illumination setting. You will find the values recommended by Carl Zeiss in the table "Maximum radiation exposure times" on page 22.

- When operating on the eye, use the retina protection filter (blue barrier filter). It protects the patient's retina against unnecessary (blue) radiation and increases the exposure time by a factor of 5.

- When operating on the exterior eye, use the retinal protection device to prevent light from entering the pupil, especially when the pupil is dilated (see page 191).

Proceed as follows to set the start value of the light sources:

- Press tab [2] in the main menu.

- Press the <User Config> button.

- Press the <Configuration> button in the "User Settings" menu.

- Press the <Light> button.

  → The "Light Config" submenu is displayed.

- Press the <OPMI Light> or <2nd Light Source> button in the "Light Config" submenu.

  → The "OPMI Light" or "2nd Light Source" submenu is displayed.

- Press the ⬆ arrow button to increase the start value and the ⬇ arrow button to reduce it. The brightness (light intensity) is continuously variable from 5% to 100% in 1% steps.

- Press the 🖫 button to save the changes.

- Press the 《 button four times to return to the main menu.

Setting the start value for filters of the light sources

The filter automatically swings into the beam path after the following actions:

– Power-up of the system

– Change of user

⚠	**CAUTION**

Risk of injury!

Filters that are pivoted in incorrectly may increase the light's intensity and may lead to retina damages of the patient's eye.

• Always check the filter setting before every use.

• Should the filter wheel become blocked, activate the Manual mode (siehe page 240).

Proceed as follows to swing the filter in or out:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• Press the <Configuration> button in the "User Settings" menu.

• Press the <Light> button.

→ The "Light Config" submenu is displayed.

• Press the <OPMI Light> or <2nd Light Source> button in the "Light Config" submenu.

→ The "OPMI Light" or "2nd Light Source" submenu is displayed.

• To swing the required filter into the beam path, press the Filter button and select a filter. The following filters are available depending on the system configuration and light source:

– Retinal protection filter (blue barrier filter) - reduces the blue components of the light and extends the recommended exposure time by a factor of 5.

– HaMode - generates a light spectrum similar to that of a halogen light source.

– Fluorescence - makes fluorescent areas visible (option).

– Without - empty filter position.

• Press the 💾 button to save the changes.

• Press the « button four times to return to the main menu.

Setting the SCI start value

Depending on the initial value, the SCI illumination generates a combination ratio for various applications: This is generated automatically after the following actions:

– Reaching of the standby position (with appropriate configuration)

– Power-up of the system

– Change of user

– Activation of the XY reset button (with appropriate configuration)

To set the initial value of the SCI illumination:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• In the "User Settings" menu, press the <Configure> button.

• Press the <Light> button.

 → The "Light Config" submenu is displayed.

• In the "Light Config" submenu, press the <SCI Illumination> button.

 → The "SCI Illumination" submenu is displayed.

• Under "Light Distribution", press the ⬆ arrow key to increase the initial value; to reduce it press the ⬇ arrow key.

 – Position 1 (Red Reflex Illumination)
 This illumination is set when the "light distribution" bar is located at the upper limit stop. Light emitted by the surgical microscope is limited to a diameter of approximately 20 mm and generates a red reflex which optimally visualizes the structure of the patient's eye.

 – Position 2 (Red Reflex and Surrounding Field Illumination)
 This illumination is set when the "light distribution" bar is located between 1 and 3. The light emitted by the surgical microscope generates a red reflex and simultaneously illuminates the surrounding area of the patient's eye. The surrounding field section can be set separately under "Surrounding Field Section".

   • To do this, press the ☀ button.

   • To increase the surrounding field section, press the ⬆ arrow key and to reduce it press the ⬇ arrow key.

 – Position 3 (Surrounding field illumination)
 This illumination is set when the "light distribution" bar is located at the lower limit stop. The red reflex is deactivated. The entire field of view is illuminated by surrounding field illumination.

- To save the changes, press the ⊟ button.

- To return to the main menu, press the ⟨⟨ button four times.

Setting the start values of the slit illuminator

The <Slit> submenu permits you to set the start value for the slit illuminator's light intensity as well as the slit width and slit position (direction from which the slit is moved in). The slit illuminator is always deactivated on power-up of the system. After activation of the slit illuminator, the start value is automatically set for the current user.
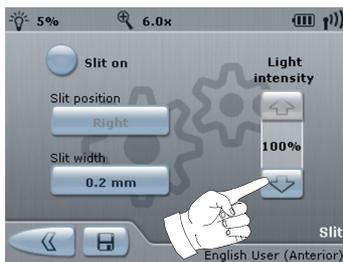
To set the initial values for the slit lamp:

- Press tab [2] in the main menu.

- Press the <User Config> button.

- In the "User Settings" menu, press the <Configure> button.

- Press the <Light> button.

  → The "Light Config" submenu is displayed.

- In the "Light Config" submenu, press the <Slit> button.

  → The "Slit" submenu is displayed.

- Press the <Slit On> button for activation or deactivation.

  → The slit illuminator is activated when the button lights up in blue.

  → The slit illuminator is deactivated when the button lights up in light blue.

- To increase the light intensity (brightness), press the ⬆ arrow key and to reduce it press the ⬇ arrow key.

- To set the slit width or position, press the button for the currently set value, e.g. "0.2 mm" or "Right".

  → The slit widths or slit positions are displayed.

- Select the desired slit width or slit position.

  ⓘ When switching the slit lamp from "Left" to "Right" or vice versa, if the slit is not positioned in the center of the field of view, this is probably to to the fact that you are not precisely in the ideal depth of field.

    - Refocus until the slit is centered in the field of view.

- To save the changes, press the ⊟ button.

- To return to the main menu, press the ⟨⟨ button four times.

Configuring zoom (User Config)
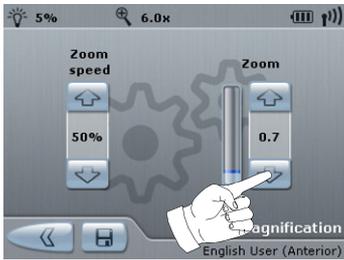
The "Magnification" submenu (Main menu> Tab 2 > User Config > Configu-ration > Magnification) enables you to assign the following functions to the profile currently loaded.

5. – Adjusting the "Zoom"
     Continuously adjust the magnification from 0.4 to 2.4.

– Setting the "Zoom speed"

Proceed as follows to set the magnification and zoom speed:

- Press tab [2] in the main menu.

- Press the <User Config> button.

- Press the <Configuration> button in the "User Config" menu.

- Press the <Zoom> button.

  → The "Magnification" submenu is displayed.

- Press the ⬆ button to increase the zoom value and the ⬇ button to reduce it.

  The total magnification of the system is automatically adjusted to the changed zoom value. For correct calculation of the total magnification, the system components - eyepieces, tube and objective lens - must have been correctly set (see page 174).

- Press the ⬆ button to increase the zoom speed and the ⬇ button to reduce it. The zoom speed is continuously variable from 5 - 100 % in 1 % steps. The zoom speed set at the factory is 50 %.

- Press the 💾 button to save the changes.

- Press the « button three times to return to the main menu.

Configuring the focus (User Config)

The "Focus" submenu (Main menu> Tab 2 > User Config > Configuration > Magnification) enables you to assign the following functions to the user profile currently loaded.

– "Activating/deactivating the Deep View" depth of field management
  The depth of field management enables the selection between optimum light transmission and maximum depth of field. When the depth of field management is deactivated (button appears light blue), the microscope is optimized for light transmission. When it is activated (the button appears blue), the microscope is automatically set to optimum depth of field in accordance with the selected magnification. The next time the system is switched on, the mode last selected will be active.

– "Activating the fast focus and setting the focus position"
  The system enables fast positioning of the surgical microscope. During fast positioning, the surgical microscope moves from its current focus position upward to a focus position saved for the current user (by max. 40 mm, to the respective limit stop.

– Setting the focus speed

Activating the depth of field management

Proceed as follows to set the depth of field management:
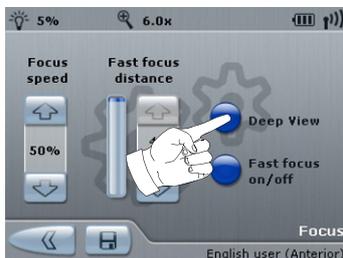
- Press tab [2] in the main menu.

- Press the <User Config> button.

- Press the <Configuration> button in the "User Config" menu.

- Press the <Focus> button.

  → The "Focus" submenu is displayed.

- Press the <Deep View> button to activate or deactivate the depth of field management

  → The function is activated when the button lights in blue color.

  → The function is deactivated when the button lights in light blue color.

- Press the ⊞ button to save the changes.

- Press the « button three times to return to the main menu.

Activating the fast focus function and setting the focus positions

During fast positioning, the surgical microscope moves from its current focus position upward to a user-specifically saved focus position (by max. 40 mm or to the relevant limit stop). In this position, fine focusing is possible at any time via the focus keys on the 5.7" control panel, the foot control panel or the handgrips. If the fast focus function is subsequently activated again, the surgical microscope returns to its initial position.

The surgical microscope does <u>not</u> return to its initial position if:

– the OPMI LUMERA 700 is restarted

– a brake is unlocked.

Press the buttons on the foot control panel or the handgrips to move the surgical microscope back to the initial position. The activation buttons (see page 199 or page 202) can be individually configured.

WARNING

Risk of injury!

Incorrect handling of a fundus viewing system mounted on the underside of the microscope or activation of the fast focus may cause injury to the patient's eye.

• Before using a fundus viewing system, make sure that the room for movement is larger than the downward travel path of the microscope.
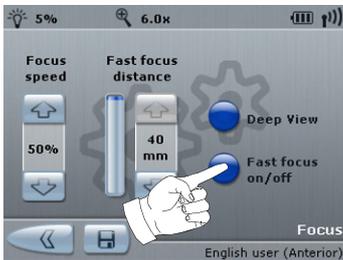
Proceed as follows to set the fast focus:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• Press the <Configuration> button in the "User Config" menu.

• Press the <Focus> button.

→ The "Focus" submenu is displayed.

• Press the "Fast Focus on/off" button to activate or deactivate the fast focus.

→ The fast focus is activated when the button lights up in blue color and deactivated when it lights up in light blue color.

• Configure the travel range by pressing the ⬆ to increase it or the ⬇ button to reduce it. You can adjust the travel range from 5 to 40 mm in steps of 1 mm. The travel range preset at the factory is 40 mm.

• Press the 🖫 button to save the changes.

• Press the 《 button three times to return to the main menu.
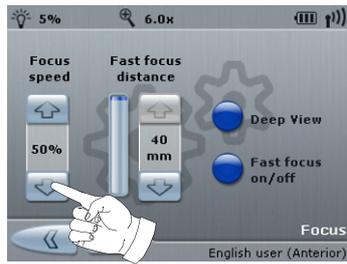
Set focus speed

Proceed as follows to set the focus speed:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• Press the <Configuration> button in the "User Config" menu.

• Press the <Focus> button.

  → The "Focus" submenu is displayed.

• Configure the focus speed by pressing the ⬆ to increase it or the ⬇ button to reduce it. The focus speed is continuously variable from 5 to 100 % in 1 % steps. The focus speed set at the factory is 50 %.

• Press the 🖫 button to save the changes.

• Press the ≪ button three times to return to the main menu.

Configuring the XY coupling (User Config)
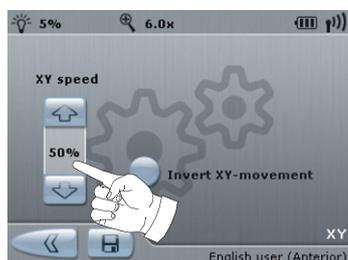
The "XY" submenu (Main menu> Tab 2 > User Config > Configuration > Magnification) enables you to assign the following functions to the profile currently loaded.

– "Invert XY movement"

– "Setting the XY speed"

Proceed as follows to set the movement direction and XY speed:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• Press the <Configuration> button in the "User Config" menu.

• Press the <XY> button.

→ The "XY" submenu is displayed.

• You activate/deactivate the inverter XY movement function by pressing the "Invert XY movement" option.

→ The function is activated when the option lights up in blue color.

→ The function is deactivated when the option lights up in light blue color.

• Press the [⬆] button to increase the XY speed and the [⬇] button to reduce it. The XY speed is continuously variable from 5 - 100 % in 1 % steps. The XY speed set at the factory is 50 %.

• Press the [💾] button to save the changes.

• Press the [«] button three times to return to the main menu.

5,
Configuring the foot control panel (User Config)

7.

32.

18. - 1.

The "Foot Control Panel" submenu (Main menu > Tab 2 > User Config > Configuration > Foot Control Panel) enables you to assign the following functions to the foot control panel connected to the system.

Function	Feature
Light +/-	Increases or reduces the light intensity of the main light source.
Light On / Off	Activates or deactivates the main light source.
Remote AUX connector on / off	Activates or deactivates additional devices connected via the remote AUX connector.
Keratoscope On / Off	Activates or deactivates the keratoscope.
DeepView On / Off	Activates or deactivates the DeepView depth of field management system.
Retinal protection device	Swings the retinal protection device into and out of the surgical microscope's beam path.
Recording Start/Stop	Starts or stops video recording.
Photo	Takes a snapshot and saves it as a digital photography
Profiles +/-	Switches between the user profiles saved in the workflow steps
VISULUX right/left	Positions the VISULUX fiber slit illuminator.
Focus +/-	Moves the OPMI focus upward or downward.
Fast focus	Moves the surgical microscope max. 40 upward; if pressed again, the microscope moves downward.
RESIGHT Focus +/- *	Moves the focus of the RESIGHT fundus viewing system upward or downward.
OPMI Filter +/-	Changes the filters integrated in the lamp housing.
Additional Filter +/-	Changes the filter of the second light source.
Slit Width +/-	Changes the slit width of the slit illuminator.
Left Slit	Changes between central illumination and slit from the left.
Right Slit	Changes between central illumination and slit from the right.
Right/Left Slit	Switches between left and right slit.

Function	Feature
SCI Position	Switches between the three defined SCI illumination positions.
SCI +/-	Continuous variation of the SCI ratio.
Additional Light On / Off	Activates or deactivates the second light source.
Reset XY	Moves the XY coupling at maximum speed to its center position.
Zoom +/-	Increases or reduces the OPMI magnification.
IDIS On / Off	Activates or deactivates the data injection.
No function	Button is disabled.

* This button is only displayed if the RESIGHT function is assigned to a user profile that you user set (see page 221).

Changing the button assignment of the foot control panel

To change the button assignment of the foot control panel:

- Press tab [2] in the main menu.

- Press the <User Config> button.

- In the "User Config" menu, press the <Configure> button.

- Press the <Foot control panel> button.

  → The "Foot control panel" submenu is displayed.

- Press the button whose function you want to change in the "Foot control panel" submenu.

  → A list of the selectable functions is displayed. You can scroll up or down using the arrow keys.

- Tap on the function to be assigned to the button.

- Repeat these two steps until you have assigned the required functions to all buttons and rocker switches.

- To save the changes, press the 🖫 button.

- To return to the main menu press the button 3 times ⟨⟨.

Preconfigured button assignment

NOTE Before using the FCP-WL wireless foot control panel, make sure that the batteries are sufficiently charged.
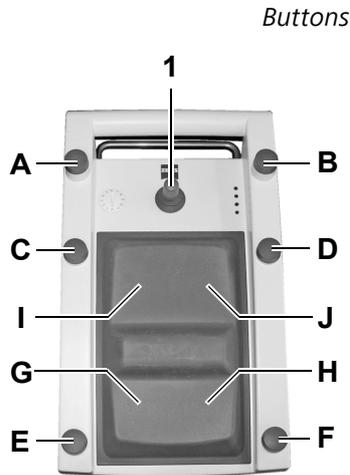
Buttons The functions of buttons A, B, C, D, E and F are preconfigured, but they can be customized to meet the user's specific requirements. Factory settings:

– Key A: Light intensity ▼

– Key B: Light intensity ▲

– Key C: Switching SCI illumination (Pos 1, Pos 2 and Pos 3)

– Key D: Activating quick focus

– Key E: Turning light source on/off

– Key F:
  - Activating/deactivating the keratoscope (if a keratoscope is integrated)
  - Swinging filter wheel in (if no keratoscope is integrated)
  - 2. Activating/deactivating the light source (if a second light source is integrated)

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

Rocker switches The default settings (focus/zoom) of the rocker switches are preconfigured horizontally or vertically for each country. However, a Carl Zeiss service technician can change the settings at any time. You can, however, customize the settings yourself at any time (see page 199).

The horizontal factory settings are:

– Button I: Focus ▼

– Button G: Zoom ▼

– Button J: Focus ▲

– Button H: Zoom ▲

The vertical factory settings are:

– Button I: Zoom ▲

– Button G: Zoom ▼

– Button J: Focus ▲

– Button H: Focus ▼

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

Configuring the handgrips (User Config)
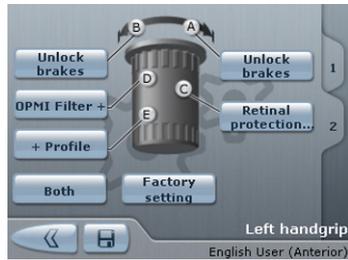
The "Handgrip" submenu (Main menu > Tab 2 > User Config > Configuration > Handgrip) enables you to select the functions you want to assign to the handgrips for the directions of rotation A, B and buttons C, D, E. Both handgrips are identical. The handgrips are delivered with preconfigured factory settings. The two handgrips can be assigned the same functions or be configured separately.
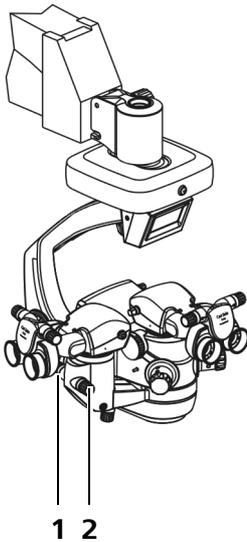
Function	Feature
Light +/-	Increases or reduces the light intensity of the main light source.
Light On / Off	Activates or deactivates the main light source.
Remote connector AUX On / Off	Activates or deactivates additional devices connected via the remote AUX connector.
Keratoscope On / Off	Activates or deactivates the keratoscope.
Depth of field Deep View On / Off	Activates or deactivates the DEEP VIEW depth of field management system.
Retinal protection device	Swings the retinal protection device into and out of the surgical microscope's beam path.
Recording Start/Stop	Starts or stops video recording
Photo	Takes a snapshot and saves it as a digital photography
Overhead display On / Off	Activates or deactivates the additional display.
Profiles +/-	Switches between the user profiles saved in the workflow steps.
VISULUX right/left	Positions the VISULUX fiber slit illuminator
Fast focus	Moves the surgical microscope max. 40 mm upward; if pressed again, the microscope moves downward.
Focus +/-	Moves the OPMI focus upward or downward.
Zoom +/-	Increases or reduces the magnification.
Unlock Brakes	Unlocks the brakes for all suspension system 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.

Function	Feature
Unlock horizontal / vertical brakes	Locks and unlocks either the vertical or horizontal magnetic brakes.
OPMI Filter +/-	Changes the filters integrated in the lamp housing.
Additional Filter +/-	Changes the filter of the second light source.
Slit Width +/-	Changes the slit width of the slit illuminator.
Left Slit	Changes between central illumination and slit from the left
Right Slit	Changes between central illumination and slit from the right.
Right/Left Slit	Slit changes between right and left.
SCI Position	Switches between the SCI positions.
SCI +/-	Increases or reduces the SCI light intensity.
Additional Light On / Off	Activates or deactivates the second light source.
IDIS On / Off	Activates or deactivates the data injection.
No function.	The button is disabled.

2. - 4.

Changing the button assignment of the handgrips
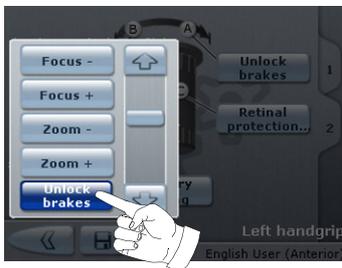
To change the button assignment of the handgrips:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• In the "User Config" menu, press the <Configure> button.

• Press the <Handgrip> button.

→ The "Left handgrip" submenu is displayed.

• Press the button whose function you want to change.

→ A list of the selectable functions 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 the directions of rotation (A, B) and to the buttons (C, D and E) of the handgrips.

• To save the changes, press the 🔲 button.

• To return to the main menu press the button 3 times 《 .
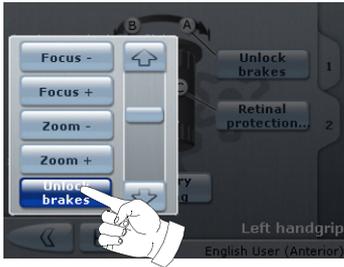
Synchronizing the handgrips

To assign identical functions to the handgrips:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• In the "User Config" menu, press the <Configure> button.

• Press the <Handgrip> button.

→ The "Left handgrip" (Tab [2]) submenu is displayed .

• When the <Both> button is deactivated, the handgrips are already identically configured. To be able to assign new functions to the handgrips, tap on the respective function or press the <Factory Settings> button.

→ The <Both> button is enabled.

• To synchronize the handgrips, press the <Both> button.

→ Both handgrips are configured identically.

→ The <Both> button is disabled again.

• To save the changes, press the 🖫 button.

• To return to the main menu press the button 3 times 《.

Preconfigured button assignment

The functions of the keys A, B, C, D and E are preconfigured, but they can be adapted user-specifically. The factory settings are:

– Key A: Unlock Brakes ▼

– Key B: Unlock Brakes ▲

– Key C: Swing the retina protection device in/out.

– Key D: Change OPMI filter

– Key E: Change OR mode (anterior/posterior)

Test the button assignment and the handgrip functions before every use. If the button assignment does not meet your requirements, you can reset it to the factory settings.

Configuring the main observation tube (image inversion) (User Config)

The "Inversion" submenu (Main menu> Tab 2 > User Config > Configuration > Inversion) allows you to configure the image inversion for the profiles of the surgical microscope and the integrated SD 3CCD or HD 3CCD camera.

Setting the image inversion
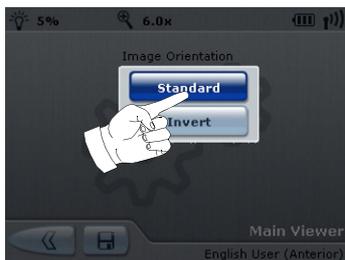
The "Inversion" submenu permits you to select whether the image on the video monitor and the Invertertube E is to be inverted. This function offers the advantage that an upside-down image resulting, e.g., from the use of a fundus imaging system with inverting optics is displayed in the correct orientation.

Proceed as follows to set the image inversion:

- Press tab [2] in the main menu.

- Press the <User Config> button.

- Press the <Configuration> button in the "User Config" menu.

- Press the <Invert> button in the tab [2].

  → The "Invert" submenu is displayed.

- Press the <Standard> or <Invert> button in the "Invert" submenu.

  → The image inversion is switched on when the <Invert> button is displayed. The image inversion is switched off when the <Standard> button is displayed.

- Activate or deactivate the image inversion by pressing the respective button.

  → The image is re-oriented on the video monitor and the Invertertube E.

- Press the ⊟ button to save the changes.

- Press the « button three times to return to the main menu.

Configuring RESIGHT (User Config)
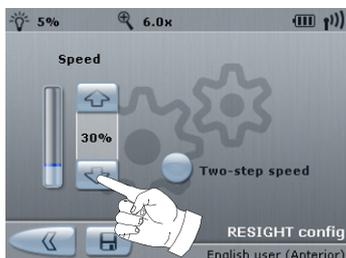
In the "RESIGHT Config" submenu (main menu > Tab 2 > User Config > Configuration > RESIGHT), you can set the following configurations for the profile currently loaded and for RESIGHT 700 fundus viewing system attached to the surgical microscope:

– Speed - controls the speed of the internal focus of the RESIGHT 700 fundus viewing system.

– Two-step speed - the internal focus of the fundus viewing system first focuses slowly, then increases its speed.

Proceed as follows to set the speeds:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• Press the <Configuration> button in the "User Config" menu.

• Press the <RESIGHT> button.

    → The "RESIGHT Config" submenu is displayed.

• Press the button to activate or deactivate the two-step speed.

    → The function is activated when the button lights up in blue color.

    → The function is deactivated when the button lights up in light blue color.

• Press the ⬆ arrow button to increase the speed and the ⬇ arrow button to reduce it. The speed is continuously variable from 10% to 100 % in 10 % steps.

• Press the 🖫 button to save the changes.

• Press the « button three times to return to the main menu.

Configuring the camera (optional) (User Config)

The "Camera Settings" submenu (Main menu> Tab 2 > User Config > Configuration > Camera) allows you to configure the camera settings for the profiles of the integrated SD 3CCD or HD 3CCD camera.

Default settings for the <Anterior> and <Posterior> profiles for the brightness control and image orientation have been factory-configured to optimally adjust the camera to the requirements of the surgical situation.

– <Anterior> has been optimized for applications in the anterior segment.

– <Posterior> has been optimized for applications in the posterior segment.

• Do not change the camera settings when switching profiles.

Setting the exposure mode

In the "Camera > Settings > Tab 1" submenu, you can select between a manual exposure setting and an automatic manual exposure control of the integrated SD 3CCD and HD 3CCD camera.

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 pre-selected 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%.

Automatic exposure   Proceed as follows to select automatic exposure control:

• Press tab [1] in the main menu.

• Press the <Camera> button.

• Press the <Settings> button in the "Camera" menu.

• Press tab [1] in the main menu.

→ The "Camera Settings" submenu is displayed.

• Deactivate the <Manual Brightness> button.

→ Automatic exposure control is active if the button is light blue and the display of the brightness setting range changes from exposure time (seconds) to percent (%).

• Select a metering method in the "Spot Size" field.

– "Integral" (standard)
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 (large spot or integral) 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> button.

→ Manual exposure control is active if the button is dark blue and the display of the brightness setting range changes from percent (%) to exposure time (seconds).

→ The button under the "Spot Size" field is grayed out.

• Move the slider to the required exposure value. You can adjust the brightness of the video image continuously between 1/10000s and 1/8s. An exposure time in the range between 1/50 and 1/30 usually provides optimum exposure results.

• Press the 🖫 button to save the changes.

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

• If you want to return to the main menu <u>without saving the changes,</u> only press the ≪ twice.

Setting hue and color saturation

In the "Camera Settings > Tab 2" submenu, you can select between the hue and the color saturation (Chroma) of the integrated SD 3CCD and HD 3CCD camera.

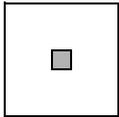Proceed as follows to set the values:

- Press tab [1] in the main menu.

- Press the <Camera> button.

- Press the <Settings> button in the "Camera" menu.

- Press tab [2] in the main menu.

  → The "Camera Settings" submenu is displayed.

- Press the ⬆ arrow button to increase the hue and color saturation (chroma) and the ⬇ arrow button to reduce it.
  The hue of the video image is continuously adjustable between 0% and 100%. Generally, a hue between 50% and 70% provides the best color impression.

- Press the 🖫 button to save the changes.

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

Setting the red value, blue value and brightness control

In the "Camera Settings > Tab 3" submenu, you can set the red value, blue value and the brightness control of the integrated SD 3CCD and HD 3CCD camera. Depending on the brightness control setting, the camera responds more strongly to very bright or darker areas.

Proceed as follows to set the values:

- Press tab [1] in the main menu.

- Press the <Camera> button.

- Press the <Settings> button in the "Camera" menu.

- Press tab [3] in the main menu.

  → The "Camera Settings" submenu is displayed.

- Press the ⬆ arrow button to increase the values and the ⬇ arrow button to reduce them.
  You can adjust the red and blue value of the video image continuously between -10 and +10. Generally, values between 50% and 70% provides the best color impression. You can set the brightness control between 0 to +8.

- Press the 🖫 button to save the changes.

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

Recommended camera settings

Our experience has shown that you can achieve very good results for the integrated HD 3CCD camera using the following settings.

Use	Settings - 3 CCD HD (internal/external)
Anterior - cataract	Brightness: 40 ... 50 %
	Light meter: Full Field
	Peak & Average: 7
	Chroma: +2
Anterior - glaucoma	Brightness: 30 ... 40 %
	Light meter: Full Field
	Peak & Average: 7
	Chroma: +2
Posterior	Brightness: 70 ... 80 %
	Light meter: Full Field
	Peak & Average: 0
	Chroma: +2

Configuring the white balance and video (User Config)

The "White Balance" submenu (Main menu > Tab2 > User Config > Configuration) permits you to set the video source (internal or external video signal) for the SD camera and to perform a white balance procedure.

Selecting the video sources
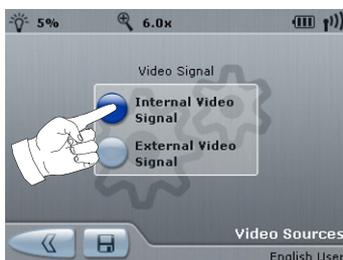
The "Video sources" submenu permits you to define whether the 22" TFT is to be supplied with an external or internal video signal. A special cable (10 m video in/out connecting cable) is required to enable use of this function.

The video source selection is only available with a SD camera.

Proceed as follows to define the video signal:

*   Press tab [2] in the main menu.

*   Press the <User Config> button.

*   Press the <Configuration> button in the "User Config" menu.

*   Press the <White balance> button.

    → The "Video" submenu is displayed.

*   Press the <Video Sources> button.

    → The "Video Sources" submenu is displayed.

*   In the "Video Signal" selection field, press the required video signal.

    → The parameter is activated when the button lights up in blue color.

    → The parameter is deactivated when the button lights up in light blue color.

*   Press the ⊞ button to save the changes.

*   Press the ≪ button three times to return to the main menu.
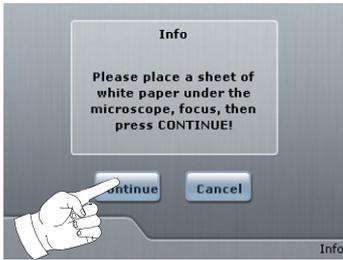
Performing the white balancing procedure

In the "White Balance" submenu, to carry out the white balance function. The system will adjust the video signal in such a way that white areas in the surgical field are also white on the monitor.

Proceed as follows to perform white balancing:

- Press tab [2] in the main menu.

- Press the <User Config> button.

- Press the <Configuration> button in the "User Config" menu.

- Press the <White balance> button.

  → The "Video" submenu is displayed.

- 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".

- Point the surgical microscope at a white object (e.g., a sheet of white paper with a matte surface).

- Switch on all light sources required and move a filter into or out of the beam path.

- Focus on the object.

- Press the <Continue> button.

  → The following message is displayed: "Please wait - white balancing in progress!"

  → If the white balancing was performed successful, the following message is displayed: "White balancing was successful". If the process was unsuccessful, the following message is displayed: "White balancing failed".

- If white balancing was unsuccessful, verify the settings described above and repeat the white balancing procedure.

- Press the ⟨ ✕ ⟩ button to return to the previous menu.

Configuring links (User Config)

In the "Links" submenu (Main Menu > Tab 2 > User Config > Configuration > Links) you can activate or deactivate the following functions for the currently loaded user profile:

– "Light and Keratoscope"
  Couples the light intensity of the keratoscope to the SCI illumination.

– "Zoom and Assistant Zoom"
  Couples the zoom system of the assistant's microscope to the main microscope.

– "Zoom and XY Focus Speed"
  Couples the speed of the XY coupling and focus to the current zoom value. This facilitates focusing on object details, as the preset focusing speed is automatically reduced at higher magnifications.
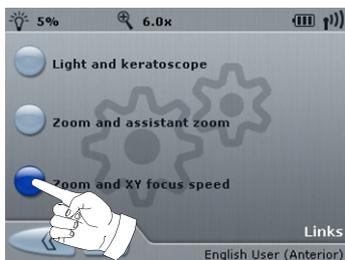
To activate or deactivate the links:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• In the "User Config" menu, press the <Configure> button.

• Press the <Links> button.

  → The "Links" submenu is displayed.

• Press the respective button to activate or deactivate links.

  → A link is active when the button lights up in blue color.

  → A link is inactive when the button lights up in light blue color.

• To save the changes, press the ⊟ button.

– To return to the main menu press the button 3 times ⟪ .

Configuring the overhead display (optional) (User Config)
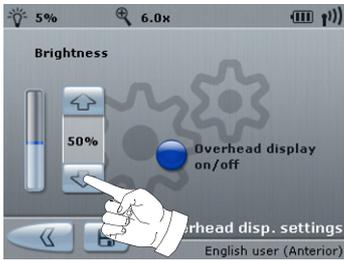
In the "Overhead Display" submenu (Main menu > Tab 2 > User Config > Configuration > Overhead Display), you can set activate/deactivate the optional overhead display for the profile that is currently loaded and adjusts its brightness.

Process as follows to activate or deactivate the overhead display and adjust the brightness:

• Press tab [2] in the main menu.

• Press the <User Config> button.

• In the "User Settings" menu, press the <Configuration> button.

• Press tab [2] in the "Device Settings" menu.

• Press the <Overhead Display> button.

→ The "Overhead disp. settings" submenu is displayed.

• Activate/deactivate the overhead display by pressing the "Overhead display on/off" option.

→ The overhead display is activated when the option lights up in blue color.

→ The overhead display is deactivated when the option lights up in light blue color.

• Press the ⬆ arrow button to increase the display brightness and the ⬇ arrow button to reduce it. The display brightness is continuously variable from 0% to 100% in 1% steps.

• Press the 🖫 button to save the changes.

• Press the ≪ button three times to return to the main menu.

Daily usage

Daily usage comprises the routine tasks to be completed in order to prepare the system and to ensure disruption-free operation.

Managing the user profiles

In the "User" submenu (Main menu > User > Tab 1), you can make the following user settings:

5.
– User management
A maximum of 20 users can be managed for each device. You can assign each user with a user language and several profiles with various device settings.

– Profile management
A maximum of 5 profiles can be managed for each user. The "Anterior" and "Posterior" DEFAULT profiles are preconfigured at the factory.
The "Anterior" DEFAULT profile is for applications in the anterior segment and the "Posterior" DEFAULT profile is for applications in the posterior segment of the eye. If you require other device settings for a surgical phase, you can create new profiles (see page 219), load and configure them (see page 185) as well as assign them to the user (see page 217).

– Setting workflow steps
In the second tab, compile the various configured profiles for a user-specific workflow step. This provides you with the optimum device setting during various surgical phases at all times. To switch between the individual profiles, press the respective button on the foot control panel (see page 199) or press the respective configured handgrip (see page 202).

Example for a workflow step:

– "Anterior" (DEFAULT profile)
This profile optimizes the device for cataract applications.

– "Posterior" (newly created profile with RESIGHT function*)
This profile optimizes the device for retina applications.

– "Contact lens" (newly created profile)
This profile allows you to optimize the device for retina applications with a contact lens.

*Observe the following points for the RESIGHT function:

– The RESIGHT function cannot be assigned a DEFAULT profile.

– The RESIGHT function can always only be assigned one profile at the same time.

– A profile marked with RESIGHT function is always automatically activated after swinging in the fundus viewing system.

Creating users

Proceed as follows to create a new user:
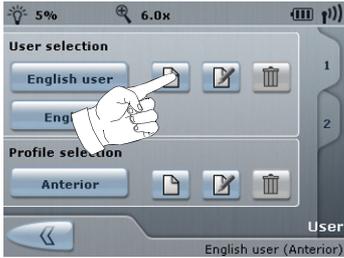
• Press the <User> button in the main menu.

→ The "User" submenu is displayed.

• Press the [icon] button in the "User selection" field.

→ A virtual keypad is displayed.

• Enter a user name.
The maximum text length is 20 characters.

• Press the [icon] button to save the user.

→ If the user already exists, the message "User already exists"" is displayed and the procedure is interrupted.

→ If the user does not yet exist, a prompt is displayed asking you which settings you would like to assign to the user.

– Select "Standard values" if you would like to assign the new user with the settings of the DEFAULT user.

– Select "Current values" if you would like to assign the new user with the settings of user who is currently loaded.

• Press the [icon] button to save the settings.

→ The new user is displayed but not yet loaded.

• Press the [icon] button to load the new user.

→ The new user is displayed in the lower right of the main menu.

Edit user

⚠ | 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.

ⓘ
- Exit the user profile by returning to the main menu immediately after you make the settings, since otherwise a profile cannot be changed using FSP, handgrips or swing in/out the RESIGHT 700.

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

    → The "User" submenu is displayed.

Assigning a profile
- Press the current profile.

    → A list of the saved profiles is displayed.

    → The DEFAULT <Anterior> and <Posterior> profiles are preconfigured at the factory. If you prefer other settings, you can create a new profile (see page 219) as well as load and reconfigure it (see page 185).

- Press the desired button to assign the new profile.

Change user name
- To change the user name, press the 🖉 button in the "Select User" field.

    → A virtual keypad with the current user name is displayed.

- Delete the current user names by pressing the ⬅ button.

- Enter a new user name (maximum of 20 characters).

- To save the changes, press the 💾 button.

Assign language
- Press the language selection button.

    → A list of the languages available is displayed.

- Press the language you wish to assign to the user.

    → The user is displayed in the selected language.

- To save the change, press the « button.

    → The main menu is displayed again.

Change user

To select a user:

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

- In the "Select User" field, press the current user.

    → A list of the available users is displayed. If there are more than five users, a list with scroll bars is displayed on the right side of the menu.

- Press the arrows for scrolling up or down.

- Tap on the user to be loaded.

    → The current user is changed but not yet loaded.

- To load the new user, press the [«] button.

    → The user is loaded and the main menu is displayed.

Delete user

Proceed as follows to delete a user:

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

    → The "User" submenu is displayed.

- Press the set user in the "User selection" field.

    → A list of the available users is displayed.
    The default user and the user who is currently loaded cannot be deleted.

- Press the user who you would like to delete.

    → The user to be deleted is displayed in the "User selection" field.

- Press the [🗑] button to delete the user.

    → A menu for the prompt is displayed.

- Select <Yes> to delete the user or select <No> to cancel the process.

    → After successfully deleting the user, the active user is loaded and the "User" submenu is displayed.

- Press the [«] button to return to the main menu.
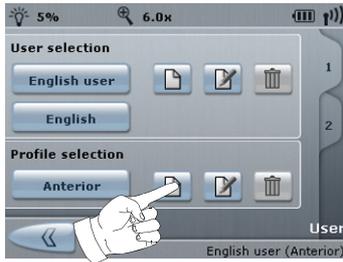
Create user profile

Proceed as follows to create a new profile

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

- Press the ☐ button in the "Profile selection" field.

  → A virtual keypad is displayed.

- Enter a name (max. 20 characters) for the new profile.

- Press the ☐ button.

  → A prompt is displayed asking which settings are to be applied for the new profile.

- Select between the following settings:

  – Default Anterior - the user profile is set for optimum applications in the anterior segment of the eye.

  – Default Posterior - the user profile is set for optimum applications in the posterior segment of the eye.

  – Stored user profile - the profile adopts all saved settings of the user who is currently loaded.

  – Current Settings - the profile adopts all current settings of the user who is currently loaded.

- Press the setting that you would like to assign to the new profile.

- Press the ☐ button to save the new profile.

  → The new profile is saved and the user menu is displayed again.
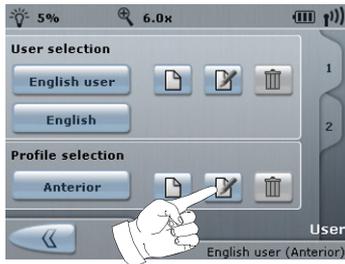
Editing the user profile

Proceed as follows to change the name of a profile:

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

* Press the ⬛ button in the "Profile selection" field.

  → A virtual keypad with the current profile name is displayed.

* Delete the current profile name by pressing the ⬛ button.

* Enter a new profile name (max. 20 characters).

* Press the ⬛ button to save the changes.

  → The profile name is saved and the user name is displayed.

Setting workflow steps
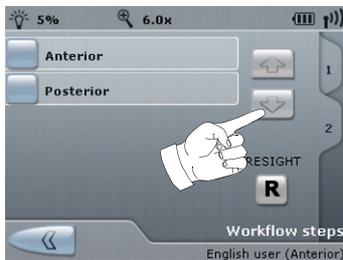
In the "Workflow steps" submenu, (Main menu > User > Tab2), you can compile the various configured profiles (max. 5) into a user-specific workflow step. This provides you with the optimum device setting during various surgical phases at all times. To switch between the individual profiles, press the respective configured button on the foot control panel (see page 199) or press the respective configured handgrip (see page 202). If have you assigned a profile to RESIGHT, you can activate this profile by swinging in the RESIGHT fundus viewing system.

In addition, you can assign a profile with the RESIGHT function. If a profile has been assigned this function, you can assign the focus control of the surgical microscope and the RESIGHT fundus viewing system to any foot control panel button.

Observe the following points for the RESIGHT function:

– The RESIGHT function cannot be assigned a DEFAULT profile.

– The RESIGHT function can always only be assigned one profile at the same time.

– A profile marked with RESIGHT function is always automatically activated after swinging in the fundus viewing system.
After swinging out the system, it returns to the profile that was previously activated.

Proceed as follows to set the workflow steps and the RESIGHT function:

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

→ The "User" submenu is displayed.

• Press tab [2].

→ The "Workflow steps" submenu is displayed.

• Select a profile by pressing it.

• Configure the profile with the workflow step accordingly by pressing the ⬆ button or the ⬇ button.

• Assign the RESIGHT function to the profile by pressing the R button.

The RESIGHT function can always only be assigned a single profile. The RESIGHT function cannot be assigned to several profiles at the same time.

• Press the « button to save the configured workflow steps.

Zooming in and out
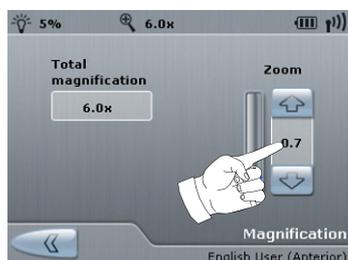
In the submenu "Magnification" (Main Menu > Tab 1> Magnification) you can read the total magnification of the system and adjust the zoom continuously from 0.4 to 2.4. During surgery, the magnification (zoom) setting is normally changed via the foot control panel or the handgrips on the surgical microscope and not via the 5.7" control panel.

This adjustment only has an effect on the current setting of the surgical microscope and is not saved. Please note that the following actions cause the system to reset the zoom to the defined center position.

–   Powering the device up

–   Pressing the reser button (if the function is activated, see page 186)

–   Moving the system into its standny position (if the function is activated, see page 186)

Proceed as follows to set the magnification:

•   Press tab [1] in the main menu.

•   Press the <Magnification> button.

    →   The "Magnification" submenu is displayed.

•   To increase the zoom value, press the [↑] button and to reduce it, press the [↓] button.

The total magnification of the system is automatically adjusted to the changed zoom value. For correct calculation of the total magnification, the system components - eyepieces, tube and objective lens - must have been correctly set (see page 174).

•   Press [«] to return to the main menu.

How to set the SCI mode and the (optional) keratoscope

⚠ **CAUTION**	**Risk of injury!**

Never leave the device unattended. Excessive irradiation times may lead to retina damage of the patient's eye.

- Never leave a device unattended with the light source still switched on.

⚠ **CAUTION**	**Risk of injury!**

The light intensity of a faulty light source can fluctuate and may damage the retina of the patient's eye.

- Always check the light source before every use.

- Should the light intensity fluctuate, activate the Manual mode (see page 240).

The "Light" submenu (Main menu > Tab 1> Light) shows you the remaining service hours of the xenon lamps and permits you to make the following settings for the main light source (e.g., LED, xenon), the second light source (e.g., LED, halogen) and the keratoscope:

– Setting the SCI and the slit illuminator (see page 224).

– Setting the SCI illumination (see page 225).

  – Red reflex illumination

  – Red reflex with surrounding field illumination

  – Surrounding field illumination

– Setting the second light source (see page 226).

– Setting the keratoscope (see page 227).

The software automatically recognizes the light source installed in your system and displays the suitable menu (xenon/halogen/LED light).

ⓘ During surgery, you can of course also use the foot control panel and the handgrips to activate and deactivate the light source(s) and the keratoscope and to adjust their light intensity. The configuration of the foot control panel and handgrips is described on page 202 and page 199.

ⓘ If device is in the standby position and it did not move to this position correctly, it may not be possible to switch the illumination on and off on the control panel.

- Move the device into the standby position as far as it will go.
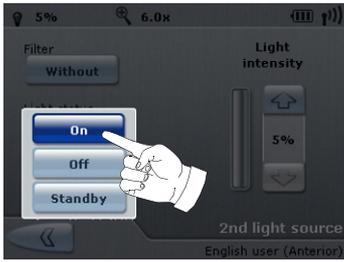
Setting the SCI mode and the slit illuminator

In the "OPMI Light" submenu, the light sources of the SCI and slit illuminator can be activated, deactivated or set to standby. The light source is always off after the system has been started. You can use the 5.7" control panel or the foot control panel to turn the light source on or off.

Proceed as follows to set the light source:

- Press tab [1] in the main menu.

- Press the <Light> button.

  → The "Light" submenu is displayed.

- Press the <OPMI Light> button.

  → The "OPMI Light" submenu is displayed.

Xenon light source - To select the light status, press the button below the "Light Status" field.

  → The following light statuses are displayed:

    – Select the <ON> status if you want to turn on the light source.

    – Select the <OFF> status if you want to turn off the light source.

    – Select the <Standby> status if the light source should be hidden, but remain activated. This prevents flickering of the light which occurs on ignition of the xenon lamp.

- Press one of the buttons described above to select a light status.

LED light source - Press the <Light on/off> button to switch the slit illuminator on or off.

- Press the ⬆ button to increase the light intensity (brightness) and the ⬇ button to reduce it. The light intensity is continuously variable from 5% to 100% in 1% steps.

- Press the « button twice to temporarily save the changes and return to the main menu.
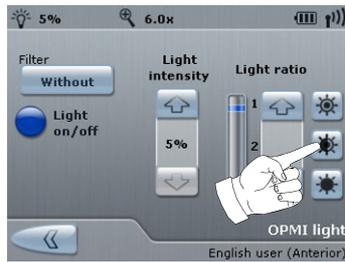
Setting the SCI illumination mode

The "OPMI Light" submenu permits you to set the SCI illumination mode. Select between a manually adjustable combination ratio and the following defined SCI illumination modes:

− Red reflex illumination ⬡
  Light emitted by the surgical microscope is limited to a diameter of approx. 20 mm and generates a red reflex which optimally visualizes the structure of the patient's eye.

− Red reflex with surrounding field illumination ⬡
  The light emitted by the surgical microscope generates a red reflex and simultaneously illuminates the surrounding area of the patient's eye. You can configure the start value for the combination ratio of this mode (see page 192).

− Surrounding field illumination ⬡
  The red reflex illumination is deactivated. The entire field of view is illuminated by surrounding field illumination.

⚠ **CAUTION**

Risk of injury!

Excessive light intensity or long exposure times to surrounding field illumination may lead to retinal injury in the patient's eye.

31.

• When working on the exterior eye, use the retina protection device to prevent light from entering the pupil, especially when the pupil is dilated.

Proceed as follows to set the illumination mode:

• Press tab [1] in the main menu.

• Press the <Light> button.

  → The "Light" submenu is displayed.

• Press the <OPMI Light> button.

  → The "OPMI Light" submenu is displayed.

• Use one of the following buttons to set a defined SCI illumination mode:

  − Red reflex illumination ⬡

  − Red reflex / surrounding field illumination ⬡

  − Surrounding field illumination ⬡

• To change the combination ratio, press the ⬆ and ⬇ button under "Light Distribution".

• Press the « button twice to temporarily save the changes and return to the main menu.
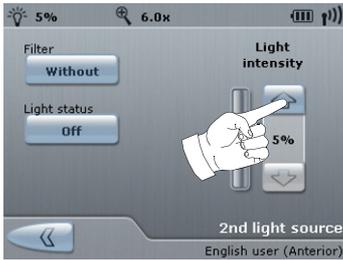
Setting the second light source

Use the "2nd Light Source" submenu to set the light supplied by a fiber slit illuminator (e.g., VISULUX) or oblique illumination. The second light source is always off after the system has been started. The second light source can be turned on and off via the 5.7" control panel or via the foot control panel or handgrips.

Proceed as follows to set the second light source on the 5.7" control panel:

- Press tab [1] in the main menu.

- Press the <Light> button.

  → The "Light" submenu is displayed.

- Press the <2nd Light Source> button.

  → The "2nd Light Source" submenu is displayed.

Xenon light source
- To select the light status, activate the button below the "Light Status" field.

  → The following light statuses are displayed:

    – Select the <ON> status if you want to turn on the light source.

    – Select the <OFF> status if you want to turn off the light source.

    – Select the <Standby> status if the light source should be hidden, but remain activated. This prevents flickering of the light which occurs on ignition of the xenon lamp.

- Press one of the buttons described above to select a light status.

LED light source
- Press the <Light on/off> button to switch the slit illuminator on or off.

  → The second light source is activated when the button lights in blue color.

  → The second light source is deactivated when the button lights in light blue color.

- Press the ⬆ arrow button to increase the light intensity (brightness) and the ⬇ button to reduce it. The light intensity is continuously variable from 5% to 100% in 1% steps.

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

Setting the keratoscope

The "Keratoscope" submenu permits you to set the keratoscope which is used to assess the shape of the cornea's surface. The keratoscope is always off after the system has been started. Use the 5.7" control panel, the foot control panel or the handgrips to turn the keratoscope on or off.
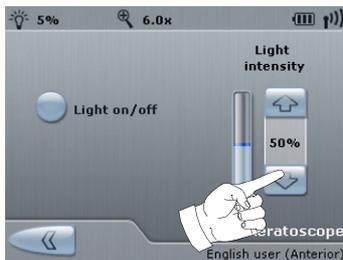

⚠ **CAUTION**

Risk of injury!

Excessive exposure times of the patient's eye to the keratoscope (laser class 1) may lead to retinal injury in the patient's eye.

•   The maximum illumination time is 10 minutes.

Proceed as follows to set the keratoscope on the 5.7" control panel:

•   Press tab [1] in the main menu.

•   Press the <Light> button.

→   The "Light" submenu is displayed.

•   Press the <Keratoscope> button.

→   The "Keratoscope" submenu is displayed.

•   Press the <Light on/off> button to turn the keratoscope on or off.

→   The keratoscope is activated when the button lights up in blue color.

→   The keratoscope is deactivated when the button lights up in light blue color.

•   Press the [⬆] arrow button to increase the light intensity (brightness) and the [⬇] button to reduce it. The light intensity is continuously variable from 5% to 100% in 1% steps.

•   Press the [«] button twice to temporarily save the changes and return to the main menu.

Setting the XY and focus positions
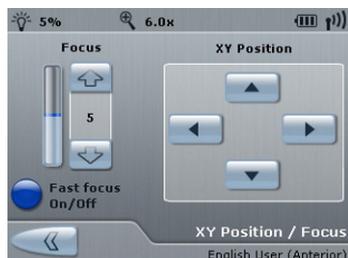
In the submenu "XY Position / Focus" (Main Menu > Tab 1 > XY Focus) you can set the focal distance and the XY position of the surgical microscope. The focusing range (travel range) of the system is 70 mm. The system features the following functions to facilitate focus control:

− Setting the focus via the foot control panel or handgrips.

− Setting the focal distance via the 5.7" control panel (see below).

− Automatic focus repositioning
For focus repositioning - e.g. when the system is started - the surgical microscope moves to the initial position. From this position, the surgical microscope can subsequently be moved downward by 30 mm and upward by 40 mm.

− Fast Focus On/Off
The system facilitates rapid positioning of the surgical microscope. whereby the surgical microscope travels outwards from the momentary focus position to a user-specifically saved position.

The buttons for activating the fast focus (see page 199 or page 202) can be individually configured.

Setting the focal distance

Proceed as follows to set the focal distance:

• Press tab [1] in the main menu.

• Press the button <XY Focus>.

→ The "XY Position / Focus" submenu is displayed.

• To increase the focal distance, press the arrow key and to reduce it press the arrow key. The focal distance is continuously variable from -30 mm to +40 mm in 1 mm steps.

• Press the button to return to the main menu.

Switch fast focus on or off

To switch the fast focus on or off:

- Press tab [1] in the main menu.

- Press the button <XY Focus>.

    → The "XY Position / Focus" submenu is displayed.

- Press the "Fast Focus On/Off" button.

    → The fast focus function is activated when the button lights up in blue.

    → The fast focus function is deactivated when the button lights up in light blue.

- Press the ⟨« button to return to the main menu.

Setting the XY position of the surgical microscope

Proceed as follows to set the XY position:

- Press tab [1] in the main menu.

- Press the button <XY Focus>.

    → The "XY Position / Focus" submenu is displayed.

- To change the XY position, press the following buttons:

If the video image is traveling in a different direction on the monitor than specified by the button, you must reposition the video camera (if it is not integrated) or deactivate the link "Posterior and XY direction" (see page 213).

Please note that this movement is directly transferred to the surgical microscope and influences its position.

- Press the ⟨« button to return to the main menu.

Set camera (illumination mode and hues)

In the "Camera" submenu (Main menu > Tab 1 > Camera), you can edit the settings of the integrated SD 3CCD camera and configure them for a white balance procedure.

<u>\<White balance\> button</u>
In the white balancing procedure, the system adjusts the video signal in such a way that white areas in the surgical field are also white on the monitor. The white balance settings are not saved. A white balancing procedure whose results are saved can be performed directly in your user-specific configuration (see page 212).
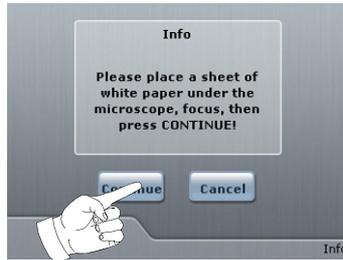
The IDIS must be switched off during a white balance procedure. The color typeface of the IDIS would falsify the white balance result.

<u>\<Settings\> button</u>
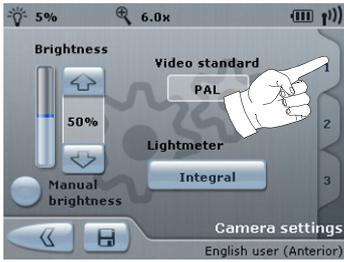Here, you can make the following settings:

– Set exposure mode (manual/automatically)

– Set hue and color saturation

– Set the red value, blue value and brightness control

Performing the white balancing procedure

To carry out white balancing:

- Press tab [1] in the main menu.

- Press the <Camera> button.

  → The submenu "Camera" is displayed.

- 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".

- Point the surgical microscope at a white object (e.g. a sheet of white paper with a matte surface).

- Switch on all light sources required and move a filter into or out of the beam path.

- 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 messagge will be displayed: "White balancing was successful". If the process was unsuccessful, the following message will be displayed: "White balancing failed".

- If white balancing was unsuccessful, verify the settings described above and repeat the white balancing procedure.

- Press the ![×] button to return to the previous menu.

- Press the ![«] button to return to the main menu.
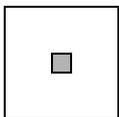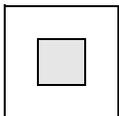
Setting the exposure mode

In the "Camera > Settings > Tab 1" submenu, you can select between a manual exposure setting and an automatic manual exposure control of the integrated SD 3CCD and HD 3CCD camera.

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 pre-selected 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%.

Automatic exposure

Proceed as follows to select automatic exposure control:

• Press tab [1] in the main menu.

• Press the <Camera> button.

• Press the <Settings> button in the "Camera" menu.

• Press tab [1] in the main menu.

→ The "Camera Settings" submenu is displayed.

• Deactivate the <Manual Brightness> button.

→ Automatic exposure control is active if the button is light blue and the display of the brightness setting range changes from exposure time (seconds) to percent (%).

• Select a metering method in the "Spot Size" field.

– "Integral" (standard)
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 (large spot or integral) 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> button.

  → Manual exposure control is active if the button is dark blue and the display of the brightness setting range changes from percent (%) to exposure time (seconds).

  → The button under the "Spot Size" field is grayed out.

- Move the slider to the required exposure value. You can adjust the brightness of the video image continuously between 1/10000s and 1/8s. An exposure time in the range between 1/50 and 1/30 usually provides optimum exposure results.

- Press the [💾] button to save the changes.

- Press the [«] button twice to return to the main menu.

- If you want to return to the main menu <u>without saving the changes,</u> only press the [«] twice.
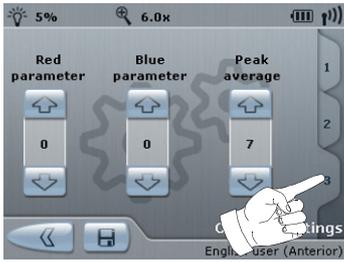
Setting hue and chroma

In the "Camera Settings > Tab 2" submenu, you can select between the hue and the color saturation (Chroma) of the integrated SD 3CCD and HD 3CCD camera.

Proceed as follows to set the values:

- Press tab [1] in the main menu.

- Press the <Camera> button.

- Press the <Settings> button in the "Camera" menu.

- Press tab [2] in the main menu.

  → The "Camera Settings" submenu is displayed.

- Press the [⬆] arrow button to increase the hue and color saturation (chroma) and the [⬇] arrow button to reduce it.
  The hue of the video image is continuously adjustable between 0% and 100%. Generally, a hue between 50% and 70% provides the best color impression.

- Press the [💾] button to save the changes.

- Press the [«] button twice to return to the main menu.

Set red value, blue value and brightness control

In the "Camera Settings > Tab 3" submenu, you can set the red value, blue value and the brightness control of the integrated SD 3CCD and HD 3CCD camera. Depending on the brightness control setting, the camera responds more strongly to very bright or darker areas.

Proceed as follows to set the values:

• Press tab [1] in the main menu.

• Press the <Camera> button.

• Press the <Settings> button in the "Camera" menu.

• Press tab [3] in the main menu.

→ The "Camera Settings" submenu is displayed.

• Press the ⬆ arrow button to increase the values and the ⬇ arrow button to reduce them.
You can adjust the red and blue value of the video image continuously between -10 and +10. Generally, values between 50% and 70% provides the best color impression. You can set the brightness control between 0 to +8.

• Press the 🖫 button to save the changes.

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

Recording video and image
(integrated HD / SD video and image acquisition system - optional)

NOTE	**Device cannot be operated!**

- Do not edit, delete or view any video recordings while OPMI LUMERA 700 is in use.

You can find an exact description of the SD and HD video recording function in the section "Annex / Options".

– "Integrated HD video and image acquisition system (see page 305).

– "Integrated SD video and image acquisition system (see page 342).

SD video recording

In the "Recording" submenu, you can record video sequences and individual images of the integrated SD 3CCD camera using the optional "Integrated HD video and image acquisition" function.

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

HD video recording

In the "Recording" submenu, you can record video sequences and individual images of the integrated HD 3CCD camera using the optional "Integrated HD video and image acquisition" function.

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

Typical procedure

Starting work

- Turn on the device at the power switch (see page 163).

- Check the system for proper function. The process is described in chapter "Operation - Function test before use".

- Select the filter suitable for your application in the illumination beam path.

- Adjust the brightness settings on the suspension system by starting with the smallest value and slowly increase the brightness. Please observe the max. permissible irradiation intensity (see page 22).

- Adjust the interpupillary distance and the eyepieces of the tubes (see page 152).

⚠ **CAUTION**   **Risk of injury!**

If the system has not been correctly balanced, unlocking of the magnetic brakes may lead to uncontrolled upward or downward movement, causing injury to the patient.

- Only open the magnetic brakes after the system has been balanced and the surgical microscope remains stationary in all positions of the working range (see page 149).

- Check the limitation of downward travel and maintain sufficient working distance from the patient (siehe page 150).

- When unlocking the magnetic brakes, hold the system at the handgrips to prevent it from unintentionally moving downward.

⚠ **CAUTION**   **Risk of injury when tilting the surgical microscope!**

If you have mounted the RESIGHT fundus viewing system on the underside of the microscope and steeply tilt the microscope, the RESIGHT fundus viewing system may unintentionally move in and injure the patient.

- Remove the RESIGHT fundus viewing system before steeply tilting the microscope.

⚠ **CAUTION**   **Risk of injury!**

If the foot control panel is accidentally activated, the exterior focus module of the surgical microscope may move downwards and injure the patient.

- Ensure to provide sufficient clearance between equipment and patient (min. 40 mm) when pressing the buttons of the foot control panel.

- Swivel the surgical microscope across the operating field, while maintaining an ergonomically favorable position.

- Press the XY reset button on the XY coupling. The executed functions depend on the configured settings (see page 186).

- Look through the eyepieces and use the suspension arm to lower the surgical microscope until the image of the surgical field becomes visible. This roughly focuses the area.

⚠ **CAUTION**

Risk of infection!

The patient may be contaminated if you touch the Invertertube E connecting cable on the assistant's microscope.

- When operating the handgrips or the zoom knob on the assistant's microscope, do not touch the non-sterile connecting cable.

- Look through the eyepieces and activate the focusing function on the foot control panel or on the hand grip until the image of the surgical field appears sharply focused. Also see "Adjusting the surgical microscope".

Ending work

NOTE

Risk of injury caused by suspended systems!

Parts of the suspension system are positioned at head level and pose a risk of injury.

- Move the system into the standby position after use and make sure that sufficient headroom is available.

- Move the suspension arm into its standby position.

- Switch off the system when not in use.

What to do in the event of malfunctions

Failure of a main function (XY, focus, zoom, light)

NOTE	**Failure of a main function!**

In the event that one of the major functions fails (XY movement, focus, zoom, light control), leading to the impairment of further functions, you can switch to the manual mode to complete an already started surgical procedure.

- Press button (1) to switch to the manual mode.

Working in manual mode

In manual mode, the light source(s) is/are set to a medium intensity and power to the XY coupling, the focus drive and the zoom unit is turned off. The lift function of the ceiling mount continues to work. Any filters swung-in earlier are swung out (please note Table, "Maximal treatment times", page 22).

- Position the surgical microscope by moving it <u>manually</u> in X and Y directions.

- Focus the surgical microscope, by moving it up and down <u>manually</u>.

- Change the magnification (zoom) by pressing the manual zoom control knob (2).

- Use rotary knob (3) to set the integrated SCI illumination <u>manually</u>. The setting options of the rotary knob are as follows:

  - Left position = red reflex illumination activated

  - Right position = surrounding field illumination activated

- Use rotary knob (4) to set the integrated slit illuminator <u>manually</u>. The setting options of the rotary knob are as follows:

  - Left position = slit illuminator from the left

  - Center position = standard OPMI illumination

  - right position = slit illuminator from the right

ⓘ In manual mode, the light source for the light guide that is not required can be turned off by pressing the button for opening the lamp module on the respective lamp housing.
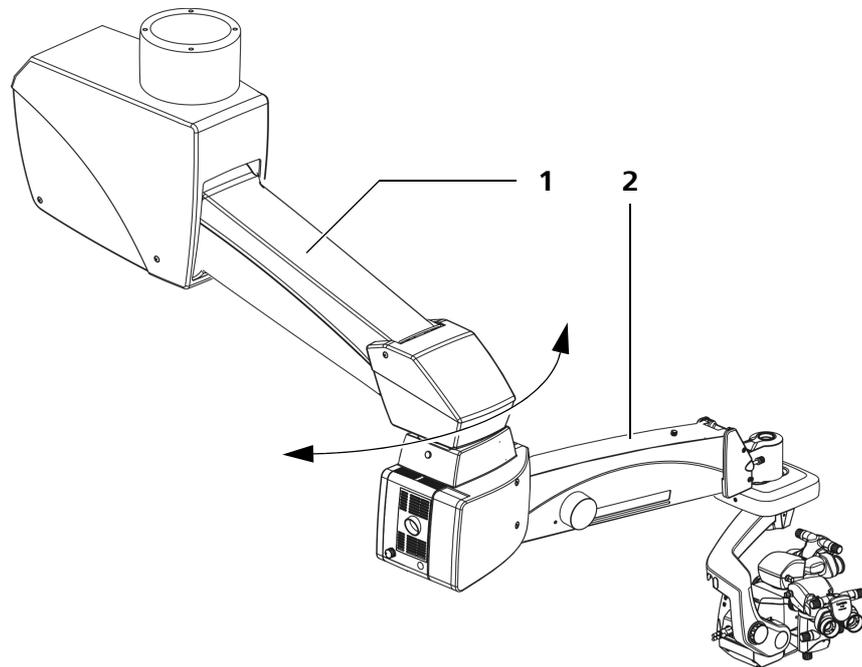
*Fig. 81: Switching to
manual mode*

Ceiling mount

Floor stand

1

1

3   **4**

2
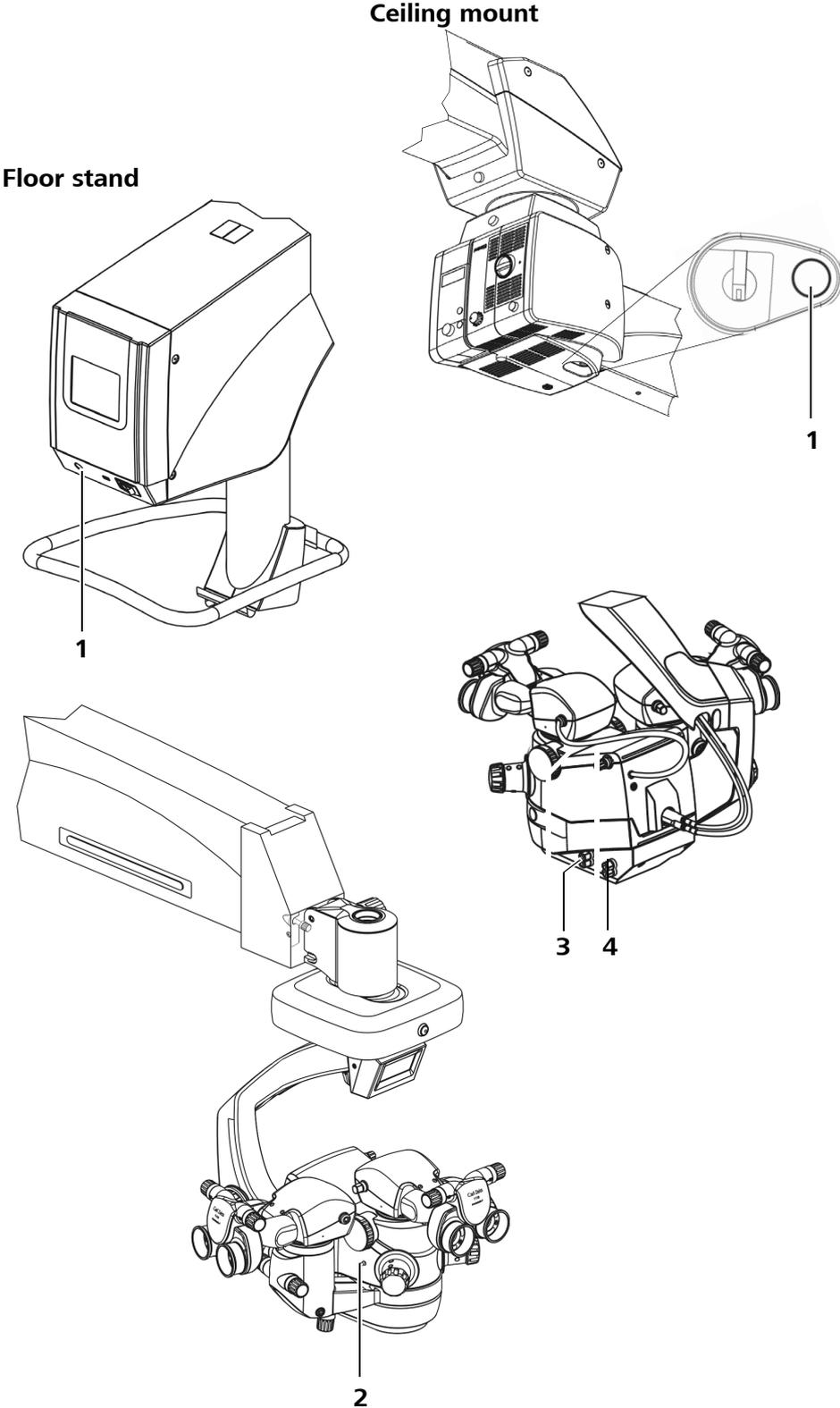
Failure of the lift arm on the ceiling mount

NOTE	**Lift function out of operation!**

- Swing the lift arm (1) and the suspension arm (2) out of the patient's surrounding area.

- Stop using the device and notify the Carl Zeiss Service.

Fig. 82: Lift arm out of the beam path

Failure of the halogen light source
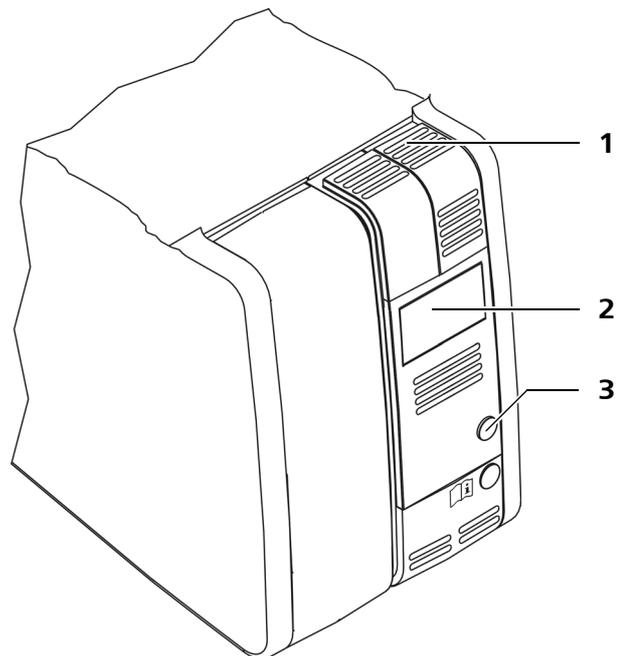
Overheating of the lamp module!

If ventilation grids (1) are covered e.g. by drapes, this may lead to overheating of the lamp modules and deactivation of the lamp.

• Do not cover the ventilation grids.

The lamp housing contains a backup lamp which automatically swings into the illumination beam path when the first lamp fails. Open flap (2) indicates that the backup lamp is operative. If the automatic swing-in function is defective, you can also swing in the backup lamp manually.

• Press button (3) to manually swing the backup lamp into the beam path.

• Exchange the defective lamp at the first opportunity.

• If the backup lamp is defective and replacement is not possible, continue surgery using an external OR illuminator.

Fig. 83: Swinging in the backup lamp

Failure of the Superlux Eye light source (xenon light source)

⚠️ **CAUTION**

Risk of injury!

Lamp rupture may lead to jamming of the lamp module and failure of the electronics modules.

- Before opening the lamp housing, make sure that the system is moved to a position where neither the patient nor the user is put at risk by falling items.

- Do not continue using the system if the lamp module is jammed or the illumination system is no longer operational. Contact the Carl Zeiss service department.

Switching to the backup lamp

The lamp module contains two xenon lamps. The second lamp is used as a backup lamp which must be swung into the illumination beam path when the first lamp fails.
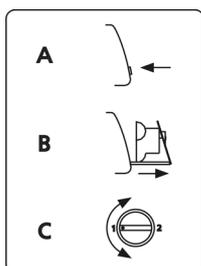
- Before replacing the lamp, switch off the suspension system at the power switch.

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

  → The lamp module is slightly ejected.

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

- Swing the second xenon lamp (backup lamp) into the beam path by turning knob (1) through 180° until it snaps in.

  → The segment in knob (1) lights red.

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

- Reset the counter in the "System Settings" menu to "0".

- Switch the suspension system back on again at the power switch.

ℹ️ If the first lamp failed and the backup lamp is in use, a warning message is displayed on the 5.7" control panel, reminding you to keep a backup lamp module ready at hand.

*Fig. 84: Malfunction of the
Superlux Eye*
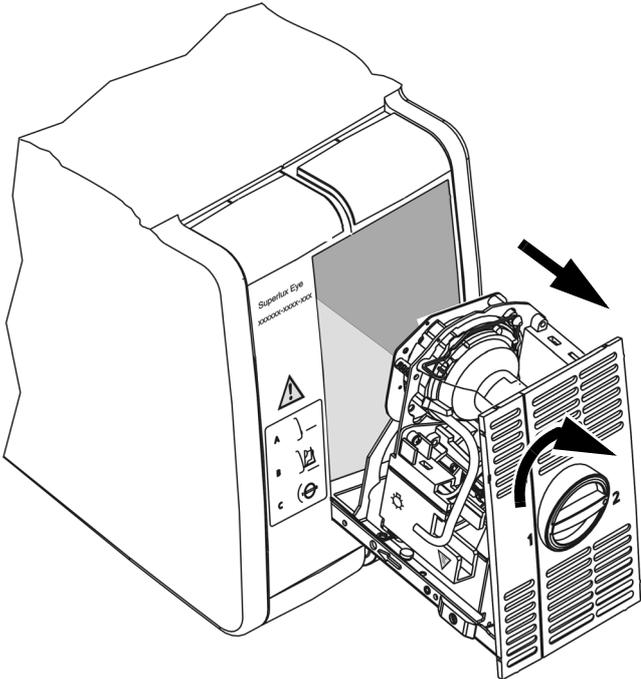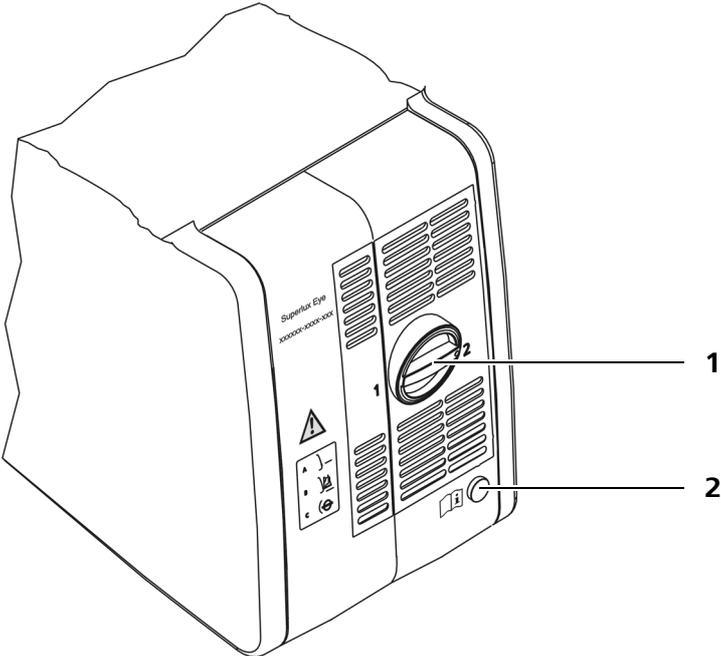
Failure of the LED light source

NOTE	**Overheating of the lamp module!**

If ventilation grids (1) are covered e.g. by drapes, this may lead to over-heating of the lamp modules and deactivation of the lamp.
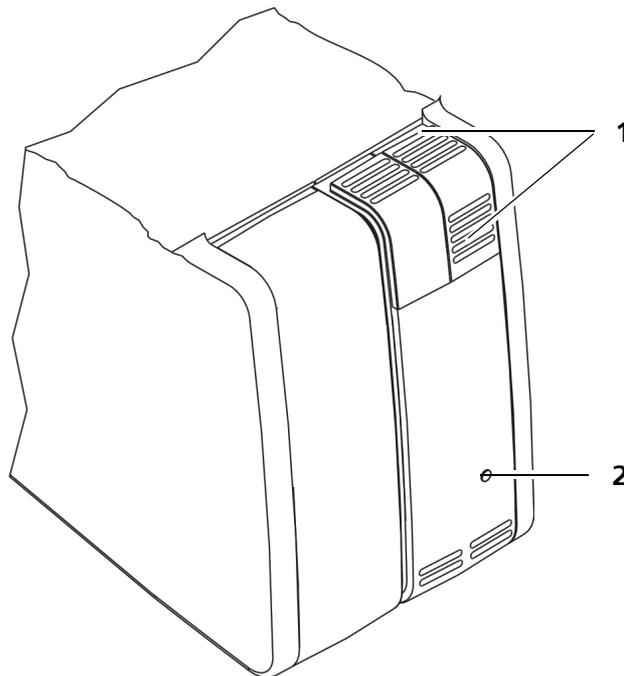
• Do not cover the ventilation grids.

NOTE	**Defect in the LED light source!**

If the LED (2) is shining amber, the LED light source is defective. In this case, the light intensity reduces to 50% and an error message is displayed on the 5.7" control panel.

• Please contact Carl Zeiss Service.

Fig. 85: LED light source

Troubleshooting

For your safety

- Many malfunctions are detected automatically. Therefore, pay attention to the error messages displayed on the 5.7" control panel (see page 253).

- If a failure occurs which you cannot correct with the aid of the chapter "What to do in the event of malfunctions", attach a sign to the system stating it is out of order and contact the Carl Zeiss service staff.

Malfunctions of the system

Problem	Possible cause	Remedy	See
No function at all.	Power plug not inserted (applies only to floor stand).	Insert the power plug.	page 114
	Power switch of suspension system not switched on.	Press the power switch. Green indicator light in the power switch must be lit.	page 163
	Automatic circuit breaker in power switch of suspension system has been activated.	Press power switch again.	page 163
	Power failure.	Contact in-house electrician.	-

Problem	Possible cause	Remedy	See
No light	Light guide not properly inserted in microscope.	Insert light guide as far as it will go.	-
	Failure of main and backup lamps.	Replace both lamps.	page 256
	Failure of suspension system electronics.	Illuminate surgical field using an OR illuminator. Contact Carl Zeiss Service.	page 243
	Lamp module in suspension system has no contact.	Insert lamp module as far as it will go.	page 256
	Light source not activated on the foot control panel.	Press light source on/off button on the foot control panel.	-
	Suspension arm is in standby position.	Pull suspension arm downward.	-
Light malfunction	Brightness level set too low.	Adjust brightness on suspension system or foot control panel.	-
	Lamp aging may lead to reduced light intensity.	Replace lamp.	page 256
	Defective light guide (illumination not uniform).	Exchange the light guide. Contact Carl Zeiss Service.	-
	Light guide not correctly inserted.	Check light guide for connectivity.	-
	Lamp is not properly seated in lamp socket.	Properly push lamp into lamp socket.	page 256
Light too bright	Brightness level set too high.	Adjust brightness on suspension system or foot control panel.	-
		Switch off light source on suspension system. Illuminate surgical field using an OR illuminator. Contact Carl Zeiss Service.	-
	Defective light control.	Switch to manual mode.	-
Red reflex too dark or non-existent.	Red reflex illumination not activated.	Activate red reflex illumination.	-
	Contaminants on objective lenses.	Clean objective lenses.	-

Problem	Possible cause	Remedy	See
	Light guide damaged or incorrectly connected.	Check that light guide is correctly seated and replace, if necessary. Contact Carl Zeiss Service.	-
	Lamp is not properly seated in lamp socket.	Properly push lamp into lamp socket.	page 256
	Main microscope is not in the correct working position.	Reposition the main microscope. Main microscope axis should coincide with optical axis of patient's eye.	page 236
Image on video monitor too dark, or high level of noise.	Use of a camera adapter (with external cameras only)	Remove fixed stop from external camera adapter.	User manual for camera
	Wrong spot size selected for camera.	Activate the integral light metering function of the camera to reduce reflections from the sclera and cornea.	User manual for camera
	Insufficient light	Increase the brightness level of illumination.	-
Motor-driven focusing and / or zoom functions of surgical microscope are inoperative.	Failure of suspension system electronics.	Manually operate the zoom on the surgical microscope.	page 240
Motions of suspension arm too stiff.	Friction adjustment knob tightened too firmly.	Slightly loosen friction adjustment knob.	page 149
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 integrated video recording function via USB port (option)

Problem	Possible cause	Remedy	See
Data cannot be stored	USB storage medium defective	Check and, if necessary, replace USB storage medium.	-
	USB storage format is not supported	Use USB storage media with FAT32 or NTFS.	-
	Memory is full	Delete files, note display of storage space available.	-
	No network connection	Set up network connection.	-
	No network authorization	Check network sharing and directories, set to readable and writable.	-
Data cannot be displayed or played back.	File format imported or filed in LAN is not supported.	Only use supported file formats.	-
	The video was imported or filed in LAN with incorrect video standard.	Set system to country-specific video standard (PAL/NTSC); start with camera for adjustment to country-specific video standard.	-
	USB storage medium was removed and reinserted in the meantime. (When the USB storage medium is removed, the device automatically creates a new patient folder, which is empty.)	Select desired patient folder.	-
Selected patient cannot be deleted.	Patient is current patient: deletion not possible.	Select a patient other than the current patient. Delete the patient you wish to delete.	-

Malfunctions of the wireless foot control panel

Problem	Possible cause	Remedy	See
Temporary failure of function.	Batteries are empty.	Replace batteries.	user manual of foot control panel
	Use of rechargeable batteries.	Replace batteries.	user manual of foot control panel
	Failure of individual button functions.	Reconfigure button function - only possible if functions can be configured on suspension system.	page 199
	Failure / malfunction of radio link in wireless foot control panel.	Connect the connecting cable, if provided.	user manual of foot control panel
	Position sensor of foot control panel always detects rest position.	Connect the connecting cable, if provided.	user manual of foot control panel
	Interference in radio link	Connect the connecting cable, if provided.	user manual of foot control panel
	Weak radio signal	Connect the connecting cable, if provided.	user manual of foot control panel
	No pairing with suspension system	Perform pairing with suspension system	page 175

Problem	Possible cause	Remedy	See
Unintended activation of function.	Button got jammed after activation.	Put foot control panel in its rest position.	user manual of foot control panel
		Reconfigure button function - only possible if functions can be configured on suspension system.	
	Foot control panel sends incorrect activation signal.	Put foot control panel in its rest position.	user manual of foot control panel
		Reconfigure button function - only possible if functions can be configured on suspension system.	
	Wrong foot control panel.	Check whether the identifications on the suspension system and in the indicator of the foot control panel are identical.	user manual of foot control panel
		Perform pairing with suspension system	page 175

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 116
Sporadic loss of functions.	Loss of individual key functions.	Reconfigure key functions - only possible if functions on suspension system can be configured.	page 199

Error messages displayed on the 5.7" control panel

In the event of malfunctions occurring during operation, error messages are displayed on the 5.7" control panel.

• Check and eliminate the malfunction.

• Acknowledge the error message.

The following table contains examples of error messages and the corresponding remedies. If you have problems eliminating the malfunction or if errors keep recurring, do not continue using the system and contact Carl Zeiss Service.

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

Error message	Possible cause	Remedy	See
XY coupling error. The error can be acknowledged.	– e.g. hardware error in motor electronics	If the error impairs your work, switch to the manual mode.	page 240
If the error impairs your work, please switch to the manual mode and contact your Carl Zeiss service partner.	– e.g. software error, inadmissible status of motor control		
Light source error. The error can be acknowledged.	– e.g. malfunction of light intensity setting	If the error impairs your work, switch to the manual mode.	page 240
If the error impairs your work, please switch to the manual mode and contact your Carl Zeiss service partner.			
Zoom error. The error can be acknowledged.	– e.g. jammed hardware	If the error impairs your work, switch to the manual mode.	page 240
If the error impairs your work, please switch to the manual mode and contact your Carl Zeiss service partner.			
Focus error. The error can be acknowledged.	– e.g. jammed motor of the focus system	If the error impairs your work, switch to the manual mode.	page 240
If the error impairs your work, please switch to the manual mode and contact your Carl Zeiss service partner.			

Error message	Possible cause	Remedy	See
Error during system start. Please reboot the system. Please make sure that no function buttons are pressed during the booting process.	– e.g. a button was pressed during system start	Reboot the system. Make sure not to press any button during this process.	-
System error. The error can be acknowledged. If the error recurs, please contact your Carl Zeiss service partner.	– Unknown software or hardware error.	Acknowledge the error and inform Carl Zeiss Service if it occurs again.	-

Care and Maintenance

System maintenance

Changing the halogen lamp

⚠ CAUTION	**Risk of burns!**
	If you change the lamp shortly after it has failed, the lamp will still be very hot.
	• Use heat-resistant protective gloves when replacing the lamp.

NOTE	**Use of the correct halogen lamp**
	• Only use the 12 V, 100 W halogen lamp specified in the chapter "System data => Ordering data => Consumables".

Always make sure before surgery that both the primary lamp and backup lamp are intact.

To change the lamp, proceed as follows:

- Turn off the system at the power switch.

- Press button (2), the lamp module is slightly ejected. Pull out lamp module (1).

- Remove the defective halogen lamp from the spring-loaded mount.

- Pull ceramic base (7) from the contact pins of the halogen lamp.

- Plug ceramic base (7) onto the contact pins of the new halogen lamp.

- Insert the new halogen lamp. Make sure you do not touch lamp bulb (6) or the interior of reflector (5).

- Press the halogen lamp into the spring-loaded mount.

- Push the lamp module including the new halogen lamp back into the system.

- Turn on the system at the power switch.

NOTE	**Dropping of the light's brightness or complete failure!**
	• If the backup lamp becomes defective and replacement is not possible, use the external OR light to continue working.

Fig. 86: Replacing the halogen lamp
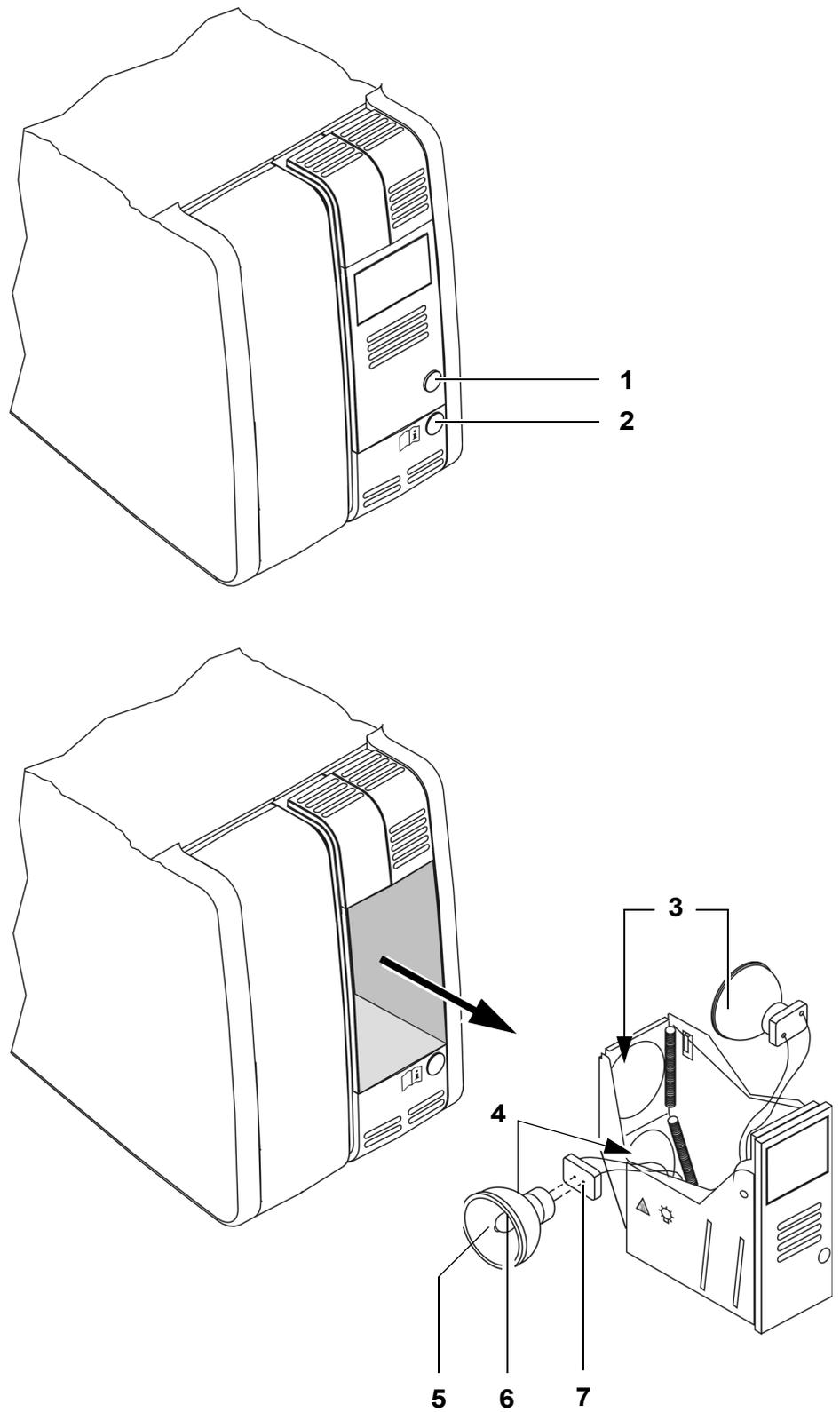
Replacing the xenon lamp module for Superlux Eye

<table>
<tr><td>⚠ **CAUTION**</td><td>**Risk of injury!**

Due to glass splinters of a failed lamp, the lamp module may block and electronic assemblies may fail.

- Never change the lamp above the patient.

- Before opening the lamp housing, ensure that the device is moved to a position in which possibly falling particles cannot put the patient or user at risk.

- If the lamp module is blocked or illumination is no longer operable, the device may not be used any longer. Please contact Carl Zeiss Service.</td></tr>
<tr><td>*NOTE*</td><td>**Use of the correct lamp module**

- Only use the lamp modules specified in the chapter "System data => Ordering data => Consumables".</td></tr>
</table>

Replacing the lamp module
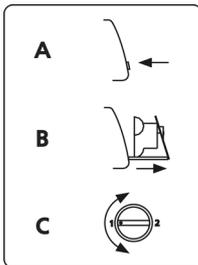
- Before replacing the lamp, turn off the device at the power switch.

- Press the 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 the drilled hole (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 xenon lamp and the second (backup) xenon lamp.

- Set the remaining service hour counter to its initial value of 500 hours (see page 180).

- 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 Carl Zeiss service representative.

ⓘ Only use the original transport case (2), as it also provides explosion protec-

tion, should xenon lamps be defective.

Fig. 87: Replacing the lamp module
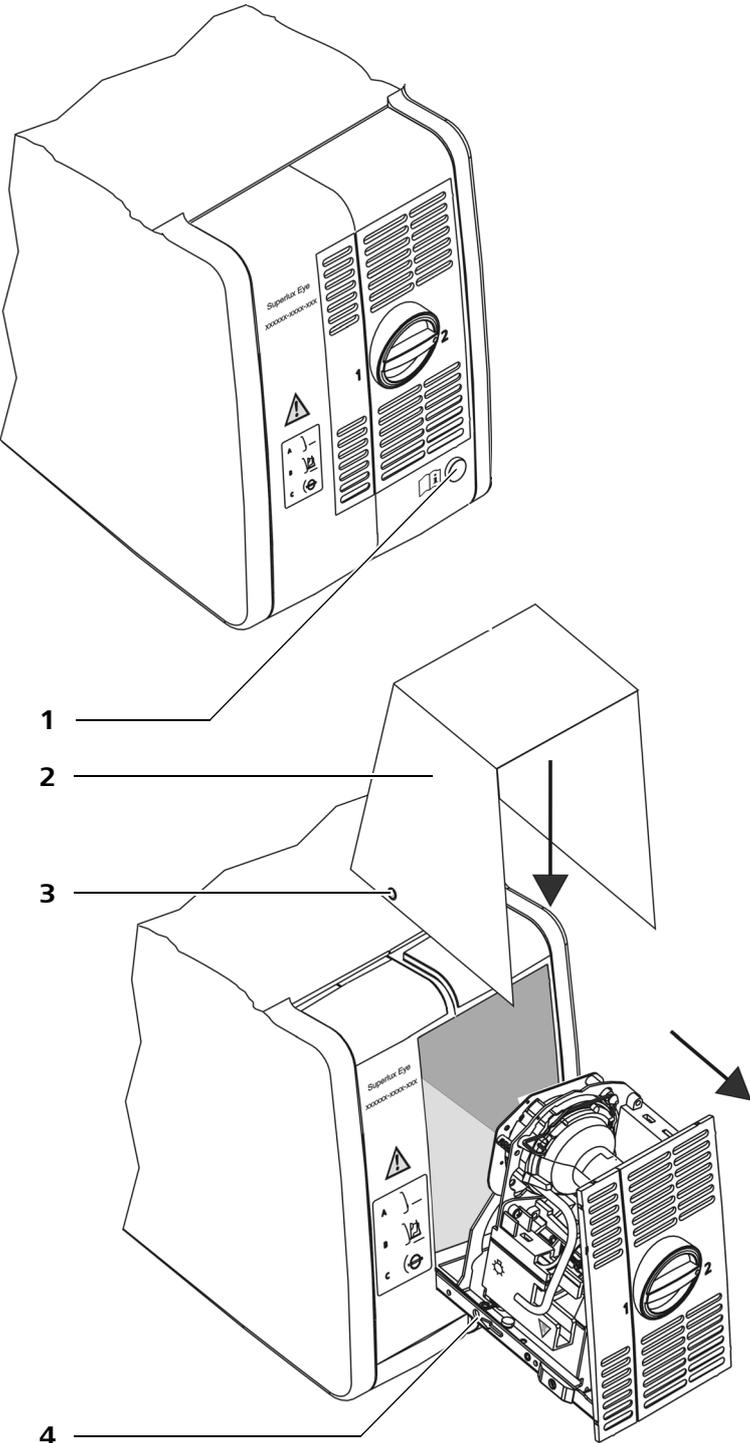
Balancing the weight on the carrier arm (monitor) of the floor stand

If the monitor (e.g., 22" TFT) no longer remains in the position required, the following carrier arm components can be adjusted.

Increasing the friction of left/right movement of the suspension arm.

• Remove plastic cover (1) on the suspension arm joint.

• Loosen securing screw (3) on the carrier arm by turning it counterclockwise using an M2.5 hex key.

• Tighten adjustment screw (2) of the suspension arm by turning it clockwise until the required friction has been obtained using an M5 hex key.

• Firmly retighten securing screw (3) on the carrier arm by turning it clockwise using an M2.5 hex key.

• Reattach plastic cover (1).

Readjusting the gas pressure spring

• Alight the suspension and carrier arm horizontally.

• Tighten adjustment screw of the gas pressure spring (4) by turning it **counterclockwise** until the suspension arm with the monitor no longer moves downward by itself.

If the suspension arm with the monitor continues to move downward, the gas pressure spring is defective.

• Please contact the Carl Zeiss service department in this case.

Adjusting the movement of the monitor

• Tighten the securing screw (5) of the monitor bracket by turning it clockwise until the monitor remains in the required position.

Fig. 88: Balance setting of
video monitor
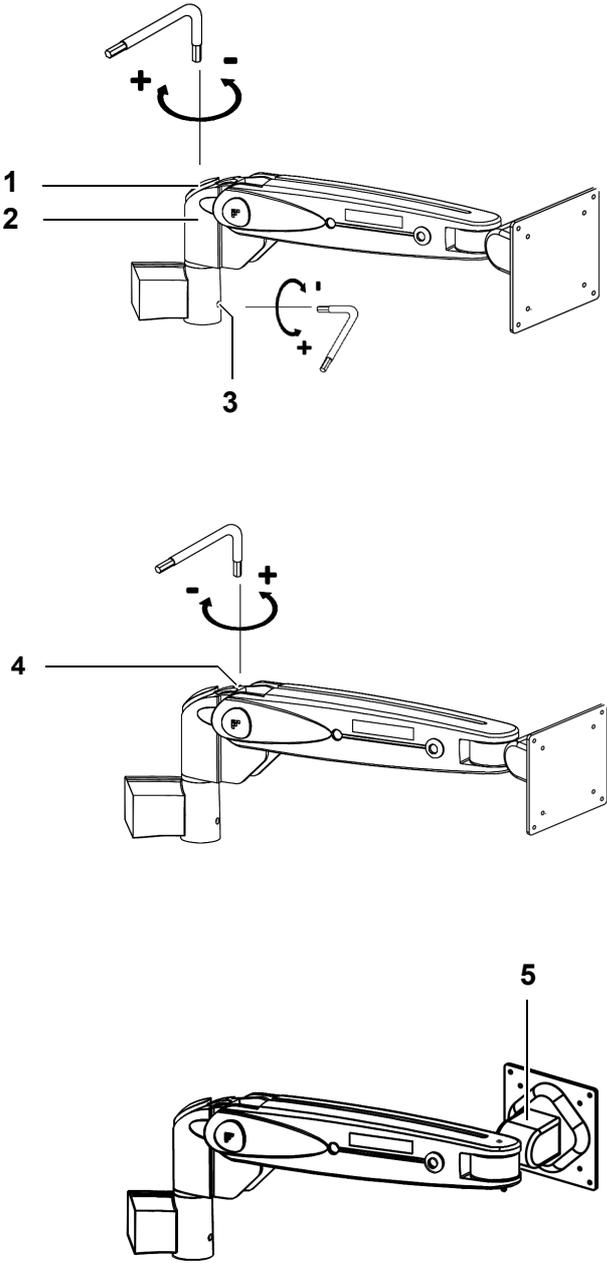
Maintenance intervals

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

Component	Inspection features and acceptance criteria	Remark
According to country-specific interval requirements		
Safety check	According to country-specific requirements	
Prior to each use		
Brakes	Electrical and mechanical function test: Unlock brakes completely; braking force holds microscope securely in balanced state without any change of position	
Lamps	Checking: – Operating hours within permissible range – Replacement lamp available and ready for use	
When specified operating hours have been reached		
Lamps	We recommend replacing the lamp after reaching the operational hours specified	
Every 12 months		
Documentation and identification labels	Visual inspection: Manuals and identification labels available, undamaged, complete and legible	

Component	Inspection features and acceptance criteria	Remark
Controls such as hand grips and XY coupling (optional)	Visual inspection and function test: – Visual and audible signals functional and react to prompt – Manual mode properly functioning – Probes move easily without play	
Carrier system including microscope mount	Function test: – Play-free movement of the bearings, stops and suspensions – Brakes operational at maximum permissible OPMI configuration Maximum admissible load max. 7 kg	
Stand column (floor stand only)	Function test: Secure without mechanical play in the column connection	
Castors (floor stand only)	Visual inspection and function test: – Play-free attachment, lock-up free turning and rolling, locking tabs and brakes securely positioned – Cable deflectors available	
Illumination: Fan / dust filter	Function test: – Fan and vacuum capacity noticeable	
Microscope	Function test: Checking optical imaging and illumination of the field of view	
Zoom, focus and illuminated field diaphragm	Function test: – Jolt-free operation of the zoom system – 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: Attached parts without mechanical play, knurled screws tightened and other removable microscope components securely mounted	
Foot control panel (optional)	Visual inspection and function test: – Complete, undamaged dust and spray water protection – Replace FCP WL battery	

Component	Inspection features and acceptance criteria	Remark
Video monitor (optional)	Visual inspection and function test: – No noticeable damage to housing – Check the image quality – Check the gas pressure spring of the lift arm	

Every 2 years

Component	Inspection features and acceptance criteria	Remark
Illumination: Light guide	Function test: – Check the light guide – Check the illuminated field	
Light source: Optical filters	– Check the light source filters	

Every 4 years

Component	Inspection features and acceptance criteria	Remark
Carrier system including microscope mount	Visual inspection: – No signs of wear on the supporting structure – No signs of wear or damage on the interfaces and couplings – No visible damage or wear on the connection and mount of the spring packs	
Cables, plugs and switches	Visual inspection: – Undamaged insulation and connectors on system/cable – Check the cable guide including fasteners	
Electronics	We recommend replacing the internal batteries	
Castors (floor stand only)	We recommend replacing the castors	
Light guide	We recommend replacing the light guide	

Every 6 years

Component	Inspection features and acceptance criteria	Remark
Monitor	We recommend replacing the monitor carrier arm including the gas pressure spring.	

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 labels

– Leakage current test

– Test of the protective ground conductor

– 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 manual mode without patient, every 6 months at the minimum

Care of the device

Cleaning

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.

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

Sterilization

Asepsis sets

The asepsis sets available from Carl Zeiss contain rubber caps and hand grips which can be sterilized in autoclaves. For detailed information on resterilization, please see the enclosed instructions "Preparation of resterilizable products" for the particular asepsis set.

Drapes

To ensure sterile covering of the system, it is also possible to use the single-use drapes.

We recommend the following drape types:

- Type 70, no. 306070
- Type 71, no. 306071
- Type 81, no. 306084

- 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.

- Attach the drape with sufficient slack using the adhesive tape.

Disinfection

It may be necessary to disinfect the surfaces.

NOTE	**Damage to the surfaces on the instrument!**
	• Use a disinfectant based on aldehyde and/or alcohol. The addition of quaternary compounds is acceptable. To prevent damaging surfaces, disinfecting agents 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

⚠ WARNING	**Risk of injury to the mechanic!**

If dismounted inappropriately, the ceiling mount may fall down and injure the mechanic.

• Always dismount the ceiling mount appropriately.

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

Mechanical and electrical floor stand data

Mechanical system of OPMI LUMERA 700 on floor stand

Component	Property
Microscope tilt mechanism	With self-locking control gear, manually adjustable via rotary knob.
	Tilt angle +90° / -20° *Pasvirimo kampas +90° / -20°*
XY coupling	Travel range: max. 61 mm x 61 mm *Judėjimo ribos: maks. 61 mm x 61 mm*
	Automatic centering at push of button
Suspension arm	Length: 850 mm
	Lateral tilt angle: 320°
	Travel: +360 mm / -360 mm
Carrier arm	Length: 450 mm
	Lateral tilt angle: 320°
Stand height	1880 mm
Base (dimensions)	805 x 805 mm
Maximum permissible load on the suspension arm	When the surgical microscope (without tube, eyepieces, objective lens) and the XY coupling are mounted, the maximum permissible load of accessories additionally mounted to the suspension arm is 9 kg.
Total weight	Approx. 235 kg

13.

26.

Fig. 89: *Dimensional drawing of OPMI LUMERA 700*

11. 320°

10. 320°

12. 270°

9. 450 mm; 850 mm

8. 360 mm

360 mm

1880 mm

805 mm   805 mm
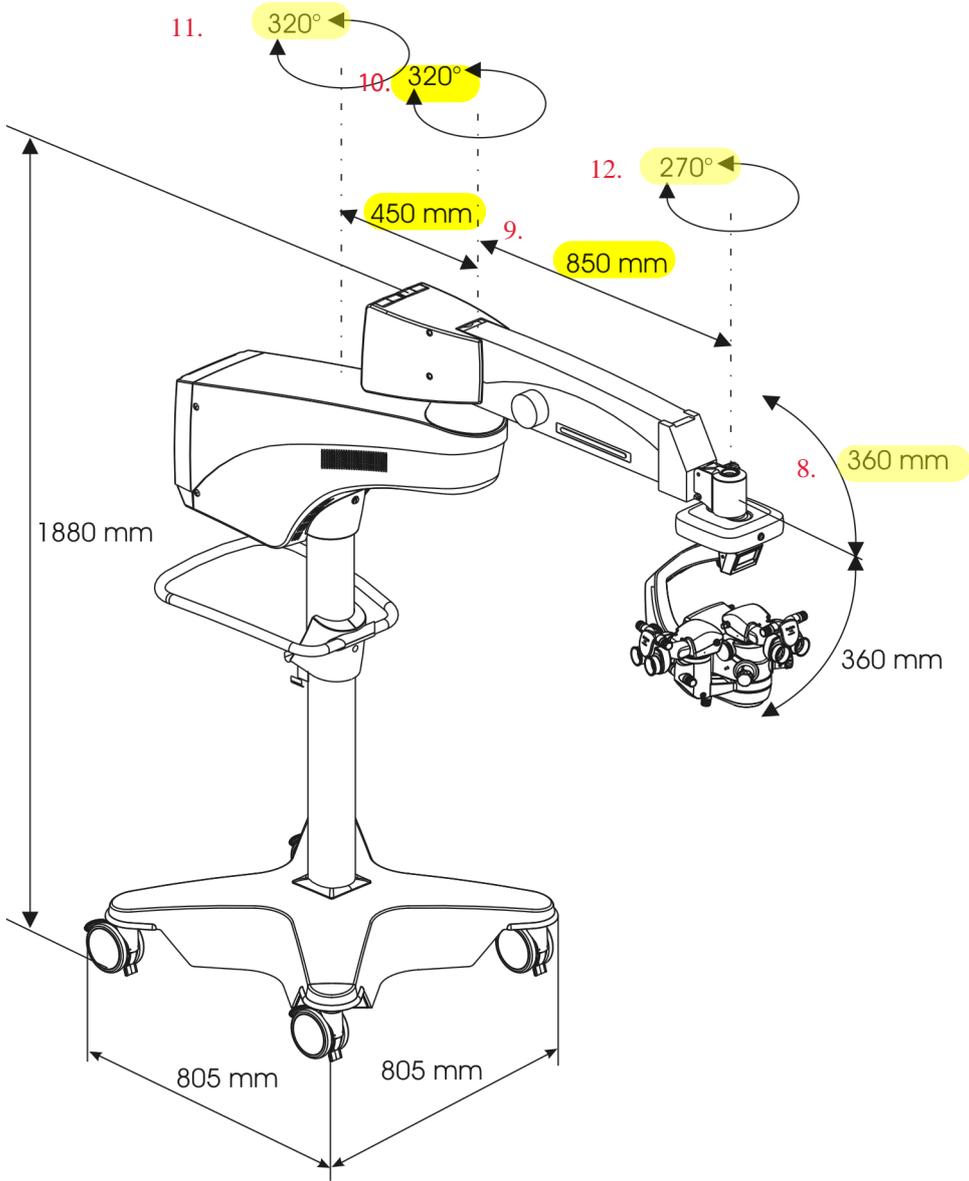
Electrical system of OPMI LUMERA 700 on floor stand

Component	Feature
Line connection	Only connect the system to wall outlets which are provided with a properly connected protective ground conductor.
Rated voltage	115 VAC (100 - 125 VAC)
	230 VAC (230 - 125 VAC)
Current consumption	115 VAC max. 1200 VA
	230 VAC max. 1200 VA
Rated frequency	50 - 60 Hz
Fuses	Automatic circuit breaker
Electrical inlets	Video input port (analog)
	Video input port "Lemo" (digital)
Electrical outlets	Power socket 115/230 VAC, max. 5 A
	Video output port: Composite (analog)
	Video output port: "Y/C" (analog)
	Video output port: "YPbPr" (analog)
	Video output port: "DVI" (digital)
	2x video output port: "HD-SDI" (digital)
	Remote socket for an external signal with max. 24 V / 0.5 A.
	Ethernet connector (option)
Fiber optic illumination Halogen	Lamp housing with 2 halogen lamps (1 backup lamp) with 12 V 100 W in quick-change modules for one light guide
	– Retina protection filter (blue barrier filter)
	– Fluorescence filter 485 nm (optional)
	Fully automatic lamp change if first halogen lamp fails

Remote connector
View of connector sid

Component	Feature
Fiber optic illumination Superlux Eye	Xenon short-arc reflector lamp, color temperature: approx: 5100 K
	Rated power: approx. 180 W
	Filters:
	– Retina protection filter (blue barrier filter)
	– HaMode filter
	– Fluorescence filter 485 nm (optional)
	Backup lamp in lamp housing, swung in manually
Fiber optic illumination LED	Color temperature: approx. 5000 K (±500 K)
	Rated power: approx. 50 W
	Filters:
	– Retina protection filter (blue barrier filter)
	– HaMode filter
	– 25% Gray filter (optional)
	– Fluorescence filter 485 nm (optional)
	Service life:
	– approx. 70% brightness after 20,000 hours
	– approx. 50 % brightness after 50,000 hours
Keratoscope - Laser class 1 (laser data as per EN 60825-1:2003)	Wavelength: 610 ± 15 nm
	Radiation power: <1 mW
	Emission time: > 10 min.
	Divergence of beam: 100° aperture angle
Light stop slider for slit illuminator	Slit width: 0.2 mm, 2 mm, 3 mm, 4 mm Slit height: 12 mm

The system has been designed for continuous operation.

37. - 2.

Mechanical and electrical ceiling mount data

Mechanical system of OPMI LUMERA 700 on ceiling mount

Component	Property
Microscope tilt mechanism	With self-locking control gear, manually adjustable via rotary knob, tilt angles + 90° / -20 °.
XY coupling	Travel range: max. 61 mm x 61 mm
	Automatic centering at push of button
	Lateral tilt angle: 270°
Suspension arm	Length: 973 mm
	Lateral tilt angle: 2 x 153°
	Travel: +340 mm / -340 mm
Lift arm	Length: 1170 mm
	Lateral tilt angle: 2 x 172°
	Travel: +345 mm / -345 mm
Maximum permissible load on the suspension arm	When the surgical microscope (without tube, eyepieces, objective lens) and the XY coupling are mounted, the maximum permissible load of accessories additionally mounted to the suspension arm is 9 kg.
Carrier arm system (optional)	Extension arm (Length: 800 mm, lateral tilt angle: 284°, maximum permissible load: 40 kg maximum permissible torque: 400 Nm)
	3-joint carrier arm for monitor holder (Length: 988 mm, lateral tilt angle: 320°, Travel: ±40°)
	Monitor holder with VESA-100 interface (Length: 125 mm, lateral tilt angle: 180°, Travel: ±22°, maximum permissible load: 20 kg)
Total weight	approx. 208 kg with carrier arm not included
	approx. 235 kg with carrier arm for OR illuminators (specified weight does not include OR illuminator)
	approx. 253 kg with carrier arm for video monitor (specified weight does not include video monitor)

For other dimensions, refer to the OPMI LUMERA 700 Planning Manual.

Fig. 90: Dimensional drawing
OPMI LUMERA 700
with carrier arm system
for video monitor
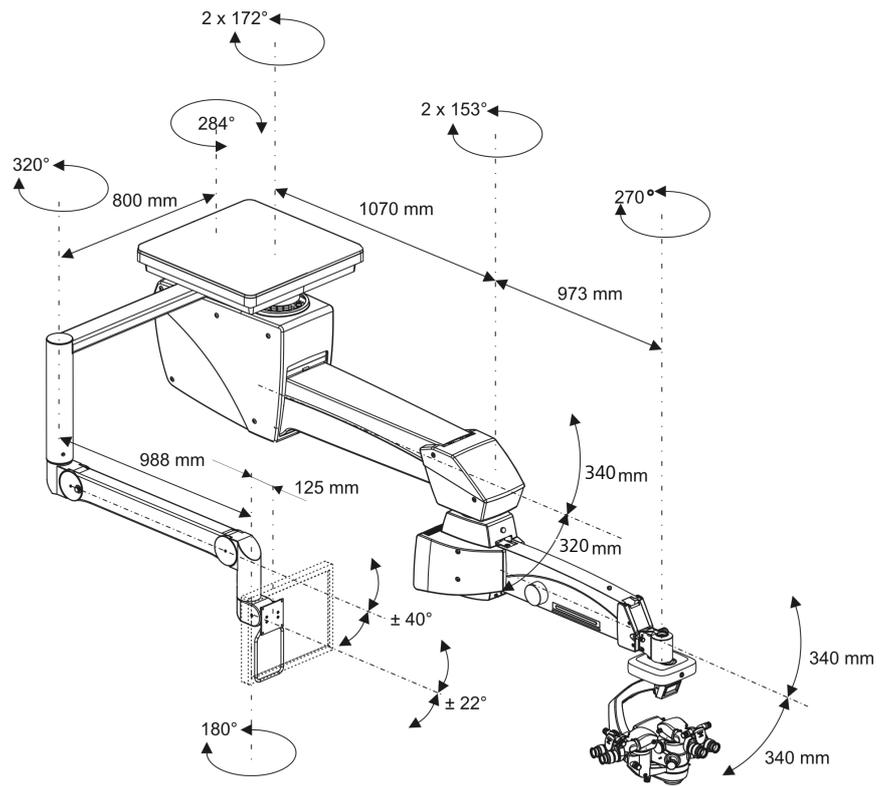
Fig. 91: Dimensional drawing
OPMI LUMERA 700
with carrier arm system
for OR illuminators
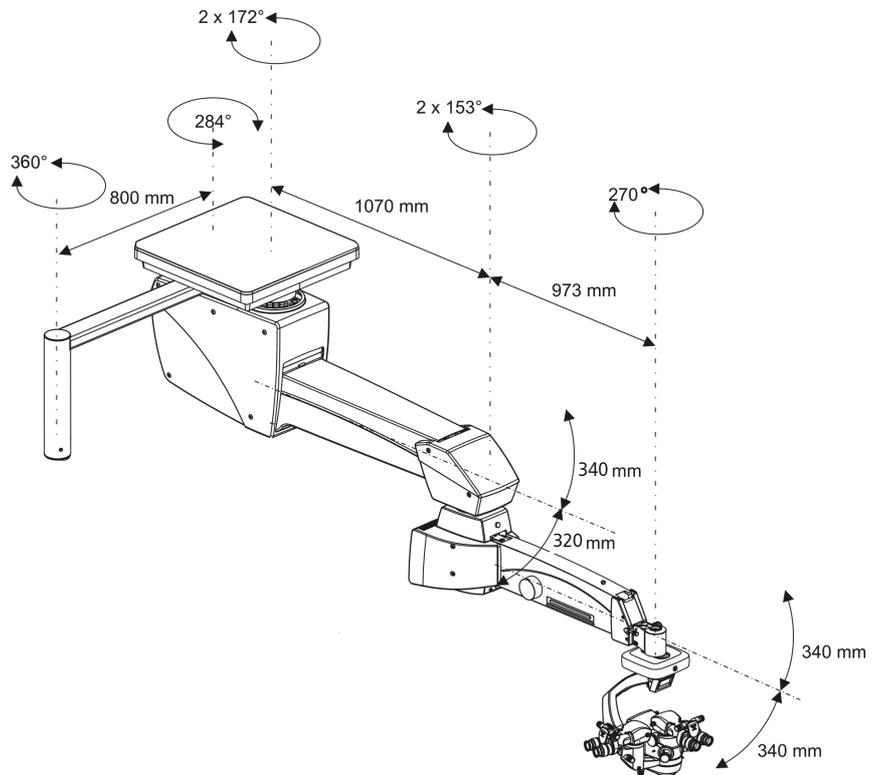
Electrical system of OPMI LUMERA 700 on ceiling mount

Component	Feature
Rated voltage	115 VAC (100 - 125 VAC)
	230 VAC (230 - 125 VAC)
Current consumption	115 VAC max. 900 VA
	230 VAC max. 900 VA
Rated frequency	50 - 60 Hz
Fuses	Automatic circuit breaker
Electrical inlets	Video input port (analog)
	Video input port "Lemo" (digital)
Electrical outlets	Power socket 115/230 VAC, max. 5 A
	Video output port: Composite (analog)
	Video output port: "Y/C" (analog)
	Video output port: "YPbPr" (analog)
	Video output port: "DVI" (digital)
	2x video output port: "HD-SDI" (digital)
	Remote socket for an external signal with max. 24 V / 0.5 A.
	Ethernet connector (option)
Fiber optic illumination Halogen	Lamp housing with 2 halogen lamps (1 backup lamp) with 12 V 100 W in quick-change modules for one light guide
	– Retina protection filter (blue barrier filter)
	– Fluorescence filter 485 nm (optional)
	Fully automatic lamp change if first halogen lamp fails

Remote connector
View of connector side

Component	Feature
Fiber optic illumination Superlux Eye	Xenon short-arc reflector lamp, color temperature: approx: 5000 K
	Rated power: approx. 180 W
	Filters:
	− Blue barrier filter (retina protection filter)
	− HaMode filter
	− Fluorescence filter 485 nm (optional)
	Backup lamp in lamp housing, swung in manually
Fiber optic illumination LED	Color temperature: approx. 5500 K (±500 K)
	Rated power: approx. 50 W
	Filters:
	− Blue barrier filter (retina protection filter)
	− HaMode filter
	− 25% Gray filter (optional)
	− Fluorescence filter 485 nm (optional)
	Service life:
	− approx. 70% brightness after 20.000 hours
	− approx. 50 % brightness after 50.000 hours
Keratoscope - Laser class 1 (laser data as per EN 60825-1:2003)	Wavelength: 610 ± 15 nm
	Radiation power: <1 mW
	Emission time: > 10 min.
	Divergence of beam: 100° aperture angle
Light stop slider for slit illuminator	Slit width: 0.2 mm, 2 mm, 3 mm, 4 mm Slit height: 12 mm

The ceiling mount is designed for continuous operation. The optional lift arm is not designed for continuous operation.

Optical data of the surgical microscope

Component		Property
Magnification	17.	3.5x - 21x (with f = 200 mm objective lens and 10x wide-field eyepieces)
	14.	Motorized zoom system with apochromatic optics, 1:6 zoom ratio
		Magnification factor γ = 0.4x - 2.4x
Focusing	27.	Motor-driven, focusing range 70 mm: 30 mm downward/40 mm upward At the press of the XY reset button, the focusing drive moves to the starting position of the focusing range.
Objective lens focal length		f = 200 mm
		f = 175 mm (optional)
		f = 225 mm with carrier ring (optional)
Tubes		Invertertube E
		Invertertube (optional)
		180° tiltable tube, f = 170 mm (optional)
		Inclined tube, f = 170 mm (optional)
Eyepieces	20. 25.	10x wide-field eyepieces with magnetic coupling
		12.5x wide-field eyepieces with magnetic coupling (optional)

22" video monitor

Component	Property	
LCD display	Diagonal	22"
	Resolution	1680 x 1050
	Pixel spacing HxV	0.282 mm x 0.282 mm
	Reaction time	25 ms
	Brightness	220 cd/m^2
	Contrast	1600 : 1
	Display colors	16.7 m
	Scan frequency	30-85 KHz horizontal
		50-85 Hz vertical
Inputs / Outputs	DVI-I (digital)	
	VGA (analog)	
	RS232 serial interface	
	S-Video Y/C (analog)	
	CVBS (video) (analog)	
General data	Current consumption	< 5 A DC
	Operating voltage	12 V DC +/- 10%
	Weight	8 kg
	Dimensions (H x W x D)	360.3 x 567.69 x 152.63 mm

Integrated SD 3CCD camera PAL (optional)

Component	Feature
Image sensor	Three 1/2" interline transfer interlace scan CCD image sensors
Resolution	720 x 576 pixels
Signal-to-noise ratio	62 dB
Scan system	Interlace: 50 half frames/second
Analog video output ports:	Composite - VBS: – 1.0 V_{p-p}/75 Ω PAL composite S-Video - Y/C: – 1.0 V_{p-p}/75 Ω luminance – 0.3 V_{p-p}/75 Ω chroma RGB: – 0.7 V_{p-p}/75 Ω for R, G, B – 0.3 V_{p-p}/75 Ω synchronization (synchronization for green and composite)

Integrated SD 3CCD camera NTSC (optional)

Component	Feature
Image sensor	Three 1/2" interline transfer interlace scan CCD image sensors
Resolution	640 x 480 pixels
Signal-to-noise ratio	62 dB
Scan system	Interlace: 60 half frames/second
Analog video output ports:	Composite - VBS: – 1.0 V_{p-p}/75 Ω NTSC composite S-Video - Y/C: – 1.0 V_{p-p}/75 Ω luminance – 0.3 V_{p-p}/75 Ω chroma RGB: – 0.7 V_{p-p}/75 Ω for R, G, B – 0.3 V_{p-p}/75 Ω synchronization (synchronization for green and composite)

Integrated HD 3CCD camera PAL (optional)

Component	Feature
Image sensor	Three 1/3" Progressive Scan CCD image sensors
Resolution	1920 x 1080 pixels
Signal-to-noise ratio	54 dB
Scan system	Progressive: 50 full frames/second
Analog video output ports:	Composite - VBS:
	– 1.0 V_{p-p}/75 Ω PAL composite
	S-Video - Y/C:
	– 1.0 V_{p-p}/75 Ω luminance
	– 0.3 V_{p-p}/75 Ω chroma
	YPbPr:
	– 1.0 V_{p-p}/75 Ω (Y)
	– 0.525 V_{p-p}/75 Ω (Pb, Pr)
Video output ports digital:	HD-SDI
	– 0.8 V_{p-p}/75 Ω PAL
	DVI
	– In accordance with DVI standards

Integrated HD 3CCD camera NTSC (optional)

Component	Feature
Image sensor	Three 1/3" Progressive Scan CCD image sensors
Resolution	1920 x 1080 pixels
Signal-to-noise ratio	54 dB
Scan system	Progressive: 59.94 full frames/second
Analog video output ports:	Composite - CVBS: – 1.0 V_{p-p}/75 Ω NTSC composite S-Video - Y/C: – 1.0 V_{p-p}/75 Ω luminance – 0.286 V_{p-p}/75 Ω chroma YPbPr: – 1.0 V_{p-p}/75 Ω (Y) – 0.525 V_{p-p}/75 Ω (Pb, Pr)
Video output ports digital:	HD-SDI – 0.8 V_{p-p}/75 Ω PAL DVI – In accordance with DVI standards

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 radiation disturbance

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

Interference measurements	Compliance	Electromagnetic environment - guidelines
RF emissions as per CISPR11	Group 1	The OPMI LUMERA® 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 B	The OPMI LUMERA® 700 is suitable for use in all facilities including locations in residential environments and those directly connected to the public power supply network which also supplies buildings used for residential purposes.

* OPMI LUMERA 700 as a system combined with MediLive MindStream is suitable for use in facilities other than locations in residential environments and those directly connected to the public power supply network which also supplies buildings used for residential purposes, provided that the following warning note is observed:

Warning: This system is only intended for use by trained medical personnel. This is a class A system as per CISPR 11. In residential areas, this system may cause radio interferences necessitating appropriate corrective measures to be taken, e.g., re-orientation, repositioning or shielding of the OPMI LUMERA 700 as a system combined with MediLive MindStream, or filtering of the connection to the site of use. |
| Harmonic emissions as per EN 61000-3-2 | Class A | |
| Emission of voltage fluctuations/flicker as per EN 61000-3-3 | Compliant | |

Electromagnetic immunity for ME equipment and ME systems

Table 2: The OPMI LUMERA® 700 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the OPMI LUMERA® 700 is responsible for ensuring that it 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 ±8 kV air discharge	±6 kV contact discharge ±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 ±1 kV for input/output lines	±2 kV for power supply lines ±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 ± 2 kV phase/neutral to ground voltage	± 1 kV phase-to-neutral voltage ± 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 40 % U_T (60 % dip of U_T) for 5 cycles	< 5 % U_T (> 95 % dip of U_T) for 0.5 cycle 40 % U_T (60 % dip of U_T) for 5 cycles No compliance at OPMI LUMERA 700 on floor stand, lamps are deactivated and default settings for the lamps are loaded.	The quality of the supply voltage should be that of a typical business or hospital environment. If the user of the OPMI LUMERA® 700 requires continued function even in the event of interruptions in the power supply, we recommend to power the OPMI LUMERA® 700 from an uninterruptible power supply or a battery.

Immunity tests	IEC 60601 test level	Compliance level	Electromagnetic environment - guidelines
	70 % U_T (30 % dip of U_T) for 25 cycles	70 % U_T (30 % dip of U_T) for 25 cycles	
	< 5 % U_T (95 % dip of U_T) for 5 s	< 5 % U_T (95 % dip of U_T) for 5 s	
		No compliance at OPMI LUMERA 700 on floor stand, but admissible as ME system remains safe and can be reset to previous status by the user.	
Power frequency (50/60 Hz) 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.

Remark: 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 LUMERA® 700 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the OPMI LUMERA® 700 is responsible for ensuring that it 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 LUMERA® 700, including cables, than the recommended safety distance that is calculated using the equation applicable to the transmission frequency involved.
			Recommended safety distance:
Conducted RF disturbances as per EN 61000-4-6	3 $V_{effective\ value}$ 150 kHz to 80 MHz	3V	$$d = 1,\ 17\sqrt{P}$$
Radiated RF disturbances as per EN 61000-4-6	3 $V_{effective\ value}$ 80 MHz to 2.5 GHz	3 V/m	$$d = 1,\ 17\sqrt{P} \quad \text{for 80 MHz to 800 MHz}$$ $$d = 2,\ 33\sqrt{P} \quad \text{for 800 MHz to 2.5 GHz}$$
			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).
			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]
			Interference may occur in the vicinity of equipment marked with the following symbol:
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 field strength measured at the location where the device is used exceeds the above compliance levels, the device must be monitored to verify proper function. 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

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

Rated power of transmitter [W]	Separation distance depending on transmission frequency [m]		
	150 KHz to 80 MHz $d = 1,17\sqrt{P}$	80 MHz to 800 MHz $d = 1,17\sqrt{P}$	800 MHz to 2.5 GHz $d = 2,33\sqrt{P}$
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

OPMI LUMERA 700 can be combined with the following devices to form a system that has already been tested:

– RESIGHT 500 / RESIGHT 700

– MEDIALINK 100

– VISULUX (fiber slit illuminator)

– TRIO 610 (HDTV camera system)

– CALLISTO eye (OR Management System)

This system combination has been approved by Carl Zeiss Meditec AG.

• In accordance with EN 60601-1:2006, section 16.2, the power outlet socket of this system is a multiple connector that is intended for an ME system. Connecting electrical devices not approved by Carl Zeiss can lead to a reduced level of safety on the ME system. When configuring your ME system (use of the power outlet socket), make sure to observe the requirements of EN 60601-1:2006, section 16, and note 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.

  • 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 standards and directives (e.g. EN 60950:2005 for data processing equipment). In addition, all configurations must meet the normative requirements for medical systems (see EN 60601-1-1:1990 or Clause 16 of the 3rd edition of EN 60601-1:2006 respectively). 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.
Please note that local legislation takes priority over the above-mentioned normative requirements. If you have any questions, please contact your local dealer or Carl Zeiss Service.

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

Components for the surgical microscope

Tube for the main surgeon

Description	Cat. No.
Tubes	
Invertertube E	303797-9140-000
Invertertube incl. asepsis (optional)	303797-9120-000
45° Inclined tube with sleeves (optional)	303784-0000-000
180° tiltable tube (optional)	303791-0000-000
Foldable tube f170/f260 incl. rotate and PROMAG (optional)	303771-9020-000
Intermediate pieces	
Intermediate piece 11 mm (optional)	303032-9002-000
Rotatable dovetail for binocular tubes (optional)	301007-0000-000

Eyepieces for the main surgeon

Description	Cat. No.
10x push-in widefield eyepiece	305542-0000-000
12.5x push-in widefield eyepiece, asph. (optional)	305543-9901-000
12.5x push-in widefield eyepiece, asph., with reticle (optional)	000000-1023-188
10x push-in widefield eyepiece with reticle (option)	000000-1023-184

Objective lenses

Description	Cat. No.
Objective lens f=200 mm	302652-9905-000
Objective lens f=175 mm (optional)	302651-9905-000
Objective lens f=175 mm with carrier ring (optional)	302671-9905-000
Objective lens f=200 mm with carrier ring (optional)	302672-9905-000
Objective lens f=225 mm with carrier ring (optional)	302673-9905-000

Components for the co-observation tube

Components for integrated assistant's microscope

Description	Cat. No.
Tubes	
Invertertube E	303797-9140-000
Invertertube incl. asepsis (optional)	303797-9120-000
45° Inclined tube with sleeves (optional)	303784-0000-000
180° tiltable tube (optional)	303791-0000-000
Foldable tube f170/f260 incl. rotate function and PROMAG (optional)	303771-9020-000
Eyepieces	
10x push-in widefield eyepiece	305542-0000-000
12.5x push-in widefield eyepiece, asph. (optional)	305543-9901-000

Components for the co-observation tube

Description	Cat. No.
Stereo co-observation tube, complete (optional)	000000-1063-869
8° assistant's microscope, f=200 mm (optional)	302624-9901-000
– 3-step magnification changer	303429-9903-000
0° assistant's microscope, fixed, f=225 mm (optional)	302952-0000-000
– 3-step magnification changer	303429-9903-000
– Adapter for 0° assistant's microscope	302980-0000-000

Miscellaneous

Additional accessories and components

Description	Cat. No.
Additional illumination	
Visulux (optional)	000000-1100-155
FC oblique illumination (optional)	303371-9004-000
Resterilizable caps	
Asepsis caps 22 mm, pack of 6	305810-9001-000
Resterilizable handgrips, pack of 6	305810-9017-000
Asepsis caps PD 180° tiltable tube, pack of 6	305810-9003-000
Asepsis VISULUX, pack of 2	305810-9009-000
Drapes	
Zeiss sterile drapes, type 70	306070-0000-000
Zeiss sterile drapes, type 70	306071-0000-000
Zeiss sterile drapes, type 84	306084-0000-000
Microscope dust cover	
Dust cover, blue with ZEISS logo	000000-1055-278
Backup lamps	
12 V, 100 W halogen lamp	380079-9040-000
Xenon backup lamp module	
Backup lamp module, incl. 2 xenon lamps for Superlux Eye	304977-9038-000
Filter	
485 nm fluorescence excitation filter for halogen light source	000000-1116-539
485 nm fluorescence excitation filter for xenon light source	304977-8010-000
Gray filter (25 %) for LED light source	000000-1142-845

Additional components

Description	Cat. No.
Instrument tray for the floor stand (optional)	00000-1352-729

Foot control panel

Description	Cat. No.
Wireless foot control panel	
Wireless foot control panel with 14 functions	304970-9020-000
Hard-wired foot control panel (FCP) (optional)	
Hard-wired foot control panel with 14 functions	304970-9015-000
Backup for wireless foot control panel (FCP WL) (optional)	
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

RESIGHT fundus viewing system

Description	Cat. No.
RESIGHT 700, motor-driven focusing unit (optional)	302721-9030-000
RESIGHT 500, manual focusing unit (optional)	302721-9020-000

You can find additional RESIGHT components in the
RESIGHT 500 & RESIGHT 700 instructions for use G-30-1695

Video accessories

You can find external video accessories for this surgical microscope in the separate instructions for use G-30-1888.

Retrofitting the OPMI LUMERA 700

The retrofit kits, also referred to as UD kits (upgrade components) listed below are integrated in or on device and must be subsequently installed by Carl Zeiss Service.

Light source

Description	Cat. No.
UC kit, halogen for a dual light source for existing 1-piece halogen light source (optional)	304977-9027-500
UC kit, halogen for a dual light source for existing 1-piece Superlux Eye light source (optional)	304977-9025-500
UC kit, LED light source (optional)	304977-9055-500
S light guide, L = 2.5 m	303481-9025-000

System

Description	Cat. No.
UC kit, integrated keratoscope (optional)	302681-9160-500
UC kit, manual control knob SCI (optional)	302681-8456-500
UC kit, overhead display (optional)	305953-9082-500

35.3 **CALLISTO eye with carrier arm**

Description	Cat. No.
UC kit, CALLISTO eye carrier arm for OPMI LUMERA 700 on the floor stand (optional)	301640-9010-500

IDIS

Description	Cat. No.
UC kit, IDIS - Integrated Data Injection System (optional - can only be retrofitted in devices with serial number 6634101596 and higher)	302681-9158-500

Integrated cameras, monitor and recording function

Description	Cat. No.
SD cameras for floor stands	
UC kit, integrated SD 3CCD camera PAL (optional)	302681-9730-500
UC kit, integrated SD 3CCD camera NTSC (optional)	302681-9780-500
HD camera for floor stands	
UC kit, integrated HD 3CCD camera (optional)	302681-9740-500
Integrated USB recording function	
UC kit, integrated SD video and image acquisition system on USB storage medium (optional)	302681-9760-500
UC kit, integrated HD video and image acquisition system on USB storage medium (optional - can only be retrofitted in devices with the following serial number: – Floor stand: 663414 – Ceiling mount without lift arm: 672612 – Ceiling mount with lift arm: 672652	302681-9765-500
Integrated 22" monitor	
UC kit, integrated 22" TFT with carrier arm for OPMI LUMERA 700 on floor stand (optional)	305953-9037-500
UC kit, integrated 22" TFT with carrier arm and support for OPMI LUMERA 700 on floor stand (optional)	305953-9038-500
Adapter set for 22" TFT in connection with integrated SD 3CCD camera for LUMERA 700 on floor stand (optional)	305953-9039-000
UC kit, integrated 22" TFT with carrier arm for OPMI LUMERA 700 on ceiling mount (optional)	305953-9241-500
Video wall panels	
UC kit, HD video wall mount (surface-mounted version) for OPMI LUMERA 700 on the floor stand (optional)	305953-9232-500
UC kit, SD video wall mount (surface-mounted version) for OPMI LUMERA 700 on ceiling mount (optional)	305953-9231-500

Networking

Description	Cat. No.
UC kit, Ethernet (optional)	305953-9081-500
Ethernet cable 10 m (optional)	305946-8660-000

Additional accessories

Description	Cat. No.
Carrier arm for operating light	
Carrier arm with AC2000 interface for OPMI LUMERA 700 OR lights on ceiling mount (optional)	305953-9294-000
Carrier arm with AC3000 interface for OPMI LUMERA 700 OR lights on ceiling mount (optional)	305953-9293-000
FSP connector for older generation	
Adapter for connecting an older generation FSP (FSP2) (optional)	305946-8185-000

Approval data

Approvals and requirements

Description	Description
Electrical design	Floor stand: EN 60601-1:2006 IEC 60601-1:2005 Ceiling mount: EN 60601-1:1988 + A1:1991 + A2:1995
	CAN/CSA-C22.2 No. 601.1
	Protection class I, degree of protection IP 20
Product classification	As per 93/42/EEC, Annex IX: Class 1
EMC requirements	The system meets the EMC requirements of EN 60601-1-2:2007, Class B
CE label	OPMI LUMERA 700 meets the essential requirements stipulated in Annex I to the 93/42/EEC Directive governing medical devices. The system is marked with $C\:E$

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 system, the system meets the requirements of Part 15 of FCC (Federal Communications Commission, USA)
CE label	If a radio module for the optional FCP WL foot control panel is integrated in the OPMI LUMERA 700, it also meets the requirements of EU Directive 1995/5/EC. The system is labeled with: $C\:E$ **0682**

Ambient conditions

For operation

Feature	Admissible range
Temperature	+ 10 °C ... 40 °C
Rel. humidity	30 % ... 75 %

For transportation and storage

Feature	Admissible range
Temperature	- 25 °C ... + 60 °C
Rel. humidity (without condensation)	10 % ... 90 %
Air pressure	500 hPa ... 1060 hPa

Symbols for transportation and storage

Symbol	Meaning
	This way up Indicates the correct upright position of the package.
	Fragile, handle with care
	Keep dry
	Do not stack
	Permissible temperature range Temperature limits for storage and operation
	Number of packaging units
	Permissible range of relative humidity Humidity limits for storage and operation
	Permissible range of air pressure Air pressure limits for storage and operation
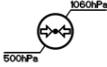
Annex / Options

Integrated HD video and image acquisition system

All settings relating to the integrated HD video recording and image acquisition function are made in the "Recording" submenu.

Intended use

The optional integrated HD video and image acquisition function is intended to support visualization and enables data recording and output.

The integrated HD video and image acquisition function only makes sense in conjunction with a connected video monitor, since the video recording is only displayed on the video monitor.

- Only with integrated HD 33CD camera.

- Only with integrated 22" TFT or external video monitor.

Normal use

34. The integrated HD video and image acquisition function is used for easy recording of video sequences and single images in clinical applications.

The recorded video and image data can be saved on a external USB storage medium or a shared directory within a network.

The unique, automatic storage of images and videos with time stamp ensures reliable assignment to the relevant patient.

⚠	CAUTION	**Connection to data networks!**

Use the LAN port only in combination with "galvanic network isolation for medical electrical equipment" in accordance with EN 60601-1:2006.
The data network connector must have adequate protection against contact at the end of cable to the separator (network side), e.g., made of plastic material.
The cable and connector of the network connection must at least comply with Cat-5e EIA/TIA-568A-5, i.e., the more recent Class D values from ISO 11801:2002 or EN 50173-1:2002.

If an integrated PAL video camera is used, it is not possible to use an external NTSC video camera.

Storage options

- USB storage medium*

- Network PC**

*   Only one USB storage medium at a time is supported.

**   Network archives must be configured as follows: Menu / Config / Medium / Storage location : configure LAN.

NOTE	**System malfunctions!**

Computer viruses may cause system malfunctions.

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

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/Capture/Display/Index/Import.

- Check USB storage media for correct function at regular intervals using a PC.

Menu overview

Main menu
In the main menu, press the button (6) to open the optional video "recording" function.

Recording menu
In the "Recording" submenu, you can record video sequences and individual images of the HD 3CCD camera using the optional "Integrated HD video and image acquisition" function.

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

Button functions

1 Open patient directory

2 Video recording button
To start the video recording, press the ● button.
"REC" is displayed in the status bar.

To end the video recording, press the ● button.
"REC" is no longer displayed in the status bar.

REC

3 Photo button
To capture an individual image the button
Still images can be created both in the live mode and during video recording or playback.

4 Open patient folder

5 Play video
To start the video, press the ▶ button.
The video is played on the video monitor (option).

To end the video recording, press the ■ button.

The video can be played faster in reverse or forwards using the ◀◀ ▶▶ buttons (in approx. 10% increments).

Fig. 92: Main menu
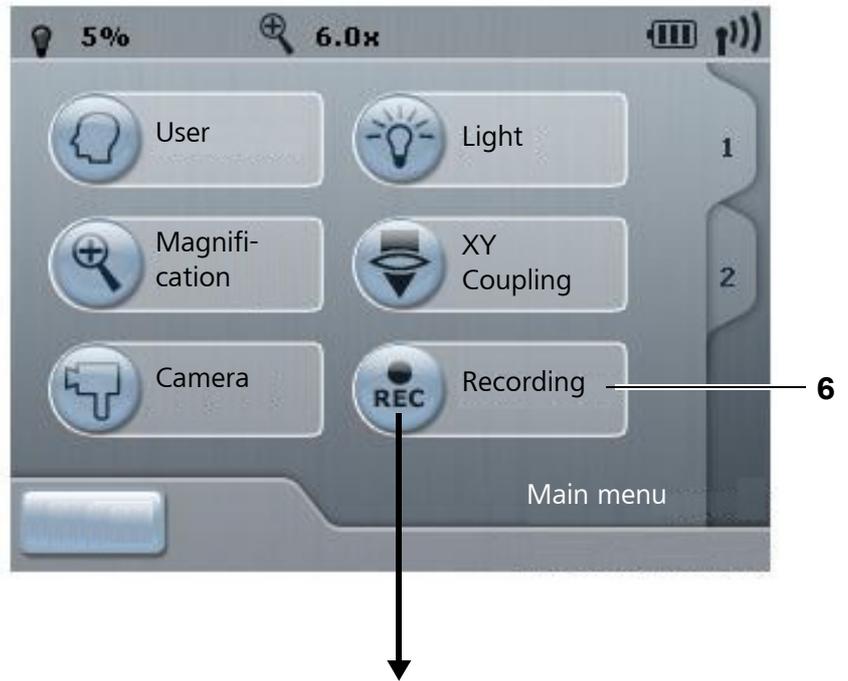
Fig. 93: HD recording menu

Configuring the HD video recording function (recording)

Configuring general recording parameters

In the second tab of the main menu, press the "System Config" button (1) to enter the "System Settings" submenu. You enter the two-page "Recording" submenu, Tab 1 by pressing the "Recording" button (2).

Here, you can set the following configurations:

3 <u><Auto Delete Mode></u>
If <Auto Delete Mode> is enabled, data cannot be assigned to a patient, but is saved to a neutral folder. Files older than 3 days are automatically deleted.

To change to a patient, <Auto Delete Mode> must be disabled.

4 <u><Image format></u>
Selection of the supported image formats: JPG or TIFF

- Press the button of the image format currently set.

→ A pop-up menu offers "TIFF" or "JPG" for selection.

- Select the desired image format.

5 <u><Beep on photo></u>
Switching on/off the notification sound when taking a photo

- Press the ⊟ button to save the changes.

→ The settings are saved for the current user.

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

*Fig. 94: Configuring the HD
        video recording function*
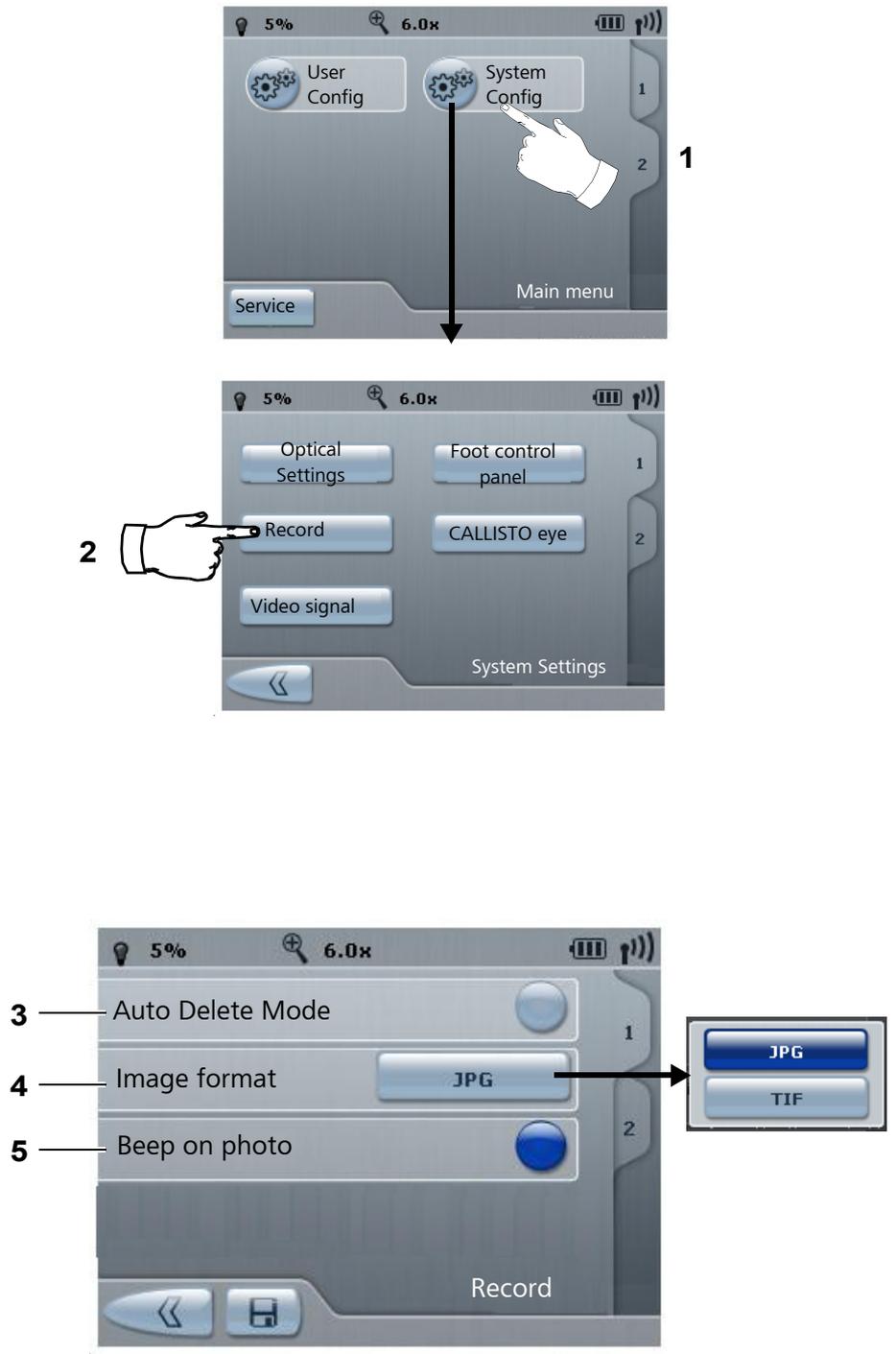
Selecting the recording medium

You can save videos and images on a USB medium (1) or in a network (2). To allow you to save the data in a network, you must first establish a network connection (see page 318).

Select the storage medium:

• Press tab 2 in the main menu.

• Press the <System Config> button.

• Press tab 1 in the "System Settings" menu.

• Press the <Recording> button.

→ The "Recording" submenu is displayed.

• Press tab 2 in the recording submenu.

• Press the button of recording medium currently set.

→ A pop-up menu offers "USB"(1) oder "Network"(2) for selection.

• Select the desired recording medium.

→ After selecting the "Network" option, the Network (3) button is activated.
Press the "Network" button and connect the network to the desired storage location (see page 318).

• Press the 🖫 button to save the changes.

→ The settings are saved for the current user.

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

Fig. 95: Storage medium
patients

Fig. 96: Save to USB media

Fig. 97: Save in network
(shared directory)
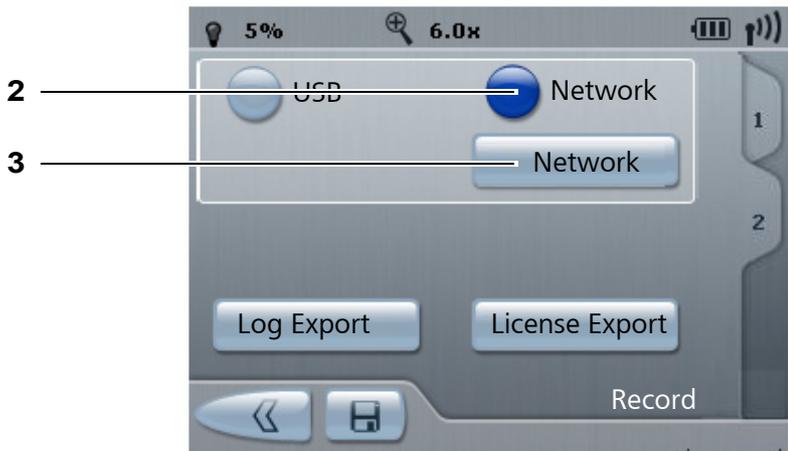
Exporting log files - Log Export

Automatically generated log files can be saved on a USB stick/HDD as a password-protected ZIP archive and sent to Carl Zeiss Service for evaluation.

Creating license file - License export

Creates a license file on the USB stick/HDD. A ZIP archive providing information on the used open source licenses is stored on the USB stick/HDD (without password protection).

.

Fig. 98: Exporting log files and licenses
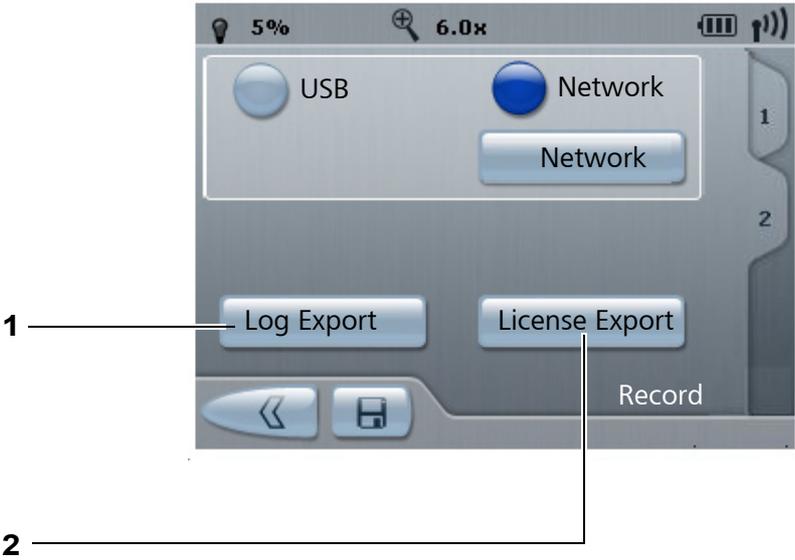
Configuring the network connection

In the "Network" submenu (Main menu> Tab 2 > System Config > Tab 1 > Recording), you can link the surgical microscope to a file directory (shared directory"). The network connection can only be configured if the system is connected to the corresponding network via a network cable.

Select one of the procedures described below:

Network link via a dynamic IP address (DHCP)

A dynamic IP address is an IP address which is automatically assigned to the requesting device by an address service (DCHP server) available in the network. The entry buttons "IP Address", "Subnet Mask" and "Gateway" are disabled when dynamic address assignment is selected.

- Press tab 2 in the main menu.

- Press the <System Config> button.

- Press the <Recording> button.

    → The "Recording" submenu is displayed.

- Select the "Network" option. The "Network" button is enabled.

- Press the <Network> button.

    → The "Network" submenu is displayed.

- Press the <DHCP> option.

    → The option is activated if it lights up in blue color and the "IP Address", "Subnet Mask" and "Gateway" input keys are deactivated.

- Perform a connection test (see page 322).

- Press the 🖫 button to save the changes.

    → The settings are saved for the current user.

- Press the ◀« button three times to return to the main menu.

*Fig. 99: Network connection
with DHCP*
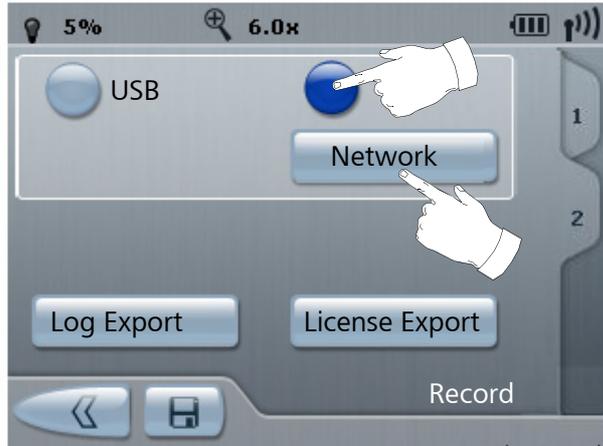
Network connection via a static IP address

Static IP addresses are fixed IP addresses permanently assigned to a system (recommended operating mode). The data required for this purpose (IP address, subnet mask, gateway and computer name) will be communicated to you by your IT administrator.

Names and addresses must not be assigned multiple times! They must occur only once in the network.

- Press tab 2 in the main menu.

- Press the <System Config> button.

- Press the <Recording> button.

    → The "Recording" submenu is displayed.

- Select the "Network" option. The "Network" button is enabled.

- Press the <Network> button.

    → The "Network" submenu is displayed.

- Deactivate the <DHCP> button (if this has not already been done).

- Activate the entry box for the IP address

    → The keyboard dialog for the entry of the local, valid IP address is opened.

- Enter the static IP address to be used. Only numeric entries with the following syntax are possible: <No.>.<No.>.<No.>.<No.> (No. ranging between 0 and 255).

- Save the IP address by pressing the 🖫 button.

    → The IP address is saved.

- Press the ⧏ button to return to the "Network" menu.

    → The "Network" menu is displayed again.

- Enter: "Subnet Mask", "Gateway", "Share Name" and "Host Address" (Tab 1-3).

- Perform a connection test (see page 322).

*Fig. 100: Network connection
        via a static IP address*

DHCP deactivated

Testing the network connection

The valid IP address with subnet mask, gateway and open ports are tested during a connection test.

- Open Tab 3 in the "Network" menu.

  → The "PING" menu is displayed.

- Press the button of the target IP <0.0.0.0>.

  → The keyboard dialog for the entry of the target IP is opened.

- Enter the target IP of the ICC from which you want to control the surgical microscope.

- Press the 💾 button to save the target IP.
  If you do not want to change anything, press the ⟨⟨ button.

  → The "PING" menu is displayed again.

- Press the <PING> button to test the connection.

  → The following is displayed:
    Ping result - Ping successful or
    Ping result - Ping failed

  → If the connection has been successfully set up, the "Lumera 700" button on the ICC monitor is displayed in blue color.

- If the connection test failed, check your target IP and, if necessary, the subnet mask and gateway.

*Fig. 101: Testing the network
            connection*

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 LUMERA 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 man-
ually.

– 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.

Automatic
IP Address 1

Automatic
IP Address 2

Automatic
IP Address X

Automatic
IP Address Server
Video Recording

Router
provides
DHCP

Automatic
IP Address
Video Recording

Operating the HD video recording function (recording)

In the main menu, press the <Recording> button to open the optional video "recording" function.

In the "Recording" submenu, you can manage the patient data.

Creating a new patient

Press the <Change> button (1)

→ The patient directory (5) is displayed.

- Press the   button (4).

    → The input menu (7) is displayed.

- Press the <Change> last name button (8).

    → A virtual keypad is displayed.

- Enter a new patient last name.
  The maximum text length is 20 characters.

- Press the   button to save.

- Press the <Change> first name button (9).

    → A virtual keypad is displayed.

- Enter a new patient first name.
  The maximum text length is 20 characters.

- Press the   button to save.

- To save and end the entry, press the   button.

Selecting a patient

Press the <Change> button (1)

→ The patient directory (5) is displayed.

- Sort the patient directory by <Date> or <Name> by pressing the button (3).

- Press the button (6) to activate the desired patient folder.

- To return to the "Recording" submenu, press the   button.

    → The selected patient name is displayed in the "Recording" submenu.

- Press the button (2) to open the desired patient folder.

*Fig. 102: Patient management
Creating patients*
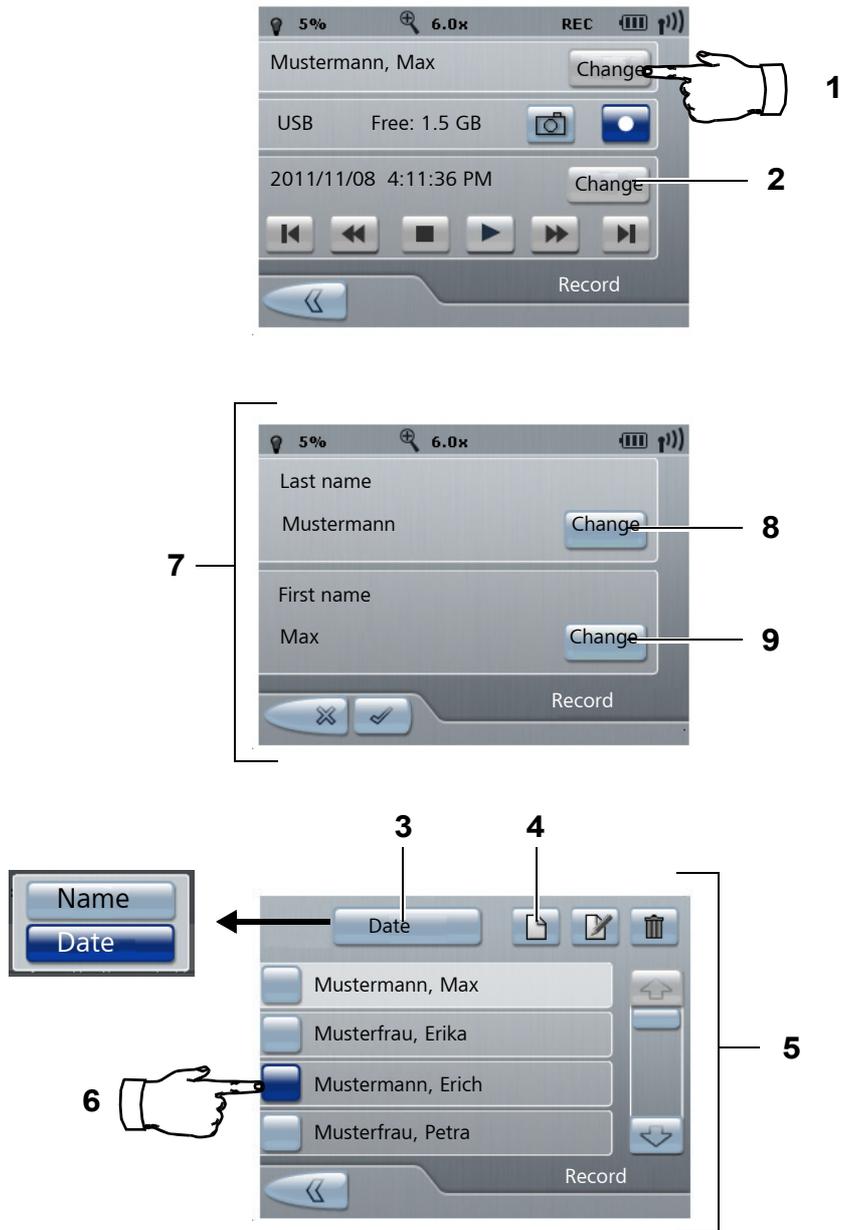
Changing patient names

Press the <Change> button (1).

→ The patient directory (5) is displayed.

• Press the ☐ button (3).

→ The input menu (7) is displayed.

• Press the <Change> last name button (8).

→ A virtual keypad is displayed.

• Change the corresponding last name.
The maximum text length is 20 characters.

• Press the ☐ button to save.

• Press the <Change> first name button (9).

→ A virtual keypad is displayed.

• Change the corresponding first name.
The maximum text length is 20 characters.

• Press the ☐ button to save.

• Press the ☐ button to end the entry.

Deleting a patient folder

Press the <Change> button (1).

→ The patient directory (5) is displayed.

• Sort the patient directory by <Date> or <Name> by pressing the button (6).

• Press the button (6) to select the desired patient folder.

• Press the ☐ button (4) to delete it.

→ A menu for the prompt (10) is displayed.

• Press <Yes> to delete the patient or press <No> to cancel the process.

*Fig. 103: Configuring the HD
video recording function*
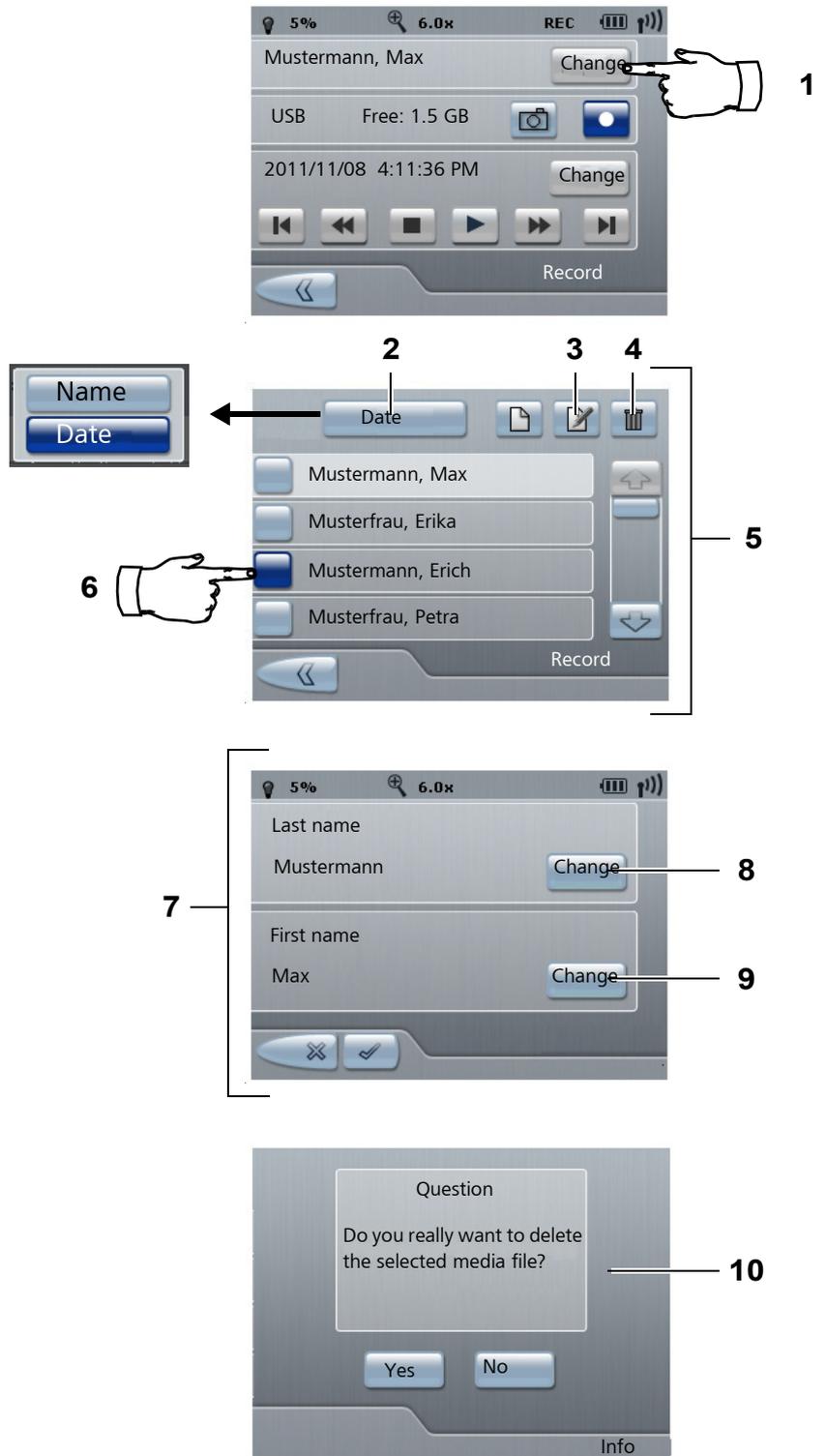
Checklist

- Always check the following points (without the patient) before using the device:

  – The monitor is switched on.

  – The network is connected and the right patient folder is selected. Or optionally: a USB storage medium is connected, detected and has sufficient storage capacity.

Recording HD videos

Press the <Change> button (1).

→ The patient directory is opened and the available patients are displayed.

- Press the button (2) to activate the desired patient folder.

- Press the button to return to the recording menu.

- To start the video recording, press the button.

  → During the video recording, "REC" is displayed in the status bar.

- To end the video recording, press the button.

  → "REC" is no longer displayed in the status bar.

Fig. 104: HD recording menu

Video recording off   Video recording is running

Capturing an individual image (photo)
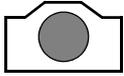
Press the <Change> button (1).

→ The patient directory (2) is opened and the available patients are displayed.

• Press the button (2) to activate the desired patient folder.

• Press the ◄◄ button to return to the recording menu.

• To capture an individual image, press the 📷 button.

→ An individual image is captured.

→ After the image is saved, an acoustic signal can be heard.

During video recording, the photo 📷 function can be used to create additional individual images. These images can also serve as markers.
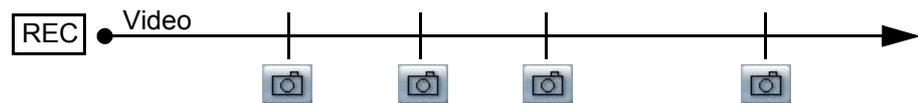
When playing back the video, the marked positions can be opened consecutively in the Recording menu using the ◄❙ ❙► buttons.

*Fig. 105: HD recording menu
Individual image*
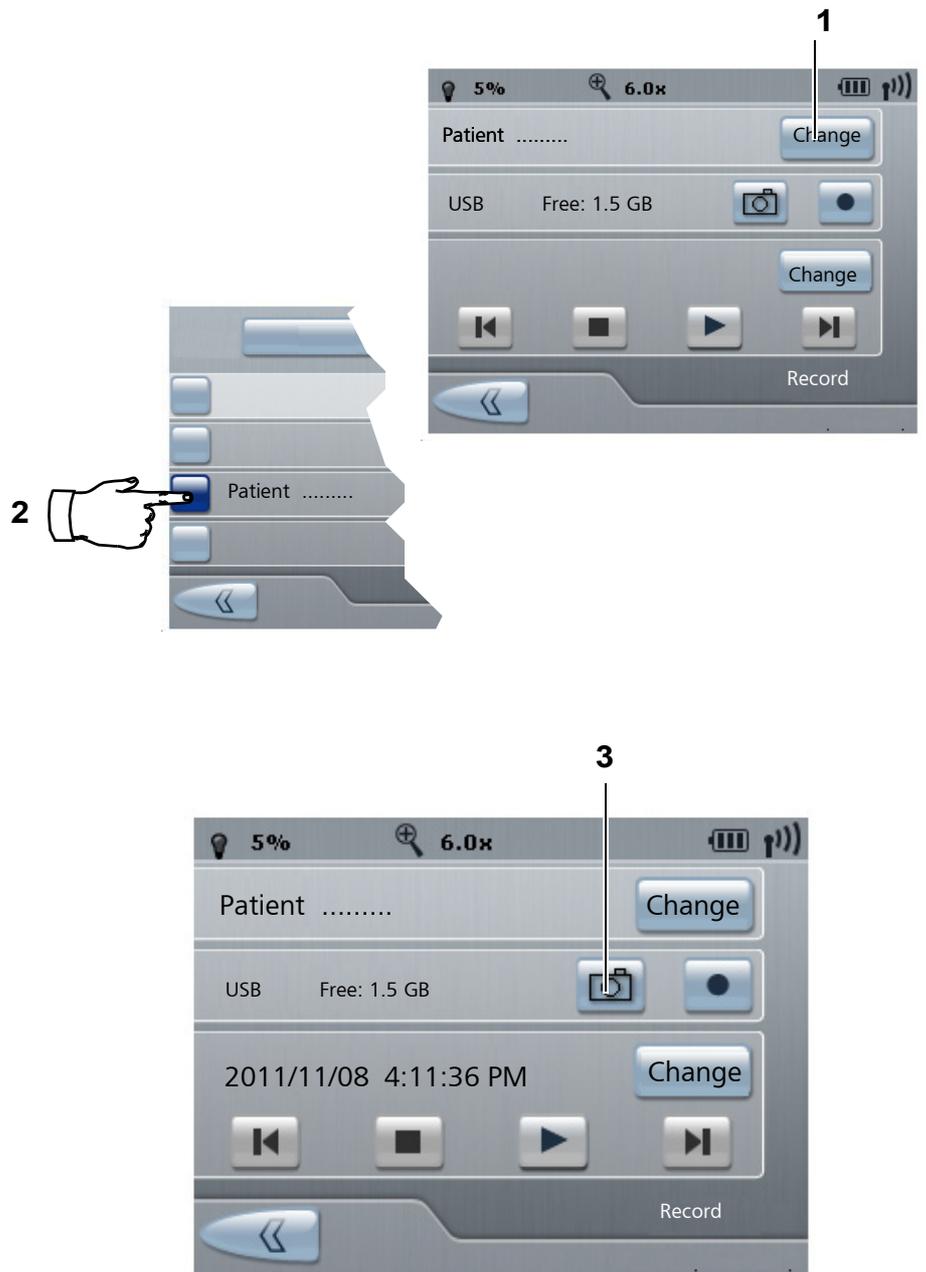
Viewing HD video
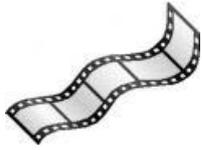
- Press the <Change> button (1).

  → The patient directory is opened and the available patients are displayed.

- Press the button (2) to activate the desired patient folder.

- Press the ⟪ button to return to the recording menu.

- Press the <Change> button (3).

  → The patient folder is opened and the available images and image files are displayed.

- Press the desired video (e.g,. 4).

- Press the ⟪ button to return to the Recording menu.

- To start the video, press the ▶ button (5).

  → The video is played on the video monitor (optional).

The video can be played faster in reverse or forwards using the ⏮ ⏭ buttons (in approx. 10% increments).

- To end the video, press the ■ button (6).

Fig. 106: Viewing HD video
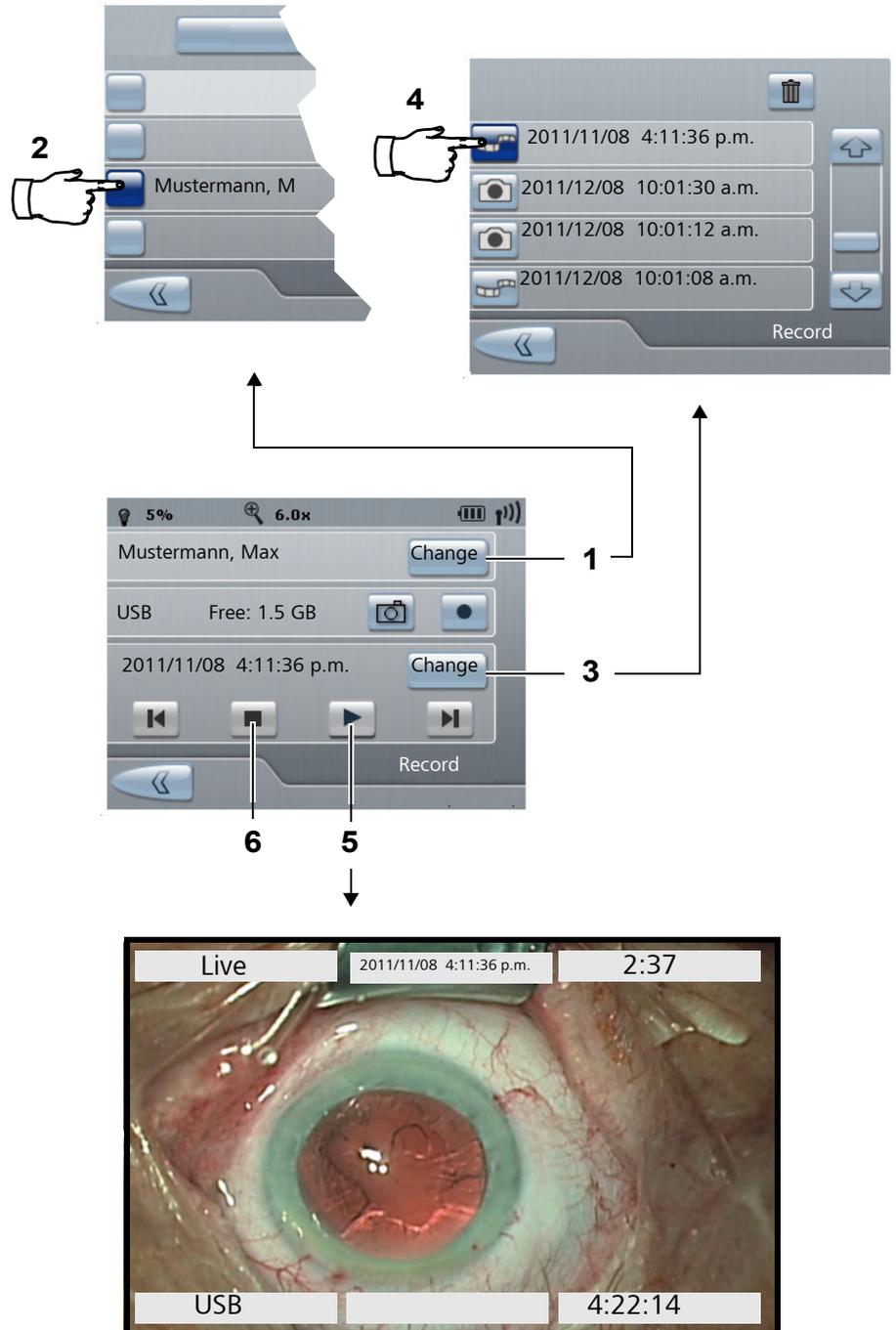
Viewing individual images (photos)
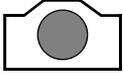
- Press the <Change> button (1).

  → The patient directory is opened and the available patients are displayed.

- Press the button (2) to activate the desired patient folder.

- Press the « button to return to the recording menu.

- Press the <Change> button (3).

  → The patient folder is opened and the available images and image files are displayed.

- Press the desired image file (e.g., 4).

- Press the « button to return to the Recording menu.

- To view the image, press the ▶ button (5).

  → The image is displayed on the video monitor (optional).

All images of this file can be viewed forwards and in reverse using the ⏮ ⏭ buttons.

- To end, press the ■ button (6).

  → The following message is displayed: "No patient is selected" (7).

Fig. 107: Viewing HD video

"No patient is selected" (7).
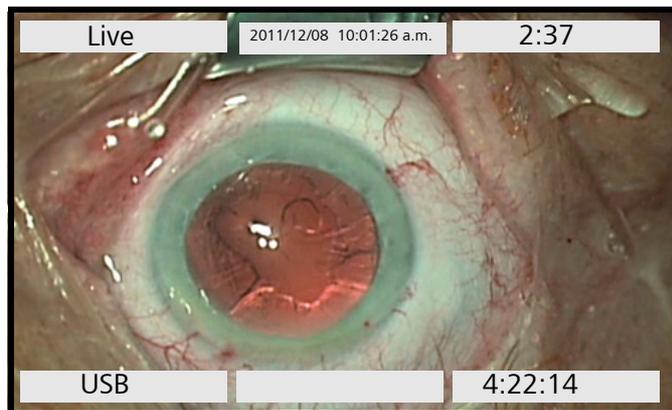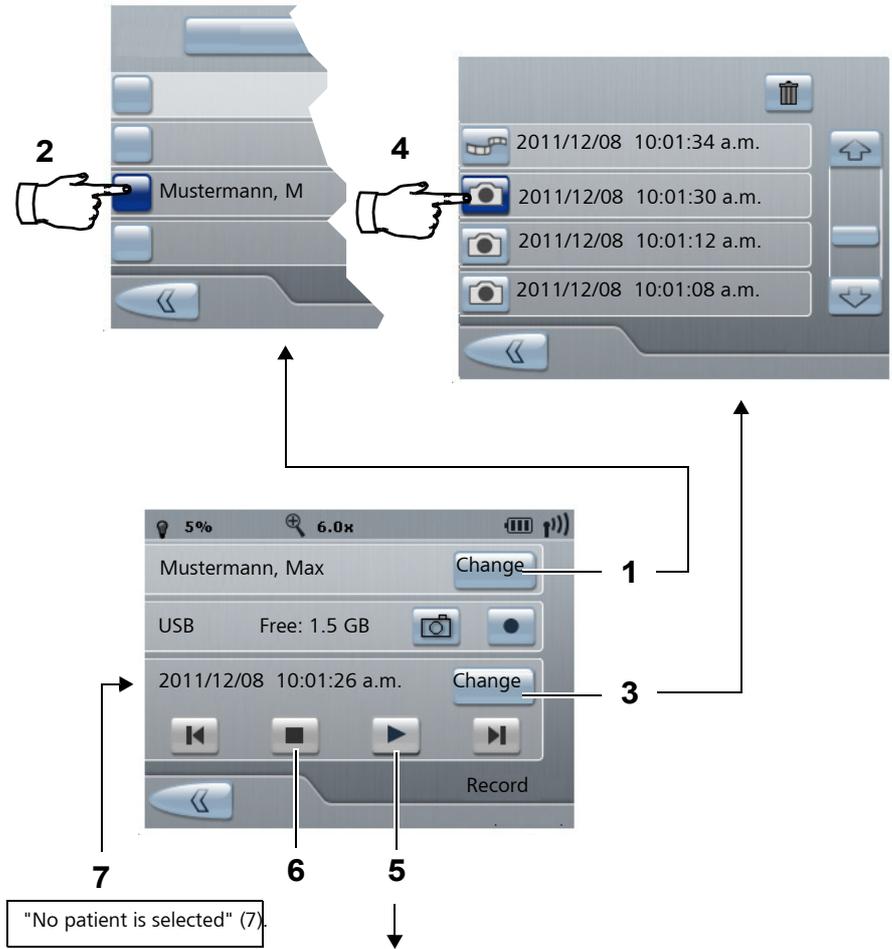
Deleting HD videos and individual images (photos)

- Press the <Change> button (1).

  → The patient directory is opened and the available patients are displayed.

- Press the button (2) to activate the desired patient folder.

- Press the ◁« button to return to the recording menu.

- Press the <Change> button (3).

  → The patient folder is opened and the available images and image files are displayed.

- Press the desired file (e.g., 4) that you would like to delete.

- Press the 🗑 button (5) to delete it.

  → A menu for the prompt (6) is displayed.

- Press <Yes> to delete the patient or press <No> to cancel the process.

Fig. 108: HD video or photos
Delete
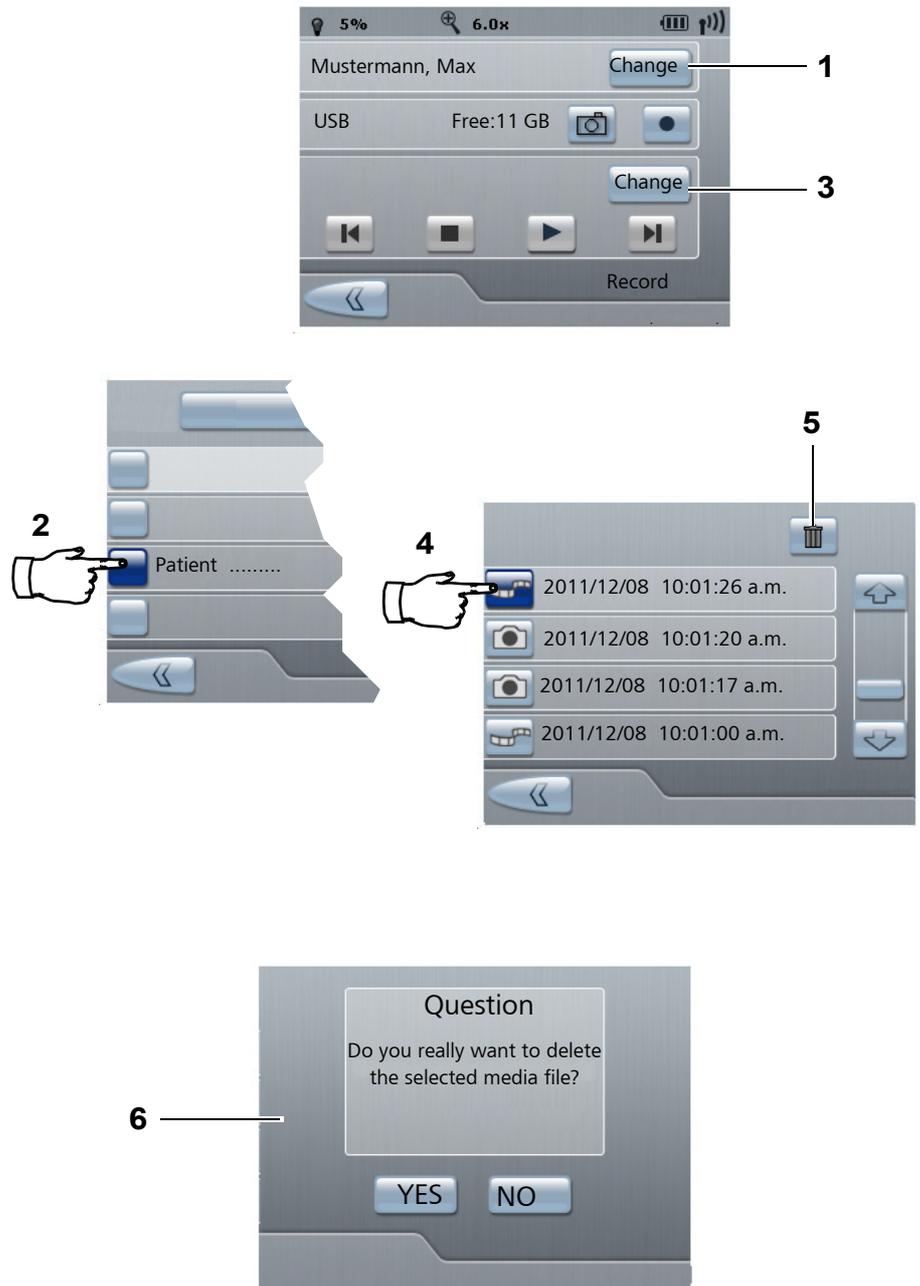
Integrated SD video and image acquisition system (optional)

All settings relating to the integrated SD video recording and image acquisition function are made in the "Recording" submenu.

Intended use

The integrated SD video and image acquisition function is intended to support visualization and enables data recording and output.

The integrated SD video and image acquisition function only makes sense in conjunction with a connected video monitor, since all configuration options and image information is only displayed on the video monitor.

Normal use

The integrated SD video and image acquisition function 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 unique, automatic storage of images and videos ensures reliable assignment to the relevant patient.

The unique, automatic storage of images and videos with time stamp ensures reliable assignment to the relevant patient.

CAUTION

Connection to data networks!

Use the LAN port only in combination with "galvanic network isolation for medical electrical equipment" in accordance with IEC 60601-1:2005.
The data network connector must have adequate protection against contact at the end of cable to the separator (network side), e.g., made of plastic material.
The cable and connector of the network connection must at least comply with Cat-5e EIA/TIA-568A-5, i.e. the more recent Class D values from IEC 11801:2002 or EN 50173-1:2002.

If an integrated PAL video camera is used, it is not possible to use an external NTSC video camera.

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	**System malfunctions!**

Computer viruses may cause system malfunctions.

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

NOTE	**USB data security!**

USB storage media are not suitable for 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/Capture/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.

Button functions on the 5.7" control panel

NOTE	**Device cannot be operated!**

- Do not edit, delete or view any video recordings while OPMI LUMERA 700 is in use.

<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 on the OSD (on-screen display), at the top right on the 5.7" control panel and on the overhead display.

- If you press the button again, the current video recording is stopped. The REC display disappears.

<Live> button
Closes all open dialogs and aborts all actions, <u>except</u> <record>.

- Press the button once to return to the live mode.

<Capture> button
Still images can be created both in the live mode and during video recording or playback.

- Pressing once activates the capture function (photo shown in top left: capture) and saves the image depending on the configuration.
Then the live image is displayed again.

<Play> button

- Press the <Play> button or select <Play> in the context menu.

  - Press once: "Pause", 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.

Fig. 109: Record tab 1

<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.

<Reset> button
If you press this button, the video recorder is reset without the need to fully reboot OPMI LUMERA 700.
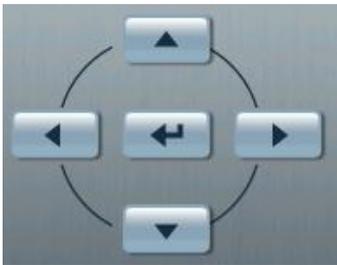
– <Select> control buttons (cursor buttons)
The ‹ › / ⌄ control buttons permit you to navigate in the menus displayed in the OSD.

– <Enter> button (↵)
Press this button to confirm your selection or to trigger a function.

Fig. 110: Record tab 2
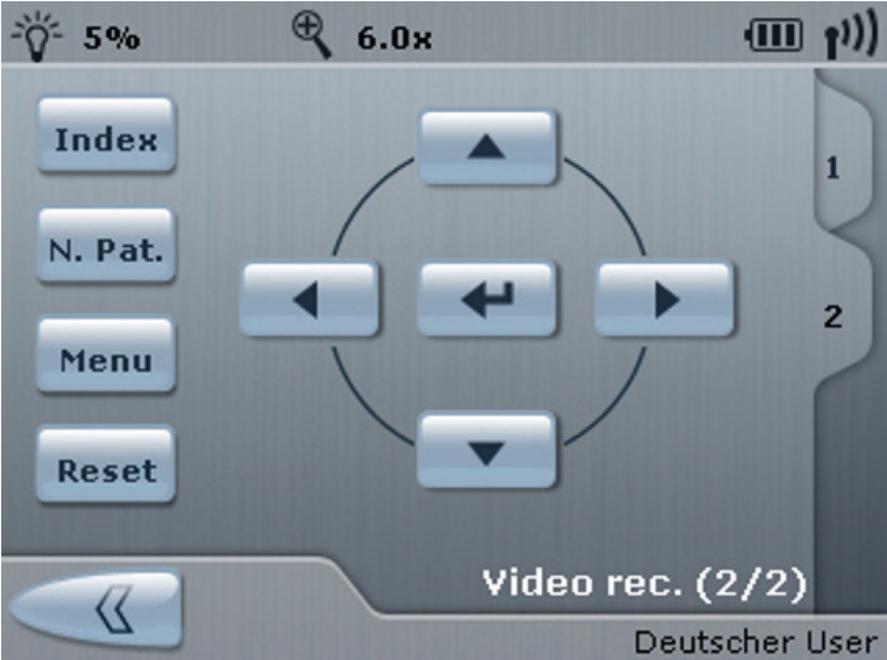
Menu functions on the video monitor

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.

*Fig. 111: Config menu
               Media*
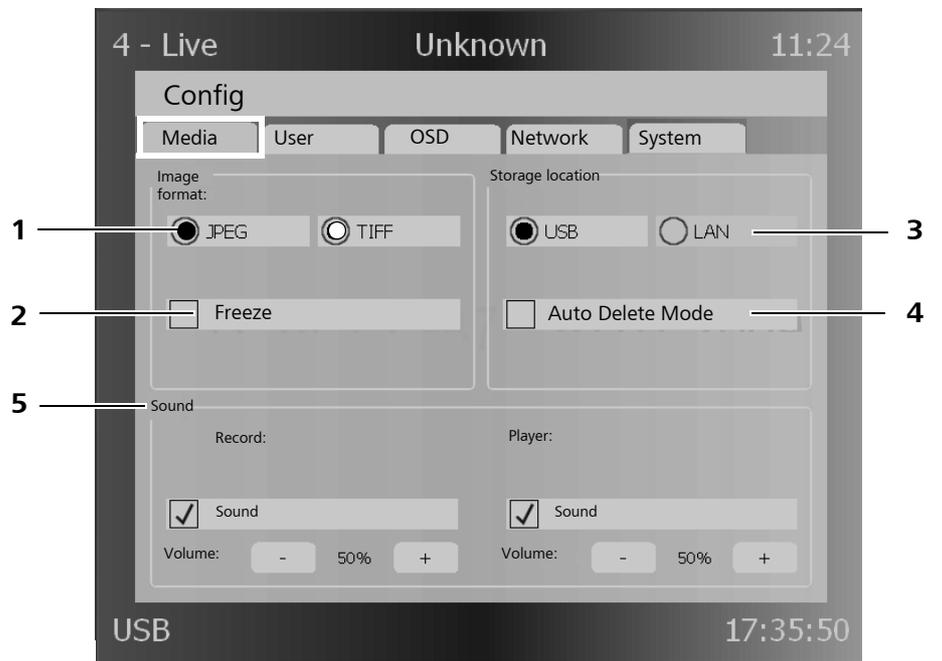
6 Language selection for OSD text
You can select the desired language in the "Language" dialog field.

7 Sounds
You can switch on/off the notification and acknowledgment sound in the "Sounds" dialog field.

8 Passwords (password protection see page 343)
A password prompt can be activated to restrict system access to authorized persons.

<OSD>

Video monitor

9 OSD position
Selecting the text field position on the optional video monitor:

– Standard display
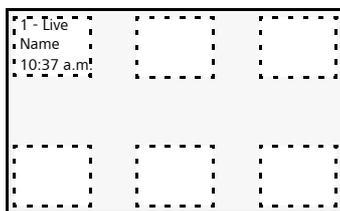
– Position selection:
Three OSD elements can be displayed in three lines at six different positions:
Top left - center - right; bottom left - center - right

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.

Fig. 112: Config menu
User and OSD

<Network>

To configure the network settings, you must log in as "Administrator": (Config/User/Passwords/Login). (Config/User/Passwords/Login).

11 <u>IP settings</u>
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 <u>Share</u>
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.

Fig. 113: Config menu
          Network

> To configure the system settings, you must 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 log files (no administration rights required)
Automatically generated log files can be saved on a USB stick/HDD as a password-protected ZIP archive. and can be sent to Carl Zeiss Service for evaluation.

USB

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
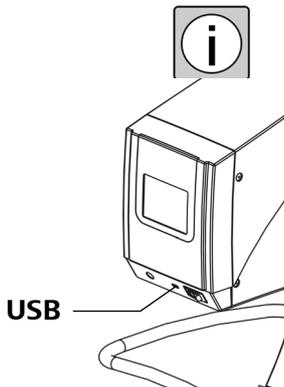
*Fig. 114: Config menu
System*

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 LUMERA 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.

Automatic
IP Address 1

Automatic
IP Address 2

Automatic
IP Address X

Automatic
IP Address Server
Video Recording

Router
provides
DHCP

Automatic
IP Address
Video Recording

Configuring the device

For the connection of your integrated video recording function via USB port 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. 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, you have to log in as administrator in the 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 CONFIG menu item.

- Navigate to the User tab.

- Select Login (1) to log in as administrator and to be able to access the network and system settings.

Fig. 115: User login
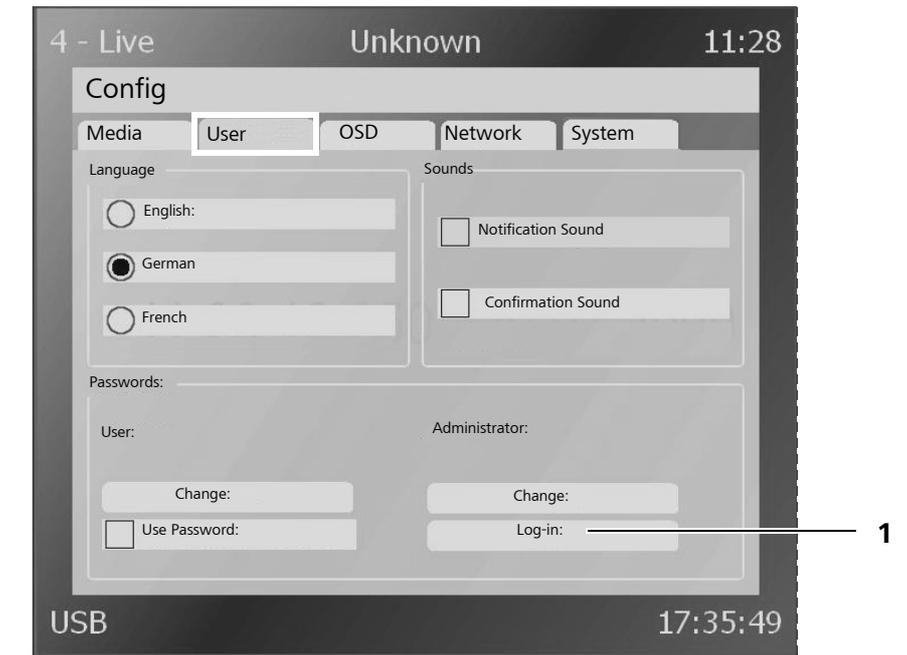
Configuring your computer for networking

Creating a directory The video recording function via USB port writes the video and image data to a directory defined by you in 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 in your computer!

- Enable the newly created directory for network access.

The video recording function via USB port has been factory-set in such a way that it looks for a shared directory named "medialink" (without quotation marks). If your shared directory has a different name, this name must be entered in the configuration mask of the video recording function via USB port.

Creating a user account To enable the video recording function via USB port to access the shared directory created by you, it must be able to log in to your computer. At the factory, the user name "MEDIALINK" and the password "MEDIALINK" have been preset for the video recording function (both in uppercase letters, without quotation marks).

- Create a user account in your computer using this name and password, or use a different account. If you use a different user account or password, you have to change the default settings in the video function recording configuration mask accordingly.

- Always press the "Apply" button to save the changes.

Fig. 116: IP settings

Connecting the surgical microscope for video recording to your network

The video recording function 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 OPMI LUMERA 700 to your network via the LAN connector (RJ45 Ethernet connector) on the back of the device.

→   If your network has been configured to accept DHCP and if no limitations exist, it should assign a unique IP address.

•   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. The illustration IP settings shows where you can find this information. The MAC address 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, 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 button for your changes to become effective!

Configuring the connection between the video recording function via USB port and your computer

After connecting OPMI LUMERA 700 to the network and successfully setting all network parameters, you have to configure the microscope 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 in the configuration mask (Fig. IP settings). 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 inquiries, you will receive a positive confirmation.

Fig. 117: IP settings

Presetting the storage device: USB or LAN

If you want the video recording function to store images and videos by default in the network configured by you, you have to set the appropriate configuration. The USB medium is the default storage device (see Fig. "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, OPMI LUMERA 700 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   When the video recording function 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 configuration" option in the tab shown in Fig. Exporting the configuration.

Fig. 118: Selecting storage
location

1

Fig. 119: Configuration
export
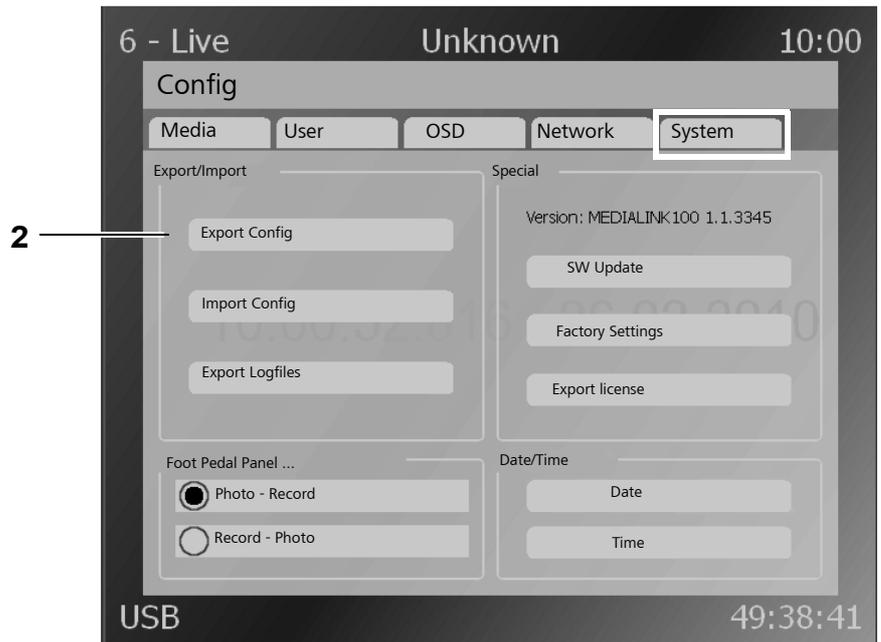
2

Checklist

- Always check the following points (without the patient) before using the device:

    – The OSD on the monitor functions correctly.

    – A USB storage medium has been connected and detected, or the network connection has been set up.

Recording photos

1 Live image

2 <Capture> button (photo function)

    – Active live image:

        • Press the <Capture> 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 <Capture> button once and the live image is frozen. Press the <Capture> button again; the displayed image is saved (2), then the live image appears again.

    – No saving:

        • Press the <Live> button and the live image is displayed again

3 <Index>
Graphic index of the current patient.
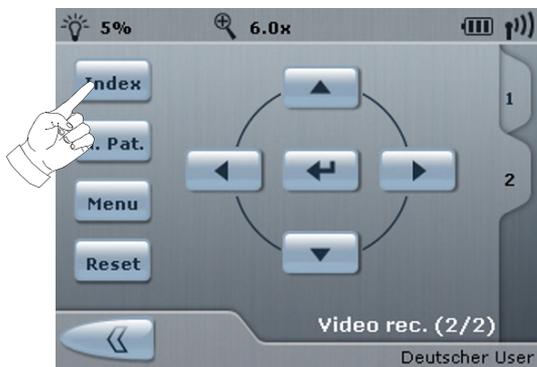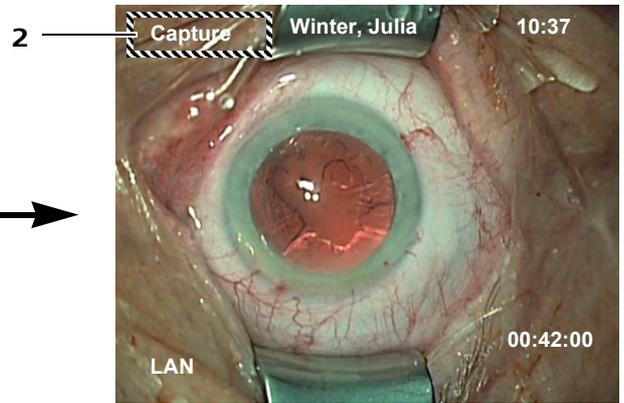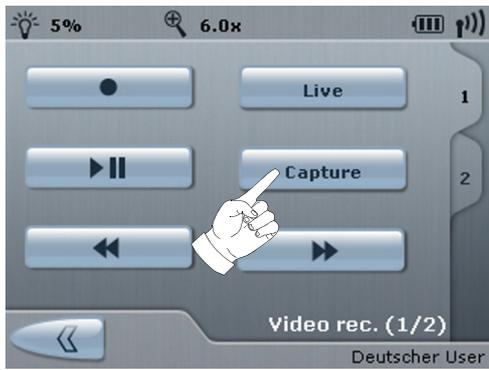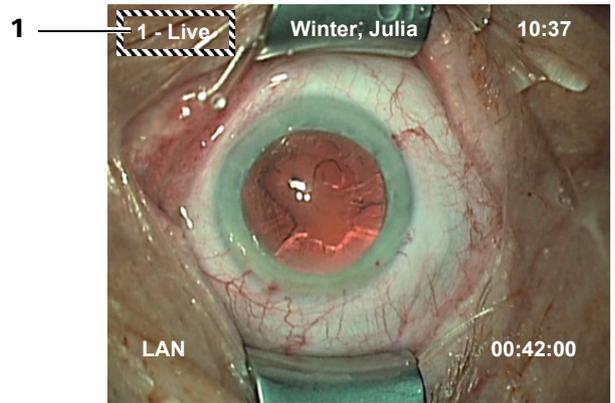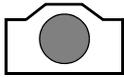
Recording videos

1 <u><Record> button (video function)</u>

• Press <Record> once.

→ Video (rec) is started; the video is saved in the graphic index of the current patient (2).

• Press <Record> again.

→ Video is stopped.

2 <u><Index></u>
Graphic index of the current patient.

During video recording, the capture function can be used to create additional single images (e.g., Capture 1 - Capture 4). These images can also serve as markers.
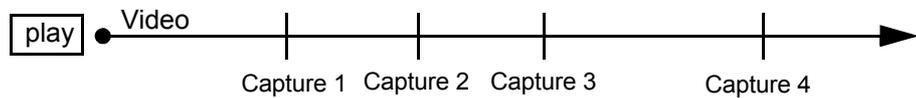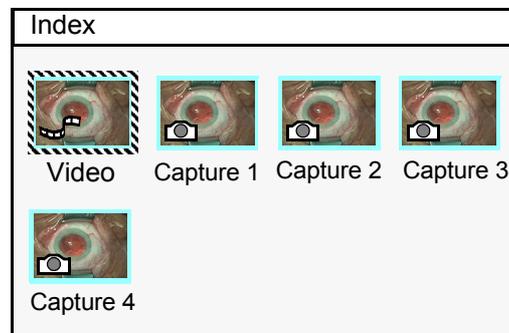
During video playback, the marked positions (e.g., Capture 1 - Capture 4) can be successively accessed using the cursor keys (⌄) on the control panel or using the remote control (⌄).
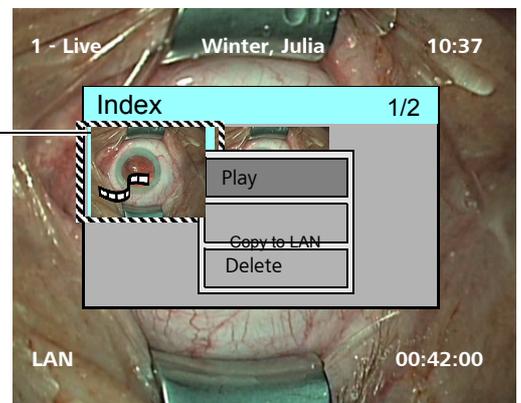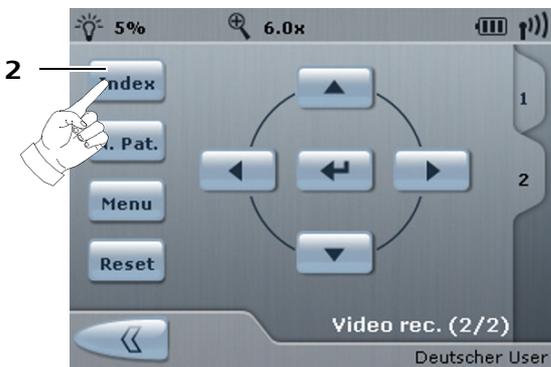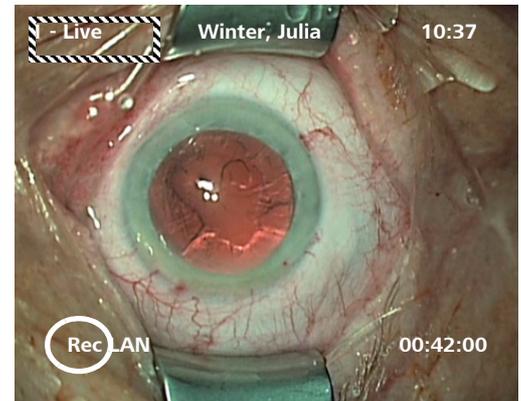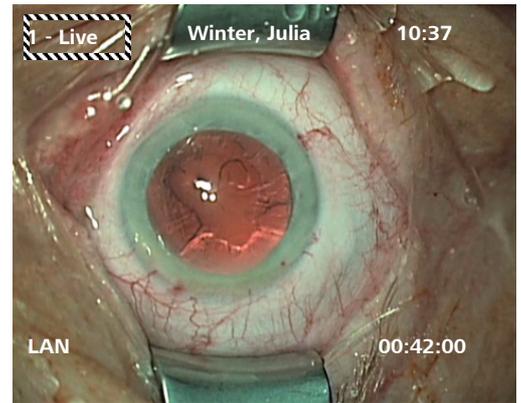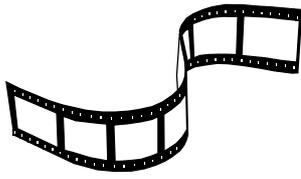
Viewing images / videos

<u><Index> thumbnail index of the current patient</u>

• Press the <Index> 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.

• When you click on the file, a context menu is opened for displaying, copying or deleting the file.

The USB or LAN storage device must be previously configured:
Menu / Config / Media / Storage Device : USB or LAN.

Fig. 120: Viewing images / videos
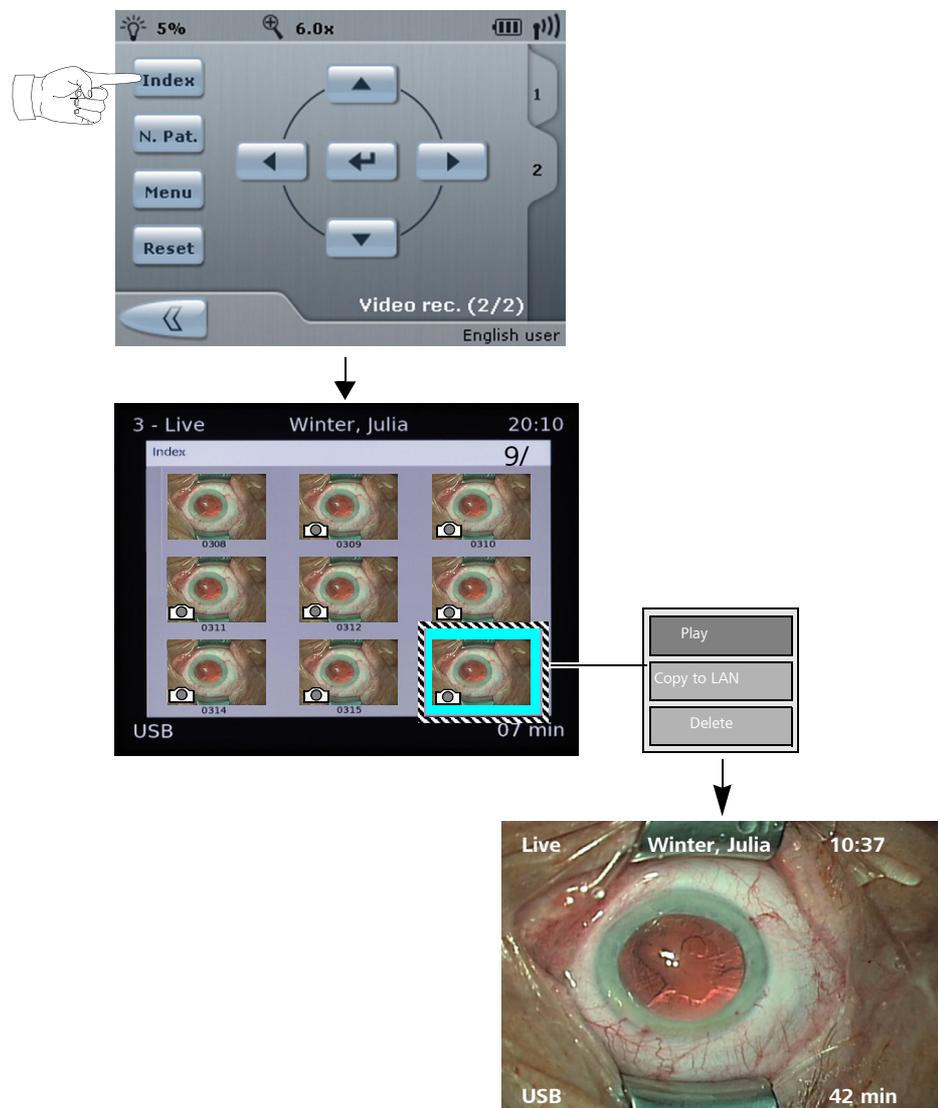
Importing images / videos

Import (<Menu> button)
> Displays all files of the non-active storage device (USB or LAN).

• Press the <Menu> button, open <Menu> , open <Import>.

• Select the folder required using the <Enter> button to display the thumb-nail index of the current folder.
Use the **< >** control buttons to select a video or image. A blue frame marks the selected file.

• When you press <Enter> after selecting the file, a context menu is opened for displaying or importing the file.

Fig. 121: Importing images / videos
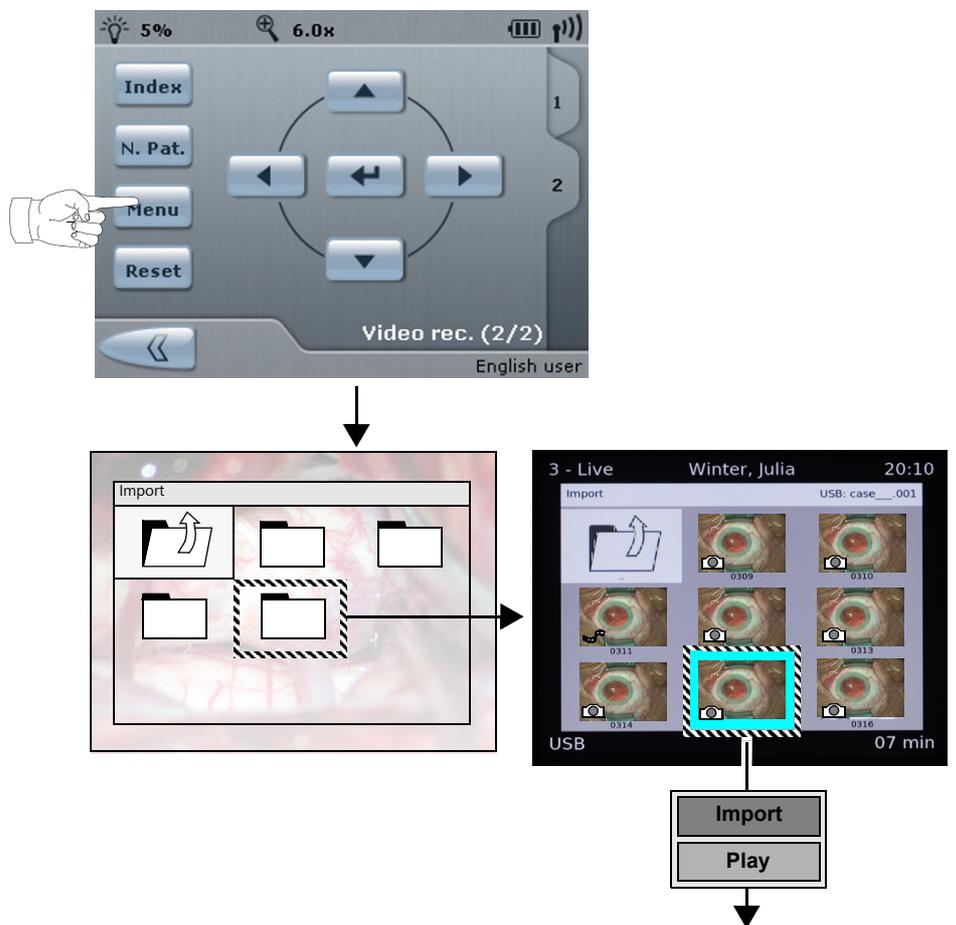
Managing patient data

– 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
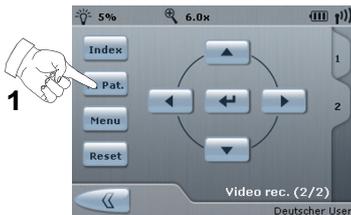
• Press <N.Pat> key (1).

• Open the <Patient> menu (3) using the ↵ button.

• Using the **< >-** control buttons, select the <New> submenu (4) and confirm with ↵.

→ A new patient directory "Unknown" is created on the external storage medium and used as the **current** patient.
You can rename the patient.

• Enter the patient's last name (5) and first name (6) via the keyboard displayed on the screen using the cursor buttons (**< >** or **⌄̂**).

Selecting a patient
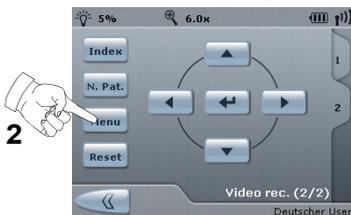
• Press <Menu> key (2).

• Open the <Patient> menu (3) using the ↵ button.

• Select patients in the <Select> submenu (7) using the control buttons **⌄̂** .

• Confirm selection with ↵.
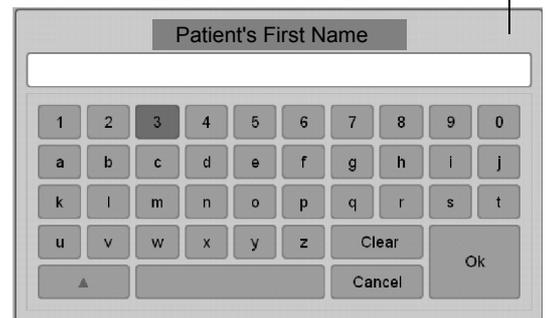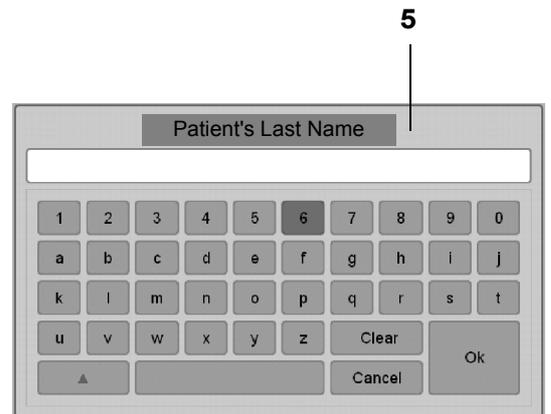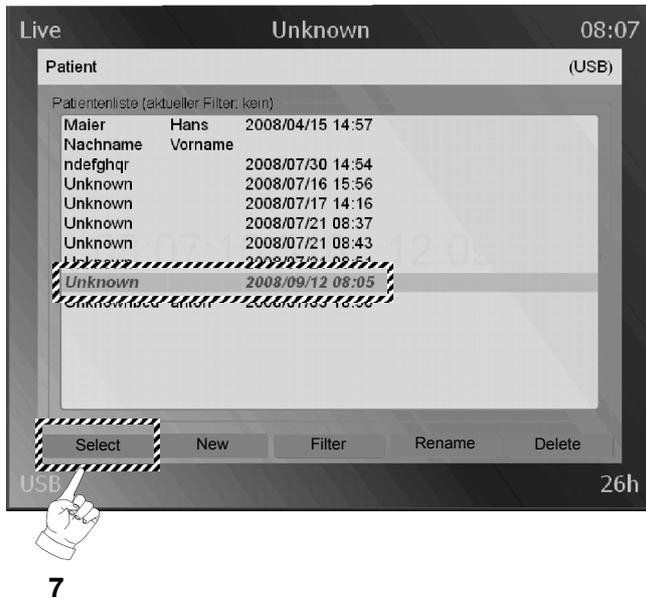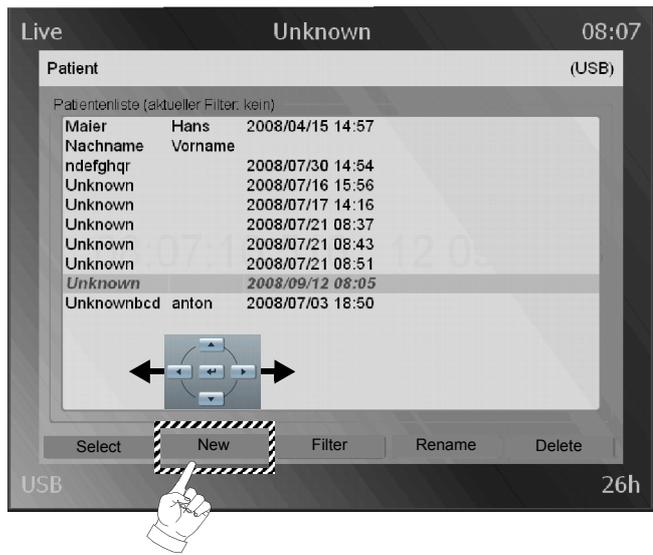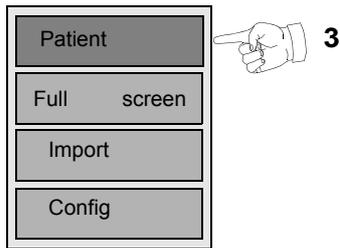
Searching for a patient (filter function)
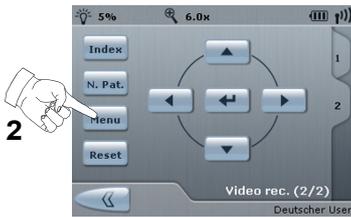
- Press <Menu> key (2).

- Open the <Patient> menu with ↵.

- Select the <Filter> submenu (8) with the ‹ › control buttons.

- Confirm with ↵.

- 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
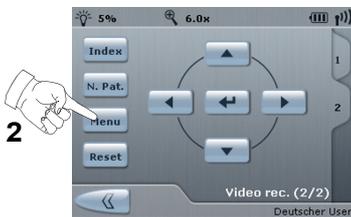
- Press <Menu> key (2).

- Open the <Patient> menu with ↵.

- Select the <Umbenennen> submenu (10) with the ‹ › control buttons.

- Confirm with ↵.

- Edit the last name (11) and first name (12) via the respective keyboard in the OSD.

Deleting a patient
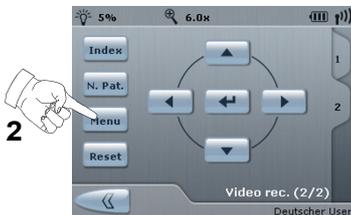
- Press <Menu> key (2).

- Open the <Patient> menu with ↵.

- Select <Delete> (13) using the ‹ › control buttons.

- Confirm with ↵.

  Select the patient to be deleted using the ↕ control buttons and delete the patient (14).

  An confirmation prompt is displayed, asking whether you really want to delete the patient. If you try to delete the current patient, the following message appears: The current patient cannot be deleted!
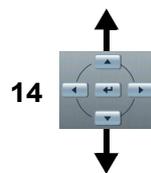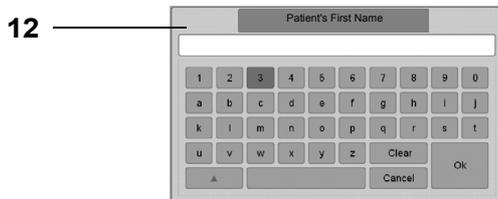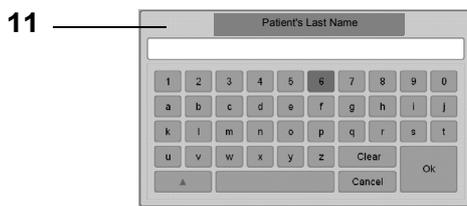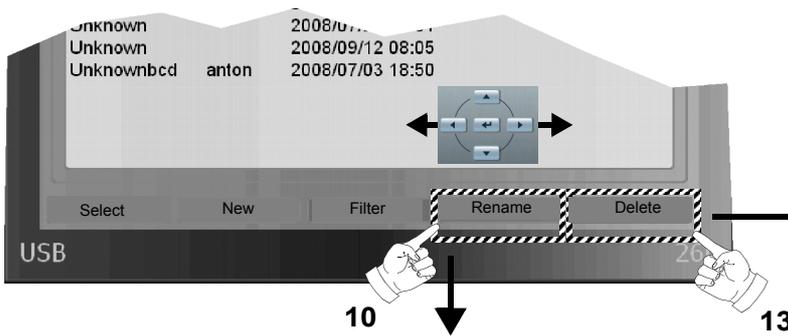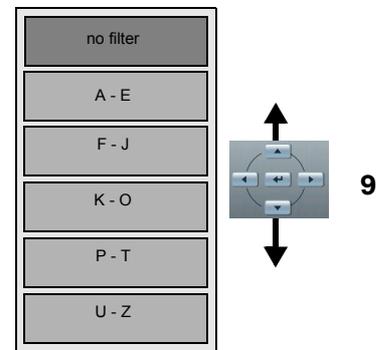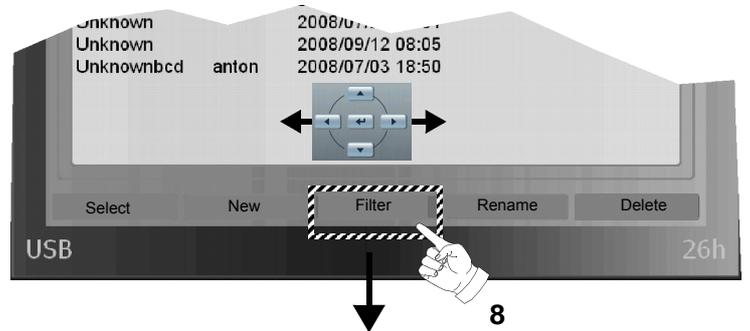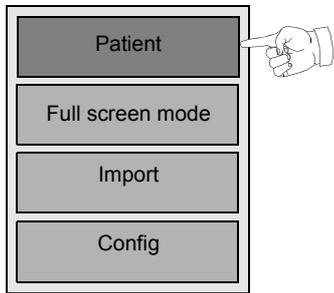
The image and video files are stored on the USB storage medium according to the following folder structure.

– 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.
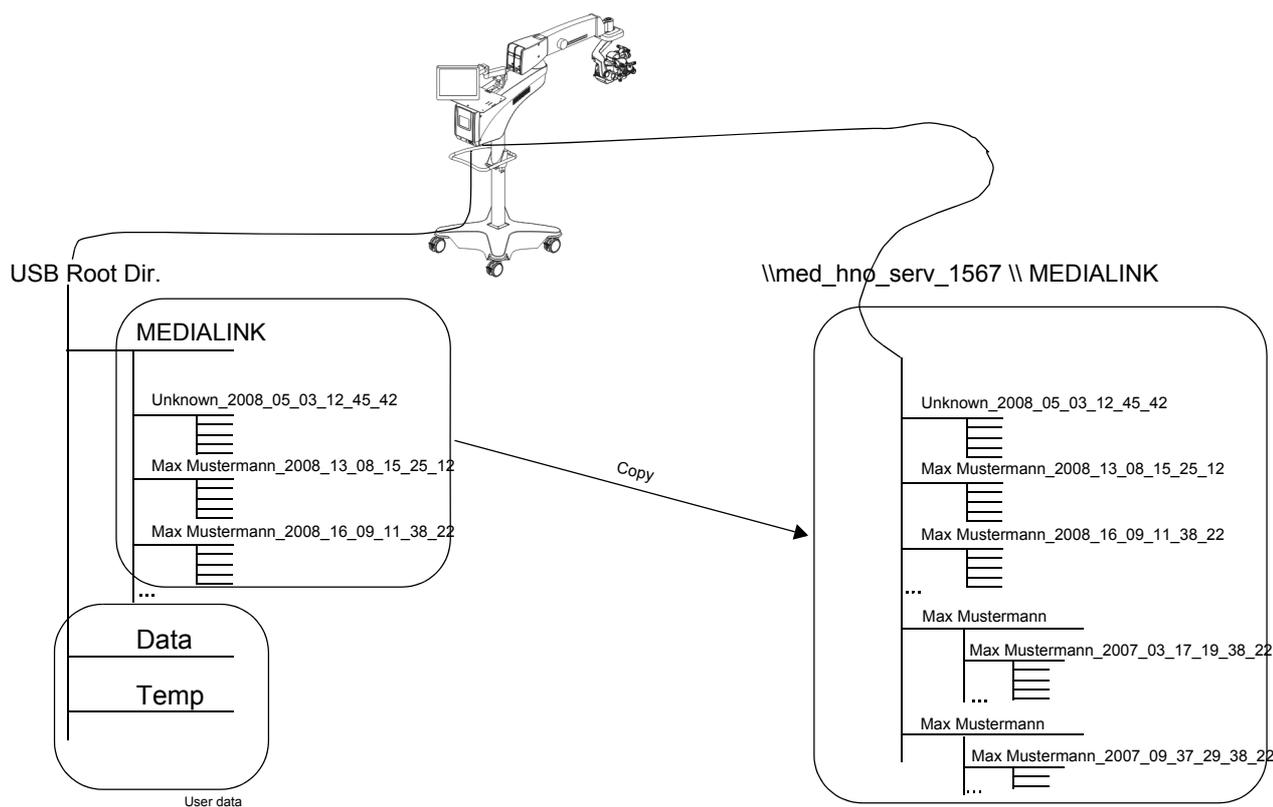
Importing patient data

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. For example, images or videos can be copied from the memory card of a camera via USB (connected non-Zeiss device) to a patient folder in the network (LAN).

The contents of the non-active storage medium (if connected) are displayed. Image and video files can be copied from there.

Only one USB storage medium (stick, memory card or external HDD) can be used at a time. 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 thumbnails or images. 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.

Play
Copy to LAN
Delete

- When you click on the file, a context menu is opened.

- Select "Copy to USB", to copy the selected data to the USB stick.

CALLISTO eye (optional)

Connecting the network between OPMI LUMERA 700 and CALLISTO eye

With the direct network connection between OPMI LUMERA 700 and CALLISTO eye (optional, the two devices must first be interconnected using a LAN cable. Afterwards, OPMI LUMERA 700 must be switched on and then CALLISTO eye.

In the "Network" submenu (Main menu > Tab 2 > System Config > Tab 1 > CALLISTO eye), you can connect the surgical microscope to CALLISTO eye. The network connection can only be configured if the system is connected to CALLISTO eye via a network cable.

Select one of the procedures described below:

Network connection via a dynamic IP address

A dynamic IP address is an IP address which is assigned automatically by an address service available in the network (DCHP server) to the requesting device. The entry buttons "IP Address", "Subnet Mask" and "Gateway" are disabled when dynamic address assignment is selected.

- Press tab [2] in the main menu.

- Press the "System Config" button.

- Press tab [2] in the "System Settings" menu.

- Press the <CALLISTO eye> button.

  → The "CALLISTO eye" submenu is displayed.

- Press the <Netzwerk> button.

  → The "Network" submenu is displayed.

- Press the <DHCP> option.

  → The option ist active when the option lights up blue amd the "IP Address", "Subnet Mask" and "Gateway" entry buttons are disabled.

- Perform a connection test (see page 383).

Network connection via a static IP address

Static IP addresses are fixed IP addresses which are assigned to a system on a permanent basis (recommended operating mode). The data required for this purpose (IP address, subnet mask, gateway and computer name) will be communicated to you by your IT administrator.

Names and addresses may not be multiply assigned! They must occur only once in the network.

- Press tab [2] in the main menu.

- Press the "System Config" button.

- Press tab [2] in the "System Settings" menu.

- Press the <CALLISTO eye> button.

  → The "CALLISTO eye" menu is displayed.

- Press the <Netzwerk> button.

  → The "Network" menu is displayed.

- Deactivate the <DHCP> button (if this has not already been done).

- Activate the entry box for the IP address.

→ The keyboard dialog for the entry of the local, valid IP address is opened.

• Enter the static IP address to be used. Only numeric entries with the following syntax are possible: <No.>.<No.>.<No.>.<No.> (No. ranging between 0 and 255).

• Save the IP address by pressing the ⊟ button.

→ The IP address is saved.

• Return to the "Network" menu by pressing the « button.

→ The "Network" menu is displayed again.

• Repeat the last four steps to enter the "Subnet Mask", "Gateway" and "Computer Name".

• Perform a connection test (see page 383).
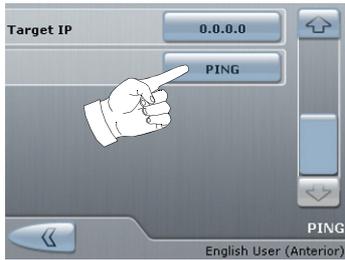
Test network connection

During the connection test, the valid IP addresses (target IP) with the subnet masks, gateways and open ports are checked.

• Scroll down in the "Network" menu.

→ The "PING" menu is displayed.

• Press the "0.0.0.0" button of the target IP.

→ The keyboard dialog for the entry of the target IP is opened.

• Enter the target IP of the ICC from which you want to control the surgical microscope.

• Press the ⊟ button to save the target IP.
If you do not want to make any changes, press the « button.

→ The "PING" menu is displayed again.

• To test the connection, press the "PING" button.

→ The following messages appear:
Ping result - Ping successful or
Ping result - Ping failed

→ If the connection has been successfully set up, the "Lumera 700" button on the ICC monitor is displayed in blue.

• If the connection test failed, check your target IP and, if necessary, the subnet mask and gateway.

Network connection to Callisto eye (optional)

Changing the CALLISTO eye network connection(optional)

*   Press the <System Config> button in the main menu.
    <CALLISTO eye>.

    → The "CALLISTO eye" menu is displayed.

*   Activate the "Change" button.

    → A keyboard dialog is displayed.

*   Enter an OR name.
    The OR name must be identical with the OR name of the ICC to which you want to connect.

*   Press the 🖫 button to save the name.
    If you do not want to change anything, press the « button.

    → The "CALLISTO eye" menu is displayed again.

*   Press the 🖫 button to save the change.

    → The following message is displayed "Info - System restart required for saving!".

*   Confirm with "Yes". The system is then restarted and the settings are saved.

    or

*   Confirm with "No". The changes are not applied and the system displays the "CALLISTO eye" menu.

Enabling the network connection to Callisto eye (optional)

After setting up the network connection with CALLISTO eye, you can transfer operation to the ICC of CALLISTO eye by enabling the network connection on the 5.7" control panel of the surgical microscope.

After the network connection has been enabled, the 5.7" control panel is disabled, and the system can only be operated via the foot control panel and the ICC.

- Press the <Connect> button to enable the network connection.

  → The message "Info - the system is enabled for remote control" and the active connection x.x.x.x" is displayed.

  → If you press the <Trennen> button, the network connection with CALLISTO eye is interrupted and the system continues to operate in the standalone mode.

On separation of the connection and return to the standalone mode, the user who was active on the surgical microscope before the network connection was set up becomes active again on the surgical microscope. Any change of user performed on CALLISTO eye is not adopted.
However, microscope settings may have been changed and must therefore be checked before the microscope is used in order to avoid any unforeseen behavior of the system.

<mark>35.1.</mark> <mark>Controlling OPMI LUMERA 700 using CALLISTO eye (optional)</mark>

<mark>The optional Remote function allows OPMI LUMERA 700 surgical microscope to be networked with CALLISTO eye. This function enables the configuration / remote control of various functions of the surgical microscope via the Ethernet interface and use of the system for documentation purposes.</mark>

After the network connection has been configured on the surgical microscope (see page 380) and enabled by the user (see page 385), a function and configuration menu for OPMI LUMERA 700 is available on CALLISTO eye.

NOTE	Wrong assignment of the control functions can lead to unexpected behavior of the remotely controlled system during remote operation.

- Before each use and without a patient, ensure that the remotely controlled system is fully functional and that the remote function works properly.

Configuration via "CALLISTO eye"

The configuration menu enables the user to save OPMI LUMERA 700 customized system settings for any number of users in the CALLISTO eye system. The configuration menus feature the following submenus organized in individual panels:
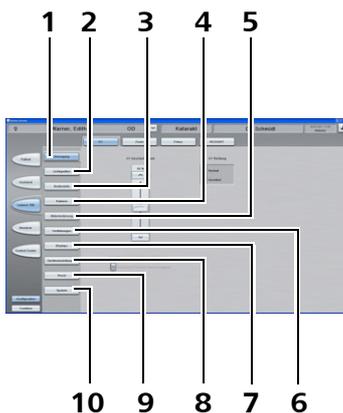
1 Configuring movement (see page 389)

- XY (speed, XY direction, links)

- Zoom (speed, zoom value, links)

- Focus (speed, fast focus, Deep View, links)

- RESIGHT (speed, two-step speed)

2 Configuring the light sources (see page 391)

- Slit illumination (light intensity, slit width, slit direction, status)

- SCI (combination ratio)

- OPMI light (light intensity, initial status, filter)

- Additional light (light intensity, initial status, filter)

- Keratoscope (light intensity, initial status, links)

3 Configuring the controls (see page 392)

- Foot control panel buttons and rocker switches

- Handgrip buttons

4 Configuring the camera (see page 392)

–   Settings (exposure mode, light meter, load anterior or posterior default settings, brightness, hue, ..)

–   Video input port (external, internal)

–   White balance

5 Configuring the image orientation (see page 395)

–   Normal/inverted

6 Configuring the links (see page 395)

7 Configuring the display (see page 397)

–   IDIS (layout, brightness, parameter assignment)

–   Additional display (brightness, status)

8 Configuring the device settings (see page 399)

–   Device settings (user profiles)

–   Workflow steps

–   RESIGHT function

9 Configuring the reset function (see page 399)

10 Configuring the system (see page 400)

–   Optics (eyepiece, objective lens, tube)

–   HD 3CCD camera (resolution, format)

–   Importing user data

–   Importing log files

NOTE	• If there are any problems with the power network, change to the standalone mode by unplugging the power plug and thus disconnecting the system from the power network.

1 2 3
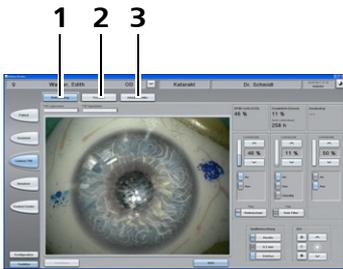
Control via "CALLISTO eye"

The function menu permits the user to perform customized settings on the OPMI LUMERA 700 and monitor instrument statuses, such as the signal strength of the wireless foot control panel.

The function menu has the following tabs:

1 Setting the illumination (see page 402)

– OPMI light (light intensity, status, filter)

– Additional light (light intensity, status, filter)

– Keratoscope (light intensity, status)

– Slit illumination (slit position, slit width, status)

– SCI (combination ratio)

– Start/stop video recording

– Show/hide IDIS

2 Setting position (see page 403)

– Focus (fast focus, Deep View, focus value)

– Zoom (system magnification, zoom value)

– Position (VISULUX, XY control)

– Start/stop video recording

– Show/hide IDIS

3 Setting workflow steps (see page 403)

– Sorting workflow steps

– Start/stop video recording

– Show/hide IDIS

Configure movements (XY, zoom, focus, RESIGHT)

The <Movement> (1) configuration menu is divided into four tabs in which you can specify user-specific settings for the XY coupling, zoom, focus, RESIGHT

1 2
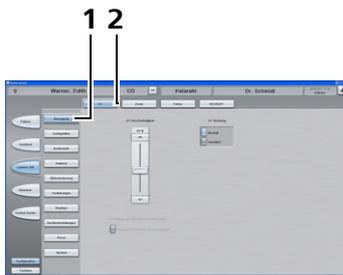
Tab <XY> (2)

Configuring XY speed
- Press the [⌃] arrow button to increase the XY speed and the [⌄] arrow button to reduce it. The XY speed is continuously variable from 1% to 100% in 1% steps.

Configuring the XY direction
- Press the <Normal> button to move the XY coupling in the usual direction or the <Invert> to move the XY coupling in the opposite direction.

Settings from the Links menu
The "Links" menu indicates whether the zoom is coupled with the XY focus speed.

3
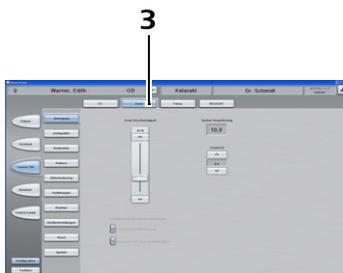
<Zoom> tab (3)

Setting the zoom speed
- Press the [⌃] arrow button to increase the zoom speed and the [⌄] arrow button to reduce it. The zoom speed is continuously variable from 1% to 100% in 1% steps.

Setting the zoom value
- Press the [⌃] arrow button to increase the start value and the [⌄] arrow button to reduce it.

The "System magnification" display (total system magnification) is automatically adjusted to the changed zoom value. For correct calculation of the total magnification, the system components - eyepieces, tube and objective lens - must have been correctly set (see page 174).

Settings in the Links menu
The "Links" menu indicates whether the following components are coupled:

– Zoom and assistant zoom

– Zoom and XY/focus speed

4
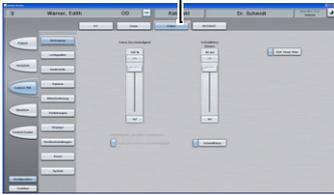
<Focus> tab (4)

Setting the focus speed

- Press the [↑] arrow button to increase the focus speed and the [↓] arrow button to reduce it. The focus speed is continuously variable from 1% to 100% in 1% steps.

Setting the fast focus distance

The system enables fast positioning of the surgical microscope. The surgical microscope moves from its current focus position upward by max. 40 mm (or to the respective limit stop).

- Press the <Fast focus> button to activate or deactivate the fast focus.

- Press the [↑] arrow button to increase the fast focus distance and the [↓] arrow button to reduce it. The fast focus distance is continuously variable from -30 to +40 mm in 1 mm steps. The fast focus distance preset at the factory is 40 mm.

18. Activating / deactivating the DoF Deep View function
This function enables the selection between optimum light transmission and maximum depth of field. When the depth of field management is deactivated (button appears light gray), the microscope is optimized for light transmission. When this function is activated (the button appears light blue), the microscope is automatically set to optimum depth of field in accordance with the selected magnification.

- Press the <DoF Deep View> button to activate or deactivate the depth of field management.

Settings in the Links menu

The "Links" menu indicates whether the zoom speed is coupled with the XY/focus speed.

5

<RESIGHT> tab (5)

Here you can user-specifically set the speed of the internal focus of the RESIGHT 700 fundus imaging system.

Set speed

- To increase the RESIGHT focus speed, press the [↑] arrow key; to reduce it, press the [↓] arrow key. The speed is continuously variable from 10 to 100% in 10% increments.

Set two-level speed

- Tap on the <On> button to activate the two-level speed.

- Tap on the <Off> button to deactivate the two-level speed.

Configuring the light sources

The <Light sources> (1) configuration menu consists of the "Illumination" tab. Here, you can set various start values for the slit illumination, SCI, OPMI light, additional light and keratoscope.

1 2
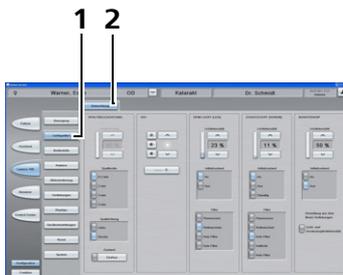
<Illumination> tab (2)

Set light intensity
- To increase the light intensity, press the [^] arrow key and to reduce it press the [v] arrow key. The light intensity is continuously variable from 0% to 100% in 1% increments.

Swinging filters in/out of the beam path
- Press the respective filter button to swing a filter in or out.

Setting the SCI illumination mode
- Use one of the following buttons to set a defined SCI illumination mode:
    - Red reflex illumination
    - Red reflex / surrounding field illumination
    - Surrounding field illumination

- To change the combination ratio of the red reflex/surrounding field illumination, press the   button. Change the values by pressing the [^] or [v] arrow key under the "SCI" logo. To save the new combination ratio, press the <Set> button.

Switching the slit illuminator on / off
- Tap on the <On/Off> button under "Status" to activate or deactivate the slit illumination.

Setting the slit illuminator's light intensity
The slit lamp must be switched on to set the light intensity.

- To increase the light intensity, press the [^] arrow key; to reduce it press the [v] arrow key. The light intensity is continuously variable from 0% to 100% in 1% increments.

Setting the slit width and direction
- Press the respective button to set the slit width or direction.

Settings in the "Links" menu
Here you can see whether the light intensity of the keratoscope is coupled with the main lighting of the surgical microscope in the "Links" menu.

Configuring the controls

The <Controls> configuration menu (1) permits you to configure the hand-grips on the surgical microscope and the buttons and rocker switches on the connected foot control panel.
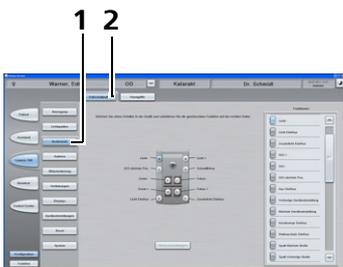
<Foot control panel> tab (2)

Configuring buttons and rocker switches
• Tap on one of the buttons in the graphic to select the desired function. Using the [^] and [˅] arrow keys, scroll up or down to see all functions.

Resetting to factory settings
• Press the <Factory Settings> button to reset all rocker switches and buttons to their delivery status.
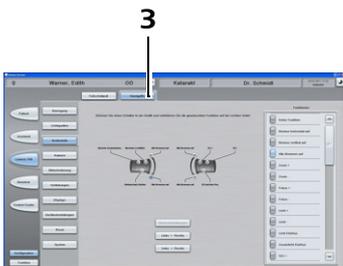
<Handgrips> tab (3)

Configuring the handgrips
• Tap on one of the buttons in the graphic to select the required function. Using the and arrow keys, [^] oder [˅] scroll up or down to see all functions.

Resetting to factory settings
• Press the <Factory Settings> button to reset all buttons to their delivery status.

Configure Camera

In the <Camera> (1) configuration menu, you can configure the camera settings of the SD 3CCD or HD 3CCD camera integrated in the surgical microscope. In addition, you can assign the camera with the <Anterior> and <Posterior> user profiles. Default settings for both user profiles have been preset at the factory to optimally adjust the camera to the requirements of the surgical situation.
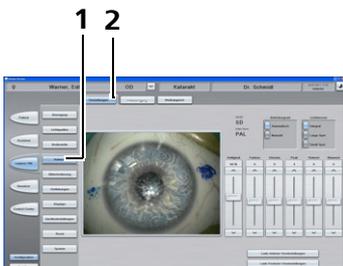
<Settings> tab (2)

You can select between a manual exposure setting and an automatic exposure control of an integrated SD 3CCD or HD 3CCD camera.

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 pre-selected 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%.

Setting automatic exposure control

- Press the <Automatic> button to activate the automatic exposure control.

  → Automatic exposure control is active if the button is light blue and the display of the brightness setting range changes from exposure time (seconds) to percent (%).

- Select a metering method in the "Light meter" field.

  - "Integral" (standard)
    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 (large spot or integral) or use the manual exposure mode.

Setting manual exposure control

- Press the <Manual> button to activate the manual exposure setting.

  → Manual exposure control is active if the button is dark blue and the display of the brightness setting range changes from percent (%) to exposure time (seconds).

- Move the slider to the required exposure value. You can adjust the brightness of the video image continuously between 1/10000s and 1/8s. An exposure time in the range between 1/50 and 1/30 usually provides optimum exposure results.

Setting hue and chroma (color saturation)

- Press the ⌃ arrow button to increase the hue or chroma and the ⌄ arrow button to reduce it. The values are continuously variable from 0% to 100% in 1% steps.

Setting the peak (brightness control)
- Press the [∧] arrow button to increase the brightness control and the [∨] arrow button to reduce it. The values are continuously variable between 0 and +8.

Setting the red and blue value
- Press the [∧] arrow button to increase the red and blue value and the [∨] arrow button to reduce them. The values are continuously variable between -10 and +10.

Loading default settings
- Press the <Load Anterior Default Settings> button to set the SD 3CCD or HD 3CCD camera for applications in the anterior segment of the eye.

- Press the <Load Posterior Default Settings> button to set the SD 3CCD or HD 3CCD camera for applications in the posterior segment of the eye.

2

<Video input port> tab (2)

You can switch between an internal and external video input port signal.

- Press the <Internal> or <External> button to activate the corresponding video input port.

  → The respective video input port is activated if the button is highlighted in light blue.

3

<White Balance> tab (3)

In the white balancing procedure, the system adjusts the video signal in such a way that white areas in the surgical field are also white on the monitor.

Complete the following steps before you start the white balance procedure:

- Place a sheet of white paper under the microscope.

- Focus the microscope.

- Switch on all light sources required

- Swing filter in or out of the beam path.

- Focus on the object.

- Press the <Start> 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 was unsuccessful, verify the settings described above and repeat the white balancing procedure.

Configure image orientation

In the <Image Orientation> configuration menu (1), you can configure the image inversion of the SD 3CCD or HD 3CCD camera integrated in the surgical microscope. You can select whether the image on the video monitor and the Invertertube E is to be inverted. This function offers the advantage that an upside-down image resulting, e.g., from the use of a fundus imaging system with inverting optics is displayed in the correct orientation.

1 2
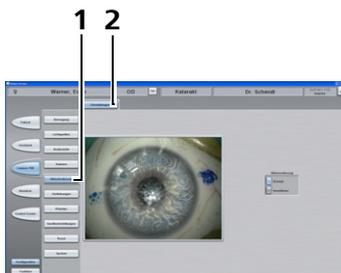
<Settings> tab (2)

Configure image inversion

• Activate the <Normal> button to retain the normal image setting or activate the <Inverted> button to display the image rotated by 180°.

Configuring links

1
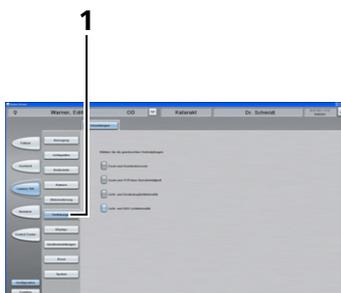
The <Links> configuration menu (1) permits you to activate or deactivate the following settings:

– "Zoom and Assistant Zoom" - couples the zoom system of the assistant's microscope to the main microscope.

– "Zoom and XY Focus Speed" - couples the speed of the XY coupling and focus to the current zoom value. This facilitates focusing on object details, as the preset focusing speed is automatically reduced at higher magnifications.

– "Light and Keratoscope Intensity" - couples the light intensity of the keratoscope to the SCI illumination.

– "Light and IDIS Intensity" - couples the light intensity of the integrated data injection system to the SCI illumination.
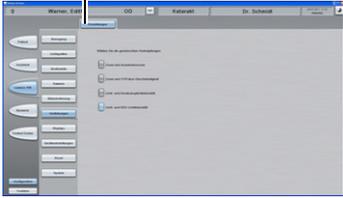
<Settings> tab (2)

Selecting links

- Press the respective button to activate or deactivate links.

→ A link is active when the button lights up in light blue.

→ A link is inactive when the button lights up in gray.

Configure display

The <Display> configuration menu (1) consists of the "IDIS" and "Additional Display" tabs. Here you can configure the display settings for the data injection and the additional display.

1 2
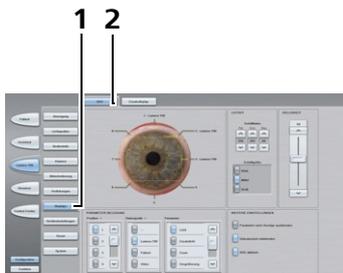
<IDIS> tab (2)

Setting the parameter assignment
Here, you can assign the IDIS parameters that can be injected with individual positions (1 - 8) on the patient's eye. To do this, proceed as follows:

• In the "Position" menu, select a position between 1 and 8. Using the
  arrow buttons, you can scroll up or down to display the hidden positions.

• Select one of the following data sources:

  – Lumera 700

  – Patient (patient data)

  – Video (video recording)

• Set the parameter of the selected data source.

  – After selecting the "Lumera 700" data source, the following parameters are available: "Light, additional light, zoom, magnification, FCP signal strength, FCP charge state"

  – After selecting the "Patient" data source, the "TIOL angle" parameter is available. The TIOL angel is the angle in which a toric lens is to be implanted.

  – After selecting the "Video" data source, the "Recording status on/off" parameter is available.

• Repeat the points described above until you have assigned all the required parameters with the respective positions.

Configuring other settings
• Activate or deactivate the following settings by pressing the respective button.

  – Hide parameters after display
    If this switch is set, the corresponding parameter is only displayed for a change and is hidden again after a few seconds.

  – Show video area
    Shows a frame in the IDIS that shows the surgeon which area of his field of view is also visible in the video (and can also be recorded).

– IDIS activated
Indicates whether the IDIS in this device setting or workflow step is to be activated or deactivated. The setting is only used if a user switches back and forth between his device settings. When the user is changed, the IDIS is switched off at first, depending on the setting made here.

Setting the layout
• Press the [⌃] , [⌄] arrow buttons to change the font color of the elementary colors red, green or blue. The font color is continuously variable between 0 and 255.

• Press the <Small>, <Medium> or <Large> button to set the font size.

Setting the brightness
• Press the [⌃] arrow button to increase the brightness and the [⌄] arrow button to reduce it. The brightness is continuously variable from 0% to 100% in 1% steps.

3
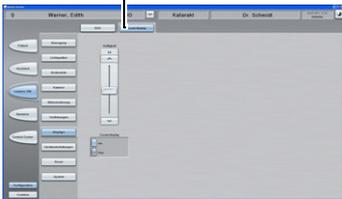
<Additional Display> tab (3)

Additional Display On/Off
• Press the corresponding button to activate or deactivate the the additional display.

Set brightnes
• To increase the brightness, press the arrow key; [⌃] to reduce it press the arrow key [⌄]. The values are continuously variable from 0 to 100% in 1% increments.

Configure system settings

The <Device Settings > configuration menu (1) consists of the "Settings" tab. Here, you can access the user of the surgical microscope and his/her user profile (device settings). In addition, you can compile the user profiles into a user-specific workflow step. This provides you with the optimum device setting during various surgical phases at all times.

To switch between the individual profiles, press the respective configured button on the foot control panel or press the respective configured handgrip.

1 2
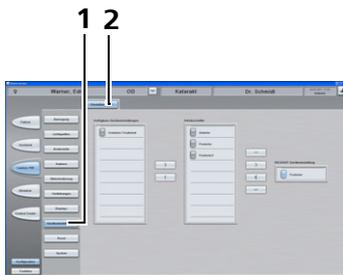
<Settings> tab (2)

Insert and sort workflow steps
• Under "Available Device Settings", mark the user profile to which you wish to assign the workflow.

• Press the ⌞ > ⌝ arrow key.

• Specify the order of the workflow by marking a user profile and pressing the ⌞ ^ ⌝ or ⌞ ˅ ⌝ arrow keys.

Assign RESIGHT function
• Assign the RESIGHT device setting to a user profile by marking the user profile in the "Workflow step" field and pressing the ⌞ ‹ ⌝ arrow key.

Configuring the reset functions

1
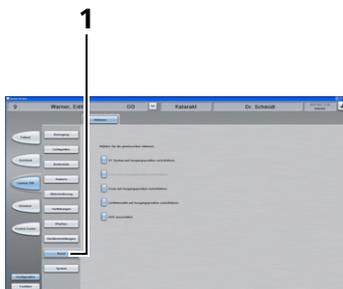
In the <Reset> configuration menu (1) you can set which functions should be reset to the initial value when the XY Reset button is pressed or the park position is reached. The following reset options can be stored on a user specific basis:

– Move XY system back to initial position (center system in XY direction)

– Move focus back to initial position (cannot be deactivated)

– Move zoom back to initial position

– Move light intensity back to initial position (set initial values)

– Switch off IDIS

CAUTION
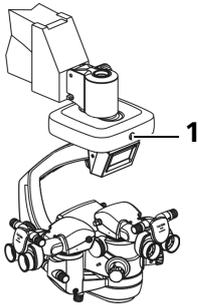
Risk of collision!

Pressing the reset button (1) moves the XY coupling into its configured starting position and/or moves the focus into the center position. This can injure the patient or damage any accessories installed.

- Keep sufficient distance between device and patient (minimum 40mm) when pressing the XY reset button (1).

- Ensure that any accessories installed do not come into contact with other objects.
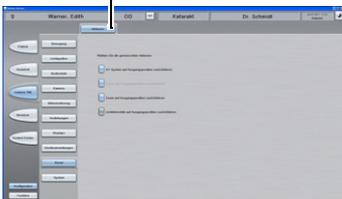
<Reset> tab (2)

Selecting the reset functions
- Press the respective button to activate or deactivate the reset functions.

  → A function is active when the button lights up in light blue color.

  → A function is inactive when the button lights up in gray color.

Configuring the system

The <System> (1) configuration menu is divided into four tabs in which you can specify user-specific settings for Optics, HD Camera, User Import and Log Import.

<Optics> tab (2)

Setting the parameters for the system's total magnification
- In the fields "Eyepieces", "Tube" and "Lens", select the desired system components by pressing the button.

  → The parameter is active when the button lights up in light blue.

  → The parameter is inactive when the button lights up in gray.

1 2
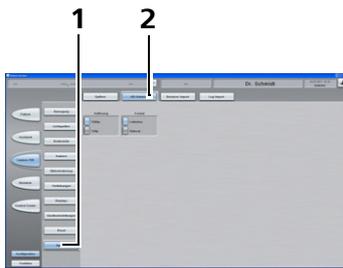
<HD Camera> tab (2)

Set the video signal of the integrated HD 3CCD camera.

Set the resolution
•   Select between the HD video resolution <1080p> or <720p> by pressing the corresponding button.

→ The parameter is active when the button lights up in light blue color.

→ The parameter is inactive when the button lights up in gray color.

Set the format
•   Select between the display format <Letterbox> or <Sidecut> by pressing the corresponding button.

→ The parameter is active when the button lights up in light blue color.

→ The parameter is inactive when the button lights up in gray color.

3
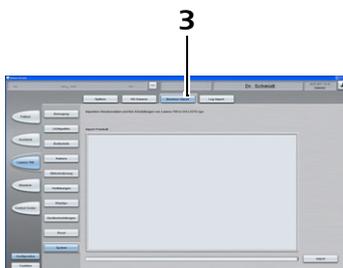
<User Import> tab (3)

–   Users already existing in CALLISTO eye are overwritten by the surgical microscope.

–   Users not yet existing in CALLISTO eye are imported from the surgical microscope.

–   Imported user data cannot be exported back to the surgical microscope.

Import user data
•   To import user data saved in the surgical microscope, press the <Import> button.

→ A message is displayed, indicating that the import has started.

→ After completion of the import, the number of imported users is displayed.

4
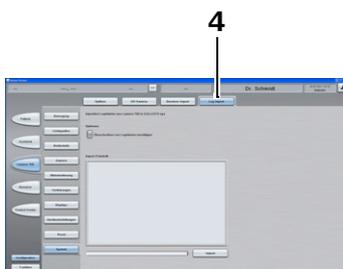
<Log Import> tab (4)

Importing log files
•   If you want to overwrite log files in CALLISTO eye, activate the option "Confirm overwrite of log files".

•   Press the <Import> button to import the log files stored in the surgical microscope.

→ A message is displayed, indicating that the import has started.

→ After completion of the import, the number of imported log files is displayed.

Adjusting the light (main and slit illumination)

1
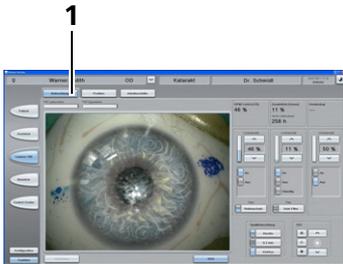
In the <Lighting> tab (1) you can set the slit lighting, OPMI light, additional light, keratoscope and SCI.

Setting the light intensity

- To increase the light intensity, press the ⌃ arrow key; to reduce it press the ⌄ arrow key. The light intensity is continuously variable from 0 to 100% in 1% increments.

Swinging filters in/out of the beam path

- Press the display field and button with the filter name to select the filter. The available filters are displayed.

Switching the light on/off

- Press the <On>, <Off> or <Standby> buttons to switch light sources on and off or to put them into standby mode.

Setting the SCI illumination mode

- Use one of the following buttons to use a defined SCI illumination mode:

  - Red reflex illumination ☀

  - Red reflex / surrounding field illumination ☀

  - Surrounding field illumination ☀

- To change the combination ratio (increase and decrease the red reflex/surrounding field illumination, press the ⌃ or ⌄ buttons.

Switching the slit illuminator on / off

- Press the <On/Off> button to switch the slit lamp on or off.

Setting the slit width

- Press the Slit width button. The available slit widths are displayed. You have the choice between slit widths 0.2 mm, 2 mm, 3 mm and 4 mm.

Setting the slit direction

- Press the Slit direction button. The available slit directions are displayed. You can specify the slit direction either as right or left.

Start/stop video recording

- Press the <Record> button to record a video of the treatment.

- You can interrupt the recording by pressing the

Show/hide IDIS

- Press the <IDIS> button to show the data injection.

- You can hide the data injectino by pressing the

Setting positions (zoom, focus, XY)

2
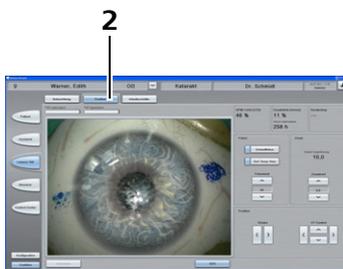
In the <Position> tab (2), you can set the zoom, focus and XY position for the surgical microscope.

Setting the zoom value

- To increase the zoom value, press the [^] arrow key; to decrease it, press the [⌄] arrow key. The zoom is continuously variable between 0.4 and 2.4.

  The total magnification of the system is automatically adjusted to the changed zoom value. For correct calculation of the total magnification, the system components - eyepieces, tube and objective lens - must have been correctly set (see page 174).

Setting the focus value

- To increase the focal distance, press the [^] arrow key and to reduce it press the [⌄] arrow key. The focal distance is continuously variable from -30 mm to +40 mm in 1 mm steps.

Setting the XY control

- To shift the surgical microscope in the X direction, press the [‹] or [›] keys; to shift it in the Y direction, press the [⌄] or [^] arrow keys.

  If the video image is traveling in a different direction on the monitor than specified by the button, you must reposition the video camera (if it is not integrated) or deactivate the link "Posterior and XY direction" (see page 395).

Activating / deactivating the DoF Deep View function

- Activate/deactivate the Deep View depth of field management system by pressing the <DoF Deep View> button.

Switch fast focus on/off

- Activate/deactivate the fast focus function by pressing the <Fast Focus> button.

Start/stop video recording

- Press the <Record> button to record a video of the treatment.

- You can interrupt the recording by pressing the

Show/hide IDIS

- Press the <IDIS> button to show the data injection.

- You can hide the data injectino by pressing the

Set the workflow steps

3
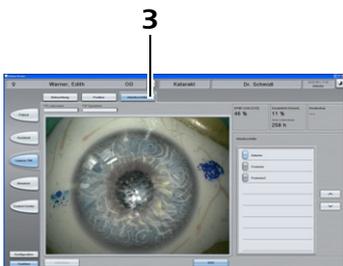
The <Workflow Steps> tab (3) permits you to access a system configuration tailored to your application.

When you select a workflow step, all configuration settings stored for this workflow step are transmitted to the connected devices, e.g. for a "Light ON" workflow step or the other "Light OFF" workflow step. If you switch back and forth between the two types, this has a light on/light off effect on OPMI LUMERA 700.

Sorting workflow steps

- Press the <Workflow Step> tab (3).

  → The list of all workflow steps is displayed.

- Set a workflow step for the current user by marking a workflow step and arranging it in the desired order using the [^] or [˅] arrow button.

Start/stop video recording

- Press the <Record> button to record a video of the treatment.

- Press the <Record> button again to stop recording.

Show/hide IDIS

- Press the <IDIS> button to show the data injection system.
- Press the <IDIS> button again to hide the data injection system.

Indexes
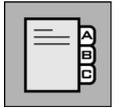
List of technical terms

Term	Explanation
Anterior	Software application which sets the camera in such a way that optimum image visualization is achieved in the anterior segment of the eye.
Apochromatic optics	Optical system with maximum correction of chromatic aberration
Composite (Video)	Composite video is a combined video signal and is referred to as a CVBS signal.
Drapes	Sterile covers for surgical microscopes
Host computer	A host computer "houses" your files (shared directory") and is connected to the OPMI LUMERA 700 ("Client") via a local network.
Inverter	Used in surgery of the back part of the eye. It corrects the orientation of the image by using the fundus imaging system or wide angle optics.
Center position	Starting position for the XY coupling, the focus and the internal focus of the RESIGHT 700 fundus viewing system.
Posterior	Software application which sets the camera in such a way that optimum image visualization is achieved in the posterior segment of the eye
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.
Taring	Compensation between input and output

14.

List of abbreviations

Term	Explanation
AG	**A**ktien **G**esellschaft (Corporation)
BEV	**BEv**: German acronym for "Besondere Er-satzstromversorgung" (special emergency backup power supply)
BNC	**B**ayonet **N**eill **C**oncelmann (Coaxial bayonet-locking connector for high fre-quencies, named after its inventor)
CCD	**C**harge **C**oupled **D**evice-Technology (optical sensor)
CE	**C**ommunauté **E**uropéenne (European Community) - The manufacturer declares that the device com-plies with the directives of the European Union.
CSA	**C**anadian **S**tandards **A**ssociation
DIN	**D**eutsche **I**nstitut für **N**ormung (German standards association)
DHCP	**D**ynamic **H**ost **C**onfiguration **P**rotocol (Network configuration for the dynamic assign-ment of IP addresses)
DoF	**D**epth **o**f **F**ield - management system
D	Diopters (refractive power of optical systems)
DVI	**D**igital **V**ideo **I**nterface (digital interface for video data)
EMC	**E**lectro**m**agnetic **C**ompatibility defines non-inter-ference of electrical and electronic devices with their environment
EN	**E**uropean **N**orm (European Standard)
CVBS	**C**olor **V**ideo **B**lanking **S**ynch - signal (television signal for color image transmission)
FCC	**F**ederal **C**ommunications **C**ommission (US regulatory authority for communication device)
FCP	**F**oot **C**ontrol **P**anel
HD	**H**igh **D**efinition

Term	Explanation
HD-SDI	**H**igh **D**efinition **S**erial **D**igital **I**nterface (digital interface for video and audio data)
HDTV	**H**igh **D**efinition **T**ele**V**ision (high-resolution TV)
HF	**H**igh**f**requency
ICC	**I**nformation and **C**ontrol **C**enter
IDIS	**I**ntegrated **D**ata **I**njection **S**ystem (data injection in the surgical microscope)
IEC	**I**nternational **E**lectrotechnical **C**ommission
IOL	**I**ntra**o**cular**l**ens - artificial lens for the eye
IP	**I**nternet **P**rotocol (Protocol for transmit data in the Internet or network)
JPG	**J**oint **P**hotographics expert **G**roup (file extension for image files)
LED	**L**ight **E**mitting **D**iode
LAN	**L**ocal **A**rea **N**etwork
NTSC	**N**ational **T**elevision **S**ystems **C**ommittee (US institution defining the first color television standard)
OR	**Op**eration
OPMI	Surgical microscope
OSD	**O**n **S**creen **D**isplay
PIN	**P**ersonal **I**dentification **N**umber
PAL	**P**hase **A**lternating **L**ine (color encoding system in analog TV systems)
PD	**P**upillary **d**istance
PC	**P**ersonal **C**omputer
SCI	**S**tereo **C**oaxial **I**llumination
SD	**S**tandard **D**efinition
SDTV	**S**tandard **D**efinition **T**ele**V**ision (Television standard with resolution less than HDTV, e.g. PAL or NTSC)
SIP	**S**ervice **I**ndentification **P**rogram

Term	Explanation
SW	**S**oft**w**are
TIFF	**T**agged **I**mage **F**ile **F**ormat
WL	**Wi**rel**e**ss
WLAN	**W**ireless **L**ocal **A**rea **N**etwork
USB	**U**niversal **S**erial **B**us (Standard plug for connecting peripherial devices)
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

D

W

X

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