

Carl Zeiss

# OPMI<sup>®</sup> PENTERO<sup>®</sup> 900

## Software Release 1.2



Quick Guide

G-30-1859-en

Version 1.2

11/11/2011





The present Quick Guide is just an excerpt of the full Instructions for Use. The present Quick Guide cannot substitute for the Instructions for Use. Therefore, please familiarize yourself first with the explanations and warning notices of the full Instructions for Use G-30-1822.

## Key to symbols



G-30-1822

Carefully read Instructions for Use (G-30-1822).



Additional information and tips

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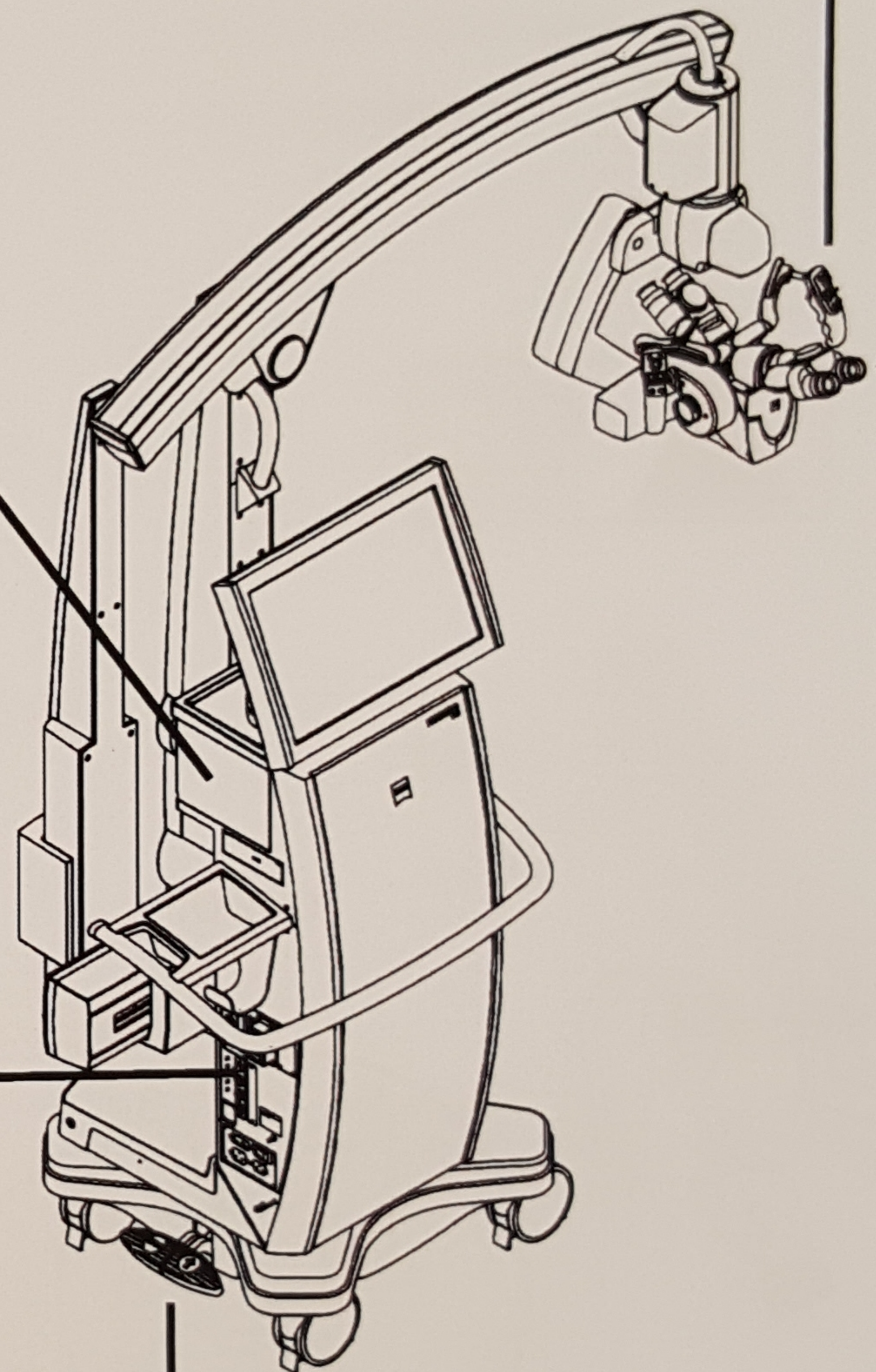
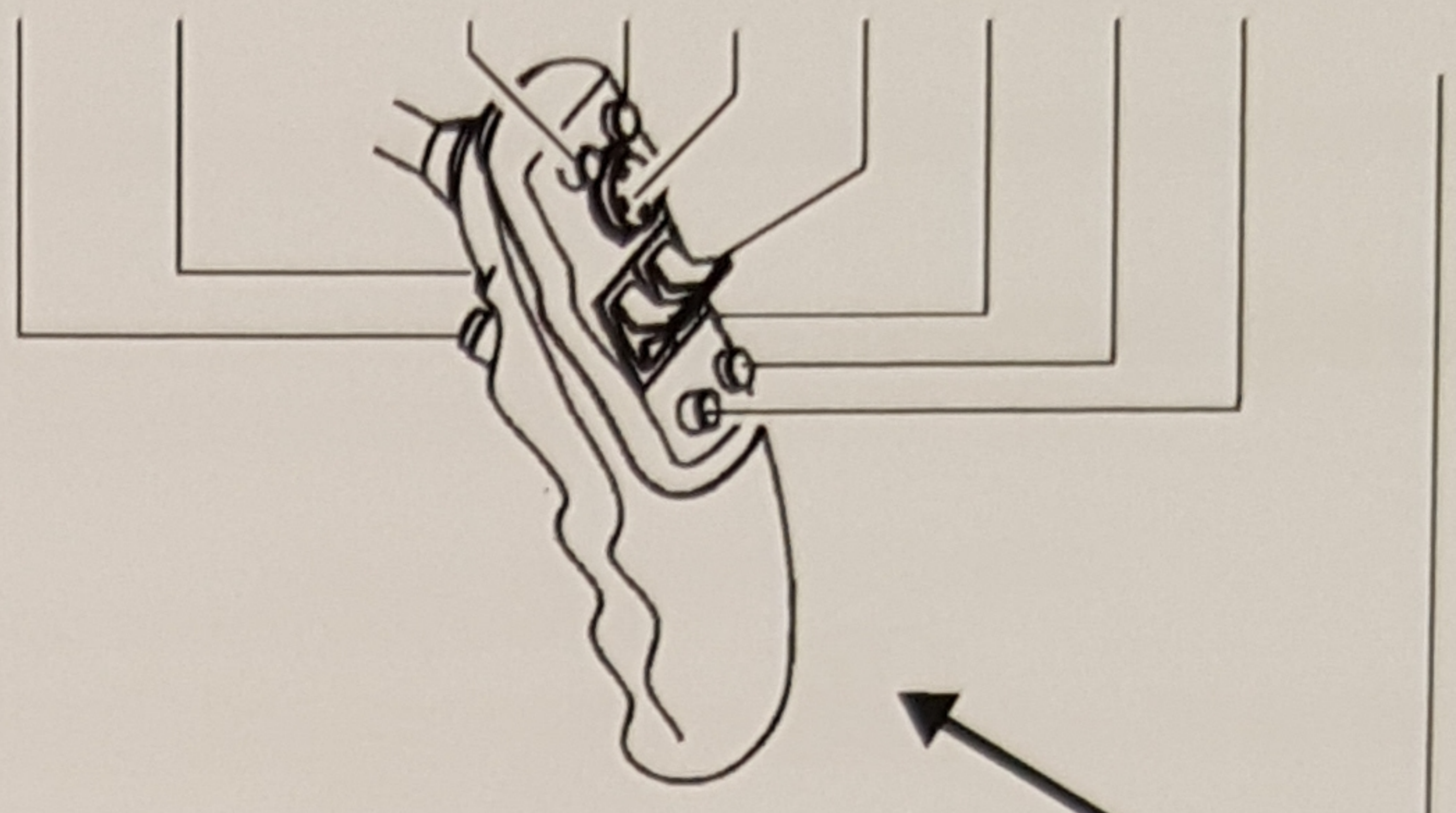
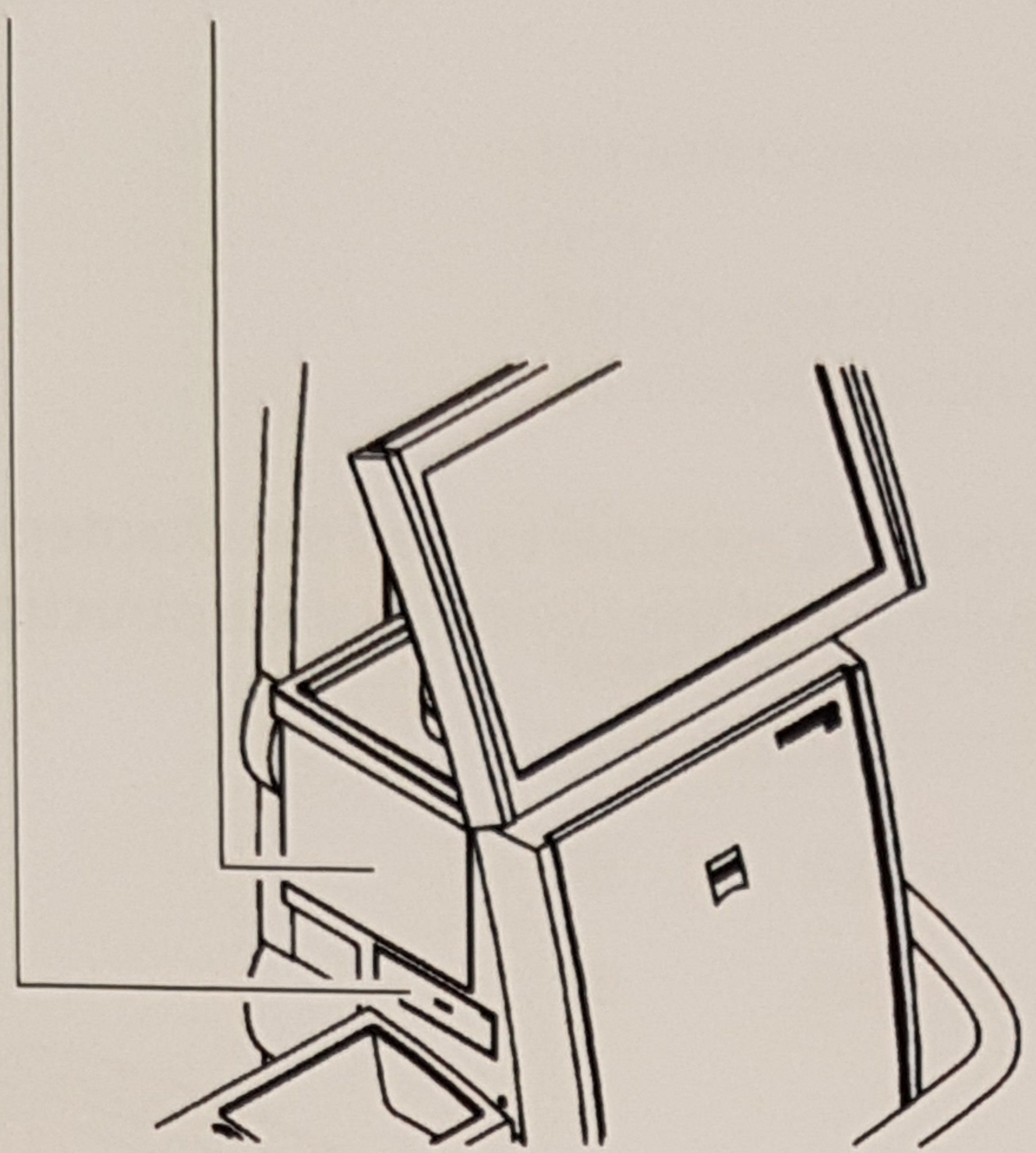
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# Overview OPMI PENTERO 900

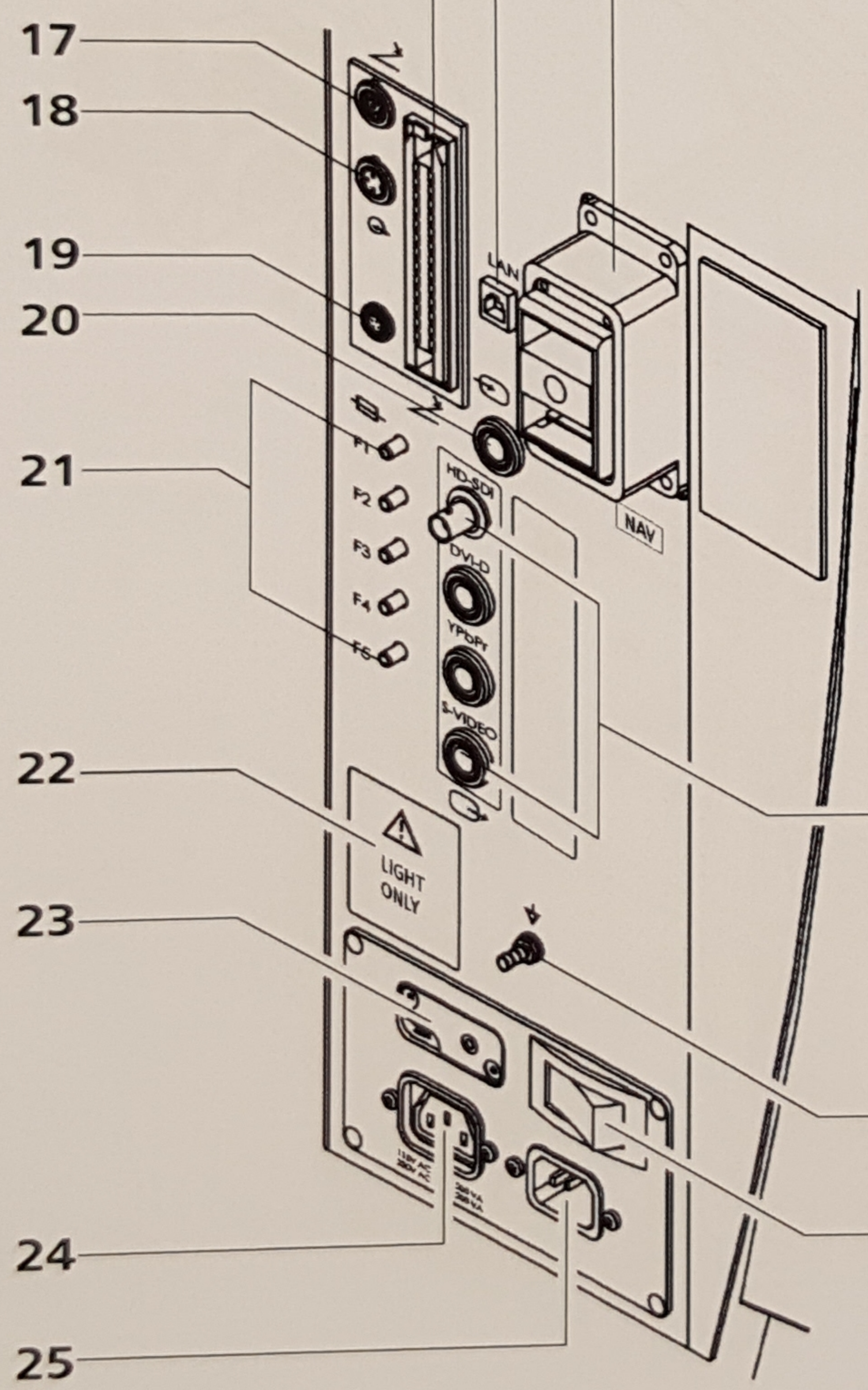
- 1 Adjusting the microscope
- 2 Programmable button (factory setting : Illumination + )
- 3 Programmable button (factory setting : Illumination - )
- 4 Set focus +/- (can be configured: Set zoom +/-)
- 5 Set zoom +/- (can be configured: Set focus +/-)
- 6 Joystick: Adjusting the OPMI in X/Y direction
- 7 Programmable button (factory setting : Autofocus)
- 8 Programmable button (factory setting : take photo)
- 9 Release/lock magnetic brakes for selected axes (SB)
- 10 Release/lock magnetic brakes for all axes (AB)
- 11 Connect USB storage media (2x USB connectors)
- 12 Replace Xenon lamp / exchange lamp container
- 13 Holder for external mini HDD USB
- 14 Connect external navigation system
- 15 Connect LAN
- 16 Connect foot control panel, foot button or OR chair
- 17 Connect foot rocker switch
- 18 AUX socket; for control of an external device
- 19 Connect foot control panel (FCP or FCP WL)
- 20 Video input (e.g. for connection of endoscope camera)
- 21 Miniature circuit breaker
- 22 Switch for light-only operation (remove door)
- 23 Mains voltage display
- 24 Power output
- 25 Power connection (115/230V)
- 26 Power switch; turn device on
- 27 Connect device to equipotential bonding
- 28 Video signal outputs (connect external monitor)
- 29 Press stop button - lock stand in place
- 30 Set for straight travel

11.13 12

10 9 8 7 6 5 4 3 2 1

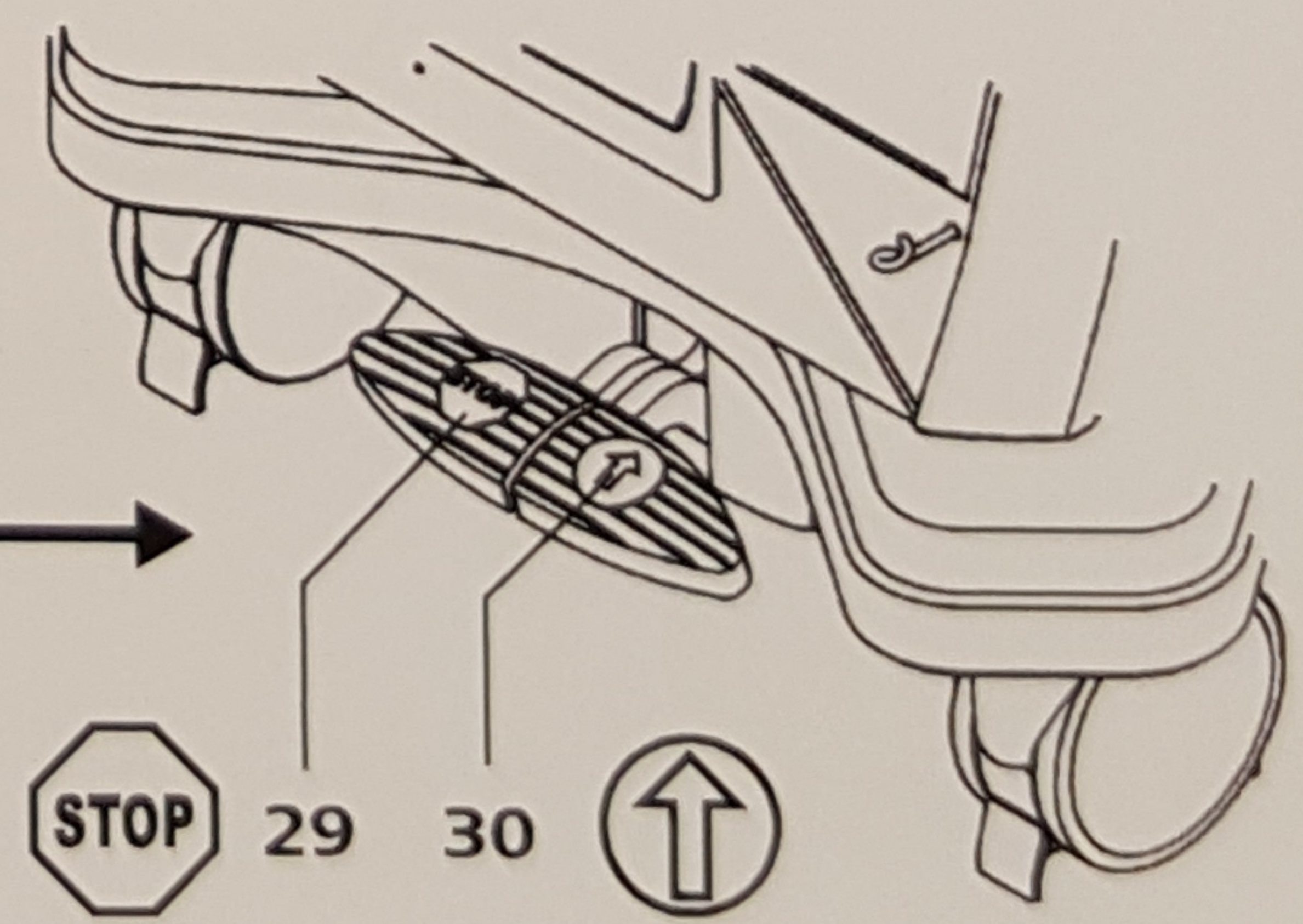


16 15 14



27

26

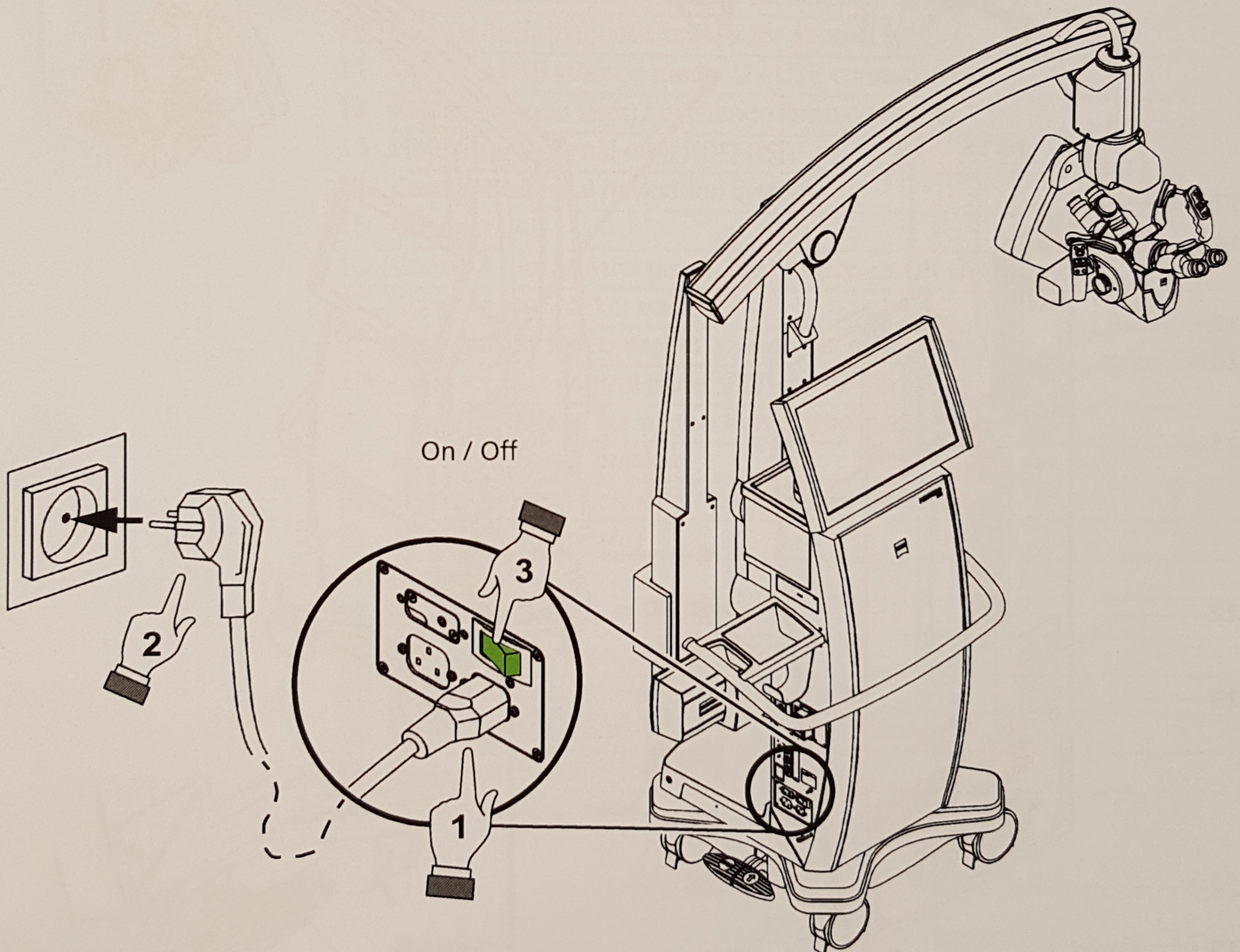


# Preparations for use

## Powering the device up



Before you power up this device, it is essential to read the chapters on "Safety measures" and "Preparations for use of the device" in the Instructions for Use, G-30-1822.



# Positioning the microscope

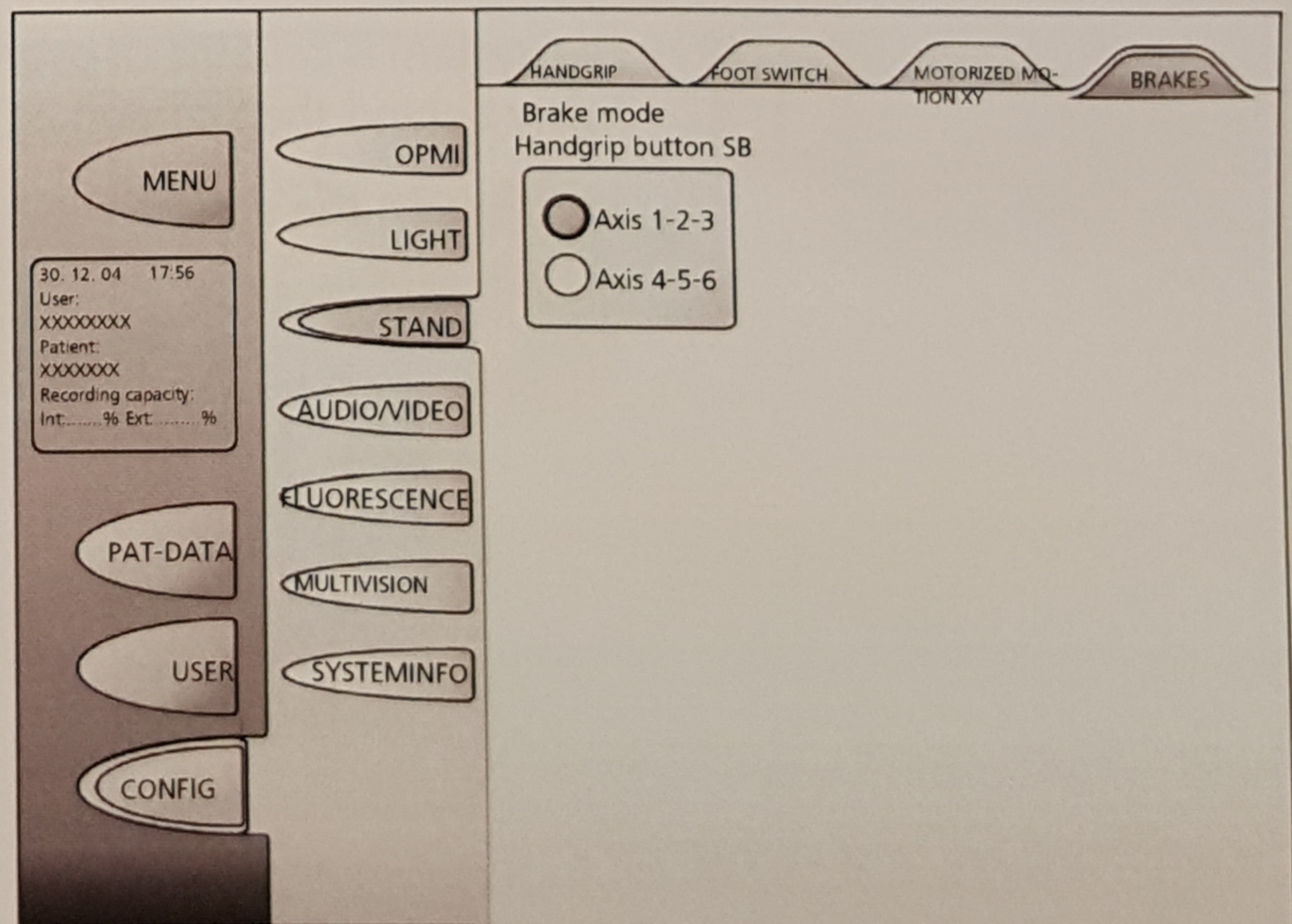
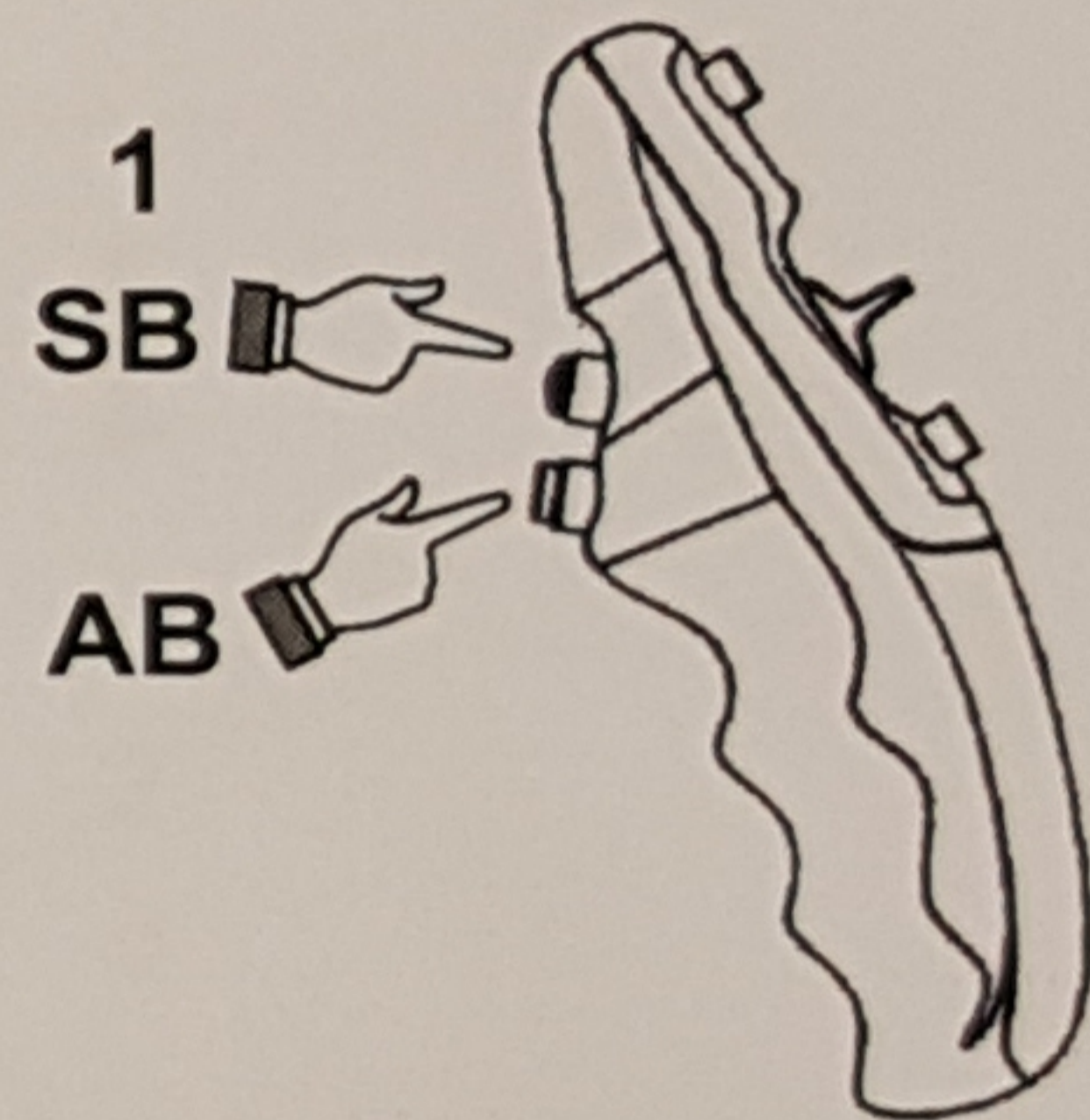
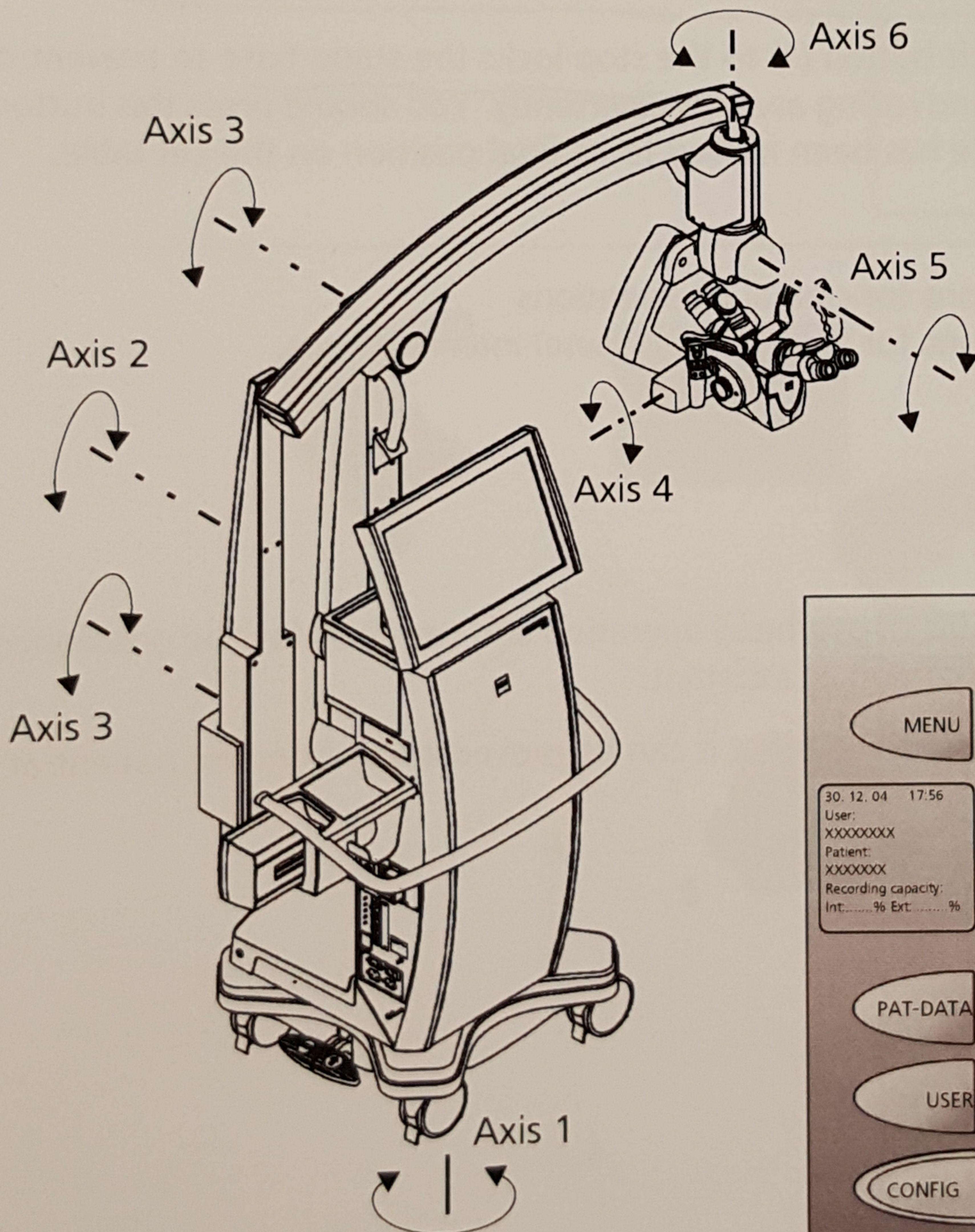
For safety reasons, the system may be used in perfectly balanced condition only.

Before you use this device, it is essential to read the chapter on "Preparations for use of the device" in the Instructions for Use, G-30-1822!

AB release all magnetic brakes.

Select the axes to be released when you press the SB button (1) on the handgrip. Select from the following:

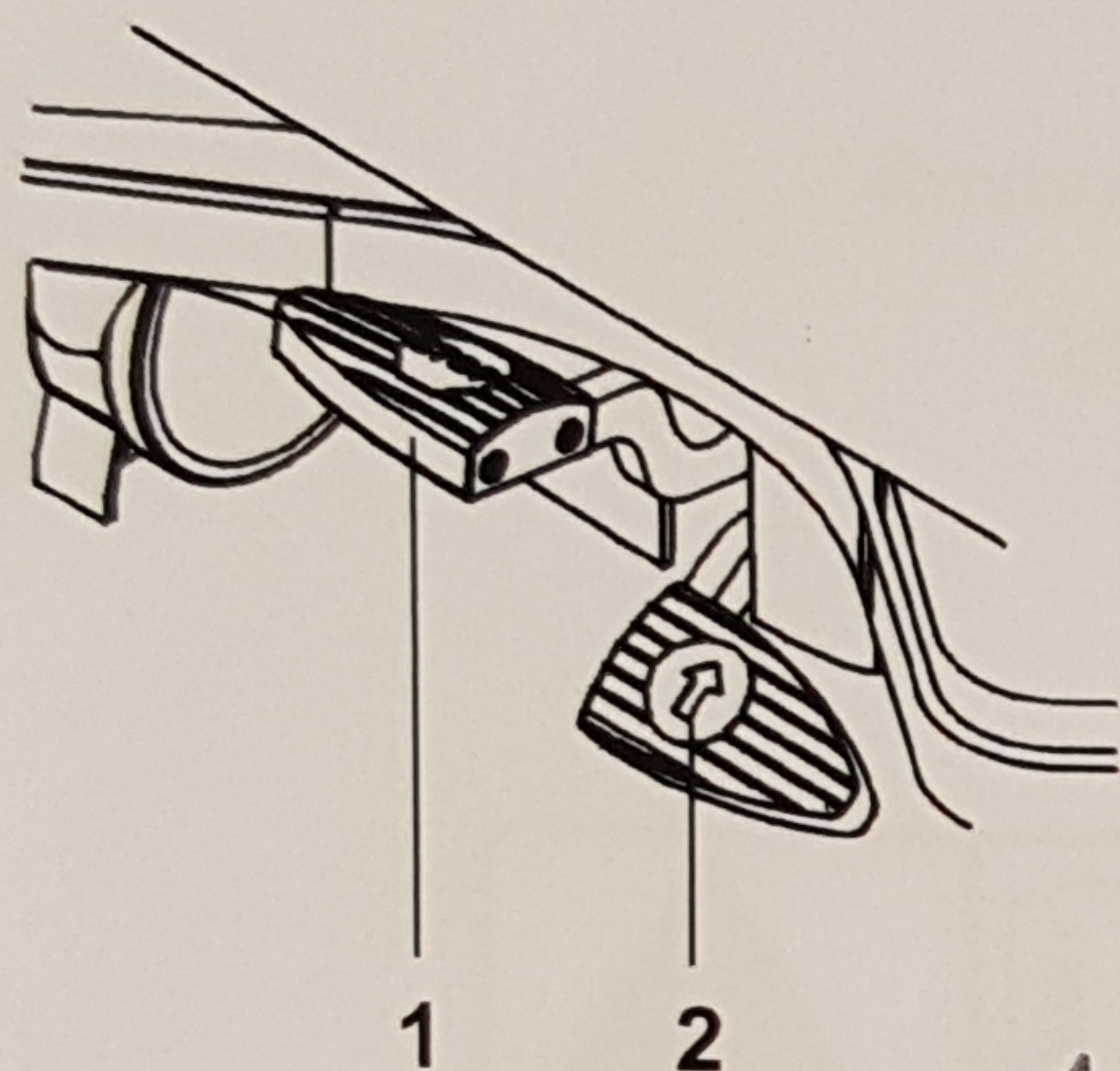
- |    |            |                       |
|----|------------|-----------------------|
| SB | Axis 1-2-3 | Stand axes (standard) |
| SB | Axis 4-5-6 | Microscope axes       |



## Positioning the system at the operating table

The stand is equipped with a grip that can be used to easily and safely guide the system when re-positioning or shifting its position. For this purpose, please use this handle exclusively.

The stand base features the new FlexiTrak technology which simplifies the shifting and re-positioning of the system in the OR significantly. Two additional control buttons on the stand base allow you to conveniently select the desired moving status:



- If no button was pressed:  
Exact and sensitive positioning in the OR and on the OR table in any direction with little force.
- If the right button (2) was pressed strongly until it snaps in place:  
Safe and exact straight-ahead travel even over small doorsteps or elevator entrances. Pressing this button until it snaps in place sets one of the front casters for straight travel. The other casters remain steerable. By lightly pressing button (1), all four casters are rendered steerable again.
- Pressing the left button (1) to the stop locks the stand base to prevent it from shifting and rolling away inadvertently. You should press this button once the device has been moved to its final position on the OR table.

- 3 Possible positions for cranial interventions
- 4 Possible positions for face-to-face (spine) interventions
- 5 Surgeon
- 6 Assistant

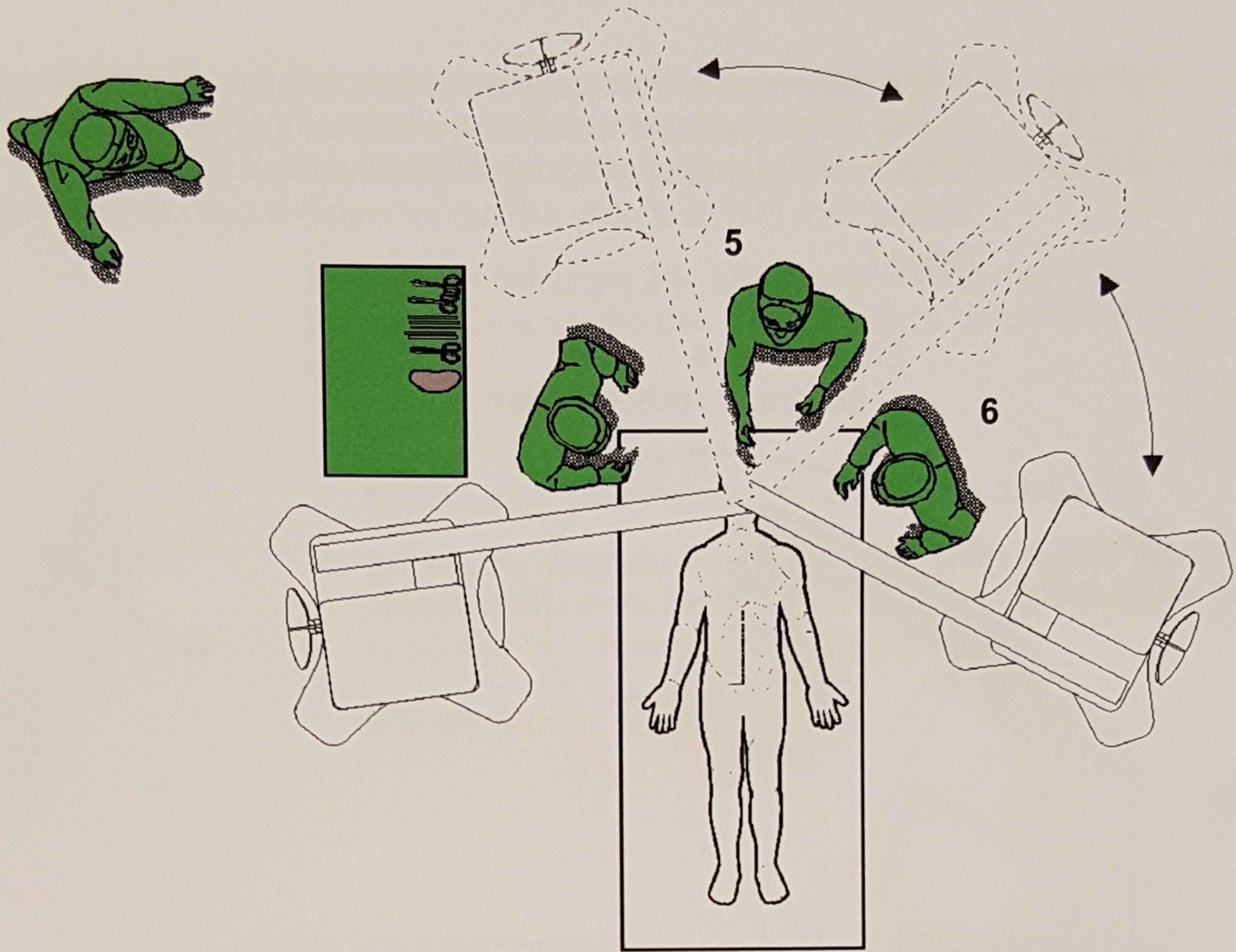


The system is capable of overhead operation and can therefore be positioned freely behind the surgeon or assistant.

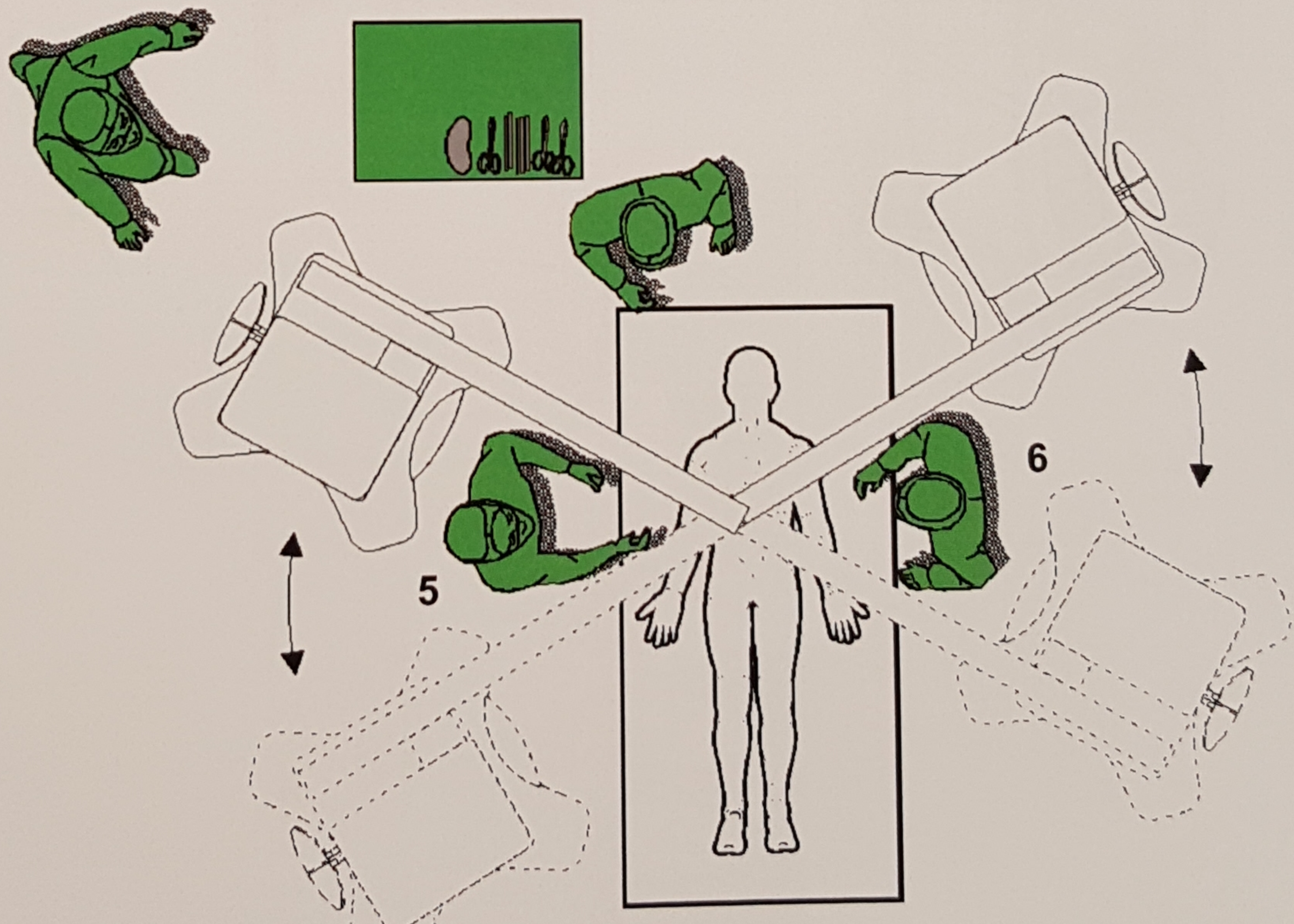
- Position the system such that it can be moved away from the patient at any time.



3



4



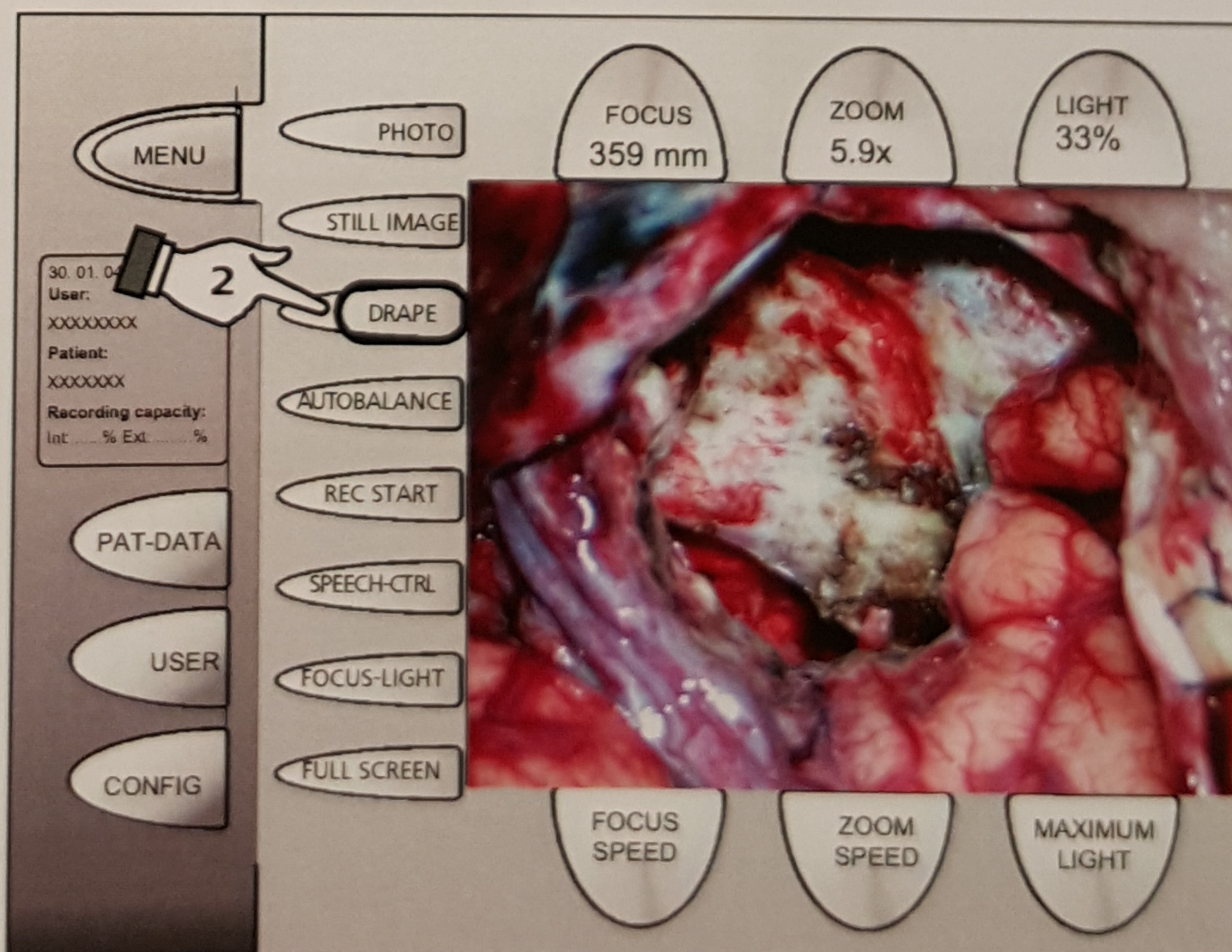
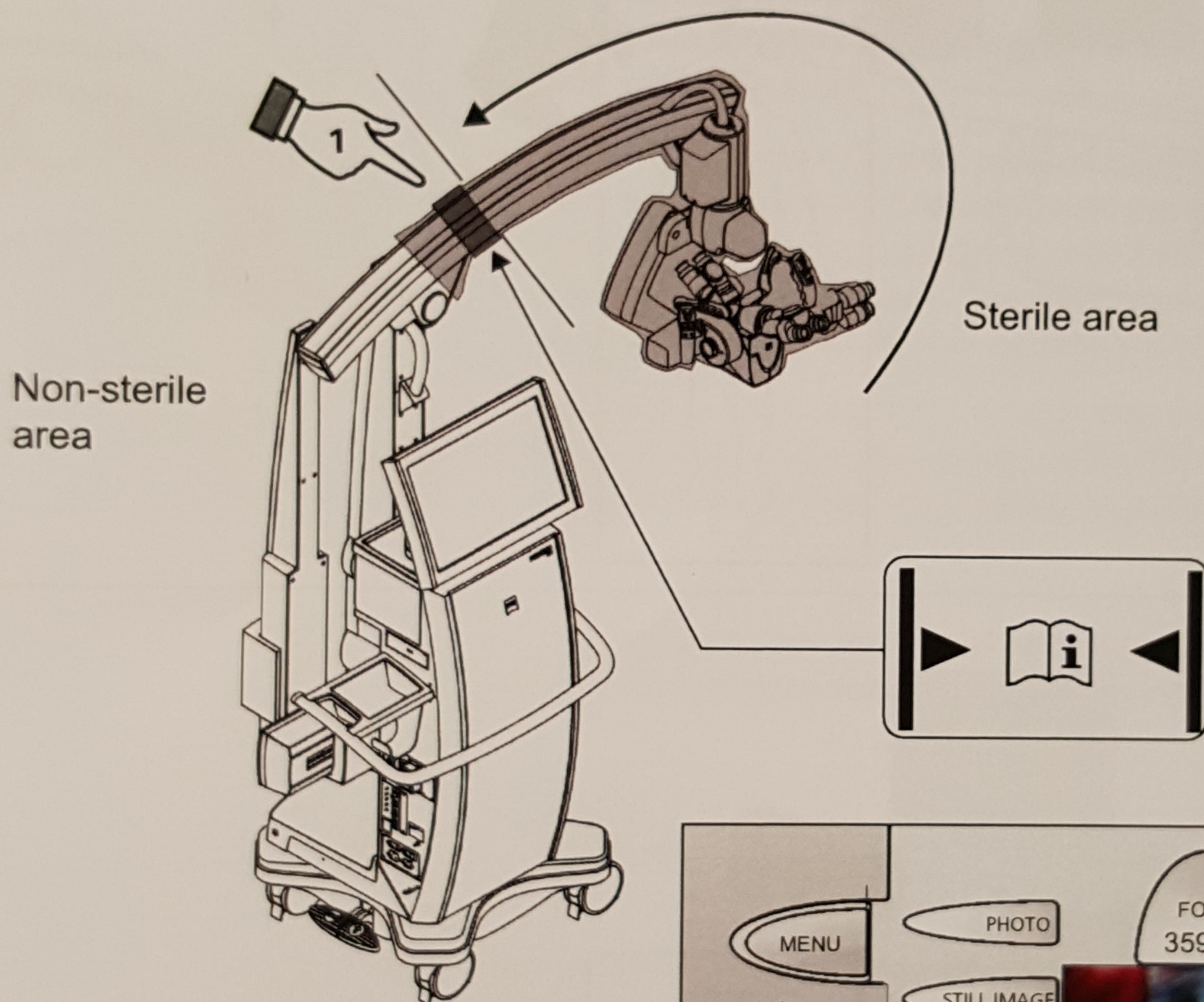
# Applying sterile drapes



G-30-1822

When applying the drapes, please ensure that there is sufficient space for swivel, tilt and rotation movements of the surgical microscope. Refer to the user manual of the sterile drape and ensure that the drape is attached such that its sterility will not be impaired (see sterile area in the figure below).

Effective area  
of the drape suction system



# Balancing the system

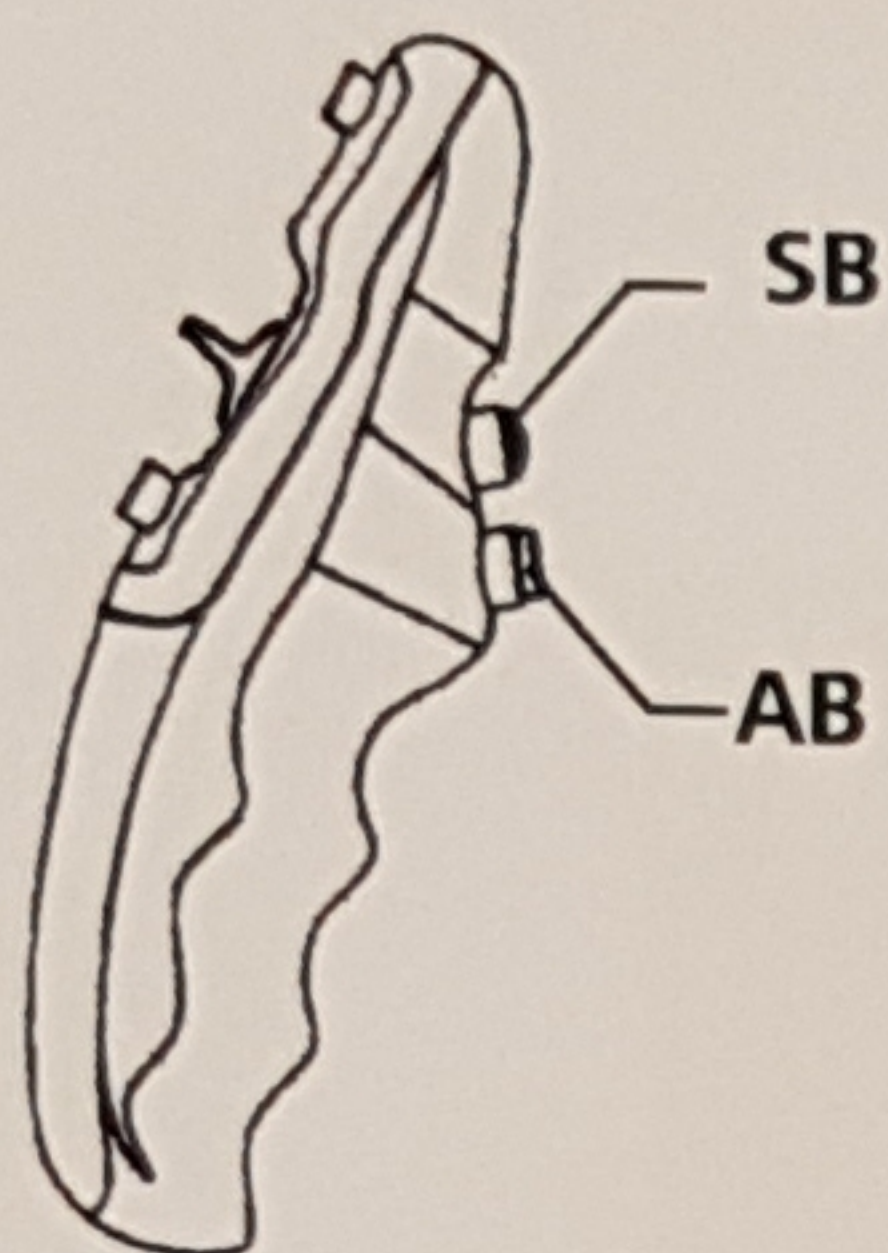


G-30-1822

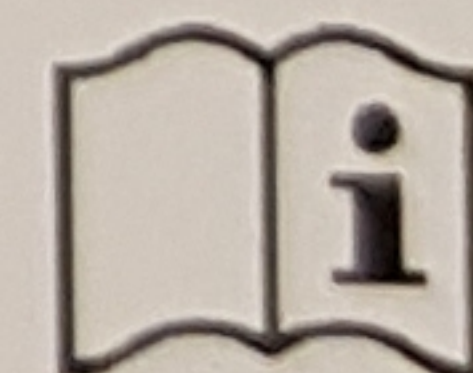
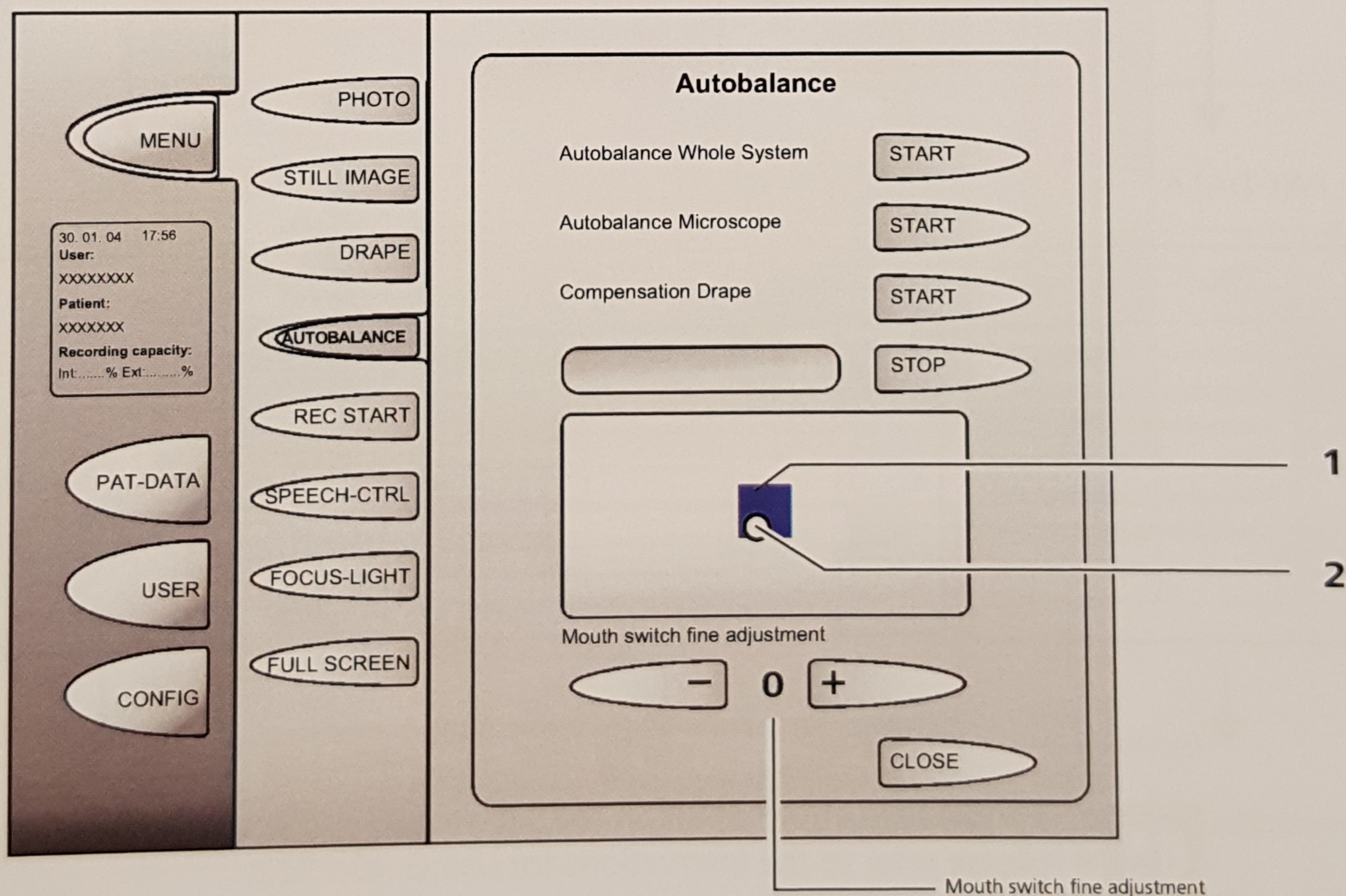
Please be absolutely sure to follow the procedure described in the user manual under "Balancing the system".

For safety reasons, the system may be used in perfectly balanced condition only.

The steps of balancing and subsequent testing may not be carried out above the patient and require that a safe distance be kept from other persons and devices.



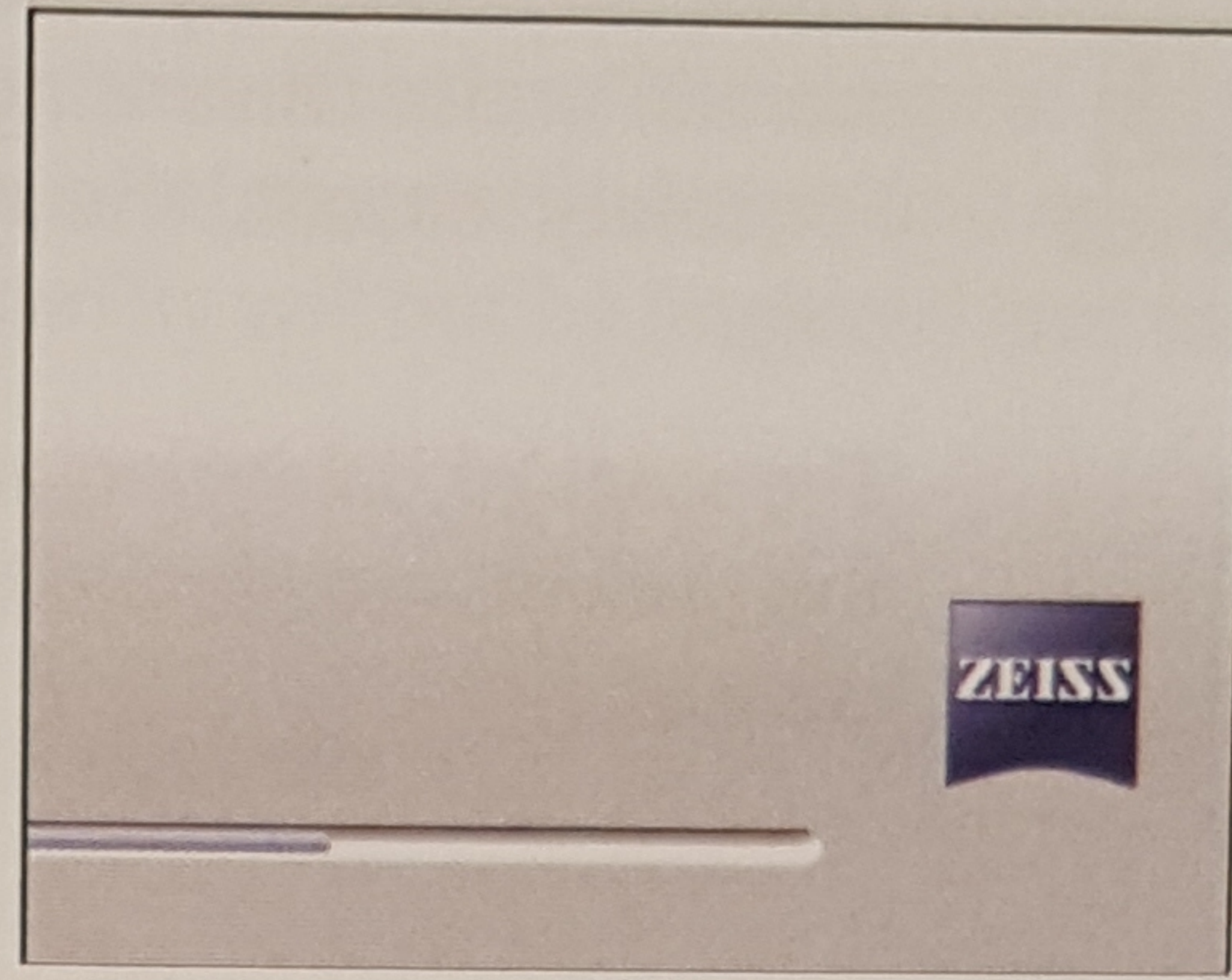
- For this step, hold the microscope by both hand grips.
- Release the magnetic brakes (AB) and swing-out the microscope until the indicator (1) is in the center of the blue field (2). Subsequently, you can carry out the "Autobalance Whole System".



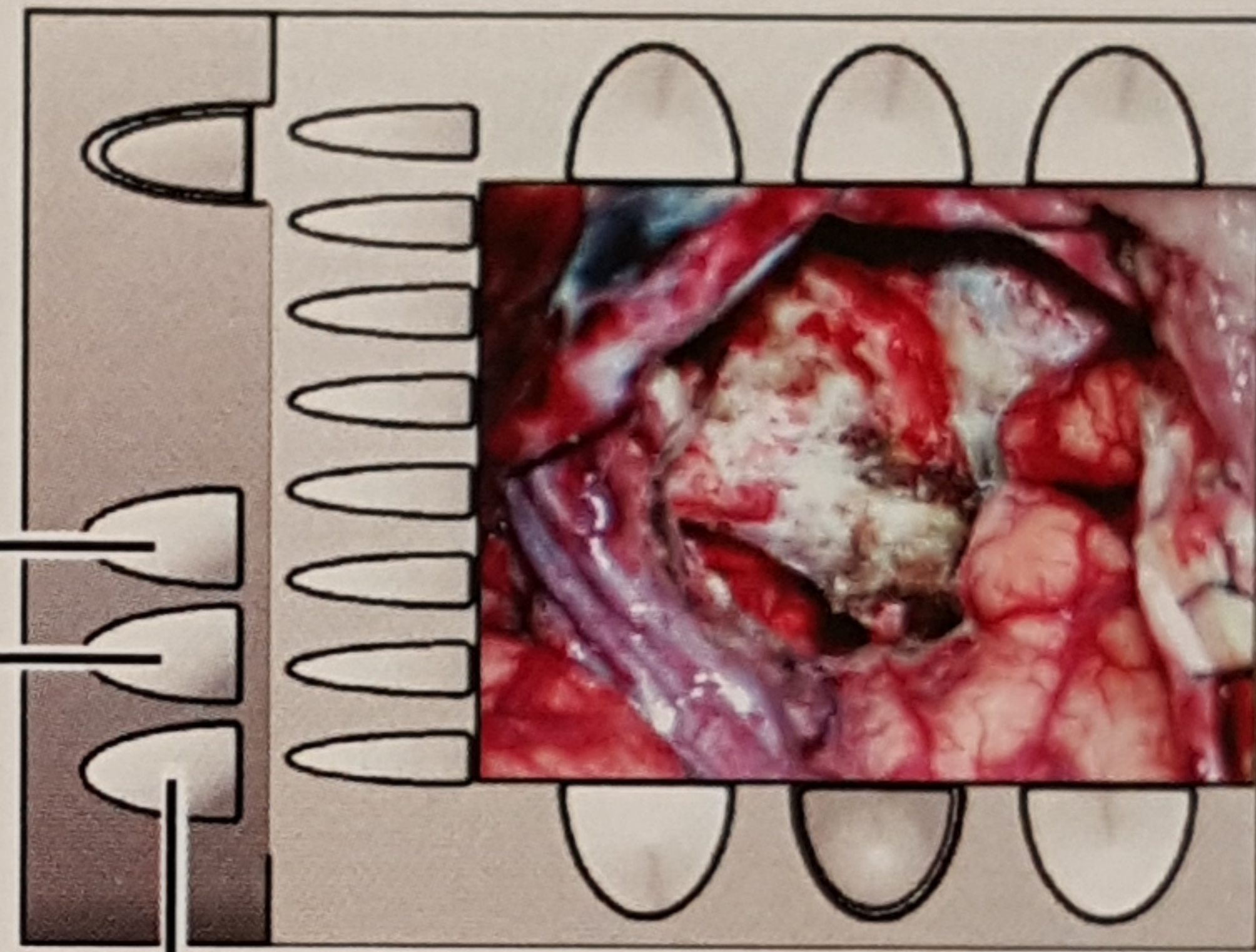
G-30-1822

# Central user interface (touchscreen)

Start



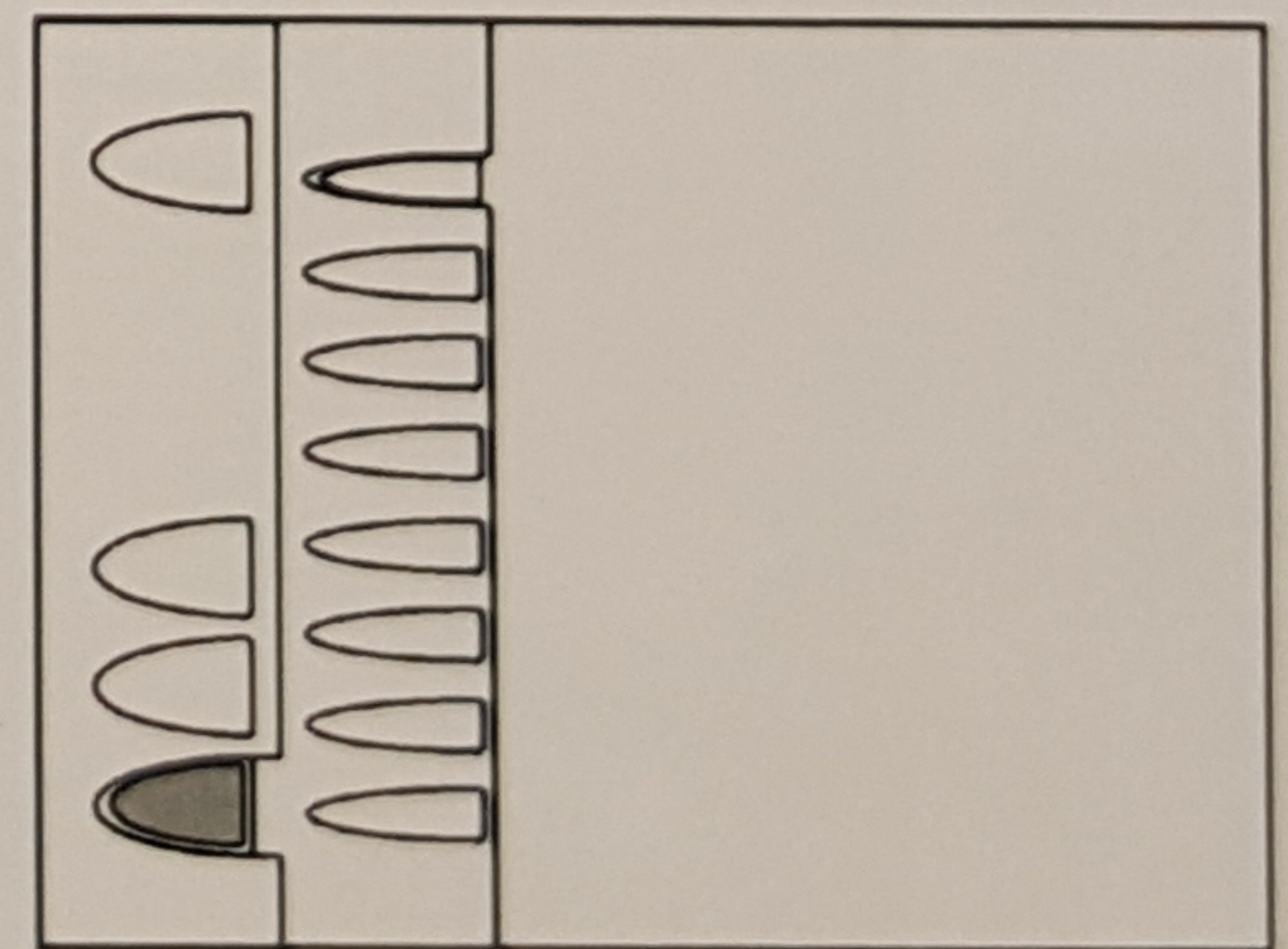
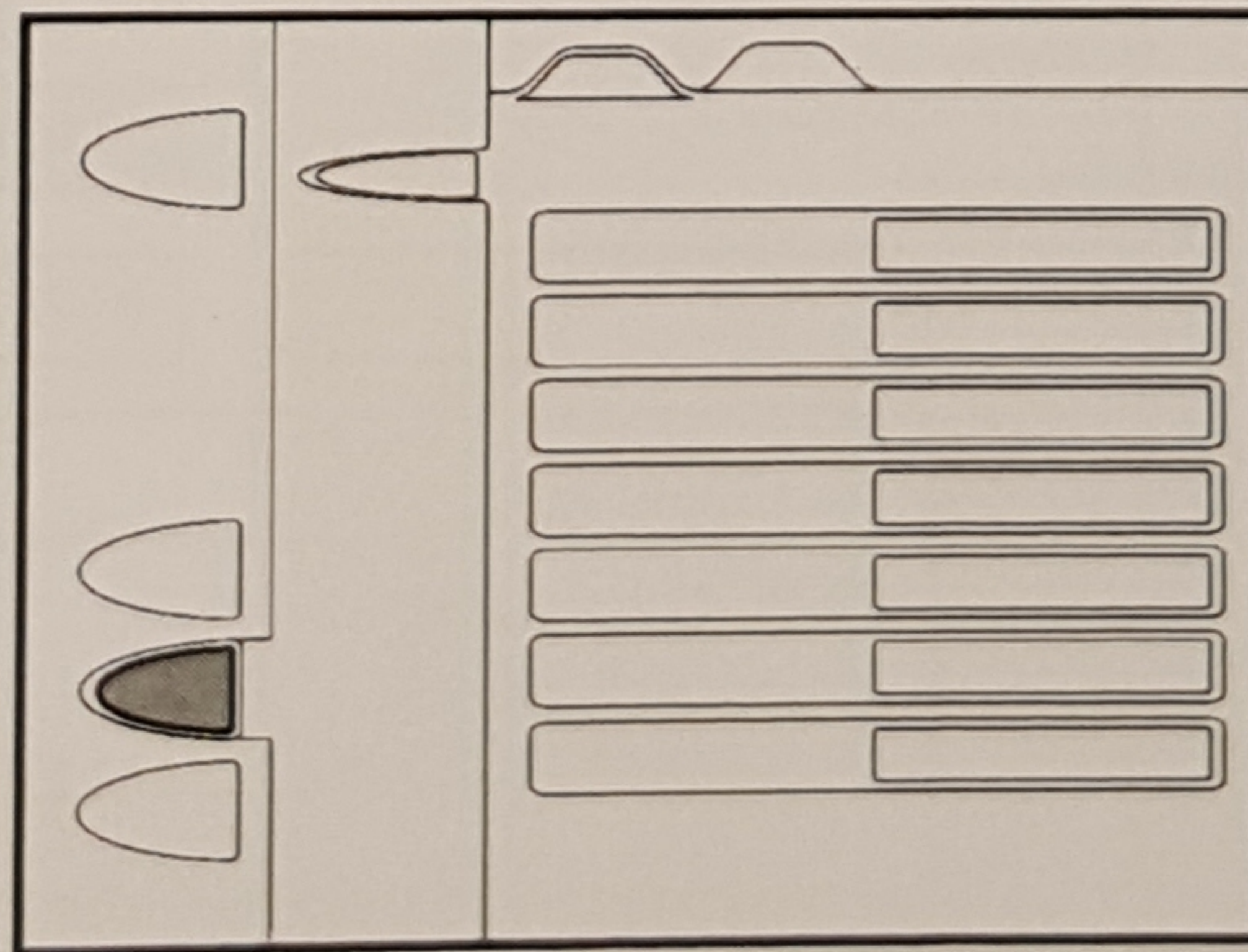
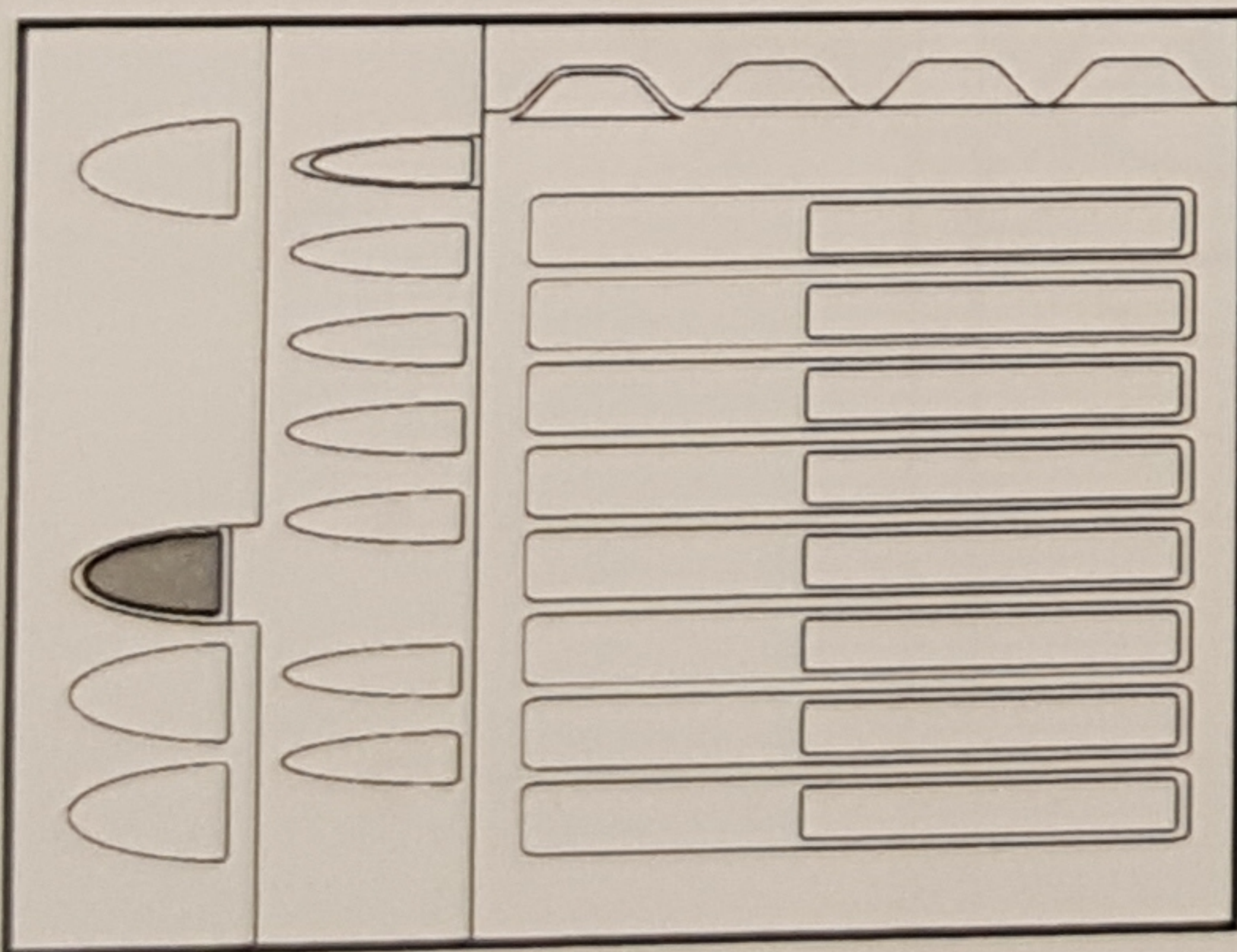
MENU



PAT-DATA

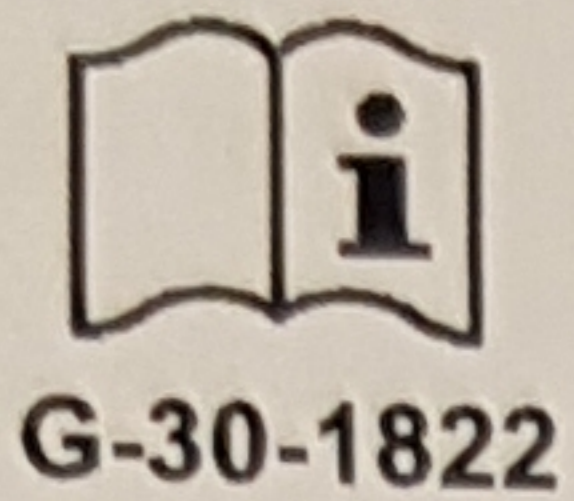
USER

CONFIG



For detailed information on the sub-menus and configuration of sub-menus, please refer to the Instructions for Use G-30-1822.

# Focus-light adjustment



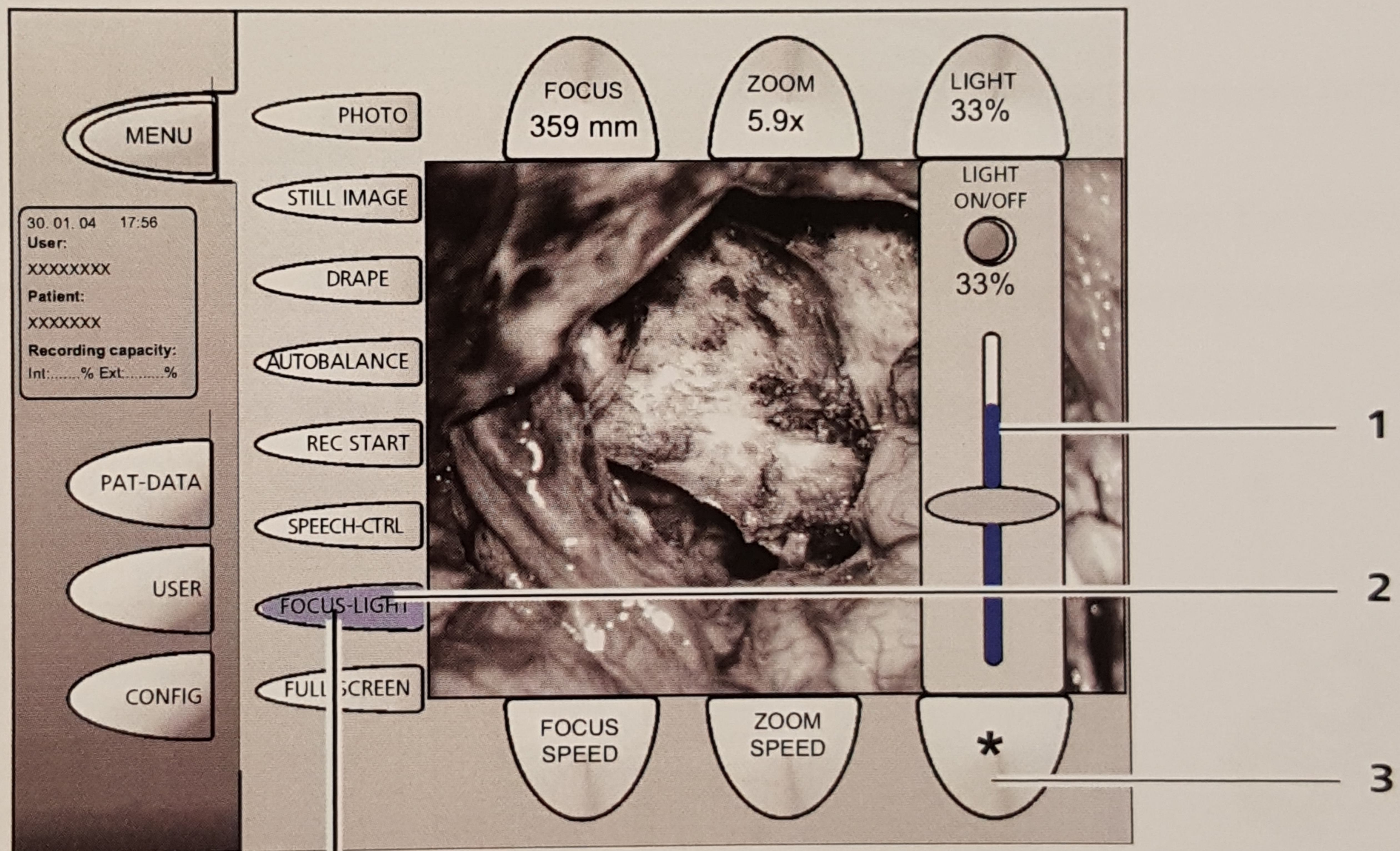
Safety feature intended to prevent possible tissue damage due to excessive illumination intensity.

The focus-light control regulates the illumination intensity as a function of working distance.

At the minimal working distance of 200 mm, the illumination intensity is limited to max. 25%. With increasing working distance, increasingly more light is made available to the user.

The actual maximal illumination intensity that is available as a function of the working distance is displayed by a blue bar (1) in the light control unit. The illumination intensity can be changed within the blue adjustment range shown, but not beyond.

The focus-light control is always turned on by default as per factory settings and after each system start.



\*) LIGHT INTENSITY FOCUS-LIGHT adjustment is **inactive**

\*) MAXIMUM LIGHT FOCUS-LIGHT adjustment is **active**

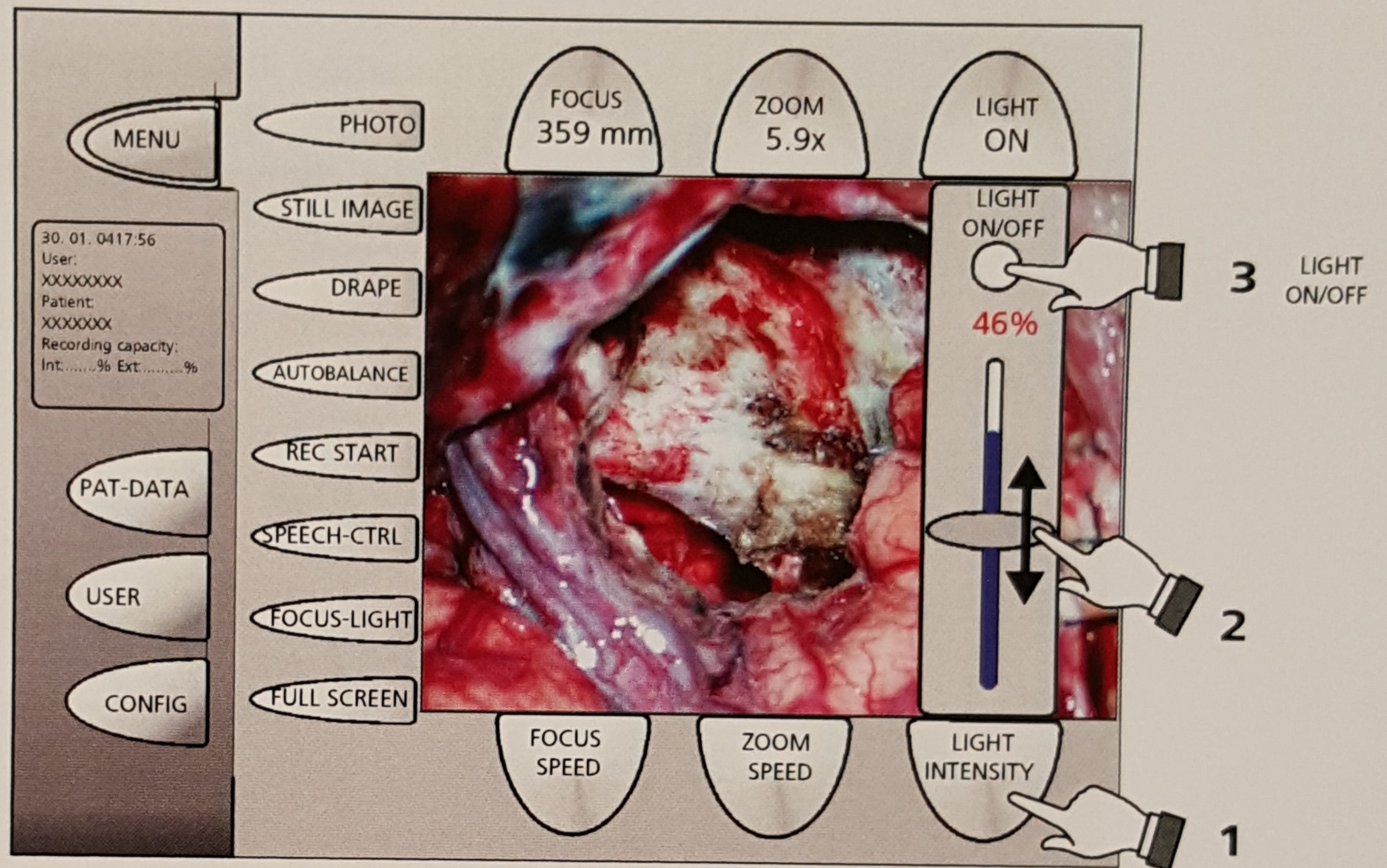
# Setting the illumination



G-30-1822

Please read the section on "Possible burn injury due to high illumination intensity" of the chapter, "Safety measures", in the Instructions for Use G-30-1822.

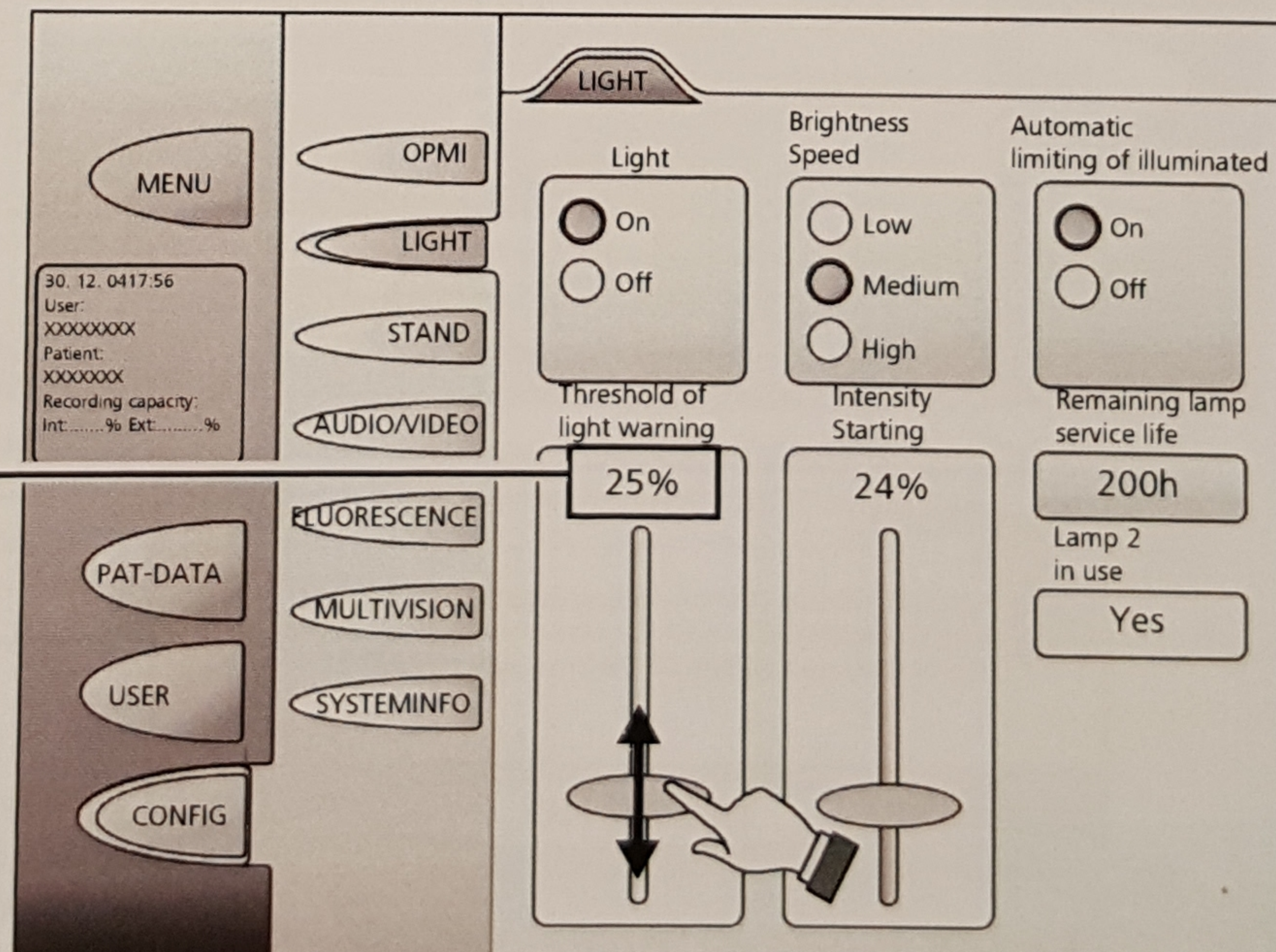
## Setting the illumination on the touchscreen



## Setting the illumination in the "Light" configuration menu



G-30-1822



# Attaching the tube and eyepieces

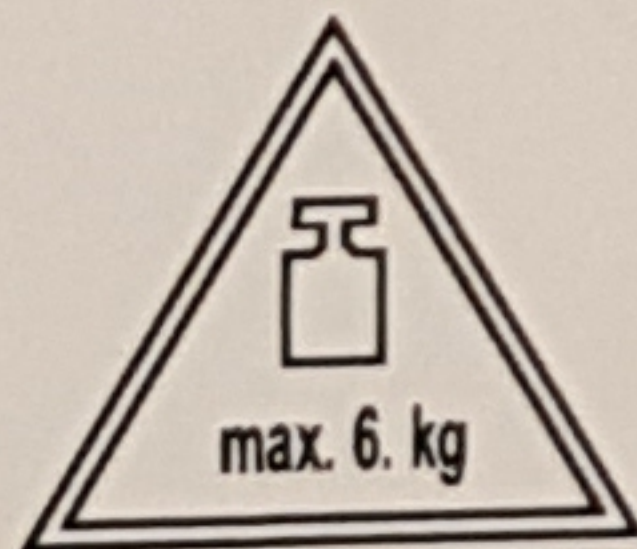


Exchange assemblies and accessories prior to the operation and with no patient being present!

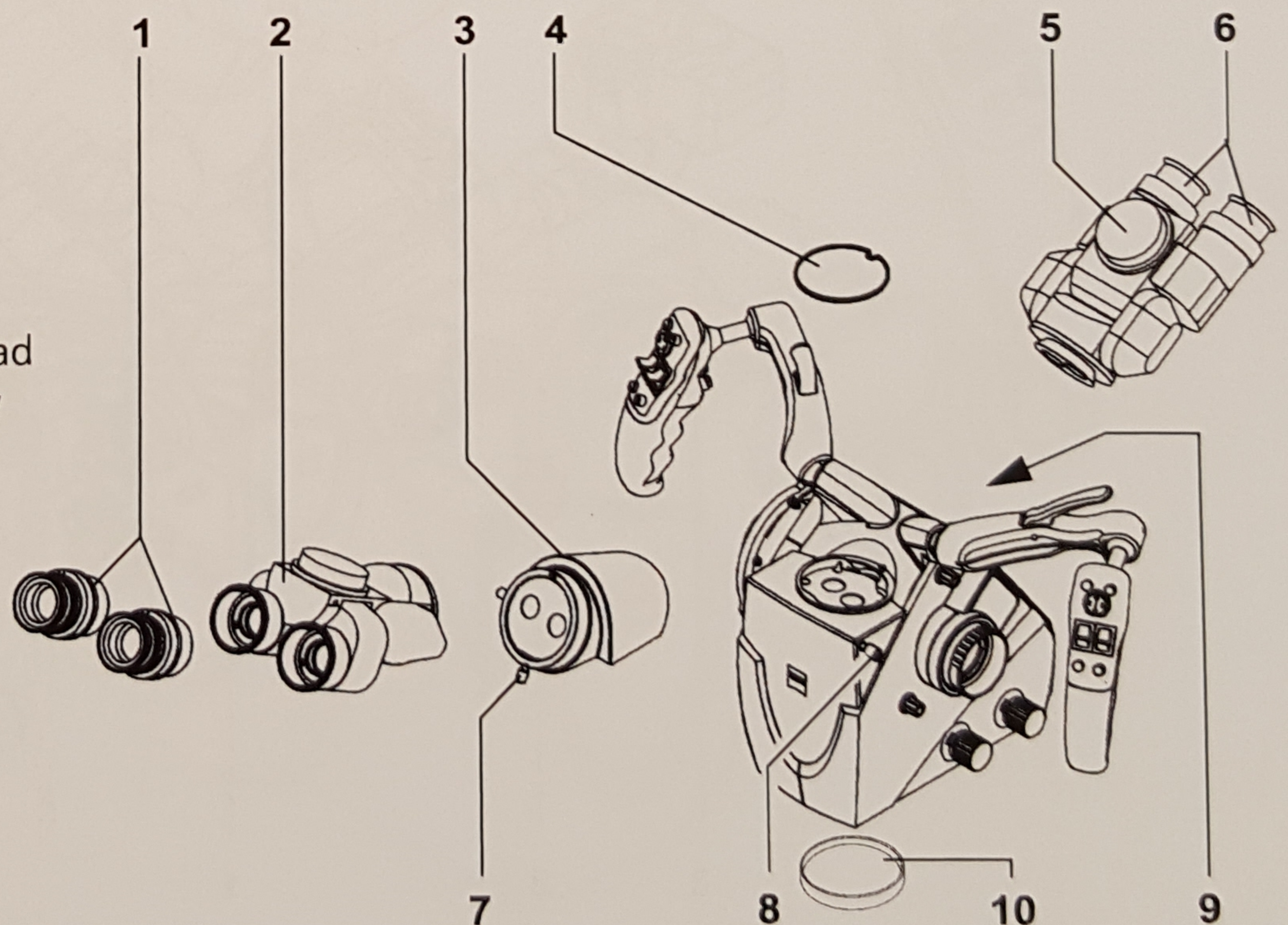
- Unscrew the fastening screw (8) rotating it several turns.
- Remove the cover (4).
- Place the spine adapter (3) on the microscope body and tighten the fastening screw (8) .
- Place the binocular tube (2) on the spine adapter (3) and tighten the fastening screw (7) .
- Insert the widefield eyepieces (1) into the respective mounts on the binocular tube as far as they will go.
- Place the stereo dual binocular tube (5) on the microscope body and tighten the fastening screw (9) .
- Insert the widefield eyepieces (6) into the respective mounts on the binocular tube as far as they will go.
- Before start-up, remove the protective cover (10) from the objective lens.



Check the assemblies for firm seating. Tighten the fastening screws (8) and (9) firmly! Balance the surgical microscope, page 11.



Maximum admissible load  
on the microscope body



# Attaching the documentation/stereo dual system

- Undo the knurled ring (1).
- Take off the dust cover (2) and keep it for further use.
- Slide the accessories assembly (3) into the mount of the image exit port and rotate it gently until the guide projections line up with the grooves. Slide the accessories assembly into the mount to the stop.
- Screw the knurled ring (1) onto the accessories assembly (3) and tighten it.



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The type of stereo dual system (image exit ports on the side: left/right or opposite image exit ports: face-to-face) can be configured on the touchscreen (CONFIG/OPMI/TUBE).

The pivoting mirror has two positions:

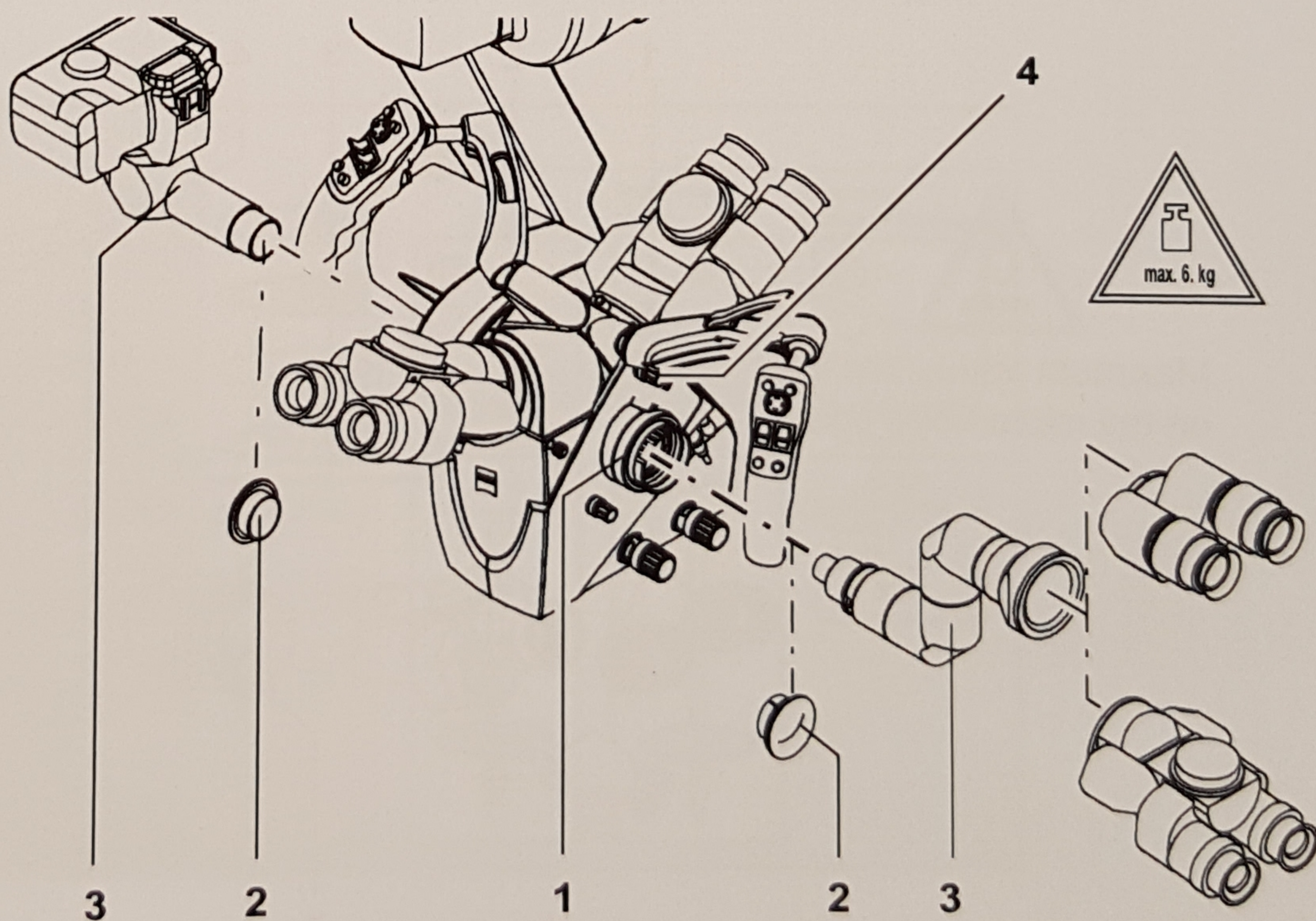
**Left/Right:** The light is guided to the image exit ports on the sides.

**Face to Face:** The light is guided to the tube mount on the back.

The pivoting mirror can also be moved manually on the setting button (4).



Check the assemblies for firm seating. Tighten the fastening screws (8) and (9) firmly! Balance the surgical microscope, page 11.





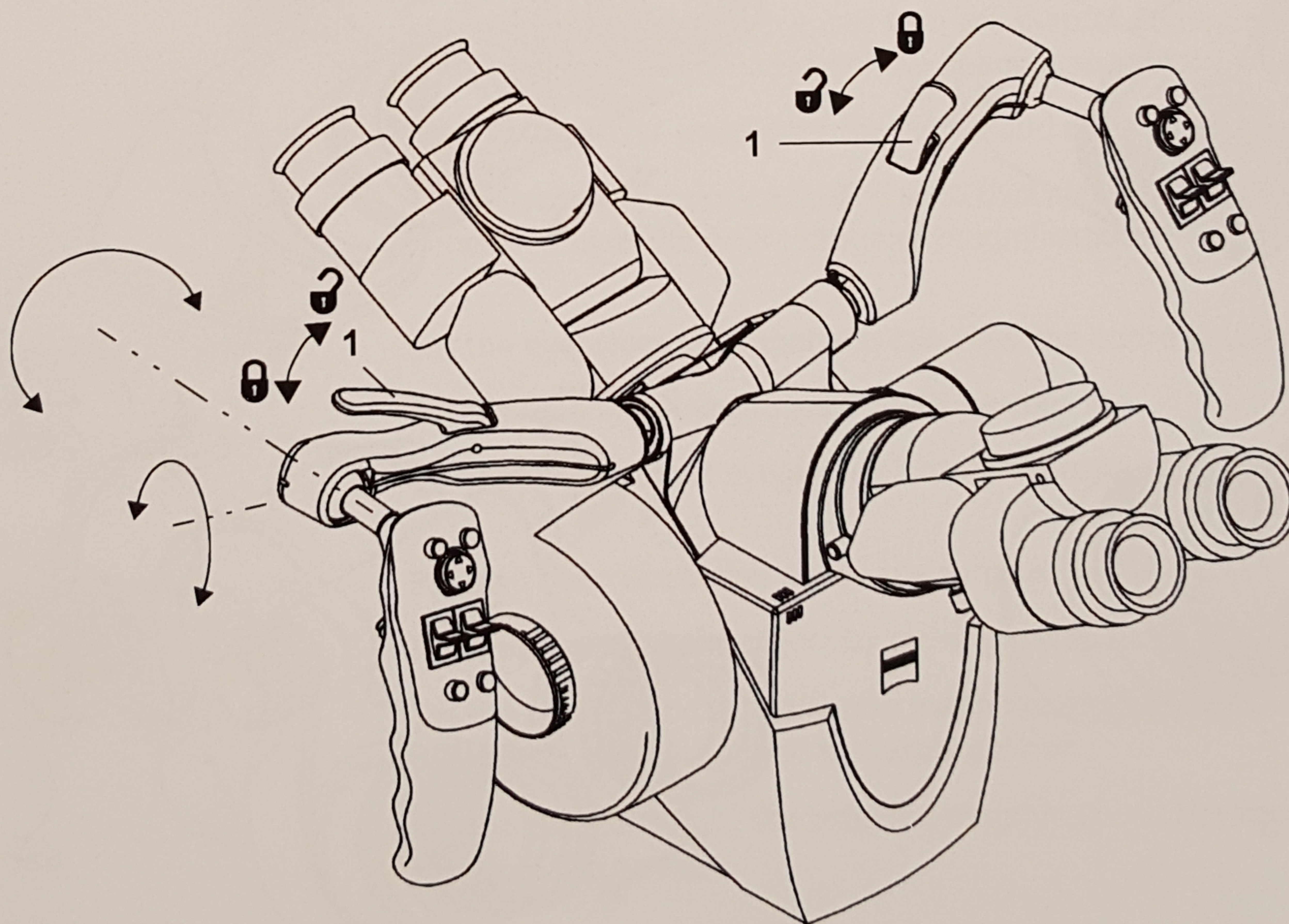
## Adjusting the position of the handgrips

You can adjust the handgrip positions to suit your preferences.

- Open clamping lever (1) and swivel the bracket or handgrip to the desired position.
- Select handgrip positions that are suitable for the operation. Maintain a sufficient distance to the accessories installed on the microscope.
- Firmly tighten the clamping levers (1).



The handgrip including lever can be rotated by approx. 180°.



# Adjusting the tubes and eyepieces

## Setting the eye distance on the tube

1 By pushing together or pulling apart the two eyepiece sockets.

2 By rotating the dial

The correct position has been reached when the two eyepiece images merge into one.

## Adjusting the eyepiece

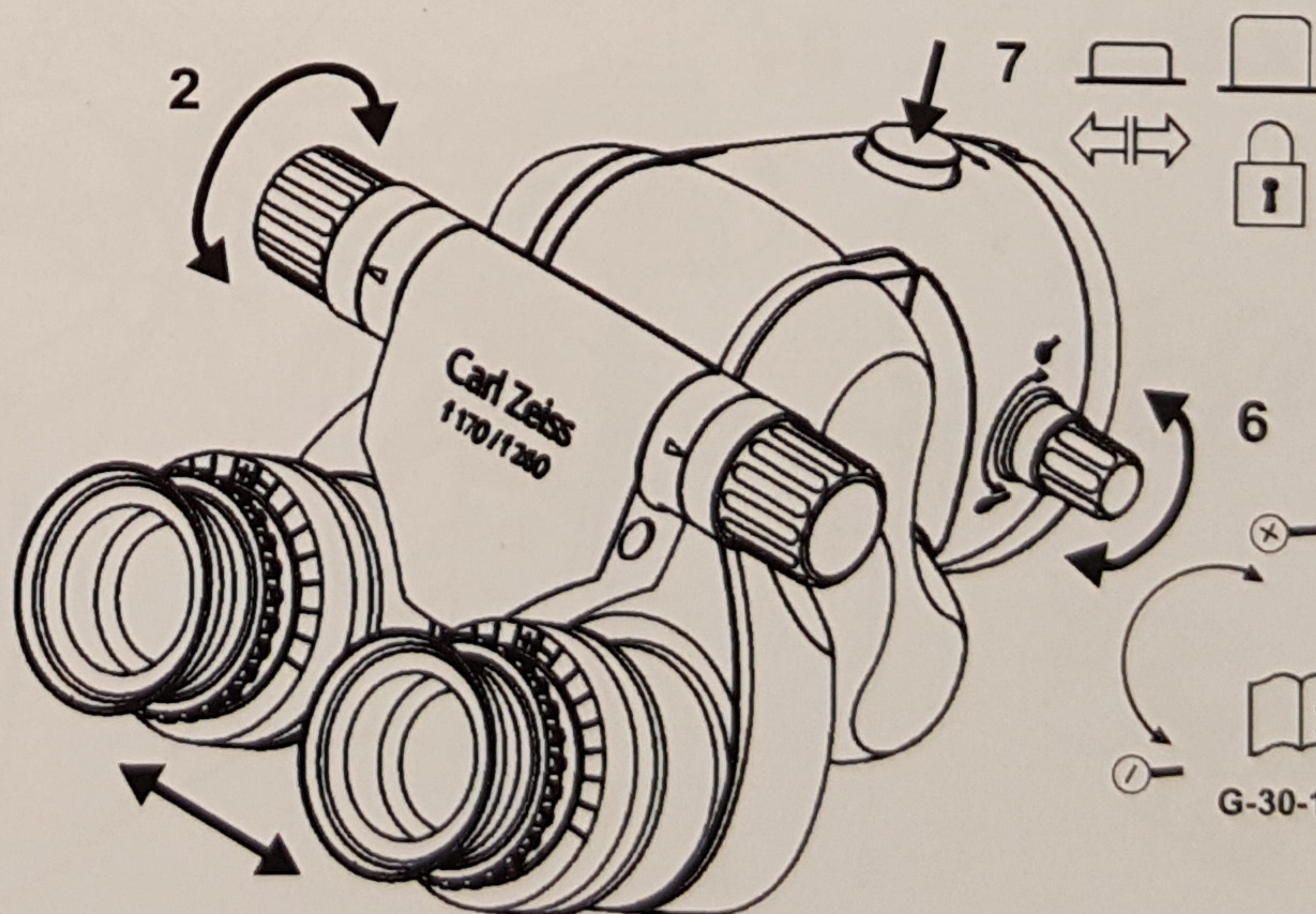
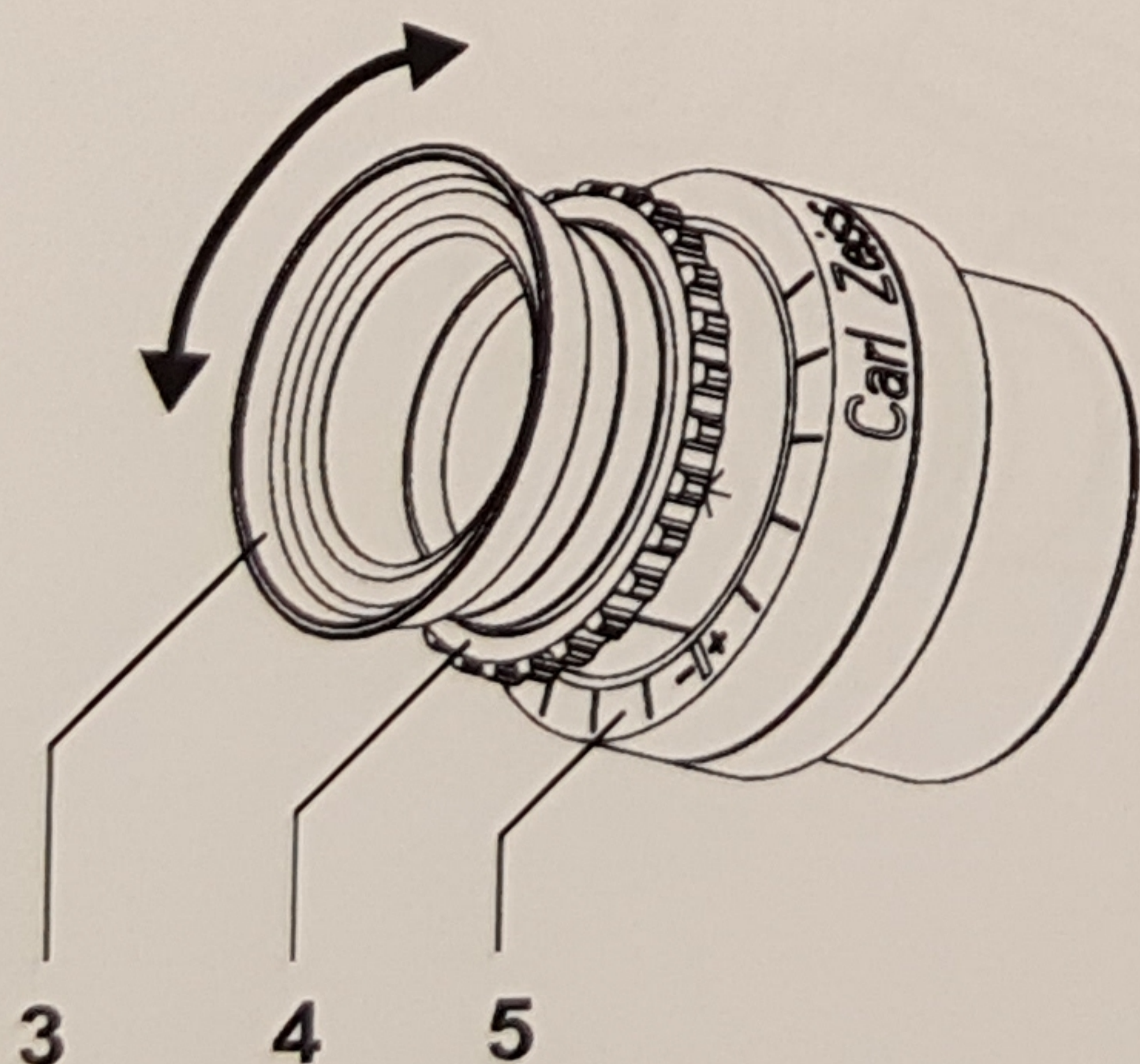
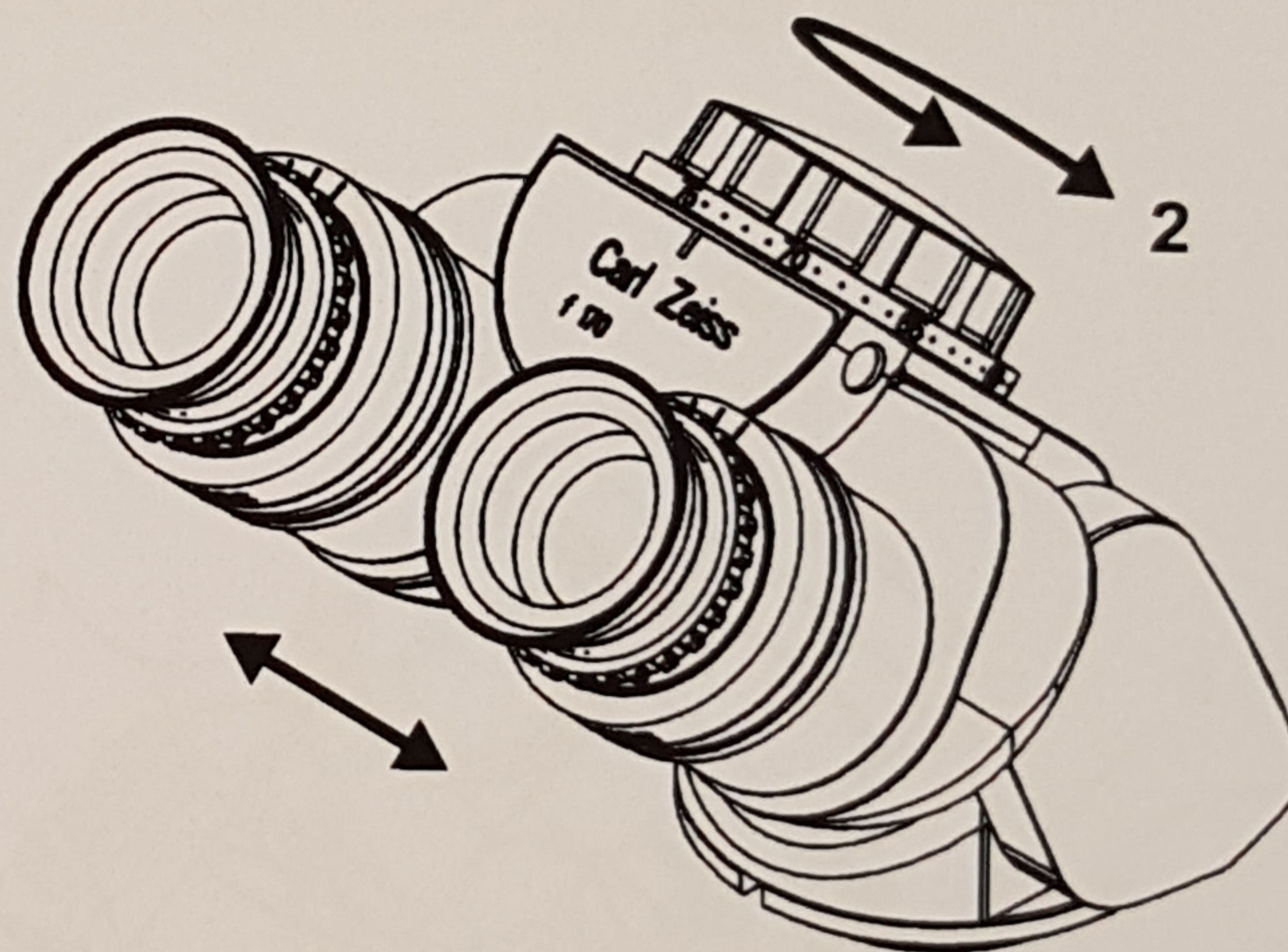
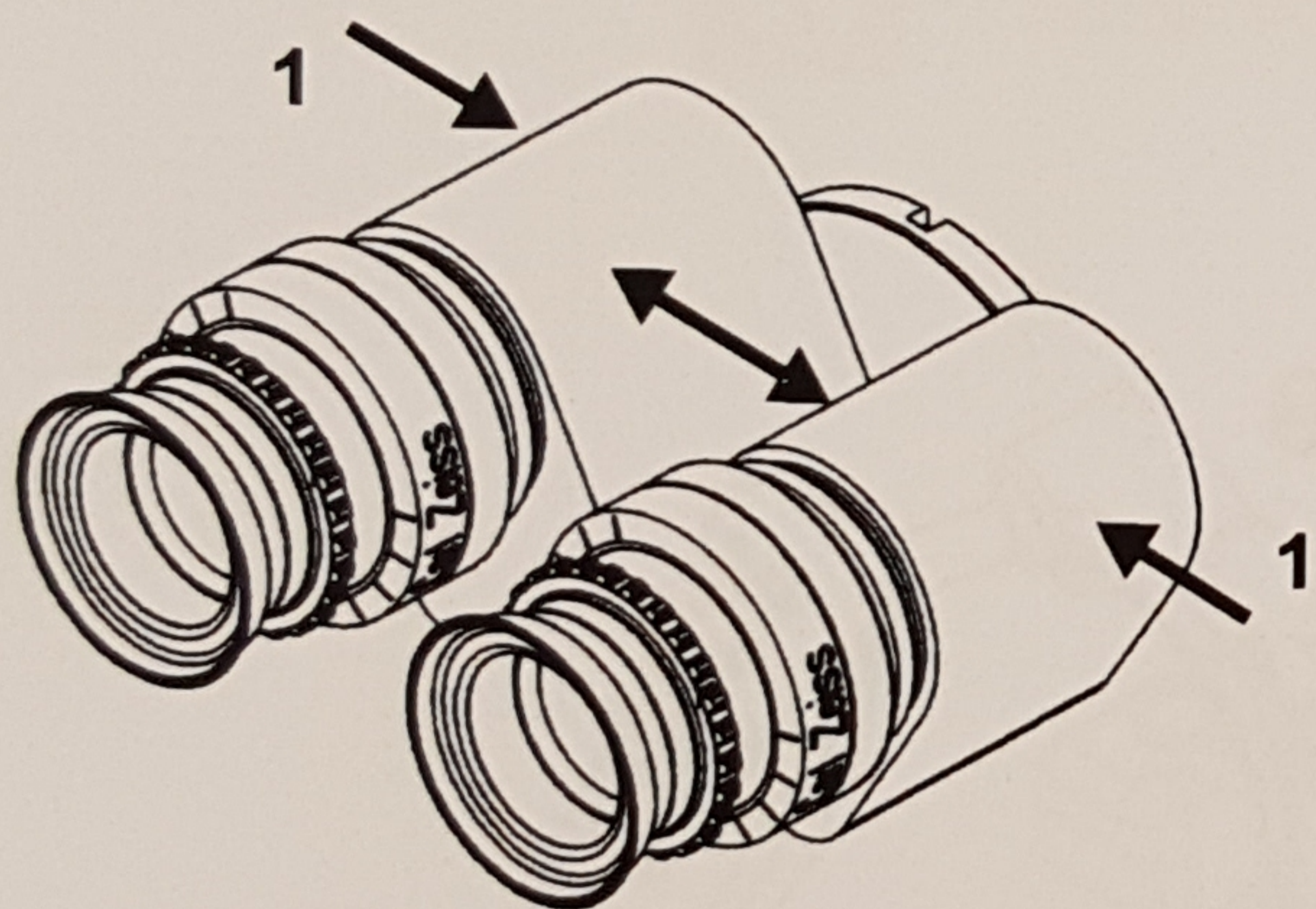
3 Eyecup for adjusting the distance between eyepiece and eye

4 Diopter dial is adjustable from -5 D to +5 D

5 Diopter scale for reading the set refraction value

6 Dial for integrated magnification changer

7 Button for manual tube rotation



# Adjusting the surgical microscope

## *Eye distance adjustment*

- Move the microscope to a vertical position above a level object, e. g. a sheet of paper with some writing.
- Move eyepieces and binocular tube to eye distance.

## *Adjusting the eyepieces*

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

- Set the microscope to minimum magnification. Select a short working distance (shortest working distance + approx. 25 mm).
  - Set the diopter setting ring on the eyepiece to 0 D. (Diopters).
  - Look through the eyepiece and move the microscope body to focus the image.
  - Set the microscope to maximum magnification and adjust the fine focusing system until the image is sharply defined.
  - Then reset the microscope to minimum magnification without changing the working distance.
  - Set the diopter setting ring to the maximum plus value (e.g. +5 D).
  - Look through the eyepiece and turn the diopter setting ring slowly towards the negative values until the image is sharply defined.
  - Repeat the entire procedure for the second eyepiece.
- The microscope is now adjusted such that a consistently sharp image is generated over the entire range of magnifications.

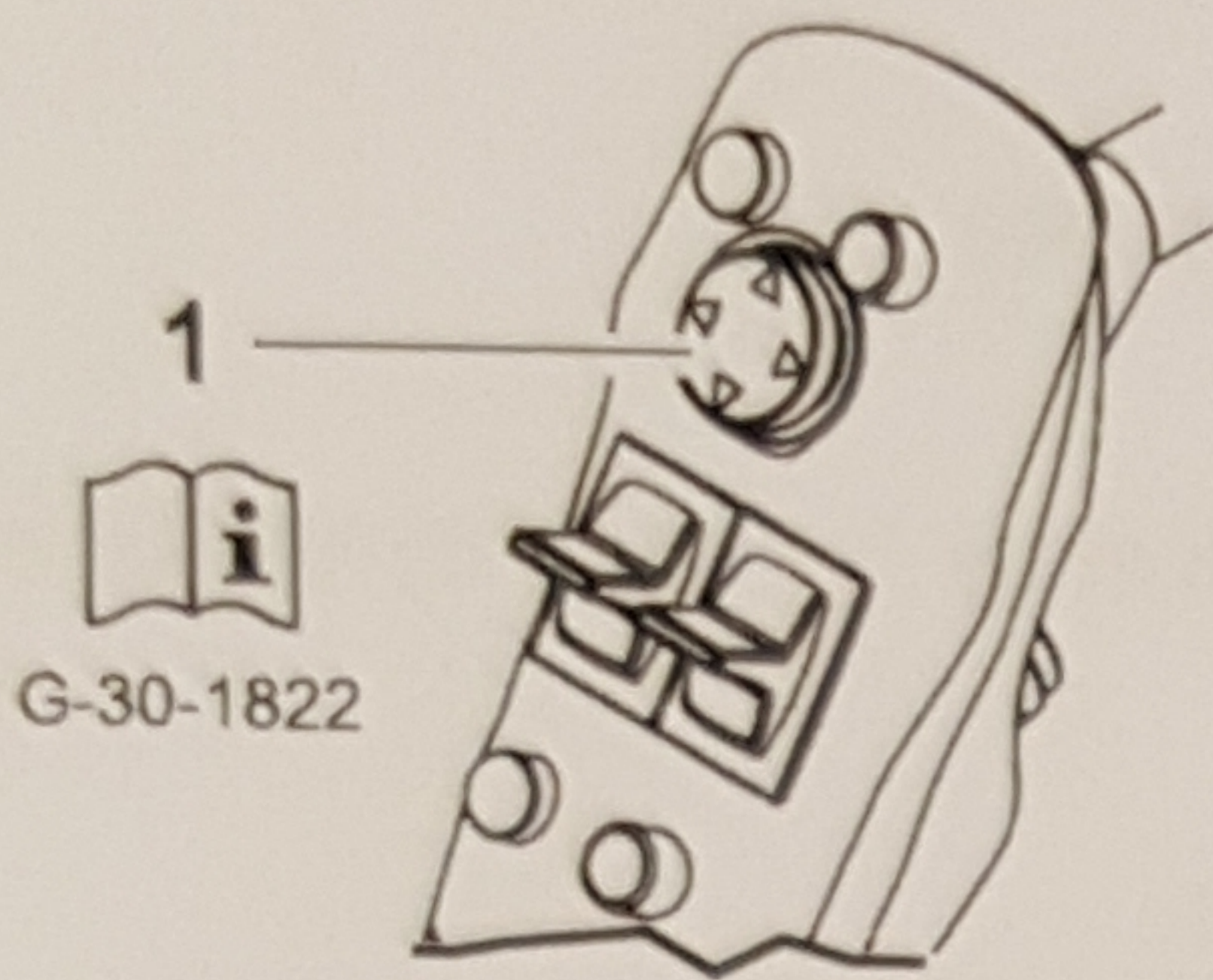
## *Adjusting the eyecups*

- Set the eyepieces such that you can view the entire visual field.
  - Viewing with eyeglasses: Rotate eyecups in.
  - Viewing without eyeglasses: Rotate eyecups out.

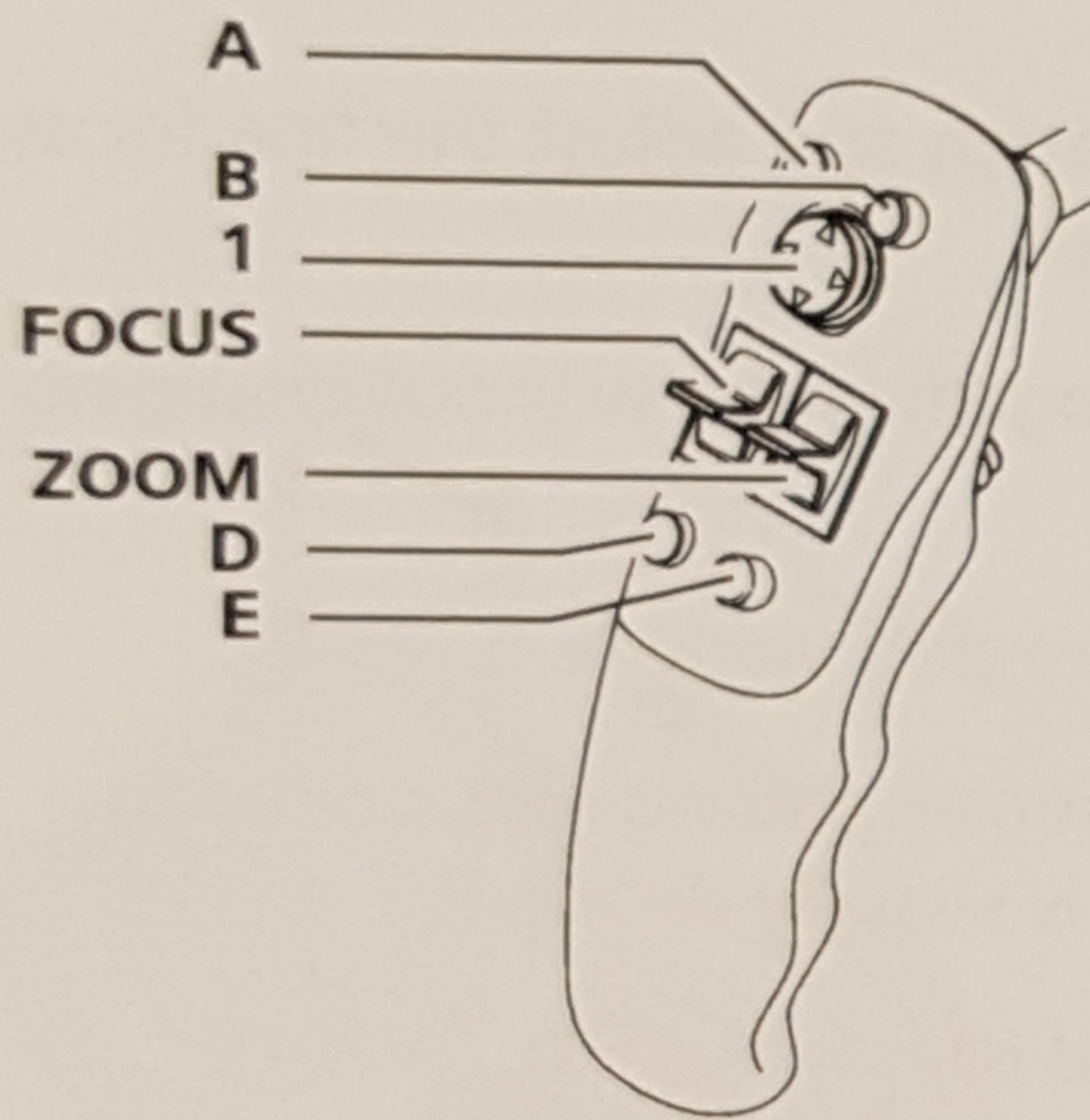
## *Set the working distance and magnification*

- Position the microscope above the surgical field.
- Roughly focus on the object by moving the microscope.
- Set the microscope to maximum magnification and adjust the fine focusing system until the image is sharply defined.
- Set the microscope to the required magnification. The focal plane is retained in the process.

# Configuring the hand grips



Focus + ↔ Zoom +  
 Focus - ↔ Zoom -  
 (C)



The functions of the surgical microscope can be triggered via the buttons of the hand grips or via a foot control panel. If programmable, buttons allow user-specific configuration.

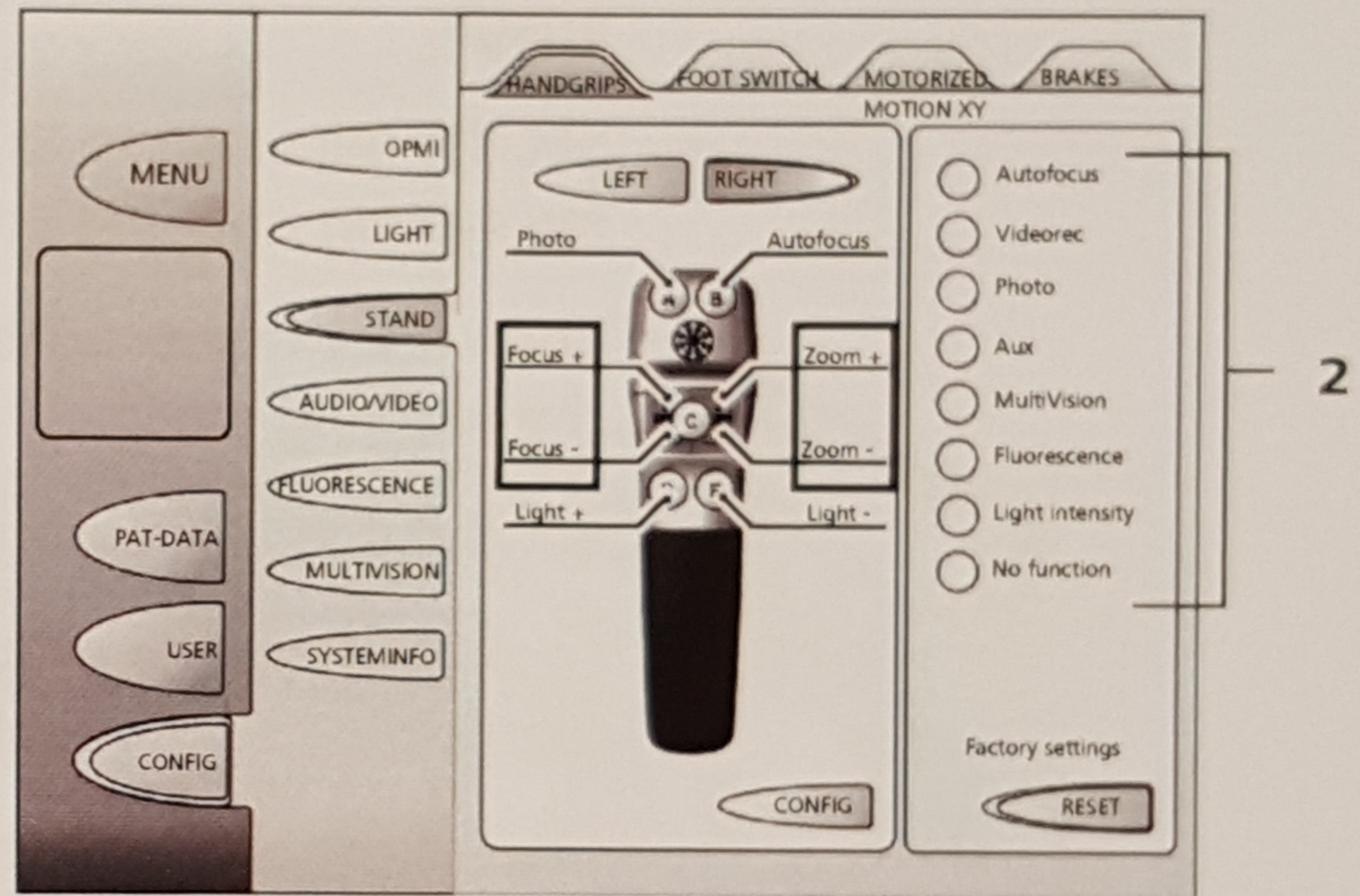
Both hand grips are identical. In its default setting, the joystick (1) can be used for motorized fine adjustment in XY direction.

The same functions can be assigned to either hand grip (CONFIG). But it is also possible to configure functions on the right hand grip that are different from that on the left hand grip.

Select the functions you wish to assign to the programmable buttons **A**, **B**, **D** or **E** from the CONFIG / STAND / HANDGRIPS menu item.

The rocker switches for **Zoom** and **Focus** can also be reconfigured as desired by the user. Just briefly press button (C) on the touch screen.

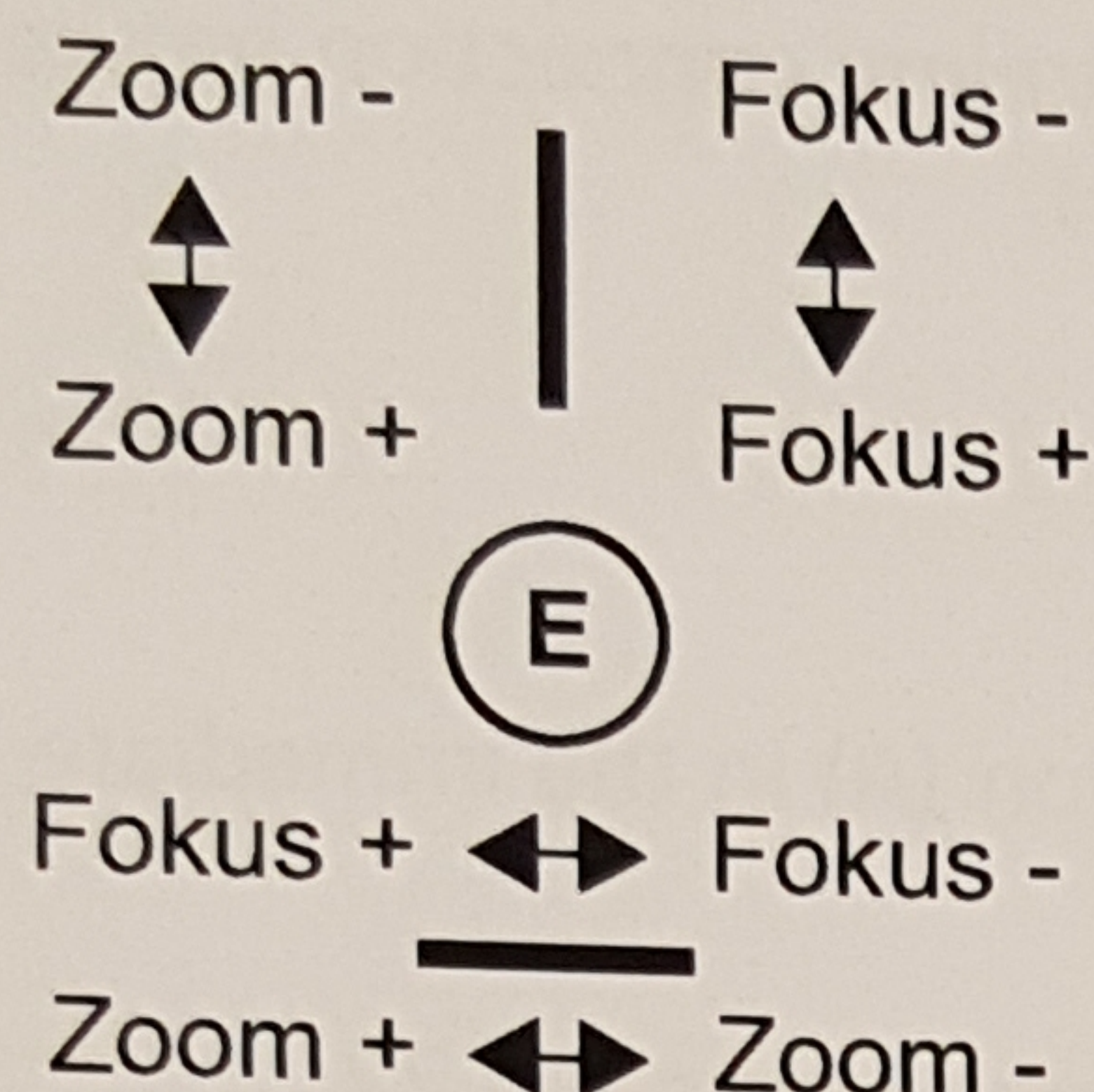
Display and functions are exchanged.



- For configuration of both hand grips, press **CONFIG**.
- For separate configuration of the left or right hand grip, press the **LEFT** or **RIGHT** button.  
The buttons are displayed only if the **CONFIG** button was pressed.
- Press the button (**A**, **B**, **D**, **E**) to which you wish to assign a different function.
- Press the corresponding function in the selection menu (2) in order to assign it to the button.
- The name of the button changes and reflects the new function.
- Press the **RESET** button in order to restore the factory settings.

The joystick of the right hand grip has specific functions in optional applications.

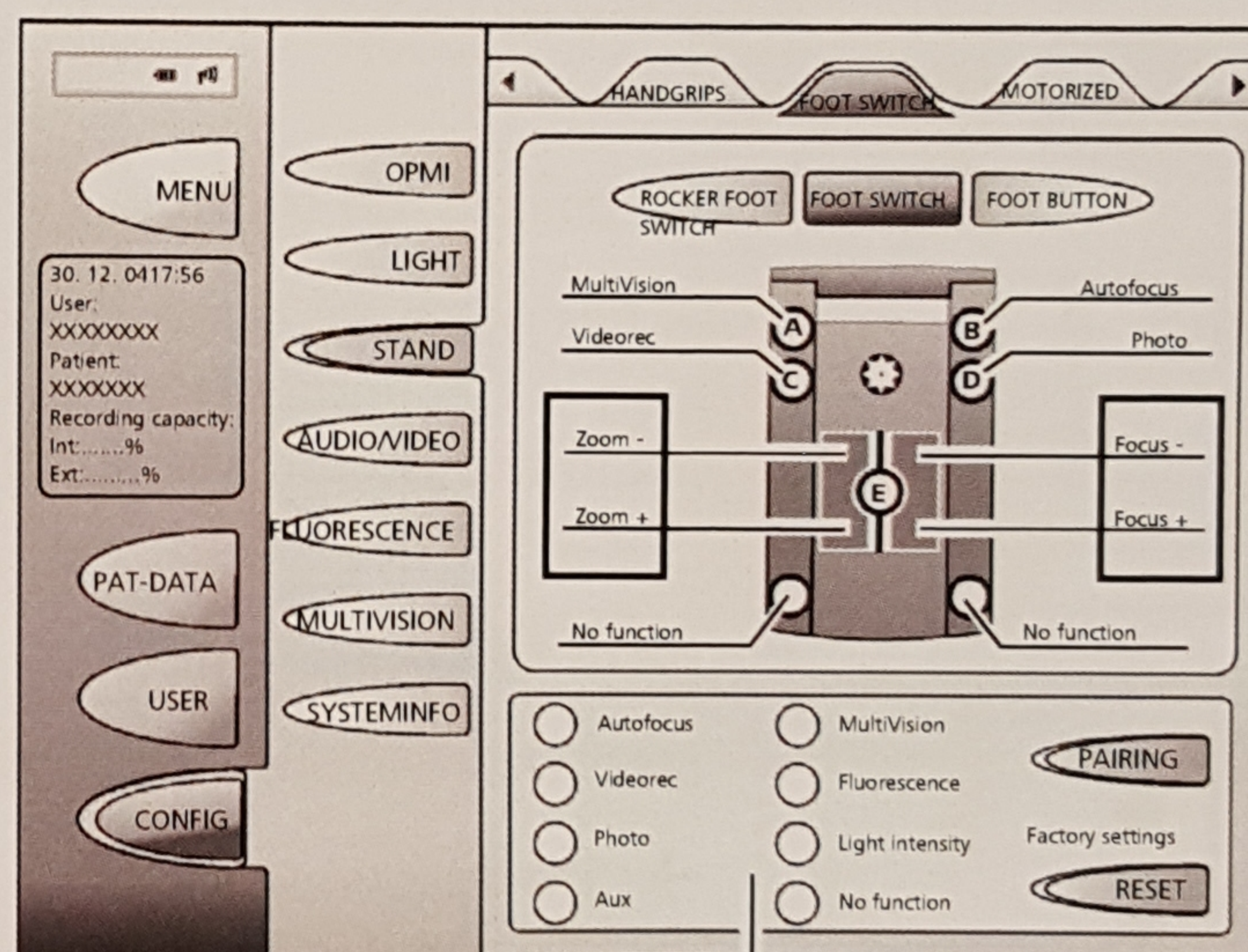
# Configuring the foot control panel



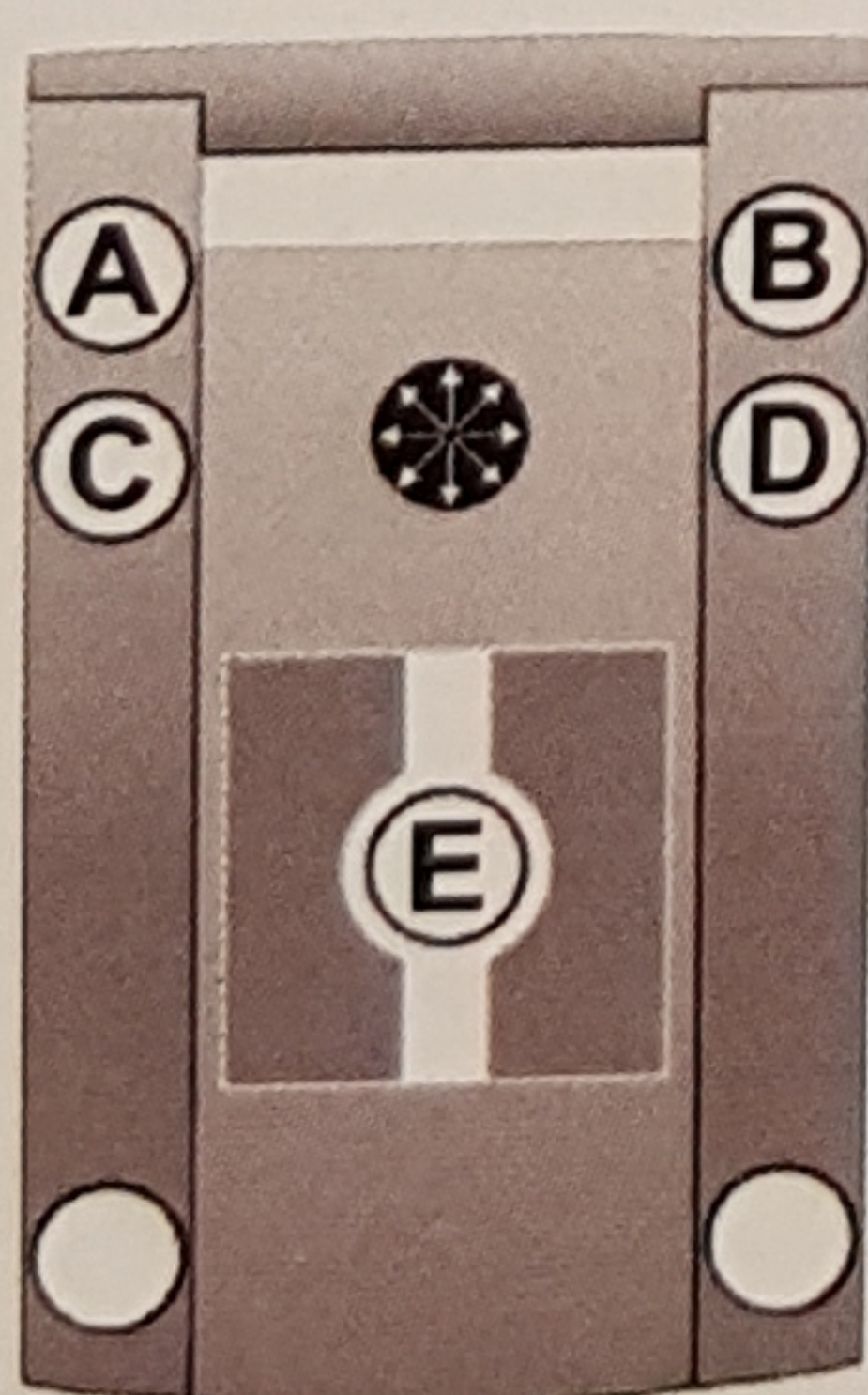
You can trigger the functions of the surgical microscope using the buttons on the handgrips or on a foot control panel. Programmable buttons can be configured for the requirements of each user.

The joystick on the foot control panel permits motorized fine movement of the microscope in the XY directions.

The rocker switches for **Zoom** and **Focus** can be reconfigured by the user. Briefly press button (E) on the touchscreen. The display and functions will be swapped.



1



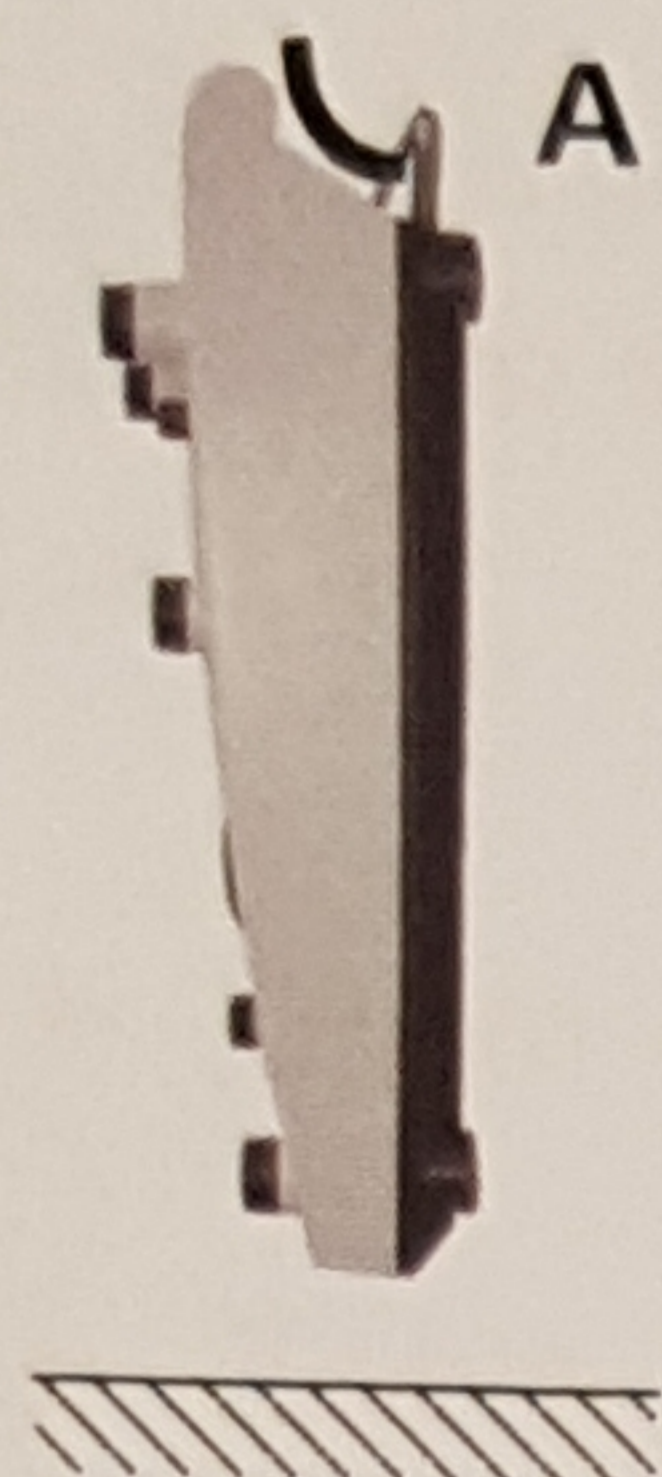
Configure programmable buttons A, B, C, D

- Press the button (**A, B, C, D**) you wish to reassign to a different function.
- Then press the corresponding function in the selection menu (1) in order to assign it to the button. The name of the button changes and reflects the new function.
- Press the **RESET** button in order to restore the factory settings.

## Pair with wireless foot control panel (FCP WL) (optional)

Pairing means the fixed relative assignment of the stand and a defined foot control panel.

It is required for wireless operation. Pairing the system for the first time, there may be a delay of up to approx. 20s before the wireless connection between the stand and the foot control panel is established.



Proceed as follows for pairing:

- Turn the stand on using the power switch (1).
- Place the foot control panel in a vertical position (A) in the immediate vicinity of the stand (distance less than 2 m).
- Start the pairing process on the stand as described on page 22.

### Performing foot control pairing (optional)

Press the <Pairing> button to assign a wireless foot control panel to the system.

Before pairing, go through the following steps:

If this has not been done already, place the foot control panel in its vertical position in the immediate vicinity of the system (max. distance of 1 m) and keep it in this position until pairing is completed.

### Perform the pairing

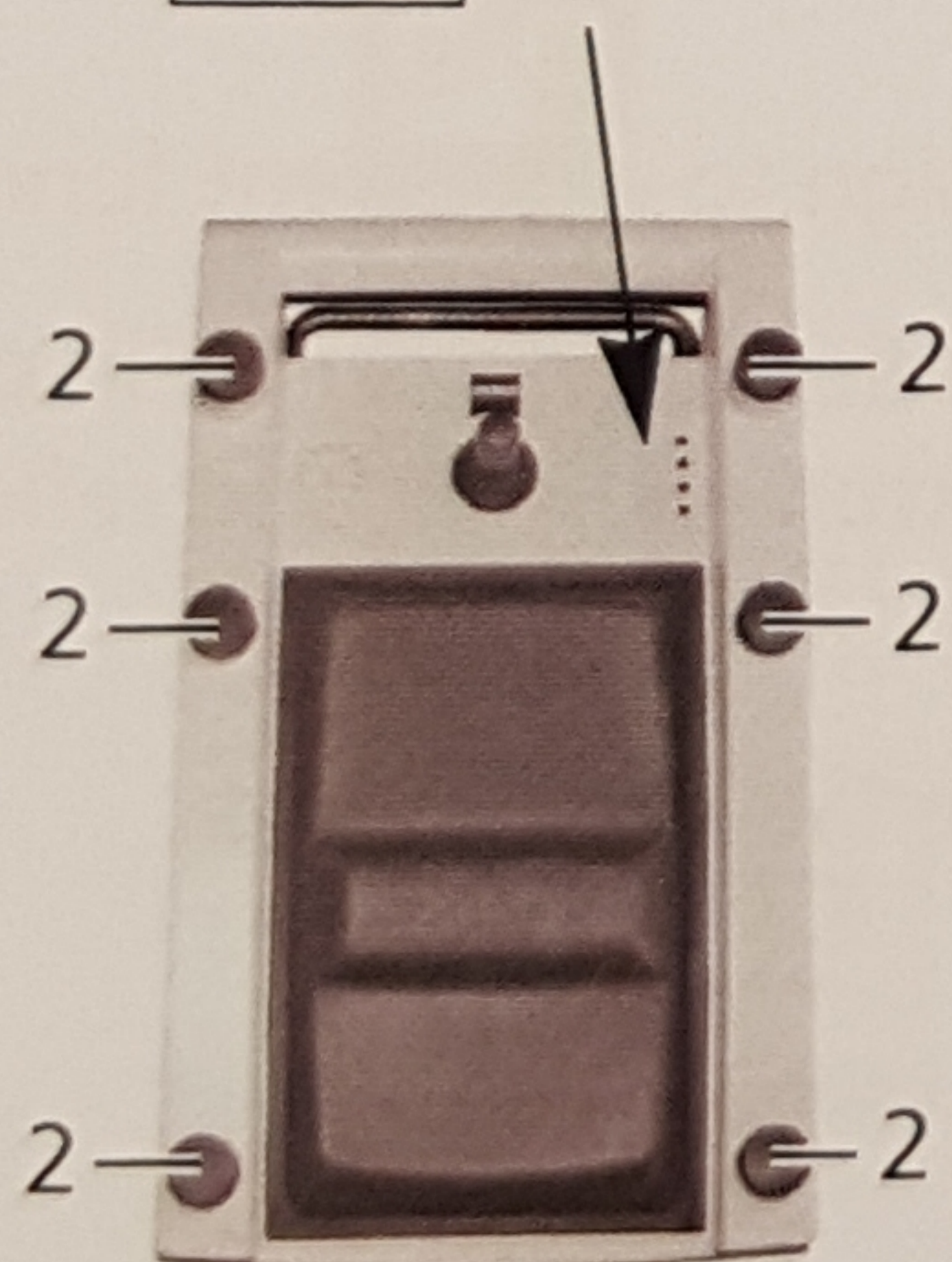
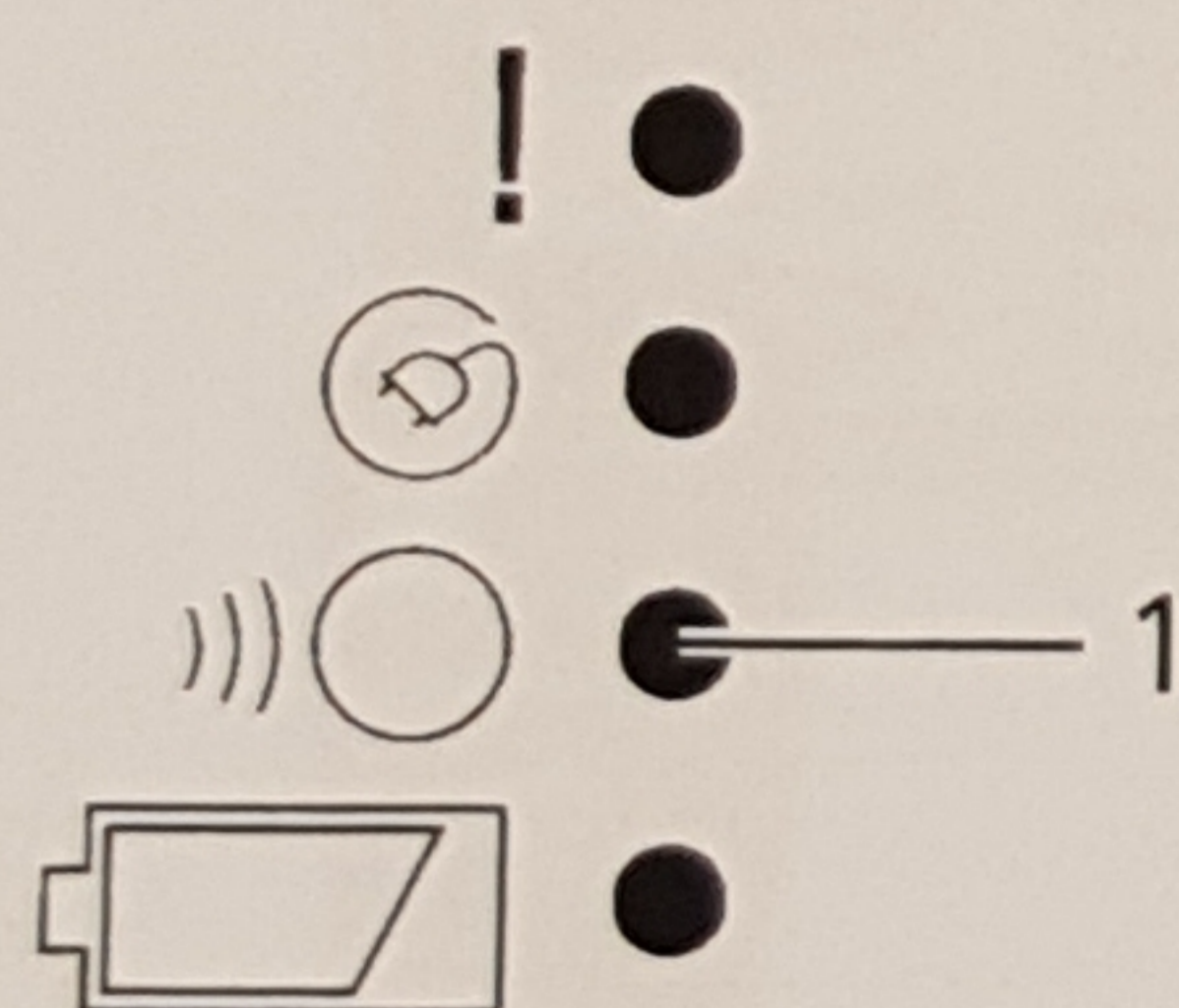
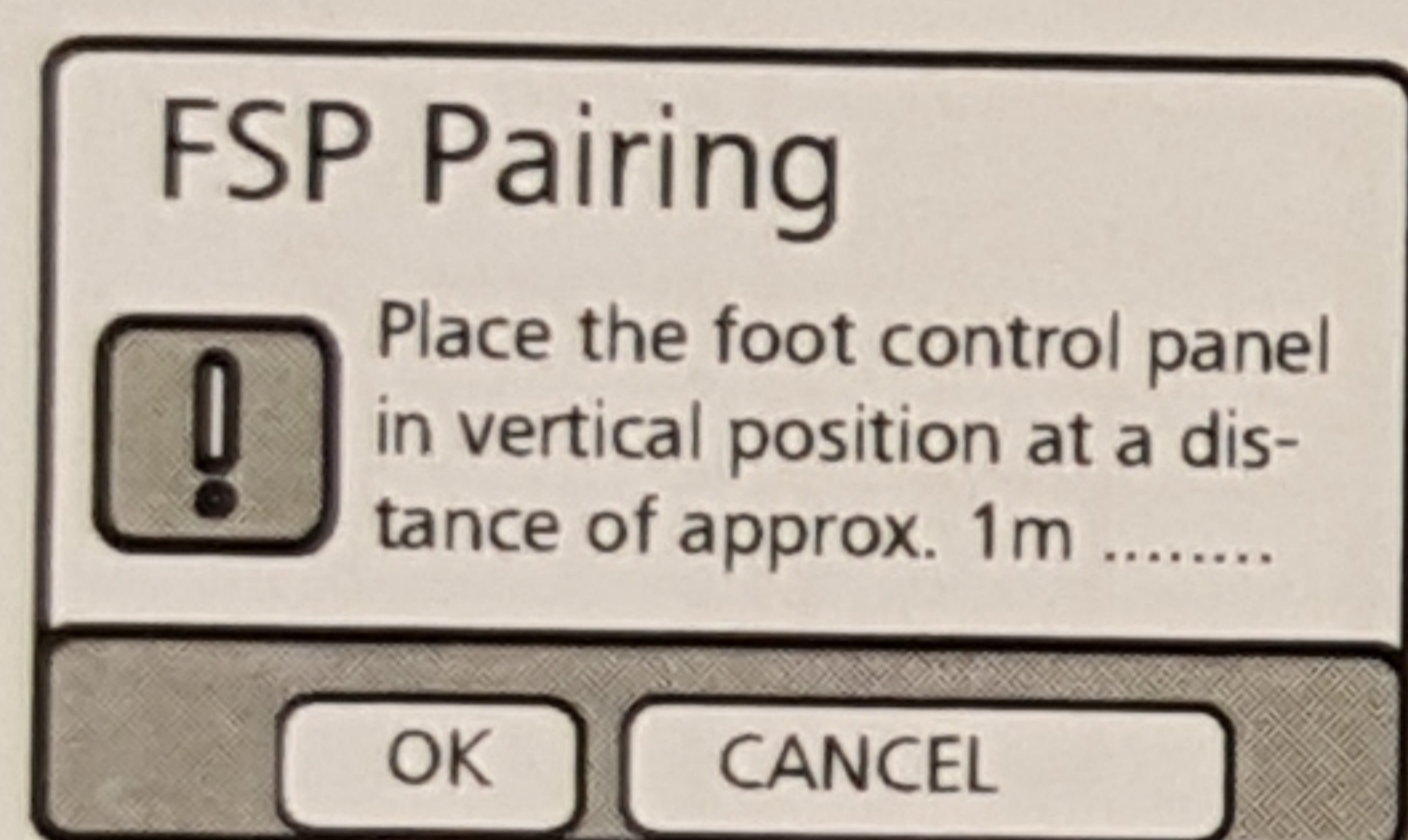
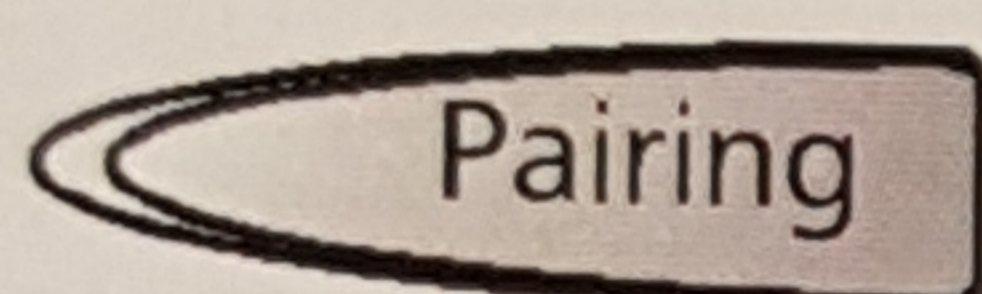
- Start the "pairing" by pressing the <Start Pairing> button.
  - The following message is displayed "Press any button of the foot control panel until the third LED from the top flashes orange, and keep the foot control panel in its vertical position".

### Successful pairing

If pairing was successful, the "Radio link intensity" indicator (1) flashes green for approx. 1 s and the following message is displayed:

- "Pairing successfully completed. Place the foot control panel in horizontal position (working position) and perform a functional test. Use the dial on the foot control panel to set the number specified on the stand."

- You can check whether pairing was successful by simultaneously pressing any two buttons (2) on the foot control panel. The "Radio link intensity" status indicator will be lit.

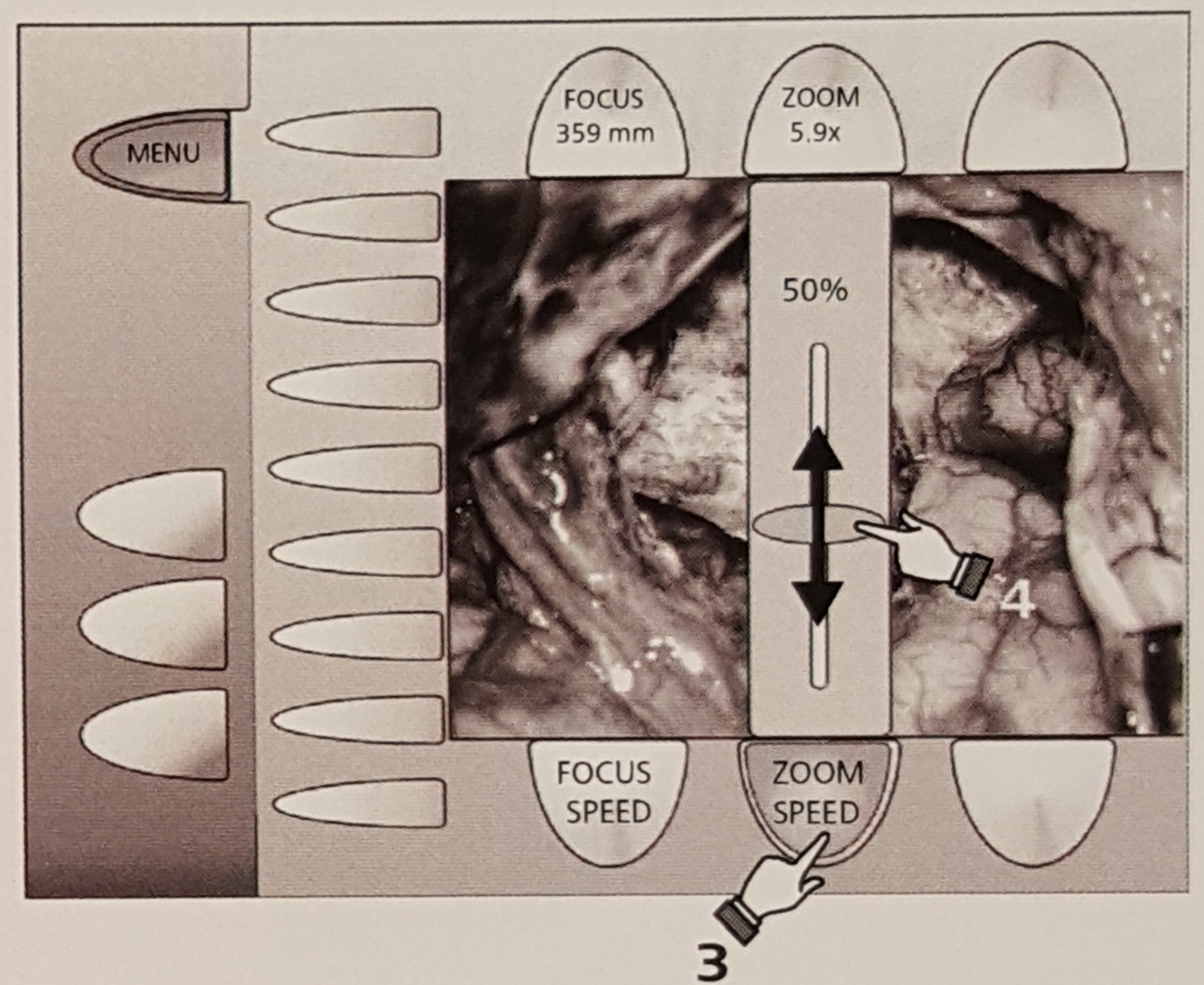
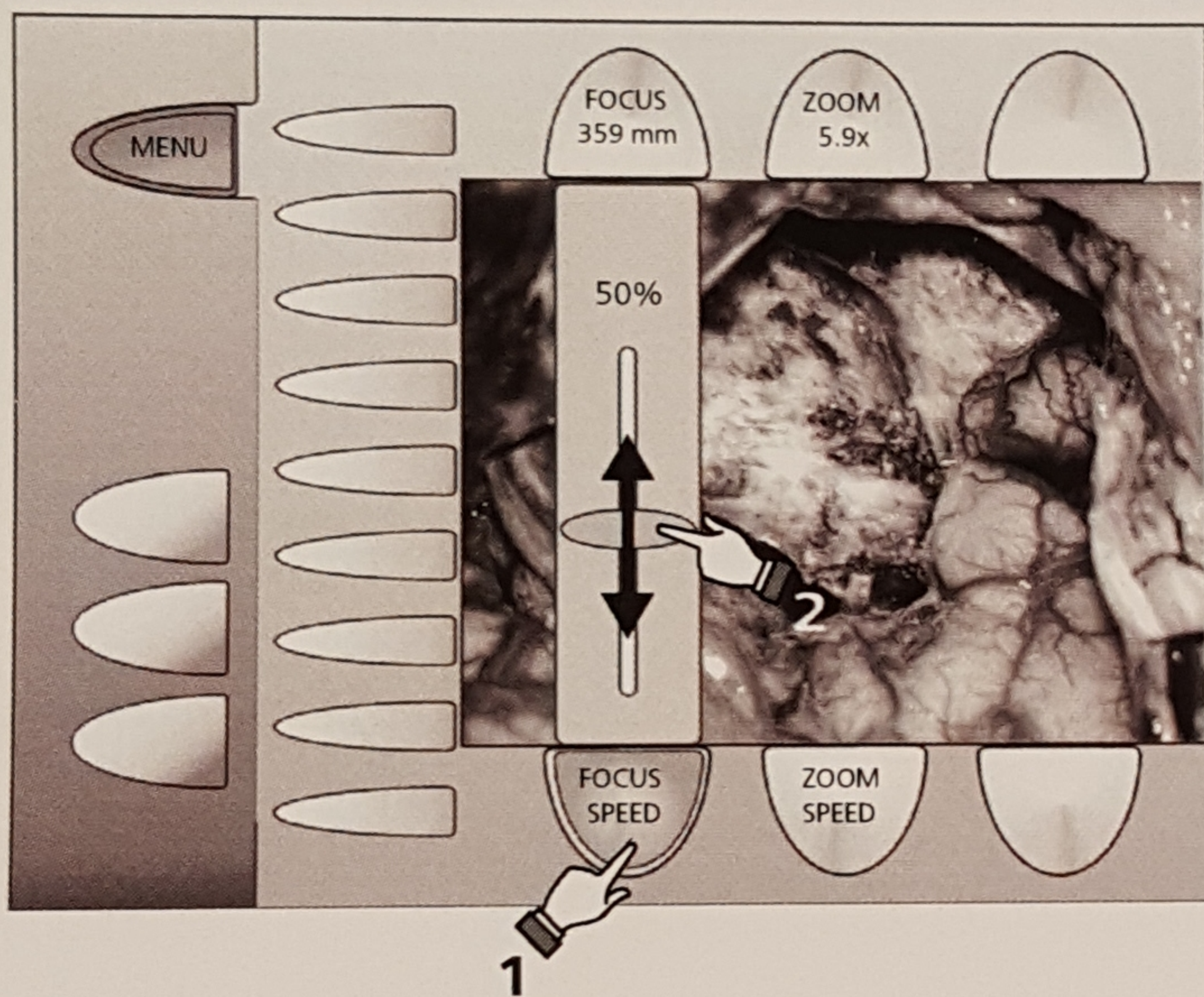


# Setting the adjustment speeds of focus and zoom

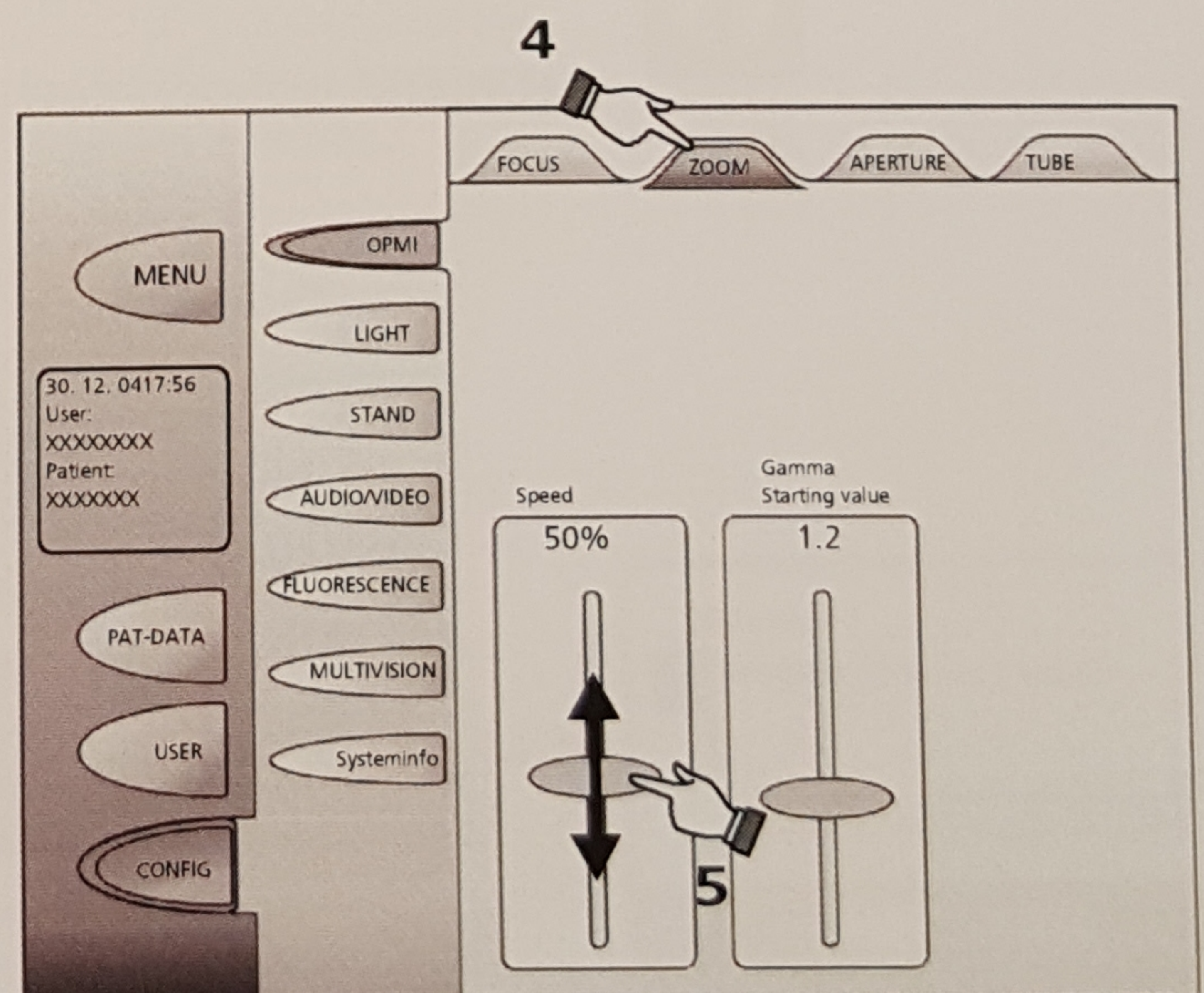
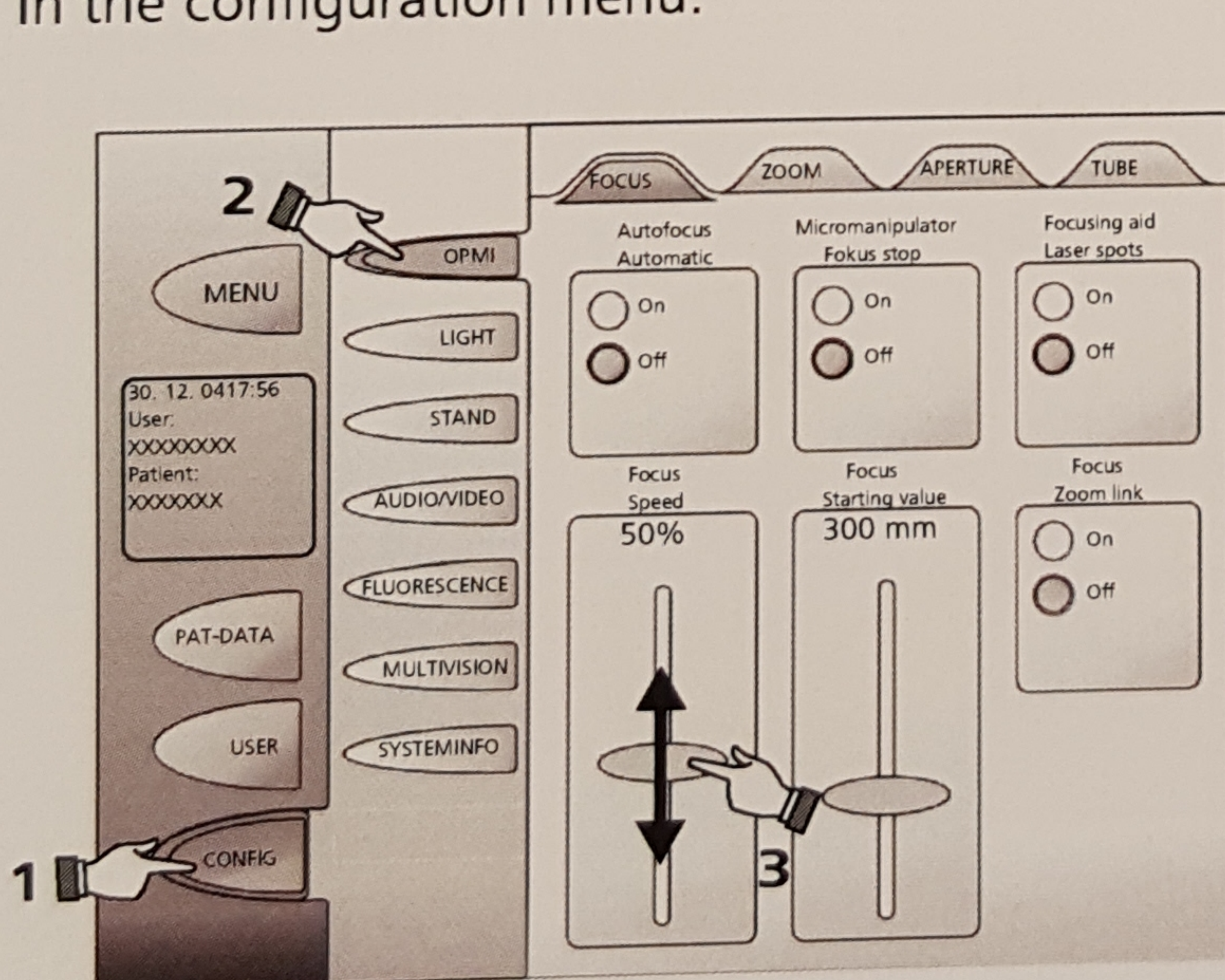
Press the focus or zoom button in the **main menu**. Use the displayed slider to set the focus or zoom speed as required.

These settings can also be performed in the **configuration menu**. Press CONFIG/OPMI and select the Focus or Zoom tab. Use the slider to set the focus or zoom speed as required.

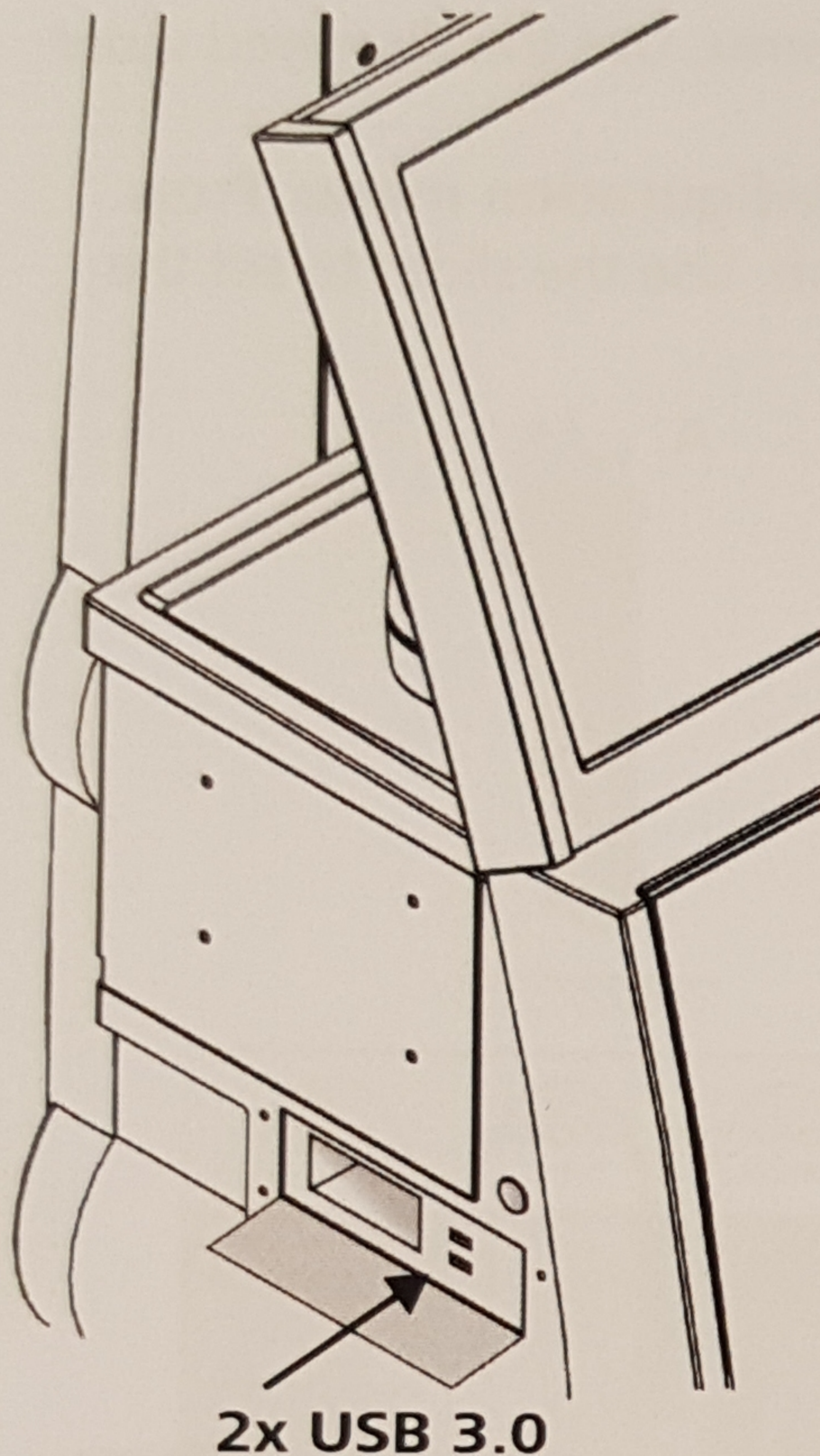
In the main menu:



In the configuration menu:



## Exporting patient data to USB stick/DICOM (optional)




- Open the PAT-DATA menu (1).
- Open the "List" tab (2).
- Select the desired patient from the list (3).
- Open the image folder of the patient (4).
- Select the images you wish to export and highlight them by pressing the Highlight button (5).
- Press "SAVE"(6).
- Select the appropriate register from the SAVE menu: USB or DICOM (7) (optional).

The number of images you wish to export is displayed.

- Plug-in the USB medium (8).
- Exporting to DICOM format (9)
- Saving images anonymously (10)

Provides the option to Save selected images anonymously.

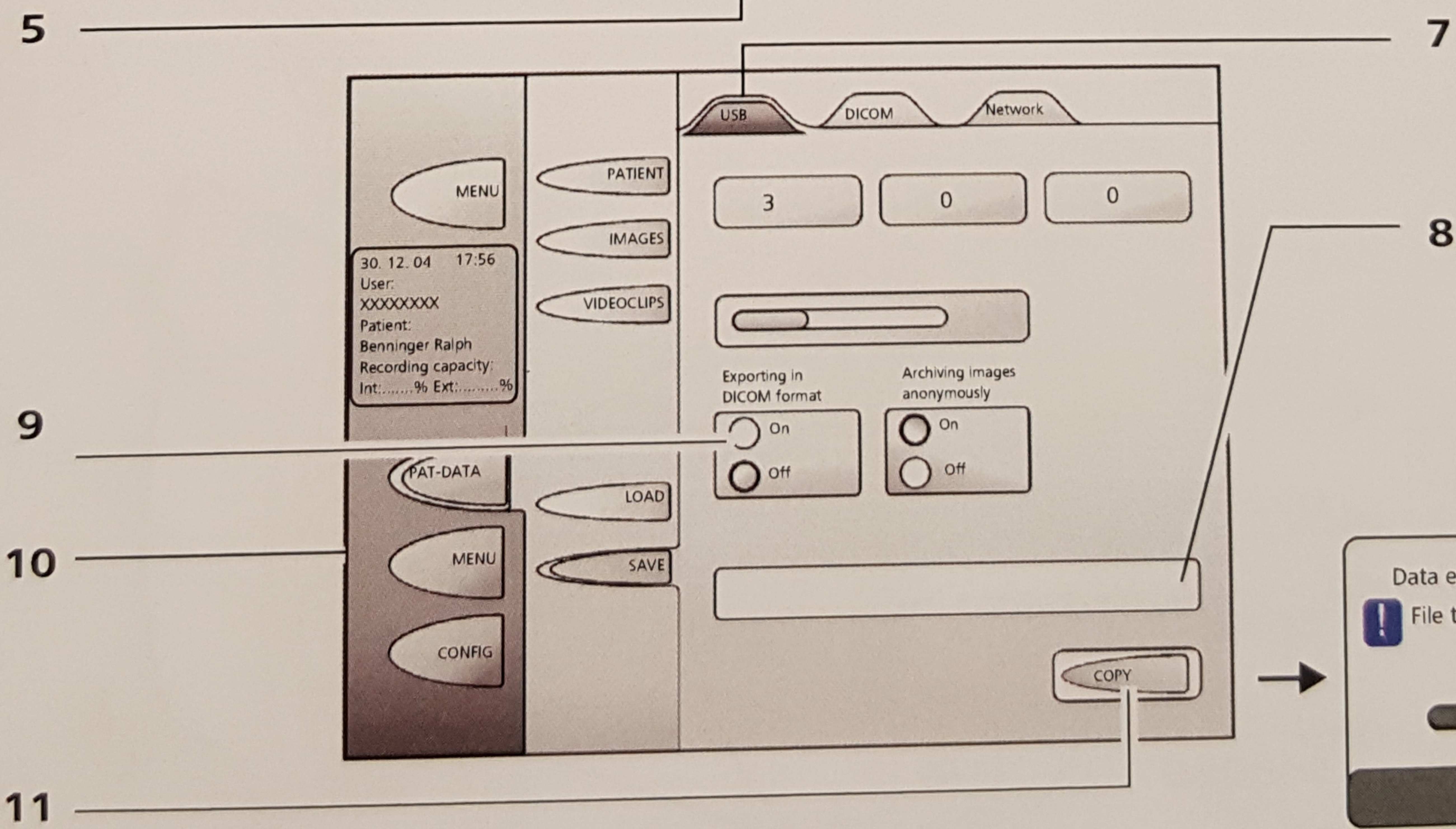
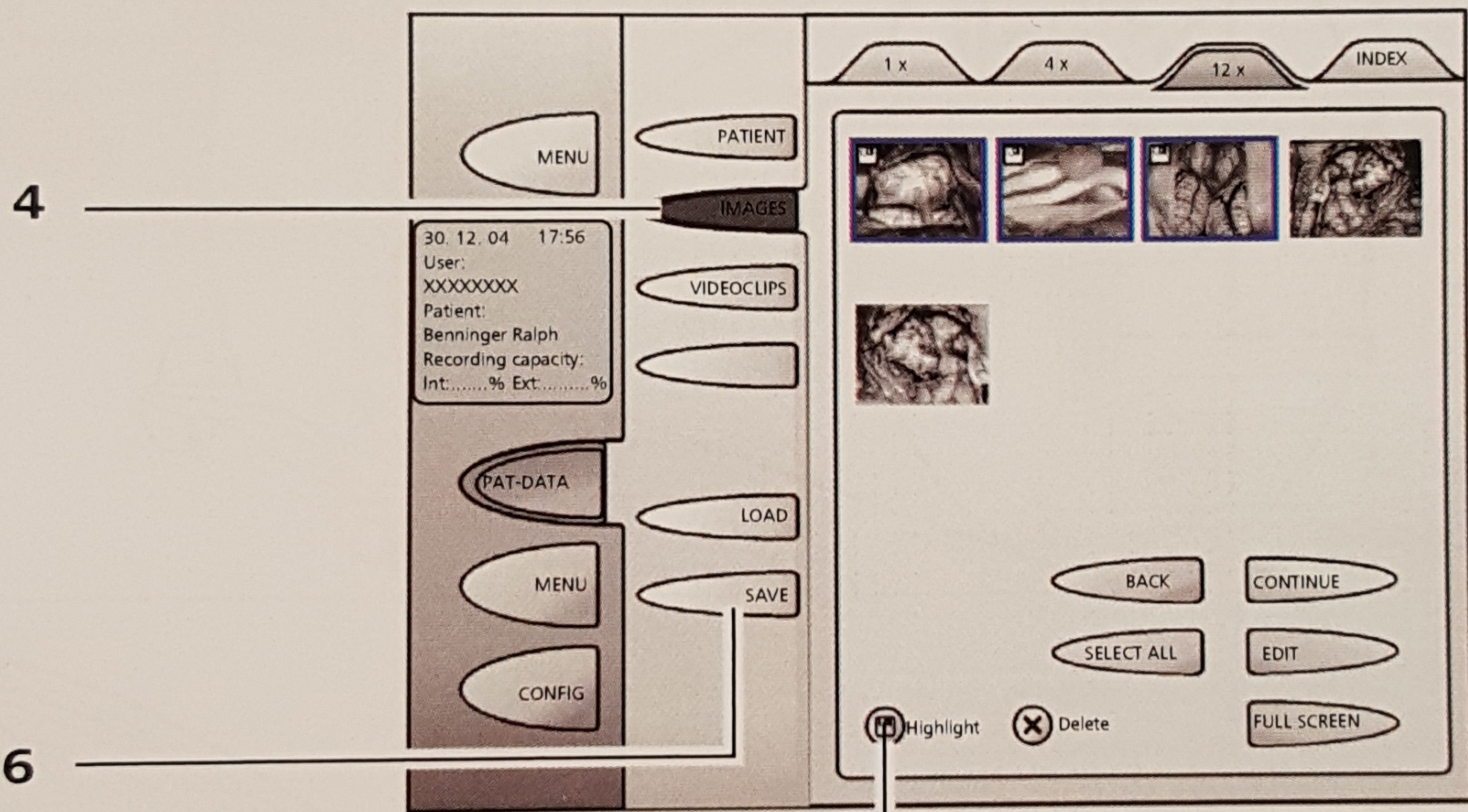
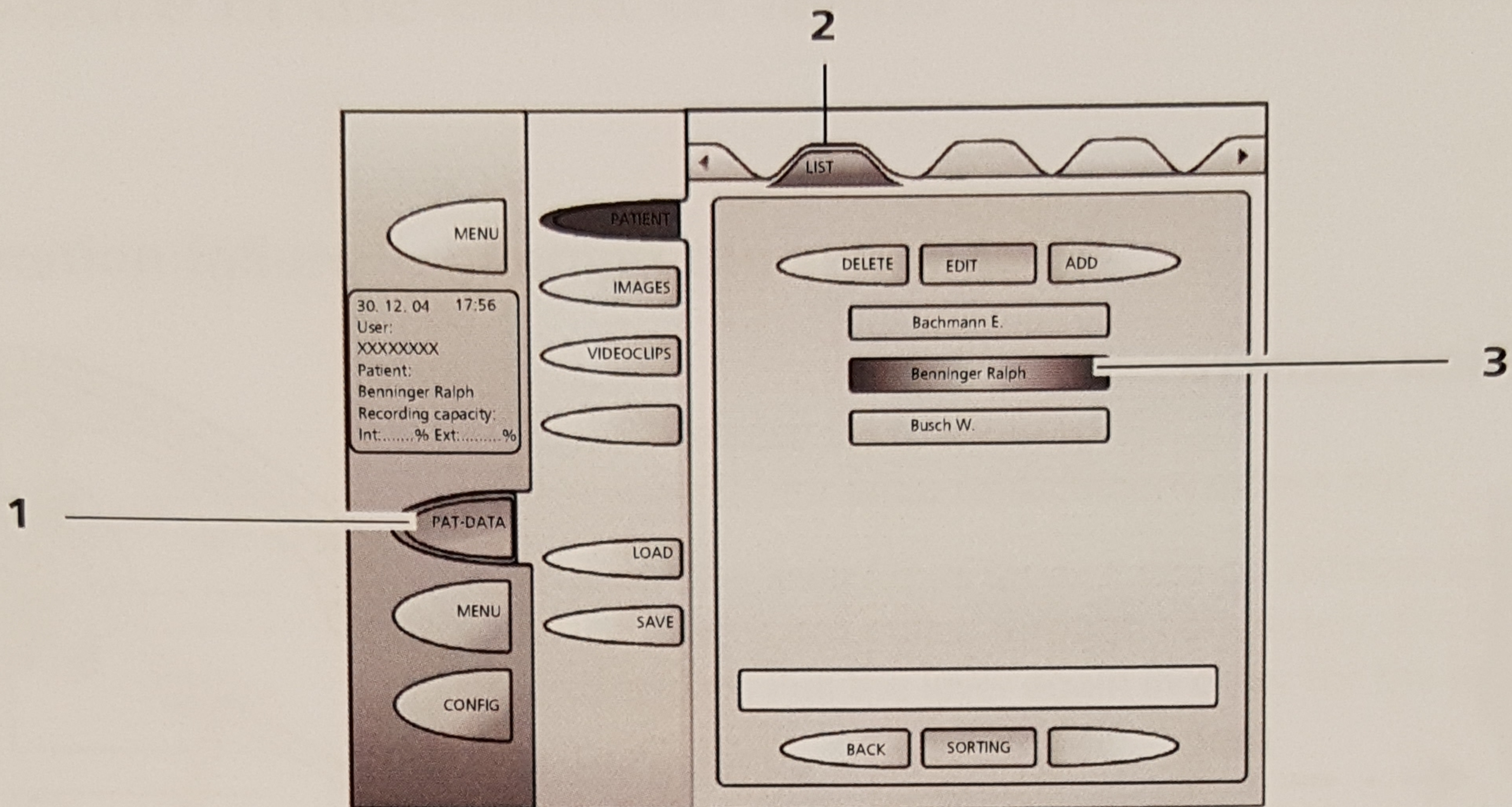
- Press "COPY" (11) to export the images.  
The progress of data export is indicated by a window with a progress bar.

In the local image folder, the exported images are indicated by the save symbol .



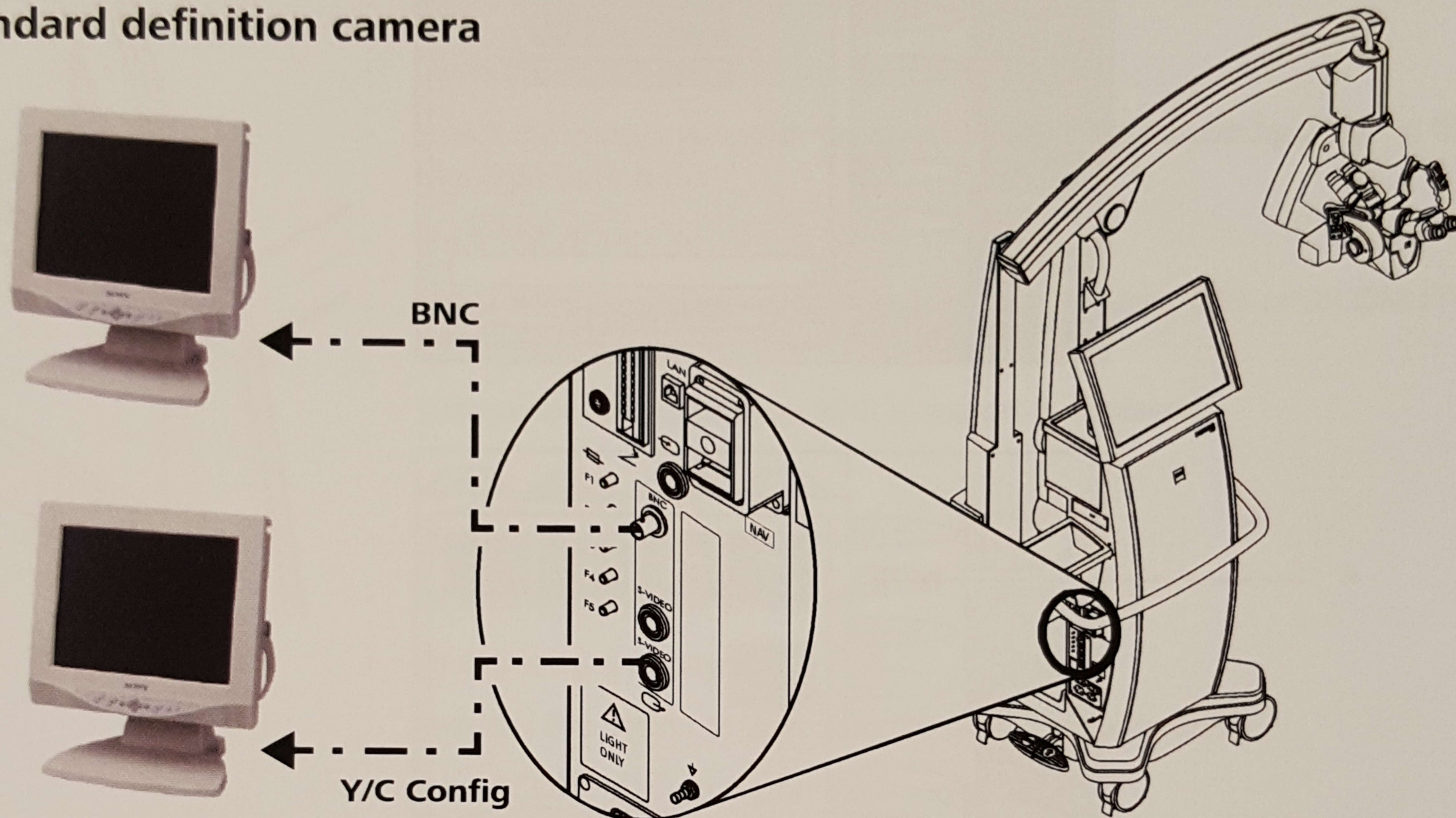
The system is not designed for permanent storage of data. Data can be backed-up on a USB medium, an external hard drive or a hospital server (DICOM option). Each user is responsible for backing up one's own data.



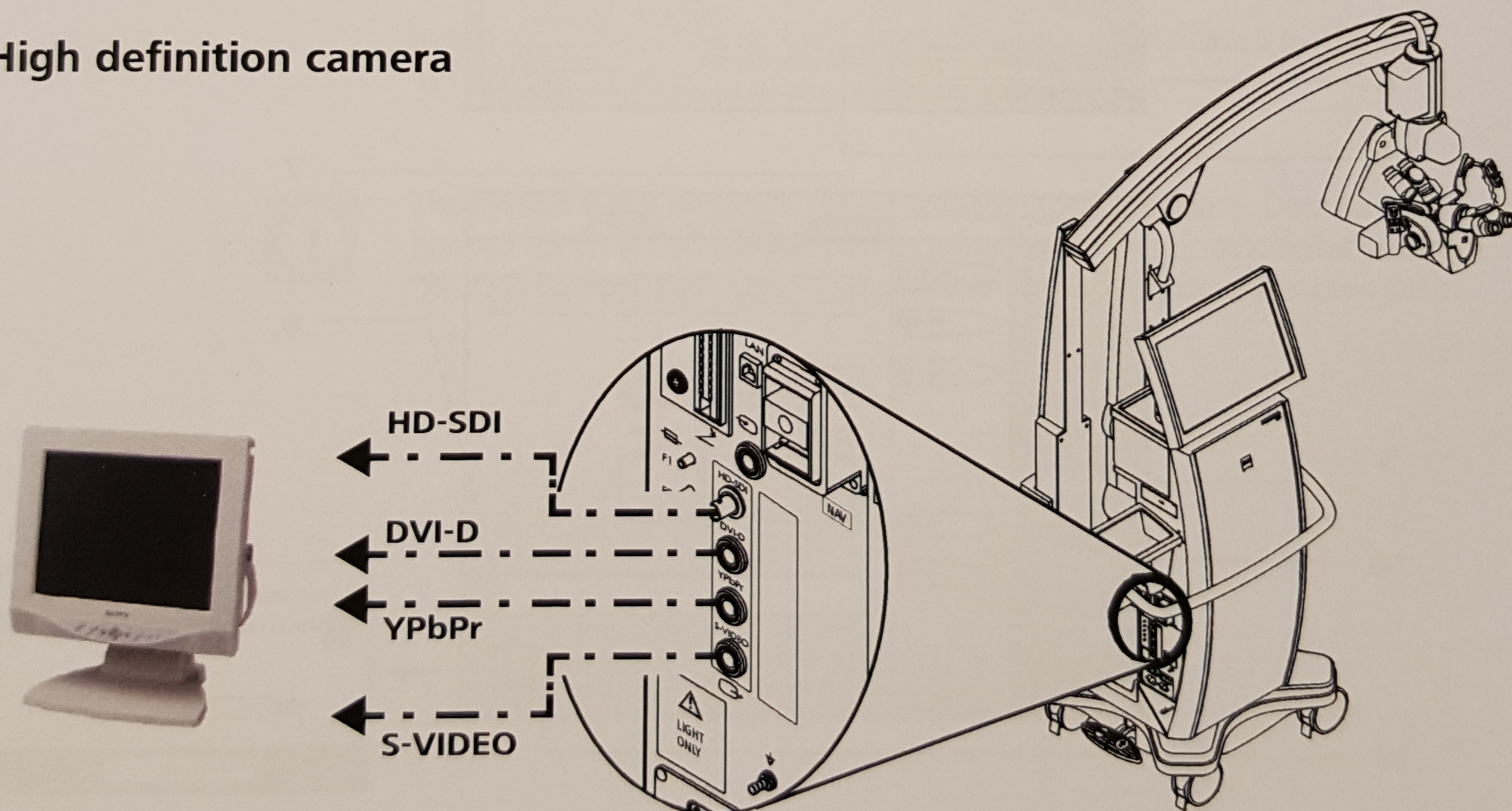


# Connecting an external monitor

## Standard definition camera

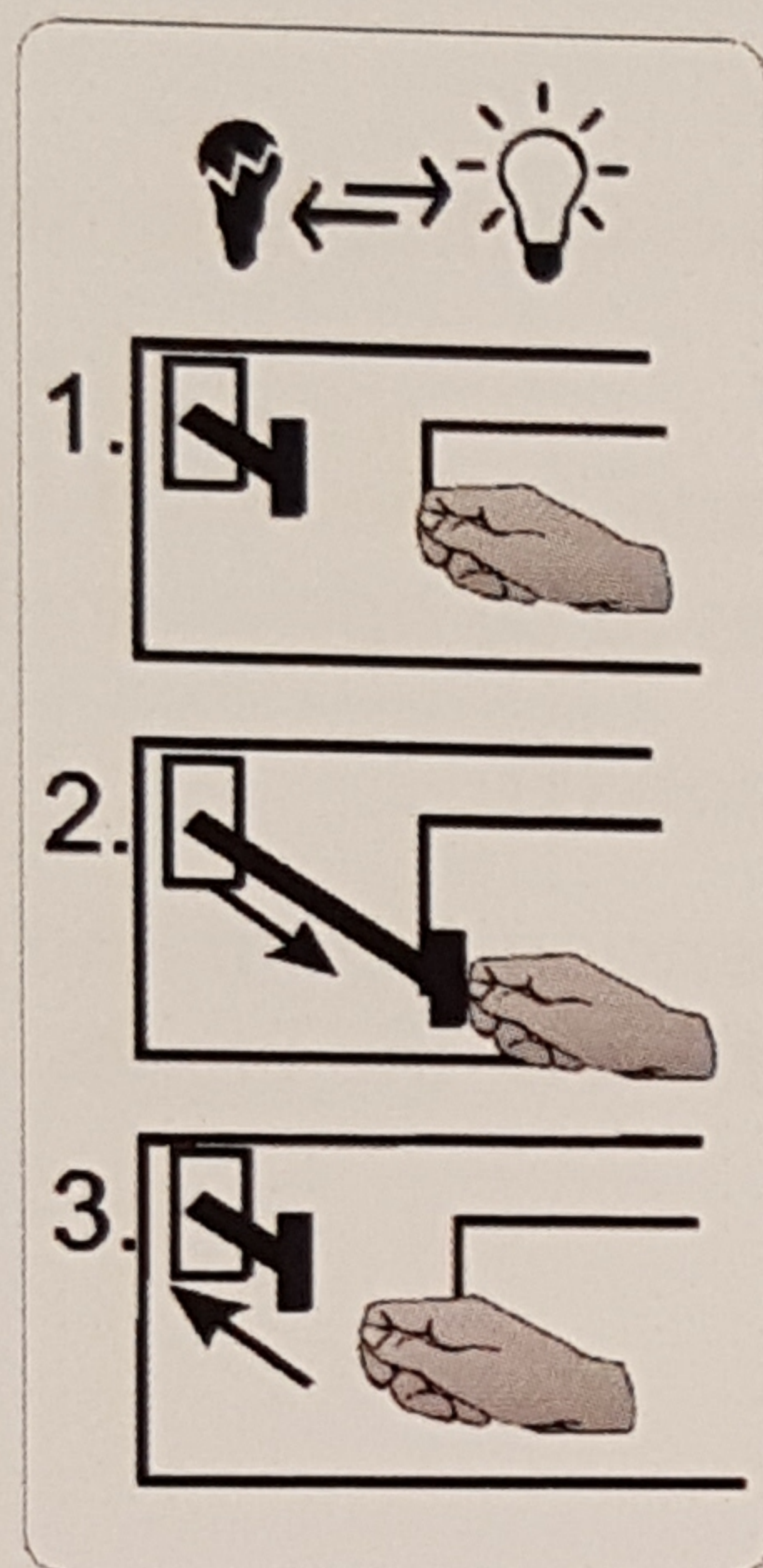


## High definition camera



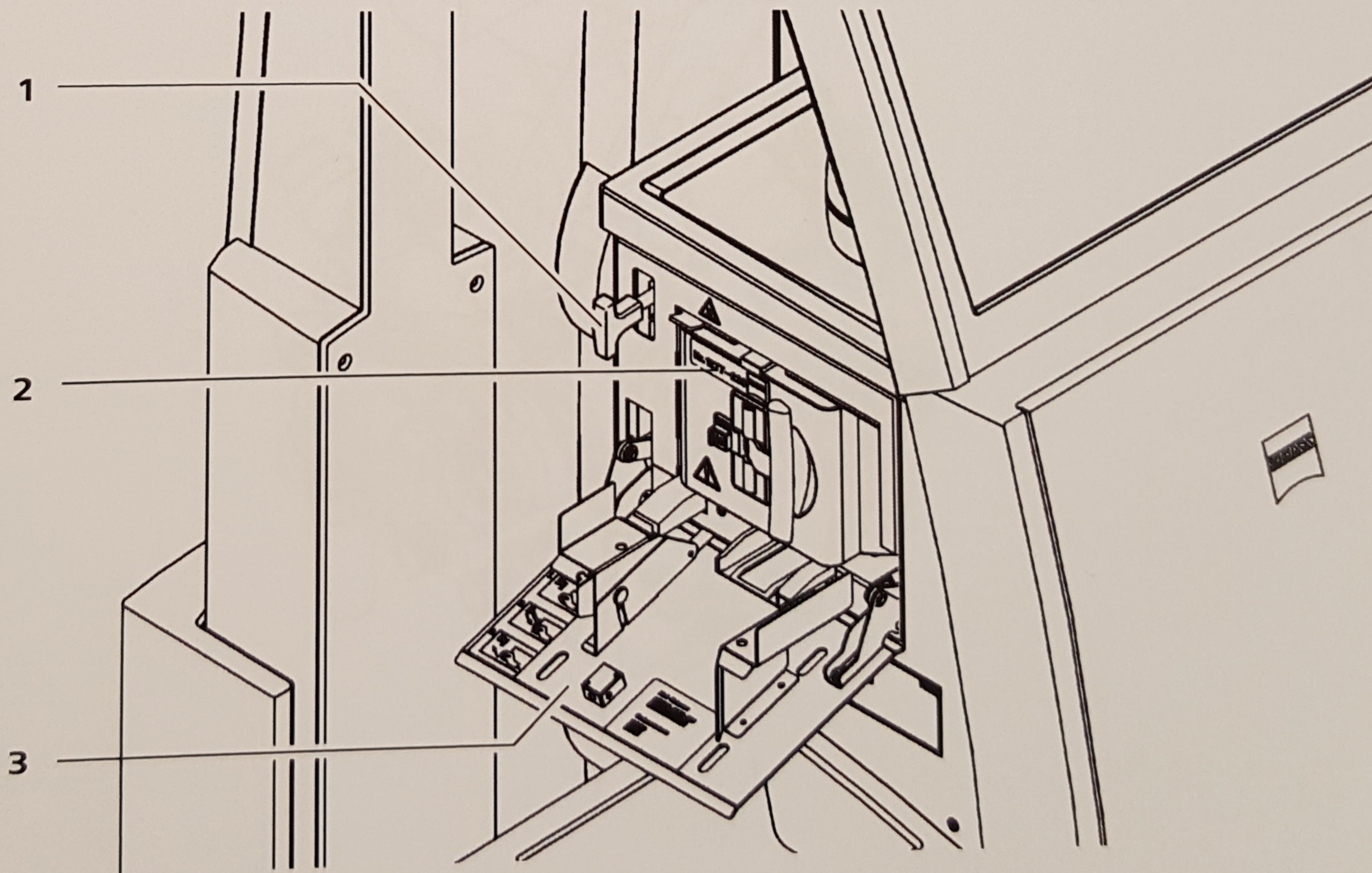
# Procedure in the event of faults

## Illumination failure - changing the xenon lamp



- Open the door (3) to the stop. The lever (1) for lamp replacement moves out.
- Pull out the lever (1) as far as it will go without applying force. If the lever is not pulled through completely, the lamp will not have been exchanged. Pull the lever again in order for the lamp to snap in place.
- Close the door.
- Order a new Xenon lamp. The order number (2) is shown on the lamp module.

Replace the spent lamp only, if a replacement lamp is available locally. Use the illumination only with two Xenon lamps. If one of the lamps fails, switch to the second lamp. Leave the spent lamp in its housing until it can be replaced by a new lamp.



# Failure of the zoom function

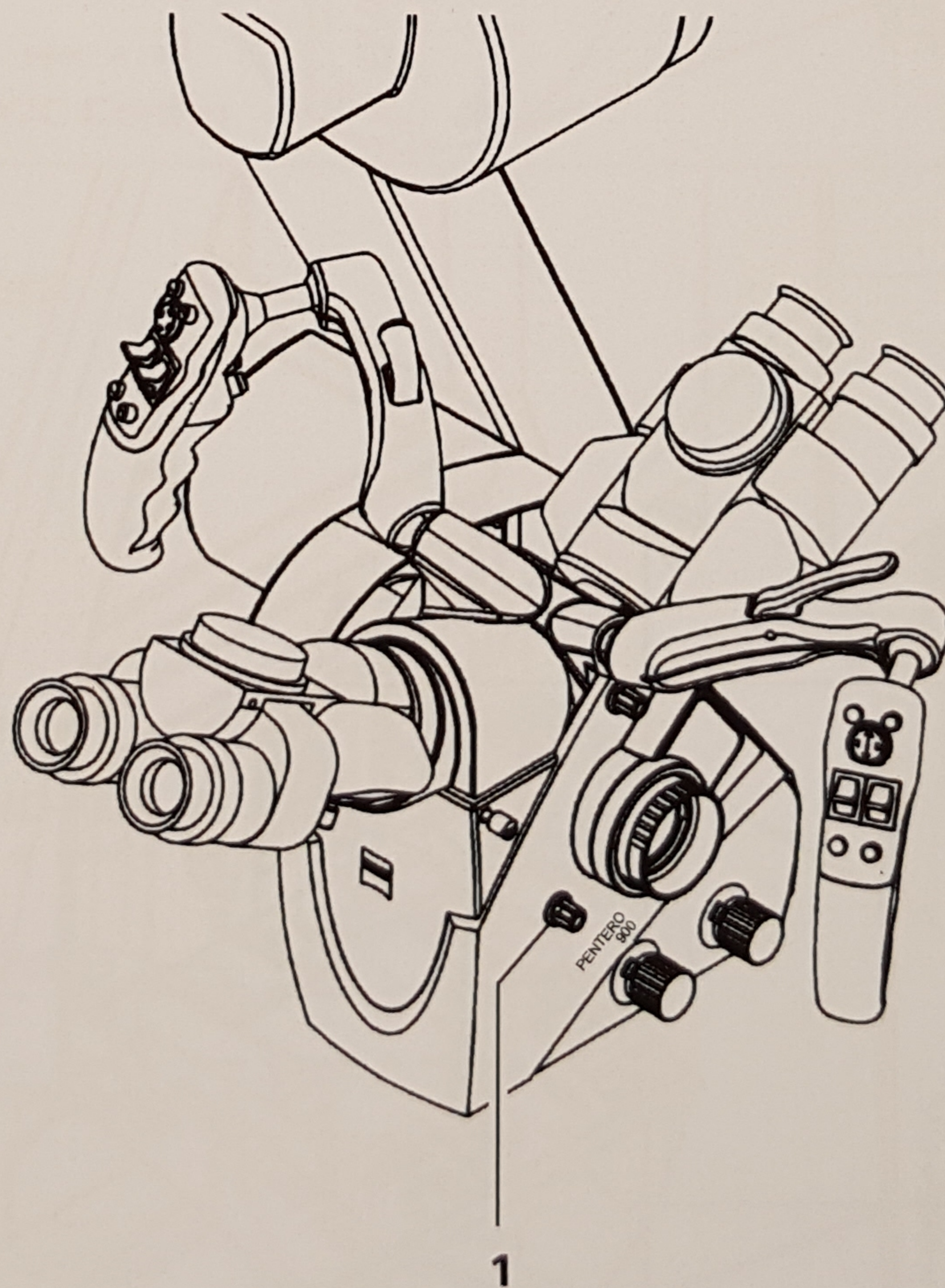
## Failure of the zoom function while all other functions of the suspension system work correctly

- Adjust the magnification manually using zoom knob (1).

## Failure of the zoom drive

In the event of a failure of the zoom drive (e.g. zoom drive moves constantly into an end position):

- Set the mode selector switch on the connector panel to the LIGHT ONLY mode. This ensures that the light source continues to be operational.
- Adjust the magnification manually using zoom knob (1).
- Continue surgery by manually operating the suspension system and the surgical microscope by overcoming the locking effect of the brakes.



# Failure of the focusing function

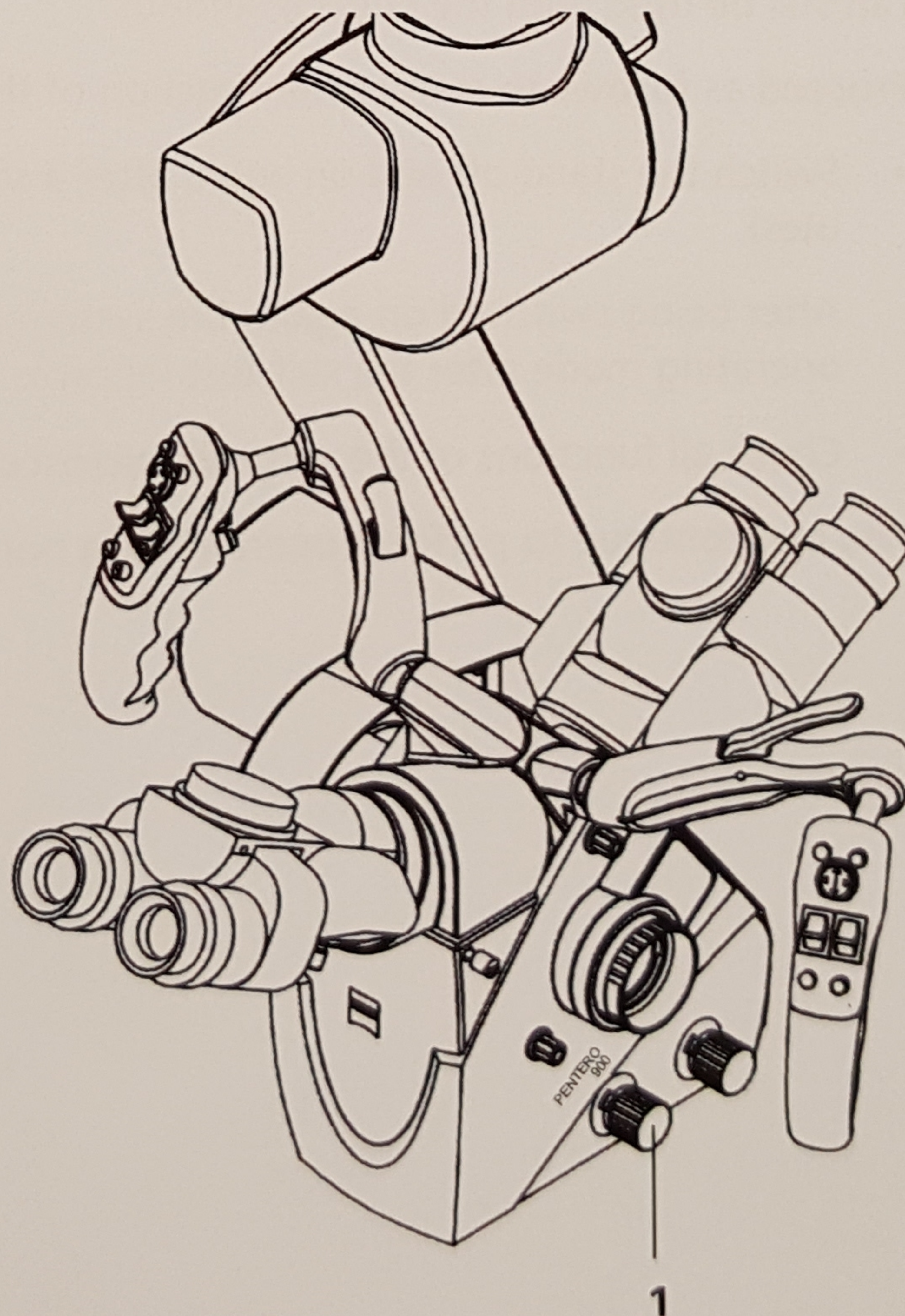
## Failure of the focusing function while all other functions of the suspension system work correctly

- Adjust the working distance manually using focusing knob (1).

## Malfunction of the focusing drive

In the event of a malfunction of the focusing drive (e.g. focusing drive moves constantly into an end position):

- Set the mode selector switch on the connector panel to the LIGHT ONLY mode. This ensures that the light source continues to be operational.
- Adjust the working distance manually using focusing knob (1).
- Continue surgery by manually operating the suspension system and the surgical microscope by overcoming the locking effect of the brakes.



## Failure or blocking of the magnetic brakes

### NOTE

#### Failure of the electronics (magnetic brakes)

If the magnetic brakes fail (magnetic brakes are closed), you can manually move the axes of the stand by overcoming the locking effect of the brakes.

## Failure of the touchscreen



### CAUTION

#### Do not touch the touchscreen if it has failed!

- Never touch the touchscreen surface if the touchscreen has failed.

Only the lighting of the display may have failed. In this case, you would access menus or change values inadvertently.



If the touchscreen no longer responds to your input, the OPMI PENTERO 900 can still be used with the current settings.

Proceed as follows to restore the function of the touchscreen:

- Switch the stand off and on again after a short time (after approx. 2 minutes).

After being switched on again, the system automatically enters normal operating mode after the self-test (approx. 30 seconds).

- Check all functions of the surgical microscope and of the stand.

You can continue to perform operations in normal mode.

## Computer failure (power supply intact)

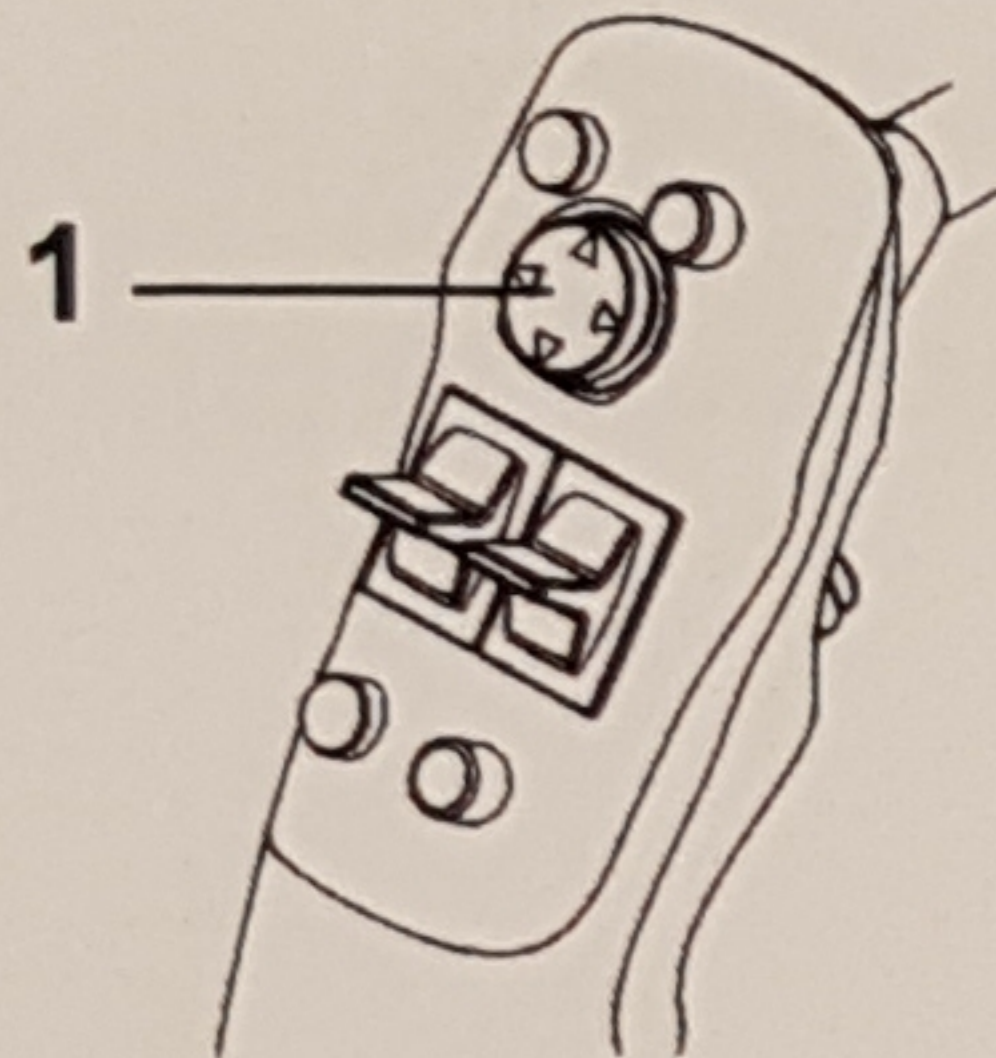
If the computer fails, all computer controlled functions such as the touch-screen display, photo, video recording, autobalance, image transfer to an external monitor are disabled.

### NOTE

#### Operability of functions

All important functions of the device remain fully operational for the user during this time (using the focus, zoom, light, brakes and XY motor).

## Error messages in data projection



Important system errors are shown in the integrated data projection in the microscope. Such messages can be acknowledged with the joystick (1) in the right handle (button) or the touch screen.

## Failure of the line voltage

If the power fails, the uninterruptible power supply (UPS) starts automatically. For a short time, it ensures that there is no loss of data. The interruption-free power supply does not serve the light source nor the microscope and stand functions.

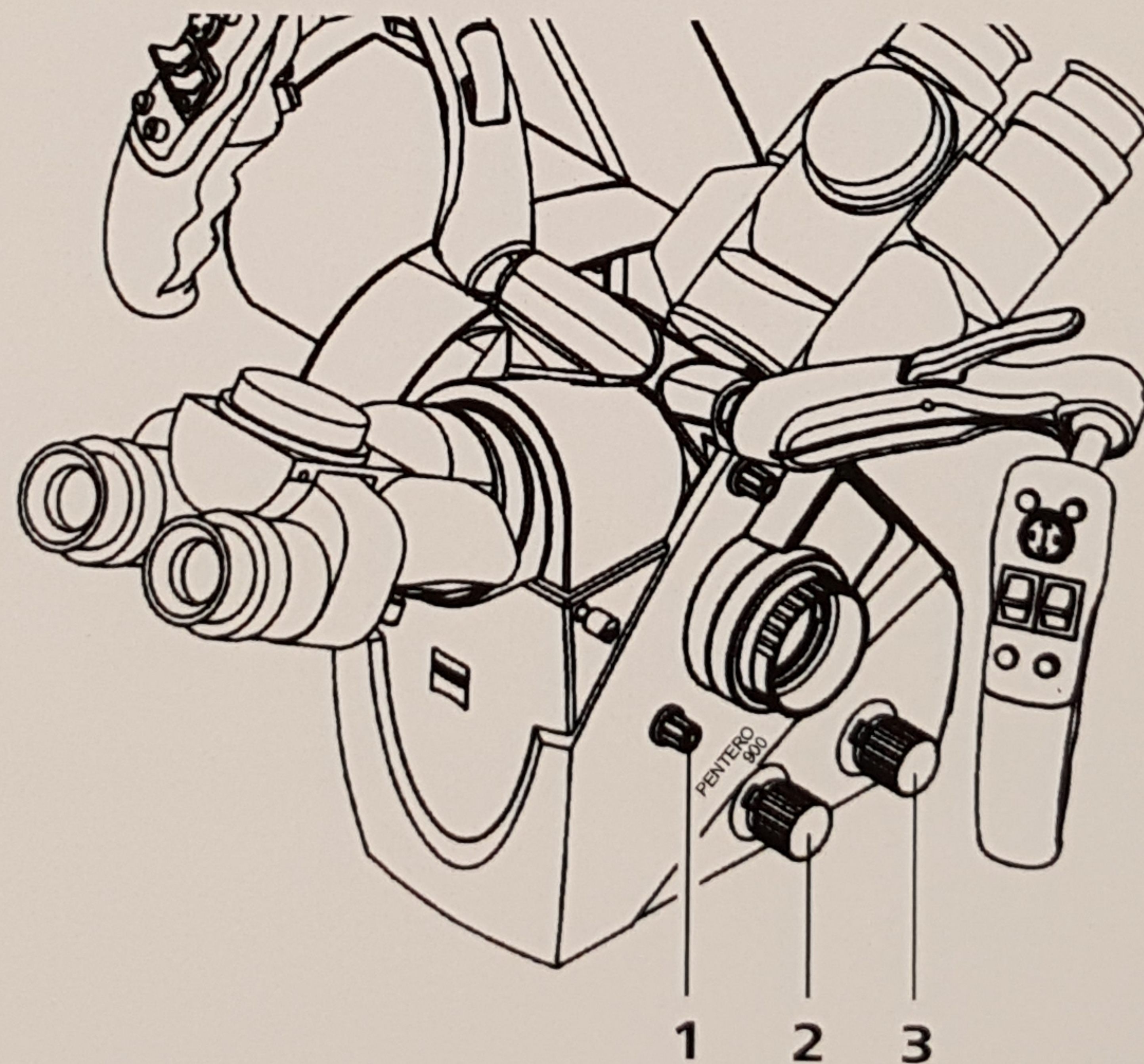
If there is no power supply for a longer period of time, the system is closed down. As soon as the power is back, the user is notified ("Power OK") and all subsystems are rebooted.

If the magnetic brakes fail (magnetic brakes are closed), you can manually move the suspension arm with the microscope by overcoming the locking effect of the brakes.

Adjust the magnification level manually using the zoom button (1).

Adjust the working distance manually using the focus button (2).

Adjust the indicator field diameter with the respective button (3).





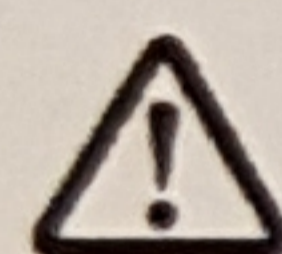
## Failure of all control functions (LIGHT ONLY mode)

- The power switch (3) is turned on and the system is ready for use.
- In case of malfunction, remove the cover (1) (magnetic lid). The LIGHT ONLY switch (2) is situated underneath.
- Move the LIGHT ONLY switch (2) from position **1** to position **2** (LIGHT ONLY mode).

### NOTE

#### Limited functionality in LIGHT ONLY mode!

The microscope and suspension system functions are deactivated. The LIGHT ONLY mode ensures that the illumination continues to work at constant and sufficient light intensity. You can move the system manually by overcoming the locking effect of the brakes.



### CAUTION

#### Light intensity after switching to LIGHT ONLY mode!

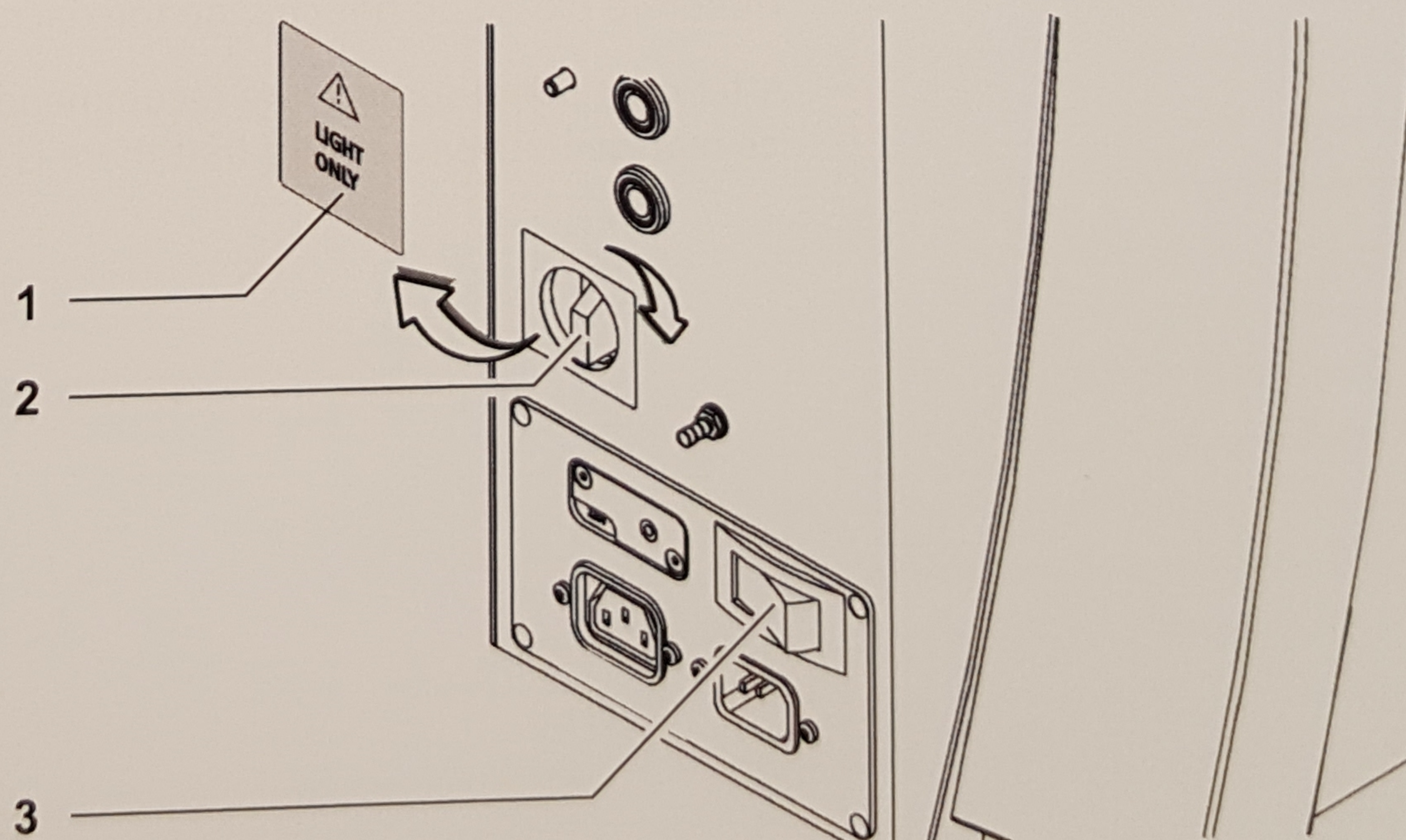
If, before switching to LIGHT-ONLY mode, the Focus-Light control was:

- **inactive** , the light intensity is approx. 70%.
- **active** , (factory setting) the light intensity is limited to approx. 25% for a minimal working distance of 200 mm. With increasing working distance, the light intensity increases accordingly (up to approx. 70%).

### NOTE

#### Light intensity after re-start

Re-starting the system with the LIGHT ONLY mode being activated leads to a light intensity of approx. 25%.



## Blocking individual magnetic brakes (Microscope cannot be moved, or only moved with difficulty)

To ensure a high degree of safety and avoid unintentional movements, some control features have been installed. If one of the control features reacts, individual brakes are blocked.

To reestablish operability and complete the surgery, proceed as follows:

- If the situation during surgery is not critical, switch off the device using the main switch, and restart it after a short time. The device is functional again.
- Proceed as follows to quickly regain access to the basic functions in a critical situation:

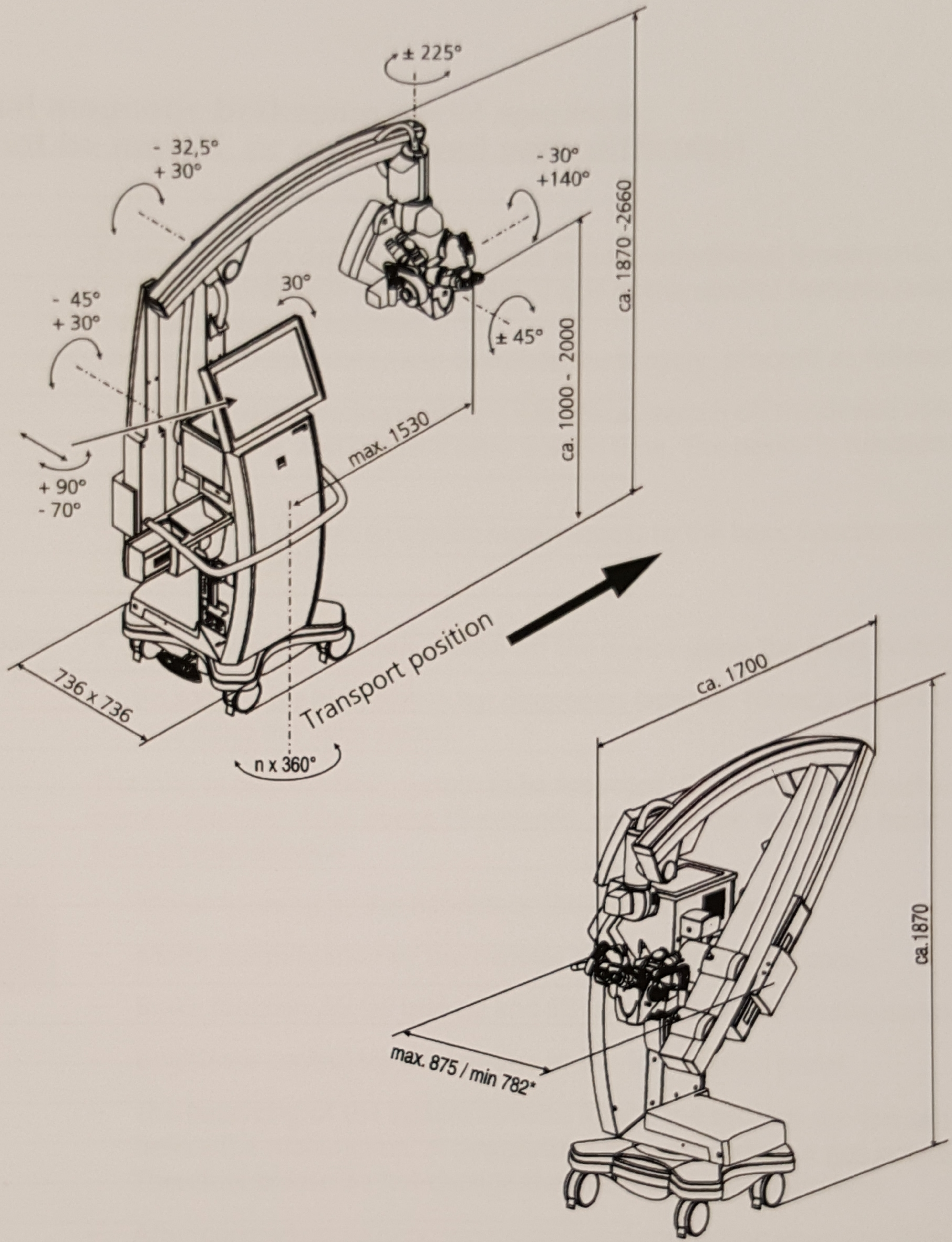
- Watch the touchscreen, switch off the device using the main switch.
- As soon as the blue charge bar disappears (approx. 10 sec.), restart the device using the main switch.

This causes only the basic system to be rebooted. Computer and touchscreen remain disabled. After about 15 seconds, you have the following basic functions at your disposal:

- Motor focusing by the handles or the foot control panel.
- Motor magnification by the handles or the foot control panel.
- Brake function AB (all brakes) and SB (axes 1, 2 and 3) on the handle
- Brightness control via the handles or the foot control panel.
- The balancing of the system remains intact, the settings are the same as before the malfunction. A new autobalance procedure is not possible. Therefore please do not change the microscope configuration.
- After concluding surgery, we recommend contacting your Carl Zeiss service representative to ensure that there is no hardware error.

*Touchscreen without charge bar:*





Dimensions in mm

Transport position:



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