

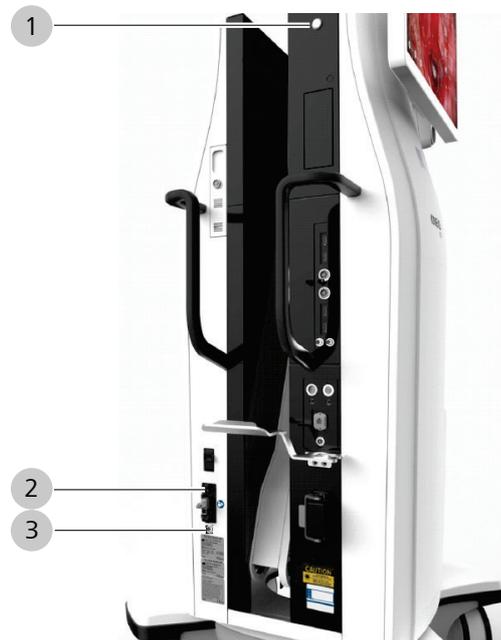
*Action*

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

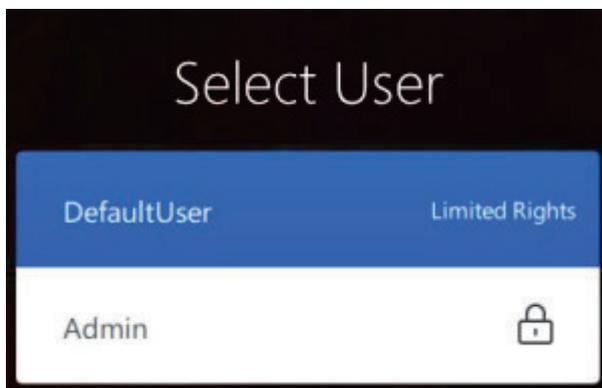
When you use the device for the first time, only the selections "DefaultUser" and "Admin" appear in the "Select User" selection window on the login screen. The "DefaultUser" user group has only limited rights. In order to be able to use the device to a full extent, you must create a new user during initial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

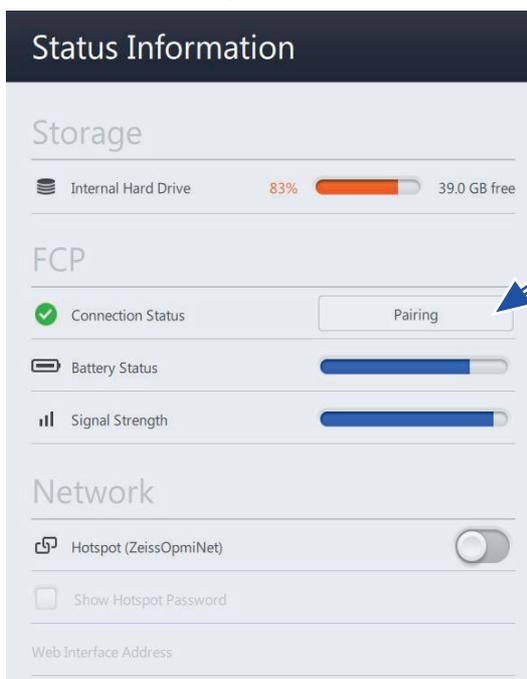
*Action*

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



⇒ The “Status Information” menu is displayed.

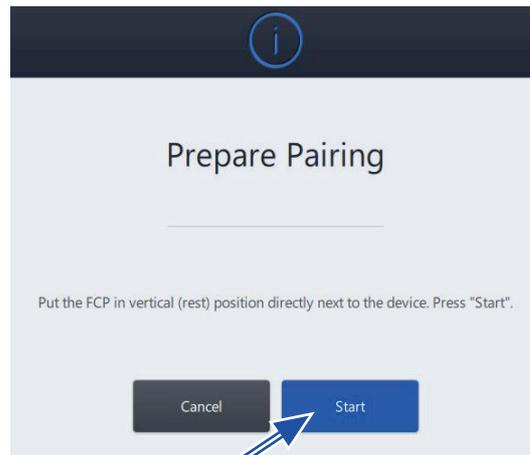
2. Tap on the [Pairing] button.



⇒ The “Prepare pairing” menu is displayed.

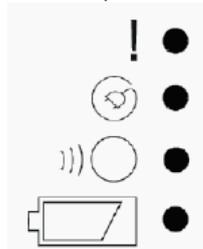
3. Follow the prompts on the screen. Put the foot control panel in a vertical position in the immediate vicinity of the device.

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

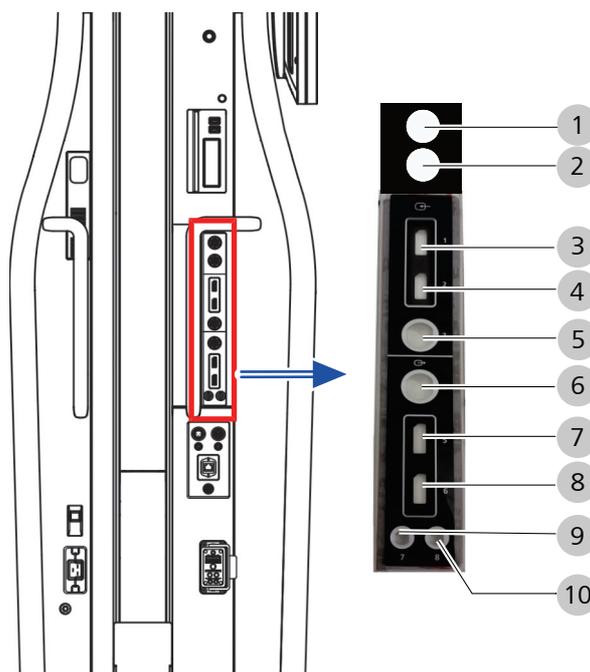


Figure 59: Connecting external video devices and monitors

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!**

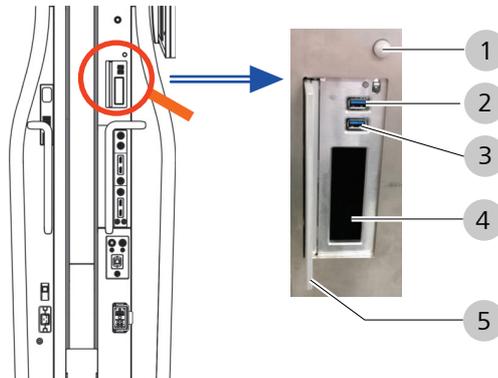
Connecting accessories which have not been approved by ZEISS may lead to patient injuries.

- ▶ 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](http://www.zeiss.com/med).

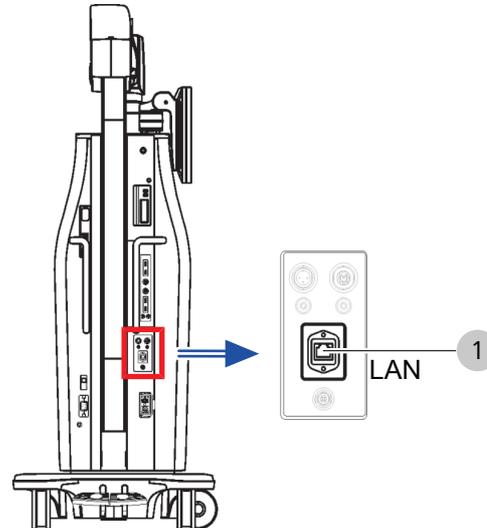
### 4.13.1 Activating IT admin system rights

*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](http://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 corresponding 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

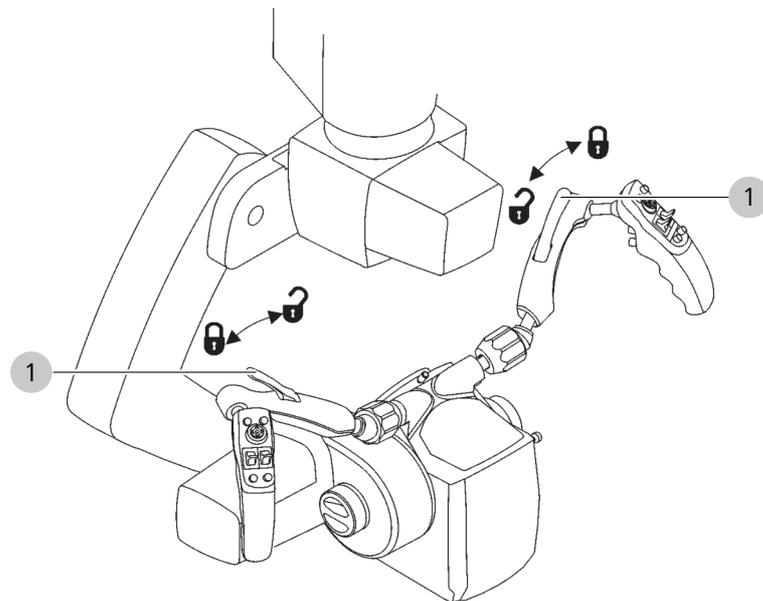


Figure 60: Setting the position of the handgrips

1	Locking lever
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### 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

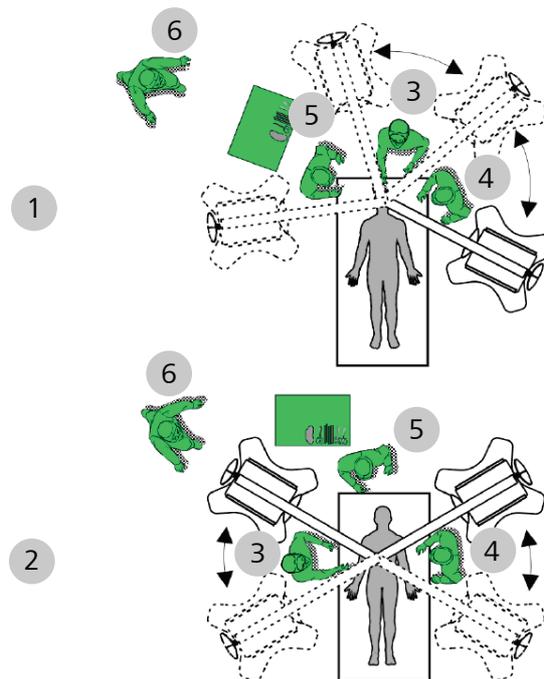


Figure 61: Positioning the device in the OR

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

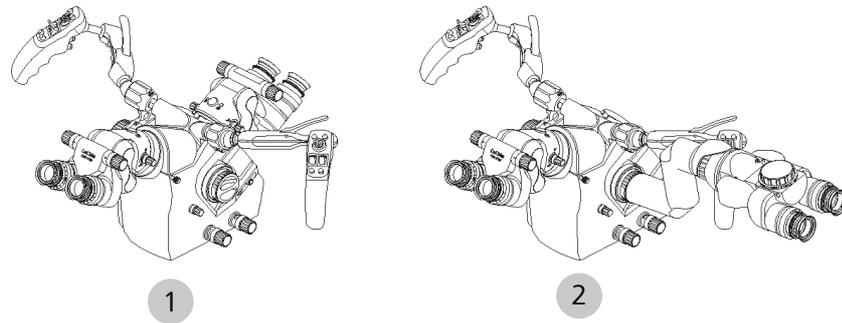


Figure 62: Configuring the device for applications

13. 2.	1	Configuring the device for "face-to-face" co-observation (spine)	2	Configuring the device for "left/right" co-observation (cranial)	14. 2.
		[renginio konfigūravimas "veidas į veidą" bendrajam stebėjimui (stuburo operacijoms)]		[renginio konfigūravimas "į dešinę/kaire" bendrajam stebėjimui (kaukolės operacijoms)]	

## 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.

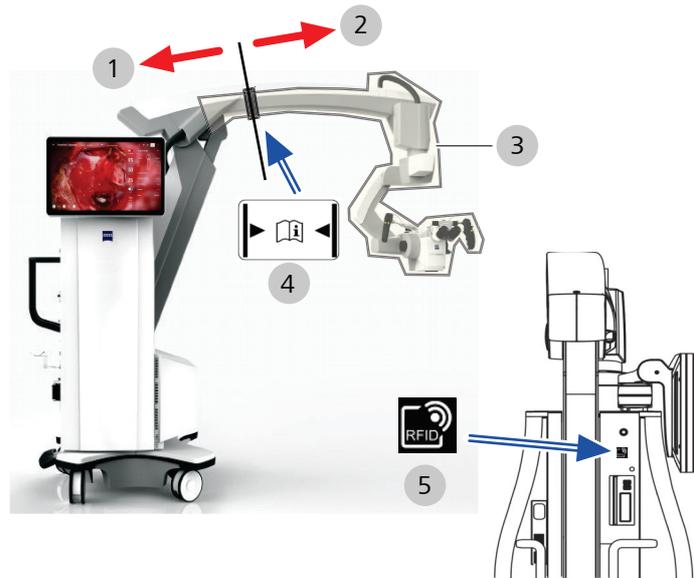


Figure 63: Attaching SMARTDRAPE

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 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.

4. Seal the SMARTDRAPE airtight at the marking using one of the fastening straps.
5. Remove the RFID label from the SMARTDRAPE and hold or fasten it on the RFID reader.  
⇒ 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. 3. 1. **Autobalance the entire device: On the touchscreen, tap on the [System] button in the additional menu "Extended operation" [▶ 56].** Viso įrenginio autobalansavimas : ant prisilietimui jautraus ekrano bakstelėkite [System] mygtuką , esantį papildomame meniu "Extended operation"
2. **Autobalance Drape (balance axes 2 and 3): On the touchscreen, tap on the [Drape] button in the additional menu "Extended operation".** Apklotų autobalansavimas (ašių 2 ir 3 balansavimas): ant prisilietimui jautraus ekrano bakstelėkite [Drape] mygtuką , esantį papildomame meniu "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.

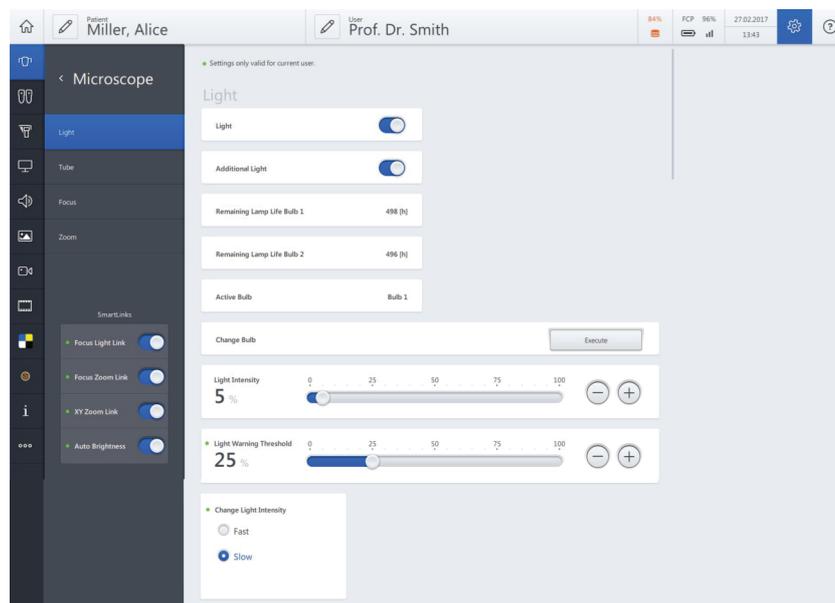


Figure 65: “Settings Microscope” menu, “Light” submenu

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.

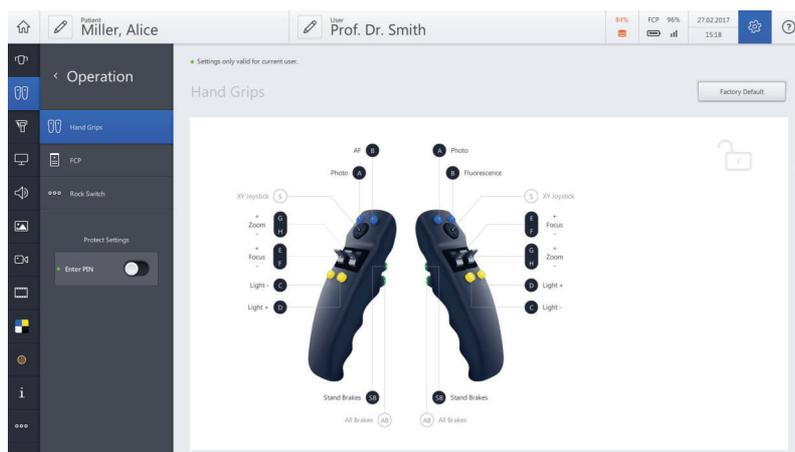
### 6.1.3 Configuring the button assignment of the hand grips, foot control panel and rocker foot switch

#### 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:

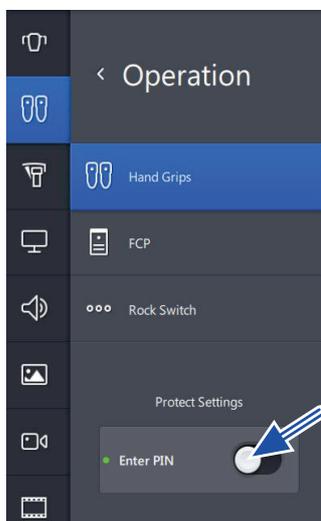
- Light: Light brighter (top button) / Light darker (bottom button)
  - Zoom: + (top button) / - (bottom button)
  - Focus: + (top button) / - (bottom button)
4. Check the button assignment and the functions of the rocker foot switch before every application and without a patient.

### 6.1.3.5 Protection of settings

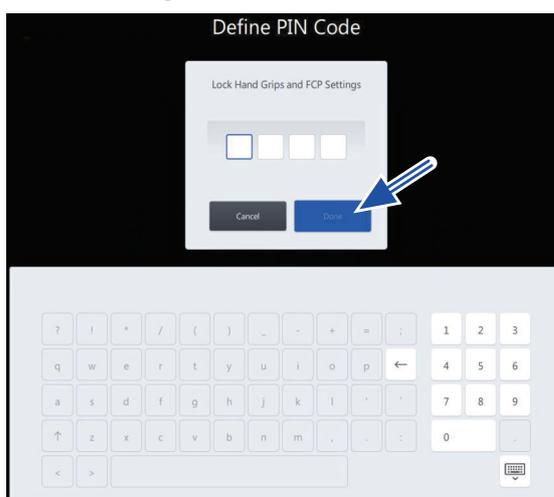
Every user can protect his handgrip and foot control panel configuration against third-party access with a password (PIN). Settings thus protected can be changed again only after unlocking them with the valid PIN.

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.

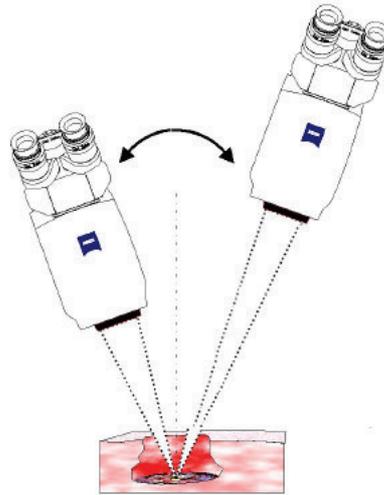


Figure 66: Overview of rotary axes: Stand axes: 1-3, microscope axes: 4-6

■ "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

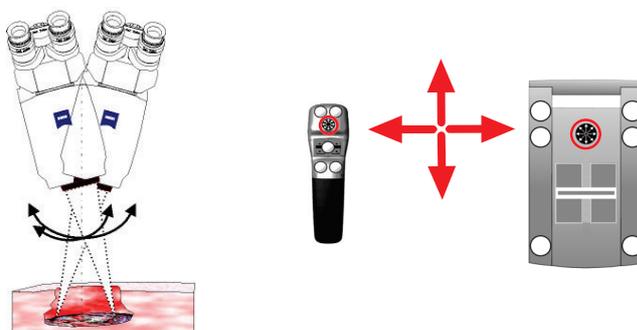
1. Tap on ⚙ Settings → ⏸ Operation → Handgrips.
2. Tap on the [SB] button. It's the upper green brake release button on the back of the handgrip.
  - ⇒ The assignable functions are displayed on the right side:
    - "Stand Brakes"
    - "Microscope Brakes"
    - "PointLock"
3. Tap on the desired function.
  - ⇒ 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.

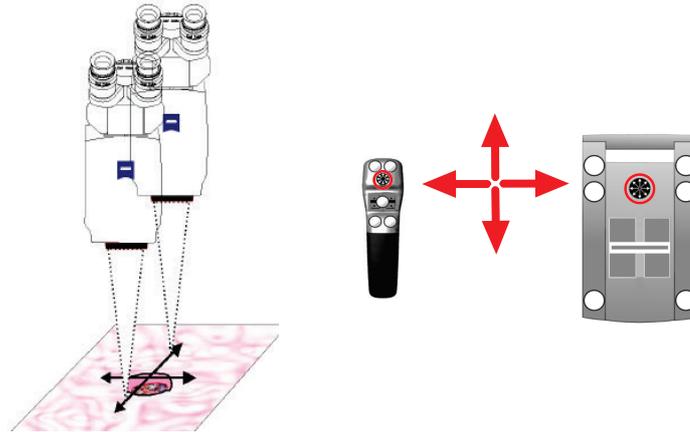
*Action*

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

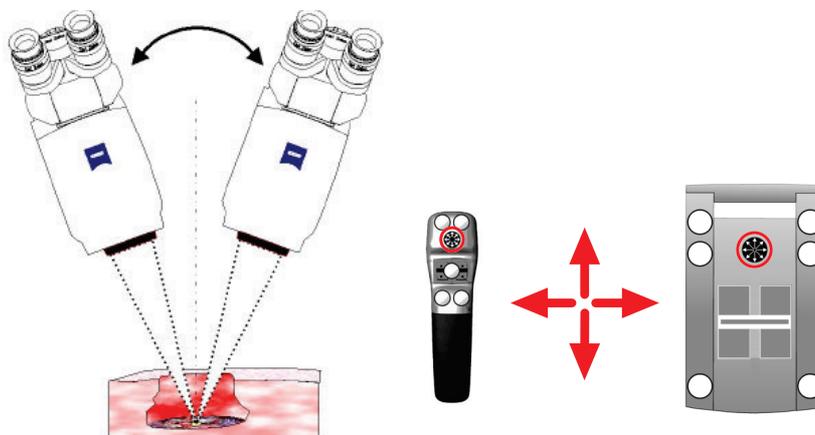
- ☑ Position the microscope above the desired surgical field and focus on the plane to be observed.

#### 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.

- 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*

- Tap on  Settings →  Stand.
- Tap on the [Start] button in the "Start Drape Position" field.
- 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.
- 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:

- 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.**

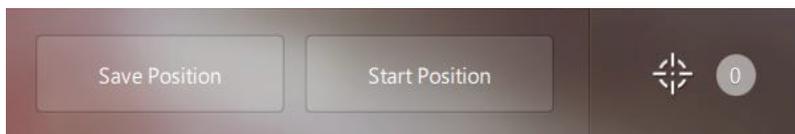
No diagnosis may be made based on the position memory, as the patient position is not calibrated with the device position and may differ from the latter.

- ▶ 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 .

### 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 .

### 6.1.8 Configuring the video camera

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

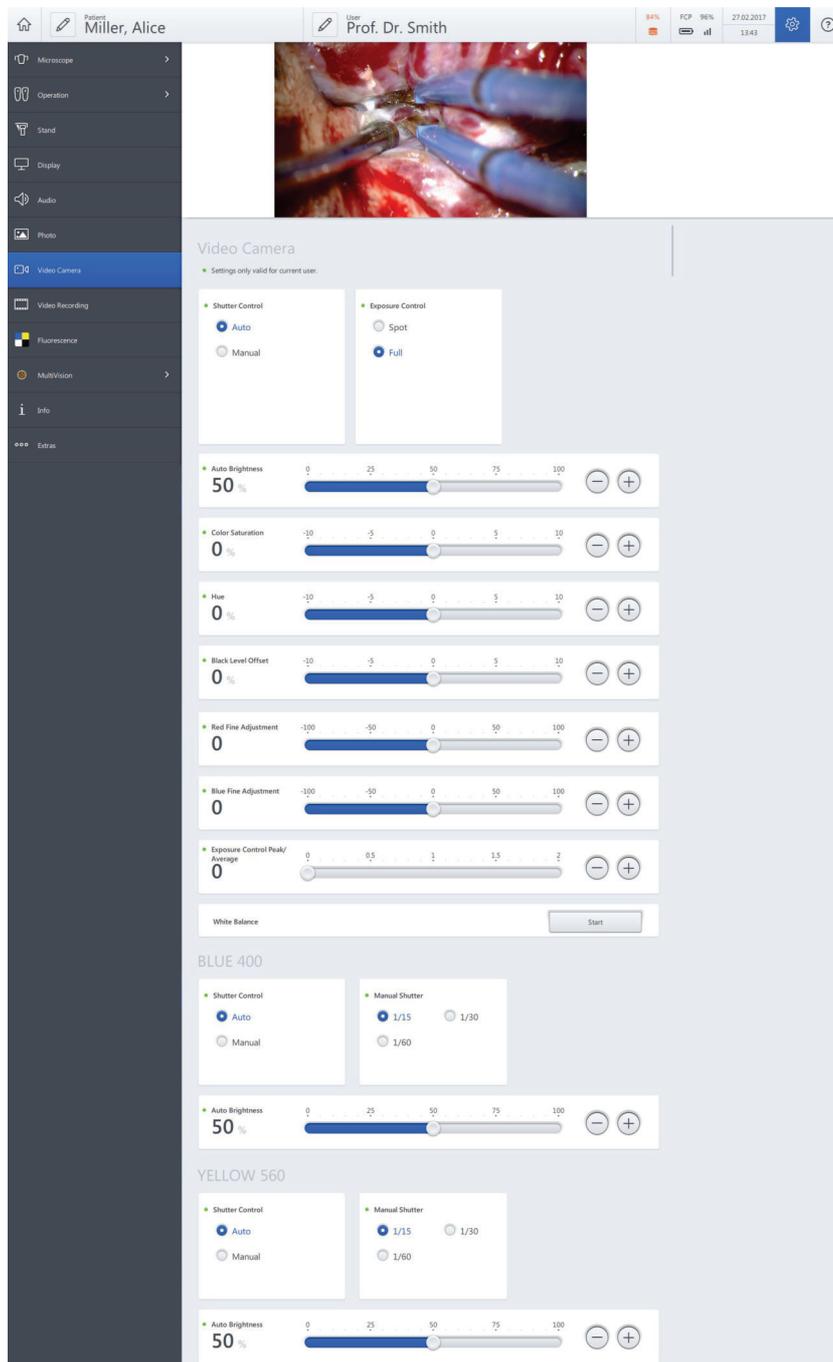


Figure 67: "Settings Video Camera" menu

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  $\pm 0$  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  $\pm 0$  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 pre-configured 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.

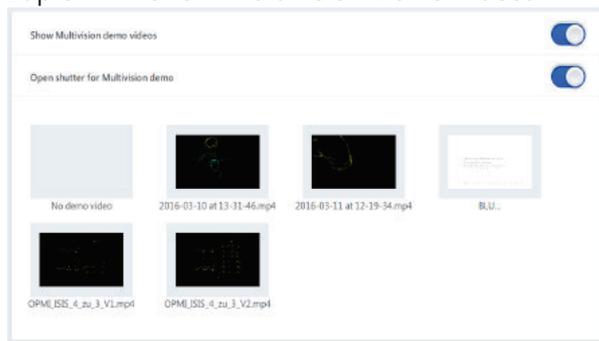


15. In the menu bar, tap on  Fluorescence → Select the fluorescence application. → Start the fluorescence application → .
16. By pressing the button on the touchscreen, the configured FL button or the FCP button, you can activate the respective next phase of the INFRARED 800 fluorescence application. 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 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

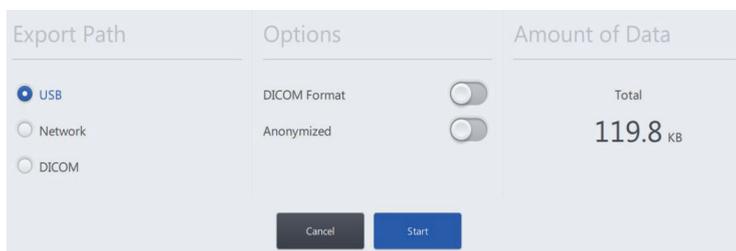
Action

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.

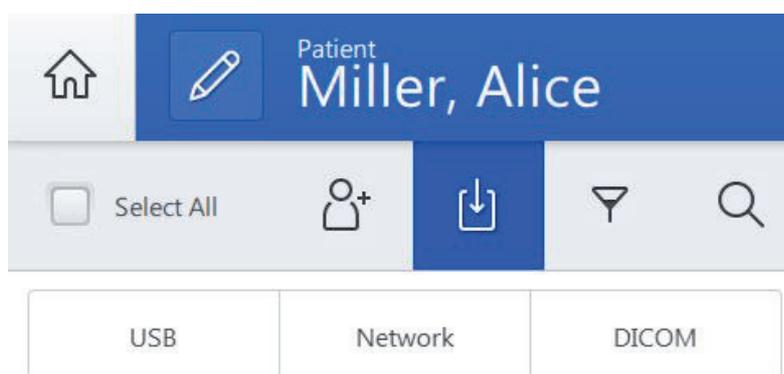


4. Select the desired "Export Path" [USB, Network Share, [DICOM] button].
5. Select the memory option:  
**DICOM format** (for USB and network only)  
On: Images are stored on a USB medium in DICOM format.  
Off: Images are saved in native format (PNG, JPEG) in the pre-defined patient data structure.  
**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.

Scheduled for	Last Name	First Name	Patient ID	Date of Birth	Gender	Accession Number	Req. Proc. ID	Modality	
29.03.2017 15:30	Smith	Otto	PRH56	31.12.1975	♂	ACN456	RPE124	Kranioskopia	GM >
04.02.2016 10:30	Smith	Bob	PRD23	31.01.1970	♂	ACN123	RPE123	Kranioskopia	GM >

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

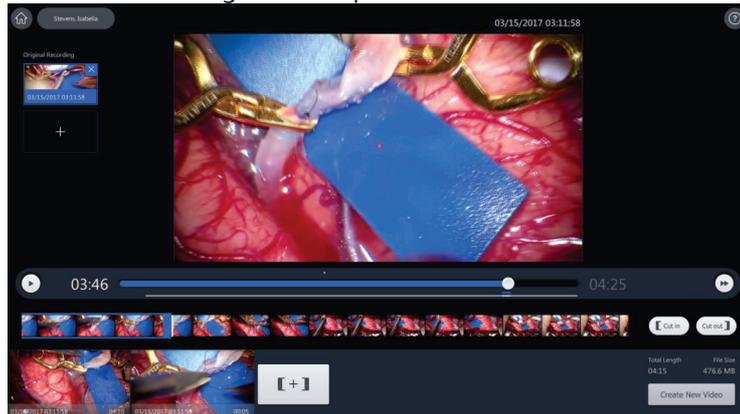
1. Tap on the [Videos] button in the "Patient" menu .
  - ⇒ All videos of the patient are displayed.  
If not all of the videos are displayed, scroll down the video list.
2. Tap on the video you want to view in full size.  
The following information/buttons are displayed in the footer of the video player:
  - ⇒ 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.

### DICOM (pasirinkimas)

## 20. 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!

Action

#### The BLUE 400 fluorescence target is not sterile!

- ▶ 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 → .



## 23. 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.

Integruotas YELLOW 560 fluorescencijos modulis naudojamas vizualizuoti fluorescuojančioms zonoms. Jis skirtas fluoroforų sužadinimui bangų ilgio diapazone nuo 460 iki 500 nm ir stebėjimui bangų ilgio diapazone nuo 540 iki 690 nm. Chirurgas gali persijungti atgal ir pirmyn tarp baltos šviesos ir mėlynos sužadinimo šviesos fluorescencijai vieno mygtuko paspaudimu. Siekiant optimalaus fluorescencinės šviesos atkūrimo, patalpos ir aplinkinės šviesos turi būti pritemdytos.

## 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.

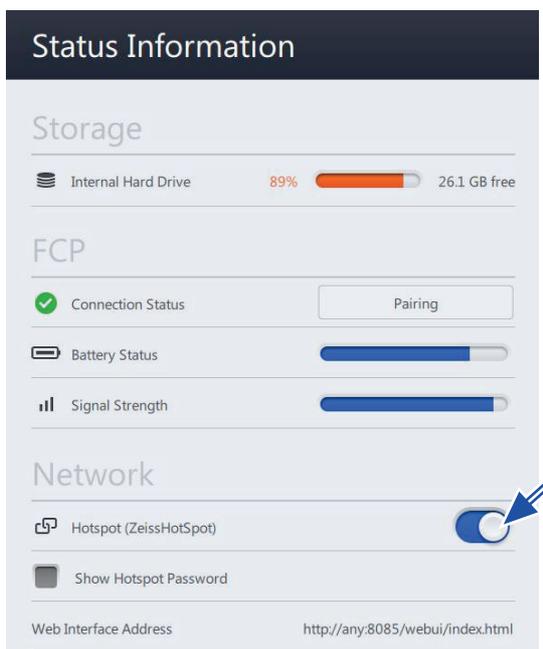
### Action

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

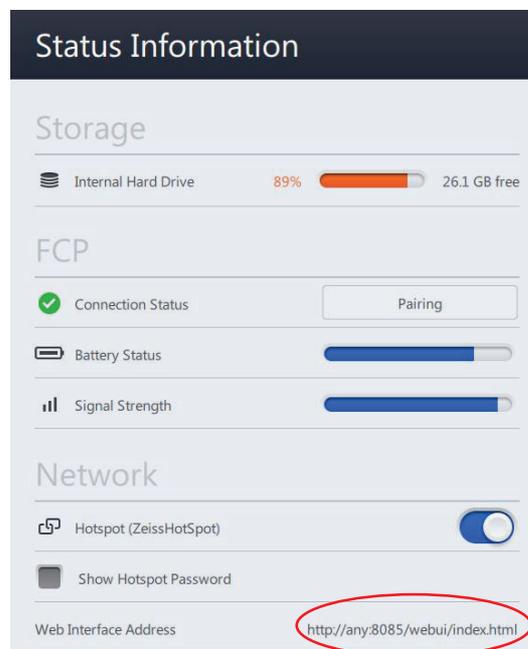
If the web interface is activated in the device, you can access the patient data from an external device.

### 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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## Valymas ir Dezinfekcija

# 16. 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.

### Mechaninių paviršių valymas

#### 16. 7.2.3 Cleaning mechanical surfaces

All mechanical surfaces of the system can be cleaned by wiping them with a damp cloth. *Visi mechaniniai sistemos paviršiai gali būti valomi nuvalant juos drėgnu skudurėliu.*

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 dish-washing liquid. *Pašalinkite visas galimas nuosėdas, naudodami 50% etilo alkoholio ir 50% distiliuoto vandens mišinį, kartu su buitinių indų plovimo skysčiu.*

#### 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

*Paviršių dezinfekcija*

#### 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%

Maksimali naudojama koncentracija yra:  
• Alkoholis (testuota su 2 propanoliu): 60%  
• Aldehidas (testuota su glutaraldehidu): 2%  
• Ketvirtiniai junginiai (testuota su 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. *Dezinfekuokite visus reikiamus paviršius.*

## 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](http://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)	<ul style="list-style-type: none"> <li>▶ No regular inspections or maintenance are required in order to maintain electromagnetic compatibility (EMC).</li> </ul>
According to country-specific time specifications	
Safety inspection	<ul style="list-style-type: none"> <li>▶ Checking the device and electrical safety</li> </ul>
Prior to each use	
Brakes	<ul style="list-style-type: none"> <li>▶ Electrical and mechanical function test:</li> </ul> <p>Release brakes completely; braking force holds microscope securely in balanced state without any change of position.</p>
Lamps	<ul style="list-style-type: none"> <li>▶ Check:                             <ul style="list-style-type: none"> <li>■ Operating hours within permissible range</li> <li>■ Replacement lamp available and ready for use</li> </ul> </li> </ul> <p>We recommend replacing the lamp after: The specified operating hours have been reached (500 hours)</p>

## 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 →  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](http://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.

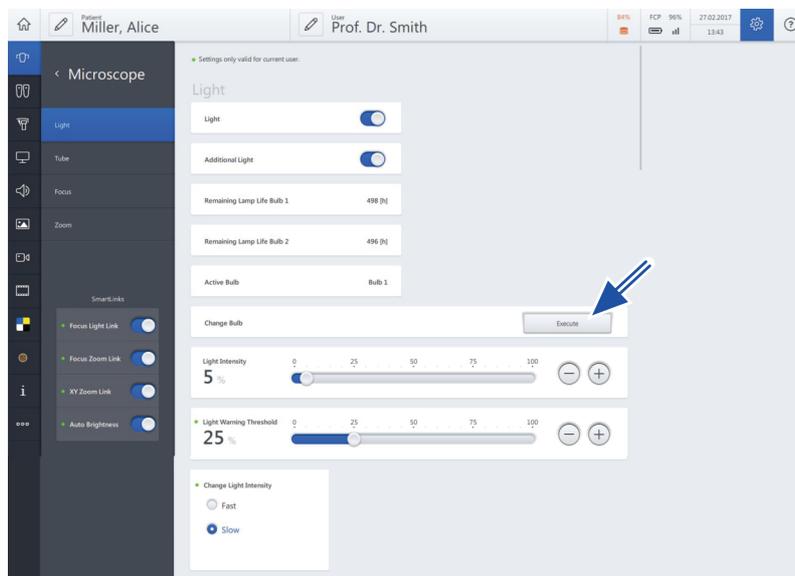
## 9.5 Lamp change

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

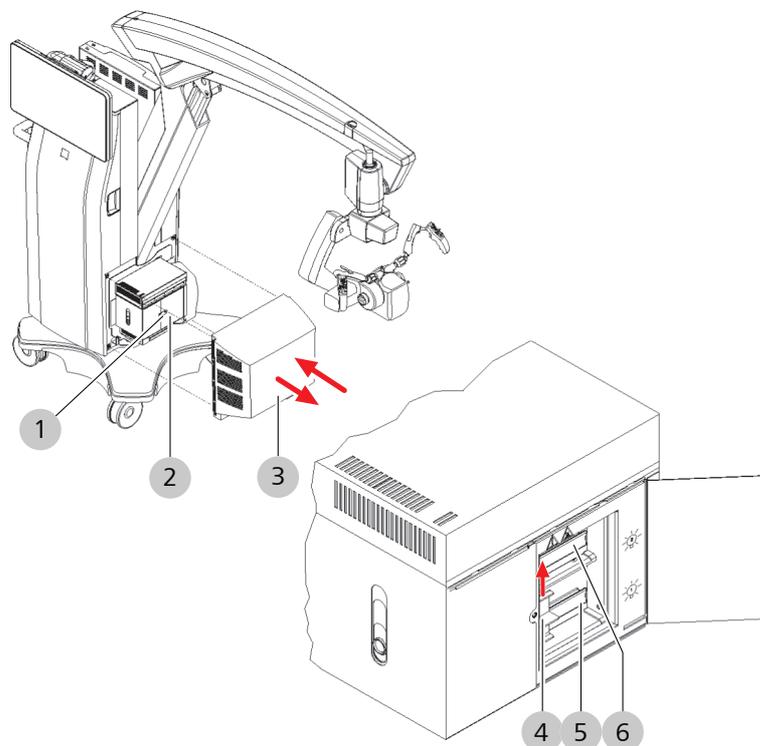


Figure 68: Manual lamp change

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.

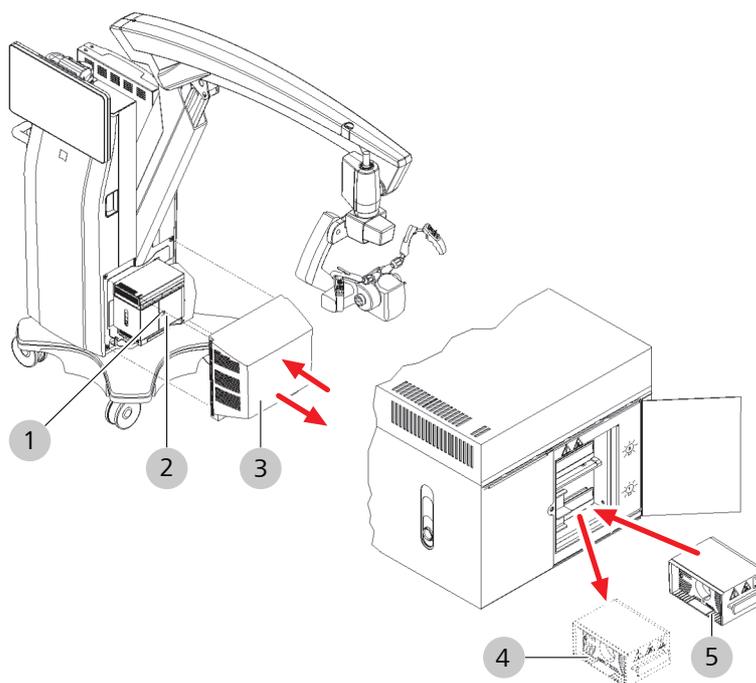


Figure 69: Replacing the lamp container

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.

Empty page, for your notes

## 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	
--------------------	---

- 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 →  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:



## 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	$\lambda$ 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 x 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 <small>(-0.8 Vp-p/75 <math>\Omega</math> PAL)</small>	1920x1080p50/60

### 10.11 Digital video inputs

Designation	Value
Input 3, 4: Display port	1920x1080p50/60
Input: 5 HDM / DVI	1920x1080p50/60
	1280x720p50/60

### 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 micro- scope body	Max. 6 kg
Max. dimensions in transport posi- tion (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	$\lambda$ 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

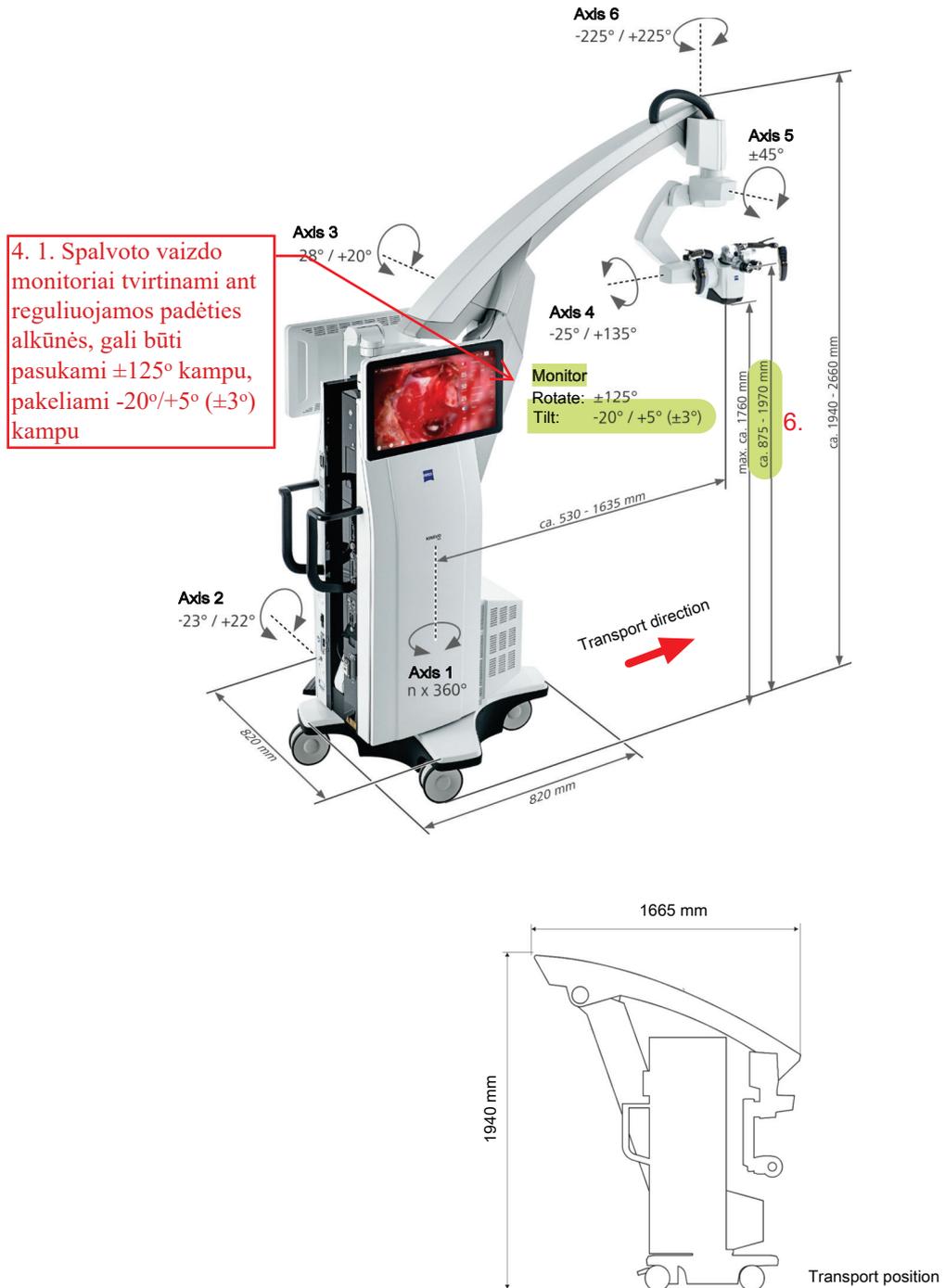


Figure 70: Dimensional drawing (dimensions in mm)

## 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.

<b>Interference emission measurements</b>	<b>Compliance</b>	<b>Electromagnetic environment - guidelines</b>
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.

<b>Electromagnetic immunity tests</b>	<b>IEC 60601 test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment - guidelines</b>
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.

<p>Voltage dips, short interruptions and voltage variations as per IEC 61000-4-11</p>	<p>&lt; 5% <math>U_T</math> (&gt; 95% dip in <math>U_T</math>) for 1/2 cycle 40% <math>U_T</math> (60% dip in <math>U_T</math>) for 5 cycles  70% <math>U_T</math> (30% dip in <math>U_T</math>) for 25 cycles  &lt; 5% <math>U_T</math> (95% dip in <math>U_T</math>) for 5 s</p>	<p>&lt; 5% <math>U_T</math> (&gt; 95% dip in <math>U_T</math>) for 1/2 cycle 40% <math>U_T</math> (60% dip in <math>U_T</math>) for 5 cycles  70% <math>U_T</math> (30% dip in <math>U_T</math>) for 25 cycles  &lt; 5% <math>U_T</math> (95% dip in <math>U_T</math>) for 5 s</p>	<p>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.</p>
<p>Magnetic field for supply frequency (50/60 Hz) as per IEC 61000-4-8</p>	<p>3 A/m</p>	<p>3 A/m</p>	<p>Magnetic fields in the supply frequency should correspond to the typical values that are found in business and hospital environments.</p>
<p>Note: <math>U_T</math> is the AC voltage supply before application of the test levels.</p>			

### 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
<p>Conducted RF disturbances as per IEC 61000-4-6</p> <p>Radiated RF disturbances as per IEC 61000-4-3</p>	<p>3 V<sub>effective value</sub> 150 kHz to 80 MHz</p> <p>3 V/m 80 MHz to 2.5 GHz</p>	<p>3 V/m</p> <p>3 V</p>	<p>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.</p> <p><b>Recommended separation distance</b></p> <p><math>d = 1.2 \sqrt{P}</math></p> <p><math>d = 1.2 \sqrt{P}</math> for 80 MHz to 800 MHz</p> <p><math>d = 2.3 \sqrt{P}</math> for 800 MHz to 2.5 GHz</p> <p>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<sup>a</sup> should be lower than the compliance level.<sup>b</sup> Interference is possible in the vicinity of equipment marked with the following symbol.</p> 

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.

<sup>a</sup> 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.

<sup>b</sup> 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

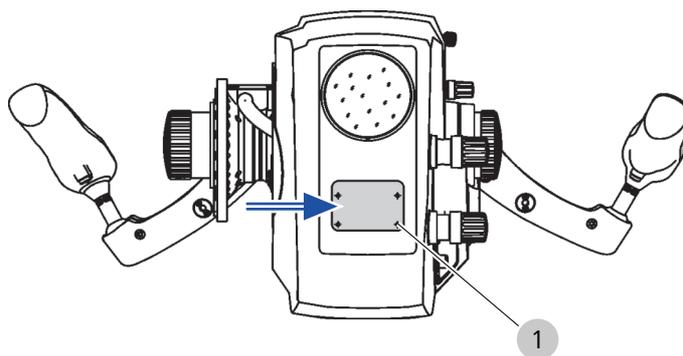
The KINEVO 900 is intended for operation in an electromagnetic environment as specified below. The customer or the user of the KINEVO 900 is responsible for ensuring that the device is operated in such an environment.

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.

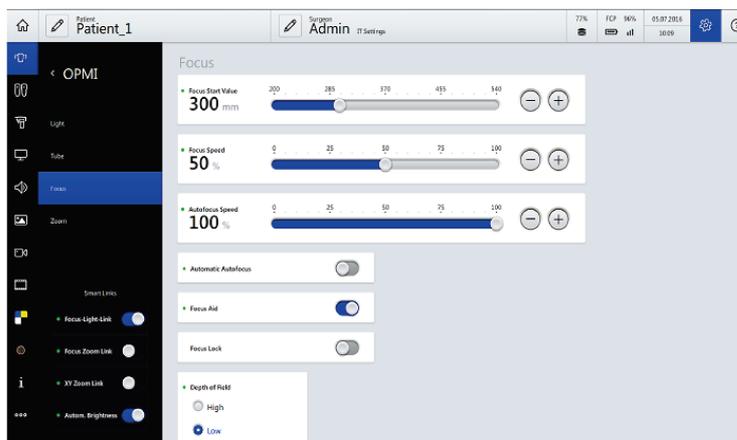
*Prerequisite*

- 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](http://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 ro- tation function (only in conjunction with mouth switch 000000-1177-805)	303771-9111-000
Angle optics with dove- tail (spine adapter), white		302584-9200-000

**11.1.4 Eyepieces for main tube**

Designation	Specification	Order no.
Push-in widefield eye-pieces, 2 pcs	10x	305542-0000-000
Push-in widefield eye-pieces, 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 eye-pieces, 2 pcs	10x	305542-0000-000
Push-in widefield eye-pieces, 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 eye-pieces, 2 pcs	10x	305542-0000-000
Push-in widefield eye-pieces, 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 eye-pieces, 2 pcs	10x	305542-0000-000
Push-in widefield eye-pieces, 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**

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

**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

19.3.

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

Stereo poliarizaciniai akiniai 5 poros

## 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](http://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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## MICROSOFT SOFTWARE LICENSE TERMS

### WINDOWS EMBEDDED STANDARD 7

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These license terms are an agreement between you and *[OEM]*. Please read them. They apply to the software included on this device. The software also includes any separate media on which you received the software.

The software on this device includes software licensed from Microsoft Corporation or its affiliate.

The terms also apply to any Microsoft

- updates,
- supplements,
- Internet-based services, and
- support services

for this software, unless other terms accompany those items. If so, those terms apply.

If you obtain updates or supplements directly from Microsoft, then Microsoft, and not *[OEM]*, licenses those to you.

**As described below, using the software also operates as your consent to the transmission of certain computer information for Internet-based services.**

**By using the software, you accept these terms. If you do not accept them, do not use the software. Instead, contact *[OEM]* to determine its return policy for a refund or credit.**

---

**If you comply with these license terms, you have the rights below.**

#### 1. USE RIGHTS

**Use.** The software license is permanently assigned to the device with which you acquired the software. You may use the software on the device.

#### 2. ADDITIONAL LICENSING REQUIREMENTS AND/OR USE RIGHTS

- Specific Use.** *[OEM]* designed the device for a specific use. You may only use the software for that use.
- Other Software.** You may use other programs with the software as long as the other programs
  - directly supports the manufacturer's specific use for the device, or
  - provide system utilities, resource management, or anti-virus or similar protection.
  - Software that provides consumer or business tasks or processes may not be run on the device. This includes email, word processing, spreadsheet, database, scheduling and personal finance software. The device may use terminal services protocols to access such software running on a server.
- Device Connections.** You may not use the software as server software. In other words, more than one device may not access, display, run, share or use the software at the same time.

You may use terminal services protocols to connect the device to a server running business task or processes software such as email, word processing, scheduling or spreadsheets.

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.

The ten connection limit applies to devices that access the software indirectly through “multiplexing” or other software or hardware that pools connections. You may use unlimited inbound connections at any time via TCP/IP.

- d. Remote Access Technologies.** You may access and use the software remotely from another device using remote access technologies as follows.

Remote Desktop. The single primary user of the device may access a session from any other device using Remote Desktop or similar technologies. A “session” means the experience of interacting with the software, directly or indirectly, through any combination of input, output and display peripherals. Other users may access a session from any device using these technologies, if the remote device is separately licensed to run the software.

Other Access Technologies. You may use Remote Assistance or similar technologies to share an active session.

Other Remote Uses. You may allow any number of devices to access the software for purposes other than those described in the Device Connections and Remote Access Technologies sections above, such as to synchronize data between devices.

- e. Font Components.** While the software is running, you may use its fonts to display and print content. You may only
- 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.

- 3. VHD BOOT.** Additional copies of the software created using the software’s Virtual Hard Disk functionality (“VHD Image”) may be pre-installed on the physical hard disk of the device. These VHD Images may only be used for maintaining or updating the software installed on the physical hard disk or drive. If the VHD Image is the only software on your device, it may be used as the primary operating system but all other copies of the VHD Image may only be used for maintenance and updating.

- 4. POTENTIALLY UNWANTED SOFTWARE.** The software may include Windows Defender. If Windows Defender is turned on, it will search this device for “spyware,” “adware” and other potentially unwanted software. If it finds potentially unwanted software, the software will ask you if you want to ignore, disable (quarantine) or remove it. Any potentially unwanted software rated “high” or “severe,” will be automatically removed after scanning unless you change the default setting. Removing or disabling potentially unwanted software may result in

- Other software on your device ceasing to work, or
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- 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.

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- 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](http://www.time.windows.com) once a week to provide your 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](http://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](http://go.microsoft.com/fwlink/?linkid=128106).
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