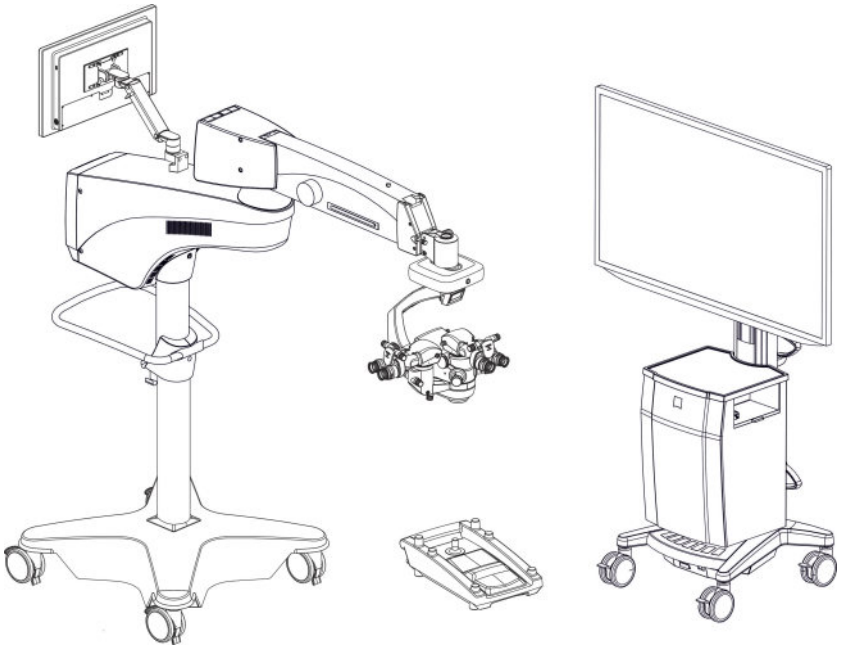
OPMI Lumera 700 with Digital Option

Software Release 3.2

Instructions for Use



Brands

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Table of Contents

1 Notes on the instructions for use

1.1 Device name

OMPI Lumera 700 is referred to as "device" in these Instructions for Use.

1.2 Area of application

These Instructions for Use apply to OMPI Lumera 700 with Software Release 3.2 and the following identification:

- Reference number: 6634 (OPMI Lumera 700)
- Material number: 305953-9050-000 (Monitor Cart (optional))

1.3 Purpose and storage of the documentation

These instructions for use explain the safety features, functions and performance parameters of the device. They contain instructions on the safe use of the device and identify measures for its care and maintenance.

Correct operation of the device is imperative for its safe and successful function.

Action

- ▶ Read these Instructions for Use before setting up and using the device the first time.
- ▶ Keep the instructions for use accessible for all users at all times.
- ▶ Pass the instructions for use to future owners of the device.

1.4 Questions and comments

Action

- ▶ If you have questions or comments concerning these instructions for use or the device itself, contact ZEISS Service.

You can find the ZEISS contact partner for your country on the following website: www.zeiss.com/med

1.5 Conventions in this document

Certain types of information are specially marked in this document for better recognition.

1.5.1 Conventions in all text areas

- This is a list.
  - This is a second level list.

This is a cross-reference: Questions and comments [▶ 11].

This is **bold type**.

This is `software code` or `program text`.

Names of software dialogs, fields or menus, and software messages are marked by quotation marks:

- "View" menu.
- "Do you want to save the settings?"

The steps in menu and file paths are separated by slashes:

- "File / Save as"
- "My documents / Documents"

Keys, buttons, knobs, levers and other operating controls are marked by square brackets:

- [START] key
- [Next] button

1.5.2 Conventions in a course of action

⚠ WARNING!

This is warning information about hazards that can cause death or severe injuries if not avoided.

The warning message names the possible consequences.

▶ This is a measure with which hazards can be prevented.

⚠ CAUTION!

This is warning information about hazards that can cause injuries if not avoided.

The warning message names the possible consequences.

▶ This is a measure with which hazards can be prevented.

NOTE

This is warning information about hazards that can cause property damages if not avoided.

The warning message names the possible consequences.

▶ This is a measure with which hazards can be prevented.

Prerequisite

☑ This is a requirement that must be met before the start of a sequence of actions.

Action

1. This is a command.
2. **CAUTION! This is a warning message about hazards that can occur during a single action.** This is a command.

   ⇨ This is the result of a sequence of actions.

1.6 Other applicable documents

Document type	Document title	Optional
Product overview	ZEISS Video Accessories	No
Instructions for Use	Preparation of Resteril-izable Products	No
Instructions for Use	VISULUX	Yes
Instructions for Use	RESIGHT 500 & RESIGHT 700	Yes
Instructions for Use	CALLISTO eye	Yes
Instructions for Use	14-function foot control panel, wired (FCP) or wireless (FCP WL)	NO
Information	Radio Approval Information	NO
Instructions for Use	CALLISTO eye Panel PC (model I)	NO
Instructions for Use	CALLISTO eye Panel PC (model II)	YES
Instructions for Use	CALLISTO eye Panel PC (model II) (digital surgical microscope)	NO
Instructions for Use	CALLISTO eye Basic Functions	NO
Instructions for Use	CALLISTO eye - Software Add-On for Assistance Functions	NO
Instructions for Use	CALLISTO eye - Software Add-On for OMPI Lumera 700 control	NO
Instructions for Use	CALLISTO eye - Software Add-On for VISALIS 500 Parameter Display	YES

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2 Safety notes

2.1 Target group

These Instructions for Use are intended for physicians, medical and technical staff, and nurses who are responsible for preparing, operating or maintaining the device following training.

It is the duty of the equipment owner/operator to train and instruct all operating personnel.

2.2 Area of use

2.2.1 Intended uses

OPMI Lumera 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.

2.2.2 Indication for use

OPMI Lumera 700

The device is intended only for surgical procedures in the field of ophthalmology. It illuminates and magnifies the structures of the eye (intraocular and extraocular) while the surgeon carries out the procedure.

It can be used for all types of surgical procedure on the anterior and posterior segments of the eye, for various applications and diseases, e.g.

- Cataract
- Glaucoma
- Retinal diseases
- Corneal diseases
- Vitrectomy

2.2.3 Contraindication

The product must not be used for diagnostic purposes.

Video images in particular, as well as recorded video and still images, can differ from the patient's real eye in terms of color, contrast, size and shape. For patients with serious retinal damage, the use of additional protective equipment to reduce light exposure is advised. This protective equipment consists of:

- a blue filter
- a retinal protection device

2.2.4 Normal use

NOTE

Using the device

OMPI Lumera 700 with digital option may only be used with CALLISTO eye (Panel PC II).

As a result of its mechanical construction and the characteristics listed below, the device is suitable for performing surgical procedures on the anterior and posterior segments of the eye:

- SCI illumination system (Stereo Coaxial Illumination)
- A range of illumination sources
- Attachable fundus viewing systems (RESIGHT 500, RESIGHT 700)
- VISULUX fiber slit lamp

Once the power switch has been activated, the device can be safely and easily moved into its operating position either by using the handgrips or the suspension arm after the magnetic brakes have been released. A sterile staff member covers the microscope with drapes and installs sterilizable caps before the start of surgery.

The surgeon or a sterile staff member positions the microscope and focuses it. During surgery, the functions most frequently used by the surgeon, such as focus, magnification, XY movement, light intensity up/down and adjustment of the illumination level, are controlled by means of the foot control panel, allowing the user's hands to remain free for the surgical procedure. Certain settings, such as the illumination level, unlocking of the magnetic brakes or the insertion of RESIGHT 500 or RESIGHT 700 for surgical procedures conducted on the posterior eye segment, are performed by hand. For viewing or training purposes, the progress of the operation can be viewed by doctors and staff members on the 3D monitor supplied in the digital option. When using this function, you can switch between two modes: **Hybrid:** "Viewing through the eyepiece is still possible" or **Digital:** "Viewing is only possible on the 3D monitor using the 3D glasses. Viewing through the eyepiece is no longer possible." In order for the physician and other personnel to continue viewing, additional video equipment can be installed on the device. Specific contact lenses or RESIGHT 700 / RESIGHT 500 must be used for surgical procedures conducted on the posterior eye segment.

When finished, the surgeon swivels the microscope out of the surgical field and into the park position. Pressing the reset button on the XY coupling, or positioning the device in the park position, resets the device to its initial values and makes it ready for the next operation. The drape or the resterilizable caps are removed by the surgeon or by a nurse. The drape is to be disposed of in accordance

with the hospital regulations of the respective country. The resterilizable caps can be sterilized again. The device can be cleaned and disinfected.

The product must be regularly checked for full functionality by a hospital technician.

At the end of the electronic device's service life, it must be disposed of in accordance with the regulations of the respective country.

2.2.5 Patient target group

Age	All age groups (from newborns through to the elderly)
Gender	All
State of health	Not relevant for the application
Weight	No limit
Status during surgery	Under local or general anesthesia

2.3 Responsibilties and duties of the operator

Operating personnel

The device may only be operated by instructed and trained personnel.

- Ensure that the operating personnel have been trained and instructed.
- Ensure that the operating personnel have read and understood the Instructions for Use.
- Keep the Instructions for Use available at all times for the operating personnel.
- To simplify access for all operating personnel, order additional copies of the Instructions for Use from ZEISS as required.
- Define the required skills for handling the device and provide information on who is authorized for which activities.
- Define rules for reporting errors and damage, and make sure that people are informed of these. (see Notification to manufacturers and authorities [▷ 19]).
- Provide the necessary protective clothing.
- Regularly check compliance with the national laws and regulations concerning accident prevention and occupational health.

Safety inspections

- ▶ To prevent any reduction in device safety due to aging and wear: Have regular safety inspections performed which are set in accordance with the applicable national regulations for this device

The safety inspections may only be performed by the manufacturer or qualified personnel.

- ▶ Comply with the specified time limits.
- ▶ Perform the inspections to the prescribed extent.

The device should, as a minimum, undergo the following checks and safety inspections:

- Check that the Instructions for Use are present
- Visually inspect the device and its accessories for damage, as well as legibility of markings and labels
- Leakage current test
- Test of protective ground conductor
- Function and wear test of the brakes
- Function test of all switches, buttons, sockets and LEDs on the device

- ▶ Contact ZEISS Service or authorized service personnel as soon as a change occurs in the device.

Maintenance and inspection

- ▶ To ensure safe operation of the device and reach the expected service life: observe the maintenance and inspection intervals that are specified in these Instructions for Use, see: Maintenance [▷ 215].

Device modifications

NOTE

Unauthorized interference with the device

This device must not be modified without the manufacturer's approval. If the system is modified after consultation with the manufacturer, suitable inspections and testing by ZEISS Service or authorized specialist personnel must be completed to ensure subsequent safe use. The manufacturer is not liable for damage caused by unauthorized persons modifying the system. This also invalidates all claims under the guarantee.

Accessories and additional equipment

- ▶ If you wish to connect accessories or additional equipment to the device: Contact your ZEISS representative [▷ 11].

Additional equipment connected to medical electrical devices must demonstrably comply with the corresponding IEC or ISO standards (e.g. IEC 60950 for data processing equipment).

Furthermore, any configurations must comply with the requirements stipulated in the standards for medical systems (see IEC 60601-1).

If you connect additional devices to medical electrical systems, you are considered to be a system configurer and are thus responsible for ensuring that the system complies with the normative requirements for systems.

Local laws take precedence over the above normative requirements.

2.3.1 Messages to manufacturer and authorities

If a serious incident occurs in connection with this medical device affecting the operator or another person, the operator (or person responsible) must report this serious incident to the manufacturer or seller of the medical product. In the European Union, the operator must report this serious incident to the competent authority in his/her country.

2.4 Measures and duties of the operator

Electrical safety

- Always switch off the device before connecting it to or disconnecting it from the power supply, for cleaning its surface, or if it will not be used for a prolonged period of time.
- Only connect the device to a power supply that complies with the values specified on the rating label.
- Do not use multiple sockets!
- Do not use extension cables!
- Do not touch the device if your body is electrostatically charged and the device is not grounded.
- Connect the device via the potential equalization connection (according to IEC 60601-1) to other active devices with the same ground potential or connect it to a protective ground connection.
- Please observe the information on electromagnetic compatibility (EMC).

The device contains freely accessible live components. If you remove the housing, you run the risk of electric shock.

- Never open the device!

Environmental conditions

Using the device in unsuitable ambient conditions may lead to damage, malfunction or injury.

- ▶ Make sure that the installation conditions and the operation of the device comply with the surgical requirements:
- ■ Low vibration
- ■ Clean environment
- ■ Avoid extreme mechanical stress
- ▶ Do not use power-operated devices included in the delivery package
- ■ in explosive atmospheres,
- ■ at a distance of less than 25 cm from flammable anesthetics or volatile solvents such as alcohol, benzine or similar substances.
- ▶ Do not use or store the device in damp rooms. Do not expose the device to water splashes, dripping water or sprayed water.
- ▶ Ensure that fluids cannot enter the device.
- ▶ Operate the device only within the limits of the ambient conditions [▷ 252] stipulated.
- ▶ Store and transport the device only within the limits of the ambient conditions stipulated.

Formation of condensation

Excessive temperature changes can lead to the condensation of moisture in the air and thus to the formation of condensation on the device.

- ▶ Avoid moving the device between rooms with large temperature differences.
- ▶ Operate the device only within the limits of the ambient conditions [▷ 252] stipulated.

Symbols and labels

- ▶ Note the symbols and labels attached to the device!

Transport

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

Handling

Small, loose objects (e.g. screws) that get inside the device can damage the device.

- ▶ Do not place small, loose objects on the device.

2.5 Electromagnetic compatibility

The device is subject to special precautionary measures regarding electromagnetic compatibility (EMC). The following factors can cause EMC disturbances:

- Portable and mobile HF communication equipment in the vicinity of the device.
- Other devices set up in the vicinity or stacked together with the device.
- Accessories, cables and spare parts not specified in the Instructions for Use and not sold by ZEISS as spare parts.

You can prevent EMC disturbances by using the following precautionary measures:

- ▶ Comply with the Instructions for Use.
- ▶ The device must be installed and initially commissioned in accordance with the EMC notes in the Technical specifications section.
- ▶ Only use accessories, transformers, cables and spare parts specified in the Instructions for Use or approved by ZEISS for this device.
- ▶ If you are installing the device near or stacking it with other devices: Check the device is operating correctly in this configuration.

2.6 Requirements for operation

2.6.1 Before commissioning for the first time

Installation performed by technical personnel or ZEISS Service

Please make sure that the following requirements continue to be met for further operation:

- ▶ Make sure that the connecting components are properly set and that all screw connections are securely tightened.
- ▶ Make sure that all cables and plugs are in proper condition.
- ▶ Make sure that the device is connected to an electrical outlet with a proper protective ground conductor.
- ▶ Determine the supply voltage at the installation site and set the voltage of the device in accordance with the installation site's supply voltage.
- ▶ Make sure the device is connected using the provided power cable.

Hazards arising from connecting the device to an IT network

The following safety measures should be observed in order to prevent injuries or damage:

- Check to make sure that the requirements for connecting the device to an IT network are met. [▷ 102]

Hazards arising from condensation of air humidity

Moving the device from a cold environment (T < 10 °C) to a warm one may cause air humidity to condense.

- If you move the device from a cold environment to a warm one, wait at least one hour before switching the device on to allow it to reach the environment's ambient temperature.

2.6.2 Before every use

Hazards arising from phototoxicity

To prevent phototoxic damage to the patient's eye:

- Check the light source for visible damage.
- Check the filter setting.
- Switch off the light source for light guides that are not being used and attach them to the mount provided.

Hazards arising from attached accessories and components

The following safety measures should be observed in order to prevent injuries or damage:

- Never exceed the device's maximum permitted weight load.
- Always route cables so that they do not hinder the user.
- Never cover any ventilation openings. Doing so can cause the device to overheat and fail.
- Never attempt to forcefully connect any electrical connectors. If connection is not readily possible, check whether the plug fits the socket. If any of the connectors are damaged, have the ZEISS Service team or an authorized service representative repair them.

Hazards arising from moving components

The following safety measures must be observed to prevent injuries or damage:

- Make certain to compensate for any added weight to the device; this will enable the surgical microscope to maintain its balance in all positions of the working range.
- Limit the stroke of the suspension arm to prevent any contact with the patient should the surgical microscope be lowered accidentally.
- Check the surgical microscope for sufficient freedom of movement.
- Make sure there is sufficient space available for focus positioning. The surgical microscope must not come into contact with the patient.
- Secure the device into position using the locking tabs on the stand base to prevent the device from rolling away unexpectedly.
- When using a fundus viewing system: make sure that the space available for movement is greater than the downward travel path of the microscope.
- When using an assistant's microscope: adjust the assistant’s microscope before use and make sure it is properly locked in position. If you tilt the surgical microscope in the horizontal viewing direction and the assistant’s microscope is not locked in place, the assistant's microscope may swivel in.

Hazards arising from an attached fundus viewing system

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 space available for movement is larger than the downward travel path of the microscope.
- Perform a focus reset.

Hazards arising from disruptions to the 14-function foot control panel

Inadequate power supply to the wireless 14-function foot control panel may cause the device to malfunction.

- Make sure that the batteries are fully charged and that the "Battery" status display is not blinking.

Hazards arising from unknown software settings

The following safety measures should be observed in order to prevent injuries or damage:

- ▶ Before each use, check the user settings in the software.

Hazards arising from non-tested functions

The following safety measures should be observed in order to prevent injuries or damage:

- ▶ Perform a functional test before using the device.

Dangers due to faulty braking function

A malfunctioning magnetic brake can endanger the safety of the patient and user and cause damage to the device.

- ▶ Before each operation, check the braking function of the magnetic brake on the suspension arm:
- ■ When the brake is released, it must be possible to move the suspension arm smoothly.
- ■ The suspension arm must not move when the brake is locked.

2.6.3 During operation

Hazards arising from phototoxicity

To prevent phototoxic damage to the patient's eye:

- ▶ Use the lowest brightness setting possible.
- ▶ Select an appropriate brightness setting according to the recommended values provided by ZEISS (see "Maximum radiation exposure times" [▷ 30]). Doing this limits the exposure intensity and the exposure time.
- ▶ Use the retina protection filter to reduce the blue portions of the light. The retina protection filter protects the patient’s eye from unnecessary radiation and increases the exposure time.
- ▶ When working on the exterior eye: use the retina protection device. This will prevent light from entering the pupil.
- ▶ Avoid looking directly into the light source on the microscope's objective lens or light guide.
- ▶ When the light source is switched on: monitor the device at all times.

Hazards arising from unsterile parts

Unsterile parts may cause injury to the patient.

- ▶ Always use the appropriate sterile accessories for the device.
- ▶ Never touch the unsterile connection cable on the assistant's microscope while operating the handgrips or zoom button.

Hazards arising from the fundus viewing system swiveling in

If the RESIGHT 500 or RESIGHT 700 fundus viewing system is mounted on the underside of the microscope and you steeply tilt the microscope, the RESIGHT fundus viewing system may unintentionally swivel in and injure the patient.

- ▶ Remove the fundus viewing system before tilting the microscope at a steep angle.

Hazards arising from defective or unidentified accessories

Defective or unidentified accessories may lead to increased leakage current on the system and injure the patient.

- ▶ Do not connect any defective or unidentified accessories.
- ▶ Never touch video interfaces while in contact with the patient.
- ▶ Never touch the power outlet while you are in contact with the patient.

Hazards arising from defective motor electronics

Defective motor electronics can cause limited functionality and failure of the following primary functions:

- XY Movement
- Focus
- Zoom
- Light control

- ▶ In the event of a fault, activate Manual mode.

Hazards arising from an outdated xenon lamp

If the xenon lamp is used beyond its maximum service life of 500 hours, it may fail suddenly and interrupt operation.

- ▶ When the xenon lamp has reached its maximum service life: swivel the backup xenon lamp into position.
- ▶ When the backup xenon lamp has reached its maximum service life: replace the xenon lamp module of the Superlux Eye light source and reset the remaining service hours meter to its initial value.

Hazards arising from a hot halogen lamp

If you replace the lamp shortly after it has failed, the lamp will still be very hot.

- ▶ Use heat-resistant protective gloves when replacing the lamp.

Hazards arising from the device not being fully functional

If an error occurs which cannot be fixed by using the "Troubleshooting" section, or if you notice anomalies such as restrictions or noise development in the course of movement:

- ▶ Mark the device as non-functional.
- ▶ Notify ZEISS Service or an authorized service representative.

2.6.4 After every use

Hazards arising from a lack of supervision

If the device is switched on, but not supervised, it may cause injuries or damage.

- ▶ If you are not using the device, switch it off at the power switch.

Hazards arising from inadequate sanitation

Insufficient, incorrect or wrong cleaning or disinfection that does not comply with these Instructions for Use can expose the patient or medical staff to a considerable risk of infection.

- ▶ Follow the instructions in "Cleaning and disinfection [▷ 211]".

2.7 Measures to prevent phototoxic injury

There are multiple publications [▷ 32] [1-5)] that deal with the issue of phototoxicity in eye surgeries. They list 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 ZEISS, as a manufacturer, makes allowance for them in its systems.

2.7.1 Illumination characteristics (spectral composition)

Studies on the exposure of the eye to light with varying spectral compositions 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

For protection of the retina, 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.

The retina protection filter's orange color changes the color of the light. The physician must become accustomed to working with the altered appearance of the anatomical structures. The camera's white balance function can partially compensate for the changed color.

2.7.2 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

ZEISS has addressed this aspect by providing this system with a device for continuously varying the brightness of the light source. This permits the surgeon to adapt the light intensity at the patient's eye to best suit the conditions in each case.

2.7.3 Angle of illumination

A number of publications [▶ 32] [1-4] suggest tilting the microscope 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.

2.7.4 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.

Fiber optic illumination

This is the reason why ZEISS uses fiber optic illumination in its surgical microscope systems.

2.7.5 Exposure time to light

⚠ CAUTION!

The light emitted by this device may be harmful.

The longer the duration of exposure, the greater the risk of ocular damage. Prolonged exposure to this instrument at maximum intensity may exceed the hazard reference value.

- ▶ When determining the length of exposure, always refer to the table "Maximum radiation exposure times [▷ 30]".

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 ZEISS through the use of a swing-in retina protection filter (blue barrier filter) that can be swung into the microscope's illumination beam path.

Brightness setting

The brightness control scale of our devices has a linear structure with values ranging from 2% to 100% for LED light sources and 5% to 100% for xenon/halogen light sources. The DIN EN ISO 15004-2 standard stipulates maximum radiation exposure times for the different illumination configurations. These can be found in the table "Maximum radiation exposure times [▷ 30]".

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 and 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 of a material without UV / blue filter are at a higher risk)
- Previous exposure to bright light (such as retinal photography, especially within the last 24 hours)

During cataract procedures, exposure is interrupted by the following factors:

- Lens material
- Phaco handpiece
- Eye movement

This is expected to significantly lengthen the time before photoretinitis might be expected to occur.

Effects of Microscope illumination

A prospective study [▷ 32] [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. The prospective study also found that, at the same brightness setting, phototoxic retinal injury could be expected after operations with a duration of approximately 100 minutes.

Stereo Coaxial Illumination (SCI)

The Stereo Coaxial Illumination function of this device 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. In order to reduce the risk of phototoxicity during cataract operations, ZEISS recommends taking the following measures:

- ▶ Adjust the surrounding field illumination to be somewhat darker than the central red reflex spot. This simultaneously reduces glare from the patient's sclera.
- ▶ Use the lowest brightness setting possible.
- ▶ Use the retina protection filter (blue barrier filter) to reduce the blue portions of the light. The retina protection filter increases the recommended duration of the radiation exposure.
- ▶ When working on the exterior eye: use the retina protection device. This will prevent light from entering the pupil.
- ▶ Turn off the microscope illumination system or cover the patient’s eye during pauses in surgery.

Also see

Maximum radiation exposure times [▷ 30]

2.8 Maximum radiation exposure times

The following table is intended to provide the surgeon with a guideline in determining the potential risk. Any deviation from these values is only permissible when medically justified.

Basis for calculation

The calculations are based on the daily exposure [▶ 32] limits recommended for occupational safety[6)]. A safety factor of 10 has been used in determining these limits.

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,
- Immobile eye, which means that only one area is subject to exposure,
- Pupil dilated to 8 mm.

The use of the blue barrier filter (retina protection filter) increases the recommended exposure time as compared to the illumination values without the blue barrier filter specified below. The exact exposure times for the respective illumination values with and without the blue barrier filter can be found in the table below.

2.8.1 Maximum radiation exposure times

	Maximum radiation exposure times per light source [min]:[sec]			
	Without retina protection filter		With retina protection filter	
Halogen	**100% brightness**	**50% brightness**	**100% brightness**	**50% brightness**
Wide-field illumination	2:31	6:16	12:48	28:48
Red reflex illumination	11:48	31:24	73:42	150:00
Slit illumination	5:36	14:48	37:48	77:18
Xenon	**100% brightness**	**50% brightness**	**100% brightness**	**50% brightness**
Wide-field illumination	00:33	1:03	6:34	12:24
Red reflex illumination	2:42	5:07	33:06	63:12

	Maximum radiation exposure times per light source [min]:[sec]			
	Without retina protection filter		With retina protection filter	
Slit illumination	1:07	2:07	16:48	32:00
LED	**100% brightness**	**50% brightness**	**100% brightness**	**50% brightness**
Wide-field illumination	0:47	1:53	10:18	22:18
Red reflex illumination	3:21	8:19	47:54	119:00
Slit illumination	1:16	3:09	23:48	59:18

2.8.2 References

[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

3 Description of the device

3.1 Device marking

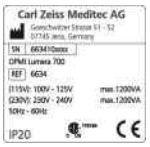
⚠ CAUTION!

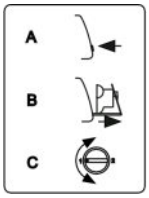
Risk of injury due to illegible labels!

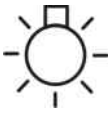
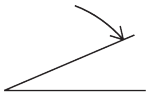
Over time, labels can become dirty or unidentifiable, making it difficult or impossible for hazards to be recognized or necessary operating instructions to be followed.

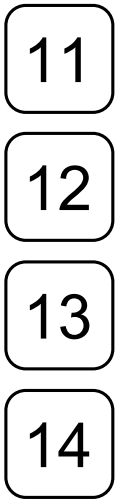
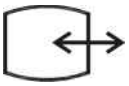
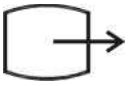
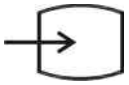
- For this reason, all safety, warning and operating instructions are to be kept in good condition at all times.
- Damaged labels are to be replaced immediately. For replacement labels, contact us or one of our authorized representatives.

Symbol	Name	Explanation
	Prohibition sign	Do not sit on the device.
	Prohibition sign	Do not step on the device.
	Warning label	General warning sign!
	Warning label	Warning: risk of hand injuries!
	Warning label	Hot surface warning!
	Warning label	Maximum load capacity 40 kg!
	Warning label	Maximum load capacity 20 kg!
	Warning label	Maximum load capacity 13 kg!

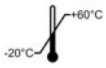
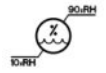
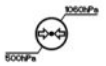
Symbol	Name	Explanation
	Warning label	Maximum load capacity 10 kg!
	Warning label	Maximum load capacity 9 kg!
	Warning label	Maximum load capacity 3 kg!
	Mandatory label	Consult Instructions for Use
	Symbol	Comply with the Instructions for Use and/or accompanying documents. ■ Manual mode fault signal [▷ 60] ■ LED light source fault signal [▷ 60] ■ [Downward travel limit] rotary knob [▷ 69] ■ [Open lamp module] button [▷ 75] ■ Invertertube E port [▷ 54]
	Rating plate	Provides information on: ■ Manufacturer ■ System data ■ Power data [▷ 240] ■ Device conformity [▷ 239]
	UDI label	Provides information on: ■ Date of manufacture ■ Machine readable label (barcode) ■ UDI Device Identifier (UDI-DI) ■ UDI Production Identifier (UDI-PI) ■ MD labeling (Medical Device)
	SIP label	Provides information on: ■ Manufacturer ■ Manufacturer's contact information ■ SIP number of the device

Symbol	Name	Explanation
	Lamp exchange	▶ Press the button ▶ Pull out the lamp module ▶ Rotate [Backup Xenon Lamp] switch 180°
	Transport position	Before transporting the system, make sure that it is in this position in order to avoid any damage.
	1-Chip HD Camera	The device includes an integrated 1-chip HD camera.
	HD Camera	The device includes an integrated 3-chip HD camera.
	HD recording	The device includes integrated HD video and image recording.
	IDIS	The device includes IDIS.
	Manufac-turer	-
	Date of manufacture	-
	WEEE label	Do not dispose of electrical or electronic devices along with normal domestic waste. The bar beneath the garbage bin icon declares that the device was "put into circulation" on August 13, 2005.
	Non-ionizing electromag-netic radiation	-
	Serial number	-
	Reference number:	-

Symbol	Name	Explanation
	CE label	-
	CSA certification mark	-
	Pairing	Assigns the device to a wireless 14-function foot control panel.
	Focus position	If the dot is located between the two arrow tips, the surgical microscope's focusing system is in its initial position.
	Tilt axis	If the line matches the line on the support arm, the surgical microscope is in the vertical position.
	Unlocked	-
	locked	-
	lamp	-
	Service interface	-
	Foot control panel connector	-

Symbol	Name	Explanation
	Video ports	-
	Signal output and input	-
	Signal output	-
	Signal input	-
	Potential equalization	-
USB	USB port	-
LAN 1	Network connection	-
LAN 2	Network connection	-
HD-SDI	Signal output	-
-	Radio label	See also document G-30-2021 (Radio Approval Information)

3.2 Labeling on packaging

Symbol	Symbol	Explanation
	Indication of direction "top"	Indicates the correct upright position of the package.
	Fragile	Handle with care
	Keep dry	Protect packaging and packaged contents from wetness.
	Do not stack	Stacking of the packages is not permitted. No load should be placed on the package.
	Permissible temperature	The product may only be transported and stored within a temperature range of min. -20°C to max. +60°C.
	Packing unit	Number of packaging units
	Permissible relative air humidity	The product may only be transported and stored at an humidity of min. 10% and max. 90% RH.
	Permissible atmospheric pressure	The product may only be transported and stored at an atmospheric pressure of min. 500 hPa and max. 1060 hPa.
LUMERA 700		Device name
		Brand / Logo
		Min. 1.2 m forklift length
	Center of gravity	Indicates the package's center of gravity.

Symbol	Symbol	Explanation
		Shockwatch
		Tiltwatch

Table 1: Symbols for transport and storage

3.3 Device setup

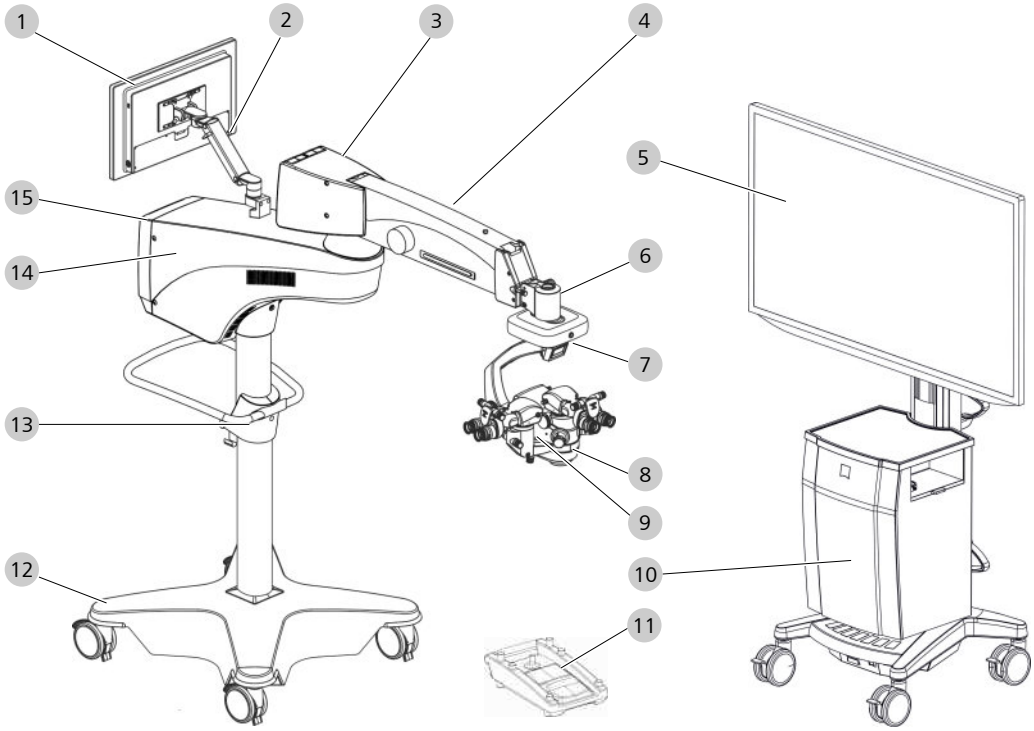


Figure 1: Example with integrated CALLISTO eye Panel PC and assistant's microscope

1	CALLISTO eye Panel PC (model II)	2	Support arm for CALLISTO eye Panel PC
3	Lamp housing	4	Suspension arm
5	3D monitor (optional)	6	XY coupling
7	Overhead display	8	Operating microscope
9	Microscope for Assistant	10	Monitor cart (optional)
11	14-Function foot control panel	12	Stand base

13	Stand column	14	Support arm with connector panel
15	Control panel		

The following components can alternatively be attached for the CALLISTO eye Panel PC (model II):
NOTE! Not available for digital option!

- CALLISTO eye Panel PC (model I)
- 22" Monitor
- 23.6" Monitor
- 22" Monitor with instrument tray
- 23.6" Monitor with instrument tray

3.3.1 CALLISTO eye Panel PC

The CALLISTO eye Panel PC provides hardware and interfaces for the device. This hardware enables the device to receive, record and play back video signals generated during surgery.

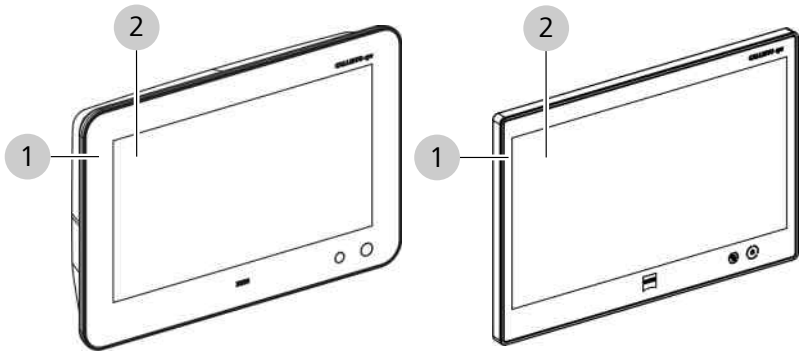


Figure 2: CALLISTO eye Panel PC (pictured left: model I, pictured right: model II)

1	User terminal	2	Touchscreen

3.3.2 Support arm for CALLISTO eye Panel PC

The support arm is used to align the CALLISTO eye panel PC vertically or horizontally.

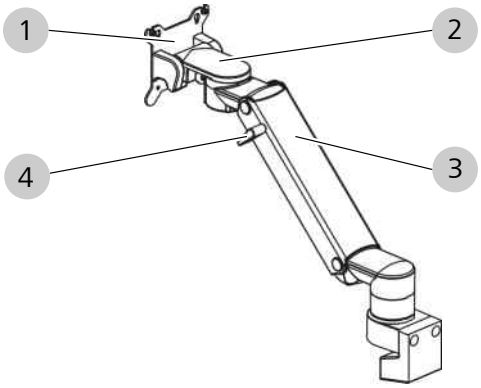


Figure 3: Support arm for CALLISTO eye Panel PC

1	VESA interface	2	Monitor mount
3	Suspension arm	4	Fixing lever

3.3.3 Lamp housing

The lamp housing is used to store the light sources. Simple light sources supply light to the surgical microscope's SCI illumination system. Dual light sources supply light to the surgical microscope's SCI illumination system as well as an additional illumination system.

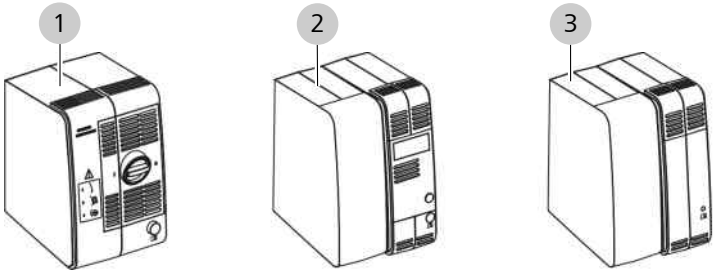


Figure 4: Simple light sources

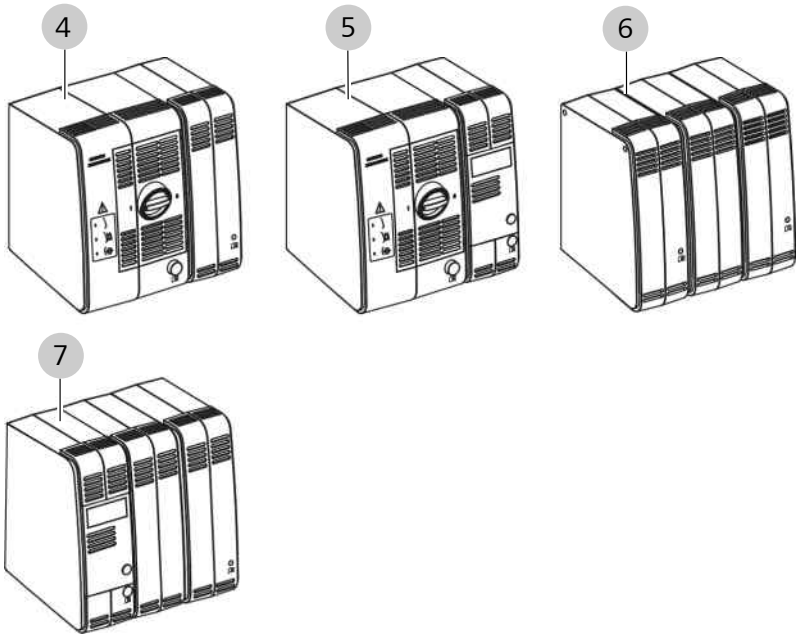


Figure 5: Dual light sources

1	Superlux Eye	2	Halogen (optional)
3	LED (optional)	4	Superlux Eye + LED (optional)
5	Superlux Eye + Halogen (optional)	6	LED + LED (optional)
7	Halogen + LED (optional)		

3.3.3.1 Light source features

Properties	Explanation	Light source		
		Superlux Eye	Halogen	LED
Lamp exchange		manual	automa-tic	-

3.3.3.2 Swivel filters

Filter	Explanation	Light source		
		Superlux Eye	Halogen	LED
Retina protection filter	Protects the patient's eye from unnecessary radiation and allows the recommended exposure time to be increased.	Default	Default	Default
Fluorescence filter, 485 nm	Makes fluorescent areas visible.	Optional	Optional	Optional
HaMode filter	Generates a light spectrum similar to that of a halogen light source.	Default	-	Default
Gray filter, 25%	Reduces the set light intensity to 25% and allows the radiation exposure time to be increased by a factor of 4.	-	-	Optional

3.3.4 Suspension arm

The suspension arm is used to position the microscope vertically and horizontally.

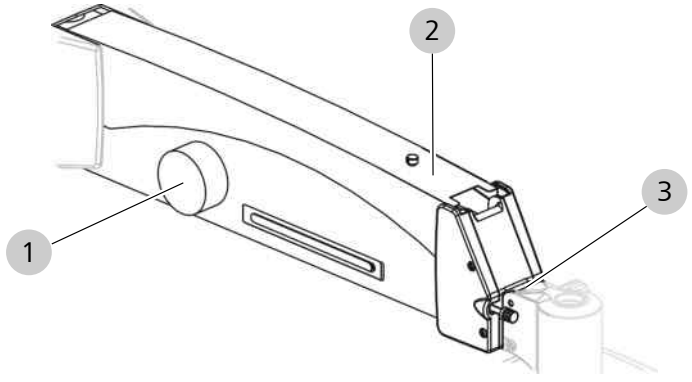


Figure 6: Suspension arm

1	Magnetic brake	2	Cable tray
3	XY coupling interface		

3.3.5 XY coupling

The XY coupling is used to orient the surgical microscope vertically above the patient's eye in the X and Y-direction.

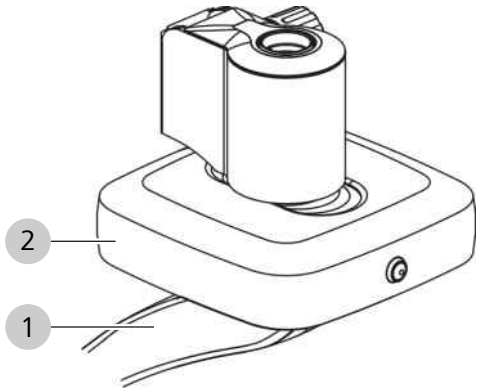


Figure 7: XY coupling

1	Support arm for the surgical microscope	2	Motorized positioning unit

3.3.6 Overhead display

The overhead display displays information on the device's software settings.

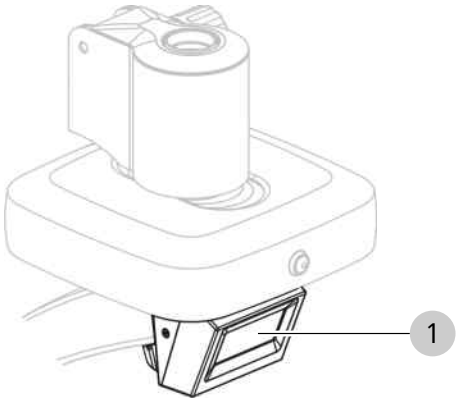


Figure 8: Overhead display

1	Display (optional)

3.3.7 Surgical microscope

The surgical microscope enlarges and illuminates the surgical field.

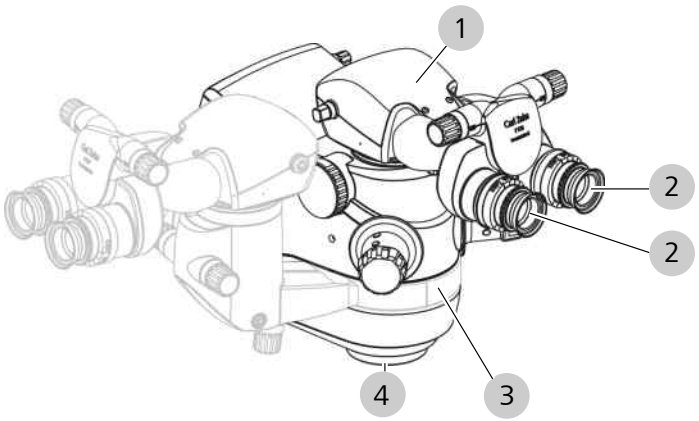


Figure 9: Digital surgical microscope (example with inverter tube E)

1	Inverter tube E	2	Eyepieces
3	Main observer	4	Objective lens

3.3.7.1 Invertertube E

The Invertertube E rotates inverted images into an upright position.

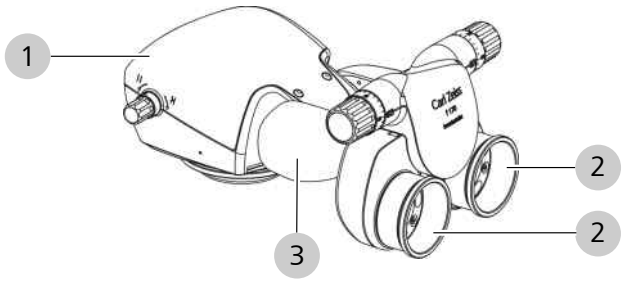


Figure 10: Invertertube E

1	Tube body	2	Eyepiece mount
3	Panning mechanism		

The Invertertube E can be electrically swiveled 110°.

3.3.7.2 Widefield eyepiece (10x or 12.5x)

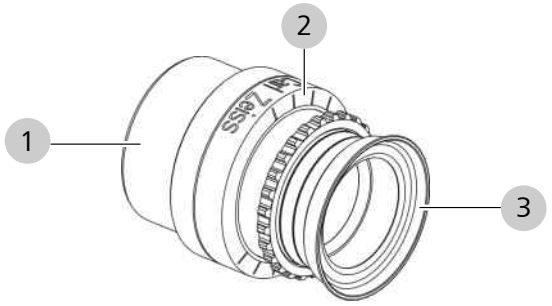


Figure 11: Widefield eyepiece (10x or 12.5x)

1	Magnetic coupling	2	Diopter scale
3	Eyecup		

3.3.7.3 Objective lens

The apochromatic lens adjusts the surgical microscope to fit different operating distances.

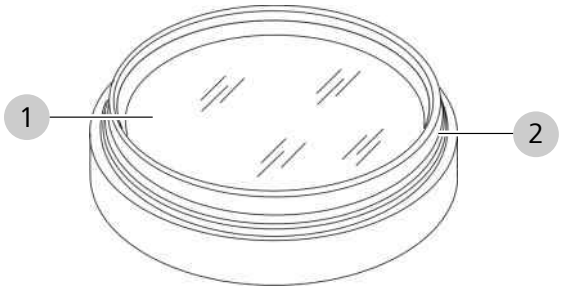


Figure 12: Objective lens

1	Lens	2	Fine screw threads

3.3.8 Digital surgical microscope

The digital surgical microscope enlarges and illuminates the surgical field and displays it on the 3D monitor.

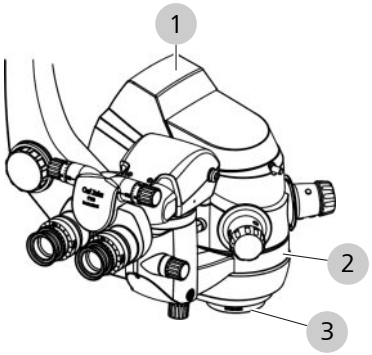


Figure 13: Digital surgical microscope (example with inverter tube E)

1	Integrated 4K camera	2	Main observer
3	Objective lens		

3.3.9 Assistant's Microscope (optional)

The assistant's microscope provides the assistant with the same image as that of the main operator.

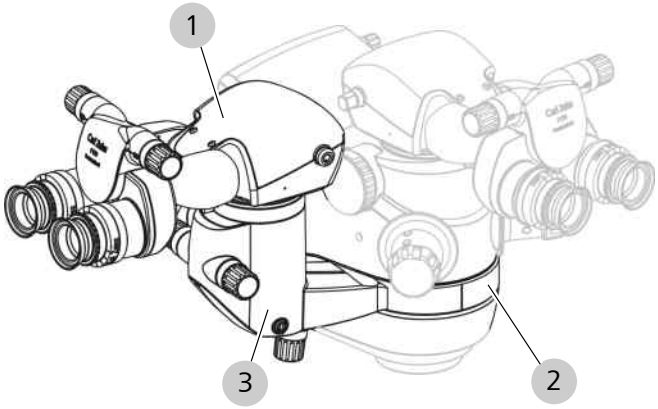


Figure 14: Assistant's microscope (example with Invertertube E)

1	Invertertube E	2	Swivel mechanism with lock
3	Electrical zoom system: works independently of, or in parallel with, the surgical microscope zoom feature. Alternative: manual 5x magnification changer: works independently of the surgical microscope's zoom feature.		

3.3.10 Monitor cart (digital surgical microscope)

3.3.10.1 Monitor cart (front)

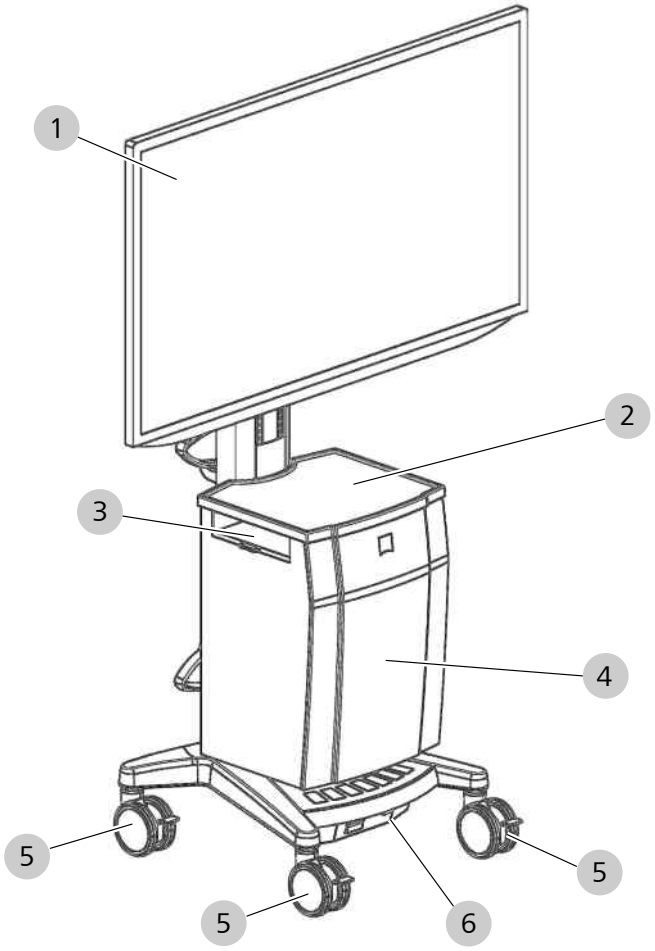


Figure 15: Monitor cart (front)

1	3D Monitor	2	Tray
3	Storage compartment with USB interface for connecting an external hard drive	4	Housing
5	Steerable casters	6	Isolating transformer

3.3.10.2 Monitor cart (rear)

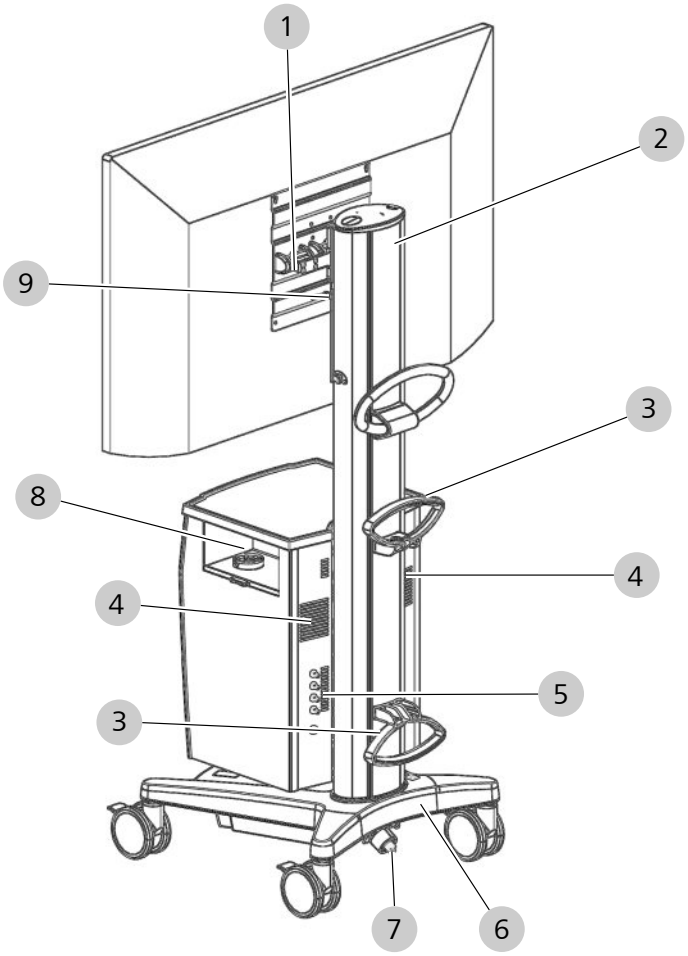


Figure 16: Monitor cart (rear)

1	VESA interface	2	Device column
3	Cable holder	4	Ventilation opening
5	Video connector panel [▶ 57]	6	Device base
7	Cable set	8	Storage compartment with dovetail for storing the backup eyepiece
9	Fixing lever		

3.3.11 14-function foot control panel

The 14-function foot control panel is used to operate the device hands-free.

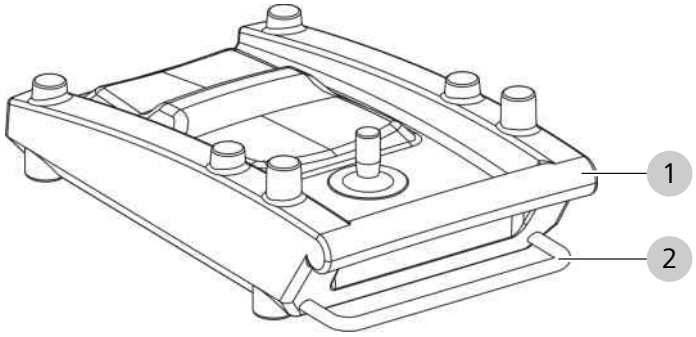


Figure 17: 14-function foot control panel

1	Bracket	2	Storage bracket

The 14-function foot control panel is available in wireless (FCP WL) and wired versions (FCP).

3.3.12 Stand base

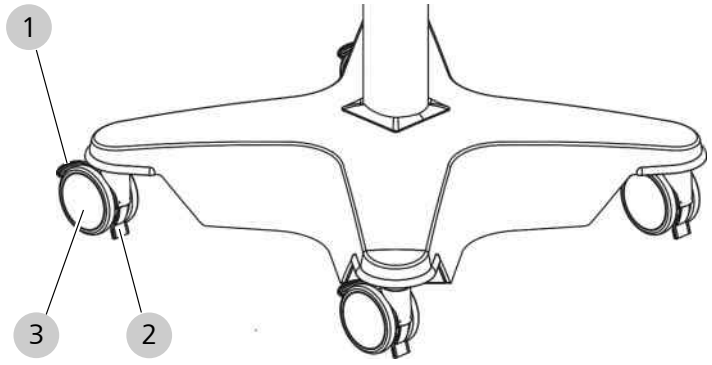


Figure 18: Stand base

1	Locking tab	2	Cable deflector
3	Steerable casters		

3.3.13 Stand column

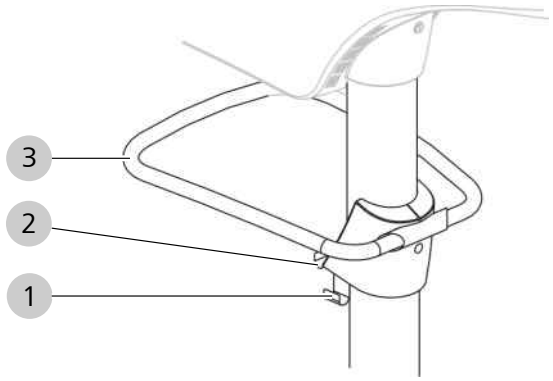


Figure 19: Stand column

1	Cable holder	2	Foot control panel bracket
3	Transport handle		

3.3.14 Support arm with connector panel

The support arm is used to align the suspension arm horizontally and to store electronic components.

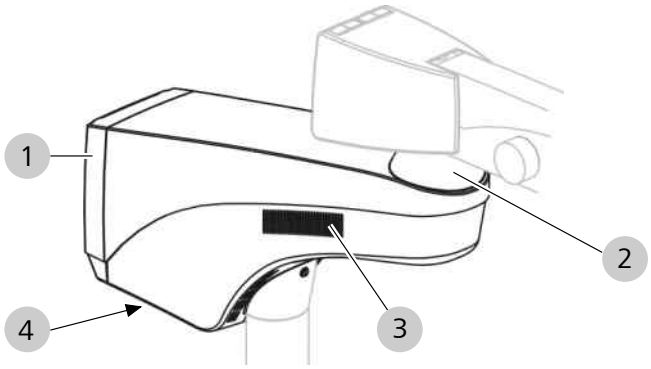


Figure 20: Support arm with connector panel

1	Control panel [▷ 70]	2	Suspension arm mount
3	Ventilation opening	4	Connector panel [▷ 55]

3.3.15 Integrated video monitor

The integrated video monitor can be used for dual observation of the surgical procedure by sterile surgical staff.

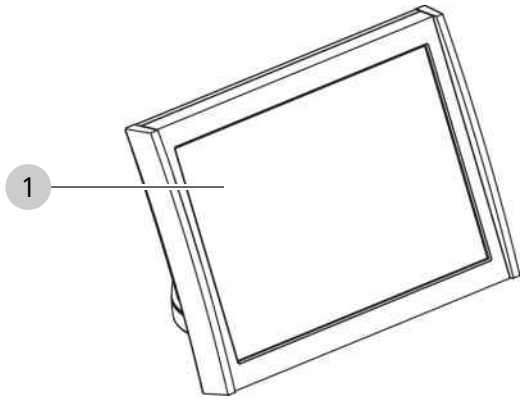


Figure 21: Integrated video monitor

1	Monitor

3.3.16 Support arm for integrated video monitor

The support arm is used to adjust the integrated video monitor vertically and horizontally.

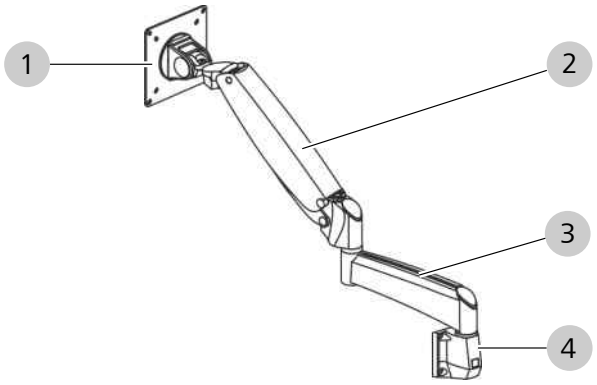


Figure 22: Support arm for integrated video monitor

1	VESA interface	2	Suspension arm
3	Swivel arm	4	Mount

3.3.17 Instrument tray

The instrument tray is intended to hold ZEISS devices.

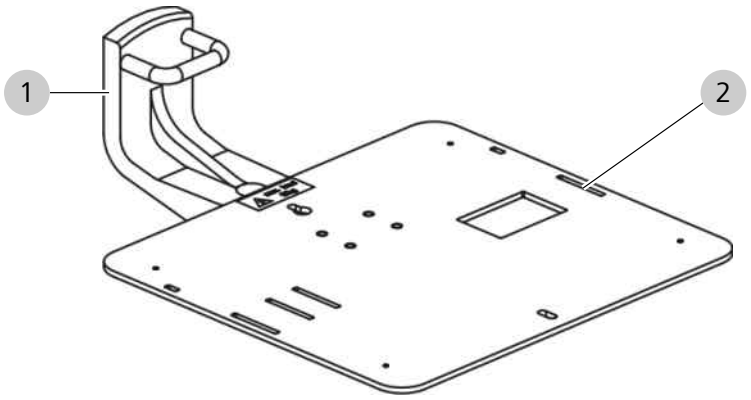


Figure 23: Instrument tray

1	Mount for integrated video monitor	2	Instrument support surface

3.3.18 Integrated keratoscope ring

The integrated keratoscope ring provides intraoperative visualizations of corneal curvatures. An elliptical reflection of the keratoscope ring light on the cornea displays the direction of the astigmatism. The direction shown is merely an indicator for the astigmatism and is not intended for use in measuring the astigmatism's refractive power.

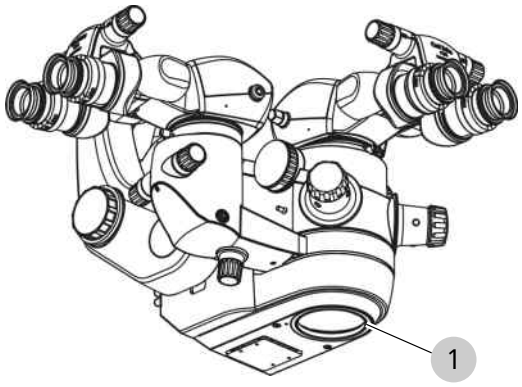


Figure 24: Integrated keratoscope ring

1	LED illumination

The red LED illumination system forms a ring around the objective lens.

3.3.19 Connections on the surgical microscope

Figure 25: Connections on the surgical microscope

1	Right coobservation output	2	Left coobservation output
3	Light guide input	4	RESIGHT 700 port
5	Invertertube E port		

3.3.20 Connections on the assistant's microscope

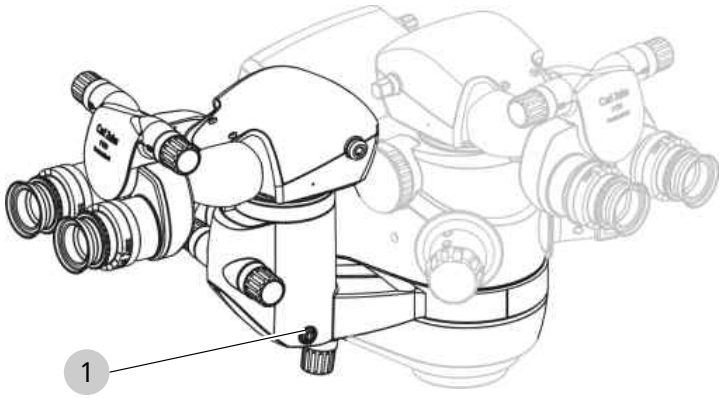


Figure 26: Connections on the assistant's microscope

1	Invertertube E port

3.3.21 Connector panel

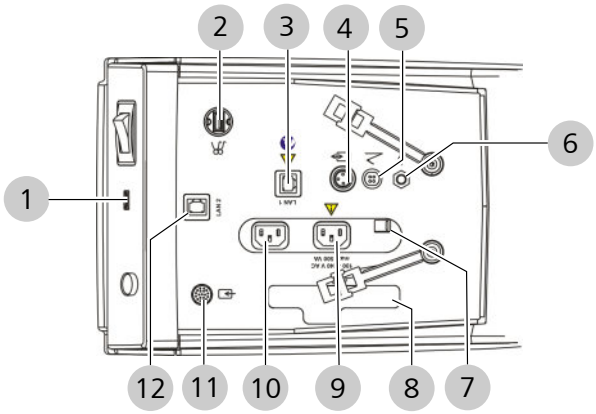


Figure 27: Connector panel (example with optional connections)

1	USB port for HD video and image recording (optional)	2	USB service port
3	LAN 1 network connection (optional)	4	Remote connection for external devices with a maximum switching capacity of 24 V / 0.5 A.
5	Foot control panel connector	6	Potential equalization connector in accordance with the requirements of IEC 60601-1.
7	Sliding switch for rated voltage	8	Connection panel for the integrated HD camera (optional)
9	Power outlet with max. voltage rating 100 - 240 V AC, max. 500 VA	10	Power input socket
11	LEMO socket for IDIS (optional, only on external CALLISTO eye Panel PC)	12	LAN 2 network connection (optional)

3.3.22 Connector panel for the integrated HD camera

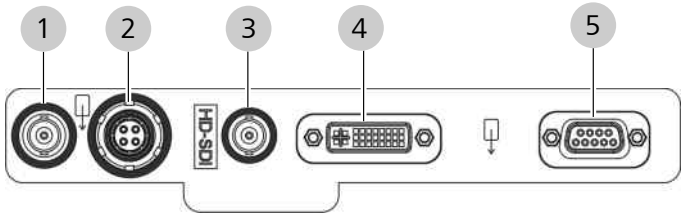
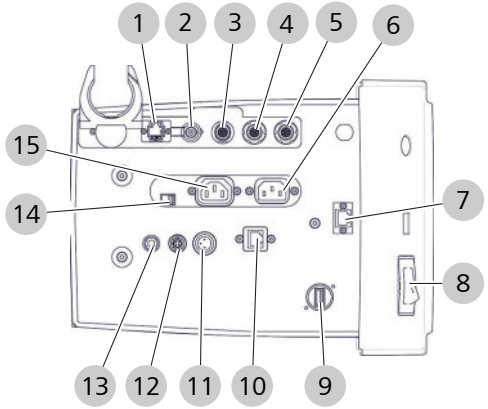


Figure 28: Connector panel for the integrated HD camera

1	Composite video output	2	Y/C video output (green)
3	HD-SDI video output	4	DVI-D video output
5	YPbPr video output		

3.3.23 Digital surgical microscope connector panel



1	LAN 3 network connector for monitor cart	2	HD-SDI video port
3	Lemo socket for CALLISTO eye	4	Lemo socket (green)
5	Lemo socket (blue)	6	Power input socket
7	LAN 2 network connector	8	Power switch
9	USB service port	10	LAN 1 network connector
11	Remote connection for external devices with a maximum switching capacity of 24 V / 0.5 A.	12	Foot control panel connector
13	IEC 60601-1 standard potential equalization connector.	14	Sliding switch for rated voltage
15	Power output socket		

3.3.24 Monitor cart connector panel

The connector panel on the monitor cart is used to connect an external 2D monitor. The connectors are numbered 11, 12, 13 and 14.

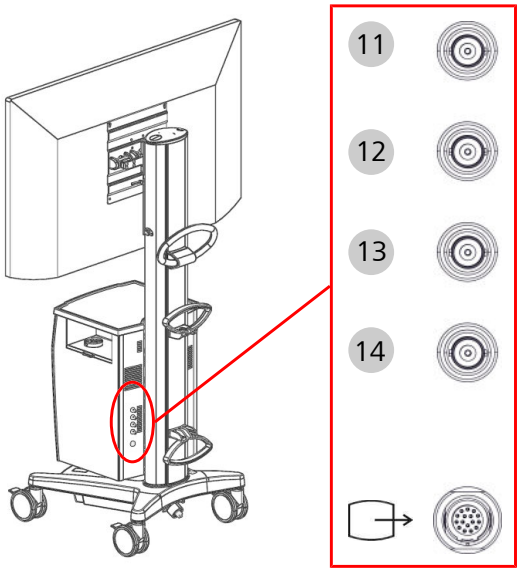
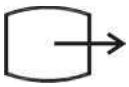


Figure 29: Monitor cart connector panel

11-14	3G-SDI video output 4K-UHD 3840x2160p (2 sample interleave)
	ODU video output Full HD - 2D, HDMI 1920x1080p

3.3.25 CALLISTO eye Panel PC connector panel (model I)

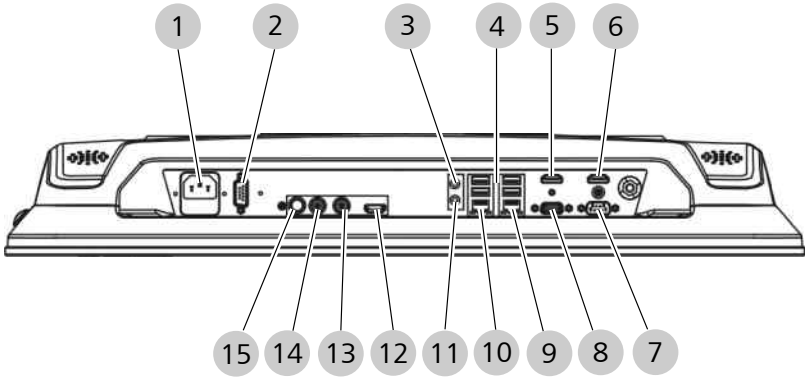


Figure 30: CALLISTO eye Panel PC connector panel (model I)

1	Voltage connection	2	COM port
3	Microphone port	4	USB ports (4x)
5	HDMI port (disabled)	6	HDMI port for IDIS

7	COM port (disabled)	8	VGA port (disabled)
9	Network connection	10	Network connection
11	Speaker port	12	HDMI port (disabled)
13	HD-SDI video output (disabled)	14	HD-SDI video input
15	Y/C video input		

3.3.26 CALLISTO eye Panel PC connector panel (model II)

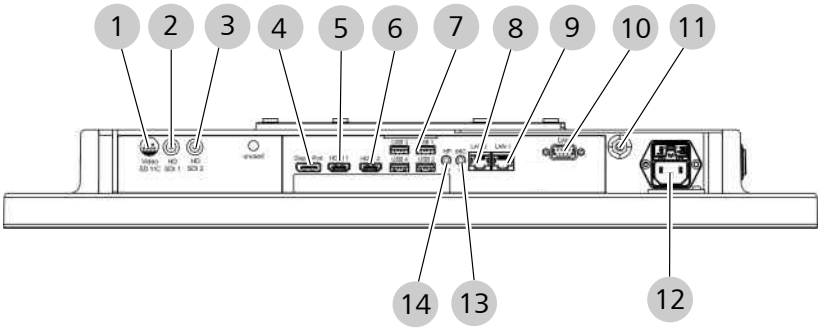


Figure 31: CALLISTO eye Panel PC connector panel (model II)

1	Y/C video input	2	HD-SDI 1 video input
3	HD-SDI 2 (disabled)	4	Display port
5	HDMI 1 port (for IDIS)	6	HDMI 2 port
7	4 USB ports (4x)	8	LAN 2 network port
9	LAN 1 network port for OMPI Lumera 700 / hospital network	10	CAN port
11	Potential equalization	12	Voltage connection
13	Microphone port	14	Speaker port

3.4 Control elements and displays

3.4.1 Superlux Eye light source fault signal

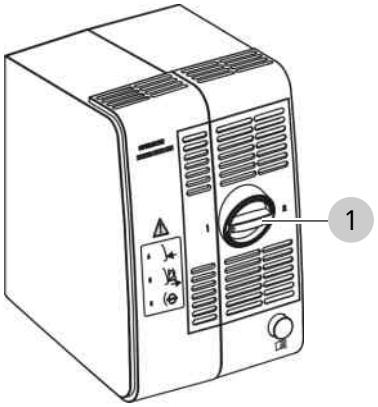


Figure 32: Superlux Eye light source fault signal

Item	Symbol	Name	Explanation
1		Red segment	Illuminated red: xenon lamp is defective. The backup xenon lamp is on.

3.4.2 Halogen light source fault signal

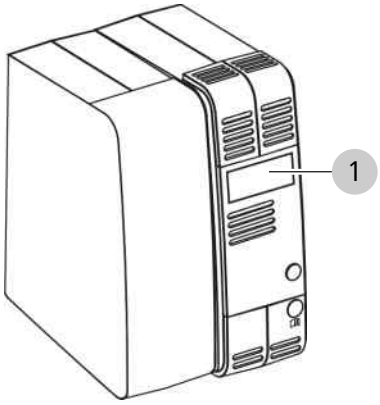


Figure 33: Halogen light source fault signal

Item	Symbol	Name	Explanation
1		Automatic flap	Flap open: halogen lamp is defective. The backup halogen lamp is on.

3.4.3 LED light source fault signal

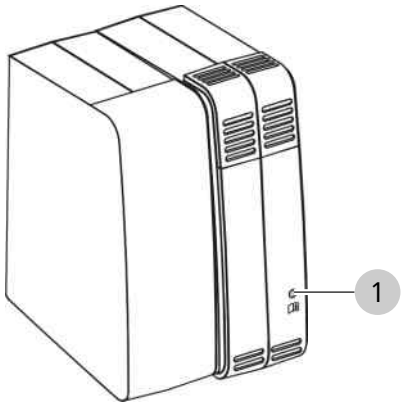


Figure 34: LED light source fault signal

Item	Symbol	Name	Explanation
1		Amber LED	Illuminated amber: LED light source is defective. Light intensity is 50%. An error message is displayed on the control panel.

3.4.4 Manual mode fault signal

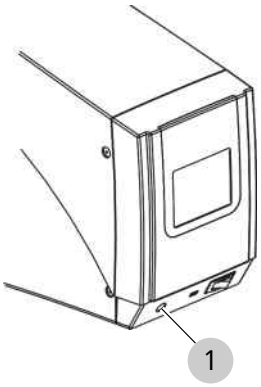


Figure 35: Manual mode fault signal

Item	Symbol	Name	Explanation
1		Yellow LED	Not illuminated: working mode is activated Illuminated yellow: manual mode is activated ■ Light sources are at medium intensity ■ XY coupling, focus and zoom are inactive ■ The filters are in the swiveled-out position ■ Control panel is black

3.4.5 Overhead display

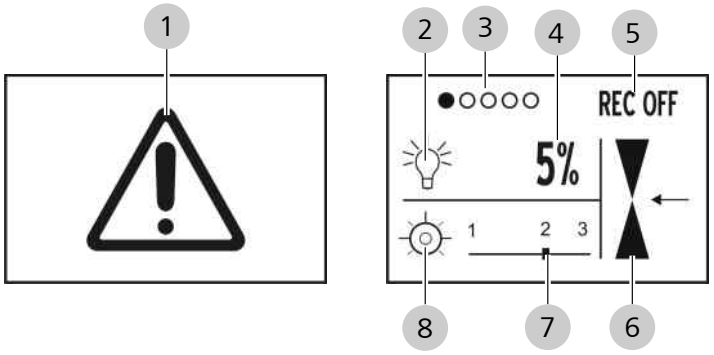
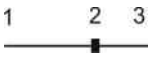


Figure 36: Elements that can be displayed on the overhead display

Item	Symbol	Name	Explanation
1		"CAUTION "	Displays a message on the control panel. Once the message is canceled by the user, the message disappears on the control panel and on the overhead display.
2		Status of the light source	Bright lamp: light source is on. Dark lamp: light source is off.
3	●○○○○ **R**	Surgery profiles	Empty circle: displays created surgery profiles. One circle is displayed for each surgery profile which has been configured for the current user (max. five). Filled circle: indicates the active surgery profile. R: a surgery profile with RESIGHT profile is active
4	5%	Intensity of the light source	Displays the light intensity from 5% to 100%.
5	REC OFF	Video status	REC OFF: no video recording. REC ON: video recording is running. REC ON/REC OFF: no integrated HD image and video recording available.
6		Focus position	Up arrow: focus 40 mm above initial position. Center arrow: focus at initial position. Down arrow: focus 30 mm below initial position.

Item	Symbol	Name	Explanation
7		SCI illumination mix ratio	Position 1: red reflex illumination 100%, surrounding field illumination 0%. Position 2: red reflex illumination 100%, surrounding field illumination 50%. Position 3: red reflex illumination 0%, surrounding field illumination 100%.
8		SCI illumination status	Empty icon: light emitted generates a red reflex. Icon half filled: light emitted generates a red reflex and simultaneously illuminates the surrounding area of the patient's eye. Icon filled: light emitted illuminates the entire field of view.

3.4.6 Surgical microscope

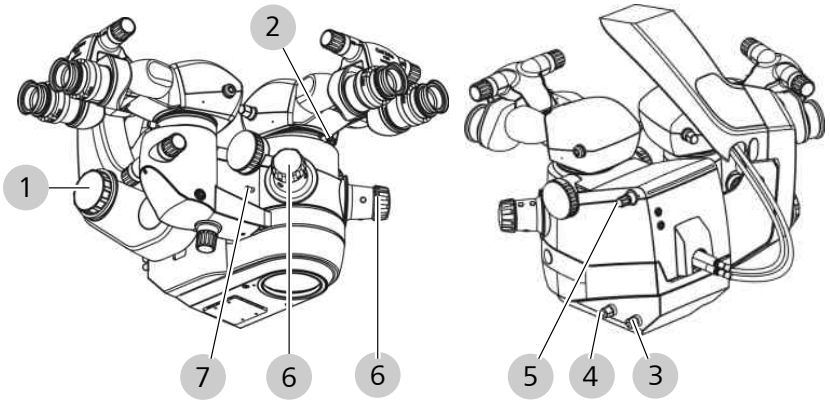


Figure 37: Controls on the surgical microscope

Item	Key	Name	Erklärung
1		Adjustment wheel [OPMI tilt]	Tilts the surgical microscope.
2		Securing screw	Fastens the tubes or accessories to the surgical microscope.

Item	Key	Name	Erklärung
3		[Integrated slit lamp] rotary knob	In the event of device fault: position slit lamp manually. ■ Left position: slit lamp from the left ■ Center position: standard OPMI illumination ■ Right position: slit lamp from the right
4		[SCI illumination] rotary knob	In the event of device fault: manually switch SCI illumination. ■ Left position: light emitted generates a red reflex. ■ Right position: light emitted illuminates the entire field of view
5		[Coobservation output] rotary knob	Switches the co-observation output from left to right or vice versa.
6		Handgrips	Positions the surgical microscope. Buttons and directions of rotation are freely configurable. [▷ 87]
7		Zoom adjustment knob	In the event of device fault: zoom manually.

3.4.7 Digital surgical microscope

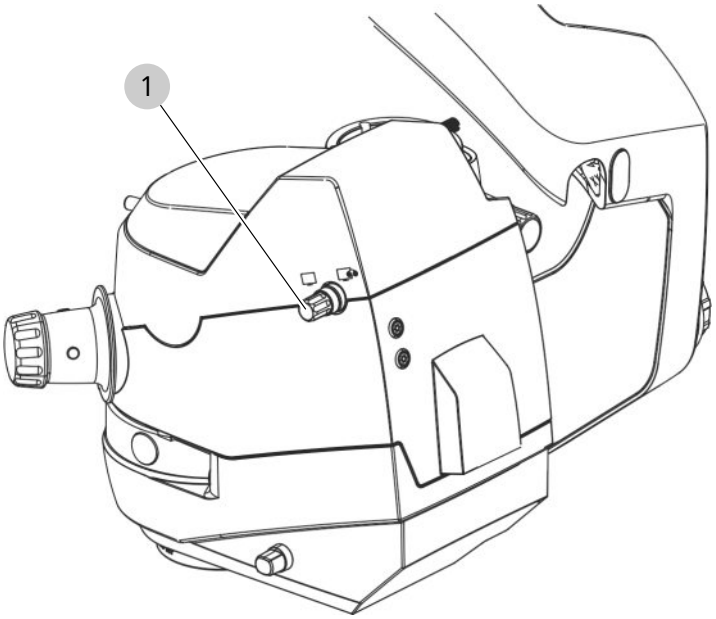


Figure 38: Digital surgical microscope

Pos.	Symbol	Name	Explanation
1		[Operating mode] knob	Sets the operating mode of the surgical microscope. ■ Left position: Digital: the image is visible on the 3D monitor ■ Right position: Hybrid: the image is visible on the 3D monitor and in the tube

3.4.8 Assistant's microscope

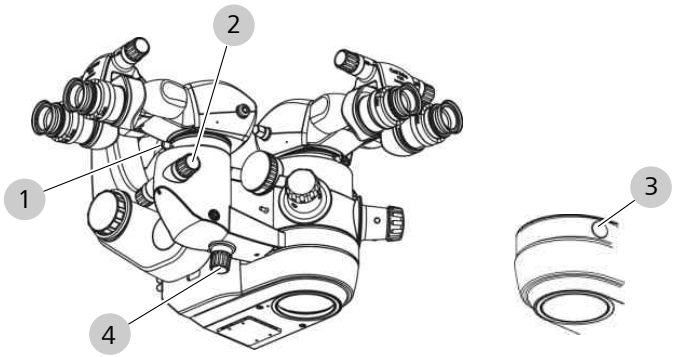


Figure 39: Controls on the assistant's microscope

Pos.	Symbol	Name	Explanation
1		Securing screw	Fastens a tube.
2		Knob [zoom]	Rotate left: larger Rotate right: smaller
3		Locking knob	Releases the lock on the assistant's microscope. The knob is always located opposite the assistant’s microscope.
4		Focus knob	Rotate left: increase Rotate right: decrease

3.4.9 Invertertube E

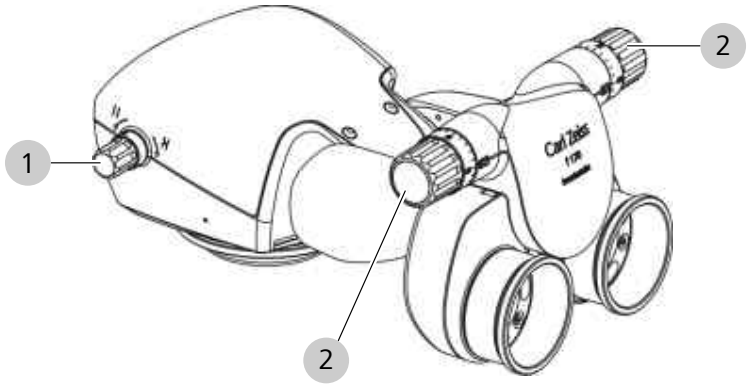
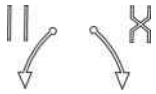


Figure 40: Control elements on the Invertertube E

Item	Symbol	Name	Explanation
1		[Inversion] adjustment wheel	Switches between "not inverted" and "inverted".
2		[Inter-pupillary distance] adjustment wheel	Sets the interpupillary distance.

3.4.10 Widefield eyepiece

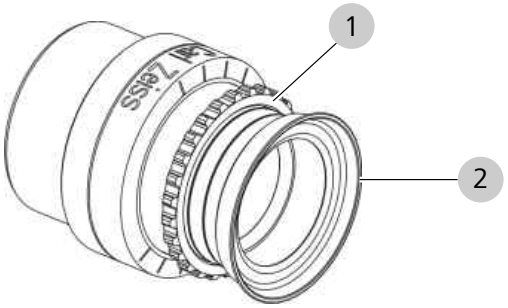


Figure 41: Control elements on widefield eyepiece

Item	Name	Explanation
1	Diopter setting ring	Compensates for visual defects from -8 dpt to +5 dpt.
2	Eyecup	Prevents the entry of scattered light.

3.4.11 Handgrips

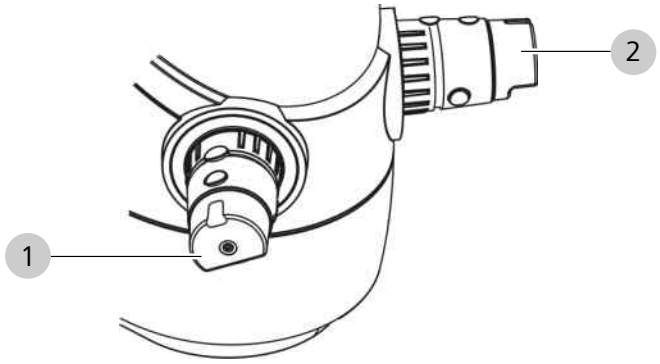


Figure 42: Control elements on the handgrips

Item	Name	Explanation
1	Left handgrip	Positions the surgical microscope. Factory settings for buttons and directions of rotation [▷ 84]
2	Right handgrip	Positions the surgical microscope. Factory settings for buttons and directions of rotation [▷ 85]

3.4.12 14-function foot control panel

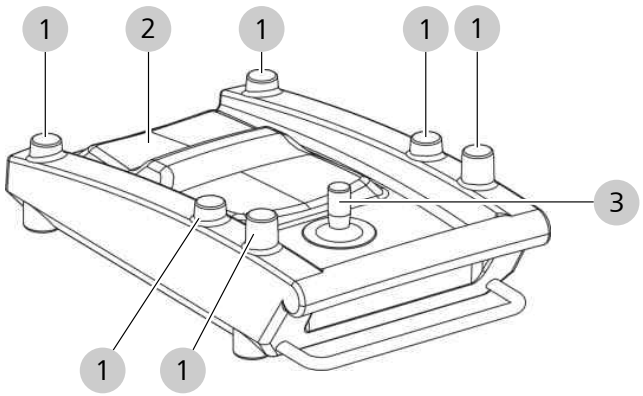


Figure 43: Controls on the 14-function foot control panel

Pos.	Name	Explanation
1	Buttons	Control device functions (freely configurable).
2	Rocker switches	Control zoom and focus (horizontal and vertical configuration possible).
3	Joystick	Adjusts the XY coupling.

3.4.13 XY coupling

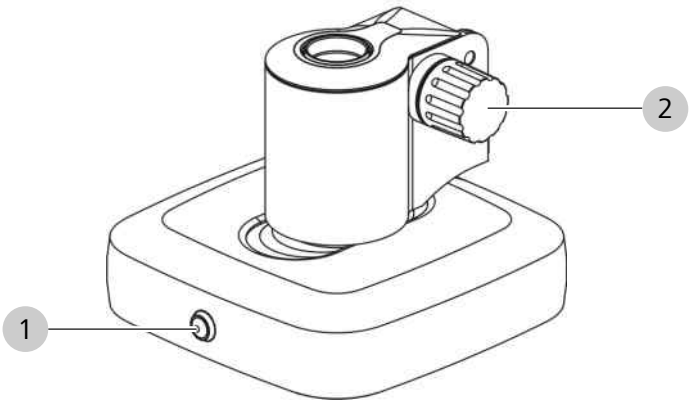


Figure 44: Controls for the XY coupling

Item	Symbol	Name	Explanation
1		XY reset button	Resets functions to their initial positions. Not illuminated: the following functions are in their initial position: ■ XY coupling ■ Focus (surgical microscope and RESIGHT 700) ■ Zoom ■ Light source Illuminated: a function is active.
2		Friction adjustment knob	Enables the surgical microscope to rotate left or right.

3.4.14 Suspension arm

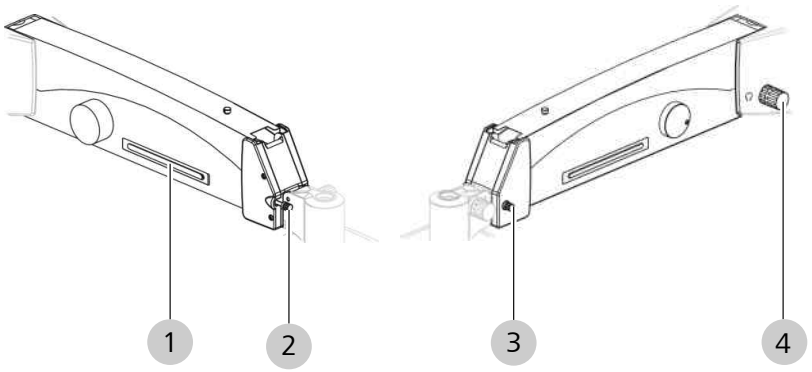
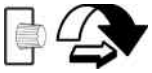
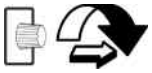
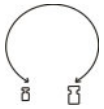


Figure 45: Controls on the suspension arm

Item	Key	Name	Erklärung
1		[Release magnetic brake] switch	Triggers the magnetic brake. Can be operated by unsterile staff members.
2		[Downward travel limit] rotary knob	Sets the minimum working distance from the surgical field in the vertical direction.
3		[Suspension arm immobi-lization] rotary knob	Prevents the suspension arm from shooting upward or moving downwards when an accessory is being attached or removed.
4		[Weight balance] rotary knob	Balances the surgical microscope.

3.4.15 Control panel

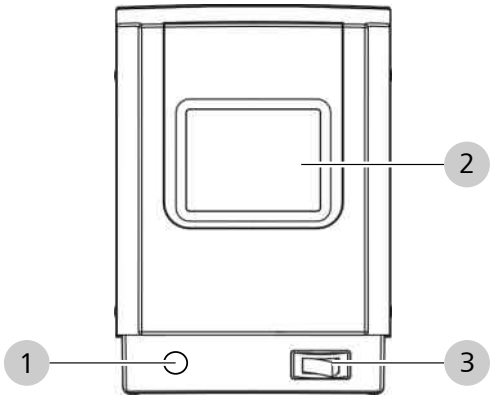


Figure 46: Control elements on the control panel

Item	Symbol	Name	Explanation
1		[Manual mode] switch	Activates manual control.
2		Control panel	Controls and configures the software.
3		Power switch	Not illuminated: device is off. Illuminated green: device is on.

3.4.16 Monitor cart (digital surgical microscope)

3.4.16.1 Monitor cart (front)

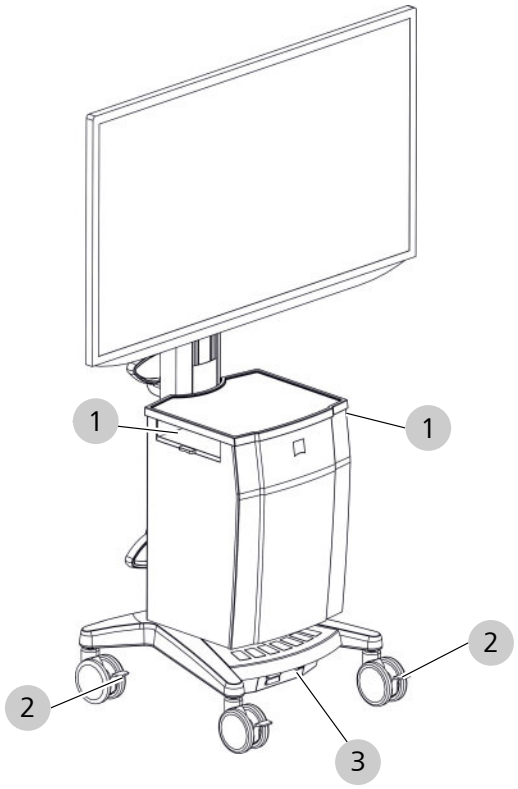


Figure 47: Controls on monitor cart (front)

Pos.	Symbol	Name	Explanation
1		Storage compartment	For storing device accessories and other objects.
2		Locking tab	Positions the monitor cart and secures it to prevent it from moving unintentionally. ■ Up: caster is movable ■ Down: caster is locked
3		Voltage selector	Sets the rated voltage of the monitor cart to the rated voltage of the installation site.

3.4.16.2 Monitor cart (rear)

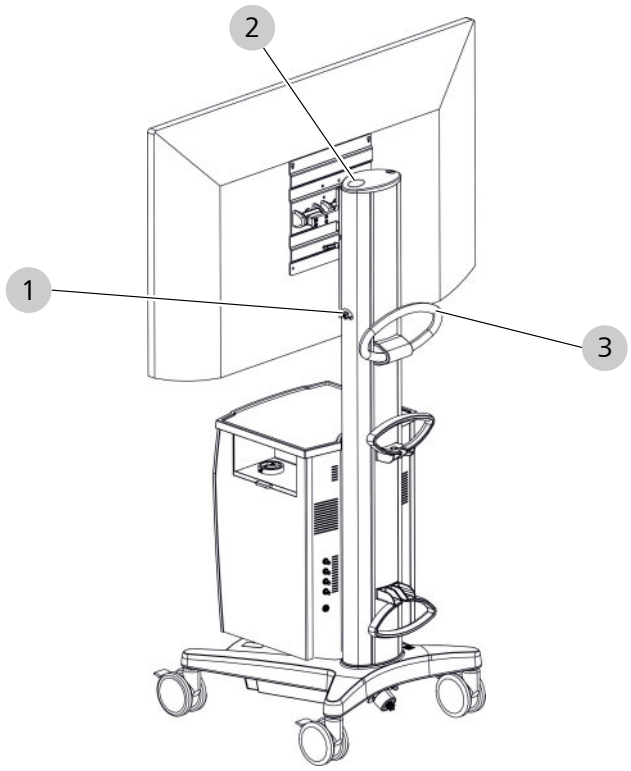


Figure 48: Controls on monitor cart (rear)

Pos.	Symbol	Name	Explanation
1		[Cable compartment] rotary knob	Left position: cable compartment is locked. Right position: cable compartment is unlocked.
2		[Power] button	Not illuminated: monitor cart is switched off. Illuminated green: monitor cart is switched on.
3		Transport handle	Used to push the monitor cart.

3.4.17 CALLISTO eye Panel PC (model I)

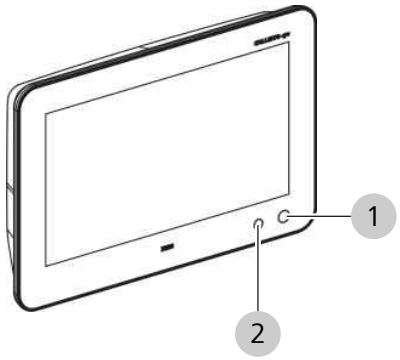


Figure 49: Control elements on the CALLISTO eye Panel PC (model I)

Pos.	Symbol	Name	Explanation
1		[Power] button	Not illuminated: CALLISTO eye Panel PC is not connected to a power source.
		[Power] button	Illuminated green: CALLISTO eye Panel PC is on.
		[Power] button	Illuminated orange: CALLISTO eye Panel PC is connected to a power source.
2		[Touch Function] button	Not illuminated: touch screen is activated. Illuminated: touchscreen is locked.

3.4.18 CALLISTO eye Panel PC (model II)

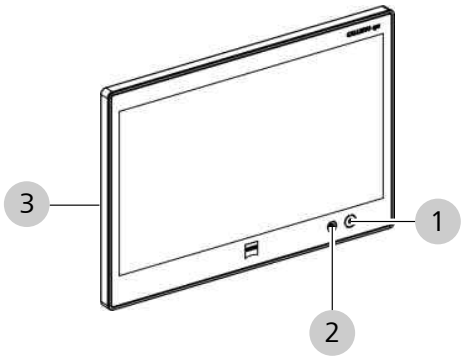


Figure 50: Control elements on the CALLISTO eye Panel PC (model II)

Pos.	Symbol	Name	Explanation
1		[Power] button	Not illuminated: CALLISTO eye Panel PC is not connected to a power source or the main power switch is in the off position.
		[Power] button	Illuminated green: CALLISTO eye Panel PC is on.
		[Power] button	Illuminated orange: CALLISTO eye Panel PC is connected to a power source.
2		[Touch function] button	Not illuminated: touch screen is activated. Illuminated: touchscreen is locked.
3		Main switch	Turns the CALLISTO eye Panel PC on and off.

3.4.19 Superlux Eye light source

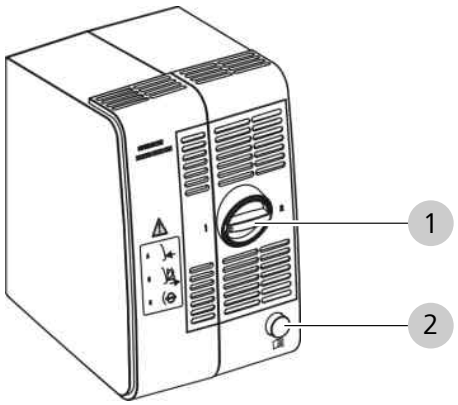
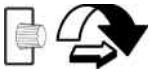


Figure 51: Superlux Eye light source controls

Item	Key	Name	Erklärung
1		[Backup xenon lamp] switch	Switches to the backup xenon lamp.
2		[Open lamp module] button	Opens the lamp module.

3.4.20 Halogen light source

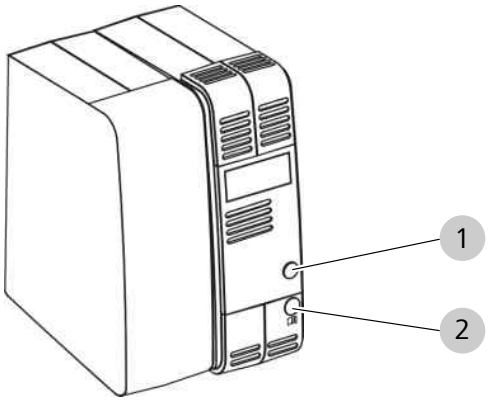
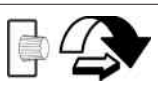


Figure 52: Halogen light source controls

Item	Key	Name	Erklärung
1		[Backup halogen lamp] button	Switches to the backup halogen lamp.
2		[Open lamp module] button	Opens the lamp module.

3.5 Software description

3.5.1 Control panel layout

The displayed elements consist of the operating panel functions.

Figure 53: Control panel

Item	Name	Explanation
1	Bottom bar	Displays the following information: ■ User and OP profile ■ Menu
2	Working area	Displays the main content of the operating panel. If the work area is not sufficient for display, the main content of the operating panel is displayed on several tabs.
3	Status bar	Displays the device status. Tapping displays status details in the workspace, tapping again decreases the display.

3.5.2 Bottom bar

The bottom bar displays the available storage options and the menu that is currently open.

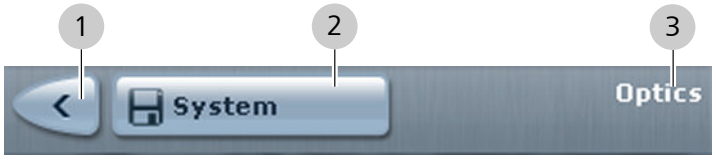


Figure 54: Bottom bar

Pos.	Symbol	Name	Explanation
1		Back	Temporarily saves values.
2		System	Saves device-specific values (e.g. optical settings, pairing, network, etc.)
		User name / Start values	Saves user-specific start values. (e.g. SCI illumination, zoom, etc.)
		User name / Profile name	Saves profile-specific values. (e.g. light on/off, foot control panel configuration, etc.)
		User name / Profile name	Saving not possible.
		Activate	Activates the selected user profile.
3	optics	Menu name	Displays the menu that is currently open.

3.5.3 Status bar

The icons in the status bar provide information about the current status of the device.

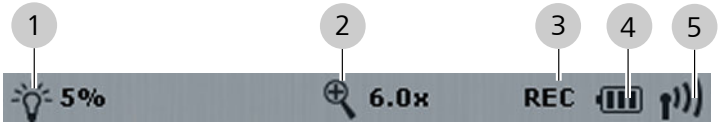


Figure 55: Status bar

Pos.	Symbol	Name	Explanation
1		Light	Light on, light intensity in %.
		Light	Light off, light intensity in %.

Pos.	Symbol	Name	Explanation
2		Magnifi-cation	Displays the total magnification.
3	REC	Record	For integrated HD video and image recording: indicates that recording is in process.
4		Battery	Displays the charge state of the battery in the wireless 14-function foot control panel.
5		Bluetooth	Displays the signal strength of the connection to the wireless 14-function foot control panel.

3.5.4 Color code

The button colors provide information about the status of display elements or the functions they represent.

Button	Color	Erklärung
	Gray	Locked button.
	Light blue	Clickable button.
	Blue	Clicked or active button.
	Gray	Locked function.
	Light blue	Deactivated function.
	Blue	Activated function.

3.5.5 Interactive buttons

The following table provides descriptions of all interactive buttons and their functions.

Button	Name	Erklärung
	Save	Saves the selected element.
	Up arrow	Increases the value. When the highest value has been reached, the arrow button is grayed out.
	Down arrow	Lowers the value. When the lowest value has been reached, the arrow button is grayed out.
	Right arrow	Increases the value. When the highest value has been reached, the arrow button is grayed out.

Button	Name	Erklärung
	Left arrow	Lowers the value. When the lowest value has been reached, the arrow button is grayed out.
	Minus	Decreases a value in the "Date & Time" menu.
	Plus	Increases a value in the "Date & Time" menu.
	Ok	Confirms an action.
	Close	Closes a menu.
	Function button	Deactivates a function.
	Function button	Activates a function.
	Add	Adds an element.
	Delete	Deletes a selected element.
	Edit	Modifies a selected element.
	Workflow steps	Opens the "Surgery Profiles" menu.
	Photo	Selects a photo.
	Video	Selects a video.
	Photo capture	Takes a photo. Tip: During video recording, the photo capture button can be tapped to create additional individual images. These can also be used as markers for skipping through the video recording.
	Video Recording	Records a video.
	Playback	Starts playback.
	Pause	Pauses playback.
	Stop	Stops playback.
	Fast forward	Increases playback speed by 10% with each press.
	Fast rewind	Decreases playback speed by 10% with each press.

Button	Name	Erklärung
	Skip forward	Jumps to the next marker during playback. If no marker has been set, the video skips directly to the end.
	Skip backward	Jumps to the previous marker during playback. If no marker has been set, the video skips directly to the beginning.

3.5.6 Navigation buttons

The following elements are used for navigating through the menus:

Button	Name	Erklärung
	Menu button	Opens a menu.
	Submenu button	Opens a submenu.
	Selection field	Opens a selection list.
	Arrow button	Scrolls up in a selection list. When the highest element has been reached, the arrow button is grayed out.
	Arrow button	Scrolls down in a selection list. When the lowest element has been reached, the arrow button is grayed out.
	Slider	Scrolls up and down in a selection list.
	Back	Navigates to the previous menu or submenu and temporarily saves the selected settings.

3.5.7 Control panel keyboard

If text entries need to be made, a virtual keyboard is displayed on the control panel with the following input options:

Figure 56: Control panel keyboard

Pos.	Symbol	Name	Explanation
1	-	Text field	-
2	-	Numeric keypad	Used to input numbers.
3		Delete	Deletes characters to the left of the cursor.
4		Space bar	-
5	-	ABC keypad	Used to input letters.
6		Shift key	Switches between upper-case and lower-case letters.

3.5.8 Settings for daily operation – main menu, tab 1

Figure 57: Main menu, tab 1

Pos.	Symbol	Name	Explanation
1		User	Manages user and surgery profiles.
2		Light	Adjusts the SCI illumination and light sources.
3		XY Focus Magnifi-cation	Adjusts the following functions: ■ Total magnification ■ DeepView ■ Focus of the surgical microscope ■ Position of the XY coupling
4		Record	Manages patient data. Used for photo and video capture.
5		Additional Settings	Adjusts user-specific settings.
6		Camera	Configures the integrated 4K camera.

3.5.9 Basic device settings – main menu, tab 2

Figure 58: Main menu, tab 2

Pos.	Symbol	Name	Explanation
1		System Settings	Adjusts system-specific settings: ■ optics ■ Pairing ■ Recording ■ CALLISTO eye ■ Video Format ■ Versions ■ Date & Time ■ Export data ■ Service PIN ■ Lamp service life
2		CALLISTO connection	Transfers control to the CALLISTO eye Panel PC.

3.5.10 Factory settings for handgrips and 14-function foot control panel

3.5.10.1 Left handgrip factory settings

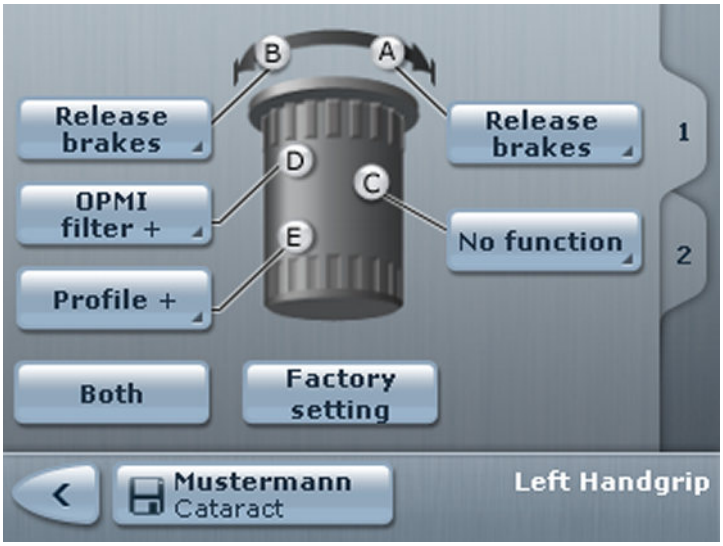


Figure 59: Preconfigured button assignments on the left handgrip

Item	Symbol	Name	Explanation
A	Release brakes	Direction of rotation A	Releases all magnetic brakes and allows the device to be moved along all axes.
B	Release brakes	Direction of rotation B	Releases all magnetic brakes and allows the device to be moved along all axes.
C	No function	Button C	
D	OPMI filter +	Button D	Moves forward one filter.
E	Profile +	Button E	Moves forward one surgery profile.

3.5.10.2 Right handgrip factory settings

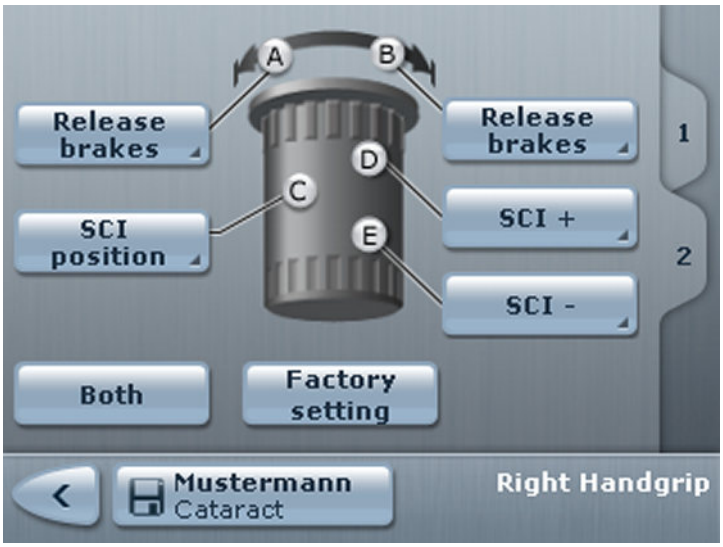


Figure 60: Preconfigured button assignments on the right handgrip

Item	Symbol	Name	Explanation
A	Release brakes	Direction of rotation A	Releases all magnetic brakes and allows the device to be moved along all axes.
B	Release brakes	Direction of rotation B	Releases all magnetic brakes and allows the device to be moved along all axes.
C	SCI position	Button C	Switches between the three defined SCI illumination positions.
D	SCI +	Button D	Increases the SCI light intensity.
E	SCI -	Button E	Reduces the SCI light intensity.

3.5.10.3 Factory settings of the 14-function foot control panel

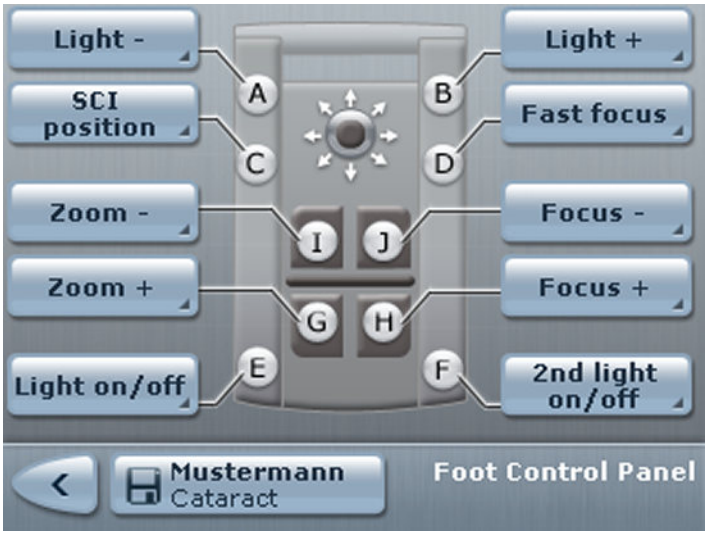


Figure 61: Preconfigured button assignments on the foot control panel

Item	Symbol	Name	Explanation
A	Light -	Button A	Reduces the light intensity of the main light source.
B	Light +	Button B	Increases the light intensity of the main light source.
C	SCI position	Button C	Switches between the three defined SCI illumination positions.
D	Fast Focus	Button D	Switches between two focus levels.
E	Light On / Off	Button E	Activates or deactivates the main light source.
F	2nd light source On / Off	Button F	If there is an integrated 2nd light source: activates or deactivates the second light source.
	Keratoscope On / Off	Button F	If there is an integrated kerato-scope ring: activates or deactivates the keratoscope ring.
g	Zoom +	Rocker switch G	Increases the magnification on the surgical microscope.
H	Focus +	Rocker switch H	Raises the surgical microscope focus.
I	Zoom -	Rocker switch I	Decreases the magnification on the surgical microscope.
J	Focus -	Rocker switch J	Lowers the surgical microscope focus.

3.5.11 Configurable assignments for handgrips and the 14-function foot control panel

Area	Function	Explanation	Assignment possible		
					
	No function	Button is disabled.	x	x	
Light/ illumi-nation	Light On / Off	Activates or deactivates the main light source.	x	x	
	Light +	Increases the light intensity of the main light source.	x	x	
	Light -	Reduces the light intensity of the main light source.	x	x	
	SCI +	Increases the SCI light intensity.	x	x	
	SCI -	Reduces the SCI light intensity.	x	x	
	SCI position	Switches between the three defined SCI illumination positions.	x	x	
	Slit left	Switches between central illumination and slit from the left.	x	x	
	Slit right	Switches between central illumination and slit from the right.	x	x	
	Right/Left slit	Switches between left and right slit.	x	x	
	Slit width +	Moves forward one slit width on the integrated slit illuminator.	x	x	
	Slit width -	Moves back one slit width on the integrated slit illuminator.	x	x	
	OPMI filter +	Moves forward one filter.	x	x	
	OPMI filter -	Moves back one filter.	x	x	
	Keratoscope On / Off	Activates or deactivates the keratoscope ring.	x	x	
	Retina stop	Swings the retina protection device into and out of the surgical microscope's beam path.	x	x	
	VISULUX left	Positions the VISULUX fiber slit illuminator on the left side.	x	x	
	VISULUX right	Positions the VISULUX fiber slit illuminator on the right side.	x	x	

Area	Function	Explanation	Assignment possible		
					
OPMI	Focus +	Raises the surgical microscope focus.	x	x	x
	Focus -	Lowers the surgical microscope focus.	x	x	x
	RESIGHT Focus +	For RESIGHT user profile: raises the RESIGHT 700 focus.	x	x	x
	RESIGHT Focus -	For RESIGHT user profile: lowers the RESIGHT 700 focus.	x	x	x
	Fast Focus	Moves the surgical microscope max. 40 mm upward; if pressed again, it moves the microscope downward.	x	x	
	Reset XY	Moves the XY coupling to its center position at maximum speed.	x	x	
	Zoom +	Increases the magnification on the surgical microscope.	x	x	x
	Zoom -	Decreases the magnification on the surgical microscope.	x	x	x
Video/ Assis-tance	Profiles -	Moves one surgery profile back (according to the order set out in the working steps).	x	x	
	Profiles +	Moves one surgery profile forward (according to the order set out in the working steps).	x	x	
	Start / Stop recording	Starts or stops video recording.	x	x	
	Photo	Creates a photo.	x	x	
	Invert	Inverts the image on the video monitor and Invertertube E.	x	x	
Other	DeepView On / Off	Turns the depth of field management on or off.	x		
	Release brakes	Releases all magnetic brakes and allows the device to be moved along all axes.	x		
	Release vert. brakes	Releases the magnetic brakes for vertical movement.	x		
	Release horiz. brakes	Releases the magnetic brakes for horizontal movement.	x		
	Overhead On / Off	Turns the overhead display on or off.	x	x	

Area	Function	Explanation	Assignment possible		
					
	2nd light source On / Off	Activates or deactivates the second light source.	x	x	
	2nd light source filter +	Moves forward one filter.	x	x	
	2nd light source filter -	Moves back one filter.	x	x	
	AUX On / Off	Activates or deactivates additional devices connected via the remote connector.	x	x	

3.6 Functional description

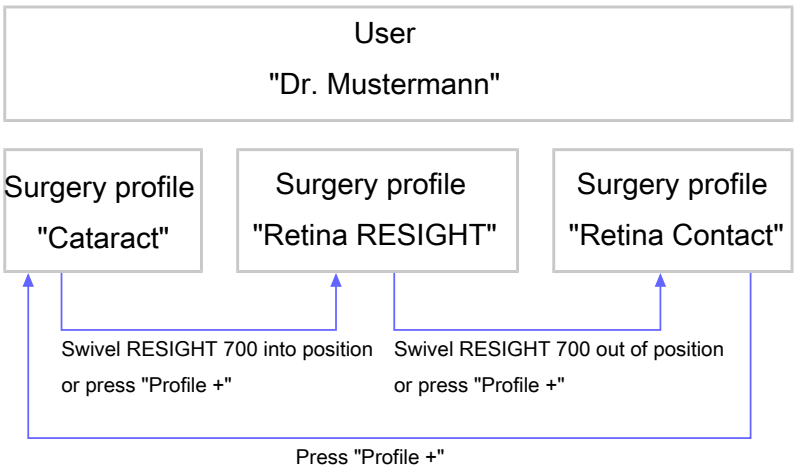
3.6.1 Operating concept

In order to ensure that the optimal device settings are always available during different surgical phases, different surgery profiles can be created for each user. The device automatically adds the user's surgery profile to a list of working steps. The order of surgery profiles in the list of working steps can be modified.

If configured accordingly, a button on the 14-function foot control panel or the handgrips can be pressed to switch to the next or previous surgery profile in the list of working steps during surgery. This enables the user to quickly select the optimal device settings during different phases of surgery.

It is also possible to set a surgery profile for use with the RESIGHT 700 fundus viewing system. In this case, the surgery profile is automatically activated when the RESIGHT 700 is swiveled into position. When the RESIGHT 700 is swiveled back out, the next surgery profile in the list is automatically activated.

Example: user with three surgery profiles



Example: surgery profile configuration options

	User "John Doe"		
Device Setting	**Surgery profile for "Cataract surgery"**	**Surgery profile for "Retina surgery with RESIGHT"**	**Surgery profile for "Retina surgery with contact lenses"**
Surgery profile name	Cataract	Retina RESIGHT	Retina Contact
Foot control panel configuration ■ Buttons C and D ■ Rocker switches J and H	Fast Focus Focus +, Focus -	Focus +, Focus - RESIGHT Focus +, RESIGHT Focus -	- Focus +, Focus -
Handgrip configuration	Retina stop Profile +, Profile -	- Profile +, Profile -	- Profile +, Profile -
Camera ■ Light measurement method ■ Brightness ■ Chroma ■ Peak / Average	Integral 40 - 50% +2 7	Integral 70 - 80% +2 0	Integral 70 - 80% +2 0
Speed (focus, XY, zoom)	High	Low	Low
Total magnification	×	×	×
Links	×	×	×
Reset	×	×	×
SCI illumination	+	-	-
Overhead display	+	-	-
DeepView	+	-	-
RESIGHT function	-	+	-
2nd light source	-	+	-
Inversion	-	+	-
RESIGHT internal focus	-	+	-
Integrated slit illuminator	-	-	+

x Function is set at use-specific

\+ Function is switched on

\- Function is switched off

3.6.2 SCI illumination

SCI illumination (Stereo Coaxial Illumination) is used for illuminating the surgical field and generating a red reflex.

SCI illumination features three preconfigured types of illumination, the mix ratio of which can be retrospectively adjusted.

Function	Effect
Red reflex illumination	Light emitted by the surgical microscope is limited to a diameter of approximately 20 mm and generates a red reflex which optimally shows the structure of the patient's eye. ■ Red reflex illumination 100% ■ Surrounding field illumination 0%
Mixed light: 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. ■ Red reflex illumination 100% ■ Surrounding field illumination 50% By changing the ratio between red reflex and surrounding field illumination, you can influence the depth perception and detail recognition according to your surgical needs. If you wish to work with only one standard setting for the entire cataract surgery, we recommend using full (100%) red reflex illumination and about 30-50% surrounding field illumination. These values can be adjusted in the start values in each user profile and saved; this allows them to be activated for each surgery when the system is moved out of the park position.
Surrounding field illumination	Light emitted from the surgical microscope illuminates the entire field of view. The red reflex illumination is deactivated. ■ Red reflex illumination 0% ■ Surrounding field illumination 100%

3.6.3 Main and auxiliary light source

The main light source (OPMI light) provides light to the SCI illumination system and is only used for operations on the anterior segment of the eye. When working on the posterior eye segment with Endo illumination, the main light source can be switched off and the auxiliary light source (2nd light source) switched on. The following functions can be adjusted for both light sources:

Function	Effect
Light status	The following status options are available: ■ [On]: The OPMI light is switched on following activation of the device setting. ■ [Off]: The OPMI light is switched off following activation of the device setting. ■ [Standby]: The OPMI light is in standby mode following activation of the device setting. Only available if a xenon lamp is installed for the OPMI light on your device. In standby mode, the lamp is switched on, but blocked out. This prevents the flickering of the light that occurs on ignition of the xenon lamp.
Light intensity	The light intensity can only be adjusted for the auxiliary lamp if [On] is selected as the initial state.
Filter	The selection of filters depends on which filters are installed. It is also possible to select [Without] for no filter.

3.6.4 Total magnification

The total magnification is a function of the zoom value and the optical parameters on the eyepieces, tube and objective lens. The zoom value is not directly set on the device; rather, it is adjusted via the total magnification setting. When the total magnification is changed, the zoom adjusts so that the device zoom/eyepieces/tube/objective lens produce the set total magnification.

3.6.5 Fast Focus

The fast focus function is used to switch quickly between two different focus levels. This might be necessary if IOL is used or an Endo light sensor is implemented. When fast focus is activated, the surgical microscope moves from its current focus position upward and away from the eye according to the value set (max. 40 mm or to the respective stop). Activating fast focus again returns the focus to its initial position. The focus will not return to its initial position if the following actions are performed following activation of fast focus:

- The device is restarted
- A magnetic brake is released
- The user profile is switched
- The surgery profile is switched
- The XY Reset button is pressed

The "fast focus" function can only be activated by means of the 14-function foot control panel or the handgrips. This requires configuring the 14-function foot control panel or the handgrips to do so.

3.6.6 RESIGHT functions

The device can be equipped with the RESIGHT 500 or RESIGHT 700 contact-free fundus viewing systems. The fundus viewing system provides a detailed view of the retina without having to move the microscope. Swiveling the fundus viewing system into the surgical microscope's beam path inverts the microscope image, turning the image upside down. The Invertertube E can be used to automatically display the image correctly again. The following RESIGHT 700 settings can be adjusted for automatic focus and image inversion:

Function	Effect
Invertertube E image inversion	Displays the image in an upright (normal) position or inverts it.
RESIGHT 700 internal focus speed	Controls the internal focus speed of the RESIGHT 700. The internal focus ensures that the surgical microscope no longer needs to be vertically moved. When working on the anterior segment of the eye, the RESIGHT 700 can be moved out of the beam path without blurring the surgical microscope image.
RESIGHT 700 two-step internal focus speed	Switches the two-step speed on or off. ■ If two-step speed is switched off: the device focuses using the same speed set by the user. ■ If two-step speed is switched on: tapping and holding down the focus setting changes the focus speed, starting from the smallest speed value (factory setting) and then increasing in speed.

3.6.7 DeepView

DeepView optimizes the depth of field or the light transmission of the microscope image.

Function	Effect
DeepView is switched on	Sharp depth perception at every magnification.
DeepView is switched off	Optimal light transmission for a bright image with high resolution.

3.6.8 Reset

The reset options are basic settings that the device reverts back to when the XY reset button is pressed on the OPMI or the device is in the park position. The following functions can be adjusted:

Function	Effect
Reset XY position	Moves the XY coupling to its center position at maximum speed
Reset focus position	Moves the OPMI focus and internal focus on the RESIGHT 700 fundus viewing system (if connected) to their initial positions (center position). This setting cannot be deactivated. Hence, the button is always blue.
Reset magnification to start value	Resets the total magnification to its configured start value.
Reset illumination to start value	Resets the SCI illumination settings and the light source brightness to their configured start values. The filter selection is not reset to its configured start value.

3.6.9 Links

Links can be used to couple various settings with one another. When one setting is changed, the settings linked to it are automatically changed as well. The following functions can be adjusted:

Function	Effect
Couple light intensity of keratoscope to light intensity of OPMI	Couples the light intensity of the keratoscope to the SCI illumination. This link is only available if the keratoscope ring is installed.
Couple assistant zoom to OPMI zoom	Couples the assistant's microscope's zoom system to the main microscope's zoom system. This link is only available if the assistant's microscope is installed.
Couple XY and focus speed to magnification	Couples the speed of the XY coupling and focus to the current total magnification value. This link facilitates focusing on object details, as the preset focusing speed is automatically reduced at higher magnifications.

3.6.10 Manual mode

Manual mode switches from working mode to Manual mode in the event of a device fault. In Manual mode, the device uses the following settings:

- Light sources are at medium intensity.
- XY coupling, focus and zoom are inactive.
- The filters are swiveled out.
- The control panel is black.

To continue working in Manual mode:

- Manually set the magnification on the zoom adjustment knob of the microscope.
- Manually position the suspension system for focusing and for moving the system in the XY direction.

Pressing the Manual mode button again switches the device back to working mode.

3.6.11 Assistant's microscope

The device can be equipped with an assistant's microscope. The assistant’s microscope is rotatable and has two working positions. These working positions are to the left and right of the main surgeon at a 90° angle. The assistant's microscope can be swiveled out of the 90° position by using the swivel mechanism. The swivel mechanism lock holds the assistant's microscope in position when the surgical microscope is tilted horizontally. The assistant’s microscope features a focusing system and is equipped with a motorized zoom system or a manual 5x magnification changer.

No.	Function	Effect
1	Electrical zoom system	The electrical zoom system works independently of, or in parallel with, the surgical microscope zoom feature.
2	Alternative: manual 5x magnification changer	The manual 5x magnification changer works independently of the surgical microscope's zoom feature.

3.6.12 IDIS (Integrated Data Injection System)

The device can be equipped with IDIS. IDIS enables data to be injected into the device's right eyepiece or CALLISTO eye.

The following device status information can be displayed:

- Main light source brightness
- Auxiliary light source brightness
- Zoom system magnification
- Charge state of the battery for the foot control panel
- Signal strength of the foot control panel radio connection

Recorded OCT images and the visible area on the screen and in the video can be injected from CALLISTO eye.

If CALLISTO eye is equipped with the "Assistance Functions" option, additional assistance functions data can be injected.

- K TRACK : visualization of the shape of the cornea in combination with the keratoscope ring.
- Z ALIGN : an assistance function for aligning toric intraocular lenses.

- RHEXIS : provides assistance when reaching the desired size and shape of the capsulorhexis.
- Incision/LRI : an assistance function for positioning incisions and LRIs.

IDIS can only be configured and activated via CALLISTO eye.

3.6.13 Integrated slit illumination

The device can be equipped with integrated slit illumination. The integrated slit illuminator allows you to produce a bright, sharply delimited slit image for high-contrast observation through the surgical microscope. Due to its fixed illumination angles of +6° or -6°, the integrated slit illuminator is suitable primarily for retina applications with contact glasses. Additional Endo illumination is therefore not necessary for this purpose. The illumination angle can be controlled using the configured buttons on the foot control panel, the configured buttons on the handgrips, or the control panel. The following functions can be adjusted:

Function	Effect
State	The slit illuminator is switched on or off:
Light intensity	The light intensity can only be set when the slit illuminator is switched on.
Slit width	Available slit widths: ■ 0.2 mm ■ 2 mm ■ 3 mm ■ 4 mm
Slit position	The slit position can be moved from left to right or vice versa by means of an electric motor.

3.6.14 Integrated HD camera

The device can be equipped with an integrated HD camera. Default settings can be loaded from the device settings for the integrated HD camera, and settings can be manually adjusted.

The default settings are located in the "Anterior" and "Posterior" surgery profiles. Both default settings have been factory-configured to optimally adjust the camera to the requirements of the surgical situation. The "Anterior" default settings have been optimized for applications in the anterior segment, the "Posterior" default settings for applications in the posterior segment of the eye.

The user can choose between automatic and manual exposure for both default settings.

- Automatic exposure adjusts the brightness of the video image to the specified nominal value automatically.
- Manual exposure deactivates the exposure metering and sets a fixed exposure time.

The following color values can be adjusted for both default settings:

Function	Effect
Hue	Shifts the entire color spectrum.
Chroma	Controls the color saturation. The higher the value is set, the more intense the colors are displayed.
Red and blue value	Raising the blue value results in a cold image; raising the red value produces a warm image.
Peak / average	Influences the characteristics of the automatic exposure. When set to 0, the HD camera adjusts the image brightness so that the brightest image area is not distorted. When set to the maximum value (+8), the HD camera sets the brightness to the middle value. When set to values between +1 and +7, the brightness is set to a value between both extremes.

3.6.15 Integrated 4K cameras (digital surgical microscope)

The device is fitted with two integrated 4K cameras. Default settings for the integrated 4 K cameras can be loaded from the device settings, or else the settings can be adjusted manually.

The default settings are located in the "Anterior" and "Posterior" surgery profiles. Both default settings have been factory-configured to optimally adjust the camera to the requirements of the surgical situation. The "Anterior" default settings have been optimized for applications in the anterior segment, the "Posterior" default settings for applications in the posterior segment of the eye.

- **Hybrid mode**

  Automatic exposure adjusts the brightness of the video image to the specified nominal value automatically.

- **Digital mode**

  Manual exposure deactivates the exposure metering and sets a fixed exposure time.

The following color values can be adjusted for both default settings:

Function	Effect
Red and Blue Value	Raising the blue value results in a cold image; raising the red value produces a warm image.
Chroma (color saturation)	Controls the color saturation. The higher the value is set, the more intense the colors are displayed.
PEAK / AVERAGE	Influences the characteristics of the automatic exposure. When set to 0, the 4K camera adjusts the image brightness so that the brightest image area is not distorted. When set to the maximum value (+2), the 4K camera sets the brightness to the middle value. When set to a value in between, the brightness is set to a value between both extremes.

3.6.16 Integrated HD video and image recording

The device can be equipped with integrated HD video and image recording. The integrated HD video and image recording is used for easy recording of videos and photos in clinical applications. The recorded videos and photos can be stored on an external USB storage device or in a shared directory within an IT network. The unambiguous, automatic storage of videos and photos with timestamps ensures that they are reliably assigned to the relevant patient. The integrated HD video and image recording is only useful when used in conjunction with a connected video monitor, as the video recording can only be played back on the video monitor. The following functions can be adjusted:

Function	Effect
Auto Delete Mode	When "Auto Delete Mode" is turned on: ■ Files older than 3 days are automatically deleted ■ Video and photos are not assigned to a patient; rather, they are stored in a neutral folder
Image format	Saves recorded photos in TIF or JPG format.
Acoustic indication on photos	Produces an acoustic indication on recorded photos.
Video quality	Saves video recordings at the following quality levels: ■ Low - suitable for documentation purposes ■ Medium - suitable for documentation purposes ■ High - suitable for presentations
Storage location	Saves videos and photos to the network or to a USB storage device.
Video log and OS licenses	Exports video log and OS licenses to the IT network or to a USB storage device.

3.6.17 HD video and image recording (digital surgical microscope)

The device is equipped with HD video and image recording. The HD video and image recording is used for easy recording of videos and photos in clinical applications. The recorded videos and photos can be stored on an external USB storage device. This requires that the hard disk has only one partition and is formatted in exFAT or FAT32. [▷ 243]

You can find further information in the document: G-30-2003-de - 2.0 - CALLISTO eye SW 3.7 Instructions for Use Basic Functions / Section: Video Recording.

4 Installation

4.1 Safety during installation

⚠ CAUTION!

Risk of injury due to electrical current!

Connecting unrecognized, defective or non-permitted accessories to live ports may result in electric shock.

- ▶ Connect only recognized, functioning and permitted accessories to live ports.
- ▶ When configuring your ME system, please make sure to comply with the requirements of IEC 60601-1.

⚠ CAUTION!

Risk of injury due to electrical current!

As per IEC 60601-1, section 16.2, this device's power outlet is a multiple electrical outlet intended for use with an ME system. Connecting unrecognized, defective or non-permitted accessories can lead to a reduced level of safety on the ME system.

- ▶ Use the multiple electrical outlet only for accessories which are part of or compatible with the ME system.
- ▶ Never connect auxiliary power strips or extension cords.
- ▶ Do not exceed the maximum permissible electrical load of the multiple electrical outlet.

NOTE

Setting up an ME system!

Anyone connecting additional equipment to medical electrical devices is a system configurer and as such is responsible for compliance of the system with the standards for systems. Local laws take precedence over the above normative requirements.

- ▶ Connect only devices which are approved by ZEISS or that demonstrably comply with the applicable standards and directives (e.g. IEC 60950 for data processing equipment). Furthermore, all configurations must comply with the requirements set out in the standards for medical systems (see IEC 60601-1).
- ▶ If you have any questions, please contact ZEISS Service or your local dealer.

4.2 Preparing the installation

4.2.1 Requirements for connecting the device to an existing IT network

The device can be connected to an existing IT network. This enables:

- Video and image data to be saved to a shared directory.
- OMPI Lumera 700 to be connected to CALLISTO eye. This function enables the configuration / remote control of various functions of the surgical microscope via the Ethernet interface.

⚠ CAUTION!

Risk of damage caused by viruses!

Connecting the device to an existing IT network or connecting a USB storage medium to the device may infect the device with viruses. This may lead to limited functionality or malfunctions in the device.

▶ Keep the IT network or USB storage medium free of viruses. The operator is responsible for the safety of the IT network.

⚠ CAUTION!

Unknown risks due to network integration!

Integration of the device into an existing IT network that includes other ME devices may lead to unknown risks to patients, operators or other individuals.

▶ The operator of the device must determine, analyze, evaluate and control these risks before the device is connected to the IT network.

▶ The following changes to the IT network may result in new risks and may therefore necessitate additional analyses:
- Changing the IT network configuration
- Attaching auxiliary elements to the IT network
- Removing elements from the IT network
- Updating devices which are connected to the IT network
Upgrading devices which are connected to the IT network

⚠ CAUTION!

Risk of electric shock!

If the IT network does not provide the features required to integrate the device into the IT network (listed below), the following hazards may arise:

Risk of electric shock if the user touches a live part of the casing and a patient.

Increased leakage current on the power outlets.

The following specifications and measures as per IEC 60601 are to be adhered to when connecting the device to an existing IT network:

- The IT network to which the device is to be connected must have the following features:
  - IPv4, static or dynamic address.
  - Any IP address space.
- The IT network to which the device is to be connected must have the following configuration:
  - The firewall is open for inbound ports.
  - All data is transmitted unsecured from the device to the customer's secured internal network.
  - No data is transmitted externally from the device.
- Requirements in relation to network connection with the device:
  - The IT network has a RJ45 network connection, at least Cat.5, 100 Mbit/s.
  - The device has a network isolator that complies with IEC 60601-1, which means that it is not connected to the IT network power supply.
  - The operator is responsible for the topology of the IT network, the flow of information and the routing between the device, the IT network and other devices.

4.3 Connections

4.3.1 Connecting the power supply

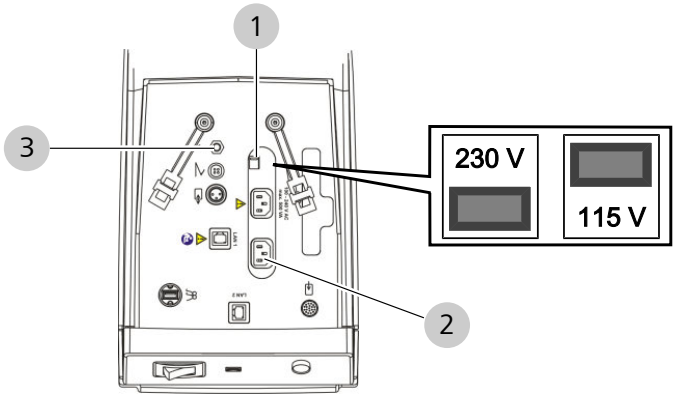


Figure 62: Connecting the power supply

1	Sliding switch for rated voltage	2	Power input socket
3	Potential equalization connector		

⚠ WARNING!

Risk of injury caused by electrical voltage!

- ▶ To prevent the risk of electric shock, this device may only be connected to a power grid which is connected to a flawless protective ground conductor.

NOTE

Device damage resulting from incorrect rated voltage setting!

- ▶ Check to make sure the rated voltage sliding switch corresponds to the rated voltage of the net available at the site of installation.
- ▶ If the rated voltage is not correctly set, adjust the sliding switch using a suitable tool.

Material	■ Included power cord

Prerequisite

☑ The power switch is off.

☑ The power cable is unplugged.

☑ The rated voltage for the sliding switch corresponds to the rated voltage of the mains power available at the installation site. Possible voltages are 115 V (12.5 A fuses) / 230 V (6.2 A fuses), 50–60 Hz.

Action

1. Plug the power cord into the power inlet socket.
2. Plug the power cord into the power outlet.

3. Secure the power cord using the strain relief device [▶ 117].
4. If required: connect the potential equalization connector to the equipotential bonding bar in the OR.

4.3.2 Connecting the power supply to the monitor cart (digital surgical microscope)

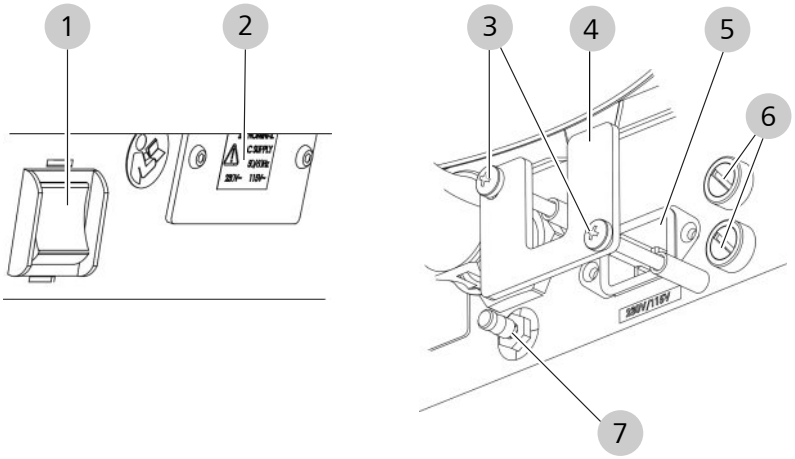


Figure 63: Connecting the power supply of the monitor cart

1	Power switch	2	Voltage selector (115 V / 230 V)
3	Screws	4	Mount
5	Power input socket	6	Fuses (12.5 A / 6.2 A)
7	Potential equalization connector		

Tools	Phillips head screwdriver PH2
Material	Included power cord

Prerequisite

☑ The power switch is off.
☑ The power cable is unplugged.
☑ The integrated fuses correspond to the available voltage.

Action

1. Set the voltage selector to the rated voltage of the installation site. Possible voltages are 115 V / 230 V, 50-60 Hz.
2. Please remove the cover using the Phillips screwdriver. Keep the screws and the cover near the monitor cart.
3. Plug the power cord into the power inlet socket of the monitor cart.
4. Attach the cover with the help of the Phillips screwdriver.

5. Connect the power cord of the monitor cart to the power supply.
6. If required: Connect the green-yellow potential equalization cable of an additional grounding to the additional equipotential contact on the isolating transformer. This enables the connection of active devices to the same ground potential, or connection to the protective ground.

4.3.3 Connecting the 14-function foot control panel

The device can be controlled using either the wireless or wired variants of the foot control panel.

4.3.3.1 Connecting the wireless variant

Action

1. Switch on the device using the power switch.
2. Put the 14-function foot control panel in a vertical position in the immediate vicinity of the device.
3. Run the pairing. [▶ 163]

4.3.3.2 Connecting the wired variant

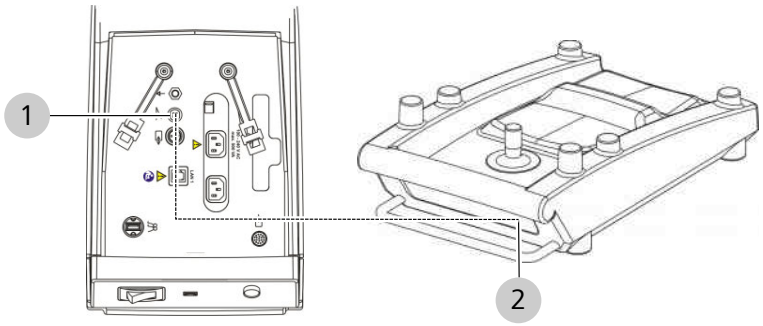


Figure 64: Connector panel

1	Foot control panel connector	2	Foot control panel connector

Material	■ 3 m, 6 m or 10 m cable

Action

1. Plug the 4-pin connector (straight or angled) into the foot control panel port on the suspension system.
2. Plug the 6-pin connector into the foot control panel port on the 14-function foot control panel.

4.3.4 Setting up a network connection with the CALLISTO eye Panel PC

The device can be connected either directly (point to point) or indirectly via a switch to an external CALLISTO eye Panel PC.
Tip: We recommend establishing a network connection via a switch. With this configuration you can switch on the devices in any order.

4.3.4.1 Setting up a network connection via a switch

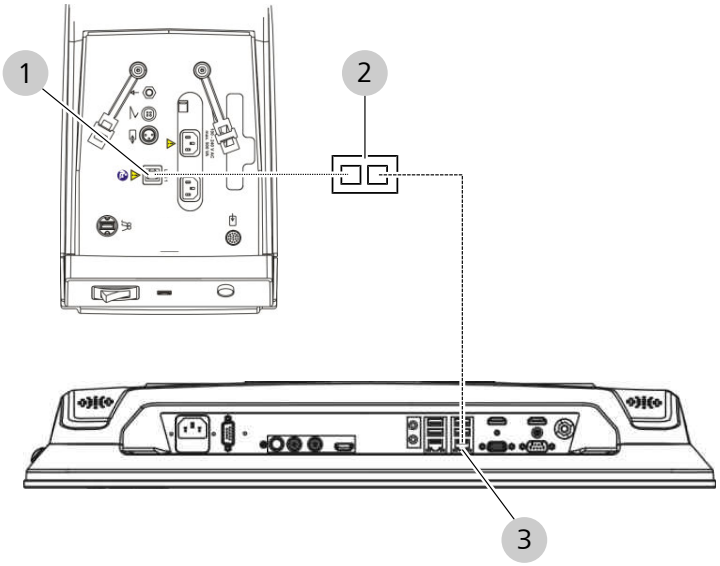


Figure 65: Network connection with CALLISTO eye Panel PC (model I)

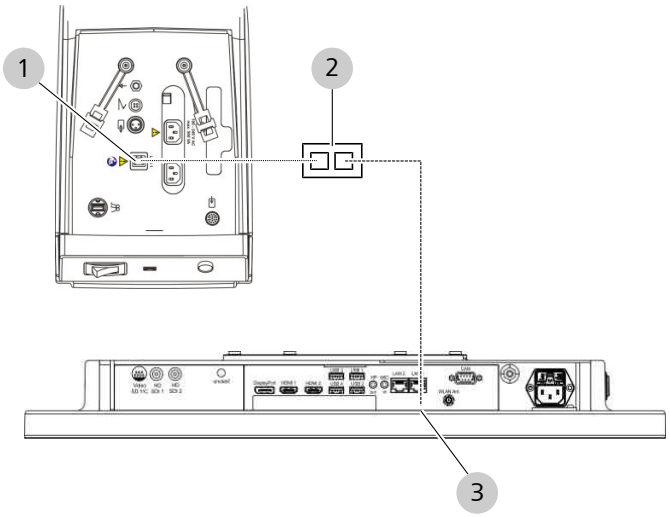


Figure 66: Network connection with CALLISTO eye Panel PC (model II)

1	LAN 1 network connection	2	Switch
3	LAN 1 network connection		

⚠ CAUTION!

Risk of injury due to electrical current!

In the event of a defect in the IT network, the network cable plug can carry dangerous voltage.

- ▶ Check to make sure that the requirements [▷ 102] for connecting the device to an IT network are met.

Material	■ 2x network cable, 10m

Action

1. Turn the device and the CALLISTO eye Panel PC off.
2. Connect the network connections of both devices to the switch. Cable: 2x network cable, 10 m
3. Turn the switch on.
4. Turn the device and the CALLISTO eye Panel PC on.
5. Configure the network connection with CALLISTO eye. [▷ 165]

4.3.4.2 Setting up a direct network connection (without IT network connection)

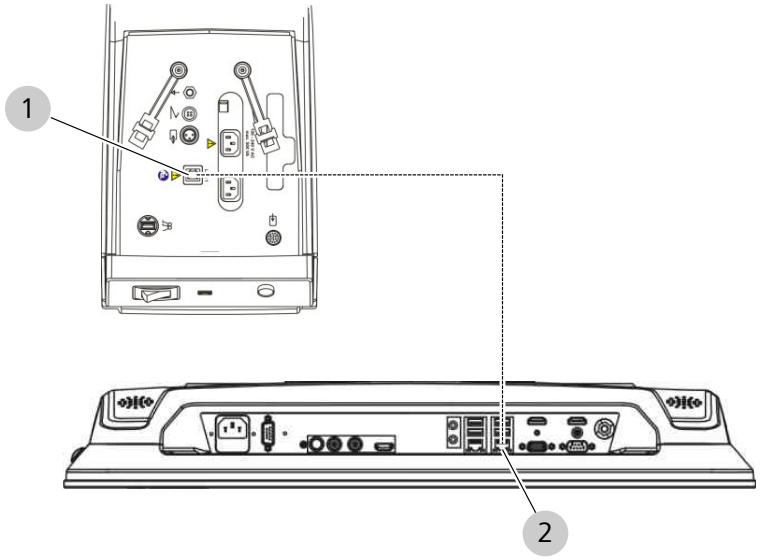


Figure 67: Network connection with CALLISTO eye Panel PC (model I)

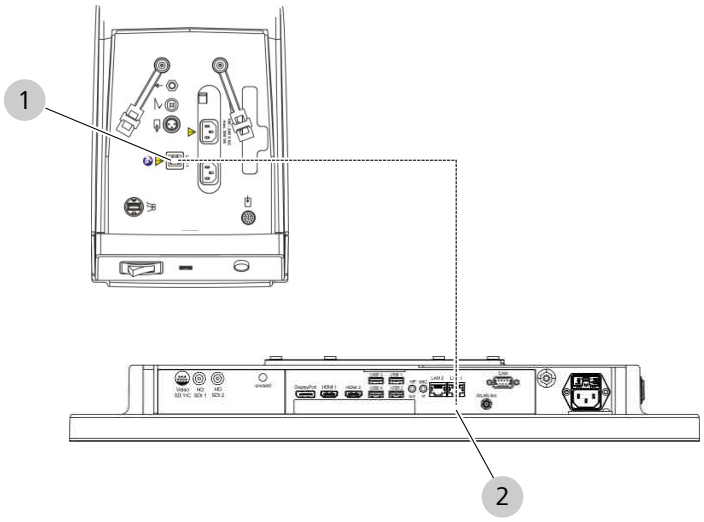


Figure 68: Network connection with CALLISTO eye Panel PC (model II)

1	LAN 1 network connection	2	LAN 1 network connection

Material	■ Network cable, 10m

The network connection is established during startup. Therefore observe the following steps:

Action

1. Turn the device and the CALLISTO eye Panel PC off.
2. Disconnect the CALLISTO eye Panel PC from the power.
3. Connect the network connections of both devices. Cable: network cable, 10 m
4. Reconnect the CALLISTO eye Panel PC to the power.
   ⇨ The CALLISTO eye Panel PC network adapter is now activated and visible for the device.
5. Switch the device on.
6. Turn the CALLISTO eye Panel PC on.
7. Configure the network connection with CALLISTO eye. [▶ 165]

Tip: After each of the network connectors have been unplugged and plugged back in, the device and CALLISTO eye Panel PC must be restarted to adjust to the changes in the network.

4.3.5 Establishing a network connection with an integrated CALLISTO eye Panel PC

The device can be connected either directly (point to point) or indirectly via a switch to an integrated CALLISTO eye Panel PC.

4.3.5.1 Establishing a network connection via a switch

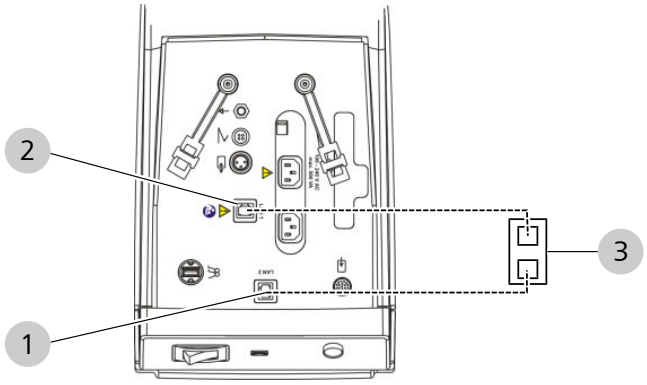


Figure 69: Establishing a network connection via a switch

1	LAN 2 network port	2	LAN 1 network port
3	Switch		

⚠ CAUTION!

Risk of injury due to electrical current!

In the event of a defect in the IT network, the network cable plug can carry dangerous voltage.

- ▶ Check to make sure that the requirements [▷ 102] for connecting the device to an IT network are met.

Material	■ 2x network cable, 10 m

Action

1. Switch the device off.
2. Connect the LAN 1 and LAN 2 network connectors to the hospital IT network. Cable: 2x network cable, 10 m
3. Switch on the device.
4. Configure the network connection to CALLISTO eye. [▷ 165]

4.3.5.2 Establishing a direct connection (without connecting to an IT network)

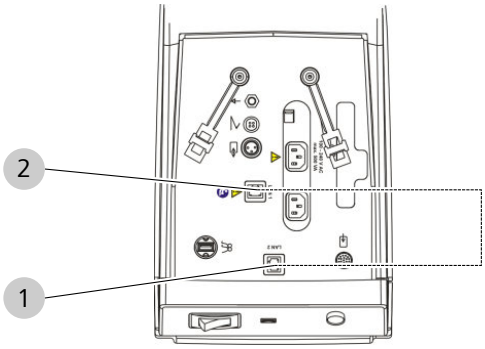


Figure 70: Establishing a direct connection

1	LAN 2 network port	2	LAN 1 network port

Material	■ RJ45 Ethernet

Action

1. Connect the LAN 1 network connector to the LAN 2 network connector. Cable: RJ45 Ethernet
2. Configure the network connection to CALLISTO eye. [▶ 165]

4.3.6 Connecting IDIS via CALLISTO eye Panel PC

In order to use IDIS, you must connect the device to the CALLISTO eye Panel PC.

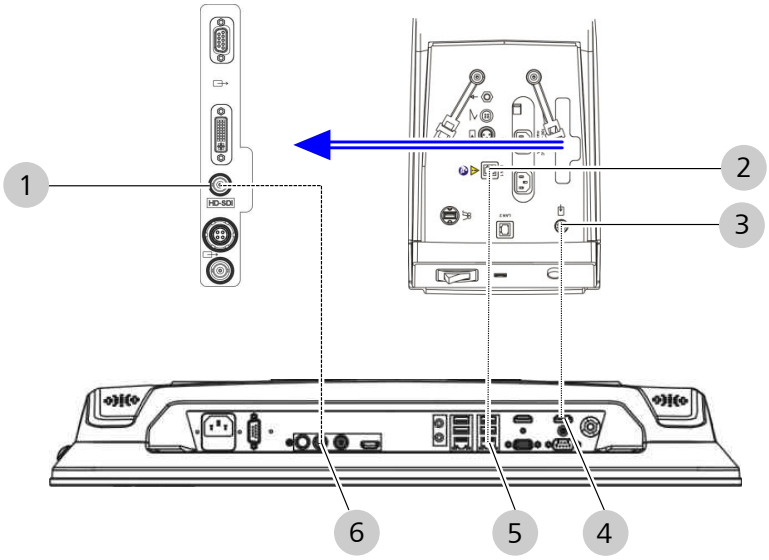


Figure 71: IDIS with CALLISTO eye Panel PC (model I)

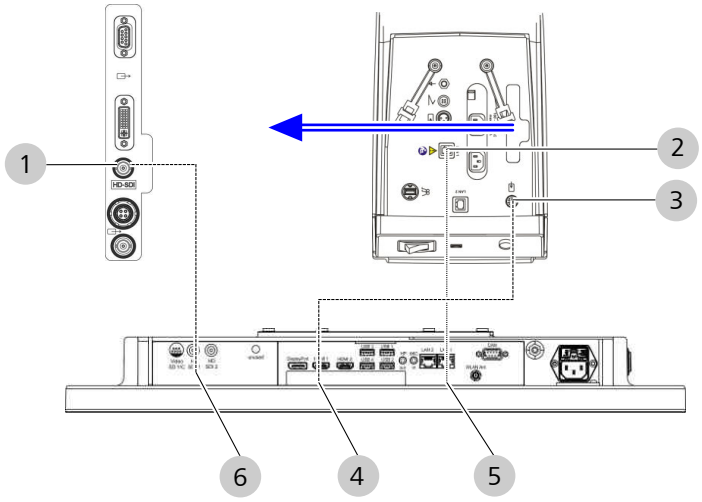


Figure 72: IDIS with CALLISTO eye Panel PC (model II)

1	HD-SDI video output	2	LAN 1 network connection
3	LEMO socket for IDIS	4	HDMI port
5	LAN 1 network connection	6	HD-SDI video input

Material	■ System cable, LEMO 2B – HDMI, 10 m ■ HD-SDI video cable 75 Ohm 2xBNC pin, 5m or 10m ■ LAN cable, 5m or 10m

Prerequisite

☑ To load the assistance functions, a video signal from the integrated HD camera must be present in the CALLISTO eye Panel PC. Video signals of external cameras are not supported by CALLISTO eye!

Action

1. Connect the HD-SDI video output to the HD-SDI video input. Cable: HD-SDI video cable 75 Ohm 2xBNC pin, 5m or 10m
2. Connect the LEMO port to the HDMI port. Cable: system cable, LEMO 2B – HDMI, 10 m
3. Connect the network connections of both devices. Cable: LAN cable, 5m or 10m
4. Configure the network connection with CALLISTO eye. [▶ 165]

4.3.7 Connecting external video devices

External video devices can be connected to devices with an integrated HD camera. If the device is not equipped with integrated HD video and image recording, you can connect the optional MEDIALINK 100 SD video recording tool.

4.3.7.1 Connecting the HD monitor to the integrated HD camera

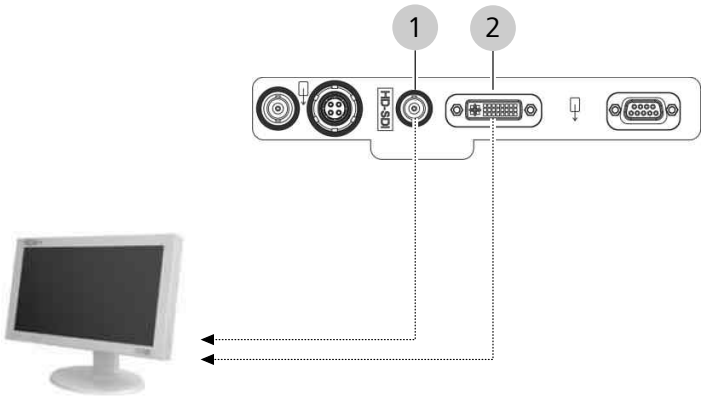


Figure 73: Connecting the HD monitor

1	HD-SDI video output	2	DVI-D video output

⚠ CAUTION!

Risk of injury due to electrical current!

Connecting unrecognized, defective or non-permitted accessories to live ports may result in electric shock.

- ▶ Connect only recognized, functioning and permitted accessories to live ports.
- ▶ When configuring your ME system, please make sure to comply with the requirements of IEC 60601-1.

Material	■ System cable DVI-D, 5 m ■ Alternative: HD-SDI connecting cable 75 Ohm with 2x BNC pin

Action

1. Connect the integrated HD camera's DVI-D video output to the DVI-D video input on the HD monitor. The connector side with the ferrite core must be plugged in on the suspension system. Cable: system cable DVI-D, 5 m
2. Alternative: Connect the integrated HD camera's HD-SDI video output to the BNC video input on the HD monitor. Cable: HD-SDI connecting cable 75 Ohm with 2x BNC pin

4.3.7.2 Connecting the MEDIALINK 100 and SD monitor to the integrated HD camera

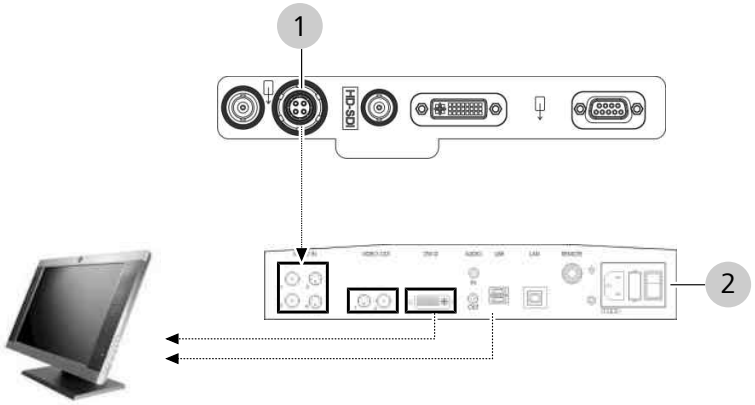


Figure 74: Connecting the SD monitor via MEDIALINK

1	Y/C video output (green)	2	MEDIALINK 100 connector panel

⚠ CAUTION!

Risk of injury caused by accessories falling down!

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 auxiliary equipment such as the MEDIALINK 100 is standing securely on the instrument tray.
- ▶ Secure further accessories using the supplied straps.

Material	■ S video cable out, 10m ■ BNC - BNC cable, 10 m ■ System cable DVI-D, 5m

Action

1. Connect the integrated HD camera's Y/C video output (green) to the Y/C video input on the MEDIALINK 100. Cable: S video cable out, 10m
2. Connect the MEDIALINK 100's Y/C, BNC or DVI-D video output to the video input port on your SD video monitor. Cable: see materials information

4.3.8 Connecting the video and network cables to the monitor cart (digital surgical microscope)

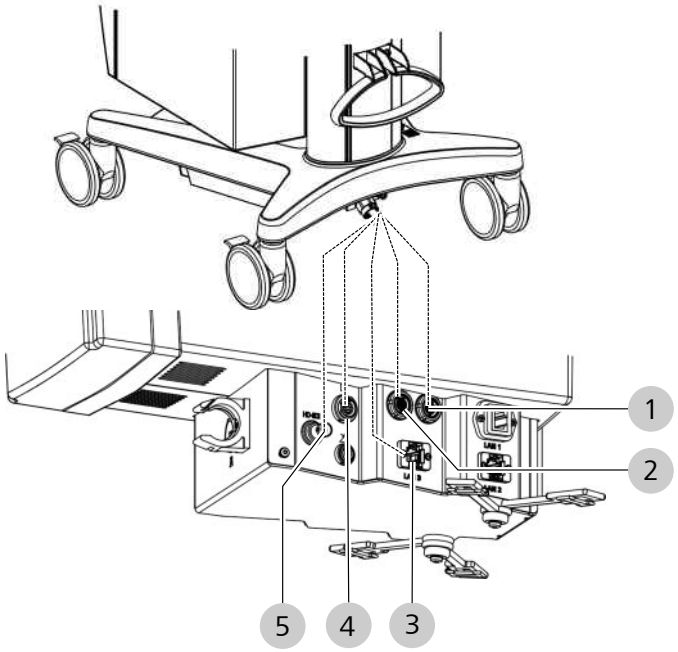


Figure 75: Connecting the video and network cables to the monitor cart

1	LEMO socket (blue)	2	LEMO socket (green)
3	LAN 3 network connector for monitor cart	4	Lemo socket for CALLISTO eye
5	HD-SDI video port		

Material	Supplied cable set

Action

1. Plug the camera cable with the blue markings into the (blue) LEMO socket.
2. Plug the camera cable with the green markings into the (green) LEMO socket.
3. Plug the network cable of the monitor cart into the LAN 3 network connector.
4. Plug the 3G-SDI video cable into the LEMO socket for CALLISTO eye.
5. Plug the HDMI-A video overlay cable into the HD-SDI video port.

4.3.9 Establishing a network connection between CALLISTO eye and OPMI

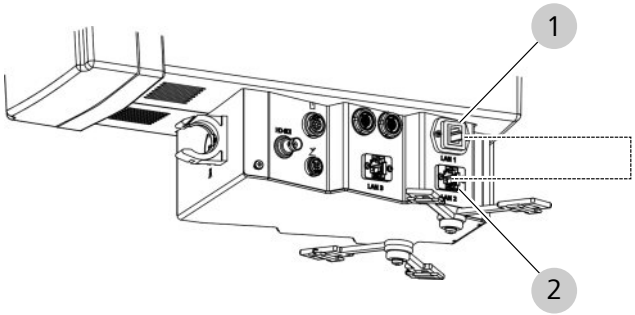


Figure 76: Establishing a network connection to CALLISTO eye

1	LAN 1 network port	2	LAN 2 network port

Action

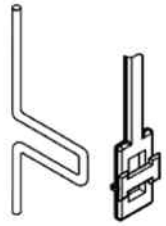
1. Connect the LAN 1 network connector to the LAN 2 network connector. Cable: RJ45 Ethernet

4.3.10 Connecting the strain relief

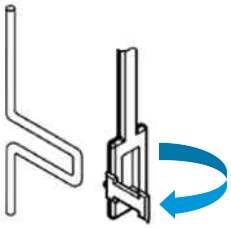
The strain relief protects the cables against being pulled out.

Action

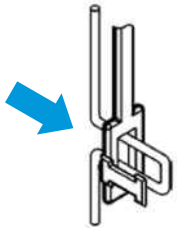
1. Form the cable into a loop.
   The length of the cable between the strain relief device and the connector should be at least 320 mm



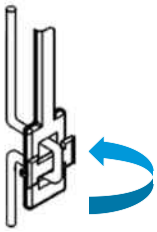
2. Open flap.



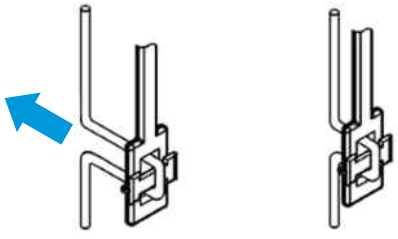
3. Push the cable through the opening.



4. Close the flap.



5. Tighten the cable until it encloses the flap.



6. Check the remaining cable length between the strain relief device and the connector.

4.3.11 Connecting a 3D monitor from a third-party manufacturer

NOTE

Combining the device with a 3D monitor from a third-party manufacturer may pose a safety risk.

When connecting a 3D monitor from a third-party manufacturer, the customer automatically declares itself to be the distributor. The combination of the device with a 3D monitor from a third-party manufacturer has neither been verified nor validated by Zeiss, and may lead to a possible safety risk.

Prerequisite

☑ The device and the third-party manufacturer's 3D monitor are switched off.

Action

1. Read and observe the documentation provided by the manufacturer of the 3D monitor.
2. Connect the 3D monitor to the corresponding connection sockets on the device using approved video cables.
3. Set the 3D monitor to your desired display mode. Read and observe the monitor manufacturer's documentation for this purpose.

5 Daily startup

5.1 Outfitting the surgical and assistant's microscopes with accessories

5.1.1 Replacing accessories and components

⚠ CAUTION!

Risk of injury caused by accessories falling down!

Incorrectly mounted auxiliary equipment can fall off and injury the patient.

- ▶ Never replace accessories over the patient.
- ▶ Before each use, check to make sure the accessory is mounted firmly.
- ▶ Check to make sure that the securing screws are tight!

⚠ CAUTION!

Risk of injury caused by downward movement of the surgical microscope!

The surgical microscope is not balanced; it can move downwards and injure the patient.

- ▶ Never replace accessories over the patient.
- ▶ Never exceed the device or accessory's maximum permitted weight load.
- ▶ Ensure that you compensate for any weight [▷ 125] that is added to the device; this will enable the surgical microscope to remain stationary in all positions of the working range.
- ▶ Limit the vertical movement [▷ 128] of the suspension arm to prevent any contact with the patient should the surgical microscope be lowered accidentally. This applies in particular during the installation of accessories such as VISULUX or RESIGHT 700.

NOTE

Widefield eyepieces with magnetic coupling!

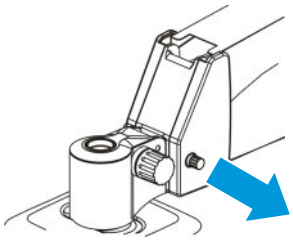
For eyepieces that have been removed from the tube: observe the usual rules for handling magnets.

- ▶ Do not place the eyepiece near instruments which may be magnetizable.
- ▶ Do not place the eyepiece on sensitive electronic devices such as infusion pumps, pacemakers, measuring devices or magnetic data media such as floppy disks, audio and video tapes or credit cards.
- ▶ Always store the eyepiece in its original packaging when not using it.

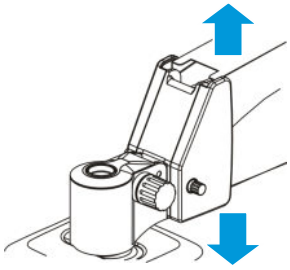
Material	■ Tubes and eyepieces for surgical and assistant's microscopes ■ Objective lens ■ As required: RESIGHT 500 or RESIGHT 700 fundus viewing system ■ As required: VISULUX auxiliary illumination system or FC oblique illumination system ■ As required: co-observation components
Documents	■ Instructions for Use for the accessory or component

Action

1. Place the suspension arm in a horizontal position. To do this, pull out the [suspension arm fixing] rotary knob and rotate it 180° clockwise or counterclockwise.



2. Move the suspension arm slightly upward and downward until the lock snaps in.



⇨ Now the suspension arm cannot swing upward.

3. Loosen the securing screw on the main observer and the assistant's microscope a few turns counter clockwise.

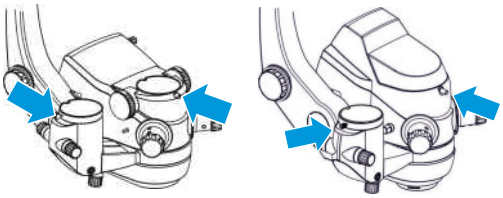


Figure 77: Example: left OPMI Lumera 700 / right OPMI Lumera 700 digital option

4. Remove the dust protection covers and store both of them for later use.

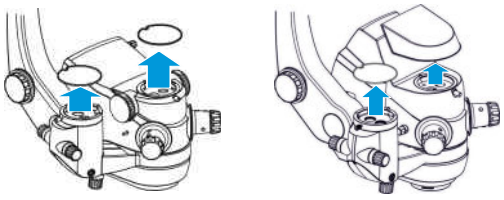


Figure 78: Example: left OPMI Lumera 700 / right OPMI Lumera 700 with digital option

5. Attach a tube to the main observer and turn the securing screw clockwise until it is tight. You can install further accessories between the tube and the main observer in the same way.

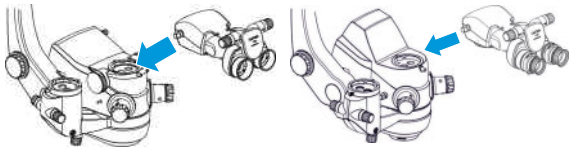


Figure 79: Example: left OPMI Lumera 700 / right OPMI Lumera 700 with digital option

6. Attach a tube to the assistant's microscope and turn the securing screw clockwise until it is tight. You can install further accessories between the tube and the assistant's microscope in the same way.

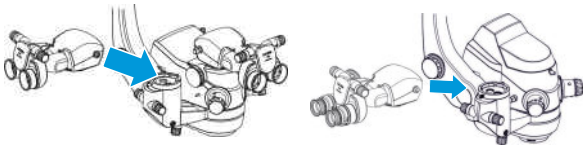


Figure 80: Example: left OPMI Lumera 700 / right OPMI Lumera 700 with digital option

7. Insert eyepieces into the eyepiece mount as far as they will go. When using documentation equipment: insert the eyepieces with the reticle on the same side of the tube where the documentation equipment is located.

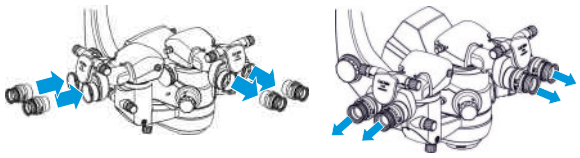
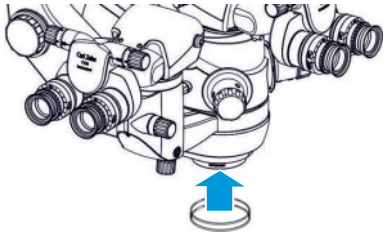


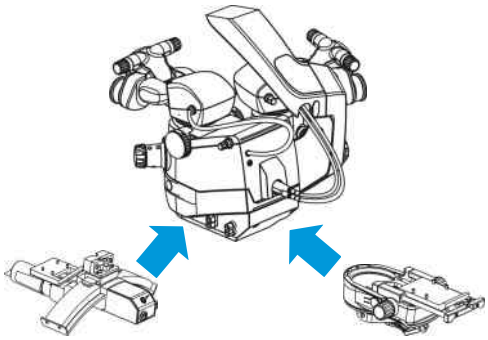
Figure 81: Example: left OPMI Lumera 700 / right OPMI Lumera 700 with digital option

⇨ The magnetic coupling holds the eyepieces.

8. Screw the objective lens into the main observer and tighten it.



9. Adjust the parameters on the tube, objective lens and eyepieces. [▷ 162]
10. Additional accessories can be installed on the underside of the microscope. Refer to the accessory's Instructions for Use.



11. Balance the weight. [▷ 125]

5.1.2 Connecting the Invertertube E

The electrical inverter on the Invertertube E is controlled by the electrical connection. If the Invertertube is connected along with the RESIGHT 700, both accessories are synchronized and the field of view is always displayed in the correct orientation. This also includes the image inversion of an integrated HD camera.

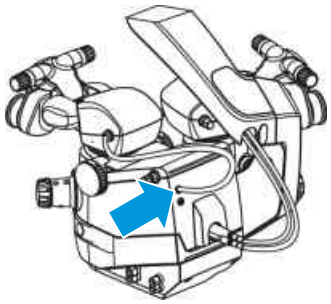
Material	■ Invertertube E connection cable ■ Cable clip

Prerequisite

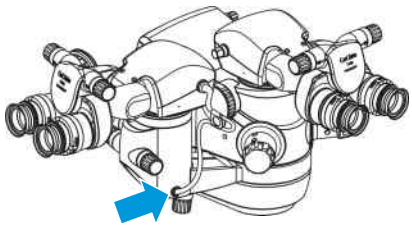
☑ The Invertertube E is attached.

Action

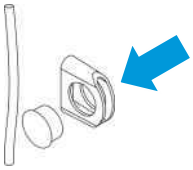
1. Insert the Invertertube E connection cable into the surgical microscope's Invertertube E connector.



2. For devices with assistant's microscope: follow steps 2 - 8. Insert the Invertertube E connection cable into the assistant's microscope's Invertertube E connector.

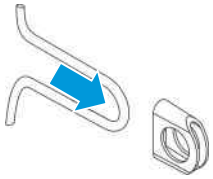


3. Secure the connection cable with a cable clip. To do this, push the cap out of the cable clip.

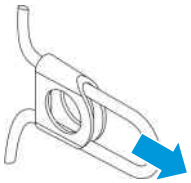


4. Form the connecting cable into a loop.

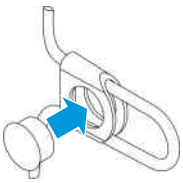
5. Pass the loop through the cable clip.



6. Pull the loop through the cable clip until the connecting cable runs straight upward.



7. Secure the loop in the cable clip. To do this, replace the cap in the cable clip.



⇨ The cable clip is secure.

5.1.3 Connecting RESIGHT 700

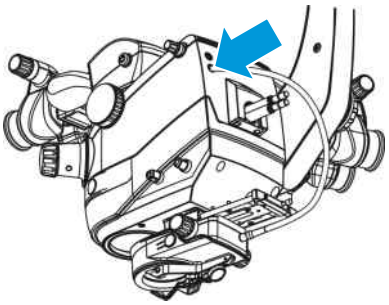
The RESIGHT 700 internal focus is controlled by the electrical connection. If RESIGHT 700 is connected along with the Invertertube E, both accessories are synchronized and the field of view is always displayed in the correct orientation. This also includes the image inversion of an integrated HD camera.

Prerequisite

☑ RESIGHT 700 is attached.

Action

1. Insert the RESIGHT 700 connection cable into the surgical microscope's RESIGHT 700 connector.



5.1.4 Connecting auxiliary illumination

On devices with dual light sources, an auxiliary illumination system can be connected by means of a second light guide.

⚠ CAUTION!

Risk of injury caused by suspended light guide!

A suspended light guide may cause retina damage or slight burns to the patient.

- ▶ Always turn off the light source for the light guide that is not in use.
- ▶ Push the light guide that isn't required into a free space on the cable holder so that it is pointing away from the patient.
- ▶ Remove the protective cap on the unused light guide. This will prevent melting of the protective cap if the light source is accidentally turned on.

Material	■ S light guide, 2.5 m

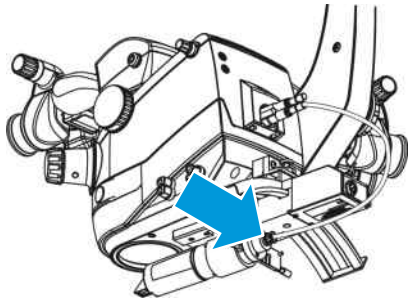
Prerequisite

☑ The auxiliary illumination system is attached.

☑ The device is switched off.

Action

1. Insert the end of the light guide as far as it will go into the light guide socket of the auxiliary illumination system.



5.1.5 Balancing the system

Balancing the weight adjusts the spring force of the suspension arm so that the surgical microscope remains in position when the magnetic brakes are released.

⚠ WARNING!

Danger due to unbalanced device

Working with a device that cannot be balanced may result in injury to the patient.

- ▶ Switch the device off.
- ▶ Mark the device as non-functional.
- ▶ Contact ZEISS Service or authorized service personnel.

⚠ CAUTION!

Risk of crushing caused by moving suspension arm!

Hands and/or fingers can be crushed between the suspension arm and the XY coupling.

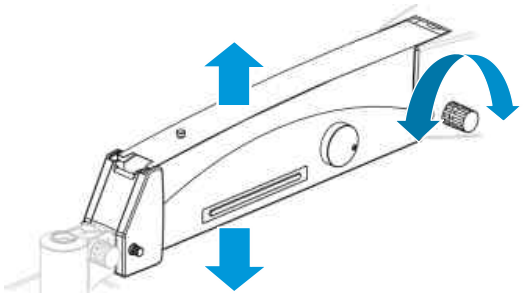
- ▶ Stay clear of the area between suspension arm and XY coupling while the suspension arm is in motion.

Prerequisite

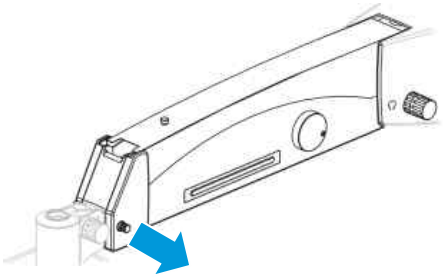
- ☑ There is no patient underneath the surgical microscope.
- ☑ The accessory is attached.
- ☑ The suspension arm is locked in a horizontal position.

Action

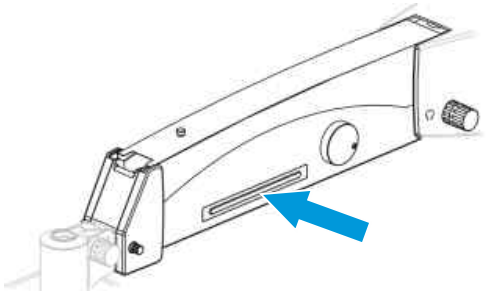
1. Roughly balance the weight. Slightly move the arm up and down while rotating the [Weight balancing] rotary knob. Continue doing this until you feel that sufficient spring force is obtained to compensate for the weight of the surgical microscope and the accessory. To increase the spring force: rotate the [Weight balancing] rotary knob clockwise. To decrease the spring force: rotate the [Weight balancing] rotary knob counter clockwise.



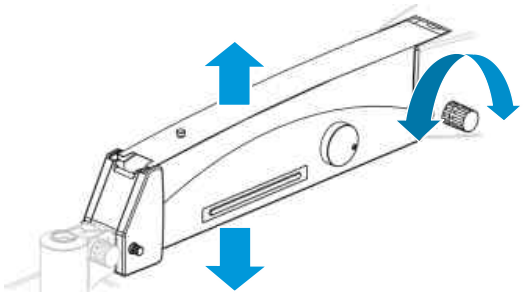
2. Hold the suspension arm in position and gently pull the [Fixing suspension arm position] rotary knob out. If the rotary knob does not release, repeat step 1.



3. Release the magnetic brakes. To do this, press and hold the [Release magnetic brakes] button or the button configured for this purpose on the surgical microscope handgrip.



4. Move the suspension arm up and down approximately 20 cm while adjusting the [Weight balancing] rotary knob until the force of the upward movement is exactly the same as that of the downward movement.



Result

✓ If the surgical microscope remains in position with the magnetic brakes released, the weight was successfully balanced.

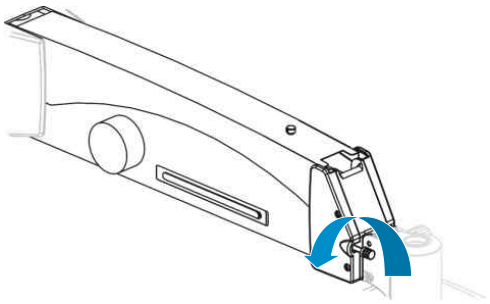
5.2 Adjusting the surgical and assistant's microscopes

5.2.1 Adjusting the limit of downward travel

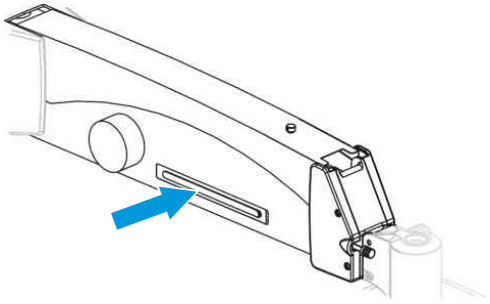
The downward travel limit limits the working distance from the surgical field. This prevents contact with the patient if the surgical microscope is inadvertently lowered.

Action

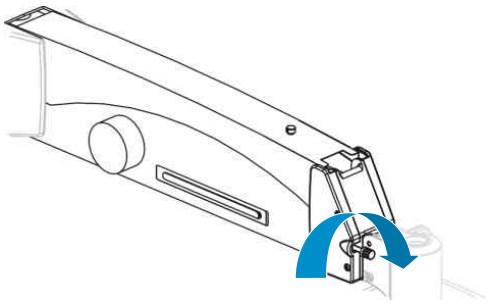
1. Release the downward travel limit lock. To do this, rotate the [Downward travel limit] rotary knob counter-clockwise.



2. Lower the surgical microscope until you are able to focus while maintaining sufficient working distance from the surgical field. To do this, press and hold the [Release magnetic brakes] button or the button configured for this purpose on the surgical microscope handgrip.



3. Lock the downward travel limit. To do this, rotate the [Downward travel limit] rotary knob clockwise as far as it will go.



   ⇨ The downward travel limit is set.

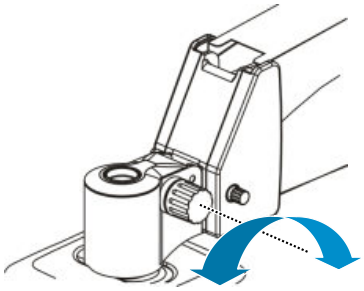
4. Check the working distance from the surgical field. To do this, lower the surgical microscope to its lowest stopping position again.

5.2.2 Adjusting the friction

The friction setting allows the surgical microscope to rotate left and right.

Action

1. To increase mobility: rotate the friction knob counter clockwise.
2. To decrease mobility: rotate the friction knob clockwise.

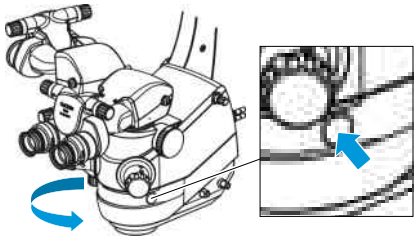


5.2.3 Positioning the assistant's microscope

The swivel mechanism allows the assistant's microscope to be positioned to the left or right of the main observer.

Action

1. Press the locking button and swivel the assistant's microscope a bit in the desired direction until the locking position has been overridden.



2. Release the locking button and continue to swivel the assistant's microscope until the lock snaps into position automatically.

Result

✓ The assistant’s microscope is secured to prevent it from swiveling out.

5.2.4 Adjusting microscope tilt

The manual tilting device can be used to orient the optical axis of the surgical microscope vertically to the patient's eye.

⚠ CAUTION!

Risk of injury caused by assistant's microscope swiveling in!

If you tilt the surgical microscope in the horizontal viewing direction and the assistant's microscope is not locked in place, the assistant's microscope may swivel in.

- ▶ Position the assistant's microscope and lock it before beginning surgery.

⚠ CAUTION!

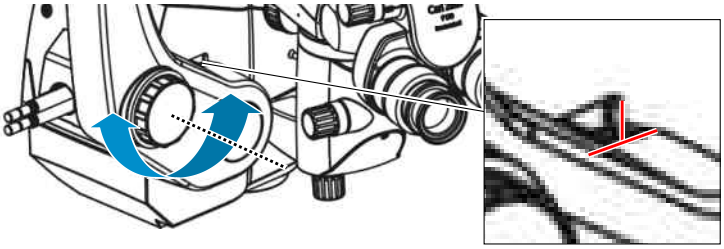
Risk of injury caused by fundus viewing system swiveling in!

If the RESIGHT 500 or RESIGHT 700 fundus viewing system is mounted on the underside of the microscope, and you steeply tilt the microscope, the RESIGHT fundus viewing system may swivel in.

- ▶ Remove the fundus viewing system before tilting the microscope at a steep angle.

Action

1. Tilt the surgical microscope towards you: rotate the [OPMI tilt] knob clockwise.
2. Tilt the surgical microscope away from you: rotate the [OPMI tilt] knob counter clockwise.



Result

- ✓ When the bar on the surgical microscope and that of the support arm are perpendicular to each other, the surgical microscope is in the perpendicular position relative to the patient's eye.

5.2.5 Adjusting the tubes and eyepieces

With the right settings, you can achieve an image which is sharply defined over the complete magnification range without any renewed focusing during the magnification setting.

Prerequisite

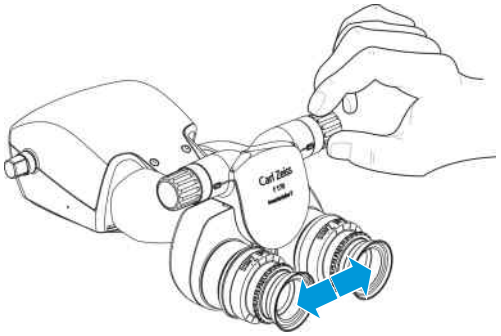
☑ The surgical microscope is positioned vertically above a level object.

☑ Do not wear any bifocal or progressive lenses for the adjustment procedure and subsequent work with the microscope. Such lenses make correct diopter setting impossible and result in unsatisfactory imaging.

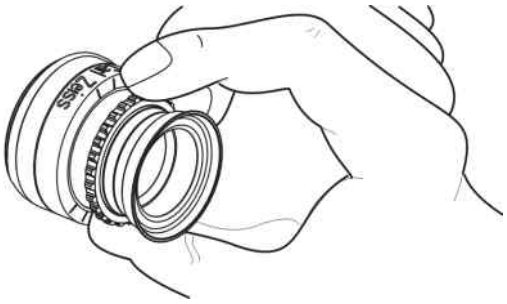
☑ Have writing implements ready. To permit fast setup of the microscope, it is advisable to store the pupillary distances and prescriptions of the different users so that they can be easily set during system preparation.

Action

1. Look through the eyepieces.
2. Position the eyepieces at eye width using the [Interpupillary distance] adjustment wheel so that both eyepiece images appear as a single image.

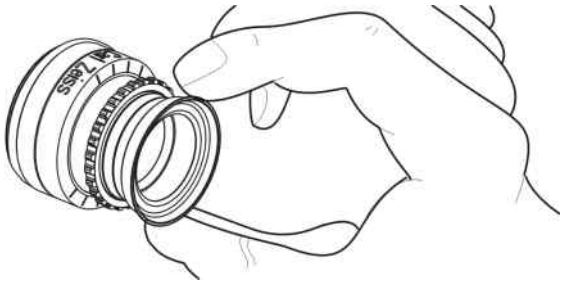


3. Set the diopter setting on both eyepieces to "0" diopters.



4. Set the surgical microscope to the lowest magnification setting.
5. Look through the eyepieces and move the surgical microscope to focus the image.
6. Set the microscope to the highest magnification setting and correct the image with the focusing function until it is sharply defined.
7. Reset the microscope to the lowest magnification setting without changing the working distance.

8. Follow steps 9 through 11 for each eyepiece individually.
9. Rotate the diopter adjustment ring on the eyepiece to its maximum plus diopter value.
10. Look through the eyepiece.
11. Slowly rotate the diopter adjustment ring in the minus diopter direction until the image is sharply defined.
    ⇨ The microscope generates an image which is sharply defined over the complete magnification range without requiring any refocusing while adjusting the total magnification.
12. Adjust the eyecups of the eyepieces in such a way that the entire visual field can be seen.



    ⇨ When viewing with eyeglasses: the eyecups are screwed in.
    ⇨ When viewing without eyeglasses: the eyecups are unscrewed.

5.2.6 Adjusting the working distance and magnification

Prerequisite

☑ The surgical microscope is positioned vertically above a level object.

Action

1. Focus on the object by moving the surgical microscope.
2. Set the microscope to the highest magnification setting and focus the image until it is sharply defined.
3. Set the surgical microscope to the required magnification.
    ⇨ The focal plane is retained.

5.2.7 Using the digital video system for observation without eyepieces (digital surgical microscope)

NOTE

Disturbing light effects caused by room lighting

When using Hybrid mode, disturbing light effects caused by room lighting may occur while viewing the video image.

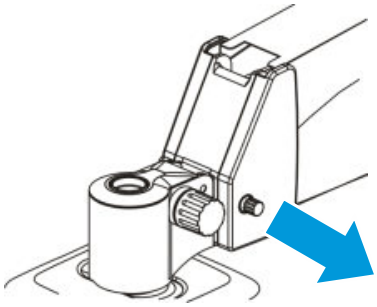
▶ Turn the eyepieces away from the source of the room lighting.

The digital surgical microscope allows you to use the surgical microscope without a tube or eyepieces. The surgical field is displayed on an external 3D monitor via the digital video system.

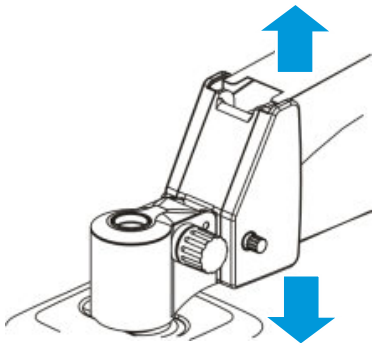
To use the surgical microscope as a digital video system for observation without eyepieces, proceed as follows:

Action

1. Place the suspension arm in a horizontal position. To do this, pull out the [suspension arm fixing] rotary knob and rotate it 180° clockwise or counterclockwise.

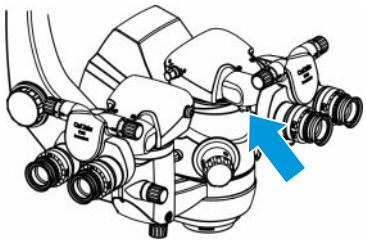


2. Move the suspension arm slightly upward and downward until the lock snaps in.

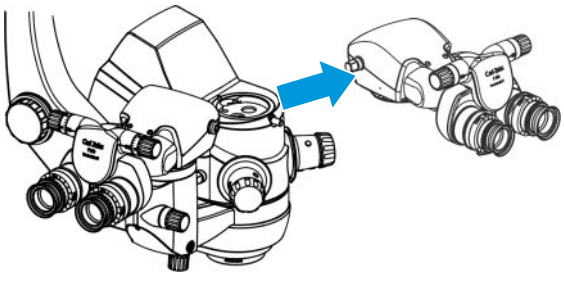


⇨ Now the suspension arm cannot swing upward.

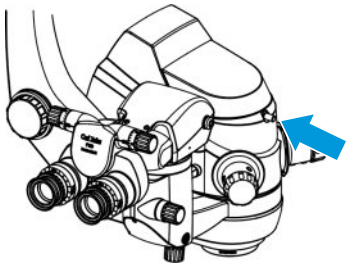
3. Unscrew the fastening screw on the microscope by turning it counterclockwise for several turns.



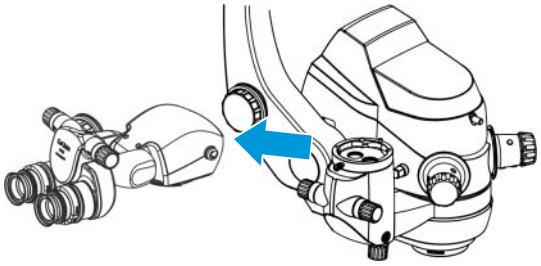
4. Remove inverter tube E from the main microscope.



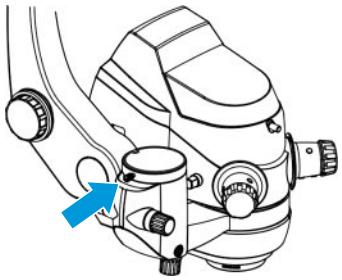
5. Place the cover on the main microscope and tighten the fastening screw hand-tight.



6. Remove inverter tube E from the assistant's microscope.



7. Place the assistant’s cover on the assistant's microscope and tighten the fastening screw hand-tight.



⇨ Due to the lower weight without a tube, the suspension arm must be rebalanced, see: Balancing the system [▶ 125].

5.3 Positioning the device in the OR

5.3.1 Moving the OPMI

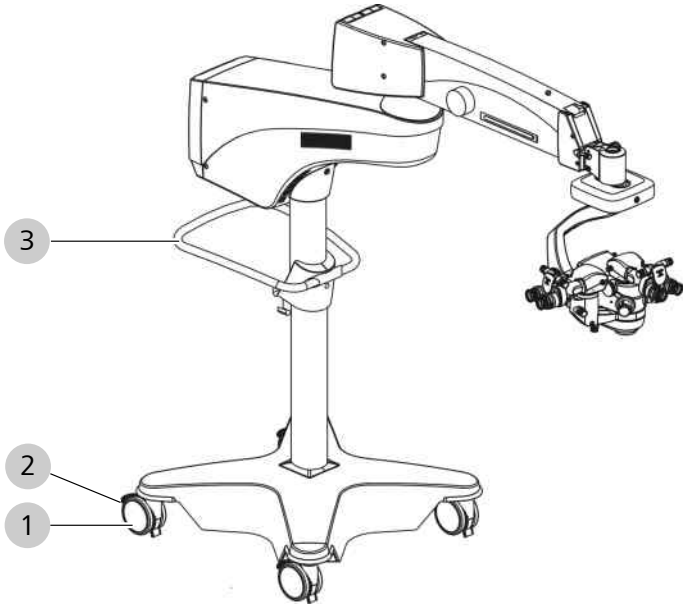


Figure 82: Moving the device

1	Steerable caster	2	The determining party
3	Transport handle		

⚠ CAUTION!

Risk of injury caused by inappropriate cable routing!

May cause persons to trip and fall.

- ▶ Always route cables in a manner such that they do not obstruct your work.

Action

1. Hold the device in position with the transport handle.
2. Unlock all four caster locking tabs and carefully move the device into a good position.
3. When you have reached the desired position, press the tabs on at least two locking tabs.
4. Make sure that the device is standing securely. Push and pull on the transport handle to check.

5.3.2 Swiveling the device over the surgical field

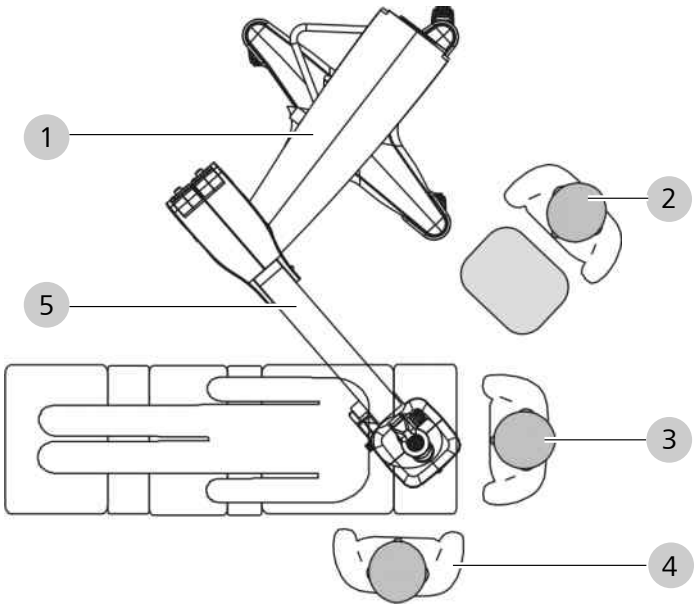


Figure 83: Surgical situation (example with an assistant on the left-hand side)

1	Support arm	2	Sterilization nurse
3	Surgeon	4	Assistant
5	Suspension arm		

⚠ CAUTION!

Risk of crushing caused by rotating support and suspension arms!

Fingers may be crushed between the stand column and the support arm, as well as between the support arm and the suspension arm.

- ▶ Never touch this area while moving these parts.

Action

1. Swivel the surgical microscope over the surgical field.
2. Angle the support arm and suspension arm to maintain optimal freedom of movement.

5.3.3 Bringing the OPMI into the working position

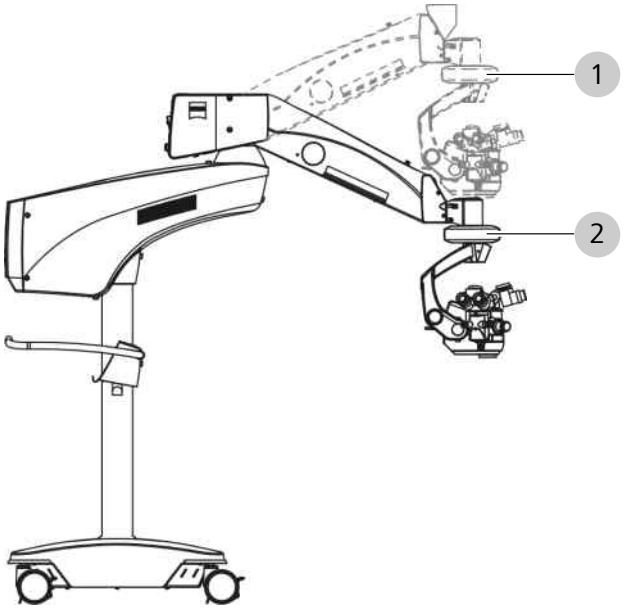


Figure 84: Placing the device in the working position

1	Park position	2	Working position

⚠ CAUTION!

Risk of injury caused by lowering of the surgical microscope!

If the surgical microscope has not been correctly balanced, unlocking the magnetic brakes may lead to downward movement, causing injury to the patient.

- ▶ Only release the magnetic brakes after the system has been balanced [▷ 125] and the surgical microscope remains stationary in all positions of the working range.
- ▶ Check the downward travel limit [▷ 128] and maintain sufficient working distance from the patient. The surgical microscope must not come into contact with the patient even if it is lowered inadvertently. This applies in particular to installed accessories such as VISULUX and RESIGHT 700.
- ▶ When unlocking the magnetic brakes, hold the system by the handgrips to prevent it from unintentionally moving downward.

Prerequisite

☑ The downward travel limit on the suspension arm is not locked.

Action

1. Release the magnetic brakes.
2. Move the surgical microscope into the desired working position.

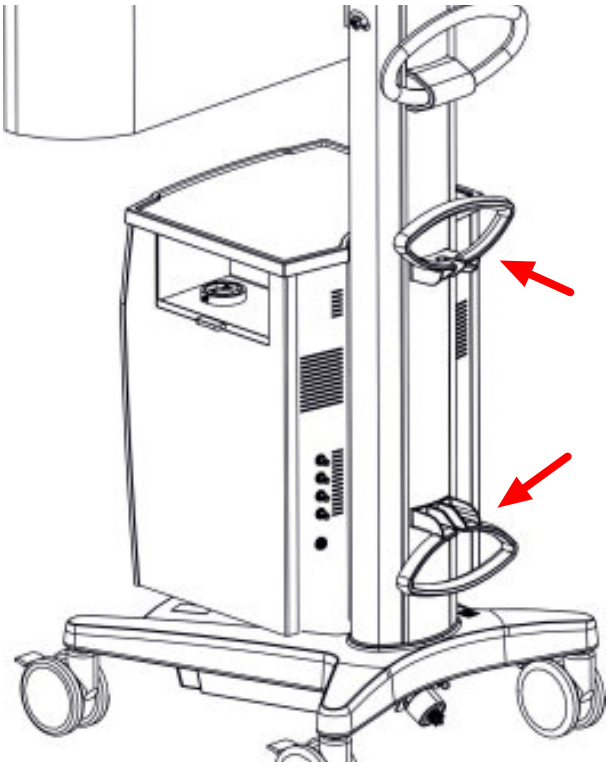
Tip: An unsterile staff member can use the switching strip to release the magnetic brakes.

5.3.4 Monitor cart (digital surgical microscope)

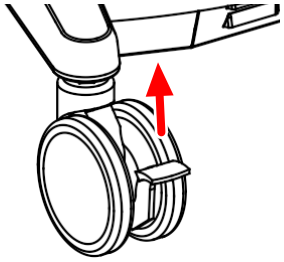
5.3.4.1 Moving the monitor cart

Action

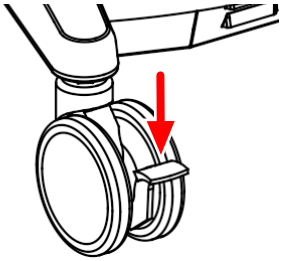
1. To move the monitor cart to another location, disconnect the power plug and all cables from the connector panel of the OPMI.
2. Wrap the cable set around the cable holder on the back of the monitor cart.



3. Secure all objects on the tray against falling or stow them away in the drawers of the monitor cart.
4. Close the drawers on each side of the monitor cart.
5. Release the locking tabs on the casters and move the monitor cart to the desired position.



6. After transport, reactivate the locking tabs.



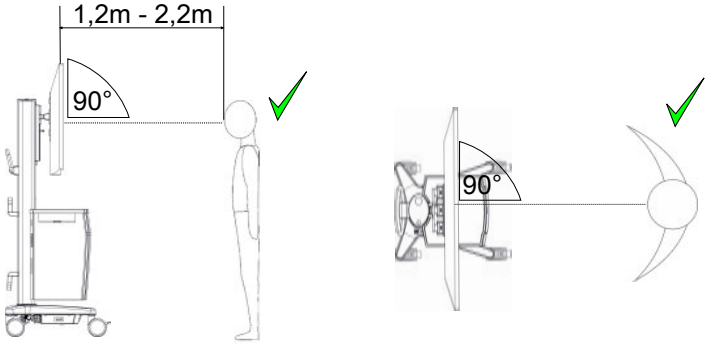
5.3.4.2 Moving the monitor cart into the working position

Prerequisite

☑ The locking tabs have been released.

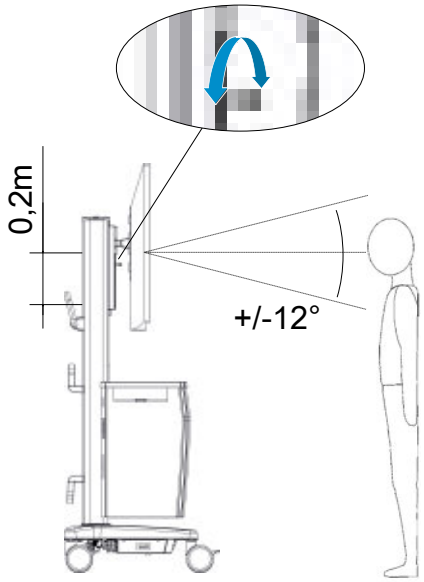
Action

1. Position the monitor cart so that the 3D monitor is located at least 1.2 m and no more than 2.2 m away from the viewer.
2. After transport, reactivate the locking tabs on the casters.



3. To adjust the height of the 3D monitor, release the locking lever on the rear of the monitor cart.
4. Adjust the height of the 3D monitor to the desired position using both hands.
   Note:
   The surgeon's line of sight should be as perpendicular and centered to the 3D monitor as possible.

5. Retighten the locking lever.
6. With the tilt function you can readjust the 3D monitor by +/-12°.



5.3.5 Positioning the CALLISTO eye Panel PC

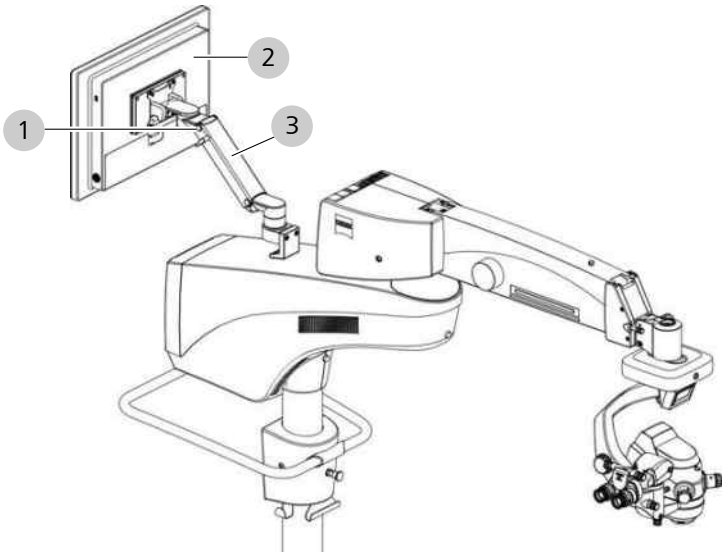


Figure 85: Positioning the CALLISTO eye Panel PC

1	Fixing lever	2	Monitor
3	Suspension arm		

⚠ CAUTION!

Risk of crushing caused by moving parts!

Fingers may be crushed between the monitor and support arm.

- ▶ Stay clear of the area between the suspension arm and the monitor while the user terminal is in motion.

Action

1. Release the suspension arm by rotating the fixing lever to the right.
   - ⇨ The suspension arm can be freely moved.
2. Swivel the support arm and the suspension arm into the desired horizontal and vertical position.
3. Lock the suspension arm by rotating the fixing lever to the left.
   - ⇨ The suspension arm is locked.
4. Hold on to the upper corner of the user terminal and set the desired viewing angle.

5.3.6 Adjusting the integrated video monitor

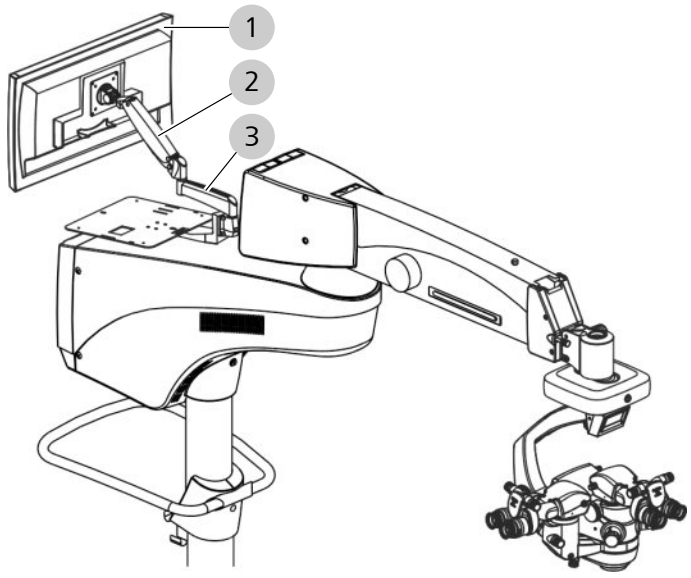


Figure 86: Adjusting the integrated video monitor

1	Video monitor	2	Suspension arm
3	Carrier arm		

⚠ CAUTION!

Risk of crushing caused by moving parts!

Fingers may be crushed between the monitor and support arm.

- ▶ Stay clear of the area between the suspension arm and the monitor while the user terminal is in motion.

⚠ CAUTION!

Risk of crushing caused by lowering of the video monitor!

A loss of gas in the suspension arm may cause the integrated video monitor to lower, causing injury to the patient.

- ▶ Compensate for the loss of gas by readjusting the gas spring. [▷ 233]

Action

1. Swivel the support arm and the suspension arm into the desired horizontal position.
2. Tilt the suspension arm upward or downward until the desired height is reached.
3. Hold on to the upper corners of the integrated video monitor and set the desired viewing angle.

6 Before every use

6.1 Safety during preparation

⚠ WARNING!

Risk of injury caused by attached fundus viewing system!

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 space available for movement is larger than the downward travel path of the microscope.
- ▶ Prior to using the fundus viewing system, reset the focus. [▷ 147]

⚠ CAUTION!

Risk of injury caused by incorrect software settings!

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

- ▶ Check the selected user before each use.
- ▶ Only make changes to your own user profile.

NOTE

Loss of functionality caused by hardware or software faults!

- ▶ Arrange suitable precautions, irrespective of the application, to be able to end the operation or application without use of this microscope.
- ▶ Keep a backup lamp or an OR illuminator ready at hand.

NOTE

Light source failure due to overheating!

If the ventilation openings are covered, the device can accumulate heat, and the light source may stop working.

- ▶ Never cover any ventilation openings.

6.2 Switching the device on

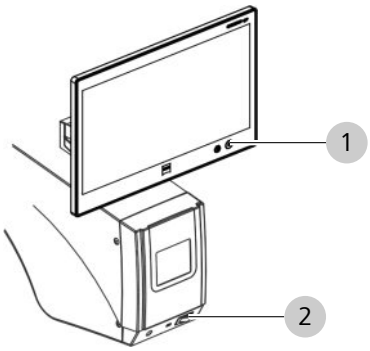


Figure 87: Switching the device on (example with integrated CALLISTO eye Panel PC)

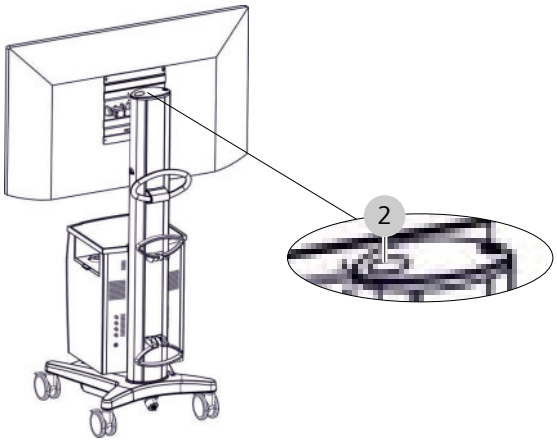


Figure 88: Switching on the monitor cart

1	[Power] button	2	Power switch

⚠ CAUTION!

Risk of infection caused by particles being stirred up!

The built-in fan can stir up loose particles and transfer germs to the patient when the device is switched on.

- ▶ Only turn the device on when there is no patient beneath the surgical microscope.

NOTE

Device cannot be operated!

The automatic circuit breaker in the power switch was activated due to a circuit overload or short.

- ▶ To switch the device on: press the power switch.
- ▶ If the automatic circuit breaker is triggered again, notify ZEISS Service.

Prerequisite

☑ The 14-function foot control panel is connected.

☑ For a direct network connection between the device and the CALLISTO eye Panel PC, both devices must be connected by means of a network cable.

Action

1. Monitor cart (digital surgical microscope): press the [Power] switch button.
   ⇨ The power switch button will light up green and a video signal will appear on the monitor.
   ⇨ The monitor cart is now ready for operation.
2. Press the [Power] switch button.
   ⇨ The power switch will light up green and the main menu will appear on the control panel.
   ⇨ The device is now ready to be started.
3. In the CALLISTO eye Panel PC: press the [Power] switch button.
   ⇨ The power switch will light up green.
   ⇨ CALLISTO eye is now ready for use.

6.3 Function test

Function tests reveal faults and incorrect software settings that may impact your work or result in unexpected device behavior.

6.3.1 Device function tests

Use the following list to check device functionality before each use (patient should not be present!).

Action

- ▶ Check to make sure all required accessories are attached to the surgical and assistant's microscopes. [▷ 119]
  ⇨ The surgical microscope can be freely and easily positioned.
- ▶ Check to make sure the device weight has been balanced. [▷ 125]
  ⇨ The surgical microscope maintains its balance in all positions of the working range when the magnetic brakes are released.
- ▶ Check to make sure the downward travel limit is set. [▷ 128]
  ⇨ The surgical microscope can be lowered far enough to focus while maintaining sufficient working distance from the surgical field.
- ▶ Check to make sure the XY coupling friction is set. [▷ 129]
  ⇨ The surgical microscope is in a fixed position and cannot be inadvertently swiveled to the right or left.
- ▶ Check to make sure the surgical microscope is set up. [▷ 131]
  ⇨ Both eyepiece images appear as a single image.
  ⇨ The focal plane is retained when zooming.

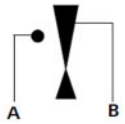
- ▶ In Hybrid mode, check that the surgical microscope has been configured. (digital surgical microscope) [▷ 131]
  - ⇨ Both eyepiece images appear as a single image.
  - ⇨ The focal plane is retained when zooming.
- ▶ Check that 3D image is displaying on the monitor. (digital surgical microscope)
  - ⇨ The 3D image has been configured correctly. (digital surgical microscope)
- ▶ Make sure the correct user and surgery profiles are set. [▷ 155]
  - ⇨ The saved settings are appropriate for the user.
- ▶ Check to make sure the buttons on the 14-function foot control panel are configured. [▷ 170]
  - ⇨ The device performs the configured functions.
- ▶ Check to make sure the handgrips on the surgical microscope are configured. [▷ 171]
  - ⇨ The device performs the desired functions.
- ▶ Check to make sure the zoom, focus and XY speeds are set. [▷ 173]
  - ⇨ The device moves the components at the desired speeds.
- ▶ Check to make sure the SCI illumination system is set. [▷ 180]
  - ⇨ The lowest light intensity is set on the device.
  - ⇨ The desired illumination type is set on the device.
  - ⇨ A suitable filter is swiveled in on the device.
- ▶ Check the light sources. [▷ 181]
  - ⇨ For xenon lamps: the remaining service hours must be sufficient to complete the operation.
- ▶ Check to make sure the objective lens and the eyepieces are clean.
- ▶ For integrated IDIS: check the light intensity.
  - ⇨ The displayed parameters must not blind the user or limit the field of vision.
- ▶ For integrated IDIS: check to make sure the total magnification is correctly displayed. [▷ 162]
  - ⇨ The optical settings match the configuration on the surgical microscope.
- ▶ Check to make sure the device is positioned in such a way so that it can be pushed away from the patient at any time. [▷ 135]

6.3.2 Function tests for device with fundus viewing system

Prior to using the fundus viewing system, reset the focus.

Action

- 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 (i.e. 1.0).
- Lower the microscope onto the surgical field until the cornea of the patient’s eye is in focus.
- Tighten the [Downward travel limit] rotary knob.
- With no patient present, check to make sure the suspension arm cannot be lowered any further.

6.4 Preparing the system for sterile use

6.4.1 Attaching sterile accessories

⚠ CAUTION!

Risk of infection caused by missing sterile accessories!

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

- ▶ Use the device only with suitable sterile accessories.
- ▶ Disinfect, clean and sterilize sterile accessories before each use. This also applies to the first use after delivery. These procedures may only be performed by properly trained personnel.

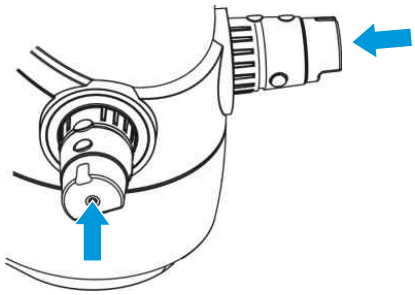
Material	■ Asepsis caps ■ Asepsis caps 22 mm ■ Asepsis caps 49 mm
Documents	■ "Preparation of resterilizable products" manual

Prerequisite

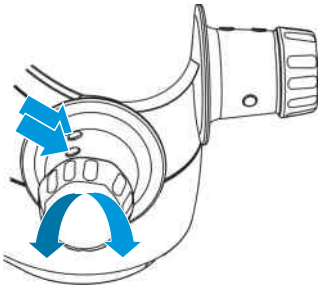
☑ The asepsis caps are sterilized.

Action

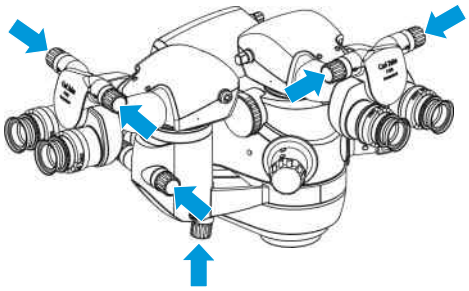
1. Slide the asepsis caps onto the handgrips of the surgical microscope.



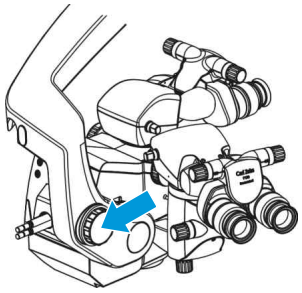
2. Turn the sterilizable caps in such a way that the elevations for the buttons precisely fit on the handgrip buttons.



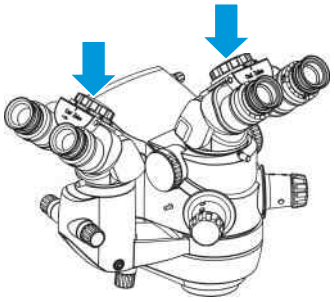
3. Slide the 22 mm sterilizable cap onto the adjustment knob on the surgical and assistant's microscopes.



4. Slide the 49 mm sterilizable cap onto the [OPMI tilt] adjustment knob.



5. For 180° tiltable tube: slide the 49 mm sterilizable cap onto the [Interpupillary distance] adjustment knob.



6.4.2 Placing the drape

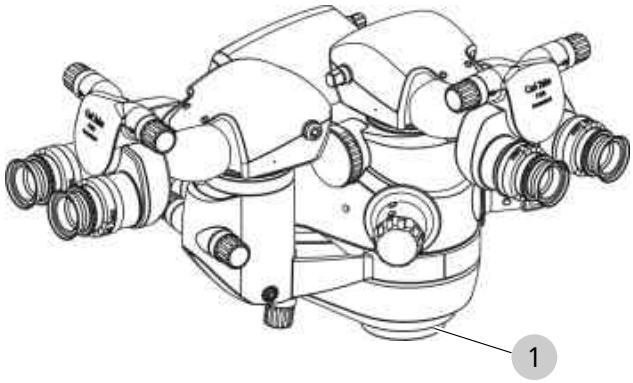


Figure 89: Placing the drape

1	Objective lens

NOTE

Reduced image quality!

Drapes with vision guard may reduce the image quality of the optics.

- ▶ Remove the protective film from the drape lens.
- ▶ If the drape lens is dirty, replace it with a new one.

Material	■ Without camera: drapes (460 mm x 330 mm) ■ For 2 observer tubes with camera: sterile OPMI drapes (1220 mm x 2090 mm) or sterile OPMI drapes (1220 mm x 3000 mm)

Action

1. Place the drape on the objective lens. Make sure there is sufficient room for the surgical microscope to move.
2. To prevent slippage: secure the drape with the included adhesive tape.

7 Operation

7.1 Safety during operation

⚠ CAUTION!

Risk of injury due to electrical current!

Contact with plug connector contacts may cause electric shock.

- ▶ Never touch the contacts on plug connectors during contact with the patient.

⚠ CAUTION!

Risk of injury caused by high IDIS light intensity!

If IDIS is activated, excessive IDIS light intensity in the eyepiece can cause glare and may damage the user's retina.

- ▶ Reduce the IDIS light intensity until an optimum view of the surgical field is provided.
- ▶ If the IDIS light intensity cannot be reduced, deactivate the IDIS system.

⚠ CAUTION!

Danger due to accidentally triggered functions!

Plugging the foot control panel in or out during operation may lead to functions being triggered accidentally and thus to startling.

- ▶ Avoid plugging the foot control panel in or out during operation.

NOTE

Loss of functionality caused by hardware or software faults!

The XY movement, focus, zoom, light or magnetic brakes may fail, limiting your ability to operate.

- ▶ Activate Manual mode.
- ▶ Contact ZEISS Service.

NOTE

14-function foot control panel failure!

The device cannot be controlled via the 14-function foot control panel.

- In the case of a wireless 14-function foot control panel: check to make sure the batteries are sufficiently charged.
- If the batteries are charged and the foot control panel does not work: use the cable to operate the 14-function foot control panel.
- If the 14-function foot control panel still does not work: activate the manual mode.
- Activate Manual mode.
- It is possible to override the brake function of the stand manually in order to make rough settings on the stand.
- The microscope may be manually positioned using the suspension arm.
- Brightness is set at a fixed value.
- Settings on the zoom, on the SCI lighting environment and on the integrated slit illumination system may be carried out by manual operation.

NOTE

Falling panel parts!

Collision with the suspension arms may occur when the surgical microscope is being moved.

- During motion control, ensure that the route is collision-free. [▷ 128]

7.2 3D-4K monitor settings

In the event that the settings have been changed unintentionally, follow the steps set out below:

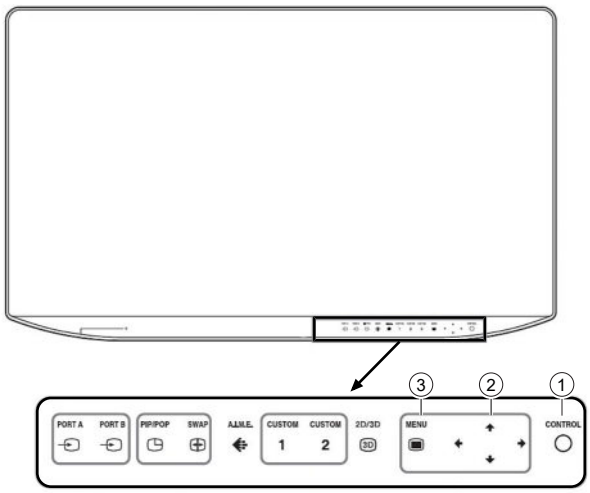
Prerequisite

☑ The device is equipped with the digital option.

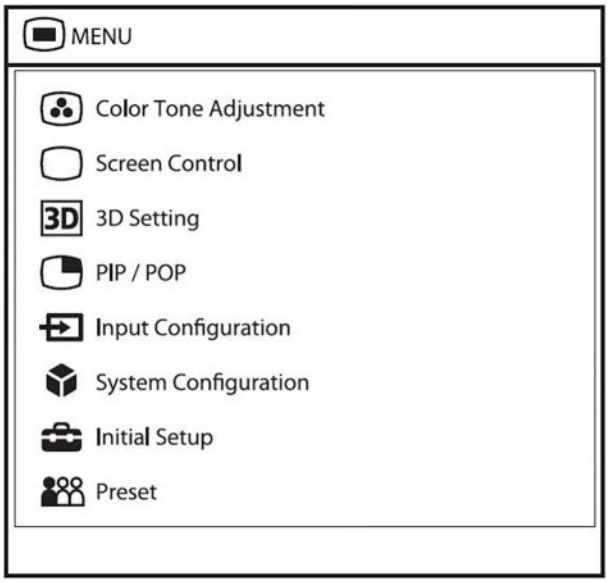
☑ The monitor is switched on.

Action

1. Press [Control] (1) to make the menu bar appear.



2. Press [MENU] (3) to display the menu.



3. Use the arrow buttons (2) to navigate to [Preset], then press [Control] (1) to confirm.
4. Use the arrow button (2) → to navigate to [Load Default].
5. Use the arrow button (2) ↓ to navigate to [Load Default].
6. Confirm [Load Default] by clicking on the right arrow.

   ⇨ A dialog opens: "Load file [NO] / [YES]"
7. Use the arrow buttons (2) to navigate to [YES], then press [Control] (1) to confirm.

   ⇨ A factory reset is in progress.
8. Press [MENU] (3) to display the menu.

9. Use the arrow buttons (2) to navigate to [Screen Control], then press [Control] (1) to confirm.
10. Use the arrow buttons (2) to select the "SDI 1" tab and perform the following settings:

SDI 1	
4K Scan Size	OFF
HD Scan Size	OFF
SD Scan Size	OFF
Zoom	OFF
Flip Pattern	OFF
SD Aspect	4:3
Interface Mode	HD Dual

11. Press [MENU] to confirm the entered value.
    ⇨ The menu closes.
12. Press [MENU] (3) to display the menu.
13. Use the arrow buttons (2) to navigate to [3D Setting], then press [Control] (1) to confirm.
14. Use the arrow buttons (2) to select the "SDI 1" tab and perform the following settings:

SDI 1	
2D/3D Select	3D
3D Signal Format	Dual Stream
3D Disparity	0
L/R Priority	L Line First

15. Press [MENU] to confirm the entered value.
    ⇨ The Screen Control menu closes.
16. Press [Control] (1) to hide the menu bar.

Result

✓ The monitor is configured for surgery with the digital option.

7.3 Configuring user and surgery profiles

7.3.1 Creating and activating users

Upon first login, the predefined user Default User is set. The Default User cannot be deleted; it features the following characteristics:

- English user interface
- Anterior surgery profile – for applications in the anterior segment of the eye
- Posterior surgery profile – for applications in the posterior segment of the eye

Each time the device is started, the previously logged-in user is automatically activated. The name of the user who is logged in, as well as their surgery profile, are displayed at the bottom right in the control panel. A maximum of 40 users can be managed.

Action

1. Open the main menu.
2. Tap the [User] menu button.
   ⇨ The user menu will appear.

3. To create a user: tap the button next to the "User" selection field.
   ⇨ The screen keyboard will appear.
4. Enter the user name. The maximum text length is 20 characters.
5. Save the user name: tap the button.
   ⇨ If the user name does not yet exist, the following message will appear: "Which settings should be used?"
6. Assign the settings to [Default User] or [Current User].
7. Save the user. To do this, tap the button.
   ⇨ The user will be created and displayed in the selection field.

8. To activate the user: tap the [Activate] button.
   ⇨ A message will appear: "The current user is being changed. Please wait."

Result

✓ The user is displayed in the footer.

7.3.2 Changing the user language

The "Default User" language cannot be changed. The following languages can be set for manually added users:

● German	● Lithuanian
● English	● Macedonian
● French	● Norwegian
● Spanish	● Portuguese
● Italian	● Brazilian Portuguese
● Russian	● Romanian
● Japanese	● Serbian
● Chinese	● Slovakian
● Polish	● Slovenian
● Albanian	● Swedish
● Bosnian	● Turkish
● Czech	● Ukrainian
● Danish	● Vietnamese
● Dutch	● Hungarian
● Estonian	● Bulgarian
● Finnish	● Greek
● Latvian	● Croatian

Prerequisite

☑ A manually added user is activated.

Action

1. Open the main menu.
2. Tap the [User] menu button.
   ⇨ The user menu will appear.
3. Tap the current language in the "Language" selection field.
   ⇨ The selection list will appear.
4. Select the desired user language.

Result

✓ The selected user language will be changed immediately.

7.3.3 Deleting users

Action

1. Open the main menu.
2. Tap the [User] menu button.
   ⇨ The user menu will appear.
3. Select an **inactive** user. The active user and the "Default User" cannot be deleted.
4. Tap the button and confirm the prompt.

Result

✓ The selected user will be deleted.

7.3.4 Creating a "Cataract" surgery profile

The "Cataract" surgery profile saves device settings [▶ 90] for applications in the anterior segment of the eye. This surgery profile can be derived from the preconfigured "Anterior" surgery profile.

Prerequisite

☑ The user for which the surgery profile is being created is active.

Action

1. Open the main menu.
2. Tap the [User] menu button.
   ⇨ The user menu will appear.

3. Select the "Anterior" surgery profile. To do this, tap the button next to the "Surgery profile" selection field.
   ⇨ The screen keyboard will appear.
4. Delete the name and replace it with "Cataract". The maximum text length is 20 characters.
5. Save the surgery profile. To do this, tap the button.
   ⇨ The surgery profile will be created and displayed in the selection field.
6. To activate the surgery profile: tap the [Activate] button.
   ⇨ The following message will appear: "The current surgery profile settings are being changed. Please wait!".

Result

✓ The surgery profile is displayed in the footer.

7.3.5 Creating a "Retina RESIGHT" surgery profile

The "Retina RESIGHT" surgery profile saves device settings [▶ 90] for applications in the posterior eye segment with the RESIGHT 500 or RESIGHT 700 fundus viewing system. This surgery profile can be derived from the preconfigured "Posterior" surgery profile.

Prerequisite

☑ The user for which the surgery profile is being created is active.

Action

1. Open the main menu.
2. Tap the [User] menu button.
   ⇨ The user menu will appear.

3. Select the "Posterior" surgery profile. To do this, tap the button next to the "Surgery profile" selection field.
   ⇨ The screen keyboard will appear.
4. Delete the name and replace it with "Retina RESIGHT". The maximum text length is 20 characters.
5. Save the surgery profile. To do this, tap the button.
   ⇨ The surgery profile will be created and displayed in the selection field.
6. To activate the surgery profile: tap the [Activate] button.
   ⇨ The following message will appear: "The current surgery profile settings are being changed. Please wait!".

Result

✓ The surgery profile is displayed in the footer.

7.3.6 Creating a "Retina Contact" surgery profile

The "Retina Contact" surgery profile saves device settings [▶ 90] for applications in the posterior eye segment with contact glasses. The image inversion and RESIGHT focus functions on the 14-function foot control panel can therefore be deactivated. Since the differences between the two profiles are minor, the "Retina Contact" surgery profile can be derived from the "Retina RESIGHT" profile.

Prerequisite

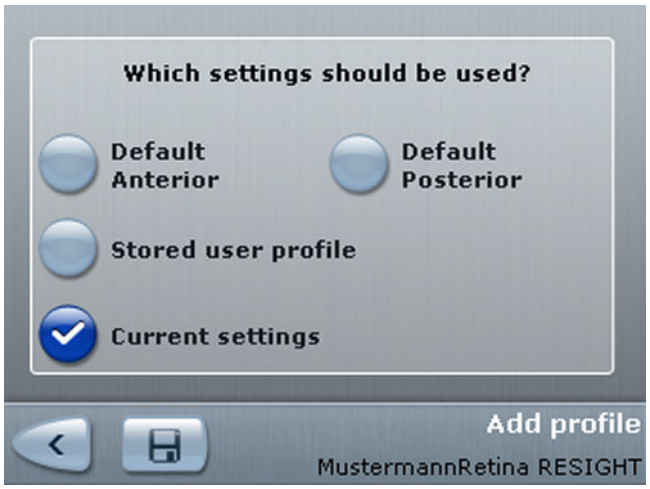
☑ The user for which the surgery profile is being created is active.

☑ The "Retina RESIGHT" surgery profile has been created and configured.

Action

1. Open the main menu.
2. Tap the [User] menu button.
   ⇨ The user menu will appear.

3. Activate the "Retina RESIGHT" surgery profile.
4. To add the "Retina Contact" surgery profile: tap the button next to the "Surgery profile" selection field.
   ⇨ The screen keyboard will appear.
5. Enter the name "Retina Contact". The maximum text length is 20 characters.
6. Save the surgery profile. To do this, tap the button.
   ⇨ The following prompt will appear: "Which settings should be used?"



7. To use the active user's current settings: activate the [Current settings] button.
8. Save the surgery profile. To do this, tap the button.

Result

✓ The surgery profile is displayed in the footer.

7.3.7 Assigning the RESIGHT function to the surgery profile

If a profile features the RESIGHT function designation, and the RESIGHT 700 is swiveled in, the device automatically activates the surgery profile with the RESIGHT function [▷ 94].

Action

1. Open the main menu.
2. Open the [User] menu.
3. Tap on the button.
   ⇨ The "Surgery profile" menu will appear.

4. Select the desired device settings.
   ⇨ The selected surgery profile features a light gray background.
5. Assign the RESIGHT function to the surgery profile. To do this, tap the button.
   ⇨ The selected surgery profile will be designated with an **R**.
6. To save the settings to a specific user: tap the button.

7.3.8 Configuring working steps

The order of device settings and the use of device settings with RESIGHT can be configured individually for each user.

Action

1. Open the main menu.
2. Tap the [User] menu button.
3. Tap on the button.
   ⇨ The "Surgery profile" menu will appear.

4. Select the device setting you would like to move.
   ⇨ The selected device setting features a light gray background.
5. Adjust the order of device settings with the arrow buttons.
6. To save the settings to a specific user: tap the button.

7.3.9 Deleting a surgery profile

Action

1. Open the main menu.
2. Tap the [User] menu button.
3. Tap on the button.
   ⇨ The "Surgery profile" menu will appear.
4. Select an **inactive** surgery profile. The active surgery profile cannot be deleted.
5. To delete the selected surgery profile: tap the button and confirm the prompt.
   ⇨ The surgery profile will be deleted, but will remain in the device's internal storage.
6. To delete the surgery profile permanently: Tap the button.

7.4 Device-specific software configuration

This section contains information about user tasks which are not part of day-to-day operations. These settings apply to all users.

7.4.1 Setting date and time

The date and time must be set during the following activities:

- First use
- Change of time zone
- Switching from summer to winter time, or vice versa

Prerequisite

☑ No surgical operation is currently in progress. Changing the date or time requires restarting the device!

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Date & Time] submenu button.
   ⇨ The configuration menu will appear.

4. Set the desired values.
5. To save the settings for a specific device: tap the [System] button and confirm the prompt.

Result

✓ The new settings will take effect following restart.

7.4.2 Configuring optics

The optical parameters must be configured in order to correctly calculate the total magnification.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.

3. Tap the [Optics] submenu button.
   ⇨ The "Optics" menu will appear.

4. Select the eyepiece and the objective lens the device is using.
   ⇨ Activated functions are colored blue.
5. To save the settings for a specific device: tap the [System] button.

7.4.3 Pairing

Wireless operation of the 14-function foot control panel requires pairing it with the device.

Prerequisite

☑ The foot control panel is in a vertical position and in the immediate vicinity of the device.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Pairing] submenu button.
   ⇨ The "Pairing" menu will appear.
4. Tap the [Start pairing] submenu button.
   ⇨ The following message will appear: "Device and foot control panel are being paired".

5. Press any button on the foot control panel until the status indicator flashes orange. Keep the foot control panel in a vertical position. On initial pairing, it may take up to 20 seconds for the radio link between the suspension system and the foot control panel to be established.
   ⇨ The following message will appear: "Pairing successfully completed. Place the foot control panel in a horizontal position and perform a function test. Set the number specified on the stand on the rotary wheel of the foot control panel."
   ⇨ If pairing is successful: the "Radio link intensity" status indicator will illuminate red for approximately one second, and a message will appear.
6. Perform a function test. To do this, press any two buttons on the foot control panel.
   ⇨ The "Radio link intensity" status indicator will illuminate green for approximately one second.
7. Set the number specified on the stand on the rotary wheel of the foot control panel.

7.4.4 Configuring the video signal of the integrated camera

7.4.4.1 Configuring the resolution

The resolution can be set to 1080p or 720p.

Prerequisite

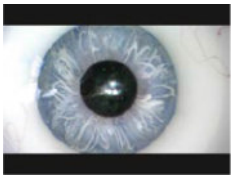
☑ The device includes an integrated HD camera.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Video format] submenu button.
   ⇨ The "Video format" menu will appear.
4. Select the desired resolution.
5. To save the settings for a specific device: tap the [System] button.

7.4.4.2 Configuring the display format

If a display device with an aspect ratio other than 16:9 is connected to the SD output, the display format can be set (letterbox or sidecut). Setting the display format has no effect when using CALLISTO eye for display purposes.

Display format	Explanation	Image
Letterbox	The image will be displayed in 16:9 format, but black bars will appear at the top and bottom of the screen.	
Sidecut	The image is cut off on the sides, and only the middle of the image is displayed in an aspect ratio of 4:3. The black frame indicates the actual size of the image.	

Prerequisite

☑ The device includes an integrated HD camera.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Video format] submenu button.
   ⇨ The "Video format" menu will appear.
4. Select the desired display format.
5. To save the settings for a specific device: tap the [System] button.

7.4.5 Configuring the network connection with CALLISTO eye

There are two ways to establish a network connection:

- Establishing a network connection with default values [▷ 165]
- Manually configuring a network connection [▷ 166]

7.4.5.1 Establishing a network connection with default values

With this function, the device activates the "DHCP" network setting and loads the device and CALLISTO eye data stored in the device. The stored data consists of:

- IP Adress
- Subnet Mask
- Gateway
- Computer name

Prerequisite

☑ The device is connected to the CALLISTO eye Panel PC via a network cable.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [CALLISTO] submenu button.
   ⇨ The "CALLISTO eye" menu will appear.

4. Tap the [Reset] button and confirm the prompt.
   ⇨ The default network settings will be loaded.
   ⇨ The device will restart.

7.4.5.2 Configuring the network connection

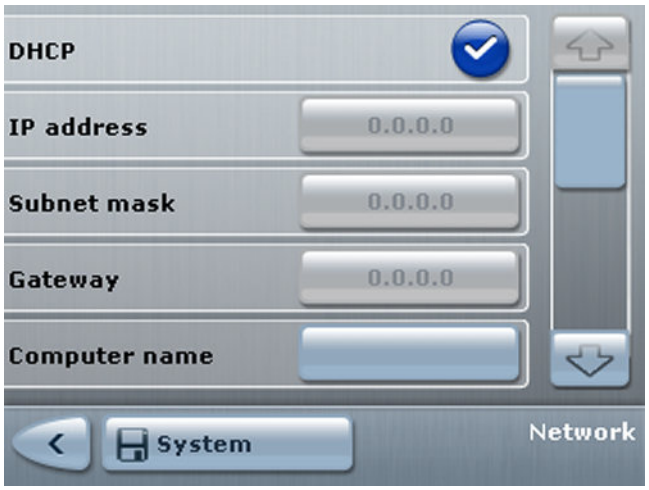
The network connection with CALLISTO eye can be configured manually or automatically via a DHCP server.

Prerequisite

☑ The device is connected to the CALLISTO eye Panel PC via a network cable.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [CALLISTO] submenu button.
4. Tap the [Network] button.
   ⇨ The "Network" menu is displayed.



5. **To automatically provide network parameters:** activate the [DHCP] button.
   ⇨ The button will turn blue.
   ⇨ The "IP address", "Subnet mask" and "Gateway" buttons will become deactivated.
6. **To manually input network parameters:** Deactivate the [DHCP] button.
   ⇨ The button will turn light blue.
   ⇨ The "IP address", "Subnet mask" and "Gateway" buttons will become activated.
7. Tap the [IP address] button.
   ⇨ The screen keyboard will appear.
8. Enter the static IP address to be used. Only numeric entries with the following syntax are possible:
   <No.>.<No.>.<No.>.<No.> (ranging between 0 and 255).

9. To save the IP address: tap the button.
   ⇨ The "Network" menu is displayed.
10. Follow the same steps for "Subnet mask", "Gateway" and "Computer name".
11. To save the settings for a specific device: tap the [System] button.
12. Perform a connection test. [▶ 167]

7.4.5.3 Testing the network connection with CALLISTO eye

Prerequisite

☑ The CALLISTO eye IP address is known.

☑ The "Network" menu is displayed. [▶ 166]

Action

1. Scroll down using the slider or arrow buttons.
   ⇨ The "PING" menu will appear.
2. Tap the [0.0.0.0] button in the "Target IP" field.
   ⇨ The screen keyboard will appear.
3. Enter the CALLISTO eye IP address. Only numeric entries with the following syntax are possible: <No.>.<No.>.<No.>.<No.> (ranging between 0 and 255).
4. To save the IP address: tap the button.
   ⇨ The "PING" menu will appear.
5. Test the network connection. To do this, tap the [PING] button.

Result

✓ If the "Ping result - Ping successful" message appears, the network connection was successfully established.

✓ If the "Ping result - Ping failed" message appears, the network connection could not be established. There is a problem with the host address, subnet mask or gateway. Check your host address, subnet mask and gateway.

7.4.6 Configuring integrated HD video and image recording

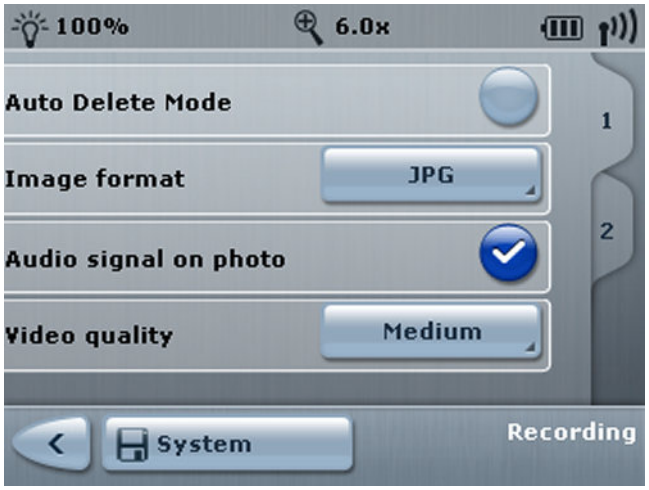
The integrated HD video and image recording [▶ 99] creates HD videos and photos of the operation.

Prerequisite

☑ The device includes integrated HD video and image recording.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Recording] submenu button.
   ⇨ The "Recording" menu will appear.



4. Select the desired settings.
5. To save the settings for a specific device: tap the [System] button.

Tip: If "Auto Delete Mode" is activated, HD videos and photos older than three days will be automatically deleted. Moreover, HD video and photos are not assigned to a patient; rather, they are stored in a neutral folder. If you would like to assign HD videos and photos to a patient, you must deactivate "Auto Delete Mode".

7.4.6.1 Configuring the network connection

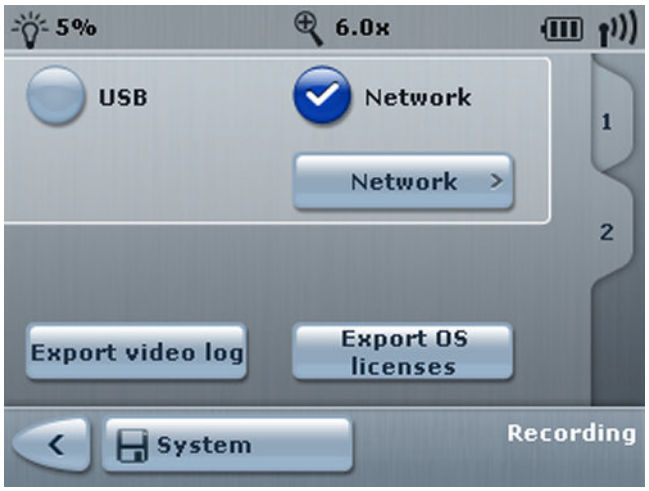
The network connection for integrated HD video and image recording can be established manually or automatically via a DHCP server.

Prerequisite

☑ The device is connected to an IT network via a network cable.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Recording] submenu button.
4. Tap the [Tab 2] button.
   ⇨ The "Recording" menu will appear.



5. Tap the [Network] button. If the button is deactivated, first activate the [Network] button and then tap the [System] button.
   ⇨ The "Network" button will become activated.
   ⇨ The "Recording Network" menu will appear.
6. **To automatically provide network parameters:** activate the [DHCP] button.
   ⇨ The button will turn blue.
   ⇨ The "IP address", "Subnet mask" and "Gateway" buttons will become deactivated.
7. **To manually input network parameters:** deactivate the [DHCP] button.
   ⇨ The button will turn light blue.
   ⇨ The "IP address", "Subnet mask" and "Gateway" buttons will become activated.
8. Tap the [IP address] button.
   ⇨ The screen keyboard will appear.
9. Enter the static IP address to be used. Only numeric entries with the following syntax are possible: <No.>.<No.>.<No.>.<No.> (ranging between 0 and 255).
10. To save the IP address: tap the button.
    ⇨ The "Recording Network" menu will appear.
11. Follow the same steps for "Subnet mask" and "Gateway".
12. To save the settings for a specific device: tap the [System] button.

7.4.6.2 Exporting video logs or OS licenses

Video logs or OS licenses can be saved to an IT network or USB storage device.

Prerequisite

☑ A network connection has been established. Alternative: a USB storage device is connected, recognized and contains sufficient free storage space.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Recording] submenu button.
   ⇨ The "Recording" menu will appear.
4. Tap [Tab 2].

5. To export video logs: tap the [Export video log] button.
   ⇨ The following message will appear: "Started exporting log files. Please wait. Exporting of log files was successful".
   ⇨ The generated ZIP archive file contains information about the recorded videos.
6. To export OS licenses: tap the [Export OS licenses] button.
   ⇨ The following message will appear: "Started exporting licenses files. Please wait. Exporting of licenses files was successful".
   ⇨ The generated ZIP archive file contains information about the open source licenses used.
7. Close the message. To do this, tap the  button.

7.4.7 Configuring the 3D video recording

The integrated 4K video and image recording [▶ 99] creates 4K videos and photos of the operation.

For further information, please see the following document: G-30-2003-de - 2.0 - 2019-05-27

7.5 Configuring the software for specific users

All user-specific settings are saved to the user profile or surgery profile which is currently active. The existing user profile or surgery profile is overwritten (exception: the factory default user is currently active). If you do not want to overwrite the current user profile or surgery profile, you must first select and activate a different user profile or surgery profile.

7.5.1 Configuring the 14-function foot control panel

The 14-function foot control panel's buttons and rocker switches can be assigned user-specific functions [▶ 87]. If the RESIGHT 700 is swiveled in and you would like to control the RESIGHT 700's internal focus via the 14-function foot control panel, the rocker switches must be assigned the following RESIGHT focus functions:

- RESIGHT Focus -
- RESIGHT Focus +

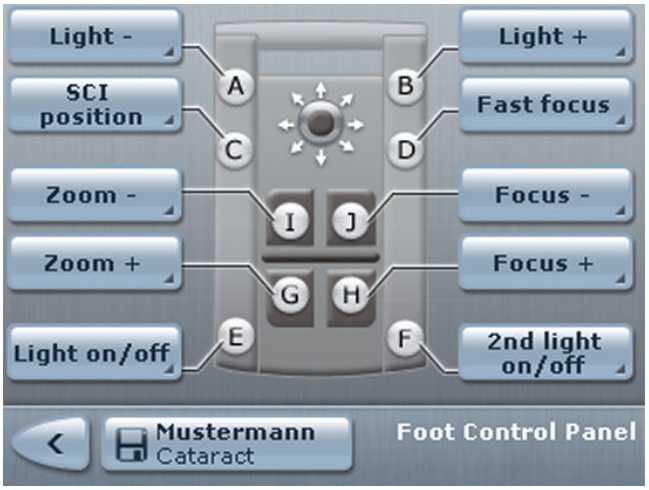
Prerequisite

☑ The surgery profile you wish to configure is activated.

☑ In order for the RESIGHT focus functions to be assigned to the "I" and "H" rocker switches, the RESIGHT function [▶ 160] must be assigned to the activated surgery profile.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [Foot control panel] submenu button.
   ⇨ The "Foot Control Panel" menu will appear.



4. Tap the buttons whose assignments you would like to change.
   ⇨ The list of available functions will appear.
5. Select the function you would like to assign to the selected button on the 14-function foot control panel.
   ⇨ The function will be displayed on the button.
6. To save the changes to the surgery profile: tap the button.

Tip: Test the button assignments and functions on the 14-function foot control panel before each use when the patient is not present.

7.5.2 Configuring the handgrips

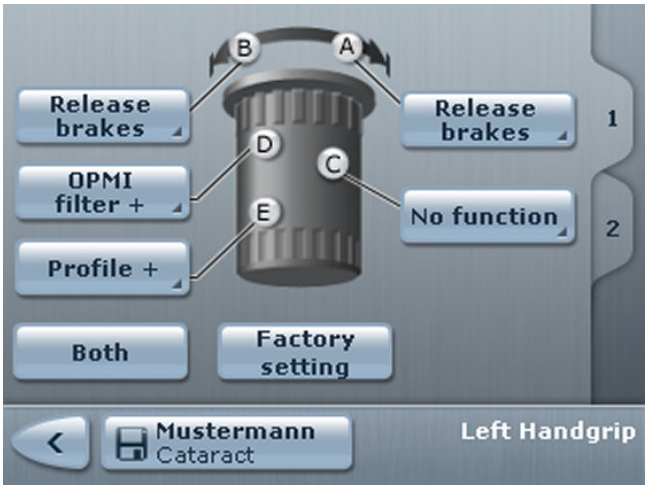
The buttons and directions of rotation on the handgrips can be assigned user-specific functions [▶ 87].

Prerequisite

☑ The surgery profile you wish to configure is activated.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [Handgrip] submenu button.
   ⇨ The "Left Handgrip" menu will appear.



4. To assign a different function to one of the handgrips: tap the "A" or "B" selection field.
   To assign a different function to one of the buttons: tap the "C", "D" or "E" selection field.
   ⇨ The list of available functions will appear.
5. Select the function you would like to assign to the selected button.
   ⇨ The function will be displayed on the button.
6. If required: handgrips with different configurations can be given **identical** assignments. To do this, tap the [Both] button.
   ⇨ Both handgrips will be configured identically.
   ⇨ The "Both" button will become grayed out.
7. To save the changes to the surgery profile: tap the button.

Tip: Test the button configuration and the handgrip functions before every use. If the button configuration does not meet your requirements, you can reset it to the factory settings.

7.5.3 Configuring image inversion on the Invertertube E

Displays an upside-down image in the correct orientation when the RESIGHT 700 is swiveled in.

Prerequisite

☑ The surgery profile you wish to configure is activated.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [Inversion] submenu button.
   ⇨ The "Inversion" menu will appear.
4. Tap the selection field under "Image orientation".
   ⇨ The image statuses will appear.
5. To turn on inversion: tap the [Invert] button.
6. Activate the modified image. Tap the button and confirm the prompt.
7. To save the changes to the surgery profile: tap the button.

7.5.4 Configuring the direction of the XY coupling

If needed, the direction of the XY coupling can be inverted.

Prerequisite

☑ The surgery profile you wish to configure is activated.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [Inversion] submenu button.
   ⇨ The "Inversion" menu will appear.

4. Tap the selection field under "XY direction".
   ⇨ The direction will appear.
5. To turn inversion on: tap the [Invert] button.
6. To save the changes to the surgery profile: tap the button.

7.5.5 Configuring the speed

The speeds of the focus, zoom and XY coupling can be set between 5% and 100% in 1% increments.

Prerequisite

☑ The surgery profile you wish to configure is activated.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [Speeds] submenu button.
   ⇨ The "Speeds" menu will appear.
4. Set the desired speeds.
5. To save the changes to the surgery profile: tap the button.

The speeds of the XY coupling and focus can be coupled with the current total magnification value. The coupling can be activated and deactivated in the "Links [▶ 175]" menu.

7.5.6 Configuring the speed of the RESIGHT 700 internal focus

The speed of the RESIGHT 700 internal focus can be set between 10% and 100% in 10% increments.

Prerequisite

☑ The surgery profile you wish to configure is activated.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [RESIGHT] submenu button.
   ⇨ The "RESIGHT" menu will appear.
4. Configure the speed.
5. Activate or deactivate the [Two-step speed] button.
   ⇨ Activated functions are colored blue.
6. To save the changes to the surgery profile: tap the button.

7.5.7 Configuring the overhead display

The overhead display can be turned on or off. The brightness can also be set between 0% and 100% in 1% increments. The factory setting is 50%.

Prerequisite

☑ The surgery profile you wish to configure is activated.

☑ The device includes an overhead display.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [Overhead display] submenu button.
   ⇨ The "Overhead display" menu will appear.
4. Tap the [Overhead display on] button to activate or deactivate the overhead display.
   ⇨ Activated functions are colored blue.
5. Set the desired brightness with the arrow buttons.
6. To save the changes to the surgery profile: tap the  button.

Tip: We recommend using a bright overhead display for operations in the anterior segment of the eye. For operations in the posterior segment of the eye, we recommend using a dim overhead display or turning the display off.

7.5.8 Configuring fast focus

The fast focus [▷ 93] function is used to switch quickly between two different focus levels. The distance can be set between +5 mm and +40 mm in 1 mm increments. The factory setting is +40 mm.

⚠ WARNING!

Risk of injury caused by attached fundus viewing system!

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 space available for movement is larger than the downward travel path of the microscope.
- ▶ Prior to using the fundus viewing system, reset the focus. [▷ 147]

Prerequisite

☑ The surgery profile you wish to configure is activated.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [Fast focus] submenu button.
   ⇨ The "Fast focus" menu will appear.
4. Set the desired fast focus distance with the arrow buttons.
5. To save the changes to the surgery profile: tap the  button.

7.5.9 Configuring links

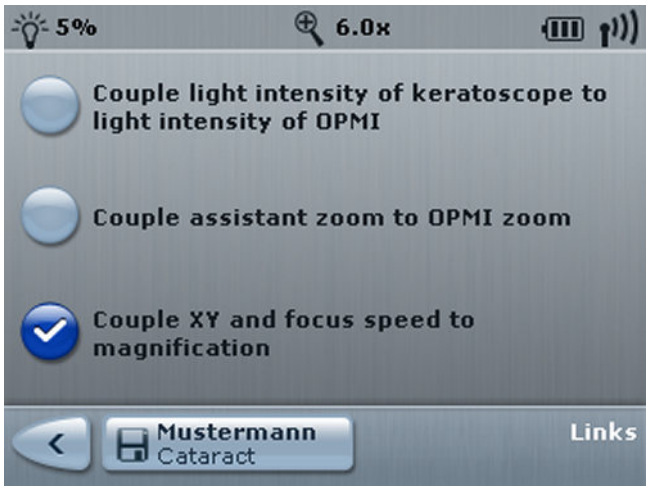
Links [▷ 95] can be used to couple various settings with one another.

Prerequisite

☑ The surgery profile you wish to configure is activated.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.
3. Tap the [Links] submenu button.
   ⇨ The "Links" menu will appear.



4. Activate the desired link.
   ⇨ Activated functions are colored blue.
5. To save the changes to the surgery profile: tap the  button.

7.5.10 Configuring reset options

The reset options [▷ 94] are basic settings that the device reverts back to when the XY reset button is pressed on the OPMI or the device is in the park position.

⚠ CAUTION!

Risk of injury caused by lowering of the external focus!

Pressing the XY reset button causes the microscope to focus and lower, which may injure the patient.

- ▶ Make sure that the working distance between the microscope and the patient is greater than the travel range of the microscope.

Prerequisite

☑ The user profile you wish to configure is activated.

Action

1. Open the main menu.
2. Tap the [Additional Settings] menu button.

3. Tap the [Reset] submenu button.
   ⇨ The "Reset" menu will appear.

4. Activate the desired functions.
   ⇨ Activated functions are colored blue.
5. To save the settings as start values to the user profile: tap the  button.

7.6 Using the digital video system for observation without eyepieces (digital surgical microscope)

7.6.1 Perform white balance

NOTE

Always perform white balancing in Digital mode.

Color deviations

- ▶ Always perform white balancing in Digital mode, because otherwise color deviations may occur due to external light shining through the eyepieces.

NOTE

Video discoloration due to external light.

Discoloration of the video image displayed on the 3D monitor.

- ▶ Perform white balancing in absolute darkness. To do this, turn off all unnecessary external light sources.
- ▶ To perform white balancing in anterior mode, use only the light source from the surgical microscope.
- ▶ To perform white balancing in posterior mode, use only the light source that is used for the anterior eye segment.
- ▶ Cover the eyepieces / tube interfaces and protect them from external light.

In the white balance procedure, the device adjusts the 4K cameras so that white areas in the surgical field also appear white on the monitor. This provides a natural color impression when viewing videos and photos.

Prerequisite

☑ The ambient light required for the operation is turned on.

☑ The surgical microscope is aimed at a white object.

NOTE! It is advised to use the supplied target.

☑ The field of view is sharply discernible.

☑ The required light source is turned on.

☑ The system is set to Digital mode.

☑ The filters are in the swiveled-out position.

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
   ⇨ The "Camera" menu will appear.

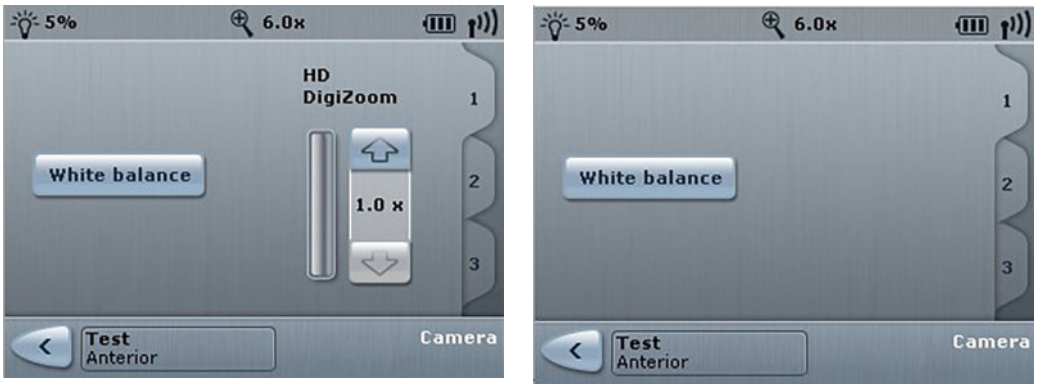


Figure 90: Left: HD white balance / Right: white balance for digital surgical microscope

3. Tap the [White Balance] button.
   ⇨ The following message will appear: "Please place a white sheet of paper under the microscope, focus the image, then press 'Continue'!"
4. To start the white balance: tap the [Next] button.
   ⇨ The following message will appear: "Please wait - white balance in progress!"
   ⇨ If the white balance was successful, the following message will appear: "White balance successfully completed".
   ⇨ If the white balance fails, the following message will appear: "White balance failed".

5. If the white balancing was successful, tap the  button.

Result

✓ White balancing settings are profile-specific.

Tip: The white balance is saved for the currently selected user. When switching to a different user, the white balance value for the newly selected user will be loaded. Once the white balancing procedure is completed, all keys are enabled again. The values determined are saved for each specific user, and will be available to the user in question each time the device is restarted.

NOTE! We recommend carrying out the white balance procedure at least once a week so as to avoid distortion of the video image.

7.6.2 Performing an operation on the 3D monitor

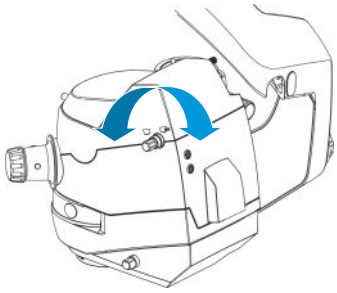
The digital video system has the following modes:

- **Hybrid mode:**

  The image can be viewed on the 3D monitor and in the tube.

- **Digital mode:**

  The image can be viewed on the 3D monitor.



⚠ CAUTION!

Risk of injury due to laser radiation!

The 3D glasses do not offer any laser protection. When using the 3D glasses during laser coagulation procedures, there is a risk of injuring the posterior eye segment.

Viewing through the microscope eyepiece does not protect you from laser radiation either!

▶ Always wear suitable laser protection glasses during laser coagulation procedures!

7.6.2.1 Operation on the anterior eye segment

Action

1. Make sure that the system is set to "Digital" mode.
2. Focus on the iris at maximum magnification.
3. Set the magnification to the value that you require in order to view the surgical field.
4. Perform the required surgical procedures.

7.6.2.2 Operation on the posterior eye segment with RESIGHT

Action

1. Make sure that the system is set to "Digital" mode.
2. Activate the RESIGHT to switch to the posterior settings.
3. Focus on the retina.
4. Perform the required surgical procedures.

7.6.2.3 Operation on the posterior eye segment with contact lens

Prerequisite

☑ The surgeon has created his/her own Posterior profile.

☑ In the Posterior profile there is no inversion of the image.

Action

1. Make sure that the system is set to "Digital" mode.
2. Switch to your own Posterior profile using either the 14-function foot control panel or the handgrips.
3. Use the contact lens before focusing the retina.
4. Focus the retina.
5. Perform the required surgical procedures.

7.6.3 Completing the operation

Prerequisite

☑ The expert has performed the final steps of the surgery.

Action

1. Move the device into the park position.
2. Clean the device.
3. Clean the monitor cart.

7.7 Daily operation

During daily operation, settings can be temporarily adjusted, and certain settings can be saved to the user profile or surgery profile which is currently active.

Doing this overwrites the existing user profile or surgery profile (unless the factory default profile, "Default User", is currently active). If you do not want to overwrite the current user profile or surgery profile, you must first select and activate a different user profile or surgery profile.

Temporary settings apply until the settings are modified or any of the following actions are performed:

- Restarting the device
- Switching the user profile or surgery profile
- Placing the device in the park position (depending on the reset options configuration)
- Pressing the XY reset button (depending on the reset options configuration)

In all four cases, the microscope reverts to the settings specified in the selected or active device settings.

7.7.1 Setting the illumination

The device detects which light source is installed and displays the appropriate settings options. The sections below provide explanations of the following light sources:

- SCI illumination
- Main light source (OPMI light)
- Auxiliary light source (2nd light source)
- Integrated keratoscope ring
- Integrated slit illumination

7.7.1.1 Adjusting the SCI illumination

The SCI illumination system [▷ 92] features three adjustable types of illumination whose mix ratio can be retrospectively adjusted.

⚠ CAUTION!

Risk of injury caused by incorrect illumination settings!

Excessive light intensity, long exposure times or using the wrong filter may lead to retinal damage in the patient's eye.

- ▶ Use the lowest brightness setting possible.
- ▶ Select an appropriate brightness setting according to the recommended values provided by ZEISS (see "Maximum radiation exposure times" [▷ 30]). Doing this limits the exposure intensity and the exposure time.
- ▶ When operating on the eye, use the retina protection filter. The retina protection filter protects the patient's eye from unnecessary radiation, enabling a longer exposure time.
- ▶ When working on the exterior eye: use the retina protection device. This will prevent light from entering the pupil.
- ▶ Make sure you select the correct filter for the operation.

⚠ CAUTION!

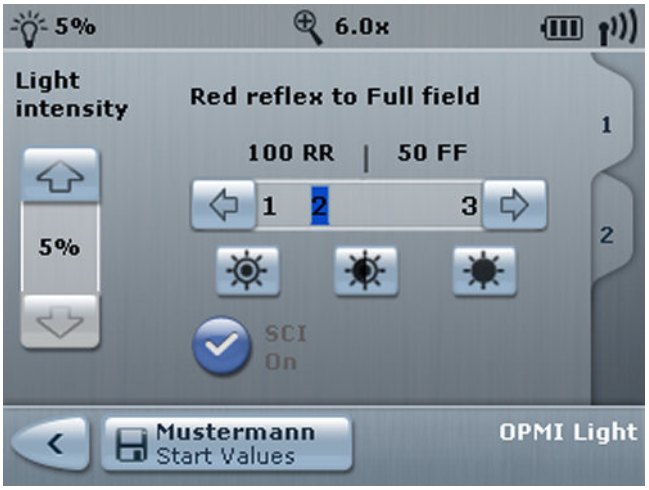
Risk of injury caused by unsupervised device!

Long radiation exposure times while the device is unattended may lead to retinal damage in the patient's eye.

- ▶ If the light source is on: supervise the device.

Action

1. Open the main menu.
2. Tap the [Light] menu button.
3. Tap the [OPMI light] submenu button.
   ⇨ The "OPMI Light" menu will appear.



4. To set the red reflex illumination: tap the button.
5. To set the mixed light illumination: tap the button.
6. To set the surrounding field illumination: tap the button.
   ⇨ The SCI illumination type will be immediately set on the device.
7. If you selected mixed light, use the arrow buttons to modify the mix ratio.
8. To temporarily save the settings: tap the button.
9. To save the settings as start values to the user profile: tap the button.

7.7.1.2 Checking the main and auxiliary light sources

The main and auxiliary light sources [▷ 92] provide light to the SCI illumination system and the auxiliary illumination system. Before each use, check each light source to make sure it is functioning properly. The device detects which light source is installed and displays the appropriate menu.

⚠ CAUTION!

Risk of infection caused by xenon lamp rupture!

Lamp fragments may unnoticeably contaminate sterile areas of the device.

- ▶ Never exceed the lamp's maximum service life of 500 hours.
- ▶ When the remaining service life reaches 5 hours, replace the lamp and reset the service hour counter.

NOTE

Light source failure caused by aging of the lamp!

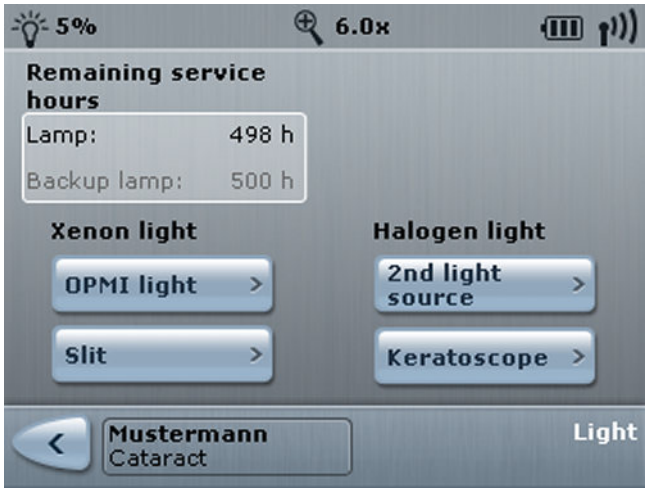
As light sources age, their actual illumination intensity decreases. The intensity of the light sources may fluctuate, or the light sources may fail.

This can affect the operation and/or anesthesia times.

- ▶ Before each use, check each light source to make sure it is functioning properly.
- ▶ LED light source: If the fault signal is illuminated, the light source is defective, and the light intensity is 50%. Inform ZEISS Service.
- ▶ Xenon light source: If the fault signal is illuminated, the xenon lamp is defective, and the backup xenon lamp is in use. Replace the lamp.
- ▶ Halogen light source: If the fault signal is illuminated, the halogen lamp is defective, and the backup halogen lamp is in use. Replace the lamp.
- ▶ Keep a backup lamp or an OR illuminator ready at hand.
- ▶ Postpone the surgical procedure.

Action

1. Return to the main menu.
2. Tap the [Light] menu button.
   ⇨ The "Light" menu will appear.



3. Check the remaining service hours.
4. If the remaining service life is less than 5 hours, the backup xenon lamp must be swiveled in and the remaining service hours reset. [▷ 230]

7.7.1.3 Setting the main and auxiliary light sources

The following values can be set in 1% increments for the light sources:

- LED: 2% to 100%
- Xenon: 5% to 100%
- Halogen: 5% to 100%

Action

1. Open the main menu.
2. Tap the [Light] menu button.
3. Tap the [OPMI light] submenu button or the [2nd light source] submenu button.
   ⇨ The selected submenu will appear.
4. Tab 1: Set the desired light intensity using the arrow buttons.
5. Tab 2: Select an initial state.
6. To temporarily save the settings: tap the button.
7. To save the settings to the surgery profile: tap the button.

7.7.1.4 Setting filters for the main and auxiliary light sources

Filters [▷ 43] can be swiveled in or out to protect the patient's eye. The filter selection is dependent on the light source installed.

Action

1. Open the main menu.
2. Tap the [Light] menu button.
3. Tap the [OPMI light] submenu button or the [2nd light source] submenu button.
   ⇨ The selected submenu will appear.
4. Tab 2: Select a filter.
5. To temporarily save the settings: tap the button.
6. To save the settings to the surgery profile: tap the button.

7.7.1.5 Adjusting the integrated slit illumination system

The integrated slit illumination system [▷ 97] generates a high-contrast slit image. An LED light source can be set to values between 2% and 100% in 1% increments; xenon and halogen light sources can be set between 5% and 100%.

Prerequisite

☑ The device includes an integrated slit illumination system.

Action

1. Open the main menu.
2. Tap the [Light] menu button.
3. Tap the [Slit] submenu button.
   ⇨ The "Slit" menu will appear.

4. To switch on the slit illumination: activate the [Slit On] function.
5. Set the desired light intensity using the arrow buttons.
6. Select the desired slit position.
7. Select the desired slit width.
8. To temporarily save the settings: tap the button.
9. To save the changes to the surgery profile: tap the button.

7.7.2 Setting the total magnification

The total magnification [▶ 93] is a function of the zoom value and the optical parameters on the eyepieces, tube and objective lens.

Prerequisite

☑ The optical settings are configured. [▶ 162]

Action

1. Open the main menu.
2. Tap the [XY focus magnification] button.
   ⇨ The "XY Focus Magnification" menu will appear.

3. Set the total magnification with the arrow buttons.

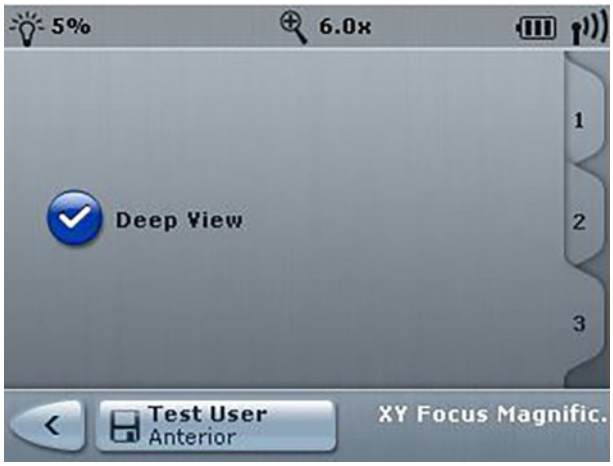
4. To temporarily change the settings: tap the button.
5. To save the settings as start values to the user profile: tap the button.

7.7.3 Setting DeepView

DeepView [▷ 94] optimizes the depth of field or the light transmission of the microscope image.

Action

1. Open the main menu.
2. Tap the [XY focus magnification] button.
3. Tap [Tab 2].
   ⇨ The "XY focus magnification" menu is displayed.
   NOTE! The hybrid mode must be set for the digital surgical microscope. DeepView is not available in Digital mode.



4. To activate or deactivate depth of field management: tap the [DeepView] button.
   ⇨ Activated functions are illuminated blue.
5. To temporarily change the settings: tap the button.
6. To save the settings to the surgery profile: tap the button.

7.7.4 Setting the focus distance

The focus can be set between -30 mm and +40 mm in 1 mm increments.

Prerequisite

☑ The system has been set to Digital mode. Not possible in Hybrid mode.

Action

1. Open the main menu.
2. Tap the [XY focus magnification] button.

3. Tap [Tab 3].
   ⇨ The "XY Focus Magnification" menu will appear.

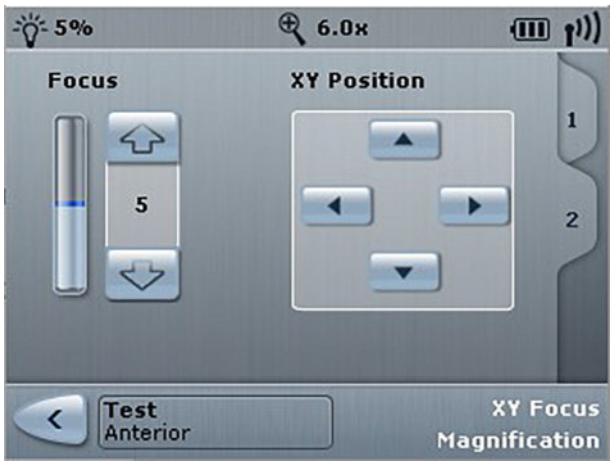


Figure 91: In Digital mode, the XY Focus Magnification menu appears without page 3.

4. Use the arrow buttons to set the focus distance.
   ⇨ The selected setting will be immediately applied to the device following input.
5. To temporarily save the changes: tap the button.

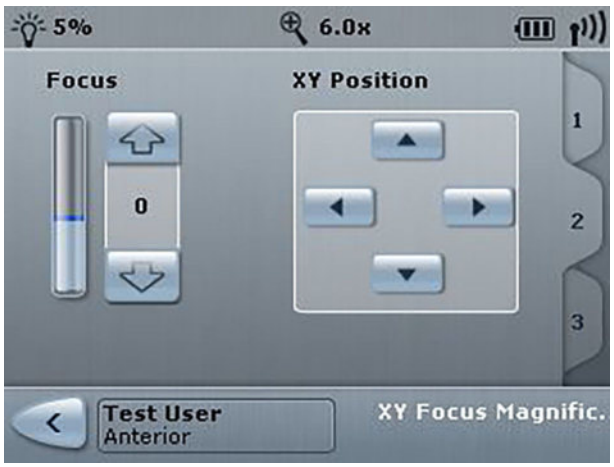
Tip: If Focus + or Focus - are assigned to one of the buttons, you can also use a button on the 14-function foot control panel or the handgrips to change the total magnification.

7.7.5 Changing the XY coupling position

The XY coupling can be positioned in a 61 x 61 mm area. The speed and direction of movement (normal or inverted) can be configured.

Action

1. Open the main menu.
2. Tap the [XY focus magnification] button.
3. Tap [Tab 3].
   ⇨ The "XY Focus Magnification" menu will appear.



4. Use the arrow buttons to position the XY coupling.
   ⇨ The XY coupling will immediately move in the corresponding direction. If the video image on the monitor moves in a direction other than that indicated on the button, the external video camera needs to be positioned differently.
5. To temporarily save the changes: tap the button.

7.7.6 Setting the integrated keratoscope ring

The integrated keratoscope ring provides intraoperative visualizations of corneal curvatures.

Prerequisite

☑ The device includes an integrated keratoscope ring.

Action

1. Open the main menu.
2. Tap the [Light] menu button.
3. Tap the [Keratoscope] submenu button.
   ⇨ The "Keratoscope" menu will appear.

4. To switch on the integrated keratoscope ring: activate the [Keratoscope On] button.
5. Use the arrow buttons to set the desired light intensity.
6. To temporarily save the changes: tap the button.

7.7.7 Setting the HD Digizoom

The camera image can be digitally magnified from 1.0x to 2.0x in 0.1 increments. Digital magnifications do not affect the optical zoom system.

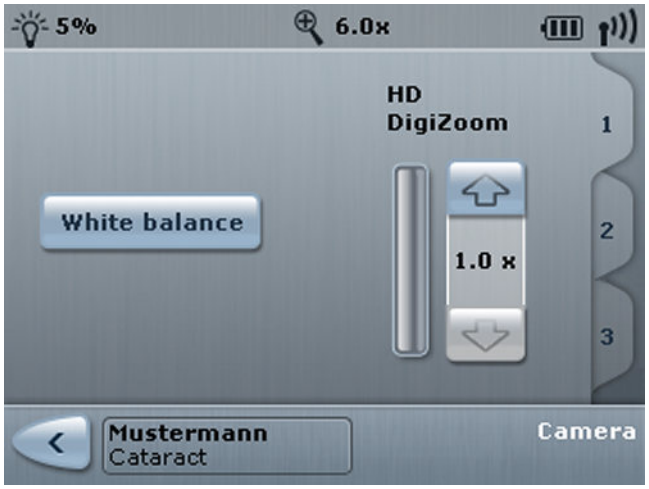
Prerequisite

☑ The device includes an integrated HD camera.

☑ The device includes the CALLISTO eye Panel PC or an integrated monitor.

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
   ⇨ The "Camera" menu will appear.



3. Use the arrow buttons to set the digital magnification.

The value set will not be saved. The standard value of 1.0 will be reset after a restart or change of user.

7.7.8 Setting the integrated HD camera

A white balance can be performed to optimize the display of videos and photos. You can still switch between automatic and manual exposure and adjust the color rendering options.

7.7.8.1 White balancing

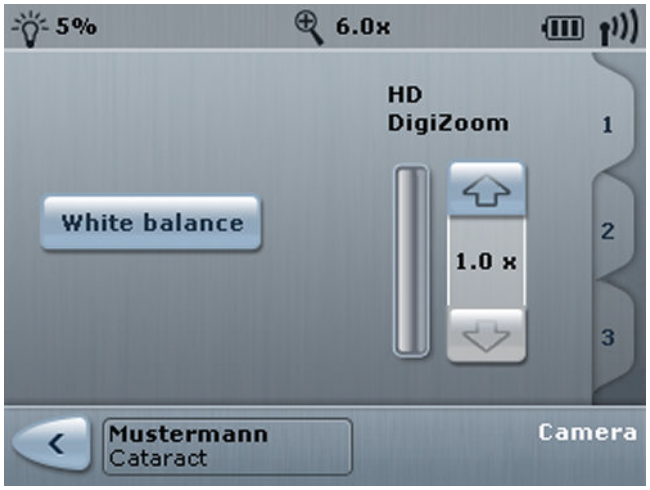
In a white balance procedure, the system adjusts the HD camera so that white areas in the surgical field also appear white on the video image. This provides a natural color impression when viewing videos and photos.

Prerequisite

- ☑ The device includes an integrated HD camera.
- ☑ The surgical microscope is aimed at a white object.
- ☑ The field of view is sharply discernible.
- ☑ The light source is on.
- ☑ The filters are swiveled in or out.
- ☑ IDIS is off.

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
   ⇨ The "Camera" menu will appear.



3. Tap on the [White Balance] button.
   ⇨ The following message will appear: "Please place a white sheet of paper under the microscope, focus the image, then press 'Continue'!"
4. To start the white balance: Tap on the [Next] button.
   ⇨ The following message will appear: "Please wait - white balance in progress!"
   ⇨ If the white balance was successful, the following message will appear: "White balance successfully completed”.
   ⇨ If the white balance fails, the following message will appear: "White balance failed".
5. If the white balancing was successful, tap the  button.

Result

✓ White balancing settings are profile-specific.

7.7.8.2 Setting automatic exposure control

Automatic exposure automatically adjusts the brightness of the video image to the specified nominal value. The following light metering methods can be set for automatic exposure:

Parameter	Symbol	Effect
INTEGRAL		Default. Exposure measurement is performed across the full video image. This light metering method is recommended for surgical fields that are fully and evenly lit.
Large spot		The exposure is measured in an area in the image center. This light metering method is ideal for surgical fields with darkened edges.
Small spot		The exposure is measured in a very small area in the image center. This light metering method is suitable for working with an extremely small illuminated field diameter. If the object you are interested in viewing is not located in the center of the image, set the light metering method to "Large spot" or "Integral".

Prerequisite

☑ The device includes an integrated HD camera.

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
3. Tap on [Tab 2].

   ⇨ The "Camera" menu will appear.

4. To set the automatic exposure: deactivate the [Manual brightness] button.
   ⇨ The light metering methods will be activated, and "Brightness" will be written in the left values range.
5. Select the desired light metering method.
6. Under "Brightness", set the desired brightness.
7. To temporarily save the settings: tap the button.
8. To save the settings to the surgery profile: tap the button.

7.7.8.3 Setting manual exposure control

Manual exposure deactivates the exposure metering and sets a fixed exposure time. The exposure time can be set to any value between 1/10000 s and 1/8 s. An exposure time in the range between 1/50 and 1/30 usually provides optimum exposure results.

Prerequisite

☑ The device includes an integrated HD camera.

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
3. Tap [Tab 2].
   ⇨ The "Camera" menu will appear.

4. To set the manual exposure: activate the [Manual brightness] button.
   ⇨ The light metering methods will be deactivated, and "Exposure time" will be written in the left values range.
5. Under "Exposure time", set the desired exposure time.
6. To temporarily save the settings: tap the button.
7. To save the settings to the surgery profile: tap the button.

7.7.8.4 Configuring color values

Prerequisite

☑ The device includes an integrated HD camera.

☑ A white balance was performed. [▷ 188]

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
   ⇨ The "Camera" menu will appear.
3. Tap [Tab 2].
4. Use the arrow buttons to change the color values for Hue and Chroma.
5. Tap [Tab 3].
6. Use the arrow buttons to change the color values for Red value, Blue value and Peak / Average.
7. To temporarily save the settings: tap the  button.
8. To save the settings to the surgery profile: tap the  button.

7.7.9 Setting the integrated 4K cameras (digital surgical microscope)

A white balance can be performed to optimize the display of videos and photos. You can still switch between automatic and manual exposure and adjust the color rendering options.

7.7.9.1 Perform white balance

NOTE

Always perform white balancing in Digital mode.

Color deviations.

- ▶ Always perform white balancing in Digital mode, because otherwise color deviations may occur due to external light shining through the eyepieces.

NOTE

Video discoloration due to external light.

Discoloration of the video image displayed on the 3D monitor.

- ▶ Perform white balancing in absolute darkness. To do this, turn off all unnecessary external light sources.
- ▶ To perform white balancing in anterior mode, use only the light source from the surgical microscope.
- ▶ To perform white balancing in posterior mode, use only the light source that is used for the anterior eye segment.
- ▶ Cover the eyepieces / tube interfaces and protect them from external light.

In the white balance procedure, the device adjusts the 4K cameras so that white areas in the surgical field also appear white on the monitor. This provides a natural color impression when viewing videos and photos.

Prerequisite

☑ The ambient light required for the operation is turned on.

☑ The surgical microscope is aimed at a white object.

NOTE! It is advised to use the supplied target.

☑ The field of view is sharply discernible.

☑ The required light source is turned on.

☑ The system is set to Digital mode.

☑ The filters are in the swiveled-out position.

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
   ⇨ The "Camera" menu will appear.

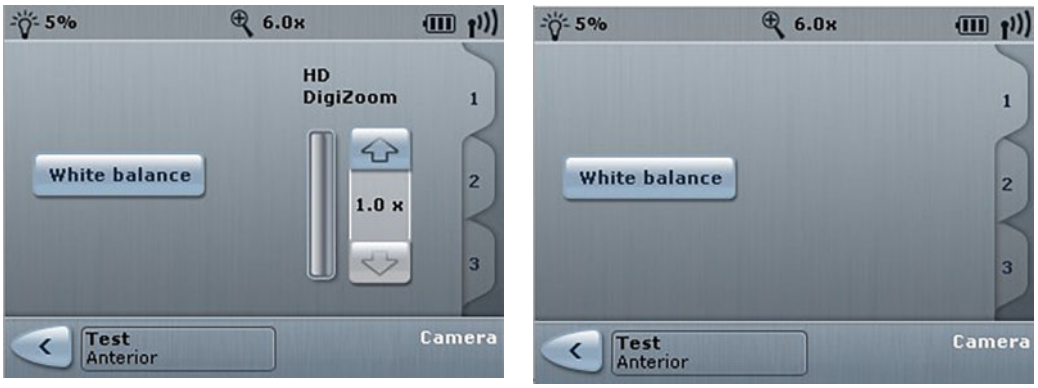


Figure 92: Left: HD white balance / Right: white balance for digital surgical microscope

3. Tap the [White Balance] button.
   ⇨ The following message will appear: "Please place a white sheet of paper under the microscope, focus the image, then press 'Continue'!"
4. To start the white balance: tap the [Next] button.
   ⇨ The following message will appear: "Please wait - white balance in progress!"
   ⇨ If the white balance was successful, the following message will appear: "White balance successfully completed".
   ⇨ If the white balance fails, the following message will appear: "White balance failed".

5. If the white balancing was successful, tap the  button.

Result

✓ White balancing settings are profile-specific.

Tip: The white balance is saved for the currently selected user. When switching to a different user, the white balance value for the newly selected user will be loaded. Once the white balancing procedure is completed, all keys are enabled again. The values determined are saved for each specific user, and will be available to the user in question each time the device is restarted.

NOTE! We recommend carrying out the white balance procedure at least once a week so as to avoid distortion of the video image.

7.7.9.2 Setting automatic exposure control in Hybrid mode

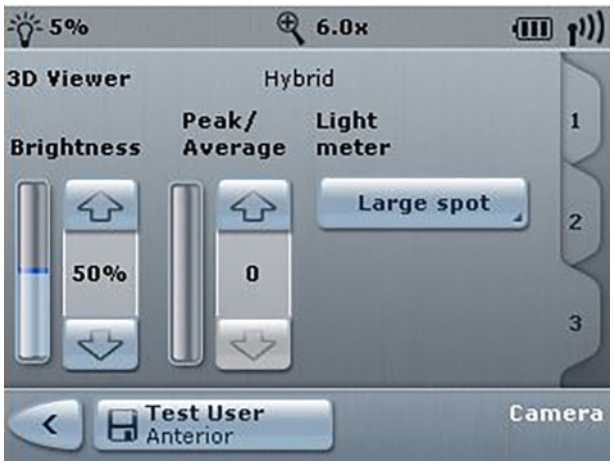
Automatic exposure automatically adjusts the brightness of the video image to the specified nominal value. The following light metering methods can be set for automatic exposure:

Parameter	Symbol	Effect
Brightness		The camera controls the exposure automatically. The target brightness for the camera image does not depend on the brightness of the light source. Default setting in Hybrid mode: 50%
Peak/Average		Influences the characteristics of the automatic exposure. When set to 0, the 4K cameras adjust the image brightness so that the brightest image area is not distorted. When set to the maximum value (+2), the 4K camera sets the brightness to a medium value. When set to a value in between, the brightness is set to a value in between both extremes.
Exposure measurement		
Integral		Default. Exposure measurement is performed across the full video image. This light metering method is recommended for surgical fields that are fully and evenly lit.

Parameter	Symbol	Effect
Large spot		The exposure is measured in an area in the image center. This light metering method is ideal for surgical fields with darkened edges.
Small spot		The exposure is measured in a very small area in the image center. This light metering method is suitable for working with an extremely small illuminated field diameter. If the object you are interested in viewing is not located in the center of the image, set the light metering method to "Large spot" or "Integral".

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
   ⇨ The "Camera" menu will appear.
3. Tap [Tab 3].



4. To set the automatic exposure: deactivate the [Manual brightness] button.
   ⇨ The light metering methods will be activated, and "Brightness" will be written in the left values range.
5. Select the desired light metering method.
6. Under "Brightness", set the desired brightness.
7. To temporarily save the settings: tap the  button.
8. To save the settings to the surgery profile: tap the  button.

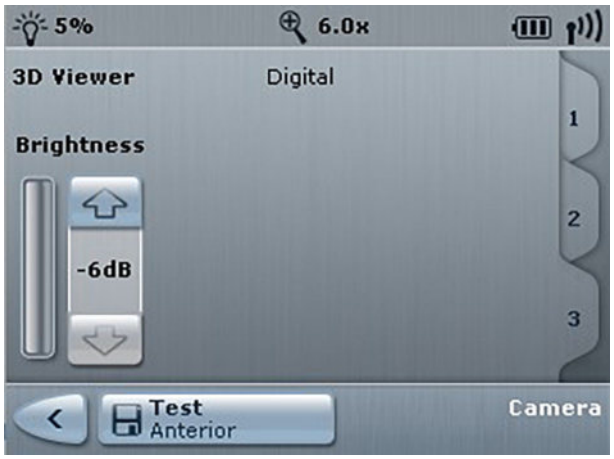
7.7.9.3 Setting manual exposure control in Digital mode

Manual exposure deactivates the exposure metering and sets a fixed exposure time.

The brightness increases the camera's sensitivity. This value should be increased when the brightness of the light source is inadequate. The default value for brightness is -6 db.

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
3. Tap [Tab 3].
   ⇨ The "Camera" menu will appear.



4. Use the "Brightness" setting to set the brightness to the desired value in db. (The default value for brightness is -6 db.)
5. To temporarily save the settings: tap the button.
6. To save the settings to the surgery profile: tap the button.

7.7.9.4 Configuring color values

Prerequisite

☑ A white balance was performed. [▶ 188]

Action

1. Open the main menu.
2. Tap the [Camera] menu button.
   ⇨ The "Camera" menu will appear.
3. Tap [Tab 2].
4. Use the arrow buttons to change the color values for Red, Blue and Chroma.
5. To temporarily save the settings: tap the button.
6. To save the settings to the surgery profile: tap the button.

7.7.10 Recording

A patient file must first be created and selected before videos and photos can be recorded for the first time. Recorded videos and photos are automatically allocated to the selected patient file.

Digital option

For more information on the "Perform recording" function, consult document: G-30-2003, "Automatic Video Recording" section.

In order to make a recording, it is a requirement that the external storage medium only has one partition and has been formatted in exFAT or FAT32. [▷ 243] The external storage medium must be connected to the monitor cart [▷ 48] in order to start an automatic video recording on the CALLISTO eye.

7.7.10.1 Creating and selecting a patient file

NOTE

Loss of data!

USB storage devices are not suitable for storing patient data long term.

- ▶ Have USB storage devices checked to make sure they are in good working order before using them.
- ▶ Arrange for data to be backed up on a regular basis by your IT administrator.

Prerequisite

☑ The device includes integrated HD video and image recording.

☑ An IT network or USB storage device is configured to be used as the storage location. Both devices have sufficient storage capacity.

Action

1. Open the main menu.
2. Tap the [Recording] menu button.
   ⇨ The "Recording" menu will appear.

3. Tap the [Change] button next to the patient file.
   ⇨ The "Patient" menu will appear.

4. If required: create a patient file. To do this, tap the button.
   ⇨ The "Recording" menu will appear.
5. Create a patient file under the last and first name of the patient. The name can be no longer than 20 characters.
6. Save the patient file: tap the button for the currently loaded user.
   ⇨ The "Patient" menu will appear.
7. Select a patient file. To do this, tap the button.
8. Load the selected patient file. To do this, tap the button.

Result

✓ The patient file will be displayed in the "Recording" menu.

7.7.10.2 Recording HD video

NOTE

Loss of data!

Removing a USB storage device while data is being saved may cause the data to be lost.

▶ Never remove USB storage devices while data is being saved.

Prerequisite

☑ The device includes integrated HD video and image recording.

☑ To allocate HD videos to a patient file, "Auto Delete Mode" [▷ 167] must be deactivated and a patient file [▷ 197] must be selected.

Action

1. Open the main menu.
2. Tap the [Recording] menu button.
   ⇨ The "Recording" menu will appear.

3. Start the video recording: tap the button.
   ⇨ "REC" will appear in the status bar. The date and time are not displayed while video recording is in progress. However, this information is recorded and subsequently displayed during playback.
   ⇨ The "Change" buttons will become deactivated.
4. Stop the video recording: tap the button.
   ⇨ "REC" will disappear from the status bar.
   ⇨ The "Change" buttons will become activated again.

Tip: You can use the button to take additional photos during video recording. These photos can also be used as markers. During playback of the HD video, the marked locations can be jumped to in succession via the and buttons.

7.7.10.3 Taking photos

NOTE

Loss of data!

Removing a USB storage device while data is being saved may cause the data to be lost.

▶ Never remove USB storage devices while data is being saved.

Prerequisite

☑ The device includes integrated HD video and image recording.

☑ To allocate HD videos to a patient file, "Auto Delete Mode" [▷ 167] must be deactivated and a patient file [▷ 197] must be selected.

Action

1. Open the main menu.
2. Tap the [Recording] menu button.
   ⇨ The "Recording" menu will appear.

3. Take a photo: tap the button.
   ⇨ The photo will be saved.
   ⇨ You will hear an acoustic signal.

7.7.10.4 Viewing HD videos

⚠ CAUTION!

False diagnosis due to video images!

The monitors are neither calibrated nor designed for diagnostic purposes. Visualized images may contain variations in shape, contrast and color.

- ▶ Do not use the video sequences, video clips (cut sequences) or photos for diagnostic or treatment purposes.

NOTE

Device cannot be operated!

When viewing or deleting video recordings during surgery, the device cannot be operated!

- ▶ Do not edit, delete or view any video recordings while the device is being operated.

Prerequisite

☑ The device includes integrated HD video and image recording.

☑ The device includes an integrated video monitor or an external monitor.

☑ A patient file has been selected. [▶ 197]

Action

1. Open the main menu.
2. Tap the [Recording] menu button.
   ⇨ The "Recording" menu will appear.

3. Open the file directory. To do this, tap the [Change] button.
   ⇨ The file directory will open and the available HD videos and photos will be displayed.
4. Select an HD video. To do this, tap the button.
   ⇨ Activated functions are colored blue.
5. Return to the "Recording" menu. To do this, tap the button.

   ⇨ The "Recording" menu will appear and the "Playback" button will be active.
6. To play an HD video: Tap on the button .
7. To fast forward or fast rewind through an HD video: tap the or buttons.
8. To skip to the beginning or end of an HD video: tap the or buttons.
9. To stop playback of the HD video: tap the button.

7.7.10.5 Viewing photos

⚠ CAUTION!

False diagnosis due to video images!

The monitors are neither calibrated nor designed for diagnostic purposes. Visualized images may contain variations in shape, contrast and color.

- ▶ Do not use the video sequences, video clips (cut sequences) or photos for diagnostic or treatment purposes.

Prerequisite

- ☑ The device includes integrated HD video and image recording.
- ☑ The device includes an integrated video monitor or an external monitor.
- ☑ A patient file has been selected. [▷ 197]

Action

1. Open the main menu.
2. Tap the [Recording] menu button.
   ⇨ The "Recording" menu will appear.

3. Open the file directory. To do this, tap the [Change] button.
   ⇨ The file directory will open and the available HD photos and videos will be displayed.
4. Select a photo: tap the button.
   ⇨ Activated functions are colored blue.
5. Return to the "Recording" menu. To do this, tap the button.
   ⇨ The "Recording" menu will appear and the button will be active.

6. To view a photo: Tap on the button ▶.
7. To switch between photos: tap the ◀◀ or ▶▶ buttons.
8. To skip to the first or last photo: tap the ⏮ or ⏭ buttons.
9. To stop viewing photos: tap the ■ button.

7.7.10.6 Deleting HD videos or photos

NOTE

Device cannot be operated!

When viewing or deleting video recordings during surgery, the device cannot be operated!

- ▶ Do not edit, delete or view any video recordings while the device is being operated.

Prerequisite

☑ The device includes integrated HD video and image recording.

☑ A patient file has been selected. [▷ 197]

Action

1. Open the main menu.
2. Tap the [Recording] menu button.
   ⇨ The "Recording" menu will appear.

3. Tap the [Change] button to the right of the file.
   ⇨ The file folder will appear.

4. To delete an HD video: tap the button. To delete a photo: tap the button.
   ⇨ The button will turn blue.
5. To delete the file: tap the button and confirm the prompt.

Result

✓ The file is deleted!

7.7.11 Transferring control to CALLISTO eye

Control of the device can be transferred to CALLISTO eye. This enables the device to connect to CALLISTO eye and enables various functions on the surgical microscope to be configured / controlled remotely via the Ethernet interface.

NOTE

Using the device

The OPMI Lumera 700 may only be used with CALLISTO eye.

NOTE

Unauthorized modifications to the system

This system must not be modified without approval from the manufacturer. If the system is modified after consultation with the manufacturer, suitable inspections and testing must be carried out to ensure subsequent safe use. The manufacturer is not liable for damage caused by unauthorized modifications to the system. Furthermore, this will forfeit any rights to claim under warranty.

NOTE

Unintentional movement during surgery!

Any change in the focus and zoom setting via CALLISTO eye may lead to unintentional movement during surgery.

- ▶ Only personnel who have been appropriately trained are allowed to control the surgical microscope via CALLISTO eye.

NOTE

Network faults!

Network faults can overload the device and prevent it from being used.

- ▶ End control of the device via CALLISTO eye. [▷ 206]
- ▶ Disconnect the device from the IT network: to do this, unplug the network cable on the device.

Prerequisite

☑ The device includes CALLISTO eye.

☑ The network connection to CALLISTO eye is configured.

Action

1. Open the main menu.
2. Tap the [CALLISTO Connection] menu button.
   ⇨ The "CALLISTO eye" menu will appear.

3. To transfer control to CALLISTO eye: tap the [Allow] button.
   ⇨ The following message will appear: "Info - The system is enabled for remote control / Active connection x.x.x.x."

Result

✓ The control panel is locked. The device can only be operated via the 14-function foot control panel, the handgrips and the CALLISTO eye Panel PC.

7.7.12 Ending control via CALLISTO eye

The network connection to CALLISTO eye can be ended to return control to the device.

Prerequisite

☑ Control of the device has been transferred to CALLISTO eye. [▷ 204]

Action

1. Tap the [Disconnect] button.
   ⇨ The following message will appear: "Connection to CALLISTO eye terminated. Current user data are being loaded."

Result

✓ The user that was active on the surgical microscope before the network connection was established will become active again on the surgical microscope.

✓ Any change of user performed on CALLISTO eye is not applied.

7.8 Typical operating sequence

7.8.1 Starting work

⚠ CAUTION!

Risk of injury caused by lowering of the external focus!

If the foot control panel buttons are pressed unintentionally, the external focus of the surgical microscope may be lowered and injure the patient.

▶ Make sure that the working distance between the microscope and the patient is greater than the travel range of the microscope.

⚠ CAUTION!

Risk of injury caused by lowering of the external focus!

Pressing the XY reset button causes the microscope to focus and lower, which may injure the patient.

▶ Make sure that the working distance between the microscope and the patient is greater than the travel range of the microscope.

⚠ CAUTION!

Risk of infection due to non-sterile parts!

Unsterile parts may cause injury to the patient.

▶ Never touch the unsterile connection cable on the assistant's microscope while operating the handgrips or zoom button.

For fine focus, first focus on the area of interest with a large zoom factor, then reduce the zoom factor.

Also see

- Swiveling the device over the surgical field [▶ 136]
- Function test [▶ 145]
- Swiveling the device over the surgical field [▶ 136]
- Bringing the OPMI into the working position [▶ 137]

7.8.1.1 Hybrid mode

Action

1. Switch on the device at the power switch.
2. Check the system to make sure it is functioning properly.
3. Set the system to Hybrid mode.
4. Adjust the tube and eyepieces.
5. Reset the device to its start values. To do this, press the [XY reset button] on the XY coupling. The executed functions depend on the configured reset options.
6. Swivel the surgical microscope over the surgical field. [▶ 136]
7. Bring the surgical microscope into its working position. [▶ 137]
8. Look through the eyepieces and lower the surgical microscope using the suspension arm until the surgical field comes into focus.
   ⇨ This is to achieve rough focusing.
9. Look through the eyepieces and activate the focusing function on the 14-function foot control panel or on the handgrip until the image of the surgical field appears sharply focused.

Also see

- Function test [▶ 145]
- Swiveling the device over the surgical field [▶ 136]

7.8.1.2 Digital mode

Action

1. Switch on the device at the power switch.
2. Switch on the monitor cart with the power switch.
3. Check the system to make sure it is functioning properly.
4. Configure the monitor settings.
5. Reset the device to its start values. To do this, press the [XY reset button] on the XY coupling. The executed functions depend on the configured reset options.
6. Swivel the surgical microscope over the surgical field. [▶ 136]
7. Bring the surgical microscope into its working position. [▶ 137]

8. Look at the monitor and lower the surgical microscope using the suspension arm until the surgical field comes into focus.
   ⇨ This is to achieve rough focusing.
9. Look at the monitor and activate the focusing function on the 14-function foot control panel or on the handgrip until the image of the surgical field appears sharply focused.

Also see

- Function test [▶ 145]
- Swiveling the device over the surgical field [▶ 136]

7.8.2 Carrying out the working steps

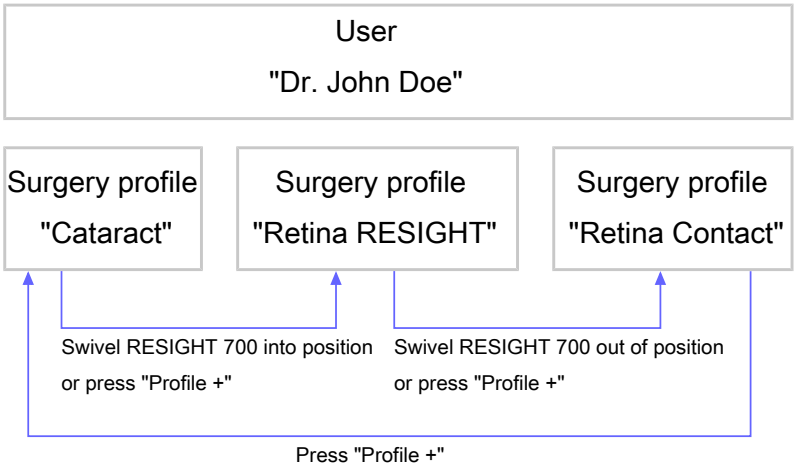


Figure 93: Carrying out the working steps (example)

Prerequisite

☑ A surgery profile has been created for each phase of surgery.

☑ The sequence of surgery profiles has been configured.

Action

1. If you have not already done so, swivel the device into its working position.
   ⇨ The "Cataract" surgery profile will become activated.
2. Conduct a **cataract surgery**.
3. To conduct a **retina surgery with RESIGHT 700**: swivel the RESIGHT 700 into position.
   ⇨ The second surgery profile will become activated.
   ⇨ The device will load the device settings saved to the surgery profile.
4. To conduct a **retina surgery with contact glasses**: swivel the RESIGHT 700 out.
   ⇨ The third surgery profile will become activated.
   ⇨ The device will load the device settings saved to the surgery profile.

5. Following the operation, if you would like to return to the first surgery profile: press the configured "Profile +" button on the handgrip or the 14-function foot control panel.

Result

✓ The first surgery profile will become activated again.

Device settings such as illumination, focus and total magnification can be changed during the individual phases of surgery. Depending on the configuration you are using, this can be done via the 14-function foot control panel, the handgrips or the control panel.

7.8.3 Stopping work

Action

1. Swivel the surgical microscope into the park position [▶ 137].
   ⇨ Depending on how the reset options [▶ 175] are configured, certain functions will be reset to their start values.
2. Switch the device off.

7.9 Switching the device off

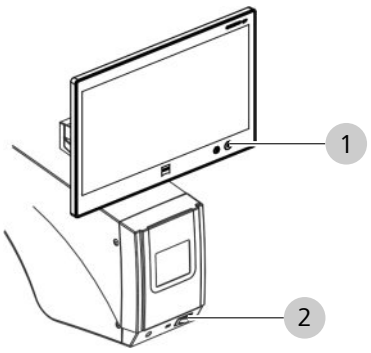


Figure 94: Switching the device off (example with integrated CALLISTO eye Panel PC)

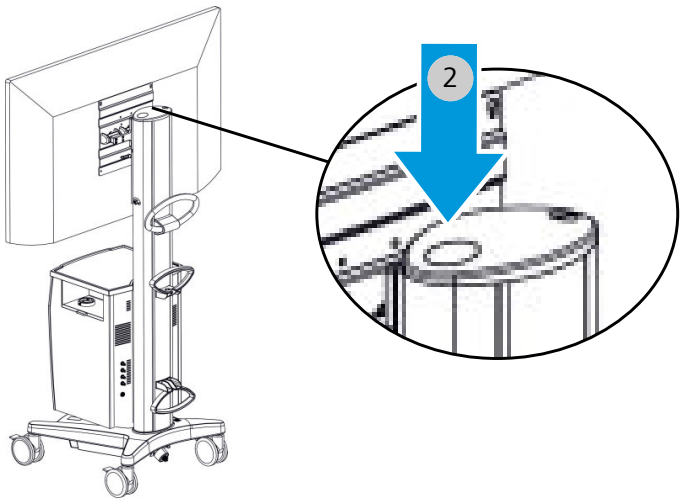


Figure 95: Switch off the device (monitor cart with 3D monitor)

1	[Power] button	2	Power switch

Action

1. For an external CALLISTO eye Panel PC: press the [Power] switch button.
   ⇨ The power button LED will switch off.
   ⇨ The CALLISTO eye Panel PC is switched off.
2. Press the [Power] switch button.
   ⇨ The power switch LED will switch off.
   ⇨ The device is switched off.
3. Monitor cart: press the [Power] switch button.
   ⇨ The power button LED will switch off.
   ⇨ The device is switched off.

8 Cleaning and disinfection

8.1 Safety during cleaning and disinfection

NOTE

Damage due to liquid entering the device

Liquid entering the device can cause damage.

- ▶ We recommend informing the service partner as soon as a change occurs in the device.

Contamination of the device

Dust can penetrate into the internal optics of the device or its individual components.

Action

- ▶ Always close all openings that are not in use with the covers provided (e.g. openings for eyepieces, tube outlets or the lateral co-observation outlets).
- ▶ Always store tubes, eyepieces and accessories in dust-free cases when they are not being used.
- ▶ After use, cover the system with the supplied dust cover to protect it from dust.
- ▶ Clean used accessories directly after use.

Cleaning and disinfection by wiping

Dust can penetrate into the internal optics of the device or its individual components.

Action

- ▶ Always close all openings that are not in use with the covers provided (e.g. openings for eyepieces, tube outlets or the lateral co-observation outlets).
- ▶ Always store tubes, eyepieces and accessories in dust-free cases when they are not being used.
- ▶ After use, cover the system with the supplied dust cover to protect it from dust.
- ▶ Clean used accessories directly after use.

Cleaning and spray disinfection

Dust can penetrate into the internal optics of the device or its individual components.

Action

- ▶ Always close all openings that are not in use with the covers provided (e.g. openings for eyepieces, tube outlets or the lateral co-observation outlets).
- ▶ Always store tubes, eyepieces and accessories in dust-free cases when they are not being used.
- ▶ After use, cover the system with the supplied dust cover to protect it from dust.
- ▶ Clean used accessories directly after use.

8.2 Cleaning

Clean the device before the first use and after every use.

8.2.1 Cleaning optical surfaces

The multi-layer T* coating of the optical components (e.g. eyepieces, objective lenses) ensures optimal image quality. Image quality is impaired by even slight contamination of the optics or by a fingerprint. Clean the exterior surfaces of the optical components (eyepieces, objective lenses) only when necessary:

Action

- ▶ Do not use any chemical cleaning agents.
- ▶ Use a clean and grease-free brush to remove dust.

TIP: For the regular cleaning of surgical microscope's objective lenses and eyepieces, we recommend the optics cleaning set and Cleaning agents available from ZEISS.

8.2.2 Cleaning the touchscreen

Ensure that no moisture or cleaning agent penetrates inside the touchscreen and the second monitor in order to prevent damage to them.

Prerequisite

☑ Switch the device off.

Action

- ▶ Clean the display with a soft, clean cloth (e.g. a microfiber cloth) or with damp optical cleaning cloths (available from specialist trade outlets or under ZEISS order number 000000-0537-331).
- ▶ If necessary, moisten the cloth slightly with water or pure glass cleaner (Do NOT use all-purpose cleaners or other cleaning agents). (Do not spray or apply directly to the display screen!)
- ▶ Use the damp cloth to wipe off the touchscreen.

8.2.3 Cleaning mechanical surfaces

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

Action

- ▶ Do not use any aggressive or abrasive cleaning agents.
- ▶ Remove any possible residue using a mixture of 50% ethyl alcohol and 50% distilled water plus a dash of household dishwashing liquid.

8.2.4 Fogging of optical surfaces

We recommend using an anti-fogging agent to prevent fogging of optical surfaces. Anti-fogging agents like the ones offered by opticians for applications with eyeglasses are also suitable for optical surfaces from ZEISS.

Action

- ▶ Observe the Instructions for Use pertaining to the anti-fogging agent concerned.

An anti-fogging agent does not ensure fog-free eyepiece optics. It cleans eyepiece optics and protects them against dirt, grease, dust, lint and fingerprints.

8.3 Disinfection

8.3.1 Disinfecting the mechanical surfaces

The maximum concentrations for application are:

- For alcohols: 2-propanol 80 %, ethanol 96 %
- For aldehydes: glutaraldehyde 2 %
- For quaternary compounds: DDAC 2.5 %
- For chlorine-releasing compounds: chlorine dioxide 0.3 %
- For phenols: phenylphenol 0.7 %

Disinfectants with an alcohol concentration higher than 70% can be used to achieve maximum disinfection. There is a chance that long-term use of such disinfectants may cause the device's surfaces to become dull or matte, or may loosen the adhesive labels on the

device without causing them to fall off. However, the use of such disinfectants will never impair device performance or endanger patients.

NOTE

Surface damage caused by use of the wrong disinfectants!

Performing disinfection with the wrong disinfectants may result in damage to the surfaces of the device.

- ▶ Use an aldehyde and/or alcohol-based disinfectant. The addition of quaternary compounds is acceptable.
- ▶ In order to prevent surface tensions, you may use only the disinfecting components specified above.

Action

- ▶ Disinfect all the required surfaces.

9 Maintenance

9.1 Maintenance schedule for the operator

9.1.1 Every six months

Component	Activity
Manual mode	▶ Check the following functions: ■ The light sources are at medium intensity ■ The XY coupling, focus and zoom motor are inactive ■ The filters are in the swiveled-out position ■ The control panel is black

9.2 Maintenance schedule for the authorized service

9.2.1 Every twelve months

Component	Activity
Documentation and identification labels	▶ Check that the instructions for use and identification labels are complete, undamaged and legible.
Handles and XY coupling	▶ Check the following functions: ■ The visual and acoustic signals are functional. ■ Manual mode is functional. ■ The bearings, stops and suspension mountings are free of play.
Support system and microscope suspension mounting	▶ Check the following functions: ■ The bearings, stops and suspension mountings are free of play. ■ Brakes are operational at the maximum permissible OPMI configuration.
Stand column	▶ Check to make sure the column connection is free of play.

Component	Activity
Casters	▶ Check the following functions: ■ The casters are free from backlash. ■ The casters turn and roll without jamming. ■ The brakes and locking tabs hold securely. ■ The cable guards are present.
Light sources	▶ Check to make sure the fan is sufficiently powerful.
Microscope	▶ Check to make sure the optical imaging is in good working order and the field of view is well illuminated.
Zoom, focus and illuminated field diaphragm	▶ Check the following functions: ■ The zoom system is running smoothly. ■ The focus, zoom and illuminated field diaphragm can be easily moved.
Accessories such as the objective lens, tube, etc.	▶ Check the following functions: ■ The accessories are free of mechanical play. ■ The accessories are secured by knurled screws.
Wireless 14-function foot control panel	▶ Check to make sure the dust and spray water guard is undamaged. ▶ Change the batteries in the 14-function foot control panel.
Integrated video monitor	▶ Check the following functions: ■ The housing is undamaged. ■ The image quality is okay. ■ The suspension arm and the gas spring hold the video monitor in the desired position.

9.2.2 Every two years

Component	Activity
Light guide	▶ Check to make sure: ■ The light guide is intact. ■ The light field is uniform.
Light source	▶ Check whether the light source filters are intact.
Suspension arm with toothed belt and toothed belt pulley	▶ Check according to the criteria listed in the System Checkout Protocol or Service Manual.

9.2.3 Every four years

Component	Activity
Support system and microscope suspension mounting	▶ Check to make sure the following components are free of abrasion and damage: ■ Supporting structures ■ Interfaces ■ Couplings ■ Connection and fastenings of the spring assemblies
Cables, plugs and switches	▶ Check the following functions: ■ The insulation and plug connections of the cables and the device are intact. ■ The cable routing and cable fastenings are tight.
Electronics:	▶ Replace the internal batteries.
Casters	▶ Replace the casters.
Light guide	▶ Replace the light guide.

9.2.4 Every six years

Component	Activity
Integrated video monitor	▶ Replace the support arm, including the gas spring.

9.3 Performing safety inspection

The safety inspection serves to determine and evaluate device safety. The user of this device is obligated to perform and document safety inspections in compliance with IEC 62353.

⚠ CAUTION!

Risk of injury without safety inspection!

Hazards and device deficiencies will not be detected in time and can have a negative effect on patients, users, or others.

- ▶ Have a safety inspection in compliance with IEC 62353 performed on time and to the prescribed extent. At the same time, be sure to observe the relevant national regulations.

Prerequisite

☑ Only the manufacturer or qualified persons may perform safety inspections.

Action

- ▶ Check to make sure the Instructions for Use are available.
- ▶ Check to make sure all marks and inscriptions on the device are legible.
- ▶ Check the leakage current and the protective ground conductors.
- ▶ Check to make sure the casters and locking devices function properly and are not worn-out.
- ▶ Perform a function check of all switches, buttons, sockets and indicator lamps of the system.
- ▶ Check every six months to make sure Manual mode is working.

10 Troubleshooting

10.1 Localizing malfunctions

If a malfunction occurs, the corresponding information is displayed on the touchscreen in the form of a message.

Malfunctions are saved to a log file which can be exported and forwarded to ZEISS.

10.1.1 Response to faults with messages

Action

1. Check the message.
2. Once you have dealt with the issue, tap the message to remove it from the display.
   ⇨ The message is saved to a log file and can be exported.
3. If the problem persists, export the log file and send it to ZEISS Service.

10.1.2 Exporting log files

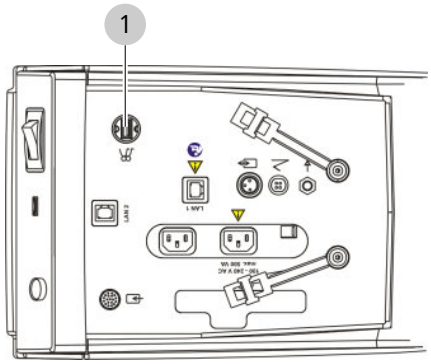


Figure 96: Exporting log files

1	USB service port

NOTE

Connecting USB hubs with power supply!

Connecting USB hubs with power supply to the USB service port can prevent the device from starting properly.

▶ USB hubs with power supply must not be connected to the USB service port.

Action

1. Connect a USB storage device to the USB service port.
2. Open the main menu.
3. Tap the [System Settings] menu button.
   ⇨ The "System Settings" menu will appear.

4. Tap the [Export data] button.
   ⇨ The log file is copied to the USB storage device.
   ⇨ If no USB storage device is connected, the following error message will appear: "Error - USB storage medium not found."

10.2 Faults (with messages)

Message / Fault	Cause	Remedy
Pairing could not be successfully completed. Several foot control panels were detected.	Multiple foot control panels are nearby.	▶ Restart the pairing process.
Pairing could not be successfully completed. No foot control panel was detected.	The 14-function foot control panel was not in a vertical position and in the immediate vicinity of the device.	▶ Place the 14-function foot control panel in a vertical position in the immediate vicinity of the device (less than 1 m away) and restart the pairing process. In the event of malfunction, you can always use the 14-function wireless foot control panel with a cable. Keep the cable in the vicinity of the suspension system for this case.
XY coupling error. The error can be acknowledged. If the error impairs your work, please switch to Manual mode and contact your ZEISS Service representative.	Hardware error in motor electronics Software error, inadmissible status of motor control	▶ If the error impairs your work: Activate Manual mode. [▷ 227]
Light source error. The error can be acknowledged. If the error impairs your work, please switch to Manual mode and contact your ZEISS Service representative.	Malfunction of light intensity setting	▶ If the error impairs your work: Activate Manual mode. [▷ 227]
Zoom error. The error can be acknowledged. If the error impairs your work, please switch to Manual mode and contact your ZEISS Service representative.	Jammed hardware	▶ If the error impairs your work: Activate Manual mode. [▷ 227]
Focus error. The error can be acknowledged. If the error impairs your work, please switch to Manual mode and contact your ZEISS Service representative.	Focus system motor is jammed	▶ If the error impairs your work: Activate Manual mode. [▷ 227]

Message / Fault	Cause	Remedy
Error during system start. Please reboot the system, making sure that no function buttons are pressed during the booting process.	A button was pressed during system start.	▶ Restart the system. Make sure not to press any buttons during this process.
System error. The error can be acknowledged. If the error recurs, please contact your ZEISS Service representative.	Unknown software or hardware error	▶ Acknowledge the error message. ▶ If the message appears again, contact ZEISS Service.

10.3 Faults (without messages)

10.3.1 Device faults

Fault	Cause	Remedy
No electrical function in device	The power plug is not plugged in.	▶ Connect the mains plug. [▷ 104]
	Power switch of stand is not switched on.	▶ Check to make sure the power switch is illuminated green. If it is not: press the power switch. [▷ 144]
	Automatic circuit breaker in power switch of stand responds.	▶ Press power switch. [▷ 144] ▶ If the automatic circuit breaker is triggered again, notify ZEISS Service.
	There is a power supply failure.	▶ Contact in-house electrician.
Illumination on the surgical microscope is out of service.	Suspension arm is in the park position.	▶ Move suspension arm into the working position. To do this, pull the suspension arm downwards. [▷ 137]
	Light source has not been switched on.	▶ Press the configured buttons on the handgrip or the 14-function foot control panel.
	Halogen light source: halogen lamp failure.	▶ Switch halogen lamps. [▷ 229]
	Superlux Eye light source: xenon lamp is defective.	▶ Swivel the backup xenon lamp in. [▷ 230]
	Superlux Eye light source: xenon lamp and backup xenon lamp are defective.	▶ Change the Superlux Eye light source lamp module. [▷ 231]
	Superlux Eye light source: lamp module is not making contact.	▶ Push the lamp module in as far as it will go. [▷ 231]
	Light guide is not properly inserted on the microscope.	▶ Push the light guide in as far as it will go.

Fault	Cause	Remedy
	Stand electronics failure.	▶ Use a surgical lamp to illuminate the surgical field. ▶ Inform ZEISS Service.
Illumination on the surgical microscope is faulty.	Brightness level set too low.	▶ Increase the brightness on the stand or on the 14-function foot control panel.
	Ageing of the lamp reduces the amount of light.	▶ Switch halogen lamps. [▷ 229] ▶ Change the Superlux Eye light source lamp module. [▷ 231]
	Defective light guide (illumination not uniform).	▶ Inform ZEISS Service.
	The lamp reflector for the halogen lamp is not sitting correctly in the lamp bulb.	▶ Press the lamp reflector into the lamp bulb. [▷ 229]
	The LED light source is defective, and the light intensity is 50%.	▶ Inform ZEISS Service.
The illumination of the surgical field is too bright.	Brightness level set too high.	▶ Decrease the brightness on the stand or on the 14-function foot control panel. ▶ Switch off the light source on the stand. Use a surgical lamp to illuminate the surgical field. ▶ Inform ZEISS Service.
	Defective light control.	▶ Activate Manual mode. [▷ 227]
Red reflex is too dark or non-existent.	Red reflex illumination is not activated.	▶ Switch the red reflex illumination on. [▷ 183]
	Soiled objective lens.	▶ Clean the objective lens.
	Light guide is damaged.	▶ Inform ZEISS Service.
	The lamp reflector for the halogen lamp is not sitting correctly in the lamp holder.	▶ Press the lamp reflector into the lamp holder. [▷ 229]
	The surgical microscope is not oriented.	▶ Place the device in the working position. [▷ 137] The main microscope axis must coincide with the optical axis of the patient's eye.
Image on video monitor is too dark, or there is a high level of noise.	Insufficient light.	▶ Increase the brightness level of the illumination. ▶ Increase the camera brightness setting in the "Camera" menu.

Fault	Cause	Remedy
	Incorrect light metering method selected for the integrated camera.	▶ Activate the "Integral" light metering method. [▷ 190]
The surgical microscope's motorized focus or zoom functions are inoperative.	Failure of stand electronics.	▶ Operate the device in Manual mode. [▷ 228] Use the manual zoom on the surgical microscope.
The suspension arm can only be moved with difficulty.	Friction adjustment knob overtightened.	▶ Rotate the [Weight balancing] rotary knob until the suspension arm becomes mobile. [▷ 125]
The surgery profile cannot be changed via the configured button on the handgrip.	You are not in the main menu.	▶ Return to the main menu.
No video image.	Connection cable not properly connected.	▶ Check all connections.
Stand wobbles.	Floor not level. Stand base not appropriately positioned.	▶ Reposition the stand base. [▷ 135]
The suspension arm cannot be balanced.	Technical fault in a function module.	▶ Switch the device off. ▶ Mark the device as non-functional. ▶ Contact ZEISS Service or authorized service personnel.

10.3.2 Integrated video and image recording faults

Fault	Cause	Remedy
Data cannot be stored.	USB storage device is defective.	▶ Check to make sure the USB storage device is working. ▶ If the USB storage device is not working properly, replace it.
	USB storage format is not supported.	▶ Use USB storage devices with FAT32 or NTFS.
	No storage capacity.	▶ Delete data you no longer need. Note the available storage space display.
	No network connection.	▶ Establish a network connection. [▷ 168]
	No network authorization.	▶ Check to make sure the network and directories are being shared. ▶ Adjust the read and write permissions.

Fault	Cause	Remedy
Data cannot be displayed or played back.	Non-supported file format imported or saved to the LAN.	▶ Use supported file formats.
	Video with incorrect video system was imported or saved to the LAN.	▶ Set the device to the video system for your country (PAL or NTSC). ▶ Reboot the device.
	USB storage device was removed and reinserted in the meantime. When the USB storage device is removed, the device automatically creates a new, empty patient file.	▶ Select the desired patient file. [▷ 197]
Integrated video and image recording not functioning.	USB storage device was removed and reinserted repeatedly during recording.	▶ Restart the device after surgery.
Selected patient cannot be deleted.	Patient is current patient.	▶ Select another patient. [▷ 197] ▶ Delete the desired patient.
Digital surgical microscope		
External storage medium (hard drive, USB stick, etc.) no recognized.	The storage medium is unformatted and/or has more than one partition.	▶ Format the external storage medium in exFAT or FAT32, not in NTFS. ▶ Check that the external storage medium only has one partition. Partition style: GPT and MBR are supported.

10.3.3 14-function foot control panel faults

Fault	Cause	Remedy
The 14-function foot control panel is not functioning.	The batteries are dead.	▶ Replace the batteries.
	The rechargeable batteries are dead.	▶ Replace the rechargeable batteries.
	Failure of individual button functions.	▶ Reconfigure the button functions. This can only be done if the buttons on the device are configurable.
	Radio link failure/fault.	▶ Establish a cable connection. [▷ 235]
	The 14-function foot control panel's position sensor always detects the rest position.	▶ Establish a cable connection. [▷ 235]
	Weak radio signal.	▶ Establish a cable connection. [▷ 235]

Fault	Cause	Remedy
	No pairing with stand.	▶ Perform pairing. [▷ 163]
The surgery profile cannot be changed via the configured button on the 14-function foot control panel.	You are not in the main menu.	▶ Return to the main menu.
Functions are being triggered unintentionally.	A button on the 14-function foot control panel has become mechanically stuck after being pressed.	▶ Place the 14-function foot control panel in its rest position. ▶ Reconfigure the button functions. This can only be done if the buttons on the device are configurable.
	The 14-function foot control panel is sending an incorrect activation signal.	▶ Place the 14-function foot control panel in its rest position. ▶ Reconfigure the button functions. This can only be done if the buttons on the device are configurable.
	The wrong 14-function foot control panel is being used.	▶ Check the marking. The marking on the stand and the indicator on the 14-function foot control panel must match. ▶ Perform pairing. [▷ 163]

10.3.4 Wired 14-function foot control panel faults

Fault	Cause	Remedy
The 14-function foot control panel is not functioning.	The 14-function foot control panel is not plugged in.	▶ Check to make sure the 14-function foot control panel is properly plugged in on the stand.
Intermittent loss of functionality.	Failure of individual button functions.	▶ Reconfigure the button functions. This can only be done if the buttons on the device are configurable.
The surgery profile cannot be changed via the configured button on the 14-function foot control panel.	You are not in the main menu.	▶ Return to the main menu.

10.3.5 Monitor cart / 3D monitor faults

Fault	Cause	Remedy
No video image - only color bars	Camera cable not connected to OPMI.	▶ Connect the camera cable to the device. [▷ 115] ▶ Check that there is a cable connection between the monitor cart and OPMI.
	Faulty camera cable.	▶ The camera cable must be replaced. Inform ZEISS Service.
No video picture, the 3D monitor displays a black screen.	The 3D monitor is not switched on.	▶ Switch on the 3D monitor using the power switch.
	Power cable not connected to the 3D monitor.	▶ Connect the power cable to the 3D monitor.
	The power switch on the monitor cart is not switched on.	▶ Switch on the power switch on the monitor cart.
No 3D video picture	Wrong 3D glasses in use.	▶ Use the 3D glasses supplied with the device.
Fuse on monitor cart defective.	Voltage selector switch on the monitor cart is not set correctly.	▶ Set the voltage selector switch on the monitor cart to either 115 V or 230 V depending on the voltage used in the country in question.
	Incorrect fuse type selected.	▶ Insert the correct fuse type in accordance with the position of the voltage selector switch on the isolating transformer. [▷ 236]

Also see

- Connecting the video and network cables to the monitor cart (digital surgical microscope) [▷ 115]

10.4 Troubleshooting work

10.4.1 Activating manual mode

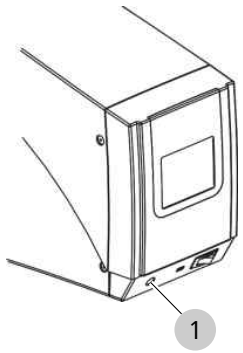


Figure 97: Activating manual mode

1	[Manual mode] switch

⚠ CAUTION!

Risk of injury caused by malfunctioning motor electronics!

In the case of malfunctioning motor electronics, the device may make uncontrollable movements or main functions such as XY movement, focus, zoom and light control may become impaired.

- ▶ Activate manual mode.
- ▶ Contact ZEISS Service.

Action

1. Press the [Manual mode] switch.
   - ⇨ The light sources are at medium intensity
   - ⇨ The XY coupling, focus and zoom motor are inactive
   - ⇨ The filters are the in swiveled-out position. For filters that were previously in the swiveled-in position: note the "Maximum radiation exposure times" table. [▷ 30]
   - ⇨ The control panel is black
   - ⇨ The shutters are in the swiveled-out position
2. If manual mode is activated: operate the device manually. [▷ 228]

10.4.2 Operating the device in manual mode

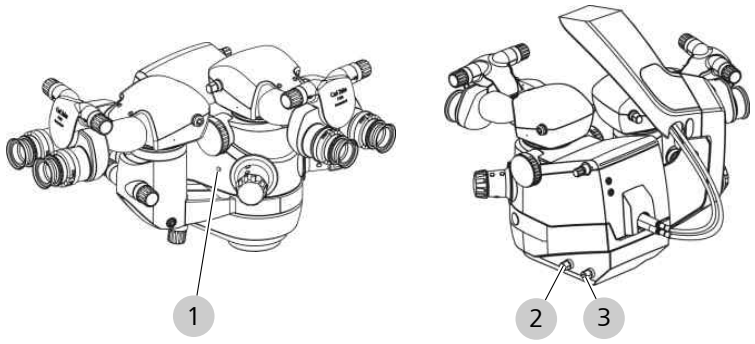


Figure 98: Operating the device in Manual mode

1	Zoom adjustment knob	2	[SCI illumination] rotary knob
3	[Integrated slit illumination] rotary knob		

Prerequisite

☑ Manual mode is activated.

Action

1. Positioning the surgical microscope. Move the suspension arm in the desired direction.
2. Focus the surgical microscope. To do this, move the suspension arm up and down.
3. Set the magnification on the manual zoom adjustment knob.
4. Set the SCI illumination. To do this, rotate the [SCI illumination] rotary knob to the following positions:
   - ⇨ Left position: light emitted generates a red reflex.
   - ⇨ Right position: light emitted illuminates the entire field of view
5. Set the integrated slit illumination. To do this, rotate the [Integrated slit illumination] rotary knob to the following positions:
   - ⇨ Left position: slit illuminator from the left
   - ⇨ Center position: standard OPMI illumination
   - ⇨ Right position: slit illuminator from the right

Tip: In Manual mode, you can switch off the light sources for light guides which you no longer need. To do this, press the [Open lamp module] button on the lamp housing.

10.4.3 Changing the halogen lamp

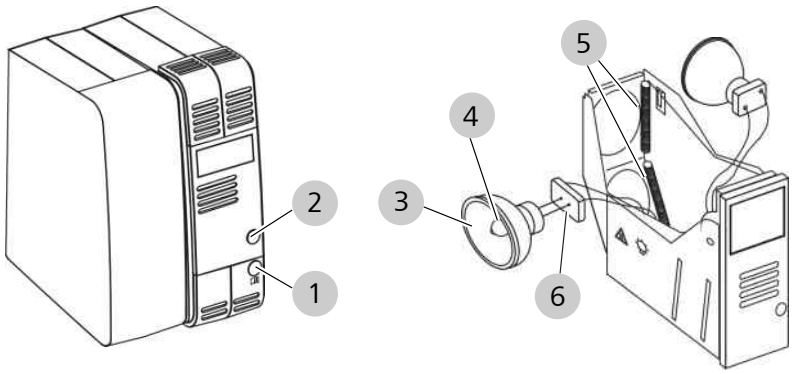


Figure 99: Changing the halogen lamp

1	[Open lamp module] button	2	Lamp module
3	Lamp reflector of the halogen lamp	4	Lamp bulb of the halogen lamp
5	Spring-loaded mounts	6	Ceramic base of the lamp module

⚠ CAUTION!

Risk of burn injury caused by a defective halogen lamp!

New halogen lamp can be damaged by body oils.

- ▶ Wait several minutes until the halogen lamp is cool.
- ▶ Replace the halogen lamp with heat-reflective protective gloves.

Material	■ Halogen lamp: 12 V, 100 W

Prerequisite

☑ The power switch is off.

Action

1. Press the [Open lamp module] button.
   ⇨ The lamp module will be partially ejected.
2. Pull out the lamp module.
3. **CAUTION! Risk of burns due to hot halogen lamp!** Remove the defective halogen lamp from the spring-loaded mount.
4. Pull the ceramic base from the contact pins of the halogen lamp.
5. **NOTE! New halogen lamp can be damaged by contact!** Plug the ceramic base onto the contact pins of the new halogen lamp.
6. Insert the new halogen lamp.
7. Press the halogen lamp into the spring-loaded mount.
8. Push the lamp module including the new halogen lamp back into the device.

9. Switch on the device using the power switch.
10. Check both halogen lamps for functionality.

10.4.4 Swiveling the backup xenon lamp into position and resetting the remaining service hours

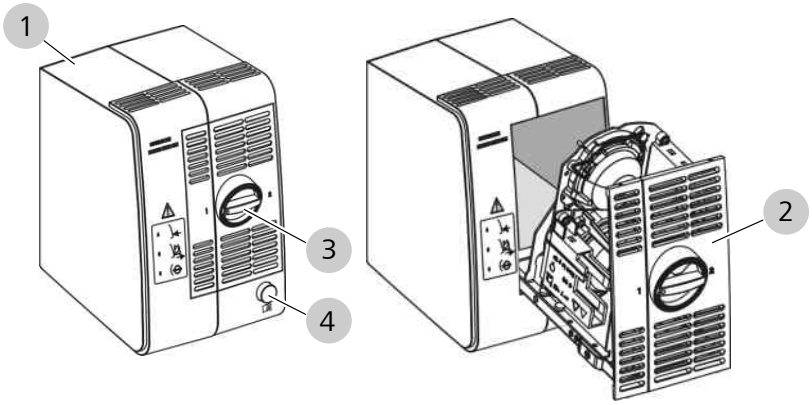


Figure 100: Swiveling the backup xenon lamp into position

1	Lamp housing	2	Lamp module
3	[Backup xenon lamp] switch	4	[Open lamp module] button

⚠ CAUTION!

Risk of injury caused by lamp rupture!

Lamp rupture may lead to jamming of the lamp module and failure of the electronics modules.

- ▶ The lamp module may be changed only by appropriately trained personnel.
- ▶ Before opening the lamp housing: move the device to a position in which 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. Contact ZEISS Service.

Prerequisite

☑ The power switch is off.

Action

1. Press the [Open lamp module] button.
   ⇨ The lamp module will be partially ejected.
2. Pull out the lamp module as far as it will go.
3. Swivel the second xenon lamp (backup lamp) into position. To do this, rotate the [Backup xenon lamp] switch clockwise 180° until it snaps into place.
   ⇨ The red segment in the [Backup xenon lamp] switch will appear.
4. Push the lamp module all the way back into the lamp housing.

5. Switch on the device using the power switch.
   ⇨ The red segment in the [Backup xenon lamp] switch will illuminate.
   ⇨ The following message will appear on the control panel: "OPMI light source: spare lamp is in use, please change main lamp."
6. Acknowledge the error message.
7. Reset the remaining service hours counter to its initial value of 500. To do this, go to [System Settings] > [Tab 2] > [Lamp service life] > [Reset] from the main menu.
   ⇨ The following prompt will appear: "Do you wish to reset the service hours of the lamps?"
8. To reset the service hours: tap the [Yes] button.
   ⇨ The remaining service hours will be reset to 500

Tip: To be safe, keep a backup lamp module with two new xenon lamps at hand.

10.4.5 Changing the Superlux Eye light source lamp module

If the lamp fails, do not use the light source for any further operations, and replace the complete lamp module with a new or reconditioned OEM lamp module with two working lamps.

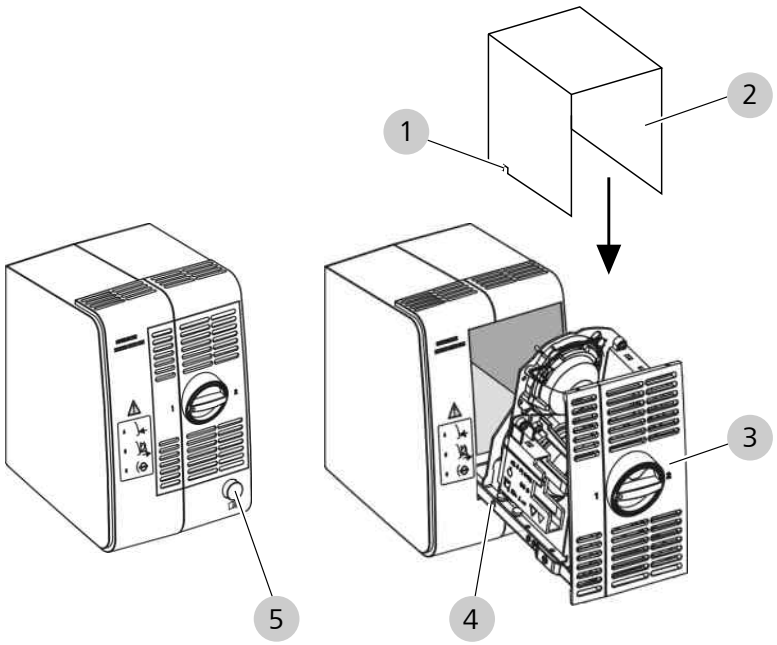


Figure 101: Replacing the Superlux Eye light source lamp module

1	Bolt	2	Original transport packaging
3	Lamp module	4	Borehole
5	[Open lamp module] button		

⚠ CAUTION!

Risk of injury caused by lamp rupture!

Lamp rupture may lead to jamming of the lamp module and failure of the electronics modules.

- ▶ The lamp module may be changed only by appropriately trained personnel.
- ▶ Before opening the lamp housing: move the device to a position in which 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. Contact ZEISS Service.

Material	■ Xenon backup lamp module with 2 xenon lamps for Superlux Eye

Only change the lamp module after it has cooled down completely. The hot surface of the xenon lamp can cause burns, and high pressure inside the hot lamp can cause the lamp to burst in the event of a malfunction.

Prerequisite

☑ The power switch is off.

Action

1. Press the [Open lamp module] button.
   ⇨ The lamp module will be partially ejected.
2. Carefully guide the lamp module out of the lamp housing as far as it will go, unlock and remove it, and hold it facing away from you.
   Always hold the lamp module by the housing only, and do not touch the lamp itself (lamp may be hot and is sensitive).
3. Slide the original transport packaging over the module until the bolt snaps into the borehole. This unlocks the stop.
4. Pull out the old module.
5. Carefully place the old lamp module back into the packaging.
6. **NOTE! Using the correct lamp module. Use only the replacement lamp module specified above.**
   Carefully remove the new lamp module from the packaging, slide it into the lamp housing (facing away from you, touch only the housing) and close the lamp housing.
   Rough handling of the lamp module, as well as uncoordinated handling, can result in non-visible damage to the xenon lamp or the lamp housing/module. In turn, this can also cause damage to the lamp (glass body & ceramic). The lamp housing must audibly lock into place.
7. Switch on the device using the power switch.
8. Check the functioning of the xenon lamp and backup xenon lamp.

9. Reset the remaining service hours counter to its initial value of 500.
10. Package the old lamp module in the backup lamp module's original transport packaging.
11. Fill in the enclosed return card and send the old lamp module to ZEISS Service.

Use only the original transport packaging! It features explosion protection for potentially defective xenon lamps.

Always replace the complete lamp module with a new OEM lamp module. Use only a new or reconditioned OEM lamp module with two working lamps. These are subjected to special quality controls and a controlled assembly process to ensure the functionality of the lamps and therefore the light source.

Replace individual lamps according to the training and service manual and consult qualified personnel.

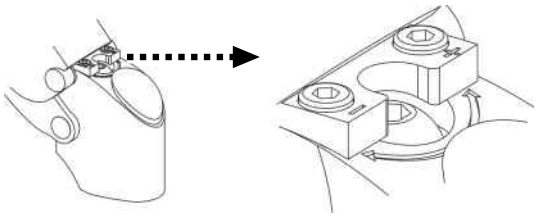
10.4.6 Setting the gas spring on the integrated video monitor

If the integrated video monitor descends on its own, you can readjust the gas spring of the spring arm.

Tools	■ M5 hex key

Action

1. Align the suspension arm and the carrier arm horizontally.
2. Tighten the hexagon socket screw on the gas spring clockwise (+) until the integrated video monitor remains in the desired position.
   NOTE! If the suspension arm continues to descend by itself, the gas spring is defective.



3. Inform ZEISS Service!

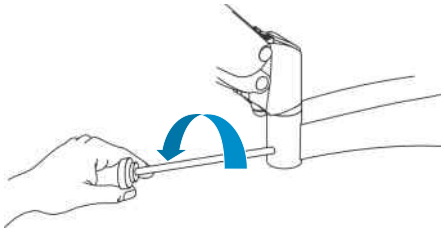
10.4.7 Increasing the mobility of the suspension arm on the integrated video monitor

If the integrated video monitor swings out to the left or right unintentionally, you can increase the mobility of the spring arm.

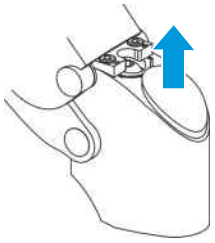
Tools	■ M2.5 hex key ■ M5 hex key

Action

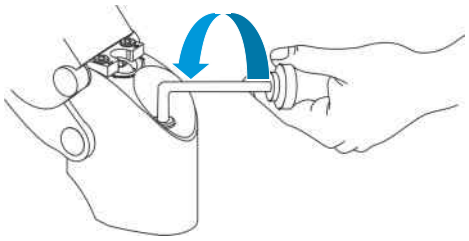
1. Loosen the securing screw on the support arm. To do this, turn the securing screw counter clockwise using an M2.5 hex key.



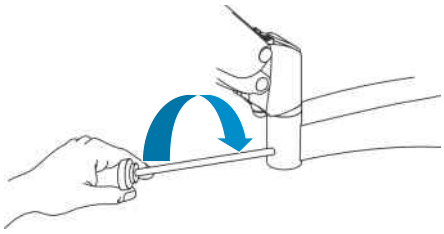
2. Remove the plastic cover on the suspension arm.



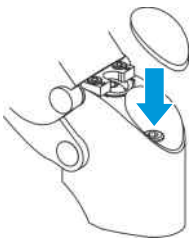
3. Tighten the adjustment screw on the suspension arm until the desired level of mobility is achieved. To do this, turn the adjustment screw clockwise using an M5 hex key.



4. Retighten the securing screw on the suspension arm. To do this, turn the securing screw clockwise using an M2.5 hex key.



5. Reattach the plastic cover.



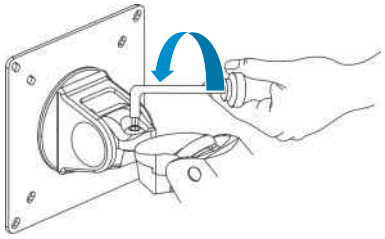
10.4.8 Increasing mobility of the monitor mount on the integrated video monitor

If the integrated video monitor tilts forward unintentionally, you can increase the mobility of the monitor bracket.

Tools	■ M5 hex key

Action

1. Tighten the hexagon socket screw on the monitor mount clockwise until the integrated video monitor remains in the desired position.



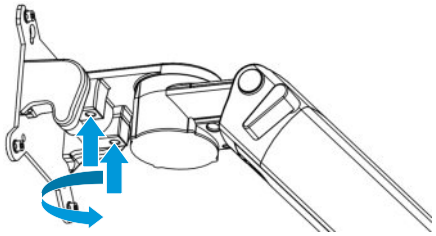
10.4.9 Increasing mobility of the monitor mount on the integrated CALLISTO eye Panel PC support arm

If the CALLISTO eye Panel PC is making undesired tilting movements, the mobility of the monitor mount can be increased.

Tools	■ M5 hex key

Action

1. Tighten the hexagon socket screw clockwise until the integrated CALLISTO eye Panel PC remains in the desired position.



10.4.10 Establishing a cable connection for the 14-function foot control panel

If the 14-function foot control panel remains non-operational after pairing, connect it to the device using a cable.

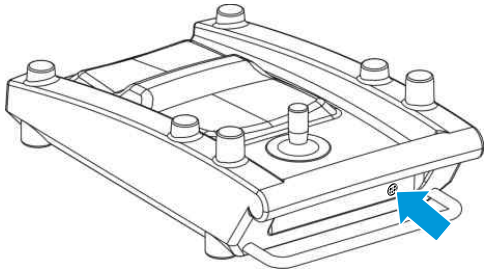
Material	■ 3 m, 6 m or 10 m cable

Prerequisite

☑ The power switch is off.

Action

1. Insert the 6-pin connector into the socket on the 14-function foot control panel.



2. Insert the 4-pin connector (straight or angled) into the socket on the stand.

10.4.11 Replacing the fuses

The fuses are located on the right beside the power socket on the rear of the isolating transformer.

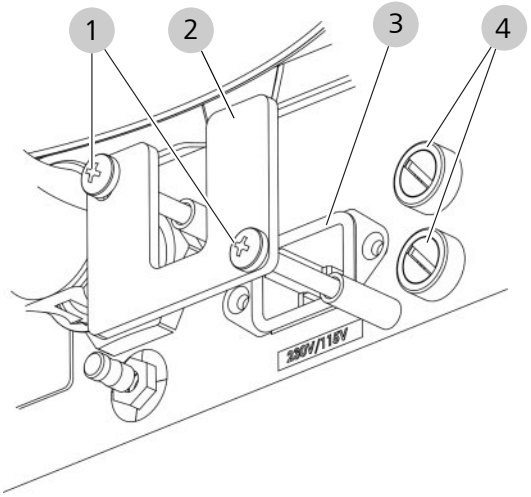


Figure 102: Changing fuses

1	Screws	2	Mount
3	Power cord	4	Fuse holders

Tools	■ Phillips head screwdriver PH2 ■ Flat-head screwdriver, blade width: 5 mm
Material	■ 2x T6.3 AH / 230V ■ 2x T12.5 AH / 115 V

Prerequisite

☑ The power switch on the monitor cart is off.

Action

1. Disconnect the power cord from the power supply.
2. Please remove the cover using the Phillips screwdriver.
3. Keep the screws and the cover near the system.

4. Unplug the power cord from the connection socket.
5. Remove both fuses by unscrewing the fuse holder using a flat-head screwdriver.
6. Remove the fuses and insert new fuses. Only use fuses with the electrical ratings specified above.
7. Mount the fuse holders.
8. Attach the power cord.
9. Mount the power cord cover.
10. Connect the power cord to the power supply.
11. Switch on the monitor cart with the power switch.

10.4.12 View firmware versions

An overview of the installed firmware versions is available in the "Versions" menu. The information displayed varies depending on the equipment the device is equipped with.

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Versions] button.
   ⇨ The "Versions" menu will appear.
4. To view all firmware versions: tap the arrow buttons.
   ⇨ The menu will scroll up or down.

10.4.13 Opening the Service menu

The Service menu is password-protected and may only be accessed by personnel trained by ZEISS.

Prerequisite

☑ The service PIN is available

Action

1. Open the main menu.
2. Tap the [System Settings] menu button.
3. Tap the [Service PIN] submenu button.
   ⇨ The "Service PIN" menu will appear.
4. To open the Service menu: enter the service PIN.

10.5 Service information

You can find the ZEISS contact partner for your country on the following website: www.zeiss.com/med

Empty page, for your notes

11 Technical specifications

11.1 Essential performance

The device does not have any essential performance features as defined in IEC 60601-1.

11.2 Regulatory information

Classification of the device according to IEC 60601-1

The device is classified as follows:

OPMI Lumera 700

- Degree of protection against electric shock: Class I
- Degree of protection against entry of water: IP 20
- Electromagnetic compatibility (EMC): Meets the standard IEC 60601-1-2, Class B (as per CISPR 11)
- Operating mode: continuous operation

OPMI Lumera 700 digital option

- Degree of protection against electric shock: Class I
- Degree of protection against entry of water: IP 20
- Electromagnetic compatibility (EMC): Meets the standard IEC 60601-1-2, Class A (as per CISPR 11)
- Operating mode: continuous operation

Classification of the 14-function foot control panel

- See also document G-30-2021 (Radio Approval Information). The radio frequency approvals apply only to the wireless version of the 14-function foot control panel.

11.3 Bluetooth module

FCP WL, FCP Gateway WL

Designation	Value
Transmit and receive frequencies	2402 MHz to 2480 MHz
Receiving power	-82 dBm to 0 dBm
Transmission power	1 mW to max. 2.5 mW (Class 2)
Modulation	FHSS

11.4 Electrical data

11.4.1 Stand

	Values
Rated voltage	(115): 100 - 125 V AC
	(230): 220 - 240 V AC
Total current consumption at 115 V	1200 VA maximum
Total current consumption at 230 V	1200 VA maximum
Rated frequency	50 - 60 Hz
Degree of protection (EN 60529)	IP 20
Protection class (EN 60601-1)	I
Fuses	Automatic circuit breaker
Electrical output	100/240 V AC
	500 VA maximum
Remote connector	24 V
	0.5 A
Network connection	RJ45

11.4.2 Light Sources

	Unit	Superlux Eye	Halogen	LED
Illumination type		Fiber optics	Fiber optics	Fiber optics
Main lamp		Xenon short-arc reflector bulb	Halogen bulb	LED
Spare lamp		Xenon short-arc reflector bulb	Halogen bulb	-
Color temperature	K	5000 (±500)	3200 (±500)	5500 (±500)
Voltage	V	-	12	-
Rated power	W	180	100	50
Lamp exchange		manual	automatic	automatic
Retina protection filter		standard	standard	standard
Fluorescence filter, 485 nm		optional	optional	optional
HaMode filter		standard	-	standard
Gray filter, 25%		-	-	optional

11.4.3 Integrated HD camera

	Unit	HD ready	Full HD	Full HD with video recording and streaming
1-Chip HD camera image sensor		1/3" progressive HD MOS sensor		
3-Chip HD camera image sensor		Three 1/3" progressive HD MOS sensors		
Resolution	Pixels	1280 x 720	1920 x 1080	1920 x 1080
Signal-to-noise ratio	dB	54		
Scanning system PAL	Hz	Progressive: 50 full frames/second		
Scanning system NTSC	Hz	Progressive: 59.94 full frames/second		

11.4.3.1 Digital video outputs

	Unit	HD ready	Full HD	Full HD with video recording and streaming
HD-SDI (-0.8 Vp-p/75 ΩPAL)	Pixels / Hz (PAL)	720p / 50	720p / 50 1080p / 50	720p / 50 1080p / 50
	Pixels / Hz (NTSC)	720p / 59.94	720p / 59.94 1080p / 59.94	720p / 59.94 1080p / 59.94
DVI (according to DVI Standards)	Pixels / Hz (PAL)	720p / 50	720p / 50 1080p / 50	720p / 50 1080p / 50
	Pixels / Hz (NTSC)	720p / 59.94	720p / 59.94 1080p / 59.94	720p / 59.94 1080p / 59.94

11.4.3.2 Analog video output ports

	Unit	HD ready	Full HD	Full HD with video recording and streaming
Composite (-1.0 Vp-p/75 ΩPAL composite)	Pixels / Hz (PAL)	567i	-	-
	Pixels / Hz (NTSC)	480i / 59.94	-	-
Y/C (-1.0 Vp-p/75 Ω luminance) (-0.3 Vp-p/75 Ω chroma)	Pixels / Hz (PAL)	-	576i / 50	576i / 50
	Pixels / Hz (NTSC)	-	480i / 59.94	480i / 59.94
YPbPr (-1.0 Vp-p/75 Ω (Y)) (-0.525 Vp-p/75 Ω (Pb, Pr)	Pixels / Hz (PAL)	720p / 50	720p / 50 1080p / 50	720p / 50 1080p / 50

	Unit	HD ready	Full HD	Full HD with video recording and streaming
	Pixels / Hz (NTSC)	720p / 59.94	720p / 59.94 1080p / 59.94	720p / 59.94 1080p / 59.94

11.4.4 Integrated 4K cameras (digital surgical microscope)

	Value
Image sensor	1/3" 3 chip
Resolution	3840 x 2160 pixels
Signal-to-noise ratio	54 dB
PAL scan frequency	50 frames/second (Hz)
NTSC scan frequency	59.94 frames/second (Hz)
Filter	IR filter / Laser protection filter (532 nm)

11.4.5 Integrated HD video and image recording

	Unit	HD ready	Full HD	Full HD with video recording and streaming
Video resolution	Pixels	-	-	1920 x 1080
Required storage space ■ Low ■ Medium ■ High	GB	-	-	■ 1.8 GB per hour ■ 3.2 GB per hour ■ 4.6 GB per hour
Image frequency	Hz	-	-	25/30 frames per second (PAL/NTSC)
Video codec		-	-	H.264
Video format	mpg	-	-	MPEG
Photo Format		-	-	JPEG and TIFF (uncompressed)
Image resolution	Pixels	-	-	1920x1080 (2.1 megapixels)
Media for saving videos to USB				
Storage device		-	-	USB stick or HDD
Interface		-	-	USB 2.0 (or higher)

	Unit	HD ready	Full HD	Full HD with video recording and streaming
File system		-	-	FAT16, FAT32 or NTFS
Speed (read and write)	MB/s	-	-	> 5
Media for saving videos to an IT network				
Interface	MBit/s	-	-	≥ 100
Protocol		-	-	CIFS
Speed (read and write)	MB/s	-	-	> 5

11.4.6 Integrated 4K video and image recording on the monitor cart (digital surgical microscope)

	Unit	Full HD with video recording and streaming
Video resolution	Pixels	1920 x 1080
Image Frequency	Hz	60 frames per second (PAL/NTSC)
Video codec		H.264
Video Format	mpg	MPEG
Media for saving videos to USB		
Storage Device		USB stick or HDD
Interface		USB 2.0 (or higher)
file system		exFAT / FAT32 / not NTFS
Partition style		GPT and MBR are supported
Speed (read and write)	MB/s	> 5
Media for saving videos to an IT network		
Interface	MBit/s	≥ 100
Log		CIFS
Speed (read and write)	MB/s	> 5

11.4.7 Integrated keratoscope ring

	Value
Wavelength	610 nm (±15 nm)
Radiation output	0.149 mW
Divergence of beam (opening angle)	100°

11.4.8 Integrated 22" monitor

	Value
Input voltage	24 V (DC)
Current consumption	1.5 A @ 24 V (DC)
Resolution	1,680 x 1,050 pixels
Reaction time	8 ms
Setting the brightness	220 cd/cm^2
Contrast	1600:1
Color display	16.7 M
Analog video inputs	VGA, Y/C, composite
Digital video inputs	DVI-D, DVI-A
COM port	RS-232

11.4.9 Integrated 23.6"monitor

	Value
Input voltage	24 V DC (± 15%)
Nominal current consumption	1.2A @ 24 V DC
Resolution	1920 x 1080 pixels
Aspect ratio	16:9
Reaction time (gray to gray)	15 ms
Viewing angle	typ. horizontal 178°; typ. vertical 178° @ contrast ratio = 10
Brightness (with front glass)	typ. 300 cd/m^2
Contrast ratio	Min. 700:1, type 1000:1
Color display	16.7 M (8-bit)
Digital video inputs	DVI-I, HDMI, DP

11.4.10 Monitor cart

	Value
Rated voltage	115/230 V
Total current consumption	Max. 1240VA
Rated frequency	50/60 Hz
Degree of protection (EN 60529)	IP XO
Protection class (EN 60601-1)	I
Fuses	■ 2x T6.3 AH / 230V ■ 2x T12.5 AH / 115 V
Remote connector	24 V
	0.5 A

11.4.11 4K-2D video outputs

	Value
Outputs 11, 12, 13 and 14 3G-SDI	QuadSDI 3840x2160 50/60p (4xBNC)

11.5 Mechanical data

11.5.1 Integrated slit illumination

	Value
Slit width	■ 0.2 mm ■ 2 mm ■ 3 mm ■ 4 mm
Slit height	12 mm
Angle of illumination	+6° or -6°

11.5.2 Integrated 22" monitor

	Value
Weight	8 kg (±10 %)
Dimensions (W x H x D)	360 x 568 x 153 mm
Screen diagonal	22"

11.5.3 Integrated 23.6"monitor

	Value
Weight	7.4 kg (±5 %)
Dimensions (W x H x D)	593.3 x 363.3 x 63.85 mm (±1 mm)
Display size	23.6"

11.5.4 Monitor cart

	Value
Components	■ Sony LMD-X550MT 4K-3D monitor incl. instructions for use ■ 2x 4K video CCU ■ Isolating transformer

11.6 Optical data

11.6.1 Surgical microscope

	Value
Magnification (with objective lens f=200 and eyepiece 10x)	3.5x - 21x
Magnification factor	0.4x - 2.4x
Zoom system	Motorized
Focus	Motorized
Total focus range	70 mm
Upward focus range	40 mm
Downward focus range	30 mm

11.6.2 Objective lenses

	Unit	f=175	f=200
Focal Length	mm	175	200

11.6.3 Objective lenses with support ring

	Unit	f=175	f=200	f=225
Focal Length	mm	175	200	225

11.6.4 Eyepieces

	Unit	10x	12.5x
Magnification	x	10	12.5
Focal Length	mm	25	20
Field of view	mm	21	18
Distance of the exit pupil from the last lens	mm	24 - 25.5	22 - 23.5
Diopter adjustment range	dpt.	+5 / -8	+5 / -8
Weight	kg	0.120	0.115

11.7 Dimensions and weights

11.7.1 Dimensions and swiveling ranges

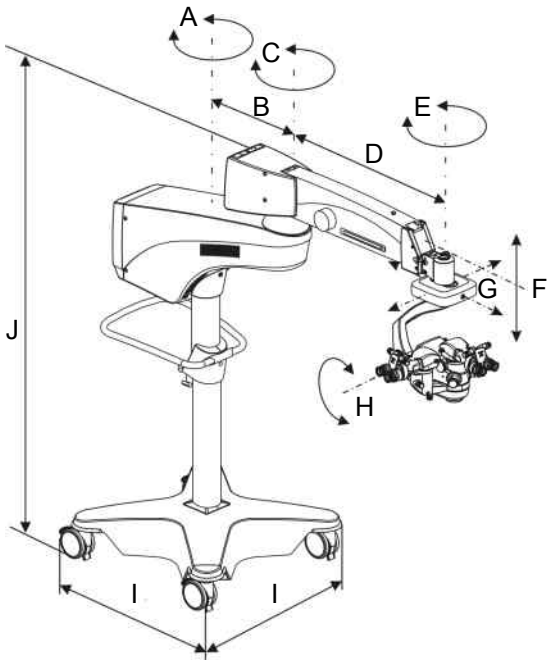


Figure 103: Dimensions and swiveling ranges

	Item	Value
Support arm swiveling angle	A	320°
Support arm length	B	450 mm
Suspension arm swiveling angle	C	320°
Suspension arm length	D	893 mm
XY coupling angle of rotation	E	330°
Suspension arm lift	F	±360 mm

	Item	Value
XY coupling travel range	G	61 mm
Microscope tilt mechanism tilt angle	H	+90° / -20°
Foot dimension	I	805 mm
Stand height	J	1880 mm

11.7.2 Support arm for integrated CALLISTO eye Panel PC

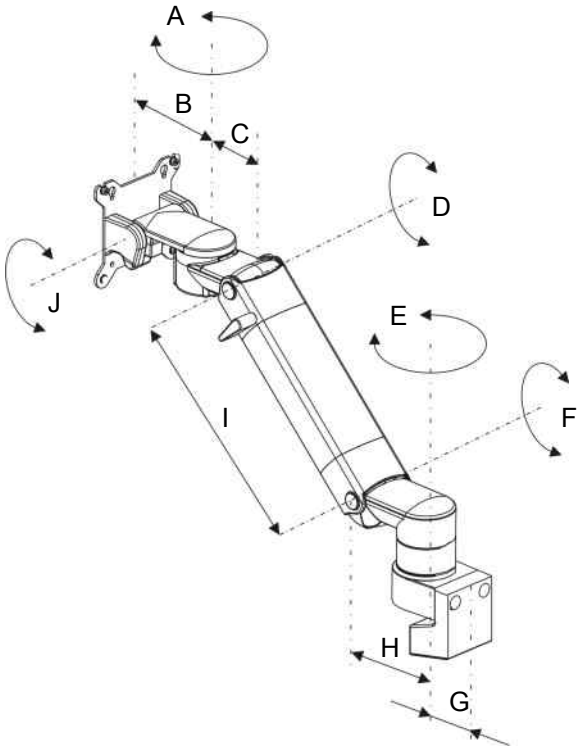


Figure 104: Dimensions and swiveling ranges

	Item	Value
Monitor mount swiveling angle	A	220°
Monitor mount length	B	101 mm
	C	70 mm
Support arm tilt angle	D	45°
Support arm swiveling angle	E	210°
Support arm tilt angle	F	45°
	G	45 mm
	H	70 mm
Extension arm length	I	252 mm
VESA 75/100 interface tilt angle	J	24°

11.7.3 Support arm for integrated video monitor

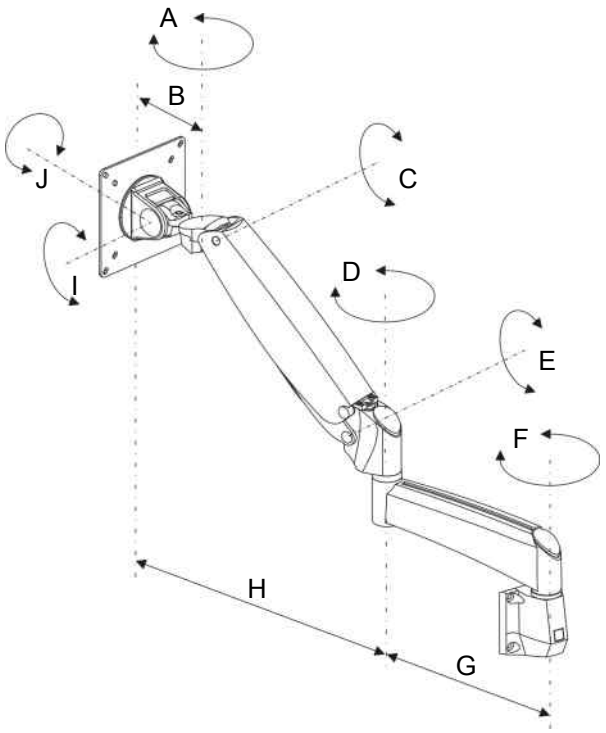


Figure 105: Dimensions and swiveling ranges

	Item	Value
Monitor mount swiveling angle	A	180°
Monitor mount length	B	84 mm
Suspension arm tilt angle	C	±41°
Suspension arm swiveling angle	D	360°
Suspension arm tilt angle	E	±41°
Extension arm swiveling angle	F	±90°
	G	180 mm
	H	max. 380 mm
VESA 75/100 interface tilt angle	I	±85°
VESA 75/100 interface angle of rotation	J	±90°

11.7.4 Maximum weight capacity

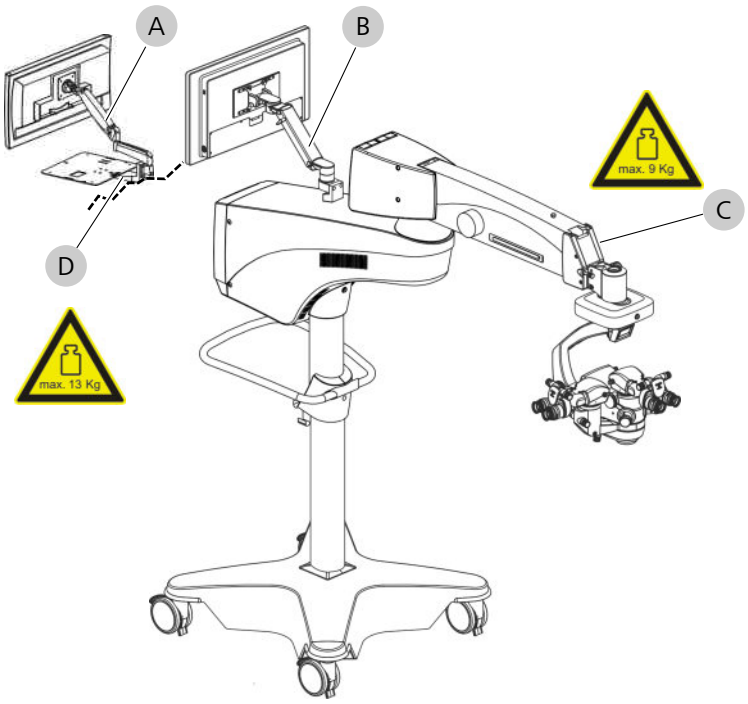


Figure 106: Maximum weight capacity

	Item	Value
Support arm for integrated 22" monitor	A	10 kg
Support arm for integrated CALLISTO eye Panel PC	B	15 kg
Suspension arm (with mounted surgical microscope [no tube, eyepieces, objective lens] and XY coupling)	C	9 kg
Instrument tray	D	13 kg

11.7.5 Total weight

	Value
■ Total weight with CALLISTO eye Panel PC and accessories	approx. 280 kg

11.7.6 Monitor cart

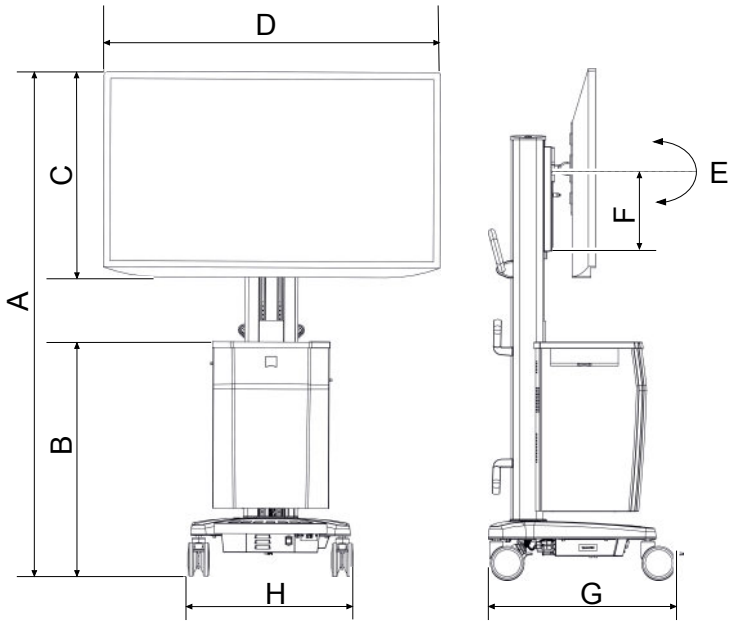


Figure 107: Dimensions, swiveling ranges and total weight

	Pos.	Value
Overall height	A	1830 mm
Height of monitor cart	B	882 mm
Height of 3D monitor	C	772 mm
Width of 3D monitor	D	1265 mm
Tilt angle of 3D monitor	E	12° downward, 12° upward
Height adjustment of 3D monitor	F	200 mm
Length of monitor cart	G	721 mm
Width of monitor cart	H	621 mm
Total weight		155 kg (including 10 kg additional load on the upper tray and 3 kg additional load in the drawers)

11.8 Ambient requirements for operation

	All stand variants
Temperature	+10 °C ... +40 °C
Rel. humidity	30% ... 75%
Air pressure	800 hPa ... 1060 hPa

11.9 Ambient requirements for transport and storage

	All stand variants
Temperature	-20 °C ... +60 °C
Rel. humidity (without condensation)	10% ... 90%
Air pressure	500 hPa ... 1060 hPa

11.10 Guidance and manufacturer´s declaration – electromagnetic immunity

The device is subject to specific precautions with regard to electromagnetic compatibility (EMC) in Professional Healthcare Facility Environments. In order to avoid the occurrence of EMC interference, the device may only be installed, operated and maintained in the manner indicated in these Instructions for Use and only with components supplied by ZEISS.

⚠ WARNING!

Malfunction caused by other devices!

Do not install or operate the OMPI Lumera 700 in direct proximity to other devices (with the exception of the combination of the devices described in these Instructions for Use), as this can impair the function of the device.

- ▶ If it cannot be avoided that the OMPI Lumera 700 is operated in proximity to other devices, the proper function of the OMPI Lumera 700 must be monitored.

⚠ WARNING!

Malfunction caused by non-approved components!

Electrical devices can influence each other as a result of their electromagnetic radiation. The use of non-approved components can cause increased emissions or reduce the device's immunity.

- ▶ Only use accessories, transformers, cables and spare parts which are specified in these Instructions for Use or which have been approved by ZEISS for this device.

⚠ WARNING!

Loss of performance caused by RF units!

- ▶ Do not use any portable or mobile RF communication equipment or transmitters (including peripheral devices such as antenna cables or external antennas) in the proximity of the OMPI Lumera 700 (minimum distance 30 cm). as it cannot be ruled out that the function of the device will be impaired or that the performance of the device deteriorates.
- ▶ Do not use cell phones near the OMPI Lumera 700. They represent a potential risk of improper functioning of medical devices. The malfunctions that may occur depend on a variety of local factors These cannot be predicted or estimated
- ▶ Please follow the EMC guidelines in the following pages.

NOTE

Disturbances caused by electromagnetic radiation!

The OMPI Lumera 700 may be disturbed by other devices even when these other devices comply with the emission requirements applicable to them according to CISPR.

- ▶ Do not use the OMPI Lumera 700 when it is located next to or stacked on top of other devices.
- ▶ If operation of the device located next to or stacked on top of other devices is required, observe the OMPI Lumera 700 to ensure its normal operation in the arrangement in which it is used.
- ▶ If you use the OMPI Lumera 700 together with another instrument/device that emits high-frequency waves or high voltage, check the effects before using such instruments/ devices and install the device in such a way that interference from high-frequency waves is minimized.

The following device functions have been defined for the immunity test:

- The CALLISTO eye user interface is accessible at all times.
- The integrated HD camera's video signal is accessible at all times.
- Magnification of the surgical field is accessible at all times.
- Illumination of the surgical field is accessible at all times.
- Focusing on the surgical field is accessible at all times.

11.10.1 Electromagnetic disturbance emissions

OMPI Lumera 700

The OMPI Lumera 700 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the OMPI Lumera 700 is responsible for ensuring that the device is operated in such an environment.	
Interference measurements	**Compliance**
HF emissions as per CISPR 11	Group 1
HF emissions as per CISPR 11	Class B*
Harmonic emissions as per IEC 61000-3-2	Class A*
Voltage fluctuations/flicker according to IEC 61000-3-3	Compliant*

Note*

* The OMPI Lumera 700 as a system combination with the CALLISTO eye Panel PC (model I with SN 690912xxx and 690914xxx) 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 according to CISPR 11. In residential areas, this device may cause radio interference requiring appropriate corrective measures to be taken, such as reorienting, repositioning or shielding the OMPI Lumera 700, or filtering the connection to the site of use.

OMPI Lumera 700 (digital surgical microscope)

The OMPI Lumera 700 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the OMPI Lumera 700 is responsible for ensuring that the device is operated in such an environment.	
Interference measurements	**Compliance**
HF emissions as per CISPR 11	Group 1
HF emissions as per CISPR 11	Class A*
Harmonic emissions as per IEC 61000-3-2	Compliant*
Voltage fluctuations/flicker according to IEC 61000-3-3	Compliant*

Note*

* The OMPI Lumera 700 as a system combination with the CALLISTO eye Panel PC (model II with SN 690912xxx and 690914xxx) 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 according to CISPR 11. In residential areas, this device may cause radio interference requiring appropriate corrective measures to be taken, such as reorienting, repositioning or shielding the OMPI Lumera 700, or filtering the connection to the site of use.

11.10.2 Electromagnetic immunity for all ME equipment and ME systems

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

Electromagnetic immunity tests	IEC 60601 test level	Compliance level
Electrostatic discharge (ESD) as per IEC 61000-4-2	± 8 kV contact discharge	± 8 kV contact discharge
	±15 kV air discharge	±15 kV air discharge
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines	± 2 kV for power supply lines
	±1 kV for input/output lines	±1 kV for input/output lines
Surge IEC 61000 -4-5	±1 kV phase-to- neutral voltage	±1 kV phase-to- neutral voltage
	±2 kV phase/neutral to ground voltage	±2 kV phase/neutral to ground voltage
Magnetic field for supply frequency (50/60 Hz) as per IEC 61000-4-8	30 A/m	30 A/m
Voltage dips, short interruptions and voltage variations as per IEC 61000-4-11	0% U_T for 1/2 cycle	0% U_T for 1/2 cycle
	0% U_T for 1 cycle	0% U_T for 1 cycle
	70% U_T for 25/30 cycles	70% U_T for 25/30 cycles
	0% U_T for 250/300 cycles	0% U_T for 250/300 cycles

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

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

Electromagnetic immunity tests	IEC 60601 test level	Compliance level
Conducted HF IEC 61000-4-6	3 V 150 kHz to 80 MHz	3 V
	6 V ISM and amateur radio bands between 150 kHz and 80 MHz	6 V
Radiated HF disturbances as per IEC 61000-4-3	10 V/m 80 MHz to 2.7 GHz	10 V/m

Radiated RF disturbances from near fields of wireless communication devices as per EN 61000-4-3	27 V/m 385 MHz	27 V/m
	28 V/m 450 MHz, 810 MHz – 2.45 GHz	28 V/m
	9 V/m 710 MHz – 780 MHz, 5.24 GHz – 5.785 GHz	9 V/m

12 Accessories and components

12.1 Accessories

These Instructions for Use describe accessories that are not essential components of the individual deliveries. A current list of accessories can be obtained from your ZEISS contact partner.

You can find the ZEISS contact partner for your country on the following website: www.zeiss.com/med

Use only accessories and spare parts which are approved by ZEISS for this device. When using accessories and spare parts that are not approved by ZEISS, safe operation of the device cannot be guaranteed.

12.1.1 Fundus imaging systems

Name	Specification	Order no.
RESIGHT 700	Motorized focusing unit	302721-9030-000
RESIGHT 500	Manual focusing unit	302721-9020-000
For additional components, please refer to the RESIGHT 500 & RESIGHT 700 Instructions for Use		

12.1.2 Additional illumination

Designation	Specification	Order no.
VISULUX	Motorized Fiber Slit Illuminator	000000-1100-155

12.1.3 Products that can be reprocessed (sterilization)

Name	Specification	Order no.
6x sterilizable caps, 22 mm	-	305810-9001-000
6x sterilizable caps (OPMI LUMERA 700)	-	305810-9017-000
6x sterilizable caps, 49 mm 180° foldable tube	-	305810-9003-000
6x sterilizable caps, 12 mm	-	305810-9002-000
2x handgrips, 6x sterilizable caps, 22 mm	-	305810-9015-000
2x sterilizable metal sleeves (VISULUX)	-	305810-9009-000

12.1.4 Drapes

Name	Specification	Order no.
OPMI drapes, sterile (5 pcs.)	1220 mm x 2090 mm	306070-0000-000
OPMI drapes, sterile (5 pcs.)	1220 mm x 3000 mm	306071-0000-000
Drapes (10 pcs.)	460 mm x 330 mm	306084-0000-000
Drapes for CALLISTO eye (80 pcs.)	-	301640-0014-100

12.1.5 CALLISTO eye

Designation	Specification	Order no.
CALLISTO eye BASIC V3.5	With CALLISTO eye Panel PC (model I)	301640-3000-350
CALLISTO eye ASSISTANCE V3.5	With CALLISTO eye Panel PC (model I)	301640-3010-350
CALLISTO eye ASSISTANCE markerless V3.5	With CALLISTO eye Panel PC (model I)	301640-3020-350
CALLISTO eye BASIC V3.6	With CALLISTO eye Panel PC (model I)	301640-3000-360
	With CALLISTO eye Panel PC (model II)	301640-4000-360
CALLISTO eye ASSISTANCE markerless V3.6	With CALLISTO eye Panel PC (model I)	301640-3020-360
	With CALLISTO eye Panel PC (model II)	301640-4020-360
CALLISTO eye BASIC V3.7	With CALLISTO eye Panel PC (model II)	301640-4000-370
CALLISTO eye ASSISTANCE markerless V3.7	With CALLISTO eye Panel PC (model II)	301640-4020-370

12.1.5.1 CALLISTO eye components

Name	Specification	Order no.
Cart	For CALLISTO eye Panel PC	301640-9200-200
Table stand	For CALLISTO eye Panel PC	301640-9000-200
IOLMaster 500, reference image option	-	000000-1865-713
Swivel arm	For CALLISTO eye Panel PC	301640-9020-000
System cable set together with trolley or table stand		
■ Cable set	■ 10 m	302755-8640-000
■ Network cable	■ 10 m	302755-8641-000

12.1.6 Video accessories

For external video accessories for this surgical microscope, please refer to the separate product overview G-30-1888.

12.2 Components

12.2.1 14-function foot control panel

Name	Specification	Order no.
FCP WL	Wireless	304970-9200-000
FCP	Wired	304970-9100-000
Cable	3 m	304970-8730-000
Cable	6 m	304970-8760-000
Cable	10 m	304970-8710-000

12.2.2 3D monitor with cart

Designation	Specification	Order no.
3D monitor with cart	■ Sony LMD-X550MT 3D monitor ■ Monitor cart	308203-9460-000 305953-9050-000
3D glasses (5 pairs)	-	000000-1992-943

12.2.3 Tubes for surgical and assistant's microscopes

Name	Specification	Order no.
Invertertube E	Motorized	303797-9140-000
Invertertube	manual	303797-9120-000
45° inclined tube	-	303784-0000-000
180° tiltable tube	-	303791-0000-000

12.2.4 Eyepieces for surgical and assistant's microscopes

Name	Specification	Order no.
Eyepiece (2 pcs.)	10x	305542-0000-000
Eyepiece (2 pcs.)	12.5x asph.	305543-9901-000
Eyepiece with reticle (for main operator only)	10x	000000-1023-184
Eyepiece with reticle (for main operator only)	12.5x asph.	000000-1023-188

12.2.5 Intermediate pieces for surgical microscope

Name	Specification	Order no.
Intermediate piece	11 mm	303032-9002-000
Rotary dovetail for binocular tubes	-	301007-0000-000

12.2.6 Objective lenses

Name	Specification	Order no.
Objective lens	f = 200 mm	302652-9905-000
Objective lens	f = 175 mm	302651-9905-000
Objective lens with support ring	f = 175 mm	302671-9905-000
Objective lens with support ring	f = 200 mm	302672-9905-000
Objective lens with support ring	f = 225 mm	302673-9905-000

12.2.7 Coobservation

Designation	Specification	Order no.
Stereo coobservation module	-	000000-1063-869
8° assistant's microscope with magnification changer	-	302624-9901-000
0° assistant's microscope with magnification changer	-	302952-0000-000

12.2.8 Integrated components (factory installed)

Designation	Specification	Order no.
SCI illumination	-	302681-9023-000
SCI illumination system with integrated slit illuminator	-	302681-9024-000
Superlux Eye light source	-	304977-9023-000
LED light source	-	304977-9055-000
Halogen light source	-	304977-9052-000
Dual light source, LED + LED	■ LED ■ LED ■ S light guide	304977-9055-000 304977-9055-000 303481-9025-000
Dual light source, LED + Superlux Eye	■ LED ■ Superlux Eye ■ S light guide	304977-9055-000 304977-9023-000 303481-9025-000

Designation	Specification	Order no.
Dual light source, LED + halogen	■ LED ■ Halogen ■ S light guide	304977-9055-000 304977-9052-000 303481-9025-000
Dual light source, Superlux Eye + halogen	-	304977-9024-000
Gray filter (25%) for LED light source	-	000000-1124-845
Assistant's microscope with electrical zoom system	-	302681-9100-000
Assistant's microscope with manual 5x magnification changer	-	302681-9110-000
Integrated keratoscope ring	-	302681-9160-000
IDIS	-	302681-9158-000
Overhead display	-	305953-9082-000
Instrument tray	-	00000-1352-729

12.2.9 Lamps and light guides

Name	Specification	Order no.
Halogen lamp (2 pcs)	12 V, 100 W	380079-9040-000
Backup lamp module for Superlux Eye with two xenon lamps	-	304977-9038-000

12.2.10 Dust cover

Name	Specification	Order no.
Dust cover, blue, with ZEISS logo	-	000000-1055-278

12.2.11 Network cable

Name	Specification	Order no.
Network cable	2x RJ45, 10 m	305946-8660-000

12.2.12 Country-specific power cable

Name	Specification	Order no.
Europe	-	000000-0301-997
UK	-	000000-0400-264
Swiss	-	309850-9011-000

Name	Specification	Order no.
Argentina	-	000000-0434-527
Brazil	-	000000-0527-730
China	-	000000-0475-507
The Netherlands	-	000000-0613-792

12.2.13 Fuses

Designation	Specification	Order no.
Fuses	■ T6.3 AH / 230 V ■ T12.5 AH / 115 V	■ - ■ -

12.3 UC kits

The following UC kits (upgrade components) are integrated either in or on the device and must be installed by ZEISS Service after acquisition.

Designation	Specification	Order no.
UC kit, Superlux Eye light source	Retrofit of a Superlux Eye light source for halogen/Superlux Eye or LED/Superlux Eye dual light source.	304977-9027-500
UC kit, halogen light source	Retrofit of a halogen light source for Superlux Eye/halogen or LED/halogen dual light source.	304977-9025-500
UC kit, LED light source	Retrofit of an LED light source for LED/LED, Superlux Eye/LED or halogen/LED dual light source.	304977-9055-500
UC kit, LED light source	Changeover to simple LED light source for Superlux Eye or halogen	304977-9055-500
UC kit, 485 nm fluorescence exciter filter	For LED light source	304977-0016-500
UC kit, 485 nm fluorescence exciter filter	For Superlux Eye light source	304977-0015-500
UC kit, integrated HD 3-chip camera	-	302681-9740-500
UC kit, integrated HD recording	-	302681-9765-600
UC kit, integrated video monitor with carrier arm	-	305953-9037-500
UC kit, integrated video monitor with carrier arm and instrument tray	-	305953-9038-500
UC kit, overhead display	-	305953-9082-500

Designation	Specification	Order no.
UC kit, manual SCI illumination button	-	302681-8456-500
UC kit, keratoscope ring	-	302681-9160-500
UC kit, IDIS	Can only be retrofitted in devices with serial numbers 6634101596 or higher	302681-9158-500
UC kit, FCP to FCP WL	-	304970-9021-500
UC Kit, ethernet	-	305953-9081-500
UC kit, support arm	For CALLISTO eye Panel PC	301640-9020-500

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13 Decommissioning

13.1 Cleaning before storage

13.1.1 Cleaning the device and accessories

Action

- Clean the device and any accessories which are no longer needed as described in "Cleaning and disinfection [▷ 211]".

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14 Packaging and transport

14.1 Preparing for transport

14.1.1 Placing the device in the transport position

⚠ WARNING!

Risk of injury during incorrect transportation!

If the surgical microscope is transported in an incorrect transportation position or moved across uneven terrain during transportation, it may fall over and injure the installer.

- ▶ The device should only be transported in its transport position and on appropriate terrain.

⚠ CAUTION!

Risk of crushing caused by rotating support and suspension arms!

Fingers may be crushed between the stand column and the support arm, as well as between the support arm and the suspension arm.

- ▶ Never touch this area while moving these parts.

NOTE

Functional loss due to incorrect transportation!

Incorrect transportation can result in functional loss when the device is put into operation, or it may render the device unable to be put into operation.

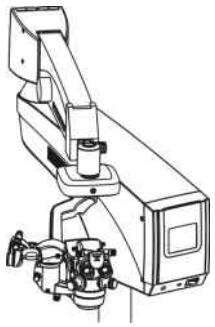
- ▶ Always transport the surgical microscope in the transport box intended for this purpose.
- ▶ Store the surgical microscope under the correct ambient conditions, both during and after transport.
  Take note of the temperature, humidity and pressure, and make sure that the surgical microscope is positioned correctly.

Prerequisite

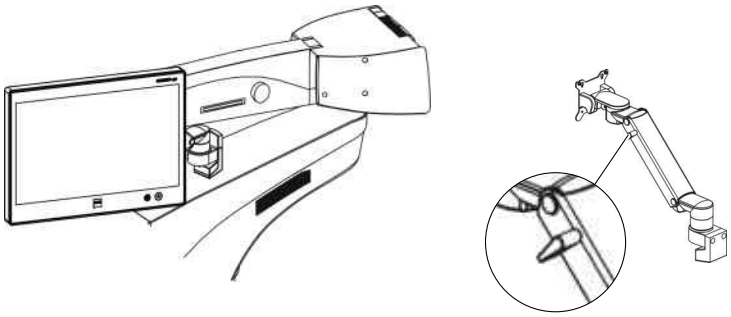
☑ The power switch is off.

Action

1. Remove the power plug from the wall socket.
2. Place the support arm and suspension arm in the following transport position.

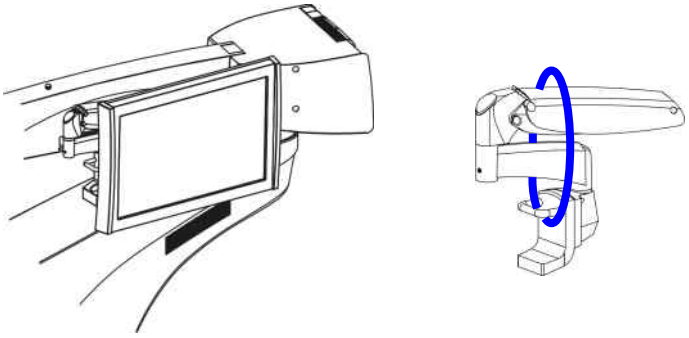


3. For the integrated CALLISTO eye Panel PC: Place the carrier arm in the following transport position and push the locking lever downwards.



⇨ The integrated CALLISTO eye Panel PC is locked.

4. For an integrated video monitor: Place the integrated video monitor in the following transport position.



5. Thread the supplied Velcro tape onto the bracket of the video monitor and wrap it around its spring and support arm.

⇨ The integrated video monitor is locked.

6. Hang the 14-function foot control panel on the foot control panel bracket.
7. Coil the cable.
8. Hang the cable on the cable holder.

15 Disposal

15.1 Environmental pollution

NOTE

Notes on environmental pollution!

Inappropriate disposal may contaminate the environment!

- ▶ Do not dispose of the systems along with normal domestic waste.

⇨ Separate disposal according to the local laws/regulations governing the disposal of electrical and electronic equipment is required.

15.2 Disposal of the device

- ▶ Keep packing material in the event of a relocation or repair.
- ▶ If you want to dispose of the packing material: Dispose of packing material by sending it for recycling through an acknowledged collection system.

The device contains electronic components with integrated batteries.

- ▶ Dispose of the device and integrated batteries correctly, in accordance with national legislation.

The device specified on the delivery note must not be disposed of via household waste or communal disposal companies according to the applicable EU guidelines valid at the time the device was placed on the market.

- ▶ For more information about the disposal of the device, please contact the ZEISS contact partner in your country.

You can find the ZEISS contact partner for your country on the following website: www.zeiss.com/med

- ▶ If you want to sell the device or its components: Inform the purchaser that they must dispose of the device according to the regulations valid at that time.

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Glossary

Automatic fuse

An overcurrent protection device which switches the system off in the event of a short.

BNC

BNC (Bayonet Neill Concelman) is a coaxial connector with bayonet lugs for high-frequency applications.

Composite

In composite video signals, color, brightness and synchronization information are combined and transmitted via a single cable.

Depth of field

The range of depth that appears sharply defined through the microscope.

DHCP

DHCP (Dynamic Host Configuration Protocol) is a network configuration for dynamically assigning IP addresses.

DIN

DIN (German standards association)

Diopter scale

Element of an eyepiece for reading off the set refraction value.

Drapes

Sterile covers for surgical microscopes.

DVI

DVI (Digital Visual Interface) is an electronic interface for the transfer of digital and analog video content.

Electromagnetic compatibility (EMC)

EMC (electromagnetic compatibility) designates the normal, desired state in which technical devices do not impede each other as the result of undesired electric or electromagnetic effects (non-interference).

Eyecup

An eyepiece control element used to shield the eyepiece against scattered light during eye-controlled focusing.

FCP

The FCP is a wired foot control panel.

HD-SDI

HD-SDI (High Definition Serial Digital Interface) is a connection used to transmit uncompressed video signals.

HF

HF (high frequency)

IDIS

Integrated Data Injection System

IEC

International Electrotechnical Commission

IEC

International Electrotechnical Commission

Incision/LRI

A CALLISTO eye assistance function for positioning incisions and LRIs.

IOL

IOL (intraocular lens) is an artificial lens in the eye.

IP

The IP (Internet Protocol) is a communications protocol to transfer data in the Internet or a network.

K TRACK

A CALLISTO eye assistance function used together with the keratoscope to visualize the corneal curvature.

LAN

LAN (local area network)

Manual mode

Used to switch from working mode to manual mode in the event of a device fault.

NTSC

NTCS (National Television Systems Committee) is a US American institution which defined the first color transmission system.

Pairing

Pairing is the term used to describe the fixed relative assignment of the suspension system and foot control panel.

PAL

PAL (Phase Alternating Line) is a color transmission system in analog TV systems.

RESIGHT 500

A manual fundus viewing system for stereoscopic imaging of the posterior segment of the eye.

RESIGHT 700

An electric fundus viewing system for stereoscopic imaging of the posterior segment of the eye.

Retina protection filter

Filters out the blue portion of the light beam and makes it possible to operate for longer periods of time. This is also referred to as a blue barrier filter.

RHEXIS

A CALLISTO eye assistance function which provides assistance when reaching the desired size and shape of the capsulorhexis.

SCI

Stereo Coaxial Illumination

SIP

SIP (Service Identification Program)

UC kit

UC (Upgrade Component) is a retrofit kit for ZEISS devices or systems.

UDI

Unique Device Identification (UDI) Standardized identification system for medical devices.

UDI Production Identifier (UDI-PI)

Unique Device Identification - Production Identifier

UDI-DI

Unique Device Identification - Device Identifier

USB

USB (universal serial bus) is a standard connector to connect peripheral devices.

UV

UV (ultraviolet)

WEEE

WEEE (Waste of Electrical and Electronic Equipment)

WL

WL (Wireless)

WLAN

Wireless Local Area Network

Y/C

Another term for S-Video; color and brightness signals are transmitted separately.

YPbPr

A color model that transmits brightness information Y and color difference information Pb and Pr separately.

Z ALIGN

A CALLISTO eye assistance function for aligning toric intraocular lenses.

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G-30-1673-en - 15.8 - 2022-06-28