4.14.7 Configure the network connection for DICOM (option).

Network and DICOM addresses must be assigned by the IT system rights 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.

For detailed information, please refer to ZEISS DICOM Conformance Statement, G-30-1952.

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. Read and observe the ZEISS DICOM Conformance Statement, G-30-1952.
2. Tap on ⚙ Settings ⟶ Service PC ⟶ Network.
3. Scroll down in the "Network menu" ⟶ DICOM.
4. Enter all DICOM data. Preset data can be overwritten.
   You will receive this information from your IT system rights administrator.
5. Please pay attention to upper-case and lower-case letters in the AE titles.
6. Tap on the [Apply] button.
   ⇨ The network connection is active.
7. Tap on the [Test Connection] button.

Result

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

4.14.8 Changing the computer name of the device

Action

1. Tap on ⚙ Settings ⟶ Service PC.
2. Open the "Network" tab.
3. Enter the new computer name for the device in the "Change computer name" field (after rebooting).
4. Tap on the [Apply] button.
   ⇨ A system message indicating that the computer name has been changed, licenses have been deleted and must be reimported and a reboot is required appears on the monitor.
5. Confirm the system message displayed on the monitor.
6. Reboot the device and log in as the "IT admin".
7. Tap on ⚙ Settings ⟶ Service PC.
8. Select the "Configuration" tab.
9. Tap on the [Start] button in the "Delete All Licenses" field.
10. Tap on the [Reimport] button in the "Reimport licenses" field.
    ⇨ The licenses from the last backup are restored.

4.15 Configuring the Service PC

The following settings and configurations can be performed only by authorized users who have the IT admin password required for this purpose.
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 at the following website: www.zeiss.com/med.

You have the following adjustment options:

- Service
  - Synchronize Patient Data
  - Export User
  - Import User
- Settings
  - Activate User Password
  - Change Standard 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

4.15.1 Service

Action

1. Tap on ⚙ Settings → Service PC → Service.
2. Tap on the corresponding button [Start] in order to initiate the action.
3. Close the "Settings" menu by tapping on the ⌂ button.

4.15.2 Settings

4.15.2.1 Activate User Password

If you activate the user password in order to protect the patient data, all users must log into the system using the standard password assigned by IT Admin. All newly created users also receive the standard password assigned by IT Admin. This means that the IT Admin is responsible for the standard password and its forwarding to all users of the system.

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.

4.15.2.2 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.

4.15.3 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.

4.16 Connecting the navigation system to the device

You can connect navigation systems to the device:

- Navigation system via standard connection (11). The motorized positioning and travel functions of the navigation system are limited to the three microscope axes.
- Navigation system via extended connection (network LAN). The motorized positioning and travel functions of the navigation system are possible in all stand and microscope axes.

The initial connection (calibration) of an external navigation system must be performed by trained personnel of the navigation system manufacturer. Please observe the operating instructions provided in the Instructions for Use of the navigation system.

⚠ CAUTION!

Faulty navigation!

The navigation antenna attached to the microscope 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 corresponding specifications 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. Connect the navigation system to the device; for this purpose, read and observe the navigation system manufacturer's corresponding instructions.
2. To use the data injection functions of the navigation system, activate the navigation system in the "Settings MultiVision" menu [▷ 169].

4.17 Mounting the laser micromanipulators

⚠ CAUTION!

Incorrect mounting of a laser micromanipulator

Incorrect mounting of the laser micromanipulator can cause damage to equipment and errors during use. Anyone connecting additional equipment to medical electrical systems is considered a system configurer and as such responsible for compliance of the system with the standards for systems (see IEC 60601-1-1 or section 16 of the 3rd edition of IEC 60601-1, respectively). Local legislation has priority over the requirements of the abovementioned standards.

- ▶ Observe the information and the instructions for use supplied by the manufacturer of the laser micromanipulator. If necessary, contact your ZEISS representative.
- ▶ Before fitting the ZEISS dovetail mount, consult the laser manufacturer to check whether it is compatible. Some laser manufacturers offer their own assembly sets for their laser micromanipulators.

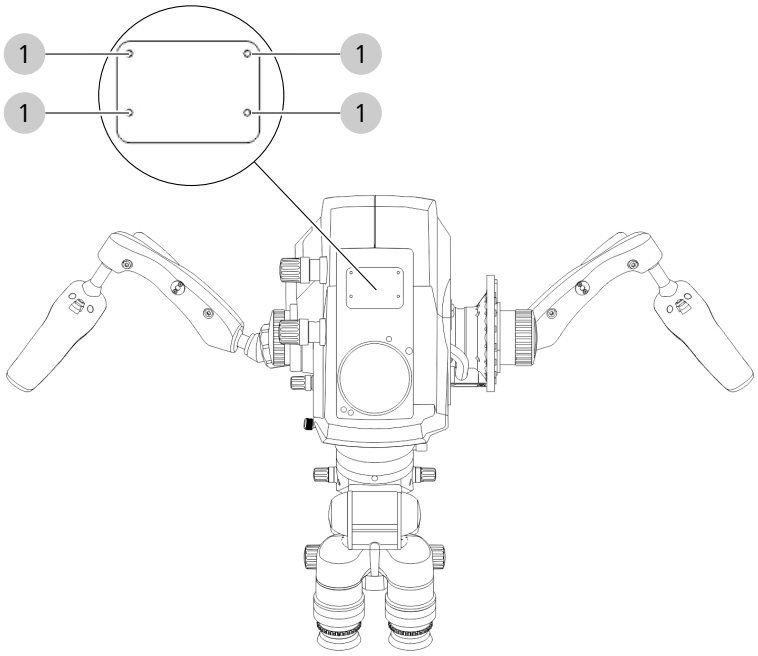


Figure 73: Fitting the dovetail mount on the underside of the surgical microscope

1	Threaded bores (4x) for fastening the dovetail mount for laser micromanipulators

Prerequisite

- ☑ The microscope is configured as a system for hybrid (optical-digital) visualization.
- ☑ Dovetail mount including four M3x12 fastening screws (screw material: A2-70) is available (order number: 303360-9903-000).
- ☑ The laser micro manipulator weighs no more than 1 kg.
- ☑ The system is switched off.

Action

1. Fasten the dovetail mount for laser micromanipulators to the bottom of the surgical microscope using the four (M3x12) screws supplied.
2. Make sure that the maximum permissible screw-in depth of the fastening screws into the Varioskop carrier is 5 mm.
3. Tighten the four screws firmly to a tightening torque of 0.93 Nm.
4. Slide the laser micromanipulator into the dovetail mount.
5. Tighten the knurled screw firmly to secure the laser micromanipulator in the dovetail mount.

Result

- ✓ You can prepare the device for the use of a laser micromanipulator.

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

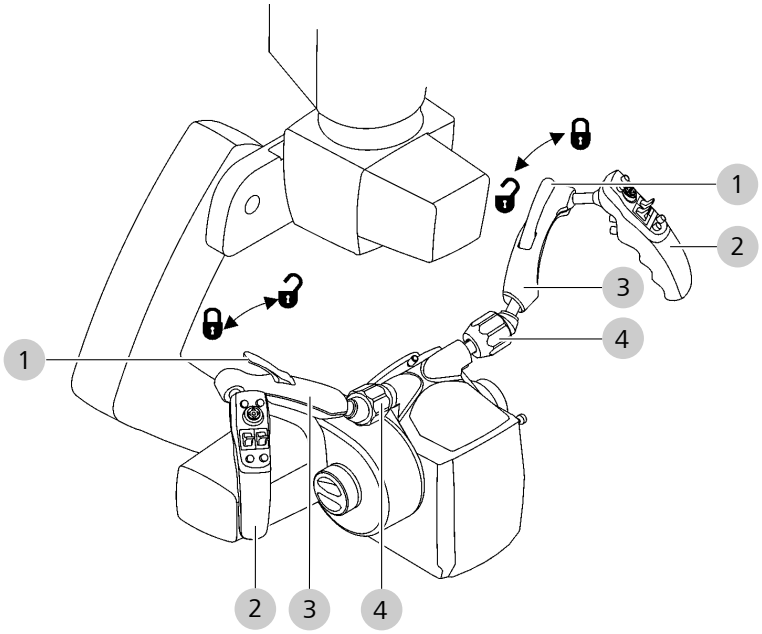


Figure 74: Setting the position of the hand grips

1	Locking lever	2	Handle
3	Handgrip holder	4	Handgrip holder locking screw

Action

1. Move the surgical microscope so that you have a good view of the surgical field.
2. Open both locking screws to adapt the position of the handgrip holders.
3. Move the handgrip holders with the handgrips to a position that is favorable and comfortable for you.
4. Tighten both locking screws firmly.
5. If necessary, open the two clamping levers and perform a fine adjustment of the position of both handgrips.
   ⇨ The handgrips can be rotated approx. 180°.
6. Swivel or rotate the handgrips such that you are able to operate the surgical microscope comfortably.
7. Press the clamping levers shut hand-tight.
8. Then check whether the required swiveling ranges of the surgical microscope are sufficient and any collisions with attached components (e.g. the lateral co-observer) can be excluded.

5.3 Positioning the device in the OR

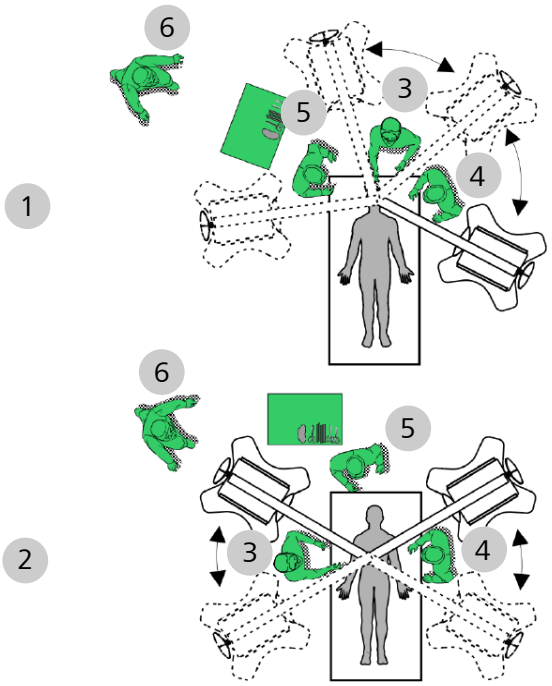


Figure 75: Positioning the device in the OR

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 that the system can move freely!

⚠ CAUTION!

Check that the system can move freely!

Position the device in such a way that you can move it away from the patient at any time by overpowering the brake mechanism. Since the connector of the power input socket is used as a disconnect device, the disconnect device must remain freely accessible.

5.5 Configuring the device for applications

The information in this paragraph only applies to the optional configuration of the microscope as a system for hybrid (optical-digital) visualization.

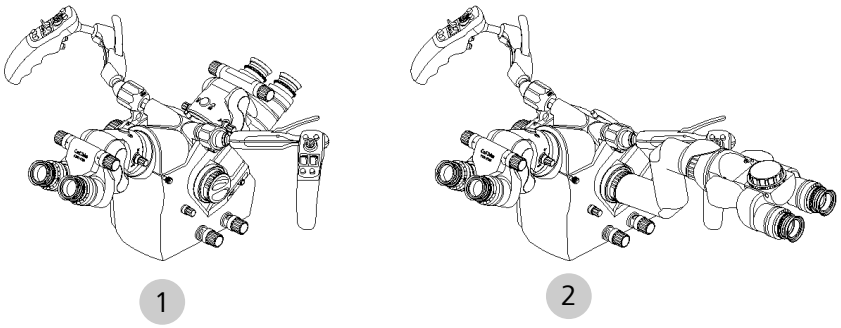


Figure 76: Configuring the device for applications

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

5.6 Drape position

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

⚠ CAUTION!

Risk of crushing!

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

- ▶ The drape position may be used only without a patient!
- ▶ Never touch the area between the vertical arm and the horizontal arm while you are 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.
   ⇨ The device then automatically travels to the drape position.
   ⇨ When a beep sounds, the drape position has been reached.

Determing a new drape position

If the factory set drape position is unfavorable for you, you can define and save your own drape position.

4. Move the device to a position that is favorable and comfortable for you.
5. Tap on ⚙ Settings ⟶ Stand.
6. Tap on the [OK] button in the "Save Current Position as Drape Position" field.
   ⇨ The current position of the device is saved as the new drape position.
7. Now you can move the device to the drape position as usual.

5.7 Attaching a ZEISS SMARTDRAPE

⚠ CAUTION!

Risk of infection

Risk of infection due to contamination.

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

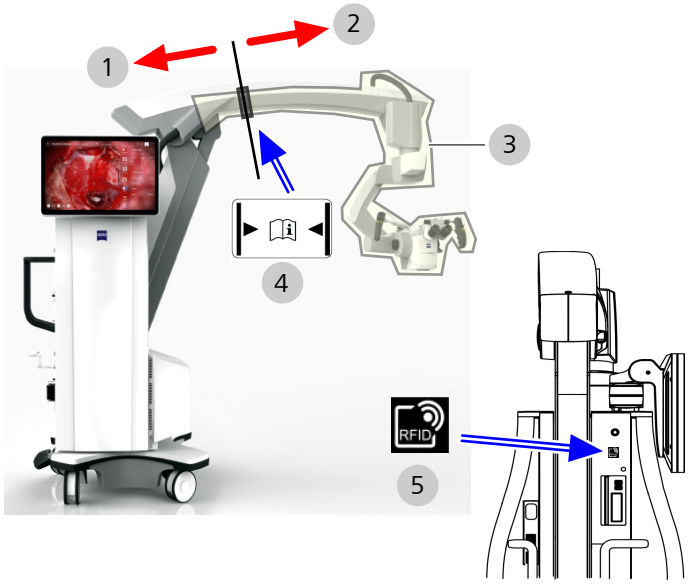


Figure 77: Attaching a SMARTDRAPE

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

Prerequisite

- ☑ The device is in the drape position [▶ 163]
- ☑ When using drapes from third-party manufacturers without RFID detection, the "AutoDrape" function (air extraction for easier draping) is not available. The magnetic fastening function cannot be used if the drape does not have a corresponding magnetic holder.
- ☑ ZEISS SMARTDRAPES (order number 306028-0000-000) are tested for use with navigation systems.

Action

1. Unpack the SMARTDRAPE.
2. Pull the SMARTDRAPE over the surgical microscope.
3. Fasten the drape ring of the SMARTDRAPE to the lens below the surgical microscope.
   ⇨ The drape ring with the magnet engages in the correct position (proper orientation of the beveled cover glass to prevent reflections).
4. Pull the SMARTDRAPE over the horizontal arm until it covers the marking.
   When attaching the SMARTDRAPE, make sure that there is sufficient free space for swiveling, tilting and rotating movements of the surgical microscope.
   Make sure the control elements can be safely operated through the SMARTDRAPE.
5. Seal the SMARTDRAPE airtight at the marking using one of the fastening straps.
6. Remove the RFID label from the SMARTDRAPE.
7. Stick the adhesive label on the RFID reader.
   ⇨ It can take up to 10 seconds to successfully read in the code.
   ⇨ A beep sounds as soon as the code has been successfully read in.
   ⇨ The AudoDrape function is available.
8. Open the additional menu “Extended operation” on the touch-screen.
9. Open the additional menu "Extended operation" on the touch-screen.
10. Activate the [AutoDrape] slide switch to switch on the automatic suction pump.
    ⇨ The vacuum system operates at maximum power after approx. 2 minutes.
    ⇨ After approx. 2 minutes, the suction system automatically switches to a reduced power to maintain a vacuum.
11. Remove the RFID label once the operation has ended.

5.8 Autobalance

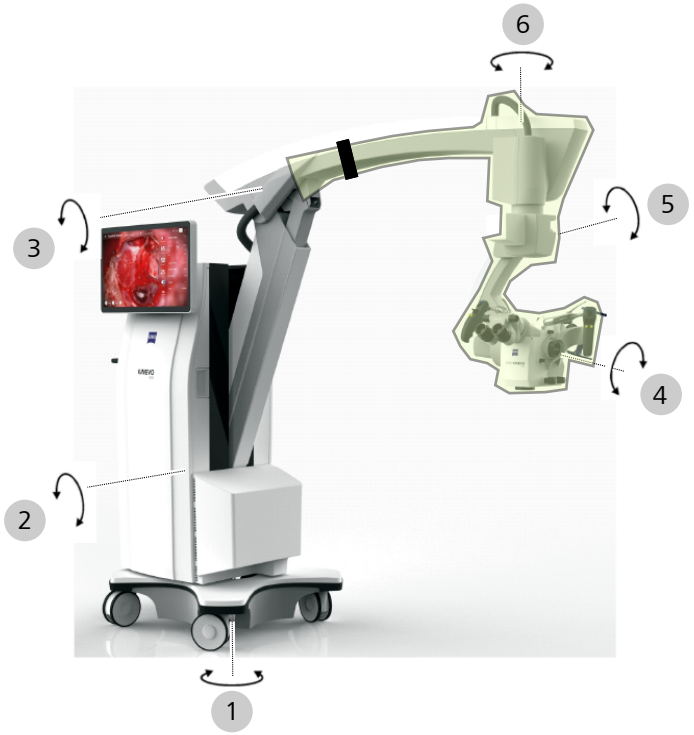


Figure 78: Autobalance

⚠ 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 may not be carried out 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 hand grips. Repeat the autobalance if necessary.

Prerequisite

☑ No tubes and accessories are mounted on the system in the fully digital microscope configuration.

Action

1. Autobalance full system: Tap the [System] button in the "Extended operation" menu on the touchscreen.
2. Autobalance drape (balance out axes 2 and 3): Tap on the [Drape] button in the "Extended operation" additional menu on the touchscreen.

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

5.9 Setting the microscope

The information in this paragraph only applies to the optional configuration of the microscope as a system for hybrid (optical-digital) visualization.

Action

1. Move the microscope to a vertical position above a flat object, e.g. a sheet of paper with writing.
2. Adjust the distance of the eyepieces at the binocular tube to your interocular distance so that the two eyepiece images (object and edge of visual field) merge into one.
3. Set the microscope to minimum magnification. Select a working distance which is as short as possible (shortest working distance + approx. 25 mm).
4. Set the diopter setting ring on the eyepiece to 0 D. (Diopters).
5. Look through the eyepiece and focus the image sharply.
6. Set the microscope to maximum magnification and adjust the fine focusing system until the image is sharply defined.
7. Then reset the microscope to minimum magnification 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 has now been set in such a way that the image is sharply defined over the complete magnification range without any renewed focusing during the magnification setting.
11. If you nevertheless need to refocus, repeat this procedure.
12. Adjust the eyecups of the eyepieces in such a way that the entire visual field can be seen.
    Observation using eyeglasses: Screw the eyecups in all the way.
    Observation without eyeglasses: Unscrew the eyecups and adjust them individually.

5.10 Connect QEVO Micro-Inspection Tool (option)

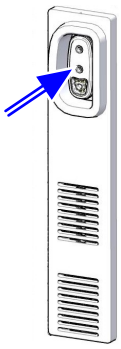
When connecting and using the Micro-Inspection Tool, it is vital that you observe the relevant safety instructions and warning notices in the QEVO and QEVO ECU Instructions for Use! [▶ 13]

Prerequisite

- ☑ The monitoring and control unit QEVO ECU is installed on KINEVO 900 .
- ☑ QEVO is prepared in sterile form.
- ☑ QEVO is placed in the sterile reprocessing basketInstru-Safe.

Action

1. Sterile person: Remove QEVO from the reprocessing basket with the cableInstru-Safe.
2. Sterile person: Deposit the QEVO in the sterile area safely.
3. Unsterile person: Plug the connector into the connection socket of the control unit.



4. Lay the cable so that it does not disturb any user and nobody can stumble over it.

In order to use the Micro-Inspection Tool, you must also activate QEVO in the user surface of KINEVO 900 . [▶ 168]

5.11 Activate QEVO Micro-Inspection Tool (option)

Prerequisite

- ☑ The license for the Micro-Inspection ToolQEVO has been activated.
- ☑ KINEVO 900 is switched on.

Action

1. Tap on Settings ⟶ MultiVision.
2. To enable the MultiVision Data Injection of the QEVO camera image, activate the "QEVO / Video" function in the "Source" field.
   ⇨ When pressing the [MultiVision] button on the hand grip or the foot control panel [▶ 180] the camera image is injected by QEVO.
3. To enable the display of the QEVOcamera image on the monitor, activate the "QEVO" function in the "Video source" field ("QEVO" section).

⇨ When pressing the [QEVO] button on the hand grip or foot control panel [▷ 180] the QEVO camera image is shown on the system monitors as a full image. The KINEVO 900 camera image is shown on the touchscreen as Picture in Picture.

5.12 Activating a connection to the navigation system

Please note the information provided by the manufacturer of the navigation system. The navigation system to be connected must be calibrated once for the KINEVO 900 by the manufacturer in order to be used properly.

⚠ CAUTION!

Faulty 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 license has been activated.

☑ The navigation system is connected to the device [▷ 155]

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.
   ⇨ As soon as you activate the slide switch in the "Navigation (extended)" field, the current IP address appears under the slide switch.

Result

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

5.13 Preparing the device for the use of laser micromanipulators

⚠ CAUTION!

Danger due to unintentional change to the focus position.

Due to deactivation of the "Focus Lock" function, the focal planes of the surgical microscope and the laser micromanipulator do not match and the desired effectiveness of the laser micromanipulator is not achieved.

- ▶ Before each use, check that the focal planes correspond (without a patient present). It is essential that the focal plane of the surgical microscope matches that of the laser micromanipulator.
- ▶ When operating an approved external laser micromanipulator, activate the "Focus Lock" function if it does not have an AF function.
- ▶ Observe the information and the instructions for use supplied by the manufacturer of the laser micromanipulator. If necessary, contact your ZEISS representative.

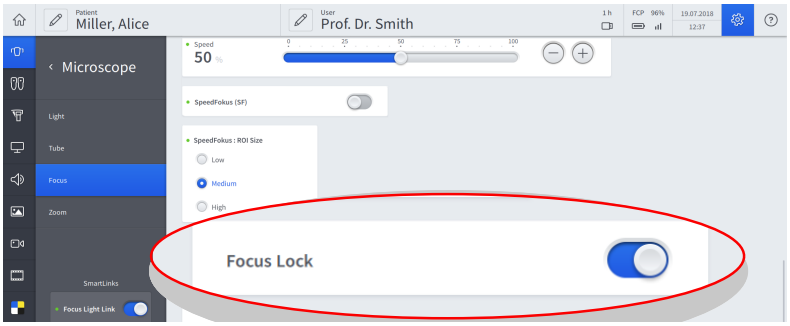
Prerequisite

- ☑ The microscope is configured as a system for hybrid (optical-digital) visualization.
- ☑ The laser micromanipulator is mounted on the surgical microscope
- ☑ No patient is lying underneath the surgical microscope and the mounted laser micromanipulator

Action

1. Switch the device on.
2. Adjust the working distance (coarse focus) to the focus value of the laser micromanipulator.
   ⇨ The current focus value is displayed on the monitor.
3. If necessary, correct the focus adjustment by slightly shifting it (fine focus).
4. Aim the aiming beam at a suitable object (e.g. a wooden spatula) to check the mutual alignment of the focal planes.
5. 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 by appropriate minor adjustment.
7. Tap on ⚙ Settings → Microscope → Focus.

8. Activate the slide switch in the "Focus Lock" field.



   ⇨ All motorized focus functions, including the "Autofocus" function, are deactivated.

   ⇨ The focal planes cannot be adjusted by motor.

   ⇨ The "Autofocus" function will not be triggered when the brakes are activated.

9. In order to work with the laser micromanipulator, read and observe the manufacturer's documentation.

5.14 Device function tests

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

Action

▶ Check AutoBalance [▷ 166].

   ⇨ The surgical microscope maintains its balance in all positions of the working range when the magnetic brakes are released.

▶ Check accessories on the surgical microscope [▷ 112], Use integrated 3D video system for observation without eyepieces (option), attach documentation / coobservation set-up.

   ⇨ All necessary components are assembled on the surgical microscope and assistant's view.

   ⇨ The tubes and eyepieces are correctly configured.

   ⇨ Check that the surgical microscope and the tube are in a position convenient for you.

   ⇨ The intraocular distance (pupillary distance) has been set.

   ⇨ The eyecups have been set in such a way that you can see the full field of view.

   ⇨ Check that the correct prescription has been set on the diopter scale.

   ⇨ Check that image quality is correct throughout the entire magnification range.

   ⇨ The objective lens and eyepieces are clean.

   ⇨ The correct function of the other equipment (illumination system, video system, etc.) has been checked using the relevant Instructions for Uses.

⇨ The surgical microscope can be positioned flawlessly with assembled accessories.

- ▶ Check handgrips on the surgical microscope [▷ 180].
  - ⇨ The buttons and rocker switches are equipped with the required functions.
  - ⇨ The buttons and rocker switches carry out the respective functions correctly.
- ▶ Check foot control panel and foot rocker switch [▷ 180].
  - ⇨ The buttons and rocker switches are equipped with the required functions.
  - ⇨ The buttons and rocker switches carry out the respective functions correctly.
- ▶ Check zoom [▷ 178].
  - ⇨ Start value and speed are set correctly.
- ▶ Check focus [▷ 178].
  - ⇨ Start value, speed and autofocus are set correctly.
- ▶ Check SmartLinks [▷ 179].
  - ⇨ The required SmartLinks are activated.
- ▶ Check displays.
  - ⇨ The inputs and outputs from/to external systems are correctly configured.
  - ⇨ The required images are displayed on the monitors/ external systems as required.
- ▶ Check image quality of the monitors.
  - ⇨ White balance was completed [▷ 196].
  - ⇨ Color saturation and hue are set correctly [▷ 195].
- ▶ Check image quality of the external systems, observe the manufacturer's specifications while doing so.
- ▶ If you wish to record [▷ 197] or stream [▷ 215] video data, check the respective settings (resolution, 2D/3D, parallel recording etc.).
- ▶ Check illumination [▷ 175].
  - ⇨ The illumination is set correctly.
  - ⇨ The remaining service hours are sufficient for the duration of the operation.
- ▶ Check user profile [▷ 201] and patient profile [▷ 204].
  - ⇨ The correct user is activated and correctly configured.
  - ⇨ The patient has been created correctly.

6 Operation

6.1 Safety during operation

⚠ WARNING!

Contamination with pathogenic germs!

If the device is cleaned using unsuitable methods or cleaning agents, pathogenic germs can accumulate on the device.

- ▶ Make sure that the device is operated only in a sterile manner and with sterile accessories.
- ▶ Make sure that the device is operated and cleaned only by instructed personnel.
- ▶ Use only cleaning agents which are suitable for cleaning sterile equipment when cleaning the device.

⚠ CAUTION!

The user interface of the touchscreen is unsterile!

The patient may be contaminated if sterile persons touch the touchscreen and then touch the sterile area.

- ▶ Ensure that the touchscreen is operated only by unsterile persons who have no contact with the sterile area.
- ▶ Ensure that sterile persons who have contact with the patient operate the touchscreen only via commercial, sterile medical applicators.

⚠ CAUTION!

Risk of injury to eyes caused by the light source.

If light enters the patient's eyes during surgery in the facial area, there is a risk of damaging the retina.

- ▶ Make sure that no light enters the patient's eyes during operations in the facial area.
- ▶ Do not use the device to perform ophthalmological interventions on the patient.

⚠ CAUTION!

Risk of injury to eyes caused by laser beams.

If laser beams enter the patients' eyes while the Focus or Autofocus are switched on, there is a danger of damage to the retina.

- ▶ During operations in the facial area, make sure that no laser beams from Focus or Autofocus enter the patient's eyes.
- ▶ While Focus or Autofocus are switched on, do not aim the surgical microscope at the patients' or any other persons' eyes.

⚠ CAUTION!

Risk of burns due to high light intensity.

The interaction of heat and antimicrobial substances in incision foils may lead to an increased reaction of the patient to these substances.

- ▶ Avoid using adhesive foil/incision foil to cover the patient wherever possible.
- ▶ Avoid high light intensity outside of the OR area.
- ▶ Avoid long treatment periods.

⚠ CAUTION!

Risk of burns due to high light intensity.

Using dry drapes to cover the patient increases the risk of 2nd degree burns due to an excessive light intensity.

- ▶ Avoid drying out of the drapes which are used to cover the patient.
- ▶ Make sure that the drapes always remain moist.
- ▶ Avoid high light intensity outside of the OR area.
- ▶ Avoid long treatment periods.

⚠ CAUTION!

Risk of burns due to high light intensity.

Using dry drapes to cover the patient increases the risk of 2nd degree burns due to an excessive light intensity when the device is switched on and left unattended.

- ▶ Never leave the device aimed at the patient while it is switched on.
- ▶ Never leave the device unattended for a longer period of time.

⚠ CAUTION!

Xenon lamp failure caused by ageing of the lamp.

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

- ▶ Please note the remaining service hours displayed on the touch-screen.
- ▶ Once the current xenon lamp has reached 500 service hours, activate the backup xenon lamp.
- ▶ Replace the xenon lamp when its operating time of 500 service hours has expired.

⚠ CAUTION!

Damages due to unintentionally touching the touchscreen.

Touching the screen in this case may unintentionally open menus or change settings.

- ▶ Do not touch the touchscreen unintentionally if the system is switched on.
- ▶ Allow only trained personnel to use the system.

⚠ CAUTION!

Risk of injury caused by electrical voltage.

Contact with plug connector contacts may cause electric shock.

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

6.2 Software configuration

6.2.1 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.

6.2.2 Configure microscope

Tap on ⚙ Settings → Microscope.

Prior to use, check the illumination and make sure that the illumination intensity required for the application is available.

6.2.2.1 Configuring the illumination

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

- Light on/off
- Additional light on/off
- Set light intensity

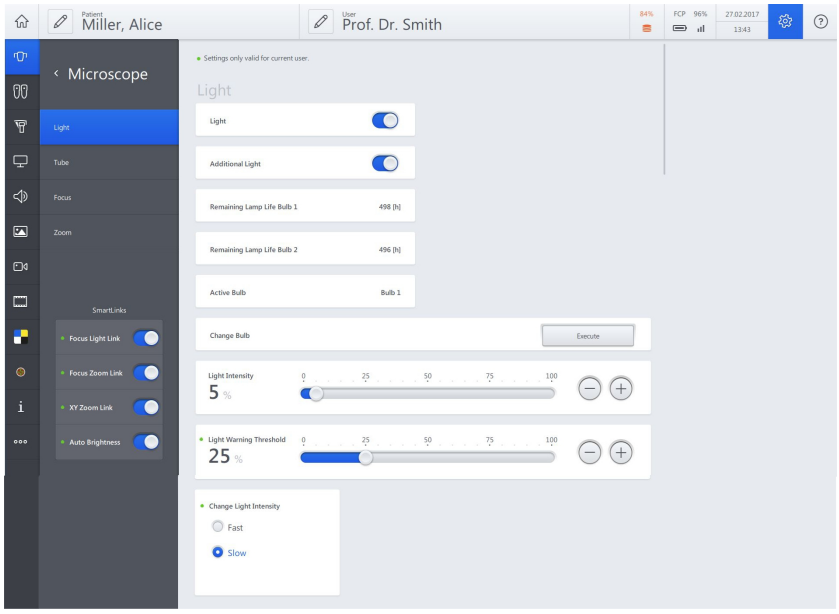


Figure 79: "Settings Microscope" menu, "Light" submenu

If a high magnification is used, the diameter of the field of view and the light intensity at the surgeon's eye both decrease whereas the light intensity in the surgical field remains the same. Some components can further reinforce this effect:

- Eyepieces with a high magnification
- 3-Step magnification changer
- Foldable tube f170/f260 with tube magnification (PROMAG function)

In digital operation, the video image can show more noise (autogain) or become darker (manual gain) at high magnification.

The "Focus Light Link" function limits the maximum adjustable light intensity in the focal plane depending on the working distance. Possible tissue damage due to an unintentional high light intensity can thus be avoided. This function should only be deactivated if a higher light intensity is required for the current application. Therefore, please note the recommendations for preventing burns.

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 → activation .
3. **CAUTION! Tissue damage due to high light intensity! When working at maximum magnification, pay attention to the set light intensity to prevent burns, especially of the surrounding tissue.**
   Set the desired light intensity with the [Light Intensity] slide control.

The light intensity is influenced by the "Focus Light Link" function (if activated), so that the light intensity which you have set can be limited depending on the working distance.

4. Set the required warning threshold level on the [Light Warning Threshold] slide control.
   ⇨ 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 and on the Light Intensity slide control.
5. Select the speed of light intensity change with the buttons on the hand grip and the foot control panel, i.e. [High] or [Low].
6. In the “SmartLinks” menu you can activate or deactivate the "Focus Light Link" function.
   ⇨ Activated: Influences the maximum adjustable light intensity and limits it depending on the working distance used.
7. In the “SmartLinks” menu you can activate or deactivate the “Auto Brightness” function.
   ⇨ Activated: Automatic control of the light intensity for constant image brightness in the eyepiece.

* In China the "Focus Light Link" function always remains activated and cannot be deactivated due to national regulations.

6.2.2.2 Configure tube

Prerequisite

☑ The microscope is configured as a system for hybrid (optical-digital) visualization.

☑ The system mode is set at "Optical".

Action

1. Tap on Settings → Microscope → Tube [▶ 79].
2. Tap on the focal length of tube in use: 170 mm for tiltable tube and foldable tube or 260 mm for foldable tube with magnification.
3. Tap on the ocular 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 co-observation selection:
   Opposite image outputs: Face-to-face for tiltable tube or foldable tube.
   Lateral image outputs: Right and left for stereo co-observation module or photo adapter for external camera.

6.2.2.3 Configure focus

Action

1. Tap on Settings → Microscope → Focus.
2. Set the desired value with the [Start Value] slide control.
   ⇨ The microscope starts with this working distance after it is switched on.
3. Set the desired value with the [Speed] slide control.
   ⇨ Set speed of the motorized fine focus adjustment.
4. Set the desired value on the slide control [Autofocus speed] (option).
   ⇨ Adjusting 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 focusing 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 stop] button. For the application of an optional micromanipulator with a fixed working distance.
   ⇨ Focus Lock on: Autofocus inoperative. Focus rocker switch on hand grip/foot control panel out of operation.
   ⇨ Focus Lock off: Autofocus functioning. Focus rocker switch on hand grip/foot control panel 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 for the system.

6.2.2.4 Configuring zoom

Action

1. Tap on Settings → Microscope → Zoom.
2. Set the desired value on the [Start value] slide control.
3. Set the desired value on the [Speed] slide control.

6.2.2.5 Configuring SmartLinks

Action

1. Tap on ⚙ Settings → Microscope.
   ⇨ In the “Microscope” menu you can activate or deactivate four SmartLinks.
2. Deactivate the "Focus Light Link"* function (this function is always activated by default).
   ⇨ A warning is displayed indicating that tissue damage may result if the "Focus Light Link" is deactivated.
3. If you really want to deactivate the "Focus Light Link" function, tap on the [Yes] button.
   ⇨ The "Focus Light Link" function no longer can limit the maximum adjustable light intensity in the focal plane (depending on the working distance). Possible tissue damage due to an unintentional high light intensity can thus occur.
   This function should only be deactivated if a higher light intensity is required for the current application!
4. Therefore, please note the recommendations for preventing burns [▶ 18].
5. Activate the "Focus Light Link" function.
   ⇨ The maximum light intensity is limited for the selected working distance (zoom).
   ⇨ A high light intensity over a longer period of time can damage tissue and cause burns in the area of the illuminated surgical field. The "Focus Light Link" function reduces this risk and should always remain activated.
6. Activate the "Focus Zoom Link" function.
   ⇨ The focusing speed automatically adapts to the magnification. The preselected focusing speed is automatically reduced when a higher magnification is used.
7. Activate the "XY Zoom Link" function.
   ⇨ The motorized XY travel speed automatically adapts to the magnification. The preselected travel speed is automatically reduced when a higher magnification is used.
8. Activate the "Auto Brightness" function.
   ⇨ The light intensity automatically adapts to constant brightness in the eyepiece depending on the working distance and magnification.
9. Close the "Settings" menu by tapping on the ⌂ button.

* In China the "Focus Light Link" function always remains activated and cannot be deactivated due to national regulations.

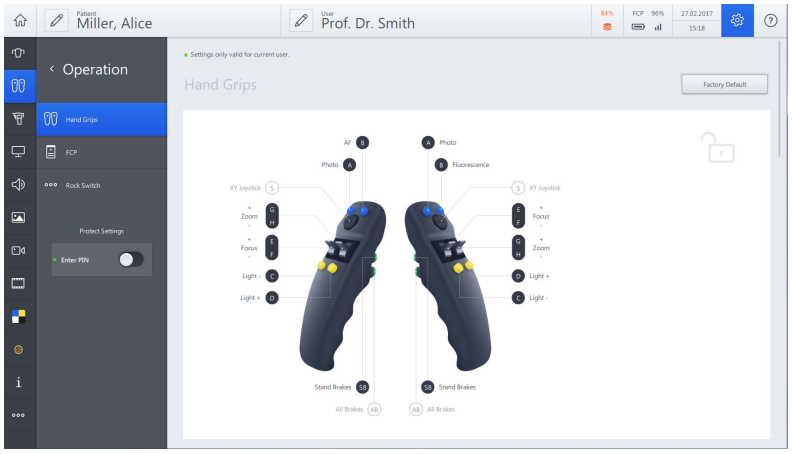
6.2.3 Configuring the button assignment of the hand grips, foot control panel and rocker foot switch

6.2.3.1 Configuring the handgrips

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

Action

1. Tap on Settings ⟶ Operation ⟶ Hand Grips.



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 [XY Mode] function in the selection field, see XY mode movement modes [▷ 184].

6.2.3.2 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] (stand brakes) can be used to enable various movement modes, depending on the system configuration.

Action

1. Tap on Settings → Operation → Hand Grips.

2. To 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. In the selection field, tap on a function that you wish to assign to the button (e.g. SB: release stand brakes).
   ⇨ The function is accepted and displayed next to the button symbol.

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

6.2.3.3 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.

Furthermore, one of the configurable FCP buttons also can be used to change between motorized movement modes ("Stand" menu XY Mode).

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

6.2.3.4 Configure rocker foot switch

Action

1. Tap on Settings → Operation → ooo 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)

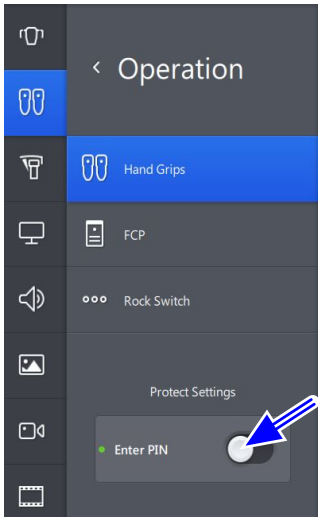
4. Check the button assignment and the functions of the rocker foot switch before every application and without a patient.

6.2.3.5 Protect Settings

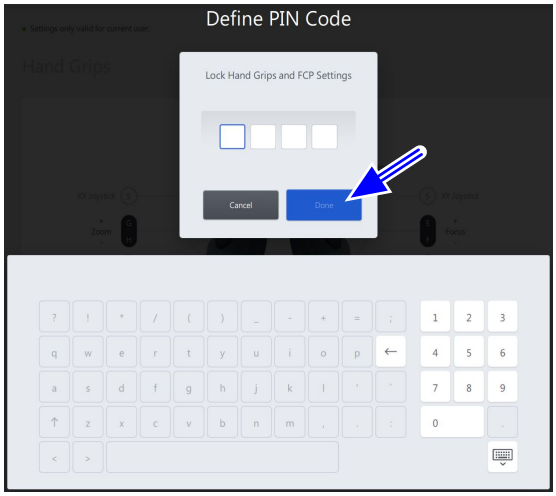
Each user can protect his hand grip and foot switch configuration against third-party access using a password (PIN). After unlocking, the settings secured in this way can only be changed again using a valid PIN.

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 number: tap 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 shown in all controls, top right, by the symbol .

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

6.2.4 Configure stand

Action

1. Tap on ⚙ Settings ⟶ Stand.

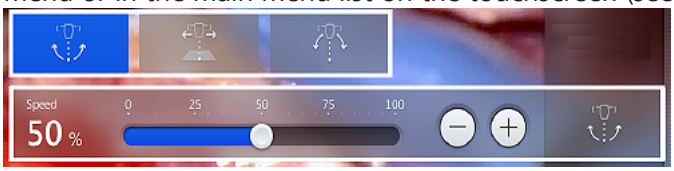
6.2.4.1 XY Mode movement modes

- Various brakes are activated in the manual movement modes. In the process, the microscope is guided via the hand grips by pushing the "AB" (all microscope and all stand brakes activated always) and the "SB" buttons.

  The manual movement modes can be configured in ⚙ Settings ⟶ Operation ⟶ Hand grips ⟶ SB button.

- In the motorized movement modes, the microscope movements are carried out using motor function by operating the joystick on the hand grip or FCP.

  The motorized movement modes can be configured in ⚙ Settings ⟶ Operation ⟶ Hand grip or FCP. The speeds of the motorized movement modes can be set via the "Stand" menu or in the main menu list on the touchscreen (see image).



  One of the configurable handgrip or FCP buttons also can be configured to change between the motorized movement modes. (⚙ Settings ⟶ Operation ⟶ Hand grips ⟶ XY adjustment mode).

6.2.4.1.1 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.

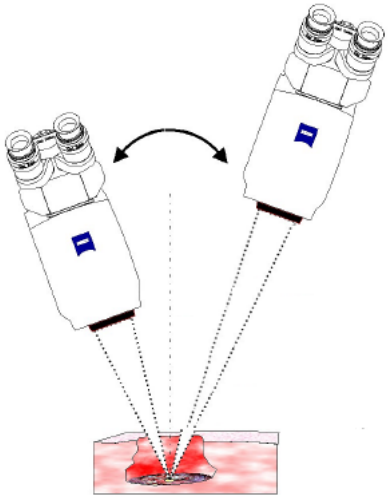
- Release “microscope brakes”

  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 80: 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.



6.2.4.1.1.1 Configure manual movement modes

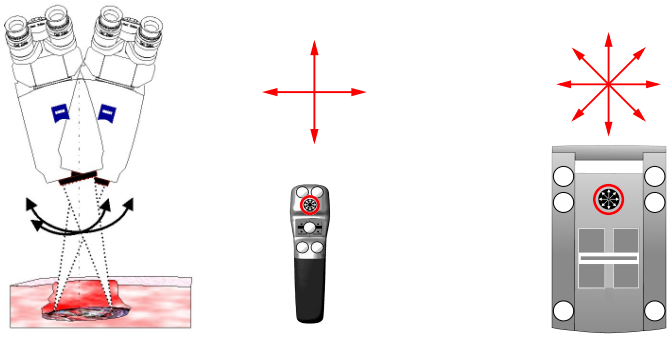
Action

1. Tap on ⚙ Settings ⟶ Operation ⟶ Hand Grips.
2. Tap on the [SB] button. This is the green brake activation button at the top of the hand grip's reverse side.
   ⇨ The assignable functions appear on the right-hand side:
   "Stand brakes"
   "Microscope brakes"
   "PointLock"
3. Tap on the desired function.
   ⇨ The assigned functions appear alongside the [SB] button.
4. Close the "Settings" menu by tapping on the ⌂ button.
5. On the hand grip, press the brake activation [SB] button with the required function and continue to hold it pressed.
   ⇨ "Stand brakes": Only the stand axes 1, 2, and 3 can now be freely moved manually.
   ⇨ "Microscope brakes": Only the microscope axes 4, 5, and 6 can now be freely moved manually.
   ⇨ "PointLock": Manual movement of the microscope.
   In this movement mode the working distance can also be changed, the middle of the visual field remains automatically in focus and well defined (in the area of the working distance from 200...625 mm).

6.2.4.1.2 Motorized movement modes

6.2.4.1.2.1 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

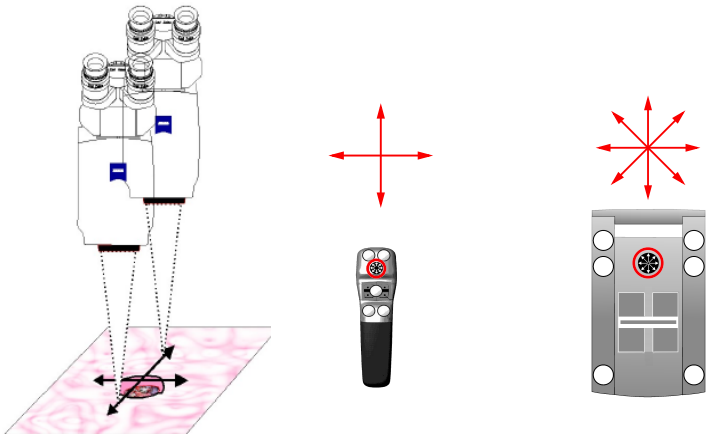
☑ The microscope is positioned and focused above the desired surgical field

Action

1. Tap on ⚙ Settings → Stand.
2. Tap on the [Microscope] button in the "XY Mode" field.
3. Set the desired speed with the [Microscope] slide control in the "Speed settings (XY)" field.
   ⇨ The assigned speed is displayed on the respective slide control.
4. Close the "Settings" menu by tapping on the ⌂ button.

6.2.4.1.2.2 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

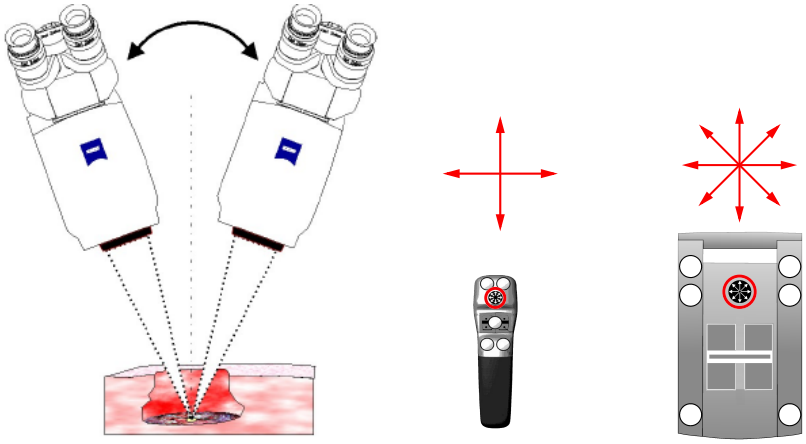
☑ The microscope is positioned and focused above the desired surgical field

Action

- ▶ Tap on ⚙ Settings ⟶ Stand.
- ▶ Tap on the [Stand] button in the "XY Mode" field.
- ▶ Set the desired speed with the [Stand] slide control in the "Speed settings (XY)" field.
  - ⇨ The assigned speed is displayed on the respective slide control.
- ▶ Close the "Settings" menu by tapping on the ⌂ button.

6.2.4.1.2.3 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 view). 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

☑ The microscope is positioned and focused above the desired surgical field

Action

1. Tap on ⚙ Settings ⟶ Stand.
2. Tap on the [PointLock] button in the "XY Mode" field.
3. Set the desired speed with the [PointLock] slide control in the "Speed settings (XY)" field.
   You also can set this speed via the main menu bar on the touchscreen.
   ⇨ The assigned speed is displayed on the respective slide control.
4. Close the "Settings" menu by tapping on the ⌂ button.

6.2.4.1.2.4 Configuring the handgrip "XY Mode"

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 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.

6.2.4.1.2.5 Parking position

⚠ CAUTION!

Risk of crushing!

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

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

Action

1. Bring the monitor (optionally: both monitors) into the transit position.

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

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

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

6.2.4.1.2.6 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 you are 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.
   ⇨ The device then automatically travels to the drape position.
   ⇨ When a beep sounds, the drape position has been reached.

Determing a new drape position

If the factory set drape position is unfavorable for you, you can define and save your own drape position.

4. Move the device to a position that is favorable and comfortable for you.
5. Tap on ⚙ Settings ⟶ Stand.
6. Tap on the [OK] button in the "Save Current Position as Drape Position" field.
   ⇨ The current position of the device is saved as the new drape position.
7. Now you can move the device to the drape position as usual.

6.2.4.2 Position memory

⚠ CAUTION!

Tissue damage due to incorrect movement of the surgical microscope!

If the system or patient is moved or displaced in the meantime, it is longer possible to move to the saved system position safely.

- ▶ Do not move the system or the patient if you wish to use position saving.

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

6.2.4.2.1 Configuring the position memory

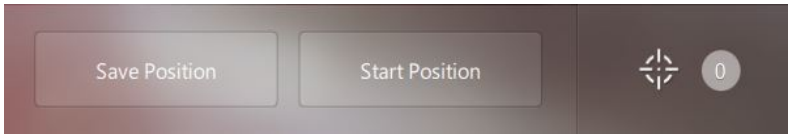
Action

1. Tap on Settings → Operation → Handgrips or FCP.
2. In order to assign a hand grip or FCP button to position saving: Tap on the corresponding letters 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. In the selection field, tap on [Position Memory].
   ⇨ The function is accepted and displayed next to the button symbol.

6.2.4.2.2 Position, saving of

Action

1. Tap on the hand grip or FCP button configured with "Position Memory".
   ⇨ A miniature image of the photograph taken is briefly displayed on the screen [Photos] on the touchscreen. The photo is saved with the current microscope position, working distance and magnification in the patient data with the "Position" symbol ⌖.
2. You can also use the ⌖ button on the touchscreen in the main menu list below.
   ⇨ The "Position Memory" menu is shown on the bottom right-hand side of the touchscreen.



3. Tap on [Save position].

6.2.4.2.3 Start Position

Action

1. Press and hold the position button for at least 2 seconds. A selection menu will open on the touchscreen showing the positions currently saved.
2. Press and release the joystick button on the right hand grip or on the FCP to navigate to the desired saved position.
3. The active position is highlighted in blue.
4. Press the joystick button on the hand grip 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.

6.2.4.2.4 Set positioning speed

Action

1. Tap ⚙ Settings ⟶ Stand ⟶ scroll down in the stand menu.
2. Set the desired positioning speed on the slide control.
3. Close the "Settings" menu by tapping on the ⌂ button.

6.2.5 Configure displays

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

Action

1. Tap on ⚙ Settings🖵 ⟶ Displays.
2. In this menu, set which display should be shown on external monitors at what level of quality.
3. Close the "Settings" menu by tapping on the ⌂ button.

6.2.6 Configure audio

Action

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

6.2.7 Configuring Photo

Action

1. Tap on Settings → Photo.
2. Select whether the photos are to be taken with the internal camera or with the external DSLR camera (option) in the "Recording" field.
3. Select the desired format for saving your photos on the device in the "Storage format (internal camera)" field.
4. If you would like to take photos with an external camera, activate the slide switch in the "Light intensity for external camera" field.
   - ⇨ The switch illuminates blue .
   - ⇨ The light intensity of the xenon illumination is briefly set to 100% when the external DSLR camera is released.
5. Close the "Settings" menu by tapping on the button.

6.2.8 Configuring the video camera

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

Action

1. Tap on Settings → Video Camera.
2. Set the parameters of the video camera as desired.

6.2.8.1 Setting the brightness

You can set the exposure for the video recording via the shutter control and via the direct exposure control:

- Automatic shutter control: The video camera automatically controls the exposure time and keeps the set brightness constant
- Manual shutter control: You can set the exposure time manually
- "Spot" exposure control: The exposure is measured in a very small area in the image center. This setting is suitable for working in narrow channels.
- "Full" exposure control: The exposure is measured across the entire video image. This setting is suitable for fully illuminated surgical fields or strong local reflections.
- Auto Brightness: You can set the desired exposure time manually; the video camera automatically readjusts the exposure time

Action

1. Select the "Auto" or "Manual" function in the "Shutter Control" field.
2. Select the function "Spot" or "Full" in the "Exposure Control" field.
3. Set the required brightness with the slide control in the "Auto Brightness" field.

6.2.8.2 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 slide control in the "Color Saturation" field.
   ⇨ Higher values produce more intensive colors.
2. Set the desired value with the "Hue" slide control.
   ⇨ A hue of ±0 usually provides the most natural color impression.

6.2.8.3 Setting the black level offset

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

Action

▶ Set the desired value with the slide control in the "Black Level Offset" field.
   ⇨ The smaller this value is, the darker the black will be.

6.2.8.4 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

- ▶ Set the desired values in the "Red Fine Adjustment", "Blue Fine Adjustment" and "Exposure Control Peak/Average" fields using the respective slide control in each case.
  - ⇨ Values of ±0 usually provide the most natural color impression.

6.2.8.5 White Balance

You can perform a white balance for the integrated camera. Here the device adjusts the signal of the integrated camera in such a way that white areas in the surgical field also appear white on the monitor.
The white balance must not be performed during a fluorescence application in order to ensure that the camera parameters are not falsified. Furthermore, the influence of extraneous light should be minimized or avoided altogether (e.g. direct sunlight passing through a window or direct illumination from a surgical ceiling lamp).

Prerequisite

- ☑ The illumination is switched on on the device
- ☑ The device is not in the fluorescence mode
- ☑ The surgical field is shielded from extraneous light

Action

1. Aim surgical microscope at a white object.
2. Focus on the white object.
   - ⇨ The field of view is sharply discernible.
3. 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"!"
4. To start the white balance: Tap on the [Next] button. To cancel the process: 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.
5. Following a successful white balance, tap on the [Close] button.
   - ⇨ The white balance settings are saved user-dependently.
6. Close the "Settings" menu by tapping on the ⌂ button.

6.2.9 Configuring the video recording

Action

1. Tap on Settings → Video Recording.
2. If the recorded video data are to be saved only on the internal hard drive, tap on "None" in the "Parallel Recording" field.
3. If the recorded video data also are to be (parallel) saved to a connected USB medium, tap on "USB" in the "Parallel Recording" field.
4. If the recorded video data also are to be (parallel) saved to a network folder, tap on "Network" in the "Parallel Recording" field.
5. Switch on "3D Recording" (option) → if the video data are to be recorded in 3D format.
6. Switch on "SmartRecording" → if you would like to record HD video data extending into the past for a period of up to five minutes during an operation.
   ⇨ If "SmartRecording" is activated, HD video data of the operation are recorded in a buffer. The oldest video data in the buffer are cleared in such a way that the last five minutes always remain stored in the buffer. You can start and stop the recording the HD video data from the buffer at any time.
7. Switch on "Video Streaming" → if you would like to live stream video recordings to a streaming client via LAN, WLAN or hotspot.
   ⇨ The web address of the device which must be entered as the Streaming Client is displayed in the "Web Address for Video Streaming" field.
8. If you would like to transmit your video data for video streaming in high definition, tap on "HD Video" in the "Video Streaming" field.
   ⇨ The video files are transmitted in high definition.
9. If you would like to transmit your video data for video streaming in low resolution, tap on "LowRes Quality" in the "Video Streaming" field.
   ⇨ The video files will then be transmitted in low resolution. The quality of the transmitted video data is therefore lower than for recordings performed in HD quality.
   ⇨ The data volume is much lower.
10. Close the "Settings" menu by tapping on the button.

6.2.10 Configure fluorescence

All of the settings you select in the "Fluorescence" menu apply only to the currently active user.

Action

1. Tap on Settings → Fluorescence.
2. Select the desired fluorescence application in the "Fluorescence Mode" field.
   Only activated fluorescence options are displayed.
3. BLUE 400: "Light Intensity (start value)" → Set the start value with the slide control.
4. YELLOW 560: "Light Intensity (start value)" → Set the start value with the slide control.
5. IR 800: Switch on "AutoGain" → .
   ⇨ The camera gain is controlled automatically during the recording phase.
6. IR 800: Switch off "AutoGain" → .
   ⇨ You can control the camera gain manually during the recording phase.
7. IR 800: Switch on "AutoDetection" (automatic fluorescence detection) → .
   ⇨ The "Replay" playback phase initially starts only when the fluorescence agent begins to flow into the tissue.
8. IR 800: Switch off "AutoDetection" (automatic fluorescence detection) → .
   ⇨ The "Replay" playback phase already starts at the beginning of the video recording, i.e. the black leader (where no fluorescence signal is present) also is played back.
9. IR 800: Switch on "Skip Setup" (preparation phase) → .
   ⇨ INFRARED 800 starts immediately in the Recording Mode. You cannot perform any focus or zoom settings.
10. IR 800: Switch off "Skip Setup" (preparation phase) → .
    ⇨ You can set the focus and zoom parameters and select the image section; then the recording phase starts.
11. IR 800: Switch on "AutoZoom" (default setting: off) → .
    ⇨ The system starts the recording phase with the magnification set by you in the "AutoZoom (start value)" field.
12. IR 800: Switch off "AutoZoom" → .
    ⇨ You can set the total magnification outside of the preconfigured range.
13. IR 800: "AutoZoom (start value)" → Set the desired start value with the slide control.

14. IR 800: "Gain (Start value)" ⟶ Set the desired start value on the slide control.
15. IR 800: "Short Replay [Number]" ⟶ Set the desired repetition rate for the short replays with the slide control.
    You can set the repetition rate to a value ranging from 0 to 10.
    ⇨ Short replays are played back successively until the repetition rate set by you is reached or the Fluorescence button on the handgrip or foot control panel is pressed.
16. IR 800: "Short Replay [Duration]" ⟶ Set the duration for the short replays with the slide control.
17. IR 800: "Long Replay [Number]" ⟶ Set the desired repetition rate for the long replays with the slide control.
    You can set the repetition rate to a value ranging from 0 to 10.
    ⇨ Long replays are played back successively until the repetition rate set by you is reached or the Fluorescence button on the handgrip or foot control panel is pressed.
18. IR 800: "MultiVision overlay" ⟶ set whether the infrared image should also be shown during recording as MultiVision display ( ) or shown on the monitor only ( ).
19. IR 800: "Display on the monitor" ⟶ set whether the infrared image should be shown on the touchscreen during recording.
20. FLOW 800: "MultiVision Data Injection" ⟶ set whether the FLOW 800 evaluation is also shown as a MulitiVision Data Injection ( ) or shown on the monitor only ( ).
21. Close the "Settings" menu by tapping on the ⌂ button.

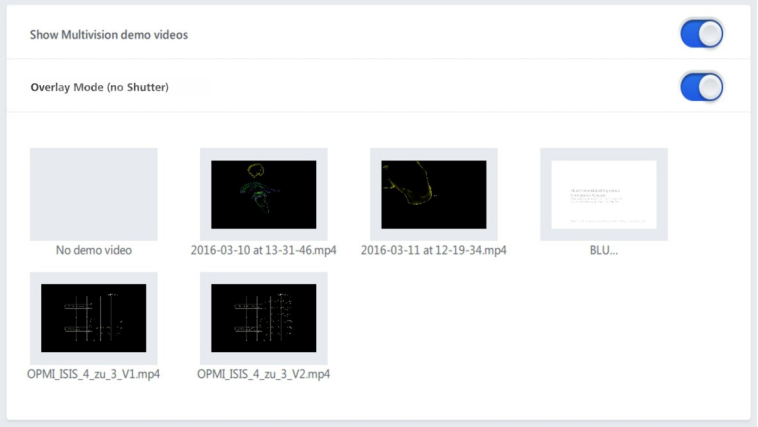
6.2.11 Configure MultiVision

In this menu, you can set the parameters for data injection.

Action

1. Tap on Settings ⟶ Operation ⟶ Handgrips or FCP.
2. To assign the MultiVision 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 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. If you would like to show MultiVision demo videos, tap on ⟶ Show MultiVision Demo Videos ⟶ Switch on .



   ⇨ The menu with MultiVision demo videos is displayed.

   ⇨ The "Overlay Mode (no Shutter)" field is displayed and the overlay mode is automatically switched on.
   You can display the MultiVision demo videos with the shutter open or closed (with or without the overlay mode).

9. If you would like to view MultiVision demo videos with the shutter closed, tap on ⟶ Overlay Mode (no Shutter) ⟶ Switch off .
10. Tap on one of the video thumbnails.

    ⇨ The selected MultiVision demo video is shown.

11. Before you leave the MultiVision demo mode, make sure that the shutter is open or open the shutter: Tape on ⟶ Overlay Mode (no Shutter) ⟶ Switch on .
12. To activate the automatic switch-off function for QEVO (option), tap on ⟶ QEVO ⟶ Automatic Switch-off .
13. To switch on the marker for QEVO (option), tap on ⟶ QEVO ⟶ Marker .
14. Select the video source. To do this, tap on the desired selection field.
15. Depending on the navigation system connected, tap on ⟶ "Navigation (standard)" or "Navigation (extended)" .
16. Close the "Settings" menu by tapping on the ⌂ button.