KINEVO 900

Software Release 1.1

Instructions for Use

Brand names

KINEVO 900 is a trademark/are trademarks or registered trademark(s) of Carl Zeiss Meditec AG or other companies of the ZEISS Group in Germany and/or other countries.

All other trademarks mentioned in this document are the property of their respective owners.

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1 Notes on Instructions for Use

1.1 Product name

KINEVO 900 is referred to as "Device" in these Instructions for Use.

1.2 Scope

The present Instructions for Use apply to KINEVO 900 with Software Release 1.1 and the following identification:

- Reference number: 6640

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.

- ▶ 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

- ▶ If you have any questions or comments concerning these instructions for use or the device itself, please 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 [▶ 12].

This is **bold type**.

This is a `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.

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

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	Document number
Training record	Training record for newly installed system	G-30-1714
Instructions for Use	INFRARED 800 with FLOW 800 Option	G-30-1956
Instructions for Use	Mouth switch (option)	G-30-1469
Instructions for Use	14-function foot control panel, wired (FCP) or wireless (FCP WL) (option)	G-30-1706
Instructions for Use	QEVO and QEVO ECU (option)	G-30-1976
Conformance statement	DICOM Conformance Statement	G-30-1952
MICROSOFT SOFTWARE LICENSE TERMS	WINDOWS EMBEDDED STANDARD 7	As an annex to the present Instructions for Use

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2 Safety notes

2.1 Target group

⚠ CAUTION!

Only to be operated by trained personnel!

These Instructions for Use are intended for physicians, nurses and other medical and technical staff who prepare, operate or maintain the device after appropriate training. It is the duty of the device owner/operator to train and brief all the operating personnel.

- Initial instruction in preparation, operation, warnings/hazards, emergency operation and transport of the device shall be provided according to Training record G-30-1714 in connection with the present Instructions for Use.
- Any further training and instruction of planned operating personnel shall be performed by the operator of the device based on these Instructions for Use.

2.2 Area of use

2.2.1 Intended use

The KINEVO 900 is a surgical microscope intended for the illumination and magnification of the surgical area and for the support of visualization in surgical procedures.

⚠ CAUTION!

Risk of injury to the patient's eye!

The device must not be used for ophthalmological procedures.

- Make sure that no xenon light and no laser radiation enters the patient's eyes.

2.2.2 Normal use

The KINEVO 900 is suitable for cranial and spinal applications in neurosurgery, for ENT applications in the area of the auditory nerves and the base of the skull. Further fields of application include reconstructive and plastic procedures in accident surgery, plastic and reconstructive surgery, and oral and maxillofacial surgery in hospitals, clinics or other human medical institutions. The KINEVO 900 is also suitable for multidisciplinary use in microsurgery. It is designed for surgical procedures in which endoscopes and surgical microscopes are used simultaneously. The system can be optionally supplemented with navigation and network systems.

2.2.3 Risk of burn injuries caused by high illumination intensity

⚠ CAUTION!

Risk of burn injuries caused by high illumination intensity

Improper use of the xenon illumination may result in an excessively high illumination intensity, thus causing third degree burn injuries! A long surgical procedure increases the risk of injury, in particular if a standard procedure takes considerably longer than usual.

✓ Various factors contribute to the risk of burn injuries:

General

The device is equipped with a powerful xenon illumination.
If used improperly, the xenon illumination can lead to an excessively high illumination intensity resulting in third degree burns.
Never leave a device unattended when its light source is switched on!
Various factors contribute to the risk of burn injuries:

Device-related factors:

- If a high magnification value is used, the diameter of the field of view and the light intensity at the surgeon's eye both decrease while the light intensity in the surgical field remains the same. This effect is amplified by using certain accessory parts, e.g. for eyepieces, via a higher magnification or, in the case of the f170/f260 foldable tube, via the tube magnification (PROMAG function). When working at maximum magnification, you should therefore pay particular attention to the set light intensity to prevent burns, especially of the surrounding tissue.

Surgery-related factors:

- The size of the luminous field influences the risk of injury in two respects: With a large luminous field diameter, areas of the skin are illuminated which are not monitored as strictly by the surgeon and which are not moistened sufficiently. These areas represent a particular risk of injury. Such injuries can be prevented by adjusting the luminous field size to the smallest size required for that particular operation.
- If the luminous field is reduced in size, the intensity increases because the light is more strongly focused. So, if possible, the intensity should be lowered as soon as the size of the luminous field is reduced.
- A long surgical procedure increases the risk of injury, in particular if a standard procedure takes considerably longer than usual.

- Injuries in the peripheral area can be prevented by covering this area with moist, sterile gauze. The gauze must be moistened at regular intervals to prevent the area from drying out or heating up. The risk is increased if dry drapes are used to cover such areas.
- It should also be considered that some areas of the body may be more sensitive than others.
- Certain preparations of the surgical field, local vasoconstrictive medications and surgical incision drapes may also result in a higher risk of injury (surgical drapes may heat up to varying degrees depending on their color and moisture content).

Patient-related factors:

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

Recommendations

- The initial light intensity should be preset to a low value.
- If used, surgical drapes should also be remoistened at regular intervals in order to prevent heat from accumulating underneath the surgical drape.
- The risk of burns can be reduced by constantly irrigating the illuminated surgical area and by keeping it moist.
- Using the buttons on the handgrip or foot control panel, the surgeon can then set the illumination intensity to the value required for the procedure. Please note that the intensity increases with decreasing luminous field size if the Spot function is used. For this reason, the intensity should only be set after the size of the luminous field has been changed.
- The system features "automatic limiting of luminous field", which should not be turned off.
- Usually, the magnification factor is increased during surgery. This darkens the image so that the illumination intensity must be increased. This loss in image brightness is automatically compensated if the zoom-dependent brightness control is activated.
- Never leave a device unattended when its light source is switched on.
- Switch off the light when the microscope is not used or make sure that it is not aimed at unprotected bare skin.

2.2.4 Electromagnetic compatibility

The device is subject to specific requirements with regard to electromagnetic compatibility (EMC).

Take the following precautionary measures to avoid EMC malfunctions:

Procedure

- ▶ Observe the Instructions for Use.
- ▶ Observe the EMC guidelines in the section “Technical specifications".
- ▶ Only use accessories, cables and spare parts which have been approved by ZEISS for this device.
- ▶ If you use radio equipment or wireless transmission components: Maintain a minimum distance of 30 cm from all components of the device.
- ▶ If you install the device in the vicinity of other devices or stack it with other devices: Check whether normal operation is possible in this arrangement.

2.3 Responsibilities and duties of the operator

Operating personnel

The device may be operated only by properly instructed and trained persons.

- ▶ Make sure that the operating personnel are appropriately trained and instructed.
- ▶ Make sure 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.
- ▶ Specify the competencies for handling the device and state who is authorized to perform what tasks.
- ▶ Determine the reporting obligations for malfunction and damage and make them known. Notification of the manufacturer and authorities. [▷ 20]
- ▶ Provide the necessary protective clothing.
- ▶ Regularly check that the legal regulations applicable in your country with regard to accident prevention and work safety are being complied with.

Safety inspections

- ▶ In order to prevent a reduction of the device's safety due to aging and wear, have safety inspections performed regularly as specified for this device by the applicable national regulations.

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

- ▶ Comply with the specified time limits.
- ▶ Carry out checks according to the extent specified.

The safety inspections of the device should at least comprise the following points:

- Availability of the Instructions for Use
- Visual inspection of the device and accessories for damage, as well as legibility of the labels
- Leakage current test
- Test of protective ground conductor
- Function and wear test of the brakes
- Function test of all switches, buttons, sockets and indicator lamps of the device

Maintenance and inspection

- ▶ In order to ensure safe operation of the device and reach the expected useful life: Comply with the maintenance and inspection intervals specified in these Instructions for Use.

Modifications to the product

- ▶ WARNING: This device must not be modified without the manufacturer’s permission. If the device is modified, suitable inspections and tests must be performed to ensure that the device can still be used safely.

Accessories and additional equipment

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

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

In addition, all configurations must meet the normative requirements for medical systems (see IEC 60601-1-1 or Clause 16 of the 3rd edition of IEC 60601-1 respectively).

Anyone connecting additional equipment to medical electrical systems is a system configurer and as such responsible for compliance of the system with the standards for systems.

Local legislation has priority over the above normative requirements.

Dangers arising from connection to a network

Before connecting the device to a network, observe the following safety measures to prevent injury or damage:

- ▶ The user (or IT manager) is responsible for ensuring that no computer viruses are transmitted to the device via the network connection.
- ▶ Make sure that there are no defects in the network which could lead to a hazardous voltage on the network connector.
- ▶ Ensure a data transmission rate of 1 Gbit/s (Fast Ethernet) and the conformity of your network configuration with internet protocol IPv4 so that patient data can be exported to your network reliably, safely and error-free.

Changes to the network

The following subsequent changes to the network may result in new risks:

- Changes to the network configuration
- Connecting additional devices to the network
- Disconnecting devices from the network
- Updates of devices connected to the network
- Upgrades of devices connected to the network
- ▶ Analyze and eliminate any risk factors newly incurred by such changes to the network.

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 incidence to the manufacturer or seller of the medical product. In the European Union, the operator must report this serious incident to the responsible authorities in the applicable 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

- ▶ 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.

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.

2.5 Liability and warranty

The warranty and liability depend on the contractually specified conditions.

Do not modify the device without permission.

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

3 Device description

3.1 General

The standard configuration of the KINEVO 900 includes modules and functions for neurosurgical applications (autofocus, autodrape, navigation interface and MultiVision system). This basic equipment can be extended to include additional options and accessories. A symmetrical system design with 2 system monitors enables flexible positioning in the operating room. A modular hardware and software concept allows the user to achieve an individually adjustable system configuration. This in turn enables the subsequent activation of an additional function of an installed hardware module at a later date by activating a corresponding license.

Only installed and active options and their functionalities can be displayed and configured on the touchscreen.

3.2 Innovative functionalities

3.2.1 Kinematic and robot-assisted positioning functions

Every KINEVO 900 system offers the user new and innovative movement and positioning functions for simplified and more precise pre- and intraoperative microscope positioning in its standard configuration.

- Manual "PointLock" movement mode

  When the "SB" button on the handgrip is pressed (for PointLock configured), the microscope can be moved and realigned freely (e.g. in order to adjust to a different observation angle for the same object) without changing the focal point in the center of the field of view. The working distance is at the same time automatically adapted from 200 to 625 mm within the available focal length range. The new PointLock control greatly simplifies repositioning and adjustment of the microscope whenever the user would like to remain focused on the field of view center.

- Motorized "PointLock" XY movement mode

  This new motorized XY movement function enables time-saving and exact adjustment of the microscope while keeping it focused on the focal point (field of view center) at a constant working distance. The motor control can be triggered via the XY joystick on the handgrip or hands-free with the FCP.

- Position Memory

  The current position of the microscope, its alignment to the object, the working distance and the magnification can be saved intraoperatively at any time. Via the handgrip and the FCP or the user interface on the touchscreen, the user can call up these stored positions again and automatically move to them with high accuracy via the release button on the handgrip or FCP at any time during the procedure. Important intraoperative landmarks or anatomical details can be called up again and set in this way at any time.

- Motorized "Microscope XY movement mode

  The microscope can be moved by motor in the three axes of its suspension, 4, 5 and 6. This enables precise motorized tilting and swiveling of the focal point in the XY direction with a fixed working distance. The stand does not move in the process.

- Motorized "Stand" XY movement mode

  The microscope can be moved by motor in the three axes 1, 2 and 3 in the XY focal plane without tilting or swiveling; the alignment of the eyepieces always remains the same (e.g. horizontal). This enables precise motorized XY movement of the focal point at a fixed working distance. Only the axes of the stand move in the process.

- Motorized movement to the system park position

  The device can be automatically moved to its park position, thus enabling a constantly identical and compact park position.

- Motorized movement to a drape position

  The drape position is saved as a factory setting, however, can be changed arbitrarily. This drape position can be redefined and saved by the user in order to enable more efficient draping always performed in the same position.

3.2.2 QEVO hand-held, digital exploration tool (option)

QEVO (option, see Instructions for Use G-30-1776) is a new type of hand-held, digital and completely sterilizable exploration tool for the display of anatomic details not accessible with the microscope (e.g. a view behind an aneurysm to be clipped). It can be plugged into the console of the KINEVO 900 easily and quickly as required, thus replacing an additional endoscope system which would require both time and effort to prepare. The clear high-resolution HD video image of QEVO is displayed on the system monitor or an externally connected video monitor by pressing a button on the handgrip or the FCP.

3.2.3 Integrated 3D video system for observation without eyepieces (option)

The KINEVO 900 features an optional 2nd system video monitor (HD) on the back of the symmetrical console. The system can be used with a corresponding configuration (fully integrated optional 3D stereo video camera) and as a digital visualization system. Depending on the surgical situation at hand and the user's individual preference, the system can be used with a tube and eyepieces and/or with a correspondingly positioned external 3D video monitor for display of the surgical area. When used instead of the optional second HD system monitor, a second 3D video monitor (as a component of the stereo option) on the system console additionally enables observation of the surgical area with stereoscopic glasses.

⚠ CAUTION!

Application of BLUE 400 only with eyepiece-based optical observation!

- ▶ The use of tubes and eyepieces is required for the BLUE 400 option.

3.2.4 Data management

- Data storage in a shared network (option)

  The KINEVO 900 can be connected to the clinic network via a LAN connection (and optionally via WLAN, see below). A correspondingly configured server directory enables fast and easy data transfer of images and videos to this network drive for central data storage and fast accessing of this data from every PC/laptop connected to the network for editing and processing (e.g. with a video editor). This option also enables parallel video recording (option) on this network drive and prevents e.g. time-consuming data transfer using USB media.

- Wireless WLAN data transfer (option)

  An optional WLAN module with a WiFi hotspot function simplifies the management of images and videos stored with the KINEVO 900 enormously. With this option, a wireless connection to the clinic network or server directory can be configured instead of a LAN connection for time-saving data transfer. A WiFi hotspot for connections to mobile devices (e.g. tablets or smartphones) can be additionally activated and used, thus enabling users to access the patient data directory in the KINEVO 900 and download the desired images and video clips quickly and easily. All network, WLAN and WiFi connections are password-protected.

3.2.5 Navigation functionality

The KINEVO 900 is prepared for the display of navigation information and the connection of external navigation systems (factory-integrated standard navigation interface and MultiVision system). In connection with an extended navigation license, the new robotic positioning capabilities featuring motors in all system axes permit automatic alignment of the microscope to a trajectory predefined in the navigation planning software, provided that the connected navigation system supports this function.

3.2.6 Video recording functionality (option)

The KINEVO 900 offers the user a considerably more effective video recording functionality. A stereo video camera enables the user to choose a 2D or a 3D recording. In addition to the normal HD video recording (activated via handgrip, FCP or touchscreen user interface), a disk space optimized recording with a reduced resolution also can be activated, e.g. in order to record and save daily surgical procedures in their full length. An intuitive video editor with a cut & merge function enables fast and easy video editing on the system prior to downloading. A video streaming option can be activated if the system is connected to the clinic network. This option makes it possible to transmit the surgical procedure via LAN/WLAN e.g. to a remote auditorium with any accessible IP address or to a connected mobile device via WiFi.

3.3 Device marking

3.3.1 Labeling on the microscope

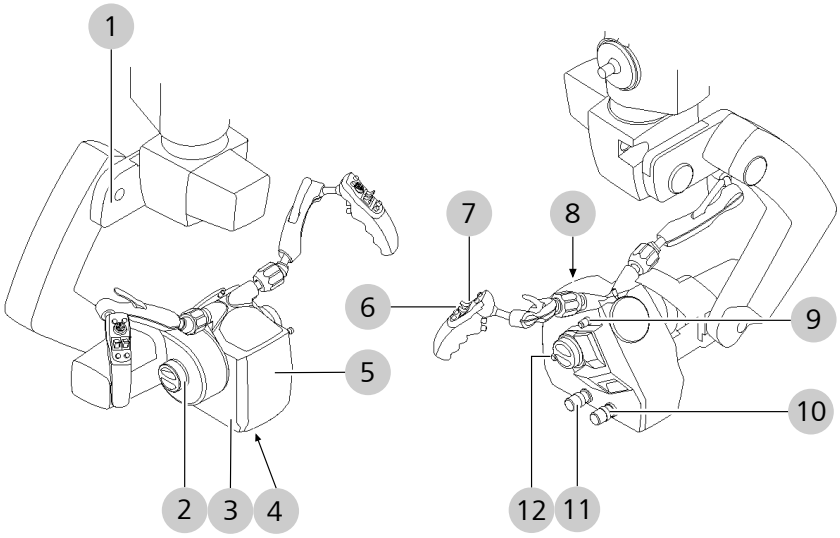


Figure 1: Labeling on the microscope

Item	Symbol	Explanation
1		Max. load 6 kg
2		Open, right/left co-observation port
3		Warning of laser beam (labeling for autofocus option)
4	Varioskop	Brand name

Item	Symbol	Explanation
5	ZEISS	Brand / ZEISS logo
6	**Z**	Zoom
7	**F**	Focus
8	302584-9000-000 XXXXXXXXX	Microscope identification label (inside)
9		Switch over, right/left co-observation port
10		Luminous-field diaphragm
11		Focus/working distance
12		Adjust zoom magnification manually

3.3.2 Rating label/UDI label

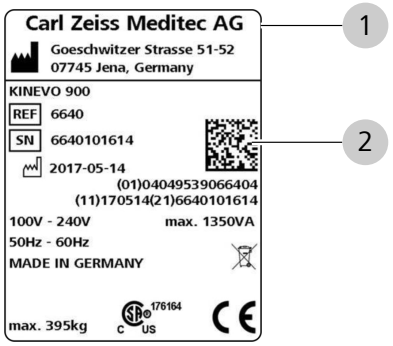


Figure 2: Rating label/UDI label

Item	Explanation
1	Rating label ■ Manufacturer: Carl Zeiss Meditec AG ■ Manufacturer's address: Goeschwitzer Strasse 51 - 52 07745 Jena, Germany ■ Manufacturer symbol: ■ Device name: KINEVO 900 ■ Rated voltage: 100V - 240V ■ Max. connected load: 1350VA ■ Line frequency range: 50Hz - 60 Hz ■ Designation of origin for industrial products: MADE IN GERMANY ■ WEEE mark: ■ CSA mark: 176164 c US ■ CE marking: This medical device is labeled according to Appendix XII of Medical Device Directive 93/42/EEC. ■ Maximum total mass: Max. 395 kg
2	UDI label ■ Machine-readable label (barcode) ■ Date of manufacture, year-month-day ■ UDI Device Identifier (UDI-DI) ■ UDI Production Identifier (UDI-PI)

3.3.3 Labeling on stand, Part 1

Figure 3: Labeling on stand

Item	Symbol	Explanation
1	KINEVO 900	Device name
2	ZEISS	Brand / Logo
3		Seal for drape suction
4		Risk of crushing!
5		Transport position: ■ Observe the Instructions for Use ■ Pushing position ■ General warning

3.3.4 Labeling on stand, Part 2

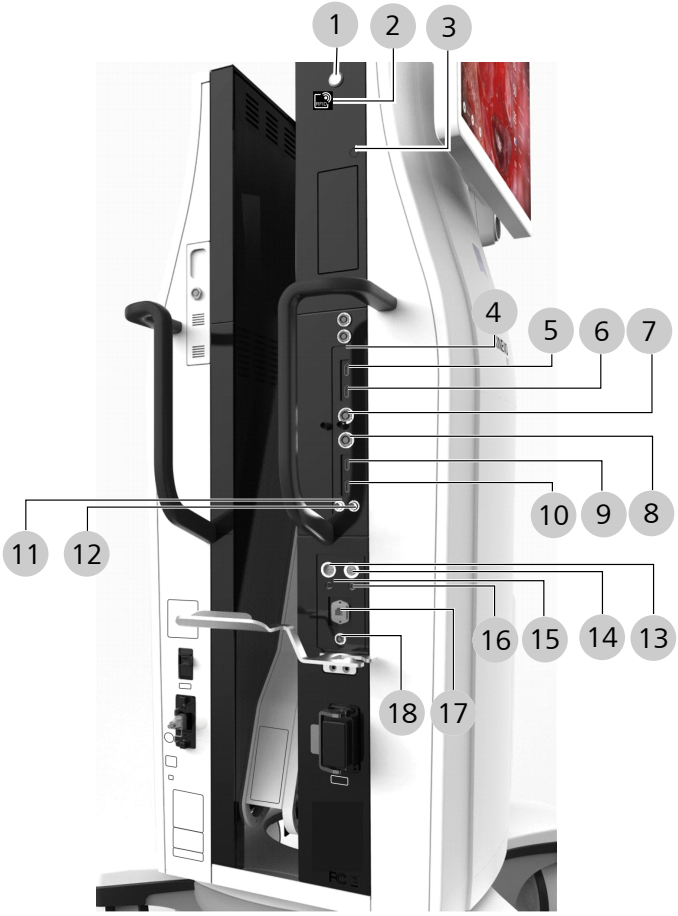


Figure 4:

Item	Symbol	Explanation
1		Standby/ON-OFF switch
2	RFID	RFID capture or reading device
3	**USB OPEN**	Open USB cover
4	4K	Video output: 4K (2x)
5		Video input: Display port
6		Video input: Display port
7		Video input: HDMI / DVI
8		Video output: DVI
9		Video output: Display port
10		Video output: Display port

Item	Symbol	Explanation
11		Video output: HD-SDI / 3G-SDI
12		Video output: HD-SDI / 3G-SDI
13		Remote connector
14		Foot control panel, 14-function
15		Audio out
16		Audio in
17	**LAN**	Ethernet port (LAN)
18		Rock switch

3.3.5 Labeling on stand, Part 3

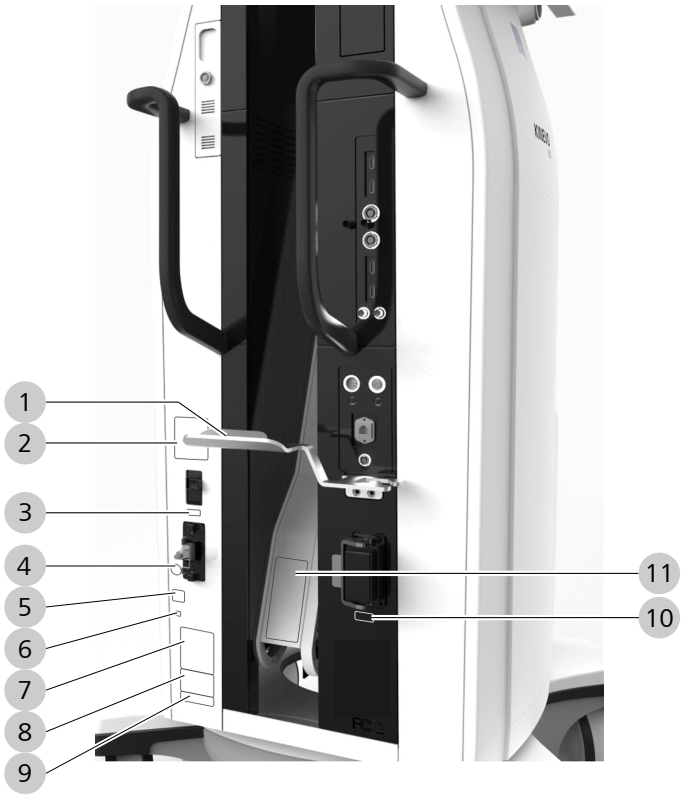
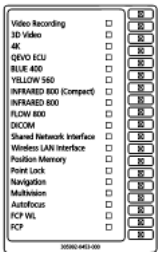


Figure 5: Labeling on stand, Part 3

Item	Symbol	Explanation
1		Risk of crushing!

Item	Symbol	Explanation
2		Rating plate with certification data for INFRARED 800 (option), specifying: ■ Manufacturer ■ License data ■ UDI labeling ■ CE marking
3		Fuse display F1
4		Read and observe the Instructions for Use.
5		Non-ionizing electromagnetic radiation
6		Potential equalization
7		Rating plate with certification data for KINEVO 900, specifying: ■ Manufacturer ■ Device data ■ Power data ■ UDI labeling ■ Type of disposal ■ Total weight ■ CSA mark ■ CE marking
8		SIP label, specifying: ■ Manufacturer ■ Manufacturer's contact details ■ SIP number of device (SIP = Service Identification Program)
9	**664010xxxx**	Serial number of device
10	NAV	Port for navigation system

Item	Symbol	Explanation
11		Identification label, options
		Identification for installed options

3.3.6 Labeling on stand base

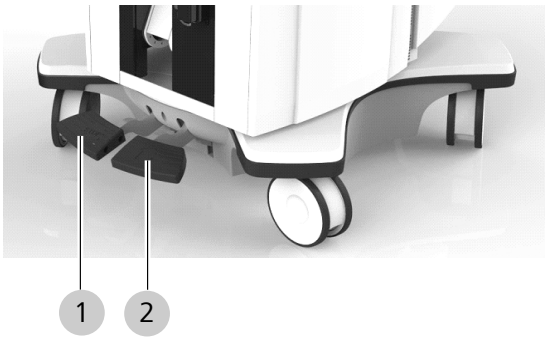


Figure 6:

Item	Symbol	Explanation
1		Pedal locking tabs
2		Straight-ahead travel pedal

3.3.7 Labeling on light source

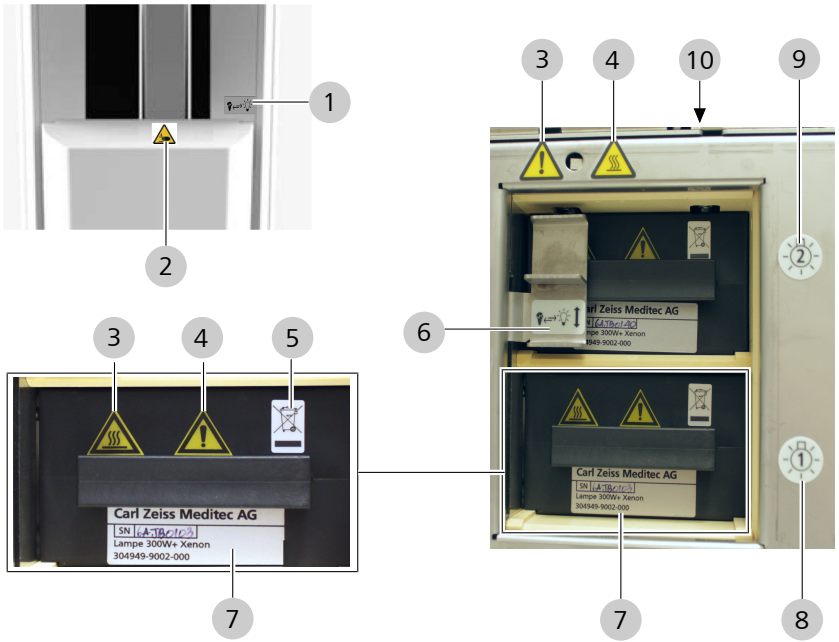
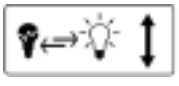
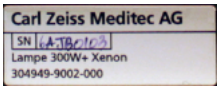
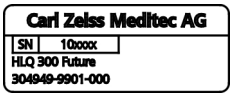


Figure 7: Labeling on light source

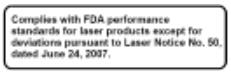
Item	Symbol	Explanation
1		Lamp replacement/manual lamp replacement (removal of light source cover)
2		Risk of crushing!
3		Hot surface
4		General warning
5		“Observe disposal regulations” label Do not dispose of electrical or electronic devices along with normal domestic waste.
6		Manual lamp change
7		Identification label, lamp 30W+ xenon
8		Light 1

Item	Symbol	Explanation
9		Light 2
10		Identification label, “HLQ 300 Future” light source

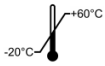
3.3.8 Labeling for autofocus option

Figure 8: Labeling for autofocus option

Item	Symbol	Explanation
1		Warning of laser beam
Country-specific labels: Class 2 laser - laser radiation - Do not look into the beam or view directly with optical instruments		
2		German label: Class 2 laser
3		Spanish label: Class 2 laser
4		English label: Class 2 laser

Item	Symbol	Explanation
5		French label: Class 2 laser
6		US label: Class 2 laser

3.3.9 Labeling on packaging

Symbol	Symbol	Explanation
	Indication of direction “This side up"	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 at a temperature range of min. -20°C to max. +60°C.
	Packing unit	Specification of the number of packing units
	Permissible relative 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.
KINEVO 900		Device name
		Brand / Logo
		Min. 1.2 m forklift length

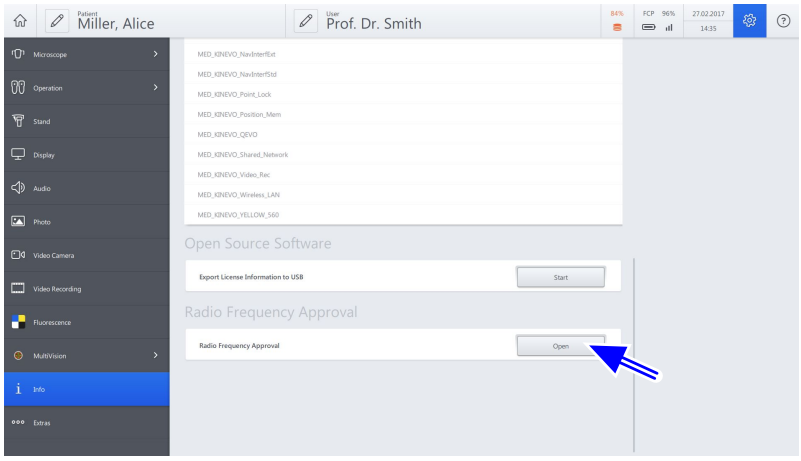
Symbol	Symbol	Explanation
	Center of gravity	Indicates the package's center of gravity.
		Shockwatch
		Tiltwatch

Table 1: Symbols for transport and storage

3.3.10 Displaying radio frequency approvals on the monitor

Action

1. Tap on ⚙ Settings ⟶ **i** Info.



2. Scroll down in the "Info menu": Open ⟶ Radio Frequency Approval.
   ⇨ The markings of the existing radio frequency approval are displayed.
3. Scroll down in the "Radio Frequency Approval" display.
4. Close the "Radio Frequency Approval" display by tapping on the black surface next to the display.

3.4 Structure of the device

3.4.1 Device overview

Figure 9: Device overview

1	Main monitor (touchscreen)	2	Vertical arm
3	Horizontal arm	4	Microscope suspension
5	Microscope	6	Console
7	Lamp housing	8	Stand base
9	Connector panel	10	Transport handle, 2x
11	Second monitor (option)		

3.4.2 Overview of connector panel

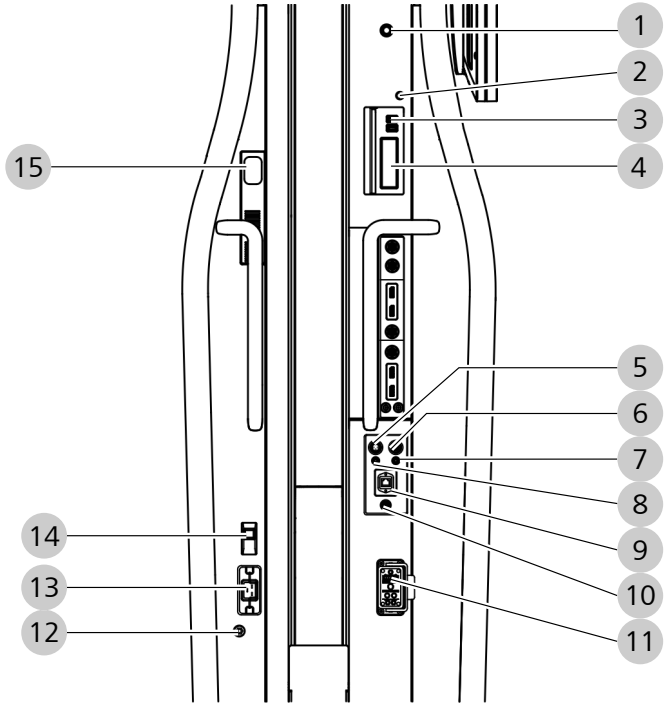


Figure 10: Overview of connector panel

Item	Symbol	Name
1	I/0	Powering the device up and down
2	USB OPEN	Open USB cover
3	2 x USB 3.0	USB port (3.0) (2x)
4		Shelf for external USB mini HDD
5		Remote connector (AUX)
6		Connector 14-function foot control panel
7		Audio in
8		Audio out
9	LAN	Ethernet port (LAN)
10		Rocker foot switch connector
11	NAV	Port for navigation system
12		Potential equalization: For connecting the system to the potential equalization system in compliance with IEC 60601-1.

Item	Symbol	Name
13		Power inlet socket
14		Automatic circuit breaker
15		Connection socket for hand-held, digital exploration tool QEVO

3.4.3 Overview of video connector panel

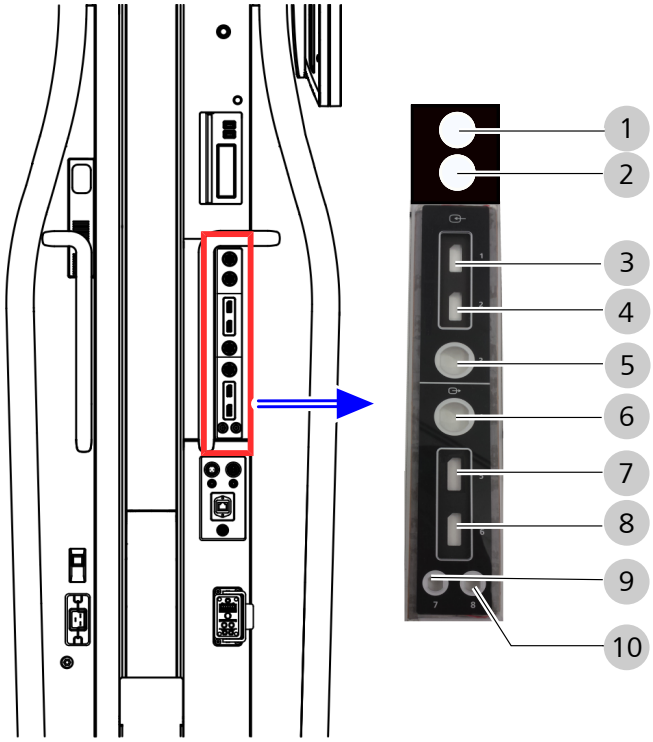


Figure 11: Overview of video connector panel

Item	Symbol	Type	Use
1	4 K	Video output	4 K: Video output, left
2	4 K	Video output	4 K: Video output, right
3		Video input: Display port	Connection of navigation video source for MultiVision overlay
4		Video input: Display port	
5		Video input: HDMI / DVI	Video input for external endoscope camera

Item	Symbol	Type	Use
6		Video output: DVI	■ 2D/3D for stereo option ■ Live full screen/endo/PIP ■ Touchscreen imaging
7		Video output: Display port (stereo)	Camera signal video output, e.g. also for external monitor (option)
8		Video output: Display port (mono)	2D live image touchscreen, mono left
9		Video output: HD-SDI / 3G-SDI	Live camera image (corresponds to eyepiece view) with MultiVision overlay (option) Mono camera (HD): Video output, left Stereo camera (3D HD): Video output, left
10		Video output: HD-SDI / 3G-SDI	Live camera image (corresponds to eyepiece view) with MultiVision overlay (option) HD-SDI (1080i) 3G-SDI (1080p) Stereo camera (3D HD): Video output, right

3.4.4 Overview of microscope

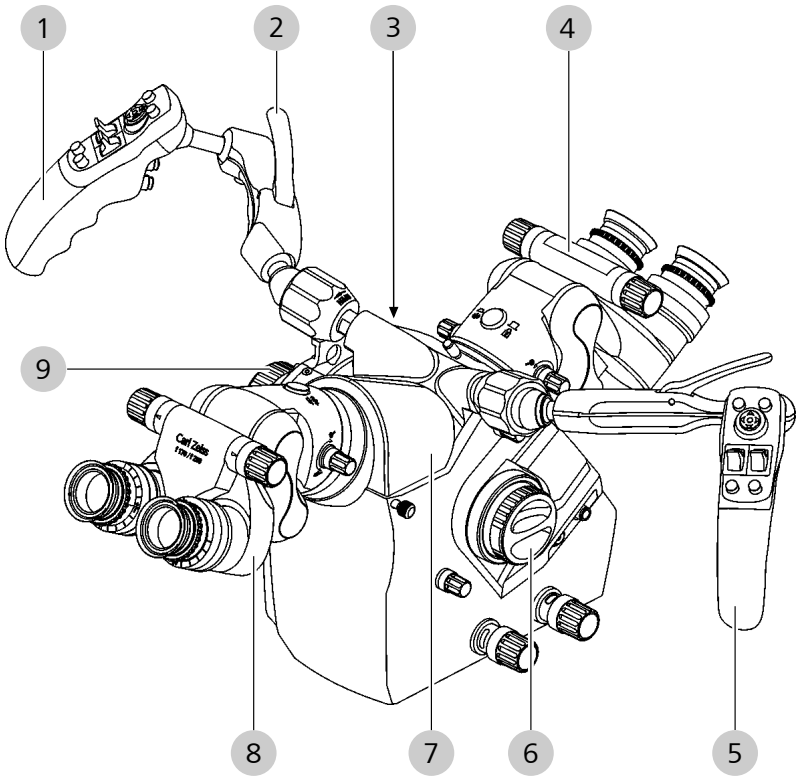


Figure 12: Overview of microscope

1	Left hand grip	2	Hand grip clamp
3	Microphone	4	Assistant tube (face-to-face)
5	Right hand grip	6	Right co-observation port
7	Angle optics	8	Tube for surgeon
9	Left co-observation port		

3.4.4.1 Configuration options

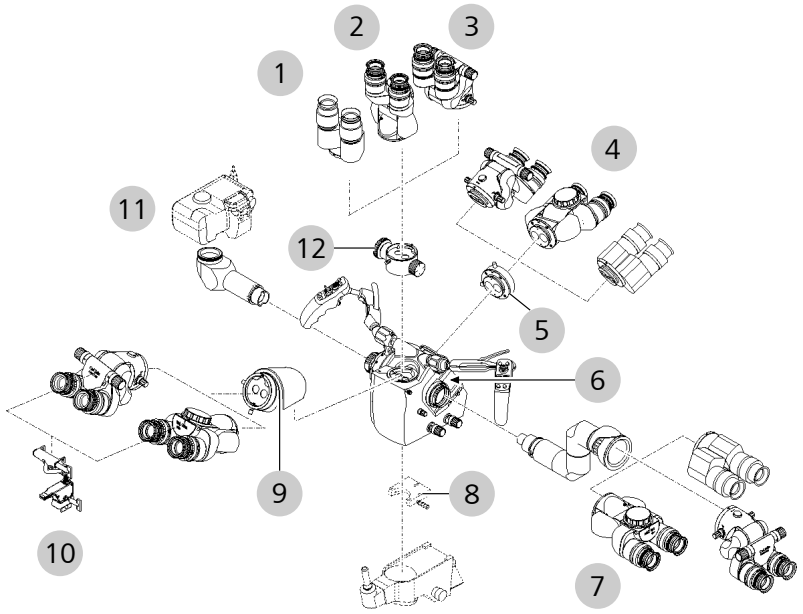


Figure 13: Configuration options

1	Straight binocular tube	2	Tiltable binocular tube
3	Folding binocular tube	4	Tubes for face-to-face viewing (items 1, 2, 3)
5	Rotating adapter	6	Navigation system antenna connector
7	Stereo co-observation module with tubes (items 1, 2, 3)	8	Adapter plate for connecting laser micromanipulator
9	Angle optics*	10	Mouth switch
11	Photo adapter for DSLR	12	Magnification changer, 3-position*

* When assembling the microscope, be careful not to mount the 3-position magnification changer (item 12) and the angle optics (item 9) on the microscope body at the same time. In this case, the microscope body would be too heavy for the autobalance function.

3.4.4.2 Overview of binocular tubes

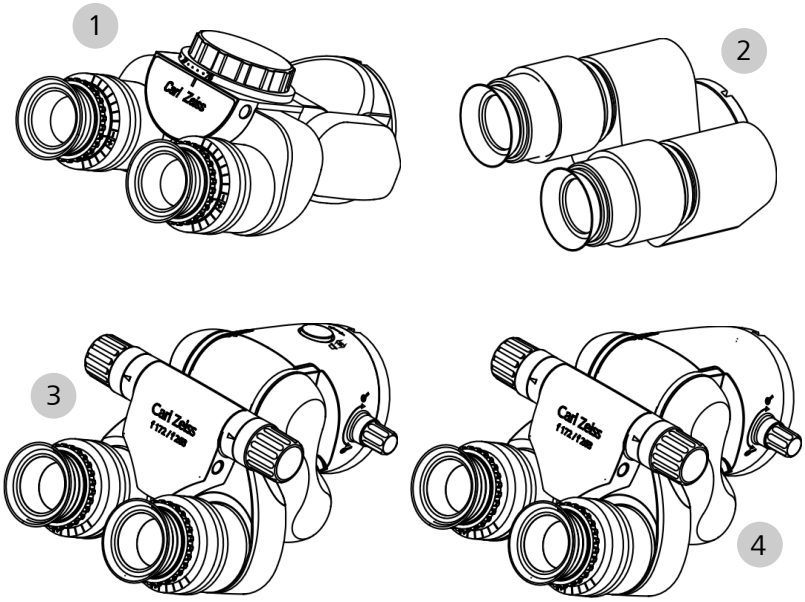


Figure 14: Binocular tubes

1	180° tiltable tube, focal length f= 170 mm	2	Straight tube, focal length f= 170 mm
3	Foldable tube, focal length f= 170/260 mm	4	Foldable tube for mouth switch, focal length f=170/260 mm

3.4.4.3 Widefield eyepiece (10x or 12.5x)

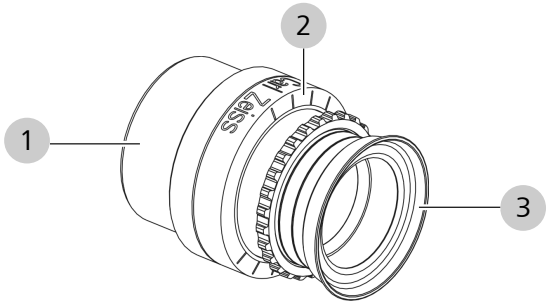


Figure 15: Widefield eyepiece (10x or 12.5x)

1	Magnetic coupling	2	Diopter scale
3	Eyecup		

3.4.4.4 Stereo co-observation module

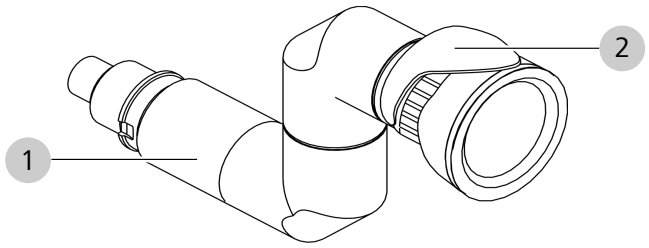


Figure 16: Stereo co-observation module

1	Stereo co-observation module with 2 pivot joints
2	Locking lever

3.4.4.5 Additional Light

Schematic of shadow adjustment via additional illumination
The additional illumination can be activated via the touchscreen.

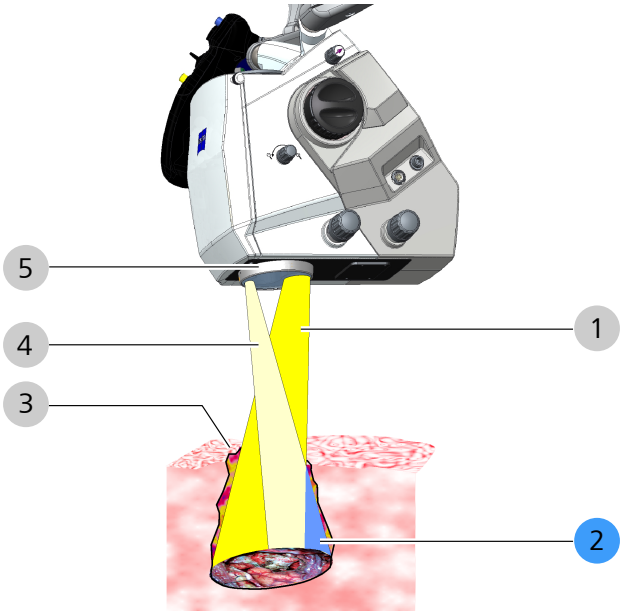


Figure 17: Additional Light

1	Main illumination	2	Shaded area of main illumination
3	Surgical field	4	Special illumination to brighten shadows
5	Objective lens of surgical microscope		

3.5 Control elements and displays

3.5.1 Screen keyboard

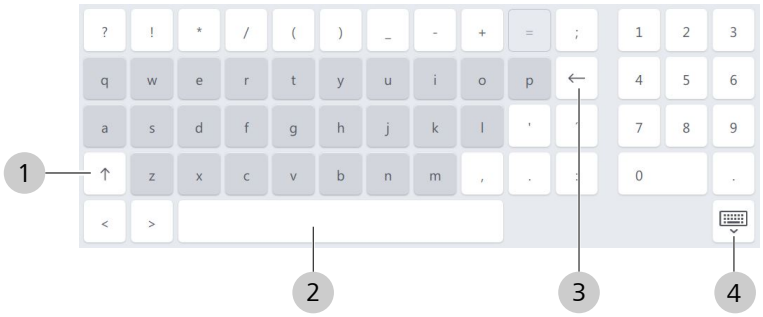


Figure 18: Screen keyboard key assignment

Item	Name	Explanation
1	Shift key	Switches between upper-case and lower-case letters.
2	Space key	-
3	Delete key	Deletes the character to the left of the cursor.
4	Close	Ends the input and closes the screen keyboard.

3.5.2 Display: Editing

A rotating editing symbol appears during editing. A load symbol is displayed while larger amounts of data are being saved, imported or exported.

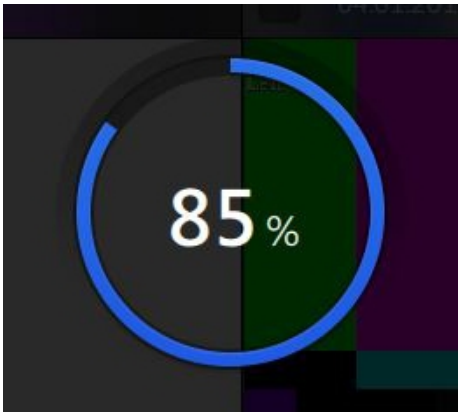


Figure 19: Progress display

During longer editing periods, the percentage display flashes inside the circle symbol.

3.5.3 Online help

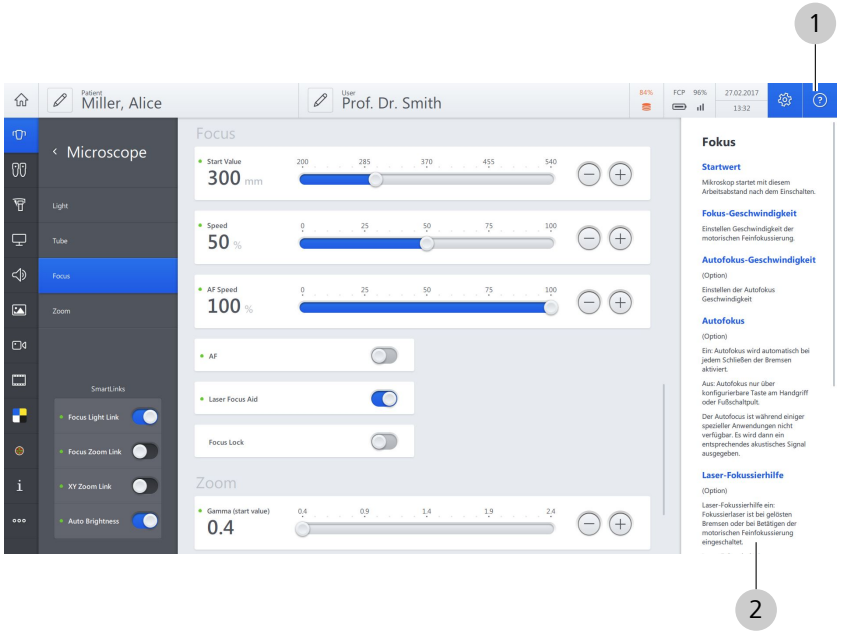


Figure 20: Call-up and display of online help

Item	Symbol	Name	Explanation
1	?	Button [Online help]	Tapping on the ? button opens the Help window on the right side.
2		Help menu	If the entire help text is not displayed, scroll down on the touchscreen.

The content of the Help window adapts to the respective opened menu. To close the Help window, tap on the [Online help] button again.

3.5.4 Error messages on the monitor

Information on a problem occurring during operation is detected automatically and displayed as an error message. The device saves this error message in a log file which can be exported (Settings - Extras - Export Log Files).

NOTE

Error messages on the monitor!

If a malfunction occurs during operation, a corresponding error message is displayed on the monitor.

- ▶ If an error occurs that you cannot correct with the aid of the chapter “What to do in the event of malfunctions”, label the device as out of order and contact ZEISS Service.

Figure 21: Error message on the monitor

Prerequisite

☑ Error message appears on the monitor

Action

1. Carefully read through the error message and follow the instructions displayed therein.
2. Acknowledge the error message either directly on the monitor or by pressing the center joystick button on the **left** handgrip.
3. If the error message appears on the monitor again and the problem persists, export the log file and contact your responsible ZEISS Service organization.

3.5.5 Controls on the microscope

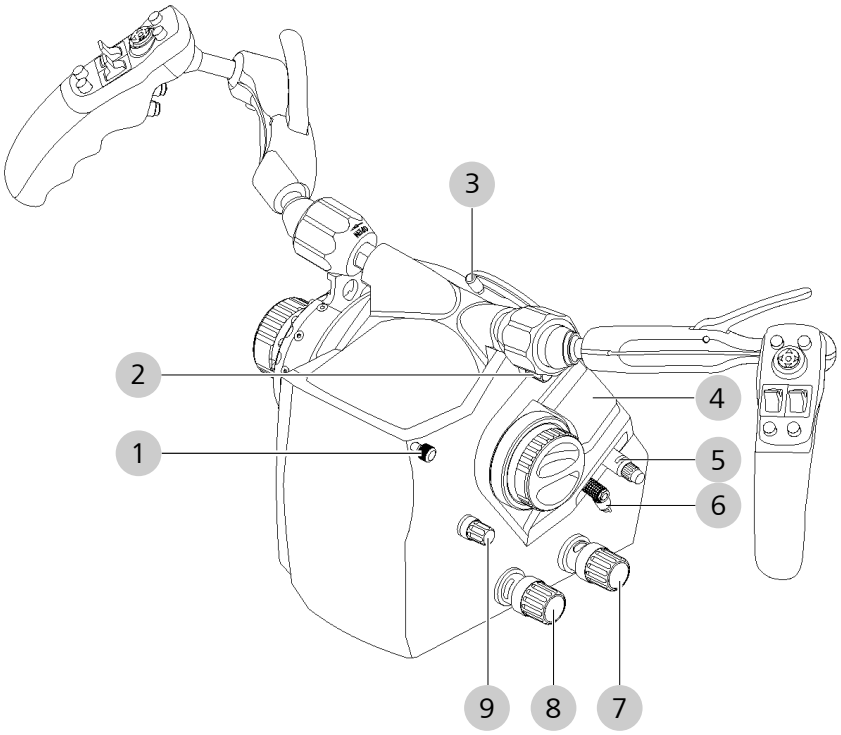


Figure 22: Controls on the microscope

Item	Symbol	Name	Explanation
1		Fastening screw	Attach the assembly: Tighten the fastening screw hand-tight.
2		Adjust pivoting mirror	Image outputs: Face-to-face image outputs: Right and left.
3		Fastening screw	Attach the assembly: Tighten the fastening screw hand-tight.
4		Socket (under cover)	Antenna connector (external navigation system accessory).
5		Camera release socket	For shutter release of an external camera.
6		Mouth switch socket	For connecting the optional mouth switch.
7		Adjust luminous field diameter manually	Turn CCW:Larger Turn CW: Smaller
8		Adjust focus/ working distance manually	Turn CCW: Larger Turn CW: Smaller

Item	Symbol	Name	Explanation
9		Adjust zoom magnification manually	Turn CCW: Smaller Turn CW: Larger

3.5.6 Controls of binocular tubes

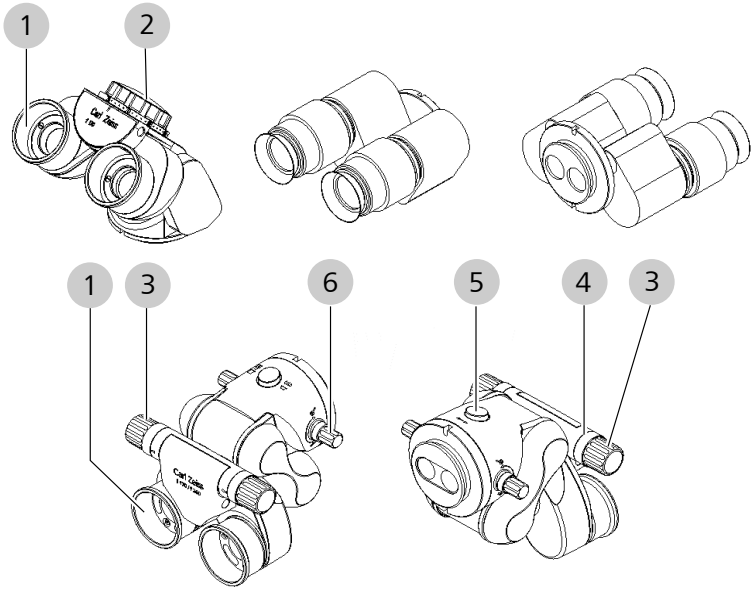
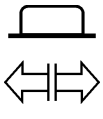


Figure 23: Controls of binocular tubes

Item	Symbol	Name	Explanation
1		Eyepiece mounting	Insert widefield eyepieces into eyepiece mounting as far as they will go.
2		Adjustment wheel for eye distance	Setting the eye distance (interpupillary distance)
3		Adjustment knobs for eye distance	Setting the eye distance (interpupillary distance)
4		Eye distance scale	Display of eye distance (interpupillary distance)
5		Locking device for rotation function	After the locking device is pressed, the tube can optionally be rotated CW or CCW.
6		Adjustment wheel for integrated magnification changer (PROMAG)	Changing to a higher magnification.

3.5.7 Controls for widefield eyepieces

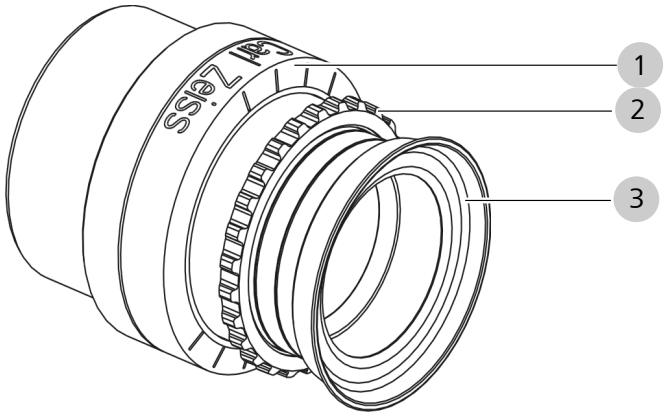


Figure 24: Controls on widefield eyepiece

Item	Name	Explanation
1	Diopter scale	Adjustable from -8 dpt. to +5 dpt.
2	Diopter setting ring	For adjusting the diopter setting.
3	Adjustable eyecup	Prevents the entry of scattered light.

3.5.8 Controls of handgrips

Both handgrips are of the same design. You can configure the left and the right handgrip with the same functions or with different functions.

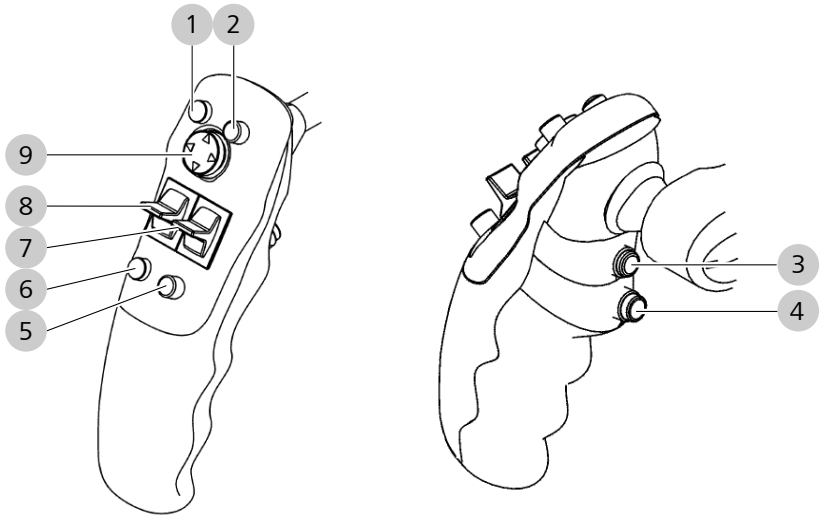


Figure 25: Button assignment of handgrips

Item	Name	Explanation
1	Button **A**, configurable	Factory setting: Take photo

Item	Name	Explanation
2	Button **B**, configurable	Factory setting: Autofocus
3	Brake release button (**SB**)	Brake release button for selected rotary axes and positioning modes (factory setting: stand axes)
4	Brake release button (**AB**)	Brake release button for all stand and microscope axes
5	Button **D**, configurable	Factory setting: Increase illumination intensity
6	Button **C**, configurable	Factory setting: Reduce illumination intensity
7	Rocker switch **G / H**	Zoom + / Zoom - (factory setting)
8	Rocker switch **E / F**	Focus + / Focus - (factory setting)
9	Joystick	Motorized XY fine adjustment Depending on the current operating mode, the joystick of the right handgrip may have certain special functions (see separate description in the corresponding chapters). Messages displayed on the touchscreen can be acknowledged by pressing the center position of the joystick button on the **left** handgrip.

3.6 Software description

3.6.1 General

All menus shown in these Instructions for Use are in English. The name and explanation of each function is specified in the respective language in the following lists.

Optional applications (licenses)

Various applications are available for the device which can be activated after obtaining a license. All licenses must be ordered separately.

Display and operation

Only activated applications are displayed on the touchscreen and can be configured and operated.

User-specific settings

User-specific settings are marked by a green dot placed in front of their designation.
These changes in settings are adopted only for the current user.

Please note the following: In order not to obstruct intraoperative changes of users, do not have the focus and zoom start values set user-specifically.Changes of the focus and zoom start values only become effective after the device is restarted.

3.6.2 Interactive buttons

All interactive buttons and their functions are described in the following table.

Symbol	Button	Explanation
	Live image	Touchscreen with live image, status bar and main menu bar
	Configuration menu (config)	All configurations and settings are accessible via this menu.
	Switch	Function switched on
	Switch	Function switched off
	Button	Triggers a function.
	Controller	Continuously variable The values displayed (SI units) are rounded. They serve only to enhance the display and do not represent a measurement function.

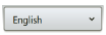
Symbol	Button	Explanation
	+/- buttons	Adjustable in steps
	Record button	Records and saves the current display.
	Video On button	Video recording running
	Video Stop button	Video recording stopped
	Selection field	Selection between functions (blue: selected)
	Functions	Selection of various functions (blue: selected)
	Loudspeaker on button	Switch loudspeaker on
	Loudspeaker off button	Switch loudspeaker off
	PIN lock deactivated	Unlock settings for handgrips and FCP.
	PIN lock activated	Lock settings for handgrips and FCP.
	Selection menu	Selection of various system languages
	Functions	Create new user or patient
	Functions	Edit patient/user profile
	Functions	Filter patient data/filtering direction
	Functions	Search for patient record
	Functions	Import/Export data
	Functions	Hide keyboard
	Functions	Delete

Table 2: Interactive buttons

3.6.3 User interface of the KINEVO 900

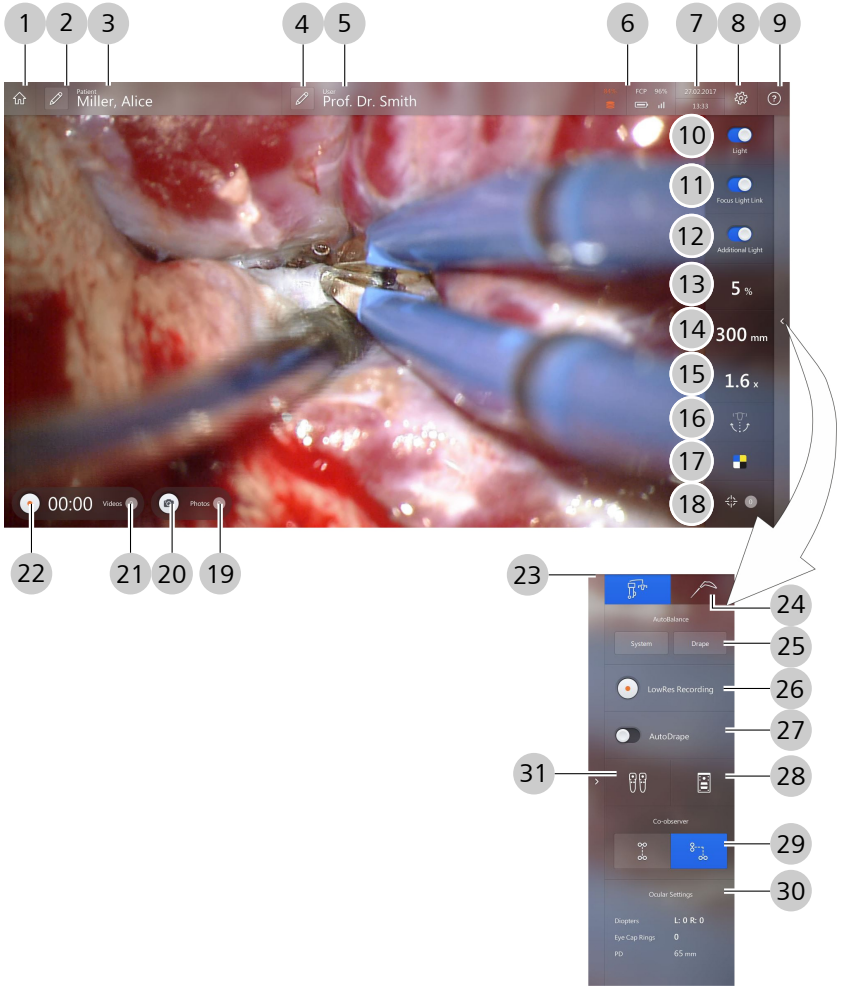


Figure 26: Design of the KINEVO 900 user interface

Item	Name	Explanation
1	Main menu (Home)	Navigation to the main menu with live image, status bar and main menu bar
2	Edit patient data	Used to edit the patient data.
3	Patient	Displays name of current patient, tapping on the button opens the patient directory.
4	Edit user data	Used to edit user data.
5	Physician/user	Displays name of current user, tapping on the button opens the user directory.
6	Status information	Displays current status information, tapping on the button opens an overview [▶ 59].
7	Date, time	Displays current date and time.
8	Configuration menu	Opens the configuration menu.

Item	Name	Explanation
9	Help	Opens the help window on the right-hand edge of the screen.
10	Light	Switch the light on/off.
11	Focus Light Link	Limits the maximum light intensity for the selected working distance.
12	Additional Light	Switch the Additional Light on/off.
13	Light Intensity	Set Light Intensity.
14	Focus speed	Set the speed of the motorized fine focus adjustment.
15	Zoom speed	Set the zoom speed.
16	XY adjustment movement modes	Set the stand and speed movement modes.
17	Fluorescence setting	Select the activated fluorescence modules for BLUE 400, YELLOW 560 and INFRARED 800 with FLOW 800.
18	Position memory	Save position (bookmark) or move to stored position.
19	Number of photos	Displays the number of photos taken.
20	Image recording	Take still image (photo).
21	Number of videos	Displays the number of videos taken.
22	Video recording	Start and stop video recording.
23	Additional menu “Extended operation”	Offers additional adjustment options for the device.
24	Surgical microscope or endoscope	Tap on the [Surgical microscope] button to work only with the device. Tap on the [QEVO] button to switch to the QEVO probing instrument.
25	Autobalance	Tap on the [System] button to balance the device. Tap on the [Drape] button to perform fine balancing with a drape.
26	Video recording with low resolution	Start and stop video recording with fine resolution. Suitable for recording long-term videos.
27	Autodrape	Starts the drape suction automatically. When the RFID label of your SMART-DRAPE has been read-in, the system starts when the drape suction button is tapped.

Item	Name	Explanation
28	Foot control panel	Tap on the button in order to assign functions to the buttons of the foot control panel.
29	Start value of co-observer tube	This value also can be set manually on the microscope body.
30	Settings of current users	Displays the user-specific eyepiece settings.
31	Handgrips	Tap on the button in order to assign functions to the buttons of the handgrips.

All control elements, the status bar and the main menu bar can be hidden by tapping on the live image (full screen mode). Only the video runtime is displayed during a recording in the fullscreen mode. If you tap on the monitor again, all control elements, the status bar and the main menu bar will reappear. The display values (SI units) are rounded. They serve to enhance the display and do not represent a measurement function.

3.6.4 Status information

Figure 27: Status information overview

Item	Symbol	Name	Explanation
1		Internal Hard Drive	Available internal hard disk space
2		USB	Available space on connected USB medium
3	Eject	Remove Hard-ware	The hardware (e.g. USB medium) can be removed now
4		Connection Sta-tus	Wireless FCP connected
5		Battery Status	Charging status of battery in FCP
6		Signal Strength	FCP signal strength
7		Hotspot	Hotspot connection (WiFi) ON/OFF
8		Show Hotspot Password	Hotspot password display ON/OFF
9		Web interface address	Displays the address of the web in-terface

3.6.5 “Patient data” menu

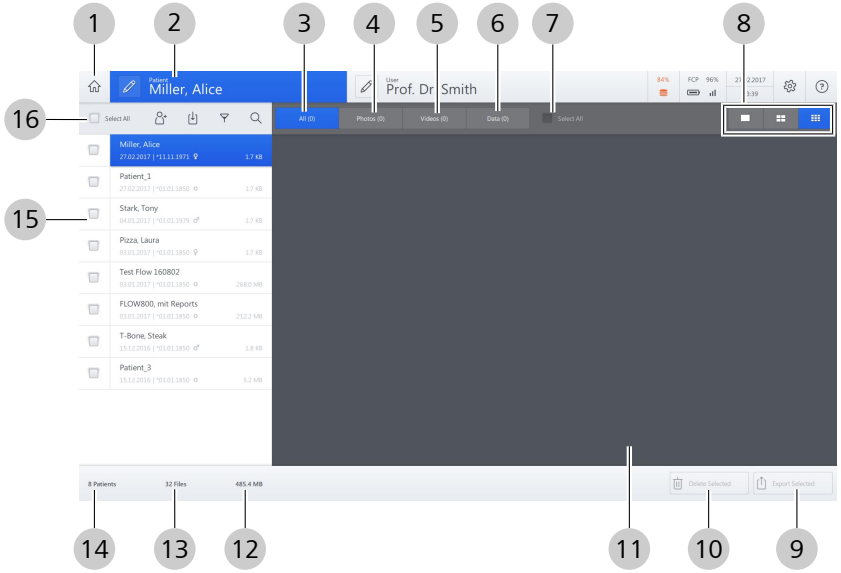


Figure 28: Design of “Patient data” menu

Item	Name	Explanation
1	Main menu (Home)	Navigation to the main menu with live image, status bar and main menu bar
2	Patient	Displays name of current patient, tapping on the button opens the patient directory.
3	All ( )	Displays all of the respective patient’s recorded images, videos and data in the preview window.
4	Photos ( )	Filters the preview window for photos; all of the respective patient’s recorded images are displayed.
5	Videos ( )	Filters the preview window for videos; all of the respective patient’s recorded videos are displayed.
6	Data ( )	Filters the preview window for data; all of the respective patient’s recorded data are displayed (e.g. analysis data from the fluorescence mode INFRARED 800 with FLOW 800).
7	Select All	Selects the entire contents of the respective preview window. This function is used e.g. to export or delete patient data.
8	Preview window display	Determines the size of the images in the preview window (large, medium, small).
9	Export	Exports all selected patient files.
10	Delete	Deletes all selected patient files.

Item	Name	Explanation
11	Preview window	Displays all patient files as thumbnails.
12	Storage volume	Displays the total storage volume of all patient files in the footer bar.
13	Number of files	Displays the total number of all patient files in the footer bar.
14	Number of patients	Displays the total number of all patients in the footer bar.
15	Patient directory	Displays the patient registry on the left side of the monitor.
16	Edit patient directory	Offers five options for working with the patient directory: Select all patients/Add new patients/Import patient files/Sort patients/ Search for patients

3.6.6 “Import patient data from the DICOM Worklist” menu”

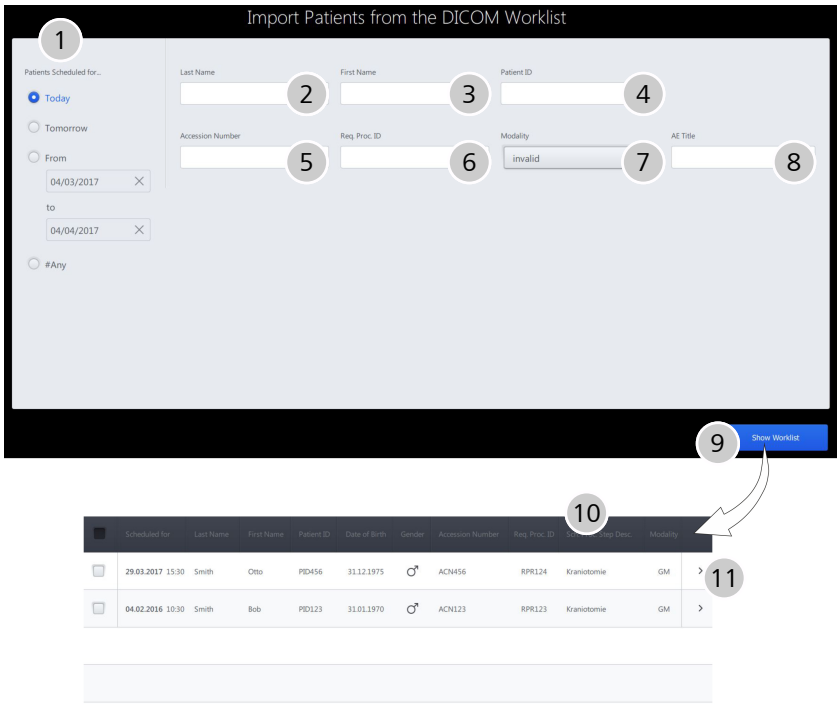


Figure 29: Input mask and DICOM Worklist display window

Item	Name	Explanation
1	Scheduled date	Period of time (selectable) for which the DICOM Worklist is to be called up.
2	Last Name	Patient’s last name.
3	First Name	Patient’s first name.

Item	Name	Explanation
4	Patient ID	Primary hospital identification number for the patient.
5	Accession Number	Department-specific case number which identifies the order for the “imaging Service Request”.
6	Req. Proc. ID	**Requested Procedure ID** Identification number which identifies the procedure requested in the “Imaging Service Request”.
7	Modality	Device type with which the scheduled procedure step is to be performed.
8	AE Title	AE title of the device with which the scheduled procedure step is to be performed.
9	Show Worklist	Tap on button to open the DICOM Worklist.
10	Sch. Proc. Step Desc.	**Scheduled Procedure Step Description** Description specified by the hospital or classification of the scheduled procedure step.
11	Arrow button	Tap on button to display more details about the patient.
-	Req. Proc. Desc.	**Requested Procedure Description** Administrative description specified by the hospital or classification of the requested procedure.
-	Req. Proc. Code	**Requested Procedure Code** Code value that describes the requested procedure according to a specific coding scheme.
-	Ref. Phys. Name	**Referring Physician’s Name** Name of the referring physician who requested the procedure.
-	Sch. Proc. Step Start	**Scheduled Procedure Step Start** Scheduled start time for the procedure step.
-	Sch. Protocol Code	**Scheduled Protocol Code** Code value that describes the scheduled protocol according to a specific coding scheme.

3.6.7 “Edit video recording” menu

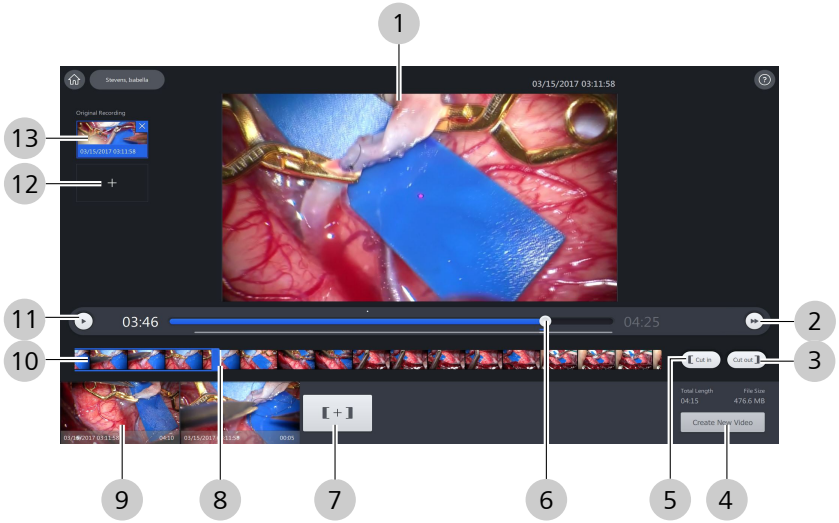


Figure 30: “Edit video recording” menu

Item	Name	Explanation
1	Video recording	Displays the recorded video.
2	Fast forward	Used to run the video recording forward rapidly.
3	Cut out	Determines the end point of the timeline selection window, and therefore of the scheduled video recording.
4	Create New Video	Saves the cut video sequence as a new video.
5	Cut in	Determines the starting point of the timeline selection window, and therefore of the scheduled video recording/display.
6	“Video playback” slide control	The gray slider keeps moving throughout the entire length of the video recording. Slide the gray slider to jump to an interesting area in the video recording without using the [Fast-forward] / [Rewind] buttons.
7	Save video sequence temporarily	Temporarily saves the currently cut video sequence and displays it as a preview.
8	Time marker	Marks the current position in the timeline selection window during video playback.
9	Preview window	Displays the cut video sequence(s).
10	Timeline selection window	Displays the individual sequences/frames of the video. The start and end of the timeline selection window is bounded by blue bars. You can slide these blue bars to select and cut the sequence relevant for you in the video.

Item	Name	Explanation
11	Start / Pause	Plays back the video recording. The playback of the video recording can be stopped by repeatedly tapping on the button.
12	Add Original Recording	Opens a preview window with all original video recordings of the patient.
13	Original Recording	Displays the original video recordings as a preview.

3.6.8 SmartLinks

In the "Settings Microscope" menu, four SmartLinks are available for your selection:

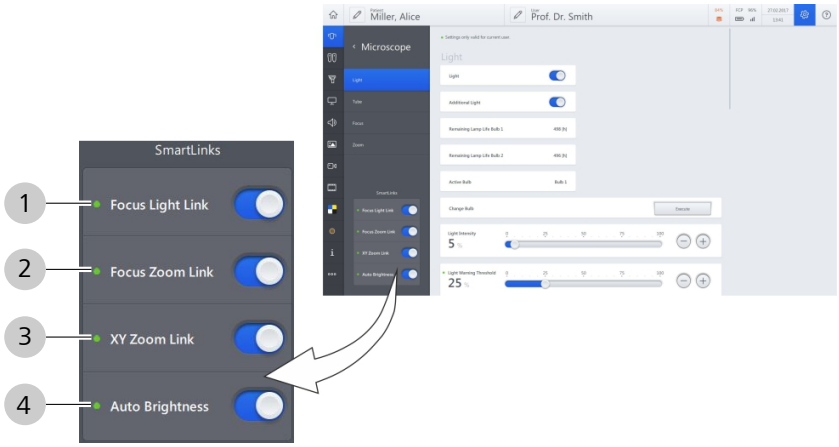


Figure 31: SmartLinks

Item	Name	Explanation
1	Focus Light Link	Limits the maximum light intensity for the selected working distance.
2	Focus Zoom Link	Automatically adapts the focusing speed to the magnification. The preselected focusing speed is automatically reduced when a higher magnification is used.
3	XY Zoom Link	Automatically adapts the XY travel speed to the magnification. The preselected travel speed is automatically reduced when a higher magnification is used.
4	Auto Brightness	Regulates the light intensity for constant brightness in the eyepiece depending on the working distance and magnification. Automatically adapts the luminous field diameter.

3.6.9 Light

In this menu, you configure the microscope illumination settings.

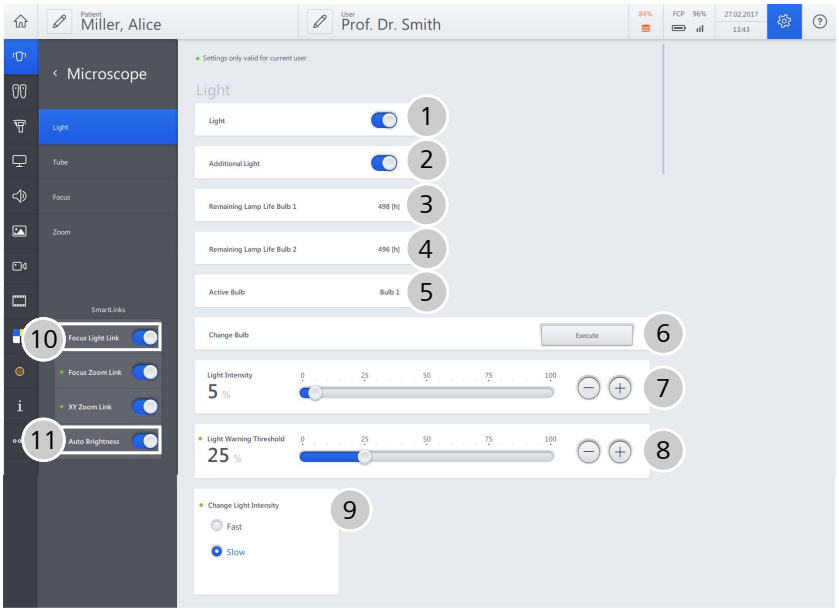


Figure 32: "Settings Microscope" menu, "Light" submenu

Item	Name	Explanation
1	Light	Switch the light on/off.
2	Additional Light	Switch the Additional Light on/off.
3	Remaining lamp operating time Bulb 1	Remaining lamp operating time of bulb 1 until the next recommended bulb change (total lamp operating time = 500 hours)
4	Remaining lamp operating time Bulb 2	Remaining lamp operating time of bulb 2 until the next recommended bulb change (total lamp operating time = 500 hours)
5	Active Bulb	Indicates whether bulb 1 or bulb 2 is in operation.
6	Change Bulb	Activate lamp change from bulb 1 to bulb 2.
7	Light Intensity	Set Light Intensity.
8	Light Warning Threshold	Set light warning threshold (factory setting: 25 %). Display on monitor.
9	Light intensity change	Select speed of light intensity change (fast or slow).
10	SmartLinks: Focus Light Link	Limits the maximum light intensity for the selected working distance.

Item	Name	Explanation
11	SmartLinks: Auto Brightness	Regulates the light intensity for constant brightness in the eyepiece depending on the working distance and magnification. Automatically adapts the luminous field diameter.

3.6.10 Tube

Select the tubes and eyepieces used for the surgeon. The total magnification is calculated with these stored values and displayed on the monitor.

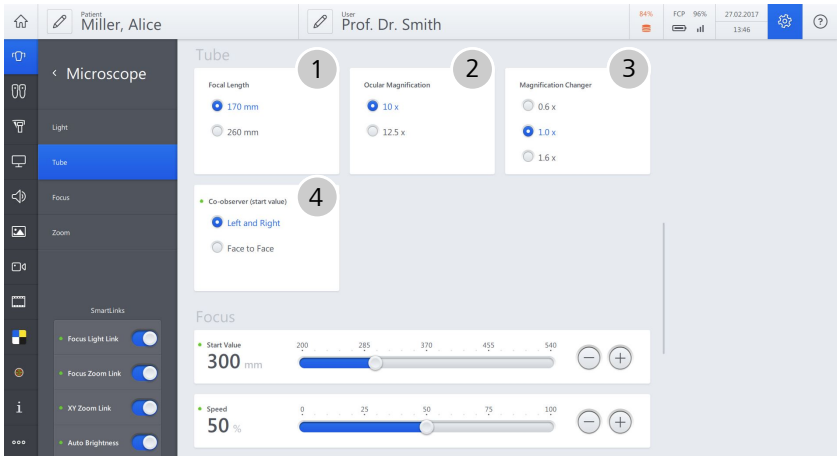


Figure 33: "Settings Microscope" menu, "Tube" submenu

Item	Name	Explanation
1	Focal Length	Focal length of tube used: (170 mm for tiltable tube and foldable tube, 260 mm for foldable tube with magnification).
2	Ocular Magnification	Magnification of the eyepieces used: (10x or 12.5x).
3	Magnification Changer	Magnification of the optional 3-position magnification changer.
4	Co-observer (start value)	Selection of co-observer: ■ Image outputs face-to-face: Face-to-face for tiltable tube or foldable tube ■ Image outputs left and right: Right and left for stereo co-observation module or photo adapter for external camera The "co-observer (start value)" can be adjusted on the monitor in the additional menu "Extended operation" and manually on the microscope body.

3.6.11 Focus

In this menu, you configure the focus settings.

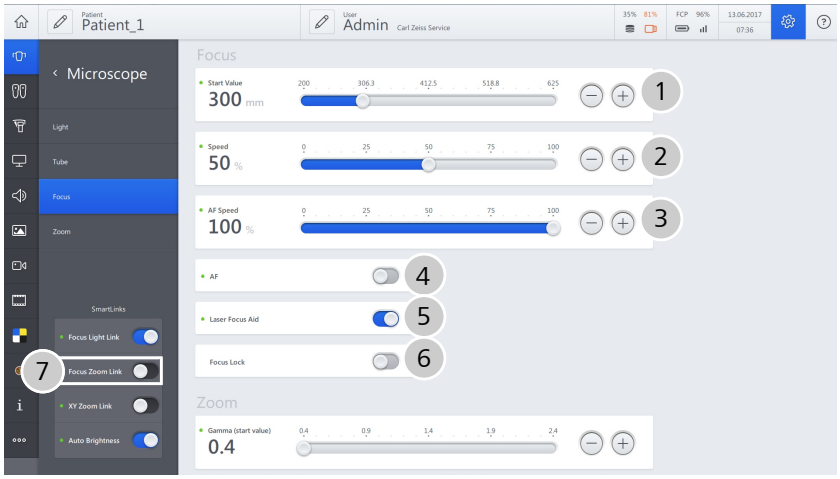


Figure 34: "Settings Microscope" menu, "Focus" submenu

Item	Name	Explanation
1	Start Value	The microscope starts with this working distance after it is switched on.
2	Speed	Set the speed of the motorized fine focus adjustment.
3	Autofocus (AF) Speed	(option) Adjust the autofocus speed.
4	Autofocus (AF)	(option) On: Autofocus is automatically activated each time the brakes are closed. Off: Autofocus only via configurable button on the handgrip or foot control panel. The autofocus is not available during a few specific applications. A corresponding acoustic signal is then emitted.
5	Laser Focus Aid	(option) Laser Focus Aid on: The focusing laser is switched on when the brakes are released or the motorized fine focus adjustment is actuated. Laser Focus Aid off: The focusing laser is switched off.

Item	Name	Explanation
6	Focus Lock	For the application of an optional micromanipulator with a fixed working distance. Focus Lock on: Autofocus out of operation. Focus rocker switch on handgrip/foot switch out of operation. Focus Lock off: Autofocus functioning. Focus rocker switch on handgrip/foot control panel active.
7	Focus Depth	High: High depth of field - less light - lower image resolution. Low: Low depth of field - more light - high image resolution. The [Focus Depth] selection field is **not** displayed when the BLUE 400 and YELLOW 560 options are activated.
8	SmartLinks: Focus Zoom Link	Automatic adaptation of the focusing speed to the magnification. The preselected focusing speed is automatically reduced when a higher magnification is used.

3.6.12 Zoom

In this menu, you configure the zoom settings.

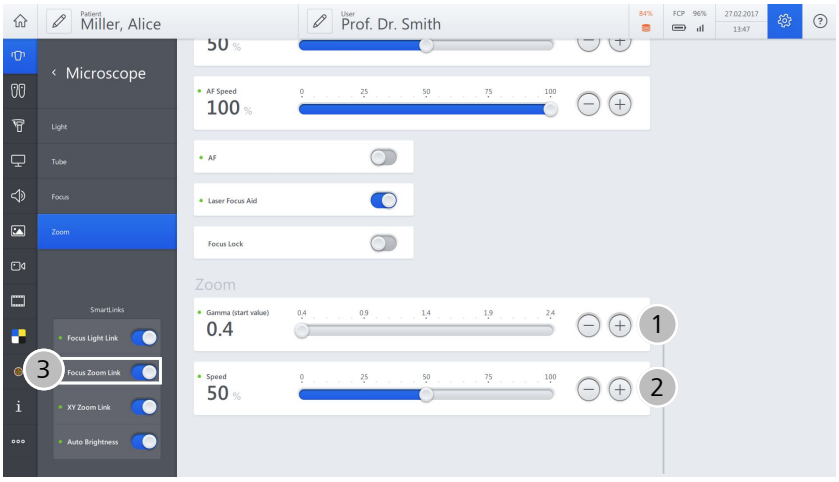


Figure 35: Zoom

Item	Name	Explanation
1	Gamma (start value)	Set the zoom factor (0.4 ... 2.4) at which the zoom system is to start after the device is switched on.
2	Speed	Set the zoom speed.
3	SmartLinks: XY Zoom Link	Automatic adaptation of the motorized XY travel speed to the magnification. The preselected travel speed is automatically reduced when a higher magnification is used.

3.6.13 Handgrips

In this menu, you configure the controls of the handgrips.

Figure 36: "Settings Microscope" menu, "Handgrips" submenu

Item	Name	Explanation
1	Factory settings	Tapping this button resets the programming of all handgrip functions to the factory settings.
2	Selection window, right side	Appears after a handgrip button is tapped: Displays all available functions for each handgrip button.
3	Assign PIN	By activating this button, you can protect your button assignment for the handgrips with a four-digit PIN.
A	Button [A], configurable	Tapping on handgrip button [A] opens a selection window on the right side where the available functions can be selected.
B	Button [B], configurable	Tapping on handgrip button [B] opens a selection window on the right side where the available functions can be selected.
C	Button [C], configurable	Tapping on handgrip button [C] opens a selection window on the right side where the available functions can be selected.
D	Button [D], configurable	Tapping on handgrip button [D] opens a selection window on the right side where the available functions can be selected.

Item	Name	Explanation
S	XY Joystick	For motorized XY fine adjustment The XY joystick of the right handgrip can have certain special functions, depending on the option activated. Messages displayed on the touchscreen can be acknowledged by pressing the center position of the joystick button on the left handgrip.
E	Rocker switch [E] for focus zoom	Tapping on button [E] opens a selection window on the right side for selecting the direction (+/-) or changing the zoom/focus functions.
F	Rocker switch [F] for focus-zoom	Tapping on button [F] opens a selection window on the right side for selecting the direction (+/-) or changing the zoom/focus functions.
G	Rocker switch [G] for zoom-focus	Tapping on button [F] opens a selection window on the right side for selecting the direction (+/-) or changing the zoom/focus functions.
H	Rocker switch [H] for zoom-focus	Tapping on button [H] opens a selection window on the right side for selecting the direction (+/-) or changing the zoom/focus functions.
SB	SB brake handgrip button (Selected brakes)	Tapping on the [SB] handgrip button opens a selection window on the right side where certain brake and movement functions can be selected.
AB	AB brake button (all stand and microscope axes)	As long as [AB] button is pressed, the entire system can move freely. When you let go of the [AB] button, the system locks stably and with vibration damping.

3.6.14 Foot control panel (FCP)

In this menu, you configure the controls of the FCP (foot control panel).

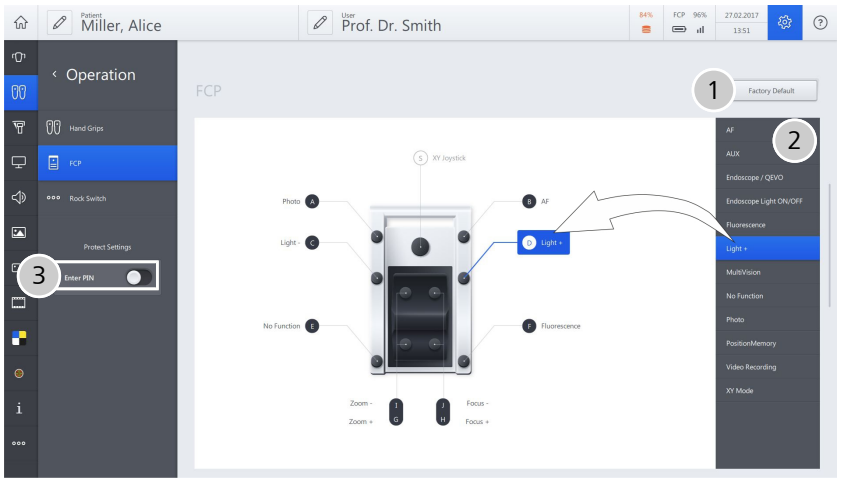


Figure 37: "Settings Microscope" menu, "Handgrips" submenu

Item	Name	Explanation
1	Factory settings	Tapping this button resets the programming of all handgrip buttons to the factory settings.
2	Selection window	Appears after a foot control panel button is tapped: Displays all available functions for each foot control panel button.
3	Assign PIN	By activating this button, you can protect your button assignment for the foot control panel with a four-digit PIN.
S	XY Joystick	Motorized XY fine adjustment.
A	Button [A], configurable	Tapping on foot control panel button [A] opens a selection window on the right side where the available functions can be selected.
B	Button [B], configurable	Tapping on foot control panel button [B] opens a selection window on the right side where the available functions can be selected.
C	Button [C], configurable	Tapping on foot control panel button [C] opens a selection window on the right side where the available functions can be selected.
D	Button [D], configurable	Tapping on foot control panel button [D] opens a selection window on the right side where the available functions can be selected.

Item	Name	Explanation
E	Button [E], configurable	Tapping on foot control panel button [E] opens a selection window on the right side where the available functions can be selected.
F	Button [F], configurable	Tapping on foot control panel button [F] opens a selection window on the right side where the available functions can be selected.
G	Rocker switch [G] for zoom-focus	Tapping on foot control panel button [G] opens a selection window on the right side for selecting the direction or changing the zoom/focus functions.
H	Rocker switch [H] for zoom-focus	Tapping on foot control panel button [H] opens a selection window on the right side for selecting the direction or changing the zoom/focus functions.
I	Rocker switch [I] for focus-zoom	Tapping on foot control panel button [I] opens a selection window on the right side for selecting the direction or changing the zoom/focus functions.
J	Rocker switch [J] for focus-zoom	Tapping on foot control panel button [J] opens a selection window on the right side for selecting the direction or changing the zoom/focus functions.

3.6.15 Rock switch

In this menu, you configure the controls of the rocker foot switch.

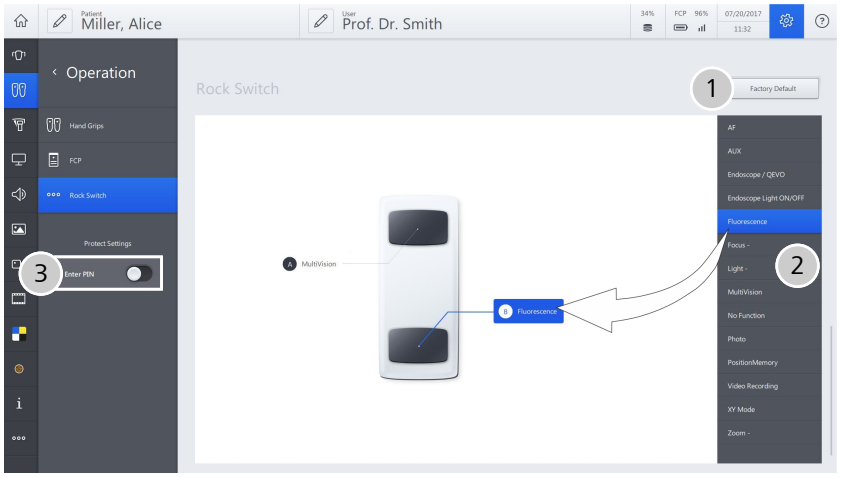


Figure 38: "Settings Microscope" menu, "Rocker foot switch" submenu

Item	Name	Explanation
1	Factory settings	Tapping this button resets the programming of the rocker foot switch to the factory settings.
2	Rocker foot switch, configurable	Appears after rocker foot switch is tapped: Displays all available functions for each rocker foot switch button: When the following functions are selected for a rocker foot switch, the second rocker foot switch is automatically assigned: ■ Light: Light brighter (top button) / darker (bottom button) ■ Zoom: + (top button) / - (bottom button) ■ Focus: + (top button) / - (bottom button)
3	Assign PIN	By activating this button, you can protect your button assignment for the rocker foot switch with a four-digit PIN.

3.6.16 Stand

In this menu, you configure the movement modes, the park position and the drape position.

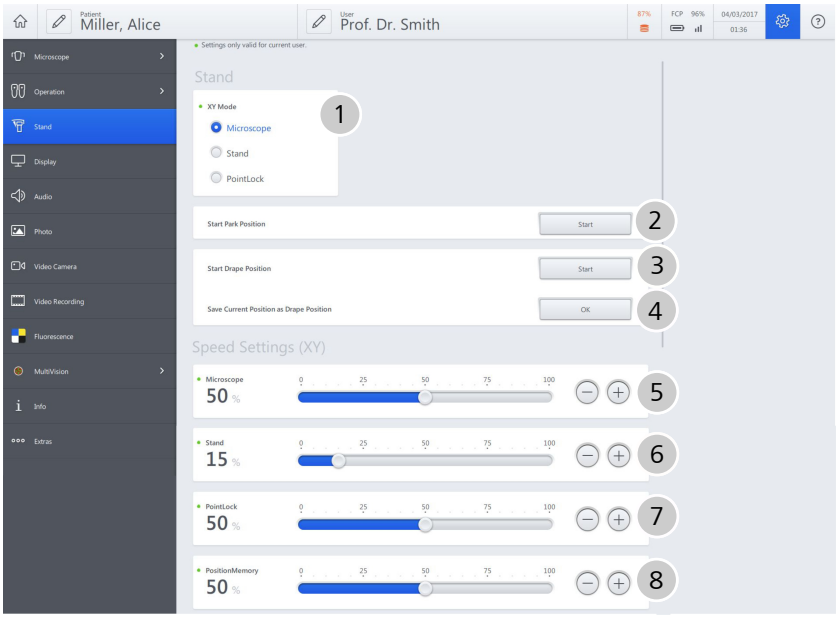


Figure 39: "Settings Stand" menu

Item	Name	Explanation
1	XY Mode	Selection of the movement modes for motorized fine adjustment using the joystick on the handgrip or on the foot control panel: ■ Microscope movement only in three axes ■ Stand, XY movement in the focal point plane ■ PointLock, adjustment around the focal point
2	Start Park Position	Device moves to park position.
3	Start Drape Position	Device moves to drape position.
4	Save Current Position as Drape Position	Save drape position.
5	Microscope	Preselect speed.
6	Stand	Preselect speed.
7	PointLock	Preselect speed.
8	PositionMemory	Preselect speed.

3.6.17 Displays

In this menu, you configure the settings of the video outputs.

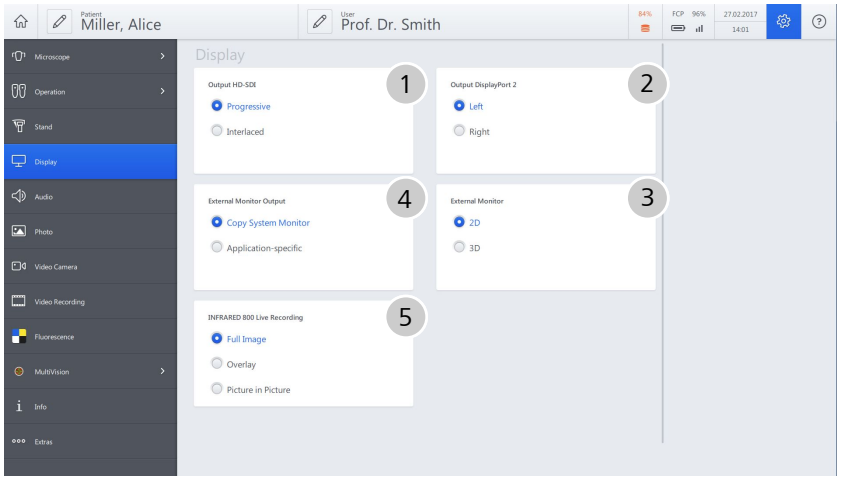


Figure 40: "Settings Display" menu

Item	Name	Explanation
1	Output HD-SDI1	Selection window: ■ Progressive 3G-SDI: Full Image ■ Interlaced HD-SDI Video output: 9 or 10
2	Output Display Port 2	Selection window: ■ Left camera ■ Right camera Video output: 7 or 8
3	External monitor DVI	Camera signal video output, e.g. also for external monitor (option). Video output: 6
4	External Monitor Output	Selection window - Display on external monitor: ■ Touchscreen copy ■ Application-specific Video output: 6
5	INFRARED 800 Live Display	Selection window: Touchscreen imaging ■ 2D/3D for stereo option ■ Live Full Screen/Endo/PIP ■ Picture in picture display Video output: 6

3.6.18 Audio

In this menu, you configure the audio settings.

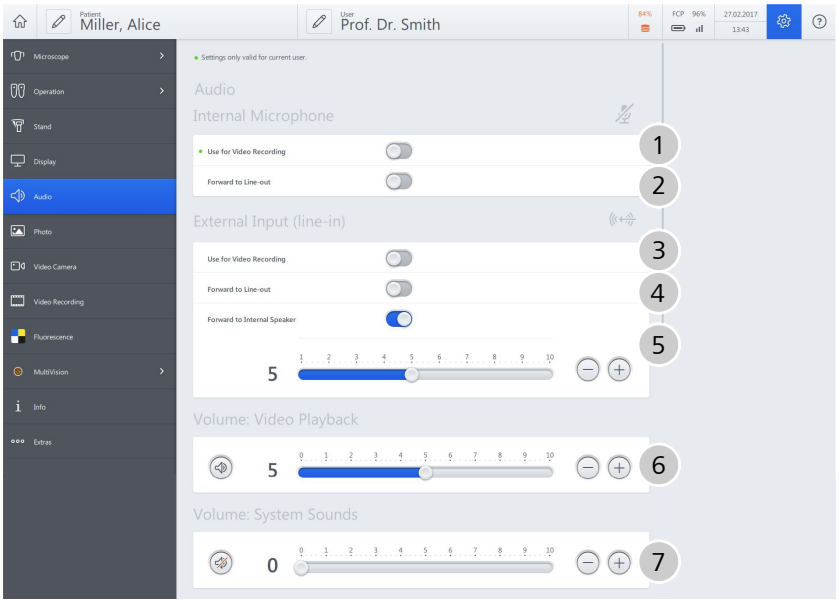


Figure 41: "Settings Display" menu

Item	Name	Explanation
1	Internal Microphone: Use for video recording	Switch microphone on/off.
2	Internal Microphone: Forward to line-out	Switch microphone on/off.
3	External Input (line-in): Use for video recording	Switch microphone on/off.
4	External Input (line-in): Forward to line-out	Switch microphone on/off.
5	External Input (line-in): Forward to internal loudspeaker	Switch microphone on/off. Adjust volume.
6	Volume: Video Playback	Switch playback on/off. Adjust volume.
7	Volume: System Sounds	Switch playback on/off. Adjust volume.

3.6.19 Photo

In this menu, you configure the photo settings.

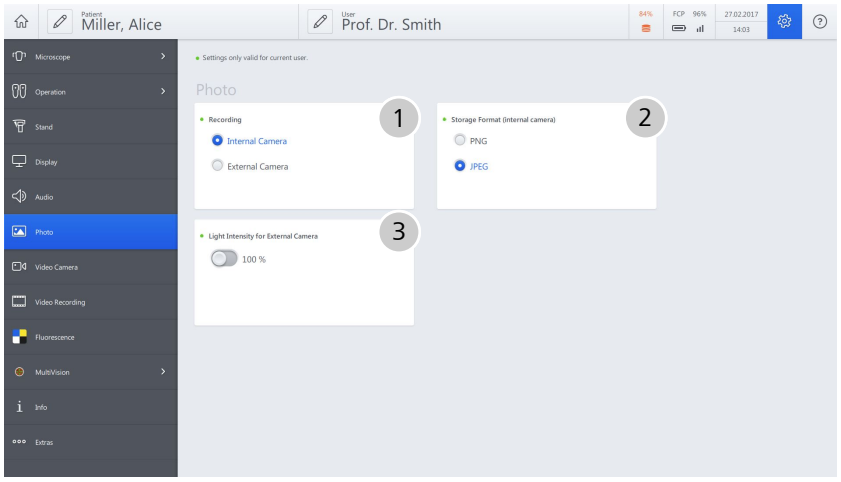


Figure 42: "Settings Photo" menu

Item	Name	Explanation
1	Exposure	Selection: ■ Single images with internal video camera ■ Images with external photo camera (DSLR, option)
2	Storage format of internal camera	Storage format for images taken: ■ PNG format ■ JPEG format
3	Light intensity for external camera	Utilization of maximum xenon light output (100%) for taking photos.

3.6.20 Video camera

In this “White Light” menu, you configure the settings of the video camera. You can optionally configure the video settings for BLUE 400 and YELLOW 560.

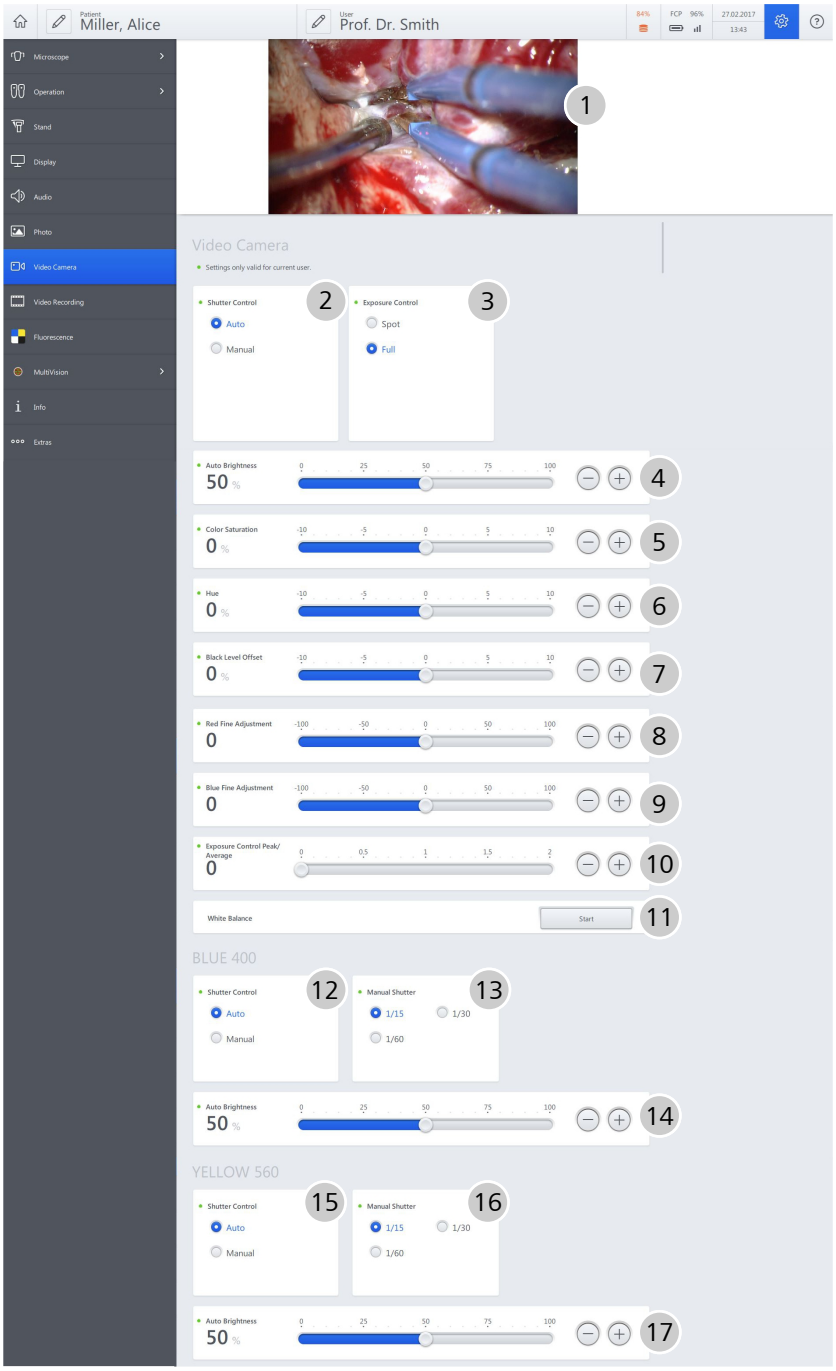


Figure 43: “Settings Video Camera” menu

Item	Name	Explanation
1	Preview window	Video image for checking the settings.

Item	Name	Explanation
2	Shutter control	Selection in the shutter control: ■ Auto: Automatic control of the exposure time ■ Manual: Manual control of the exposure time
3	Exposure Control	Selection of exposure control: ■ Spot: Exposure control in image center Suitable for working in narrow channels. ■ Full: Exposure control in the entire image For a completely illuminated surgical field or strong local reflections.
4	Auto Brightness	Set the brightness level of the automatic brightness control. This field appears only if the shutter control was set to “Auto” (Item 2).
5	Color Saturation	Set the color saturation.
6	Hue	Set the hue.
7	Black Level Offset	With a higher black level, dark image details are displayed brighter. This can lead to an enhanced recognizability.
8	Red Fine Adjustment	Set the red value.
9	Blue Fine Adjustment	Set the blue value.
10	Exposure Control Peak/Average	Set the peak value or the average value.
11	White balance	Start white balance.
12	Shutter Control BLUE 400	Selection in the BLUE 400 brightness mode: ■ Auto: Automatic control of the exposure time ■ Manual: Manual control of the exposure time
13	Manual Shutter BLUE 400	Set the desired exposure time for BLUE 400 manually. This field appears only if the BLUE 400 shutter control was set to “Manual” (Item 12).
14	Auto Brightness BLUE 400	Set the brightness level of the automatic brightness control for BLUE 400. This field appears only if the BLUE 400 shutter control was set to “Auto” (Item 12).

Item	Name	Explanation
15	Shutter Control YELLOW 560	Selection in the YELLOW 560 brightness mode: ■ Auto: Automatic control of the exposure time ■ Manual: Manual control of the exposure time
16	Manual Shutter YELLOW 560	Set the desired exposure time for YELLOW 560 manually. This field appears only if the YELLOW 560 shutter control was set to “Manual” (Item 15).
17	Auto Brightness YELLOW 560	Set the brightness level of the automatic brightness control for YELLOW 560. This field appears only if the YELLOW 560 shutter control was set to “Auto” (Item 15).

3.6.21 Video recording

In this menu, you configure the settings for video recordings.

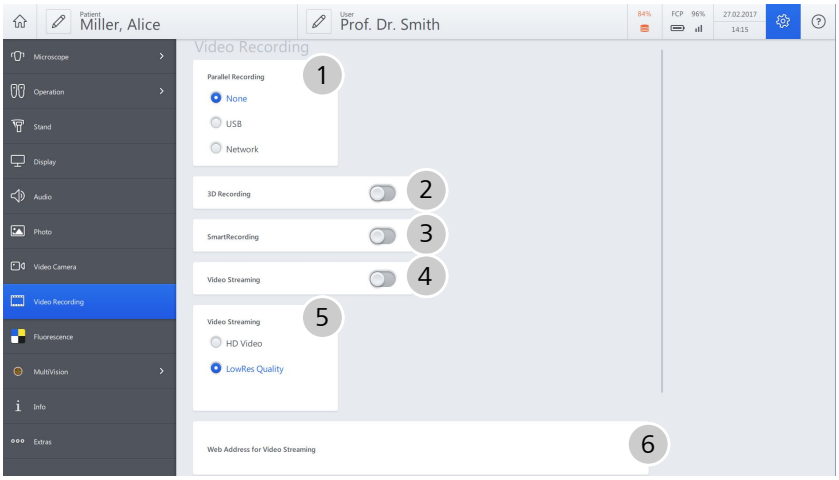


Figure 44: “Settings Video Recording” menu

Item	Name	Explanation
1	Parallel Recording	The data are always stored on the internal hard drive. In addition, parallel storage on a connected USB storage medium or a configured network drive (USB or network drive) also is possible.
2	3D recording	Option for a stereo video camera. Selection whether the internal recording is to be made in 3D format (ON).

Item	Name	Explanation
3	Smart Recording	If activated (ON), this function enables the user to create a video clip (via the video recording handgrip button/FCP) with a start time that lies in the past.
4	Video Streaming	Activates video streaming (LAN or WLAN); the source for the video streaming can be selected under item 1.
5	Video Streaming	Selection of video resolution. ■ HD Video: High resolution (1920 x 1080) ■ LowRes Video: Low resolution (960 x 540)
6	Web address for video streaming	Entry of intended web address for video streaming.

3.6.22 Fluorescence

(Option) Fluorescence settings for BLUE 400, YELLOW 560 and INFRARED 800 with FLOW 800.
Only activated fluorescence options are displayed on the touchscreen and can be configured.

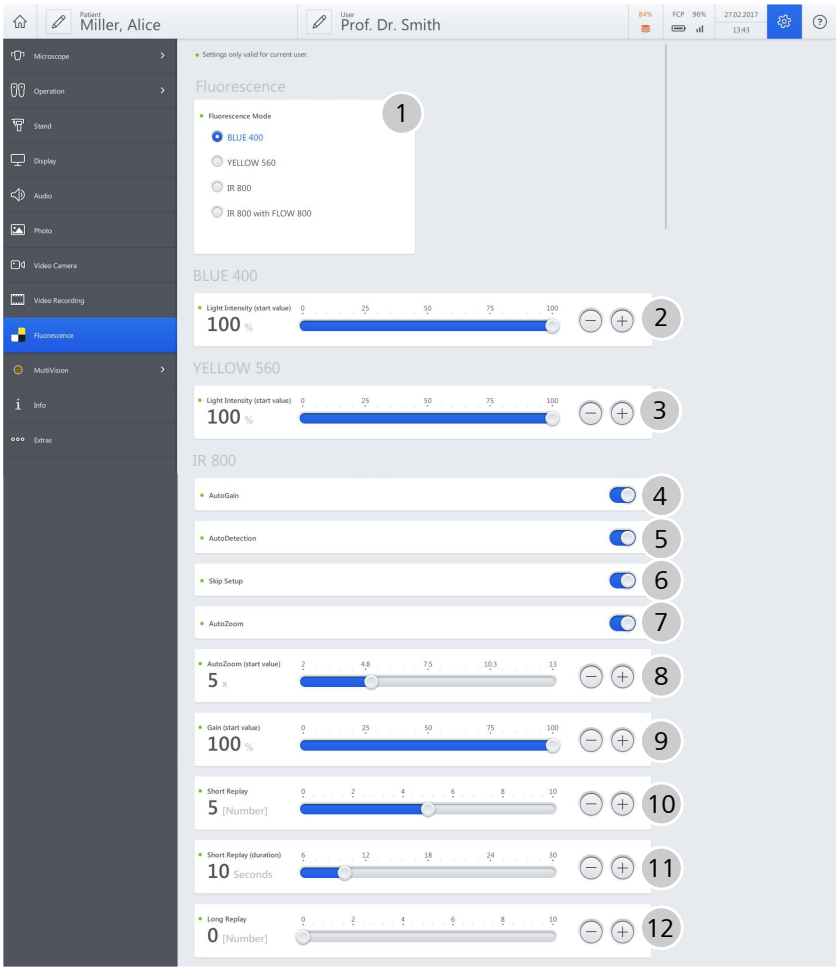


Figure 45: "Settings Fluorescence" menu

Item	Name	Explanation
1	Fluorescence: ■ BLUE 400 ■ YELLOW 560 ■ IR 800 ■ IR 800 with FLOW 800	Activating the fluorescence option Activating the handgrip button (for fluorescence). By pressing on the touchscreen, the configured handgrip button or the FCP button, you can activate the respective fluorescence application.
2	Light Intensity Start Value BLUE 400	Preselect the light intensity for BLUE 400.
3	Light Intensity Start Value YELLOW 560	Preselect the light intensity for YELLOW 560.

Item	Name	Explanation
4	Automatic Gain Control	Selection of auto gain control: ■ Auto: The camera gain is controlled automatically. ■ Manual: The camera gain is controlled manually.
5	AutoDetection	The automatic fluorescence detection detects the influx of the fluorescence dye during the recording. ■ ON: The black leader without any fluorescence signal is hidden during the replay. ■ OFF: The replay is played back incl. the black leader.
6	Skip Setup (One Push Activation)	On: INFRARED 800 starts immediately in the recording mode, the setup phase is skipped.
7	AutoZoom	On: The total magnification is automatically changed to the preconfigured value (3) without a notice dialog. Off: A setup dialog for changing the total magnification outside of the preconfigured range (3) is displayed.
8	AutoZoom (start value)	Magnification value to which the microscope is set for the start of the recording of the INFRARED 800 video.
9	Gain (start value)	Set the gain start value for a manual camera gain.
10	Short Replay (number)	The short replay is played back repeatedly until the preset number of short replays has been reached or the button that was configured for the fluorescence application is pressed on the handgrip or the foot control panel. The number of short replays is automatically limited to max. 25.
11	Short Replay: Duration (seconds)	The length of the short replay is adjustable from 6 to 30 seconds.
12	Long Replay (number)	The recorded fluorescence video is played back in full length until the preset number of replays has been reached or the button that was configured for the fluorescence application is pressed on the handgrip or the foot control panel.

3.6.23 MultiVision

In this menu, you configure the settings for MultiVision (integrated data injection, option).

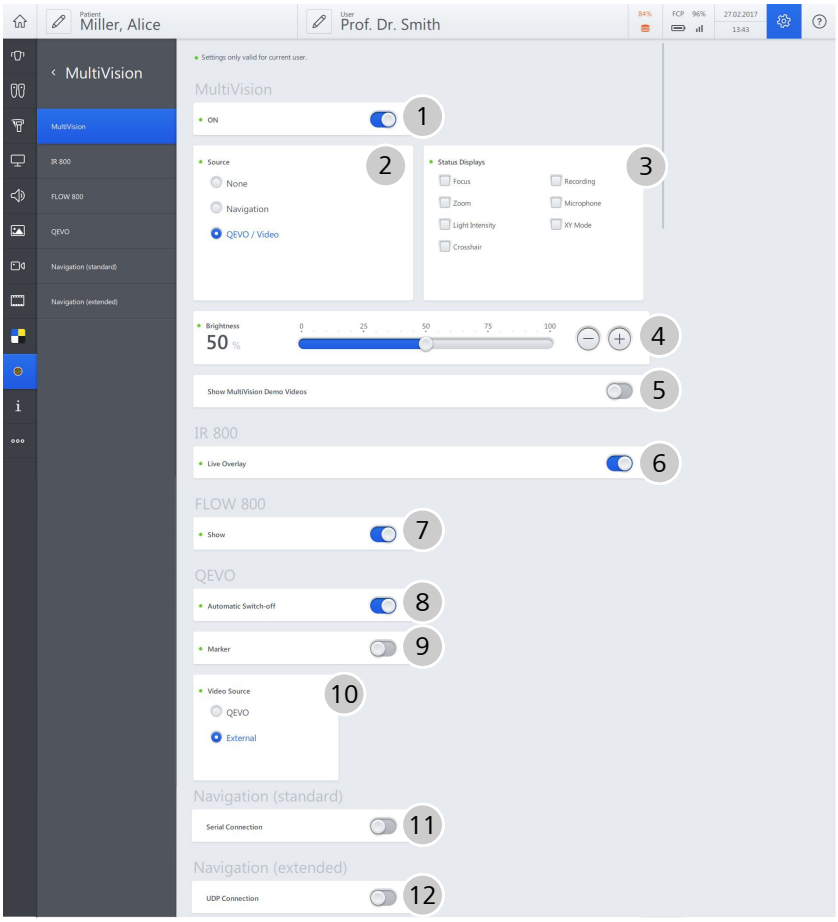


Figure 46: "Settings MultiVision" menu (option)

Item	Name	Explanation
1	MultiVision ON	Switch the MultiVision function (option) on/off.
2	Source	Selection of MultiVision data source for display: ■ None ■ Navigation: Data from the navigation system are displayed. ■ QEVO: Video recording is displayed.

Item	Name	Explanation
3	Status displays	Selection of displays which can be shown in the MultiVision display with a corresponding symbol: – Current magnification (Zoom) – Current working distance (Focus) – Current light intensity – Recording status: REC – Microphone – Reticle (optical axis, focal point) – XY Mode
4	Brightness	Set the brightness of the data injection.
5	Show MultiVision Demo Videos	Open shutter for MultiVision demo. Demo videos are displayed.
6	IR 800 Show	Show INFRARED 800 live image (recording).
7	FLOW 800 Show	Show FLOW 800 evaluation.
8	QEVO Automatic Switch-off (Auto rest mode)	Switch automatic switch-off for QEVO on/off.
9	QEVO Marker	Switch QEVO marker on/off.
10	Video source	Select video source (output 5).
11	Navigation (standard)	The navigation system is connected directly to the device: Activate / deactivate connection to navigation system with standard functions.
12	Navigation (extended)	The navigation system is connected to the device via the network: Activate / deactivate connection to navigation system with extended functions.

3.6.24 Info

INFO

This menu displays a variety of information regarding the system (serial numbers, software versions, license information).

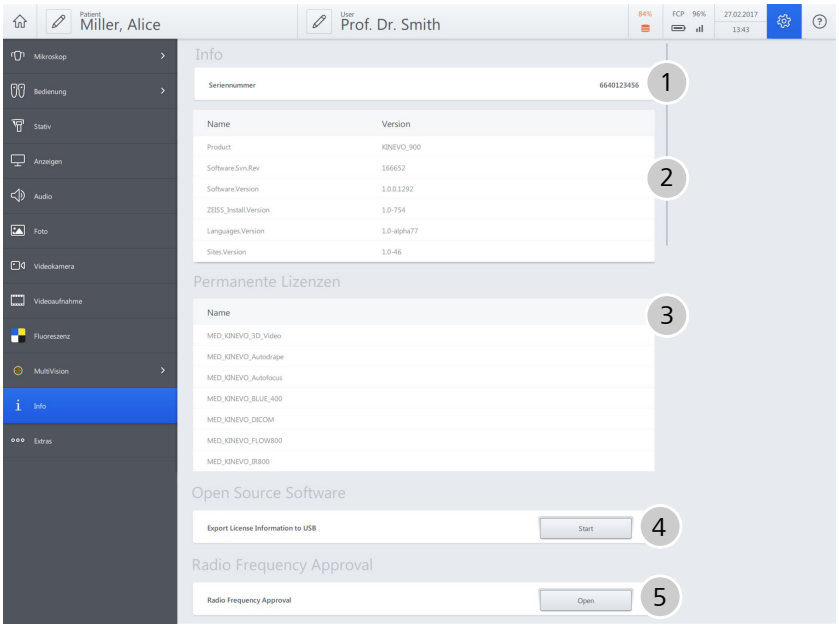


Figure 47: "Settings Info" menu

Item	Name	Explanation
1	Serial number	Displays serial number of device.
2	Name/Version	Displays the following values: ■ Product name ■ Software version ■ ZEISS install. version ■ Language version
3	Licenses	Lists all licenses installed in the device.
4	Export Licenses	Tap on the [Start] button to export licenses to a USB storage medium.
5	Radio Frequency Approval	Tap on the [Open] button to display all radio frequency approvals available on the device.

3.6.25 Extras

o o o

In this menu, you can perform license imports and log file exports.

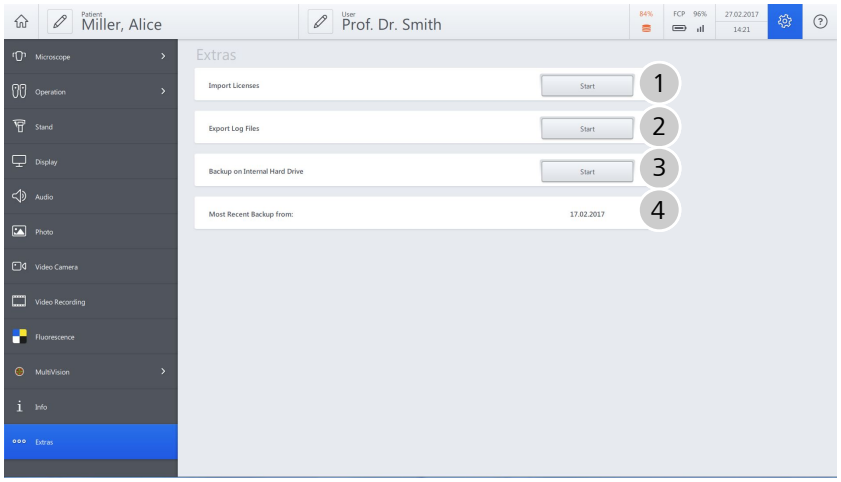


Figure 48: "Settings Extras" menu

Item	Name	Explanation
1	Import Licenses	Import additional licenses.
2	Export Log Files	When you press this button, the log files (error messages) are saved to a connected USB storage medium. You can then send this data to ZEISS Service as an e-mail attachment.
3	Backup on Internal Hard Drive	Available system backups.
4	Last Backup time:	Point of time of last backup.

3.6.26 Password-protected settings and configurations

The following settings and configurations can be performed only by authorized users who have the IT admin password required for this purpose.

If the rights for IT system administration are activated, an input window is displayed where the password for IT system rights must be entered.
The IT ADMIN password is contained in a sealed red envelope included in the scope of supply.

3.6.26.1 Service PC

Service PC - Service

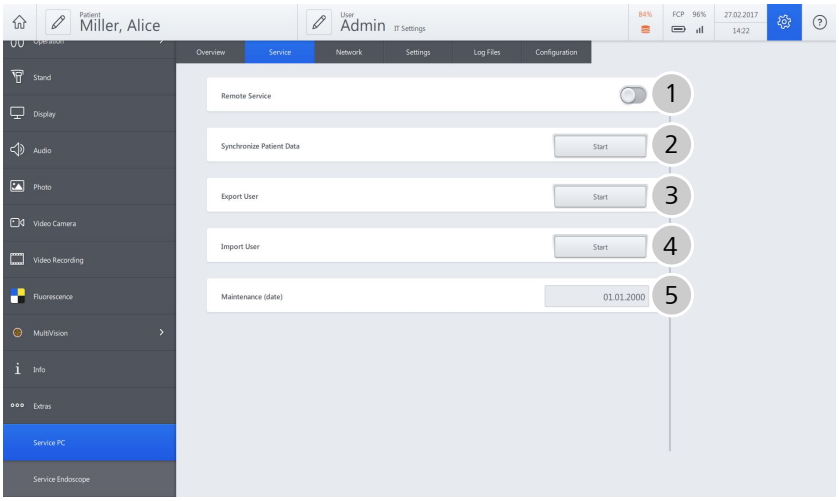


Figure 49: "Settings Service PC" menu, "Service" tab

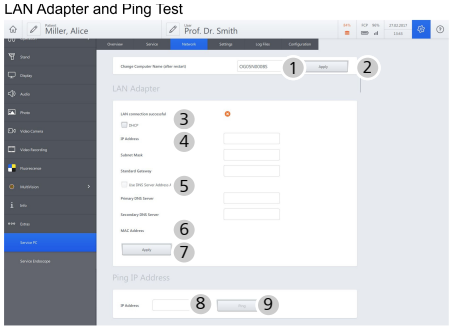
Item	Name	Explanation
1	Remote Service	Switch remote service on/off.
2	Synchronize Patient Data	Synchronize patient data.
3	Export User	Export the existing user profile.
4	Import User	Import the existing user profile.
5	Maintenance (date)	Date of last maintenance call.

3.6.26.2 Network

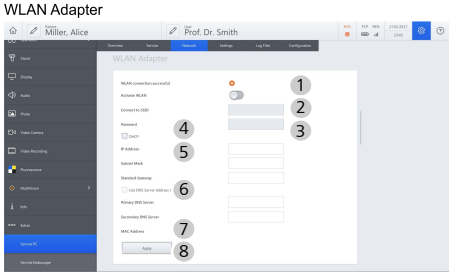
Service PC - Network

In this menu, you configure the network settings.

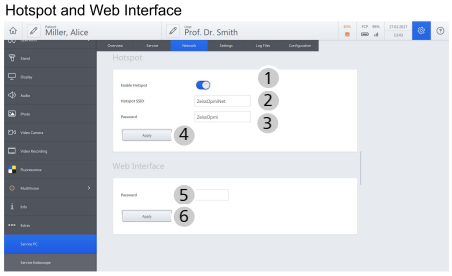
LAN Adapter and Ping Test



WLAN Adapter



Hotspot and Web Interface



Share Folder

DICOM

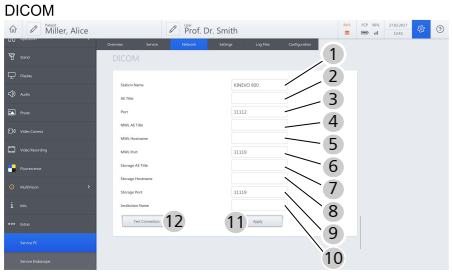


Figure 50: "Settings Service PC" menu, "Network" tab

Item	Name	Explanation
LAN adapter and ping		
1	Change PC Name	Change PC name (recommended), change takes effect after restart:
2	Assign	Confirm entry.
3	DHCP	Assign a network connection via DHCP.
4	IP Address	Specify IP address for LAN connection. **Important:** Do not specify an IP address from these address areas: ■ 192.168.173.xxx (used for the KINEVO 900 hotspot) ■ 192.168.100.xxx (used for an internal network connection to QEVO (option))
5	DNS Server Address	The DNS server address is automatically activated with DHCP.
6	MAC Address	Display of MAC address.
7	Assign	Confirm entry.
8	IP Address	Enter IP address for ping test.
9	Ping	Start ping test.
WLAN Adapter		
1	Activate WLAN	WLAN corresponds to WPK2 / PSK.
2	SSID	Enter SSID (Service Set Identifier - also called network name).
3	Password	Enter password.
4	DHCP	Assign a network connection via DHCP.
5	IP Address	Specify IP address for LAN connection. **Important:** Do not specify an IP address from these address areas: ■ 192.168.173.xxx (used for the KINEVO 900 hotspot) ■ 192.168.100.xxx (used for an internal network connection to QEVO (option))
6	DNS Server Address	The DNS server address is automatically activated with DHCP.
7	MAC Address	Display of MAC address.
8	Assign	Confirm entry.
Hotspot and web interface		
1	Hotspot	Switch on/off; first activate WLAN connection.

Item	Name	Explanation
2	Hotspot SSID	Enter SSID (Service Set Identifier - also called network name).
3	Hotspot Password	Enter password. For password, see: Touchscreen / Status bar / Network / Display hotspot password.
4	Assign	Confirm entry.
5	Web Interface Password	Factory setting: “ZEISS”.
6	Assign	Requirement: WLAN connection is activated. Confirm entry.
Network		
1	Activate	Activate network connection.
2	Host	Enter host name (sys. admin data).
3	User Name	Enter user name (sys. admin data).
4	Password	Enter password (sys. admin data).
5	Workgroup	Enter workgroup (sys. admin data).
6	Share Name	Enter share name (sys. admin data).
7	Assign	Confirm entry.
DICOM		
1	Station Name	KINEVO 900 Enter own readable name (human readable).
2	MWL AE Title	KINEVO 900 AET (Application Entity Title) Own DICOM name.
3	Port	Preset.
4	MWL AE Title	Enter name of worklist (sys. admin data).
5	MWL Hostname	Enter host name (sys. admin data).
6	MWL Port	Preset.
7	Storage AE Title	Enter storage AE Title (sys. admin data).
8	Storage Hostname	Enter storage host name (sys.admin data).
9	Storage Port	Preset.
10	Institution Name	Enter name of clinic/institution.
11	Assign	Confirm entry.
12	Test Connection	Test DICOM connection.

3.6.26.3 Setting values

Service PC - setting values

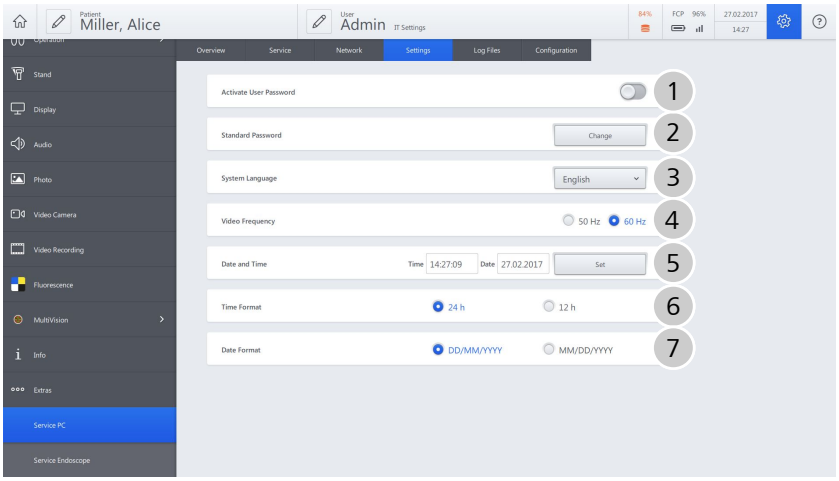


Figure 51: "Settings Service PC" menu, "Setting values" tab

Item	Name	Explanation
1	Activate User Password	User password is activated.
2	Standard Password	Change standard password for all users.
3	System Language	Select.
4	Video Frequency	Set: 50 Hz or 60 Hz.
5	Date and Time	Set and [Accept].
6	Time Format	Select: 24h or 12h.
7	Date Format	Select: DD/MM/YYYY or MM/DD/YYYY.

3.6.26.4 Log files

Service PC - Log files

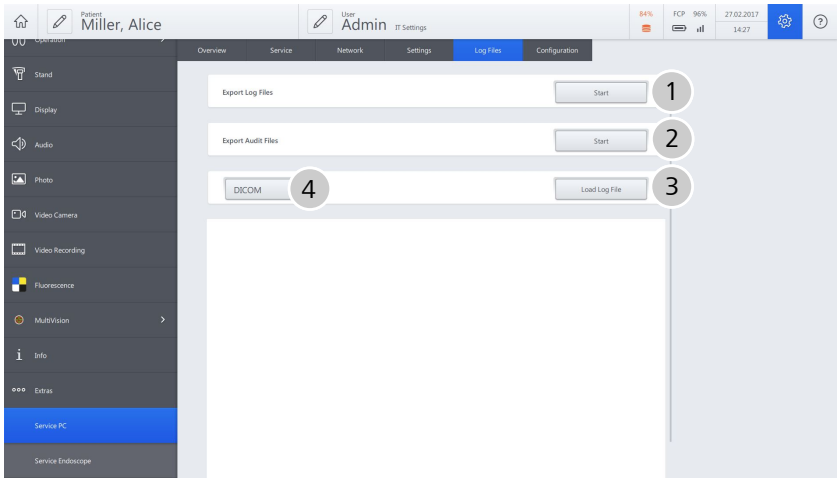


Figure 52: "Settings Service PC" menu, "Log files" tab

Item	Name	Explanation
1	Export Log Files	Export log files to a USB storage medium.
2	Export Audit Files	Export audit files to a USB storage medium.
3	Load Log Files	Load log files from USB storage medium.
4	DICOM	Load log files from DICOM.

3.6.26.5 Configuration

Service PC - Configuration

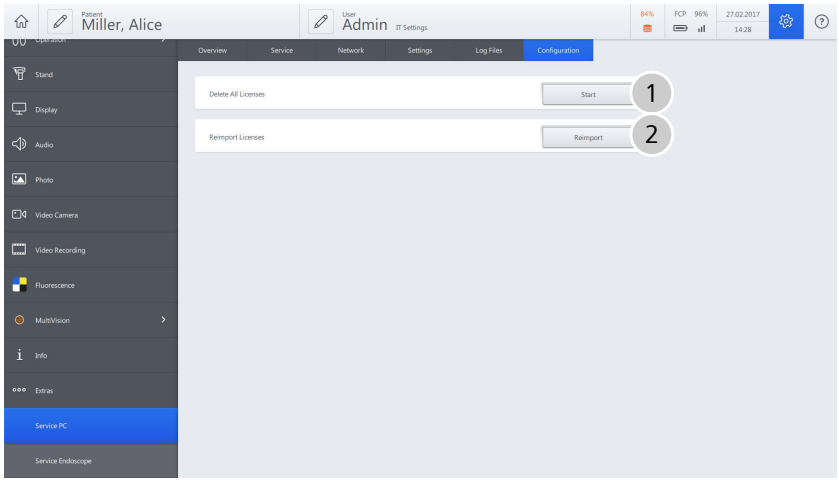


Figure 53: "Settings Service PC" menu, "Configuration" tab

Item	Name	Explanation
1	Delete	Delete all licenses installed on the device.
2	Reimport	Reimport previously exported licenses.

4 Installation

4.1 Requirements

Installation requires special knowledge and skills.
An installation by persons not authorized by ZEISS can lead to the injury of patients and operators, as well as to property damage.

Action

- ▶ Have the installation and initial startup performed only by persons authorized by ZEISS.

4.2 Attaching tubes and eyepieces

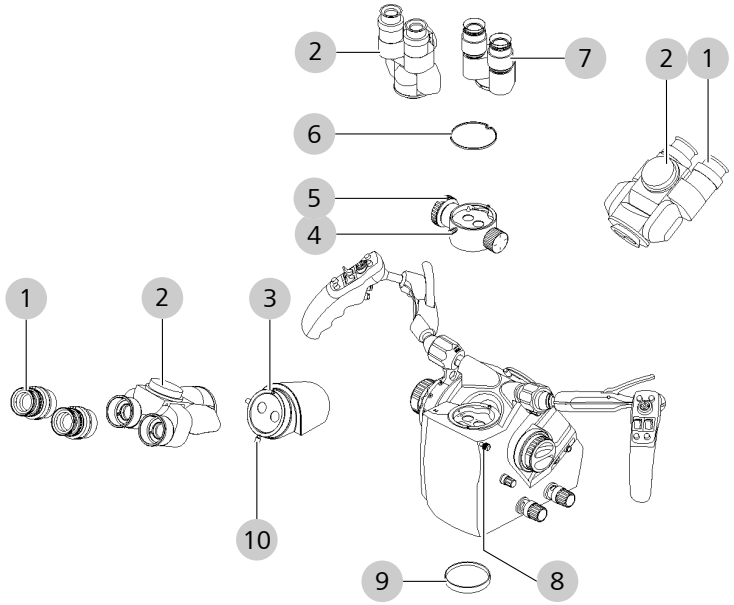


Figure 54: Attaching tubes and eyepieces

1	Widefield eyepieces	2	Tiltable tube, optional foldable tube
3	Angle optics (spine adapter)*	4	Fastening screw, magnification changer
5	Magnification changer, 3-position*	6	Dust protection cover
7	Straight tube	8	Fastening screw
9	Transport protection cover	10	Fastening screw, angle optics

* When assembling the microscope, be careful not to mount the 3-position magnification changer (item 5) and the angle optics (item 3) on the microscope body at the same time. In this case, the microscope body would be too heavy for the autobalance function.

NOTE

Widefield eyepieces with magnetic coupling!

Please keep in mind the usual rules for the handling of magnets with regard to eyepieces that have been removed from the tube:

- ▶ Do not place the eyepiece near instruments that could 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.

⚠ CAUTION!

Never stare directly into the sun or a light source with the tube!

An excessive light intensity can damage the retina of the eye.

- ▶ Never stare directly into the sun or a light source with the eyepieces or the binocular tube!

⚠ CAUTION!

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

Never change modules and approved accessories during a surgical procedure or above the patient!

- ▶ Always make sure that the maximum permissible load is not exceeded.
- ▶ Balance the completely equipped surgical microscope before each application.

Action

1. Unscrew the fastening screw on the microscope body several turns.
2. Remove the dust protection cover.
3. As needed: Place the angle optics with dovetail (spine adapter) or the magnification changer (option) on the microscope body and tighten the fastening screw on the microscope body hand-tight.
4. Mount the binocular tube and tighten the fastening screw on the microscope body or on the angle optics with dovetail (spine adapter) hand-tight.
5. Insert widefield eyepieces as far as they will go in the mounts provided on the binocular tube.
6. Remove the transport protection cover from the objective lens.
7. Enter the tube focal lengths and eyepiece magnifications used in the “Settings Surgical Microscope” menu [▶ 129] so that the device can calculate the correct total magnification.

4.3 Using an integrated 3D video system for observation without eyepieces (option)

If your KINEVO 900 is equipped with the "3D video system" option, you can use the surgical microscope without tube and eyepieces. Via the 3D video system, the surgical field is displayed on the second 3D video monitor on a separate, external 3D video monitor. With this type of application, the magnification, and therefore the resolution on the monitor, is lower than it is when using the surgical microscope with tube and eyepieces.

⚠ CAUTION!

Do not use images and videos for diagnostic purposes!

The monitors are neither calibrated nor designed for diagnostic purposes.

- ▶ The video contents and images displayed on the monitors (cut sequences) must not be used for diagnostic purposes. They may contain deviations with respect to scale, shape, contrast and color.

To use the surgical microscope as an integrated 3D video system for observation without eyepieces, proceed as follows:

Action

1. Unscrew the fastening screw on the microscope body several turns.
2. Remove the binocular tube with the widefield eyepieces from the microscope body or from the angle optics with dovetail (spine adapter).
3. Remove the angle optics with dovetail (spine adapter) or the magnification changer (option) from the microscope body.
4. Place the Digiskop cover on the microscope body and tighten the fastening screw hand-tight.
5. Unscrew the fastening screw of the binocular assistant's tube several turns.
6. Remove the binocular assistant's tube with the widefield eyepieces from the microscope body.
7. Place the assistant's Digiskop cover on the microscope body and tighten the fastening screw hand-tight.
8. Switch the device on.
9. Check the image and color quality of the video display on the 3D video monitor.
   ⇨ If the image and color quality are perfect, you can start your operation.
10. If the 3D video system fails and no image is displayed on the 3D video monitor, switch the device off and disconnect it from the power supply.
11. Use a second device to finish your operation.

12. Contact your competent ZEISS Service organization and have them repair the defective device.

4.4 Attaching the documentation/co-observation equipment

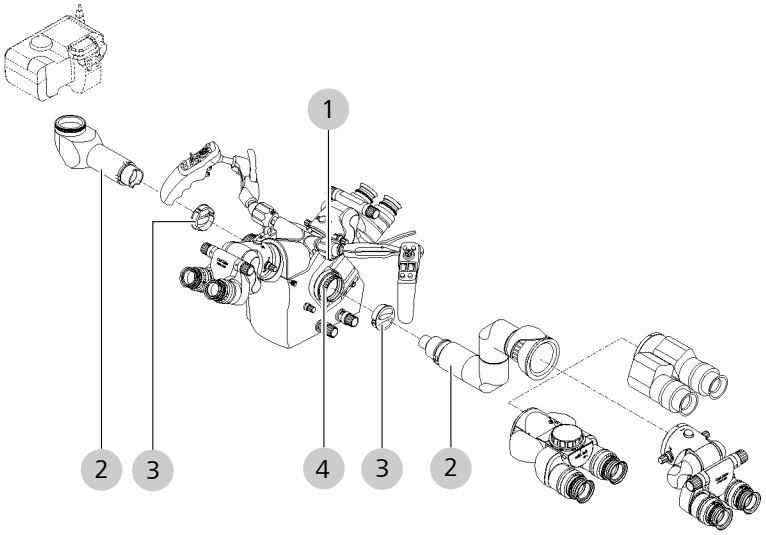


Figure 55: Attaching the documentation/co-observation equipment

1	[Pivoting mirror] adjustment knob	2	Co-observation module e.g. photo adapter for DSLR or stereo co-observer
3	Dust protection cap	4	Knurled ring, right Opposite knurled ring on the left not shown

Action

1. Loosen the knurled ring concerned.
2. Remove the dust protection cap.
3. Push the co-observation module into the mount of the image output as far as it will go.
   The mount of the image output is equipped with guide brackets.
4. Screw the knurled ring onto the co-observation module and tighten the knurled ring securely.
5. Set the [pivoting mirror] adjustment knob on the microscope body for the lateral co-observer connection .
6. Or configure the pivoting mirror setting on the monitor:
   Tap on Settings → Microscope → Tube [▷ 66].
7. In the [Co-observer (start value)] field, activate the function "Lateral".

4.5 Mounting the mouth switch

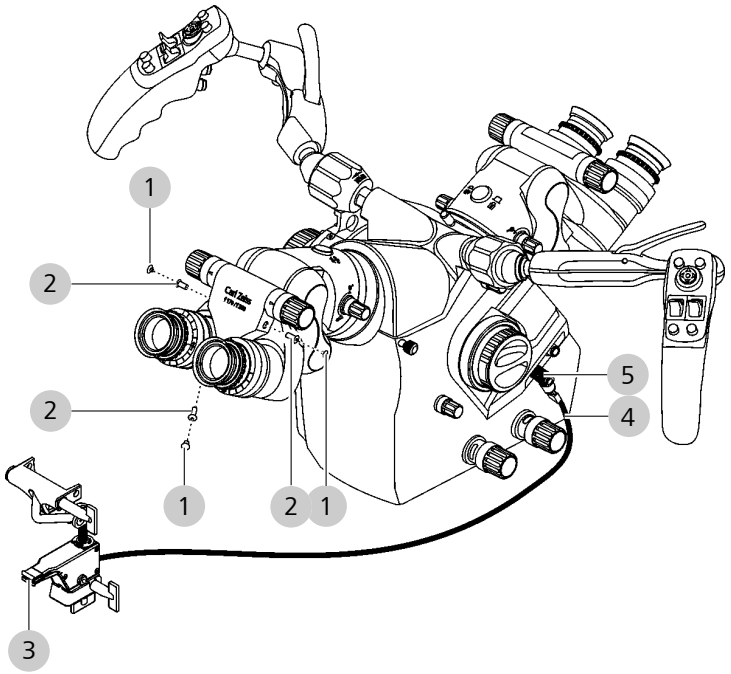


Figure 56: Mounting the mouth switch

1	Protective cap, 3 pcs	2	Fastening screw, 3 pcs
3	Mouth switch for 180° tiltable tube and foldable tube	4	Mouth switch cable with connector
5	Angle adapter for mouth switch		

Action

1. Remove the three protective caps from the tube.
   ⇨ Threads for attaching the mouth switch are located underneath the protective caps.
2. Position the mouth switch on the tube and attach it with three screws (included in the scope of supply).
3. Tighten the three screws hand-tight using a 4 mm Allen key.
4. Insert the mouth switch cable in the angle adapter for the mouth switch.
5. Connect the angle adapter for the mouth switch to the connection socket on the microscope.
6. Adjust the height, inclination and distance of the mouth switch with the corresponding clamping screws, tightening them properly.
7. Perform an autobalance for the system [▸ 124].

You will find an exact description of the mouth switch in the Instructions for Use of the Mouth Switch G-30-1469.

4.6 Moving the device

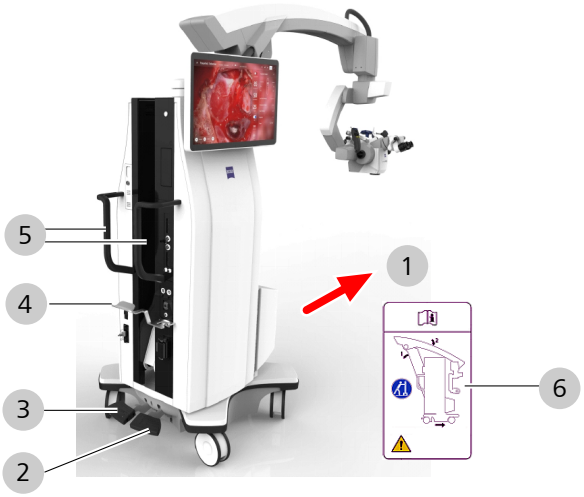


Figure 57: Moving the device

1	Transport direction 	2	Locking tab button 
3	Straight-ahead travel button 	4	Holder for cable and foot control panel
5	Transport handles	6	Park position [▶ 142]

⚠ CAUTION!

Risk of crushing!

Fingers may be crushed between the vertical arm and the horizontal arm.

- ▶ Never touch the area  between the vertical arm and the horizontal arm while moving the device.
- ▶ Use the transport handles to move, push and position the device.

⚠ CAUTION!

Risk of toppling!

The device may topple over and injure persons when being moved over thresholds and obstacles.

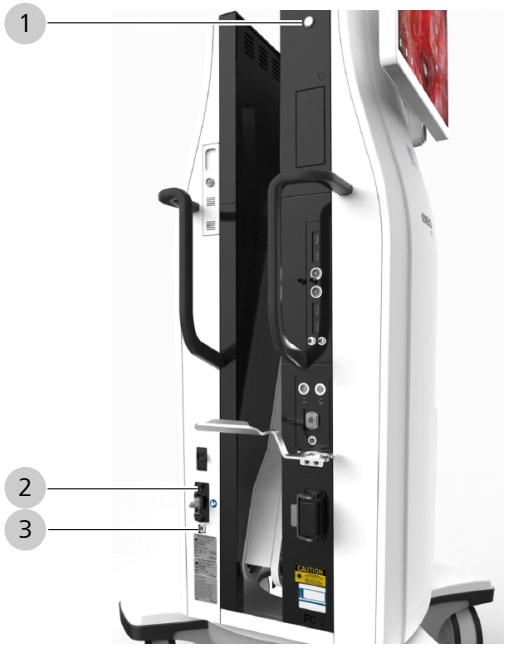
- ▶ Be careful when pushing or pulling the device over thresholds.
- ▶ Push or pull the device **grasping it only by its transport handles** in the transport direction.
- ▶ Be extremely careful when moving over sloped surfaces.
- ▶ Do not park the device on sloped surfaces.

Action

1. Tap on Settings → Stand → and, in the field -Move to park position, →the -Start button.
2. To activate the travel, press the XY joystick button on the right handgrip to the right and hold it down until the park position has been reached. The joystick on the FCP also can be used to activate the travel.
3. The device now automatically travels to the park position.

   ⇨ When the park position has been reached, this is acknowledged by a signal tone.
4. Remove the power plug from the power outlet.
5. Hang the foot control panel on the holder provided for this purpose.
6. Hang the power cord on the holder provided for this purpose.
7. Release the locking button and push the device in the direction of the arrow (= transport direction).
8. Press the straight-ahead travel button:
   When steering the device over longer distances and in a straight-ahead direction.
9. When the locking button is pressed gently, all four castors again become steerable, e.g. in order to position the device at its usage site.
10. Press the locking button:
    For locking at the usage site or in a park position.

4.7 Connecting the device to the power supply and switching it on



1	"Device Power On/Off" operating button	2	Power inlet socket
3	Potential equalization connector		

⚠ CAUTION!

Danger! Electrical voltage!

When the power cord is connected to the power outlet, the device is in the Standby mode. The Standby/ON-OFF switch illuminates white.

- ▶ Since the connector of the power inlet socket is used as a disconnect device, the disconnect device must remain freely accessible.

⚠ CAUTION!

Protective conductor connection!

To avoid the risk of electrical shock, this device may only be connected to a power grid which is provided with a protective ground conductor (IEC 60601-1).

- ▶ Only connect the device to power outlets which are equipped with a properly connected protective ground conductor.

NOTE

Tripping hazard!

Inappropriately laid cables represent an increased risk of tripping.

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

Action

1. Plug the power cord included in the scope of supply into the power inlet socket.
2. Plug the power cord into the power outlet.
   ⇨ The "Device Power On/Off" operating button is illuminated white.
3. Press the "Device Power On/Off" operating button once.
   ⇨ The "Device Power On/Off" operating button is illuminated green.
   ⇨ The operating system is booted.
   ⇨ The device comes on and displays the start screen and is ready for operation.

4.8 Initial device login

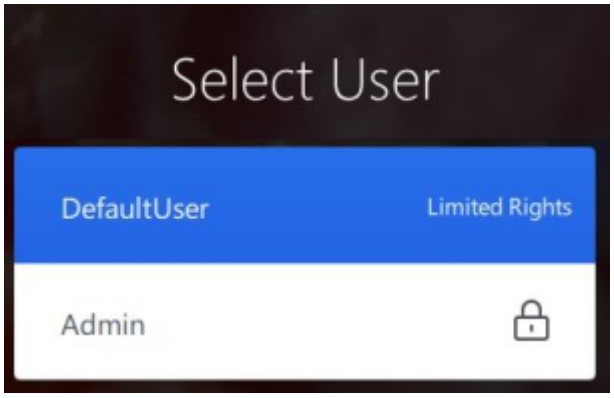
When you use the device for the first time, only the selections “DefaultUser” and “Admin” appear in the “Select User” selection window on the login screen. The “DefaultUser” user group has only limited rights. In order to be able to use the device to a full extent, you must create a new user during initial startup of the device.

Prerequisite

☑ The device is connected to the power supply and switched on. [▷ 102]

Action

1. Tap on the “DefaultUser” field in the “Select User” selection window.



   ⇨ The start screen opens.
   ⇨ In the status bar at the top of the screen, the “DefaultUser” appears in the “User” field.
2. Tap on the [DefaultUser] button.
   ⇨ The “Select User” selection window opens again.
   ⇨ The [Add User] button appears in the “Select User” selection window .
3. Tap on the [Add User] button and create a new user [▷ 153].

Result

✓ The next time you start the device, the user you have created will appear in the “Users” selection window. Now you can add new users [▶ 153], remove users [▶ 156], edit user data [▶ 153] etc.

4.9 Connecting the wired foot control panel or rocker foot switch

Figure 58: Connection sockets for foot control panel and rocker foot switch

1	Connection socket for foot control panel	2	Connection socket for rocker foot switch

Action

1. If you would like to connect a foot control panel, connect the cable of the foot control panel to the corresponding port on the device.
2. To check the preconfigured button assignment of the foot control panel, open the additional menu "Extended operation" on the right edge of the monitor screen and tap in the [Foot control panel] button .
   ⇨ The preconfigured button assignment is displayed.
3. To change the button assignment, tap on the [Change settings] button in the display window. Adapt the button assignment as required [▶ 133].
4. If you would like to connect a foot control panel, connect the cable of the rocker foot switch to the corresponding port for foot rocker switches on the device.
5. To check the preconfigured button assignment of the rocker foot switch, tap on Settings → Operation → Rocker foot switch. Adapt the button assignment as required [▶ 133].

4.10 Pairing the wireless foot control panel with the device

You can use the "Pairing" function to assign the wireless foot control panel (FCB WL) to the device.

Prerequisite

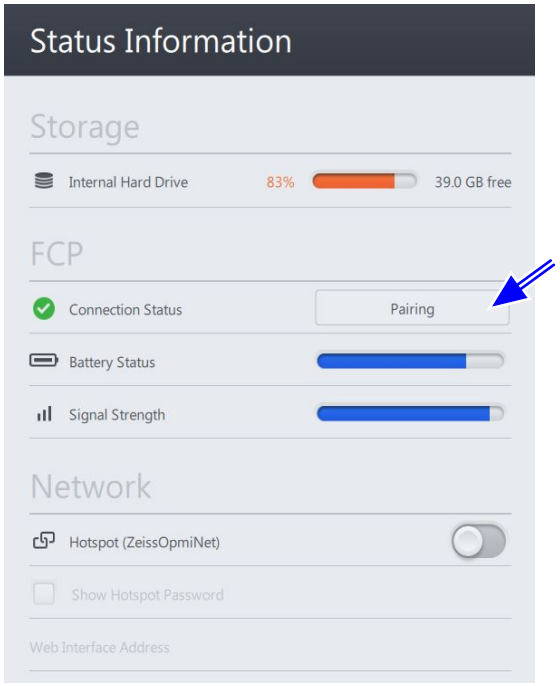
☑ Wireless foot control panel is switched on

Action

1. Tap on the [Status Information] button in the status bar.

⇨ The "Status Information" menu is displayed.

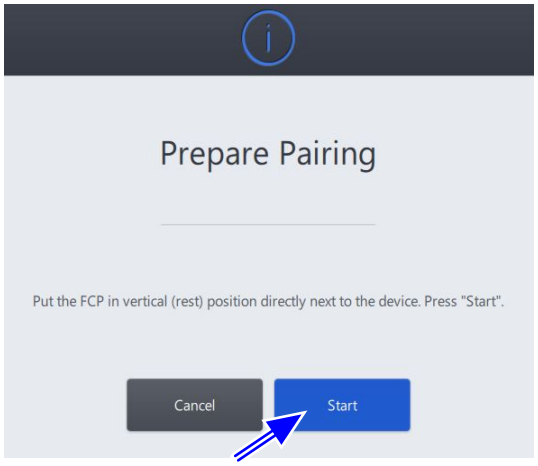
2. Tap on the [Pairing] button.



⇨ The "Prepare pairing" menu is displayed.

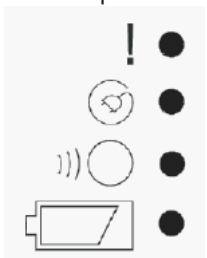
3. Follow the prompts on the screen. Put the foot control panel in a vertical position in the immediate vicinity of the device.

4. Tap on the [Start] button.



   ⇨ The message “Pairing of the device and the foot control panel in progress” is displayed.

5. “Press a button on the foot control panel until the third LED from the top flashes orange. Keep the foot control panel in a vertical position”.



   ⇨ Following successful pairing, a corresponding message appears on the screen: "Pairing was 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.”

6. Perform a function test. To do this, press any two buttons on the foot control panel.

   ⇨ The “Radio Connection Intensity” status display lights up green for approx. 1 second.

7. Use the rotary indicator on the foot control panel to set the number specified on the stand sticker and make the assignment of the paired foot control panel to this stand visible.

⚠ CAUTION!

Malfunction due to incorrect pairing!

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

▶ Check and label the assignments of the device and the foot control panel.

8. If pairing is unsuccessful, the “Radio Connection Intensity” status display lights up red for approx. 1s and one of the following messages appears:
   “Pairing could not be performed successfully. No foot control panel was detected.”
   “Pairing could not be performed successfully. Multiple foot control panels were detected.”
9. Repeat the “Pairing” procedure.

4.11 Connecting external video devices and monitors

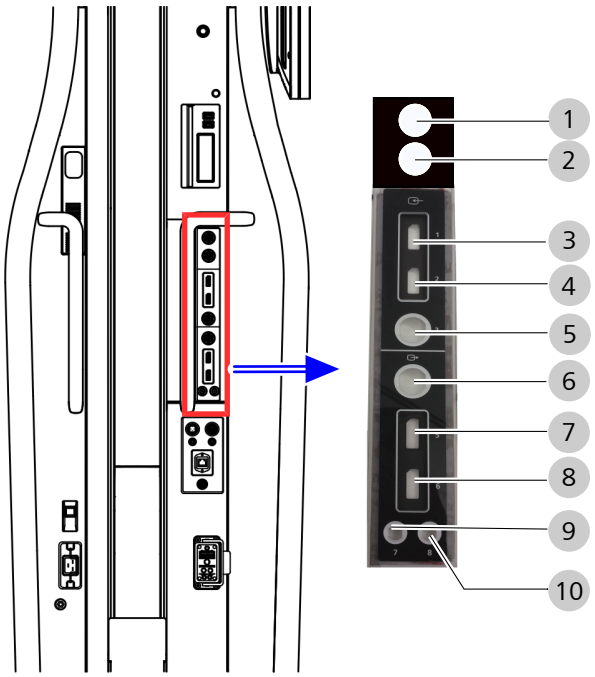


Figure 59: Connecting external video devices and monitors

1	Video output 4K	2	Video output 4K
3	Video input for MultiVision	4	Video input for MultiVision
5	Video input for external endoscope camera	6	Video output for external monitor
7	Camera signal video output (touchscreen live image)	8	Camera signal video output (touchscreen live image)
9	Camera video output	10	Camera video output

⚠ CAUTION!

Hazard caused by live cables and connectors!

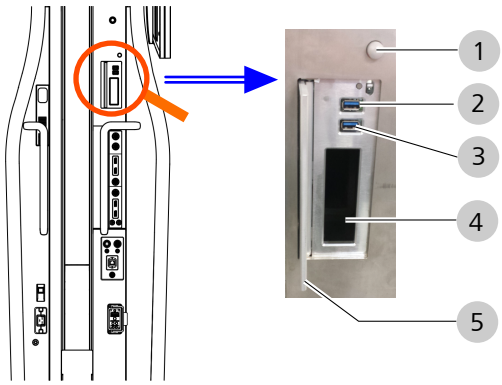
Connecting accessories which have not been approved by ZEISS may lead to patient injuries.

- ▶ Do not touch the power output socket or any other signal interfaces when in contact with the patient.
- ▶ When assembling your system, observe the requirements of IEC 60601-1 Chapter 16 or EN 60601-1-1.

Action

1. Connect the external video devices and monitors to the corresponding video inputs and outputs of the device.
   Approved video cables can be found in product overview G-30-1888.
2. If required, connect the external video sources (e.g. the endoscope) to the corresponding video input of the device.

4.12 Connecting USB storage media



1	Push button for opening the USB flap	2	USB port (USB 3.0)
3	USB port (USB 3.0)	4	Shelf for USB storage medium
5	Flap		

NOTE

Use only accessories (USB media) approved by ZEISS!

- ▶ Device safety during operation cannot be guaranteed if accessories that are not authorized by ZEISS are used.

NOTE

Virus-free USB storage media

- ▶ The user is responsible for ensuring that the USB medium used for data exchange is free of viruses.

Action

1. Press the push button
   ⇨ The flap opens
2. Connect the USB storage medium to USB ports and deposit the USB storage medium in the shelf.

4.13 Configuring the network (possible only with IT admin password)

⚠ CAUTION!

Unknown risks due to network integration!

Integration of the device in an existing network which includes other ME devices may lead to unknown risks for patients, operators or other persons.

- ▶ The operator of the device must determine, analyze, evaluate and control these risks before the device is integrated in the network.

You can connect the device to your hospital network in order to export patient data to your network or to a DICOM server or in order to import patient data from a DIOCOM worklist.

IT admin system rights

The following settings and configurations can be performed only by authorized users who have the IT admin password required for this purpose. If the rights for IT system administration are activated, an input window is displayed where the password for IT system rights must be entered. The IT ADMIN password is contained in a sealed red envelope included in the scope of supply.
If you have forgotten the IT Admin password, contact ZEISS Service. You can find the ZEISS contact partner for your country on the internet in the following website: www.zeiss.com/med.

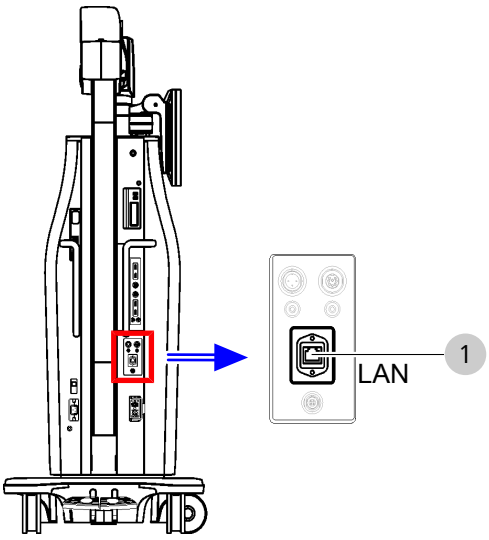
4.13.1 Activating IT admin system rights

Action

1. Tap on the button [User] ⟶ [Admin].
2. Enter the IT admin password.
   The IT ADMIN password is contained in a sealed red envelope included in the scope of supply.
3. Tap on the [OK] button  .
   ⇨ The IT admin system administrator is displayed in the status bar.

4.13.2 Activating the network connection via LAN adapter

NOTE! The Ethernet port in the device has a network isolator as per IEC 60601-1.



1	Network/Ethernet connection (LAN)

NOTE

Secure network!

The user (IT manager) is responsible for ensuring that the network to which the system is connected is protected against unauthorized access from outside via an appropriate safeguard (e.g. a firewall).

- ▶ The "network installation" must not take place during an operation.

Prerequisite

☑ The device is connected to the respective network via a network cable.

Action

1. Tap on ⚙ Settings ⟶ Service PC ⟶ Network.
2. Enter the appropriate data.
3. Tap on the [Apply] button.

Result

✓ The LAN connection is active.

4.13.3 Activate network connection via wireless LAN (option)

As soon as the WLAN adapter has been activated, you can connect the device to your network via WLAN or set up and activate the device as a hotspot [▶ 111].

You only have to enter the IP and DNS address data for your WLAN once, as these values are stored.

Prerequisite

☑ WIFI corresponds to WPA2/PSK

Action

1. Tap on ⚙ Settings ⟶ Scroll down in the Settings menu ⟶ Service PC ⟶ Network ⟶ Scroll down in the Network menu ⟶ WLAN Adapter.
2. Activate the "Activate WLAN" slide switch.
   ⇨ The WLAN adapter is activated.
   ⇨ Now you can connect the device to your network via WLAN (see description below), or set up and activate the device as a hotspot [▶ 111].
3. When connecting the device to your WLAN for the first time, you must enter all of the required values (steps 4-6).
4. Enter the SSID network names and the password for your WLAN.
5. If your network has a DHCP server, activate the [DHCP] button.
   ⇨ The functions "DHCP" and "Obtain DNS server address automatically" are activated together  .
   ⇨ All required values are filled out by the DHCP server.
6. If no DHCP server is currently available, enter all of the required IP and DNS address data manually.
7. Tap on the [Apply] button.

Result

✓ The device connects to your WLAN.

4.13.4 Creating and activating the device as a hotspot

As soon as the WLAN adapter has been activated, you can define and activate the device as a hotspot.

The "IT Admin" user group must activate the hotspot so that the "Default Users" and "Users" user groups can use the device as a hotspot.
When the device is shut down, the hotspot function is switched off again.
After each restart of the device, the "Default Users" and "Users" user groups can switch on the hotspot function on the device [▶ 175].

You only have to set up the device as a hotspot once. The values you have entered will be stored.

Prerequisite

☑ WLAN adapter is activated [▶ 111]

Action

1. Tap on ⚙ Settings ⟶ Scroll down in the Settings menu ⟶ Service PC ⟶ Network ⟶ Scroll down in the Network menu ⟶ HotSpot.
2. Activate the [Activate Hotspot] slide switch.
   ⇨ If the device has already been set up as a hotspot, it now can be used as a hotspot [▶ 175]. by the "Default Users" and "Users" user groups.
3. When setting up the device as a hotspot for the first time, enter the SSID hotspot name and the password for this hotspot. Make sure that you assign a separate SSID hotspot name to each device to ensure that the desired hotspot can be correctly controlled.
4. Tap on the [Apply] button.

Result

✓ Now the device can be used as a hotspot [▶ 175] by the "Default Users" and "Users" user groups.

4.13.5 Activating the web interface in the device

If the device is set up as a hotspot and is activated, the "IT Admin" user group can define a password for the web interface which can be used to access patient data from an external device.

Prerequisite

☑ WLAN adapter is activated [▶ 111]

☑ Device was set up and activated as a hotspot [▶ 111] by the "IT Admin" user group.

Action

1. Tap on ⚙ Settings ⟶ Scroll down in the Settings menu ⟶ Service PC ⟶ Network ⟶ Scroll down in the Network menu ⟶ Web interface.
2. Enter the password for the web interface
3. Tap on the [Apply] button.

Result

✓ Now the "Default Users" or "Users" user group can connect to the activated web interface [▶ 176] from an external device in order to access patient data.

4.13.6 Network drive (network storage)

Enables the storage of patient data (still images and videos) in a shared network drive folder.

Prerequisite

☑ The device is connected to the respective network via LAN or WLAN.

Action

1. Tap on ⚙ Settings ⟶ Service PC ⟶ Network ⟶ Scroll down in the "Network menu" ⟶ Network drive.
2. Place a check mark in the "Activate" box.
3. Enter the host name, user name, password, workgroup and share name.
   You will receive this information from your system administrator.
4. Tap on the [Apply] button.

Result

✓ The network connection is active.

4.13.7 Configure the network connection for DICOM (option).

Network and DICOM addresses must be assigned by the IT administrator in charge. Zeiss Service must be aware of all IT and DICOM parameters (PACS/RIS name, AE title, IP address, port number) ahead of the installation. Please pay attention to upper-case and lower-case letters in the AE titles!

Prerequisite

☑ Select the correct PACS.
Be sure to check the connection configuration for a PACS, as data loss otherwise is possible.
Carry out the TCP/IP configuration correctly.
Export to a USB medium is enabled only after user and password authentication.

Action

1. Tap on ⚙ Settings ⟶ Service PC ⟶ Network ⟶ Scroll down in the "Network menu" ⟶ DICOM.
2. Enter all DICOM data. Preset data can be overwritten.
   You will receive this information from your system administrator.
3. Tap on the [Apply] button.

   ⇨ The network connection is active.
4. Tap on the [Test Connection] button.

Result

✓ The result of the connection test appears in an info window.

4.14 Configure the Service PC (possible only with IT admin password).

The following settings and configurations can be performed only by authorized users who have the IT admin password required for this purpose. Configure the Ethernet (possible only with IT admin password).
The IT ADMIN password is contained in a sealed red envelope included in the scope of supply.
If you have forgotten the IT admin password, contact ZEISS Service. You can find the ZEISS contact partner for your country on the Internet in the following website: www.zeiss.com/med.

You have the following adjustment possibilities:

- Service
  - Synchronize Patient Data
  - Export User
  - Import User
- Settings
  - Activate User Password
  - Change Default Password
  - Set System Language
  - Change Video Frequency
  - Set Date and Time
  - Change Time Format
  - Change Date Format
- Log Files
  - Export Log Files
  - Export Audit Files
  - Load DICOM Log Files

4.14.1 Service

Action

1. Tap on ⚙ Settings ⟶ Service PC ⟶ Service.
2. Tap on the respective [Start] button to start the action.
3. Close the "Settings" menu by tapping on the ⌂ button.

4.14.2 Settings

4.14.2.1 Activate User Password

If you activate the user password in order to protect patient data, all users must log in to the device with the standard password which was assigned by you. All newly created users also will receive the standard password which was assigned by you. I.e., as the IT administrator, you are responsible for the standard password and for passing it on to all users of the device.

Users can log in to the device as a "Default User", since no password entry is required for this purpose. However, you then can only view the patient data of the current patient.

Action

1. Tap on Settings → Service PC → Settings.
2. In the "Standard Password" field, tap on the [Change] button.
3. Enter a new password.
4. Confirm your entry by tapping on the [Done] button.
5. Tap on the slide switch in the "Activate User Password" field to activate the user password.
   - ⇨ The slide switch turns blue .
   - ⇨ The user password is activated.
   - ⇨ All users must log in to the device with the standard password which was assigned by you.
   - ⇨ Newly added users automatically receive the standard password assigned by you.
6. Disclose the new user password to the device users.

4.14.2.2 Setting general parameters

Action

1. Tap on Settings → Service PC → Settings.

   You can set the following general parameters:
2. **Set system language:** → Select the desired system language.
3. **Change Video Frequency:** → 50 Hz or 60 Hz.
   - ⇨ The changes take effect only after the device is restarted.
4. **Set Date and Time:** → After setting, tap on the [Accept] button.
5. **Change Time Format:** → 24h or 12h.
6. **Change Date Format:** → DD.MM.YYYY or mm/dd/yyyy.
7. Close the "Settings" menu by tapping on the button.

4.14.3 Log Files

Action

1. Tap on ⚙ Settings ⟶ Service PC ⟶ Log Files.
2. Tap on the respective [Start] button to start the action.
3. To load a DICOM log file, tap on the [Load Log File] button to start the action.
4. Close the "Settings" menu by tapping on the ⌂ button.

4.15 Connecting the navigation system to the device

You can connect the following navigation systems to the device:

- Standard navigation system:
  - The navigation system features standard functions
  - The navigation system is connected directly to the device via a cable with a connector.
- Extended navigation system:
  - The navigation system features extended functions
  - The navigation system is connected to the device via the network

Once the navigation system has been connected to the device, trained personnel from the manufacturer of the navigation system must perform the calibration and inspection of the navigation functionalities.

⚠ CAUTION!

Fault navigation!

The navigation antenna may become maladjusted due to a collision during transport or coarse positioning.

- ▶ Check the entire navigation system according to the manufacturer's specifications before every use.
- ▶ Check the calibration of the navigation system according to the manufacturer's specifications before every use.
- ▶ Before every intervention using a connected and authenticated navigation system, the function and accuracy of the navigation system including the display in the data injection must be verified accordingly (e.g. by focusing on a measuring point or comparing the focal point with a navigated instrument).
  Observe the specifications of the manufacturer of the navigation system.
- ▶ Connection of the navigation system to the device results in a medical system for which the system supplier (manufacturer of the navigation system) must meet the stipulated requirements (approval, qualifications, etc.). All accompanying papers required will be supplied by the manufacturer of the navigation system.

Prerequisite

☑ The navigation antenna has been installed on the microscope (by trained personnel from the navigation system manufacturer)

Action

1. If you use a standard navigation system: Connect the navigation system directly to the device; for this purpose, read and observe the manufacturer's corresponding instructions.
2. If you use an extended navigation system: Connect the navigation system to the device via the network; for this purpose, read and observe the manufacturer's correponding instructions.
3. To install functionalities of the navigation system in the device, activate the navigation system in the "Settings MultiVision" menu [▶ 126].

Empty page, for your notes

5 Daily startup

5.1 Safety during preparation

⚠ CAUTION!

Functional deterioration!

We recommend taking adequate precautions, depending on the application, to enable the surgical procedure or treatment to be finished without using this microscope (for example in case of a system defect).
As the age of the light source increases, the illumination intensity achieved in a particular setting decreases. Please replace the xenon lamp in due time. Please note the remaining service hours displayed on the touchscreen.

- ▶ Check the instrument for proper functionality or damage before each use.
- ▶ Perform a function test; if required, replace the lamps prior to using the system.
- ▶ Make sure that no tissue damage is caused by excessive illumination intensity.
- ▶ Always keep a backup lamp ready so that you can replace a defective lamp following surgery.

NOTE

Do not cover the ventilation openings!

Overheating of the device

- ▶ Do not cover the ventilation openings, as overheating of the light source will cause the device to switch off.

5.2 Setting the position of the handgrips

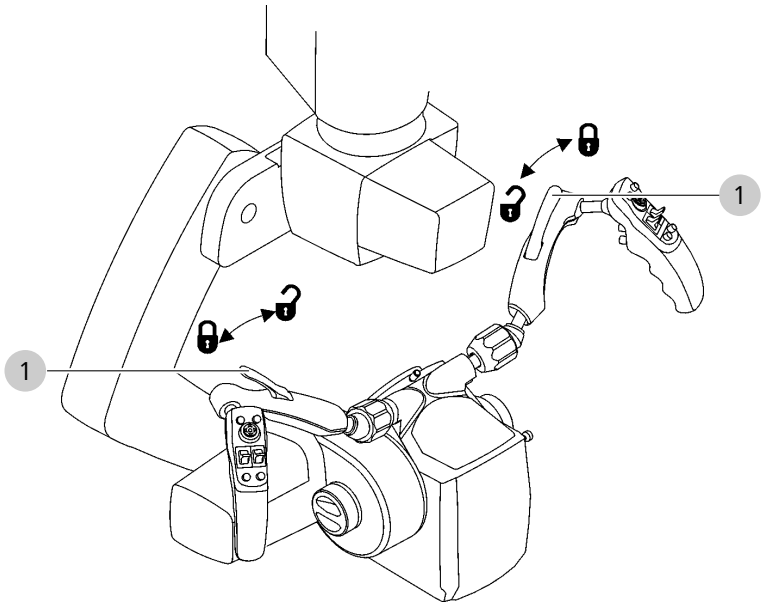


Figure 60: Setting the position of the handgrips

1	Locking lever

Action

1. Open the locking lever and swivel the mounting bracket or only the handgrip into the desired position.
   The handgrip, including the clamp, can be swiveled approx. 180°.
2. Choose an ergonomic position of the handgrips appropriate for the surgical procedure.
3. Tighten the clamping levers hand-tight.
4. Then check whether the required swiveling ranges of the microscope are sufficient and any collisions with attached accessories can be excluded (lateral co-observer).

5.3 Positioning the device in the OR

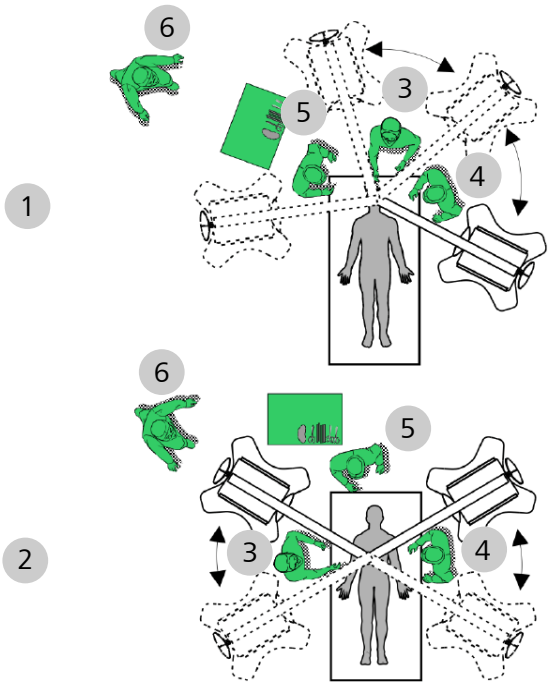


Figure 61: Positioning the device in the OR

1	Possible positions for cranial procedures	2	Possible positions for face-to-face (spine) procedures
3	Surgeon	4	Assistant
5	Sterile specialist	6	Non-sterile specialist

5.4 Check the movement freedom of the device!

⚠ CAUTION!

Check the movement freedom of the device!

Position the device so that it can be pushed away from the patient at any time.
Since the connector of the power inlet socket is used as a disconnect device, the disconnect device must remain freely accessible.

5.5 Configuring the device for applications

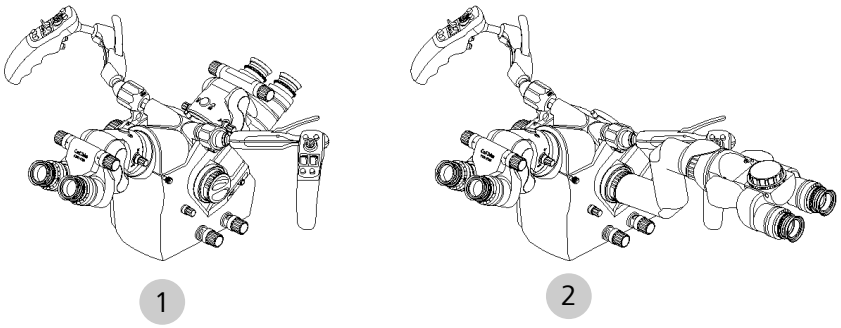


Figure 62: Configuring the device for applications

1	Configuring the device for “face-to-face” co-observation (spine)	2	Configuring the device for “left/right” co-observation (cranial)

5.6 Drape position

The drape position is saved as a factory setting, however, can be changed arbitrarily.

⚠ CAUTION!

Risk of crushing!

Fingers may be crushed between the vertical arm and the horizontal arm.

- ▶ The drape position may be used only without a patient!
- ▶ Never touch the area between the vertical arm and the horizontal arm while the device is moving to the drape position.

Action

1. Tap on Settings ⟶ Stand.
2. Tap on the [Start] button in the “Start Drape Position” field.
3. To activate the travel, press the XY joystick button on the right handgrip to the right and hold it down until the drape position has been reached. The joystick on the FCP also can be used to activate the travel.
4. The device then automatically travels to the drape position.
   ⇨ When the drape position has been reached, this is acknowledged by a signal tone.

Save Current Position as Drape Position:

5. See Drape position [▷ 122] Save Current Position.

5.7 Attaching SMARTDRAPE

⚠ CAUTION!

Using drapes from other manufacturers may result in deviations of the optical parameters.

The cover glasses on drapes from other manufacturers may impair the optical characteristics of the device. This may result e.g. in the transmission of falsified navigation data.

- ▶ Use only a ZEISS SMARTDRAPE for the device.

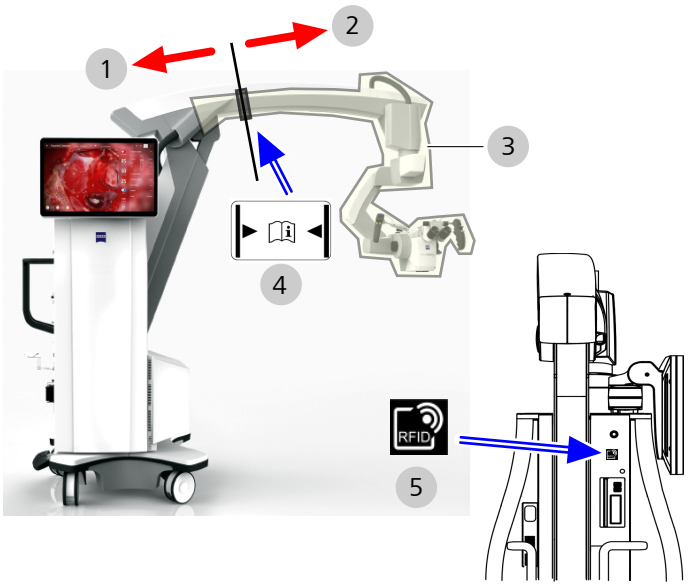


Figure 63: Attaching SMARTDRAPE

1	Non-sterile area	2	Sterile area
3	Effective area of drape suction system	4	Marking: Close SMARTDRAPE air-tight here
5	RFID reader		

Prerequisite

☑ When using drapes from third-party manufacturers without RFID detection, the autodrape function (air extraction for easier draping) is not available.

ZEISS SMARTDRAPE (užsakymo numeris 306028-0000-000) yra išbandyta naudoti su navigacijos sistemomis.

☑ ZEISS SMARTDRAPEs (order number 306028-0000-000) are tested for use with navigation systems.

Action

1. For draping the microscope, motorized travel to Drape position [▷ 122], which is available ex works, can be executed. This position can be changed and resaved at any time.
2. Unpack the SMARTDRAPE and pull it over the surgical microscope and the horizontal arm.
3. Pull the SMARTDRAPE over the marking on the horizontal arm. When attaching the SMARTDRAPE, make sure that there is sufficient free space for swiveling, tilting and rotating movements of the surgical microscope.

Sandariai priklijuokite SMARTDRAPE ant pažymėtos vietos, naudodami vieną iš tvirtinimo juostelių.

4. Seal the SMARTDRAPE airtight at the marking using one of the fastening straps.

Nuimkite RFID etiketę nuo SMARTDRAPE ir laikykite arba pritvirtinkite ją prie RFID skaitytuvo.

5. Remove the RFID label from the SMARTDRAPE and hold or fasten it on the RFID reader.

Kai tik yra nuskaitomas kodas, galima naudoti „AutoDrape“ funkciją.

   ⇨ Once the code has been read in, the AutoDrape function is available.

6. Open the additional menu “Extended operation” [▷ 56] on the touchscreen.
7. Press the AutoDrape button in the main menu to activate the AutoDrape suction pump.

The suction system operates at maximum power during the first approx. 2 minutes. Then it automatically switches to a reduced power to maintain a vacuum.

5.8 Autobalance

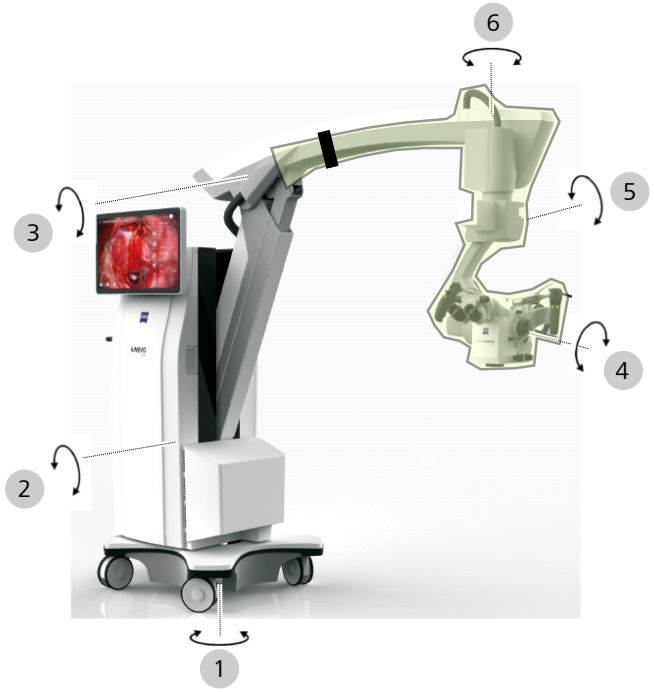


Figure 64: Autobalance

⚠ CAUTION!

Use the device in perfectly balanced condition only!

With an incorrectly balanced device, actuation of the brake buttons may lead to uncontrolled movements of the device.

- ▶ Balancing and the subsequent test must not be performed when the system is positioned over the patient and may be done only at a safe distance from other persons and devices.
- ▶ Check the balance of the device by actuating the brake buttons while holding the microscope securely by both handgrips. Repeat the autobalance if necessary.

Action

1. Autobalance the entire device: On the touchscreen, tap on the [System] button in the additional menu "Extended operation" [▷ 56].
2. Autobalance Drape (balance axes 2 and 3): On the touchscreen, tap on the [Drape] button in the additional menu "Extended operation".

If the device has been correctly balanced, the surgical microscope can be moved almost effortlessly.

5.9 Adjusting the microscope

Action

1. Position the microscope vertically above a flat object, e.g. a written piece of paper.
2. Bring the eyepieces on the binocular tube to eye distance, so that the two eyepiece images (the object and the periphery of the field of view) merge to produce a single image.
3. Set to the smallest magnification on the microscope. Select as short a working distance as possible (shortest working distance + approx. 25 mm).
4. Adjust the diopter setting ring on the eyepiece to 0 dpt. (diopters).
5. Look through the eyepiece and focus the image sharply.
6. Set the microscope to the highest magnification and correct the fine focusing until the image is defined sharply.
7. Now set to the smallest magnification once again without changing the working distance.
8. Adjust the diopter setting ring on the eyepiece to the maximum positive dpt. value (e.g. +5 dpt.).
9. Look through the eyepiece and slowly turn the diopter setting ring in the minus dpt. direction until the image is once again defined sharply.
10. Repeat the entire procedure for the second eyepiece.
    ⇨ The microscope is now adjusted so that a constantly sharp image is produced throughout the entire magnification range without your having to refocus after changing the magnification value.
11. If you nevertheless still have to refocus, repeat this procedure.
12. Adjust the eyecups so that you can survey the entire field of view.
    Observation with eyeglasses: Screw in the eyecups completely.
    Observation without eyeglasses: Unscrew and adapt the eyecups individually.

5.10 Activating the navigation system

Once the navigation system has been connected to the device, trained personnel from the manufacturer of the navigation system must perform the calibration and inspection of the navigation functionalities.

⚠ CAUTION!

Fault navigation!

The navigation antenna may become maladjusted due to a collision during transport or coarse positioning.

- ▶ Check the calibration of the navigation system according to the manufacturer's specifications before every use.

Prerequisite

☑ The navigation system is connected to the device [▶ 116]

Action

1. Tap on ⚙ Settings → MultiVision.
2. Activate the "MultiVision" slide switch.
   ⇨ The "MultiVision" function is switched on, the data injection of the navigation system can be activated.
3. Activate the "Navigation" function in the "Source" field.
4. Depending on the navigation system connected, activate the "Navigation (standard)" or the "Navigation ("extended") function.
5. Have the calibration and inspection of the navigation functionalities performed by trained personnel from the navigation system manufacturer.

Result

✓ Following successful calibration and inspection, you can install the functionalities of the navigation system on the device and use them there.

6 Operation

6.1 Software configuration

6.1.1 Touchscreen

⚠ CAUTION!

Do not touch the touchscreen if it has failed!

There is a possibility that only the illumination of the display has failed. In this case, you would access menus or change values inadvertently.

- ▶ Do not touch the surface of the touchscreen if the device is switched on and its screen is dark.

6.1.2 Configuring the microscope

Tap on ⚙ Settings → Microscope.

6.1.2.1 Configuring the illumination

You can assign illumination settings user specifically in the “Light” menu.

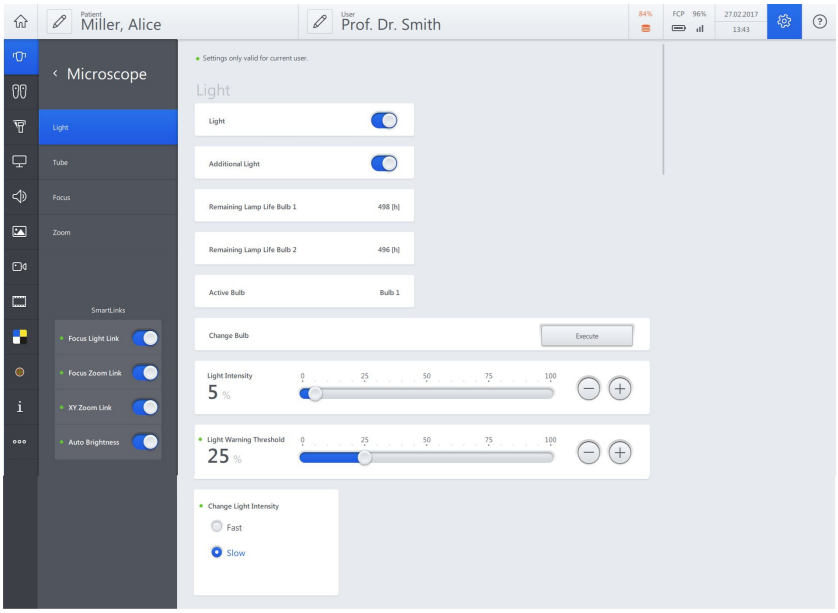


Figure 65: “Settings Microscope” menu, “Light” submenu

The following functions are included:

- Light on/off
- Additional Light on/off
- Set Light Intensity

The “Focus Light Link” function can be set via “SmartLinks” in the “Light” menu **or** in the main menu bar on the touchscreen.

Action

1. Tap on Settings → Microscope → Light.
2. Whenever the illumination is switched on, you also can switch on the additional light:
   → Additional Light → Switch-on .
3. Use the [Light intensity] controller to set the required illumination intensity.

⚠ CAUTION!

Reduction in the light intensity

If the magnification value selected is high, the diameter of the field of view decreases and the light intensity at the surgeon's eye is reduced, however, the light intensity in the surgical field stays the same. When working at high magnification, you should therefore pay particular attention to the set light intensity to prevent burns, especially of the surrounding tissue.
This effect is enhanced by using certain accessories e.g.:

- eyepieces with higher magnification,
- 3-step magnification changers or
- a foldable tube f170/f260 with tube magnification (PROMAG function).

4. Set the required warning threshold level on the [Light Warning Threshold] controller.
   ⇨ The value set is displayed in the “Light” menu.
   If the light warning threshold is exceeded, this is displayed by an orange color in the live menu, in the main menu bar, Light Intensity controller.
5. Select the speed of light intensity change with the buttons on the handgrip and the foot control panel, i.e. [High] or [Low].
6. In the “SmartLinks” menu you can use the “Focus-Light Link” to activate or deactivate the function.
   ⇨ Activated: The maximum adjustable light intensity is limited depending on the working distance used.
7. In the “SmartLinks” menu you can activate or deactivate the “Auto Brightness” switch.
   ⇨ Activated: Automatic control of the light intensity for constant image brightness in the eyepiece.
8. Check the remaining lamp operating time of both “bulbs” in the light source (the active lamp is “Bulb 1”).

⚠ CAUTION!

Limited service life of the xenon lamp!

If the xenon lamps are used after the guaranteed lamp operating time of 500h has expired, it cannot be excluded that the lamp may fail or even burst during use.

- ▶ Replace the xenon lamp when its operating time of 500 hours has expired. The new xenon lamp will then once again display 0 expired lamp operating hours.

9. Tap on the [Change Bulb] button.

6.1.2.2 Configuring the tube

Action

1. Tap on ⚙ Settings ⟶ Microscope ⟶ Tube.
2. Tap on the focal length of the tube used: (170 mm for tiltable tube and foldable tube, 260 mm for foldable tube with magnification).
3. Tap on the eyepiece magnification of the eyepieces used: (10x or 12.5x).
4. Tap on the magnification of the optional 3-position magnification changer.
5. Tap on the selection of the co-observer:
   Image outputs face-to-face: Face-to-face for tiltable tube or foldable tube
   Image outputs left and right: Right and left for stereo co-observation module or photo adapter for external camera.

6.1.2.3 Configuring the focus

Action

1. Tap on ⚙ Settings ⟶ Microscope ⟶ Focus.
2. Set the desired value with the [Start Value] controller.
   ⇨ The microscope starts with this working distance after it is switched on.
3. Set the desired value with the [Speed] controller.
   ⇨ Set the speed of the motorized fine focus adjustment.
4. Set the desired value with the [Autofocus Speed] controller (option).
   ⇨ Adjust the autofocus speed
5. Tap on the [Autofocus] button (option).
   ⇨ On: Autofocus is automatically activated each time the brakes are closed.
   ⇨ Off: Autofocus is triggered via a configurable button on the handgrip or the foot control panel.
   The autofocus is not available during a few specific applications, e.g. when using a micromanipulator (Focus Lock function). A corresponding acoustic signal is then emitted.
6. Tap on the [Laser Focus Aid] button (option).

⇨ Laser Focus Aid on: The focusing laser is switched on when the brakes are released or the motorized fine focus adjustment is actuated.

⇨ Laser Focus Aid off: The focusing laser is switched off.

7. Tap on the [Focus Lock] button. For the application of an optional micromanipulator with a fixed working distance.

   ⇨ Focus Lock on: Autofocus out of operation. Focus rocker switch on handgrip/foot switch out of operation.

   ⇨ Focus Lock off: Autofocus functioning. Focus rocker switch on handgrip/foot switch active.

8. Select the depth of field. Tap on the desired selection field in the "Focus Depth" selection field.

   ⇨ High: High depth of field - less light - lower image resolution

   ⇨ Low: Low depth of field - more light - higher image resolution

The "Focus Depth" field is not displayed when the BLUE 400 and YELLOW 560 options are activated.

6.1.2.4 Configuring the zoom

Action

1. Tap on Settings → Microscope → Zoom.
2. Set the desired value with the [Start Value] controller.
3. Set the desired value with the [Speed] controller.

6.1.2.5 Configuring SmartLinks

Action

1. Tap on Settings → Microscope.

   ⇨ Four SmartLinks are available for your selection in the microscope menu:

2. Activate the Focus Light Link function.

   ⇨ This limits the maximum light intensity for the selected working distance (zoom).

3. Activate the Focus Zoom Link function.

   ⇨ The focusing speed is automatically adapted to the magnification. The preselected focusing speed is automatically reduced when a higher magnification is used.

4. Activate the XY-Zoom Link function.

   ⇨ Automatic adaptation of the motorized XY travel speed to the magnification. The preselected travel speed is automatically reduced when a higher magnification is used.

5. Activate the Auto Brightness.

   ⇨ This regulates the light intensity for constant brightness in the eyepiece depending on the working distance and magnification.

6. Close the “Settings” menu by tapping on the ⌂ button.

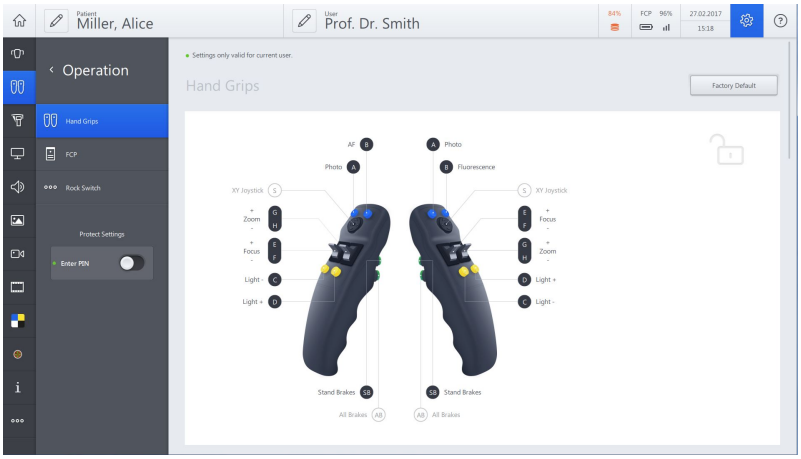
6.1.3 Configuring the button assignment of the hand grips, foot control panel and rocker foot switch

6.1.3.1 Configuring the handgrips

In the “Handgrips” menu, you can assign user-specific functions to the buttons.

Action

1. Tap on ⚙ Settings → Operation → Handgrips.



2. To assign a function to a button: Tap on the corresponding letter e.g. [A].
   ⇨ A field with the available functions appears in the selection field on the right side.
3. Tap on the function to be assigned to the button.
   ⇨ The function is accepted and displayed next to the button symbol.
4. You can swap the zoom and focus functions of the two rocker switches and change the respective direction (+/-).
5. Tap on the rocker switch symbols [E-F], [G-H].
   ⇨ The available functions appear in the selection field on the right side.
6. Tap on the function to be assigned to the rocker switches.
   ⇨ The function is accepted and displayed next to the button symbol.

One of the configurable handgrip buttons also can be configured to change between the motorized movement modes (“Stand” XY Adjustment Mode menu).

7. To assign a function to a button: Tap on the corresponding letter e.g. [A].
8. Tap on the function in the selection field: [XY Mode] See XY Mode movement modes [▷ 136].

6.1.3.2 Configuring the brake release buttons

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

- The lower button [AB] is not configurable. When pressed, it releases all microscope and stand axes for positioning.
- The upper button [SB] (Selected Brakes) can be used to enable various movement modes, depending on the system configuration.

Action

1. Tap on Settings ⟶ Operation ⟶ Handgrips.

2. Assign a function to the [SB] button: Tap on an [SB] button symbol.
   ⇨ The available functions appear in the selection field on the right side.
3. Tap on a function in the selection field to be assigned to the button (e.g. SB: Release stand brakes).
   ⇨ The function is accepted and displayed next to the button symbol.

TIP: Test the button assignment and the functions of the brake release buttons before every application and without a patient.

6.1.3.3 Configuring the foot control panel (FCP)

In the "FCP" menu, you can assign user-specific functions to the buttons.

Action

1. Tap on Settings → Operation → FCP.
2. To assign a function to a button: Tap on a button symbol, e.g. [A].
   ⇨ The available functions appear in the selection field on the right side.
3. Tap on a function in the selection field to be assigned to the button.
   ⇨ The function is accepted and displayed next to the button symbol.
4. The zoom and focus functions can be swapped or the direction (+/-) can be changed.
5. Tap on the rocker switch symbols [I-G], [J-H].
   ⇨ The available functions appear in the selection field on the right side.
6. Tap on a function in the selection field to be assigned to the rocker switches.
   ⇨ The function is accepted and displayed next to the button symbol.

One of the configurable FCP buttons also can be used to change between motorized movement modes ("Stand" menu XY mode). Detailed information: XY Mode movement modes [▶ 136].

7. To assign a function to a button: Tap on the corresponding letter e.g. [A].
8. Tap on the function [XY adjustment mode] in the selection field.
9. Check the button assignment and the functions of the foot control panel before every application and without a patient.

6.1.3.4 Configuring the rocker foot switch

Action

1. Tap on Settings → Operation → Rocker foot switch.
2. To assign a function to the rocker foot switch: Tap on button symbol [A] or [B]
   ⇨ The available functions appear in the selection field on the right side.
3. Tap on a function in the selection field to be assigned to the button.
   ⇨ The function is accepted and displayed next to the button symbol.

When the following functions are selected for a rocker foot switch, the second rocker foot switch is automatically assigned:

- Light: Light brighter (top button) / Light darker (bottom button)
- Zoom: + (top button) / - (bottom button)
- Focus: + (top button) / - (bottom button)

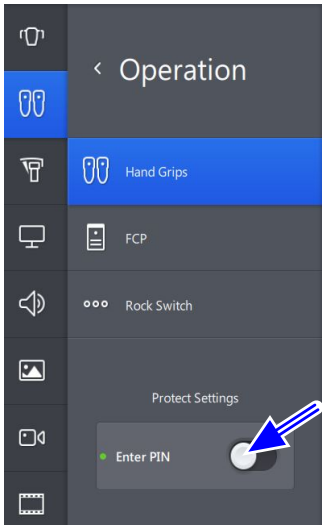
4. Check the button assignment and the functions of the rocker foot switch before every application and without a patient.

6.1.3.5 Protection of settings

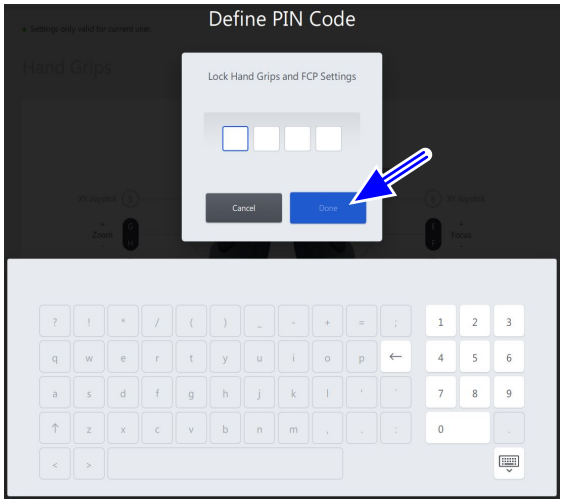
Every user can protect his handgrip and foot control panel configuration against third-party access with a password (PIN). Settings thus protected can be changed again only after unlocking them with the valid PIN.

Action

1. Tap on Settings → Operation.
2. Tap on the [PIN input] button to activate the lock .



3. Enter a 4-digit PIN.



4. To save the PIN: Tap on the [Done] button.

⇨ The switch in the [PIN input] button lights up blue  .
In the "Operation" menu, this is displayed for all controls at the upper right by the symbol.
The PIN lock is jointly **active** for all controls.

5. To **Unlock** tap on the [PIN input] button 
6. Enter your PIN.
7. Tap on the [Done] button.

⇨ The switch in the [PIN input] button lights up gray  .
The PIN lock is jointly **deactivated** for all controls.
In the "Operation" menu, this is displayed for all controls at the upper right by the symbol.

8. Close the "Settings" menu by tapping on the button.

6.1.4 Configuring the stand

Action

1. Tap on ⚙ Settings ⟶ Stand.

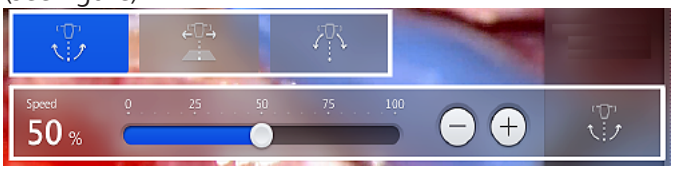
6.1.4.1 XY Mode movement modes

- Different brakes are released during the manual movement modes. Here, the microscope is steered via the handgrips by pressing “AB” (all microscope and stand brakes constantly activated) and the “SB” buttons.

  The manual movement modes can be configured in ⚙ Settings ⟶ Operation ⟶ Handgrips ⟶ SB Button.

- For the motorized movement modes, microscope movements are executed via motor drive by actuating the joystick on the handgrip or the FCP.

  The motorized movement modes can be configured in ⚙ Settings ⟶ Operation ⟶ on the handgrips or on the FCP. The speeds of the motorized movement modes can be adjusted via the “Stand” menu or in the main menu bar on the touchscreen (see figure).



  One of the configurable handgrip or FCP buttons also can be configured to change between the motorized movement modes. (⚙ Settings ⟶ Operation ⟶ Handgrips ⟶ XY Adjustment Mode).

6.1.4.1.1 Manual movement modes

- Release “Stand Brakes”

  In this mode, the brakes of the stand axes are released. The microscope remains fixed in its axes and can be moved freely about stand axes 1, 2 and 3 when the “SB” button is pressed on the handgrip.

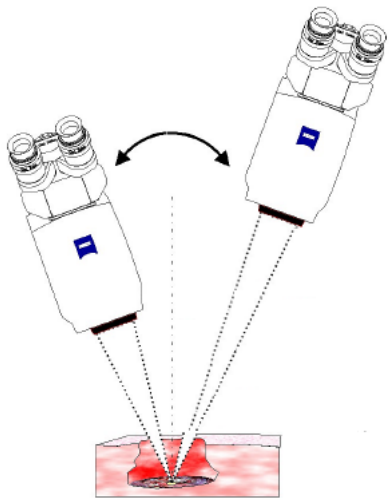
- Release “microscope brakes”

  In this mode, the brakes of the microscope are released with fixed stand axes. The microscope can be moved freely about axes 4, 5 and 6 when the “SB” button is pressed on the handgrip.

Figure 66: Overview of rotary axes: Stand axes: 1-3, microscope axes: 4-6

- "PointLock"

  If the "SB" button on the handgrip is pressed, the microscope can be moved and repositioned while the focal point remains in the center of the field of vision.
  The working distance can be adjusted within the available focal length range of 200 ... 625 mm while the microscope is moved about the object to be observed. If you change the working distance while pivoting, the focus is automatically reset and the object in the center of the field of view remains sharply focused.



6.1.4.1.1.1 Configuring manual movement modes

Action

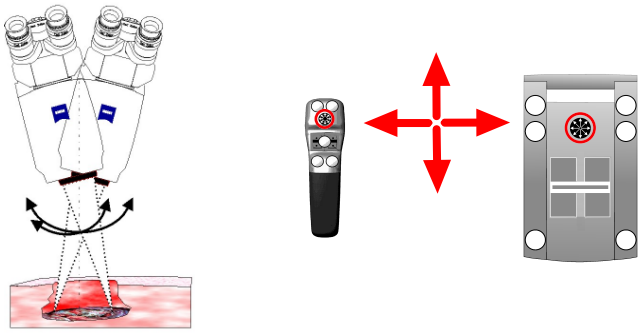
1. Tap on Settings → Operation → Handgrips.
2. Tap on the [SB] button. It's the upper green brake release button on the back of the handgrip.
   ⇨ The assignable functions are displayed on the right side:
   "Stand Brakes"
   "Microscope Brakes"
   "PointLock"
3. Tap on the desired function.
   ⇨ The assigned functions are displayed next to the [SB] button.
4. Close the "Settings" menu by tapping on the button.
5. Press and hold the [SB] brake release button with the desired function on the handgrip.
   ⇨ "Stand Brakes": Only stand axes 1, 2 and 3 can be moved freely manually now.
   ⇨ "Microscope Brakes": Only microscope axes 4, 5 and 6 can be moved freely manually now.

⇨ "PointLock": Manual movement of the microscope.
In this movement mode, the working distance also can be changed and the center of the field of view automatically remains sharply focused (within the working distance range of 200...625 mm).

6.1.4.1.2 Motorized movement modes

6.1.4.1.2.1 Microscope movement mode

The microscope can be moved by motor in the three axes of its suspension, 4, 5 and 6. Precise motorized XY movement of the focal point is thus enabled by tilting and swiveling the microscope with a fixed working distance. The stand does not move in the process. Movement can be triggered via the joystick on the handgrip or the FCP if the corresponding XY movement mode was selected in the "Stand" menu. The movement speed is individually adjustable.



Prerequisite

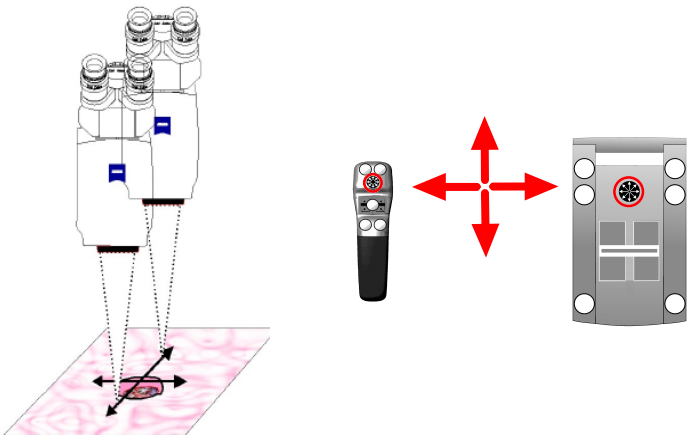
☑ Position the microscope above the desired surgical field and focus on the section to be observed.

Action

1. Tap on ⚙ Settings ⟶ Stand.
2. In the [XY Adjustment Mode] selection field, tap on the [Microscope] button.
3. Adjust the "Motorized XY Speeds" of the controllers to the desired speed on the [Microscope] controller.
   The "Motorized XY Speeds" function can be set via the "Stand" menu or in the main menu bar on the touchscreen.
   ⇨ The assigned speed is displayed on the respective controller.
4. Close the "Settings" menu by tapping on the ⌂ button.

6.1.4.1.2.2 Stand movement mode

The microscope can be moved by motor in the three axes 4, 5 and 6 in the XY focal plane without tilting or swiveling; the horizontal alignment of the eyepieces always remains unchanged. This enables precise motorized XY movement of the focal point at a fixed working distance.
Movement can be triggered via the joystick on the handgrip or the FCP if the corresponding XY movement mode was selected in the "Stand" menu. The movement speed is individually adjustable.



Prerequisite

☑ Position the microscope above the desired surgical field and focus on the plane to be observed.

Action

▶ Tap on ⚙ Settings ⟶ Stand.

▶ In the [XY Adjustment Mode] selection field, tap on the [Stand] button.

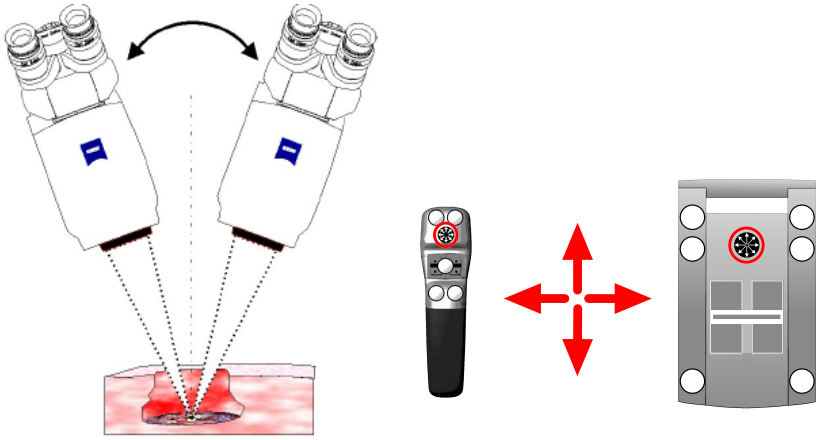
▶ Adjust the "Motorized XY Speeds" of the controllers to the desired speed on the [Stand] controller.
The "Motorized XY Speeds" function can be set via the "Stand" menu or in the main menu bar on the touchscreen.

⇨ The assigned speed is displayed on the respective controller.

▶ Close the "Settings" menu by tapping on the ⌂ button.

6.1.4.1.2.3 PointLock movement mode

This motorized movement function enables time-saving and precise movement of the microscope, during which the microscope remains focused on the focal point (center of the field of vision). Movement can be triggered via the joystick on the handgrip or the FCP if the corresponding XY movement mode was selected in the "Stand" menu. The movement speed is individually adjustable. In the Motorized PointLock mode, you can use the joystick on the handgrip or the FCP to motorically pivot the microscope in the same direction as the joystick (CCW/CW/forward/back – in 90° increments only!) and only with a fixed working distance!).



Prerequisite

☑ Position the microscope above the desired object point and focus on this point.

Action

1. Tap on ⚙ Settings ⟶ Stand.
2. In the [XY Adjustment Mode] selection field, tap on the [PointLock] button.
3. Set the "Motorized XY Speeds" controllers and the [PointLock] controller to the desired speed.
   The "Motorized XY Speeds" function can be set via the "Stand" menu or in the main menu bar on the touchscreen.
   ⇨ The assigned speed is displayed on the respective controller.
4. Close the "Settings" menu by tapping on the ⌂ button.

6.1.4.1.2.4 Configuring the "XY Movement Mode" handgrip button

One of the configurable handgrip or FCP buttons also can be configured to change between the motorized movement modes.

Action

1. Tap on Settings → Operation → Handgrips or FCP.
2. To assign a function to a button of a handgrip or the FCP: Tap on the corresponding letter of the button e.g. [A].
   ⇨ In the "Handgrips" or "FCP" menu, a selection field with the available functions appears on the right side.
3. Tap on [XY adjustment mode] in the selection field.
   ⇨ The function is accepted and displayed next to the button symbol.

Check the button assignment and the functions of the handgrips or the foot control panel before every application and without a patient.

6.1.4.1.2.5 Park position

⚠ CAUTION!

Risk of crushing!

Fingers may be crushed between the vertical arm and the horizontal arm.

- ▶ The park position may be used only after the application (without a patient) or when transporting the device!
- ▶ Never touch the area between the vertical arm and the horizontal arm while they are moving to the park position.

Action

1. Put the monitor (optionally: both monitors) in the transport position.

2. Tap on Settings → Stand → Move to park position → Start.
3. To activate the travel, press the XY joystick button on the right handgrip to the right and hold it down until the park position has been reached. The joystick on the FCP also can be used to activate the travel.

4. The device now automatically travels to the park position.

⇨ When the park position has been reached, this is acknowledged by a signal tone.

6.1.4.1.2.6 Drape position

The drape position is saved as a factory setting, however, can be changed arbitrarily.

⚠ CAUTION!

Risk of crushing!

Fingers may be crushed between the vertical arm and the horizontal arm.

- ▶ The drape position may be used only without a patient!
- ▶ Never touch the area between the vertical arm and the horizontal arm while the device is moving to the drape position.

Action

1. Tap on Settings ⟶ Stand.
2. Tap on the [Start] button in the “Start Drape Position” field.
3. To activate the travel, press the XY joystick button on the right handgrip to the right and hold it down until the drape position has been reached. The joystick on the FCP also can be used to activate the travel.
4. The device then automatically travels to the drape position.
   ⇨ When the drape position has been reached, this is acknowledged by a signal tone.

Save Current Position as Drape Position:

5. See Drape position [▷ 143] Save Current Position.

6.1.4.2 Position Memory

You can intraoperatively save the current position of the microscope, its orientation to the object, the working distance and the magnification at any time during a surgical procedure via a preconfigured handgrip or FCP button or recall these parameters again directly via the monitor.

You no longer can move to the saved positions in the following cases:

- The device was restarted (the reference coordinate system of the stand was reinitialized)
- The power supply was interrupted (the reference coordinate system of the stand was reinitialized)
- The parking brakes of the device were released and the device was moved
- The patient was moved

6.1.4.2.1 Configuring the position memory

Action

1. Tap on Settings → Operation → Handgrips or FCP.
2. To assign the position memory function to a button of a handgrip or the FCP: Tap on the corresponding letter of the button e.g. [A].
   ⇨ In the “Handgrips” or “FCP” menu, a selection field with the available functions appears on the right side.
3. Tap on [Position Memory] in the selection field.
   ⇨ The function is accepted and displayed next to the button symbol.

6.1.4.2.2 Saving a position

⚠ CAUTION!

Do not use images created with “Save Position” for diagnostic purposes.

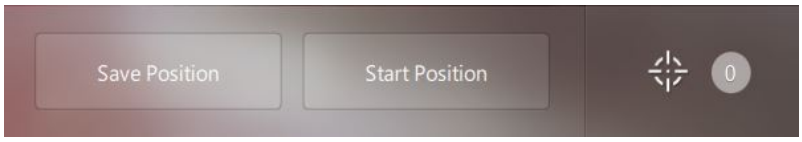
No diagnosis may be made based on the position memory, as the patient position is not calibrated with the device position and may differ from the latter.

▶ Images may contain deviations with respect to position, scale, shape, contrast and color.

Action

1. Tap on the handgrip button or FCP button configured with “Position Memory”.
   ⇨ A thumbnail of the acquired photo is briefly displayed above the [Photos] button on the touchscreen. The photo is stored in the patient data along with the current microscope position, working distance and magnification by pressing the “Position” symbol ⌖.
2. You also can use the ⌖ button on the touchscreen at the bottom in the main menu bar.

⇨ The "Position Memory" menu is displayed at the bottom right on the touchscreen.



3. Tap on [Save Position].

6.1.4.2.3 Travel to a position

Action

1. Press and hold the Position button for at least 2 sec. A selection menu with all of the currently stored positions opens on the touchscreen.
2. Push the joystick button on the right handgrip or on the FCP up/down to navigate to the desired stored position.
3. The active position is highlighted in blue.
4. Press the joystick button on the handgrip or the FCP to the right and hold it down until the position has been reached.
   ⇨ When the position has been reached, this is acknowledged by a signal tone.

6.1.4.2.4 Setting the positioning speed

Action

1. Tap on Settings → Stand → and scroll down in the Stand menu.
2. Set the desired positioning speed with the slide control (slider).
3. Close the "Settings" menu by tapping on the ⌂ button.

6.1.5 Configuring displays

Display on external monitors, on the touchscreen for the INFRARED 800 option

Action

1. Tap on Settings → Displays.
2. In this menu, you define which display is to be displayed with which quality on external monitors or with which display INFRARED 800 is to be displayed on the touchscreen.
3. Close the "Settings" menu by tapping on the ⌂ button.

6.1.6 Configuring Audio

Action

1. Tap on Settings → Audio.
2. Internal Microphone: → Use switch for video recording → Switch-on .
3. Internal Microphone: → Forward to line-out switch → Switch-on .
4. External Input: → Use switch for video recording → Switch-on .
5. External Input: → Forward to line-out switch → Switch-on .
6. External Input: → Forward to internal loudspeaker switch → Switch-on → . Set the volume with the controller.
7. Volume: Video Playback: → Set the volume with the controller.
8. Volume: Volume: System Sounds: → Set the volume with the controller.
9. Close the "Settings" menu by tapping on the button.

6.1.7 Configuring Photo

Action

1. Tap on Settings → Photo.
2. Selection: Recording
   → Images with external photo camera (DSLR, option)
   → Single images with internal video camera
3. Selection: Storage format for images taken
   → Save in PNG format
   → Save in JPEG format
4. Light intensity for external camera: → 100% switch → Switch-on .
   ⇨ Utilization of the maximum xenon light output (100%) is necessary for taking photos with an external camera.
5. Close the "Settings" menu by tapping on the button.

6.1.8 Configuring the video camera

All settings in this menu are displayed in the preview image.

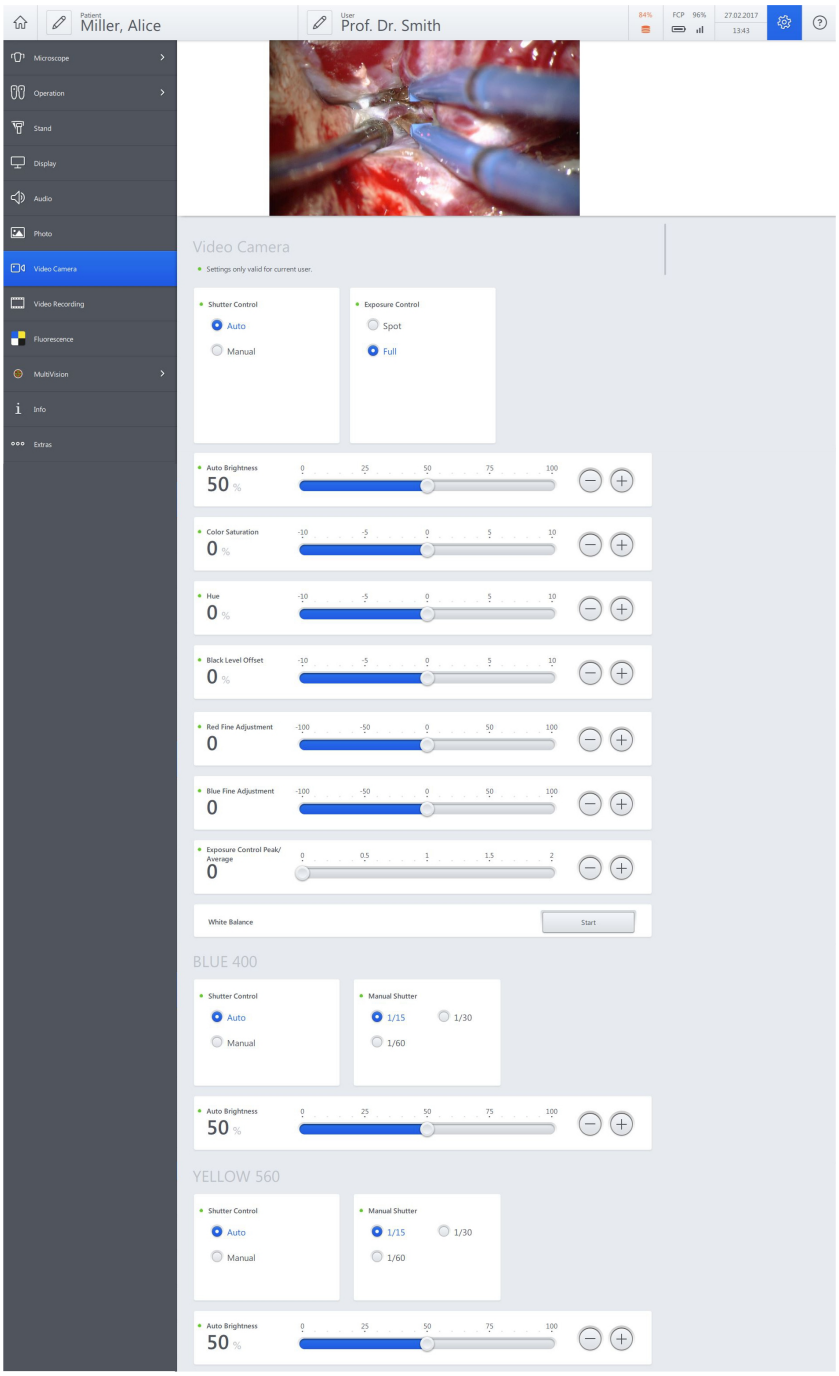


Figure 67: "Settings Video Camera" menu

Action

1. Tap on Settings → Video Camera →.
2. Scroll down in the menu.
3. Set the parameters of the video camera as desired.

6.1.8.1 Setting the brightness

- Automatic: The video camera automatically controls the exposure time and attempts to keep the set brightness constant.
- Manual: The video camera does not control the image brightness; the exposure time can be set manually.
- Spot: The exposure is measured in a very small area in the image center. For working in narrow channels
- Full: The exposure is measured over the entire video image. For a completely illuminated surgical field or strong local reflections.
- Set the desired exposure time manually.

Action

1. Select the "Shutter Control". To do this, tap on the [Auto] or [Manual] button in the "Brightness Control" selection field.
2. Select the "Exposure Control". To do this, tap on the [Spot] or [Full] button in the "Exposure Control" selection field.

6.1.8.2 Setting the auto camera brightness

The video camera automatically controls the exposure time and attempts to keep the set brightness constant.

Action

1. Use the [Auto Brightness] controller to set the required brightness.

6.1.8.3 Setting the color saturation and hue

You can set the hue and color saturation (chroma) of the integrated camera.

Action

1. Set the desired value with the [Color Saturation] controller.
   ⇨ A color saturation of ±0 usually provides the most natural color impression.
2. Set the desired value with the [Hue] controller.
   ⇨ Greater values produce more intensive colors.

6.1.8.4 Setting the black level offset

The black level offset indicates how bright the darkest part of the image is.

Action

1. Set the desired value with the [Black Level Offset] controller.
   ⇨ The smaller this value is, the darker the black will be.

6.1.8.5 Setting the red level, blue level and peak/average

You can set the coloring of the integrated camera via the red level and the blue level. You can influence the characteristic of the automatic exposure via the peak/average level.

Action

1. Use the controllers to set the desired levels [red, blue and peak/average levels].
   ⇨ Values of ±0 usually provide the most natural color impression.

6.1.8.6 White Balance

You can perform a white balance for the integrated camera. Here the system adjusts the signal of the integrated camera in such a way that white areas in the surgical field also appear white on the monitor.

Prerequisite

☑ The surgical microscope is aimed at a white object.

☑ The illumination is switched on.

☑ The field of view is sharply discernible.

Action

1. Start the white balance. Tap on the [White Balance] button.
   ⇨ The following prompt appears: “Please place a sheet of white paper underneath the microscope, focus on it and press “Next”!”
2. To start the white balance: Tap on the [Next] button. To interrupt the procedure: Tap on the [Cancel] button.
   ⇨ The message “Please wait - white balance in progress!” appears. After a successful white balance, the message "White balance completed successfully” appears. If it was not successful, the message “White balance failed” is displayed.
3. Following a successful white balance, tap on the [Close] button.
   ⇨ The white balance settings are saved user-dependently.
4. Close the “Settings” menu by tapping on the ⌂ button.

6.1.9 Configuring the video recording

Action

1. Tap on ⚙ Settings 🎞 → Video Recording.
2. Selection: Parallel Recording
   None → The data are always stored on the internal hard drive.
   USB → In addition, the data can be simultaneously recorded on a connected USB medium.
   Network → In addition, the data can be simultaneously recorded on a configured network drive.
3. 3D recording switch (option for stereo video camera): Selection whether the internal recording is to be made in 3D format. → Switch-on  .

4. Smart Recording: If activated (ON), this function enables the user to create a video clip (via the video recording handgrip button/FCP) with a start time that lies in the past.. → Switch-on .
5. Video Streaming: Activates video streaming (LAN or WLAN).
   → Switch-on .
6. Selection of video data quality
   → HD video corresponds to high quality
   → Low-Res video corresponds to low quality
7. Web address for video streaming: Up to 3 addresses can be displayed here (LAN, WLAN Client and WLAN HotSpot), under which an external device can connect to the KINEVO 900 for streaming.
   Start streaming:

   The network settings must have been configured and activated by the IT Admin under → Settings → Service PC →. Connect the external device to LAN, WLAN Client or WLAN HotSpot (see status information display [59]).
   Video Streaming → Switch-on .
   Activate HD or LowRes video streaming.
   Enter the web address on the external device and start stream.
8. Close the "Settings" menu by tapping on the button.

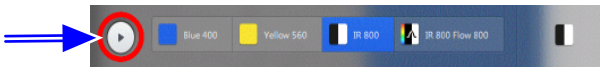
6.1.10 Configuring fluorescence

Action

1. Tap on Settings → Fluorescence.
2. Selection: Fluorescence mode (Only activated fluorescence options are displayed on the touchscreen and can be configured.)

   ⇨ BLUE 400
   ⇨ YELLOW 560
   ⇨ IR 800
   ⇨ IR 800 with FLOW 800
3. BLUE 400: Light Intensity → Set the start value with the controller.
4. YELLOW 560: Light Intensity → Set the start value with the controller.
5. IR 800: Selection of auto gain control:
   →Auto: The camera gain is controlled automatically. → Switch-on .
   →Manual: The camera gain is controlled manually. → Switch-off .

6. IR 800: Automatic fluorescence detection
   → The black leader without any fluorescence signal is hidden during the replay. → Switch-on .
   → The replay is played back incl. the black leader. → Switch-off .
7. IR 800: Direct activation: → Switch-on . INFRARED 800 starts immediately in the recording mode, the setup phase is skipped.
8. IR 800: AutoZoom:
   → The total magnification is automatically changed to the preconfigured value. → Switch-on .
   → A setup dialog for changing the total magnification outside of the preconfigured range is displayed. → Switch-off .
9. IR 800: Gain (start value) → Set the desired start value with the controller.
10. IR 800: Short Replay: The short replay is played back repeatedly until the preset number of short replays has been reached or the button programmed with FL is pressed on the handgrip or the FCP. The number of short replays is automatically limited to max. 10. → Set the number of short replays with the controller.
11. IR 800: Short Replay: Duration → Set the duration of the short replays with the controller.
12. IR 800: Number of long replays: The recorded fluorescence video is played back in full length until the preset number of replays has been reached or the button programmed with FL is pressed on the handgrip or the FCP. → Set the number of long replays with the controller.
13. IR 800 Zoom (start value): Magnification value to which the microscope is set for the start of the recording of the INFRARED 800 video. → Set the desired start value with the controller.
14. The respective fluorescence application also can be started or terminated from the main menu bar on the touchscreen.

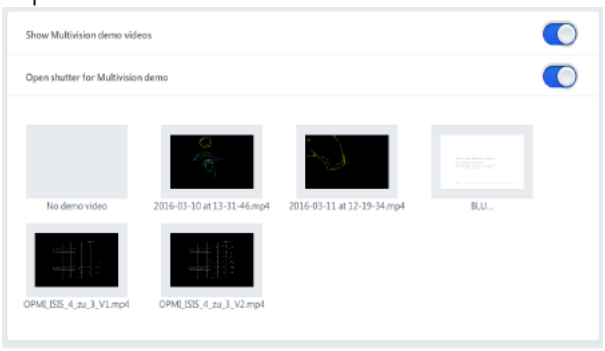


15. In the menu bar, tap on Fluorescence → Select the fluorescence application. → Start the fluorescence application → .
16. By pressing the button on the touchscreen, the configured FL button or the FCP button, you can activate the respective next phase of the INFRARED 800 fluorescence application.
    You can cancel the INFRARED 800 fluorescence application by pressing the FL button (for more than 3 seconds).
17. Close the "Settings" menu by tapping on the ⌂ button.

6.1.11 Configuring MultiVision

Action

1. Tap on Settings → Operation → Handgrips or FCP.
2. To assign the MultiVision function to a button of a hand grip or the FCP: Tap on the corresponding letter of the button e.g. [A].
   ⇨ In the “Hand grips” or “FCP” menu, a selection field with the available functions appears on the right side.
3. Tap on MultiVision in the selection field.
   ⇨ The function is accepted and displayed next to the button symbol.
4. Tap on Settings → MultiVision → MultiVision switch → Switch-on .
5. Select the MultiVision source. To do this, tap on the desired selection field.
6. Select the type of status displays on the display.
7. Use the [Brightness] slide control to set the desired brightness on the display.
8. Tap on → Show MultiVision Demo Videos .



   ⇨ The menu with MultiVision demo videos is displayed.
9. Open Shutter for MultiVision Demo → Switch-on .
10. (Option) Tap on → IR 800 Live Overlay .
11. (Option) Tap on → FLOW 800 Show .
12. (Option) Tap on → QEVO → Automatic Switch-off .
13. (Option) Tap on → QEVO → Marker .
14. Select the video source. To do this, tap on the desired selection field.
15. (Option) Depending on the navigation system connected, tap on → "Navigation (standard)" or "Navigation (extended)" .
16. Close the “Settings” menu by tapping on the button.

6.2 Managing users

In the “User” menu, you can manage a maximum of 40 users. You can assign a user language and various user-specific settings to each user.

- You can change the names of users. You cannot change the name of the default user.
- You can delete users. You cannot delete the active user or the default user.
- If the desired user is not displayed, scroll down on the touch-screen display.

6.2.1 Adding users

When you add a new user, the default factory settings are initially entered and and user-specific settings (marked with a green dot on the touchscreen) [▶ 54] can be entered by the user at any time.

Action

1. Tap on the [User] button in the status bar.
2. Tap on the button.
3. Enter: the name, language, interpupillary distance, diopters of the left/right eye, marking rings of the adjustable eyecup for the new user.
4. Tap on the [OK] button .
5. To select the new user as an active user, tap on the desired user name in the “Select User” menu.
   ⇨ The current user is highlighted in blue.
   ⇨ The new user is now highlighted in blue and displayed as the active user in the status bar.
6. Close the menu by tapping on the button.

6.2.2 Configuring users

In the status bar of the “Configure User" menu, you can perform the following user profile settings for the current user:

- Change user name
- Select language
- Add comment
- Enter interpupillary distance
- Enter diopters for left eye
- Enter diopters for right eye
- Marking rings on the adjustable eyecup

  If the values entered (for the interpupillary distance or diopters of the left and right eye) exceed the adjustable value limits, a note on the permissible values appears on the touchscreen.

Action

1. Tap on the [Configure User] button in the status bar.
2. Tap on the respective field: [User Name, Language, Comment ...].
3. Enter the user profile data.
4. Tap on the [Save] button.
   ⇨ The user profile settings were saved for the current user.

6.2.3 Export user settings to a USB storage medium.

Every user (incl. default users) can export his own complete user settings to a USB storage device in order to transfer them to another KINEVO 900. Only the IT admin user can at once select and export all user data records to a USB storage device.

Action

1. Select the user to be exported as the active user.
2. Tap on the [Configure User] button in the status bar.
3. Connect the USB storage device to the USB port.
4. Tap on the [Export] button to export the complete user settings to a USB storage device.

6.2.4 Importing the user settings from a USB storage device

(E.g. from another KINEVO 900)

A logged-in user (incl. default users) can import his personal user settings from a user record stored on a USB storage device. Only the IT admin can import complete user data records. Records imported in this way are created as new users.
When a new user is created, it is always checked whether this name already exists. If it does already exist, a suffix is appended to the newly added user name (e.g. “Ellen Edwards_2”).

Action

1. Tap on the [Configure User] button in the status bar.
2. Connect the USB storage device to the USB port.
3. Tap on the [Import] button to import the complete user settings from the USB storage device.
   ⇨ The list of user records stored on the USB storage device is displayed.
4. Select the user record to be imported.
   ⇨ The selected user record is imported.
   The selected user is displayed as the active user in the status bar.

6.2.5 Change of user

NOTE! It is not possible to change users during a video recording. Therefore, always terminate any running video recordings before changing users.

Action

1. Tap on the [User] button in the status bar.
   ⇨ The "Select User" menu is displayed. The current user is highlighted in blue.
2. Tap on the new user name.
   ⇨ The new user is displayed. The "Change of user" menu is hidden.

6.2.6 Copy User

Action

1. Tap on the [User] button in the status bar.
   ⇨ The "Select User" menu is displayed.
   All stored users are displayed. The user list is sorted alphabetically.
2. If a user is not displayed, scroll down the user list.
3. Tap on the [Configure User] button .
4. Select the desired user.
   ⇨ The desired user is highlighted in blue .
5. Tap on the [Copy] button at the bottom left to copy the user record.
   ⇨ The copy (with the suffix "_1" appended to the name) is displayed below the copied user.

6.2.7 Delete User

Action

1. Tap on the [User] button in the status bar.
   ⇨ The “Select User” menu is displayed.
2. Tap on the [Configure User] button .
   ⇨ All stored users are displayed. The user list is sorted alphabetically.
3. If the new user is not displayed, scroll down the user list.
4. Mark the box in front of the user name to be deleted.
   To delete multiple users simultaneously, mark the boxes in front of the names of all users to be deleted.
   ⇨ Selection is confirmed by a symbol.
5. Tap on the [Delete] button to delete the user name(s) you have selected.
   ⇨ The “Delete User” menu is displayed.
6. To delete the user(s): Tap on the [Yes] button.
   ⇨ The user(s) has/have been deleted.
7. Tap on the live image on the touchscreen to close the menu.

6.3 Managing patients

You can manage patient data in the “Patient” menu. In the patient menu, you can save, export or delete images, videos or data.

6.3.1 Adding a patient

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The “Patient” menu is displayed.
2. Tap on the [Add Patient] button .
   ⇨ The “Create New Patient” menu is displayed.
3. Tap on the respective field: [First name, Last name, Gender, Date of birth, Patient ID, Comments ...].
   ⇨ The virtual keyboard is displayed.
4. Enter the desired patient data.
   If the date is entered in the wrong format, a message will appear at the top of the touchscreen: “Wrong format. Use MM/DD/YYYY.”
5. Tap on the [Done] button.
   ⇨ The patient data were saved for the current patient.
6. To close the “Patient” menu: Tap on the [Patient] button or on the button in the status bar.

6.3.2 Changing patients

It is not possible to change patients during a video recording. Always terminate any running video recordings before changing patients.

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The "Patient" menu is displayed.
2. Tap on the new patient name.
   ⇨ The patient folder is displayed and created as the current patient.
3. To close the "Patient" menu: Tap on the [Patient] button or on the ⌂ button in the status bar.

6.3.3 Edit patient data

In the status bar of the "Edit patient data" menu ✎, you can perform the following settings for the current patient:

- Change first name
- Change last name
- Add comment
- Gender
- Date of birth
- Patient ID

Action

1. Tap on the [Edit patient data] ✎ button in the status bar.
   ⇨ The "Edit patient data" menu is displayed.
2. Tap on the respective field: [First name, Last name, Gender, Date of birth, Patient ID, Comments ...].
   ⇨ The virtual keyboard is displayed.
3. Change the required patient information.
4. Tap on the [Done] button.
   ⇨ The patient data were saved for the current patient.

6.3.4 Searching for a patient

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The "Patient" menu is displayed.
2. Tap on the [Search] button 🔍.
   ⇨ A search window is displayed.
3. Enter a search term: Patient name, starting letters, etc.
   ⇨ The patient or patient group being searched for is displayed.

6.3.5 Sorting patients

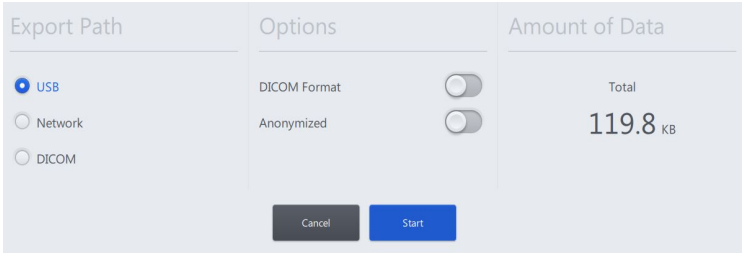
Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The “Patient” menu is displayed.
2. Tap on the [Filter] button .
   ⇨ The sorting criteria [Date], [Name], [Size] are displayed.
3. Tap on the desired [Button].
   ⇨ The patient list is displayed sorted.
4. Tap on the [Sort] button to display the sorted patient list in ascending or descending order (alphabetical order).
5. To close the “Patient” menu: Tap on the [Patient] button or on the button in the status bar.

6.3.6 Exporting patient data

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The “Patient” menu is displayed.
2. Tap on the name of the patient whose data is to be saved. Mark the box in front of the patient name.
   ⇨ Selection is confirmed by a symbol.
3. Tap on the [Export Selected] button.
   ⇨ The “Export Patient Data” menu is displayed.

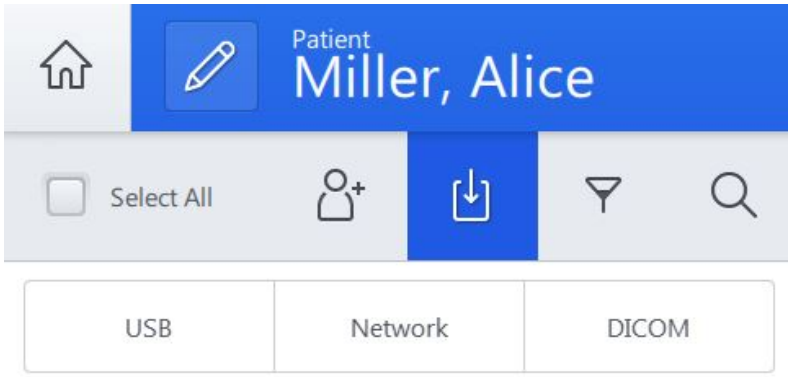


4. Select the desired “Export Path” [USB, Network Share, [DICOM] button].
5. Select the memory option:
   DICOM format (for USB and network only)
   On: Images are stored on a USB medium in DICOM format.
   Off: Images are saved in native format (PNG, JPEG) in the pre-defined patient data structure.
   Anonymized
   On: No user or patient names are saved in the EXIF image data.
   Off: The EXIF image data include surgeon and user names.
6. Tap on the [Start] button to export the patient data.
7. To close the “Patient" menu: Tap on the [Patient] button or on the button in the status bar.
8. A successful export is acknowledged by a short status message.

6.3.7 Importing patient data from the USB port or network

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The “Patient” menu is displayed.
2. Tap on the [Import] button.
3. Select the medium from which the patients are to be imported: [USB] or [Network] button.

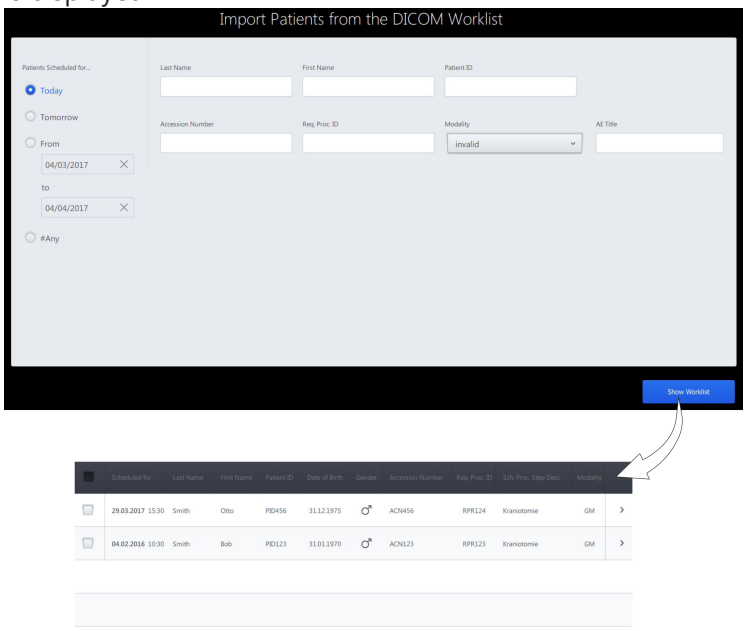


   ⇨ The “Import Patient Data” menu is displayed.
4. Mark the box in front of the name of the patient whose patient data you want to import.
   Mark the [Select All] box if you want to import all of the displayed patients.
5. Tap on the [Start] button to import the patient data.
   ⇨ A new patient record is always imported, i.e. the data are not added to the existing patient record.
   ⇨ If a new patient record is imported which has the same name as the existing patient record, there will be two patient records with the same name.
   If necessary, change the new patient name (by adding the suffix “_1”).
6. To close the “Patient" menu: Tap on the [Patient] button or on the button in the status bar.

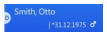
6.3.8 Importing patient data from the DICOM Worklist

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The “Patient” menu is displayed.
2. Tap on the [Import] button.
3. Tap on the [DICOM] button.
   ⇨ The input mask "Import patient data from DICOM Worklist" is displayed.



4. If you know the patient's required data and would like to import it, enter this data in the input mask.
5. If you do not know the patient's required data, tap on the [Show Worklist] button.
   ⇨ All patients of the DICOM Worklist are displayed.
6. If you would like to view further details of individual patients, tap on the corresponding arrow key on the right side of the screen.
   ⇨ A detailed list of the respective patient data then opens.
7. Push this list to the right to return to the DICOM Worklist.
8. Mark the box in front of the name of the patient whose patient data you want to import.
   Mark the box in the header of the DICOM Worklist if you want to import all of the displayed patients.
9. Tap on the [Import selection] button.
   ⇨ The “Patient” menu is displayed.
   ⇨ The imported patient(s) are marked with a "D" in the patient list.



⇨ The patient name is marked with an information symbol in the status bar.

If you tap on this symbol, the detailed list of patient data opens.

10. To close the “Patient" menu: Tap on the [Patient] button or on the ⌂ button in the status bar.

6.3.9 Deleting patients

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The “Patient” menu is displayed.
2. Tap on the patient to be deleted.
   To delete multiple patients simultaneously, mark the boxes in front of the names of all patients to be deleted.
   ⇨ Selection is confirmed by a  symbol.
3. Tap on the [Delete] 🗑 button to delete the selected patient.
   ⇨ The “Delete Patient Data” menu is displayed.
4. To delete the patient(s):
   First place a check mark  next to “Remove patient".
   Then tap on the [Yes] button.
   ⇨ The patient or patients is/are then deleted.
5. To close the “Patient” menu: Tap on the [Patient] button or on the ⌂ button in the status bar.

6.4 Video recording (option)

With the “Video Recording” option, you can record the live video of the integrated camera during the surgical procedure. The recorded video is assigned to the actively selected patient in the process.
The following possibilities exist for recording a video:

- Handgrip button: ⚙ Settings → Operation → Handgrips → Configure a configurable button for video recording
- FCP button: ⚙ Settings → Operation → FCP → Configure a configurable button for video recording
- [Video] button on the touchscreen:  Start

Action

1. Starting the video recording: Tap on the [Video Recording] button]  or actuate the button on the handgrip or the FCP programmed for "Video Recording".
   ⇨ On the touchscreen, the [Video Recording] button changes from  to  and the time display indicates the runtime of the video recording.

⇨ A blue bar with information on the video recording appears at the bottom of the touchscreen:
On the left side: e.g. HD recording; on the right side: storage location, e.g. internal hard drive with specification of storage capacity in percentage.

2. Stopping the video recording: Tap on the [Video Recording] button again or actuate the button on the handgrip or the FCP programmed for the “Video Recording” function.

TIP:
During a video recording, additional photos can be taken via the [Photo] button. At the same time, these photos can be used as markers. During the playback of the video, the marked locations can be called in succession via the [Search Backwards] or [Search Forwards] button in the “Record” menu.

You can change to the Patient Video menu of the current patient by tapping on the [Videos] button on the touchscreen (bottom left).

6.5 Creating photos with the integrated video camera

You can create photos and assign them to a patient.
The following possibilities exist for creating a photo:

- Handgrip button: ⟶ Configurable button is configured for the "Photo" function
- FCP button: ⟶ Configurable button is configured for the "Photo" function
- [Photo] button on the touchscreen
- [Photo] button in the Video Player, during playback of a video from the patient data.

Action

1. Creating a photo: Tap on the [Photo] button or actuate the button on the handgrip or the FCP configured for the “Photo” function.

   ⇨ A thumbnail of the acquired photo is briefly displayed above the [Photo] button. At the same time, an acoustic signal sounds. The photo is saved.

Tipp:

You can change to the Patient Photo menu of the current patient by tapping on the [Photos] button on the touchscreen (bottom left).

When playing back a recorded video, you can take a photo of the current video playback position and use it as a marker for this posi-

tion in the video. During the playback of the video, the marked locations can be called in succession via the [Search Backwards] or [Search Forwards] button in the “Record” menu.

6.6 Creating photos with the DSLR camera (option)

As an option, a Canon DSLR camera can be connected via a photo adapter.
You can create photos and assign them to a patient.
The following possibilities exist for creating a photo:

- FCP button: → Assign the "Photo" function to a configurable button
- FCP button: → Assign the "Photo" function to a configurable button
- [Photo] button on the touchscreen
- [Photo] button in the video player, for playback of patient videos.

Action

1. First install the photo adapter, the T2 adapter and the DSLR camera on the side co-observer connection of the microscope. See Controls on the microscope [▶ 50], Attaching the documentation/co-observation equipment [▶ 98]
2. Connect the DSLR camera and the photo release socket to the control cable, order no.: 000000-1229-877.
3. Tap on Settings → Photo → Exposure → External Camera.
4. Tap on the [Light intensity for external camera] button.
   ⇨ The switch illuminates blue .
   The light intensity of the xenon illumination is briefly set to 100% when the external DSLR camera is released.
5. Creating a photo: Tap on the [Photo] button or actuate the button on the handgrip or the FCP assigned with the “Photo” function.
   ⇨ The photo is saved in the memory of the external DSLR camera.

6.7 Patient data, photos and videos

⚠ CAUTION!

Do not use images and videos for diagnostic purposes!

The monitors are neither calibrated nor designed for diagnostic purposes.

- The video contents and images displayed on the monitors (cut sequences) must not be used for diagnostic purposes. They may contain deviations with respect to scale, shape, contrast and color.

6.7.1 Opening the patient directory

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The patient directory opens. The data of the current patients are displayed.

6.7.2 Display of media objects (files)

Three views are available for displaying the files in the patient directory. Tapping on one of the symbols changes the number of files displayed.

6.7.3 Viewing patient images

Action

1. Tap on the [Photos] button in the “Patient” menu.
   ⇨ All photos of the patient are displayed.
   If not all of the photos are displayed, scroll down the photo list.
2. Tap on the photo you want to view in full size.
   ⇨ The photo is displayed in full size.
   The following information/buttons are displayed in the footer:
   ⇨ Opened photo/number of photos
   ⇨ Date and time of recording
   ⇨ Located on the left and right edge of the photo are arrows [<], [>] for moving in reverse or forward.
3. Tap on the appropriate arrow [<], [>] to view the previous photo or the next photo or “wipe” horizontally across the touchscreen.
4. Close the menu: Tap on the [Patient] button or on ⌂ in the status bar.

Photos with position memory markings ⌖ are used to move to saved position memory positions. See: Position Memory [▶ 144]

6.7.4 Viewing patient videos

Action

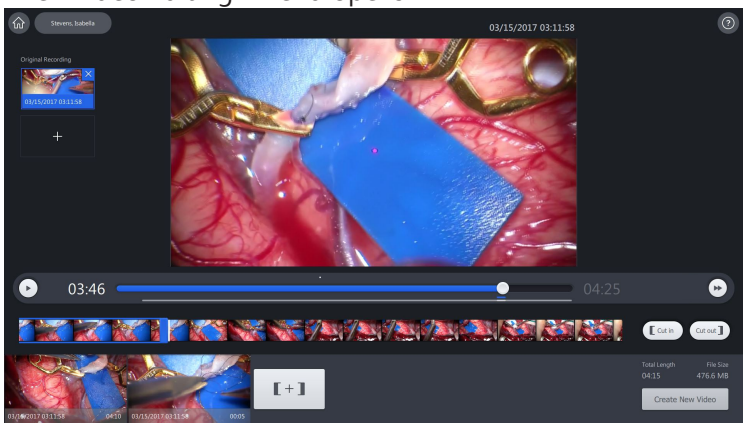
1. Tap on the [Videos] button in the "Patient" menu .
   ⇨ All videos of the patient are displayed.
   If not all of the videos are displayed, scroll down the video list.
2. Tap on the video you want to view in full size.
   The following information/buttons are displayed in the footer of the video player:
   ⇨ Opened video/number of videos
   ⇨ Date and time of recording
   ⇨ Playback
   ⇨ Pause
   ⇨ Fast forward
   ⇨ Take/save photo of current display
   ⇨ Edit video
   ⇨ Delete
   ⇨ Export
3. Tap on the [Start] button ⓟ to start the playback. Tap on the [Pause] button ⓘ to stop the playback.
4. Tap on the [Fast Forward] button ⓕ to run the video forward at fast speed.
5. Tap on the [Record] button ⓒ, to record and save a frame from the sequence. At the same time, a marker is set. It should provide you with orientation in the video.
   Markers are assigned to the photos in the video.
6. Tap on the [Edit video] button to edit a recorded video.
7. Tap on the [Delete] button to remove the current video.
8. Tap on the [Export] button to export the current video.
9. Located on the left and right edge of the video are arrows [<], [>] for moving in reverse or forward. Tap on the appropriate arrow [<], [>] to open the previous video or the next video.

6.7.5 Editing patient videos

Videos must not be edited while a recording is in progress. End the recording first.

Action

1. Tap on the [Videos] button in the “Patient” menu.
2. Tap on the video to be edited.
   ⇨ The video view opens.
3. To edit the video, tap on the [Edit video] button .
   ⇨ The “Video Editing” menu opens.



4. Tap the [Start] button to play back the video recording.
5. Tap on the [Fast Forward] button, to run the video recording forward at fast speed. You can also move the slide control underneath the video recording to jump to a specific location.
6. When you have found the part of the video recording which you would like to exclude from the summary, tap on the [Pause] button.
   ⇨ The current playback position in the video recording is displayed in the timeline selection window as a time marker (small white bar).
7. Drag the blue start bar of the timeline selection window onto the time marker.
8. Tap the [Cut in] button.
   ⇨ The video sequence starts at this position
9. Tap the [Start] button to continue the playback of the video recording.
10. Tap on the [Pause] button if you do not want to play back the entire video recording, but would like to remove the rear portion of the video from the display.
    ⇨ The current playback position in the video recording is displayed as a time marker (small white bar) in the timeline selection window.
11. Drag the blue end bar of the timeline selection window onto the time marker.

12. Tap the [Cut out] button.
    ⇨ The video sequence now ends earlier.
13. You can relocate the start and end points of the video sequence at any time.
14. Tap on the [Temporarily save video sequence] [+] button to temporarily save the marked video sequence.
    ⇨ The cut-out video is displayed as a preview at the bottom of the screen.
15. Tap on the [Create New Video] button to save it in the "Patient" menu.
16. To load and edit another video of the patient, tap on the [Add original recording] + button.
    ⇨ A preview window with all original video recordings of the patient opens.
17. Tap on the video recording you want to edit.
18. Edit the video recording as described.
19. Close the menu by tapping on the [Patient] button or on ⌂ in the status bar.

6.8 DICOM (option)

Transfer of patient data

The DICOM option enables a standardized exchange of patient data with the PACS system of the clinic.
Please observe the DICOM Conformance Statement applicable to the KINEVO 900: G-30-1952.
In order to utilize the DICOM functionality, the KINEVO 900 must be registered and configured in the hospital network.

NOTE

Do not use imported images and videos for diagnostic purposes!
Perform diagnosis only at approved diagnostic stations.

Playback images may contain deviations with respect to scale, shape, contrast and color.

- ▶ It is best not to enter patient master data locally in order to avoid mix-ups.
- ▶ Preferably load patient master data from a DICOM Worklist.
- ▶ If data are transmitted by the device into the data network or are kept available in the data network, there is a risk that they will be corrupted or transmitted incompletely. Therefore, no liability can be accepted for the correctness of the data.

6.8.1 Importing patient data from the DICOM Worklist

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The “Patient” menu is displayed.
2. Tap on the [Import] button.
3. Tap on the [DICOM] button.
4. Fill out the offered search criteria.
   The search criteria are interpreted as an “AND operation” for the query. Empty search windows are interpreted as "wild cards" (placeholders for other characters).
   To limit the search, you can e.g. enter the first letters of the patient’s name.
5. Select the scheduled date.
6. Select the [Modality].
7. Tap on the [Show Worklist] button.
   ⇨ The DICOM Worklist is then displayed with the planned patient records.
8. Accept the patient record by marking the box in front of the patient name or all records by marking the [planned for] box.
9. Tap on the [Import selection] button to import the records.

6.8.2 Exporting patient data to DICOM

Action

1. Tap on the [Patient] button in the status bar.
   ⇨ The “Patient” menu is displayed.
2. Mark all data to be imported.
3. Tap on the [Export Selected] button at the bottom right on the touchscreen.
   ⇨ The “Export Patient Data” menu is displayed.
4. Tap on the [DICOM] selection field in the “Export Path” field.
5. Tap on the [Start] button to export the patient data.
   ⇨ The following message then appears: “Export in progress”.

6.9 BLUE 400 (option)

Because of regulatory restrictions regarding the contrast medium used with BLUE 400, the BLUE 400 option is not registered in all countries, and is therefore not available in every country. Please contact your local ZEISS representative to obtain information regarding the registration status of BLUE 400 in your country. In the USA, the BLUE 400 option may not be used for clinical applications, but only for research purposes!

Intended use

The BLUE 400 option is designed for a surgical microscope and can be used in tumor surgery to visualize marked tumor tissue with fluorescence dyes.

Normal use

The integrated BLUE 400 fluorescence module is used to make fluorescing areas visible. It is designed for excitation in the wavelength range of 400 to 410 nm and observation in the wavelength range of 620 to 710 nm. The surgeon can switch back and forth between white light and blue excitation light for fluorescence at the touch of a button. For optimal playback/reproduction of the fluorescent light, the room and surrounding lights should be dimmed.

Normal use under standard conditions

The BLUE 400 fluorescence option permits the user to visualize and digitally record fluorescent light and auto-fluorescent light emitted by tissue.
The visualization of the fluorescence signal is influenced by several different factors:

- The fluorescence medium and its concentration in the tissue
- The illumination intensity of the light source in the defined wavelength range
- The transmission of the optical system
- The total magnification and the aperture setting
- The working distance and the luminous field size

The medical contraindications applicable to the use of the KINEVO 900 in combination with a fluorescence medium are applicable when using suitable marker substances.

- Only use fluorescent agents approved for the planned application.
- Check whether the fluorescent agent can be excited in the wavelength range from 400 to 410 nm and whether it emits fluorescent light of sufficient intensity in the wavelength range from 620 to 710 nm.

- As in almost all procedures, false-positive and false-negative results can also occur in the fluorescence-based method. Evaluation by the user based on other methods is necessary.

For optimal visualization of the fluorescence signal, the room and surrounding lights should be dimmed.

⚠ CAUTION!

The BLUE 400 fluorescence target is not sterile!

Action

- ▶ Perform a function test before use.
- ▶ Focus the microscope on the BLUE 400 fluorescence target included in the scope of supply and switch to the BLUE 400 fluorescence mode.
  - ⇨ The function test was successful if the image displayed on the touchscreen is identical to the photo shown in the supplied quick reference guide. There may be some slight differences in color and brightness.

⚠ CAUTION!

Application of BLUE 400 only with eyepiece-based optical observation!

- ▶ The use of tubes and eyepieces is required for the BLUE 400 option.

⚠ CAUTION!

Do not use images and videos for diagnostic purposes!

The monitors are neither calibrated nor designed for diagnostic purposes.

- ▶ The video contents and images displayed on the monitors (cut sequences) must not be used for diagnostic purposes. They may contain deviations with respect to scale, shape, contrast and color.

6.9.1 Configuring BLUE 400

6.9.1.1 Configuring the fluorescence button on the handgrip or FCP

Action

1. Tap on Settings ⟶ Operation ⟶ Handgrips [▶ 131] or configure the FCP ⟶ Fluorescence button.
2. Tap on a configurable button.
   - ⇨ The available functions appear in the selection field on the right side.
3. Tap on the “Fluorescence” function in the selection field.
   - ⇨ The function is accepted and displayed next to the button symbol.

6.9.1.2 Configuring the light intensity for BLUE 400

Action

1. Tap on Settings → Fluorescence → BLUE 400.
2. Set the desired start value with the BLUE 400 [Light Intensity] controller.
   ⇨ The illumination lights with this brightness when BLUE 400 is switched on.

In order to achieve a good fluorescence result, ZEISS recommends using the factory setting of 100%.

6.9.1.3 Configuring the video camera for BLUE 400

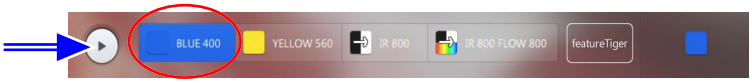
Action

1. Tap on Settings → Video Camera.
2. Scroll down in the Video Camera menu to → BLUE 400.
3. Set the shutter control to “Auto” or “Manual”.
4. If you have set the shutter control to “Auto”, set the desired brightness level on the [Auto Brightness] controller.
5. If you have set the shutter control to “Manual”, set the exposure time in the [Manual Shutter] selection field.
6. Close the “Settings” menu by tapping on the button.

6.9.1.4 Starting the BLUE 400 fluorescence application

Action

1. To start the BLUE 400 fluorescence application, tap on the handgrip or the FCP button to which you have assigned the “Fluorescence” function.
2. Or, in the main menu bar on the touchscreen, tap on Fluorescence → Select BLUE 400 → Start the fluorescence application → .



6.10 YELLOW 560 (option)

Because of regulatory restrictions regarding the contrast medium used with YELLOW 560, the YELLOW 560 option is not registered in all countries, and is therefore not available in every country. Please contact your local ZEISS representative to obtain information regarding the registration status of YELLOW 560 in your country. In the USA, the YELLOW 560 option may not be used for clinical applications, but only for research purposes!

Intended use

The YELLOW 560 fluorescence option is designed for intraoperative illumination of the surgical field with light of wavelengths ranging from 460 nm to 500 nm and, for special emphasis, with light of wavelengths ranging from 540 nm to 690 nm.

Normal use

The integrated YELLOW 560 fluorescence module is used to make fluorescing areas visible. It is designed for excitation in the wavelength range of 460 to 500 nm and observation in the wavelength range of 540 to 690 nm. The surgeon can switch back and forth between white light and blue excitation light for fluorescence at the touch of a button. For optimal playback/reproduction of the fluorescent light, the room and surrounding lights should be dimmed.

Normal use under standard conditions

The YELLOW 560 fluorescence option permits the user to visualize and digitally record fluorescent light and auto-fluorescent light emitted by tissue.
The visualization of the fluorescence signal is influenced by several different factors:

- The fluorescence medium and its concentration in the tissue
- The illumination intensity of the light source in the defined wavelength range
- The transmission of the optical system
- The total magnification and the aperture setting
- The working distance and the luminous field size

The medical contraindications applicable to the use of the KINEVO 900 in combination with a fluorescence medium are applicable when using suitable marker substances.

As in almost all procedures, false-positive and false-negative results can also occur in the fluorescence-based method.

For optimal visualization of the fluorescence signal, the room and surrounding lights should be dimmed.

⚠ CAUTION!

The YELLOW 560 fluorescence target is not sterile!

Action

- ▶ Perform a function test before use.
- ▶ Focus the microscope on the YELLOW 560 fluorescence target included in the scope of supply and switch to the fluorescence mode.
  - ⇨ The function test was successful if the image displayed on the touchscreen is identical to the photo shown in the supplied quick reference guide. There may be some slight differences in color and brightness.

⚠ CAUTION!

Do not use images and videos for diagnostic purposes!

The monitors are neither calibrated nor designed for diagnostic purposes.

- ▶ The video contents and images displayed on the monitors (cut sequences) must not be used for diagnostic purposes. They may contain deviations with respect to scale, shape, contrast and color.

6.10.1 Configuring YELLOW 560

6.10.1.1 Configuring the fluorescence button on the handgrip or FCP

Action

1. Tap on Settings → Operation → Handgrips or FCP → Configure Fluorescence button.
2. Tap on a configurable button [▷ 131].
   - ⇨ The available functions appear in the selection field on the right side.
3. Tap on the “Fluorescence” function in the selection field.
   - ⇨ The function is accepted and displayed next to the button symbol.

6.10.1.2 Configuring the light intensity for YELLOW 560

Action

1. Tap on Settings → Fluorescence → YELLOW 560.
2. Set the desired start value with the YELLOW 560 [Light Intensity] controller.
   - ⇨ The illumination lights with this brightness when YELLOW 560 is switched on.

In order to achieve a good fluorescence result, ZEISS recommends using the factory setting of 100%.

6.10.1.3 Configuring the video recording for YELLOW 560

Action

1. Tap on Settings → Video Camera → and scroll down in the Video Camera menu to → YELLOW 560.
2. Set the shutter control to Auto or Manual.
3. If you have set the shutter control to “Auto”, set the desired brightness level on the [Auto Brightness] controller.
4. If you have set the shutter control to “Manual”, set the exposure time in the [Manual Shutter] selection field.
5. Close the “Settings” menu by tapping on the button.

6.10.1.4 Starting the YELLOW 560 fluorescence application

Action

1. To start the YELLOW 560 fluorescence application, tap on the handgrip or the FCP button to which you have assigned the “Fluorescence” function.
2. Or, in the main menu bar on the touchscreen, tap on Fluorescence → YELLOW 560 → Start the fluorescence application → .

6.11 Using the device as a hotspot

As soon as the WLAN adapter has been activated, you can use the device as a hotspot.

After each restart of the device, the hotspot must be switched on again by the "Default Users" or "Users" user group. When the device is shut down, the hotspot function is switched off again.

Prerequisite

☑ WLAN adapter is activated [▷ 111]

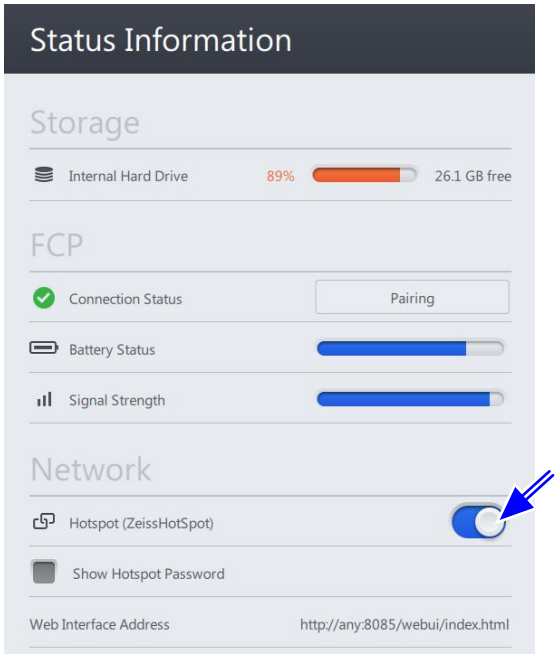
☑ Device was set up and activated as a hotspot [▷ 111] by the "IT Admin" user group.

Action

1. Tap on the [Status Information] button in the status bar.

⇨ The “Status Information” menu is displayed.

2. Activate the [HotSpot] slide switch.



Result

✓ The device is available as a hotspot.

6.12 Connecting an external device to the device via web interface

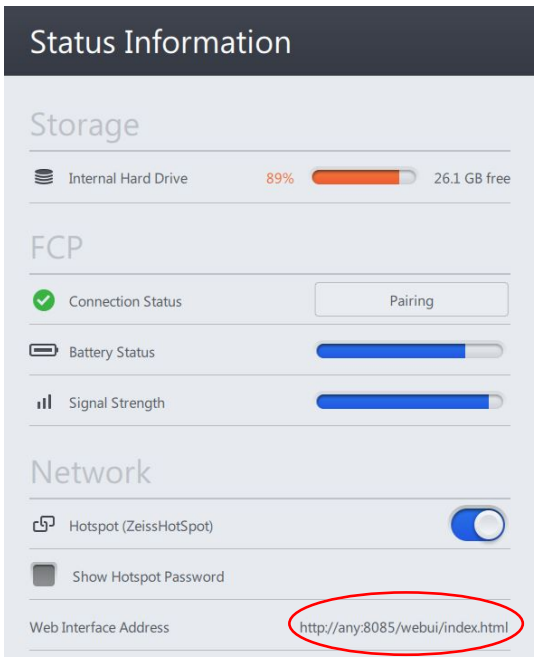
If the web interface is activated in the device, you can access the patient data from an external device.

Prerequisite

- ☑ WLAN adapter is activated [▶ 111]
- ☑ Device was set up and activated as a hotspot [▶ 111] by the "IT Admin" user group.
- ☑ Device is used as a hotspot [▶ 175]
- ☑ Web interface in the device is activated [▶ 112]

Action

1. Tap on the [Status Information] button in the status bar.
   - ⇨ The “Status Information” menu is displayed.
   - ⇨ The address of the web interface is visible.



2. Enter the displayed address of the web interface on the external device.
   - ⇨ An input mask for the web interface password opens on the external device
3. Enter the web interface password (assigned by the "IT Admin" user group) on the external device.

Result

- ✓ The external device is connected to the device via the web interface; patient data can be accessed.

6.13 Powering the device down

Action

1. Press the Standby/ON-OFF switch on the device.
   ⇨ The device shuts down
   ⇨ The device is in Standby mode if the Standby/ON-OFF switch illuminates white.
2. Remove the power plug from the power outlet to safely disconnect the device from the power supply.

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7 Cleaning and disinfection

7.1 Contamination of the device

Dust can penetrate into the internal optics of the device or its individual components.

- Never shut down the device without a binocular tube and eyepieces.
- Close all unused openings with the covers provided for that purpose (e.g. outputs for tubes and side beam splitter outputs).
- Always store tubes, eyepieces and accessories in dust-free cases when they are not being used.
- After use, cover the device to protect it from dust.

The accessories are to be cleaned as soon as possible after use.

7.2 Cleaning

7.2.1 Cleaning optical surfaces

The multilayer T* super anti-reflection coating of the optical components (e.g. eyepieces, objective lenses) ensures optimum image quality. Even slight contamination or a single fingerprint reduces image quality. Clean the outer surfaces of optical components (eyepieces, objective lenses) only as required:

Action

- ▶ Do not use any chemical agents.
- ▶ Use a clean and grease-free brush to remove dust.

TIP: For regular cleaning of the surgical microscope's objective lenses and eyepieces, we recommend using the optics cleaning kit available from ZEISS (Order no.: 1216-071).

7.2.2 Cleaning the touchscreen and second monitor (option)

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 the 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 wipe it directly onto the display!)
- ▶ Wipe off the touchscreen with a moist cloth.

7.2.3 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.

7.2.4 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 also are 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.

7.2.5 Cleaning agents

	Unit	Order number
Optics cleaning kit	1 piece	000000-2096-685
Microfiber cleaning cloth	1 piece	000000-1254-655

7.3 Disinfection

7.3.1 Disinfection of surfaces

The maximum application concentrations are:

- For alcohol (tested with 2 propanol): 60%
- For aldehyde (tested with glutaraldehyde): 2%
- For quaternary compounds (tested with DDAC): 0.2%

NOTE

Surface damage caused by 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 of the required surfaces.

7.4 Sterilization via sterile covers (drapes)

7.4.1 Drapes

⚠ CAUTION!

Risk of infection!

Risk of infection due to contamination!

- ▶ For sterile draping of the device, use disposable sterile covers (drapes).

- Attach the SMARTDRAPE [▷ 123] so that there is sufficient freedom of movement for the microscope suspension mounting and the surgical microscope.
- When attaching the SMARTDRAPE, make that there is sufficient free space for swiveling, tilting and rotating movements of the surgical microscope.
- The surgeon must be able to reliably operate the controls through the SMARTDRAPE.

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8 Maintenance

8.1 Safety during maintenance

Regularly checking and maintaining the device is necessary to ensure safe and correct operation of the system and a long service life. For example, within the framework of a service and maintenance contract.
Device-specific technical knowledge is required for all maintenance work. It is frequently necessary to open the system for this work.
Please contact your local ZEISS Service organization in due time for the performance of these maintenance activities.
You can find the ZEISS contact partner for your country on the Internet at the following website: www.zeiss.com/med

8.2 Maintenance schedule for the operator

8.2.1 User maintenance intervals

Component	Activity or test criterion
Electromagnetic compatibility (EMC)	▶ No regular inspections or maintenance are required in order to maintain electromagnetic compatibility (EMC).
According to country-specific time specifications	
Safety inspection	▶ Checking the device and electrical safety
Prior to each use	
Brakes	▶ Electrical and mechanical function test: Release brakes completely; braking force holds microscope securely in balanced state without any change of position.
Lamps	▶ Check: ■ Operating hours within permissible range ■ Replacement lamp available and ready for use We recommend replacing the lamp after: The specified operating hours have been reached (500 hours)

8.3 Maintenance schedule for the authorized service

8.3.1 Service maintenance intervals

Time interval	Activity or test criterion
Every 12 months:	Basic device functions Specific functional tests and checks: Microscope, illumination, stand, visual inspection of device identification, cleaning and inspection of optics, video functionality
Every 4 years:	Extended device functions Extended functional tests and checks: Microscope, illumination, stand, visual inspection of device identification and device safety, cleaning and inspection of optics, video functionality, equipment-specific functional tests and checks of various options

8.3.2 Performance of safety inspections

The safety inspection serves to determine and evaluate product safety. The user of this product is obligated to perform and document safety inspections in compliance with IEC 62353.

⚠ CAUTION!

Risk of injury without safety inspection!

Hazards and product 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 the safety inspection.

Action

- ▶ Check whether the Instructions for Use are available.
- ▶ Check whether the Instructions for Use are available.
- ▶ Check the leakage current and the protective ground conductors.
- ▶ Check whether the castors and brakes function properly and are not worn-out.
- ▶ Perform a function check of all switches, buttons, sockets and indicator lamps of the system.

9 Troubleshooting

9.1 Locating faults

If a particular event occurs during operation or the device registers an irregularity, the device indicates this fault by displaying a message on the monitor.

Faults are saved in a service file. You can export this log file and transmit it to your ZEISS Service organization.

9.1.1 Response to malfunctions with messages

Error messages provide information about:

- The current operating step during which the indicated error/fault occurred
- The proposed solution for rectifying the indicated error/fault
- If appropriate, a hint that the log files must be exported and sent to ZEISS Service

Action

1. If an error message appears on the monitor, read through the message text carefully.
2. Tap on the [Close] button or press the center position of the joystick button on the left hand grip to close the error message.
3. Correct the displayed error/fault.
4. If this error message remains displayed on the monitor, export the log file and send it to ZEISS Service [▷ 185].

9.1.2 Exporting log files

Faults with messages are saved in log files stored on the device. You can export these log files to a USB storage device and send them to ZEISS Service for error analysis.

Action

1. Connect a USB storage device to the USB port.
2. Tap on ⚙ Settings → ⁰⁰⁰ Extras → Export log files → Start.
   ⇨ The log files are then exported to the connected USB storage device.
3. Remove the USB storage device.
4. Send these log files to your ZEISS Service organization.

9.1.3 Service information

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

9.2 Faults without messages

Fault	Cause	Remedy
No function at all	The device is not connected to the power supply.	▶ Connect the device to the power supply.
	The device is not switched on.	▶ Press the "Device Power On/Off" operating button once. The operating button is illuminated white.
	Automatic circuit breaker in power switch of stand responds.	▶ Press the "Device Power On/Off" operating button again.
No surgical field illumination on the microscope	Lamps 1 and 2 have failed.	▶ Replace both lamp containers [▷ 191].
	Failure of device electronics.	▶ Illuminate the OR field with an additional OR light. ▶ Contact ZEISS Service.
	The light source is not switched on.	▶ Activate the "Light" function in the main menu on the monitor.
The surgical field illumination is too dark.	The set brightness is too low.	▶ Increase the brightness using the preconfigured buttons on the hand grip / foot control panel / rocker foot switch.
	The lamp is too old / weak.	▶ Perform a lamp change on the monitor [▷ 189] or manually [▷ 190].
The surgical field is not evenly illuminated.	The light guide is defective.	▶ Have the light guide replaced by ZEISS Service.
The surgical field illumination is too bright.	The set brightness is too high.	▶ Reduce the brightness using the preconfigured buttons on the hand grip / foot control panel / rocker foot switch.
The focus cannot be set via the hand grip / foot control panel / rocker foot switch.	The system control is defective.	▶ Adjust the focus manually using the corresponding rotary knob on the microscope body [▷ 50].
The focus drive consistently moves to the end position.	The system control is defective.	▶ Adjust the focus manually using the corresponding rotary knob on the microscope body [▷ 50].
	The drape cover glass on the objective lens is dirty or of poor optical quality.	▶ Clean the cover glass. ▶ Use the ZEISS SMARTDRAPE [▷ 123].

Fault	Cause	Remedy
The zoom cannot be set via the hand grip / foot control panel / rocker foot switch.	The system control is defective.	▶ Adjust the zoom manually using the corresponding rotary knob on the microscope body [▷ 50].
The zoom drive consistently moves to the end position.		▶ Adjust the zoom manually using the corresponding rotary knob on the microscope body [▷ 50].
Poor image quality	The drape cover glass on the objective lens is dirty or of poor optical quality.	▶ Clean the cover glass. ▶ Use the ZEISS SMARTDRAPE.
The monitor is black.	The system control is defective.	▶ Do not touch the monitor! This is necessary to ensure that you do not execute any unwanted actions. ▶ Switch the device off, wait briefly (for approx. 2 min) and then switch it back on. ▶ If the monitor is still black, contact ZEISS Service.
No video image appears on the external monitor	The external monitor is not connected to the device.	▶ Connect the external monitor to the corresponding video output of the device [▷ 107].
External video source is not displayed	The external video source is not connected to the device.	▶ Connect the external monitor to the corresponding video input of the device [▷ 107].
The co-observer tube cannot be repositioned	The system control is defective.	▶ Adjust the pivoting mirror for the co-observer tube manually using the corresponding rotary knob on the microscope body [▷ 50].
The brakes of the axes are closed	The line voltage has failed, the device is no longer being supplied with power.	▶ Pull and push [▷ 188] the microscope body and stand arms into the desired position manually.
Malfunction / failure of wireless foot control panel	The batteries are empty.	▶ Read and follow the Instructions for Use supplied for the foot control panel, G-30-1706.
	The radio connection is faulty or has failed.	▶ Read and follow the Instructions for Use supplied for the foot control panel, G-30-1706.
	The foot control panel is not completely paired with the device.	▶ Pair the foot control panel with the device again [▷ 105].

9.3 Basic functions following failure of the system control (Basic Function Mode)

If the system control fails and the line voltage is still present, all filters in the light source and in the microscope will be swiveled out. The Focus Light Link and Auto Brightness functions are not available.

The button assignments of the hand grip, foot control panel and rocker foot switch remain stored.

⚠ CAUTION!

Limited illumination functions!

Following failure of the system control, the light intensity is decreased to approx. 50%. The Focus Light Link and Auto Brightness functions are not available.

- ▶ You can once again increase or further decrease the light intensity at any time in order to complete your surgical procedure.

You can set the following functions in the Basic Function Mode:

Function	Adjustments following failure of the system control
Release all axes	▶ Press the bottom button [AB] on the back of the hand grips.
Release the stand axes	▶ Press the top button [SB] on the back of the hand grips.
Focus +/-	▶ Adjust the focus using the buttons configured for this purpose on the hand grip / foot control panel / rocker foot switch.
Zoom +/-	▶ Adjust the zoom using the buttons configured for this purpose on the hand grip / foot control panel / rocker foot switch.
Light +/-	▶ Adjust the brightness using the buttons configured for this purpose on the hand grip / foot control panel / rocker foot switch.

9.4 Device in the de-energized state

If the line voltage fails and the device no longer is being supplied with power, the brakes of all axes close. You can execute movement in the individual axes manually by overcoming the braking effect.

Action

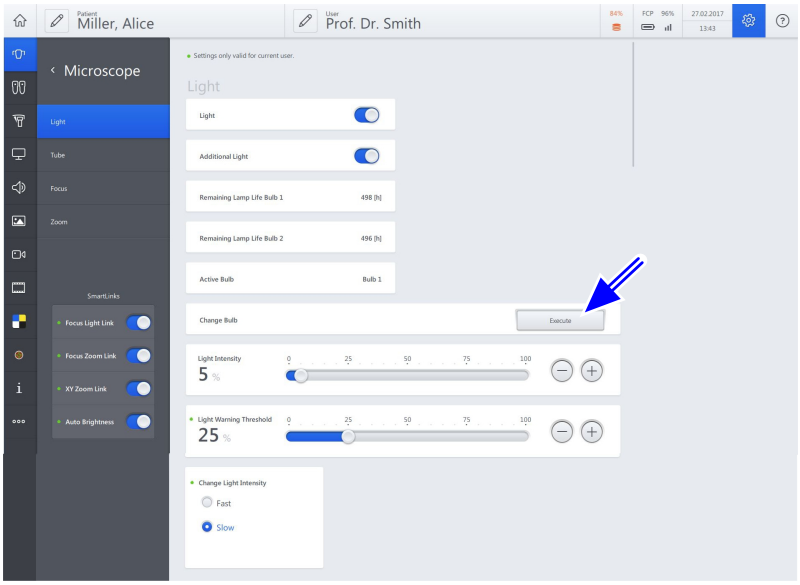
- ▶ To move the microscope, grasp the microscope by its hand grip and pull or push the microscope body into the desired position with both hands.
- ▶ To execute movement in individual stand axes, push or press the vertical / horizontal arm and/or the microscope suspension into the desired position.

9.5 Lamp change

If the device detects a defective lamp or a lamp fails during operation, an automatic lamp change takes place.
You also can change the lamp manually on the touchscreen.

Action

1. Tap on Settings ⟶ Microscope ⟶ Light ⟶ Change Bulb ⟶ Execute.



2. Close the “Settings” menu by tapping on the ⌂ button.
   ⇨ The live image of the video camera appears on the touchscreen.
3. After changing the lamp check the set brightness level.

9.6 Manual lamp change

In case of motor failure

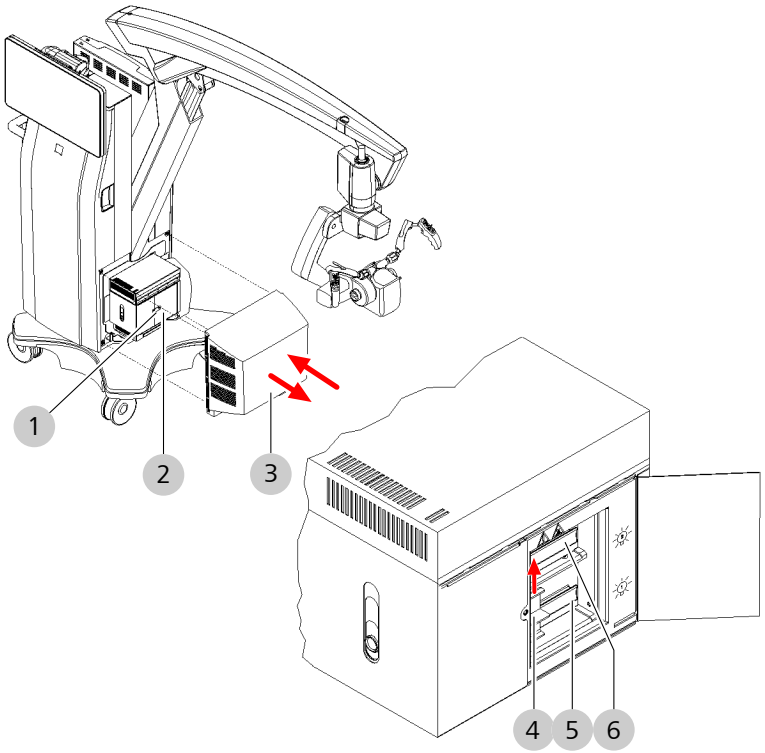


Figure 68: Manual lamp change

1	Latch	2	Housing doors
3	Cover	4	Push lever
5	Bulb 1	6	Bulb 2

Prerequisite

☑ Remove the power plug from the power outlet to safely disconnect the device from the power supply.

☑ Watch out for obstacles when changing lamps: Note the position of the microscope!

Action

1. Grasp the cover of the lamp housing by the recessed grips on the left and right side with both hands.
2. Pull the cover off of the device in a horizontal direction.
3. Open the latch of the housing doors.
4. Open the housing doors.
5. Slide or press the push lever towards the second lamp which is not in use as far as it will go.
6. Close the housing doors and latch them again.
7. Reattach the cover to the receptacles on the device.

⇨ The cover is properly attached if the receptacles engage fully.

8. Plug the power cord back into the power outlet.

9. Be sure to replace the defective lamp with a new one [▷ 191] following surgery.
10. Dispose of the old lamp according to your local directives and laws.

9.7 Replacing the lamp container

⚠ CAUTION!

Risk of injury and burns!

In case of malfunction, the high pressure inside the hot lamp may cause the lamp to burst. Also, the hot surface of the lamp container may also cause burns.

- ▶ Let the lamp container cool off for at least 10 minutes before replacing it.

⚠ CAUTION!

Improper handling of the lamp container may result in injuries!

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

- ▶ The lamp container may be changed only by properly trained persons.

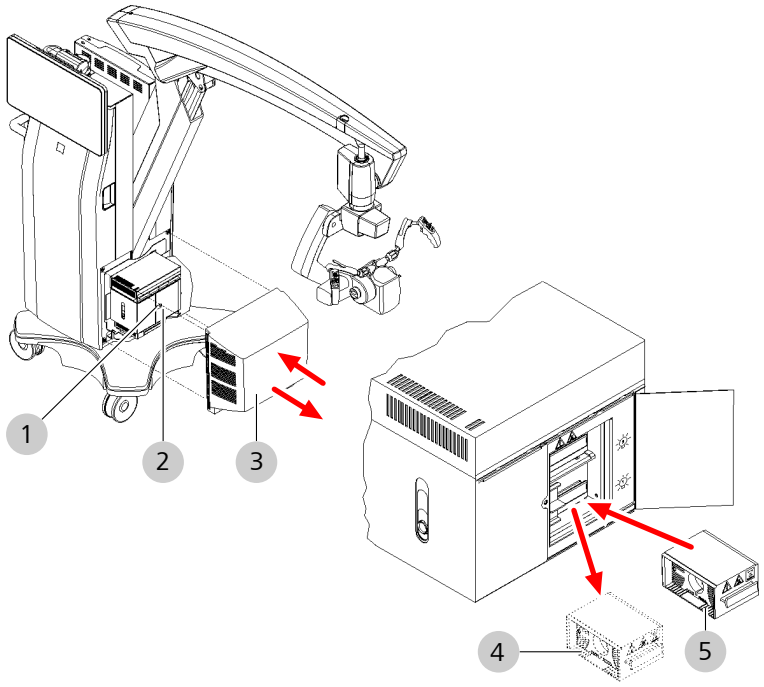


Figure 69: Replacing the lamp container

1	Latch	2	Housing doors
3	Cover	4	Old lamp container
5	New lamp container		

Prerequisite

☑ Remove the power plug from the power outlet to safely disconnect the device from the power supply.

☑ Watch out for obstacles when changing lamps: Note the position of the microscope!

Action

1. Grasp the cover of the lamp housing by the recessed grips on the left and right side with both hands.
2. Pull the cover off of the device in a horizontal direction.
3. Open the latch of the housing doors.
4. Open the housing doors.
5. Pull out the defective lamp container.
6. Slide a new lamp container into the lamp housing as far as it will go.
7. Close the housing doors and latch them again.
8. Reattach the cover to the receptacles on the device.
   ⇨ The cover is properly attached if the receptacles engage fully.
9. Plug the power cord back into the power outlet.

Following a lamp failure, a message stating that you should keep an extra new plug-in lamp unit on hand as a replacement appears on the monitor during every device start.

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10 Technical specifications

10.1 Conformity

Directives and standards which KINEVO 900 is compliant with:

- KINEVO 900 complies with Medical Device Directive: Class I

It is labeled with	CE

- KINEVO 900 complies with Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- KINEVO 900 is RoHS compliant.

KINEVO 900 fulfills the requirements of the following standards:

- IEC 60601-1
- IEC 60601-1-2
- IEC 60825
- IEC 62304
- CAN/CSA-C22.2 NO. 60601-1

Classification of the product according to IEC 60601

KINEVO 900 is classified as follows:

- Degree of protection against electric shock: Class 1
- Operating mode: Continuous operation

Classification of the product according to IEC 60601-2:2007

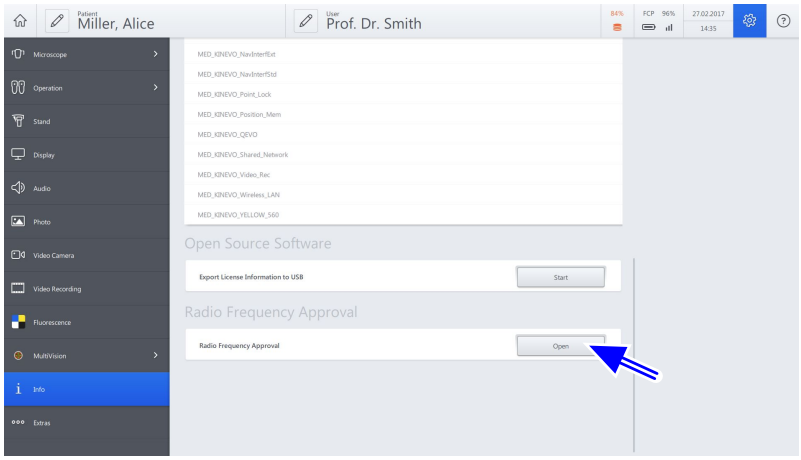
- Electromagnetic compatibility (EMC): Fulfills IEC 60601-1-2, Class A (as per CISPR 11)

10.2 Radio frequency approval

10.2.1 Displaying radio frequency approvals on the monitor

Action

1. Tap on ⚙ Settings ⟶ **i** Info.



2. Scroll down in the “Info menu”: Open ⟶ Radio Frequency Approval.
   ⇨ The markings of the existing radio frequency approval are displayed.
3. Scroll down in the “Radio Frequency Approval” display.
4. Close the “Radio Frequency Approval” display by tapping on the black surface next to the display.

10.2.2 Radio frequency approval labeling

This device contains radio modules and fulfills the requirements of 1999/5/EC.

The device is labeled with: CE

10.3 Radio modules

10.3.1 FCP WL, FCP Gateway WL and FCP Interface

Designation	Value
Transmit and receive frequencies	2402 MHz to 2480 MHz
Receive power	-82 dBm to 0 dBm
Transmit power	1 mW to max. 2.5 mW (Class 2)
Modulation	FHSS

10.3.2 WLAN module

Intel® 7260HMW

Designation	Value
Transmit and receive frequencies	2412 MHz to 2472 MHz
Transmit power	The maximum output power may vary according to country depending on local regulations.*
Modulation	CCK, DQPSK, DBPSK, BPSK, QPSK, 16 QAM, 64 QAM, 256 QAM

* Output power

- 802.11b: +16 dBm minimum
- 802.11g: +14 dBm minimum
- 802.11a: +14 dBm minimum
- 802.11n HT20 (2.4 GHz): +13 dBm minimum
- 802.11n HT40 (2.4 GHz): +13 dBm minimum

10.3.3 RFID

Designation	Value
Transmit and receive frequencies	13.56 MHz
Transmit power	-54 dBm
Modulation	ASK

10.4 Essential performance features

The device has no essential performance features.

10.5 Electrical data

Designation	Value
Rated voltage	100 - 240 V AC
Current consumption	Max. 1350 VA
Rated frequency	50 - 60 Hz
Protection class (according to EN 60601-1)	I
Remote connector	24 V
Fuse	Automatic fuse

10.6 Light source

Designation	Value
Color temperature	Approx. 5600 K
Voltage	24 V
Rated output	Approx. 300 W

Additional information

- Illumination technique: Fiber optics
- Main lamp: Xenon short-arc reflector lamp
- Spare bulb: Xenon short-arc reflector lamp
- Lamp change: Automatic / manual to spare bulb
- Lamp change: Manual
- Filters: UV/IR heat protection filter, sieve aperture, controls light intensity

10.7 Aiming beam laser

Designation	Value
Max. power (IEC 60825-1)	< 1 mW
Wavelength	λ 630 - 640 nm
Laser class	II

Function of laser beam

The focal point is determined by two visible laser beams which intersect in the focal plane.

10.8 Integrated HD camera

Designation	Value
Resolution	1920 x 1080 p
Signal-to-noise ratio	54 dB
Sampling frequency	50 Hz, 59.94 frames/second

10.9 4K camera

Designation	Value
Resolution	3840 × 2160 p
Signal-to-noise ratio	54 dB
Sampling frequency	50 Hz, 59.94 frames/second

10.10 Digital video outputs

Designation	Value
Output: 6 HDMI / DVI	1920x1080p50/60
Output: 7, 8 Display port	1920x1080p50/60
Output: 9, 10 HD-SDI (-0.8 Vp-p/75 ΩPAL)	1920x1080p50/60

10.11 Digital video inputs

Designation	Value
Input 3, 4: Display port	1920x1080p50/60
Input: 5 HDM / DVI	1920x1080p50/60
	1280×720p50/60

10.12 4K video outputs

Designation	Value
Output 1, 2 HDMI UHD 4K	3840x2160p50/60
Color sampling	4:2:0

10.13 Mechanical data

10.13.1 System data

Designation	Value
Max. additional load on microscope body	Max. 6 kg
Max. dimensions in transport position (WxHxD)	875x1880x1700mm
Total weight with max. additional load	Max. 395 kg
Total weight of system incl. wooden transport box	Approx. 510 kg

10.13.2 Weights of accessories

Name	Weight
Stereo co-observation module (000000-1063- 869)	1084 g
Tiltable tube, 180° (303791-0000-000)	860 g
Straight tube, f = 170 mm (303765-0000-000)	528 g
Folding tube, f = 170/260 mm (303771-9020-000)	940 g
Folding tube, f = 170 / 260 mm for mouth switch (303771-9110-000)	940 g

Name	Weight
Angle optics with dovetail (spine adapter) (302581-9200-000)	440 g
Photo adapter, f = 340 mm (000000-1022-973)	420 g
Photo adapter, T2 Canon EOS (000000-0448-028)	60 g
Mouth switch for 180° tiltable tube (000000-1177-805)	470 g
Push-in widefield eyepieces, 10x (2 pcs) (305542-0000-000)	216 g
Push-in widefield eyepieces, 12.5x (2 pcs) (305543-9901-000)	216 g
Magnification changer, 3-position (303429-9903-000)	448 g
Rotating adapter (301007-0000-000)	192 g
Dovetail guide (303360-9903-000)	40 g
Micromanipulator	See manufacturer documentation, max. 1 kg

10.14 Optical data

10.14.1 Surgical microscope

Designation	Value
Varioskop	Approx. 200 ... 625 mm
Zoom system magnification factor	0.4x - 2.4x
Aiming beam laser (Autofocus option):	
Max. power (IEC 60825-1)	< 1 mW
Wavelength	λ 630 - 640 nm

Additional information

- Magnification adjustment: motorized/manual
- Focusing: motorized/manual
- Sensor for working distance and magnification for neuronavigation
- Motor-driven, travel speed adjustable, automatic adaptation to magnification

10.14.2 Widefield eyepiece (magnification factor 10x)

Designation	Value
Focal Length	25 mm
Field of view	21 mm
Distance of the exit pupil from the last lens	24 - 25.5 mm
Diopter adjustment range	+5/-8
Weight	120 g

10.14.3 Widefield eyepiece (magnification factor 12.5x)

Designation	Value
Focal length	20 mm
Field of view	18 mm
Distance of the exit pupil from the last lens	22 - 23.5 mm
Diopter adjustment range	+5/-8
Weight	115 g

10.15 Ambient requirements for operation

Designation	Permissible range
Temperature	+10 ... +40 °C
Relative humidity	30 ... 75%
Atmospheric pressure	700 ... 1060 hPa

10.16 Ambient requirements for transport and storage

Designation	Permissible range
Temperature	-20 ... +60°C
Relative humidity (without condensation)	10 ... 92%
Atmospheric pressure	500 ... 1060 hPa

10.17 Operation with intraoperative MRT systems

For operation in the vicinity of an MRT/MRI scanner, the device must be positioned so that all system components (stand, microscope) are located outside of the 5-Gauss line. The operator must take suitable measures to ensure that the device cannot be moved toward the MRT/MRI system across the 5-Gauss line. The device must be switched off during an MR image acquisition. You may use the device only when no MR image acquisition is in progress.

10.18 Dimensional drawing

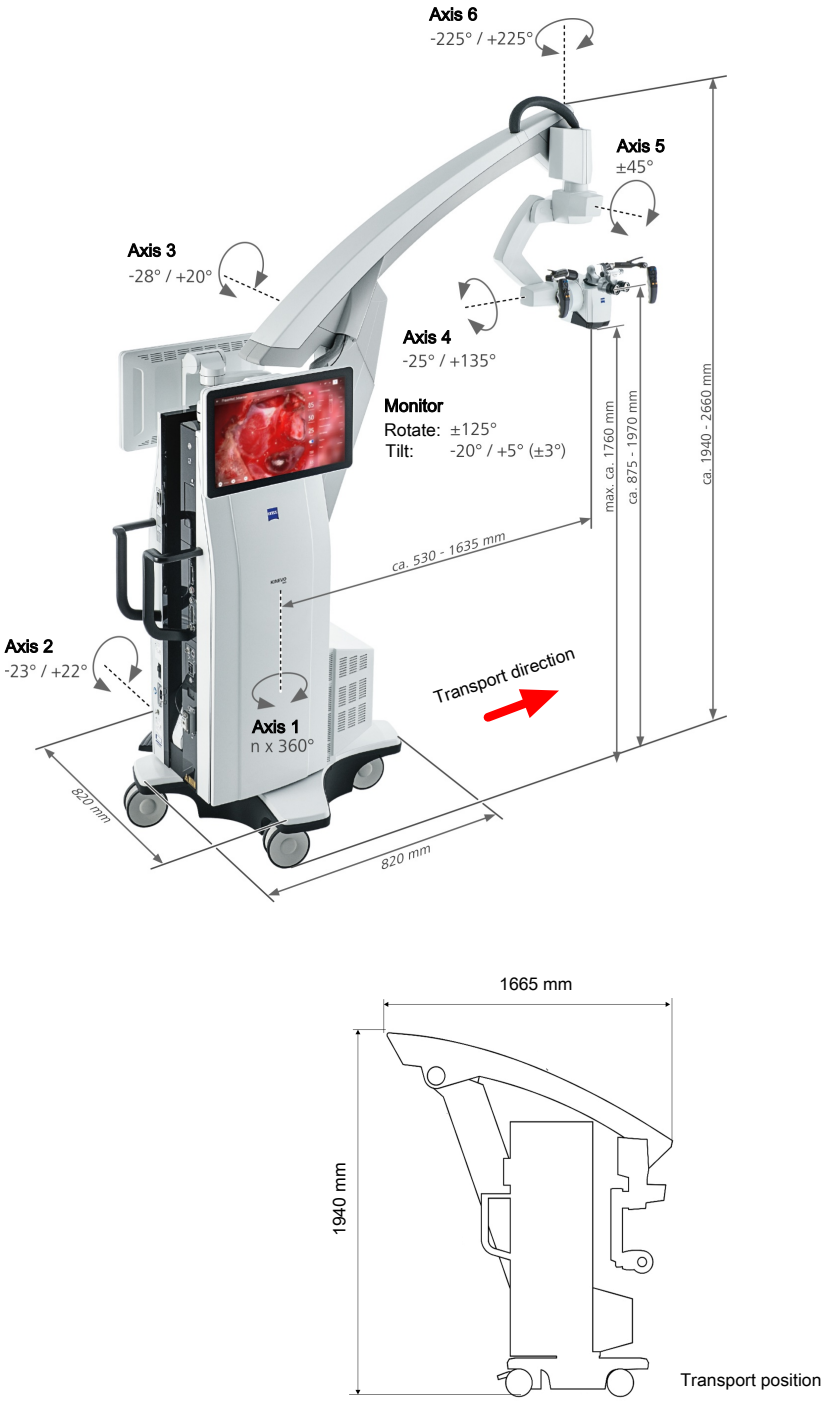


Figure 70: Dimensional drawing (dimensions in mm)

10.19 Guidelines and manufacturer's declaration for electromagnetic compatibility

10.19.1 EMC - Electromagnetic compatibility as per IEC 60601-1-2: 2007 (3rd Edition)

The device is subject to specific precautions with regard to electromagnetic compatibility (EMC). In order to avoid the occurrence of EMC interference, the device may only be installed, started up and maintained in the manner indicated in these Instructions for Use and only with components supplied by ZEISS.

NOTE

Danger due to electromagnetic radiation!

The KINEVO 900 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 KINEVO 900 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 KINEVO 900 to ensure its normal operation in the arrangement in which it is used.

NOTE

Danger due to electromagnetic radiation!

Electrical devices can influence each other as a result of their electromagnetic radiation. The use of non-approved components (accessories, transformers of all types, cables) 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.
- ▶ Do not use any portable or mobile RF communication equipment or radio devices near the device, as it is not possible to exclude the possibility that the function of the device will be affected.
- ▶ Do not use any cell phones near the device. They represent a potential risk for the proper functioning of medical equipment. Malfunctions may occur, depending on a variety of local factors. They cannot be predicted and can by no means be estimated.
- ▶ Please follow the EMC guidelines on the following pages.

10.19.1.1 Electromagnetic interference emissions

The KINEVO 900 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the KINEVO 900 is responsible for ensuring that the device is operated in such an environment.

Interference emission measurements	**Compliance**	**Electromagnetic environment - guidelines**
RF emissions as per CISPR 11	Group 1	The KINEVO 900 uses RF energy only for its internal functions. As a result, RF emissions are very low and unlikely to cause any interference in nearby electronic devices.
RF emissions as per CISPR 11	Class A	The KINEVO 900 is suitable for use in other facilities than residential environments that are directly connected to the PUBLIC POWER GRID which also supplies buildings used for residential purposes:
Harmonic emissions as per IEC 61000-3-2	Not applicable	
Emission of voltage fluctuations/ flicker as per IEC 61000-3-3	Not applicable	

NOTE
The properties of the KINEVO 900 determined by EMISSIONS permit its use in industrial areas and in hospitals (CISPR 11, Class A). If used in a residential area (for which Class B usually is required as per CISPR 11), the KINEVO 900 may not provide the necessary protection with regard to radio frequency communication services. The user may have to take corrective measures such as moving or realigning the device.

10.19.1.2 Electromagnetic immunity for all ME equipment and ME systems

The KINEVO 900 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the KINEVO 900 is responsible for ensuring that the device is operated in such an environment.

Electromagnetic immunity tests	IEC 60601 test level	Compliance level	Electromagnetic environment - guidelines
Electrostatic discharge (ESD) as per IEC 61000-4-2	±6 kV contact discharge ±8 kV air discharge	±6 kV contact discharge ±8 kV air discharge	Floors should be made of wood or concrete or be covered with ceramic tiles. If the floor is covered with synthetic material, the relative humidity must be at least 30%.
Fast transient/burst immunity as per IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	The quality of the supply voltage should be that of a typical business or hospital environment.
Surges as per IEC 61000-4-5	±1 kV line-to-line voltage ±2 kV line-to-ground voltage	±1 kV line-to-line voltage ±2 kV line-to-ground voltage	The quality of the supply voltage should be that of a typical business or hospital environment.

Voltage dips, short interruptions and voltage variations as per IEC 61000-4-11	< 5% U_T (> 95% dip in U_T) for 1/2 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (95% dip in U_T) for 5 s	< 5% U_T (> 95% dip in U_T) for 1/2 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (95% dip in U_T) for 5 s	The quality of the supply voltage should be that of a typical business or hospital environment. If the user of the KINEVO 900 requires continued operation even in the event of interruptions in the power supply, we recommend to power the KINEVO 900 from an uninterruptible power supply or a battery.
Magnetic field for supply frequency (50/60 Hz) as per IEC 61000-4-8	3 A/m	3 A/m	Magnetic fields in the supply frequency should correspond to the typical values that are found in business and hospital environments.
Note: U_T is the AC voltage supply before application of the test levels.			

10.19.1.3 Electromagnetic immunity for non-life-supporting devices

The KINEVO 900 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the KINEVO 900 is responsible for ensuring that the device is operated in such an environment.

Electromagnetic immunity tests	IEC 60601 test level	Compliance level	Electromagnetic environment - guidelines
Conducted RF disturbances as per IEC 61000-4-6 Radiated RF disturbances as per IEC 61000-4-3	3 $V_{effective\ value}$ 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3 V/m 3 V	Portable or mobile RF communication equipment, including cables, should not be used at distances which are closer to the KINEVO 900 than the recommended separation distance calculated according to the equation appropriate for the transmission frequency. **Recommended separation distance** $d = 1.2 \sqrt{P}$ $d = 1.2 \sqrt{P}$ for 80 MHz to 800 MHz $d = 2.3 \sqrt{P}$ for 800 MHz to 2.5 GHz where P is the rated output of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). The field strength of stationary radio transmitters for all frequencies according to an on-site investigation[a] should be lower than the compliance level.[b] Interference is possible in the vicinity of equipment marked with the following symbol. 

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is influenced by absorption and reflection by structures, objects and persons.

[a] Theoretically, field strengths of stationary transmitters such as base stations for mobile telephones and mobile land radio equipment, amateur radio stations, AM and FM radio broadcast and TV broadcast transmitters cannot be predicted accurately. To assess the electromagnetic environment with respect to stationary RF transmitters, a site study of the electromagnetic phenomena should be considered. If the measured field strength in the location where the KINEVO 900 is used exceeds the COMPLIANCE LEVELS indicated above, the KINEVO 900 should be monitored to verify normal OPERATION. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the KINEVO 900.

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

10.19.1.4 Recommended safety distances between portable and mobile RF communication equipment and the ME device

The KINEVO 900 is intended for use in an ELECTROMAGNETIC ENVIRONMENT in which RF disturbances are controlled. The customer or the user of the KINEVO 900 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communication equipment (transmitters) and the KINEVO 900 - depending on the output power of the communication equipment as specified below.

Rated output power of the transmitter W	**Safety distance, dependent on transmission frequency** m		
	150 kHz to 80 MHz	**80 MHz to 800 MHz**	**800 MHz to 2.5 GHz**
	$d = 1.2 \sqrt{P}$	$d = 1.2 \sqrt{P}$	$d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is influenced by absorption and reflection by structures, objects and persons.

10.19.2 EMC - Electromagnetic compatibility IEC 60601-1-2: 2014 (4th Edition)

The device is subject to specific precautions with regard to electromagnetic compatibility (EMC) in the area of Professional Healthcare Facility Environment.
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!

Functional deterioration!

Do not install or operate the device 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 KINEVO 900 is operated in proximity to other devices, the proper function of the KINEVO 900 must be monitored.

⚠ WARNING!

Functional deterioration!

- 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!

Deterioration of performance!

- 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 device (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 will deteriorate.
- Do not use any cell phones near the device. They represent a potential risk for the proper functioning of medical equipment. Malfunctions may occur, depending on a variety of local factors. They cannot be predicted and can by no means be estimated.
- Please follow the EMC guidelines on the following pages.

NOTE

Danger due to electromagnetic radiation!

The KINEVO 900 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 KINEVO 900 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 KINEVO 900 to ensure its normal operation in the arrangement in which it is used.

10.19.2.1 Electromagnetic interference emissions

The KINEVO 900 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the KINEVO 900 is responsible for ensuring that the device is operated in such an environment.

Interference emission measurements	**Compliance**
RF emissions as per CISPR 11	Group 1
RF emissions as per CISPR 11	Class A
Emission of voltage fluctuations/flicker as per IEC 61000-3-3	Not applicable

NOTE
The properties of the KINEVO 900 determined by EMISSIONS permit its use in industrial areas and in hospitals (CISPR 11, Class A). If used in a residential area (for which Class B usually is required as per CISPR 11), the KINEVO 900 may not provide the necessary protection with regard to radio frequency communication services. The user may have to take corrective measures such as moving or realigning the device.

NOTE

The emission properties of the KINEVO 900 are suitable for use in industrial areas and hospitals (CISPR 11 Class A). If the KINEVO 900 is used in a residential area (for which CISPR 11 Class B is normally required) this equipment may not provide the necessary protection with regard to radio frequency communication services.

10.19.2.2 Electromagnetic immunity for all ME equipment and ME systems

The KINEVO 900 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the KINEVO 900 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 ±15 kV air discharge	±8 kV contact discharge ±15 kV air discharge
Fast transient/burst immunity as per IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines
Surges as per IEC 61000-4-5	±1 kV voltage Phase neutral conductor ±2 kV voltage Phase neutral conductor-ground	±1 kV voltage Phase neutral conductor ±2 kV voltage Phase neutral conductor-ground
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

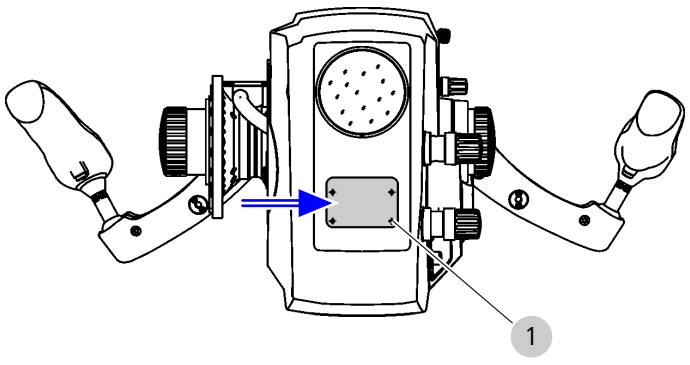
10.19.2.3 Electromagnetic immunity for non-life-supporting devices

The KINEVO 900 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the KINEVO 900 is responsible for ensuring that the device is operated in such an environment.		
Electromagnetic immunity tests	**IEC 60601 test level**	**Compliance level**
Conducted RF disturbances as per IEC 61000-4-6	3 V 150 kHz to 80 MHz	3 V
	6 V ISM bands between 150 kHz and 80 MHz	6 V
Radiated RF disturbances as per IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz	3 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

10.20 Interface for laser micromanipulators

The dovetail guide, order number: 303360-9903-000, is not included in the scope of supply.

Only laser micromanipulators with a max. weight of 1 kg may be mounted on the interface.



1	Threaded bores (4x) for fastening the dovetail guide

⚠ CAUTION!

Use of an external micromanipulator (e.g. from another manufacturer)!

If you want to connect an external micromanipulator to the device: Contact your ZEISS contact partner. All configurations must meet the normative requirements for medical systems (see IEC 60601-1-1 or Clause 16 of the 3rd edition of IEC 60601-1 respectively). Anyone connecting additional equipment to medical electrical systems is a system configurer and as such responsible for compliance of the system with the standards for systems. Local legislation has priority over the above normative requirements.

- ▶ Before each use, check the correspondence of the focal planes (without a patient).
- ▶ Please observe the separate Instructions for Use for your laser micromanipulator.
- ▶ It is absolutely essential that the focal planes of the surgical microscope and of the laser micromanipulator be identical!
- ▶ When operating an approved external micromanipulator, activate the "Focus Stop" function if it does not have an AF function.

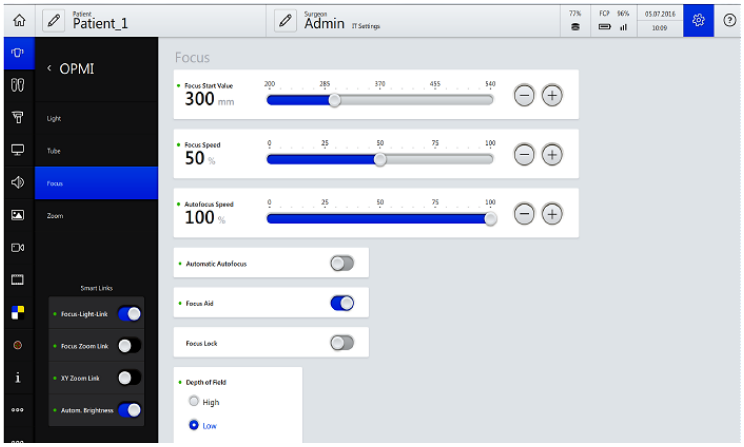
Prerequisite

- ☑ The laser micromanipulator is installed on the dovetail guide (option), order number: 303360-9903-000 located on the bottom of the microscope.
- ☑ Before each use of the laser of the surgical microscope with a laser micromanipulator, you must adjust the focal plane of the surgical microscope to the focal plane of the laser micromanipulator. Following a correct adjustment of both focal planes, the focus of the surgical microscope (Varioskop) must not be readjusted in order to prevent a deviation of the focal planes resulting in an unfocused laser beam during the laser process.
  The Varioskop is used for motorized adjustment of the working distance (coarse focus) as well as for motorized adjustment of the image sharpness (fine focus). Using the focus rocker switches, you can continuously adjust the working distance between 200 mm and 625 mm.

Action

1. Adjust the working distance (coarse focus) to the focus value of the laser micromanipulator. The current focus value is displayed on the touchscreen. Check the correspondence of the focal planes according to the procedure recommended above. If necessary, correct the focus setting by adjusting it slightly (fine focus).
2. Tap on the [Settings] button  in the status bar.
3. Tap on the [Microscope] [Focus] button.

⇨ The "Focus" menu is displayed.



4. Activate the Focus Stop function. 

   ⇨ All motorized focus functions, including the autofocus, are out of operation. This prevents accidental motorized maladjustment of the focal planes. If Focus Stop is activated, no autofocus is performed when the brakes are applied, even if the autofocus is switched on.

5. Before each use, check the correspondence of the focal planes (without a patient). Aim the aiming beam at a suitable object (e.g. a wooden spatula) and trigger a single pulse.

   ⇨ The center of the burn zone must not deviate from the center of the aiming beam by more than max. 0.5 mm.

6. If necessary, correct the focus setting by adjusting it slightly.

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11 Accessories and spare parts

11.1 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.

11.1.1 Video accessories

Video accessories can be found in the separate product overview G-30-1888.

11.1.2 QEVO

Designation	Specification	Order no.
QEVO	Digital Exploration Tool and Control Unit	303155-9020-000

11.1.3 Main tube

Designation	Specification	Order no.
Tiltable tube 180°	Swivel range 180°, f=170mm	303791-0000-000
Foldable tube, white	f=170/260 mm not suitable for mouth switch adaptation	303771-9021-000
Foldable tube for mouth switch, white	f=170/260 mm without integrated rotation function (only in conjunction with mouth switch 000000-1177-805)	303771-9111-000
Angle optics with dovetail (spine adapter), white		302584-9200-000

11.1.4 Eyepieces for main tube

Designation	Specification	Order no.
Push-in widefield eyepieces, 2 pcs	10x	305542-0000-000
Push-in widefield eyepieces, 2 pcs	12.5x aspherical	305543-9901-000

11.1.5 Co-observer tube

Designation	Specification	Order no.
Stereo co-observation module	with 2 pivot joints and locking levers	000000-1063-869

11.1.6 Tube for left/right co-observation

Designation	Specification	Order no.
Straight tube	f=170 mm	303765-0000-000
Sleeve	Sleeves for tubes with screw thread	305542-0107-000
Tiltable tube 180°	Swivel range 180°, f=170mm	303791-0000-000
Foldable tube, white	f=170/260 mm not suitable for mouth switch adaptation	303771-9021-000

11.1.7 Eyepieces for left/right co-observation

Designation	Specification	Order no.
Push-in widefield eyepieces, 2 pcs	10x	305542-0000-000
Push-in widefield eyepieces, 2 pcs	12.5x aspherical	305543-9901-000

11.1.8 Tube for face-to-face

Designation	Specification	Order no.
Tiltable tube 180°	Swivel range 180°, f=170mm	303791-0000-000
Foldable tube, white	f=170/260 mm not suitable for mouth switch adaptation	303771-9021-000
Rotating adapter		301007-0000-000

11.1.9 Eyepieces for face-to-face

Designation	Specification	Order no.
Push-in widefield eyepieces, 2 pcs	10x	305542-0000-000
Push-in widefield eyepieces, 2 pcs	12.5x aspherical	305543-9901-000

11.1.10 Tube covers

Designation	Specification	Order no.
Cover, main observer tube	NCS 1002-B	302584-1040-000
Cover, co-observer tube	NCS 1002-B, lak	302584-1041-000

11.1.11 Tube for posterior fossa

Designation	Specification	Order no.
Straight tube	f=170 mm	303765-0000-000
Sleeve, 2x	for tubes with screw thread	305542-0107-000

11.1.12 Eyepieces for posterior fossa

Designation	Specification	Order no.
Push-in widefield eyepieces, 2 pcs	10x	305542-0000-000
Push-in widefield eyepieces, 2 pcs	12.5x aspherical	305543-9901-000

11.1.13 Fluorescence targets

Designation	Specification	Order no.
Fluorescence target	BL 400	302581-9052-000
Fluorescence target	YE 560	302582-9208-000

11.1.14 Foot control panel

Designation	Specification	Order no.
FCP WL	Foot control panel with 14 functions, wireless	304970-9200-000
FCP	Foot control panel with 14 functions, cable-connected	304970-9015-000
Foot control panel accessories		
Battery set	3 pieces, packaged	304970-8821-000
FCP indicating label	FCP indicating label	304970-1010-000
Instructions for Use for FCP and FCP WL	G-30-1706 FCP and FCP WL	000000-1520-536

11.1.15 FCP cable/FCP backup cable

Designation	Specification	Order no.
FCP CAN bus cable	6m	304970-8760-000

11.1.16 Rocker foot switch

Designation	Specification	Order no.
Rocker switch	2 functions, 3 m cable	305989-8609-000

11.1.17 Sterile covers/drapes

Nr. 28 (5 vnt.), sterilūs apklotai

Designation	Specification	Order no.
SMARTDRAPE	No. 28 (5 pcs), sterile	306028-0000-000
VisionGuard replacement lenses	(20/box), sterile	306001-0000-000

VisionGuard pakaitinės linzės (stikliukai) sterilūs

11.1.18 Mouth switch

Designation	Specification	Order no.
Mouth switch	for 180° tiltable tube and foldable tube (303771-9110-000)	000000-1177-805
Angle adapter for mouth switch		302700-8602-000

11.1.19 Magnification Changer

Designation	Specification	Order no.
Magnification Changer	3-position	303429-9903-000

11.1.20 Country-specific cables

Designation	Specification	Order no.
Europe	Power cord, length: 6 m	000000-0594-821
USA	Power cord, length: 6 m	000000-0594-822
UK	Power cord, length: 6 m	000000-0594-823
Switzerland	Power cord, length: 6 m	000000-0584-947
Argentina	Power cord, length: 6 m	000000-0594-906
China	Power cord, length: 6 m	000000-0594-824
Brazil	Power cord, length: 6 m	000000-0594-905

11.1.21 Adaptation of laser micromanipulators

Designation	Specification	Order no.
Dovetail mount / adapter plate for ext. components	(e.g. laser micromanipulator)	303360-9903-000

11.1.22 Stereo glasses

Designation	Specification	Order no.
Set of stereo polarization glasses	5 pairs	000000-1992-943

11.2 Spare parts

11.2.1 Backup lamp

Designation	Specification	Order no.
Lamp container	HLQ300W+	304949-9002-000

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12 Disposal

12.1 Environmental pollution

NOTE

Note 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.

12.2 Disposal

- ▶ 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 off 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 resell 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

AET

AE Titles must be given locally unique names by the system administrator and be appropriately managed. They are large and 16 bytes long. They must be configured in this way before a DICOM connection is initialized.

Diopter scale

Element of an eyepiece for reading off the set refraction value.

Electromagnetic compatibility (EMC)

EMC (electromagnetic compatibility) designates the usually desired state in which technical devices do not impede each other by undesired electric or electromagnetic effects (non-interference).

Eyecup

Eyepiece control element used to shield the eyepiece against scattered light during eye-controlled focusing.

FL button

Release button for fluorescence application on the handgrip or FCP

LAN

LAN (local area network)

Ref. Phys. Name

Referring Physician's Name, name of the referring physician who requested the procedure.

Req. Proc. Code

Requested Procedure Code, code value that describes the requested procedure according to a specific coding scheme.

Req. Proc. Desc.

Requested Procedure Description, administrative description specified by the hospital or classification of the requested procedure.

Req. Proc. ID

Requested Procedure ID, identification number that identifies the requested procedure in the "Imaging Service Request".

Sch. Proc. Step Desc.

Scheduled Procedure Step Description, description specified by the hospital or classification of the scheduled procedure step.

Sch. Proc. Step Start

Scheduled Procedure Step Start, planned start time for the procedure step.

Sch. Protocol Code

Scheduled Protocol Code, code value that describes the scheduled protocol according to a specific coding scheme.

Technical safety test

Technical safety test to determine and assess the system safety.

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

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Keyword index

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WINDOWS EMBEDDED STANDARD 7

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You may allow up to ten other devices to access the software to use

- File Services,
- Print Services,

- Internet Information Services, and
- Internet Connection Sharing and Telephony Services.

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- embed fonts in content as permitted by the embedding restrictions in the fonts; and
- temporarily download them to a printer or other output device to print content.

f. Icons, images and sounds. While the software is running, you may use but not share its icons, images, sounds, and media.

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- Other software on your device ceasing to work, or
- Your breaching a license to use other software on this device

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   a. **Consent for Internet-Based Services.** The device may contain one or more of the software features described below. These features connect to Microsoft or service provider computer systems over the Internet. In some cases, you will not receive a separate notice when they connect. For more information about these features, visit go.microsoft.com/fwlink/?linkid=104604.

      By using these features, you consent to the transmission of this information. Microsoft does not use the information to identify or contact you.

      Computer Information. The following features use Internet protocols, which send to the appropriate systems computer information, such as your Internet protocol address, the type of operating system and browser, the name and version of the software you are using, and the language code of the device where you installed the software. Microsoft uses this information to make the Internet-based services available to you. *[OEM]* has elected to turn on the following features on the device.

      - Plug and Play and Plug and Play Extensions. You may connect new hardware to your device. Your device may not have the drivers needed to communicate with that hardware. If so, the update feature of the software can obtain the correct driver from Microsoft and install it on your device.

      - Web Content Features. Features in the software can retrieve related content from Microsoft and provide it to you. Examples of these features are clip art, templates, online training, online assistance and Appshelp. You may choose to switch them off or not use them.

      - Digital Certificates. The software uses x.509 version 3 digital certificates. These digital certificates confirm the identity of user sending information to each other and allow you to encrypt the information. The software retrieves certificates and updates certificate revocation lists over the Internet.

      - Auto Root Update. The Auto Root Update feature updates the list of trusted certificate authorities. You can switch off this feature.

      - Windows Media Digital Rights Management. Content owners use Windows Media digital rights management technology (WMDRM) to protect their intellectual property, including copyrights. This software and third party software use WMDRM to play and copy WMDRM-protected content. If the software fails to protect the content, content owners may ask

Microsoft to revoke the software's ability to use WMDRM to play or copy protected content. Revocation does not affect other content. When you download licenses for protected content, you agree that Microsoft may include a revocation list with the licenses. Content owners may require you to upgrade WMDRM to access their content. Microsoft software that includes WMDRM will ask for your consent prior to the upgrade. If you decline an upgrade, you will not be able to access content that requires the upgrade. You may switch off WMDRM features that access the Internet. When these features are off, you can still play content for which you have a valid license.

- Windows Media Player. When you use Windows Media Player, it checks with Microsoft for
  - compatible online music services in your region;
  - new versions of the player; and
  - codecs if your device does not have the correct ones for playing content.

  You can switch off this feature. For more information, go to: go.microsoft.com/fwlink/?LinkId=51331.
- Malicious Software Removal/Clean On Upgrade. Before installation of the software, the software will check and remove certain malicious software listed at www.support.microsoft.com/?kbid=890830 ("Malware") from your device. When the software checks your device for Malware, a report will be sent to Microsoft about any Malware detected or errors that occurred while the software was checking for Malware. No information that can be used to identify you is included in the report. You may disable the software's Malware reporting functionality by following the instructions found at www.support.microsoft.com/?kbid=890830.

- Network Awareness. This feature determines whether a system is connected to a network by either passive monitoring of network traffic or active DNS or HTTP queries. The query only transfers standard TCP/IP or DNS information for routing purposes. You can switch off the active query feature through a registry setting.

- Windows Time Service. This service synchronizes with www.time.windows.com once a week to provide your l device with the correct time. The connection uses standard NTP protocol.

- Search Suggestions Service. In Internet Explorer, when you type a search query in the Instant Search box or type a question mark (?) before your search term in the Address bar, you will see search suggestions as you type (if supported by your search provider). Everything you type in the Instant Search box or in the Address bar when preceded by a question mark (?) is sent to your search provider as you type. Also, when you press Enter or click the Search button, the text in the Instant Search box or Address bar is sent to the search provider. If you use a Microsoft search provider, use of the information sent is subject to the Microsoft Online Privacy Statement. This statement is available at go.microsoft.com/fwlink/?linkid=31493. If you use a third-party search provider, use of the information sent will be subject to the third party's privacy practices. You can turn search suggestions off at any time. To do so, use Manage Add-ons under the Tools button in Internet Explorer. For more information about the search suggestions service, see go.microsoft.com/fwlink/?linkid=128106.

- Consent to Update Infrared Emitter/Receiver. The software may contain technology to ensure the proper functioning of the infrared emitter/receiver device shipped with certain Media Center-based products. You agree that the software may update the firmware of this device.

- Media Center Online Promotions. If you use Media Center features of the software to access Internet-based content or other Internet-based services, such services may obtain the following information from the software to enable you to receive, accept and use certain promotional offers:

  - certain device information, such as your Internet protocol address, the type of operating system and browser you are using, and the name and version of the software you are using,

  - the requested content, and

  - the language code of the device where you installed the software.

  - Your use of the Media Center features to connect to those services serves as your consent to the collection and use of such information.

- Media Playback Updates. The software on the device may include media playback features which receives updates directly from the MSCORP Media Playback Update servers. If activated by your manufacturer, these updates will be downloaded and installed without further notice to you. The manufacturer is responsible for ensuring these updates work on your device.

- Windows Update Agent. The software on the device includes Windows Update Agent ("WUA"). This feature enables your device to access Windows Updates either directly from MSCORP Windows Update server or from a server installed with the required server component and from the Microsoft Windows Update server. To enable the proper functioning of the Windows Update service in the software (if you use it) updates or downloads to the Windows Update service will be required from time to time and downloaded and installed without further notice to you. Without limiting any other disclaimer in these license terms or any license terms accompanying a Windows Update, you acknowledge and agree that no warranty is provided by Microsoft Corporation or their affiliates with respect to any Windows Update that you install or attempt to install on your device.

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