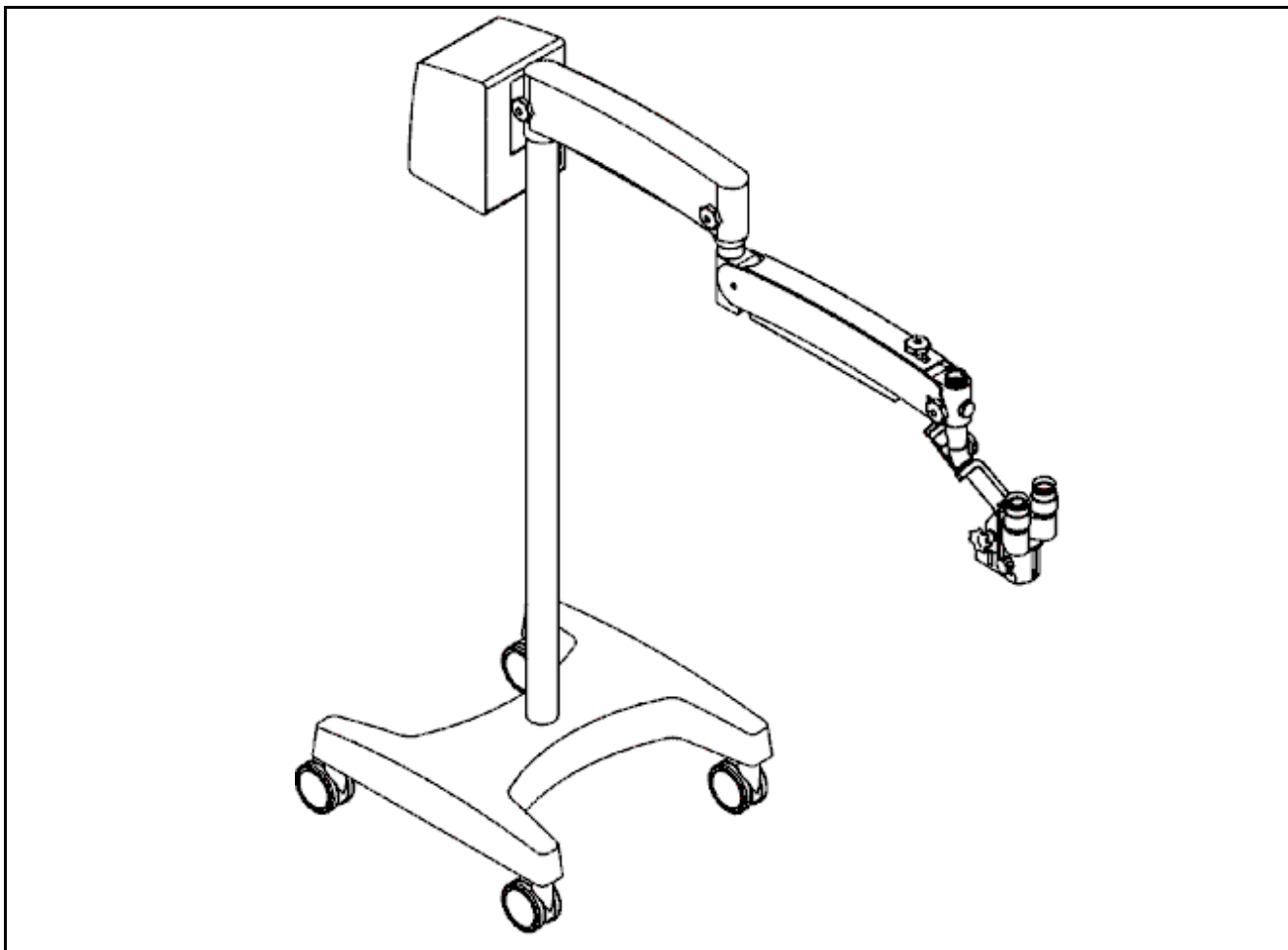


OPMI[®] 1 FC on S100 floor stand



Instructions for use

G-30-1701-en

Issue 2.0

Printed on 25. 09. 2007



Key to symbols

Different symbols used in this user's manual draw your attention to safety aspects and useful tips. The symbols are explained in the following.



Warning!

The **warning triangle** indicates potential sources of danger which may constitute a risk of injury for the user or a health hazard.



Caution:

The **square** indicates situations which may lead to malfunction, defects, collision or damage of the instrument.



Note:

The **hand** indicates hints on the use of the instrument or other tips for the user.

OPMI[®]

OPMI[®] is a registered trademark of Carl Zeiss.

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G-30-1701-en

OPMI® 1 FC on S100 floor stand

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Functions at a glance

OPMI 1 FC surgical microscope

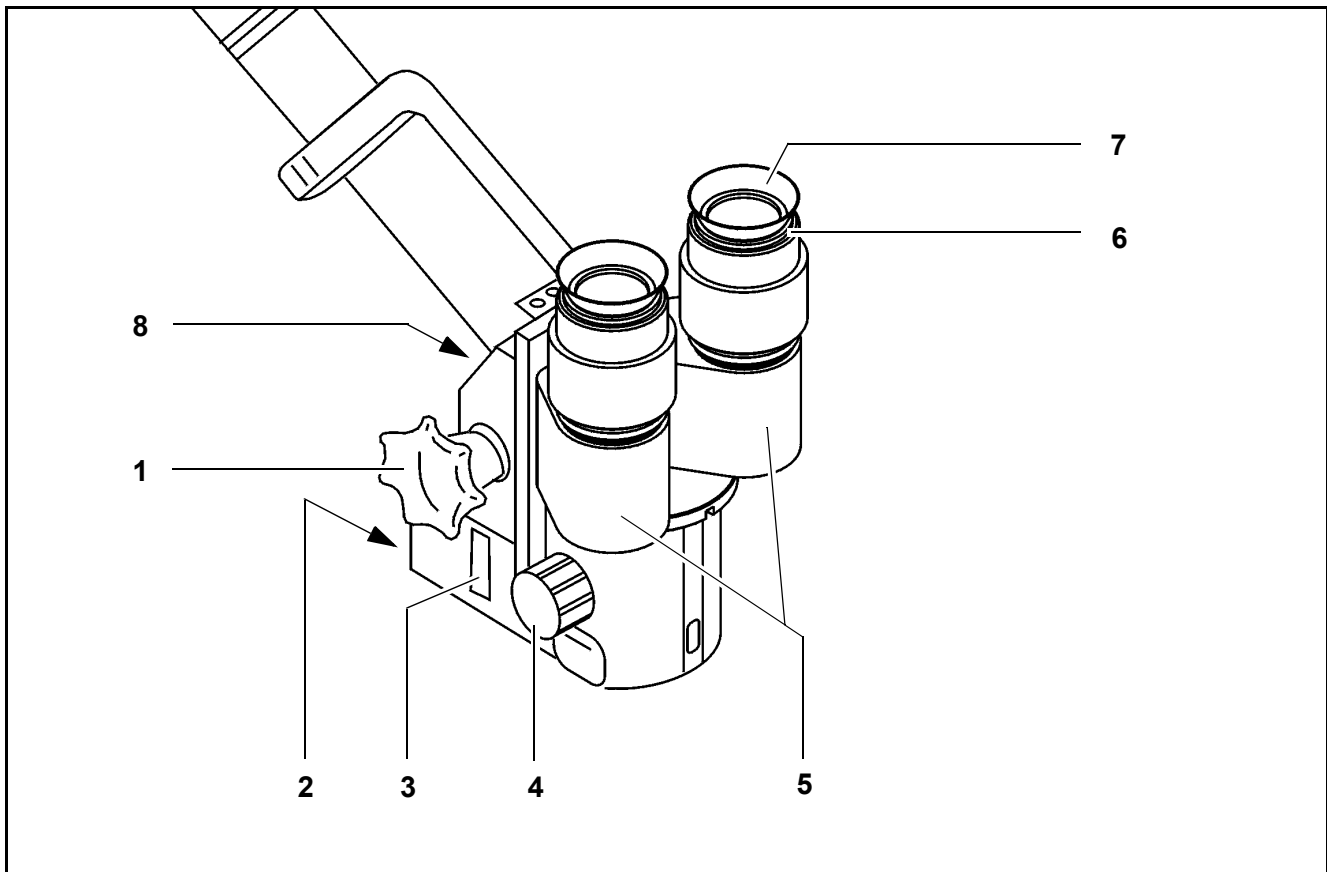
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S100 floor stand

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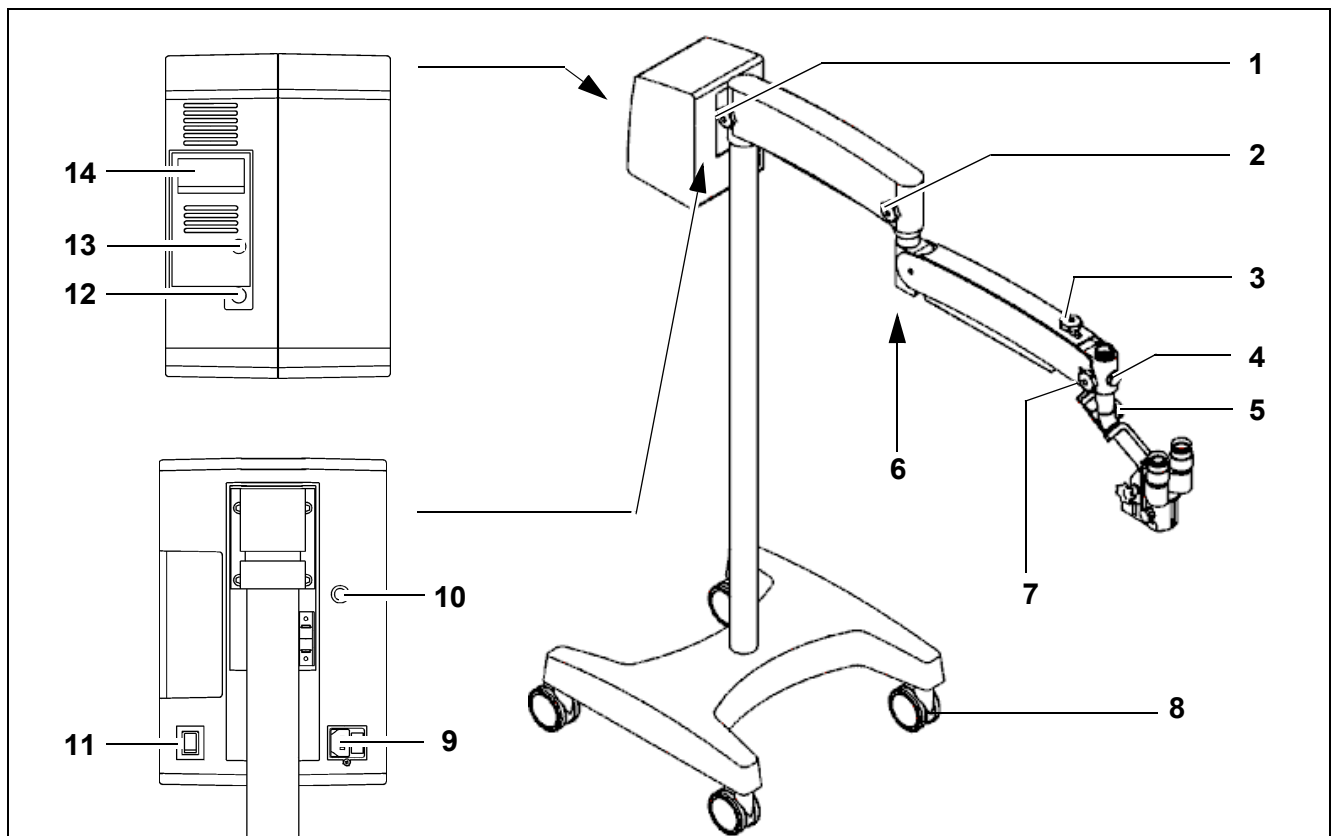
OPMI 1 FC surgical microscope

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S100 floor stand

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Safety

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The device described in this manual has been designed and tested in accordance with Carl Zeiss safety standards as well as German and international standards. This guarantees a high degree of instrument safety.

The system described in this user manual has been designed in compliance with the requirements of:

- EN
- IEC
- UL
- CSA

In accordance with Directive 93/42/EEC for medical devices, the complete quality management system of the company Carl Zeiss Surgical GmbH, 73446 Oberkochen, Germany, has been certified by DQS Deutsche Gesellschaft zur Zertifizierung von Managementsystemen GmbH, a notified body, under registration number 250758 MP23.

- As per Directive 93/42/EEC, the unit is a Class I instrument.
- For USA: FDA classification Class I.



We would like to provide you with information about safety aspects which must be observed when handling this device. This chapter contains a summary of the most important information concerning matters relevant to instrument safety.

Important safety information has been incorporated in this manual and is marked with a warning triangle accordingly. Please give this information your special attention.

The correct use of the system is absolutely vital for safe operation. Please make yourself totally familiar with the contents of this manual prior to start-up of the instrument. Please also observe the user manuals of any additional equipment. Further information is available from our service department or from authorized representatives.

- Please observe all applicable accident prevention regulations.
- The instrument must be connected to a special emergency backup line supply in accordance with the regulations or directives which apply in your country.

Notes on installation and use

Safe working order

- Do not operate the equipment contained in the delivery package in
 - explosion-risk areas,
 - the presence of inflammable anesthetics or volatile solvents such as alcohol, benzine or similar chemicals.
- Do not station or use the instrument in damp rooms. Do not expose the instrument to water splashes, dripping water or sprayed water.
- Immediately unplug any equipment that gives off smoke, sparks or strange noises. Do not use the instrument until our service representative has repaired it.
- Do not place any fluid-filled containers on top of the instrument. Make sure that no fluids can seep into the instrument.
- Do not force cable connections. If the male and female parts do not readily connect, make sure that they are appropriate for one another. If any of the connectors are damaged, have our service representative repair them.
- Potential equalization: The instrument can be incorporated into potential equalization measures. For this purpose, contact our service department.
- Do not use a mobile phone in the vicinity of the equipment because the radio interference can cause the equipment to malfunction. The effects of radio interference on medical equipment depend on a number of various factors and are therefore entirely unforeseeable.
- Modifications and repairs on these instruments or instruments used with them may only be performed by our service representative or by other authorized persons.
- The manufacturer will not accept any liability for damage caused by unauthorized persons tampering with the instrument; this will also forfeit any rights to claim under warranty.
- Use this instrument only for the applications described.
- Only use the instrument with the accessories supplied. Should you wish to use other accessory equipment, make sure that Carl Zeiss or the equipment manufacturer has certified that its use will not impair the safety of instrument.

- Only personnel who have undergone training and instruction are allowed to use this instrument. It is the responsibility of the customer or institution operating the equipment to train and instruct all staff using the equipment.
- Keep the user's manuals where they are easily accessible at all times for the persons operating the instrument.
- Never look at the sun through the binocular tube, the objective lens or an eyepiece.
- Do not pull at the light guide cable, at the power cord or at other cable connections.
- This instrument is a high-grade technological product. To ensure optimum performance and safe working order of the instrument, its safety must be checked once every 12 months. We recommend having this check performed by our service representative as part of regular maintenance work.
If a failure occurs which you cannot correct using the trouble-shooting table, attach a sign to the instrument stating it is out of order and contact our service representative.

Notes on EMC (electromagnetic compatibility)

The device complies with the EMC requirements of IEC 60601-1-2. For operating the device, observe the EMC precautions specified below.

Only use accessory equipment approved by Carl Zeiss for this device.

Do not use any portable or mobile HF communication equipment in the vicinity of the device, as it cannot be ruled out that the function of the device will be impaired.

Requirements for operation

Our service representative or a specialist authorized by us will install the instrument. Please make sure that the following requirements for operation remain fulfilled in the future:

- All mechanical connections (details in the user's manual) which are relevant to safety are properly connected and screw connections tightened.
- All cables and plugs are in good working condition.
- The voltage setting on the instrument conforms to the rated voltage of the line supply on site.
- The instrument is plugged into a power outlet which has a properly connected protective ground contact.

- The power cord being used is the one designed for use with this instrument.

Before every use and after re-equipping the instrument

- Make sure that all "Requirements for operation" are fulfilled.
- Go through the checklist.
- Re-attach or close any covers, panels or caps which have been removed or opened.
- Pay special attention to warning symbols on the instrument (triangular warning signs with exclamation marks), labels and any parts such as screws or surfaces painted red.
- Do not cover any ventilation openings.

For every use of the instrument

- Avoid looking directly into the light source, e.g. into the microscope objective lens or a light guide.
- When the illumination is on, the light guide must be connected at both ends. Otherwise there is a risk of fire or burn injuries.
- Any kind of radiation has a detrimental effect on biological tissue. This also applies to the light illuminating the surgical field. Please therefore reduce the brightness and duration of illumination on the surgical field to the absolute minimum required.
- When operating on the eye, always use a GG 475 protection filter to ensure that the patient's retina is not exposed to unnecessary (blue) radiation (retinal injury).

After every use of the instrument

- Always use the main power switch of the instrument to turn it off.
- The main power switch must always be turned off when the instrument is not in use.

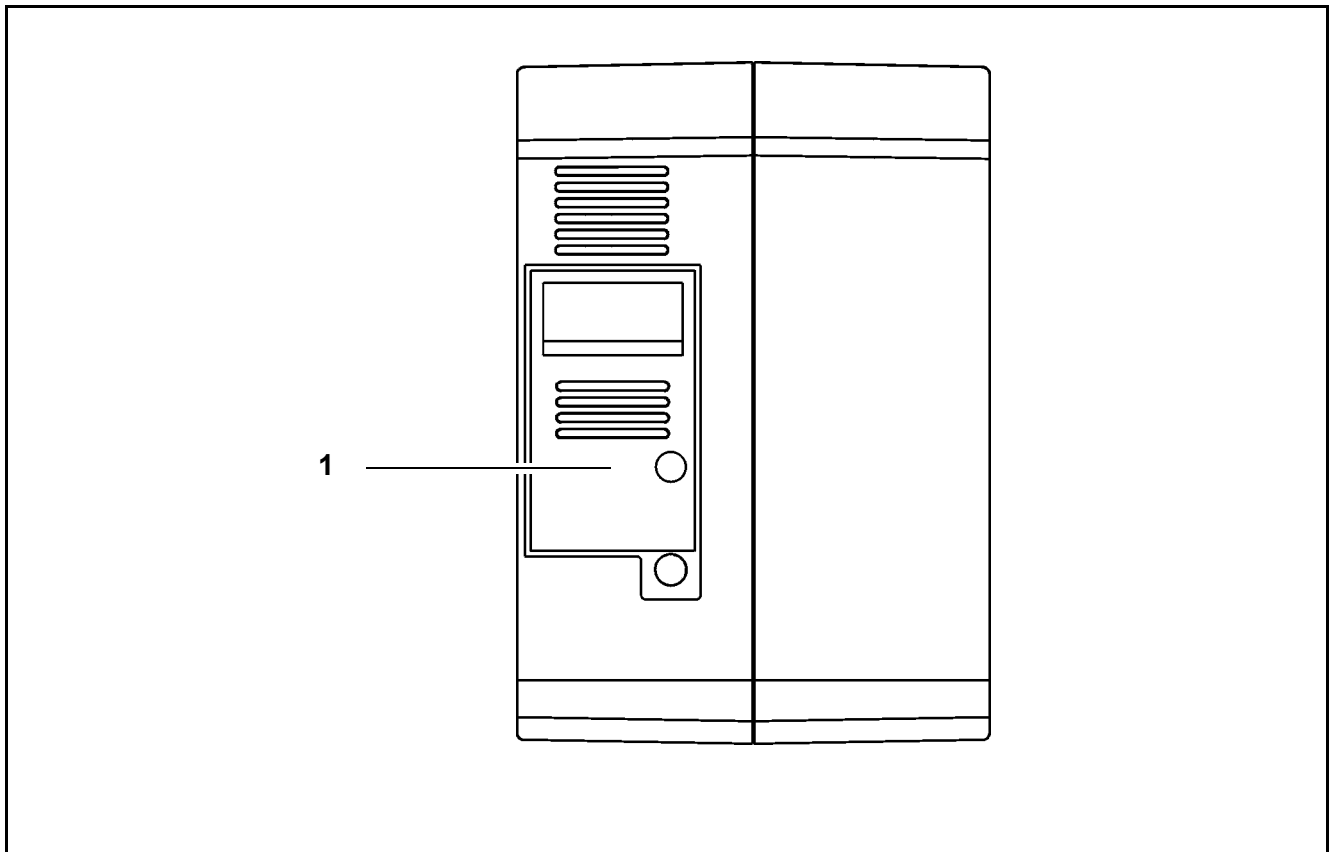
Safety devices

Backup lamp

The backup lamp permits lamp exchange after lamp failure.

The lamp module (in the electronics box of the suspension system) contains a backup lamp. The lamp module contains a second 12 V, 100 W halogen lamp as a backup lamp. If the first halogen lamp fails, you can manually switch to the second halogen lamp.

For a detailed description, please see page 60.



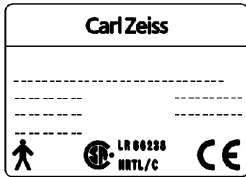
Warning labels and notes



Caution:

Observe all warning labels and notes!

If any label is missing on your instrument or has become illegible, please contact us or one of our authorized representatives. We will supply the missing labels.



Instrument label plate

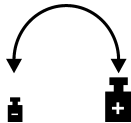
The instrument label plate indicates the following:

- name of the unit
- Cat. No.
- rated voltage and current consumption
- rated frequency range
- serial number.



Brightness control

After the illumination has been switched on, you can continuously adjust the brightness of the fiber illumination by turning the appropriate knob.



Balance setting

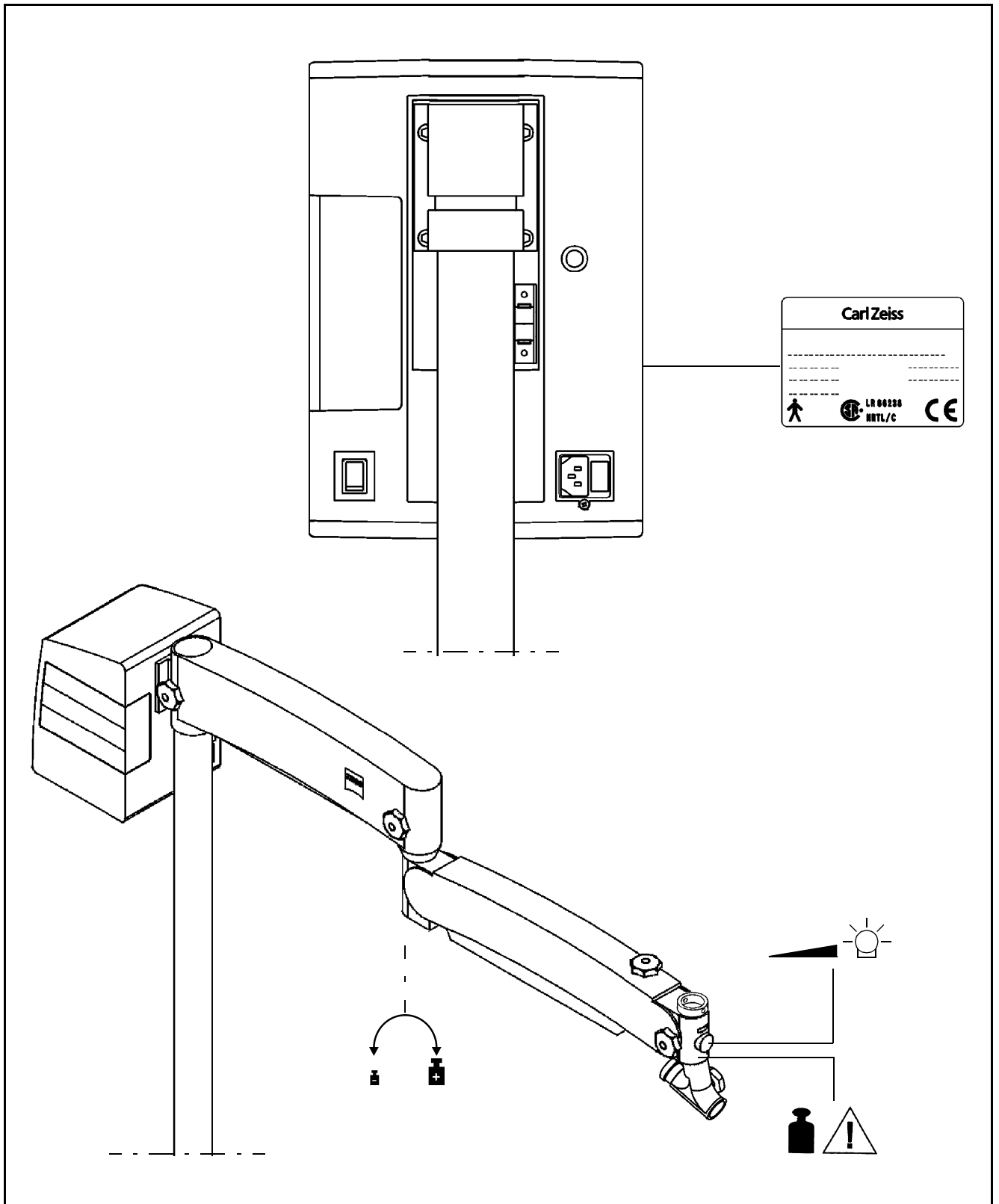
Turn the screw to adjust the balance setting of the suspension arm.



Maximum load

When surgical microscopes are mounted on the suspension systems, the overall weight of the microscope including accessories and coupling must not exceed a maximum value.

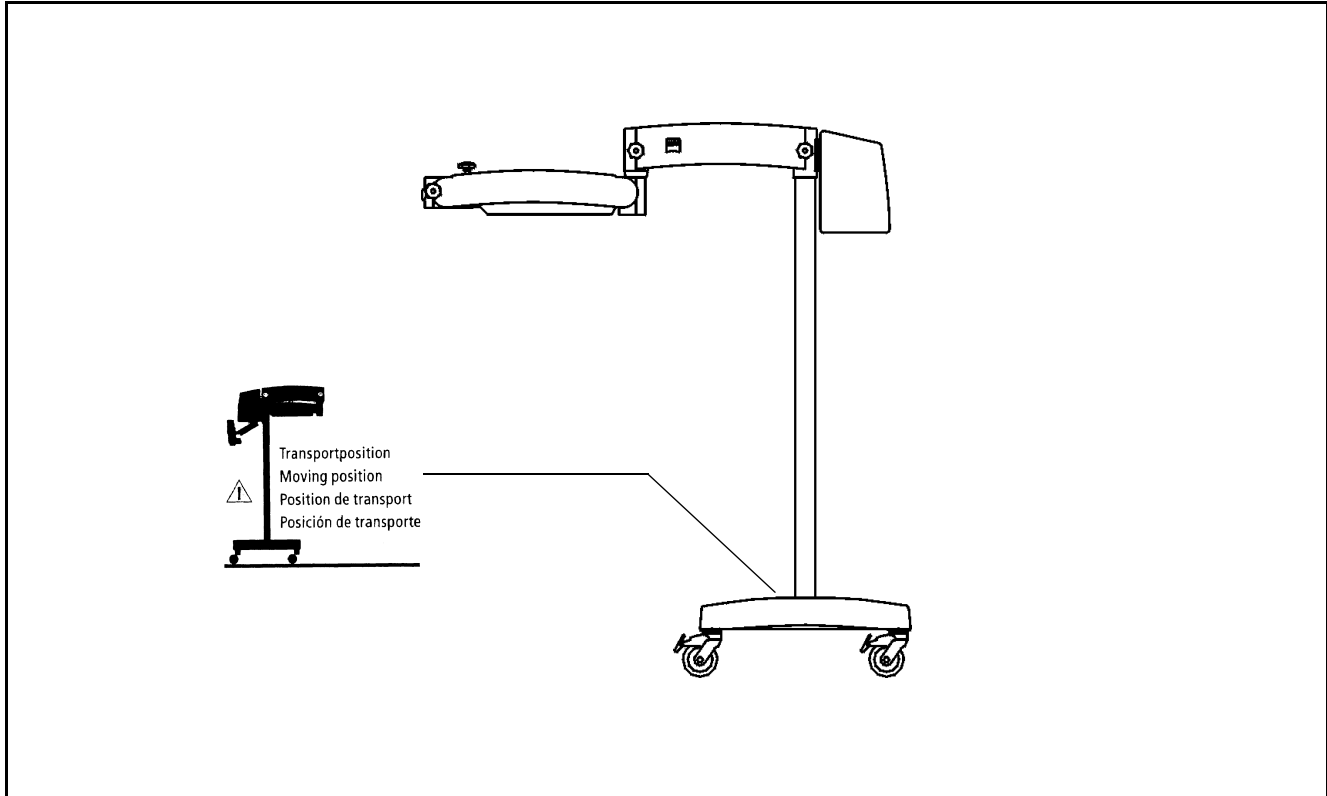
The S100 floor stand has been designed for a load on the suspension arm of 2.5 kg to 7.0 kg.





Moving position

Position of the floor stand for safe transportation.



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OPMI 1 FC on S100 floor stand

Intended use

The OPMI 1 FC surgical microscope on S100 floor stand is an instrument for manual operation. It can be used in all disciplines and in various applications, e.g. as:

- surgical microscope
- diagnostic microscope
- training and dissecting microscope.

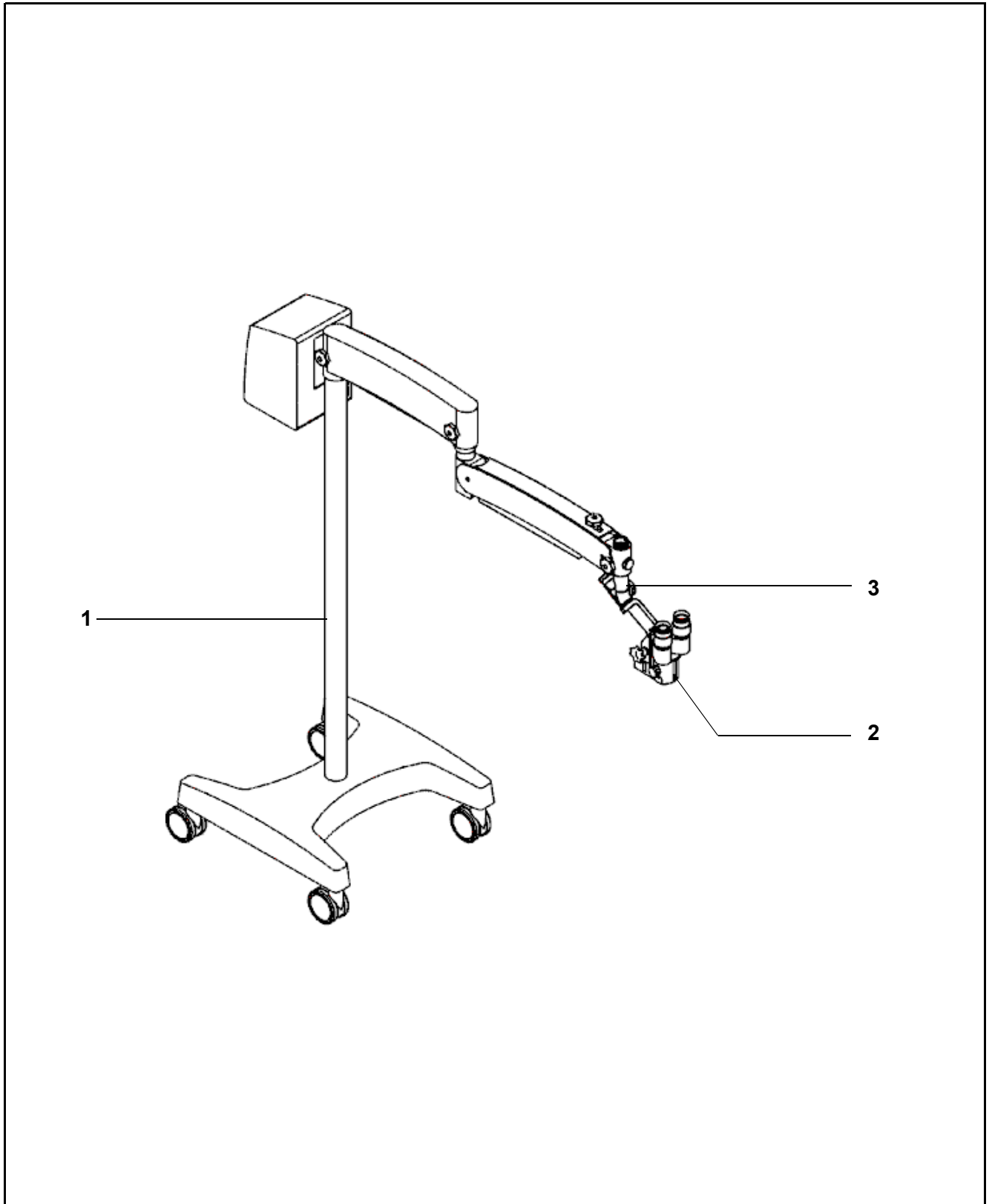
The OPMI 1 FC surgical microscope is mounted on the S100 floor stand via a 120° coupling. The 120° coupling makes the instrument ideal for ENT applications.

The suspension arm and its adjustable brake function enables you to balance the suspension system, allowing reliable positioning of the surgical microscope.

Set-up, OPMI 1 FC on S100 floor stand

The system comprises the following components:

- 1 S100 floor stand
- 2 OPMI 1 FC surgical microscope
- 3 120° coupling





OPMI 1 FC surgical microscope

Intended use

The OPMI 1 FC is a surgical microscope for manual operation. It can be used in all disciplines and in various applications, e.g. as:

- Surgical microscope
- diagnostic microscope
- training and dissecting microscope.

The optics of the OPMI 1 FC surgical microscope provide superb optical quality. The microscope image displays optimum contrast and excellent detail recognition along with a large depth of field. A 5-step magnification changer allows you to set the magnification required.

Fine focusing is made via a drive knob on the microscope body. The focusing range is 40 mm.

To change the viewing direction, you can continuously swivel the Opmi 1 FC surgical microscope about its horizontal axis.

The OPMI 1 FC surgical microscope is mounted on the S100 floor stand via a 120° coupling. The 120° coupling makes the instrument ideal for ENT applications.

The friction of the lateral tilt motion and the fine focusing can be set to the weight of the microscope equipment.

A 100 W halogen reflector lamp is integrated into the suspension system. A light guide directs the light to the illumination system of the microscope. The object is illuminated coaxially to the observation direction.

The OPMI 1 FC surgical microscope can be equipped with various accessories:

- various coobservation accessories
- camera and video equipment

These accessories can be mounted quickly and easily.

For the depth of field setting, we recommend using a double iris diaphragm (Cat. No. 30 33 54 - 0000).

Set-up of the OPMI 1 FC surgical microscope

- 1 Securing screw**

The securing screw holds and secures the microscope in the drilled hole of the suspension system. When mounting the microscope to the suspension system, you must **tighten** this securing screw until stop (use tool).
Before every use and after re-equipping the instrument, make sure that the securing screw has been tightened.
- 2 Microscope shaft**
- 3 Clip for light guide**
- 4 Securing screw for binocular tube**

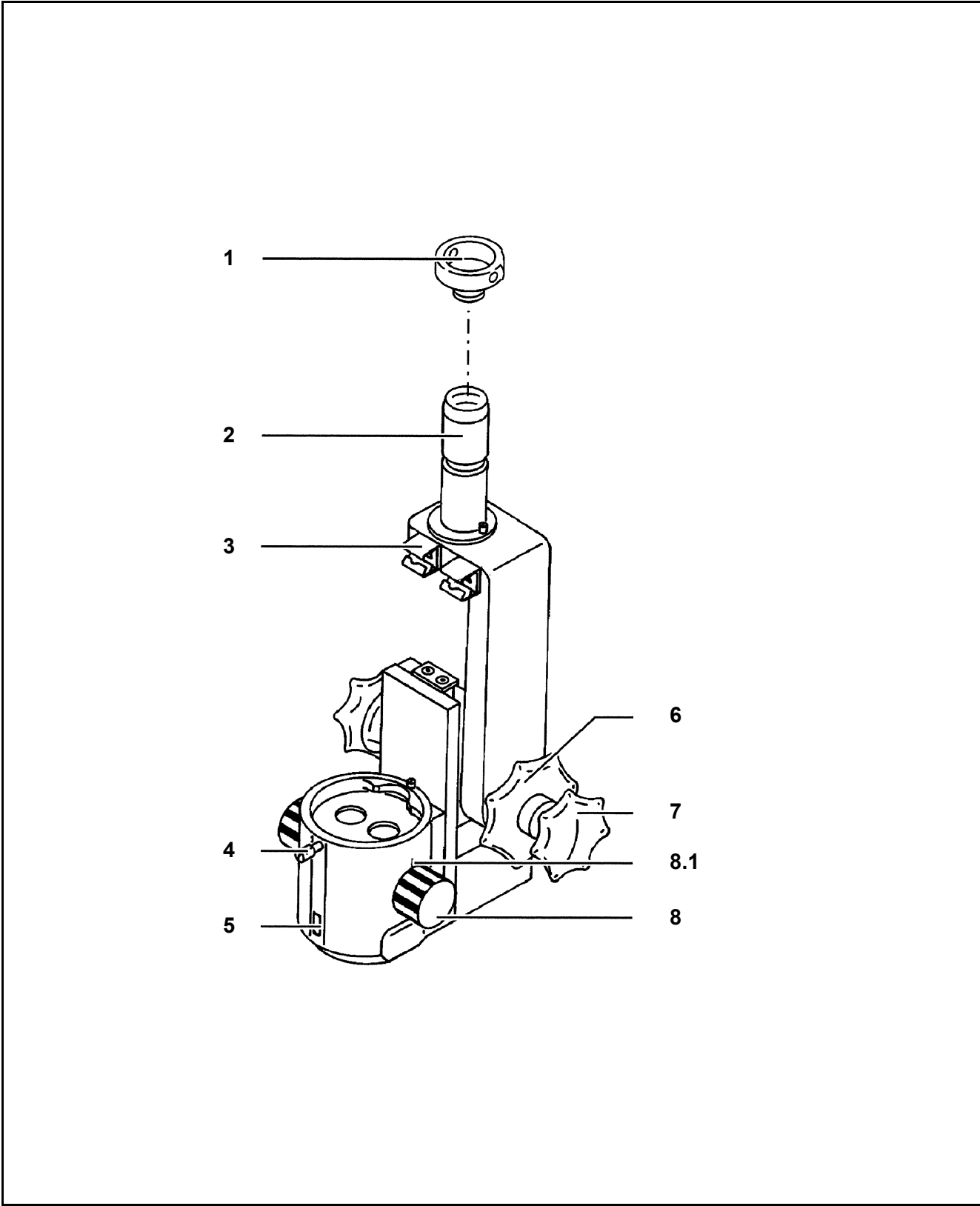
After insertion of the binocular tube or another module into the mount of the microscope, **tighten** the securing screw until stop.
Before every use and after re-equipping the instrument, make sure that the securing screw has been tightened.
- 5 Cover**

You can remove this cover and mount a handgrip for microscope guidance instead.
- 6 Adjusting knob (clamping grip)**

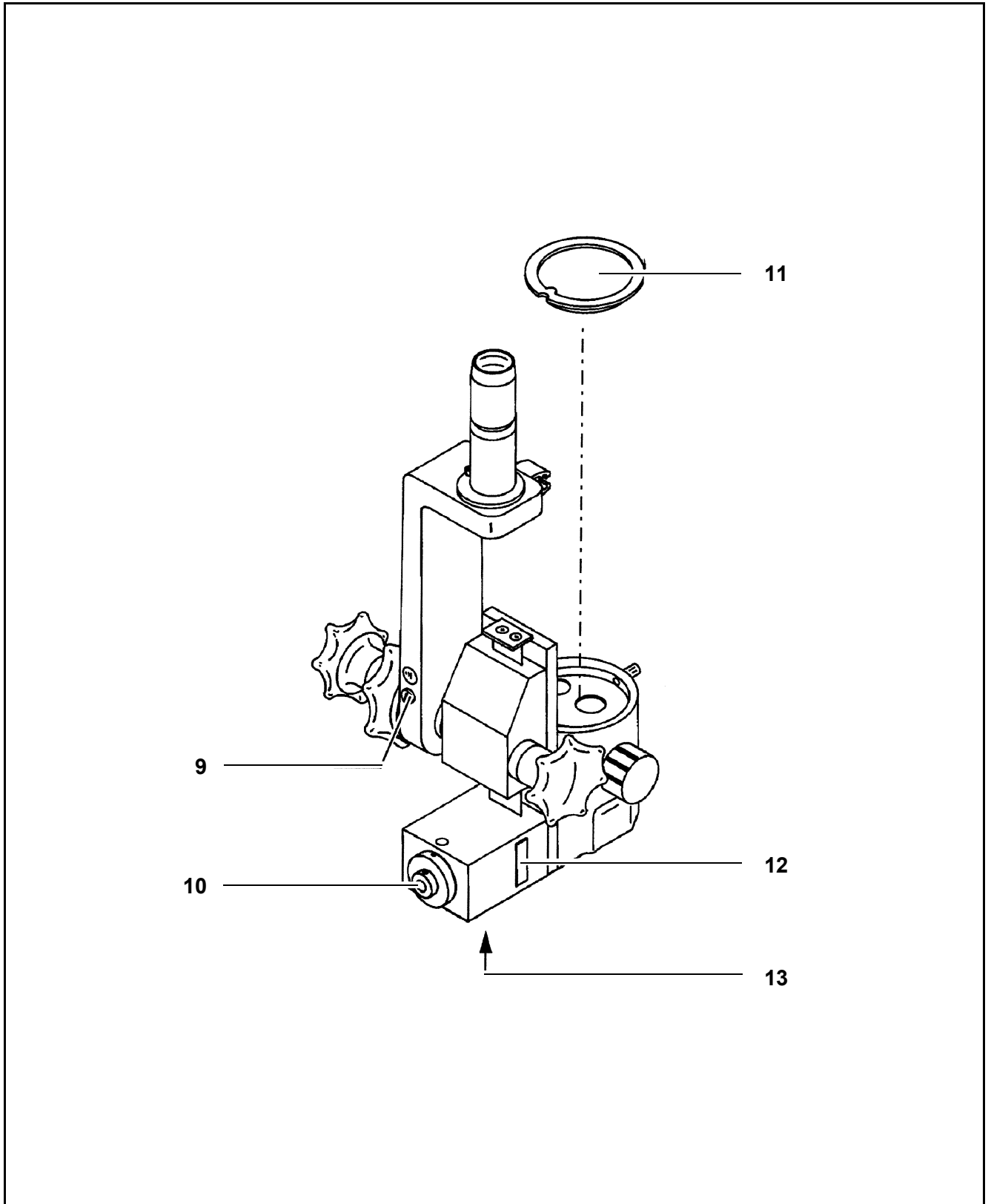
For different observation positions, the microscope can be turned about the axis (2) of this adjusting knob (1). Using this knob, you can adjust the friction of the microscope's tilt motion. Set the friction of the tilt motion more tightly by turning the adjusting knob clockwise. If you turn the adjusting knob anti-clockwise, the friction of the tilt motion will be more smoothly.
- 7 Focus adjusting knob**

An adjusting knob available on both sides is used for focusing. The friction of the focusing movement is set by turning the two adjusting knobs in opposite directions.
- 8 Adjustment knob for manual magnification changer**

You can change the microscope's magnification in five steps: $\gamma = 0.4$; $\gamma = 0.6$; $\gamma = 1.0$; $\gamma = 1.6$; $\gamma = 2.5$. The number on the adjusting knob close to the black line marking (8.1) indicates the currently set magnification factor γ .



- 9** Connection screw for potential balance
This connection permits you to apply the "potential balance" protection measure to this instrument
- 10** Light guide socket
- 11** Dust cover
This cover must be removed before the binocular tube or another module can be inserted in the mount of the microscope.
- 12** Cover for filter slot
After removing the cover, you can push a filter module (option) in the slot.
- 13** Bores for dovetail mount
A dovetail mount for accessories can be attached to the underside of the microscope.
Cat.No. of the dovetail mount: 30 33 60- 9910-000.

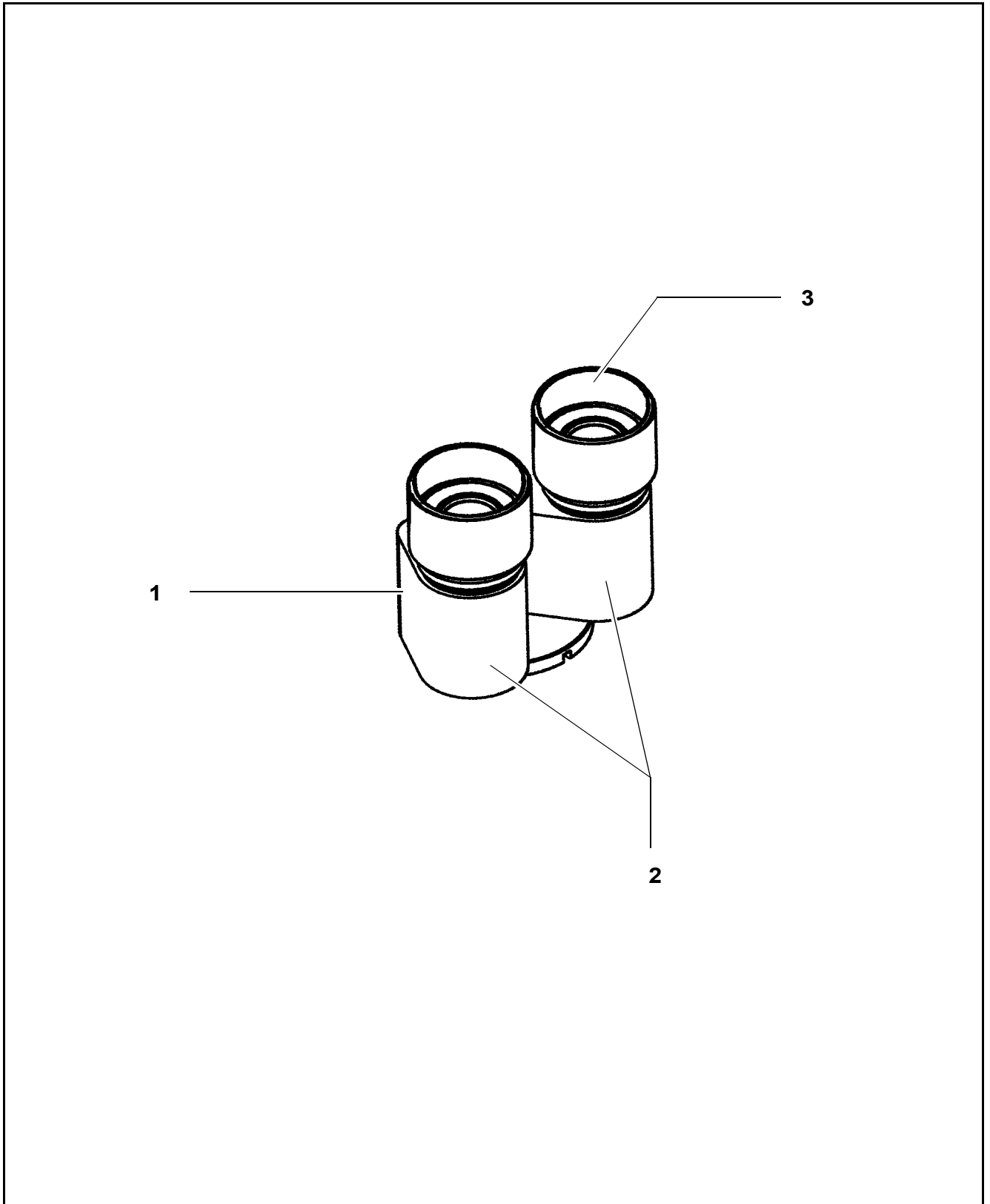


Binocular tube and eyepieces

Straight tube

The straight tube is part of the standard configuration of the OPMI 1 FC surgical microscope.

- 1 Straight tube
- 2 Adjusting the interpupillary distance
You can set the interpupillary distance by pressing the two tube halves together or pulling them apart. The interpupillary distance has been set correctly when the two eyepiece images merge into one.
- 3 Eyepiece mount



Widefield eyepieces with magnetic coupling



Note:

When the eyepiece has been removed from the tube, please remember that it is equipped with a magnetic coupling. Eyepieces inserted in the tube produce a very minor magnetic field, i.e. the usual regulations for the handling of magnets must only be observed with unused eyepieces.

- Do not place the eyepiece near instruments which may be magnetic.
- Do not place the eyepiece on sensitive electronic instruments such as infusion pumps, heart pacemakers, measuring instruments or magnetic data carriers such as disks, audio/video tapes or credit cards.
- Always store the unused eyepiece in its original packaging.

1 Eyecup

Always set the eyecup in such a way that the entire field of view can be seen.

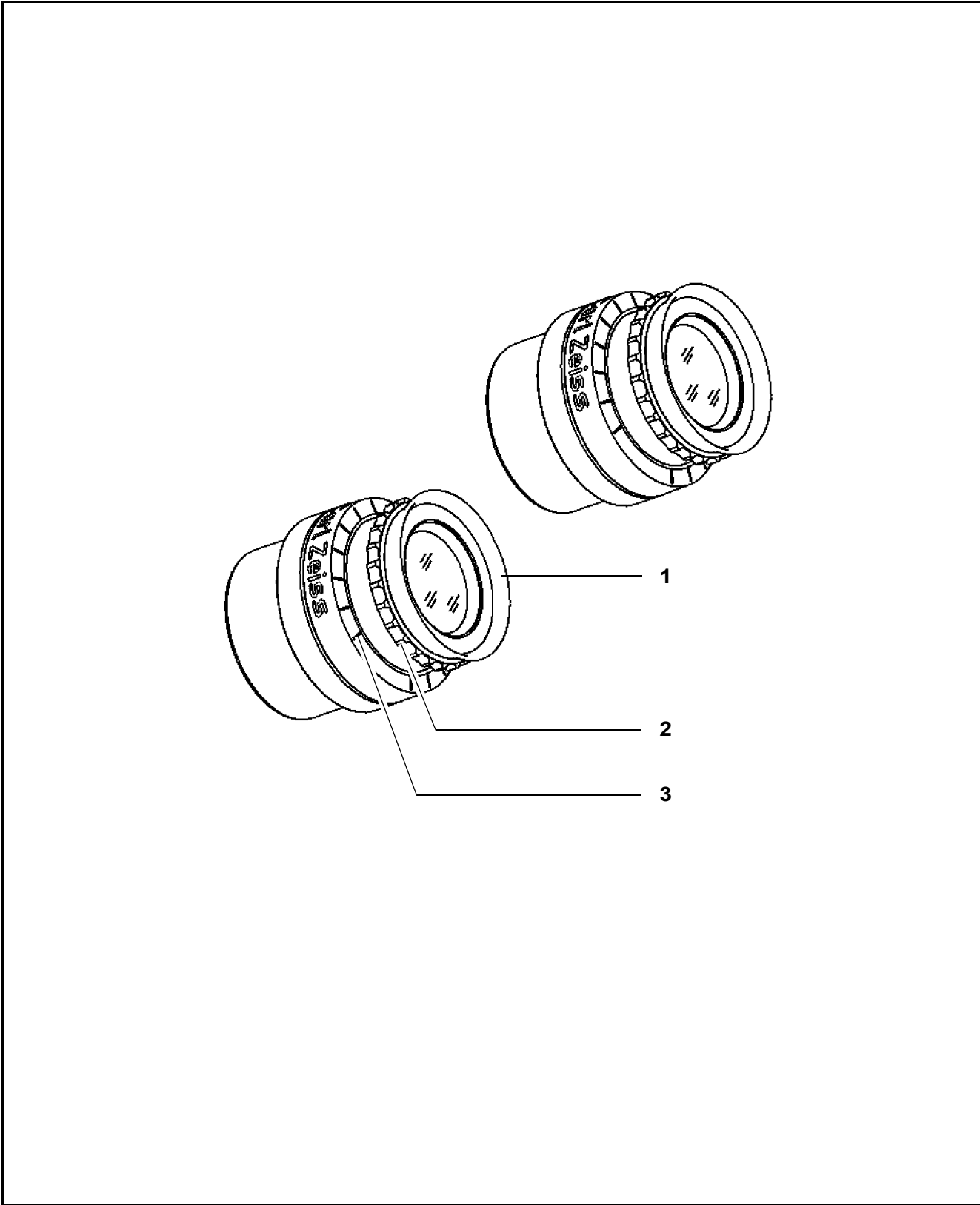
- Viewing with eyeglasses: Screw in the eyecups all the way.
- Viewing without eyeglasses: Adapt the eyecups to the viewer's field of view by screwing them outward.

2 Diopter setting ring

The eyepieces enable you to set your prescription between -8 D and +5 D. Eyeglass wearers using their glasses during work should set the diopter setting ring to 0. Turn the ring until the optimum setting has been achieved. An integrated brake holds the setting ring in the position set.

3 Diopter scale

For reading off the prescription set.



S100 floor stand

Intended use

The S7 floor stand is a suspension system for manually operated Zeiss surgical microscopes. The stands can be used

- in ORs,
- at examination and therapy workstations,
- at training and dissection workstations.

The S100 floor stand has been designed for carrying microscopes and accessories with a total weight of 2.5 kg to 7 kg.

The suspension system is equipped with a 12 V, 100 W halogen illumination system for fiber illumination. If the first halogen lamp fails, you can manually switch to the second halogen lamp.

The 120° coupling makes the suspension system ideal for ENT applications.

Description of the modules

The S100 floor stand comprises the suspension arm, the carrier arm, the electronics box, the stand column and the stand base.

The electronics box is mounted on the carrier arm. It contains the illumination system, the connector panel and the power switch.

The suspension arm permits almost effortless positioning of the surgical microscope. The spring force of the suspension arm can be varied in a range from 2.5 to 7 kg, permitting reliable balancing of the microscope even with accessory equipment attached. The suspension arm is provided with a switch for illumination.

The stand base is easy to move on its four casters. It has been designed in such a way that high stability is ensured even with unfavorable loading of the stand. The locking tabs permit you to reliably secure the S100 floor stand in position.

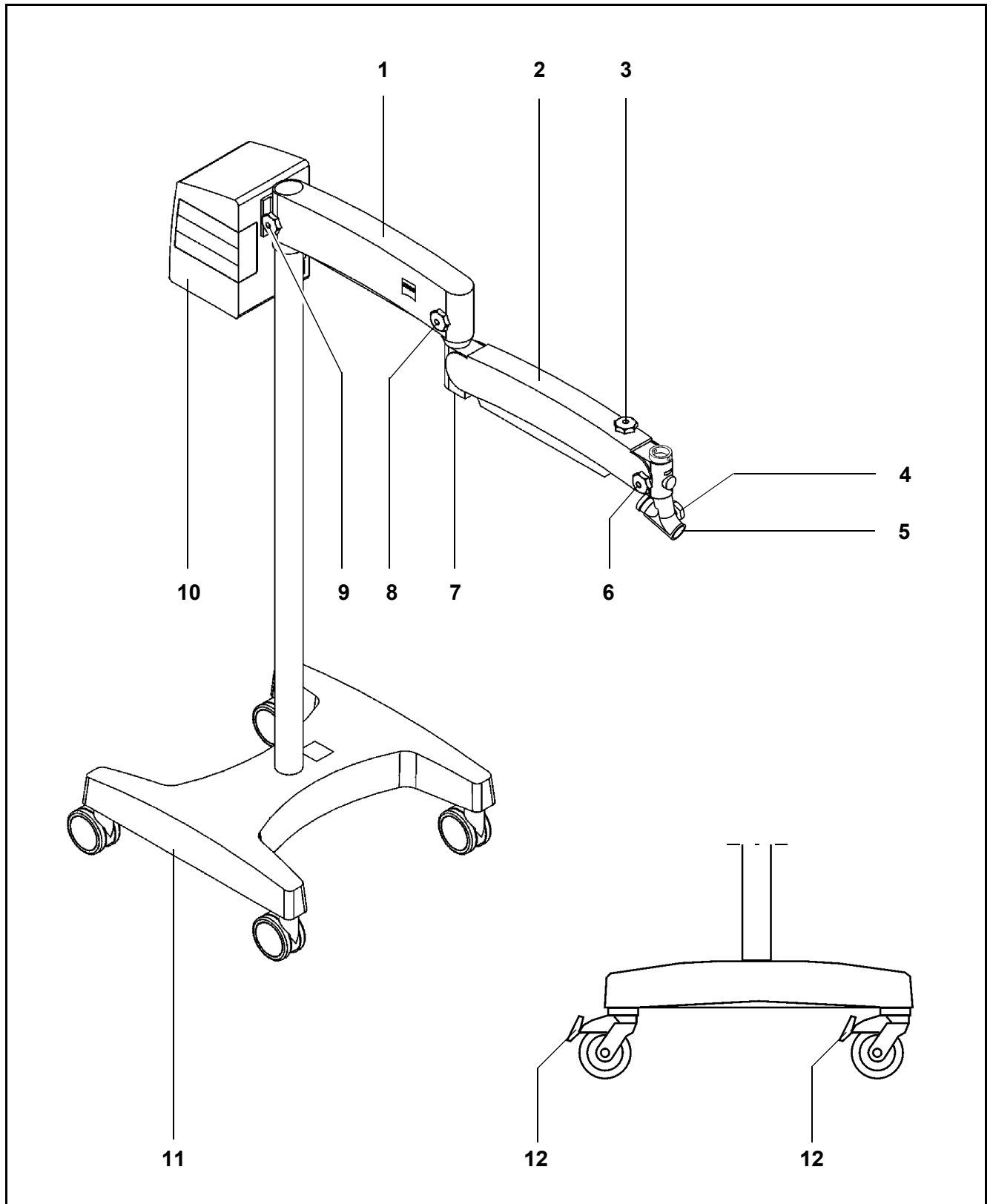


Note:

As the stand can be easily maneuvered, there is a tendency to underestimate its weight. Therefore, move the stand slowly and carefully!

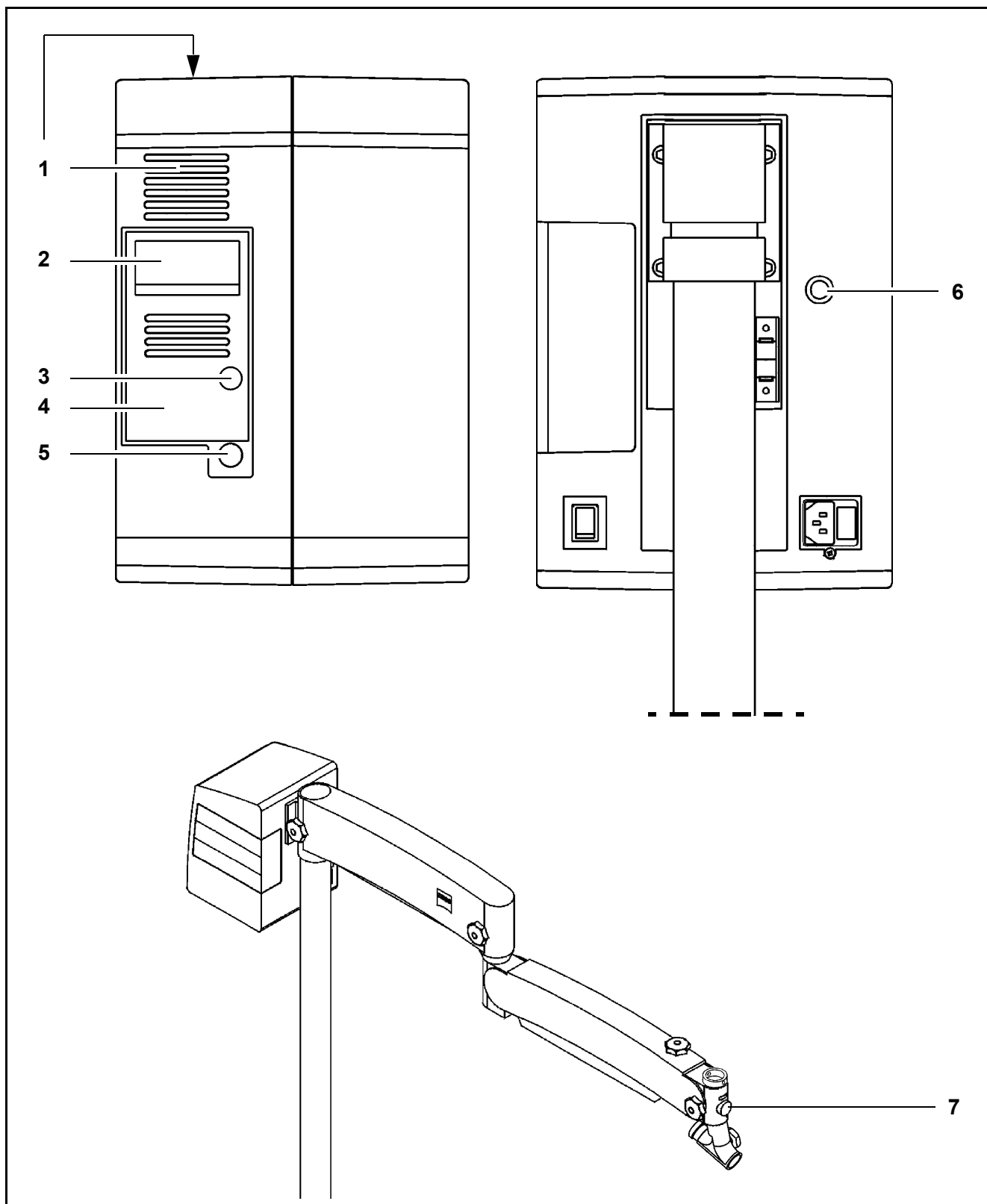
Controls, displays, connections

- 1** Carrier arm
- 2** Suspension arm
The suspension arm is provided with a switch. When the suspension arm is moved into its working position, this switch activates the illumination system. The illumination system is switched off in the upper rest position.
- 3** Adjustment screw
After balancing the microscope equipment, you can use this screw to set the friction of the upward/downward motion of the suspension arm.
- 4** Friction adjustment screw
Use this screw to set the friction of the microscope's tilt motion.
- 5** 120° coupling
The 120° coupling is a part of the basic configuration.
- 6** Friction adjustment screw
Use this screw to set the friction of the coupling's rotation.
- 7** Balance setting screw
- 8** Friction adjustment screw
Use this screw to set the friction of the suspension arm's horizontal motion.
- 9** Friction adjustment screw
Use this screw to set the friction of the carrier arm's rotation.
- 10** Electronics box
The electronics box contains the illumination system.
- 11** Stand base
The four steerable casters make it easy for you to move the instrument to the site of use.
- 12** Two locks
Press once to lock the stand in position.
To release, press down the upper part of the lock.



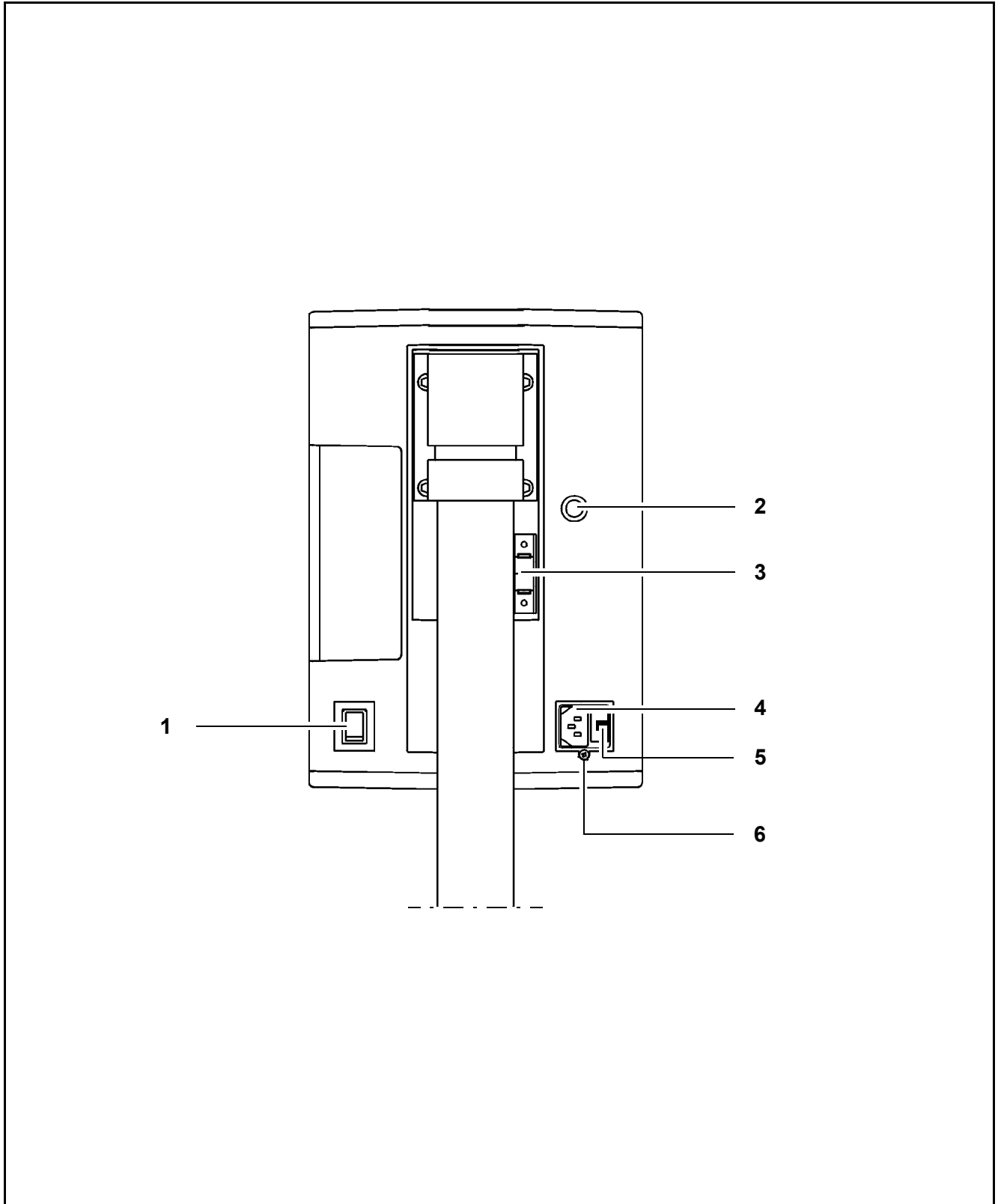
Illumination system

- 1** Ventilation grid
Do not cover the ventilation grid! Make sure that drapes do not cover the grid. Otherwise the unit may overheat, causing the integrated thermal cut-out to switch off the illumination.
- 2** Flap
The flap is the mechanical indicator for the operating status of the halogen lamps.
 - If the flap is closed, the main lamp is operative.
 - An open flap indicates that the backup lamp is operative.
- 3** Manual switching to the backup lamp
Press this button to swing the backup lamp into the beam path.
- 4** Lamp module
- 5** Opening the lamp module
When you press this button, the lamp module is slightly ejected. Pull out the lamp module all the way for changing the lamp.
- 6** Socket for the light guide
This socket is used to direct the light from the illumination system to the surgical microscope.
- 7** Brightness control
If the illumination system is on, you can continuously adjust the brightness of the fiber illumination by turning this knob.



Connection panel

- 1** Power switch
- 2** Socket for light guide
The light guide directs the light from the illumination system to the surgical microscope.
- 3** Strain relief device
The strain relief device prevents inadvertent unplugging of the power cable.
- 4** Power inlet
The power cable connects the instrument to the line power socket. The power inlet contains the instrument fuse.
- 5** Indicator window for rated voltage and voltage switchover
The line voltage available at the site of installation must lie within the range specified in the technical data, and must be set to 115 V or 230 V as applicable.
- 6** Potential equalization (option)
For connecting the unit to the potential equalization contact in the OR.



Preparations for use

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Attaching the equipment

Mounting coupling and microscope

**Caution:**

- The suspension arm is under spring tension. Hold the arm with your hand before loosening friction adjustment screw (1).
- Screw (1) only has a braking, no locking function.
- The maximum weight of the microscope including accessories and the coupling must not exceed 7 kg.
- After the microscope has been mounted, the suspension arm can move downward. Prevent the microscope from knocking against any objects.

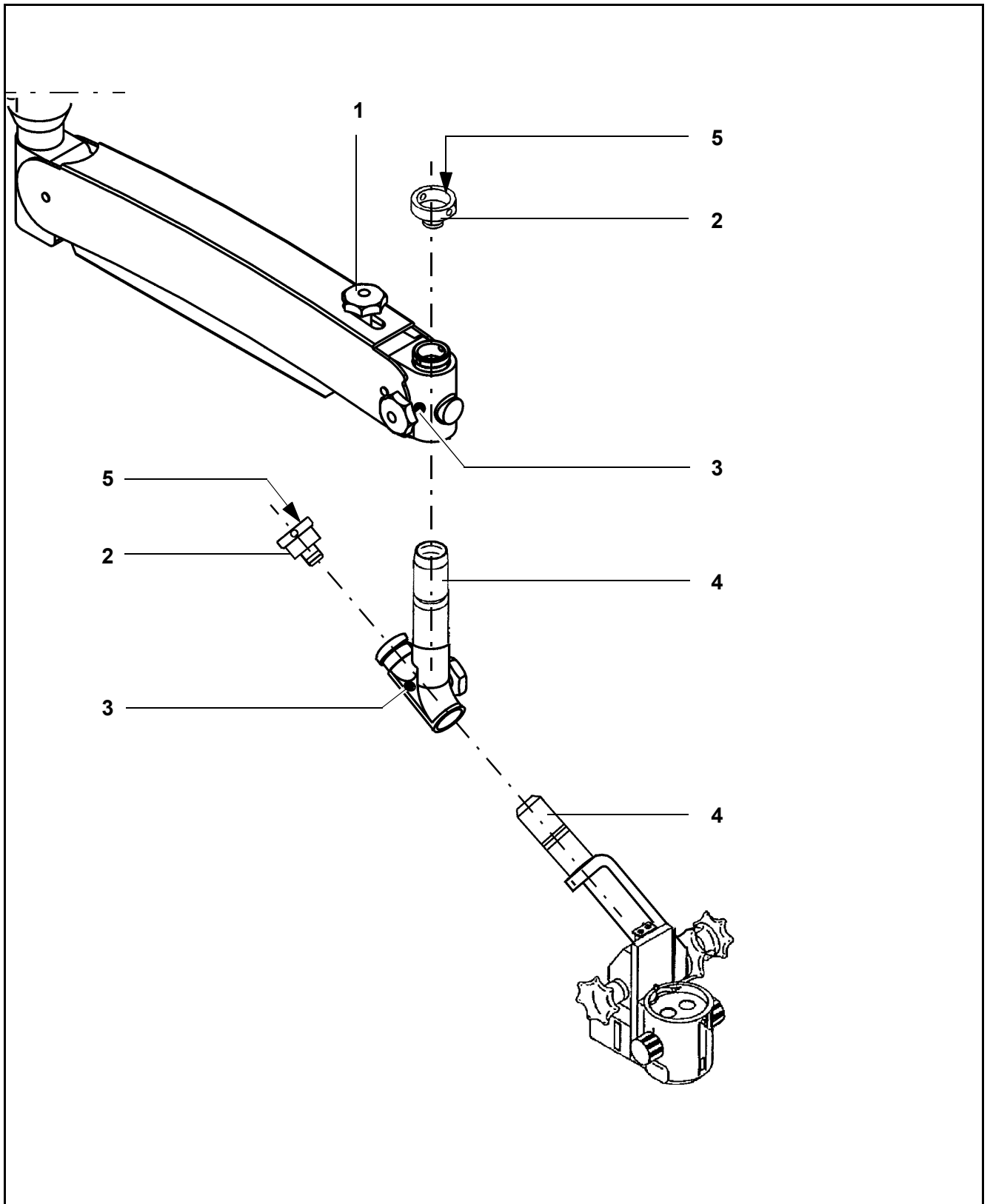
Proceed as follows:

- Tighten friction adjustment screw (1) (braking function).
- Slightly lubricate shaft(s) (4) (e.g. with instrument grease or vaseline).
- Insert shaft(s) (4) in the mount(s). Screw in securing screws (2) and (3). Use a suitable tool (e.g. hex key or screwdriver) to tighten securing screws (2) and (3).
- Securing screw (2) contains a hex socket head screw (5) which is an additional securing screw. Firmly tighten hex socket head screw (5) using a suitable hex key.

**Note:**

To change the surgical microscope or equipment configuration, proceed in the reverse order. Please observe the following points:

- Move the suspension arm into its top position.
- Tighten friction adjustment screw (1) (braking function).
- Hold the surgical microscope securely while loosening the securing screws.



Binocular tube, eyepieces and objective lens, mounting

- Bring the suspension arm in a position convenient for you and tighten friction adjustment knob (1).
- Give securing screw (5) a few turns to loosen it.
- Remove cover (2) and store it in a safe place.
- Place binocular tube (4) on the microscope body and firmly tighten securing screw (5).



Note:

You can install further accessories between the binocular tube and the microscope body. Lock these units in position in the same way using securing screw (5).

- Insert widefield eyepieces (3) as far as they will go in the mounts (4) intended for them in the binocular tube. The magnetic coupling reliably secures them in position.



Note:

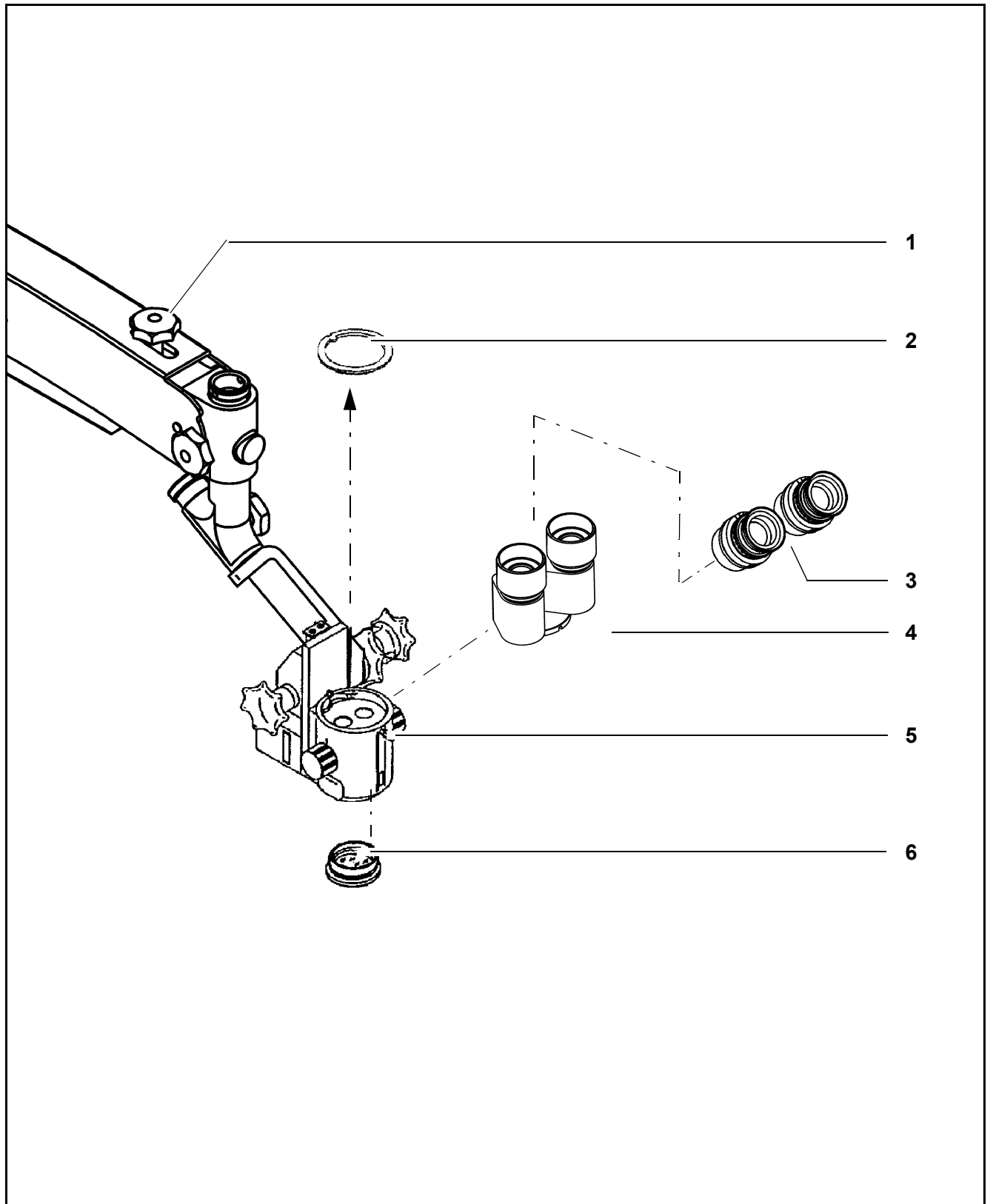
If you wish to use documentation equipment, we can supply an eyepiece with a reticle to aid focusing. The retrofitting of a reticle to an eyepiece can only be performed in the factory or by our service staff. Always install the eyepiece with the reticle on the same side of the binocular tube where the documentation equipment is located.

- Loosen adjustment screw (1) again and adjust the degree of friction as required.
- Screw objective lens (6) into the microscope body and tighten it firmly.



Caution:

- Before every use and after re-equipping the instrument, make sure that binocular tube (4) is securely locked in position.
- Make sure that securing screw (5) and objective lens (6) have been firmly tightened!
- Re-adjust the balance of the suspension arm after every change of the equipment.



Microscope accessories, changing

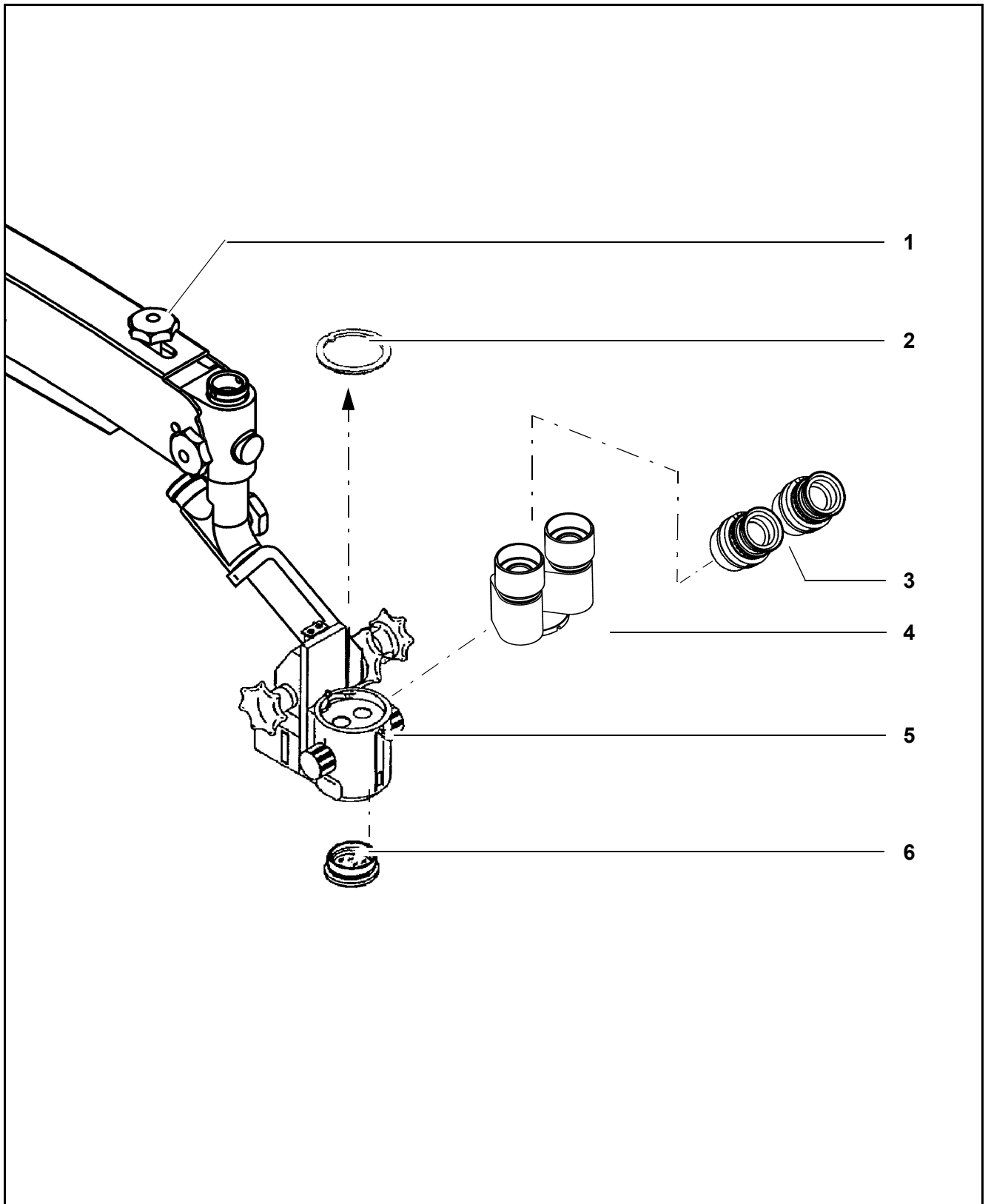
The microscope accessories can be changed in reverse order to that described in section "Binocular tube, eyepieces and objective lens, attachment". Please observe the following:

- Turn off the unit at the power switch before changing any accessories.
- Bring the suspension arm in a position convenient for you and tighten friction adjustment knob (1).
- After changing the accessories, loosen the adjustment screw again and adjust the degree of friction as required.



Caution:

- Before every use and after re-equipping the instrument, make sure that binocular tube (4) is securely locked in position.
- Make sure that securing screw (5) and objective lens (6) have been firmly tightened!
- Re-adjust the balance of the suspension arm after every change of the equipment.



Connections

Connecting the stand



- Check the voltage setting at (3).

Caution:

The voltage of the suspension system is set in the factory to the rated voltage of the country of destination which must lie between 100 V and 240 V. The line voltage available at the site of installation must lie within the admissible voltage range, see the technical data. If this is not the case, you must not operate the system.



Note:

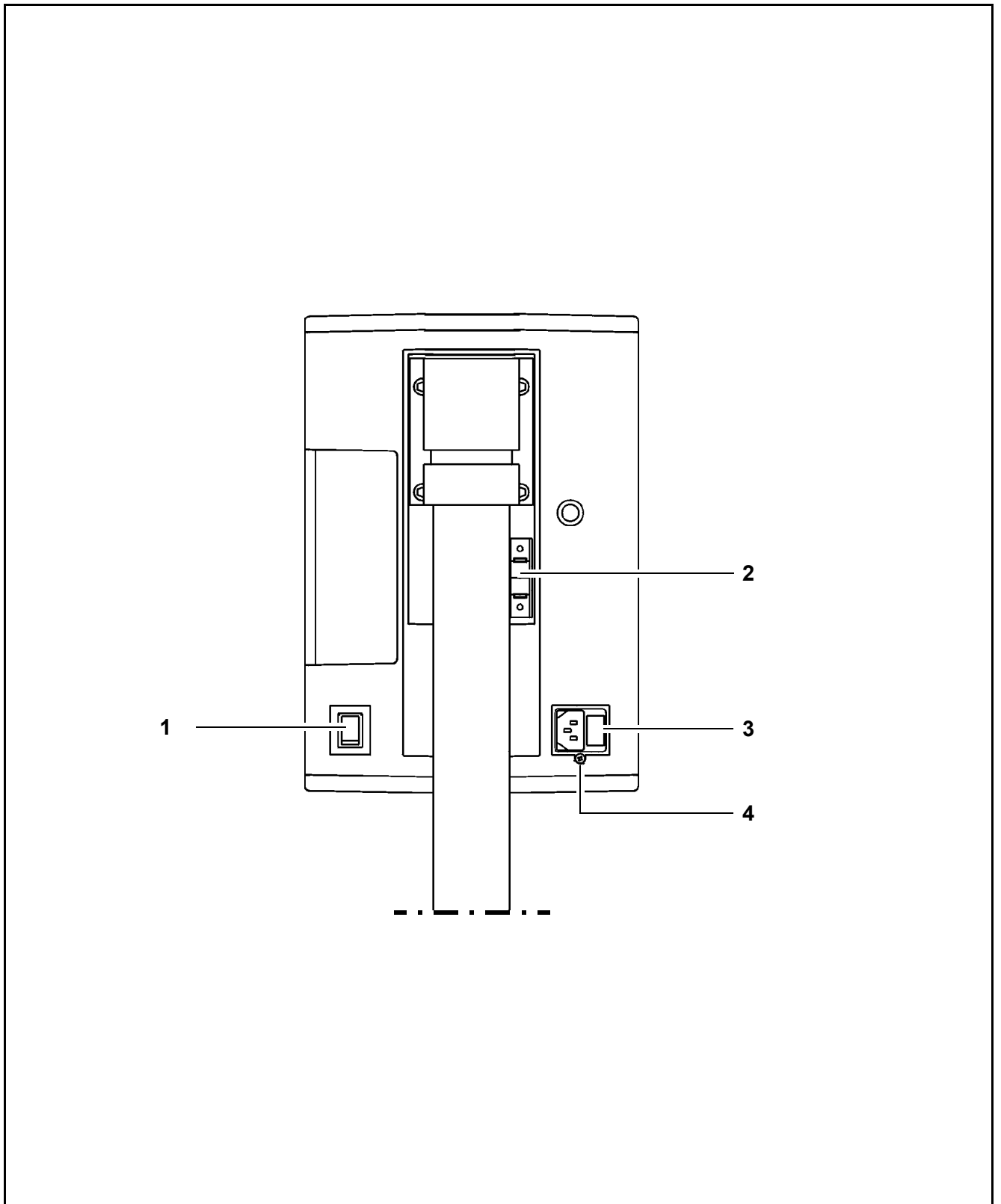
Only unplug/plug in the power cable when the unit has been switched off with power switch (1).

- If necessary, connect potential equalization connector (4) of the suspension system with the potential equalization contact in the place of use.
- Connect the power cable to strain relief device (2).
- Connect the suspension system to line power using the power cable intended for it. Only use power outlets which are provided with a properly connected protective earth contact.

Connecting the light guide

- Switch off the unit.
- Insert the light guide into the light guide socket of the illumination system in the electronics box until it snaps in.
- Insert the light guide into the light guide socket on the surgical microscope until it snaps in.
- Insert the light guide in the light guide clip on the bracket of the surgical microscope.
- Make sure that the light guide has been routed in such a way that the movement of the stand and the surgical microscope are not restricted and that they can be moved in all directions without stretching, extreme kinking or twisting of the light guide.

For a detailed description of the light guide change, see page 66.



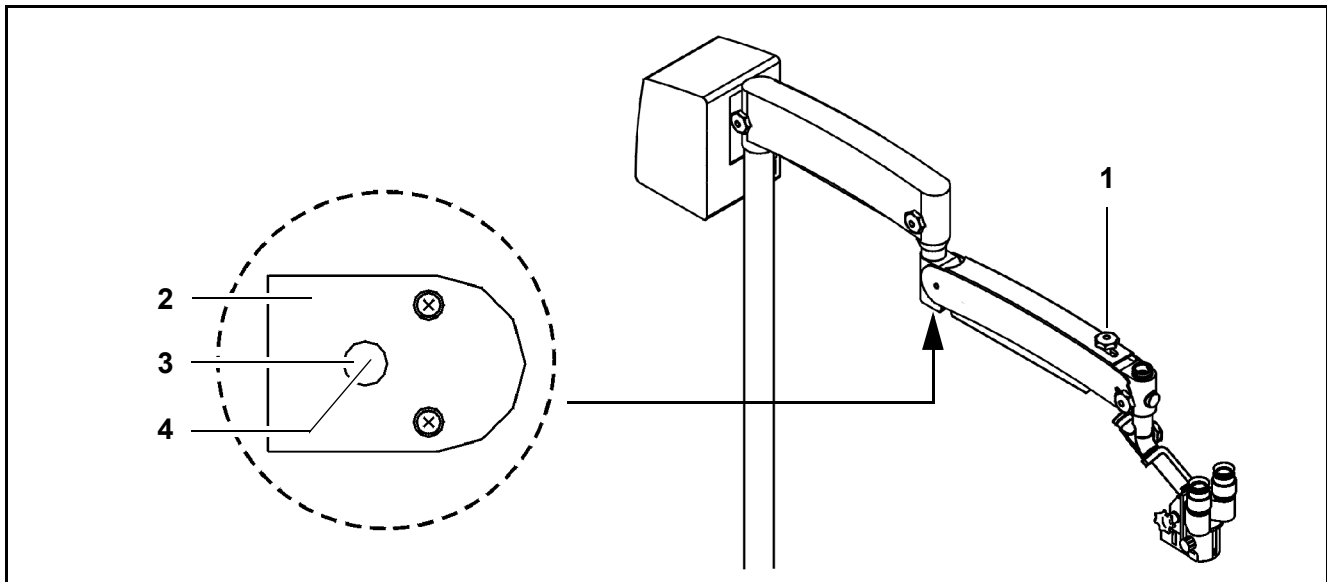
Adjusting the system

Balancing the suspension arm



Caution:

- The suspension arm is under spring tension. Hold the arm with your hand before loosening friction adjustment screw (1).
 - Screw (1) only has a braking, no locking function.
 - The maximum weight of the microscope including accessories and the coupling must not exceed 7 kg.
 - After the microscope has been mounted, the suspension arm can move downward. Prevent the microscope from knocking against any objects.
- Loosen friction adjustment screw (1) of the suspension arm.
 - Place an 8 mm Allen key into opening (3) in cover (2).
 - Turn balance adjusting screw (4) until the suspension arm is balanced.
 - Check the balance setting in several positions.
 - Use screw (1) to set the required friction of the upward/downward motion of the suspension arm.



Positioning the floor stand



Note:

Please also read the chapter: "Relocating the stand".

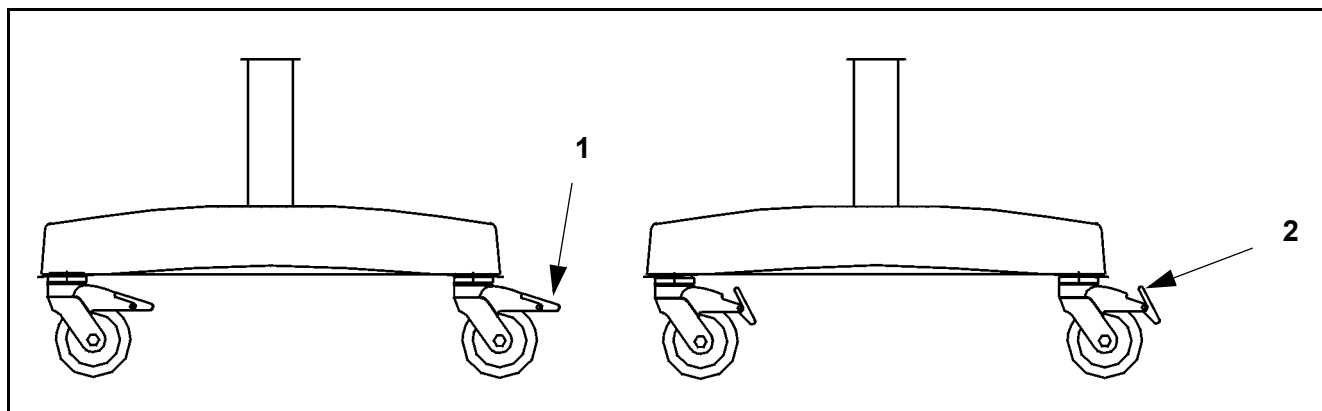
- Move the floor stand to its site of use. Make sure that the carrier arm and the suspension arm are folded together for transport. This is essential for optimum mobility of the stand.
- Press the upper parts of locks (2) downward to release the locks.
- Bring the stand into the position required.
- Press locks (1) downward.
- Check whether the stand is locked in position.



Caution:

The floor where the stand is positioned must be level.

- Secure the stand in position using the brake tabs on the base.
- Make sure that the floor stand is stable and cannot tilt or roll away.

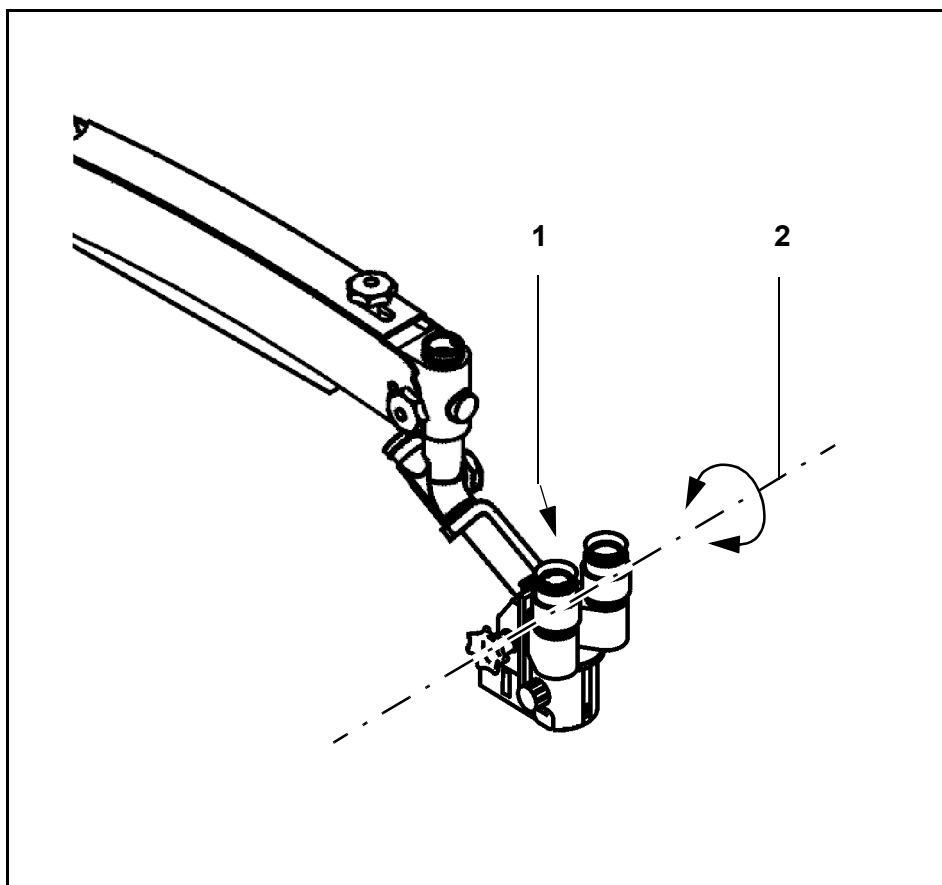


Adjusting the tilt of the microscope

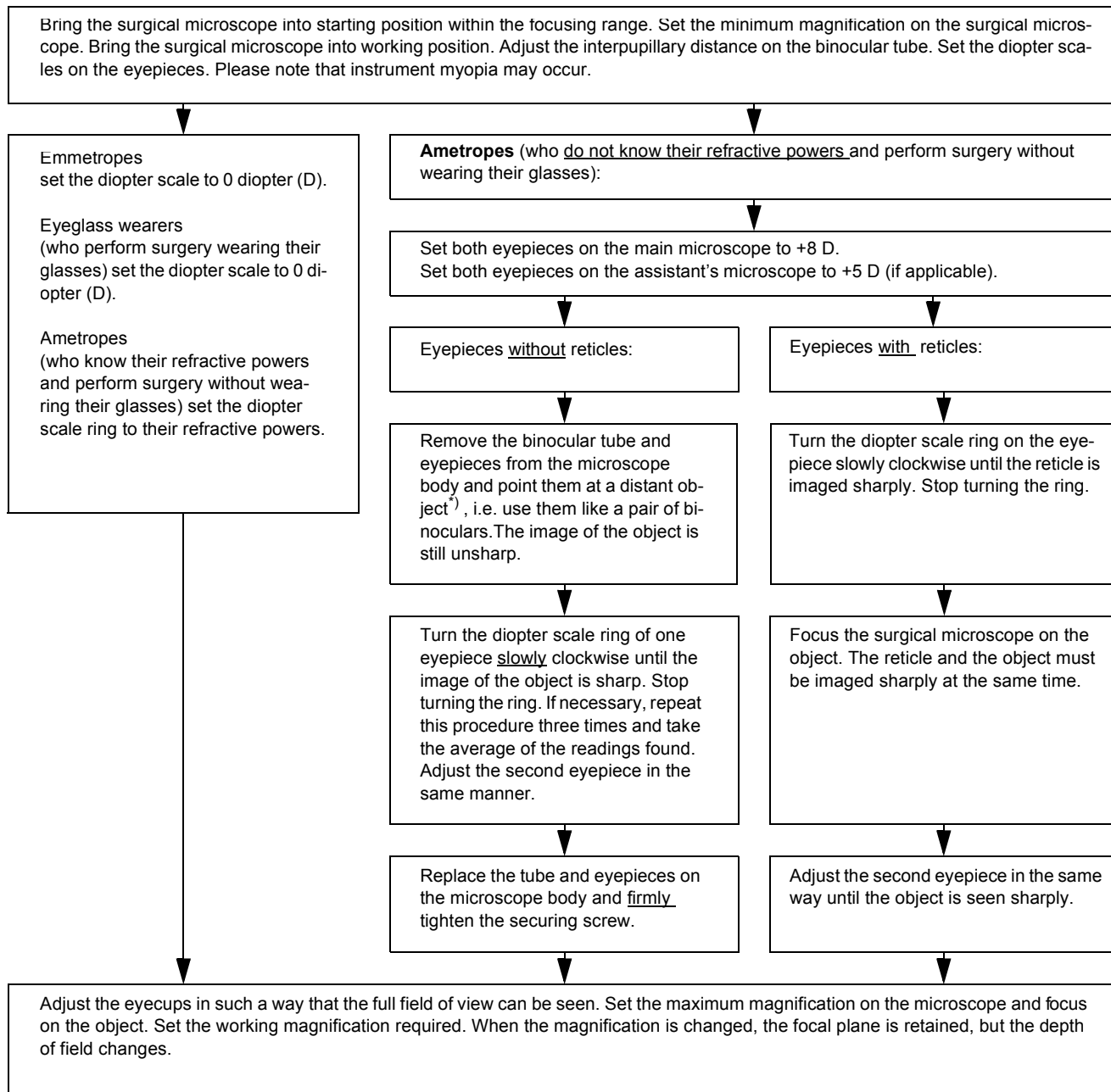
For different observation positions, the microscope can be turned about the axis (2) of the adjusting knob (1). Using this adjusting knob (1), you can set the friction of the microscope's tilt motion.

Set the friction of the tilt motion more tightly by turning the adjusting knob (1) clockwise. If you turn the adjusting knob (1) anti-clockwise, the friction of the tilt motion will be more smoothly.

For further information about the adjusting knob (1), see page 24, item 6.



Adjusting the surgical microscope

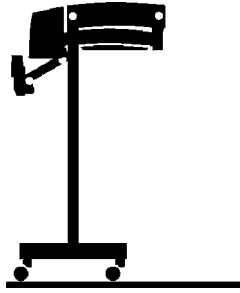


Note: If several surgeons use the instrument, it is advisable to draw up a table showing the individual refractive powers of each surgeon and to keep it in a handy location near the instrument.

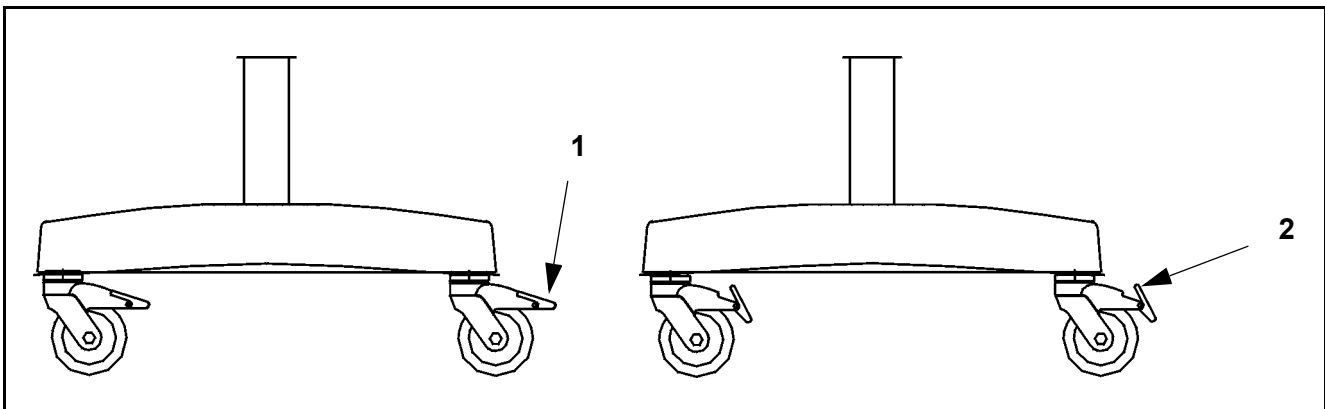
***) CAUTION:** Never point the eyepieces at the sun!

Relocating the stand

- Turn off the unit at the power switch.
- Unplug the power cord from the wall outlet.
- Release locks (2) by pressing the upper parts of the locks downward.
- Bring the unit into its moving position, see sketch.



- Be careful of heights when passing through doorways.
- Avoid collisions of any kind.
- Do not go over steps and edges: the stand might topple!
- Be extremely careful when moving over slopes.
- Do not park the stand on slopes.
- Press locks (1) downward.
- Check whether the stand is locked in position.



Operation

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Checklist

**Caution:**

Always check the following points before using the instrument (without patient!):

S100 suspension system

- Check that the securing screws have been tightened, see page 42.
- Check that the correct rated voltage has been set for the suspension system.
- Check that all cables have been connected.
- The light guide has been connected (also to the microscope).
- Turn on the instrument at the power switch of the suspension system.

Illumination

- The halogen lamps including the backup lamps are intact.
- The halogen illumination can be switched on and off by moving the suspension arm up and down. The halogen illumination remains on while the suspension arm is within an adjustable working range. When the suspension arm is in its upper rest position, the halogen illumination is off.

Balance setting

- Check that the suspension arm has been properly balanced.
- The friction of the suspension arm, the carrier arm, the 120° coupling and the surgical microscope has been set as required.

Stand base

- The locks have snapped in and the stand is securely positioned.

**Warning!**

If a function fails, you must not use this instrument for safety reasons. Correct the fault (see the "Troubleshooting table") or contact our service dept.

OPMI 1FC surgical microscope

- The binocular tube is screwed on tightly.
- The securing screw for the binocular tube is tightened firmly.
- The objective lens is screwed on tightly.
- Check that the light guide has been connected.
- Turn on the instrument at the power switch of the suspension system.

Eyepieces / Binocular tube

- Check that the surgical microscope and the tube are in a position convenient for you.
- Check that the correct interpupillary distance has been set.
- Check that the eyecups have been adjusted in such a way that you can see the full field of view.
- Check that the correct prescription has been set on the diopter ring.
- Check that image quality is the same throughout the entire magnification range.

Friction adjustment of the surgical microscope

- The friction of the tilt motion of the microscope has been set (1).
- The friction of the rotational movement of the microscope has been set.
- The friction of the focusing movement has been set.
- Check that the minimum working distance (height) from the surgical field has been adjusted.

Accessories

Proper functioning of further instrument components has been checked using the relevant user's manual.

**Warning!**

If a function fails, you must not use this instrument for safety reasons. Correct the fault (see the "Troubleshooting table") or contact our service dept.

Procedure

Starting work

- All preparations for use have been completed.
- The system has been checked using the checklist.
- Switch on the power switch of the suspension system.
- Move the suspension arm into its working position.
- Swing the surgical microscope over the surgical field.
- Recheck the minimum distance to the surgical field.
- Set the brightness level of the surgical field illumination as required.
- Bring the surgical microscope into an ergonomic position.
- Select the lowest magnification using the knob of the magnification changer.
- Set focusing to the mid-position.
- For coarse focusing, look through the eyepieces and lower the surgical microscope via the suspension arm until the surgical field comes into focus. This will result in coarse focusing.
- Select the highest magnification using the knob of the magnification changer.
- Look through the eyepieces and activate the focusing function until the microscope is sharply focused on the surgical field.
- Select the magnification required (magnification changer).
- Look through the eyepieces of the binocular tube. Adjust the eyepieces in such a way that you can see both the edge of the field of view and the microscope image sharply. Also see “Adjusting the surgical microscope“.

Finishing work

- Move the suspension arm into its upper rest position.
- Switch off the instrument when you are not using it.

**Warning!**

- Avoid looking directly into the light source, e.g. into the microscope objective lens or into the light guide!

What to do in an emergency

Failure of the halogen lamp

**Caution:**

Do not cover the ventilation grid! Make sure that drapes do not cover the grid, as this can lead to overheating of the lamp modules and to lamp failure.

**Note:**

The lamp housing contains a backup lamp which is automatically swung into the illumination beam path when the first lamp fails. Open flap (3) indicates that the backup lamp is operative.

Changing the lamp after lamp failure

Manual selection of the backup lamp

Press the button (2) to swing the backup lamp into the beam path.

Recommendation:

- Immediately change the defective halogen lamp after using the unit, see page 68.

If the backup lamp fails:

- Change the halogen lamp.

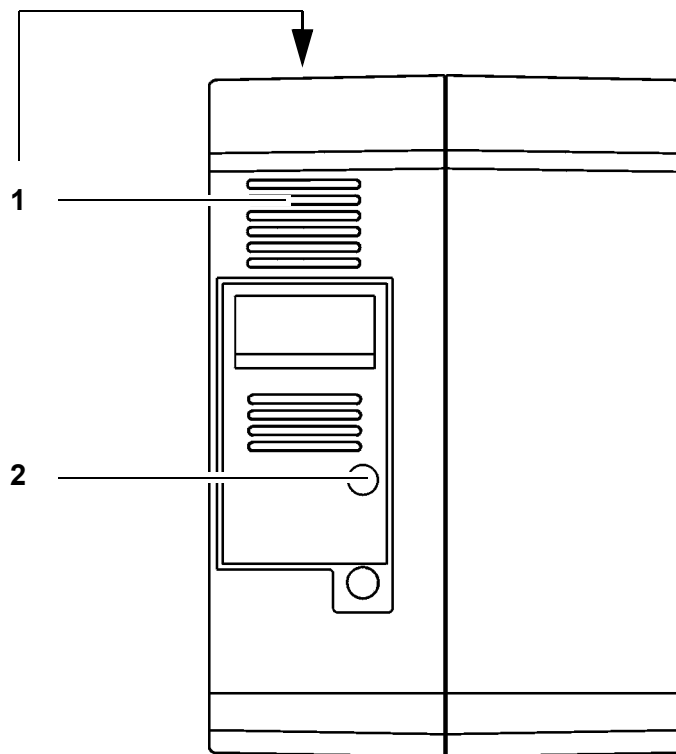
**Warning!**

If you replace the lamp shortly after it has failed, the lamp will still be very hot. Wear heat-protection gloves to avoid burns!

This procedure is described under "Changing the halogen lamp", see page 68.

After the lamp change:

- Switch the suspension system back on. Adjust the brightness of the illumination on the control panel as required.



Maintenance / Further information

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Trouble-shooting

- This instrument is a high-grade technological product. To ensure optimum performance and safe working order of the instrument, its safety must be checked once every 12 months. We recommend having this check performed by our service representative as part of regular maintenance work.

If a failure occurs which you cannot correct using the trouble-shooting table, attach a sign to the instrument stating it is out of order and contact our service representative.

S100 Suspension System - Illumination

Problem	Possible cause	Remedy	See
No illumination at all.	Power cord not plugged in.	Plug in power cords.	page 48
	Power switch not pressed.	Press power switch.	page 38
	Defective instrument fuse.	Change instrument fuse.	page 72
	Defective power cable.	Change power cable.	-
	Line power failure.	Contact in-house technician.	-
	Failure of suspension system electronics.	Illuminate surgical field using an OR illuminator. Contact service dept.	-
	Light guide not properly inserted in lamp or microscope.	Insert light guide as far as it will go.	page 48
Insufficient illumination.	Brightness level set too low.	Adjust brightness using the brightness control knob.	page 36
	Light guide not properly inserted in lamp or microscope.	Insert light guide as far as it will go.	page 48
	Defective light guide (illumination not uniform).	Change light guide.	page 66

Problem	Possible cause	Remedy	See
Halogen lamp in the illumination system remains dark, and fan is running.	Knob for brightness control set to the left-hand stop.	Turn the knob clockwise.	page 36
	Inclination switch deactivated.	Move surgical microscope on the suspensions arm down from the parking position.	page 34, Pos. 2
	Lamp module has no contact.	Insert lamp module as far as it will go.	page 60
	Defective halogen lamp.	Switch to backup lamp.	page 60
	Ceramic base does not have proper contact with halogen lamp.	Plug ceramic base firmly onto contacts of halogen lamp.	page 70
	Failure of suspension system electronics.	Illuminate surgical field using an OR illuminator. Contact service dept.	-
Halogen lamp goes constantly off and on again during operation.	Ventilation slots are covered or contaminated.	Ventilation slots must be clear; clean them if necessary.	page 60
	Thermal cut-out in lamp housing is contaminated.	Clean thermal cut-out with a dry brush; blow it clean, if necessary.	-
	Defective fan.	Contact service dept.	-
	Failure of suspension system electronics.	Illuminate surgical field using an OR illuminator. Contact service dept.	-

Suspension system and microscope

Problem	Possible cause	Remedy	See
Motion of surgical microscope too stiff.	Friction adjustment screw on suspension system tightened too firmly.	Loosen friction adjustment screw on suspension system as required.	page 34

Changing the light guide.



Note:

If the field-of-view illumination is not even, the light guide can be defective. This is a defect which occurs in particular after the light guide has been badly bent or twisted. It is easy to check the light guide: turn it in its socket on the surgical microscope while watching the illuminated field of view. If the dark spots in the field of view also turn, the light guide is defective.

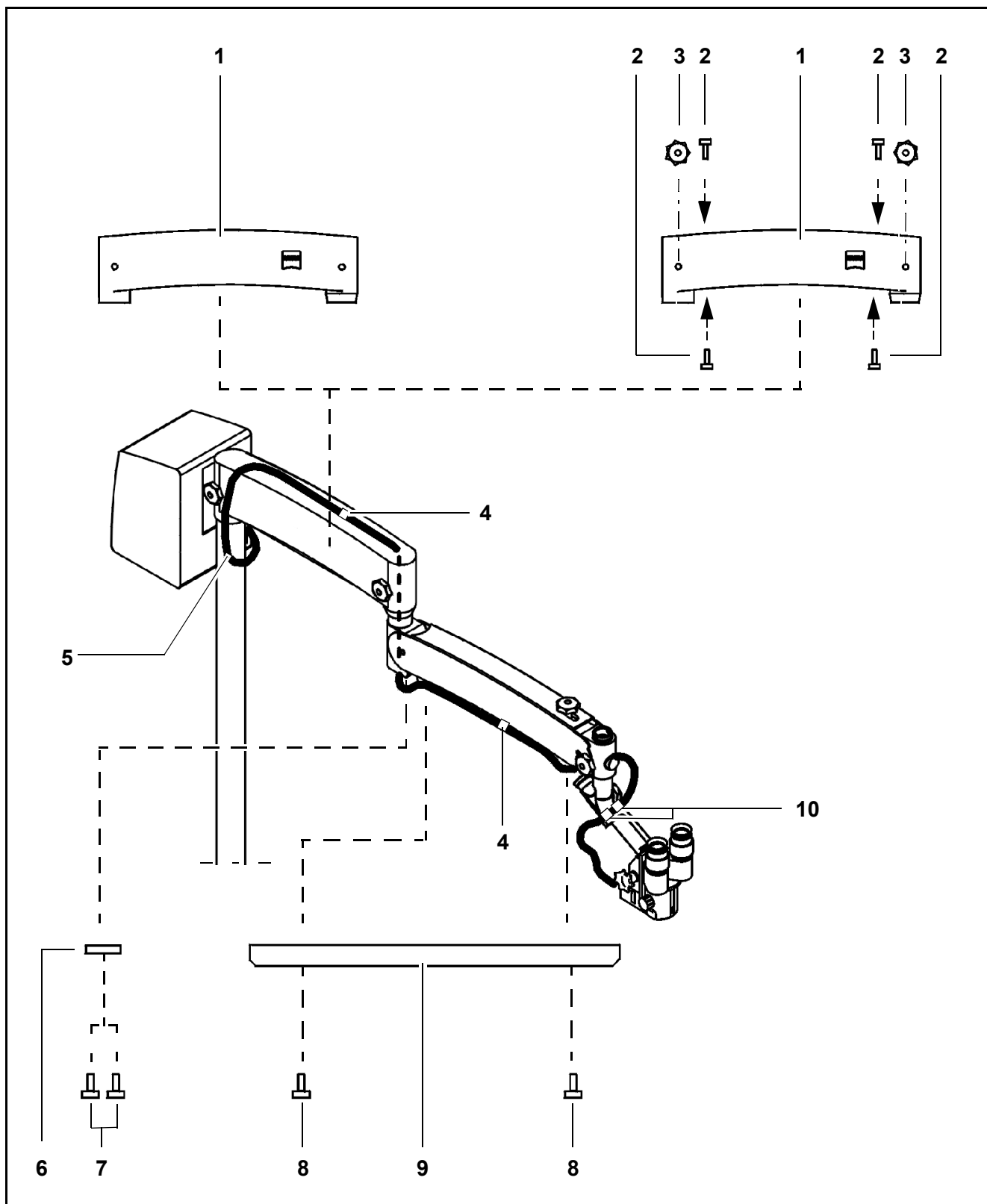
Change light guide as follows:

Remove light guide (5)

- Switch off the unit.
- Pull out the light guide (5) from its mounts on the illumination system and on the surgical microscope.
- Remove the friction adjustment screws (3).
- Remove the connecting screws (2) of the covers (1).
- Remove the covers (1).
- Remove the fastening screws (8) of the cover (9).
- Remove the cover (9).
- Remove the fastening screws (7) of the cover of the joint (6).
- Remove the cover of the joint (6).
- Remove the light guide (5) from the two strain relief devices (4) and the two holders (10).
- Pull the light guide out of the cable routing on the carrier arm system.

Installing the light guide (5)

- Proceed in the reverse order to install the new light guide (5).
- Make sure that the light guide has been routed in such a way that the movement of the carrier arm system and surgical microscope are not restricted and that they can be moved in all directions without stretching, extreme kinking or twisting of the light guide.



Changing the halogen lamp

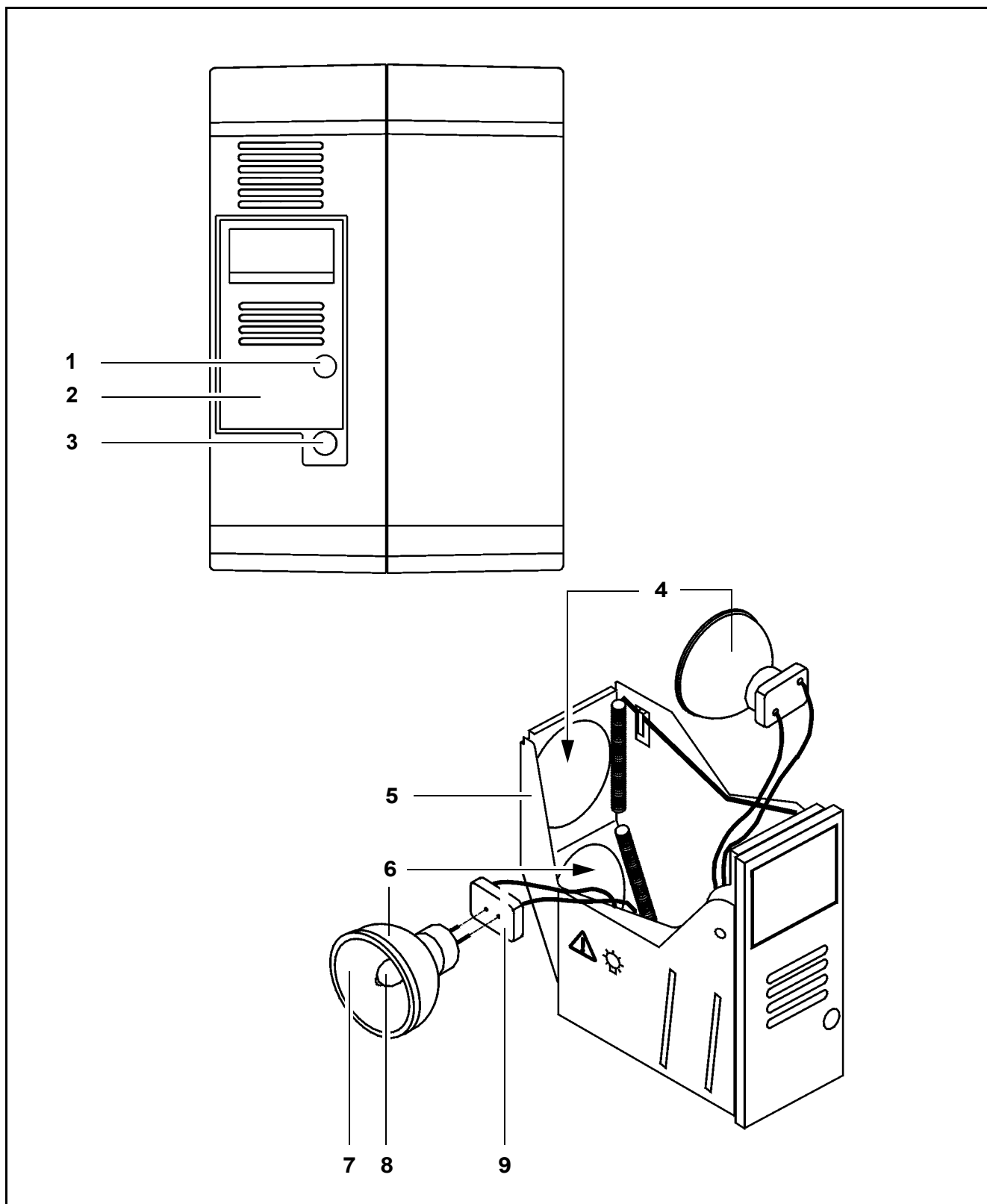
Remove defective lamp



Warning!

If you change the lamp shortly after it has gone out, the lamp will still be very hot. Wear heat-protection gloves to avoid burns!

- Turn off the suspension system at the power switch.
- Press button (3), the lamp module is slightly ejected. Pull out lamp module (2).
- Press button (1). The lamp holder in the lamp module springs open.
- Remove the defective halogen lamp from the spring-loaded mount.
- Pull ceramic base (9) from the contact pins of the halogen lamp.



Insert new lamp

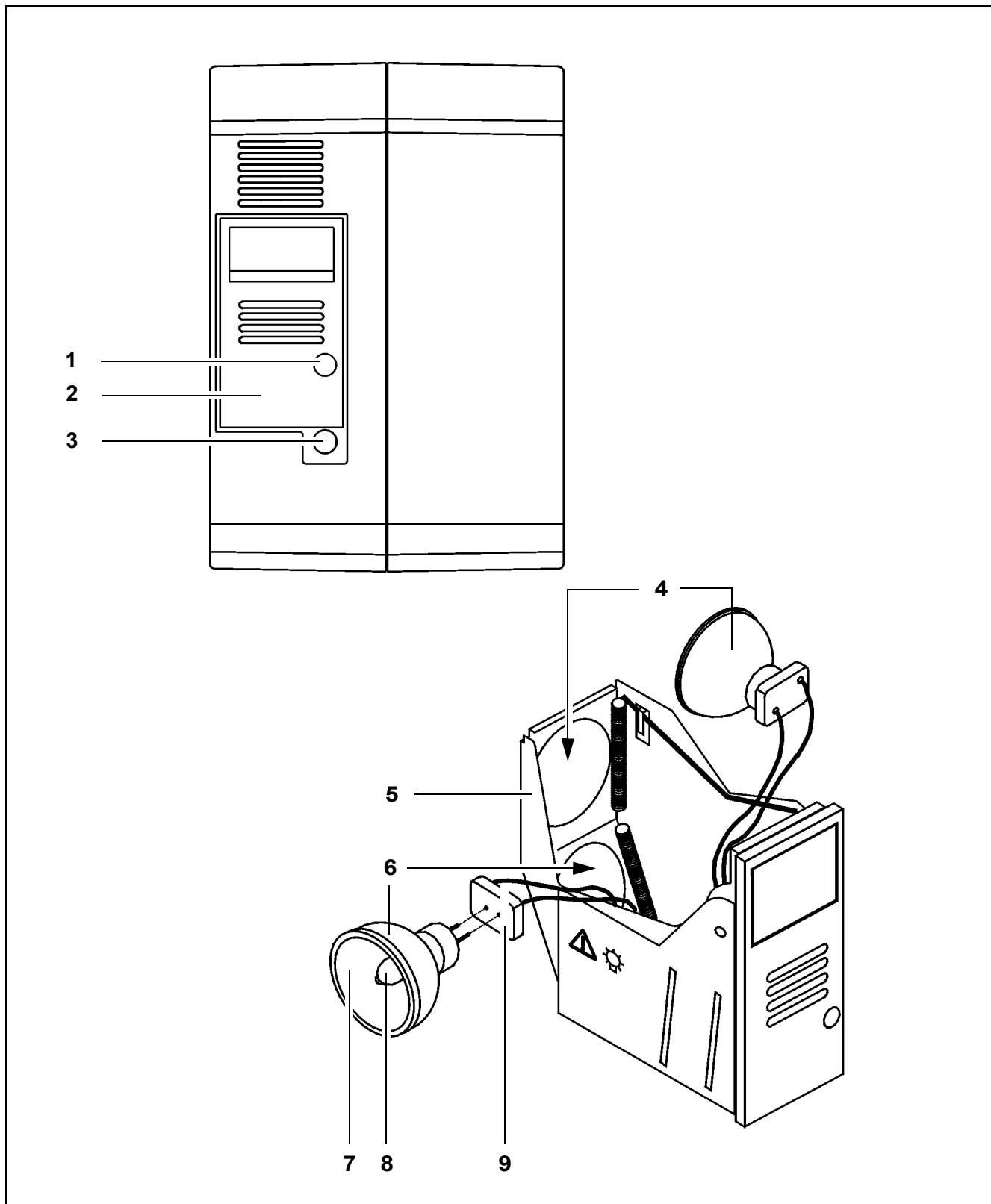
- Plug the ceramic base (9) onto the contact pins of a new halogen lamp.
- Insert the new halogen lamp. Make sure you do not touch lamp bulb (8) or the interior of reflector (7).
- Press the halogen lamp into the spring-loaded mount.
- Press the lamp holder (5) into the lamp module until it snaps in.
- Push the lamp module including the new halogen lamp back into the unit.
- Turn on the system at its power switch.
- Use the brightness control knob to adjust the illumination, when the suspension arm is in its working position.

**Note:**

Only use 12 V, 100 W halogen lamps.
Available under Cat. No.: 380079-9040-000

To use the service life of your halogen lamps as economically as possible, we recommend that you do not set the brightness to a higher level than required for your work.

If main lamp (4) has failed, remove it and replace it by backup lamp (6). Install the new halogen lamp instead of the backup lamp.



Changing the fuse

The fuses are integrated in the power inlet socket for the power cable. To change a fuse, proceed as follows:

- Turn off the unit at the power switch.
- Unplug the power cable from the line power socket.
- Unplug the power cable from the power inlet socket.
- Insert a suitable object under two flaps (1) and pull out fuse holder (2).
- Remove the defective fuse.
- Insert the new fuse and push the fuse holder back into its compartment.

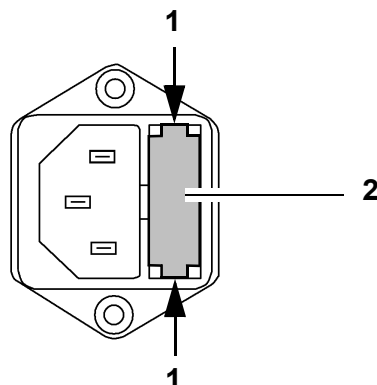


Note:

Be sure to use a fuse with the correct rating. The rating is also given on the instrument label plate.

- Connect the unit to line power.
- Turn on the unit at the power switch.

Fuse rating	Cat. No.
For 100...120 V~ T 6.3 A/H 250 V	000000-0149-693
For 220...240 V~ T 3.15 A/H 250 V	000000-0149-690



Care of the unit



Warning!

If possible, the systems and accessories should be cleaned immediately after use. Contaminations should not be allowed to dry on the objects, as this would make cleaning and disinfecting more difficult.

If possible, machines should be used for disinfecting and cleaning. For details, please also see the relevant comments on sterilization equipment.

Cleaning optical surfaces

The multi-layer T* coating of the optical components (e.g. eyepieces, objective lenses) ensures optimum image quality.

Image quality is impaired by even slight contamination. To protect the internal optics from dust, the system should never be left without the objective lens, binocular tube and eyepieces. After use, cover the system to protect it from dust. Always store objective lenses, eyepieces and accessories which are not being used in dust-free cases.

Clean the external surfaces of optical components as required:



Caution:

Do not use any chemical detergents or aggressive substances. These may damage the optical surfaces.

- Remove coarse dirt (splashes of blood etc.) using distilled water to which a dash of household dish-washing liquid has been added. Wipe the surfaces only with a damp, under no circumstances with a wet cloth.
Any remaining marks can be easily removed using the following aids.
- For thorough cleaning of optical surfaces, use the optics cleaning set (Cat. No. 000000-1216-071) or damp optics cleaning wipes (available from specialized dealers).
- Remove minor contaminations such as dust, streaks, etc. using a clean microfiber cleaning cloth (available from specialized dealers or under Cat.No. 000000-1254-655).

Fogging of optical surfaces

To protect the eyepiece optics from fogging, we recommend using an anti-fogging agent.

**Note:**

Anti-fogging agents provided by eyecare professionals for use with eyeglass lenses are also suitable for Zeiss eyepieces.

- Please observe the instructions for use supplied with each anti-fogging agent.

Anti-fogging agents do not only ensure fog-free optics. They also clean the eyepiece optics and protect them against dirt, grease, dust, fluff and fingerprints.

Cleaning mechanical surfaces

All mechanical surfaces of the equipment can be cleaned by wiping with a moist cloth. Do not use any aggressive or abrasive cleaning agents.

Wipe off any residue with a mixture of 50% ethyl alcohol and 50% distilled water plus a dash of household dish-washing liquid.

Sterilization

The asepsis sets available from Carl Zeiss contain rubber caps, sleeves and handgrips which can be sterilized in autoclaves. We recommend the following program for sterilization:

Sterilization temperature: 134° C

Sterilization time: 10 minutes

Sterile single-use drapes are available to cover the system.

**Note:**

When draping the system, make sure there is enough slack in the drapes to allow for movement of the microscope carrier and surgical microscope. It is especially important that the drapes are completely loose around the handgrips. The surgeon must be able to operate the controls through the drape.

Disinfecting the control keys

To be able to use the system in the OR, for example, it may be necessary to disinfect the control keys. We recommend using MELISEPTOL disinfectant solution (B. Braun, Melsungen AG). Carl Zeiss keeps MELISEPTOL in stock, and you can also obtain it locally in many countries from representatives of B. Braun, Melsungen AG.



Warning!

- Wear disposable plastic gloves to prevent skin contact with the disinfectant.
- MELISEPTOL is inflammable (flame point at 31 °C). Please read the product information from B. Braun, Melsungen AG.

To apply MELISEPTOL, proceed as follows:

- Switch off the unit before disinfecting.
- Apply the disinfectant across the entire surface of the control panel. Do not let any disinfectant seep into the unit.
- Leave the disinfectant on the unit for approx. 30 minutes.
- Then carefully wipe the disinfectant off the surface using a sterile, lint-free cloth.
- Dispose of the gloves and cloth as normal waste.

You can obtain the following articles from Carl Zeiss:

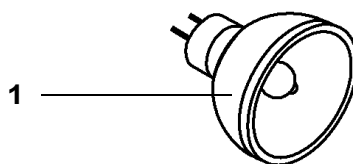
	Cat. No.
1 l MELISEPTOL in vario bottle	000000-0103-907
MELISEPTOL HBV spray, 250 ml	000000-0103-910
MELISEPTOL HBV cloths	000000-0103-911
Disposable gloves:	
Size 1 (large) size 8-9	000000-0117-736
Size 2 (medium) size 7-8	000000-0117-737

Ordering data

Description	Cat. No.
S 100 floor stand	000000-1403-542
Halogen illumination for S 100 suspension systems	304977-9043-000
OPMI 1 FC surgical microscope	303322-0000-000
120°-Coupling	000000-1080-351
S light guide 2.2 m (for floor stand)	303481-9022-000

Spare parts

Description	Cat. No.
Halogen lamp 12 V, 100 W (1)	380079-9040-000
Fuse 100...120 V~ T 6.3 A/H 250 V	000000-0149-693
Fuse 220...240 V~ T 3.15 A/H 250 V	000000-0149-690



Accessories

Please observe the following:

Only operate the instrument with the accessories included in the delivery package. If you want to use other accessories, make sure that Carl Zeiss or the manufacturer of the accessories has proved and confirmed that these accessories meet the respective technical safety standards and can be used without risk.

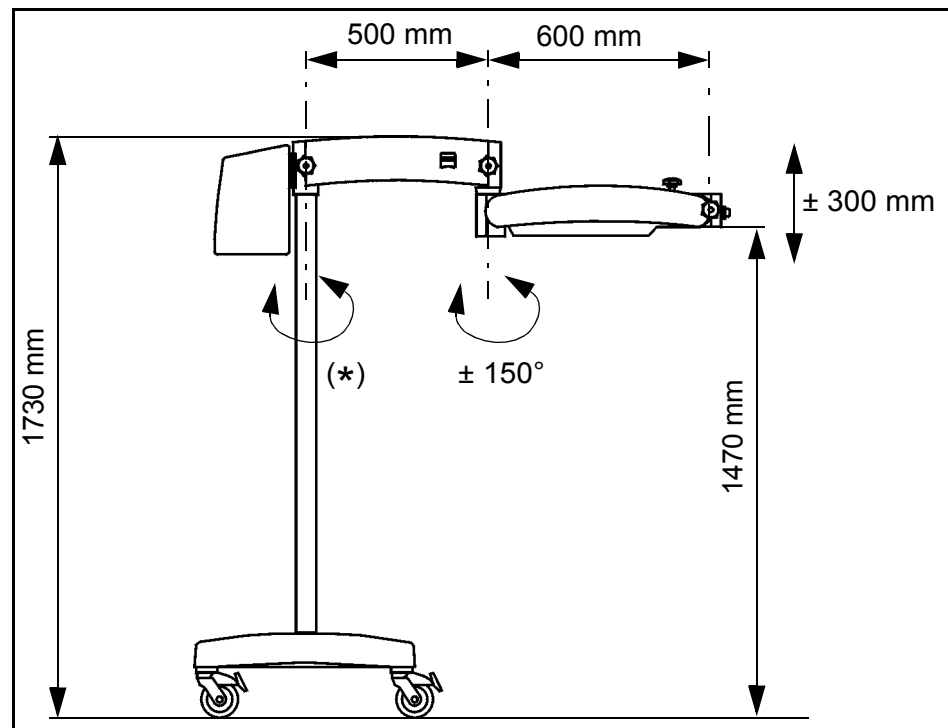
Description	Cat. No.
12 mm asepsis caps, pack of 6 (for knob for brightness control)	305810-9002-000
27 mm asepsis caps, pack of 6 (for "magnification" adjusting knob)	305810-9008-000
62 mm asepsis caps, pack of 2 (for "focus" adjusting knob)	305810-9014-000
1 pair of resterilizable handgrip covers for OPMI 1 FC	305810-9012-000

Technical data



S100 floor stand

Mechanical Data

Admissible max. load on suspension arm	2.5 to 7.0 kg (complete microscope equipment including accessories and coupling)
Suspension arm	Length...600 mm Swivel angle about carrier arm... $\pm 150^\circ$ Vertical lift... ± 300 mm
Carrier arm	Length...500 mm Swivel angle about stand column...no stop (*)
Stand height	1470 mm in horizontal position
Base (dimensions)	650 x 625 mm
Weight	approx. 90 kg, including microscope



Electrical data of S100 floor stand

Line connection	Only connect the suspension system to wall outlets which are provided with a properly connected protective ground conductor.
Rated voltage	115 VAC (100...120 VAC± 10%) 230 VAC (220...240 VAC± 10%)
Power consumption	115 VAC max. 2.0 A 230 VAC max. 1.0 A
Rated frequency	50...60 Hz
Fuses	Fuse link 115 V~ T 6.3 A/H 250 V 230 V~ T 3.15 A/H 250 V
Fiber optic illumination	2x 12 V 100 W halogen reflector lamp Manual lamp change.
Electrical standard	complying with IEC 601-1/EN 60 601-1/UL 2601-1; CAN/CSA C22.2 No 601.1 Protection class I, degree of protection IPX0, Type B equipment  Product classification I as per directive 93/42/EWG Annex IX
Approval	
EMC requirements	complying with EN 60601-1-2; Class B

The system has been designed for continuous operation.

OPMI 1 FC surgical microscope

Power supply, not required	The OPMI 1 FC is a surgical microscope for manual operation
Tubes / Eyepieces	Straight binocular tube, f = 170 mm. 12.5x widefield eyepieces (10x option) with magnetic coupling. Option: inclined or tiltable binocular tube.
Objective lenses	Options: objective lenses with mount diameter 48 mm, with different focal lengths from f = 200 mm to f = 400 mm, graded in steps of 50 mm.
Magnification	Manual, 5-step magnification changer magnification factor $\gamma = 0.4x - 2.5x$ magnification steps: $\gamma = 0.4$; $\gamma = 0.6$; $\gamma = 1.0$; $\gamma = 1.6$; $\gamma = 2.5$
Focusing	Manual, using the "focus" adjusting knob", focusing range: 40 mm
Illumination	Coaxial illumination, supply via light guide from 12 V 100 W halogen reflector lamp in lamp module in suspension system.
Weight	2.0 kg microscope body, alone

Ambient requirements

For operation	Temperature Rel. humidity Air pressure	+10 °C...+40 °C 30%...90% 700 hPa...1,060 hPa
For transportation and storage (in shipment packaging)	Temperature Rel. humidity (with condensation) Air pressure	- 40 °C...+70 °C 10%...100% 500 hPa...1,060 hPa

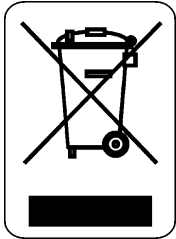
The unit meets the essential requirements stipulated in Annex I to the 93/42/EEC Directive governing medical devices. The unit is marked with:



Subject to change.

Disposal

User information on the disposal of electrical and electronic devices



This symbol means that the product must not be disposed of as normal domestic waste.

The correct disposal of electrical or electronic devices helps to protect the environment and to prevent potential hazards to the environment and/or human health which may occur as a result of improper handling of the devices concerned.

For detailed information on the disposal of the product, please contact your local dealer or the device manufacturer or its legal successor. Please also note the manufacturer's topical information on the internet. In the event of resale of the product or its components, the seller is required to inform the buyer that the product must be disposed of in accordance with the applicable national regulations currently in force.

For end customers in the European Union

Please contact your dealer or supplier if you wish to dispose of electrical or electronic devices.

Information on disposal in countries outside the European Union

This symbol is only applicable in the European Union. For the disposal of electrical and electronic devices, please observe the relevant national legislation and other regulations applicable in your country.

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