

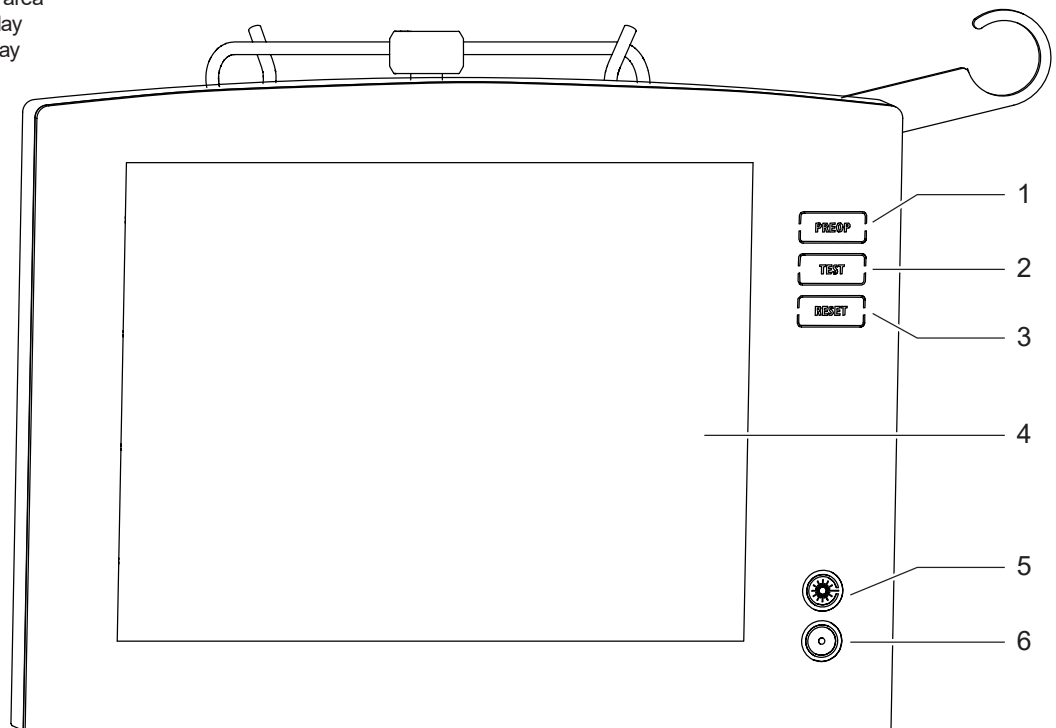
OS 4[™] USER MANUAL

INSTRUCTIONS
VC860300, VC860200

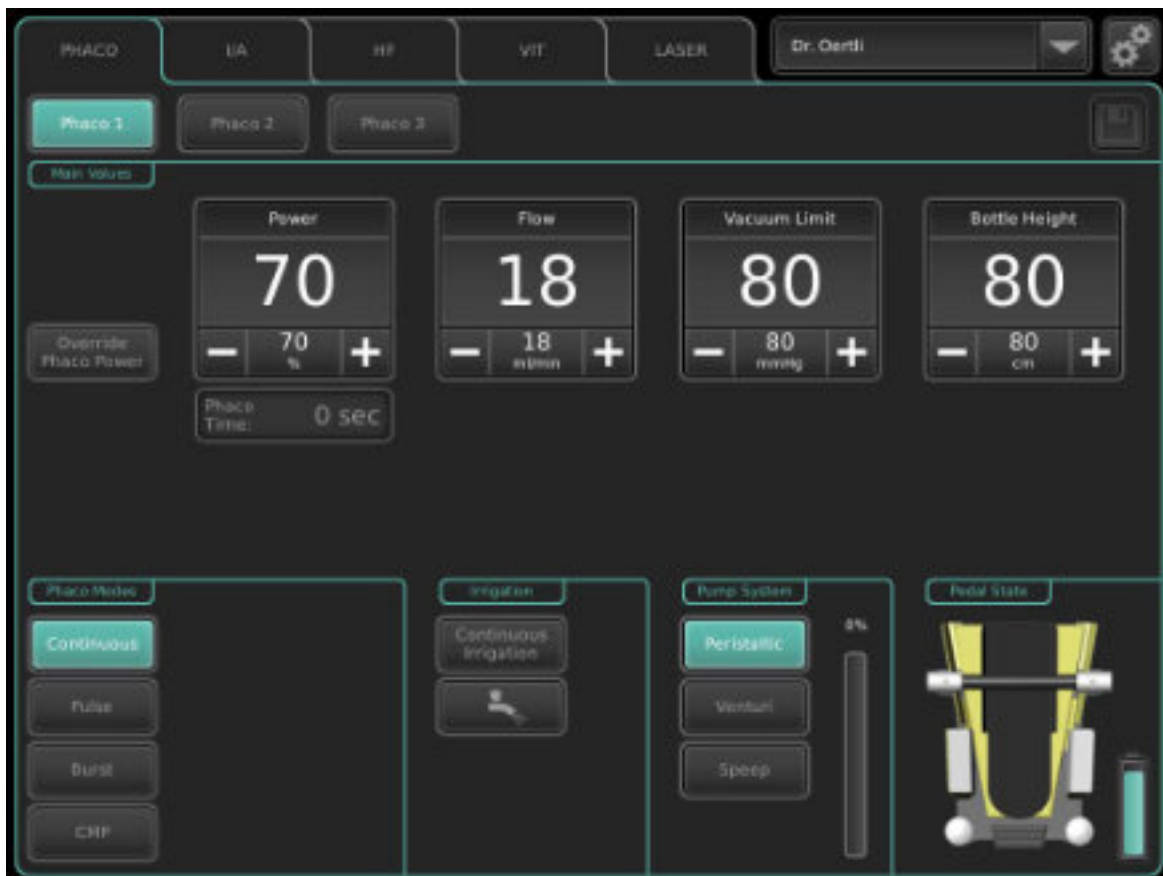


Control panel

- 1 PREOPkey
- 2 TESTkey
- 3 RESETkey
- 4 Display and settings area
- 5 LASER ACTIVEdisplay
- 6 LASERREADYdisplay



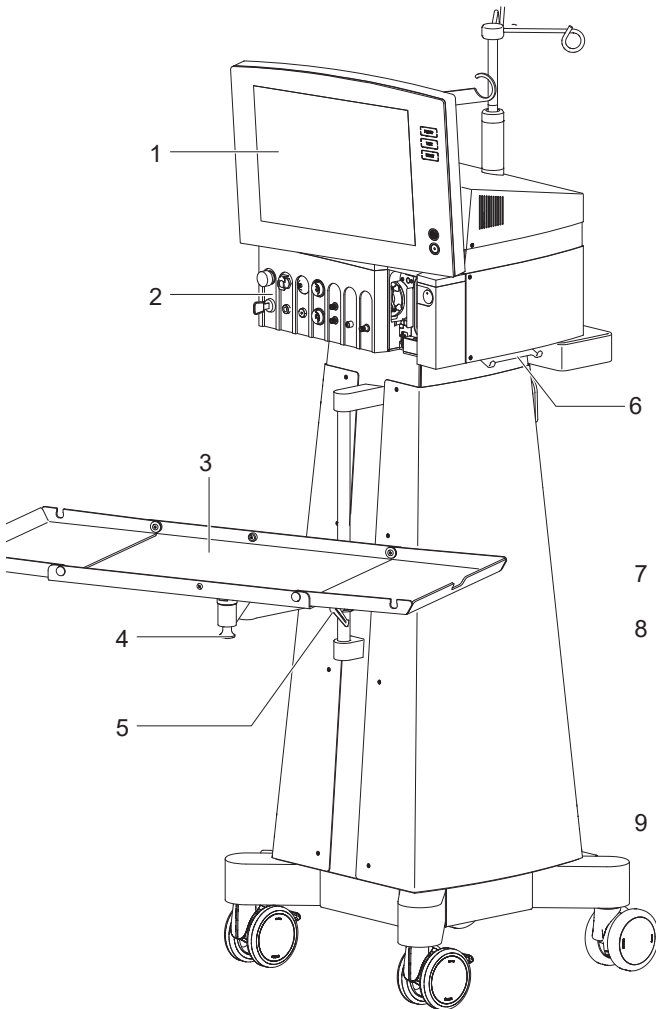
Display and settings area



EN

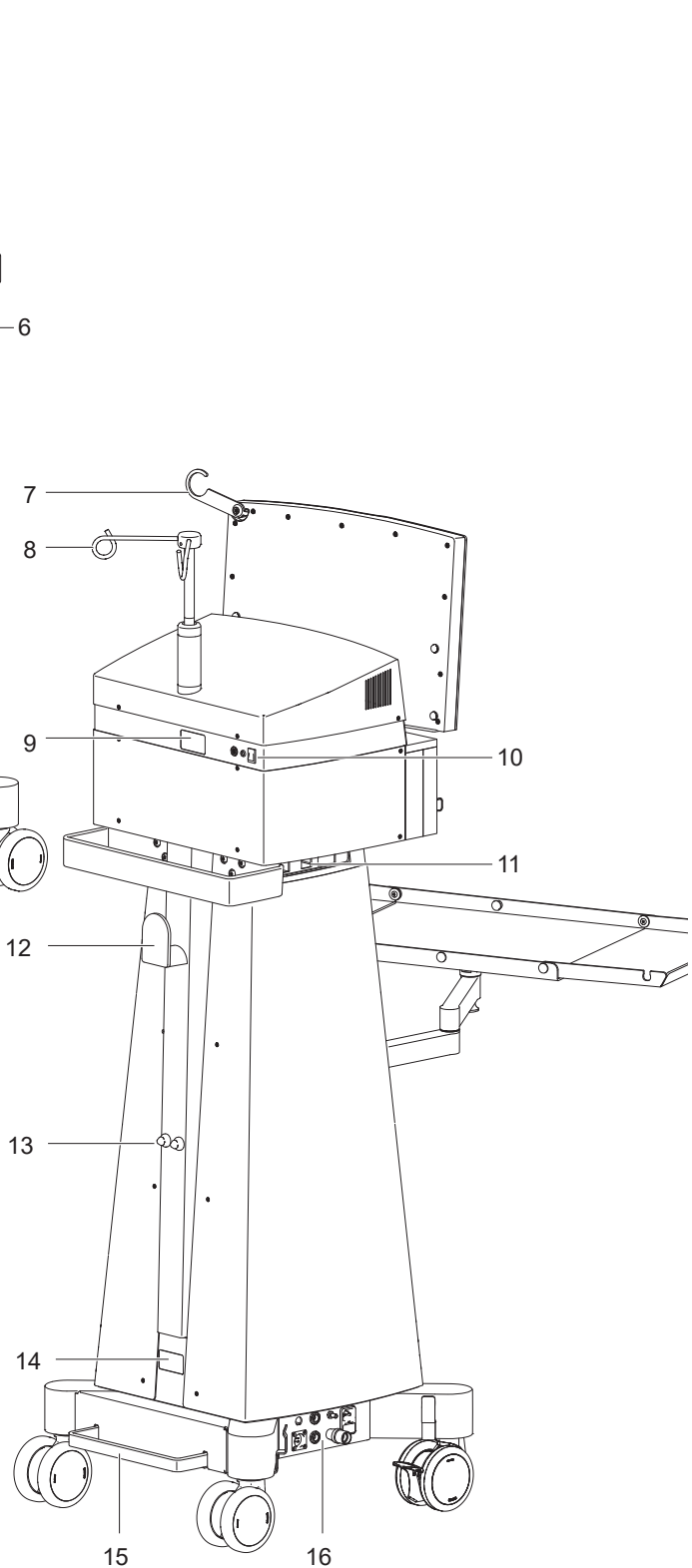
Front view

- 1 Control panel
- 2 Ports on front of device
- 3 Instrument tray (optional)
- 4 Unlocking device for the instrument tray
- 5 Height-adjustment lever for the instrument tray
- 6 Drainage bag suspension



Rear view

- 7 GFI suspension
- 8 I/ V pole
- 9 Laser class 4 sign (LASERfunction)
- 10 On/off switch
- 11 Ports on left side of column (top)
- 12 Mounting for tubes and cables
- 13 Pedal holder
- 14 Type plate surgical platform
- 15 Brake
- 16 Ports on left side of column (bottom)
- 17 Pedal



OS 4[™] USER MANUAL

INSTRUCTIONS
VC860300, VC860200

CAUTION:

U.S. Federal Law restricts this device to sale by or on the order of a physician.



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1 About this document

These instructions for use will familiarise you with the properties of OS4.




These instructions for use are part of the surgical platform and apply to all the surgical platform variants specified. These instructions for use describe the safe and appropriate use of the device in all operating phases.

1.1 Target groups

Target group	Task
Operator	<ul style="list-style-type: none"> Keep this manual close to where the surgical platform is used, also for later use. Tell employees to read and take note of this manual and other related documents, especially the safety instructions and warnings (► 2 Safety). Take note of additional surgical platform related rules and requirements.
Specialised medical and technical staff	<ul style="list-style-type: none"> Read, take note of and comply with this manual, especially the safety instructions and warnings (► 2 Safety).


Tab. 1 Target groups and their tasks

1.2 Warnings and symbols in this manual

Warning sign/ word	Danger level	Consequences of non-compliance
 DANGER!	Imminent danger	Death, serious injury
 WARNING!	Possible danger	Death, serious injury
 CAUTION!	Possible dangerous situation	Slight injury
NOTE!	Possible dangerous situation	Material damage


Tab. 2 Warnings






Explanation of the structure of a warning message using the example of a warning:

 **WARNING!**

Specification of the hazard.

Specification of a possible effect.

 Steps to take to avoid the hazard.

Symbol	Meaning
	Safety sign
	Precondition for action
	Separate actions that must be carried out
1., 2., ...	Multiple actions that must be carried out in the order stated
	Cross-reference
	Information that makes working with the surgical platform easier

Tab. 3 Symbols

1.3 Other relevant documents

Document	Document no.	Purpose
ParaProg manual for OS4	VV016041	Instructions for operating ParaProg mode
Service manual for OS4	VV016042	Instructions for performing service and maintenance (only for service technicians authorised by Oertli)
Instructions for Processing of Reusable Instruments Cleaning, Disinfection and Sterilisation	TN999042	General instructions for reprocessing (cleaning, disinfection, sterilisation)
User manual for OS4 cassette	TN999074	Instructions for use
User manual for handpieces and tips for HF surgery	TN999005	Instructions for use
User manual for phaco handpiece and phaco tips, reusable	TN999022	Instructions for use
User manual for drainage bag	TN999039	Instructions for use
User manual Phaco tips, single use	TN999052	Instructions for use
User manual for vitrectomy cutter, single use	TN999079	Instructions for use
User manual for endo light instruments ViPer scleral indenter, single use	TN999063	Instructions for use
User manual for silicone application set 10 cc Snap Lock / universal visco cannula, single use	TN999090	Instructions for use

Document	Document no.	Purpose
Installation instructions for the OS4 instrument table	TN999075	Instructions for use
User manual for air supply tube, single use	TN999076	Instructions for use
User manual for active infusion set, single use	TN999077	Instructions for use
User manual for chandelier light with trocar, 25G, 27G, single use	TN999085	Instructions for use
User manual for I/A instruments, reusable	TN999093	Instructions for use

Tab.4 Other relevant documents

2 Safety



WARNING!

Improper use of the surgical platform.
 Danger to patient and user.

- ⚠ The safety chapter contains important information about the safety of the surgical platform: Read it carefully before using the device for the first time.



The surgical platform has been manufactured in accordance with the state of the art and recognised technical safety rules. Nevertheless, dangers to life and limb of the user or third parties, damage to the surgical platform and other objects during its use cannot be ruled out.

2.1 Intended use

The OS4 surgical platform, dependent on the surgical platform variant, is used to perform surgical interventions in the anterior and posterior eye segment. Information on the specific range of functions of your surgical platform can be found in section **3.1 Surgical platform variants**.

In the full assembly of the surgical platform variant "anterior/posterior with endolaser", it includes the following functionalities:

- Irrigation and aspiration (I/A function)
- Ultrasound phaco (PHACO function)
- Bipolar diathermy for coagulation in the case of bleeding and coaptation of the conjunctiva during the eye surgery (DIA function)
- Bipolar diathermic capsulotomy (CAPS function)
- Bipolar diathermic deep sclerotomy ab interno (HFDSGLAU function)
- Operation of a vitrectomy instrument (VIT function)
- Injection and extraction of viscoelastic substances (INJECTION and EXTRACTION functions)
- Retinal photocoagulation with endolaser (LASER function)
- Intraocular illumination (LUM function)
- Maintaining intra-ocular pressure by air (AIR function) and active infusion (GFI function, gas-forced infusion)
- Fluid/air exchange



Instruments and consumables, in connection with Oertli devices, constitute a complete surgical system. The use of consumables and handpieces which were not manufactured by Oertli can affect system performance and lead to possible dangers (**24.1 Accessories, spare parts, instruments, consumables**).

2.1.1 Potential misuse

The surgical platform is not suited for surgical interventions outside the eye.

Failure to comply with the intended use, alterations carried out without the approval of Oertli, or operation with unsuitable parameters are regarded as misuse of the surgical platform. Misuse of the surgical platform can have the following consequences:

- Danger to patients and staff using the device
- Impaired functionality of and damage to the surgical platform which are not covered by the warranty

Oertli accepts no liability for damage caused by use for purposes other than those for which the device was designed.

2.1.2 Intended user

The surgical platform may only be used by trained medical personnel.

The correct choice of surgical platform settings is the responsibility of the surgeon.

2.1.3 Intended patients

The surgical platform may be used in the vicinity of the patient.

The surgical platform can be used for all patients, regardless of their age, height or weight, assuming the physician considers an operation to be justified.

The following potential dangers exist when using the DIA, CAPS or HFDSGLAU functions in patients with heart pacemakers or pacemaker electrodes:

- Impairment of pacemaker function
- Damage to the pacemaker

Ask the cardiology department for advice if you are unsure.

2.1.4 Intended environment

The surgical platform may only be used in enclosed rooms.

The surgical platform must not be used in rooms with inflammable anaesthetics or other combustible gases and materials. Where possible, only non-flammable cleaning agents and disinfectants should be used. Ensure that flammable cleaning agents and disinfectants have completely evaporated prior to HF application. There is a risk of flammable solutions collecting under the patient or in bodily depressions or orifices. Collections of fluids in these areas should be wiped up prior to using HF surgical devices. Be aware that due to spark formation which can occur during normal use of HF surgical devices, endogenous gases and oxygen-saturated materials, such as cotton, wool and gauze, can ignite. Risk of fire and explosion!

For surgical platforms with an endolaser, the room must be arranged and labelled in accordance with local standards and guidelines for the use of an endolaser. Additional requirements on laser safety can be found in standard IEC825-1 ("Safety of laser products").



Information on permitted environmental conditions (► 23.3 Environmental conditions).

2.1.5 Intended use of the endolaser

Indications:

Retinal photocoagulation for the treatment of retinal diseases such as:

- Retinal tears
- Retinal detachment
- Neovascularisations

Contraindications:

- All eye surgeries in which vision is not clear and the surgeon cannot determine the exact dose of energy using tissue reaction.
- Other applications which deviate from intended use.

2.2 Operator's obligations

- The operator is responsible for the safe operation of the surgical platform.
- Only use the surgical platform if it is in perfect technical condition, and always use it for its intended use, taking account of safety issues and dangers, and in accordance with this manual.
- Ensure that this manual and all other relevant documents are kept complete and legible, and accessible to staff at any time.
- Ensure that the following requirements are met and monitored:
 - Intended use
 - IEC60601-1:2005/A1:2012 Medical electrical equipment - Part 1: General requirements for basic safety and essential performance
 - Statutory or other safety and accident prevention rules
 - Standards and guidelines in force in the country in which the device is being used
- Regularly start up and maintain the endolaser (► 22.1 Maintenance table). Otherwise the warranty with regard to the laser becomes invalid.

2.2.1 Staff qualifications

- Ensure that staff required to use the surgical platform have read and understood this manual and all other relevant documents before starting work, especially the safety, maintenance and servicing information.
- Specify staff responsibilities and supervision.
- All work may only be carried out by specialist technical staff.
- Staff undergoing training may only use the surgical platform under the supervision of specialist technical staff.

2.3 Staff obligations

- Only use the surgical platform if it is in perfect technical condition, and always use it for its intended use, taking account of safety issues and dangers, and in accordance with this manual.
- Refrain from any working practices that endanger staff or third parties.
- In the event of a fault that affects safety, immediately switch off the surgical platform and have the fault corrected by an appropriate person.
- In all cases of doubt regarding the safety of the surgical platform: Switch off the surgical platform and prevent further use.
- In addition to the overall documentation, comply with statutory or other safety and accident prevention rules and the standards and guidelines in force in the country in which the device is being used.

2.4 Safety instructions for potential danger areas

2.4.1 Electrical safety

If covers are opened or parts removed that are not accessible without tools, live components can become exposed.

Plugs can also be live.

- Before opening the surgical platform, unplug it from the power source.
- Do not maintain or repair an open surgical platform that is live.
- Electrical work may only be carried out by the authorised service unit.
- Before connecting the surgical platform, check whether the mains voltage and frequency in theatre are correct (► 3.2 Labelling and marking and ► 23.4 Electrical data).
- In order to reduce the risk of electrocution, the surgical platform may only be connected to a supply network with an earth wire.
- Connect the mains cable to an earthed socket.
- Do not connect any peripheral devices to the surgical platform.

2.4.2 Electromagnetic waves

Other devices emitting electromagnetic waves can affect measuring data or cause malfunctioning of the surgical platform.

This surgical platform can cause malfunctions or can disrupt the operation of devices in the immediate vicinity.

- Take note of information on the radio module and on electromagnetic compatibility (► 24.3 Radio module and ► 24.5 Electromagnetic compatibility (EMC)).
- Do not operate mobile phones, cordless phones, transmitters/receivers or other electrical devices that produce electromagnetic waves in the same room as OS4.
- In the event of malfunctions, take appropriate corrective actions such as, for example, realignment, rearrangement of the OS4 or shielding.
- Only use the original instruments and accessories recommended and provided by the manufacturer.

Otherwise there may be increased interference or the interference resistance of the OS4 may be reduced.

2.4.3 Light emissions

- Take note of reference values for irradiation in the document "Endo illuminator user manual" (► 1.3 Other relevant documents, document no. TN999063 and TN999085).
- Avoid focusing the output of an illumination module on a small area of the retina for a longer period of time since this may cause photoreinitis and serious permanent injury to the patient.

2.4.4 Laser

The "anterior/posterior with endolaser" surgical platform variant (VC86030x) contains a class 4 laser. Irradiating the skin or eyes with direct or indirect scatter radiation presents a risk of blinding and/or burning.

Flammable gases and substances additionally present a risk of fire or explosion.

Failure to comply with the intended use set forth in this document is prohibited and is considered to be misuse of the surgical platform. This can lead to a dangerous radiation exposure or hazards due to electrical voltage.

Therefore it is mandatory to observe the following safety instructions:

- Observe "Laser" warning sign in the treatment room.
- Familiarise yourself with safety devices (LASERSTOP, key switch, etc.) and personal protective equipment.
- Always secure the laser probe port with the associated protective laser cap during periods of non-use.

- To avoid irradiating the skin and eyes by direct or scatter radiation, the following precautions should be taken:
 - Only connect the laser probe directly prior to treatment.
 - Only activate the laser directly prior to treatment.
 - Ensure that the laser beam is not oriented directly at persons.
 - Ensure that the foot pedal is always within reach of the operating surgeon. Third parties are not authorised to trigger the laser.
 - If the laser is not being used for treatment, always set the laser to stand-by mode.
- Never look directly into the beam of an emitted laser. Risk of blinding!
- Ensure that the laser beam is not oriented directly at flammable substances. Risk of fire!
- Without an activated key switch, it is not possible to emit laser pulses. Persons authorised to operate the device are responsible for the safekeeping of the key which must be removed after use.
- To avoid hazardous situations during treatment, connect the door remote switch (DRS) according to the manufacturer's instructions for use. See also ► 5.4.2 Check port for door remote switch (DRS).
- All persons who spend time in the laser room must protect their eyes with protective laser goggles which are suitable for the intensity and wavelength of the laser radiation and which are approved by Oertli (► 24.1 Accessories, spare parts, instruments, consumables).
- In the event of damage or a colour change in the coating of the protective laser goggles, do not use them any longer and replace them.
- When emitting the laser pulse, ensure that there are no objects in the optical path.
- Immediately before switching on the laser, warn all persons in the laser area.
- A protective filter (fully automated or passive, for 532 nm) must be added to the optical path of the microscope during the laser treatment. Only use protective filters recommended by Oertli (► 24.1 Accessories, spare parts, instruments, consumables).

2.5 Safety instructions for individual operational phases

2.5.1 Transport

Move the surgical platform during transport only with the instrument tray folded up (parked position).

2.5.2 Start-up

- Do not use the surgical platform directly beside other surgical platforms.
- If operation in the vicinity of other surgical platforms is necessary: Monitor the surgical platform to check that it is operating according to its intended use in the selected arrangement.
- Risk of crushing when operating the instrument tray. Place instrument tray in the working position only according to the procedure described in this manual and in the instrument tray manual (► 1.3 Other relevant documents).

2.5.3 Operation

- Only operate the surgical platform with the brake applied.
- Do not tilt the surgical platform more than 5° in the operating position.
- Do not lean on the instrument tray and do not place a load of more than 2.5 kg on the instrument tray.
- The following potential dangers exist when using the DIA, CAPS or HFDS GLAU functions in patients with heart pacemakers or pacemaker electrodes:
 - Impairment of pacemaker function
 - Damage to the pacemaker
 Ask the cardiology department for advice if you are unsure.
- The use of bipolar diathermy as well as CAPS or HFDS GLAU within the surgical platform may interfere with the operation of other electromedical equipment.
- All HF accessory components (connection sockets, plugs, cables, handpieces, tips) must be checked before every operation. Damaged accessories must not be used and must be replaced immediately. In particular, electrode cables must be checked for possible damage, e.g. by means of a magnifying glass.
- If the DIA, CAPS or HFDS GLAU functions are being used at the same time that the patient is being monitored by physiological monitoring devices: Place monitoring electrodes as far away as possible from the instrument tips. Needle monitoring electrodes are not recommended. In all cases, monitoring systems with an integrated high frequency current limitation are recommended.
- Ensure that the patient does not come into contact with metal parts that are grounded or have significant capacitance to earth.
- Monitor instrument med tips closely during power output when the DIA, CAPS or HFDS GLAU functions are in operation. Release the pedal immediately if tissue is becoming too hot.
- Only use filtered and oil-free pressurised air.
- Only use instruments, cassettes, tube systems and accessories supplied by Oertli.
- To avoid breakage of the instruments or malfunction, do not manually modify (bending, cutting, engraving) instruments, handpieces and tips.
- Clean, disinfect and sterilise reusable instruments before each use.
- Check all accessories regularly for damage, especially instrument cables.
- Replace damaged cables immediately.
- Do not continue to use a damaged surgical platform or accessories. Notify the authorised service unit.
- In all cases of doubt regarding the safety of the surgical platform: Switch off the surgical platform and prevent further use with the appropriate measures.

2.5.4 Maintenance and repair

Improper service and improper repairs endanger staff and patients and will void any warranty.

Live components can become exposed through the unauthorised opening and removal of components. Plugs can also be live. There is a risk of electric shock!

Service and repairs to the surgical platform may only be performed by service technicians authorised by Oertli and based on the last valid version of the service manual.

2.6 Safety devices (surgical platform dependent, LASERfunction)

2.6.1 LASERSTOPkey

Using the LASERSTOPbutton, the laser can be switched off by the user in emergency situations (► 18.4 Using the LASER STOPkey in hazardous situations).

2.6.2 Port for door remote switch (DRS)

► 3.5.2 Port for door remote switch (DRS)

2.6.3 Port for laser user protection filter (UPF)

► 3.5.1 Connection for fully automated laser user protection filter (UPF)

2.7 Personal protective equipment (LASERfunction): Protective laser goggles

All persons who spend time in the laser room must protect their eyes with protective laser goggles or laser filters (laser user protection filters, UPF) which are suitable for the intensity and wavelength of the laser radiation and which are approved by Oertli.

The protective laser goggles must meet the following standard:

- DIN EN 207 "Personaleye protection – filter and eye protection devices against laser radiation (protective laser goggles)"

The laser protective goggles are included in the set of equipment supplied, but can also be ordered separately (► 24.1 Accessories, spare parts, instruments, consumables).

3 Structure and function

3.1 Surgical platform variants

Depending on the surgical platform variant, your surgical platform has the following functionalities:

Functionality	"Anterior/posterior" variant (VC86020X)	"Anterior/posterior with endolaser" variant (VC86030X)
PHACO	✓	✓
I/A	✓	✓
DIA/CAPS/HFDS GLAU*	✓	✓
Anterior vitrectomy	✓	✓
Posterior vitrectomy	✓	✓
INJECTION(+)/EXTRACTION	✓	✓
ENDO PHACO	✓	✓
LASER	-	✓
Gasforced infusion (GFI)	✓	✓
Fluid/air exchange	✓	✓
Intraocular illumination:		
Light LED	✓	✓
Light LED+	✓	✓

* The HFDSGLAUfunction is optional and can be enabled as desired.

3.2 Labelling and marking

i The labelling and marking of the OS4 varies depending on the surgical platform variant (► 3.1 Surgical platform variants) and its functional scope.

OS4 is marked on the front and rear as well as on the left column side as follows:

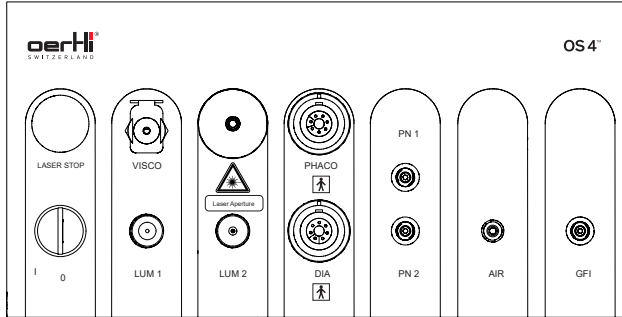


Fig. 1 Front marking



Fig. 2 Back marking



Fig. 3 Marking on left side of column (top)

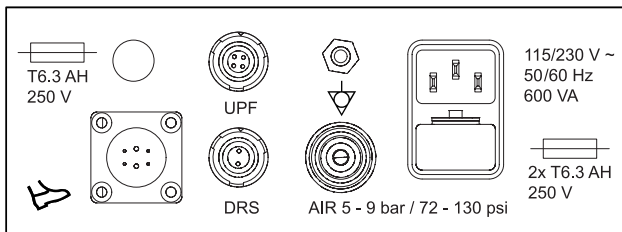


Fig. 4 Marking on left side of column (bottom)

The back of the surgical platform and the pedal also bear a type plate.

3.2.1 Typeplate on the surgical platform



Fig. 5 Typeplate on the surgical platform (example)

3.2.2 Pedal type plate



Fig. 6 Pedal type plate (example)

3.2.3 Instrument tray type plate

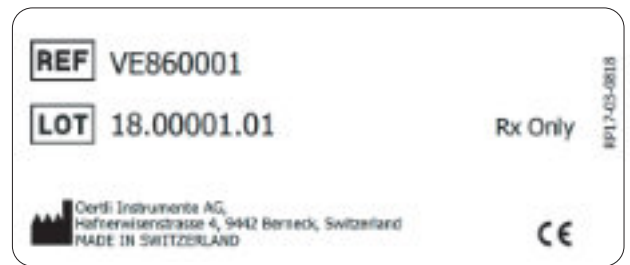


Fig. 7 Instrument tray type plate (example)

3.2.4 Sign on instrument tray



Fig. 8 Sign on instrument tray

3.2.5 Laser class 4 sign for surgical platform with the LASERfunction (optional)

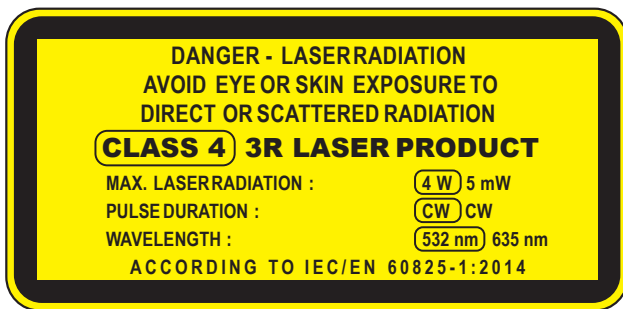


Fig. 9 Laser class 4 sign (LASERfunction)

3.2.6 Symbols on type plates



Symbol	Meaning
	Oertli article number
	Serial number (e.g. 75640001)
	Lot number (e.g. 14.00001.01)
	WEEE- device must be disposed of by specialist department
	Caution!
	Observe instructions for use
	Manufacturer and date of manufacture year-month-day (e.g. 2020-12-02)

Symbol	Meaning
	Weight of the surgical platform including maximum load (e.g. 92 kg)
	This product fulfils the requirements of the Council Directive 93/42/EEC concerning medical devices.
Rx Only	CAUTION: U.S. Federal Law restricts this device to sale by or on the order of a physician.
IPX6	Increased protection against heavy spray water (pedal only)

Tab. 5 Symbols on type plates

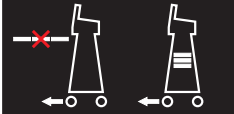

3.2.7 Symbols on the surgical platform

Symbol	Meaning
	Application parts of type BF
	Warning!
	Laser beam warning. Laser beam outlet.
	Laser Aperture
	Observe instructions for use
	Non-ionising electromagnetic radiation. The surgical platform contains a radio module for wireless connection with the pedal.
COM	Port for communication with the pedal
	On/off switch: Switches the surgical platform on or off
0	Endolaser key switch: Switches the laser off
I	Endolaser key switch: Switches the laser on
	Only use mains fuses with the values indicated T6.3 AH 250 V 2x T6.3 AH 250 V
115/230 V ~ 50/60 Hz 600 VA	Permissible mains voltage and mains frequency

Symbol	Meaning
	Pedal socket
	Port for equipotential bonding
AIR5 - 9 bar/ 72 - 130 psi	Permissible air pressure
SERVICE	Service interface (for service technicians only)
REMOTE	Remote control junction box (remote control optional)




Tab. 6 Symbols on the surgical platform

3.2.8 Symbols on instrument tray

Symbol	Meaning
	When pushing the surgical platform, put the instrument tray in parked position, since the surgical platform may otherwise tip over.
	Do not sit; maximum load 2.5 kg

Tab. 7 Symbols on instrument tray

3.2.9 Icons on the user interface

Symbol	Meaning
	Routine message/ information (► 21.2.1 Routine messages)
	Warning (► 21.2.2 Warnings)
	Error message (► 21.2.3 Error messages)

Tab. 8 Icons on the user interface

3.3 Task and function

The OS4 surgical platform, dependent on the surgical platform variant, is used to perform surgical interventions in the anterior and posterior eye segment. Information on the specific range of functions of your surgical platform can be found in section ► 3.1 Surgical platform variants.

In the full assembly of the surgical platform variant "anterior/posterior with endolaser", it includes the functionalities which are described in section ► 2.1 Intended use.

The surgical platform activates and controls the instruments connected with the limit values determined by the surgeon and set on the control panel, fine control being carried out with the foot pedal and within the pre-defined value range.

OS4 works with two complete pumps:

- Peristaltic pump
- Venturi pump

The peristaltic pump can be operated in SPEEP mode which enables control of the desired vacuum during occlusion.

Frequently used set values can be stored and retrieved.

3.4 Structure

3.4.1 Surgical platform overview

- Fig. Front view, page 4
- Fig. Rear view, page 4

3.4.2 Control panel

- Fig. Control panel, page 3

All settings for operating OS4 can be adjusted in the touch-sensitive control panel. At the same time, the surgical platform provides information about the operational status and current values on various displays.

It consists of the following components:

Component	References
PREOP and TEST keys	► 6.2.1 PREOP and TEST keys
RESET key	► 6.2.2 RESET key
Status displays (LASER function, optional)	► 6.2.3 Status displays (LASER function, optional)
Display and settings area	► 6.2.4 Display and settings area

Tab. 9 Components of the control panel

The control panel can be panned horizontally and vertically to offer good readability and operability at all times.

The control panel is illuminated so that the surgical platform can also be operated in low-light conditions.

3.4.3 Ports

EN

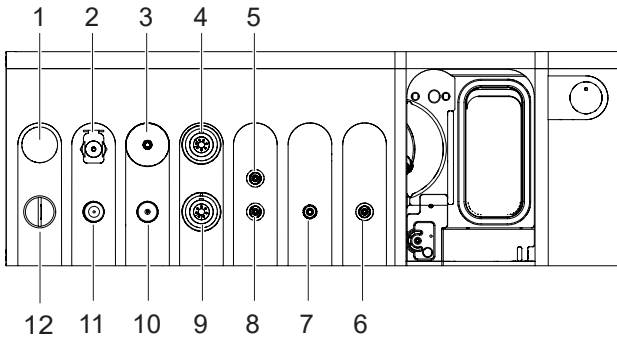


Fig. 10 Ports on front of device

- | | |
|--|----------------------------------|
| 1 LASER STOP key | 7 Air delivery line port |
| 2 Port for silicone application set (INJECTION/EXTRACTION) | 8 Vitrectomy cutter port (green) |
| 3 Laser probe port | 9 Diathermy handpiece port |
| 4 Phaco handpiece port | 10 Light source 2 port |
| 5 Vitrectomy cutter port (black) | 11 Light source 1 port |
| 6 GF infusion (gas-forced infusion, red) | 12 Endolaser key switch |

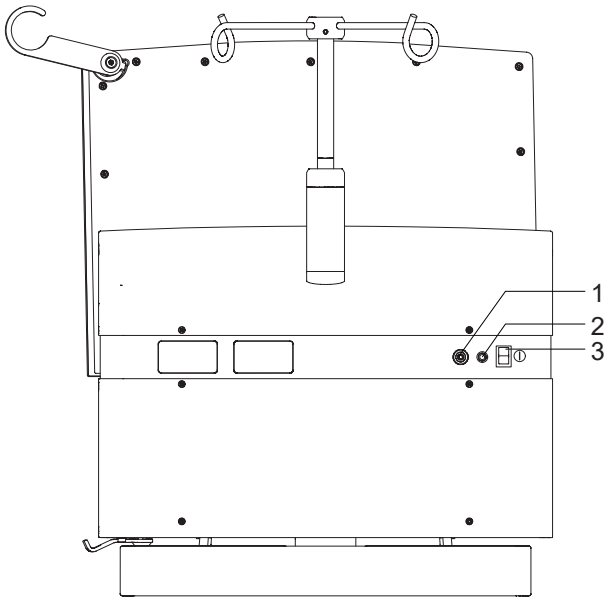


Fig. 11 Ports on back of device

- | | |
|---------------------|-----------------|
| 1 COMport | 3 On/off switch |
| 2 Voltage indicator | |

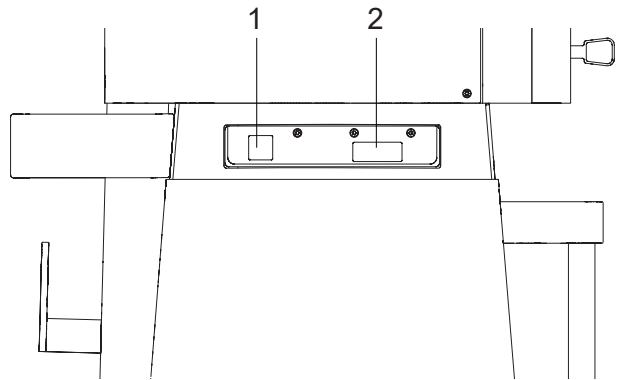


Fig. 12 Ports on the left column side (top)

- | | |
|--|---|
| 1 Service interface (for service technicians only) | 2 Remote control junction box (remote control optional) |
|--|---|

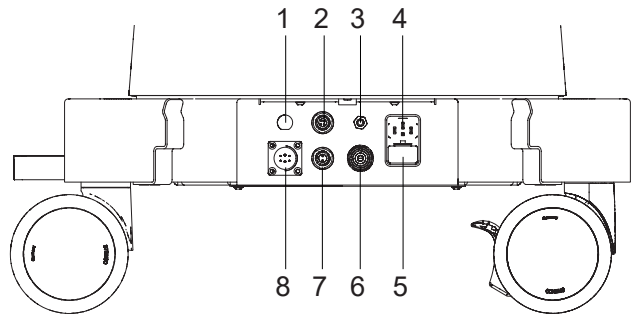


Fig. 13 Ports on the left column side (bottom)

- | | |
|---|--|
| 1 Fuseholder | 5 Fuse drawer with fuse holder (adjustment of the mains voltage) and fuses |
| 2 Connection for fully automated UPF (laser user protection filter) | 6 Pressurised air port |
| 3 Potential matching pin | 7 Port for DRS (door remote switch) |
| 4 Power supply | 8 Pedal socket |

3.4.4 I/A system on the surgical platform

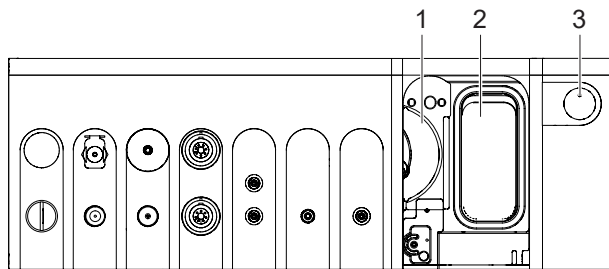


Fig. 14 I/A system on the surgical platform

- | | |
|-----------------|-------------------------|
| 1 Pump wheel | 3 Cassette eject button |
| 2 Cassette slot | |

The cassette eject button has an LED:

- Display lit in blue: cassette inserted
- Display off: no cassette inserted

3.5 Ports for monitoring systems (LASER function, optional)

3.5.1 Connection for fully automated laser user protection filter (UPF)

i The laser user protection filter is not included in the delivery. Its use is the sole responsibility of the operator.

Only use the laser user protection filter from Meridian AG.

There is a corresponding port on the lower left side of the column for monitoring a fully automated laser user protection filter. This connection allows a fully automated UPF to be connected to the laser and used.

If a passive UPF is used instead of a fully automated UPF, it must be confirmed manually at the surgical platform that, when using the endolaser, a suitable system is used or is ready for use and that all persons in the room are protected by suitable personal protective equipment (protective laser goggles). Otherwise the laser is inactive (protection function).

3.5.2 Port for door remote switch (DRS)

i The door remote switch is not included in the delivery. Its use is the sole responsibility of the operator.

There is a corresponding port on the lower left side of the column for monitoring room entry with a door remote switch (DRS). A monitoring circuit can be connected using this port. If no DRS is used, the port must be spanned using a shorting plug (► 5.4.2 Check port for door remote switch (DRS)). Otherwise the laser is inactive (protection function).

3.6 Cassette with I/A tube system

Only cassettes with tube systems for single use are available; external drainage bags are not part of the delivery and can be ordered separately (► 24.1.4 Consumables).

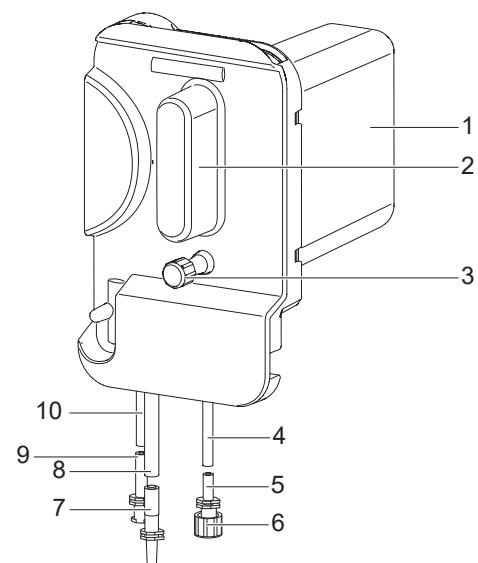


Fig. 15 Cassette with I/A tube system

- | | |
|--|------------------------------------|
| 1 Drainage container | 6 Protective cap for infusion port |
| 2 Handle | 7 Irrigation port |
| 3 Connection for drainage bag with protective cap (blue, emergency draining) | 8 Irrigation line |
| 4 Infusion line | 9 Aspiration port |
| 5 Infusion port | 10 Aspiration line |

The fill level of the cassette can be checked on the corresponding display on the control panel (► 6.2.11 Pump setting and fill level of the cassette).

3.7 Pedal

The I/A system and instruments are controlled by the pedal. It can be connected to the corresponding port of the surgical platform or operated wirelessly (► 5.3 Connect pedal).

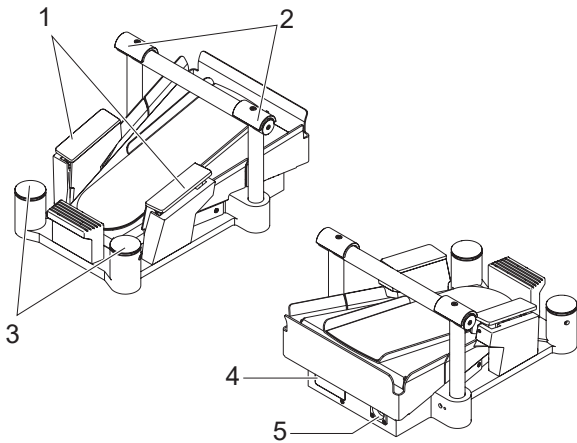


Fig. 16 Pedal

- | | |
|--------------------------------|----------------------------------|
| 1 Switch, lateral (left/right) | 4 Cover (radio module) |
| 2 Switch, top (left/right) | 5 Pedal socket (under the cover) |
| 3 Heel switch (left/right) | |

The pedal settings can be performed using ParaProg individually for each physician (► 8 Using/setting the pedal and user manual for ParaProg ► 1.3 Other relevant documents).

Default values have been set when the device is supplied.

The pedal can be charged directly via the surgical platform (► 5.7 Charging the pedal).

If the pedal is not needed or if OS4 is moved, it can be suspended behind on the back of the surgical platform (► 4.2 Transporting the surgical platform).

3.8 Instrument tray (optional)

The instrument tray is not included in the delivery. It can be ordered separately (► 24.1 Accessories, spare parts, instruments, consumables).

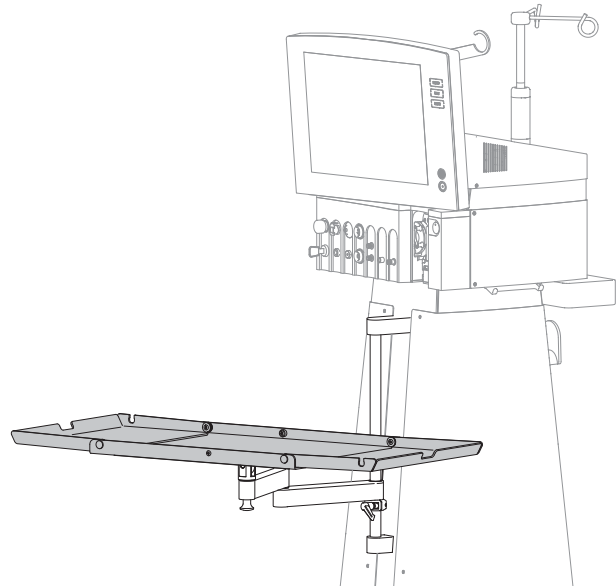


Fig. 17 Instrument tray

4 Transport, storage and disposal

4.1 Unpacking the surgical platform and checking its condition

1. Unpack the surgical platform as soon as it is delivered and check for damage that may have occurred in transit.
2. Notify the haulier immediately of any damage that has occurred in transit.
3. Dispose of packaging material in accordance with local regulations.

4.2 Transporting the surgical platform

The surgical platform is braked centrally using the brake arm. The brake acts on the two rear wheels:

Position	Orientation	Description
1	top	<ul style="list-style-type: none"> – Wheels fully movable. – The surgical platform can be pushed in all directions.
2	bottom	<ul style="list-style-type: none"> – Rear wheels are fully secured. – The surgical platform cannot be moved.

Tab. 10 Brake arm positions

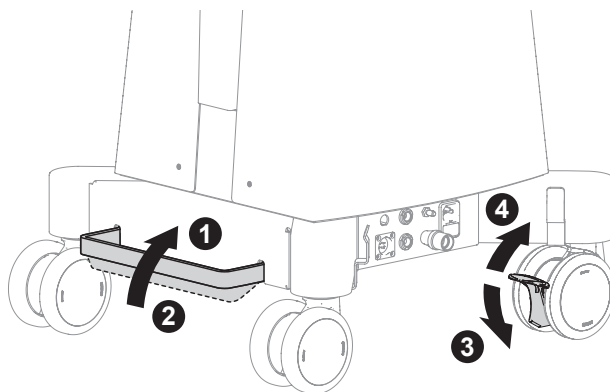


Fig. 18 Brakes on the surgical platform

The two front wheels can additionally be separately secured with the grips, if needed.

- Apply brakes: Position 3
- Release brakes: Position 4

NOTE!

Collision with other objects.

The surgical platform can tip over if it is transported with the instrument tray opened.

Damage to the surgical platform.

- ☞ To push the surgical platform, place the instrument tray in the parked position and fully retract the I/V pole.

i Weight details (► 23.2 Dimensions and weights).

☞ All connection cables disconnected.

☞ Instrument tray in parked position (► 19.6 Folding up the instrument tray and placing it in the parked position).

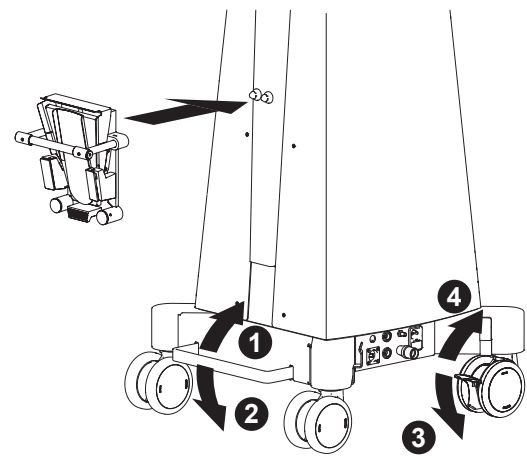


Fig. 19 Hang pedal

1. Suspend pedal on the pedal holder on the surgical platform.
2. Wind cable on holder.
3. Place brake arm in position 1.
4. If necessary, release brake grips on the front wheels (position 4).
5. Hold the surgical platform by the handle and move to the desired set-up location.
6. To secure the surgical platform, place brake arm in position 2.
7. If necessary, secure brake grips on the front wheels (position 3).

4.3 Storing the surgical platform

1. Ensure that the storage location meets the following conditions:
 - dry
 - free from vibrations
2. Ensure that the storage conditions are met (► 23.3 Environmental conditions).

4.4 Disposal

The product must not be disposed of in household waste. It must be collected separately from household waste and disposed of in an environmentally responsible manner in accordance with the local regulations governing the disposal of electronic devices, or sent to Oertli for disposal.

The operator is responsible for the proper disposal of the product.

Single-use items must be disposed of in accordance with the local regulations for the disposal of contaminated medical waste.

5 Start-up



WARNING!

Improper use of the surgical platform.

Danger to patient and user.

- ☞ The safety chapter contains important information about the safety of the surgical platform: Read it carefully before using the device for the first time.



CAUTION!

Careless handling of the surgical platform and instrument tray.

Pinching of the hand or finger.

- ☞ Carefully fold out the side parts of the tray.
- ☞ Do not place fingers between the lever arms of the instrument tray.

5.1 Setting up the surgical platform



- Position the surgical platform so that the user can always see all the displays and hear acoustic signals and can always operate all the controls, components, keys and ports.
- Position the surgical platform so that it is not interfered with by other devices and does not itself interfere with other devices (► 2.4.2 Electromagnetic waves).
- Permitted environmental conditions (► 23.3 Environmental conditions).

- ☞ Position the surgical platform in a suitable place on a stable, even and clean base (► 4.2 Transporting the surgical platform).
- ☞ To secure the surgical platform, place brake arm in position 2.
- ☞ If necessary, secure brake grips on the front wheels (position 3).

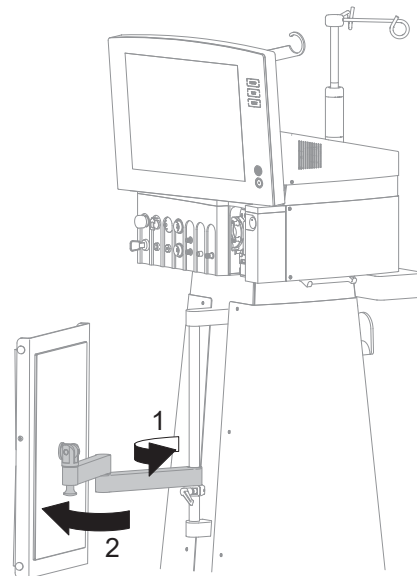
5.1.1 Opening the instrument tray and placing it in working position

NOTE!

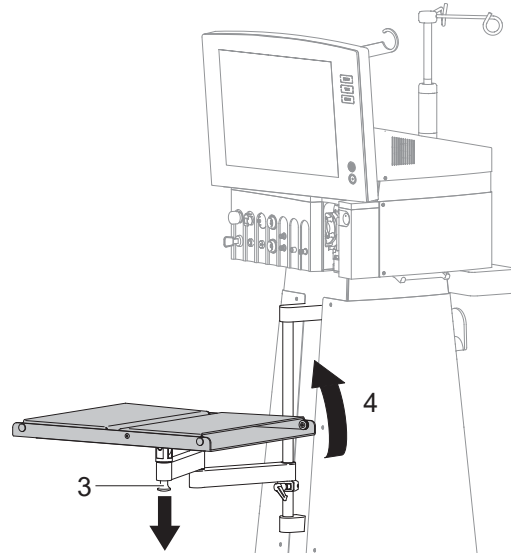
Overloading of the instrument tray.

Severe damage to the surgical platform.

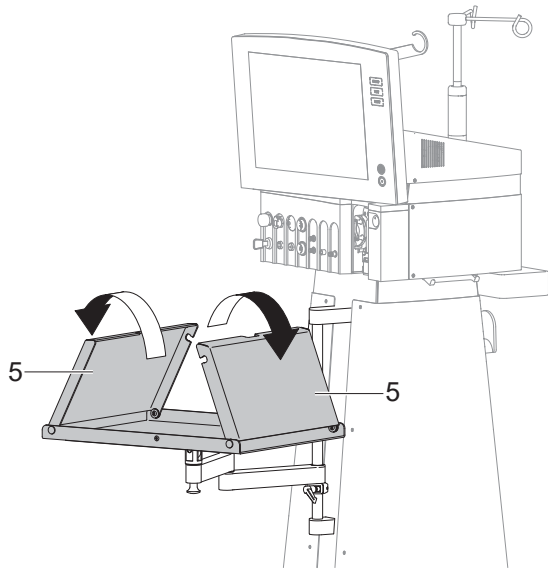
- ☞ During use, do not place a load of more than 2.5 kg on the instrument tray.
- ☞ Do not place any load on the instrument tray when the surgical platform is moved.
- ☞ Do not use the instrument tray for support.
- ☞ Do not sit on the instrument tray.
- ☞ Do not place any heavy components on the instrument tray.



1. Take instrument tray out of the parked position (1 and 2).

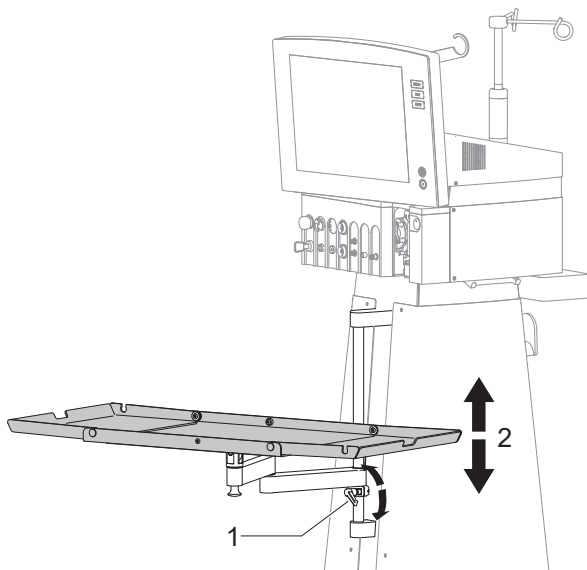


2. Release the unlocking mechanism by pulling in the direction of the arrow (3) and hold.
3. Rotate instrument tray (4).



4. Let go of the unlocking mechanism.
5. Fold out side parts (5).

5.1.2 Height adjustment



1. Support instrument tray with your hand and push lever for height adjustment (1) upwards in the direction of the arrow.
2. Move instrument tray upwards or downwards (2).
3. Once it is in the desired working position, push lever for height adjustment (1) downwards in the direction of the arrow.

The instrument tray is firmly secured.

5.2 Mount the infusion pole

NOTE

Leaking liquid.

Damageto the surgical platform.

- ☞ Position the infusion pole as shown below at a 45-degree angle to the surgical platform.

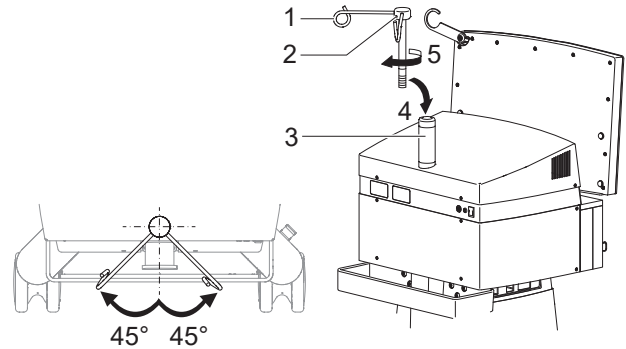


Fig. 20 Mount the infusion pole

1. Insert (4) infusion pole (1) into the holder (3).
2. Firmly rotate the infusion pole in the direction of the arrow (5).
3. If the infusion pole is not at a 45-degree angle to the surgical platform: Use an Allen key to loosen the screw (2), place infusion pole as shown in a 45-degree angle and secure screw once again.

i The bottle height is adjusted via the corresponding value range in the display and settings area (► 7.3 Adjust bottle height/ IOP).

5.3 Connect pedal

You can either connect the pedal to the surgical platform or operate it wirelessly via wireless data transmission.

i Radio-controlled operation:

The setting for radio-controlled operation has already been activated as a default in service mode.

If you want to use a pedal other than the one provided, contact the authorised service unit.

⚠ Prior to operation: Pedal is charged (► 5.7 Charging the pedal).

Operation via cable

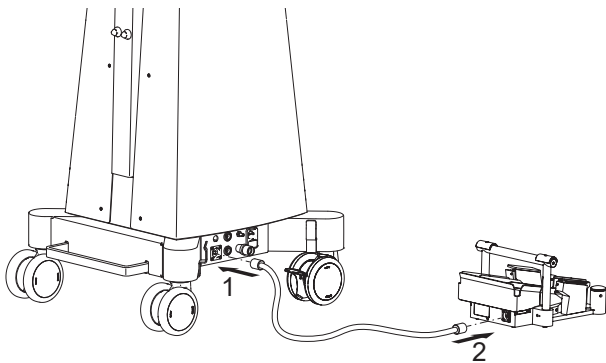


Fig. 21 Connect pedal

- ☞ Connect the pedal cable to the pedal socket (1) on the surgical platform.
 - ☞ Connect the pedal cable to the pedal socket (2) on the pedal.
 - ☞ Switch on the surgical platform (► 5.8 Switching on the surgical platform).
- Status display for pedal status (► 6.2.12 Status displays for pedal status and pedal battery status) is activated.

Wireless operation via radio

- ☞ Surgical platform switched on.
- ☞ Operate heel button.

It takes about 10 sec. until the radio connection is established.

Status display for pedal status (► 6.2.12 Status displays for pedal status and pedal battery status) is activated.

5.4 Check ports for monitoring systems (LASERfunction, optional)

5.4.1 Laser user protection filter (UPF)

⚠ WARNING!

No laser user protection filter.

Hazard to user due to laser radiation.

- ☞ Insert permitted laser user protection filter in the optical path of the microscope during the laser treatment.

⚠ WARNING!

Protective equipment missing.

Hazard due to laser radiation.

- ☞ Protect all persons who spend time in the laser room with protective laser goggles for 532 nm/OD6.

To protect the user, a laser user protection filter must be inserted in the optical path of the microscope during the laser treatment. Only use protective filters recommended by Oertli.

Passive laser user protection filters for various types of microscopes are available from Oertli. They are securely installed in the optical path of the microscope and continuously filter harmful laser radiation.

- ☞ When starting up the endolaser, confirm that a passive UPF is connected and that all persons in the room are protected by protective laser goggles (► 18 Performing an endolaser operation).

Fully automated laser user protection filters for various types of microscopes are available from Oertli. They are fixed in the optical path of the microscope and connected to the surgical platform via a cable. The filter glass is automatically swiveled into the optical path shortly before the laser radiation is triggered and filters the harmful laser radiation only when using the laser.

- ☞ Have a fully automated laser protection filter configured for the device by the authorised service unit before use.
- ☞ Before use, install the filter in the microscope according to the manufacturer's instructions.
- ☞ When starting OS4, ensure that the fully automated UPF is properly connected to the surgical system.
- ☞ When starting up the endolaser, confirm that all persons in the room are protected by protective laser goggles (► 18 Performing an endolaser operation).

5.4.2 Check port for door remote switch (DRS)

i The door remote switch is not included in the delivery. Its use is the sole responsibility of the operator. If no DRS is used, a shorting plug must be inserted. Otherwise the laser is inactive (protection function).

- ☞ Connect DRS according to the manufacturer's instructions for use.

Or

- ☞ If no DRS is used, span the port with a shorting plug.

5.5 Connect pressurised air

An external pressurised air supply is needed for the VIT and INJECTION+ functions and for operating the venturi pump.

The corresponding fittings are not included in the delivery. They can be ordered separately (► 24.1 Accessories, spare parts, instruments, consumables).

NOTE!

Excessively high pressure.

The surgical platform no longer works correctly; damage to the surgical platform.

- ☞ Adhere to the specified supply pressure (► 23.5 Supply pressure).

i If there is no pressure connection or insufficient pressure connection, the VIT and INJECTION+ functions and the venturi pump cannot be operated. If there is no pressure connection, the cassette cannot be inserted and ejected.

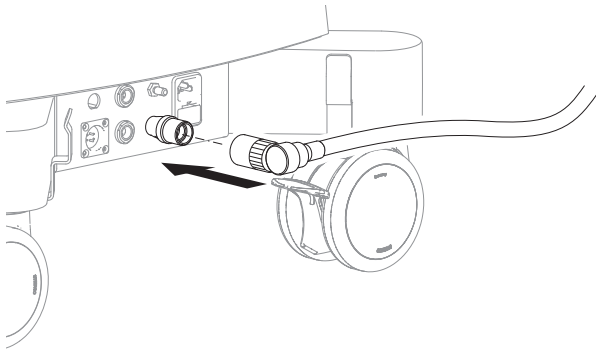


Fig. 22 Connect pressurised air

1. Connect fittings to the pressurised air connection on the surgical platform.
2. Connect fittings to the pressurised air supply.

5.6 Connecting to mains power

NOTE!

Incorrect mains voltage.
Damage to the surgical platform.

- ⚠ Check that the mains voltage and mains frequency in the theatre correspond to the specified values.

NOTE!

Incorrect voltage selection at the voltage selector.
Damage to the surgical platform.

- ⚠ Check that the voltage selector at the power source is correctly set (115 V or 230 V).

- ⚠ Mains voltage and mains frequency in theatre correct (► 3.2 Labelling and marking and ► 23.4 Electrical data).
- ⚠ Earthed and easily accessible socket available.
- ⚠ Voltage selector correctly inserted (► 22.2 Select mains voltage and insert fuses).

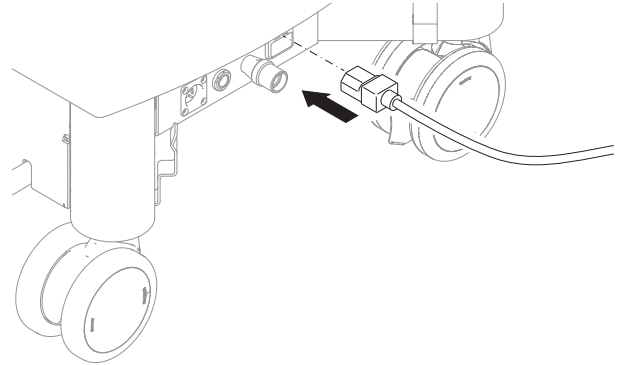


Fig. 23 Power supply

1. Plug the power cable into the power supply of the surgical platform.
2. Connect power cable with mainspower socket.
Mains adapter connected to mainscurrent.
Voltage indicator (1) is lit in orange:

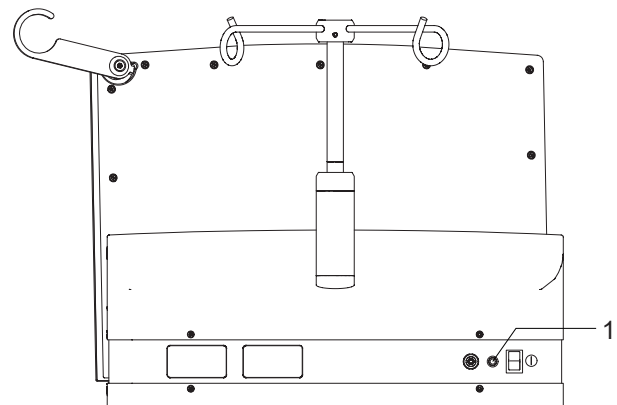


Fig. 24 Voltage indicator

5.7 Charging the pedal

Prior to initial use, the pedal must be connected to the surgical platform for 8 hours. This ensures that the battery is fully charged.

i The pedal is charged via OS4.
The pedal can be charged when the OS4 is switched on or off. The OS4 only needs to be connected to the mains current.

🔌 Surgical platform connected to the mains, mains voltage applied (► 5.6 Connecting to mains power).

1. Optional: Switch on the surgical platform (► 5.8 Switching on the surgical platform).
2. Connect pedal to the surgical platform (► 5.3 Connect pedal).

The pedal is charged via the surgical platform.
The charging icon appears in the pedal status field.

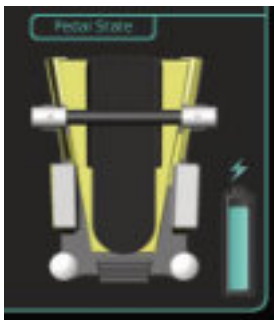


Fig. 25 Pedal status field

5.8 Switching on the surgical platform

⚡ Press the on/off button on the surgical platform.

Voltage indicator is lit and green.

The surgical platform automatically performs a self-test after it has been switched on.

If the test has been completed successfully, the message SYSTEMREADY, CHOOSEFUNCTION is displayed in the control panel.

The selected surgeon is displayed in the top right-hand corner (► 9.2 Select surgeon memory).

The surgical platform is now ready and can be prepared for the surgery (► 9 Performing general preparations for surgery).

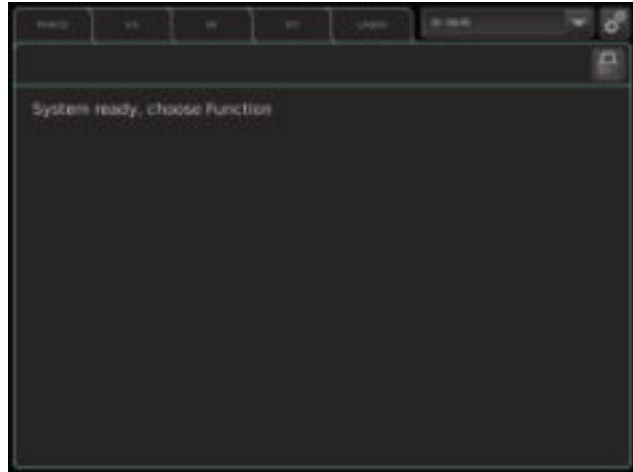


Fig. 26 Start screen

If error messages appear, these are correspondingly displayed:

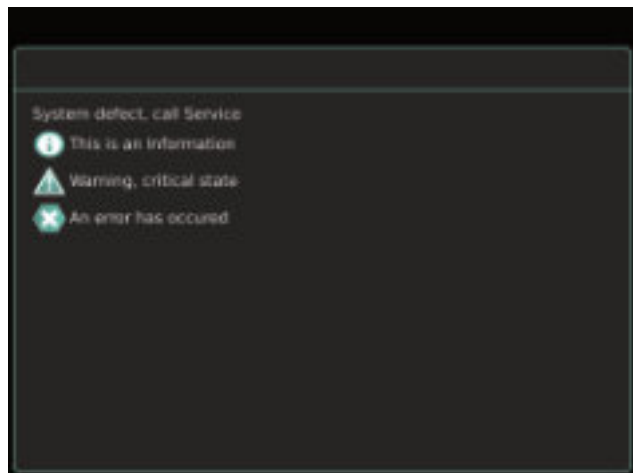


Fig. 27 Example of messages

i Overview of error messages (► 21.2.3 Error messages).

6 Working with the user interface

6.1 Operating concept

The user interface is divided into four levels:

- User level (display and settings area): Normal operating range, display and setting of functions and value ranges
- Auxiliary menus: Fine-tuning/additional setting options for functions and value ranges
- ParaProg: Basic surgeon settings.
Access only for trained experts, e.g. hospital technicians (user manual for ParaProg ► 1.3 Other relevant documents).
- Service: Access only for authorised Oertli service

6.2 Overview of user interface

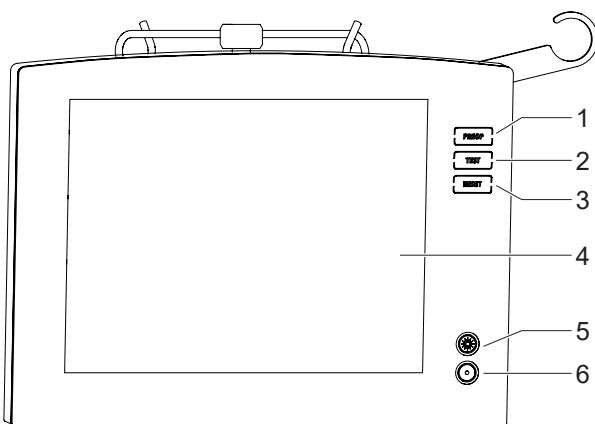


Fig. 28 User interface

- | | |
|------------|-----------------------------|
| 1 PREOPkey | 4 Display and settings area |
| 2 TESTkey | 5 LASER ACTIVEdisplay |
| 3 RESETkey | 6 LASER READYdisplay |

6.2.1 PREOP and TEST keys

Key	Description
PREOP	– Starts and discontinues tube system prefilling
TEST	– Only with PHACO function: Starts phaco test – Only with VIT function: Test vitrectomy cutter – Only for the HF function group: Test HF instrument

Tab. 11 PREOP and TEST keys

i PREOP and TEST can be discontinued at any time by pressing the PREOP or TEST key or the RESET key. In the event of unintentional activation, PREOP can also be discontinued by activating the REFLUX position of the pedal. The message PREOP DISCONTINUED! or PHACO TEST DISCONTINUED! appears on the display.

6.2.2 RESET key

Key	Description
RESET	Put the surgical platform into a safe status and restart it

Tab. 12 RESET key

i The key can be pressed whenever normal operation is no longer possible.

6.2.3 Status displays (LASER function, optional)

Display	Description
LASER READY	– The display is lit in blue: The laser is started up and is ready for use. – The display is not lit: The laser is not ready for use.
LASER ACTIVE	– The display blinks: The laser is in use. Laser pulses are being emitted. – The display is not lit: The laser is not in use. No laser pulses are being emitted.

Tab. 13 Status displays (LASER function, optional)

6.2.4 Display and settings area

The display and settings area provides information on the functional status of the surgical platform and is used to select functions as well as the display and input of the required values.

The display and settings area reacts to gentle touching or tapping and can be operated using sterile film and surgical gloves.

It is possible that only the operable functions are active, depending on the stage of the surgical procedure or the position of the pedal. This allows OS4 to offer a high degree of protection against misuse. The execution of a command can be identified by the change in the input element and, if applicable, an acoustic signal (control tone, ► 21.1 Control, confirmation and warning tones). If a blocked function is pressed, the display does not change.

The values displayed can be increased or reduced using the +/- keys immediately below the value displays.



Fig. 29 Display and settings area (e.g. PHACO)

No.	Element	References
1	Function display	(► 6.2.5 Function display)
2	Surgeon memory	(► 9.2 Select surgeon memory)
3	Auxiliary menu	(► 6.2.13 Auxiliary menus)
4	Value ranges	(► 6.2.7 Value ranges and ► 6.3.7 Working with values)
5	Status displays for pedal status and pedal battery status	(► 6.2.12 Status displays for pedal status and pedal battery status)
6	Pumpsetting and fill level of the cassette	(► 6.2.11 Pumpsetting and fill level of the cassette)
7	Irrigation settings	(► 6.2.10 Irrigation settings)
8	Function-dependent settings area	(► 6.2.9 Function-dependent settings area)
9	Function-dependent modes	(► 6.2.8 Function-dependent modes)
10	Programme selection	(► 6.2.6 Programme selection)

Tab. 14 Display and settings area

6.2.5 Function display

The desired operating function can be selected in this area (► 6.3.1 Working with tabs/switching between functions).



Fig. 30 Function display (e.g. PHACO)

Key	Description
PHACO	Ultrasound phaco function with programmes and subfunctions
I/A	Irrigation/aspiration function with programmes and subfunctions
HF	High-frequency function with programmes and subfunctions
VIT	Vitrectomy function with programmes and subfunctions
LASER	Laser function with programmes and subfunctions

Tab. 15 Function display

6.2.6 Programme selection

In this area, the desired function-dependent programmes can be selected in the individual functions (► 6.3.3 Working with function keys for function modes).



Oertli recommends programming programme changes on the pedal.

PHACO function

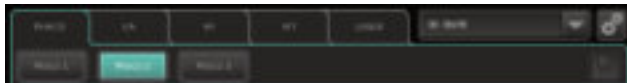


Fig. 31 PHACO programme selection

Key	Description	Reference
PHACO1, PHACO2, PHACO3	Ultrasound phaco function: Select PHACO 1, PHACO2 or PHACO3 with the values saved for the respective programme.	► 11.1 Performing ultrasound phaco (PHACO)

Tab. 16 Programme in the PHACO function

I/A function

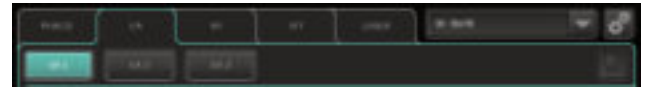


Fig. 32 I/A programme selection

Key	Description	Reference
I/A 1, I/A 2, I/A 3	Irrigation/ aspiration function: select I/A 1, I/A 2 or I/A 3 with the values saved for the respective programme.	► 11.2 Performing irrigation and aspiration (I/A)

Tab. 17 Programme in the I/A function

HF function

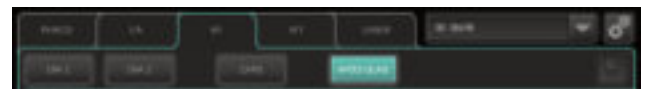


Fig. 33 HF programme selection

Key	Description	Reference
DIA 1, DIA 2	Select DIA (diathermy) function with the power value stored for the respective programme.	► 12 Performing diathermy (DIA)
CAPS	Select CAPS (capsulotomy) function with the power output level stored.	► 13 Performing capsulotomy (CAPS)
HFDS GLAU	Select HFDS GLAU (high frequency deep sclerotomy) function.	► 14 Performing glaucoma surgery (HFDS GLAU)

Tab. 18 Programmes in the HF function

VIT function



Fig. 34 VIT programme selection

Key	Description	Reference
VIT 1, VIT 2, VIT 3	Select functions VIT 1, VIT 2, VIT 3 (vitrectomy) for operating a vitrectomy cutter with the values saved for the respective programme.	► 11.3 Performing anterior vitrectomy (VIT) ► 15 Performing pars plana vitrectomy
INJECTION(+)	Select INJECTION (injection of silicone oil) function with the stored values.	► 16 Visco: Performing injection/ extraction of silicone oil
EXTRACTION	Select EXTRACTION (extraction of silicone oil) function with the stored values.	► 16 Visco: Performing injection/ extraction of silicone oil

Key	Description	Reference
ENDO PHACO	Select ENDOPHACO function with the stored values.	► 17 Performing endophaco operation

Tab.19 Programmes in the VITfunction

LASERfunction

In the LASERfunction, the keys for laser operation are displayed in the programme selection. They provide information on the status of the endolaser (► 18 Performing an endolaser operation).



Fig. 35 LASERprogramme selection

6.2.7 Value ranges

These ranges display the respective values:

- Pedal in zero position or position 1: Saved maximum value
- Pedal in position 2 or 3: Current value



Fig. 36 Value ranges (example:PHACO)

Detailed information on the setup of the value ranges and setting values can be found in section ► 6.3.7 Working with values.

6.2.8 Function-dependent modes

This area contains the additional modes available for the respective function.

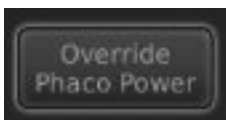


Fig. 37 Function-dependent modes (example:PHACO)

6.2.9 Function-dependent settings area

This area contains the additional parameter settings area available for the respective function.

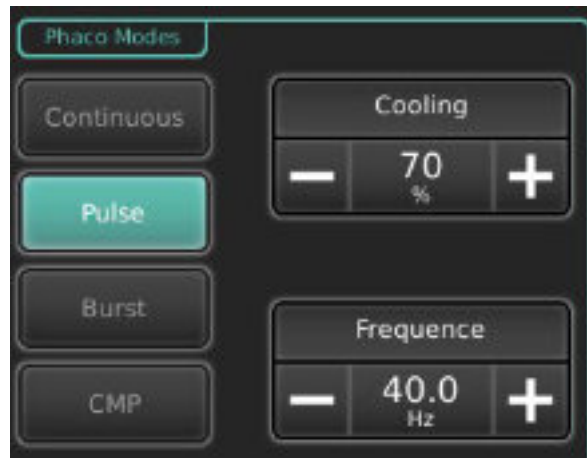


Fig. 38 Function-dependent settings area (example:PHACO)

6.2.10 Irrigation settings

Irrigation settings can be made in this area.



Fig. 39 Irrigation settings

No.	Element	Reference
1	Continuous irrigation	► 7.1.2 Continuous irrigation (IRR)
2	BSS removal	► 7.1.1 BSS removal

Tab.20 Irrigation settings

6.2.11 Pump setting and fill level of the cassette

The desired pump can be selected in this area and the fill level of the cassette of the I/A tube system can be displayed.

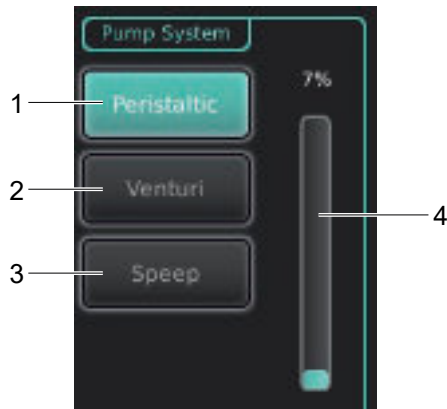


Fig. 40 Pump setting and fill level of the cassette

No.	Element	Description
1	Peristaltic	Select peristaltic pump
2	Venturi	Select venturi pump
3	SPEEP	Select SPEEP
4	Cassette fill level	Displays the fill level of the cassette. If the cassette has exceeded a certain fill level, the colour of the display changes: <ul style="list-style-type: none"> – Green: Low fill level. – Orange: 70% fluidic level. – Red: 90% fluidic level. Error message on screen (► 21.2.2 Warnings).

Tab.21 Pump setting and fill level of the cassette

6.2.12 Status displays for pedal status and pedal battery status

Important information about the pedal is displayed in this area.

i If the pedal is not connected, the status display for the pedal status is disabled and the pedal battery status is not displayed.

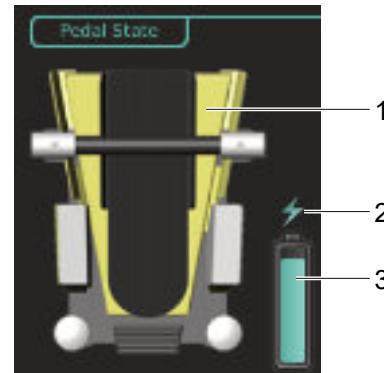


Fig. 41 Pedal status and pedal battery status

No.	Element	Description
1	Pedal status	<ul style="list-style-type: none"> – Shows the direction in which the pedal moves. – Shows the key being activated.
2	Charging icon	This is displayed when the pedal is connected to the surgical platform by the cable and the pedal is charged.
3	Pedal battery status	<p>Displays the battery status of the pedal. If the charging of the pedal falls below a certain level, the colour of the display changes from green (high charge) to orange to red (low charge, ► 5.7 Charging the pedal).</p> <p>If the charge status is so low that the battery needs to be connected to the power supply, a corresponding message is displayed on the screen.</p>

Tab.22 Pedal status and pedal battery status

i By tapping on the figure of the pedal, the desired pedal configuration display opens (► 8 Using/setting the pedal).

EN



Fig. 42 Current pedal settings (for information only)

6.2.13 Auxiliary menus

Auxiliary menus are windows in which additional fine-tuning can be performed for a programme (► 6.3.5 Working with windows):



Fig. 43 Auxiliary menu (Phaco Power Override) in the programme PHACO 1

Auxiliary menus are opened via the icon:



6.3 Working with cross-functional operating elements of the display and settings area

This section contains information on using recurring elements of the user interface.

6.3.1 Working with tabs/switching between functions

You can use tabs to select the main functions of the OS4:



Fig. 44 Function display tab (example: PHACO)

i After the function change, you will be in programme 1 of the selected function in each case.

- ☞ Tap the desired tab in the function display.
The contents of the selected function are displayed.
- ☞ To switch to another tab, tap on the desired tab.

i Some setting windows also subdivide in tabs. The functionality is identical in this case. See the following sections.

6.3.2 Switching between programmes

Switching is equivalent to operating function keys (► 6.3.3 Working with function keys for function modes) and is performed by simply tapping on the desired programme key:

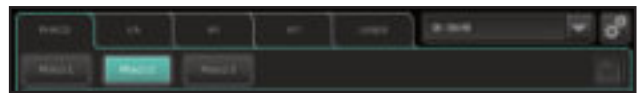


Fig. 45 Selecting programmes (example: PHACO)

- ☞ To select a programme, tap the desired programme key.
The programme is switched.

6.3.3 Working with function keys for function modes

OS4 differentiates between two types of function keys:

- Function keys for alternative functions
- Function keys for additional functions (► 6.3.4 Working with function keys for additional functions)

In the case of function keys for alternative functions, only one of the functions can ever be activated in each case:

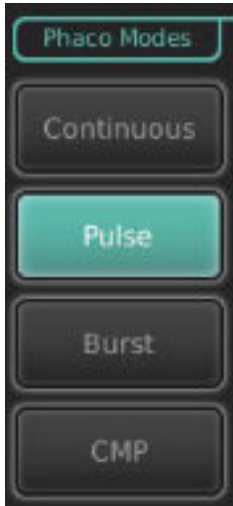


Fig. 46 Alternative options (example)

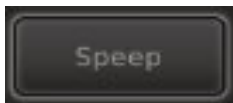
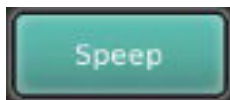


Fig. 47 Inactive function key

- ☞ Tap the desired function key.
The function key turns green and the desired function is selected:



- ☞ To deselect the function: Select another function.

6.3.4 Working with function keys for additional functions

OS4 differentiates between two types of function keys:

- Function keys for alternative functions (► 6.3.3 Working with function keys for function modes)
- Function keys for additional functions

A function key for additional functions may have several states:



Fig. 48 Additional function (example)

- ☞ Tap on all desired function keys.
The respective function key turns green and the desired function is selected:



The condition for activating the function is fulfilled. Additional function is active. The respective function key is outlined in white.



6.3.5 Working with windows

In windows, you can perform additional settings. They are usually opened using symbols (icons).

EN



Fig. 49 Example: Icon to open the light properties setting

1. Tap on the icon.

The window with the setting options is displayed:



Fig. 50 Light properties settings

2. Perform the desired settings in the window.
3. Save changes with symbol:



4. Close window by tapping on the "X":



6.3.6 Working with sliders

You can use sliders to change values progressively:

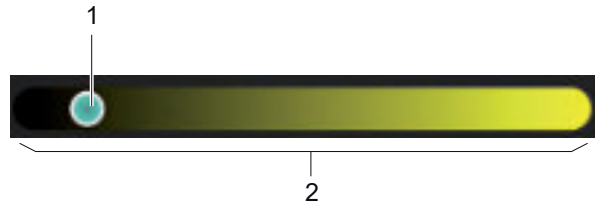


Fig. 51 Slider

- 1 Slider
- 2 Settings range

1. Tap on the slider (1) and hold down.
 2. Slide the slider in the desired direction along the settings area (2).
 3. When the desired area is reached, let go of the slider.
- Alternatively, the values can be changed directly by tapping on the desired settings area.

6.3.7 Working with values

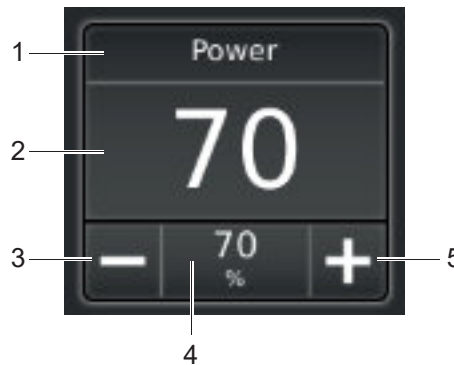


Fig. 52 Value range (example: PHACO)

- 1 Name of the value
 - 2 Current value/ saved
 - 3 Decrease maximum value
 - 4 Maximum value with unit
 - 5 Increase maximum value
- maximum value (if pedal is in pos. 0 or 1, ► 6.2.7 Value ranges)

Change values

The procedure is the same for value ranges in the main display and settings area and in the auxiliary menu:

☞ The desired programme is selected.

1. Press the + or – key for the value until the desired maximum value is displayed.

i – Changing values gradually: Press the + or – key briefly.

– Changing values more quickly: Keep the + or – key held down for longer.

Changed (not stored) values are retained for the duration of the operation.

They are reset to the stored values in the following cases:

- Inserting a cassette
- Switching the operating platform off/on
- RESET
- Change of surgeon memory

☞ To reset the values in a programme, press and hold the programme key for 3 s.
The values are reset.

Storing values

Values can be stored for a particular programme. The procedure is the same for value ranges in the main display and settings area and in the auxiliary menu:

1. Change values as described above.
2. Save changes with symbol:



The saved values/fields are briefly lit in green.

7 Working with cross-functional settings and displays

7.1 Irrigation settings



Fig. 53 Irrigation settings

- 1 Continuous irrigation 2 BSS removal

7.1.1 BSS removal

Using BSS removal, BSS fluid can be removed before or after an operation.

☞ Press and hold the BSS removal key:



BSS fluid is released.

☞ To stop BSS removal: Release the key.

7.1.2 Continuous irrigation (IRR)

In continuous irrigation, irrigation flow is maintained irrespective of the pedal setting.

Task	Method
Select mode	☞ Press Continuous Irrigation key. The Continuous Irrigation key is lit in green. The mode is selected.
Start irrigation flow	☞ Select defined pedal position for irrigation or Cont. irrigation on/off. The irrigation valve opens. The BSS removal key is lit. The irrigation flow starts.
Interrupt irrigation flow	☞ Select pedal position REFLUX or Cont. irrigation on/off. The irrigation valve closes. The BSS removal key display goes out. The irrigation flow is interrupted.
End mode	☞ Press Continuous Irrigation key. The irrigation valve closes. The Continuous Irrigation display and the BSS removal key go out. The irrigation flow ends.

Tab. 23 Continuous irrigation (IRR) tasks

i The continuous irrigation is stored with the PHACO, I/A, HF, DIA, VIT, INJECTION(+), EXTRACTION, ENDO PHACO and LASER functions.

7.2 Select pumps and switch between pumps

i The function is not available in the following programmes: DIA 1, DIA 2, CAPS, HFDS GLAU.

You can choose between 3 alternative pumps:

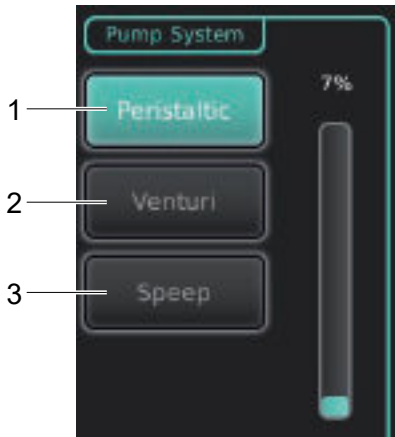


Fig. 54 Pump setting

No.	Element	Description
1	Peristaltic	Select peristaltic pump
2	Venturi	Select venturi pump
3	SPEEP	Select SPEEP

Tab. 24 Pump alternatives

Switching between pumps is equivalent to operating function keys (► 6.3.3 Working with function keys for function modes) and is performed by simply tapping on the desired programme key.

i A switch between pumps cannot be performed while the pedal is activated in a position for aspiration or REFLUX.

SPEEP

In SPEEP mode, the vacuum limit of the peristaltic pump is set linearly in the defined pedal position while the set flow remains constant until the vacuum limit is reached.

REFLUX (Backflush)

REFLUX (backflush) is performed according to the pedal configuration selected in ParaProg. The maximum pressure for the back flush with the pump is 150 mmHg.

REFLUX is limited to 4 sec. per activation.

7.3 Adjust bottle height/IOP

⚠ WARNING!
Manually changing the hook for the bottle intake. Risk to the patient due to incorrect display of the bottle height.
✎ Do not change the hook provided for the bottle intake. Bottles may only be hung on the hooks provided by the manufacturer.

Depending on the type of irrigation (► 9.6 Connecting the infusion set (infusion)) and setting in ParaProg (user manual for ParaProg, ► 1.3 Other relevant documents), one of the following value ranges is displayed in the display and settings area:


Irrigation type / ParaProg	Value range
----------------------------	-------------

- Gravity infusion
- Unit in ParaProg: cm



- Gravity infusion with infusion pole
- Unit in ParaProg: mmHg



Irrigation type / ParaProg	Value range
<ul style="list-style-type: none"> – Active infusion – Unit in ParaProg: mmHg 	

Tab.25 Irrigation types

i As soon as the ACTUAL value exceeds the alarm threshold set in ParaProg (► 1.3 Other relevant documents) for the IOP pressure, the GFI alarm signal sounds.

Adjusting bottle height

In service mode (► 1.3 Other relevant documents, VV016042) it is possible to configure the manual or automatic infusion pole control. Automatic infusion pole control is used as standard.

Automatic infusion pole control:

⚠ CAUTION!
Unexpected movement of the infusion pole while handling the infusion bottle.
Slight injury to the user or other people.
☞ Keep all body parts out of the way of the travel path of the infusion pole.

☞ If the cassette is inserted, press the + or – key in the value range until the desired bottle height is set.

If no cassette is inserted, press the + or – key to adjust the future bottle height (target value) in the value range. The infusion pole does not move.

The infusion pole travels automatically when the following events occur:

- Cassette is inserted: infusion pole travels at the stored value of the programme selected. The infusion pole does not travel in the start level.
- Cassette is ejected: infusion pole travels downwards.

Manual infusion pole control:

☞ Press the + or – key in the value range until the desired bottle height is displayed.

7.4 Adjust AIRfunction


i The function is available in the following programmes: Vitrectomy (VIT 1, VIT2, VIT 3), INJECTION(+), EXTRACTION, ENDO PHACO, LASER.

The AIRfunction can be controlled via the defined pedal position or the display and settings area.

OS4 additionally offers 3 programmable settings for the air supply: AIR 1, AIR 2, AIR 3.



Fig. 55 Adjust AIRfunction

Task	Method
Switch on mode	☞ Select AIR 1, AIR2 or AIR3. The function is selected.
Change values	☞ Press the + or – key until the desired AIR pressure is displayed.
Rest values to stored value	☞ Press and hold Air 1, Air 2 or Air 3 key for 3 seconds.
Save values for AIR 1, AIR2 or AIR 3	☞ Save changes with symbol: 
Switch off mode	<ul style="list-style-type: none"> ↪ AIR function switched off (► 7.5 Fluid/air exchange (switching between AIR and irrigation function)). ↪ 3-way stopcock set to BSS (► 7.5 Fluid/air exchange (switching between AIR and irrigation function)). ☞ Select AIR 1, AIR2 or AIR3 once again. The function is deselected.

Tab.26 Adjust AIRfunction

i As soon as the actual value exceeds the alarm threshold set in ParaProg (► 1.3 Other relevant documents) for AIR pressure, the AIR alarm signal sounds.

7.5 Fluid/air exchange (switching between AIR and irrigation function)

EN

⚠ CAUTION!
Lack of toning of the eye during aspiration due to unintended switching of machine-driven 3-way stopcock without activation of air.
Risk of short-term hypotension.

- ☞ Stringently monitor IOP during surgery.
- ☞ Activate air at the OS4 surgical platform or switch 3-way stopcock on the surgical platform to BSS.

i The function is available in the following programmes: Vitrectomy (VIT 1, VIT 2, VIT 3), INJECTION(+), EXTRACTION, ENDO PHACO, LASER.

i ☞ Comply with additional operation and safety instructions in document TN999076 (► 1.3 Other relevant documents).

In the functions listed, a switch can be made via the display and settings area between the emission of pressurised air (AIR) or BSS fluid using an open 3-way stopcock and the configuration of tube connections.

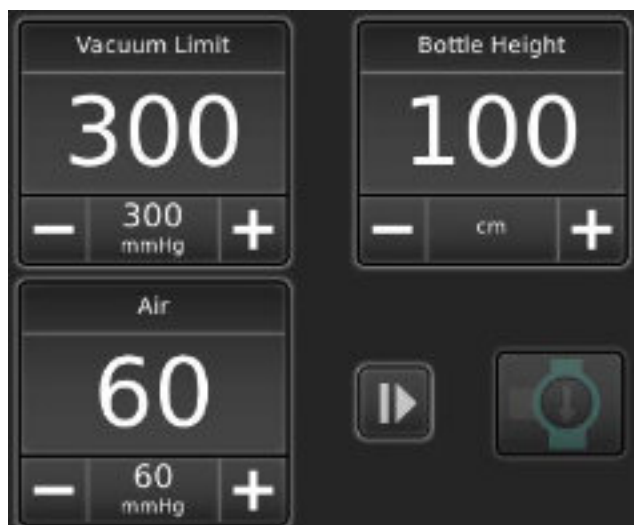
















Fig. 56 Valve display

The preset parameters are irrigation / BSS supply, AIR is selected and the manual 3-way stopcock is set so that all the connections are open.

Task	Method
Initial position of the 3-way stopcock on the surgical platform.	Irrigation/ BSS supply is preset. All valves are closed. 
Switch on BSS	☞ Irrigation/BSS supply is set. ☞ Activate pedal in irrigation position. BSS valve is opened. Icon is displayed: 
Prepare/switch on air supply	☞ Press icon:  The icon is lit in blue. The AIR function is ready: 
Switch from BSS to AIR	☞ Press icon:  The valve is switched from BSS to AIR. Pressurised air is supplied: 
Switch from AIR to BSS	☞ Press icon:  The valve is switched from AIR to BSS. BSS is supplied. 

Task	Method
End air supply	<p>When irrigation/BSS supply is set:</p> <p>☞ Press icon:</p>  <p>The icon is no longer lit. The air supply is ended:</p>  <p>BSS valve remains open.</p> 
	<p>When air supply is set:</p> <p>☞ Press icon:</p>  <p>The icon is no longer lit. The AIR valve is closed. The air supply is ended:</p>  <p>Nothing is supplied to the eye. Aspiration remains possible.</p> 

Tab.27 Switch valves



Alternatively, an external manual 3-way stopcock can be used to switch between the output of pressurised air (AIR) or BSS fluid. This option can be selected in ParaProg (user manual for ParaProg ► 1.3 Other relevant documents).

The following symbol appears in the display and settings area:



Fig. 57 Manual 3-way stopcock

The manual 3-way stopcock is preset to irrigation/ BSS supply, Air is selected.

Task	Method
Switch from BSS to AIR	<p>☞ Press icon:</p>  <p>The icon is lit in blue. The AIR function is ready:</p>  <p>☞ Switch manual 3-way stopcock from irrigation/BSS supply to air. Air is supplied.</p>
Switch from AIR to BSS	<p>☞ Switch manual 3-way stopcock from air to irrigation/ BSS supply. Irrigation/BSS is supplied.</p>

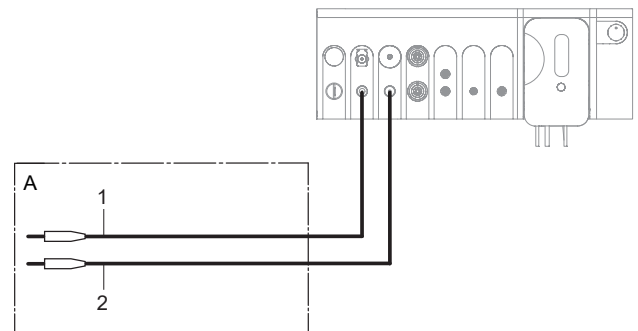
Tab.28 Fluid/air exchange with manual 3-way stopcock

7.6 Adjusting the light source (Light 1 or Light 2)

i The function is available in the following programmes: Vitrectomy (VIT 1, VIT 2, VIT 3, INJECTION(+), EXTRACTION, ENDO PHACO, LASER).

Always insert light instruments carefully into the port as far as they will go. Otherwise the maximum possible amount of light will not be available.

OS4 offers the following types of light sources:





No.	Type	Port	Name in display and settings area
1	LED+	Light source 1 port	Light 1
2	LED	Light source 2 port	Light 2





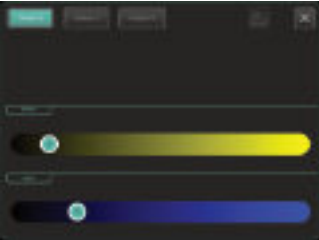

Tab.29 Types of light sources



Fig. 58 Adjust light source

Task	Method
Switch off light source	Press key:  The light source is deactivated: 

Tab.30 Adjust light source

Task	Method
Switch on light source	Press icon:  The light source is activated: 
Adjust brightness	Press the + or – key until the desired power output level is displayed. OnlyLED+: Brightness setting applies only to the colour yellow.
Save brightness setting	Save changes with symbol: 
OnlyLED+: Make additional settings (Colour 1, Colour 2, Colour 3)	Light source switched on. 1. Press icon:  2. Use slider to adjust Colour 1, Colour 2, Colour 3. 
	Save changes with symbol: 

8 Using/setting the pedal

1. Pedal connected to the surgical platform (► 5.3 Connect pedal).

The pedal settings can be configured using ParaProg individually for each physician (user manual for ParaProg ► 1.3 Other relevant documents).

8.1 Function keys

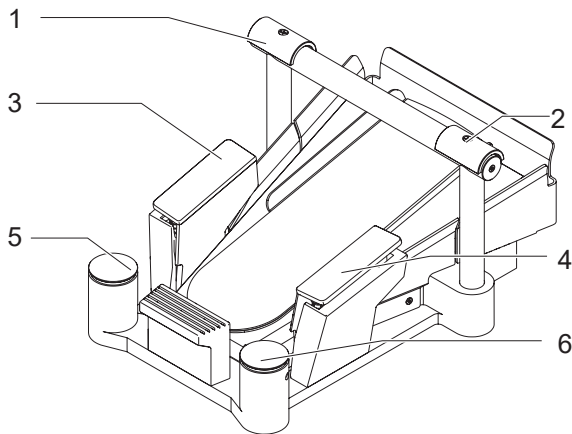


Fig. 59 Function keys

No.	Element
1	TOPleft switch
2	TOPright switch
3	Lateral left switch
4	Lateral right switch
5	Heel switch, left
6	Heel switch, right

Tab. 31 Function keys

8.2 Vertical range of movement

The vertical range of movement is divided into 3 sections, from zero position to fully depressed:

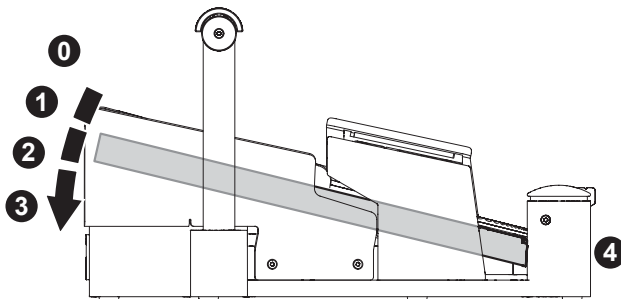


Fig. 60 Vertical range of movement

These three sections are between positions 0, 1, 2 and 3. Position points 1 and 2 can be felt in the form of slight resistance (slight engagement) when the pedal is pressed slowly down.

Pressing with the heel brings the pedal into position 4 (REFLUX) for back flush.

8.3 Horizontal range of movement

The horizontal range of movement is divided into 3 sections: left, right and normal position (middle):

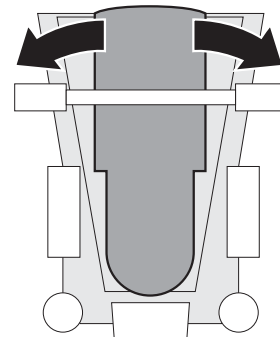


Fig. 61 Horizontal range of movement

8.4 Display pedal settings

The standard configurations can be seen as follows for each function:

1. Tap the pedal display in the display and settings area.

The window with the pedal configurations is displayed:



Fig. 62 Configuring the function keys

☞ For functions of the function keys, tap on the Buttons key.

☞ For horizontal and vertical range of movement functions, tap on the Sections key:



Fig. 63 Configuring the function keys

8.5 Individually configuring pedal configurations

For each combination option of a vertical and horizontal range of movement, function keys can be stored in ParaProg (ParaProg user manual ► 1.3 Other relevant documents).

9 Performing general preparations for surgery

The following sections describe the necessary steps to prepare OS4 for surgery.



CAUTION!

Defective components.

Risk to user and patient.

Damage to the surgical platform.

- ⚙ Before installation, check all components for completeness, possible damage and leakage.
- ⚙ All handpiece leads and any (electrical) leads should be regularly checked (e.g. exposed conductive wire, nicks/tears in the insulation, deformation, etc.).
- ⚙ Do not reuse damaged or defective components, instead replace them immediately.

9.1 Switching on the surgical platform

🔌 Pedal charged (► 5.7 Charging the pedal).

🔌 Air connection set up (► 5.5 Connect pressurised air).

🔌 Instrument tray prepared (optional, ► 5.1.1 Opening the instrument tray and placing it in working position) and covered with a sterile cloth (not included with the delivery).

⚙ Press the on/off button on the surgical platform.

Voltage indicator is lit and green.

The surgical platform automatically performs a self-test after it has been switched on.

If the test has been completed successfully, the message SYSTEMREADY, CHOOSEFUNCTION is displayed in the control panel.

The surgical platform is ready.

9.2 Select surgeon memory

🔌 Pedal in zero position.

1. When the surgical platform is switched off: Switch on the surgical platform (► 9.1 Switching on the surgical platform).



Fig. 64 Select surgeon memory

2. Tap on the arrow in the SURGEONMEMORY field.
3. Select from the list of desired surgeon memories.
The setting is automatically transferred.

9.3 Setting volume

The volumes of control/warning sounds, voice confirmation and the start tone can be adjusted independently of one another.

i The control sounds for DIA, CAPS, HFDS GLAU and the GFI alarm signal cannot be switched off completely.
The control sounds for the endolaser cannot be changed (standard specifications).
The adjusted volume settings apply to all of a user's functions/programmes.

- 1. Switching on the surgical platform (► 9.1 Switching on the surgical platform).
- 2. Surgeon memory selected (► 9.2 Select surgeon memory).

1. Press key:



The General window is displayed:



Fig. 65 General window

2. Press the + or – key in the Confirmation Sound Volume value range until the desired volume for warning tones is displayed.
 - Values: 0 to 100%
3. Press the + or – key in the Control Sound Volume value range until the desired volume for control tones is displayed.
 - Values: 0 to 100%
4. Press the + or – key in the Start Sound Volume value range until the desired volume for the start-up tone is displayed.
 - Values: 0 to 100%
5. Press the + or – key in the Voice Confirmation Volume value range until the desired volume for the voice confirmation is displayed.
 - Values: 0 to 100%

6. Save changes with symbol:



7. Close window by tapping on the "X":



9.4 Installing cassette with I/A tube system

! WARNING!
Insufficient sterility.
Hazard to patient.

- ☞ Only use original Oertli cassettes (► 24.1 Accessories, spare parts, instruments, consumables).
- ☞ Do not re-use cassette intended for single use.
- ☞ Sterility must be ensured when installing the cassette. The ends of the tubes connecting instruments must remain in the sterile area.

! CAUTION!
Defective components.
Danger to patient and user.

- ☞ Before installing the cassette, check the tube system for completeness, possible damage and leakage.

With the exception of the HF functions, all surgical steps require a perfectly assembled and filled irrigation / aspiration system. All elements are designed so that faulty connections are highly unlikely: To simplify the setup of the I/A system, the OS4 uses cassette systems which only need to be inserted into the surgical platform.

9.4.1 Unpacking and preparing the pack

! WARNING!
Insufficient sterility.
Hazard to patient.

- ☞ Non-sterile persons: Do not touch the contents of the pack.
- ☞ Only touch the outer side.

1. Non-sterile person: Open the pack and give the pack to the sterile person for removal.
Sterile removal of contents by the sterile person.
2. Put sterile film from the pack over the control panel.
3. Remove ties from cassette tubes.

9.4.2 Insert the cassette

WARNING!
Sharp edges in the cassette shaft.
Risk of injury.
⚠ Do not reach into the cassette shaft on the surgical platform.

NOTE!
Unauthorised repairs to or work on the surgical platform.
Damage to the surgical platform.
⚠ Do not perform work on the cassette shaft on the surgical platform with a tool.
⚠ When inserting the cassette, ensure that no tubes are caught.

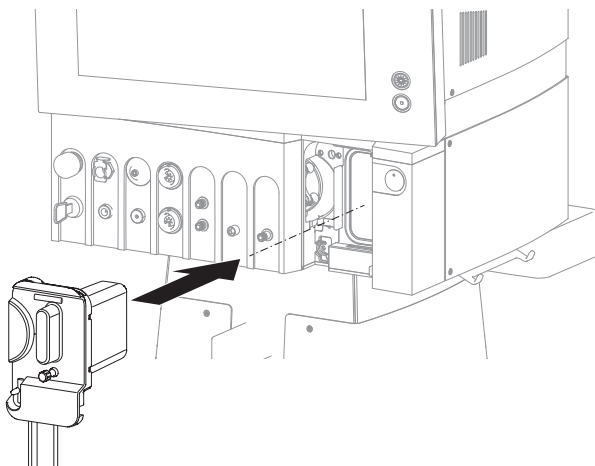


Fig. 66 Insert the cassette

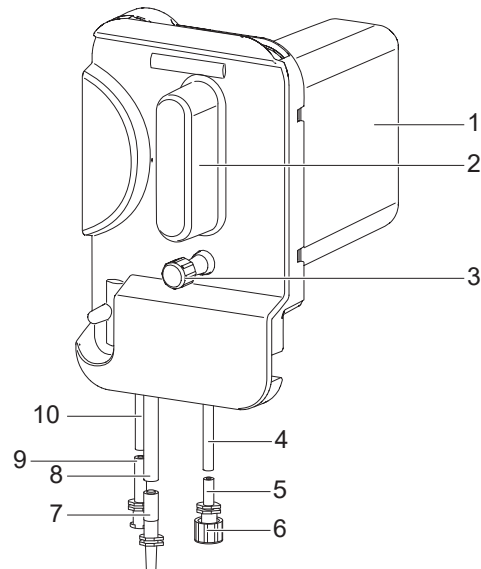


Fig. 67 Connections on the cassette

- | | |
|--|------------------------------------|
| 1 Drainage container | 6 Protective cap for infusion port |
| 2 Handle | 7 Irrigation port |
| 3 Connection for drainage bag with protective cap (blue, emergency draining) | 8 Irrigation line |
| 4 Infusion line | 9 Aspiration port |
| 5 Infusion port | 10 Aspiration line |

i Ensure that the blue protective cap for the emergency draining (3) is screwed in completely.

1. Remove and dispose of the protective cap for the infusion port (6). Connect infusion port (5) to the infusion set. Ensure sterility!
2. Push cassette (with tubes pointing downwards) into the cassette shaft as far as it will go.
The cassette is automatically pulled in.

i The tubes should not be kinked or caught during insertion of the cassette.

3. Insert irrigation port (7) and aspiration port (9) into the desired handpiece.

i The Luer connectors are designed to prevent incorrect connection.

4. When using drainage bag VV636010 (optional): Remove blue protective cap (3) and mount drainage tube securely on the port for drainage bags for emergency drainage (3) on the cassette.

NOTE!

Insufficient vacuum.
Leaking irrigation fluid.

- ⚠ If no drainage bag is attached (optional): Ensure that the drainage seal (3) is correctly closed.

9.5 Securing the drainage bag (optional)

Drainage bags are not included in the delivery and may be ordered separately (► 24.1.4 Consumables).

i Take note of additional instructions for use in document TN999039 (► 1.3 Other relevant documents).

NOTE!

Capacity of the drainage bag of the cassette exhausted.

Sterile field can become contaminated.

- ⚡ During longer surgeries, always use a drainage bag.

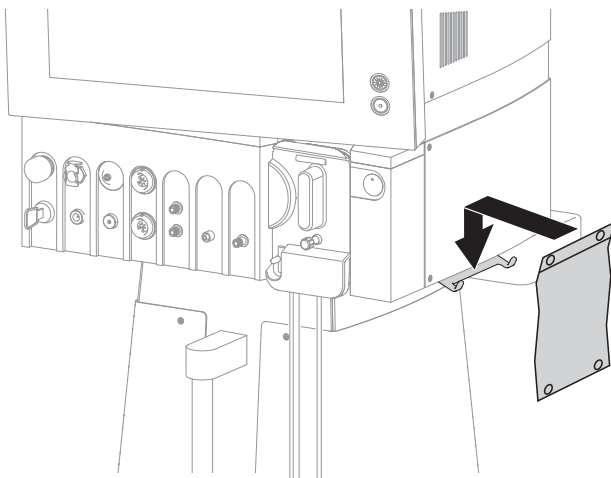


Fig. 68 Securing the drainage bag

1. Suspend the drainage bag on the suspension for drainage bags on the surgical platform.
2. Secure drainage tube on the cassette on the connection for drainage bags.

i Close the clamp of the drainage bag when the OS4 is used.

9.6 Connecting the infusion set (infusion)

OS4 offers two options for infusions:

- Gravity infusion
- Active infusion (gas-forced infusion, GFI)

⚠ CAUTION!

Incorrect use of the infusion set.
Hazard to patient.

- Correct use of the infusion set is the surgeon's responsibility.
- Position the infusion container higher than the patient's eye level. Correct positioning of the infusion container is the surgeon's responsibility.
- Ensure that there is always enough eye rinse solution in the infusion container.
- Continuously monitor the volume during use.

9.6.1 Gravity infusion

⚡ Infusion pole mounted (► 5.2 Mount the infusion pole).

⚡ Irrigation pole is adjusted in the ParaProg (► 1.3 Other relevant documents).

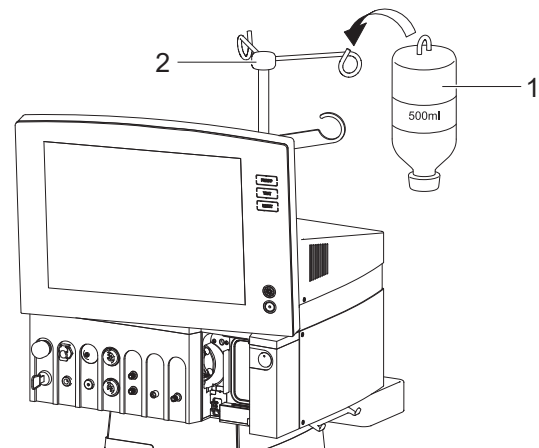


Fig. 69 Suspend the infusion bottle

1. Suspending the infusion bottle (1) on the hook on the infusion pole (2).

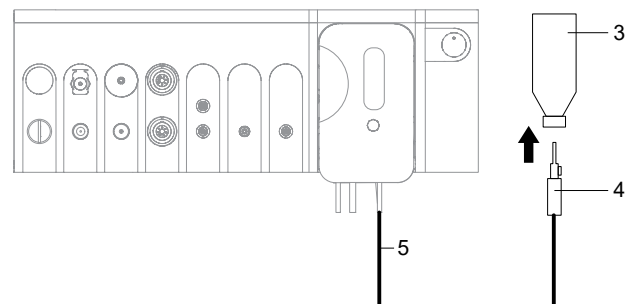


Fig. 70 Connect the infusion set

2. Remove protective cap from infusion set.
3. Close the tube clamp on the infusion set.
4. Connect infusion set (4) to infusion bottle (3).
5. Connect infusion set to infusion port (5).

6. Adjust desired function and bottle height (► 7.3 Adjust bottle height/IOP).
7. Open the tube clamp on the infusion set.

i To prevent leakage of liquid, close the tube clamp on the infusion set when replacing the infusion bottle.

i An alarm signal sounds if the infusion set is wrongly connected to the port for the drainage set. The notification **Faulty connection of giving set.** Immediately remove cassette! appears. Take the following steps immediately in order to prevent damage to the surgical platform caused by overflowing fluid:

1. Remove the cassette from the surgical platform.
2. Empty cassette.
3. Connect infusion set correctly to the infusion port.
4. Please insert a cassette.

9.6.2 Using an active infusion (gas-forced infusion, GFI)

⚠ CAUTION!
Non-controllable infusion.
Hazard to patient.

✎ For the active infusion, use only glass or plastic bottles with a 500-ml capacity.

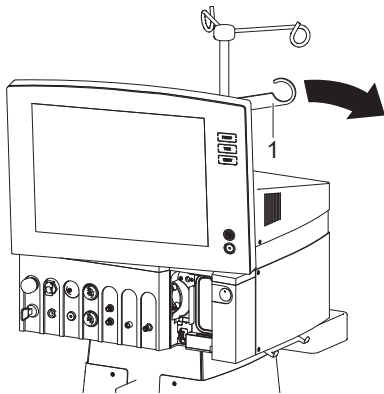


Fig. 71 Fold out the GFI suspension

⚠ Active IOP is adjusted in the ParaProg (► 1.3 Other relevant documents) selected.

1. Position the GFI suspension (1) on the surgical platform.
2. Remove the protective tube from the cannula.
3. Close tube clamp on active infusion set.

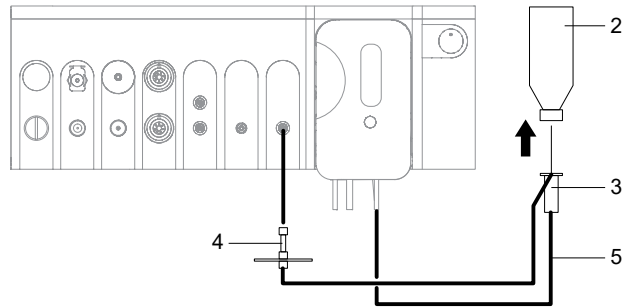


Fig. 72 Connect active infusion set

4. Connect GFI connection to the GFI port (4) on the surgical platform.
5. Pre-pierce infusion bottle (2) with spike.
6. Insert cannula on active infusion set (3) into infusion bottle (2). Make sure that the cannula protrudes above the liquid level of the bottle.

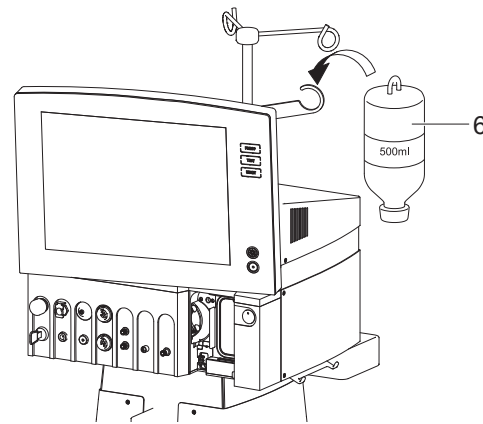


Fig. 73 Suspend the infusion bottle

7. Suspend the infusion bottle (6) on the GFI suspension on the surgical platform.
8. Connect the infusion line of the active infusion set to the infusion line (5) of the cassette.
9. Fill half of the drop chamber with ophthalmic rinsing solution.
10. Adjust the required function and GFI pressure on the surgical platform (► 7.3 Adjust bottle height/ IOP).
11. Open tube clamp on active infusion set.

i To prevent leakage of liquid, close the tube clamp on the active infusion set when replacing the infusion bottle.

9.6.3 Setting the IOPbasis

! WARNING!

Wrong infusion bottle height.
Hazard to patient.

- ☞ Ensure that the value selected for the height of the position of the patient's eye corresponds to the mean fluid level in the bottle.

i

The setting adjusted applies to all functions/programmes.

1. Press key:



The General window is displayed:



Fig. 74 General window

2. Press the + or – key in the IOPBasis value range until the desired IOP basis is displayed.

– Values: 0 to 150 cm

- ☞ Save changes with symbol:



3. Close window by tapping on the "X":



9.7 Connecting surgical instruments

i

The respective handpiece connection depends on the respective surgical method and is described in the respective section in detail.

The ports for the surgical instruments are coded on the surgical platform both by colour and by mechanical means. This makes it impossible to connect the instruments incorrectly.

Instrument	Reference
Ultrasound phaco handpiece	► 11.1 Performing ultrasound phaco (PHACO)
Irrigation/aspiration instrument	► 11.2 Performing irrigation and aspiration (I/A)
Instruments for the anterior vitrectomy	► 11.3 Performing anterior vitrectomy (VIT)
Diathermy instruments (diathermy, capsulotomy, glaucoma)	► 12 Performing diathermy (DIA) ► 13 Performing capsulotomy (CAPS) ► 14 Performing glaucoma surgery (HFDS GLAU)
Instruments for pars plana vitrectomy	► 15 Performing pars plana vitrectomy
Silicone application set	► 16 Visco: Performing injection/extraction of silicone oil
Instruments for endophaco surgery	► 17 Performing endophaco operation
Instruments for endolaser surgery	► 18 Performing an endolaser operation

Tab. 32 Surgical instruments

9.8 Filling I/A tube system (PREOPfilling process)

! WARNING!

Handpiece in patient's eye during PREOP.
Injury to patient's eye.

- ☞ Never carry out the (PREOP)filling process while the handpiece is in the eye.

i

PREOPand TEST can be discontinued at any time by pressing the PREOP or TEST key or the RESET key. In the event of unintentional activation, PREOPand TEST can also be discontinued by operating the REFLUX position or position 4 of the pedal. The message PREOPDISCONTINUED! or PHACO TEST DISCONTINUED! appears on the display.

EN

⚠ CAUTION!
Air in I/A system.
Danger to patient (poor chamber stability).

- ☞ To ensure proper operation, fill the I/A system completely with irrigation liquid.
- ☞ Ensure that there are no air bubbles in the tubes.

- ☞ Correct installation of the cassette checked (► 9.4 Installing cassette with I/A tube system).
- ☞ Surgical instruments prepared (► 9.7 Connecting surgical instruments).

9.8.1 Variant 1: Phaco instrument

i Proceed according to option 1 in the case of a phaco operation, as a phaco test is automatically launched after PREOP.

- ☞ Phaco handpiece prepared (► 11.1.1 Connecting the ultrasound phaco handpiece).
1. Attach test chamber (► 11.1.2 Attaching the test chamber).
 2. Open the infusion tap on the infusion set.
 3. Select PHACO function.
 4. Press the PREOP key.

The irrigation valve opens and the pump draws liquid through the tube system.

The Phaco window with the filling progress in % is displayed:

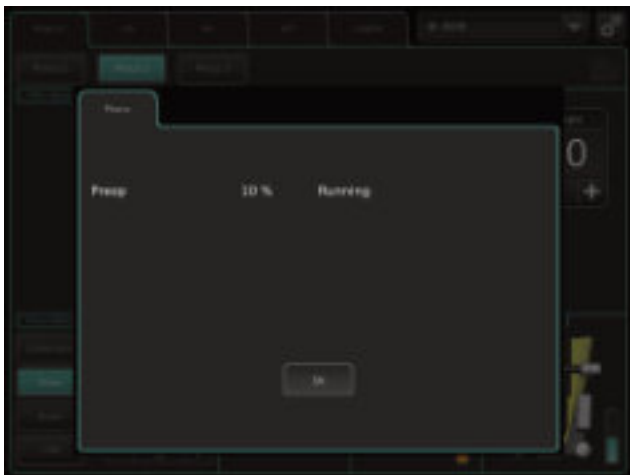


Fig. 75 Phaco window

5. Position test chamber slanted slightly upwards.
The residual air rises upwards out of the tubes.
6. Wait until the filling process automatically switches off.
The phaco test is performed automatically (► 11.1.4 Conducting phaco test).
The phaco system is ready for use once the phaco test has been successfully completed.

9.8.2 Variant 2: I/A instrument

1. Open the tube clamp on the infusion set.
2. Hold the tip of the coaxial I/A instrument or of the bimanual I/A instruments in the container with irrigation liquid.
3. Select I/A function.
4. Press the PREOP key.

The irrigation valve opens and the pump draws liquid through the tube system.

The I/A window with the filling progress in % is displayed:

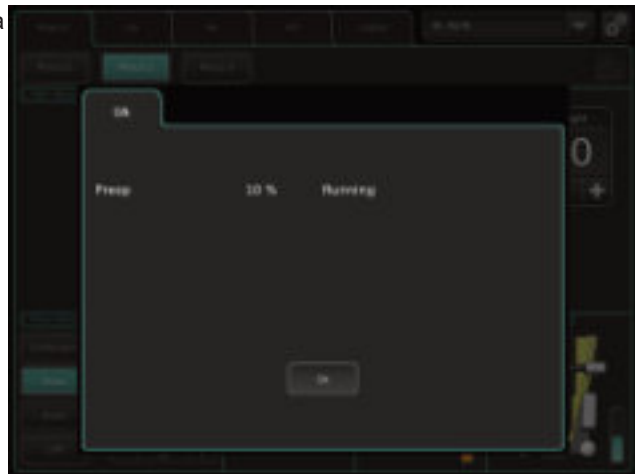


Fig. 76 I/A window

5. Wait until the filling process automatically switches off.
The I/A system is ready for use.

9.8.3 Variant 3: Vitrectomy

1. Combine irrigation and aspiration tube.
2. Open the tube clamp on the infusion set.
3. Select VITfunction.
4. Press the PREOPkey.

The irrigation valve opens and the pump draws liquid through the tube system.

The VIT window with the filling progress in % is displayed:



Fig. 77 VIT window

5. Wait until the filling process automatically switches off.
6. Connect vitrectomy cutter and irrigation handpiece or irrigation line.
The system is ready for use.
7. Press TESTkey to test the cutter.

10 Functions and default values

⚠ WARNING!

Improper use of the surgical platform.

Danger to patient and user.

- ⚠ The values given below are by no means recommended or suggested value settings. The correct choice of surgical platform settings is in fact the responsibility of the surgeon.

Every surgeon develops their own surgical technique which in turn calls for specific settings for the different surgical steps. OS4 is highly flexible in meeting these individual requirements.

In addition, please note that settings cannot simply be transferred to OS4 from a surgical platform of another manufacturer. The types of instruments used, the irrigation / aspiration tubes and the height of the infusion bottle also influence irrigation, aspiration and vacuum behaviour.

The following default values are stored on delivery of the surgical platform:

- Pump selection: SPEEP

Basic settings for PHACO

Programme	Venturi	Peristaltic	SPEEP	Power output	Modulation	Bottle height	Active infusion
PHACO 1 (Grooving)	100 mmHg 80% venteff.	18 ml/min 100 mmHg	18 ml/min 100 mmHg	50%	Continuous	80 cm	60 mmHg
PHACO 2 (Removal)	350 mmHg 80% venteff.	35 ml/min 350 mmHg	35 ml/min 350 mmHg	50%	Pulse: 40 Hz, 50% cooling	80 cm	60 mmHg
PHACO 3 (Epinucleus)	350 mmHg 50% venteff.	25 ml/min 350 mmHg	25 ml/min 350 mmHg	20%	Continuous	80 cm	60 mmHg
I/A 1	350 mmHg 70% venteff.	20 ml/min 400 mmHg	20 ml/min 400 mmHg	-	-	80 cm	60 mmHg
I/A 2	60 mmHg 90% venteff.	6 ml/min 60 mmHg	6 ml/min 60 mmHg	-	-	80 cm	60 mmHg
I/A 3	450 mmHg 90% venteff.	25 ml/min 450 mmHg	25 ml/min 450 mmHg	-	-	80 cm	60 mmHg

Tab.33 Basic settings for PHACO

Basic settings for vitrectomy

Programme	23G Venturi	23G Perist.	23G SPEEP	Cut rate/power	Modulation	Bottle height	Active infusion
VIT 1 (vitrectomy)	550 mmHg 100% v-eff.	50 ml/min 550 mmHg	50 ml/min 550 mmHg	5000 cuts/min	-	35 cm	26 mmHg
VIT 2 (at the retina)	300 mmHg 100% v-eff.	18 ml/min 550 mmHg	18 ml/min 550 mmHg	7500 cuts/min	-	35 cm	26 mmHg
VIT 3 (Retinal detachment)	150 mmHg 100% v-eff.	5 ml/min 550 mmHg	5 ml/min 550 mmHg	10,000 cuts/min	-	35 cm	26 mmHg
ENDO PHACO	250 mmHg 80% v-eff.	15 ml/min 250 mmHg	15 ml/min 250 mmHg	60%	CMP: 40 Hz, 85% cooling	60 cm	40 mmHg

Tab.34 Basic settings for vitrectomy

Basic settings for HF

Programme	Poweroutput	Bottle height	Active infusion
DIA 1	50%	80 cm	60 mmHg
DIA 2	15%	50 cm	40 mmHg
CAPS	Regular	80 cm	60 mmHg
HFDS GLAU	-	80 cm	60 mmHg

Tab.35 Basic settings for HF

Basic settings for additional functions

Function	Value
AIR 1	20 mmHg
AIR 2	30 mmHg
AIR 3	40 mmHg
INJECTION(+)	3.5 bar
EXTRACTION	0.98 bar
Light 1 LED+	<ul style="list-style-type: none"> - Colour1: 70% white/ 30% blue - Colour2: 90% white/ 60% blue - Colour3: 40% white/ 40% blue
Light 2 LED	30%
Instant DIA	20%

Tab.36 Basic settings for additional functions

11 Performing cataract surgery

11.1 Performing ultrasound phaco (PHACO)

11.1.1 Connecting the ultrasound phaco handpiece

⚠ WARNING!
Incorrect use of the instrument.
Hazard to patient.

- ☞ Only use the surgical platform with the instruments and accessories recommended and supplied by Oertli (► 24.1 Accessories, spare parts, instruments, consumables).

The instrument must be connected as shown in the following diagram:

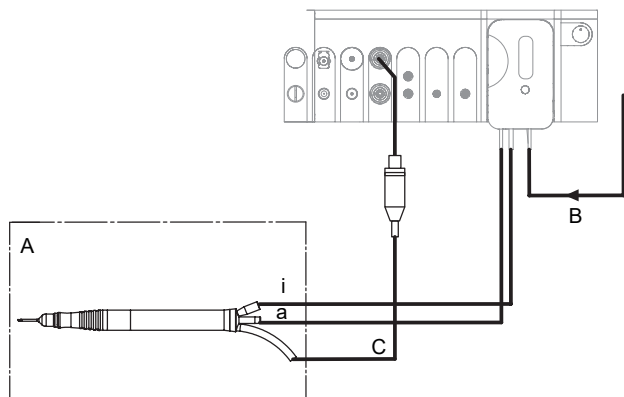


Fig. 78 Connecting the ultrasound phaco handpiece

- | | |
|-----------------|--------------|
| A Sterile field | a Aspiration |
| B Infusion | i Irrigation |
| C Cable | |

1. Install cassette with I/A tube system (► 9.4 Installing cassette with I/A tube system).
2. Tap BSS bottle and hang at the desired bottle height (► 9.6 Connecting the infusion set (infusion)).
3. Connect infusion (B) with cassette.
4. Insert the irrigation tube (i) and the aspiration tube (a) into the ultrasound phaco handpiece. The Luer connectors are designed to make incorrect connection of the instruments impossible.
5. Insert the plug marked in blue of the phaco handpiece into the port (C) marked in blue on the surgical platform.

Fitting a single-use tip

NOTE!
Phacotip overtightened during fitting.
Damage to the instrument.

- ☞ Carefully tighten phaco tip.
- ☞ Store the prefitted key. It will be needed again at the end of the operation to remove the tip.

1. Place the single-use Oertli tip with the prefitted key supplied on the handpiece, making sure that it is straight.
2. Applying normal manual pressure, turn the tip gently in a clockwise direction until it locks into position on the handpiece.
3. Remove the key by pulling it off in a straight line and visually inspect the tip to ensure that it has been perfectly fitted.
4. Wet the Oertli silicone irrigation sleeve with irrigation liquid to ease fitting.

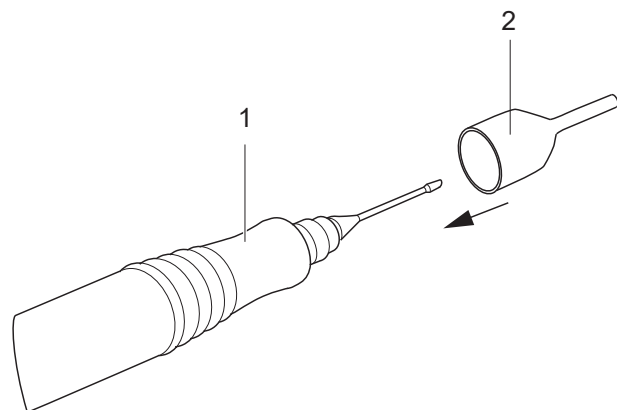


Fig. 79 Fitting the silicon irrigation sleeve

5. Screw Oertli silicone irrigation sleeve (2) onto the tip on the handpiece

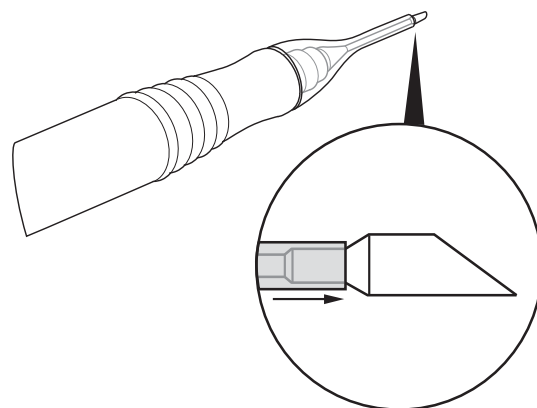


Fig. 80 Adjust tip

6. Adjust in the direction of the arrow until the tip of the Oertli silicone irrigation sleeve abuts the trumpet of the tip.

Fitting a reusable tip

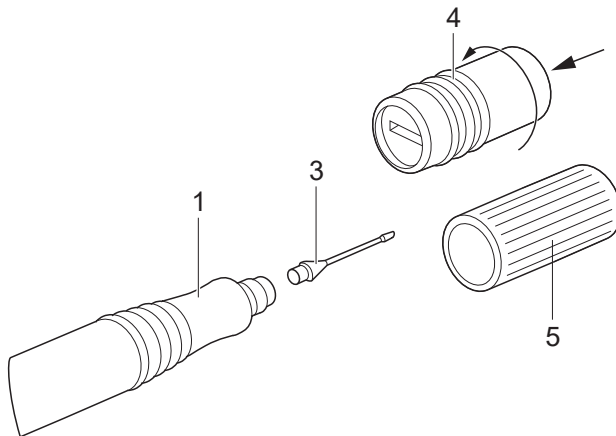


Fig. 81 Reusable tip

1. Pull the phacokey (5) provided or the titanium key (4) available as an accessory over the reusable Oertli tip (3).
2. Applying slight axial pressure, screw the tip onto the phaco handpiece (1) in a clockwise direction as far as it will go.
3. Wet the Oertli silicone irrigation sleeve with irrigation liquid to ease fitting.

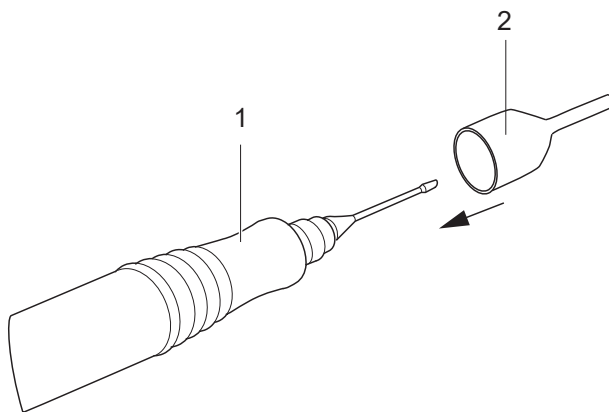


Fig. 82 Fitting the silicon irrigation sleeve

4. Screw Oertli silicone irrigation sleeve (2) onto the tip on the handpiece

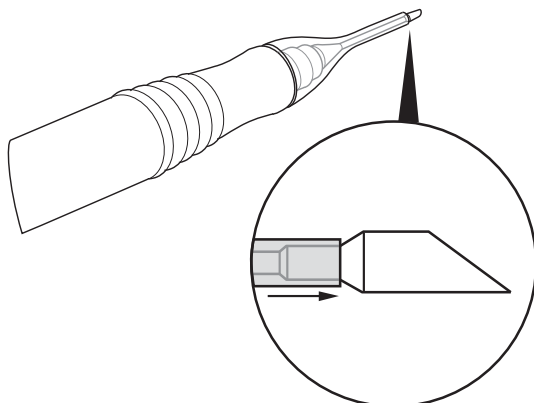


Fig. 83 Adjust tip

5. Adjust in the direction of the arrow until the tip of the Oertli silicone irrigation sleeve abuts the trumpet of the tip.

11.1.2 Attaching the test chamber

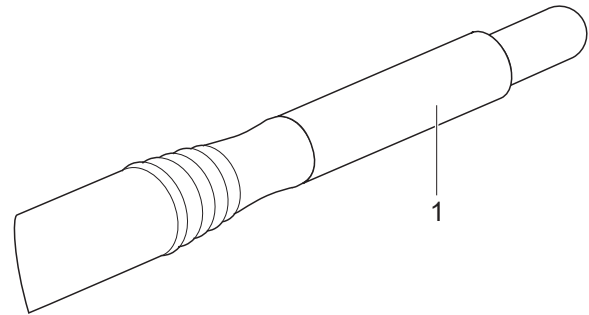


Fig. 84 Attaching the test chamber

1. Attach sterile test chamber (1). Ensure that the test chamber is mounted to the posterior end flush with the Oertli silicone irrigation sleeve.
2. Fill I/A tube system (► 9.8 Filling I/A tube system (PREOP filling process)).
3. Position handpiece with test chamber slanted slightly upwards.
The residual air rises upwards out of the tubes.
4. After filling, carry out phaco test (► 11.1.4 Conducting phaco test).

11.1.3 PHACOfunction (ultrasound phaco)



WARNING!

Ultrasound deflection of the activated phaco tip.
Injury to the user.

- ⚠ Do not touch the tip of the activated phaco handpiece.

11.1.4 Conducting phaco test



WARNING!

Handpiece in patient's eye during the phaco test.
Injury to patient's eye.

- ⚠ Never carry out the phaco test while the tip of the phaco handpiece is in the eye.



WARNING!

Defective handpiece.
Hazard to patient.

- ⚠ Perform phaco test before each operation. The test is automatically carried out if PREOP is started from the PHACO1, PHACO2 or PHACO3 programmes.

⚠ WARNING!
Defective handpiece.
Hazard to patient.

- ☞ If the message **HANDPIECEDEFECTIVE** appears, the handpiece must not be used.
- ☞ Use a new, functioning handpiece.

NOTE!
Operation in non-designated condition.
Damage to the handpiece and phaco tip.

- ☞ Only perform the phaco test with a test chamber filled with BSS.

Task	Method
Start test	<ul style="list-style-type: none"> ☞ Ultrasound phaco handpiece connected (► 11.1.1 Connecting the ultrasound phaco handpiece) 1. Select PHACO function. 2. Press PHACO 1, PHACO 2 or PHACO 3 key. Selected programme is displayed with the stored limit values. 3. Fill I/A tube system (► 9.8 Filling I/A tube system (PREOP filling process)). 4. Ensure that the test chamber is filled with water. 5. Press the TEST key. <p>After completion of the phaco test one of the following messages appears:</p> <ul style="list-style-type: none"> – Success message: Successful (► 21.2.1 Routine messages) – Warning messages (► 21.2.2 Warnings)
Discontinue test prematurely	<ul style="list-style-type: none"> ☞ Press the RESET key. – or – ☞ Activate REFLUX position of the pedal. – or – ☞ Press the TEST key. The message PHACO TEST DISCONTINUED! is displayed. No ultrasound output possible.
End test	<p>After the phaco test has been successfully completed and the message Successful has been displayed, the surgical platform is ready for use in the selected programme PHACO 1, PHACO 2 or PHACO 3.</p>



Fig. 85 Successful phaco test

Tab. 37 Phaco test tasks

11.1.5 PHACOfunction (PHACO1, PHACO2, PHACO3)

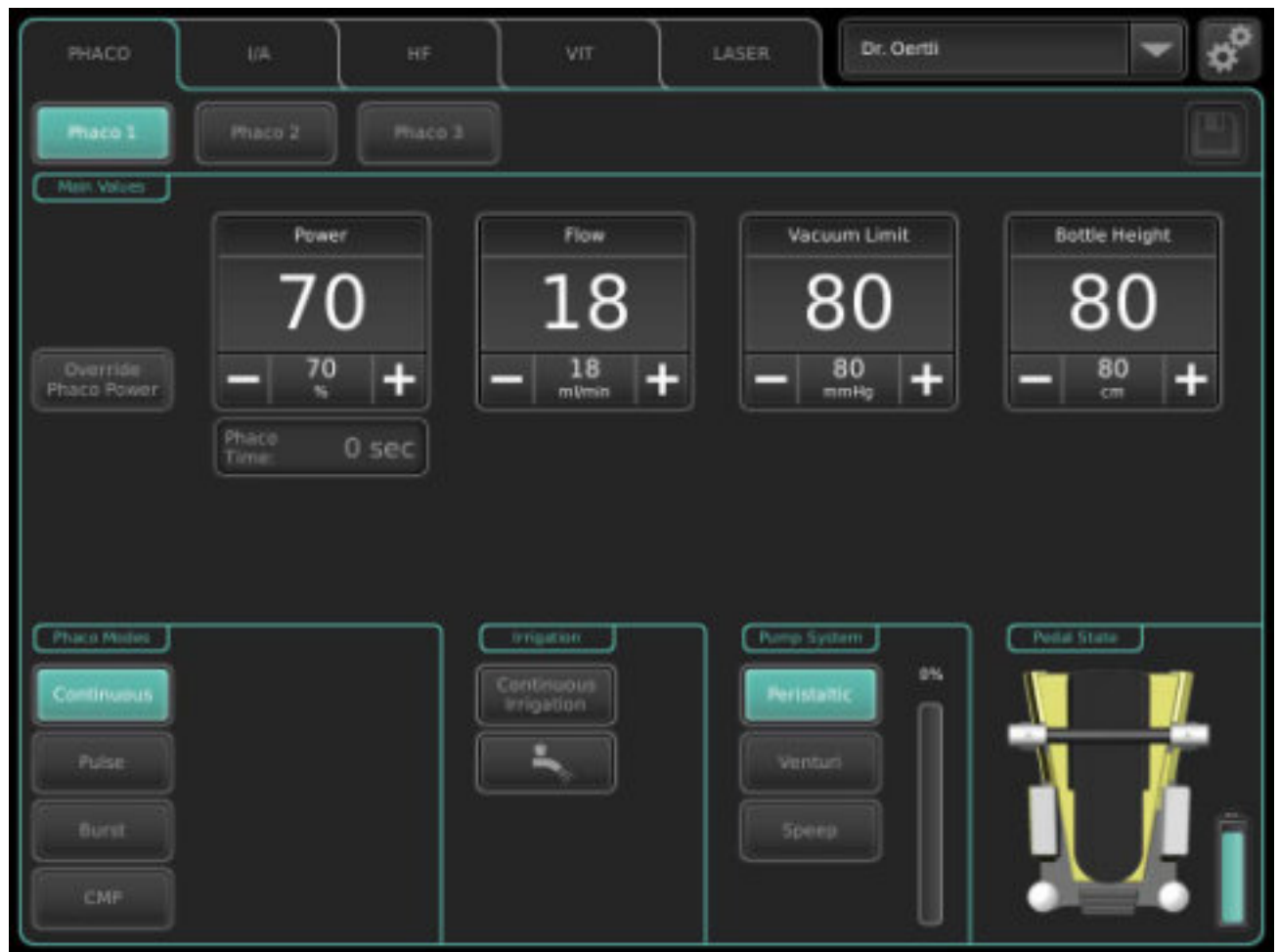


Fig. 86 PHACOfunction (example:PHACO2)

- i** If the messages Perform Phacotest or Perform prep are still displayed under the Power value range, the corresponding preparations must be performed:
- ► 9.8 Filling I/A tube system (PREOP filling process)
 - ► 11.1.4 Conducting phaco test
- Otherwise the PHACOfunction cannot be used.

Task	Method
Select programme	<ol style="list-style-type: none"> Select PHACOfunction. Press PHACO 1, PHACO2 or PHACO3 key. <p>Selected programme is displayed with the stored limit values.</p>
Select irrigation	► 7.1 Irrigation settings
Select pump	► 7.2 Select pumps and switch between pumps
Display pedal settings	<ul style="list-style-type: none"> ☞ Tapped pedal display (► 8.4 Display pedal settings). <p>A window with the assigned pedal positions is displayed.</p>
Change power output value	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values: 0 to 100%
Peristaltic pump, SPEEP mode: Change flow	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values: 1 to 60 ml/min
Venturi pump: Change venturi effect	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values: 10 to 100%
Change vacuum limit	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values: 5 to 650 mmHg
Change bottle height	► 7.3 Adjust bottle height/ IOP
Control phaco	<ul style="list-style-type: none"> ☞ Activate pedal. <p>Current values are displayed.</p>
Set mode	<ul style="list-style-type: none"> – Default: Continuous power output (CONTINUOUS) – Modulation types (► PULSE, BURST, CMP modulation types) <ul style="list-style-type: none"> – PULSE – BURST – CMP – Override Vacuum (► Override Vacuum) – Override Phaco Power (► Override phaco power)
Reset Phaco Time	<p>The effective phaco time runs during the operation.</p> <p>The effective phaco time is measured relative to the power output. It thus gives an indication of how much energy has been given off.</p> <p>To reset the effective phaco time, if needed:</p> <ul style="list-style-type: none"> ► Reset phaco time in section 11.1.6
Change programme	<ul style="list-style-type: none"> ☞ Select the correspondingly saved pedal position or select another programme via programme selection.

Task	Method
End programme	☞ Select another programme via function display and programme selection.

Tab.38 PHACOfunction tasks

PULSE, BURST, CMP modulation types

Three modulation types are available in addition to continuous power output:

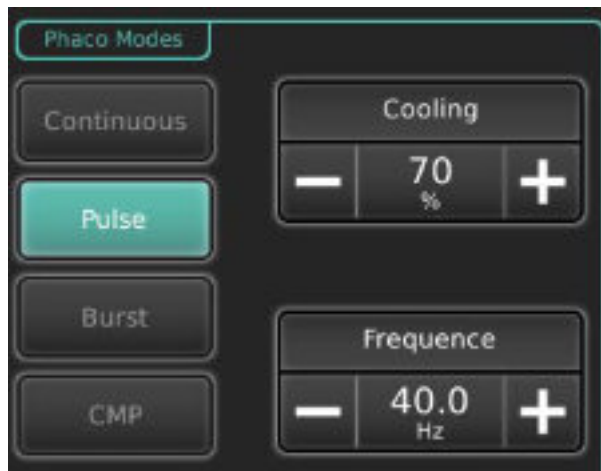
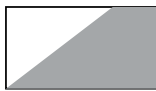
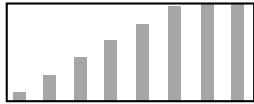
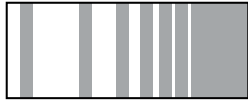


Fig. 87 Modulation type (example: PULSE)

Modulation type	Description
CONTINUOUS	<ul style="list-style-type: none"> – Continuous power output – Pedal: Control level of the continuous power 
PULSE	<ul style="list-style-type: none"> – Phaco power output supplied as: individual pulses with equal intervals between them – Pedal: controls the height of the individual pulse 
BURST	<ul style="list-style-type: none"> – Phaco power output supplied as: individual pulses with set power output – Pedal: controls the interval between the individual pulses 

Modulation type	Description
CMP (only for bimanual phaco or endophaco)	The CMP mode is identical to the PULSE mode with the following exception: the parameter range that can be selected is restricted (cooling factor min. 85%) to minimise heating at the phaco tip. This means that no bimanual irrigation sleeve is needed during the operation.

Tab.39 Modulation types

Change modulation type

Task	Method
Change modulation type	☞ Tap the desired function key. The function key turns green and the desired modulation type is selected.

Tab.40 Change modulation type

i During active power output, the CMP mode cannot be exited.

PULSE mode tasks

Task	Method
Switch on mode	☞ Tap the desired function key. The function is selected.
Change cooling factor	☞ Press the relevant + or – key. – Values: 10 to 99%
Change pulse frequency	☞ Press the relevant + or – key. – Values: 0.5 to 40 Hz
Switch off mode	☞ Select another modulation type using the corresponding function key.

Tab.41 PULSE mode tasks

BURST mode tasks

Task	Method
Switch on mode	☞ Tap the desired function key. The function is selected.
Change ratio of power output to pause	☞ Press the relevant + or – key. – Values: 10 to 100%
Change length of a pulse (burst)	☞ Press the relevant + or – key. – Values: 10 to 500 msec
Switch off mode	☞ Select another modulation type using the corresponding function key.

Tab.42 BURST mode tasks

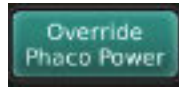

CMP mode tasks

Task	Method
Switch on mode	☞ Tap the desired function key. The function is selected.
Change cooling factor	☞ Press the relevant + or – key. – Values: 85 to 99%
Change pulse frequency	☞ Press the relevant + or – key. – Values: 1.5 to 40 Hz
Switch off mode	☞ Select another modulation type using the corresponding function key.

Tab.43 CMP mode tasks

Override phaco power



Briefly increase the phaco power above and beyond the defined limit value. To do this, the override limit value must be stored in the auxiliary menu and activated (► 11.1.6 Adjusting settings in the auxiliary menu).

Task	Method
Switch on mode	☞ Set override value in the auxiliary menu (► 11.1.6 Adjusting settings in the auxiliary menu).
Select mode	☞ Tap the desired function key. The function is selected: 
Activate mode	☞ Activate pedal. Values are adjusted automatically according to the information stored in the auxiliary menu. The function key is shown as active: 
Change values	☞ Change override values in the auxiliary menu (► 11.1.6 Adjusting settings in the auxiliary menu).
Switch off mode	☞ Tap the desired function key once more. The function is deselected.

Tab.44 Override phaco power tasks

Override Vacuum

To override the vacuum limit, use the **OVERRIDE** key to set a higher limit value of up to 650 mmHg (► 11.1.6 Adjusting settings in the auxiliary menu).




Task	Method
Switch on mode	<ul style="list-style-type: none"> Set override value in the auxiliary menu (► 11.1.6 Adjusting settings in the auxiliary menu).
Select mode	<ul style="list-style-type: none"> Tap the desired function key. The function is selected: 
Activate mode	<ul style="list-style-type: none"> Press the pedal in the override position. Values are adjusted automatically according to the information stored in the auxiliary menu. The function key is shown as active. 
Change values	<ul style="list-style-type: none"> Change override values in the auxiliary menu (► 11.1.6 Adjusting settings in the auxiliary menu).
Switch off mode	<ul style="list-style-type: none"> Tap the desired function key once more. The function is deselected.

Tab. 45 Override Vacuum tasks

11.1.6 Adjusting settings in the auxiliary menu

Settings for override phaco power




The settings are adjusted in the same tab of the auxiliary menu.

Task	Method
Open auxiliary menu	<ul style="list-style-type: none"> PHACO function selected 1. Press key:  <p>The auxiliary menu is displayed.</p> 2. Select Override Phaco tab. <p>The settings for normal mode without override as well as the settings for the override are shown.</p> <ul style="list-style-type: none"> – Top: Main values without override – Bottom: Values for Override Phaco Power
Change values	<ul style="list-style-type: none"> Press the relevant + or - keys for the override. As soon as the override value exceeds the main value, the Override Phaco Power key is displayed in the display and settings area.
Save settings and close auxiliary menu	1. Save changes for the selected phaco programme with the key:  2. Close window by tapping on the "X": 

Tab. 46 Auxiliary menu Override Phaco Power


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Settings for override Vacuum

Task	Method
Open auxiliary menu	<p>☞ Desired PHACO programme selected.</p> <p>1. Press key:</p>  <p>The auxiliary menu is displayed.</p> <p>2. Select Override Vacuum tab.</p> <p>The settings for normal mode without override as well as the settings for the override are shown.</p> <ul style="list-style-type: none"> – Top: Main values without override – Bottom: Override Vacuum values
Change values	<p>☞ Press the relevant + or - key for the override.</p> <ul style="list-style-type: none"> – Values: 5 to 650 mmHg <p>As soon as the override value exceeds the main value, the Override Vacuum key is displayed in the display and settings area.</p>
Savesettings and close auxiliary menu	<p>1. Savechanges for the selected PHACO programme with the key:</p>  <p>2. Close window by tapping on the "X":</p> 

Tab.47 Auxiliary menu Override Vacuum

Reset phaco time

Task	Method
Open auxiliary menu	<p>☞ PHACO function selected</p> <p>1. Press key:</p>  <p>The auxiliary menu is displayed.</p> <p>2. Select Phaco tab.</p> <p>The current phaco time is displayed.</p>
Reset Phaco Time key	<p>The effective phaco time runs during the operation.</p> <p>The effective phaco time is measured relative to the power output. It thus gives an indication of how much energy has been given off.</p> <p>To reset the effective phaco time, if needed:</p> <ul style="list-style-type: none"> ☞ Press the Reset key. <p>Phaco time is set to zero.</p> <p>– or –</p> <ul style="list-style-type: none"> ☞ Press the phaco time displayed in the main control panel for 1.5 seconds.

Tab.48 Reset phaco time

- i** The phaco time is automatically reset under the following conditions:
- after switching the system on/off
 - after a reset
 - after a phaco test
 - after a change in physicians
 - after insertion of a new cassette

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11.2 Performing irrigation and aspiration (I/A)

11.2.1 Fitting and connecting the irrigation/aspiration instrument (coaxial and bimanual)

Fitting and connecting coaxial I/A instrument

The instrument must be connected as shown in the following diagram:

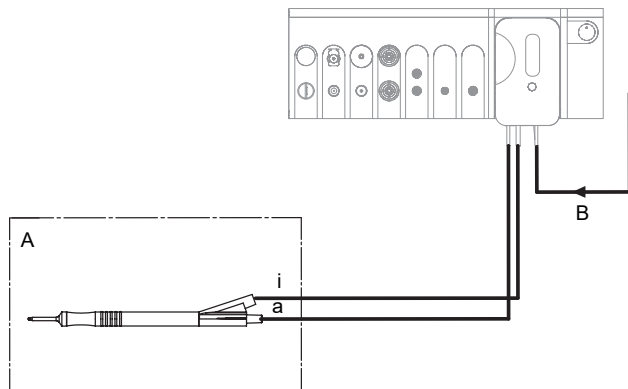


Fig. 88 Connect coaxial I/A instrument

A Sterile field
B Infusion
a Aspiration
i Irrigation

1. Install cassette with I/A tube system (► 9.4 Installing cassette with I/A tube system).
2. Tap BSS bottle and hang at the desired bottle height (► 9.6 Connecting the infusion set (infusion)).
3. Connect infusion (B) with cassette.

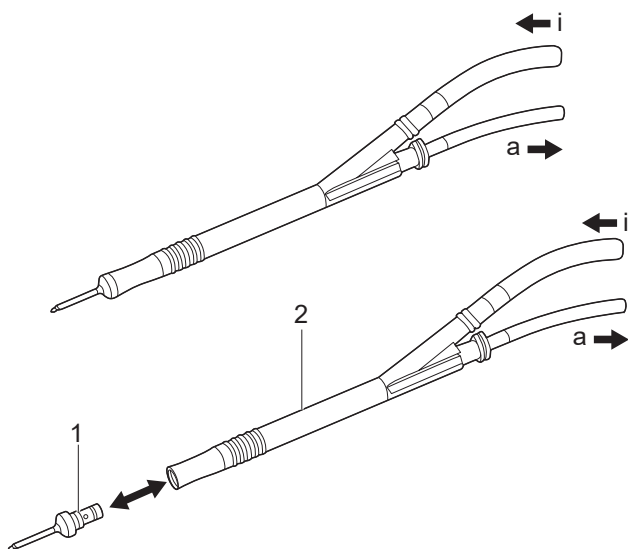


Fig. 89 Fitting and connecting coaxial I/A instrument

4. Plug the irrigation tube (i) and the aspiration tube (a) into the I/A handpiece (2). The Luer connectors are designed to make incorrect connection of the instruments impossible.
5. Wet the selected tip (1) with irrigation liquid to ease fitting.

6. Plug the tip (1) into the I/A handpiece (2). When using an I/A tip with irrigation sleeve, mount the irrigation sleeve on the tip.
7. Fill I/A tube system (► 9.8 Filling I/A tube system (PREOP filling process)).

Fitting and connecting bimanual I/A instrument

The instrument must be connected as shown in the following diagram:

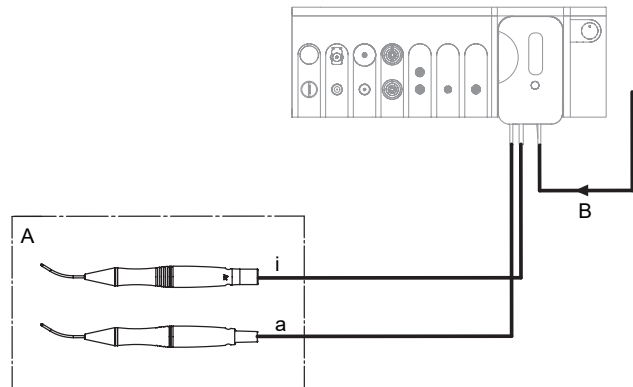


Fig. 90 Connect bimanual I/A instrument

A Sterile field
B Infusion
a Aspiration
i Irrigation

1. Install cassette with I/A tube system (► 9.4 Installing cassette with I/A tube system).
2. Tap BSS bottle and hang at the desired bottle height (► 9.6 Connecting the infusion set (infusion)).
3. Connect infusion (B) with cassette.
4. Connect irrigation tube (i) to the irrigation handpiece and aspiration tube (a) to the aspiration handpiece. The Luer connectors are designed to make incorrect connection of the instruments impossible.
5. Fill I/A tube system (► 9.8 Filling I/A tube system (PREOP filling process)).

11.2.2 I/A function (I/A 1, I/A 2, I/A 3)

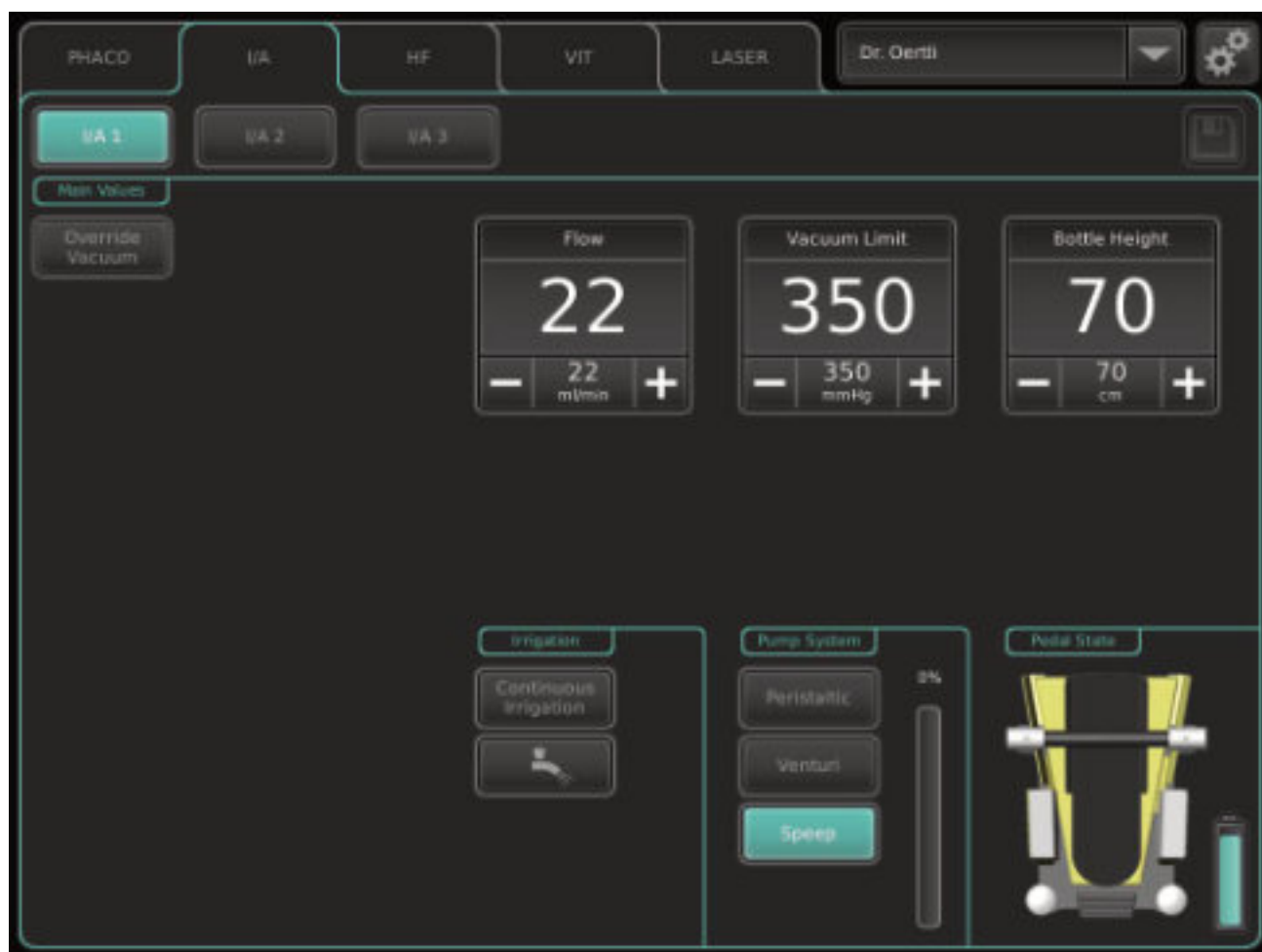




Fig. 91 I/A function (example:I/A 1)

Task	Method
Select programme	<ol style="list-style-type: none"> Select I/A function. Press I/A 1, I/A 2 or I/A 3 key. Selected programme is displayed with the stored limit values.
Select irrigation	► 7.1 Irrigation settings
Select pump	► 7.2 Select pumps and switch between pumps
Display pedal settings	<ul style="list-style-type: none"> Tap pedal display (► 8.4 Display pedal settings). <p>A window with the assigned pedal positions is displayed.</p>
Change vacuum limit	<ul style="list-style-type: none"> Press the relevant + or – key. – Values: 5 to 650 mmHg
Peristaltic pump, SPEEP mode: Change flow	<ul style="list-style-type: none"> Press the relevant + or – key. – Values: 0 to 60 ml/min
Venturi pump: Change venturi effect	<ul style="list-style-type: none"> Press the relevant + or – key. – Values: 10 to 100%
Change bottle height	► 7.3 Adjust bottle height/ IOP
Control irrigation/ aspiration process	<ul style="list-style-type: none"> Activate pedal. <p>Current values are displayed.</p>
Backflush	<ul style="list-style-type: none"> Activate pedal position for REFLUX (► REFLUX (Backflush)).
Set mode	<ul style="list-style-type: none"> After pressing the I/A 1, I/A 2 or I/A 3 key, select the desired mode: OVERRIDE (► Proportional I/A override)
Reset Phaco Time	<p>The effective phaco time runs during the operation in the PHACO function.</p> <p>The effective phaco time is measured relative to the power output. It gives an indication of how much energy has been given off.</p> <p>To reset the effective phaco time, if needed: ► 11.1.6 Adjusting settings in the auxiliary menu.</p>
Change programme	<ul style="list-style-type: none"> Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	<ul style="list-style-type: none"> Select another programme via function display and programme selection.

Tab.49 I/A function tasks




Proportional I/A override

To override the vacuum limit, use the OVERRIDE key to set a higher limit value of up to 650 mmHg (► 11.2.3 Adjusting settings in the auxiliary menu: I/A override).

Task	Method
Switch on mode	<ul style="list-style-type: none"> Set override value in the auxiliary menu (► 11.2.3 Adjusting settings in the auxiliary menu: I/A override).
Select mode	<ul style="list-style-type: none"> Tap the desired function key. <p>The function is selected:</p> 
Activate mode	<ul style="list-style-type: none"> Press the pedal in the override position. <p>Values are adjusted automatically according to the information stored in the auxiliary menu.</p> <p>The function key is shown as active.</p> 
Change values	<ul style="list-style-type: none"> Change override values in the auxiliary menu (► 11.2.3 Adjusting settings in the auxiliary menu: I/A override).
Switch off mode	<ul style="list-style-type: none"> Tap the desired function key once more. <p>The function is deselected.</p>

Tab.50 Proportional I/A override tasks

11.2.3 Adjusting settings in the auxiliary menu: I/A override

Task	Method
Open auxiliary menu	<p>↳ Desired I/A programme selected.</p> <p>1. Press key:</p>  <p>The auxiliary menu is displayed.</p> <p>2. Select Override I/A tab.</p> <p>The settings for normal mode without override as well as the settings for the override are shown.</p> <ul style="list-style-type: none"> – Top: Main values without override – Bottom: Override I/A values
Change values	<p>⇄ Press the relevant + or - key for the override.</p> <ul style="list-style-type: none"> – Values: 5 to 650 mmHg <p>As soon as the override value exceeds the main value, the Override Vacuum key is displayed in the display and settings area.</p>
Savesettings and close auxiliary menu	<p>1. Savechanges for the selected I/A programme with the key:</p>  <p>2. Close window by tapping on the "X":</p> 

Tab. 51 Auxiliary menu override I/A

11.3 Performing anterior vitrectomy (VIT)

11.3.1 Connecting instruments for anterior vitrectomy

i The vitrectomy cutter is normally only connected if necessary.

The instruments must be connected as shown in the following diagram:

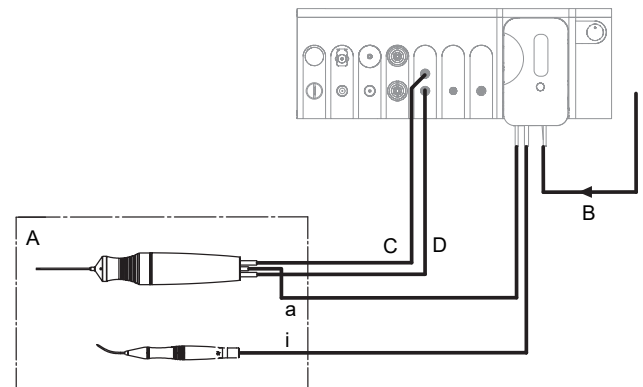


Fig. 92 Connected and active instruments for the VITfunction (anterior vitrectomy)

- A Sterile field
- B Infusion
- C Vitrectomy cutter (black)
- D Vitrectomy cutter (green)
- a Aspiration
- i Irrigation

1. Install cassette with I/A tube system (► 9.4 Installing cassette with I/A tube system).
2. Tap BSS bottle and hang at the desired bottle height (► 9.6 Connecting the infusion set (infusion)).
3. Connect infusion (B) with cassette.
4. Connect the tube marked in black to the Luer port marked in black (C, top), turning it a half-turn to the right.
5. Connect the tube marked in green to the Luer port marked in green (D, bottom), turning it a half-turn to the right.
6. Connect aspiration tube (a) of the vitrectomy cutter to the aspiration tube of the cassette.
7. Connect irrigation tube (i) to the irrigation handpiece.

11.3.2 VITfunction (vitrectomyVIT1, VIT2, VIT3) during anterior vitrectomy

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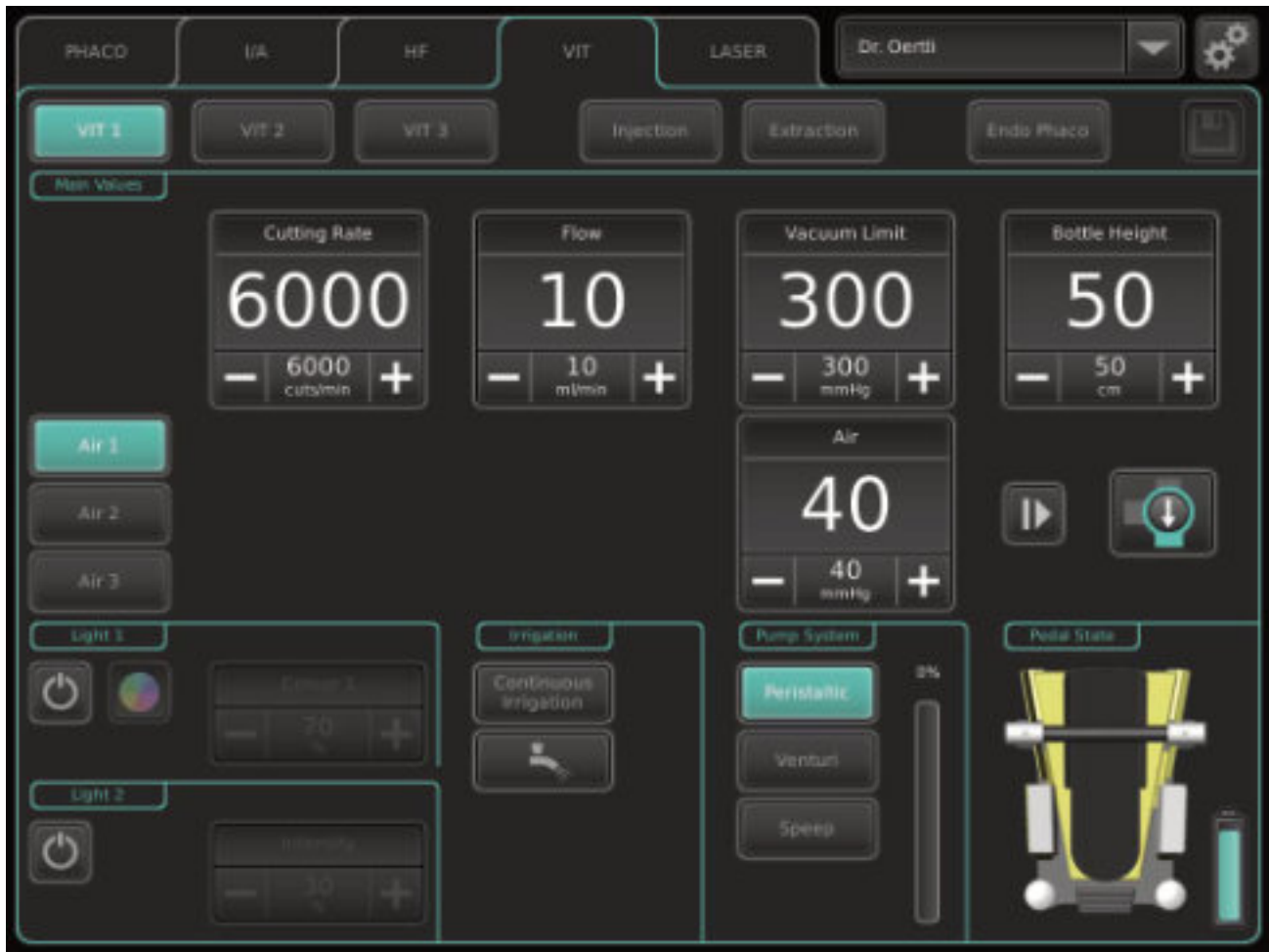


Fig.93 VITfunction (example:VIT1)

Task	Method
Select programme	<ol style="list-style-type: none"> 1. Select VITfunction. 2. Press VIT1, VIT2 or VIT3 key. Selected programme is displayed with the stored limit values.
Select irrigation	► 7.1 Irrigation settings
Select pump	► 7.2 Select pumps and switch between pumps
Display pedal settings	<ul style="list-style-type: none"> ☞ Tap pedal display(► 8.4 Display pedal settings). <p>A window with the assigned pedal positions is displayed.</p>
Change cuts per minute	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values:60 to 10000 cuts/min
Peristaltic pump, SLEEP mode: Change flow	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values:0 to 60 ml/min
Venturi pump: Change venturi effect	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values:10 to 100%
Change vacuum limit	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values:5 to 650 mmHg
Change bottle height	► 7.3 Adjust bottle height/ IOP height
Test vitrectomy cutter	<ul style="list-style-type: none"> ☞ Pedal not activated ☞ Press the TESTkey.
Control vitrectomy	<ul style="list-style-type: none"> ☞ Activate pedal. <p>Current values are displayed.</p>
Use Instant DIA	► 12.4 Use Instant DIA
Switch between Irrigation/Aspiration/Cut and Irrigation/Cut/Aspiration	► Switch between Irrigation/Cut/Aspiration and Irrigation/Aspiration/Cut
Change programme	☞ Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	☞ Select another programme via function display and programme selection.

Tab.52 VIT1, VIT2, VIT3 (anterior vitrectomy) function tasks

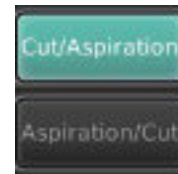
Switch between Irrigation/Cut/Aspiration and Irrigation/Aspiration/Cut

OS4 provides an additional function for anterior vitrectomy, which can be used to change the order of aspiration and cutting in the vertical pedal deflection by pressing the right TOPbutton on the pedal. To do this, the appropriate pedal assignments for the surgeon memory must be selected in ParaProg (► 1.3 Other relevant documents).



Fig. 94 Switch between Irrigation/Cut/Aspiration and Irrigation/Aspiration/Cut

Task	Method
Switch on mode	<ul style="list-style-type: none"> ☞ Select the following pedal assignments in ParaProg (► 1.3 Other relevant documents) for the VITfunction and save: <ul style="list-style-type: none"> – Section assignment: Assignment 1 or 2 – Button Assignment: Assignment 6 <p>In the VITfunction the function keys for Aspiration/Cut and Cut/Aspiration are then displayed.</p>



Switch from Aspiration/Cut to Cut/Aspiration	<ul style="list-style-type: none"> ☞ Press the right TOPbutton on the pedal. <p>or</p> <ol style="list-style-type: none"> 1. Place the pedal in the zero position. 2. Press the Cut/Aspiration function key in the operating interface. <p>The following vertical pedal assignment is used:</p> <ul style="list-style-type: none"> – Pos. 1: Irrigation – Pos. 2: Cut – Pos. 3: Aspiration
--	--

Task	Method
Switch from Cut/ Aspiration to Aspiration/Cut	<p>☞ Press the right TOPbutton on the pedal.</p> <p>or</p> <ol style="list-style-type: none"> 1. Place the pedal in the zero position. 2. Press the Aspiration/Cut function key in the operating interface. <p>The following vertical pedal assignment is used:</p> <ul style="list-style-type: none"> – Pos. 1: Irrigation – Pos. 2: Aspiration – Pos. 3: Cut
End mode	Deselect the pedal assignment Button Assignment 6 in ParaProg (► 1.3 Other relevant documents).

Tab.53 Switch between Irrigation/Cut/Aspiration and Irrigation/Aspiration/Cut

12 Performing diathermy (DIA)

12.1 Fitting and connecting diathermy instrument



WARNING!

High temperature of the lead after use/unintentional power output.

Burns to patient.

Damage to other leads.

- ☞ Mount the patient leads in such a way that contact with the patient and other leads is avoided.
- ☞ Keep active electrodes that are temporarily unused in a place isolated from the patient.

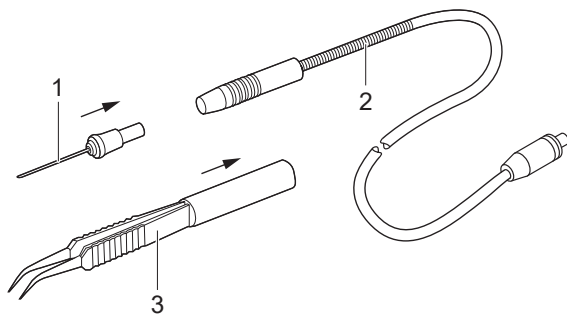


Fig. 95 Fit diathermy instrument

1. Insert tip (1)(diathermy/capsulotomy/ HFDS GLAU)or bipolar forceps (3)into the handpiece (2),making sure that they are locked in position.

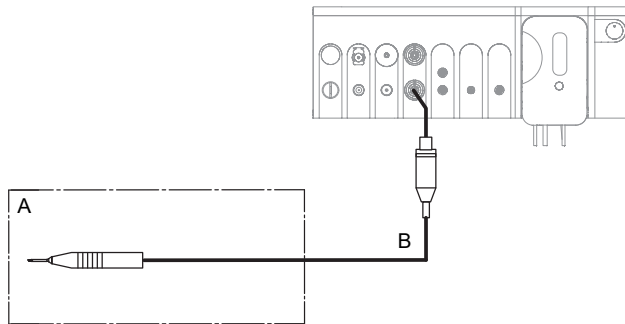


Fig. 96 Connect diathermy instrument

A Sterile field

B Cable

2. Insert the plug (B)marked in red of the diathermy handpiece into the port marked in red on the surgical platform.

12.2 Performing the HF test



WARNING!

Defective HF tip (short circuit).

Risk of corneal burns in the patient's eye.

- ☞ Perform HF test before each operation.
- ☞ If the message HF TIP DEFECTIVE appears, the HF tip must not be used.
- ☞ Use a new, functioning HF tip.

Task	Method
Start test	<ul style="list-style-type: none"> ☞ Diathermy instrument mounted and connected (► 12.1 Fitting and connecting diathermy instrument) <ol style="list-style-type: none"> 1. Select HF function. 2. Press DIA 1 key, DIA 2 key, CAPS key or HFDS Glau key. Selected function is displayed with the stored limit values. 3. Ensure that the HF tip is in a dry environment. 4. Press the Test key. <p>After completion of the HF test one of the following messages appears:</p> <ul style="list-style-type: none"> – Success message: HF test successful (► 21.2.1 Routine messages) – Warning: HF tip defective (► 21.2.2 Warnings)
End test	<p>After successful completion of the HF test with the message HF test successful, the surgical platform is ready for use in the HF function selected.</p>

Tab. 54 HF test tasks

12.3 DIA(DIA1, DIA2) function



WARNING!

Improper use of the surgical platform.
 Danger to patient and user.

- ☞ Read the warnings in the safety chapter before using this function (► 2.5.3 Operation).



- We recommend working with low settings at the beginning.
- The I/A system cannot be operated by the pedal in this function.



Fig. 97 DIA function (example: DIA 1)

Task	Method
Select programme	<ol style="list-style-type: none"> 1. Select HF function. 2. Press DIA 1 or DIA2 key. Selected programme is displayed with the stored limit values.
Select irrigation	► 7.1 Irrigation settings
Display pedal settings	<ul style="list-style-type: none"> ☞ Tap pedal display (► 8.4 Display pedal settings). <p>A window with the assigned pedal positions is displayed.</p>
Change power output value	<ul style="list-style-type: none"> ☞ Press the relevant + or – key. – Values: 0 to 100%
Change bottle height	► 7.3 Adjust bottle height/ IOP
Give diathermy power output	<ul style="list-style-type: none"> ☞ Activate pedal. Current values are displayed.
Change programme	☞ Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	☞ Select another programme via function display and programme selection.

Tab.55 DIAfunction tasks

12.4 Use Instant DIA

OS4 offers the option of being able to quickly perform diathermy (Instant DIA) without a function change within a programme in the VIT function:

First the function must be defined in ParaProg for a pedal position in the vitrectomy (user manual for ParaProg ► 1.3 Other relevant documents).

12.4.1 Defining values for Instant DIA

If Instant DIA is defined for a pedal position in the vitrectomy, injection(+) or extraction, an additional field (Power) for adjusting the diathermy power output is displayed in the corresponding programmes VIT 1, VIT 2 and VIT 3, INJECTION(+) or EXTRACTION:



1. Press the + or – key for the Power value until the desired maximum value is displayed (► 6.3.7 Working with values).
2. Save changes with symbol:



12.4.2 Use Instant DIA

1. Select relevant pedal position.
2. Give diathermy power output linearly.

13 Performing capsulotomy (CAPS)

13.1 Connect diathermy instrument and perform HF test

- ▶ 12.1 Fitting and connecting diathermy instrument
- ▶ 12.2 Performing the HF test

13.2 CAPSfunction



WARNING!

Improper use of the surgical platform.
 Danger to patient and user.

- ⚡ Read the warnings in the safety chapter before using this function (▶ 2.5.3 Operation).



- The power output of both power output levels is controlled by the surgical platform and can't be influenced by the surgeon.
- The I/A system cannot be operated by the pedal in this function.



Fig. 98 CAPSfunction

Task	Method
Select programme	<ol style="list-style-type: none"> 1. Select HF function. 2. Press CAPSkey. CAPSwith the relevant power output level is displayed.
Select irrigation	<ul style="list-style-type: none"> ► 7.1 Irrigation settings
Display pedal settings	<ul style="list-style-type: none"> ⌘ Tap pedal display(► 8.4 Display pedal settings). <p>A window with the assigned pedal positions is displayed.</p>
Switch between REGULAR and HIGH power output levels	<ul style="list-style-type: none"> ⌘ Press desired key: <ul style="list-style-type: none"> – CAPSregular – CAPShigh
Changebottle height	<ul style="list-style-type: none"> ► 7.3 Adjust bottle height/ IOP
Give capsulotomy power output	<ul style="list-style-type: none"> ⌘ Activate pedal. <p>Current values are displayed.</p>
Changeprogramme	<ul style="list-style-type: none"> ⌘ Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	<ul style="list-style-type: none"> ⌘ Select another programme via function display and programme selection.

Tab.56 CAPSfunction tasks

14 Performing glaucoma surgery (HFDSGLAU)

14.1 Connect diathermy instrument and perform HF test

- ▶ 12.1 Fitting and connecting diathermy instrument
- ▶ 12.2 Performing the HF test

14.2 HFDSGLAU(High Frequency Deep Sclerotomy) function (optional)



WARNING!

Improper use of the surgical platform.

Danger to patient and user.

- 📖 Read the warnings in the safety chapter before using this function (▶ 2.5.3 Operation).



- The HFDSGLAU function must be released by Oertli. Contact your local Oertli distribution partner.
- The power output is controlled by the surgical platform and can't be influenced by the surgeon.
- The I/A system cannot be operated by the pedal in this function.



Fig. 99 HFDSGLAU function

Task	Method
Select programme	<ol style="list-style-type: none"> 1. Select HF function. 2. Press the HFDSGLAU key. HFDSGLAU is displayed.
Select irrigation	<ul style="list-style-type: none"> ► 7.1 Irrigation settings
Display pedal settings	<ul style="list-style-type: none"> ☞ Tap pedal display (► 8.4 Display pedal settings). <p>A window with the assigned pedal positions is displayed.</p>
Change bottle height	<ul style="list-style-type: none"> ► 7.3 Adjust bottle height/ IOP
Give HF power output	<ul style="list-style-type: none"> ☞ Activate pedal.
Change programme	<ul style="list-style-type: none"> ☞ Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	<ul style="list-style-type: none"> ☞ Select another programme via function display and programme selection.

Tab.57 HFDSGLAU function tasks

15 Performing pars plana vitrectomy

15.1 Connecting instruments

The instruments must be connected as shown in the following diagram:

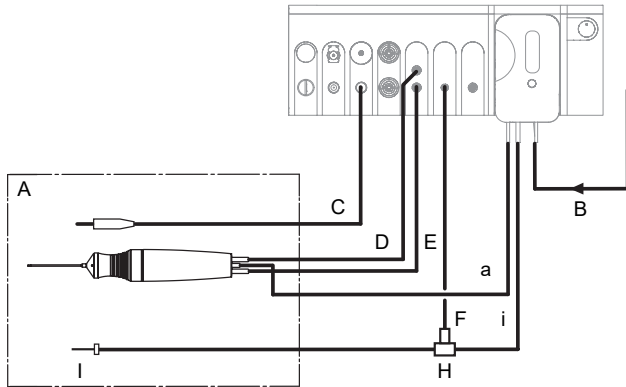


Fig. 100 Connected and active instruments for the VITfunction (pars plana vitrectomy)

- | | |
|----------------------------------|--------------|
| A Sterile field | a Aspiration |
| B Infusion | i Irrigation |
| C Light 2 (alternative: Light 1) | |
| D Vitrectomy cutter (black) | |
| E Vitrectomy cutter (green) | |
| F Air | |
| H 3-way stopcock | |
| I Trocar | |

1. Install cassette and I/A tube system (► 9.4 Installing cassette with I/A tube system).
2. Tap BSS bottle and hang at the desired bottle height (► 9.6 Connecting the infusion set (infusion)).
3. Connect infusion (B) with cassette.
4. Connect light instrument (C) to port for light source 1 (alternatively light source 2).
5. Connect the tube of the vitrectomy cutter marked in black to the Luer port marked in black (D, top), turning it a quarter-turn to the right.
6. Connect the tube of the vitrectomy cutter marked in green to the Luer port marked in green (E, bottom), turning it a quarter-turn to the right.
7. If necessary, fill I/A tube system (► 9.8 Filling I/A tube system (PREOPfilling process)).
8. Connect aspiration tube (a) of the vitrectomy cutter to the aspiration tube of the cassette.
9. Connect irrigation tube (i) and air supply tube (F) to the 3-way stopcock.
10. Connect 3-way stopcock with the irrigation line to the trocar.
11. Test vitrectomy cutter.
12. Connect the air supply tube to the appropriate port (AIR) on the surgical platform.

15.2 Perform Vit test

During the Vit test, the proper connection of a vitrectomy cutter is verified and the vitrectomy system is adjusted.

Task	Method
Start test	1. Vitrectomy cutter connected (► 15.1 Connecting instruments) <ol style="list-style-type: none"> 1. Select VITfunction. 2. Press VIT 1, VIT 2 or VIT 3 key. Selected programme is displayed with the stored limit values. 3. Press the TESTkey. After completion of the Vit test one of the following messages appears: <ul style="list-style-type: none"> – Success message: Successful – Warning: Failed
Discontinue test prematurely	<ul style="list-style-type: none"> ✎ Press the RESETkey. – or – ✎ Activate REFLUXposition of the pedal. – or – ✎ Press the TESTkey.
End test	After the Vit test has been successfully completed and the message Successful has been displayed, the surgical platform is ready for use in the selected programme VIT 1, VIT 2 or VIT 3.

Tab.58 Vit test tasks

15.3 VITfunction (vitrectomy VIT1, VIT2, VIT3) during pars plana vitrectomy

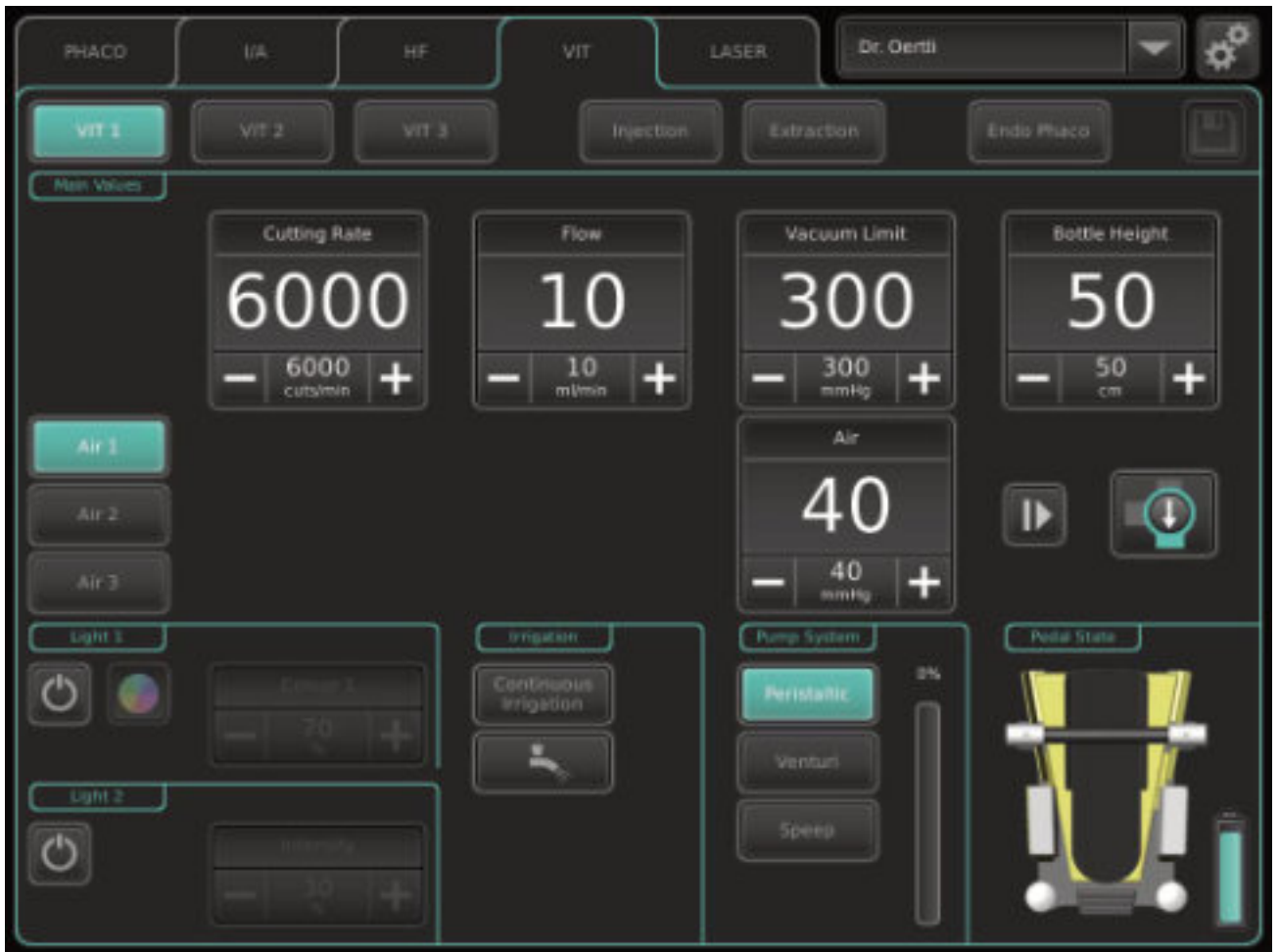


Fig. 101 VITfunction (example:VIT1)

EN

Task	Method
Select programme	<ol style="list-style-type: none"> Select VITfunction. Press VIT1, VIT2 or VIT3 key. Selected programme is displayed with the stored limit values.
Adjust AIRfunction	► 7.4 Adjust AIRfunction
Select light source	► 7.6 Adjusting the light source (Light 1 or Light 2)
Select irrigation	► 7.1 Irrigation settings
Select pump	► 7.2 Select pumps and switch between pumps
Display pedal settings	<ul style="list-style-type: none"> ☞ Tapped pedal display(► 8.4 Display pedal settings). <p>A window with the assigned pedal positions is displayed.</p>
Change cuts per minute	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values:60 to 10000 cuts/min
Peristaltic pump, SLEEP mode: Change flow	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values:0 to 60 ml/min
Venturi pump: Change venturi effect	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values:10 to 100%
Change vacuum limit	<ul style="list-style-type: none"> ☞ Press the relevant+ or – key. – Values:5 to 650 mmHg
Change bottle height	► 7.3 Adjust bottle height/ IOP
Switch between AIR and irrigation function	► 7.5 Fluid/air exchange (switching between AIR and irrigation function)
Test vitrectomy cutter and calibrate sensor	<ul style="list-style-type: none"> ☞ Pedal not activated ☞ Press the TESTkey. ► 15.2 Perform Vit test
Activate/deactivate vitrectomy cutter	<p>Deactivate:</p> <ul style="list-style-type: none"> ☞ Activate pedal position for Cut on/off. <p>Cutting rate is deactivated and greyed out.</p> <p>Activate:</p> <ul style="list-style-type: none"> ☞ Activate pedal position for Cut on/off again. <p>Cutting rate is activated and no longer greyed out.</p>
Control vitrectomy	<ul style="list-style-type: none"> ☞ Activate pedal. <p>Current values are displayed.</p>
Trigger single cut	☞ Activate pedal position for Cut single.
Use Instant DIA	► 12.4 Use Instant DIA

Task	Method
Change programme	☞ Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	☞ Select another programme via function display and programme selection.

Tab.59 VIT1, VIT2, VIT3 (pars plana vitrectomy) function tasks

16 Visco: Performing injection/ extraction of silicone oil

16.1 Connecting instruments

INJECTION/ EXTRACTIONfunction

The instrument must be connected as shown in the following diagram:

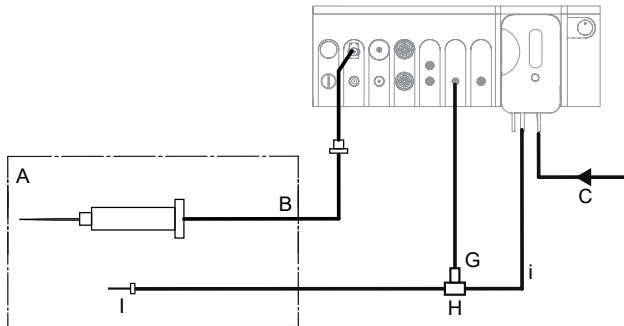


Fig. 102 Connect silicone application set

- A Sterile field
- B Silicone application
- C Infusion
- G Air
- H 3-way stopcock
- I Trocar
- i Irrigation

1. For an injection: Use a syringe filled with silicone oil.
2. Connect silicone application set to the port for the silicone application set on the surgical platform.
3. Connect the irrigation tube (i) and the air tube (G) to the 3-way stopcock (H).
4. Connect the 3-way stopcock (H) with the irrigation line to the trocar (I).

i Take note of additional instructions for use in document TN999090 (► 1.3 Other relevant documents).

INJECTION(+)function

When using the INJECTION+function, also connect the following instruments and accessories as shown in the diagram below:

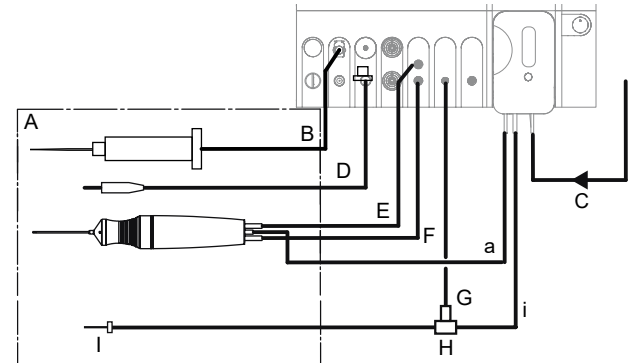


Fig. 103 Additional instruments and accessories for INJECTION+function

- A Sterile field
- B Silicone application
- C Infusion
- D Light 2 (alternative: Light 1)
- E Vitrectomy cutter (black)
- F Vitrectomy cutter (green)
- G Air
- H 3-way stopcock
- I Trocar
- a Aspiration
- i Irrigation

⚠ Cassette and I/A tube system, vitrectomy cutter, light instrument and air delivery line connected with 3-way stopcock and prepared (► 15.1 Connecting instruments).

1. For an injection: Use a syringe filled with silicone oil.
2. Connect silicone application set to the port for the silicone application set on the surgical platform.

i Take note of additional instructions for use in document TN999090 (► 1.3 Other relevant documents).

16.2 INJECTIONfunction

⚠ WARNING!
Incorrect use of the instrument.
Hazard to patient.

- ⚡ Only use the surgical platform with the instruments and accessories recommended and supplied by Oertli (► 24.1 Accessories, spare parts, instruments, consumables).
- ⚡ Always connect the INJECTION/EXTRACTION port to an infusion syringe and never connect directly to the eye.
- ⚡ When using a syringe to hold silicone, ensure that there is no air in the syringe reservoir.

⚠ WARNING!
IOP too high.
Risk of corneal oedema.

- ⚡ Continuously monitor the intra-ocular pressure. If necessary, adjust the injection pressure to the injection flow.



Fig. 104 INJECTIONfunction

Task	Method
Select programme	<ol style="list-style-type: none"> Select VITfunction. Press the INJECTIONkey. Selected programme is displayed with the stored limit values.
Adjust AIRfunction	► 7.4 Adjust AIRfunction
Select light source	► 7.6 Adjusting the light source (Light 1 or Light 2)
Select irrigation	► 7.1 Irrigation settings
Display pedal settings	<p>☞ Tappedal display(► 8.4 Display pedal settings).</p> <p>A window with the assigned pedal positions is displayed.</p>
Change injection pressure limit	<p>☞ Press the relevant+ or – key.</p> <p>– Values:0.05 to 5 bar</p>
Changebottle height	► 7.3 Adjustbottle height/ IOP
Switch between AIRand irrigation function	► 7.5 Fluid/air exchange (switching between AIRand irrigation function)
Control injection	<p>☞ Activate pedal.</p> <p>Current values are displayed.</p>
Use Instant DIA	► 12.4 Use Instant DIA
Changeprogramme	☞ Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	☞ Select another programme via function display and programme selection.

Tab.60 INJECTIONfunction tasks

16.3 INJECTION+function

The INJECTION+function can be enabled with ParaProg (► 1.3 Other relevant documents) instead of the INJECTION function. The INJECTION+function allows a vitrectomy cutter to be used in addition to the injection of silicone oil.



WARNING!

Incorrect use of the instrument.
 Hazard to patient.

- ⚠ Only use the surgical platform with the instruments and accessories recommended and supplied by Oertli (► 24.1 Accessories, spare parts, instruments, consumables).
- ⚠ Always connect the INJECTION/EXTRACTION port to an infusion syringe and never connect directly to the eye.
- ⚠ When using a syringe to hold silicone, ensure that there is no air in the syringe reservoir.



WARNING!

IOP too high.

Risk of corneal oedema.

- ⚠ It is vital that the injection/aspiration ratio and IOP be monitored during the operation.

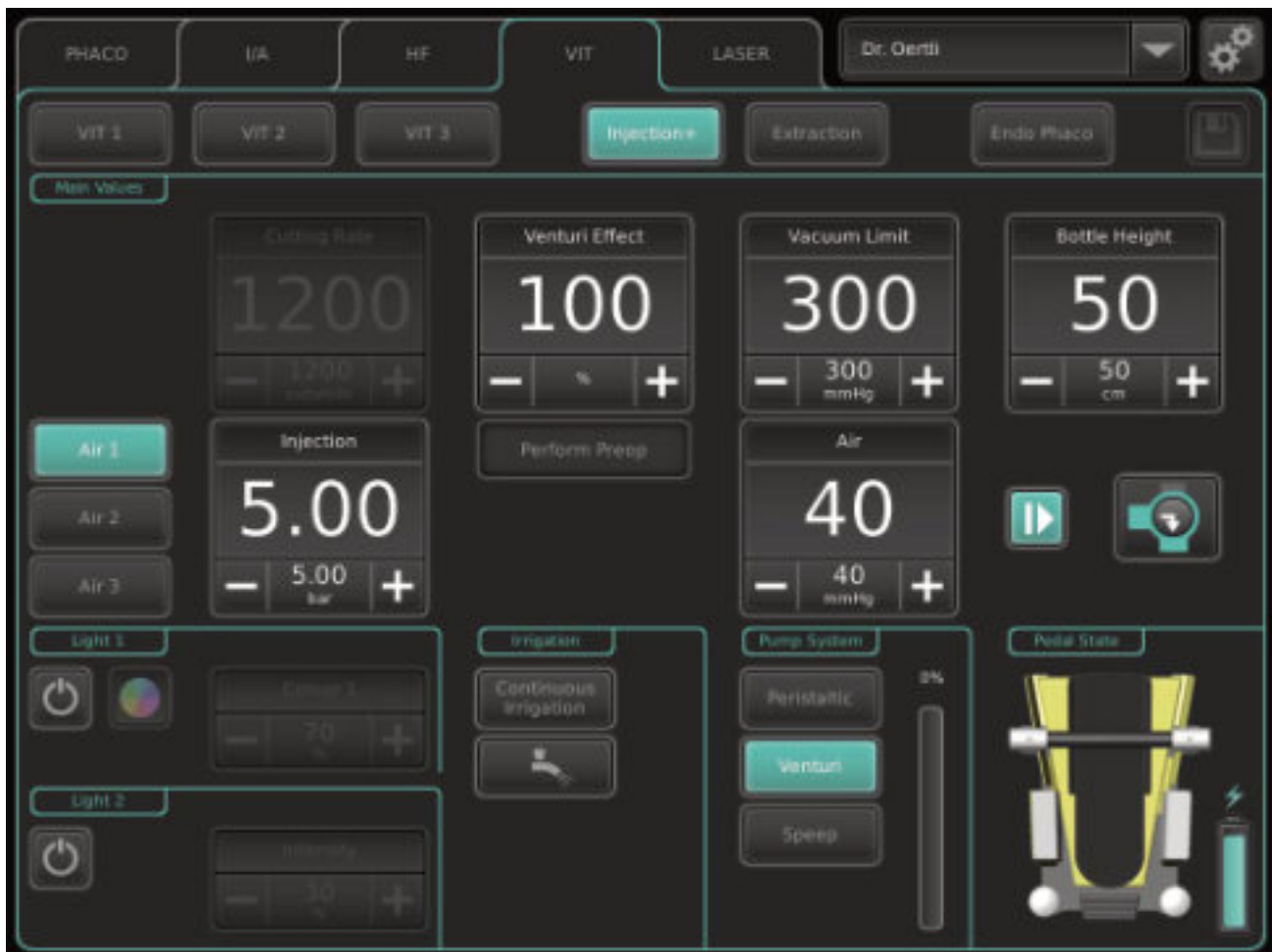


Fig. 105 INJECTION+function

Task	Method
Select programme	1. Select VITfunction. 2. Press the INJECTION+key. Selected programme is displayed with the stored limit values.
Adjust AIRfunction	► 7.4 Adjust AIRfunction
Select light source	► 7.6 Adjusting the light source (Light 1 or Light 2)
Select irrigation	► 7.1 Irrigation settings
Select pump	► 7.2 Select pumps and switch between pumps
Display pedal settings	☞ Tap pedal display(► 8.4 Display pedal settings). A window with the assigned pedal positions is displayed.
Change injection pressure limit	☞ Press the relevant+ or – key. – Values:0.05 to 5 bar
Change cuts per minute	☞ Press the relevant+ or – key. – Values:60 to 10000 cuts/min
Peristaltic pump, SLEEP mode: Changeflow	☞ Press the relevant+ or – key. – Values:0 to 60 ml/min
Venturi pump: Change venturi effect	☞ Press the relevant+ or – key. – Values:10 to 100%
Change vacuum limit	☞ Press the relevant+ or – key. – Values:5 to 650 mmHg
Changebottle height	► 7.3 Adjust bottle height/ IOP
Switch between AIR and irrigation function	► 7.5 Fluid/air exchange (switching between AIR and irrigation function)
Control injection	☞ Activate pedal. Current values are displayed.
Test vitrectomy cutter and calibrate sensor	☞ Pedal not activated ☞ Press the TESTkey. ► 15.2 Perform Vit test
Activate/deactivate vitrectomy cutter	Activate: ☞ Activate pedal position for cut on/off. Cutting rate is activated and no longer greyed out. Deactivate: ☞ Activate pedal position for cut on/off again. Cutting rate is deactivated and greyed out.
Control vitrectomy	☞ Activate pedal. Current values are displayed.
Use Instant DIA	► 12.4 Use Instant DIA

Task	Method
Changeprogramme	☞ Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	☞ Select another programme via function display and programme selection.

Tab.61 INJECTION+function tasks

16.4 EXTRACTIONfunction

⚠ WARNING!
Incorrect use of the instrument.
Hazard to patient.

- ⚡ Only use the surgical platform with the instruments and accessories recommended and supplied by Oertli (► 24.1 Accessories, spare parts, instruments, consumables).
- ⚡ Always connect the INJECTION/EXTRACTION port to an infusion syringe and never connect directly to the eye.
- ⚡ When using a syringe to hold silicone, ensure that there is no air in the syringe reservoir.
- ⚡ Ensure that no liquid is aspirated into the surgical platform, especially when applying substances with low viscosity.

⚠ WARNING!
IOP too high.
Risk of corneal oedema.

- ⚡ Adjust the parameters in time, especially toward the end of the exchange. Reduce the suction power accordingly.



Fig. 106 EXTRACTIONfunction

Task	Method
Select programme	<ol style="list-style-type: none"> 1. Select VITfunction. 2. Press the EXTRACTIONkey. Selected programme is displayed with the stored limit values.
Adjust AIRfunction	➤ 7.4 Adjust AIRfunction
Select light source	➤ 7.6 Adjusting the light source (Light 1 or Light 2)
Select irrigation	➤ 7.1 Irrigation settings
Display pedal settings	<p>☞ Tappedal display(➤ 8.4 Display pedal settings).</p> <p>A window with the assigned pedal positions is displayed.</p>
Changeextraction pressure limit	<p>☞ Press the relevant+ or – key.</p> <p>– Values:0.01 to 1 bar</p>
Changebottle height	➤ 7.3 Adjustbottle height/ IOP height
Control extraction	<p>☞ Activate pedal.</p> <p>Current values are displayed.</p>
Use Instant DIA	➤ 12.4 Use Instant DIA
Changeprogramme	☞ Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	☞ Select another programme via function display and programme selection.

Tab.62 EXTRACTIONfunction tasks

17 Performing endophaco operation

EN

WARNING!
Improper use of the surgical platform.
Danger to patient and user.
☞ Read the warnings in the safety chapter before using this function (► 2.5.3 Operation).

WARNING!
Ultrasound deflection of the endophaco tip.
Injury to the user.
☞ Do not touch the tip of the activated phaco handpiece.

17.1 Connecting instruments

WARNING!
Incorrect use of the instrument.
Hazard to patient.
☞ Only use the surgical platform with the instruments and accessories recommended and supplied by Oertli (► 24.1 Accessories, spare parts, instruments, consumables).

The instruments must be connected as shown in the following diagram:

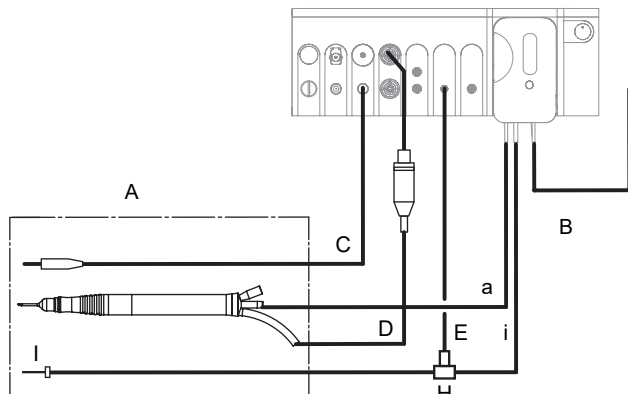


Fig. 107 Connected and active instruments for the ENDO PHACO function

- A Sterile field
- B Infusion
- C Light 2 (alternative: Light 1)
- D Cable phaco handpiece
- E Air
- H 3-way stopcock
- I Trocar
- a Aspiration
- i Irrigation

1. Install cassette with I/A tube system (► 9.4 Installing cassette with I/A tube system).
2. Tap BSS bottle and hang at the desired bottle height (► 9.6 Connecting the infusion set (infusion)).
3. Connect infusion (B) with cassette.
4. Connect light instrument (C) to port for light source 1 (alternatively light source 2).
5. Connect the air supply tube to the appropriate port (AIR) on the surgical platform.
6. Fill I/A tube system (► 9.8 Filling I/A tube system (PREOP filling process)).
7. Insert the aspiration tube (a) into the ultrasound phaco handpiece. The Luer connectors are designed to make incorrect connection of the instruments impossible.
8. Insert the plug marked in blue of the phaco handpiece into the port (D) marked in blue on the surgical platform.
9. Connect irrigation tube (i) and air supply tube (E) to the 3-way stopcock.
10. Connect 3-way stopcock with the irrigation line to the trocar.

i The connection for irrigation at the phaco handpiece remains empty.

Fitting a reusable endophaco tip

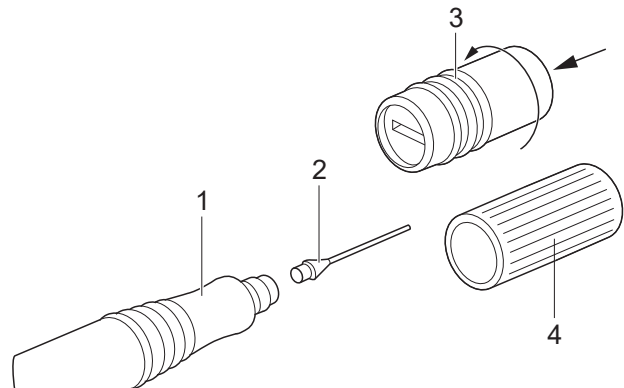


Fig. 108 Reusable endophaco tip

1. Pull the phaco key (4) provided or the titanium key (3) available as an accessory over the reusable Oertli endophaco tip (2).
2. Applying slight axial pressure, screw the tip onto the endophaco handpiece (1) in a clockwise direction as far as it will go.
3. After filling, conduct phaco test with the endophaco tip, dipped in a bowl of BSS (for cooling) (► 11.1.4 Conducting phaco test).

17.2 ENDOPHACOfunction



Fig. 109 ENDOPHACOfunction

EN

Task	Method
Select programme	<ol style="list-style-type: none"> Select VITfunction. Press ENDO PHACOkey. Selected programme is displayed with the stored limit values.
Adjust AIRfunction	➔ 7.4 Adjust AIRfunction
Adjust modulation type	<ol style="list-style-type: none"> Press Phaco Modes key. Modulation type CMP is displayed (➔ PULSE, BURST, CMP modulation types in section 11.1.5). Adjust settings for CMP.
Select light source	<ol style="list-style-type: none"> Press the Lights key. The light sources are displayed. Adjust light source (➔ 7.6 Adjusting the light source(Light 1 or Light 2)).
Select irrigation	➔ 7.1 Irrigation settings
Select pump	➔ 7.2 Select pumps and switch between pumps
Display pedal settings	<ul style="list-style-type: none"> Tap pedal display(➔ 8.4 Display pedal settings). <p>A window with the assigned pedal positions is displayed.</p>
Change power output value	<ul style="list-style-type: none"> Press the relevant+ or – key. <p>– Values:0 to 100%</p>
Peristaltic pump, SPEEP mode: Change flow	<ul style="list-style-type: none"> Press the relevant+ or – key. <p>– Values:1 to 60 ml/min</p>
Venturi pump: Change venturi effect	<ul style="list-style-type: none"> Press the relevant+ or – key. <p>– Values:10 to 100%</p>
Change vacuum limit	<ul style="list-style-type: none"> Press the relevant+ or – key. <p>– Values:5 to 650 mmHg</p>
Change bottle height	➔ 7.3 Adjust bottle height/ IOP
Control phaco	<ul style="list-style-type: none"> Activate pedal. <p>Current values are displayed.</p>
Reset Phaco Time	<p>The effective phaco time runs during the operation.</p> <p>The effective phaco time is measured relative to the power output. It thus gives an indication of how much energy has been given off.</p> <p>To reset the effective phaco time, if needed:</p> <ul style="list-style-type: none"> ➔ Reset phaco time in section 17.3.1
Change programme	<ul style="list-style-type: none"> Select the correspondingly saved pedal position or select another programme via programme selection.
End programme	<ul style="list-style-type: none"> Select another programme via function display and programme selection.

Tab.63 ENDOPHACOfunction tasks

17.3 Adjusting settings in the auxiliary menu

17.3.1 Reset phaco time

Task	Method
Open auxiliary menu	<ol style="list-style-type: none"> Press key: <div data-bbox="1043 443 1145 539" data-label="Image"> </div> <p>The auxiliary menu is displayed.</p> <ol style="list-style-type: none"> Select Phaco tab. The current phaco time is displayed.
Reset Phaco Time key	<p>The effective phaco time runs during the operation.</p> <p>The effective phaco time is measured relative to the power output. It thus gives an indication of how much energy has been given off.</p> <p>To reset the effective phaco time, if needed:</p> <ul style="list-style-type: none"> ➔ Press the relevant Reset key. <p>Phaco time is set to zero.</p>

Tab.64 Reset phaco time

18 Performing an endolaser operation



WARNING!

Improper use of the surgical platform.

Danger to patient and user.

- ☞ Read the warnings in the safety chapter before using this function (► 2.5.3 Operation).

18.1 Connecting the laser user protection filter (optional)

Oertli offers various laser user protection filters for the various microscope types:

Passive laser user protection filter:

- ☞ The filter glass is installed fixed in the optical path of the microscope and permanently filters out harmful laser radiation.
- ☞ No further action is necessary.

Fully automated laser user protection filter:

- ☞ The housing of the laser user protection filter is installed fixed in the optical path of the microscope.
- ☞ The filter glass automatically swings in when the laser is operated.

Task	Method
Establish cable connection	<ul style="list-style-type: none"> ☞ Plug the connecting cable into the surgical platform. ☞ Plug in the connecting cable to the fully automated UPF. To do this, align the red point of the plug with the red point of the housing and insert the plug (► 5.4.1 Laser user protection filter (UPF)).

Tab.65 Connect the fully automated laser user protection filter

18.2 Releaseprotective laser cap

NOTE!

Penetration of contaminants into the laser opening.
Damage to the endolaser.

- ☞ Do not remove the protective laser cap from the surgical platform. It must be placed back onto the port after each operation.
- ☞ If no laser probe is inserted in the inlet of the endolaser, attach the protective laser cap.

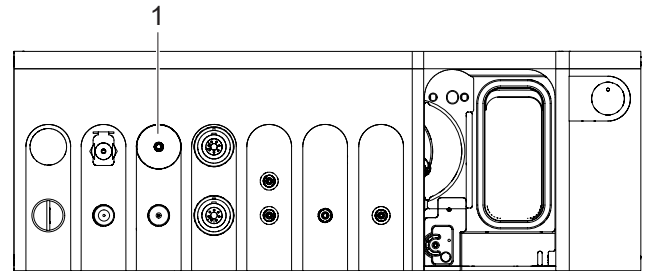


Fig. 110 Releaseprotective laser cap

- ☞ Detach protective laser cap from the port for the laser probe (1).

18.3 Connecting instruments

⚠ WARNING!
Damage to the laser probe.
Danger to patient and user.

- ☞ When connecting the laser probe, take note of information in the instrument package inserts provided.
- ☞ Always insert laser probe carefully into the port as far as it will go.
- ☞ Do not kink, bend or break the laser probe.

The instruments must be connected as shown in the following diagram:

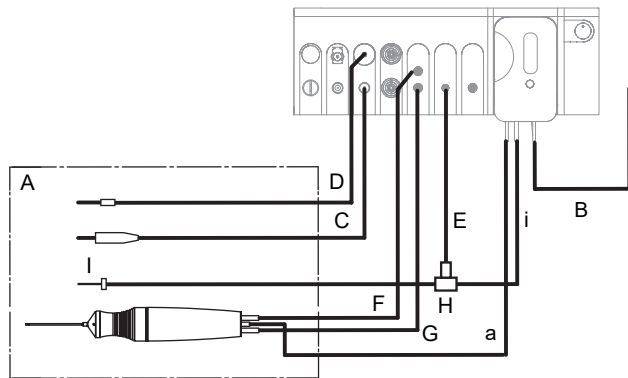


Fig. 111 Connected and active instruments for the LASER function

- A Sterile field
- B Infusion
- C Light 2 (alternative: Light 1)
- D Laser probe
- E Air
- F Vitrectomy cutter (black)
- G Vitrectomy cutter (green)
- H 3-way stopcock
- I Trocar
- a Aspiration
- i Irrigation

1. Install cassette with I/A tube system (► 9.4 Installing cassette with I/A tube system).
2. Tap BSS bottle and hang at the desired bottle height (► 9.6 Connecting the infusion set (infusion)).
3. Connect infusion (B) with cassette.
4. Connect light instrument (C) to port for light source 1 (alternatively light source 2).
5. Insert plug for the laser probe (D) as far as it will go into the port on the surgical platform.
6. Connect irrigation tube (i) and air supply tube (E) to the 3-way stopcock.
7. Connect 3-way stopcock with the irrigation line to the trocar.
8. Connect the air supply tube to the appropriate port (AIR) on the surgical platform.

18.4 Using the LASERSTOPkey in hazardous situations

To be able to immediately switch off the endolaser in hazardous situations, the OS4 has a LASERSTOPkey on the front of the device:

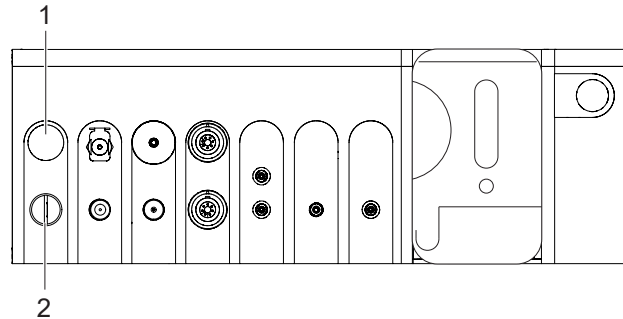


Fig. 112 LASERSTOPbutton on the surgical platform

- 1 LASER STOPkey
- 2 Endolaser key switch

Task	Method
Activate LASER STOP	<ol style="list-style-type: none"> 1. Firmly press the LASER STOPkey. The endolaser is deactivated. 2. Confirm message.
Unlock LASER STOPkey	<p>Before the endolaser can be used once again, the LASER STOPkey must be unlocked:</p> <ol style="list-style-type: none"> 1. Turn LASER STOPkey to the right. The endolaser is unlocked.

Tab. 66 LASERSTOPkey tasks

18.5 LASERfunction

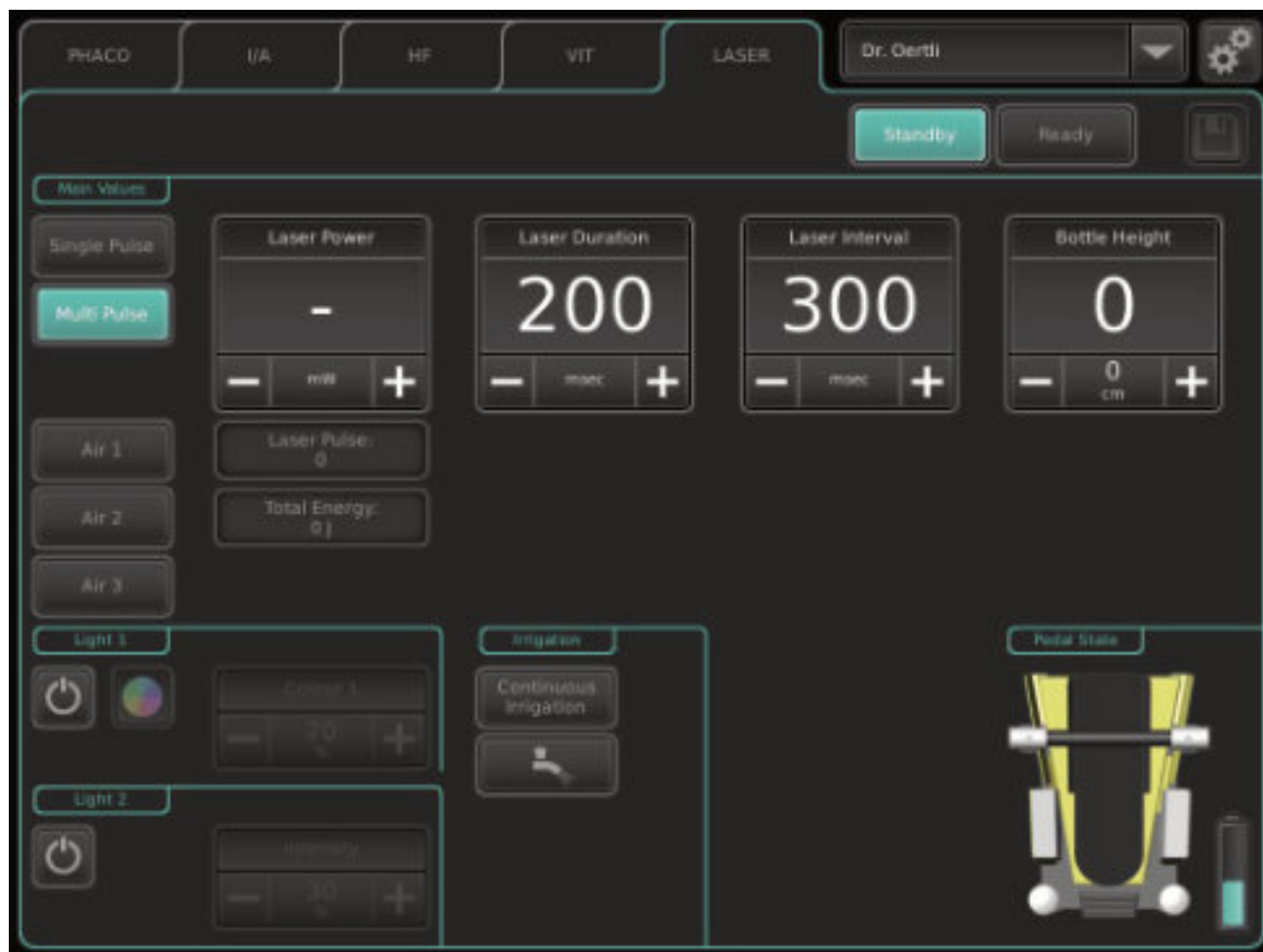


Fig. 113 LASERfunction

18.6 Putting the endolaser into service

- 🔧 Instruments connected (► 18.1 Connecting the laser user protection filter (optional) and ► 18.2 Release protective laser cap)
- 🔧 Laser user protection filter (UPF) connected (► 5.4.1 Laser user protection filter (UPF))
- 🔧 Door remote switch (DRS) connected (► 5.4.2 Check port for door remote switch (DRS))
- 🔧 LASER STOP (1) key unlocked (► 18.4 Using the LASER STOP key in hazardous situations)
- 🔧 Key switch (2) in position I
- 🔧 Pedal connected (► 5.3 Connect pedal)

1. Select LASER function.

When all preconditions have been met, the Standby key is lit.

2. Check and adjust desired (power output) values.

3. Press Ready key.

If a passive laser user protection filter is used, a message appears asking the user to confirm that a passive laser user protection filter is connected, and that all persons in the room are protected from laser radiation.

If a fully automated laser user protection filter is connected, OS4 recognises this and a message appears asking the user to confirm that all persons in the room are protected from laser radiation.

After confirmation of the message, the remaining time for preheating the laser is displayed with a second counter, provided that the process has not yet been completed.

When the warm-up phase is complete and the laser user protection filter is connected or the message 'Reminder: Protection for laser users' is confirmed, the Ready key lights up green and the LASER READY display blue.

The laser warning icon is displayed in the window:



The endolaser is ready for use.

18.7 Working with the endolaser

⚠️ WARNING!
 Non-visible or diffuse laser aiming beam.
 Endolaser defective.
 Hazard to patient.

- 🔧 Stop using surgical platform.
- 🔧 Contact the service unit.

i The setting in the Laser Power value range cannot be saved for safety reasons.
 Triggering the laser pulses is always assigned to position 3 on the pedal and cannot be changed.

Task	Method
Switching between Standby and Ready mode	🔧 Press desired key.
Select between single laser pulses and multiple laser pulses	🔧 Select desired mode: <ul style="list-style-type: none"> – Single Pulse (single) – Multi Pulse (multiple)
Adjust AIR function	► 7.4 Adjust AIR function
Select light source	► 7.6 Adjusting the light source (Light 1 or Light 2)
Select irrigation	► 7.1 Irrigation settings
Select pump	► 7.2 Select pumps and switch between pumps
Display pedal settings	🔧 Tapped pedal display (► 8.4 Display pedal settings). A window with the assigned pedal positions is displayed.
Change power output value	🔧 Press the relevant + or – key. – Values: 50 to 1500 mW
Reset Laser Pulse key	The laser pulse counter runs during the operation. To reset the counter, if needed: 🔧 Hold down the relevant key for 3 seconds. Counter is set to zero. – or – ► 18.8.2 Resetting the laser pulse (laser pulse counter) and laser power (laser power counter)
Reset Laser Power key	The laser power counter runs during the operation. To reset the counter, if needed: 🔧 Hold down the relevant key for 3 seconds. Counter is set to zero. – or – ► 18.8.2 Resetting the laser pulse (laser pulse counter) and laser power (laser power counter)
Change duration of laser	🔧 Press the relevant + or – key. – Values: 10 bis 5000 msec
Change laser interval	🔧 Press the relevant + or – key. – Values: 0 bis 5000 msec
Change bottle height	► 7.3 Adjust bottle height/ IOP
Control laser	🔧 The Ready key is lit and green 🔧 Operate pedal position 3. The LASER ACTIVE display is lit and orange. The warning sound for the laser power output can be heard. Current values are displayed.




Task	Method
End programme	☰ Select another programme via function display and programme selection.

Tab.67 LASERfunction tasks

i Before removing the laser fibre, set the laser to Standby.


18.8 Adjusting settings in the auxiliary menu

18.8.1 Set laser aiming beam

Task	Method
Open auxiliary menu	<p>☰ LASER programme selected</p> <ol style="list-style-type: none"> Press key:  The auxiliary menu is displayed. Select Lasertab.
Set brightness of the laser aiming beam	<p>☰ Press the relevant + or – key.</p> <p>– Levels: 1 to 9</p>
Savesettings and close auxiliary menu	<ol style="list-style-type: none"> Save changes for the Laser programme with the key:  Close window by tapping on the "X": 

Tab.68 Set laser aiming beam

18.8.2 Resetting the laser pulse (laser pulse counter) and laser power (laser power counter)

Task	Method
Open auxiliary menu	<p>☰ LASER programme selected</p> <ol style="list-style-type: none"> Press key:  The auxiliary menu is displayed. Select Lasertab.
Reset Laser Pulse key	<p>The laser pulse counter runs during the operation.</p> <p>To reset the counter, if needed:</p> <p>☰ Press the relevant Reset key.</p> <p>Counter is set to zero.</p>
Reset Laser Power key	<p>The laser power counter runs during the operation.</p> <p>To reset the counter, if needed:</p> <p>☰ Press the relevant Reset key.</p> <p>Counter is set to zero.</p>

Tab.69 Resetting the laser pulse (laser pulse counter) and laser power (laser power counter)

- i**
- When the laser is in Ready status, the counters for the laser pulse and the laser power cannot be reset.
 - Under the following conditions, the counters for the laser pulse and laser power are automatically reset:
 - after switching the system on/off
 - after a reset
 - after removing the laser probe
 - after a change in physicians
 - after insertion of a new cassette

19 Ending the operation

19.1 Removing surgical instruments

EN

WARNING!
 Incorrect use of the instrument.
 Hazard to patient.

- ☞ Diathermy, capsulotomy and HFDS tips must be cleaned immediately upon removal from the eye and kept wet in BSS or distilled water until they are re-sterilised.

i With the exception of the light instrument, you cannot remove the instruments from the socket by pulling the cable.

- Fig. 10 Ports on front of device
- ☞ For phaco and diathermy instruments: hold the plug by the sleeve and pull out.
- ☞ For handpieces for vitrectomy/AIR/GFI: Hold the connections by the sleeve, turn a half turn and pull out.
- ☞ Laser probe: Hold the probe by the sleeve and completely unscrew it from the surgical platform.
- ☞ Light instruments: Pull out of the surgical platform.
- ☞ Silicone application set: Unlock tube connection and pull out of the surgical platform.

WARNING!
 Insufficient sterility and damage to the instruments.
 Hazard to patient.

- ☞ Do not reuse single-use instruments.

19.2 Removing cassette with I/A tube system

WARNING!
 Insufficient sterility and damage to the instruments.
 Hazard to patient.

- ☞ Cassette and tubes may not be reused.

WARNING!
 Improper use of the cassette.
 Hazard to patient.

- ☞ Observe information on the cassette pack and the relevant package inserts.

i The cassette can only be removed if the pedal is in the zero position.

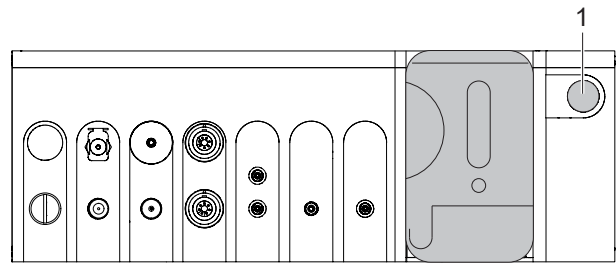


Fig. 114 Cassette eject button

1. Press cassette eject button (1).
 The cassette is released and can be removed.
2. Dispose of cassette and I/A tube system in accordance with regulations (➤ 4.4 Disposal).

19.3 Switch off the surgical platform

NOTE!
 Improper shutdown of the surgical platform.
 Damage to the surgical platform.

- ☞ Always switch off the surgical platform using the on/off button. Only then is it ensured that the system is properly shut down.

- ☞ Press the on/off button on the surgical platform.
 The surgical platform and control panel shut down.

19.4 Mounting the protective laser cap (surgical platform dependent)

NOTE!
 Penetration of contaminants into the laser opening.
 Damage to the endolaser.

- ☞ Do not remove the protective laser cap from the surgical platform. It must be placed back onto the port after each operation.
- ☞ If no laser probe is inserted in the inlet of the endolaser, attach the protective laser cap.

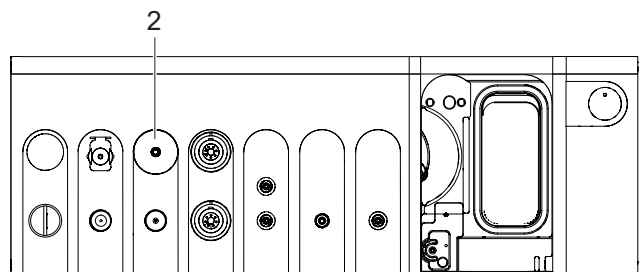


Fig. 115 Mount protective laser cap

- ☞ Mount the protective laser cap on the port for the laser probe (2).

19.5 Removing the pedal

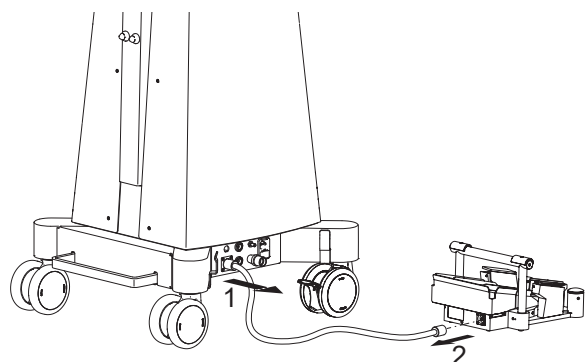


Fig. 116 Removing the pedal

1. Disconnect the pedal cable from the pedal socket (1) on the surgical platform.
2. Disconnect the pedal cable from the pedal socket (2) on the pedal.

If the pedal is being operated wirelessly, the connection is automatically broken when the surgical platform is shut down and the pedal shuts off.

19.6 Folding up the instrument tray and placing it in the parked position

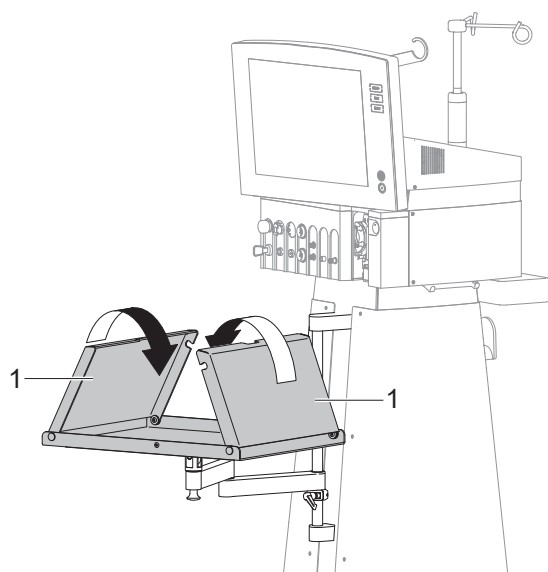


Fig. 117 Fold up side parts

1. Fold up side parts (1).

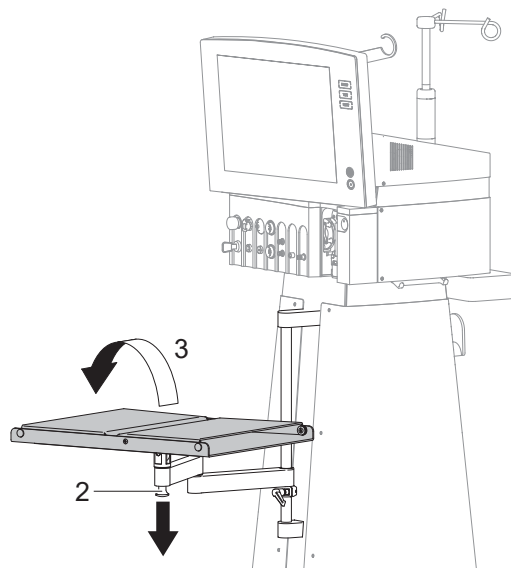


Fig. 118 Rotate instrument tray

2. Release the unlocking mechanism by pulling in the direction of the arrow (2) and hold.
3. Rotate instrument tray (3).
4. Let go of the unlocking mechanism.

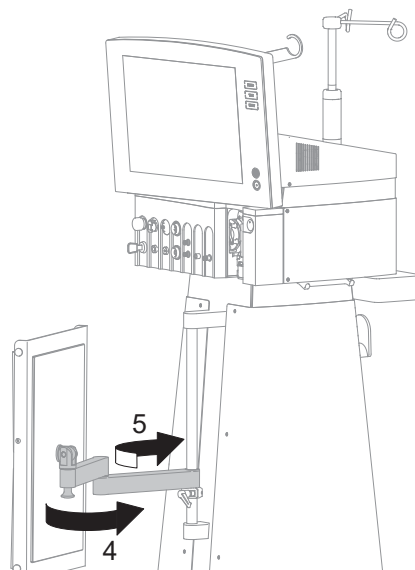


Fig. 119 Move instrument tray into the parked position
5. Move instrument tray into parked position (4 and 5).

20 Cleaning and sterilisation



WARNING!

Live components come into contact with moisture.
 Live components are exposed.

Risk of electric shock.

- ☞ Switch off the surgical platform and disconnect it from the power source before cleaning.

NOTE!

Improper cleaning or disinfection of the surgical platform.

Damage to the surgical platform.

- ☞ Keep the control panels and the housing of the surgical platform dry and never spray or rinse them.

20.1 Cleaning the control panel

NOTE!

Improper cleaning of the surgical platform.

Damage to the surgical platform.

- ☞ Do not roughly rub the surgical platform. Roughly rubbing the device with a dry cloth can damage the control panel.
- ☞ Wipe the surgical platform dry. Any remaining water drops or soil on the screen can lead to spots and limitation of the touch functionality.

- ☞ Clean the control panel only using a very soft, lint-free cloth moistened with petroleum ether, aldehydes or alcohol.

20.2 Cleaning the surgical platform housing and pedal

- ☞ After each day of operation, clean the surgical platform housing and pedal with a soft, lint-free cloth moistened with medical gasoline, aldehydes or a cleaning agent recommended by Oertli Instrumente AG (► 20.2.1 Recommended cleaning agents for Oertli surgical platforms).
- ☞ It is particularly important that BSS residues are removed.

20.2.1 Recommended cleaning agents for Oertli surgical platforms

The following cleaning agents have been tested by Oertli and are recommended for cleaning:

Cleaning agents	Manufacturer
Mikrozid AF	Schülke
Indicin Pro	Ecolab
Mikrozid Universal Wipe	Schülke

Tab. 70 Recommended cleaning agents

20.3 Cleaning and sterilising reusable instruments



WARNING!

Insufficient sterility and damage to the instruments.

Hazard to patient.

- ☞ Do not reuse single-use instruments.



WARNING!

Insufficient sterility and damage to the instruments.

Hazard to patient.

- ☞ Carefully follow the cleaning and sterilization requirements for reusable instruments (► 1.3 Other relevant documents, document no. TN999042).

21 Surgical platform messages and troubleshooting

21.1 Control, confirmation and warning tones

The surgical platform gives audible signals on the state of the I/A system and power output. Different noise signals demonstrate the different states.

21.1.1 Control tones

State	Tone
Irrigation open	Sound of a slow, low-pitched drip (pip-pip)
Aspiration active	Continuous: Continuous sound of a slow drip (pip-pip), rising in pitch as the vacuum level increases Pip-pip: Sound of a slow, high-pitched drip (pip-pip), rising in pitch as the vacuum level increases
Vacuum limit reached	Continuous: Additional short whistling sounds Pip-pip: Additional short whistling sounds
Phaco power output active	Additional very low-pitched, brief sounds
Diathermy active	Very high-pitched, quickly repeating signal rising in pitch as the output increases
Capsulotomy active	Regular: Low-pitched, rapid sequence of sounds High: High-pitched rapid sequence of sounds
HFDS active	Low-pitched, rapid sequence of sounds
Injection active	High-pitched, short sounds in very slow sequence, rising in pitch as the pressure increases
Extraction active	Very high-pitched, long sounds in very slow sequence, rising in pitch as the pressure increases
Override Vacuum/ Override Phaco Power active	Additional very low-pitched, short sounds in a slow sequence
REFLUX active	Very high-pitched, quickly repeating signal
Laser active	Medium-pitched sequence of sounds which are played in rhythm with the laser pulse emitted

Tab.71 Control tones

21.1.2 Confirmation tones

State	Tone
Switching a function	Very high-pitched, quickly repeating sound depending on the function: <ul style="list-style-type: none"> – PHACO: 1x – I/A: 2x – DIA, CAPS, HFDS: 3x – VITPN, INJE(+), EXTR, ENDO PHACO: 4x – LASER: 5x
Switching a programme	High-pitched, quickly repeating sound depending on the programme: <ul style="list-style-type: none"> – Programme 1: 1x – Programme 2: 2x – Programme 3: 3x
Switching a PHACO mode/type of modulation	Very low-pitched, quickly repeating sound depending on the PHACO mode: <ul style="list-style-type: none"> – CONTINUOUS: 1x – PULSE: 2x – BURST: 3x – CMP: 4x
Switching the pump system	High-pitched, quickly repeating sound depending on the pump system: <ul style="list-style-type: none"> – Peristaltic: 1x – Venturi: 2x – SPEEP: 3x Low-pitched, quickly repeating sound depending on the selection: <ul style="list-style-type: none"> – Aspiration/Cut: 2x – Cut/Aspiration: 1x
Storing values	Very high-pitched, short sound
Reset values	Two very high, brief tones
Volume adjustment	Low-pitched short sound whose volume changes with the volume adjustment

Tab.72 Confirmation tones

21.1.3 Warning tones

State	Tone
Alarm AIR/ GFI/ Alarm Laser	Very high-pitched, long sound with a very slow sequence
"PRESSURE DEVIATION" alarm	Very high-pitched or very low-pitched continuous sound (depending on the setting)
Infusion set incorrectly connected to cassette	Medium-pitched sequence of sounds

Tab.73 Warning tones

21.1.4 Voice confirmation

The voice confirmation is based on the selected programmes and modes, selected values as well as warnings and information. You can set the scope of the voice information in ParaProg for each physician (user manual for ParaProg ► 1.3 Other relevant documents).

21.2 Display and settings area messages

Selected, programmed and current values and important information on further states of the surgical platform are shown in the control panel. Warnings and information are given in the language selected in ParaProg (user manual for ParaProg ► 1.3 Other relevant documents).

i Faults not mentioned in this chapter or that cannot be traced back to the causes listed must be reported to Oerthli.

21.2.1 Routine messages



Fig. 120 Example of routine message

Message	Meaning
HF test successful	HF test was successfully performed.

Tab. 74 Routine messages

21.2.2 Warnings



Fig. 121 Example of warning

Message	Action
Surgeonname must be unique.	Change surgeon name.
Surgeon name is too long	Choose fewer letters.
No pedal	Please connect a pedal.
Check phaco handpiece.	Please check handpiece.
Phaco handpiece defective	Please insert another handpiece.
Repeat phaco test.	Please repeat phaco test.
Check phaco tip	Please tighten phaco tip.
HF tip defective	Please insert another HF tip.
Check air pressure	Please check air pressure.
Visco pressure deviation	Please check visco setup.
Temperature too high	Please wait a short time.
Faulty connection of giving set. Immediately remove cassette.	<ol style="list-style-type: none"> 1. Immediately remove cassette from the surgical platform. 2. Empty cassette. 3. Connect infusion set correctly to the cassette's infusion port. 4. Replace the cassette in the surgical platform.
No cassette	Please insert a cassette.
Cassette full	Please change cassette.
Laser key switch off	Please turn laser key switch on.
Laser emergency switch off	Please release emergency switch.
Laser: no fibre detection. Fully connect fibre.	<ol style="list-style-type: none"> Insert fibre. Fully connect fibre.
Laser door interlock not closed	Please close door interlock.

Message	Action
Fully automated UPF detected	To use the fully automated laser user protection filter: <ul style="list-style-type: none"> ☞ Contact the laser module update service. To use of a passive laser user protection filter: <ol style="list-style-type: none"> 1. Remove the fully automated laser user protection filter. 2. Disconnect OS4 from the power supply. 3. Restart OS4.
Fully automated UPF detected even though it is not configured.	Fully automated UPF is used. <ul style="list-style-type: none"> ☞ Contact the service unit to customise the configuration.
Fully automated UPF detected, but not installed correctly.	☞ Install the fully automated UPF in the microscope according to the manufacturer's instructions.
No fully automated UPF detected - Connect fully automated UPF	☞ Connect fully automated UPF.
No fully automated UPF detected	Laser is deactivated, all other functions remain active. To be able to use the laser again: <ol style="list-style-type: none"> 1. Connect fully automated UPF. 2. Disconnect OS4 from the power supply. 3. Restart OS4.
Laser module disabled due to error38	Laser is deactivated, all other functions remain active. To be able to use the laser again: <ol style="list-style-type: none"> 1. Disconnect OS4 from the power supply. 2. Restart OS4.
Laser: output power too low	☞ Set Laser Power value.
Pedal not Laser conform	☞ Please connect an OS4 pedal.
Reminder: Laser user protection	☞ Insert or connect laser user protection filter. <ul style="list-style-type: none"> ☞ Put on protective equipment.
Laser in saturation	☞ Decrease laser power.
Laser: Power output too low	☞ Please check fibre. <ul style="list-style-type: none"> ☞ Call service.
Laser: Laser beeper malfunction	☞ Call service.
Laser: Laser microphone malfunction	☞ Call service.
Laser overtemperature	☞ Please wait until system has cooled down.
Laser: no autokey detected	☞ Please enter autokey and confirm.

Message	Action
Laser: foot switch malfunction	☞ Call service.
Laser: no foot switch detected	☞ Please plug in foot switch and confirm.
Laser: GLM01-IF no communication	☞ Call service.

Tab.75 Warnings

21.2.3 Error messages



Fig. 122 Example of error message

Message	Possible cause	Action
ERROR 1	Supply error	☞ Call service.
ERROR 2	Adjust dia	☞ Call service.
ERROR 3	Adjust pedal	☞ Call service.
ERROR 5 (the RESET key flashes)	Display error	☞ Call service.
ERROR 7	CORE software	☞ Call service.
ERROR 8 (the RESET key flashes)	COM error	☞ Call service.
ERROR 10	Peristaltic pump failure	☞ Call service.
ERROR 11	HF output stage	☞ Perform HF test. ☞ Call service.
ERROR 12	Irrigation pole motor	☞ Call service.
ERROR 15	Force sensor	☞ Call service.
ERROR 16	Adjust venturi sensor	☞ Call service.
ERROR 17	Adjust force sensor	☞ Call service.
ERROR 18	Check venturi pump system	☞ Call service.
ERROR 20	Extraction deviation	☞ Call service.
ERROR 21	Adjust visco sensor	☞ Call service.
ERROR 22	Adjust air sensor	☞ Call service.

Message	Possible cause	Action
ERROR23	VITPN differential sensor	☎ Call service.
ERROR24	LUM1 module	☎ Call service.
ERROR25	LUM2 module	☎ Call service.
ERROR26	Venturi System	☎ Call service.
ERROR31	Liquid level sensor	☎ Call service.
ERROR32	IRR valve	☎ Call service.
ERROR33	AIR/GFI port	☎ Call service.
ERROR38	Laser module	☎ Call service.
ERROR39	Wireless module	☎ Call service.
ERROR41	COREprint	☎ Call service.
ERROR44	COMmodule	☎ Call service.
ERROR45	Watchdog	☎ Call service.
ERROR46	COM has no connection to CORE	☎ Call service.
ERROR47	Interface Index between COM and CORE is not identical	☎ Call service.
ERROR48	Database Error	☎ Call service.
ERROR49	No active UPF detected	☎ Call service.
ERROR50	Incompatibility of laser version and active UPF	☎ Call service.
ERROR201	PLD: Current regulation malfunction	☎ Call service.
ERROR202	PLD: Light control malfunction	☎ Call service.
ERROR203	PLD: Current regulation malfunction	☎ Call service.
ERROR204	PLD: Current regulation malfunction	☎ Call service.
ERROR205	PLD: Voltage regulation malfunction	☎ Call service.
ERROR206	Malfunction of a measuring diode or power laser diode	☎ Call service.
ERROR207	PLD: Malfunction	☎ Call service.
ERROR208	PLD: Supply error	☎ Call service.
ERROR209	PLD: Supply error	☎ Call service.
ERROR210	Laser: cooling system malfunction	☎ Call service.
ERROR211	Laser: cooling system malfunction	☎ Call service.

Message	Possible cause	Action
ERROR212	Laser: cooling system malfunction	☎ Call service.
ERROR213	Laser: cooling system malfunction	☎ Call service.
ERROR214	Laser: cooling system malfunction	☎ Call service.
ERROR215	Laser: cooling system malfunction	☎ Call service.
ERROR216	Laser: cooling system malfunction	☎ Call service.
ERROR217	Laser: cooling system malfunction	☎ Call service.
ERROR218	Laser: cooling system malfunction	☎ Call service.
ERROR219	Laser: cooling system malfunction	☎ Call service.
ERROR230	Laser: processor malfunction	☎ Call service.
ERROR232	Laser: processor malfunction	☎ Call service.
ERROR234	Laser: power supply malfunction	☎ Call service.
ERROR235	Laser: power supply malfunction	☎ Call service.
ERROR239	Laser: internal clock malfunction	☎ Call service.
ERROR240	Laser: memory malfunction	☎ Call service.
ERROR264	Laser: fibre detection malfunction	☎ Call service.
ERROR266	Laser: foot switch malfunction	☎ Call service.
ERROR268	Laser: Laser user protection filter malfunction	☎ Call service.
ERROR269	Laser: beam switch malfunction	☎ Call service.
ERROR273	Laser: I2C IO expander malfunction	☎ Call service.
ERROR274	Laser: processor malfunction	☎ Call service.

Tab. 76 Error messages

22 Maintenance, inspection, repair

⚠ WARNING!

The surgical platform and all accessories must be inspected regularly. In particular, instrument cables must be checked for insulation damage.

Damaged accessories must not be used and must be replaced immediately.

Service and repairs to the surgical platform may only be performed by service technicians authorised by Oertli and based on the last valid version of the service manual.

22.1 Maintenance table

This surgical platform only needs the following calibration and maintenance:

Task	Interval	Person responsible	Procedure
Calibration	Annual	By Oertli authorised service	<ul style="list-style-type: none"> ⌘ Adjust pressure sensors according to instructions in the service manual.
Maintenance	Annual	Operator	<ol style="list-style-type: none"> 1. Check electric cables (instruments and power supply) for wear or damage, and have damaged cables replaced by the authorised service unit. 2. Clean salt residues from pressure sensor port.
		By Oertli authorised service	<ul style="list-style-type: none"> ⌘ In the event of frequent use: Check mechanical parts (pump wheel, valve, tube switch). ⌘ Maintain laser (► 22.3 Information on maintenance of the endolaser).
Maintenance	Every 2 months	Operator	<ul style="list-style-type: none"> ⌘ Put the laser into service.

Tab.77 Maintenance table

22.2 Select mains voltage and insert fuses

⚠ WARNING!

Live components are exposed. Improper work on the surgical platform.

Risk of electric shock.

- ⌘ Unplug power cable from mains socket before replacing fuses.
- ⌘ Do not use makeshift fuses.
- ⌘ Do not use makeshift fuses.

i

The surgical platform is supplied with two spare fuses.

Always replace defective fuses with new fuses of the same type (► 23.4 Electrical data).

You will find the values printed at the power supply on the surgical platform (► 3.2 Labelling and marking).

The fuse holder (1) and the fuse drawer (2) are located on the left side of the column (below):

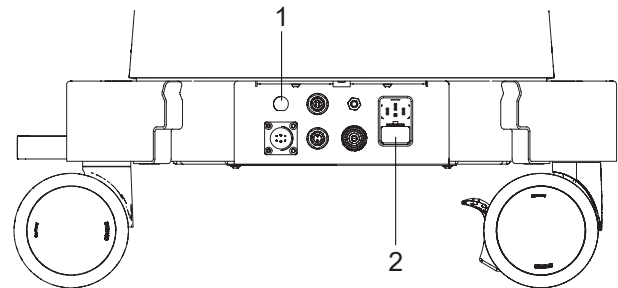


Fig. 123 Position of fuse holder (1) and fuse drawer (2)

Fuse holder

- ⌘ Pull fuse out of fuse holder (1) and replace with new fuse.

Fuse drawer

1. Hold down the tab of the fuse drawer.
2. Remove the fuse drawer.

The position of the voltage selector in the fuse drawer (to the left or to the right) determines the mains voltage (115 V or 230 V):

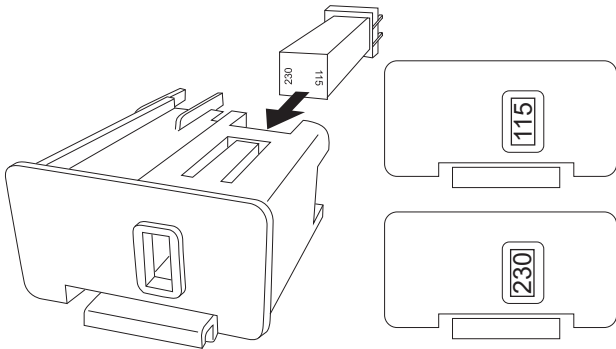


Fig. 124 Remove voltage selector/select mains voltage

3. If needed: Replace defective fuse.
4. Insert voltage selector such that the correct mains voltage is displayed in the viewing window:
 - 115 V: In the viewing window of the voltage selector, 115 V must be displayed.
 - 230 V: In the viewing window of the voltage selector, 230 V must be displayed.
5. Reinsert fuse drawer.

22.3 Information on maintenance of the endolaser

⚠ WARNING!

Improper repairs/work on the surgical platform.
 Danger to patient and user.

- ⚡ Have maintenance performed on the endolaser only by authorised service personnel.
- ⚡ Do not attempt to readjust or repair the surgical platform yourself under any circumstances.

The following points must be checked at a minimum during annual maintenance:

- Laser beam power level
- Functional testing of the endolaser and the transmission system
- Safety check

The safety check must only be performed by authorised and trained personnel according to the specifications for medical devices using calibrated measuring equipment. The check and the results must be done using forms approved by Oertli. The one-year interval may differ from country to country based on the respective guidelines.

It is the operator's responsibility to ensure that the endolaser is used and maintained in accordance with national guidelines.

The user has the option of checking the aiming and working beams as well as the function of the laser and the transmission system.

If the operator detects an error of a unit during an inspection, the unit must be immediately taken out of service and personnel qualified by Oertli must be contacted.

22.4 Repair

⚠ WARNING!

Improper repairs/work on the surgical platform.
 Danger to patient and user.

- ⚡ Repairs to the surgical platform may only be performed by service technicians authorised by Oertli and based on the last valid version of the service manual.

22.4.1 Authorised service points

Oertli Instrumente AG

Customer Service and Support

Hafnerwisenstr. 4

CH– 9442 Berneck, Switzerland

Tel.: +41 (0)71 747 42 00

E-mail: css@oertli-instruments.com

Website: www.oertli-instruments.com

Contact your local distribution partner or Oertli for information on authorised service points in your country.

22.4.2 Sending defective surgical platform, instrument or part to Oertli

1. Clean and sterilise instruments before returning them to the service point (► 20 Cleaning and sterilisation).
2. Send surgical platform, instrument or part in appropriate packaging to the service point.

22.4.3 Ordering spare parts

1. Have the following information to hand when ordering spare parts (► 3.2.1 Typeplate on the surgical platform and ► 3.2.2 Pedal type plate):
 - Oertli article number
 - Serial number
2. Contact the authorised service unit.

23 Technical data

23.1 Classifications

Property	Value
Protection class	1
CEclassification	II b
Application parts	non-earthed, Type BF (IEC60601-1)
Noise level	< 70 dB (A)

Tab.78 Classifications

23.2 Dimensions and weights

Property	Value
Surgical platform dimensions (without tray, pole retracted, W x H x D)	49 x 154 x 52 cm
Dimensions of the instrument tray (L x W)	80 x 35 cm
Weight with tray, "anterior/posterior with endolaser" variant	75 kg
Weight with tray, "anterior/posterior" variant	67 kg
Weight with tray, "anterior" variant	67 kg
Pedal weight	6 kg
Weight of tray	7 kg

Tab. 79 Dimensions and weights

23.3 Environmental conditions

i The surgical platform must be brought to the operating temperature indicated before use. Therefore do not switch it on immediately.

	Temperature [°C]	Relative humidity [%] (non-condensing)	Air pressure [hPa]
Operation	+14 to +28	30 to 75	700 to 1060
Storage and transport	-20 to +55	10 to 90	500 to 1060

Tab. 80 Environmental conditions

23.4 Electrical data

Property	Value
Mains voltages	115 / 230 VAC
Mains frequency	50 Hz/60 Hz
Power consumption	600 VA
Fuses	3x T6.3 AH, 250 V, high breaking capacity
Operating mode	Continuous

Tab.81 Surgical platform electrical data

23.5 Supply pressure

Property	Value
Supply pressure	Pressurised air: 5 to 9 bar, 55 NI/min
Port	NIST EN ISO5359 connection
Pressurised air according to EN ISO7396-1	Oil-free, dry, filtered Maximum content: – Oil: 0.1 mg/m ³ – Water vapour: 67 ml/m ³ – Solids: 1 mg/m ³

Tab. 82 Supply pressure

If there is no supply pressure or insufficient supply pressure, the VIT and INJECTION+ functions and the venturi pump cannot be operated.

If there is no pressure connection, the cassette cannot be inserted and ejected.

23.6 Powerdata in the individual functions

Function	Value
PHACO	26 kHz - 28.8 kHz, 28 kHz nominal 40 W ± 8 W (100% / 1100 Ohm) $V_{RMS} = 210 \text{ V} (40 \text{ W} / 1100 \text{ Ohm})$
Vacuum	5 mmHg- 650 mmHg Accuracy: ± 20 % or 30 mmHg (greater value) Adjustable increment: 5 mmHg
Peristaltic flow	0 ml/min- 60 ml/min Adjustable increment: – 0 - 10 ml/min: 0.1 ml/min – 10 - 60 ml/min: 1 ml/min Accuracy: ± 20%
Reflux peristaltic	15 ml/min, accuracy: ± 20% 150 mmHg, accuracy: ± 20%
Reflux venturi	100 mmHg Accuracy: ± 20%
VIT	Cuts per minute: – 60 - 10,000 cuts/min with CF cutter, Accuracy: ± 20% – 30 - 5,000 cuts/min with SPS vitrectomy cutter, Accuracy: ± 20% Max. output pressure: 3.5 bar
DIA	500 kHz ± 100 kHz 0 W - 8 W nominal (50 Ohm), DIA (100%): 95 V max. output voltage (idling voltage)
CAPS	500 kHz ± 100 kHz, specific output values Regular: 7.8 W ± 1.5 W (50 Ohm), 340 V max. output voltage (idling voltage) High: 9.2 W ± 1.8 W (50 Ohm), 365 V max. output voltage (idling voltage)
HFDS	500 kHz ± 100 kHz, specific baseline values HFDS: 7.3 W ± 1.4 W (50 Ohm), 320 V max. output voltage (idling voltage)
AIR/GFI	0 mmHg- 120 mmHg ± 10%, min. 5 mmHg Increment: 1 mmHg
Visco injection	0.05 bar - 5.0 bar Accuracy: 0.5 bar - 5.0 bar ± 0.2 bar
Visco extraction	0.01 bar - 1.0 bar Accuracy: – 0.2 bar - 0.8 bar: ± 0.1 bar – 0.8 bar - 1.0 bar: ± 20%

Function	Value
Light	– LED: 17 Lum (23G) – LEDplus: 19 Lum (23G)
Laser	Working beam: – Laser class 4, max. 1.5 W cw – 532 nm, max. pulse length: 5 sec – Safety distance (NOHD): 10 m Increments: – Laser power: 10 mW – Pulse duration: 10 ms – Pulse interval: 10 ms Aiming beam: – Laser class 3R, max. 5 mW cw – 635 nm

Tab.83 Powerdata for individual functions

24 Appendix

24.1 Accessories, spare parts, instruments, consumables



WARNING!

Improper use of the surgical platform.
Danger to patient and user.

- ☞ Only use instruments, tube systems and accessories supplied by Oertli.



Contact your local Oertli representative who will provide information about the most up-to-date range of accessories such as surgical platform accessories, spare parts, instruments, tips and consumables available in your country.

This section contains only selected accessories.

24.1.1 Surgical platform accessories

Article number	Description
VE860010	Dual linear, wireless pedal for OS4
VE860001	Instrument table for OS4
VX100911	Compressed air hose, 5m, NIST-AIR connection on one end, spare part for OS3
340833	UPF laser user protection filter, passive, for Zeiss/HS Moeller microscope
340846	UPF laser user protection filter, passive, for Leica microscope
340990	UPF laser user protection filter, passive, for Topcon microscope
F18. P1E01.1001MED	Laser safety goggles, filter impact OD6+, blocked wavelength 532 nm DIN/EN identification: – 315-532 nm DLB5 – 315-532 nm IRLB6Y
341091	UPF laser user protection filter, fully automated, for Zeiss/HS Moeller microscope
341090	UPF laser user protection filter, fully automated, for Leica microscope
VE860030	Cover for OS4

Tab.84 Surgical platform accessories

24.1.2 Spare parts

Article number	Description
VX520013	Replacement fuses 6.3AT, high breaking capacity, box of 10

Tab.85 Spare parts

24.1.3 Instruments (application parts)

Article number	Description
VG800011	Phaco handpiece, reusable
VE655000	I/A handpiece, coaxial, reusable
VE654100	I/A bimanual instrument set, diameter 0.8 mm, aspiration port 0.3 mm, irrigation port 0.5 mm, reusable
VE654101	I/A bimanual instrument set, roughened tips, diameter 0.8 mm, aspiration port 0.3 mm, irrigation port 0.5 mm, reusable
VE201710	Diathermy handpiece, long, reusable
VE201712	Diathermy handpiece, short, reusable
VV104110	Continuous Flow Cutter 20G, sterile/single use, box of 10
VV106010	SPS cutter 23G, sterile/single use, box of 10
VV106110	Continuous Flow Cutter 23G, sterile/single use, box of 10
VV105110	Continuous Flow Cutter 25G, sterile/single use, box of 10
VV107110	Continuous Flow Cutter 27G, sterile/single use, box of 10
VV300101	Endo illuminator 90°, 20G, with ViPer scleral indenter, comfort-connector, sterile/single use, box of 10
VV300103	Endo illuminator 90°, 23G, with ViPer scleral indenter, comfort-connector, sterile/single use, box of 10
VV300105	Endo illuminator 90°, 25G, with ViPer scleral indenter, comfort-connector, sterile/single use, box of 10
VV300194	Endo illuminator panorama, 23G, shielded, with ViPer scleral indenter, comfort-connector, sterile/single use, box of 10
VV300195	Endo illuminator panorama, 25G, shielded, with ViPer scleral indenter, comfort-connector, sterile/single use, box of 10
VV300197	Endo illuminator widefield, 27G, shielded, with ViPer scleral indenter, comfort-connector, sterile/single use, box of 10
VV300152	Chandelier illuminator bendable, 25G, with Calibur trocar, snaplock for 23/25G, sterile/single use, box of 10
VV300155	Chandelier illuminator flexible, 25G, with Calibur trocar, snaplock for 23/25G, sterile/single use, box of 10
VV300157	Chandelier illuminator flexible, 27G, with Calibur trocar, snaplock for 23/25/27G, sterile/single use, box of 10
VK400103	Laser probe OS4, straight, 23G, sterile/single use, box of 10
VK400105	Laser probe OS4, straight, 25G, sterile/single use, box of 10

Article number	Description
VK400107	Laser probe OS4, straight, 27G, sterile/single use, box of 10
VK400111	Laser probe OS4, curved, 20G, sterile/single use, box of 10
VK400113	Laser probe OS4, flexible curved, 23G, sterile/single use, box of 10
VK400115	Laser probe OS4, flexible curved, 25G, sterile/single use, box of 10
VK400117	Laser probe OS4, flexible curved, 27G, sterile/single use, box of 10
VK400123	Laser probe OS4, steerable, 23G, sterile/single use, box of 10
VK400125	Laser probe OS4, steerable, 25G, sterile/single use, box of 10
VK400203	Illuminated laser probe OS4, straight, 23G, sterile/single use, box of 10
VK400205	Illuminated laser probe OS4, straight, 25G, sterile/single use, box of 10
VK400207	Illuminated laser probe OS4, straight, 27G, sterile/single use, box of 10
VK400211	Illuminated laser probe OS4, curved, 20G, sterile/single use, box of 10
VK400213	Illuminated laser probe OS4, flexible curved, 23G, sterile/single use, box of 10
VK400215	Illuminated laser probe OS4, flexible curved, 25G, sterile/single use, box of 10
VK400303	Laser probe OS4, directional retractable, 23G, sterile/single use, box of 10
VK400305	Laser probe OS4, directional retractable, 25G, sterile/single use, box of 10
VK400313	Laser probe OS4, directional retractable inverted, 23G, sterile/single use, box of 10
VK400315	Laser probe OS4, directional retractable inverted, 25G, sterile/single use, box of 10
VK400323	Laser probe OS4, directional extendable, 23G, sterile/single use, box of 10
VK400325	Laser probe OS4, directional extendable, 25G, sterile/single use, box of 10
VK400333	Laser probe OS4, directional extendable inverted, 23G, sterile/single use, box of 10
VK400335	Laser probe OS4, directional extendable inverted, 25G, sterile/single use, box of 10

Tab.86 Instruments

24.1.4 Consumables

Article number	Description
VV636010	Drainage bags for cassettes and tube systems, non-sterile/disposable, box of 20
VV660010	Cassette for OS4, with infusion set and display cover, sterile/single use, box of 10
VV662006	Active infusion set for OS4, sterile/single use, box of 6
VV690101	Air delivery line with filter and 3-way stopcock, sterile/single use, box of 10
VV690310	Silicone injection/extraction set, 10 cc, with 20G visco cannula, sterile/single use, box of 10
VV690350	Silicone injection/extraction set, 10 cc, with universal visco cannula for Caliburn trocar system 23/25/27G, sterile/single use, box of 10
VV690353	Silicone injection/extraction set, 10 cc, with snap lock visco cannula for Caliburn trocar system 23G, sterile/single use, box of 10

Tab.87 Consumables

24.2 Characteristic lines in diathermy

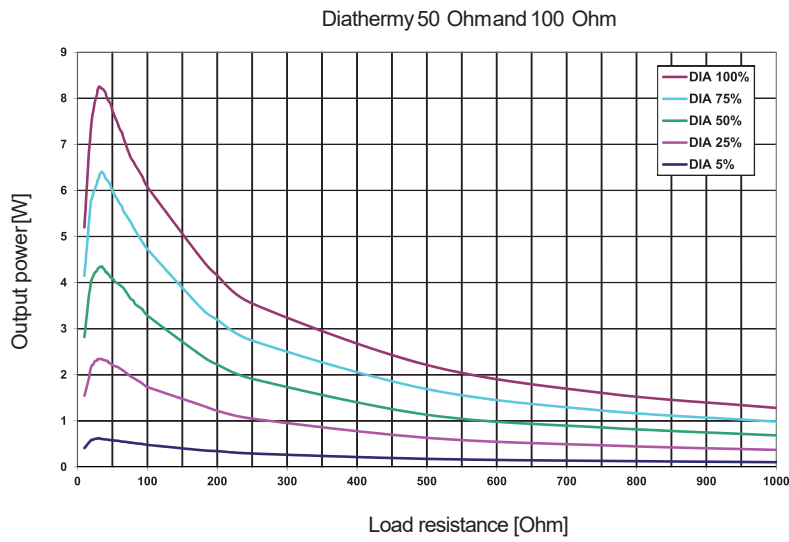


Fig. 125 Diathermy

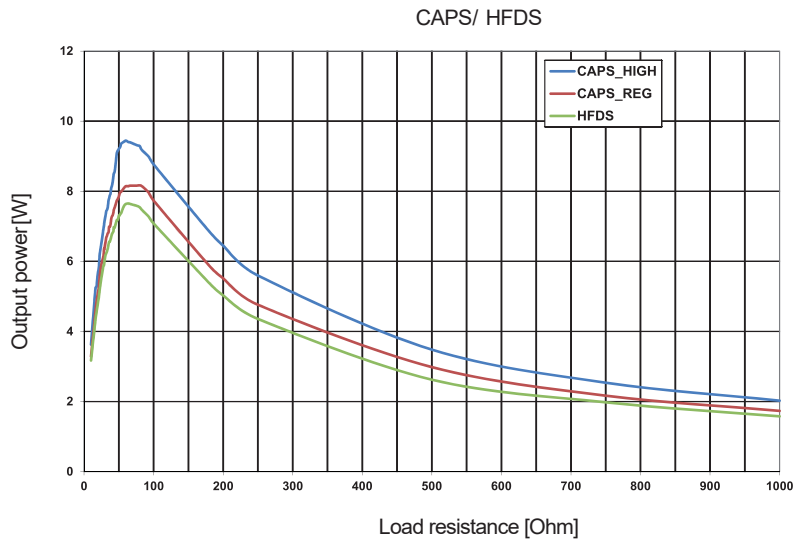


Fig. 126 CAPS/HFDS GLAU

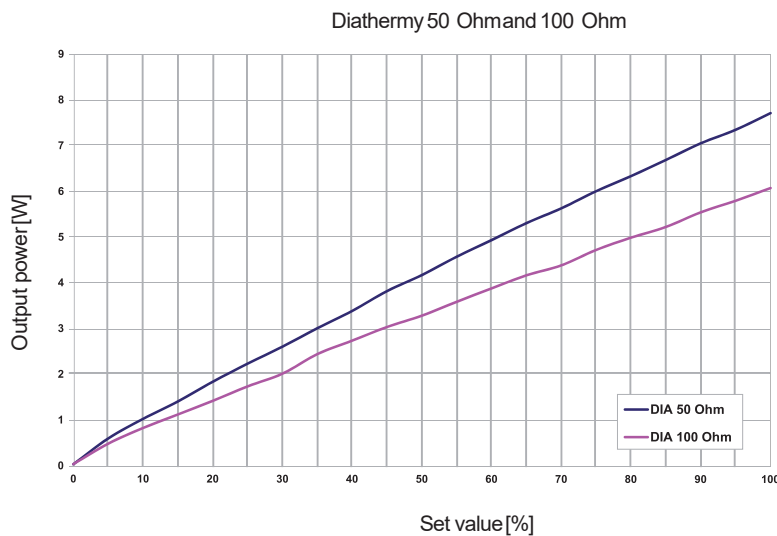


Fig. 127 DIA 50 Ohm/100 Ohm

24.3 Radiomodule

The surgical platform has a certified radio module for communicating with the wireless pedal. Other devices may interfere with this module, even if these other devices comply with the emission requirements valid for them in accordance with CISPR.

Incorrect function selection on the surgical platform is thus prevented in that only correctly transmitted signals are also converted.

Property	Value
Frequency band	2.400-2483.5 GHzISMband
Frequency behaviour	Frequency hopping
Max. transmission power	+ 6 dBm

Tab.88 Radio module characteristics

The position of the radio module is labelled on the housing of the surgical platform with the following symbol:



24.4 Simplified EU declaration of conformity

Hereby, Oertli declares that the OS4 surgical platform with integrated RF-module is in compliance with Directive 2014/53/ EU. The full text of the EU declaration of conformity can be obtained at the following internet address: www.oertli-instruments.com

24.5 Electromagnetic compatibility (EMC)

OS4 was tested in accordance with the requirements from IEC60601-1-2:2007 (edition 3) and IEC60601-1-2:2014 (edition 4).

Medical electronic devices are subject to specific EMC safety precautions. OS4 must be set up and used in accordance with the EMC instructions given in this operating manual.

Portable and mobile RF communications devices can affect the operational safety of the surgical platform.

The use of accessories differing from those specified by Oertli can lead to increased interference and / or a reduction of the interference tolerance level.

24.5.1 Guidelines and manufacturer's declaration

OS4 is designated for operation in an electromagnetic environment as specified below.

The operator of OS4 must ensure that it is operated in such an environment.

Table 1

Guidelines and manufacturer's declaration – electromagnetic interference		
Interference measurements	Conformity	Electromagnetic environment – Guidelines
RF emissions in accordance with CISPR 11	Group 1	The OS4 surgical platform uses RF energy solely for its internal function. Thus, its RF emission is very low, and it is unlikely that neighbouring electronic devices will be affected.
RF emissions in accordance with CISPR 11	Class B	The OS4 surgical platform is suitable for use in all environments including living quarters and those that are directly connected to the public power supply which also supplies buildings used for living quarters.
Harmonic emissions in accordance with IEC61000-3-2	Class A	
Voltage fluctuation/flicker emissions in accordance with IEC61000-3-3	Complies	
Explanatory note:		

Tab.89 Electromagnetic interference

Table 2

Guidelines and manufacturer's declaration – electromagnetic interference resistance			
Interference resistance tests	IEC60601 – test level	Compatibility level	Electromagnetic environment – guidelines
Electrostatic discharge (ESD) in accordance with IEC61000-4-2	± 8 kV Contact discharge ± 15 kV Air discharge	± 8 kV Contact discharge ± 15 kV Air discharge	Floors should be composed of wood or concrete, or covered with ceramic tiles. If the floor is covered with synthetic material, the relative humidity must be at least 30 %.
Electrical fast transients / bursts in accordance with IEC61000-4-4	± 2 kV for mains cables ± 1 kV for input and output cables	± 2 kV for mains cables ± 1 kV for input and output cables	The quality of the supply voltage should be suitable for a typical business or hospital environment.
Surges in accordance with IEC61000-4-5	± 1 kV voltage outside conductor to outside conductor ± 2 kV voltage outside conductor to earth	± 1 kV voltage outside conductor to outside conductor ± 2 kV voltage outside conductor to earth	The quality of the supply voltage should be suitable for a typical business or hospital environment.
Voltage dips, short interruptions and fluctuations in the supply voltage in accordance with IEC61000-4-11	0 % U_t (for ½ period at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°) 0 % U_t (for 1 period) 70 % U_t (for 0.5 s) 0 % U_t (for 5 s)	0 % U_t (for ½ period at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°) 0 % U_t (for 1 period) 70 % U_t (for 0.5 s) 0 % U_t (for 5 s)	The quality of the supply voltage should be suitable for a typical business or hospital environment. If the user of the “OS4” surgical platform requires continuous functioning even in the event of power supply interruption, we recommend that the “OS4” surgical platform be powered from an uninterruptible power supply or a battery.
Magnetic field at the power frequency (50/60 Hz) in accordance with IEC61000-4-8	30 A/m	30 A/m	Magnetic fields at the supply frequency should reflect the typical values found in a business or hospital environment.

Explanatory note:

U_t is the mains alternating voltage before application of the test level.

Tab.90 Electromagnetic interference resistance

Guidelines and manufacturer's declaration – electromagnetic interference resistance

Interference resistance tests	IEC60601 – test level	Compatibility level	Electromagnetic environment – guidelines
Conducted RF interference volumes in accordance with IEC61000-4-6	3 V _{Effective} 150 kHz to 80 MHz 6 V _{Effective} in ISM frequency bands	3 V _{Effective} 150 kHz to 80 MHz 6 V _{Effective} in ISM frequency bands	Portable and mobile RF devices should not be used at a distance from the "OS4" surgical platform, including its cables, that is less than the recommended protective distance calculated by using a formula suitable for the transmitting frequency.
Radiated RF interference volumes in accordance with IEC61000-4-3	3 V/m 80 MHz to 2.7 GHz	10 V/m 80 MHz to 2.7 GHz	Recommended protective distance: $d = 1.2\sqrt{P}$ $d = 0.35\sqrt{P}$ for 80 MHz to 800 MHz $d = 0.7\sqrt{P}$ for 800 MHz to 2.7 GHz
Radiated RF interference volumes in the immediate vicinity of wireless communication devices in accordance with IEC61000-4-3	acc. to 8.10 IEC60601-1-2:2014	acc. to 8.10 IEC60601-1-2:2014	where P is the power rating of the transmitter in Watts (W) according to the information supplied by the transmitter manufacturer and d is the recommended protective distance in metres (m). The field strength of stationary RF transmitters should, for all frequencies, be lower than the compatibility level ^b according to inspection at the site. ^a In the vicinity of devices carrying the following designation, interference is possible.



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

EXPLANATORY NOTE 2: These guidelines may not be applicable in all cases. The diffusion of electromagnetic waves is influenced by absorption and reflection from buildings, objects and persons.

a

The field strength of stationary transmitters, such as base stations of mobile phones and land mobile services, amateur radio stations, AM and FM radio and television transmitters cannot theoretically be predicted accurately.

In order to determine the electromagnetic environment surrounding stationary RF transmitters, an investigation of the electromagnetic features of the location is recommended.

If the determined field strength at the location where the "OS4" is to be used exceeds the aforementioned compatibility level, the "OS4" must be monitored to demonstrate that it is functioning according to its intended use. If unusual power features are observed, additional measures may be required, for example realignment or changing the location of the "OS4".

b

Field strength should not exceed 3 V/m above the 150 kHz to 80 MHz frequency range.

Tab.91 Electromagnetic interference resistance (continued)

Table 3

Recommended protective distances between portable and mobile RF telecommunications devices and the OS4 surgical platform

The “OS4” surgical platform is intended for operation in electromagnetic environments in which the RF interference volumes can be controlled. The client or the user the surgical platform “OS4” surgical platform can help avoid electromagnetic interference by complying with the minimum distance between portable and mobile RF telecommunications devices (transmitters) and the “OS4” surgical platform, dependent on the emission power of the communication device as indicated below.

	Protective distance depending on the transmission frequency		
	m		
Nominal capacity of the transmitter	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.7 GHz
<i>W</i>	$d = 1.2\sqrt{P}$	$d = 0.35\sqrt{P}$	$d = 0,7\sqrt{P}$
0.01	0.12	0.035	0.07
0.1	0.38	0.11	0.22
1	1.2	0.35	0.7
10	3.8	1.1	2.2
100	12	3.5	7

For transmitters whose maximum nominal capacity is not indicated in the chart above, the recommended protective distance *d* in metres (m) can be determined using the formula or the relevant column, where *P* is the maximum nominal capacity of the transmitter in Watts (W) according to the information supplied by the manufacturer of the transmitter.

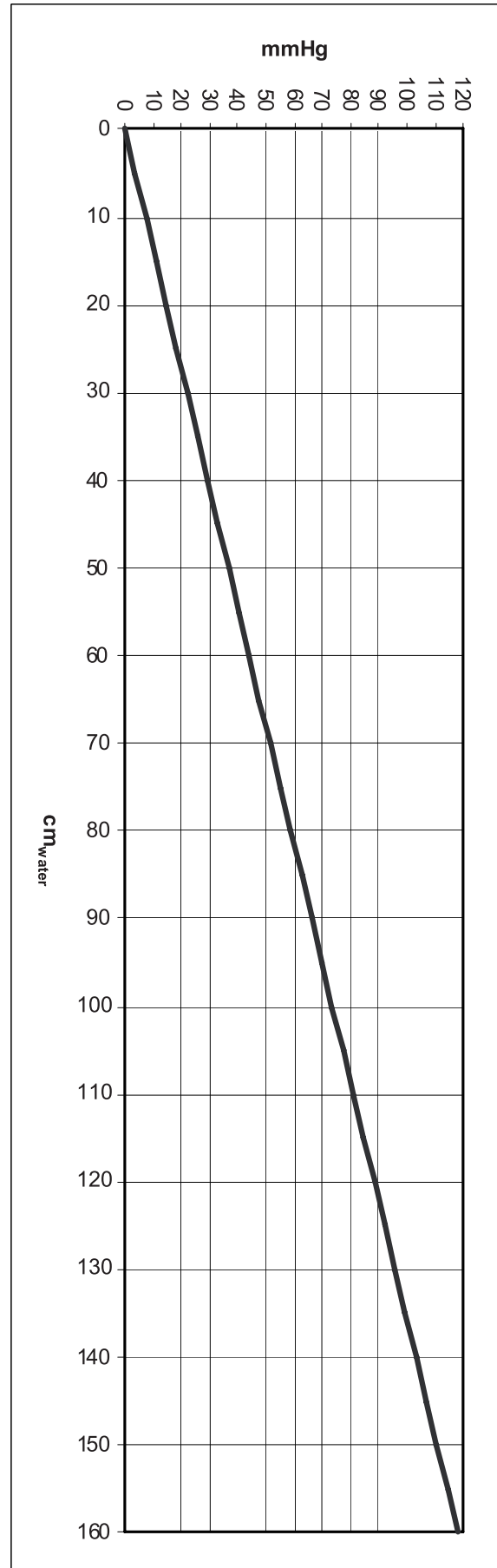
EXPLANATORY NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

EXPLANATORY NOTE 2: These guidelines may not be applicable in all cases. The diffusion of electromagnetic volumes is influenced by absorption and reflection from buildings, objects and persons.

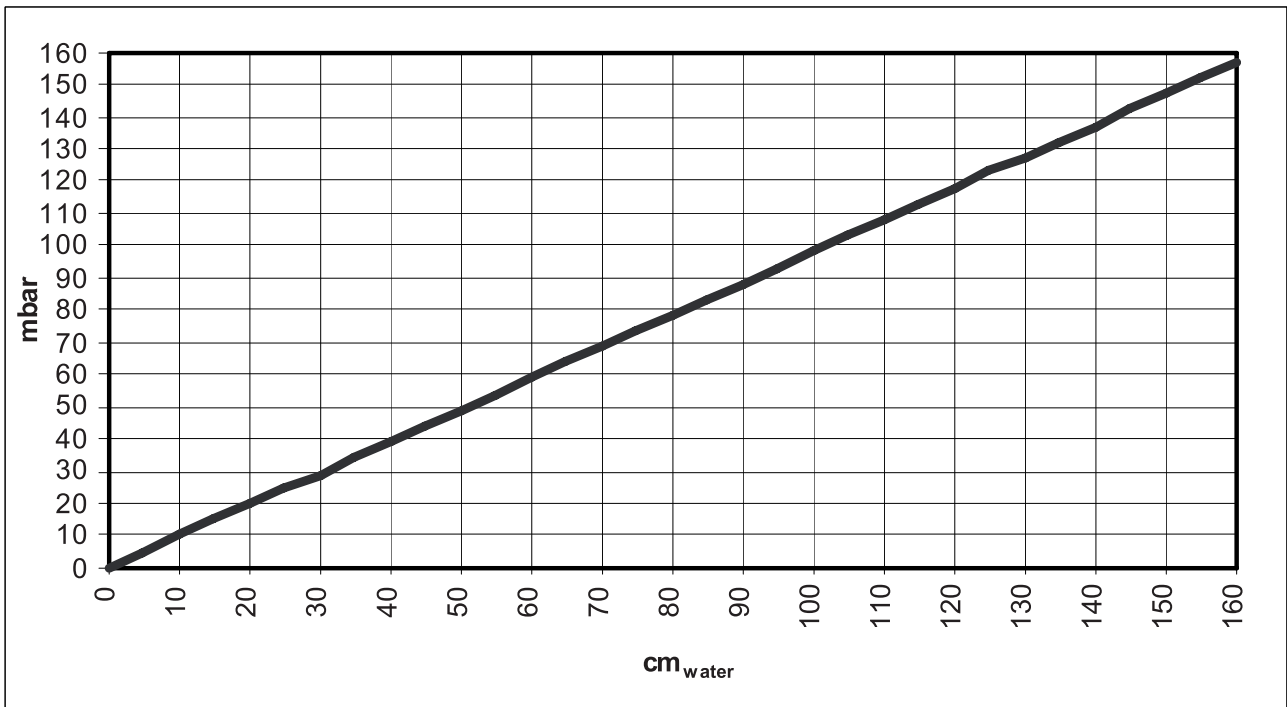
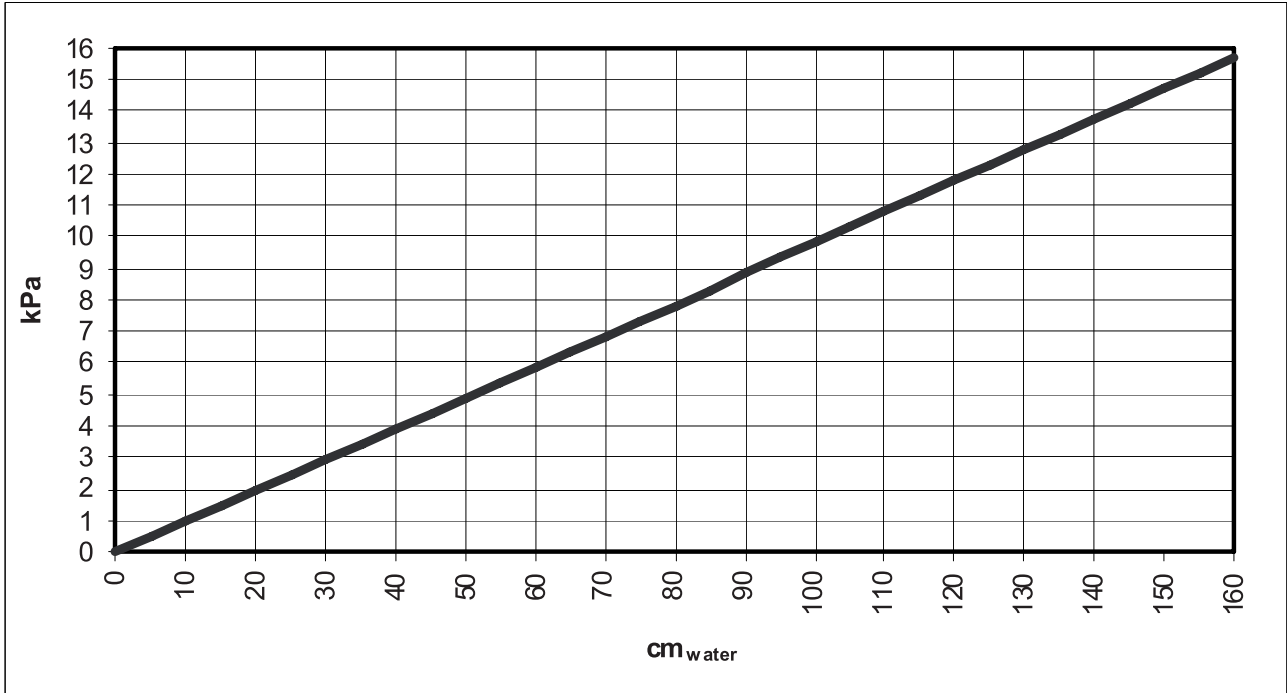
Tab.92 Recommended protective distances

24.6 Pressure conversion table

cm _{water}	Pa	kPa	mbar	mmHg
0	0	0.00	0	0.0
5	490	0.49	5	3.7
10	981	0.98	10	7.4
15	1471	1.47	15	11.1
20	1961	1.96	20	14.7
25	2452	2.45	25	18.4
30	2942	2.94	29	22.1
35	3432	3.43	34	25.8
40	3923	3.92	39	29.5
45	4413	4.41	44	33.2
50	4903	4.90	49	36.9
55	5394	5.39	54	40.6
60	5884	5.88	59	44.2
65	6374	6.37	64	47.9
70	6865	6.86	69	51.6
75	7355	7.35	74	55.3
80	7845	7.85	78	59.0
85	8336	8.34	83	62.7
90	8826	8.83	88	66.4
95	9316	9.32	93	70.0
100	9807	9.81	98	73.7
105	10297	10.30	103	77.4
110	10787	10.79	108	81.1
115	11278	11.28	113	84.8
120	11768	11.77	118	88.5
125	12258	12.26	123	92.2
130	12749	12.75	127	95.9
135	13239	13.24	132	99.5
140	13729	13.73	137	103.2
145	14220	14.22	142	106.9
150	14710	14.71	147	110.6
155	15200	15.20	152	114.3
160	15691	15.69	157	118.0



EN



24.7 Third-party materials and licenses

The OS4 incorporates materials from several Open Source software projects. Therefore the use of these materials is governed by different Open Source licenses.

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- BIGDIGITS multiple-precision arithmetic library
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